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Sthraitu

Part 4/5 Contactors \& Circuit Breakers



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- All dimensioned drawings are displayed within the confines of available space on the page and are only intended as a guide.
- All circuit diagrams are schematic wiring diagrams which are intended to allow better understanding of the function, and will need to be edited/added to during the course of project planning.
- All images represent samples of the product and are intended for information purposes only.

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Relays


## Relays

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## - Relay Package Schrack, Series SNR



- Schrack-Info
- Relay package consisting of a relay and a DIN rail socket
- 1 CO 6 A rated current
- Safe disconnection compliant with VDE 0160 in combination with socket YRT78626
- Module width only 6.2 mm
- Narrow component width allows high component density and tight-packed functionality on the DIN rail
- Complies with the 2011/65/EU RoHS Directive
- Protection diode

Dimensions (mm)


## Circuit Diagram



Dimensions \& Circuit Diagram

| A | Screw terminals |
| :--- | :--- |
| B | Spring clamp terminals |
| C | Dimensions SNR relay |
| D | Bottom view on solder pins |
| E | 1 CO |

Relay Package Schrack, Series SNR
Rated Breaking Capacity


Technical Data

| CONTACT DATA | 6 A |
| :---: | :---: |
| Number of contact and type | 1 CO |
| Contact style | Single contact |
| Type of disconnection | Micro-switch |
| Rated current | 6 A |
| Rated voltage/ max. switching voltage AC | 240 / $400 \mathrm{~V} \sim$ |
| Max. rated breaking capacity AC | 1500 VA |
| Limiting making capacity, max 4 s , duty factor $10 \%$ | 10 A |
| Contact material | $\mathrm{AgSnO}_{2}, \mathrm{AgSnO}_{2}$ hard gold plated |
| INPUT DATA |  |
| Rated voltage | 12, 24 V DC, $115,230 \mathrm{~V}$ AC / V DC (type 115, $230 \mathrm{~V} \mathrm{AC} \mathrm{/} \mathrm{~V} \mathrm{DC} \mathrm{mit} 60 \mathrm{~V}$ DC relay) |
| Rated power DC coil | 12 V DC $184 \mathrm{~mW}, 24 \mathrm{~V}$ DC $220 \mathrm{~mW}, 115 \mathrm{~V}$ AC $402 \mathrm{mVA}, 230 \mathrm{~V}$ AC 736 mVA |
| Operation range according to IEC 61810 | 2 |
| GENERAL DATA |  |
| Ambient temperature | $-40 . . .55^{\circ} \mathrm{C}$ |
| Degree of protection DIN 40050 | IP20 |
| Terminals | Screw terminals/ spring clamp terminals |
| Terminal screw torque according to IEC 61984 | 0.5 Nm |
| Max. | 0.6 Nm |
| $\begin{array}{ll}\text { Wire cross section } & \text { Solid wire } \\ & \text { Stranded wire } \\ & \text { With ferrule (DIN 46228/1) }\end{array}$ | $0.14 \ldots 2.5 \mathrm{~mm}^{2}$ $0.14 \ldots 2.5 \mathrm{~mm}^{2}$ $0.14 \ldots 2.5 \mathrm{~mm}^{2}$ |


| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| Relay Package - Screw Terminal |  |  |
| 12V-DC, 1 CO, 6A with socket | [000-6 | ST3P3LB2 |
| 24V-DC, 1 CO, 6A with socket |  | ST3P3LC4 |
| 24V-DC, 1 CO, 6A with socket |  | ST3P2LC4 |
| 230V-AC/DC, 1 CO, 6A with socket | - -80 | ST3P3TP0 |
| Relay Package - Spring Clamp Terminal |  |  |
| 24V-DC, 1 CO, 6A with socket |  | ST4P3LC4 |
| 230V-AC/DC, 1 CO, 6A with socket | 0000 | ST4P3TP0 |

## Accessories

| DIN rail mounted plug-in socket for SNR relays, 24V-DC, 6A, incl. protection diode, with screw terminals | [-000-9, | ST3FLC4 |
| :---: | :---: | :---: |
| SNR jumper bar, red, 500 mm | - -8000 | ST37001 |
| SNR jumper bar, blue, 500 mm |  | ST37002 |
| SNR jumper bar, grey, 500 mm |  | ST37003 |
| Marking plate, 1 plate $=100 \mathrm{pcs}$. | -000-9, | ST37040 |

Plug-in Relays

- Power Relays Schrack, Series RT



## Schrack-Info

RTI

- 1 pole $12 / 16$ A, AC or DC coil
- 1 CO or 1 NO
- Sensitive coil $400 \mathrm{~mW} / 0.75 \mathrm{VA}$
- $5 \mathrm{kV}, 10 \mathrm{~mm}$ coil/contact
- Appliance class II (VDE 0700)
- Safe disconnection compliant with VDE 0160 in combination with socket YRT78626
- Ambient temperature $85^{\circ} \mathrm{C}$ (DC coil)
- Low component height 15.7 mm
- Gold plated contacts available
- Print and screw type sockets
- For boiler controls, timer relays, garage door controls, vending machines, interface modules


## RT1 Inrush and High Inrush

- 1 pole 16 A, for high peak inrush current
- 1 NO
- RTS3T024 (= High Inrush) with Tungsten early-make contact
- Sensitive coil 400 mW
- $5 \mathrm{kV}, 10 \mathrm{~mm}$ coil/contact
- Appliance class II (VDE 0700)
- Ambient temperature $85^{\circ} \mathrm{C}$
- Low component height 15.7 mm
- Print and screw type sockets
- For household appliances, heating controls, light controls, building automation


## RT2

- 2 poles 8 A, AC or DC coil
- 2 CO
- Sensitive coil 400 mW
- $5 \mathrm{kV}, 10 \mathrm{~mm}$ coil/contact
- Appliance class II (VDE 0700)
- Safe disconnection compliant with VDE 0160 in combination with socket YRT78626
- Low component height 15.7 mm
- Print and screw type sockets
- For household appliances, heating controls, emergency lighting, modems

Plug-in Relays

Power Relays Schrack, Series RT

- RT Overview

| Relays | Number of contacts and type | Rated current [A] | Coil |  | Pinning [mm] | Contact material | RT1 | RTI Inrush | RT1 <br> High Inrush | RT2 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| RT114012 | 1 CO | 12 | DC | 12 V | 3.5 | AgNi90/10 | X |  |  |  |
| RT114024 | 1 CO | 12 | DC | 24 V | 3.5 | AgNi90/10 | X |  |  |  |
| RT114524 | 1 CO | 12 | AC | 24 V | 3.5 | AgNi90/10 | X |  |  |  |
| RT214012 | 1 CO | 12 | DC | 12 V | 5 | AgNi90/10 | X |  |  |  |
| RT214024 | 1 CO | 12 | DC | 24 V | 5 | AgNi90/10 | X |  |  |  |
| RT214730 | 1 CO | 12 | AC | 230 V | 5 | AgNi90/10 | X |  |  |  |
| RT314005 | 1 CO | 16 | DC | 5 V | 5 | AgNi90/10 | X |  |  |  |
| RT314012 | 1 CO | 16 | DC | 12 V | 5 | AgNi90/10 | X |  |  |  |
| RT314024 | 1 CO | 16 | DC | 24 V | 5 | AgNi90/10 | X |  |  |  |
| RT334024 | 1 NO | 16 | DC | 24 V | 5 | AgNi90/10 | X |  |  |  |
| RT314110 | 1 CO | 16 | DC | 110 V | 5 | AgNi90/10 | X |  |  |  |
| RT314524 | 1 CO | 16 | AC | 24 V | 5 | AgNi90/10 | X |  |  |  |
| RT314730 | 1 CO | 16 | AC | 230 V | 5 | AgNi90/10 | X |  |  |  |
| RT315730 | 1 CO | 16 | AC | 230 V | 5 | AgNi90/10 hgp* | X |  |  |  |
| RT33K012 | 1 NO | 16 | DC | 12 V | 5 | AgNi90/10 |  | X |  |  |
| RT33K024 | 1 NO | 16 | DC | 24 V | 5 | AgNi90/10 |  | X |  |  |
| RT31 L024 | 1 CO | 16 | DC | 24 V | 5 | $\mathrm{AgSnO}_{2}$ |  | X |  |  |
| RTS3T024 | 1 NO | 16 | DC | 24 V | 5 | $\mathrm{T}^{* *}+\mathrm{AgSnO}_{2}$ |  |  | X |  |
| RT424006 | 2 CO | 8 | DC | 6 V | 5 | AgNi90/10 |  |  |  | X |
| RT424012 | 2 CO | 8 | DC | 12 V | 5 | AgNi90/10 |  |  |  | X |
| RT424024 | 2 CO | 8 | DC | 24 V | 5 | AgNi90/10 |  |  |  | X |
| RT425024 | 2 CO | 8 | DC | 24 V | 5 | AgNi90/10 hgp* |  |  |  | X |
| RTE24024 | 2 CO | 8 | DC | 24 V | 5 | AgNi90/10 |  |  |  | X |
| RT424048 | 2 CO | 8 | DC | 48 V | 5 | AgNi90/10 |  |  |  | X |
| RT424060 | 2 CO | 8 | DC | 60 V | 5 | AgNi90/10 |  |  |  | X |
| RT424110 | 2 CO | 8 | DC | 110 V | 5 | AgNi90/10 |  |  |  | X |
| RT424524 | 2 CO | 8 | AC | 24 V | 5 | AgNi90/10 |  |  |  | X |
| RT424548 | 2 CO | 8 | AC | 48 V | 5 | AgNi90/10 |  |  |  | X |
| RT424615 | 2 CO | 8 | AC | 115 V | 5 | AgNi90/10 |  |  |  | X |
| RT425615 | 2 CO | 8 | AC | 115 V | 5 | AgNi90/10 hgp* |  |  |  | X |
| RT424730 | 2 CO | 8 | AC | 230 V | 5 | AgNi90/10 |  |  |  | X |
| RT425730 | 2 CO | 8 | AC | 230 V | 5 | AgNi90/10 hgp* |  |  |  | X |

*hgp = hard gold-plated
**Tungsten pre-contact
Dimensions (mm)


Plug-in Relays

- Power Relays Schrack, Series RT

Circuit Diagrams



\#5. 3


Circuit Diagrams, Contacts \& Pinning

| A | RT1 |
| :---: | :---: |
| B | RT1 Inrush and High Inrush |
| C | RT2 |
| \#1.1 | 12 A, pinning 3.5 mm |
| \#1.2 | 1 CO |
| \#1.3 | 1 NO |
| \#2.1 | 12 A, pinning 5 mm |
| \#2.2 | 1 CO |
| \#2.3 | 1 NO |


| $\# 3.1$ | 16 A, pinning 5 mm |
| :---: | :---: |
| $\# 3.2$ | 1 CO |
| $\# 3.3$ | 1 NO |
| $\# 4.1$ | 16 A, pinning 5 mm |
| $\# 4.2$ | 1 NO |
| $\# 4.3$ | 1 CO |
| $\# 5.1$ | 8 A, pinning 5 mm |
| $\# 5.2$ | 2 CO |
| $\# 5.3$ | 2 NO |

General Info
View of the terminals, dimensions in mm . Equipping with indicated hole diameter also possible in 2.5 mm or 2.54 mm contact spacing.

## Power Relays Schrack, Series RT

Rated Breaking Capacity \& Coil Operating Voltage Range RTI


Rated Breaking Capacity \& Coil Operating Voltage Range RT 1 Inrush And High Inrush


Rated Breaking Capacity \& Coil Operating Voltage Range RT2


Rated Breaking Capacity \& Coil Operating Voltage Ranges

| RTI |  |
| :---: | :---: |
| $\mathbf{A}$ | Max. DC rated breaking capacity |
| $\mathbf{B}$ | Coil operating range DC |
| $\mathbf{C}$ | Coil operating range AC |
| $\mathbf{\# 1}$ | Resistive load |
| $\boldsymbol{\# 2}$ | 16 A version |
| $\boldsymbol{\# 3}$ | Recommended voltage range in $[\mathrm{V}]$ |
| $\mathbf{U}$ | DC voltage in $[\mathrm{V}]$ |
| $\mathbf{U} / \mathbf{U}^{\text {rtd }}$ | Coil voltage in $[\mathrm{V}]$ |
| $\mathbf{I}$ | DC current in $[\mathrm{A}]$ |
| $\boldsymbol{U}$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |


| RT1 Inrush and High Inrush |  |
| :---: | :---: |
| A | Max. DC rated breaking capacity |
| B | Coil operating range DC (RT3) |
| $\mathbf{C}$ | Coil operating range DC (RTS) |
| \#1 | Resistive load |
| \#2 | Recommended voltage range in [V] |
| \#3 | Monostable version |
| $\mathbf{U}$ | DC voltage in [V] |
| $\mathbf{U / U} / \mathbf{U}^{\text {rd }}$ | Coil voltage in [V] |
| $\mathbf{I}$ | DC current in [A] |
| $\boldsymbol{U}$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |

RT2

| RT2 |  |
| :---: | :---: |
| A | Max. DC rated breaking capacity |
| B | Coil operating range DC |
| C | Coil operating range AC |
| \#1 | 1 contact |
| \#2 | 2 pole resistive load |
| \#3 | 2 contacts in series |
| \#4 | Recommended voltage range in [V] |
| \#5 | Rated coil voltage in [V] |
| U | DC voltage in [V] |
| $\mathbf{U} / \mathbf{U}^{\text {rid }}$ | Coil voltage in [V] |
| 1 | DC current in [A] |
| $ง$ | Ambient temperature in [ ${ }^{\circ} \mathrm{C}$ ] |

Plug-in Relays

## Power Relays Schrack, Series RT

- Technical Data

RTI


RT1 Inrush and High Inrush

| CONTACT DATA |  | RT3 | RTS |
| :---: | :---: | :---: | :---: |
| Number of contacts and type |  | 1 CO or 1 NO | 1 NO |
| Contact style |  | Single contact |  |
| Rated current |  | 16 A |  |
| Rated voltage / max. switching voltage AC |  | $250 / 400 \mathrm{~V}$ |  |
| Limiting continuous current |  | 16 A |  |
| Max. rated breaking capacity AC |  | 4000 VA |  |
| Limiting making current |  | 30 A (max. 4 s at $10 \%$ DF) | 165 A (max. 20 ms incandescent lamps) 800 A (max. $200 \mu \mathrm{~s}$ fluorescent lamps) |
| Contact material |  | $\mathrm{AgNi} 90 / 10, \mathrm{AgSnO}_{2}$ | W (lead contact) $+\mathrm{AgSnO}_{2}$ |
| COIL DATA |  |  |  |
| Rated voltage |  | $5 . .110 \mathrm{~V}$ DC |  |
| Rated power |  | 400 mW |  |
| Operative range, IEC 61810 |  | 2 |  |
| Coil insulation system according to UL1446 |  | Class F |  |
| Operation-/ release voltage/ coil resistance | 24 V DC coil | $16.8 \mathrm{~V} / 2.4 \mathrm{~V} / 1440 \Omega \pm 10 \%$ |  |
| at ambient temperature $23{ }^{\circ} \mathrm{C}$ | 230 V AC coil | - | $172.5 \mathrm{~V} / 34.5 \mathrm{~V} / 32500 \Omega \pm 10 \%$ |

RT2

| CONTACT DATA | $\mathbf{8 ~ A ~}$ |
| :--- | :---: |
| Number of contacts and type | 2 CO |
| Contact style | Single contact |
| Rated current | 8 A |
| Rated voltage/max. switching voltage AC | $250 \mathrm{~V} / 400 \mathrm{~V} \sim$ |
| Limiting continuous current | $8 \mathrm{~A}, \mathrm{UL}: 10 \mathrm{~A}$ |
| Max. rated breaking capacity AC | 200 VA |
| Limiting making current (max. 4 s at 10 \% DF) | 15 A |
| Contact material |  |
| COIL DATA | DC coil |
| Rated voltage | AC coil |
|  | DC coil |
| Rated power | AC coil |

Power Relays Schrack, Series RT
DESCRIPTION
Power Relays RTI, 12A

| Power Relays RTI, 12A |
| :--- |
| 12V-DC, 1 CO, 12A |
| 24V-DC, 1 CO, 12A |
| 24V-AC, 1 CO, 12A |
| 12V-DC, 1 CO, 12A |
| 24V-DC, 1 CO, 12A |
| 230V-AC, 1 CO, 12A |
| Power Relays RT1, 16A |


| $5 \mathrm{~V}-\mathrm{DC}, 1 \mathrm{CO}, 16 \mathrm{~A}$ |  |
| :--- | :--- |
| $12 \mathrm{~V}-\mathrm{DC}, 1 \mathrm{CO}, 16 \mathrm{~A}$ |  |
| $24 \mathrm{~V}-\mathrm{DC}, 1 \mathrm{CO}, 16 \mathrm{~A}$ |  |
| $24 \mathrm{~V}-\mathrm{DC}, 1 \mathrm{NO}, 16 \mathrm{~A}$ |  |
| $24 \mathrm{~V}-\mathrm{AC}, 1 \mathrm{CO}, 16 \mathrm{~A}$ |  |
| $230 \mathrm{~V}-\mathrm{AC}, 1 \mathrm{CO}, 16 \mathrm{~A}$ |  |
| $230 \mathrm{~V}-\mathrm{AC}, 1 \mathrm{CO}, 16 \mathrm{~A}$, gold plated |  |


| - - - - - | RT314005 |
| :---: | :---: |
| $0 \times 0$ | RT314012 |
| [-000-8) | RT314024 |
| -600-9, | RT334024 |
| $+\infty=$ | RT314524 |
| -000-0, | RT314730 |
| - 000000 | RT315730 |

Power Relays RT1 Inrush and High Inrush

| 12V-DC, 1 NO, 16A |
| :--- |
| $24 \mathrm{~V}-\mathrm{DC}, 1 \mathrm{NO}, 16 \mathrm{~A}$ |
| $24 \mathrm{~V}-\mathrm{DC}, 1 \mathrm{CO}, 16 \mathrm{~A}$ |


| -000-6000 | RT33K012 |
| :---: | :---: |
| [-000-0, | RT33K024 |
|  | RT31 L024 |

Power Relays RTI High Inrush

| 24V-DC, 1 NO, 16A | - | RTS3T024 |
| :---: | :---: | :---: |
| Power Relays RT2 |  |  |
| 6V-DC, 2 CO, 8A | - $+0 \times 0$ | RT424006 |
| 12V-DC, 2 CO, 8A | -000-9, | RT424012 |
| 24V-DC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | -800-9, | RT424024 |
| 24V-DC, $2 \mathrm{CO}, 8 \mathrm{~A}$, gold plated | -000-9, | RT425024 |
| 24V-DC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | - $-\cdots \cdots$ | RTE24024 |
| 48V-DC, 2 CO, 8A | -000080 | RT424048 |
| 60V-DC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | - -2000 | RT424060 |
| 110V-DC, 2 CO, 8A | - $-\times 000$ | RT424110 |
| 24V-AC, 2 CO, 8A | $+\infty 0$ | RT424524 |
| 48V-AC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | -000-9, | RT424548 |
| 115V-AC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | $+00 \%-\infty$ | RT424615 |
| 115V-AC, $2 \mathrm{CO}, 8 \mathrm{~A}$, gold plated | [-000] | RT425615 |
| 230V-AC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | -500-0, | RT424730 |
| 230V-AC, 2 CO, 8A, gold plated | -000-0, | RT425730 |

Spring Clamp Terminal Plug-in Socket for Power Relays RT


## Plug-in Socket for Power Relays RT

DIN rail mounted plug-in socket for RT1x relays, pinning 3.5 mm , max. 12A, I/O - logical arrangement, with screw terminals


## terminals

DIN rail mounted plug-in socket for XT, RT $2 x$ x, RT3x, RT4x relays, pinning 5 mm , max. 12A, I/O - logical arrangement, with screw
DIN rail mounted plug-in socket for RT2x, RT3x, RT4x relays, pinning 5mm, max. 16A, conventional arrangement, with screw
terminals

Jumper bar for connection of up to 8 RT-sockets

| - 50000 | RT78725 |
| :---: | :---: |
|  | RT17017 |
| -80-0-8 | RT170R8 |
| -080-9, | YRT 16040 |

Modules Matching Plug-in Socket for Power Relays RT

| LED module, red, $6-24 V$ AC/DC, EM07 | YMLRA024 |  |
| :--- | :--- | :--- |
| LED module, red, $6-24 V$ DC, A1+, EM 18 | YMLRD024-A |  |
| LED module, red, $6-24 V$ DC, A1-, EM08 | YMLRD024 | 0000 |

Plug-in Relays

## Power Relays Schrack, Series RT

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| Modules Matching Plug-in Socket for Power Relays RT |  |  |
| LED module, red, 110-230V AC, EM06 | -80008080 | YMLRW230 |
| LED module, green, 6-24V AC/DC, EM 11 | - -80000 | YMLGA024 |
| LED module, green 6-24V DC with protection diode, A1+, EM 12 | [-0000] | YMLGD024 |
| LED module, green, 110-230V AC, EM 10 |  | YMLGW230 |
| Protection diode module 6-230V DC, A1+, EM09 | - $-0 \times 0$ | YMFDG230 |
| RC Network module 6-60V AC, EM02 | $+\infty=0$ | YMRCW024 |
| RC Network module 110-230V AC, EMO3 | $+\infty=0$ | YMRCW230 |
| Varistor module, 24V-AC, EM04 | $\begin{array}{lll} \hline-00 & 0 \\ \hline \end{array}$ | YMVAW024 |
| Varistor module 230V-AC, EM05 | $+0000$ | YMVAW230 |

## Pluggable Interface Relay Schrack, Series XT





## Schrack-Info

- 1 pole $16 \mathrm{~A}, 2$ poles 8 A , 1 or 2 CO
- AC or DC coil, sensitive coil 400 mW
- Reinforced insulation, appliance class II (VDE 0700)
- Safe disconnection complaint with VDE 0160 in combination with socket YRT78626
- $4 \mathrm{kV}, 8 \mathrm{~mm}$ coil/contact
- Lockable manual testing system (see drawing "How To Use")
- Optional model with mechanical and/or electrical indication
- Suitable for standard RT sockets
- Recyclable packaging
- Complies with the 2011/65/EU RoHS Directive
- For control panels, machine building


## Dimensions (mm)



Plug-in Relays

- Pluggable Interface Relay Schrack, Series XT

Circuit Diagrams


How To Use


## How To Use

Description of the locking function: If the test button is pulled out to forcibly, it may skip the test position and move directly to the locking position. To go to the locking position, please remove the plastic locking cam (see drawing).

Circuit Diagrams

| \#1 | $16 \mathrm{~A}, 1 \mathrm{CO}$ |
| :---: | :---: |
| \#2 | $8 \mathrm{~A}, 2 \mathrm{CO}$ |
| General info | View of the terminals, dimensions in mm |

Rated Breaking Capacity \& Coil Operating Voltage Range


Rated Breaking Capacity \& Coil Operating Voltage Range

| $\mathbf{A}$ | Max. DC rated breaking capacity |
| :---: | :--- |
| $\mathbf{B}$ | Coil operating range DC |
| $\mathbf{C}$ | Coil operating range AC |
| $\mathbf{U}$ | DC voltage in $[\mathrm{V}]$ |
| $\mathbf{U} / \mathbf{U}^{\text {rd }}$ | Coil voltage in $[\mathrm{V}]$ |
| $\mathbf{I}$ | DC current in $[\mathrm{A}]$ |
| $\boldsymbol{U}$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |


| \#1 | 1 pole $12 / 16$ A resistive load |
| :--- | :--- |
| \#2 | 2 pole 8 A resistive load |
| \#3 | 2 contacts in series |
| \#4 | 1 contact |
| \#5 | Versions without LED |
| \#6 | Recommended voltage range in $[\mathrm{V}]$ |

## - Pluggable Interface Relay Schrack, Series XT

- Technical Data


| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| Pluggable Interface Relay XT |  |  |
| 24V-DC, 1 CO, 16A, with LED and protection diode | [-000-608 | XT374LC4 |
| 24V-DC, $2 \mathrm{CO}, 8 \mathrm{~A}$, with LED and protection diode | - $-\times 0$ - | XT484LC4 |
| 24V-AC, 2 CO, 8A, with LED |  | XT484R24 |
| 230V-AC, 2 CO, 8A, with LED | $+500-\pi$ | XT484T30 |
| Spring Clamp Terminal Plug-in Socket for Relays, Series XT |  |  |
| DIN rail mounted plug-in socket for RT2x, RT3x, RT4x, XT, RP4x relays, pinning 5mm, max. 16A, with spring clamp terminals | - $50-6$ | RT7872P |
| Retaining clip for RT relays with ejection function |  | RT17017 |
| Retaining clip for XT and RP relays with ejection function |  | XT 17017 |
| Jumper link for connection of RT7872P | $+000-0$ | RT170P 1 |

Plug-in Socket for Relays, Series XT

| DIN rail mounted plug-in socket for RT1x relays, pinning 3.5mm, max. 12A, I/O - logical arrangement, with screw terminals |
| :--- |
| DIN rail mounted plug-in socket for XT, RT2x, RT3x, RT4x relays, pinning 5mm, max. 12A, I/O-logical arrangement, with screw |
| terminals |
| DIN rail mounted plug-in socket for RT2x, RT3x, RT4x relays, pinning 5mm, max. 16A, conventional arrangement, with screw |
| terminals |
| Retaining clip for RT relays with ejection function |
| Retaining clip for XT and RP relays with ejection function |
| Jumper bar for connection of up to 8 RT-sockets |
| Marking tag (for YRT sockets YRT78624 and YRT78626) |

## Accessories for Plug-in Sockets, Series XT

| LED module, red, 6-24V AC/DC, EM07 |  | YMLRA024 |
| :---: | :---: | :---: |
| LED module, red, 6-24V DC, A1+, EM 18 |  | YMLRD024-A |
| LED module, red, 6-24V DC, A1-, EM08 |  | YMLRD024 |
| LED module, red, 110-230V AC, EM06 | $\begin{aligned} & -80 \\ & \hline 00 \\ & \hline \end{aligned}$ | YMLRW230 |
| LED module, green, 6-24V AC/DC, EM 11 | -0000 | YMLGA024 |
| LED module, green 6-24V DC with protection diode, $\mathrm{Al}+$, EM 12 |  | YMLGD024 |
| LED module, green, 110-230V AC, EM 10 | $+\infty 0 \infty$ | YMLGW230 |
| Protection diode module 6-230V DC, Al+, EM09 | - $-\infty \times 1$ | YMFDG230 |
| RC Network module 6-60V AC, EM02 | -000-0, | YMRCW024 |
| RC Network module 110-230V AC, EM03 | $+50-6$ | YMRCW230 |
| Varistor module, 24V-AC, EM04 | - $-0 \times 0$ | YMVAW024 |
| Varistor module 230V-AC, EM05 | $+\infty=-n$ | YMVAW230 |

Plug-in Relays

- Plug-in Relays S-Relay, Series 4


Schrack-Info

## S-RELAY

- Miniature industry-grade relay for multi-purpose application
- AC and DC coil
- Suitable for DIN rail mounted plug-in sockets, for use in control panel building or on PCBs (PCB and soldering connectors)
- Mechanical indicator and lockable test button
- Integrated insulated contact chambers for increased flash-over resistance
- Cadmium-free contact material
- Certificate: VDE


## Socket YRS78704

- Socket for S-RELAY Series 4
- Suitable for mounting in electrical enclosures or for DIN rail mounting
- High-grade terminals preventing incorrect insertion
- Captive terminal screws


## LED and protection modules

- Compatible with socket YRS78704
- LED DC modules with integrated protection diode
- Retrofittable
- Plug-in Relays S-Relay, Series 4

Dimensions (mm)


Circuit Diagrams

## \#1


\#2
\#3

\#2.1
\#2. 2

\#2. 3
\#2.4

| Circuit Diagrams |  |  |
| :---: | :---: | :---: |
| \#1 | Circuit diagram | S-RELAY |
| \#2 | Terminals |  |
| \#2.1 | NO contacts |  |
| \#2.2 | NC contacts | Socket |
| \#2.3 | Coil |  |
| \#2.4 | Com |  |
| \#3 | Circuit diagram | Protection diode module |

Plug-in Relays

Plug-in Relays S-Relay, Series 4
Rated Breaking Capacity, Reduction Factor \& Coil Operating Voltage Range


Rated Breaking Capacity, Reduction Factor \& Coil Operating Voltage Range

| $\mathbf{A}$ | Electrical service life at AC resistive load, switching frequency: 1.200 cycles/hour |
| :---: | :--- |
| $\mathbf{B}$ | Electrical service life reduction factor at AC inductive load |
| $\mathbf{C}$ | Max. DC rated breaking capacity |
| $\mathbf{N}$ | Number of cycles/ electrical service life at AC1 |
| $\mathbf{S}$ | Rated breaking capacity in [kVA] |
| $\mathbf{F}$ | Reduction factor |
| $\boldsymbol{\operatorname { c o s } \boldsymbol { \varphi }}$ | Power factor |
| $\mathbf{D}$ | Resistive load DC1 |
| $\mathbf{E}$ | Inductive load L/R $=40 \mathrm{~ms}$ |
| $\mathbf{I}$ | DC current in [A] |
| $\mathbf{U}$ | DC current in [A] |
| Coil Types |  |

COIL DATA - DC voltage version

| Coil code | Rated voltage V DC | Coil resistance $\Omega$ at $20^{\circ} \mathrm{C}$ | Acceptable resistance | Coil operating range V DC |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | min. (at $20^{\circ} \mathrm{C}$ ) | max. (at $55^{\circ} \mathrm{C}$ ) |
| 006 | 6 | 40 | +10\% | 4,8 | 6,6 |
| 012 | 12 | 160 | +10\% | 9,6 | 13,2 |
| 024 / LC4 | 24 | 640 | +10\% | 19,2 | 26,4 |
| 048 | 48 | 2600 | +10\% | 38,4 | 52,8 |
| 060 | 60 | 4000 | +10\% | 48 | 66 |
| 110 | 110 | 13600 | +10\% | 88 | 121 |
| 220 / N20 | 220 | 54000 | +10\% | 165 / 176 | 242 |

COIL DATA - AC $50 / 60 \mathrm{~Hz}$ voltage version

| Coil code | Rated voltage V AC | Coil resistance $\Omega$ at $20^{\circ} \mathrm{C}$ | Acceptable resistance | Coil operating range V AC |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | min. (at $20^{\circ} \mathrm{C}$ ) | max. (at $55^{\circ} \mathrm{C}$ ) |
| 506 | 6 | 9,8 | +10\% | 4.8 | 6.6 |
| 512 | 12 | 39,5 | +10\% | 9.6 | 13.2 |
| 524 / R24 | 24 | 158 | +10\% | 19.2 | 26.4 |
| 548 | 48 | 640 | +10\% | 38.4 | 52.8 |
| 615 / S15 | 115 | 3610 | +10\% | 92 | 127 |
| 730 / T30 | 230 | 16100 | +10\% | 184 | 253 |

TECHNICAL DATA, Protection diode module

| Voltage | $6 \ldots 230 \mathrm{VDC}$ |
| :---: | :---: |
| Wiring | $\mathrm{A} 1+$ |
|  | $\mathrm{A} 2-$ |

$\square$ Plug-in Relays S-Relay, Series 4

- Technical Data

| CONTACT DATA |  |  |  |
| :---: | :---: | :---: | :---: |
| Number and type of contacts |  |  | 4 CO |
| Contact material |  |  | AgNi |
| Rated/ max. switching voltage AC |  |  | $250 / 250 \mathrm{~V} \sim$ |
| Min. switching load |  |  | $10 \mathrm{~V}(\mathrm{AgNi})$ |
| Rated load (capacity) |  | AC1 | $6 \mathrm{~A} / 250 \mathrm{~V} \sim$ |
|  |  | AC15 | 1.5 A / $120 \mathrm{~V} \mathrm{\sim} ; 0.75 \mathrm{~A} / 240 \mathrm{~V}$ (C300) |
|  |  | AC3 | 125 W (single-phase motor) |
|  |  | DC1 | $6 \mathrm{~A} / 24 \mathrm{~V}$ DC |
|  |  | DC13 | $0.22 \mathrm{~A} / 120 \mathrm{~V}$ DC; 0.1 A / 250 V DC (R300) |
| Min. switching current |  |  | 5 mA |
| Max. inrush current |  |  | 12 A |
| Rated current |  |  | 6 A |
| Max. rated breaking capacity |  | AC1 | 1500 VA |
| Min. rated breaking capacity |  |  | 0.3 W (AgNi) |
| Contact resistance |  |  | $\leq 100 \mathrm{~m} \Omega$ |
| Max. operating capacity | At rated load | AC1 | 1200 cycles/hour |
|  | No load |  | 18000 cycles/hour |
| COIL DATA |  |  |  |
| Rated voltage $50 / 60 \mathrm{~Hz}$ |  | AC $50 / 60 \mathrm{~Hz}$ | 6... $240 \mathrm{~V} \sim$ |
|  |  | DC | 5...220 V |
| Must release voltage |  | AC | $\geq 0.2 \mathrm{U}_{\mathrm{N}}$ |
|  |  | DC | $\geq 0.1 U_{N}$ |
| Operating range of supply voltage |  |  | See table "Coil types" |
| Rated power consumption |  | AC | 1.6 VA |
|  |  | DC | 0.9 W |
| Insulation |  |  | According to PN-EN 60664-1 |
| Insulation class |  |  | B250 |
| Insulation rated voltage |  |  | 250 V ~ |
| Rated surge voltage |  |  | $2500 \mathrm{~V} ; 1.2 / 50 \mu \mathrm{~s}$ |
| Overvoltage category |  |  | 11 |
| Insulation pollution degree |  |  | 2 |
| Dielectric strength |  | Between coil and contacts | $2500 \mathrm{~V} \sim$ (basic insulation) |
|  |  | Contact clearance | $1500 \mathrm{~V} \sim$ (micro-disconnection clearance) |
|  |  | Pole-pole | $2000 \mathrm{~V} \sim$ (basic insulation) |
| Contact - coil distance |  |  |  |
| Clearance |  |  | $\geq 1.6 \mathrm{~mm}$ |
| Creepage |  |  | $\geq 3.2 \mathrm{~mm}$ |
| GENERAL DATA |  |  |  |
| Operating/release time (typical value) |  | AC | 10 / 8 ms |
|  |  | DC | $13 / 3 \mathrm{~ms}$ |
| Electrical service life |  | Resistive AC1 | $>10^{5}, 6 \mathrm{~A} / 250 \mathrm{~V}$ |
|  |  | $\cos \varphi$ | See diagram |
| Mechanical service life (cycles) |  |  | $>2 \times 10^{7}$ |
| Dimensions (LxW×H) |  |  | $27.5 \times 21.2 \times 35.6 \mathrm{~mm}$ |
| Weight |  |  | 35 g |
| Ambient temperature | Storage |  | $-40 . . .+85^{\circ} \mathrm{C}$ |
|  | Operating | AC | $-40 . . .+55^{\circ} \mathrm{C}$ |
|  |  | DC | $-40 \ldots+70^{\circ} \mathrm{C}$ |
| Cover degree of protection |  |  | IP40 |
| Environmental protection |  |  | RTI |
| Shock resistance |  | ( $\mathrm{NO} / \mathrm{NC)}$ | $10 / 5 \mathrm{~g}$ |
| Vibration resistance |  |  | $5 \mathrm{~g} ; 10 \ldots 150 \mathrm{~Hz}$ |
| Solder bath temperature |  |  | max. $270{ }^{\circ} \mathrm{C}$ |
| Soldering time |  |  | max. 5 sec . |

Plug-in Relays

Plug-in Relays S-Relay, Series 4


Plug-in Socket for S-Relay 4 Poles, Series 4


Plug-in Relays Schrack, Series PT


Circuit Diagrams


Dimensions \& Circuit Diagrams

| A | Soldering and plug-in terminals (standard version) |
| :---: | :---: |
| B | LED |
| C | Protection diode and LED |
| D | Bottom view on pins |
| E | 4 pole |
| F | 3 pole |
| $\mathbf{G}$ | 2 pole |

Plug-in Relays

- Plug-in Relays Schrack, Series PT

Rated Breaking Capacity \& Coil Operating Voltage Range


Rated Breaking Capacity \& Coil Operating Voltage Range

| A | Max. DC rated breaking capacity |
| :---: | :---: |
| B | Electrical endurance |
| C | Coil operating range DC |
| D | Coil operating range AC |
| \#1 | 1 contact |
| \#2 | 2 contacts in series |
| \#3 | 3 contacts |
| \#4 | 4 contacts |
| \#5 | Resistive load |
| \#6 | 4 pole |


| \#7 | 3 pole |
| :---: | :---: |
| \#8 | 2 pole |
| \#9 | 250 V AC resistive load |
| \#10 | Recommended voltage range in [V] |
| $\mathbf{U}$ | DC voltage in [V] |
| $\mathbf{U} / \mathbf{U}^{\text {rd }}$ | Coil voltage in [V] |
| $\mathbf{I}$ | DC current in $[\mathrm{A}]$ |
| $\mathbf{I 1}$ | Switching current in $[\mathrm{A}]$ |
| $\mathbf{Z}$ | Cycles |
| $\boldsymbol{U}$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |

- Plug-in Relays Schrack, Series PT
- Technical Data

| CONTACT DATA |  | PT2 | PT3 | PT5 |
| :---: | :---: | :---: | :---: | :---: |
| Number of contacts and type |  | 2 CO | 3 CO | 4 CO |
| Contact style |  | Single contact |  |  |
| Type of disconnection |  | Micro-switch |  |  |
| Rated current |  | 12 A | 10 A | 6 A |
| Rated voltage/ max. switching voltage AC |  | 240 / $400 \mathrm{~V} \sim$ |  | $240 / 240 \mathrm{~V} \sim$ |
| Limiting continuous current |  | 12 A | 10 A | 6 A |
| Limiting short time current 30 ms |  | 300 A |  |  |
| Max. rated breaking capacity AC |  | 3000 VA | 2500 VA | 1500 VA |
| Limiting making current, max. 20 ms |  | 24 A | 20 A | 12 A |
| Contact material |  | $\mathrm{AgNi} 90 / 10, \mathrm{AgNi} 90 / 10$ hard gold plated |  |  |
| Minimal contact load |  | $12 \mathrm{~V} / 10 \mathrm{~mA}, 20 \mathrm{mV} / 1 \mathrm{~mA}$ hard gold plated |  |  |
| COIL DATA |  |  |  |  |
| Rated voltage | DC coil | 6... 220 V |  |  |
|  | AC coil | $6 . .230 \mathrm{~V}$ |  |  |
| Rated power | DC coil | 750 mW |  |  |
|  | AC coil | 1.0 VA |  |  |
| Operative range, IEC 61810 |  | 2 |  |  |
| Coil insulation system according to UL1446 |  | Class F |  |  |
| Operation-/ release voltage/ coil resistance | 6 V DC coil | $4.5 \mathrm{~V} / 0.6 \mathrm{~V} / 48 \Omega \pm 10 \%$ |  |  |
| at ambient temperature $23{ }^{\circ} \mathrm{C}$ | 12 V DC coil | $9 \mathrm{~V} / 1.2 \mathrm{~V} / 192 \Omega \pm 10 \%$ |  |  |
|  | 24 V DC coil | $18 \mathrm{~V} / 2.4 \mathrm{~V} / 777 \Omega \pm 10 \%$ |  |  |
|  | 48 V DC coil | $36 \mathrm{~V} / 4.8 \mathrm{~V} / 3072 \Omega \pm 10 \%$ |  |  |
|  | 60 V DC coil | $45 \mathrm{~V} / 6 \mathrm{~V} / 4845 \Omega \pm 12$ \% |  |  |
|  | 110 V DC coil | $82.5 \mathrm{~V} / 11 \mathrm{~V} / 16133 \Omega \pm 15 \%$ |  |  |
|  | 220 V DC coil | $165 \mathrm{~V} / 22 \mathrm{~V} / 64533 \Omega \pm 10 \%$ |  |  |
|  | 6 VAC coil* | $4.8 \mathrm{~V} / 1.8 \mathrm{~V} / 11 \Omega \pm 10 \%$ |  |  |
|  | $12 \mathrm{~V} \mathrm{AC} \mathrm{coil*}$ | $9.6 \mathrm{~V} / 3.6 \mathrm{~V} / 48 \Omega \pm 10 \%$ |  |  |
|  | $24 \mathrm{~V} \mathrm{AC} \mathrm{coil*}$ | $19.2 \mathrm{~V} / 7.2 \mathrm{~V} / 192 \Omega \pm 10 \%$ |  |  |
|  | 48 V AC coil* | $38.4 \mathrm{~V} / 14.4 \mathrm{~V} / 777 \Omega \pm 10 \%$ |  |  |
|  | 115 V AC coil* | $92 \mathrm{~V} / 34.5 \mathrm{~V} / 4845 \Omega \pm 12 \%$ |  |  |
|  | 230 V AC coil* | $184 \mathrm{~V} / 69 \mathrm{~V} / 19465 \Omega \pm 15 \%$ |  |  |

*50 Hz

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| PT Relays 2 Poles |  |  |
| 24V-DC, 2 CO, 12A |  | PT270024 |
| 48V-DC, $2 \mathrm{CO}, 12 \mathrm{~A}$ |  | PT270048 |
| 24V-AC, 2 CO, 12A |  | PT270524 |
| 230V-AC, 2 CO, 12A |  | PT270730 |
| Plug-in Socket for PT Relays 2 Poles |  |  |
| DIN rail mounted plug-in socket for PT2 relays, 8 pole, 12A (2 CO) | [-80-8 | YPT78702 |
| Retaining clip metal | $0 \times 0$ | PT28800 |
| PT Relays 3 Poles |  |  |
| 24V-DC, 3 CO, 10A |  | PT370024 |
| 110V-DC, 3 CO, 10A | -000-n | PT370110 |
| $24 \mathrm{~V}-\mathrm{AC}, 3 \mathrm{CO}, 10 \mathrm{~A}$ |  | PT370524 |
| 230V-AC, 3 CO, 10A | - -0.0 | PT370730 |
| Plug-in Socket for PT Relays 3 Poles |  |  |
| DIN rail mounted plug-in socket for PT3 relays, 11 pole, 10A (3 CO) | - -80 | YPT78703 |
| PT Relays 4 Poles |  |  |
| 6V-DC, 4 CO, 6A | - $-6-5$ | PT570006 |
| 12V-DC, 4 CO, 6A | $0 \times 0$ | PT570012 |
| 24V-DC, 4 CO, 6A |  | PT570024 |
| 48V-DC, 4 CO, 6A | -600-0.0) | PT570048 |
| 110V-DC, 4 CO, 6A with LED and protection diode |  | PT570MB0 |
| 60V-DC, $4 \mathrm{CO}, 6 \mathrm{~A}$ | - -1000 | PT570060 |
| 110V-DC, 4 CO, 6A |  | PT570110 |
| 125V-DC, 4 CO, 6A | -000-0.0) | PT570125 |
| 220V-DC, 4 CO, 6A | $+\infty=\infty$ | PT570220 |
| 6V-AC, $4 \mathrm{CO}, 6 \mathrm{~A}$ | - -1000 | PT570506 |
| 12V-AC, $4 \mathrm{CO}, 6 \mathrm{~A}$ | -000-0, | PT570512 |

## Plug-in Relays

## - Plug-in Relays Schrack, Series PT

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| PT Relays 4 Poles |  |  |
| 24V-AC, 4 CO, 6A | -000000 | PT570524 |
| $48 \mathrm{~V}-\mathrm{AC}, 4 \mathrm{CO}, 6 \mathrm{~A}$ |  | PT570548 |
| $115 \mathrm{~V}-\mathrm{AC}, 4 \mathrm{CO}, 6 \mathrm{~A}$ | $0 \times 0$ | PT570615 |
| 230V-AC, 4 CO, 6A |  | PT570730 |
| 24V-DC, 4 CO, 6A with LED and protection diode | $0 \times 0$ | PT570LC4 |
| 24V-DC, 4 CO, 6A with LED | -00\% | PT570L24 |
| 20V-DC, 4 CO, 6A with LED | -000-0) | PT570N20 |
| 24V-DC, 4 CO, 6A with LED | 000\% | PT570R24 |
| $115 \mathrm{~V}-\mathrm{AC}, 4 \mathrm{CO}, 6 \mathrm{~A}$ with LED |  | PT570S 15 |
| 230V-AC, $4 \mathrm{CO}, 6 \mathrm{~A}$ with LED | -000\% | PT570T30 |
| 24V-DC, $4 \mathrm{CO}, 6 \mathrm{~A}$, gold plated | 00000 | PT580024 |
| 110V-DC, 4 CO, 6A, gold plated |  | PT580110 |
| 220V-DC, 4 CO, 6A, gold plated | -000\% | PT580220 |
| 24V-AC, $4 \mathrm{CO}, 6 \mathrm{~A}$, gold plated | 00000 | PT580524 |
| $115 \mathrm{~V}-\mathrm{AC}, 4 \mathrm{CO}, 6 \mathrm{~A}$, gold plated |  | PT580615 |
| 230V-AC, $4 \mathrm{CO}, 6 \mathrm{~A}$, gold plated |  | PT580730 |
| 24 V -DC, $4 \mathrm{CO}, 6 \mathrm{~A}$, gold plated with LED |  | PT580L24 |
| 230V-AC, 4 CO, 6A, gold plated with LED | 0000000 | PT580T30 |
| Plug-in Socket for PT Relays 4 Poles |  |  |
| DIN rail mounted plug-in sockeef for PT5 relays, 14 pole, 6A (4 CO), with spring clamp terminals | -000-0) | PT7874P |
| Retaining clip for PT socket PT7874P | -000-0) | PT17021 |
| Jumper link, 12A, for PT socket PT7874P | -000\% | PT170P1 |
| Marking tag | -000-0) | YPT16040 |

## Plug-in Socket for PT Relays, I/O - Logical Arrangement 4 Poles

| DIN rail mounted plug-in socket for PT5 relays, 14-pole, 6A (4CO) with screw terminals | - -8008 | PT78742 |
| :---: | :---: | :---: |
| Retaining clip for PT socket PT7874P | -500-0, | PT17021 |
| Jumper bar, 12A, for connection of up to 6 PT sockets YPT78... | -000-9, | PT170R6 |
| Marking tag | $+5006$ | YPT16040 |
| Plug-in Socket for PT Relays 4 Poles, Conventional Model |  |  |
| DIN rail mounted plug-in socket for PT2 relays, 8 pole, 12A (2 CO) | - $-\frac{0}{00}$ | YPT78702 |
| DIN rail mounted plug-in socket for PT3 relays, 11 pole, 10A (3 CO) | -00\%-0, | YPT78703 |
| DIN rail mounted plug-in socket for PT5 relays, 14 pole, 6A (4CO) |  | YPT78704 |
| DIN rail mounted plug-in socket for PT5 relays, 14 pole, 6A (4 CO) with protection diode | -00000] | YPT78110 |
| Retaining clip | -500-9, | YPT16016 |
| Retaining clip for PT socket PT78xx | $\begin{array}{lll} \hline-\infty 0 & -9 \\ \hline \end{array}$ | PT17024 |
| Jumper bar, 12A, for connection of up to 6 PT sockets YPT78... | $+\infty=0$ | PT170R6 |
| Marking tag | $+\infty 000$ | YPT16040 |

Modules Matching Plug-in Socket for PT Relays

| LED module, red, 6-24V AC/DC, EM07 | - | YMLRA024 |
| :---: | :---: | :---: |
| LED module, red, 6-24V DC, A1+, EM 18 | - $-\frac{10}{0-6}$ | YMLRD024-A |
| LED module, red, 6-24V DC, AI-, EM08 | [-000-9, | YMLRD024 |
| LED module, red, 110-230V AC, EM06 | - $-1 \times 0$ | YMLRW230 |
| LED module, green, 6-24V AC/DC, EM 11 |  | YMLGA024 |
| LED module, green 6-24V DC with protection diode, $\mathrm{Al} 1+$, EM 12 | -000-0-0, | YMLGD024 |
| LED module, green, 110-230V AC, EM 10 |  | YMLGW230 |
| Protection diode module 6-230V DC, Al+, EM09 |  | YMFDG230 |
| RC Network module 6-60V AC, EM02 | [-0000, | YMRCW024 |
| RC Network module 110-230V AC, EM03 |  | YMRCW230 |
| Varistor module, 24V-AC, EM04 | $+\infty=-\infty$ | YMVAW024 |
| Varistor module 230V-AC, EM05 | $+\infty=0$ | YMVAW230 |

[^0]Plug-in Relays Schrack, Series MT




## ת Schrack-Info

- $2 / 3$ poles $10 \mathrm{~A}, \mathrm{AC}$ or DC coil
- 2 or 3 CO
- Cadmium-free contact material
- Standard model with mechanical status indicator
- Optional electrical status indicator
- Test switch system: touch protection, lockable with lever integrated in the cap, front access test switch
- Multi-purpose use for industrial system and machine building


## Dimensions (mm)



Plug-in Relays

- Plug-in Relays Schrack, Series MT

Rated Breaking Capacity \& Coil Operating Voltage Range


Rated Breaking Capacity \& Coil Operating Voltage Range


Technical Data
CONTACT DATA 10 A

| Number of contacts and type |  | 2 CO or 3 CO contacts |
| :---: | :---: | :---: |
| Contact style |  | Single contact |
| Rated current |  | 10 A |
| Rated voltage/ max. switching voltage AC |  | $240 / 400 \mathrm{~V} \sim$ |
| Limiting continuous current |  | 10 A |
| Max. rated breaking capacity AC |  | 2500 VA |
| Limiting making current, max. 20 ms |  | 20 A |
| Contact material |  | $\mathrm{AgNi} 90 / 10, \mathrm{AgNi} 90 / 10$ hard gold plated |
| Minimal contact load |  | $12 \mathrm{~V} / 10 \mathrm{~mA}, 20 \mathrm{mV} / 1 \mathrm{~mA}$ hard gold plated |
| COIL DATA |  |  |
| Rated voltage | DC coil | 6... 220 V |
|  | AC coil | 6... 230 V ~ |
| Rated power | DC coil | 1.2 W |
|  | AC coil | 2.3 VA |
| Operative range, IEC 61810 |  | 2 |
| Coil insulation system according to UL1446 |  | Class 130 (B) |
| Operation-/ release voltage/ coil resistance at ambient temperature $23^{\circ} \mathrm{C}$ | 24 V DC coil | $18 \mathrm{~V} / 2.4 \mathrm{~V} / 475 \Omega \pm 10 \%$ |
|  | 24 V AC coil | $19.2 \mathrm{~V} / 7.2 \mathrm{~V} / 86 \Omega \pm 10 \%$ |
|  | 230 V AC coil | $184 \mathrm{~V} / 69 \mathrm{~V} / 8300 \Omega \pm 10 \%$ |

- Plug-in Relays Schrack, Series MT

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| MT Relays 2 Poles |  |  |
| 12V-DC, 2 CO, 10A |  | MT221012 |
| 24V-DC, 2 CO, 10A | 00000 | MT221024 |
| $12 \mathrm{~V}-\mathrm{AC}, 2 \mathrm{CO}, 10 \mathrm{~A}$ | $0 \times 0$ | MT226012 |
| 24V-AC, 2 CO, 10A | $0 \times 0$ | MT226024 |
| 115V-AC, 2 CO, 10A | $0 \times 0$ | MT226115 |
| $230 \mathrm{~V}-\mathrm{AC}, 2 \mathrm{CO}, 10 \mathrm{~A}$ | $0 \times 0$ | MT226230 |
| $230 \mathrm{~V}-\mathrm{AC}, 2 \mathrm{CO}, 10 \mathrm{~A}$ with LED |  | MT228230 |

## Plug-in Socket for MT Relays 2 Poles

DIN rail mounted plug-in socket for MT2 relays, 8 pole, 10A (2 CO) with screw terminals, not compatible with function modules $\quad$ YMR78701

## MT Relays 3 Poles

| 12 V -DC, 3 CO, 10A |  | MT321012 |
| :---: | :---: | :---: |
| 24 V -DC, 3 CO, 10A | -600-0) | MT321024 |
| $48 \mathrm{~V}-\mathrm{DC}, 3 \mathrm{CO}, 10 \mathrm{~A}$ | -600-0, | MT321048 |
| 60V-DC, 3 CO, 10A | - -60 | MT321060 |
| 24V-DC, 3 CO, 10A with protection diode | - $000-80$ | MT3210C4 |
| 110V-DC, 3 CO, 10A | - -1000 | MT321110 |
| 220V-DC, 3 CO, 10A | $+\infty=0$ | MT321220 |
| $24 \mathrm{~V}-\mathrm{DC}, 3 \mathrm{CO}, 10 \mathrm{~A}$ with LED | $+00 \div-\pi$ | MT323024 |
| 48V-DC, 3 CO, 10A with LED | -000-0-0 | MT323048 |
| 60V-DC, 3 CO, 10A | $+\infty=-\infty$ | MT323060 |
| $24 \mathrm{~V}-\mathrm{DC}, 3 \mathrm{CO}, 10 \mathrm{~A}$ with LED and protection diode | - -0.000 | MT3230C4 |
| 110V-DC, 3 CO, 10A with LED | -mon | MT323110 |
| 220V-DC, 3 CO, 10A with LED |  | MT323220 |
| 12V-AC, 3 CO, 10A | -50-0) | MT326012 |
| 24V-AC, 3 CO, 10A |  | MT326024 |
| $48 \mathrm{~V}-\mathrm{AC}, 3 \mathrm{CO}, 10 \mathrm{~A}$ | $+\quad-\infty 0$ | MT326048 |
| 60V-AC, 3 CO, 10A | - $-\cdots 000$ | MT326060 |
| $115 \mathrm{~V}-\mathrm{AC}, 3 \mathrm{CO}, 10 \mathrm{~A}$ | $+\infty, \infty$ | MT326115 |
| 230V-AC, 3 CO, 10A | [-000] | MT326230 |
| $24 \mathrm{~V}-\mathrm{AC}, 3 \mathrm{CO}, 10 \mathrm{~A}$ with LED | $+\infty=-n$ | MT328024 |
| $115 \mathrm{~V}-\mathrm{AC}, 3 \mathrm{CO}, 10 \mathrm{~A}$ with LED | - -600 | MT328115 |
| $230 \mathrm{~V}-\mathrm{AC}, 3 \mathrm{CO}, 10 \mathrm{~A}$ with LED | - -6000 | MT328230 |
| 24V-DC, 3 CO, 10A, gold plated | $\begin{array}{\|l\|l\|} \hline-000 & -0 \\ \hline \end{array}$ | MT331024 |
| 110V-DC, 3 CO, 10A, gold plated | $+0,0-\infty$ | MT331110 |
| 220V-DC, 3 CO, 10A, gold plated | $\begin{array}{lll} -\infty & 0-9 \\ \hline \end{array}$ | MT331220 |
| 24V-DC, 3 CO, 10A, gold plated | $+\infty=\infty$ | MT333024 |
| 24V-DC, 3 CO, 10A, gold plated | $\begin{array}{rrr} \hline-000 & 0-8 \\ \hline \end{array}$ | MT3330C4 |
| 230V-AC, 3 CO, 10A, gold plated | $+\infty$ | MT336230 |

## Plug-in Socket for MT Relays 3 Poles

DIN rail mounted plug-in socket for MT3 relays and timer relays series ZR4, 11 pole, $10 \mathrm{~A}(3 \mathrm{CO})$, with screw terminals, not compatible with function modules

| -80-9090 | YMR78700 |
| :---: | :---: |
| -800-9080 | MT78740 |
| $\begin{array}{lll} -50 & -0 \\ \hline \end{array}$ | MTMLO024 |
| -500-9, | MTMTOOAO |
| [-800-8, | MTMU0730 |
| $+\infty 0 \%$ | MTMZOW00 |
| - -60 | MTMFOWOO |



RM732730



RM78705

## Schrack-Info

## RM2/3/7

- $2 / 3$ poles $10 / 16$ A, AC or DC coil
- Switching capacity up to 6000 VA
- Mechanical status indicator
- Test switch
- Plug-in or print versions, strap mounting or DIN rail mounting
- For elevator controls, mains adaptors


## RM5 / 6

- $2 / 3$ poles $10 / 16$ A, AC or DC coil
- 2 NO or 3 NO
- 3 mm contact gap
- Test switch
- Plug-in or print versions, strap mounting or DIN rail mounting
- For mains adaptors, power supply units, pump control systems


## RM8

- 2 poles $25 \mathrm{~A}, \mathrm{AC}$ or DC coil
- 2 CO
- Mechanical status indicator
- Test switch
- Strap mounting or DIN rail mounting
- For cleaning machines, heating/cooling equipment


## RMD

- 1 pole 30 A, AC or DC coil
- 1 NO or $1 \mathrm{NO} \& 1 \mathrm{NC}$
- Switching capacity up to 7500 VA
- Test switch
- Strap mounting
- For battery chargers, heating controls

Plug-in Relays Schrack, Series RM
Dimensions (mm)


Dimensions

| A | Cover without lug, plug-in connectors for plug-in socket |
| :---: | :---: |
| B | PCB version |
| C | Cap with mounting bracket, Faston 250 (187 possible) |
| D1 | Cap with DIN snap mechanism (only Faston 250) |
| D2 | Lying |
| D3 | Standing |

Plug-in Relays

- Plug-in Relays Schrack, Series RM
- Circuit Diagrams


Circuit Diagrams

| \#1.1 | 2 CO |
| :---: | :---: |
| $\# 1.2$ | 3 CO |
| $\# 2.1$ | 2 NO |
| \#2.2 | 3 NO |
| \#3 | 2 CO |
| $\# 4$ | $1 \mathrm{NO}, \mathrm{RMD}$ |

$\square$ Plug-in Relays Schrack, Series RM
Rated Breaking Capacity


Rated Breaking Capacity

| $\mathbf{A}$ | RM2/3/7 Max. DC rated breaking capacity |
| :---: | :---: |
| $\mathbf{B}$ | RM5/6 Max. DC rated breaking capacity |
| $\mathbf{C}$ | RM8 Max. DC rated breaking capacity |
| $\mathbf{D}$ | RMD Max. DC rated breaking capacity |
| $\mathbf{\# 1}$ | 1 contact |
| $\mathbf{\# 2}$ | 2 contacts in series |
| $\mathbf{\# 3}$ | 3 contacts in series |
| $\mathbf{\# 4}$ | Resistive load |
| $\mathbf{U}$ | DC voltage in $[\mathrm{V}]$ |
| $\mathbf{1}$ | DC current in $[\mathrm{A}]$ |

Plug-in Relays

## - Plug-in Relays Schrack, Series RM

- Technical Data RM2/3/7


Technical Data RM5/6/8

| CONTACT DATA |  | RM5 | RM6 | RM8 |
| :---: | :---: | :---: | :---: | :---: |
| Number of contacts and type |  | 2 NO | 3 NO | 2 CO |
| Contact style |  | Single contact |  |  |
| Contact gap |  | 3 mm |  | - |
| Rated current |  | 16 A | 10 A | 25 A |
| Rated voltage/ max. switching voltage AC |  | 400 / 440 V | 230 / 400 V | 400 / 400 V |
| Max. rated breaking capacity AC |  | 6000 VA | 3800 VA | 6000 VA |
| Limiting making current, max. 20 ms |  | 30 A | 25 A | 60 A |
| Contact material |  | AgCdO |  | $\mathrm{AgCdO}, \mathrm{AgNi} 90 / 10$ |
| Minimal contact load |  | 24 V DC / 100 mA |  |  |
| COIL DATA |  |  |  |  |
| Rated voltage | DC coil | 6...220 V |  |  |
|  | AC coil | $6 . . .400 \mathrm{~V}$ |  |  |
| Rated power | DC coil | 1.7 W |  | 1.2 W |
|  | AC coil | 2.7 VA |  | 2.7 VA |
| Operative range, IEC 61810 |  | 2 |  |  |
| Coil insulation system according to UL1446 |  | Class 130 (B) |  |  |
| Operation-/ release voltage/ coil resistance | 24 V DC coil | $18 \mathrm{~V} / 2.4 \mathrm{~V} / 345 \Omega \pm 10 \%$ |  | $18 \mathrm{~V} / 2.4 \mathrm{~V} / 475 \Omega \pm 10 \%$ |
| at ambient temperature $23{ }^{\circ} \mathrm{C}$ | 230 V AC coil | $184 \mathrm{~V} / 69 \mathrm{~V} / 7500 \Omega \pm 10 \%$ |  |  |

- Technical Data RMD

| CONTACT DATA |  | RMD |
| :---: | :---: | :---: |
| Number of contacts and type |  | 1 NO |
| Contact style |  | Single bridging contact |
| Rated current |  | 30 A |
| Rated voltage/ max. switching voltage AC |  | 400 / 440 V |
| Max. rated breaking capacity AC |  | 7500 VA |
| Limiting making current, max. 20 ms |  | 60 A |
| Contact material |  | AgCdO, AgNi90/10 |
| Minimal contact load |  | 24 V DC / 100 mA |
| COIL DATA |  |  |
| Rated voltage | DC coil | 6... 220 V |
|  | AC coil | $6 . .400 \mathrm{~V}$ |
| Rated power | DC coil | 1.2 W |
|  | AC coil | 2.7 VA |
| Operative range, IEC 61810 |  | 2 |
| Coil insulation system according to UL1446 |  | Class 130 (B) |
| Operation-/ release voltage/ coil resistance | 24 V DC coil | $18 \mathrm{~V} / 2.4 \mathrm{~V} / 475 \Omega \pm 10 \%$ |
| at ambient temperature $23{ }^{\circ} \mathrm{C}$ | 230 V AC coil | $184 \mathrm{~V} / 69 \mathrm{~V} / 7500 \Omega \pm 10 \%$ |

- Plug-in Relays Schrack, Series RM

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| RM Relays 2 Poles |  |  |
| 24V-DC, 2 CO, 25A | -000-0-6) | RM835024 |
| 24V-DC, 2 CO, 25A | -000-9-9 | RM838024 |
| 24V-DC, 2 CO, 25A | -600-0] | RM839024 |
| 24V-DC, 1 NO, 30A | $+\infty 0 \div 0$ | RMD05024 |
| 230V-AC, $2 \mathrm{CO}, 25 \mathrm{~A}$ | - $-0 \times 0$ | RM805730 |
| 230V-AC, $2 \mathrm{CO}, 25 \mathrm{~A}$ | $+60 \div-\infty$ | RM8357305E |
| 230V-AC, $2 \mathrm{CO}, 25 \mathrm{~A}$ | -600-0] | RM809730 |
| 230V-AC, 2 CO, 25A | - -2000 | RM839730 |
| RM Relays 3 Poles |  |  |
| 24V-DC, 3 CO, 10A | -600-6-9, | RM332024-D |
| 230V-AC, 3 CO, 10A | - $-0-0$ | RM3327305E |
| 24 V -DC, 3 NO, 10A | -600-9, | RM632024-A |
| 24V-DC, 3 CO, 16A | -000-0) | RM702024-C |
| 12V-DC, 3 CO, 16A | $+\infty=0$ | RM732012-C |
| 24V-DC, 3 CO, 16A | -000-0-6, | RM732024-C |
| 60V-DC, 3 CO, 16A | -800-0) | RM732060 |
| $24 \mathrm{~V}-\mathrm{AC}, 3 \mathrm{CO}, 16 \mathrm{~A}$ | - $-0-\infty$ | RM732524-C |
| 230V-AC, 3 CO, 16A | $\begin{aligned} &-\infty-\infty \\ & \hline \end{aligned}$ | RM732730 |
| $400 \mathrm{~V}-\mathrm{AC}, 3 \mathrm{CO}, 16 \mathrm{~A}$ | $\begin{array}{r} -000 \\ \hline 000 \\ \hline \end{array}$ | RM732900 |
| 230V-AC, 3 CO, 16A | $+50$ | RM7357305E |
| 24V-DC, 3 CO, 16A | --00-9, | RM738024-C |
| 230V-AC, 3 CO, 16A | $+\infty 0$ | RM738730-C |
| 230V-AC, 3 CO, 16A | - -000 | RM7397305E |
| Plug-in Socket for RM Relays, up to 16 A, for RMxx $\mathbf{2 x x x}$ |  |  |
| DIN rail mounted plug-in socket, 11 pole, up to 16A, for Faston 187 | -600-9 | RM78705 |

DIN rail mounted plug-in socket, 11 pole, up to 16A, for Faston 187

## Relay Sockets \& Sets

Relay Sockets and Sets Schrack, Series SNR


D Dimensions (mm)

Schrack-Info

- Relay package consisting of a relay and a DIN rail socket
- 1 CO 6 A rated current
- Safe disconnection compliant with VDE 0160 in combination with socket YRT78626
- Module width only 6.2 mm
- Narrow component width allows high component density and tight-packed functionality on the DIN rail
- Complies with the 2011/65/EU RoHS Directive
- Protection diode

$\qquad$

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| 12V-DC, 1 CO, 6A with socket | -000-9, | ST3P3LB2 |
| 24V-DC, 1 CO, 6A with socket | -000-0 | ST3P3LC4 |
| 24V-DC, 1 CO, 6A with socket | -000-0, | ST3P2LC4 |
| 230V-AC/DC, 1 CO, 6A with socket | -000-9, | ST3P3TP0 |
| 24V-DC, 1 CO, 6A with socket | - | ST4P3LC4 |
| 24V-DC, 1 CO, 6A with socket, htv |  | ST4P2LC4 |
| 230V-AC/DC, 1 CO, 6A with socket | [-000-9000 | ST4P3TP0 |
| DIN rail mounted plug-in socket for SNR relays, 24V-DC, 6A, incl. protection diode, with screw terminals | - $-0 \times 0$ | ST3FLC4 |
| SNR jumper bar, red, 500 mm | - -60 | ST37001 |
| SNR jumper bar, blue, 500 mm | -000-0 | ST37002 |
| SNR jumper bar, grey, 500 mm | - -8000 | ST37003 |
| Marking plate, 1 plate $=100 \mathrm{pcs}$. | -000-9, | ST37040 |
| Separator plate | $+\infty 0-\infty$ | ST36040 |
| Connection bridge 20 pole for YSN90020 |  | YSN90020 |

## Relay Sockets for Schrack, Series RT



RT7872P


YRT78624


Schrack-Info
RT7872P

- Screwless terminals
- Solid wire for toolless mounting
- Twin terminals for each connection
- Cross-connector bridges to establish a connection
- Open coil circuit for active modules
- Inputs and outputs separated


## RT78725, YRT78624, YRT78626

- Easy changing of the relay even if tightly packed
- High-grade terminals preventing incorrect insertion
- Captive terminal screws


Dimensions

| A | Label |
| :---: | :---: |
| B | Relay |
| C | Bracket |
| D | Module |

## Relay Sockets \& Sets

Relay Sockets for Schrack, Series RT
Technical Data


For stranded conductors with single wires of 0.05 mm or less, the used of ferrules is recommended. When using stranded conductors without ferrules, the terminal must be opened to insert the conductor.
*For 1 pole relays ( 16 A ) the relay terminals 11-21, 12-22 and 14-24 have to be bridged!

## Mounting Instructions

RT7872P


Relay Sockets \& Sets

Relay Sockets for Schrack, Series RT

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| Jumper link for connection of RT7872P | - $0 \times 0$ - | RT170P 1 |
| DIN rail mounted plug-in socket for RT2x, RT3x, RT4x, XT, RP4x relays, pinning 5mm, max. 16A, with spring clamp terminals |  | RT7872P |
| DIN rail mounted plug-in socket for RT1x relays, pinning 3.5 mm , max. $12 \mathrm{~A}, 1 / \mathrm{O}$ - logical arrangement, with screw terminals | -000-m | YRT78624 |
| DIN rail mounted plug-in socket for XT, RT2x, RT3x, RT4x relays, pinning 5 mm , max. 12A, $1 / \mathrm{O}$ - logical arrangement, with screw terminals | $+\infty 00$ | YRT78626 |
| DIN rail mounted plug-in socket for RT2x, RT3x, RT4x relays, pinning 5mm, max. 16A, conventional arrangement, with screw terminals | $+\infty=\sigma$ | RT78725 |
| Jumper bar for connection of up to 8 RT-sockets |  | RT170R8 |
| Retaining clip for RT relays with ejection function | -000-n | RT17017 |
| Marking tag (for YRT sockets YRT78624 and YRT78626) |  | YRT 16040 |
| LED module, red, 6-24V AC/DC, EM07 |  | YMLRA024 |
| LED module, red, 6-24V DC, A1+, EM 18 |  | YMLRD024-A |
| LED module, red, 6-24V DC, A1-, EM08 | -000-0 | YMLRD024 |
| LED module, red, 110-230V AC, EM06 | - $-0 \times 0$ | YMLRW230 |
| LED module, green, 6-24V AC/DC, EM 11 |  | YMLGA024 |
| LED module, green 6-24V DC with protection diode, A1+, EM 12 |  | YMLGD024 |
| LED module, green, 110-230V AC, EM 10 | $+500$ | YMLGW230 |
| Protection diode module 6-230V DC, A1+, EM09 | [-000] | YMFDG230 |
| RC Network module 6-60V AC, EM02 | $+\infty=0$ | YMRCW024 |
| RC Network module 110-230V AC, EM03 | $+\infty=0$ | YMRCW230 |
| Varistor module, 24V-AC, EM04 |  | YMVAW024 |
| Varistor module 230V-AC, EM05 | $4$ | YMVAW230 |

## Relay Sockets for Schrack, Series XT



- Screwless terminals
- Solid wire for toolless mounting
- Twin terminals for each connection
- Cross-connector bridges to establish a connection
- Open coil circuit for active modules
- Inputs and outputs separated


## RT78725, YRT78624, YRT78626

- Easy changing of the relay even if tightly packed
- High-grade terminals preventing incorrect insertion
- Captive terminal screws
- Dimensions (mm)


Dimensions

| A | Label |
| :---: | :---: |
| B | Relay |
| C | Bracket |
| D | Module |

Relay Sockets for Schrack, Series XT

- Technical Data


For stranded conductors with single wires of 0.05 mm or less, the used of ferrules is recommended. When using stranded conductors without ferrules, the terminal must be opened to insert the
conductor.
*For 1 pole relays ( 16 A ) the relay terminals $11-21,12-22$ and 14-24 have to be bridged!

## Mounting Instructions

RT7872P


## Relay Sockets \& Sets

Relay Sockets for Schrack, Series XT


Relay Sockets for S-Relay, Series RS4


Schrack-Info

- Socket for S-RELAY Series 4
- Suitable for mounting in electrical enclosures or for DIN rail mounting
- High-grade terminals preventing incorrect insertion
- Captive terminal screws

Dimensions (mm)


Mounting of Accessories
Dimensions \& Mounting of Accessories


| A | Standard socket |
| :--- | :--- |
| B | Socket with retainer/retractor clip |
| $\mathbf{1}$ | Installation of retainer/ retractor clip, module and <br> description plate |
| $\mathbf{2}$ | Retainer/retractor clip usage |
| $\mathbf{C}$ | Description plate |
| $\mathbf{D}$ | Retainer/ retractor clip |
| $\mathbf{E}$ | Module |

## Relay Sockets \& Sets

Relay Sockets for S-Relay, Series RS4


| Circuit Diagram |  |
| :---: | :---: |
| \#1 |  |
| $\# 1.1$ | Terminals |
| $\# 1.2$ | NO contacts |
| $\# 1.3$ | NC contacts |
| $\# 1.4$ | Coil |

Technical Data
TECHNICAL DATA


## Relay Sockets for Schrack, Series PT




YPT78703

## PT78742

- Socket with separated control and load connectors
- High-grade terminals preventing incorrect insertion
- Captive terminal screws
- Double A2 for easy through-wiring

YPT78702, YPT78703, YPT78704, YPT78110

- High-grade terminals preventing incorrect insertion
- Captive terminal screws


## PT78604

- Print socket, 4 poles, 6 A


Relay Sockets \& Sets

Relay Sockets for Schrack, Series PT

- Dimensions (mm)


Dimensions

| A | Relay |
| :---: | :---: |
| $\mathbf{B}$ | Bracket |
| $\mathbf{C}$ | Module |
| $\mathbf{D}$ | Label |
| $\mathbf{E}$ | Jumper bar |
| $\mathbf{F}$ | Opening access |
| $\mathbf{G}$ | Conductor opening |

Reduction Curves


## Reduction Curves

| \#1 | Tight package |
| :---: | :---: |
| $\mathbf{I}$ | Load current in $[\mathrm{A}]$ |
| $\boldsymbol{\vartheta}$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |

## Relay Sockets for Schrack, Series PT

- Technical Data

| PT 7874P |  |  |
| :---: | :---: | :---: |
|  |  | 4 POLE |
| Rated current |  | 6 A |
| Rated voltage/ max. switching voltage |  | $240 \mathrm{~V} \sim$ |
| Limiting continuous current |  | See reduction curve |
| Dielectric strength | Coil-contact set | $2500 \mathrm{~V}_{\text {ms }}$ |
|  | Open contact | $1200 \mathrm{~V}_{\text {ms }}$ |
|  | Adjacent contacts | $2000 \mathrm{~V}_{\text {ms }}$ |
| Clearance/ creepage | Coil-contact circuit | $\geq 4 / 4 \mathrm{~mm}$ |
|  | Adjacent contact circuits | $\geq 1.8 / 3.5 \mathrm{~mm}$ |
| Insulation to IEC 60664-1 |  |  |
| Type of insulation | Coil-contact set | Basic |
|  | Open contact | Functional |
|  | Adjacent contact | Basic |
| Rated insulation voltage |  | 250 V |
| Pollution degree |  | 2* |
| Overvoltage category |  | III |
| Ambient temperature | For mounting/handling | $-25 . . .+70^{\circ} \mathrm{C}$ |
|  | In operation | $-40 . .+70^{\circ} \mathrm{C}$ |
| Terminals |  | Screw less terminal |
| Wire stripping length |  | 12 mm |
| Terminal capacity | Solid wire | $1 \times 0.75 / 1 / 1.5 \mathrm{~mm}^{2}, 2 \times 0.75 / 1 \mathrm{~mm}^{2}$ |
|  | With standard insulation (no reinforced insulation) | $2 \times 1.5 \mathrm{~mm}^{2}$ |
|  | Stranded wire without ferrule | $1 \times 0.75 / 1 / 1.5 \mathrm{~mm}^{2}, 2 \times 0.75 / 1 \mathrm{~mm}^{2}$ |
|  | Without ferrule, with standard insulation | $2 \times 1.5 \mathrm{~mm}^{2}$ |
|  | With ferrule | $1 \times 0.75 / 1 \mathrm{~mm}^{2}, 2 \times 0.75 \mathrm{~mm}^{2}$ |
|  | With ferrule, without insulation or insulation at least 18 mm long | $1 \times 1.5 \mathrm{~mm}^{2}$ |

*With inserted relay pollution degree 1 in region of contact pins/ socket inlets.

PT 78742

|  | 4 POLE |
| :---: | :---: |
| Rated current | 6 A |
| Rated voltage/ max. switching voltage | $240 \mathrm{~V} \sim$ |
| Limiting continuous current | See reduction curve |
| Dielectric strength Coil-contact set <br>  Open contact <br>  Adjacent contacts | $\begin{aligned} & 2500 \mathrm{~V}_{\mathrm{rms}} \\ & 1200 \mathrm{~V}_{\mathrm{rm}} \\ & 2000 \mathrm{~V}_{\mathrm{rms}} \end{aligned}$ |
| Clearance/ creepage Coil-contact circuit <br>  Adjacent contact circuits | $\begin{aligned} & \geq 4 / 4 \mathrm{~mm} \\ & \geq 1.8 / 3.5 \mathrm{~mm} \\ & \hline \end{aligned}$ |
| Insulation to IEC 60664-1 <br> Type of insulation <br> Coil-contact set <br> Open contact <br> Adjacent contact | Basic Functional Basic |
| Rated insulation voltage | 250 V |
| Pollution degree | 2* |
| Overvoltage category | III |
| Ambient temperature | $-40 . . .+70^{\circ} \mathrm{C}$ |
| Terminals | Screw terminal |
| Terminal torque according to IEC $61984$ <br> Max. | $\begin{aligned} & 0.5 \mathrm{Nm} \\ & 0.7 \mathrm{Nm} \end{aligned}$ |
| Terminal capacity Copper wire <br>  Stranded wire <br>  With ferrule (DIN 46228/1) | $\begin{aligned} & 2 \times 2.5 \mathrm{~mm}^{2} \\ & 2 \times 2.5 \mathrm{~mm}^{2} \\ & 2 \times 1.5 \mathrm{~mm}^{2} \end{aligned}$ |

*With inserted relay pollution degree 1 in region of contact pins/ socket inlets.

## Relay Sockets \& Sets

## Relay Sockets for Schrack, Series PT

- Technical Data

| YPT 78702, YPT 78703, YPT 78704, YPT 78110 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  | 2 POLE | 3 POLE | 4 POLE |
| Rated current |  | 12 A | 10 A | 6 A |
| Rated voltage/ max. switching voltage AC |  | $250 \mathrm{~V} \sim$ |  |  |
| Limiting continuous current |  | See reduction curve |  |  |
| Dielectric strength | Coil-contact set | $\begin{aligned} & 2500 \mathrm{~V}_{\mathrm{rms}} \\ & 1200 \mathrm{~V}_{\mathrm{rms}} \\ & 2500 \mathrm{~V}_{\mathrm{ms}} \end{aligned}$ |  |  |
|  | Open contact |  |  |  |
|  | Adjacent contacts |  |  |  |
| Clearance/ creepage | Coil-contact circuit | $\geq 4 / 4 \mathrm{~mm}$ |  |  |
|  | Adjacent contact circuits | $\geq 3.5 / 9.5 \mathrm{~mm}$ | $\geq 2.6 / 3.5 \mathrm{~mm}$ | $\geq 1.8 / 3.5 \mathrm{~mm}$ |
| Insulation to IEC 60664-1 |  |  |  |  |
| Type of insulation | Coil-contact set |  |  |  |
|  | Open contact |  | Functional |  |
|  | Adjacent contact | Basic |  | Functional |
| Rated insulation voltage |  | 250 V |  |  |
| Pollution degree |  | 2 |  |  |
| Overvoltage category |  | III |  |  |
| Ambient temperature |  | $-40 . . .+70^{\circ} \mathrm{C}$ |  |  |
| Terminals |  | Screw terminals |  |  |
| Terminal torque according to IEC 61984 |  | 0.5 Nm |  |  |
|  | Max. | 0.7 Nm |  |  |
| Terminal capacity | Copper wire | $2 \times 2.5 \mathrm{~mm}^{2}$ |  |  |
|  | Stranded wire | $2 \times 2.5 \mathrm{~mm}^{2}$ |  |  |
|  | With ferrule (DIN 46228/1) | $2 \times 1.5 \mathrm{~mm}^{2}$ |  |  |

PT 78604

|  | 4 POLE |
| :---: | :---: |
| Rated current | 6 A |
| Rated voltage/ max. switching voltage AC | 250 V |
| Limiting continuous current | See reduction curve |
| Dielectric strength Coil-contact set <br>  Open contact <br>  Adjacent contacts | $\begin{aligned} & 2500 \mathrm{~V}_{\mathrm{rms}} \\ & 1200 \mathrm{~V}_{\mathrm{rm}} \\ & 2000 \mathrm{~V}_{\mathrm{ms}} \end{aligned}$ |
| Clearance/ creepage Coil-contact circuit <br>  <br> Adjacent contact circuits | $\begin{aligned} & \geq 4 / 4 \mathrm{~mm} \\ & \geq 1.8 / 3.5 \mathrm{~mm} \\ & \hline \end{aligned}$ |
| Insulation to IEC 60664-1 <br> Type of insulation <br> Coil-contact set <br> Open contact <br> Adjacent contact | Basic <br> Functional <br> Functional |
| Rated insulation voltage | 250 V |
| Pollution degree | 2 |
| Overvoltage category | III |
| Ambient temperature | $-40 \ldots+80^{\circ} \mathrm{C}$ |
| Terminals | Screw terminals |
| Terminal torque according to IEC 61984 Max. | $\begin{aligned} & 0.5 \mathrm{Nm} \\ & 0.7 \mathrm{Nm} \end{aligned}$ |
| Terminal capacity Copper wire <br>  Stranded wire <br>  With ferrule (DIN 46228/1) | $\begin{aligned} & 2 \times 2.5 \mathrm{~mm}^{2} \\ & 2 \times 2.5 \mathrm{~mm}^{2} \\ & 2 \times 1.5 \mathrm{~mm}^{2} \end{aligned}$ |

Relay Sockets \& Sets

Relay Sockets for Schrack, Series PT

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| DIN rail mounted plug-in socket for PT5 relays, 14 pole, 6A (4CO), with spring clamp terminals | -000- 0 - | PT7874P |
| Jumper link, 12A, for PT socket PT7874P | -000000 | PT170P1 |
| DIN rail mounted plug-in socket for PT5 relays, 14-pole, 6A (4 CO) with screw terminals | -000-m | PT78742 |
| Retaining clip for PT socket PT7874P | -000-9, | PT17021 |
| Marking tag | -00\%-n | YPT16040 |
| DIN rail mounted plug-in socket for PT2 relays, 8 pole, 12A (2 CO) | -000-0, | YPT78702 |
| DIN rail mounted plug-in socket for PT3 relays, 11 pole, 10A (3 CO) | $+\infty=0$ | YPT78703 |
| DIN rail mounted plug-in socket for PT5 relays, 14 pole, 6A (4 CO) | - $-\cdots \cdots$ | YPT78704 |
| DIN rail mounted plug-in socket for PT5 relays, 14 pole, $6 \mathrm{~A}(4 \mathrm{CO})$ with protection diode | -000-9, | YPT78110 |
| Retaining clip | -000-9, | YPT16016 |
| Retaining clip for PT socket PT78xx | -000-c, | PT17024 |
| Jumper bar, 12A, for connection of up to 6 PT sockets YPT78... | -000-9, | PT170R6 |
| PCB socket for PT5 relays, 4 pole, 6A | -000-9, | PT78604 |
| Retaining clip metal | - $-\cdots \times 0$ | PT28800 |
| Retaining clip metal for PCB socket | - $-0 \times 0$ | PT28802 |
| Marking tag for socket PT787... | -000-9, | PT17040 |
| LED module, red, 6-24V AC/DC, EM07 | $+\infty, \infty$ | YMLRA024 |
| LED module, red, 6-24V DC, A1+, EM 18 | - $-\cdots \times 0$ | YMLRD024-A |
| LED module, red, 6-24V DC, A1-, EM08 | - $\times 0$ - | YMLRD024 |
| LED module, red, 110-230V AC, EM06 | -000-9, | YMLRW230 |
| LED module, green, 6-24V AC/DC, EM 11 | - +0000 | YMLGA024 |
| LED module, green 6-24V DC with protection diode, A1+, EM 12 | $+\infty=-6$ | YMLGD024 |
| LED module, green, 110-230V AC, EM 10 | $+\infty=0$ | YMLGW230 |
| Protection diode module 6-230V DC, Al+, EM09 | -000-9, | YMFDG230 |
| RC Network module 6-60V AC, EM02 | $+\infty \times \infty$ | YMRCW024 |
| RC Network module 110-230V AC, EM03 |  | YMRCW230 |
| Varistor module, 24V-AC, EM04 | $\begin{array}{\|ccc} \hline-000 & -\infty \\ \hline \end{array}$ | YMVAW024 |
| Varistor module 230V-AC, EM05 | -000-0, | YMVAW230 |

Relay Sockets \& Sets

Relay Sockets for Schrack, Series MT





MTMFOWOO

Schrack-Info

- DIN rail snap mounting
- Screw mounting with centering screw
- Pozidrive screws with lift terminals
- Logical arrangement of I/O terminals
- White labelling field

Dimensions (mm)


Relay Sockets for Schrack, Series MT
Circuit Diagrams
MMR78701

Time Module Functionalities

| A | $\begin{aligned} & \mathrm{U} / \mathrm{t} \square \square \mathrm{~L} \\ & \mathrm{R} \longrightarrow \square \end{aligned}$ |
| :---: | :---: |
| B | $\square$ |
| C |  |
| $D$ |  |
| $E$ |  |
| F | $\begin{aligned} & \mathrm{U} / \mathrm{t} \square \mathrm{~T} \\ & \mathrm{R} \end{aligned}$ |
| $G$ | $\begin{aligned} & \mathrm{U} / \mathrm{t}+\boldsymbol{+} \mathrm{C}+\boldsymbol{+} \mathrm{C} \\ & \mathrm{R} \end{aligned}$ |
| H | $\begin{aligned} & \mathrm{U} / \mathrm{t}+\boldsymbol{\square} \mathrm{C} \\ & \mathrm{R} \end{aligned}$ |

Circuit Diagrams \& Time Module Functionalities
$\qquad$

| A | Response delayed <br> MTMZOW00, MTMFOW00 |
| :---: | :--- |
| B | Reset delayed <br> MTMFOW00 |
| C | Single shot leading edge with pulse control <br> MTMFOW00 |
| D | Single shot trailing edge <br> MTMFOW00 |
| E | Response delayed with control contact <br> MTMFOW00 |
| F | Single shot leading edge <br> MTMFOW00 |
| G | Flashing pause starting <br> MTMFOW00 |
| H | Flashing pulse starting <br> MTMFOW00 |

## Relay Sockets \& Sets

## Relay Sockets for Schrack, Series MT

- Technical Data


Function Modules For Socket MT78740

| Rated voltage | $24 \ldots 240 \mathrm{~V} \mathrm{DC} / \mathrm{AC}$ |
| :--- | :---: |
| Mains frequency | $48 \ldots 63 \mathrm{~Hz}$ |
| Repeat accuracy | $\pm 0.5 \%$ |
| Repeatability | $\leq 0.5 \%$ or 5 ms |
| Temperature influence | $\leq 0.1 \%$ pro ${ }^{\circ} \mathrm{C}$ |
| Time ranges switchable | $0.05 \mathrm{~s} . .240 \mathrm{~h} \mathrm{in} 8$ ranges |
| Ambient temperature | $-25 \ldots+55^{\circ} \mathrm{C}$ |



Relay Sockets for Schrack, Serie RM (RMxx2xxx )


## Schrack-Info

- $2 / 3$ poles $10 / 16 \mathrm{~A}$
- RM socket for RMxx2x types (Faston 187):
RM332, RM632, RM732

Dimensions (mm)


Technical data

| Rated current |  | 16 A |
| :---: | :---: | :---: |
| Rated voltage |  | 250 V |
| Dielectric strength | Coil-contact set | $2500 \mathrm{~V}_{\text {ms }}$ |
|  | Open contact | $1500 \mathrm{~V}_{\mathrm{ms}}$ |
|  | Adjacent contact | $2500 \mathrm{~V}_{\text {ms }}$ |
| Clearance/ creepage coil-contact circuit |  | $\geq 4.0 / 14.9 \mathrm{~mm}$ |
| Insulation to IEC 60664-1 |  |  |
| Type of insulation | Coil-contact set | Basic |
|  | Open contact | Functional |
|  | Adjacent contact | Basic |
| Rated insulation voltage |  | 250 V |
| Pollution degree |  | 2 |
| Overvoltage category |  | III |
| Ambient temperature |  | $-40 . . .+40^{\circ} \mathrm{C}$ |
| Terminals |  | Screw terminals |
| Terminal torque according to IEC 61984 |  | 0.8 Nm |
|  | Max. | 1.2 Nm |
| Terminal capacity | Copper wire | $2 \times 2.5 \mathrm{~mm}^{2}$ |
|  | Stranded wire | $2 \times 2.5 \mathrm{~mm}^{2}$ |
|  | With ferrule (DIN 46228/1) | $2 \times 1.5 \mathrm{~mm}^{2}$ |


| DESCRIPTION | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |
| DIN rail mounted plug-in socket, 11 pole, up to 16A, for Faston 187 | $-\infty 000$ | RM78705 |
| Retaining Clip | RM28802 |  |

Relay Sockets \& Sets

Print Relay Sockets for Schrack, Series RP5


## Schrack-Info

- Print socket for 2.5 mm Pinning
- Matches Relay Series RP5

Dimensions (mm)


## Technical Data

| Rated current |  | 12 A |
| :---: | :---: | :---: |
| Rated voltage/ max. switching voltage AC |  | $240 / 400 \mathrm{~V} \sim$ |
| Dielectric strength | Coil-contact set | $4000 \mathrm{~V}_{\text {ms }}$ |
| Clearance/ creepage | Coil-contact circuit | $\geq 4 / 4 \mathrm{~mm}$ |
| Insulation to IEC 60664-1 |  |  |
| Type of insulation | Coil-contact set | Basic |
|  | Open contact | Functional |
| Rated insulation voltage |  | 250 V |
| Pollution degree |  | 2 |
| Overvoltage category |  | III |
| Ambient temperature |  | $-40 . . .+80^{\circ} \mathrm{C}$ |
| Degree of protection DIN 40050 |  | IP20 |
| Terminals |  | PCB |
| Insertion cycles |  | A (10) |
| Max. insertion force total |  | 100 N |
| Mounting distance |  | Tight package |
| Resistance to soldering heat |  | $270{ }^{\circ} \mathrm{C} / 10 \mathrm{~s}$ |


| DESCRIPTION | AVAILABLE |
| :--- | :---: |
| PCB socket for RP5 relays with 2.5mm pinning | ORDER NO. |
| Bracket for PCB socket series RP5 | RP78600 |

Print Relay Sockets for Schrack, Series RT


- Print socket for 3.5 and 5 mm Pinning
- Matches Relay Series RT

Dimensions (mm)


## Relay Sockets \& Sets

## Print Relay Sockets for Schrack, Series RT

Reduction Curves


Reduction Curves


- Technical Data

RP 78601, RP 78602


## Print Relay Sockets for PT Relays



Schrack-Info

- Print socket, 4 poles, 6 A

Dimensions (mm)


Technical Data

|  | 4 POLE |
| :---: | :---: |
| Rated current | 6 A |
| Rated voltage/ max. switching voltage AC | $250 \mathrm{~V} \sim$ |
| Limiting continuous current | See reduction curve |
| Dielectric strength Coil/contact set <br>  Open contact <br>  Adjacent contacts | $\begin{aligned} & 2500 \mathrm{~V}_{\mathrm{rms}} \\ & 1200 \mathrm{~V}_{\mathrm{rms}} \\ & 2000 \mathrm{~V}_{\mathrm{rms}} \end{aligned}$ |
| Clearance/ creepage Coil contact circuit <br>  Adjacent contact circuits | $\begin{aligned} & \geq 4 / 4 \mathrm{~mm} \\ & \geq 1.8 / 3.5 \mathrm{~mm} \\ & \hline \end{aligned}$ |
| Insulation to IEC 60664-1 <br> Type of insulation <br> Coil-contact set <br> Open contact <br> Adjacent contact | Basic <br> Functional Functional |
| Rated insulation voltage | 250 V |
| Pollution degree | 2 |
| Overvoltage category | III |
| Ambient temperature | $-40 \ldots+80^{\circ} \mathrm{C}$ |
| Terminals | Screw terminals |
| Terminal torque accrding to IEC 61984 Max. | $\begin{aligned} & 0.5 \mathrm{Nm} \\ & 0.7 \mathrm{Nm} \end{aligned}$ |
| Terminal capacity Copper wire <br>  Stranded wire <br>  With ferrule (DIN 46228/1) | $\begin{aligned} & 2 \times 2.5 \mathrm{~mm}^{2} \\ & 2 \times 2.5 \mathrm{~mm}^{2} \\ & 2 \times 1.5 \mathrm{~mm}^{2} \end{aligned}$ |


| DESCRIPTION | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |
| PCB socket for PT5 relays, 4 pole, 6 A | PT78604 |  |
| Retaining clip metal for PCB socket | -000 |  |

Print Relays Schrack, Series PE


Schrack-Info

- $1 \mathrm{CO}, 5 \mathrm{~A}$
- Coil 5 up to 24 V DC
- 2.5 mm Pinning
- Low component height of 10 mm
- Coil power rating: 200 mW
- Cadmium-free contact material
- Ambient temperature $85^{\circ} \mathrm{C}$
- For industrial equipment electronics, whiteware, battery powered devices

Dimensions (mm)


Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range


Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range

| $\mathbf{A}$ | Max. DC rated breaking capacity |
| :---: | :---: |
| $\mathbf{B}$ | Electrical endurance |
| $\mathbf{C}$ | Coil operating range DC |
| $\mathbf{\# 1}$ | Resistive load |
| \#2 | 250 V AC resistive load |
| \#3 | U $_{\text {rtd }}$ Rated coil voltage |
| $\mathbf{I}$ | DC current in $[\mathrm{A}]$ |
| $\mathbf{I 1}$ | Switching current $[\mathrm{A}]$ |
| $\mathbf{U}$ | DC voltage in $[\mathrm{V}]$ |
| $\mathbf{U} / \mathbf{U}_{\text {rtd }}$ | Coil voltage in $[\mathrm{V}]$ |
| $\mathbf{Z}$ | Cycles |
| $\boldsymbol{v}$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |

- Print Relays Schrack, Series PE
- Technical Data


## CONTACT DATA

| Number of contacts and type |  | 1 CO contact |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Rated current |  | 5 A |  |  |
| Rated voltage/ max. switching voltage AC |  | 250 / 400 V |  |  |
| Max. rated breaking capacity AC |  | 1250 V |  |  |
| Contact material |  | AgNi 90/1 |  |  |
| Frequency of operation | With Load | 360 ops/h |  |  |
|  | Without Load | $72000 \mathrm{ops} / \mathrm{h}$ |  |  |
| Operate release time |  |  |  |  |
| Bounce time |  | $\text { typ. } 4 / 6 \text { m }$ |  |  |
| COIL DATA |  |  |  |  |
| Operative range, IEC 61810 |  | 2 |  |  |
| INSULATION DATA |  |  |  |  |
| Initial dielectric strength | Open contacts | $\begin{aligned} & 1000 \mathrm{~V}_{\mathrm{rms}} \\ & 4000 \mathrm{~V}_{\mathrm{rms}} \end{aligned}$ |  |  |
|  | Conatct and coil |  |  |  |
| Initial insulation resistance | Open contact set | $>10 \times 10^{9} \Omega$ |  |  |
| Clearance/ creepage | Contact and coil | $\geq 3.2 / 4 \mathrm{~mm}$ |  |  |
| Ambient temperature |  | $-40 \ldots+85{ }^{\circ} \mathrm{C}$ |  |  |
| DESCRIPTION |  |  | AVAILABLE | ORDER NO. |
| 5V-DC, 1 CO, 5A |  |  |  | PE014005 |
| 12V-DC, 1 CO, 5A |  |  |  | PE014012 |
| 24V-DC, 1 CO, 5A |  |  |  | PE014024 |

Print Relays

Print Relays Schrack, Series RE


- Schrack-Info
- 1 NO, 6 A
- Coil 5 up to 24 V DC
- PCB area $200 \mathrm{~mm}^{2}$
- Optimised height of 10.6 mm
- Coil power rating: 200 mW
- Wash proof
- For programmable controls, timer relays, temperature controllers, interface boards, whiteware

Dimensions (mm)


Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range


Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range

| A | Max. DC rated breaking capacity |
| :---: | :---: |
| B | Electrical endurance |
| C | Coil operating range DC |
| \#1 | Resistive load |
| \#2 | 250 V AC resistive load |
| \#3 | Recommended voltage range |
| $\mathbf{I}$ | DC current in $[\mathrm{A}]$ |
| $\mathbf{I I}$ | Switching current $[\mathrm{A}]$ |
| $\mathbf{U}$ | DC voltage in $[\mathrm{V}]$ |
| $\mathbf{U} / \mathbf{U}_{\text {trd }}$ | Coil voltage in $[\mathrm{V}]$ |
| $\mathbf{Z}$ | Cycles |
| $\boldsymbol{U}$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |

- Print Relays Schrack, Series RE
- Technical Data


## CONTACT DATA



Print Relays

Print Relays Schrack, Series RP


- 1 pole $8 / 16 \mathrm{~A}$
- 1 CO
- Pinning $3.5 \mathrm{~mm}(8 \mathrm{~A})$ or $5 \mathrm{~mm}(16 \mathrm{~A})$
- For mains adaptors, household appliances, heating controls, cabling and wiring installations


## RPII/2

- 2 poles 8 A
- 1 CO
- Pinning 5 mm
- For UPS, household appliances


## RP Power PCB Relay Cards E

- Horizontal or vertical design
- 1 pole 8 A
- 1 CO
- Wash proof
- For I/O modules, heating controls, time switches

RP Overview

| Relais | Number of CO contacts | Rated current <br> [A] | Coil |  | Pinning <br> [mm] | Contact material | RPII/1 | RPII/2 | RP Relay Cards E Vertical | RP Relay Cards E Horizontal |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| RP310012-A | 1 | 16 | DC | 12 V | 5 | AgCdO | X |  |  |  |
| RP310024-A | 1 | 16 | DC | 24 V | 5 | AgCdO | X |  |  |  |
| RP418024-A | 1 | 8 | DC | 24 V | 3.5 | AgCdO | X |  |  |  |
| RP710024-A | 1 | 16 | DC | 24 V | 5 | AgCdO | X |  |  |  |
| RP420012-B | 2 | 8 | DC | 12 V | 5 | AgCdO |  | X |  |  |
| RP420024-B | 2 | 8 | DC | 24 V | 5 | AgCdO |  | X |  |  |
| RP420524-B | 2 | 8 | AC | 24 V | 5 | AgCdO |  | X |  |  |
| RP420730-B | 2 | 8 | AC | 230 V | 5 | AgCdO |  | X |  |  |
| RP421024-B | 2 | 8 | DC | 24 V | 5 | AgNi0. 15 |  | X |  |  |
| RP421048-B | 2 | 8 | DC | 48 V | 5 | AgNi0. 15 |  | X |  |  |
| RP421730-B | 2 | 8 | AC | 230 V | 5 | AgNi0. 15 |  | X |  |  |
| RP820024-A | 2 | 8 | DC | 24 V | 5 | AgCdO |  | X |  |  |
| RP510012-E | 1 | 8 | DC | 12 V | 2.5 | AgCdO |  |  | X |  |
| RP510024-E | 1 | 8 | DC | 24 V | 2.5 | AgCdO |  |  | X |  |
| RP610012-E | 1 | 8 | DC | 12 V | 2.5 | AgCdO |  |  |  | X |
| RP611024-E | 1 | 8 | DC | 24 V | 2.5 | AgNi0. 15 |  |  |  | X |

## Print Relays Schrack, Series RP

Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range


Dimensions \& Circuit Diagrams

| A | RPII/1 +2 |
| :---: | :---: |
| B | RPII/1, 8 A, 3.5 mm Pinning, 1 CO |
| C | RPII/1, 16 A, 5 mm Pinning, 1 CO |
| D | RPII/2, 8 A, 5 mm Pinning, 2 CO |


| $\mathbf{E}$ | RP PCB Vertical |
| :---: | :---: |
| $\mathbf{F}$ | $8 \mathrm{~A}, 2.5 \mathrm{~mm}$ Pinning, 1 CO, vertical |
| $\mathbf{G}$ | RP PCB Horizontal |
| $\mathbf{H}$ | $8 \mathrm{~A}, 2.5 \mathrm{~mm}$ Pinning, 1 CO, horizontal |

## Print Relays

- Print Relays Schrack, Series RP

Dimensions (mm) \& Circuit Diagrams


- Print Relays Schrack, Series RP

Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range

| A | RPII/1 Max. DC rated breaking capacity |
| :---: | :---: |
| B | RPII/1 Electrical endurance |
| C | RPII/1 Coil operating range DC |
| D | RPII/2 Max. DC rated breaking capacity |
| E | RPII/2 Electrical endurance |
| F | RPII/2 Coil operating range DC |
| G | RP Power PCB relay card E (horizontal// <br> vertikal) Max. DC rated breaking <br> capacity |
| H | RP Power PCB relay card E (horizontal// <br> vertikal) Coil operating range DC |
| \#1 | Resistive load |


| \#2 | 250 V AC Resistive load |
| :---: | :---: |
| \#3 | $U_{N}$ Nominal coil voltage |
| \#4 | 1 contact |
| \#5 | 2 contacts in series |
| 1 | DC current in [A] |
| 11 | Switching current in [A] |
| U | DC voltage in [V] |
| $\mathrm{U} / \mathrm{U}_{\mathrm{N}}$ | Coil voltage in [V] |
| Z | Cycles |
| $ง$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |

## - Print Relays Schrack, Series RP

Technical Data

| RPII/ 1 |  |  |  |
| :---: | :---: | :---: | :---: |
| CONTACT DATA |  | 8 A | 16 A |
| Number of contacts and type |  | 1 CO |  |
| Rated current |  | 8 A | 16 A |
| Rated voltage/ max. switching voltage AC |  | 250 / 400 V |  |
| Limiting making current |  | 16 A | 25 A |
| Max. rated breaking capacity AC |  | 2000 VA | 4000 VA |
| Contact material |  | AgNio. 15 | AgCdO |
| Frequency of operation | With Load Without Load | $\begin{gathered} 600 \mathrm{~h}^{-1} \\ 72000 \mathrm{~h}^{-1} \end{gathered}$ |  |
| Operate/ release time max. |  | $8 / 2 \mathrm{~m}$ |  |
| Bounce time |  | $2 / 4 \mathrm{~m}$ |  |
| COIL DATA |  |  |  |
| Operative range, IEC 61810 |  | 2 |  |
| INSULATION DATA |  |  |  |
| Initial dielectric strength | Open contacts | $1000 \mathrm{~V}_{\mathrm{ms}}$ |  |
|  | Conatct and coil | $4000 \mathrm{~V}_{\mathrm{ms}}$ |  |
| Clearance/ creepage | Contact and coil | $\geq 8 / 8 \mathrm{~mm}$ |  |
| Ambient temperature |  | $-40 \ldots+70^{\circ} \mathrm{C}$ |  |

RPII/2


RP Power PCB relay card E
CONTACT DATA

| Number of contacts and type | 8 A, wash fight |
| :--- | :---: |
| Rated current | 1 CO |
| Rated voltage/max. switching voltage AC | 8 A |
| Limiting making current, max. 4 s , duty factor $10 \%$ | $250 / 400 \mathrm{~V}$ |
| Max. rated breaking capacity AC | 15 A |
| Contact material | 2000 V |
| Frequency of operation | With Load |
|  | Without Load |

Print Relays Schrack, Series RP

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| RPII/1 |  |  |
| 12V-DC, 1 CO, 16A | -000\% | RP310012-A |
| 24V-DC, 1 CO, 16A | -000\% | RP310024-A |
| 24V-DC, 1 CO, 12A | $0 \times 0$ | RP418024-A |
| RPII/2 |  |  |
| 12V-DC, 2 CO, 8A |  | RP420012-B |
| 24V-DC, 2 CO, 8A |  | RP420024-B |
| $24 \mathrm{~V}-\mathrm{AC}, 2 \mathrm{CO}, 8 \mathrm{~A}$ |  | RP420524-B |
| 230V-AC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | 0000 | RP420730-B |
| 24V-DC, 2 CO, 8A |  | RP421024-B |
| $230 \mathrm{~V}-\mathrm{AC}, 2 \mathrm{CO}, 8 \mathrm{~A}$ | -00\% | RP421730-B |
| 24V-DC, 2 CO, 8A |  | RP820024-A |
| RP Power PCB Relay Cards E Vertical |  |  |
| 12V-DC, 1 CO, 8A | -000\% | RP510012-E |
| 24V-DC, 1 CO, 8A |  | RP510024-E |
| RP Power PCB Relay Cards E Horizontal |  |  |
| 12V-DC, 1 CO, 8A |  | RP610012-E |
| 24V-DC, 1 CO, 8A | 000000 | RP611024-E |

## Print Relays



Schrack-Info
RTI

- 1 pole $12 / 16$ A, AC or DC coil
- 1 CO or 1 NO
- Sensitive coil $400 \mathrm{~mW} / 0.75$ VA
- $5 \mathrm{kV}, 10 \mathrm{~mm}$ coil/contact
- Appliance class II (VDE 0700)
- Safe disconnection compliant with VDE 0160 in combination with socket YRT78626
- Ambient temperature $85^{\circ} \mathrm{C}$ (DC coil)
- Low component height 15.7 mm
- Gold plated contacts available
- Print and screw type sockets
- For boiler controls, timer relays, garage door controls, vending machines, interface modules


## RT1 Inrush and High Inrush

- 1 pole 16 A, for high peak inrush current
- 1 NO
- RTS3T024 (= High Inrush) with Tungsten early-make contact
- Sensitive coil 400 mW
- $5 \mathrm{kV}, 10 \mathrm{~mm}$ coil/contact
- Appliance class II (VDE 0700)
- Ambient temperature $85^{\circ} \mathrm{C}$
- Low component height 15.7 mm
- Print and screw type sockets
- For household appliances, heating controls, light controls, building automation


## RT2

- 2 poles 8 A, AC or DC coil
- 2 CO
- Sensitive coil 400 mW
- $5 \mathrm{kV}, 10 \mathrm{~mm}$ coil/contact
- Appliance class II (VDE 0700)
- Safe disconnection compliant with VDE 0160 in combination with socket YRT78626
- Low component height 15.7 mm
- Print and screw type sockets
- For household appliances, heating controls, emergency lighting, modems


## RT2 Bistable

- 2 poles 8 A
- 2 CO
- Bistable version with one (= RT424A24) or two coils (RT424F 12 or RT424F24)
- Reinforced insulation
- For battery powered devices or memory storage applications
- Print Relays Schrack, Series RT
- RT Overview

| Relais | Number of contacts and type | Rated current <br> [A] | Coil |  | Pinning <br> [mm] | Contact material | RT1 | $\underset{\text { RTI }}{\text { Inrush }}$ | RTI High Inrush | RT2 | $\begin{gathered} \text { RT2 } \\ \text { Bistable } \\ \hline \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| RT114012 | 1 CO | 12 | DC | 12 V | 3.5 | AgNi90/10 | X |  |  |  |  |
| RT114024 | 1 CO | 12 | DC | 24 V | 3.5 | AgNi90/10 | X |  |  |  |  |
| RT114524 | 1 CO | 12 | AC | 24 V | 3.5 | AgNi90/10 | X |  |  |  |  |
| RT214012 | 1 CO | 12 | DC | 12 V | 5 | AgNi90/10 | X |  |  |  |  |
| RT214024 | 1 CO | 12 | DC | 24 V | 5 | AgNi90/10 | X |  |  |  |  |
| RT214730 | 1 CO | 12 | AC | 230 V | 5 | AgNi90/10 | X |  |  |  |  |
| RT314005 | 1 CO | 16 | DC | 5 V | 5 | AgNi90/10 | X |  |  |  |  |
| RT314012 | 1 CO | 16 | DC | 12 V | 5 | AgNi90/10 | X |  |  |  |  |
| RT314024 | 1 CO | 16 | DC | 24 V | 5 | AgNi90/10 | X |  |  |  |  |
| RT334024 | 1 NO | 16 | DC | 24 V | 5 | AgNi90/10 | X |  |  |  |  |
| RT314110 | 1 CO | 16 | DC | 110 V | 5 | AgNi90/10 | X |  |  |  |  |
| RT314524 | 1 CO | 16 | AC | 24 V | 5 | AgNi90/10 | X |  |  |  |  |
| RT314730 | 1 CO | 16 | AC | 230 V | 5 | AgNi90/10 | X |  |  |  |  |
| RT315730 | 1 CO | 16 | AC | 230 V | 5 | AgNi90/10 hgp* | X |  |  |  |  |
| RT33K012 | 1 NO | 16 | DC | 12 V | 5 | AgNi90/10 |  | X |  |  |  |
| RT33K024 | 1 NO | 16 | DC | 24 V | 5 | $\mathrm{AgNi90} / 10$ |  | X |  |  |  |
| RT31L024 | 1 CO | 16 | DC | 24 V | 5 | $\mathrm{AgSnO}_{2}$ |  | X |  |  |  |
| RTS3T024 | 1 NO | 16 | DC | 24 V | 5 | $\mathrm{T}^{* *}+\mathrm{AgSnO}_{2}$ |  |  | X |  |  |
| RT424006 | 2 CO | 8 | DC | 6 V | 5 | AgNi90/10 |  |  |  | X |  |
| RT424012 | 2 CO | 8 | DC | 12 V | 5 | AgNi90/10 |  |  |  | X |  |
| RT424024 | 2 CO | 8 | DC | 24 V | 5 | AgNi90/10 |  |  |  | X |  |
| RT425024 | 2 CO | 8 | DC | 24 V | 5 | AgNi90/10 hgp* |  |  |  | X |  |
| RTE24024 | 2 CO | 8 | DC | 24 V | 5 | AgNi90/10 |  |  |  | X |  |
| RT424048 | 2 CO | 8 | DC | 48 V | 5 | AgNi90/10 |  |  |  | X |  |
| RT424060 | 2 CO | 8 | DC | 60 V | 5 | AgNi90/10 |  |  |  | X |  |
| RT424110 | 2 CO | 8 | DC | 110 V | 5 | AgNi90/10 |  |  |  | X |  |
| RT424524 | 2 CO | 8 | AC | 24 V | 5 | AgNi90/10 |  |  |  | X |  |
| RT424548 | 2 CO | 8 | AC | 48 V | 5 | AgNi90/10 |  |  |  | X |  |
| RT424615 | 2 CO | 8 | AC | 115V | 5 | AgNi90/10 |  |  |  | X |  |
| RT425615 | 2 CO | 8 | AC | 115 V | 5 | AgNi90/10 hgp* |  |  |  | X |  |
| RT424730 | 2 CO | 8 | AC | 230 V | 5 | AgNi90/10 |  |  |  | X |  |
| RT425730 | 2 CO | 8 | AC | 230 V | 5 | AgNi90/10 hgp* |  |  |  | X |  |
| RT424A24 | 2 CO | 8 | DC | 24 V | 5 | AgNi90/10 |  |  |  |  | X |
| RT424F12 | 2 CO | 8 | DC | 12 V | 5 | AgNi90/10 |  |  |  |  | X |
| RT424F24 | 2 CO | 8 | DC | 24 V | 5 | AgNi90/10 |  |  |  |  | X |

*hgp = hard gold-plated

* *Tungsten pre-contact

Dimensions (mm)


Dimensions
A $\quad$ RT1, RT1 Inrush, RT1 High Inrush, RT2 und RT2 Bistable 1 coil (RT424A24)
B $\quad$ RT2 Bistable 2 coils (RT424F 12 bzw. RT424F24)

## Print Relays

## Print Relays Schrack, Series RT

Rated Breaking Capacity \& Coil Operating Voltage Range RT 1


Inrush and High Inrush Rated Breaking Capacity \& Coil Operating Voltage Range RT1


Rated Breaking Capacity \& Coil Operating Voltage Range RT2


- Print Relays Schrack, Series RT

Rated Breaking Capacity \& Coil Operating Voltage Ranges

| RTI |  |
| :---: | :---: |
| $\mathbf{A}$ | Max. DC rated breaking capacity |
| $\mathbf{B}$ | Coil operating range DC |
| $\mathbf{C}$ | Coil operating range AC |
| \#1 | Resistive load |
| \#2 | 16 A version |
| \#3 | Recommended voltage range in [V] |
| $\mathbf{U}$ | DC voltage in [V] |
| $\mathbf{U} / \mathbf{U}_{\text {rtd }}$ | Coil voltage in $[\mathrm{V}]$ |
| $\mathbf{I}$ | DC current in $[\mathrm{A}]$ |
| $\boldsymbol{\vartheta}$ | Ambient temperature in [ $\left.{ }^{\circ} \mathrm{C}\right]$ |


| RT1 Inrush und High Inrush |  |
| :---: | :---: |
| A | Max. DC rated breaking capacity |
| B | Coil operating range DC (RT3) |
| $\mathbf{C}$ | Coil operating range DC (RTS) |
| \#1 | Resistive load |
| \#2 | Recommended voltage range in [V] |
| \#3 | Monostable version |
| $\mathbf{U}$ | DC voltage in [V] |
| $\mathbf{U / U} \mathbf{U r t a}$ | Coil voltage in [V] |
| $\mathbf{I}$ | DC current in [A] |
| $\boldsymbol{U}$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |

RT2

| A | Max. DC rated breaking capacity |
| :---: | :---: |
| B | Coil operating range DC |
| $\mathbf{C}$ | Coil operating range AC |
| \#1 | 1 contact |
| \#2 | 2-pole resistive load |
| \#3 | 2 contacts in series |
| \#4 | Recommended voltage range in [V] |
| \#5 | Rated coil voltage in [V] |
| $\mathbf{U}$ | DC voltage in [V] |
| $\mathbf{U} / \mathbf{U}_{\text {rtd }}$ | Coil voltage in [V] |
| $\mathbf{I}$ | DC current in [A] |
| $\boldsymbol{U}$ | Ambient temperature in [ $\left.{ }^{\circ} \mathrm{C}\right]$ |


| RT2 Bistable |  |
| :---: | :---: |
| A | Max. DC rated breaking capacity |
| B | Electrical endurance |
| C | Coil operating range, 1 coil |
| D | Coil operating range, 2 coils |
| \#1 | 1 contact |
| \#2 | 2 contacts in series |
| \#3 | 2-pole resistive load |
| \#4 | 250 V AC resistive load |
| \#5 | Max. SET |
| \#6 | Max. SET and RESET 16 A, $2 \times 8 \mathrm{~A}$ |
| \#7 | Max. RESET |
| \#8 | $\mathrm{U}_{\text {rid }}$ Rated coil voltage |
| \#9 | SET |
| \#10 | RESET |
| \#11 | Max. SET and RESET |
| U | DC voltage in [V] |
| $\mathbf{U} / \mathbf{U r t d}^{\text {rem }}$ | Coil voltage in [V] |
| I | DC current in [A] |
| 11 | Switching current in [A] |
| Z | Cycles |
| $ง$ | Ambient temperature in [ ${ }^{\circ} \mathrm{C}$ ] |

## Print Relays

- Print Relays Schrack, Series RT

Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range RT2 Bistable


- Print Relays Schrack, Series RT

Rated Breaking Capacity \& Coil Operating Voltage Ranges

| RTI |  |
| :---: | :---: |
| $\mathbf{A}$ | Max. DC rated breaking capacity |
| $\mathbf{B}$ | Coil operating range DC |
| $\mathbf{C}$ | Coil operating range AC |
| \#1 | Resistive load |
| \#2 | 16 A version |
| \#3 | Recommended voltage range in [V] |
| $\mathbf{U}$ | DC voltage in [V] |
| $\mathbf{U} / \mathbf{U}_{\text {rtd }}$ | Coil voltage in $[\mathrm{V}]$ |
| $\mathbf{I}$ | DC current in $[\mathrm{A}]$ |
| $\boldsymbol{\vartheta}$ | Ambient temperature in [ $\left.{ }^{\circ} \mathrm{C}\right]$ |


| RT1 Inrush und High Inrush |  |
| :---: | :---: |
| $\mathbf{A}$ | Max. DC rated breaking capacity |
| B | Coil operating range DC (RT3) |
| $\mathbf{C}$ | Coil operating range DC (RTS) |
| \#1 | Resistive load |
| \#2 | Recommended voltage range in [V] |
| \#3 | Monostable version |
| $\mathbf{U}$ | DC voltage in [V] |
| $\mathbf{U / U} \mathbf{U r t a}$ | Coil voltage in [V] |
| $\mathbf{I}$ | DC current in [A] |
| $\boldsymbol{U}$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |

RT2

| $\mathbf{A}$ | Max. DC rated breaking capacity |
| :---: | :---: |
| $\mathbf{B}$ | Coil operating range DC |
| $\mathbf{C}$ | Coil operating range AC |
| \#1 | 1 contact |
| \#2 | 2-pole resistive load |
| \#3 | 2 contacts in series |
| \#4 | Recommended voltage range in [V] |
| \#5 | Rated coil voltage in [V] |
| $\mathbf{U}$ | DC voltage in [V] |
| $\mathbf{U} / \mathbf{U}_{\text {rtd }}$ | Coil voltage in [V] |
| $\mathbf{I}$ | DC current in [A] |
| $\boldsymbol{\vartheta}$ | Ambient temperature in [ $\left.{ }^{\circ} \mathrm{C}\right]$ |


| RT2 Bistable |  |
| :---: | :---: |
| A | Max. DC rated breaking capacity |
| B | Electrical endurance |
| C | Coil operating range, 1 coil |
| D | Coil operating range, 2 coils |
| \#1 | 1 contact |
| \#2 | 2 contacts in series |
| \#3 | 2-pole resistive load |
| \#4 | 250 V AC resistive load |
| \#5 | Max. SET |
| \#6 | Max. SET and RESET 16 A, $2 \times 8 \mathrm{~A}$ |
| \#7 | Max. RESET |
| \#8 | $\mathrm{U}_{\text {rid }}$ Rated coil voltage |
| \#9 | SET |
| \#10 | RESET |
| \#11 | Max. SET and RESET |
| U | DC voltage in [V] |
| $\mathbf{U} / \mathbf{U r t d}^{\text {rem }}$ | Coil voltage in [V] |
| I | DC current in [A] |
| 11 | Switching current in [A] |
| Z | Cycles |
| $ง$ | Ambient temperature in [ ${ }^{\circ} \mathrm{C}$ ] |

Print Relays

- Print Relays Schrack, Series RT

Wiring Diagrams



B
\# 2.1


C



D
\#6. 1


Circuit Diagrams

| A | RT1 |
| :---: | :--- |
| B | RT1 Inrush and High Inrush |
| C | RT2 |
| D | RT2 Bistable |
| \#1.1 | 12 A, pinning 3.5 mm |
| \#1.2 | 1 CO |
| \#1.3 | 1 NO |
| \#2.1 | 12 A, pinning 5 mm |
| \#2.2 | 1 CO |
| \#2.3 | 1 NO |
| \#3.1 | 16 A, pinning 5 mm |


| \#3.2 | 1 CO |
| :--- | :--- |
| \#3.3 | 1 NO |
| \#4.1 | 16 A, pinning 5 mm |
| \#4.2 | 1 NO |
| \#4.3 | 1 CO |
| \#5.1 | 8 A, pinning 5 mm |
| \#5.2 | 2 CO |
| \#5.3 | 2 NO |
| \#6.1 | 8 A, pinning 5 mm |
| \#6.2 | For 2 coil version only |
| \#6.3 | 2 CO |

[^1]
## Print Relays Schrack, Series RT

- Technical Data (Part 1)

| CONTACT DATA |  | RT1 |  |
| :---: | :---: | :---: | :---: |
|  |  | 12 A | 16 A |
| Number of contacts and type |  | 1 CO or 1 NO contact |  |
| Contact style |  | Single contact |  |
| Rated current |  | 12 A | 16 A |
| Rated voltage/ max. switching voltage AC |  | $250 / 400 \mathrm{~V}$ |  |
| Limiting continious current |  | 12 A | 16 A, UL: 20 A |
| Max. rated breaking capacity AC |  | 3000 VA | 4000 VA |
| Limiting making current (max. 4 s at 10 \% DF) |  | 25 A | 30 A |
| Contact material |  | AgNi 90/10, $\mathrm{AgNi} 90 / 10$ hard gold plated |  |
| COIL DATA |  |  |  |
| Rated voltage | DC coil | $\begin{gathered} \hline 5 . .110 \mathrm{~V} \\ 24 . . .230 \mathrm{~V} \sim \end{gathered}$ |  |
|  | AC coil |  |  |
| Rated power | DC coil | 400 mW |  |
|  | AC coil | 0.74 VA |  |
| Operative range, IEC 61810 |  | 2 |  |
| Coil insulation system according to UL1446 |  | Class F |  |
| Operation-/ release voltage/ coil resistance | 24 V DC coil | $16.8 \mathrm{~V} / 2.4 \mathrm{~V} / 1440 \Omega \pm 10 \%$ |  |
| at ambient temperature $23{ }^{\circ} \mathrm{C}$ | 230 V AC coil | $172.5 \mathrm{~V} / 34.5 \mathrm{~V} / 32500 \Omega \pm 10 \%$ |  |

RTI Inrush and High Inrush

| CONTACT DATA |  | RT3 | RTS |
| :---: | :---: | :---: | :---: |
| Number of contacts and type |  | 1 CO oder 1 NO | 1 NO |
| Contact style |  | Single contact |  |
| Rated current |  | 16 A |  |
| Rated voltage / max. switching voltage AC |  | $250 / 400 \mathrm{~V} \sim$ |  |
| Limiting continuous current |  | 16 A |  |
| Max. rated breaking capacity AC |  | 4000 VA |  |
| Limiting making current |  | 30 A (max. 4 s at $10 \%$ DF) | 165 A (max. 20 ms incandescent lamps) <br> 800 A (max. $200 \mu$ s fluorescent lamps) |
| Contact material |  | $\mathrm{AgNi} 90 / 10, \mathrm{AgSnO}_{2}$ | W (lead contact) $+\mathrm{AgSnO}_{2}$ |
| COIL DATA |  |  |  |
| Rated voltage |  | 5...110 V DC |  |
| Rated power |  | 400 mW |  |
| Operative range, IEC 61810 |  | 2 |  |
| Coil insulation system according to UL1446 |  | Class F |  |
| Operation-/ release voltage/ coil resistance | 24 V DC coil | $16.8 \mathrm{~V} / 2.4 \mathrm{~V} / 1440 \Omega \pm 10 \%$ |  |
| at ambient temperature $23{ }^{\circ} \mathrm{C}$ | 230 V AC coil | - | $172.5 \mathrm{~V} / 34.5 \mathrm{~V} / 32500 \Omega \pm 10 \%$ |

## - Print Relays Schrack, Series RT

- Technical Data (Part 2)


RT2 Bistable

| CONTACT DATA |  | 8 A |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Number of contacts and type |  | 2 CO |  |  |
| Rated current |  | $8 \mathrm{~A}, \mathrm{UL}$ : 10 A |  |  |
| Rated voltage/ max. switching voltage AC |  | $250 / 400 \mathrm{~V}$ |  |  |
| Limiting continuous current |  | $8 \mathrm{~A}, \mathrm{UL}$ : 10 A |  |  |
| Max. rated breaking capacity AC |  | 2000 VA |  |  |
| Limiting making current (max. 4 s at $10 \%$ DF) |  | 15 A |  |  |
| Contact material |  | AgNi 90/10 |  |  |
| Frequency of operation | With Load Without Load |  | $\begin{gathered} 900 \mathrm{~h}^{-1} \\ 72000 \mathrm{~h}^{-1} \end{gathered}$ |  |
| Operate/release time max. |  | $10 / 5 \mathrm{~ms}$ |  |  |
| Bounce time |  | $4 / 9 \mathrm{~ms}$ |  |  |
|  |  |  |  |  |
| COIL DATA |  | 1 COIL |  |  |
| Magnetic system |  | Bistable |  |  |
| Operative range, IEC 61810 |  | 2 |  |  |
| Coil voltage range DC |  | 24 V |  |  |
| Limiting voltage, \% of rating voltage |  | 120 \% |  |  |
| Energization duration at < 10 \% duty factor | Min. | $30 \mathrm{~ms}$ |  |  |
|  | Max. |  |  |  |
| Coil insulation system according to UL1446 |  | Class F |  |  |
| BISTABLE COIL - OPERATION* |  | 1 COIL |  |  |
| Coil terminals |  | A1 |  | A2 |
| Operate |  | + |  | - |
| Reset |  | - |  | + |


| COIL DATA |  | 2 COILS |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Magnetic system |  | Bistable |  |  |
| Operative range, IEC 61810 |  | 2 |  |  |
| Coil voltage range DC |  | $12 / 24 \mathrm{~V}$ |  |  |
| Limiting voltage, \% of rating voltage |  | 150 \% |  |  |
| Energization duration at < 10 \% duty factor | Min. | 30 ms |  |  |
|  | Max. | $1 \text { min. }$ |  |  |
| Coil insulation system according to UL1446 |  | Class F |  |  |
| BISTABLE COILS - OPERATION* |  | 2 COILS |  |  |
| Coil terminals |  | A1 | A3 | A2 |
| Operate |  |  | + | - |
| Reset |  | - | + |  |


| INSULATION DATA |  |  |
| :--- | :--- | :--- |
| Initial dielectric strength | Open contacts | $1000 \mathrm{~V}_{\text {ms }}$ |
|  | Conatct and coil | $5000 \mathrm{~V}_{\text {ms }}$ |
|  | Adjacent contacts | $2500 \mathrm{~V}_{\text {rms }}$ |
| Clearance/ creepage | Conatct and coil | $>10 / 10 \mathrm{~mm}$ |
|  | Adjacent contacts | $>3 / 4 \mathrm{~mm}$ |
| Ambient temperature | Bistable 1 coil | $-10 \ldots+85^{\circ} \mathrm{C}$ |
|  | Bistable 2 coils | $-40 \ldots+85^{\circ} \mathrm{C}$ |

[^2]- Print Relays Schrack, Series RT

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| Print Relays RT 1, 12A |  |  |
| 12V-DC, 1 CO, 12A |  | RT114012 |
| $24 \mathrm{~V}-\mathrm{DC}, 1 \mathrm{CO}, 12 \mathrm{~A}$ | $+\infty=-\pi$ | RT114024 |
| $24 \mathrm{~V}-\mathrm{AC}, 1 \mathrm{CO}, 12 \mathrm{~A}$ | - $-\infty$ | RT114524 |
| 12V-DC, 1 CO, 12A | - | RT214012 |
| 24V-DC, 1 CO, 12A |  | RT214024 |
| 230V-AC, 1 CO, 12A | -00\% | RT214730 |
| Print Relays RT1, 16A |  |  |
| 5V-DC, 1 CO, 16A |  | RT314005 |
| 12V-DC, 1 CO, 16A | - $-0 \times 0$ | RT314012 |
| 24 V -DC, 1 CO, 16A | $+\infty-\infty$ | RT314024 |
| 24 V -DC, $1 \mathrm{NO}, 16 \mathrm{~A}$ | - $-0-0.7$ | RT334024 |
| 24V-AC, 1 CO, 16A | -000-9, | RT314524 |
| 230V-AC, 1 CO, 16A | - $-\infty$ | RT314730 |
| 230V-AC, 1 CO, 16A, gold plated | -000\% | RT315730 |
| Print Relays RT1 Inrush |  |  |
| 12V-DC, 1 NO, 16A | -000-9, | RT33K012 |
| 24V-DC, 1 NO, 16A | - $-\infty \times 0$ | RT33K024 |
| 24V-DC, 1 CO, 16A | - -800 | RT31 L024 |
| Print Relays RT1 High Inrush |  |  |
| 24V-DC, 1 NO, 16A | $+\infty-\infty$ | RTS3T024 |
| Print Relays RT2 |  |  |
| 6V-DC, 2 CO, 8A | - $-6 \times 8$ | RT424006 |
| 12V-DC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | -000-9, | RT424012 |
| 24V-DC, 2 CO, 8A | - $+\cdots \times-\infty$ | RT424024 |
| $24 \mathrm{~V}-\mathrm{DC}, 2 \mathrm{CO}, 8 \mathrm{~A}$, gold plated | -500-7 | RT425024 |
| 24V-DC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | -000-9, | RTE24024 |
| 48V-DC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | -000-0, | RT424048 |
| 60V-DC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | $+\infty 0$ | RT424060 |
| 110 V -DC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | - $-0 \times 0$ | RT424110 |
| 24V-AC, 2 CO, 8A | -000-9, | RT424524 |
| $48 \mathrm{~V}-\mathrm{AC}, 2 \mathrm{CO}, 8 \mathrm{~A}$ | -000-9, | RT424548 |
| $115 \mathrm{~V}-\mathrm{AC}, 2 \mathrm{CO}, 8 \mathrm{~A}$ | -000-6) | RT424615 |
| $115 \mathrm{~V}-\mathrm{AC}, 2 \mathrm{CO}, 8 \mathrm{~A}$, gold plated | -000-9, | RT425615 |
| 230V-AC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | -000-n) | RT424730 |
| 230V-AC, 2 CO, 8A, gold plated | -000-8) | RT425730 |
| Print Relays RT2 Bistable |  |  |
| 24V-DC, 2 CO, 8A | -000-9, | RT424A24 |
| 12V-DC, $2 \mathrm{CO}, 8 \mathrm{~A}$ | -00\%-9, | RT424F 12 |
| 24V-DC, 2 CO, 8A |  | RT424F24 |

## Print Relays

Print Relays Schrack, Series RY


- Schrack-Info
- 1 pole 8 A
- 1 CO or 1 NO
- Coil 12 or 24 V DC
- Pinning $3.2(\mathrm{CO})$ or $5 \mathrm{~mm}(\mathrm{NO})$
- Low component height of 12.3 mm
- Reinforced insulation (appliance class II)
- RY530012 (NO version) especially suitable for ohmic or inductive loads
- For heating controls, interface technology, household appliances, timers, thermostats

Dimensions \& Circuit Diagrams (mm)


Dimensions \& Circuit Diagrams

| A | 1 CO, Pinning 3.2 mm |
| :--- | :--- |
| B | 1 NO, Pinning 5 mm |

- Print Relays Schrack, Series RY

Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range


Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range

| $\mathbf{A}$ | Max. DC rated breaking capacity |
| :---: | :---: |
| $\mathbf{B}$ | Electrical endurance |
| $\mathbf{C}$ | Coil operating range DC |
| $\mathbf{\# 1}$ | Resistive load |
| $\mathbf{\# 2}$ | 250 V AC Resistive load |
| $\mathbf{\# 3}$ | Recommended voltage range |
| $\mathbf{I}$ | DC current in $[\mathrm{A}]$ |
| $\mathbf{I 1}$ | Switching current in $[\mathrm{A}]$ |
| $\mathbf{U}$ | DC voltage in $[\mathrm{V}]$ |
| $\mathbf{U} / \mathbf{U}_{\text {ntd }}$ | Coil voltage in $[\mathrm{V}]$ |
| $\mathbf{Z}$ | Cycles |
| $\boldsymbol{U}$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |

Technical Data
CONTACT DATA


Print Relays

Print Relays Schrack, Series SNR


Schrack-Info

- 1 pole 6 A
- 1 CO or 1 NO
- Coil 12 or 24 V DC
- Sensitive coil 170 mW
- Only 5 mm component width
- High component density and tight-packed functionality
- Reinforced insulation (appliance class II)
- Cadmium-free contact material $\mathrm{AgSnO}_{2}$
- For interface technology, SPS, timers, centralised and decentralised heating controls


## Dimensions (mm)



Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range


Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range

| A | Max. DC rated breaking capacity |
| :---: | :---: |
| B | Electrical endurance |
| C | Coil operating range DC |
| \#1 | Resistive load |
| \#2 | 250 V AC Resistive load |
| \#3 | Recommended voltage range |


| $\mathbf{I}$ | DC current in $[\mathrm{A}]$ |
| :---: | :---: |
| $\mathbf{I I}$ | Switching current in $[\mathrm{A}]$ |
| $\mathbf{U}$ | DC voltage in $[\mathrm{V}]$ |
| $\mathbf{U} / \mathbf{U}_{\text {rd }}$ | Coil voltage in $[\mathrm{V}]$ |
| $\mathbf{Z}$ | Cycles |
| $\boldsymbol{U}$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |

Print Relays Schrack, Series SNR
Circuit Diagrams


- Circuit Diagrams

| A | Bottom view on solder pins |
| :---: | :---: |
| B | 1 CO |
| C | 1 NO |

Technical Data
CONTACT DATA


## Print Relays

Print Relays Schrack, Series PT


Schrack-Info

- 4 poles 6 A
- AC or DC coil (PT581024 or PT571730)
- 4 CO
- Up to 1500 VA switching capacity (PT5 relays)
- Component height 29 mm
- Cadmium-free contact material
- Mechanical and electrical status indicator, PT581024 with LED
- Touch protection test switch, choice of locking method
- White labelling field
- Multi-purpose use for control and machine building

Dimensions (mm)


## Print Relays Schrack, Series PT

Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Ranges


Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Ranges

| A | Max. DC rated breaking capacity |
| :---: | :---: |
| B | Electrical endurance |
| C | Coil operating range DC |
| D | Coil operating range AC |
| \#1 | Resistive load |
| \#2 | 4 contacts |
| \#3 | 4 -pole |
| \#4 | 250 V AC resistive load |
| \#5 | Recommended voltage range in [V] |
| U | DC voltage in [V] |
| $\mathbf{U} / \mathbf{U}_{\text {rid }}$ | Coil voltage in [V] |
| 1 | DC current in [A] |
| 11 | Switching current in [A] |
| Z | Cycles |
| $\checkmark$ | Ambient temperature in [ ${ }^{\circ} \mathrm{C}$ ] |

Print Relays

- Print Relays Schrack, Series PT
- Circuit Diagram

| A | PCB layout 4-pole, 4 CO |
| :---: | :---: |
| B | LED (for PT581024) | LED (for PT581024)


$\qquad$

Technical Data


- Force-guided Contacts Relays Schrack, Series SR, Print Version


Schrack-Info

## SR2

- 2 poles with force-guided contacts 6 A
- 2 CO
- Coil 24 V DC
- Contact material AgNi
- Reinforced insulation between the poles
- Complies with EN 50205

SR4

- 4 poles with force-guided contacts 8 A
- 2 NO, 2 NC (SR4D4024) or 3 NO, 1 NC (SR4M4024)
- Coil 24 V DC
- Contact material $\mathrm{AgSnO}_{2}$
- Compact, slim-line design
- Complies with EN 50205


## SR6

- 6 poles with force-guided contacts 8 A
- 4 NO, 2 NC
- Coil 24 V DC
- Contact material $\mathrm{AgSnO}_{2}$
- Reinforced insulation between all contacts
- Complies with EN 50205

Multi-purpose application of SR2, SR4 \& SR6

- For emergency stops, machine and press controls, elevators and escalators, safety switches

Force-guided Contacts Relays Schrack, Series SR

- Force-guided Contacts Relays Schrack, Series SR, Print Version

Dimensions (mm) \& Circuit Diagrams


Dimensions \& Circuit Diagrams

| \#1 | SR2 |
| :---: | :---: |
| \#1.1 | 2 CO, 6 A |
| \#2 | SR4 |
| \#2.1 | 2 NO und 2 NC, 8 A |
| \#2.2 | 3 NO und 1 NC, 8 A |
| \#3 | SR6 |
| \#3.1 | 4 NO und 2 NC, 8 A |

Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range SR2


## Force-guided Contacts Relays Schrack, Series SR, Print Version

Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range SR4


Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Range SR6


Rated Breaking Capacity, Electrical Service Life \& Coil Operating Voltage Ranges

| SR2 |  |
| :---: | :---: |
| A | Max. DC rated breaking capacity |
| B | Electrical service life |
| C | Coil operating range DC |
| \#1 | Resistive load |
| \#2 | 250 V AC resistive load |
| \#3 | Recommended voltage range in [V] |
| U | DC voltage in [V] |
| $\mathrm{U} / \mathrm{U}_{\text {rid }}$ | Coil voltage in [V] |
| 1 | DC current in [A] |
| 11 | Switching current in [A] |
| Z | Cycles |
| $ง$ | Ambient temperature in $\left[{ }^{\circ} \mathrm{C}\right]$ |


| SR4 |  |
| :---: | :---: |
| A | Max. DC rated breaking capacity |
| B | Electrical service life |
| C | Coil operating range DC |
| \#1 | Resistive load |
| \#2 | 250 V AC resistive load on 1 NO |
| contact |  |


| SR6 |  |
| :---: | :---: |
| A | Max. DC rated breaking capacity |
| B | Electrical service life |
| C | Coil operating range DC |
| \#1 | Resistive load |
| \#2 | 250 V AC resistive load on 1 NO |
| contact |  |

Force-guided Contacts Relays Schrack, Series SR

Force-guided Contacts Relays Schrack, Series SR, Print Version

- Technical Data

| CONTACT DATA |  | SR2 | SR4 |  | SR6 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Number of contacts and type |  | 2 CO | 2 NO und 2 NC or 3 NO und 1 NC |  | 4 NO und 2 NC |
| Contact style | EN 50205 | Single contact, force guided |  |  |  |
| Rated current |  | 6 A | 8 A |  |  |
| Rated voltage/ max. switching voltage AC |  | $250 / 400 \mathrm{~V} \sim$ |  |  |  |
| Min. recommended contact load |  | $5 \mathrm{~V} / 10 \mathrm{~mA}$ |  |  |  |
| Initial contact resistance |  | $<100 \mathrm{~m} \Omega$ at $1 \mathrm{~A}, 24 \mathrm{~V}$ DC |  |  |  |
| Contact material |  | AgNi | $\mathrm{AgSnO}_{2}$ |  |  |
| Frequency of operation | With load | $6 \mathrm{~min}^{-1}$ |  |  |  |
|  | Without load | $300 \mathrm{~min}^{-1}$ | $150 \mathrm{~min}^{-1}$ |  |  |
| Contact ratings according to IEC60947-5-1 | AC15 | - | $3 \mathrm{~A}(1 \mathrm{NO})$ |  | $5 \mathrm{~A}(2 \mathrm{NO})$ |
|  | DC13 | - |  |  | $6 \mathrm{~A}(2 \mathrm{NO})$ |
| Mechanical service life |  | $10 \times 10^{6}$ Operations |  |  |  |
| INSULATION DATA |  |  |  |  |  |
| Dielectric strength | Open contacts | $1500 \mathrm{~V}_{\text {ms }}$ |  |  |  |
|  | Contact and coil | $4000 \mathrm{~V}_{\text {ms }}$ |  |  |  |
|  | Adjacent contacts | $3000 \mathrm{~V}_{\text {ms }}$ | $2500 \mathrm{~V}_{\text {ms }}$ |  | $3000 \mathrm{~V}_{\text {ms }}$ |
| Clearance/ creepage | Open contacts | Micro disconnection |  |  |  |
|  | Contact and coil | $\geq 8 / 8 \mathrm{~mm}$ | $\geq 10 / 10 \mathrm{~mm}$ |  | $\geq 5.5 / 5.5 \mathrm{~mm}$ |
|  | Adjacent contacts | $\geq 5.5 / 5.5 \mathrm{~mm}$ | $\geq 3 / 3.5 \mathrm{~mm}$ |  | $\geq 5.5 / 5.5 \mathrm{~mm}$ |
| Insulation to EN 50178 |  |  |  |  |  |
| Type of insulation | Contact and coil | Reinforced |  |  |  |
|  | Adjacent contacts | Reinforced | Basic |  | Reinforced |
| Ambient temperature |  | $-25 . .+70^{\circ} \mathrm{C}$ |  |  |  |
| DESCRIPTION |  |  | AVAILABLE |  | ORDER NO. |
| 24V-DC, 2 CO, 6A |  | -000-600 |  |  | SR2Y5024 |
| 24V-DC, 2 NO, 2 NC, 8A |  | $\begin{array}{lll} -\infty 0 & -0 \\ \hline 00 \end{array}$ |  |  | SR4D4024 |
| 24V-DC, 3 NO, 1 NC, 8A |  | - $-\infty$ |  |  | SR4M4024 |
| 24V-DC, 4 NO, 2 NC, 8A |  |  |  |  | SR6B4024 |

Force-guided Contacts Relays Schrack, Series SR, in DIN Rail Module


Dimensions (mm)


Dimensions

| SR2Z | Module length: 87 mm <br> Module width: 20 mm |
| :---: | :--- |
| SR6Z | Module length: 87 mm <br> Module width: 46 mm |

General Info
Fit onto mounting rails according DIN EN 60175

Force-guided Contacts Relays Schrack, Series SR

Force-guided Contacts Relays Schrack, Series SR, in DIN Rail Module
Circuit Diagrams


Force-guided Contacts Relays Schrack, Series SR, in DIN Rail Module

- Technical Data

| CONTACT DATA |  | SR2Z | SR6Z |
| :---: | :---: | :---: | :---: |
| Number of contacts and type |  | 2 CO | 4 NO und 2 NC |
| Contact style | EN 50205 | Single contact, force guided |  |
| Rated current |  | 6 A | 8 A |
| Rated voltage/ max. switching voltage AC |  | $250 / 250 \mathrm{~V} \sim$ |  |
| Min. recommended contact load |  | $5 \mathrm{~V} / 10 \mathrm{~mA}$ |  |
| Initial contact resistance |  | $\leq 100 \mathrm{~m} \Omega$ at $1 \mathrm{~A}, 24 \mathrm{~V}$ DC |  |
| Contact material |  | AgNi | $\mathrm{AgSnO}_{2}$ |
| Frequency of operation | With load | $6 \mathrm{~min}^{-1}$ |  |
|  | Without load | $300 \mathrm{~min}^{-1}$ | $150 \mathrm{~min}^{-1}$ |
| Contact ratings according to IEC60947-5-1 | AC15 | - | $5 \mathrm{~A}(1 \mathrm{NO})$ |
|  | DC13 | - | $6 \mathrm{~A}(1 \mathrm{NO})$ |
| Mechanical service life |  | $10 \times 10^{6}$ Operations |  |
| COIL DATA |  |  |  |
| Operative range | \% of rated coil voltage | 90 to $110 \%$ of Urtd $10 \%$ of Urtd |  |
|  | Release voltage ( $+23^{\circ} \mathrm{C}$ ) |  |  |
| Limiting voltage | \% of rated coil voltage | 110 \% | - |
|  | Max. coil power | 700 mW | 1200 mW |
| Input circuit |  | LED | - |
| INSULATION DATA |  |  |  |
| Dielectric strength | Open contacts | $1500 \mathrm{~V}_{\text {rms }}$ | $1000 \mathrm{~V}_{\text {rms }}$ |
|  | Contact and coil | $4000 \mathrm{~V}_{\text {ms }}$ | $3000 \mathrm{~V}_{\text {ms }}$ |
|  | Adjacent contacts | $2000 \mathrm{~V}_{\text {ms }}$ |  |
| Clearance/ creepage | Open contacts | Micro disconnection |  |
|  | Contact and coil | $\geq 8 / 8 \mathrm{~mm}$ | $\geq 5.5 / 5.5 \mathrm{~mm}$ |
|  | Adjacent contacts | $\geq 1 / 1 \mathrm{~mm}$ | $\geq 2.8 / 2.8 \mathrm{~mm}$ |
| Insulation to EN 50178 |  | Reinforced |  |
| Type of insulation | Contact and coil |  |  |
|  | Adjacent contacts | Basic |  |
| OTHER DATA |  |  |  |
| Wire cross section | Solid wire | $2.5 \mathrm{~mm}^{2}$ |  |
|  | Stranded wire | $2.5 \mathrm{~mm}^{2}$ |  |
|  | Stranded wire with ferrule | $1.5 \mathrm{~mm}^{2}$ |  |
| Terminal type |  | Spring clamp terminals |  |
| Mounting position |  | Any |  |
| Ambient temperature | For mounting/ handling | $\begin{gathered} \hline \ldots . .40^{\circ} \mathrm{C} \\ -25 \ldots-50^{\circ} \mathrm{C} \\ \hline \end{gathered}$ |  |
|  | In operation |  |  |
| DESCRIPTION |  |  | AVAILABLE ORDER NO. |
| 24V-DC, 2 CO, 6A |  | SR2ZYO24 |  |
| 24V-DC, 4 NO, 2 NC, 8A |  | SR6ZB024 |  |

Modular Devices, Control Units

M Modular Relays


Schrack-Info

- Coupling relay
- Installation design

Modular Relays


- Schrack-Info
- 1 or $2 \mathrm{CO}, 8 \mathrm{~A}$
- Supply voltage 12 or 24 up to $240 \mathrm{~V}-\mathrm{AC} / \mathrm{DC}$
- Width 17.5 or 35 mm

Type


- Modular Relays

BZ651000 Dimensions


BZ651000 Wiring Diagram


BZ652000 Dimensions


| DESCRIPTION | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |
| 1 CO 8A/250V-AC, Coil 24-240V AC/DC | BZ651000 |  |
| 2 CO 8A/250V-AC, Coil 12-240V AC/DC | BZ652000 |  |

PLC Series EASY


Schrack-Info
For easy switching of complex requirements. It is very easy with the EASY control relay to realize the requirements only with a keystroke or with the comfortable EASY-Soft on the PC. The easy menu navigation simplifies the entering. Saving of installation and wiring costs.

EA274108

|  | EA274103 | EA274104 | EA274108 | EA274109 | EA274115 | EA274121 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Nominal supply power | 100-240 V AC | 100-240 V AC | 24 V DC | 24 V DC | 100-240 V AC | 24 V DC |
| Power losses | 5 VA | 5 VA | 2 W | 2 W | 10 VA | 3,5 W |
| Input, digital | 8 | 8 | 8 | 8 | 12 | 12 |
| Input analogue 0-10 V (option) | - | - | 2 | 2 | - | 4 |
| Output, digital ( $\mathrm{R}=$ relay, T =transistor) | 4R | 4R | 4R | 4R | 6R | 8T |
| Output analogue 0-10 V (option) | - | - | - | - | - | - |
| LC-display/keypad | yes/yes | yes/yes | yes/yes | yes/yes | yes/yes | yes/yes |
| Week-/year timer | -/- | yes/yes | -/- | yes/yes | yes/yes | yes/yes |
| Continues output | 8A | 8A | 8A | 8A | 8A | 0,5 A |
| Short-circuit proof at $\cos \varphi=1$ | MCB B16 = 600 A |  |  |  |  | - |
| Short-circuit proof at $\cos \varphi=0,5 \ldots 0,7$ | МСВ B16 = 900 A |  |  |  |  | - |
| Terminal connection | $0,2-4,0 \mathrm{~mm}^{2}$ (AWG 22, 12), rigid $0,2-2,5 \mathrm{~mm}^{2}$ (AWG 22, 12), flexible |  |  |  |  |  |
| Degree of protection | IP 20 |  |  |  |  |  |
| Radio frequency interference | EN 55011, EN 55022 class B, IEC 61000-6-1,2,3,4 |  |  |  |  |  |
| Working ambient temperature | $-25^{\circ} \mathrm{C} \ldots+55^{\circ} \mathrm{C}$ |  |  |  |  |  |
| Transport and stock temperature | $-40^{\circ} \mathrm{C} \ldots+70^{\circ} \mathrm{C}$ |  |  |  |  |  |
| Approvals | EN50178, IEC/EN 60947, UL, CSA |  |  |  |  |  |
| Mounting | rail mounting acc. DIN 50022, 35 mm or for screw mounting use adapter ZB4-101-GF1 |  |  |  |  |  |
| Measurement (W $\times \mathrm{H} \times \mathrm{D}) \mathrm{mm}$ | $71,5 \times 90 \times 58 \mathrm{~mm}$ |  |  |  | $107,5 \times 90 \times 58 \mathrm{~mm}$ |  |


|  | EA212314 | EA232112 | EA256267 | EA274110 | EA274113 | EA274119 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Supply power | 100-240 V AC | 24 V DC | 100-240 V AC | 24 V DC | 24 V DC | 24 V DC |
| Power losses | 10 VA | 4 W | 10 VA | 2 W | 7 VA | 3,5 W |
| Input, digital | 12 | 12 | 12 | 8 | 12 | 12 |
| Input analogue 0-10 V (option) | - | - | - | 2 | 4 | 4 |
| Output, digital ( $\mathrm{R}=$ relay, $\mathrm{T}=$ transistor | 6 R | 6R | 6R | 4R | 6R | 6R |
| Output analogue 0-10 V (option) | - | - | - | - | - | - |
| LC-display/keypad | -/- | -/- | yes/yes | -/- | yes/yes | yes/yes |
| Week-/year timer | -/- | -/- | yes/yes | yes/yes | yes/yes | yes/yes |
| Continues output | 8A | 8A | 8A | 8A | 8A | 8A |
| Short-circuit proof at $\cos \varphi=1$ | MCB B16 $=600 \mathrm{~A}$ |  |  |  |  |  |
| Short-circuit proof at $\cos \varphi=0,5 \ldots 0,7$ | МСВ B16 $=900 \mathrm{~A}$ |  |  |  |  |  |
| Terminal connection | $0,2-4,0 \mathrm{~mm}^{2}$ (AWG 22, 12), rigid $0,2-2,5 \mathrm{~mm}^{2}$ (AWG 22, 12), flexible |  |  |  |  |  |
| Degree of protection | IP 20 |  |  |  |  |  |
| Radio frequency interference | EN 55011, EN 55022 class B, IEC 61000-6-1, 2, 3, 4 |  |  |  |  |  |
| Working ambient temperature | $-25^{\circ} \mathrm{C} \ldots+55^{\circ} \mathrm{C}$ |  |  |  |  |  |
| Transport and stock temperature | $-40^{\circ} \mathrm{C} \ldots+70^{\circ} \mathrm{C}$ |  |  |  |  |  |
| Approvals | EN50178, IEC/EN 60947, UL, CSA |  |  |  |  |  |
| Mounting | rail mounting acc. DIN 50022, 35 mm or for screw mounting use adapter ZB4-101-GF1 |  |  |  |  |  |
| Measurement ( $\mathrm{W} \times \mathrm{H} \times \mathrm{D}$ ) mm | $107,5 \times 90 \times 58 \mathrm{~mm}$ |  | $\begin{gathered} 107,5 \times 90 \times 72 \\ \mathrm{~mm} \end{gathered}$ | $\begin{gathered} 71,5 \times 90 \times 58 \\ \mathrm{~mm} \\ \hline \end{gathered}$ | $107,5 \times 90 \times 58 \mathrm{~mm}$ |  |

## PLC Series EASY

Dimensions


## Dimensions



| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| EASY512ACRC-100-240VAC, control relay, 8IN-digital, 4OUT-relays, clock | - $\square^{-\infty}$ | EA274104 |
| EASY512ACR-100-240VAC, control relay, 81 N -digital, 4OUT-relays | [-0000 0 | EA274103 |
| EASY512DCR-24VDC, controlrelay, 8IN-digital, 4OUT-relays | $\left[\begin{array}{rr} -\infty \\ -\infty & 0-8 \\ \hline \end{array}\right.$ | EA274108 |
| EASY512DCRC-24VDC, control relay, 8IN-digital, 4OUT-relays, clock |  | EA274109 |
| EASY512DCRCX-24VDC, control relays without display, 2IN-Analog, 2IN-digital, 4OUT-relays |  | EA274110 |
| EASY719ABRC-24VAC, control relay, 4IN-Analog, 8IN-digital, 4OUT-relays; clock |  | EA274113 |
| EASY719ACRC-100-240VAC , control relay, 12IN-digital, 6OUT-relays, clock | $\left[\begin{array}{rr} \square & -\infty \\ -\infty & -\infty \\ \hline \end{array}\right.$ | EA274115 |
| EASY719DCRC-24VDC, control relay, 12IN-digital, 6OUT-relays, clock | $+8$ | EA274119 |
| EASY721DCTC-24VDC, control relay, 12IN-digital, 8OUT-Transistor, clock | $\square$ | EA274121 |
| EASY618ACRE-240VAC, control relay expansion, 12IN-dig, 6OUT-relays | - -3 | EA212314 |
| EASY618DCRC-24VDC , control relay expansion, 12IN-digital, 6OUT-relays |  | EA232112 |
| EASY819ACRC-100-240VAC, control relay, 12IN-digital, 6OUT-relays, clock | $+\square_{0}+\infty$ | EA256267 |
| Windows programing software for easy400-700 | $\square$ | EA284545 |
| EASY500/700 -Memory module, extern |  | EA270884 |
| EASY-PC-Programming cable RS232; control relay easy | $\begin{array}{rrr} -\infty & 0-\infty \\ \hline \end{array}$ | EA202409 |
| EASY400-Switched power supply 100-240VAC/24VDC, 1,25A, 1 phase |  | EA212319 |
| EASY800PC cable for programming | $\begin{array}{rr} \square & -\infty \\ -\infty & 0-8 \\ \hline \end{array}$ | EA256277 |
| EASY-PC-Programming cable USB; easy $500+700$ | $\begin{array}{rrr} -\infty & \infty \\ \hline \end{array}$ | EA 107926 |

Timer Relays

Timer Relays Series ZR5


- Timer Relays Series ZR4


Timer Relays Series AMPARO


Timer Relays Series ZR5


Timer Relays Series ZR4


Timer Relays Series ZR6


## Timer Relays

Timer Relays Series ZR5 Page ..... 98
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Timer Relays Series AMPARO Page ..... 112
Timer Relays Series ZR6 Page ..... 116

## Timer Relays

## - Timer Relays Series ZR5



Schrack-Info

## ZR5E0011

- 1 CO
- Mode: "E"
- Multi-voltage 24-240 V AC/DC
- In-line design
- 17.5 mm component width


## ZR5R0011

- 1 CO
- Mode: "R"
- Multi-voltage 24-240 V AC/DC
- In-line design
- 17.5 mm component width


## ZR5ERO11

- 1 CO
- Modes: "E" \& "R"
- Multi-voltage 24-240 V AC/DC
- In-line design
- 17.5 mm component width


## ZR5MFOII

- Multi-function timer relay
- 1 CO
- Modes: "E", "R", "Ws", "Wa", "Es", "Wu" \& "Bp"
- Multi-voltage 12-240 V AC/DC
- In-line design
- 17.5 mm component width


## ZR5MF025

- Multi-function timer relay
- 2 CO
- Modes: "E", "R", "Ws", "Wa", "Es", "Wu" \& "Bp"
- Multi-voltage 12-240 V AC/DC
- In-line design
- 35 mm component width


## ZR5B0011

- 1 CO
- Modes: " lp" \& "li"
- Multi-voltage 12-240 V AC/DC
- In-line design
- 17.5 mm component width


## ZR5B0025

- Multi-function dual time flasher relay with internal clock
- 2 CO
- Wide input voltage range
- Modes: "lp", "li", "ER", "EWu", "EWs", WsWa" \& "Wt"
- Multi-voltage 12-240 V AC/DC
- In-line design
- 35 mm component width


## ZR5SD025

- 2 CO
- Wide input voltage range
- Mode: "S"
- Multi-voltage $12-240 \mathrm{~V}$ AC/DC
- In-line design
- 35 mm component width


## ZR5RT011

- Timer function for emergency lighting tests
- 1 CO
- Integrated test switch
- Mode: "Ws"
- 230 V AC
- In-line design
- 17.5 mm component width


## NOTE:

- The timer function must be selected in a de-energised state!
- Timer Relays Series ZR5
- Overview Timer Relays ZR5

| Article | Number of contacts and type | Voltage range | Number of time ranges | Number of functions | E | R | Ws | Wa | Es | Wu | Bp | Ip | li | ER | EWu | EWs | WsWa | Wt | S | WsTest |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ZR5E0011 | 1 CO | 24-240 V AC / DC | 7 | 1 | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ZR5R0011 | 1 CO | $24-240$ V AC / DC | 7 | 1 |  | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ZR5ER011 | 1 CO | $24-240$ V AC / DC | 7 | 2 | X | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ZR5MFO11 | 1 CO | 12-240 V AC / DC | 7 | 7 | X | X | X | X | X | X | X |  |  |  |  |  |  |  |  |  |
| ZR5MF025 | 2 CO | 12-240 V AC / DC | 7 | 7 | X | X | X | X | X | X | X |  |  |  |  |  |  |  |  |  |
| ZR5B0011 | 1 CO | 12-240 V AC / DC | 7 | 2 |  |  |  |  |  |  |  | X | X |  |  |  |  |  |  |  |
| ZR5B0025 | 2 CO | 12-240 V AC / DC | 7 | 7 |  |  |  |  |  |  |  | X | X | X | X | X | X | X |  |  |
| ZR5SD025 | 2 CO | $12-240$ V AC / DC | 4 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |
| ZR5RTO11 | 1 CO | 230 V AC | 6 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | X |

O Overview Modes

| Article |  |
| :--- | :--- |
| ZR5EOO11 | Time relay ON delay |
| ZR5R0011 | Time relay OFF delay |
| ZR5ERO11 | Time relay ON-OFF delay |
| ZR5MFO11 | Multifunction time relays |
| ZR5MF025 |  |
| ZR5B0011 | Pulse time relay |
| ZR5B0025 |  |
| ZR5SD025 | Star-Delta relay |
| ZR5RTO11 | Emergency light test relay |


| E | ON delay |  |
| :---: | :--- | :--- |
| $\mathbf{R}$ | OFF delay | (with control contact) |
| $\mathbf{W s}$ | Single shot leading edge | (with control contact) |
| $\mathbf{W a}$ | Single shot trailing edge | (with control contact) |
| Es | ON delay | (with control contact) |
| $\mathbf{W u}$ | Single shot leading edge voltage controlled |  |
| $\mathbf{B p}$ | Flasher pause first | (with control contact) |
| ER | ON and OFF delay |  |
| EWu | ON delay and single shot leading edge voltage controlled | (with control contact) |
| EWs | ON delay and single shot leading edge | (with control contact) |
| $\mathbf{W s W a}$ | Single shot leading- and single shot trailing edge |  |
| $\mathbf{W t}$ | Pulse sequence monitoring |  |
| $\mathbf{S}$ | Star-Delta start-up | (with control contact) |
| $\mathbf{W s T e s t ~}$ | Single shot leading edge |  |

## ZR5B0011

| $\mathbf{I p}$ | Asymmetric flasher pause first (flashing) |
| :---: | :--- |
| $\mathbf{l i}$ | Asymmetric flasher pulse first (flashing) |

## ZR5B0025

| Ip | Asymmetric flasher pause first (pulsing) |
| :---: | :--- |
| li | Asymmetric flasher pulse first (pulsing) |

Timer Relays

Timer Relays Series ZR5
Dimensions (mm)


Configuration \& Functionalities
Configuration \& Functions


Example ZR5MFOII

| $\mathbf{1}$ | Operation display |
| :--- | :--- |
| $\mathbf{2}$ | Adjustable time range 50 ms to 100 h |
| $\mathbf{3}$ | Adjustable function area ( $\mathrm{E}, \mathrm{R}, \mathrm{Ws}, \mathrm{Wa}, \mathrm{Es}, \mathrm{Wu}$ and Bp ) |
| $\mathbf{4}$ | 45 mm cap dimension |
| $\mathbf{5}$ | Multi-voltage 12 or 24 V to $240 \mathrm{~V} \mathrm{AC} / \mathrm{DC}$ |

Time Ranges

| ZR5EOO11, ZR5ROO11, ZR5ERO11, ZR5MFO11, <br> ZR5MFO25, ZR5B0011, ZR5B0025 |  |
| :---: | :---: |
| Time range | Adjustment range |
| 1 s | $50 \mathrm{~ms}-1 \mathrm{~s}$ |
| 10 s | $500 \mathrm{~ms}-10 \mathrm{~s}$ |
| 1 min | $3 \mathrm{~s}-1 \mathrm{~min}$ |
| 10 min | $30 \mathrm{~s}-10 \mathrm{~min}$ |
| 1 h | $3 \mathrm{~min}-1 \mathrm{~h}$ |
| 10 h | $30 \mathrm{~min}-10 \mathrm{~h}$ |
| 100 h | $5 \mathrm{~h}-100 \mathrm{~h}$ |


| ZR5SDO25 |  |
| :---: | :---: |
| Time range | Adjustment range |
| 10 s | $500 \mathrm{~ms}-10 \mathrm{~s}$ |
| 30 s | $1500 \mathrm{~ms}-30 \mathrm{~s}$ |
| 1 min | $3 \mathrm{~s}-1 \mathrm{~min}$ |
| 3 min | $9 \mathrm{~s}-3 \mathrm{~min}$ |


| ZR5RTOII |
| :---: |
| Time range reversible |
| between |
| $10 \mathrm{~min}, 30$ min, 60 min, |
| $90 \mathrm{~min}, 2 \mathrm{~h}$ und 3 h |

Timer Relays Series ZR5
Overview Circuit Diagrams


## Timer Relays

## Timer Relays Series ZR5

■ Overview Circuit Diagrams

| A | ON/OFF-DELAY RELAYS |  |
| :---: | :---: | :---: | :---: |
| A1 | ON delay (E) | without control contact |
| A2 | OFF delay (R) | with control contact "S" |
| A3 | ON delay (E) | without control contact |
| A4 | OFF delay (R) | with control contact "S" |
| B | MULTIFUNCTION RELAYS |  |
| B1 | OFF delay (R), Single shot leading edge (Ws), Single shot trailing edge (Wa) and |  |
| ON delay with control input (Es) |  |  |


| $E$ |  |  |
| :---: | :---: | :---: |
|  |  |  |
| M/S |  | EWs |
| Wa |  |  |
| ES |  |  |
| MU |  |  |
|  |  | WsTest |
| II |  |  |

Overview Modes

| Article | E | R | Ws | Wa | Es | Wu | Bp | Ip | li | ER | EWu | EWs | WsWa | Wt | S | WsTest |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ZR5E0011 | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ZR5R0011 |  | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ZR5ERO11 | X | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ZR5MF011 | X | X | X | X | X | X | X |  |  |  |  |  |  |  |  |  |
| ZR5MF025 | X | X | X | X | X | X | X |  |  |  |  |  |  |  |  |  |
| ZR5B0011 |  |  |  |  |  |  |  | X | X |  |  |  |  |  |  |  |
| ZR5B0025 |  |  |  |  |  |  |  | X | X | X | X | X | X | X |  |  |
| ZR5SD025 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |
| ZR5RTO11 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | X |

Detailed Description of Modes (Part 1)

## ZR5B0011

|  | Asymmetric flasher pause first (flashing) |
| :---: | :--- |
| Ip | When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t 1}$ begins (green <br> LED $\mathbf{U} / \mathbf{t}$ flashes slowly). After the interval $\boldsymbol{t 1}$ has expired, the output relay <br> $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval <br> $\mathbf{t 2}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes fast). After the interval $\mathbf{t 2}$ has expired, <br> the output relay switches into off-position (yellow LED not illuminated). The <br> output relay is triggered at the ratio of $\mathbf{t 1 : t 2}$ until the supply voltage is <br> interrupted. |


|  |  |
| :---: | :---: |
| Ip | Asymmetric flasher pause first (pulsing) <br> When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t} \mathbf{1}$ begins (green LED $\mathbf{U} / \mathbf{\dagger}$ flashes slowly). After the interval $\mathbf{t 1}$ has expired, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval $\mathbf{t 2}$ begins (green LED U/t flashes fast). After the interval $\mathbf{+ 2}$ has expired, the output relay switches into off-position (yellow LED not illuminated). The output relay is triggered at the ratio of $\mathbf{t 1 : t 2}$ until the supply voltage is interrupted. |


| li | Asymmetric flasher pulse first (pulsing)When the supply voltage $\mathbf{U}$ is applied, the output relay $\mathbf{R}$ switches into <br> on-position (yellow LED illuminated) and the set interval $\mathbf{t 1}$ begins (green <br> LED $\mathbf{U} / \mathbf{t}$ flashes slowly). After the interval $\mathbf{t 1}$ has expired, the output relay <br> switches into off-position (yellow LED not illuminated) and the set interval $\mathbf{+ 2}$ <br> begins (green LED $\mathbf{U} / \mathbf{t}$ flashes fast). After the interval $\mathbf{+ 2}$ has expired, the <br> output relay switches into on-position (yellow LED illuminated). The output <br> relay is triggered at the ratio of $\mathbf{t 1 : + 2}$ until the supply voltage is interrupted. |
| :---: | :--- |

## Timer Relays

## Timer Relays Series ZR5

Detailed Description of Modes (Part 2)

| ON delay |  |
| :--- | :--- |
|  | When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t}$ begins (green LED <br> $\mathbf{U} / \mathbf{t}$ flashes). After the interval $\mathbf{t}$ has expired (green LED $\mathbf{U} / \mathbf{t}$ illuminated) <br> the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated). This <br> status remains until the supply voltage is interrupted. If the supply voltage is <br> interrupted before the expiry of the interval $\mathbf{t}$, the interval already expired is <br> erased and is restarted when the supply voltage is next applied. |

ON delay

When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes). After the interval $\mathbf{t}$ has expired (green LED U/t illuminated) status remains until the supply voltage is interrupted. If the supply voltage is erased and is restarted when the supply voltage is next applied.

## OFF delay with control contact "S"

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED $\mathbf{U} / \mathbf{t}$ illuminated). When the control contact $\mathbf{S}$ is closed, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated). If the control contact is opened, the set interval $\mathbf{t}$ begins (green LED U/t flashes). After the interval t has expired (green LED U/t illuminated) the output relay switches into offposition (yellow LED not illuminated). If the control contact is closed again before the interval thas expired, the interval already expired is erased and is restarted

## Single shot leading edge with control contact "S"

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED $\mathbf{U} / \mathbf{t}$ illuminated). When the control contact $\mathbf{S}$ is closed, the output relay $\mathbf{R}$ switches into on-position (green LED U/t illuminated) and the set interval $\mathbf{t}$ begins (green LED U/t flashes). After the interval $\mathbf{t}$ has expired (green LED $\mathbf{U} / \mathbf{t}$ illuminated) the output relay switches into off-position (yellow LED not illuminated). During the interval, the control contact can be operated any number of times. A further cycle can only be started when the cycle run has been completed.

## Single shot trailing edge with control contact " S "

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED $\mathbf{U} / \mathbf{t}$ illuminated). Closing the control contact $\mathbf{S}$ has no influence on the condition of the output $\mathbf{R}$. When the control contact is opened, the output relay switches into on-position (yellow LED illuminated) and the set interval $\boldsymbol{t}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes). After the interval $\mathbf{t}$ has expired (green LED $\mathbf{U} / \mathbf{t}$ illuminated), the output relay switches into off-position (yellow LED not illuminated). During the interval, the control contact can be operated any number of times. A further cycle can only be started when the cycle run has been completed.

## ON delay with control contact "S"

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED $\mathbf{U} / \mathbf{t}$ illuminated). When the control contact $\mathbf{S}$ is closed, the set interval $\mathbf{t}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes). After the interval $\mathbf{t}$ has expired (green LED $\mathbf{U} / \mathbf{t}$ illuminated) the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated). This status remains until the control contact is opened again. If the control contact is opened before the interval $\boldsymbol{t}$ has expired, the interval already expired is erased and is restarted with the next cycle.

## Single shot leading edge, voltage controlled

When the supply voltage $\mathbf{U}$ is applied, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval $\mathbf{t}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes). After the interval $\mathbf{t}$ has expired (green LED $\mathbf{U} / \mathbf{t} \boldsymbol{i l l u m i n a t e d ) ~}$ the output relay switches into off-position (yellow LED not illuminated). This status remains until the supply voltage is interrupted. If the supply voltage is interrupted before the interval $t$ has expired, the output relay switches into off-position. The interval already is erased and is restarted when the supply voltage is next applied.

## Flasher pause first

When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes). After the interval $\mathbf{t}$ has expired, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval $\mathbf{t}$ begins again After the interval $\mathbf{t}$ has expired, the output relay switches into off-position (yellow LED not illuminated). The output relay is triggered at a ratio of $1: 1$ until the supply voltage is interrupted.

## ON delay and OFF delay with control contact "S"

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED $\mathbf{U} / \mathbf{t}$ illuminated). When the control contact $\mathbf{S}$ is closed, the set interval $\mathbf{t 1}$ begins (green LED U/t flashes slowly). After the interval $\mathbf{t 1}$ has expired, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated). If the control contact is opened, the set interval $\mathbf{t} \mathbf{2}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes fast). After the interval $\mathbf{t} \mathbf{2}$ has expired, the output relay switches into offposition (yellow LED not illuminated). If the control contact is opened before the interval $\mathbf{t 1}$ has expired, the interval already expired is erased and is restarted with the next cycle.

## ON delay and single shot leading edge, voltage controlled

When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t 1}$ begins (green LED U/t flashes slowly). After the interval $\mathbf{t 1}$ has expired, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval $\mathbf{t} \mathbf{2}$ begins (green LED U/t flashes fast). After the interval $\mathbf{t 2}$ has expired, the output relay switches into off-position (yellow LED not illuminated). If the supply voltage is interrupted before the interval $\mathbf{1 1 + \mathbf { + } 2}$ has expired, the interval already expired is erased and is restarted when the supply voltage is next applied.

ON delay and single shot leading edge with control contact "S" The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED $\mathbf{U} / \mathbf{t}$ illuminated). When the control contact $\mathbf{S}$ is closed, the set interval $\mathbf{t 1}$ begins (green LED U/t flashes slowly). After the interval $\mathbf{t 1}$ has expired, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval $\mathbf{t} \mathbf{2}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes fast). After the interval t2 has expired, the output relay switches into off-position (yellow LED not illuminated). During the interval, the control contact can be operated any number of times. A further cycle can only be started when the cycle run has been completed.

Single shot leading and single shot trailing edge with control contact |  |
| :--- |
| Sing |

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED $\mathbf{U} / \mathbf{t}$ illuminated). When the control contact $\mathbf{S}$ is closed, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval $\mathbf{t 1}$ begins (green LED U/t flashes slowly). After the interval $\mathbf{t} \mathbf{1}$ has expired, the output relay $\mathbf{R}$ switches into off-position (yellow LED not illuminated). If the control contact is opened, the output relay again switches into on-position (yellow LED illuminated) and the set interval $\mathbf{+ 2}$ begins (green LED $\mathbf{U} / \boldsymbol{\dagger}$ flashes fast). After the interval $\mathbf{t} \mathbf{2}$ has expired the output relay switches into off-position (yellow LED not illuminated). During the interval, the control contact can be operated any number of times.

## Pulse sequence monitoring <br> When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t 1}$ begins (green LED U/† flashes slowly) and the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) After the interval $\mathbf{t 1}$ has expired, the set interval $\mathbf{t 2}$ begins (green LED U/t flashes fast). So that the output relay $\mathbf{R}$ remains into on-position, the control contact $\mathbf{S}$ must be closed and opened again within the set interval $\mathbf{+ 2}$. If this does not happen, the output relay $\mathbf{R}$ switches into off-position (yellow LED not illuminated) and all further pulses at the control contact are ignored. To restart the function the supply voltage must be interrupted and reapplied.

## Star-delta start up

When the supply voltage $\mathbf{U}$ is applied, the star-contact switches into onposition (yellow LED illuminated) and the set star-time $\boldsymbol{\dagger} \mathbf{1}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes). After the interval $\mathbf{t} \mathbf{l}$ has expired (green LED $\mathbf{U} / \mathbf{t}$ illuminated), the star-contact switches into off-position (yellow LED not illuminated) and the set transit-time $\mathbf{+ 2}$ begins. After the interval $\mathbf{t 2}$ has expired, the contact for the delta-contactor switches into on-position. To restart the function, the supply voltage must be interrupted and reapplied.

## Single shot leading edge with control contact "S"

The supply voltage $\mathbf{U}$ must be constantly to the device (green LED U/t illuminated). Pressing the integrated test key forces the output relay $\mathbf{R}$ to switch into on-position (yellow LED illuminated), so the emergency lights are disconnected from the mains and the set interval $\mathbf{t}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes). After the interval $\mathbf{t}$ has expired (green LED $\mathbf{U} / \mathbf{t} \boldsymbol{i l l} \mathbf{u m i n a t e d ) , ~ t h e ~}$ output relay $\mathbf{R}$ switches into off-position (yellow LED not illuminated) and the emergency lights are reconnected to the mains. During the interval, the test key can be operated any number of times. Prolonged pressure on the test key (>2s) aborts the running test interval (green LED $\mathbf{U} / \mathbf{t}$ flashes fast) and a further cycle can be started.

- Timer Relays Series ZR5
- Technical Data

|  |  |  | ZR5E0011 | ZR5R0011 | ZR5ERO11 | ZR5MFO11 | ZR5MFO25 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| INDICATORS | Green LED U/t ON |  | Indication of supply voltage |  |  |  |  |
|  | Green LED U/t flashes |  | Indication of time period |  |  |  |  |
|  | Yellow LED R ON/OFF |  | Indication of relay outputs |  |  |  |  |
| MECHANICAL DESIGN | Housing |  | Self-extinguishing plastic housing IP40 |  |  |  |  |
|  | IP rating housing |  |  |  |  |  |  |
|  | Mounting | (EN 50022) | DIN-rail TS 35 |  |  |  |  |
|  | Terminal | (VBG 4, PZ1 required) | Shockproof terminal connection |  |  |  |  |
|  | IP rating terminal |  | IP20 |  |  |  |  |
|  | Mounting position |  | Any |  |  |  |  |
|  | Tightening torque |  | Max. 1 Nm |  |  |  |  |
|  | Terminal capacity |  | $1 \times 0.5$ to $2.5 \mathrm{~mm}^{2}$ with/without multicore cable end $1 \times 4 \mathrm{~mm}^{2}$ without multicore cable end $2 \times 0.5$ to $1.5 \mathrm{~mm}^{2}$ with/without multicore cable end $2 \times 2.5 \mathrm{~mm}^{2}$ flexible without multicore cable end |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| INPUT CIRCUIT | Input |  | Terminals A1 (+)-A2 |  |  |  |  |
|  | Supply voltage |  | 24-240 V AC / DC |  |  | 12-240 V AC/DC |  |
|  | Tolerance |  | $24 \mathrm{~V} . . .-15 \%$ to 240 V... 10 \% |  |  | $12 \mathrm{~V} . . .-10 \%$ to 240 V.... $10 \%$ |  |
|  | Rated consumption |  | $4 \mathrm{VA}(1.5 \mathrm{~W})$ |  |  |  | $6 \mathrm{VA}(2 \mathrm{~W})$ |
|  | Rated frequency |  | 48 to 63 Hz |  |  |  |  |
|  | Duty cycle |  | 100 \% |  |  |  |  |
|  | Reset time |  | 100 ms |  |  |  |  |
|  | Residual ripple for DC |  | 10 \% |  |  |  |  |
|  | Drop-out voltage |  | > $30 \%$ of minimum rated supply voltage |  |  |  |  |
|  | Overvoltage category | (IEC 60664-1) | III |  |  |  |  |
|  | Rated surge voltage |  | 4 kV |  |  |  |  |
| OUTPUT CIRCUIT | Number of contacts and type |  | 1 CO |  |  |  | 2 potential free CO contacts |
|  | Rated voltage |  | 250 V AC |  |  |  |  |
|  | Switching capacity |  | $2000 \mathrm{VA}(8 \mathrm{~A} / 250 \mathrm{~V})$ |  |  |  |  |
|  | Fusing |  | 8 A fast acting |  |  |  |  |
|  | Mechanical service life |  | $20 \times 10^{6}$ operations |  |  |  |  |
|  | Electrical service life |  | $2 \times 10^{5}$ operations at 1000 VA resistive load |  |  |  |  |
|  | Switching frequency | (IEC 947-5-1) | Max. $60 / \mathrm{min}$ at 100 VA resistive load, $\max .6 / \mathrm{min}$ at 1000 VA resistive load |  |  |  |  |
|  | Overvoltage category | (IEC 60664-1) | III |  |  |  |  |
|  | Rated surge voltage |  |  |  | 4 kV |  |  |
| CONTROL INPUT | Input not potential free |  | NO CONTROL CONTACT | Terminals A1-B1 |  |  |  |
|  | Loadable |  |  | Yes |  |  |  |
|  | Max. line length |  |  | 10 m |  |  |  |
|  | Trigger level (sensitivity) |  |  | Automatic adaption to supply voltage |  |  |  |
|  | Min. control pulse length |  |  | DC $50 \mathrm{~ms}, \mathrm{AC} 100 \mathrm{~ms}$ |  |  |  |
| ACCURACY | Base accuracy |  | $\pm 1 \%$ of maximum scale value |  |  |  |  |
|  | Adjustment accuracy |  | < $5 \%$ of maximum scale value |  |  |  |  |
|  | Repetition accuracy |  | $<0.5 \%$ or $\pm 5 \mathrm{~ms}$ |  |  |  |  |
|  | Voltage influence |  | - |  |  |  |  |
|  | Temperature influence |  | $\leq 0.01 \% /{ }^{\circ} \mathrm{C}$ |  |  |  |  |
| AMBIENT CONDITIONS | Ambient temperature | (IEC 68-1) | $-25^{\circ} \mathrm{C}$ to $+55^{\circ} \mathrm{C}$ |  |  |  |  |
|  | Storage temperature |  | $-25^{\circ} \mathrm{C}$ to $+70{ }^{\circ} \mathrm{C}$ |  |  |  |  |
|  | Transport temperature |  | $-25^{\circ} \mathrm{C}$ to $+70^{\circ} \mathrm{C}$ |  |  |  |  |
|  | Relative humidity | (IEC 721-3-3 class 3K3) | $15 \%$ to $85 \%$ |  |  |  |  |
|  | Pollution degree | (IEC 664-1) | 2, if built in 3 |  |  |  |  |
|  | Vibration resistance | (IEC 68-2-6) | 10 to $55 \mathrm{~Hz}, 0.35 \mathrm{~mm}$ |  |  |  |  |
|  | Shock resistance | (IEC 68-2-27) | $15 \mathrm{~g}, 11 \mathrm{~ms}$ |  |  |  |  |

## Timer Relays

- Timer Relays Series ZR5

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| Tripping and Release Delay |  |  |
| Timer single function ON-delay $24-240 \mathrm{~V}$ AC/DC, $1 \mathrm{CO}, 8 \mathrm{~A} / 250 \mathrm{~V}$ |  | ZR5E0011 |
| Timer single function OFF-delay $24-240 \mathrm{~V}$ AC/DC, $1 \mathrm{CO}, 8 \mathrm{~A} / 250 \mathrm{~V}$ | 0000 | ZR5R0011 |
| Timer duo function ON/OFF-delay 24-240V AC/DC, 1CO, 8A/250V | (00000) | ZR5EROII |
| Multi-function Relays |  |  |
| Timer multifunction 12-240V AC/DC, 1CO, 8A/250V | - 00000 | ZR5MF011 |
| Timer mullifunction 12-240V AC/DC, 2CO, 8A/250V | $0 \times 0$ | ZR5MF025 |
| Flasher Relays |  |  |
| Timer flashing 12-240V AC/DC, 1CO, 8A/250V |  | ZR5B0011 |
| Two-time multifunction 12-240V AC/DC, 2CO, 8A/250V |  | ZR5B0025 |
| Star-Delta Relays |  |  |
| Timer Star-Delta 12-240V AC, 2CO, 8A | - +000 | ZR5SD025 |
| Emergency Lighting Testers |  |  |
| Emergency-light-test-relay 230V, modular version | -0000000 | ZR5RTOII |

Timer Relays Series ZR4, for Round 11 Pole Plug-in Socke


## Schrack-Info

## ZR4MF025-A

- Multi-function relay
- 2 CO
- Modes: "E", "R", "Ws", "Wa", "Es", "Wu" \& "Bp"
- For 11 pole plug-in MT socket
- Multi-voltage 12-240 V AC/DC
- 38 mm component width
- Standard front dimension 45 mm


## ZR4B0025-A

- Flasher relay
- 2 CO
- Internal clock
- Dual time multi-function
- Zoom voltage
- Modes: "lp", "li", "ER", "EWu", "EWs", WsWa" \& "Wt"
- For 11 pole plug-in MT socket
- Multi-voltage 12-240 V AC/DC
- 38 mm component width
- Standard front dimension 45 mm


## YMR78700

- MT socket compatible with pluggable Series ZR4 timer relays
- Overview ZR4 Timer Relays

| Article | Number of contacts and type | Voltage range | Number of time ranges | Number of functions | E | R | Ws | Wa | Es | Wu | Bp | Ip | li | ER | EWu | EWs | WsWa | Wt |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ZR4MF025-A | 2 CO | 12-240 V AC / DC | 7 | 7 | X | X | X | X | X | X | X |  |  |  |  |  |  |  |
| ZR4B0025-A | 2 CO | 12-240 V AC / DC | 7 | 7 |  |  |  |  |  |  |  | X | X | X | X | X | X | X |

Timer Relays

- Timer Relays Series ZR4, for Round 11 Pole Plug-in Socket
- Overview Modes


| Functions |  |  |
| :---: | :---: | :---: |
| E | ON delay |  |
| R | OFF delay | (with control contact) |
| Ws | Single shot leading edge | (with control contact) |
| Wa | Single shot trailing edge | (with control contact) |
| Es | ON delay | (with control contact) |
| Wu | Single shot leading edge voltage controlled |  |
| Bp | Flasher pause first |  |
| ER | ON and OFF delay | (with control contact) |
| EWu | ON delay and single shot leading edge voltage controlled |  |
| EWs | ON delay and single shot leading edge | (with control contact) |
| WsWa | Single shot leading- and single shot trailing edge | (with control contact) |
| Wt | Pulse sequence monitoring |  |
| Ip | Asymmetric flasher pause first |  |
| li | Asymmetric flasher pulse first |  |

Dimensions (mm)


Circuit Diagrams Overview


- Time Ranges

| ZR4MF025-A, ZR4B0025-A |  |
| :---: | :---: |
| Time range | Adjustment range |
| 1 s | $50 \mathrm{~ms}-1 \mathrm{~s}$ |
| 10 s | $500 \mathrm{~ms}-10 \mathrm{~s}$ |
| 1 min | $3 \mathrm{~s}-1 \mathrm{~min}$ |
| 10 min | $30 \mathrm{~s}-10 \mathrm{~min}$ |
| 1 h | $3 \mathrm{~min}-1 \mathrm{~h}$ |
| 10 h | $30 \mathrm{~min}-10 \mathrm{~h}$ |
| 100 h | $5 \mathrm{~h}-100 \mathrm{~h}$ |

Timer Relays Series ZR4, for Round 11 Pole Plug-in Socket

- Modes



## Overview Modes

| Article | $\mathbf{E}$ | $\mathbf{R}$ | $\mathbf{W s}$ | $\mathbf{W a}$ | $\mathbf{E s}$ | $\mathbf{W u}$ | $\mathbf{B p}$ | Ip | li | ER | EWu | EWs | WsWa | Wt |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ZR4MF025-A | X | X | X | X | X | X | X |  |  |  |  |  |  |  |
| ZR4B0025-A |  |  |  |  |  |  |  | X | X | X | X | X | X | X |

Detailed Description of Modes (Part 1)

| E | ON delay <br>  <br> When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t}$ begins (green LED <br> $\mathbf{U} / \mathbf{t}$ flashes). After the interval $\mathbf{t}$ has expired (green LED $\mathbf{U} / \mathbf{t}$ illuminated) <br> the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated). This <br> status remains until the supply voltage is interrupted. If the supply voltage is <br> interrupted before the expiry of the interval $\mathbf{t}$, the interval already expired is <br> erased and is restarted when the supply voltage is next applied. |
| :---: | :--- |


|  | OFF delay with conrol contact "S" |
| :---: | :--- |
| The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED <br> $\mathbf{U} / \mathbf{t}$ illuminated). When the control contact $\mathbf{S}$ is closed, the output relay $\mathbf{R}$ <br> switches into on-position (yellow LED illuminated). If the control contact is <br> opened, the set interval $\mathbf{t}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes). After the interval <br> $\mathbf{t}$ has expired (green LED $\mathbf{U} / \mathbf{t}$ illuminated) the output relay switches into off- <br> position (yellow LED not illuminated). If the control contact is closed again <br> before the interval $\mathbf{t}$ has expired, the interval already expired is erased and <br> is restarted. |  |


| Ws | Single shot leading edge with control contact "S" |
| :---: | :--- |
|  |  |


|  | Asymmetric flasher pause first |
| :--- | :--- |
| Ip | When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t 1}$ begins (green <br> LED $\mathbf{U} / \mathbf{t}$ flashes slowly). After the interval $\mathbf{t 1}$ has expired, the output relay <br> $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval <br> $\mathbf{t 2}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes fast). After the interval $\mathbf{t 2}$ has expired, <br> the output relay switches into off-position (yellow LED not illuminated). The <br> output relay is triggered at the ratio of $\mathbf{t 1 : t 2}$ until the supply voltage is <br> interrupted. |


| li | Asymmetric flasher pulse first |
| :---: | :---: |
|  | When the supply voltage $\mathbf{U}$ is applied, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval $\boldsymbol{\dagger} 1$ begins (green LED U/t flashes slowly). After the interval $\boldsymbol{\mathbf { 1 }}$ has expired, the output relay switches into off-position (yellow LED not illuminated) and the set interval $\mathbf{t 2}$ begins (green LED $\mathbf{U} / \mathbf{\dagger}$ flashes fast). After the interval $\mathbf{~} \mathbf{2}$ has expired, the output relay switches into on-position (yellow LED illuminated). The output relay is triggered at the ratio of $\mathbf{t 1 : t 2}$ until the supply voltage is interrupted. |


| $\mathbf{E R} \quad$ON delay and OFF delay with control contact "S" <br> $\mathbf{U}$ must be constantly applied to the device (green LED <br> $\mathbf{U} / \mathbf{t}$ illuminated). When the control contact $\mathbf{S}$ is closed, the set interval $\mathbf{t 1}$ <br> begins (green LED $\mathbf{U} / \mathbf{t}$ flashes slowly). After the interval $\mathbf{t 1}$ has expired, <br> the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated). If the <br> control contact is opened, the set interval $\mathbf{t 2}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes <br> fast). After the interval $\mathbf{t 2}$ has expired, the output relay switches into off- <br> position (yellow LED not illuminated). If the control contact is opened before <br> the interval $\mathbf{t 1}$ has expired, the interval already expired is erased and is <br> restarted with the next cycle. |
| :--- | :--- |

## Timer Relays

## Timer Relays Series ZR4, for Round 11 Pole Plug-in Socket

## Detailed Description of Modes (Part 2)

| $\mathbf{W a}$ | Single shot trailling edge with control contact "S" <br> The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED <br> $\mathbf{U / t}$ illuminated). Closing the control contact $\mathbf{S}$ has no influence on the <br> condition of the output $\mathbf{R}$. When the control contact is opened, the output <br> relay switches into on-position (yellow LED illuminated) and the set interval $\mathbf{t}$ <br> begins (green LED $\mathbf{U / t}$ flashes). After the interval $\mathbf{t}$ has expired (green LED <br> $\mathbf{U / t}$ illuminated), the ouput relay switches into off-position (yellow LED not <br> illuminated). During the interval, the control contact can be operated any <br> number of times. A further cycle can only be started when the cycle run has <br> been completed. |
| :---: | :--- |

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED $\mathbf{U} / \mathbf{t}$ illuminated). Closing the control contact $\mathbf{S}$ has no influence on the condition of the output $\mathbf{R}$. When the control contact is opened, the output relay switches into on-position (yellow LED illuminated) and the set interval $\boldsymbol{t}$ $\mathbf{U / t}$ illuminated), the ouput relay switches into off-position (yellow LED not illuminated). During the interval, the control contact can be operated any been completed

## ON delay with control contact "S"

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED $\mathbf{U} / \mathbf{t}$ illuminated). When the control contact $\mathbf{S}$ is closed, the set interval $\boldsymbol{\dagger}$
Es begins (green LED U/t flashes). After the interval $\mathbf{t}$ has expired (green LED $\mathbf{U} / \mathbf{t}$ illuminated) the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated). This status remains until the control contact is opened again. If the control contact is opened before the interval $\boldsymbol{t}$ has expired, the interval already expired is erased and is restarted with the next cycle.

## Single shot leading edge, voltage controlled

When the supply voltage $\mathbf{U}$ is applied, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval $\mathbf{t}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes). After the interval $\mathbf{t}$ has expired (green LED $\mathbf{U} / \mathbf{t}$ illuminated) the output relay switches into off-position (yellow LED not illuminated). This status remains until the supply voltage is interrupted. If the supply voltage is interruted before the interval thas expired, the output relay switches into off-position. The interval already is erased and is restarted when the supply voltage is next applied.

## Flasher pause first

When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t}$ begins (green LED $\mathbf{U} / \mathbf{\dagger}$ flashes). After the interval $\mathbf{t}$ has expired, the output relay $\mathbf{R}$ switches

Bp

|  | ON delay and single shot leading edge, voltage controlled |
| :---: | :---: |
| EWu | When the supply voltage $\mathbf{U}$ is applied, the set interval $\boldsymbol{\dagger} \mathbf{l}$ begins (green LED U/t flashes slowly). After the interval $\mathbf{t 1}$ has expired, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval $\mathbf{2}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes fast). After the interval $\mathbf{t 2}$ has expired, the output relay switches into off-position (yellow LED not illuminated). If the supply voltage is interrupted before the interval $\mathbf{1 1 + \mathbf { t }}$ has expired, the interval already expired is erased and is restarted when the supply voltage is next applied. |


| EWs | ON delay and single shot leading edge with control contact "S"The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED <br> $\mathbf{U} / \mathbf{t}$ illuminated). When the control contact $\mathbf{S}$ is closed, the set interval $\mathbf{t 1}$ <br> begins (green LED $\mathbf{U} / \mathbf{t}$ flashes slowly). After the interval $\mathbf{t 1}$ has expired, <br> the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) and <br> the set interval $\mathbf{+ 2}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes fast). After the interval <br> $\mathbf{t 2}$ has expired, the output relay switches into off-position (yellow LED not <br> illuminated). During the interval, the control contact can be operated any <br> number of times. A further cycle can only be started when the cycle run has <br> been completed. |
| :---: | :--- |


| WsWa | Single shot leading and single shot trailing edge with control contact <br> "S" |
| :--- | :--- |
| The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED <br> $\mathbf{U} / \mathbf{t}$ illuminated). When the control contact $\mathbf{S}$ is closed, the output relay $\mathbf{R}$ <br> switches into on-position (yellow LED illuminated) and the set interval $\mathbf{t 1}$ <br> begins (green LED U/t flashes slowly). After the interval $\mathbf{t 1}$ has expired, the <br> output relay $\mathbf{R}$ switches into off-position (yellow LED not illuminated). If the <br> control contact is opened, the output relay again switches into on-position <br> (yellow LED illuminated) and the set interval $\mathbf{t 2}$ begins (green LED $\mathbf{U} / \mathbf{t}$ <br> flashes fast). After the interval t2 has expired the output relay switches into <br> off-position (yellow LED not illuminated). During the interval, the control <br> contact can be operated any number of times. |  |


| Wt | Pulse sequence monitoringWhen the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t 1}$ begins (green <br> LED $\mathbf{U} / \mathbf{t}$ flashes slowly) and the output relay $\mathbf{R}$ switches into on-position <br> (yellow LED illuminated) After the interval $\mathbf{t 1}$ has expired, the set interval <br> $\mathbf{t 2}$ begins (green LED $\mathbf{U} / \mathbf{t}$ flashes fast). So that the output relay $\mathbf{R}$ remains <br> into on-position, the control contact $\mathbf{S}$ must be closed and opened again <br> within the set interval $\mathbf{+ 2}$. If this does not happen, the output relay $\mathbf{R}$ switches <br> into off-position (yellow LED not illuminated) and all further pulses at the <br> control contact are ignored. To restart the function the supply voltage must <br> be interrupted and reapplied. |
| :--- | :--- |

－Timer Relays Series ZR4，for Round 11 Pole Plug－in Socket
－Technical Data

|  |  |  | ZR4MF025－A | ZR4B0025－A |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| INDICATORS | Green LED U／ヶ ON |  | Indication of supply voltage |  |  |  |
|  | Green LED U／ヶ flashes |  | Indication of time period | Indication of time period t1 |  |  |
|  | Green LED U／t flashes fast |  | － | Indication of time period $\dagger 2$ |  |  |
|  | Yellow LED R ON／OFF |  | Indication of relay output |  |  |  |
| MECHANICAL DESIGN | Housing <br> IP rating housing |  | Self－extinguishing plastic housing IP40 |  |  | $\begin{aligned} & \text { Page } \\ & 111 \end{aligned}$ |
|  |  |  |  |  |  |  |
|  | Mounting | （IEC 60067－1－18。） | $\frac{\text { 1P40 }}{11 \text {－pole socket YMR78700 }}$ |  |  |  |
|  | Terminal （VBG 4，PZ1 <br> required）  |  | Shockproof terminal connection |  |  |  |
|  |  |  |  |  |  |  |
|  | Mounting position |  | Any |  |  |  |
|  | Tightening torque |  | Max． 1 Nm |  |  |  |
|  | Terminal capacity |  | $1 \times 0.5$ to $2.5 \mathrm{~mm}^{2}$ with／without multicore cable end $1 \times 4 \mathrm{~mm}^{2}$ without multicore cable end $2 \times 0.5$ to $1.5 \mathrm{~mm}^{2}$ with／without multicore cable end $2 \times 2.5 \mathrm{~mm}^{2}$ flexible without multicore cable end |  |  |  |
| INPUT CIRCUIT | Pins |  | S2（＋）－S 10 ／A1（＋）－A2 |  |  |  |
|  | Supply voltage |  | 12－240 V AC／DC |  |  |  |
|  | Tolerance |  | －10\％to＋10\％ |  |  |  |
|  | Rated consumption |  | $6 \mathrm{VA}(2 \mathrm{~W})$ |  |  |  |
|  | Reated frequency |  | 48 to 63 Hz |  |  |  |
|  | Duty cycle |  | 100 \％ |  |  |  |
|  | Reset time |  | 100 ms |  |  |  |
|  | Residual ripple for DC |  | 10 \％ |  |  |  |
|  | Drop－out voltage |  | ＞ $30 \%$ of the supply voltage |  |  |  |
|  | Overvoltage category（IEC 60664－1） |  | III |  |  |  |
|  | Rated surge voltage |  | 4 kV |  |  |  |
| OUTPUT CIRCUIT | Number of contacts and type |  | 2 potential free CO contacts |  |  |  |
|  | Rated voltage |  | 250 V AC |  |  |  |
|  | Switching capacity |  | 2000 VA（8A／ 250 V ） |  |  |  |
|  | Fusing |  | 8 A fast acting |  |  |  |
|  | Mechanical service life |  | $20 \times 10^{6}$ operations |  |  |  |
|  | Electrical service life |  | $2 \times 10^{5}$ operations at 1000 VA resistive load |  |  |  |
|  | Switching frequency（IEC 60947－5－1） |  | Max． 6 ／min at 1000 VA resistive load |  |  |  |
|  | Overvoltage category（IEC 60664－1） |  | III |  |  |  |
|  | Rated surge voltage |  | 4 kV |  |  |  |
| CONTROL CIRCUIT | Input not potential free |  | Pins S2－S5 |  |  |  |
|  | Loadable |  | Yes |  |  |  |
|  | Max．line length |  | 10 m |  |  |  |
|  | Trigger level（sensitivity） |  | Automatic adaption to supply voltage |  |  |  |
|  | Min．control pulse length |  | DC 50 ms ，AC 100 ms |  |  |  |
| ACCURACY | Base accuracy |  | $\pm 1 \%$ of maximum scale value |  |  |  |
|  | Adjusting accuracy |  | ＜ $5 \%$ of maximum scale value |  |  |  |
|  | Repition accuracy |  | $<0.5 \%$ or $\pm 5 \mathrm{~ms}$ |  |  |  |
|  | Temperature influence |  | $\leq 0.01 \% /{ }^{\circ} \mathrm{C}$ |  |  |  |
| AMBIENT CONDITIONS | Ambient temperature |  | $-25^{\circ} \mathrm{C}$ to $+55^{\circ} \mathrm{C}$ |  |  |  |
|  | Storage temperature |  | $-25^{\circ} \mathrm{C}$ to $+70^{\circ} \mathrm{C}$ |  |  |  |
|  | Transport temperature |  | $-25^{\circ} \mathrm{C}$ to $+70^{\circ} \mathrm{C}$ |  |  |  |
|  | Relative humidity（IEC 60721－3－3 class 3K3） |  | $15 \%$ to $85 \%$ |  |  |  |
|  | Pollution degree（IEC 60664－1） |  | 2 ，if built in 3 |  |  |  |
| DESCRIPTION |  |  | AVAILABLE ORDER NO． |  |  |  |
| Multi－function Relays |  |  |  |  |  |  |
| Timer multifunction 12－240V AC／DC，2CO，8A，plug－version |  |  |  |  |  |  |
| Flasher Relays |  |  |  |  |  |  |
| Two－time multifunction 12－240VAC／DC，2CO，8A，250V，plug－version |  |  | －000－9 |  | ZR4B0025－A |  |

## Sockets

DIN rail mounted plug－in socket for MT3 relays and timer relays series ZR4， 11 pole，10A（3 CO），with screw terminals，not compatible with function modules
Yoon

## Timer Relays

## Timer Relays Series AMPARO



ZRAMF011

## Schrack-Info

## ZRAE0011

- Tripping delayed timer relay
- Mode: "E"
- $1 \mathrm{CO}, 5 \mathrm{~A}$
- 24-48 V DC / 24-240 V AC
- Time range 0.05 seconds - 10 hours
- Component width 17.5 mm


## ZRAR0011

- Release delayed timer relay
- Mode: "R"
- $1 \mathrm{CO}, 5 \mathrm{~A}$
- 24-48 V DC / 24-240 V AC
- Time range 0.05 seconds - 10 hours
- Component width 17.5 mm


## ZRAMF011

- Multi-function timer relay
- Modes: "E", "R", "Ws", "Wu", "Wa", "Bp" \& "F"
- $1 \mathrm{CO}, 5 \mathrm{~A}$
- 24-48 V DC / 24-240 V AC
- Time range 0.05 seconds - 10 hours
- Component width 17.5 mm
- Overview AMPARO Timer Relays

| Article | Number of contacts <br> and type | Voltage range | Number of <br> time ranges | Number of <br> functions | $\mathbf{E}$ | $\mathbf{R}$ | $\mathbf{W s}$ | $\mathbf{W u}$ | $\mathbf{W a}$ | $\mathbf{B p}$ | $\mathbf{F}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ZRAEOOII | 1 CO | $24-240 \mathrm{VAC} / \mathrm{DC}$ | 6 | 1 | X |  |  |  |  |  |  |
| ZRAROOII | 1 CO | $24-240 \mathrm{VAC} / \mathrm{DC}$ | 6 | 1 |  | X |  |  |  |  |  |
| ZRAMFOII | 1 CO | $24-240 \mathrm{VAC} / \mathrm{DC}$ | 6 | 7 | X | X | X | X | X | X | X |

- Timer Relays Series AMPARO

Overview Modes


| E | Ounctions |  |
| :---: | :--- | :--- |
| $\mathbf{R}$ | OFF delay | (with control contact) |
| $\mathbf{W s}$ | Single shot leading edge | (with control contact) |
| $\mathbf{W u}$ | Single shot leading edge voltage controlled |  |
| $\mathbf{W a}$ | Single shot trailing edge | (with control contact) |
| $\mathbf{B p}$ | Flasher pause first |  |
| $\mathbf{F}$ | T-FlipFlop (Toggle) |  |

Dimensions (mm)


## Configuration \& Settings



Configuration \& Functionalities

| $\mathbf{1}$ | Fine adjustment |
| :---: | :--- |
| $\mathbf{2}$ | Setting of time range |
| $\mathbf{3}$ | Selection of the desired function |
| $\mathbf{4}$ | Status indication <br> U/t: LED green...Supply voltage applied <br> R: LED yellow...Relay is active |

Overview Circuit Diagrams


Timer Relays

- Timer Relays Series AMPARO
- Modes



## - Overview Modes

| Article | $\mathbf{E}$ | $\mathbf{R}$ | Ws | Wu | Wa | Bp | $\mathbf{F}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ZRAEOO11 | X |  |  |  |  |  |  |
| ZRAR0011 |  | X |  |  |  |  |  |
| ZRAMFO11 | X | X | X | X | X | X | X |

Description of Modes

| E | ON delay |  |
| :---: | :---: | :---: |
| $\mathbf{R}$ | OFF delay | with control contact |
| $\mathbf{W s}$ | Single shot leading edge | with control contact |
| $\mathbf{W u}$ | Single shot leading edge voltage controlled <br> (function selector must be set on Ws and fixed jumper A1 - B1) |  |
| $\# 1$ | Function Ws with fixed jumper A1 - B1 |  |
| $\mathbf{W a}$ | Single shot trailing edge | with control contact |
| $\mathbf{B p}$ | Flasher pause first |  |
| $\mathbf{F}$ | T-FlipFlop (Toggle) |  |

- Timer Relays Series AMPARO
- Technical Data

|  |  |  | ZRAEOO11 | ZRAR0011 | ZRAMFO11 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| INDICATORS | Green LED U/t ON |  | Indication of supply voltage |  |  |
|  | Green LED U/ヶ flashes |  | Indication of time period |  |  |
|  | Yellow LED R ON/OFF |  | Relay is energized |  |  |
| INPUT CIRCUIT | Terminals |  | A1-A2 |  |  |
|  | Supply voltage |  | 24-48 V DC / 24-240 V~ |  |  |
|  | Duty cycle |  | 100 \% |  |  |
|  | Bridging time |  | < 30 ms |  |  |
|  | Reset time |  | 100 ms |  |  |
|  | Drop-out voltage |  | > 30 \% |  |  |
|  | Power loss |  | 1 W |  |  |
| OUTPUT CIRCUIT | Number of contacts and type |  | 1 CO |  |  |
|  | Terminals |  | 15-16-18 |  |  |
|  | Type |  | Relay |  |  |
|  | Contact material |  | AgNi |  |  |
|  | Rated voltage |  | 250 V |  |  |
|  | Max. switching voltage |  | 250 V |  |  |
|  | Max. switching current |  | 5 A |  |  |
|  | Rated current |  | $5 \mathrm{~A} / 250 \mathrm{~V}$ |  |  |
|  | Service life | Mechanical | $1 \times 10^{6}$ operations |  |  |
|  |  | Electrical | $1 \times 10^{5}$ operations |  |  |
|  | Switching frequency | With load |  | 6 / min |  |
|  |  | Without load |  | 1200 / min |  |
|  | Fusing |  | 5 A fast acting |  |  |
| DATAS OF INSULATION | Pollution degree (IEC 61812-1) |  | 2 |  |  |
|  | Overvoltage category (IEC 61812-1) |  | 11 |  |  |
|  | Rated insulation voltage (IEC 61812-1) | Input circuit/ output circuit | 300 V |  |  |
|  | Rated surge voltage (IEC 61812-1) | Input circuit/ output circuit | 2500 V |  |  |
|  | Insulation-test-voltage (IEC 61812-1) | Input circuit/ output circuit | 1600 V |  |  |
|  | Insulation | Input circuit/ output circuit | Basic insulation |  |  |
| ELECTRICAL CONNECTION | Terminal |  | Screw-terminal |  |  |
|  | Terminal capacity | Rated terminal capacity | $2.5 \mathrm{~mm}^{2}$ |  |  |
|  | Max. terminal capacity | Flexible with / without ferrule | $1 \times 0.25 \ldots 2.5 \mathrm{~mm}^{2}$ (23 AWG...14AWG) |  |  |
|  |  | Flexible without sleeve | $2 \times 0.25 \ldots 1.5 \mathrm{~mm}^{2}(23$ AWG...14AWG) |  |  |
|  |  | Flexible with twin-sleeve | $2 \times 0.25 \ldots 1.5 \mathrm{~mm}^{2}$ (23 AWG...14AWG) |  |  |
|  |  | Stranded without sleeve | $1 \times 0.25$.. | $5 \mathrm{~mm}^{2}$ (23 AW | .14AWG) |
|  | Length without insulation |  | 7 mm |  |  |
|  | Tightening torque |  | Max. 0.5 Nm |  |  |
| GENERAL DATA | Ambient temperature | Operation | $-25 . . .50^{\circ} \mathrm{C}$ |  |  |
|  | Dimensions (DIN 43880) | LxHxD | $17.5 \times 97 \times 57.9 \mathrm{~mm}$ |  |  |
|  | Mounting | (EN 60715) | DIN-rail |  |  |
|  | Mounting position |  | Any |  |  |
|  | IP rating | Housing | IP40 |  |  |
|  |  | Terminals | IP20 |  |  |
| DESCRIPTION |  |  | AVAILABLE ORDER NO. |  |  |
| Tripping and Release Delay |  |  |  |  |  |
| Timer single function ON-delay AMPARO, 24 V AC/DC or 230 V AC, 1 CO, 5A/230V |  |  | -00\%-0 |  |  |
| Timer single function OFF-delay AMPARO, 24 V AC/DC or 230 V AC, $1 \mathrm{CO}, 5 \mathrm{~A} / 230 \mathrm{~V}$ |  |  | - |  |  |
| Multi-function Relays |  |  |  |  |  |
| Timer multifunction AMPARO, 24V AC/DC or 230V AC, 1 CO, 5A/230V |  |  | - $+\infty$ - |  |  |

## Timer Relays

Timer Relays Series ZR6


Overview Modes
$\mathbf{1}$ delayed contact (terminals $15-16-18$ ) and $\mathbf{1}$ instantaneous contact (terminals 25-26-28)

| $\mathbf{1}$ delayed contact (terminals 15-16-18) and $\mathbf{1}$ instantaneous contact (terminals 25-26-28) |  |  |
| :--- | :--- | :--- |
| E11 | ON delay |  |
| R11 | OFF delay | with control contact "S" |
| Es11 | ON delay | with control contact "S" |
| Wu11 | Single shot leading edge voltage controlled |  |
| Ws11 | Single shot leading edge | with control contact "S" |
| Wa11 | Single shot trailing edge | with control contact "S" |
| Bi11 | Flasher pulse first |  |
| Bp11 | Flasher pause first |  |


| 2 delayed contacts |  |  |
| :---: | :--- | :--- |
| E20 | ON delay |  |
| R20 | OFF delay | with control contact "S" |
| Es20 | ON delay | with control contact "S" |
| Wu20 | Single shot leading edge voltage controlled |  |
| Ws20 | Single shot leading edge | with control contact "S" |
| Wa20 | Single shot trailing edge | with control contact "S" |
| Bi20 | Flasher pulse first |  |
| Bp20 | Flasher pause first |  |

## Circuit Diagram



Time Ranges

| Time range | Adjustment range |
| :---: | :---: |
| 1 s | $50 \mathrm{~ms}-1 \mathrm{~s}$ |
| 3 s | $150 \mathrm{~ms}-10 \mathrm{~s}$ |
| 10 s | $500 \mathrm{~ms}-10 \mathrm{~s}$ |
| 30 s | $1500 \mathrm{~ms}-30 \mathrm{~s}$ |
| 1 min | $3 \mathrm{~s}-1 \mathrm{~min}$ |
| 3 min | $9 \mathrm{~s}-3 \mathrm{~min}$ |
| 10 min | $30 \mathrm{~s}-10 \mathrm{~min}$ |
| 30 min | $90 \mathrm{~s}-30 \mathrm{~min}$ |
| 1 h | $3 \mathrm{~min}-1 \mathrm{~h}$ |
| 3 h | $9 \mathrm{~min}-3 \mathrm{~h}$ |
| 10 h | $30 \mathrm{~min}-10 \mathrm{~h}$ |
| 30 h | $90 \mathrm{~min}-30 \mathrm{~h}$ |
| 1 d | $72 \mathrm{~min}-1 \mathrm{~d}$ |
| 3 d | $216 \mathrm{~min}-3 \mathrm{~d}$ |
| 10 d | $12 \mathrm{~h}-10 \mathrm{~d}$ |
| 30 d | $36 \mathrm{~h}-30 \mathrm{~d}$ |

Timer Relays Series ZR6

- Modes (Part 1)



## Detailed Description of Modes (Part 1)

The internal potentiometer is deactivated when a remote potentiometer is connected! The function has to be set before connecting the relay to the supply voltage.

|  | ON delay |
| :---: | :--- |
|  | When the supply voltage $\mathbf{U}$ is applied, the instantaneous contact switches <br> into on-position and the set interval $\mathbf{t}$ begins (green LED flashes). After the <br> interval $\mathbf{t}$ has expired (green LED illuminated) the delayed contact switches <br> into on-position (yellow LED illuminated). This status remains until the supply <br> voltage is interrupted. If the supply voltage is interrupted before the expiry <br> of the interval $\mathbf{t}$, the interval already expired is erased and is restarted when <br> the supply voltage is next applied. | into on-position (yellow LED illuminated). This status remains until the supply of the interval $\mathbf{t}$, the interval already expired is erased and is restarted when the supply voltage is next applied.

## OFF delay with control contact "S"

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED illuminated). When the control contact $\mathbf{Y 1}-\mathbf{Y} \mathbf{2}$ is closed, both contacts switch into on-position (yellow LED illuminated). If the control contact is R11 opened, the instantaneous contact switches into off-position and the set interval $\mathbf{t}$ begins (green LED flashes). After the interval $\mathbf{t}$ has expired (green LED illuminated) the delayed contact switches into off-position (yellow LED not illuminated). If the control contact is closed again before the interval $\mathbf{t}$ has expired, the interval already expired is erased and is restarted with the next cycle.

## ON delay with control contact "S"

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED illuminated). When the control contact $\mathbf{Y 1} \mathbf{- Y 2}$ is closed, the instantaneous contact switches into on-position and the set interval $\boldsymbol{t}$ begins (green LED flashes). After the interval thas expired (green LED illuminated) the delayed contact switches into on-position (yellow LED illuminated). This status remains until the control contact is opened again. If the control contact is opened before the interval $\mathbf{t}$ has expired, the interval already expired is erased and is restarted with the next cycle.

## Single shot leading edge voltage controlled (Wull)

When the supply voltage $\mathbf{U}$ is applied, both contacts switch into on-position (yellow LED illuminated) and the set interval $\mathbf{t}$ begins (green LED flashes). After the interval thas expired (green LED illuminated) the delayed contact
Wull switches into off-position (yellow LED not illuminated). This status remains until the supply voltage is interrupted. If the supply voltage is interrupted before the interval thas expired, the both contacts switch into off-position. The interval already expired is erased and is restarted when the supply voltage is next applied.

ON delay
When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t}$ begins (green LED flashes). After the interval thas expired (green LED illuminated) the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated). This status remains until the supply voltage is interrupted. If the supply voltage is interrupted before the expiry of the interval $\mathbf{t}$, the interval already expired is erased and is restarted when the supply voltage is next applied.

| R2O | OR <br> Th <br> ill <br> sw <br> sw <br> op <br> ex <br> ly <br> in <br> w |
| :---: | :--- |

## OFF delay with control contact "S"

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED illuminated). When the control contact $\mathbf{Y 1}-\mathbf{Y 2}$ is closed, the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated). If the control contact is opened, the set interval $\mathbf{t}$ begins (green LED flashes). After the interval thas expired (green LED illuminated) the output relay switches into off-position (yellow LED not illuminated). If the control contact is closed again before the interval $\mathbf{t}$ has expired, the interval already expired is erased and is restarted with the next cycle.

| Es20 | ON delay with control contact "S" |
| :---: | :---: |
|  | The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED illuminated). When the control contact $\mathbf{Y 1} \mathbf{- Y 2}$ is closed, the set interval t begins (green LED flashes). After the interval $\mathbf{t}$ has expired (green LED illuminated) the output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated). This status remains until the control contact is opened again. If the control contact is opened before the interval $\mathbf{t}$ has expired, the interval already expired is erased and is restarted with the next cycle. |


| WU20 | Single shot leading edge voltage controlledWhen the supply voltage $\mathbf{U}$ is applied, the output relay $\mathbf{R}$ switches into <br> on-position (yellow LED illuminated) and the set interval $\boldsymbol{t}$ begins (green <br> LED flashes). After the interval $\mathbf{t}$ has expired (green LED illuminated) the <br> output relay switches into off-position (yellow LED not illuminated). This <br> status remains until the supply voltage is interrupted. If the supply voltage is <br> interrupted before the interval thas expired, the output relay switches into <br> off-position. The interval already expired is erased and is restarted when the <br> supply voltage is next applied. |
| :---: | :--- |

## Timer Relays

## Timer Relays Series ZR6

- Modes (Part 2)



## Detailed Description of Modes (Part 2)

The internal potentiometer is deactivated when a remote potentiometer is connected! The function has to be set before connecting the relay to the supply voltage.

| Ws 11 | Single shot leading edge with control contact "S" |
| :---: | :---: |
|  | The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED illuminated). When the control contact Y1-Y2 is closed, both contacts switch into on-position (yellow LED illuminated) and the set interval $\dagger$ begins (green LED flashes). After the interval $\boldsymbol{t}$ has expired (green LED illuminated) the delayed contact switches into off-position (yellow LED not illuminated). The instantaneous contact remains in on-position, until the control contact is opened again. During the interval, the control contact (and the instantaneous contact) can be operated any number of times. A further cycle can only be started when the cycle run has been completed. |


|  | Single shot leading edge with control contact "S" |
| :---: | :--- |
|  | The supply voltage U must be constantly applied to the device (green LED <br> illuminated). When the control contact Y 1-Y2 is closed, the output relay <br> $\mathbf{R}$ switches into on-position (yellow LED illuminated) and the set interval <br> $\mathbf{t}$ begins (green LED flashes). After the interval $\mathbf{t}$ has expired (green LED <br> illuminated) the output relay switches into off-position (yellow LED not <br> illuminated). During the interval, the control contact can be operated any <br> number of times. A further cycle can only be started when the cycle run has <br> been completed. |

## Single shot trailing edge with control contact "S"

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED illuminated). When the control contact $\mathbf{Y 1} \mathbf{- Y 2}$ is closed the instantaneous contact switches into on-position. When the control contact is opened, the instantaneous contact switches into off-position, the delayed contact
Wall switches into on-position (yellow LED illuminated) and the set interval t begins (green LED flashes). After the interval $\boldsymbol{t}$ has expired (green LED illuminated), the delayed contact switches into off-position (yellow LED not illuminated). During the interval, the control contact (and the instantaneous contact) can be operated any number of times. A further cycle can only be started when the cycle run has been completed.

| $\mathbf{W a 2 O}$ | Sin <br> Th <br> illu <br> co <br> ou <br> in <br> LED <br> ill <br> nu <br> be |
| :---: | :--- |

## Single shot trailing edge with control contact " S "

The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED illuminated). Closing the control contact $\mathbf{Y 1 - Y 2}$ has no influence on the condition of the output relay $\mathbf{R}$. When the control contact is opened, the output relay switches into on-position (yellow LED illuminated) and the set interval $\boldsymbol{t}$ begins (green LED flashes). After the interval $\boldsymbol{t}$ has expired (green LED illuminated), the output relay switches into off-position (yellow LED not illuminated). During the interval, the control contact can be operated any number of times. A further cycle can only be started when the cycle run has been completed.

## Flasher pulse first

When the supply voltage $\mathbf{U}$ is applied, the instantaneous contact and the delayed contact switch into on-position (yellow LED illuminated) and the set interval $\mathbf{t}$ begins (green LED flashes). After the interval $\boldsymbol{t}$ has expired, the delayed contact switches into off-position (yellow LED not illuminated) and the set interval $\boldsymbol{t}$ begins again. The delayed contact is triggered at a ratio of 1:1 until the supply voltage is interrupted.

## Flasher pause first

When the supply voltage $\mathbf{U}$ is applied, the instantaneous contact switches into on-position and the set interval $\boldsymbol{t}$ begins (green LED flashes). After the interval $\mathbf{t}$ has expired, the delayed contact switches into on-position (yellow LED illuminated) and the set interval $\boldsymbol{t}$ begins again. After the interval $\boldsymbol{\dagger}$ has expired, the delayed contact switches into off-position (yellow LED not illuminated). The delayed contact is triggered at a ratio of 1:1 until the supply voltage is interrupted.

> | Flasher pulse first |
| :--- |
| When the supply voltage $\mathbf{U}$ is applied, the output relay $\mathbf{R}$ switches into |
| on-position (yellow LED illuminated) and the set interval $\boldsymbol{\leftarrow}$ begins (green |
| LED flashes). After the interval $\mathbf{t}$ has expired, the output relay switches into |
| off-position (yellow LED not illuminated) and the set interval $\mathbf{t}$ begins again. |
| The output relay is triggered at a ratio of $1: 1$ until the supply voltage is |
| interrupted. |

| Bp20 | Flasher pause first |
| :---: | :---: |
|  | When the supply voltage $\mathbf{U}$ is applied, the set interval $\mathbf{t}$ begins (green LED flashes). After the interval $\mathbf{t}$ has expired, the output relay $\mathbf{R}$ switches into onposition (yellow LED illuminated) and the set interval $\boldsymbol{t}$ begins again. After the interval $\mathbf{t}$ has expired, the output relay switches into off-position (yellow LED not illuminated). The output relay is triggered at a ratio of $1: 1$ until the supply voltage is interrupted. |

- Timer Relays Series ZR6
- Technical Data

| INDICATORS | Green LED U/ヶ ON |  | Indication of supply voltage |
| :---: | :---: | :---: | :---: |
|  | Green LED U/ヶ flashes |  | Indication of time period |
|  | Yellow LED R ON/OFF |  | Indication of relay output |
| MECHANICAL DESIGN | Housing |  | Self-extinguishing plastic housing |
|  | IP rating housing |  | IP40 |
|  | Mounting | (EN 60715) | DIN-rail TS 35 |
|  | Terminal | (VBG 4, PZ1 required) | Shockproof terminal connection |
|  | IP rating terminal |  | IP20 |
|  | Mounting position |  | Any |
|  | Tightening torque |  | Max. 1 Nm |
|  | Terminal capacity |  | $1 \times 0.5$ to $2.5 \mathrm{~mm}^{2}$ with/without multicore cable end $1 \times 4 \mathrm{~mm}^{2}$ without multicore cable end $2 \times 0.5$ to $1.5 \mathrm{~mm}^{2}$ with/ without multicore cable end $2 \times 2.5 \mathrm{~mm}^{2}$ flexible without multicore cable end |
| INPUT CIRCUIT | Input |  | Terminals A1-A2 (galvanically separated) |
|  | Supply voltage | AC/DC | 24 V to 240 V ~ |
|  | Tolerance | 24 to 240 V DC | $-20 \%$ to +25\% |
|  |  | 24 to 240 V AC | -15\% to +10 \% |
|  | Rated frequency | 48 to 400 Hz | 24 to $240 \mathrm{~V} \sim$ |
|  |  | 16 to 48 Hz | 48 to 240 V ~ |
|  | Rated consumption |  | $2.5 \mathrm{VA}(1 \mathrm{~W})$ |
|  | Duration of operation |  | 100 \% |
|  | Reset time |  | 500 ms |
|  | Wave form | For AC | Sinus |
|  | Residual ripple | For DC | 10 \% |
|  | Drop-out voltage |  | > $15 \%$ of the supply voltage |
|  | Overvoltage category | (IEC 60664-1) | III |
|  | Rated surge voltage |  | 4 kV |
| OUTPUT CIRCUIT | Number of contacts and type |  | 2 potential free CO contacts |
|  | Rated voltage |  | 250 V AC |
|  | Switching capacity | (distance $<5 \mathrm{~mm}$ ) | 750 VA (3 A / 250 V ) |
|  |  | (distance $>5 \mathrm{~mm}$ ) | 1250 VA (5A / $250 \mathrm{~V} \sim 1$ |
|  | Fusing |  | 5 A fast acting |
|  | Mechanical service life |  | $20 \times 10^{6}$ operations |
|  | Electrical service life |  | $2 \times 10^{5}$ operations at 1000VA resistive load |
|  | Switching capacity | (IEC 60947-5-1) | Max. 60 / min at 100 VA resistive load, Max. 6 / min at 1000 VA resistive load |
|  | Overvoltage category | (IEC 60664-1) | III |
|  | Rated surge voltage |  | 4 kV |
| CONTROL CONTACT | Activation |  | Bridge Y1-Y2 |
|  | Potential free |  | Yes, basic isolation against input and output circuit |
|  | Loadable |  | No |
|  | Control voltage | Max. | 5 V |
|  | Short circuit current | Max. | 1 mA |
|  | Line length | Max. | 10 m |
|  | Control pulse length | Min. | 50 ms |
| REMOTE POTENTIOMETER | (not included) |  | The internal potentiometer is de-activated when a remote potentiometer is connected! |
|  | Connections |  | $1 \mathrm{M} \Omega$ potentiometer, terminals Z1-Y2 |
|  | Line type |  | Twisted pair |
|  | Control voltage | Max. | 5 V |
|  | Short circuit current | Max. | $\mu \mathrm{A}$ range |
|  | Line length | Max. | 5 m |
| ACCURACY | Base accuracy |  | $\pm 1 \%$ (of maximum scale value) using $1 \mathrm{M} \Omega$ remote potentiometer |
|  | Frequency response |  | - |
|  | Adjustment accuracy |  | $<5 \%$ (of maximum scale value) using $1 \mathrm{M} \Omega$ remote potentiometer |
|  | Repetition accuracy |  | $<0.5 \%$ or $\pm 5 \mathrm{~ms}$ |
|  | Temperature influence |  | $\leq 0,01 \% /{ }^{\circ} \mathrm{C}$ |
| AMBIENT CONDITIONS | Ambient temperature | $\begin{gathered} \text { (IEC 60068-1) } \\ \text { (UL 508) } \end{gathered}$ | $\begin{aligned} & -25^{\circ} \mathrm{C} \text { to }+55^{\circ} \mathrm{C} \\ & -25^{\circ} \mathrm{C} \text { to }+40^{\circ} \mathrm{C} \\ & \hline \end{aligned}$ |
|  | Storage temperature |  | $-25^{\circ} \mathrm{C}$ to $+70^{\circ} \mathrm{C}$ |
|  | Transport temperature |  | $-25^{\circ} \mathrm{C}$ to $+70^{\circ} \mathrm{C}$ |
|  | Relative humidity | (IEC 60721-3-3 class 3K3) | $15 \%$ to $85 \%$ |
|  | Pollution degree | (IEC 60664-1) | 3 |
|  | Vibration resistance | (IEC 60068-2-6) | 10 to $55 \mathrm{~Hz}, 0.35 \mathrm{~mm}$ |
|  | Shock resistance | (IEC 60068-2-27) | $15 \mathrm{~g}, 11 \mathrm{~ms}$ |

*The potentiometer is used for remote setting of the time. Here, the internal potentiometer (knob for fine adjustment of the time) is automatically disabled. The nominal value of the potentiometer is $1 \mathrm{M} \Omega$. At a value approximately $>1.6 \mathrm{M} \Omega$ at this input the time fine-tuning is again determined by the internal potentiometer.

| DESCRIPTION | AVAILABLE |
| :--- | :--- |
| Multi-function Relays |  |
| Timer multifunction $12-240 \mathrm{VAC} / \mathrm{DC}, 2 \mathrm{CO}, 8 \mathrm{~A} / 250 \mathrm{~V}$ | $-\infty 00=0$ |

## Multi-function Relays

Measuring and Monitoring Relays

Measuring and Monitoring Relays Series UR5
Measuring and Monitoring Relays Series AMPARO

$\square$ Measuring and Monitoring Relays Series UR6


Relay Module


Summary Alarm Indicators
Diode Combination DBS


## Measuring and Monitoring Relays

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Measuring and Monitoring Relays

## Measuring and Monitoring Relays Series UR5



## Schrack-Info

## UR5U1011

- Voltage monitoring for AC and DC in 1-phase networks
- Undervoltage monitoring
- 1 CO
- Component width 17.5 mm
- In-line design


## UR5U3011

- 3-phase voltage monitoring
- Undervoltage monitoring
- Supply voltage $=$ measured voltage
- 1 CO
- Component width 17.5 mm
- In-line design


## UR5U3N 11

- 3-phase undervoltage monitoring
- Fixed switching threshold US and fixed hysteresis
- 1 CO
- Component width 17.5 mm
- In-line design


## UR5I1011

- AC monitoring in 1-phase networks
- 1 CO
- Component width 17.5 mm
- In-line design



## UR5P3011

- Phase sequence, phase failure and phase imbalance monitoring
- 1 floating CO (output relay)
- Component width 17.5 mm
- In-line design


## UR5R 1021

- Tripping unit for motor winding temperature monitoring with or without short-circuit monitoring of the thermistor circuit (selectable with terminal bridges)
- Optional reading of a temperature sensor
- Test functionality with integrated Reset switch
- Max. rated insulation voltage sensor circuit up to 690 V
- 1 CO
- Component width 35 mm
- In-line design


## UR5L1021

- Filling level monitoring of conductive liquids
- Multiple modes
- Safe disconnection of measuring circuits
- 1 CO
- Component width 35 mm
- In-line design

Measuring and Monitoring Relays Series UR5

- Overview Modes

| Article number | Functions |
| :---: | :---: |
| UR5U1011 | AC/DC under voltage monitoring in 1-phase mains with adjustable <br> threshold and hysteresis. <br> UNDER = Under voltage monitoring |
| UR5U3011 | Undervoltage monitoring in 3-phase mains (each phase against <br> the neutral wire) with fixed or adjustable threshold voltage US and fixed <br> hysteresis. |
| UR5U3N11 | Undervoltage monitoring in 3-phase mains (each phase against the <br> neutral wire) with fixed threshold voltage US and fixed hysteresis. |
| UR5I1011 | AC current monitoring in 1-phase mains with adjustable threshold and |
| fixed hysteresis. |  |

Dimensions (mm)


Measuring and Monitoring Relays

- Measuring and Monitoring Relays Series UR5
- Time Ranges

| Article number |  | Adjustment range |
| :---: | :--- | :---: |
| UR5U1011 | Tripping delay (delay): | - |
| UR5U3011 | Tripping delay: | fixed approx. 200 ms |
| UR5U3N11 | Tripping delay: <br> Threshold Us: | fixed approx. 200 ms <br> fixed, 195.5 V (L N ) |
| UR511011 | Tripping delay (delay): | - |
| UR5P3011 | Tripping delay: | (L N) |
| UR5R 1021 | Start-up suppression time (start): <br> Trippprox. 100 ms <br> UR5L1021 | Tripping delay (delay): <br> Turn-off delay (delay ON): |

Circuit Diagrams


Circuit Diagrams

| A | Monitoring temperature sensors |
| :--- | :--- |
| B | Monitoring thermal contact |
| C | Reset |
| D | Probe max. |
| E | Probe min. |
| F | Mass probe |

Measuring and Monitoring Relays Series UR5
Modes


## Measuring and Monitoring Relays

## Measuring and Monitoring Relays Series UR5

Detailed Description of Modes (Part 1)

| UR5U1011 | The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED illuminated). The output relay $\mathbf{R}$ switches into on-position (yellow LED <br> illuminated) when the measured voltage $\mathbf{U}$ exceeds the value adjusted at the Us regulator. The output relay $\mathbf{R}$ switches into off-position (yellow LED not <br> illuminated) when the measured value for the voltage falls below the set value by more than the fixed hysteresis. |
| :--- | :--- |


| UR5U3011 | Under voltage monitoring for 3-phase AC mains with variable threshold voltage Us and fixed hysteresis. All measuring inputs (LI, L2 and L3) must be <br> connected to phase voltage. If single or 2-phase monitoring is required, unused input terminals (L) must be connected to mains voltage to have proper <br> L-N voltage on the terminals $\mathbf{L I}, \mathbf{L 2}$ and $\mathbf{L 3}$. A phase failure can not be detected, if the reverse voltage coming from the load exceeds the threshold US <br> relay. <br> Test function (optional) <br> The test function enables a manually disconnection of the output relay. <br> Under voltage monitoring <br> The output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated), when the measuring voltage of all connected phases exceeds the fixed threshold <br> US by more than the fixed hysteresis $\mathbf{H}$. When the voltage of one of the connected phases (LI, L2 or L3) falls below the fixed threshold, the output relay $\mathbf{R}$ <br> switches into off-position again (yellow LED not illuminated). |
| :---: | :--- |


|  | Under voltage monitoring for 3-phase AC mains with fixed threshold voltage US and fixed hysteresis. All measuring inputs (L1, L2 and L3) must be <br> connected to phase voltage. If single or 2-phase monitoringis required, unused input terminals (L) must be connected to mains voltage to have proper $\mathbf{L}-\mathbf{N}$ <br> voltage on the terminals $\mathbf{L 1}, \mathbf{L 2}$ and $\mathbf{L 3}$. A phase failure can not be detected, if the reverse voltage coming from the load exceeds the threshold US relay. <br> Test function (optional) <br> The test function enables a manually disconnection of the output relay. <br> Under voltage monitoring |
| :--- | :--- |
| UR5U3NII |  |
| The output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated), when the measuring voltage of all connected phases exceeds the fixed threshold |  |
| US by more than the fixed hysteresis $\mathbf{H}$. When the voltage of one of the connected phases (LI, L2 or L3) falls below the fixed threshold, the output relay $\mathbf{R}$ |  |
| switches into off-position again (yellow LED not illuminated). |  |


| The supply voltage $\mathbf{U}$ must be constantly applied to the device (green LED illuminated). The output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated) when the <br> measured current exceeds the value adjusted at the Is regulator. The output relay $\mathbf{R}$ switches into off-position (yellow LED not illuminated) when the measured value <br> for the current falls below the set value by more than the fixed hysteresis. |
| :--- | :--- |


| UR5P3011 | A | Phase sequence monitoring <br> When all the phases are connected in the correct sequence and the measured asymmetry is less than the fixed value, the output relay switches into on-position (yellow LED illuminated). When the phase sequence changes, the output relay switches into off-position (yellow LED not illuminated). |
| :---: | :---: | :---: |
|  | B | Phase failure monitoring <br> The output relay $\mathbf{R}$ switches into off-position (yellow LED not illuminated), when one of the three phases fails. |
|  | C | Asymmetry monitoring <br> The output relay $\mathbf{R}$ switches into off-position (yellow LED not illuminated), when the asymmetry exceeds the value set at the ASYM-regulator. Reverse voltages of a consumer (e.g. a motor which continues to run on two phases only) do not effect the disconnection. |

## Temperature monitoring of the motor winding with fault latch

| UR5R1021 | If the sup motor) <br> Pressin and th <br> When into of <br> The out a reset | Temperat <br> ly voltage $\mathbf{U}$ is applied (green LED illumina e output relay switches into on-position. <br> he test/reset key under this conditions, force he switching function can be checked in cas <br> cumulative resistance of the PTC-circuit exce sition (red LED illuminated). <br> relay $\mathbf{R}$ switches into on-position again (red LED (internal or external) was pressed or the supply |
| :---: | :---: | :---: |
|  |  | Application of an external reset |
|  |  | External reset |
|  |  | Application of internal test/reset key |
|  |  | Test/Reset |
|  |  | LED Failure |
|  |  | PTC (Positive Temperature Coefficient) |

Measuring and Monitoring Relays Series UR5
Modes


## Measuring and Monitoring Relays

## Measuring and Monitoring Relays Series UR5

Detailed Description of Modes (Part 2)


Measuring and Monitoring Relays Series UR5

- Technical Data (Part 1)

|  |  |  | UR5U1011 | UR5U3011 | UR5U3N11 | UR511011 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| INDICATORS | Green LED ON/OFF |  | Indication of supply voltage | - | - | Indication of supply voltage |
|  | Green LED LI ON/OFF |  | - | Indication of supply voltage Ll - N | - | - |
|  | Green LED L2 ON/OFF |  | - | Indication of supply voltage L2 - N | - | - |
|  | Green LED L3 ON/OFF |  | - | Indication of supply voltage L3-N | - | - |
|  | Yellow LED ON/OFF |  | Indication of relay output |  |  |  |
| MECHANICAL DESIGN | Housing |  | Self-extinguishing plastic housing IP40 |  |  |  |
|  | Degree of protection housing |  |  |  |  |  |
|  | Mounting | (EN 60715) | DIN-rail TS 35 |  |  |  |
|  | Terminal | $\begin{aligned} & \hline \text { (VBG 4, PZ1 } \\ & \text { required) } \end{aligned}$ | Shockproof terminal connection |  |  |  |
|  | Degree of protection terminal |  | IP20 |  |  |  |
|  | Mounting position |  | Any |  |  |  |
|  | Tightening torque |  | Max. 1 Nm |  |  |  |
|  | Terminal capacity |  | $1 \times 0.5$ to $2.5 \mathrm{~mm}^{2}$ with/without multicore cable end $1 \times 4 \mathrm{~mm}^{2}$ without multicore cable end $2 \times 0.5$ to $1.5 \mathrm{~mm}^{2}$ with/without multicore cable end $2 \times 2.5 \mathrm{~mm}^{2}$ flexible without multicore cable end |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| INPUT CIRCUIT | Supply voltage |  | Measuring voltage |  |  | 230 V |
|  | Rated voltage $U_{N}$ |  | $\begin{gathered} 24 \mathrm{VAC} / \mathrm{DC}, \\ 230 \mathrm{~V} \sim \end{gathered}$ | 3(N) $230 / 400 \mathrm{~V}$ |  |  |
|  | Terminals |  | $\begin{array}{\|cc\|} \hline 230 \mathrm{~V} \sim & \mathrm{E}-\mathrm{F} 3 \\ & \mathrm{E}-\mathrm{F} 2 \\ 24 \mathrm{~V} \sim & (\text { distance } \\ & >5 \mathrm{~mm}) \end{array}$ | N-L1-L2-L3 |  | Li - N |
|  | Tolerance |  | $\begin{gathered} -25 \% \text { to }+20 \% \\ \text { of } U_{N} \end{gathered}$ | $\begin{gathered} -30 \% \text { to }+10 \% \\ \text { of } U_{N} \\ \hline \end{gathered}$ | $\begin{gathered} -30 \% \text { to }+15 \% \\ \text { of } U_{N} \end{gathered}$ | $\begin{gathered} -15 \% \text { to }+15 \% \\ \text { of } U_{N} \end{gathered}$ |
|  | Rated consumption |  | $230 \mathrm{~V} \sim$ 10 VA <br>  $(0.6 \mathrm{~W})$ <br> $24 \mathrm{~V} \sim$ 1.3 VA <br> 24 VDC $(0.8 \mathrm{~W})$ | 5 VA (0.6 W) <br> 8 VA (0.8 W) | $5 \mathrm{VA}(0.6 \mathrm{~W})$ | $5 \mathrm{VA}(0.8 \mathrm{~W})$ |
|  | Rated frequency |  | AC 48 to 63 Hz |  |  |  |
|  | Duration of operation |  | 100\% |  |  |  |
|  | Reset time |  | 500 ms |  |  |  |
|  | Wave form |  | AC / DC Sinus |  |  | Sinus |
|  | Hold-up time |  |  |  |  |  |
|  | Drop-out voltage |  | $\begin{aligned} & \hline>60 \% \text { of } \\ & \text { supply } \\ & \text { voltage } \\ & \hline \end{aligned}$ | Determined by undervoltage detection (see measured circuit) |  | $\begin{gathered} \hline>20 \% \text { of } \\ \text { supply } \\ \text { voltage } \end{gathered}$ |
|  | Overvoltage category (IEC 60664-1) |  | III |  |  |  |
|  | Rated surge voltage |  | 4 kV |  |  |  |
| OUTPUT CIRCUIT | Number of contacts and type |  | 1 potential free CO |  |  |  |
|  | Rated voltage |  | $250 \mathrm{~V} \sim$ |  |  |  |
|  | Switching capacity |  | 1250 VA (5 A / 250 V ) |  |  |  |
|  | Fusing |  | 5 A fast acting |  |  |  |
|  | Mechanical service life |  | $20 \times 10^{6}$ operations |  |  |  |
|  | Electrical service life |  | $2 \times 10^{5}$ operations at 1000VA resistive load |  |  |  |
|  | Switching capacity (IEC 60947-5-1) |  | Max. 6 / min at 1000 VA resistive load |  |  |  |
|  | Overvoltage category (IEC 60664-1) |  | III |  |  |  |
|  | Rated surge voltage |  | 4 kV |  |  |  |
| MEASURING VOLTAGE | Measuring variable |  | $\begin{gathered} \hline \text { AC or DC Sinus, } \\ 48 \text { to } 63 \mathrm{~Hz} \\ \hline \end{gathered}$ | AC Sinus, 48 to 63 Hz |  |  |
|  | Measuring input |  | Supply voltage | 160-240 V~ | Supply voltage | 5A AC |
|  | Terminals |  | $\begin{array}{\|cc} \hline 230 \mathrm{~V} \sim & \mathrm{E}-\mathrm{F3} \\ 24 \mathrm{~V} \sim & \mathrm{E}-\mathrm{F} 2^{*} \\ 24 \mathrm{VDC} & \mathrm{E}-\mathrm{Fl}(+) \\ \hline \end{array}$ | N-L1-L2-L3 |  | Li, Lk |
|  | Overload capacity |  | $120 \%$ of $U_{N}$ | Determined by tolerance specified for supply voltage |  | $\begin{gathered} \hline 7 \mathrm{~A}(\text { ex } 5 \mathrm{~A}: \\ \text { distance } \\ >5 \mathrm{~mm}!\text { ) } \\ \hline \end{gathered}$ |
|  | Starting current |  | - |  |  | $\begin{array}{ll} \hline 1 \mathrm{~s} & 40 \mathrm{~A} \\ 3 \mathrm{~s} & 20 \mathrm{~A} \\ \hline \end{array}$ |
|  | Input resistance |  | - |  |  | $10 \mathrm{~m} \Omega$ |
|  | Switching threshold Us |  | 80-120\% | 160-240 V | fix, 195.5 V (L - N ) | $10-100 \%$ of $I_{N}$ |
|  | Hysteresis H |  | Fixed, 5\% | Approx. 5 \% |  | Fixed, 10 \% |
|  | Overvoltage category | (IEC 60664-1) |  |  |  |  |
|  | Rated surge voltage |  | 4 kV |  |  |  |

## Measuring and Monitoring Relays

## - Measuring and Monitoring Relays Series UR5

- Technical Data (Part 2)

|  |  |  | UR5U1011 | UR5U3011 | UR5U3NII | UR511011 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ACCURACY | Base accuracy |  |  | < 5 \% | d value |  |
|  | Adjustment accuracy |  | $\pm 5 \%$ of rated value |  |  | $\pm 5 \%$ of rated value |
|  | Repetition accuracy |  |  | <2\% | d value |  |
|  | Voltage influence |  |  |  |  |  |
|  | Temperature influence |  |  | $\leq 0$. | $1{ }^{\circ} \mathrm{C}$ |  |
| AMBIENT CONDITIONS | Ambient temperature | (IEC 60068-1) |  | $-25^{\circ}$ | $55^{\circ} \mathrm{C}$ |  |
|  | Storage temperature |  |  | $-25^{\circ}$ | $70^{\circ} \mathrm{C}$ |  |
|  | Transport temperature |  |  | $-25^{\circ}$ | $70^{\circ} \mathrm{C}$ |  |
|  | Relative humidity | $\begin{gathered} \text { (IEC } 60721-3-3 \\ \text { class } 3 \mathrm{~K} 3) \\ \hline \end{gathered}$ |  |  | 5 \% |  |
|  | Pollution degree | (IEC 60664-1) |  | 2 |  | 2, if built in 3 |
|  | Vibration resistance | (IEC 68-2-6) | $\begin{gathered} 10 \text { to } 55 \mathrm{~Hz}, 0.35 \\ \mathrm{~mm} \end{gathered}$ |  |  | $\begin{gathered} 10 \text { to } 55 \mathrm{~Hz}, 0.35 \\ \mathrm{~mm} \\ \hline \end{gathered}$ |
|  | Shock resistance | (IEC 68-2-27) | $15 \mathrm{~g}, 11 \mathrm{~ms}$ |  |  | $15 \mathrm{~g}, 11 \mathrm{~ms}$ |

*The distance between the devices must be greater than 5 mm !

- Technical Data (Part 3)

|  |  |  | UR5P3011 | UR5R1021 | UR5L1021 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| INDICATORS | Green LED ON/OFF |  | Indication of supply voltage |  |  |
|  | Yellow LED ON/OFF |  | Indication of relay output | - | Indication of relay output |
|  | Red LED ON/OFF |  | - | Indication of failure |  |
| MECHANICAL DESIGN | Housing <br> Degree of protection housing |  | Self-extinguishing plastic housing IP40 |  |  |
|  |  |  |  |  |  |
|  | Mounting | (EN 60715) | DIN-rail TS 35 |  |  |
|  | Terminal | $\begin{gathered} \hline \text { (VBG 4, PZ } \\ \text { required) } \end{gathered}$ | Shockproof terminal connection |  |  |
|  | Degree of protection terminal |  | IP20 |  |  |
|  | Mounting position |  | Any |  |  |
|  | Tightening torque |  | Max. 1 Nm |  |  |
|  | Terminal capacity |  | $1 \times 0.5$ to $2.5 \mathrm{~mm}^{2}$ with/without multicore cable end $1 \times 4 \mathrm{~mm}^{2}$ without multicore cable end $2 \times 0.5$ to $1.5 \mathrm{~mm}^{2}$ with/ without multicore cable end $2 \times 2.5 \mathrm{~mm}^{2}$ flexible without multicore cable end |  |  |
| INPUT CIRCUIT | Supply voltage |  | Measured voltage | $230 \mathrm{~V} \sim$ |  |
|  | Rated voltage $\mathrm{U}_{\mathrm{N}}$ |  | 3(N) $230 / 400 \mathrm{~V} \sim$ | $230 \mathrm{~V} \sim$ |  |
|  | Terminals |  | N-L1-L2-L3 | A1-A2 |  |
|  | Tolerance |  | $-30 \%$ to $+30 \%$ of $U_{N}$ | $-15 \%$ to $+10 \%$ of $\mathrm{U}_{\mathrm{N}}$ |  |
|  | Rated consumption |  | $8 \mathrm{VA}(0.8 \mathrm{~W})$ | $1.3 \mathrm{VA}(1 \mathrm{~W})$ | 2 VA (1 W) |
|  | Rated frequency |  | AC 48 to 63 Hz |  |  |
|  | Duty cycle |  | $100 \%$ |  |  |
|  | Reset time |  | 500 ms | 250 ms | 500 ms |
|  | Residual ripple for DC |  | - | 50 ms | - |
|  | Drop out voltage |  | > $20 \%$ of the supply voltage | > $30 \%$ of the supply voltage |  |
|  | Overvoltage category | (IEC 60664-1) | III |  |  |
|  | Rated surge voltage |  | 4 kV | 6 kV |  |
| OUTPUT CIRCUIT | Number of contacts and type |  | 1 potential free CO |  |  |
|  | Rated voltage |  | $250 \mathrm{~V} \sim$ |  |  |
|  | Terminals |  | - | 11-12-14 | - |
|  | Switching capacity |  | 1250 VA (5 A / $250 \mathrm{~V} \sim 1$ | 1250 VA AC1 B300/P300 (IEC 60947-5-1), therm. constant current 5 A |  |
|  | Fusing |  | 5 A fast acting |  |  |
|  | Mechanical service life |  | $15 \times 10^{6}$ operations | $20 \times 10^{6}$ operations |  |
|  | Electrical service life |  | $100 \times 10^{3}$ operations at 1000 VA resistive load | $2 \times 10^{5}$ operations at 1000 VA resistive load |  |
|  | Switching frequency | (IEC 60947-5-1) | Max. 6 / min at 1000 VA resistive load |  |  |
|  | Overvoltage category | (IEC 60664-1) | III |  |  |
|  | Rated surge voltage |  | 4 kV | 6 kV |  |

Measuring and Monitoring Relays Series UR5

- Technical Data (Part 4)


| *Note: The terminals R2-T2 are internal affiliated with each other! |  |  |
| :---: | :---: | :---: |
| DESCRIPTION | AVAILABLE | ORDER NO. |
| Voltage Monitoring Relays |  |  |
| Voltage monitoring relay, 1 phase, 1CO |  | UR5U1011 |
| Voltage monitoring relay with adjustable voltage range 160-240V, 3-phase, 1CO |  | UR5U3011 |
| Voltage monitoring relay, 3 phase against N , fixed $\mathrm{Us}_{s}=195.5 \mathrm{~V}, 1 \mathrm{CO}$ |  | UR5U3N11 |
| Current Monitoring Relays |  |  |
| Current monitoring relay 1 phase, input 230V, 1 CO |  | UR511011 |
| Phase Monitoring Relays |  |  |
| Phase monitoring relay, 3 phase, 1CO | - $-\infty$ | UR5P3011 |
| Thermistor Monitoring Relays |  |  |
| Thermistor monitoring relay, 1 phase, 1CO | - $0 \times 0$ | UR5R1021 |
| Level Monitoring Relays |  |  |
| Level monitoring relay, 1 phase, 1CO |  | UR5L1021 |

Measuring and Monitoring Relays

Measuring and Monitoring Relays Series AMPARO


- Supply voltage $230 / 400 \mathrm{~V}$
- Supply circuit = measuring circuit
- Neutral conductor is required
- Component width 17.5 mm


## URAU3N11

- 1- and 3-phase undervoltage monitoring with fixed switching threshold
- $1 \mathrm{CO}, 5 \mathrm{~A}$
- Supply voltage $230 / 400 \mathrm{~V}$
- Supply circuit $=$ measuring circuit
- Neutral conductor is required
- Component width 17.5 mm


## URAP3011

- Phase sequence and phase failure monitoring
- Fixed phase imbalance monitoring
- Supply voltage $230 / 400$ V
- Neutral conductor is required
- Component width 17.5 mm


## Dimensions (mm)



Circuit Diagrams


Measuring and Monitoring Relays Series AMPARO

- Configuration \& Functionalities


Configuration \& Settings

| $\mathbf{1}$ | URAU3011 and URAU3N11 |
| :---: | :---: |
|  | Status indication |
|  | LED yellow |
| = Relay is active |  |


| $\mathbf{2}$ | URAP3011 |  |
| :---: | :---: | :---: |
|  | Status indication |  |
|  | U | LED green <br> = Supply voltage is applied |
|  | LED yellow |  |
| Relay is active |  |  |


| Electrical connection |  |
| :---: | :---: |
| L1-L2-L3-N | Supply and measuring voltage |
|  | $3 \mathrm{~N} \sim 230 / 400 \mathrm{~V}, 50 / 60 \mathrm{~Hz}$ |
| $11-12-14$ | Output relay |
|  | ACl $5 \mathrm{~A} / 250 \mathrm{~V}$ |

Measuring and Monitoring Relays

Measuring and Monitoring Relays Series AMPARO
Modes


Modes

| URAU3011 |  |
| :---: | :---: |
| U | Undervoltage monitoring for 3-phase AC mains with variable threshold voltage Us and fixed hysteresis. <br> All measuring inputs ( $L 1, L 2$ and $L 3$ ) must be connected to phase voltage. If single-phase monitoring is required, unused input terminals ( $L$ ) must be connected to mains voltage to have proper $\mathbf{L}-\mathbf{N}$ voltage on the terminals $\mathbf{L 1}, \mathbf{L} \mathbf{2}$ and $\mathbf{L 3}$. A phase failure can not be detected, if the reverse voltage coming from the load exceeds the threshold Us relay. |
|  | Undervoltage monitoring |
|  | The output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated), when the measuring voltage of all connected phases exceeds the fixed threshold Us by more than the fixed hysteresis $\mathbf{H}$. When the voltage of one of the connected phases (L1, L2 or L3) falls below the fixed threshold, the output relay $\mathbf{R}$ switches into off-position again (yellow LED not illuminated). |
|  | \#1 Hysteresis |


| URAU3N11 |  |
| :---: | :---: |
| U | Undervoltage monitoring for 3-phase AC mains with fixed threshold voltage Us ( $=195.5 \mathrm{~V}$ ) and fixed hysteresis. <br> All measuring inputs ( $\mathrm{L} 1, \mathrm{~L} 2$ and L 3 ) must be connected to phase voltage. If single-phase monitoring is required, unused input terminals ( L ) must be connected to mains voltage to have proper $\mathbf{L - N}$ voltage on the terminals L1, $\mathbf{L 2}$ and $\mathbf{L 3}$. A phase failure can not be detected, if the reverse voltage coming from the load exceeds the threshold Us relay. |
|  | Undervoltage monitoring |
|  | The output relay $\mathbf{R}$ switches into on-position (yellow LED illuminated), when the measuring voltage of all connected phases exceeds the fixed threshold Us by more than the fixed hysteresis $\mathbf{H}$. When the voltage of one of the connected phases (L1, L2 or L3) falls below the fixed threshold, the output relay $\mathbf{R}$ switches into off-position again (yellow LED not illuminated). |
|  | \#1 Hysteresis |


| URAP3011 |  |
| :---: | :---: |
| PS | Monitoring of phase sequenceWhen all the phases are connected in the correct sequence and the measured asymmetry <br> is less than the fixed value, the output relay $\mathbf{R}$ switches into on-position. <br> When the phase sequence changes, the output relay $\mathbf{R}$ switches into off-position. |
|  | Phase failure monitoring |
|  | The output relay $\mathbf{R}$ switches into off-position, when one of the three phases fails. |

Measuring and Monitoring Relays Series AMPARO

- Technical Data

|  |  |  | URAU3011 | URAU3NII | URAP3011 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| INPUT CIRCUIT | Terminals |  | L1-L2-L3-N |  |  |
|  | Supply voltage |  | $230 / 400 \mathrm{~V}$ |  |  |
|  | Tolerance |  | $-30 \%$ to $+15 \%$ of $U_{N}$ |  |  |
|  | Rated frequency |  | $50 / 60 \mathrm{~Hz}$ |  |  |
|  | Duty cycle |  | $100 \%$ |  |  |
|  | Bridging time |  | 10 ms |  |  |
|  | Reset time |  | 500 ms |  |  |
|  | Drop-out voltage |  | < 30 \% | According to switching threshold 0.85 of $\mathrm{U}_{\mathrm{N}}$ | < 30 \% |
|  | Power loss |  | 0.8 W |  |  |
| MEASURING CIRCUIT | Terminals |  | L1-L2-L3-N |  |  |
|  | Measure |  | Voltage 3-phase |  |  |
|  | Measurement methods |  | Rectified value |  |  |
|  | Monitoring functions |  | Undervoltage | Undervoltage | Phase sequence, phase failure, asymmetry |
|  | Measuring range |  | $\mathrm{U}_{\mathrm{N}}=230 / 400 \mathrm{~V} \sim$ |  |  |
|  | Overload |  | See tolerances of the supply voltage |  |  |
|  | Thresholds | Max. | - | - | - |
|  |  | Min. | $85 \%$ of $U_{N}$ | $85 \%$ of $U_{N}$ | - |
|  |  | Adjustable | Yes | No | No |
|  |  | Asymmetry | - | - | Fixed, 30 \% |
|  | Hysteresis |  | $5 \%$ |  | - |
| TIME CIRCLES | ON delay Fixed |  | Approx. 400 ms |  |  |
|  | OFF delay |  | $<250 \mathrm{~ms}$ |  |  |
| INDICATION | Supply voltage | Green LED U ON |  |  | Indication of supply voltage |
|  | Relay status | Yellow LED R ON |  | Relay is energized |  |
| OUTPUT CIRCUIT | Number of contacts and type |  | 1 CO |  |  |
|  | Terminals |  | 11-12-14 |  |  |
|  | Type |  | Relay |  |  |
|  | Contact material |  | AgNi |  |  |
|  | Rated voltage |  | 250 V |  |  |
|  | Max. switching voltage |  | 250 V |  |  |
|  | Max. switching current |  | 5 A |  |  |
|  | Rated current |  | $5 \mathrm{~A} / 250 \mathrm{~V}$ |  |  |
|  | Lifetime | Mechanical | $1 \times 10^{6}$ operations |  |  |
|  |  | Electrical (AC-1) |  | $1 \times 10^{5}$ operations |  |
|  | Switching frequency | With load | 6/min |  |  |
|  |  | Without load | 300 / min |  |  |
|  |  |  | 5 A fast acting |  |  |
| ACCURACY | Basic accuracy |  | < 5 \% |  |  |
|  | $\frac{\text { Basic accuracy }}{\text { Setting accuracy }}$ |  | - |  |  |
|  | Repeatability |  | <2\% |  |  |
|  | Influence of temperature |  | $<0.05 \% /{ }^{\circ} \mathrm{C}$ |  |  |
| STANDARDS | Product standards |  | EN 61010-2-201:2013 |  |  |
|  | Immunity EN 61326-1 |  | Basic electromagnetic environment |  |  |
|  | Emission EN 61326-1 |  | Class B |  |  |
| DATAS OF INSULATION accord. to IEC 61010-2-201 | Pollution degree |  | 2 |  |  |
|  | Overvoltage category |  | 11 |  |  |
|  | Rated insulation voltage Input circuit/ output circuit |  | 300 V |  |  |
|  | Rated surge voltage Input circuit/ output circuit |  | 2500 V |  |  |
|  | Insulation test voltage Input circuit/ output circuit |  | 1500 V |  |  |
|  | Insulation Input circuit/ output circuit |  | Basic insulation |  |  |
| ELECTRICAL CONNECTION | Terminal |  | Screw-terminal |  |  |
|  | Rated terminal capacity |  | $2.5 \mathrm{~mm}^{2}$ |  |  |
|  | Max. terminal capacity | Flexible with/without ferrule | $1 \times 0.25 \ldots 2.5 \mathrm{~mm}^{2}$ (23 AWG...14AWG) |  |  |
|  |  | Flexible without sleeve | $2 \times 0.25 \ldots 1.5 \mathrm{~mm}^{2}$ (23 AWG...14AWG) |  |  |
|  |  | Flexible with twin-sleeve | $2 \times 0.25 \ldots 1.5 \mathrm{~mm}^{2}$ (23 AWG...14AWG) |  |  |
|  |  | Stranded without sleeve | $1 \times 0.2$ | $2.5 \mathrm{~mm}^{2}$ (23 AWG | 14AWG) |
|  | Length without insulation |  | 7 mm |  |  |
|  | Tightening torque |  | Max. 0.5 Nm |  |  |
| GENERAL DATA | Ambient temperature Operation |  | $-25 \ldots+50^{\circ} \mathrm{C}$ |  |  |
|  | $\begin{array}{ll}\begin{array}{l}\text { Dimensions (DIN } \\ 43880 \text { ) }\end{array} & \text { L×H×D }\end{array}$ |  | $17.5 \times 97 \times 57.9 \mathrm{~mm}$ |  |  |
|  | Mounting (EN 60715) |  | DIN-rail |  |  |
|  | Mounting position |  | Any |  |  |
|  | Degree of protection | Housing | IP40 |  |  |
|  |  | Terminals | IP20 |  |  |

Measuring and Monitoring Relays

## Measuring and Monitoring Relays Series AMPARO

| DESCRIPTION | AVAILABLE |
| :--- | :--- |
| Voltage Monitoring Relays | ORDER NO. |
| Voltage monitoring relay AMPARO with adjustable voltage range $160-240 \mathrm{~V}, 230 \mathrm{~V}-\mathrm{AC}, 3$ phase, $1 \mathrm{CO}, 5 \mathrm{~A} / 230 \mathrm{~V}$ |  |
| Voltage monitoring relay AMPARO, 230V-AC, with fixed switching threshold Us $=195.5 \mathrm{~V}, 3$ phase against $\mathrm{N}, 1 \mathrm{CO}, 5 \mathrm{~A} / 230 \mathrm{~V}$ |  |
| Phase Monitoring Relays | URAU3011 |
| Phase monitoring relay AMPARO, 230V-AC, 3 phase, $1 \mathrm{CO}, 5 \mathrm{~A} / 230 \mathrm{~V}$ | URAU3N11 |

## Measuring and Monitoring Relays Series UR6



UR6I 1052


## UR6P3052

- Voltage monitoring in 3-phase networks
- Phase sequence and phase failure monitoring
- Supply voltage = measured voltage
- Reverse voltage detection
- Neutral conductor connection optional
- 2 CO
- Component width 22.5 mm
- Industrial type design


## UR6R 1052

- Motor winding temperature monitoring
- 2 CO
- Supply voltage 230 V AC
- Connection of external Reset switch possible
- Component width 22.5 mm
- Industrial type design


## UR6L1052

- Multi-function monitoring relay
- Filling level monitoring of conductive liquids
- Safe disconnection of measuring circuits
- 2 CO
- Component width 22.5 mm
- Industrial type design


## UR6U3052

- Multi-function monitoring relay
- Voltage monitoring in 3-phase networks
- Phase sequence and phase failure monitoring
- Phase imbalance monitoring can be activated/deactivated
- Neutral conductor connection optional
- Loss of neutral wire detection
- 2 CO
- Zoom voltage 24 to 240 V AC/DC
- Component width 22.5 mm
- Industrial type design


## UR6I1052

- Multi-function monitoring relay
- Current monitoring for AC and DC in 1-phase networks
- Error memory
- 16.6 to 400 Hz
- 2 CO
- Zoom voltage 24 to 240 V AC/DC
- Component width 22.5 mm
- Industrial type design

Measuring and Monitoring Relays

Measuring and Monitoring Relays Series UR6

- Technical Data (Part 1)


Measuring and Monitoring Relays Series UR6

- Technical Data (Part 2)

|  |  |  | UR6U1052 | UR6U3052 | UR611052 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| MEASURING CIRCUIT | Fusing | (UL 508) | Max. 20 A |  |  |
|  | Measured variable |  | $\begin{gathered} \hline \text { DC or AC Sinus } \\ (16.6 \text { to } 400 \mathrm{~Hz}) \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { AC Sinus (48 to } 63 \\ \mathrm{~Hz} \text { ) } \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { DC or AC Sinus } \\ (16.6 \text { to } 400 \mathrm{~Hz}) \\ \hline \end{gathered}$ |
|  | Input |  | 30 V Terminals <br> AC/DC $\mathrm{E}-\mathrm{F} 1(+)$ <br> 60 V Terminals <br> AC/DC $\mathrm{E}-\mathrm{F} 2(+)$ <br> 300 V Terminals <br> AC/DC $\mathrm{E}-\mathrm{F} 3(+)$ | $3(\mathrm{~N}) \sim \begin{gathered} \text { Terminals } \\ (\mathrm{N}) \mathrm{L1}-\mathrm{LQ} \\ -\mathrm{L} 3 \end{gathered}$ | 2 mA Terminals <br> AC/DC $\mathrm{K}-11(+1$ <br> 1 A Terminals <br> AC/DC $\mathrm{K}-12(+1$ <br> 5 A Terminals <br> AC/DC $\mathrm{K}-13(+)$ |
|  | Overload capacity |  | 30 V $100 \mathrm{~V}_{\mathrm{ms}}$ <br> $A C / D C$  <br> 60 V $150 \mathrm{~V}_{\mathrm{rms}}$ <br> AC/DC  <br> 300 V  <br> AC/DC $440 \mathrm{~V}_{\mathrm{rms}}$ | 3 (N)~ 3 (N)~ | 20 mA 250 mA <br> $\mathrm{AC} / \mathrm{DC}$  <br> 1 A  <br> $\mathrm{AC} / \mathrm{DC}$ 3 A <br> 5 A  <br> $\mathrm{AC} / \mathrm{DC}$ 10 A |
|  | Input resistance |  | 30 V $47 \Omega$ <br> AC/DC  <br> 60 V  <br> AC/DC $100 \Omega$ <br> 300 V  <br> AC/DC $470 \Omega$ | $3(\mathrm{~N}) \sim 1 \mathrm{M} \Omega$ | 20 mA $2.7 \Omega$ <br> $\mathrm{AC} / \mathrm{DC}$  <br> 1 A  <br> $\mathrm{AC} / \mathrm{DC}$ $47 \mathrm{~m} \Omega$ <br> 5 A  <br> $\mathrm{AC} / \mathrm{DC}$ $10 \mathrm{~m} \Omega$ |
|  | Switching threshold | Max. <br> Min. | $10 \%$ to $100 \%$ of $U_{N}$ $5 \% \text { to } 95 \% \text { of } U_{N}$ | $\begin{aligned} & -20 \% \text { to }+30 \% \text { of } U_{N} \\ & -30 \% \text { to }+20 \% \text { of } U_{N} \end{aligned}$ | $10 \%$ to $100 \%$ of $I_{N}$ $5 \% \text { to } 95 \% \text { of } I_{N}$ |
|  | Asymmetry |  | - | $5 \%$ to 25 \% | - |
|  | Overvoltage category | (IEC 60664-1) |  | III |  |
|  | Rated surge voltage |  |  | 4 kV |  |
| ACCURACY | Base accuracy |  | $\leq 3 \%$ (of maximum scale value) |  |  |
|  | Frequency response |  | $\begin{gathered} -10 \% \text { to } 5 \%(16.6 \text { to } \\ 400 \mathrm{~Hz}) \\ \hline \end{gathered}$ | - | $\begin{gathered} -10 \% \text { to } 5 \%(16.6 \text { to } \\ 400 \mathrm{~Hz}) \\ \hline \end{gathered}$ |
|  | Adjustment accuracy |  | $\leq 5 \%$ (of maximum scale value) |  |  |
|  | Repetition accuracy |  | $\leq 2 \%$ |  |  |
|  | Voltage influence |  | - |  |  |
|  | Temperature influence |  | $\leq 0.05 \% /{ }^{\circ} \mathrm{C}$ |  |  |
| AMBIENT CONDITIONS | Ambient temperature | $\begin{aligned} & (\text { IEC 60068-1) } \\ & \text { (UL 508) } \end{aligned}$ | $\begin{aligned} & -25^{\circ} \mathrm{C} \text { to }+55^{\circ} \mathrm{C} \\ & -25^{\circ} \mathrm{C} \text { to }+40^{\circ} \mathrm{C} \end{aligned}$ |  |  |
|  | Storage temperature |  | $-25^{\circ} \mathrm{C}$ to $+70^{\circ} \mathrm{C}$ |  |  |
|  | Transport temperature |  | $-25^{\circ} \mathrm{C}$ to $+70^{\circ} \mathrm{C}$ |  |  |
|  | Relative humidity | (IEC 721-3-3 class 3K3) | $15 \%$ to $85 \%$ |  |  |
|  | Pollution degree | (IEC 60664-1) | 3 |  |  |
|  | Vibration resistance | (IEC 60068-2-6) | $\begin{array}{cc} \hline 10 \text { to } 55 \\ \mathrm{~Hz} \end{array} \quad 0.35 \mathrm{~mm}$ |  |  |
|  | Shock resistance | (IEC 60068-2-27) | $15 \mathrm{~g} \quad 11 \mathrm{~ms}$ |  |  |

Measuring and Monitoring Relays

Measuring and Monitoring Relays Series UR6

- Technical Data (Part 3)

|  |  | UR6P3052 | UR6R1052 | UR6L1052 |
| :---: | :---: | :---: | :---: | :---: |
| INDICATORS | Green LED ON | Indication of supply voltage |  |  |
|  | Yellow LED ON/OFF | Indication of relay output | - | Indication of relay output |
|  | Red LED ON/OFF | - | Indication of failure | - |
| MECHANICAL DESIGN | Housing | Self-extinguishing plastic housing IP40 |  |  |
|  | Degree of protection housing |  |  |  |
|  | Mounting (EN 60715) | DIN-rail TS 35 |  |  |
|  | Terminal (VBG 4, PZ1 required) | Shockproof terminal connection IP20 |  |  |
|  | Degree of protection terminal |  |  |  |
|  | Mounting position | Any |  |  |
|  | Tightening torque | Max. 1 Nm |  |  |
|  | Terminal capacity | $1 \times 0.5$ to $2.5 \mathrm{~mm}^{2}$ with/without multicore cable end $1 \times 4 \mathrm{~mm}^{2}$ without multicore cable end $2 \times 0.5$ to $1.5 \mathrm{~mm}^{2}$ with/without multicore cable end $2 \times 2.5 \mathrm{~mm}^{2}$ flexible without multicore cable end |  |  |
| INPUT CIRCUIT | Terminals | (N) L1-L2-L3 [= measuring voltage] | A1-A2 (galvanically separated) | A1-A2 |
|  | Supply voltage | 3 (N) $230 / 400$ V AC | 230 V AC |  |
|  | $\begin{array}{cc}230 \mathrm{~V} \mathrm{AC} \\ \text { Tolerance } & 3(\mathrm{~N}) \sim 230 / 400 \mathrm{~V} \mathrm{AC}\end{array}$ | 3 (N) ~ 342 to 457 V | $-15 \% \text { to }+15 \%$ |  |
|  | Rated consumption | 9 VA | 2 VA (1.5 W) |  |
|  | Rated frequency | $50 / 60 \mathrm{~Hz}$ |  |  |
|  | Duration of operation | 100\% |  |  |
|  | Reset time | 500 ms |  |  |
|  | Wave form for AC | - |  |  |
|  | Residual ripple for DC | - |  |  |
|  | Drop-out voltage | > $20 \%$ of the supply voltage | $>15 \%$ of the supply voltage | $>30 \%$ of the supply voltage |
|  | Overvoltage category (IEC 60664-1) | III |  |  |
|  | Rated surge voltage | 4 kV |  |  |
| OUTPUT CIRCUIT | Number of contacts and type | 2 potential free CO contacts |  |  |
|  | Rated voltage AC | $250 \mathrm{~V} \sim$ |  |  |
|  | Switching capacity $\quad$Distance between the devices is  <br>  $<5 \mathrm{~mm}$  <br> Distance between the devices is  <br> $>$ $>5 \mathrm{~mm}$ | 750 VA (3 A / 250 V ) |  |  |
|  | Fusing | 5 A fast acting |  |  |
|  | Mechanical service life | $20 \times 10^{6}$ operations |  |  |
|  | Electrical service life | $2 \times 10^{5}$ operations at 1000 VA resistive load |  |  |
|  | Switching frequency (IEC 60947-5-1) | Max. 60 / min at 100 VA resistive load |  |  |
|  | Overvoltage category (IEC 60664-1) | III |  |  |
|  | Rated surge voltage | 4 kV |  |  |

Measuring and Monitoring Relays Series UR6

- Technical Data (Part 4)


Measuring and Monitoring Relays

Measuring and Monitoring Relays Series UR6

- Overview Modes

| UR6U1052 | AC/DC voltage monitoring in 1 -phase mains with adjustable thresholds, timing for start-up suppression and tripping delay separately adjustable as well as the following functions (selectable by means of rotary switch): |  |
| :---: | :---: | :---: |
|  | OVER | Overvoltage monitoring |
|  | OVER + LATCH | Overvoltage monitoring with fault latch |
|  | UNDER | Undervoltage monitoring |
|  | UNDER + LATCH | Undervoltage monitoring with fault latch |
|  | WIN | Monitoring the window between "Min." with "Max." |
|  | WIN + LATCH | Monitoring the window between "Min." with "Max." with fault latch |


| UR6U3052 | Voltage monitoring in 3-phase mains with adjustable thresholds, adjustable tripping delay, monitoring of phase sequence and <br> phase failure, monitoring of asymmetry with adjustable threshold as well as the following functions (selectable by means of rotary <br> switch): |  |
| :--- | :---: | :--- |
|  | UNDER | Undervoltage monitoring |
|  | UNDER + SEQ | Undervoltage monitoring and monitoring of phase sequence |
|  | WIN | Monitoring the window between "Min." and "Max." |
|  | WIN + SEQ | Monitoring the window between "Min." and "Max." and monitoring of phase sequence |


| UR611052 | AC/DC current monitoring in 1-phase mains with adjustable thresholds, timing for start-up suppression and tripping delay separately adjustable as well as the following functions (selectable by means of rotary switch): |  |
| :---: | :---: | :---: |
|  | OVER | Overcurrent monitoring |
|  | OVER + LATCH | Overcurrent monitoring with fault latch |
|  | UNDER | Undercurrent monitoring |
|  | UNDER + LATCH | Undercurrent monitoring with fault latch |
|  | WIN | Monitoring the window between "Min." and "Max." |
|  | WIN + LATCH | Monitoring the window between "Min." and "Max." with fault latch |

UR6P3052 $\quad$ Monitoring of phase sequence, phase failure and detection of return voltage (by means of evaluating the asymmetry)

| UR6R1052 | Temperature monitoring of the motor winding (max. 6 PTC) with fault latch for temperature probes in accordance with DIN 44081 and test function with integrated test/reset key |
| :---: | :---: |
| UR6L1052 | Level monitoring of conductive liquid, timing for tripping delay and turnoff delay separately adjustable as well as the following functions (selectable by means of rotary switch): |
|  | PUMP UP Pump up or minimum monitoring |
|  | PUMP DOWN Pump down or maximum monitoring |

Dimensions (mm)

$\square$ Time Ranges

| Article number |  | Adjustment range |  |
| :---: | :---: | :---: | :---: |
| UR6U1052 | Start-up suppression time | 0 s | 10 s |
|  | Tripping delay | 0.1 s | 10 s |
| UR6U3052 | Start-up suppression time |  |  |
|  | Tripping delay | 0.1 s | 10 s |
| UR611052 | Start-up suppression time | 0 s | 10 s |
|  | Tripping delay | 0.1 s | 10 s |
| UR6P3052 | Start-up suppression time | Fixed, max. 500 ms |  |
|  | Tripping delay |  |  |
| UR6R1052 | Start-up suppression time |  |  |
|  | Tripping delay | - |  |
| UR6L1052 | Tripping delay (DELAY ON) | 0.5 s | 10 s |
|  | Turn-off delay (DELAY OFF) | 0.5 s | 10 s |

Measuring and Monitoring Relays Series UR6

- Circuit Diagrams Overview


Overview Circuit Diagrams

| UR6U1052 |  |
| :---: | :--- |
| A | Supply voltage 24 V AC / DC <br> Range 30 V and fault latch |
| B | Supply voltage 230 V AC / DC <br> Range 60 V and fault latch |
| C | Supply voltage 24 V AC / DC <br> Range 300 V and fault latch |


| UR6I 1052 |  |
| :---: | :--- |
| F | Supply voltage 24 V AC / DC <br> Range 20 mA and fault latch |
| G | Supply voltage 24 V AC / DC <br> Range 5 A without fault latch |
| H | Supply voltage 230 V AC <br> Range 1 A and fault latch |


| UR6U3052 |  |
| :---: | :--- |
| D | Supply voltage 24 V AC / DC |
| E | Supply voltage 230 V AC |


| UR6L1052 |  |
| :--- | :--- |
| $\mathbf{1 1}$ | Probe max. |
| $\mathbf{1 2}$ | Probe min. |
| $\mathbf{1 3}$ | Mass probe |

Measuring and Monitoring Relays

Measuring and Monitoring Relays Series UR6
UR6U 1052 Modes


Detailed Description of UR6U1052 Modes


## Measuring and Monitoring Relays Series UR6

## UR6U3052 Modes



Detailed Description of UR6U3052 Modes


Measuring and Monitoring Relays

## Measuring and Monitoring Relays Series UR6

UR6I 1052 Modes


Detailed Description of UR6I 1052 Modes


Measuring and Monitoring Relays Series UR6

## UR6P3052 Modes



Detailed Description of UR6P3052 Modes

| UR6P3052 | 4.1 | Phase sequence monitoring <br> When all the phases are connected in the correct sequence and the measured asymmetry is less than the fixed value, the output relays switch into on-position (yellow LED illuminated). When the phase sequence changes, the output relays switch into off-position (yellow LED not illuminated). |
| :---: | :---: | :---: |
|  | 4.2 | Phase failure monitoring <br> When one of the three phases fails, the output relays switch into off-position (yellow LED not illuminated). |
|  | 4.3 | Detection of reverse voltage (by means of evaluation of asymmetry) <br> The output relays switch into off-position (yellow LED not illuminated) when the asymmetry between the phase voltages exceeds the fixed value of the asymmetry. An asymmetry caused by the reverse voltage of a consumer (e.g. a motor which continues to run on two phases only) does not effect the disconnection. |

## UR6R 1052 Modes



Detailed Description of UR6R 1052 Modes

| UR6R1052 | 5.1 5.2 | If the supply voltage $\mathbf{U}$ is applied (green LED illuminated) and the cumulative resistance of the PTC-circuit* is less than $\mathbf{3 . 6 k} \boldsymbol{\Omega}$ (standard temperature of the motor), the output relays switch into on-position. Pressing the test/reset key under this conditions forces the output relays to switch into off-position. They remain in this state as long as the test/reset key is pressed and thus the switching function can be checked in case of fault. The test function is not effective using an external reset key. When the cumulative resistance of the PTC-circuit exceeds $\mathbf{3 . 6 k \Omega}$ (at least one of the PTCs has reached the cut-off temperature), the output relays switch into off-position (red LED illuminated). The output relays again switch into on-position (red LED not illuminated), if the cumulative resistance drops below $\mathbf{1 . 8 \mathbf { k } \Omega}$ by cooling down of the PTC and either a reset key (internal or external) was pressed or the supply voltage was disconnected and reapplied. |
| :---: | :---: | :---: |
|  |  |  |

## Measuring and Monitoring Relays

## Measuring and Monitoring Relays Series UR6

UR6L1052 Modes


Detailed Description of UR6L1052 Modes

| UR6L1052 | PUMP UP | 6.1 | Pump up <br> Connection of the probe rods E1, E2 and E3. Alternatively the electrically conducting container can be connected in lieu of the test probe E3. When the air-fluid level falls below the minimum probe E2 the set interval of tripping delay (Delay $\mathbf{O N}$ ) begins. After the expiration of the interval, the output relays $\mathbf{R}$ switches into on-position (yellow LED illuminated). When the air-fluid level again rises above the maximum probe E1, the set interval of turn-off delay (Delay OFF) begins. After the expiration of the interval the output relays $\mathbf{R}$ switches into off-position (yellow LED not illuminated). |
| :---: | :---: | :---: | :---: |
|  | PUMP UP | 6.2 | Minimum monitoring (Pump up) <br> Connection the probe rods E2 and E3 (bridge E1-E3). Alternatively the electrically conducting container can be connected in lieu of the test probe $\mathbf{E 3}$. When the air-fluid level falls below the probe $\mathbf{E 2}$ the set interval of tripping delay (Delay ON) begins. After the expiration of the interval, the output relays $\mathbf{R}$ switches into on-position (yellow LED illuminated). When the air-fluid level again rises above the probe E2, the set interval of turn-off delay (Delay OFF) begins. After the expiration of the interval the output relays $\mathbf{R}$ switches into off-position (yellow LED not illuminated). |
|  | PUMP DOWN | 6.3 | Pump down <br> Connection of the probe rods E1, E2 and E3. Alternatively the electrically conducting container can be connected in lieu of the test probe E3. When the maximum probe E1 gets moistened the set interval of tripping delay (Delay ON) begins. After the expiration of the interval the output relays $\mathbf{R}$ switches into on-position (yellow LED illuminated). When the airfluid level falls below the minimum probe E2, the set interval of turn-off delay (Delay OFF) begins. After the expiration of the interval, the output relays $\mathbf{R}$ switches into off-position (yellow LED not illuminated). |
|  | PUMP DOWN | 6.4 | Maximum monitoring (Pump down) <br> Connection of probe rods $\mathbf{E 2}$ and $\mathbf{E 3}$ (bridge E1-E3). Alternatively the electrically conducting container can be connected in lieu of the test probe E3. When the probe E2 gets moistened the set interval of tripping delay (Delay ON) begins. After the expiration of the interval the output relays $\mathbf{R}$ switches into on-position (yellow LED illuminated). When the air-fluid level sinks below the probe E2, the set interval of turn-off delay (Delay OFF) begins. After the expiration of the interval the output relays $\mathbf{R}$ switches into off-position (yellow LED not illuminated). |
|  | Diagram | 5 | Level |
|  |  | 6 | Probe El |
|  |  | 7 | Probe E2 |
|  |  | 8 | Probe E3 |
|  |  | 9 | Delay ON |
|  |  | 10 | Delay OFF |


| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| Voltage Monitoring Relays |  |  |
| Voltage monitoring relay, 1 phase, $\mathrm{AC} / \mathrm{DC}, 2 \mathrm{CO}$ | [-000-9, | UR6U1052 |
| Voltage monitoring relay, 3 phase, AC/DC, 2 CO | -000-9, | UR6U3052 |
| Current Monitoring Relays |  |  |
| Current monitoring relay, 1 phase, input 24-240V-AC/DC, 1 CO | -800-m | UR611052 |
| Phase Monitoring Relays |  |  |
| Phase monitoring relay, 3 phase, 2 CO | - + -000 | UR6P3052 |
| Thermistor Monitoring Relays |  |  |
| Thermistor monitoring relay, 1 phase, 230V-AC, 2 CO | - $700 \times 8$ | UR6R1052 |
| Level Monitoring Relays |  |  |
| Level monitoring relay, 1 phase, input 230V-AC/5A, 2 CO | -80\%-0, | UR6L1052 |

Accessories, Probes for Level Monitoring Relays


## Schrack-Info

## URL90010, URL90020, URL90030

- Maximum pressure range 1000 kPa
- Operating temperature up to $70^{\circ} \mathrm{C}$
- Coated with Nylon 66
- For use in all application, except for certain fields of the food processing industry where Nylon 66 is prohibited as insulating material


## URL91010

- Probe element can be connected to cable

Dimensions URL90010 (mm)


Technical Data URL90010, URL90020 \& URL90030

| Holder / Conductive probe | Material |  | Nylon |
| :---: | :---: | :---: | :---: |
|  | Thread | Inch | 1,5 British standard |
|  | Degree of protection |  | IP65 |
|  | Max. temperature |  | $+70^{\circ} \mathrm{C}$ |
| Conductor / Electrode rods | Material | Stainless steel | AISI 316 |
|  | Coating |  | Black powder epoxy |
|  | Length |  | 1 m |
|  | Number of conductors | URL90010 | $1 \times 1 \mathrm{metre}$ rod |
|  |  | URL90020 | $2 \times 1$ metre rod |
|  |  | URL90030 | $3 \times 1$ metre rod |

Note: Coating of rods improves resistance to false switching caused by frothing of condensation.

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |
| Level monitoring immersion probe | URL91010 |  |
| Level monitoring 1 probe, $1 \times 1$ meter | URL90010 |  |
| Level monitoring 2 probes, $2 \times 1$ meter | URL90020 |  |
| Level monitoring 3 probes, $3 \times 1$ meter | URL90030 |  |

## Relay Module

## Relay PCB


$\square$ Schrack-Info

- 8 pcs. relay module ( 24 V DC/8 A)
- Version with plug-in relay
- 2 CO per relay
- DC control voltage
- Negative control voltage
- LED operating lights
- Fast and easy DIN rail mounting

Dimensions (mm)


Circuit Diagram


Relay PCB

- Technical Data

| 8 relay module |  |  |  |
| :---: | :---: | :---: | :---: |
| Number of contacts and type | 8 channels each with 2 CO |  |  |
| Rated current | 8 A |  |  |
| Supply voltage AC | $250 \mathrm{~V} \sim$ |  |  |
| Coil voltage DC | $24 \mathrm{~V}+10 \%$ |  |  |
| Coil current (1 channel) | $22 \mathrm{~mA}+10 \%$ |  |  |
| Turn ON time | 15 ms |  |  |
| Turn OFF time | 10 ms |  |  |
| Protection circuit | Damping- and protection diode |  |  |
| LED colors | Yellow and green |  |  |
| Contact material | AgNi |  |  |
| Housing material | UL94V-0 plastic material |  |  |
| Connection terminal Screw terminal | $2.5 \mathrm{~mm}^{2}$ |  |  |
| Degree of protection IEC 529, EN 60529 | IP00 |  |  |
| Coil-/ contact isolation | $2.5 \mathrm{kVA} / 60 \mathrm{~s}$ |  |  |
| Isolation between output terminals $\quad$ (open contacts) | $1 \mathrm{kVA} / 60 \mathrm{~s}$ |  |  |
| Overvoltage category | III |  |  |
| Pollution degree | 2 |  |  |
| Ambient temperature Operation | $-10^{\circ} \mathrm{C}$ to $+50^{\circ} \mathrm{C}$ |  |  |
| Approx. weight | ca. 419 g |  |  |
| Reference standard | IEC 664-1, DIN VDE 0110.1 |  |  |
| Mounting | Vertical on DIN-rail |  |  |
| DESCRIPTION |  | AVAILABLE | ORDER NO. |
| Relay module, 8 pcs. plug-in relays, 24 V DC/8A, each with 2CO, for DIN-rail |  | -00\% | IK022176 |

## Summary Alarm Indicators

## Summary Alarm Indicators SSM 11-24V-DC



- Contact monitoring with change over contact
- High reliability lighting
- Acoustic signalling
- Optical collective signalling
- Compatible with 11 pole plug-in socket YMR78700


## Dimensions SSM 11 (mm)



Summary Alarm Indicators SSM 11-24V-DC

Dimensions YMR78700 (mm)


Circuit Diagram SSM 11


Technical Data

| Rated voltage | $24 \mathrm{~V} \mathrm{DC}+20 \%$ |  |
| :--- | :---: | :---: |
| Contacts | Max. | $250 \mathrm{~V} \sim$ |
|  |  | 8 A |
| Power consumption | Idle | ca. 1 VA |
|  | In operation | ca. 4 VA |

Assembly

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |
| Indicator for Summary-alarm SSM 11-24V | YY494006 |  |
| DIN rail mounted plug-in socket for MT3 relays and timer relays Series ZR4, 11 pole, 10A (3 CO), with screw terminals, not <br> compatible with function modules | YMR78700 |  |

The Fault light (H4) will be on as long as there is one (or several) interruptions-regardless of whether the Acknowledge key has been pressed or not.

If the motor is not running, the light $(\mathbf{H} \mathbf{I})$ will be off; if the motor is running, the light will be on. In the event of faulty operation of the motor ( $\mathbf{F}$ ) , the light will flash on-off.

## Contact monitoring with Change Over Contact

During regular operation the light will be on (H2); in the event of an interruption, the light will flash on-off (H3).

## High Reliability Lighting

To maintain the functionality of acoustic and optical collective signalling, connecting a parallel resistor is recommended (at 24 V , $2 \mathrm{~K} 2 \Omega / 1 / 2 W$ )

> Acoustic Signalling In the event of an interruption, the horn will signal approx. 15 sec. afterwards (H5). It can be reset by pressing the Acknowledge (B4)
> key.

## Diode Combination

Diode Combination DBS

YY494007

YY494107



YY494007



YY494007


## Schrack-Info

- Despite their compact size the diode combinations DBS 10 (YY494007) and DBSO1 (YY494107) are suitable for up to 10 indicators. If there are light bulbs/glow lamps or LEDs for signalling operating states, integrating the diode combination can be a simple way to retrofit an alarm verification.
By connecting multiple combinations it is possible to scan any number of alarms. Every diode combinations contains a protective diode, which limits the impact of a defective individual diode on other components of the system (e.g. contactors). Both diode combinations DBS 10 and DBSO1 can be used as protection diodes for relays and contactors.
- The DBS 10 and DBSO1 have different polarities, which are explained in detail in the circuit diagrams
- Both types are compatible with the 11 pole plug-in socket YMR78700

Dimensions DBS 10 \& DBSO1 (mm)


Dimensions YMR78700 (mm)



Diode Combination DBS
Circuit Diagrams DBS 10 \& DBSO1


## Technical Data

| Rated voltage | Max. | $250 \mathrm{~V} \sim$ |
| :--- | :---: | :---: |
| Peak voltage | $1000 \mathrm{~V} \sim$ |  |
| Current | Max. | 1 A per single message |
| Peak current | Diode | 1 A $/ 10 \mathrm{~ms}$ |
| Input |  | 1 N4007 (Pin 1) |
| Output | Group C | VDE 0110 |
| Insulation class |  | $250 \mathrm{~V} \sim$ |
| Assembly |  | 11 -pole socket YMR78700 |


| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| Diode-combination DBS 10 | - $+0 \times 0$ | YY494007 |
| Diode-combination DBSO1 |  | YY494107 |
| DIN rail mounted plug-in socket for MT3 relays and timer relays Series ZR4, 11 pole, 10A (3 CO), with screw terminals, not compatible with function modules | $+000-6$ | YMR78700 |

## Modular Contactors

Modular Contactors „R" AC-1, AC Coil


Modular Contactors „R" AC-1, AC Coil


Modular Contactors „R" AC-1, ACDC Coil Modular Contactors „R" AC-1, ACDC Coil


## Modular Contactors

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Modular Contactors AC-1

- Modular Contactors "R" AC-1, AC Coil



Dimensions


1) 1 Module 2) 2 Modules
2) 0,5 Module

- Modular Contactors "R" AC-1, AC Coil

Circuit Diagrams


## Modular Contactors AC-1

- Modular Contactors "R" AC-1, AC Coil

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 24VAC coil voltage |  |  |  |
| 20A, 1NO / 24VAC 1 MW | R20-10 |  | BZ326486 |
| 20A, 1NO+1 NC / 24VAC 1 MW | R20-11 | [-000-9 | BZ326421 |
| 20A, 2NO / 24VAC 1 MW | R20-20 |  | BZ326453 |
| 20A, 1NO / 24VAC 1 MW | R20-02 | - -1000 | BZ326490 |
| 25A, 1NO+1NC / 24VAC 1 MW | R25-11 |  | BZ326476 |
| 25A, 1NO+3NC / 24VAC 2 MW | R25-13 |  | BZ326464 |
| 25A, 2NO / 24VAC 1 MW | R25-20 | - $-0 \times 0$ | BZ326474 |
| 25A, 2NC / 24VAC 1 MW | R25-02 |  | BZ326480 |
| 25A, 2NO+2NC / 24VAC 2 MW | R25-22 | [-000-6 | BZ326482 |
| 25A, 3NO+1NC / 24VAC 2 MW | R25-31 | $+\infty=0$ | BZ326462 |
| 25A, 4NO / 24VAC 2 MW | R25-40 | - $-0 \times 0$ | BZ326460 |
| 25A, 4NC / 24VAC 2 MW | R25-04 | $\begin{array}{r} -600 \\ \hline \end{array}$ | BZ326483 |
| 40A, 2NO+2NC / 24VAC 3 MW | R40-22 |  | BZ326488 |
| 40A, 3NO+1NC / 24VAC 3 MW | R40-31 |  | BZ326487 |
| 40A, 4NO / 24VAC 3 MW | R40-40 | -000-90000 | BZ326443 |
| 40A, 4NC / 24VAC 3 MW | R40-04 |  | BZ326489 |
| 63A, 2NO+2NC / 24VAC 3 MW | R63-22 |  | BZ326456 |
| 63A, 3NO+1NC / 24VAC 3 MW | R63-31 |  | BZ326455 |
| 63A, 4NO / 24VAC 3 MW | R63-40 | -000-0.0 | BZ326445 |
| 63A, 4NC / 24VAC 3 MW | R63-04 |  | BZ326458 |
| 230VAC coil voltage |  |  |  |
| 20A, 1NO / 230VAC 1 MW | R20-10 |  | BZ326471 |
| 20A, $1 \mathrm{NO}+1 \mathrm{NC} / 230 \mathrm{VAC} 1 \mathrm{MW}$ | R20-11 | -000-9, | BZ326438 |
| 20A, 2NO / 230VAC 1 MW | R20-20 | -60\%-0, | BZ326437 |
| 20A, 2 NC / 230VAC 1 MW | R20-02 | - $-0 \times 0$ | BZ326439 |
| 25A, 1NO / 230VAC 1 MW | R25-10 | [-000-9, | BZ326473 |
| 25A, 1NO+1NC/230VAC 1 MW | R25-11 | -000-0, | BZ326479 |
| 25A, 1NO+3NC / 230VAC 2 MW | R25-13 | $+50 \div 0$ | BZ326465 |
| 25A, 2NO / 230VAC 1 MW | R25-20 | - $-0 \times 0$ | BZ326475 |
| 25A, 2NC / 230VAC 1 MW | R25-02 | $+600-6$ | BZ326481 |
| 25A, 2NO+2NC / 230VAC 2 MW | R25-22 | -000-0, | BZ326472 |
| 25A, 3NO+1NC / 230VAC 2 MW | R25-31 |  | BZ326463 |
| 25A, 4NO / 230VAC 2 MW | R25-40 | [-000-9, | BZ326461 |
| 25A, 4NC / 230VAC 2 MW | R25-04 | -000-m | BZ326467 |
| 40A, 2NO+2NC / 230VAC 3 MW | R40-22 | -000-0, | BZ326466 |
| 40A, 3NO / 230VAC 3 MW | R40-30 |  | BZ326468 |
| 40A, 3NO+1NC / 230VAC 3 MW | R40-31 | -000-9, | BZ326454 |
| 40A, 4NO / 230VAC 3 MW | R40-40 | $+\infty=0$ | BZ326442 |
| 40A, 4NC / 230VAC 3 MW | R40-04 |  | BZ326459 |
| 63A, 2NO+2NC / 230VAC 3 MW | R63-22 | [-60-n | BZ326457 |
| $63 \mathrm{~A}, 3 \mathrm{NO}+1 \mathrm{NC} / 230 \mathrm{VAC} 3 \mathrm{MW}$ | R63-31 | [-000-9, | BZ326452 |
| 63A, 4NO / 230VAC 3 MW | R63-40 |  | BZ326444 |
| 63A, 4NC / 230VAC 3 MW | R63-04 | $\begin{array}{rrr} \hline-50 & 0-8 \\ \hline \end{array}$ | BZ326469 |
| Accessories |  |  |  |
| Auxiliary contact 1NO+1NC 3A 0.5 MW | RH11 | -000-9, | BZ326470 |

Modular Contactors "R" AC-1, ACDC Coil


Dimensions


## Modular Contactor AC-1

## Modular Contactors "R" AC-1, ACDC Coil

C Circuit Diagrams


Connection Diagrams



Modular Contactors "Amparo" AC-1, AC Coil


## Schrack-Info

- Modular Contactors, 2- or 4-pole
- AC-coil $24 \mathrm{VAC} 50 / 60 \mathrm{~Hz}, 230 \mathrm{VAC} 50 \mathrm{~Hz}$
- Operational current 20, 25, 40 and 63A
- Width of contactor 1, 2 or 3 MW
- Less hum
- 1 MW = approximately 17.5 mm


Dimensions


1) 1 Module
2) 2 Modules
3) 3 Modules

## Modular Contactors AC-1

## Modular Contactors "Amparo" AC-1, AC Coil

Circuit Diagrams
R20-11

Connection Diagrams


R25-40



R40-22



R40-40, R63-40


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 24VAC coil voltage |  |  |  |
| 20A, 1NO+1 NC / 24VAC 1 MW | R20-11 |  | BZ326421ME |
| 20A, 2NO / 24VAC 1 MW | R20-20 | $+50-\infty$ | BZ326453ME |
| 25A, 4NO / 24VAC 2 MW | R25-40 |  | BZ326460ME |
| 230VAC coil voltage |  |  |  |
| 20A, 2NO / 230VAC 1 MW | R20-20 |  | BZ326437ME |
| 20A, 1NO+1 NC / 230VAC 1 MW | R20-11 | - $-\infty$ | BZ326438ME |
| 20A, 2 NC / 230VAC 1 MW | R20-02 | - -00000 | BZ326439ME |
| 40A, 4NO / 230VAC 3 MW | R40-40 | -000-m | BZ326442ME |
| 63A, 4NO / 230VAC 3 MW | R63-40 |  | BZ326444ME |
| 25A, 4NO / 230VAC 2 MW | R25-40 | $+\infty=0$ | BZ326461 ME |
| 25A, 3NO+1NC / 230VAC 2 MW | R25-31 | - -00000 | BZ326463ME |
| 40A, 2NO+2NC / 230VAC 3 MW | R40-22 | $+50-\infty$ | BZ326466ME |

Modular Contactors "R" AC-1, AC Coil

| Lamp Type | Power W | Current A | Capacitors $\mu \mathrm{F}$ | Max. lamps per pole at 230 V 50 Hz and max. $60^{\circ} \mathrm{C}$ |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | R20.. | R25.. | R40.. | R63.. |
| Incandescent lamps | 60 | 0,27 | - | 36 | 50 | 92 | 129 |
|  | 100 | 0,45 | - | 21 | 30 | 55 | 77 |
|  | 200 | 0,91 | - | 10 | 15 | 27 | 38 |
|  | 300 | 1,36 | - | 7 | 10 | 19 | 26 |
|  | 500 | 2,27 | - | 4 | 6 | 11 | 16 |
|  | 1000 | 4,5 | - | 2 | 3 | 6 | 8 |
| Fluorescent lamps | 11 | 0,16 | 1,3 | 60 | 75 | 210 | 310 |
| uncompensated or | 18 | 0,37 | 2,7 | 25 | 30 | 90 | 140 |
| serial compensated | 24 | 0,35 | 2,5 | 25 | 30 | 90 | 140 |
|  | 36 | 0,43 | 3,4 | 20 | 25 | 70 | 140 |
|  | 58 | 0,67 | 5,3 | 14 | 17 | 45 | 70 |
|  | 65 | 0,67 | 5,3 | 13 | 16 | 40 | 65 |
|  | 85 | 0,8 | 5,3 | 11 | 14 | 35 | 60 |
| Fluorescent lamps | 11 | 0,07 | - | $2 \times 100$ | $2 \times 110$ | $2 \times 220$ | $2 \times 250$ |
| dual-connection | 18 | 0,11 | - | $2 \times 50$ | $2 \times 55$ | $2 \times 130$ | $2 \times 200$ |
|  | 24 | 0,14 | - | $2 \times 40$ | $2 \times 44$ | $2 \times 110$ | $2 \times 160$ |
|  | 36 | 0,22 | - | $2 \times 30$ | $2 \times 33$ | $2 \times 70$ | $2 \times 100$ |
|  | 58 | 0,35 | - | $2 \times 20$ | $2 \times 22$ | $2 \times 45$ | $2 \times 70$ |
|  | 65 | 0,35 | - | $2 \times 15$ | $2 \times 16$ | $2 \times 40$ | $2 \times 60$ |
|  | 85 | 0,47 | - | $2 \times 10$ | $2 \times 11$ | $2 \times 30$ | $2 \times 40$ |
| Fluorescent lamps | 11 | 0,09 | 2 | 33 | 43 | 67 | 107 |
| parallel compensated | 18 | 0,13 | 2 | 25 | 32 | 50 | 80 |
|  | 24 | 0,16 | 3 | 25 | 32 | 50 | 80 |
|  | 36 | 0,27 | 4 | 22 | 32 | 50 | 80 |
|  | 58 | 0,45 | 7 | 14 | 18 | 36 | 46 |
|  | 65 | 0,5 | 7 | 14 | 18 | 36 | 46 |
|  | 85 | 0,6 | 8 | 12 | 16 | 33 | 44 |
| Fluorescent lamps | 18 | 0,09 | - | 40 | 40 | 100 | 150 |
| with electronic fluorescent | 36 | 0,16 | - | 20 | 20 | 50 | 75 |
| lamp ballast | 58 | 0,25 | - | 15 | 15 | 30 | 55 |
|  | 80 | 0,4 | - | 7 | 10 | 20 | 30 |
|  | $2 \times 18$ | 0,17 | - | 20 | 20 | 50 | 60 |
|  | $2 \times 28$ | 0,25 | - | 15 | 15 | 37 | 45 |
|  | $2 \times 36$ | 0,32 | - | 10 | 10 | 25 | 30 |
|  | $2 \times 58$ | 0,49 | - | 7 | 7 | 15 | 20 |
|  | $2 \times 80$ | 0,7 | - | 4 | 4 | 8 | 10 |
| Transformers | 20 | 0,09 | - | 40 | 52 | 110 | 174 |
| for metal halid | 50 | 0,22 | - | 20 | 24 | 50 | 80 |
| low voltage lamps | 75 | 0,33 | - | 13 | 16 | 35 | 54 |
|  | 100 | 0,43 | - | 10 | 12 | 27 | 43 |
|  | 150 | 0,65 | - | 7 | 9 | 19 | 29 |
|  | 200 | 0,87 | - | 5 | 5 | 14 | 23 |
|  | 300 | 1,3 | - | 3 | 4 | 9 | 14 |
| Mercury-vapour lamps | 50 | 0,61 | - | 16 | 21 | 38 | 55 |
| (high-pressure lamps) | 80 | 0,8 | - | 12 | 16 | 28 | 40 |
| uncompensated | 125 | 1,15 | - | 8 | 11 | 20 | 28 |
| e. g. HQL, HPL | 250 | 2,15 | - | 4 | 6 | 11 | 15 |
|  | 400 | 3,25 | - | 3 | 4 | 7 | 10 |
|  | 700 | 5,4 | - | 1 | 2 | 4 | 6 |
|  | 1000 | 7,5 | - | 1 | 1 | 3 | 4 |
| Mercury-vapour lamps | 50 | 0,28 | 7 | 7 | 18 | 36 | 50 |
| (high-pressure lamps), | 80 | 0,41 | 8 | 5 | 16 | 31 | 44 |
| compensated | 125 | 0,65 | 10 | 3 | 13 | 25 | 35 |
| e. g. HQL, HPL | 250 | 1,22 | 18 | 2 | 7 | 14 | 19 |
|  | 400 | 1,95 | 25 | 1 | 5 | 10 | 14 |
|  | 700 | 3,45 | 45 | 1 | 3 | 6 | 8 |
|  | 1000 | 4,8 | 60 | - | 2 | 4 | 6 |

Technical Specification - Modular Contactors AC-1

Modular Contactors "R" AC-1, AC Coil

| Lamp Type | Power W | Current A | Capacitors $\mu \mathrm{F}$ | Max. lamps per pole at 230 V 50 Hz and max. $60^{\circ} \mathrm{C}$ |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | R20.. | R25.. | R40.. | R63.. |
| Metal halide lamps | 35 | 0,53 | - | 22 | 24 | 57 | 65 |
| uncompensated | 70 | 1 | - | 12 | 14 | 30 | 35 |
| e. g. HQI, HPI, CDM | 150 | 1,8 | - | 6 | 8 | 17 | 18 |
|  | 250 | 3 | - | 4 | 5 | 10 | 12 |
|  | 400 | 3,5 | - | 3 | 4 | 8 | 10 |
|  | 1000 | 9,5 | - | 1 | 1 | 3 | 4 |
|  | 2000 | 16,5 | - | - | - | 2 | 2 |
| 400 V per Pole | 2000 | 10,5 | - |  | - | - | 2 |
|  | 3500 | 18 | - | - | - | 1 | 1 |
| Metal halide lamps compensated <br> e. g. HQI, HPI, CDM | 35 | 0,25 | 6 | 8 | 21 | 42 | 58 |
|  | 70 | 0,45 | 12 | 4 | 11 | 21 | 29 |
|  | 150 | 0,75 | 20 | 2 | 7 | 13 | 18 |
|  | 250 | 1,5 | 33 | 1 | 4 | 9 | 11 |
|  | 400 | 2,1 | 35 | 1 | 4 | 9 | 10 |
|  | 1000 | 5,8 | 95 | - | 1 | 3 | 4 |
|  | 2000 | 11,5 | 148 | - | - | 2 | 2 |
| 400V per Pole | 2000 | 6,6 | 58 | - | - | 3 | 4 |
|  | 3500 | 11,6 | 100 | - | - | 2 | 3 |
| Metal halide lamps with electronic fluorescent with electronic fluorescent lamp ballast (e. g.: PCI) 50-125 x In lamp for 0,6ms | 20 | 0,1 | integrated | 9 | 9 | 18 | 20 |
|  | 28 | 0,15 | integrated | - | - | - | 18 |
|  | 35 | 0,2 | integrated | 6 | 6 | 11 | 13 |
|  | 70 | 0,36 | integrated | 5 | 5 | 10 | 12 |
|  | 150 | 0,7 | integrated | 4 | 4 | 8 | 10 |
| Sodium-vapour lamps (low pressure lamps), uncompensated | 35 | 1,5 | - | 7 | 9 | 22 | 30 |
|  | 55 | 1,5 | - | 7 | 9 | 22 | 30 |
|  | 90 | 2,4 | - | 4 | 6 | 13 | 19 |
|  | 135 | 3,3 | - | 3 | 4 | 10 | 14 |
|  | 150 | 3,3 | - | 3 | 4 | 10 | 14 |
|  | 180 | 3,3 | - | 3 | 4 | 10 | 14 |
|  | 200 | 3,3 | - | 3 | 4 | 10 | 14 |
| Sodium-vapour lamps (low pressure lamps), compensated | 35 | 0,31 | 20 | 5 | 6 | 15 | 18 |
|  | 55 | 0,42 | 20 | 5 | 6 | 15 | 18 |
|  | 90 | 0,63 | 30 | 3 | 4 | 10 | 12 |
|  | 135 | 0,94 | 45 | 2 | 3 | 7 | 8 |
|  | 150 | 1 | 40 | 2 | 3 | 8 | 9 |
|  | 180 | 1,16 | 40 | 2 | 3 | 8 | 9 |
|  | 200 | 1,32 | 25 | - | - | 10 | 12 |
| Sodium-vapour lamps (high pressure lamps), uncompensated | 150 | 1,8 | - | 5 | 8 | 17 | 22 |
|  | 250 | 3 | - | 4 | 5 | 10 | 13 |
|  | 330 | 3,7 | - | 3 | 4 | 8 | 10 |
|  | 400 | 4,7 | - | 2 | 3 | 6 | 8 |
|  | 1000 | 10,3 | - | 1 | 1 | 3 | 4 |
| Sodium-vapour lamps (high pressure lamps), compensated | 150 | 0,83 | 20 | 5 | 7 | 20 | 25 |
|  | 250 | 1,5 | 33 | 3 | 4 | 12 | 15 |
|  | 330 | 2 | 40 | 2 | 3 | 10 | 13 |
|  | 400 | 2,4 | 48 | 2 | 2 | 8 | 12 |
|  | 1000 | 6,3 | 106 | 1 | 1 | 4 | 6 |
| Sodium-vapour lamps <br> (high pressure lamps) with serial electronic (e. g.: PCI) 50-125 $\times \ln$ lamp for $0,6 \mathrm{~ms}$ | 20 | 0,1 | integrated | 9 | 9 | 18 | 20 |
|  | 35 | 0,2 | integrated | 6 | 6 | 11 | 13 |
|  | 70 | 0,36 | integrated | 5 | 5 | 10 | 12 |
|  | 150 | 0,7 | integrated | 4 | 4 | 8 | 10 |
| LED-Lamps <br> consider the inrush current of the lamp ballast and the $\cos \varphi$ of the lamp |  | urrent of inrush c inrush cur | [A] contactor amp/EVG | 195 | 233 $230 V$ | 424 ax. $60^{\circ}$ | 565 |

- Modular Contactors "R" AC-1, AC Coil

| Type |  |  | 2-pole |  |  |  | 4-pole |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | R20 | R25 | R40 | R63 | R25 | R40 | R63 | RHII |
| Main Contacts ${ }^{5(6) 77}$ |  |  |  |  |  |  |  |  |  |  |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ |  | V | $440{ }^{21}$ | $441{ }^{21}$ | $442{ }^{2)}$ | $443{ }^{2)}$ | $444{ }^{21}$ | $445{ }^{2)}$ | $446{ }^{2)}$ | $447{ }^{2)}$ |
| Rated operation voltage $U_{\text {e }}$ |  | V | 440 | 440 | 440 | 440 | 440 | 440 | 440 | 440 |
| Frequency of operations z | AC1, AC3 | 1/h | 300 | 300 | 600 | 600 | 300 | 600 | 600 | 600 |
| Mechanical life |  | $5 \times 10^{6}$ | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Utilization category AC1 / AC7 ${ }_{\text {a }}$ |  |  |  |  |  |  |  |  |  |  |
| Switching of resistive load |  |  |  |  |  |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}\left(=l_{l_{t}}\right)$ |  |  |  |  |  |  |  |  |  |  |
| open | at $60^{\circ} \mathrm{C}$ | A | 20 | 25 | 40 | 63 | 25 | 40 | 63 | - |
| Contact life |  | $5 \times 10^{6}$ | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | - |
| Minimum Switch Voltage |  | $\mathrm{V} / \mathrm{mA}$ | 24/100 | 24/100 | 24/100 | 24/100 | 24/100 | 24/100 | 24/100 | 17/5 |
| Short time current | 10s-current | A | 72 | 72 | 216 | 240 | 72 | 216 | 240 | - |
| Power loss per pole at le/AC1 |  | W | 2 | 3 | 3 | 7 | 2 | 3 | 7 | 0,5 |
| Utilization category AC2 and AC3 / AC7b |  |  |  |  |  |  |  |  |  |  |
| Switching of three-phase motors |  |  |  |  |  |  |  |  |  |  |
| Rated operational current $I_{\text {e }}$ |  | A | - | - | - | - | 9 | 27 | 30 | - |
| Rated operational power |  |  |  |  |  |  |  |  |  |  |
| of three-phase motors | 220 V | kW | - | - | - | - | 2.2 | 7.5 | 8 | - |
| $50-60 \mathrm{~Hz}$ | 230-240V | kW | - | - | - | - | 2.5 | 8 | 8,5 | - |
|  | 380-415V | kW | - | - | - | - | 4 | 12,5 | 15 | - |
| 2-pole motors | 230 V | kW | 1.1 | 1.3 | 2,6 | 5 | - | - | - | - |
| Contact life |  | $5 \times 10^{6}$ | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | - |
| Power consumption of coils |  |  |  |  |  |  |  |  |  |  |
| AC operated | inrush | VA | 7-9 | 7-9 |  |  | 20-25 | 33-45 | 33-45 | - |
|  | sealed | VA | 2.2-4.2 | 2.2-4.2 | 5.7 | 5.7 | 4-6 | 6-8 | 6-8 | - |
|  |  | W | 0.8-1.6 | 0.8-1.6 |  | 5-7 | 1.5-2.5 | 2.6 | 2.6 | - |
| $A C$ and DC-operated |  | W | - | - |  |  | 3-4 | - | - | - |
| Operation range of coilsin multiples of control voltage $\mathrm{U}_{5}\left(-40^{\circ}-+40^{\circ} \mathrm{C}\right)$ |  |  |  |  |  |  |  |  |  |  |
|  |  |  | 0.85-1.1 | 0.85-1.1 | 0.85-1.1 | 0.85-1.1 | 0.85-1.1 | 0.85-1.1 | 0.85-1.1 | - |

2) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): Uimp $=4 \mathrm{kV}$.
3) Max. occ. switching overvoltage $<4 \mathrm{kV}$
4) Duty cycle: $100 \%$

Technical Specification - Modular Contactors AC-1

- Modular Contactors "R" AC-1, AC/ACDC Coil

Data according to IEC60 947-4-1, IEC60 947-5-1, VDE 0660

| Type |  |  | R20 | R25 (2p.) | R25 (4p.) | R25-..VM | R40 | R63 | RHII |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Short circuit protection |  |  |  |  |  |  |  |  |  |
| max. fuse Coordination-type "1" | $\mathrm{gL}(\mathrm{gG})$ | A | 35 | 35 | 35 | 35 | 63 | 80 | - |
| Rated short circuit current | "r" | kA | 3 | 3 | 3 | 3 | 3 | 3 | - |
|  | "lq" | kA | 3 | 3 | 10 | 10 | 10 | 10 | - |
| Switching time at control voltage U $\pm 10 \%$ |  |  |  |  |  |  |  |  |  |
|  | make time | ms | 7-16 | 7-16 | 9-15 | 17-24 | 11-15 | 11-15 | - |
|  | release time | ms | 6-12 | 6-12 | 4-8 | 17-23 | 6-13 | 6-13 | - |
|  | arc duration | ms | 10-15 | 10-15 | 10-15 | 10-15 | 10-15 | 10-15 | - |
| Cable cross-sections |  |  |  |  |  |  |  |  |  |
| Main connector | solid or stranded | $\mathrm{mm}^{2}$ | 1.5-10 | 1.5-10 | 1.5-10 | 1.5-10 | 2.5-25 | 2.5-25 | 0.5-2.5 ${ }^{31}$ |
|  | flexible | $\mathrm{mm}^{2}$ | 1.5-6 | 1.5-6 | 1.5-6 | 1.5-6 | 2.5-16 | 2.5-16 | 0.5-2.5 ${ }^{31}$ |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ | 1.5-6 | 1.5-6 | 1.5-6 | 1.5-6 | 2.5-16 | 2.5-16 | 0.5-1.5 |
| Clamps per pole |  |  | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| Magnetic coil | solid or stranded | $\mathrm{mm}^{2}$ | 0.75-2.5 | 0.75-2.5 | 0.75-2.5 | 0.75-2.5 | 0.75-2.5 | 0.75-2.5 | - |
|  | flexible | $\mathrm{mm}^{2}$ | 0.5-2.5 | 0.5-2.5 | 0.5-2.5 | 0.5-2.5 | 0.5-2.5 | 0.5-2.5 | - |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ | 0.5-1.5 | 0.5-2.5 | 0.5-1.5 | 0.5-1.5 | 0.5-1.5 | 0.5-1.5 | - |
| Clamps per pole |  |  | 1 | 1 | 1 | 1 | 1 | 1 | - |
| Auxiliary Contacts ${ }^{5 / 617)}$ |  |  |  |  |  |  |  |  |  |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}{ }^{1 /}$ |  | $\checkmark \mathrm{AC}$ | - | - | - | - | - | - | $440^{21}$ |
| Thermal rated current $I_{\text {th }}$ | $40^{\circ} \mathrm{C}$ | A | - | - | - | - | - | - | 10 |
| Ambient temperature | $60^{\circ} \mathrm{C}$ | A | - | - | - | - | - | - | 6 |
| Utilization category AC15 |  |  |  |  |  |  |  |  |  |
| Rated operational | 220-240V | A | - | - | - | - | - | - | 3 |
| current $\mathrm{I}_{\text {e }}$ | 380-415V | A | - | - | - | - | - | - | 2 |
|  | 440 V | A | - | - | - | - | - | - | 1,6 |
| Utilization category DC13 |  |  |  |  |  |  |  |  |  |
| Rated operational | 24-60V | A | - | - | - | - | - | - | 2 |
| current $l_{\text {e }}$ | 110 V | A | - | - | - | - | - | - | 0.4 |
| per pole | 220 V | A | - | - | - | - | - | - | 0.1 |
| Short circuit protection |  |  |  |  |  |  |  |  |  |
| short-circuit current 1kA, contact welding not accepted | gL (gG) | A | - | - | - | - | - | - | 10 |

2) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): Uimp $=4 \mathrm{kV}$.
3) Maximum cable cross-section with prepared conductor
4) AC7b motor 2 -pole $230 \mathrm{~V} 1,1 \mathrm{~kW}$
5) Rated frequency $50 / 60 \mathrm{~Hz}$
6) Max. occ. switching overvoltage $<4 \mathrm{kV}$
7) Duty cycle: $100 \%$

- Modular Contactors "R" AC-1, ACDC Coil

| Type |  | $\begin{gathered} \text { 4-pole } \\ \text { R25-..VM } \\ \hline \end{gathered}$ | RH11-1 |
| :---: | :---: | :---: | :---: |
| Main contacts ${ }^{5 / 617}$ |  |  |  |
| Rated insulation voltage $U_{i}$ | V | $440{ }^{21}$ | $440{ }^{21}$ |
| Rated operational voltage $U_{\text {e }}$ | V | 440 | 440 |
| Switching frequency AC1, AC3 | 1/h | 300 | 600 |
| Mechanical endurance | $5 \times 10^{6}$ | 1 | 1 |
| Utilization category AC1 |  |  |  |
| Rated operational current $I_{e}\left(=l_{t+1}\right)$ |  |  |  |
| open... at $60^{\circ} \mathrm{C}$ | A | 25 | - |
| Endurance of main contacts | $\mathrm{S} \times 10^{6}$ | 0.1 | - |
| Minimum switching voltage | $\mathrm{V} / \mathrm{mA}$ | 24/100 | 17/5 |
| Short time current 10s-current | A | 72 | - |
| Power loss per polel ${ }_{\text {e }} /$ ACl | W | 2 | 0.5 |
| Utilization category AC3 / AC7b |  |  |  |
| Switching of slipring or squirrel-cage motors |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | A | 9 | - |
| Rated power of motor 220 V | kW | 2.2 | - |
| $50-60 \mathrm{~Hz}$ 230-240V | kW | 2.5 | - |
| $380-415 \mathrm{~V}$ | kW | 4 | - |
| 2-pole motors 230V | kW | - | - |
| Endurance of main contacts | $5 \times 10^{6}$ | 0.15 | - |
| Power consumption of coil |  |  |  |
| AC-operated closing | VA | 20-25 | - |
| closed | VA | 4-6 | - |
|  | W | 3-3.5 |  |
| DC-operated | W | 3-4 | - |
| Operating range of coilin multiples of control voltage $\mathrm{U}_{5}\left(-40^{\circ} \mathrm{C}\right.$ to $\left.+40^{\circ} \mathrm{C}\right)$ |  |  |  |
|  |  | 0.85-1.1 | - |

2) Valid for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): $\mathrm{U}_{\mathrm{imp}}=4 \mathrm{kV}$
3) Rated frequency $50 / 60 \mathrm{~Hz}$
4) Max. occ. switching overvoltage $<4 \mathrm{kV}$
5) Duty cycle: $100 \%$

Modular Contactors "Amparo" AC-1, AC Coil

| Data according: | R20 | R25 | R40 | R63 |
| :---: | :---: | :---: | :---: | :---: |
|  | IEC/EN 60947-4-1 |  |  |  |
|  | IEC/EN 61095 |  |  |  |
| Rated current $\mathrm{l}_{\text {th: }}$ | 20A | 25A | 40A | 63A |
| Rated voltage 1 -phase $\mathrm{U}_{8}$ : | 230 V | 230 V | 230 V | 230 V |
| 3-phase $\mathrm{U}_{\mathrm{e}}$ : | - | 400 V | 400 V | 400V |
| Rated current $\mathrm{l}_{\text {e: }} \quad$ at $\mathrm{ACl} / \mathrm{AC7}_{\text {a }}$ | 20A | 25A | 40A | 63A |
| Rated power $\quad \mathrm{ACl}$ at $\mathrm{U}_{\mathrm{e}}=230 \mathrm{VAC} \mathrm{Pmax:}$ | 4kW | 16 kW | - | - |
| AC1 at $U_{e}=400 \mathrm{VAC} \mathrm{Pmax}$ : | - | - | 28kW | 40kW |
| AC3 at $U_{e}=400 \mathrm{VAC} \mathrm{Pmax}$ : | - | 4kW | 12kW | 15 kW |
| Rated insulation voltage $U_{i}$ : | 500 V | 500 V | 500 V | 500 V |
| Rated impulse withstand voltage $\mathrm{U}_{\text {imp }}$ : | 4kV |  |  |  |
| Nominal frequency: | $50 / 60 \mathrm{~Hz}$ |  |  |  |
| Maximum short circuit protection | $25 \mathrm{AgL} / \mathrm{gG}$ | $35 \mathrm{AgL} / \mathrm{gG}$ | $63 \mathrm{AgL} / \mathrm{gG}$ | 80A gl/g |
| Mechanical endurance | 3000000 | 3000000 | 3000000 | 3000000 |
| Electrical endurance at ${ }^{\text {a }}$ / $\mathrm{AC7}_{\text {a }}$ | 150000 | 150000 | 150000 | 150000 |
| at AC3 / AC7b | - | 150000 | 150000 | 150000 |
| Breadth ( $1 \mathrm{MW}=17.8 \mathrm{~mm}$ ) | 1 MW | 2 MW | 3 MW | 3 MW |
| Maximum surrounding temperature | $-5^{\circ} \mathrm{C} \ldots+55^{\circ} \mathrm{C}$ |  |  |  |
| Protection degree | IP20 |  |  |  |

## Terminal Screws

| Devices | Kind of connection |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Screw with | Screw with |  | Screw |  | Screw driver | Tightening torque |  |
|  | washer | clamp box |  | w.nut |  |  | Nm | lb. inch |
| Type | 最 | $\begin{gathered} \text { 菑 } \\ \text { (\%) } \end{gathered}$ |  |  |  |  |  |  |
| Modular Contactors |  |  |  |  |  |  |  |  |
| Main and auxiliary conductors R20, R25 | - | M3, 5 | - | - | (4) | Pz1 | 0.8-1.4 | 7-12 |
| R40, R63 | - | M5 | - | - |  | Pz2 | 2.5-3 | 22-26 |
| Coil conductor |  |  |  |  |  |  |  |  |
| R20, R25 | - | M3,5 | - | - |  | Pz 1 | 0.6-1.2 | 5-11 |
| R40, R63 | - | M3, 5 | - | - |  | Pz 1 | 0.6-1.2 | 5-11 |

Electromechanical Contactors

Electromechanical Contactors Series LA


Reversing Contactor Combinations
Series ALEA LSW

Contactors Series CUBICO Mini, 3-pole



Electromechanical Contactors Series ALEA LS


Star-Delta Contactor Combinations Series ALEA LSY


Contactors Series CUBICO Classic, 3-pole


## Electromechanical Contactors

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Electromechanical Contactors Series LA

## - Micro Contactors LA, Size M



## Schrack-Info

- Contactors up to $2.2 \mathrm{~kW}, 3$ - or 4 -pole
- Worldwide smallest power contactor
- Suitable for safety applications according IEC 60335-1
- 3-pole contactors with one integrated auxiliary contact ( 1 NO or 1 NC )
- All auxiliary contactors are suitable for electronic circuits according to IEC 60947-5-4
- 4-pole contactors without auxiliary contact
- Contactors can not be fitted with additional auxiliary contacts
- No Thermal overload relais for contactors LAM are available
- Mountable on mounting rail TS 15 or with adaptor on DIN rail -TS35
- Further accessories find attached

| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | $\begin{gathered} \text { KO-05D } \\ 440 \end{gathered}$ |
| :---: | :---: | :---: |
| Utilization category AC-1 $\cos \varphi=1$ |  |  |
| Rated operational power at 400VAC | (kW) | 8.3 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}=\mathrm{I}_{\mathrm{th}}$ at $40^{\circ} \mathrm{C}$ and 480 VAC | (A) | 12 |
| Utilization category AC-2 and AC-3 |  |  |
| Rated operational power at 400VAC | (kW) | 2.2 |
| Rated operational current $I_{\text {e }}$ at $380-440 \mathrm{VAC}$ | (A) | 5 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | -40 ... +60 |
| Permissible mounting position |  |  |
| Rules and regulations according |  | IEC 60947-4-1, EN 60947-4-1 |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | Auxiliary contacts 440 |
| Thermal rated current $I_{t h}$ at $40^{\circ} \mathrm{C}$ and 440 VAC | (A) | 5 |
| Utilization category AC-15 |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ at $40^{\circ} \mathrm{C}$ and $230 / 440 \mathrm{VAC}$ | (A) | 3/1 |
| Utilization category DC13 ${ }^{11}$ |  |  |
| Rated operational current le at $40^{\circ} \mathrm{C}$ up to 60 VDC | (A) | 0.5 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | -40 ... +60 |
| Rules and regulations according |  | IEC 60947-5-1, EN 60947-5-1 |

[^3](Test ratings 17VDC, 5mA) Positively guided contacts

- Micro Contactors LA, Size M

Dimensions


Circuit Diagrams

| K0-05D10 | K0-05D01 | K0-05D00-40 |
| :---: | :---: | :---: |
|  |  |  |

Connection Diagrams


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 2.2kW - 3-pole |  |  |  |
| AC-3/5A, 3NO+1NO, 24VAC | K0-05D10 | -000-0-6 | LAMD0510 |
| AC-3/5A, 3NO+1NO, 230VAC | K0-05D 10 |  | LAMD0513 |
| AC-3/5A, $3 \mathrm{NO}+1 \mathrm{NO}, 400 \mathrm{VAC}$ | K0-05D10 | - -0.000 | LAMD0514 |
| AC-3/5A, 3NO+1NO, 24VDC | K0-05D10 | - -10000 | LAMD0515 |
| AC-3/5A, 3NO+1NC, 24VAC | K0-05D01 | - -1000 | LAMD0520 |
| AC-3/5A, 3NO+1NC, 230VAC | K0-05D01 | $+\infty=-\infty$ | LAMD0523 |
| AC-3/5A, $3 \mathrm{NO}+1 \mathrm{NC}, 400 \mathrm{VAC}$ | K0-05D01 | - -1000 | LAMD0524 |
| AC-3/5A, 3NO+1NC, 24VDC | K0-05D01 | $\begin{array}{lll} \hline-\infty & -\infty \\ \hline \end{array}$ | LAMD0525 |
| 2.2kW - 4-pole |  |  |  |
| AC-3/5A, 4NO, 24VAC | K0-05D00-40 | - -80 | LAMD0540 |
| AC-3/5A, 4NO, 230VAC | K0-05D00-40 | $\begin{array}{lll} -600 & -0 \\ \hline \end{array}$ | LAMD0543 |
| AC-3/5A, 4NO, 400VAC | K0-05D00-40 | $+50-6$ | LAMD0544 |
| AC-3/5A, 4NO, 24VDC | K0-05D00-40 | $+\infty=-\infty$ | LAMD0545 |
| Accessories for contactors size $\mathbf{M}$ |  |  |  |
| DIN-rail slotted, $1000 \times 15 \times 5 \mathrm{~mm}$ | TS 15 |  | LAMZTS 15 |
| DIN-rail adaptor TS35 | TS35 | $+\infty=0$ | LAMZTS35 |

Electromechanical Contactors Series LA

## - Mini Contactors LA, Size 1



Schrack-Info

- Contactors up to $4 \mathrm{~kW}, 3$ - or 4 -pole
- 3-pole contactors with integrated auxiliary contacts (1NO or 1NC), 4-pole contactors without integrated auxiliary contact
- 3-pole contactors with one integrated auxiliary contact NO , auxiliary contact HKM can be snapped on
- 3-pole contactors with one integrated auxiliary contact NC, auxiliary contact HKM can be snapped on
- 4-pole contactors, auxiliary contacts HKM can be snapped on
- 3-pole contactors for direct mounting of Thermal overload relais of type U12/16E..K 1 suitable
- 4-pole contactors are not suitable for Thermal overload relais
- Mountable on DIN-rail TS35 or mounting plate
- Further accessories find attached

|  |  | K1-09 |
| :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Utilization category AC-1 $\cos \varphi=1$ |  |  |
| Rated operational power at 400VAC | (kW) | 13,8 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}=\mathrm{I}_{\mathrm{t}}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 20 |
| Utilization category AC-2 and AC-3 |  |  |
| Rated operational power at 400VAC | (kW) | 4 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $380-440 \mathrm{VAC}$ | (A) | 9 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-40 \ldots+60$ |
| Permissible mounting position |  |  |
| Rules and regulations according |  | IEC 60947-4-1, EN60947-4-1 |
|  |  | included auxiliary contacts |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Thermal rated current $\mathrm{l}_{\text {th }}$ at $40^{\circ} \mathrm{C}$ and 440 VAC | (A) | 10 |
| Utilization category AC-15 |  |  |
| Rated operational current le at $40^{\circ} \mathrm{C}$ and 230/440VAC | (A) | $3 / 1.6$ |
| Utilization category DC13 ${ }^{1 /}$ |  |  |
| Rated operational current le at $40^{\circ} \mathrm{C}$ up to 60/110/220VDC | (A) | $2 / 0.4$ / 0.1 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-40 \ldots+60$ |
| Rules and regulations according |  | IEC 60947-5-1, EN 60947-5-1 |

## - Mini Contactors LA, Size 1

Dimensions


Circuit Diagrams


Connection Diagrams

| K1-09D10 | K1-09D01 | K1-09D00-40 |
| :---: | :---: | :---: |
| $\bigcirc{ }^{1} \bigcirc^{3} \bigcirc^{5} \bigcirc^{13} \mathrm{O}^{\text {A1 }}$ | $\bigcirc \bigcirc^{1} \bigcirc^{3} \bigcirc^{5} \bigcirc^{21} \mathrm{O}^{\mathrm{A} 1}$ | $\mathrm{O}_{1}^{1} \mathrm{O}^{3} \mathrm{O}^{5} \mathrm{O}$ |
| $\begin{array}{llllll} & 0 & 0 & 0 & \bigcirc & 0 \\ 2 & 4 & 6 & 14 & A^{2}\end{array}$ |  | $\begin{array}{llllll}0 & 0 & 0 & 0 & 0 \\ 2 & 4 & 6 & 8 & A 2\end{array}$ |


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 4kW - 3-pole |  |  |  |
| $3 \mathrm{NO}+1 \mathrm{NC}, 20 \mathrm{~A}, 24 \mathrm{VAC}$ | K1-09D10 | -000-000 | LA100910 |
| $3 \mathrm{NO}+1 \mathrm{NC}, 20 \mathrm{~A}, 24 \mathrm{VDC}$ | K1-09D10 | -0000 | LA100915 |
| 3 NO main + 1NC auxiliary contact,20A, 24VDC+supressor | K1-09D10 |  | LA10091B |
| $3 \mathrm{NO}+1 \mathrm{NC}, 20 \mathrm{~A}, 230 \mathrm{VAC}$ | K1-09D10 |  | LA100913 |
| 3 NO main + 1NC auxiliary contact,20A,230VAC+supressor | K1-09D10 |  | LA10091C |
| $3 \mathrm{NO}+1 \mathrm{NC}, 20 \mathrm{~A}, 24 \mathrm{VAC}$ | K1-09D01 |  | LA100920 |
| $3 \mathrm{NO}+1 \mathrm{NC}, 20 \mathrm{~A}, 24 \mathrm{VDC}$ | K1-09D01 | -600-9 | LA100925 |
| 3NO + 1NC, 20A, 230 VAC | K1-09D01 | $+\infty 0=0$ | LA100923 |
| 4kW - 4-pole |  |  |  |
| 4 NO 230V AC, 20A | K1-09D00-40 | $+500-6$ | LA100943 |
| 4NO, 20A, $24 \mathrm{VDC}+$ suppressor | K1-09D00-40 | 0 | LA10094B |
| Auxiliary contacts |  |  |  |
| Auxiliary contact block for mini Contactors K1, 2NO | HKM20 |  | LA 190143 |
| Auxiliary contact block for mini Contactors K1, 1NO+1NC | HKM 11 |  | LA 190151 |
| Auxiliary contact block for mini Contactors K1, 2NO+2NC | HKM22 |  | LA190150 |
| Auxiliary contact block for mini Contactors K1, 2NC, HKMO2 | HKMO2 |  | LA 190152 |

Electromechanical Contactors Series LA

Power Contactors LA, Size 2


Schrack-Info

- Contactors up to $30 \mathrm{~kW}, 4$-pole
- K2-23 up to K2-37, in maximum 4 frontside auxiliary contacts HN or HA can be snapped on
- K2-45 up to K2-60, in maximum 6 frontside auxiliary contacts HN or HA can be snapped on
- No Thermal overload relais retrofit
- Mountable on DIN-rail TS35 or mounting plate
- Further accessories find attached

|  |  | K2-23 | K2-30 | K2-37 | K2-45 | K2-60 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathrm{i}}$ | (VAC) |  |  |  |  |  |
| Utilization category AC-1 $\cos \varphi=1$ |  | 690 |  |  |  |  |
| Rated operational power at 400VAC | (kW) | 31 | 34,5 | 34,5 | 55 | 69 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}=\mathrm{I}_{\mathrm{t}}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 45 | 50 | 50 | 80 | 100 |
| Utilization category AC-2 and AC-3 |  |  |  |  |  |  |
| Rated operational power at 400VAC | (kW) | 11 | 15 | 18,5 | 22 | 30 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $380-400 \mathrm{VAC}$ | (A) | 23 | 30 | 37 | 45 | 60 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | -40 ... +60 |  |  |  |  |
| Permissible mounting position |  |  |  |  |  |  |
| Rules and regulations according |  | IEC 947-4-1/ EN60947-4-1 |  |  |  |  |

## Dimensions



- Power Contactors LA, Size 2

Circuit and Connection Diagram


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 4-pole |  |  |  |
| K2-23A00-40 230VAC/11kW | K2-23A00-40 |  | LA202343 |
| K2-30A00-40 230VAC/15kW | K2-30A00-40 |  | LA203043 |
| K2-37A00-40 110VAC/18.5kW | K2-37A00-40 |  | LA203742 |
| K2-37A00-40 230VAC/18kW | K2-37A00-40 |  | LA203743 |
| K2-45A00-40 230VAC/22kW | K2-45A00-40 |  | LA204543 |
| K2-60A00-40 230VAC/30kW | K2-60A00-40 |  | LA206043 |
| Auxiliary contacts |  |  |  |
| front 1NO, 3A (230V AC-15) for LA2, LA3004-LA3115, LA4 | HN10 | -000-n | LA190100 |
| front 1NC, 3A (230V AC-15) for LA2, LA3004-LA3115, LA4 | HNO1 | -000-0 | LA190101 |
| front 1NC, 6A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HAO1 |  | LA190135 |
| front 1NO, 6A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HA10 |  | LA190137 |
| front learly make NO, 3A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HN1OU | - -8000 | LA190138 |
| front 1 delayed NC, 3A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HNOIU | -000-000, | LA190139 |

Electromechanical Contactors Series LA

Power Contactors LA, Size 3, 4-18.5kW


## Schrack-Info

- Contactors from 4 kW up to $18.5 \mathrm{~kW}, 3$ - or 4 -pole
- K3-10 up to K3-22, in maximum 4 frontside auxiliary contacts HN or HA can be snapped on
- K3-24 up to K3-40, in maximum 4 frontside auxiliary contacts HN or HA as well as 2 "side mounted" auxiliary contacts HB can be snapped on
- 3-pole contactors K3-10 up to K3-22 suitable for Thermal overload relais of type U12/16E..K3
- 3-pole contactors K3-10 up to K3-40 suitable for Thermal overload relais of type U3/32
- 3-pole contactors K3-24 up to K3-40 suitable for Thermal overload relais of type U3/42
- 4-pole contactors are not suitable for Thermal overload relais
- Mountable on DIN-rail TS35 or mounting plate
- Further accessories find attached

|  |  | K3-10 | K3-14 | K3-18 | K3-22 | K3-24 | K3-32 | K3-40 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathrm{i}}$ | (VAC) | 690 |  |  |  |  |  |  |
| Utilization category AC-1 $\cos \varphi=1$ |  | 690 |  |  |  |  |  |  |
| Rated power at 400VAC | (kW) | 17,3 | 17,3 | 22,1 | 22,1 | 34,6 | 45 | 55,4 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}=\mathrm{I}_{\text {th }}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 25 | 25 | 32 | 32 | 50 | 65 | 80 |
| Utilization category AC-2 and AC-3 |  |  |  |  |  |  |  |  |
| Rated power at 400VAC | (kW) | 4 | 5,5 | 7,5 | 11 | 11 | 15 | 18,5 |
| Rated operational current $I_{e}$ at 380-400VAC | (A) | 10 | 14 | 18 | 22 | 24 | 32 | 40 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-40 \ldots+60$ |  |  |  |  |  |  |
| Permissible mounting position |  |  |  |  | $1$ |  |  |  |
| Rules and regulations according |  | IEC 60947-4-1, EN60947-4-1 |  |  |  |  |  |  |


|  |  | Included auxiliary contacts |
| :--- | :--- | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Thermal rated current $\mathrm{I}_{\mathrm{t}}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 10 |
| Utilization category $\mathrm{AC}-15$ |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ and $230 / 440 \mathrm{VAC}$ | (A) | $3 / 1,6$ |
| Utilization category $\mathrm{DC13} 3^{1)}$ |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ up to $60 / 110 / 220 \mathrm{VDC}$ | (A) | $3,5 / 0,5 / 0,1$ |
| Ambient temperature (operation) | ( $\left.{ }^{\circ} \mathrm{C}\right)$ | $-40 \ldots+60$ |
| Rules and regulations according |  | IEC $60947-5-1$, EN 60947-5-1 |

1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24VDC (Test ratings $17 \mathrm{VDC}, 5 \mathrm{~mA}$ ), positively guided contacts

Power Contactors LA, Size 3, 4-18.5kW
Dimensions


1) Minimum side distances to conductive parts at coil voltages:
$500 \mathrm{~V} \mathrm{U}_{\mathrm{imp}}=6 \mathrm{kV} 2 \mathrm{~mm}$
$660-690 \mathrm{~V} \mathrm{U}_{\mathrm{imp}}=8 \mathrm{kV} 4,5 \mathrm{~mm}$

## Circuit Diagrams

K3-..ND10


K3-..NA00-22


K3-..ND01


K3-..ND10=


K3-.. A00


K3-..ND01=


K3-.. A00 $=$


Electromechanical Contactors Series LA

- Power Contactors LA, Size 3, 4-18.5kW
- Connection Diagrams

| K3-..ND10 | K3-..ND01 | к3-..A00 | K3-..NA00-40 | K3-14NAOO-22 |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 4kW / 10A AC3, 25A AC-1, 3-pole |  |  |  |
| $4 \mathrm{~kW}, \mathrm{AC} 3,10 \mathrm{~A}, 24 \mathrm{VAC}+1 \mathrm{NO}$ built in | K3-10ND10 |  | LA301010N |
| $4 \mathrm{~kW}, \mathrm{AC} 3,10 \mathrm{~A}, 24 \mathrm{VDC}+1 \mathrm{NO}$ built in | K3-10ND $10=$ |  | LA301015N |
| $4 \mathrm{~kW}, \mathrm{AC} 3,10 \mathrm{~A}, 24 \mathrm{VAC}+1 \mathrm{NC}$ built in | K3-10ND01 |  | LA301020N |
| $4 \mathrm{~kW}, \mathrm{AC} 3,10 \mathrm{~A}, 48 \mathrm{VAC}+1 \mathrm{NO}$ built in | K3-10ND10 | -000-n | LA301011N |
| $4 \mathrm{~kW}, \mathrm{AC} 3,10 \mathrm{~A}, 110 \mathrm{VAC}+1 \mathrm{NO}$ built in | K3-10ND10 |  | LA301012N |
| $4 \mathrm{~kW}, \mathrm{AC} 3,10 \mathrm{~A}, 230 \mathrm{VAC}+1 \mathrm{NO}$ built in | K3-10ND10 | [-600-4 | LA301013N |
| $4 \mathrm{~kW}, \mathrm{AC} 3,10 \mathrm{~A}, 400 \mathrm{VAC}+1 \mathrm{NO}$ built in | K3-10ND10 |  | LA301014N |
| $4 \mathrm{~kW}, \mathrm{AC} 3,10 \mathrm{~A}, 230 \mathrm{VAC}+1 \mathrm{NC}$ built in | K3-10ND01 | $\begin{array}{rrr} \hline-\infty 0 & \sigma \\ \hline \end{array}$ | LA301023N |
| $4 \mathrm{~kW}, \mathrm{AC} 3,10 \mathrm{~A}, 400 \mathrm{VAC}+1 \mathrm{NC}$ built in | K3-10ND01 | [-000] | LA301024N |
| $4 \mathrm{~kW}, \mathrm{AC} 3,10 \mathrm{~A}, 230 \mathrm{VAC}+1 \mathrm{NC}$ built in | K3-10ND01 = | - $-\infty \times 0$ | LA301025N |
| 4kW / 10A AC3, 25A AC-1, 4-pole |  |  |  |
| 4kW, AC3, 10A, 230VAC, 4 main contacts | K3-10NA00-40 | - $-\infty$ | LA301043N |
| $5.5 \mathrm{~kW} / 14 \mathrm{~A} \mathrm{AC}-3,25 \mathrm{~A} \mathrm{AC}$-1, 3-pole |  |  |  |
| Contactor 3pole, $5.5 \mathrm{~kW}, \mathrm{AC} 3,14 \mathrm{~A}, 24 \mathrm{VAC}+1 \mathrm{NO}$ built in | K3-14ND10 | - | LA301410N |
| Contactor 3pole, $5.5 \mathrm{~kW}, \mathrm{AC} 3,14 \mathrm{~A}, 48 \mathrm{VAC}+1 \mathrm{NO}$ built in | K3-14ND 10 |  | LA301411N |
| Contactor 3-pole, $5.5 \mathrm{~kW}, \mathrm{AC} 3,14 \mathrm{~A}, 24 \mathrm{VAC}+1 \mathrm{NC}$ built in | K3-14ND01 | $+\infty=0$ | LA301420N |
| Contactor 3-pole, $5.5 \mathrm{~kW} / 14 \mathrm{~A} \mathrm{AC3}, \mathrm{25A} \mathrm{ACI}, \mathrm{1NC}$, | K3-14ND01 |  | LA301422N |
| Contactor 3pole, $5.5 \mathrm{~kW}, \mathrm{AC} 3,14 \mathrm{~A}, 24 \mathrm{VDC}+1 \mathrm{NO}$ built in | K3-14ND $10=$ | $\begin{array}{rrr} \hline-80 & 0-6 \\ \hline \end{array}$ | LA301415N |
| Contactor 3-pole, $5.5 \mathrm{~kW} / 14 \mathrm{~A} \mathrm{AC3}, 25 \mathrm{~A} \mathrm{ACl}, 1 \mathrm{NO}, 220 \mathrm{VDC}$ | K3-14ND $10=$ |  | LA301418N |
| Contactor 3-pole, 5.5kW, AC3, 14A, $24 \mathrm{VDC}+1 \mathrm{NC}$ built in | K3-14NDO1 = | - $-\infty \times 0$ | LA301425N |
| Contactor 3pole, 5.5kW, AC3, 14A, 110VAC + 1NO built in | K3-14ND 10 |  | LA301412N |
| Contactor 3pole, $5.5 \mathrm{~kW}, \mathrm{AC} 3,14 \mathrm{~A}, 230 \mathrm{VAC}+1 \mathrm{NO}$ built in | K3-14ND10 | $\begin{array}{rrr} \hline-000 & \sigma-\infty \\ \hline \end{array}$ | LA301413N |
| Contactor 3-pole, $5.5 \mathrm{~kW}, \mathrm{AC} 3,14 \mathrm{~A}, 230 \mathrm{VAC}+1 \mathrm{NC}$ built in | K3-14NDO1 | $\begin{array}{r} -\infty 0 \\ \hline 00 \\ \hline \end{array}$ | LA301423N |
| Contactor 3pole, $5.5 \mathrm{~kW}, \mathrm{AC} 3,14 \mathrm{~A}, 400 \mathrm{VAC}+1 \mathrm{NO}$ built in | K3-14ND 10 | $+\infty 0=0$ | LA301414N |
| Contactor 3-pole, $5.5 \mathrm{~kW} / 14 \mathrm{~A} \mathrm{AC3}, \mathrm{25A} \mathrm{ACl}, \mathrm{1NC}, \mathrm{400VAC}$ | K3-14ND01 |  | LA301424N |

5.5kW / 14A AC-3, 25A AC-1, 4-pole

| Contactor 4-pole, $5.5 \mathrm{~kW}, \mathrm{AC} 3,14 \mathrm{~A}, 230 \mathrm{VAC}, 4$ main contacts | K3-14NA00-40 | LA301443N |
| :--- | :--- | :--- |
| Contactor 4-pole, $5.5 \mathrm{~kW} / 14 \mathrm{~A} \mathrm{AC3}, 25 \mathrm{~A} \mathrm{AC1}, 2 \mathrm{NO}+2 \mathrm{NC}, 230 \mathrm{VAC}$ | K3-14NA00-22 | LA3014C3N |


| Contactor 3-pole, $7.5 \mathrm{~kW}, 1 \mathrm{NO}, 24 \mathrm{VAC}, 18 \mathrm{~A} \mathrm{AC3}, \mathrm{32A} \mathrm{ACl}$ | K3-18ND10 |  | LA301810N |
| :---: | :---: | :---: | :---: |
| Contactor, 3-pole, $7.5 \mathrm{~kW} / 18 \mathrm{~A} \mathrm{AC3}, 32 \mathrm{~A} \mathrm{ACl}, 1 \mathrm{NO}, 24 \mathrm{VDC}$ | K3-18ND10= | - $-\cdots$ | LA301815N |
| Contactor 3-pole, $7.5 \mathrm{~kW} / 18 \mathrm{~A} \mathrm{AC3}, 32 \mathrm{~A} \mathrm{ACl}, 1 \mathrm{NO}, 48 \mathrm{VDC}$ | K3-18ND $10=$ |  | LA301816N |
| Contactor, 3-pole, $7.5 \mathrm{~kW} / 18 \mathrm{~A} \mathrm{AC3}, 32 \mathrm{~A} \mathrm{ACI}, 1 \mathrm{NC}, 24 \mathrm{VAC}$ | K3-18ND01 | [-000-9, | LA301820N |
| Contactor, 3-pole, $7.5 \mathrm{~kW} / 18 \mathrm{~A} \mathrm{AC3}, 32 \mathrm{~A} \mathrm{ACl}, \mathrm{1NC}, \mathrm{24VDC}$ | K3-18ND01 = | - -60 | LA301825N |
| Contactor 3-pole, 7.5kW/18A AC3, 32A ACI, 1NO, 48VAC | K3-18ND 10 |  | LA301811N |
| Contactor 3-pole, 7.5kW/18A AC3, 32A ACl, 1NO, 110VAC | K3-18ND 10 |  | LA301812N |
| Contactor 3-pole, $7.5 \mathrm{~kW}, 1 \mathrm{NO}, 230 \mathrm{VAC}, 18 \mathrm{~A} \mathrm{AC3,32A} \mathrm{AC1}$ | K3-18ND10 | -000-6 | LA301813N |

Power Contactors LA, Size 3, 4-18.5kW

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 7.5kW / 18A AC-3, 32A AC-1, 3-pole |  |  |  |
| Contactor, 3-pole, 7.5kW/18A AC3, 32A ACI, 1NC, 230VAC | K3-18NDO1 | [000-9, | LA301823N |
| Contactor 3-pole, 7.5kW/18A AC3, 32A ACl, 1NO, 415VAC | K3-18ND 10 | $-600-\frac{1}{0}$ | LA301814N |
| 7.5kW / 18A AC-3, 32A AC-1, 4-pole |  |  |  |
| Contactor, 4-pole, 7.5 kW , 4 main contacts., 230VAC, 18A AC3,32A AC1 | K3-18NA00-40 | - + - | LA301843N |
| $11 \mathrm{~kW} / 22 \mathrm{~A}$ AC-3, 32A AC-1, 3-pole |  |  |  |
| Contactor, 3 -pole, $11 \mathrm{~kW}, 1 \mathrm{NO}, 24 \mathrm{VAC}, 22 \mathrm{~A} \mathrm{AC3}, 32 \mathrm{~A} \mathrm{AC1}$ | K3-22ND 10 | -700-9 | LA302210N |
| Contactor, 3 -pole, $11 \mathrm{~kW} / 22 \mathrm{~A} \mathrm{AC3}, 32 \mathrm{~A} \mathrm{ACl}, 1 \mathrm{NO}, 24 \mathrm{VDC}$ | K3-22ND10= | -000-9, | LA302215N |
| Contactor 3-pole, $11 \mathrm{~kW} / 22 \mathrm{~A}$ AC3, 32A ACl, 1NO, 48VDC | K3-22ND10= |  | LA302216N |
| Contactor, 3-pole, $11 \mathrm{~kW} / 22 \mathrm{~A} \mathrm{AC3}, 32 \mathrm{~A} \mathrm{ACl}, 1 \mathrm{NC}, 24 \mathrm{VDC}$ | K3-22NDO1 = | -000-9, | LA302225N |
| Contactor 3-pole, $11 \mathrm{~kW} / 22 \mathrm{~A}$ AC3, 32A ACl, $1 \mathrm{NO}, 48 \mathrm{VAC}$ | K3-22ND 10 |  | LA302211N |
| Contactor 3-pole, $11 \mathrm{~kW} / 22 \mathrm{~A}$ AC3, 32A ACl, 1NO, 110VAC | K3-22ND10 |  | LA302212N |
| Contactor, 3-pole, $11 \mathrm{~kW}, 1 \mathrm{NO}, 230 \mathrm{VAC}, 22 \mathrm{~A} \mathrm{AC3}, 32 \mathrm{~A} \mathrm{ACl}$ | K3-22ND 10 | -000-9, | LA302213N |
| Contactor, 3-pole, $11 \mathrm{~kW} / 22 \mathrm{~A}$ AC3, 32A ACl, 1NC, 230VAC | K3-22ND01 | -00\%-9, | LA302223N |
| Contactor, 3-pole $11 \mathrm{~kW} / 22 \mathrm{~A} \mathrm{AC3}, 32 \mathrm{~A} \mathrm{AC1}, \mathrm{1NO}, \mathrm{400VAC}$ | K3-22ND10 | - + - | LA302214N |
| Contactor 3-pole, $11 \mathrm{~kW} / 22 \mathrm{~A}$ AC3, 32A ACl, 1NC, 400VAC | K3-22ND01 |  | LA302224N |
| $11 \mathrm{~kW} / 22 \mathrm{~A}$ AC-3, 32A AC-1, 4-pole |  |  |  |
| Contactor, 4-pole, $11 \mathrm{~kW} / 22 \mathrm{~A}$ AC3, 32A ACl, 4 main contact, 230VAC | K3-22NA00-40 |  | LA302243N |
| $11 \mathrm{~kW} / 24 \mathrm{~A}$ AC-3, 50A AC-1, 3-pole |  |  |  |
| Contactor, 3-pole, $11 \mathrm{~kW} / 24 \mathrm{~A}$ AC3, 50A ACl, 24VAC | K3-24A00 |  | LA302430 |
| Contactor, 3-pole, $11 \mathrm{~kW} / 24 \mathrm{~A} \mathrm{AC3,50A} \mathrm{AC1}, \mathrm{48VDC}$ | K3-24A00= |  | LA302436 |
| Contactor, 3 -pole, 11kW/24A AC3, 50A AC1, 24VDC | K3-24A00= | -60\%-9, | LA302435 |
| Contactor, 3-pole, $11 \mathrm{~kW} / 24 \mathrm{~A} \mathrm{AC3}, \mathrm{50A} \mathrm{ACl}, \mathrm{48VAC}$ | K3-24A00 |  | LA302431 |
| Contactor, 3 -pole, $11 \mathrm{~kW} / 24 \mathrm{~A} \mathrm{AC3,50A} \mathrm{AC1}, \mathrm{110VAC}$ | K3-24A00 |  | LA302432 |
| Contactor, 3-pole, $11 \mathrm{~kW} / 24 \mathrm{~A} \mathrm{AC3,50A} \mathrm{ACl}, \mathrm{230VAC}$ | K3-24A00 | - $+\cdots \times 0$ | LA302433 |
| 15kW / 32A AC-3, 65A AC-1, 3-pole |  |  |  |
| Contactor, 3-pole, 15kW/32A AC3, 65A ACl, 24VAC | K3-32A00 | [-000-9, | LA303230 |
| Contactor, 3 -pole, 15kW/32A AC3, 65A ACl, 24VDC | K3-32A00= | -000-9, | LA303235 |
| Contactor, 3 -pole, 15kW/32A AC3, 65A ACl, 48VAC | K3-32A00 |  | LA303231 |
| Contactor, 3 -pole, 15kW/32A AC3, 65A ACl, 110VAC | K3-32A00 |  | LA303232 |
| Contactor, 3-pole, 15kW/32A AC3, 65A ACl, 230VAC | K3-32A00 | $+\infty=\infty$ | LA303233 |
| Contactor, 3-pole, 15kW/32A AC3, 65A ACl, 400VAC | K3-32A00 | -000-9, | LA303234 |
| Contactor, 3-pole, 15kW/32A AC3, 65A ACl, 48VDC | K3-32A00= | - $-0 \times 0$ | LA303236 |
| 18.5kW / 40A AC-3, 80A AC-1, 3-pole |  |  |  |
| Contactor, 3-pole, 18,5kW/40A AC3, 80A AC1, 24VAC | K3-40A00 |  | LA304030 |
| Contactor, 3 -pole, 18,5kW/40A AC3, 80A ACl, 48VAC | K3-40A00 | -600-6 | LA304031 |
| Contactor, 3 -pole, 18,5kW/40A AC3, 80A ACl, 110VAC | K3-40A00 |  | LA304032 |
| Contactor, 3 -pole, 18,5kW/40A AC3, 80A ACl, 230VAC | K3-40A00 | -000-9, | LA304033 |
| Contactor, 3 -pole, 18,5kW/40A AC3, 80A ACl, 400VAC | K3-40A00 |  | LA304034 |
| Contactor, 3-pole, 18,5kW/40A AC3, 80A ACl, 24VDC | K3-40A00= |  | LA304035 |
| Auxiliary contacts |  |  |  |
| front 1NO, 3A (230V AC-15) for LA2, LA3004-LA3115, LA4 | HN10 |  | LA190100 |
| front 1NC, 3A (230V AC-15) for LA2, LA3004-LA3115, LA4 | HNO1 | $+\infty=-\frac{1}{0}$ | LA190101 |
| front 1NC, 6A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HAO1 | $+\infty 0$ | LA190135 |
| front 1NO, 6A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HA1O | $+000$ | LA190137 |
| front learly make NO, 3A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HNIOU | $-\infty=\infty$ | LA190138 |
| front 1delayed NC, 3A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HNOIU | $+\infty=0$ | LA190139 |

Electromechanical Contactors Series LA

Power Contactors LA, Size 3, 22-90kW


## Schrack-Info

- Contactors from 22 kW up to $90 \mathrm{~kW}, 3$ - or 4 -pole
- K3-50 up to K3-74, in maximum 4 frontside auxiliary contacts HN or HA as well as 2 "side mounted" auxiliary contacts HB can be snapped on
- K3-50 up to K3-74 with DC-coil, in maximum 3 frontside auxiliary contacts HN or HA as well as 2 "side mounted" auxiliary contacts HB can be snapped on
- K3-90 and K3-115, in maximum 7 frontside auxiliary contacts HN or HA as well as 2 "side mounted" auxiliary contacts HB can be snapped on
- K3-151 and K3-176, in maximum 1 frontside auxiliary contact HKT as well as 2 "side mounted" auxiliary contacts HKA 11 can be snapped on
- 3-pole Contactors K3-50 up to K3-74 suitable for Thermal overload relais of type U3/74
- 3-pole Contactors K3-90 and K3-115 suitable for Thermal overload relais of type U85
- 3-pole Contactors K3-151 and K3-176 suitable for Thermal overload relais of type U180
- 4-pole Contactors are not suitable for Thermal overload relais
- Mouting of K3-50 up to K3-74 on DIN-rail TS35 or mounting plate
- Mouting of K3-90 up to K3-115 on 2 DIN-rails TS35 or mounting plate
- Mouting of K3-151 and K3-176 on mounting plate
- Further accessories find attached


Power Contactors LA, Size 3, 22-90kW
Dimensions


## Circuit Diagrams



Connection Diagrams


Electromechanical Contactors Series LA

Power Contactors LA, Size 3, 22-90kW

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 22kW / 50A AC-3, 110A AC-1, 3-pole |  |  |  |
| Contactor, 3 -pole, $22 \mathrm{~kW} / 50 \mathrm{~A}$ AC3, 110A ACl, 24VAC | K3-50A00 | -000-6) | LA305030 |
| Contactor, 3-pole, 22kW/50A AC3, 110A ACl, 110VAC | K3-50A00 |  | LA305032 |
| Contactor, 3-pole, 22kW/50A AC3, 110A ACl, 230VAC | K3-50A00 | [-000-9, | LA305033 |
| Contactor, 3-pole, 22kW/50A AC3, 110A ACl, 24VDC | K3-50A00= | -800-6 | LA305035 |
| $30 \mathrm{~kW} / 62 \mathrm{~A}$ AC-3, 120A AC-1, 3-pole |  |  |  |
| Contactor, 3-pole, 30kW/62A AC3, 120A ACl, 24VAC | K3-62A00 | - +0000 | LA306230 |
| Contactor, 3-pole, $30 \mathrm{~kW} / 62 \mathrm{~A} \mathrm{AC3}, 120 \mathrm{~A} \mathrm{ACl}, 48 \mathrm{VAC}$ | K3-62A00 |  | LA306231 |
| Contactor, 3-pole, 30kW/62A AC3, 120A ACl, 110VAC | K3-62A00 |  | LA306232 |
| Contactor, 3-pole, 30kW/62A AC3, 120A ACl, 230VAC | K3-62A00 | -000-9, | LA306233 |
| Contactor, 3-pole, 30kW/62A AC3, 120A AC1, 400VAC | K3-62A00 |  | LA306234 |
| Contactor, 3-pole, 30kW/62A AC3, 120A ACl, 24VDC | K3-62A00= | - -6000 | LA306235 |

37 -55kW / 74-115A AC-3, 130-200A AC-1, 3-pole

| Contactor, 3-pole, 37kW/74A AC3, 130A ACl, 110VAC | K3-74A00 |  | LA307432 |
| :---: | :---: | :---: | :---: |
| Contactor, 3-pole, 37kW/74A AC3, 130A AC1, 230VAC | K3-74A00 | -600-6 | LA307433 |
| Contactor, 3 -pole, $37 \mathrm{~kW} / 74 \mathrm{~A}$ AC3, 130A ACl, 400VAC | K3-74A00 |  | LA307434 |
| 45kW/85A AC3, 150A AC1, 3-pole, 230VAC/DC | K3-90A00 | -800-0-0 | LA309033 |
| $45 \mathrm{~kW} / 85 \mathrm{~A} \mathrm{AC3}, \mathrm{150A} \mathrm{ACl}, \mathrm{3-pole}, \mathrm{48VAC}$ | K3-90A00 |  | LA30903E |
| $55 \mathrm{~kW} / 115 \mathrm{~A}$ AC3, 200A AC1, 3-pole, 230VAC/DC | K3-115A00 | -800-90000 | LA311533 |


| 75-90kW / 150-175A AC-3, 230-250A AC-1, 3-pole |  |  |  |
| :--- | :--- | :--- | :--- |
| $75 \mathrm{~kW} / 150 \mathrm{~A} \mathrm{AC3}, 230 \mathrm{~A} \mathrm{ACl}, 3$-pole, 230VAC/DC | K3-151A00 | K3-176A00 | LA31500H |
| $90 \mathrm{~kW} / 175 \mathrm{~A}$ AC3, 250A AC1, 3-pole, 230VAC/DC |  | LA31750H |  |

55-90kW / 115-175A AC-3, 200-250A AC-1, 4-pole

| $55 \mathrm{~kW} / 115 \mathrm{~A} \mathrm{AC3}, 200 \mathrm{~A} \mathrm{ACl}, 4$-pole, 230VAC/DC | K3-116A00-40 | LA311643 |
| :--- | :--- | :--- |
| $75 \mathrm{~kW} / 150 \mathrm{~A} \mathrm{AC3,230A} \mathrm{AC1}, \mathrm{4-pole}, \mathrm{230VAC/DC}$ | K3-151 A00-40 | LA315043 |
| $90 \mathrm{~kW} / 175 \mathrm{~A} \mathrm{AC3}, 250 \mathrm{~A} \mathrm{ACl}, 4$-pole, 230VAC/DC | K3-176A00-40 | LA317543 |

Auxiliary contacts

| front 1NO, 3A (230V AC-15) for LA2, LA3004-LA3115, LA4 | HN10 | -000-6 | LA190100 |
| :---: | :---: | :---: | :---: |
| front 1NC, 3A (230V AC-15) for LA2, LA3004-LA3115, LA4 | HNO1 | -000-6) | LA190101 |
| lateral 1NO+1NC, 3A (230V AC-15) for K3-24 to K3-115 | HB11 |  | LA190134 |
| front 1NC, 6A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HAO1 | - - - - | LA190135 |
| front 1NO, 6A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HA10 | - $-0 \times 0$ | LA190137 |
| front learly make NO, 3A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HNIOU | $+50-6$ | LA190138 |
| front 1 delayed NC, 3A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HNOIU | -000-0, | LA190139 |
| front 2NO+2NC, 3A (230V, AC-15) for K3-116 to K3-316 | HKT22 | $+00-\infty$ | LA190144 |
| lateral 1NO+1NC, 3A (230V, AC-15) for K3-116 to K3-316 | HKAll | - $-0 \times 0$ | LA190145 |
| front 1NO+1NC, 3A (230V, AC-15) for K3-116 to K3-316 | HKT 11 |  | LA190146 |

Power Contactors LA, Size 3, 110-300kW


Schrack-Info

- Contactors from 110 kW up to $300 \mathrm{~kW}, 3$-pole
- K3-210 up to K3-316, in maximum 1 frontside auxiliary contact HKT as well as 2 "side mounted" auxiliary contacts HKA11 can be snapped on
- K3-450A22 and K3-550A22, 1 additional frontside auxiliary contact HKF22 can be snapped on
- K3-210 up to K3-316 suitable forThermal overload relais of type U320 (on request)
- K3-450 and K3-550 suitable for Thermal overload relais of type U800 (on request)
- K3-450 up to K3-550 retrofit with a 4th pole "NP" (neutral conductor)
- Mountable on mounting plate
- Further accessories find attached


Dimensions


## Electromechanical Contactors Series LA

Power Contactors LA, Size 3, 110-300kW
Dimensions


| Type | A | B | C | H | N |
| :--- | :---: | :---: | :---: | :---: | :---: |
| K3-450 | 40 | 10,5 | 4 | 233 | 206 |
| K3-550 | 40 | 12,5 | 6 | 258 | 228 |

Circuit and Connection Diagrams


* HKF22 - standard mounted
** HKF22 - additional

| DESCRIPTION | TYPE NO. | AVAILABLE |
| :--- | :--- | :--- |
| $\mathbf{1 1 0 - 3 0 0 k W} / \mathbf{2 1 0 - 5 5 0 A}$ AC-3, 230-250A AC-1, 3-pole |  | ORDER NO. |
| Contactor, 3pole, 110kW/210A AC3, 350A ACl, 230V AC/DC | K3-210A00 |  |
| Contactor, 3pole, 132kW/260A AC3, 230V AC/DC | K3-260A00 | LA32103H |
| Contactor, 3pole, 160kW/315A AC3, 450A AC1, 230V AC/DC | K3-316A00 | LA32603H |
| Contactor, 3pole,250kW/450A AC3 600A AC1, 2NO+2NC, 230VACDC | K3-450A22 | LA33163H |
| Contactor, 3pole,300kW/550A AC3 760A AC1, 2NO+2NC, 230VACDC | K3-550A22 | LA34500H |

## Auxiliary contacts

| front $1 N O+1 N C, 3 A(230 V, A C-15)$ for K3-116 to K3-316 | HKT11 | LA190146 |
| :--- | :--- | :--- | :--- |
| front 2NO+2NC, 3A (230V, AC-15) for K3-116 to K3-316 | HKT22 | LA 190144 |
| front 2NO+2NC, 3A (230V, AC-15) for K3-450 to K3-550 | HKF22 | LA190147 |
| lateral $1 N O+1 N C, 3 A(230 V, A C-15)$ for K3-116 to K3-316 | HKA11 | LA190145 |

Contactors for Photovoltaic Plants, 1000V DC


## Schrack-Info

- Contactor 30A, 1000VDC DC-1
- For use as a string-switch in closed-circuit principle (in connection with Fire brigade - Emergency OFF - switch)
- In maximum 2 frontside auxiliary contacts HKT as well as 2 "side mounted" auxiliary contacts HKA 11 can be snapped on

K3PV-30


Rules and regulations according
IEC 60947-4-1, EN60947-4-1

1) $>40^{\circ} \mathrm{C} \ldots 1 \% /{ }^{\circ} \mathrm{C}$ reduction ( e.g.: at $60^{\circ} \mathrm{C} 20 \%$ reduction $=24 \mathrm{~A}$ )

## Dimensions



[^4]Electromechanical Contactors Series LA

Contactors for Photovoltaic Plants, 1000V DC
Circuit and Connection Diagram


Contactors for Photovoltaic plants, 1000V DC

| Contactor, 6-pole, 30A DC-1, 1000VDC, 230VAC | K3PV-30 | $-\infty=0$ LA3030D3PV |
| :--- | :--- | :--- |

Auxiliary contacts

| front 2NO+2NC, 3A (230V, AC-15) for K3-116 to K3-316 | HKT22 |  | LA190144 |
| :---: | :---: | :---: | :---: |
| front 1NO+1NC, 3A (230V, AC-15) for K3-116 to K3-316 | HKTII |  | LA190146 |
| lateral 1NO+1NC, 3A (230V, AC-15) for K3-116 to K3-316 | HKAll | -000-0, | LA190145 |

Micro Auxiliary Contactors, Size M

$\square$ Schrack-Info

- Auxiliary contactors 4-pole, 3A AC-15
- Worldwide smallest auxiliary contactor
- Auxiliary contactors not retrofit with additional auxiliary contacts
- Contacts suitable for electronic circuits according to IEC 60947-5-4
- Suitable for safety applications according IEC 60335-1
- Mountable to DIN-rail TS 15 or with adaptor to TS35

LAMH0370

| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | $\begin{gathered} \text { K0-04D } \\ 440 \\ \hline \end{gathered}$ |  |
| :---: | :---: | :---: | :---: |
| Thermal rated current $l_{t+}$ at $40^{\circ} \mathrm{C}$ and 440VAC | (A) | 5 |  |
| Utilization category AC-15 |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ and 230/440VAC | (A) | 3/1 |  |
| Utilization category DC13 ${ }^{11}$ |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ up to 60VDC | (A) | 0,5 |  |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-40 . . .60$ |  |
| Permissible mounting position |  |  |  |
| Rules and regulations according |  | IEC60947-5-1, EN 6 |  |

Rules and regulations according

1) Contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24VDC (Test ratings 17VDC, 5 mA ) Positively guided contacts

Dimensions


Electromechanical Contactor Series LA

Micro Auxiliary Contactors, Size M
Circuit Diagrams
K0-04D40

Connection Diagrams



Mini Auxiliary Contactors, Size 1

$\square$ Schrack-Info

- Auxiliary contactors 4-pole, 3A AC-15
- Auxiliary contactors with additional auxiliary contact HK retrofit
- Contacts suitable for electronic circuits according to IEC 60947-5-4
- Mountable on DIN-rail TS35

|  |  | K1-07 |
| :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Thermal rated current lih at $40^{\circ} \mathrm{C}$ and 440 VAC | (A) | 10 |
| Utilization category AC-15 |  |  |
| Rated operational current le at $40^{\circ} \mathrm{C}$ and $230 / 440 \mathrm{VAC}$ | (A) | $3 / 1.6$ |
| Utilization category DC13 ${ }^{1 /}$ |  |  |
| Rated operational current le at $40^{\circ} \mathrm{C}$ up to $60 / 110 / 220 \mathrm{VDC}$ | (A) | 2 / 0.4 / 0.1 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-40 . . .+60$ |
| Permissible mounting position |  |  |

Rules and regulations according
IEC 60947-5-1, EN 60947-5-1

1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24 VDC (Test ratings 17VDC, 5 mA ), positively guided contacts

Dimensions


Electromechanical Contactor Series LA

- Mini Auxiliary Contractors, Size 1

Circuit Diagrams


Connection Diagrams



Auxiliary Contactors, Size 3, DC Coil


Schrack-Info

- Auxiliary contactors DC operated, 4-pole, 4A AC-15, for electronic circuits
- Coil in energy saving wiring - with reduced power consumption of 2 W (at closed)
- Auxiliary contactors with in maximum 3 additional auxiliary contacts HN retrofit
- Contacts suitable for electronic circuits according to IEC 60947-5-4
- Mountable to DIN-rail TS35

| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | $\begin{gathered} \text { K3-07ND } \\ 690 \end{gathered}$ |  |
| :---: | :---: | :---: | :---: |
| Thermal rated current lth at $40^{\circ} \mathrm{C}$ and 440VAC | (A) | 10 |  |
| Utilization category AC-15 |  |  |  |
| Rated operational current le at $40^{\circ} \mathrm{C}$ and 230/440VAC | (A) | 4 / 1.6 |  |
| Utilization category DC13 ${ }^{\text {1/ }}$ |  |  |  |
| Rated operational current le at $40^{\circ} \mathrm{C}$ up to $60 / 110 / 220$ VDC | (A) | 3.5 / 0.5 / 0.1 |  |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-40 \ldots+60$ |  |
| Permissible mounting position |  |  |  |
| Rules and regulations according |  | IEC 60947-5-1, EN 60947-5-1 |  |
| 1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24VDC (Test ratings 17VDC, 5mA) Positively guided contacts |  |  |  |

## Dimensions



Electromechanical Contactors Series LA

Auxiliary Contactors, Size 3, DC Coil
Circuit Diagrams


Connection Diagrams


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 4A, 4-pole |  |  |  |
| for electronic circuits 4A, 24VDC, 4NO | K3-07ND40= | -000-9, | LA300475N |
| for electronic circuits 4A, 24VDC, 3NO+1NC | K3-07ND31 = |  | LA300485N |
| for electronic circuits 4A, 24VDC, 2NO+2NC | K3-07ND22= | -000-9, | LA300495N |
| for electronic circuits 4A, 24VDC, 4NC | K3-07ND04= | $\begin{array}{rrr} -\infty 0 & 0-\infty \\ \hline \end{array}$ | LA3004A5N |
| Auxiliary contacts |  |  |  |
| front 1NO, 3A (230V AC-15) for LA2, LA3004-LA3115, LA4 | HN10 |  | LA190100 |
| front 1NC, 3A (230V AC-15) for LA2, LA3004-LA3115, LA4 | HNO1 | -50, -10 | LA190101 |
| front learly make NO, 3A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HNIOU | $+\infty=\sigma$ | LA190138 |
| front 1 delayed NC, 3A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HNOIU | $\begin{array}{rrr} \hline-000 & 0-\infty \\ \hline \end{array}$ | LA190139 |

## Capacitor Switching Contactors LA, Size 3



## Schrack-Info

- Contactors for switching of capacitors from 12.5 kVAr up to 100 kVAr
- With included, magnetic uncoupled, Capacitor pre-loading resistors
- K3-18NK.. with one included auxiliary contact, in maximum 1 additional frontside auxiliary contact HN or HA can be snapped on
- K3-24K up to $\mathrm{K} 3-74 \mathrm{~K}$, in maximum 1 frontside auxiliary contact HN or HA as well as 2 "side mounted" auxiliary contacts HB can be snapped on
- K3-90K and K3-115K, in maximum 4 frontside auxiliary contacts HN or HA as well as 2 "side mounted" auxiliary contacts HB can be snapped on
- Mountable on DIN-rail TS35 or mounting plate, mouting of K3-90K and K3-115K on 2 DIN-rails TS35 or mounting plate

|  | K3-18NK | K3-24K | K3-32K | K3-50K | K3-62K | K3-74K | K3-90K | K3-115K |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathbf{i}} \quad$ (VAC) | 690 |  |  |  |  |  |  |  |
| Utilization category AC-1 |  |  |  |  |  |  |  |  |
| Rated operational current $l_{\text {th }}$ at $50^{\circ} \mathrm{C}$ and 690VAC (A) | 32 | 45 | 60 | 100 | 110 | 120 | 155 | 190 |
| Utilization category AC-6b |  |  |  |  |  |  |  |  |
| Rated operational power at 400VAC (kVAr) | 0... 12.5 | 10... 20 | 10... 25 | 20... 33.3 | 20... 50 | 20... 75 | $33 \ldots 80$ | $33 \ldots 100$ |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $50^{\circ}$ and 380-400VAC (A) | 0... 18 | 14.. 28 | 14... 36 | $30 . . .48$ | $30 \ldots 72$ | $30 . .108$ | 50... 115 | 50.. 144 |
| Ambient temperature (operation) ( ${ }^{\circ} \mathrm{C}$ ) | $-40 \ldots+60$ |  |  |  |  |  |  |  |
| Permissible mounting position |  |  |  |  |  |  |  |  |
| Rules and regulations according | IEC 60947-4-1 / EN60947-4-1 |  |  |  |  |  |  |  |

Electromechanical Contactors Series LA

Capacitor Switching Contactors LA, Size 3
Dimensions


Schematic Diagram


Auxiliary contacts installed:

Capacitor Switching Contactors LA, Size 3

- Connection Diagrams


Built-in auxiliary contacts:

1) 1 NO
2) 1 NC
3) no contacts

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 12.5kVAr |  |  |  |
| 12.5kVAr 230VAC / 1 NO | K3-18NK10 | [000-6, | LA3K1813N |
| 12.5kVAr 230VAC / 1 NC | K3-18NKO1 | +00\%-9, | LA3K1823N |
| 20kVAr |  |  |  |
| 20kVAr 230VAC | K3-24K00 | -80\%-9, | LA3K2433 |
| 25kVAr |  |  |  |
| 25kVAr 230VAC | K3-32K00 |  | LA3K3233 |
| 33.3 kVAr |  |  |  |
| 33.3kVAr 230VAC | K3-50K00 | -800-6 | LA3K5033 |
| 50kVAr |  |  |  |
| 50kVAr 230VAC | K3-62K00 | -00\%-6 | LA3K6233 |
| 75kVAr |  |  |  |
| 75kVAr 230VAC | K3-74K00 | -000-\% | LA3K7433 |
| 80kVAr |  |  |  |
| 80kVAr 230VAC | K3-90K00 | - -50, - - | LA3K9033 |
| 100kVAr |  |  |  |
| 100kVAr 230VAC | K3-115K00 |  | LA3K1A33 |
| Auxiliary contacts |  |  |  |
| front 1NO, 3A (230V AC-15) for LA2, LA3004-LA3115, LA4 | HN1O | [-000-9, | LA190100 |
| front 1NC, 3A (230V AC-15) for LA2, LA3004-LA3115, LA4 | HNO1 | -000-9, | LA190101 |
| lateral 1NO+1NC, 3A (230V AC-15) for K3-24 to K3-115 | HB11 | $+800 \div$ | LA190134 |
| front 1NC, 6A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HAOI | -000-9, | LA 190135 |
| front 1NO, 6A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HA10 | $\begin{array}{rr} -\infty & -\infty \\ \hline \end{array}$ | LA190137 |
| front learly make NO, 3A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HN10U | -000-0, | LA190138 |
| front 1delayed NC, 3A (230V, AC-15) for K2, K3-07 to K3-115, K4 | HNOIU | -600-6 | LA 190139 |

## Electromechanical Contactors Series LA

## Sidemounted Auxiliary Contacts for Contactors K3-24 to K3-115

- Schrack-Info
- Auxiliary contacts "side mounted" HB ...
- Mounting possible at left and right side of contactor
- Correct terminal designation of the auxiliary contacts depends on the mounting-side at contactor
- Auxiliary contact HB are suitable for electronic circuits according to IEC 60947-5-4



Circuit and Connection Diagram


Front- and Sidemounted Auxiliary Contacts for Contactors K3-116 to K3-316


## - Schrack-Info

- Auxiliary contacts "frontside" HKT and "side mounted" HKA can be snapped on
- Correct terminal designation of the auxiliary contacts "side mounted" depends on the mounting-side at contactor

|  |  | Auxiliary contacts (front) HKT | Auxiliary contacts (side) HKA |
| :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |  |
| Thermal rated current $\mathrm{l}_{\text {th }}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 10 | 10 |
| Utilization category AC-15 |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ and $230 / 440 \mathrm{VAC}$ | (A) | $3 / 1.5$ | $3 / 1.6$ |
| Utilization category DC13) |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ up to $60 / 110 / 220 \mathrm{VDC}$ | (A) | - / 0,5 / 0.2 | - / $0.5 / 0.3$ |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | -40 ... +60 |  |
| Rules and regulations according |  | IEC 60947 | 247-5-1 |

1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24 VDC (Test ratings 17VDC, 5 mA ), positively guided contacts

## Dimensions



Dimensions


## Electromechanical Contactors Series LA

Front- and Sidemounted Auxiliary Contacts for Contactors K3-116 to K3-316
Circuit Diagrams


1) right mounted 2) left mounted

Connection Diagrams


1) right mounted
2) left mounted

| DESCRIPTION | TYPE NO. AVAILABLE | ORDER NO. |  |
| :--- | :--- | :--- | :--- |
| $\mathbf{3 A}, \mathbf{A C}-15$ |  |  |  |
| front $1 \mathrm{NO}+1 \mathrm{NC}, 3 \mathrm{~A}(230 \mathrm{~V}, \mathrm{AC}-15)$ for K3-116 to K3-316 | HKT11 |  |  |
| front 2NO+2NC, 3A (230V, AC-15) for K3-116 to K3-316 | HKT22 | HKAll | LA190146 |
| lateral 1NO+1NC, 3A (230V, AC-15) for K3-116 to K3-316 | LA 190144 |  |  |

- Frontmounted Auxiliary Contacts for Contactors K3-450 to K3-550

$\square$ Schrack-Info
- Auxiliary contacts "frontside" HKF22 ...
- For extension of contactors K3-450 and K3-550 with integrated $2 \mathrm{NO}+2$ NC auxiliary contacts to $4 N O+4 N C$

|  |  | Auxiliary contacts (front) HKF |
| :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Thermal rated current $\mathrm{l}_{t+}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 16 |
| Utilization category AC-15 |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ and $230 / 440 \mathrm{VAC}$ | (A) | $3 / 1.6$ |
| Utilization category DC13) |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ up to $60 / 110 / 220 \mathrm{VDC}$ | (A) | - / 0.5 / 0.2 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | -40 ... +60 |
| Rules and regulations according |  | IEC 60947-5-1, EN 60947-5-1 |

1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24VDC (Test ratings 17VDC, 5mA), positively guided contacts

Circuit and Connection Diagram


| DESCRIPTION | TYPE NO. | AVAILABLE |
| :--- | :--- | :---: |
| $\mathbf{3 A}, \mathbf{A C}-15$ |  |  |
| front $2 N O+2 N C, 3 A(230 V, A C-15)$ for K3- 450 to $K 3-550$ | HKF22 |  |

3A, AC- 15

## Electromechanical Contactors Series LA

Direct on Line Starters D.O.L. with Selector Switch


## Schrack-Info

- Plastic-housings IP65, with selector switch Man-0-Auto, reset-button for thermal overload relais and included contactor K3
- Thermal overload relais $U 12 / 16$..K3 has to be ordered seperately (range according rated current of motor)
- Available for motor powers of up to 4 kW , up to 7.5 kW and up to 11 kW AC-3
- Cable entry cut-out for one cable gland M20x1.5 at upper side of housing, diameter $=20.4 \mathrm{~mm}$
- Cable entry cut-outs at rear side of housing, $4 \times$ diameter $=23 \mathrm{~mm}$


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| DOL-starter $4 \mathrm{~kW} / 400 \mathrm{~V}$ AC3 (for U12/16E...K3) | P1-W10 | P1-W18 | P1-W22 |
| DOL-starter $7.5 \mathrm{~kW} / 400 \mathrm{~V}$ AC3 (for U12/16E...K3) | LA003115K3 |  |  |
| DOL-starter $11 \mathrm{~kW} / 400 \mathrm{~V}$ AC3 (for U12/16E...K3) | LA003116K3 |  |  |

LSD, LSS Contactors for Switching Motors, 3-pole, Size 00


LSDD0723

Schrack-Info

- Contactors from 3 kW up to $5.5 \mathrm{~kW}, 3$-pole with integrated auxiliary contact NC or NO
- Contactors LSDD with one included auxiliary contact NO retrofit with one additional auxiliary contact 1-pole LSZD05.. or 4-pole LSZDD2..
- Contactors LSDD with one included auxiliary contact NC retrofit with one additional auxiliary contact 1-pole LSZD05.. or 4-pole LSZDH5..
- Contactors LSSD can not be equipped by additional auxiliary contacts
- Contactors LSSD with reduced coil power consumption of 2,3W and coil voltage 17-30VDC, specially suitable for control by PLC
- Fitting surge supressors LSZD0001 up to LSZD0004
- Contactors LSDD and LSSD are suitable for use of Thermal overload relais type LSTD
- All auxiliary contacts are suitable for electronic circuits according EN 60947-5-4 (17VDC, 1mA)
- Coil and main contacts are not exchangeable
- Contactors LSDD and LSSD can be fitted by solder pin adaptor LSZDD002 for mounting to printed boards
- Mountable to DIN-rail TS35 or mounting plate
- Further accessories find attached

|  |  | $\begin{aligned} & \text { LSDD07 } \\ & \text { LSSDO7 } \end{aligned}$ | $\begin{aligned} & \text { LSDD09 } \\ & \text { LSSD09 } \end{aligned}$ | $\begin{aligned} & \text { LSDD12 } \\ & \text { LSSD12 } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) |  | 690 |  |
| Utilization category AC-1 $\cos \varphi=1$ |  |  |  |  |
| Rated power at 400VAC | (kW) | 11 | 13 | 13 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}=\mathrm{I}_{\text {th }}$ at $40^{\circ} \mathrm{C}$ and 690 VAC | (A) | 18 | 22 | 22 |
| Utilization category AC-2 and AC-3 |  |  |  |  |
| Rated power at 400VAC | (kW) | 3 | 4 | 5,5 |
| Rated operational current $I_{\text {e }}$ at $380-440 \mathrm{VAC}$ | (A) | 7 | 9 | 12 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ |  | $-25 \ldots+60$ |  |
| Permissible mounting position |  |  |  |  |
| Rules and regulations according |  | IEC 60947-4-1, EN60947-4-1 |  |  |
|  |  | Included Auxiliary contacts |  |  |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |  |  |
| Thermal rated current $l_{\text {th }}$ at $40^{\circ} \mathrm{C}$ and 690 VAC | (A) | 10 |  |  |
| Utilization category AC-15 |  |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ and $230 / 400$ VAC | (A) | 6/3 |  |  |
| Utilization category DC13 1) |  |  |  |  |
| Rated operational current $I_{\text {e }}$ at $40^{\circ} \mathrm{C}$ up to $60 / 110 / 220 \mathrm{VDC}$ | (A) | 2/1/0,3 |  |  |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-25 \ldots+60$ |  |  |
| Rules and regulations according |  | IEC 60947-5-1, EN 60947-5-1 |  |  |
| 1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24VDC (Test ratings 17VDC, 1 mA ). Positively guided contacts. |  |  |  |  |

## Electromechanical Contactors Series ALEA LS

LSD, LSS Contactors for Switching Motors, 3-pole, Size 00
Dimensions


Screw terminals with surge suppressor, auxiliary contact block and mounted thermal overload relay LSTD.
Lateral distance to grounded components $=6 \mathrm{~mm}$.
2) Auxiliary contact block
3) Surge suppressor
4) Drilling pattern
5) Auxiliary contact block 1-pole

## Dimensions


3) Surge suppressor
4) Drilling pattern

## Circuit Diagrams

LSDD/LSSD

Connection Diagrams


LSD, LSS Contactors for Switching Motors, 3-pole, Size 00

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Size 00 - type LSDD - 7A |  |  |  |
| Contactor 3kW / 7A AC-3, 24VAC, 50 Hz , with 1 NO , size 00 | LSDD |  | LSDD0710 |
| Contactor 3kW / 7A AC-3, 24VAC, 50 Hz , with 1 NC , size 00 | LSDD | - $+0 \times 0$ | LSDD0720 |
| Contactor 3kW / 7A AC-3, 110VAC, 50 Hz , with 1 NO , size 00 | LSDD |  | LSDD0712 |
| Contactor 3kW / 7A AC-3, 110VAC, 50 Hz , with 1 NC , size 00 | LSDD | -mon | LSDD0722 |
| Contactor 3kW / 7A AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, with 1 NO , size 00 | LSDD |  | LSDD0713 |
| Contactor 3kW / 7A AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, with 1 NC , size 00 | LSDD |  | LSDD0723 |
| Contactor 3kW / 7A AC-3, 24VDC, with 1 NO, size 00 | LSDD | - -1000 | LSDD0715 |
| Contactor 3kW / 7A AC-3, 24VDC, with 1 NC, size 00 | LSDD | $+\infty 0$ | LSDD0725 |
| Size 00 - type LSDD - 9A |  |  |  |
| Contactor $4 \mathrm{~kW} / 9 \mathrm{~A} \mathrm{AC}-3,24 \mathrm{VAC}, 50 \mathrm{~Hz}$, with 1 NO , size 00 | LSDD | -600-6 | LSDD0910 |
| Contactor $4 \mathrm{~kW} / 9 \mathrm{~A}$ AC-3, $24 \mathrm{VAC}, 50 \mathrm{~Hz}$, with 1 NC , size 00 | LSDD | $\underline{-\infty} 0$ | LSDD0920 |
| Contactor 4kW / 9A AC-3, 110VAC, 50 Hz , with 1 NO , size 00 | LSDD | -000-0, | LSDD0912 |
| Contactor 4kW / 9A AC-3, 110VAC, 50 Hz , with 1 NC , size 00 | LSDD |  | LSDD0922 |
| Contactor 4kW / 9A AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, with 1 NO , size 00 | LSDD |  | LSDD0913 |
| Contactor 4kW / 9A AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, with 1 NC , size 00 | LSDD |  | LSDD0923 |
| Contactor 4kW / 9A AC-3, 24VDC, with 1 NO, size 00 | LSDD | $\begin{array}{r} -600 \\ \hline-8 \\ \hline \end{array}$ | LSDD0915 |
| Contactor 4kW / 9A AC-3, 24VDC, with 1 NC, size 00 | LSDD | - -0000 | LSDD0925 |
| Size 00 - type LSDD - 12A |  |  |  |
| Contactor 5.5kW / 12A AC-3, 24VAC, 50 Hz , with 1 NO , size 00 | LSDD |  | LSDD 1210 |
| Contactor 5.5kW / 12A AC-3, 24VAC, 50 Hz , with 1 NC , size 00 | LSDD | - -1000 | LSDD1220 |
| Contactor $5.5 \mathrm{~kW} / 12 \mathrm{~A} \mathrm{AC}-3,110 \mathrm{VAC}, 50 \mathrm{~Hz}$, with 1 NO , size 00 | LSDD | - $-0 \times 0$ | LSDD1212 |
| Contactor $5.5 \mathrm{~kW} / 12 \mathrm{~A} \mathrm{AC}-3,110 \mathrm{VAC}, 50 \mathrm{~Hz}$, with 1 NC , size 00 | LSDD | - $-6-10$ | LSDD 1222 |
| Contactor 5.5kW/12A AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, with 1 NO , size 00 | LSDD | $0 \times 0$ | LSDD 1213 |
| Contactor $5.5 \mathrm{~kW} / 12 \mathrm{~A} \mathrm{AC}-3,230 \mathrm{VAC}, 50 / 60 \mathrm{~Hz}$, with 1 NC , size 00 | LSDD | - -1000 | LSDD1223 |
| Contactor $5.5 \mathrm{~kW} / 12 \mathrm{~A} \mathrm{AC}-3,24 \mathrm{VDC}$, with 1 NO , size 00 | LSDD | - -1000 | LSDD1215 |
| Contactor 5.5kW / 12A AC-3, 24VDC, with 1 NC, size 00 | LSDD | $+00-\infty$ | LSDD1225 |
| Size 00 - type LSSD for PLC - 7A |  |  |  |
| $3 \mathrm{~kW} / 400 \mathrm{~V}, 1 \mathrm{NO}, 17-30 \mathrm{VDC}$ for PLC, size 00 | LSSD | - -1000 | LSSD071G |
| $3 \mathrm{~kW} / 400 \mathrm{~V}, 1 \mathrm{NC}, 17-30 \mathrm{VDC}$ for PLC, size 00 | LSSD |  | LSSD072G |
| Size 00 - type LSSD for PLC - 9A |  |  |  |
| $4 \mathrm{~kW} / 400 \mathrm{~V}, 1 \mathrm{NO}, 17-30 \mathrm{VDC}$ for PLC, size 00 | LSSD |  | LSSD091G |
| 4kW/400V, 1 NC, 17-30VDC for PLC, size 00 | LSSD | - $-\infty$ | LSSD092G |
| Size 00 - type LSSD for PLC - 12A |  |  |  |
| $5.5 \mathrm{~kW} / 400 \mathrm{~V}, 1 \mathrm{NO}, 17-30 \mathrm{VDC}$ for PLC, size 00 | LSSD | $\begin{array}{lll} \hline-\infty & -\infty \\ \hline \end{array}$ | LSSD121G |
| $5.5 \mathrm{~kW} / 400 \mathrm{~V}, 1 \mathrm{NC}, 17-30 \mathrm{VDC}$ for PLC, size 00 | LSSD | $0 \times 0$ | LSSD122G |
| Auxiliary contacts |  |  |  |
| 1 NC size 00, DIN 50005, wiring from bottom | LSZD |  | LSZD0501 |
| 1NO size 00, DIN 50005, wiring from bottom | LSZD | - -1000 | LSZD0510 |
| 1NC size 00, DIN 50012 | LSZD | $+000-\infty$ | LSZDD201 |
| 1NO+2NC size 00, DIN 50012 | LSZD | - -1000 | LSZDD212 |
| 1NO+3NC size 00, DIN 50012 | LSZD | $\underline{-60} 0$ | LSZDD213 |
| 2NO+2NC size 00, DIN 50012 | LSZD | $+\infty=0$ | LSZDD222 |
| 2NO+2NC size 00, DIN 50005 | LSZD | - -00000 | LSZDH522 |
| 3NO+1NC size 00, DIN 50005 | LSZD | $+\infty=\infty$ | LSZDH531 |
| 4NO size 00, DIN 50005 | LSZD | - $-0 \times 0$ | LSZDH540 |

Electromechanical Contactors Series ALEA LS

LSD, LSS Contactors for Switching Motors, 3-pole, Size 0


Schrack-Info

- Contactors from 4 kW up to $11 \mathrm{~kW}, 3$-pole
- Contactors LSDO retrofit in maximum with 6 auxiliary contacts (four 1-pole auxiliary contacts LSZOD0.., LSZOD9.. or one 4-pole LSZOD 1.., as well as one "side mounted" LSZOD711) but in maximum 4 NC
- Contactors LSSO retrofit in maximum with 2 auxiliary contacts (two 1 -pole auxiliary contacts LSZODO.. or LSZOD9..)
- Contactors LSSO with reduced coil power consumption of $4,2 \mathrm{~W}$ and coil voltage of 17-30VDC, suitable for control by PLC
- All auxiliary contacts are suitable for electronic circuits according EN 60947-5-4 (17VDC, 1mA)
- Fitting surge supressors LSZD0005, LSZD0006, LSZ00001 up to LSZ00003
- Contactors LS. 0 are suitable for use of Thermal overload relais of type LSTO
- Coil and main contacts are exchangeable - on request
- Mountable to DIN-rail TS35 or mounting plate
- Further accessories find attached

|  |  | LSD009 | LSDO12 / LSSO12 | LSDO17 / LSSO17 | LSDO25 / LSSO25 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |  |  |  |
| Utilization category AC-1 $\cos \varphi=1$ |  |  |  |  |  |
| Rated power at 400VAC | (kW) | 23 |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}=\mathrm{I}_{\mathrm{l}}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 40 |  |  |  |
| Utilization category AC-2 and AC-3 |  |  |  |  |  |
| Rated power at 400VAC | (kW) | 4 | 5,5 | 7,5 | 11 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $380-440 \mathrm{VAC}$ | (A) | 9 | 12 | 17 | 25 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-25 \ldots+60$ |  |  |  |
| Permissible mounting position |  |  |  |  |  |
| Rules and regulations according |  | IEC 60947-4-1, EN60947-4-1 |  |  |  |

LSD, LSS Contactors for Switching Motors, 3-pole, Size 0
Dimensions


Screw terminals with surge suppressor, auxiliary contact block and mounted thermal overload relay. Lateral distance to grounded components $=6 \mathrm{~mm}$.
$a=3 \mathrm{~mm}$ at $<240 \mathrm{~V} ; \mathrm{a}=7 \mathrm{~mm}$ at $>240 \mathrm{~V}$
$b=D C 10 \mathrm{~mm}$ deeper than $A C$

1) Auxiliary contact block, laterally mountable
2) Auxiliary contact block, mountable on the front, 1 and 4 pole
3) Surge suppressor
4) Drilling pattern

## Circuit and Connection Diagram



Terminal designations according to EN 50012

Electromechanical Contactors Series ALEA LS

LSD, LSS Contactors for Switching Motors, 3-pole, Size 0

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Size 0 - type LSDO-9A |  |  |  |
| Contactor $4 \mathrm{~kW} / 9 \mathrm{~A} \mathrm{AC}-3,24 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 0 | LSDO | [000-980 | LSD00930 |
| Contactor 4kW / 9A AC-3, 24VDC, size 0 | LSDO | -000-9, | LSD00935 |
| Contactor 4kW / 9A AC-3, 110VAC, 50 Hz , size 0 | LSDO | [-000-8, | LSD00932 |
| Contactor 4kW / 9A AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, size 0 | LSDO | - $\times$ - | LSD00933 |
| Size 0-type LSDO-12A |  |  |  |
| Contactor 5.5kW / 12A AC-3, 24VDC, size 0 | LSDO | - -2000 | LSD01235 |
| Contactor 5.5kW / 12A AC-3, 24VAC, 50 Hz , size 0 | LSDO | -80000] | LSD01230 |
| Contactor $5.5 \mathrm{~kW} / 12 \mathrm{AAC}-3,110 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 0 | LSDO | [-000-6 | LSD01232 |
| Contactor $5.5 \mathrm{~kW} / 12 \mathrm{~A}$ AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, size 0 | LSDO | -000-9, | LSD01233 |
| Size 0 - type LSDO-17A |  |  |  |
| Contactor $7.5 \mathrm{~kW} / 17 \mathrm{~A} \mathrm{AC}-3,24 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 0 | LSDO |  | LSD01730 |
| Contactor $7.5 \mathrm{~kW} / 17 \mathrm{~A} \mathrm{AC}-3,24 \mathrm{VDC}$, size 0 | LSDO |  | LSD01735 |
| Contactor $7.5 \mathrm{~kW} / 17 \mathrm{AAC}-3,110 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 0 | LSDO | [-80-8, | LSD01732 |
| Contactor 7.5kW / 17A AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, size 0 | LSDO | - -6000 | LSD01733 |
| Contactor $7.5 \mathrm{~kW} / 17 \mathrm{~A} \mathrm{AC}-3,400 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 0 | LSDO | -00000, | LSD01734 |
| Size 0 - type LSDO-25A |  |  |  |
| Contactor $11 \mathrm{~kW} / 25 \mathrm{~A} \mathrm{AC}-3,24 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 0 | LSDO | - -20008 | LSD02530 |
| Contactor $11 \mathrm{~kW} / 25 \mathrm{~A}$ AC-3, 24VDC, size 0 | LSDO |  | LSD02535 |
| Contactor $11 \mathrm{~kW} / 25 \mathrm{~A}$ AC-3, 110VAC, 50 Hz , size 0 | LSDO | -000-0, | LSD02532 |
| Contactor $11 \mathrm{~kW} / 25 \mathrm{~A}$ AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, size 0 | LSDO | - +000 | LSD02533 |
| Size 0-type LSSO for PLC - 12A |  |  |  |
| Contactor 5.5kW, AC-3, 17-30VDC, for PLC, size 0 | LSSO | - $+0 \times 0$ | LSSO123H |
| Size 0 - type LSSO for PLC - 17A |  |  |  |
| Contactor 7.5kW, AC-3, 17-30VDC, for PLC, size 0 | LSSO | -80\%-9 | LSS0173H |
| Size 0-type LSSO for PLC - 25A |  |  |  |
| Contactor 11.0kW, AC-3, 17-30VDC, for PLC, size 0 | LSSO |  | LSS0253H |
| Auxiliary contacts |  |  |  |
| Auxiliary contact block for size 0-12, 1NC | LSZO | $+50$ | LSZ0D001 |
| Auxiliary contact block for size 0-12, 1NO | LSZO |  | LSZOD010 |
| Auxiliary contact block for size 0-12,1NO + 3 NC | LSZO | - $-\times-6$ | LSZOD113 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50012 | LSZO | [-80-9, | LSZOD 122 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50005 | LSZO | -700-6-9, | LSZOD 122F |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50012 | LSZO | $+000-6$ | LSZOD131 |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50005 | LSZO | -5000 | LSZOD131F |
| Auxiliary contact block for size 0-12, 4NO, DIN EN 50005 | LSZO | [-000-9, | LSZOD140F |
| Auxiliary contact block for size $0-12,1 \mathrm{NO}+1 \mathrm{NC}$, 1. position | LSZO | $+\infty=\infty$ | LSZ0D711 |
| Auxiliary contact block for size 0-12, 1NC, delayed | LSZO |  | LSZ0D901 |
| Auxiliary contact block for size 0-12, 1NO, delayed | LSZO |  | LSZ0D910 |

ISD Contactors for Switching Motors, 3-pole, Size 2


## $\square$ Schrack-Info

- Contactors from 15 kW up to $22 \mathrm{~kW}, 3$-pole
- Contactors LSD2 can be fitted in maximum with 6 auxiliary contacts (four 1-pole auxiliary contacts LSZODO.., LSZOD9.. or one 4-pole LSZOD 1.., as well as one "side mounted" LSZOD711) but in maximum 4 NC
- All auxiliary contacts are suitable for electronic circuits according EN 60947-5-4 (17VDC, 1 mA )
- Fitting surge supressors LSZ00001, LSZ00002 or LSZ20001
- Contactors LSD2 are suitable for use of Thermal overload relais of type LST2
- Coil and main contacts are exchangeable - on request
- Mountable to DIN-rail TS35 or mounting plate
- Further accessories find attached

|  |  | LSD232 | LSD240 | LSD250 |
| :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathbf{i}}$ | (VAC) | 690 |  |  |
| Utilization category AC-1 $\cos \varphi=1$ |  |  |  |  |
| Rated power at 400VAC | (kW) | $31 \quad 38$ |  | 38 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}=\mathrm{I}_{\text {th }}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 50 | 60 | 60 |
| Utilization category AC-2 and AC-3 |  |  |  |  |
| Rated power at 400VAC | (kW) | 15 | 18,5 | 22 |
| Rated operational current $I_{e}$ at 500/690VAC | (A) | $32 / 20$ | 40/24 | 50/24 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-25 \ldots+60$ |  |  |
| Permissible mounting position |  |  |  |  |
| Rules and regulations according |  | IEC 60947-4-1, EN60947-4-1 |  |  |

## Dimensions



[^5]Electromechanical Contactors Series ALEA LS

- LSD Contactors for Switching Motors, 3-pole, Size 2

Circuit and Connection Diagram


Terminal designations according to EN 50012

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Size 2 - type LSD2-32A |  |  |  |
| Contactor 15kW / 32A AC-3 24VAC, 50 Hz , size 2 | LSD2 | -000000 | LSD23230 |
| Contactor 15kW / 32A AC-3, 24VDC, size 2 | LSD2 | - -1000 | LSD23235 |
| Contactor 15kW / 32A AC-3 110VAC, 50 Hz , size 2 | LSD2 |  | LSD23232 |
| Contactor 15kW / 32A AC-3 230VAC, $50 / 60 \mathrm{~Hz}$, size 2 | LSD2 | - +0000 | LSD23233 |
| Size 2 - type LSD2-40A |  |  |  |
| Contactor 18,5kW / 40A AC-3, 24VAC, 50Hz, size 2 | LSD2 | -600-9, | LSD24030 |
| Contactor 18,5kW / 40A AC-3, 24VDC, size 2 | LSD2 | -000-9, | LSD24035 |
| Contactor 18,5kW / 40A AC-3, 110VAC, 50 Hz , size 2 | LSD2 | $+\infty 0=0$ | LSD24032 |
| Contactor 18,5kW / 40A AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, size 2 | LSD2 | -00\%-8) | LSD24033 |

Size 2 - type LSD2-50A

| Contactor 22kW / 50A AC-3, 24VAC, 50Hz, size 2 | LSD2 | [-000-9, | LSD25030 |
| :---: | :---: | :---: | :---: |
| Contactor 22kW / 50A AC-3, 24VDC, size 2 | LSD2 |  | LSD25035 |
| Contactor $22 \mathrm{~kW} / 50 \mathrm{~A}$ AC-3, $110 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 2 | LSD2 | [-000.0] | LSD25032 |
| Contactor 22kW / 50A AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, size 2 | LSD2 | - +00006 | LSD25033 |
| Auxiliary contacts |  |  |  |
| Auxiliary contact block for size 0-12, 1NC | LSZO | - -6000 | LSZ0D001 |
| Auxiliary contact block for size 0-12, 1NO | LSZO | -000-0, | LSZ0D010 |
| Auxiliary contact block for size 0-12, 1NO + 3NC | LSZO |  | LSZOD113 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50012 | LSZO | [-000, | LSZOD122 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50005 | LSZO | $\begin{array}{rrr} \hline-\infty 0 & 0-\infty \\ \hline \end{array}$ | LSZOD122F |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50012 | LSZO | - $-0 \times 0$ | LSZOD 131 |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50005 | LSZO | $+\infty=-\infty$ | LSZ0D131F |
| Auxiliary contact block for size 0-12, 4NO, DIN EN 50005 | LSZO | $+00 \div 0$ | LSZOD140F |
| Auxiliary contact block for size 0-12, 1NO + 1NC, 1. position | LSZO | - -1000 | LSZ0D711 |
| Auxiliary contact block for size 0-12, 1NC, delayed | LSZO |  | LSZ0D901 |
| Auxiliary contact block for size 0-12, 1NO, delayed | LSZO |  | LSZOD910 |

LLD Contactors for Switching Motors, 3-pole, Size 3


Schrack-Info

- Contactors from 30 kW up to $45 \mathrm{~kW}, 3$-pole
- Contactors LSD3 can be fitted in maximum with 8 auxiliary contacts (four 1-pole auxiliary contacts LSZOD0.., LSZOD9.. or one 4-pole LSZOD 1.., as well as 2 "side mounted" auxiliary contacts LSZOD711 or LSZ3D811) but in maximum 4 NC
- All auxiliary contacts are suitable for electronic circuits according EN 60947-5-4 (17VDC, 1 mA )
- Fitting surge supressors LSZ00001, LSZ00002 or LSZ20001
- Contactors LSD3 are suitable for use of Thermal overload relais of type LST3
- Coil and main contacts are exchangeable - on request
- Mountable to high DIN-rail TH35, TH75 or mounting plate
- Further accessories find attached

|  |  | LSD363 | LSD380 | LSD395 |
| :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathrm{i}}$ | (VAC) | 690 |  |  |
| Utilization category AC-1 $\cos \varphi=1$ |  |  |  |  |
| Rated power at 400VAC | (kW) | 59 | 66 | 66 |
| Rated operational current $I_{e}=I_{\text {th }}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 100 | 120 | 120 |
| Utilization category AC-2 and AC-3 |  |  |  |  |
| Rated power at 400VAC | (kW) | 30 | 37 | 45 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at 500/690VAC | (A) | 65/47 | 80/58 | 95/58 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-25 \ldots+60$ |  |  |
| Permissible mounting position |  |  |  |  |
| Rules and regulations according |  | IEC 60947-4-1, EN60947-4-1 |  |  |

## Electromechanical Contactors Series ALEA LS

## LSD Contactors for Switching Motors, 3-pole, Size 3

Dimensions


Screw terminals with surge suppressor, auxiliary contact block and mounted thermal overload relay.
$\mathrm{a}=0 \mathrm{~mm}$ with varistor $<240 \mathrm{~V}$, diode assembly
$a=3.5 \mathrm{~mm}$ with varistor and $>240 \mathrm{~V}$
$a=17 \mathrm{~mm}$ with RC element
$b=D C 13 \mathrm{~mm}$ deeper than $A C$

1) Auxiliary contact block, laterally mountable
2) Auxiliary contact block, mountable on the front, 1-and 4-pole, same dimensions for versions with screw or Cage Clamp terminals
3) Surge suppressor
4) Drilling pattern
5) For mounting on TH 35 standard mounting rail according to EN 60715 ( 15 mm deep) or TH 75 standard mounting rail according to EN 60715 6) Allen screw 4 mm

## Circuit and Connection Diagram



[^6]LSD Contactors for Switching Motors, 3-pole, Size 3

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Size 3 - type LSD3-65A |  |  |  |
| Contactor 30kW / 65A AC-3, 24VAC, 50Hz, size 3 | LSD3 |  | LSD36530 |
| Contactor 30kW / 65A AC-3, 24VDC, size 3 | LSD3 |  | LSD36535 |
| Contactor 30kW / 65A AC-3, 110VAC, 50 Hz , size 3 | LSD3 | -000-7 | LSD36532 |
| Contactor 30kW / 65A AC-3, 230VAC, $50 / 60 \mathrm{~Hz}$, size 3 | LSD3 | -000-m | LSD36533 |
| Contactor 30kW/65A AC-3, w. $2 \mathrm{~N} / \mathrm{O}+2 \mathrm{NC}, 230 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 3 | LSD3 | $\begin{array}{lll} \hline-\infty 0 & 0-\infty \\ \hline \end{array}$ | LSD36553 |

Size 3 - type LSD3 - 80A

| Contactor $37 \mathrm{~kW} / 80 \mathrm{~A}$ AC-3, $24 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 3 | LSD3 |  | LSD38030 |
| :---: | :---: | :---: | :---: |
| Contactor 37kW / 80A AC-3, 24VDC, size 3 | LSD3 | - -0000 | LSD38035 |
| Contactor $37 \mathrm{~kW} / 80 \mathrm{~A}$ AC-3, with $2 \mathrm{NO}+2 \mathrm{NC}, 24 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 3 | LSD3 |  | LSD38050 |
| Contactor 37kW / 80A AC-3, I10VAC, 50Hz, size 3 | LSD3 | $+\infty 0$ | LSD38032 |
| Contactor 37kW/80A AC-3, with 2 NO+2 NC, I10VAC, 503 | LSD3 |  | LSD38052 |
| Contactor 37kW / 80A AC-3, 230VAC, 50/60Hz, size 3 | LSD3 | $+\infty=0$ | LSD38033 |
| Size 3 - type LSD3-95A |  |  |  |
| Contactor 45kW / 95A AC-3, 24VAC, 50Hz, size 3 | LSD3 | - 700008 | LSD39530 |
| Contactor 45kW / 95A AC-3, 24VDC, size 3 | LSD3 | [000-9, | LSD39535 |
| Contactor 45kW / 95A AC-3, 230VAC, 50/60Hz, size 3 | LSD3 | - +000 | LSD39533 |
| Contactor 45kW/95A AC-3, with $2 \mathrm{NO}+2 \mathrm{NC}, 230 \mathrm{VAC}, 503$ | LSD3 | $+\infty=0$ | LSD39553 |
| Auxiliary contacts |  |  |  |
| Auxiliary contact block for size 0-12, 1NC | LSZO | [000-6, | LSZ0D001 |
| Auxiliary contact block for size 0-12, 1NO | LSZO | $+\infty=-\infty$ | LSZ0D010 |
| Auxiliary contact block for size 0-12, 1 NO + 3NC | LSZO | - $-0 \times 0$ | LSZOD113 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50012 | LSZO | $+\infty 0$ | LSZOD 122 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50005 | LSZO | [000-6) | LSZOD122F |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50012 | LSZO | $\begin{array}{lll} \hline-\infty & -\infty \\ \hline \end{array}$ | LSZOD131 |
| Auxiliary contact block for size 0-12,3NO + 1NC, DIN EN 50005 | LSZO | $+\infty=0$ | LSZOD131F |
| Auxiliary contact block for size 0-12, 4NO, DIN EN 50005 | LSZO | --000-0, | LSZOD140F |
| Auxiliary contact block for size $0-12,1 \mathrm{NO}+1 \mathrm{NC}$, 1. position | LSZO | $\begin{array}{ll} \hline-00 & 0-8 \\ \hline \end{array}$ | LSZ0D711 |
| Auxiliary contact block for size 0-12, 1NC, delayed | LSZO |  | LSZ0D901 |
| Auxiliary contact block for size 0-12, 1NO, delayed | LSZO |  | LSZOD910 |
| Auxiliary contact block for size 3-12,1NO + 1NC, 2. position | LSZ3 | $+\infty=0$ | LSZ3D811 |

LSD Contactors and Vacuum Contactors, 3-pole, Size 6 / 10 / 12 / 14




LSDH64G3

Schrack-Info

- Contactors LSD6115F are fitted with box terminals up to $70 \mathrm{~mm}^{2}$
- All other contactor types fitted with screw connection (busbar connection). Box terminals on request
- Contactors LSD6 up to LSDG are fitted with a withdrawable coil unit. At mounting contactor, please to consider dimension "k" (clearance upwards) for exchanging the coil
- Contactors LSD6 up to LSDG - fitted as standard with 2 "side mounted" auxiliary contacts LSZOD711 (2S+2Ö) - can be extended in maximum up to 8 auxiliary contacts (additional four 1-pole auxiliary contacts LSZODO.., LSZOD9.. or one 4-pole LSZOD $1 .$. , or two "side mounted" auxiliary contacts LSZ3D811) but in maximum 4 NC .
- All auxiliary contacts are suitable for electronic circuits according EN 60947-5-4 (17VDC, 1mA)
- Vacuum-Contactors LSDH - fitted as standard with 8 "side mounted" auxiliary contacts (4S+4Ö) can not be extended by additional auxiliary contacts
- Fitting surge supressors (RC-units) for contactors LSD6 up to LSDG - LSZ60001.
- Vacuum-Contactors LSDH are already fitted with one integrated varistor-circuit and a "burn-off" indication of main contacts, can be seen from outside
- Contactors only suitable for electronic overload relais - on request
- Coil and main contacts for contactors LSD6 up to LSDG are exchangeable - on request
- Vacuum tubes for contactors LSDH - on request
- Mountable to mounting plate
- Further accessories find attached

LSD Contactors and Vacuum Contactors, 3-pole, Size 6 / 10 / 12 / 14


|  |  | LSDG41 | LSDG51 | LSDH6 | LSDH8 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 1000 |  |  |  |
| Utilization category AC-1 $\cos \varphi=1$ |  |  |  |  |  |
| Rated power at 400VAC | (kW) | 263 | 362 | 415 | 558 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}=\mathrm{I}_{\mathrm{t}}$ at $40^{\circ} \mathrm{C}$ and 690 VAC | (A) | 430 | 610 | 700 | 910 |
| Utilization category AC-2 and AC-3 |  |  |  |  |  |
| Rated power at 400VAC | (kW) | 231 | 291 | 347 | 450 |
| Rated operational current $I_{\text {e }}$ at 690/1000VAC | (A) | 400/400 | 500/450 | 630/435 | 820/580 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-25 \ldots+60$ |  |  |  |
| Permissible mounting position |  |  |  | $\sqrt[3]{5^{\circ}}{ }^{22,5^{\circ}}$ |  |
| Rules and regulations according |  |  | IEC 60947 | 0947-4-1 |  |


|  |  | Inkludierte Auxiliary contacts |
| :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Thermal rated current Ith at $40^{\circ} \mathrm{C}$ and 690 VAC | (A) | 10 |
| Utilization category AC-15 |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ at $40^{\circ} \mathrm{C}$ and $230 / 400$ VAC | (A) | 5,6/3,6 |
| Utilization category DC13 |  |  |
| Rated operational current $I_{\text {e }}$ at $40^{\circ} \mathrm{C}$ up to $60 / 110 / 220 \mathrm{VDC}$ | (A) | 5/1,14/0,48 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | -25 ... +60 |
| Rules and regulations according |  | $\begin{gathered} \hline \text { IEC } 60947-5-1, \text { EN } \\ 60947-5-1 \end{gathered}$ |

## Electromechanical Contactors Series ALEA LS

LSD Contactors and Vacuum Contactors, 3-pole, Size 6 / 10 / 12 / 14
Dimensions: LSD6 Contactors, Size 6


Distance from grounded parts: Lateral: 10 mm , Front: $20 \mathrm{~mm}, \mathrm{k}$
$=120 \mathrm{~mm}$ (minimum clearance for removing the withdrawable coil)

1) 2nd auxiliary contact block, lateral
2) Box terminals*
3) Auxiliary contact block, mountable on the front
4) Drilling pattern
5) RC element
*LSD6115F with box terminal, LSD6155F and LSD6195F without box terminal

LSD Contactors and Vacuum Contactors, 3-pole, Size 6 / 10 / 12 / 14
Dimensions: LSDE Contactors, Size 10


Distance from grounded parts: Lateral: 10 mm , Front: $20 \mathrm{~mm}, \mathrm{k}=150 \mathrm{~mm}$ (minimum clearance for removing the withdrawable coil)

1) 2nd auxiliary contact block, lateral
2) Box terminals, optional
3) Auxiliary contact block, mountable on the front
4) Drilling pattern
5) RC element

## Electromechanical Contactors Series ALEA LS

- LSD Contactors and Vacuum Contactors, 3-pole, Size 6 / 10 / 12 / 14

Dimensions: LSDG Contactors, Size 12


Distance from grounded parts: Lateral: 10 mm , Front: $20 \mathrm{~mm}, \mathrm{k}=150 \mathrm{~mm}$ (minimum clearance for removing the withdrawable coil)

1) 2nd auxiliary contact block, lateral
2) Box terminals, optional
3) Auxiliary contact, mountable on the front 5) Drilling pattern
4) $R C$ element

Dimensions: LSDH6 Vacuum Contactors, Size 14


1) With box terminals for laminated copper bars (on request). Terminal cover for touch protection LSZHDOO1.

Detail: A = Contact erosion indication for vacuum interrupter contacts

- LSD Contactors and Vacuum Contactors, 3-pole, Size 6 / 10 / 12 / 14

Dimensions: LSDH8 Vacuum Contactors, Size 14


1) With box terminals for laminated copper bars (on request). Terminal cover for touch protection LSZHDOO1.

Detail: $\mathrm{A}=$ Contact erosion indication for vacuum interrupter contacts
Circuit Diagrams

LSD6, LSDE, LSDG
(1)

LSDH6, LSDH8


Terminal designations according to EN 50012.

1) $2 \mathrm{NO}+2 \mathrm{NC}$, with front mounted 4-pole LSZOD 122 auxiliary contact block or with lateral 2-pole LSZOD711 auxiliary contact block
2) $4 N O+4 N C$

Connection Diagrams


[^7]Electromechanical Contactors Series ALEA LS

LSD Contactors and Vacuum Contactors, 3-pole, Size 6 / 10 / 12 / 14

| DESCRIPTION | TYPE NO. AVAILABLE | ORDER NO. |  |
| :--- | :--- | :--- | :--- |
| Size 6- type LSD6-185A |  |  |  |
| Contactor 55KW, 220-240VUC, with 2NO + 2NC, size 6 (with terminal box) | LSD6 | LSD6 | LSD6 |
| Contactor 75KW, 220-240VUC, with 2NO + 2NC, size 6 | LSD6115F |  |  |
| Contactor 90KW, 220-240VUC, with 2NO + 2NC, size 6 | LSD6155F |  |  |

Size 10 - type LSDE - 300A

| Contactor $110 \mathrm{KW}, \mathrm{AC}-3,220-240 \mathrm{VUC}$, with $2 \mathrm{NO}+2 \mathrm{NC}, 50 \mathrm{~Hz}$, size 10 | LSDE |  | LSDE225F |
| :---: | :---: | :---: | :---: |
| Contactor $132 \mathrm{KW}, \mathrm{AC}-3,220-240 \mathrm{VUC}$, with $2 \mathrm{NO}+2 \mathrm{NC}, 50 \mathrm{~Hz}$, size 10 | LSDE | - -60 | LSDE265F |
| Contactor $160 \mathrm{KW}, \mathrm{AC}-3,220-240 \mathrm{VUC}$, with $2 \mathrm{NO}+2 \mathrm{NC}, 50 \mathrm{~Hz}$, size 10 | LSDE | - $-\times 0$ | LSDE305F |

Size 12 - type LSDG - 500A

| Contactor 200KW, AC-3, 220-240VUC, with $2 \mathrm{NO}+2 \mathrm{NC}, 50 \mathrm{~Hz}$, size 12 | LSDG |  | LSDG415F |
| :---: | :---: | :---: | :---: |
| Contactor 250KW, AC-3, 220-240VUC, with $2 \mathrm{NO}+2 \mathrm{NC}, 50 \mathrm{~Hz}$, size 12 | LSDG | - - \% - - | LSDG515F |
| Size 14 - type LSDH - 820A |  |  |  |
| Contactor $335 \mathrm{KW}, \mathrm{AC}-3,220-240 \mathrm{VAC}$, with $4 \mathrm{NO}+4 \mathrm{NC}, 50 \mathrm{~Hz}$, size 14 | LSDH | - +00000 | LSDH63G3 |
| Contactor 600KW, AC-3, 220-240VAC, with $4 \mathrm{NO}+4 \mathrm{NC}, 50 \mathrm{~Hz}$, size 14 | LSDH |  | LSDH64G3 |
| Contactor 450KW, AC-3, 220-240VAC, with $4 \mathrm{NO}+4 \mathrm{NC}, 50 \mathrm{~Hz}$, size 14 | LSDH | - $+0 \times 0$ | LSDH82G3 |
| Contactor 800KW, AC-3, 220-240VAC, with $4 \mathrm{NO}+4 \mathrm{NC}, 50 \mathrm{~Hz}$, size 14 | LSDH |  | LSDH83G3 |

Auxiliary contacts

| Auxiliary contact block for size 0-12, 1NC | LSZO | -000-9, | LSZOD001 |
| :---: | :---: | :---: | :---: |
| Auxiliary contact block for size 0-12, 1 NO | LSZO | - -8000 | LSZOD010 |
| Auxiliary contact block for size 0-12, 1NC, delayed | LSZO |  | LSZ0D901 |
| Auxiliary contact block for size 0-12, 1NO, delayed | LSZO |  | LSZ0D910 |
| Auxiliary contact block for size 0-12,1NO + 3NC | LSZO | -60-9, | LSZOD113 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50012 | LSZO |  | LSZOD122 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50005 | LSZO | -000-9, | LSZOD 122F |
| Auxiliary contact block for size 0-12,3NO + 1NC, DIN EN 50012 | LSZO | $+\infty=0$ | LSZOD131 |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50005 | LSZO | - -1000 | LSZOD131F |
| Auxiliary contact block for size 0-12, 4NO, DIN EN 50005 | LSZO | $+000-\infty$ | LSZOD140F |
| Auxiliary contact block for size $0-12,1 \mathrm{NO}+1 \mathrm{NC}$, 1. position | LSZO | $+\infty=\infty$ | LSZ0D711 |
| Auxiliary contact block for size 3-12,1NO + 1NC, 2. position | LSZ3 | $+\infty=0$ | LSZ3D811 |

■LSU Contactors with 2 NO and 2 NC, 4-pole, Size $00 / 0 / 2$


LSUD 12C3

## Schrack-Info

- 4-pole Contactors with 2 NO and 2 NC (switch over contactors)
- Contactors LSUD can be fitted in maximum with 4 auxiliary contacts (one 1-pole auxiliary contact LSZD05.. or one 4-pole LSZDH5..)
- Contactors LSUO and LSU2 can be fitted in maximum with 6 auxiliary contacts (four 1-pole auxiliary contacts LSZODO.., LSZOD9.. or one 4-pole LSZOD 1.., as well as one "side mounted" auxiliary contact LSZOD711) but in maximum 4 NC
- Fitting surge supressors for contactors LSUD - LSZD0001 up to LSZD0004
- Fitting surge supressors for contactors LSUO - LSZ00001, LSZ00002 or LSZ00003
- Fitting surge supressors for contactors LSU2 - LSZ00001, LSZ00002 or LSZ20001
- All auxiliary contacts are suitable for electronic circuits according EN 60947-5-4 (17VDC, 1mA)
- Coil and main contacts for contactors LSUD are not exchangeable
- Coil and main contacts for contactors LSUO and LSU2 are exchangeable - on request
- Electrical data of LSUD up to LSU2 are identical to according contactors LSD of size 00 up to size 2
- When using mechanical interlock for two contactors LSUO, the "right side mounted" (4th) pole of left contactor has to be changed to the left side of contactor
- Mountable to DIN-rail TS35 or mounting plate
- Further accessories find attached

|  |  | LSUD12 | LSU025 | LSU240 |
| :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathbf{i}}$ | (VAC) | 690 |  |  |
| Utilization category AC-1 $\cos \varphi=1$ |  |  |  |  |
| Rated power at 230VAC | (kW) | 7,5 | 13,3 | 22 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}=\mathrm{I}_{\mathrm{t}}$ at $40^{\circ} \mathrm{C}$ and 690 VAC | (A) | 22 | 40 | 60 |
| Utilization category AC-2 and AC-3 |  |  |  |  |
| Rated power at 230VAC | (kW) | 3 | 5,5 | 11 |
| Rated operational current $I_{\text {e }}$ at $380-440 \mathrm{VAC}$ | (A) | 11 | 22 | 40 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-25 \ldots+60$ |  |  |
| Permissible mounting position |  |  |  |  |
| Rules and regulations according |  | IEC 60947-4-1, EN60947-4-1 |  |  |

## Electromechanical Contactors Series ALEA LS

ISU Contactors with 2 NO and 2 NC, 4-pole, Size $00 / 0 / 2$
Dimensions


Lateral distance to grounded components $=6 \mathrm{~mm}$
2) Auxiliary contact block
4) Drilling pattern
3) Surge suppressor
5) Auxiliary contact block 1-pole

## Dimensions



Lateral distance to grounded components $=6 \mathrm{~mm}$
$\mathrm{a}=3 \mathrm{~mm}$ at $<250 \mathrm{~V}$ and mounting of surge suppressor
$a=7 \mathrm{~mm}$ at $>250 \mathrm{~V}$ and mounting of surge suppressor
$b=D C 10 \mathrm{~mm}$ deeper than $A C$

* $4^{\text {th }}$ Pole can be changed to left side without tool

1) Auxiliary contact block, laterally mountable (left)
2) Auxiliary contact block, mountable on the front
3) Surge suppressor
4) Drilling pattern

LSU Contactors with 2 NO and 2 NC, 4-pole, Size $00 / 0 / 2$
Dimensions


Lateral distance to grounded components $=6 \mathrm{~mm}$
$\mathrm{a}=0 \mathrm{~mm}$ with varistor $<240 \mathrm{~V}$
$a=3.5 \mathrm{~mm}$ with varistor $>240 \mathrm{~V}$
$a=17 \mathrm{~mm}$ with $R C$ element and diode assembly
$b=$ Size 2: DC 15 mm deeper than $A C$

1) Auxiliary contact block, laterally mountable (right or left)
2) Auxiliary contact block, mountable on the front, ( 1 and 4 pole)
3) Surge suppressor
4) Drilling pattern

## Circuit Diagrams

(1) LSUD

2) LSUO
$\xrightarrow[A 2(-)]{2}$
(3) LSU2
$\xrightarrow[A 2(-)]{2}$

## Terminal designations according to EN 50005

1) LSUD contactors with $2 \mathrm{NO}+2 \mathrm{NC}$ main contacts

Auxiliary contacts blocks LSZDH5... and LSZD05.. can be snapped on
2) LSUO contactors with $\mathbf{2 N O}+2 \mathrm{NC}$ main contacts

Auxiliary contacts LSZODO.., LSZOD9... and auxiliary contacts blocks LSZOD 1..F can be snapped on 3) LSU2 contactors with $2 \mathrm{NO}+2 \mathrm{NC}$ main contacts

Auxiliary contacts LSZODO.., LSZOD9... and auxiliary contacts blocks LSZODI..F can be snapped on

## Connection Diagrams



[^8]
## Electromechanical Contactors Series ALEA LS

■LSU Contactors with 2 NO and 2 NC, 4-pole, Size $00 / 0 / 2$

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Size 00 - type LSUD - 12A |  |  |  |
| $5.5 \mathrm{~kW} / 400 \mathrm{~V}, 2 \mathrm{NO}+2 \mathrm{NC}, 230 \mathrm{VAC}, 50 / 60 \mathrm{~Hz}$, size 00 | LSUD | -000-9080 | LSUD12C3 |
| Size 0-type LSU0-25A |  |  |  |
| $11 \mathrm{~kW} / 400 \mathrm{~V}, 2 \mathrm{NO}+2 \mathrm{NC}, 230 \mathrm{VAC}, 50 / 60 \mathrm{~Hz}$, size 0 | LSU0 | -000-6 | LSU025C3 |
| Size 2 - type LSU2-40A |  |  |  |
| $18,5 \mathrm{~kW} / 400 \mathrm{~V}, 2 \mathrm{NO}+2 \mathrm{NC}, 230 \mathrm{VAC}, 50 / 60 \mathrm{~Hz}$, size 2 | LSU2 | -0000000 | LSU240C3 |
| Auxiliary contacts |  |  |  |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50012 | LSZO |  | LSZOD 122 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50005 | LSZO |  | LSZOD122F |
| 2NO+2NC size 00, DIN 50012 | LSZD | -000-8, | LSZDD222 |
| 2NO+2NC size 00, DIN 50005 | LSZD | $+500-6$ | LSZDH522 |

■LSR Contactors 4-pole, for Switching Resistive Loads AC-1, Size 00 / 0 / 2 / 3


Schrack-Info

- 4-pole Contactors with 4 NO, from 22A up to 140 A AC-1 loads
- Contactors LSRD can be fitted in maximum with 4 auxiliary contacts (one 1-pole auxiliary contact LSZD05.. or one 4-pole LSZDH5..)
- Contactors LSRO and LSR2 can be fitted in maximum with 6 auxiliary contacts (four 1-pole auxiliary contacts LSZODO.., LSZOD9.. or one 4-pole LSZOD 1.. and one "side mounted" auxiliary contact LSZOD711) but in maximum 4 NC
- Contactors LSR3 can be fitted in maximum with 8 auxiliary contacts (four 1-pole auxiliary contacts LSZODO.. or LSZOD9.. or one 4-pole LSZOD 1.. and 2 "side mounted" auxiliary contacts LSZOD711 or LSZ3D811) but in maximum 4 NC
- Fitting surge supressors for contactors LSRD - LSZD0001 up to LSZD0004
- Fitting surge supressors for contactors LSRO - LSZ00001, LSZ00002 or LSZ00003
- Fitting surge supressors for contactors LSR2 and LSR3 - LSZ00001, LSZ00002 or LSZ20001
- All auxiliary contacts are suitable for electronic circuits according EN 60947-5-4 (17VDC, 1 mA )
- Coil and main contacts for contactors LSRD are not exchangeable
- Coil and main contacts for contactors LSRO up to LSR3 are exchangeable - on request
- Electrical data of LSRD up to LSR3 are identical to according contactors LSDD up to LSD3
- When using mechanical interlock for two contactors LSRO, the "right side mounted" (4th) pole of left contactor has to be changed to the left side of contactor
- Mountable to DIN-rail TS35 or mounting plate
- Further accessories find attached



## Electromechanical Contactors Series ALEA LS

LSR Contactors 4-pole, for Switching Resistive Loads AC-1, Size 00 / 0 / 2 / 3
Dimensions


Lateral distance to grounded components $=6 \mathrm{~mm}$
2) Auxiliary contact block
3) Surge suppressor
4) Drilling pattern
5) Auxiliary contact block 1-pole

## Dimensions



Lateral distance to grounded components $=6 \mathrm{~mm}$
$a=3 \mathrm{~mm}$ at $<250 \mathrm{~V}$ and mounting of surge suppressor
$a=7 \mathrm{~mm}$ at $>250 \mathrm{~V}$ and mounting of surge suppressor
$b=D C 10 \mathrm{~mm}$ deeper than AC

* $4^{\text {th }}$ Pole can be changed to left side without tool

1) Auxiliary contact block, laterally mountable (left)
2) Auxiliary contact block, mountable on the front
3) Surge suppressor
4) Drilling pattern

LSR Contactors 4-pole, for Switching Resistive Loads AC-1, Size 00 / 0 / 2 / 3
Dimensions


Lateral distance to grounded components $=6 \mathrm{~mm}$
$a=0 \mathrm{~mm}$ with varistor $<240 \mathrm{~V}$
$a=3.5 \mathrm{~mm}$ with varistor $>240 \mathrm{~V}$
$a=17 \mathrm{~mm}$ with $R C$ element and diode assembly
$b=$ Size 2: DC 15 mm deeper than $A C$

1) Auxiliary contact block, laterally mountable (right or left)
2) Auxiliary contact block, mountable on the front, (1-and 4-pole)
3) Surge suppressor
4) Drilling pattern
5) For mounting on TH 35 standard mounting rail according to EN 60715 (15mm deep) EN 60715
6) Allen screw 4 mm

Dimensions


Lateral distance to grounded components $=6 \mathrm{~mm}$
$\mathrm{a}=0 \mathrm{~mm}$ with varistor $<240 \mathrm{~V}$
$a=3.5 \mathrm{~mm}$ with varistor $>240 \mathrm{~V}$
$a=17 \mathrm{~mm}$ with RC element and diode assembly
$b=$ Size 3: DC 13 mm deeper than $A C$

1) Auxiliary contact block, laterally mountable (right or left)
2) Auxiliary contact block, mountable on the front, (1-and 4-pole)
3) Surge suppressor
4) Drilling pattern
5) For mounting on TH 35 standard mounting rail according to EN 60715 ( 15 mm deep)
or for size 3 also to TH 75 standard mounting rail according to EN 60715
6) Allen screw 4 mm

Electromechanical Contactors Series ALEA LS

■LSR Contactors 4-pole, for Switching Resistive Loads AC-1, Size 00 / 0 / 2 / 3

- Circuit Diagrams
(1) LSRD, LSR2, LSR3

(2) LSRO
$\xrightarrow{\sim}$

Terminal designations according to EN 50005

1) 4NO, LSZDH5.. And LSZD05.. auxiliary contact blocks can be snapped on
2) 4 NO, LSZODO.., LSZOD9.. auxiliary contact and LSZOD I..F auxiliary contact blocks can be snapped on

- Connection Diagrams

| LSRD | LSR0, LSR2, LSR3 |
| :---: | :---: |
| 1 3 5 7 $A 1$ <br> $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ <br> $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ <br> 2 4 6 8 $A 2$ |  |

Terminal designations according to EN 50005

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Size 00-type LSRD - 12A |  |  |  |
| Contactor 18A ACl, $24 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 00 | LSRD |  | LSRD 1840 |
| Contactor 18A ACl, 24VDC, size 00 | LSRD |  | LSRD 1845 |
| Contactor 18A ACl, 230VAC, $50 / 60 \mathrm{~Hz}$, size 00 | LSRD | - | LSRD1843 |
| Contactor 22A ACl, $24 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 00 | LSRD |  | LSRD2240 |
| Contactor 22A ACl, 24VDC, size 00 | LSRD | -000-0 | LSRD2245 |
| Contactor 22A ACl, 230VAC, $50 / 60 \mathrm{~Hz}$, size 00 | LSRD | $\begin{array}{\|ccc} \hline-00 & -\pi \\ \hline \end{array}$ | LSRD2243 |
| Auxiliary contacts for LSRD contactors |  |  |  |
| 1NC size 00, DIN 50005, wiring from bottom | LSZD |  | LSZD0501 |
| 1 NO size 00, DIN 50005, wiring from bottom | LSZD |  | LSZD0510 |
| 4NO size 00, DIN 50005 | LSZD |  | LSZDH540 |
| 3NO+1NC size 00, DIN 50005 | LSZD |  | LSZDH531 |
| 2NO+2NC size 00, DIN 50005 | LSZD | $+\infty$ | LSZDH522 |
| Size 0 - type LSRO-40A |  |  |  |
| Contactor 35A ACl, 24VAC, 50 Hz , size 0 | LSRO |  | LSR03540 |
| Contactor 35A ACl, 24VDC, size 0 | LSRO |  | LSR03545 |
| Contactor 35A ACl, 230VAC, $50 / 60 \mathrm{~Hz}$, size 0 | LSRO | $0 \times 0$ | LSR03543 |
| Contactor 40A ACl, 24VAC, 50 Hz , size 0 | LSRO |  | LSR04040 |
| Contactor 30A ACl, 24VDC, size 0 | LSRO |  | LSR04045 |
| Contactor 40A ACl, 230VAC, $50 / 60 \mathrm{~Hz}$, size 0 | LSRO |  | LSR04043 |
| Auxiliary contacts for LSRO contactors |  |  |  |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50012 | LSZO |  | LSZOD131 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50012 | LSZO | $+\infty=-\infty$ | LSZOD 122 |
| Auxiliary contact block for size 0-12, $1 \mathrm{NO}+3 \mathrm{NC}$ | LSZO |  | LSZOD113 |
| Auxiliary contact block for size 0-12, 4NO, DIN EN 50005 | LSZO | $\begin{array}{\|ccc} \hline-00 & -\infty \\ \hline \end{array}$ | LSZOD140F |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50005 | LSZO | $+-\infty 0$ | LSZOD131F |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50005 | LSZO | $+\infty 0$ | LSZOD122F |
| Auxiliary contact block for size $0-12,1 \mathrm{NO}+1 \mathrm{NC}$, 1. position | LSZO |  | LSZ0D711 |

## Stнраскиж

LSR Contactors 4-pole, for Switching Resistive Loads AC-1, Size $00 / 0$ / 2 / 3

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Auxiliary contacts for LSRO contactors |  |  |  |
| Size 2 - type LSR2-60A |  |  |  |
| Contactor 60A ACl, $24 \mathrm{VAC}, 50 \mathrm{~Hz}$, size 2 | LSR2 |  | LSR26040 |
| Contactor 60A ACl, 230VAC, $50 / 60 \mathrm{~Hz}$, size 2 | LSR2 | - $0-0.0$ | LSR26043 |
| Contactor 60A ACl, 24VDC, size 2 | LSR2 |  | LSR26045 |
| Auxiliary contacts for LSR2 contactors |  |  |  |
| Auxiliary contact block for size 0-12, 1NO | LSZO | -000-0 | LSZ0D010 |
| Auxiliary contact block for size 0-12, 1NC | LSZO | - -0.0 | LSZ0D001 |
| Auxiliary contact block for size $0-12,1 \mathrm{NO}$, delayed | LSZO |  | LSZOD910 |
| Auxiliary contact block for size 0-12, 1NC, delayed | LSZO |  | LSZ0D901 |
| Auxiliary contact block for size $0-12,1 \mathrm{NO}+1 \mathrm{NC}$, 1. position | LSZO | -00-n | LSZ0D711 |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50012 | LSZO |  | LSZOD131 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50012 | LSZO | - $0 \times 0$ | LSZOD 122 |
| Auxiliary contact block for size 0-12, 1 NO + 3NC | LSZO | -000-0, | LSZOD113 |
| Auxiliary contact block for size 0-12, 4NO, DIN EN 50005 | LSZO | -000-m | LSZOD 140F |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50005 | LSZO | -000-0.000 | LSZ0D131F |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50005 | LSZO | $+\infty 0$ | LSZOD 122F |
| Size 3 - type LSR3-140A |  |  |  |
| Contactor 110A ACl, 24VAC, 50Hz, size 3 | LSR3 |  | LSR31140 |
| Contactor 110A ACl, 230VAC, $50 / 60 \mathrm{~Hz}$, size 3 | LSR3 | - | LSR31143 |
| Contactor 110A ACI, 24VDC, size 3 | LSR3 |  | LSR31145 |
| Contactor 140A AC1, 230VAC, $50 / 60 \mathrm{~Hz}$, size 3 | LSR3 |  | LSR31443 |
| Contactor 140A AC1, 24VDC, size 3 | LSR3 | - $-\infty$ | LSR31445 |
| Auxiliary contacts for LSR3 contactors |  |  |  |
| Auxiliary contact block for size 0-12, 1NO | LSZO |  | LSZ0D010 |
| Auxiliary contact block for size 0-12, 1NC | LSZO | -000-7 | LSZ0D001 |
| Auxiliary contact block for size $0-12,1 \mathrm{NO}$, delayed | LSZO |  | LSZOD910 |
| Auxiliary contact block for size 0-12, 1NC, delayed | LSZO |  | LSZ0D901 |
| Auxiliary contact block for size $0-12,1 \mathrm{NO}+1 \mathrm{NC}$, 1. position | LSZO | -600-0-6 | LSZ0D711 |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50012 | LSZO |  | LSZOD131 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50012 | LSZO | $+\infty=0$ | LSZOD 122 |
| Auxiliary contact block for size 0-12, 1 NO + 3NC | LSZO | $+0006$ | LSZOD113 |
| Auxiliary contact block for size 0-12, 4NO, DIN EN 50005 | LSZO | $\begin{array}{rr} \hline-000 & -\infty \\ \hline \end{array}$ | LSZOD 140F |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50005 | LSZO | $+000$ | LSZ0D131F |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50005 | LSZO | $+\infty=\infty$ | LSZOD 122F |
| Auxiliary contact block for size 3-12, 1NO + 1NC, 2. position | LSZ3 | $\begin{array}{rrr} \hline-000 & 0-9 \end{array}$ | LSZ3D811 |

Electromechanical Contactors Series ALEA LS

ILSK Capacitor Switching Contactors, Size 00 / 0 / 3


|  |  | LSKD17 | LSK032 | LSK362 |
| :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |  |  |
| Utilization category AC-6b |  |  |  |  |
| Rated power at 400VAC | (kVAr) | 5 ... 12,5 | 6... 25 | 5 ... 50 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $50^{\circ}$ and $380-400 \mathrm{VAC}$ | (A) | 8 ... 18 | 9... 36 | 8 ... 72 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | -25 ... +60 |  |  |
| Permissible mounting position |  |  |  |  |
| Rules and regulations according |  | IEC 60947-4-1, EN60947-4-1 |  |  |

## Dimensions



LSK Capacitor Switching Contactors, Size 00 / 0 / 3
Dimensions


1) Drilling pattern

## Dimensions

## LSK3



1) Drilling pattern

## Circuit Diagrams

| LSKD | LSK0, LSK3 |
| :---: | :---: |
|  |  |

## Electromechanical Contactors Series ALEA LS

ISK Capacitor Switching Contactors, Size 00 / 0 / 3
Circuit Diagrams


1) Size 00
2) Sizes 0 and 3

Connection Diagrams


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Size 00-12.5kVAr |  |  |  |
| Capacitor switching Contactors 12.5 kVar, 220-240VAC, 1NO/1NC | LSKD |  | LSKD17B3 |
| Size 0-25kVAr |  |  |  |
| Capacitor switching Contactors $25 \mathrm{kVar}, 220-240 \mathrm{VAC}, 1 \mathrm{~N} / \mathrm{O}$ | LSKO | [-000-9, | LSK03213 |
| Size 3-50kVAr |  |  |  |
| Capacitor switching Contactors $50.0 \mathrm{kVar}, 220-240 \mathrm{VAC}, 1 \mathrm{NO}$ | LSK3 | -000-9, | LSK36213 |
| Auxiliary contacts |  |  |  |
| Auxiliary contact block for size 0-12,1NO + 1NC, 1. position | LSZO | -000-60 | LSZ0D711 |

## - LSHD Auxiliary Contactors 4-pole, Size 00



## Schrack-Info

- 4-pole Auxiliary contactors for control functions
- Auxiliary contactors LSHD can be extended with additional auxiliary contacts to 8-pole (one 4-pole LSZDH5..) but in maximum 4 NC
- Auxiliary contactors LSHD...N and LSHD...G with reduced power consumption of coil - 3,2W - and coil voltage of 17-30VDC are specially designed for control by PLC
- Auxiliary contactors LSHD...N and LSHD...G can not be extended with additional auxiliary contacts
- Contacts are suitable for electronic circuits according EN 60947-5-4 (17VDC, 1 mA )
- Coil and main contacts for contactors LSHD are not exchangeable
- 4-pole auxiliary contactors LSHD can be retrofitted with a soldering adaptor LSZDD002 for mounting to printed boards
- Mountable to DIN-rail TS35 or mounting plate
- Further accessories find attached

|  |  | LSHD |
| :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Thermal rated current $\mathrm{l}_{\text {th }}$ at $40^{\circ} \mathrm{C}$ and 400VAC | (A) | 10 |
| Utilization category AC-15 |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ and 230/400VAC | (A) | 6/3 |
| Utilization category DC13 1) |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ up to $60 / 110 / 220 \mathrm{VDC}$ | (A) | 2/1/0,3 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | -25 ... +60 |
| Permissible mounting position |  |  |
| Rules and regulations according |  | IEC 60947-5-1, EN 60947-5-1 |

1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24VDC (Test ratings 17VDC, 1 mA ). Positively guided contacts.

Dimensions


[^9]
## Electromechanical Contactors Series ALEA LS

## - LSHD Auxiliary Contactors 4-pole, Size 00

Dimensions
LSHD.. N, LSHD..G

[mm]

Lateral distance to grounded components $=6 \mathrm{~mm}$. All types: no further auxiliary contacts or contact blocks can be snapped on.
LSHD...N: surge suppressor can be inserted
LSHD...G: with built-in diode

1) Surge suppressor
2) Drilling pattern

## Circuit Diagrams

| LSHD067. | LSHD068. | LSHD069. |
| :---: | :---: | :---: |
|  |  |  |

Terminal designations according to EN 50011. Surge suppression can be plugged in.
Fitting auxiliary contacts according to EN 50005 - LSZD05.. and LSZDH5.

## Circuit Diagrams

| LSHD067N | LSHD068N | LSHD069N |
| :---: | :---: | :---: |
|  |  |  |

Terminal designations according to EN 50011 (no auxiliary contacts can be snapped on), surge suppressor can be plugged in.
Circuit Diagrams

| LSHD067G | LSHD068G | LSHD069G |
| :---: | :---: | :---: |
|  |  |  |

Terminal designations according to EN 50011 (no auxiliary contacts can be snapped on), diode integrated.

## Connection Diagrams

| LSHD067. |  |  |  |  | LSHD068. |  |  |  |  | LSHD069. |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ${ }^{13}$ |  | 33 |  |  | $\stackrel{13}{\bigcirc}$ | 21 | 3 |  |  | $\stackrel{13}{\bigcirc}$ | $\stackrel{21}{\bigcirc}$ |  |  | $\stackrel{\text { A1 }}{\bigcirc}$ |
| $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |  |  | $\bigcirc$ | $\bigcirc$ |
| 14 | 24 | 34 | 44 | A2 | 14 | 22 | 34 | 44 | A2 | 14 | 22 | 32 | 44 | A2 |

LSHD Auxiliary Contactors 4-pole, Size 00

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Size 00 - type LSHD |  |  |  |
| 6 A 4 NO AC24V, 50/60Hz | LSHD | [-80-980 | LSHD0670 |
| 6A 4NO DC24V | LSHD | $+700-\pi$ | LSHD0675 |
| 6 A 4 NO AC230V, $50 / 60 \mathrm{~Hz}$ | LSHD | [-0000] | LSHD0673 |
| $6 \mathrm{~A} 3 \mathrm{NO}+1 \mathrm{NC} \mathrm{AC24V}, \mathrm{50/60Hz}$ | LSHD | - $\times 10$ | LSHD0680 |
| $6 \mathrm{~A} 3 \mathrm{NO}+1 \mathrm{NC} \mathrm{DC24V}$ | LSHD | [000-6, | LSHD0685 |
| $6 \mathrm{~A} 3 \mathrm{NO}+1 \mathrm{NC} \mathrm{AC230V} ,50 / 60 \mathrm{~Hz}$ | LSHD | - -6000 | LSHD0683 |
| 6A 2NO+2NC AC24V, 50/60Hz | LSHD | - $-\cdots \times 0$ | LSHD0690 |
| $6 \mathrm{~A} 2 \mathrm{NO}+2 \mathrm{NC} \mathrm{DC24V}$ | LSHD | - -5000 | LSHD0695 |
| 6A 2NO+2NC AC230V, $50 / 60 \mathrm{~Hz}$ | LSHD | -000-9, | LSHD0693 |
| Auxiliary contacts for LSHD contactors |  |  |  |
| 1 NC size 00, DIN 50005, wiring from bottom | LSZD | [-7000] | LSZD0501 |
| 1 NO size 00, DIN 50005, wiring from bottom | LSZD | $\begin{array}{\|ccc} \hline-\infty 0 & -\pi \\ \hline \end{array}$ | LSZD0510 |
| 4NO size 00, DIN 50005 | LSZD | [-000] | LSZDH540 |
| 3NO+1NC size 00, DIN 50005 | LSZD | - -6000 | LSZDH531 |
| 2NO+2NC size 00, DIN 50005 | LSZD | -000 0 - | LSZDH522 |
| Size 00 - type LSHD for PLC |  |  |  |
| 6A 4NO DC17-30V, for PLC | LSHDN |  | LSHD067N |
| 6A 4NO DC17-30V, for PLC, with diode | LSHDG |  | LSHD067G |
| $6 \mathrm{~A} 3 \mathrm{NO}+1 \mathrm{NC} \mathrm{DC17-30V}$, | LSHDN |  | LSHD068N |
| 6A 2NO+2NC DC 17-30V, for PLC | LSHDN |  | LSHD069N |
| 6A 2NO+2NC DC 17-30V, for PLC, with diode | LSHDG |  | LSHD069G |

## Electromechanical Contactors Series ALEA LS

Frontmounted Auxiliary Contacts for Contactors Size 00, LSDD with one included NO


## Schrack-Info

- 1- and 4-pole Auxiliary Contacts for Contactors LSDD with one included NO
- Contact designation according to DIN 50005 or DIN 50012
- All auxiliary contacts are suitable for electronic circuits according EN 60947-5-4 (17VDC, 1 mA )

|  |  | Auxiliary contacts <br> LSZD05, LSZDD, LSZDH, LSZOD |
| :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Thermal rated current $l_{t+}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 10 |
| Utilization category AC-15 |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ and 230/400VAC | (A) | 6/3 |
| Utilization category DC13) |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ up to 60/110/220VDC | (A) | 2/1/0,3 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-25 \ldots+60$ |
| Rules and regulations according |  | IEC 60947-5-1, EN 60947-5-1 |

1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24VDC (Test ratings 17VDC, 1mA). Positively guided contacts.

## Dimensions



1) according to EN 50005 , Screw terminals, cable entry from below, 1-pole
2) according to EN 50012, Screw terminals, 1- to 4-pole

Frontmounted Auxiliary Contacts for Contactors Size 00, LSDD with one included NO

- Circuit Diagrams

| LSZD0510 | LSZD0501 | LSZDD201 | LSZDD212 | LSZDD213 | LSZDD222 |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\left.\right\|_{52} ^{51}$ | $\left.\right\|_{22} ^{21}$ |  |  |  |

Connection Diagrams

| LSZD0510 | LSZD0501 | LSZDD201 | LSZDD212 | LSZDD213 | LSZDD222 |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $21$ | $0213143$ | $\begin{array}{llll} 21 & 31 & 41 \\ 0 & 0 & 0^{33} & 0 \end{array}$ | $00_{0}^{21} 0 O_{0}^{31} O_{0}^{43} 0$ |
| $(0)$  <br> 53 54 | 1 0 51 51 | $\bigcirc$ | O20 | $\mathrm{ccccc}^{\bigcirc}$ | [rrrr |


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 1 NO size 00, DIN 50005, wiring from bottom | LSZD |  | LSZD0510 |
| 1 NC size 00, DIN 50005, wiring from bottom | LSZD | -000-9, | LSZD0501 |
| 1NC size 00, DIN 50012 | LSZD | -700-6, | LSZDD201 |
| 1NO+2NC size 00, DIN 50012 | LSZD | - $-0 \times 0$ | LSZDD212 |
| 1NO+3NC size 00, DIN 50012 | LSZD | $\begin{array}{\|ccc} \hline-000 & 0 \\ \hline \end{array}$ | LSZDD213 |
| 2NO+2NC size 00, DIN 50012 | LSZD | -000-0, | LSZDD222 |

## Electromechanical Contactors Series ALEA LS

Frontmounted Auxiliary Contacts for Contactors Size 00, LSDD with one included NC, also for LSRD, LSUD and Auxiliary Contactors LSHD


LSZDH522

- Schrack-Info
- 1- and 4-pole Auxiliary Contacts for Contactors LSDD with one included NC, for contactors LSRD, LSUD and auxiliary contactors LSHD
- Contact designation according to DIN 50005
- All auxiliary contacts are suitable for electronic circuits according EN 60947-5-4 (17VDC, 1 mA )

|  |  | Auxiliary contacts LSZD05, LSZDD, LSZDH, LSZOD |
| :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Thermal rated current $I_{\text {th }}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 10 |
| Utilization category AC-15 |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ and $230 / 400 V A C$ | (A) | 6/3 |
| Utilization category DC13 ${ }^{1 /}$ |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ up to 60/110/220VDC | (A) | 2/1/0,3 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-25 \ldots+60$ |
| Rules and regulations according |  | IEC 60947-5-1, EN 60947-5-1 |

1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24VDC (Test ratings 17VDC, 1 mA ). Positively guided contacts.

## Dimensions

LSZD05.. 1


LSZDH5..


[^10]Frontmounted Auxiliary Contacts for Contactors Size 00, LSDD with one included NC, also for LSRD, LSUD and Auxiliary Contactors LSHD

- Circuit Diagrams


Connection Diagrams

| LSZD0510 | LSZD0501 | LSZDH540 | LSZDH531 | LSZDH522 |
| :---: | :---: | :---: | :---: | :---: |
| 0  <br> 03 0 <br> 54  | [ | 53 63 73 83 <br> 0 0 0 0 <br> 0 0   <br> 54 64 74 84 | 53 61 73 83 <br> 0 0 0 0 <br> 0    <br> 54 62 0 0 <br> 54 62 74 84 | 53 61 71 83 <br> 0 0 0 0 <br> 0    <br> 0 0 0 0 <br> 54 62 72 84 |


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| 1NO size 00, DIN 50005, wiring from bottom | LSZD | LSZD | LSZD |
| 1NC size 00, DIN 50005, wiring from bottom | LSZD | LSZD0510 |  |
| 4NO size 00, DIN 50005 | LSZD | LSZD0501 |  |
| 3NO+1NC size 00, DIN 50005 |  |  |  |
| 2NO+2NC size 00, DIN 50005 |  |  |  |

## Electromechanical Contactors Series ALEA LS

## - Parallel Connectors (Star Jumper) and Feed Terminals, Size 00



LSZDD003

Schrack-Info

- 3-pole parallel connectors (star jumpers) size 00 can be shortened by one pole to 2-pole connectors
- 3- or 4-pole parallel connectors (star jumpers) size 00 with feed terminal have a maximum cross section of $25 \mathrm{~mm}^{2}$
- 3-pole feed terminal size 00 with 3 terminals also are permittted as feed terminal for motor protection switches BESD up to a maximum cross section of $6 \mathrm{~mm}^{2}$

Dimensions


| DESCRIPTION | TYPE NO. | AVAILABLE |
| :--- | :--- | :---: |
| Parallel connectors | ORDER NO. |  |
| Parallel connector 4-pole for LSDD 1 terminal | LSZD |  |
| Star jumper 3-pole for LSDD size 00 | LSZD | LSZDDO004 |
| Feed terminals | LSZD | LSZDY002 |
| Feed terminal 3 phase for LSDD $6 \mathrm{~mm}^{2}, 3$ terminals |  | LSZDD001 |

## - Wiring Sets, Mechanical Interlock and Connection Clips, Size 00

Schrack-Info

- Wiring set LSZDW001 for reversing contactor combinations includes besides necessary bridges for mains also the wiring for electrical interlock, the connection clips for both contactors and the integrated, mechanical interlocking link. Mechanical interlocking link does not increase width of reversing contactor assembly
- Wiring set LSZDY001 for Y-D contactor combinations includes - besides necessary bridges for mains, the star jumper - the wiring for electrical interlock (between $Y$ - and Delta-contactor) and the clips for connection of all contactors and the integrated, mechanical interlocking link between Y-and Deltacontactor. Mechanical interlocking link does not increase width of Y-D contactor assembly (total width of combination = summary of all single contactor widths + width of Y-D timer). Y-D timer has to be ordered seperately
- Contactor assemblies LSYD and LSWD are suitable for thermal overload relais of type LSTD
- Value of current for overload relais at Y-D combinations = rated current of motor $\ln \times 0.58$

Circuit Diagram - Reversing Assemblies


## Main circuit, Size 00:

1) The LSZDWOO1 wiring set contains, among other things, wiring connectors for connecting the main circuit.

## Control circuit, Size 00:

The terminal designations for the contactors comply with EN 50012. The LSZDWOO1 wiring set contains, among other things, the electrical interlock.
2) For momentary-contact operation
3) For maintained-contact operation

SO Button "OFF"
S1 Button "Clockwise ON"
S2 Button "Counter clockwise ON"
S Button "CW-OFF-CCW"
K1 Clockwise contactor

K2 Counter clockwise contactor
F1 Fuses for main circuit
F3 Fuses for control circuit
F2 Thermal overload relays

## Electromechanical Contactors Series ALEA LS

## 7 Wiring Sets, Mechanical Interlock and Connection Clips, Size 00

Circuit Diagram - Y-D Assemblies

(1)

(2)

(3)

## Main circuit:

1) The LSZDW001 wiring set contains, among other things, wiring connectors for connecting the main circuit.

## Control circuit:

with LSZD0101 Y-Delta timer, laterally mounted (example circuits). The contact element K4:17/18 is only closed in the wye stage; the contact element is open in the delta stage as well as in the de-energized state. $\mathrm{S} 1(\mathrm{~S})$ is connected to clamping point $\mathrm{K} 1: 33$.
2) For momentary-contact operation
3) For maintained-contact operation, * Clamping point K1:44 remains unwired in this version

| SO Button "OFF" K3 Delta contactor |  |  |
| :---: | :---: | :---: |
| S1 Button "ON" K4 Solid-state, time-delay auxiliary contact block or timing relay |  |  |
| S Maintained-contact switch FO Fuses |  |  |
| K1 Line contactor F1 Thermal overload relays |  |  |
| K2 Star contactor |  |  |
| DESCRIPTION | TYPE NO. AVAILABLE | ORDER NO. |
| Wiring Set for Reversing-Assemblies size 00, including mechanical interlock | LSZD $\square_{\text {- }}^{-\infty-\infty}$ | LSZDW001 |
| Mechanical connector for 2 contactors size 00 | $\text { LSZD } \quad-\infty \div 0$ | LSZDW002 |
| Wiring Set for YD-Assemblies size 00, including mechanical Interlock | LSZD $\square^{-\infty}$ | LSZDY001 |

## Solder Pin Adapter, Size 00



Schrack-Info

LSZDD002

- Mouting of contactors LSDD, LSSD as well as 4-pole auxiliary ontactors LSHD to printed boards

| DESCRIPTION | TYPE NO. | AVAILABLE |
| :--- | :--- | :---: |
| Solder pin adaptor for LS.D, size 00, 10-pole | ISZD |  |

Star-Delta Timers


Connection Link for Motor Protection Switches and Contactors, Size 00 (0)


Schrack-Info

- Connection link LSZDD005 for connection of motor protection switch BESD size 00 with AC or DC operated contactor LSDD or LSSD
- Connection link LSZDD006 for connection of motor protection switch BESO size 0 with AC or DC operated contactor LSDD or LSSD

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Connector for LSDD (AC or DC operated) and BESD, electrical and mechanical | LSZD | LSZD | LSZD |
| Connector for LSDD (AC or DC operated) and BESO, electrical and mechanical | LSZDDO |  |  |

## Surge Supressors (plug in), Size 00



- Schrack-Info
- Surge supressors for frontside mounting to all contactors of size 00
- Surge supressors do not only protect the coil of the contactor, they also preseve the driving contacts of control
- LSZD0001 and LSZD002 designed as varistor, for AC and DC
- LSZD0003 designed as RC-combination, for AC and DC
- LSZD0004 designed as diode-assembly, only for DC

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Varistor AC24-48V, DC24-70V size 00, plug-in type | LSZD | LSZD | LSZD0001 |
| Varistor AC127-240V, DC150-250V size 00, plug-in type | LSZD | LSZD | LSZD0002 |
| Suppressor AC 127-240V, DC150-250V size 00, plug-in type | LSZD |  |  |
| Suppressor diode DC12-250V size 00, plug-in type |  |  |  |

## Electromechanical Contactors Series ALEA LS

Frontmounted Auxiliary Contacts, 1-pole, Size 0-12

- Schrack-Info
- 1-pole auxiliary contacts for frontside mounting, according to DIN EN 50005 bzw. 50012
- Available as NO, NC, early make NO or delayed NC
- For contactors LS., size 0 up to 12
- Complete terminal designation of the auxiliary contacts results out of the combination of mounting place at contactor (auxiliary contact - column) and the printed terminal number at the auxiliary contact
- As possible, a symmetrical arrangement of NO and NC contacts has to be considered.
- Auxiliary contacts are suitable for electronic circuits according IEC 60947-5-4 (17VDC, 1 mA ) and are positively driven

|  |  | Auxiliary contacts <br> LSZD05, LSZDD, LSZDH, LSZOD |
| :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Thermal rated current $\mathrm{l}_{1+}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 10 |
| Utilization category AC-15 |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ and 230/400VAC | (A) | 6/3 |
| Utilization category DC13 ${ }^{1 /}$ |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ up to $60 / 110 / 220 \mathrm{VDC}$ | (A) | 2/1/0,3 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-25 . . .60$ |
| Rules and regulations according |  | IEC 60947-5-1, EN 60947-5-1 |

Dimensions


## Circuit Diagrams

| D010 | D001 | D901 | D910 |
| :---: | :---: | :---: | :---: |
| \| 1 | 1.3 | 15 | 1.7 |
| $-7$ | $-1_{4}^{1}-$ | $7$ | $-\int_{8}^{1}$ |


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Auxiliary contact block for size $0-12,1 \mathrm{NC}$ | LSZO | LSZO | LSZOD001 |
| Auxiliary contact block for size $0-12,1 \mathrm{NO}$ | LSZO | LSZOD010 |  |
| Auxiliary contact block for size $0-12,1 \mathrm{NC}$, delayed | LSZO | LSZOD901 |  |
| Auxiliary contact block for size $0-12,1 \mathrm{NO}$, delayed |  | LSZOD910 |  |

Frontmounted Auxiliary Contacts, 4-pole, Size 0-12
Schrack-Info

- 4-pole auxiliary contacts for frontside mounting, according to DIN EN 50005 or 50012
- Available with 4 contacts in several combinations of NO and NC
- For contactors LS., size 0 up to 12
- Auxiliary contacts are suitable for electronic circuits according IEC 60947-5-4 (17VDC, 1 mA ) and are positively driven

|  |  | Auxiliary contacts <br> LSZD05, LSZDD, LSZDH, LSZOD |
| :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Thermal rated current $\mathrm{l}_{t}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 10 |
| Utilization category AC-15 |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ and 230/400VAC | (A) | 6/3 |
| Utilization category DC13 ${ }^{1 /}$ |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ up to $60 / 110 / 220 \mathrm{VDC}$ | (A) | 2/1/0,3 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | -25 ... +60 |
| Rules and regulations according |  | IEC 60947-5-1, EN 60947-5-1 |

1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24VDC (Test ratings 17VDC, 1 mA ). Positively guided contacts.

## Dimensions



According to EN 50012 and *EN 50005 (LSZOD I..F), Screw terminals, 4-pole
Circuit Diagrams


## Electromechanical Contactors Series ALEA LS

Frontmounted Auxiliary Contacts, 4-pole, Size 0-12

- Connection Diagrams

| LSZ0D131 | LSZ0D122 | LSZ0D113 |
| :---: | :---: | :---: |
| $\bigcirc \bigcirc^{13} \bigcirc_{\bigcirc}^{21} \bigcirc^{33} \bigcirc^{43}$ | $\begin{array}{llll}13 & 21 & 31 & 41 \\ \bigcirc & \bigcirc & \bigcirc & \bigcirc\end{array}$ | 13 21 31 41 <br> $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ |
| $\begin{array}{llll} \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ 14 & 22 & 34 & 44 \\ \hline \end{array}$ | $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ <br> 14 22 32 44 |  |
| LSZ0D140F | LSZ0D131F | LSZ0D122F |
| 13 23 33 43 <br> $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ <br> 14 $\bigcirc$ $\bigcirc$ $\bigcirc$ <br> 14 34 44  | 13 23 33 41 <br> $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ <br> 14 $\bigcirc$ $\bigcirc$ $\bigcirc$ <br> 14 34   | 13 23 31 41 <br> $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ <br> 14 $\bigcirc$ $\bigcirc$ $\bigcirc$ <br> 1 32 42  |


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50012 | LSZO | - $+0 \times 0$ | LSZOD 131 |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50012 | LSZO | -000-9, | LSZOD122 |
| Auxiliary contact block for size 0-12, 1 NO + 3NC | LSZO | -000-6 | LSZOD113 |
| Auxiliary contact block for size 0-12, 4NO, DIN EN 50005 | LSZO | - -000 | LSZOD140F |
| Auxiliary contact block for size 0-12, 3NO + 1NC, DIN EN 50005 | LSZO | [-00-9, | LSZOD131F |
| Auxiliary contact block for size 0-12, 2NO + 2NC, DIN EN 50005 | LSZO | -000-0, | LSZOD 122F |

Sidemounted Auxiliary Contacts, 2-pole, Size 0-12


- Schrack-Info
- 2-pole auxiliary contacts for side mounting, according to DIN EN 50012
- Available as $1 \mathrm{NO}+1 \mathrm{NC}$
- For contactors LS., size 0 up to 12 as "first" side mounted (LSZOD711) respectively as "second" side mounted at size 3 up to 12 (LSZ3D811)
- Correct terminal designation of the auxiliary contacts depends on the mounting-side at contactor (left or right side)
- "Second" side mounted auxiliary contact at contactor - LSZ3D811, can be snapped onto "first" auxilliary contact LSZOD711 (maximum number of retrofittable auxiliary contacts has to be respected)
- As possible, a symmetrical arrangement of $N O$ and $N C$ contacts has to be considered.
- Auxiliary contacts are suitable for electronic circuits according IEC 60947-5-4 (17VDC, 1 mA ) and are positively driven

|  |  | Auxiliary contacts <br> LSZD05, LSZDD, LSZDH, LSZOD |
| :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |
| Thermal rated current $\mathrm{l}_{\text {tr }}$ at $40^{\circ} \mathrm{C}$ and 690VAC | (A) | 10 |
| Utilization category AC-15 |  |  |
| Rated operational current $\mathrm{l}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ and 230/400VAC | (A) | 6/3 |
| Utilization category DC13 ${ }^{1 /}$ |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ up to $60 / 110 / 220 \mathrm{VDC}$ | (A) | 2/1/0,3 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-25 \ldots+60$ |
| Rules and regulations according |  | IEC 60947-5-1, EN 60947-5-1 |

1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24VDC (Test ratings 17VDC, 1mA). Positively guided contacts.

Dimensions


Auxiliary contact block, Size 0-12 (LSZOD711) / 3-12 (LSZOD811)
according to EN 50012, laterally mountable,
Screw terminals, 2-pole

## Electromechanical Contactors Series ALEA LS

Sidemounted Auxiliary Contacts, 2-pole, Size 0-12
C Circuit Diagrams
LSZOD711

Terminal designations according to EN 50012

1) mounted left
2) mounted right

- Connection Diagrams

| LSZ0D711 |  | LSZ3D811 |  |
| :---: | :---: | :---: | :---: |
| $21 \bigcirc 2 \varepsilon$ | $31 \bigcirc 2 z$ | $61 \bigcirc \mathrm{zL}$ | $71 \bigcirc 29$ |
| $13 \bigcirc \downarrow$ | $43 \bigcirc \mathrm{ml}$ | $53 \bigcirc 18$ | $83 \bigcirc \mathrm{ts}$ |
| $14 \bigcirc 8 \downarrow$ | $44 \bigcirc \varepsilon\llcorner$ | $54 \bigcirc \varepsilon 8$ | $84 \bigcirc \varepsilon \varsigma$ |
| $22 \bigcirc 1 \varepsilon$ | $32 \bigcirc 12$ | $62 \bigcirc \ldots$ | $72 \bigcirc 19$ |
| (1) | (2) | (1) | (2) |

1) mounted left
2) mounted right

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Auxiliary contact block for size 0-12, 1NO + 1NC, 1. position | LSZO | - -800 | LSZ0D711 |
| Auxiliary contact block for size 3-12,1NO + 1NC, 2. position | LSZ3 | -000-0, | LSZ3D811 |

- Connection Links for Motor Protection Switches and Contactors, Size 0-3


Schrack-Info

- Contactors with AC-coil have less hight than those with DC-coil, therefore different connection links are necessary
- Connection link LSZODOO2, for connection of Motor protection switch BESO with AC operated contactor LSDO or LSSO
- Connection link LSZODOO4, for connection of Motor protection switch BESO with DC operated contactor LSDO or LSSO
- Connection link LSZ2D004, for connection of Motor protection switch BES2 with AC operated contactor LSD2
- Connection link LSZ2D005, for connection of Motor protection switch BES2 with DC operated contactor LSD2
- Connection link LSZ3D004, for connection of Motor protection switch BES3 with AC operated contactor LSD3
- Connection link LSZ3D003, for connection of Motor protection switch BES3 with DC operated contactor LSD3

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| for contactors size 0 (AC operated) and motor protection switch size 0 | LSZO | -000-6 | LSZOD002 |
| for contactors size 0 (DC operated) and motor protection switch size 0 | LSZO |  | LSZOD004 |
| for contactors size 2 (AC operated) and motor protection switch size 2 | LSZ2 |  | LSZ2D004 |
| for contactors size 2 (DC operated) and motor protection switch size 2 | LSZ2 |  | LSZ2D005 |
| for contactors size 3 (AC operated) and motor protection switch size 3 | LSZ3 | -50-m | LSZ3D004 |
| for contactors size 3 (DC operated) and motor protection switch size 3 | LSZ3 | $\begin{array}{rrr} \hline-000 & 0-8 \\ \hline \end{array}$ | LSZ3D003 |

Electromechanical Contactors Series ALEA LS

Supressor Units, Size 0-12

- Schrack-Info
- At contactors of size 0 up to 3 , surge supressors can be snapped in at top- or bottom-side of contactor. At contactors of size 6 up to 12, only at the top
- When a surge supressor is used together with connection link and motor protection switch, the supressor generally should be snapped in at bottom-side of contactor (to enable easy exchange)
- When a surge supressor is used at a combination of contactor and thermal overload relais, the supressor generally should be snapped in at top-side of contactor (to enable easy exchange)
- The diode assemblies for contactors size 0 have a defined polarity (marked with "+" and "-") therefore they are of different design for top or bottom mounting
- Circuit Diagram


1) Diode assembly
2) Varistor
3) $R C$ element

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Diode-assembly DC24V top mounted, size 0 | LSZD | - -8000 | LSZD0005 |
| Diode-assembly DC24V bottom mounted, size 0 | LSZD |  | LSZD0006 |
| Varistor for size 0, 24-48VAC, 24-70VDC | LSZO |  | LSZ00001 |
| Varistor for size 0, 127-240VAC, 150-250VDC | LSZO |  | LSZ00002 |
| Surge suppressor, RC for size 0, 127-240VAC, 150-250VDC | LSZO | $+\infty=-\infty$ | LSZ00003 |
| Surge suppressor, RC for size 2-3, 127-240VAC, 150-250VDC | LSZ2 | - -000000 | LSZ20001 |
| Surge suppressor, RC for size 6, 127-240VAC, 150-250VDC | LSZ6 |  | LSZ60001 |

Latching Block, Mechanical and Electrical, Size 0-2


■ Schrack-Info

- For frotside mounting ontos contactors of size 0 up to 2
- After contactor has switched on, the latching block catches the contactor in position "ON", also without control voltage. Release of latching block is realised by a short impuls of 24VAC or DC (terminal E1/E2)
- The Latching block additionally comes with one additional button for manual switching on and one reset-button for manual switching off
- Latching block occupies 2 of the 4 frontside plug-in slots of contactor and has to be assessed as a 2 NC at the summary number of maximum possible auxiliary contacts


## Dimensions



| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Mechanical latching block for s . $0-2$, remains "ON" if voltage fails | LSZO | $-\infty$ | LSZOOI13 |

## Electromechanical Contactors Series ALEA LS

Terminal Covers, Size 2-12

- Schrack-Info
- Additional terminal covers for contactors of size 2 and 3 with box terminals (Mouting onto box terminal)
- Short terminal covers ( 38 or 42 mm ) for contactors of size 6 up to 14 (without box terminal) as a cover for the terminals of contactor assemblies
- Long terminal covers ( 100 or 120 mm ) for contactors size 6 up to 14 (without box terminal) as a cover for the terminals of contactors feeded by busbar or cable lug
- One cover is necessary for one side of contactor, 2 pcs. have to be ordered for both-sided covering of one contactor


## Dimensions


4) Terminal cover

## Dimensions



1) 2nd auxiliary contact block, lateral
2) Auxiliary contact block, mountable on the front
3) RC element
4) Terminal cover

Terminal Covers, Size 2-12
Dimensions

2) Auxiliary contact block, mountable on the front
4) Terminal cover

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Terminal cover for contactors size 2, for one side of contactor | LSZ2 | - $-\infty=0$ | LSZ2D002 |
| Terminal cover for contactors size 3, for one side of contactor | LSZ3 | -080-9, | LSZ3D002 |
| Terminal cover for size 6, contactors with cable lug or busbar | LSZ6 | -5000 | LSZ6D001 |
| Terminal cover short version for size 10/12 for contactors with cable lug | LSZ6 | -000-9, | LSZ6D002 |
| Terminal cover for size 10/12 | LSZE | $+\infty=0$ | LSZED001 |
| Term. cover short version for size 10/12 for contactors with cable lug | LSZE | - $-\infty$ | LSZED002 |
| Terminal cover for contactors size 14 with cable lug | LSZH |  | LSZHD001 |

## Reversing Contactor Combinations Series ALEA LSW

Reversing Contactor Combinations LS, Size 00 / 0 / 2 / 3



## Schrack-Info

- Fully wired Reversing contactor assemblies up to 45 kW with integrated mechanical interlock
- Additional, posible auxiliary contacts see "auxiliary contact"" for die according size of contactors LSD.
- Thermal overload relais LST (not included in Reversing contactor assemblies) are additionally necessary
- For rated current of motor 0.11 A up to 12 A ... contactors size 00. use overload relais LSTD
- For rated current of motor 1.8 A up to 25 A ... contactors size 0 . use overload relais LSTO
- For rated current of motor 5.5 A up to 50 A ... contactors size 2, use overload relais LST2
- For rated current of motor 18A up to 100A ... contactors size 3, use overload relais LST3
- Thermal overload relais LST are designed for direct mouting to contactor or in "stand alone installation" by help of holder LSZ. TE01 to DIN-rail TS35
- Higher power for Reversing contactor assemblies (> 45 kW up to 450 kW ) can all be built by single components
- Therefore necessary, electronic overload relais with rated currents of $>100 \mathrm{~A}$ up to 630A for direct mouting to contactor or in "stand alone" version - on request

|  |  | LSWD07 \| | LSWD09 | LSWD12 | LSW012 | LSW017 | LSW025 | LSW232 | LSW240 | LSW250 | LSW365 | LSW380 | LSW395 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ | (VAC) | 690 |  |  |  |  |  |  |  |  |  |  |  |
| Utilization category AC-2 and AC-3 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Rated power at 400VAC | (kW) | 3 | 4 | 5,5 | 5,5 | 7,5 | 11 | 15 | 18,5 | 22 | 30 | 37 | 45 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at 380....440VAC | (A) | 7 | 9 | 12 | 12 | 17 | 25 | 32 | 40 | 50 | 65 | 80 | 95 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-25 \ldots+60$ |  |  |  |  |  |  |  |  |  |  |  |
| Permissible mounting position |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Rules and regulations according |  | IEC 60947-4-1, EN60947-4-1 |  |  |  |  |  |  |  |  |  |  |  |

Reversing Contactor Combinations LS, Size 00 / 0 / 2 / 3
Dimensions


1) with or without LSZDW002 mechanical interlock link
2) with LSZOWOO2 mechanical interlock

## Dimensions



[^11]
## Reversing Contactor Combinations Series ALEA LSW

Reversing Contactor Combinations LS, Size $00 / 0$ / 2 / 3
Circuit Diagrams, Size 00


Main circuit, Size 00:

1) The LSZDWOO1 wiring set contains, among other things, wiring connectors for connecting the main circuit.

Control circuit, Size 00:
The terminal designations for the contactors comply with EN 50012. The LSZDWOO1 wiring set contains, among other things, the electrical interlock.
2) For momentary-contact operation
3) For maintained-contact operation

SO Button "OFF"
S1 Button "Clockwise ON"
S2 Button "Counter clockwise ON"
S Button "CW-OFF-CCW"
K1 Clockwise contactor

K2 Counter clockwise contactor
F1 Fuses for main circuit
F3 Fuses for control circuit
F2 Thermal overload relays

Reversing Contactor Combinations LS, Size 00 / 0 / 2 / 3
Circuit Diagrams, Size 0/2/3
LSW0/LSW2/LSW3

(1)

(2)

(3)

## Main circuit, Sizes 0 to 3:

1) The LSZ.WOO1 wiring set contains, among other things, the wiring modules on the top and bottom for connecting the main current paths.

## Control circuit, Sizes 0 to 3:

The terminal designations for the contactors comply with EN 50012. The LSZOWOO2 mechanical interlock contains 2 NC contact, one for each contactor interlock.
2) For momentary-contact operation
3) For maintained-contact operation

SO Button "OFF"
S1 Button "Clockwise ON"
S2 Button "Counter clockwise ON"
S Button "CW-OFF-CCW"
K1 Clockwise contactor

K2 Counter clockwise contactor
F1 Fuses for main circuit
F3 Fuses for control circuit
F2 Thermal overload relays

## Reversing Contactor Combinations Series ALEA LSW

Reversing Contactor Combinations LS, Size 00 / 0 / 2 / 3

- Connection Diagrams, Size 00



## Connection Diagrams, Size 0/2/3



Terminal designations according to EN 50005. LSZOW002 mechanical interlock (laterally mountable), integrated in reversing contactor assemblies (reversing starters), contains 2 NC contacts for the electrical interlock, one for each contactor.


## Size 0-11kW



## Size 2-22kW

| Reversing Contactors Assembly, 15 kW, AC3, 230VAC, size 2 | LSW2 | LSW23233 |
| :--- | :--- | :--- | :--- |
| Reversing Contractors Assembly, 18,5 kW, AC3, 230VAC, size 2 | LSW2 | LSW24033 |
| Reversing Contractors Assembly, 22 kW, AC3, 230VAC, size 2 |  |  |
| Size 3 - 45 kW | LSW2 |  |
| Reversing Contractors Assembly, 30 kW, AC3, 230VAC, size 3 | LSD |  |
| Reversing Contractors Assembly, 37 kW, AC3, 230VAC, size 3 | LSW3 | LSW36533 |
| Reversing Contractors Assembly, 45 kW, AC3, 230VAC, size 3 | LSW38033 |  |

## Mechanical Interlock for Contactors, Size 0-12



## Schrack-Info

- Devices for mechanical interlocking of 2 contactors
- Mechanical interlock LSZOWOO2 for 2 contactors of size 0 up to 3 additionally contain 2 NC contacts for the electrical interlock between both contactors
- Mechanical interlock LSZ6W001 for 2 contactors of size 6 up to 12 (no auxiliary contacts are contained)
- For assembling of mechanical interlocked contactors of size 0 up to 6,2 additional connection clips are necessary
- Interlocked contactors of size 10 and 12 do not need connection clips, because they have to be fixed onto mounting plate
- When using mechanical interlock for two contactors LSR and LSU of size 0 , the "right side mounted" (4th) pole of left contactor has to be changed to the left side of contactor


## Dimensions



| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Mech. interlock for contactors size 0-3 (included 2 NC auxiliary contacts) | LSZO |  | LSZ6 |
| Mechanical interlock for contactors size $6-12$ |  | LSZOW002 |  |

## - Wiring Sets for Reversing Contactor Combinations, Size 0-12



LSZOW001

## - Schrack-Info

- Wiring sets for "self-assembling" of Reversing contactor assemblies
- Wiring set LSZOW001 for Reversing contactor assemblies size 0 contains all necessary bridges for mains. The mechanical interlock (to be ordered seperately) increases the total breadth of contactor assembly by 10 mm . Connection clips are not necessary, this function is realised by the bridges for mains
- Wiring set LSZ2W001 for Reversing contactor assemblies size 2 contains all necessary bridges for mains and connection clips. The mechanical interlock (to be ordered seperately) increases the total breadth of contactor assembly by 10 mm
- Wiring set LSZ3W001 for Reversing contactor assemblies size 3 contains all necessary bridges for mains and connection clips. The mechanical interlock (to be ordered seperately) increases the total breadth of contactor assembly by 10 mm
- Wiring set LSZ6W002 for Reversing contactor assemblies size 6 contains all necessary bridges for mains. The mechanical interlock (to be ordered seperately) increases the total breadth of contactor assembly by 10 mm
- Wiring set LSZEWOO1 for Reversing contactor assemblies size 10 contains all necessary bridges for mains. The mechanical interlock (to be ordered seperately) increases the total breadth of contactor assembly by 10 mm
- Wiring set LSZGWOO1 for Reversing contactor assemblies size 12 contains all necessary bridges for mains. The mechanical interlock (to be ordered seperately) increases the total breadth of contactor assembly by 10 mm

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Wiring set for reversing assemblies size 0 | LSZO | LSZOW001 |  |
| Wiring set for reversing assemblies size 2 , including connection clips | LSZ2 |  |  |
| Wiring set for reversing assemblies size 3 , including connection clips | LSZ3 | LSZ2W001 |  |
| Wiring set for reversing assemblies size 12 | LSZG | LSZ3W001 |  |

## Connection Clips for Contactors, Size 0-6



- Schrack-Info
- Set contain 2 clips for 1 contactor assembly (connecting of 2 contactors)
- Connection clips for direct fixing of 2 contactors (without gap) or for assembling 2 contactors with mechanical interlock in between ( 10 mm )
- Connection clips can be mounted without any tool

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Connection clips for 3/4-pole contactors, size 0 , not interlocked | LSZO | -000-900 | LSZ0W003 |
| Connection clips for 3/4-pole contactors, size 0, interlocked | LSZO | [-000-9, | LSZOW004 |
| Connection clips for 4-pole contactors, size 2, interlocked | LSZ2 | $-\infty 0 \div-\infty$ | LSZ2W002 |
| Connection clips for 4-pole contactors, size 3, interlocked | LSZ3 | [-00-9, | LSZ3W002 |
| Connection clips for 3 -pole contactors, size $2 / 3 / 6$, interlocked | LSZ2 | $+\infty 0$ | LSZ2W003 |
| Connection clips for 3/4-pole contactors, size 2/3, not interlocked | LSZ2 |  | LSZ2D001 |

Star-Delta Contactor Combinations LSY, Size 00 / 0 / 2


LSYO3233

## Schrack-Info

- Fully wired Y-D contactor assemblies up to 22 kW with integrated mechanical interlock between Delta- and Star-contactor
- For additional auxiliary contacts see "auxiliary contacts" for contactors LSD.
- Thermal overload relais LST (not included at Y-D contactor assembliy) has to be ordered seperately
- Rated currrent values 0.11 A up to 12 A (up to $7,5 \mathrm{~kW}$ YD) ... for contactors size 00 . use Thermal overload relais LSTD
- Rated currrent values 1.8 A up to 25 A (up to 15 kW YD) ... for contactors size 0 use Thermal overload relais LSTO
- Rated currrent values 5.5A up to 50A (up to 22 kW YD) ... for contactors size 2 use Thermal overload relais LST2
- Rated currrent values 18 A up to 100 A (> 22 kW YD) ... for Contactors size 3 use Thermal overload relais LST3
- Thermal overload relais LST are designed for direct mouting to contactor or in "stand alone installation" by help of holder LSZ.TE01 to DINrail TS35
- Higher power for Y-D contactor assemblies (> 22 kW up to 500 kW ) can all be built by existing single components. Therefore necessary, electronic overload relais with rated currents of $>100 \mathrm{~A}$ up to 630 A for direct mouting to contactor or in "stand alone" version - on request
- Adjusting values for thermal overload relais at $Y$-D use $=$ rated current of motor $\ln \times 0.58$


Rated Data at AC 50 Hz 400 V

| Rating | Operational <br> current $\boldsymbol{I}_{\mathbf{e}}$ <br> kW | Motor current | Size | Line/delta | Star contactor | WYE-Delta timer |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | Order No.

Star-Delta Contactor Combinations Series ALEA LSY

Star-Delta Contactor Combinations LSY, Size 00 / 0 / 2
Dimensions


Dimensions


## Dimensions



Star-Delta Contactor Combinations LSY, Size 00 / 0 / 2
Circuit Diagrams


## Main circuit:

1) The LSZDWOO1 wiring set contains, among other things, wiring connectors for connecting the main circuit

Control circuit:
with LSZDO101 Y-Delta timer, laterally mounted (example circuits). The contact element K4:17/18 is only closed in the wye stage; the contact element is open in the delta stage as well as in the de-energized state. $\mathrm{S} 1(\mathrm{~S})$ is connected to clamping point K 1:33.
2) For momentary-contact operation
3) For maintained-contact operation, * Clamping point $\mathrm{K} 1: 44$ remains unwired in this version


## Star-Delta Contactor Combinations Series ALEA LSY

Parallel Connectors (Star Jumper) and Feed Terminals, Size 0-12


LSZOD003


LSZ2D003


LSZ2Y005

## Schrack-Info

- 3-pole Parallel connectors (star jumpers) without terminal for contactors of size 0 up to 3 can be shortened by one pole (2-pole)
- Recommended covers for Paralllconnectors for contactors of size 6-LSZ6D002, for size 10 and 12 - LSZED002
- 3-pole Feed terminals BEZOO116 and BEZOO216 with three terminals can be used either for the feeding of contactors LSD, or for the feeding of Motor protection switches BES of according size
- 1-pole Feed terminals LSZ3D001 can be used either for the feeding of contactors LSD3, or for the feeding of Motor protection switches BES3. Therefore 3 of these terminals are necessary


## Dimensions



| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Feed terminals |  |  |  |
| Feed terminal, $95 \mathrm{~mm}^{2}$ for size 3, 1-pole + terminal | LSZ3 |  | LSZ3D001 |
| Parallel connectors |  |  |  |
| Parallel connector, $35 \mathrm{~mm}^{2}$ for size 0, 3-pole + terminal | LSZO |  | LSZOD003 |
| Parallel connector, star jumper 3-pole for contactors size 0 | LSZO |  | LSZOY002 |
| Parallel connector, 3-pole for contactors size 2, with feed-terminal $95 \mathrm{~mm}^{2}$ | LSZ2 |  | LSZ2D003 |
| Parallel connector, star jumper 3-pole for contactors size 2 | LSZ2 | [-60-9, | LSZ2Y005 |
| Parallel connector, star jumper 3-pole for contactors size 3 | LSZ3 | - $-\cdots$ | LSZ3Y004 |
| Parallel connector, star jumper 3-pole for contactors size 6 | LSZ6 |  | LSZ6Y003 |
| Parallel connector, star jumper 3-pole for contactors size 10, 12 | LSZE |  | LSZEY003 |

## - Wiring Sets for Star-Delta Contactor Combinations, Size 0-2



## ■ Schrack-Info

- Wiring sets for "self assembling" of Y-D contactor assemblies
- Wiring set LSZOYOO1 for Y-D contactor assemblies size 0-0-0 (up to 15 kW ) includes all necessary bridges for mains. The mechanical interlock (to be ordered seperately) increases the total breadth of contactor assembly by 10 mm . Connection clips and star jumper also are included. The Y - D timer also has to be ordered seperately
- Wiring set LSZ2YOO3 for Reversing contactor assemblies size 2-2-2 (up to 37 kW ) only includes the wiring for bottom side of contactors and the star jumper. For feeding Net- and Delta-contactor double infeed is recommended. The mechanical interlock (to be ordered seperately) increases the total width of contactor assembly by 10 mm . Connection clips are - because of recommended mounting plate LSZ2Y002 - not necessary. The Y-D timer also has to be ordered seperately
- Wiring sets or mounting plates for assemblies of size 3 up to 12 - on request

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Wiring set for Y-D assemblies size 0-0-0, including wiring, connection clips and star jumper | LSZO | -500 | LSZOYOO1 |
| Wiring set for Y-D assemblies size 2-2-0, including wiring bottom and star jumper | LSZ2 | LSZ2Y004 |  |
| Wiring set for Y-D assemblies size 2-2-2, including wiring bottom and star jumper | LSZ2 | LSZ2Y003 |  |
| Base-plate for YD-assemblies, size 2-2-0, for side arranged YD relay | LSZ2 | LSZ2Y001 |  |
| Base-plate for YD-assemblies, size 2-2-2, for side arranged YD relay | LSZ2 | LSZ2Y002 |  |

## Contactors Series CUBICO Mini, 3-pole

Contactors Series CUBICO Mini, 3-pole


■ Schrack-Info

- Contactors from $3 \mathrm{~kW} / 6 \mathrm{~A}, 4 \mathrm{~kW} / 9 \mathrm{~A}$ or $5,5 \mathrm{~kW} / 12 \mathrm{~A}, 3$-pole with integrated auxiliary contact
- Available with $230 \mathrm{VAC}, 24 \mathrm{VAC}$ or 24 VDC - coil
- Auxiliary contact NC or NO, depends of type
- Fitting surge suppressors are available
- Mountable to DIN-rail TS35 or mounting plate
- Further accessories find attached

|  |  | LZDM06 | LZDM09 | LZDM 12 |
| :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathrm{i}}$ | (VAC) | 690 |  |  |
| Utilization category AC-1 $\cos \varphi=1$ |  |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ | (A) | 20 | 20 | 20 |
| Utilization category AC-2 and AC-3 |  |  |  |  |
| Rated power at 400VAC | (kW) | 2,2 | 4 | 5,5 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ 400VAC | (A) | 6 | 9 | 12 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | -5 ... +40 |  |  |
| Permissible mounting position |  | Horizontal and verrical $+/-22.5^{\circ}$ |  |  |
| Rules and regulations according |  | IEC/EN 60947-4-1 |  |  |

Dimensions


Circuit Diagrams


1) 3-pole with auxiliary contact, 1 NO
2) 3-pole with auxiliary contact, 1 NC

- Connection Diagrams

| Lzom. 1 | Lzom. 2. |
| :---: | :---: |
|  |  |
|  |  |

Contactors Series CUBICO Mini, 3-pole

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| 6A |  |  |
| 3 -pole, 3kW, 6A, 1NO, 230VAC |  | LZDM0613 |
| 3 -pole, 3kW, 6A, 1NC, 230VAC | $+\infty=0$ | LZDM0623 |
| 3 -pole, 3kW, 6A, 1NO, 24VAC | - $-0 \times 0$ | LZDM0610 |
| 3-pole, 3kW, 6A, 1NC, 24VAC | $+80 \%-\infty$ | LZDM0620 |
| 3 -pole, 3kW, 6A, 1NO, 24VDC | -000-9, | LZDM0615 |
| 3 -pole, 3kW, 6A, 1NC, 24VDC | $+\infty=0$ | LZDM0625 |
| 9A |  |  |
| 3 -pole, 4kW, 9A, 1NO, 230VAC |  | LZDM0913 |
| 3 -pole, 4kW, 9A, 1NC, 230VAC | $+00 \div-6$ | LZDM0923 |
| 3 -pole, 4kW, 9A, 1NO, 24VAC | $+50-6$ | LZDM0910 |
| 3 -pole, 4kW, 9A, 1NC, 24VAC |  | LZDM0920 |
| 3-pole, 4kW, 9A, 1NO, 24VDC | $+50-\infty$ | LZDM0915 |
| 3-pole, 4kW, 9A, 1NC, 24VDC |  | LZDM0925 |
| 12A |  |  |
| 3 -pole, $5,5 \mathrm{~kW}, 12 \mathrm{~A}, 1 \mathrm{NO}, 230 \mathrm{VAC}$ |  | LZDM1213 |
| 3 -pole, 5,5kW, 12A, 1NC, 230VAC | $+\infty=\infty$ | LZDM1223 |
| 3-pole, 5,5kW, 12A, 1NO, 24VAC | $+\infty=0$ | LZDM1210 |
| 3-pole, 5,5kW, 12A, 1NC, 24VAC | $+\infty 0-\infty$ | LZDM1220 |
| 3-pole, 5,5kW, 12A, 1NO, 24VDC | $+000-6$ | LZDM1215 |
| 3-pole, 5,5kW, 12A, 1NC, 24VDC |  | LZDM1225 |

Contactors Series CUBICO Mini, 3-pole

## Accessories Series CUBICO Mini



## Schrack-Info

- Auxiliary contacts for front-mounting for contactors series CUBICO Mini
- Protective modules for 24 V and 230 V coil of the contactors

Dimensions


Circuit Diagram

| LZZMH022 | LZZMV... |
| :---: | :---: |
| $51 \quad 637381$ | $\sim / \pm$ |
|  |  |
| $\begin{array}{llll}52 & 64 \quad 74 \quad 82\end{array}$ | $\sim / \pm$ |

## Connection Diagram



| DESCRIPTION | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |
| Auxiliary contacts |  |  |
| Auxiliary contacts front-type for CUBICO Mini 2NO+2NC |  |  |
| Surge supressors |  |  |
| Varistor Mini $24-48 \mathrm{VAC} / \mathrm{DC}$ | LZZMH022 |  |
| Varistor Mini $110-250 \mathrm{VAC}$ |  |  |

- Contactors Series CUBICO Classic, 3-pole

- Schrack-Info
- Contactors from $4 \mathrm{~kW} / 9 \mathrm{~A}$ up to $18,5 \mathrm{~kW} / 38 \mathrm{~A}$
- 3-pole with integrated auxiliary contact
- Avialable with $230 \mathrm{VAC}, 24 \mathrm{VAC}$ or 24 VDC - coil
- Auxiliary contact NC or NO, depends of type
- Fitting surge suppressors are available
- Mountable to DIN-rail TS35 or mounting plate
- Further accessories find attached

LZDC32BO

| LZDC09 | LZDC12 | LZDC18 | LZDC25 | LZDC32 | LZDC38 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| L90 |  |  |  |  |  |


|  |  | LZDC09 | LZDC12 | LZDC18 | LZDC25 | LZDC32 | LZDC38 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathrm{i}}$ | (VAC) | 690 |  |  |  |  |  |
| Utilization category AC-1 $\cos \varphi=1$ |  |  |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ at $40^{\circ} \mathrm{C}$ | (A) | 25 | 25 | 32 | 40 | 50 | 50 |
| Utilization category AC-2 and AC-3 |  |  |  |  |  |  |  |
| Rated power at 400VAC | (kW) | 4 | 5,5 | 7,5 | 11 | 15 | 18,5 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ 400VAC | (A) | 9 | 12 | 18 | 25 | 32 | 38 |
| Ambient temperature (operation) | $\left({ }^{\circ} \mathrm{C}\right)$ | $-5 \ldots+40$ |  |  |  |  |  |
| Permissible mounting position |  | Horizontal and vertical +/-22.5 |  |  |  |  |  |
| Rules and regulations according |  | IEC/EN 60947-4-1 |  |  |  |  |  |

Dimensions

LZDC09.., LZDC12.., LZDC18..


LZDC25.., LZDC32.., LZDC38..



## Connection Diagram



Circuit Diagram


## Contactors Series CUBICO Classic, 3-pole

Contactors Series CUBICO Classic, 3-pole

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |
| 4kW / 9A |  |  |
| 3 -pole, 4kW, 9A, 1NO+1NC, 230VAC |  |  |
| 3 -pole, $4 \mathrm{~kW}, 9 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 24 \mathrm{VAC}$ |  | LZDC09B3 |
| 3 -pole, 4kW, 9A, $1 \mathrm{NO}+1 \mathrm{NC}, 24 \mathrm{VDC}$ |  | LZDCO9BO |

## 5,5kW / 12A

| 3 -pole, $5,5 \mathrm{~kW}, 12 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 230 \mathrm{VAC}$ |  | LZDC12B3 |  |
| :--- | :--- | :--- | :--- |
| 3 -pole, $5,5 \mathrm{~kW}, 12 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 24 \mathrm{VAC}$ |  |  |  |
| 3 -pole, $5.5 \mathrm{~kW}, 12 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 24 \mathrm{VDC}$ |  | LZDC12BO |  |

## 7,5kW / 18A

| 3 -pole, $7,5 \mathrm{~kW}, 18 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 230 \mathrm{VAC}$ |  | LZDC18B3 |  |
| :--- | :--- | :--- | :--- |
| 3 -pole, $7,5 \mathrm{~kW}, 18 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 24 \mathrm{VAC}$ |  |  |  |
| 3 -pole, $7.5 \mathrm{~kW}, 18 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 24 \mathrm{VDC}$ |  | LZDC18BO |  |

## II kW / 25A

| 3 -pole, $11 \mathrm{~kW}, 25 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 230 \mathrm{VAC}$ |  |  |  |
| :--- | :--- | :--- | :--- |
| 3 -pole, $11 \mathrm{~kW}, 25 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 24 \mathrm{VAC}$ |  |  |  |
| $\mathbf{1 5 k W} / 32 \mathrm{~A}$ |  |  |  |
| 3 -pole, $15 \mathrm{~kW}, 32 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 230 \mathrm{VAC}$ |  | LZDC25B3 |  |
| 3 -pole, $15 \mathrm{~kW}, 32 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 24 \mathrm{VAC}$ |  | LZDC25BO |  |

## 18,5kW / 38A

| 3 -pole, $18,5 \mathrm{~kW}, 38 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 230 \mathrm{VAC}$ | $-\infty 000$ | LZDC38B3 |
| :--- | :--- | :--- |
| 3 -pole, $18,5 \mathrm{~kW}, 38 \mathrm{~A}, 1 \mathrm{NO}+1 \mathrm{NC}, 24 \mathrm{VAC}$ | LZDC38B0 |  |

Accessories Series CUBICO Classic


## Schrack-Info

- Auxiliary contacts for front or side-mounting for contactors series CUBICO Classic
- Mechanical interlock for two contactors series Classic
- Protective modules for 24 V and 230 V coil of the contactors

Dimensions


Dimensions


## Circuit Diagrams

| LCCH031 | LCCH022 | LCCHO2O | LZZCH002 | LCCH011 | LCCCH711 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 53617383 | 53617183 | 5363 | 5161 | 5361 | 13/43 21/31 |
| $\pm 4+1$ | $1-4$ | 1 | 4 | $1-14$ | $1-1$ |
| ${ }_{54}{ }^{1}+7484$ | 54627284 | $54 \quad 64$ |  | $54 \quad 62$ | 14/44 ${ }^{\text {22/32 }}$ |

## Contactors Series CUBICO Classic, 3-pole

## Accessories Series CUBICO Classic

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| Auxiliary contact block |  |  |
| Auxiliary contact front-type for CUBICO Classic, 3NO+1NC | -000-6, | LZZCH031 |
| Auxiliary contact front-type for CUBICO Classic, 2NO+2NC | -000-9, | LZZCH022 |
| Auxiliary contacts front-type for CUBICO Classic, 2NO | -000-9, | LZZCH020 |
| Auxiliary contact front-type for CUBICO Classic, 2NC | - $\times 0 \times 1$ | LZZCH002 |
| Auxiliary contact front-type for CUBICO Classic, 1NO+1NC | -000-9, | LZZCH011 |
| Auxiliary contact block - side |  |  |
| Auxiliary contact side-type for CUBICO Classic, 1NO+1NC | - $-\cdots$ | LZZCH711 |
| Mechanical interlock |  |  |
| Mechanical interlock for CUBICO Classic | -000-6, | LZZCL001 |
| Surge supressors |  |  |
| Varistor Classic 24-48V AC/DC |  | LZZCV024 |
| Varistor Classic 110-250 V AC | $\begin{array}{r} -600 \\ \hline \end{array}$ | LZZCV230 |

Technical Information
Terminal Screws

| Devices | Kind of connection |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Type | Screw with washer | Screw with clamp box |  | $\begin{aligned} & \text { Screw } \\ & \text { w.nut } \end{aligned}$ |  | Screw driver |  | lb. inch |
| Micro Contactors, all conductors K0-.. | M2,5 | - | - | - | 5 |  | 0.6-0.8 | 5-7 |
| Mini Contactors, all conductors K1-.. | M3,5 | - | - | - |  |  | 0.8-1.4 | 7-12 |
| Auxiliary Contactors, all conductors K(G)3-07.. | M3,5 | - | - | - | 5 |  | 0.8-1.4 | 7-12 |
| Contactors <br> Main conductor <br> K(G)3-10.. to K3-22.. <br> K(G)3-24.. to K3-40.. <br> K3-50.. to K3-74.. | M3,5 | M5 <br> M6 |  |  | (5) | $\begin{aligned} & \text { Pz2 } \\ & \text { Pz2 } \\ & \text { Pz3 } \end{aligned}$ | $\begin{gathered} 0.8-1.4 \\ 2.5-3 \\ 3.5-4.5 \end{gathered}$ | $\begin{gathered} 7-12 \\ 22-26 \\ 31-40 \end{gathered}$ |
| K2-23, -30, -37A00-40 $\mathrm{K} 2-45,-60 \mathrm{~A} 00-40$ | M4 | M6 |  |  | $\sqrt{4}$ | $\begin{aligned} & \mathrm{Pz} 2 \\ & \mathrm{Pz} 3 \end{aligned}$ | $\begin{aligned} & 1.2-1.8 \\ & 3.5-4.5 \end{aligned}$ | $\begin{aligned} & 11-16 \\ & 31-40 \end{aligned}$ |
| K3-90, K3-115 | - | - | M8 | - | (1) | 4 mm hex socket | 4-6.5 | 35-57 |
| $\begin{aligned} & \text { K3-116.. to K3-176.. } \\ & \text { K3-210.. to K3-316 } \\ & \text { K3-450.. and K3-550.. } \end{aligned}$ | - - - |  |  | M8 <br> M10 <br> M 12 | $\square$ |  | $\begin{aligned} & 17 \\ & 35 \\ & 60 \end{aligned}$ | $\begin{aligned} & 150 \\ & 315 \\ & 540 \end{aligned}$ |
| Auxiliary conductor K(G)3-10 to K3-22 <br> Coil conductor $K(G) 3-10 \text { to K3-550 }$ | M3,5 <br> M3,5 | - - |  |  | $4 \sqrt{3}$ | $\begin{aligned} & \text { Pz2 } \\ & \text { Pz2 } \end{aligned}$ | 0.8-1.4 <br> 0.8-1.4 | $\begin{aligned} & 7-12 \\ & 7-12 \end{aligned}$ |
| Accessories <br> HK, HKM <br> HA, HN, K2-.., HB.. | $\begin{aligned} & M 3,5 \\ & M 3,5 \end{aligned}$ | - |  | - |  | $\begin{aligned} & \text { Pz2 } \\ & \text { Pz2 } \end{aligned}$ | $\begin{aligned} & 0.8-1.4 \\ & 0.8-1.4 \end{aligned}$ | $\begin{aligned} & 7-12 \\ & 7-12 \end{aligned}$ |

Technical Specification - Electromechanical Contactors Series LA

## Micro Contactors LA, Size M

Technical Specifications according to IEC 60947-4-1, VDE 0660, EN 60947-4-1


## Micro Contactors LA, Size M

Technical Specifications according to IEC 60947-4-1, VDE 0660, EN 60947-4-1

| Main contacts |  | Type | K0-05D |
| :---: | :---: | :---: | :---: |
| Utilization category DC1 |  |  |  |
| Switching of resistive load | 1 pole 24 V | A | 12 |
| Time constant $\mathrm{L} / \mathrm{R} \leq 1 \mathrm{~ms}$ | 60 V | A | 12 |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 110 V | A | - |
|  | 220 V | A | - |
|  | 3 poles in series 24 V | A | 12 |
|  | 60 V | A | 12 |
|  | 110 V | A | 12 |
|  | 220 V | A | - |
| Utilization category DC3 and DC5 |  |  |  |
| Switching of shunt motors | 1 pole 24V | A | 12 |
| and series motors | 60 V | A | - |
| Time constant $\mathrm{L} / \mathrm{R} \leq 15 \mathrm{~ms}$ | 110 V | A | - |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 220 V | A | - |
|  | 3 poles in series 24 V | A | 12 |
|  | 60 V | A | 12 |
|  | 110 V | A | 12 |
|  | 220 V | A | - |
| Maximum ambient temperature |  |  |  |
| Operation | open | ${ }^{\circ} \mathrm{C}$ | -40 to $+60(+90)^{11}$ |
|  | enclosed | ${ }^{\circ} \mathrm{C}$ | -40 to +40 |
| Storage |  | ${ }^{\circ} \mathrm{C}$ | -50 to +90 |
| Short circuit protection |  |  |  |
| for contactors without thermal overload relay |  |  |  |
| Coordination-type " 1 " according to IEC 947-4-1 |  |  |  |
| Contact welding without hazard of persons max. fuse size | gl (gG) | A | 32 |
| Coordination-type "2" according to IEC 947-4-1 |  |  |  |
| Light contact welding accepted |  |  |  |
| max. fuse size | gL (gG) | A | - |
| Contact welding not accepted max. fuse size | gL (gG) | A | - |
| For contactors with thermal overload relay the device with the smaller admissible backup ruse (contactor of thermal overload relay) determines the fuse size |  |  |  |
| Cable cross-sections |  |  |  |
| for contactors |  |  |  |
| main connector | solid of stranded | $\mathrm{mm}^{2}$ | 0.5-1.5 |
|  | flexible | $\mathrm{mm}^{2}$ | 0.5-1.5 |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ | 0.5-1.5 |
| Cables per clamp |  |  | 2 |
|  | solid of stranded | AWG | 20-14 |
| Frequency of operation $z$ | without load | 1/h | 10000 |
| contactors without thermal overload relay | AC3, I | 1/h | 600 |
|  | AC4, I | 1/h | 120 |
|  | DC3, I | 1/h | 600 |
| Mechanical life | AC operated | $5 \times 10^{6}$ | 3 |
|  | DC operated | $5 \times 10^{6}$ | 4 |
| Short time current | 10s-current | A | 50 |
| Power loss per pole | at $\mathrm{I}_{\mathrm{e}} /$ AC3 400 V | W | 0.2 |
| Resistance to shock according to IEC 68-2-27 |  |  |  |
| Shock time 20 ms sine-wave |  |  |  |
| AC operated | NO | 9 | 2.5 |
|  | NC | g | 2.5 |

[^12]Technical Specification - Electromechanical Contactors Series LA

## Micro Contactors LA, Size M

Technical Specifications according to IEC 60947-5-1, VDE 0660, EN 60947-5-1

| Auxiliary contacts |  | Type | KO-04D |
| :--- | :--- | :---: | :---: |
| KO-05D |  |  |  |

1) Suitable at 690 V for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard industry): $\mathrm{U}_{\mathrm{imp}}=4 \mathrm{kV}$. Data for other conditions on request.
2) $90^{\circ} \mathrm{C}$ : reduces the control voltage range to 0.9 up to $1.0 \times \mathrm{U}_{\mathrm{s}}$ and reduces the thermal rated current lth to le/ ACl 15 .
3) Summary switching time $=$ release time + arc duration.

Micro Contactors LA, Size M
Motor Rating and Breaking Current (K0-05D)
a)
$P_{n}=A C 4$
380/ 220/
400 V 230 V
kW kW

$$
I_{a}\left(=I_{e}=A C 1\right)
$$




1) Millions of Operations
a) Motor Rating
b) Breaking Current

Technical Specification - Electromechanical Contactors Series LA

## Mini Contactors LA, Size 1

Technical Specifications according to IEC 947-4-1, VDE 0660, EN 60947-4-1

| Main contacts |  | Type | K1-09D |
| :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ |  | V AC | $690{ }^{11}$ |
| Making capacity $\mathrm{l}_{\text {eff }}$ | at $\mathrm{U}_{\mathrm{e}}=690 \mathrm{VAC}$ | A | 165 |
| Breaking capacity $\mathrm{l}_{\text {eff }}$ | 400 V AC | A | 100 |
| $\cos \varphi=0.65$ | 500 V AC | A | 90 |
|  | 690 VAC | A | 80 |
| Utilization category AC1 - Switching of resistive load |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}\left(=I_{t+1}\right)$ at $40^{\circ} \mathrm{C}$, open |  | A | 20 |
| Rated operational power of three-phase resistive loads | 230 V | kW | 7.9 |
| $50-60 \mathrm{~Hz}, \cos \varphi=1$ | 240 V | kW | 8.3 |
|  | 400 V | kW | 13.8 |
|  | 415 V | kW | 14.3 |
| Rated operational current $I_{e}\left(=l_{t+1}\right)$ at $60^{\circ} \mathrm{C}$, enclosed |  | A | 16 |
| Rated operational power of three-phase resistive loads | 230 V | kW | 6.3 |
| $50-60 \mathrm{~Hz}, \cos \varphi=1$ | 240 V | kW | 6.7 |
|  | 400 V | kW | 11 |
|  | 415 V | kW | 11.5 |
| Minimum cross-section of conductor at load with $\mathrm{I}_{\mathrm{e}}\left(=\mathrm{I}_{\mathrm{t}_{\mathrm{t}}}\right)$ |  | $\mathrm{mm}^{2}$ | 2.5 |
| Utilization category AC2 and AC3 - Switching of three-phase motors |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 220 V | A | 12 |
| open and enclosed | 230 V | A | 11.5 |
|  | 240 V | A | 11 |
|  | 380-400V | A | 9 |
|  | 415-440V | A | 8 |
|  | 500 V | A | 7 |
|  | 660-690V | A | 5 |
| Rated operational power of three-phase motors | 220-240V | kW | 3 |
| $50-60 \mathrm{~Hz}$ | 380-440V | kW | 4 |
|  | 500-690V | kW | 4 |
| Utilization category AC4 - Switching of squirrel cage motors, inching |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 220 V | A | 12 |
| open and enclosed | 230 V | A | 11.5 |
|  | 240 V | A | 11 |
|  | 380-400V | A | 9 |
|  | 415-440V | A | 8 |
|  | 500 V | A | 7 |
|  | 660-690V | A | 5 |
| Rated operational power of three-phase motors | 220-240V | kW | 3 |
| $50-60 \mathrm{~Hz}$ | 380-440V | kW | 4 |
|  | 500-690V | kW | 4 |
| Utilization category AC5a - Switching of gas discharge lamps |  |  |  |
| Rated operational current $\mathrm{l}_{\mathrm{e}}$ per pole at $220 / 230 \mathrm{~V}$ |  |  |  |
| Fluorescent lamps, |  |  |  |
|  | uncompensated and serial compensated | A | 10 |
|  | parallel compensated | A | 2 |
|  | dual-connection | A | 16 |
| Metal halide lamps ${ }^{31}$, |  |  |  |
|  | uncompensated | A | 10 |
|  | parallel compensated | A | 2 |
| Mercury-vapour lamps ${ }^{41}$ |  |  |  |
|  | uncompensated | A | 16 |
|  | parallel compensated | A | 2 |
| Mixed light lamps ${ }^{51}$ |  | A | 16 |

## LED-Lamps

consider the inrush current of the lamp ballast
max. lamps per pole $\qquad$
and $\cos \varphi$ of the lamp
$\left(1_{\text {nIED }} \leq I_{l_{t \mid}}\right)=$ inrush current of lamp/EVG

| max. inrush current of contactor | A |  |
| :--- | :--- | :--- |
| Utilization category AC5b Switching of incandescent lamps ${ }^{6 /}$ | A |  |
| Rated operational current le per pole at $220 / 230 \mathrm{~V}$ | 8 |  |

Rated operational current le per pole at 220/230 V
A
8

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $\mathrm{U}_{\mathrm{imp}}=8 \mathrm{kV}$. Data for other conditions on request.
2) Metal halide lamps and sodium-vapour lamps (high- and low-pressure lamps).
3) High-pressure lamps.
4) Blended lamps, containing a mercury high-pressure unit and a tungsten helix in a fluorescent glass bulb (daylight lamps).
5) Current inrush approx. $16 \times 1$

## Mini Contactors LA, Size 1

Technical Specifications according to IEC 947-4-1, VDE 0660, EN 60947-4-1

| Main contacts |  | Type | K1-09D |
| :---: | :---: | :---: | :---: |
| Utilization category DC1 |  |  |  |
| Switching of resistive load | 1 pole 24V | A | 20 |
| Time constant $\mathrm{L} / \mathrm{R} \leq 1 \mathrm{~ms}$ | 60 V | A | 20 |
| Rated operational current $I_{\text {e }}$ | 110 V | A | 5 |
|  | 220 V | A | 0.6 |
|  | 3 poles in series 24 V | A | 20 |
|  | 60 V | A | 20 |
|  | 110 V | A | 20 |
|  | 220 V | A | 16 |
| Utilization category DC3 and DC5 |  |  |  |
| Switching of shunt motors | 1 pole 24V | A | 20 |
| and series motors | 60 V | A | 5 |
| Time constant $\mathrm{L} / \mathrm{R} \leq 15 \mathrm{~ms}$ | 110 V | A | 1 |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 220 V | A | 0.15 |
|  | 3 poles in series 24 V | A | 20 |
|  | 60 V | A | 20 |
|  | 110 V | A | 20 |
|  | 220 V | A | 2 |
| Maximum ambient temperature |  |  |  |
| Operation | open | ${ }^{\circ} \mathrm{C}$ | -40 to $+60(+90)^{11}$ |
|  | enclosed | ${ }^{\circ} \mathrm{C}$ | -40 to +40 |
| with thermal overload relay | open | ${ }^{\circ} \mathrm{C}$ | -25 to +60 |
|  | enclosed | ${ }^{\circ} \mathrm{C}$ | -25 to +40 |
| Storage |  | ${ }^{\circ} \mathrm{C}$ | -50 to +90 |
| Short circuit protection - for contactors without thermal overload relay |  |  |  |
| Coordination-type " 1 " according to IEC 947-4-1 |  |  |  |
| Contact welding without hazard of persons max. fuse size | $\mathrm{gL}(\mathrm{gG})$ | A | 40 |
| Coordination-type "2" according to IEC 947-4-1 |  |  |  |
| Light contact welding accepted |  |  |  |
| max. fuse size | $\mathrm{gL}(\mathrm{gG})$ | A | 25 |
| Contact welding not accepted |  |  |  |
| max. fuse size | $g \mathrm{l}$ (gG) | A | 10 |
| For contactors without thermal overload relay the device with the smaller admissible backup fuse |  |  |  |
| (contactor or thermal overload relay) determines the fuse size. |  |  |  |
| Cable cross-sections |  |  |  |
| for contactors without thermal overload relay |  |  |  |
| main connector | solid or stranded | $\mathrm{mm}^{2}$ | 0.5-2.5 |
|  | flexible | $\mathrm{mm}^{2}$ | 0.5-2.5 |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ | 0.5-1.5 |
| Cables per clamp |  |  | 2 |
|  | solid or stranded | AWG | 18-14 |
| Frequency of operations z | without load | 1/h | 10000 |
| Contactors without thermal overload relay | AC3, I | 1/h | 600 |
|  | AC4, $\mathrm{I}_{\text {e }}$ | 1/h | 120 |
|  | DC3, $\mathrm{I}_{\mathrm{e}}$ | 1/h | 600 |
| Mechanical life | AC operated - $\mathrm{S}_{\text {x }}$ | 106 | 5 |
|  | DC operated - Sx | 106 | 15 |
| Short time current | 10s-current | A | 96 |
| Power loss per pole | at le/AC3 400V | W | 0.15 |
| Resistance to shock according to IEC 68-2-27 |  |  |  |
| Shock time 20 ms sine-wave |  |  |  |
| AC operated | NO | g | 5 |
|  | NC | g | 5 |
| DC operated | NO | g | 8 |
|  | NC | g | 6 |

1) $90^{\circ} \mathrm{C}$ : reduces the control voltage range to 0.9 up to $1.0 \times \mathrm{U}_{\mathrm{s}}$ and reduces the rated current $\mathrm{I}_{\mathrm{e}} / \mathrm{AC} 1$ to the value of $\mathrm{I}_{\mathrm{e}} / \mathrm{AC} 3$

Technical Specification - Electromechanical Contactors Series LA

## Mini Contactors LA, Size 1

- Technical Specifications according to IEC 947-5-1, VDE 0660, EN 60947-5-1

| Auxiliary contacts |  | Type | K1-09D | $\mathrm{K} 1-09 \mathrm{D}=$ | HK |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ |  | VAC | $690^{11}$ | 6901 | 6901) |
| Thermal rated current $\mathrm{Ith}^{\text {to }}$ to 690 V |  |  |  |  |  |
| Ambient temperature | $40^{\circ} \mathrm{C}$ | A | 10 | 10 | 10 |
|  | $60^{\circ} \mathrm{C}$ | A | 6 | 6 | 6 |
| Power loss per pole | at $\mathrm{l}_{\text {th }}$ | W | 0.5 | 0.5 | 0.5 |
| Utilization category AC15 |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 220-240V | A | 3 | 3 | 3 |
|  | 380-415V | A | 2 | 2 | 2 |
|  | 440 V | A | 1.6 | 1.6 | 1.6 |
|  | 500 V | A | 1.2 | 1.2 | 1.2 |
|  | 660-690V | A | 0.6 | 0.6 | 0.6 |
| Utilization category DC13 |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 60 V | A | 2 | 2 | 2 |
|  | 110 V | A | 0.4 | 0.4 | 0.4 |
|  | 220 V | A | 0.1 | 0.1 | 0.1 |
| Maximum ambient temperature |  |  |  |  |  |
| Operation | open | ${ }^{\circ} \mathrm{C}$ | -40 to $+60(+90)^{31}$ |  |  |
|  |  | ${ }^{\circ} \mathrm{C}$ | -40 to +40 |  |  |
| Storage |  | ${ }^{\circ} \mathrm{C}$ | -40 to +90 |  |  |
| Short circuit protection |  |  |  |  |  |
| short-circuit current 1 kA contact welding not accepted |  |  | 20 | 20 | 20 |
|  |  |  |  |  |  |
| max. fuse size | $\mathrm{gL}(\mathrm{gG})$ | A |  |  |  |
| For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size. |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| Power consumption of coils |  |  |  |  |  |
| AC operated | inrush | VA | 25 | - | - |
|  | sealed | VA | 4-5 | - | - |
|  |  | W | 1.2 | - | - |
| DC operated | inrush | W | - | 2.5 | - |
|  | sealed | W | - | 2.5 | - |
| Operation range of coils |  |  | 19-30 V DC | 0.8-1.1 | - |
| in multiples of control voltage $\mathrm{U}_{5}$ |  |  | 0.85-1.1 |  |  |
| Switching time at control voltage $\mathrm{U}_{5} \pm 10 \%{ }^{4 / 5}$ |  |  |  |  |  |
| AC operated | make time | ms | 15-19 | - | - |
|  | release time | ms | 8-25 | - | - |
|  | arc duration | ms | 10-15 | - | - |
| DC operated | make time | ms | - | 15-25 | - |
|  | release time | ms | - | 8-25 | - |
|  | arc duration | ms | - | 10-15 | - |
| Cable cross-section |  |  |  |  |  |
| all connectors | solid | $\mathrm{mm}^{2}$ | 0.5-2.5 | 0.5-2.5 | 0.5-2.5 |
|  | flexible | $\mathrm{mm}^{2}$ | 0.5-2.5 | 0.5-2.5 | 0.5-2.5 |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ | 0.5-1.5 | 0.5-1.5 | 0.5-1.5 |
| Clamps per pole |  |  | 2 | 2 | 2 |

1) Suitable at 690 V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $\mathrm{U}_{\mathrm{imp}}=8 \mathrm{kV}$. Data for other conditions on request.
2) $90^{\circ} \mathrm{C}$ : reduces the control voltage range to 0.9 up to $1.0 \times \mathrm{U}_{\mathrm{s}}$ and reduces the thermal rated current lth to the value of le/ ACl 15 .
3) Summary switching time $=$ release time + arc duration.
4) Release time of NC make time of NO increase when suppressor units for voltage peak protection are use (Varistor, RC-units, Diode units).

Mini Contactors LA, Size 1
Motor Rating and Breaking Current (K1-09D)
a) $P_{n}=A C 4$

b)


1) Millions of Operations
a) Motor Rating
b) Breaking Current

Technical Specification - Electromechanical Contactors Series LA

## Auxiliary Contactors LA

Technical Specifications according to IEC 947-5-1, VDE 0660, EN 60947-5-1

|  |  | Type | K3-07ND | K3-07ND= | KG3-07A | KG3-07D |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathbf{i}}{ }^{\text {1/ }}$ |  | VAC ${ }^{11}$ | 690 | 690 | 690 | 690 |
| Thermal rated current $\mathrm{I}_{\text {th }}$ to 690V |  |  |  |  |  |  |
| Ambient temperature | $40^{\circ} \mathrm{C}$ | A | 10 | 10 | 20 | 10 |
|  | $60^{\circ} \mathrm{C}$ | A | 6 | 6 | 16 | 6 |
| Frequency of operations z |  | 1/h | 10000 | 10000 | 10000 | 10000 |
| Mechanical life |  | $5 \times 10^{6}$ | 10 | 10 | 10 | 50 |
| Utilization category AC15 |  |  |  |  |  |  |
| Rated operational | $220-240 \mathrm{~V}$ | A | 4 | 4 | 12 | 4 |
| current I | 380-415V | A | 2 | 2 | 4 | 2 |
|  | 440 V | A | 1.6 | 1.6 | 4 | 1.6 |
|  | 500 V | A | 1.2 | 1.2 | 3 | 1.2 |
|  | 660-690V | A | 0.6 | 0.6 | 1 | 0.6 |
| Utilization category DC13 |  |  |  |  |  |  |
| Rated operational | 24-60V | A | 3.5 | 3.5 | 8 | 3.5 |
| current $I_{\text {e }}$ | 110 V | A | 0.5 | 0.5 | 1 | 0.5 |
| per pole | 220 V | A | 0.1 | 0.1 | 0.1 | 0.1 |
| Power consumption of coils |  |  |  |  |  |  |
| AC operated | inrush | VA | 30-45 | - | - | - |
|  | sealed | VA | 7-10 | - | - | - |
|  |  | W | 2.6-3 | - | - | - |
| DC operated | inrush | W | - | 75 | 3 | 3 |
|  | sealed | W | - | 2 | 3 | 3 |
| Operation range of coils |  |  |  |  |  |  |
| in multiples of control voltage $\mathrm{U}_{5}$ |  |  | 0.85-1.1 | 0.8-1.1 | 0.8-1.1 | 0.8-1.1 |
| Switching time at control voltage $\mathrm{U}_{\mathbf{s}} \pm 10 \%$ |  |  |  |  |  |  |
|  | make time | ms | 8-16 | 8-16 | 65-85 | 65-85 |
|  | release time | ms | 5-13 | 5-13 | $20-30^{31}$ | $20-30^{3 /}$ |
| Maximum ambient temperature |  |  |  |  |  |  |
| Operation | open | ${ }^{\circ} \mathrm{C}$ | -40 to $+60(+90)^{21}$ |  |  |  |
|  | enclosed | ${ }^{\circ} \mathrm{C}$ | -40 to +40 |  |  |  |
| Storage |  | ${ }^{\circ} \mathrm{C}$ | -40 to +90 |  |  |  |
| Short circuit protection |  |  |  |  |  |  |
| short-circuit current 1 kA , contact welding not accepted |  |  |  |  |  |  |
| max. fuse size | gL (gG) | A | 20 | 20 | 25 | 20 |
| Cable cross-section |  |  |  |  |  |  |
| Connector | solid | $\mathrm{mm}^{2}$ | 0.75-6 |  |  |  |
|  | flexible | $\mathrm{mm}^{2}$ | 1-4 |  |  |  |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ | 0.75-4 |  |  |  |
| Magnet coil | solid | $\mathrm{mm}^{2}$ | 0.75-2.5 |  |  |  |
|  | flexible | $\mathrm{mm}^{2}$ | 0.75-2.5 |  |  |  |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ | 0.5-1.5 |  |  |  |
| Clamps per pole |  |  | 2 |  |  |  |
| Connector | solid | AWG | 18-10 |  |  |  |
|  | flexible | AWG | 18-10 |  |  |  |
| Clamps per pole |  |  | 2 |  |  |  |
| Magnet coil | solid | AWG | 14-12 |  |  |  |
|  | flexible | AWG |  |  |  |  |
| Clamps per pole |  |  | 2 |  |  |  |

1) Suitable at 690 V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $\mathrm{U}_{\text {imp }}=8 \mathrm{kV}$. Data for other conditions on request.
2) $90^{\circ}$ reduces the control voltage range to 0.9 up to $1.0 \times \mathrm{U}_{\mathrm{s}}$ and reduces the thermal rated current $\mathrm{I}_{\mathrm{t}} / \mathrm{ACl}$ to the value of $\mathrm{I}_{\mathrm{e}} / \mathrm{ACl5}$
3) With built-in coil suppressor.

- Capacitor Switching Contactors LA, Size 3

Rated Operational Power at $50 / 60 \mathrm{~Hz}$

| Ambient Te $50^{\circ} \mathrm{C}$ | rature |  | $60^{\circ} \mathrm{C}$ |  |  | Auxiliary Contacts Built-in Add. |  |  | Type |  | Coil voltage ${ }^{11}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \hline 380 \mathrm{~V} \\ & 400 \mathrm{~V} \\ & \text { kVAr } \end{aligned}$ | $\begin{aligned} & 415 \mathrm{~V} \\ & 440 \mathrm{~V} \\ & \mathrm{kVAr} \end{aligned}$ | $\begin{aligned} & 660 \mathrm{~V} \\ & 690 \mathrm{~V} \\ & \mathrm{kVAr} \end{aligned}$ | $\begin{aligned} & \hline 380 \mathrm{~V} \\ & 400 \mathrm{~V} \\ & \mathrm{kVAr} \end{aligned}$ | $\begin{aligned} & 415 \mathrm{~V} \\ & 440 \mathrm{~V} \\ & \mathrm{kVAr} \end{aligned}$ | $\begin{aligned} & 660 \mathrm{~V} \\ & 690 \mathrm{~V} \\ & \mathrm{kVAr} \end{aligned}$ | NO | NC | pcs. |  |  | $\begin{aligned} & \text { Pack } \\ & \text { pcs. } \end{aligned}$ | $\begin{aligned} & \text { Weight } \\ & \mathrm{kg} / \mathrm{pc} . \end{aligned}$ |
| $\begin{aligned} & 0-12.5 \\ & 0-12.5 \end{aligned}$ | $\begin{aligned} & 0-13 \\ & 0-13 \end{aligned}$ | $\begin{aligned} & 0-20 \\ & 0-20 \end{aligned}$ | $\begin{aligned} & 0-12.5 \\ & 0-12.5 \end{aligned}$ | $\begin{aligned} & 0-13 \\ & 0-13 \end{aligned}$ | $\begin{aligned} & 0-20 \\ & 0-20 \end{aligned}$ | $1$ | $1$ | $\begin{aligned} & 1^{21} \\ & 1^{21} \end{aligned}$ | K3-18NK 10 <br> K3-18NKOI |  | $\begin{aligned} & 1 \\ & 1 \end{aligned}$ | $\begin{aligned} & 0.34 \\ & 0.34 \end{aligned}$ |
|  | $\begin{aligned} & 10.5-22 \\ & 10.5-27 \end{aligned}$ | $\begin{aligned} & 17-33 \\ & 17-41 \\ & \hline \end{aligned}$ | $\begin{aligned} & 10-20 \\ & 10-25 \end{aligned}$ | $\begin{aligned} & 10.5-22 \\ & 10.5-27 \\ & \hline \end{aligned}$ | $\begin{aligned} & 17-33 \\ & 17-41 \\ & \hline \end{aligned}$ |  | - | $\begin{aligned} & 3^{31} \\ & 3^{31} \end{aligned}$ | $\begin{aligned} & \text { K3-24K00 } \\ & \text { K3-32K00 } \\ & \hline \end{aligned}$ | $\begin{aligned} & 230 \\ & 230 \end{aligned}$ | $\begin{aligned} & 1 \\ & 1 \end{aligned}$ | $\begin{aligned} & 0.62 \\ & 0.62 \end{aligned}$ |
| $\begin{aligned} & 20-33.3 \\ & 20-50 \\ & 20-75^{4)} \end{aligned}$ | $\begin{array}{r} 23-36 \\ 23-53 \\ 23-75^{4)} \\ \hline \end{array}$ | $\begin{gathered} 36-55 \\ 36-82 \\ 36-120^{4)} \end{gathered}$ | $\begin{gathered} 20-33.3 \\ 20-50 \\ 20-60 \\ \hline \end{gathered}$ | $\begin{aligned} & 23-36 \\ & 23-53 \\ & 23-64 \\ & \hline \end{aligned}$ | $\begin{gathered} 36-55 \\ 36-82 \\ 36-100 \\ \hline \end{gathered}$ | - | - | $\begin{aligned} & 3^{31} \\ & 3^{31} \\ & 3^{31} \end{aligned}$ | $\begin{aligned} & \text { K3-50K00 } \\ & \text { K3-62K00 } \\ & \text { K3-74K00 } \\ & \hline \end{aligned}$ | $\begin{aligned} & 230 \\ & 230 \\ & 230 \\ & \hline \end{aligned}$ | $1$ | $\begin{aligned} & 1.0 \\ & 1.0 \\ & 1.0 \\ & \hline \end{aligned}$ |
| $\begin{aligned} & 33-80 \\ & 33-100^{6} \end{aligned}$ | $\begin{gathered} 36-82 \\ 36-103^{61} \end{gathered}$ | $\begin{gathered} 57-120 \\ 57-148^{61} \end{gathered}$ | $\begin{gathered} 33-75 \\ 33-90^{6)} \end{gathered}$ | $\begin{gathered} 36-77 \\ 36-93^{61} \end{gathered}$ | $\begin{gathered} 57-120 \\ 57-148^{61} \end{gathered}$ | - | - | $\begin{aligned} & 6^{5)} \\ & 6^{5)} \end{aligned}$ | $\begin{aligned} & \text { KЗ-90К00 } \\ & \text { K3-115K00 } \end{aligned}$ | 230 230 | $1$ | $\begin{aligned} & 2.3 \\ & 2.3 \end{aligned}$ |

Specification: Contactors K3-...K are suitable for switching low-inductive and low loss capacitors in capacitor banks
(IEC70 and 831, VDE 0560) without and with reactors.
Capacitor switching contactors are fitted with early make contacts and damping resistors, to reduce the value of make current $<70 \times \mathrm{I}_{\mathrm{e}}$.
Operating Conditions: Capacitor switching contactors are protected against contact welding for a prospective making current of $200 \times \mathrm{I}_{\mathrm{e}}$.

1) See coil voltage range and non-standard coil voltages
2) 1 HN .. Or HA.. snap-on.
3) 2 HB .. for side mounting and 1 HN .. or HA.. snap-on.
4) Consider the max. thermal current of the contactor K3-74A: $I_{t h} 130 \mathrm{~A}$.
5) 2 HB .. on the left or right side and 4 HN .. or HA.. snap-on.
6) Consider the min. cross-section of conductor at max. load.

Technical Specifications according to IEC 947-4-1, IEC 947-5-1, EN 60947-4-1, EN 60947-5-1, VDE 0660

| Type |  |  | K3-18NK | K3-24K | K3-32K | K3-50K | K3-62K | K3-74K | K3-90K | K3-115K |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Max. frequency of operations z |  | 1/h | 120 | 120 | 120 | 120 | 120 | 80 | 80 | 80 |
| Contact life | non reactive capacitor banks | $5 \times 10^{3}$ | 250 | 150 | 150 | 150 | 150 | 120 | 120 | 120 |
|  | reactive capacitor banks | $5 \times 10^{3}$ | 400 | 300 | 300 | 300 | 300 | 200 | 200 | 200 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ | at $50^{\circ} \mathrm{C}$ | A | 0-18 | 14-28 | 14-36 | 30-48 | 30-72 | 30-108 | 50-115 | 50-144 |
| AC6b | at $60^{\circ} \mathrm{C}$ | A | 0-18 | 14-28 | 14-36 | 30-48 | 30-72 | 30-87 | 50-108 | 50-130 |
| Rated operational current $l_{\text {th }}$ | at $50^{\circ} \mathrm{C}$ | A | 32 | 45 | 60 | 100 | 110 | 120 | 155 | 190 |
| ACl | at $60^{\circ} \mathrm{C}$ | A | 32 | 40 | 55 | 90 | 100 | 110 | 145 | 170 |
| Overload factor | at $50^{\circ} \mathrm{C}$ | \% | 78 | 60 | 67 | 108 | 53 | 11 | 35 | 32 |
| acc. To EN 61921: 30 \% min. | at $60^{\circ} \mathrm{C}$ | \% | 78 | 43 | 53 | 88 | 39 | 26 | 34 | 31 |
| Fuses gL (gG) | from/to | A | 35/63 | 50/80 | 63/100 | 80/160 | 125/160 | 160/200 | 160/200 | 160/250 |

Technical Specification - Electromechanical Contactors Series LA

Capacitor Switching Contactors LA, Size 3

| Contactor | Type |  | K3-18NK10 | K3-18NKO1 | K3-24K | K3-32K |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Capacitor rating at rated power <br> (Utilization category AC-6b) | $\begin{aligned} & 230 \mathrm{~V}, 50 / 60 \mathrm{~Hz} \\ & 400 \mathrm{~V}, 50 / 60 \mathrm{~Hz} \\ & 525 \mathrm{~V}, 50 / 60 \mathrm{~Hz} \\ & 690 \mathrm{~V}, 50 / 60 \mathrm{~Hz} \\ & \hline \end{aligned}$ | kVAr | $0-7$ |  | 5-11 | 5-14 |
|  |  | kVAr |  | 0-12,5 | 10-20 | 10-25 |
|  |  | kVAr | 0-15 | 0-15 | 12-25 | 12-32 |
|  |  | kVAr | 0-20 | 0-20 | 17-33 | 17-41 |
| Auxiliary contact mounted |  |  | 1 NO | 1NC | -- | -- |
| Auxiliary contacts mountable | snap on front |  | $\begin{aligned} & \hline \text { 1NC/6A } \\ & \text { HAOI } \end{aligned}$ | $\begin{aligned} & \hline \text { 1NC/6A } \\ & \text { HAO1 } \end{aligned}$ | -- | -- |
|  |  |  | $\begin{gathered} \hline \text { 1NO/3A } \\ \text { HN10 } \end{gathered}$ | 1NO/3A | 1NO/3A | 1NO/3A |
|  |  |  |  | HN10 | HN10 | HN10 |
|  |  |  | $1 \mathrm{NC} / 3 \mathrm{~A}$HNOI | 1NC/3A | 1NC/3A | $1 \mathrm{NC} / 3 \mathrm{~A}$ |
|  |  |  |  | HNO1 |  |  |
|  | side mounted |  | -- | -- | $\begin{gathered} \hline \mathrm{NO}+1 \mathrm{NC} / 3 \mathrm{~A} \\ \mathrm{HB} 11 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \mathrm{NO}+1 \mathrm{NC} / 3 \mathrm{~A} \\ \mathrm{HB} 11 \end{gathered}$ |
| Magnetic coil operating range |  |  | -- | -- | -- | -- |
| Max. switching frequency |  | $\mathrm{h}^{-1}$ | 120 | 120 | 120 | 120 |
| Electrical endurance |  | operating cycles | 250000 | 250000 | 150000 | 150000 |
| Rated operational current $\mathrm{I}_{\text {e }}$ | at $50^{\circ} \mathrm{C}$ | A | 0-18 | 0-18 | 14-28 | 14-36 |
|  | at $60^{\circ} \mathrm{C}$ | A | 0-18 | 0-18 | 14-28 | 14-36 |
| Ambient temperature |  | ${ }^{\circ} \mathrm{C}$ | $\leq 60$ (90) ${ }^{11}$ | $\leq 60$ (90) ${ }^{11}$ | $\leq 60$ (90) ${ }^{11}$ | $\leq 60$ (90) ${ }^{11}$ |
| Standards |  |  | IEC 947-4-1 / EN 60947-4-1 / VDE 0660 |  |  |  |
| Short-circuit protection | fuse gl/gG | A | 35-63 | 35-63 | 50-80 | 63-100 |
| Conductor cross-sections |  |  |  |  |  |  |
| For contactors without thermal overload relay |  |  | $\stackrel{5+8}{5+8}$ |  |  |  |
| - 1 cable per clamp | solid or stranded <br> flexible <br> flexible with multicore cable end | $\begin{aligned} & \mathrm{mm}^{2} \\ & \mathrm{~mm}^{2} \\ & \mathrm{~mm}^{2} \\ & \hline \end{aligned}$ | $0.75-6$ |  | $2.5-16$ |  |
| - 2 cable per clamp | solid or stranded | $\overline{\mathrm{mm}^{2}}$ | $\begin{gathered} 6+(1-6) / 4+(0.75-4) \\ 2.5+(0.75-2.5) / 1.5+(0.75-1.5) \\ 6+(1.5-6) / 4+(1-4) \\ 2.5+(0.75-2.5) / 1.5+(0.75-1.5) \end{gathered}$ |  | $\begin{gathered} 16+(2.5-6) / 10+(4-10) \\ 6+(4-6) / 4+(2.5-4) \\ 16+(2.5-6) / 10+(4-10) \\ 6+(4-6) / 4+(2.5-4) \end{gathered}$ |  |
| - Cables per clamp |  |  | 2 |  | 2 |  |
| For main connector |  |  | $\begin{array}{r} 18-10 \\ 18-10 \\ \hline \end{array}$ |  | $\begin{gathered} 16-10 \\ 14-4 \\ \hline \end{gathered}$ |  |
| - 1 cable per clamp | solid | AWG |  |  |  |  |
|  | flexible | AWG |  |  |  |  |
| - 2 cable per clamp | solid | AWG | $\begin{aligned} & 10+(16-10) / 12+(18-12) \\ & 14+(18-16) / 16+(18-16) \end{aligned}$ |  | $\begin{aligned} & 10+(16-10) / 12+(18-12) \\ & 14+(18-16) / 16+(18-16) \end{aligned}$ |  |
|  |  |  |  |  |  |  |
|  | flexible | AWG | $\begin{aligned} & 10+(14-10) / 12+(18-12) \\ & 14+(18-14) / 16+(18-16) \\ & \hline \end{aligned}$ |  | $4+(18-12) / 6+(18-8)$ |  |
|  |  |  |  |  | $8+(18-8) / 10+(18-12)$ |  |
| - Cables per clamp |  |  | 2 |  | 2 |  |
| Coil voltage |  |  |  |  |  |  |
|  | $0,85-1,1 \times U_{N}$ |  | $230 \mathrm{VAC} ; 50 \mathrm{~Hz}$ |  |  |  |
| Mechanical life | AC operated $\mathrm{S} \times 10^{6}$ |  | 10 |  |  | 10 |
|  | DC operated $\mathrm{S} \times 10^{6}$ |  | 10 |  |  | 10 |
| Short time current | 10 S current | A | 144 |  |  | 240 |
| Power loss per pole | at $\mathrm{I}_{e} / \mathrm{AC3} 400 \mathrm{~V}$ | W | 0.5 |  |  | 1.3 |

[^13]Capacitor Switching Contactors LA, Size 3


1) With reduced control voltage range 0.9 up to $1.0 \times \mathrm{U}_{\mathrm{e}}$ and with reduced rated current $\mathrm{I}_{\mathrm{e}} / \mathrm{ACl}$ according to $\mathrm{I}_{\mathrm{e}} / \mathrm{AC} 3$

Technical Specification - Electromechanical Contactors Series LA

Capacitor Switching Contactors LA, Size 3

| Mounted auxiliary contacts | Type |  | K3-18NK | K3-24K, K3-32K | $\begin{gathered} \text { K3-50К, К3-62K } \\ \text { К3-74K } \end{gathered}$ | K3-90K, K3-115K |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Control circuit |  |  |  |  |  |  |
| Power consumption of coils |  |  |  |  |  |  |
| AC operated | inrush | VA | 33-45 | 90-115 | 140-165 | 190-280 |
|  | sealed | VA | 7-10 | 9-13 | 13-18 | 2.5-5 |
|  |  | W | 2.6-3 | 2.7-4 | 5.4-7 | 2.5-5 |
| DC operated | inrush | W | 75 | 140 | 200 | 190-280 |
|  | sealed | W | 2 | 2 | 6 | 2.5-5 |
| Operation range of coils |  |  |  |  |  |  |
| in multiples of control voltage $U_{s}$ | AC operated |  | 0.85-1.1 | 0.85-1.1 | 0.85-1.1 | 0.85-1.1 |
|  | DC operated |  | 0.8-1.1 | 0.8-1.1 | 0.8-1.1 | 0.8-1.1 |
| Switching time |  |  |  |  |  |  |
| At control voltage $\mathrm{U}_{\mathrm{s}} \pm 10 \%^{2 / 3}$ ) |  |  |  |  |  |  |
| AC operated | make time | ms | 8-16 | 10-25 | 12-28 | 20-35 |
|  | release time | ms | 5-13 | 8-15 | 8-15 | 35-50 |
|  | arc duration | ms | 10-15 | 10-15 | 10-15 | 10-15 |
| DC operated | make time | ms | 8-12 | 10-20 | 12-23 | 20-35 |
|  | release time | ms | 8-13 | 10-15 | 10-18 | 35-50 |
|  | arc duration | ms | 10-15 | 10-15 | 10-15 | 10-15 |
| Cable cross-section |  |  |  |  |  |  |
| Auxiliary connector | solid | $\mathrm{mm}^{2}$ | 0.75-6 | -- | -- | -- |
|  | flexible | $\mathrm{mm}^{2}$ | 1-4 | -- | -- | -- |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ | 0.75-4 | -- | -- | -- |
| Magnet coil | solid | $\mathrm{mm}^{2}$ | 0.75-2.5 | 0.75-2.5 | 0.75-2.5 | 0.75-2.5 |
|  | flexible | $\mathrm{mm}^{2}$ | 0.5-2.5 | 0.5-2.5 | 0.5-2.5 | 0.5-2.5 |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ | 0.5-1.5 | 0.5-1.5 | 0.5-1.5 | 0.5-1.5 |
| Clamps per pole |  |  | 2 | 2 | 2 | 2 |
| Auxiliary connector | solid | AWG | 18-10 | -- | -- | -- |
|  | flexible | AWG | 18-10 | -- | -- | -- |
| Magnet coil | solid flexible | AWG | 14-12 | 14-12 | 14-12 | 14-12 |
|  |  | AWG | 18-12 | 18-12 | 18-12 | 18-12 |
| Clamps per pole |  |  | 2 | 2 | 2 | 2 |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}{ }^{1 /}$ | V~ |  | 690 | -- | -- | -- |
| Thermal rated current lth to 690V |  |  |  |  |  |  |
| Ambient temperature | $40^{\circ} \mathrm{C}$ | A | 16 | -- | -- | -- |
|  | $60^{\circ} \mathrm{C}$ | A | 12 | -- | -- | -- |
| Utilization category AC15 |  |  |  |  |  |  |
| Rated operational current $I_{\text {e }}$ | 220-240V | A | 12 | -- | -- | -- |
|  | $380-415 \mathrm{~V}$ | A | 4 | -- | -- | -- |
|  | 440 V | A | 4 | -- | -- | -- |
|  | 500 V | A | 3 | -- | -- | -- |
|  | 660-690V | A | 1 | -- | -- | -- |
| Utilization category DC13 |  |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 60 V | A | 8 | -- | -- | -- |
|  | 110 V | A | 1 | -- | -- | -- |
|  | 220 V | A | 0.1 | -- | -- | -- |
| Short circuit protection <br> short-circuit current 1 kA , contact welding not accepted <br> max. fuse size <br> gL (gG) <br> A <br> 25 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Auxiliary contacts snap on or side mounted | Type |  | HAOI | HB11 | HN10 | HNO1 |
|  |  |  | 1 NC | $1 \mathrm{NO}+1 \mathrm{NC}$ | 1 NO | 1 NC |
| AC15 | 230 V | A | 6 | 3 | 3 | 3 |
| AC15 | 400 V | A | 3 | 2 | 2 | 2 |
| AC1 | 690 V | A | 25 | 10 | 10 | 10 |

[^14]
## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660

| Main contacts |  | Type | K(G)3-10 | K(G)3-14 | K(G)3-18 | K(G)3-22 | K(G)3-24 | K(G)3-32 | K(G)3-40 | K3-50 | K3-62 | K3-74 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}{ }^{1 /}$ |  | VAC | 690 | 690 | 690 | 690 | 690 | 690 | 690 | 830 | 830 | 830 |
| Making capacity ${ }_{\text {eff }}$ | $\begin{aligned} & \text { at } U_{e}= \\ & 690 \mathrm{VAC} \end{aligned}$ | A | 200 | 200 | 200 | 200 | 400 | 500 | 500 | 700 | 900 | 900 |
|  | 1000VAC | A | - | - | - | - | - | - | - | - | - | - |
| Breaking capacity $\mathrm{I}_{\text {eff }}$ | 400VAC | A | 180 | 180 | 200 | 200 | 380 | 400 | 400 | 600 | 800 | 800 |
| K3-10 to K3-22 $\cos \varphi=0.65$ | 500VAC | A | 150 | 150 | 180 | 180 | 300 | 370 | 370 | 500 | 700 | 700 |
| K3-24 to K3-1200 $\cos \varphi=0.35$ | 690VAC | A | 100 | 100 | 150 | 150 | 260 | 340 | 340 | 400 | 500 | 500 |
|  | 1000VAC | A | - | - | - | - | - | - | - | - | - | - |
| Utilization category AC1 |  |  |  |  |  |  |  |  |  |  |  |  |
| Switching of resistive load Rated operational current $\mathrm{I}_{\mathrm{e}}\left(=I_{t_{t}}\right)$ at $40^{\circ} \mathrm{C}$, open |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 690 V | A | 25 | 25 | 32 | 32 | 50 | 65 | 80 | 110 | 120 | 130 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Rated operational power of three-phase resistive loads $50-60 \mathrm{~Hz}, \cos \varphi=1$ | 220 V | kW | 9.5 | 9.5 | 12.2 | 12.2 | 19.0 | 24.7 | 30.4 | 41.9 | 45.7 | 49.5 |
|  | 230 V | kW | 9.9 | 9.9 | 12.7 | 12.7 | 19.9 | 25.9 | 31.8 | 43.8 | 47.7 | 51.7 |
|  | 240 V | kW | 10.4 | 10.4 | 13.3 | 13.3 | 20.8 | 27.0 | 33.2 | 45.7 | 49.8 | 54.0 |
| $50-60 \mathrm{~Hz}, \cos \varphi=1$ | 380 V | kW | 16.4 | 16.4 | 21.0 | 21.0 | 32.9 | 42.7 | 52.6 | 72.3 | 78.9 | 85.5 |
|  | 400 V | kW | 17.3 | 17.3 | 22.1 | 22.1 | 34.6 | 45.0 | 55.4 | 76.1 | 83.0 | 90.0 |
|  | 415 V | kW | 17.9 | 17.9 | 23.0 | 23.0 | 35.9 | 46.7 | 57.4 | 79.0 | 86.2 | 93.3 |
|  | 440 V | kW | 19.9 | 19.0 | 24.4 | 24.4 | 38.1 | 49.5 | 60.9 | 83.7 | 91.3 | 99.0 |
|  | 500 V | kW | 21.6 | 21.6 | 27.7 | 27.7 | 43.3 | 56.2 | 69.2 | 95.2 | 103.8 | 112.5 |
|  | 660 V | kW | 28.5 | 28.5 | 36.5 | 36.5 | 57.1 | 74.2 | 91.3 | 125.6 | 137.0 | 148.4 |
|  | 690 V | kW | 29.8 | 29.8 | 38.2 | 38.2 | 59.7 | 77.6 | 95.5 | 131.3 | 143.2 | 155.2 |
|  | 1000V | kW | - | - | - | - | - | - | - | - | - | - |
| Rated operational current $I_{e}\left(=I_{\text {the }}\right)$ at $60^{\circ} \mathrm{C}$, enclosed | 690 V | A | 25 | 25 | 32 | 32 | 40 | 55 | 65 | 90 | 100 | 110 |
| Rated operational power of three-phase resistive loads $50-60 \mathrm{~Hz}, \cos \varphi=1$ | 220 V | kW | 9.5 | 9.5 | 12.2 | 12.2 | 15.2 | 20.9 | 24.7 | 34.3 | 38.1 | 41.9 |
|  | 230 V | kW | 9.9 | 9.9 | 12.7 | 12.7 | 15.9 | 21.9 | 25.9 | 35.8 | 39.8 | 43.8 |
|  | 240 V | kW | 10.4 | 10.4 | 13.3 | 13.3 | 16.6 | 22.8 | 27.0 | 37.4 | 41.5 | 45.7 |
| $50-60 \mathrm{~Hz}, \cos \varphi=1$ | 380 V | kW | 16.4 | 16.4 | 21.0 | 21.0 | 26.3 | 36.2 | 42.7 | 59.2 | 65.7 | 72.3 |
|  | 400 V | kW | 17.3 | 17.3 | 22.1 | 22.1 | 27.7 | 38.1 | 45.0 | 62.3 | 69.2 | 76.1 |
|  | 415 V | kW | 17.9 | 17.9 | 23.0 | 23.0 | 28.7 | 39.5 | 46.7 | 64.6 | 71.8 | 79.0 |
|  | 440 V | kW | 19.0 | 19.0 | 24.4 | 24.4 | 30.4 | 41.9 | 49.5 | 68.5 | 76.1 | 83.7 |
|  | 500 V | kW | 21.6 | 21.6 | 27.7 | 27.7 | 34.6 | 47.6 | 56.2 | 77.9 | 86.5 | 95.2 |
|  | 660 V | kW | 28.5 | 28.5 | 36.5 | 36.5 | 45.7 | 62.8 | 74.2 | 102.8 | 114.2 | 125.6 |
|  | 690 V | kW | 29.8 | 29.8 | 38.2 | 38.2 | 47.7 | 65.7 | 77.6 | 107.4 | 119.4 | 131.3 |
|  | 1000V | kW | - | - | - | - | - | - | - | - | - | - |
| Minimum cross-section of conductor at load with $I_{e}\left(=I_{t h}\right)$ |  | $\mathrm{mm}^{2}$ | 4 | 4 | 6 | 6 | 10 | 16 | 25 | 35 | 50 | 50 |
| Utilization category AC2 and AC3 |  |  |  |  |  |  |  |  |  |  |  |  |
| Switching of three-phase motors |  |  |  |  |  |  |  |  |  |  |  |  |
| Rated operational current $I_{\text {e }}$ open and enclosed | 220 V | A | 12 | 15 | 18 | 22 | 24 | 30 | 40 | 50 | 63 | 74 |
|  | 230 V | A | 11.5 | 14.5 | 18 | 22 | 24 | 30 | 40 | 50 | 63 | 74 |
|  | 240 V | A | 11 | 15 | 18 | 22 | 24 | 30 | 40 | 50 | 63 | 74 |
|  | 380-400V | A | 10 | 14 | 18 | 22 | 24 | 30 | 40 | 50 | 63 | 74 |
|  | 415 V | A | 9 | 14 | 18 | 22 | 24 | 30 | 40 | 50 | 63 | 74 |
|  | 440 V | A | 9 | 14 | 18 | 22 | 24 | 30 | 40 | 50 | 63 | 74 |
|  | 500 V | A | 8.9 | 11.9 | 15 | 15 | 22.5 | 28.5 | 28.5 | 44 | 54 | 64.5 |
|  | 660-690V | A | 6.7 | 9 | 12 | 12 | 17.5 | 21 | 21 | 33 | 42 | 49 |
|  | 1000V | A | - | - | - | - | - | - | - | - | - | - |
| Rated operational power of three-phase motors $50-60 \mathrm{~Hz}$ | 220-230V | kW | 3 | 4 | 5 | 6 | 6 | 8.5 | 11 | 12.5 | 18.5 | 22 |
|  | 240 V | kW | 3 | 4 | 5 | 7 | 7 | 9 | 11.5 | 13.5 | 19 | 23 |
|  | 380-400V | kW | 4 | 5.5 | 7.5 | 11 | 11 | 15 | 18.5 | 22 | 30 | 37 |
|  | 415 V | kW | 4.5 | 6 | 8.5 | 12 | 12 | 16 | 20 | 24 | 33 | 40 |
|  | 440 V | kW | 4.5 | 6 | 8.5 | 12 | 12 | 16 | 20 | 24 | 33 | 40 |
|  | 500 V | kW | 5.5 | 7.5 | 10 | 10 | 15 | 18.5 | 18.5 | 30 | 37 | 45 |
|  | 660-690V | kW | 5.5 | 7.5 | 10 | 10 | 15 | 18.5 | 18.5 | 30 | 37 | 45 |
|  | 1000V | kW | - | - | - | - | - | - | - | - | - | - |

[^15]Technical Specification - Electromechanical Contactors Series LA

Power Contactors
Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660

| Main Contacts |  | Type | K3-90 | K3-115 | K3-116 | K3-151 | K3-176 | K3-210 | K3-260 | K3-316 | K3-450 | K3-550 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}^{\text {i }}{ }^{1 /}$ |  | VAC | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Making capacity ${ }_{\text {leff }}$ | at $U_{\mathrm{e}}=$ 690VAC | A | 1100 | 1200 | 1200 | 1500 | 2000 | 2100 | 2600 | 3200 | 4500 | 5500 |
|  | 1000VAC | A | 540 | 600 | 600 | 720 | 840 | 1020 | 1200 | 1500 | 2400 | 3000 |
| Breaking capacity $\mathrm{l}_{\text {eff }}$ | 400VAC | A | 950 | 1100 | 1000 | 1200 | 1500 | 1600 | 2100 | 2600 | 4500 | 5500 |
| K3-10 up to K3-22 $\cos \varphi=0.65$ | 500VAC | A | 850 | 1000 | 1000 | 1200 | 1500 | 1600 | 2100 | 2600 | 4500 | 5500 |
| K3-24 up to K3-1200 $\cos \varphi=0.35$ | 690VAC | A | 600 | 600 | 800 | 1000 | 800 | 1200 | 1900 | 2300 | 3200 | 4400 |
|  | 1000VAC | A | 450 | 450 | 400 | 500 | 600 | 700 | 850 | 1000 | - | - |
| Utilization category AC1 |  |  |  |  |  |  |  |  |  |  |  |  |
| Switching of resistive load <br> Rated operational current $I_{e}\left(=I_{t_{t}}\right)$ <br> at $40^{\circ} \mathrm{C}$, open | 690 V | A | 160 | 200 | 200 | 230 | 250 | 350 | 450 | 500 | 700 | 760 |
| Rated operational power | 220 V | kW | 60 | 76 | 76 | 87 | 95 | 133 | 171 | 190 | 266 | 289 |
| of three-phase resistive loads | 230 V | kW | 63 | 79 | 79 | 91 | 99 | 139 | 179 | 199 | 279 | 302 |
| $50-60 \mathrm{~Hz}, \cos \varphi=1$ | 240 V | kW | 66 | 83 | 83 | 95 | 103 | 145 | 187 | 207 | 291 | 315 |
|  | 380 V | kW | 105 | 131 | 131 | 151 | 164 | 230 | 296 | 329 | 460 | 500 |
|  | 400 V | kW | 110 | 138 | 138 | 159 | 173 | 242 | 311 | 346 | 485 | 526 |
|  | 415 V | kW | 115 | 143 | 143 | 165 | 179 | 251 | 323 | 359 | 503 | 546 |
|  | 440 V | kW | 121 | 152 | 152 | 175 | 190 | 266 | 342 | 381 | 533 | 579 |
|  | 500 V | kW | 138 | 173 | 173 | 199 | 216 | 303 | 389 | 453 | 606 | 658 |
|  | 660 V | kW | 182 | 228 | 228 | 262 | 285 | 400 | 514 | 571 | 800 | 868 |
|  | 690 V | kW | 191 | 239 | 239 | 274 | 298 | 418 | 537 | 597 | 836 | 908 |
|  | 1000V | kW | 221 | 277 | 216 | 318 | 346 | 433 | 546 | 606 | 692 | 866 |
| Rated operational current $I_{e}\left(=I_{t_{t}}\right)$ |  |  |  |  |  |  |  |  |  |  |  |  |
| Rated operational power | 220 V | kW | 55 | 64 | 64 | 68 | 76 | 106 | 137 | 152 | 209 | 228 |
| of three-phase resistive loads | 230 V | kW | 57 | 67 | 67 | 71 | 79 | 111 | 143 | 159 | 219 | 239 |
| $50-60 \mathrm{~Hz}, \cos \varphi=1$ | 240 V | kW | 59 | 70 | 70 | 74 | 83 | 116 | 150 | 166 | 228 | 249 |
|  | 380 V | kW | 95 | 111 | 111 | 118 | 131 | 184 | 237 | 263 | 362 | 395 |
|  | 400 V | kW | 100 | 117 | 117 | 124 | 138 | 193 | 249 | 277 | 381 | 415 |
|  | 415 V | kW | 104 | 122 | 122 | 129 | 143 | 201 | 259 | 287 | 395 | 431 |
|  | 440 V | kW | 110 | 129 | 129 | 137 | 152 | 213 | 274 | 304 | 419 | 457 |
|  | 500 V | kW | 125 | 147 | 147 | 155 | 173 | 242 | 312 | 346 | 476 | 519 |
|  | 660 V | kW | 165 | 194 | 194 | 205 | 228 | 320 | 412 | 457 | 628 | 685 |
|  | 690 V | kW | 173 | 202 | 202 | 215 | 239 | 334 | 430 | 478 | 657 | 717 |
|  | 1000V | kW | 166 | 187 | 216 | 277 | 346 | 388 | 499 | 554 | 692 | 866 |
| Minimum cross-section of conductor <br> at load with $\mathrm{I}_{\mathrm{e}}\left(=I_{t_{t}}\right)$ |  | $\mathrm{mm}^{2}$ | 95 | 120 | 95 | 95 | 120 | 240 | $2 \times 150$ | $2 \times(30 \times 6)$ | $2 \times(40 \times 5)$ | $2 \times(50 \times 5)$ |
| Utilization category AC2 and AC3 |  |  |  |  |  |  |  |  |  |  |  |  |
| Switching of three-phase motors |  |  |  |  |  |  |  |  |  |  |  |  |
| Rated operational current $I_{\text {e }}$ | 220 V | A | 90 | 115 | 115 | 150 | 175 | 210 | 260 | 315 | 450 | 550 |
| open and enclosed | 230 V | A | 90 | 115 | 115 | 150 | 175 | 210 | 260 | 315 | 450 | 550 |
|  | 240 V | A | 90 | 115 | 115 | 150 | 175 | 210 | 260 | 315 | 450 | 550 |
|  | 380-400V | A | 90 | 115 | 115 | 150 | 175 | 210 | 260 | 315 | 450 | 550 |
|  | 415 V | A | 90 | 115 | 115 | 150 | 175 | 210 | 260 | 315 | 450 | 550 |
|  | 440 V | A | 90 | 115 | 115 | 150 | 175 | 210 | 260 | 315 | 450 | 550 |
|  | 500 V | A | 79 | 79 | 115 | 150 | 175 | 210 | 260 | 315 | 450 | 550 |
|  | 660-690V | A | 60 | 60 | 100 | 120 | 140 | 150 | 180 | 240 | 400 | 500 |
|  | 1000 V | A | 45 | 45 | 45 | 60 | 70 | 85 | 100 | 125 | 200 | 250 |
| Rated operational power | $220-230 \mathrm{~V}$ | kW | 25 | 33 | 30 | 40 | 50 | 60 | 75 | 90 | 132 | 175 |
| of three-phase motors | 240 V | kW | 27 | 35 | 35 | 45 | 55 | 65 | 80 | 100 | 140 | 185 |
| $50-60 \mathrm{~Hz}$ | 380-400V | kW | 45 | 55 | 55 | 75 | 90 | 110 | 132 | 160 | 250 | 300 |
|  | 415 V | kW | 49 | 63 | 59 | 80 | 95 | 115 | 140 | 180 | 257 | 315 |
|  | 440 V | kW | 49 | 63 | 63 | 85 | 100 | 125 | 150 | 190 | 270 | 335 |
|  | 500 V | kW | 55 | 55 | 75 | 90 | 100 | 132 | 160 | 210 | 300 | 375 |
|  | 660-690V | kW | 55 | 55 | 90 | 110 | 132 | 132 | 160 | 210 | 375 | 500 |
|  | 1000V | kW | 55 | 55 | 55 | 75 | 90 | 110 | 132 | 160 | 280 | 355 |

[^16]Data for other conditions on request.

## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660

| Main contacts |  | Type | K(G)3-10 | K(G)3-14 | K(G)3-18 | K(G)3-22 | K(G)3-24 | K(G)3-32 | K(G)3-40 | K3-50 | K3-62 | K3-74 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Utilization category AC4 |  |  |  |  |  |  |  |  |  |  |  |  |
| Switching of squirrel cage motors, inching |  |  |  |  |  |  |  |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ | 220 V | A | 12 | 15 | 18 | 18 | 24 | 30 | 40 | 50 | 63 | 63 |
| open and enclosed | 230 V | A | 11.5 | 14,5 | 18 | 18 | 24 | 30 | 40 | 50 | 62 | 62 |
|  | 240 V | A | 11 | 14 | 18 | 18 | 24 | 32 | 40 | 50 | 62 | 62 |
|  | 380-400V | A | 10 | 14 | 18 | 18 | 24 | 32 | 40 | 50 | 62 | 62 |
|  | 415 V | A | 9 | 14 | 18 | 18 | 23 | 30 | 37 | 45 | 60 | 60 |
|  | 440 V | A | 9 | 14 | 18 | 18 | 23 | 30 | 37 | 45 | 55 | 55 |
|  | 500 V | A | 9 | 12 | 16 | 16 | 17,5 | 21 | 21 | 33 | 42 | 42 |
|  | 660 V | A | 7 | 9 | 9 | 9 | 17 | 20 | 20 | 31 | 40 | 40 |
|  | 690 V | A | 6,5 | 8,5 | 8,5 | 8,5 | 17 | 20 | 20 | 31 | 40 | 40 |
|  | 1000 V | A | - | - | - | 5 | - | - | - | - | - | - |
| Rated operational power | 220-230V | kW | 3 | 4 | 5 | 5 | 6 | 8,5 | 11 | 12,5 | 18,5 | 18,5 |
| of three-phase motors | 240 V | kW | 3 | 4 | 5 | 7,5 | 7 | 9 | 11,5 | 13,5 | 19 | 19 |
| $50-60 \mathrm{~Hz}$ | 380-400V | kW | 4 | 5,5 | 7,5 | 8,5 | 11 | 15 | 18,5 | 22 | 30 | 30 |
|  | 415 V | kW | 4,5 | 6 | 8,5 | 8,5 | 12 | 16 | 20 | 24 | 33 | 33 |
|  | 440 V | kW | 4,5 | 6 | 8,5 | 10 | 12 | 16 | 20 | 24 | 33 | 33 |
|  | 500 V | kW | 5,5 | 7,5 | 10 | 10 | 15 | 18,5 | 18,5 | 30 | 37 | 37 |
|  | 660-690V | kW | 5,5 | 7,5 | 10 | - | 15 | 18,5 | 18,5 | 30 | 37 | 37 |
|  | 1000V | kW | - | - | - |  | - | - | - | - | - | - |
| Utilization category AC5a |  |  |  |  |  |  |  |  |  |  |  |  |
| Switching of gas discharge lamps |  |  |  |  |  |  |  |  |  |  |  |  |
| Rated operational current $I_{\text {e }}$ per pole at $220 / 230 \mathrm{~V}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| Fluorescent lamps, |  |  |  |  |  |  |  |  |  |  |  |  |
| uncompensated and serial compensated |  | A | 20 | 20 | 25 | 25 | 40 | 52 | 64 | 88 | 96 | 104 |
| parallel compensated |  | A | 7 | 9 | 9 | 9 | 18 | 22 | 22 | 30 | 40 | 45 |
| dual-connection |  | A | 22,5 | 22,5 | 28 | 28 | 45 | 58 | 72 | 98 | 108 | 117 |
| Metal halide lamps", |  |  |  |  |  |  |  |  |  |  |  |  |
| uncompensated |  | A | 12 | 15 | 19 | 19 | 30 | 39 | 48 | 66 | 72 | 78 |
| parallel compensated |  | A | 7 | 9 | 9 | 9 | 18 | 22 | 22 | 30 | 40 | 45 |
| Mercury-vapour lamps ${ }^{\text {2 }}$, |  |  |  |  |  |  |  |  |  |  |  |  |
| uncompensated |  | A | 22,5 | 25 | 28 | 28 | 45 | 58 | 72 | 99 | 108 | 117 |
| parallel compensated |  | A | 7 | 9 | 9 | 9 | 18 | 22 | 22 | 30 | 40 | 45 |
| Mixed light lamps ${ }^{3{ }^{3}}$ |  | A | 20 | 20 | 25 | 25 | 40 | 52 | 64 | 88 | 96 | 104 |
| LED-Lamps |  |  |  |  |  |  |  |  |  |  |  |  |
| consider the inrush current of the lamp ballast |  |  |  |  | max. lamps per pole ( $\left.\mathrm{I}_{\text {nled }} \leq \mathrm{I}_{\mathrm{tr}}\right)$ |  |  | = | inrush current of contactor |  |  |  |
| and $\cos \varphi$ of the lamp |  |  |  |  |  |  |  |  | inrush current of lamp/EVG |  |  |  |
| max inrush current of contactor |  | A | 282 | 282 | 282 | 282 | 564 | 705 | 705 | 987 | 1269 | 1268 |
| Utilization category AC5b |  |  |  |  |  |  |  |  |  |  |  |  |
| Switching of incandescent lamps ${ }^{4 /}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| 1) Metal halide lamps and sodium-vapour lamps (high- and low-pressure lamps) |  |  |  |  |  |  |  |  |  |  |  |  |
| 2) High-pressure lamps |  |  |  |  |  |  |  |  |  |  |  |  |
| 3) Blended lamps, containing a mercury high-pressure unit and a tungsten helix in a fluorescent glass bulb (daylight lamps) |  |  |  |  |  |  |  |  |  |  |  |  |
| 4) Current inrush approx. $16 \times \mathrm{I}_{\text {e }}$ |  |  |  |  |  |  |  |  |  |  |  |  |

Technical Specification - Electromechanical Contactors Series LA

## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660


1) Metal halide lamps and sodium-vapour lamps (high- and low-pressure lamps)
2) High-pressure lamps
3) Blended lamps, containing a mercury high-pressure unit and a tungsten helix in a flourescent glass bulb (daylight lamps)
4) Current inrush approx. $16 \times \mathrm{le}$

## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660

| Main Contacts |  | Type | K(G)3-10 | K(G)3-14 | K(G)3-18 | K(G)3-22 | K(G)3-24 | K(G)3-32 | K(G)3-40 | K3-50 | K3-62 | K3-74 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Utilization category AC6 ${ }_{\text {A }}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| Transformer primary switching |  |  |  |  |  |  |  |  |  |  |  |  |
| at inrush |  | n | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 400 V | A | 4,5 | 5,5 | 7,5 | 7,5 | 10,5 | 13,5 | 13,5 | 20 | 27 | 33 |
| Rated operational power | $220-230 \mathrm{~V}$ | kVA | 1,8 | 2,2 | 3 | 3 | 4,2 | 5,4 | 5,4 | 8 | 10,7 | 13 |
| dependent on inrush $n$ | 240 V | kVA | 1,9 | 2,3 | 3,1 | 3,1 | 4,3 | 5,6 | 5,6 | 8,3 | 11,2 | 13,5 |
|  | 380-400V | kVA | 3,1 | 3,8 | 5,2 | 5,2 | 7,3 | 9,3 | 9,3 | 13,5 | 18,5 | 22,5 |
| For different inrush-factors x | 415-440V | kVA | 3,4 | 4,2 | 5,7 | 5,7 | 8 | 10,2 | 10,2 | 15 | 20,5 | 25 |
| use the following formula: | 500 V | kVA | 3,9 | 4,8 | 6,5 | 6,5 | 9 | 11,5 | 11,5 | 17 | 23 | 28 |
| $\mathrm{Px}_{\mathrm{x}}=\mathrm{Pn}^{*}(\mathrm{n} / \mathrm{x})$ | 660-690V | kVA | 5,4 | 6,5 | 9 | 9 | 12,5 | 16 | 16 | 24 | 32 | 39 |
| Utilization category AC6b |  |  |  |  |  |  |  |  |  |  |  |  |
| Switching of three-phase capacitors |  |  |  |  |  |  |  |  |  |  |  |  |
| Maximum inrush current (peak value) |  |  |  |  |  |  |  |  |  |  |  |  |
| as multiple k of the |  |  |  |  |  |  |  |  |  |  |  |  |
| capacitor rated current |  | k | 35 | 25 | 20 | 20 | 25 | 25 | 25 | 25 | 25 | 20 |
| Rated operational current $I_{\text {e }}$ | 500 V | A | 8 | 12 | 15,5 | 15,5 | 23 | 32 | 32 | 45 | 60 | 70 |
| Rated operational power | $220-230 \mathrm{~V}$ | kVAr | 3 | 4,5 | 6 | 6 | 8,5 | 12 | 12 | 17 | 24 | 28 |
| $(\sin \varphi \rightarrow 1)$ | 240 V | kVAr | 3,5 | 5 | 6,5 | 6,5 | 9,5 | 13 | 13 | 18,5 | 25 | 29 |
|  | 380-400V | kVAr | 5 | 7,5 | 10 | 10 | 15 | 20 | 20 | 29 | 39 | 46 |
| For different multiples x | 415-440V | kVAr | 5,5 | 8 | 11 | 11 | 16 | 22 | 22 | 32 | 43 | 50 |
| use the following formula: | 500 V | kVAr | 7 | 10 | 13 | 13 | 20 | 26 | 26 | 39 | 50 | 58 |
| Px $=\mathrm{Pk}^{*}(\mathrm{k} / \mathrm{x})$ | 660-690V | kVAr | 7 | 10 | 13 | 13 | 20 | 26 | 26 | 40 | 50 | 58 |
| Switching of reactive capacitor banks |  |  |  |  |  |  |  |  |  |  |  |  |
| Rated operational current $I_{\text {e }}$ | 690 V | A | 8 | 13 | 18 | 20 | 28 | 36 | 42 | 48 | 72 | $108^{17}$ |
| Rated operational power | 220-230V | kVAr | 2,9 | 5 | 7 | 7,5 | 11 | 14 | 16 | 20 | 28 | 33 |
|  | 240 V | kVAr | 3,1 | 5,4 | 7 | 8 | 11 | 14 | 17 | 20 | 28 | 36 |
|  | 380-400V | kVAr | 5 | 9 | 12,5 | 13 | 20 | 25 | 27,5 | 33,3 | 50 | $75{ }^{11}$ |
|  | 415-440V | kVAr | 5,5 | 9,5 | 13 | 14 | 22 | 27 | 30 | 36 | 53 | $75^{11}$ |
|  | 500 V | kVAr | 6 | 11 | 15 | 17 | 25 | 30 | 36 | 40 | 60 | 75 |
|  | 660-690V | kVAr | 8 | 15 | 20 | 22 | 33 | 41 | 48 | 55 | 82 | 100 |
|  | 1000 V | kVAr | - | - | - | - | - | - | - | - | - | - |
| Utilization category DC1 |  |  |  |  |  |  |  |  |  |  |  |  |
| Switching of resistive load |  |  |  |  |  |  |  |  |  |  |  |  |
| Time constant $\mathrm{L} / \mathrm{R} \leq 1 \mathrm{~ms}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 1 pole 24 V | A | 20 | 25 | 32 | 32 | 50 | 65 | 80 | 110 | 120 | 130 |
|  | 60 V | A | 20 | 25 | 32 | 32 | 50 | 65 | 80 | 110 | 120 | 130 |
|  | 110 V | A | 6 | 6 | 6 | 6 | 10 | 10 | 10 | 12 | 12 | 12 |
|  | 220 V | A | 0,8 | 0,8 | 0,8 | 0,8 | 1,4 | 1,4 | 1,4 | 1,4 | 1,4 | 1,4 |
| 3 poles in series | 24 V | A | 20 | 25 | 32 | 32 | 50 | 65 | 80 | 110 | 120 | 130 |
|  | 60 V | A | 20 | 25 | 32 | 32 | 50 | 65 | 80 | 110 | 120 | 130 |
|  | 110 V | A | 20 | 25 | 32 | 32 | 50 | 65 | 80 | 110 | 120 | 130 |
|  | 220 V | A | 16 | 20 | 20 | 20 | 30 | 35 | 35 | 63 | 80 | 80 |
| Utilization category DC3 and DC5 |  |  |  |  |  |  |  |  |  |  |  |  |
| Switching of shunt motors |  |  |  |  |  |  |  |  |  |  |  |  |
| and series motors |  |  |  |  |  |  |  |  |  |  |  |  |
| Time constant $\mathrm{L} / \mathrm{R} \leq 15 \mathrm{~ms}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 1 pole 24 V | A | 20 | 25 | 32 | 32 | 50 | 65 | 80 | 110 | 120 | 130 |
|  | 60 V | A | 6 | 6 | 6 | 6 | 30 | 30 | 30 | 60 | 60 | 60 |
|  | 110 V | A | 1,2 | 1,2 | 1,2 | 1,2 | 1,8 | 1,8 | 1,8 | 1,8 | 1,8 | 1,8 |
|  | 220 V | A | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,25 | 0,25 | 0,25 |
| 3 poles in series | 24 V | A | 20 | 25 | 32 | 32 | 50 | 65 | 80 | 110 | 120 | 130 |
|  | 60 V | A | 20 | 25 | 32 | 32 | 40 | 40 | 40 | 80 | 80 | 80 |
|  | 110 V | A | 20 | 20 | 20 | 20 | 40 | 40 | 40 | 80 | 80 | 80 |
|  | 220 V | A | 2,5 | 2,5 | 2,5 | 2,5 | 4 | 4 | 4 | 5 | 5 | 5 |

1) Consider resistive load ( $I_{t}$ )

Technical Specification - Electromechanical Contactors Series LA

## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660


## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660

| Main contacts | Type | K(G)3-10 | K(G)3-14 | K(G)3-18 | K(G)3-22 | K(G)3-24 | K(G)3-32 | K(G)3-40 | K3-50 | K3-62 | K3-74 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Maximum ambient temperature |  |  |  |  |  |  |  |  |  |  |  |
| Operation open | ${ }^{\circ} \mathrm{C}$ |  |  |  |  | -40 to +60 | $(+90)^{11}$ |  |  |  |  |
| enclosed | ${ }^{\circ} \mathrm{C}$ |  |  |  |  | -40 to | +40 |  |  |  |  |
| with thermal overload relay open | ${ }^{\circ} \mathrm{C}$ |  |  |  |  | -25 to |  |  |  |  |  |
| enclosed | ${ }^{\circ} \mathrm{C}$ |  |  |  |  | -25 to | +40 |  |  |  |  |
| Storage | ${ }^{\circ} \mathrm{C}$ |  |  |  |  | -50 to | +90 |  |  |  |  |
| Short circuit protection |  |  |  |  |  |  |  |  |  |  |  |
| for contactors without thermal overload relay |  |  |  |  |  |  |  |  |  |  |  |
| Coordination-type "1" according to IEC 947-4-1 |  |  |  |  |  |  |  |  |  |  |  |
| Contact welding without hazard of persons max. fuse size $\mathrm{gL}(\mathrm{gG})$ | A | 63 | 63 | 63 | 63 | 100 | 100 | 100 | 160 | 160 | 160 |
| Coordination-type "2" according to IEC 947-4-1 |  |  |  |  |  |  |  |  |  |  |  |
| Light contact welding accepted |  |  |  |  |  |  |  |  |  |  |  |
| max. fuse size gl (gG) | A | 25 | 35 | 35 | 35 | 50 | 50 | 50 | 100 | 125 | 125 |
| Contact welding not accepted |  |  |  |  |  |  |  |  |  |  |  |
| max. fuse size gl (gG) | A | 16 | 16 | 16 | 16 | 25 | 35 | 35 | 50 | 63 | 63 |
| For contactors with thermal overload relay the device with | the sm | er admissib | le backup fu | use (contacto | or or thermal | overload relay) | lay) determin | nes the fuse size. |  |  |  |

Cable cross-sections


[^17]Technical Specification - Electromechanical Contactors Series LA

## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660


For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size.


1) $90^{\circ}$ reduces the control voltage range to 0.9 up to $1.0 \mathrm{XU}_{\mathrm{s}}$ and reduces the rated current $\mathrm{I}_{\mathrm{e}} / \mathrm{AC} 1$ to the value of $\mathrm{I}_{e} / \mathrm{AC} 3$
2) $70^{\circ}$ reduces the control voltage range to $1.0 \times U_{s}$ and reduces the rated current $I_{e} / \mathrm{ACl}$ to the value of $\mathrm{I}_{\mathrm{e}} / \mathrm{AC} 3$
3) After each $1 \times 10^{6}$ operations magnetic core and built-in auxiliary contact block must be changed

## - Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660


1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $\mathrm{U}_{\text {imp }}=8 \mathrm{kV}$. Data for other conditions on request
2) Total breaking time $=$ release time + arc duration
3) Values for delay of the release time of the make contact and the make time of the break contact will be increased, if magnet coils are protected against voltage peaks (varistor, RCunit, diode-unit)
4) with built-in coil suppressor
5) for contactors KG3-A.. only.

Technical Specification - Electromechanical Contactors Series LA

## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660

| Auxiliary Contacts |  | Type | K3-90 K3-115 | K3-116 | K3-151 | K3-176 | K3-210 | K3-260 | K3-316 | K3-450 K3-550 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{Ui}^{1{ }^{1 /}}$ |  |  |  |  |  |  |  |  |  |  |
| Thermal rated current $\mathrm{Ith}_{\text {the }}$ up to 690V |  | V | - |  | - |  |  | - |  | 690 |
| Ambient temperature | $40^{\circ} \mathrm{C}$ | A | - |  | - |  |  | - |  | 10 |
|  | $60^{\circ} \mathrm{C}$ | A | - |  | - |  |  | - |  | - |
| Utilization category AC15 <br> Rated operational current $I_{\text {e }}$ |  | - | - |  | - |  |  | - |  | - |
|  | 220-240V | A | - |  | - |  |  | - |  | 3 |
|  | $380-415 \mathrm{~V}$ | A | - |  | - |  |  | - |  | 2 |
|  | 440 V | A | - |  | - |  |  | - |  | 1.5 |
|  | 500 V | A | - |  | - |  |  | - |  | 1.5 |
|  | 660-690V | A | - |  | - |  |  | - |  | 1 |
| Utilization category DC13 |  |  |  |  |  |  |  |  |  |  |
| Rated operational current $I_{\text {e }}$ | 60V | A | - |  | - |  |  | - |  | - |
|  | 110 V | A | - |  | - |  |  | - |  | 1 |
|  | 220 V | A | - |  | - |  |  | - |  | 0.5 |
| Short-circuit protection <br> short-circuit current 1kA contact welding not accepted max. fuse size |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | $\mathrm{gL}(\mathrm{gG})$ | A | - |  | - |  |  | - |  | 10 |
| Control circuit |  |  |  |  |  |  |  |  |  |  |
| Power consumption of coils |  |  |  |  |  |  |  |  |  |  |
| AC operated | inrush | VA | 165-220 |  | 350 |  |  | 360 |  | 800-950 |
|  | sealed | VA | 2.5-5 |  | 5 |  |  | 5 |  | 9-11 |
|  |  | W | 2.5-5 |  | 5 |  |  | 5 |  | 9-11 |
| DC operated | inrush | W | 250 |  | 350 |  |  | 360 |  | 700-850 |
|  | sealed | W | 5 |  | 5 |  |  | 5 |  | 8-10 |
| DC solenoid operated (KG3) | inrush | W | - |  | - |  |  | - |  | - |
|  | sealed | W | - |  | - |  |  | - |  |  |
| Operation range of coils |  |  |  |  |  |  |  |  |  |  |
| in multiples of control voltage $U_{s}$ |  |  |  |  |  |  |  |  |  |  |
|  | AC operated |  | 0.85-1.1 |  | 0.85-1.1 |  |  | 0.85-1.1 |  | 0.85-1.1 |
|  | DC operated |  | 0.8-1.1 |  | 0.85-1.1 |  |  | 0.85-1.1 |  | 0.85-1.1 |
| Switching time at control voltage $\mathrm{U}_{s} \pm 10 \%{ }^{2 / 3)}$ |  |  |  |  |  |  |  |  |  |  |
| AC operated | make time | ms | 20-35 |  | 30-60 |  |  | 40-60 |  | 50-100 |
|  | release time | ms | 35-50 |  | 30-80 |  |  | 15-45 |  | 150-200 / 500-1000 ${ }^{11}$ |
|  | arc duration | ms | 10-15 |  |  |  |  | - |  | - |
| DC operated double winding coil | make time | ms | 20-35 |  | 30-60 |  |  | 40-60 |  | - |
|  | release time | ms | 35-50 |  | 30-80 |  |  | 15-45 |  | - |
|  | arc duration | ms | 10-15 |  | - |  |  | - |  | - |
| DC solenoid operated (KG3) | make time | ms | - |  | - |  |  | - |  | - |
|  | release time | ms | - |  | - |  |  | - |  | - |
|  | arc duration | ms | - |  | - |  |  | - |  | - |
| Cable cross-sections |  |  |  |  |  |  |  |  |  |  |
| Auxiliary connector | solid | $\mathrm{mm}^{2}$ | - |  | - |  |  | - |  | 0.75-2,5 |
|  | flexible | $\mathrm{mm}^{2}$ | - |  | - |  |  | - |  | 0.75-2,5 |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ | - |  | - |  |  | - |  | - |
| Magnet coil | solid | $\mathrm{mm}^{2}$ | 0.75-2.5 |  | 1-2.5 |  |  | 1-2.5 |  | 1-2.5 |
|  | flexible | $\mathrm{mm}^{2}$ | 0.5-2.5 |  | 1-2.5 |  |  | 1-2.5 |  | 1-2.5 |
|  | flexible with | $\mathrm{mm}^{2}$ | 0.5-1.5 |  | - |  |  | - |  | - |
| Clamps per pole |  |  | 2 |  | 2 |  |  | 2 |  | 2 |
| Auxiliary connector | solid | AWG | - |  | - |  |  | - |  | 16-12 |
|  | solid | AWG | - |  | - |  |  | - |  | 16-12 |
| Magnet coil | solid | AWG | 14-12 |  | 16-12 |  |  | 16-12 |  | 16-12 |
|  | solid | AWG | 18-12 |  | 16-12 |  |  | 16-12 |  | 16-12 |
| Clamps per pole |  |  | 2 |  | 2 |  |  | 2 |  | 2 |

Clamps per pole

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $\mathrm{U}_{\text {imp }}=8 \mathrm{kV}$. Data for other conditions on request
2) Total breaking time $=$ release time + arc duration
3) Values for delay of the release time of the make contact and the make time of the break contact will be increased, if magnet coils are protected against voltage peaks (varistor, RC-unit, diode-unit)

## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660

| Main contacts |  | Type | K2-23 | K2-30 | K2-37 | K2-45 | K2-60 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}{ }^{1 /}$ |  | V~ | 690 | 690 | 690 | 690 | 690 |
| Making capacity $\mathrm{l}_{\text {eff }}$ | at $\mathrm{U}_{\mathrm{e}}=690 \mathrm{~V} \mathrm{AC}$ | A | 400 | 500 | 500 | 700 | 900 |
| Breaking capacity $\mathrm{l}_{\text {eff }}$ | 400V~ | A | 380 | 400 | 400 | 600 | 800 |
| K2-09 to K2-16 | $\begin{aligned} & \cos \varphi=0,65 \\ & 500 \mathrm{VAC} \end{aligned}$ | A | 300 | 370 | 370 | 500 | 700 |
| K2-23 to K3-1200 | $\begin{aligned} & \cos \varphi=0,35 \\ & 690 \mathrm{~V} \text { AC } \end{aligned}$ 1000V~ | A | 260 | 340 | 340 | 400 | 500 |
| Utilization category AC1 |  |  |  |  |  |  |  |
| Switching of resistive load |  |  |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\mathrm{e}}\left(=l_{\mathrm{t}_{\text {l }}}\right)$ |  |  |  |  |  |  |  |
| at $40^{\circ} \mathrm{C}$, open |  | A | 45 | 50 | 50 | 80 | 100 |
| Rated operational power | 220 V | kW | 17 | 19 | 19 | 30 | 38 |
| of three-phase resistive loads | 230 V | kW | 18 | 20 | 20 | 31,5 | 40 |
| $50-60 \mathrm{~Hz}, \cos \varphi=1$ | 240 V | kW | 18,5 | 20,5 | 20,5 | 33 | 41 |
|  | 380 V | kW | 29,5 | 33 | 33 | 52 | 65 |
|  | 400 V | kW | 31 | 34,5 | 34,5 | 55 | 69 |
|  | 415 V | kW | 32 | 36 | 36 | 57 | 71 |
|  | 440 V | kW | 34 | 38 | 38 | 61 | 76 |
|  | 500 V | kW | 39 | 43 | 43 | 69 | 86 |
|  | 660 V | kW | 51 | 57 | 57 | 91 | 114 |
|  | 690 V | kW | 53,5 | 60 | 60 | 95 | 119 |
| Rated operational current $\mathrm{I}_{\mathrm{e}}\left(=I_{\text {the }}\right)$ |  | A | 35 | 40 | 40 | 63 | 80 |
| at $60^{\circ} \mathrm{C}$, enclosed | 220 V | kW | 13 | 15 | 15 | 24 | 30 |
| Rated operational power | 230 V | kW | 13,5 | 16 | 16 | 25 | 31,5 |
| of three-phase resistive loads | 240 V | kW | 14,5 | 16,5 | 16,5 | 26 | 33 |
| $50-60 \mathrm{~Hz}, \cos \varphi=1$ | 380 V | kW | 23 | 26 | 26 | 41 | 52 |
|  | 400 V | kW | 24 | 27,5 | 27,5 | 43 | 55 |
|  | 415 V | kW | 25 | 28,5 | 28,5 | 45 | 57 |
|  | 440 V | kW | 26,5 | 30 | 30 | 48 | 61 |
|  | 500 V | kW | 30 | 34 | 34 | 54 | 69 |
|  | 660 V | kW | 40 | 45 | 45 | 72 | 91 |
|  | 690 V | kW | 42 | 48 | 48 | 75 | 95 |
| Minimum cross-section of conductor at load with $I_{e}\left(=I_{t h}\right)$ |  | $\mathrm{mm}^{2}$ | 10 | 10 | 10 | 25 | 35 |
| Utilization category AC2 and AC3 |  |  |  |  |  |  |  |
| Switching of three-phase motors |  |  |  |  |  |  |  |
| Rated operational current $I_{\text {e }}$ | 220 V | A | 23 | 30 | 37 | 45 | 63 |
| open and enclosed | 230 V | A | 23 | 30 | 37 | 45 | 61 |
|  | 240 V | A | 23 | 30 | 37 | 45 | 60 |
|  | $380-400 \mathrm{~V}$ | A | 23 | 30 | 37 | 45 | 60 |
|  | 415-440V | A | 23 | 30 | 37 | 45 | 60 |
|  | 500 V | A | 23 | 30 | 30 | 45 | 55 |
|  | 660 V | A | 17,5 | 21 | 21 | 33 | 42 |
|  | 690 V | A | 17 | 20 | 20 | 31 | 40 |
| Rated operational power | 220-230V | kW | 6 | 8,5 | 11 | 12,5 | 18,5 |
| of three-phase motors | 240 V | kW | 7 | 9 | 11,5 | 13,5 | 19 |
| $50-60 \mathrm{~Hz}$ | 380-400V | kW | 11 | 15 | 18,5 | 22 | 30 |
|  | 415 V | kW | 12 | 16 | 20 | 24 | 33 |
|  | 440 V | kW | 12 | 16 | 20 | 24 | 33 |
|  | 500 V | kW | 15 | 18,5 | 18,5 | 30 | 37 |
|  | 660-690V | kW | 15 | 18,5 | 18,5 | 30 | 37 |

[^18]Data for other conditions on request.

Technical Specification - Electromechanical Contactors Series LA

## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660


[^19]
## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660


1) $90^{\circ}$ reduces the control voltage range to 0.9 up to $1.0 \times U_{s}$ and reduces the rated current $I_{e} / A C 1$ to the value of $\mathrm{I}_{\mathrm{e}} / \mathrm{AC3}$
2) Maximum cable cross-section with prepared conductor

Technical Specification - Electromechanical Contactors Series LA

## Power Contactors

Technical Specifications according to IEC 947-4-1, EN 60947-4-1, VDE 0660

| Auxiliary contacts |  | Type | K2-23 | K2-30 | K2-37 | K2-45 | K2-60 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathrm{i}}{ }^{1 /}$ |  | V AC |  | 690 |  |  | - |
| Thermal rated current $\mathrm{I}_{\mathrm{th}}$ to 690V |  |  |  |  |  |  |  |
| Ambient temperature | $40^{\circ} \mathrm{C}$ | A |  | 16 |  |  | - |
|  | $60^{\circ} \mathrm{C}$ | A |  | 12 |  |  | - |
| Utilization category AC15 |  |  |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 220-240V | A |  | 12 |  |  | - |
|  | 380-415V | A |  | 4 |  |  | - |
|  | 440 V | A |  | 4 |  |  | - |
|  | 500 V | A |  | 3 |  |  | - |
|  | 660-690V | A |  | 1 |  |  | - |
| Utilization category DC13 |  |  |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | 60V | A |  | 8 |  |  | - |
|  | 110 V | A |  | 1 |  |  | - |
|  | 220 V | A |  | 0,1 |  |  | - |
| Short circuit protection |  |  |  |  |  |  |  |
| short-circuit current 1kA, |  |  |  |  |  |  |  |
| contact welding not accepted |  |  |  |  |  |  |  |
| max. fuse size | $\mathrm{gL}(\mathrm{gG})$ | A |  | - |  |  | - |
| For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse. |  |  |  |  |  |  |  |
| Control Circuit |  |  |  |  |  |  |  |
| Power consumption of coils |  |  |  |  |  |  |  |
| AC operated | inrush | VA |  | 90-115 |  |  | 140-165 |
|  | sealed | VA |  | 9-13 |  |  | 13-18 |
|  |  | W |  | 2.7-4 |  |  | 5.4-7 |
| DC operated | inrush | W |  | 140 |  |  | 200 |
| with economic circuit | sealed | W |  | 2 |  |  | 6 |
| Operation range of coils |  |  |  |  |  |  |  |
| in multiples of control voltage $U_{s}$ | AC operated |  |  | 0.85-1.1 |  |  | 0.85-1.1 |
|  | DC operated |  |  | 0.8-1.1 |  |  | 0.8-1.1 |
| Switching time at control voltage Us $\pm 10 \%{ }^{2 / 3)}$ |  |  |  |  |  |  |  |
| AC operated | make time | ms |  | 10-25 |  |  | 12-28 |
|  | release time | ms |  | 8-15 |  |  | 8-15 |
|  | arc duration | ms |  | 10-15 |  |  | 10-15 |
| DC operated | make time | ms |  | 10-20 |  |  | 12-23 |
| with AC magnet system | release time | ms |  | 10-15 |  |  | 10-18 |
|  | arc duration | ms |  | 10-15 |  |  | 10-15 |
| Cable cross-section |  |  |  |  |  |  |  |
| Auxiliary connector | solid | $\mathrm{mm}^{2}$ |  | - |  |  | - |
|  | flexible | $\mathrm{mm}^{2}$ |  | - |  |  | - |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ |  | - |  |  | - |
| Magnet coil | solid | $\mathrm{mm}^{2}$ |  | 0.75-2.5 |  |  | 0.75-2.5 |
|  | flexible | $\mathrm{mm}^{2}$ |  | 0.5-2.5 |  |  | 0.5-2.5 |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ |  | 0.5-1.5 |  |  | 0.5-1.5 |
| Clamps per pole |  |  |  | 2 |  |  | 2 |

[^20]
## Power Contactors

Contact LifeFor selection of the suitable contactor-type according to supply voltage, power rating and application (utilization category $\mathrm{AC} 1, \mathrm{AC} 3$ or AC 4 ) use contact life characteristic diagram.
For the most common supply voltages four scales of power ratings $P_{n}$ are provided for each utilization category.
Select contactor-type according to utilization category AC3 (breaking current $I_{a}=I_{e}$ ) using the motor rating scales to the right, according to
utilization category AC4 (breaking current $I_{a}=6 \times I_{e}$ ) using the motor rating
scales to the left. ${ }^{1)}$
Select contactor-type according to utilization category AC1 (breaking
current $\left.I_{a}=I_{e} / A C 1\right)$ using the breaking current scale. ${ }^{1)}$

For contactors frequently used under AC3/AC4-mixed service conditions calculate contact life with the formula:

$$
M=\frac{\mathrm{AC} 3}{1+\frac{\% \mathrm{AC} 4}{100} \times\left(\frac{\mathrm{AC} 3}{\mathrm{AC} 4}-1\right)}
$$

$M=$ Contact life (switching cycles) for AC3/AC4-mixed operations AC3 = Contact life (switching cycles) for AC3 operations (normal switching conditions).
Breaking current $I_{a}=$ rated motor current $I_{n}$.
AC4 = Contact life (switching cycles) for AC4 operations (inching).
Breaking current $I_{a}=$ multiples of rated motor current $I_{n}$.
$\% A C 4=$ Percents of AC4-operations related to the total cycles.

1) Pay attention to the approved rated values of the selected contactor according to the national approvals

Power Contactors - Contact life

- Motor Rating (K1-09 up to K3-74)

| $\mathrm{P}_{\mathrm{n}}=\mathrm{AC} 4$ |  |  |  |
| :---: | :---: | :---: | :---: |
| 660/ | 500V | 380/ | 220/ |
| kW |  | 400V | 230 V |
|  | kW | kW | kW |
| $\left[\begin{array}{l}110 \\ 90\end{array}\right.$ | - 75 | 5 - 55 | 5 - 30 |
| - 75 | 5-56 | 56 - ${ }^{15}$ |  |
|  | $5{ }^{5}$ | 56-31 | - ${ }^{-18.5}$ |
| - 45 |  |  |  |
| - 37 | ${ }^{-30}$ |  |  |
| 30 | ${ }^{0}{ }^{18,6}$ | 22-15 |  |
| - ${ }_{18,5}^{22}$ | $2{ }^{2}$ | $15-11$ | $1{ }^{1}-7.5$ |
| 15 |  |  |  |
|  |  | . 6 |  |
|  | 7,5 | 7,5-5,5 | 5 |
| 7.5 | \% 5 - 5.5 | . 6 | $4-2,2$ |
| - 5.5 | . 5 | $4-3$ | 3 |
| 4 | 4 | - 2.2 | 2-1,1 |
| - 3 | $3-2.2$ | -2 2.5 | 15-0,75 |
| 2,2 | -2, 1.6 | . 5 - 1.1 | , 1 -0,55 |
| 1.5 | . 5 - 1, | 0, 1 -0.75 | -0,37 |
| 1.1 | . 1 -0.75 | -0,55 |  |
| -0,75 | -0,55 | -0,37 |  |
| -0,55 | -0,37 |  |  |
| -0,37 |  |  |  |
|  | - ${ }^{-0,2}$ |  |  |
|  |  |  |  |
|  |  |  |  |
| 660/ | 500 V | 380/ | 220/ |
| 690 V |  | 400 V | 230 V |


| $\mathrm{P}_{\mathrm{n}}=\mathrm{AC3}$ |  |  |  |
| :---: | :---: | :---: | :---: |
| $\begin{aligned} & 660 / \\ & 690 \mathrm{~V} \end{aligned}$ | 500 V | 380/ | 220/ |
|  |  | 400 V | 230 V |
| kW | kW | kW | kW |
| - 800 |  | - 315 | -200 |
| -500 | - ${ }^{-400}$ | -250 | - 160 |
| - 400 | - ${ }^{15} 5$ | -200 | - $\begin{array}{r}132 \\ \hline 10\end{array}$ |
| 315 | -200 | - 180 | - 90 |
| - 250 |  | - 132 |  |
| - 200 | - 160 | - 110 |  |
| - 180 | - $\begin{array}{r}132 \\ 110\end{array}$ | - 90 | - ${ }^{88}$ |
| ( 1132 | $2{ }^{2}$ | - 75 | - ${ }^{47}$ |
| -90 | 0 - 75 | - 56 | - 30 |
|  |  | - 45 |  |
|  | 5 - ${ }^{45}$ | - 30 | -18,6 |
| - 45 | $5{ }^{5}$ |  |  |
| - 37 | 7 - 30 | - 228 |  |
| 30 | 22 |  |  |
|  |  |  | -7.5 |
| - ${ }^{18,5}$ | 5 |  | 5.6 |
|  |  |  | - |
|  | $11-7.5$ | - 5,5 | - 3 |
| - 7.6 | 5.5 | - 4 | 4 - 2,2 |
|  |  |  |  |
|  | $4-3$ | 2.2 |  |
|  | 3 |  |  |
|  | -2 ${ }^{1,5}$ | - 1,1 | -0,66 |
|  |  | -0.75 | -0,37 |
|  | 0, 1 -0.75 | -0,65 |  |
| - 0.75 | $\underline{L}^{-0,55}$ | -0,3 |  |
| 660/ | 500 V | 380/ | 220/ |
| 690 V |  | 400 V | 230 V |

Technical Specification - Electromechanical Contactors Series LA

- Power Contactors - Contact life

Breaking Current (K 1-09 up to K3-74)


1) Millions of Operations

Motor Rating (K3-90 up to K3-550)



- Power Contactors - Contact life

Breaking Current (K3-90 up to K3-550)


[^21]Technical Specification - Electromechanical Contactors Series LA

## Accessories - Auxiliary Contacts and Latch

Technical Specifications according to IEC 947-5-1, EN 60947-5-1, VDE 0660

| Type |  |  | HN | HTN | HA | HB | HKT/HKA | HKF | K2-L ${ }^{2)}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathrm{U}_{\mathbf{i}}{ }^{1 /}$ |  | V AC | 690 | 690 | 690 | 690 | 690 | 690 | 690 |
| Thermal rated current $\mathrm{l}_{\text {th }}$ | to 690V |  |  |  |  |  |  |  |  |
| Ambient temperature | max. $40^{\circ} \mathrm{C}$ | A | 10 | 10 | 25 | 10 | 10 | 16 | 10 |
|  | max. $60^{\circ} \mathrm{C}$ | A | 6 | 6 | 20 | 6 | - | - | 6 |
| Frequency of operations z |  | 1/h | 3000 | - | 3000 | 3000 | - | - | 3000 |
| Mechanical life |  | $5 \times 10^{6}$ | 10 | 10 | 10 | 10 | - | - | 10 |
| Power loss per pole at $\mathrm{I}_{\mathrm{e}} / \mathrm{ACl}$ |  | W | 0.5 | 0.5 | 1.5 | 0.4 | - | - | - |
| Utilization category AC15 |  |  |  |  |  |  |  |  |  |
| Rated operational | 220-240V | A | 3 | 3 | 6 | 3 | 3 | 3 | 3 |
| current le | 380-400V | A | 2 | 2 | 3 | 2 | 2 | 2 | 2 |
|  | 440 V | A | 1,6 | 1,6 | 2 | 1,6 | 1,5 | 1,5 | 1,6 |
|  | 500 V | A | 1,2 | 1,2 | 2 | 1,2 | 1,5 | 1,5 | 1 |
|  | 660-690V | A | 0,6 | 0,6 | 1 | 0,6 | 1 | 1 | 0,5 |
| Utilization category DC13 |  |  |  |  |  |  |  |  |  |
| Rated operational | 60 V | A | 2 | 2 | 8 | 2 | - | - | 2 |
| current le | 110 V | A | 0.4 | 0.4 | 1 | 0.4 | 0.5 | 0.5 | 0.4 |
|  | 220 V | A | 0.1 | 0.1 | 0.1 | 0.1 | 0.5 | 0.2 | 0.1 |
| Short circuit protection |  |  |  |  |  |  |  |  |  |
| short-circuit current 1 kA , |  |  |  |  |  |  |  |  |  |
| contact welding not accepted max. fuse size | $\mathrm{gL}(\mathrm{gG})$ | A | 20 | 20 | 25 | 20 | 10 | 10 | 10 |

For contactors with thermal overload relay or auxiliary contacts the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size.

## Cable cross-sections

|  | solid or stranded | $\mathrm{mm}^{2}$ |
| :--- | :---: | :---: |
| flexible | $\mathrm{mm}^{2}$ | $0.75-2.5$ |
|  | flexible with multicore cable end | $\mathrm{mm}^{2}$ |
| solid | AWG | $0.75-2.5$ |
|  | flexible | AWG |

Cables per clamp
2

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $\mathrm{U}_{\text {imp }}=8 \mathrm{kV}$. Data for other conditions on request.
2) Command duration $\mathrm{min} .30 \mathrm{~ms}, 10 \%$ duty cycle, max. 30 eec.

## Direct on Line Starters D.O.L. with Selector Switch

## D.O.L. Starters with Selector Switch

| 4 | K3-10ND10 | 2 | $\mathrm{U} 12 / 16 \mathrm{~K} 3$ | IP65 | $\varnothing 20.5 \mathrm{~mm}$ | $\mathrm{P} 1 \mathrm{~W} 10 \ldots$ | 1 | 0,6 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 7.5 | K3-18ND10 | 2 | $\mathrm{U} 12 / 16 \mathrm{~K} 3$ | IP 65 | $\varnothing 20.5 \mathrm{~mm}$ | $\mathrm{P} 1 \mathrm{~W} 18 \ldots$ | 1 | 0,6 |
| 11 | K3-22ND10 | 2 | $\mathrm{U} 12 / 16 \mathrm{~K} 3$ | IP 65 | $\varnothing 20.5 \mathrm{~mm}$ | $\mathrm{P} 1 \mathrm{~W} 22 \ldots$ | 1 | 0,6 |

Enclosures for Contactors

| Suitable for <br> contactor | Protection <br> Degree | Conduit Entries <br> Top | Bottom | Type | Pack <br> pcs. | Weight <br> $\mathrm{kg} / \mathrm{pc}$. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| K3-07. to K3-22.. <br> K3-24.. ${ }^{1 /}$ to K3-40.. | IP65 | $2 \times \varnothing 20.5 \mathrm{~mm}$ | $2 \times \varnothing 20.5 \mathrm{~mm}$ | P1 | 1 | 0,35 |

Enclosures for D.O.L. Starters with reset button

| Suitable for <br> contactor | Protection <br> Degree | Conduit Entries <br> Top | Bottom | Type | Pack <br> pcs. | Weight <br> $\mathrm{kg} / \mathrm{pc}$. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| K3-10.. to K3-22.. <br> + U12/16.. K3 | IP65 | $2 \times \varnothing 20.5 \mathrm{~mm}$ | $2 \times \varnothing 20.5 \mathrm{~mm}$ | P1R | 1 | 0,35 |

Contactors for Photovoltaic Plants, 1000V DC
Rated Operational Current

| DC1 <br> $600 V$ | 1000 V | 1200V | Additional <br> Aux. Contacts |  | Type |  | Pack <br> pcs. | Weight <br> $\mathrm{kg} / \mathrm{pc}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 30 A | 30 A | - | 2 HKAl1 | K3PV-30 | 230 | $220-230 \mathrm{~V} 50 \mathrm{~Hz}$, <br> 240 V 60 Hz | 1 | 0.9 |

## Contactors for DC-Switching for PV-installations, as remote controlled fire protection defeat device

In most Photovoltaic-installations, the switch disconnectors according to IEC 60364-7-712 are integrated in the DC/AC-inverter. So the wires between solar-panels and inverter are continuously under voltage.
According to ÖVE-R 11-1: 2013, Photovoltaic installations must have a fire protection defeat device.
For this purpose, contactors for DC switching, used as a fire protection defeat device, can switch off the Photovoltaic-installation with a remote controlled fire brigade Emergency-Stop button.

1) Other coil voltages from 24 to 600 VAC , on request

- Technical Specifications


2) $>40^{\circ}$... $1 \% / \mathrm{C}^{\circ}$ de-rating (e.g.. at $60^{\circ} \mathrm{C} 20 \%$ de-rating)

## Technical Specification - Electromechanical Contactors Series ALEA LS

## General Information - Main Contacts for Contactors LSD, LSR, LSS and LSU

Endurance of the Main Contacts
The characteristic curves show the contact endurance of the contactors when switching resistive and inductive AC loads ( $\mathrm{AC}-1 / \mathrm{AC}-3$ ) depending on the breaking current and rated operational voltage. It is assumed that the operating mechanisms are switched randomly, i.e. not synchronized with the phase angle of the supply system.
The rated operational current le complies with utilization category AC-4 (breaking six times the rated operational current) and is intended for a contact endurance of at least 200000 operating cycles.
If a shorter endurance is sufficient, the rated operational current I e/AC-4 can be increased. If the contacts are used for mixed operation, i.e. normal switching (breaking the rated operational current according to utilization category AC-3) in combination with intermittent inching (breaking several times the rated operational current according to utilization category $\mathrm{AC}-4)$, the contact endurance can be calculated approximately from the following equation:

A

$$
1+\frac{C}{100}\left(\frac{A}{B}-1\right)
$$

Characters in the equation:
X Contact endurance for mixed operation in operating cycles
A Contact endurance for normal operation $\left(\mathrm{I}_{\mathrm{a}}=\mathrm{I}_{\mathrm{e}}\right)$ in operating cycles
B Contact endurance for inching ( $I_{a}=$ multiple of $I_{e}$ ) in operating cycles
C Inching operations as a percentage of total switching operations
Diagram: Endurance of the Main Contacts - Size 00/0


General Information - Main Contacts for Contactors LSD, LSR, LSS and LSU
Diagram: Endurance of the Main Contacts - Size 2/3/6-12

A) Size 2

1) Operating cycles
$P_{N}=$ Rated power for squirrel-cage motors at 400V
$I_{a}=$ Breaking current
$I_{\mathrm{e}}=$ Rated operational current
C) Size 6 (LSD6)

Size 10 (LSDE)
Size 12 (LSDG)

Electromagnetic compatibility (EMC)

The contactors with solid-state operating mechanism comply with the requirements for operation in industrial installations.

| • Interference immunity |  |  |
| :--- | :--- | :--- |
| Burst | IEC 61000-4-4 | 4 kW |
| Surge | IEC 61000-4-5 | 4 kW |
| Electrostatic discharge | IEC 61000-4-2 | $8 / 15 \mathrm{~kW}$ |
| Electromagnetic field | IEC 61000-4-3 | $10 \mathrm{~V} / \mathrm{m}$ |
| Emitted interference |  | A |
| Limited value class | EN 55011 |  |

## Technical Specification - Electromechanical Contactors Series ALEA LS

## General Information - Auxiliary Contacts for Contactors LSD, LSR, LSS and LSU

Rated Data of the Auxiliary Contacts
ALEA controls are climate-proof and are suitable and tested for use worldwide.
If the devices are used in ambient conditions which deviate from common industrial conditions (EN60721-3-3 "Stationary Use, Weather-Protected"), the manufacturer must be consulted about possible restrictions with regard to the reliability and endurance of the device and possible protective measures.


1) Attachable auxiliary contact blocks for size $S 00$ and laterally mountable auxiliary contact blocks for 0 to 12: 6A
2) Up to 500 V switching capacity for laterally mountable auxiliary contact blocks.

## Endurance of the Auxiliary Contacts

It is assumed that the operating mechanisms are switched randomly, i.e. not synchronized with the phase angle of the supply system.
The contact endurance is mainly dependent on the breaking current.
The characteristic curves apply to

- Integrated auxiliary contacts for LSS/LSD
- LSZ..... auxiliary contact blocks for contactor sizes 00 to 12 .

General Information - Auxiliary Contacts for Contactors LSD, LSR, LSS and LSU
Diagram: Endurance of the Auxiliary Contacts


Legend:
$\mathrm{I}_{\mathrm{a}}=$ Breaking current
$I_{e}=$ Rated operational current

1) Million operating cycles
2) Basic unit
3) Basic unit with auxiliary block snapped on

Technical Specification - Electromechanical Contactors Series ALEA LS

- Contactors LSDD, LSSD and LSUD
- General Data - Contactors LSDD, LSSD

| Type |
| :--- |
| Size |
| Allgemeine Daten |

Miniature circuit breakers up to 230 V with C characteristic Short-circuit current $I_{k}<400 \mathrm{~A}$

1) See "Endurance of the main contacts"
2) See "Conductor cross-sections"
3) Test conditions according to IEC 60947-4-1

- Contactors LSDD, LSSD and LSUD

■ Control-Contactors LSDD, LSSD, LSUD

| Type Size |  |  | LSDD, LSUD <br> 00 | $\begin{gathered} \text { LSSD } \\ 00 \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: |
| Magnetic coil operating range |  |  |  |  |
| AC operation |  | $\begin{aligned} & 50 \mathrm{~Hz} \\ & 60 \mathrm{~Hz} \end{aligned}$ | $\begin{gathered} 0.8 \ldots 1.1 \times U_{s} \\ 0.85 \ldots 1.1 \times U_{s} \end{gathered}$ |  |
| - DC operation |  | up to 50 Hz <br> up to 60 Hz | $\begin{gathered} 0.8 \ldots 1.1 \times U_{5} \\ 0.85 \ldots 1.1 \times U_{5} \end{gathered}$ | $0.7 \ldots 1.25 \times \mathrm{U}_{5}\left(\mathrm{U}_{5}=17-13 \mathrm{VDC}\right)$ |
| Power consumption of the magnetic coils (when coil is cold and $1.0 \times \mathrm{U}_{\mathrm{s}}$ ) |  |  |  |  |
| Standard version | - Closing | VA | 27/24.3 |  |
|  | - P.f. |  | 0.8/0.75 |  |
|  | - Closed | VA | 4.4/3.4 |  |
|  | - P.f. |  | 0.27/0.27 |  |
| - AC operation, 50 Hz, USA/Canada | - Closing | VA | 26.4 |  |
|  | - P.f. for closing |  | 0.81 |  |
|  | - Closed | VA | 4.7 |  |
|  | - P.f. for closed |  | 0.26 |  |
| - AC operation, 60 Hz, USA/Canada | - Closing | VA | 31.7 |  |
|  | - P.f. for closing |  | 0.77 |  |
|  | - Closed | VA | 5.1 |  |
|  | - P.f. for closed |  | 0.27 |  |
| - DC operation | Closing = Closed | W | 3.3 | 2,3 |
| Permissible residual current of the electronics (with 0 signal) |  |  |  |  |
|  | - AC operation |  | $<3 \mathrm{~mA} \times\left(230 \mathrm{~V} / \mathrm{U}_{5}\right)$ |  |
|  | - DC operation |  | $<10 \mathrm{~mA} \times\left(24 \mathrm{~V} / \mathrm{U}_{5}\right)$ |  |
| Operating times ${ }^{1 /}$ |  |  |  |  |
| Total break time $=$ Opening delay + Arcing time |  |  |  |  |
| - AC operation at $0.8 \ldots 1.1 \times \mathrm{U}_{\text {s }}$ | Closing delay | ms | 8... 35 |  |
|  | Opening delay | ms | 4 ... 30 |  |
| - DC operation at $0.85 \ldots 1.1 \times \mathrm{U}_{5}$ | Closing delay | ms | $25 \ldots 100$ |  |
|  | Opening delay | ms | $7 \ldots 10$ |  |
| - Arcing time |  | ms | $10 \ldots 15$ |  |
| Operating times for $1.0 \times \mathrm{U}^{11}$ |  |  |  |  |
| - AC operation | Closing delay | ms | $10 . .25$ |  |
|  | Opening delay | ms | 5 ... 30 |  |
| - DC operation | Closing delay | ms | $30 . .50$ |  |
|  | Opening delay | ms | $7 \ldots 9$ |  |

1) The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor
coils are attenuated against voltage peaks (noise suppression diode 6 to 10 times; diode assemblies 2 to 6 times, varistor +2 to 5 ms ).
Main Circuit-Contactors LSDD, LSSD, LSUD

| Type Size |  |  | $\begin{gathered} \text { LSDD07, LSSD07 } \\ 00 \end{gathered}$ | $\begin{gathered} \text { LSDD09, LSSD09 } \\ 00 \end{gathered}$ | LSDD 12, LSSD 12, LSUD 12 <br> 00 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| AC capacity |  |  |  |  |  |
| Utilization category AC-1Switching resistive loads |  |  |  |  |  |
| Rated operational current $I_{\text {e }}$ | at $40^{\circ} \mathrm{C}$ up to 690 V <br> at $60^{\circ} \mathrm{C}$ up to 690 V | $\begin{aligned} & \text { A } \\ & \text { A } \end{aligned}$ | $\begin{aligned} & 18 \\ & 16 \\ & \hline \end{aligned}$ | $\begin{aligned} & 22 \\ & 20 \\ & \hline \end{aligned}$ | $\begin{aligned} & 22 \\ & 20 \\ & \hline \end{aligned}$ |
| Rated power for AC loads ${ }^{1 /}$ | 230 V | kW | 6.3 | 7.5 | 7.5 |
| P.f. $=0.95$ (at $60^{\circ} \mathrm{C}$ ) | 400 V | kW | 11 | 13 | 13 |
|  | 500 V | kW | 13.8 | 17 | 17 |
|  | 690 V | kW | 19 | 22 | 22 |
| Minimum conductor cross-section | at $40^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 2.5 | 2.5 | 2.5 |
| for loads with $\mathrm{I}_{\text {e }}$ | at $60^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 2.5 | 2.5 | 2.5 |
| Utilization categories AC-2 and AC-3 |  |  |  |  |  |
| Rated operational currents $I_{\text {e }}$ | up to 400 V | A | 7 | 9 | 12 |
|  | 440 V | A | 7 | 9 | 11 |
|  | 500 V | A | 5 | 6.5 | 9 |
|  | 690 V | A | 4 | 5.2 | 6.3 |
| Rated power for slipring or squirrel cage | at 230 V | kW | 2.2 | 3 | 3 |
| motors at 50 and 60 Hz | 400 V | kW | 3 | 4 | 5.5 |
|  | 500 V | kW | 3.5 | 4.5 | 5.5 |
|  | 690 V | kW | 4 | 5.5 | 5.5 |
| Thermal load capacity | 10 s current ${ }^{2}$ | A | 56 | 72 | 96 |

[^22]Technical Specification－Electromechanical Contactors Series ALEA LS

Contactors LSDD，LSSD and LSUD
Main Circuit－Contactors LSDD，LSSD，LSUD

| Type Size |  |  | $\begin{gathered} \text { LSDD07, LSSDO7 } \\ 00 \end{gathered}$ | LSDD09，LSSD09 <br> 00 | $\begin{gathered} \text { LSDD 12, LSSD } 12 \\ 00 \\ \hline \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| AC capacity |  |  |  |  |  |
| Power loss per conducting path | at $\mathrm{I}_{\mathrm{e}} / \mathrm{AC}-3$ | W | 0，42 | 0，7 | 1，24 |
| Utilization category AC－4（at $\left.\mathrm{I}_{\mathrm{a}}=6 \times \mathrm{I}_{\mathrm{e}}\right)^{1 /}$ |  |  |  |  |  |
| －Rated operational current $\mathrm{I}_{\text {e }}$ | up to 400 V | A | 6，5 | 8，5 | 8，5 |
| －Rated power for squirrel－cage motors with 50 and 60 Hz | up to 400 V | kW | 3 | 4 | 4 |
| －The following applies to a contact endurance of about 200000 operating cycles： |  |  |  |  |  |
| －Rated operational currents $\mathrm{I}_{\text {e }}$ | up to 400 V | A | 2，6 | 4，1 | 4，1 |
|  | 690 V | A | 1，8 | 3，3 | 3，3 |
| －Rated power for squirrel－cage motors with 50 and 60 Hz | at 230 V | kW | 0，67 | 1，1 | 1，1 |
|  | 400 V | kW | 1，15 | 2 | 2 |
|  | 500 V | kW | 1，45 | 2 | 2 |
|  | 690V | kW | 1，15 | 2，5 | 2，5 |
| Utilization category AC－5a |  |  |  |  |  |
| Switching gas discharge lamps，inductive ballast per main current path at 230V <br> －Uncorrected，rated power per lamp／rated operational current per lamp |  |  |  |  |  |
|  |  |  |  |  |  |
|  | L 18W／0．37A | Units | 54 | 59 | 59 |
|  | L36W／0．43A | Units | 46 | 51 | 51 |
|  | L58W／0．67A | Units | 29 | 32 | 32 |
|  | L 80W／0．79A | Units | 25 | 27 | 27 |
| －DUO switching（two－lamp） |  |  |  |  |  |
|  | L18W／0．22A | Units | 90 （§ $2 \times 90$ lamps） | 100 （ $2 \times 100 \mathrm{lamps}$ ） | 100 （\＃2 $2 \times 100$ lamps） |
|  | L36W／0．42A | Units | 47 （§ $2 \times 47$ lamps） | 52 （仓2 $2 \times 52$ lamps） | 52 （\＃2 $\times 52$ lamps） |
|  | L58W／0．63A | Units | $31(\triangleq 2 \times 31 \mathrm{lamps})$ | 34 （仓2 $\times 34$ lamps） | 34 （\＃2 $2 \times 34$ lamps） |
|  | L 80W／0．87A | Units | 22 （今2 22 lamps） | 25 （仓2 $2 \times 25$ lamps） | 25 （仓2 $2 \times 25$ lamps） |

Switching gas discharge lamps with correction per main current path at 230 V
－Shunt compensation with inductive ballast，rated power per lamp／capacitance／rated operational current per lamp


[^23]- Contactors LSDD, LSSD and LSUD

Main Circuit-Contactors LSDD, LSSD, LSUD

| Type <br> Size |  |  | LSDD07, LSSD07 <br> 00 | LSDD09, LSSD09 <br> 00 | $\begin{gathered} \text { LSDD 12, LSSD } 12 \\ 00 \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| DC capacity |  |  |  |  |  |
| Utilization category DC-1 Switching resistive loads ( $\mathrm{L} / \mathrm{R} \leq 1 \mathrm{~ms}$ ) <br> - Rated operational current $\mathrm{I}_{\mathrm{e}}\left(\right.$ at $\left.60^{\circ} \mathrm{C}\right)$ |  |  |  |  |  |
| - 1 conducting path | up to 24 V | A | 15 | 20 |  |
|  | 60 V | A | 15 | 20 |  |
|  | 110 V | A | 1.5 | 2.1 |  |
|  | 220 V | A | 0.6 | 0.8 |  |
|  | 440 V | A | 0.42 | 0.6 |  |
|  | 600 V | A | 0.42 | 0.6 |  |
| - 2 conducting paths in series | up to 24 V | A | 15 | 20 |  |
|  | 60 V | A | 15 | 20 |  |
|  | 110 V | A | 8.4 | 12 |  |
|  | 220 V | A | 1.2 | 1.6 |  |
|  | 440 V | A | 1.6 | 0.8 |  |
|  | 600 V | A | 0.5 | 0.7 |  |
| - 3 conducting paths in series | up to 24 V | A | 15 | 20 |  |
|  | 60 V | A | 15 | 20 |  |
|  | 110 V | A | 15 | 20 |  |
|  | 220 V | A | 15 | 20 |  |
|  | 440 V | A | 0.9 | 1.3 |  |
|  | 600 V | A | 0.7 | 1 |  |
| Utilization category DC-3 und DC-5, Shunt-wound and series-wound motors (L/R $\leq 15 \mathrm{~ms}$ ) <br> - Rated operational current $\mathrm{I}_{\mathrm{e}}\left(\right.$ at $\left.60^{\circ} \mathrm{C}\right)$ |  |  |  |  |  |
|  |  |  |  |  |  |
| - 1 conducting path | up to 24 V | A | 15 | 20 |  |
|  | 60 V | A | 0.35 | 0.5 |  |
|  | 110 V | A | 0.1 | 0.15 |  |
|  | 220 V | A | -- | -- |  |
|  | 440 V | A | -- | -- |  |
|  | 600 V | A | -- | -- |  |
| - 2 conducting paths in series | up to 24 V | A | 15 | 20 |  |
|  | 60 V | A | 3.5 | 5 |  |
|  | 110 V | A | 0.25 | 0.35 |  |
|  | 220 V | A | -- | -- |  |
|  | 440 V | A | -- | -- |  |
|  | 600 V | A | -- | -- |  |
| - 3 conducting paths in series | up to 24V | A | 15 | 20 |  |
|  | 60 V | A | 15 | 20 |  |
|  | 110 V | A | 15 | 20 |  |
|  | 220 V | A | 1.2 | 1.5 |  |
|  | 440 V | A | 0.14 | 0.2 |  |
|  | 600 V | A | 0.14 | 0.2 |  |
| Switching frequency z in operating cycles/hour |  |  |  |  |  |
| - Contactors without overload relay | No-load switching frequency AC | $\mathrm{h}^{-1}$ |  | 1000 |  |
|  | No-load switching frequency DC | $\mathrm{h}^{-1}$ |  | 1000 |  |
| Dependence of the switching | Rated operation |  |  |  |  |
| frequency $z^{\prime}$ on the operational current | AC-1 (AC/DC) | $\mathrm{h}^{-1}$ |  |  |  |
| $\mathrm{I}^{\prime}$ and operational voltage $\mathrm{U}^{\prime}$ : | AC-2 (AC/DC) | $h^{-1}$ |  | 1000750 |  |
| $z^{\prime}=z \cdot\left(l_{e} / 1\right) \cdot\left(400 \mathrm{~V} / \mathrm{U}^{\prime}\right)^{1,5} \cdot 1 / \mathrm{h}$ | AC-3 (AC/DC) | $\mathrm{h}^{-1}$ |  | 750 |  |
|  | AC-4 (AC/DC) | $\mathrm{h}^{-1}$ |  | 250 |  |
| - Contactors with overload relays (mean value) |  | $h^{-1}$ |  | 15 |  |

Conductor Cross-Sections-Contactors LSDD, LSSD, LSUD

| (1 or 2 conductors can be connected) | Main and auxiliary conductors; coil connections: |  | Screw terminals |
| :---: | :---: | :---: | :---: |
| For standard screwdriver size 2 and Pozidriv 2 | - Solid | $\mathrm{mm}^{2}$ | $2 \times(0.5 \ldots 1.5)^{11} ; 2 \times(0.75 \ldots 2.5)^{1)}$ acc. to IEC $60947 ;$ $\max .2 \times(1 \ldots 4)$ |
|  | - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.5 \text {... } 1.5)^{11} ; 2 \times(0.75 \text {... } 2.5)^{11}$ |
|  | - Solid or stranded, AWG cables | AWG | $2 \times(20 . . .16)^{\prime \prime} ; 2 \times(18 . . .14)^{\prime \prime} ; 1 \times 12$ |
|  | - Terminal screw |  | M3 |
|  | - fightening torque | Nm | 0.8 ... 1.2 (7 ... $10.3 \mathrm{lb} . \mathrm{in}$ ) |
| ( 1 or 2 conductors can be connected) | Main and auxiliary conductors; coil connections: |  | Cage Clamp terminals (on request) |
|  | - Solid | $\mathrm{mm}^{2}$ | $2 \times(0.25$... 2.5) |
|  | - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 1.5)$ |
|  | - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 2.5)$ |
|  | - AWG cables, solid or stranded | AWG | $2 \times(24 . . .14)$ |

[^24]Technical Specification - Electromechanical Contactors Series ALEA LS

Contactors LSDO, LSSO and LSUO
■ General Data - Contactors LSDO, LSSD, LSUD


1) See "Endurance of the main contacts"
2) See "Conductor cross-sections"
3) Test conditions according to IEC 60947-4-1

- Contactors LSDO, LSSO and LSUO
- Control-Contactors LSDO, LSSO, LSUO

| $\begin{aligned} & \text { Type } \\ & \text { Size } \end{aligned}$ |  |  | LSDO, LSUO 0 | $\begin{gathered} \text { LSSO } \\ 0 \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: |
| Magnetic coil operating range | AC/DC |  | $0.8 \ldots 1.1 \times \mathrm{U}_{5}$ | 0.7 ... $1.25 \times \mathrm{U}_{\mathrm{s}} / \mathrm{U}_{\mathrm{s}}=17-30 \mathrm{VDC}$ |
| Power consumption of the magnetic coils (when coil is cold and $1.0 \times \mathrm{U}_{5}$ ) |  |  |  |  |
| - AC operation, $50 / 60 \mathrm{~Hz}$ | - Closing | VA |  |  |
| Standard version | - P.f. |  | 0.82 |  |
|  | - Closed | VA | 7,8 |  |
|  | - P.f. |  | 0.24 |  |
| - AC operation, $50 / 60 \mathrm{~Hz}$ | - Closing | VA | 64/63 |  |
| Standard version | - P.f. for closing |  | 0.72/0.74 |  |
|  | - Closed | VA | 8.4/6.8 |  |
|  | - P.f. for closed |  | 0.24/0.28 |  |
| AC operation, 50 Hz , USA/Canada | - Closing | VA | 61 |  |
|  | - P.f. for closing |  | 0,82 |  |
|  | - Closed | VA | 7,8 |  |
|  | - P.f. for closed |  | 0,24 |  |
| - AC operation, 60 Hz , USA/Canada | - Closing | VA | 69 |  |
|  | - P.f. for closing |  | 0,76 |  |
|  | - Closed | VA | 7,5 |  |
|  | - P.f. for closed |  | 0,28 |  |
| - DC operation | Closing $=$ Closed | W | 5,4 | 4,2 |
| Permissible residual current of the electronics (with 0 signal) |  |  |  |  |
|  | - AC operation | mA | $<6 \mathrm{~mA} \times\left(230 \mathrm{~V} / \mathrm{U}_{5}\right)$ |  |
|  | - DC operation | mA | $<16 \mathrm{~mA} \times\left(24 \mathrm{~V} / \mathrm{U}_{5}\right)$ |  |
| Operating times ${ }^{1 /}$ |  |  |  |  |
| Total break time $=$ Opening delay + Arcing time |  |  |  |  |
| - AC operation at $0.8 \ldots \mathrm{I..1} \times \mathrm{U}_{\text {s }}$ | Closing delay | ms | 8 ... 44 |  |
|  | Opening delay | ms | 4 ... 20 |  |
| - DC operation at $0.85 \ldots 1.1 \times \mathrm{U}_{\text {s }}$ | Closing delay | ms | 50 ... 170 |  |
|  | Opening delay | ms | 13.5 ... 15.5 |  |
| - Arcing time |  | ms | 10 |  |
| Operating times for $1.0 \times \mathrm{U}^{11}$ |  |  |  |  |
| - AC operation | Closing delay | ms | $10 . .17$ |  |
|  | Opening delay | ms | 4 ... 20 |  |
| - DC operation | Closing delay | ms | 55 ... 85 |  |
|  | Opening delay | ms | $14 . . .15 .5$ |  |

1) The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (varistor +2 ms to 5 ms , diode assembly: 2 to 6 times).

- Main Circuit Contactors LSDO, LSSO, LSUO

| TypeSize |  |  | LSD009 | LSDO12, LSSO12 <br> 0 | LSDO17, LSSO17 <br> 0 | LSD025, LSSO25 LSUO25 <br> 0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| AC capacity |  |  |  |  |  |  |
| Utilization category AC-1 |  |  |  |  |  |  |
| Switching resistive loads |  |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | at $40^{\circ} \mathrm{C}$ up to 690 V | A | 40 |  |  |  |
|  | at $60^{\circ} \mathrm{C}$ up to 690 V | A | 35 |  |  |  |
| Rated power for AC loads ${ }^{1 /}$ | 230 V | kW | 13,3 |  |  |  |
| P.f. $=0.95\left(\mathrm{at} 60^{\circ} \mathrm{C}\right)$ | 400 V | kW | 23 |  |  |  |
|  | 500 V | kW | 29 |  |  |  |
|  | 690 V | kW | 40 |  |  |  |
| Minimum conductor cross-section | at $40^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 10 |  |  |  |
| for loads with $\mathrm{I}_{\text {e }}$ | at $60^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 10 |  |  |  |
| Utilization categories AC-2 and AC-3 |  |  |  |  |  |  |
| Rated operational currents $I_{\text {e }}$ | up to 400 V | A | 9 | 12 | 17 | 25 |
|  | 440 V | A | 9 | 12 | 17 | 22 |
|  | 500 V | A | 6,5 | 12 | 17 | 18 |
|  | 690 V | A | 5,2 | 9 | 13 | 13 |
| Rated power for slipring or squirrel cage | at 110 V | kW | 1,1 | 1,5 | 2,2 | 3 |
| motors at 50 and 60 Hz | 230 V | kW | 3 | 3 | 4 | 5,5 |
|  | 400 V | kW | 4 | 5,5 | 7,5 | 11 |
|  | 500 V | kW | 4,5 | 7,5 | 10 | 11 |
|  | $660 \mathrm{~V} / 690 \mathrm{~V}$ | kW | 5,5 | 7,5 | 11 | 11 |
| Thermal load capacity | 10 s current ${ }^{2}$ | A | 80 | 110 | 150 | 200 |
| Power loss per conducting path | at $\mathrm{l}_{\mathrm{e}} / \mathrm{AC}-3$ | W | 0,4 | 0,5 | 0,9 | 1,6 |

1) Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account).
2) According to IEC 60947-4-1. For rated values for various start-up conditions see Protection Equipment: Thermal Overload Relays.

Technical Specification - Electromechanical Contactors Series ALEA LS

- Contactors LSDO, LSSO and LSUO
- Main Circuit Contactors LSDO, LSSO, LSUO

| Type Size |  |  | LSD009 <br> 0 | LSDO12, LSSO12 0 | LSDO17, LSSO17 <br> 0 | LSDO25, LSSO25 LSUO25 <br> 0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| AC capacity |  |  |  |  |  |  |
| Power loss per conducting path | at $\mathrm{I}_{\mathrm{e}} /$ AC- 3 |  |  |  |  |  |
| Utilization category AC-4 (at $\left.\mathrm{I}_{\mathrm{a}}=6 \times \mathrm{I}_{\mathrm{e}}\right)^{1 /}$ |  |  |  |  |  |  |
| - Rated operational current $l_{\text {e }}$ | up to 400 V | A | 8,5 | 12,5 | 15,5 | 15,5 |
| - Rated power for squirrel-cage motors with 50 and 60 Hz | up to 400V | kW | 4 | 5,5 | 7,5 | 7,5 |
| The following applies to a contact endurance of about 200000 operating cycles: |  |  |  |  |  |  |
| - Rated operational currents II | up to 400V | A | 4,1 | 5,5 | 7,7 | 9 |
|  | 690 V | A | 3,3 | 5,5 | 7,7 | 9 |
| - Rated power for squirrel-cage motors with 50 and 60 Hz | at 110 V | kW | 0,5 | 0,73 | 1 | 1,2 |
|  | 230 | kW | 1,1 | 1,5 | 2 | 2,5 |
|  | 400V | kW | 2 | 2,6 | 3,5 | 4,4 |
|  | 500 V | kW | 2 | 3,3 | 4,6 | 5,6 |
|  | 690 V | kW | 2,5 | 4,6 | 6 | 7,7 |

Utilization category AC-5a
Switching gas discharge lamps, inductive
ballast per main current path at 230 V


## Switching gas discharge lamps with correction per main current path at 230V

Shunt compensation with inductive ballast, rated power per lamp/capacitance/rated operational current per lamp


For deviating inrush current factors $x$, the power must be recalculated as follows: $P_{x}=P_{n 30} \cdot 30 / x$
Utilization category AC-6b, switching low-inductance (low-loss, metallized dielectric) AC capacitors

| Rated operational currents le | up to 400V | A | 5,8 | 10,8 |
| :---: | :---: | :---: | :---: | :---: |
| Rated power for single capacitors or | at 230 V | kVAr | 2,5 | 4 |
| banks of capacitors (minimum inductance | 400 V | kVAr | 4 | 7,5 |
| of $6 \mu \mathrm{H}$ between capacitors connected in | 500 V | kVAr | 4 | 7,5 |
| parallel) at $50 \mathrm{~Hz}, 60 \mathrm{~Hz}$ | 690 V | kVAr | 4 | 7,5 |

1) For $\mathrm{I}_{\mathrm{e}} / \mathrm{AC}-1=35 \mathrm{~A}\left(60^{\circ} \mathrm{C}\right)$ and the corresponding minimum conductor cross-section $10 \mathrm{~mm}^{2}$.
2) Depending on the electronic ballast used, higher lamp numbers are also possible.

- Contactors LSDO, LSSO and LSUO
- Main Circuit Contactors LSDO, LSSO, LSUO

| Type Size |  |  | LSD009 <br> 0 | LSDO12, LSSO12 0 | LSDOIT, LSSO17 <br> 0 | LSDO25, LSSO25 LSU025 <br> 0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| DC capacity |  |  |  |  |  |  |
| Utilization category DC-1 Switching resistive loads (L/R $\leq 1 \mathrm{~ms}$ ) |  |  |  |  |  |  |
| - Rated operational current $\mathrm{I}_{\mathrm{e}}\left(\operatorname{att} 60^{\circ} \mathrm{C}\right)$ |  |  |  |  |  |  |
| - 1 conducting path | up to 24 V | A |  | 35 |  |  |
|  | 60 V | A |  | 20 |  |  |
|  | 110 V | A |  | 4,5 |  |  |
|  | 220 V | A |  | 1 |  |  |
|  | 440 V | A |  | 0,4 |  |  |
|  | 600 V | A |  | 0,25 |  |  |
| - 2 conducting paths in series | up to 24 V | A |  | 35 |  |  |
|  | 60 V | A |  | 35 |  |  |
|  | 110 V | A |  | 35 |  |  |
|  | 220 V | A |  | 5 |  |  |
|  | 440 V | A |  | 1 |  |  |
|  | 600 V | A |  | 0,8 |  |  |
| - 3 conducting paths in series | up to 24 V | A |  | 35 |  |  |
|  | 60 V | A |  | 35 |  |  |
|  | 110 V | A |  | 35 |  |  |
|  | 220 V | A |  | 35 |  |  |
|  | 440 V | A |  | 2,9 |  |  |
|  | 600 V | A |  | 1,4 |  |  |
| Utilization category DC-3 und DC-5, Shunt-wound and series-wound motors ( $\mathbf{L} / \mathrm{R} \leq 15 \mathrm{~ms}$ ) <br> - Rated operational current $\mathrm{I}_{\mathrm{e}}\left(\right.$ at $\left.60^{\circ} \mathrm{C}\right)$ |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| - 1 conducting path | up to 24 V | A |  | 20 |  |  |
|  | 60 V | A |  | 5 |  |  |
|  | 110 V | A |  | 2,5 |  |  |
|  | 220 V | A |  | 1 |  |  |
|  | 440 V | A |  | 0,09 |  |  |
|  | 600 V | A |  | 0,06 |  |  |
| - 2 conducting paths in series | up to 24V | A |  | 35 |  |  |
|  | 60 V | A |  | 35 |  |  |
|  | 110 V | A |  | 15 |  |  |
|  | 220 V | A |  | 3 |  |  |
|  | 440 V | A |  | 0,27 |  |  |
|  | 600 V | A |  | 0,16 |  |  |
| - 3 conducting paths in series | up to 24V | A |  | 35 |  |  |
|  | 60 V | A |  | 35 |  |  |
|  | 110 V | A |  | 35 |  |  |
|  | 220 V | A |  | 10 |  |  |
|  | 440 V | A |  | 0,6 |  |  |
|  | 600 V | A |  | 0,6 |  |  |
| Switching frequency $\mathbf{z}$ in operating cycles/hour |  |  |  |  |  |  |
| - Contactors without overload relay | No-load switching frequency AC | $\mathrm{h}^{-1}$ |  | 5000 |  |  |
|  | No-load switching frequency DC | $\mathrm{h}^{-1}$ |  | 1500 |  |  |
| Dependence of the switching | Rated operation |  |  | 1000 |  |  |
| frequency $z^{\prime}$ on the operational current | AC-1 (AC/DC) | $\mathrm{h}^{-1}$ |  |  |  |  |
| $I^{\prime}$ and operational voltage $\mathrm{U}^{\prime}$ : $z^{\prime}=z \cdot\left(I_{e} / I^{\prime}\right) \cdot\left(400 \mathrm{~V} / \mathrm{U}^{\prime}\right)^{1,5} \cdot 1 / \mathrm{h}$ | AC-2 (AC/DC) | $h^{-1}$ | 1000 |  |  | 750 |
|  | AC-3 (AC/DC) | $\mathrm{h}^{-1}$ | 1000 |  |  | 750 |
|  | AC-4 (AC/DC) | $h^{-1}$ | 300 |  |  | 250 |
| - Contactors with overload relays (mean value) |  | $h^{-1}$ |  | 15 |  |  |

Technical Specification - Electromechanical Contactors Series ALEA LS

Contactors LSDO, LSSO and LSUOConductor Cross-Section-Contactors LSDO, LSSO, LSUO

| Type <br> Size |  | LSD009, LSSO12, LSDO12, LSSOI7, LSDO17, LSSO25, LSD025, LSU025 <br> 0 |
| :---: | :---: | :---: |
| Conductor cross-sections ( 1 or 2 conductors can be connected) |  |  |
| Main conductors: |  | Screw terminals |
| Solid | $\mathrm{mm}^{2}$ | $2 \times(1 \ldots 2.5)^{11} ; 2 \times(2.5 \ldots 6)^{\prime \prime}$ acc. to IEC 60947 ; max. $1 \times 10$ |
| Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(1 . . .2 .5)^{11} ; 2 \times(2.5 \ldots . .6)^{11}$ |
| AWG cables, solid | AWG | $2 \times(16 \ldots 12)$ |
| - AWG cables, solid or stranded | AWG | $2 \times(14 \ldots 10)$ |
| - AWG cables, stranded | AWG | $1 \times 8$ |
| - Terminal screws |  | M4 (Pozidriv size 2) |
| - fightening torque | Nm | 2 ... 2.5 (18 ... $22 \mathrm{lb} . \mathrm{in}$ ) |
| Auxiliary conductors |  |  |
| - Solid | mm ${ }^{2}$ | $2 \times(0.5 \ldots 1.5)^{11} ; 2 \times(0.75 \ldots 2.5)^{11}$ acc. to IEC 60947 ; max. $2 \times(0.75 \ldots 4)$ |
| Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.5 \ldots 1.5)^{11} ; 2 \times(0.75 \ldots 2.5)^{11}$ |
| - Solid or stranded AWG ( 2 x ) | AWG | $2 \times(20 \ldots 16)^{11} ; 2 \times(18 \ldots 14)^{11} ; 1 \times 12$ |
| - Terminal screws |  | M3 |
| tightening torque | Nm | 0.8 ... 1.2 (7 ... $10.3 \mathrm{lb} . \mathrm{in}$ ) |
| Auxiliary conductors |  | Cage Clamp terminals (on request) |
| Solid | $\mathrm{mm}^{2}$ | $2 \times(0.25$... 2.5) |
| - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 1.5)$ |
| - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25$... 2.5$)$ |
| - AWG cables, solid or stranded | AWG | $2 \times(24 \ldots 14)$ |

1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Contactors LSD2 and LSU2

| General Data - Contactors LSD2, LSU2 |
| :--- |
| Type <br> Size |

short-circuit current $\mathrm{I}_{k}<400 \mathrm{~A}$
I

1) See "Endurance of the main contacts"
2) See "Conductor cross-sections" pages onward
3) According to IEC 60 947-4-1.

Technical Specification - Electromechanical Contactors Series ALEA LS

Contactors LSD2 and LSU2

- Control-Contactors LSD2, LSU2

| Type |  |  | LSD232 | LSD240, LSU240 | LSD250 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Size |  |  | 2 | 2 | 2 |
| Magnetic coil operating range AC/DC |  |  | $0.8 \ldots \mathrm{~F} .1 .1 \times \mathrm{U}_{5}$ |  |  |
| Power consumption of the magnetic coils (when coil is cold and $1.0 \times \mathrm{U}_{5}$ ) |  |  |  |  |  |
| - AC operation, $50 / 60 \mathrm{~Hz}$ | - Closing | VA | 104 | 145 |  |
| Standard version | - P.f. |  | 0,78 | 0,79 |  |
|  | - Closed | VA | 9,7 | 12,5 |  |
|  | - P.f. |  | 0,42 | 0,36 |  |
| - AC operation, $50 / 60 \mathrm{~Hz}$ | - Closing | VA | 127/113 | 170/155 |  |
| Standard version | - P.f. for closing | VA | 0.73/0.69 | 0.76/0.72 |  |
|  | - Closed |  | 11.3/9.5 | 15/11.8 |  |
|  | - P.f. for closed |  | 0.41/0.42 | 0.35/0.38 |  |
| - AC operation, 50 Hz , USA/Canada | - Closing | VA | 108 | 150 |  |
|  | - P.f. for closing |  | 0,76 | 0,77 |  |
|  | - Closed | VA | 9,6 | 12,5 |  |
|  | - P.f. for closed |  | 0,42 | 0,35 |  |
| AC operation, 60 Hz , USA/Canada | - Closing | VA | 120 | 166 |  |
|  | - P.f. for closing |  | 0,7 | 0,71 |  |
|  | - Closed | VA | 10,1 | 12,6 |  |
|  | - P.f. for closed |  | 0,42 | 0,37 |  |
| DC operation | Closing $=$ Closed | W | 13,3 | 13,3 |  |
| Permissible residual current of the electronics (with 0 signal) |  |  |  |  |  |
|  | - AC operation | mA | $<12 \mathrm{~mA} \times\left(230 \mathrm{~V} / \mathrm{U}_{\mathrm{s}}\right)$ | $<18 \mathrm{~mA} \times\left(230 \mathrm{~V} / \mathrm{U}_{\mathrm{s}}\right)$ |  |
|  | - DC operation | mA | $<38 \mathrm{~mA} \times\left(24 \mathrm{~V} / \mathrm{U}_{5}\right)$ | $<38 \mathrm{~mA} \times\left(24 \mathrm{~V} / \mathrm{U}_{s}\right)$ |  |
| Operating times for ${ }^{1 /}$ |  |  |  |  |  |
| Total break time $=$ Opening delay + Arcing time |  |  |  |  |  |
| AC operation at 0.8 ... $1.1 \times \mathrm{U}_{\text {s }}$ | Closing delay | ms | $11 . . .30$ | $10 . . .24$ |  |
|  | Opening delay | ms | 7 ... 10 | 7 ... 10 |  |
| - DC operation at 0.85 ... $1.1 \times \mathrm{U}_{5}$ | Closing delay | ms | $50 . . .95$ | 60 ... 100 |  |
|  | Opening delay | ms | $20 . .30$ | $20 . . .25$ |  |
| - Arcing time |  | ms | 10 | 10 |  |
| Operating times for $1.0 \times \mathrm{U}_{5}{ }^{11}$ |  |  |  |  |  |
| - AC operation | Closing delay | ms | $13 . . .22$ | $12 . . .20$ |  |
|  | Opening delay | ms | 7 ... 10 | 7 ... 10 |  |
| - DC operation | Closing delay | ms | $60 . . .75$ | $70 . . .85$ |  |
|  | Opening delay | ms | $20 . . .30$ | 20 ... 25 |  |

1) The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (varistor +2 ms to 5 ms , diode assembly: 2 to 6 times).
－Contactors LSD2 and LSU2
Main Circuit－Contactors LSD2，LSU2

| Type <br> Size |  |  | LSD232 <br> 2 | LSD240，LSU240 <br> 2 | LSD250 <br> 2 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| AC capacity |  |  |  |  |  |
| Utilization category AC－1，Switching resistive loads |  |  |  |  |  |
| Rated operational current $I_{\text {e }}$ | at $40^{\circ} \mathrm{C}$ up to 690 V | A | 50 | 60 | 60 |
|  | at $60^{\circ} \mathrm{C} \mathrm{up} \mathrm{to} 690 \mathrm{~V}$ | A | 45 | 55 | 55 |
| Rated power for AC loads ${ }^{1 /}$ | 230 V | kW | 18 | 22 | 22 |
| P．f．$=0.95\left(\mathrm{at} 60^{\circ} \mathrm{C}\right)$ | 400V | kW | 31 | 38 | 38 |
|  | 500 V | kW | 39 | 46 | 46 |
|  | 690 V | kW | 54 | 66 | 66 |
| Minimum conductor cross－section for loads with $I_{\text {e }}$ | at $40^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 16 | 16 | 16 |
|  | at $60^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 10 | 16 | 16 |
| Utilization categories AC－2 and AC－3 |  |  |  |  |  |
| Rated operational currents $I_{\text {e }}$ | up to 500 V | A | 32 | 40 | 50 |
|  | 690 V | A | 20 | 24 | 24 |
| Rated power for slipping or squirrel cage motors at 50 and 60 Hz | 230 V | kW | 7，5 | 11 | 15 |
|  | 400 V | kW | 15 | 18，5 | 22 |
|  | 500 V | kW | 18，5 | 22 | 30 |
|  | 690 V | kW | 18，5 | 22 | 22 |
| Thermal load capacity | 10 s current ${ }^{2}$ | A | 320 | 400 | 400 |
| Power loss per conducting path | at $\mathrm{l}_{\mathrm{e}} / \mathrm{AC}-3$ | W | 1，8 | 2，6 | 5 |
| Utilization category AC－4（at $\mathrm{I}_{\mathrm{a}}=6 \times \mathrm{I}$ ） |  |  |  |  |  |
| －Rated operational current $I_{\text {e }}$ | up to 400V | A | 29 | 35 | 41 |
| －Rated power for squirrel－cage motors with 50 and 60 Hz | up to 400 V | kW | 15 | 18，5 | 22 |
| －The following applies to a contact endurance of about 200000 operating cycles： |  |  |  |  |  |
| －Rated operational currents I | up to 400V | A | 15，6 | 18，5 | 24 |
|  | 690 V | A | 15，6 | 18，5 | 24 |
| －Rated power for squirrel－cage motors with 50 and 60 Hz | 230 | kW | 4，7 | 5，4 | 7，3 |
|  | 400V | kW | 8，2 | 9，5 | 12，6 |
|  | 500 V | kW | 9，8 | 11，8 | 15，8 |
|  | 690 V | kW | 13 | 15，5 | 21，8 |
| Utilization category AC－5a，Switching gas discharge lamps，inductive ballast per main current path at 230 V |  |  |  |  |  |
| －Uncorrected，rated power per lamp／rated operational current per lamp |  |  |  |  |  |
| －Uncorrected | L 18W／0，37A | Units | 135 | 162 | 162 |
|  | L36W／0，43A | Units | 116 | 139 | 139 |
|  | L58W／0，67A | Units | 74 | 89 | 89 |
|  | L80W／0，79A | Units | 63 | 75 | 75 |
| －DUO switching（two－lamp） |  |  |  |  |  |
|  | L 18W／0，22A | Units | 227 （ | 272 （气 $2 \times 272$ lamps） | 272 （仓2×272 lamps） |
|  | L36W／0，42A | Units | 119 （仓2x119 lamps） | 142 （气 $2 \times 142$ lamps） | 142 （ $\triangleq 2 \times 142 \mathrm{lamps})$ |
|  | L58W／0，63A | Units | 79 （ $\triangle 2 \times 79$ lamps） | 95 （§ $2 \times 95$ lamps） | 95 （§ $2 \times 95$ lamps） |
|  | L80W／0，87A | Units | 57 （气 $2 \times 57$ lamps） | 68 （气 $2 \times 68$ lamps） | 68 （气 $2 \times 68$ lamps） |
| Switching gas discharge lamps with correction per main current path at 230V |  |  |  |  |  |
| Shunt compensation with inductive ballast，rated power per lamp／capacitance／rated operational current per lamp |  |  |  |  |  |
| －Shunt compensation with inductive ballast | L 18W／4，5uF／0，11A | Units | 78 | 98 | 123 |
|  | L $36 \mathrm{~W} / 4,5 \mu \mathrm{~F} / 0,21 \mathrm{~A}$ | Units | 78 | 98 | 123 |
|  | L58W／7，0 0 F／0，32A | Units | 50 | 63 | 79 |
|  | L80W／7，0 ${ }^{\text {F／} / 0,49 \mathrm{~A}}$ | Units | 50 | 63 | 73 |
| －With solid－state ballast ${ }^{3}$ single lamp |  |  |  |  |  |
|  | L $18 \mathrm{~W} / 6,8 \mu \mathrm{~F} / 0,10 \mathrm{~A}$ | Units | 224 | 280 | 350 |
|  | L36W／6，8 ${ }^{\text {L }}$／ $0,18 \mathrm{~A}$ | Units | 124 | 155 | 194 |
|  | L58W／10ヶF／0，29A | Units | 77 | 96 | 120 |
|  | L80W／10ヶF／0，43A | Units | 52 | 65 | 81 |
| －With solid－state ballast ${ }^{3}$ two lamp |  |  |  |  |  |
|  | L 18W／10 $/$ F／0，18A | Units | 124 （仓2 $2 \times 124$ lamps） | $155 \triangleq 2 \times 155 \mathrm{lamps}$ | 194 （\＃2 $\times 194$ lamps） |
|  | L36W／10 $/$ F／0，35A | Units | 64 （\＃2 $2 \times 64$ lamps） | 80 （\＃2 $2 \times 80$ lamps） | 100 （\＃2 $\times 100 \mathrm{lamps}$ ） |
|  | L58W／22 $\mathrm{F}^{\text {／}}$ ， 52 L A | Units | 43 （仓） $2 \times 43$ lamps） | 54 （仓） $2 \times 54$ lamps） | 67 （ $\triangleq 2 \times 67$ lamps） |
|  | L $80 \mathrm{~W} / 22 \mu \mathrm{~F} / 0,86 \mathrm{~A}$ | Units | 26 （\＃） $2 \times 26$ lamps） | 32 （气 $2 \times 32$ lamps） | 40 （仓） $2 \times 40 \mathrm{lamps}$ ） |

[^25]
## Technical Specification - Electromechanical Contactors Series ALEA LS

## Contactors LSD2 and LSU2

Main Circuit-Contactors LSD2, LSU2


For deviating inrush current factors $x$, the power must be recalculated as follows: $P_{x}=P_{n 30} \cdot 30 / x$
Utilization category AC-6b, switching low-inductance (low-loss, metallized dielectric) AC

## capacitors

Rated operational currents Ie
up to 400V A
Rated power for single capacitors or

| at 230 V | kVAr |
| :---: | :---: |
| 400 V | kVAr |
| 525 V | kVAr |

of $6 \mu \mathrm{H}$ between capacitors connected in
parallel) at $50 \mathrm{~Hz}, 60 \mathrm{~Hz}$

1) For $\mathrm{I}_{\mathrm{e}} / \mathrm{AC}-1=35 \mathrm{~A}\left(60^{\circ} \mathrm{C}\right)$ and the corresponding minimum conductor cross-section $10 \mathrm{~mm}^{2}$.
2) Depending on the electronic ballast used, higher lamp numbers are also possible.

Contactors LSD2 and LSU2
Main Circuit-Contactors LSD2, LSU2

| Type <br> Size |
| :--- |
| DC capacity |
| Utilization category DC-1 <br> Rated operational curr <br> -1 conducting path |
|  |
| -2 conducting paths in series |

- 3 conducting paths in series

2 conducting paths in series
-3 conducting paths in series

|  | , 10 V | A | 5 | 55 |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 220 V | A | 25 | 25 | 5 |
|  | 440 V | A | 0.6 | 0.6 | 0.6 |
|  | 600 V | A | 0.35 | 0.35 | 0.35 |
| Switching frequency z in operating cycles/hour |  |  |  |  |  |
| - Contactors without overload relay | No-load switching frequency AC | $\mathrm{h}^{-1}$ | 5000 | 5000 | 5000 |
|  | No-load switching frequency DC | $\mathrm{h}^{-1}$ | 1500 | 1500 | 1500 |
| Dependence of the switching frequency $z^{\prime}$ on the operational current | Rated operation |  | 1200 | 1200 | 1000 |
| $I^{\prime}$ and operational voltage $U^{\prime}$ : $z^{\prime}=z \cdot\left(I_{e} / I^{\prime}\right) \cdot\left(400 \mathrm{~V} / \mathrm{U}^{\prime}\right)^{1,5} \cdot 1 / \mathrm{h}$ | AC-2 (AC/DC) | $h^{-1}$ | 750 | 600 | 400 |
|  | AC-3 (AC/DC) | $h^{-1}$ | 1000 | 1000 | 800 |
|  | AC-4 (AC/DC) | $\mathrm{h}^{-1}$ | 250 | 300 | 300 |
| - Contactors with overload relays (mean value) |  | $\mathrm{h}^{-1}$ | 15 | 15 | 15 |

## Technical Specification - Electromechanical Contactors Series ALEA LS

Contactors LSD2 and LSU2Conductor Cross-Sections-Contactors LSD2, LSU2


1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Contactors LSD3 and LSU3

- General Data - Contactors LSD3

| Type |
| :--- |
| Size |

Main circuit

- Fuse links gl/gG NH, DIAZED, NEOZED
acc. to IEC 60 947-4-1 /DIN EN 60 947-4-1

| Type of coordination "1" | A | 250 | 250 |
| :--- | :--- | :--- | :--- |
| Type of coordination "2" | A | 125 | 160 |
| Weld-free" | A | 63 | 100 |
|  |  |  |  |
|  | A |  | 10 |
| ree protection at $I_{k} \geq 1 \mathrm{kA}$ ) | A |  | 10 |



1) See "Endurance of the main contacts"
2) See "Conductor cross-sections"
3) According to IEC 60 947-4-1

Technical Specification - Electromechanical Contactors Series ALEA LS

Contactors LSD3 and LSU3

- Control-Contactors LSD3

| Type | LSD365 | LSD380 | LSD395 |
| :--- | :---: | :---: | :---: |
| Size | 3 | 3 | 3 |
| Magnetic coiloperating range |  |  |  |

Magnetic coil operating range $\quad$ AC/D
Power consumption of the magnetic coils (when coil is cold and $1.0 \times \mathrm{U}_{5}$ )

- AC operation, $50 / 60 \mathrm{~Hz}$

Standard version

AC operation, $50 / 60 \mathrm{~Hz}$
Standard version

- AC operation, 50 Hz , USA/Canada
- AC operation, 60 Hz , USA/Canada

|  | - P.f. for closing |
| :--- | :--- |
|  | - Closed |
| - DC operation | P.f. for closed |
| Closing $=$ Closed |  |

## Permissible residual current of the electronics (with 0 signal)

|  | - AC operation <br> - DC operation | mA mA |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Operating times |  |  |  |  |
| Total break time $=$ Opening delay + Arcing time |  |  |  |  |
| - AC operation at $0.8 \ldots 1.1 \times \mathrm{U}_{\text {s }}$ | Closing delay | ms | $16 . . .57$ | $17 . . .90$ |
|  | Opening delay | ms | $10 . .19$ | $10 . .25$ |
| - DC operation at 0.85 ... $1.1 \times \mathrm{U}_{\text {s }}$ | Closing delay | ms | $90 . . .230$ | 90 ... 230 |
|  | Opening delay | ms | $14 . .20$ | $14 . .20$ |
| - Arcing time |  | ms | 10 ... 15 | 10 ... 15 |
| Operating times for $1.0 \times \mathrm{Us}^{11}$ |  |  |  |  |
| - AC operation | Closing delay | ms | $18 . . .34$ | $18 . . .30$ |
|  | Opening delay | ms | $11 . . .18$ | $11 . . .23$ |
| - DC operation | Closing delay | ms | $100 . . .120$ | $100 . . .120$ |
|  | Opening delay | ms | 16... 20 | $16 . . .20$ |

1) The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (varistor +2 ms to 5 ms , diode assembly: 2 to 6 fimes)

Contactors LSD3 and LSU3
Main Circuit-Contactors LSD3

| Type <br> Size |  |  | LSD365 <br> 3 | LSD380 <br> 3 | LSD395 <br> 3 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| AC capacity |  |  |  |  |  |
| Rated operational current $I_{e}$ | $\begin{gathered} \text { at } 40^{\circ} \mathrm{C} \text { up to } 690 \mathrm{~V} \\ 1000 \mathrm{~V} \end{gathered}$ | $\begin{aligned} & \text { A } \\ & \text { A } \end{aligned}$ | $\begin{aligned} & 100 \\ & 50 \end{aligned}$ | $\begin{aligned} & 120 \\ & 60 \end{aligned}$ | $\begin{aligned} & 120 \\ & 70 \end{aligned}$ |
|  | $\begin{gathered} \text { at } 60^{\circ} \mathrm{C} \text { up to } 690 \mathrm{~V} \\ 1000 \mathrm{~V} \end{gathered}$ | A | 90 40 | $\begin{gathered} 100 \\ 50 \end{gathered}$ | 100 60 |
| Rated power for AC loads ${ }^{11}$ | 230 V | kW | 34 | 38 | 38 |
| P.f. $=0.95\left(\mathrm{at} 60^{\circ} \mathrm{C}\right)$ | 400 V | kW | 59 | 66 | 66 |
|  | 500 V | kW | 74 | 82 | 82 |
|  | 690 V | kW | 102 | 114 | 114 |
|  | 1000 V | kW | 66 | 82 | 98 |
| Minimum conductor cross-section | at $40^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 35 | 50 | 50 |
| for loads with $I_{\text {e }}$ | at $60^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 35 | 35 | 35 |
| Utilization categories AC-2 and AC-3 |  |  |  |  |  |
| Rated operational currents $I_{\text {e }}$ | up to 500 V | A | 65 | 80 | 95 |
|  | 690 V | A | 47 | 58 | 58 |
|  | 1000 V | A | 25 | 30 | 30 |
| Rated power for slipping or squirrel cage | 230 V | kW | 18,5 | 22 | 22 |
| motors at 50 and 60 Hz | 400 V | kW | 30 | 37 | 45 |
|  | 500 V | kW | 37 | 45 | 55 |
|  | 690V | kW | 45 | 55 | 55 |
|  | 1000 V | kW | 30 | 37 | 37 |
| Thermal load capacity | 10 s current ${ }^{2 /}$ | A | 600 | 760 | 760 |
| Power loss per conducting path | at $\mathrm{I}_{\mathrm{e}} / \mathrm{AC}-3$ | W | 4,6 | 7,7 | 10,8 |
| Utilization category AC-4 (at $\left.\mathrm{I}_{\mathrm{a}}=6 \times \mathrm{I}_{\mathrm{e}}\right)^{\text {1/ }}$ |  |  |  |  |  |
| - Rated operational current $\mathrm{l}_{\text {e }}$ | up to 400V | A | 55 | 66 | 80 |
| - Rated power for squirrel-cage motors with 50 and 60 Hz | up to 400 V | kW | 30 | 37 | 45 |
| - The following applies to a contact endurance of about 200000 operating cycles: |  |  |  |  |  |
| - Rated operational currents I ${ }_{\text {e }}$ | up to 400 V | A | 28 | 34 | 42 |
|  | 690 V | A | 28 | 34 | 42 |
|  | 1000 V | A | 20 | 23 | 23 |
| - Rated power for squirrel-cage motors with 50 and 60 Hz | 230 | kW | 8,7 | 10,4 | 12 |
|  | 400 V | kW | 15,1 | 17,9 | 22 |
|  | 500 V | kW | 18,4 | 22,4 | 27 |
|  | 690 V | kW | 25,4 | 30,9 | 38 |
|  | 1000V | kW | 22 | 30 | 30 |

[^26]Technical Specification - Electromechanical Contactors Series ALEA LS

Contactors LSD3 and LSU3
Main Circuit-Contactors LSD3


1) Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account).
2) According to IEC 60947-4-1. For rated values for various start-up conditions see: Thermal Overload Relays.
3) Depending on the electronic ballast used, higher lamp numbers are also possible.

Contactors LSD3 and LSU3
Main Circuit-Contactors LSD3

| Type <br> Size |  |  | LSD365 <br> 3 | LSD380 <br> 3 | LSD395 <br> 3 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| AC capacity |  |  |  |  |  |
| Utilization category AC-6a, switching AC transformers |  |  |  |  |  |
| - Rated operational current $\mathrm{I}_{\text {}}$ |  |  |  |  |  |
| For inrush current $\mathrm{n}=20$ | up to 400V | A | 63,5 | 80 | 84,4 |
|  | up to 690V | A | 47 | 58 | 58 |
| For inrush current $\mathrm{n}=30$ | up to 400V | A | 42,3 | 56,3 | 56,3 |
|  | up to 690V | A | 42,3 | 56,3 | 56,3 |
| - Rated power P |  |  |  |  |  |
| For inrush current $\mathrm{n}=20$ | 230 V | kVA | 25,3 | 31,9 | 33,6 |
|  | 400V | kVA | 43,9 | 55,4 | 58 |
|  | 500 V | kVA | 54,9 | 69,3 | 73,1 |
|  | 690 V | kVA | 56,2 | 69,3 | 69,3 |
| For inrush current $\mathrm{n}=30$ | 230 V | kVA | 16,8 | 22,4 | 22,4 |
|  | 400 V | kVA | 29,3 | 39 | 39 |
|  | 500 V | kVA | 36,6 | 48,7 | 48,7 |
|  | 690 V | kVA | 50,3 | 67,3 | 67,3 |
| For deviating inrush current factors x , the power must be recalculated as follows: $\mathrm{P}_{\mathrm{x}}=\mathrm{P}_{\mathrm{n} 30} \cdot 30 / \mathrm{x}$ |  |  |  |  |  |
| Utilization category AC-6b, switching low-inductance (low-loss, metallized dielectric) AC capacitors |  |  |  |  |  |
| Rated operational currents Ie | up to 400V | A | 57 | 72 |  |
| Rated power for single capacitors or | at 230 V | kvar | 24 | 29 |  |
| banks of capacitors (minimum inductance | 400 V | kvar | 40 | 50 |  |
| of $6 \mu \mathrm{H}$ between capacitors connected inparallel) at $50 \mathrm{~Hz}, 60 \mathrm{~Hz}$ | 525 V | kvar | 50 | 65 |  |
|  | 690 V | kvar | 40 | 50 |  |
| DC capacity |  |  |  |  |  |
| Utilization category DC-1 Switching resistive loads (L/R $\leq 1 \mathrm{~ms}$ ) |  |  |  |  |  |
| - Rated operational current $\mathrm{l}_{\mathrm{e}}\left(\right.$ at $\left.60^{\circ} \mathrm{C}\right)$ |  |  |  |  |  |
| - 1 conducting path | up to 24 V | A | 90 | 100 | 100 |
|  | 60 V | A | 23 | 60 | 60 |
|  | 110 V | A | 4,5 | 9 | 9 |
|  | 220 V | A | 1 | 2 | 2 |
|  | 440 V | A | 0,4 | 0,6 | 0,6 |
|  | 600 V | A | 0,26 | 0,4 | 0,4 |
| - 2 conducting paths in series | up to 24 V | A | 90 | 100 | 100 |
|  | 60 V | A | 90 | 100 | 100 |
|  | 110 V | A | 90 | 100 | 100 |
|  | 220 V | A | 5 | 10 | 10 |
|  | 440 V | A | 1 | 1,8 | 1,8 |
|  | 600 V | A | 0,8 | 1 | 1 |
| - 3 conducting paths in series | up to 24 V | A | 90 | 100 | 100 |
|  | 60 V | A | 90 | 100 | 100 |
|  | 110 V | A | 90 | 100 | 100 |
|  | 220 V | A | 70 | 80 | 80 |
|  | 440 V | A | 2,9 | 1,8 | 4,5 |
|  | 600 V | A | 1,4 | 1 | 2,6 |

Technical Specification - Electromechanical Contactors Series ALEA LS

Contactors LSD3 and LSU3
Main Circuit-Contactors LSD3

| Type |
| :--- | :--- | :--- | :--- | :--- |
| Size |

Contactors LSD3 and LSU3

- Conductor Cross-Sections-Contactors LSD3

| Type <br> Size |  |  | $\begin{gathered} \text { LSD3 } \\ 3 \end{gathered}$ |
| :---: | :---: | :---: | :---: |
| 1 or 2 conductors can be connected |  |  |  |
| Main conductors: |  |  | Screw terminals |
| Front clamping point | Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | 2.5 ... 35 |
| connected | - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | 4 ... 50 |
|  | - Stranded | $\mathrm{mm}^{2}$ | 2.5 ... 16 |
|  | - Solid | $\mathrm{mm}^{2}$ | 4 ... 70 |
|  | - Ribbon cable conductors (number x width x thickness) | $\mathrm{mm}^{2}$ | $6 \times 9 \times 0.8$ |
|  | AWG cables, solid or stranded | AWG | 10... 2/0 |
| Rear clamping point connected | - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | 2.5 ... 50 |
|  | - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | $10 . . .50$ |
|  | - Stranded | $\mathrm{mm}^{2}$ | 2.5 ... 16 |
|  | - Solid | $\mathrm{mm}^{2}$ | $10 . . .70$ |
|  | - Ribbon cable conductors (number x width x thickness) | $\mathrm{mm}^{2}$ | $6 \times 9 \times 0.8$ |
|  | AWG cables, solid or stranded | AWG | $10 . . .2 / 0$ |
| Both clamping points connected | - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(2.5$... 35) |
|  | - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | $2 \times(4 \ldots 35)$ |
|  | - Stranded | $\mathrm{mm}^{2}$ | $2 \times(2.5 \ldots 16)$ |
|  | - Solid | $\mathrm{mm}^{2}$ | $2 \times(4 \ldots 50)$ |
|  | - Ribbon cable conductors (number x width x thickness) | $\mathrm{mm}^{2}$ | $2 \times(6 \times 9 \times 0.8)$ |
|  | - AWG cables, solid or stranded | AWG | $2 \times(10 \ldots 1 / 0)$ |
|  | - Terminal screw |  | M6 (Inbus. SW 4) |
|  | - tightening torque | Nm | 4 ... 6 (36 ... $53 \mathrm{lb} . \mathrm{in}$ ) |
| Connection for drilled copper bars 1) <br> Without box terminal with cable lugs ${ }^{2{ }^{2}}$ <br> ( 1 or 2 conductors can be connected) | Max. width | mm | 10 |
|  | - Finely stranded with cable lug |  | $10 . . .50^{31}$ |
|  | - Stranded with cable lug |  | $10 . . .70^{31}$ |
|  | - AWG cables, solid or stranded |  | 7... 1/0 |
|  | Auxiliary conductors: |  |  |
|  | - Solid | $\mathrm{mm}^{2}$ | $\begin{aligned} 2 \times(0.5 \ldots 1.5)^{4} ; & 2 \times(0.75 \ldots 2.5)^{4} \text { acc. to IEC } 60947 ; \\ & \max .2 \times(0.75 \ldots 4) \end{aligned}$ |
|  | - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.5 \ldots 1.5) 4) ; 2 \times(0.75$... 2.5) 4) |
|  | - AWG cables, solid or stranded | AWG | $2 \times(20 \ldots 16)^{4} ; 2 \times(18 \ldots 14)^{4} ; 1 \times 12$ |
|  | - Terminal screw |  | M3 |
|  | - tightening torque | Nm | 0.8 ... 1.2 (7 ... 10.3 lb.in) |


| Auxiliary conductors: |  | $\mathrm{mm}^{2}$ |
| :--- | :--- | :--- |
|  | Cage Clamp terminals (on request) |  |
|  | • | Solid |
|  | Finely stranded with end sleeve | $\mathrm{mm}^{2}$ |
| ( $0.25 \ldots 2.5)$ |  |  |
|  | Finely stranded without end sleeve | $\mathrm{mm}^{2}$ |

[^27]Technical Specification - Electromechanical Contactors Series ALEA LS

3) See "Electromagnetic compatibility (EMC)"
4) According to IEC 60 947-4-1

Control - Contactors LSD6

Contactors LSD6
$\square$
Main Circuit-Contactors LSD6

| Type Size |  |  | LSD611 <br> 6 | LSD615 <br> 6 | LSD619 <br> 6 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| AC capacity |  |  |  |  |  |
| Utilization category AC-1, Switching resistive loads |  |  |  |  |  |
| Rated operational current $I_{\text {e }}$ | at $40^{\circ} \mathrm{C}$ up to 690 V | A | 160 | 185 | 215 |
|  | at $60^{\circ} \mathrm{C}$ up to 690 V | A | 140 | 160 | 185 |
|  | at $60^{\circ} \mathrm{C} \mathrm{up} \mathrm{to} 1000 \mathrm{~V}$ | A | 80 | 90 | 100 |
| Rated power for AC loads ${ }^{1 /}$ | 230 V | kW | 53 | 60 | 70 |
| P.f. $=0.95\left(\mathrm{at} 60^{\circ} \mathrm{C}\right)$ | 400 V | kW | 92 | 105 | 121 |
|  | 500 V | kW | 115 | 131 | 152 |
|  | 690 V | kW | 159 | 181 | 210 |
|  | 1000 V |  | 131 | 148 | 165 |
| Minimum conductor cross-section | at $40^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 70 | 95 | 95 |
| for loads with $\mathrm{I}_{\text {e }}$ | at $60^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 50 | 70 | 95 |
| Utilization categories AC-2 and AC-3 |  |  |  |  |  |
| Rated operational currents $I_{\text {e }}$ | up to 500 V | A | 115 | 150 | 185 |
|  | 690 V | A | 115 | 150 | 170 |
|  | 1000 V | A | 53 | 65 | 65 |
| Rated power for slipping or squirrel cage | 230 V | kW | 37 | 50 | 61 |
| motors at 50 and 60 Hz | 400 V | kW | 64 | 84 | 104 |
|  | 500 V | kW | 81 | 105 | 132 |
|  | 690 V | kW | 113 | 146 | 167 |
|  | 1000 V | kW | 75 | 90 | 90 |
| Thermal load capacity | 10 s current ${ }^{2}$ | A | 1100 | 1300 | 1480 |
| Power loss per conducting path | at $\mathrm{I}_{\mathrm{e}} / \mathrm{AC}-3$ | W | 7 | 9 | 13 |
| Utilization category AC-4 (at $\left.\mathrm{I}_{\mathrm{a}}=6 \times \mathrm{I}_{\mathrm{e}}\right)^{1 /}$ |  |  |  |  |  |
| - Rated operational current $\mathrm{I}_{\text {e }}$ | up to 400 V | A | 97 | 132 | 160 |
| - Rated power for squirrel-cage motors with 50 and 60 Hz | up to 400 V | kW | 55 | 75 | 90 |
| - The following applies to a contact endurance of about 200000 operating cycles: |  |  |  |  |  |
| - Rated operational currents I | up to 400 V | A | 54 | 68 | 81 |
|  | 690 V | A | 48 | 57 | 65 |
|  | 1000 V | A | 34 | 38 | 42 |
| - Rated power for squirrel-cage motors with 50 and 60 Hz | 230 | kW | 16 | 20 | 25 |
|  | 400 V | kW | 29 | 38 | 45 |
|  | 500 V | kW | 37 | 47 | 57 |
|  | 690 V | kW | 48 | 55 | 65 |
|  | 1000 V | kW | 49 | 55 | 60 |
| Utilization category AC-6a, switching AC transformers |  |  |  |  |  |
| - Rated operational current $\mathrm{l}_{\text {e }}$ |  |  |  |  |  |
| For inrush current $\mathrm{n}=20$ | up to 690 V | A | 115 | 148 | 148 |
| For inrush current $\mathrm{n}=30$ | up to 690 V | A | 90 | 99 | 99 |
| - Rated power P | at 230 V | KVA | 45 | 58 | 58 |
| For inrush current $\mathrm{n}=20$ | 400 V | KVA | 79 | 102 | 102 |
|  | 500 V | KVA | 99 | 128 | 128 |
|  | 690 V | KVA | 137 | 176 | 176 |
|  | 1000 V | KVA | 80 | 98 | 117 |
| For inrush current $\mathrm{n}=30$ | at 230 V | KVA | 35 | 39 | 39 |
|  | 400 V | KVA | 62 | 68 | 68 |
|  | 500 V | KVA | 77 | 85 | 85 |
|  | 690V | KVA | 107 | 118 | 118 |
|  | 1000 V | KVA | 80 | 98 | 117 |

For deviating inrush current factors $x$, the power must be recalculated as follows: $\mathrm{P}_{\mathrm{x}}=\mathrm{P}_{\mathrm{n} 30} \cdot 30 / \mathrm{x}$
Utilization category AC-6b, switching low-inductance (low-loss, metallized dielectric) AC capacitors
Ambient temperature $40^{\circ} \mathrm{C}$

| Rated operational currents $I_{e}$ | up to 500 V | A |
| :--- | :---: | :---: |
| Rated power for single capacitors or | at 230 V | kvar |
| banks of capacitors (minimum | 400 V | kvar |
| inductance of $6 \mu \mathrm{H}$ between capacitors | 500 V | kvar |
| connected in parallel) at $50 \mathrm{~Hz}, 60 \mathrm{~Hz}$ | 690 V | kvar |
| l) Indusial fur |  |  |

Rated power for single capacitors or at 230 V

|  |  |
| :---: | :---: |
| A | 105 |
| kvar | 42 |
| kvar | 72 |
| kvar | 90 |
| kvar | 72 |


|  |  |
| :---: | :---: |
| 125 | 145 |
| 50 | 58 |
| 86 | 100 |
| 108 | 125 |
| 86 | 100 |

[^28]2) According to IEC 60947-4-1

Technical Specification - Electromechanical Contactors Series ALEA LS

## Contactors LSD6

Main Circuit-Contactors LSD6

| Type <br> Size |
| :--- |
| DC capacity |

Utilization category DC-1 Switching resistive loads (L/R $\leq 1 \mathrm{~ms}$ )

- Rated operational current $I_{e}\left(\right.$ at $\left.60^{\circ} \mathrm{C}\right)$
- 1 conducting path
- 2 conducting paths in series
- 3 conducting paths in series

| up to 24 V | A | 160 |
| ---: | :---: | :---: |
| 60 V | A | 160 |
| 110 V | A | 18 |
| 220 V | A | 3,4 |
| 440 V | A | 0,8 |
| 600 V | A | 0,5 |
| up to 24 V | A | 160 |
| 60 V | A | 160 |
| 110 V | A | 160 |
| 220 V | A | 20 |
| 440 V | A | 3,2 |
| 600 V | A | 1,6 |
| up to 24 V | A | 160 |
| 60 V | A | 160 |
| 110 V | A | 160 |
| 220 V | A | 160 |
| 440 V | A | 11,5 |
| 600 V | A | 4 |

Utilization category DC-3 und DC-5, Shunt-wound and series-wound motors (L/R $\leq$ 15ms)

- Rated operational current $I_{e}\left(\right.$ at $\left.60^{\circ} \mathrm{C}\right)$
- 1 conducting path

|  | 600 V | A |  | 0,12 |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| - 2 conducting paths in series | up to 24 V | A | 160 |  |  |
|  | 60 V | A | 160 |  |  |
|  | 110 V | A | 160 |  |  |
|  | 220 V | A | 2,5 |  |  |
|  | 440 V | A | 0,65 |  |  |
|  | 600 V | A | 0,37 |  |  |
| - 3 conducting paths in series | up to 24 V | A | 160 |  |  |
|  | 60 V | A | 160 |  |  |
|  | 110 V | A | 160 |  |  |
|  | 220 V | A | 160 |  |  |
|  | 440 V | A | 1,4 |  |  |
|  | 600 V | A | 0,75 |  |  |
| Switching frequency $\mathbf{z}$ in operating cycles/hour |  |  |  |  |  |
| Contactors without overload relay | No-load switching frequency AC | $\mathrm{h}^{-1}$ | 2000 |  | 2000 |
| Dependence of the switching | AC-1 | $h^{-1}$ | 800 |  | 800 |
| frequency $z^{\prime}$ on the operational current | AC-2 | $h^{-1}$ | 400 |  | 300 |
| $I^{\prime}$ and operational voltage $\mathrm{U}^{\prime}$ : | AC-3 | $h^{-1}$ | 1000 |  | 750 |
| $z^{\prime}=z \cdot\left(l_{e} / 1\right) \cdot\left(400 \mathrm{~V} / \mathrm{U}^{\prime}\right)^{1,5} \cdot 1 / \mathrm{h}$ | AC-4 | $h^{-1}$ | 130 |  | 130 |

Contactors LSD6
Conductor Cross-Sections-Contactors LSD6

| Type <br> Size |  |  | $\begin{gathered} \text { LSD6 } \\ 6 \end{gathered}$ |
| :---: | :---: | :---: | :---: |
| Screw terminals | Main conductors: without box terminal/busbar connection <br> - Finely stranded with cable lug ${ }^{11}$ <br> - Stranded with cable lug ${ }^{11}$ <br> - AWG cables, solid or stranded <br> - Connecting bar (max. width) <br> - Terminal screw <br> Tightening torque | $\mathrm{mm}^{2}$ <br> $\mathrm{mm}^{2}$ <br> AWG <br> mm <br> Nm | $\begin{gathered} 16 \ldots 95 \\ 25 \ldots 120 \\ 4 \ldots 250 \mathrm{kcmil} \\ 17 \\ \mathrm{M} 8 \times 25(\mathrm{SW} 13) \\ 10 \ldots 14(89 \ldots 124 \mathrm{lb} . \mathrm{in}) \\ \hline \end{gathered}$ |
|  | Auxiliary conductors: <br> - Solid <br> - Finely stranded with end sleeve <br> - AWG cables, solid or stranded <br> - Terminal screw <br> Tightening torque | $\begin{gathered} \mathrm{mm}^{2} \\ \mathrm{~mm}^{2} \\ \text { AWG } \\ \mathrm{Nm} \\ \hline \end{gathered}$ | $\begin{gathered} 2 \times(0.5 \ldots 1.5)^{2)} ; 2 \times(0.75 \ldots 2.5)^{2)} \text { acc. to IEC } 60947 ; \text { max. } 2 \times(0.75 \ldots 4) \\ 2 \times(0.5 \ldots 1.5)^{2)} ; 2 \times(0.75 \ldots 2.5)^{2 \prime} \\ 2 \times(18 \ldots 14) \\ \mathrm{M} 3(\text { PZ 2) } \\ 0.8 \ldots 1.2(7 \ldots 10.3 \mathrm{lb} . \mathrm{in}) \\ \hline \end{gathered}$ |
| Cage Clamp terminals (on request) | Auxiliary conductors: <br> - Solid <br> - Finely stranded with end sleeve <br> - Finely stranded without end sleeve <br> - AWG cables, solid or stranded | $\begin{gathered} \mathrm{mm}^{2} \\ \mathrm{~mm}^{2} \\ \mathrm{~mm}^{2} \\ \text { AWG } \end{gathered}$ | $\begin{gathered} 2 \times(0.25 \ldots 2.5) \\ 2 \times(0.25 \ldots 1.5) \\ 2 \times(0.25 \ldots 2.5) \\ 2 \times(24 \ldots 14) \\ \hline \end{gathered}$ |

1) When connecting cable lugs according to DIN 46235 , use LSZ6DOO1 terminal cover for conductor cross-sections from $95 \mathrm{~mm}^{2}$ to ensure phase spacing.
2) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Technical Specification - Electromechanical Contactors Series ALEA LS


- Contactors LSDE
- Main Circuit-Contactors LSDE

| Type Size |  |  | LSDE22 | LSDE26 | LSDE30 |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | 10 | 10 | 10 |
| AC capacity |  |  |  |  |  |
| Utilization category AC-1, Switching resistive loads |  |  |  |  |  |
| Rated operational current $\mathrm{I}_{\text {e }}$ | at $40^{\circ} \mathrm{C}$ up to 690 V | A | 275 | 330 |  |
|  | at $60^{\circ} \mathrm{C}$ up to 690 V | A | 250 | 300 |  |
|  | at $60^{\circ} \mathrm{C}$ up to 1000 V | A | 100 | 150 |  |
| Rated power for $\mathrm{AC} \mathrm{loads}{ }^{1 /}$ | 230 V | kW | 94 | 113 |  |
| P.f. $=0.95$ (at $60^{\circ} \mathrm{C}$ ) | 400 V | kW | 164 | 197 |  |
|  | 500 V | kW | 205 | 246 |  |
|  | 690 V | kW | 283 | 340 |  |
|  | 1000 V | kW | 164 | 246 |  |
| Minimum conductor cross-section | at $40^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 150 | 185 |  |
| for loads with $\mathrm{I}_{\text {e }}$ | at $60^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 120 |  |  |
| Utilization categories AC-2 and AC-3 |  |  |  |  |  |
| Rated operational currents $\mathrm{I}_{\text {e }}$ | up to 500 V | A | 225 | 265 | 300 |
|  | 690 V | A | 225 | 265 | 280 |
|  | 1000 V | A | 68 | 95 | 95 |
| Rated power for slipping or squirrel cage | 230 V | kW | 73 | 85 | 97 |
| motors at 50 and 60 Hz | 400 V | kW | 128 | 151 | 171 |
|  | 500 V | kW | 160 | 189 | 215 |
|  | 690 V | kW | 223 | 265 | 280 |
|  | 1000 V | kW | 90 | 132 | 132 |
| Thermal load capacity | 10 s current ${ }^{2 / 1}$ | A | 1800 | 2400 | 2400 |
| Power loss per conducting path | at $\mathrm{l}_{\mathrm{e}} / \mathrm{AC}-3 / 500 \mathrm{~V}$ | W | 17 | 18 | 22 |
| Utilization category AC-4 (at $\left.\mathrm{I}_{\mathrm{a}}=6 \times \mathrm{I}_{\mathrm{e}}\right)^{1 /}$ |  |  |  |  |  |
| - Rated operational current $\mathrm{I}_{\text {e }}$ | up to 400 V | A | 195 | 230 | 280 |
| Rated power for squirrel-cage motors with 50 and 60 Hz | up to 400 V | kW | 110 | 132 | 160 |
| - The following applies to a contact endurance of about 200000 operating cycles: |  |  |  |  |  |
| - Rated operational currents I | up to 400 V | A | 96 | 117 | 125 |
|  | 690 V | A | 85 | 105 | 115 |
|  | 1000 V | A | 42 | 57 | 57 |
| - Rated power for squirrel-cage motors with 50 and 60 Hz | 230 | kW | 30 | 37 | 40 |
|  | 400 V | kW | 54 | 66 | 71 |
|  | 500 V | kW | 67 | 82 | 87 |
|  | 690 V | kW | 82 | 102 | 112 |
|  | 1000 V | kW | 59 | 80 | 80 |
| Utilization category AC-6a, switching AC transformers |  |  |  |  |  |
| - Rated operational current $\mathrm{l}_{\text {e }}$ |  |  |  |  |  |
| For inrush current $\mathrm{n}=20$ | up to 690V | A | 227 | 265 | 273 |
| For inrush current $\mathrm{n}=30$ | up to 690V | A | 151 | 182 | 182 |
| - Rated power P | at 230 V | KVA | 90 | 105 | 109 |
| For inrush current $\mathrm{n}=20$ | 400V | KVA | 157 | 183 | 189 |
|  | 500 V | KVA | 196 | 229 | 236 |
|  | 690 V | KVA | 271 | 317 | 326 |
|  | 1000 V | KVA | 117 | 164 | 164 |
| For inrush current $\mathrm{n}=30$ | at 230 V | KVA | 60 | 72 | 72 |
|  | 400V | KVA | 105 | 126 | 126 |
|  | 500 V | KVA | 130 | 158 | 158 |
|  | 690V | KVA | 180 | 217 | 217 |
|  | 1000 V | KVA | 117 | 164 | 164 |
| For deviating inrush current factors $x$, the power must be recalculated as follows: $P_{x}=P_{\text {n30 }} 0 \cdot 30 / x$ |  |  |  |  |  |

- Rated operational current $I_{e}$
invush current $\mathrm{n}=20$
- Rated power $P$

For inrush current $\mathrm{n}=20$

Utilization category AC-6b, switching low-inductance (low-loss, metallized dielectric) AC capacitors

|  |  |  |  |
| :--- | :---: | :---: | :---: |
| Ambient temperature $40^{\circ} \mathrm{C}$ |  |  |  |
| Rated operational currents I | up to 500 V | A | 183 |
| Rated power for single capacitors or | at 230 V | kvar | 73 |
| banks of capacitors (minimum | 400 V | kvar | 127 |
| inductance of $6 \mu \mathrm{H}$ between capacitors | 500 V | kvar | 159 |
| connected in parallel) at $50 \mathrm{~Hz}, 60 \mathrm{~Hz}$ | 690 V | kvar | 127 |

1) Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account).
2) According to IEC 60947-4-1.

Technical Specification - Electromechanical Contactors Series ALEA LS

## Contactors LSDE

Main Circuit-Contactors LSDE


Utilization category DC-1 Switching resistive loads (L/R $\leq 1 \mathrm{~ms}$ )

- Rated operational current $I_{e}\left(\right.$ at $\left.60^{\circ} \mathrm{C}\right)$
- 1 conducting path
- 2 conducting paths in series
- 3 conducting paths in series
-2 conducting paths in series
-3 conducting paths in series
Switching frequency $\mathbf{z}$ in operating cycles/hour
- Contactors without overload relay

Dependence of the switching
frequency $z^{\prime}$ on the operational current
$I^{\prime}$ and operational voltage $U^{\prime}$ :
$z^{\prime}=z \cdot\left(I_{\mathrm{e}} / I^{\prime}\right) \cdot\left(400 \mathrm{~V} / U^{\prime}\right)^{1,5} \cdot 1 / \mathrm{h}$
No-load switching
frequency $A C$

|  |  |
| :--- | :--- |
| AC-1 | $h^{-1}$ |
| 750 |  |


| AC-2 | $h^{-1}$ |
| :--- | :--- |

Contactors LSDE

- Conductor Cross-Sections-Contactors LSDE

| Type |  |  |  |
| :---: | :---: | :---: | :---: |
| Size |  |  | 10 |
| Conductor cross-sections of main conductors |  |  |  |
| Screw terminals | Main conductors: <br> - Finely stranded with cable lug ${ }^{\prime \prime}$ <br> - Stranded with cable lug ${ }^{\prime \prime}$ <br> - AWG cables, solid or stranded <br> - Connecting bar (max. width) <br> - Terminal screw <br> - Tightening torque | $\mathrm{mm}^{2}$ <br> $\mathrm{mm}^{2}$ <br> AWG <br> mm <br> Nm | $\begin{gathered} 50 \ldots 240 \\ 70 \ldots 240 \\ 2 / 0 \ldots 500 \mathrm{kcmil} \\ 25 \\ \mathrm{M} 10 \times 30(\mathrm{SW} 17) \\ 14 \ldots 24(124 \ldots 210 \mathrm{lb} . \mathrm{in}) \end{gathered}$ |
|  | Auxiliary conductors: <br> - Solid <br> - Finely stranded with end sleeve <br> - AWG cables, solid or stranded <br> - Terminal screw <br> - Tightening torque | $\mathrm{mm}^{2}$ <br> $\mathrm{mm}^{2}$ <br> AWG <br> Nm | $\begin{gathered} 2 \times(0.5 \ldots 1.5)^{2)} ; 2 \times(0.75 \ldots 2.5)^{2)} \\ \text { acc. to IEC } 60947 ; \text { max. } 2 \times(0.75 \ldots 4) \\ 2 \times(0.5 \ldots 1.5)^{2)} ; 2 \times(0.75 \ldots 2.5)^{2)} \\ 2 \times(18 \ldots 14) \\ M 3(\text { PZ 2) } \\ 0.8 \ldots 1.2(7 \ldots 10.3 \mathrm{lb} . \mathrm{in}) \end{gathered}$ |
| Cage Clamp terminals (on request) | Auxiliary conductors: <br> - Solid <br> - Finely stranded with end sleeve <br> - Finely stranded without end sleeve <br> - AWG cables, solid or stranded | $\mathrm{mm}^{2}$ <br> $\mathrm{mm}^{2}$ <br> $\mathrm{mm}^{2}$ <br> AWG | $\begin{gathered} 2 \times(0.25 \ldots 2.5) \\ 2 \times(0.25 \ldots 1.5) \\ 2 \times(0.25 \ldots 2.5) \\ 2 \times(24 \ldots 14) \end{gathered}$ |

1) When connecting cable lugs according to DIN 46235, use LSZ6 DOO1 terminal cover for conductor cross-sections from $95 \mathrm{~mm}^{2}$ to ensure phase spacing.
2) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Technical Specification - Electromechanical Contactors Series ALEA LS

- Contactors LSDG

■ General Data - Contactors LSDG

| Type |
| :--- |
| Size |

1) See "Endurance of the main contacts"
2) See "Conductor cross-sections"
3) See "Electromagnetic compatibility (EMC)"
4) According to IEC 60 947-4-1

Control - Contactors LSDG

| Type |  |  | LSDG41 |  | LSDG51 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Size |  |  | 12 |  | 12 |
| Operating range of the solenoid AC/DC (UC) | AC |  |  | 0.8 ... $1.1 \times$ |  |
| Power consumption of the solenoid |  |  |  |  |  |
| - Conventional operating mechanism |  |  |  |  |  |
| - AC operation | Closing at $\mathrm{U}_{5}$ min | VA/p.f. | 700/0.9 |  |  |
|  | Closing at $\mathrm{U}_{5}$ max | VA/p.f. | 830/0.9 |  |  |
|  | Closed at $U_{5}$ min | VA/p.f. | 7.6/0.9 |  |  |
|  | Closed at $U_{5}$ max | VA/p.f. | 9.2/0.9 |  |  |
| - DC operation | Closing at $\mathrm{U}_{5}$ min | W | 770 |  |  |
|  | Closing at $U_{s}$ max | W | 920 |  |  |
|  | Closed at $U_{s}$ min | W | 8,5 |  |  |
|  | Closed at $U_{s}$ max | W | 10 |  |  |
| PLC control input (EN 61131-2/type 2) |  |  | $24 \mathrm{VDC} / \leq 30 \mathrm{~mA}$ power consumption, (operating range 17 ... 30VDC) |  |  |
| Operating times (Total break time = Opening delay + Arcing time) |  |  |  |  |  |
| - Conventional operating mechanism |  |  |  |  |  |
| - at $0.8 \times U_{s}$ min ... $1.1 \times U_{s}$ max | Closing delay | ms | $45 . . .100$ |  |  |
|  | Opening delay | ms | 60 ... 100 |  |  |
| - at $U_{5}$ min ... $U_{5}$ max | Closing delay | ms | 50 ... 70 |  |  |
|  | Opening delay | ms | $70 . .100$ |  |  |
| - Arcing time |  | ms | 10 ... 15 |  |  |

Contactors LSDG
$\square$ Main Circuit-Contactors LSDG

| Type Size |  |  | $\begin{gathered} \text { LSDG41 } \\ 12 \\ \hline \end{gathered}$ | $\begin{gathered} \text { LSDG51 } \\ 12 \\ \hline \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: |
| AC capacity |  |  |  |  |
| Utilization category AC-1, Switching resistive loads |  |  |  |  |
| Rated operational current $I_{\text {e }}$ | at $40^{\circ} \mathrm{C}$ up to 690 V | A | 430 | 610 |
|  | at $60^{\circ} \mathrm{C}$ up to 690 V | A | 400 | 550 |
|  | at $60^{\circ} \mathrm{C}$ up to 1000 V | A | 200 | 200 |
| Rated power for AC loads ${ }^{1 /}$ | 230 V | kW | 151 | 208 |
| P.f. $=0.95$ (at $60^{\circ} \mathrm{C}$ ) | 400 V | kW | 263 | 362 |
|  | 500 V | kW | 329 | 452 |
|  | 690 V | kW | 454 | 624 |
|  | 1000 V | kW | 329 | 329 |
| Minimum conductor cross-section | at $40^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | $2 \times 150$ | $2 \times 185$ |
| for loads with $I_{\text {e }}$ | at $60^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 240 | $2 \times 185$ |
| Utilization categories AC-2 and AC-3 |  |  |  |  |
| Rated operational currents $I_{\text {e }}$ | up to 500 V | A | 400 | 500 |
|  | 690 V | A | 400 | 450 |
|  | 1000 V | A | 180 | 180 |
| Rated power for slipping or squirrel-cage | 230 V | kW | 132 | 164 |
| motors at 50 and 60 Hz | 400 V | kW | 231 | 291 |
|  | 500 V | kW | 291 | 363 |
|  | 690 V | kW | 400 | 453 |
|  | 1000 V | kW | 250 | 250 |
| Thermal load capacity | 10 s current ${ }^{2}$ | A | 3200 | 4000 |
| Power loss per conducting path | at $\mathrm{l}_{\mathrm{e}} /$ AC-3/500V | W | 35 | 55 |
| Utilization category AC-4 (at $\left.\mathrm{I}_{\mathrm{a}}=6 \times \mathrm{l} \mathrm{l}_{\mathrm{e}}\right)^{1 /}$ |  |  |  |  |
| - Rated operational current $\mathrm{l}_{\text {e }}$ | up to 400 V | A | 350 | 430 |
| Rated power for squirrel-cage motors with 50 and 60 Hz | up to 400V | kW | 200 | 250 |
| - The following applies to a contact endurance of about 200000 operating cycles: |  |  |  |  |
| - Rated operational currents I | up to 400 V | A | 150 | 175 |
|  | 690 V | A | 135 | 150 |
|  | 1000 V | A | 80 | 80 |
| - Rated power for squirrel-cage motors with 50 and 60 Hz | 230 V | kW | 48 | 56 |
|  | 400 V | kW | 85 | 98 |
|  | 500 V | kW | 105 | 123 |
|  | 690 V | kW | 133 | 148 |
|  | 1000 V | kW | 113 | 113 |
| Utilization category AC-6a, switching AC transformers |  |  |  |  |
| - Rated operational current $\mathrm{I}_{\text {e }}$ |  |  |  |  |
| For inrush current $\mathrm{n}=20$ | up to 690V | A | 377 | 404 |
| For inrush current $\mathrm{n}=30$ | up to 690V | A | 251 | 270 |
| - Rated power P |  |  |  |  |
| For inrush current $\mathrm{n}=20$ | at 230 V | kVA | 150 | 161 |
|  | 400 V | kVA | 261 | 280 |
|  | 500 V | kVA | 326 | 350 |
|  | 690 V | kVA | 450 | 483 |
|  | 1000 V | kVA | 311 | 311 |
| For inrush current $\mathrm{n}=30$ | at 230 V | kVA | 100 | 107 |
|  | 400 V | kVA | 173 | 187 |
|  | 500 V | kVA | 217 | 234 |
|  | 690 V | kVA | 300 | 323 |
|  | 1000 V | kVA | 311 | 311 |
| For deviating inrush current factors x , the power must be recalculated as follows: $\mathrm{P}_{\mathrm{x}}=\mathrm{P}_{\mathrm{n} 30} \cdot 30 / \mathrm{x}$ |  |  |  |  |

For deviating inrush current factors $x$, the power must be recalculated as follows: $P_{x}=P_{n 30} \cdot 30 / x$

| Utilization category AC-6b, switching low-inductance (low-loss, metallized dielectric) AC capacitors |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Ambient temperature $40^{\circ} \mathrm{C}$ |  |  |  |  |
| Rated operational currents I 。 | up to 500 V | A | 287 | 407 |
| Rated power for single capacitors or | at 230 V | kVAr | 114 | 162 |
| banks of capacitors (minimum | 400 V | kVAr | 199 | 282 |
| inductance of $6 \mu \mathrm{H}$ between capacitors | 500 V | kVAr | 248 | 352 |
| connected in parallel) at $50 \mathrm{~Hz}, 60 \mathrm{~Hz}$ | 690 V | kVAr | 199 | 282 |

1) Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account)
2) According to IEC 60947-4-1

Technical Specification - Electromechanical Contactors Series ALEA LS

Contactors LSDG
Main Circuit-Contactors LSDG

| Type <br> Size | LSDG41 | 12 |
| :--- | :---: | :---: | | LSDG51 |  |
| :---: | :---: |
| DC capacity |  |

Utilization category DC-1 Switching resistive loads (L/R $\leq 1 \mathrm{~ms}$ )

- Rated operational current $I_{e}\left(\right.$ at $\left.60^{\circ} \mathrm{C}\right)$
-1 conducting path
- 3 conducting paths in series

|  |  |  |
| :---: | :---: | :---: |
| up to 24 V |  |  |
| 60 V | A | 400 |
| 110 V | A | 330 |
| 220 V | A | 33 |
| 440 V | A | 3,8 |
| 600 V | A | 0,9 |
| up to 24 V | A | 0,6 |
| 60 V | A | 400 |
| 110 V | A | 400 |
| 220 V | A | 400 |
| 440 V | A | 400 |
| 600 V | A | 4 |
| up to 24 V | A | 2 |
| 60 V | A | 400 |
| 110 V | A | 400 |
| 220 V | A | 400 |
| 440 V | A | 400 |
| 600 V | A | 11 |
| A | 5,2 |  |

Utilization category DC-3 und DC-5, Shunt-wound and series-wound motors (L/R $\leq 15 \mathrm{~ms}$ )

- Rated operational current $\mathrm{I}_{\mathrm{e}}$ (at $60^{\circ} \mathrm{C}$ )
- 1 conducting path
- 2 conducting paths in series
- 2 conducting paths in series


## Contactors LSDG

■ Conductor Cross-Sections-Contactors LSDG

| Type |  |  | LSDG |
| :---: | :---: | :---: | :---: |
| Size |  |  | 12 |
| Screw terminals | Main conductors: without box terminal/busbar connection (box terminals on request) |  |  |
|  | - Finely stranded with cable lug' | $\mathrm{mm}^{2}$ | 50 ... 240 |
|  | - Stranded with cable lug ${ }^{11}$ | $\mathrm{mm}^{2}$ | $70 . . .240$ |
|  | - AWG cables, solid or stranded | AWG | 2/0 ... 500 kcmil |
|  | - Connecting bar (max. width) | mm | 25 |
|  | - Terminal screw |  | M $10 \times 30$ (SW 17) |
|  | - Tightening torque | Nm | $14 . . .24$ (124 ... $210 \mathrm{lb} . \mathrm{in}$ ) |
|  | Auxiliary conductors: |  |  |
|  | - Solid | $\mathrm{mm}^{2}$ | $\begin{gathered} 2 \times(0.5 \ldots 1 . .5)^{22} ; 2 \times(0.75 \ldots 2 . .5)^{2)} \text { acc. to IEC } \\ 60947 ; \max .2 \times(0.75 \ldots 4) \end{gathered}$ |
|  | - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.5 \ldots 1.5)^{2)} ; 2 \times(0.75 \ldots 2.5)^{2)}$ |
|  | - AWG cables, solid or stranded | AWG | $2 \times(18 . . .14)$ |
|  | - Terminal screw |  | M3 (PZ 2) |
|  | - Tightening torque | Nm | 0.8 ... 1.2 (7 ... $10.3 \mathrm{lb} . \mathrm{in})$ |
| Cage Clamp terminals (on request) | Auxiliary conductors: |  |  |
|  | - Solid | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 2.5)$ |
|  | - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 1.5)$ |
|  | - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 2.5)$ |
|  | - AWG cables, solid or stranded | AWG | $2 \times(24 . . .14)$ |

1) When connecting cable lugs according to DIN46234 for conductor cross-sections of $185 \mathrm{~mm}^{2^{2}}$ and more and according to DIN46235 for conductor cross-sections of $240 \mathrm{~mm}{ }^{2}$ and more, the LSZED001 terminal cover must be used to keep the phase clearance
2) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Technical Specification - Electromechanical Contactors Series ALEA LS

- CSA and UL Rated Data for Contactors LSD, LSS and LSU

■ CSA and UL Rated Data for Contactors LSDD/0, LSSD/0 and LSUD/0


CSA and UL Rated Data for Contactors LSD2, LSU2, LSD3


CSA and UL Rated Data for Contactors LSD, LSS and LSU
$\square$ CSA and UL Rated Data for Auxiliary Contacts

| Size | 00 |  | $00-12$ |
| :--- | :---: | :---: | :---: | :---: |

CSA and UL Rated Data for Contactors LSD6, LSDE


CSA and UL Rated Data for Contactors LSDG


## Technical Specification - Electromechanical Contactors Series ALEA LS

## General Information - Vacuum Contactors LSDH

## Vakuum Contactors LSDH - Overview

IEC 60947-4-1, EN 60947-4-1 (VDE 0660 Part 102)
The LSDH contactors are climate-proof. They are finger-safe according to EN 50274 . Terminal covers may have to be fitted onto the connecting bars, depending on the configuration with other devices (see chapter "Accessories" - terminal covers).

## FUNCTION

MAIN CONTACTS

## Contact erosion indication with LSDH 6/8 vacuum contactors

The contact erosion of the vacuum interrupters can be checked during operation with the help of 3 white double slides on the contactor base. If the distance indicated by one of the double slides is < 0.5 mm while the contactor is in the closed position, the vacuum interrupter must be replaced

To ensure maximum reliability, it is recommended to replace all 3 vacuum interrupters.
AUXILIARY CONTACTS
Contact reliability
The auxiliary contacts are suitable for solid-state circuits

- with currents $\geq 1 \mathrm{~mA}$
- and voltages from 17 V

SURGE SUPPRESSION

## Control circuit

Protection of coils against overvoltage:
AC operation

- Fitted with varistors as standard

DC operation
Retrofitting options:

- With varistors

If LSDH 6/8 is to be used for DC operation, an additional reversing contactor is required; this is included in the scope of supply in the same packaging as the vacuum contactor.

## Electromagnetic Compatibility

LSDH 6/8 contactors for AC operation are fitted with an electronically controlled solenoid operating mechanism with a high interference immunity.

| Contactor <br> type | Rated control <br> supply voltage $U_{\mathbf{s}}$ | Overvoltage type <br> (IEC 60801) | Degree of severity <br> (IEC 60801) | Overvoltage <br> strength |
| :---: | :---: | :---: | :---: | :---: |
| SSDH6 | $110 \mathrm{~V} \ldots . .132 \mathrm{~V}$ | Burst | 3 | 2 kV |
| LSDH8 | Surge | 4 | 6 kV |  |
|  | $200 \mathrm{~V} \ldots 277 \mathrm{~V}$ | Burst | 4 | 4 kV |
|  |  | Surge | 4 | 5 kV |
|  | Burst | 4 | 4 kV |  |
|  | $380 \mathrm{~V} \ldots 600 \mathrm{~V}$ | Surge | 4 | 6 kV |

Note:
During operation in installations in which the emitted interference limits cannot be observed, e.g. when used for output contactors in converters,
LSDH6/8 contactors without a main conductor path circuit are recommended (see description next page).

## APPLICATION

The standard LSDH6. and LSDHB. contactors with electronically controlled contactor mechanism, have high resistance to electromagnetic interference.
Causes for such interference can be, for example:

- Frequency converters which are operated nearby can cause periodic overvoltages at the control level of the contactors.
- High-energy pulses cause by switching operations and atmospheric discharges can cause interference on the control cables.

To reduce interference voltages caused by frequency converters, the manufacturer recommends the use of e.g. input filters, output filters, grounding or shielding in the installation.
Further measures that should be applied for overvoltage damping:

- Feeding the contactors using control transformer according to EN 60204 - rather than directly from the network
- Use of surge arresters, if required


## Control circuit

The rectifier bridge is connected to varistors for protection against overvoltages. The built-in rectifier bridge affords sufficient protection for the coils.

## Main circuit

As standard LSDH. contactors with integrated RC varistors.

## Protection of the main current paths

An integrated $R C$ varistor connection for the main current paths of the contactors dampens the switching overvoltage rises to safe values. This prevents multiple restriking. The operator of an installation can therefore rest assured that the motor winding cannot be damaged by switching overvoltages with steep voltage rises.

## Important note:

The overvoltage damping circuit is not required if LSDH $6 / 8$ contactors are used in circuits with DC choppers, frequency converters or speed-variable operating mechanisms, for example. It could be damaged by the voltage peaks and harmonics which are generated. This may cause phase-to-phase short-circuits in the contactors.
Order special contactor version without overvoltage damping (on request).

Contactors LSDH6 and LSDH8 at 230VAC


Endurance of the auxiliary contacts
The contact endurance for utilization category AC-12 or AC-15/AC-14 depends mainly on the breaking current. It is assumed that the operating mechanisms are switched randomly, i.e. not synchronized with the phase angle of the supply system.

Diagram:

1) Operating cycles

## Contact Erosion Indication with LSDH6 and LSDH8 Vacuum Contactors

The contact erosion of the vacuum interrupters can be checked during operation with the help of 3 white double slides on the contactor base.
If the distance indicated by one of the double slides is $<0.5 \mathrm{~mm}$ while the contactor is in the closed position, the vacuum interrupter must be replaced. To ensure maximum reliability, it is recommended to replace all 3 vacuum interrupters.

Endurance of the Main Contacts


1) Operating cycles at ...
$P_{N}=$ Rated power for squirrel-cage motors at 400 V
$I_{a}=$ Breaking current
$\mathrm{I}_{\mathrm{e}}=$ Rated operational current

Technical Specification - Electromechanical Contactors Series ALEA LS

- General Information - Vacuum Contactors LSDH

Rated Data of the Auxiliary Contacts

| Type |  | LSDH6 and LSDH8 acc. to IEC 60947-5-1 (VDE 0660 Part 200) |
| :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ (degree of pollution 3, overvoltage category III) | V | 690 |
| Continuous thermal current $\mathrm{I}_{\text {th }}=$ Rated operational current $\mathrm{I}_{\mathrm{e}} / \mathrm{AC}-12$ | A | 10 |
| AC load, Rated operational current $I_{\text {e }} /$ AC-15/AC-14 |  |  |
| - for rated operational voltage $U_{\text {e }} \quad 24 \mathrm{~V}$ | A | 10 |
| 110 V | A | 10 |
| 125 V | A | 10 |
| 220 V | A | 6 |
| 230 V | A | 5,6 |
| 380 V | A | 4 |
| 400 V | A | 3,6 |
| 500 V | A | 2,5 |
| 660 V | A | 2,5 |
| 690 V | A | 2,3 |
| DC load, Rated operational current $\mathrm{I}_{\mathrm{e}} / \mathrm{DC-12}$ |  |  |
| - for rated operational voltage $U_{\text {e }}$ 24V | A | 10 |
| 60 V | A | 10 |
| 110 V | A | 3,2 |
| 125 V | A | 2,5 |
| 220 V | A | 0,9 |
| 440 V | A | 0,33 |
| 600 V | A | 0,22 |
| DC load, Rated operational current $\mathrm{I}_{\mathrm{e}} / \mathrm{DC-13}$ |  |  |
| - for rated operational voltage $U_{\text {e }} \quad 24 \mathrm{~V}$ | A | 10 |
| 60 V | A | 5 |
| 110 V | A | 1,14 |
| 125 V | A | 0,98 |
| 220 V | A | 0,48 |
| 440 V | A | 0,13 |
| 600 V | A | 0,07 |
| CSA and UL rated data for the auxiliary contacts |  |  |
| Rated voltage | VAC max. | 600 |
| Switching capacity |  | A 600, P 600 |

## General Information - Vacuum Contactors LSDH

- General Data - Vacuum Contactors LSDH6, LSDH8

| Type |  | LSDH6 | LSDH8 |
| :---: | :---: | :---: | :---: |
| Size |  | 14 | 14 |
| Permissible mounting position, installation instructions ${ }^{1 / 2)} \quad$ AC and DC operation The contactors are designed for operation on a vertical mounting surface. |  |  |  |
| Mechanical endurance Electrical endurance | Operating cycles |  |  |
| Rated insulation voltage $\mathrm{U}_{\mathrm{i}}$ (degree of pollution 3, overvoltage category III) | kV |  |  |
| Rated impulse withstand voltage $\mathbf{U}_{\text {imp }}$ | kV |  |  |
| Safe isolation between the coil and the main contacts acc. to EN 60947-1, Appendix N | kV | 1 |  |
| Permissible ambient temperature | ${ }^{\circ} \mathrm{C}$ | $\begin{aligned} & -25 \ldots+55 \\ & -55 \ldots+80 \end{aligned}$ |  |
|  | ${ }^{\circ} \mathrm{C}$ |  |  |
| Degree of protection acc. to EN 60947-1, Appendix C |  | IP00/open, coil assembly IP40 |  |
| Touch protection acc. to EN 50274 |  | Finger-safe with cover |  |
| Shock resistance |  |  |  |
| - Rectangular pulse AC operation | $\mathrm{g} / \mathrm{ms}$ | 8.1/5 and 4.7/10 <br> $9 / 5$ and $5.7 / 10$ <br> $12.8 / 5$ and $7.4 / 10$ <br> 14.4/5 and $9.1 / 10$ | $\begin{aligned} & 9.5 / 5 \text { and } 5.7 / 10 \\ & 8.6 / 5 \text { and } 5.1 / 10 \\ & 13.5 / 5 \text { and } 7.8 / 10 \\ & 13.5 / 5 \text { and } 7.8 / 10 \\ & \hline \end{aligned}$ |
| DC operation | $\mathrm{g} / \mathrm{ms}$ |  |  |
| - Sine pulse AC operation | $\mathrm{g} / \mathrm{ms}$ |  |  |
| DC operation | $\mathrm{g} / \mathrm{ms}$ |  |  |
| Conductor cross-sections |  | See "Conductor Cross-Sections" |  |
| Electromagnetic compatibility (EMC) |  | See "Electromagnetic compatibility (EMC)" |  |
| Short-circuit protection |  |  |  |
| - Fuse link gl/gG NH, DIAZED, NEOZED acc. to IEC 60 947-4-1/DIN EN 60 947-4-1 |  |  |  |
| Type of coordination "1" | A | 1000 | 1250 |
| Type of coordination "2" | A | 500 | 630 |
| Weld-free ${ }^{4)}$ | A | 400 | 500 |
| Auxiliary circuit |  |  |  |
| - Fuse links gl/gG DIAZED, NEOZED (weld-free protection af $\mathrm{l}_{k} \geq 1 \mathrm{kA}$ ) <br> - Or miniature circuit breakers with C characteristic $\mathrm{I}_{k}<400 \mathrm{~A}$ | A | 10 |  |
|  | A | 10 |  |

1) To easily replace the laterally mounted auxiliary switches it is recommended to maintain a minimum distance of 30 mm between the contactors.
2) If mounted at a $90^{\circ}$ angle (conducting paths are horizontally above each other), the switching frequency is reduced by $80 \%$ compared with the normal values.
3) See page before "Endurance of the auxiliary contacts".
4) Test conditions according to IEC 60947-4-1.

5) At 24 VDC ; for further voltages, deviations of up to $\pm 10 \%$ are possible.

Technical Specification - Electromechanical Contactors Series ALEA LS

Vacuum Contactors LSDH

- Main Circuit - Vacuum Contactors LSDH6, LSDH8

|  |  |  | LSDH6 | LSDH8 |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | 14 | 14 |
| AC capacity |  |  |  |  |
| Utilization category AC-1, Switching resistive loads |  |  |  |  |
| - Rated operational current $I_{\text {e }}$ | at $40^{\circ} \mathrm{C}$ up to 690 V | A | 700 | 910 |
|  | at $60^{\circ} \mathrm{C} \mathrm{up} \mathrm{to} 690 \mathrm{~V}$ | A | 630 | 850 |
|  | at $60^{\circ} \mathrm{C}$ up to 1000 V | A | 450 | 800 |
| - Rated power for AC loads ${ }^{1 /}$ | 230 V | kW | 240 | 323 |
| P.f. $=0.95\left(\mathrm{at} 60^{\circ} \mathrm{C}\right)$ | 400 V | kW | 415 | 558 |
|  | 500 V | kW | 545 | 735 |
|  | 690 V | kW | 720 | 970 |
|  | 1000 V | kW | 780 | 1385 |
| - Minimum conductor cross-section for loads with $I_{\text {e }}$ | at $40^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | $2 \times 24$ | $\mathrm{I}_{\mathrm{e}} \geq 800 \mathrm{~A}: 2 \times 60 \times 5$ (Cu busbars) |
|  | at $55^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | $2 \times 18$ | $\mathrm{I}_{\mathrm{e}}<800 \mathrm{~A}: 2 \times 240$ |
| Utilization categories AC-2 and AC-3 |  |  |  |  |
| - Rated operational currents $I_{\text {e }}$ | up to 690V | A | 630 | 820 |
|  | 1000 V | A | 435 | 580 |
| - Rated power for slipping or squirrel-cage motors at 50 and 60 Hz | at 230 V | kW | 200 | 260 |
|  | 400 V | kW | 347 | 450 |
|  | 500 V | kW | 434 | 600 |
|  | 690V | kW | 600 | 800 |
|  | 1000 V | kW | 600 | 800 |
| Utilization category AC-4 (at $\mathrm{I}_{\mathrm{a}}=6 \times \mathrm{l} \mathrm{I}_{\mathrm{e}}{ }^{1 /}$ |  |  |  |  |
| - Rated operational current $\mathrm{I}_{\text {e }}$ | up to 690V | A | 610 | 690 |
| - Rated power for squirrel-cage motors with 50 and 60 Hz | up to 400V | kW | 355 | 400 |
| - The following applies to a contact endurance of about 200000 operating cycles: |  |  |  |  |
| - Rated operational currents $\mathrm{I}_{\text {e }}$ | up to 690V | A | 300 | 360 |
|  | 1000 V | A | 210 | 250 |
| - Rated power for squirrel-cage motors with 50 and 60 Hz | 230 V | kW | 97 | 110 |
|  | 400 V | kW | 168 | 191 |
|  | $500 \mathrm{~V}^{\prime \prime}$ | kW | 210 | 250 |
|  | $690 \mathrm{~V}^{11}$ | kW | 278 | 335 |
|  | $1000 \mathrm{~V}^{1 \prime}$ | A | 290 | 350 |
| Utilization category AC-6a, switching AC transformers |  |  |  |  |
| - Rated operational current $I_{\text {e }}$ |  |  |  |  |
| - For inrush current $\mathrm{n}=20$ | up to 400V | A | 513 | 675 |
| - For inrush current $\mathrm{n}=30$ | up to 400 V | A | 342 | 450 |
| - Rated power P | at 230 V | kVA | 195 | 256 |
| - For inrush current $\mathrm{n}=20$ | 400 V | kVA | 338 | 445 |
|  | 500 V | kVA | 444 | 584 |
|  | 690V | kVA | 586 | 771 |
|  | 1000 V | kVA | 752 | 1003 |
| - For inrush current $\mathrm{n}=30$ | at 230 V | kVA | 130 | 171 |
|  | 400 V | kVA | 226 | 297 |
|  | 500V | kVA | 296 | 389 |
|  | 690 V | kVA | 390 | 514 |
|  | 1000 V | kVA | 592 | 778 |

Utilization category AC-6b, switching low-inductance (low-loss, metallized dielectric) AC capacitors

- Rated operational currents $I_{e}$
- Rated power for single capacitors at 50 Hz and 60 Hz
- Rated power for single capacitors or banks of capacitors (minimum inductance of $6 \mu \mathrm{H}$ between capacitors

| up to 400 V | A | 433 |
| ---: | :--- | :--- |
| at 230 V | kVAr | 175 |
| 400 V | kVAr | 300 |
| 500 V | kVAr | 400 |
| 690 V | kVAr | 300 |
| at 230 V | kVAr | 145 |
| 400 V | kVAr | 250 |
| 500 V | kVAr | 333 |
| 690 V | kVAr | 250 |

1) Max. permissible rated operational current $I_{e} / A C-4=I_{e} / A C-3$ up to 500 V , for reduced contact endurance and reduced switching frequency
2) For deviating inrush current factors $x$, the power must be recalculated as follows: $P_{x}=P_{n 30} \cdot 30 / x$

## Vacuum Contactors LSDH

- Main Circuit - Vacuum Contactors LSDH6, LSDH8


1) Acc. to IEC 60947-4-1

Conductor Cross Sections - Vacuum Contactors LSDH6, LSDH8

| Type |  | LSDH6 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Size |  |  | LSDH8

3) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

CSA and UL Rated Data for Vacuum Contactors LSDH6, LSDH8

| Type Size |  |  |  | $\begin{gathered} \text { LSDH6 } \\ \hline \end{gathered}$ | $\begin{gathered} \text { LSDH8 } \\ \hline \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage |  |  | VAC | 600 | 600 |
| Uninterrupted current | - O |  | A | 630 | 820 |
| Maximum horsepower ratings (CSA and UL approved values) |  |  |  |  |  |
| - Rated power for induction motors at 60 Hz |  | at 200 V | hp | 231 | 290 |
|  |  | 230 V | hp | 266 | 350 |
|  |  | 460 V | hp | 530 | 700 |
|  |  | 575 V | hp | 664 | 860 |
| NEMA/EEMAC ratings |  |  |  |  |  |
| NEMA/EEMAC size |  |  | hp | 6 | 7 |
| Uninterrupted current | Open |  | A | 600 | 820 |
|  | Enclosed |  | A | 540 | 810 |
| Rated power for induction motors at 60 Hz |  | at 200 V | hp | 150 | -- |
|  |  | 230 V | hp | 200 | 300 |
|  |  | 460 V | hp | 400 | 600 |
|  |  | 575 V | hp | 400 | 600 |

## Technical Specification - Electromechanical Contactors Series ALEA LS

## Contactors LSR (4-pole) for Switching Resistive Loads

## AC und DC OPERATION

According to EN60947-4-1 (VDE0660 Part102).The contactors are suitable for use in any climate. They are finger-safe according to EN50274
The accessories for the 3 -pole ALEA contactors can also be used for the 4 -pole versions.
FUNCTION

- Switching resistive loads
- Isolating systems with ungrounded or poorly grounded neutral conductors
- System transfers when alternative AC power supplies are used
- As contactors, e.g. for variable-speed operating mechanisms which only have to carry current and not switch
- These contactors are also suitable for switching of combined loads at distribution plants (e.g.: supply of heatings, lamps, motors or PC's) with an $\cos \varphi>0,8$ according IEC 60947-4-1 for AC-1
INTEGRATION
MOUNTABLE AUXILIARY CONTACTS


## Size 00

Maximum 4 auxiliary contacts.
Size 0
Maximum 2 auxiliary contacts (either laterally mounted or snapped onto the top)
Size 2-3
Maximum 4 auxiliary contacts (either laterally mounted or snapped onto the top).

## CONTACTOR ASSEMBLY WITH MECHANICAL INTERLOCK

The 4-pole LSR contactors with 4 NO contacts as the main contacts are suitable for making contactor assemblies with a mechanical interlock, e.g. for system transfers
Size 00
Contactor assemblies can be constructed from two LSRD contactors in conjunction with mechanical interlocks and two connecting clips (Order No.: LSZDW002),
Size 0
When constructing 4-pole contactor assemblies from two LSRO contactors, the fourth pole of the left contactor must always be moved to the left side.
If the laterally mountable LSZOW002 mechanical interlock is used, the contactor assembly is connected with LSZOW004 (2 pcs.).

## Sizes 2 and 3

Contactor assemblies can be constructed from two LSR2 or two LSR3 contactors in conjunction with the laterally mountable LSZOW002 mechanical interlock and the LSZ2W002 for size 2 or LSZ3W002 for size 3

| General Data - Contactors LSR |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Type |  |  | LSRD18 | LSRD22 | LSR035 | LSR040 | LSR260 | LSR311 | LSR314 |
| Size |  |  | 00 | 00 | 0 | 0 | 2 | 3 | 3 |
| Permissible mounting position ${ }^{1 /}$ |  |  |  |  |  |  |  |  |  |
| Mechanical endurance |  | Operating cycles | 30 million |  | 10 million |  |  |  |  |
| Electrical endurance at $\mathrm{I}_{\mathrm{e}} / \mathbf{A C}-1 \quad$ Operating cycles |  |  | approx. 0.5 million |  |  |  |  |  |  |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ (degree of pollution 3, overvoltage category III) |  |  | 690 |  |  |  |  |  |  |
| Permissible ambient temperature | During operation | ${ }^{\circ} \mathrm{C}$ | $-25 \ldots+60$ |  |  |  |  |  |  |
|  | During storage | ${ }^{\circ} \mathrm{C}$ | $-55 \text {... + } 80$ |  |  |  |  |  |  |
| Degree of protection acc. to DIN EN 60947-1, Appendix C | Device |  | IP20 |  |  |  | IP20 |  |  |
|  | Connection range |  |  |  |  |  | IP00 |  |  |
| Touch protection acc. to EN 50274 |  |  | finger-safe |  |  |  |  |  |  |
| Short-circuit protection of contactors without thermal overload relays |  |  |  |  |  |  |  |  |  |
| Main circuit <br> - Fuse links gl/gG NH, DIAZED, NEOZED acc. to IEC 60947-4-1/DIN EN 60947-4-1 |  |  | 352010 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  | - Type of coordination "11) | A |  |  |  |  | 160 | 250 | 250 |
|  | - Type of coordination "2"1) | A |  |  |  |  | 63 | 125 | 160 |
|  | - Weld-free | A |  |  |  |  | 50 | 63 | 100 |

[^29]Contactors LSR (4-pole) for Switching Resistive Loads

- Control - Contactors LSR


1) With size 00 , $D C$ operation: Operating times at $0.85 \ldots 1.1 \times U_{\text {s }}$

Technical Specification - Electromechanical Contactors Series ALEA LS

## Contactors LSR (4-pole) for Switching Resistive Loads

- Main Circuit - Contactors LSR

| Type Size |  |  | LSRD 18 <br> 00 | LSRD22 <br> 00 | LSR035 <br> 0 | $\begin{gathered} \text { LSR040 } \\ 0 \end{gathered}$ | $\begin{gathered} \text { LSR260 } \\ 2 \\ \hline \end{gathered}$ | $\begin{gathered} \text { LSR311 } \\ 3 \\ \hline \end{gathered}$ | $\begin{gathered} \text { LSR314 } \\ 3 \\ \hline \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| AC capacity |  |  |  |  |  |  |  |  |  |
| Utilization category AC-1, switching resistive loads |  |  |  |  |  |  |  |  |  |
| - Rated operational currents $\mathrm{I}_{\text {e }}$ | at $40^{\circ} \mathrm{C}$ up to 690 V | A | 18 | 22 | 35 | 40 | 60 | 110 | 140 |
|  | at $60^{\circ} \mathrm{C}$ up to 690 V | A | 16 | 20 | 30 | 35 | 55 | 100 | 120 |
| - Rated power for AC loads | 230 V | kW | 7 | 8,5 | 12,5 | 15 | 23 | 42 | 53 |
| P.f. $=0.95$ (at $40^{\circ} \mathrm{C}$ ) | 400 V | kW | 12 | 14,5 | 22 | 26 | 39 | 72 | 92 |
| - Minimum conductor cross-section for loads with | at $40^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 3 | 2,5 | 10 | 10 | 16 | 50 | 50 |
|  | at $55^{\circ} \mathrm{C}$ | $\mathrm{mm}^{2}$ | 3 | 2,5 | 10 | 10 | 16 | 50 | 50 |
| Utilization category AC-2 and AC-3 |  |  |  |  |  |  |  |  |  |
| - Rated operational currents $I_{\text {e }}$ | at $60^{\circ} \mathrm{C}$, at 400 V | A | 9 | 12 | 17 | 25 | 26 | -- | -- |
| - Rated power of slipring | at 230 V | kW | 3 | 3 | 4 | 5,5 | 5,5 | -- | -- |
| or squirrel-cage motors at 50 and 60 Hz | 400V | kW | 4 | 5,5 | 7,5 | 11 | 11 | -- | -- |

or squirrel-cage motors at 50 and 60 Hz 400V
DC capacity
Utilization category DC-1, switching resistive loads ( $L / R \leq 1 m s$ )

- Rated operational currents $I_{e}\left(\right.$ at $40^{\circ} \mathrm{C}$ )
- 1 conducting path
- 2 conducting paths in series
- 3 conducting paths in series
- 4 conducting paths in series


Utilization category DC-3/DC-5, Shunt-wound and series-wound motors (L/R $\leq 15 \mathrm{~ms}$ )

- Rated operational currents $\mathrm{I}_{\mathrm{e}}\left(\right.$ at $\left.40^{\circ} \mathrm{C}\right)$
- 1 conducting path
- 2 conducting paths in series
- 3 conducting paths in series
- 4 conducting paths in series

General Information - Auxiliary Contactors LSH

- General Data - Auxiliary Contactors LSH

| Type | LSH |
| :---: | :---: |
| Size | 00 |
| Permissible mounting position <br> $A C$ and $D C$ operation <br> The contactors are designed for operation on a vertical mounting surface. |  |
| Upright mounting position - AC operation | Special version required |
| - DC operation | Standard version |
| Positively-driven operation of contacts in contactor relays LSH: <br> Yes, in the basic unit and the auxiliary contact block as well as between the basic unit and the snap-on auxiliary contact block (removable) acc. to: <br> - ZH $1 / 457$ <br> - EN 60947-5-1, Appendix L | Explanations: <br> There is positively-driven operation if it is ensured that the NC and NO contacts cannot be closed at the same time. $\mathrm{ZH1} / 457$ <br> Safety rules for control units on power-operated presses in the metalworking industry. <br> EN 60947-5-1, Appendix L <br> Low-voltage control gear, control equipment, and switching elements. Special requirements for positively-driven contacts SUVA <br> Accident prevention regulations of the „Schweizer Unfallverhütungsanstalt" (Swiss Institute for Accident Insurance) |
| Contact reliability <br> Contact reliability at $17 \mathrm{~V}, 1 \mathrm{~mA}$ acc. to EN 60947-5-4 | Frequency of contact faults $<10^{-8}$, d. h. $<1$ <br> fault per 100 million operating cycles |

## - Contact Endurance for AC-15/AC-14 and DC-13 Utilization Categories

The contact endurance is mainly dependent on the breaking current. It is assumed that the operating mechanisms are switched randomly, i.e. not synchronized with the phase angle of the supply system.

If magnetic circuits other than the contactor coil systems or solenoid valves are present, e.g. magnetic brakes, protective
measures for the load circuits are necessary. RC elements and freewheel diodes would be suitable as protective measures.
The characteristic curves apply to:

- LSH auxiliary contactors
- LSZDH5 and LSZD05 auxiliary contact blocks


## Technical Specification - Electromechanical Contactors Series ALEA LS

## General Information - Auxiliary Contactors LSH

Diagram: Contact Endurance

$\mathrm{I}_{\mathrm{a}}=$ Breaking current
$\mathrm{I}_{\mathrm{e}}=$ Rated operational current

1) Basic unit
2) Basic unit with aux. Block snapped on
3) Million operating cycles
4) Snap-on auxiliary contact blocks: $\mathrm{I}_{\mathrm{e}} / D C-13$ max. 6A

- CSA and UL Rated Data for Auxiliary Contactors LSHD

| Type Size |  | $\begin{gathered} \text { LSHD } \\ 00 \end{gathered}$ |
| :---: | :---: | :---: |
| Basic units and auxiliary contact blocks |  |  |
| - Rated control supply voltage | VAC | max. 600 |
| - Rated voltage | VAC | 600 |
| Switching capacity | A | A 600, Q 60 |
| - Uninterrupted current at 240VAC |  | 10 |
| General data |  |  |
| Mechanical endurance |  |  |
| - Basic units | Operating cycles | 30 million |
| - Basic unit with snap-on auxiliary contact block | Operating cycles | 10 million |
| - Solid-state compatible auxiliary contact block | Operating cycles | 5 million |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ (Rated insulation voltage 3, overload category III) | V | 690 |
| Rated impulse withstand voltage $\mathbf{U}_{\text {imp }}$ | kV | 6 |
| Safe isolation between the coil and the contacts in the basic unit acc. to EN 60947-1, Appendix N | $\checkmark$ | 400 |
| Permissible ambient temperature During operation | ${ }^{\circ} \mathrm{C}$ | -25 ... +60 |
| During storage | ${ }^{\circ} \mathrm{C}$ | -55 ... +80 |
| Degree of protection acc. to EN 60947-1, Appendix C |  | IP20, coil assembly IP40 |
| Touch protection acc. to EN 50274 |  | finger-safe |
| Shock resistance AC/DC operation |  |  |
| Rectangular pulse | $\mathrm{g} / \mathrm{ms}$ | 10/5 and 5/10 |
| Sine pulse | $\mathrm{g} / \mathrm{ms}$ | $15 / 5$ and $8 / 10$ |
| Conductor cross-sections ( 1 or 2 conductors can be connected) |  |  |
| Auxiliary conductor and coil terminals |  | Screw terminals |
| - Solid | $\mathrm{mm}^{2}$ | $\begin{gathered} 2 \times(0,5 \ldots 1,5) ; 2 \times(0,75 \ldots 2,5) \text { acc. to IEC } 60947 ; \\ \max .2 \times(1 \ldots 4) \end{gathered}$ |
| - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0,5 \ldots 1,5) ; 2 \times(0,75 \ldots 2,5)$ |
| - AWG cables, solid or stranded | AWG | $2 \times(20 . . .16) ; 2 \times(18 . . .14) ; 1 \times 12$ |
| - Terminal screws |  | M3 |
| - tightening torque | Nm | 0,8 ... 1,2 (7 ... 10,3 lb.in) |
| Auxiliary conductor and coil terminals |  | Cage Clamp terminals (on request) |
| - Solid | $\mathrm{mm}^{2}$ | $2 \times(0,25 \ldots 2,5)$ |
| - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0,25 \ldots 1,5)$ |
| - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0,25 \ldots 2,5)$ |
| - AWG cables, solid or stranded | AWG | $2 \times(24 \ldots 14)$ |
| Short-circuit protection |  |  |
| (weld-free protection at $\mathrm{I}_{\mathrm{k}} \geq 1 \mathrm{kA}$ ) |  |  |
| - Fuse links, gl/gG operational class |  |  |
| - DIAZED | A | 10 |
| - NEOZED | A | 10 |
| - Or miniature circuit breakers with C characteristic (short-circuit current $\mathrm{I}_{k}<400 \mathrm{~A}$ ) | A | 6 |

- General Information - Auxiliary Contactors LSH
- Control - Auxiliary Contactors LSHD


Technical Specification - Electromechanical Contactors Series ALEA LS

General Information - Auxiliary Contactors LSH
Contact Capacity - Auxiliary Contactors LSHD

| Type <br> Size |  |  | LSHD <br> 00 |
| :---: | :---: | :---: | :---: |
| Rated operational currents $\mathrm{I}_{\text {e }}$ |  |  |  |
| AC-12 |  | A | 10 |
| AC-15/AC-14 <br> for rated operational voltage $U_{s}$ | up to 230 V | A | 6 |
|  | 400 V | A | 3 |
|  | 500 V | A | 2 |
|  | 690 V | A | 1 |
| DC-12 for rated operational voltage $\mathrm{U}_{5}$ |  |  |  |
| - 1 conducting path | 24 V | A | 10 |
|  | 60 V | A | 6 |
|  | 110 V | A | 3 |
|  | 220 V | A | 1 |
|  | 440 V | A | 0,3 |
|  | 600 V | A | 0,15 |
| - 2 conducting paths in series | 24 V | A | 10 |
|  | 60 V | A | 10 |
|  | 110 V | A | 4 |
|  | 220 V | A | 2 |
|  | 440 V | A | 1,3 |
|  | 600 V | A | 0,65 |
| - 3 conducting paths in series | 24 V | A | 10 |
|  | 60 V | A | 10 |
|  | 110 V | A | 10 |
|  | 220 V | A | 3,6 |
|  | 440 V | A | 2,5 |
|  | 600 V | A | 1,8 |
| DC-13 for rated operational voltage $\mathrm{U}_{5}$ |  |  |  |
| - 1 conducting path | 24 V | A | $10^{1 /}$ |
|  | 60 V | A | 2 |
|  | 110 V | A | 1 |
|  | 220 V | A | 0,3 |
|  | 440 V | A | 0,14 |
|  | 600 V | A | 0,1 |
| - 2 conducting paths in series | 24 V | A | 10 |
|  | 60 V | A | 3,5 |
|  | 110 V | A | 1,3 |
|  | 220 V | A | 0,9 |
|  | 440 V | A | 0,2 |
|  | 600 V | A | 0,1 |
| - 3 conducting paths in series | 24 V | A | 10 |
|  | 60 V | A | 4,7 |
|  | 110 V | A | 3 |
|  | 220 V | A | 1,2 |
|  | 440 V | A | 0,5 |
|  | 600 V | A | 0,26 |
| Switching frequency $z$ |  |  |  |
| - In operating cycles/h | AC-12/DC-12 | $h^{-1}$ | 1000 |
| during normal duty | AC-15/AC-14 | $h^{-1}$ | 1000 |
| for utilization category | DC-13 | $h^{-1}$ | 1000 |
| - No-load switching frequency |  | $\mathrm{h}^{-1}$ | 10000 |

- No-load switching frequency

Dependence of the switching frequency $z$ ' on the operational current $I^{\prime}$ and operational voltage $U^{\prime}$
$z^{\prime}=z \cdot 1 \mathrm{e} / \mathrm{I}^{\prime} \cdot\left(\mathrm{Ue} / \mathrm{U}^{\prime}\right)^{1.5} \cdot 1 / \mathrm{h}$

1) Snap-on auxiliary contact blocks: 6A

## - General Information - Auxiliary Contactors LSH

## DC OPERATION

IEC 60947 and EN 60947 (VDE 0660).
The LSH auxiliary contactors for switching auxiliary circuits are tailored to the special requirements of working with electronic controls.
The LSHD ... G/N auxiliary contactors cannot be extended with auxiliary contact blocks.

## FUNCTION

No auxiliary contact blocks can be snapped onto these auxiliary contactors. They have a low power consumption, an extended magnetic coil operating range and an integrated surge suppressor for damping opening surges (exception: LSHD ... N).
TECHNICAL SPECIFICATIONS
All technical specifications not mentioned in the table below are identical to those of the LSHD06.0., LSHD06.5., LSHD06.3 auxiliary contactors.
General Data - Auxiliary Contactors LSH

| Type <br> Size |  | $\begin{gathered} \text { LSHD...N } \\ 00 \\ \hline \end{gathered}$ | $\begin{gathered} \text { LSH...G } \\ 00 \end{gathered}$ |
| :---: | :---: | :---: | :---: |
| Magnetic coil operating range |  | $0.7 \ldots 1.25 \times \mathrm{U}_{\text {s }}$ |  |
| Power consumption of the magnetic coil (for cold coil) |  |  |  |
| Closing $=$ closed |  |  |  |
| at $U_{5}=17 \mathrm{~V}$ | W | 1,2 |  |
| at $\mathrm{U}_{5}=24 \mathrm{~V}$ | W | 2,3 |  |
| at $U_{5}=30 \mathrm{~V}$ | W | 3,6 |  |
| Permissible residual current of the electronics for 0 signal |  | $<10 \mathrm{~mA} \times\left(24 \mathrm{~V} / \mathrm{U}_{\mathrm{s}}\right)$ |  |
| Overvoltage configuration of the magnetic coil |  | No overvoltage damping | With diode integrated |
| Operating times |  |  |  |
| - Closing at 17 V |  |  |  |
| - ON-delay NO | ms |  |  |
| - OFF-delay NC | ms |  |  |
| - At 24 V |  |  |  |
| - ON-delay NO | ms |  |  |
| - OFF-delay NC | ms |  |  |
| - At 30 V |  |  |  |
| - ON-delay NO | ms |  |  |
| - OFF-delay NC | ms |  |  |
| - Closing at $17 \ldots 30 \mathrm{~V}$ |  |  |  |
| - OFF-delay NO | ms | $7 . .17$ | $40 . . .60$ |
| - ON-delay NC | ms | $22 . .30$ | $60 . . .70$ |
| Upright mounting position |  |  |  |

## Technical Specification - Electromechanical Contactors Series ALEA LS

## General Information - Contactors LSS

## DC OPERATION

IEC 60947, EN 60947 (VDE 0660).
The LSS contactors for switching motors are tailored to the special requirements of working with electronic controls. The LSSD contactors cannot be extended with auxiliary contacts or contact blocks. Two single-pole auxiliary contacts can be fitted to the LSSO contactors.

## FUNCTION

LSS contactors have a low power consumption, an extended operating range of the magnetic coil and an integrated surge suppressor for damping opening surges. TECHNICAL SPECIFICATIONS

All technical specifications not mentioned in the table below are identical to those of the LSDD and LSDO contactors for switching motors. The LSSD contactors cannot be extended with auxiliary contacts or contact blocks. Two single-pole auxiliary contacts LSZODO10/D001 can be fitted to the LSSO contactor (see Accessories).
General data - Auxiliary Contactors LSSD, LSSO

| Type |  |  | LSSO...H |
| :---: | :---: | :---: | :---: |
| Size |  | 00 | 0 |
| General data |  |  |  |
| Mechanical endurance | Operating cycles | 30 million | 10 million |
| Safe isolation between the coil and the main contacts acc. to EN 60947-1, Appendix N | V |  |  |
| Control <br> Magnetic coil operating range |  |  |  |
| Power consumption of the magnetic coil (for cold coil) |  |  |  |
| Closing = closed |  |  |  |
| at $\mathrm{U}_{5}=17 \mathrm{~V}$ | W | 1,2 | 2,1 |
| at $\mathrm{U}_{5}=24 \mathrm{~V}$ | W | 2,3 | 4,2 |
| at $\mathrm{U}_{\mathrm{s}}=30 \mathrm{~V}$ | W | 3,6 | 6,6 |
| Permissible residual current of the electronics (for $\mathbf{O}$ signal) |  | $<10 \mathrm{~mA} \times\left(24 \mathrm{~V} / \mathrm{U}_{5}\right)$ | $<6 \mathrm{~mA} \times\left(24 \mathrm{~V} / \mathrm{U}_{5}\right)$ |
| Overvoltage configuration of the magnetic coil |  | With diode | With varistor |
|  |  | $\rightarrow$ | $-\underset{u}{-7}$ |
| Operating times of the contactors for PLC-use |  |  |  |
| - Closing <br> - at 17 V |  |  |  |
| - ON-delay NO | ms | 40 ... 120 | 93 ... 270 |
| - OFF-delay NC | ms | $30 . . .70$ | 83 ... 250 |
| - at 24 V |  |  |  |
| - ON-delay NO | ms | $30 . . .60$ | 64 ... 87 |
| - OFF-delay NC | ms | $20 . . .40$ | $55 . . .78$ |
| - at 30V |  |  |  |
| - ON-delay NO | ms | $20 . . .50$ | $53 . . .64$ |
| - OFF-delay NC | ms | $15 . . .30$ | $45 . .56$ |
| - Opening at $17 . . .30 \mathrm{~V}$ |  |  |  |
| - ON-delay NO | ms | 7 ... 17 | 18 ... 19 |
| - OFF-delay NC | ms | 22 ... 30 | 24 ... 25 |

## Accessories for LSD and LSH Contactors and Auxiliary Contactors

## Operation

In the case of the versions for rated control supply voltages of 110 V and 230 V , either AC voltage or DC voltage can be applied on the line side, whereas the variant for 24 V is designed for DC operation only. A DC-operated contactor is connected to the output in accordance with the input voltage that is applied. The mean value of the OFF-delay is approximately 1.5 times the specified minimum time.
Surge Suppression
All LSD contactors and LSH auxiliary contactors can be retrofitted with RC elements or varistors for damping opening surges in the coil. Diodes or diode assemblies can be used. The surge suppressors are plugged onto the front of size 00 contactors. Space is provided for them next to a snap-on auxiliary contact block. With all size 0 to 3 contactors, varistors, RC elements and diode assemblies can be plugged on directly at the coil terminals, either on the top or underneath. With all size 0 to 3 contactors, varistors, RC elements and diode assemblies can be plugged on directly at the coil terminals, either on the top or underneath. The plug-in direction of the diodes and diode assemblies is determined by a coding device. Auxiliary contactors are supplied either without overvoltage damping or already fitted with a diode-assembly. According to the version. Note: The OFF-delay times of the NO contacts and the ON-delay times of the NC contacts increase if the contactor coils are damped against voltage peaks
Note: The OFF-delay times of the NO contacts and the ON-delay times of the NC contacts increase if the contactor coils are damped against voltage peaks (noise suppression diode 6 to 10 times; diode assemblies 2 to 6 times, varistor +2 to 5 ms ).

## Soldier Pin Adapter

The solder pin adapters can be used for all contactors of size 00 .
Technical Data


## Capacitor Switching Contactors LSK

- Capacitor Contactors LSK


## AC OPERATION

IEC 60947, EN 60947 (VDE 0660)
The contactors are suitable for use in any climate. They are finger-safe according to EN 50274 . The LSK capacitor contactors are special version of the size 00 to 3 ALEA contactors. The capacitors are precharged by means of the mounted leading NO contacts and resistors; only then do the main contacts close.
This prevents disturbances in the network and welding of the contactors. Only discharged capacitors are permitted to be switched on with capacitor contactors.
The auxiliary contact block which is snapped onto the capacitor contactor contains the three leading NO contacts and in the case of 00 one standard NC contact and in the case of 0 and 3 one standard NO contact, which is unassigned. Size 00 also contains another unassigned NO contact in the basic unit.
In addition, a 2-pole auxiliary contact block can be mounted laterally on the LSK3 capacitor contactors ( $1 \mathrm{NO}+1 \mathrm{NC}$ versions); type LSZOD711. The fitting of auxiliary switches for LSKD and LSKO is not expandable. For the capacitor switching capacity of the basic LSD contactor version, see Technical specifications.

## MOUNTING INSTRUCTIONS

In the area of capacitor switching contactors, difficulty inflammable and self-extinguishing materials may be used only, because abnormal temperatures within the area of the resistance spirals cannot be excluded.

## TECHNICAL SPECIFICATIONS

All technical specifications not mentioned in the table below are identical to those of the LSDD contactors for size 00 , to those of the LSDO contactors for size 0 and to those of the LSD3 contactors for size 3.

## Technical Specification - Electromechanical Contactors Series ALEA LS

## Capacitor Switching Contactors LSK

Technical Data - Capacitor Contactors LSK

| Type |  |  |  | LSK03213 | LSK36213 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Size |  |  | 00 | 0 | 3 |
| Capacitor rating at | 230V, $50 / 60 \mathrm{~Hz}$ | kvar | 3 ... 7.5 | 3.5 ... 15 | 3.5 ... 30 |
| rated power | $400 \mathrm{~V}, 50 / 60 \mathrm{~Hz}$ | kvar | 5 ... 12.5 | 6... 25 | 5... 50 |
| (utilization category AC-6b) | $525 \mathrm{~V}, 50 / 60 \mathrm{~Hz}$ | kvar | 7.5 ... 15 | 7.8 ... 30 | 7.5 ... 60 |
|  | $690 \mathrm{~V}, 50 / 60 \mathrm{~Hz}$ | kvar | 10... 21 | $10 . . .42$ | 10... 84 |
| Auxiliary contacts mounted (unassigned) |  |  | $1 \mathrm{NO}+1 \mathrm{NC}$ | 1NO |  |
| Auxiliary contacts mountable (lateral), not for sizes 00 and 0 |  |  |  |  | $2 \mathrm{NC}+2 \mathrm{NO}$ or $1 \mathrm{NO}+1 \mathrm{NC}$ |
| Magnetic coil operating range |  |  |  | $0.8 \ldots 1.1 \times \mathrm{U}$ |  |
| Max. switching frequency |  |  | 180 | 100 |  |
| Electrical endurance |  | Operating cycles | >250000 | > 150000 | > 100000 |
| Ambient temperature ${ }^{\circ} \mathrm{C}$ |  |  |  | 60 |  |
| Standards |  |  | IEC | 47/DIN EN 60947 (VDE 0660) |  |
| Short-circuit protection |  |  |  | 1.6 ... $2.2 \times 1$ e |  |
| Conductor cross-sections (1 or 2 conductors can be connected) |  |  |  |  |  |
| Main conductors |  |  | Screw terminals |  |  |
| - Solid |  | $\mathrm{mm}^{2}$ | $2 \times(0.5$... 1.5); $2 \times(0.75$... 2.5) | $2 \times(1 . . .2 .5) ; 2 \times(2.5$... 6) | - |
|  |  |  | acc. to IEC 60947; max. $2 \times(1 . . .4)$ | acc. to IEC 60947; max. $1 \times 10^{1)}$ | - |
| - Finely stranded with end sleeve |  |  | $2 \times(0.5$... 1.5); $2 \times(0.75$... 2.5) | $2 \times(1 . . .2 .5) ; 2 \times(2.5 . . .6)^{1)}$ | - |
| - AWG cables |  |  |  |  | - |
| - solid |  | AWG | $2 \times(20 . . .16)$ | $2 \times(16 . . .12)$ | - |
| - solid or stranded |  | AWG | $2 \times(18 \ldots 14)$ | $2 \times(14 \ldots 10)$ | - |
| - stranded |  | AWG | $1 \times 12$ | $1 \times 8$ | - |
| - Terminal screws |  |  | M3 | M4 (Pozidriv Gr. 2) | - |
| - tightening torque |  | Nm | 0.8 ... 1.2 | 2 ... 2.5 | - |
|  |  | lb.in | 7 ... 10.3 | $18 . .22$ | - |
| Coil voltage | 0.85-1.1 x |  | $230 \mathrm{VAC} ; 50 / 60 \mathrm{~Hz}$ | $230 \mathrm{VAC} ; 50 / 60 \mathrm{~Hz}$ | 230VAC; $50 / 60 \mathrm{~Hz}$ |

Capacitor Switching Contactors LSK

- Conductor Cross Sections - Capacitor Contactors LSK

| Type |  |  | LSKD17B3 | LSK03213 | LSK36213 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Size |  |  | 00 | 0 | 3 |
| (1 or 2 conductors can be connected) |  |  |  |  |  |
|  | Main conductors: |  | Screw terminals |  |  |
| Front clamping point connected | with box terminal |  |  |  |  |
|  | - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | - | - | 2.5 ... 35 |
|  | - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | - | - | 4 ... 50 |
|  | - Solid | $\mathrm{mm}^{2}$ | - | - | 2.5 ... 16 |
|  | - Stranded | $\mathrm{mm}^{2}$ | - | - | 4 ... 70 |
|  | - Ribbon cable conductors (number x width x thickness) | $\mathrm{mm}^{2}$ | - | - | $6 \times 9 \times 0.8$ |
|  | - AWG cables, solid or stranded | AWG | - | - | 10 ... $2 / 0$ |
| Rear clamping point connected | - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | - | - | 2.5 ... 50 |
|  | - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | - | - | $10 . . .50$ |
|  | - Solid | $\mathrm{mm}^{2}$ | - | - | 2.5 ... 16 |
|  | - Stranded | $\mathrm{mm}^{2}$ | - | - | 10 ... 70 |
|  | thickness) | $\mathrm{mm}^{2}$ | - | - | $6 \times 9 \times 0.8$ |
|  | - AWG cables, solid or stranded | AWG | - | - | $10 . . .2 / 0$ |
| Both clamping points connected | - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | - | - | max. $2 \times 35$ |
|  | - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | - | - | max. $2 \times 35$ |
|  | - Solid | $\mathrm{mm}^{2}$ | - | - | max. $2 \times 16$ |
|  | - Stranded | mm ${ }^{2}$ | - | - | max. $2 \times 50$ |
|  | - Ribbon cable conductors (number x width x thickness) | $\mathrm{mm}^{2}$ | - | - | $2 \times(6 \times 9 \times 0.8)$ |
|  | - AWG cables, solid or stranded | AWG | - | - | $2 \times(10 \ldots 1 / 0)$ |
|  | - Terminal screw |  | - | - | M6 (Inbus, SW 4) |
|  | - tightening torque | Nm | - | - | 4 ... 6 |
|  |  | lb.in |  |  | $36 . . .53$ |
| Connection for drilled copper bars Without box terminal with cable lugs ${ }^{2 l}$ | Max. width | mm | - | - | 10 |
|  | - Finely stranded with cable lug | $\mathrm{mm}^{2}$ | - | - | $10 . . .50^{31}$ |
|  | - Stranded with cable lug | $\mathrm{mm}^{2}$ | - | - | $10 . . .70^{31}$ |
| (1 or 2 conductors can be connected) | - AWG cables, solid or stranded | AWG | - | - | 7 ... 1/0 |
|  | Auxiliary conductors: |  |  |  |  |
|  | - Solid | $\mathrm{mm}^{2}$ | $2 \times(0.5 \ldots 1.5)^{4}$; | $2 \times(0.5 . . .1 .5)^{4}$; |  |
|  |  |  | $2 \times(0.75 \ldots 2.5)^{4}$ | $2 \times(0.75 \text {... } 2.5)^{4}$ acc. to IEC 60947; |  |
|  |  |  | acc. to IEC 60947; | max. $2 \times(0.75$... 4) |  |
|  |  |  | max. $2 \times(1 \ldots 4)$ |  |  |
|  | Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.5 \ldots 1.5)^{4}$; |  |  |
|  |  |  | $2 \times(0.75 \ldots 2.5)^{4}$ |  |  |
|  | - AWG cables, <br> solid or stranded | AWG | $2 \times(20 . . .16)^{4}$; |  |  |
|  |  |  | $2 \times(18 \ldots 14)^{4} ; 1 \times 12$ |  |  |
|  | - Terminal screw |  | M3 |  |  |
|  | - fightening torque | Nm | 0.8 ... 1.2 |  |  |
|  |  | lb.in | 7 ... 10.3 |  |  |
| Cage Clamp terminals (on request) | Auxiliary conductors: |  |  |  |  |
|  | - Solid | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 2.5)$ |  |  |
|  | - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 1.5)$ |  |  |
|  | - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots . .5)$ |  |  |
|  | - AWG cables, solid or stranded | AWG | $2 \times(24 . . .14)$ |  |  |

[^30]
## Reversing Contactor Combinations

The LSW reversing contactor assemblies can be ordered as follows:

## Sizes 00 to 3

Fully wired and tested, with mechanical and electrical interlock. For assemblies with AC operation and $50 / 60 \mathrm{~Hz}$, a dead interval of 50 ms must be provided when used with voltages $\geq 500 \mathrm{~V}$; a dead interval of 30 ms is recommend for use with voltages $\geq 400 \mathrm{~V}$. These dead times do not apply to assemblies with DC operation.

## Sizes 00 to 12

As components for self-assembly.
In addition, there are accessories (auxiliary switch blocks, surge suppressors, etc.), which have to be ordered separately.
For overload relays for motor protection, see "Thermal overload relays". The LSW contactor assemblies have screw terminals and are suitable for screwing or snapping onto 35 mm standard mounting rails.

## Complete units up to size 3

The fully wired reversing contactor assemblies are suitable for use in any climate. They are finger-safe according to EN 50274 . The contactor assemblies consist of 2 contactors with the same power, with one NC contact in the basic unit. The contactors are mechanically and electrically interlocked (NC contact interlock).
For motor protection, LST thermal overload relays for direct mounting or stand-alone installation must be ordered separately.
Rated Data AC-2 and AC-3 at AC 50 Hz 400 V

| Rating kW | Operational current $I_{\text {e }}$ A | Size | Order No. Contactor | Mechanical interlock ${ }^{2)}$ | Wiring set | Fully wired and tested contactor assemblies |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 3 | 7 | 00 | LSDD07 | - | LSZDW001 ${ }^{51}$ | LSWD0733 |
| 4 | 9 |  | LSDD09 |  |  | LSWD0933 |
| 5,5 | 12 |  | LSDD12 |  |  | LSWD1233 |
| 5,5 | 12 | 0 | LSD012 | LSZOW002 | LSZOW001 ${ }^{6 /}$ | LSW01233 |
| 7,5 | 17 |  | LSD017 |  |  | LSW01733 |
| 11 | 25 |  | LSD025 |  |  | LSW02533 |
| 15 | 32 | 2 | LSD232 | LSZOW002 | LSZ2W001 ${ }^{71}$ | LSW23233 |
| 18,5 | 40 |  | LSD240 |  |  | LSW24033 |
| 22 | 50 |  | LSD250 |  |  | LSW25033 |
| 30 | 65 | 3 | LSD365 | LSZOW002 | LSZ3W001 ${ }^{7}$ | LSW36533 |
| 37 | 80 |  | LSD380 |  |  | LSW38033 |
| 45 | 95 |  | LSD395 |  |  | LSW39533 |

2) Laterally mountable with two auxiliary contacts, one for each contactor.
3) Wiring set contains: mechanical interlock; connecting clips for 2 contactors; wiring modules on the top and bottom.
4) Wiring set contains: wiring modules on the top and bottom.
5) Wiring set contains: 2 connecting clips for contactors; wiring modules on the top and bottom.

## COMPONENTS FOR CUSTOMER ASSEMBLY

For customer assembly of reversing contactor assemblies size 6,10 and 12 , following components are available.
Contactors, thermal overload relays, the mechanical interlock (as of size 0 ) and - for momentary-contact operation auxiliary contact blocks for latching must be ordered separately.

| DESCRIPTION | Order No. |
| :--- | :--- |
| Wiring set for size 6 | LSZ6WOO2 |
| Wiring set for size 10 | LSZEW001 |
| Wiring set for size 12 | LSZGW001 |
| Mechanical interlock for size $6,10,12$ | LSZ6W001 |

The operating times of the individual LSD contactors are rated in such a way that no overlapping of the contact making and the arcing time between two contactors can occur on reversing, providing they are interlocked by way of their auxiliary switches (NC contact interlock) and the mechanical interlock. For assemblies with AC operation and $50 / 60 \mathrm{~Hz}$, a dead interval of 50 ms must be provided when used with voltages $\geq 500 \mathrm{~V}$. This dead times does not apply to assemblies with DC operation. The operating times of the individual contactors are not affected by the mechanical interlock. The following points should be noted:

## Size 00

- For maintained-contact operation:

Use contactors with an NC contact in the basic unit for the electrical interlock.

- For momentary-contact operation:

Use contactors with an NC contact in the basic unit for the electrical interlock; in addition, an auxiliary contact block with at least one NO contact for latching is required per contactor.

## Sizes $\mathbf{0}$ to $\mathbf{3}$

- For maintained-contact operation:

The contactors have no auxiliary contact in the basic unit; NC contacts for the electrical interlock are therefore integrated in the mechanical interlock that can be mounted on the side of contactor (one contact each for the left and right-hand contactors).

- For momentary-contact operation:

Electrical interlock as for maintained-contact operation; for the purpose of latching an auxiliary contact with an NO contact is additionally required for each contactor. This contact can be snapped onto the top of the contactors. Alternatively, auxiliary contact blocks mounted on the side can be used; they must be fitted onto the outside of each contactor.

## SURGE SUPPRESSION

## Sizes 00 to 3

All contactor assemblies can be fitted with RC elements or varistors for damping opening surges in the coil.
As with the individual contactors, the surge suppressors can either be plugged onto the top of the contactors (size 00) or fitted onto the coil terminals on the top or bottom (size 0 to 3 ).

## TECHNICAL SPECIFICATIONS

The technical specifications are identical to those of the LSD .. contactors.
The CSA and UL approvals only apply to the complete contactor assemblies and not to the individual parts for customer assembly.

## Star-Delta Contactor Combinations

These LSY contactor assemblies for wye-delta starting are designed for standard applications.
Note:
Contactor assemblies for wye-delta starting in special applications such as very heavy starting or wye-delta starting of special motors must be customized.
Help with designing such special applications is available.

## Complete units up to size 2

The LSY contactor assemblies for wye-delta starting can be ordered as follows:

## Sizes 00 to 2

Fully wired and tested, with electrical interlock, dead interval of up to 10 s on reversing (size 00 with electrical and mechanical interlocks)
A dead interval of 50 ms on reversing is already integrated in the time relay function. There is also a range of accessories (auxiliary contact blocks, surge suppressors, etc.) that must be ordered separately.
For overload relays for motor protection, see "Thermal Overload Relays"
The LSY contactor assemblies have screw terminals and are suitable for screwing or snapping onto 35 mm standard mounting rails. Fully wired and tested LSY contactor assemblies have one unassigned NO contact which is mounted onto the front of the K3 delta contactor. A timing relay is mounted onto the right side of the assemblies.
Rated Data at AC 50 Hz 400 V

| Rating <br> kW | Operational current $I_{\text {e }}$ A | Motor current A | Size | Line/delta contactor | Star contactor | WYE-Delta timer | Order No. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| up to 7.5 | 17 | 17 | 00-00-00 | LSDD 1213 | LSDD0713 | LSZD0101 | LSYD1733 |
| up to 15 | 32 | 34 | 0-0-0 | LSD02533 | LSD01213 | LSZD0101 | LSY03233 |
| up to 22 | 50 | 43 | 2-2-0 | LSD23233 | LSD02533 | LSZD0101 | LSY25033 |

COMPONENTS FOR CUSTOMER ASSEMBLY
Installation kits with wiring modules and, if necessary, mechanical connectors are available for contactor assemblies for wyedelta starting. Contactors, overload relays, wye-delta timers, auxiliary contacts for electrical interlock - if required also feeder terminals, mechanical interlocks (exception: In the case of the wiring set for size 00 contactor assemblies the mechanical interlock between the delta contactor and the star contactor is included in the kit) and base plates - must be ordered separately.
The wiring sets for sizes 00 and 0 contain the top and bottom main conducting path connections between the line and delta contactors (top) and between the delta and star contactors (bottom). In the case of sizes 2 to 12 only the bottom main conducting path connection between the delta and star contactors is included in the wiring module, owing to the larger conductor cross-section at the infeed.

| DESCRIPTION | Order No. |
| :---: | :---: |
| Wiring set for Y-D assemblies size 0-0-0, including wiring, connection clips and star jumper ${ }^{\text {I/ }}$ | LSZOYOO1 |
| Parallel connector, star jumper 3-pole for contactors size $0^{2 /}$ | LSZOYOO2 |
| Base-plate for YD-assemblies, size 2-2-0, for side arranged YD relay ${ }^{3 /}$ | LSZ2Y001 |
| Wiring set for Y-D assemblies size 2-2-0, including wiring bottom and star jumper | LSZ2Y004 |
| Parallel connector, star jumper 3-pole for contactors size 2 | LSZ2Y005 |
| Star-Delta timer 20s | LSZD0101 |
| Star-Delta timer 60s | LSZDO102 |
| Wiring Set for YD-Assemblies size 00, including mechanical Interlock | LSZDY001 |
| Star jumper 3-pole for LSDD size 00 | LSZDY002 |
| 1) Wiring set contains: mechanical interlock, 3 connecting clips; wiring modules on the top (connection between line and delta contactor) and on the bottom (connection between delta and wyecontactor); star jumper. <br> 2) Wiring set contains: 5 connecting clips; wiring modules on the top (connection between line and delta contactor) and on the bottom (connection between delta and wye-contactor); star jumper. <br> 3) Wiring set includes the wiring at bottom between star and delta contactor and the star jumper. |  |
|  |  |
|  |  |

## MOTOR PROTECTION

Thermal overload relays can be used for overload protection. The overload relay can be either mounted onto the line contactor or separately fitted.
It must be set to 0.58 times the rated motor current.

## FUNCTION

Wye-delta starting can only be used either if the motor normally operates in a $\Delta$ connection or starts soffly or if the load torque during $Y$ starting is low and does not increase sharply. On the $Y$ step the motors can carry approximately $50 \%$ (class KL 16 ) or $30 \%$ (class KL 10 ) of their rated torque; The tightening torque is approximately $1 / 3$ of that during direct on-line starting. The starting current is approximately 2 to 2.7 times the rated motor current.
The changeover from $Y$ to $\Delta$ must not be effected until the motor has run up to rated speed. Operating mechanisms which require this changeover to be performed earlier are unsuitable for wyedelta starting.
The ratings given in the table are only applicable to motors with a starting current ratio $\mathrm{IA} \leq 8.4 \times \mathrm{IN}$ and using wye-delta timing relayLSZD0101/LSZD0101 with a dead interval of approximately 50 ms .
SURGE SUPPRESSION

## Sizes 00 to 3:

All contactor assemblies can be fitted with RC elements, varistors or diode assemblies for damping opening surges in the coil. As with the individual contactors, the surge suppressors can either be plugged onto the top of the contactors (size 00 ) or fitted onto the coil terminals on the top or bottom (size 0 to 3 ).

## Sizes 6 to 12:

The contactors are fitted with varistors as standard.

Technical Specifications - Star-delta Contactor Combinations Series LSY

## Star-Delta Contactor Combinations

Technical Specifications
Short-circuit protection with fuses for motor feeders with short-circuit currents up to 50 kA and 690 V . For Thermal overload relays see: Thermal Overload Relays.

| Rating | Sizes <br> of contactors K1-K3-K2 | Rated motor current | Thermal overload relay | Setting range <br> (the thermal overload relays must be set to 0.58 times the rated motor current) | Permissible back-up fuses for starters, <br> comprising contactor assemblies and overload relays |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | Single or double infeed" <br> Fuse links |  | LV HRC <br> Operational class | listed <br> fuses <br> CLASS <br> RK5/L | British <br> Standard |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | LV HRC, DIAZED, NEOZED $\mathrm{gL} / \mathrm{gG}$ operational class Type of coordination |  | aM Type of coordination „2" |  | Fuses |  |
|  |  |  |  |  |  |  | BS88 |  |  |
|  |  |  |  |  |  |  | Type of coordination |  |  |  |
|  |  |  |  |  | „1" | "2" |  | A | „1" | „2" |
| kW |  |  | Type | A | A | A |  |  | A | A | A |
| 5,5 | 00-00-00 | 12 | LSTD0800 | 5.5 ... 8 | 35 | 20 |  | 10 | 30 | 35 | 20 |
| 7,5 | 00-00-00 | 16 | LSTD 1000 | 7... 10 | 35 | 20 | 16 | 40 | 35 | 20 |
| 11 | 0-0-0 | 22 | LST01600 | $11 . .16$ | 63 | 25 | 20 | 60 | 63 | 25 |
| 15 | 0-0-0 | 29 | LST02000 | $14 . . .20$ | 100 | 35 | 20 | 80 | 100 | 35 |
| 18,5 | 0-0-0 | 35 | LST02500 | $20 . . .25$ | 100 | 35 | 20 | 100 | 100 | 35 |
| 22 | 2-2-0 | 41 | LST23200 | 22 ... 32 | 125 | 63 | 35 | 125 | 125 | 63 |

1) The maximum rated motor current must not be exceeded.

Star-Delta Contactor Combinations

- Technical Specifications



## overload relay

1) Short-circuit protection with overload relays, see Thermal Overload Relays.
2) $\mathrm{Up} \mathrm{to}_{\mathrm{k}}<0.5 \mathrm{kA}$; $\leq 260 \mathrm{~V}$
3) For Circuit diagram see chapter "Star-Delta Contactor combinations"

## Technical Specification - Electromechanical Contactors Series CUBICO

## Electromechanical Contactors Series CUBICO Mini, 3-pole

Electric Life Curve AC3


1) Electric life curve
2) Rated current (A)
3) Rated outputs of three-phase motors AC-3 $(50 \mathrm{~Hz})$

Electric Life Curve AC4


1) Electric life curve
2) Rated current (A)

Electromechanical Contactors Series CUBICO Mini, 3-poleTechnical Specifications

|  |  |  | LZDM06 | LZDM09 | LZDM12 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Standard |  |  | IEC/EN 60947-4-1 |  |  |
| Rated insulation voltage |  |  | 690VAC |  |  |
| Rated frequency |  |  | $50 / 60 \mathrm{~Hz}$ |  |  |
| Rated impulse withstand voltage |  |  | 6 kV |  |  |
| Overvoltage category |  |  | III |  |  |
| Rated current AC1 |  |  | 20A | 20A | 20A |
| Rated current AC3 |  | 230 V | 6A | 9A | 12A |
|  |  | 400 V | 6A | 9A | 12A |
|  |  | 415 V | 6A | 9A | 12A |
|  |  | 690 V | 3.8A | 4.9A | 4.9A |
| Rated current AC4 |  | 230 V | 6A | 9A | 12A |
|  |  | 400 V | 6A | 9A | 9A |
|  |  | 415 V | 6A | 9A | 9A |
|  |  | 690 V | 3.8A | 4.9A | 4.9A |
| Rated making capacity |  |  | $10 \times \mathrm{I}_{\mathrm{e}}(\mathrm{AC} 3) / 12 \times \mathrm{I}_{\mathrm{e}}$ (AC4) |  |  |
| Rated breaking capacity |  |  | $8 \times 1{ }_{\text {e }}(\mathrm{AC} 3) / 10 \times \mathrm{I}_{\mathrm{e}}(\mathrm{AC} 4)$ |  |  |
| Short-time withstand current 10s |  |  | 48A | 72A | 96A |
| Rated power AC3 |  | 230 V | 1.5kW | 2.2kW | 3kW |
|  |  | 400 V | 2.2kW | 4kW | 5.5 kW |
|  |  | 415 V | 2.2kW | 4kW | 5.5 kW |
|  |  | 690 V | 3kW | 4kW | 4kW |
| Operating frequency |  | AC3 | 1.200 operations/h |  |  |
|  |  | AC4 | 300 operations/h |  |  |
| Electrical lifetime |  | AC3 | 1.200.000 operations |  |  |
| Mechanical lifetime |  |  | 10.000 .000 operations |  |  |
| Configuration of main contacts |  | 3-pole | 3 NO | 3 NO | 3 NO |
| Protection degree |  |  | IP20 | IP20 | IP20 |
| Ambient air temperature |  |  | -5 up to $+40^{\circ} \mathrm{C}$ | -5 up to $+40^{\circ} \mathrm{C}$ | -5 up to $+40^{\circ} \mathrm{C}$ |
| Storage temperature |  |  | -25 up to $+55^{\circ} \mathrm{C}$ | -25 up to $+55^{\circ} \mathrm{C}$ | -25 up to $+55^{\circ} \mathrm{C}$ |
| Correction coefficient |  | $40^{\circ} \mathrm{C}$ | 1 | 1 | 1 |
|  |  | $50^{\circ} \mathrm{C}$ | 0,875 | 0,875 | 0,875 |
|  |  | $60^{\circ} \mathrm{C}$ | 0,75 | 0,75 | 0,75 |
|  |  | $70^{\circ} \mathrm{C}$ | 0,625 | 0,625 | 0,625 |
| Altitude |  |  | 2000 m | 2000m | 2000m |
| Atmosphere conditions |  |  | $50 \%$ humidity at $+40^{\circ} \mathrm{C}$ |  |  |
| Installation position |  |  | horizontal and vertical $+/-22,5^{\circ}$ |  |  |
| Coil voltage |  | Us | 24VAC, 230VAC or 24VDC |  |  |
| Coil acting range |  | attraction | 85\%-110\% Us | 85\%-110\% Us | 85\%-110\% Us |
|  |  | release | AC: $20 \%-70 \%$ Us | AC: $20 \%-70 \%$ Us | AC: $20 \%-70 \%$ Us |
|  |  |  | DC: $10 \%-60 \%$ Us | DC: $10 \%-60 \%$ Us | DC: $10 \%-60 \%$ Us |
| Coil average power |  | start | 40VA | 40VA | 40VA |
|  |  | holding | 7VA | 7VA | 7VA |
| Heat wastage |  |  | 4 W | 4 W | 4 W |
| Main contact action time |  | close | 10-18ms | $10-18 \mathrm{~ms}$ | 10-18ms |
|  |  | disconnection | 4-16ms | $4-16 \mathrm{~ms}$ | 4-16ms |
| Terminal capacity of main circuit | flexible with end sleeve | $1 \times$ | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{2}$ |
|  |  | 2 x | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{2}$ |
|  | rigid cable | 1x | 1-2.5mm ${ }^{2}$ | $1-2.5 \mathrm{~mm}^{2}$ | $1-2.5 \mathrm{~mm}^{2}$ |
|  |  | 2x | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{\text {a }}$ | 1-2.5mm ${ }^{\text {a }}$ |
|  | screw size |  | M3 | M3 | M3 |
|  | torque |  | 0.8 Nm | 0.8 Nm | 0.8 Nm |
| Terminal capacity of control circuit | flexible with end sleeve | 1x | $1-2.5 \mathrm{~mm}^{2}$ | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{2}$ |
|  |  | $2 \times$ | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{2}$ | $1-2.5 \mathrm{~mm}^{2}$ |
|  | rigid cable | 1x | $1-2.5 \mathrm{~mm}^{2}$ | $\begin{aligned} & 1-2.5 \mathrm{~mm}^{2} \\ & 1-2.5 \mathrm{~mm}^{2} \end{aligned}$ | $1-2.5 \mathrm{~mm}^{2}$ |
|  |  | 2 x | 1-2.5mm ${ }^{2}$ |  | 1-2.5mm ${ }^{2}$ |
|  | screw size |  | M3 | M3 | M3 |
|  | torque |  | 0.8 Nm | 0.8 Nm | 0.8 Nm |
| Terminal capacity of auxiliary contacts | flexible with end sleeve | $1 \times$ | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{2}$ |
|  |  | $2 \times$ | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{2}$ | $1-2.5 \mathrm{~mm}^{2}$ |
|  | rigid cable | 1x | $1-2.5 \mathrm{~mm}^{2}$ | $1-2.5 \mathrm{~mm}^{2}$ | $1-2.5 \mathrm{~mm}^{2}$ |
|  |  | $2 \times$ | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{2}$ | 1-2.5mm ${ }^{2}$ |
|  | screw size |  | M3 | M3 | M3 |
|  | torque |  | 0.8 Nm | 0.8 Nm | 0.8 Nm |

## Technical Specification - Electromechanical Contactors Series CUBICO

Electromechanical Contactors Series CUBICO Mini, 3-pole

- Application in Illumination Circuit

| W | A | $\mu \mathrm{F}$ | LZDM06 | LZDM09 | LZDM12 |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | max. number of lamps per phase |  |  |
| Incandescent lamp |  |  |  |  |  |
| 60 | 0,27 | - | 35 | 35 | 35 |
| 75 | 0,34 | - | 28 | 28 | 28 |
| 100 | 0,45 | - | 21 | 21 | 21 |
| 150 | 0,68 | - | 14 | 14 | 14 |
| 200 | 0,71 | - | 10 | 10 | 10 |
| 300 | 1,4 | - | 6 | 6 | 6 |
| 500 | 2,3 | - | 4 | 4 | 4 |
| 750 | 3,4 | - | 2 | 2 | 2 |
| 1000 | 4,6 | - | 2 | 2 | 2 |
| Single fluorescent lamp with starter, without compensation |  |  |  |  |  |
| 20 | 0,39 | - | 24 | 24 | 24 |
| 40 | 0,45 | - | 21 | 21 | 21 |
| 64 | 0,7 | - | 12 | 12 | 12 |
| 80 | 0,8 | - | 12 | 12 | 12 |
| 110 | 1,15 | - | 8 | 8 | 8 |
| Single fluorescent lamp with starter, parallel compensation |  |  |  |  |  |
| 20 | 0,18 | 5 | 83 | 83 | 83 |
| 40 | 0,26 | 5 | 58 | 58 | 58 |
| 65 | 0,42 | 7 | 35 | 35 | 35 |
| 80 | 0,52 | 7 | 28 | 28 | 28 |
| 100 | 0,6 | 16 | 23 | 23 | 23 |
| 110 | 0,7 | 18 | 21 | 21 | 21 |

## Fluorescent lamps in dual mounting with starter, without compensation

|  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $2 \times 20$ | $2 \times 0,22$ | - | 21 | 21 | 21 |
| $2 \times 40$ | $2 \times 0,41$ | - | 11 | 11 | 7 |
| $2 \times 65$ | $2 \times 0,67$ | - | 7 | 7 | 7 |
| $2 \times 80$ | $2 \times 0,82$ | - | 5 | 5 | 5 |
| $2 \times 110$ | $2 \times 1,10$ | - | 4 | 4 | 4 |


| $2 \times 20$ | $2 \times 0,13$ | - | 36 | 36 | 36 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $2 \times 40$ | $2 \times 0,24$ | - | 20 | 20 | 20 |
| $2 \times 65$ | $2 \times 0,39$ | - | 12 | 12 | 12 |
| $2 \times 80$ | $2 \times 0,48$ | - | 10 | 10 | 10 |
| $2 \times 110$ | $2 \times 0,65$ | - | 7 | 7 | 7 |
| Single fluorescent lamp without starter, without compensation |  |  |  |  |  |
| 20 | 0,43 | - | 22 | 22 | 22 |
| 40 | 0,55 | - | 17 | 17 | 17 |
| 65 | 0,8 | - | 12 | 12 | 12 |
| 80 | 0,95 | - | 10 | 10 | 10 |
| 110 | 0,4 | - | 6 | 6 | 6 |
| Single fluorescent lamp with starter, with parallel compensation |  |  |  |  |  |
| 20 | 0,19 | 5 | 50 | 50 | 50 |
| 40 | 0,29 | 5 | 33 | 33 | 33 |
| 65 | 0,46 | 7 | 20 | 20 | 20 |
| 80 | 0,57 | 7 | 16 | 16 | 16 |
| 110 | 0,79 | 16 | - | - | - |
| Fluorescent lamp without starter, without compensation |  |  |  |  |  |
| $2 \times 20$ | $2 \times 0,25$ | - | 19 | 19 | 19 |
| $2 \times 40$ | $2 \times 0,47$ | - | 10 | 10 | 10 |
| $2 \times 65$ | $2 \times 0,76$ | - | 6 | 6 | 6 |
| $2 \times 80$ | $2 \times 0,93$ | - | 5 | 5 | 5 |
| $2 \times 110$ | $2 \times 1,3$ | - | 3 | 3 | 3 |

Electromechanical Contactors Series CUBICO Mini, 3-pole
Application in Illumination Circuit

| W | A | $\mu \mathrm{F}$ | LZDM06 | LZDM09 | LZDM12 |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | max. number of lamps per phase |  |  |

Fluorescent lamp in dual mounting without starter, with compensation in series

| $2 \times 20$ | $2 \times 0,15$ | - | 34 | 34 | 34 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $2 \times 40$ | $2 \times 0,26$ | - | 18 | 18 | 18 |
| $2 \times 65$ | $2 \times 0,43$ | - | 11 | 9 | 11 |
| $2 \times 80$ | $2 \times 0,53$ | - | 9 | 6 | 9 |
| $2 \times 110$ | $2 \times 0,72$ | - | 6 | 6 |  |


| Low press sodium vapor lamps with parallel compensation |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 35 | 0,3 | 17 | - | - | - |
| 55 | 0,4 | 17 | - | - | - |
| 90 | 0,6 | 25 | - | - | - |
| 135 | 0,9 | 36 | - | - | - |
| 150 | 1 | 36 | - | - | - |
| 180 | 1,2 | 36 | - | - | - |
| 200 | 1,3 | 36 | - | - | - |

Low press sodium vapor lamps without compensation

| 150 | 1,9 | - | 4 | 4 | 4 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 250 | 3,2 | - | 2 | 2 | 2 |
| 400 | 5 | - | 1 | - | 1 |
| 700 | 8,8 | - | - | - | - |
| 1000 | 12,4 | - | - | - |  |

Low press sodium vapor lamps with parallel compensation

| 150 | 0,84 | 20 | - | - | - |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 250 | 1,4 | 32 | - | - | - |
| 400 | 2,2 | 48 | - | - | - |
| 700 | 3,6 | 96 | - | - | - |
| 1000 | 5,5 | 120 | - | - | - |

High press hydrargyrum lamps without compensation

|  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| High press hydrargyrum lamps without compensation |  |  |  |  |  |
| 50 | 0,54 | - | 14 | 14 | 14 |
| 80 | 0,81 | - | 9 | 9 | 9 |
| 125 | 1,2 | - | 6 | 3 | 6 |
| 250 | 2,3 | - | 3 | 1 | 3 |
| 400 | 4,1 | - | 1 | - | 1 |
| 700 | 6,8 | - | - | - | - |
| 1000 | 9,9 | - | - | - |  |

High press hydrargyrum lamps with parallel compensation

| 50 | 0,3 | 10 | - | - | - |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 80 | 0,45 | 10 | - | - | - |
| 125 | 0,67 | 10 | - | - | - |
| 250 | 1,3 | 18 | - | - | - |
| 400 | 2,3 | 25 | - | - | - |
| 700 | 3,8 | 40 | - | - | - |
| 1000 | 5,5 | 60 | - | - | - |

## Technical Specification - Electromechanical Contactors Series CUBICO

Electromechanical Contactors Series CUBICO Classic, 3-pole
Electric Life Curve AC3


1) Electric life curve
2) Rated current (A)
3) Rated outputs of three-phase motors $\mathrm{AC}-3(50 \mathrm{~Hz})$

Electric Life Curve AC4


1) Electric life curve
2) Rated current (A)

Electromechanical Contactors Series CUBICO Classic, 3-pole

- Technical Specifications



## Technical Specification - Electromechanical Contactors Series CUBICO

Electromechanical Contactors Series CUBICO Classic, 3-pole

- Application in Illumination Circuit

| W | A | $\mu \mathrm{F}$ | LZDC09 | LZDC12 | LZDC18 | LZDC25 | LZDC32 | LZDC38 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | max. number of lamps per phase |  |  |  |  |  |
| Incandescent lamp |  |  |  |  |  |  |  |  |
| 60 | 0,27 | - | 59 | 59 | 77 | 92 | 129 | 129 |
| 75 | 0,34 | - | 47 | 47 | 61 | 73 | 103 | 103 |
| 100 | 0,45 | - | 35 | 35 | 46 | 55 | 77 | 77 |
| 150 | 0,68 | - | 23 | 23 | 30 | 36 | 51 | 51 |
| 200 | 0,71 | - | 17 | 17 | 23 | 27 | 38 | 38 |
| 300 | 1,4 | - | 11 | 11 | 15 | 18 | 25 | 25 |
| 500 | 2,3 | - | 7 | 7 | 8 | 11 | 15 | 15 |
| 750 | 3,4 | - | 4 | 4 | 6 | 7 | 10 | 10 |
| 1000 | 4,6 | - | 3 | 3 | 4 | 5 | 7 | 7 |

Single fluorescent lamp with starter, without compensation

| 20 | 0,39 | - | 41 | 41 | 53 | 66 | 89 | 89 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 40 | 0,45 | - | 35 | 35 | 46 | 57 | 77 | 77 |
| 64 | 0,7 | - | 22 | 22 | 30 | 37 | 50 | 43 |
| 80 | 0,8 | - | 20 | 20 | 26 | 32 | 43 |  |
| 110 | 1,15 | - | 12 | 12 | 15 | 20 | 26 | 26 |

Single fluorescent lamp with starter, parallel compensation

| 20 | 0,18 | 5 | 94 | 94 | 105 | 155 | 215 | 215 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 40 | 0,26 | 5 | 65 | 65 | 75 | 107 | 150 | 150 |
| 65 | 0,42 | 7 | 40 | 40 | 45 | 66 | 92 |  |
| 80 | 0,52 | 7 | 32 | 32 | 36 | 53 | 74 |  |
| 100 | 0,6 | 16 | 26 | 26 | 29 | 43 | 59 | 59 |
| 110 | 0,7 | 18 | 24 | 24 | 27 | 40 | 55 | 55 |

## Fluorescent lamps in dual mounting with starter, without compensation

|  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $2 \times 20$ | $2 \times 0,22$ | - | 36 | 36 | 46 | 58 | 78 |  |
| $2 \times 40$ | $2 \times 0,41$ | - | 18 | 18 | 24 | 30 | 42 |  |
| $2 \times 65$ | $2 \times 0,67$ | - | 10 | 10 | 14 | 18 | 26 |  |
| $2 \times 80$ | $2 \times 0,82$ | - | 8 | 8 | 12 | 14 | 26 |  |
| $2 \times 110$ | $2 \times 1,10$ | - | 6 | 6 | 8 | 10 | 14 | 20 |


| Fluorescent lamps in dual mounting with starter, with compensation in series |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $2 \times 20$ | $2 \times 0,13$ | - | 60 | 60 | 80 | 100 | 134 | 134 |
| $2 \times 40$ | $2 \times 0,24$ | - | 32 | 32 | 42 | 54 | 72 | 72 |
| $2 \times 65$ | $2 \times 0,39$ | - | 20 | 20 | 26 | 32 | 44 |  |
| $2 \times 80$ | $2 \times 0,48$ | - | 16 | 16 | 20 | 26 | 36 |  |
| $2 \times 110$ | $2 \times 0,65$ | - | 12 | 12 | 16 | 20 | 26 | 36 |

Single fluorescent lamp without starter, without compensation

|  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 20 | 0,43 | - | 37 | 37 | 48 | 60 | 97 | 97 |
| 40 | 0,55 | - | 29 | 29 | 38 | 47 | 63 | 63 |
| 65 | 0,8 | - | 20 | 20 | 26 | 32 | 43 |  |
| 80 | 0,95 | - | 16 | 16 | 22 | 27 | 36 |  |
| 110 | 0,4 | - | 11 | 11 | 15 | 18 | 25 | 26 |

Single fluorescent lamp with starter, with parallel compensation

| 20 | 0,19 | 5 | 84 | 84 | 110 | 136 | 184 | 184 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 40 | 0,29 | 5 | 55 | 55 | 72 | 89 | 101 | 101 |
| 65 | 0,46 | 7 | 34 | 34 | 45 | 56 | 76 | 76 |
| 80 | 0,57 | 7 | 28 | 28 | 36 | 45 | 61 | 61 |
| 110 | 0,79 | 16 | 20 | 20 | 26 | 32 | 44 | 44 |
| Fluorescent lamp without starter, without compensation |  |  |  |  |  |  |  |  |
| $2 \times 20$ | $2 \times 0,25$ | - | 32 | 32 | 42 | 52 | 70 | 70 |
| $2 \times 40$ | $2 \times 0,47$ | - | 16 | 16 | 22 | 26 | 36 | 36 |
| $2 \times 65$ | $2 \times 0,76$ | - | 10 | 10 | 12 | 16 | 22 | 22 |
| $2 \times 80$ | $2 \times 0,93$ | - | 8 | 8 | 10 | 12 | 18 | 18 |
| $2 \times 110$ | $2 \times 1,3$ | - | 6 | 6 | 8 | 10 | 12 | 12 |

Electromechanical Contactors Series CUBICO Classic, 3-pole

- Application in Illumination Circuit

| W | A | $\mu \mathrm{F}$ | LZDC09 | LZDC12 | LZDC18 | LZDC25 | LZDC32 | LZDC38 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | max. number of lamps per phase |  |  |  |  |  |

Fluorescent lamp in dual mounting without starter, with compensation in series

| $2 \times 20$ | $2 \times 0,15$ | - | 56 | 56 | 74 | 92 | 124 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $2 \times 40$ | $2 \times 0,26$ | - | 30 | 30 | 40 | 50 | 66 |  |
| $2 \times 65$ | $2 \times 0,43$ | - | 18 | 18 | 24 | 30 | 40 | 66 |
| $2 \times 80$ | $2 \times 0,53$ | - | 14 | 14 | 18 | 24 | 32 |  |
| $2 \times 110$ | $2 \times 0,72$ | - | 10 | 10 | 14 | 18 | 32 |  |

Low press sodium vapor lamps with parallel compensation

| 35 | 0,3 | 17 | 40 | 40 | 50 | 63 | 86 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 55 | 0,4 | 17 | 30 | 30 | 37 | 47 | 65 |  |
| 90 | 0,6 | 25 | - | - | 25 | 36 | 43 |  |
| 135 | 0,9 | 36 | - | - | - | 21 | 28 |  |
| 150 | 1 | 36 | - | - | - | 19 | 26 |  |
| 180 | 1,2 | 36 | - | - | - | 15 | 28 |  |
| 200 | 1,3 | 36 | - | - | - | 14 | 26 |  |

Low press sodium vapor lamps without compensation

| 150 | 1,9 | - | 6 | 6 | 7 | 10 | 13 | 13 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 250 | 3,2 | - | 3 | 3 | 4 | 5 | 8 | 8 |
| 400 | 5 | - | 2 | 2 | 3 | 3 | 5 |  |
| 700 | 8,8 | - | - | - | 2 | 2 | 2 |  |
| 1000 | 12,4 | - | - | - | 1 | 1 | 2 |  |

Low press sodium vapor lamps with parallel compensation

| 150 | 0,84 | 20 | - | - | 17 | 22 | 30 | 30 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 250 | 1,4 | 32 | - | - | - | 13 | 18 |  |
| 400 | 2,2 | 48 | - | - | - | 8 | 18 |  |
| 700 | 3,6 | 96 | - | - | - | - | 11 |  |
| 1000 | 5,5 | 120 | - | - | - | - | 6 |  |

High press hydrargyrum lamps without compensation

| 50 | 0,54 | - | 22 | 22 | 27 | 35 | 48 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 80 | 0,81 | - | 14 | 14 | 18 | 23 | 38 |  |
| 125 | 1,2 | - | 9 | 9 | 12 | 15 | 21 |  |
| 250 | 2,3 | - | 5 | 5 | 6 | 8 | 11 |  |
| 400 | 4,1 | - | 2 | 2 | 3 | 4 | 11 |  |
| 700 | 6,8 | - | 1 | 1 | 2 | 2 | 6 |  |
| 1000 | 9,9 | - | 1 | 1 | 1 | 1 | 3 | 2 |

High press hydrargyrum lamps with parallel compensation

| 50 | 0,3 | 10 | 40 | 40 | 50 | 63 | 86 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 80 | 0,45 | 10 | 26 | 26 | 33 | 42 | 57 |
| 125 | 0,67 | 10 | 17 | 17 | 22 | 28 | 38 |
| 250 | 1,3 | 18 | 9 | 9 | 11 | 14 | 20 |
| 400 | 2,3 | 25 | - | - | 6 | 8 | 11 |
| 700 | 3,8 | 40 | - | - | - | 5 | 20 |
| 1000 | 5,5 | 60 | - | - | - | 3 | 11 |

Thermal Overload Relays

Motor Protection Relays Series LA, U12/16E...K3


Thermal Overload Relays LST, Size 0


Thermal Overload Relays LST, Size 3


Thermal Overload Relays LST, Size 00


Thermal Overload Relays LST, Size 2


Thermal Overload Relays Series CUBICO


## Thermal Overload Relays

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Motor Protection Relays Series LA

Motor Protection Relays U 12/16E...K3 with Manual Reset for Contactors K(G)3-10 to K(G)3-22


- Schrack-Info
- For direct mounting onto contactors $K(G) 3-10$ up to $K(G) 3-22$
- Rated currents for direct starter of 0.12 A up to 30 A
- Rated currents for YD starter of 7A up to 52A
- Adjustment of relay: rated current of motor $\ln \times 0.58$
- Auxiliary contacts 1 NC and $1 \mathrm{NO}(95 / 96,97 / 98)$
- Reset by hand

Dimensions


Circuit and Connection Diagram


- Motor Protection Relays U12/16E...K3 with Manual Reset for Contactors K(G)3-10 to K(G)3-22

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 0.12-0.18A U 12/16E...K3 Manual-Reset | U12/16 K3 | - +000 | LA300100K3 |
| 0.18-0.27A U12/16E...K3 Manual-Reset | U12/16 K3 |  | LA300101 K3 |
| 0.27-0.4A U 12/16E...K3 Manual-Reset | U12/16 K3 | - +00000 | LA300102K3 |
| 0.4-0.6A U12/16E...K3 Manual-Reset | U12/16 K3 | $+\infty=-\infty$ | LA300103K3 |
| 0.6-0.9A U12/16E...K3 Manual-Reset | U12/16 K3 | - $-\cdots 0$ | LA300104K3 |
| 0.8-1.2A U12/16E...K3 Manual-Reset | U12/16 K3 |  | LA300105K3 |
| 1.2-1.8A U 12/16E...K3 Manual-Reset | U12/16 K3 | $+\infty=0$ | LA300106K3 |
| 1.8-2.7A U12/16E...K3 Manual-Reset | U12/16 K3 |  | LA300107K3 |
| 2.7-4A U12/16E...K3 Manual-Reset | U12/16 K3 | $\begin{array}{lll} \hline-\infty 0 & 0 \\ \hline \end{array}$ | LA300108K3 |
| 4-6A U12/16E...K3 Manual-Reset | U12/16 K3 | $+\infty=0$ | LA300109K3 |
| 6-9A U12/16E...K3 Manual-Reset | U12/16 K3 | $+500-6$ | LA300110K3 |
| 8-11A U12/16E...K3 Manual-Reset | U12/16 K3 | $+\infty$ | LA300111K3 |
| 10-14A U12/16E...K3 Manual-Reset | U12/16 K3 |  | LA300112K3 |
| 13-18A U12/16E....K3 Manual-Reset | U12/16 K3 | $+00 \div-6$ | LA300113K3 |
| 17-23A U12/16E...K3 Manual-Reset | U12/16 K3 | $+\infty=0$ | LA300114K3 |
| 22-30A U 12/16E...K3 Manual-Reset | U12/16 K3 | -000-9, | LA300126K3 |

## Thermal Overload Relays Series ALEA LST

## Thermal Overload Relays LST, Size 00



- Schrack-Info
- Thermal overload relais with phase failure monitoring for direct mounting onto contactors of size 00
- Seperate mouting can be realised by "stand alone holder" LSZDTEO1
- Devices are equipped with potential-free auxiliary contact $1 \mathrm{NO}+1 \mathrm{NC}$, manual- and automaticRESET, display of operating state, TEST-function, STOP-button and rated current adjusting knob with sealable cover. The terminals of contactors auxiliary contact $14 / 22$ as well as contactors terminal (coil) A2 are connected through the device

Dimensions


1) For mounting on TH35-7,5 standard mounting rail according to EN 60715

Circuit and Connection Diagram - LSTD


- Thermal Overload Relays LST, Size 00

Circuit and Connection Diagram - LSTD with LSZDTEO1


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Thermal Overload Relay 0.11-0.16A size 00 | LSTD |  | LSTD0016 |
| Thermal Overload Relay 0.14-0.2A size 00 | LSTD |  | LSTD0020 |
| Thermal Overload Relay 0.18-0.25A size 00 | LSTD |  | LSTD0025 |
| Thermal Overload Relay 0.22-0.32A size 00 | LSTD |  | LSTD0032 |
| Thermal Overload Relay 0.28-0.40A size 00 | LSTD | $\begin{array}{lll} \hline-\infty & \infty & 0 \\ \hline \end{array}$ | LSTD0040 |
| Thermal Overload Relay 0.35-0.50A size 00 | LSTD | -000-0, | LSTD0050 |
| Thermal Overload Relay 0.45-0.63A size 00 | LSTD |  | LSTD0063 |
| Thermal Overload Relay 0.55-0.80A size 00 | LSTD |  | LSTD0080 |
| Thermal Overload Relay 0.70-1,00A size 00 | LSTD | -000-n | LSTD0100 |
| Thermal Overload Relay $0.9-1,25 \mathrm{~A}$ size 00 | LSTD | $+\infty 000$ | LSTD0125 |
| Thermal Overload Relay 1.1-1.6A size 00 | LSTD | -000-n | LSTD0160 |
| Thermal Overload Relay 1.4-2.00 A size 00 | LSTD |  | LSTD0200 |
| Thermal Overload Relay 1.8-2.5A size 00 | LSTD | $+\infty=\infty$ | LSTD0250 |
| Thermal Overload Relay 2.2-3.2A size 00 | LSTD | - -0000 | LSTD0320 |
| Thermal Overload Relay 2.8-4.00 A size 00 | LSTD | $-\infty 0-n$ | LSTD0400 |
| Thermal Overload Relay 3.5-5.00 A size 00 | LSTD | $+\infty=-\infty$ | LSTD0500 |
| Thermal Overload Relay 4.5-6.3A size 00 | LSTD | $+50<\pi$ | LSTD0630 |
| Thermal Overload Relay 5.5-8.00 A size 00 | LSTD | $+000-6$ | LSTD0800 |
| Thermal Overload Relay 7.00-10.00 A size 00 | LSTD |  | LSTD1000 |
| Thermal Overload Relay 9.00-12.00 A size 00 | LSTD |  | LSTD 1200 |

## Thermal Overload Relays Series ALEA LST

Thermal Overload Relays LST, Size 0


- Schrack-Info
- Thermal overload relais with phase failure monitoring for direct mounting onto contactors of size 0
- Seperate mouting can be realised by "stand alone holder" LSZOTEO1
- Devices are equipped with potential-free auxiliary contact $1 \mathrm{NO}+1 \mathrm{NC}$, manual- and automaticRESET, display of operating state, TEST-function, STOP-button and rated current adjusting knob with sealable cover.

Dimensions

with terminal bracket for stand-alone installation

1) For mounting on TH35-7,5 standard mounting rail according to EN 60715

Circuit and Connection Diagram - LST2 with LST2TEO1


Thermal Overload Relays LST, Size 0

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Thermal Overload Relay 1.8-2.5A size 0 | LSTO | - + - - - | LST00250 |
| Thermal Overload Relay 2.2-3.2A size 0 | LSTO | -00000] | LST00320 |
| Thermal Overload Relay 2.8-4.0A size 0 | LSTO | -500-6) | LST00400 |
| Thermal Overload Relay 3.5-5.00 A size 0 | LSTO | [-0000] | LST00500 |
| Thermal Overload Relay 4.5-6.3 A size 0 | LSTO | $+50 \cdots 6$ | LST00630 |
| Thermal Overload Relay 5.5-8.00 A size 0 | LSTO | -000-9, | LST00800 |
| Thermal Overload Relay 7.00-10.00A size 0 | LSTO | $+\infty=0$ | LST01000 |
| Thermal Overload Relay 9-12.5A size 0 | LSTO | - $-\cdots$ | LST01250 |
| Thermal Overload Relay 11-16A size 0 | LSTO | $+\infty=\infty$ | LST01600 |
| Thermal Overload Relay 14-20A size 0 | LSTO | $+\infty 00$ | LST02000 |
| Thermal Overload Relay 17-22A size 0 | LSTO | $+50=0$ | LST02200 |
| Thermal Overload Relay 20-25A size 0 | LSTO | $+\infty=0$ | LST02500 |

## Thermal Overload Relays Series ALEA LST

## - Thermal Overload Relays LST, Size 2



Dimensions

with terminal bracket for stand-alone installation

1) For mounting on TH35-15 or TH75 standard mounting rail acc. to EN 60715

Circuit and Connection Diagram - LST2 with LST2TE01


| DESCRIPTION | TYPE NO. AVAILABLE |  |
| :--- | :--- | :--- |
| Thermal Overload Relay 5.5-8A size 2 | ORDER NO. |  |
| Thermal Overload Relay 7-10A size 2 | LST2 | LST2 |
| Thermal Overload Relay 11-16A size 2 | LST2 | LST2 |
| Thermal Overload Relay 14-20A size 2 | LST2 | LST2 |
| Thermal Overload Relay 18-25A size 2 | LST2 | LST2 |
| Thermal Overload Relay 22-32A size 2 | LST21000 |  |
| Thermal Overload Relay 28-40A size 2 | LST21600 |  |
| Thermal Overload Relay 36-45A size 2 |  |  |
| Thermal Overload Relay 40-50A size 2 |  |  |

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Thermal Overload Relays LST, Size 3

$\square$ Schrack-Info

- Thermal overload relais with phase failure monitoring for direct mounting onto contactors of size 3
- Seperate mouting can be realised by "stand alone holder" LSZ3TEO1
- Devices are equipped with potential-free auxiliary contact $1 \mathrm{NO}+1 \mathrm{NC}$, manual- and automaticRESET, display of operating state, TEST-function, STOP-button and rated current adjusting knob with sealable cover.

Dimensions

with terminal bracket for stand-alone installation

1) For mounting on TH35-7,5 standard mounting rail according to EN 60715.

Circuit and Connection Diagram - LST3 with LST3TEO1


| DESCRIPTION | TYPE NO. AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |
| Thermal Overload Relay 18-25A size 3 | LST3 | LST3 |
| Thermal Overload Relay 28-40A size 3 | LST3 | LST3 |
| Thermal Overload Relay 36-50A size 3 | LST3 | LST3 |
| Thermal Overload Relay 45-63A size 3 | LST3 | LST3400 |
| Thermal Overload Relay 57-75A size 3 | LST35000 |  |
| Thermal Overload Relay 70-90A size 3 |  |  |
| Thermal Overload Relay 80-100A size 3 |  |  |

## Thermal Overload Relays Series ALEA LST

- Holder for Stand-alone Installation of Thermal Overload Relays, Size 00 / 0 / 2 / 3


Schrack-Info

- For seperate mouting of Thermal overload relais LST to DIN-rail TS35 or TH35
- Stand alone holder size 3 (LSZ3TEO1) also can be mounted to DIN-rail TS75 or TH75

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Holder for LSTD size 00 | LSZD | -700\% | LSZDTE01 |
| Holder for LST Thermal overload relay, size 00 | LSZO | [-000-9, | LSZOTE01 |
| Holder for LST Thermal overload relay, size 2 | LSZ2 |  | LSZ2TE01 |
| Holder for LST Thermal overload relay, size 3 | LSZ3 |  | LSZ3TE01 |

## Thermal Overload Relays Series CUBICO Mini



## - Schrack-Info

- Matching on contactor series CUBICO Mini
- Plug-in type
- Included auxiliary contacts
- Phase failure protection
- Manual and automatic reset
- Temperature compensation
- Tripping indicator
- Test- and Stop-button

Dimensions
LZTM


## Connection Diagram



## Circuit Diagram



## Thermal Overload Relays Series CUBICO

Thermal Overload Relays Series CUBICO Mini

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| Bimetal-version |  |  |
| 0,1-0,16A |  | LZTM0016 |
| 0,16-0,25A |  | LZTM0025 |
| 0,25-0,40A |  | LZTM0040 |
| 0,4-0,63A | - -1000 | LZTM0063 |
| 0,63-1A | -00 $0-0$ <br> 00 0 | LZTM0100 |
| 1-1,6A | -000-0, | LZTM0160 |
| 1,6-2,5A | - -1000 | LZTM0250 |
| 2,5-4A | -000-n | LZTM0400 |
| 4-6A |  | LZTM0600 |
| 5,5-8A | [-600-9, | LZTM0800 |
| 7-10A | -000-0.9 | LZTM1000 |
| 9-13A | 00000 | LZTM1300 |

## Thermal Overload Relays Series CUBICO Classic



## - Schrack-Info

- Matching on contactor series CUBICO Classic
- Plug-in type
- Included auxiliary contacts
- Phase failure protection
- Manual and automatic reset
- Temperature compensation
- Tripping indicator
- Test- and Stop-button

Dimensions


Connection
Diagramm


Circuit Diagram


## Thermal Overload Relays Series CUBICO

Thermal Overload Relays Series CUBICO Classic

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: |
| Bimetal-version |  |  |
| 0,16A-0,25A |  | LZTC0025 |
| 0,25-0,4A |  | LZTC0040 |
| 0,4-0,63A |  | LZTC0063 |
| 0,63-1A |  | LZTC0100 |
| 1-1,6A |  | LZTC0160 |
| 1,6-2,5A | - -2000 | LZTC0250 |
| 2,5-4A | [-000] | LZTC0400 |
| 4-6A |  | LZTC0600 |
| 5,5-8A | -000-9, | LZTC0800 |
| 7-10A |  | LZTC1000 |
| 9-13A |  | LZTC1300 |
| 12-18A | -500-6) | LZTC1800 |
| 16-24A | - -2000 | LZTC2400 |
| 23-32A | - -6000 | LZTC3200 |
| 30-38A | -000-9, | LZTC3800 |

## - Motor Protection Relays

Relays with Standard Tripping Characteristic

| Tripping time depending on the multiple of the current setting from cold condition (tolerance $\pm 20 \%$ of the tripping time) |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Setting Range A |  | $\begin{gathered} I_{A} / I_{N} \\ 3 \end{gathered}$ | $\begin{gathered} I_{A} / I_{N} \\ 4 \end{gathered}$ | $\begin{gathered} I_{A} / I_{N} \\ 5 \end{gathered}$ | $\begin{gathered} I_{A} / I_{N} \\ 6 \end{gathered}$ | $\begin{gathered} \mathrm{I}_{\mathrm{A}} / \mathrm{I}_{\mathrm{N}} \\ \mathbf{7 , 2} \end{gathered}$ | $\begin{gathered} I_{A} / I_{N} \\ 8 \end{gathered}$ |
| U12/16E |  | s | 5 | s | s | 5 | 5 |
| 0.12 | 0.18 | 18.5 | 10.4 | 7.2 | 5.5 | 4.3 | 3.6 |
| 0.18 | - 0.27 | 16,7 | 9,8 | 6,5 | 5 | 4,1 | 3,5 |
| 0.27 | 0.4 | 19,4 | 12,1 | 8,2 | 5,9 | 4,9 | 4,2 |
| 0.4 | 0.6 | 18,7 | 11,2 | 8 | 6 | 4,9 | 4,1 |
| 0.6 | 0.9 | 19,7 | 11,6 | 8,1 | 6,1 | 4,9 | 4,2 |
| 0,8 | 1,2 | 22,9 | 13,6 | 10 | 7,3 | 6 | 5,2 |
| 1,2 | - 1,8 | 22,2 | 13,2 | 9,2 | 7,6 | 5,8 | 5,3 |
| 1,8 | 2,7 | 23 | 13,7 | 9,3 | 7,6 | 5,7 | 5,1 |
| 2,7 | 4 | 24 | 14,4 | 9,9 | 7,8 | 5,9 | 5,1 |
| 4 | 6 | 24,7 | 13,8 | 9,9 | 7,3 | 5,6 | 4,8 |
| 6 | 9 | 22 | 13,4 | 8 | 5,7 | 4,1 | 3,5 |
| 8 | 11 | 17,4 | 9,2 | 5,9 | 4,1 | 2,9 | 2,3 |
| 10 | 14 | 26,4 | 12,9 | 7,6 | 5,2 | 3,5 | 2,8 |
| 13 | 18 | 14,7 | 7,7 | 4,8 | 3,2 | 2,3 | 1,7 |
| 17 | 23 | 16,2 | 8,4 | 5 | 3,6 | 2,4 | 1,8 |
| 22 | 30 | 16,8 | 8,5 | 5 | 3,6 | 2,3 | 1,9 |
| U3/32 |  | s | s | 5 | s | s | s |
| 0.12 | 0.18 | 16,1 | 9,6 | 6,8 | 5,3 | 4,2 | 3,7 |
| 0.18 | - 0.27 | 16,6 | 9,7 | 6,7 | 5,2 | 4,1 | 3,6 |
| 0.27 | 0.4 | 19,4 | 11,4 | 7,9 | 6,1 | 4,7 | 4,2 |
| 0.4 | 0.6 | 18,7 | 10,9 | 7,6 | 5,9 | 4,6 | 4 |
| 0.6 | 0.9 | 19,2 | 11,2 | 7,7 | 5,9 | 4,6 | 4,1 |
| 0,8 | 1,2 | 20,8 | 12,3 | 8,5 | 6,6 | 5,2 | 4,6 |
| 1,2 | - 1,8 | 25,5 | 14,1 | 9,8 | 7,6 | 5,9 | 5,2 |
| 1,8 | - 2,7 | 26,6 | 15,6 | 10,9 | 8,3 | 6,5 | 5,7 |
| 2,7 | 4 | 22,7 | 13,6 | 9,5 | 7,4 | 5,8 | 5,1 |
| 4 | 6 | 22,2 | 13,3 | 9,3 | 7,1 | 5,6 | 4,9 |
| 6 | 9 | 20,4 | 11,9 | 8,2 | 6,1 | 4,7 | 4 |
| 8 | 11 | 20,9 | 11,8 | 7,9 | 5,7 | 4,3 | 3,5 |
| 10 | 14 | 21,3 | 11,7 | 7,4 | 5,1 | 3,7 | 3 |
| 13 | 18 | 21,2 | 12,1 | 8 | 6,2 | 4,6 | 4,1 |
| 17 | - 24 | 20,4 | 12 | 8,6 | 6,3 | 4,5 | 3,7 |
| 23 | - 32 | 20,2 | 10,2 | 6,7 | 4,7 | 3,4 | 2,8 |
| U3/42 |  | 5 | 5 | 5 | s | 5 | s |
| 10 | 14 | 21,8 | 11,4 | 7 | 5 | 3,7 | 2,8 |
| 14 | 20 | 22,4 | 11,2 | 6,7 | 4,5 | 3,2 | 2,4 |
| 20 | - 28 | 21,8 | 10,8 | 6,5 | 4,5 | 3,3 | 2,5 |
| 28 | 42 | 25,2 | 13,3 | 8 | 5,5 | 4 | 3,1 |
| U3/74 |  | s | s | 5 | 5 | 5 | 5 |
| 20 | - 28 | 21,8 | 10,8 | 6,5 | 4,5 | 3,3 | 2,5 |
| 28 | - 42 | 25,2 | 13,3 | 8 | 5,5 | 4 | 3,1 |
| 40 | 52 | 18,3 | 9,2 | 5,6 | 3,9 | 2,8 | 2,2 |
| 52 | 65 | 17,8 | 8,7 | 5,2 | 3,4 | 2,5 | 1,9 |
| U85 | - | 5 | s | s | s | s | 5 |
| 60 | - 90 | 19,5 | 13,5 | 11 | 10 | 9,5 | 8,5 |
| 80 | 120 | 18 | 11 | 10 | 9 | 8,5 | 8 |

## Technical Specification - Motor Protection Relays Series LA

## - Motor Protection Relays

■ Fuses for U3/32, U3/42, U3/74, U12/16E, U85, U180, U320 and U800

| Type | Setting Range |  |  |  |  |  | Max. Fuse Size According to Coordination-type"(1" "ו" |  |  |  | Fuse UL | SCCR |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | direct |  |  |  | Y $\Delta$ |  | quick | slow, gL ( gG ) | slow, gL ( gG ) | aM |  |  |
|  | A |  |  | A |  |  | $\frac{\mathbf{A}}{0,5^{21}}$ | A | A | A | A | kA |
| $\begin{aligned} & \hline 12 / 16 E \\ & U 3 / 32 \end{aligned}$ | 0,12 - 0,18 |  |  | A |  |  |  | 0,5 ${ }^{21}$ | 25 | - | 15 |  |
|  | 0,18 | - | 0,27 |  | - |  | 1,0 ${ }^{21}$ | 1,0 ${ }^{21}$ | 25 | - | 15 | 5 |
|  | 0,27 | - | 0,4 |  | - |  | 2 | 2 | 25 | - | 15 | 5 |
|  | 0,4 | - | 0,6 |  | - |  | 2 | 2 | 25 | - | 15 | 5 |
|  | 0,6 | - | 0,9 |  | - |  | 4 | 4 | 25 | - | 15 | 5 |
|  | 0,8 | - | 1,2 |  | - |  | 4 | 4 | 25 | 2 | 15 | 5 |
|  | 1,2 | - | 1,8 |  | - |  | 6 | 6 | 25 | 2 | 15 | 5 |
|  | 1,8 | - | 2,7 |  | - |  | 10 | 10 | 25 | 4 | 15 | 5 |
|  | 2,7 | - | 4 |  | - |  | 16 | 10 | 25 | 4 | 15 | 5 |
|  | 4 | - | 6 | 7 | - | 10,5 | 20 | 16 | 25 | 6 | 15 | 5 |
|  | 6 | - | 9 | 10,5 | - | 15,5 | 35 | 25 | 35 | 10 | 25 | 5 |
|  | 8 | - | 11 | 14 | - | 19 | 35 | 25 | 35 | 16 | 30 | 5 |
|  | 10 | - | 14 | 18 | - | 24 | 50 | 35 | 63 | 16 | 40 | 5 |
|  | 13 | - | 18 | 23 | - | 31 | 50 | 35 | 63 | 20 | 50 | 5 |
|  | 17 | - | (23)24 | 30 | - | (40)41 | 63 | 50 | 63 | 25 | 60 | 5 |
|  | (22)23 | - | (30)32 | (38)40 | - | (52)55 | 80 | 63 | 80 | 35 | 70 | 5 |
| U3/42 | 10 | - | 14 | 18 | - | 24 | 50 | 35 | 80 | 16 | 40 | 5 |
|  | 14 | - |  | 24 | - |  | 63 | 50 | 80 | 25 | 60 | 5 |
|  | 20 | - | 28 | 35 | - | 48 | 80 | 63 | 80 | 35 | 80 | 5 |
|  | 28 | - | 42 | 48 | - | 73 | 100 | 80 | 150 | 50 | 110 | 5 |
| U3/74 | 20 | - | 28 | 35 | - | 48 | 100 | 80 | 150 | 35 | 80 | 5 |
|  | 28 | - | 42 | 48 | - | 73 | 125 | 100 | 150 | 50 | 110 | 5 |
|  | 40 | - | 52 | 70 | - | 90 | 160 | 100 | 150 | 63 | 200 | 5 |
|  | 52 | - | 65 | 90 | - | 112 | 160 | 125 | 150 | 80 | 250 | 10 |
|  | 60 | - | 74 | 104 | - | 128 | 160 | 125 | 150 | 80 | 250 | 10 |
| U85 | 60 | - | 90 | 104 | - | 156 |  |  |  |  | 300 | 10 |
|  | 80 | - | 120 | 140 |  |  |  |  |  |  | - | 10 |
|  | all ranges all ranges |  |  |  |  |  | For short circuit protecting overload relays with current transformer use fuse according to the contactor of the combination. |  |  |  | - | - |
|  |  |  |  |  |  |  | - | - |  |  |

1) Coordination-type according to IEC 947-4-1:
" 1 " Welding of contactor and damage of the thermal overload relay allowed.
"2" Light contact welding accepted. Thermal overload relay must not be damaged.
2) Miniature fuse

## Terminal Screws



## - Motor Protection Relays

Data according to IEC 947-4-1, IEC 947-5-1, VDE 0660, EN 60947-4-1, EN 60947-5-1

| Type | U12/16 ${ }^{4)}$ | U3/32 | U3/42 | U3/74 | U85 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}{ }^{11} \quad \mathrm{~V} \sim$ | 690 | 690 | 690 | 690 | 750 |
| Permissible ambient temperature <br> operation <br> open <br> ${ }^{\circ} \mathrm{C}$ <br> storage |  |  |  |  |  |
| Trip class | 10A | 10A | 10A | 20A | 10A |
| Cable cross-section <br> Main connector <br> solid or stranded $\mathrm{mm}^{2}$ <br> flexible $\mathrm{mm}^{2}$ <br> flexible with multicore cable end $\mathrm{mm}^{2}$ | $\begin{gathered} 0.75-6+0.75-2.5^{21} \\ 0.75-4+0.5-2.5^{21} \\ 0.5-2.5+0.5-1.5 \end{gathered}$ | $\begin{gathered} 0.75-6 \\ 1-4 \\ 0.75-4 \end{gathered}$ | $\begin{gathered} 0.75-10 \\ 0.75-6 \\ 0.75-6 \end{gathered}$ | $\begin{gathered} 4-35^{2)} \\ 6-25^{2 \prime} \\ 4-25 \end{gathered}$ | 3) |
| Cables per clamp number | 1+1 | 2 | 2 | 1 |  |
| Auxiliary connector <br> solid or stranded $\mathrm{mm}^{2}$ flexible $\mathrm{mm}^{2}$ flexible with multicore cable end $\mathrm{mm}^{2}$ | $\begin{gathered} 0.75-2.5^{2 l} \\ 0.5-2.5^{2 I} \\ 0.5-1.5 \end{gathered}$ |  |  |  |  |
| Cables per clamp number | 2 |  |  |  |  |


| Type |  | U3/32 | U12/16E | $\begin{aligned} & \text { U3/42 } \\ & \text { U3/74 } \end{aligned}$ | U85 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Auxiliary contacts |  |  |  |  |  |  |  |  |  |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}{ }^{1 /}$ |  |  |  |  |  |  |  |  |  |
| same potential | V | 690 | 690 | 690 | 690 |  |  |  |  |
| different potential | V | 440 | 440 | 250 | 440 |  |  |  |  |
| Utilization category AC15 |  |  |  |  |  |  |  |  |  |
| Rated operational 24 V | A | 3 | 5 | 4 | 5 |  |  |  |  |
| current $\mathrm{I}_{\text {e }}$ 230V | A | 2 | 3 | 2,5 | 3 |  |  |  |  |
| 400 V | A | 1 | 2 | 1,5 | 2 |  |  |  |  |
| 690 V | A | 0,5 | 0,6 | 0,6 | 0,6 |  |  |  |  |
| Utilization category DC13 |  |  |  |  |  |  |  |  |  |
| Rated operational 24 V | A | 1 | 1,2 | 1,2 | 1,2 |  |  |  |  |
| current $\mathrm{I}_{\text {e }} \quad 110 \mathrm{~V}$ | A | 0,15 | 0,15 | 0,15 | 0,15 |  |  |  |  |
| 220 V | A | 0,1 | 0,1 |  |  |  |  |  |  |
| Short circuit prot. (without welding 1kA) |  |  |  |  |  |  |  |  |  |
| highest fuse rating $\mathrm{gL}(\mathrm{gG})$ | A | 4 | 6 | 6 | 6 |  |  |  |  |
| Type |  | U12/16 | U12/16E ${ }^{4 /}$ | U3/32 | U3/42 | U3/42 | U3/74 | U3/74 | U85 |
| Setting range |  | to 23A | 22-30A | all | to 28A | 28-42A | to 52A | 52-65A | all |
| Power loss per current path (max.) |  |  |  |  |  |  |  |  |  |
| minimum setting value | W | 1,1 | 1,7 | 1,1 | 1,3 | 1,3 | 2 | 2.9 | 1.1 |
| maximum setting value | W | 2,3 | 3,7 | 2,3 | 2,6 | 3,3 | 3,7 | 4.5 | 2.5 |

## Temperature Compensation

In case of higher ambient temperature use the following formula:
(Ambient temperature - 20) $\times 0,125=$ correction factor in $\%$ of the full load motor current
Example: Ambient temperature $70^{\circ} \mathrm{C}$, full load motor current 7A
( $70-20$ ) $\times 0,125=6,25 \%$
Setting value: $7 \mathrm{~A}+6,25 \%=7,44 \mathrm{~A}$

1) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): $\mathrm{U}_{\mathrm{imp}}=4 \mathrm{kV}$ (at 440V), 6 kV (at 690V)

Data for other conditions on request.
2) Maximum cable cross-section with prepared conductor
3) Without terminals, suitable for bushing one connector $70 \mathrm{~mm}^{2}$ (stranded) per phase
4) U12/16E... 30A: Cable cross-section for main connector like type U3/42, one connector only

Technical Specification - Motor Protection Relays Series LA

## Tripping Characteristics

Tripping Curves for U12/16E, U3/32, U3/42 and U3/74
1)
a) $\min \mathrm{s}$

2)

b)

1) with three-phase load - Proceeding from service condition the times decrease to $20-30 \%$ of the characteristic values. 2) with two-pole load - Proceeding from service condition the times decrease to $70-80 \%$ of the characteristic values. a) Tripping time (Average value of typical tolerance curves from cold condition)
b) F. L. C. multiplication factor

## Tripping Curves for U85



[^31]
## General Information

| Overload relays | Current measurement | Current range | Contactors (type, size, rating in kW) |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | $\begin{gathered} \text { LSSD+LSDD/S00 } \\ 3 / 4 / 5.5 \\ \hline \end{gathered}$ | $\begin{gathered} \text { LSSO+LSDO/SO } \\ 5.5 / 7.5 / 11 \end{gathered}$ | $\begin{gathered} \text { LSD2/S2 } \\ \text { 15/18.5/22 } \end{gathered}$ | $\begin{gathered} \text { LSD3/S3 } \\ 30 / 37 / 45 \end{gathered}$ |
| LSTD | integrated | 0.11 ... 12 | yes | -- | -- | -- |
| LSTO | integrated | 1.8 ... 25 | -- | yes | -- | -- |
| LST2 | integrated | 5.5 ... 50 | -- | -- | yes | -- |
| LST3 | integrated | 18 ... 100 | -- | -- | -- | yes |

## General Data



1) Connection for mounting onto contactors: Optimally adapted in electrical, mechanical and design terms to the contactors and soft starters, these connecting pins can be used for direct mounting of the overload relays. Standalone installation is possible as an alternative (in some cases in conjunction with a stand-alone installation module). 2) Selector switch for manual/automatic RESET and RESET button: With this switch you can choose between manual and automatic RESET. A device set to manual RESET can be reset locally by pressing the RESET button. A remote RESET is possible using the RESET modules (accessories), which are independent of size (on request). 3) Switch position indicator and TEST function of the wiring: Indicates a trip and enables the wiring test. 4) Motor current setting: Setting the device to the rated motor current is easy with the large rotary knob. 5) STOP button: If the STOP button is pressed, the NC contact is opened. This switches off the contactor downstream. The NC contact is closed again when the button is released.
2) Transparent, sealable cover Secures the motor current setting, TEST function and the selector switch for manual/ automatic RESET against adjustment.
3) Supply terminals: The generously sized terminals permit connection of two conductors with different cross-sections for the main and auxiliary circuits. The auxiliary circuit can be connected with screw terminals and alternatively with spring-loaded terminals (on request).

Connection of the auxiliary circuit

| Connection type |  | Screw terminals |
| :---: | :---: | :---: |
| - Terminal screw |  | Pozidriv size 2 |
| - Tightening torque |  | Nm 0.8 ... 1.2 |
| - Conductor cross-sections (min./max.), 1 or 2 conductors |  |  |
| - solid | $\mathrm{mm}^{2}$ | $1 \times(0.5 \ldots 4), 2 \times(0.5 \ldots 2.5)$ |
| - finely stranded without end sleeve | $\mathrm{mm}^{2}$ | - |
| - finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $1 \times(0.5 \ldots 2.5), 2 \times(0.5 \ldots 1.5)$ |
| - stranded | $\mathrm{mm}^{2}$ | - |
| - AWG cables, solid or stranded | AWG | $2 \times(20 \ldots 14)$ |
| Connection type |  | Spring-loaded terminals on request |
| - Conductor cross-sections (min./max.), 1 or 2 conductors |  |  |
| - solid | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 1.5)$ |
| - finely stranded without end sleeve | $\mathrm{mm}^{2}$ | -- |
| - finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 1.5)$ |
| - stranded | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 1.5)$ |
| - AWG cables, solid or stranded | AWG | $2 \times(24 \ldots 16)$ |

## Technical Specifications - Thermal Overload Relays Series ALEA LST

## General Information

## Schrack-Info

The LST thermal overload relays up to 100 A have been designed for inverse-time delayed protection of loads with normal starting against excessive temperature rises due to overload or phase failure. An overload or phase failure results in an increase of the motor current beyond the set rated motor current. Via heating elements, this current rise heats up the bimetal strips inside the device which then bend and as a result trigger the auxiliary contacts by means of a tripping mechanism. The auxiliary contacts then switch off the load by means of a contactor. The break time depends on the ratio between the tripping current and set current le and is stored in the form of a long-term stable tripping characteristic.
The tripped status is signalled by means of a switch position indicator. Resetting takes place either manually or auto matically after the recovery time has elapsed. The devices are manufactured in accordance with environmental guidelines and contain environmentally friendly and reusable materials.

## Mounting

The thermal overload relais LST are designed electrical and mechanical to contactors LSS/LSD. Therefore a direct mounting to contactor is standard.
Alternatively the LST can be mounted separate by using stand alone holder LSZ.TEOI

## Connection

The thermal overload relais LST are with screwed connection performed.
Overload relays in contactor assemblies for wye-delta starting
When overload relays are used in combination with contactor assemblies for wye-delta starting it must be noted that only 0.58 times the motor current flows through the line contactor. An overload relay mounted onto the line contactor must be set to 0.58 times the motor current.

## Operation with frequency converter

The LST thermal overload relays are suitable for operation with frequency converters. Depending on the frequency of the converter, a higher current than the motor current must be used in some cases due to eddy-currents and skin effects.

## Phase failure protection

The LST thermal overload relays are fitted with phase failure sensitivity in order to minimize temperature rises of the load in the case of a phase failure during single-phase operation.

## Setting

The LST thermal overload relays are set to the rated motor current by means of a rotary knob. The scale of the rotary knob is shown in ampere.

## Manual and automatic reset

Automatic and manual reset is selected by pressing and turning the blue button (RESET button). If the button is set to manual reset, the overload relay can be reset directly by pressing the RESET button. Resetting is possible in combination with mechanical and electrical reset options from the range of accessories. If the blue button is set to automatic RESET, the relay is reset automatically. The time between tripping and resetting is determined by the recovery time.
Recovery time
After tripping due to overload, the LST thermal overload relays require some time until the bimetal strips have cooled down. The device can only be reset after the bimetal strips have cooled down. This time (recovery time) depends on the tripping characteristics and strength of the tripping current. The recovery time allows the load to cool down after tripping due to overload.

## Test function

The TEST slide can be used to check whether the operational LST thermal overload relay is working properly. Actuating the slide simulates tripping of the relay. During this simulation the NC contact (95-96) is opened and the NO contact (97-98) is closed. This tests whether the auxiliary circuit has been correctly connected to the overload relay. If the LST thermal overload relay has been set to automatic RESET, the overload relay is automatically reset when the TEST slide is released. The relay must be reset with the RESET button if it has been set to manual RESET.

## Stop function

If the STOP button is pressed, the NC contact is opened. This switches off the contactor downstream and thus the load.
The load is switched on again when the STOP button is released.
Display of the operating state
The respective operating state of the LST thermal overload relay is displayed by means of the position of the marking on the TEST function/switch position indicator slide. After tripping due to overload or phase failure, the marking on the slide is to left on the "O" mark, otherwise it is on the "I" mark.
Auxiliary contacts
The LST thermal overload relays are fitted with an NO contact for the "tripped" signal, and an NC contact for disconnecting the contactor.

Thermal Overload Relays LSTD, LSTO, LST2, LST3Technical Specifications

2) Terminal compartment: degree of protection IPOO.
3) The LSTD thermal overload relay with Cage Clamp terminals can only be used as a stand-alone installation.

Technical Specifications - Thermal Overload Relays Series ALEA LST

| $\triangle$ Thermal Overload Relays LSTD, LSTO, LST2, LST3 |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\triangle$ Technical Specifications |  |  |  |  |  |
| Type |  | LSTD | LSTO | LST2 | LST3 |
| Size |  | 00 | 0 | 2 | 3 |
| Main circuit |  |  |  |  |  |
| Rated insulation voltage $\mathrm{U}_{\mathbf{i}}$ (degree of pollution 3) | V |  | 690 |  | 1000 |
| Rated impulse withstand voltage $\mathrm{U}_{\text {imp }}$ | kV |  | 6 |  | 8 |
| Rated operational voltage $\mathrm{U}_{\mathrm{e}}$ | V |  | 690 |  | 1000 |
| Type of current |  |  |  |  |  |
| Direct current |  | Yes <br> Yes, frequency range up to 400 Hz |  |  |  |
| - Alternating current |  |  |  |  |  |
| Set current | A | $\begin{gathered} 0.11 \ldots 0.16 \text { to } \\ 9 \ldots . .12 \end{gathered}$ | $\begin{gathered} \hline 1.8 \ldots 2.5 \text { to } \\ 20 \ldots 25 \end{gathered}$ | $\begin{gathered} 5.5 \ldots 8 \text { to } \\ 40 . . .50 \end{gathered}$ | $\begin{gathered} 18 \ldots . .25 \text { to } \\ 80 \text {... } 100 \end{gathered}$ |
| Power loss per unit (max.) | W | 3.9 ... 6.6 | 3.9 ... 6 | $6 . . .9$ | 10 ... 16.5 |
| Short-circuit protection |  |  |  |  |  |
| - With fuse without contactor |  |  |  |  |  |
| - With fuse and contactor |  | See "Technical specifications" (short-circuit protection with fuses/motor starter protectors for motor feeders) |  |  |  |
| Safe isolation between main and auxiliary conducting path acc. to IEC 60947-1 | V | 500 |  | 690 |  |
| Connection for main circuit |  |  |  |  |  |
| Connection type |  | Screw terminals with box terminal |  |  |  |
|  |  | Pozidriv size 2 |  |  | Allen screw 4mm |
| - Tightening torque | Nm | 0.8 ... 1.2 | 2 ... 2.5 | $3 . . .4 .5$ | 4 ... 6 |
| - Conductor cross-sections (min./max.), |  |  |  |  |  |
| 1 or 2 conductors |  |  |  |  |  |
| - solid | $\mathrm{mm}^{2}$ | $\begin{gathered} 2 \times(0.5 \ldots .1 .5)^{2)} \\ 2 \times(0.75 \ldots . .2 .5)^{2)} \\ \text { Max. } 2 \times(1 \ldots .4)^{2 l} \end{gathered}$ | $\begin{aligned} & 2 \times(1 \ldots 2.5)^{2)} \\ & 2 \times(2.5 \ldots 6)^{2)} \end{aligned}$ <br> Max. $2 \times\left(2.5 \ldots 10^{2)}\right)$ | $2 \times(0.75 \ldots 16)$ | $2 \times(2.5 \ldots 16)$ |
| - finely stranded with end sleeve | $\overline{m m}{ }^{2}$ | $\begin{gathered} 2 \times(0.5 \ldots 1.5)^{27} \\ 2 \times(0.75 \ldots \quad 2.5)^{21} \\ \hline \end{gathered}$ | $\begin{aligned} & 2 \times(1 \ldots 2.5)^{2} \\ & 2 \times(2.5 \ldots 6)^{2)} \end{aligned}$ | $\begin{aligned} & 2 \times(0.75 \ldots 16) \\ & 1 \times(0.75 \ldots 25) \end{aligned}$ | $\begin{aligned} & 2 \times(2.5 \ldots 35) \\ & 1 \times(2.5 \ldots 50) \\ & \hline \end{aligned}$ |
| - stranded | $\mathrm{mm}^{2}$ | $\begin{aligned} & 2 \times(0.5 \ldots \quad 1.5)^{2)} \\ & 2 \times(0.75 \ldots 2.5)^{2)} \\ & \text { Max. } 2 \times(1 \ldots 4)^{21} \end{aligned}$ | $\begin{gathered} 2 \times(1 \ldots 2.5)^{2)} \\ 2 \times(2.5 \ldots 6)^{21} \\ \text { Max. } 2 \times(2.5 \ldots 10)^{2)} \end{gathered}$ | $\begin{aligned} & 2 \times(0.75 \ldots 25) \\ & 1 \times(0.75 \ldots 35) \end{aligned}$ | $\begin{aligned} & 2 \times(10 \ldots 50) \\ & 1 \times(10 \ldots . .70) \end{aligned}$ |
| - AWG cables, solid or stranded | AWG | $2 \times(18 . . .14)$ | $2 \times(14 \ldots 10)$ | $\begin{aligned} & 2 \times(18 \ldots 3) \\ & 1 \times(18 \ldots 1) \\ & \hline \end{aligned}$ | $\begin{aligned} & 2 \times(10 \ldots 1 / 0) \\ & 1 \times(10 \ldots 2 / 0) \\ & \hline \end{aligned}$ |
| - ribbon cable conductors (number x width x thickness) mm |  | -- |  | $2 \times(6 \times 9 \times 0.8)$ | $2 \times(6 \times 9 \times 0.8)$ |
| Busbar connection |  | Busbar connection ${ }^{1 /}$ |  |  |  |
| - Terminal screw | Nm | -- |  |  | M6 $\times 20$ |
| - Tightening torque |  | -- |  |  | 4 ... 6 |
| - Conductor cross-sections (min./max.) |  |  |  |  |  |
| - finely stranded with cable lug | $\mathrm{mm}^{2}$ | -- |  |  | $2 \times 70$ |
| - stranded with cable lug | $\mathrm{mm}^{2}$ | -- |  |  | $3 \times 70$ |
| - AWG cables, solid or stranded, with cable lug | AWG | -- |  |  | 2/0 |
| - with connecting bar (max. width) | mm | -- |  |  | 12 |
| Connection type |  | Cage Clamp terminals (on request) |  |  |  |
| - Conductor cross-sections (min./max.) |  |  |  |  |  |
| - solid | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 2.5)$ |  | -- |  |
| - finely stranded without end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 2.5)$ |  | -- |  |
| - finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 1.5)$ |  | -- |  |
| - stranded | $\mathrm{mm}^{2}$ | -- |  | -- |  |
| - AWG cables, solid or stranded | AWG | $2 \times(24 \ldots 14)$ |  | -- |  |

1) The box terminal is removable. Rail and cable lug connections are possible if the box terminal is removed.
2) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

- Thermal Overload Relays LSTD, LSTO, LST2, LST3Technical Specifications

| Type Size |  | $\begin{gathered} \text { LSTD } \\ 00 \end{gathered}$ | $\begin{gathered} \text { LSTO } \\ 0 \end{gathered}$ | $\begin{gathered} \text { LST2 } \\ 2 \end{gathered}$ | $\begin{gathered} \text { LST3 } \\ 3 \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Auxiliary circuit |  |  |  |  |  |
| Number of NO contacts |  | 1 |  |  |  |
| Number of NC contacts |  | 1 |  |  |  |
| Auxiliary contacts - assignment |  | 1 NO for the signal "rripped", |  |  |  |
| Rated insulation voltage $\mathbf{U}_{\mathbf{i}}$ (degree of pollution 3) | V | 690 |  |  |  |
| Rated impulse withstand voltage $\mathrm{U}_{\text {imp }}$ | kV | 6 |  |  |  |
| Contact rating of the auxiliary contacts |  |  |  |  |  |
| - NC contact with alternating current AC-14/AC-15, rated operational current $I_{e}$ at $U_{e}$ : |  |  |  |  |  |
| - 24V | A | 4 |  |  |  |
| -120V | A | 4 |  |  |  |
| - 125V | A | 4 |  |  |  |
| - 230V | A | 3 |  |  |  |
| - 400V | A | 2 |  |  |  |
| - 600V | A | 0.6 |  |  |  |
| -690V | A | 0.5 |  |  |  |
| - NO contact with alternating current AC-14/AC-15, rated operational current $I_{e}$ at $U_{e}$ : |  |  |  |  |  |
|  |  |  |  |  |  |
| - 24V | A | 3 |  |  |  |
| - 120V | A | 3 |  |  |  |
| - 125V | A | 3 |  |  |  |
| - 230V | A | 2 |  |  |  |
| - 400 V | A | 1 |  |  |  |
| - 600V | A | 0.6 |  |  |  |
| -690V | A | 0.5 |  |  |  |
| - NC contact, NO contact with direct current DC-13, rated operational current $\mathrm{I}_{\mathrm{e}}$ at $\mathrm{U}_{\mathrm{e}}$ : |  |  |  |  |  |
|  |  |  |  |  |  |
| - 24V | A | 1 |  |  |  |
| -60V | A | 11 |  |  |  |
| - 110V | A | 0.22 |  |  |  |
| - 125V | A | 0.22 |  |  |  |
| - 220V | A | 0.11 |  |  |  |
| - Continuous thermal current Ith | A | $6^{21}$ |  |  |  |
| - Contact reliability (suitability for PLC control; 17V, 5 mA ) |  | Yes |  |  |  |
| Short-circuit protection |  |  |  |  |  |
| - With fuse |  |  |  |  |  |
| - gl/gG operational class | A | 6 |  |  |  |
| - Quick | A | 10 |  |  |  |
| - With miniature circuit breaker (C characteristic) | A | 6 |  |  |  |
| Safe isolation between main and auxiliary conducting path acc. to IEC 60947-1 | V | 415 |  |  |  |
| CSA, UL, UR rated data |  |  |  |  |  |
| Auxiliary circuit - switching capacity |  | B600, R300 |  |  |  |
| Connection of the auxiliary circuit |  |  |  |  |  |
| Connection type |  | Screw terminals |  |  |  |
| - Terminal screw |  | Pozidriv size 2 |  |  |  |
| - Tightening torque | Nm | 0.8 ... 1.2 |  |  |  |
| - Conductor cross-sections (min./max.), 1 or 2 conductors |  |  |  |  |  |
| - solid | mm ${ }^{2}$ | $\left.2 \times(0.5 \ldots 1.5)^{3}\right), 2 \times(0.75 \ldots 2.5)^{31}$ |  |  |  |
| - finely stranded without end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.5 \ldots . .1 .5), 2 \times(0.75 \ldots .2 .5)$ |  |  |  |
| - finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $\left.2 \times(0.5 \ldots 1.5)^{3}\right), 2 \times(0.75 \ldots 2.5)^{31}$ |  |  |  |
| - stranded | $\mathrm{mm}^{2}$ | $2 \times(0.5 \ldots 1.5)^{3}, 2 \times(0.75 \ldots 2.5)^{3}$ |  |  |  |
| - AWG cables, solid or stranded | AWG | $2 \times(18 \ldots 14)$ |  |  |  |
| Connection type |  | Cage Clamp terminals on request |  |  |  |
| - Conductor cross-sections (min./max.) |  |  |  |  |  |
| - solid |  | $2 \times(0.25 \ldots 2.5)$ |  |  |  |
| - finely stranded without end sleeve |  | $2 \times(0.25 \ldots 2.5)$ |  |  |  |
| - finely stranded with end sleeve |  | $2 \times(0.25 \ldots 1.5)$ |  |  |  |
| - stranded |  | $\begin{gather*} -- \\ \times(24 . . .14) \end{gather*}$ |  |  |  |
| - AWG cables, solid or stranded |  |  |  |  |  |

AW cables, solid or stranded

1) On request.
2) Up to $\mathrm{I}_{\mathrm{k}} \leq 0.5 \mathrm{kA} ; \leq 260 \mathrm{~V}$.
3)If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Technical Specifications - Thermal Overload Relays Series ALEA LST

Thermal Overload Relays LSTD and LSTO
With short-circuit currents up to 50 kA at $50 / 60 \mathrm{~Hz}$ 690VAC Permissible short-circuit protection fuse for motor starters comprising overload relay and contactor, type of coordination "2"11

| Overload relays | 3kW $\triangleq$ LSSD/LSDD07 |  |  | 4kW § LSSD/LSDD09 |  |  | $5.5 \mathrm{~kW} \triangleq$ LSSD/LSDD 12 |  |  | UL-listed fuses |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Setting range | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \max =7 \mathrm{~A} \\ \text { (at } \mathrm{AC} 50 \mathrm{~Hz} 400 \mathrm{~V} \text { ) } \end{gathered}$ |  |  | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \max =9 \mathrm{~A} \\ \text { (at } \mathrm{AC} 50 \mathrm{~Hz} 400 \mathrm{~V} \text { ) } \end{gathered}$ |  |  | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \max =12 \mathrm{~A} \\ \text { (at } \mathrm{AC} 50 \mathrm{~Hz} 400 \mathrm{~V} \text { ) } \end{gathered}$ |  |  | RK5 |
| A | $\mathrm{gL} / \mathrm{gG}$ | aM | BS 88 | $\mathrm{gL} / \mathrm{gG}$ | aM | BS 88 | $\mathrm{gl} / \mathrm{gG}$ | aM | BS 88 | A |
| Size 00 |  |  |  |  |  |  |  |  |  |  |
| $0.11 \ldots 0.16$ | 0.5 | - | - | 0.5 | - | - | 0.5 | - | - | 1 |
| 0.14 ... 0.2 | 1 | - | - | 1 | - | - | 1 | - | - | 1 |
| 0.18 ... 0.25 | 1 | - | - | 1 | - | - | 1 | - | - | 1 |
| 0.22 ... 0.32 | 1.6 | - | 2 | 1.6 | - | 2 | 1.6 | - | 2 | 1 |
| 0.28 ... 0.4 | 2 | - | 2 | 2 | - | 2 | 2 | - | 2 | 1.6 |
| 0.35 ... 0.5 | 2 | - | 2 | 2 | - | 2 | 2 | - | 2 | 2 |
| 0.45 ... 0.63 | 2 | - | 4 | 2 | - | 4 | 2 | - | 4 | 2.5 |
| $0.55 \ldots 0.8$ | 4 | - | 4 | 4 | - | 4 | 4 | - | 4 | 3 |
| 0.7 ... 1 | 4 | - | 6 | 4 | - | 6 | 4 | - | 6 | 4 |
| 0.9 ... 1.25 | 4 | - | 6 | 4 | - | 6 | 4 | - | 6 | 5 |
| 1.1 ... 1.6 | 6 | - | 10 | 6 | - | 10 | 6 | - | 10 | 6 |
| 1.4 ... 2 | 6 | - | 10 | 6 | - | 10 | 6 | - | 10 | 8 |
| 1.8 ... 2.5 | 10 | - | 10 | 10 | - | 10 | 10 | - | 10 | 10 |
| 2.2 ... 3.2 | 10 | - | 16 | 10 | - | 16 | 10 | - | 16 | 12 |
| 2.8 ... 4 | 16 | - | 16 | 16 | - | 16 | 16 | - | 16 | 16 |
| 3.5 ... 5 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 |
| 4.5 ... 6.3 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 25 |
| 5.5 ... 8 | 20 | 10 | 20 | 20 | 10 | 20 | 20 | 10 | 20 | 30 |
| 7 ... 10 | - | - | - | 20 | 16 | 20 | 20 | 16 | 20 | 40 |
| 9 ... 12 | - | - | - | - | - | - | 20 | 16 | 25 | 45 |


| Overload relays | $5.5 \mathrm{~kW} \triangleq$ LSSO/LSD012 |  |  | 7.5 kW $\triangleq$ LSSO/LSD017 |  |  | $5.5 \mathrm{~kW} \triangleq$ LSSO/LSD025 |  |  | UL-listed fuses |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Setting range | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \max =12 \mathrm{~A} \\ \text { (at } \mathrm{AC} 50 \mathrm{~Hz} 400 \mathrm{~V} \text { ) } \end{gathered}$ |  |  | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \max =17 \mathrm{~A} \\ \text { (at } \mathrm{AC} 50 \mathrm{~Hz} 400 \mathrm{~V} \text { ) } \end{gathered}$ |  |  | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \max =25 \mathrm{~A} \\ \text { (at } \mathrm{AC} 50 \mathrm{~Hz} 400 \mathrm{~V} \text { ) } \end{gathered}$ |  |  | RK5 |
| A | $\mathrm{gl} / \mathrm{gG}$ | aM | BS 88 | $\mathrm{gL} / \mathrm{gG}$ | aM | BS 88 | gl/gG | aM | BS 88 | A |
| Size 0 |  |  |  |  |  |  |  |  |  |  |
| 1.8 ... 2.5 | 10 | - | 10 | 10 | - | 10 | 10 | - | 10 | 10 |
| 2.2 ... 3.2 | 10 | - | 16 | 10 | - | 16 | 10 | - | 16 | 12 |
| 2.8 ... 4 | 16 | - | 16 | 16 | - | 16 | 16 | - | 16 | 16 |
| 3.5 ... 5 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 |
| 4.5 ... 6.3 | 20 | 6 | 25 | 20 | 6 | 25 | 20 | 6 | 25 | 25 |
| 5.5 ... 8 | 25 | 10 | 25/32 ${ }^{2 /}$ | 25 | 10 | 25/32 ${ }^{21}$ | 25 | 10 | 32 | 30 |
| 7 ... 10 | 25 | 16 | 25/32 ${ }^{21}$ | 25 | 16 | 25/32 ${ }^{21}$ | 32 | 16 | 35 | 40 |
| 9 ... 12.5 | 25 | 20 | 25/32 ${ }^{2 /}$ | 25 | 20 | 25/32 ${ }^{2 /}$ | 35 | 20 | 35 | 45 |
| $11 . . .16$ | 25 | 20 | 25/32 ${ }^{2 /}$ | 25 | 20 | 25/32 ${ }^{21}$ | 35 | 20 | 35 | 60 |
| $14 . . .20$ | - | - |  | 25 | 20 | 25/32 ${ }^{21}$ | 35 | 20 | 35 | 80 |
| $17 . . .22$ | - | - |  | - | - | - | 35 | 20 | 35 | 80 |
| $20 . . .25$ | - | - | - | - | - | - | 35 | 20 | 35 | 100 |

1) Assignment and short-circuit protective devices according to IEC60947-4-1:

The contactor or starter must not endanger persons or the installation in the event of a short-circuit.
Type of coordination 1: The contactor or the starter may be non-operational after every short-circuit release.
Type of coordination 2: The contactor or the starter must be operational after a short-circuit release (without replacement of parts).
Welding of the contacts is permissible however.
2) At max. 415 V

- Thermal Overload Relays LST2 and LST3

With short-circuit currents up to 50 kA at $50 / 60 \mathrm{~Hz}$ 690VAC Permissible short-circuit protection fuse for motor starters comprising overload relay and contactor, type of coordination "2"11

| Overload relays | $3 \mathrm{~kW} \triangleq$ LSD232 |  |  | 4 kW § LSD240 |  |  | $5.5 \mathrm{~kW} \triangleq$ LSD250 |  |  | UL-listed fuses |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Setting range | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \max =32 \mathrm{~A} \\ (\mathrm{at} 50 \mathrm{~Hz} 400 \mathrm{VAC}) \end{gathered}$ |  |  | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \max =40 \mathrm{~A} \\ \text { (at } 50 \mathrm{~Hz} 400 \mathrm{VAC} \text { ) } \end{gathered}$ |  |  | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \mathrm{max}=50 \mathrm{~A} \\ \text { (at } 50 \mathrm{~Hz} 400 \mathrm{VAC}) \end{gathered}$ |  |  | RK5 |
| A | $\mathrm{gl} / \mathrm{gG}$ | aM | BS 88 | $\mathrm{gl} / \mathrm{gG}$ | aM | BS 88 | $\mathrm{gl} / \mathrm{gG}$ | aM | BS 88 | A |
| Size 2 |  |  |  |  |  |  |  |  |  |  |
| 5.5 ... 8 | 25 | 10 | 25 | 25 | 10 | 25 | 25 | 10 | 25 | 30 |
| 7 ... 10 | 32 | 16 | 32 | 32 | 16 | 32 | 32 | 16 | 32 | 40 |
| 9 ... 12.5 | 35 | 16 | 35 | 35 | 16 | 35 | 35 | 16 | 35 | 50 |
| $11 . . .16$ | 40 | 20 | 40 | 40 | 20 | 40 | 40 | 20 | 40 | 60 |
| 14 ... 20 | 50 | 25 | 50 | 50 | 25 | 50 | 50 | 25 | 50 | 80 |
| $18 . . .25$ | 63 | 32 | 63 | 63 | 32 | 63 | 63 | 32 | 63 | 100 |
| $22 . . .32$ | 63 | 35 | 63 | 63 | 35 | 63 | 80 | 35 | 80 | 125 |
| $28 . . .40$ | 63 | 50 | 63 | 63 | 50 | 63 | 80 | 50 | 80 | 150 |
| $36 . . .45$ | -- | -- | -- | 63 | 50 | 80 | 80 | 50 | 80 | 175 |
| 40 ... 50 | -- | -- | -- | -- | -- | -- | 80 | 50 | 80 | 200 |


| Overload relays | $30 \mathrm{~kW} \triangleq$ LSD365 |  |  | $37 \mathrm{~kW} \triangleq$ LSD380 |  |  | $45 \mathrm{~kW} \triangleq$ LSD395 |  |  | UL-listed fuses |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Setting range | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \max =65 \mathrm{~A} \\ \text { (at } 50 \mathrm{~Hz} 400 \mathrm{VAC}) \end{gathered}$ |  |  | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \max =80 \mathrm{~A} \\ \text { (at } 50 \mathrm{~Hz} 400 \mathrm{VAC}) \end{gathered}$ |  |  | $\begin{gathered} \mathrm{I}_{\mathrm{e}} \max =95 \mathrm{~A} \\ \text { (at } 50 \mathrm{~Hz} 400 \mathrm{VAC} \text { ) } \end{gathered}$ |  |  | RK5 |
| A | $\mathrm{gl} / \mathrm{gG}$ | aM | BS 88 | $\mathrm{gL} / \mathrm{gG}$ | aM | BS 88 | $\mathrm{gl} / \mathrm{gG}$ | aM | BS 88 | A |
| Size 3 |  |  |  |  |  |  |  |  |  |  |
| $18 . . .25$ | 63 | 32 | 63 | 63 | 32 | 63 | 63 | 32 | 63 | 100 |
| $22 . . .32$ | 80 | 35 | 80 | 80 | 35 | 80 | 80 | 35 | 80 | 125 |
| $28 . . .40$ | 80 | 50 | 80 | 80 | 50 | 80 | 80 | 50 | 80 | 150 |
| 36 ... 50 | 125 | 50 | 125 | 125 | 50 | 125 | 125 | 50 | 125 | 200 |
| $45 . . .63$ | 125 | 63 | 125 | 160 | 63 | 160 | 160 | 63 | 160 | 250 |
| $57 . . .75$ | -- | -- | -- | 160 | 80 | 160 | 160 | 80 | 160 | 300 |
| 70 ... 90 | -- | -- | -- | -- | -- | -- | 160 | 100 | 160 | 350 |
| 80 ... 100 | -- | -- | -- | -- | -- | -- | 160 | 100 | 160 | 350 |

[^32]Technical Specifications - Thermal Overload Relays series ALEA LST

## Accessories

## Overview

The following accessories are available for the LST thermal overload relays:

- For the four overload relay sizes 00 to 3 one terminal bracket each for stand-alone installation
- Terminal covers

| Type <br> For overload relays |  | $\begin{gathered} \text { LSZDTEOI } \\ \hline \end{gathered}$ | $\begin{gathered} \text { LSZOTEOI } \\ \text { LSTO } \end{gathered}$ | $\begin{gathered} \text { LSZ2TEO1 } \\ \text { LST2 } \end{gathered}$ | $\begin{gathered} \text { LSZ3TEO1 } \\ \text { LST3 } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Mounting type |  | For screw and snap-on mounting onto TH 35 standard mounting rails, size S 3 also for TH 75 standard mounting rails |  |  |  |
| Connection for main circuit |  | Screw terminals |  | Screw terminals with box terminal |  |
| Connection type |  |  |  |  |  |
| Terminal screw |  | Pozidriv size 2 |  |  | Allen screw 4 mm |
| - Conductor cross-section (min./max.), 1 or 2 conductors |  |  |  |  |  |
| - solid | mm ${ }^{2}$ | $\begin{aligned} & 1 \times(0.5 \ldots 2.5), \\ & \max .1 \times(\ldots 4) \end{aligned}$ | $\begin{gathered} 1 \times(1 \ldots 6), \\ \max .1 \times(\ldots 10) \end{gathered}$ | $2 \times(0.75$... 16) | $2 \times(2.5$... 16) |
| - finely stranded without end sleeve | $\mathrm{mm}^{2}$ | -- |  |  |  |
| - finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $1 \times(0.5 \ldots 2.5)$ | $1 \times(1 \ldots 6)$ | $\begin{aligned} & \hline 2 \times(0.75 \ldots 16), \\ & 1 \times(0.75 \ldots 25) \end{aligned}$ | $\begin{aligned} & 2 \times(2.5 \ldots 35), \\ & 1 \times(2.5 \ldots 50) \\ & \hline \end{aligned}$ |
| - stranded | $\mathrm{mm}^{2}$ | $\begin{aligned} & 1 \times(0.5 \ldots 2.5), \\ & \max .1 \times(\ldots . .4) \\ & \hline \end{aligned}$ | $\begin{gathered} 1 \times(1 \ldots 6), \\ \max .1 \times(\ldots 10) \end{gathered}$ | $\begin{gathered} \hline 2 \times(0.75 \ldots 25), \\ 1 \times(0.75 \ldots 35) \\ \hline \end{gathered}$ | $\begin{aligned} & 2 \times(10 \ldots 50), \\ & 1 \times(10 \ldots 70) \end{aligned}$ |
| - AWG cables, solid or stranded | AWG | $1 \times(18 \ldots 14)$ | $1 \times(14 \ldots 10)$ | $\begin{aligned} & 2 \times(18 \ldots 3), \\ & 1 \times(18 \ldots 1) \end{aligned}$ | $\begin{aligned} & 2 \times(10 \ldots 1 / 0) \\ & 1 \times(10 \ldots 2 / 0) \end{aligned}$ |
| - ribbon cable conductors (number x width x thickness) | mm | -- | -- | $2 \times(6 \times 9 \times 0.8)$ | $2 \times(6 \times 9 \times 0.8)$ |

## Thermal Overload Relays - Tripping Characteristics

The tripping characteristics show the relationship between the tripping time and tripping current as multiples of the set current le and are given for symmetrical three-pole and two-pole loads (from the cold state). The smallest current that causes a tripping is called " minimum tripping current". According to IEC 60947-4-1, this current must be within specified limits. The limits of the minimum tripping current for the LST thermal overload relays for symmetrical three-pole loads are between $105 \%$ and $120 \%$ of the set current. The tripping characteristic starts with the minimum tripping current and continues with higher tripping currents based on the characteristics of the so-called trip classes (CLASS 10, CLASS 20 etc.). The trip classes describe the time intervals within which the overload relays have to trip with 7.2 times the set current le from the cold state for symmetrical three-pole loads. The tripping characteristic for a three-pole LST thermal overload relay (see characteristic curve for symmetrical three-pole loads from the cold state) applies, if all three bimetal strips are simultaneously loaded with a current in same hight. If only two bimetal strips are Loaded (heated) - due to a phase failure - these two strips have to generate the full, necessary force to trigger the tripping mechanism which would result in a longer tripping time or would allow a higher current. If these higher currents are applied over a longer period, they usually cause damage to the load. To avoid this damaging, the LST thermal overload relays are fitted with phase failure sensitivity which ensures faster tripping in accordance with the characteristic curve for double-pole loads from the cold state by means of a suitable mechanical mechanism. Compared with cold load, a load at operating temperature obviously has a lower temperature reserve. This is taken into account by the LST Thermal overload relay. In this case, the tripping time is reduced by $25 \%$, when loaded with the set current le for an extended period.

## Schematic Representation of a Characteristic Curve



[^33]The characteristic curves for the individual LST thermal overload relays can be requested from Technical Assistance.

Technical Specification - Thermal Overload Relays Series CUBICO

## - Thermal Overload Relays Series CUBICO Mini

- Technical Specifications - LZTM

| Standard |  |  | IEC/EN 60947-4-1 |
| :---: | :---: | :---: | :---: |
| Rated insulation voltage |  |  | 690VAC |
| Rated frequency |  |  | $50 / 60 \mathrm{~Hz}$ |
| Rated impulse withstand voltage |  |  | 6 kV |
| Overvoltage category |  |  | III |
| Rated current |  |  | 0.1A-13A |
| Tripping class |  |  | Class 10A |
| Rated current $\mathrm{l}_{\mathrm{N}}$ |  |  | 0.1-0.16A |
|  |  |  | 0.16-0.25A |
|  |  |  | 0.25-0.4A |
|  |  |  | 0.4-0.63A |
|  |  |  | $0.63-1 \mathrm{~A}$ |
|  |  |  | 1-1.6A |
|  |  |  | 1.6-2.5A |
|  |  |  | $2.5-4 \mathrm{~A}$ |
|  |  |  | 4-6A |
|  |  |  | $5.5-8 \mathrm{~A}$ |
|  |  |  | 7-10A |
|  |  |  | 9-13A |
| Match to contactor |  |  | LZDM.... |
| Matching fuse |  | 0.1-0.16A | $2 \mathrm{AgG} / \mathrm{gl}$ |
|  |  | 0.16-0.25A | $2 \mathrm{AgG} / \mathrm{gl}$ |
|  |  | 0.25-0.4A | $2 \mathrm{AgG} / \mathrm{gl}$ |
|  |  | 0.4-0.63A | $2 \mathrm{AgG} / \mathrm{gl}$ |
|  |  | 0.63-1A | $4 \mathrm{AgG} / \mathrm{gl}$ |
|  |  | 1-1.6A | $4 \mathrm{AgG} / \mathrm{gl}$ |
|  |  | 1.6-2.5A | $6 \mathrm{AgG} / \mathrm{gl}$ |
|  |  | 2.5-4A | $10 \mathrm{AgG} / \mathrm{gl}$ |
|  |  | 4-6A | $16 \mathrm{AgG} / \mathrm{gl}$ |
|  |  | $5.5-8 \mathrm{~A}$ | $20 \mathrm{AgG} / \mathrm{gl}$ |
|  |  | 7-10A | $20 \mathrm{AgG} / \mathrm{gl}$ |
|  |  | $9-13 \mathrm{~A}$ | $25 \mathrm{AgG} / \mathrm{gl}$ |
| Overload protection |  | $1.05 \times \mathrm{I}_{\mathrm{N}}$ | No operation within 2h |
|  |  | $1.2 \times \mathrm{I}_{\mathrm{N}}$ | Operation within 2h |
|  |  | $1.5 \times 1{ }_{N}$ | Operation within 2 min |
|  |  | $7.2 \times 1{ }_{N}$ | $2 \mathrm{~s}<$ Tripping $\leq 10$ s |
| Mounting |  |  | Plug-in type |
| Auxiliary contacts |  |  | $1 \mathrm{NO}+1 \mathrm{NC}$ |
| Rated current of auxiliary contact |  | AC-15 230V | 2.61 A |
|  |  | AC-15 400V | 1.5A |
|  |  | DC-13 220V | 0.2A |
| Terminal cross section main circuit |  |  |  |
|  | Single-core conductor |  | 1-2.5mm ${ }^{2}$ |
|  | Stranded conductor |  | 1-2.5mm ${ }^{\text {a }}$ |
|  | Terminal screw |  | M4 |
| Terminal cross section auxiliary circuit |  |  |  |
|  | Single-core conductor |  | 0.5-2.5mm ${ }^{2}$ |
|  | Stranded conductor |  | $0.5-2.5 \mathrm{~mm}^{2}$ |
|  | Terminal screw |  | M3.5 |

- Thermal Overload Relays Series CUBICO Mini

Electric Tripping Curves - Class 10A

A) Tripping time
B) Current

1) 1-phase operation, cold state start
2) 2-phase operation, cold state start
3) 3-phase operation, cold state start

Technical Specification - Thermal Overload Relays Series CUBICOThermal Overload Relays Series CUBICO Classic

- Technical Specifications - LZTC

- Thermal Overload Relays Series CUBICO Classic

Electric Tripping Curve - Class 10A

A) Tripping time
B) Current

1) 1-phase operation, cold state start
2) 2-phase operation, cold state start
3) 3-phase operation, cold state start

Motor Protection Switches Series BE5


Motor Protection Switches Series BE6


- Motor Protection Switches Series BES, Size 0


Auxiliary Contacts for Motor Protection Switches
Signaling Switch for Motor Protection Switches


## Motor Protection Switches

Motor Protection Switches Series BE5, BE6 Page ..... 410
Motor Protection Switches Series ALEA BES Page ..... 425
Technical Specification Page ..... 441

Motor Protection Switches Series BE5, BE6

Motor Protection Switches Series BE5


Schrack-Info

- Motor protection switch 3-pole from 0.16 A up to 32 A

| Standards |  |  | EN 60647, IEC 60947 |
| :---: | :---: | :---: | :---: |
| Rated current $\mathrm{I}_{n}$ |  |  | 0,1-25A |
| Rated uninterrupted current = rated operational current $\mathrm{I}_{u}=\mathrm{I}_{\text {e }}$ |  |  | 25 A or current setting of the overcurrent release |
| Rated operational voltage $\mathrm{U}_{\text {e }}$ |  |  | 690VAC |
| Rated frequency |  |  | $40-60 \mathrm{~Hz}$ |
| Tripping | Overload |  | adjustable 0,6-1 $\times \mathrm{I}_{\text {n }}$ |
|  | Short circuit |  | set permanently on $14 \times \mathrm{I}_{n}$ |
| Phase failure protection |  |  | Yes |
| Tripping capacity | 0,1-10A |  | 0,1-10A: inherently stable (100kA) |
|  | 10-16A |  | 50 kA |
|  | 16-25A |  | 16kA |
| Direction of electric current |  |  | any |
| Rated impulse withstand voltage $\mathrm{U}_{\text {imp }}$ |  |  | 6000VAC |
| Overvoltage category |  |  | III |
| Current heat loss (3 pole at operating temperature) |  |  | 6W |
| Lifespan | mechanical |  | 10.000 operations |
|  | electrical (AC-3At 400V) |  | 10.000 operations |
| Maximum operating frequency |  |  | 40 operations per hour |
| Short-circuit rating | AC-3 (up to 690V) |  | 25A |
|  | DC-5 (up to 250V) |  | 25A (3 contacts in series) |
| Rated making capacity | $\cos \varphi=0,45$ | 230-690VAC | 110A |
| Rated breaking capacity | $\cos \varphi=0,45$ | 230 VAC | 90A |
|  | $\cos \varphi=0,45$ | 400VAC | 90A |
|  | $\cos \varphi=0,45$ | 500 VAC | 64A |
|  | $\cos \varphi=0,45$ | 690 VAC | 54A |
| Rated operational current enclosed, not enclosed $\mathrm{I}_{\text {e }}$ | AC-1-application | 230 VAC | 16A |
|  |  | 400VAC | 16A |
|  |  | 440VAC | 16A |
|  |  | 500 VAC | 16A |
|  |  | 690VAC | 16A |
|  | AC-3-application | 230VAC | 8,7A |
|  |  | 400VAC | 8,8A |
|  |  | 440 VAC | 7,7A |
|  |  | 500VAC | 6,4A |
|  |  | 690VAC | 4,8A |
|  | AC-4-application | 230 VAC | 6,6A |
|  |  | 400VAC | 6,6A |
|  |  | 440VAC | 6A |
|  |  | 500VAC | 5A |
|  |  | 690VAC | 3,4A |

## Motor Protection Switches Series BE5



| Article | max. rated operational power AC-3 |  |  |  |  | Continuous rated current | Setting range |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} \hline 220 \mathrm{~V}, 230 \mathrm{~V}, \\ 240 \mathrm{~V} \\ \mathrm{P}[\mathrm{~kW}] \\ \hline \end{gathered}$ | $\begin{gathered} \hline 380 \mathrm{~V}, 400 \mathrm{~V}, \\ 415 \mathrm{~V} \\ \mathrm{P}[\mathrm{~kW}] \\ \hline \end{gathered}$ | $\begin{gathered} 440 \mathrm{~V} \\ \mathrm{P}[\mathrm{~kW}] \end{gathered}$ | $\begin{aligned} & 500 \mathrm{~V} \\ & \mathrm{P}[\mathrm{~kW}] \end{aligned}$ | $\begin{aligned} & \hline 660 \mathrm{~V}, \\ & 690 \mathrm{~V} \\ & \mathrm{P}[\mathrm{~kW}] \end{aligned}$ |  | Overload tripping $I_{r}$ | Short circuit tripping $I_{\mathrm{m}}$ |
| BE500160 | - | - | - | - | 0.06 | 0.16 | 0.1-0.16 | 2.2 |
| BE500250 | - | 0.06 | 0.06 | 0.06 | 0.12 | 0.25 | 0.16-0.25 | 3.5 |
| BE500400 | 0.06 | 0.09 | 0.12 | 0.12 | 0.18 | 0.4 | 0.25-0.4 | 5.6 |
| BE500630 | 0.09 | 0.12 | 0.18 | 0.25 | 0.25 | 0.63 | 0.4-0.63 | 8.8 |
| BE501000 | 0.12 | 0.25 | 0.25 | 0.37 | 0.55 | 1 | 0.63-1 | 14 |
| BE501600 | 0.25 | 0.55 | 0.55 | 0.75 | 1.1 | 1.6 | 1-1.6 | 22 |
| BE502500 | 0.37 | 0.75 | 1.1 | 1.1 | 1.5 | 2.5 | 1.6-2.5 | 35 |
| BE504000 | 0.75 | 1.5 | 1.5 | 1.5 | 3 | 4 | 2.5-4 | 56 |
| BE506300 | 1.1 | 2.2 | 3 | 3 | 4 | 6.3 | 4-6.3 | 88 |
| BE510000 | 2.2 | 4 | 4 | 4 | 7.5 | 10 | 6.3-10 | 140 |
| BE516000 | 4 | 7.5 | 9 | 9 | 12.5 | 16 | 10-16 | 224 |
| BE520000 | 5.5 | 9 | 11 | 12.5 | 15 | 20 | 16-20 | 280 |
| BE525000 | 5.5 | 12.5 | 12.5 | 15 | 22 | 25 | 20-25 | 350 |

Dimensions


Motor Protection Switches Series BE5, BE6

Motor Protection Switches Series BE5
Circuit Diagram


Mounting Position


Tripping Characteristic Curve


Motor Protection Switches Series BE5

- Let-through Energy Diagram


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Motor protection switches series BE5 |  |  |  |
| 0.16-0.25A |  | [-00-9, | BE500250 |
| 0.25-0.40A |  |  | BE500400 |
| 0.40-0.63A |  | [000-9, | BE500630 |
| 0.63-1.00A |  | -00\%-豕 | BE501000 |
| 1.00-1.60A |  |  | BE501600 |
| 1.60-2.50A |  | - -8000 | BE502500 |
| 2.5A-4.0A |  | -000-9, | BE504000 |
| 4.0-6.3A |  | - -8000 | BE506300 |
| 6.3-10A |  | - $-\times 0$ | BE510000 |
| 10-16A |  | -000-9, | BE516000 |
| 16-20A |  | -000-0, | BE520000 |
| 20-25A |  | - $-60-1$ | BE525000 |
| 25-32A |  | - $-0 \times 0$ | BE532000 |
| Auxiliary contacts |  |  |  |
| Auxiliary contact front, 1NO+1NC | BE5/6-HIF 11 | - -2000 | BE082882 |
| Auxiliary contact front, 1NO | BE5/6-HIF 10 | $+\infty$ | BE082884 |

Motor Protection Switches Series BE5, BE6

Motor Protection Switches Series BE6


Schrack-Info

- Motor protection switch 3-pole from 24A up to 63A

| Standards |  | EN 60647, IEC 60947 |
| :---: | :---: | :---: |
| Rated current $\mathrm{In}_{n}$ |  | 32-63A |
| Rated uninterrupted current = rated operational current $\mathrm{I}_{\mathrm{U}}=I_{\text {e }}$ |  | 63 A or current setting of the overcurrent release |
| Rated operational voltage g $\mathrm{U}_{\text {e }}$ |  | 690VAC |
| Rated frequency |  | $40-60 \mathrm{~Hz}$ |
| Tripping | Overload | adjustable 0,6-1 $\times \mathrm{I}_{n}$ |
|  | Short circuit | set permanently on $14 \times \mathrm{I}_{n}$ |
| Phase failure protection |  | yes |
| Tripping capacity |  | 50kA |
| Direction of electric current |  | any |
| Rated impulse withstand voltage $\mathrm{U}_{\text {imp }}$ |  | 6000VAC |
| Overvoltage category |  | III |
| Current heat loss (3 pole at operating temperature) |  | 9,5W |
| Lifespan | mechanical | 30.000 operations |
|  | electrical (AC-3 at 400V) | 30.000 operations |
| Maximum operating frequency |  | 40 operations per hour |
| Short-circuit rating | AC-3 (up to 690V) | 63A |
|  | DC-5 (up to 250V) | 63A (3 contacts in series) |
| Degree of protection | Device | IP20 |
|  | Terminations | IPOO |
| Protection against direct contact |  | Finger and back-of-hand proof |
| Mechanical shock resistance half-sinusoidal shock 10 ms to IEC 60068-2-27 |  | 15 g |
| Altitude |  | max. 2000 m |
| Climatic proofing |  | Damp heat, constant, to IEC 60068-2-78 |
|  |  | Damp heat, cyclic, to IEC 60068-2-30 |
| Pollution degree |  | 3 |
| Ambient temperature |  | Stock $-25^{\circ} \mathrm{C}$ up tp $70^{\circ} \mathrm{C}$ |
|  |  | Not enclosed $-25^{\circ} \mathrm{C}$ up to $55^{\circ} \mathrm{C}$ |
|  |  | Enclosed $-25^{\circ} \mathrm{C}$ up to $40^{\circ} \mathrm{C}$ |
| Terminals | Screw-terminals | Single wire $1 \times 1-50 \mathrm{~mm}^{2} / 2 \times 1-35 \mathrm{~mm}^{2}$ |
|  |  | Flexible with ferrule $1 \times 1-35 \mathrm{~mm}^{2} / 2 \times 1-35 \mathrm{~mm}^{2}$ |
| Torque |  | Mains 3Nm |

Motor Protection Switches Series BE5, BE6

Motor Protection Switches Series BE6

| Article | max. rated operational power AC-3 |  |  |  |  | Continuous rated current <br> $I_{u}$ | Setting range |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} \hline 220 \mathrm{~V}, 230 \mathrm{~V}, \\ 240 \mathrm{~V} \\ \mathrm{P}[\mathrm{~kW}] \\ \hline \end{gathered}$ | $\begin{gathered} \hline 380 \mathrm{~V}, 400 \mathrm{~V}, \\ 415 \mathrm{~V} \\ \mathrm{P}[\mathrm{~kW}] \\ \hline \end{gathered}$ | $\begin{gathered} 440 \mathrm{~V} \\ \mathrm{P}[\mathrm{~kW}] \end{gathered}$ | $\begin{gathered} 500 \mathrm{~V} \\ \mathrm{P}[\mathrm{~kW}] \end{gathered}$ | $\begin{gathered} 660 \mathrm{~V}, \\ 690 \mathrm{~V} \\ \mathrm{P}[\mathrm{~kW}] \\ \hline \end{gathered}$ |  | Overload tripping $I_{r}$ | Short circuit tripping $\mathbf{I}_{\mathrm{m}}$ |
| BE632000 | 7,5 | 15 | 17,5 | 22 | 22 | 32 | 25-32 | 448 |
| BE640000 | 11 | 20 | 22 | 24 | 30 | 40 | 32-40 | 560 |
| BE650000 | 14 | 25 | 30 | 30 | 45 | 50 | 40-50 | 700 |
| BE658000 | 17 | 30 | 37 | 37 | 55 | 58 | 50-58 | 812 |
| BE663000 | 18,5 | 34 | 37 | 45 | 55 | 65 | 55-63 | 882 |

Dimensions


Motor Protection Switches Series BE5, BE6

Motor Protection Switches Series BE6

Circuit Diagram


Mounting Position


Tripping Characteristic Curve


Motor Protection Switches Series BE6
Let-through Energy Diagram


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Motor Protection Switches Series BE6 |  |  |  |
| 24-32A |  |  | BE632000 |
| 32-40A |  | - -8000 | BE640000 |
| 40-50A |  | - $-0 \times 0$ | BE650000 |
| 50-58A |  |  | BE658000 |
| 55-63A |  | - -80 | BE663000 |
| Auxiliary contacts |  |  |  |
| Auxiliary contact front, 1NO+1NC | BE5/6-HIF 11 | - $-0 \times 0$ | BE082882 |
| Auxiliary contact front, 1NO | BE5/6-HIF 10 | $+\infty 0$ | BE082884 |

Motor Protection Switches Series BE5, BE6

- Feeding Terminal Blocks for BE5

- Schrack-Info
- Feed terminals BE590001 for Motor protection switches, additionally mountable to busbars, cover for modular devices (slot 45 mm ) can be mounted
- Feed terminals BE590002 for Motor protection switches, additionally mountable to busbars, cover for modular devices (slot 45 mm ) can not be mounted

|  | BE590001 | BE590002 |
| :---: | :---: | :---: |
| Max.current: | 63 A |  |
| Max. voltage: | 690 V |  |
| Terminal-material: | brass |  |
| Pin-material: | brass |  |
| Cover: | PC / ABS - UL-V0 |  |
| Thermal properties: | EN ISO $306=138^{\circ} \mathrm{C}$ |  |
| Screw: | St 5.8 |  |
| Stripped insulation: | 12 mm |  |
| Terminal cross section: | U - single wire: 6-25 $\mathrm{mm}^{2}$ |  |
|  | R - stranded wire: $6-25 \mathrm{~mm}^{2}$ |  |
|  | K - flexible with sleeve: $4-16 \mathrm{~mm}^{2}$ |  |
|  | F - flexible with sleeve: $4-16 \mathrm{~mm}^{2}$ |  |
| Torque of screw: | 2 Nm |  |

Dimensions


[^34]2) Busbar

Feeding Terminal Blocks for BE5
Dimensions


Motor Protection Switches Series BE5, BE6

## Busbars for BE5



| Bausbar type: | Fork-busbar |
| :--- | :---: |
| Number of poles: | 3-pole |
| Max. current Is/Phase | 63 A |
| Mounting type: | not possible to break off |
| Cross section: | $10 \mathrm{~mm}^{2}$ |
| Phase sequence: | $\mathrm{LI}, \mathrm{L2}, \mathrm{L3}, \ldots$ |
| Standards: | $\mathrm{EN} \mathrm{60947-1/IEC60947-1}$ |
| Material of busbar: | $\mathrm{E}-\mathrm{Cu} 58 \mathrm{~F} 25$ |
| Insulation coordination: | Overvoltage category III |
| Protection class: | Degree of pollution 2 |
| Impulse voltage strength: | $\mathrm{IP20}$ |

Dimensions


1) BE5 without auxiliary contact
2) BE5 with auxiliary contact

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| 3 phase busbar for 2xBE5 45mm fork | BE5 | - $-\infty=0$ | BE590245 |
| 3 phase busbar for $3 \times$ BE5 45 mm fork | BE5 |  | BE590345 |
| 3 phase busbar for 3xBE5+auxiliary contact, 54 mm fork 63A | BE5 | $+\infty=\infty$ | BE590354 |
| 3 phase busbar for $4 \times$ BE5 45 mm fork | BE5 |  | BE590445 |
| 3 phase busbar for 4×BE5+auxiliary contact, 54 mm fork 63A | BE5 | $+000$ | BE590454 |
| 3 phase busbar for $5 \times$ BE5 45 mm fork | BE5 | [-000.0. | BE590545 |
| 3 phase busbar for 5xBE5+auxiliary contact, 54mm fork 63A | BE5 | $+\infty=0$ | BE590554 |

Connection Link for Motor Protection Switches BE5, BE6


Schrack-Info

- Connection links for BE5 and contactors K3-10 up to K3-22 for construction of D.O.L. (direct on line) combinations, coordination type " 1 " 3~400V

BE590011

| DESCRIPTION | TYPE NO. | AVAILABLE |
| :--- | :--- | :--- |
| Connection block for BE5 to LA3 contactor | BE5 | BE5PER NO. |

Enclosures for BE5, BE6


Schrack-Info

- Plastic-housings for Motor protection switches series BE5 and BE6


## Dimensions



Application


## Motor Protection Switches Series BE5, BE6

Enclosures for BE5, BE6
Application


Application


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Box for motor protection switch BE5 | BE5-G | Beros | BE599654 |
| Box with emergency stop button for BE5 | BE5-GNA |  |  |
| Box for motor protection switch BE6 | BE6-G | BE599655 |  |
| Padlock for box with main-switch for BE6 | BE6-VS | BE695524 |  |

Accessories for BE5, BE6


Schrack-Info

- Accessories for Motor protection switches series BE5 or BE6

| Articles |  |  | BE082884 | BE082882 | BE072896 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Type |  |  | Auxiliary-contact | Auxiliary-contact | Auxiliary-contact |
| Mounting |  |  | front | front | side |
| For product |  |  | BE5 and BE6 | BE5 and BE6 | BE5 and BE6 |
| Contacts |  |  | 1 NO | $1 \mathrm{NO}+1 \mathrm{NC}$ | $1 \mathrm{NO}+1 \mathrm{NC}$ |
| Rated impulse withstand voltage $\mathrm{U}_{\text {imp }}$ |  |  | 4 kV -AC |  | 6 kV -AC |
| Overvoltage category / Pollution degree |  |  | III/3 |  |  |
| Rated operational voltage |  |  | 440 V-AC |  | 500 V-AC |
|  |  |  | 250 V-DC |  | 250 V-DC |
| Safe isolation according VDE 0106 part 101 and part 101/A1 between auxiliary contacts and main contacts |  |  | 690 V-AC |  | 690 V-AC |
| Rated current | AC-15 | $220-240 \mathrm{VI}_{\text {e }}$ | 1 A |  | 3,5 A |
|  |  | $380-415 \mathrm{VI}$ | - | - | 2 A |
|  |  | $440-550 \mathrm{VI}_{\text {e }}$ | - | - | 1 A |
|  | $\begin{aligned} & \hline \text { DC-13 L/R F } \\ & 100 \mathrm{~ms} \end{aligned}$ | 24 VI 。 | - | - | 2 A |
|  |  | $60 \mathrm{VI}_{\text {e }}$ | - | - | 1,5 A |
|  |  | 110 VI | - | - | 1A |
|  |  | 220 VI | - | - | 0,25 A |
| Lifespan | mechanical |  | > 10000 operations |  | > 10000 operations |
|  | electrical |  | $>10000$ operations |  | > 5000 operations |
| Contact reliability | $\begin{aligned} & \left(\operatorname{at} U_{e}=24 \mathrm{VDC}, \mathrm{U}_{\text {min }}=17 \mathrm{~V}, \mathrm{I}_{\text {min }}=\right. \\ & 5.4 \mathrm{~mA}) \end{aligned}$ |  | Failure rate $<10^{-8}<1$ Failure on $1 \times 10^{8}$ operations |  |  |
| Force guided contacts according ZH 1/457 |  |  | - | - | yes |
| Short circuit rating without welding of contacts | without meltin |  | - | - | BM918104 |
|  | with melting-fu |  | $10 \mathrm{AgG} / \mathrm{gl}$ | $10 \mathrm{AgG} / \mathrm{gl}$ | $10 \mathrm{AgG} / \mathrm{gl}$ |
| Terminals | Single or flexi | wire with ferrule | $0,75-1,5 \mathrm{~mm}^{2}$ |  | 0,75-2,5 mm ${ }^{2}$ |
|  | Single- or stra | wire AWG | 18-16 |  | 18-14 |

Motor Protection Switches Series BE5, BE6

Accessories for BE5, BE6
Application


Circuit Diagrams


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Auxiliary contact front, 1NO | BE5/6-HIF 10 | - $-0-0$ | BE082884 |
| Auxiliary contact front, 1NO+1NC | BE5/6-HIF 11 |  | BE082882 |
| Auxiliary contact side, 1NO+1NC | BE5/6-HIS 11 | $+\infty 0$ | BE072896 |
| Rotary knob for BE5, lockable with up to 3 pad-locks | BE5-DK |  | BE590851 |

## Motor Protection Switches BES, Size 00



## - Schrack-Info

- Motor protection switch Class 10 for rated current of motors from 0.11 A up to $6.3 \mathrm{~A}(0.04 \mathrm{~kW}$ up to 2.2 kW ) at $\mathrm{Icu}=100 \mathrm{kA}$
- Motor protection switch Class 10 for rated current of motors from 5.5A up to $12 \mathrm{~A}(3 \mathrm{~kW}$ up to 5.5 kW ) at $\mathrm{Icu}=50 \mathrm{kA}$
- Frontside transverse arranged and "side mounted" auxiliary contacts, shunt release and undervoltage release can be snapped on
- Can be combined with contactors of size 00
- Busbars for up to zu 5 Motor protection switches (without "side mounted" accessories) are available
- Busbars for Motor protection switches with "side mounted" auxiliary contact - on request
- For assembling of BESD with AC or DC-operated contactors size 00 (D.O.L.- Combination) the connection link LSZDD005 has to be used
- Mountable to DIN-rail TS35/TH35 or mounting plate
- Further accessories find attached

Dimensions

## BESD



1) Side mounted auxiliary switch, 2-pole - BEZOOOO1,2
2) Auxiliary trip unit: undervoltage release - BEZOOOO6,7; shunt trip - BEZOOO08,9
3) Front mounted auxiliary switch - BEZOOOO3,4
4) Drilling pattern
5) Standard mounting rail TH 35 according to EN 60715
6) Lockable in "OFF" position with 3.5 ... 4.5 mm shackle diameter

Circuit Diagram


Motor Protection Switches Series ALEA BES

Motor Protection Switches BES, Size 00

| DESCRIPTION | TYPE NO. AVAILABLE |
| :--- | :--- |

Motor protection switches size 00 / 100kA (Short circuit switching capacity Icu at 400VAC)

| 0.11-0.16A, Class 10 | BESD |  | BESD0016 |
| :---: | :---: | :---: | :---: |
| 0.14-0.20A, Class 10 | BESD |  | BESD0020 |
| 0.18-0.25A, Class 10 | BESD |  | BESD0025 |
| 0.22-0.32A, Class 10 | BESD | -000-0, | BESD0032 |
| 0.28-0.40A, Class 10 | BESD |  | BESD0040 |
| 0.35-0.50A, Class 10 | BESD | -000-n | BESD0050 |
| 0.45-0.63A, Class 10 | BESD |  | BESD0063 |
| 0.55-0.80A, Class 10 | BESD | $+000-\infty$ | BESD0080 |
| 0.7-1.00A, Class 10 | BESD |  | BESD0100 |
| 0.9-1.25A, Class 10 | BESD | $+-\infty 0$ | BESD0125 |
| 1.1-1.6A, Class 10 | BESD | - -1000 | BESD0160 |
| 1.4-2.0A, Class 10 | BESD | $\begin{array}{\|ccc} \hline-00 & -\infty \\ \hline \end{array}$ | BESD0200 |
| 1.8-2.5A, Class 10 | BESD |  | BESD0250 |
| 2.2-3.2A, Class 10 | BESD | - -1000 | BESD0320 |
| 2.8-4,0A, Class 10 | BESD | -000-0, | BESD0400 |
| 3.5-5,0A, Class 10 | BESD | $\begin{aligned} & -000 \\ & \hline 00 \\ & \hline \end{aligned}$ | BESD0500 |
| 4,5-6,3A, Class 10 | BESD | $+\infty=0$ | BESD0630 |

Motor protection switches size 00 / 50kA (Short circuit switching capacity Icu at 400VAC)

| $5.5-8 A$, Class 10 | BESD | BESD0800 |  |
| :--- | :--- | :--- | :--- | :--- |
| $7-10 A$, Class 10 | BESD | BESD | $-\infty 000$ |
| $9-12 A, ~ C l a s s ~$ | 0 | BESD 1000 |  |

## Motor Protection Switches BES, Size 0



BESOO400

## Schrack-Info

- Motor protection switch Class 10 for rated current of motors from 0.11 A up to $12.5 \mathrm{~A}(0.04 \mathrm{~kW}$ up to 5.5 kW$)$ at lcu $=100 \mathrm{kA}$
- Motor protection switch Class 10 for rated current of motors from 11 A up to $25 \mathrm{~A}(7.5 \mathrm{~kW}$ up to 11 kW$)$ at Icu $=50 \mathrm{kA}$
- Frontside transverse arranged and "side mounted" auxiliary contacts, signaling switch, shunt release and undervoltage release can be snapped on
- Can be combined with contactors of size 00 and 0
- Busbars for up to zu 5 Motor protection switches (without "side mounted" accessories) are available
- When using busbar for 5 Motor protection switch and summary load current $>63 \mathrm{~A}$, double infeed (left and right end of busbar) is recommended
- Busbars for Motor protection switches with "side mounted" auxiliary contact - on request
- For assembling of BESO with AC or DC-operated contactors size 00 (D.O.L.- Combination) the connection link LSZDD006 has to be used
- For assembling of BESO with AC-operated contactors size 0 (D.O.L.- Combination) the connection link LSZODOO2 has to be used
- For assembling of BESO with DC-operated contactors size 0 (D.O.L.- Combination) the connection link LSZODOO4 has to be used
- Mountable to DIN-rail TS35/TH35 or mounting plate
- Further accessories find attached


## Dimensions



1) Side mounted auxiliary switch, 2-pole - BEZOOOO1,2
2) Signal switch
3) Auxiliary trip unit: undervoltage release - BEZOOOO6,7; shunt trip - BEZOOOO8,9
4) Front mounted auxiliary switch - BEZOOOO3,4
5) Drilling pattern
6) Standard mounting rail TH 35 according to EN 60715
7) Lockable in "OFF" position with 3.5 ... 4.5 mm shackle diameter

Motor Protection Switches Series ALEA BES

Motor Protection Switches BES, Size 0

- Circuit Diagram


| DESCRIPTION | TYPE NO. |
| :--- | :--- |

Motor protection switches size 0 / 100kA (Short circuit switching capacity Icu at 400VAC)


Motor protection switches size 0 / 50kA (Short circuit switching capacity Icu at 400 VAC)


## Motor Protection Switches BES, Size 2



## $\square$ Schrack-Info

- Motor protection switch Class 10 for rated current of motors from 18 A up to 50 A ( 11 kW up to 22 kW ) at lcu $=50 \mathrm{kA}$
- Frontside transverse arranged and "side mounted" auxiliary contacts, signaling switch, shunt release and undervoltage release can be snapped on
- Can be combined with contactors of size 2
- Busbars for up to zu 3 Motor protection switches (without "side mounted" accessories) are available
- When using busbar for 3 Motor protection switches and summary load current > 108A), double infeed (left and right end of busbar) is recommended
- Busbars for Motor protection switches with "side mounted" auxiliary contact - on request
- For assembling of BES2 with AC-operated contactors size 2 (D.O.L.- Combination) the connection link LSZ2D004 has to be used
- For assembling of BES2 with DC-operated contactors size 2 (D.O.L.- Combination) the connection link LSZ2D005 has to be used
- Mountable to DIN-rail TS35/TH35 or mounting plate
- Further accessories find attached


## Dimensions



1) Side mounted auxiliary switch, 2-pole - BEZOOOO1,2
2) Signal switch
3) Auxiliary trip unit: undervoltage release - BEZOOOO6,7; shunt trip - BEZOOOO8,9
4) Front mounted auxiliary switch - BEZOOOO3,4
5) Drilling pattern
6) Standard mounting rail TH 35 according to EN 60715
7) Lockable in "OFF" position with 3.5 ... 4.5 mm shackle diameter

Motor Protection Switches Series ALEA BES

Motor Protection Switches BES, Size 2

- Circuit Diagram


| DESCRIPTION | TYPE NO. AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |

Motor protection switches size 2 / 50kA (Short circuit switching capacity Icu at 400VAC)

| 18-25A, Class 10 | BES2 | [-000-9000, | BES22500 |
| :---: | :---: | :---: | :---: |
| 22-32A, Class 10 | BES2 | -000-n) | BES23200 |
| 28-40A, Class 10 | BES2 | -000-0, | BES24000 |
| 36-45A, Class 10 | BES2 | - $-\times 0$ - | BES24500 |
| 40-50A, Class 10 | BES2 | - $-0 \times 0$ | BES25000 |

## Motor Protection Switches BES, Size 3



## ■ Schrack-Info

- Motor protection switch Class 10 for rated current of motors from 45A up to 100 A (30kW up to 45 kW ) at $\mathrm{Icu}=50 \mathrm{kA}$
- Frontside transverse arranged and "side mounted" auxiliary contacts, signaling switch, shunt release and undervoltage release can be snapped on
- Can be combined with contactors of size 3
- For assembling of BES3 with AC-operated contactors size 3 (D.O.L.- Combination) the connection link LSZ3D004 has to be used
- For assembling of BES3 with DC-operated contactors size 3 (D.O.L.- Combination) the connection link LSZ3D003 has to be used
- Mountable to DIN-rail TS35/TH35, TS75/TH75 or mounting plate
- Further accessories find attached


## Dimensions



1) Side mounted auxiliary switch, 2-pole - BEZOOOO1,2
2) Signalling switch (SO ... S3) side mounted - BEZOOOO5
3) Auxiliary trip unit: undervoltage release - BEZOO006,7; shunt trip - BEZOO008,9
4) Front mounted auxiliary switch - BEZOOOO3,4
5) Drilling pattern
6) Standard mounting rail TH 35 according to EN 60715
7) For mounting on TH 75 standard mounting rail
8) Allen screw 4 mm
9) Lockable in "OFF" position with 3.5 ... 4.5 mm shackle diameter

Motor Protection Switches Series ALEA BES

Motor Protection Switches BES, Size 3

- Circuit Diagram


| DESCRIPTION | TYPE NO. AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |

Motor protection switches size 3 / 50kA (Short circuit switching capacity Icu at 400VAC)

| 45-63A, Class 10 | BES3 | -000-0.0) | BES36300 |
| :---: | :---: | :---: | :---: |
| 57-75A, Class 10 | BES3 | -000-m | BES37500 |
| 70-90A, Class 10 | BES3 |  | BES39000 |
| 80-100A, Class 10 | BES3 | -000-0 | BES39999 |

Auxiliary Contacts for Motor Protection Switches


Schrack-Info

- Frontside or "side mounted" auxiliary contacts for signaling of operating state "ON" or "OFF"
- Arranged at left side of Motor protection switch
- Fitting to all sizes
- Busbars for Motor protection switches with " side arranged" auxiliary contact only is realisable by special version of busbars - on request

Circuit Diagrams


1) Lateral auxiliary switch (side mounted)

BEZOOOO1-1NO + 1NC
BEZOOOO2-2NO
2) Transverse auxiliary switch (front mounted)

BEZOOOO3-1NO + 1NC
BEZOOOO4-2NO

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Auxiliary Contact, side mounted, $1 \mathrm{NO}+1 \mathrm{NC}$ | BEZO | -000-6 | BEZ00001 |
| Auxiliary Contact, front mounted, $1 \mathrm{NO}+1 \mathrm{NC}$ | BEZO | -0000] | BEZ00003 |
| Auxiliary Contact, side mounted, 2 NO | BEZO | - -00000 | BEZ00002 |
| Auxiliary Contact, front mounted, 2 NO | BEZO | $+\infty=-\infty$ | BEZ00004 |

## Motor Protection Switches Series ALEA BES

Signaling Switch for Motor Protection Switches


- Schrack-Info
- Signaling switch for signaling of "Tripped by overload or short circuit" for Motor protection switch of size 0 up to 3
- Left side mounted
- When necessary to monitor Motor protection switch of size 00 for overload or short circuit, the Motor protection switch size 00 has to be replaced by such of size 0
- Signaling switch is provided with 2 contacts for "overload" ( $1 \mathrm{NO}+1 \mathrm{NC}$ ) and 2 contacts for "short circuit" ( $1 \mathrm{NO}+1 \mathrm{NC}$ )
- Busbars for Motor protection switches with side arranged signaling switch are not available


## Circuit Diagram



Switching Example

$B E S O$ to $B E S 3$ motor protection switches with $B E Z O 0005$ signalling switch
Separate "tripped" and "short-circuit" signals:
S1 Signalling switch
Q1 Motor protection switch
F1 Fuse (gl/gG), max. 10A
H1 Signal lamp "Short-circuit"
H2 Signal lamp "Overload" or "Tripping by auxiliary trip unit"

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Signalling switch 1 NO +1 NC, for BES size $0,2,3$ | BEZO | -500 | BEZ00005 |

## Under Voltage Release Motor Protection Switches



- Schrack-Info
- Under voltage release unit for remote "switching off" the Motor protection switches (closed-circuit principle)
- Right side mounted
- Fitting to all sizes
- Only one release unit can be mounted at Motor protection switch (either undervoltage or shunt release)
- Busbars for Motor protection switches with side arranged release unit are not available


## Connection and Control Diagram



## SO, S1, S2 OFF pushbutton in the system

Q1 Motor protection switch
S Auxiliary switch of the motor protection switch Q1
F1; F2 Fuse (gl/gG) max. 10A
F3 Shunt trip
F4 Undervoltage releases

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Under voltage release $230 \mathrm{VAC} / 50 \mathrm{~Hz}, 240 \mathrm{VAC} / 60 \mathrm{~Hz}$ | BEZO | BEZ00006 |  |
| Under voltage release $400 \mathrm{VAC} / 50 \mathrm{~Hz}, 440 \mathrm{VAC} / 60 \mathrm{~Hz}$ | BEZO | BEZ0000 |  |

Shunt Release for Motor Protection Switches


## Schrack-Info

- Shunt release unit for remote "switching off" the Motor protect - Right side mounted ion switches (open-circuit principle)
- Right side mounted
- Fitting to all sizes
- Only one release unit can be mounted at Motor protection switch (either undervoltage or shunt release)
- Busbars for Motor protection switches with side arranged release unit are not available


## Connection and Control Diagram



S0, S1, S2 OFF pushbutton in the system
Q1 Motor protection switch
S Auxiliary switch of the motor protection switch Q1
F1; F2 Fuse ( $\mathrm{gL} / \mathrm{gG}$ ) max. 10A
F3 Shunt trip
F4 Undervoltage releases

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Shunt trip $20-24 V A C, 50 / 60 \mathrm{~Hz}$ | BEZO | BEZO0008 |  |
| Shunt trip $210-240 \mathrm{VAC}, 50 / 60 \mathrm{~Hz}$ | BEZO | BEZ00009 |  |

## Motor Protection Switches Series ALEA BES

## Housings and Locking Plate for Motor Protection Switches




BEZOO112


BEZOOO14

## Schrack-Info

- All housings fulfill the protection degree IP55, the rated operational voltage Ue for built-in Motor protection switches is reduced from 690 VAC to 500VAC
- Housings for Motor protection switch of size 00 with membrane (optional Emergency -Stop mushroom button available)
- Housings for Motor protection switch of size 0-2 are fitted with lockable black or red/yellow rotary handle
- Housings for Motor protection switch of size 3 are not available
- All housings are fitted with Neutral conductor- and PE-terminal
- The housings are prepared with cable entry cut-outs for metric cable glands at upper side and bottom of housing. Also the rear sides of housings are prepared with cable entry cut-outs
- Installation of Motor protection switches with Signaling switch is not possible
- Installation of Motor protection switches with front or side mounted auxiliary contacts is possible at all housings
- Installation of Motor protection switch with auxiliary contacts and overvoltage/shunt release in housings of size 2 is possible
- Housings of size 00 with membrane can be fitted with an additional locking plate (for 3 padlocks, 8 mm shackle-diameter)


## Dimensions



[^35]Housings and Locking Plate for Motor Protection Switches
Dimensions


BEZOO112 rotary handle, BEZOO113 rotary handle for emergency stop for motor protection switches size 0

1) Knock-outs for M25
2) Knock-outs for rear cable entry M20
3) Opening for padlock with shackle diameter max. $6-8 \mathrm{~mm}$
$\square$ Dimensions

## BEZOO212, BEZOO213



BEZOO212 rotary handle, BEZOO213 rotary handle for emergency stop for motor protection switches size 2

1) Knock-outs for M32 (left)
2) Knock-outs for $M 40$ (right)
3) Knock-outs for rear cable entry M32
4) Opening for padlock with shackle diameter max. 6 ... 8 mm

Motor Protection Switches Series ALEA BES

Housings and Locking Plate for Motor Protection Switches

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Housings |  |  |  |
| Insulated enclosure with membrane, size 00, IP55 | BEZO | [000-98) | BEZ00012 |
| Emergency Stop button for insulated enclosure, size 00, IP55 | BEZO |  | BEZ00013 |
| Insulated enclosure with rotary handle, size 0, IP55 | BEZO | - $-0 \times 0$ | BEZOO112 |
| Insulated enclosure with rotary handle, size 2, IP55 | BEZO |  | BEZOO212 |
| Insulated enclosure with Emergency Stop, size 2, IP55 | BEZO |  | BEZOO213 |
| Locking plate |  |  |  |
| Locking plate for 3 padlocks, size 00 | BEZO |  | BEZOOO14 |

## Bus Bars for Motor Protection Switches



Schrack-Info

- Busbars for Motor protection switches without side mounted accessories, for size 00 up to 2
- Maximum rated current In for busbars size 00/0 ... 63A, for size 2 ... 108A
- Motor protection switches size 00 and 0 can not wired with the same busbar because of different position (hight) of their terminals
- Busbars for for Motor protection switches with side mounted auxiliary contacts - on request
- Busbars for Motor protection switch with side mounted Signaling switch are not available
- Busbars for Motor protection switches of size 3 are not available

Dimensions


Dimensions


| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Busbar for 2 BESD/BESO | BEZO | - $-\infty$ | BEZ00017 |
| Busbar for 3 BESD/BESO | BEZO | [-0000, | BEZ00018 |
| Busbar for 4 BESD/BESO | BEZO | -800-6 | BEZOOO20 |
| Busbar for 5 BESD/BESO | BEZO | - $-0 \times 0$ | BEZ00021 |
| Busbar for 2 BES2 | BEZO |  | BEZOO217 |
| Busbar for 3 BES2 | BEZO |  | BEZOO218 |

Covers for Spare Places of Motor Protection Switches


## Rotary Operating Mechanisms (Door Coupling) for Motor Protection Switches



BEZOOO11

- Schrack-Info
- Door couplig- rotary handles for Motor protection switches size 0 up to 3
- Available in black or for "Emergency Off" applications in red/yellow
- Included door(cover) interlock against opening the housing at position "ON" of Motor protection switch
- Lockable in "Off"-position with in maximum 3 padlocks, shackle diameter 8 mm
- PE-terminal for wires up to $35 \mathrm{~mm}^{2}$ and support bracket for actuation axle included

Dimensions


BEZOOO10/11 for motor protection switches size 0, 2, 3
Long shaft (with bracket) ${ }^{3}$
A) Drilling pattern

1) Lockable in neutral position with max. 8 mm shackle diameter.
2) Mounted with screw cap.
3) Supplied with a shaft leng
of 330 mm ; can be adjusted by shortening the shaft
4) Grounding terminal $35 \mathrm{~mm}^{2}$ and sheet-metal bracket for shaft.

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- | :--- |
| Door coupling rotary handle for size 0-3 | BEZO | BEZ00010 |  |
| Door coupling rotary handle Emergency-Stop, for size 0-3 | BEZO | BEZOOO11 |  |

## Motor Protection Switches Series ALEA BES

## Feed Terminals for Motor Protection Switches



- Schrack-Info
- Feed terminals for busbar of Motor protection switch size 0 up to 2
- Feed terminals size 00 and 0 for in maximum Anschlussquerschnitt Ye and Ym $25 \mathrm{~mm}^{2}$, Yf $16 \mathrm{~mm}^{2}$
- Feed terminals size 2 for in maximumen Anschlussquerschnitt Ye and Ym 50mm², Yf $35 \mathrm{~mm}^{2}$
- For feeding busbar, centered (middle) position of terminal or - when summary load current exceeds rated current of busbar - both sided arrangement of feeding terminals is recommended


## Dimensions



1) Bus bars
2) Feed terminals

| DESCRIPTION | TYPE NO. | AVAILABLE | ORDER NO. |
| :---: | :---: | :---: | :---: |
| Feed terminal 3-phase up to $25 \mathrm{~mm}^{2}$, for BES size 00 | BEZO | -800-0 | BEZO0016 |
| Feed terminal 3-phase up to $25 \mathrm{~mm}^{2}$, for BES size 0 | BEZO | -0000) | BEZ00116 |
| Feed terminal 3-phase up to $50 \mathrm{~mm}^{2}$, for BES size 2 | BEZO |  | BEZOO216 |

## M Motor Protection Switches Series BES - Overview

| Type <br> Applications | BESD / BESO / BES2 / BES3 |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |
| System protection | yes " |  |  |  |
| Motor protection | yes |  |  |  |
| Size | 00, 0, 2, 3 |  |  |  |
| Rated current In |  |  |  |  |
| - Size 00 | up to 12A |  |  |  |
| - Size 0 | up to 25A |  |  |  |
| Size 2 | up to 50A |  |  |  |
| - Size 3 | up to 100A |  |  |  |
| Rated operational voltage Ue according to IEC | $690 \mathrm{VAC}^{21}$ |  |  |  |
| Rated frequency | $50 / 60 \mathrm{~Hz}$ |  |  |  |
| Trip class | Class 10 |  |  |  |
| Thermal overload release | $\begin{gathered} 0.11 \ldots 0.16 \mathrm{~A} \\ \text { up to } 80 \ldots .100 \mathrm{~A} \end{gathered}$ |  |  |  |
| Electronic trip units a multiple of the rated current | 13 Times |  |  |  |
| Short-circuit breaking capacity Icu at 400VAC | 50/100kA |  |  |  |
| Accessories for sizes | 00 | 0 | 2 | 3 |
| Auxiliary switches | yes | yes | yes | yes |
| Signalling switches | -- | yes | yes | yes |
| Undervoltage releases | yes | yes | yes | yes |
| Shunt trip units | yes | yes | yes | yes |
| Insulated three-phase busbar systems | yes | yes | yes | -- |
| Busbar adapters | yes | yes | yes | yes |
| Door-coupling rotary operating mechanisms | -- | yes | yes | yes |
| Link modules | yes | yes | yes | yes |
| Enclosures for surface mounting | yes | yes | yes | -- |
| Feed terminal | yes | yes | yes | -- |

1) For symmetrical loading of the three phases
2) 500 VAC with moulded-plastic enclosure
yes: Has this function or can use this accessory.
-- : does not have this function or cannot use this accessory.

## Mounting location and function

The BES motor protection switches have three main contact elements. In order to achieve maximum flexibility, auxiliary switches, signalling switches, auxiliary trip units and door coupling rotary operating mechanism can be supplied separately.
These components can be fitted as required on the motor protection switches without using tools.

| Front side | Transverse auxiliary switches | An auxiliary switch block can be inserted transversely on the front. |
| :--- | :--- | :--- |
| Notes: | $1 \mathrm{NO}+1 \mathrm{NC} / 2 \mathrm{NO}$ | The overall width of the motor protection switches remains unchanged. |

A maximum of 4 auxiliary contacts with auxiliary switches can be attached to each motor protection switch.

| A maximum of 4 auxiliary contacts with auxiliary switches can be attached to each motor protection switch. Auxiliary switches ( 2 contacts) and signalling switches can be mounted separately or together. | Lateral auxiliary switches $\begin{aligned} & \text { (2 contacts) } \\ & 1 \mathrm{NO}+1 \mathrm{NC} / 2 \mathrm{NO} \end{aligned}$ | One of the two auxiliary switches can be mounted laterally for each motor protection switches The contacts of the auxiliary switch close and open together with the main contacts of the motor protection switches. The overall width of the lateral auxiliary switch with 2 contacts is 9 mm . |
| :---: | :---: | :---: |
|  | Signalling switches for sizes $\mathbf{0 , 2} 2$ and $\mathbf{3}$ <br> Tripping $1 \mathrm{NO}+1 \mathrm{NC}$ Short-circuit $1 \mathrm{NO}+1 \mathrm{NC}$ | One signalling switch can be mounted at the side of each motor protection switches with a rotary operating mechanism. The signalling switch has two contact systems. One contact system always signals tripping irrespective of whether this was caused by a short-circuit, an overload or an auxiliary trip unit. The other contact system only switches in the event of a short-circuit. There is no signalling as a result of switching off with the handle. In order to be able to switch on the motor protection switches again after a short-circuit, the signalling switch must be reset manually after the error cause has been eliminated. The overall width of the signalling switch is 18 mm . |
| Right-hand side Notes: | Shunt trip units | For remote-controlled tripping of the motor protection switches. The release coil should only be energized for short periods (see schematics). |
| One auxiliary trip unit can be mounted per motor protection switch. | or |  |
|  | Undervoltage releases | Trips the motor protection switches when the voltage is interrupted and prevents the motor from being restarted accidentally when the voltage is restored. Used for remote-controlled tripping of the motor protection switches. Particularly suitable for EMERGENCY-STOP disconnection by way of the corresponding EMERGENCYSTOP pushbutton according to DIN VDE 0113. |

## Motor Protection Switches Series BES - General Information

## Schrack-Info

Motor Protection Switches BES are used for the switching and protecting of 3 -phase motors up to 45 kW at 400 VAC , as well as for electrical consumers up to 100 A .

## TYPE OF CONSTRUCTION

The motor protection switches are available in four sizes:

- Size 00 - width 45 mm , max. rated current 12 A, At 400 VAC suitable for induction motors up to 5.5 kW
- Size 0 - width 45 mm , max. rated current $25 \mathrm{~A}, \mathrm{At} 400 \mathrm{VAC}$ suitable for induction motors up to 11 kW
- Size 2 - width 55 mm , max. rated current 50 A, At 400 VAC suitable for induction motors up to 22 kW
- Size 3 - width 70 mm , max. rated current $100 \mathrm{~A}, \mathrm{At} 400 \mathrm{VAC}$ suitable for induction motors up to 45 kW


## SCREW TERMINALS

BES motor protection switches of sizes 00 and 0 are fitted with terminals with captive screws and clamping pieces, allowing the connection of 2 conductors with different cross-sections. The box terminals of the size 2 and 3 motor protection switches also enable 2 conductors with different cross-sections to be connected. With the exception of size 3 motor protection switches which are equipped with 4 mm Allen screws, all terminal screws are tightened with a Pozidriv screwdriver size 2 . The box terminals of the size 3 motor protection switches can be removed in order to connect conductors with cable lugs or connecting bars. A terminal cover is available as touch protection and to ensure that the required clearances and creepage distances are maintained if the box terminals are removed.

## MOUNTING

The motor protection switches are snap-fitted an a 35 mm standard mounting rail. A standard mounting rail with a height of 15 mm is required for size 3 motor protection switches. A 75 mm standard mounting rail can be used as an alternative for size 3 . Size 2 and 3 motor protection switches can also be screwed directly onto a base plate. When mounting the motor protection switches, the following clearances must be maintained to grounded or live parts and to cable ducts made of molded plastic.

- Clearences to Grounded or Live Parts


| Motor protection switches / circuit breakers |  |  | Distance to grounded or live parts acc. To IEC 60947-2 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Type | Size | I 。 | Y | X | Z |
|  |  | $\checkmark$ | mm | mm | mm |
| BESD | 00 | up to 690 | 20 | 70 | 9 |
| BESO | 0 | up to 500 | 30 | 90 | 9 |
|  |  | up to 690 | 50 | 90 | 30 |
| BES2 | 2 | up to 690 | 50 | 140 | 30 |
| BES3 | 3 | up to 240 | 50 | 167 | 10 |
|  |  | up to 440 | 70 | 167 | 10 |
|  |  | up to 500 | 110 | 167 | 10 |
|  |  | up to 690 | 150 | 167 | 30 |

## TRIP UNITS

BES motor protection switches are equipped with

- inverse-time delayed overload release based on the bimetal principle
- instantaneous electronic trip units (electromagnetic short-circuit releases)

The Motor protection switch BES can be adjusted to the rated current of the load.
Its short circuit release is automatically fixed to 13 times of rated current, to enable an unproblematic "running up" of the motor. When BES size 00 trips, its rocker changes to position "OFF", at BES size 0 up to size 3 the rotary operating handle changes to position "TRIP" and optical indicates a tripping.
Before switching on again, the handle has to be moved mechanical in the "OFF"-position, to prevent a unwanted switching on to an existing short circuit. The tripping of BES with rotary handle can a be monitored electrically by an additional signalling switch BEZOOOO5.

## TRIP CLASSES

The trip classes of thermally delayed trip units are based on the tripping time ( $t$ A ) at 7.2 times the set current in cold state (excerpt from IEC 60947-4):

- CLASS 10: $4 \mathrm{~s}<\dagger \mathrm{A}<10 \mathrm{~s}$

The motor protection switches must trip within this time!

## OPERATING MECHANISMS

Size 00 motor protection switches are actuated by a rocker operating mechanism and size 0,2 and 3 motor protection switches by a rotary operating mechanism. If the motor protection switches trips, the rotary operating mechanism switches to the tripped position to indicate this. Before the motor protection switches is reclosed, the rotary operating mechanism must be reset manually to the 0 position. Only then can the motor protection switches be set again to the I position. In the case of motor protection switches with rotary operating mechanisms, an electrical signal can be output by a signalling switch to indicate that the motor starter protector has tripped. All operating mechanisms can be locked in the 0 position with a padlock (shackle diameter 3.5 mm to 4.5 mm ). The motor protection switches isolating function complies with IEC 60947-2.

## PREVENTION OF UNINTENDED TRIPPING

In order to prevent premature tripping due to the integrated phase failure sensitivity, motor protection switches should always be connected to ensure current flows through all three main current paths.

## SHORT-CIRCUIT PROTECTION

If a short-circuit occurs, the short-circuit releases of BES motor protection switches isolate the faulty load feeder from the network and thus prevent further damage. Motor protection switches with a short-circuit breaking capacity of 50 kA or 100 kA are virtually short-circuit resistant at a voltage of 400 VAC , since higher short-circuit currents are not to be expected in practice.

## MOTOR PROTECTION

The tripping characteristics of BES motor protection switches are designed mainly to protect induction motors. The motor protection switches are therefore also referred to as motor circuit breakers. The rated current In of the motor to be protected is set on the setting scale. Factory setting of the short-circuit release is 13 times the rated current of the motor protection switches. This permits trouble-free starting and ensures that the motor is properly protected. The phase failure sensitivity of the motor protection switches ensures that it is tripped in time in the event of a phase failure and overcurrents that occur as a result in the other phases. Motor protection switches with thermal overload releases are normally designed in accordance with trip class 10.

## Motor Protection Switches Series BES - General Information

## SYSTEM PROTECTION

The BES motor protection switches for motor protection are also suitable for plant protection. In order to prevent premature tripping due to phase failure sensitivity, the three conducting paths must always be uniformly loaded. The conducting paths must be connected in series the case of single-phase loads.

## MAIN AND EMERGENCY-STOP SWITCHES

The BES motor protection switches comply with the isolating function to IEC 60947-2, therefore they can be used - taking IEC 60204 - 1 into account - as main and EMERGENCY-STOP switches. BES door-coupling rotary operating mechanisms for heavy duty also comply with the requirements for the isolating function.

USE IN IT SYSTEMS (IT NETWORKS)
BES motor protection switches are suitable for operation in IT systems according to IEC 60947-2. In the event of a 3-pole short-circuit, their response in this system is the same as in others: Therefore, the same short-circuit breaking capacity $I_{c u}$ and $I_{c s}$ applies, see "Technical specifications". An initial fault (ground fault) does not necessarily force immediate disconnection of the network when operating IT systems. If a second independent error occurs (ground fault), the switching capacity of the motor protection switches might be reduced. This is the case if both ground faults occur in different phases and if one of the ground faults occurs on the input side and the other on the outgoing terminal of the motor protection switches. In order to maintain the short-circuit function of the motor protection switches even with two independent ground faults (double ground faults), the reduced short-circuit breaking capacity with double ground faults must be taken into account in IT systems I culT (see "Technical specifications"). If a ground fault is instantaneously recognized and remedied (groundfault monitoring), the risk of double ground fault and thus reduced short-circuit breaking capacity I culT can be minimized.

## SWITCHING OF DC CURRENTS

BES motor protection switches for alternating currents are also suitable for DC switching. The maximum permissible DC voltage per conducting path must, however, be adhered to. Higher voltages require a series connection with 2 or 3 conducting paths. The response values of the overload release remain unchanged; the response values of a short-circuit release increase by approximately $30 \%$ for DC. The example circuits for DC switching can be seen in the table below.

Example Circuit for Size 00 to 3 BES

## Motor Protection Switches



|  | Maximum <br> permitted <br> DC voltage | Notes |
| :--- | :--- | :--- |
| 1 | Ue | 2-pole switching, non-grounded system <br> If there is no possibility of a ground fault, or if every ground fault is <br> rectified immediately <br> (ground-fault monitoring), then the maximum permitted DC voltage <br> can be tripled. |
| 2 | 300VDC | 2-pole switching, grounded system <br> The grounded pole is always assigned to the individual conducting <br> path, so that there <br> are always 2 conducting paths in series in the event of a ground fault. |
| 3 | 450VDC | 1-pole switching, grounded system <br> 3 conducting paths in series. The grounded pole is assigned to the <br> unconnected <br> conducting path. |
| 1) It is assumed that this circuit always provides safe disconnection even in the event of a <br> double ground fault that bridges two contacts. |  |  |

Technical Specification - Motor Protection Switches Series BES

## Motor Protection Switches Series BES - Size 00 up to 3

This table shows the rated ultimate short-circuit breaking capacity $\mathrm{I}_{\mathrm{cv}}$ and the rated service short-circuit breaking capacity $\mathrm{I}_{\mathrm{cs}}$ of the BES motor protection switches with different inception voltages dependent of the rated current $I_{n}$ of the motor protection switches. Motor protection switches infeed is permissible at the upper or lower terminals without restricting the rated data. If the short-circuit current at the place of installation exceeds the rated short-circuit breaking capacity of the motor protection switches as specified in the table, a back-up fuse is required. Alternatively, a motor protection switches with a limiter function can be connected upstream. The maximum rated current for the back-up fuse is specified in the tables. The rated ultimate short-circuit breaking capacity then applies as specified on the fuse.


## Motor Protection Switches Series BES - Size 00 up to 3

BES motor protection switches are suitable for operation in IT systems. Values valid for triple-pole short-circuit are $I_{c u}$ up to $I_{c s}$. In case of double ground fault on different phases at the input and output side of a motor protection switches, the special short-circuit breaking capacity $I_{\text {cult }}$ applies. The specifications in the table below apply to BES motor protection switches. In the coloured areas, $\mathrm{I}_{\text {cult }}$ is 100 kA , or in some ranges it is 50 kA . Therefore the motor protection switches are short-circuit resistant in these ranges. If the short-circuit current at the place of installation exceeds the rated short-circuit breaking capacity of the motor protection switches as specified in the table, a back-up fuse is required. The maximum rated current for the back-up fuse is specified in the tables. The rated short-circuit breaking capacity then applies as specified on the fuse.


Technical Specification - Motor Protection Switches Series BES

Motor Protection Switches Series BES - Size 00 up to 3


Max. switching frequency per hour (motor starts)
1/h
2) Above $+60^{\circ} \mathrm{C}$ current reduction
3) 500 V with moulded-plastic enclosure.
4) Terminal compartment IPOO.
5) With appropriate accessories.

Motor Protection Switches Series BES - Size 00 up to 3

| Type |  | BESD | BESO | BES2 | BES3 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Connection type |  | Screw terminals |  | Screw terminals with box terminals |  |
| Terminal screw |  | Pozidriv size 2 |  | Pozidriv size 2 | 4 mm Allen screw |
| Prescribed tightening torque | Nm | 0.8...1.2 | 2...2.5 | 3...4.5 | 4... 6 |
| Conductor cross-sections ( 1 or 2 conductors connectable) |  |  |  |  |  |
| - Solid | $\mathrm{mm}^{2}$ | $\begin{gathered} 2 \times(0.5 \ldots 1.5)^{4)} \\ 2 \times(0.75 \ldots 2.5)^{4)} \\ \hline \end{gathered}$ | $\begin{aligned} & 2 \times(1 \ldots 2.5)^{4} \\ & 2 \times(2.5 \ldots 6)^{4} \\ & \hline \end{aligned}$ | $2 \times(0.75 \ldots 16)$ | $2 \times(2.5 \ldots .16)$ |
| Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $\begin{gathered} \hline 2 \times(0.5 \ldots 1.5)^{4)} \\ \left.2 \times(0.75 \ldots .5)^{4}\right) \\ \hline \end{gathered}$ | $\begin{aligned} & \hline 2 \times(1 \ldots 2.5)^{4} \\ & 2 \times(2.5 \ldots 6)^{4} \\ & \hline \end{aligned}$ | $\begin{aligned} & 2 \times(0.75 \ldots 16), \\ & 1 \times(0.75 \ldots 25) \end{aligned}$ | $\begin{aligned} & \hline 2 \times(2.5 \ldots 35), \\ & 1 \times(2.5 \ldots 50) \\ & \hline \end{aligned}$ |
| - Stranded | $\mathrm{mm}^{2}$ | $\begin{gathered} \hline 2 \times(0.5 \ldots 1.5)^{44} \\ 2 \times(0.75 \ldots 2.5)^{4} \\ \hline \end{gathered}$ | $\begin{aligned} & 1 \times(1 \ldots 2.5)^{4} \\ & 2 \times(2.5 \ldots 6) \\ & \hline \end{aligned}$ | $\begin{gathered} 2 \times(0.75 \ldots 25), \\ 1 \times(0.75 \ldots 35) \end{gathered}$ | $\begin{aligned} & 2 \times(10 \ldots 50), \\ & 1 \times(10 \ldots 50) \end{aligned}$ |
| - AWG cables, solid or stranded | AWG | $2 \times(18 \ldots 14)$ | $2 \times(14 . . .10)$ | $\begin{aligned} & 2 \times(18 \ldots 2), \\ & 1 \times(18 \ldots 2) \end{aligned}$ | $\begin{aligned} & 2 \times(10 \ldots 1 / 0), \\ & 1 \times(10 \ldots 2 / 0) \end{aligned}$ |
| Ribbon cable conductors (number $\times$ width $\times$ thickness) | mm | -- |  | $2 \times(6 \times 9 \times 0.8)$ |  |
| Removable box terminals ${ }^{1 /}$ <br> - With copper bars ${ }^{21}$ <br> - With cable lugs ${ }^{31}$ |  | -- |  |  | $\begin{gathered} 18 \times 10 \\ \text { up to } 2 \times 70 \\ \hline \end{gathered}$ |
| Connection type |  | Cage Clamp terminals on request |  |  |  |
| Conductor cross-sections ( 1 or 2 conductors connectable) <br> - Solid <br> - Finely stranded with end sleeve <br> - Finely stranded without end sleeve <br> - AWG cables, solid or stranded | $\begin{aligned} & \mathrm{mm}^{2} \\ & \mathrm{~mm}^{2} \\ & \mathrm{~mm}^{2} \\ & \text { AWG } \end{aligned}$ | $\begin{gathered} 2 \times(0.25 \ldots 2.5) \\ 2 \times(0.25 \ldots . .1 .5) \\ 2 \times(0.25 \ldots . .2 .5) \\ 2 \times(24 \ldots .14) \end{gathered}$ | -- |  |  |
| Max. external diameter of the cable insulation | mm | 3.6 |  |  |  |

1) Cable-lug and busbar connection possible after removing the box terminals.
2) If bars larger than $12 \mathrm{~mm} \times 10 \mathrm{~mm}$ are connected, a terminal cover is needed to comply with the phase clearance (on request).
3) If conductors larger than $25 \mathrm{~mm}^{2}$ are connected, a terminal cover is needed to comply with the phase clearance (on request).
4) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified.

If identical cross-sections are used, this restriction does not apply.

Technical Specification - Motor Protection Switches Series BES

## Motor Protection Switches Series BES - Size 00 up to 3

Motor protection switches of the BES series are approved for UL/CSA and according to UL 508 and CSA C22.2 No. 14 they can be used on their own or as a load feeder in combination with a contactor. These motor protection switches can be used as "Manual Motor Controllers" for "Group Installations", as
"Manual Motor Controllers Suitable for Tap Conductor Protection in Group Installations" and as "Self-Protected Combination Motor Controllers" (Type E).
BES motor protection switches as "Manual Motor Controllers"
If used as a "Manual Motor Controller", the motor protection switches is always operated in combination with an upstream short-circuit protection device.
Approved fuses or a circuit breaker according to UL489/CSAC22.2 No. 5-02 can be used. These devices must be dimensioned according to the National Electrical
Code (UL) or Canadian Electrical Code (CSA).

| Motor protection switches |  | hp rating ${ }^{1 /}$ for $\mathrm{FLA}^{2)}$ |  | Rated current | 240VAC |  | 480VAC |  | 600VAC |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | max. |  | $\mathrm{I}_{\mathrm{n}}$ | UL | CSA | UL | CSA | UL | CSA |
|  |  |  |  |  | $\mathrm{Ibc}^{3}{ }^{\text {a }}$ | $\mathrm{Ibc}^{3}{ }^{\text {a }}$ | $\mathrm{Ibc}^{3 /}$ | $\mathrm{Ibc}^{3}{ }^{\text {a }}$ | $\mathrm{Ibc}^{3 /}$ | $\mathrm{Ibc}^{3}{ }^{\text {a }}$ |
| Type | V | 1-phase | 3 -phase | A | kA | kA | kA | kA | kA | kA |


| Size 00 |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| BESD |  |  |  | 0.16 ... 2 | 65 | 65 | 65 | 65 | 10 | 10 |
|  |  |  |  | 2.5 | 65 | 65 | 65 | 65 | 10 | 10 |
| $\begin{aligned} & \text { FLA }^{2)} \text { max. 12A, } \\ & 600 \mathrm{~V} \end{aligned}$ | 115 | 1/2 | -- | 3.2 | 65 | 65 | 65 | 65 | 10 | 10 |
|  | 200 | 11/2 | 3 | 4 | 65 | 65 | 65 | 65 | 10 | 10 |
| NEMA size 00 | 230 | 2 | 3 | 5 | 65 | 65 | 65 | 65 | 10 | 10 |
|  | 460 | -- | 71/2 | 6.3 | 65 | 65 | 65 | 65 | 10 | 10 |
|  | 575/600 | -- | 10 | 8 | 65 | 65 | 65 | 65 | 10 | 10 |
|  |  |  |  | 10 | 65 | 65 | 65 | 65 | 10 | 10 |
|  |  |  |  | 12 | 65 | 65 | 65 | 65 | 10 | 10 |


| Size 0 |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| BESO |  |  |  | 0.16 ... 3.2 | 65 | 65 | 65 | 65 | 30 | 30 |
|  |  |  |  | 4 | 65 | 65 | 65 | 65 | 30 | 30 |
| FLA ${ }^{2)}$ max. 25A,600V | 115 | 2 | -- | 5 | 65 | 65 | 65 | 65 | 30 | 30 |
|  | 200 | 3 | 5 | 6.3 | 65 | 65 | 65 | 65 | 30 | 30 |
| NEMA size 1 | 230 | 3 | 71/2 | 8 | 65 | 65 | 65 | 65 | 30 | 30 |
|  | 460 | -- | 15 | 10 | 65 | 65 | 65 | 65 | 30 | 30 |
|  | 575/600 | -- | 20 | 12.5 | 65 | 65 | 65 | 65 | 30 | 30 |
|  |  |  |  | 16 | 65 | 65 | 65 | 65 | 10 | 10 |
|  |  |  |  | 20 | 65 | 65 | 65 | 65 | 10 | 10 |
|  |  |  |  | 22 | 65 | 65 | 65 | 65 | 10 | 10 |
|  |  |  |  | 25 | 65 | 65 | 65 | 65 | 10 | 10 |


| Size 2 |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| BES2 |  |  |  | 16 | 65 | 65 | 65 | 65 | 30 | 25 |
|  |  |  |  | 20 | 65 | 65 | 65 | 65 | 30 | 25 |
| FLA ${ }^{2)}$ max. 50A, | 115 | 3 | -- | 25 | 65 | 65 | 65 | 65 | 30 | 25 |
| 600 V | 200 | 71/2 | 15 | 32 | 65 | 65 | 65 | 65 | 30 | 25 |
| NEMA size 2 | 230 | 10 | 20 | 40 | 65 | 65 | 65 | 65 | 30 | 25 |
|  | 460 | -- | 40 | 45 | 65 | 65 | 65 | 65 | 30 | 25 |
|  | 575/600 | -- | 50 | 50 | 65 | 65 | 65 | 65 | 30 | 25 |
| Size 3 |  |  |  |  |  |  |  |  |  |  |
| BES3 |  |  |  | 16 | 65 | 65 | 65 | 65 | 30 | 30 |
|  |  |  |  | 20 | 65 | 65 | 65 | 65 | 30 | 30 |
| FLA ${ }^{2)}$ max. 99A, | 115 | 71/2 | -- | 25 | 65 | 65 | 65 | 65 | 30 | 30 |
| 600 V | 200 | 20 | 30 | 32 | 65 | 65 | 65 | 65 | 30 | 30 |
| NEMA size 3 | 230 | 20 | 40 | 40 | 65 | 65 | 65 | 65 | 30 | 30 |
|  | 460 | -- | 75 | 50 | 65 | 65 | 65 | 65 | 30 | 30 |
|  | 575/600 | -- | 100 | 63 | 65 | 65 | 65 | 65 | 30 | 30 |
|  |  |  |  | 75 | 65 | 65 | 65 | 65 | 30 | 30 |
|  |  |  |  | 90 | 65 | 65 | 65 | 65 | 10 | 10 |
|  |  |  |  | 100 | 65 | 65 | 65 | 65 | 10 | 10 |

1) hp rating = Power rating in horse power (maximum motor rating).
2) FLA = Full Load Amps/Motor full load current.
3) Complies with "short-circuit breaking capacity" according to UL.

## Motor Protection Switches Series BES - Size 00 up to 3

The application "Manual Motor Controllers" is only accepted by UL. CSA does not recognize this approval!
When application "Manual Motor Controller" according CSA is prescribed - an upstream short-circuit protection device - e.g. a certified pre-fuse or a motor protection switch according UL489 has to be used. These devices must apply to the current national regulations.

| Circuit breaker |  | hp ro |  | Rated current |  | Up to 480VAC | Up to 600VAC |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Type | V | 1-phase | 3 -phase | A | kA | kA | kA |
| Size 00 |  |  |  |  |  |  |  |
| BESD |  |  |  | 0.16 ... 0.8 | 65 | 65 | 10 |
|  |  |  |  | 1 | 65 | 65 | 10 |
| FLA ${ }^{2)}$ max. 8A, | 115 | 1/3 | -- | 1.25 | 65 | 65 | 10 |
| 480 V | 200 | 3/4 | 2 | 2 | 65 | 65 | 10 |
| NEMA size 0 | 230 | 1 | 2 | 2.5 | 65 | 65 | 10 |
|  | 460 | -- | 5 | 3.2 | 65 | 65 | 10 |
|  | 575/600 | -- | -- | 4 | 65 | 65 | 10 |
|  |  |  |  | 5 | 65 | 65 | 10 |
|  |  |  |  | 6.3 | 65 | 65 | 10 |
|  |  |  |  | 8 | 65 | 65 | 10 |
| Size 0 |  |  |  |  |  |  |  |
| BESO |  |  |  | 0.16 ... 1.6 | 65 | 65 | 30 |
|  |  |  |  | 2 | 65 | 65 | 30 |
| FLA ${ }^{2 /}$ max. | 115 | 2 | -- | 2.5 | 65 | 65 | 30 |
| 22A, 480V | 200 | 3 | 5 | 3.2 | 65 | 65 | 30 |
| 12.5A, 600 V | 230 | 3 | $71 / 2$ | 4 | 65 | 65 | 30 |
|  | 460 | -- | 15 | 5 | 65 | 65 | 30 |
| NEMA size 1 | 575/600 | -- | 10 | 6.3 | 65 | 65 | 30 |
|  |  |  |  | 8 | 65 | 65 | 30 |
|  |  |  |  | 10 | 65 | 65 | 30 |
|  |  |  |  | 12.5 | 65 | 65 | 30 |
| Size 2 |  |  |  |  |  |  |  |
| BES3 |  |  |  | 16 | 65 | 65 | 25 |
|  |  |  |  | 20 | 65 | 65 | 25 |
| FLA ${ }^{21}$ max. | 115 | 3 | -- | 25 | 65 | 65 | 25 |
| 50A, 600V | 200 | $71 / 2$ | 15 | 32 | 65 | 65 | 25 |
| NEMA size 2 | 230 | 10 | 20 | 40 | 65 | 65 | 25 |
|  | 460 | -- | 40 | 45 | 65 | 65 | 25 |
|  | 575/600 | -- | 50 | 50 | 65 | 65 | 25 |
| Size 3 |  |  |  |  |  |  |  |
| BES4 |  |  |  | 16 | 65 | 65 | 30 |
|  |  |  |  | 20 | 65 | 65 | 30 |
| FLA ${ }^{2 \prime}$ max. |  | $71 / 2$ | -- | 25 | 65 | 65 | 30 |
| 100A, 480V | 200 | 20 | 30 | 32 | 65 | 65 | 30 |
| 75A, 600V | 230 | 20 | 40 | 40 | 65 | 65 | 30 |
|  | 460 | -- | 75 | 50 | 65 | 65 | 30 |
| NEMA size 3 | 575/600 | -- | 75 | 63 | 65 | 65 | 30 |
|  |  |  |  | 75 | 65 | 65 | 30 |
|  |  |  |  | 90 | 65 | 65 | -- |
|  |  |  |  | 100 | 65 | 65 | -- |

[^36]Technical Specification - Motor Protection Switches Series BES

Motor Protection Switches Series BES - Accessories

| Type |  | Lateral auxiliary switches with $1 \mathrm{NO}+1 \mathrm{NC}$ and signalling switch | Transverse auxiliary switches with $1 \mathrm{NO}+1 \mathrm{NC}$ |
| :---: | :---: | :---: | :---: |
| Max. rated voltage |  |  |  |
| Acc. to NEMA (UL) | VAC | 600 | 250 |
| Acc. to NEMA (CSA) | VAC | 600 | 250 |
| Uninterrupted current | A | 10 | 2.5 |
| Switching capacity |  | A600 | C300 |
|  |  | Q300 | R300 |

Front transverse auxiliary switches (front mounted)
Switching capacity for different voltages
$1 \mathrm{NO}+1 \mathrm{NC}, 2 \mathrm{NO}$
Rated operational current $\mathrm{I}_{\mathrm{e}}$

| - At AC-15, alternating voltage |  |  |
| :---: | :---: | :---: |
| - 24 V | A | 2 |
| -230V | A | 0.5 |
| - 400V | A | -- |
| -690V | A | -- |
| - At AC-12 $=1 \mathrm{I}_{\text {th }}$, alternating Voltage |  |  |
| - 24V | A | 2.5 |
| - 230V | A | 2.5 |
| - 400V | A | -- |
| - 690V | A | -- |
| - At DC-13, direct voltage L/R 200ms |  |  |
| - 24V | A | 1 |
| - 48 V | A | 0.3 |
| -60V | A | 0.15 |
| - 110V | A | -- |
| -220V | A | -- |
| Minimum load capacity | V | 17 |
|  | mA | 1 |

Lateral auxiliary switches and signalling switch (side mounted)

Switching capacity for different voltages
$1 \mathrm{NO}+1 \mathrm{NC}, 2 \mathrm{NO}$ and signalling switch
Rated operational current $I_{\text {e }}$

| At AC-15, alternating Voltage |  |  |
| :---: | :---: | :---: |
| - 24 V | A | 6 |
| -230V | A | 4 |
| - 400V | A | 3 |
| -690V | A | 1 |
| - At AC-12 $=1 \mathrm{I}_{\text {th }}$, alternating Voltage |  |  |
| - 24 V | A | 10 |
| -230V | A | 10 |
| -400V | A | 10 |
| -690V | A | 10 |
| - At DC, direct Voltage L/R 200 ms |  |  |
| - 24 V | A | 2 |
| -110V | A | 0.5 |
| -220V | A | 0.25 |
| -440V | A | 0.1 |
| Minimum load capacity | V | 17 |
|  | mA | 1 |


| Power consumption |  |  |  |
| :---: | :---: | :---: | :---: |
|  |  |  |  |
| - During pick-up |  |  |  |
| - AC voltages | VA/W | 20.2 / 13 | 20.2 / 13 |
| - DC voltages | W | 20 | 13 ... 80 |
| - During continuous duty |  |  |  |
| - AC voltages | VA/W | 7.2 / 2.4 | -- |
| - DC voltages | W | 2.1 | -- |
| Response voltage |  |  |  |
| - Tripping | V | $0.35 \ldots 0.7 \times \mathrm{U}$ | -- |
| - Pickup | V | $0.85 \ldots 1.1 \times \mathrm{U}$ | $0.7 \ldots 1.1 \times \mathrm{U}_{5}$ |
| Maximum opening time | ms |  |  |

## Motor Protection Switches Series BES - Accessories

Short-circuit protection for auxiliary and control circuits

| Melting fuses gl/gG | A | 10 |  |
| :---: | :---: | :---: | :---: |
| Miniature circuit breaker, C characteristic | A | 6 | Prospective short-circuit current $<0.4 \mathrm{kA}$ |
| Conductor cross-sections for auxiliary and control circuits |  |  |  |
| Connection type |  | Screw terminals |  |
| Terminal screw |  | Pozidriv size 2 |  |
| Prescribed tightening torque NmConductor cross-sections (1 or $\mathbf{2}$ conductors) |  |  |  |
|  |  |  |  |
| - Solid | $\mathrm{mm}^{2}$ | $2 \times(0.5 \ldots 1.5)^{11} / 2 \times(0.75 \ldots 2.5)^{11}$ |  |
| - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.5 \ldots 1.5)^{11} / 2 \times(0.75 \ldots 2.5)^{11}$ |  |
| - Stranded | $\mathrm{mm}^{2}$ | $2 \times(0.5 \ldots 1.5)^{11} / 2 \times(0.75 \ldots 2.5)^{11}$ |  |
| AWG cables | AWG | $2 \times(18 \ldots 14)$ |  |
|  |  | Cage Clamp terminals (on request) |  |
| Conductor cross-sections ( 1 or 2 conductors connectable) |  |  |  |
| - Solid | $\mathrm{mm}^{2}$ | $2 \times(0.25$... 2.5$)$ |  |
| - Finely stranded with end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25$... 1.5) |  |
| - Finely stranded without end sleeve | $\mathrm{mm}^{2}$ | $2 \times(0.25 \ldots 2.5)$ |  |
| - AWG cables, solid or stranded | AWG | $2 \times(24 . . .14)$ |  |
| Max. external diameter of the cable insulation | mm | 3.6 |  |

1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

## Motor Protection Switches Series BES - Characteristic Curve

The time/current characteristic, the current limiting characteristics and the ${ }^{24}$ t characteristic curves were determined according to DIN VDE 0660 and IEC 60947.
The tripping characteristic applies to the time/current characteristic of DC and AC with a frequency of 0 Hz to 400 Hz
The characteristic curves apply to the cold state. At operating temperature, the tripping times of the thermal trip units are reduced to approximately $25 \%$.
Under normal operating conditions, all three poles of the device must be loaded. To protect single-phase or DC loads, the current paths must be connected in series. The shown characteristic curve for the motor protection switch BES is a typical, individual curves for all ranges are available (on request).

Representation of Typical Time / Current Characteristic of BES


## 1) Opening time

2) Current
3) 2 -pole loading Class 10
4) 3 -pole loading Class 10

## Solid State Contactor



Solid State Contactors for Analog Controlled Starting of Motors


Softstarter, 2-phase Controlled with Integrated Bypass


Solid State Reversing Contactor for Starting of 3-phase Motors


Torque Limiters


Softstarter, 3-phase Controlled


## Solid State Contactors

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## Solid State Contactors and Motor Controllers

## Solid State Contactor, Single Phase Controlled



## Schrack-Info

- Solid state contactors products of Schrack are designed for applications, where silently and bouncefree switching is advantageous and long life span without EMC problems in service is claimed.
- The noninductive drive and the switching at zero-crossing of voltage are further features that prevents undefined switching status - which are caused by conventional, mechanical contactors. Solid state contactors applies to actuating drives, power units with frequently Stop/Start processes as well as to drives with frequently change of rotation direction

|  | LAS12301 | LAS14301 | LAS14302 | LAS 14501 |
| :---: | :---: | :---: | :---: | :---: |
| Main contacts |  |  |  |  |
| Operational voltage | $\begin{gathered} \text { 12-240VAC } \\ 50 / 60 \mathrm{~Hz} \\ \hline \end{gathered}$ | $24-480 \mathrm{VAC} 50 / 60 \mathrm{~Hz}$ |  |  |
| Operational current AC-1/51 | 30A | 30A | 30A | 50A |
| Operational current AC-3 | 15A |  |  |  |
| Operational current AC-55b | 20A |  |  |  |
| Operational current AC-56a | 15A |  |  |  |
| Control |  |  |  |  |
| Control voltage | 5-24VDC | 5-24VDC | 24-230VAC/DC | 5-24VDC |
| min. response voltage | 4.25 VDC | 4.25 VDC | 20.4VAC/DC | 4.25 VDC |
| min. dropout voltage | 1.5 VDC | 1.5 VDC | 7.2VAC/DC | 1.5 VDC |
| Thermal and mechanical characteristic |  |  |  |  |
| Power loss at PD max. | 1.2W/A |  |  |  |
| Power loss at periodic duty | 1.2W/A $\times$ operating cycle |  |  |  |
| Cooling | natural convection |  |  |  |
| Mounting | vertical +/-30 |  |  |  |
| Mounting distance - vertical mounting | $0 \mathrm{~mm} /$ horizontal min. 80 mm |  |  |  |
| Mounting distance - horizontal mounting | max. 50\% operational currents at 0 mm (not recommended) |  |  |  |
| Operating temperature range according to EN60947-4-3 | -5 up to $40^{\circ} \mathrm{C}$ |  |  |  |
| Storage temperature range according to EN60947-4-3 | -20 up to $80^{\circ} \mathrm{C}$ |  |  |  |
| max. operating temperature | $60^{\circ} \mathrm{C}$ |  |  |  |
| Derating | $100 \%$ at $40^{\circ} \mathrm{C}, 80 \%$ at $50^{\circ} \mathrm{C}, 70 \%$ at $60^{\circ} \mathrm{C}$ |  |  |  |
| Width | 45 mm | 45 mm | 45 mm | 90 mm |
| Height | 94 mm | 94 mm | 94 mm | 94 mm |
| Depth | 128.1 mm | 128.1 mm | 128.1 mm | 124.3 mm |
| Protective equipment |  |  |  |  |
| Short-circuit protection Installation - fuse | max. $50 \mathrm{Agl} / \mathrm{gG}$ |  |  |  |
| Short-circuit protection Installation and solid-state contactors - fuse | max. $1800 \mathrm{~A}^{2} \mathrm{~s}$ |  |  |  |
| Thermal overload protection | optional: LASUP62 |  |  |  |

Dimensions
LAS12301, LAS14301,
LAS14302

## Solid State Contactor, Single Phase Controlled

| Wiring Connections (Module $45 / 90 \mathrm{~mm}$ ) <br> Wiring type with or without cable/sleeves and other type of terminals *UL tested |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| L1 T1 / L2 T2 / L3 T3 <br> M4 Power terminals | $\begin{gathered} 1 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 1.5-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 1-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | Pozidriv 2 <br> 1.2Nm Max. | 6 mm <br> 1.2 Nm Max. |
| L1 T1 / L2 T2 / L3 T3 <br> M3 Power terminals | $\begin{gathered} 1 \times 0.75-4 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{aligned} & \hline 2 \times 1 \\ & \mathrm{~mm}^{2} \end{aligned}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-2,5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | Pozidriv 1 0.5 Nm Max. | 4 mm <br> 0.5 Nm Max. |
| A1 A2 / 1112 Input terminals | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-0.75 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | N.A. | 3 mm <br> 0.5 Nm Max. |

Important: When using electric or pneumatic tools for screw terminals observe the maximum torque limits
Circuit Diagram


- Rated operational current up to 63 A AC-1

1) for LASUP62 (see "Accessories for Solid State Contactors and Controllers")
2) Control voltage A1-A2

| DESCRIPTION | AVAILABLE |
| :--- | :--- |
| $\mathbf{3 0 A}$ | ORDER NO. |
| $30 \mathrm{~A} / 12-230 \mathrm{VAC}$, control voltage 5-24VDC |  |
| $30 \mathrm{~A} / 24-480 \mathrm{VAC}$, control voltage 5-24VDC | LAS 12301 |
| $30 \mathrm{~A} / 24-480 \mathrm{VAC}$, control voltage 24-230VAC/DC | LAS14301 |
| 50 A |  |
| $50 \mathrm{~A} / 24-480 \mathrm{VAC}$, control voltage 5-24VDC | LAS14302 |

## Solid State Contactors and Motor Controllers

## Solid State Contactors, 2-phase Controlled



## Schrack-Info

- Solid state contactors products of Schrack are designed for applications, where silently and bouncefree switching is advantageous and long life span without EMC problems in service is claimed
- The noninductive drive and the switching at zero-crossing of voltage are further features that prevents undefined switching status - which are caused by conventional, mechanical contactors. Solid state contactors applies to actuating drives, power units with frequently Stop/Start processes as well as to drives with frequently change of rotation direction

|  | LAS22302 | LAS24301 | LAS24501 | LAS24502 |
| :---: | :---: | :---: | :---: | :---: |
| Main contacts |  |  |  |  |
| Operational voltage | 12-240VAC $50 / 60 \mathrm{~Hz}$ | 24-480VAC $50 / 60 \mathrm{~Hz}$ |  |  |
| Operational current AC-1/51 | 30 A ( $2 \times 15 \mathrm{~A}$ ) |  | 50A ( $2 \times 25 \mathrm{~A}$ ) |  |
| Operational current AC-3 | 15A (2x7.5A) |  |  |  |
| Operational current AC-55b | $20 \mathrm{~A}(2 \times 10 \mathrm{~A})$ |  |  |  |
| Operational current AC-56a | $7 \mathrm{~A}(2 \times 3.5 \mathrm{~A})$ |  |  |  |
| Control |  |  |  |  |
| Control voltage | 24-230VAC/DC | 5-24VDC | 5-24VDC | 24-230VAC/DC |
| min. response voltage | 20.4VAC/DC | 4,25VDC | 4,25VDC | 20.4VAC/DC |
| min. dropout voltage | 7.2VAC/DC | 1.5 VDC | 1.5 VDC | 7.2VAC/DC |
| Thermal and mechanical characteristic |  |  |  |  |
| Power loss at PD max. | $2.2 \mathrm{~W} / \mathrm{A}$ |  |  |  |
| Power loss at periodic duty | 2.2W/A x operating cycle |  |  |  |
| Cooling | natural convection |  |  |  |
| Mounting | vertical +/-30 |  |  |  |
| Mounting distance - vertical mounting | $0 \mathrm{~mm} /$ horizontal min. 80 mm |  |  |  |
| Mounting distance - horizontal mounting | max. 50\% operational current at 0 mm (not recommended) |  |  |  |
| Operating temperature range according to EN60947-4-3 | -5 up to $40^{\circ} \mathrm{C}$ |  |  |  |
| Storage temperature range according to EN60947-4-3 | -20 up to $80^{\circ} \mathrm{C}$ |  |  |  |
| max. operating temperature | $60^{\circ} \mathrm{C}$ |  |  |  |
| Derating | $100 \%$ at $40^{\circ} \mathrm{C}, 80 \%$ at $50^{\circ} \mathrm{C}, 70 \%$ at $60^{\circ} \mathrm{C}$ |  |  |  |
| Width | 45 mm | 45 mm | 90 mm | 90 mm |
| Height | 94 mm | 94 mm | 94 mm | 94 mm |
| Depth | 128.1 mm | 128.1 mm | 124.3 mm | 124.3 mm |
| Protective gear |  |  |  |  |
| Short-circuit protection installation - fuse | max. $50 \mathrm{~A} \mathrm{gl} / \mathrm{gG}$ |  |  |  |
| Short-circuit protection Installation and solid-state contactors - fuse | max. 1800A ${ }^{2}$ s |  |  |  |
| Thermal overload protection | optional: LASUP62 |  |  |  |

## Dimensions

LAS22302, LAS24301

## Solid State Contactors, 2-phase Controlled

| Wiring Connections (Module $45 / 90 \mathrm{~mm}$ ) <br> Wiring type with or without cable/sleeves and other type of terminals *UL tested |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| L1 T1 / L2 T2 / L3 T3 <br> M4 Power terminals | $\begin{gathered} 1 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 1.5-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 1-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | Pozidriv 2 <br> 1.2Nm Max. | 6 mm <br> 1.2 Nm Max. |
| L1 T1 / L2 T2 / L3 T3 <br> M3 Power terminals | $\begin{gathered} 1 \times 0.75-4 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{aligned} & \hline 2 \times 1 \\ & \mathrm{~mm}^{2} \end{aligned}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-2,5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | Pozidriv 1 0.5 Nm Max. | 4 mm 0.5 Nm Max. |
| A1 A2 / 1112 Input terminals | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-0.75 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | N.A. | 3 mm 0.5 Nm Max. |

Important: When using electric or pneumatic tools for screw terminals observe the maximum torque limits
Circuit Diagram


Rated operational current up to $50 \mathrm{~A} A \mathrm{~A}-1 / 2 \times 15 \mathrm{~A} A C-3$
Two independent single-pole contactors in one housing

1) for LASUP62 (see "Accessories for Solid State Contactors and Controllers")
2) Control voltage A1-A2
3) Control voltage A3-A4

| DESCRIPTION | AVAILABLE |
| :--- | :--- |
| $\mathbf{3 0 A}$ | ORDER NO. |
| 2 -pole, $2 \times 15 \mathrm{~A} / 1 \times 30 \mathrm{~A} / 12-230 \mathrm{VAC}$, control voltage $24-230 \mathrm{VAC} / \mathrm{DC}$ |  |
| 2 -pole, $2 \times 15 \mathrm{~A} / 1 \times 30 \mathrm{~A} / 24-480 \mathrm{VAC}$, control voltage $5-24 \mathrm{VDC}$ | LAS22302 |
| $\mathbf{5 0 A}$ | LAS24301 |
| 2 -pole, $2 \times 25 \mathrm{~A} / 1 \times 50 \mathrm{~A} / 24-480 \mathrm{VAC}$, control voltage $5-24 \mathrm{VDC}$ |  |
| 2 -pole, $2 \times 25 \mathrm{~A} / 1 \times 50 \mathrm{~A} / 24-480 \mathrm{VAC}$, control voltage $24-230 \mathrm{VAC} / \mathrm{DC}$ | LAS24501 |

## Solid State Contactors and Motor Controllers

## Solid State Contactors, 3-phase Controlled



## Schrack-Info

- Solid state contactors products of Schrack are designed for applications, where silently and bounce-free switching is advantageous and long life span without EMC problems in service is claimed
- The noninductive drive and the switching at zero-crossing of voltage are further features that prevents undefined switching status - oftentimes caused by conventional, mechanical contactors. Solid state contactors applies to actuating drives, power units with frequently Stop/Start processes as well as to drives with frequently change of rotation direction

|  | LAS32202 | LAS34102 | LAS34201 | LAS34202 | LAS36201 | LAS36202 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Main contacts |  |  |  |  |  |  |
| Operational voltage | $\begin{gathered} \hline 12-240 \mathrm{VAC} \\ 50 / 60 \mathrm{~Hz} \\ \hline \end{gathered}$ | $24-480 \mathrm{VAC} 50 / 60 \mathrm{~Hz}$ |  |  | $48-600 \mathrm{VAC} 50 / 60 \mathrm{~Hz}$ |  |
| Operational current AC-1/51 | 20A | 10A | 20A | 20A | 20A | 20A |
| Control |  |  |  |  |  |  |
| Control voltage | 24-230VAC/DC |  | 5-24VDC | 24-230VAC/DC | 5-24VDC | 24-230VAC/DC |
| min . response voltage | 20.4VAC/DC |  | 4.25 VDC | 20.4VAC/DC | 4.25 VDC | $20.4 \mathrm{VAC} / \mathrm{DC}$ |
| min . dropout voltage | 7.2VAC/DC |  | 1.5 VDC | 7.2VAC/DC | 1.5 VDC | 7.2VAC/DC |
| Thermal and mechanical characteristic |  |  |  |  |  |  |
| Power loss at PD max. | 3.3W/A |  |  |  |  |  |
| Power loss at periodic duty | 3.3W/A $\times$ operating cycle |  |  |  |  |  |
| Cooling | natural convection |  |  |  |  |  |
| Mounting | vertical +/-30 |  |  |  |  |  |
| Mounting distance - vertical mounting | $0 \mathrm{~mm} /$ horizontal min. 80 mm |  |  |  |  |  |
| Mounting distance - horizontal mounting | max. $50 \%$ operational currents at 0 mm (not recommended) |  |  |  |  |  |
| Operating temperature range according to EN60947-4-3 | -5 up to $40^{\circ} \mathrm{C}$ |  |  |  |  |  |
| Storage temperature range according to EN60947-4-3 | -20 up to $80^{\circ} \mathrm{C}$ |  |  |  |  |  |
| max. operating temperature | $60^{\circ} \mathrm{C}$ |  |  |  |  |  |
| Derating | $100 \%$ at $40^{\circ} \mathrm{C}, 80 \%$ at $50^{\circ} \mathrm{C}, 70 \%$ at $60^{\circ} \mathrm{C}$ |  |  |  |  |  |
| Width | 90 mm | 45 mm | 90 mm | 90 mm | 90 mm | 90 mm |
| Height | 94 mm | 94 mm | 94 mm | 94 mm | 94 mm | 94 mm |
| Depth | 124.3 mm | 128.1 mm | 124.3 mm | 124.3 mm | 124.3 mm | 124.3 mm |
| Protective gear |  |  |  |  |  |  |
| Short-circuit protection Installation - fuse | max. $50 \mathrm{Agl} / \mathrm{gG}$ |  |  |  |  |  |
| Short-circuit protection Installation and solid-state contactors - fuse | max. $450 \mathrm{~A}^{2}$ s |  |  |  |  |  |
| Thermal overload protection | optional: LASUP62 |  |  |  |  |  |

## Dimensions



## Solid State Contactors, 3-phase Controlled

| Wiring Connections (Module $45 / 90 \mathrm{~mm}$ ) <br> Wiring type with or without cable/sleeves and other type of terminals *UL tested |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| L1 T1 / L2 T2 / L3 T3 M4 Power terminals | $\begin{gathered} 1 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 1.5-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 1-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | Pozidriv 2 <br> 1.2Nm Max. | 6 mm <br> 1.2Nm Max. |
| L1 T1 / L2 T2 / L3 T3 M3 Power terminals | $\begin{gathered} 1 \times 0.75-4 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{aligned} & \hline 2 \times 1 \\ & \mathrm{~mm}^{2} \end{aligned}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-2,5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | Pozidriv 1 0.5 Nm Max. | 4 mm 0.5 Nm Max. |
| A1 A2 / 1112 Input terminals | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-0.75 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | N.A. | 3 mm <br> 0.5 Nm Max. |

Important: When using electric or pneumatic tools for screw terminals observe the maximum torque limits

## Circuit Diagram



Rated operational current up to $3 \times 20 \mathrm{~A} A C-1 / 10 \mathrm{~A} \mathrm{AC}-3$

1) for LASUP62 (see "Accessories for Solid State Contactors and Controllers")
2) Control voltage A1-A2

| DESCRIPTION | AVAILABLE |
| :--- | :--- |
| $\mathbf{1 0 A}$ | ORDER NO. |
| $10 \mathrm{~A} / 24-480 \mathrm{VAC}$, control voltage 24-230VAC/DC |  |
| 20A | LAS34102 |
| 20A/12-230VAC, control voltage 24-230VAC/DC | LAS32202 |
| 20A/24-480VAC, control voltage 5-24VDC | LAS36201 |
| 20A/24-480VAC, control voltage 24-230VAC/DC |  |
| 20A/48-600VAC, control voltage 5-24VDC | LAS36202 |
| 20A/48-600VAC, control voltage 24-230VAC/DC |  |

## Solid State Contactors and Motor Controllers

Solid State Contactors for Direct Starting of 3-phase Motors


## Schrack-Info

- Solid state contactor for direct starting of 3-phase motors fulfills the standard of EN60947-4-2 and has a required space of only 45 mm . A control voltage range of $24-60 \mathrm{VDC}$ or $24-480 \mathrm{VAC}$ and the operational current up to $15 \mathrm{~A}\left(\mathrm{AC}-3\right.$, at $40^{\circ} \mathrm{C}$ ) provides a wide range of applications within the realms of "silently switching"

|  | LAM34154 |
| :---: | :---: |
| Main contacts |  |
| Operational voltage | 400-480VAC 50/60Hz |
| Operational current AC-53/AC-4 | 15A AC-3 |
| Control |  |
| Control voltage | 24-60VDC / 24-480VAC |
| min. response voltage | 20.4VAC/DC |
| min. dropout voltage | 5VAC/DC |
| Thermal and mechanical characteristic |  |
| Power loss at PD max. | 2.2W/A |
| Power loss at periodic duty | 2.2W/A x operating cycle |
| Cooling | natural convection |
| Mounting | vertical +/-30 ${ }^{\circ}$ |
| Mounting distance - vertical mounting | $0 \mathrm{~mm} /$ horizontal min. 80 mm |
| Mounting distance - horizontal mounting | max. 50\% operational currents at 0 mm (not recommended) |
| Operating temperature range according to EN60947-4-3 | -5 up to $40^{\circ} \mathrm{C}$ |
| Storage temperature range according to EN60947-4-3 | -20 up to $80^{\circ} \mathrm{C}$ |
| max. operating temperature | $60^{\circ} \mathrm{C}$ |
| Derating | 100\% at $40^{\circ} \mathrm{C}, 80 \%$ at $50^{\circ} \mathrm{C}, 70 \%$ at $60^{\circ} \mathrm{C}$ |
| Width | 45 mm |
| Height | 94 mm |
| Depth | 128.1 mm |
| Protective gear |  |
| Short-circuit protection Installation - fuse | max. $50 \mathrm{~A} \mathrm{gL/gG}$ |
| Short-circuit protection Installation and solid-state contactor - fuse | max. 1800A ${ }^{2}$ s |
| Thermal overload protection | optional: LASUP62 |

Dimensions


## Solid State Contactors for Direct Starting of 3-phase Motors

| Wiring Connections (Module $45 / 90 \mathrm{~mm}$ ) <br> Wiring type with or without cable/sleeves and other type of terminals * UL tested |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| L1 T1 / L2 T2 / L3 T3 M4 Power terminals | $\begin{gathered} 1 \times 1.5-6 \\ \mathrm{~mm}^{2} \\ \hline \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 1.5-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 1-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | $\begin{gathered} \hline \text { Pozidriv } 2 \\ \text { 1.2Nm Max. } \end{gathered}$ | 6 mm <br> 1.2 Nm Max. |
| L1 T1 / L2 T2 / L3 T3 M3 Power terminals | $\begin{gathered} 1 \times 0.75-4 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-2,5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $1 \times 0.75-6$ | $\begin{gathered} 2 \times 0.75-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | Pozidriv 1 0.5 Nm Max. | 4 mm <br> 0.5 Nm Max. |
| A1 A2 / 1112 Input terminals | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-0.75 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | N.A. | 3 mm 0.5 Nm Max. |

Important: When using electric or pneumatic tools for screw terminals observe the maximum torque limits

- Circuit Diagram


1) for LASUP62 (see "Accessories for Solid State Contactors and Controllers")
2) Control voltage A1-A2

| DESCRIPTION | AVAILABLE |
| :--- | :--- |
| 3-pole, 15A/380-480VAC | $-\infty=0-1000$ |

## Solid State Contactors and Motor Controllers

Solid State Reversing Contactor for Starting of 3-phase Motors


## Schrack-Info

- Long life span, compact design and unlimited number of cycles per hour characterise these semiconductor based Reversing contactors. The devices apply especially to control of cranes and to conveyor- or packaging machines

|  | LAW34102 |
| :---: | :---: |
| Main contacts |  |
| Operational voltage | 400-480VAC 50/60Hz |
| Operational current AC-53, AC-4 | 10A AC-53/AC-3 / 8A AC-4 |
| Control |  |
| Control voltage | 24-230VAC/DC |
| min . response voltage | 20.4VAC/DC |
| min. dropout voltage | 7.2VAC/DC |
| Thermal and mechanical characteristic |  |
| Power loss at PD max. | 2.2W/A |
| Power loss at periodic duty | 2.2W/A x operating cycle |
| Cooling | natural convection |
| Mounting | vertical +/-30 |
| Mounting distance - vertical mounting | $0 \mathrm{~mm} /$ horizontal min. 80 mm |
| Mounting distance - horizontal mounting | max. 50\% Operational currents at 0 mm (not recommended) |
| Operating temperature range according to EN60947-4-3 | -5 up to $40^{\circ} \mathrm{C}$ |
| Storage temperature range according to EN60947-4-3 | -20 up to $80^{\circ} \mathrm{C}$ |
| max. operating temperature | $60^{\circ} \mathrm{C}$ |
| Derating | 100\% at $40^{\circ} \mathrm{C}, 80 \%$ at $50^{\circ} \mathrm{C}, 70 \%$ at $60^{\circ} \mathrm{C}$ |
| Width | 45 mm |
| Height | 94 mm |
| Depth | 128.1 mm |
| Protective gear |  |
| Short-circuit protection Installation - fuse | max. $50 \mathrm{~A} \mathrm{gL/gG}$ |
| Short-circuit protection Installation and solid-state contactor - fuse | max. $450 \mathrm{~A}^{2} \mathrm{~s}$ |
| Thermal overload protection | optional: LASUP62 |

Dimensions
LAW34102

## Solid State Reversing Contactor for Starting of 3-phase Motors

| Wiring Connections (Module $45 / 90 \mathrm{~mm}$ ) <br> Wiring type with or without cable/sleeves and other type of terminals * UL tested |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| L1 T1 / L2 T2 / L3 T3 M4 Power terminals | $\begin{gathered} 1 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 1.5-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 1-16 \\ \mathrm{~mm}^{2} \\ \hline \end{gathered}$ | $\begin{gathered} 2 \times 1-6 \\ \mathrm{~mm}^{2} \\ \hline \end{gathered}$ | N.A. | $\begin{gathered} \text { Pozidriv } 2 \\ \text { 1.2 Nm Max. } \end{gathered}$ | 6 mm <br> 1.2Nm Max. |
| L1 T1 / L2 T2 / L3 T3 M3 Power terminals | $\begin{gathered} 1 \times 0.75-4 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{aligned} & \hline 2 \times 1 \\ & \mathrm{~mm}^{2} \end{aligned}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-2,5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | $\begin{gathered} \text { Pozidriv } 1 \\ 0.5 \mathrm{Nm} \text { Max. } \end{gathered}$ | 4 mm <br> 0.5 Nm Max. |
| A1 A2 / 1112 Input terminals | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-0.75 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | N.A. | 3 mm <br> 0.5 Nm Max. |

Important: When using electric or pneumatic tools for screw terminals observe the maximum torque limits
Circuit Diagram


1) for LASUP62 (see "Accessories for Solid State Contactors and Controllers")
2) Control voltage, rotation clockwise
3) Control voltage, rotation anticlockwise

| DESCRIPTION | AVAILABLE |
| :--- | :--- |
| 3-pole, $10 \mathrm{~A} / 24-480 \mathrm{VAC} /$ DC | ORDER NO. |

## Solid State Contactors and Motor Controllers

## Solid State Contactors for Analog Controlled Starting of Motors



## Schrack-Info

- Der Solid state analog controllers have been designed for analog control of heating elements, infrared lamp radiators applications at the packaging industry.
- The high accuracy at the control of process temperatures is performed by phase angle or shock impuls. Universal control signals are: current loop ... $0-20 \mathrm{~mA}$ or $4-20 \mathrm{~mA}$ Control voltage ... $0-10 \mathrm{VDC}$ or potentiometer control 10 kOhm .

|  | LAA14306 |
| :---: | :---: |
| Main contacts |  |
| Operational voltage | 380-480VAC |
| Operational current AC-1/51 | 30A |
| Operational current AC-55b | 30A |
| Operational current AC-56a | 30A |
| Analogue control signals |  |
| Current loop control (voltage drop max. 3V) | 0-20mA / 20-0mA |
| Input resistance (impedance min. 300kOhm) | 0-10VDC / 10-0VDC |
| Manual control with potentiometer | $0-10 \mathrm{kOhm} / 10-0 \mathrm{kOhm}$ |
| External operating voltage / power supply | 24VAC/24DC max. 30mA |
| Thermal and mechanical characteristic |  |
| Power loss at PD max. | 1.2W/A |
| Power loss at periodic duty | 1,2W/A $\times$ operating cycle |
| Cooling | natural convection |
| Mounting | vertical +/-30 |
| Mounting distance - vertical mounting | $0 \mathrm{~mm} / \mathrm{horizontal}$ min. 80 mm |
| Mounting distance - horizontal mounting | max. $50 \%$ operational currents at 0 mm (not recommended) |
| Operating temperature range according to EN60947-4-3 | -5 up to $40^{\circ} \mathrm{C}$ |
| Storage temperature range according to EN60947-4-3 | -20 up to $80^{\circ} \mathrm{C}$ |
| max. operating temperature | $60^{\circ} \mathrm{C}$ |
| Derating | $100 \%$ at $40^{\circ} \mathrm{C}, 80 \%$ at $50^{\circ} \mathrm{C}, 70 \%$ at $60^{\circ} \mathrm{C}$ |
| Width | 45 mm |
| Height | 94 mm |
| Depth | 128.1 mm |
| Protective gear |  |
| Short-circuit protection Installation - fuse | max. $50 \mathrm{~A} \mathrm{gl/gG}$ |
| Short-circuit protection Installation and solid-state contactor - fuse | max. 1800A ${ }^{2}$ s |
| Thermal overload protection | optional: LASUP62 |

## Dimensions



## Solid State Contactors for Analog Controlled Starting of Motors

| Wiring Connections (Module $45 / 90 \mathrm{~mm}$ ) <br> Wiring type with or without cable/sleeves and other type of terminals * UL tested |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| L1 T1 / L2 T2 / L3 T3 M4 Power terminals | $\begin{gathered} 1 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 1.5-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \\ \hline \end{gathered}$ | $\begin{gathered} 1 \times 1-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | Pozidriv 2 <br> 1.2Nm Max. | 6 mm <br> 1.2 Nm Max. |
| L1 T1 / L2 T2 / L3 T3 <br> M3 Power terminals | $\begin{gathered} 1 \times 0.75-4 \\ \mathrm{~mm}^{2} \\ \hline \end{gathered}$ | $\begin{aligned} & \hline 2 \times 1 \\ & \mathrm{~mm}^{2} \\ & \hline \end{aligned}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-2,5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | $\begin{gathered} \text { Pozidriv } 1 \\ 0.5 \mathrm{Nm} \text { Max. } \end{gathered}$ | 4 mm <br> 0.5 Nm Max. |
| A1 A2 / 1112 Input terminals | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-0.75 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | N.A. | 3 mm <br> 0.5 Nm Max. |

Important: When using electric or pneumatic tools for screw terminals observe the maximum torque limits

## Circuit Diagram



1) for LASUP62 (see "Accessories for Solid State Contactors and Controllers")
2) External power supply 24 VAC or 24 VDC , max 30 mA

| DESCRIPTION | AVAILABLE |
| :--- | :--- |
| $30 A$ | ORDER NO. |

## Accessories for Solid State Contactors and Controllers



## Schrack-Info

- For all Solid state contactor, Motor controllers, Reversing contactors and Analog controllers a Thermal overload relais is recommended. The optional thermal protection unit has to be snapped directly into the allocated space of device and wired to its accoding terminals. At overheating of Solid state contactor, the thermal protection unit disconnects the supply. Reset can be done manually or automatically according cooling down status of drive.

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |
| Thermal overload protection / thermostat | $-\infty=0$ |  |

## Torque Limiters and Soft Starters

## Torque Limiters



## Schrack-Info

- Torque limiter reduces by adjusting the starting torque the mechanical strain of drive is essentially reduced. Same design of devices for 1 - and 3-phase motors with adjustable running up time of 0.5 up to 5 seconds. Also the torque at starting is adjustable.


Dimensions


## Torque Limiters

| Wiring Connections (Module $45 / 90 \mathrm{~mm}$ ) <br> Wiring type with or without cable/sleeves and other type of terminals *UL tested |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| L1 T1 / L2 T2 / L3 T3 <br> M4 Power terminals | $\begin{gathered} 1 \times 1.5-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \\ \hline \end{gathered}$ | $\begin{gathered} 1 \times 1.5-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1.5-6 \\ \mathrm{~mm}^{2} \\ \hline \end{gathered}$ | $\begin{gathered} 1 \times 1-16 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 1-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | $\begin{gathered} \hline \text { Pozidriv } 2 \\ \text { 1.2Nm Max. } \end{gathered}$ | 6 mm <br> 1.2 Nm Max. |
| L1 T1 / L2 T2 / L3 T3 <br> M3 Power terminals | $\begin{gathered} 1 \times 0.75-4 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{aligned} & \hline 2 \times 1 \\ & \mathrm{~mm}^{2} \end{aligned}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-2,5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.75-6 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.75-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | Pozidriv 1 <br> 0.5 Nm Max. | 4 mm 0.5 Nm Max. |
| A1 A2 / 1112 Input terminals | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-0.75 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 1 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | $\begin{gathered} 2 \times 0.5-1.5 \\ \mathrm{~mm}^{2} \end{gathered}$ | N.A. | N.A. | $\begin{gathered} 3 \mathrm{~mm} \\ 0.5 \mathrm{Nm} \text { Max. } \end{gathered}$ |

Important: When using electric or pneumatic tools for screw terminals observe the maximum torque limits

## Circuit Diagram



1) for LASUP62 (see "Accessories for Torque Limiters and Soft Starters")

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |
| $15 A / 230-480 V A C$ | $-\infty$ | LAD34150 |
| $25 A / 230-480 V A C$ | LAD34250 | $-\infty=0$ |

## Torque Limiters and Soft Starters

Softstarter, 2-phase Controlled


## Schrack-Info

- The reduction of mechanical strikes at starting and vibations during operation are only two aspects for the application of semiconductor based Soffstarters. Not necessary replacement of Y-D assemblies, variable ratio transformers or series resistors and therefore increased flexibility makes Softstarters to an efficient solution. A wide range of products for variable power with rated currents up to 200A is available.
- Scopes of application are compressors, conveyors, water pumps and fans

|  | LAK32155 | LAK34155 | LAK34255 |
| :---: | :---: | :---: | :---: |
| Main contacts |  |  |  |
| Operational voltage | 208-240VAC 50/60Hz | $400-480$ VAC $50 / 60 \mathrm{~Hz}$ |  |
| Operational current AC-53a (without bypass) | 15A | 15A | 25A |
| Operational current AC-53b (with bypass) | - | - | - |
| Connection | 3-conductor |  |  |
| Class index AC-53a (without bypass) | X-Tx: 8-3: 100-3000 |  |  |
|  | 8 x rated current for max. 3s |  |  |
|  | 100\% duty cycle, 3000 Switching cycles / h |  |  |
| Load class | 10 or 10A |  |  |
| Leakage current | max. 5 mA |  |  |
| Load current | min .50 mA |  |  |
| Start time setting range | 0.5-10s |  |  |
| Stop time setting range | 0.5-10s |  |  |
| Torque adjustment | 0-85\% of the nominal torque Kick-Start (200ms) |  |  |
| Thermal overload relay | extern |  |  |
| Control |  |  |  |
| Control voltage | 24-230VAC/DC | 24-480VAC/DC |  |
| Active control range | - |  |  |
| Inactive control range | - |  |  |
| max. response voltage | 20.4VAC/DC |  |  |
| min. dropout voltage | 5VAC/DC |  |  |
| max. current for no operation | 1 mA |  |  |
| max. response time | 70 ms |  |  |
| max. current / power | $15 \mathrm{~mA} / 2 \mathrm{VA}$ |  |  |
| Thermal and mechanical characteristic |  |  |  |
| Power loss at PD max., without bypass | 2W/A without Bypass |  |  |
| Power loss at bridged contactor | max. 4W |  |  |
| Cooling | natural convection |  |  |
| Mounting | vertical +/-30 |  |  |
| Mounting distance - vertical mounting | $0 \mathrm{~mm} /$ horizontal min. 80 mm |  |  |
| Mounting distance - horizontal mounting | max. $50 \%$ operational currents at 0 mm (not recommended) |  |  |
| Operating temperature range according to EN60947-4-3 | -5 up to $40^{\circ} \mathrm{C}$ |  |  |
| Storage temperature range according to EN60947-4-3 | -20 up to $80^{\circ} \mathrm{C}$ |  |  |
| max. operating temperature | $60^{\circ} \mathrm{C}$ |  |  |
| Derating | $100 \%$ at $40^{\circ} \mathrm{C}, 80 \%$ at $50^{\circ} \mathrm{C}, 70 \%$ at $60^{\circ} \mathrm{C}$ |  |  |
| Rated insulation voltage $\mathrm{U}_{\mathrm{i}}$ | 660 V |  |  |
| Impulse withstand voltage $\mathrm{U}_{\text {imp }}$ | 4 kV |  |  |
| Installation category | III |  |  |
| Degree of protection | IP20 |  |  |
| Degree of pollution | 3 |  |  |
| Width | 45 mm | 45 mm | 90 mm |
| Height | 94 mm | 94 mm | 94 mm |
| Depth | 128.1 mm | 128.1 mm | 128.1 mm |
| Weight | 690 g | 690 g | 1150 g |
| Material | enclosure: PPO UL94V1; heat sink: aluminium; base plate: galvanized steel |  |  |
| Protective equipment |  |  |  |
| Short-circuit protection installation - fuse | $50 \mathrm{AgL} / \mathrm{gG}$ | $50 \mathrm{AgL} / \mathrm{gG}$ | 80A gl/gG |
| Short-circuit protection installation and solid-state contactor - fuse | $1800 \mathrm{~A}^{2} \mathrm{~s}$ | $1800 \mathrm{~A}^{2} \mathrm{~s}$ | $6300 \mathrm{~A}^{2} \mathrm{~s}$ |
| Thermal overload protection | LASUP62 |  |  |

Softstarter, 2-phase Controlled
Dimensions


| Wiring Connections (Module <br> 45/90mm) <br> Wiring type with or without <br> cable/sleeves and other type <br> of terminals *UL tested |
| :--- |
| L1 T1 / L2 T2 / L3 T3 <br> M4 Power terminals |
| L1 T1 / L2 T2 / L3 T3 <br> M3 Power terminals |
| A1 A2 / 11 12 |
| Input terminals |

Important: When using electric or pneumatic tools for screw terminals observe the maximum torque limits

## Circuit Diagram



1) for LASUP62 (see "Accessories for Torque Limiters and Soft Starters")
2) Control voltage

| DESCRIPTION | AVAILABLE | ORDER NO. |
| :--- | :--- | :--- |
| 3-pole, 2-phase controlled, 15A, 208-230VAC | LAK32155 |  |
| 3-pole, 2-phase controlled, 15A, 400-480VAC | LAK34155 |  |
| 3-pole, 2-phase controlled, 25A, 400-480VAC | LAK34255 |  |

## Torque Limiters and Soft Starters

## Softstarter, 2-phase Controlled with Integrated Bypass



Schrack-Info

- The reduction of mechanical strikes at starting and vibations during operation are only two aspects for the application of semiconductor based Softstarters. Not necessary replacement of Y-D assemblies, variable ratio transformers or series resistors and therefore increased flexibility makes Softstarters to an efficient solution. A wide range of products for variable power with rated currents up to 200A is available.
- Scopes of application are compressors, conveyors, water pumps and fans

|  | LAKA4 |  |  |
| :---: | :---: | :---: | :---: |
| Main contacts |  |  |  |
| Operational voltage | $3 \times 200 \mathrm{VAC}-440 \mathrm{VAC}(+10 \% /-15 \%) / 45-66 \mathrm{~Hz}$ |  |  |
|  | Operational current AC-53b (with bypass) - normal operation |  |  |
| Operational current AC-53b (with bypass) |  | at $40^{\circ}$ | at $50^{\circ}$ |
|  | LAKA4034 | 34A | 31 A |
|  | LAKA4042 | 42A | 38A |
|  | LAKA4048 | 48A | 44A |
|  | LAKA4060 | 60A | 55A |
|  | LAKA4075 | 75A | 69A |
|  | LAKA4085 | 85A | 78A |
|  | LAKA4100 | 100A | 100A |
|  | LAKA4140 | 140A | 133A |
|  | LAKA4170 | 170A | 157A |
|  | LAKA4200 | 200A | 186A |
| Class index 53b | 4-6:594 |  |  |
|  | 4 x rated current for max. 6 s |  |  |
|  | min . 594 s between start cycles |  |  |
| Connection | 3 -wire |  |  |
| Thermal overload relay | not integrated |  |  |
| Control |  |  |  |
| Control voltage | 100-240VAC (+10\%/-15\%) / 380-440VAC (+10\%/-15\%) |  |  |
| Power consumption - normal operation | $\leq 100 \mathrm{~mA}$ |  |  |
| Power consumption - start | $\leq 10 \mathrm{~mA}$ |  |  |
| Terminal Start N 1 | NO contact, max. 300VAC |  |  |
| Terminal Stop N2 | NC contact, max. 300VAC |  |  |

## Dimensions

## LAKA4034 - LAKA4100


[mm]

Softstarter, 2-phase Controlled with Integrated Bypass

- Circuit Diagrams
(1)

(2)


Examples:

1) LAKA soff starter installed with a motor protection switch/circuit breaker
2) LAKA soft starter installed with a motor protection switch/circuit breaker and line contactor K1M
a) Control voltage
b) Control contacts $13-14$ :
$\max 6 \mathrm{~A}$ at $30 \mathrm{VDC} / \mathrm{ACl1}$
$\max 2 \mathrm{~A}$ at $400 \mathrm{VAC} / \mathrm{ACl}$
Control Circuits

3) Two wire control
4) Three wire control
*Also resets the soff starter

| DESCRIPTION | AVAILABLE |
| :--- | :--- |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 34 \mathrm{~A}$ without motor protection | ORDER NO. |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 42 \mathrm{~A}$ without motor protection | LAKA4034 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 48 \mathrm{~A}$ without motor protection | LAKA4042 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 60 \mathrm{~A}$ without motor protection | LAKA4048 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 75 \mathrm{~A}$ without motor protection | LAKA4060 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 85 \mathrm{~A}$ without motor protection | LAKA4075 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 100 \mathrm{~A}$ without motor protection | LAKA4085 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 140 \mathrm{~A}$ without motor protection | LAKA4100 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 170 \mathrm{~A}$ without motor protection | LAKA4140 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 200 \mathrm{~A}$ without motor protection | LAKA4170 |

Torque Limiters and Soft Starters

Softstarter, 2-phase Controlled with Integrated Bypass and Function "Motor Protection"


Schrack-Info

- The reduction of mechanical strikes at starting and vibations during operation are only two aspects for the application of semiconductor based Softstarters. Not necessary replacement of Y-D assemblies, variable ratio transformers or series resistors and therefore increased flexibility makes Softstarters to an efficient solution. A wide range of products for variable power with rated currents up to 200A is available.
- Scopes of application are compressors, conveyors, water pumps and fans

|  | LAKS4 |  |  |
| :---: | :---: | :---: | :---: |
| Main contacts |  |  |  |
| Operational voltage | $3 \times 200 \mathrm{VAC}-440 \mathrm{VAC}(+10 \% /-15 \%) / 45-66 \mathrm{~Hz}$ |  |  |
|  | Operational current AC-53b (with bypass) - normal operation |  |  |
| Operational current AC-53b (with bypass) |  | at $40^{\circ}$ | at $50^{\circ}$ |
|  | LAKS034 | 34A | 31 A |
|  | LAKS042 | 42A | 38A |
|  | LAKS048 | 48A | 44A |
|  | LAKS060 | 60A | 55A |
|  | LAKS075 | 75A | 69A |
|  | LAKS085 | 85A | 78A |
|  | LAKS 100 | 100A | 100A |
|  | LAKS 140 | 140A | 133A |
|  | LAKS 170 | 170A | 157A |
|  | LAKS200 | 200A | 186A |
| Class index 53b | 4-6:594 |  |  |
|  | 4 x rated current for max. 6 s |  |  |
|  | min . 594 s between start cycles |  |  |
| Connection | 3 -wire |  |  |
| Thermal overload relay | integrated |  |  |
| Control |  |  |  |
| Control voltage | 100-240VAC (+10\%/-15\%) / 380-440VAC (+10\%/-15\%) |  |  |
| Power consumption - normal operation | s100m |  |  |
| Power consumption - start | $\leq 10 \mathrm{~mA}$ |  |  |
| Terminal Start N1 | NO contact, max. 300VAC |  |  |
| Terminal Stop N2 | NC contact, max. 300VAC |  |  |

Softstarter, 2-phase Controlled with Integrated Bypass and Function "Motor Protection"
Dimensions


## Circuit Diagrams



## Examples:

1) LAKS soff starter installed with a system protection circuit breaker complete with a shunt trip device
2) LAKS soff starter installed with a system protection circuit breaker and line contactor K1M
a) Control voltage
c) Auxiliary contact for "Trip"
b) Control contacts 13-14:
d) shunt release
$\max 6 \mathrm{~A}$ at $30 \mathrm{VDC} / \mathrm{AC} 11$
e) thermistor connection
$\max 2 \mathrm{~A}$ at $400 \mathrm{VAC} / \mathrm{ACl}$

Torque Limiters and Soft Starters

Softstarter, 2-phase Controlled with Integrated Bypass and Function „Motor Protection

- Control Circuits


1) Two wire control
2) Three wire control
*Also resets the soft starter

| DESCRIPTION | ORDER NO. |
| :--- | :--- | :--- |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 34 \mathrm{~A}$ with motor protection | LAKS4034 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 42 \mathrm{~A}$ with motor protection | LAKS4042 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 48 \mathrm{~A}$ with motor protection | LAKS4048 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 60 \mathrm{~A}$ with motor protection | LAKS4060 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 75 \mathrm{~A}$ with motor protection | LAKS4075 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 85 \mathrm{~A}$ with motor protection | LAKS4085 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 100 \mathrm{~A}$ with motor protection | LAKS4140 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 140 \mathrm{~A}$ with motor protection | LAKS4170 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 170 \mathrm{~A}$ with motor protection | LAKS4200 |
| 3-pole, 2-phase controlled $200-440 \mathrm{~V} / 200 \mathrm{~A}$ with motor protection |  |

Softstarter, 3-phase Controlled



## Schrack-Info

- The reduction of mechanical strikes at starting and vibations during operation are only two aspects for the application of semiconductor based Softstarters. Not necessary replacement of Y-D assemblies, variable ratio transformers or series resistors and therefore increased flexibility makes Softstarters to an efficient solution. A wide range of products for variable power with rated currents up to 200A is available.
- Scopes of application are compressors, conveyors, water pumps and fans

|  | LATB4355 | LATD4605 |
| :---: | :---: | :---: |
| Main contacts |  |  |
| Line voltage | 400-480VAC 50/60Hz |  |
| Operational current AC-53a (without Bypass) | 35A | 60A |
| Operational current AC-53b (with Bypass) | 50A | 86A |
| Connection | 3 -wires | 6-wires (Wurzel3) |
| Class index AC-53a (without Bypass) | X-Tx: 6-6: 100-120 |  |
|  | 6 x rated current for max. 6 s |  |
|  | 100\% duty cycle, 120 switching cycles / h |  |
| Class index AC-53b (with Bypass) | X-Tx: 6-6:30 |  |
|  | 6 -facher rated current for max. 6 s |  |
|  | min . 30 s between start cycles |  |
| Load class | 10 or 10A |  |
| Leakage current | max. 5 mA |  |
| Load current | min. 50 mA |  |
| Start time setting range | $0.5-30 \mathrm{~s}$ |  |
| Stop time setting range | $0.5-60 \mathrm{~s}$ |  |
| Torque adjustment | 0-85\% of the nominal torque Kick-Start (200ms) |  |
| Thermal overload relay | extern |  |
| Control |  |  |
| Control voltage | 24-480 VAC/DC |  |
| Active control range | $24-528$ VAC/DC |  |
| Inactive control range | 0-5 VAC/DC |  |
| max. response voltage | - |  |
| min. dropout voltage | - |  |
| max. current for no operation | 1 mA |  |
| max. response time | 70 ms |  |
| max. current / power | $15 \mathrm{~mA} / 2 \mathrm{VA}$ |  |
| Thermal and mechanical characteristic |  |  |
| Power loss at PD max., without bypass | 3W/A without bypass |  |
| Power loss at bridged contactor | $5 \mathrm{~W} / \mathrm{A}$ with bypass |  |
| Cooling | natural convection |  |
| Mounting | vertical +/-30 |  |
| Mounting distance - vertical mounting | $0 \mathrm{~mm} /$ horizontal min. 80 mm |  |
| Mounting distance - horizontal mounting | max. $50 \%$ operational currents at 0 mm (not recommended) |  |
| Operating temperature range according to EN60947-4-3 | -5 up to $40^{\circ} \mathrm{C}$ |  |
| Storage temperature range according to EN60947-4-3 | -20 up to $80^{\circ} \mathrm{C}$ |  |
| max. operating temperature | $60^{\circ} \mathrm{C}$ |  |
| Derating | $100 \%$ at $40^{\circ} \mathrm{C}, 80 \%$ at $50^{\circ} \mathrm{C}, 70 \%$ at $60^{\circ} \mathrm{C}$ |  |
| Rated insulation voltage $\mathrm{U}_{\mathrm{i}}$ | 660 V |  |
| Impulse withstand voltage $\mathrm{U}_{\text {imp }}$ | 4 kV |  |
| Installation category | III |  |
| Degree of protection | IP20 |  |
| Pollution degree | 3 |  |
| Width | 180 mm | 180 mm |
| Height | 140 mm | 140 mm |
| Depth | 144.8 mm | 144.8 mm |
| Weight | 2700 g | 2700 g |
| Material | enclosure: PPO UL94V1; heat sink: aluminium; base plate: galvanized steel |  |
| Protective equipment |  |  |
| Short-circuit protection installation - fuse | $125 \mathrm{~A} \mathrm{gl} / \mathrm{gG}$ | $125 \mathrm{~A} \mathrm{gl} / \mathrm{gG}$ |
| Short-circuit protection installation and solid-state contactor - fuse | $25300 \mathrm{~A}^{2} \mathrm{~s}$ | $25300 \mathrm{~A}^{2} \mathrm{~s}$ |
| Thermal overload protection | LASUP62 |  |

## Torque Limiters and Soft Starters

## Softstarter, 3-phase Controlled

Dimensions


| Die genannten Drahtstärken gelten für Anschlussdrähte mit und ohne Aderendhülsen oder andere löffreie Anschlussarten. |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| L1 T1 / L2 T2 / L3 T3 <br> *M6 Betriebsspannungsklemmen | $\begin{aligned} & 1 \times * 4- \\ & * 35 \mathrm{~mm}^{2} \end{aligned}$ | $\begin{aligned} & 2 \times * 2- \\ & 16 \mathrm{~mm}^{2} \end{aligned}$ | $\begin{aligned} & 1 \times 4- \\ & 35 \mathrm{~mm}^{2} \end{aligned}$ | $\begin{aligned} & 2 \times 4- \\ & 10 \mathrm{~mm}^{2} \end{aligned}$ | $\begin{gathered} 1 \times 4- \\ * 50 \mathrm{~mm}^{2} \end{gathered}$ | $\begin{aligned} & 2 \times 4- \\ & 16 \mathrm{~mm}^{2} \end{aligned}$ | N.A. | Pozidriv 3 4Nm, * $5,5 \mathrm{Nm}$ Max. | N.A. |

Wichtig: Wenn Sie für die Montage elektrisch oder pneumatisch betriebene Werkzeuge einsetzen, müssen Sie unbedingt auf die angegebenen maximalen Drehmomente achten.
Circuit Diagram


1) for LASUP62 (see "Accessories for Torque Limiters and Soft Starters")
2) Connections 13-14: for Start/Stop function
3) Control voltage A1-A2
4) Connections 23-24: for bypass protection

| DESCRIPTION | AVAILABLE |
| :--- | :--- |
| $35 A / 400-480 V A C$ | ORDER NO. |
| $60 \mathrm{~A} / 400-480 \mathrm{VAC}$ | LATB4355 |

Accessories for Torque Limiters and Soft Starters


## Schrack-Info

- For all Solid state contactor, Motor controllers, Reversing contactors and Analog controllers a Thermal overload relais is recommended. The optional thermal protection unit has to be snapped directly into the allocated space of device and wired to its accoding terminals. At overheating of Solid state contactor, the thermal protection unit disconnects the supply. Reset can be done manually or automatically according cooling down status of drive.

LASUP62

| DESCRIPTION | ORDER NO. |
| :--- | :---: |
| Thermal overload protection $/$ thermostat | LASAILABLE |


| A |  | Mechanical Interlock and Connection Clips | 241 | Relay Sockets for Schrack, Series MT | 50 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Auxiliary Contactors, Size 3, DC Coil | 193 | Mechanical Interlock for Contactors | 259 | Relay Sockets for Schrack, Series PT | 45 |
|  |  | Micro Auxiliary Contactors, Size M | 189 | Relay Sockets for Schrack, Series RT | 37 |
| C |  | Micro Contactors LA, Size M | 172 | Relay Sockets for Schrack, Series XT | 40 |
| Capacitor Switching Contactors LA, Size 3 | 195 | Mini Auxiliary Contactors, Size 1 | 191 | Relays | 4 |
| Connection Clips for Contactors | 260 | Mini Contactors LA, Size 1 | 174 | Reversing Contactor Combinations LS | 254 |
| Connection Link for Motor Protection Switches |  | Modular Contactors | 156 | Reversing Contactor Combinations |  |
| and Contactors | 243 | Modular Contactors „Amparo" AC-1, AC Coil | 163 | Series ALEA LSW | 254 |
| Contactors for Photovoltaic Plants | 187 | Modular Contactors „R" AC-1, AC Coil | 158 |  |  |
| Contactors Series CUBICO Classic, 3-pole | 269 | Modular Contactors „R" AC-1, ACDC Coil | 161 | S |  |
| Contactors Series CUBICO Mini | 266 | Modular Contactors „Amparo" AC-1, AC Coil | 163 | Sidemounted Auxiliary Contacts for Contactors |  |
| Contactors Series CUBICO Mini, 3-pole | 266 | Modular Contactors „R" AC-1, AC Coil | 158 | K3-24 to K3-115 | 198 |
|  |  | Modular Contactors „R" AC-1, ACDC Coil | 161 | Solder Pin Adapter | 242 |
| D |  | Modular Relays | 92 | Solid State Contactors | 452 |
| Diode Combination DBS | 154 | Motor Protection Relays Series LA | 378 | Star-Delta Contactor Combinations LSY | 261 |
| Direct on Line Starters D.O.L. |  | Motor Protection Switches | 408 | Star-Delta Contactor Combinations |  |
| with Selector Switch | 202 | Motor Protection Switches Series ALEA BES | 452 | Series ALEA LSY | 261 |
|  |  | Motor Protection Switches Series BE5, BE6 | 410 | Star-Delta Timers | 243 |
| E |  |  |  | Summary Alarm Indicators | 152 |
| EASY PLC Series | 94 | P |  | Summary Alarm Indicators SSM 11-24V-DC | 152 |
| Electromechanical Contactors | 170 | Parallel Connectors (Star Jumper) | 264 | Supressor Units | 250 |
| Electromechanical Contactors Series ALEA LS | 203 | Parallel Connectors (Star Jumper) |  | Surge Supressors (plug in) | 243 |
| Electromechanical Contactors Series LA | 172 | and Feed Terminals | 240 |  |  |
|  |  | PLC Series EASY | 94 | T |  |
| F |  | Plug-in Relays | 6 | Terminal Covers | 252 |
| Feed Terminals | 264 | Plug-in Relays S-Relay, Series 4 | 18 | Thermal Overload Relays | 376 |
| Force-guided Contacts Relays Schrack, |  | Plug-in Relays Schrack, Series MT | 27 | Thermal Overload Relays Series ALEA LST | 380 |
| Series SR | 85 | Plug-in Relays Schrack, Series PT | 23 | Thermal Overload Relays Series CUBICO | 387 |
| Force-guided Contacts Relays Schrack, |  | Plug-in Relays Schrack, Series RM | 30 | Timer Relays | 96 |
| Series SR, |  | Pluggable Interface Relay Schrack, Series XT | 15 | Timer Relays Series AMPARO | 112 |
| in DIN Rail Module | 89 | Power Contactors LA, Size 2 | 176 | Timer Relays Series ZR4 | 107 |
| Force-guided Contacts Relays Schrack, |  | Power Contactors LA, Size 3 | 176 | Timer Relays Series ZR4, for Round 11 Pole |  |
| Series SR, Print Versio | 85 | Power Relays Schrack, Series RT | 8 | Plug-in Socket | 107 |
| Front- and Sidemounted Auxiliary Contacts $f$ |  | Print Relay Sockets for PT Relays | 57 | Timer Relays Series ZR5 | 98 |
| or Contactors K3-116 to K3-31 | 199 | Print Relay Sockets for Schrack, Series RT | 55 | Timer Relays Series ZR6 | 116 |
| Frontmounted Auxiliary Contacts for Contactors |  | Print Relays | 58 |  |  |
| K3-450 to K3-550 | 201 | Print Relays Schrack, Series PE | 58 | W |  |
| Frontmounted Auxiliary Contacts for Contactors |  | Print Relays Schrack, Series PT | 82 | Wiring Sets | 241 |
| Size 00 | 236 | Print Relays Schrack, Series RE | 60 | Wiring Sets for Reversing Contactor |  |
|  |  | Print Relays Schrack, Series RP | 62 | Combinations | 260 |
| L |  | Print Relays Schrack, Series RT | 68 | Wiring Sets for Star-Delta Contactor |  |
| Latching Block | 251 | Print Relays Schrack, Series RY | 78 | Combinations | 265 |
| LSD, LSS Contactors for Switching Motors | 203 | Print Relays Schrack, Series SNR | 80 |  |  |
| LSHD Auxiliary Contactors | 233 | Probes for Level Monitoring Relays | 149 |  |  |
| LSK Capacitor Switching Contactors | 230 |  |  |  |  |
| LSR Contactors | 225 | R |  |  |  |
| LSU Contactors | 221 | Relay Module | 150 |  |  |
|  |  | Relay Package Schrack, Series SNR | 6 |  |  |
| M |  | Relay PCB | 150 |  |  |
| Measuring and Monitoring Relays | 120 | Relay Sockets \& Sets | 36 |  |  |
| Measuring and Monitoring Relays |  | Relay Sockets and Sets Schrack, Series SNR | 36 |  |  |
| Series AMPARO | 132 | Relay Sockets for S-Relay, Series RS4 | 43 |  |  |
| Measuring and Monitoring Relays Series UR5 | 122 | Relay Sockets for Schrack, Serie RM |  |  |  |
| Measuring and Monitoring Relays Series UR6 | 137 | (RMxx2xxx ) | 53 |  |  |


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| BES22500 | 430 | BZ326442 | 162 | EA270884 | 95 |
| BES23200 | 430 | BZ326443 | 162 | EA274103 | 95 |
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| BES24500 | 430 | BZ326445 | 162 | EA274108 | 95 |
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| BESD0050 | 426 | BZ326461 | 162 |  |  |
| BESD0063 | 426 | BZ326461VM | 164 | L |  |
| BESD0080 | 426 | BZ326462 | 162 | LA003115K3 | 202 |
| BESD0100 | 426 | BZ326462VM | 164 | LA003116K3 | 202 |
| BESD0125 | 426 | BZ326463 | 162 | LA003117K3 | 202 |
| BESD0160 | 426 | BZ326463VM | 164 | LA100770 | 192 |
| BESD0200 | 426 | BZ326464 | 162 | LA 100773 | 192 |
| BESD0250 | 426 | BZ326464VM | 164 | LA 100774 | 192 |
| BESD0320 | 426 | BZ326465 | 162 | LA 100775 | 192 |
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| ST3P3TP0 | 36 | YMLGW230 | 42 | YPT16040 | 26 |  |  |
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| ST4P3LC4 | 7 | YmlRa024 | 13 | YPT78110 | 26 |  |  |
| ST4P3LC4 | 36 | YmlRa024 | 17 | YPT78110 | 49 |  |  |
| ST4P3TPO | 7 | YmlRa024 | 26 | YPT78702 | 25 |  |  |
| ST4P3TPO | 36 | YmlRa024 | 39 | YPT78702 | 26 |  |  |
|  |  | YmlRa024 | 42 | YPT78702 | 49 |  |  |
| $u$ |  | YmlRA024 | 49 | YPT78703 | 25 |  |  |
| UR511011 | 131 | YMLRD024 | 13 | YPT78703 | 26 |  |  |
| UR5L1021 | 131 | YMLRD024 | 17 | YPT78703 | 49 |  |  |
| UR5P3011 | 131 | YMLRD024 | 26 | YPT78704 | 26 |  |  |
| UR5R1021 | 131 | YMLRD024 | 39 | YPT78704 | 49 |  |  |
| UR5U1011 | 131 | YMLRD024 | 42 | YRS 16009 | 22 |  |  |
| UR5U3011 | 131 | YMLRD024 | 49 | YRS 16009 | 44 |  |  |
| UR5U3N11 | 131 | YMLRD024-A | 13 | YRS 16016 | 22 |  |  |
| UR611052 | 148 | YMLRD024-A | 17 | YRS 16016 | 44 |  |  |
| UR6L1052 | 148 | YMLRD024-A | 26 | YRS 16040 | 22 |  |  |
| UR6P3052 | 148 | YMLRD024-A | 39 | YRS 16040 | 44 |  |  |
| UR6R1052 | 148 | YMLRD024-A | 42 | YRS78704 | 22 |  |  |
| UR6U1052 | 148 | YMLRD024-A | 49 | YRS78704 | 44 |  |  |
| UR6U3052 | 148 | YMLRW230 | 14 | YRSFL230 | 22 |  |  |
| URAP3011 | 136 | YMLRW230 | 17 | YRSLG024 | 22 |  |  |
| URAU3011 | 136 | YMLRW230 | 26 | YRSLG230 | 22 |  |  |
| URAU3N11 | 136 | YMLRW230 | 39 | YRSLR024 | 22 |  |  |
| URL90010 | 149 | YMLRW230 | 42 | YRSLR230 | 22 |  |  |
| URL90020 | 149 | YMLRW230 | 49 | YRT 16040 | 13 |  |  |
| URL90030 | 149 | YMR78700 | 153 | YRT16040 | 17 |  |  |
| URL91010 | 149 | YMR78700 | 155 | YRT16040 | 39 |  |  |
|  |  | YMR78700 | 11 | YRT16040 | 42 |  |  |
| x |  | YMR78700 | 29 | YRT78624 | 13 |  |  |
| XT17017 | 17 | YMR78700 | 52 | YRT78624 | 17 |  |  |
| XT17017 | 17 | YMR78701 | 29 | YRT78624 | 39 |  |  |
| XT17017 | 42 | YMR78701 | 52 | YRT78624 | 42 |  |  |
| XT374LC4 | 17 | YMRCW024 | 14 | YRT78626 | 13 |  |  |
| XT484LC4 | 17 | YMRCW024 | 17 | YRT78626 | 17 |  |  |
| XT484R24 | 17 | YMRCW024 | 26 | YRT78626 | 39 |  |  |
| XT484T30 | 17 | YMRCW024 | 39 | YRT78626 | 42 |  |  |
|  |  | YMRCW024 | 42 | YSN90020 | 36 |  |  |
| Y |  | YMRCW024 | 49 | YY494006 | 153 |  |  |
| YMFDG230 | 14 | YMRCW230 | 14 | YY494007 | 155 |  |  |
| YMFDG230 | 17 | YMRCW230 | 17 | YY494107 | 155 |  |  |
| YMFDG230 | 26 | YMRCW230 | 26 |  |  |  |  |
| YMFDG230 | 39 | YMRCW230 | 39 | z |  |  |  |
| YMFDG230 | 42 | YMRCW230 | 42 | ZR4B0025-A | 111 |  |  |

## General Terms of Delivery

issued by the Austrian Electrical and Electronics Industry Association (FEEI)
of at most one half of one per cent, a total of no more than $5 \%$, however, of the value of that part of the goods to be delivered which cannot be used on account of Seller's failure to deliver an essential part thereof, provided the Buyer has suffered a damage to the aforesaid extent. Assertion of rights of damages exceeding this extent is precluded.
6. Passage of risk and place of performance
6.1. Unless otherwise agreed, the delivery of goods is considered sold EXW in accordance with INCOTERMS® 2010.
6.2. For services, the place of performance shall be the place indicated in the written order confirmation, secondary to that at which the service is actually rendered by Seller. The risk in respect of such services or any part thereof shall pass to Buyer at the time the services have been rendered.
7. Payment
7.1. Unless otherwise agreed, one third of the purchase price shall fall due at the time of receipt by Buyer of the order confirmation of Seller, one third after half the delivery period has elapsed and the balance at the time of delivery. Irrespective thereof the turnover tax comprised in the amount of the invoice shall be paid within 30 days of the invoice date. If bankruptcy proceedings are instituted against the assets of Buyer or if an application for bankruptcy proceedings is not granted for insufficiency of assets, deliveries shall only be made against cash in advance.
7.2. In the case of part settlements the individual part payments shall fall due upon receipt of the respective invoices. The same shall apply to amounts invoiced for additional deliveries or resulting from additional agreements beyond the scope of the original contract, irrespective of the terms of payment agreed upon for the principal delivery.
7.3. Payment shall be made without any discount free Seller's domicile in the agreed currency. Drafts and checks shall be accepted on account of payment only, with all interest, fees and charges in connection therewith (such as col- lection and discounting charges) to be borne by Buyer.
7.4. Buyer shall not be entitled to withhold or offset payment on the grounds of any warranty claims or other counterclaims.
7.5. Payment shall be deemed to have been effected on the date at which the amount in question is at Seller's disposal.
7.6. If Buyer fails to meet the terms of payment or any other obligation arising from this or other legal transactions, Seller may without prejudice to his other rights a) suspend performance of his own obligations until payments have been made or other obligations fulfilled, and exercise his right to extend the period of delivery to a reasonable extent,
b) call in debts arisen from this or any other legal transactions and charge default interest amounting to $1.25 \%$ per month plus turnover tax for these amounts beginning with the due dates, unless Seller proves costs exceeding this.
c) only perform other legal transactions against cash in advance in the case of qualified insolvency, in other words, following two delays in payment.
In any case Seller has the right to invoice all expenses arising prior to a lawsuit, especially reminder charges and lawyer's fees.
7.7. Discounts or bonuses are subject to complete payment in due time.
7.8. Seller retains title to all goods delivered by him until receipt of all amounts invoiced including interests and charges. Buyer herewith assigns his claim out of a resale of conditional commodities, even if they are processed, transformed or combined with other commodities, to Seller to secure the latter's purchase money claim. In the case of resale granting respite Buyer shall have the power of disposal of the product under retention of ownership only with the proviso that upon reselling Buyer notifies the secondary buyer of the assignment for security or enters the assignment in his account books. Upon request Buyer has to notify the assigned claim and the debtor thereof to Seller, and to make all information and material required for his debt collection available and to notify the assignment to the third-party debtor. If the goods are attached or otherwise levied upon, Buyer shall draw attention to Sellers title and immediately inform Seller of the attachment or levy.
8. Warranty and acceptance of obligation to repair defects
8.1. Once the agreed terms of payment have been complied with, Seller shall, subject to the conditions hereunder, remedy any defect existing at the time of acceptance of the article in question whether due to faulty design, material or manufacture, that impairs the functioning of said article. From particulars appearing in catalogues, folders, promotional literature as well as written or oral statements which have not been included in the agreement no warranty obligations may be deduced.
8.2. Unless special warranty periods operate for individual items the warranty period shall be 12 months. These conditions shall also apply to any goods supplied, or services rendered in respect of goods supplied, that are firmly attached to buildings or the ground. The warranty period begins at the point of passage of risk acc. to paragraph 6 .
8.3. For improved or exchanged parts, the warranty period shall start again, but shall end in any case 6 months after the original warranty period has expired.
8.4. If delivery or the performance of services is delayed for reasons outside the control of Seller, the warranty period shall begin 2 weeks after Seller is ready to deliver or perform services.
8.5. The foregoing warranty obligations are conditional upon the Buyer giving within a reasonable period notice in writing of any defects that have occurred and such notice reaching the Seller. Buyer shall prove within a reasonable period the presence of a defect, in particular he shall make available within a reasonable period to Seller all material and data in his possession. Upon receipt of such notice Seller shall, in the case of a defect covered by the warranty under 8.1 above, have the option to replace the defective goods or defective parts thereof or else to repair them on Buyer's premises or have them returned for repair, or to grant a fair and reasonable price reduction.
8.6. Any expenses incurred in connection with rectifying defects (e. g. expenses for assembly and disassembly, transport, waste disposal, travel and siteto-quarters time) shall be borne by Buyer. For warranty work on Buyer's premises Buyer shall make available free of charge any assistance, hoisting gear, scaffolding and sundry supplies and incidentals that may he required. Replaced parts shall become the property of Seller.
8.7. If an article is manufactured by Seller on the basis of design data, design drawings, models or other specifications supplied by Buyer, Seller's warranty shall be restricted to non-compliance with Buyers specifications.
8.8. Seller's warranty obligation shall not extend to any defects due to assembly and installation work not undertaken by Seller, inadequate equipment, or due to noncompliance with installation requirements and operating conditions, overloading of parts in excess of the design values stipulated by Seller, negligent or faulty handling or the use of inappropriate materials, nor for defects attributable to material supplied by Buyer. Nor shall Seller be li- able for damage due to acts of third parties, atmospheric discharges. Excess voltage and chemical influences. The warranty does not cover the replacement of parts subject to natural wear and tear. Seller accepts no warranty for the sale of used goods.
8.9. The warranty shall lapse immediately if, without written consent of Seller, Buyer himself or a third party not expressly authorised undertakes modifications or repairs on any items delivered.
8.10. Claims acc. to $\S 933 \mathrm{~b}$ ABGB are struck by the statute of limitation with lapse of the period mentioned under point 8.2.
8.11. The provisions of sub-paragraphs 8.1 to 8.10 shall apply, mutatis mutandis, to all cases where the obligation to repair defects has to be accepted for other reasons laid down by law.
9. Withdrawal from contract
9.1. Buyer may withdraw from the contract only in the event of delays caused by gross negligence on the part of Seller and only after a reasonable period of grace has elapsed. Withdrawal from contract shall be notified in writing by registered mail.
9.2. Irrespective of his other rights Seller shall be entitled to withdraw from the contract
a) if the execution of delivery or the inception or continuation of services to be rendered under the contract is made impossible for reasons within the responsibility of Buyer and if the delay is extended beyond a reasonable period of grace allowed;
b) if doubts have arisen as to Buyer's creditworthiness and if same fails, on Seller's request, to make an advance payment or to provide adequate security prior to delivery, or
c) if, for reasons mentioned in 5.4 , the period allowed for delivery is extended by more than half of the period originally agreed or by at least 6 months, or
d) if Buyer does not or does not properly meet the obligations imposed as per paragraph 13.
9.3. For the reasons given above withdrawal from the contract shall also be possible in respect of any outstanding part of the delivery or service contracted for.
9.4. If bankruptcy proceedings are instituted against Buyer or an application for bankruptcy proceedings is not granted for insufficiency of assets, Seller may withdraw from the contract without allowing a period of grace. If this withdrawal is taken, it shall take effect immediately upon the decision that the business will not be continued. If the business will be continued, a withdrawal shall not take effect until 6 months after the institution of bankruptcy proceedings or after an application for bankruptcy proceedings has not been granted for insufficiency of assets. In any case, the contract shall be terminated immediately unless the bankruptcy law to which Buyer is subject conflicts with this or if termination of the contract is necessary to prevent significant damages to Seller.
9.5. Without prejudice to Seller's claim for damages including expenses arising prior to a lawsuit, upon withdrawal from contract any open accounts in respect of deliveries made or services rendered in whole or in part shall be settled according to contract This provision also covers deliveries or services not yet accepted by Buyer as well as any preparatory acts performed by Seller. Seller shall, however, have the option alternatively to require the restitution of articles already delivered.
9.6. Withdrawal from contract shall have no consequences other than those stipulated above.
9.7. The assertion of claims on the ground of laesio enormis, error, or lapse of purpose by the Buyer is excluded.
10. Disposal of waste electrical and electronic equipment
10.1. The Buyer of electrical/electronic equipment for commercial purposes, incorporated in Austria, is responsible for the financing of the collection and treatment of waste electrical and electronic equipment as defined by the Ordinance Regulating the Handling of Waste Electrical Equipment, if he is himself the user of the electrical/electronic equipment. If the Buyer is not the end user, he shall transfer the full financial commitment to his customer by agreement and furnish proof thereof to the Seller.
10.2. The Buyer incorporated in Austria shall ensure that the Seller is provided with all information necessary to meet the Seller's obligations as manufacturer/ importer, particularly according to $\S \S 11$ and 24 of the Ordinance Regulating the Handling of Waste Electrical Equipment and the Waste Management Act.
10.3. The Buyer incorporated in Austria is liable vis-à-vis the Seller for any damage and other financial disadvantages incurred by Seller due to Buyer's failure to meet or fully meet his financing commitment or any other obligations according to Article 10. The Buyer shall bear the burden of proof of performance of this obligation.
11. Seller's liability
11.1. Outside the scope of the Product Liability Act, Seller shall be liable only if the damage in question is proved to be due to intentional acts or acts of gross negligence, within the limits of statutory provisions. Seller's total liability in cases of gross negligence is limited to the net value of the order or EUR 500,000, depending on which amount is lower.
11.2. For each incident of damage, Seller shall be liable for $25 \%$ of the net value of the order or EUR 125,000 , depending on which amount is lower.
11.3. Seller shall not be liable for damage due to acts of ordinary negligence nor for consequential damages or damages for pure economic loss, indirect damages, loss of production, financing costs, costs for replacement energy, loss of energy, data or information, loss of profits, loss of savings or interest, or damage resulting from third-party claims against buyer.
11.4. Seller shall not be liable for damages in case of non-compliance with instructions for assembly, commissioning and operation (such as are contained in instructions for use) or non-compliance with licensing requirements.
11.5. Claims that exceed the contractual penalties that were agreed on are excluded from the respective title. The provisions of paragraph 11 apply exclusively for all claims by Buyer against Seller, regardless of the legal basis or entitlement, and also apply to all employees, subcontractors and subsuppliers of Seller.

## 12. Industrial property rights and copyrights

12.1. Buyer shall indemnify Seller and hold him harmless against any claims for any infringement of industrial property rights raised against him if Seller manufactures an article pursuant to any design data, design drawings, models or other specifications made available to him by Buyer.
12.2. Design documents such as plans and drawings and other technical specifications as well as samples, catalogues, prospectuses, pictures and the like shall remain the intellectual property of Seller and are subject to the relevant statutory provisions governing reproduction, imitation, competition etc. The provisions of 2.2 above shall also cover design documents.
13. Compliance with export provisions
13.1. When passing on goods delivered by Seller to third parties (as well as any related documentation, regardless of the method of provision or the services performed by Seller [including technical support of any kind]), Buyer must comply with the applicable regulations of national and international (re-)export provisions. In any case, Buyer must observe the (re-)export provisions of Seller's country of residence, the European Union and the United States of America.
13.2. If necessary for export controls, Buyer must provide Seller with all necessary information immediately after being requested to do so, for example, information about the final recipient, final destination and purpose of the goods or services.
14. General

Should individual provisions of the contract or of these provisions be invalid the validity of the other provisions shall not be affected. The invalid provision shall be replaced by a valid one, which comes as close to the target goal as possible.
15. Jurisdiction and applicable law

Any litigations arising under the contract including litigations over the existence or non-existence thereof shall fall within the exclusive jurisdiction of the competent court at Sellers domicile; the competent court of the Bezirksgericht Innere Stadt, Vienna, shall have exclusive jurisdiction if Seller is domiciled in Vienna. The contract is subject to Austrian law excluding the referral rules. Application of the UN Convention on Contracts for the International Sale of Goods is renounced.
16. Proviso

The execution of the contract by Seller is subject to the condition that there are no obstacles standing in the way of execution due to national or international (re-)export provisions, and especially no embargos and/or other sanctions.

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[^0]:    SchRA든

[^1]:    General Info
    View of the terminals, dimensions in mm
    Equipping with indicated hole diameter also
    possible in 2.5 mm or 2.54 mm contact spacing

[^2]:    *Contact position not defined at delivery

[^3]:    1) Auxiliary contacts suitable for electronic circuits, according EN60947-5-4 for rated voltage 24VDC
[^4]:    1) DIN rail TS 35
[^5]:    Screw terminals with surge suppressor, auxiliary contact block and mounted thermal overload relay.
    $\mathrm{a}=0 \mathrm{~mm}$ with varistor $<240 \mathrm{~V}$, diode assembly
    $a=3.5 \mathrm{~mm}$ with varistor $>240 \mathrm{~V}$
    $a=17 \mathrm{~mm}$ with RC element
    $b=D C 15 \mathrm{~mm}$ deeper than $A C$

    1) Auxiliary contact block, laterally mountable
    2) Auxiliary contact block, mountable on the front, 1-and 4-pole
    3) Surge suppressor
    4) Drilling pattern
[^6]:    Terminal designations according to EN 50012

[^7]:    Terminal designations according to EN 50012

    1) $2 \mathrm{NO}+2 \mathrm{NC}$ or $4 \mathrm{NO}+4 \mathrm{NC}$

    With laterally included auxiliary contact block LSZOD711 ( $2 \mathrm{NO}+2 \mathrm{NC}$ )
    Can be extended by LSZ3D811 to $4 \mathrm{NO}+4 \mathrm{NC}$
    2) $4 N O+4 N C$

    No further auxiliary contacts possible

[^8]:    Terminal designations according to EN 50005

[^9]:    Lateral distance to grounded components $=6 \mathrm{~mm}$.

    1) Auxiliary contact block
    2) Surge suppressor
    3) Drilling pattern
[^10]:    Auxiliary contact block, size 00

    1) according to EN 50005, Screw terminals, 1 - to 4 -pole
    2) according to EN 50005, Screw terminals, cable entry from below, 1-pole
[^11]:    2) with LSZOW002 mechanical interlock.
[^12]:    1) $90^{\circ} \mathrm{C}$ : reduces the control voltage range to 0.9 up to $1.0 \times \mathrm{U}_{\mathrm{s}}$ and reduces the rated current $\mathrm{I}_{\mathrm{e}} / \mathrm{ACl}$ to the value of $\mathrm{I}_{\mathrm{e}} / \mathrm{AC} 3$
[^13]:    1) With reduced control voltage range 0.9 up to $1.0 \times \mathrm{U}_{5}$ and with reduced rated current $\mathrm{I}_{\mathrm{e}} / \mathrm{ACl}$ according to $\mathrm{I}_{\mathrm{e}} / \mathrm{AC} 3$
[^14]:    1) Suitable for: earthed-neutral systems, overvoltage category I to IV , pollution degree 3 (standard-industry): $U_{\mathrm{imp}}=8 \mathrm{kV}$. Data for other conditions on request
    2) Total breaking time $=$ release time + arc duration
    3) Values for delay of the release time of the make contact and the make time of the break contact will be increased, if magnet coils are protected against voltage peaks (varistor, RCunit, diode-unit)
[^15]:    1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV. pollution degree 3 (standard-industry): $\mathrm{U}_{\mathrm{imp}}=8 \mathrm{kV}$. Data for other conditions on request.
[^16]:    1) Suitable at 690 V for: earthed-neutral systems, overvoltage category I to IV , pollution degree 3 (standard-industry): $\mathrm{U}_{\text {imp }}=8 \mathrm{kV}$.
[^17]:    1) $90^{\circ}$ reduces the control voltage range to 0.9 up to $1.0 \times U_{s}$ and reduces the rated current $I_{e} / \mathrm{AC} 1$ to the value of $\mathrm{I}_{\mathrm{e}} / \mathrm{AC} 3$
[^18]:    1) Suitable at 690 V for: earthed-neutral systems, overvoltage category I to IV , pollution degree 3 (standard-industry): $\mathrm{U}_{\text {imp }}=8 \mathrm{kV}$.
[^19]:    1) Metal halide lamps and sodium-vapour lamps (high- and low-pressure lamps)
    2) High-pressure lamps
    3) Blended lamps, containing a mercury high-pressure unit and a tungsten helix in a fluorescent glass bulb (daylight lamps)
    4) Current inrush approx. $16 \times I_{\text {e }}$
    5) With central compensation pay attention to the current inrush (capacitor switching contactors)
[^20]:    1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): $\mathrm{U}_{\text {imp }}=8 \mathrm{kV}$. Data for other conditions on request
    2) Total breaking time $=$ release time + arc duration
    3) Values for delay of the release time of the make contact and the make time of the break contact will be increased, if magnet coils are protected against voltage peaks (varistor, RC-unit, diode-unit)
[^21]:    1) Millions of Operations
[^22]:    1) Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account).
[^23]:    1）Depending on the electronic ballast used，higher lamp numbers are also possible

[^24]:    1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.
[^25]:    1）Industrial furnaces and electric heaters with resistance heating，etc．（increased power consumption on heating up has been taken into account）．
    2）According to IEC 60947－4－1．For rated values for various start－up conditions see：Thermal Overload Relays．
    3）Depending on the electronic ballast used，higher lamp numbers are also possible．

[^26]:    1) Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account).
    2) According to IEC 60947-4-1. For rated values for various start-up conditions see: Thermal Overload Relays.
    3) Depending on the electronic ballast used, higher lamp numbers are also possible.
[^27]:    1 ) If bars larger than $12 \times 10 \mathrm{~mm}$ are connected, a terminal cover is needed to comply with the phase clearance (on request).
    2 ) If conductors larger than $25 \mathrm{~mm}^{2}$ are connected, a terminal cover is needed to comply with the phase clearance (on request).
    3 ) Only with crimped cable lugs according to DIN 46234. Cable lug max. 20 mm wide.
    4 ) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

[^28]:    1) Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account)
[^29]:    1) In accordance with the corresponding 3-pole LSD contactors
[^30]:    1) If bars larger than $12 \times 10 \mathrm{~mm}$ are connected, a terminal cover is needed to comply with the phase clearance. (on request)
    2) When connecting conductors which are larger than $25 \mathrm{~mm}^{2}$, the terminal cover must be used to keep the phase clearance. (on request)
    3) Only with crimped cable lugs according to DIN 46234 . Cable lug max. 20 mm wide.
    4) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.
[^31]:    1) with three-phase load - Proceeding from service condition the times decrease to $20-30 \%$ of the characteristic values.
    2) with two-pole load - Proceeding from service condition the times decrease to $70-80 \%$ of the characteristic values.
    a) Tripping time (Average value of typical tolerance curves from cold condition)
    b) F. L. C. multiplication factor
[^32]:    1) Assignment and short-circuit protective devices according to IEC60947-4-1:

    The contactor or starter must not endanger persons or the installation in the event of a short-circuit.
    Type of coordination 1: The contactor or the starter may be non-operational after every short-circuit release.
    Type of coordination 2: The contactor or the starter must be operational after a short-circuit release (without replacement of parts).
    Welding of the contacts is permissible however.

[^33]:    1) Tripping time 3 3- 2-pole loading
    2) Current $\quad$ 4) 3-pole loading
[^34]:    1) Feeding terminal block
[^35]:    BEZOOO12 with membrane, BEZOOO13 with emergency stop mushroom head for motor protection switches size 00

    1) Knock-outs for M25
    2) Knock-outs for rear cable entry M20
    3) Locking plate BEZOOO14
    4) EMERGENCY-STOP mushroom button
    5) Max. shackle diameter for padlock 8 mm
    a) Dimensions refer to mounting surface
[^36]:    1) hp rating = Power rating in horse power (maximum motor rating).
    2) FLA = Full Load Amps/Motor full load current.
    3) Complies with "short-circuit breaking capacity" according to UL.
