

# Contactors Motor-Starters



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Technical data, dimension sketches, illustrations and weights given in our list and printed matter are subject to change without notice.

# General

## Test Authorities, Registration Mark, Approvals

Low voltage switchgear from Benedict GmbH is built and tested to national and international specifications. All devices suit all important specifications without any test obligation, like VDE, BS and also relative to IEC Recommendations and to European Standards like IEC 947 and EN 60947.

It is for this reason of our Low voltage switchgear is used all over the world. In order to provide special versions, limitations to the max. voltages, currents and power ratings or special markings are sometimes necessary.

## Quality Control System

Since November 1991 Benedict GmbH has been certified according to the quality control system **ÖNORM EN ISO 29001**. The target of the ISO-certification is, to grant the customer the quality of the performance of his supplier, who is audited in accordance with this standard.

## CE-Marking



The manufacturer has to sign his products with the CE-Marking. With the CE-Marking the manufacturer confirms the accordance with the different EEC Directives. The CE-Marking is absolutely necessary to sell the products in the EEC.

Below you find the EEC Directives concerning our products.

Low Voltage Directive 2006/95/EC

EMC Directive 2004/108/EC

RoHS + WEEE 2002/95/EC + "002/96/EC

| Country  | North America       | Russia         | China          |
|--|---------------------|----------------|----------------|
| State deputy or private examination (state admitted) | UL<br>Canada, USA   | EAC            | CCC            |
| Label marking of examination boards                  | Listed<br>Component |                |                |
| Duty of approvals                                    | all switchgear      | all switchgear | all switchgear |

## Explanations for choice and supply of low voltage switchgear in Canada and USA

### Marking of auxiliary contacts

At several devices in UL-data are two voltages for auxiliary contacts mentioned (e. g.: 600 volts at same potential, 150 volts at different potentials). That means, if the voltage is higher than 150 volts, the control voltage applied to input terminals must be at the same potential.

Low voltage switchgear for auxiliary circuits (e. g. contactor relays, control units, auxiliary contacts in general) usually approved for "Heavy Duty" or "Standard Duty" UL and besides these marked with the admissible max. voltage or with short codes (see table).

| Marking of auxiliary contacts according to CSA and UL | Max. rated values per pole |                |         | Cont. Current A | Contact Rating Code Designation |
|---|----------------------------|----------------|---------|-----------------|---------------------------------|
|   | Voltage V                  | Current Make A | Break A |                 |                                 |
| Heavy Duty (HD or HVY DTY)                            | AC 120                     | 60             | 6       | 10              | A150                            |
|   | AC 240                     | 30             | 3       | 10              | A300                            |
|   | AC 480                     | 15             | 1,5     | 10              | A600                            |
|   | AC 600                     | 12             | 1,2     | 10              | A600                            |
|   | DC 125                     | 2,2            | 2,2     | 10              | N150                            |
|   | DC 250                     | 1,1            | 1,1     | 10              | N300                            |
| Standard Duty (SD or STD DTY)                         | DC 600                     | 0,4            | 0,4     | 10              | N600                            |
|   | AC 120                     | 30             | 3       | 5               | B150                            |
|   | AC 240                     | 15             | 1,5     | 5               | B300                            |
|   | AC 480                     | 7,5            | 0,75    | 5               | B600                            |
|   | AC 600                     | 6              | 0,6     | 5               | B600                            |
|   | DC 125                     | 1,1            | 1,1     | 5               | P150                            |
| -   | DC 250                     | 0,55           | 0,55    | 5               | P300                            |
|   | DC 600                     | 0,2            | 0,2     | 5               | P600                            |
|   | AC 120                     | 15             | 1,5     | 2,5             | C150                            |
|   | AC 240                     | 7,5            | 0,75    | 2,5             | C300                            |
|   | AC 480                     | 3,75           | 0,375   | 2,5             | C600                            |
|   | AC 600                     | 3              | 0,3     | 2,5             | C600                            |
| -   | DC 125                     | 0,55           | 0,55    | 2,5             | Q150                            |
|   | DC 250                     | 0,27           | 0,27    | 2,5             | Q300                            |
|   | DC 600                     | 0,1            | 0,1     | 2,5             | Q600                            |
|   | -                          | AC 120         | 3,6     | 0,6             | 1                               |
| AC 240  |                            | 1,8            | 0,3     | 1               | D300                            |
| DC 125  |                            | 0,22           | 0,22    | 1               | R150                            |
| DC 250  |                            | 0,11           | 0,11    | 1               | R300                            |
| -   | AC 120                     | 1,8            | 0,3     | 0,5             | E150                            |

### Discernment at UL-Standards

#### Recognized Component Industrial Control Equipment

UL issues yellow "Guide cards" with Guide- and File-No.

Devices have permission to be marked with on the label

Devices as components approved for "factory wiring": devices for employment in control panels, when they are selected, mounted and wired according to the charging conditions by skilled worker.

Valid UL-Standards: UL 508 "Standard for Industrial Control Equipment" (partly limited)

Are devices approved as "Listed Equipment" the approval is also valid for using as "Recognized Component"

#### Listed Industrial Control Equipment

UL issues white "Guide cards" with Guide- and File-No.







Devices have to be marked with the "UL-Listing Mark"

Devices approved for "field wiring",

- a) devices for employment in control panels, when they are mounted and wired by skilled worker.
- b) devices for retail in USA

Valid UL-Standards: UL 508 "Standard for Industrial Control Equipment" (unlimited)

# Approvals






| Country  | North America   |   | Switzerland  | Europe  | Russia<br>EAC   | China   | CENELEC<br>CB-Certificates |
|--|---|---|--|---|---|---|----------------------------|
| Type   | UL<br> |  | SEV<br> |  |  |  |                            |
| Micro Contactor Relays, Micro Contactors, Micro Reversing Contactors and Accessories |   |   |  |   |   |   |                            |
| K0-04D..   | -   | -   | -  | o   | o   | -   | -                          |
| K0-05D..   | o   | -   | -  | o   | o   | -   | -                          |
| K0W05D..   | o   | -   | -  | o   | o   | -   | -                          |
| Mini Contactor Relays, Mini Contactors, Mini Reversing Contactors K1 and Accessories |   |   |  |   |   |   |                            |
| K1-07D..(=)  | o   | -   | -  | o   | o   | -   | o                          |
| K1-07L..(=)  | -   | o   | -  | o   | o   | -   | o                          |
| K1-07F..(=)  | -   | o   | -  | o   | o   | -   | -                          |
| K1-09D..(=)  | o   | -   | -  | o   | o   | o   | o                          |
| K1-09L..(=)  | -   | o   | -  | o   | o   | o   | o                          |
| K1-09F..(=)  | -   | o   | -  | o   | o   | o   | -                          |
| K1-12D..(=)  | o   | -   | -  | o   | o   | o   | -                          |
| K1W09D01(=)  | o   | -   | -  | o   | o   | o   | -                          |
| K1W12D01(=)  | o   | -   | -  | o   | o   | o   | -                          |
| K1W09L01(=)  | -   | o   | -  | o   | o   | o   | -                          |
| HK.., HKM..  | o   | -   | -  | o   | o   | -   | o                          |
| RC-K1  | o   | -   | -  | o   | o   | -   | -                          |
| Contactor Relays, Contactors Series K3   |   |   |  |   |   |   |                            |
| K3-07ND..(=)   | o   | -   | -  | o   | o   | -   | -                          |
| K3-10N..(=)  | o   | -   | o  | o   | o   | o   | o                          |
| K3-14N..(=)  | o   | -   | o  | o   | o   | o   | o                          |
| K3-18N..(=)  | o   | -   | o  | o   | o   | o   | o                          |
| K3-22N..(=)  | o   | -   | o  | o   | o   | o   | o                          |
| K3-24A..(=)  | o   | -   | o  | o   | o   | o   | o                          |
| K3-32A..(=)  | o   | -   | o  | o   | o   | o   | o                          |
| K3-40A..(=)  | o   | -   | o  | o   | o   | o   | o                          |
| K3-50A..(=)  | o   | -   | o  | o   | o   | o   | o                          |
| K3-62A..(=)  | o   | -   | o  | o   | o   | o   | o                          |
| K3-74A..(=)  | o   | -   | o  | o   | o   | o   | o                          |
| K3-90A..(=)  | o   | -   | -  | o   | o   | o   | -                          |
| K3-115A..(=)   | o   | -   | -  | o   | o   | o   | -                          |
| K3-151A..(=)   | o   | -   | -  | o   | o   | -   | -                          |
| K3-176A..(=)   | o   | -   | -  | o   | o   | -   | -                          |
| K3-210A..(=)   | x   | -   | -  | o   | o   | -   | -                          |
| K3-260A..(=)   | x   | -   | -  | o   | o   | -   | -                          |
| K3-316A..(=)   | x   | -   | -  | o   | o   | -   | -                          |
| K3-450A..(=)   | o   | -   | -  | o   | o   | -   | -                          |
| K3-550A..(=)   | o   | -   | -  | o   | o   | -   | -                          |
| K3-700A..(=)   | o   | -   | -  | o   | o   | -   | -                          |
| K3-860A..(=)   | o   | -   | -  | o   | o   | -   | -                          |
| K3-1000A..(=)  | -   | -   | -  | o   | o   | -   | -                          |
| K3-1200A..(=)  | o   | -   | -  | o   | o   | -   | -                          |
| Contactor Relays, Contactors DC-operated Series KG3                                  |   |   |  |   |   |   |                            |
| KG3-07..   | o   | -   | -  | o   | o   | -   | o                          |
| KG3-10.., -14..  | o   | -   | -  | o   | o   | -   | o                          |
| KG3-18.., -22..  | o   | -   | -  | o   | o   | -   | o                          |
| KG3-24.., -32..  | o   | -   | -  | o   | o   | -   | o                          |
| KG3-40..   | o   | -   | -  | o   | o   | -   | o                          |
| Capacitor Contactors Series K3   |   |   |  |   |   |   |                            |
| K3-18K..   | o   | -   | -  | o   | o   | o   | o                          |
| K3-24K..   | o   | -   | -  | o   | o   | o   | o                          |
| K3-32K..   | o   | -   | -  | o   | o   | o   | o                          |
| K3-50K..   | o   | -   | -  | o   | o   | o   | o                          |
| K3-62K..   | o   | -   | -  | o   | o   | o   | o                          |
| K3-74K..   | o   | -   | -  | o   | o   | o   | o                          |
| K3-90K..   | o   | -   | -  | o   | o   | o   | -                          |
| K3-115K..  | o   | -   | -  | o   | o   | o   | -                          |
| Aux. contacts  |   |   |  |   |   |   |                            |
| HN.., HTN..  | o   | -   | -  | o   | o   | o   | o                          |
| HA..   | o   | -   | -  | o   | o   | -   | o                          |
| HB..   | o   | -   | -  | o   | o   | o   | o                          |
| K2-DK, K2-SK   | o   | -   | -  | o   | o   | -   | -                          |
| HKA.., HKT..   | o   | -   | -  | o   | o   | -   | -                          |
| HKF22  | -   | -   | -  | o   | o   | -   | -                          |

o In standard version approved

x In test

- Not provided for test till now

# Approvals

| Country                                 | North America   |   | Switzerland  | Europe  | Russia<br>EAC   | China   | CENELEC<br>CB-Certificates |
|---|---|---|--|---|---|---|----------------------------|
| Type                                    | UL<br> |   | SEV<br> |  |  |  |                            |
| <b>Accessories</b>                      |   |   |  |   |   |   |                            |
| K2-T..E, -A                             | -   | - | -  | o   | o   | -   | -                          |
| K2-TP                                   | o   | - | -  | o   | o   | -   | -                          |
| K2-L                                    | o   | - | -  | o   | o   | -   | -                          |
| K2-IN.                                  | o   | - | -  | o   | o   | -   | -                          |
| K2-UN.                                  | o   | - | -  | o   | -   | -   | -                          |
| K2-IM                                   | -   | - | -  | o   | o   | -   | -                          |
| K2-E                                    | o   | - | -  | o   | o   | -   | -                          |
| VG-K2                                   | -   | - | -  | o   | o   | -   | -                          |
| RC-K3                                   | o   | - | -  | o   | o   | -   | -                          |
| <b>Reversing Contactors , Serie KW3</b> |   |   |  |   |   |   |                            |
| KW3-10                                  | o   | - | -  | o   | o   | -   | -                          |
| KW3-14                                  | o   | - | -  | o   | o   | -   | -                          |
| KW3-18                                  | o   | - | -  | o   | o   | -   | -                          |
| KW3-22                                  | o   | - | -  | o   | o   | -   | -                          |
| KW3-24                                  | o   | - | -  | o   | o   | -   | -                          |
| KW3-32                                  | o   | - | -  | o   | o   | -   | -                          |
| KW3-40                                  | o   | - | -  | o   | o   | -   | -                          |
| <b>D.O.L. Starters</b>                  |   |   |  |   |   |   |                            |
| P1..                                    | o   | - | -  | o   | o   | -   | -                          |
| <b>Thermal Overload Relays</b>          |   |   |  |   |   |   |                            |
| U3/32                                   | o   | - | -  | o   | o   | -   | o                          |
| U3/42                                   | o   | - | -  | o   | o   | -   | o                          |
| U3/74                                   | o   | - | -  | o   | o   | -   | o                          |
| U12/16E                                 | o   | - | -  | o   | o   | -   | o                          |
| U12/16A                                 | -   | - | -  | o   | o   | -   | o                          |
| U12/16EM                                | -   | - | -  | o   | o   | -   | o                          |
| U12/16EQ                                | -   | - | -  | o   | o   | -   | o                          |
| U32                                     | o   | - | -  | o   | o   | -   | o                          |
| U60                                     | o   | - | -  | o   | o   | -   | o                          |
| U85                                     | o   | - | -  | o   | o   | -   | o                          |
| U180                                    | x   | - | -  | o   | o   | -   | -                          |
| U320                                    | x   | - | -  | o   | o   | -   | -                          |
| U800                                    | -   | - | -  | o   | o   | -   | -                          |
| <b>Modular Contactors</b>               |   |   |  |   |   |   |                            |
| R20                                     | o   | - | o  | o   | o   | -   | o                          |
| R25                                     | o   | - | o  | o   | o   | -   | o                          |
| R40                                     | o   | - | o  | o   | o   | -   | o                          |
| R63                                     | o   | - | o  | o   | o   | -   | o                          |
| R40, R63 2-pole                         | -   | - | -  | o   | o   | -   | o                          |
| RH11                                    | o   | - | -  | o   | o   | -   | o                          |



o In standard version approved

x In test

- Not provided for test till now

## - and - Guide- and File-No.

These data are important for UL-inspecting engineers.  
Devices

|  | Guide-No.   |      |  |       | File-No. |
|--|---|------|--|-------|----------|
|  |  |      |  |       |          |
|  | Kanada  | USA  | Kanada   | USA   |          |
| Contactors                                       | NLDX7   | NLDX | NLDX8  | NLDX2 | E41502   |
| Reversing Contactors                             | NLDX7   | NLDX | -  | -     | E41502   |
| Control Relays, Accessories                      | NKCR7   | NKCR | NKCR8  | NKCR2 | E66273   |
| Thermal Overload Relays                          | NKCR7   | NKCR | -  | -     | E66273   |
| Cam Switches                                     | NLRV7   | NLRV | -  | -     |          |
| Circuit Breakers as Manual Motor Controller      | NLRV7   | NLRV | -  | -     | E129916  |
| Circuit Breakers as Combination Motor Controller | NKJH7   | NKJH | -  | -     | E197641  |
| Bus Bar Assemblies                               | NLRV7   | NLRV | -  | -     | E129916  |
| Accessories                                      | NKCR7   | NKCR | -  | -     | E66273   |

## Technical Information

### Degree of protection acc. to IEC 60947-1

Protection ratings are prefixed by the internationally agreed letters IP followed by two digits.

1<sup>st</sup> digit: Pertains to solid objects  
2<sup>nd</sup> digit: Pertains to water.

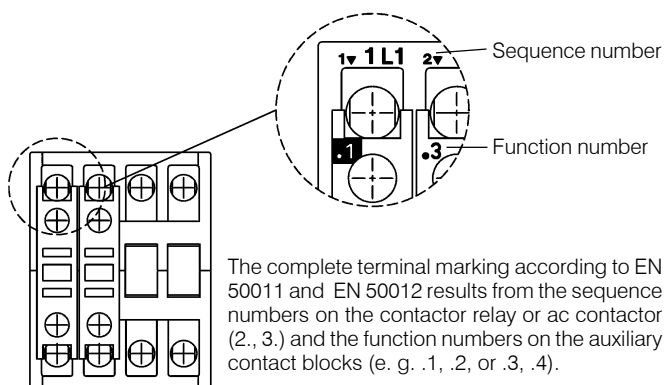
| 1 <sup>st</sup> digit | Short description  | Definition   |
|-----------------------|--|--|
| 1                     | Protected against solid objects greater than 50 mm   | Excludes solid objects exceeding 50 mm in diameter and protects against contact with live and moving parts by a large body surface such as a hand (but not against deliberate access).   |
| 2L                    | Protected against solid objects greater than 12,5 mm and against contact by standard test finger | Excludes solid objects exceeding 12,5 mm in diameter and protects against contact with live and moving parts by a standard test finger or similar objects not exceeding 80 mm in length. |
| 3                     | Protected against solid objects greater than 2,5 mm  | Excludes solid objects exceeding 2,5 mm in diameter or thickness.  |
| 4                     | Protected against solid objects greater than 1 mm  | Excludes solid objects exceeding 1 mm in diameter or thickness.  |
| 5                     | Dust protected   | Prevents ingress of dust in quantities and locations that would interfere with the intended operation of the equipment.  |
| 6                     | Dust tight   | Prevents ingress of dust.  |

### Terminal markings acc. to EN50011

Auxiliary contacts of AC contactors and contacts of contactor relays and thermal overload relays are particularly marked. The terminal markings of normally-open contacts are printed as positive figures, they of normally-closed contacts as negative figures.

This gives a clear indication of the function of the contacts.

The figure below illustrates the determination of terminal markings for contactors with auxiliary contact blocks.



| 2 <sup>nd</sup> digit | Short description                                      | Definition   |
|-----------------------|--|--|
| 1                     | Protected against dripping water                       | Dripping water (vertically falling drops) shall have no harmful effect.  |
| 2                     | Protected against dripping water when tilted up to 15° | Vertically dripping water shall have no harmful effect when the enclosure is tilted at any angle up to 15° from its normal position.                 |
| 3                     | Protected against spraying water                       | Water falling as a spray at an angle up to 60° from the vertical shall have no harmful effect.   |
| 4                     | Protected against splashing water                      | Water splashed against the enclosure from any direction shall have no harmful effect.  |
| 5                     | Protected against water jets                           | Water protected by a nozzle against the enclosure from any direction shall have no harmful effect.   |
| 6                     | Protected against heavy seas                           | Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities.                                       |
| 7                     | Protected against the effects of immersion             | Ingress of water in a harmful quantity shall not be possible when the enclosure is immersed in water under standard conditions of pressure and time. |
| 8                     | Protected against submersion                           | No ingress of water.   |

### Resistance to climatic conditions acc. to IEC60068

Open-type devices are climate-resistant in the constant climate according to IEC60068-2-78 (this is a climate with an ambient temperature of 40°C and an atmospheric humidity of 90 to 95%).

Enclosed devices are climate-resistant in an alternating climate according to IEC 68-2-30 (this is a moist alternating climate with a 24-hour cycle between climates with an ambient temperature of 25°C, and an atmospheric humidity of 95 to 100% and an ambient temperature of 40°C, and an atmospheric humidity of 90 to 96% in the presence of condensation during rises in temperature).

Data are valid up to an altitude of 2000m above sea level.

### Short circuit protection

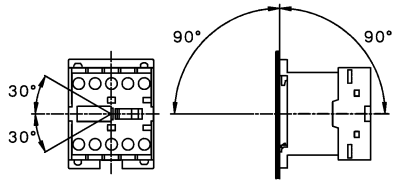
Back up fuses should be used to protect contactors and starters against short circuits. For starters the device with the smaller admissible fuse at the main and at the control circuit (contactor or thermal overload) determines the fuse size.

After a short circuit devices have to be checked for correct operation. Disconnect power before proceeding with any work on the equipment!

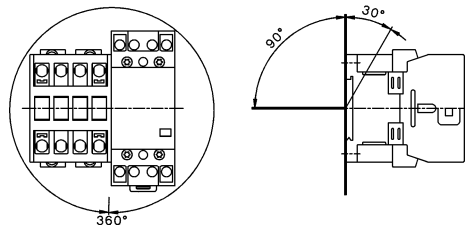
# Technical Information

## Mounting positions of contactors

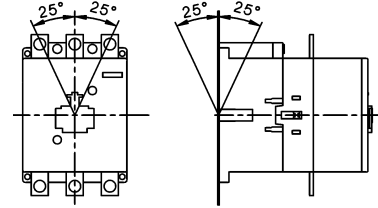
K0-.. / K1-..



K2-..A00-40, K(G)3-07 bis K3-115, R..







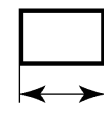


K3-151.. bis K3-1200..



## Terminal screws

| Devices<br>Type   | Kind of connection    |                       |                       |                                | Screw driver                           | Tightening torque                   |                                 |
|---|-----------------------|-----------------------|-----------------------|--------------------------------|--|-------------------------------------|---------------------------------|
|   | Screw with washer     | Screw with clamp box  | Screw w. nut          |                                |  | Nm                                  | lb. inch                        |
| <b>Micro Contactors</b> , all conductors<br>K0-..   | M2,5                  | -                     | -                     | -                              | Pz1                                    | 0,6 - 0,8                           | 5 - 7                           |
| <b>Mini Contactors</b> , all conductors<br>K1-..  | M3,5                  | -                     | -                     | -                              | Pz2                                    | 0,8 - 1,4                           | 7 - 12                          |
| <b>Contactors Relays</b> , all conductors<br>K(G)3-07..   | M3,5                  | -                     | -                     | -                              | Pz2                                    | 0,8 - 1,4                           | 7 - 12                          |
| <b>Contactors</b><br>Main conductor   |                       |                       |                       |                                |  |                                     |                                 |
| K(G)3-10.. bis K3-22..  | M3,5                  | -                     | -                     | -                              | Pz2                                    | 0,8 - 1,4                           | 7 - 12                          |
| K(G)3-24.. bis K3-40..  | -                     | M5                    | -                     | -                              | Pz2                                    | 2,5 - 3                             | 22 - 26                         |
| K3-50.. bis K3-74..   | -                     | M6                    | -                     | -                              | Pz3                                    | 3,5 - 4,5                           | 31 - 40                         |
| K2-23, -30, -37A00-40<br>K2-45, -60A00-40   | M4<br>-               | -<br>M6               | -<br>-                | -<br>-                         | Pz2<br>Pz3                             | 1,2 - 1,8<br>3,5 - 4,5              | 11 - 16<br>31 - 40              |
| K3-90, K3-115   | -                     | -                     | M8                    | -                              | 4mm hex socket                         | 4 - 6,5                             | 35 - 57                         |
| K3-116.. bis K3-176..<br>K3-210.. bis K3-316..<br>K3-450.. bis K3-700..<br>K3-860..<br>K3-1000.., K3-1200.. | -<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>- | M8<br>M10<br>M12<br>M14<br>M12 |  | 17<br>35<br>60<br>75<br>60          | 150<br>315<br>540<br>675<br>540 |
| Auxiliary conductor<br>K(G)3-10 bis K3-22   | M3,5                  | -                     | -                     | -                              | Pz2                                    | 0,8 - 1,4                           | 7 - 12                          |
| Coil conductor<br>K(G)3-10 bis K3-1200  | M3,5                  | -                     | -                     | -                              | Pz2                                    | 0,8 - 1,4                           | 7 - 12                          |
| <b>Accessories</b><br>HK, HKM<br>HA, HN, K2-.., HB..  | M3,5<br>M3,5          | -<br>-                | -<br>-                | -<br>-                         | Pz2<br>Pz2                             | 0,8 - 1,4<br>0,8 - 1,4              | 7 - 12<br>7 - 12                |
| <b>Thermal Overload Relays</b><br>Main conductor  |                       |                       |                       |                                |  |                                     |                                 |
| U12/16  | M4                    | -                     | -                     | -                              | Pz2                                    | 1,2 - 1,8                           | 11 - 16                         |
| U3/32<br>U3/42<br>U3/74   | M3,5<br>M5<br>-       | -<br>-<br>M6          | -<br>-<br>-           | -<br>-<br>-                    | Pz2<br>Pz2<br>Pz3                      | 0,8 - 1,4<br>2,5 - 3<br>3,5 - 4,5   | 7 - 12<br>22 - 26<br>31 - 40    |
| UAT21<br>UAT22<br>UAT23   | -<br>-<br>-           | M4<br>M4<br>M5        | -<br>-<br>-           | -<br>-<br>-                    | Size 3, 4<br>Size 3, 4<br>Size 3, 4, 5 | 1,2 - 1,8<br>1,2 - 1,8<br>2,5 - 3   | 11 - 16<br>11 - 16<br>22 - 26   |
| Auxiliary conductor<br>All devices  | M3,5                  | -                     | -                     | -                              | Pz2                                    | 0,8 - 1,4                           | 7 - 12                          |
| <b>Contactors for Distribution Boards</b><br>Conductors   |                       |                       |                       |                                |  |                                     |                                 |
| R20, R25<br>R40, R63<br>K1R   | -<br>-<br>M3,5        | M3,5<br>M5<br>-       | -<br>-<br>-           | -<br>-<br>-                    | Pz1<br>Pz2<br>Pz2                      | 0,8 - 1,4<br>2,5 - 3<br>0,8 - 1,4   | 7 - 12<br>22 - 26<br>7 - 12     |
| Coil conductor  |                       |                       |                       |                                |  |                                     |                                 |
| R20, R25<br>R40, R63<br>K1R   | -<br>-<br>M3,5        | M3<br>M3<br>-         | -<br>-<br>-           | -<br>-<br>-                    | Pz1<br>Pz2<br>Pz2                      | 0,6 - 1,2<br>0,6 - 1,2<br>0,8 - 1,4 | 5 - 11<br>5 - 11<br>7 - 12      |

|   |   |    |
|---|---|----|
|    | Micro Contactor Relays AC or DC operated            | 10 |
|    | Micro Contactors AC or DC operated                  | 11 |
|    | Micro Contactors With Solder Pins AC or DC operated | 12 |
|    | Coil voltages                                       | 12 |
|  | Micro Reversing Contactors AC or DC operated        | 13 |
|  | Technical Data                                      | 14 |
|  | Dimensions  | 18 |



# Micro Contactor Relays 4-pole

AC or DC Operated

Ratings Therm. Contacts <sup>2)</sup>

Distinc. Number Additional Contact

Type

Coil voltage <sup>1)</sup>  
**24** 24V 50/60Hz  
**230** 220-230V 50Hz  
 = 24 24V= DC

AC15

230V  
A

400V  
A

Rated-Current  
 $I_{th}$   
A

NO

NC

acc. to EN50011

Blocks Type



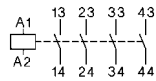
Pack Weight  
pcs. kg/pc.

## 4-pole, With Screw Terminals

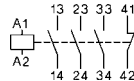


| 3 | 1,5 | 5 | 4 | - | 40E | - | K0-04D40 ... | 10 | 0,07 |
|---|-----|---|---|---|-----|---|--------------|----|------|
| 3 | 1,5 | 5 | 3 | 1 | 31E | - | K0-04D31 ... | 10 | 0,07 |
| 3 | 1,5 | 5 | 2 | 2 | 22E | - | K0-04D22 ... | 10 | 0,07 |

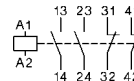
K0-04D40



K0-04D31



K0-04D22



1) Other coil voltages for AC operated contactors find on page 12. For DC operated Micro Contactors contact us.  
 2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.

# Micro Contactors

AC or DC Operated

| Power Ratings | Rated Current | Aux. Contacts <sup>2)</sup> |            | Type                                   | Coil voltage <sup>1)</sup>              | Pack pcs. | Weight kg/pc. |
|---------------|---------------|-----------------------------|------------|--|---|-----------|---------------|
|               |               | Built-in                    | Additional |  |   |           |               |
| AC2, AC3 AC1  |               |                             |            | <b>24</b><br><b>230</b><br><b>= 24</b> | 24V 50/60Hz<br>220-230V 50Hz<br>24V= DC |           |               |
| <b>380V</b>   |               |                             |            |  |   |           |               |
| <b>400V</b>   | 660V          |                             |            |  |   |           |               |
| <b>415V</b>   | 690V          | 440V                        |            |  |   |           |               |
| <b>kW</b>     | <b>kW</b>     | <b>A</b>                    |            |  |   |           |               |



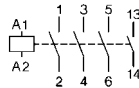
### 3-pole, With Screw Terminals

| Rated Current | Rated Voltage | Rated Power | NO | NC | Type | Coil Voltage | Pack pcs. | Weight kg/pc. |
|---------------|---------------|-------------|----|----|------|--------------|-----------|---------------|
| 2,2           | -             | 12          | 1  | -  | -    | K0-05D10 ... | 10        | 0,07          |
| 2,2           | -             | 12          | -  | 1  | -    | K0-05D01 ... | 10        | 0,07          |

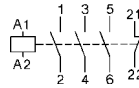
### 4-pole, With Screw Terminals

| Rated Current | Rated Voltage | Rated Power | NO | NC | Type | Coil Voltage    | Pack pcs. | Weight kg/pc. |
|---------------|---------------|-------------|----|----|------|-----------------|-----------|---------------|
| 2,2           | -             | 12          | -  | -  | -    | K0-05D00-40 ... | 10        | 0,07          |

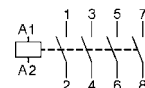
K0-05D10



K0-05D01



K0-05D00-40



# Snap-On Adapter



| Specification                 | Type                         | Pack pcs. | Weight kg/pc. |
|-------------------------------|------------------------------|-----------|---------------|
| guitable for Micro Contactors |                              |           |               |
| <b>K0</b>                     | Snap on Adapter for K0 P1039 | 10        | 0,0061        |

Snap-on Micro Contactors to 35mm DIN-rails acc. to DIN EN 50022.

1) Other coil voltages for AC operated contactors find on page 12. For DC operated Micro Contactors contact us.  
2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.

| Power Ratings | Rated Current | Aux. Contacts <sup>2)</sup> |            | Type        | Coil voltage <sup>1)</sup> | Pack pcs. | Weight kg/pc. |
|---------------|---------------|-----------------------------|------------|-------------|----------------------------|-----------|---------------|
|               |               | Built in                    | Additional |             |                            |           |               |
| AC2, AC3 AC1  |               |                             |            | <b>24</b>   | 24V 50/60Hz                |           |               |
| <b>380V</b>   |               |                             |            | <b>230</b>  | 220-230V 50Hz              |           |               |
| <b>400V</b>   | 660V          |                             |            | <b>= 24</b> | 24V= DC                    |           |               |
| <b>415V</b>   | 690V          | 440V                        |            |             |                            |           |               |
| <b>kW</b>     | <b>kW</b>     | <b>A</b>                    | NO NC      | Type        |                            |           |               |



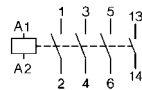
**3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications**

|            |   |   |   |   |   |                     |    |      |
|------------|---|---|---|---|---|---------------------|----|------|
| <b>2,2</b> | - | 9 | 1 | - | - | <b>K0-05L10</b> ... | 10 | 0,07 |
| <b>2,2</b> | - | 9 | - | 1 | - | <b>K0-05L01</b> ... | 10 | 0,07 |

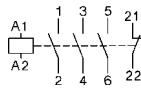
**4-pole, with Solder Pins Ø1,15 for Printed Circuit Applications**

|            |   |   |   |   |   |                        |    |      |
|------------|---|---|---|---|---|------------------------|----|------|
| <b>2,2</b> | - | 9 | - | - | - | <b>K0-05L00-40</b> ... | 10 | 0,07 |
|------------|---|---|---|---|---|------------------------|----|------|

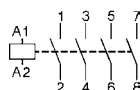
**K0-05L10**



**K0-05L01**



**K0-05L00-40**



**Coil voltages** for AC operated contactors

| Suffix to contactor type<br>e.g. K0-05D10 24 | Voltage Marking at the coil for |           | Rated Control Voltage U <sub>s</sub> range for 50Hz |           |           |           | for 60Hz |      |
|--|---------------------------------|-----------|---|-----------|-----------|-----------|----------|------|
|  | for 50Hz                        | for 60Hz  | min.  | max.      | min.      | max.      | min.     | max. |
|  | V                               | V         | V   | V         | V         | V         | V        | V    |
| 12   | 12                              | 12        | 11  | 12        | 12        | 12        |          |      |
| <b>24</b>                                    | <b>24</b>                       | <b>24</b> | <b>22</b>   | <b>24</b> | <b>24</b> | <b>24</b> |          |      |
| 42   | 42                              | 42        | 38,5  | 42        | 42        | 42        |          |      |
| 48   | 48                              | 48        | 48  | 50        | 48        | 52        |          |      |
| 90   | 100                             | 100       | 90  | 100       | 100       | 105       |          |      |
| 95   | 95-100                          | 105-110   | 95  | 100       | 105       | 110       |          |      |
| 100  | 100                             | 110-115   | 100   | 105       | 110       | 115       |          |      |
| 105  | 105-110                         | 115-120   | 105   | 110       | 115       | 120       |          |      |
| 110  | 110-115                         | 120-125   | 110   | 115       | 120       | 125       |          |      |
| 180  | 200                             | 200       | 185   | 200       | 200       | 210       |          |      |

| Suffix to contactor type<br>e.g. K0-05D10 230 | Voltage Marking at the coil for |                | Rated Control Voltage U <sub>s</sub> range for 50Hz |            |            |            | for 60Hz |      |
|---|---------------------------------|----------------|---|------------|------------|------------|----------|------|
|   | for 50Hz                        | for 60Hz       | min.  | max.       | min.       | max.       | min.     | max. |
|   | V                               | V              | V   | V          | V          | V          | V        | V    |
| 200   | 200                             | 200-220        | 195   | 205        | 200        | 220        |          |      |
| 210   | 205-215                         | 220-230        | 205   | 215        | 220        | 230        |          |      |
| 220   | 210-220                         | 220-240        | 210   | 220        | 220        | 240        |          |      |
| <b>230</b>                                    | <b>220-230</b>                  | <b>230-250</b> | <b>220</b>  | <b>230</b> | <b>230</b> | <b>250</b> |          |      |
| 240   | 230-240                         |                | 230   | 240        | 250        | 260        |          |      |

Standard voltages in bold type letters  
 Operating range of magnet-coils: 0,85 x U<sub>s</sub> (min. value of rated control voltage) up to 1,1 x U<sub>s</sub> (max. value of rated control voltage)

Coil not exchangeable

1) Other coil voltages (AC operation) see above table. For DC operated Micro Contactors contact us.  
 2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.

# Micro Reversing Contactors, Mechanical Interlocked

AC or DC Operated

| Power Ratings  | Rated Current                | Aux. Contacts <sup>2)</sup> |   | Type                                   | Coil voltage <sup>1)</sup>              | Pack pcs. | Weight kg/pc. |
|--|------------------------------|-----------------------------|---|--|---|-----------|---------------|
|  |                              | Built-in                    | Additional  |  |   |           |               |
| AC2, AC3<br><b>380V</b><br><b>400V</b><br><b>415V</b><br><b>kW</b> | AC1<br><br>660V<br>690V<br>A |                             | on left hand side<br>on right hand side<br>Contactor<br>Contactor | <b>24</b><br><b>230</b><br><b>= 24</b> | 24V 50/60Hz<br>220-230V 50Hz<br>24V= DC |           |               |
|  |                              |                             |   |  |   |           |               |



### 3-pole, with Screw Terminals

| 2,2 | - | 12 | - | 1 | - | - | - | K0W05D01MC ... | 5 | 0,14 |
|-----|---|----|---|---|---|---|---|----------------|---|------|
| 2,2 | - | 12 | 1 | - | - | - | - | K0W05D10MC ... | 5 | 0,14 |

### 4-pole, with Screw Terminals

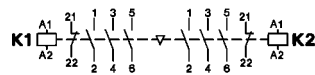
|     |   |    |   |   |   |   |   |                   |   |      |
|-----|---|----|---|---|---|---|---|-------------------|---|------|
| 2,2 | - | 12 | - | - | - | - | - | K0W05D00-40MC ... | 5 | 0,14 |
|-----|---|----|---|---|---|---|---|-------------------|---|------|



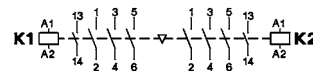
### 3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications

|     |   |                   |   |   |   |   |   |                |   |      |
|-----|---|-------------------|---|---|---|---|---|----------------|---|------|
| 2,2 | - | xxx <sup>3)</sup> | - | 1 | - | - | - | K0W05L01MC ... | 5 | 0,14 |
| 2,2 | - | xxx <sup>3)</sup> | 1 | - | - | - | - | K0W05L10MC ... | 5 | 0,14 |

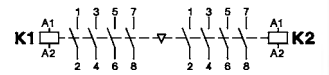
K0W05D01MC



K0W05D10MC



K0W05D00-40MC



1) Other coil voltages for AC operated contactors find on page 12. For DC operated Micro Contactors contact us.  
 2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA). Mirror contacts acc. IEC60947-4-1 Annex F.  
 3) Data on request.

# Micro Contactors

Data according to IEC 60947-4-1, VDE 0660, EN 60947-4-1

| Main Contacts   | Type   | K0-05D..(=)   | K0-05L..(=)       |
|---|--|---|-------------------|
| <b>Rated insulation voltage <math>U_i</math></b>  | V AC   | 440 <sup>1)</sup>   | 440 <sup>1)</sup> |
| <b>Making capacity <math>I_{eff}</math></b>   | at $U_e = 440V$ AC A                             | 65  | 65                |
| <b>Breaking capacity <math>I_{eff}</math></b>   | 400V AC A  | 50  | 50                |
| cos $\phi = 0,65$   |  |   |                   |
| <b>Utilization category AC1</b>   |  |   |                   |
| <b>Switching of resistive load</b>  |  |   |                   |
| Rated operational current $I_e (=I_{th})$ at 40°C, open   | <b>A</b>   | <b>12</b>   | <b>9</b>          |
| Rated operational power of three-phase resistive loads<br>50-60Hz, cosj = 1                           | 230V kW  | 4,7   | 3,5               |
|   | 240V kW  | 4,8   | 3,7               |
|   | 400V kW  | 8,3   | 3,3               |
|   | 415V kW  | 8,6   | 6,4               |
|   | 440V kW  | 9,0   | 6,8               |
| Rated operational current $I_e (=I_{th})$ at 60°C, enclosed   | A  | 8   | 6                 |
| Rated operational power of three-phase resistive loads<br>50-60Hz, cosj = 1                           | 230V kW  | 3,1   | 2,3               |
|   | 240V kW  | 3,3   | 2,4               |
|   | 400V kW  | 5,5   | 4,1               |
|   | 415V kW  | 5,7   | 4,3               |
|   | 440V kW  | 6,0   | 4,5               |
| Minimum cross-section of conductor at load with $I_e (=I_{th})$                                       | mm <sup>2</sup>                                  | 1,5   | -                 |
| <b>Utilization category AC2 and AC3</b>   |  |   |                   |
| <b>Switching of three-phase motors</b>  |  |   |                   |
| Rated operational current $I_e$<br>open and enclosed  | 220V A   | 6,2   | 6,2               |
|   | 230V A   | 6,2   | 6,2               |
|   | 240V A   | 5,6   | 5,6               |
|   | <b>380-400V A</b>                                | <b>5</b>  | <b>5</b>          |
|   | 415-440V A                                       | 5   | 5                 |
| Rated operational power of three-phase motors<br>50-60Hz  | 220-240V kW                                      | 1,5   | 1,5               |
|   | <b>380-440V kW</b>                               | <b>2,2</b>  | <b>2,2</b>        |
| <b>Utilization category AC4</b>   |  |   |                   |
| <b>Switching of squirrel cage motors, inching</b>   |  |   |                   |
| Rated operational current $I_e$<br>open and enclosed  | 220V A   | 4,9   | 4,9               |
|   | 230V A   | 4,9   | 4,9               |
|   | 240V A   | 4,1   | 4,1               |
|   | <b>380-400V A</b>                                | <b>3,5</b>  | <b>3,5</b>        |
|   | 415-440V A                                       | 3,5   | 3,5               |
| Rated operational power of three-phase motors<br>50-60Hz  | 220-240V kW                                      | 1,1   | 1,1               |
|   | <b>380-440V kW</b>                               | <b>1,5</b>  | <b>1,5</b>        |
| <b>Utilization category AC5a</b>  |  |   |                   |
| <b>Switching of gas discharge lamps</b>   |  |   |                   |
| Rated operational current $I_e$<br>per pole at 220/230V   |  |   |                   |
| Fluorescent lamps,<br>uncompensated and serial compensated<br>parallel compensated<br>dual-connection | A  | 6   | 6                 |
|   | A  | 0,5   | 0,5               |
|   | A  | 9   | 9                 |
| Metal halide lamps <sup>2)</sup> ,<br>uncompensated<br>parallel compensated                           | A  | 6   | 6                 |
|   | A  | 0,5   | 0,5               |
| Mercury-vapour lamps <sup>3)</sup> ,<br>uncompensated<br>parallel compensated                         | A  | 9   | 9                 |
|   | A  | 0,5   | 0,5               |
| Mixed light lamps <sup>4)</sup>   | A  | 9   | 9                 |
| <b>LED-Lamps</b>  |  |   |                   |
| consider the inrush current of the lamp ballast<br>and cos $\phi$ of the lamp                         | max. lamps per pole ( $I_{nLED} \leq I_{th}$ ) = | inrush current of contactor<br>inrush current of lamp/EVG |                   |
| max inrush current of contactor   | A  | 91  | 91                |
| <b>Utilization category AC5b</b>  |  |   |                   |
| <b>Switching of incandescent lamps<sup>5)</sup></b>   |  |   |                   |
| Rated operational current $I_e$<br>per pole at 220/230V   | A  | 3   | 3                 |

1) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry):  $U_{imp} = 4kV$ . 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 x  $I_e$

# Micro Contactors

Data according to IEC 60947-4-1, VDE 0660, EN 60947-4-1

| Main Contacts   | Type                              | K0-05D..(=)                    | K0-05L..(=) |
|---|-----------------------------------|--------------------------------|-------------|
| <b>Utilization category DC1</b>   |                                   |                                |             |
| <b>Switching of resistive load</b>  | 1 pole 24V A                      | 12                             | 9           |
| Time constant L/R ≤15ms   | 60V A                             | 12                             | 9           |
| Rated operational current I <sub>e</sub>  | 110V A                            | -                              | -           |
|   | 220V A                            | -                              | -           |
| 3 poles in series   | 24V A                             | 12                             | 9           |
|   | 60V A                             | 12                             | 9           |
|   | 110V A                            | 12                             | 9           |
|   | 220V A                            | -                              | -           |
| <b>Utilization category DC3 and DC5</b>   |                                   |                                |             |
| <b>Switching of shunt motors and series motors</b>  | 1 pole 24V A                      | 12                             | 9           |
| Time constant L/R ≤15ms   | 60V A                             | -                              | -           |
| Rated operational current I <sub>e</sub>  | 110V A                            | -                              | -           |
|   | 220V A                            | -                              | -           |
| 3 Pole in Serie   | 24V A                             | 12                             | 9           |
|   | 60V A                             | 12                             | 9           |
|   | 110V A                            | 12                             | 9           |
|   | 220V A                            | -                              | -           |
| <b>Maximum ambient temperature</b>  |                                   |                                |             |
| Operation   | open °C                           | -40 to +60 (+90) <sup>1)</sup> |             |
|   | enclosed °C                       | -40 to +40                     |             |
| with thermal overload relay   | open °C                           | -25 to +60                     |             |
|   | enclosed °C                       | -25 to +40                     |             |
| Storage   | °C                                | -50 to +90                     |             |
| <b>Short circuit protection</b>   |                                   |                                |             |
| 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                             | 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 fuse (contactor or thermal overload relay) determines the fuse size. |                                   |                                |             |
| <b>Cable cross-sections</b>   |                                   |                                |             |
| for contactors  |                                   |                                |             |
| main connector  | solid or stranded                 | mm <sup>2</sup>                | 0,5 - 1,5   |
|   | flexible                          | mm <sup>2</sup>                | 0,5 - 1,5   |
| Cables per clamp  | flexible with multicore cable end | mm <sup>2</sup>                | 0,5 - 1,5   |
|   | solid or stranded                 | AWG                            | 20 - 14     |
| <b>Frequency of operation z</b>   |                                   |                                |             |
| contactors without thermal oberload relay   | without load                      | 1/h                            | 10000       |
|   | AC3, I <sub>e</sub>               | 1/h                            | 600         |
|   | AC4, I <sub>e</sub>               | 1/h                            | 120         |
|   | DC3, I <sub>e</sub>               | 1/h                            | 600         |
| <b>Mechanical life</b>  |                                   |                                |             |
| AC operated   | S x10 <sup>6</sup>                | 3                              | 3           |
|   | S x10 <sup>6</sup>                | 4                              | 4           |
| <b>Short time current</b>   |                                   |                                |             |
| 10s-current   | A                                 | 50                             | 50          |
| <b>Power loss per pole</b>  |                                   |                                |             |
| at I <sub>e</sub> /AC3 400V   | W                                 | 0,2                            | 0,2         |
| <b>Resistance to shock according to IEC 68-2-27</b>   |                                   |                                |             |
| Shock time 20ms sine-wave   |                                   |                                |             |
| AC operated   | NO g                              | 2,5                            | 2,5         |
|   | NC g                              | 2,5                            | 2,5         |

1) With reduced control voltage range 0,9 up to 1,0 x U<sub>s</sub> and with reduced rated current I<sub>e</sub>/AC1 according to I<sub>e</sub>/AC3.

# Micro Contactors

Data according to IEC 60947-5-1, VDE 0660, EN 60947-5-1

| Auxiliary Contacts   | Type                 |                 | K0-04D..(=)<br>K0-05D..(=)     | K0-04L..(=)<br>K0-05L..(=) |
|--|----------------------|-----------------|--------------------------------|----------------------------|
| <b>Rated insulation voltage</b>  | <b>U<sub>i</sub></b> | VAC             | 440 <sup>1)</sup>              | 440 <sup>1)</sup>          |
| <b>Thermal rated current I<sub>th</sub> to 440V</b>  |                      |                 |                                |                            |
| Ambient temperature  | 40°C                 | A               | 5                              | 5                          |
|  | 60°C                 | A               | 3                              | 3                          |
| <b>Verlustleistung pro Pol</b>   | bei I <sub>th</sub>  | W               | 0,25                           | 0,25                       |
| <b>Utilization category AC15</b>   |                      |                 |                                |                            |
| Rated operational current I <sub>e</sub>   | 220-240V             | A               | 3                              | 3                          |
|  | 380-415V             | A               | 1,5                            | 1,5                        |
|  | 440V                 | A               | 1                              | 1                          |
| <b>Utilization category DC13</b>   |                      |                 |                                |                            |
| Rated operational current I <sub>e</sub>   | 60V                  | A               | 0,5                            | 0,5                        |
|  |                      |                 | -                              | -                          |
|  |                      |                 | -                              | -                          |
| <b>Maximum ambient temperature</b>   |                      |                 |                                |                            |
| Operation  | open                 | °C              | -40 to +60 (+90) <sup>2)</sup> |                            |
|  | enclosed             | °C              |                                |                            |
| Storage  |                      | °C              | -40 to +40                     |                            |
|  |                      |                 | -40 to +90                     |                            |
| <b>Short circuit protection</b>  |                      |                 |                                |                            |
| short-circuit current 1kA,<br>contact welding not accepted<br>max. fuse size   | gL (gG)              | A               | 10                             | 10                         |
| For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size. |                      |                 |                                |                            |
| <b>Power consumption of coils</b>  |                      |                 |                                |                            |
| AC operated  | inrush               | VA              | 9                              | 9                          |
|  | sealed               | VA              | 4                              | 4                          |
|  |                      | W               | 1,8                            | 1,8                        |
| DC operated  | inrush               | W               | 2,5                            | 2,5                        |
|  | sealed               | W               | 2,5                            | 2,5                        |
| <b>Operation range of coils</b>  |                      |                 |                                |                            |
| in multiples of control voltage U <sub>s</sub>   |                      | AC              | 0,85 - 1,1                     | 0,85 - 1,1                 |
|  |                      | DC              | 0,8 - 1,1                      | 0,8 - 1,1                  |
| <b>Switching time at control voltage U<sub>s</sub> ±10% <sup>3) 4)</sup></b>   |                      |                 |                                |                            |
| AC operated  | make time            | ms              | 13 - 18                        | 13 - 18                    |
|  | release time         | ms              | 5 - 10                         | 5 - 10                     |
|  | arc duration         | ms              | 10 - 15                        | 10 - 15                    |
| DC operated  | make time            | ms              | 10 - 20                        | 10 - 20                    |
|  | release time         | ms              | 2 - 10                         | 2 - 10                     |
|  | arc duration         | ms              | 10 - 15                        | 10 - 15                    |
| <b>Cablecross-section</b>  |                      |                 |                                |                            |
| all connectors   | solid                | mm <sup>2</sup> | 0,5 - 1,5                      | Solder Connector<br>Ø 1,15 |
|  | flexible             | mm <sup>2</sup> | 0,5 - 1,5                      |                            |
| flexible with multicore cable end  |                      | mm <sup>2</sup> | 0,5 - 1,5                      |                            |
| Clamps per pole  |                      |                 | 2                              | -                          |
|  | solid or stranded    | AWG             | 20 - 14                        | -                          |

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): U<sub>imp</sub> = 4kV.  
Data for other conditions on request.

2) With reduced control voltage range 0,9 up to 1,0 x U<sub>s</sub> and with reduced thermal rated current I<sub>th</sub> to I<sub>e</sub> /AC15.

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 used (Varistor, RC-units, Diode units).

5) Data on request.

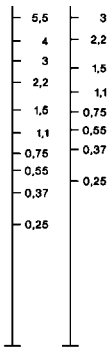
# Micro Contactors for North America

## Data according to UL508

| Main Contacts (cULus)                                 |                     | Type | K0-05D.(=)<br>K0W05D01..(=) | K0-04D..(=) | K0-05L..(=) | K0-04L..(=) |
|---|---------------------|------|-----------------------------|-------------|-------------|-------------|
| Rated operational current "General Use"               |                     | A    | 12                          | 5           | 9           | 5           |
| Rated operational power of three motors at 60Hz (3ph) | 110-120V            | hp   | 1/2                         | -           | 1/2         | -           |
|   | 200-208V            | hp   | 1                           | -           | 1           | -           |
|   | 220-240V            | hp   | 1                           | -           | 1           | -           |
|   | 277V                | hp   | 1 1/2                       | -           | 1 1/2       | -           |
| Rated operational power of AC motors at 60Hz (1ph)    | 110-120V            | hp   | 1/6                         | -           | 1/6         | -           |
|   | 200-208V            | hp   | 1/2                         | -           | 1/2         | -           |
|   | 220-240V            | hp   | 3/4                         | -           | 3/4         | -           |
| Fuse / Short-circuit current                          |                     | A/kA | 30/5                        | -           | 30/5        | -           |
| Rated voltage   |                     | VAC  | 300                         | 300         | 300         | 300         |
| <b>Auxiliary Contacts (cULus)</b>                     |                     |      |                             |             |             |             |
|   | heavy pilot duty    | AC   | B300                        | B300        | B300        | B300        |
|   | standard pilot duty | DC   | R300                        | R300        | R300        | R300        |

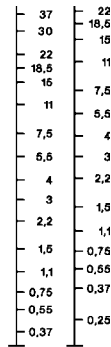
### Motor Rating P<sub>n</sub> = AC4

380/ 220/  
400V 230V  
kW kW



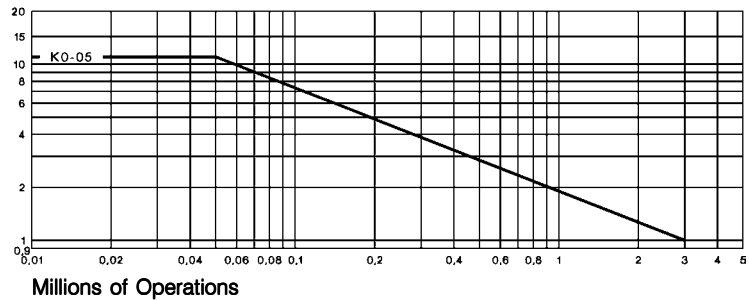
### Motor Rating P<sub>n</sub> = AC3

380/ 220/  
400V 230V  
kW kW



### Breaking Current I<sub>a</sub> (= I<sub>e</sub> = AC1)

A





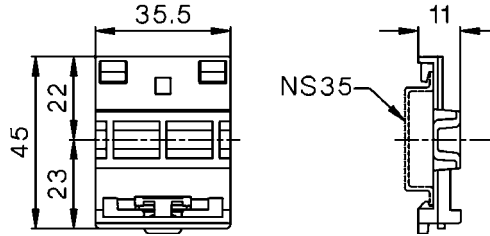
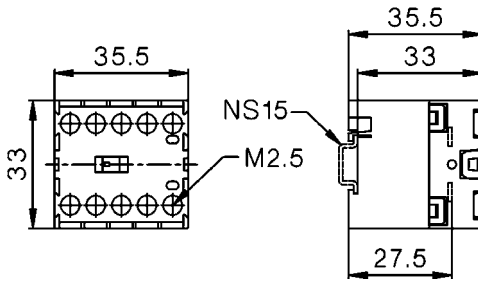
# Micro Contactors

## Dimensions

AC or DC operated  
with screw terminals

K0-04D..(=)  
K0-05D..(=)

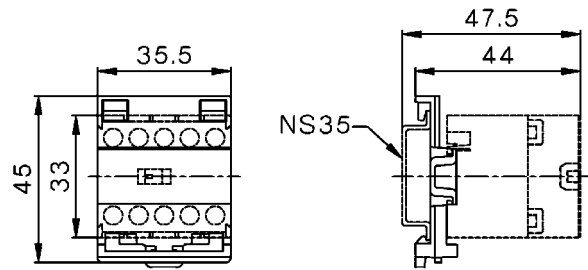
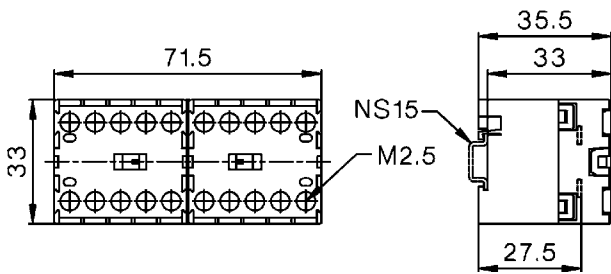
Snap-On Adapter P1039



Reversing Contactors  
with screw terminals

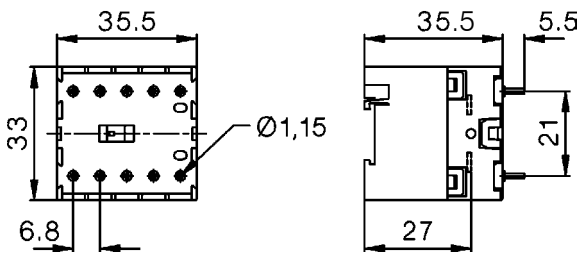
K0-..D.. with Snap-On Adapter P1039

K0W05D..MC



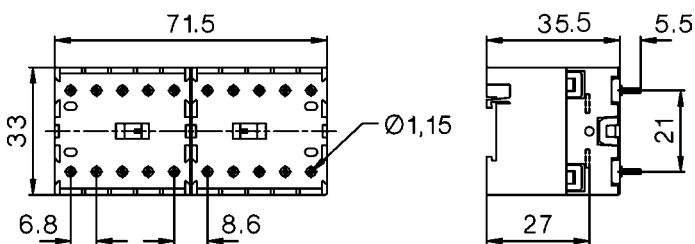
AC or DC operated  
with solder connections

K0-04L..(=)  
K0-05L..(=)



Reversing Contactors  
with solder connections

K0W05L..MC





Mini Contactor Relays 4-pole  
Auxiliary Contact Blocks 20

Interface Contactor Relays



Mini Contactors 22

Auxiliary Contact Blocks



Mini Contactors With Fast On Tab Connectors 24



Mini Contactors With Solder Pins 24

Coil voltages 24

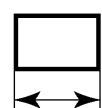


Mini Reversing Contactors 26

Auxiliary Contact Blocks



Technical Data 28



Dimensions 32

# Mini Contactor Relays 4-pole

AC Operated

| Ratings       |                          | Therm. | Contacts <sup>2)</sup> |    | Distinc. Number | Additional Contact | Type  | Coil voltage <sup>1)</sup>   |               |  |
|---------------|--------------------------|--------|------------------------|----|-----------------|--------------------|---|--|---------------|--|
| AC15          | Rated Current $I_{th}$ A |        | NO                     | NC | acc. to EN50011 | Blocks Type        |   | Pack pcs.  | Weight kg/pc. |  |
| <b>230V A</b> | 400V A                   |        |                        |    |                 |                    | <b>24</b><br><b>230</b><br><b>24VS</b><br><b>230VS</b><br><b>24VM</b><br><b>230VM</b> | 24V 50/60Hz<br>220-230V 50Hz<br>24V 50/60Hz w. protection <sup>3)</sup><br>220-230V 50Hz w. protection <sup>3)</sup><br>24V 50/60Hz 24V= DC<br>220-240V 50/60Hz 220V= DC |               |  |



## 4-pole, With Screw Terminals

| 3 | 2 | 10 | 4 | - | 40E | 1 HK.. | K1-07D40 ... | 10 | 0,16 |
|---|---|----|---|---|-----|--------|--------------|----|------|
| 3 | 2 | 10 | 3 | 1 | 31E | 1 HK.. | K1-07D31 ... | 10 | 0,16 |
| 3 | 2 | 10 | 2 | 2 | 22E | 1 HK.. | K1-07D22 ... | 10 | 0,16 |

# Auxiliary Contact Blocks For Contactor Relays

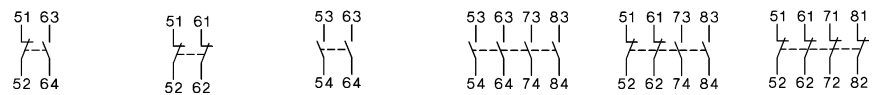


| Ratings       |                 | Thermal         | Contacts <sup>2)</sup> |    | Type        | Pack pcs. | Weight kg/pc. |
|---------------|-----------------|-----------------|------------------------|----|-------------|-----------|---------------|
| AC15          | Rated Current A | Rated Current A | NO                     | NC |             |           |               |
| <b>230V A</b> | 400V A          |                 |                        |    |             |           |               |
| 3             | 2               | 10              | 1                      | 1  | <b>HK11</b> | 10        | 0,04          |
| 3             | 2               | 10              | -                      | 2  | <b>HK02</b> | 10        | 0,04          |
| 3             | 2               | 10              | 2                      | -  | <b>HK20</b> | 10        | 0,04          |
| 3             | 2               | 10              | 4                      | -  | <b>HK40</b> | 10        | 0,04          |
| 3             | 2               | 10              | 2                      | 2  | <b>HK22</b> | 10        | 0,04          |
| 3             | 2               | 10              | -                      | 4  | <b>HK04</b> | 10        | 0,04          |

Aux. Contact Blocks

HK11      HK02      HK20      HK40      HK22      HK04

Wiring Diagrams



Distinc. Number according to EN50011 for Contactor Relay with Auxiliary Contact Block

|          |            |            |            |            |            |            |
|----------|------------|------------|------------|------------|------------|------------|
| K1-07D40 | <b>51E</b> | <b>42E</b> | <b>60E</b> | <b>80E</b> | <b>62E</b> | <b>44E</b> |
| K1-07D31 | 42Y        | 33Y        | 51Y        | 71Y        | 53Y        | 35Y        |
| K1-07D22 | 33Y        | 24Y        | 42Y        | 62Y        | 44Y        | 26Y        |

Preferable combinations with distinctive letter "E" according to DIN EN 50011

1) Other coil voltages see page 24  
 2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.  
 3) with built-in coil suppressor (varistor)

## DC Solenoid Operated

| Type | Coil voltage <sup>1)</sup> |                                       | Contacts <sup>2)</sup> |    | Additional Contact Blocks       | Pack pcs. | Weight kg/pc. | Wiring Diagrams |
|------|----------------------------|---------------------------------------|------------------------|----|---------------------------------|-----------|---------------|-----------------|
|      | 24                         | 24VS                                  | NO                     | NC |                                 |           |               |                 |
|      | 24V= DC                    | 24V= DC with protection <sup>2)</sup> |                        | /  | Distinc. Number acc. to EN50011 |           |               |                 |

### 4-pole, With Screw Terminals, Coil 2,5W



|               |   |   |     |        |    |      |  |
|---------------|---|---|-----|--------|----|------|--|
| K1-07D40= ... | 4 | - | 40E | 1 HK.. | 10 | 0,19 |  |
|---------------|---|---|-----|--------|----|------|--|

|               |   |   |     |        |    |      |  |
|---------------|---|---|-----|--------|----|------|--|
| K1-07D31= ... | 3 | 1 | 31E | 1 HK.. | 10 | 0,19 |  |
|---------------|---|---|-----|--------|----|------|--|

|               |   |   |     |        |    |      |  |
|---------------|---|---|-----|--------|----|------|--|
| K1-07D22= ... | 2 | 2 | 22E | 1 HK.. | 10 | 0,19 |  |
|---------------|---|---|-----|--------|----|------|--|

### 4-pole, With Screw Terminals, Coil 1,5W, 19 to 30V DC with suppressor <sup>3)</sup>



|                |   |   |   |   |    |      |  |
|----------------|---|---|---|---|----|------|--|
| K1-07D40= 24VR | 4 | - | - | - | 10 | 0,20 |  |
|----------------|---|---|---|---|----|------|--|

|                |   |   |   |   |    |      |  |
|----------------|---|---|---|---|----|------|--|
| K1-07D31= 24VR | 3 | 1 | - | - | 10 | 0,20 |  |
|----------------|---|---|---|---|----|------|--|

|                |   |   |   |   |    |      |  |
|----------------|---|---|---|---|----|------|--|
| K1-07D22= 24VR | 2 | 2 | - | - | 10 | 0,20 |  |
|----------------|---|---|---|---|----|------|--|

1) Other coil voltages on request

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.

3) with integrated coil suppressor (Transient Voltage Suppressor Diode)

## Mini Contactors

## AC Operated

| Power Ratings |           | Rated Current | Aux. Contacts <sup>2)</sup> |            | Type | Coil voltage <sup>1)</sup> |   |
|---------------|-----------|---------------|-----------------------------|------------|------|----------------------------|---|
| AC2, AC3      |           | AC1           | Built-in                    | Additional |      |                            |   |
| <b>380V</b>   |           |               |                             |            |      | <b>24</b>                  | 24V 50/60Hz                               |
| <b>400V</b>   | 660V      |               |                             |            |      | <b>230</b>                 | 220-230V 50Hz                             |
| <b>415V</b>   | 690V      | 690V          |                             |            |      | <b>24VS</b>                | 24V 50/60Hz w. protection <sup>3)</sup>   |
| <b>kW</b>     | <b>kW</b> | <b>A</b>      |                             |            |      | <b>230VS</b>               | 220-230V 50Hz w. protection <sup>3)</sup> |
|               |           |               |                             |            |      | <b>24VM</b>                | 24V 50/60Hz 24V= DC                       |
|               |           |               |                             |            |      | <b>230VM</b>               | 220-240V 50/60Hz 220V= DC                 |
|               |           |               |                             |            |      |                            | Pack Weight                               |
|               |           |               |                             |            |      |                            | pcs. kg/pc.                               |

### 3-pole, With Screw Terminals



| Rated Current | AC1 | AC2, AC3 | Built-in | Additional | Type    | Pack pcs.           | Weight kg/pc. |
|---------------|-----|----------|----------|------------|---------|---------------------|---------------|
| 4             | 20  | 4        | 1        | -          | 1 HKM.. | <b>K1-09D10</b> ... | 10 0,16       |
| 5,5           | 20  | 5,5      | 1        | -          | 1 HKM.. | <b>K1-12D10</b> ... | 10 0,16       |
| 4             | 20  | 4        | -        | 1          | 1HK..   | <b>K1-09D01</b> ... | 10 0,16       |
| 5,5           | 20  | 5,5      | -        | 1          | 1HK..   | <b>K1-12D01</b> ... | 10 0,16       |

### 4-pole, With Screw Terminals

| Rated Current | AC1 | AC2, AC3 | Built-in | Additional | Type  | Pack pcs.              | Weight kg/pc. |
|---------------|-----|----------|----------|------------|-------|------------------------|---------------|
| 4             | 20  | 4        | -        | -          | 1HK.. | <b>K1-09D00-40</b> ... | 10 0,16       |
| 5,5           | 20  | 5,5      | -        | -          | 1HK.. | <b>K1-12D00-40</b> ... | 10 0,16       |

## Auxiliary Contact Blocks for Contactors K1-..

| Ratings     | Thermal Rated Current | Contacts <sup>2)</sup> | Type | Pack pcs.    | Weight kg/pc. |
|-------------|-----------------------|------------------------|------|--------------|---------------|
| AC15        | A                     | NO NC                  |      |              |               |
| <b>230V</b> | 400V                  |                        |      |              |               |
| <b>A</b>    | A                     | A                      |      |              |               |
| <b>3</b>    | 2                     | 10                     | 1 1  | <b>HKM11</b> | 10 0,04       |
| <b>3</b>    | 2                     | 10                     | - 2  | <b>HKM02</b> | 10 0,04       |
| <b>3</b>    | 2                     | 10                     | 2 2  | <b>HKM22</b> | 10 0,04       |

Aux. Contact Blocks

HKM11

HKM02

HKM22

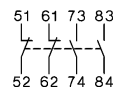
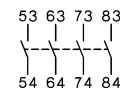
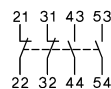
HK11

HK02

HK40

HK22

Wiring Diagrams



Contactors with Auxiliary Contact Block

Contacts according to EN50012

| Contactors | HKM11     | HKM02     | HKM22     | HK11 | HK02 | HK40 | HK22 |
|------------|-----------|-----------|-----------|------|------|------|------|
| K1-..D10   | <b>21</b> | <b>12</b> | <b>32</b> | -    | -    | -    | -    |

Contacts according to DIN EN50005

| Contactors  | HKM11 | HKM02 | HKM22 | HK11 | HK02 | HK40 | HK22 |
|-------------|-------|-------|-------|------|------|------|------|
| K1-..D01    | -     | -     | -     | 12   | 03   | 41   | 23   |
| K1-..D00-40 | -     | -     | -     | 11   | 02   | 40   | 22   |

Prefer combinations according to EN50012

## Suppressor Units for Contactors K1-..



| Voltage Range V  |                  | Type             | Pack pcs. | Weight kg/pc. |
|------------------|------------------|------------------|-----------|---------------|
| 12 - 48V AC/DC   | 1600nF / 22 Ohm  | <b>RC-K1 24</b>  | 10        | 0,01          |
| 48 - 127V AC/DC  | 680nF / 270 Ohm  | <b>RC-K1 110</b> | 10        | 0,01          |
| 110 - 250V AC/DC | 220nF / 2200 Ohm | <b>RC-K1 230</b> | 10        | 0,01          |

1) Other coil voltages see page 24

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.

3) with built-in coil suppressor (varistor)

# DC Solenoid Operated

## Type

Coil voltage <sup>1)</sup>  
**24** 24V= DC  
**24VS** 24V= DC with protection <sup>3)</sup>



Aux. Contacts <sup>2)</sup>  
 Built in Additional  
 NO NC  
 see page 114

Additional Overload Relay Type

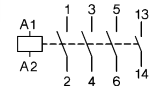
Pack pcs. Weight kg/pc.

Wiring Diagrams

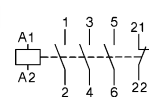


### 3-pole, With Screw Terminals, Coil 2,5W

|                 |   |   |         |            |    |      |
|-----------------|---|---|---------|------------|----|------|
| K1-09D10= . . . | 1 | - | 1 HKM.. | U12/16..K1 | 10 | 0,19 |
| K1-12D10= . . . | 1 | - | 1 HKM.. | U12/16..K1 | 10 | 0,19 |

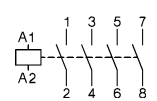


|                 |   |   |        |            |    |      |
|-----------------|---|---|--------|------------|----|------|
| K1-09D01= . . . | - | 1 | 1 HK.. | U12/16..K1 | 10 | 0,19 |
| K1-12D01= . . . | - | 1 | 1 HK.. | U12/16..K1 | 10 | 0,19 |



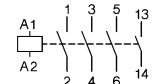
### 4-pole, With Screw Terminals, Coil 2,5W

|                    |   |   |   |            |    |      |
|--------------------|---|---|---|------------|----|------|
| K1-09D00-40= . . . | - | - | - | U12/16..K1 | 10 | 0,19 |
| K1-12D00-40= . . . | - | - | - | U12/16..K1 | 10 | 0,19 |

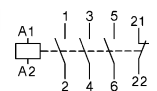


### 3-pole, With Screw Terminals, Coil 1,5W, 19 to 30V DC with suppressor <sup>3)</sup>

|               |   |   |   |            |    |      |
|---------------|---|---|---|------------|----|------|
| K1-09D10=24VR | 1 | - | - | U12/16..K1 | 10 | 0,20 |
|---------------|---|---|---|------------|----|------|



|                |   |   |   |            |    |      |
|----------------|---|---|---|------------|----|------|
| K1-09D01= 24VR | - | 1 | - | U12/16..K1 | 10 | 0,20 |
|----------------|---|---|---|------------|----|------|



1) Other coil voltages on request  
 2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.  
 3) with integrated coil suppressor (Transient Voltage Suppressor Diode)

| Power Ratings |           | Rated Current | Aux. Contacts <sup>2)</sup> |            | Type | Coil voltage <sup>1)</sup> |   |
|---------------|-----------|---------------|-----------------------------|------------|------|----------------------------|---|
|               |           |               | Built in                    | Additional |      |                            |   |
| AC2, AC3      |           | AC1           |                             |            |      | <b>24</b>                  | 24V 50/60Hz                               |
| <b>380V</b>   |           |               |                             |            |      | <b>230</b>                 | 220-230V 50Hz                             |
| <b>400V</b>   | 660V      |               |                             |            |      | <b>24VS</b>                | 24V 50/60Hz w. protection <sup>2)</sup>   |
| <b>415V</b>   | 690V      | 690V          |                             |            |      | <b>230VS</b>               | 220-230V 50Hz w. protection <sup>2)</sup> |
| <b>kW</b>     | <b>kW</b> | <b>A</b>      | NO                          | NC         | Type | <b>24VM</b>                | 24V 50/60Hz 24V DC                        |
|               |           |               |                             |            |      | <b>230VM</b>               | 220-240V 50/60Hz 220V DC                  |
|               |           |               |                             |            |      | ↓                          | Pack Weight<br>pcs. kg/pc.                |

**3-pole, with Fast On Tab Connectors 1 x 6,3mm or 2 x 2,8mm**



|          |   |    |   |   |         |                     |    |      |
|----------|---|----|---|---|---------|---------------------|----|------|
| <b>4</b> | 4 | 16 | 1 | - | 1 HKM.. | <b>K1-09F10</b> ... | 10 | 0,16 |
| <b>4</b> | 4 | 16 | - | 1 | 1 HK..  | <b>K1-09F01</b> ... | 10 | 0,16 |

**3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications**



|          |   |    |   |   |   |                     |    |      |
|----------|---|----|---|---|---|---------------------|----|------|
| <b>4</b> | 4 | 16 | 1 | - | - | <b>K1-09L10</b> ... | 10 | 0,16 |
| <b>4</b> | 4 | 16 | - | 1 | - | <b>K1-09L01</b> ... | 10 | 0,16 |

**4-pole, with Solder Pins Ø1,15 for Printed Circuit Applications**

|          |   |    |   |   |   |                        |    |      |
|----------|---|----|---|---|---|------------------------|----|------|
| <b>4</b> | 4 | 16 | - | - | - | <b>K1-09L00-40</b> ... | 10 | 0,16 |
|----------|---|----|---|---|---|------------------------|----|------|

**Coil voltages** for AC operated contactors

| Suffix to contactor type<br>e.g.<br>K1-09D10 24 | Voltage Marking at the coil for |           | Rated Control Voltage U <sub>s</sub> range for 50Hz |           |           |           | for 60Hz |      |
|---|---------------------------------|-----------|---|-----------|-----------|-----------|----------|------|
|   | 50Hz                            | for 60Hz  | min.  | max.      | min.      | max.      | min.     | max. |
|   | V                               | V         | V   | V         | V         | V         | V        | V    |
| 12  | 12                              | 12        | 11  | 12        | 12        | 12        |          |      |
| <b>24</b>                                       | <b>24</b>                       | <b>24</b> | <b>22</b>   | <b>24</b> | <b>24</b> | <b>24</b> |          |      |
| 42  | 42                              | 42        | 38,5  | 42        | 42        | 42        |          |      |
| 48  | 48                              | 48        | 48  | 50        | 48        | 52        |          |      |
| 90  | 100                             | 100       | 90  | 100       | 100       | 105       |          |      |
| 95  | 95-100                          | 105-110   | 95  | 100       | 105       | 110       |          |      |
| 100   | 100                             | 110-115   | 100   | 105       | 110       | 115       |          |      |
| 105   | 105-110                         | 115-120   | 105   | 110       | 115       | 120       |          |      |
| 110   | 110-115                         | 120-125   | 110   | 115       | 120       | 125       |          |      |
| 180   | 200                             | 200       | 185   | 200       | 200       | 210       |          |      |

| Suffix to contactor type<br>e.g.<br>K1-09D10 230 | Voltage Marking at the coil for |                | Rated Control Voltage U <sub>s</sub> range for 50Hz |            |            |            | for 60Hz |      |
|--|---------------------------------|----------------|---|------------|------------|------------|----------|------|
|  | 50Hz                            | for 60Hz       | min.  | max.       | min.       | max.       | min.     | max. |
|  | V                               | V              | V   | V          | V          | V          | V        | V    |
| 200  | 200                             | 200-220        | 195   | 205        | 200        | 220        |          |      |
| 210  | 205-215                         | 220-230        | 205   | 215        | 220        | 230        |          |      |
| 220  | 210-220                         | 220-240        | 210   | 220        | 220        | 240        |          |      |
| <b>230</b>                                       | <b>220-230</b>                  | <b>230-250</b> | <b>220</b>  | <b>230</b> | <b>230</b> | <b>250</b> |          |      |
| 240  | 230-240                         | 240-260        | 230   | 240        | 240        | 260        |          |      |
| 400  | 380-400                         | 400-440        | 380   | 400        | 400        | 440        |          |      |
| 500  | 475-500                         | 520-545        | 475   | 500        | 520        | 545        |          |      |
| 550  | 525-550                         | 600            | 525   | 550        | 570        | 600        |          |      |

**Standard voltages in bold type letters**  
**Operating range of magnet-coils: 0,85 x U<sub>s</sub> (min. value of rated control voltage) up to 1,1 x U<sub>s</sub> (max. value of rated control voltage)**

Coil not exchangeable

1) Other coil voltages see page 24

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.



3) with built-in coil suppressor (varistor)

# DC Solenoid Operated

## Type

Coil voltage <sup>1)</sup>  
**24** 24V= DC  
**24VS** 24V= DC with protection <sup>3)</sup>



Aux. Contacts <sup>2)</sup>  
 Built in Additional  
   
 NO NC

Additional Overload Relay see pages 115, 117 Type

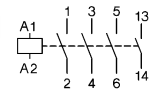
Pack pcs. Weight kg/pc.

Wiring Diagrams

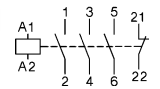
### 3-pole, with Fast On Tab Connectors 1 x 6,3mm or 2 x 2,8mm



**K1-09F10= . . .** 1 - 1 HKM.. <sup>4)</sup> 10 0,19



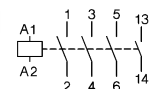
**K1-09F01= . . .** - 1 1 HK.. <sup>4)</sup> 10 0,19



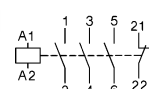
### 3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications



**K1-09L10= . . .** 1 - - - 10 0,19

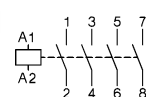


**K1-09L01= . . .** - 1 - - 10 0,19



### 4-pole, with Solder Pins Ø1,15 for Printed Circuit Applications

**K1-09L00-40= . . .** - - - - 10 0,19





1) Other coil voltages on request  
 2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.  
 3) with integrated coil suppressor (Transient Voltage Suppressor Diode)  
 4) U12/16E K3 with U12SMK3 for single mounting



## Mini Reversing Contactors, Mechanical Interlocked

AC Operated

| Power Ratings  | Rated Current              | Aux. Contacts <sup>2)</sup><br>Built-in | Additional  |                              | Type       | Coil voltage <sup>1)</sup>   | Pack pcs.   | Weight kg/pc. |
|--|----------------------------|---|---|------------------------------|------------|--|---|---------------|
|  |                            |   | on left hand side Contactor   | on right hand side Contactor |            |  |   |               |
| AC2, AC3<br><b>380V</b><br><b>400V</b><br><b>415V</b><br><b>kW</b> | 660V<br>690V<br>690V<br>kW | AC1<br><br>690V<br>A                    |   | K1<br>Type                   | K2<br>Type | <b>24</b><br><b>230</b><br><b>24VS</b><br><b>230VS</b><br><b>24VM</b><br><b>230VM</b><br>↓ | 24V 50/60Hz<br>220-230V 50Hz<br>24V 50/60Hz w. protection <sup>3)</sup><br>220-230V 50Hz w. prot. <sup>3)</sup><br>24V 50/60Hz 24V DC<br>220-240V 50/60Hz 220V DC |               |

### 3-pole, with Screw Terminals



|            |     |    |   |   |        |        |                       |   |      |
|------------|-----|----|---|---|--------|--------|-----------------------|---|------|
| <b>4</b>   | 4   | 20 | - | 1 | HKM11V | HKM11X | <b>K1W09D01MC</b> ... | 1 | 0,32 |
| <b>5,5</b> | 5,5 | 20 | - | 1 | HKM11V | HKM11X | <b>K1W12D01MC</b> ... | 1 | 0,32 |
| <b>4</b>   | 4   | 20 | 1 | - | -      | HKM..  | <b>K1W09D10MC</b> ... | 1 | 0,32 |
| <b>5,5</b> | 5,5 | 20 | 1 | - | -      | HKM..  | <b>K1W12D10MC</b> ... | 1 | 0,32 |

### 4-pole, with Screw Terminals


|            |     |    |   |   |   |       |                         |   |      |
|------------|-----|----|---|---|---|-------|-------------------------|---|------|
| <b>4</b>   | 4   | 20 | - | - | - | HKM.. | <b>K1W09D00-40MC</b> .. | 1 | 0,32 |
| <b>5,5</b> | 5,5 | 20 | - | - | - | HKM.. | <b>K1W12D00-40MC</b> .. | 1 | 0,32 |

### 3-pole, with Solder Pins Ø1,15 for Printed Circuit Applications



|          |   |    |   |   |   |   |                       |   |      |
|----------|---|----|---|---|---|---|-----------------------|---|------|
| <b>4</b> | 4 | 16 | - | 1 | - | - | <b>K1W09L01MC</b> ... | 1 | 0,32 |
| <b>4</b> | 4 | 16 | 1 | - | - | - | <b>K1W09L10MC</b> ... | 1 | 0,32 |

## Auxiliary Contact Blocks for Mini Reversing Contactors K1-..

| Ratings                         | Thermal Rated Current | Contacts <sup>2)</sup><br> | Type | Pack pcs.     | Weight kg/pc. |           |
|---------------------------------|-----------------------|---|------|---------------|---------------|-----------|
| AC15<br><b>230V</b><br><b>A</b> |                       |   |      |               |               | 400V<br>A |
| <b>3</b>                        | 2                     | 10  | 1 1  | <b>HKM11V</b> | 10            | 0,04      |
| <b>3</b>                        | 2                     | 10  | 1 1  | <b>HKM11X</b> | 10            | 0,04      |



Aux. Contact Blocks Aux. Contact Blocks

HKM11V HKM11X

Wiring Diagrams



## Reversing Starter Connector



For Reversing Starter Types, incl. Coil Connector

| Type                   | Pack pcs.     | Weight kg/pc. |      |
|------------------------|---------------|---------------|------|
| K1W09D..MC, K1W12D..MC | <b>K1W-VB</b> | 1             | 0,01 |

1) Other coil voltages see page 24

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.

3) with built-in coil suppressor (varistor)

# DC Solenoid Operated

Type

24  
24VS  
↓  
Coil voltage <sup>1)</sup>  
24V= DC  
24V= DC with  
protection <sup>2)</sup>

Additional  
Overload  
Relay  
see  
page114  
Type

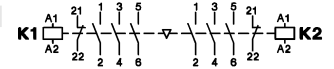
Pack Weight  
pcs. kg/pc.

Wiring Diagrams

## 3-pole, with Screw Terminals

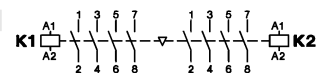


|                 |            |   |      |
|-----------------|------------|---|------|
| K1W09D01MC= ... | U12/16..K1 | 1 | 0,32 |
| K1W12D01MC= ... | U12/16..K1 | 1 | 0,32 |
| K1W09D10MC= ... | U12/16..K1 | 1 | 0,32 |
| K1W12D10MC= ... | U12/16..K1 | 1 | 0,32 |



## 4-pole, with Screw Terminals

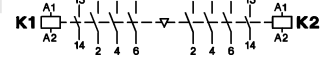
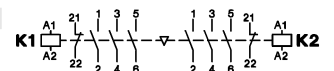
|                   |            |   |      |
|-------------------|------------|---|------|
| K1W09D00-40MC= .. | U12/16..K1 | 1 | 0,32 |
| K1W12D00-40MC= .. | U12/16..K1 | 1 | 0,32 |



## 3-pole, with Solder Pins Ø1,15 for Printed Circuits Applications



|                 |   |   |      |
|-----------------|---|---|------|
| K1W09L01MC= ... | - | 1 | 0,32 |
| K1W09L10MC= ... | - | 1 | 0,32 |



1) Other coil voltages on request  
2) with integrated coil suppressor (Transient Voltage Suppressor Diode)

# Mini Contactors

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

| Main Contacts   | Type  | K1-09D..   | K1-09F..          | K1-09L..          | K1-12D..          |     |
|---|---|--|-------------------|-------------------|-------------------|-----|
| Rated insulation voltage $U_i$  | V AC  | 690 <sup>1)</sup>  | 690 <sup>1)</sup> | 690 <sup>2)</sup> | 690 <sup>1)</sup> |     |
| Making capacity $I_{eff}$   | at $U_e = 690V$ AC  | 165  | 165               | 165               | 165               |     |
| Breaking capacity $I_{eff}$<br>$\cos\phi = 0,65$  | 400V AC   | 100  | 100               | 100               | 100               |     |
|   | 500V AC   | 90   | 90                | 90                | 90                |     |
|   | 690V AC   | 80   | 80                | 80                | 80                |     |
| <b>Utilization category AC1</b><br><b>Switching of resistive load</b>                                 |   |  |                   |                   |                   |     |
| Rated operational current $I_e (=I_{th})$ at 40°C, open   | <b>A</b>  | <b>20</b>  | <b>16</b>         | <b>16</b>         | <b>20</b>         |     |
| Rated operational power of three-phase resistive loads<br>50-60Hz, $\cos\phi = 1$                     | 230V kW   | 7,9  | 6                 | 6                 | 7,9               |     |
|   | 240V kW   | 8,3  | 6,5               | 6,5               | 8,3               |     |
|   | 400V kW   | 13,8   | 11                | 11                | 13,8              |     |
|   | 415V kW   | 14,3   | 11,5              | 11,5              | 14,3              |     |
| Rated operational current $I_e (=I_{th})$ at 60°C, enclosed   | A   | 16   | 12                | 12                | 16                |     |
|   | Rated operational power of three-phase resistive loads<br>50-60Hz, $\cos\phi = 1$ | 230V kW  | 6,3               | 4,5               | 4,5               | 6,3 |
|   | 240V kW   | 6,7  | 5                 | 5                 | 6,7               |     |
|   | 400V kW   | 11   | 8                 | 8                 | 11                |     |
| 415V kW   | 11,5  | 8,5  | 8,5               | 11,5              |                   |     |
| Minimum cross-section of conductor at load with $I_e (=I_{th})$                                       | mm <sup>2</sup>   | 2,5  | 2,5               | -                 | 2,5               |     |
| <b>Utilization category AC2 and AC3</b><br><b>Switching of three-phase motors</b>                     |   |  |                   |                   |                   |     |
| Rated operational current $I_e$<br>open and enclosed  | 220V A  | 12   | 12                | 12                | 15                |     |
|   | 230V A  | 11,5   | 11,5              | 11,5              | 14,5              |     |
|   | 240V A  | 11   | 11                | 11                | 14                |     |
|   | <b>380-400V A</b>   | <b>9</b>   | <b>9</b>          | <b>9</b>          | <b>12</b>         |     |
|   | 415-440V A  | 8  | 8                 | 8                 | 11                |     |
|   | 500V A  | 7  | 7                 | 7                 | 9                 |     |
|   | 660-690V A  | 5  | 5                 | 5                 | 6,5               |     |
| Rated operational power of three-phase motors<br>50-60Hz  | 220-240V kW   | 3  | 3                 | 3                 | 4                 |     |
|   | <b>380-440V kW</b>  | <b>4</b>   | <b>4</b>          | <b>4</b>          | <b>5,5</b>        |     |
|   | 500-690V kW   | 4  | 4                 | 4                 | 5,5               |     |
| <b>Utilization category AC4</b><br><b>Switching of squirrel cage motors, inching</b>                  |   |  |                   |                   |                   |     |
| Rated operational current $I_e$<br>open and enclosed  | 220V A  | 12   | 12                | 12                | 15                |     |
|   | 230V A  | 11,5   | 11,5              | 11,5              | 14,5              |     |
|   | 240V A  | 11   | 11                | 11                | 14                |     |
|   | <b>380-400V A</b>   | <b>9</b>   | <b>9</b>          | <b>9</b>          | <b>12</b>         |     |
|   | 415-440V A  | 8  | 8                 | 8                 | 11                |     |
|   | 500V A  | 7  | 7                 | 7                 | 9                 |     |
|   | 660-690V A  | 5  | 5                 | 5                 | 6,5               |     |
| Rated operational power of three-phase motors<br>50-60Hz  | 220-240V kW   | 3  | 3                 | 3                 | 4                 |     |
|   | <b>380-440V kW</b>  | <b>4</b>   | <b>4</b>          | <b>4</b>          | <b>5,5</b>        |     |
|   | 500-690V kW   | 4  | 4                 | 4                 | 5,5               |     |
| <b>Utilization category AC5a</b><br><b>Switching of gas discharge lamps</b>                           |   |  |                   |                   |                   |     |
| Rated operational current $I_e$<br>per pole at 220/230V   |   |  |                   |                   |                   |     |
| Fluorescent lamps,<br>uncompensated and serial compensated<br>parallel compensated<br>dual-connection | A   | 10   | 10                | 10                | 10                |     |
|   | A   | 2  | 2                 | 2                 | 2                 |     |
|   | A   | 16   | 16                | 16                | 16                |     |
| Metal halide lamps <sup>3)</sup> ,<br>uncompensated<br>parallel compensated                           | A   | 10   | 10                | 10                | 10                |     |
|   | A   | 2  | 2                 | 2                 | 2                 |     |
| Mercury-vapour lamps <sup>4)</sup> ,<br>uncompensated<br>parallel compensated                         | A   | 16   | 16                | 16                | 16                |     |
|   | A   | 2  | 2                 | 2                 | 2                 |     |
| Mixed light lamps <sup>5)</sup>   | A   | 16   | 61                | 16                | 16                |     |
| <b>LED-Lamps</b>  |   |  |                   |                   |                   |     |
| consider the inrush current of the lamp ballast<br>and $\cos\phi$ of the lamp                         | max. lamps per pole ( $I_{nLED} \leq I_{th}$ )                                    | = $\frac{\text{inrush current of contactor}}{\text{inrush current of lamp/EVG}}$ |                   |                   |                   |     |
| max inrush current of contactor   | A   | 233  | 233               | 233               | 233               |     |
| <b>Utilization category AC5b Switching of incandescent lamps <sup>6)</sup></b>                        |   |  |                   |                   |                   |     |
| Rated operational current $I_e$<br>per pole at 220/230V   | A   | 8  | 8                 | 8                 | 8                 |     |

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry):  $U_{imp} = 8kV$ .  
Data for other conditions on request.

2) Suitable at 690V for pollution degree 2,  $U_{imp} = 6kV$ .  
Pollution degree 3  $U_i = 690V$  non-tracking of the printed circuit CTI  $\geq 600$   
Pollution degree 3  $U_i = 500V$  non-tracking of the printed circuit CTI  $\geq 400$   
Pollution degree 3  $U_i = 400V$  non-tracking of the printed circuit CTI  $\geq 100$

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 x I<sub>e</sub>

# Mini Contactors

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

| Main Contacts   |                                   |                     | Type            | K1-09D..                       | K1-09F..     | K1-09L..         | K1-12D..  |
|---|-----------------------------------|---------------------|-----------------|--------------------------------|--------------|------------------|-----------|
| <b>Utilization category DC1</b>   |                                   |                     |                 |                                |              |                  |           |
| <b>Switching of resistive load</b>  | 1 pole                            | 24V                 | A               | 20                             | 16           | 16               | 20        |
| Time constant L/R ≤15ms   |                                   | 60V                 | A               | 20                             | 16           | 16               | 20        |
| Rated operational current I <sub>e</sub>  |                                   | 110V                | A               | 5                              | 5            | 5                | 5         |
|   |                                   | 220V                | A               | 0,6                            | 0,6          | 0,6              | 0,6       |
|   | 3 poles in series                 | 24V                 | A               | 20                             | 20           | 20               | 20        |
|   |                                   | 60V                 | A               | 20                             | 20           | 20               | 20        |
|   |                                   | 110V                | A               | 20                             | 20           | 20               | 20        |
|   |                                   | 220V                | A               | 16                             | 16           | 16               | 16        |
| <b>Utilization category DC3 and DC5</b>   |                                   |                     |                 |                                |              |                  |           |
| <b>Switching of shunt motors and series motors</b>  | 1 pole                            | 24V                 | A               | 20                             | 16           | 16               | 20        |
| Time constant L/R ≤15ms   |                                   | 60V                 | A               | 5                              | 5            | 5                | 5         |
| Rated operational current I <sub>e</sub>  |                                   | 110V                | A               | 1                              | 1            | 1                | 1         |
|   |                                   | 220V                | A               | 0,15                           | 0,15         | 0,15             | 0,15      |
|   | 3 poles in series                 | 24V                 | A               | 20                             | 16           | 16               | 20        |
|   |                                   | 60V                 | A               | 20                             | 16           | 16               | 20        |
|   |                                   | 110V                | A               | 20                             | 16           | 16               | 20        |
|   |                                   | 220V                | A               | 2                              | 2            | 2                | 2         |
| <b>Maximum ambient temperature</b>  |                                   |                     |                 |                                |              |                  |           |
| Operation   | open                              | °C                  |                 | -40 to +60 (+90) <sup>1)</sup> |              |                  |           |
|   | enclosed                          | °C                  |                 |                                |              |                  |           |
| with thermal overload relay   | open                              | °C                  |                 | -40 to +40                     |              |                  |           |
|   | enclosed                          | °C                  |                 |                                |              |                  |           |
| Storage   |                                   | °C                  |                 | -50 to +90                     |              |                  |           |
| <b>Short circuit protection</b>   |                                   |                     |                 |                                |              |                  |           |
| 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                   |                 | 40                             | 40           | 40               | 40        |
| Coordination-type "2" according to IEC 947-4-1  |                                   |                     |                 |                                |              |                  |           |
| Light contact welding accepted  |                                   |                     |                 |                                |              |                  |           |
| max. fuse size  | gL (gG)                           | A                   |                 | 25                             | 25           | 25               | 25        |
| Contact welding not accepted  |                                   |                     |                 |                                |              |                  |           |
| max. fuse size  | gL (gG)                           | A                   |                 | 10                             | 10           | 10               | 10        |
| For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size. |                                   |                     |                 |                                |              |                  |           |
| <b>Cable cross-sections</b>   |                                   |                     |                 |                                |              |                  |           |
| for contactors without thermal overload relay   |                                   |                     |                 |                                |              |                  |           |
| main connector  | solid or stranded                 | mm <sup>2</sup>     |                 | 0,5 - 2,5                      | Fast on      | Solder connector | 0,5 - 2,5 |
|   |                                   | flexible            | mm <sup>2</sup> | 0,5 - 2,5                      | 1x 6,3 x 0,8 | Ø 1,15           | 0,5 - 2,5 |
| Cables per clamp  | flexible with multicore cable end | mm <sup>2</sup>     |                 | 0,5 - 1,5                      | or           | -                | 0,5 - 1,5 |
|   |                                   | AWG                 |                 | 2                              | 2x 2,8 x 0,8 | -                | 2         |
|   | solid or stranded                 | AWG                 |                 | 18 - 14                        |              |                  | 18 - 14   |
| <b>Frequency of operations z</b>  |                                   |                     |                 |                                |              |                  |           |
| for contactors without thermal overload relay   |                                   |                     |                 |                                |              |                  |           |
|   | without load                      | 1/h                 |                 | 10000                          | 10000        | 10000            | 10000     |
|   | AC3, I <sub>e</sub>               | 1/h                 |                 | 600                            | 600          | 600              | 700       |
|   | AC4, I <sub>e</sub>               | 1/h                 |                 | 120                            | 120          | 120              | 150       |
|   | DC3, I <sub>e</sub>               | 1/h                 |                 | 600                            | 600          | 600              | 700       |
| <b>Mechanical life</b>  | AC operated                       | S x 10 <sup>6</sup> |                 | 5                              | 5            | 5                | 5         |
|   | DC operated                       | S x 10 <sup>6</sup> |                 | 15                             | 15           | 15               | 15        |
| <b>Short time current</b>   | 10s-current                       | A                   |                 | 96                             | 96           | 96               | 120       |
| <b>Power loss</b> per pole  | at I <sub>e</sub> /AC3 400V       | W                   |                 | 0,15                           | 0,15         | 0,15             | 0,25      |
| <b>Resistance to shock according to IEC 68-2-27</b>   |                                   |                     |                 |                                |              |                  |           |
| Shock time 20ms sine-wave   |                                   |                     |                 |                                |              |                  |           |
| AC operated   | NO                                | g                   |                 | 5                              | 5            | 5                | 5         |
|   | NC                                | g                   |                 | 5                              | 5            | 5                | 5         |
| DC operated   | NO                                | g                   |                 | 8                              | 8            | 8                | 8         |
|   | NC                                | g                   |                 | 6                              | 6            | 6                | 6         |

1) With reduced control voltage range 0,9 up to 1,0 x U<sub>s</sub> and with reduced rated current I<sub>e</sub>/AC1 according to I<sub>e</sub>/AC3

# Mini Contactors

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

| Auxiliary Contacts   |  |  | Type  | K1-07D..<br>K1-09D..<br>K1-12D.. | K1-07D..=<br>K1-09D..=<br>K1-12D..= | K1-07D..= 24VR<br>K1-09D..= 24VR | K1-09F..(=)       | K1-07L..(=)<br>K1-09L..(=) | HK..              |
|--|--|--|---|----------------------------------|-------------------------------------|----------------------------------|-------------------|----------------------------|-------------------|
| <b>Rated insulation voltage <math>U_i</math></b>   |  |  | V AC  | 690 <sup>1)</sup>                | 690 <sup>1)</sup>                   | 690 <sup>1)</sup>                | 690 <sup>1)</sup> | 690 <sup>2)</sup>          | 690 <sup>1)</sup> |
| <b>Thermal rated current <math>I_{th}</math> to 690V</b>   |  |  |   |                                  |                                     |                                  |                   |                            |                   |
| Ambient temperature  |  |  | 40°C A  | 10                               | 10                                  | 10                               | 10                | 10                         | 10                |
|  |  |  | 60°C A  | 6                                | 6                                   | 6                                | 6                 | 6                          | 6                 |
| <b>Power loss per pole</b>   |  |  | at $I_{th}$ W                                     | 0,5                              | 0,5                                 | 0,5                              | 0,5               | 0,5                        | 0,5               |
| <b>Utilization category AC15</b>   |  |  |   |                                  |                                     |                                  |                   |                            |                   |
| Rated operational current $I_e$  |  |  | 220-240V A  | 3                                | 3                                   | 3                                | 3                 | 3                          | 3                 |
|  |  |  | 380-415V A  | 2                                | 2                                   | 2                                | 2                 | 2                          | 2                 |
|  |  |  | 440V A  | 1,6                              | 1,6                                 | 1,6                              | 1,6               | 1,6                        | 1,6               |
|  |  |  | 500V A  | 1,2                              | 1,2                                 | 1,2                              | 1,2               | 1,2                        | 1,2               |
|  |  |  | 660-690V A  | 0,6                              | 0,6                                 | 0,6                              | 0,6               | 0,6                        | 0,6               |
| <b>Utilization category DC13</b>   |  |  |   |                                  |                                     |                                  |                   |                            |                   |
| Rated operational current $I_e$  |  |  | 60V A   | 2                                | 2                                   | 2                                | 2                 | 2                          | 2                 |
|  |  |  | 110V A  | 0,4                              | 0,4                                 | 0,4                              | 0,4               | 0,4                        | 0,4               |
|  |  |  | 220V A  | 0,1                              | 0,1                                 | 0,1                              | 0,1               | 0,1                        | 0,1               |
| <b>Maximum ambient temperature</b>   |  |  |   |                                  |                                     |                                  |                   |                            |                   |
| Operation  |  |  | open °C   | -40 to +60 (+90) <sup>3)</sup>   |                                     |                                  |                   |                            |                   |
|  |  |  | enclosed °C                                       | -40 to +40                       |                                     |                                  |                   |                            |                   |
| Storage  |  |  | °C  | -40 to +90                       |                                     |                                  |                   |                            |                   |
| <b>Short circuit protection</b>  |  |  |   |                                  |                                     |                                  |                   |                            |                   |
| short-circuit current 1kA,<br>contact welding not accepted<br>max. fuse size   |  |  | gL (gG) A   | 20                               | 20                                  | 20                               | 20                | 20                         | 20                |
| For contactors with thermal overload relay the device with the smaller admissible control fuse (contactor or thermal overload relay) determines the fuse size. |  |  |   |                                  |                                     |                                  |                   |                            |                   |
| <b>Power consumption of coils</b>  |  |  |   |                                  |                                     |                                  |                   |                            |                   |
| AC operated  |  |  | inrush VA   | 25                               | -                                   | -                                | 25                | 25                         | -                 |
|  |  |  | sealed VA   | 4 - 5                            | -                                   | -                                | 4 - 5             | 4 - 5                      | -                 |
|  |  |  | W   | 1,2                              | -                                   | -                                | 1,2               | 1,2                        | -                 |
| DC operated  |  |  | inrush W  | -                                | 2,5                                 | 1,5                              | 2,5               | 2,5                        | -                 |
|  |  |  | sealed W  | -                                | 2,5                                 | 1,5                              | 2,5               | 2,5                        | -                 |
| <b>Operation range of coils</b>  |  |  |   |                                  |                                     |                                  |                   |                            |                   |
| in multiples of control voltage $U_s$  |  |  |   | 0,85 - 1,1                       | 0,8 - 1,1                           | 19 - 30V DC                      | 0,85 - 1,1        | 0,85 - 1,1                 | -                 |
| <b>Switching time at control voltage <math>U_s \pm 10\%</math> <sup>4) 5)</sup></b>  |  |  |   |                                  |                                     |                                  |                   |                            |                   |
| AC operated  |  |  | make time ms                                      | 15 - 19                          | -                                   | -                                | 15 - 19           | 15 - 19                    | -                 |
|  |  |  | release time ms                                   | 8 - 25                           | -                                   | -                                | 8 - 25            | 8 - 25                     | -                 |
|  |  |  | arc duration ms                                   | 10 - 15                          | -                                   | -                                | 10 - 15           | 10 - 15                    | -                 |
| DC operated  |  |  | make time ms                                      | -                                | 15 - 25                             | 15 - 25                          | 15 - 25           | 15 - 25                    | -                 |
|  |  |  | release time ms                                   | -                                | 8 - 25                              | 8 - 25                           | 8 - 25            | 8 - 25                     | -                 |
|  |  |  | arc duration ms                                   | -                                | 10 - 15                             | 10 - 15                          | 10 - 15           | 10 - 15                    | -                 |
| <b>Cable cross-section</b>   |  |  |   |                                  |                                     |                                  |                   |                            |                   |
| all connectors   |  |  | solid mm <sup>2</sup>                             | 0,5 - 2,5                        | 0,5 - 2,5                           | 0,5 - 2,5                        | Fast on           | Solder connector           | 0,5 - 2,5         |
|  |  |  | flexible mm <sup>2</sup>                          | 0,5 - 2,5                        | 0,5 - 2,5                           | 0,5 - 2,5                        | 1x 6,3 x 0,8      | Ø 1,15                     | 0,5 - 2,5         |
|  |  |  | flexible with multicore cable end mm <sup>2</sup> | 0,5 - 1,5                        | 0,5 - 1,5                           | 0,5 - 1,5                        | or                |                            | 0,5 - 1,5         |
|  |  |  |   |                                  |                                     |                                  | 2x 2,8 x 0,8      |                            |                   |
| Clamps per pole  |  |  |   | 2                                | 2                                   | 2                                | -                 | -                          | 2                 |
|  |  |  | solid or stranded AWG                             | 18 - 14                          | 18 - 14                             | 18 - 14                          |                   |                            | 18 - 14           |

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry):  $U_{imp} = 8kV$ .  
Data for other conditions on request.

2) Suitable at 690V for pollution degree 2,  $U_{imp} = 6kV$ .  
Pollution degree 3  $U_i = 690V$  non-tracking of the printed circuit CTI  $\geq 600$   
Pollution degree 3  $U_i = 500V$  non-tracking of the printed circuit CTI  $\geq 400$   
Pollution degree 3  $U_i = 400V$  non-tracking of the printed circuit CTI  $\geq 100$

3) With reduced control voltage range 0,9 up to 1,0 x  $U_s$  and with reduced thermal rated current  $I_{th}$  to  $I_e/AC15$

4) Summary switching time = release time + arc duration

5) Release time of NC make time of NO increase when suppressor units for voltage peak protection are used (Varistor, RC-units, Diode units).

# Mini Contactors for North America

## Data according to UL508

| Main Contacts (cULus)                                       |          | Type                | K1-09D..<br>K1W09D01 | K1-09F.. | K1-09L..          | K1-07D.. | K1-12D..<br>K1W12D01 | HK.. |
|---|----------|---------------------|----------------------|----------|-------------------|----------|----------------------|------|
| Rated operational current "General Use"                     |          | A                   | 15                   | 15       | 20                | 10       | 20                   | 10   |
| Rated operational power of three-phase motors at 60Hz (3ph) | 110-120V | hp                  | 1½                   | 1½       | 1½                | -        | 2                    | -    |
|   | 200-208V | hp                  | 3                    | 3        | 3                 | -        | 3                    | -    |
|   | 220-240V | hp                  | 3                    | 3        | 3                 | -        | 3                    | -    |
|   | 440-480V | hp                  | 5                    | 5        | 5                 | -        | 7½                   | -    |
|   | 550-600V | hp                  | 7½                   | 7½       | 7½                | -        | 10                   | -    |
| Rated operational power of AC motors at 60Hz (1ph)          | 110-120V | hp                  | ½                    | ½        | ½                 | -        | ¾                    | -    |
|   | 200-208V | hp                  | 1                    | 1        | 1                 | -        | 1½                   | -    |
|   | 220-240V | hp                  | 1½                   | 1½       | 1½                | -        | 2                    | -    |
| Fuse / Short-circuit current                                |          | A/kA                | 30/5                 | 30/5     | 30/5              | -        | 30/5                 | -    |
| Rated voltage   |          | V AC                | 600                  | 600      | 600 <sup>1)</sup> | 600      | 600                  | 600  |
| <b>Auxiliary Contacts (cULus)</b>                           |          | heavy pilot duty    | AC                   | A600     | A600              | A600     | A600                 | A600 |
|   |          | standard pilot duty | DC                   | Q600     | Q600              | Q600     | Q600                 | Q600 |

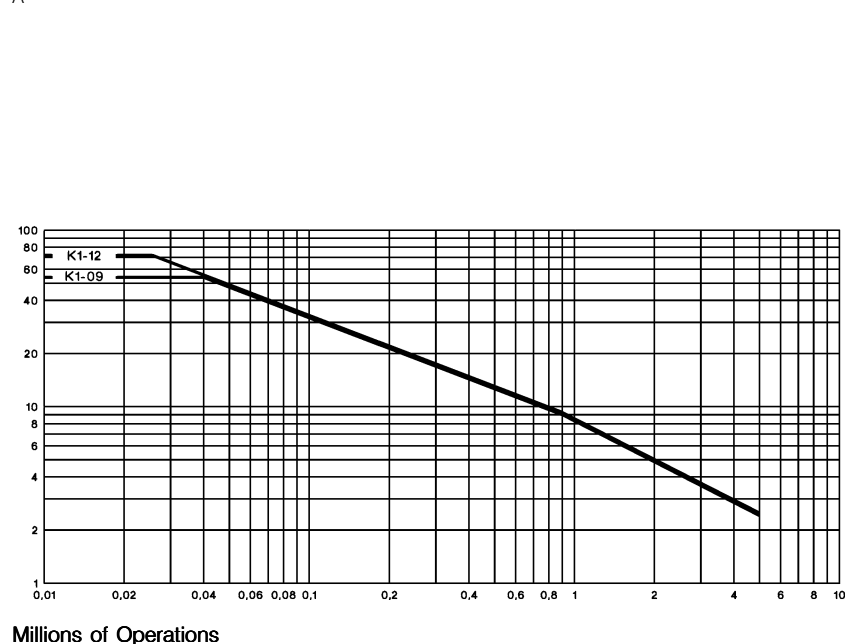
### Motor Rating P<sub>n</sub> = AC4

| 660/690V | 500V | 380/400V | 220/230V |
|----------|------|----------|----------|
| 110      | 75   | 55       | 30       |
| 90       | 55   | 45       | 22       |
| 75       | 45   | 37       | 18,5     |
| 55       | 37   | 30       | 15       |
| 45       | 30   | 22       | 11       |
| 37       | 22   | 18,5     | 7,5      |
| 30       | 18,5 | 15       | 5,5      |
| 22       | 15   | 11       | 4        |
| 18,5     | 11   | 7,5      | 3        |
| 15       | 7,5  | 5,5      | 2,2      |
| 11       | 5,5  | 4        | 1,5      |
| 7,5      | 4    | 3        | 1,1      |
| 5,5      | 3    | 2,2      | 0,75     |
| 4        | 2,2  | 1,5      | 0,55     |
| 3        | 1,5  | 1,1      | 0,37     |
| 2,2      | 1,1  | 0,75     | 0,25     |
| 1,5      | 0,75 | 0,55     |          |
| 1,1      | 0,55 | 0,37     |          |
| 0,75     | 0,37 | 0,25     |          |
| 0,55     | 0,25 |          |          |
| 0,37     |      |          |          |
| 0,25     |      |          |          |

### Motor Rating P<sub>n</sub> = AC3

| 660/690V | 500V | 380/400V | 220/230V |
|----------|------|----------|----------|
| 600      | 400  | 315      | 200      |
| 600      | 315  | 250      | 160      |
| 400      | 315  | 200      | 132      |
| 315      | 250  | 160      | 110      |
| 250      | 200  | 160      | 90       |
| 200      | 160  | 110      | 75       |
| 160      | 132  | 90       | 55       |
| 132      | 110  | 75       | 45       |
| 110      | 90   | 75       | 37       |
| 90       | 75   | 55       | 30       |
| 75       | 55   | 45       | 22       |
| 55       | 45   | 37       | 18,5     |
| 45       | 37   | 30       | 15       |
| 37       | 30   | 22       | 11       |
| 30       | 22   | 18,5     | 7,5      |
| 22       | 18,5 | 15       | 5,5      |
| 18,5     | 15   | 11       | 4        |
| 15       | 11   | 7,5      | 3        |
| 11       | 7,5  | 5,5      | 2,2      |
| 7,5      | 5,5  | 4        | 1,5      |
| 5,5      | 4    | 3        | 1,1      |
| 4        | 3    | 2,2      | 0,75     |
| 3        | 2,2  | 1,5      | 0,55     |
| 2,2      | 1,5  | 1,1      | 0,37     |
| 1,5      | 1,1  | 0,75     | 0,25     |
| 1,1      | 0,75 | 0,55     |          |
| 0,75     | 0,55 | 0,37     |          |
| 0,55     | 0,37 | 0,25     |          |
| 0,37     | 0,25 |          |          |
| 0,25     |      |          |          |

### Breaking Current I<sub>a</sub> (= I<sub>g</sub> = AC1)



| 1) Pollution degree | CTI - PWB | U <sub>i</sub> |
|---------------------|-----------|----------------|
| 2                   | ≥ 100     | 600V           |
| 3                   | ≥ 400     | 480V           |
| 3                   | 100 - 400 | 240V           |

Contactors, Motor-Starters  
 Circuit Breakers  
 Manual Motor-Starters  
 Switches  
 AC-Main Switches  
 DC-Switch Disconnect  
 Push Buttons  
 Representatives, Suppliers

# Mini Contactors

## Dimensions

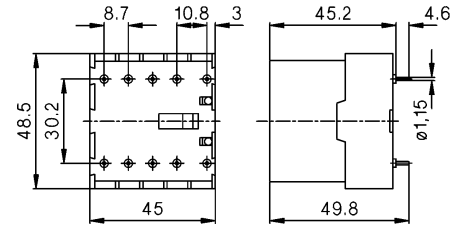
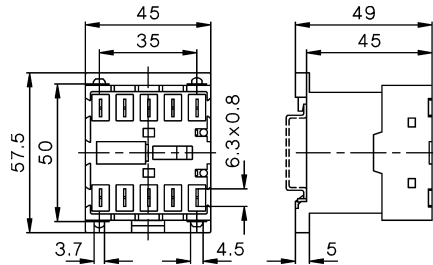
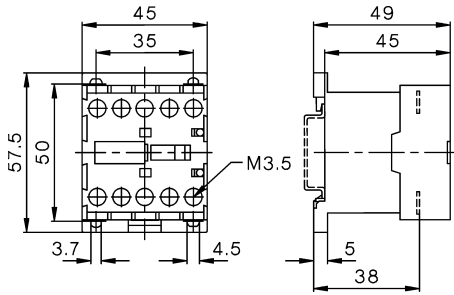
**AC and DC operated**  
with screw terminals

**K1-07D..**  
**K1-09D..**  
**K1-12D..**

with fast on terminals

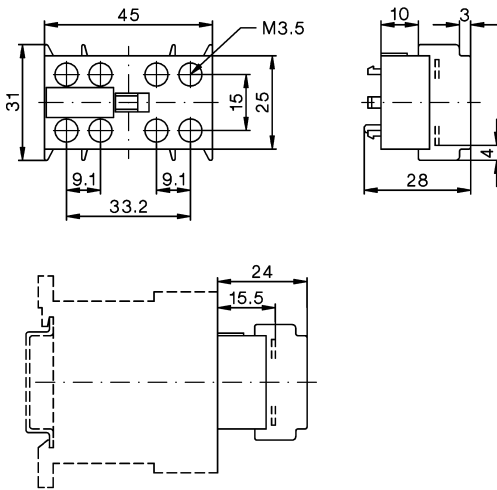
**K1-07F..**  
**K1-09F..**

**AC and DC operated**  
**with solder connections**  
**K1-07L..**  
**K1-09L..**



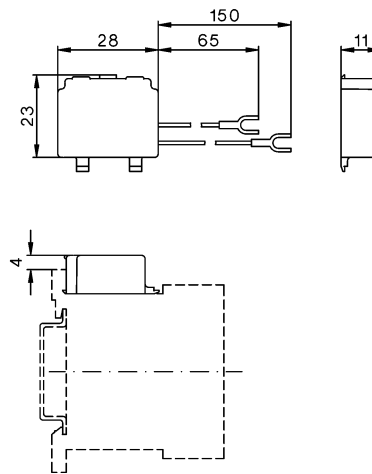
### Auxiliary Contact Blocks

**HK..**



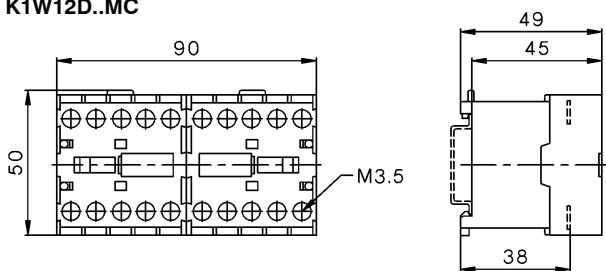
### Suppressor Units

**RC-K1**



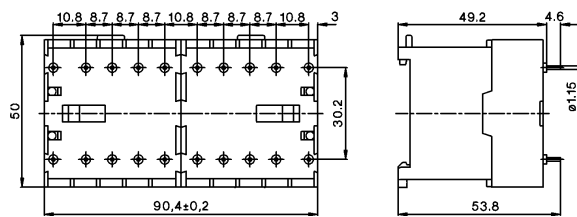
### Reversing Contactors

**K1W09D..MC**  
**K1W12D..MC**

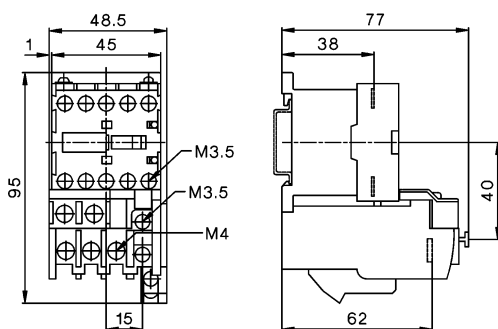


### Reversing Contactors

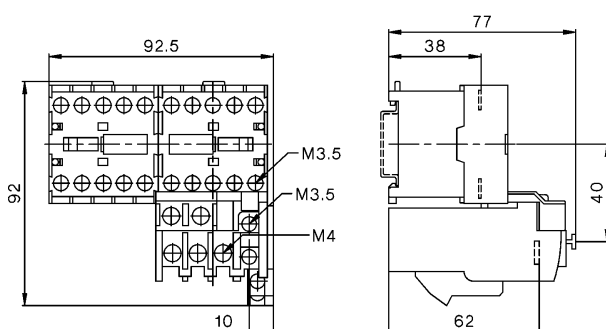
**K1W09L..MC**



**K1-09 + U12/16.. K1**  
**K1-12**



**K1W09D..MC + U12/16E K1**  
**K1W09D..MC + U12/16E K1**





Contactor Relays 4-pole, AC Operated

34



Auxiliary Contact Blocks 1-pole

34



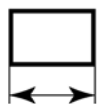
Contactor Relays 4-pole, DC Operated

35



Technical Data

36



Dimensions

38



## Contactor Relays

## AC Operated

| Ratings | Therm. Rated Current | 400V<br>A | $I_{th}$<br>A | Contacts |       | Distinc. Number acc. to | Additional Contact Blocks | Type | Coil voltage <sup>1)</sup> |               |
|---------|----------------------|-----------|---------------|----------|-------|-------------------------|---------------------------|------|----------------------------|---------------|
|         |                      |           |               | Built-in | NO NC |                         |                           |      | 24V 50/60Hz                | 110-120V 60Hz |
| AC15    |                      |           |               |          |       |                         |                           |      | 24V 50/60Hz                | 110-120V 60Hz |
| 230V    |                      |           |               |          |       |                         |                           |      | 110V 50Hz                  | 230-264V 60Hz |
| A       |                      |           |               |          |       |                         |                           |      | 220-240V 50Hz              | 400-440V 60Hz |
|         |                      |           |               |          |       | EN50011                 | Type                      |      | 380-415V 50Hz              |               |

### 4-pole, contacts suitable for electronic circuits according to EN947-5-4<sup>2)</sup>

| 4 | 2 | 10 | 4 | - | 40E | max. 4 | K3-07ND40 | ... | 1 | 0,22 |  |
|---|---|----|---|---|-----|--------|-----------|-----|---|------|--|
| 4 | 2 | 10 | 3 | 1 | 31E | HN..   | K3-07ND31 | ... | 1 | 0,22 |  |
| 4 | 2 | 10 | 2 | 2 | 22E |        | K3-07ND22 | ... | 1 | 0,22 |  |
| 4 | 2 | 10 | - | 4 | 04E |        | K3-07ND04 | ... | 1 | 0,22 |  |



## Auxiliary Contact Blocks <sup>3)</sup>

| Ratings | Thermal Rated Current | 400V<br>A | Contacts <sup>2)</sup> | Type | Pack pcs. | Weight kg/pc. |
|---------|-----------------------|-----------|------------------------|------|-----------|---------------|
|         |                       |           |                        |      |           |               |
| AC15    |                       |           |                        |      |           |               |
| 230V    |                       |           |                        |      |           |               |
| A       |                       |           |                        |      |           |               |

### 1-pole, contacts suitable for electronic circuits according to EN947-5-4<sup>2)</sup>

| 3 | 2 | 10 | 1 | - | - | - | HN10  | ... | 10 | 0,02 |
|---|---|----|---|---|---|---|-------|-----|----|------|
| 3 | 2 | 10 | - | 1 | - | - | HN01  | ... | 10 | 0,02 |
| 3 | 2 | 10 | - | - | 1 | - | HN10U | ... | 10 | 0,02 |
| 3 | 2 | 10 | - | - | - | 1 | HN01U | ... | 10 | 0,02 |



### 1-pole, for high switching capacity

| 6 | 3 | 25 | 1 | - | - | - | HA10 | ... | 10 | 0,03 |
|---|---|----|---|---|---|---|------|-----|----|------|
| 6 | 3 | 25 | - | 1 | - | - | HA01 | ... | 10 | 0,03 |

Accessories see page 34 - 38

1) Other coil voltages see page 51

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.

3) Technical Data see page 64

## DC Operated

| Type | Coil voltage <sup>1)</sup> |         | Contacts |    | Distinc. Number acc. to | Additional Contact Blocks | Pack pcs. | Weight kg/pc. | Wiring Diagrams |
|------|----------------------------|---------|----------|----|-------------------------|---------------------------|-----------|---------------|-----------------|
|      | 24                         | 48      | Built-in |    |                         |                           |           |               |                 |
|      | 24V DC                     | 48V DC  |          |    |                         |                           |           |               |                 |
|      | 110V DC                    | 220V DC |          |    |                         |                           |           |               |                 |
|      | ↓                          |         | NO       | NC | EN50011                 | Type                      |           |               |                 |

### 3W Coil power, for high switching capacity <sup>3)</sup>

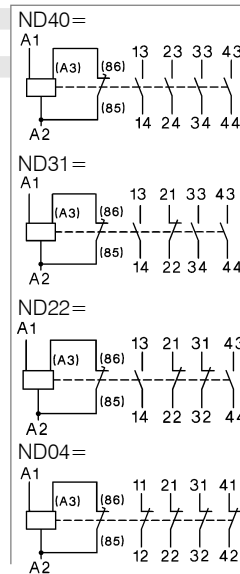
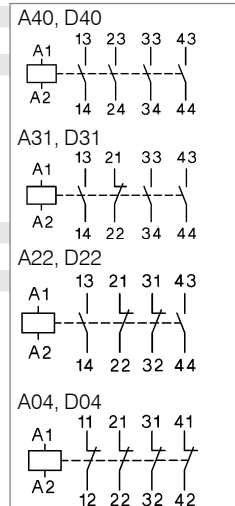
|               |   |   |     |        |   |      |
|---------------|---|---|-----|--------|---|------|
| KG3-07A40 ... | 4 | - | 40E | max. 4 | 1 | 0,53 |
| KG3-07A31 ... | 3 | 1 | 31E | HN..   | 1 | 0,53 |
| KG3-07A22 ... | 2 | 2 | 22E | oder   | 1 | 0,53 |
| KG3-07A04 ... | - | 4 | 04E | HA..   | 1 | 0,53 |

### 3W Coil power, for electronic circuits <sup>2)3)</sup>

|               |   |   |     |        |   |      |
|---------------|---|---|-----|--------|---|------|
| KG3-07D40 ... | 4 | - | 40E | max. 4 | 1 | 0,53 |
| KG3-07D31 ... | 3 | 1 | 31E | HN..   | 1 | 0,53 |
| KG3-07D22 ... | 2 | 2 | 22E |        | 1 | 0,53 |
| KG3-07D04 ... | - | 4 | 04E |        | 1 | 0,53 |

### with double winding coil, for electronic circuits <sup>2)</sup>

|                |   |   |     |        |   |      |
|----------------|---|---|-----|--------|---|------|
| K3-07ND40= ... | 4 | - | 40E | max. 3 | 1 | 0,25 |
| K3-07ND31= ... | 3 | 1 | 31E | HN..   | 1 | 0,25 |
| K3-07ND22= ... | 2 | 2 | 22E |        | 1 | 0,25 |
| K3-07ND04= ... | - | 4 | 04E |        | 1 | 0,25 |



1) Other coil voltages on request

2) Contacts suitable for electronic circuits, according to EN947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F.

3) with integrated coil suppressor (Transient Voltage Suppressor Diode)

## Contactors Relays

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

|  |                                   |                 | K3-07ND                        | K3-07ND=  | KG3-07A               | KG3-07D               |
|--|-----------------------------------|-----------------|--------------------------------|-----------|-----------------------|-----------------------|
| <b>Rated insulation voltage <math>U_i</math></b> <sup>1)</sup>               | V AC                              | Type            | 690                            | 690       | 690                   | 690                   |
| <b>Thermal rated current <math>I_{th}</math></b> to 690V                     |                                   |                 |                                |           |                       |                       |
| Ambient temperature  | 40°C                              | A               | 10                             | 10        | 20                    | 10                    |
|  | 60°C                              | A               | 6                              | 6         | 16                    | 6                     |
| <b>Frequency of operations z</b>   | 1/h                               |                 | 10000                          | 10000     | 10000                 | 10000                 |
| <b>Mechanical life</b>   | S x 10 <sup>6</sup>               |                 | 10                             | 10        | 10                    | 50                    |
| <b>Utilization category AC15</b>   |                                   |                 |                                |           |                       |                       |
| Rated operational current $I_e$  | 220-240V                          | A               | 4                              | 4         | 12                    | 4                     |
|  | 380-415V                          | A               | 2                              | 2         | 4                     | 2                     |
|  | 440V                              | A               | 1,6                            | 1,6       | 4                     | 1,6                   |
|  | 500V                              | A               | 1,2                            | 1,2       | 3                     | 1,2                   |
|  | 660-690V                          | A               | 0,6                            | 0,6       | 1                     | 0,6                   |
| <b>Utilization category DC13</b>   |                                   |                 |                                |           |                       |                       |
| Rated operational current $I_e$  | 24-60V                            | A               | 3,5                            | 3,5       | 8                     | 3,5                   |
| per pole   | 110V                              | A               | 0,5                            | 0,5       | 1                     | 0,5                   |
|  | 220V                              | A               | 0,1                            | 0,1       | 0,1                   | 0,1                   |
| <b>Power consumption of coils</b>  |                                   |                 |                                |           |                       |                       |
| 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                     |
| <b>Operation range of coils</b>  |                                   |                 |                                |           |                       |                       |
| in multiples of control voltage $U_s$  |                                   |                 | 0,85 - 1,1                     | 0,8 - 1,1 | 0,8 - 1,1             | 0,8 - 1,1             |
| <b>Switching time</b> at control voltage $U_s \pm 10\%$                      |                                   |                 |                                |           |                       |                       |
| make time  | ms                                |                 | 8 - 16                         | 8 - 16    | 65 - 85               | 65 - 85               |
| release time   | ms                                |                 | 5 - 13                         | 5 - 13    | 20 - 30 <sup>3)</sup> | 20 - 30 <sup>3)</sup> |
| <b>Maximum ambient temperature</b>   |                                   |                 |                                |           |                       |                       |
| Operation  | open                              | °C              | -40 to +60 (+90) <sup>2)</sup> |           |                       |                       |
|  | enclosed                          | °C              | -40 to +40                     |           |                       |                       |
| Storage  |                                   | °C              | -40 to +90                     |           |                       |                       |
| <b>Short circuit protection</b>  |                                   |                 |                                |           |                       |                       |
| short-circuit current 1kA,<br>contact welding not accepted<br>max. fuse size | gL (gG)                           | A               | 20                             | 20        | 25                    | 20                    |
| <b>Cable cross-section</b>   |                                   |                 |                                |           |                       |                       |
| Connector  | solid                             | mm <sup>2</sup> | 0,75 - 6                       |           |                       |                       |
|  | flexible                          | mm <sup>2</sup> | 1 - 4                          |           |                       |                       |
|  | flexible with multicore cable end | mm <sup>2</sup> | 0,75 - 4                       |           |                       |                       |
| Magnet coil  | solid                             | mm <sup>2</sup> | 0,75 - 2,5                     |           |                       |                       |
|  | flexible                          | mm <sup>2</sup> | 0,75 - 2,5                     |           |                       |                       |
|  | flexible with multicore cable end | mm <sup>2</sup> | 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             | 18 - 12                        |           |                       |                       |
| Clamps per pole  |                                   |                 | 2                              |           |                       |                       |

## Data according to UL508

|                           |                  |      |      |      |      |      |
|---------------------------|------------------|------|------|------|------|------|
| Rated operational current | A                |      | 10   | 10   | 20   | 10   |
| "General Use"             |                  |      |      |      |      |      |
| Rated operational voltage | max.             | V AC | 600  | 600  | 600  | 600  |
| <b>Auxiliary Contacts</b> | heavy pilot duty |      | A600 | A600 | A600 | A600 |

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): Uimp = 8kV.  
Data for other conditions on request.

2) With reduced control voltage range 0,9 up to 1,0 x  $U_s$  and with reduced thermal rated current  $I_{th}$  according to  $I_e$  /AC15

3) with built-in coil suppressor

# Contactor Relays

## Position of Terminals

AC operated

DC operated with double wound coil

**K3-07ND22**

**K3-07ND31**

**K3-07ND40**

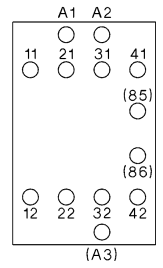
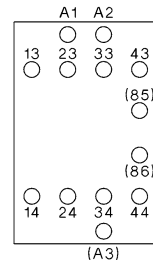
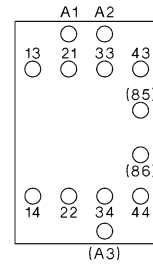
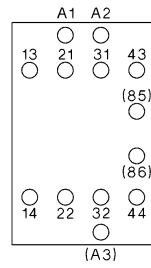
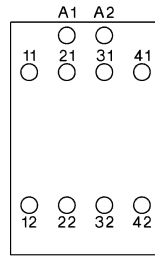
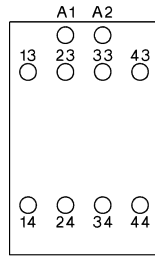
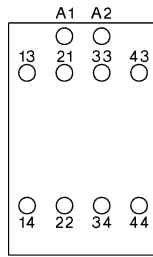
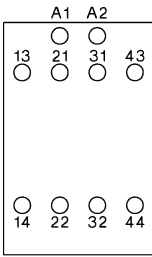
**K3-07ND04**

**K3-07ND22=**

**K3-07ND31=**

**K3-07ND40=**

**K3-07ND04=**



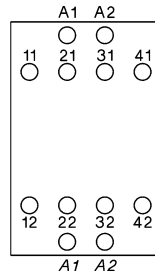
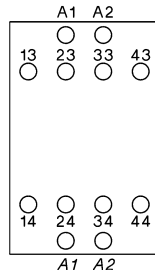
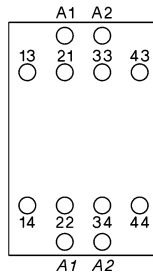
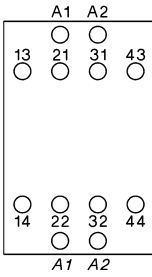
DC solenoid operated

**KG3-07A22**  
**KG3-07D22**

**KG3-07A31**  
**KG3-07D31**

**KG3-07A40**  
**KG3-07D40**

**KG3-07A04**  
**KG3-07D04**

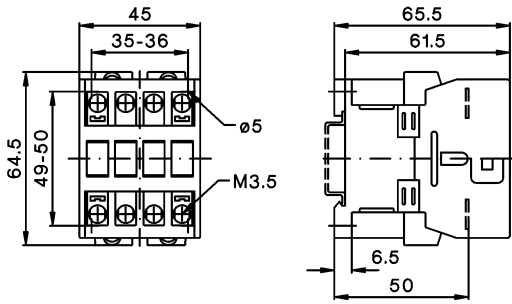


# Contactors Relays

## Dimensions

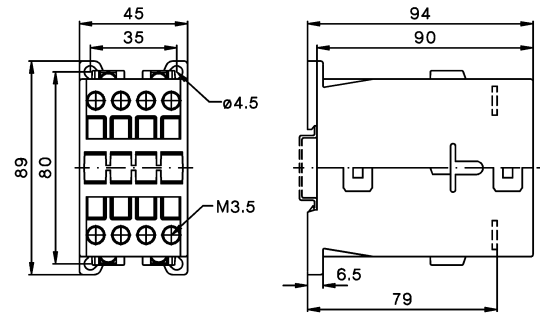
AC operated

K3-07ND..



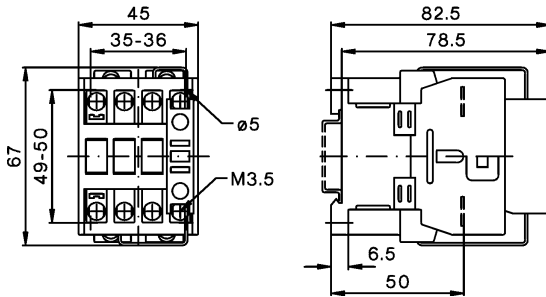
DC solenoid operated

KG3-07..



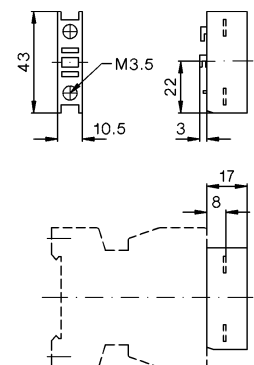
DC operated with double winding coil

K3-07ND.. =

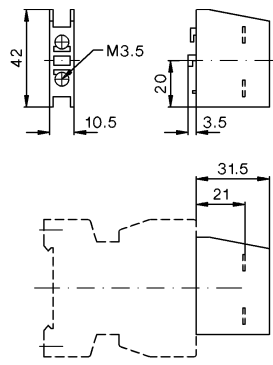











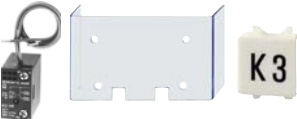





Auxiliary contact blocks

HN10, HN01



HA10, HA01



|   |  |    |                            |
|---|--|----|----------------------------|
|    | Contactor overview   | 40 | Contactors, Motor-Starters |
|    | Contactors 3-pole, AC Operated   | 42 |                            |
|    | Contactors 3-pole, DC Operated   | 43 | Circuit Breakers           |
|    | Contactors 4-pole  | 44 |                            |
|    | Capacitor Switching Contactors   | 45 | Manual Motor-Starters      |
|    | Auxiliary Contact Blocks<br>Snap-on Momentary Contacts<br>Additional Fourth Poles for Contactors | 46 |                            |
|   | Pneumatic Timers<br>Electronic Timers On-delay<br>Electronic Timers Off-delay                    | 47 | Switches                   |
|  | Mechanical Interlocks<br>Latches<br>Additional Terminals, Parallel Connectors                    | 48 |                            |
|  | Indicator Units<br>Fuse Holders<br>Suppressor Units  | 49 | AC-Main Switches           |
|  | Interface<br>Terminal Covers<br>Mounting Parts, Marking System                                   | 50 |                            |
|  | Control Voltages   | 52 | DC-Switch Disconnectors    |
|  | Spare Coils AC-operated<br>Feeder Groups   | 52 |                            |
|  | Spare Coils DC-operated<br>Spare Contacts  | 53 | Push Buttons               |
|  | Technical Data   | 56 |                            |
|  | Dimensions   | 76 | Representatives, Suppliers |

## Contactors 3-pole

- Up to 1200A AC3
- Up to 1350A AC1
- DIN-rail mounting up to AC3 115A
- International Approvals
- Data according to IEC 947 / EN 60947



|                                       |                 |       |  |  |   |   |  |  |              |              |              |              |                                |               |
|---------------------------------------|-----------------|-------|--|--|---|---|--|--|--------------|--------------|--------------|--------------|--------------------------------|---------------|
| <b>Ratings</b>                        |                 |       |  |  |   |   |  |  |              |              |              |              |                                |               |
| AC3                                   | 400V            | Motor | 10A  | 14A  | 18A                                       | 22A                                       | 24A  | 32A  | 40A          | 50A          | 62A          | 74A          | 90A                            | 115A          |
|                                       | 380-400V        |       | 4kW  | 5,5kW  | 7,5kW                                     | 11kW                                      | 11kW   | 15kW   | 18,5kW       | 22kW         | 30kW         | 37kW         | 45kW                           | 55kW          |
|                                       | 660-690V        |       | 5,5kW  | 7,5kW  | 10kW                                      | 10kW                                      | 15kW   | 18,5kW                                       | 18,5kW       | 30kW         | 37kW         | 45kW         | 55kW                           | 55kW          |
| AC1                                   | 690V at 40°C    |       | 25A  | 25A  | 32A                                       | 32A                                       | 50A  | 65A  | 80A          | 110A         | 120A         | 130A         | 160A                           | 200A          |
| <b>Type</b>                           | <b>K3-</b>      |       | <b>10ND10</b>                                | <b>14ND10</b>                                | <b>18ND10</b>                             | <b>22ND10</b>                             | <b>24A00</b>                                     | <b>32A00</b>                                 | <b>40A00</b> | <b>50A00</b> | <b>62A00</b> | <b>74A00</b> | <b>90A00</b>                   | <b>115A00</b> |
| Auxiliary contacts                    |                 |       | 1NO  | 1NO  | 1NO                                       | 1NO                                       | -  | -  | -            | -            | -            | -            | -                              | -             |
| <b>Type</b>                           | <b>K3-</b>      |       | <b>10ND01</b>                                | <b>14ND01</b>                                | <b>18ND01</b>                             | <b>22ND01</b>                             |  |  |              |              |              |              |                                |               |
| Auxiliary contacts                    |                 |       | 1NC  | 1NC  | 1NC                                       | 1NC                                       |  |  |              |              |              |              |                                |               |
| <b>Cable cross-section</b>            |                 |       |  |  |   |   |  |  |              |              |              |              |                                |               |
| Solid                                 | mm <sup>2</sup> |       |  | 0,75 - 6                                     |   |   |  | 1,5 - 25                                     |              |              | 4 - 50       |              | 10 - 120                       |               |
| Flexible                              | mm <sup>2</sup> |       |  | 1 - 4  |   |   |  | 2,5 - 16                                     |              |              | 10 - 35      |              | 10 - 95                        |               |
| <b>Auxiliary contact</b>              |                 |       |  |  |   |   |  |  |              |              |              |              |                                |               |
| I <sub>th</sub> 40°C                  | A               |       |  | 10   |   |   |  | -  |              |              | -            |              | -                              |               |
| AC15 230V                             | A               |       |  | 3  |   |   |  | -  |              |              | -            |              | -                              |               |
| 400V                                  | A               |       |  | 2  |   |   |  | -  |              |              | -            |              | -                              |               |
| <b>Power consumption</b>              |                 |       |  |  |   |   |  |  |              |              |              |              |                                |               |
| Inrush VA                             |                 |       |  | 33 - 45                                      |   |   |  | 90 - 115                                     |              |              | 140 - 165    |              | 280                            |               |
| of coils hold VA                      |                 |       |  | 7 - 10                                       |   |   |  | 9 - 13                                       |              |              | 13 - 18      |              | 5                              |               |
| Operation range of coils              |                 |       |  | 0,85 - 1,1                                   |   |   |  | 0,85 - 1,1                                   |              |              | 0,85 - 1,1   |              | 0,85 - 1,1                     |               |
| <b>Mounting</b>                       |                 |       | 35mm DIN-rail or base                        |  |   |   |  |  |              |              |              |              | 2x DIN-rail or base            |               |
| <b>Additional aux. contact blocks</b> |                 |       |  |  |   |   |  |  |              |              |              |              |                                |               |
| Front mounting                        | <b>Type</b>     |       | <b>HN10</b><br>1NO<br>f. low level switching | <b>HN01</b><br>1NC<br>f. low level switching | <b>HA10</b><br>1NO<br>25A I <sub>th</sub> | <b>HA01</b><br>1NC<br>25A I <sub>th</sub> | max.<br>4 HN..<br>or<br>4 HA..                   |  |              |              |              |              | max.<br>7 HN..<br>or<br>7 HA.. |               |
| <b>Additional aux. contact blocks</b> |                 |       |  |  |   |   |  |  |              |              |              |              |                                |               |
| Side mounting                         | <b>Type</b>     |       | -  | -  | -   | -   | <b>HB11</b><br>1NO+1NC<br>f. low level switching | <b>HB02</b><br>2NC<br>f. low level switching |              |              |              |              | max.<br>2 HB..                 |               |
| <b>Overload Relay (thermal)</b>       |                 |       |  |  |   |   |  |  |              |              |              |              |                                |               |
| Single phase protection               |                 |       |  |  |   |   |  |  |              |              |              |              |                                |               |
| Temperature compensation              |                 |       | <b>U3/32</b>                                 |  |   | <b>U3/74</b>                              |  |  | <b>U85</b>   |              |              |              |                                |               |
| Trip and alarm contacts               |                 |       | <b>U12/16..K3</b>                            |  | <b>U3/42</b>                              |   |  |  |              |              |              |              |                                |               |
| <b>Type</b>                           |                 |       |  |  |   |   |  |  |              |              |              |              |                                |               |
| Number of Setting Ranges from         |                 |       | 16<br>0,12 - 30A                             | 16<br>0,12 - 32A                             | 4<br>10 - 42A                             | 5<br>20 - 74A                             | 2<br>60 - 120A                                   |  |              |              |              |              |                                |               |
| <b>Busbar sets</b>                    |                 |       | -  | -  | -   | -   | -  |  |              |              |              |              |                                |               |



Contactor, Motor-Starters

Circuit Breakers

Manual Motor-Starters







Switches

AC-Main Switches

DC-Switch Disconnectors

Push Buttons












Representatives, Suppliers

|   |                         |   |                        |  |                 |                 |                                  |                    |                        |                 |
|---|-------------------------|---|------------------------|--|-----------------|-----------------|----------------------------------|--------------------|------------------------|-----------------|
| 150A  | 175A                    | 210A  | 260A                   | 315A   | 450A            | 550A            | 700A                             | 860A               | 1000A                  | 1200A           |
| 75kW<br>90kW  | 90kW<br>110kW           | 110kW<br>160kW  | 132kW<br>210kW         | 160kW<br>250kW   | 250kW<br>375kW  | 300kW<br>475kW  | 400kW<br>630kW                   | 500kW<br>700kW     | 580kW<br>850kW         | 680kW<br>1000kW |
| 230A  | 250A                    | 350A  | 450A                   | 500A   | 700A            | 760A            | 1000A                            | 1100A              | 1200A                  | 1350A           |
| <b>151A00</b>   | <b>176A00</b>           | <b>210A00</b>   | <b>260A00</b>          | <b>316A00</b>  | <b>450A22</b>   | <b>550A22</b>   | <b>700A22</b>                    | <b>860A22</b>      | <b>1000A12</b>         | <b>1200A12</b>  |
| -   | -                       | -   | -                      | -  | 2NO+2NC         | 2NO+2NC         | 2NO+2NC                          | 2NO+2NC            | 1NO+2NC                | 1NO+2NC         |
| 2 x 16-120<br>2 x 16-120  | busbar<br>30x6          | busbar<br>30x6  | busbar<br>30x6         | busbar<br>30x6   | busbar<br>30x5  | busbar<br>40x6  | busbar<br>50x8                   | busbar<br>50x8     | busbar<br>50x10        | busbar<br>50x10 |
| -<br>-<br>-   | -                       | -   | -                      | -  | -               | 10<br>3<br>2    | -                                | -                  | 10<br>3<br>2           | -               |
| 350<br>5<br>0,85 - 1,1  | 350<br>5                | 360<br>5  | 360<br>5<br>0,85 - 1,1 | 360<br>5   | 800-950<br>9-11 | 800-950<br>9-11 | 1350-1600<br>21-25<br>0,85 - 1,1 | 1350-1600<br>21-25 | 2400<br>70<br>0,85-1,1 | 2400<br>70      |
| base  |                         |   |                        |  |                 |                 |                                  |                    |                        |                 |
|    | <b>HKT11</b><br>1NO+1NC | <b>HKT22</b><br>2NO+2NC   | max. 1 pc.             |  |                 |                 |                                  |                    |                        |                 |
|    | <b>HKF22</b><br>2NO+2NC | max. 1 pc.  |                        |  |                 |                 |                                  |                    |                        |                 |
|  | <b>HKB11</b><br>1NO+1NC | max. 2 pcs.   |                        |  |                 |                 |                                  |                    |                        |                 |
|    | <b>HKA11</b><br>1NO+1NC | max. 2 pcs.   |                        |  |                 |                 |                                  |                    |                        |                 |
|    | <b>U180</b>             |  | <b>U320</b>            |  | <b>U800</b>     |                 |                                  |                    |                        |                 |
| 1<br>120 - 180A<br>integrated   |                         | 2<br>144 - 320A<br>integrated   |                        | 3<br>240 - 800A  |                 |                 |                                  |                    |                        |                 |
|   |                         |   |                        | SU840/550  | SU840/860       |                 |                                  |                    |                        |                 |



# Contactors 3-pole

# AC Operated

| Ratings   |      | Rated Current | Aux. Contacts   |   | Type                     | Coil voltage <sup>1)</sup> | Pack pcs. | Weight kg/pc. |
|---|------|---------------|---|---|--------------------------|----------------------------|-----------|---------------|
| AC2, AC3  |      |               | Built-in  | Additional see page 46  |                          |                            |           |               |
| 380V  |      |               |   |   |                          |                            |           |               |
| 400V  | 660V | AC1           |  |  |                          | 24                         |           |               |
| 415V  | 690V | 690V          |   |   |                          | 110                        |           |               |
| kW  | kW   | A             | NO  | NC  | Typ                      | 230                        |           |               |
|   |      |               |   |   |                          | 400                        |           |               |
|   |      |               |   |   |                          | ▼                          |           |               |
|    |      |               |   |   |                          |                            |           |               |
| <b>4</b>  | 5,5  | 25            | 1   | -   | max. 4                   |                            | 1         | 0,23          |
| <b>4</b>  | 5,5  | 25            | -   | 1   | HN.. or HA..             |                            | 1         | 0,23          |
| <b>5,5</b>  | 7,5  | 25            | 1   | -   |                          |                            | 1         | 0,23          |
| <b>5,5</b>  | 7,5  | 25            | -   | 1   |                          |                            | 1         | 0,23          |
| <b>7,5</b>  | 10   | 32            | 1   | -   |                          |                            | 1         | 0,23          |
| <b>7,5</b>  | 10   | 32            | -   | 1   |                          |                            | 1         | 0,23          |
| <b>11</b>   | 10   | 32            | 1   | -   |                          |                            | 1         | 0,23          |
| <b>11</b>   | 10   | 32            | -   | 1   |                          |                            | 1         | 0,23          |
|    |      |               |   |   |                          |                            |           |               |
| <b>11</b>   | 15   | 50            | -   | -   | max. 4                   |                            | 1         | 0,48          |
| <b>15</b>   | 18,5 | 65            | -   | -   | HN.. or HA..             |                            | 1         | 0,48          |
| <b>18,5</b>   | 18,5 | 80            | -   | -   | and 2HB..                |                            | 1         | 0,48          |
|   |      |               |   |   |                          |                            |           |               |
| <b>22</b>   | 30   | 110           | -   | -   | max. 4 (3) <sup>4)</sup> |                            | 1         | 0,85          |
| <b>30</b>   | 37   | 120           | -   | -   | HN.. or HA..             |                            | 1         | 0,85          |
| <b>37</b>   | 45   | 130           | -   | -   | and 2HB..                |                            | 1         | 0,85          |
|  |      |               |   |   |                          |                            |           |               |
| <b>45</b>   | 55   | 160           | -   | -   | max. 7                   |                            | 1         | 2,2           |
| <b>55</b>   | 55   | 200           | -   | -   | HN.. or HA.. and 2HB..   |                            | 1         | 2,2           |
|  |      |               |   |   |                          |                            |           |               |
| <b>75</b>   | 110  | 230           | -   | -   | 1 HKT..                  |                            | 1         | 4             |
| <b>90</b>   | 132  | 250           | -   | -   | and 2 HKA11              |                            | 1         | 4             |
|  |      |               |   |   |                          |                            |           |               |
| <b>110</b>  | 160  | 350           | -   | -   |                          |                            | 1         | 7,2           |
| <b>132</b>  | 210  | 450           | -   | -   |                          |                            | 1         | 7,2           |
| <b>160</b>  | 250  | 500           | -   | -   |                          |                            | 1         | 7,2           |
|  |      |               |   |   |                          |                            |           |               |
| <b>250</b>  | 375  | 600           | 2   | 2   | 1 HKF22                  |                            | 1         | 13            |
| <b>300</b>  | 475  | 760           | 2   | 2   |                          |                            | 1         | 13,5          |
|  |      |               |   |   |                          |                            |           |               |
| <b>400</b>  | 630  | 1000          | 2   | 2   |                          |                            | 1         | 26,5          |
| <b>500</b>  | 700  | 1100          | 2   | 2   |                          |                            | 1         | 27,6          |
|  |      |               |   |   |                          |                            |           |               |
| <b>580</b>  | 850  | 1200          | 1   | 2   | 2 HKB11                  |                            | 1         | 49            |
| <b>680</b>  | 1000 | 1350          | 1   | 2   |                          |                            | 1         | 53            |


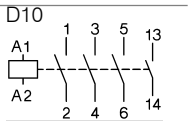

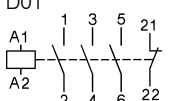

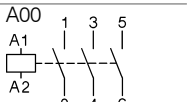
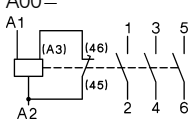
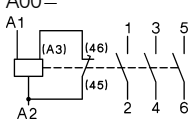
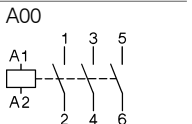
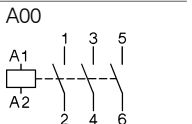
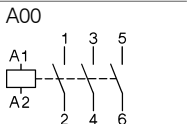
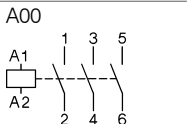
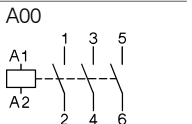
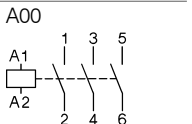
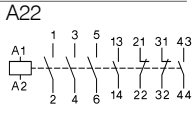
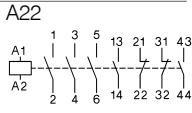
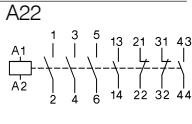
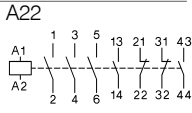
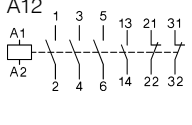
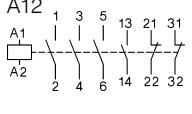
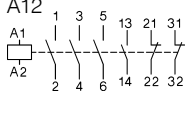
1) Coil voltage range and other coil voltages see page 51

2) Type for AC- and DC-operating; e.g.: 230: 220-240V 50/60Hz and 220V DC (with integrated coil suppressor)

3) Type 230VS for AC-operating 220-240V 50Hz (with integrated coil suppressor)

4) max. 3 HN.. or HA.. for DC-operated Contactors

# DC Operated

| Type  | Coil voltage <sup>1)</sup> | Coil power | Additional Overload Relay see page 114 Type | Pack pcs. | Weight kg/pc. | Wiring Diagram  |
|---|----------------------------|------------|---|-----------|---------------|---|
|   |                            |            |   |           |               |   |
|    | 24                         | 3/3        | U3/32                                       | 1         | 0,53          | <br>D10<br>Coil Circuits see page 53<br>Terminal Markings  |
| KG3-10A01 ... <sup>5)</sup>   | 48                         | 3/3        | U12/16E<br>U12/16EQ                         | 1         | 0,53          |   |
| KG3-14A10 ... <sup>5)</sup>   | 110                        | 3/3        | UAT21                                       | 1         | 0,53          |   |
| KG3-14A01 ... <sup>5)</sup>   |                            | 3/3        |   | 1         | 0,53          |   |
| KG3-18A10 ... <sup>5)</sup>   |                            | 3/3        |   | 1         | 0,53          |   |
| KG3-18A01 ... <sup>5)</sup>   |                            | 3/3        |   | 1         | 0,53          |   |
|    | 24                         | 3/3        |   | 1         | 0,53          | <br>D01  |
| KG3-22A01 ... <sup>5)</sup>   | 48                         | 3/3        |   | 1         | 0,53          |   |
| KG3-24A00 ... <sup>5)</sup>   | 110                        | 4/4        | U3/32                                       | 1         | 0,57          |   |
|    | 24                         | 4/4        | U3/42                                       | 1         | 0,57          | <br>A00=<br><br>A00=<br>A1 (A3) (46) 1 3 5<br>A2 (45) 2 4 6 |
| KG3-32A00 ... <sup>5)</sup>   | 48                         | 4/4        | U3/42                                       | 1         | 0,57          |   |
| KG3-40A00 ... <sup>5)</sup>   | 110                        | 4/4        | UAT..                                       | 1         | 0,57          |   |
|  | 24                         | 200/6      | U3/74                                       | 1         | 0,9           | <br>A00=<br>A1 (A3) (46) 1 3 5<br>A2 (45) 2 4 6  |
| K3-50A00= ...   | 48                         | 200/6      |   | 1         | 0,9           |   |
| K3-74A00= ...   | 110                        | 200/6      |   | 1         | 0,9           |   |
|  | 24                         | 280/5      | U85   | 1         | 2,2           | <br>A00<br>A1 1 3 5<br>A2 2 4 6  |
| K3-115A00 ... <sup>2)</sup>   | 48                         | 280/5      |   | 1         | 2,3           |   |
|  | 24                         | 350/5      | U180  | 1         | 4             | <br>A00<br>A1 1 3 5<br>A2 2 4 6  |
| K3-176A00 ... <sup>2)</sup>   | 48                         | 350/5      |   | 1         | 4             |   |
| K3-210A00 ... <sup>2)</sup>   | 110                        | 360/5      | U320  | 1         | 7,2           |   |
|  | 24                         | 360/5      |   | 1         | 7,2           | <br>A22<br>A1 1 3 5 13 21 31 43<br>A2 2 4 6 14 22 32 44  |
| K3-260A00 ... <sup>2)</sup>   | 48                         | 360/5      |   | 1         | 7,2           |   |
| K3-316A00 ... <sup>2)</sup>   | 110                        | 360/5      |   | 1         | 7,2           |   |
|  | 24                         | 800/10     | U800  | 1         | 13            | <br>A22<br>A1 1 3 5 13 21 31 43<br>A2 2 4 6 14 22 32 44  |
| K3-550A22 ... <sup>2)</sup>   | 48                         | 800/10     | +SU840/550                                  | 1         | 13,5          |   |
|  | 24                         | 1500/20    | U800  | 1         | 26,5          | <br>A12<br>A1 1 3 5 13 21 31<br>A2 2 4 6 14 22 32  |
| K3-860A22 ... <sup>2)</sup>   | 48                         | 1500/20    | +SU840/860                                  | 1         | 27,6          |   |
|  | 24                         | 2100/60    |   | 1         | 49            | <br>A12<br>A1 1 3 5 13 21 31<br>A2 2 4 6 14 22 32  |
| K3-1200A12= ...   | 48                         | 2100/60    |   | 1         | 53            |   |

1) Other coil voltages on request

2) Type for AC- and DC-operating: e.g.: 24: 24V 50/60Hz and 24V DC (with integrated coil suppressor)

5) with integrated coil suppressor

## Contactors 3-pole

DC Operated with double winding coil



| Ratings |      | Rated Current | Aux. Contacts |             | Type         | Coil voltage <sup>1)</sup>                               | Pack Weight pcs. | Wiring Diagram |
|---------|------|---------------|---------------|-------------|--------------|--|------------------|----------------|
| AC2     | AC3  |               | Built-in      | Additional  |              |  |                  |                |
| 380V    |      | AC1           |               | see page 46 |              | 24 24V= DC<br>48 48V= DC<br>110 110V= DC<br>220 220V= DC |                  |                |
| 400V    | 660V | 690V          | NO            | NC          | Type         | ↓  | kg/pc.           |                |
| 415V    | 690V |               |               |             |              |  |                  |                |
| kW      | kW   | A             |               |             |              |  |                  |                |
| 4       | 5,5  | 25            | 1             | -           | max. 3       |  |                  | D10=           |
| 4       | 5,5  | 25            | -             | 1           | HN.. or HA.. |  |                  |                |
| 5,5     | 7,5  | 25            | 1             | -           | HA..         |  |                  | D01=           |
| 5,5     | 7,5  | 25            | -             | 1           |              |  |                  |                |
| 7,5     | 10   | 32            | 1             | -           |              |  |                  | ... A00=       |
| 7,5     | 10   | 32            | -             | 1           |              |  |                  |                |
| 11      | 10   | 32            | 1             | -           |              |  |                  |                |
| 11      | 10   | 32            | -             | 1           |              |  |                  |                |
| 11      | 15   | 50            | -             | -           | max. 4       |  |                  |                |
| 15      | 18,5 | 65            | -             | -           | HN.. or HA.. |  |                  |                |
| 18,5    | 18,5 | 80            | -             | -           | HA.. + 2HB.. |  |                  |                |

## Contactors 4-pole

AC or DC Operated



| Ratings |      | Rated Current | Aux. Contacts |             | Type                 | Coil voltage <sup>2)</sup>   | Pack Weight pcs. | Wiring Diagram |
|---------|------|---------------|---------------|-------------|----------------------|--|------------------|----------------|
| AC2     | AC1  |               | Built-in      | Additional  |                      |  |                  |                |
| 380V    |      | AC1           |               | see page 46 |                      | 24 24V 50/60Hz<br>110 110V 50/60Hz<br>230 220-240V 50Hz<br>400 380-415V 50Hz<br>= 24 24V= DC <sup>3)</sup> |                  |                |
| 400V    |      | 690V          | NO            | NC          | Type                 | ↓  | kg/pc.           |                |
| 415V    | 400V |               |               |             |                      |  |                  |                |
| kW      | kW   | A             |               |             |                      |  |                  |                |
| 4       | 17,5 | 25            | -             | -           | max. 4 <sup>3)</sup> |  |                  | A00-40         |
| 4       | 17,5 | 25            | -             | -           | HN.. or HA..         |  |                  |                |
| 4       | 17,5 | 25            | -             | -           | HA..                 |  |                  | A00-22         |
| 5,5     | 17,5 | 25            | -             | -           |                      |  |                  |                |
| 5,5     | 17,5 | 25            | -             | -           |                      |  |                  | A00-04         |
| 5,5     | 17,5 | 25            | -             | -           |                      |  |                  |                |
| 7,5     | 22   | 32            | -             | -           |                      |  |                  |                |
| 7,5     | 22   | 32            | -             | -           |                      |  |                  |                |
| 7,5     | 22   | 32            | -             | -           |                      |  |                  |                |
| 11      | 22   | 32            | -             | -           |                      |  |                  |                |
| 11      | 31   | 45            | -             | -           | max. 4               |  |                  |                |
| 15      | 34,5 | 50            | -             | -           | HN..                 |  |                  |                |
| 18,5    | 34,5 | 50            | -             | -           | or HA..              |  |                  |                |
| 22      | 55   | 80            | -             | -           | max. 6               |  |                  |                |
| 30      | 69   | 100           | -             | -           | HN.. or HA..         |  |                  |                |
| 15      | 43   | 63            | -             | -           | 1HKT..               |  |                  |                |
| 15      | 43   | 63            | -             | -           | + 2xHKA11            |  |                  |                |
| 30      | 85   | 125           | -             | -           |                      |  |                  |                |
| 30      | 85   | 125           | -             | -           |                      |  |                  |                |
| 45      | 94   | 135           | -             | -           |                      |  |                  |                |
| 55      | 139  | 200           | -             | -           |                      |  |                  |                |
| 75      | 159  | 230           | -             | -           |                      |  |                  |                |
| 90      | 173  | 250           | -             | -           |                      |  |                  |                |
| 110     | 242  | 350           | -             | -           |                      |  |                  |                |
| 132     | 310  | 450           | -             | -           |                      |  |                  |                |
| 160     | 346  | 500           | -             | -           |                      |  |                  |                |

Latch for Contactors 4-pole see page 48

1) Other coil voltages on request

2) Coil voltage range and non-standard coil voltages see page 51

3) DC Operated with double winding coil, max. 3 additional aux. contacts

4) other technical data on request

5) with integrated coil suppressor

# Capacitor Switching Contactors

for use with reactive or non-reactive capacitor banks



| Rated Operational Power at 50/60Hz<br>Ambient Temperature |                      |                      |                     |                     |                      | Aux. Contacts<br>Built-in Add. |                 | Type            | Coil voltage <sup>1)</sup><br>220-240V 50Hz | Pack pcs. | Weight kg/pc. |
|---|----------------------|----------------------|---------------------|---------------------|----------------------|--------------------------------|-----------------|-----------------|---|-----------|---------------|
| 50°C  |                      | 60°C                 |                     |                     |                      |                                |                 |                 |   |           |               |
| 380V  | 415V                 | 660V                 | 380V                | 415V                | 660V                 | 1                              | 1 <sup>2)</sup> |                 | 230   |           |               |
| 400V  | 440V                 | 690V                 | 400V                | 440V                | 690V                 |                                |                 |                 |   |           |               |
| kVAR  | kVAR                 | kVAR                 | kVAR                | kVAR                | kVAR                 | NO                             | NC              | pcs.            |   |           |               |
| 0-12,5  | 0-13                 | 0-20                 | 0-12,5              | 0-13                | 0-20                 | 1                              | -               | 1 <sup>2)</sup> |   | 1         | 0,34          |
| 0-12,5  | 0-13                 | 0-20                 | 0-12,5              | 0-13                | 0-20                 | -                              | 1               | 1 <sup>2)</sup> |   | 1         | 0,34          |
| 10-20   | 10,5-22              | 17-33                | 10-20               | 10,5-22             | 17-33                | -                              | -               | 3 <sup>3)</sup> |   | 1         | 0,62          |
| 10-25   | 10,5-27              | 17-41                | 10-25               | 10,5-27             | 17-41                | -                              | -               | 3 <sup>3)</sup> |   | 1         | 0,62          |
| 20-33,3   | 23-36                | 36-55                | 20-33,3             | 23-36               | 36-55                | -                              | -               | 3 <sup>3)</sup> |   | 1         | 1,0           |
| 20-50   | 23-53                | 36-82                | 20-50               | 23-53               | 36-82                | -                              | -               | 3 <sup>3)</sup> |   | 1         | 1,0           |
| 20-75 <sup>4)</sup>                                       | 23-75 <sup>4)</sup>  | 36-120 <sup>4)</sup> | 20-60               | 23-64               | 36-100               | -                              | -               | 3 <sup>3)</sup> |   | 1         | 1,0           |
| 33-80   | 36-82                | 57-120               | 33-75               | 36-77               | 57-120               | -                              | -               | 6 <sup>5)</sup> |   | 1         | 2,3           |
| 33-100 <sup>6)</sup>                                      | 36-103 <sup>6)</sup> | 57-148 <sup>6)</sup> | 33-90 <sup>6)</sup> | 36-93 <sup>6)</sup> | 57-148 <sup>6)</sup> | -                              | -               | 6 <sup>5)</sup> |   | 1         | 2,3           |

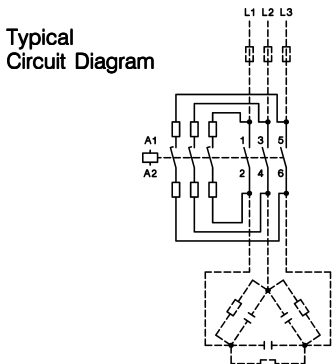
**Specification:** Contactors K3..K are suitable for switching low-inductive and low loss capacitors in capacitor banks (IEC70 and 831, VDE 0560) without and with reactors.

Capacitor switching contactors are fitted with early make contacts and damping resistors, to reduce the value of make current <math>< 70 \times I\_e</math>.

**Operating Conditions:** Capacitor switching contactors are protected against contact welding for a prospective making current of  $200 \times I_e$ .

**Technical Data** acc. to IEC 947-4-1, IEC 947-5-1, EN 60947-4-1, EN 60947-5-1, VDE 0660

| Type  |                              | K3-18K          | 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 | $S \times 10^3$ | 250     | 150     | 150      | 150      | 120       | 120     | 120     |
|   | reactive capacitor banks     | $S \times 10^3$ | 400     | 300     | 300      | 300      | 200       | 200     | 200     |
| Rated operational current $I_e$<br>AC6b       | at 50°C                      | A               | 0-18    | 14-28   | 14-36    | 30-48    | 30-72     | 30-108  | 50-115  |
|   | at 60°C                      | A               | 0-18    | 14-28   | 14-36    | 30-48    | 30-72     | 30-87   | 50-108  |
| Rated operational current $I_{th}$<br>AC1     | at 50°C                      | A               | 32      | 45      | 60       | 100      | 110       | 120     | 155     |
|   | at 60°C                      | A               | 32      | 40      | 55       | 90       | 100       | 110     | 145     |
| Overload factor<br>acc. to EN 61921: 30% min. | at 50°C                      | %               | 78      | 60      | 67       | 108      | 53        | 11      | 35      |
|   | at 60°C                      | %               | 78      | 43      | 53       | 88       | 39        | 26      | 34      |
| Fuses gL (gG)                                 | from / to                    | A               | 35 / 63 | 50 / 80 | 63 / 100 | 80 / 160 | 125 / 160 | 160/200 | 160/250 |

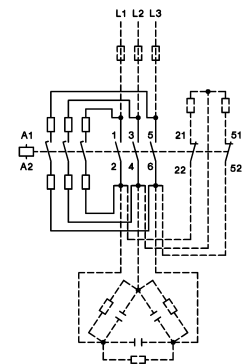


**Wiring Diagram for Quick Discharge Resistors**

Make sure that the current of the discharge resistors is not higher than the rated current (AC1) of the auxiliary contacts

**Mounting instructions:**

In the area of capacitor switching contactors, difficulty inflammable and self-extinguishing materials shall be used only, because abnormal temperatures within the area of the resistor spirals cannot be excluded.



- 1) Coil voltage range and non-standard coil voltages see page 51
- 2) 1 HN.. or HA.. snap-on
- 3) 2HB.. for side mounting and 1 HN.. or HA.. snap-on
- 4) Consider the max. thermal current of the contactor K3-74A:  $I_{th}$  130A
- 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
- 7) Type 230 for AC- and DC-operating 220-240V 50/60Hz and 220V DC (with integrated coil suppressor)  
Type 230VS for AC-operating 220-240V 50Hz (with integrated coil suppressor)

## Auxiliary Contact Blocks for contactors K(G)3-07.. to K3-115.., type HN.. for low level switching <sup>1)</sup>



| Rated<br>AC15<br>230V<br>A | Operational Current |                  | Contacts | Type  | Pack | Weight |
|----------------------------|---------------------|------------------|----------|-------|------|--------|
|                            | AC15<br>400V<br>A   | AC1<br>690V<br>A |          |       |      |        |
| 3                          | 2                   | 10               | NO       | HN10  | 10   | 0,02   |
| 3                          | 2                   | 10               | NC       | HN01  | 10   | 0,02   |
| 3                          | 2                   | 10               | EM       | HN10U | 10   | 0,02   |
| 3                          | 2                   | 10               | LB       | HN01U | 10   | 0,02   |
| 6                          | 3                   | 25               | NO       | HA10  | 10   | 0,03   |
| 6                          | 3                   | 25               | NC       | HA01  | 10   | 0,03   |

## Auxiliary Contact Block for contactors K3-24.. to K3-115.., for low level switching <sup>1)</sup>



| Rated<br>AC15<br>230V<br>A | Operational Current |                  | mounting:<br>1 HB.. on left side<br>and 1 HB.. on right side | Contacts | Type | Pack | Weight |
|----------------------------|---------------------|------------------|--|----------|------|------|--------|
|                            | AC15<br>400V<br>A   | AC1<br>690V<br>A |  |          |      |      |        |
| 3                          | 2                   | 10               |  | NO       | HB11 | 10   | 0,02   |
| 3                          | 2                   | 10               |  | NC       | HB02 | 10   | 0,02   |

## Auxiliary Contact Blocks for contactors K3-116.. to K3-1200



| Rated<br>AC15<br>230V<br>A | Operational Current |                  | For contactors                 | Contacts | Type  | Pack | Weight |
|----------------------------|---------------------|------------------|--------------------------------|----------|-------|------|--------|
|                            | AC15<br>400V<br>A   | AC1<br>690V<br>A |                                |          |       |      |        |
| 3                          | 2                   | 10               | K3-116 to K3-316 top           | NO       | HKT11 | 1    | 0,04   |
| 3                          | 2                   | 10               | K3-116 to K3-316 top           | NC       | HKT22 | 1    | 0,05   |
| 3                          | 2                   | 10               | K3-116 to K3-316 outside       | NO       | HKA11 | 1    | 0,05   |
| 6                          | 3                   | 16               | K3-200 to K3-860 <sup>2)</sup> | NO       | HKF22 | 1    | 0,12   |
| 6                          | 3                   | 16               | K3-1000, K3-1200 inside        | NC       | HKB11 | 1    | 0,17   |

## Snap-on Momentary Contacts for K(G)3-07.. to K3-115.. for low level switching<sup>1)</sup>



| Rated<br>AC15<br>230V<br>A | Operational Current |                  | Specification   | Contacts | Type  | Pack | Weight |
|----------------------------|---------------------|------------------|-----------------|----------|-------|------|--------|
|                            | AC15<br>400V<br>A   | AC1<br>690V<br>A |                 |          |       |      |        |
| 3                          | 2                   | 10               | manual operated | NO       | HTN10 | 10   | 0,02   |
| 3                          | 2                   | 10               | manual operated | NC       | HTN01 | 10   | 0,02   |

## Terminal Blocks for contactors K(G)3-07.. to K3-115.. and K2-..



| Specification              | Thermal Current I <sub>th</sub><br>A | Type  | Pack | Weight |
|----------------------------|--------------------------------------|-------|------|--------|
| 2 terminals interconnected | 26                                   | K2-DK | 10   | 0,02   |
| 2 terminals insulated      | 26                                   | K2-SK | 10   | 0,02   |

1) Contacts suitable for electronic circuits, according to IEC60947-5-4 for rated voltage 24V DC (test ratings 17V DC, 5mA) Mirror contacts acc. IEC60947-4-1 Annex F. Technical data see page 74

2) Contact travel of make contacts adjustable, see page 73

# Elektronic Timer

for mounting on DIN-rail, Control voltage 24-240V AC/DC, 1 changeover contact  
 OFF-delay without auxiliary voltage  
 Replace Pneumatic Timer K2-TP.. and K2-TA



| 5 Functions in one device   | 4 Time ranges in one device                  | Rated Current AC1 250V A | Type               | Pack pcs. | Weight kg/pc. |
|---|--|--------------------------|--------------------|-----------|---------------|
| ON-delay,<br>OFF-delay,<br>Single shot trailing edge,<br>Single shot leading edge,<br>Single shot leading and trailing edge | 0,1 - 1,<br>1 - 10,<br>6 - 60 a,<br>18 - 180 | 5                        | <b>K3-T180 240</b> | 1         | 0,085         |

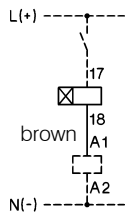
## Elektronic Timer On-delay for contactors K(G)3-07.. to K3-115.. and K2-..

Timer will be connected with the contactor coil, can be snapped onto the contactor and occupies 2 add-on spaces. Contactor switches On-delay.

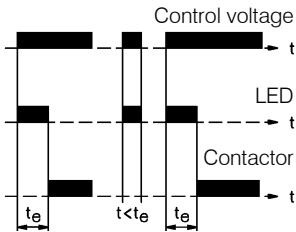


| Operational Voltage V | Time Range s | Rated Current AC15 A | Type                | Pack pcs. | Weight kg/pc. |
|-----------------------|--------------|----------------------|---------------------|-----------|---------------|
| 24 - 60V AC/DC        | 1 - 30       | 0,75                 | <b>K2-TE30 60</b>   | 1         | 0,08          |
| 100 - 250V AC/DC      | 1 - 30       | 0,75                 | <b>K2-TE30 250</b>  | 1         | 0,08          |
| 24 - 60V AC/DC        | 10 - 180     | 0,75                 | <b>K2-TE180 60</b>  | 1         | 0,08          |
| 100 - 250V AC/DC      | 10 - 180     | 0,75                 | <b>K2-TE180 250</b> | 1         | 0,08          |
| 24 - 60V AC/DC        | 30 - 600     | 0,75                 | <b>K2-TE600 60</b>  | 1         | 0,08          |
| 100 - 250V AC/DC      | 30 - 600     | 0,75                 | <b>K2-TE600 250</b> | 1         | 0,08          |

### Wiring Diagram



### Timing Chart



### Operation Range

Time repeat accuracy  $\leq 1\%$   
 Recovery time (typical) 50ms

**Voltage Drop** after the time delay  $t_e$   
 (Control voltage 24V: use contactor with 20V-coil)  
 Max. inrush current (peak value) 25A < 10ms

### Duty Cycle

Ambient temperature  $-40^\circ - +60^\circ\text{C}$   
 Short circuit protection 2A

## Interface for contactors K3-07.. to K3-74.. and K2-07.. to K2-60..



| Input Voltage U <sub>e</sub> | Power Consumption | Rated Current I <sub>e</sub> AC15 | 250V AC | 400V AC | Type         | Pack pcs. | Weight kg/pc. |
|------------------------------|-------------------|-----------------------------------|---------|---------|--------------|-----------|---------------|
| 24V DC                       | 0,35W             | 0,75A                             | 0,5A    |         | <b>K2-IM</b> | 1         | 0,03          |

Amplifier element for contactor control by programmable controller

## Fuse Holders for contactors K(G)3-07.. to K3-115.. and K2-..



| Specifications   | Rated Voltage | Type        | Pack pcs. | Weight kg/pc. |
|--|---------------|-------------|-----------|---------------|
| Fuse holder for fuse 5x20mm (max. 6,3A)<br>Fuses are not included. | 250V AC       | <b>K2-F</b> | 1         | 0,02          |

## Rectifier with Fuse Holder for contactors K(G)3-07.. to K3-115.. and K2-..

| Specifications             | Rated Voltage | Type          | Pack pcs. | Weight kg/pc. |
|----------------------------|---------------|---------------|-----------|---------------|
| with built-in rectifier 1A | 250V AC       | <b>K2-RF1</b> | 1         | 0,03          |
| with built-in rectifier 3A | 250V AC       | <b>K2-RF3</b> | 1         | 0,03          |

## Latch for contactors K(G)3-07.. to K3-74.. and K2-..

with NC aux. contact  
power consumption max. 30VA

| Type       | Coil voltage      |
|------------|-------------------|
| <b>24</b>  | 22-26V 50/60Hz    |
| <b>110</b> | 100-120V 50/60Hz  |
| <b>230</b> | 210 -250V 50/60Hz |
| <b>400</b> | 360-440V 50/60Hz  |

For Contactors

| For Contactors                                   | Type                | Pack pcs. | Weight kg/pc. |
|--|---------------------|-----------|---------------|
| K3-07 to K3-22, K2-07 to K2-16                   | <b>K2-L22 . . .</b> | 1         | 0,08          |
| K3-24 to K3-40, K2-23 to K2-37, KG3-10 to KG3-40 | <b>K2-L40 . . .</b> | 1         | 0,08          |
| K3-50 to K3-74, K2-45 to K2-60                   | <b>K2-L74 . . .</b> | 1         | 0,08          |



Technical data see page 74

**Latch / Magnetic latch for Contactors K3-151 to K3-1200 on request**

## Indicator Units for contactors K(G)3-07.. to K3-115.. and K2-..



| Specifications   | Voltage Range    | Type          | Pack pcs. | Weight kg/pc. |
|--|------------------|---------------|-----------|---------------|
| <b>Coil Current Indicator</b> , green (LED)  | 24 - 660V AC/DC  | <b>K2-ING</b> | 10        | 0,02          |
| <b>Coil Current Indicator</b> , red (LED)  | 24 - 660V AC/DC  | <b>K2-INR</b> | 10        | 0,02          |
| To connect in series with the contactor coil. In case of coil interruption the indication goes out. Voltage drop appr. 2 volts |                  |               |           |               |
| <b>Voltage Indicator</b> , clear (glow-disc. I.)   | 220 - 415V AC/DC | <b>K2-UN</b>  | 10        | 0,02          |
| <b>Voltage Indicator</b> , red (LED)   | 24 - 120V AC/DC  | <b>K2-UNR</b> | 10        | 0,02          |
| To connect parallel to the contactor coil. In case of applied voltage the indication also lights at coil interruption.         |                  |               |           |               |

## Snap-On Adapter



| For Type   | Specification  | Type         | Pack pcs. | Weight kg/pc. |
|--|--|--------------|-----------|---------------|
| K2-DK, K2-SK, K2-TE, K2-TA<br>K2-IM, K2-F, K2-RF<br>K2-IN., K2-UN. | for snap-on mounting of accessories on 35mm DIN-rail acc. DIN EN 50022 | <b>K2-SM</b> | 10        | 0,009         |

## Additional 4<sup>th</sup> Poles for contactors K3-315.. to K3-1200



| For Contactors         | Thermal Current I <sub>th</sub><br>A | Type          | Pack<br>pcs. | Weight<br>kg/pc. |
|------------------------|--------------------------------------|---------------|--------------|------------------|
| K3-315, K3-450, K3-550 | <b>325</b>                           | <b>NP325</b>  | 1            | 0,7              |
| K3-315, K3-450, K3-550 | <b>500</b>                           | <b>NP500</b>  | 1            | 1,3              |
| K3-450, K3-550         | <b>760</b>                           | <b>NP760</b>  | 1            | 1,4              |
| K3-700, K3-860         | <b>500</b>                           | <b>NP501</b>  | 1            | 1,3              |
| K3-700, K3-860         | <b>1000</b>                          | <b>NP1000</b> | 1            | 1,6              |
| K3-1000, K3-1200       | <b>1000</b>                          | <b>NP1001</b> | 1            | 1,6              |

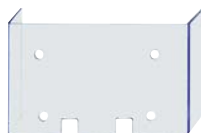
## Mechanical Interlocks



| Interlocks contactor with contactor<br>Type                              | Type   | Mounting   | Type                         | Pack<br>pcs. | Weight<br>kg/pc. |
|--|--|------------|------------------------------|--------------|------------------|
| K3-07 to K3-40<br>KG3-07 to KG3-22<br>KG3-24 to KG3-40<br>K2-07 to K2-37 | K3-07 to K3-40<br>KG3-07 to KG3-22<br>KG3-24 to KG3-40<br>K2-07 to K2-37 | horizontal | <b>LG10889</b> <sup>1)</sup> | 10           | 0,006            |
| K3-24 to K3-74<br>K2-23 to K2-60   | K3-50 to K3-74<br>K2-45 to K2-60   | horizontal | <b>LG10890</b> <sup>1)</sup> | 1            | 0,010            |
| K3-90, K3-115  | K3-90, K3-115  | horizontal | <b>LG11478</b> <sup>1)</sup> | 1            | 0,010            |
| K65 to K110  | K65 to K110  | horizontal | <b>LG8511</b>                | 1            | 0,076            |
| K3-116 to K3-316   | K3-116 to K3-316   | horizontal | <b>LG11223H</b>              | 1            | 0,06             |
| K3-315 to K3-550   | K3-315 to K3-550   | horizontal | <b>LG10400H</b>              | 1            | 0,8              |
| K3-315 to K3-550   | K3-315 to K3-550   | vertical   | <b>LG10400V</b>              | 1            | 0,8              |
| K3-450, K3-550   | K3-700, K3-860   | horizontal | <b>LG10399H</b>              | 1            | 1,6              |
| K3-450, K3-550   | K3-700, K3-860   | vertical   | <b>LG10399V</b>              | 1            | 0,9              |
| K3-700, K3-860   | K3-700, K3-860   | horizontal | <b>LG10402H</b>              | 1            | 1,5              |
| K3-700, K3-860   | K3-700, K3-860   | vertical   | <b>LG10402V</b>              | 1            | 0,9              |
| K3-700, K3-860   | K3-1000, K3-1200   | horizontal | <b>LG10401H</b>              | 1            | 1,9              |
| K3-700, K3-860   | K3-1000, K3-1200   | vertical   | <b>LG10401V</b>              | 1            | 1,6              |
| K3-1000, K3-1200   | K3-1000, K3-1200   | horizontal | <b>LG10403H</b>              | 1            | 1,8              |
| K3-1000, K3-1200   | K3-1000, K3-1200   | vertical   | <b>LG10403V</b>              | 1            | 1,5              |

1) clamps for mounting incl.

## Terminal Covers for terminal protection according to DIN 57106, VBG 4



| For Contactors           | Specification          | Type            | Pack<br>pcs. | Weight<br>kg/pc. |
|--------------------------|------------------------|-----------------|--------------|------------------|
| K65 to K110 (spare part) | for 6 terminals        | <b>LG9333</b>   | 1            | 0,045            |
| K3-151, K3-176           | 3-pole for 3 terminals | <b>LG10404</b>  | 1            | 0,12             |
| K3-116 to K3-176         | 4-pole for 4 terminals | <b>LG104044</b> | 1            | 0,14             |
| K3-210, K3-260, K3-316   | for 3 terminals        | <b>LG11457</b>  | 1            | 0,14             |
| K3-200                   | for 3 terminals        | <b>LG10405</b>  | 1            | 0,18             |
| K3-315, K3-450           | for 3 terminals        | <b>LG10406</b>  | 1            | 0,28             |
| K3-550                   | for 3 terminals        | <b>LG10407</b>  | 1            | 0,34             |
| K3-700                   | for 3 terminals        | <b>LG10408</b>  | 1            | 0,39             |
| K3-860                   | for 3 terminals        | <b>LG10409</b>  | 1            | 0,49             |

## Additional Terminals



| For Contactors  | Cable Cross-sections to clamp mm <sup>2</sup><br>solid or<br>stranded | flexible | flex. with multi-<br>core cable end | Type           | Pack<br>pcs. | Weight<br>kg/pc. |
|---|---|----------|-------------------------------------|----------------|--------------|------------------|
| <b>Additional Terminal Single Pole, with fingertouch protection</b> |   |          |                                     |                |              |                  |
| K(G)3-10 to K(G)3-22<br>K2-09 to K2-16                              | 0,75 - 10   | 0,75 - 6 | 0,75 - 6                            | <b>LG9339N</b> | 6            | 0,009            |
| K3-151 to K3-176  | 16 - 120 + 16 - 95  |          |                                     | <b>LG11224</b> | 1            | 0,10             |



## Parallel Connectors

| For Contactors | Cable Cross-sections to clamp<br>solid or flexible | mm <sup>2</sup> to clamp<br>flex. with multi-<br>core cable end | Type | Pack pcs. | Weight kg/pc. |
|----------------|--|---|------|-----------|---------------|
|----------------|--|---|------|-----------|---------------|



### Parallel Connectors, 3 Poles Parallel

Current-carrying capacity: 2,5 x AC1-value of the contactor

| K(G)3-10 to K(G)3-22<br>K2-09 to K2-16 | terminal hole for screw M5     | Type          | Pack | Weight |
|--|--------------------------------|---------------|------|--------|
|  |                                | <b>LG9241</b> | 50   | 0,004  |
| K2-23 to K2-37                         | 4 - 35      6 - 25      4 - 25 | <b>LG5587</b> | 10   | 0,022  |

### Parallel Connectors, 4 Poles Parallel

Current-carrying capacity: 3,2 x AC1-value of the contactor

| K(G)3-10 to K(G)3-22<br>K2-09 to K2-16 | terminal hole for screw M5 | Type          | Pack | Weight |
|--|----------------------------|---------------|------|--------|
|  |                            | <b>LG7360</b> | 10   | 0,006  |

## Suppressor Units

| Voltage Range V | Mounting | Type | Pack pcs. | Weight kg/pc. |
|-----------------|----------|------|-----------|---------------|
|-----------------|----------|------|-----------|---------------|



### RC-units for contactors K3-07 - K3-74

|                  |           |                  |                   |    |      |
|------------------|-----------|------------------|-------------------|----|------|
| 12 - 48V AC/DC   | to snap   | 1600nF / 22 Ohm  | <b>RC-K3N 24</b>  | 10 | 0,01 |
| 48 - 127V AC/DC  | on the    | 680nF / 270 Ohm  | <b>RC-K3N 110</b> | 10 | 0,01 |
| 110 - 230V AC/DC | contactor | 220nF / 2200 Ohm | <b>RC-K3N 230</b> | 10 | 0,01 |
| 230 - 415V AC/DC |           | 120nF / 620 Ohm  | <b>RC-K3N 400</b> | 10 | 0,01 |

### RC-units for contactors K3-07 - K3-74 and reversing contactors K3NWU10 - K3WU74

|                  |           |                  |                    |    |      |
|------------------|-----------|------------------|--------------------|----|------|
| 12 - 48V AC/DC   | to snap   | 1600nF / 22 Ohm  | <b>RC-K3NW 24</b>  | 10 | 0,01 |
| 48 - 127V AC/DC  | on the    | 680nF / 270 Ohm  | <b>RC-K3NW 110</b> | 10 | 0,01 |
| 110 - 230V AC/DC | contactor | 220nF / 2200 Ohm | <b>RC-K3NW 230</b> | 10 | 0,01 |
| 230 - 415V AC/DC |           | 120nF / 620 Ohm  | <b>RC-K3NW 400</b> | 10 | 0,01 |

## Mounting Parts

| Description                 | For Type                             | Specification  | Type          | Pack pcs. | Weight kg/pc. |
|-----------------------------|--------------------------------------|--|---------------|-----------|---------------|
| <b>Clamp, no distance</b>   | K3-07 to K3-115<br>K2-07 to K2-37    | To join contactors without distance, 2 pieces required   | <b>P426-1</b> | 50        | 0,001         |
| <b>Clamp, 7mm distance</b>  | K3-07 to K3-115<br>K2-07 to K2-37    | To join contactors with 7mm distance, 2 pieces required  | <b>P418-1</b> | 10        | 0,002         |
| <b>Clamp, 12mm distance</b> | K3-07 to K3-115<br>K2-07 to K2-37    | To join contactors with 12mm distance, 2 pieces required | <b>P807-1</b> | 10        | 0,002         |
| <b>Clamp asymmetric</b>     | K3-07 to K3-40<br>with K3-50 - K3-74 | To join contactors with 12mm distance, 2 pieces required | <b>P785-1</b> | 10        | 0,002         |



## Marking System for contactors K3-07.. to K3-115.., K2-.. and aux. contact blocks HN and HA

| Description          | Specification                        | Type            | Pack pcs. | Weight kg/100pc |
|----------------------|--------------------------------------|-----------------|-----------|-----------------|
| <b>Marking Plate</b> | 2-section without marking, divisible | <b>P487-1</b>   | 100       | 0,025           |
| <b>Marking Plate</b> | 3-section without marking, divisible | <b>P971-1</b>   | 100       | 0,038           |
| <b>Marking Plate</b> | 4-section without marking, divisible | <b>P245-1</b>   | 100       | 0,050           |
| <b>Marking Plate</b> | marked, choice of K1...K32           | <b>P245-K..</b> | 100       | 0,013           |



## Coil voltages for AC operated contactors

Type-suffix for coil-types K6/.. to K45/...  
for contactor-types K3-07.. to K3-74

| Suffix to contactor type | to coil type | Voltage Marking at the coil |                       | Rated Control Voltage U <sub>s</sub> range |                   |                 |                   |
|--------------------------|--------------|-----------------------------|-----------------------|--|-------------------|-----------------|-------------------|
|                          |              | for 50Hz V                  | for 60Hz V            | for 50Hz min. V                            | for 50Hz max. V   | for 60Hz min. V | for 60Hz max. V   |
| 6                        | 41.6         | 6                           |                       | 6  | 6,6               | 6,6             | 7,3               |
| 6,6                      | 41.6,6       | 6,6                         |                       | 6,6  | 7,3               | 7,3             | 8                 |
| 7,3                      | 41.7,3       | 7,3                         |                       | 7,3  | 8                 | 8               | 9                 |
| 8                        | 41.8         | 8                           |                       | 8  | 9                 | 9               | 10                |
| 9                        | 41.9         | 9                           |                       | 9  | 10                | 10              | 11                |
| 10                       | 41.10        | 10                          |                       | 10   | 11                | 11              | 12                |
| 11                       | 41.11        | 11                          | 12                    | 11   | 12                | 12              | 13,2              |
| 12                       | 41.12        | 12                          |                       | 12   | 13,2              | 13,2            | 14,5              |
| 13,2                     | 41.13        | 13,2                        |                       | 13,2                                       | 14,5              | 14,5            | 16                |
| 14,5                     | 41.14        | 14,5                        |                       | 14,5                                       | 16                | 16              | 18                |
| 16                       | 41.16        | 16                          |                       | 16   | 18                | 18              | 20                |
| 18                       | 41.18        | 18                          |                       | 18   | 20                | 20              | 22                |
| 20                       | 41.20        | 20                          |                       | 20   | 22                | 22              | 24                |
| <b>24</b>                | <b>4.24</b>  | <b>24</b>                   | <b>24</b>             | <b>22</b>                                  | <b>24</b>         | <b>24</b>       | <b>27</b>         |
| 25                       | 41.25        | 25                          |                       | 24   | 27                | 27              | 30                |
| 27                       | 41.27        | 27                          | 32                    | 27   | 30                | 30              | 33                |
| 32                       | 41.32        | 32                          | 36                    | 30   | 33                | 33              | 36                |
| 33                       | 41.33        | 36                          | 36                    | 33   | 36                | 36              | 39                |
| 36                       | 41.36        | 36                          | 42                    | 36   | 39                | 39              | 42                |
| 40                       | 41.40        | 42                          | 42                    | 39   | 42                | 42              | 47                |
| <b>42</b>                | <b>4.42</b>  | <b>42</b>                   | <b>48</b>             | <b>42</b>                                  | <b>47</b>         | <b>47</b>       | <b>52</b>         |
| 48                       | 41.48        | 48                          | 48                    | 44   | 48                | 48              | 52                |
| 55                       | 41.55        | 55                          | 60                    | 52   | 58                | 58              | 65                |
| 60                       | 41.60        | 60                          |                       | 58   | 65                | 65              | 72                |
| 65                       | 41.65        | 65                          |                       | 65   | 72                | 72              | 80                |
| 75                       | 41.75        | 75                          |                       | 72   | 80                | 80              | 90                |
| 85                       | 41.85        | 85                          |                       | 80   | 90                | 90              | 100               |
| 90                       | 41.90        | 100                         | 100                   | 90   | 100               | 100             | 110               |
| <b>110</b>               | <b>4.110</b> | <b>110</b>                  | <b>110-120</b>        | <b>100</b>                                 | <b>110</b>        | <b>110</b>      | <b>122</b>        |
| 115                      | 41.115       | 115                         | 125                   | 110  | 122               | 122             | 135               |
| 127                      | 41.127       | 127                         |                       | 122  | 135               | 135             | 150               |
| 140                      | 41.140       | 140                         |                       | 135  | 150               | 150             | 165               |
| 150                      | 41.150       | 150                         |                       | 150  | 165               | 165             | 180               |
| 165                      | 41.165       | 165                         | 180-208               | 165  | 180               | 180             | 208               |
| 180                      | 41.180       | 180-210 <sup>1)</sup>       | 200-240 <sup>1)</sup> | 180  | 210 <sup>1)</sup> | 200             | 240 <sup>1)</sup> |
| 190 <sup>2)</sup>        | 41.190       | 200-240                     | 200-240               | 200  | 240               | 200             | 240               |
| 200                      | 41.200       | 200-230 <sup>1)</sup>       | 220-240               | 200  | 230 <sup>1)</sup> | 220             | 240               |
| <b>230</b>               | <b>4.230</b> | <b>220-240</b>              | <b>230-264</b>        | <b>220</b>                                 | <b>240</b>        | <b>230</b>      | <b>264</b>        |
| 254                      | 41.254       | 254                         | 277                   | 240  | 264               | 264             | 290               |
| 270                      | 41.270       | 270                         |                       | 264  | 290               | 290             | 315               |
| 300                      | 41.300       | 300                         |                       | 290  | 315               | 315             | 345               |
| 320                      | 41.320       | 320                         |                       | 315  | 345               | 345             | 380               |
| 345                      | 41.345       | 345-400 <sup>1)</sup>       | 380-440 <sup>1)</sup> | 345  | 400 <sup>1)</sup> | 380             | 440 <sup>1)</sup> |
| 390 <sup>2)</sup>        | 41.390       | 400-480                     | 400-480               | 400  | 480               | 400             | 480               |
| <b>400</b>               | <b>4.400</b> | <b>380-415</b>              | <b>400-440</b>        | <b>380</b>                                 | <b>415</b>        | <b>400</b>      | <b>460</b>        |
| 415                      | 41.415       | 415-440                     | 440-480               | 400  | 440               | 440             | 480               |
| 440                      | 41.440       | 440-480                     | 480-500               | 440  | 480               | 480             | 530               |
| 480                      | 41.480       | 480-500                     | 530-580               | 480  | 530               | 530             | 580               |
| 500                      | 41.500       | 500-550                     | 550-600               | 500  | 550               | 550             | 600               |
| 550                      | 41.550       | 550-600                     | 600                   | 550  | 600               | 600             | (650)             |

### Standard voltages in bold type letters

- 1) Operating range of magnet-coils: 0,85 x U<sub>s</sub> (min. value of rated control voltage) up to 1,05 x U<sub>s</sub> (max. value of rated control voltage)
- 2) Reduction of mechanical life to 10% of normal life. It is not admissible as a spare coil in a contactor for different coil voltages.

Type-suffix for coil-types K85/... and K110/...  
for contactor-types K85 to K110

| Suffix to contactor type | to coil type | Voltage Marking at the coil |            | Rated Control Voltage U <sub>s</sub> range |                 |                 |                 |
|--------------------------|--------------|-----------------------------|------------|--|-----------------|-----------------|-----------------|
|                          |              | for 50Hz V                  | for 60Hz V | for 50Hz min. V                            | for 50Hz max. V | for 60Hz min. V | for 60Hz max. V |
| 20                       | 4.20         | 20                          | 24         | 20   | 22              | 24              | 26              |
| 24                       | 4.24         | 24                          |            | 24   | 27              | 29              | 32              |
| 42                       | 4.42         | 42                          |            | 42   | 47              | 50              | 56              |
| 110                      | 4.110        | 110-120                     |            | 110  | 122             | 132             | 146             |
| <b>230</b>               | <b>4.230</b> | <b>220-240</b>              | <b>277</b> | <b>220</b>                                 | <b>240</b>      | <b>264</b>      | <b>288</b>      |
| 400                      | 4.400        | 380-415                     | 460-480    | 380  | 415             | 455             | 498             |

Type-suffix for coil-types K3-1200/...  
for contactor-types K3-1000.. to K3-1200..

|            |              |                |   |            |            |            |            |
|------------|--------------|----------------|---|------------|------------|------------|------------|
| 110        | 4.110        | 110-115        | - | 110        | 115        | 110        | 115        |
| <b>230</b> | <b>4.230</b> | <b>220-230</b> | - | <b>220</b> | <b>230</b> | <b>220</b> | <b>230</b> |
| <b>400</b> | <b>4.400</b> | <b>380-400</b> | - | <b>380</b> | <b>400</b> | <b>380</b> | <b>400</b> |
| 440        | 4.440        | 440            | - | 440        | 440        | 440        | 440        |

## Coil voltages for AC and DC operated contactors

Type-suffix for coil-types K3-115/.. to K3-860/...  
for contactor-types K3-90.. to K3-860..

| Suffix to contactor type | to coil type | Voltage Marking at the coil |            | Rated Control Voltage U <sub>s</sub> range |                 |                 |                 |
|--------------------------|--------------|-----------------------------|------------|--|-----------------|-----------------|-----------------|
|                          |              | for 50/60Hz V               | for DC V   | for 50Hz min. V                            | for 50Hz max. V | for 60Hz min. V | for 60Hz max. V |
| 24                       | 4.24         | 24                          | 24         | 22   | 24              | 22              | 24              |
| 48                       | 4.48         | 48                          | 48         | 44   | 48              | 44              | 48              |
| 110                      | 4.110        | 110-120                     | 110        | 110  | 120             | 110             | 120             |
| <b>230</b>               | <b>4.230</b> | <b>220-240</b>              | <b>220</b> | <b>220</b>                                 | <b>240</b>      | <b>220</b>      | <b>240</b>      |
| <b>400</b>               | <b>4.400</b> | <b>380-415</b>              | -          | <b>380</b>                                 | <b>415</b>      | <b>380</b>      | <b>415</b>      |

## Coil voltages for AC operated contactors

Type-suffix for coil-types K3-115/..AC  
for contactor-types K3-90..AC to K3-115..AC

| Suffix to contactor type | to coil type   | Voltage Marking at the coil |            | Rated Control Voltage U <sub>s</sub> range |                 |                 |                 |
|--------------------------|----------------|-----------------------------|------------|--|-----------------|-----------------|-----------------|
|                          |                | for 50Hz V                  | for 60Hz V | for 50Hz min. V                            | for 50Hz max. V | for 60Hz min. V | for 60Hz max. V |
| <b>110AC</b>             | <b>4.110AC</b> | 110-122                     | 132-146    | 110  | 122             | 132             | 146             |
| <b>230AC</b>             | <b>4.230AC</b> | <b>220-240</b>              | <b>277</b> | <b>220</b>                                 | <b>240</b>      | <b>264</b>      | <b>288</b>      |

Other coil voltages on request

Operating range of magnet-coils: 0,85 x U<sub>s</sub> (min. value of rated control voltage) up to 1,1 x U<sub>s</sub> (max. value of rated control voltage)

With reduced control voltage range 0,9 up to 1,0 x U<sub>s</sub> at ambient temperature 60 - 90°C

## Spare Coils for AC operated contactors



|   |                                    | Type                | Coil voltage <sup>1)</sup> | Pack pcs. | Weight kg/pc. |
|---|------------------------------------|---------------------|----------------------------|-----------|---------------|
|   |                                    | <b>4.24</b>         | 24V 50Hz                   |           |               |
|   |                                    | <b>4.42</b>         | 42V 50Hz                   |           |               |
|   |                                    | <b>4.110</b>        | 110V 50Hz                  |           |               |
|   |                                    | <b>41.180</b>       | 180V 50Hz, 220V 60Hz       |           |               |
|   |                                    | <b>4.230</b>        | 220-240V 50Hz              |           |               |
|   |                                    | <b>4.400</b>        | 380-415V 50Hz              |           |               |
|   |                                    | ↓                   |                            |           |               |
| For Contactors                          |                                    |                     |                            |           |               |
| K3-07N.. up to K3-22N..                 |                                    | <b>K10N/ ...EUR</b> |                            | 1         | 0,053         |
| K3-07.. up to K3-22..                   |                                    | <b>K3-6/ ...</b>    |                            | 10        | 0,040         |
| K2-07.. up to K2-16..                   |                                    | <b>K6/ ...</b>      |                            | 10        | 0,040         |
| K3-24.. up to K3-40..                   |                                    | <b>K24/ ...</b>     |                            | 1         | 0,085         |
| K2-23.. up to K2-37..                   |                                    | <b>K23/ ...</b>     |                            | 1         | 0,085         |
| K3-50.. up to K3-74.., K2-45.., K2-60.. |                                    | <b>K45/ ...</b>     |                            | 1         | 0,110         |
| K65.., K85..                            |                                    | <b>K85/ ...</b>     |                            | 1         | 0,215         |
| K110..                                  |                                    | <b>K110/ ...</b>    |                            | 1         | 0,220         |
|   |                                    | Type                | Coil voltage <sup>1)</sup> |           |               |
|   |                                    | <b>4.110</b>        | 110V 50Hz, 110-115V 60Hz   |           |               |
|   |                                    | <b>4.230</b>        | 220-230V 50Hz              |           |               |
|   |                                    | <b>4.400</b>        | 380-400V 50Hz              |           |               |
|   |                                    | ▼                   |                            | pcs.      | kg/pc.        |
| For Contactors                          |                                    |                     |                            |           |               |
| K3-150.., K3-175..                      |                                    | <b>K3-175/ ...</b>  |                            | 1         | 0,38          |
| K3-1000.., K3-1200..                    | without feeder group <sup>2)</sup> | <b>K3-1200/ ...</b> |                            | 1         | 3,12          |

## Spare Coils for AC and DC operated contactors



|                    |                                    | Type               | Coil voltage <sup>1)</sup> | Pack pcs. | Weight kg/pc. |
|--------------------|------------------------------------|--------------------|----------------------------|-----------|---------------|
|                    |                                    | <b>4.24</b>        | 24V 50/60Hz / 24V DC       |           |               |
|                    |                                    | <b>4.110</b>       | 110-120V 50/60Hz / 110V DC |           |               |
|                    |                                    | <b>4.230</b>       | 220-240V 50/60Hz / 220V DC |           |               |
|                    |                                    | <b>4.400</b>       | 380-415V 50/60Hz           |           |               |
|                    |                                    | ▼                  |                            |           |               |
| For Contactors     |                                    |                    |                            |           |               |
| K3-90.., K3-115..  | with feeder group                  | <b>K3-115/ ...</b> |                            | 1         | 0,30          |
| K3-151.., K3-176.. | with feeder group                  | <b>K3-176/ ...</b> |                            | 1         | 0,68          |
| K3-210.., K3-316.. | with feeder group                  | <b>K3-316/ ...</b> |                            | 1         | 0,68          |
| K3-450.., K3-550.. | without feeder group <sup>2)</sup> | <b>K3-550/ ...</b> |                            | 1         | 1,63          |
| K3-700.., K3-860.. | without feeder group <sup>2)</sup> | <b>K3-860/ ...</b> |                            | 1         | 2,44          |

## Spare Feeder Groups for contactors K3-450.. to K3-860..



|   |             | Type                 | Coil voltage <sup>1)</sup> | Pack pcs. | Weight kg/pc. |
|---|-------------|----------------------|----------------------------|-----------|---------------|
| In case of changing control voltage, change coil and feeder group too |             | <b>110</b>           | 110-120V 50/60Hz / 110V DC |           |               |
|   |             | <b>230</b>           | 220-240V 50/60Hz / 220V DC |           |               |
|   |             | <b>400</b>           | 380-415V 50/60Hz           |           |               |
|   |             | ↓                    |                            |           |               |
| For Contactors  |             |                      |                            |           |               |
|   | for coils   |                      |                            |           |               |
| K3-450.., K3-550..  | K3-550/4... | <b>K3-550/FG ...</b> |                            | 1         | 0,33          |
| K3-700.., K3-860..  | K3-860/4..  | <b>K3-860/FG ...</b> |                            | 1         | 0,54          |

1) Coil voltage range and non-standard coil voltages see page 51

2) In case of changing control voltage, change coil and feeder group too

# Spare Coils for DC operated contactors



| Aux. Contact Block for double winding coil      |                                    | Type                | Coil voltage <sup>1)</sup> | Pack pcs. | Weight kg/pc. |
|---|------------------------------------|---------------------|----------------------------|-----------|---------------|
|   |                                    | <b>47.24</b>        | 24V DC                     |           |               |
|   |                                    | <b>47.48</b>        | 48V DC                     |           |               |
|   |                                    | <b>47.110</b>       | 110V DC                    |           |               |
|   |                                    | <b>47.220</b>       | 220V DC                    |           |               |
| ↓   |                                    |                     |                            |           |               |
| For Contactors                                  |                                    |                     |                            |           |               |
| K3-07N.. = up to K3-22N.. =                     | HN01U                              | <b>K10N/ ...</b>    |                            | 1         | 0,052         |
| K3-07.. = up to K3-22.. =                       | HN01U                              | <b>K3-6/ ...</b>    |                            | 1         | 0,042         |
| K2-07.. = up to K2-16.. =                       | HN01U                              | <b>K6/ ...</b>      |                            | 1         | 0,042         |
|   |                                    |                     |                            |           |               |
| K3-24.. = up to K3-40.. =                       | HN01X                              | <b>K24/ ...</b>     |                            | 1         | 0,090         |
| K2-23.. = up to K2-37.. =                       | HN01X                              | <b>K23/ ...</b>     |                            | 1         | 0,090         |
| K3-50.. = up to K3-74.. =, K2-45.. =, K2-60.. = | HN01Z                              | <b>K45/ ...</b>     |                            | 1         | 0,115         |
|   |                                    |                     |                            |           |               |
| K65.. =, K85.. =                                | -                                  | <b>K85/ ...</b>     |                            | 1         | 0,220         |
| K110.. =  | -                                  | <b>K110/ ...</b>    |                            | 1         | 0,225         |
|   |                                    |                     |                            |           |               |
| For Contactors                                  |                                    | Type                | Coil voltage <sup>1)</sup> | pcs.      | kg/pc.        |
|   |                                    | <b>43.110</b>       | 110V DC                    |           |               |
|   |                                    | <b>43.220</b>       | 220V DC                    |           |               |
| ↓   |                                    |                     |                            |           |               |
| K3-1000.. =, K3-1200.. =                        | without feeder group <sup>2)</sup> | <b>K3-1200/ ...</b> |                            | 1         | 3,12          |

## Wiring Diagrams for Coil Circuit

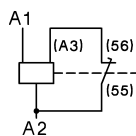
AC operated,

**K3-07..**  
up to **K110..**



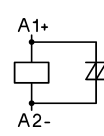
DC operated with double winding coil

**K3-07..**  
up to **K3-22..**

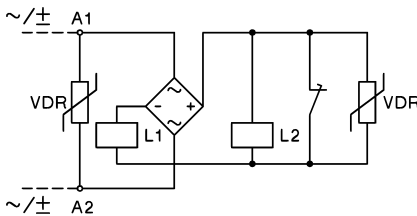


DC operated

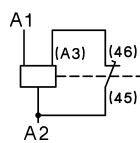
**KG3..**



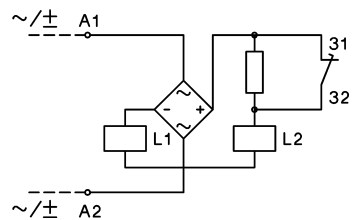
AC and DC operated with double winding coil  
**K3-90A00, K3-115A00**  
**K3-151A00, K3-176A00**  
**K3-210A00 to K3-316A00**



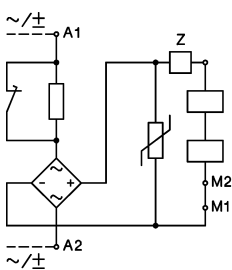
**K3-24..**  
to  
**K3-74..**



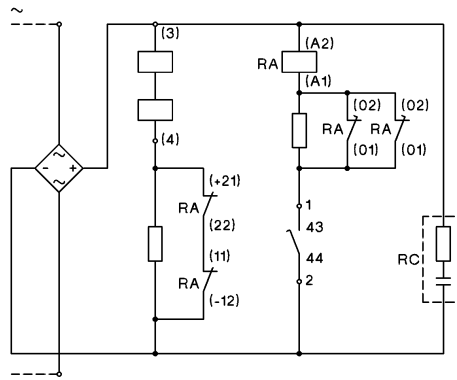
AC and DC operated with series resistor  
**K3-200A21**  
**K3-315A21**



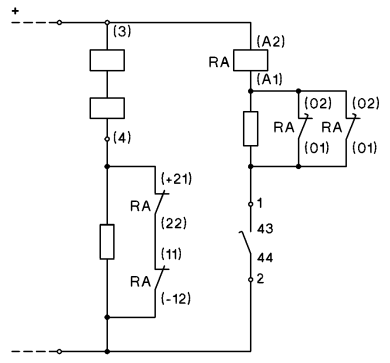
AC and DC operated with series resistor  
**K3-450..** up to **K3-860..**



DC operated with DC coil  
**K3-1000.., K3-1200..**



AC operated with DC coil  
**K3-1000.., K3-1200..**



Adjustable dropout operating time for K3-450.. to K3-860..:  
150-200ms: Wiring see above (delivery standard)  
500-1000ms: Jumper device "Z"  
approx. 20ms: Special wiring see package folder

Contactor K3-1000.., K3-1200..:  
For control voltages up to 125V  
NC contacts 21-22 and 11-12 are connected parallel,  
for higher voltages contacts are connected in series (delivery standard).

1) Other coil voltages on request

2) In case of changing control voltage, change coil and feeder group too

## Spare Contacts



| <b>Main Contacts<br/>for Contactors</b> | <b>Type</b>        | <b>Pack<br/>pcs.</b> | <b>Weight<br/>kg/pc.</b> |
|---|--------------------|----------------------|--------------------------|
| K85..                                   | <b>EK85/1</b>      | 3                    | 0,235                    |
| K110..                                  | <b>EK110/1</b>     | 3                    | 0,275                    |
| K3-150..                                | <b>EK3-150/10</b>  | 1                    | 0,32                     |
| K3-151..                                | <b>EK3-151/10</b>  | 1                    | 0,16                     |
| K3-175..                                | <b>EK3-175/10</b>  | 1                    | 0,32                     |
| K3-176..                                | <b>EK3-176/10</b>  | 1                    | 0,16                     |
| K3-200..                                | <b>EK3-200/10</b>  | 1                    | 0,18                     |
| K3-210..                                | <b>EK3-210/10</b>  | 1                    |                          |
| K3-260..                                | <b>EK3-260/10</b>  | 1                    |                          |
| K3-315..                                | <b>EK3-315/10</b>  | 1                    | 0,34                     |
| K3-316..                                | <b>EK3-316/10</b>  | 1                    |                          |
| K3-450..                                | <b>EK3-450/10</b>  | 1                    | 0,35                     |
| K3-550..                                | <b>EK3-550/10</b>  | 1                    | 0,35                     |
| K3-700..                                | <b>EK3-700/10</b>  | 1                    | 0,85                     |
| K3-860..                                | <b>EK3-860/10</b>  | 1                    | 1,0                      |
| K3-1000..                               | <b>EK3-1000/10</b> | 1                    | 1,4                      |
| K3-1200..                               | <b>EK3-1200/10</b> | 1                    | 1,4                      |

# Approximate Values for three-phase Motors

## Motor Full Load Currents

Approximate values of motor F.L.C. and minimum "slow blow" respectively "gL" short-circuit fuse

| Motor rating<br>kW | Range according to BS for 415V F.L.C. |     |      |    | 220-230V Value of Motor of fusing at motor start |      |          | 240V Value of Motor of fusing at motor start |      |          | 380-400V Value of Motor of fusing at motor start |      |          | 415V Value of Motor of fusing at motor start |      |          | 500V Value of Motor of fusing at motor start |      |          | 660-690V Value of Motor of fusing at motor start |      |          |
|--------------------|---------------------------------------|-----|------|----|--|------|----------|--|------|----------|--|------|----------|--|------|----------|--|------|----------|--|------|----------|
|                    | PS~hp                                 | hp  | cosφ | %  | D.O.L. A   | YD A | F.L.C. A | D.O.L. A                                     | YD A | F.L.C. A | D.O.L. A   | YD A | F.L.C. A | D.O.L. A                                     | YD A | F.L.C. A | D.O.L. A                                     | YD A | F.L.C. A | D.O.L. A   | YD A | F.L.C. A |
| <b>0,06</b>        | 0,08                                  | -   | 0,7  | 59 | 0,38   | 1    | 1        | 0,35   | 1    | 1        | <b>0,22</b>                                      | 1    | 1        | -  | -    | -        | 0,16   | 1    | 1        | -  | -    | -        |
| <b>0,09</b>        | 0,12                                  | -   | 0,7  | 60 | 0,55   | 2    | 2        | 0,5  | 2    | 2        | <b>0,33</b>                                      | 1    | 1        | -  | -    | -        | 0,24   | 1    | 1        | -  | -    | -        |
| <b>0,12</b>        | 0,16                                  | -   | 0,7  | 61 | 0,76   | 2    | 2        | 0,68   | 2    | 2        | <b>0,42</b>                                      | 2    | 2        | -  | -    | -        | 0,33   | 1    | 1        | -  | -    | -        |
| <b>0,18</b>        | 0,24                                  | -   | 0,7  | 61 | 1,1  | 2    | 2        | 1  | 2    | 2        | <b>0,64</b>                                      | 2    | 2        | -  | -    | -        | 0,46   | 1    | 1        | -  | -    | -        |
| <b>0,25</b>        | 0,34                                  | -   | 0,7  | 62 | 1,4  | 4    | 2        | 1,38   | 4    | 2        | <b>0,88</b>                                      | 2    | 2        | -  | -    | -        | 0,59   | 2    | 2        | -  | -    | -        |
| <b>0,37</b>        | 0,5                                   | -   | 0,72 | 64 | 2,1  | 4    | 4        | 1,93   | 4    | 4        | <b>1,22</b>                                      | 4    | 2        | -  | -    | -        | 0,85   | 2    | 2        | 0,7  | 2    | 2        |
| <b>0,55</b>        | 0,75                                  | -   | 0,75 | 69 | 2,7  | 4    | 4        | 2,3  | 4    | 4        | <b>1,5</b>                                       | 4    | 2        | -  | -    | -        | 1,2  | 4    | 2        | 0,9  | 2    | 2        |
| <b>0,75</b>        | 1                                     | 1   | 0,8  | 74 | 3,3  | 6    | 4        | 3,1  | 6    | 4        | <b>2</b>   | 4    | 4        | 2  | 4    | 4        | 1,48   | 4    | 2        | 1,1  | 2    | 2        |
| <b>1,1</b>         | 1,5                                   | 1,5 | 0,83 | 77 | 4,9  | 10   | 6        | 4,1  | 6    | 6        | <b>2,6</b>                                       | 4    | 4        | 2,5  | 4    | 4        | 2,1  | 4    | 4        | 1,5  | 4    | 2        |
| <b>1,5</b>         | 2                                     | 2   | 0,83 | 78 | 6,2  | 10   | 10       | 5,6  | 10   | 10       | <b>3,5</b>                                       | 6    | 4        | 3,5  | 6    | 4        | 2,6  | 4    | 4        | 2  | 4    | 4        |
| <b>2,2</b>         | 3                                     | 3   | 0,83 | 81 | 8,7  | 16   | 10       | 7,9  | 16   | 10       | <b>5</b>   | 10   | 6        | 5  | 10   | 6        | 3,8  | 6    | 6        | 2,9  | 6    | 4        |
| <b>2,5</b>         | 3,4                                   | -   | 0,83 | 81 | 9,8  | 16   | 16       | 8,9  | 16   | 10       | <b>5,7</b>                                       | 10   | 10       | -  | -    | -        | 4,3  | 6    | 6        | -  | -    | -        |
| <b>3</b>           | 4                                     | 4   | 0,84 | 81 | 11,6   | 20   | 16       | 10,6   | 20   | 16       | <b>6,6</b>                                       | 16   | 10       | 6,5  | 16   | 10       | 5,1  | 10   | 10       | 3,5  | 6    | 4        |
| <b>3,7</b>         | 5                                     | 5   | 0,84 | 82 | 14,2   | 25   | 20       | 13   | 25   | 16       | <b>8,2</b>                                       | 16   | 10       | 7,5  | 16   | 10       | 6,2  | 16   | 10       | -  | -    | -        |
| <b>4</b>           | 5,5                                   | -   | 0,84 | 82 | 15,3   | 25   | 20       | 14   | 25   | 20       | <b>8,5</b>                                       | 16   | 10       | -  | -    | -        | 6,5  | 16   | 10       | 4,9  | 10   | 6        |
| <b>5,5</b>         | 7,5                                   | 7,5 | 0,85 | 83 | 20,6   | 35   | 25       | 18,9   | 35   | 25       | <b>11,5</b>                                      | 20   | 16       | 11   | 20   | 16       | 8,9  | 16   | 10       | 6,7  | 16   | 10       |
| <b>7,5</b>         | 10                                    | 10  | 0,86 | 85 | 27,4   | 35   | 35       | 24,8   | 35   | 35       | <b>15,5</b>                                      | 25   | 20       | 14   | 25   | 16       | 11,9   | 20   | 16       | 9  | 16   | 10       |
| <b>8</b>           | 11                                    | -   | 0,86 | 85 | 28,8   | 50   | 35       | 26,4   | 35   | 35       | <b>16,7</b>                                      | 25   | 20       | -  | -    | -        | 12,7   | 20   | 16       | -  | -    | -        |
| <b>11</b>          | 15                                    | 15  | 0,86 | 87 | 39,2   | 63   | 50       | 35,3   | 50   | 50       | <b>22</b>  | 35   | 25       | 21   | 35   | 25       | 16,7   | 25   | 20       | 13   | 25   | 16       |
| <b>12,5</b>        | 17                                    | -   | 0,86 | 87 | 43,8   | 63   | 50       | 40,2   | 63   | 50       | <b>25</b>  | 35   | 35       | -  | -    | -        | 19   | 35   | 25       | -  | -    | -        |
| <b>15</b>          | 20                                    | 20  | 0,86 | 87 | 52,6   | 80   | 63       | 48,2   | 80   | 63       | <b>30</b>  | 50   | 35       | 28   | 35   | 35       | 22,5   | 35   | 25       | 17,5   | 25   | 20       |
| <b>18,5</b>        | 25                                    | 25  | 0,86 | 88 | 64,9   | 100  | 80       | 58,7   | 80   | 63       | <b>37</b>  | 63   | 50       | 35   | 50   | 50       | 28,5   | 50   | 35       | 21   | 35   | 25       |
| <b>20</b>          | 27                                    | -   | 0,86 | 88 | 69,3   | 100  | 80       | 63,4   | 80   | 80       | <b>40</b>  | 63   | 50       | -  | -    | -        | 30,6   | 50   | 35       | -  | -    | -        |
| <b>22</b>          | 30                                    | 30  | 0,87 | 89 | 75,2   | 100  | 80       | 68   | 100  | 80       | <b>44</b>  | 63   | 50       | 40   | 63   | 50       | 33   | 50   | 50       | 25   | 35   | 35       |
| <b>25</b>          | 34                                    | -   | 0,87 | 89 | 84,4   | 125  | 100      | 77,2   | 100  | 100      | <b>50</b>  | 80   | 63       | -  | -    | -        | 38   | 63   | 50       | -  | -    | -        |
| <b>30</b>          | 40                                    | 40  | 0,87 | 90 | 101  | 125  | 125      | 92,7   | 125  | 100      | <b>60</b>  | 80   | 63       | 55   | 80   | 63       | 44   | 63   | 50       | 33   | 50   | 35       |
| <b>37</b>          | 50                                    | 50  | 0,87 | 90 | 124  | 160  | 160      | 114  | 160  | 125      | <b>72</b>  | 100  | 80       | 66   | 100  | 80       | 54   | 80   | 63       | 42   | 63   | 50       |
| <b>40</b>          | 54                                    | -   | 0,87 | 90 | 134  | 160  | 160      | 123  | 160  | 160      | <b>79</b>  | 100  | 100      | -  | -    | -        | 60   | 80   | 63       | -  | -    | -        |
| <b>45</b>          | 60                                    | 60  | 0,88 | 91 | 150  | 200  | 160      | 136  | 200  | 160      | <b>85</b>  | 125  | 100      | 80   | 100  | 100      | 64,5   | 100  | 80       | 49   | 63   | 63       |
| <b>51</b>          | 70                                    | -   | 0,88 | 91 | 168  | 200  | 200      | 154  | 200  | 200      | <b>97</b>  | 125  | 100      | -  | -    | -        | 73,7   | 100  | 80       | -  | -    | -        |
| <b>55</b>          | 75                                    | -   | 0,88 | 91 | 181  | 250  | 200      | 166  | 200  | 200      | <b>105</b>                                       | 160  | 125      | -  | -    | -        | 79   | 125  | 100      | 60   | 80   | 63       |
| <b>59</b>          | 80                                    | 80  | 0,88 | 91 | 194  | 250  | 250      | 178  | 250  | 200      | <b>112</b>                                       | 160  | 125      | 105  | 160  | 125      | 85,3   | 125  | 100      | -  | -    | -        |
| <b>75</b>          | 100                                   | 100 | 0,88 | 91 | 245  | 315  | 250      | 226  | 315  | 250      | <b>140</b>                                       | 200  | 160      | 135  | 200  | 160      | 106  | 160  | 125      | 82   | 125  | 100      |
| <b>90</b>          | 125                                   | 125 | 0,88 | 92 | 292  | 400  | 315      | 268  | 315  | 315      | <b>170</b>                                       | 250  | 200      | 165  | 200  | 200      | 128  | 160  | 160      | 98   | 125  | 125      |
| <b>110</b>         | 150                                   | 150 | 0,88 | 92 | 358  | 500  | 400      | 327  | 400  | 400      | <b>205</b>                                       | 250  | 250      | 200  | 250  | 250      | 156  | 200  | 200      | 118  | 160  | 125      |
| <b>129</b>         | 175                                   | 175 | 0,88 | 92 | 420  | 500  | 500      | 384  | 500  | 400      | <b>242</b>                                       | 315  | 250      | 230  | 315  | 250      | 184  | 250  | 200      | -  | -    | -        |
| <b>132</b>         | 180                                   | -   | 0,88 | 92 | 425  | 500  | 500      | 393  | 500  | 500      | <b>245</b>                                       | 315  | 250      | -  | -    | -        | 186  | 250  | 200      | 140  | 200  | 160      |
| <b>147</b>         | 200                                   | 200 | 0,88 | 93 | 472  | 630  | 630      | 432  | 630  | 500      | <b>273</b>                                       | 315  | 315      | 260  | 315  | 315      | 207  | 250  | 250      | -  | -    | -        |
| <b>160</b>         | 220                                   | -   | 0,88 | 93 | 502  | 630  | 630      | 471  | 630  | 630      | <b>295</b>                                       | 400  | 315      | -  | -    | -        | 220  | 315  | 250      | 170  | 200  | 200      |
| <b>184</b>         | 250                                   | 250 | 0,88 | 93 | 590  | 800  | 630      | 541  | 630  | 630      | <b>340</b>                                       | 400  | 400      | 325  | 400  | 400      | 259  | 315  | 315      | -  | -    | -        |
| <b>200</b>         | 270                                   | -   | 0,88 | 93 | 626  | 800  | 800      | 589  | 800  | 630      | <b>370</b>                                       | 500  | 400      | -  | -    | -        | 278  | 315  | 315      | 215  | 250  | 250      |
| <b>220</b>         | 300                                   | 300 | 0,88 | 93 | 700  | 1000 | 800      | 647  | 800  | 800      | <b>408</b>                                       | 500  | 500      | 385  | 500  | 400      | 310  | 400  | 400      | -  | -    | -        |
| <b>250</b>         | 340                                   | -   | 0,88 | 93 | 803  | 1000 | 1000     | 736  | 1000 | 800      | <b>460</b>                                       | 630  | 500      | -  | -    | -        | 353  | 500  | 400      | 268  | 315  | 315      |
| <b>257</b>         | 350                                   | 350 | 0,88 | 93 | 826  | 1000 | 1000     | 756  | 1000 | 800      | <b>475</b>                                       | 630  | 630      | 450  | 630  | 500      | 363  | 500  | 400      | -  | -    | -        |
| <b>295</b>         | 400                                   | 400 | 0,88 | 93 | 948  | 1250 | 1000     | 868  | 1000 | 1000     | <b>546</b>                                       | 800  | 630      | 500  | 630  | 630      | 416  | 500  | 500      | -  | -    | -        |
| <b>315</b>         | 430                                   | -   | 0,88 | 93 | 990  | 1250 | 1250     | 927  | 1250 | 1000     | <b>580</b>                                       | 800  | 630      | -  | -    | -        | 445  | 630  | 500      | 337  | 400  | 400      |
| <b>355</b>         | 483                                   | -   | 0,89 | 95 | -  | -    | -        | -  | -    | -        | <b>636</b>                                       | 800  | 800      | -  | -    | -        | 483  | 630  | 630      | 366  | 500  | 400      |
| <b>400</b>         | 545                                   | -   | 0,89 | 96 | -  | -    | -        | -  | -    | -        | <b>710</b>                                       | 1000 | 800      | -  | -    | -        | 538  | 630  | 630      | 410  | 500  | 500      |

The motor F.L.C. be valid for standard internal and surface cooled three-pole motors with 1500 min<sup>-1</sup>. The fuses values be valid for the motor F.L.C. shown in the table and D.O.L.-start: starting current max. 6x motor F.L.C., starting time max. 5s; star-delta-start: starting current max. 2x motor F.L.C., starting time max. 15s. For

motors with higher F.L.C., higher starting current and/or longer starting time, larger short-circuit fuses are required. The maximum admissible value is dependent on the switchgear respectively thermal overload relay.

### Approximate values of motor F.L.C. according to CSA and UL

| Motor rating<br>hp | Motor F.L.C. at 110-120V |           |           | Motor F.L.C. at 220-240V <sup>1)</sup> |           |           | Motor F.L.C. at 440-480V |           |           | Motor F.L.C. at 550-600V |           |           |
|--------------------|--------------------------|-----------|-----------|--|-----------|-----------|--------------------------|-----------|-----------|--------------------------|-----------|-----------|
|                    | 1-phase A                | 2-phase A | 3-phase A | 1-phase A                              | 2-phase A | 3-phase A | 1-phase A                | 2-phase A | 3-phase A | 1-phase A                | 2-phase A | 3-phase A |
| 1/2                | 9.8                      | 4.0       | 4.4       | 4.9                                    | 2.0       | 2.2       | 2.5                      | 1.0       | 1.1       | 2.0                      | 0.8       | 0.9       |
| 3/4                | 13.8                     | 4.8       | 6.4       | 6.9                                    | 2.4       | 3.2       | 3.5                      | 1.2       | 1.6       | 2.8                      | 1.0       | 1.3       |
| 1                  | 16.0                     | 6.4       | 8.4       | 8.0                                    | 3.2       | 4.2       | 4.0                      | 1.6       | 2.1       | 3.2                      | 1.3       | 1.7       |
| 1-1/2              | 20.0                     | 9.0       | 12.0      | 10.0                                   | 4.5       | 6.0       | 5.0                      | 2.3       | 3.0       | 4.0                      | 1.8       | 2.4       |
| 2                  | 24.0                     | 11.8      | 13.6      | 12.0                                   | 5.9       | 6.8       | 6.0                      | 3.0       | 3.4       | 4.8                      | 2.4       | 2.7       |
| 3                  | 34.0                     | 16.6      | 19.2      | 17.0                                   | 8.3       | 9.6       | 8.5                      | 4.2       | 4.8       | 6.8                      | 3.3       | 3.9       |
| 5                  | 56.0                     | 26.4      | 30.4      | 28.0                                   | 13.2      | 15.2      | 14.0                     | 6.6       | 7.6       | 11.2                     | 5.3       | 6.1       |
| 7-1/2              | 80.0                     | 38.0      | 44.0      | 40.0                                   | 19.0      | 22.0      | 21.0                     | 9.0       | 11.0      | 16.0                     | 8.0       | 9.0       |
| 10                 | 100.0                    | 48.0      | 56.0      | 50.0                                   | 24.0      | 28.0      | 26.0                     | 12.0      | 14.0      | 20.0                     | 10.0      | 11.0      |
| 15                 | 135.0                    | 72.0      | 84.0      | 68.0                                   | 36.0      | 42.0      | 34.0                     | 18.0      | 21.0      | 27.0                     | 14.0      | 17.0      |
| 20                 | -                        | 94.0      | 108.0     | 88.0                                   | 47.0      | 54.0      | 44.0                     | 23.0      | 27.0      | 35.0                     | 19.0      | 22.0      |
| 25                 | -                        | 118.0     | 136.0     | 110.0                                  |           |           |                          |           |           |                          |           |           |

# Contactors

Data 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      |
|--|--------------------|-----------|------------|------------|-----------|-----------|-----------|-------------|------------|------------|------------|
| <b>Rated insulation voltage <math>U_i</math> <sup>1)</sup></b>                 | V AC               | 690       | 690        | 690        | 690       | 690       | 690       | 690         | 830        | 830        | 830        |
| <b>Making capacity <math>I_{eff}</math></b> at $U_e = 690V$ AC                 | A                  | 200       | 200        | 200        | 200       | 400       | 500       | 500         | 700        | 900        | 900        |
|  | 1000V AC           | -         | -          | -          | -         | -         | -         | -           | -          | -          | -          |
| <b>Breaking capacity <math>I_{eff}</math></b> 400V AC                          | A                  | 180       | 180        | 200        | 200       | 380       | 400       | 400         | 600        | 800        | 800        |
| K3-10 to K3-22 $\cos\phi = 0,65$   | A                  | 150       | 150        | 180        | 180       | 300       | 370       | 370         | 500        | 700        | 700        |
| K3-24 to K3-1200 $\cos\phi = 0,35$   | A                  | 100       | 100        | 150        | 150       | 260       | 340       | 340         | 400        | 500        | 500        |
|  | 1000V AC           | -         | -          | -          | -         | -         | -         | -           | -          | -          | -          |
| <b>Utilization category AC1</b>  |                    |           |            |            |           |           |           |             |            |            |            |
| <b>Switching of resistive load</b>   |                    |           |            |            |           |           |           |             |            |            |            |
| Rated operational current $I_e (=I_{th})$ at 40°C, open                        | 690V A             | <b>25</b> | <b>25</b>  | <b>32</b>  | <b>32</b> | <b>50</b> | <b>65</b> | <b>80</b>   | <b>110</b> | <b>120</b> | <b>130</b> |
| Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$ | 220V kW            | 9,5       | 9,5        | 12,2       | 12,2      | 19,0      | 24,7      | 30,4        | 41,9       | 45,7       | 49,5       |
|  | 230V kW            | 9,9       | 9,9        | 12,7       | 12,7      | 19,9      | 25,9      | 31,8        | 43,8       | 47,7       | 51,7       |
|  | 240V kW            | 10,4      | 10,4       | 13,3       | 13,3      | 20,8      | 27,0      | 33,2        | 45,7       | 49,8       | 54,0       |
|  | 380V kW            | 16,4      | 16,4       | 21,0       | 21,0      | 32,9      | 42,7      | 52,6        | 72,3       | 78,9       | 85,5       |
|  | 400V kW            | 17,3      | 17,3       | 22,1       | 22,1      | 34,6      | 45,0      | 55,4        | 76,1       | 83,0       | 90,0       |
|  | 415V kW            | 17,9      | 17,9       | 23,0       | 23,0      | 35,9      | 46,7      | 57,4        | 79,0       | 86,2       | 93,3       |
|  | 440V kW            | 19,0      | 19,0       | 24,4       | 24,4      | 38,1      | 49,5      | 60,9        | 83,7       | 91,3       | 99,0       |
|  | 500V kW            | 21,6      | 21,6       | 27,7       | 27,7      | 43,3      | 56,2      | 69,2        | 95,2       | 103,8      | 112,5      |
|  | 660V kW            | 28,5      | 28,5       | 36,5       | 36,5      | 57,1      | 74,2      | 91,3        | 125,6      | 137,0      | 148,4      |
|  | 690V 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 $I_e (=I_{the})$ at 60°C, enclosed                   | 690V A             | 25        | 25         | 32         | 32        | 40        | 55        | 65          | 90         | 100        | 110        |
| Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$ | 220V kW            | 9,5       | 9,5        | 12,2       | 12,2      | 15,2      | 20,9      | 24,7        | 34,3       | 38,1       | 41,9       |
|  | 230V kW            | 9,9       | 9,9        | 12,7       | 12,7      | 15,9      | 21,9      | 25,9        | 35,8       | 39,8       | 43,8       |
|  | 240V kW            | 10,4      | 10,4       | 13,3       | 13,3      | 16,6      | 22,8      | 27,0        | 37,4       | 41,5       | 45,7       |
|  | 380V kW            | 16,4      | 16,4       | 21,0       | 21,0      | 26,3      | 36,2      | 42,7        | 59,2       | 65,7       | 72,3       |
|  | 400V kW            | 17,3      | 17,3       | 22,1       | 22,1      | 27,7      | 38,1      | 45,0        | 62,3       | 69,2       | 76,1       |
|  | 415V kW            | 17,9      | 17,9       | 23,0       | 23,0      | 28,7      | 39,5      | 46,7        | 64,6       | 71,8       | 79,0       |
|  | 440V kW            | 19,0      | 19,0       | 24,4       | 24,4      | 30,4      | 41,9      | 49,5        | 68,5       | 76,1       | 83,7       |
|  | 500V kW            | 21,6      | 21,6       | 27,7       | 27,7      | 34,6      | 47,6      | 56,2        | 77,9       | 86,5       | 95,2       |
|  | 660V kW            | 28,5      | 28,5       | 36,5       | 36,5      | 45,7      | 62,8      | 74,2        | 102,8      | 114,2      | 125,6      |
|  | 690V 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 $I_e (=I_{th})$                | mm <sup>2</sup>    | 4         | 4          | 6          | 6         | 10        | 16        | 25          | 35         | 50         | 50         |
| <b>Utilization category AC2 and AC3</b>  |                    |           |            |            |           |           |           |             |            |            |            |
| <b>Switching of three-phase motors</b>   |                    |           |            |            |           |           |           |             |            |            |            |
| Rated operational current $I_e$ open and enclosed                              | 220V A             | 12        | 15         | 18         | 22        | 24        | 30        | 40          | 50         | 63         | 74         |
|  | 230V A             | 11,5      | 14,5       | 18         | 22        | 24        | 30        | 40          | 50         | 62         | 74         |
|  | 240V A             | 11        | 14         | 18         | 22        | 24        | 32        | 40          | 50         | 62         | 74         |
|  | <b>380-400V A</b>  | <b>10</b> | <b>14</b>  | <b>18</b>  | <b>22</b> | <b>24</b> | <b>32</b> | <b>40</b>   | <b>50</b>  | <b>62</b>  | <b>74</b>  |
|  | 415V A             | 9         | 14         | 18         | 22        | 23        | 30        | 40          | 50         | 62         | 74         |
|  | 440V A             | 9         | 14         | 18         | 22        | 23        | 30        | 40          | 50         | 62         | 74         |
|  | 500V 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 50-60Hz                          | 220-230V kW        | 3         | 4          | 5          | 6         | 6         | 8,5       | 11          | 12,5       | 18,5       | 22         |
|  | 240V kW            | 3         | 4          | 5          | 7         | 7         | 9         | 11,5        | 13,5       | 19         | 23         |
|  | <b>380-400V kW</b> | <b>4</b>  | <b>5,5</b> | <b>7,5</b> | <b>11</b> | <b>11</b> | <b>15</b> | <b>18,5</b> | <b>22</b>  | <b>30</b>  | <b>37</b>  |
|  | 415V kW            | 4,5       | 6          | 8,5        | 12        | 12        | 16        | 20          | 24         | 33         | 40         |
|  | 440V kW            | 4,5       | 6          | 8,5        | 12        | 12        | 16        | 20          | 24         | 33         | 40         |
|  | 500V 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           | -         | -          | -          | -         | -         | -         | -           | -          | -          | -          |

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry):  $U_{imp} = 8kV$ .  
Data for other conditions on request.

# Contactors

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

| Type            | K3-90      | K3-115     | K3-116     | K3-151     | K3-176     | K3-210     | K3-260     | K3-316     | K3-450     | K3-550     | K3-700      | K3-860      | K3-1000     | K3-1200     |
|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| V~              | 1000       | 1000       | 1000       | 1000       | 1000       | 1000       | 1000       | 1000       | 1000       | 1000       | 690         | 690         | 690         | 690         |
| A               | 1100       | 1200       | 1200       | 1500       | 2000       | 2100       | 2600       | 3200       | 4500       | 5500       | 7000        | 8600        | 10000       | 12000       |
| A               | 540        | 600        | 600        | 720        | 840        | 1020       | 1200       | 1500       | 2400       | 3000       | -           | -           | -           | -           |
| A               | 950        | 1100       | 1000       | 1200       | 1500       | 1600       | 2100       | 2600       | 4500       | 5500       | 7000        | 8000        | 8000        | 10000       |
| A               | 850        | 1000       | 1000       | 1200       | 1500       | 1600       | 2100       | 2600       | 4500       | 5500       | 7000        | 8000        | 8000        | 10000       |
| A               | 600        | 600        | 800        | 1000       | 800        | 1200       | 1900       | 2300       | 3200       | 4400       | 5600        | 6900        | 7000        | 8000        |
| A               | 450        | 450        | 400        | 500        | 600        | 700        | 850        | 1000       | -          | -          | -           | -           | -           | -           |
| <b>A</b>        | <b>160</b> | <b>200</b> | <b>200</b> | <b>230</b> | <b>250</b> | <b>350</b> | <b>450</b> | <b>500</b> | <b>700</b> | <b>760</b> | <b>1000</b> | <b>1100</b> | <b>1200</b> | <b>1350</b> |
| kW              | 60         | 76         | 76         | 87         | 95         | 133        | 171        | 190        | 266        | 289        | 381         | 419         | 457         | 514         |
| kW              | 63         | 79         | 79         | 91         | 99         | 139        | 179        | 199        | 279        | 302        | 398         | 438         | 478         | 537         |
| kW              | 66         | 83         | 83         | 95         | 103        | 145        | 187        | 207        | 291        | 315        | 415         | 457         | 498         | 561         |
| kW              | 105        | 131        | 131        | 151        | 164        | 230        | 296        | 329        | 460        | 500        | 658         | 724         | 789         | 888         |
| kW              | 110        | 138        | 138        | 159        | 173        | 242        | 311        | 346        | 485        | 526        | 692         | 762         | 831         | 935         |
| kW              | 115        | 143        | 143        | 165        | 179        | 251        | 323        | 359        | 503        | 546        | 718         | 790         | 862         | 970         |
| kW              | 121        | 152        | 152        | 175        | 190        | 266        | 342        | 381        | 533        | 579        | 762         | 838         | 914         | 1028        |
| kW              | 138        | 173        | 173        | 199        | 216        | 303        | 389        | 453        | 606        | 658        | 866         | 952         | 1039        | 1169        |
| kW              | 182        | 228        | 228        | 262        | 285        | 400        | 514        | 571        | 800        | 868        | 1143        | 1257        | 1371        | 1543        |
| kW              | 191        | 239        | 239        | 274        | 298        | 418        | 537        | 597        | 836        | 908        | 1195        | 1314        | 1434        | 1613        |
| kW              | 221        | 277        | 216        | 318        | 346        | 433        | 546        | 606        | 692        | 866        | -           | -           | -           | -           |
| A               | 145        | 170        | 170        | 180        | 200        | 280        | 360        | 400        | 550        | 600        | 800         | 875         | 960         | 1080        |
| kW              | 55         | 64         | 64         | 68         | 76         | 106        | 137        | 152        | 209        | 228        | 304         | 333         | 365         | 411         |
| kW              | 57         | 67         | 67         | 71         | 79         | 111        | 143        | 159        | 219        | 239        | 318         | 348         | 382         | 430         |
| kW              | 59         | 70         | 70         | 74         | 83         | 116        | 150        | 166        | 228        | 249        | 332         | 363         | 399         | 448         |
| kW              | 95         | 111        | 111        | 118        | 131        | 184        | 237        | 263        | 362        | 395        | 526         | 575         | 631         | 710         |
| kW              | 100        | 117        | 117        | 124        | 138        | 193        | 249        | 277        | 381        | 415        | 554         | 606         | 665         | 748         |
| kW              | 104        | 122        | 122        | 129        | 143        | 201        | 259        | 287        | 395        | 431        | 575         | 628         | 690         | 776         |
| kW              | 110        | 129        | 129        | 137        | 152        | 213        | 274        | 304        | 419        | 457        | 609         | 666         | 731         | 823         |
| kW              | 125        | 147        | 147        | 155        | 173        | 242        | 312        | 346        | 476        | 519        | 692         | 757         | 831         | 935         |
| kW              | 165        | 194        | 194        | 205        | 228        | 320        | 412        | 457        | 628        | 685        | 914         | 1000        | 1097        | 1234        |
| kW              | 173        | 202        | 202        | 215        | 239        | 334        | 430        | 478        | 657        | 717        | 956         | 1045        | 1147        | 1290        |
| kW              | 166        | 187        | 216        | 277        | 346        | 388        | 499        | 554        | 692        | 866        | -           | -           | -           | -           |
| mm <sup>2</sup> | 95         | 120        | 95         | 95         | 120        | 240        | 2x150      | 2x(30x6)   | 2x(40x5)   | 2x(50x5)   | 2x(60x5)    | 2x(60x6)    | 2x(60x6)    | 2x(60x8)    |
| A               | 90         | 115        | 115        | 150        | 175        | 210        | 260        | 315        | 450        | 550        | 700         | 860         | 1000        | 1200        |
| A               | 90         | 115        | 115        | 150        | 175        | 210        | 260        | 315        | 450        | 550        | 700         | 860         | 1000        | 1200        |
| A               | 90         | 115        | 115        | 150        | 175        | 210        | 260        | 315        | 450        | 550        | 700         | 860         | 1000        | 1200        |
| <b>A</b>        | <b>90</b>  | <b>115</b> | <b>115</b> | <b>150</b> | <b>175</b> | <b>210</b> | <b>260</b> | <b>315</b> | <b>450</b> | <b>550</b> | <b>700</b>  | <b>860</b>  | <b>1000</b> | <b>1200</b> |
| A               | 90         | 115        | 115        | 150        | 175        | 210        | 260        | 315        | 450        | 550        | 700         | 860         | 1000        | 1200        |
| A               | 90         | 115        | 115        | 150        | 175        | 210        | 260        | 315        | 450        | 550        | 700         | 860         | 1000        | 1200        |
| A               | 79         | 79         | 115        | 150        | 175        | 210        | 260        | 315        | 450        | 550        | 700         | 860         | 1000        | 1200        |
| A               | 60         | 60         | 100        | 120        | 140        | 150        | 180        | 240        | 400        | 500        | 630         | 700         | 860         | 1000        |
| A               | 45         | 45         | 45         | 60         | 70         | 85         | 100        | 125        | 200        | 250        | -           | -           | -           | -           |
| kW              | 25         | 33         | 30         | 40         | 50         | 60         | 75         | 90         | 132        | 175        | 225         | 280         | 325         | 390         |
| kW              | 27         | 35         | 35         | 45         | 55         | 65         | 80         | 100        | 140        | 185        | 235         | 290         | 335         | 400         |
| <b>kW</b>       | <b>45</b>  | <b>55</b>  | <b>55</b>  | <b>75</b>  | <b>90</b>  | <b>110</b> | <b>132</b> | <b>160</b> | <b>250</b> | <b>300</b> | <b>400</b>  | <b>500</b>  | <b>580</b>  | <b>680</b>  |
| kW              | 49         | 63         | 59         | 80         | 95         | 115        | 140        | 180        | 257        | 315        | 415         | 515         | 600         | 710         |
| kW              | 49         | 63         | 63         | 85         | 100        | 125        | 150        | 190        | 270        | 335        | 450         | 530         | 630         | 750         |
| kW              | 55         | 55         | 75         | 90         | 100        | 132        | 160        | 210        | 300        | 375        | 500         | 600         | 720         | 850         |
| kW              | 55         | 55         | 90         | 110        | 132        | 132        | 160        | 210        | 375        | 500        | 630         | 700         | 850         | 1000        |
| kW              | 55         | 55         | 55         | 75         | 90         | 110        | 132        | 160        | 280        | 355        | -           | -           | -           | -           |



# Contactors

Data 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     |
|--|--------------------|-----------|------------|------------|------------|--|-----------|-------------|-----------|-----------|-----------|
| <b>Utilization category AC4</b>  |                    |           |            |            |            |  |           |             |           |           |           |
| <b>Switching of squirrel cage motors, inching</b>                          |                    |           |            |            |            |  |           |             |           |           |           |
| Rated operational current $I_e$  | 220V A             | 12        | 15         | 18         | 18         | 24   | 30        | 40          | 50        | 63        | 63        |
| open and enclosed  | 230V A             | 11,5      | 14,5       | 18         | 18         | 24   | 30        | 40          | 50        | 62        | 62        |
|  | 240V A             | 11        | 14         | 18         | 18         | 24   | 32        | 40          | 50        | 62        | 62        |
|  | <b>380-400V A</b>  | <b>10</b> | <b>14</b>  | <b>18</b>  | <b>18</b>  | <b>24</b>  | <b>32</b> | <b>40</b>   | <b>50</b> | <b>62</b> | <b>62</b> |
|  | 415V A             | 9         | 14         | 18         | 18         | 23   | 30        | 37          | 45        | 60        | 60        |
|  | 440V A             | 9         | 14         | 18         | 18         | 23   | 30        | 37          | 45        | 55        | 55        |
|  | 500V A             | 9         | 12         | 16         | 16         | 17,5   | 21        | 21          | 33        | 42        | 42        |
|  | 660V A             | 7         | 9          | 9          | 9          | 17   | 20        | 20          | 31        | 40        | 40        |
|  | 690V A             | 6,5       | 8,5        | 8,5        | 8,5        | 17   | 20        | 20          | 31        | 40        | 40        |
|  | 1000V A            | -         | -          | -          | -          | -  | -         | -           | -         | -         | -         |
| Rated operational power of three-phase motors 50-60Hz                      | 220-230V kW        | 3         | 4          | 5          | 5          | 6  | 8,5       | 11          | 12,5      | 18,5      | 18,5      |
|  | 240V kW            | 3         | 4          | 5          | 5          | 7  | 9         | 11,5        | 13,5      | 19        | 19        |
|  | <b>380-400V kW</b> | <b>4</b>  | <b>5,5</b> | <b>7,5</b> | <b>7,5</b> | <b>11</b>  | <b>15</b> | <b>18,5</b> | <b>22</b> | <b>30</b> | <b>30</b> |
|  | 415V kW            | 4,5       | 6          | 8,5        | 8,5        | 12   | 16        | 20          | 24        | 33        | 33        |
|  | 440V kW            | 4,5       | 6          | 8,5        | 8,5        | 12   | 16        | 20          | 24        | 33        | 33        |
|  | 500V kW            | 5,5       | 7,5        | 10         | 10         | 15   | 18,5      | 18,5        | 30        | 37        | 37        |
|  | 660-690V kW        | 5,5       | 7,5        | 10         | 10         | 15   | 18,5      | 18,5        | 30        | 37        | 37        |
|  | 1000V kW           | -         | -          | -          | -          | -  | -         | -           | -         | -         | -         |
| <b>Utilization category AC5a</b>   |                    |           |            |            |            |  |           |             |           |           |           |
| <b>Switching of gas discharge lamps</b>                                    |                    |           |            |            |            |  |           |             |           |           |           |
| Rated operational current $I_e$ per pole at 220/230V                       |                    |           |            |            |            |  |           |             |           |           |           |
| 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 <sup>1)</sup> , 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 <sup>2)</sup> , 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 <sup>3)</sup>  | A                  | 20        | 20         | 25         | 25         | 40   | 52        | 64          | 88        | 96        | 104       |
| <b>LED-Lamps</b>   |                    |           |            |            |            |  |           |             |           |           |           |
| consider the inrush current of the lamp ballast and $\cos\phi$ of the lamp |                    |           |            |            |            |  |           |             |           |           |           |
| max. lamps per pole ( $I_{nLED} \leq I_{th}$ )                             |                    |           |            |            |            | = $\frac{\text{inrush current of contactor}}{\text{inrush current of lamp/EVG}}$ |           |             |           |           |           |
| max inrush current of contactor  | A                  | 282       | 282        | 282        | 282        | 564  | 705       | 705         | 987       | 1269      | 1268      |
| <b>Utilization category AC5b</b>   |                    |           |            |            |            |  |           |             |           |           |           |
| <b>Switching of incandescent lamps<sup>4)</sup></b>                        |                    |           |            |            |            |  |           |             |           |           |           |
| Rated operational current $I_e$ per pole at 220/230V                       | A                  | 12,5      | 12,5       | 12,5       | 12,5       | 25   | 31        | 31          | 43        | 56        | 56        |

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 x  $I_e$

# Contactors

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

| Type      | K3-90  | K3-115    | K3-151    | K3-176    | K3-210   | K3-260     | K3-316     | K3-450     | K3-550     | K3-700     | K3-860     | K3-1000    | K3-1200    |
|-----------|--|-----------|-----------|-----------|--|------------|------------|------------|------------|------------|------------|------------|------------|
| A         | 85   | 98        | 55        | 63        | 85   | 100        | 120        | 150        | 180        | 230        | 280        | 340        | 400        |
| A         | 85   | 98        | 55        | 63        | 85   | 100        | 120        | 150        | 180        | 230        | 280        | 340        | 400        |
| A         | 85   | 98        | 55        | 63        | 85   | 100        | 120        | 150        | 180        | 230        | 280        | 340        | 400        |
| <b>A</b>  | <b>85</b>                                      | <b>85</b> | <b>55</b> | <b>63</b> | <b>85</b>  | <b>100</b> | <b>120</b> | <b>150</b> | <b>180</b> | <b>230</b> | <b>280</b> | <b>340</b> | <b>400</b> |
| A         | 85   | 85        | 55        | 63        | 85   | 100        | 120        | 150        | 180        | 230        | 280        | 340        | 400        |
| A         | 85   | 85        | 55        | 63        | 85   | 100        | 120        | 150        | 180        | 230        | 280        | 340        | 400        |
| A         | 85   | 85        | -         | -         | -  | -          | -          | -          | -          | -          | -          | -          | -          |
| A         | 60   | 60        | -         | -         | -  | -          | -          | -          | -          | -          | -          | -          | -          |
| A         | 57,5   | 57,5      | -         | -         | -  | -          | -          | -          | -          | -          | -          | -          | -          |
| A         | -  | -         | -         | -         | -  | -          | -          | -          | -          | -          | -          | -          | -          |
| kW        | 25   | 30        | 15        | 18,5      | 25   | 30         | 37         | 45         | 51         | 68         | 80         | 110        | 132        |
| kW        | 27   | 32        | 15,5      | 19        | 26   | 31         | 38         | 47         | 53         | 71         | 83         | 115        | 137        |
| <b>kW</b> | <b>45</b>                                      | <b>45</b> | <b>25</b> | <b>30</b> | <b>45</b>  | <b>55</b>  | <b>63</b>  | <b>75</b>  | <b>90</b>  | <b>120</b> | <b>150</b> | <b>185</b> | <b>220</b> |
| kW        | 49   | 49        | 25        | 33        | 45   | 55         | 65         | 80         | 100        | 132        | 160        | 200        | 230        |
| kW        | 49   | 49        | 30        | 34        | 48   | 55         | 67         | 85         | 100        | 132        | 160        | 200        | 230        |
| kW        | 55   | 55        | 25        | 30        | 55   | 65         | 75         | 100        | 110        | 150        | 185        | 220        | 257        |
| kW        | 55   | 55        | 25        | 30        | 55   | 65         | 75         | 100        | 110        | 150        | 185        | 220        | 257        |
| kW        | -  | -         | -         | -         | -  | -          | -          | -          | -          | -          | -          | -          | -          |
| A         | 100  | 120       | 120       | 140       | 180  | 220        | 280        | 360        | 450        | 570        | 700        | 850        | 1000       |
| A         | 55   | 70        | 85        | 100       | 130  | 160        | 200        | 300        | 360        | 460        | 550        | 660        | 800        |
| A         | 112  | 144       | 120       | 140       | 180  | 220        | 280        | 360        | 450        | 570        | 700        | 850        | 1000       |
| A         | 85   | 90        | 95        | 110       | 140  | 180        | 230        | 300        | 380        | 490        | 610        | 750        | 890        |
| A         | 55   | 70        | 75        | 85        | 110  | 140        | 170        | 260        | 300        | 400        | 480        | 580        | 700        |
| A         | 112  | 144       | 120       | 140       | 180  | 220        | 280        | 360        | 450        | 570        | 700        | 850        | 1000       |
| A         | 55   | 70        | 75        | 85        | 110  | 140        | 170        | 260        | 300        | 400        | 480        | 580        | 700        |
| A         | 100  | 120       | 100       | 120       | 160  | 200        | 250        | 320        | 400        | 500        | 600        | 700        | 800        |
| A         | max. lamps per pole ( $I_{nLED} \leq I_{th}$ ) |           |           | =         | $\frac{\text{inrush current of contactor}}{\text{inrush current of lamp/EVG}}$ |            |            |            |            |            |            |            |            |
| A         | 1551   | 1692      | 2115      | 2820      | 2961   | 3666       | 4512       | 6345       | 7755       | 9870       | 12126      | 14100      | 16920      |
| A         | 69   | 75        | 100       | 120       | 160  | 190        | 220        | 260        | 315        | 440        | 500        | 560        | 630        |

Contactors: Motor-Starters  
 Circuit Breakers  
 Manual Motor-Starters  
 Switches  
 AC-Main Switches  
 DC-Switch Disconnectors  
 Push Buttons  
 Representatives: Suppliers

# Contactors

Data 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             |
|--|-------------------|------|----------|----------|----------|----------|----------|----------|----------|-------|-------|-------------------|
| <b>Utilization category AC6a</b>   |                   |      |          |          |          |          |          |          |          |       |       |                   |
| <b>Transformer primary switching</b>   |                   |      |          |          |          |          |          |          |          |       |       |                   |
| at inrush  |                   | n    | 30       | 30       | 30       | 30       | 30       | 30       | 30       | 30    | 30    | 30                |
| Rated operational current $I_e$  | 400V              | A    | 4,5      | 5,5      | 7,5      | 7,5      | 10,5     | 13,5     | 13,5     | 20    | 27    | 33                |
| Rated operational power  | 220-230V          | kVA  | 1,8      | 2,2      | 3        | 3        | 4,2      | 5,4      | 5,4      | 8     | 10,7  | 13                |
| dependent on inrush n  | 240V              | 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:   | 500V              | kVA  | 3,9      | 4,8      | 6,5      | 6,5      | 9        | 11,5     | 11,5     | 17    | 23    | 28                |
| $P_x = P_n \cdot (n/x)$  | 660-690V          | kVA  | 5,4      | 6,5      | 9        | 9        | 12,5     | 16       | 16       | 24    | 32    | 39                |
| <b>Utilization category AC6b</b>   |                   |      |          |          |          |          |          |          |          |       |       |                   |
| <b>Switching of three-phase capacitors</b>                                       |                   |      |          |          |          |          |          |          |          |       |       |                   |
| Maximum inrush current (peak value) as multiple k of the capacitor rated current |                   |      |          |          |          |          |          |          |          |       |       |                   |
| Rated operational current $I_e$  | 500V              | k    | 35       | 25       | 20       | 20       | 25       | 25       | 25       | 25    | 25    | 20                |
|  |                   | A    | 8        | 12       | 15,5     | 15,5     | 23       | 32       | 32       | 45    | 60    | 70                |
| Rated operational power  | 220-230V          | kVAr | 3        | 4,5      | 6        | 6        | 8,5      | 12       | 12       | 17    | 24    | 28                |
| ( $\sin\phi \rightarrow 1$ )   | 240V              | 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:   | 500V              | kVAr | 7        | 10       | 13       | 13       | 20       | 26       | 26       | 39    | 50    | 58                |
| $P_x = P_k \cdot (k/x)$  | 660-690V          | kVAr | 7        | 10       | 13       | 13       | 20       | 26       | 26       | 40    | 50    | 58                |
| <b>Switching of reactive capacitor banks</b>                                     |                   |      |          |          |          |          |          |          |          |       |       |                   |
| Rated operational current $I_e$  | 690V              | A    | 8        | 13       | 18       | 20       | 28       | 36       | 42       | 48    | 72    | 108 <sup>1)</sup> |
| Rated operational power  | 220-230V          | kVAr | 2,9      | 5        | 7        | 7,5      | 11       | 14       | 16       | 20    | 28    | 33                |
|  | 240V              | 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 <sup>1)</sup>  |
|  | 415-440V          | kVAr | 5,5      | 9,5      | 13       | 14       | 22       | 27       | 30       | 36    | 53    | 75 <sup>1)</sup>  |
|  | 500V              | kVAr | 6        | 11       | 15       | 17       | 25       | 30       | 36       | 40    | 60    | 75                |
|  | 660-690V          | kVAr | 8        | 15       | 20       | 22       | 33       | 41       | 48       | 55    | 82    | 100               |
|  | 1000V             | kVAr | -        | -        | -        | -        | -        | -        | -        | -     | -     | -                 |
| <b>Utilization category DC1</b>  |                   |      |          |          |          |          |          |          |          |       |       |                   |
| <b>Switching of resistive load</b>   |                   |      |          |          |          |          |          |          |          |       |       |                   |
| Time constant $L/R \leq 1\text{ms}$  |                   |      |          |          |          |          |          |          |          |       |       |                   |
| Rated operational current $I_e$  | 1 pole            | 24V  | A        | 20       | 25       | 32       | 32       | 50       | 65       | 80    | 110   | 130               |
|  |                   | 60V  | A        | 20       | 25       | 32       | 32       | 50       | 65       | 80    | 110   | 130               |
|  |                   | 110V | A        | 6        | 6        | 6        | 6        | 10       | 10       | 12    | 12    | 12                |
|  |                   | 220V | A        | 0,8      | 0,8      | 0,8      | 0,8      | 1,4      | 1,4      | 1,4   | 1,4   | 1,4               |
|  | 3 poles in series | 24V  | A        | 20       | 25       | 32       | 32       | 50       | 65       | 80    | 110   | 130               |
|  |                   | 60V  | A        | 20       | 25       | 32       | 32       | 50       | 65       | 80    | 110   | 130               |
|  |                   | 110V | A        | 20       | 25       | 32       | 32       | 50       | 65       | 80    | 110   | 130               |
|  |                   | 220V | A        | 16       | 20       | 20       | 20       | 30       | 35       | 35    | 63    | 80                |
| <b>Utilization category DC3 and DC5</b>  |                   |      |          |          |          |          |          |          |          |       |       |                   |
| <b>Switching of shunt motors and series motors</b>                               |                   |      |          |          |          |          |          |          |          |       |       |                   |
| Time constant $L/R \leq 15\text{ms}$   |                   |      |          |          |          |          |          |          |          |       |       |                   |
| Rated operational current $I_e$  | 1 pole            | 24V  | A        | 20       | 25       | 32       | 32       | 50       | 65       | 80    | 110   | 130               |
|  |                   | 60V  | A        | 6        | 6        | 6        | 6        | 30       | 30       | 30    | 60    | 60                |
|  |                   | 110V | A        | 1,2      | 1,2      | 1,2      | 1,2      | 1,8      | 1,8      | 1,8   | 1,8   | 1,8               |
|  |                   | 220V | A        | 0,2      | 0,2      | 0,2      | 0,2      | 0,2      | 0,2      | 0,2   | 0,25  | 0,25              |
|  | 3 poles in series | 24V  | A        | 20       | 25       | 32       | 32       | 50       | 65       | 80    | 110   | 130               |
|  |                   | 60V  | A        | 20       | 25       | 32       | 32       | 40       | 40       | 40    | 80    | 80                |
|  |                   | 110V | A        | 20       | 20       | 20       | 20       | 40       | 40       | 40    | 80    | 80                |
|  |                   | 220V | A        | 2,5      | 2,5      | 2,5      | 2,5      | 4        | 4        | 4     | 5     | 5                 |

1) Consider resistive load ( $I_{th}$ ). see page 56

# Contactors




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

| Type | K3-90 | K3-115 | K3-151 | K3-176 | K3-210 | K3-260 | K3-316 | K3-450 | K3-550 | K3-700 | K3-860 | K3-1000 | K3-1200 |
|------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|
| n    | 30    | 30     | 30     | 30     | 30     | 30     | 30     | 30     | 30     | 30     | 30     | 30      | 30      |
| A    | 38    | 50     | 65     | 80     | 90     | 120    | 142    | 203    | 248    | 315    | 390    | 450     | 540     |
| kVA  | 15    | 20     | 25     | 30     | 34     | 45     | 54     | 77     | 95     | 120    | 148    | 170     | 200     |
| kVA  | 15,5  | 20,5   | 27     | 33     | 37     | 50     | 59     | 80     | 100    | 130    | 160    | 185     | 220     |
| kVA  | 26    | 34     | 45     | 55     | 60     | 80     | 95     | 140    | 170    | 210    | 270    | 310     | 370     |
| kVA  | 29    | 38     | 46     | 57     | 63     | 85     | 100    | 145    | 175    | 220    | 280    | 320     | 380     |
| kVA  | 33    | 43     | 55     | 69     | 75     | 100    | 120    | 170    | 210    | 270    | 330    | 380     | 460     |
| kVA  | 45    | 60     | 56     | 69     | 100    | 135    | 160    | 200    | 250    | 320    | 350    | 500     | 600     |
| k    | 20    | 20     | 20     | 20     | 25     | 20     | 20     | 20     | 20     | 20     | 20     | 20      | 20      |
| A    | 87    | 100    | 120    | 155    | 195    | 225    | 255    | 300    | 370    | 440    | 520    | 680     | 760     |
| kVAr | 33    | 38     | 45     | 60     | 75     | 90     | 100    | 115    | 145    | 170    | 200    | 260     | 290     |
| kVAr | 36    | 42     | 52     | 62     | 78     | 94     | 104    | 120    | 150    | 175    | 205    | 270     | 300     |
| kVAr | 57    | 65     | 80     | 100    | 130    | 155    | 170    | 200    | 250    | 300    | 350    | 450     | 500     |
| kVAr | 60    | 70     | 95     | 110    | 135    | 165    | 175    | 210    | 260    | 310    | 360    | 465     | 520     |
| kVAr | 70    | 80     | 100    | 130    | 170    | 194    | 220    | 260    | 320    | 380    | 450    | 590     | 660     |
| kVAr | 70    | 80     | 100    | 130    | 170    | 194    | 220    | 260    | 320    | 380    | 450    | 590     | 660     |
| A    | 115   | 144    | 115    | 140    | 200    | 225    | 250    | 330    | 420    | 550    | 600    | 680     | 760     |
| kVAr | 45    | 55     | 43     | 53     | 76     | 85     | 95     | 125    | 160    | 209    | 228    | 260     | 290     |
| kVAr | 45    | 55     | 45     | 55     | 80     | 90     | 100    | 130    | 170    | 220    | 240    | 280     | 310     |
| kVAr | 80    | 100    | 75     | 90     | 130    | 145    | 160    | 210    | 270    | 350    | 390    | 440     | 480     |
| kVAr | 100   | 120    | 80     | 100    | 140    | 160    | 170    | 230    | 290    | 380    | 420    | 470     | 530     |
| kVAr | 105   | 125    | 95     | 120    | 170    | 190    | 210    | 280    | 350    | 450    | 500    | 570     | 640     |
| kVAr | 120   | 148    | 125    | 150    | 200    | 230    | 260    | 350    | 450    | 600    | 650    | 700     | 800     |
| kVAr | 160   | 200    | 155    | 200    | 300    | 340    | 400    | 500    | 650    | -      | -      | -       | -       |
| A    | 160   | 200    | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |
| A    | 160   | 200    | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |
| A    | 20    | 25     | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |
| A    | 2     | 2,5    | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |
| A    | 160   | 200    | 200    | 250    | 350    | 400    | 450    | 600    | 760    | 1000   | 1100   | 1200    | 1350    |
| A    | 160   | 200    | 200    | 250    | 350    | 400    | 450    | 600    | 760    | 1000   | 1100   | 1200    | 1350    |
| A    | 160   | 200    | 150    | 170    | 250    | 280    | 315    | 400    | 480    | 560    | 630    | 800     | 900     |
| A    | 100   | 160    | 80     | 100    | 150    | 180    | 200    | 250    | 315    | 400    | 450    | 500     | 600     |
| A    | 160   | 200    | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |
| A    | 85    | 110    | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |
| A    | 2     | 2,5    | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |
| A    | 0,5   | 0,5    | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |
| A    | 160   | 200    | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |
| A    | 100   | 110    | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |
| A    | 100   | 110    | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |
| A    | 7     | 8      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -       | -       |

Contactors, Motor-Starters  
Circuit Breakers  
Manual Motor-Starters  
Switches  
AC-Main Switches  
DC-Switch Disconnectors  
Push Buttons  
Representatives, Suppliers

# Contactors

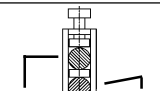






Data according to IEC 947-4-1, EN 60947-4-1, VDE 0660

| 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 |     |
|---|-----------------------------------|---------------------|---|----------|---|----------|---|----------|-------|-------|-------|-----|
| <b>Maximum ambient temperature</b>  |                                   |                     |   |          |   |          |   |          |       |       |       |     |
| Operation   | open                              |                     |   |          |   |          | -40 to +60 (+90) <sup>1)</sup>  |          |       |       |       |     |
|   | enclosed                          |                     |   |          |   |          | -40 to +40  |          |       |       |       |     |
| with thermal overload relay   | open                              |                     |   |          |   |          | -25 to +60  |          |       |       |       |     |
|   | enclosed                          |                     |   |          |   |          | -25 to +40  |          |       |       |       |     |
| Storage   |                                   |                     |   |          |   |          | -50 to +90  |          |       |       |       |     |
| <b>Short circuit protection</b>   |                                   |                     |   |          |   |          |   |          |       |       |       |     |
| 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                   | 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 smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size. |                                   |                     |   |          |   |          |   |          |       |       |       |     |
| <b>Cable cross-sections</b>   |                                   |                     |   |          |   |          |   |          |       |       |       |     |
| for contactors without thermal overload relay   |                                   |                     |   |          |   |          |   |          |       |       |       |     |
| 1 cable per clamp   |                                   |                     |   |          |   |          |   |          |       |       |       |     |
| main connector  | solid or stranded                 | mm <sup>2</sup>     |  |          |  |          |  |          |       |       |       |     |
|   | flexible                          | mm <sup>2</sup>     | 0,75 - 6  |          | 1,5 - 25  |          | 4 - 50  |          |       |       |       |     |
|   | flexible with multicore cable end | mm <sup>2</sup>     | 1 - 4   |          | 2,5 - 16  |          | 10 - 35   |          |       |       |       |     |
| 2 cables per clamp  |                                   |                     |   |          |   |          |   |          |       |       |       |     |
|   | solid or stranded                 | mm <sup>2</sup>     | 6+(1-6) / 4+(0,75-4)  |          | 16+(2,5-16) / 10+(4-16)   |          | 50+4 / 35+6 / 25+(6-16)   |          |       |       |       |     |
|   | flexible                          | mm <sup>2</sup>     | 2,5+(0,75-2,5) / 1,5+(0,75-1,5)   |          | 6+(4-16) / 4+(2,5-16)   |          | 16+(6-16) / 10+(6-16)   |          |       |       |       |     |
| main connector  | solid                             | AWG                 | 18 - 10   |          | 16 - 10   |          | 12 - 10   |          |       |       |       |     |
|   | flexible                          | AWG                 | 18 - 10   |          | 14 - 4  |          | 10 - 0  |          |       |       |       |     |
| 2 cables per clamp  |                                   |                     |   |          |   |          |   |          |       |       |       |     |
|   | solid                             | AWG                 | 10+(16-10) / 12+(18-12)   |          | 10+(16-10) / 12+(18-12)   |          | 10+(12-10) / 12+12  |          |       |       |       |     |
|   | flexible                          | AWG                 | 14+(18-14) / 16+(18-16)   |          | 14+(18-14) / 16+(18-16)   |          | 4+(18-12) / 6+(18-8)  |          |       |       |       |     |
| <b>Frequency of operations z</b>  |                                   |                     |   |          |   |          |   |          |       |       |       |     |
| Contactors without thermal overload relay   |                                   |                     |   |          |   |          |   |          |       |       |       |     |
|   | without load                      | 1/h                 | 10000   |          | 7000  |          | 7000  |          |       |       |       |     |
|   | AC3, I <sub>e</sub>               | 1/h                 | 600   |          | 600   |          | 400   |          |       |       |       |     |
|   | AC4, I <sub>e</sub>               | 1/h                 | 120   |          | 120   |          | 120   |          |       |       |       |     |
|   | DC3, I <sub>e</sub>               | 1/h                 | 600   |          | 600   |          | 400   |          |       |       |       |     |
| <b>Mechanical life</b>  |                                   |                     |   |          |   |          |   |          |       |       |       |     |
| AC operated   |                                   | S x 10 <sup>6</sup> | 10  |          | 10  |          | 10  |          |       |       |       |     |
| DC operated   |                                   | S x 10 <sup>6</sup> | 10  |          | 10  |          | 10  |          |       |       |       |     |
| DC-solenoid operated (KG3)  |                                   | S x 10 <sup>6</sup> | 50  |          | 50  |          | -   |          |       |       |       |     |
| <b>Short time current</b>   |                                   |                     |   |          |   |          |   |          |       |       |       |     |
|   | 10s-current                       | A                   | 96  | 120      | 144   | 176      | 184   | 240      | 296   | 450   | 504   | 592 |
|   | 120s-current                      | A                   | 42  | 52       | 58  | 66       | 80  | 97       | 110   | 195   | 203   | 222 |
| <b>Power loss per pole</b>  |                                   |                     |   |          |   |          |   |          |       |       |       |     |
| contact resistance  | at I <sub>e</sub> /AC3 400V       | W                   | 0,21  | 0,35     | 0,5   | 0,75     | 0,7   | 1,3      | 2     | 2,2   | 3,9   | 5,5 |
|   |                                   | mOhm                | 2,1   | 1,8      | 1,5   | 1,5      | 1,2   | 1,2      | 1,2   | 1     | 1     | 1   |
| <b>Resistance to shock acc. to IEC 68-2-27</b>  |                                   |                     |   |          |   |          |   |          |       |       |       |     |
| Shock time 20ms sine-wave   | NO                                | g                   | 10  | 10       | 10  | 10       | 8   | 8        | 8     | 8     | 8     | 8   |
|   | NC                                | g                   | 6   | 6        | 6   | 6        | -   | -        | -     | -     | -     | -   |

1) With reduced control voltage range 0,9 up to 1,0 x U<sub>s</sub> and with reduced rated current I<sub>e</sub>/AC1 according to I<sub>e</sub>/AC3

# Contactors

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

| Type                | K3-90   | K3-115   | K3-116  | K3-151 | K3-176  | K3-210 | K3-260 | K3-316   | K3-450                           | K3-550  | K3-700                           | K3-860  | K3-1000 | K3-1200   |
|---------------------|---|----------|---|--------|---|--------|--------|--|----------------------------------|---|----------------------------------|---|---------|---|
| °C                  | -40 to +60 (+90) <sup>1)</sup>  |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| °C                  | -40 to +40  |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| °C                  | -25 to +60  |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| °C                  | -25 to +40  |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| °C                  | -50 to +90  |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
|                     |   |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| A                   | 250   | 250      | 200   | 250    | 315   | 400    | 450    | 500  | 630                              | 630   | 800                              | 1000  | 1000    | 1250  |
| A                   | 160   | 200      | 160   | 200    | 250   | 315    | 400    | 400  | 500                              | 560   | -                                | -   | -       | -   |
| A                   | 100   | 125      | 125   | 160    | 200   | 250    | 315    | -  | -                                | -   | -                                | -   | -       | -   |
|                     |   |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| mm <sup>2</sup>     |  |          |  |        |  |        |        |  |                                  |  |                                  |  |         |  |
| mm <sup>2</sup>     | 0,5 - 95  | 10 - 120 | busbar<br>18 x 4<br>screw<br>M8   |        | busbar<br>25 x 6<br>screw<br>M10  |        |        | busbar<br>30 x 5<br>screw<br>M12   | busbar<br>40 x 6<br>screw<br>M12 | busbar<br>50 x 8<br>screw<br>M12  | busbar<br>50 x 8<br>screw<br>M14 | busbar<br>50 x 10<br>screw<br>2 x M12   |         |   |
| mm <sup>2</sup>     | 0,5 - 95 + 10 - 120   |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| mm <sup>2</sup>     | 0,5 - 70  |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| mm <sup>2</sup>     | 25 - 95   |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| mm <sup>2</sup>     | 10 - 95   |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| mm <sup>2</sup>     | 0,5 - 70 + 25 - 95  |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| AWG                 | 18 - 10   | -        |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| AWG                 | 18 - 3/0  | 8 - 4/0  |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| AWG                 | -   |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| AWG                 | 18 - 3/0 + 8 - 4/0  |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
|                     |   |          |   |        |   |        |        |  |                                  |   |                                  |   |         |   |
| 1/h                 | 3000  |          | 1200  |        | 1200  |        |        | 1200   |                                  | 1200  |                                  | 300   |         |   |
| 1/h                 | 300   |          | 240   |        | 150   |        |        | 50   |                                  | 20  |                                  |   |         |   |
| 1/h                 | 120   |          | -   |        | -   |        |        | -  |                                  | -   |                                  | -   |         |   |
| 1/h                 | 300   |          | -   |        | -   |        |        | -  |                                  | -   |                                  | -   |         |   |
| S x 10 <sup>6</sup> | 5   |          | 10  |        | 5   |        |        | 5  |                                  | 5 <sup>3)</sup>   |                                  | 5 <sup>3)</sup>   |         |   |
| S x 10 <sup>6</sup> | 5   |          | 10  |        | 5   |        |        | 5  |                                  | 5 <sup>3)</sup>   |                                  | 5 <sup>3)</sup>   |         |   |
| S x 10 <sup>6</sup> | -   |          | -   |        | -   |        |        | -  |                                  | -   |                                  | -   |         |   |
| A                   | 680   | 880      | 920   | 1200   | 1400  | 1800   | 2200   | 2600   | 3600                             | 4400  | 5600                             | 6900  | 8000    | 9600  |
| A                   | 275   | 330      | 410   | 500    | 575   | 800    | 900    | 1000   | 1400                             | 1750  | 2200                             | 2600  | 3000    | 3600  |
| W                   | 4,8   | 7,9      | 7,9   | 9      | 11  | 8      | 11     | 14,9   | 26,3                             | 33,3  | 49                               | 59,2  | 60      | 72  |
| mOhm                | 0,6   | 0,5      | 0,5   | 0,4    | 0,35  | 0,18   | 0,16   | 0,15   |                                  |   |                                  |   |         |   |
| g                   | 7   | 7        | -   | -      | -   | -      | -      | -  | -                                | -   | -                                | -   | -       | -   |
| g                   | 5   | 5        | -   | -      | -   | -      | -      | -  | -                                | -   | -                                | -   | -       | -   |

1) With reduced control voltage range 0,9 up to 1,0 x U<sub>s</sub> and with reduced rated current I<sub>b</sub>/AC1 according to I<sub>b</sub>/AC3

2) With reduced control voltage range 1,0 x U<sub>s</sub> and with reduced rated current I<sub>b</sub>/AC1 according to I<sub>b</sub>/AC3

3) After each 1x10<sup>6</sup> operations magnetic core and built-in auxiliary contact block must be changed

# Contactors

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

| Auxiliary 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 |
|---|---|-----------------------|--------------------|----------|----------|-----------------------|----------|----------|----------|-------|-------|
| <b>Rated insulation voltage</b> $U_i$ <sup>1)</sup>   | V~  | 690                   |                    |          |          | -                     |          |          | -        |       |       |
| <b>Thermal rated current</b> $I_{th}$ to 690V   |   |                       |                    |          |          |                       |          |          |          |       |       |
| Ambient temperature   | 40°C A  | 10                    | (16) <sup>5)</sup> |          |          | -                     |          |          | -        |       |       |
|   | 60°C A  | 6                     | (12) <sup>5)</sup> |          |          | -                     |          |          | -        |       |       |
| <b>Utilization category AC15</b>  |   |                       |                    |          |          |                       |          |          |          |       |       |
| Rated operational current $I_e$   | 220-240V A  | 3                     | (12) <sup>5)</sup> |          |          | -                     |          |          | -        |       |       |
|   | 380-415V A  | 2                     | (4) <sup>5)</sup>  |          |          | -                     |          |          | -        |       |       |
|   | 440V A  | 1,6                   | (4) <sup>5)</sup>  |          |          | -                     |          |          | -        |       |       |
|   | 500V A  | 1,2                   | (3) <sup>5)</sup>  |          |          | -                     |          |          | -        |       |       |
|   | 660-690V A  | 0,6                   | (1) <sup>5)</sup>  |          |          | -                     |          |          | -        |       |       |
| <b>Utilization category DC13</b>  |   |                       |                    |          |          |                       |          |          |          |       |       |
| Rated operational current $I_e$   | 60V A   | 3,5                   | (8) <sup>5)</sup>  |          |          | -                     |          |          | -        |       |       |
|   | 110V A  | 0,5                   | (1) <sup>5)</sup>  |          |          | -                     |          |          | -        |       |       |
|   | 220V A  | 0,1                   |                    |          |          | -                     |          |          | -        |       |       |
| <b>Short circuit protection</b><br>short-circuit current 1kA,<br>contact welding not accepted<br>max. fuse size | gL (gG) A   | 20                    | (25) <sup>5)</sup> |          |          | -                     |          |          | -        |       |       |
| <b>Control Circuit</b><br><b>Power consumption of coils</b>   |   |                       |                    |          |          |                       |          |          |          |       |       |
| AC operated   | inrush VA   | 33-45                 |                    |          |          | 90-115                |          |          | 140-165  |       |       |
|   | sealed VA   | 7-10                  |                    |          |          | 9-13                  |          |          | 13-18    |       |       |
|   | W   | 2,6-3                 |                    |          |          | 2,7-4                 |          |          | 5,4-7    |       |       |
| DC operated   | inrush W  | 75                    |                    |          |          | 140                   |          |          | 200      |       |       |
| double winding coil   | sealed W  | 2                     |                    |          |          | 2                     |          |          | 6        |       |       |
| DC solenoid operated (KG3)  | inrush W  | 3                     |                    |          |          | 4                     |          |          | -        |       |       |
|   | sealed W  | 3                     |                    |          |          | 4                     |          |          | -        |       |       |
| <b>Operation range of coils</b><br>in multiples of control voltage $U_s$  |   |                       |                    |          |          |                       |          |          |          |       |       |
|   | AC operated                                       | 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  |       |       |
| <b>Switching time</b> at control voltage $U_s \pm 10\%$ <sup>2) 3)</sup>  |   |                       |                    |          |          |                       |          |          |          |       |       |
| AC operated   | make time ms                                      | 8-16                  |                    |          |          | 10-25                 |          |          | 12-28    |       |       |
|   | release time ms                                   | 5-13                  |                    |          |          | 8-15                  |          |          | 8-15     |       |       |
|   | arc duration ms                                   | 10-15                 |                    |          |          | 10-15                 |          |          | 10-15    |       |       |
| DC operated   | make time ms                                      | 8-12                  |                    |          |          | 10-20                 |          |          | 12-23    |       |       |
| double winding coil   | release time ms                                   | 8-13                  |                    |          |          | 10-15                 |          |          | 10-18    |       |       |
|   | arc duration ms                                   | 10-15                 |                    |          |          | 10-15                 |          |          | 10-15    |       |       |
| DC solenoid operated (KG3)  | make time ms                                      | 65 - 85               |                    |          |          | 65 - 85               |          |          | -        |       |       |
|   | release time ms                                   | 20 - 30 <sup>4)</sup> |                    |          |          | 20 - 30 <sup>4)</sup> |          |          | -        |       |       |
|   | arc duration ms                                   | 10-15                 |                    |          |          | 10-15                 |          |          | -        |       |       |
| <b>Cable cross-section</b>  |   |                       |                    |          |          |                       |          |          |          |       |       |
| Auxiliary connector   | solid mm <sup>2</sup>                             | 0,75-6                |                    |          |          | -                     |          |          | -        |       |       |
|   | flexible mm <sup>2</sup>                          | 1-4                   |                    |          |          | -                     |          |          | -        |       |       |
|   | flexible with multicore cable end mm <sup>2</sup> | 0,75-4                |                    |          |          | -                     |          |          | -        |       |       |
| Magnet coil   | solid mm <sup>2</sup>                             | 0,75-2,5              |                    |          |          | 0,75-2,5              |          |          | 0,75-2,5 |       |       |
|   | flexible mm <sup>2</sup>                          | 0,5-2,5               |                    |          |          | 0,5-2,5               |          |          | 0,5-2,5  |       |       |
|   | flexible with multicore cable end mm <sup>2</sup> | 0,5-1,5               |                    |          |          | 0,5-1,5               |          |          | 0,5-1,5  |       |       |
| Clamps per pole   |   | 2                     |                    |          |          | 2                     |          |          | 2        |       |       |
| Auxiliary connector   | solid AWG   | 18 - 10               |                    |          |          | -                     |          |          | -        |       |       |
|   | flexible AWG                                      | 18 - 10               |                    |          |          | -                     |          |          | -        |       |       |
| Magnet coil   | solid AWG   | 14 - 12               |                    |          |          | 14 - 12               |          |          | 14 - 12  |       |       |
|   | flexible AWG                                      | 18 - 12               |                    |          |          | 18 - 12               |          |          | 18 - 12  |       |       |
| Clamps per pole   |   | 2                     |                    |          |          | 2                     |          |          | 2        |       |       |

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry):  $U_{imp} = 8kV$ . 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)

4) with built-in coil suppressor 5) for contactors KG3...A.. only

# Contactors

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

| Type            | K3-90               | K3-115 | K3-116 | K3-151               | K3-176 | K3-210 | K3-260               | K3-316 | K3-450                           | K3-550 | K3-700               | K3-860 | K3-1000              | K3-1200 |
|-----------------|---------------------|--------|--------|----------------------|--------|--------|----------------------|--------|----------------------------------|--------|----------------------|--------|----------------------|---------|
| V~              | -                   | -      | -      | -                    | -      | -      | -                    | -      | 690                              | -      | 690                  | -      | 690                  | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | 10                               | -      | 10                   | -      | 10                   | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| -               | -                   | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | 3                                | -      | 3                    | -      | 3                    | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | 2                                | -      | 2                    | -      | 2                    | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | 1,5                              | -      | 1,5                  | -      | 1,5                  | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | 1,5                              | -      | 1,5                  | -      | 1,5                  | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | 1                                | -      | 1                    | -      | 1                    | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | 1                                | -      | 1                    | -      | 1                    | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | 0,5                              | -      | 0,5                  | -      | 0,5                  | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| A               | -                   | -      | -      | -                    | -      | -      | -                    | -      | 10                               | -      | 10                   | -      | 10                   | -       |
| VA              | 165-220             | -      | -      | 350                  | -      | -      | 360                  | -      | 800-950                          | -      | 1350-1600            | -      | 2400                 | -       |
| VA              | 2,5-5               | -      | -      | 5                    | -      | -      | 5                    | -      | 9-11                             | -      | 21-25                | -      | 70                   | -       |
| W               | 2,5-5               | -      | -      | 5                    | -      | -      | 5                    | -      | 9-11                             | -      | 21-25                | -      | 70                   | -       |
| W               | 250                 | -      | -      | 350                  | -      | -      | 360                  | -      | 700-850                          | -      | 1300-1550            | -      | 2100                 | -       |
| W               | 5                   | -      | -      | 5                    | -      | -      | 5                    | -      | 8-10                             | -      | 18-22                | -      | 60                   | -       |
| W               | -                   | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| W               | -                   | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| ms              | 0,85-1,1<br>0,8-1,1 | -      | -      | 0,85-1,1<br>0,85-1,1 | -      | -      | 0,85-1,1<br>0,85-1,1 | -      | 0,85-1,1<br>0,85-1,1             | -      | 0,85-1,1<br>0,85-1,1 | -      | 0,85-1,1<br>0,85-1,1 | -       |
| ms              | 20-35               | -      | -      | 30-60                | -      | -      | 40-60                | -      | 50-100                           | -      | 50-100               | -      | 50-100               | -       |
| ms              | 35-50               | -      | -      | 30-80                | -      | -      | 15-45                | -      | 150-200 / 500-1000 <sup>1)</sup> | -      | 25-50                | -      | 25-50                | -       |
| ms              | 10-15               | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| ms              | 20-35               | -      | -      | 30-60                | -      | -      | 40-60                | -      | -                                | -      | -                    | -      | -                    | -       |
| ms              | 35-50               | -      | -      | 30-80                | -      | -      | 15-45                | -      | -                                | -      | -                    | -      | -                    | -       |
| ms              | 10-15               | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| ms              | -                   | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| ms              | -                   | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| ms              | -                   | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| mm <sup>2</sup> | -                   | -      | -      | -                    | -      | -      | -                    | -      | 0,75-2,5                         | -      | 0,75-2,5             | -      | 0,75-2,5             | -       |
| mm <sup>2</sup> | -                   | -      | -      | -                    | -      | -      | -                    | -      | 0,75-2,5                         | -      | 0,75-2,5             | -      | 0,75-2,5             | -       |
| mm <sup>2</sup> | -                   | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| mm <sup>2</sup> | 0,75-2,5            | -      | -      | 1-2,5                | -      | -      | 1-2,5                | -      | 1-2,5                            | -      | 1-2,5                | -      | 1-2,5                | -       |
| mm <sup>2</sup> | 0,5-2,5             | -      | -      | 1-2,5                | -      | -      | 1-2,5                | -      | 1-2,5                            | -      | 1-2,5                | -      | 1-2,5                | -       |
| mm <sup>2</sup> | 0,5-1,5             | -      | -      | -                    | -      | -      | -                    | -      | -                                | -      | -                    | -      | -                    | -       |
| mm <sup>2</sup> | 2                   | -      | -      | 2                    | -      | -      | 2                    | -      | 2                                | -      | 2                    | -      | 2                    | -       |
| AWG             | -                   | -      | -      | -                    | -      | -      | -                    | -      | 16 - 12                          | -      | 16 - 12              | -      | 16 - 12              | -       |
| AWG             | -                   | -      | -      | -                    | -      | -      | -                    | -      | 16 - 12                          | -      | 16 - 12              | -      | 16 - 12              | -       |
| AWG             | 14 - 12             | -      | -      | 16 - 12              | -      | -      | 16 - 12              | -      | 16 - 12                          | -      | 16 - 12              | -      | 16 - 12              | -       |
| AWG             | 18 - 12             | -      | -      | 16 - 12              | -      | -      | 16 - 12              | -      | 16 - 12                          | -      | 16 - 12              | -      | 16 - 12              | -       |
| AWG             | 2                   | -      | -      | 2                    | -      | -      | 2                    | -      | 2                                | -      | 2                    | -      | 2                    | -       |

1) Normal or delayed drop is adjustable

Contactors, Motor-Starters  
 Circuit Breakers  
 Manual Motor-Starters  
 Switches  
 AC-Main Switches  
 DC-Switch Disconnectors  
 Push Buttons  
 Representatives, Suppliers



# Contactors

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

| Main Contacts  | Type               | K2-09     | K2-12      | K2-16      | K2-23     | K2-30     | K2-37       | K2-45     | K2-60      | K85        | K110       |
|--|--------------------|-----------|------------|------------|-----------|-----------|-------------|-----------|------------|------------|------------|
| Rated insulation voltage $U_i$ <sup>1)</sup>                                   | V~                 | 690       | 690        | 690        | 690       | 690       | 690         | 690       | 690        | 750        | 750        |
| Making capacity $I_{eff}$ at $U_e = 690V$ AC                                   | A                  | 200       | 200        | 200        | 400       | 500       | 500         | 700       | 900        | 1100       | 1200       |
| Breaking capacity $I_{eff}$ 400V~  | A                  | 180       | 180        | 200        | 380       | 400       | 400         | 600       | 800        | 950        | 1100       |
| K2-09 to K2-16 $\cos\phi = 0,65$ 500V AC                                       | A                  | 150       | 150        | 180        | 300       | 370       | 370         | 500       | 700        | 850        | 1100       |
| K2-23 to K3-1200 $\cos\phi = 0,35$ 690V AC                                     | A                  | 100       | 100        | 150        | 260       | 340       | 340         | 400       | 500        | 600        | 600        |
|  | 1000V~             | A         | -          | -          | -         | -         | -           | -         | -          | -          | -          |
| <b>Utilization category AC1</b>  |                    |           |            |            |           |           |             |           |            |            |            |
| <b>Switching of resistive load</b>   |                    |           |            |            |           |           |             |           |            |            |            |
| Rated operational current $I_e (=I_{th})$ at 40°C, open                        | <b>A</b>           | <b>25</b> | <b>25</b>  | <b>25</b>  | <b>45</b> | <b>50</b> | <b>50</b>   | <b>80</b> | <b>100</b> | <b>150</b> | <b>170</b> |
| Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$ | 220V kW            | 9,5       | 9,5        | 9,5        | 17        | 19        | 19          | 30        | 38         | 57         | 64         |
|  | 230V kW            | 10        | 10         | 10         | 18        | 20        | 20          | 31,5      | 40         | 59         | 67         |
|  | 240V kW            | 10,5      | 10,5       | 10,5       | 18,5      | 20,5      | 20,5        | 33        | 41         | 62         | 70         |
|  | 380V kW            | 16,5      | 16,5       | 16,5       | 29,5      | 33        | 33          | 52        | 65         | 98         | 111        |
|  | 400V kW            | 17,5      | 17,5       | 17,5       | 31        | 34,5      | 34,5        | 55        | 69         | 103        | 117        |
|  | 415V kW            | 18        | 18         | 18         | 32        | 36        | 36          | 57        | 71         | 107        | 122        |
|  | 440V kW            | 19        | 19         | 19         | 34        | 38        | 38          | 61        | 76         | 114        | 129        |
|  | 500V kW            | 21,5      | 21,5       | 21,5       | 39        | 43        | 43          | 69        | 86         | 130        | 147        |
|  | 660V kW            | 28,5      | 28,5       | 28,5       | 51        | 57        | 57          | 91        | 114        | 171        | 194        |
|  | 690V kW            | 29,5      | 29,5       | 29,5       | 53,5      | 60        | 60          | 95        | 119        | 179        | 203        |
| Rated operational current $I_e (=I_{the})$ at 60°C, enclosed                   | A                  | 20        | 25         | 25         | 35        | 40        | 40          | 63        | 80         | 100        | 125        |
| Rated operational power of three-phase resistive loads 50-60Hz, $\cos\phi = 1$ | 220V kW            | 7,5       | 9,5        | 9,5        | 13        | 15        | 15          | 24        | 30         | 38         | 47         |
|  | 230V kW            | 8         | 10         | 10         | 13,5      | 16        | 16          | 25        | 31,5       | 40         | 49         |
|  | 240V kW            | 8         | 10,5       | 10,5       | 14,5      | 16,5      | 16,5        | 26        | 33         | 41         | 52         |
|  | 380V kW            | 13        | 16,5       | 16,5       | 23        | 26        | 26          | 41        | 52         | 65         | 82         |
|  | 400V kW            | 13,5      | 17,5       | 17,5       | 24        | 27,5      | 27,5        | 43        | 55         | 69         | 86         |
|  | 415V kW            | 14        | 18         | 18         | 25        | 28,5      | 28,5        | 45        | 57         | 71         | 89         |
|  | 440V kW            | 15        | 19         | 19         | 26,5      | 30        | 30          | 48        | 61         | 71         | 95         |
|  | 500V kW            | 17        | 21,5       | 21,5       | 30        | 34        | 34          | 54        | 69         | 86         | 116        |
|  | 660V kW            | 22,5      | 28,5       | 28,5       | 40        | 45        | 45          | 72        | 91         | 114        | 142        |
|  | 690V kW            | 23,5      | 29,5       | 29,5       | 42        | 48        | 48          | 75        | 95         | 119        | 149        |
| Minimum cross-section of conductor at load with $I_e (=I_{th})$                | mm <sup>2</sup>    | 4         | 4          | 4          | 10        | 10        | 10          | 25        | 35         | 50         | 70         |
| <b>Utilization category AC2 and AC3</b>  |                    |           |            |            |           |           |             |           |            |            |            |
| <b>Switching of three-phase motors</b>   |                    |           |            |            |           |           |             |           |            |            |            |
| Rated operational current $I_e$ open and enclosed                              | 220V A             | 12        | 15         | 18         | 23        | 30        | 37          | 45        | 63         | 85         | 110        |
|  | 230V A             | 11,5      | 14,5       | 17,5       | 23        | 30        | 37          | 45        | 61         | 85         | 110        |
|  | 240V A             | 11        | 14         | 17         | 23        | 30        | 37          | 45        | 60         | 85         | 110        |
|  | <b>380-400V A</b>  | <b>10</b> | <b>12</b>  | <b>16</b>  | <b>23</b> | <b>30</b> | <b>37</b>   | <b>45</b> | <b>60</b>  | <b>85</b>  | <b>110</b> |
|  | 415-440V A         | 9         | 12         | 16         | 23        | 30        | 37          | 45        | 60         | 85         | 110        |
|  | 500V A             | 9         | 12         | 16         | 23        | 30        | 30          | 45        | 55         | 85         | 110        |
|  | 660V A             | 7         | 9          | 9          | 17,5      | 21        | 21          | 33        | 42         | 60         | 60         |
|  | 690V A             | 6,5       | 8,5        | 8,5        | 17        | 20        | 20          | 31        | 40         | 58         | 58         |
| Rated operational power of three-phase motors 50-60Hz                          | 220-230V kW        | 3         | 4          | 5          | 6         | 8,5       | 11          | 12,5      | 18,5       | 25         | 33         |
|  | 240V kW            | 3         | 4          | 5          | 7         | 9         | 11,5        | 13,5      | 19         | 27         | 35         |
|  | <b>380-400V kW</b> | <b>4</b>  | <b>5,5</b> | <b>7,5</b> | <b>11</b> | <b>15</b> | <b>18,5</b> | <b>22</b> | <b>30</b>  | <b>45</b>  | <b>55</b>  |
|  | 415V kW            | 4,5       | 6          | 8,5        | 12        | 16        | 20          | 24        | 33         | 49         | 63         |
|  | 440V kW            | 4,5       | 6          | 8,5        | 12        | 16        | 20          | 24        | 33         | 49         | 63         |
|  | 500V kW            | 5,5       | 7,5        | 10         | 15        | 18,5      | 18,5        | 30        | 37         | 55         | 55         |
|  | 660-690V kW        | 5,5       | 7,5        | 7,5        | 15        | 18,5      | 18,5        | 30        | 37         | 55         | 55         |

1) Suitable at 690V for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry):  $U_{imp} = 8kV$ .  
Data for other conditions on request.

# Contactors

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

| Main Contacts   | Type                    | K2-09     | K2-12      | K2-16      | K2-23     | K2-30     | K2-37       | K2-45     | K2-60     | K85       | K110      |
|---|-------------------------|-----------|------------|------------|-----------|-----------|-------------|-----------|-----------|-----------|-----------|
| <b>Utilization category AC4</b>                               |                         |           |            |            |           |           |             |           |           |           |           |
| <b>Switching of squirrel cage motors, inching</b>             |                         |           |            |            |           |           |             |           |           |           |           |
| Rated operational current I <sub>e</sub>                      | 220V A                  | 12        | 15         | 16         | 23        | 30        | 37          | 45        | 63        | 85        | 98        |
| open and enclosed   | 230V A                  | 11,5      | 14,5       | 16         | 23        | 30        | 37          | 45        | 61        | 85        | 98        |
|   | 240V A                  | 11        | 14         | 16         | 23        | 30        | 37          | 45        | 60        | 85        | 98        |
|   | <b>380-400V A</b>       | <b>10</b> | <b>12</b>  | <b>16</b>  | <b>23</b> | <b>30</b> | <b>37</b>   | <b>45</b> | <b>60</b> | <b>85</b> | <b>85</b> |
|   | 415V A                  | 9         | 12         | 16         | 21        | 28        | 37          | 45        | 60        | 85        | 85        |
|   | 440V A                  | 9         | 12         | 16         | 21        | 28        | 37          | 45        | 60        | 85        | 85        |
|   | 500V A                  | 9         | 12         | 16         | 17        | 23        | 23          | 45        | 55        | 85        | 85        |
|   | 660V A                  | 7         | 9          | 9          | 13        | 17        | 17          | 33        | 42        | 60        | 60        |
|   | 690V A                  | 6,5       | 8,5        | 8,5        | 12,5      | 16,5      | 16,5        | 31        | 40        | 57,5      | 57,5      |
| Rated operational power                                       | 220-230V kW             | 3         | 4          | 5          | 6         | 8,5       | 11          | 12,5      | 18,5      | 25        | 30        |
| of three-phase motors   | 240V kW                 | 3         | 4          | 5          | 7         | 9         | 11,5        | 13,5      | 19        | 27        | 32        |
| 50-60Hz   | <b>380-400V kW</b>      | <b>4</b>  | <b>5,5</b> | <b>7,5</b> | <b>11</b> | <b>15</b> | <b>18,5</b> | <b>22</b> | <b>30</b> | <b>45</b> | <b>45</b> |
|   | 415-440V kW             | 4,5       | 6          | 8,5        | 11        | 15        | 20          | 24        | 33        | 49        | 49        |
|   | 500V kW                 | 5,5       | 7,5        | 10         | 11        | 15        | 15          | 30        | 37        | 55        | 55        |
|   | 660-690V kW             | 5,5       | 7,5        | 7,5        | 11        | 15        | 15          | 30        | 37        | 55        | 55        |
| <b>Utilization category AC5a</b>                              |                         |           |            |            |           |           |             |           |           |           |           |
| <b>Switching of gas discharge lamps</b>                       |                         |           |            |            |           |           |             |           |           |           |           |
| Rated operational current I <sub>e</sub> per pole at 220/230V |                         |           |            |            |           |           |             |           |           |           |           |
| Fluorescent lamps, uncompensated                              | A                       | 20        | 20         | 20         | 35        | 40        | 40          | 65        | 85        | 100       | 120       |
| Fluorescent lamps, compensated                                | A                       | 7         | 9          | 9          | 18        | 22        | 22          | 30        | 40        | 55        | 70        |
| Fluorescent lamps, dual-connection                            | A                       | 22,5      | 22,5       | 22,5       | 41        | 45        | 45          | 72        | 90        | 112       | 144       |
| Metal-halide lamps <sup>1)</sup> , uncompensated              | A                       | 12        | 15         | 15         | 28        | 30        | 30          | 50        | 62        | 85        | 90        |
| Metal-halide lamps <sup>1)</sup> , compensated                | A                       | 7         | 9          | 9          | 18        | 22        | 22          | 30        | 40        | 55        | 70        |
| Mercury-vapour lamps <sup>2)</sup> , uncompensated            | A                       | 22,5      | 25         | 25         | 41        | 45        | 45          | 72        | 90        | 112       | 144       |
| Mercury-vapour lamps <sup>2)</sup> , compensated              | A                       | 7         | 9          | 9          | 18        | 22        | 22          | 30        | 40        | 55        | 70        |
| Mixed light lamps <sup>3)</sup>                               | A                       | 20        | 20         | 20         | 35        | 40        | 40          | 65        | 85        | 100       | 120       |
| <b>Utilization category AC5b</b>                              |                         |           |            |            |           |           |             |           |           |           |           |
| <b>Switching of incandescent lamps<sup>4)</sup></b>           |                         |           |            |            |           |           |             |           |           |           |           |
| Rated operational current I <sub>e</sub> per pole at 220/230V |                         |           |            |            |           |           |             |           |           |           |           |
|   | A                       | 12,5      | 12,5       | 12,5       | 25        | 31        | 31          | 43        | 56        | 69        | 75        |
| <b>Utilization category AC6a</b>                              |                         |           |            |            |           |           |             |           |           |           |           |
| <b>Transformer primary switching</b>                          |                         |           |            |            |           |           |             |           |           |           |           |
| at inrush   |                         |           |            |            |           |           |             |           |           |           |           |
| Rated operational current I <sub>e</sub>                      | 400V A                  | 30        | 30         | 30         | 30        | 30        | 30          | 30        | 30        | 30        | 30        |
|   |                         | 4,5       | 5,5        | 7,5        | 10,5      | 13,5      | 13,5        | 20        | 27        | 38        | 50        |
| Rated operational power                                       | 220-230V kVA            | 1,8       | 2,2        | 3          | 4,2       | 5,4       | 5,4         | 8         | 10,7      | 15        | 20        |
| dependent on inrush n   | 240V kVA                | 1,9       | 2,3        | 3,1        | 4,3       | 5,6       | 5,6         | 8,3       | 11,2      | 15,5      | 20,5      |
|   | 380-400V kVA            | 3,1       | 3,8        | 5,2        | 7,3       | 9,3       | 9,3         | 13,5      | 18,5      | 26        | 34        |
| For different inrush-factors x                                | 415-440V kVA            | 3,4       | 4,2        | 5,7        | 8         | 10,2      | 10,2        | 15        | 20,5      | 29        | 38        |
| use the following formula:                                    | 500V kVA                | 3,9       | 4,8        | 6,5        | 9         | 11,5      | 11,5        | 17        | 23        | 33        | 43        |
| P <sub>x</sub> =P <sub>n</sub> *(n/x)                         | 660-690V kVA            | 5,4       | 6,5        | 9          | 12,5      | 16        | 16          | 24        | 32        | 45        | 60        |
| <b>Utilization category DC1</b>                               |                         |           |            |            |           |           |             |           |           |           |           |
| <b>Switching of resistive load</b>                            |                         |           |            |            |           |           |             |           |           |           |           |
| Time constant L/R ≤1ms  |                         |           |            |            |           |           |             |           |           |           |           |
| Rated operational current I <sub>e</sub>                      | 1 pole 24V A            | 20        | 25         | 25         | 45        | 50        | 50          | 80        | 100       | 150       | 170       |
|   | 60V A                   | 20        | 25         | 25         | 45        | 50        | 50          | 80        | 100       | 150       | 170       |
|   | 110V A                  | 6         | 6          | 6          | 10        | 10        | 10          | 12        | 12        | 20        | 25        |
|   | 220V A                  | 0,8       | 0,8        | 0,8        | 1,4       | 1,4       | 1,4         | 1,4       | 1,4       | 2         | 2,5       |
|   | 2 poles in series 24V A |           |            |            | 45        | 50        | 50          |           |           |           |           |
|   | 60V A                   |           |            |            | 45        | 50        | 50          |           |           |           |           |
|   | 110V A                  |           |            |            | 45        | 50        | 50          |           |           |           |           |
|   | 220V A                  |           |            |            | 10        | 10        | 10          |           |           |           |           |
|   | 3 poles in series 24V A | 20        | 25         | 25         | 45        | 50        | 50          | 80        | 100       | 150       | 170       |
|   | 60V A                   | 20        | 25         | 25         | 45        | 50        | 50          | 80        | 100       | 150       | 170       |
|   | 110V A                  | 20        | 25         | 25         | 45        | 50        | 50          | 80        | 100       | 150       | 170       |
|   | 220V A                  | 16        | 20         | 20         | 30        | 35        | 35          | 63        | 80        | 100       | 160       |

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 x I<sub>e</sub>

5) With central compensation pay attention to the current inrush (capacitor switching contactors)

# Contactors

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

| Main Contacts   | Type                              | K2-09                          | K2-12 | K2-16 | K2-23             | K2-30 | K2-37 | K2-45                | K2-60 | K85                   | K110 |
|---|-----------------------------------|--------------------------------|-------|-------|-------------------|-------|-------|----------------------|-------|-----------------------|------|
| <b>Utilization category DC3 and DC5</b>   |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| <b>Switching of shunt motors and series motors</b>  |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| Time constant L/R ≤15ms   | 1 pole 24V A                      | 20                             | 25    | 25    | 45                | 50    | 50    | 80                   | 100   | 150                   | 170  |
| Rated operational current I <sub>e</sub>  | 60V A                             | 6                              | 6     | 6     | 30                | 30    | 30    | 60                   | 60    | 85                    | 110  |
|   | 110V A                            | 1,2                            | 1,2   | 1,2   | 1,8               | 1,8   | 1,8   | 1,8                  | 1,8   | 2                     | 2,5  |
|   | 220V A                            | 0,2                            | 0,2   | 0,2   | 0,2               | 0,2   | 0,2   | 0,25                 | 0,25  | 0,5                   | 0,5  |
|   | 2 poles in series 24V A           |                                |       |       | 45                | 50    | 50    |                      |       |                       |      |
|   | 60V A                             |                                |       |       | 45                | 50    | 50    |                      |       |                       |      |
|   | 110V A                            |                                |       |       | 30                | 30    | 30    |                      |       |                       |      |
|   | 220V A                            |                                |       |       | 1,8               | 1,8   | 1,8   |                      |       |                       |      |
| 3 poles in series 24V A   |                                   | 20                             | 25    | 25    | 45                | 50    | 50    | 80                   | 100   | 150                   | 170  |
|   | 60V A                             | 20                             | 25    | 25    | 40                | 40    | 40    | 80                   | 80    | 100                   | 110  |
|   | 110V A                            | 20                             | 20    | 20    | 40                | 40    | 40    | 80                   | 80    | 100                   | 110  |
|   | 220V A                            | 2,5                            | 2,5   | 2,5   | 4                 | 4     | 4     | 5                    | 5     | 7                     | 8    |
| <b>Maximum ambient temperature</b>  |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| Operation   | open °C                           | -40 to +60 (+90) <sup>1)</sup> |       |       |                   |       |       |                      |       |                       |      |
|   | enclosed °C                       |                                |       |       |                   |       |       |                      |       |                       |      |
| with thermal overload relay   | open °C                           |                                |       |       |                   |       |       |                      |       |                       |      |
| enclosed °C   |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| Storage   | °C                                | -50 to +90                     |       |       |                   |       |       |                      |       |                       |      |
| <b>Short circuit protection</b>   |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| 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                         | 63                             | 63    | 63    | 80                | 80    | 80    | 160                  | 160   | 250                   | 250  |
| Coordination-type "2" according to IEC 947-4-1  |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| Light contact welding accepted  |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| max. fuse size  | gL (gG) A                         | 25                             | 35    | 35    | 50                | 50    | 50    | 100                  | 125   | 160                   | 200  |
| Contact welding not accepted  |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| max. fuse size  | gL (gG) A                         | 16                             | 16    | 16    | 25                | 35    | 35    | 50                   | 63    | 100                   | 125  |
| For contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size. |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| <b>Cable cross-sections</b>   |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| for contactors without thermal overload relay   |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| main connector  | solid or stranded mm <sup>2</sup> | 0,75 - 4                       |       |       | 1,5-10 + 1,5-6    |       |       | 4 - 35 <sup>2)</sup> |       | 10 - 70 <sup>2)</sup> |      |
|   | flexible mm <sup>2</sup>          | 0,75 - 2,5                     |       |       | 1,5-6 + 1,5-4     |       |       | 6 - 25 <sup>2)</sup> |       | 10 - 70 <sup>2)</sup> |      |
| flexible with multicore cable end   | mm <sup>2</sup>                   | 0,5 - 2,5                      |       |       | 1,5-6 + 1,5-4     |       |       | 4 - 25               |       | 10 - 35               |      |
|   | Cables per clamp                  | 2                              |       |       | 1+1               |       |       | 1                    |       | 1                     |      |
| main connector  | solid AWG                         | 14 - 10                        |       |       | 14 - 10 + 14 - 10 |       |       | 10                   |       | 10                    |      |
|   | flexible AWG                      | 18 - 10                        |       |       | 14 - 8 + 14 - 10  |       |       | 10 - 2               |       | 6 - 0                 |      |
| Cables per clamp  |                                   | 2                              |       |       | 1+1               |       |       | 1                    |       | 1                     |      |
| <b>Frequency of operations z</b>  |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| Contactors without thermal overload relay   |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
|   | without load 1/h                  | 10000                          |       |       | 7000              |       |       | 7000                 |       | 3000                  |      |
|   | AC3, I <sub>e</sub> 1/h           | 600                            |       |       | 600               |       |       | 400                  |       | 300                   |      |
|   | AC4, I <sub>e</sub> 1/h           | 120                            |       |       | 120               |       |       | 120                  |       | 120                   |      |
|   | DC3, I <sub>e</sub> 1/h           | 600                            |       |       | 600               |       |       | 400                  |       | 300                   |      |
| <b>Mechanical life</b>  |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| AC operated   | S x 10 <sup>6</sup>               | 10                             |       |       | 10                |       |       | 10                   |       | 5                     |      |
| DC operated with economy resistor   | S x 10 <sup>6</sup>               | 10                             |       |       | 10                |       |       | 10                   |       | 5                     |      |
| <b>Short time current</b>   |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
|   | 10s-current A                     | 96                             | 120   | 144   | 184               | 240   | 296   | 360                  | 504   | 680                   | 880  |
| <b>Power loss per pole</b>  |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
|   | at I <sub>e</sub> /AC3 400V W     | 0,21                           | 0,26  | 0,4   | 0,63              | 1,1   | 1,7   | 1,8                  | 3,6   | 4,3                   | 6,0  |
| <b>Resistance to shock acc. to IEC 68-2-27</b>  |                                   |                                |       |       |                   |       |       |                      |       |                       |      |
| Shock time 20ms sine-wave   | NO g                              | 10                             | 10    | 10    | 8                 | 8     | 8     | 8                    | 8     | 7                     | 7    |
|   | NC g                              | 6                              | 6     | 6     | 5                 | 5     | 5     | -                    | -     | 5                     | 5    |

1) With reduced control voltage range 0,9 up to 1,0 x U<sub>s</sub> and with reduced rated current I<sub>e</sub>/AC1 according to I<sub>e</sub>/AC3

2) Maximum cable cross-section with prepared conductor

# Contactors

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

| Auxiliary Contacts  | Type  | K2-09 | K2-12    | K2-16 | K2-23 | K2-30    | K2-37 | K2-45    | K2-60 | K85      | K110    |
|---|---|-------|----------|-------|-------|----------|-------|----------|-------|----------|---------|
| <b>Rated insulation voltage <math>U_i</math> <sup>1)</sup></b>  | V AC  |       | 690      |       |       | 690      |       | -        |       | 690      |         |
| <b>Thermal rated current <math>I_{th}</math> to 690V</b>  |   |       |          |       |       |          |       |          |       |          |         |
| Ambient temperature   | 40°C A  |       | 16       |       |       | 16       |       | -        |       | 16       |         |
|   | 60°C A  |       | 12       |       |       | 12       |       | -        |       | 12       |         |
| <b>Utilization category AC15</b>  |   |       |          |       |       |          |       |          |       |          |         |
| Rated operational current $I_e$   | 220-240V A  |       | 12       |       |       | 12       |       | -        |       | 12       |         |
|   | 380-415V A  |       | 4        |       |       | 4        |       | -        |       | 6        |         |
|   | 440V A  |       | 4        |       |       | 4        |       | -        |       | 6        |         |
|   | 500V A  |       | 3        |       |       | 3        |       | -        |       | 4        |         |
|   | 660-690V A  |       | 1        |       |       | 1        |       | -        |       | 2        |         |
| <b>Utilization category DC13</b>  |   |       |          |       |       |          |       |          |       |          |         |
| Rated operational current $I_e$   | 60V A   |       | 8        |       |       | 8        |       | -        |       | 8        |         |
|   | 110V A  |       | 1        |       |       | 1        |       | -        |       | 1        |         |
|   | 220V A  |       | 0,1      |       |       | 0,1      |       | -        |       | 0,1      |         |
| <b>Short circuit protection</b><br>short-circuit current 1kA,<br>contact welding not accepted<br>max. fuse size gL (gG) A<br>For contactors with thermal overload relay the<br>device with the smaller admissible control fuse<br>(contactor or thermal overload relay)<br>determines the fuse. |   |       | 25       |       |       | -        |       | -        |       | 25       |         |
| <b>Control Circuit</b>  |   |       |          |       |       |          |       |          |       |          |         |
| <b>Power consumption of coils</b>   |   |       |          |       |       |          |       |          |       |          |         |
| AC operated   | inrush VA   |       | 33-45    |       |       | 90-115   |       | 140-165  |       | 280-350  | 350-420 |
|   | sealed VA   |       | 7-10     |       |       | 9-13     |       | 13-18    |       | 16-23    | 23-29   |
|   | W   |       | 2,6-3    |       |       | 2,7-4    |       | 5,4-7    |       | 4-6      | 6-7,3   |
| DC operated   | inrush W  |       | 75       |       |       | 140      |       | 200      |       | 170      | 320     |
| with economic circuit   | sealed W  |       | 2        |       |       | 2        |       | 6        |       | 2        | 4       |
| <b>Operation range of coils</b><br>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  |         |
| <b>Switching time</b> at control voltage $U_s \pm 10\%$ <sup>2) 3)</sup>  |   |       |          |       |       |          |       |          |       |          |         |
| AC operated   | make time ms                                      |       | 8-16     |       |       | 10-25    |       | 12-28    |       | 13-30    |         |
|   | release time ms                                   |       | 5-13     |       |       | 8-15     |       | 8-15     |       | 8-15     |         |
|   | arc duration ms                                   |       | 10-15    |       |       | 10-15    |       | 10-15    |       | 10-15    |         |
| DC operated   | make time ms                                      |       | 8-12     |       |       | 10-20    |       | 12-23    |       | 20-30    |         |
| with AC magnet system   | release time ms                                   |       | 8-13     |       |       | 10-15    |       | 10-18    |       | 10-18    |         |
|   | arc duration ms                                   |       | 10-15    |       |       | 10-15    |       | 10-15    |       | 10-15    |         |
| <b>Cable cross-section</b>  |   |       |          |       |       |          |       |          |       |          |         |
| Auxiliary connector   | solid mm <sup>2</sup>                             |       | 0,75-4   |       |       | -        |       | -        |       | 0,75-2,5 |         |
|   | flexible mm <sup>2</sup>                          |       | 0,75-2,5 |       |       | -        |       | -        |       | 0,75-2,5 |         |
|   | flexible with multicore cable end mm <sup>2</sup> |       | 0,5-2,5  |       |       | -        |       | -        |       | 0,5-1,5  |         |
| Magnet coil   | solid mm <sup>2</sup>                             |       | 0,75-2,5 |       |       | 0,75-2,5 |       | 0,75-2,5 |       | 0,75-2,5 |         |
|   | flexible mm <sup>2</sup>                          |       | 0,5-2,5  |       |       | 0,5-2,5  |       | 0,5-2,5  |       | 0,5-2,5  |         |
|   | flexible with multicore cable end mm <sup>2</sup> |       | 0,5-1,5  |       |       | 0,5-1,5  |       | 0,5-1,5  |       | 0,5-1,5  |         |
| Clamps per pole   |   |       | 2        |       |       | 2        |       | 2        |       | 2        |         |

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry):  $U_{imp} = 8kV$ . 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)

# Contactors for North America

## Data according to UL508

| Main Contacts (cULus)  |  | 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 operational current "General Use"                                      |  | A           | 25         | 25         | 30         | 30         | 50          | 65          | 80          | 110         | 120         | 130         |
| <b>Motor DOL 3-phase</b> at 60Hz   |  |             |            |            |            |            |             |             |             |             |             |             |
| Rated operational current  |  | 600V A      | 10         | 14         | 18         | 22         | 22          | 27          | 34          | 44          | 52          | 66          |
| Rated operational power  |  | 110-120V hp | 1½         | 2          | 2          | 3          | 5           | 5           | 7½          | 10          | 10          | 10          |
|  |  | 200V hp     | 3          | 3          | 5          | 5          | 7½          | 10          | 10          | 15          | 20          | 25          |
|  |  | 220-240V hp | 3          | 3          | 7½         | 7½         | 10          | 10          | 15          | 20          | 25          | 30          |
|  |  | 277V hp     | 3          | 5          | 7½         | 7½         | 7½          | 10          | 15          | 20          | 25          | 30          |
|  |  | 380-415V hp | 5          | 5          | 10         | 10         | 10          | 15          | 20          | 25          | 30          | 40          |
|  |  | 440-480V hp | 5          | 7½         | 10         | 15         | 15          | 20          | 25          | 30          | 40          | 50          |
|  |  | 550-600V hp | 7½         | 10         | 15         | 20         | 20          | 25          | 30          | 40          | 50          | 50          |
| <b>Motor DOL 1-phase</b> at 60Hz   |  |             |            |            |            |            |             |             |             |             |             |             |
| Rated operational current  |  | 600V A      | 10         | 14         | 18         | 22         | 22          | 27          | 34          | 44          | 52          | 66          |
| Rated operational power of AC motors at 60Hz (1ph)                           |  | 110-120V hp | ½          | ¾          | 1          | 1½         | 1½          | 2           | 3           | 3           | 5           | 7½          |
|  |  | 200V hp     | 1          | 1,5        | 2          | 3          | 3           | 5           | 7½          | 7½          | 10          | 15          |
|  |  | 220-240V hp | 1½         | 2          | 3          | 3          | 5           | 5           | 7½          | 10          | 15          | 15          |
|  |  | 277V hp     | 2          | 3          | 3          | 5          | 5           | 7½          | 10          | 10          | 15          | 15          |
|  |  | 380-415V hp | 3          | 3          | 5          | 5          | 5           | 7½          | 10          | 15          | 20          | 20          |
|  |  | 440-480V hp | 3          | 5          | 5          | 7½         | 7½          | 10          | 15          | 20          | 25          | 25          |
|  |  | 550-600V hp | 3          | 5          | 7½         | 10         | 10          | 15          | 20          | 25          | 30          | 30          |
| <b>Motor DOL 3-phase</b> according to ANSI A17.5                             |  |             |            |            |            |            |             |             |             |             |             |             |
| Rated operational current  |  | 600V A      | -          | -          | -          | -          | 15          | 22          | -           | 27          | 37          | -           |
| Rated operational power of 3-phase motors for elevators (500.000 operations) |  | 110-120V hp | -          | -          | -          | -          | 2           | 3           | -           | 3           | 5           | -           |
|  |  | 200V hp     | -          | -          | -          | -          | 3           | 5           | -           | 7½          | 10          | -           |
|  |  | 220-240V hp | -          | -          | -          | -          | 5           | 7½          | -           | 7½          | 10          | -           |
|  |  | 440-480V hp | -          | -          | -          | -          | 10          | 15          | -           | 20          | 25          | -           |
|  |  | 550-600V hp | -          | -          | -          | -          | 10          | 20          | -           | 25          | 30          | -           |
| Rated current 2 series contacts  |  | 600V A      | -          | -          | -          | -          | 22          | 27          | -           | 44          | 52          | 66          |
| Fuse Class RK5 / Short-circuit current                                       |  | A/kA        | 50/5       | 50/5       | 70/5       | 90/5       | 90/5        | 125/5       | 175/5       | 200/5       | 250/5       | 300/5       |
| Fuse Class T / Short-circuit current Rated voltage                           |  | A/kA V      | 45/100 600 | 50/100 600 | 70/100 600 | 90/100 600 | 110/100 600 | 150/100 600 | 150/100 600 | 175/100 600 | 175/100 600 | 175/100 600 |
| <b>Auxiliary Contacts (cULus)</b>  |  |             | A600       | A600       | A600       | A600       | -           | -           | -           | -           | -           | -           |

| Main Contacts (cULus)                   |  | Type        | K2-09 | K2-12 | K2-16 | K2-23 | K2-30 | K2-45 | K2-60 | K85  | K110  |
|---|--|-------------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| Rated operational current "General Use" |  | A           | 25    | 25    | 25    | 40    | 40    | 72    | 90    | 125  | 150   |
| <b>Motor DOL 3-phase</b> at 60Hz        |  |             |       |       |       |       |       |       |       |      |       |
| Rated operational power                 |  | 110-120V hp | 1½    | 2     | 2     | 3     | 5     | -     | -     | 15   | -     |
|   |  | 200V hp     | 2     | 3     | 3     | 5     | 7½    | 10    | 15    | -    | 30    |
|   |  | 220-240V hp | 3     | 3     | 5     | 7½    | 10    | 15    | 20    | 35   | 40    |
|   |  | 440-480V hp | 5     | 7½    | 10    | 15    | 20    | 30    | 40    | 65   | 75    |
|   |  | 550-600V hp | 7½    | 10    | 15    | 20    | 25    | 40    | 50    | 85   | 100   |
| <b>Motor DOL 1-phase</b> at 60Hz        |  |             |       |       |       |       |       |       |       |      |       |
| Rated operational power                 |  | 110-120V hp | ½     | ¾     | 1     | 1½    | 2     | 3     | 5     | 8    | 10    |
|   |  | 200V hp     | 1     | 2     | 2     | 3     | 3     | 5     | 7½    | -    | 20    |
|   |  | 220-240V hp | 1½    | 2     | 3     | 3     | 5     | 7½    | 10    | 20   | 20    |
| Fuse / Short-circuit current            |  | A/kA        | 30/5  | 40/5  | 50/5  | 60/5  | 110/5 | 175/5 | 175/5 | -    | 300/5 |
| Rated voltage                           |  | V           | 600   | 600   | 600   | 600   | 600   | 600   | 600   | 600  | 600   |
| <b>Auxiliary Contacts (cULus)</b>       |  |             | A600  | A600  | A600  | A600  | A600  | -     | -     | A600 | A600  |

# Contactors for North America

## Data according to UL508

| Type | K3-90                 | K3-115                | K3-116 | K3-151 | K3-176 | K3-210 | K3-260 | K3-316 | K3-450  | K3-550  | K3-700  | K3-860  | K3-1000 | K3-1200 |
|------|-----------------------|-----------------------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| A    | 160                   | 200                   | 150    | 180    | 220    | 250    | 300    | 350    | 420     | 520     | 700     | 810     | -       | 1215    |
| A    | 85                    | 99                    |        | 125    | 150    | 190    | 240    | 300    | 300     | 400     | 550     | 700     | -       | 1000    |
| hp   | 15                    | 20                    | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | 25                    | 35                    | 30     | 40     | 50     | 60     | 75     | 100    | 125     | 150     | 200     | 250     | -       | 450     |
| hp   | 35                    | 40                    | 40     | 50     | 60     | 75     | 100    | 125    | 125     | 150     | 250     | 300     | -       | 450     |
| hp   | -                     | -                     | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | 50                    | 60                    | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | 65                    | 75                    | 75     | 100    | 125    | 150    | 200    | 250    | 250     | 350     | 500     | 600     | -       | 900     |
| hp   | 85                    | 100                   | 100    | 125    | 150    | 200    | 250    | 300    | 250     | 350     | 500     | 600     | -       | 900     |
| A    | 86                    | 103                   |        | 125    | 150    | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | 8                     | 10                    | 10     | 15     | 25     | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | 15                    | 20                    | 20     | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | 20                    | 25                    | -      | 25     | 30     | 40     | 50     | 50     | -       | -       | -       | -       | -       | -       |
| hp   | 20                    | 25                    | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | 30                    | 40                    | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | 40                    | 50                    | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | 50                    | 60                    | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| A    | -                     | -                     | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | -                     | -                     | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | -                     | -                     | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | -                     | -                     | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| hp   | -                     | -                     | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| A    | -                     | -                     | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| A/kA | 300/10                | 300/10                | 225/10 | 300/10 | 350/10 | 400/18 | 500/18 | 500/18 | 1200/18 | 1200/18 | 2000/30 | 2000/30 | -       | 2000/42 |
| A/kA | 300/100 <sup>3)</sup> | 300/100 <sup>3)</sup> | -      | -      | -      | -      | -      | -      | -       | -       | -       | -       | -       | -       |
| V    | 600                   | 600                   | 600    | 600    | 600    | 600    | 600    | 600    | 600     | 600     | 600     | 600     | -       | 600     |
|      | -                     | -                     | -      | -      | -      | -      | -      | -      | A600    | A600    | A600    | A600    | -       | A600    |

| Main Contacts (cULus)  | Type          | K3-18NK | K3-24K  | K3-32K   | K3-50K  | K3-62K              | K3-74K                | K3-90K                | K3-115K               |
|--|---------------|---------|---------|----------|---------|---------------------|-----------------------|-----------------------|-----------------------|
| Rated operational power of 3-phase capacitor banks at 60Hz (3ph) | 110-120V kVAr | 0-3,5   | 3-5,5   | 3-7      | 6,5-10  | 6,5-15              | 6,5-18 <sup>1)</sup>  | 10-24                 | 10-28 <sup>2)</sup>   |
|  | 200V kVAr     | 0-6     | 4,5-10  | 4,5-12,5 | 10-16,7 | 10-25               | 10-32 <sup>1)</sup>   | 17-40                 | 17-46 <sup>2)</sup>   |
|  | 220-240V kVAr | 0-7     | 5,5-11  | 5,5-15   | 12,5-20 | 12,5-30             | 12,5-36 <sup>1)</sup> | 20-47                 | 20-56 <sup>2)</sup>   |
|  | 440-480V kVAr | 0-15    | 11,5-25 | 11,5-30  | 25-40   | 25-60               | 25-72 <sup>1)</sup>   | 40-95                 | 40-114 <sup>2)</sup>  |
| 550-600V kVAr  | 0-18          | 14,5-30 | 14,5-35 | 31-50    | 31-75   | 31-90 <sup>1)</sup> | 50-120                | 50-143 <sup>2)</sup>  |                       |
| Fuse Class RK5 / Short-circuit current                           | A/kA          | 70/5    | 90/5    | 125/5    | 200/5   | 250/5               | 300/5                 | 300/10                | 300/10                |
| Fuse Class T / Short-circuit current                             | A/kA          | 80/100  | 110/100 | 150/100  | 175/100 | 175/100             | 175/100               | 300/100 <sup>3)</sup> | 300/100 <sup>3)</sup> |
| Rated voltage  | V             | 600     | 600     | 600      | 600     | 600                 | 600                   | 600                   | 600                   |
| Auxiliary Contacts (cULus)                                       |               | A600    | -       | -        | -       | -                   | -                     | -                     | -                     |

1) Consider the max. thermal current of the contactor K3-74A: I<sub>th</sub> 130A  
 2) Consider the min. cross-section of conductor at max. load  
 3) Class T and Class RK1

Contactors, Motor-Starters  
 Circuit Breakers  
 Manual Motor-Starters  
 Switches  
 AC-Main Switches  
 DC-Switch Disconnect  
 Push Buttons  
 Representatives, Suppliers

# Contactors

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

## Contact Life

For selection of the suitable contactor-type according to supply voltage, power rating and application (utilization category AC1, AC3 or AC4) 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. <sup>1)</sup>

Select contactor-type according to utilization category **AC1** (breaking current  $I_a = I_e/AC1$ ) using the **breaking current** scale. <sup>1)</sup>

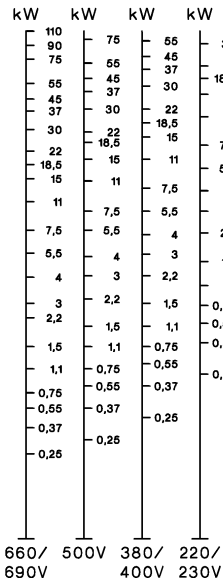
For contactors frequently used under AC3/AC4-mixed service conditions calculate contact life with the formula:

$$M = \frac{AC3}{1 + \frac{\%AC4}{100} \times \left( \frac{AC3}{AC4} - 1 \right)}$$

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  $I_e$ .  
 AC4 = Contact life<sup>2</sup> (switching cycles) for AC4 operations (inching).  
 Breaking current  $I_a =$  multiples of rated motor current  $I_e$ .  
 %AC4 = Percents of AC4-operations related to the total cycles.

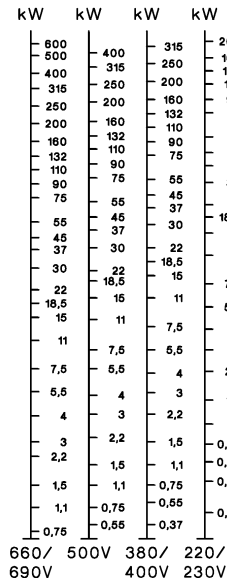
### Motor Rating $P_n = AC4$

660/ 500V 380/ 220/  
690V 400V 230V



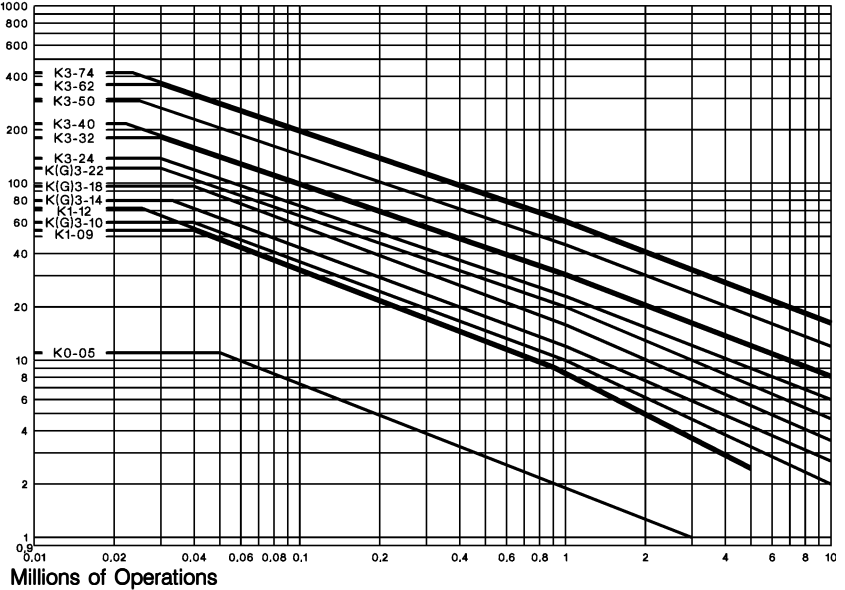
### Motor Rating $P_n = AC3$

660/ 500V 380/ 220/  
690V 400V 230V



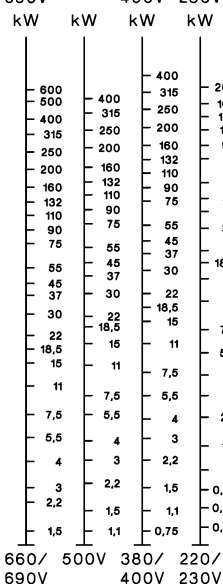
### Breaking Current $I_a (= I_e = AC1)$

A



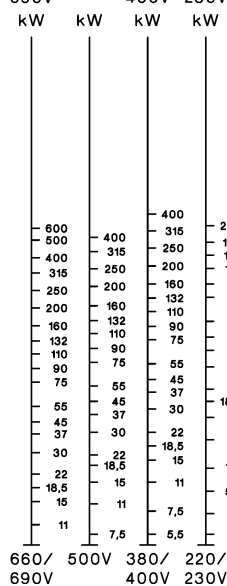
### Motor Rating $P_n = AC4$

660/ 500V 380/ 220/  
690V 400V 230V



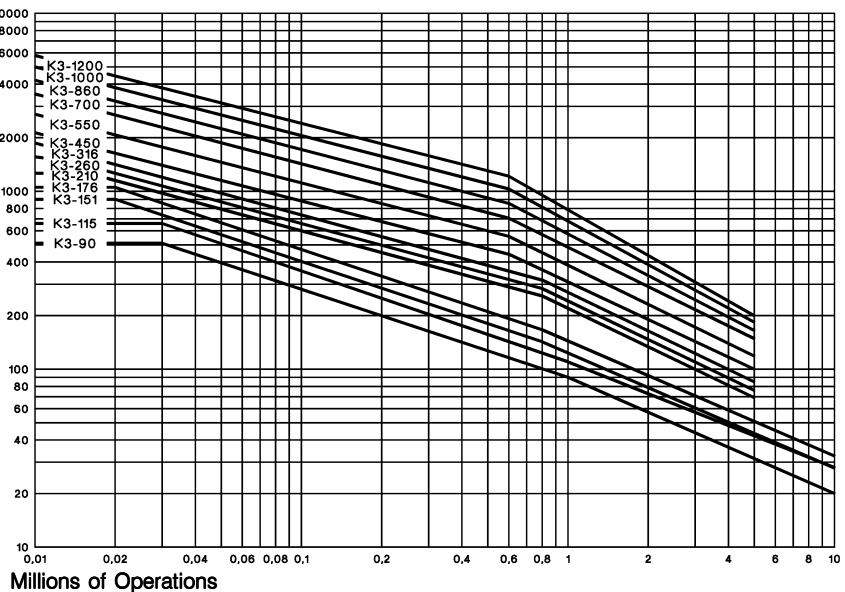
### Motor Rating $P_n = AC3$

660/ 500V 380/ 220/  
690V 400V 230V



### Breaking Current $I_a (= I_e = AC1)$

A



1) Pay attention to the approved rated values of the selected contactor according to the national approvals

# Contactors

## Utilization Categories

For easier choice of devices and in order to make the comparison of different products simpler are utilization categories for contactors and motor-starters according to IEC 947-4-1 and VDE 0660 Part 102, for

control circuit devices and switching elements according to IEC 947-5-1 and VDE 0660 Part 200 determined. The table offers different utilization categories, typical applications and assorted test conditions.

| Type of current     | Category  | Typical applications   | Rated operational current | Test conditions for the number of on-load operating cycles |         |            |                 |         |            | Test conditions for making and breaking capacities |         |            |                 |         |            |      |
|---------------------|---|--|---------------------------|--|---------|------------|-----------------|---------|------------|--|---------|------------|-----------------|---------|------------|------|
|                     |   |  |                           | Make   |         |            | Break           |         |            | Make   |         |            | Break           |         |            |      |
|                     |   |  |                           | $I_e/I_e$  | $U/U_e$ | $\cos\phi$ | $I_e/I_e$       | $U/U_e$ | $\cos\phi$ | $I_e/I_e$  | $U/U_e$ | $\cos\phi$ | $I_e/I_e$       | $U/U_e$ | $\cos\phi$ |      |
| Alternating Current | AC1   | Non-inductive or slightly inductive loads resistance furnaces                    | all values                | 1  | 1       | 0,95       | 1               | 1       | 0,95       | 1,5  | 1,05    | 0,8        | 1,5             | 1,05    | 0,8        |      |
|                     | AC2   | Slip-ring motors: starting, switching off  | all values                | 2,5  | 1       | 0,65       | 2,5             | 1       | 0,65       | 4  | 1,05    | 0,65       | 4               | 1,05    | 0,65       |      |
|                     | AC3   | Squirrel-cage motors: starting, switching off motors during running              | all values                | $I_e \leq 17A$   | 6       | 1          | 0,65            | 1       | 0,17       | 0,65   | 10      | 1,05       | 0,45            | 8       | 1,05       | 0,45 |
|                     |   |  |                           | $17A < I_e \leq 100A$                                      | 6       | 1          | 0,35            | 1       | 0,17       | 0,35   | 10      | 1,05       | 0,45            | 8       | 1,05       | 0,45 |
|                     |   |  |                           | $I_e > 100A$   | 6       | 1          | 0,35            | 1       | 0,17       | 0,35   | 10      | 1,05       | 0,35            | 8       | 1,05       | 0,35 |
|                     | AC4   | Squirrel-cage motors: starting, plugging, inching                                | all values                | 6  | 1       | 0,65       | 6               | 1       | 0,65       | 12   | 1,05    | 0,45       | 10              | 1,05    | 0,45       |      |
|                     | AC5a  | Switching of electric discharge lamp controls                                    | all values                | $I_e \leq 17A$   | 6       | 1          | 0,35            | 6       | 1          | 0,35   | 12      | 1,05       | 0,45            | 10      | 1,05       | 0,45 |
|                     |   |  |                           | $17A < I_e \leq 100A$                                      | 6       | 1          | 0,35            | 6       | 1          | 0,35   | 12      | 1,05       | 0,45            | 10      | 1,05       | 0,45 |
|                     |   |  |                           | $I_e > 100A$   | 6       | 1          | 0,35            | 6       | 1          | 0,35   | 12      | 1,05       | 0,35            | 10      | 1,05       | 0,35 |
|                     | AC5b  | Switching of incandescent lamps  | all values                | -  | -       | -          | -               | -       | -          | 3  | 1,05    | 0,45       | 3               | 1,05    | 0,45       |      |
|                     | AC6a  | Switching of transformers  | all values                | $I_e \leq 100A$  | -       | -          | -               | -       | -          | -  | 4,5     | 1,05       | 0,45            | 3,6     | 1,05       | 0,45 |
|                     |   |  |                           | $I_e > 100A$   | -       | -          | -               | -       | -          | -  | 4,5     | 1,05       | 0,35            | 3,6     | 1,05       | 0,35 |
|                     | AC6b  | Switching of capacitors  | -                         | -  | -       | -          | -               | -       | -          | 2)   |         |            | 2)              |         |            |      |
|                     | AC7a  | Slightly inductive loads in household appliances and similar applications        | all values                | -  | -       | -          | -               | -       | -          | 1,5  | 1,05    | 0,8        | 1,5             | 1,05    | 0,8        |      |
|                     | AC7b  | Motor loads for household applications   | all values                | $I_e \leq 100A$  | -       | -          | -               | -       | -          | -  | 8       | 1,05       | 0,45            | 6       | 1,05       | 0,45 |
| $I_e > 100A$        |   |  |                           | -  | -       | -          | -               | -       | -          | 8  | 1,05    | 0,35       | 6               | 1,05    | 0,35       |      |
| AC8a                | Hermetic refrigerant compressor motor control with manual resetting of overload releases    | all values   | -                         | -  | -       | -          | -               | -       | 6          | 1,05   | 0,45    | 6          | 1,05            | 0,45    |            |      |
| AC8b                | Hermetic refrigerant compressor motor control with automatic resetting of overload releases | all values   | $I_e \leq 100A$           | -  | -       | -          | -               | -       | -          | 6  | 1,05    | 0,45       | 6               | 1,05    | 0,45       |      |
|                     |   |  | $I_e > 100A$              | -  | -       | -          | -               | -       | -          | 6  | 1,05    | 0,35       | 6               | 1,05    | 0,35       |      |
| AC12                | Control of resistive loads and solid state loads with isolation by opto couplers            | all values   | -                         | -  | -       | -          | -               | -       | 1          | 1  | 0,9     | 1          | 1               | 0,9     |            |      |
| AC13                | Control of solid state loads with transformer isolation                                     | all values   | -                         | -  | -       | -          | -               | -       | 10         | 1,1  | 0,65    | 1,1        | 1,1             | 0,65    |            |      |
| AC14                | Control of small electromagnetic loads ( $\leq 72VA$ )                                      | -  | -                         | -  | -       | -          | -               | -       | 6          | 1,1  | 0,7     | 6          | 1,1             | 0,7     |            |      |
| AC15                | Control of electromagnetic load ( $> 72VA$ )  | -  | 10                        | 1  | 0,7     | 1          | 1               | 0,4     | 10         | 1,1  | 0,3     | 10         | 1,1             | 0,3     |            |      |
| Direct Current      |   |  |                           | Make $I_e/I_e$   | $U/U_e$ | L/R [ms]   | Break $I_e/I_e$ | $U/U_e$ | L/R [ms]   | Make $I_e/I_e$                                     | $U/U_e$ | L/R [ms]   | Break $I_e/I_e$ | $U/U_e$ | L/R [ms]   |      |
|                     | DC1   | Non-inductive or slightly inductive loads resistance furnaces                    | all values                | 1  | 1       | 1          | 1               | 1       | 1          | 1,5  | 1,05    | 1          | 1,5             | 1,05    | 1          |      |
|                     | DC3   | Shunt-motors: starting, plugging, inching dynamic braking of d.c. motors         | all values                | 2,5  | 1       | 2          | 2,5             | 1       | 2          | 4  | 1,05    | 2,5        | 4               | 1,05    | 2,5        |      |
|                     | DC5   | Series-motors: starting, plugging, inching dynamic braking of d.c. motors        | all values                | 2,5  | 1       | 7,5        | 2,5             | 1       | 7,5        | 4  | 1,05    | 15         | 4               | 1,05    | 15         |      |
|                     | DC6   | Switching of incandescent lamps  | all values                | -  | -       | -          | -               | -       | -          | 1,5  | 1,05    | 1)         | 4               | 1,05    | 1)         |      |
|                     | DC12  | Control of resistive loads and solid state loads with isolation by opto couplers | all values                | -  | -       | -          | -               | -       | -          | 1  | 1       | 1          | 1               | 1       | 1          |      |
|                     | DC13  | Control of electromagnets  | all values                | 1  | 1       | $\leq 300$ | 1               | 1       | $\leq 300$ | 1,1  | 1,1     | $\leq 300$ | 1,1             | 1,1     | $\leq 300$ |      |
| DC14                | Control of electromagnetic loads having economy resistors in circuit                        | all values   | -                         | -  | -       | -          | -               | -       | 10         | 1,1  | 15      | 10         | 1,1             | 15      |            |      |

$U_e$  Rated operational voltage,  $U$  Voltage before make,  $U_r$  Recovery voltage,  $I_e$  Rated operational current,  $I_c$  Current make,  $I_b$  Current broken

1) Test with incandescent lamps

2) Test conditions according to standard



## Accessories

### Data according to IEC 947-5-1, EN 60947-5-1, VDE 0660

| Type   |                     | HN       | HTN      | HA       | HB       | HKT<br>HKA | HKF<br>HKB | K2-DK<br>K2-SK | K2-TP    | K2-L <sup>2)</sup> |
|--|---------------------|----------|----------|----------|----------|------------|------------|----------------|----------|--------------------|
| <b>Rated insulation voltage <math>U_i</math></b> <sup>1)</sup>   | V AC                | 690      | 690      | 690      | 690      | 690        | 690        | 690            | 690      | 690                |
| <b>Thermal rated current <math>I_{th}</math></b> to 690V   |                     |          |          |          |          |            |            |                |          |                    |
| Ambient temperature  | max. 40°C           | A        | 10       | 10       | 25       | 10         | 16         | 26             | 10       | 10                 |
|  | max. 60°C           | A        | 6        | 6        | 20       | -          | -          | -              | -        | 6                  |
| <b>Frequency of operations z</b>   | 1/h                 | 3000     | -        | 3000     | 3000     | -          | -          | -              | 1200     | 3000               |
| <b>Mechanical life</b>   | S x 10 <sup>6</sup> | 10       | 10       | 10       | 10       | -          | -          | -              | 1        | 10                 |
| <b>Power loss</b> per pole at $I_e/AC1$  | W                   | 0,5      | 0,5      | 1,5      | 0,5      | -          | -          | -              |          |                    |
| <b>Utilization category AC15</b>   |                     |          |          |          |          |            |            |                |          |                    |
| Rated operational current $I_e$  | 220-240V            | A        | 3        | 3        | 6        | 3          | 3          | -              | 4        | 3                  |
|  | 380-400V            | A        | 2        | 2        | 3        | 2          | 2          | -              | 3        | 2                  |
|  | 440V                | A        | 1,6      | 1,6      | 2        | 1,5        | 1,5        | -              | 2        | 1,6                |
|  | 500V                | A        | 1,2      | 1,2      | 2        | 1,5        | 1,5        | -              | 2        | 1                  |
|  | 660-690V            | A        | 0,6      | 0,6      | 1        | 1          | 1          | -              | 2        | 0,5                |
| <b>Utilization category DC13</b>   |                     |          |          |          |          |            |            |                |          |                    |
| Rated operational current $I_e$  | 60V                 | A        | 2        | 2        | 8        | 2          | -          | -              | 2,5      | 2                  |
|  | 110V                | A        | 0,4      | 0,4      | 1        | 0,4        | 0,5        | -              | 1,5      | 0,4                |
|  | 220V                | A        | 0,1      | 0,1      | 0,1      | 0,1        | 0,2        | -              | 0,2      | 0,1                |
| <b>Short circuit protection</b><br>short-circuit current 1kA,<br>contact welding not accepted<br>max. fuse size  | gL (gG) A           | 20       | 20       | 25       | 20       | 10         | 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. |                     |          |          |          |          |            |            |                |          |                    |
| <b>Cable cross-sections</b>  |                     |          |          |          |          |            |            |                |          |                    |
| solid or stranded  | mm <sup>2</sup>     | 0,75-2,5 | 0,75-2,5 | 0,75-2,5 | 0,75-2,5 | 0,75-2,5   | 0,75-2,5   | 1-2,5          | 0,75-2,5 | 0,75-2,5           |
| flexible   | mm <sup>2</sup>     | 0,75-2,5 | 0,75-2,5 | 0,75-2,5 | 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 with multicore cable end  | mm <sup>2</sup>     | 0,5-1,5  | 0,5-1,5  | 0,5-1,5  | 0,5-1,5  | 0,5-1,5    | 0,5-1,5    | 0,75-2,5       | 0,5-1,5  | 0,5-1,5            |
|  | solid AWG           | 14 - 12  | 14 - 12  | 14 - 12  | 14 - 12  | 14 - 12    | 14 - 12    | 14 - 12        | 14 - 12  | 14 - 12            |
|  | flexible AWG        | 18 - 12  | 18 - 12  | 18 - 12  | 18 - 12  | 18 - 12    | 18 - 12    | 18 - 12        | 18 - 12  | 18 - 12            |
| Cables per clamp   |                     | 2        | 2        | 2        | 2        | 2          | 2          | 2              | 2        | 2                  |

### Data according to CSA, UL and CUL

| Type                                    |           | HN   | HTN  | HA   | HB.. | HKT, HKA<br>HKF | K2-DK<br>K2-SK | K2-TP | K2-L <sup>2)</sup> |
|---|-----------|------|------|------|------|-----------------|----------------|-------|--------------------|
| Rated operational current "General Use" | A         | 10   | 10   | 16   | 10   | 10              | -              | 10    | -                  |
| Rated operational voltage               | max. V AC | 600  | 600  | 600  | 600  | 600             | -              | 600   | 600                |
| <b>Auxiliary Contacts</b>               |           | A600 | A600 | A600 | A600 | A600            | -              | A600  | Intermittent duty  |

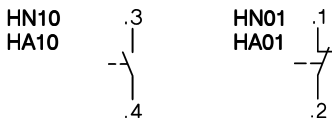
1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): Uimp = 8kV. Data for other conditions on request.

2) Command duration min. 30ms, 10% duty cycle, max. 30 eec.

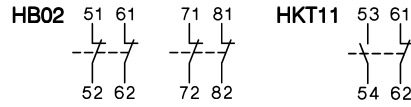
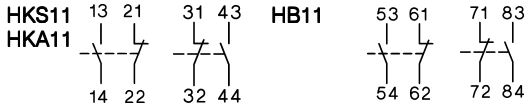
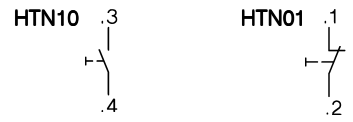
# Contactors and Accessories

## Wiring diagrams

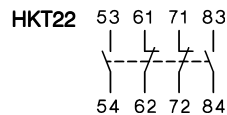
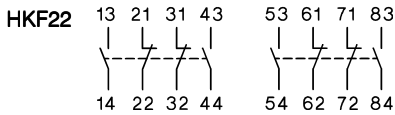
### Auxiliary contact blocks



### Snap-on momentary contact blocks



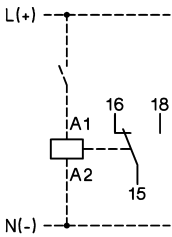
HB11, HB02:  
Correct terminal marking  
is given by mounting.



### Indicator units

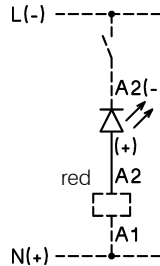
#### Electronic timer

##### K3-T180 240



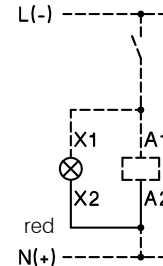
#### Coil current indicator

##### K2-ING K2-INR



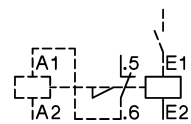
#### Voltage indicator

##### K2-UN K2-UNR



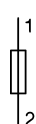
#### Latch

##### K2-L..



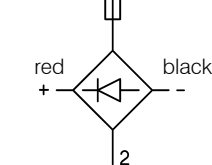
#### Fuse holder

##### K2-F



with rectifier

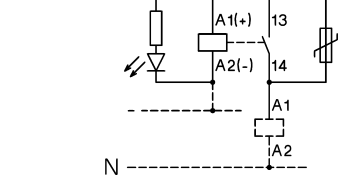
##### K2-RF1 K2-RF3



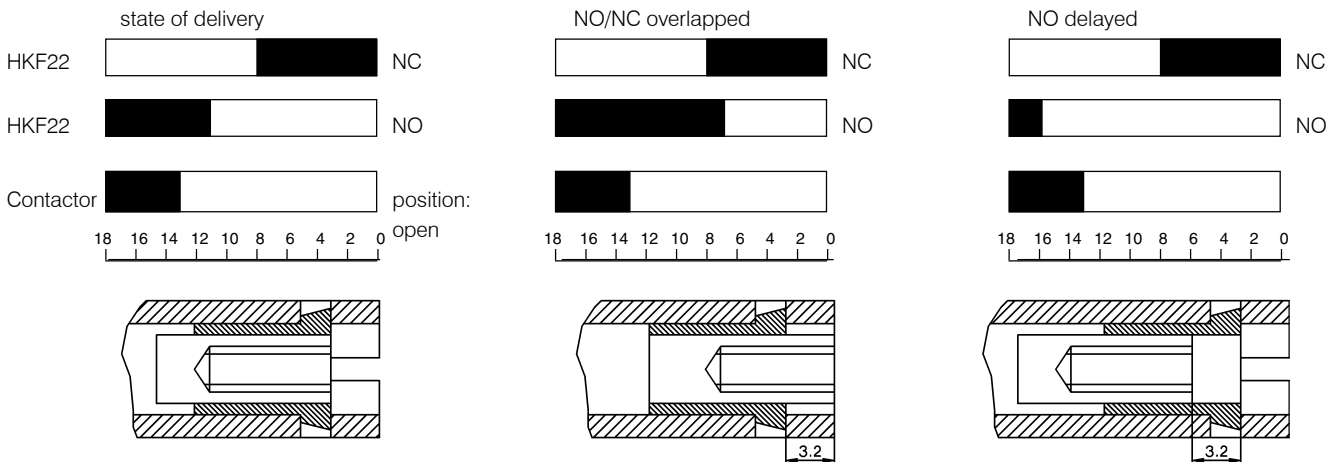
Colours mentioned in  
wiring diagram refer to  
the outgoing  
connection wires  
of the device.

#### Interface

##### K2-IM



### Regulation of switch position of aux. contact block HKF22 for contactors K3-450 to K3-860



Standard position of regulation screw

Regulation screw position (unscrew by 4 turns)

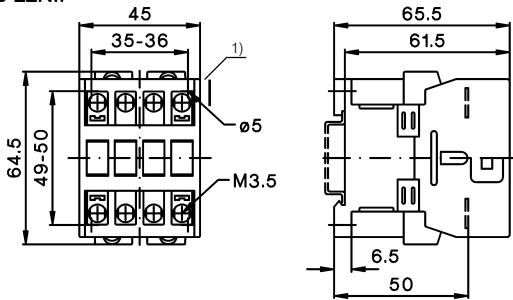
Regulation screw position (screw by 4 turns)

# Contactors

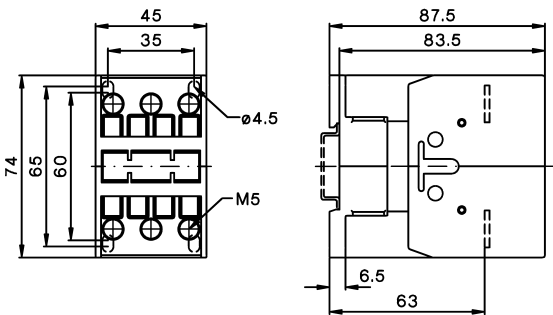
## Dimensions

### AC operated

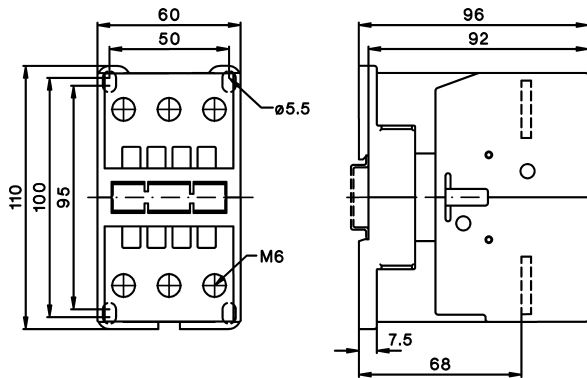
K3-10N..  
K3-14N..  
K3-18N..  
K3-22N..



K3-24..  
K3-32..  
K3-40..

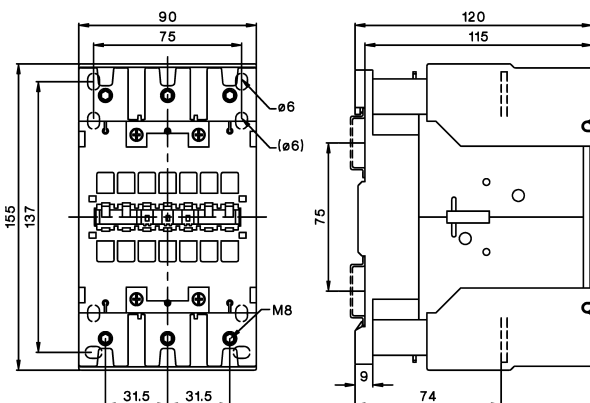


K3-50..  
K3-62..  
K3-74..



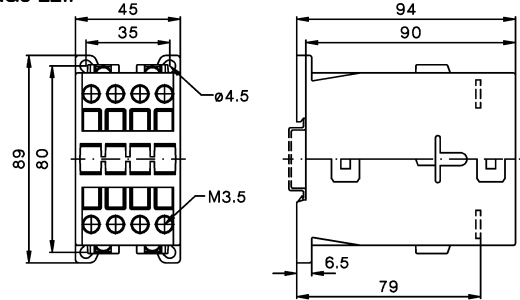
### AC and DC operated

K3-90..  
K3-115..

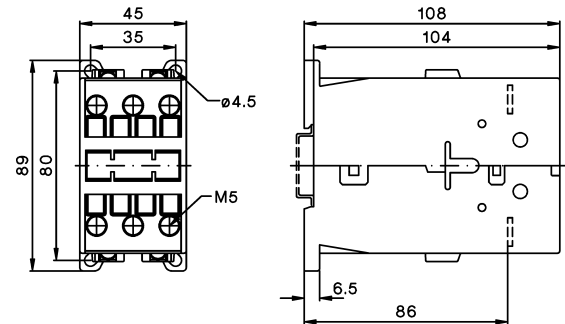


### DC operated

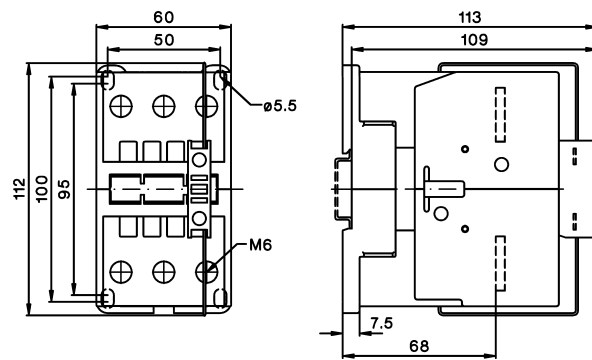
KG3-10..  
KG3-14..  
KG3-18..  
KG3-22..



KG3-24..  
KG3-32..  
KG3-40..



K3-50..=  
K3-62..=  
K3-74..=



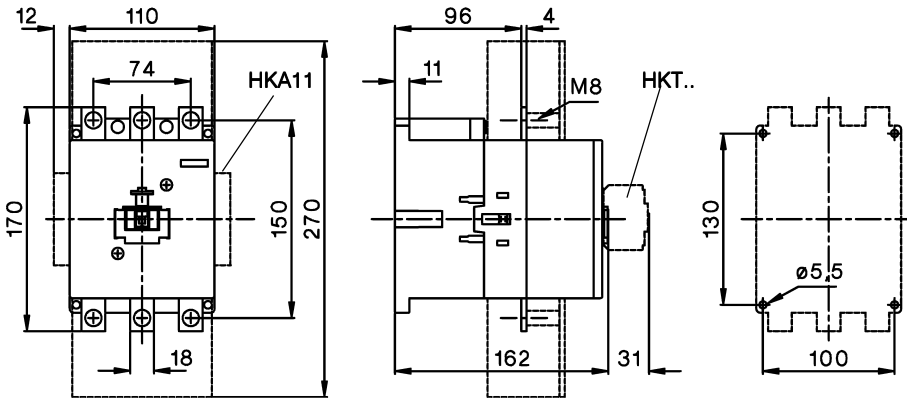
1) Minimum side distance to  
conductive parts for coil voltage:  
500V  $U_{imp}=6kV$  2mm  
660-690V  $U_{imp}=8kV$  4,5mm

# Contactors

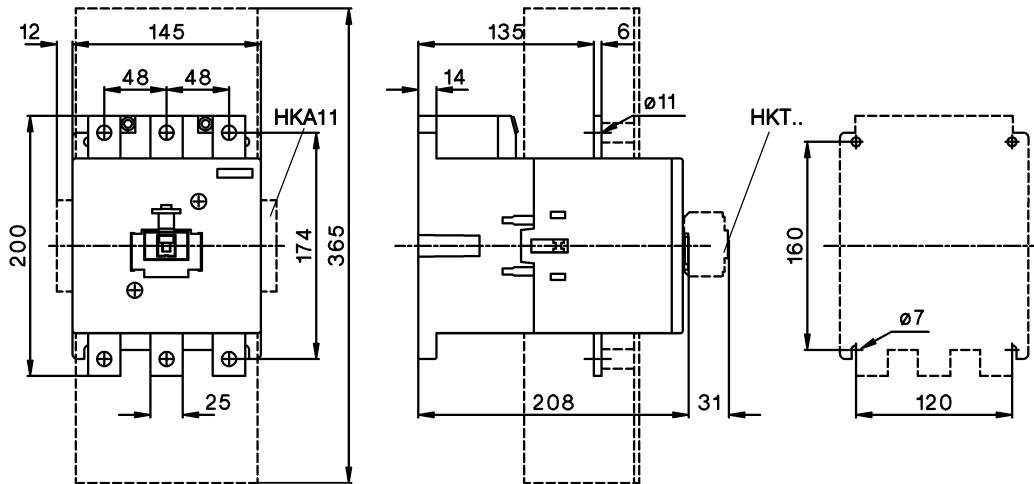
## Dimensions

AC operated, DC operated

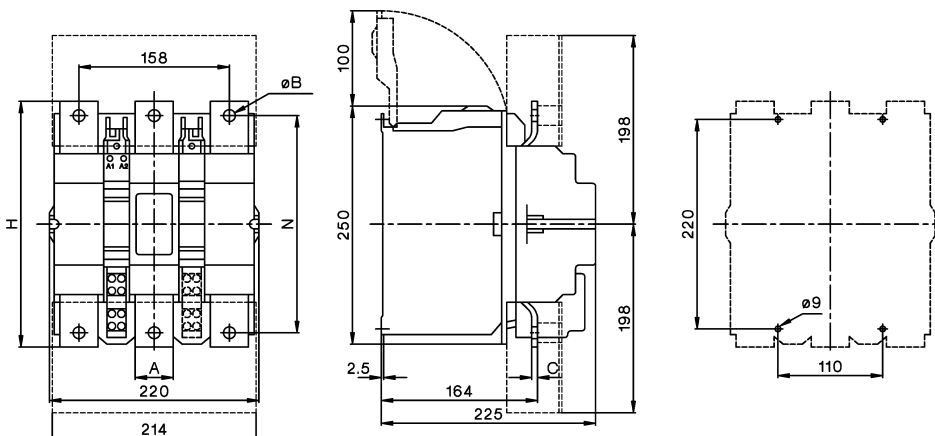
K3-151..  
K3-176..



K3-210..  
K3-260..  
K3-316..



K3-450..  
K3-550..



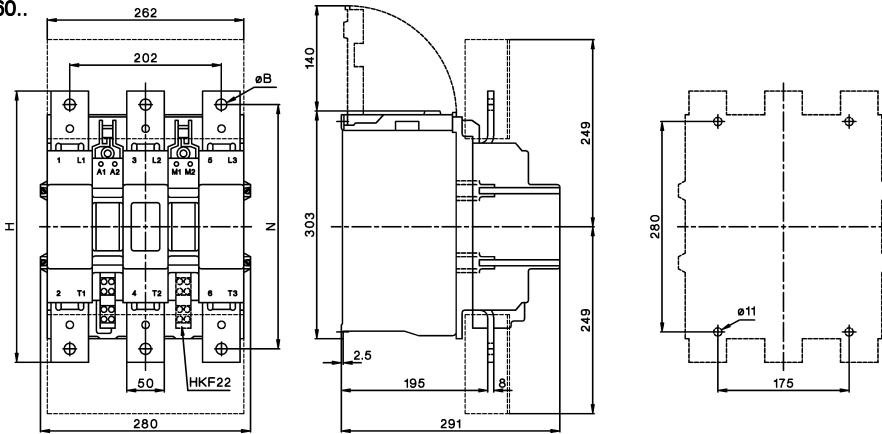
| Typ    | A  | B    | C | H   | N   |
|--------|----|------|---|-----|-----|
| K3-450 | 40 | 10,5 | 4 | 233 | 206 |
| K3-550 | 40 | 12,5 | 6 | 258 | 228 |

# Contactors

## Dimensions

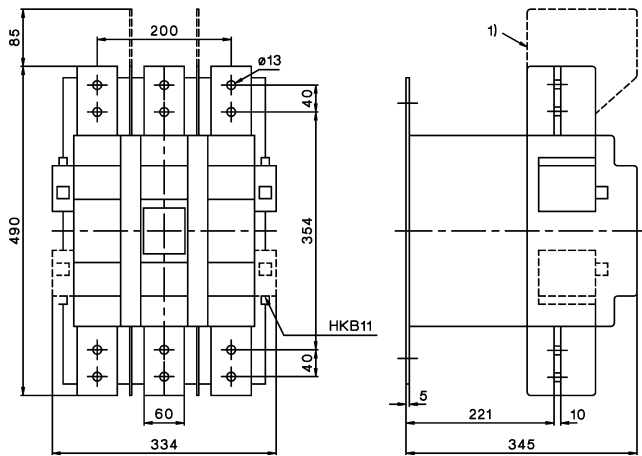
AC and DC operated

K3-700..  
K3-860..



| Typ    | B  | H   | N   |
|--------|----|-----|-----|
| K3-700 | 13 | 310 | 277 |
| K3-860 | 15 | 361 | 325 |

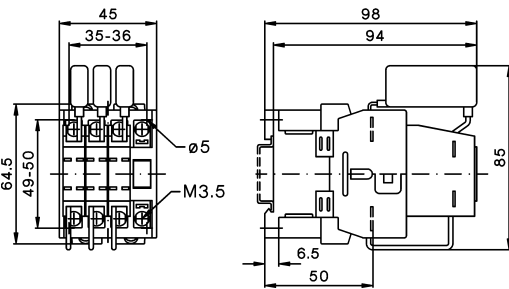
K3-1000..  
K3-1200..



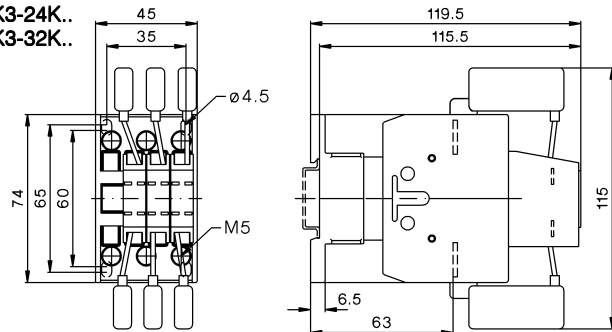
1) for K3-1200 in UL conformity application only

Capacitor switching contactors, AC operated

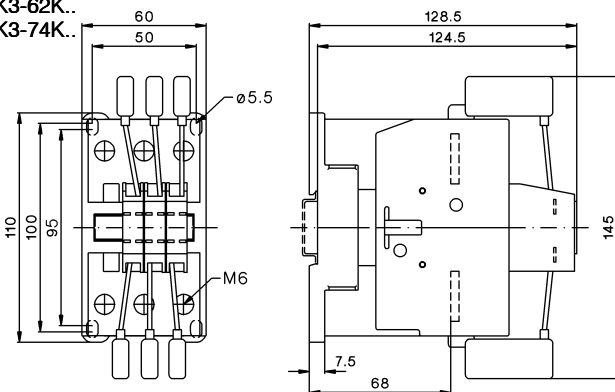
K3-18NK..



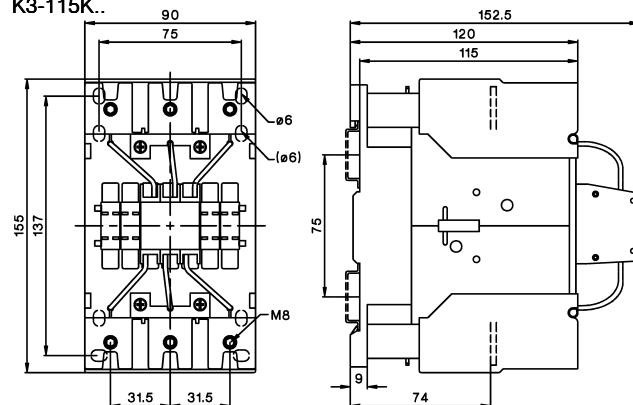
K3-24K..  
K3-32K..



K3-50K..  
K3-62K..  
K3-74K..



K3-90K..  
K3-115K..

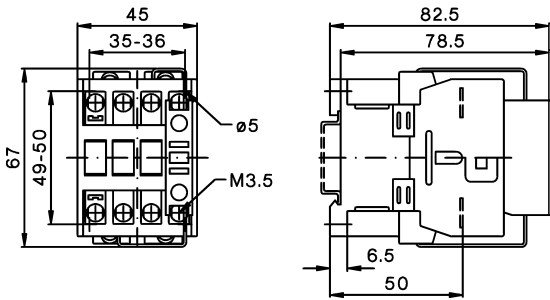


# Contactors

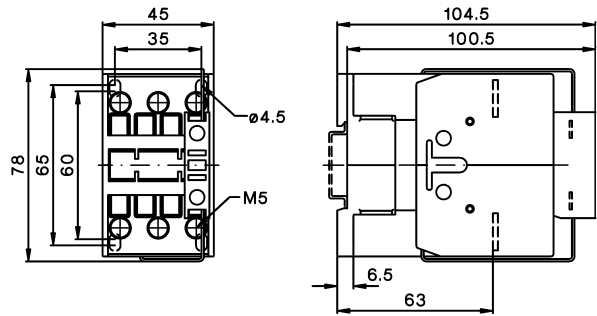
## Dimensions

### Contactors DC operated

K3-10N..=  
K3-14N..=  
K3-18N..=  
K3-22N..=

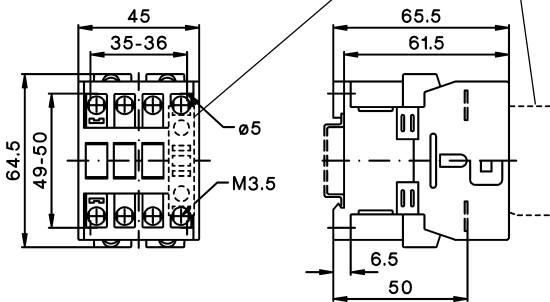


K3-24..=  
K3-32..=  
K3-40..=

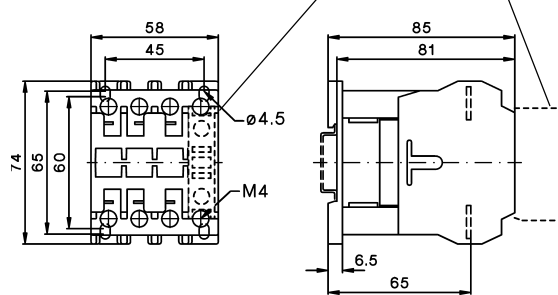


### Contactors 4-pole, AC operated / DC operated

K3-10NA00-40  
K3-14NA00-40  
K3-18NA00-40  
K3-22NA00-40

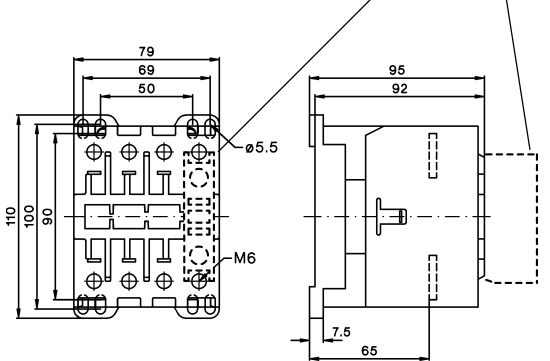


K2-23A00-40  
K2-30A00-40  
K2-37A00-40

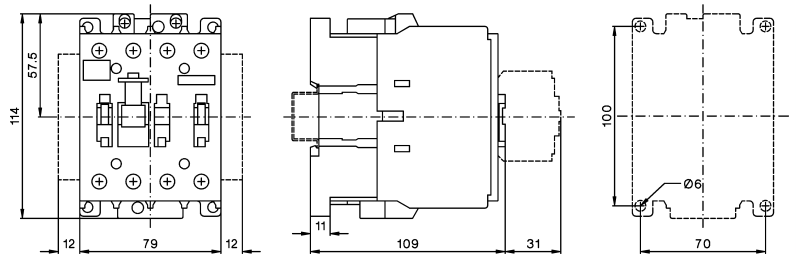


### Contactors 4-pole, AC operated / DC operated

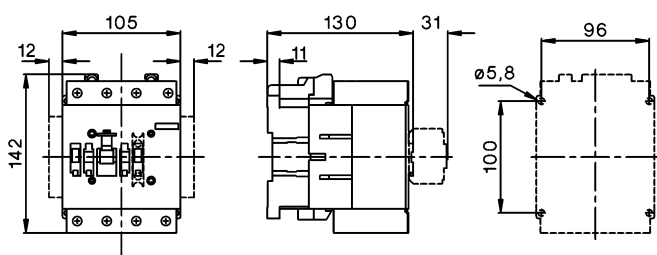
K2-45A00-40  
K2-60A00-40



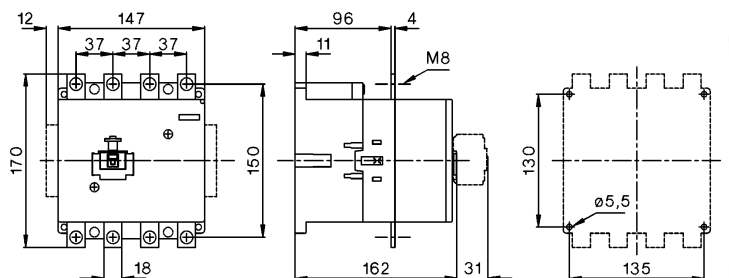
K3-41A00-40



K3-96A00-40



K3-116A00-40  
K3-151A00-40  
K3-176A00-40



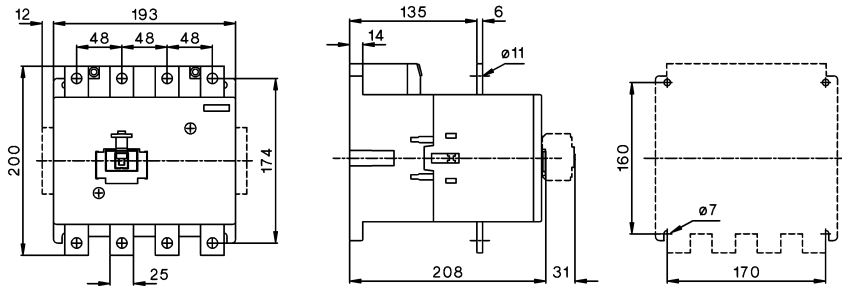
# Contactors

Contactors 4-pole, AC and DC operated

K3-210A00-40

K3-260A00-40

K3-316A00-40



## Dimensions Accessories

Aux. cont. blocks, terminal blocks

HN10, HN01 K2-SK, K2-DK

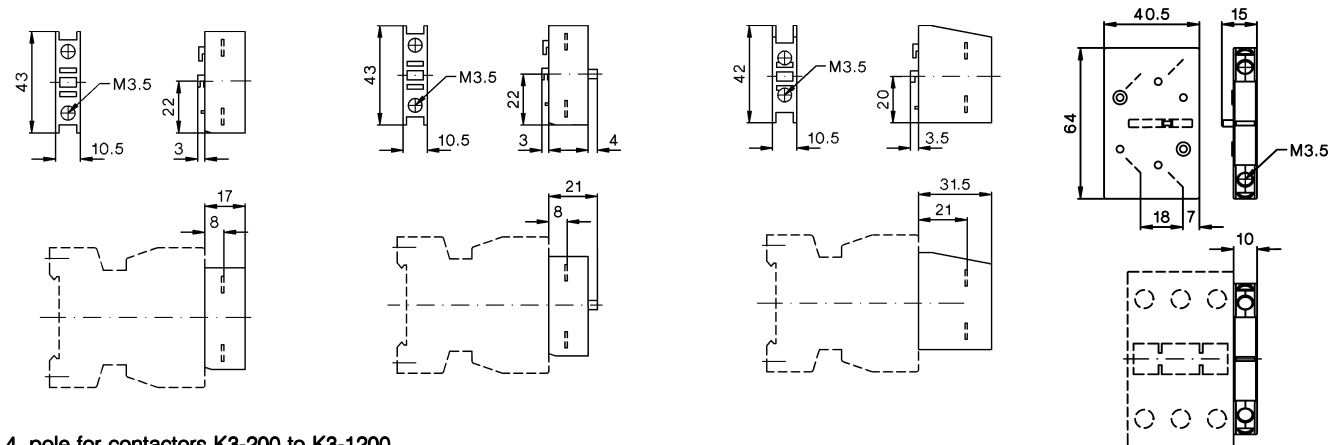
Snap-on momentary cont. blocks

HTN10, HTN01

Auxiliary contact blocks

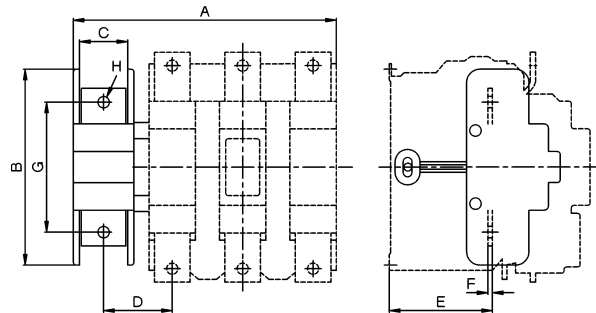
HA10, HA01

HB11, HB02



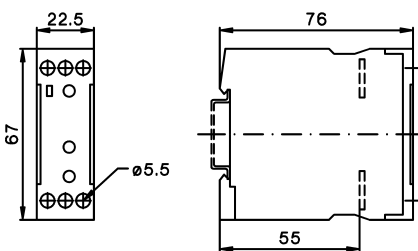
## 4. pole for contactors K3-200 to K3-1200

| Type   | A   | B   | C  | D   | E   | F | G   | H   |
|--------|-----|-----|----|-----|-----|---|-----|-----|
| NP175  | 223 | 148 | 26 | 52  | 98  | 5 | 122 | M8  |
| NP350  | 223 | 148 | 26 | 52  | 98  | 5 | 122 | M8  |
| NP325  | 262 | 148 | 26 | 55  | 116 | 5 | 122 | M10 |
| NP500  | 294 | 220 | 53 | 72  | 138 | 5 | 152 | M12 |
| NP760  | 294 | 220 | 53 | 72  | 138 | 5 | 152 | M12 |
| NP501  | 348 | 220 | 53 | 73  | 145 | 5 | 152 | M12 |
| NP1000 | 348 | 220 | 53 | 73  | 145 | 8 | 152 | M12 |
| NP1001 | 410 | 220 | 53 | 110 | 157 | 8 | 152 | M12 |



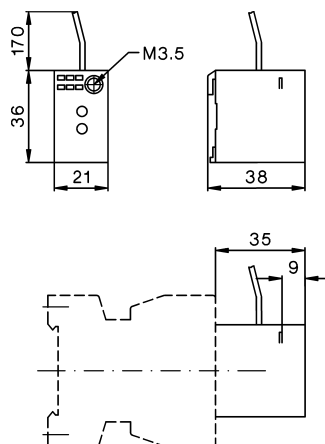
Electronic timer

K3-T180 240



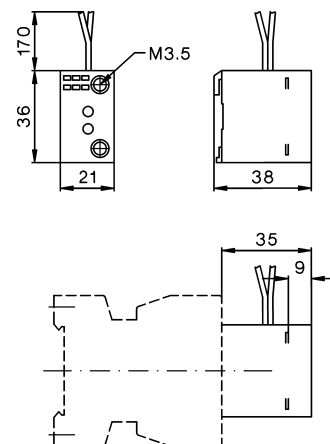
Electronic timer on-delay

K2-TE..



Electronic timer off-delay

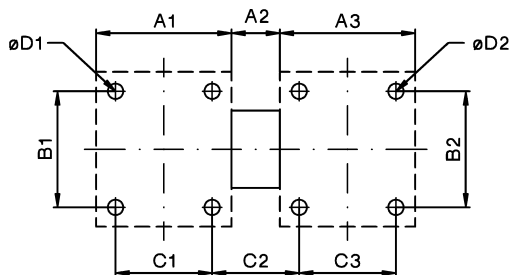
K2-TA..



# Contactors

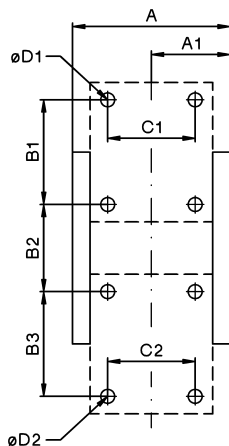
## Dimensions Accessories

### Mechanical interlocks

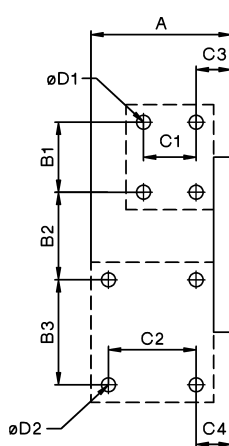


| Type            | Contactor 1        | Contactor 2        | A1  | A2 | A3  | B1  | B2  | C1  | C2    | C3  | D1   | D2   |                  |
|-----------------|--------------------|--------------------|-----|----|-----|-----|-----|-----|-------|-----|------|------|------------------|
| <b>LG10889</b>  | K3-07 to K3-40     | K3-07 to K3-40     | 45  | 7  | 45  | 50  | 50  | 35  | 17    | 35  | 4,5  | 4,5  |                  |
| <b>LG10889</b>  | KG3-07 to KG3-22   | KG3-07 to KG3-22   | 45  | 7  | 45  | 80  | 50  | 35  | 17    | 35  | 4,5  | 4,5  |                  |
| <b>LG10889</b>  | KG3-24 to KG3-40   | KG3-22 to KG3-40   | 45  | 7  | 45  | 80  | 50  | 35  | 17    | 35  | 4,5  | 4,5  |                  |
| <b>LG10890</b>  | K3-50 to K3-74     | K3-24 to K3-40     | 60  | 12 | 55  | 100 | 65  | 50  | 22    | 45  | 5,5  | 4,5  |                  |
| <b>LG10890</b>  | K3-50 to K3-74     | K3-50 to K3-74     | 60  | 12 | 60  | 100 | 100 | 50  | 22    | 50  | 5,5  | 5,5  |                  |
| <b>LG11478</b>  | K3-90 bis K3-115   | K3-90 bis K3-115   | 90  | 12 | 90  | 100 | 100 | 75  | 27    | 75  | 5,5  | 5,5  |                  |
| <b>LG8511</b>   | K65 - K110         | K65 - K110         | 90  | 12 | 90  | 100 | 100 | 75  | 27    | 75  | 6    | 6    |                  |
| <b>LG11223H</b> | K3-151, -176       | K3-151, -176       | 110 | 30 | 110 | 130 | 130 | 100 | 40    | 100 | 6    | 6    | 3-pole contactor |
| <b>LG11223H</b> | K3-116,-151, -176  | K3-116,-151, -176  | 147 | 30 | 147 | 130 | 130 | 135 | 42    | 135 | 6    | 6    | 4-pole contactor |
| <b>LG11223H</b> | K3-210, -260, -316 | K3-210, -260, -316 | 145 | 30 | 145 | 160 | 160 | 120 | 55    | 120 | 6    | 6    | 3-pole contactor |
| <b>LG11223H</b> | K3-210, -260, -316 | K3-210, -260, -316 | 193 | 30 | 193 | 160 | 160 | 170 | 55    | 170 | 6    | 6    | 4-pole contactor |
| <b>LG10400H</b> | K3-450, K3-550     | K3-450, K3-550     | 220 | 42 | 220 | 220 | 220 | 110 | 152   | 110 | 9    | 9    |                  |
| <b>LG10402H</b> | K3-700, -860       | K3-700, -860       | 280 | 32 | 280 | 280 | 280 | 175 | 137   | 175 | 11   | 11   |                  |
| <b>LG10403H</b> | K3-1000, -1200     | K3-1000, -1200     | 334 | 46 | 334 | 380 | 380 | 120 | 260   | 120 | 13,5 | 13,5 |                  |
| <b>LG10399H</b> | K3-450, -550       | K3-700, -860       | 220 | 37 | 280 | 220 | 280 | 110 | 144,5 | 175 | 9    | 11   |                  |
| <b>LG10401H</b> | K3-700, -860       | K3-1000, -1200     | 280 | 73 | 334 | 280 | 380 | 175 | 232,5 | 120 | 11   | 13,5 |                  |

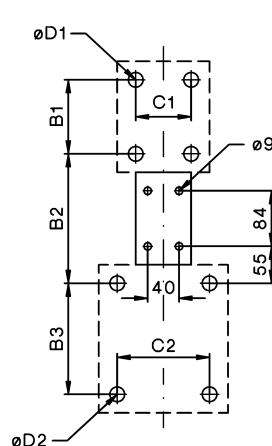
LG10400V, LG10402V



LG10399V



LG10403V, LG10401V



| Type            | Contactor 1     | Contactor 2     | A   | A1  | B1  | B2  | B3  | C1  | C2  | C3 | C4   | D1   | D2   |
|-----------------|-----------------|-----------------|-----|-----|-----|-----|-----|-----|-----|----|------|------|------|
| <b>LG10400V</b> | K3-315 - K3-550 | K3-315 - K3-550 | 250 | 134 | 220 | 94  | 220 | 110 | 110 | -  | -    | 9    | 9    |
| <b>LG10402V</b> | K3-700, -860    | K3-700, -860    | 302 | 162 | 280 | 200 | 280 | 175 | 175 | -  | -    | 11   | 11   |
| <b>LG10403V</b> | K3-1000, -1200  | K3-1000, -1200  | -   | -   | 380 | 280 | 380 | 120 | 120 | -  | -    | 13,5 | 13,5 |
| <b>LG10399V</b> | K3-450, -550    | K3-700, -860    | 302 | -   | 220 | 150 | 280 | 110 | 175 | 51 | 74,5 | 9    | 11   |
| <b>LG10401V</b> | K3-700, -860    | K3-1000, -1200  | -   | -   | 280 | 240 | 380 | 175 | 120 | -  | -    | 11   | 13,5 |

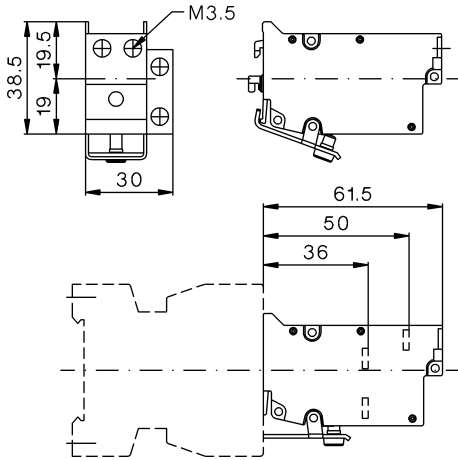


# Contactors

## Dimensions Accessories

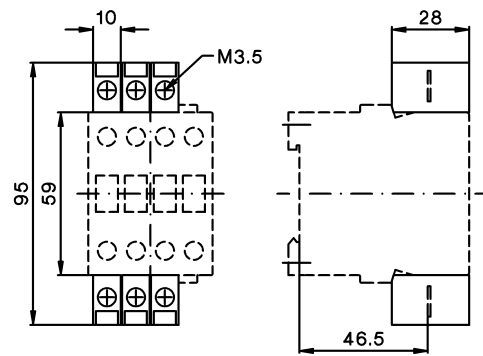
### Latch

#### K2-L..



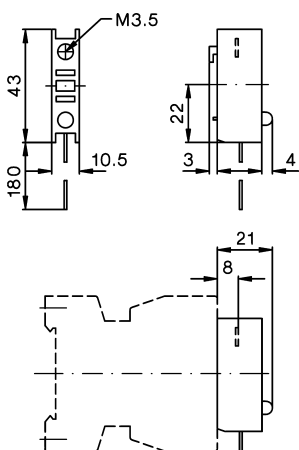
### Contactors with additional terminals

**LG9339N** (2 x 3 pieces)  
for K3-10N. to K3-22N.



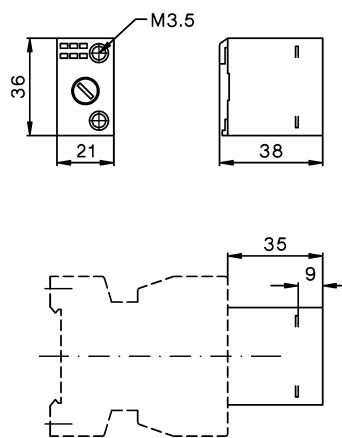
### Indicator units

**K2-ING, K2-INR**  
**K2-UN, K2-UNR**



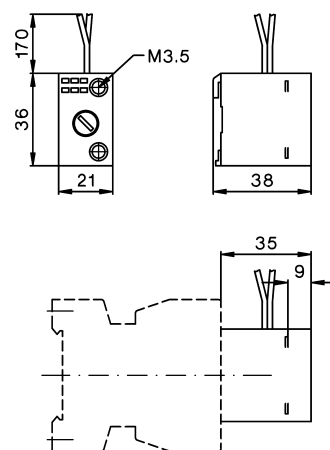
### Fuse holder

**K2-RF**



### Fuse holder with rectifier

**K2-RF1**  
**K2-RF3**

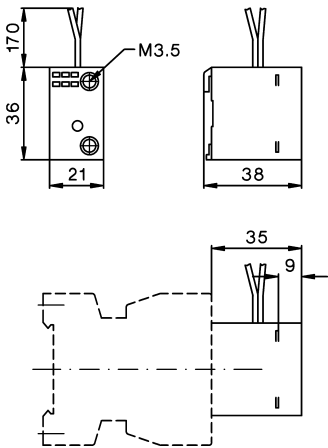


# Contactors

## Dimensions Accessories

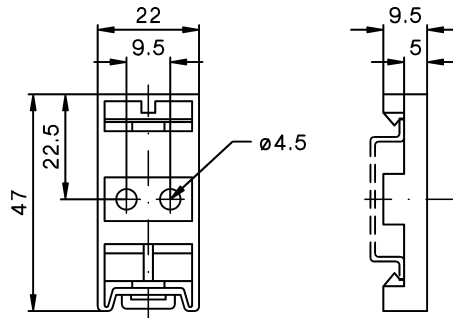
### Interface

#### K2-IM



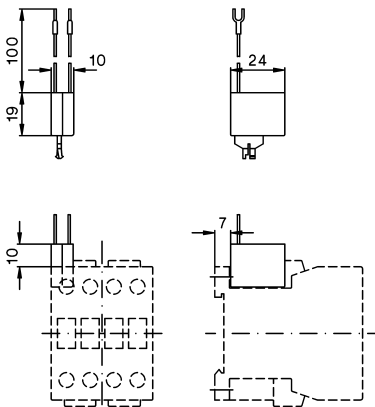
### Snap-on adapter

#### K2-SM

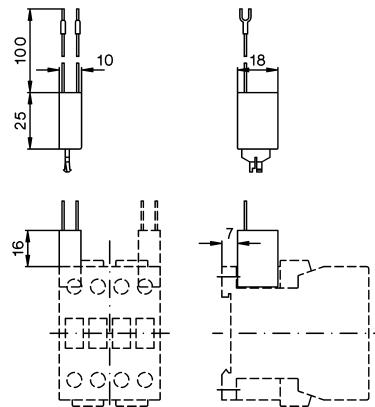


### Suppressor units

#### RC-K3N ..

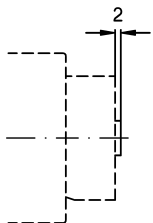


#### RC-K3NW ..



### Marking systems

marking label  
P487-1 or P245-.



# Contactors

## Position of terminals

K3-10ND10  
K3-14ND10  
K3-18ND10  
K3-22ND10  
K3-18NK10

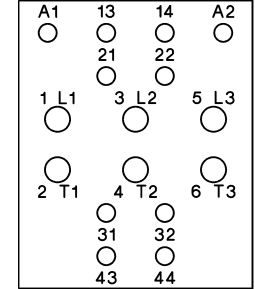
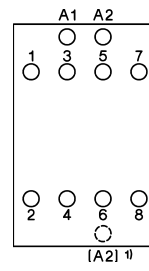
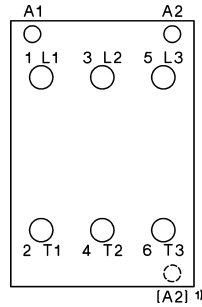
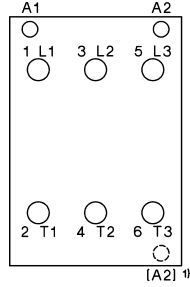
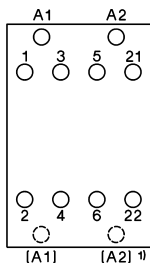
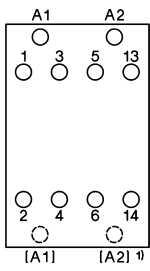
K3-10ND01  
K3-14ND01  
K3-18ND01  
K3-22ND01  
K3-18NK01

K3-24A00, K3-24K00  
K3-32A00, K3-32K00  
K3-40A00

K3-50A00, K3-50K00  
K3-62A00, K3-62K00  
K3-74A00, K3-74K00

K3-10NA00-40  
K3-14NA00-40  
K3-18NA00-40  
K3-22NA00-40  
K2-23A00-40 bis  
K2-60A00-40

K85A22  
K110A22



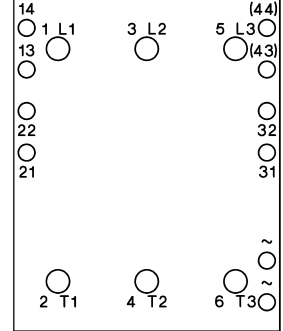
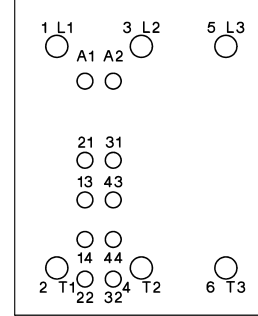
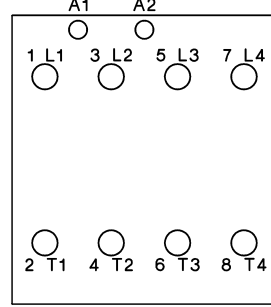
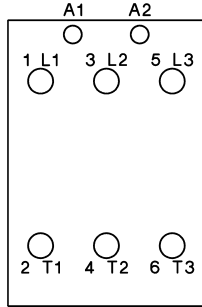
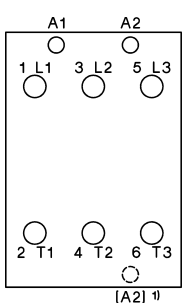
K3-90A00  
K3-115A00

K3-151A00  
K3-176A00  
K3-210A00  
K3-260A00  
K3-316A00

K3-116A00-40  
K3-151A00-40  
K3-176A00-40  
K3-210A00-40  
K3-260A00-40  
K3-316A00-40

K3-450A22  
K3-550A22  
K3-700A22  
K3-860A22

K3-1000A12  
K3-1200A12

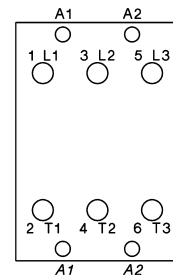
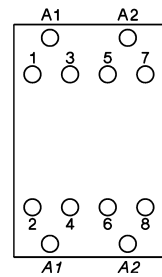
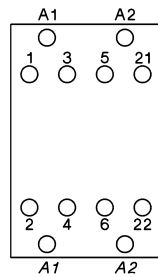
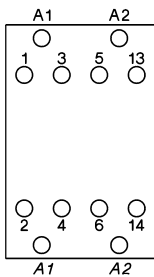


KG3-10A10  
KG3-14A10  
KG3-18A10  
KG3-22A10

KG3-10A01  
KG3-14A01  
KG3-18A01  
KG3-22A01

KG3-10A00-40  
KG3-14A00-40  
KG3-18A00-40  
KG3-22A00-40

KG3-24A00  
KG3-32A00  
KG3-40A00



K3-10ND10=  
K3-14ND10=  
K3-18ND10=  
K3-22ND10=

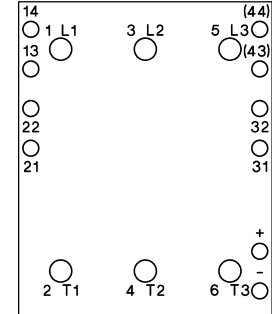
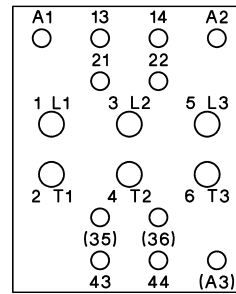
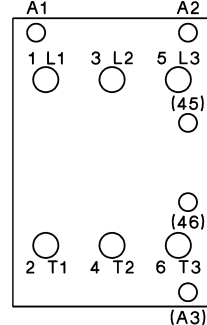
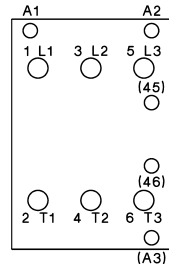
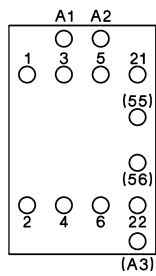
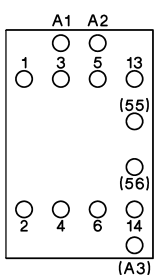
K3-10ND01=  
K3-14ND01=  
K3-18ND01=  
K3-22ND01=

K3-24A00=  
K3-32A00=  
K3-40A00=

K3-50A00=  
K3-62A00=  
K3-74A00=

K85A21=  
K110A21=

K3-1000A12=  
K3-1200A12=



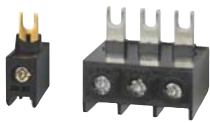
1) Type-suffix "EUR" with additional coil terminal  
Ordering example: K3-10ND10 EUR 230



Star-Delta Starters Open Type 86



Star-Delta Starters Enclosed 88  
Enclosure for Star-Delta Starters 88



Accessories 89



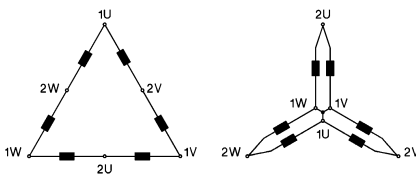
Reversing Contactors 90



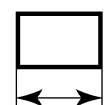
Pole Changing Starters 92



Technical Data 94



Wiring Diagrams 97



Dimensions 101

# Star-Delta Starters Open Type

AC Operated



| Ratings |      | Rated Current |      | order separately    | Type       | Coil voltage <sup>1)</sup> | Pack pcs. | Weight kg/pc. |
|---------|------|---------------|------|---------------------|------------|----------------------------|-----------|---------------|
| AC3     |      |               |      |                     |            | 220-240V 50Hz              |           |               |
| 380V    |      |               |      |                     |            | 380-415V 50Hz              |           |               |
| 400V    | 500V | 660V          | AC3  | Overload Relay      |            |                            |           |               |
| 415V    | kW   | 690V          | 400V | Type                |            |                            |           |               |
| kW      |      | kW            | A    |                     |            |                            |           |               |
| 7,5     | 7,5  | 11            | 16   | U3/32<br>U12/16E K3 | K3NY15 ... | 230<br>400                 | 1         | 0,9           |
| 15      | 18,5 | 15            | 30   |                     | K3NY26 ... |                            | 1         | 0,9           |
| 22      | 30   | 22            | 45   | U3/42               | K3Y40 ...  |                            | 1         | 1,4           |
| 30      | 37   | 30            | 60   |                     | K3Y52 ...  |                            | 1         | 1,8           |
| 45      | 55   | 45            | 85   | U3/74               | K3Y80 ...  |                            | 1         | 3,5           |
| 55      | 75   | 55            | 109  |                     | K3Y100 ... |                            | 1         | 3,7           |
| 75      | 90   | 90            | 150  | U85                 | K3Y140 ... |                            | 1         | 6,6           |
| 110     | 132  | 110           | 205  |                     | K3Y200 ... |                            | 1         | 7             |
| 132     | 160  | 160           | 240  | U180                | K3Y240 ... |                            | 1         | 15            |
| 160     | 180  | 180           | 300  |                     | K3Y300 ... |                            | 1         | 15            |

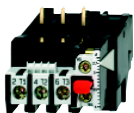
Star-delta starters are wired to accept thermal overload relay. The thermal overload relay has to be ordered separately. For full load current setting use the YD-dial of thermal overload relay.

**Ordering Example:** Star-Delta Starter, open type, rated AC3 at 400V 205A rated control voltage 230V 50Hz - **Order Type: K3Y200 230 + U85 120**

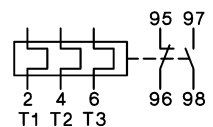
## Thermal Overload Relays

| Rated Motor Current<br>A | Type | Pack pcs. | Weight kg/pc. | Wiring Diagram |
|--------------------------|------|-----------|---------------|----------------|
|--------------------------|------|-----------|---------------|----------------|

For Star-Delta Starters K3NY15.. to K3Y40..



|             |               |   |      |
|-------------|---------------|---|------|
| 7 - 10,5    | U12/16E 6 K3  | 1 | 0,10 |
| 10,5 - 15,5 | U12/16E 9 K3  | 1 | 0,10 |
| 14 - 19     | U12/16E 11 K3 | 1 | 0,10 |
| 18 - 24     | U12/16E 14 K3 | 1 | 0,10 |
| 23 - 31     | U12/16E 18 K3 | 1 | 0,10 |

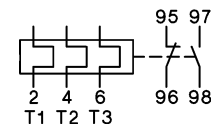


manual eset

For Star-Delta Starters K3NY15.. to K3Y52..



|             |          |   |      |
|-------------|----------|---|------|
| 7 - 10,5    | U3/32 6  | 1 | 0,14 |
| 10,5 - 15,5 | U3/32 9  | 1 | 0,14 |
| 14 - 19     | U3/32 11 | 1 | 0,14 |
| 18 - 24     | U3/32 14 | 1 | 0,14 |
| 23 - 31     | U3/32 18 | 1 | 0,14 |
| 30 - 41     | U3/32 24 | 1 | 0,14 |
| 40 - 55     | U3/32 32 | 1 | 0,14 |

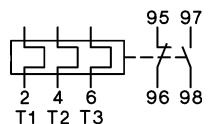


manual and auto reset

For Star-Delta Starters K3Y40.., K3Y52..



|         |          |   |      |
|---------|----------|---|------|
| 24 - 35 | U3/42 20 | 1 | 0,30 |
| 35 - 48 | U3/42 28 | 1 | 0,30 |
| 48 - 73 | U3/42 42 | 1 | 0,30 |



manual and auto reset

1) Coil voltage range and other coil voltages see page 94

| Line<br>Contactor          | Delta<br>Contactor   | Star<br>Contactor          | Electronic<br>Timer | Mechanical<br>Interlock<br>between<br>K2 and K3 | Star-Delta<br>Starter<br>Connector | Auxiliary Contacts<br>Built-in for use<br>on Contactor |             |            | Free Space for<br>Aux. Contact Blocks<br>on Contactor |             |            |
|----------------------------|----------------------|----------------------------|---------------------|---|------------------------------------|--|-------------|------------|---|-------------|------------|
|                            |                      |                            |                     |   |                                    | Line<br>K1   | Delta<br>K2 | Star<br>K3 | Line<br>K1  | Delta<br>K2 | Star<br>K3 |
| K3-10ND01<br>+ HN10        | K3-10ND01            | K3-10ND10<br>+ HN10 + HN01 | Y9A                 | LG10889   | K3NY-VB10                          | -  | -           | -          | 3   | 4           | 2          |
| K3-18ND01<br>+ HN10        | K3-18ND01            | K3-14ND10<br>+ HN10 + HN01 | Y9A                 | LG10889   | K3NY-VB10                          | -  | -           | -          | 3   | 4           | 2          |
| K3-24A00<br>+ HN10 + HN01  | K3-24A00<br>+ HN01   | K3-24A00<br>+ 2HN10 + HN01 | Y9A                 | LG10889   | K3Y-VB24                           | -  | -           | -          | 2   | 3           | 1          |
| K3-32A00<br>+ HN10 + HN01  | K3-32A00<br>+ HN01   | K3-24A00<br>+ 2HN10 + HN01 | Y9A                 | LG10889   | K3Y-VB24                           | -  | -           | -          | 2   | 3           | 1          |
| K3-50A00<br>+ HN01 + HN10  | K3-50A00<br>+ HN01   | K3-32A00<br>+ 2HN10 + HN01 | Y9A                 | LG10890   | -                                  | -  | -           | -          | 2   | 3           | 1          |
| K3-62A00<br>+ HN01 + HN10  | K3-62A00<br>+ HN01   | K3-50A00<br>+ 2HN10 + HN01 | Y9A                 | LG10890   | -                                  | -  | -           | -          | 2   | 3           | 1          |
| K3-90A00<br>+ HN01 + HN10  | K3-90A00<br>+ HN01   | K3-90A00<br>+ 2HN10 + HN01 | Y9AL                | LG11478   | -                                  | -  | -           | -          | 5   | 6           | 4          |
| K3-115A00<br>+ HN01 + HN10 | K3-115A00<br>+ HN01  | K3-90A00<br>+ 2HN10 + HN01 | Y9AL                | LG11478   | -                                  | -  | -           | -          | 5   | 6           | 4          |
| K3-151A00<br>+ HKT11       | K3-151A00<br>+ HKT11 | K3-151A00<br>+ HKT22       | Y9AL                | LG11223H  | -                                  | -  | 1/-         | -/1        | 2   | 1           | 1          |
| K3-176A00<br>+ HKT11       | K3-176A00<br>+ HKT11 | K3-151A00<br>+ HKT22       | Y9AL                | LG11223H  | -                                  | -  | 1/-         | -/1        | 2   | 1           | 1          |

**Applications**

The star-delta starting method is only practicable in such cases where the motor windings are connected in delta configuration for normal operation and the torque which is needed during the starting period is not higher than approx. 30% of the rated torque. The starting current drawn from the line will be approx. 2 to 2,7 times the rated motor current.

**Time setting**

The transition from start (star configuration) to normal operation (delta configuration) should be after the motor achieves practically full rotational speed. The use of star-delta timer Y9A with a dwell period of approx. 25ms provides a careful operation of motor and drive equipment.

**Thermal Overload Relays**

| Rated Motor Current<br>A                    | Type            | Pack<br>pcs. | Weight<br>kg/pc. | Wiring Diagram        |
|---|-----------------|--------------|------------------|-----------------------|
|   |                 |              |                  |                       |
| For Star-Delta Starters K3Y80..., K3Y100..  |                 |              |                  |                       |
| 35 - 48                                     | <b>U3/74 28</b> | 1            | 0,40             |                       |
| 48 - 73                                     | <b>U3/74 42</b> | 1            | 0,40             |                       |
| 70 - 90                                     | <b>U3/74 52</b> | 1            | 0,40             |                       |
| 90 - 112                                    | <b>U3/74 65</b> | 1            | 0,40             | manual and auto reset |
| For Star-Delta Starters K3Y140..., K3Y200.. |                 |              |                  |                       |
| 104 - 156                                   | <b>U85 90</b>   | 1            | 0,90             |                       |
| 140 - 207                                   | <b>U85 120</b>  | 1            | 0,90             |                       |
|   |                 |              |                  | manual eset           |
| For Star-Delta Starters K3Y240..., K3Y300.. |                 |              |                  |                       |
| 208 - 312                                   | <b>U180 180</b> | 1            | 1,5              |                       |
|   |                 |              |                  | manual and auto reset |

# Star-Delta Starters Enclosed Type

AC Operated

| Ratings     |           | Rated Current | Optional Extras | Wired to accept Overload Relay | Type | Coil voltage <sup>1)</sup> | Pack pcs. | Weight kg/pc. |
|-------------|-----------|---------------|-----------------|--------------------------------|------|----------------------------|-----------|---------------|
| AC3         |           |               |                 |                                |      | 220-240V 50Hz              |           |               |
| <b>380V</b> |           |               |                 |                                |      | 380-415V 50Hz              |           |               |
| <b>400V</b> | 660V      | AC3           |                 |                                |      |                            |           |               |
| <b>415V</b> | 500V      | 690V          | 400V            |                                |      |                            |           |               |
| <b>kW</b>   | <b>kW</b> | <b>kW</b>     | <b>A</b>        | <b>Type</b>                    |      |                            |           |               |

230  
400  
↓

## Plastic Enclosed, protected to IP65



| Rated Current (A) | Rated Power (kW) | Rated Power (kW) | Rated Power (kW) | Optional Extras | Wired to accept Overload Relay | Type        | Pack pcs. | Weight kg/pc. |
|-------------------|------------------|------------------|------------------|-----------------|--------------------------------|-------------|-----------|---------------|
| 7,5               | 7,5              | 11               | 16               | ST              | U3/32                          | K3NY15P ... | 1         | 1,8           |
| 15                | 18,5             | 15               | 30               | ST              |                                | K3NY26P ... | 1         | 1,8           |
| 22                | 30               | 22               | 45               | ST, H           | U3/42                          | K3Y40P ...  | 1         | 3,8           |
| 30                | 37               | 30               | 60               | ST, H           |                                | K3Y52P ...  | 1         | 4,2           |
| 45                | 55               | 45               | 85               | ST, H           | U3/74                          | K3Y80P ...  | 1         | 5,9           |
| 55                | 75               | 55               | 109              | ST, H           |                                | K3Y100P ... | 1         | 8,7           |

## Sheet Steel Enclosed, protected to IP54



| Rated Current (A) | Rated Power (kW) | Rated Power (kW) | Rated Power (kW) | Optional Extras | Wired to accept Overload Relay | Type        | Pack pcs. | Weight kg/pc. |
|-------------------|------------------|------------------|------------------|-----------------|--------------------------------|-------------|-----------|---------------|
| 7,5               | 7,5              | 11               | 16               | ST, H           | U3/32                          | K3NY15B ... | 1         | 2,8           |
| 15                | 18,5             | 15               | 30               | ST, H           |                                | K3NY26B ... | 1         | 2,8           |
| 22                | 30               | 22               | 45               | ST, H           | U3/42                          | K3Y40B ...  | 1         | 4,8           |
| 30                | 37               | 30               | 60               | ST, H           |                                | K3Y52B ...  | 1         | 5,2           |
| 45                | 55               | 45               | 85               | ST, H           | U3/74                          | K3Y80B ...  | 1         | 15            |
| 55                | 75               | 55               | 109              | ST, H           |                                | K3Y100B ... | 1         | 15            |
| 75                | 90               | 90               | 150              | ST, H           | U85                            | K3Y140B ... | 1         | 22            |
| 110               | 132              | 110              | 205              | ST, H           |                                | K3Y200B ... | 1         | 22            |

1) Coil voltage range and other coil voltages see page 94

### Type-suffix for optional extras

|                         |                  |         |
|-------------------------|------------------|---------|
| Start-Stop Push Buttons | .....T           | ...     |
| Selector Switch         | .....W           | ...     |
| Control Circuit Fuse    | <250V (1 piece)  | .....ST |
|                         | >250V (2 pieces) | .....ST |
| Run Hour Meter          | .....H           | ...     |

**Ordering Example:** Star-Delta Starter, steel sheet enclosed, with selector switch and run hour meter rated AC3 at 400V 82A, rated control voltage 230V 50Hz - **Order Type: K3Y80BWH 230 + U3/74 52**

## Enclosures for Star Delta Starter



| for Starter             | accept Overload Relay | Type         | Pack pcs. | Weight kg/pc. |
|-------------------------|-----------------------|--------------|-----------|---------------|
| <b>Plastic IP65</b>     |                       |              |           |               |
| K3NY15, K3NY26          | U3/32                 | K3Y26P-G3    | 1         | 1,0           |
| K3Y40, K3Y52            | U3/42, U3/32          | K3Y40/52P-G3 | 1         | 2,4           |
| <b>Sheet Steel IP54</b> |                       |              |           |               |
| K3NY15, K3NY26          | U3/32                 | K3Y26B-G3    | 1         | 3,4           |
| K3Y40, K3Y52            | U3/42, U3/32          | K3Y40/52B-G3 | 1         | 3,4           |

## Star-Delta Starter Connector



For Star-Delta Starter Types

|                | Type             | Pack pcs. | Weight kg/pc. |
|----------------|------------------|-----------|---------------|
| K3NY15, K3NY26 | <b>K3NY-VB10</b> | 1         | 0,02          |
| K3Y40, K3Y52   | <b>K3Y-VB24</b>  | 1         | 0,03          |

## Additional Terminals



For Star-Delta Starter Types  
Line Conn. Motor Conn.  
Line Contactor Overload Relay

Cable cross-section mm<sup>2</sup>

Type

Pack pcs. Weight kg/pc.

### Single pole with Fingertouch Protection

|                |        |                                   |               |   |       |
|----------------|--------|-----------------------------------|---------------|---|-------|
| K3NY15, K3NY26 | U12/16 | 0,75 - 10 solid<br>0,75 - 6 flex. | <b>LG9339</b> | 6 | 0,009 |
|----------------|--------|-----------------------------------|---------------|---|-------|

### Three-pole with Fingertouch Protection

|  |       |                                |               |   |       |
|--|-------|--------------------------------|---------------|---|-------|
|  | U3/42 | 4 - 35 strand.<br>4 - 25 flex. | <b>LG7559</b> | 1 | 0,052 |
|--|-------|--------------------------------|---------------|---|-------|

## Electronic Timers for Star-Delta Starters<sup>1)</sup>



| Rated Control Voltage V | Time Range s | Delay Time ms | Rated Current 230V A | Rated Current 400V A | Type            | Pack pcs. | Weight kg/pc. |
|-------------------------|--------------|---------------|----------------------|----------------------|-----------------|-----------|---------------|
| 24 - 60V AC             | 1 - 20       | 20 - 25       | 6                    | 4                    | <b>Y9A 60</b>   | 1         | 0,075         |
| 110 - 415V AC           | 1 - 20       | 20 - 25       | 6                    | 4                    | <b>Y9A 415</b>  | 1         | 0,075         |
| 24 - 60V~               | 1 - 20       | 40 - 80       | 6                    | 4                    | <b>Y9AL 60</b>  | 1         | 0,075         |
| 110 - 415V~             | 1 - 20       | 40 - 80       | 6                    | 4                    | <b>Y9AL 415</b> | 1         | 0,075         |

|                                     |            |                      |                      |              |
|-------------------------------------|------------|----------------------|----------------------|--------------|
| Time repeat accuracy                | ± 1%       | Power consumption at | 24V<br>60V           | 0,2VA<br>5VA |
| Minimum interval between operations | 2s         |                      | 220-240V<br>380-415V | 2VA<br>7VA   |
| Short circuit protection            | 4A gl (gG) |                      |                      |              |

1) not suitable for contactors K3-450 - K3-1200

## Mounting Bar



| Specification                               | Type          | Pack pcs. | Weight kg/pc. |
|---|---------------|-----------|---------------|
| For screw mounting of electronic timer Y9.. | <b>LG7735</b> | 10        | 0,09          |

## Star-Delta Starters in Special Versions

### Starters for Longer Starting Time

For longer starting times the thermal overload relay is mounted on delta-contactor. The motor is not protected in Y-connection. The timer used for this starter-type is the type Y91A, time range is 10 to 60s. Principal wiring diagram see page 98.

**Ordering Example:** K3YL52 230

### Starters with two Thermal Overload Relays on request

Basic circuit diagram see page 98



## Reversing Contactors with Mechanical Interlock

AC Operated

| Ratings                           |            | Rated<br>Current | Wired<br>to accept<br>Overload<br>Relay<br>page 114<br>Type | Type | Coil voltage <sup>1)</sup><br>110V 50Hz<br>220-240V 50Hz<br>380-415 50Hz | Pack<br>pcs. | Weight ><br>kg/pc. |
|-----------------------------------|------------|------------------|---|------|--|--------------|--------------------|
| AC3<br>380V<br>400V<br>415V<br>kW | 500V<br>kW |                  |   |      |  |              |                    |
| 660V<br>AC3                       |            |                  |   |      |  |              |                    |
| 690V<br>400V                      |            |                  |   |      |  |              |                    |
|                                   |            | A                |   |      |  |              |                    |

### Open Type

|            |      |      |    |                     |                    |   |     |
|------------|------|------|----|---------------------|--------------------|---|-----|
| <b>4</b>   | 5,5  | 5,5  | 10 | U3/32<br>U12/16E K3 | <b>K3NWU10</b> ... | 1 | 0,6 |
| <b>7,5</b> | 10   | 7,5  | 18 |                     | <b>K3NWU18</b> ... | 1 | 0,6 |
| <b>11</b>  | 15   | 15   | 24 | U3/42               | <b>K3WU24</b> ...  | 1 | 1,2 |
| <b>15</b>  | 18,5 | 18,5 | 32 |                     | <b>K3WU32</b> ...  | 1 | 1,4 |
| <b>22</b>  | 30   | 30   | 50 | U3/74               | <b>K3WU50</b> ...  | 1 | 2,5 |
| <b>30</b>  | 37   | 37   | 62 |                     | <b>K3WU62</b> ...  | 1 | 2,5 |
| <b>37</b>  | 45   | 45   | 74 |                     | <b>K3WU74</b> ...  | 1 | 2,5 |



### Sheet Steel Enclosed, protected to IP54

|            |      |      |    |       |                     |   |     |
|------------|------|------|----|-------|---------------------|---|-----|
| <b>4</b>   | 5,5  | 5,5  | 10 | U3/32 | <b>K3NWU10B</b> ... | 1 | 3,9 |
| <b>7,5</b> | 10   | 7,5  | 18 |       | <b>K3NWU18B</b> ... | 1 | 4,1 |
| <b>11</b>  | 15   | 15   | 24 | U3/42 | <b>K3WU24B</b> ...  | 1 | 4,5 |
| <b>15</b>  | 18,5 | 18,5 | 32 |       | <b>K3WU32B</b> ...  | 1 | 4,7 |
| <b>22</b>  | 30   | 30   | 50 | U3/74 | <b>K3WU50B</b> ...  | 1 | 7,1 |
| <b>30</b>  | 37   | 37   | 62 |       | <b>K3WU62B</b> ...  | 1 | 7,1 |



## Reversing Starter Connector



For Reversing Starter Types

|                  | Type             | Pack<br>pcs. | Weight<br>kg/pc. |
|------------------|------------------|--------------|------------------|
| K3NWU10, K3NWU18 | <b>K3NW-VB10</b> | 1            | 0,02             |
| K3WU24, K3WU32   | <b>K3W-VB24</b>  | 1            | 0,025            |

1) Other coil voltages see page 51

| Components for Combinations |                           | Mechanical Interlock | Reversing Starter Connector | Auxiliary Contacts Built-in for use on Contactor |          | Free Space for Aux. Contact Blocks on Contactor |    |
|-----------------------------|---------------------------|----------------------|-----------------------------|--|----------|---|----|
| Left Hand Side Contactor    | Right Hand Side Contactor |                      |                             | K1 NO/NC   | K2 NO/NC | K1 HN.. or HA..                                 | K2 |
| K1 Type                     | K2 Type                   | Type                 | Type                        |  |          |   |    |
| K3-10ND10 + HN01            | K3-10ND10 + HN01          | LG10889              | K3NW-VB10                   | -  | -        | 3   | 3  |
| K3-18ND10 + HN01            | K3-18ND10 + HN01          | LG10889              | K3NW-VB10                   | -  | -        | 3   | 3  |
| K3-24A00 + HN10 + HN01      | K3-24A00 + HN10 + HN01    | LG10889              | K3W-VB24                    | -  | -        | 2   | 2  |
| K3-32A00 + HN10 + HN01      | K3-32A00 + HN10 + HN01    | LG10889              | K3W-VB24                    | -  | -        | 2   | 2  |
| K3-50A00 + HN10 + HN01      | K3-50A00 + HN10 + HN01    | LG10890              | -                           | -  | -        | 2   | 2  |
| K3-62A00 + HN10 + HN01      | K3-62A00 + HN10 + HN01    | LG10890              | -                           | -  | -        | 2   | 2  |
| K3-74A00 + HN10 + HN01      | K3-74A00 + HN10 + HN01    | LG10890              | -                           | -  | -        | 2   | 2  |
|                             |                           |                      |                             |  |          |   |    |
| K3-10ND10 + HN01            | K3-10ND10 + HN01          | LG10889              | K3NW-VB10                   | -  | -        | 3   | 3  |
| K3-18ND10 + HN01            | K3-18ND10 + HN01          | LG10889              | K3NW-VB10                   | -  | -        | 3   | 3  |
| K3-24A00 + HN10 + HN01      | K3-24A00 + HN10 + HN01    | LG10889              | K3W-VB24                    | -  | -        | 2   | 2  |
| K3-32A00 + HN10 + HN01      | K3-32A00 + HN10 + HN01    | LG10889              | K3W-VB24                    | -  | -        | 2   | 2  |
| K3-50A00 + HN10 + HN01      | K3-50A00 + HN10 + HN01    | LG10890              | -                           | -  | -        | 2   | 2  |
| K3-62A00 + HN10 + HN01      | K3-62A00 + HN10 + HN01    | LG10890              | -                           | -  | -        | 2   | 2  |

Contactors, Motor-Starters

Circuit Breakers

Manual Motor-Starters

Switches

AC-Main Switches

DC-Switch Disconnectors

Push Buttons

Representatives, Suppliers

## Reversing Contactors for North America

AC Operated

| Ratings     |      | Rated Current | Wired to accept Overload Relay page 114 Type | Type | Coil voltage <sup>1)</sup><br>220-240V 50Hz<br>380-415V 50Hz | Pack pcs. | Weight > kg/pc. |
|-------------|------|---------------|--|------|--|-----------|-----------------|
| AC3 at      |      |               |  |      |  |           |                 |
| <b>380V</b> |      |               |  |      |  |           |                 |
| <b>400V</b> |      | 660V          | AC3  |      |  |           |                 |
| <b>415V</b> | 500V | 690V          | 400V   |      |  |           |                 |
| <b>kW</b>   | kW   | kW            | A  |      |  |           |                 |

Open Type

|             |      |      |    |                     |                      |   |     |
|-------------|------|------|----|---------------------|----------------------|---|-----|
| <b>4</b>    | 5,5  | 5,5  | 10 | U3/32<br>U12/16E K3 | <b>KNW3-10</b> . . . | 1 | 0,6 |
| <b>7,5</b>  | 10   | 10   | 18 |                     | <b>KNW3-18</b> . . . | 1 | 0,6 |
| <b>11</b>   | 15   | 15   | 24 | U3/42               | <b>KW3-24</b> . . .  | 1 | 1,2 |
| <b>15</b>   | 18,5 | 18,5 | 32 |                     | <b>KW3-32</b> . . .  | 1 | 1,4 |
| <b>18,5</b> | 18,5 | 18,5 | 40 |                     | <b>KW3-40</b> . . .  | 1 | 1,4 |



## Pole Changing Starters

AC Operated

| Ratings     |      | Rated Current | Wired to accept Overload Relay page 114 Type | Type | Coil voltage <sup>1)</sup><br>220-240V 50Hz<br>380-415V 50Hz | Pack pcs. | Weight > kg/pc. |
|-------------|------|---------------|--|------|--|-----------|-----------------|
| AC3 at      |      |               |  |      |  |           |                 |
| <b>380V</b> |      |               |  |      |  |           |                 |
| <b>400V</b> |      | 660V          | AC3  |      |  |           |                 |
| <b>415V</b> | 500V | 690V          | 400V   |      |  |           |                 |
| <b>kW</b>   | kW   | kW            | A  |      |  |           |                 |

Open Type

|            |      |      |    |                             |                      |   |     |
|------------|------|------|----|-----------------------------|----------------------|---|-----|
| <b>7,5</b> | 10   | 10   | 18 | 2 x U3/32<br>2 x U12/16E K3 | <b>K3NPU18</b> . . . | 1 | 1,0 |
| <b>11</b>  | 15   | 15   | 24 |                             | <b>K3NPU24</b> . . . | 1 | 1,5 |
| <b>15</b>  | 18,5 | 18,5 | 32 | 2 x U3/32                   | <b>K3PU32</b> . . .  | 1 | 1,9 |
| <b>22</b>  | 30   | 30   | 50 | 2 x U3/74                   | <b>K3PU50</b> . . .  | 1 | 3,9 |
| <b>30</b>  | 37   | 37   | 62 |                             | <b>K3PU62</b> . . .  | 1 | 3,9 |



Sheet Steel Enclosed, protected to IP54

|            |      |      |    |          |                       |   |     |
|------------|------|------|----|----------|-----------------------|---|-----|
| <b>7,5</b> | 10   | 7,5  | 18 | 2x U3/32 | <b>K3NPU18B</b> . . . | 1 | 1,0 |
| <b>11</b>  | 15   | 15   | 24 |          | <b>K3NPU24B</b> . . . | 1 | 1,5 |
| <b>15</b>  | 18,5 | 18,5 | 32 |          | <b>K3PU32B</b> . . .  | 1 | 1,9 |



1) Other coil voltages see page 50

**Ordering Example:** Pole Changing Starter, open version, rated AC3 at 400V 28A and 15A, control voltage 230V 50Hz  
**Order Type:** **K3PU32 230 + U3/32 32 + U3/32 18**

Pole Changing Starters for Star-Delta Operation on request

1) Other coil voltages see page 51

| Components for Combinations |                           | Mechanical Interlock | Auxiliary Contacts Built-in for use on Contactor |          | Free Space for Aux. Contact Blocks on Contactor |    |
|-----------------------------|---------------------------|----------------------|--|----------|---|----|
| Left Hand Side Contactor    | Right Hand Side Contactor |                      | K1 NO/NC   | K2 NO/NC | K1 HN.. or HA..                                 | K2 |
| K1 Type                     | K2 Type                   | Type                 |  |          |   |    |
| K3-10ND01                   | K3-10ND01                 | LG10889              | -  | -        | 4   | 4  |
| K3-18ND01                   | K3-18ND01                 | LG10889              | -  | -        | 4   | 4  |
| K3-24A00 + HN01             | K3-24A00 + HN01           | LG10889              | -  | -        | 3   | 3  |
| K3-32A00 + HN01             | K3-32A00 + HN01           | LG10889              | -  | -        | 3   | 3  |
| K3-40A00 + HN01             | K3-40A00 + HN01           | LG10890              | -  | -        | 3   | 3  |

| Components for Combinations |                        | Star Contactor  | Free Space for Aux. Contact Blocks on Contactor |              |         |
|-----------------------------|------------------------|-----------------|---|--------------|---------|
| High Speed                  | Low Speed              |                 | High Speed K1 HN.. or HA..                      | Low Speed K2 | Star K3 |
| K1 Type                     | K2 Type                | K3 Type         |   |              |         |
| K3-18ND01 + 2 x HN10        | K3-18ND01 + HN10       | K3-14ND10       | 2   | 3            | 4       |
| K3-24A00 + HN01 + 2 x HN10  | K3-24A00 + HN01 + HN10 | K3-18ND10       | 1   | 2            | 4       |
| K3-32A00 + HN01 + 2 x HN10  | K3-32A00 + HN01 + HN10 | K3-24A00 + HN10 | 1   | 2            | 3       |
| K3-50A00 + HN01 + 2 x HN10  | K3-50A00 + HN01 + HN10 | K3-32A00 + HN10 | 1   | 2            | 3       |
| K3-62A00 + HN01 + 2 x HN10  | K3-62A00 + HN01 + HN10 | K3-50A00 + HN10 | 1   | 2            | 3       |
| K3-18ND01 + 2 x HN10        | K3-18ND01 + HN10       | K3-14ND10       | 2   | 3            | 4       |
| K3-24A00 + HN01 + 2 x HN10  | K3-24A00 + HN01 + HN10 | K3-18ND10       | 1   | 2            | 4       |
| K3-32A00 + HN01 + 2 x HN10  | K3-32A00 + HN01 + HN10 | K3-24A00 + HN10 | 1   | 2            | 3       |

# Star-Delta Starters

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

| Type   |   | K3NY15                | K3NY26    | K3Y40     | K3Y52     | K3Y80                 | K3Y100     | K3Y140     | K3Y200     | K3Y240     | K3Y300     |
|--|---|-----------------------|-----------|-----------|-----------|-----------------------|------------|------------|------------|------------|------------|
| <b>Main Contacts</b>                                   |   |                       |           |           |           |                       |            |            |            |            |            |
| <b>Rated insulation voltage <math>U_i^{(1)}</math></b> | V AC  | 690                   | 690       | 690       | 690       | 690                   | 690        | 690        | 690        | 690        | 690        |
| <b>Frequency of operations <math>z</math></b>          | AC3, $I_e$ 1/h                                    |                       |           |           |           | 15                    |            |            |            |            |            |
| <b>Change-over time max. (Y-step)</b>                  | s   |                       |           |           |           | 20 (Type K3YL ... 60) |            |            |            |            |            |
| <b>Utilization category AC3</b>                        |   |                       |           |           |           |                       |            |            |            |            |            |
| <b>Switching of three-phase motors</b>                 |   |                       |           |           |           |                       |            |            |            |            |            |
| Rated operational current $I_e$                        | 220-230V A  | 16                    | 30        | 45        | 60        | 85                    | 109        | 150        | 205        | 240        | 300        |
|  | 240V A  | 16                    | 30        | 45        | 60        | 85                    | 109        | 150        | 205        | 240        | 300        |
|  | <b>380-400V A</b>                                 | <b>16</b>             | <b>30</b> | <b>45</b> | <b>60</b> | <b>85</b>             | <b>109</b> | <b>150</b> | <b>205</b> | 240        | 300        |
|  | 415-440V A  | 15                    | 30        | 45        | 60        | 85                    | 109        | 150        | 205        | 240        | 300        |
|  | 500V A  | 15                    | 30        | 45        | 60        | 85                    | 95         | 150        | 205        | 190        | 240        |
|  | 660-690V A  | 13                    | 17        | 30        | 36        | 57                    | 72         | 103        | 118        | 147        | 180        |
| Rated operational power of three-phase motors 50-60Hz  | 220-230V kW                                       | 4                     | 7,5       | 11        | 15        | 22                    | 30         | 45         | 55         | 75         | 90         |
|  | 240V kW   | 5,5                   | 11        | 15        | 18,5      | 22                    | 30         | 45         | 55         | 75         | 90         |
|  | <b>380-400V kW</b>                                | <b>7,5</b>            | <b>15</b> | <b>22</b> | <b>30</b> | <b>45</b>             | <b>55</b>  | <b>75</b>  | <b>110</b> | <b>132</b> | <b>160</b> |
|  | 415-440V kW                                       | 7,5                   | 15        | 22        | 30        | 45                    | 55         | 75         | 110        | 140        | 170        |
|  | 500V kW   | 7,5                   | 18,5      | 30        | 37        | 55                    | 75         | 90         | 132        | 132        | 180        |
|  | 660-690V kW                                       | 11                    | 15        | 22        | 30        | 45                    | 55         | 90         | 110        | 132        | 180        |
| <b>Cable cross-sections</b>                            |   |                       |           |           |           |                       |            |            |            |            |            |
| Line   | solid or stranded mm <sup>2</sup>                 | 1,5 - 6 <sup>2)</sup> |           | 1,5 - 16  |           | 10 - 70 <sup>3)</sup> |            | 10 - 120   |            | busbar     |            |
|  | flexible mm <sup>2</sup>                          | 1,5 - 4 <sup>2)</sup> |           | 1,5 - 16  |           | 16 - 50 <sup>3)</sup> |            | 10 - 95    |            | 18x5       |            |
|  | flexible with multicore cable end mm <sup>2</sup> | 1,5 - 4 <sup>2)</sup> |           | 1,5 - 16  |           | 10 - 35               |            | 10 - 95    |            | M8         |            |
| Motor  | solid or stranded mm <sup>2</sup>                 | 1,5 - 6               |           | 1,5 - 16  |           | 4 - 35 <sup>3)</sup>  |            | 10 - 120   |            | busbar     |            |
|  | flexible mm <sup>2</sup>                          | 1,5 - 4               |           | 1,5 - 16  |           | 6 - 25 <sup>3)</sup>  |            | 10 - 95    |            | 18x5       |            |
|  | flexible with multicore cable end mm <sup>2</sup> | 1,5 - 4               |           | 1,5 - 16  |           | 4 - 25                |            | 10 - 95    |            | M8         |            |
| <b>Power consumption of the combination</b>            |   |                       |           |           |           |                       |            |            |            |            |            |
|  | inrush and change-over VA                         | 55                    |           | 130       |           | 183                   |            | 560        |            | 700        |            |
|  | sealed VA   | 20                    |           | 26        |           | 36                    |            | 10         |            | 10         |            |
|  | W   | 6                     |           | 8         |           | 14                    |            | 10         |            | 10         |            |

## Coil Voltage Ranges and Non Standard Voltages for Star-Delta Starters

### K3NY15.. to K3Y100..

| Suffix to Star-Delta Starter type<br>e.g. K3Y80 <b>400</b> | Rated Control Voltage $U_s$ |            |                |            |
|--|-----------------------------|------------|----------------|------------|
|  | range for 50Hz              |            | range for 60Hz |            |
|  | min. V                      | max. V     | min. V         | max. V     |
| 24   | 24                          | 24         | 24             | 27         |
| 42   | 42                          | 47         | 47             | 52         |
| 110  | 100                         | 110        | 110            | 122        |
| 180  | 180                         | 210        | 200            | 240        |
| <b>230</b>   | <b>220</b>                  | <b>240</b> | <b>230</b>     | <b>264</b> |
| <b>400</b>   | <b>380</b>                  | <b>415</b> | <b>400</b>     | <b>415</b> |

### K3Y140, to K3Y300..

| Suffix to Star-Delta Starter type<br>e.g. K3Y300 <b>230</b> | Rated Control Voltage $U_s$ |            |                |            |            |
|---|-----------------------------|------------|----------------|------------|------------|
|   | range for 50Hz              |            | range for 60Hz |            | for DC     |
|   | min. V                      | max. V     | min. V         | max. V     | V          |
| 24  | 24                          | 24         | 24             | 24         | 24         |
| 48  | 48                          | 48         | 48             | 48         | 48         |
| 110   | 110                         | 120        | 110            | 120        | 110        |
| <b>230</b>  | <b>220</b>                  | <b>240</b> | <b>220</b>     | <b>240</b> | <b>220</b> |
| <b>400</b>  | <b>380</b>                  | <b>415</b> | <b>380</b>     | <b>415</b> | -          |

Standard voltages in bold type letters

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry):  $U_{imp} = 8kV$ . Data for other conditions on request.

2) Additional terminals see page 89

3) Maximum cable cross-section with prepared conductor

## Reversing Starters

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

| Type  |                                   | K3NWU10         | K3NWU18    | K3WU24    | K3WU32    | K3WU50    | K3WU62    | K3WU74    |
|---|-----------------------------------|-----------------|------------|-----------|-----------|-----------|-----------|-----------|
| <b>Main Contacts</b>                          |                                   |                 |            |           |           |           |           |           |
| Rated insulation voltage $U_i^{1)}$           | V AC                              | 690             | 690        | 690       | 690       | 690       | 690       | 690       |
| <b>Utilization category AC3</b>               |                                   |                 |            |           |           |           |           |           |
| <b>Switching of three-phase motors</b>        |                                   |                 |            |           |           |           |           |           |
| Rated operational current $I_e$               |                                   |                 |            |           |           |           |           |           |
|   | 220V A                            | 12              | 18         | 23        | 30        | 45        | 63        |           |
|   | 230V A                            | 11,5            | 18         | 24        | 32        | 50        | 62        | 74        |
|   | 240V A                            | 11              | 18         | 24        | 32        | 50        | 62        | 74        |
|   | <b>380-400V A</b>                 | <b>10</b>       | <b>18</b>  | <b>24</b> | <b>32</b> | <b>50</b> | <b>62</b> | <b>74</b> |
|   | 415-440V A                        | 9               | 18         | 23        | 30        | 50        | 62        | 74        |
|   | 500V A                            | 9               | 16         | 23        | 30        | 45        | 60        | 74        |
|   | 660-690V A                        | 6,5             | 8,5        | 17        | 20        | 31        | 40        | 40        |
| Rated operational power of three-phase motors |                                   |                 |            |           |           |           |           |           |
|   | 220-230V kW                       | 3               | 5          | 6         | 8,5       | 12,5      | 18,5      |           |
|   | 240V kW                           | 3               | 5          | 7         | 9         | 13,5      | 19        | 23        |
|   | <b>380-400V kW</b>                | <b>4</b>        | <b>7,5</b> | <b>11</b> | <b>15</b> | <b>22</b> | <b>30</b> | <b>37</b> |
|   | 415-440V kW                       | 4,5             | 8,5        | 12        | 16        | 24        | 33        | 40        |
|   | 500V kW                           | 5,5             | 10         | 15        | 18,5      | 30        | 37        | 45        |
|   | 660-690V kW                       | 5,5             | 10         | 15        | 18,5      | 30        | 37        | 45        |
| <b>Cable cross-sections</b>                   |                                   |                 |            |           |           |           |           |           |
| Line  | solid or stranded                 | mm <sup>2</sup> | 0,75 - 6   | 1,5 - 25  | 4 - 50    |           |           |           |
|   | flexible                          | mm <sup>2</sup> | 1 - 4      | 2,5 - 16  | 6 - 35    |           |           |           |
|   | flexible with multicore cable end | mm <sup>2</sup> | 0,75 - 4   | 1,5 - 16  | 6 - 35    |           |           |           |
| Cables per clamp                              |                                   |                 | 1          | 1         | 1         |           |           |           |
| <b>Power consumption of the combination</b>   |                                   |                 |            |           |           |           |           |           |
|   | inrush and change-over            | VA              | 33 - 45    | 90 - 115  | 140 - 185 |           |           |           |
|   | sealed                            | VA              | 7 - 10     | 9 - 13    | 13 - 18   |           |           |           |
|   |                                   | W               | 2,6 - 3    | 2,7 - 4   | 5,4 - 7   |           |           |           |

## Technical Data according to UL508

| Main Contacts (cULus)                                       | Type        | KNW3-10 | KNW3-18 | KW3-24  | KW3-32 | KW3-40 |
|---|-------------|---------|---------|---------|--------|--------|
| Rated operational power of three-phase motors at 60Hz (3ph) |             |         |         |         |        |        |
|   | 110-120V hp | 1½      | 2       | 5       | 5      | 7½     |
|   | 200V hp     | 3       | 5       | 7½      | 10     | 10     |
|   | 220-240V hp | 3       | 7½      | 10      | 10     | 15     |
|   | 277V hp     | 3       | 7½      | 7½      | 10     | 15     |
|   | 380-415V hp | 5       | 10      | 10      | 15     | 20     |
|   | 440-480V hp | 5       | 10      | 15      | 20     | 25     |
|   | 550-600V hp | 7½      | 15      | 20      | 25     | 30     |
| Fuse / Short-circuit current                                | A/kA        | 30/5    | 50/5    | 90/5    | 125/5  | 175/5  |
| Rated voltage   | V           | 600     | 600     | 600     | 600    | 600    |
| <b>Auxiliary Contacts (cULus)</b>                           |             | A600    | A600    | A600    | A600   | A600   |
| <b>Cable cross-sections</b>                                 |             |         |         |         |        |        |
| for main connectors   | solid       | AWG     | 18 - 10 | 16 - 10 |        |        |
|   | flexible    | AWG     | 18 - 10 | 14 - 4  |        |        |
| Cables per clamp  |             |         | 1       | 1       |        |        |

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry):  $U_{imp} = 8kV$ . Data for other conditions on request.

## Pole Changing Starters

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

| Type  |                                   | K3NPU18         | K3NPU24   | K3PU32    | K3PU50    | K3PU62    |
|---|-----------------------------------|-----------------|-----------|-----------|-----------|-----------|
| <b>Main Contacts</b>                                  |                                   |                 |           |           |           |           |
| Rated insulation voltage $U_i^{(1)}$                  | V AC                              | 690             | 690       | 690       | 690       | 690       |
| <b>Utilization category AC3</b>                       |                                   |                 |           |           |           |           |
| <b>Switching of three-phase motors</b>                |                                   |                 |           |           |           |           |
| Rated operational current $I_e$                       |                                   |                 |           |           |           |           |
| 220V  | A                                 | 18              | 23        | 30        | 45        | 63        |
| 230V  | A                                 | 17,5            | 23        | 30        | 45        | 60        |
| 240V  | A                                 | 17              | 23        | 30        | 45        | 60        |
| <b>380-400V</b>                                       | <b>A</b>                          | <b>16</b>       | <b>23</b> | <b>30</b> | <b>45</b> | <b>60</b> |
| 415V  | A                                 | 16              | 23        | 30        | 45        | 60        |
| 440V  | A                                 | 16              | 23        | 30        | 45        | 60        |
| 500V  | A                                 | 16              | 23        | 30        | 45        | 55        |
| 660V  | A                                 | 9               | 17,5      | 21        | 33        | 42        |
| 690V  | A                                 | 8,5             | 17        | 20        | 31        | 40        |
| Rated operational power of three-phase motors 50-60Hz |                                   |                 |           |           |           |           |
| 220-230V  | kW                                | 5               | 6         | 8,5       | 12,5      | 18,5      |
| 240V  | kW                                | 5               | 7         | 9         | 13,5      | 19        |
| <b>380-400V</b>                                       | <b>kW</b>                         | <b>7,5</b>      | <b>11</b> | <b>15</b> | <b>22</b> | <b>30</b> |
| 415-440V  | kW                                | 8,5             | 12        | 16        | 24        | 33        |
| 500V  | kW                                | 10              | 15        | 18,5      | 30        | 37        |
| 660-690V  | kW                                | 7,5             | 15        | 18,5      | 30        | 37        |
| <b>Cable cross-sections</b>                           |                                   |                 |           |           |           |           |
| Line  | solid or stranded                 | mm <sup>2</sup> | 0,75 - 6  | 1,5 - 25  | 4 - 50    |           |
|   | flexible                          | mm <sup>2</sup> | 1 - 4     | 2,5 - 16  | 6 - 35    |           |
|   | flexible with multicore cable end | mm <sup>2</sup> | 0,75 - 4  | 1,5 - 16  | 6 - 35    |           |
|   | cables per clamp                  |                 | 1         | 1         | 1         |           |
| <b>Power consumption of the combination</b>           |                                   |                 |           |           |           |           |
|   | inrush and change-over            | VA              | 55        | 128       | 178       |           |
|   | sealed                            | VA              | 20        | 26        | 31        |           |
|   |                                   | W               | 6         | 8         | 11        |           |

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry):  $U_{imp} = 8kV$ . Data for other conditions on request.

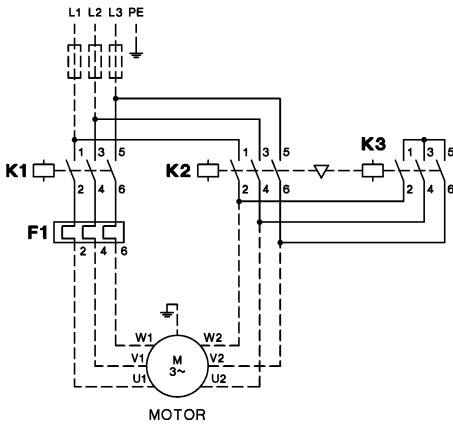
# Star-Delta Starters

## Wiring Diagrams Main Circuit

Terminal markings of contactors and relays according to DIN EN 50012  
Connections shown in main and circuits as broken lines are not included.

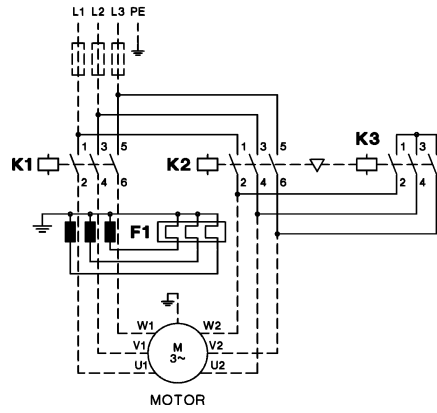
### K3NY15 to K3Y100

with thermal overload relay U3/.. or U12/16



### K3Y140 to K3Y300

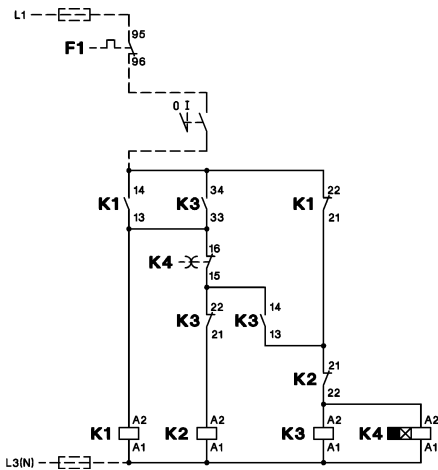
with thermal overload relay U85 or U180



## Wiring Diagrams Control Circuit

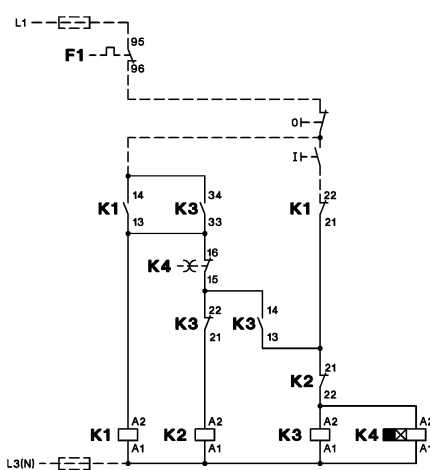
### K3NY15 to K3Y52

operating with control switch



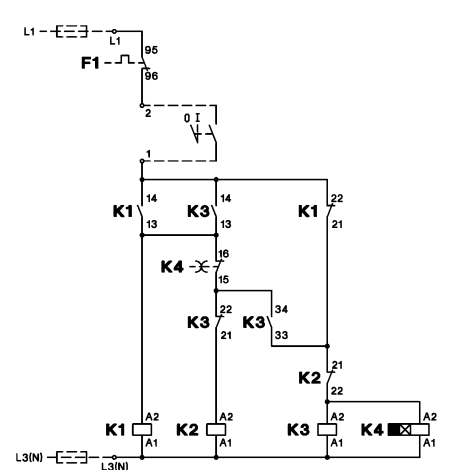
### K3NY15 to K3Y52

operating with push buttons



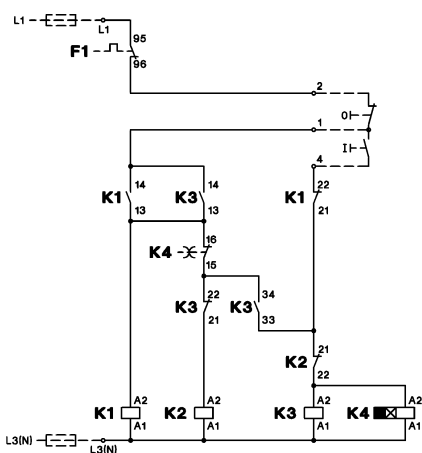
### K3Y80 to K3Y200

operating with control switch



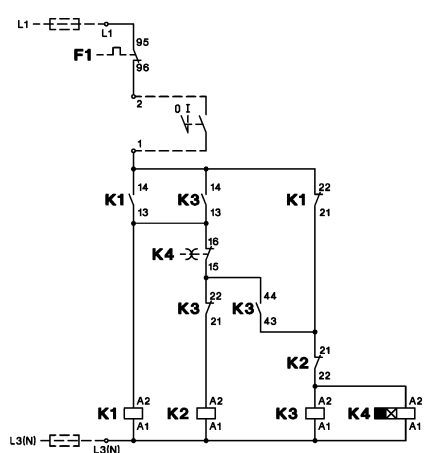
### K3Y80 to K3Y200

operating with push buttons



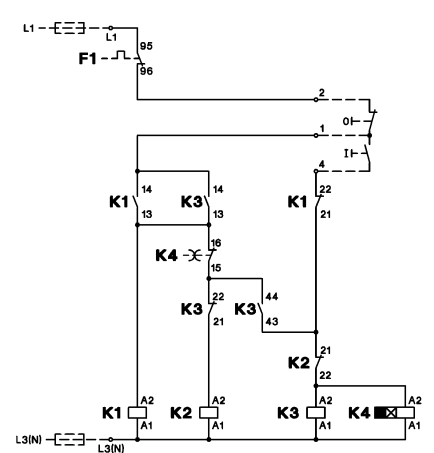
### K3Y240 to K3Y300

operating with control switch



### K3Y240 to K3Y300

operating with push buttons



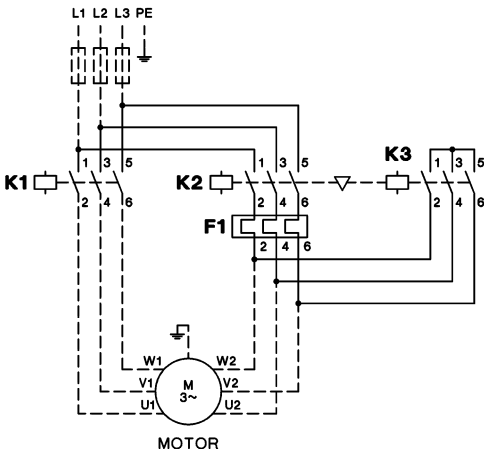


# Star-Delta Starters

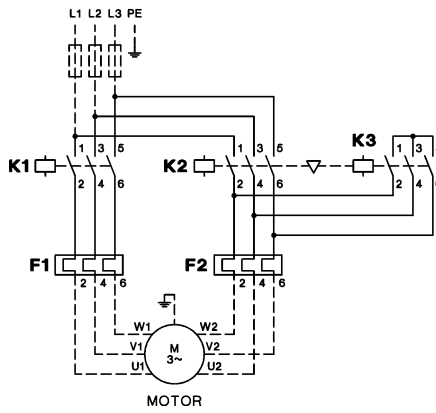
## Wiring Diagrams Main Circuit

Terminal markings of contactors and relays according to DIN EN 50012  
 Connections shown in main and control circuits as broken lines are not included.

**K3YL..**  
 Typical circuit diagram

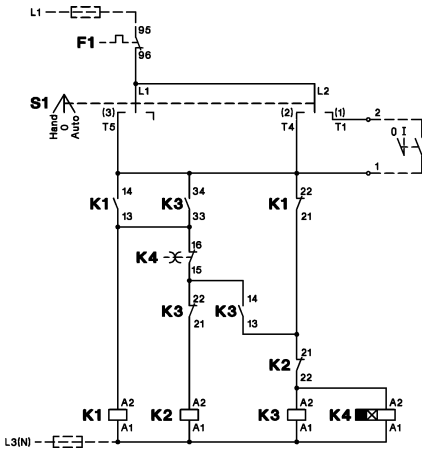


**K3Y.. with 2 Thermal Overload Relays**  
 Typical circuit diagram

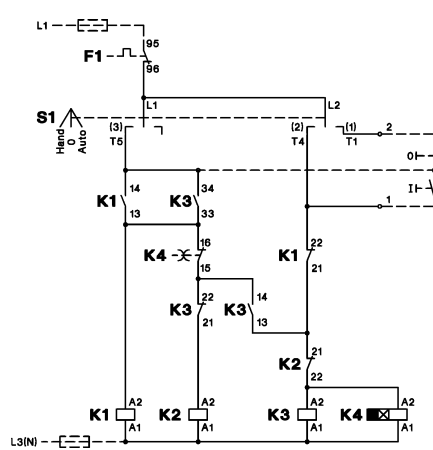


## Wiring Diagrams Control Circuit

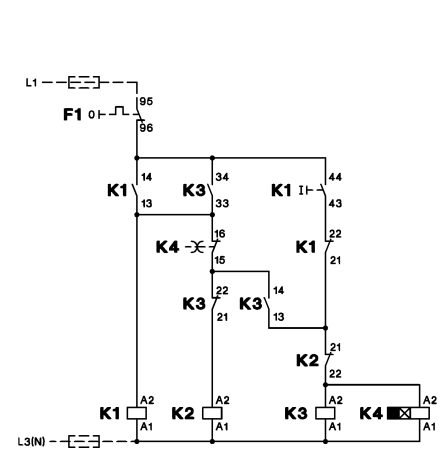
**with selector switch**  
**K3Y..W**  
 Typical circuit diagram  
 operating with control switch



Typical circuit diagram  
 operating with push buttons



**with push buttons**  
**K3Y..T**  
 Typical circuit diagram



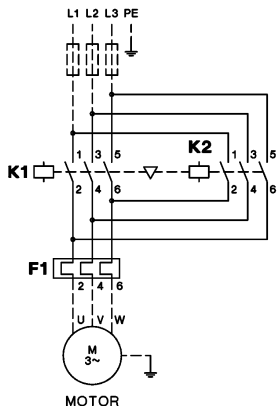
# Reversing Contactors

## Wiring Diagrams Main Circuit

Terminal markings of contactors and relays according to DIN EN 50012  
 Connections shown in main and control circuits as broken lines are not included.

### K3NWU10 to K3WU74

with thermal overload relay U3/32, U3/42 or U3/74



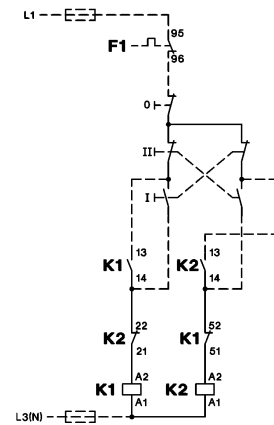
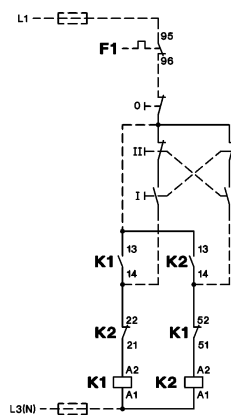
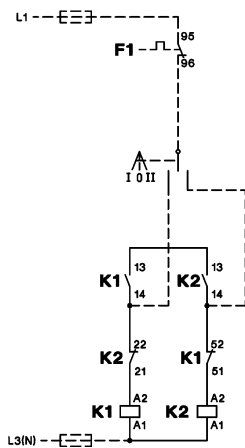
## Wiring Diagrams Control Circuit

### K3NWU10 to K3WU32

operating with control switch

operating with push buttons  
**Reversing over off-position**

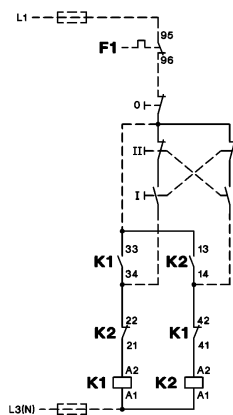
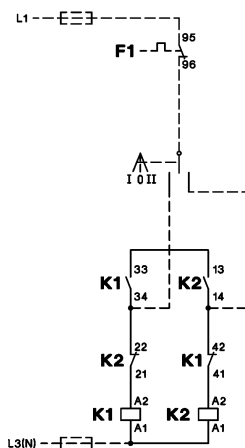
**Reversing direct**



### K3WU50, K3WU62, K3WU74

operating with control switch

operating with push buttons

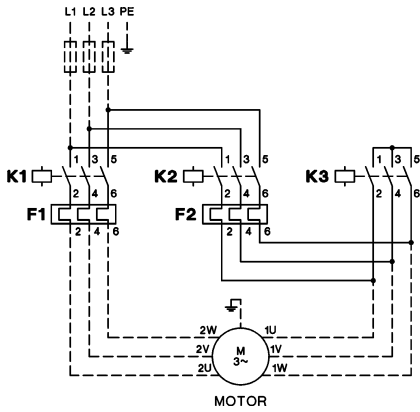


# Pole Changing Starters

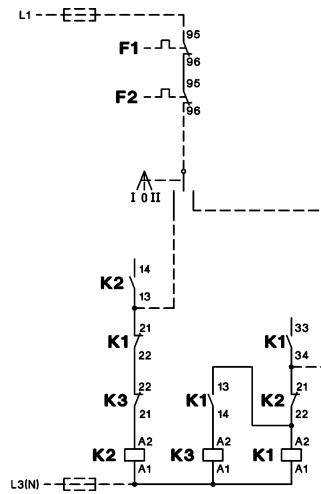
## Wiring Diagrams

Terminal markings of contactors and relays according to DIN EN 50012  
 Connections shown in main and control circuits as broken lines are not included.

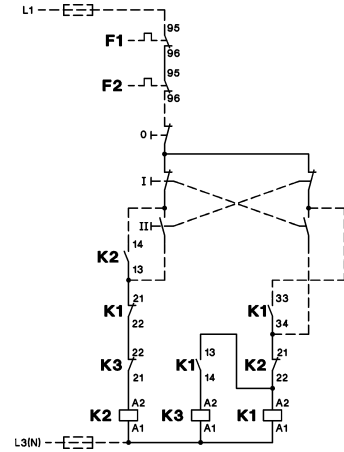
### Main Circuit



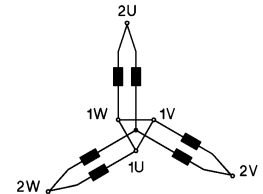
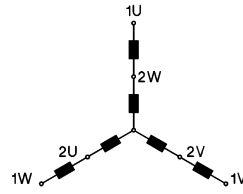
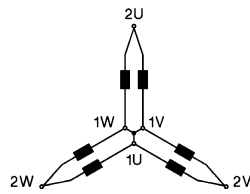
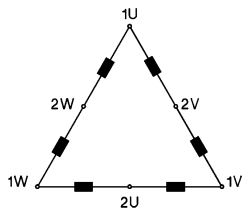
### Principal Control Circuit Wiring Diagram operating with control switch



### operating with push buttons



|                | Low speed | High speed  | Low speed | High speed  |
|----------------|-----------|-------------|-----------|-------------|
| Operation      | Delta     | Double-Star | Star      | Double-Star |
| Speed relation | 1         | 2           | 1         | 2           |
| Power relation | 1         | 1,5 - 1,8   | 0,3       | 1           |

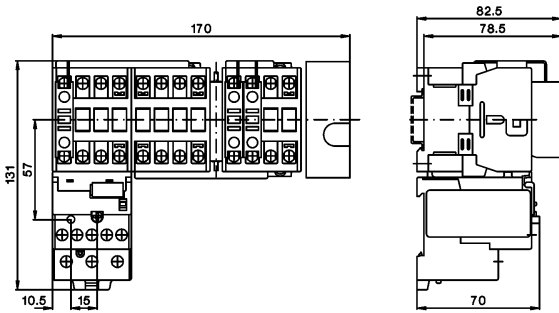


# Star-Delta Starters

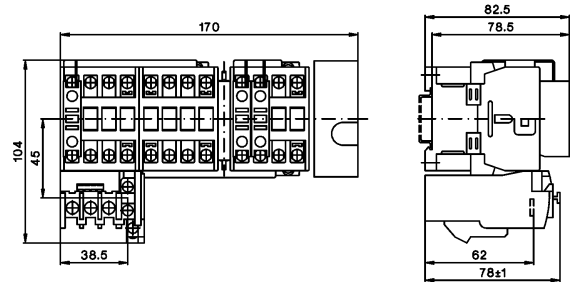
## Dimensions

Star-Delta Starters, AC operated, open type

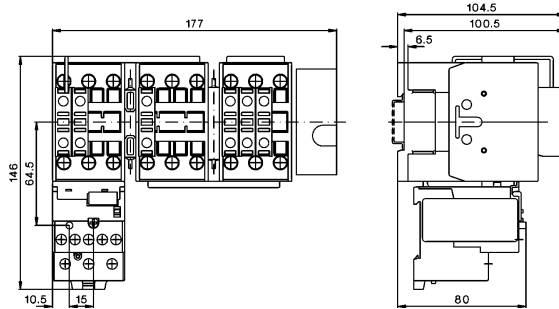
K3NY15 + U3/32  
K3NY26



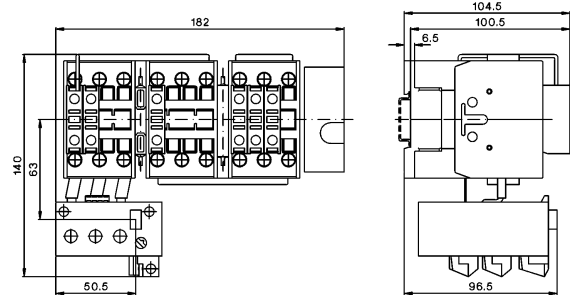
K3NY15 + U12/16E G3  
K3NY26



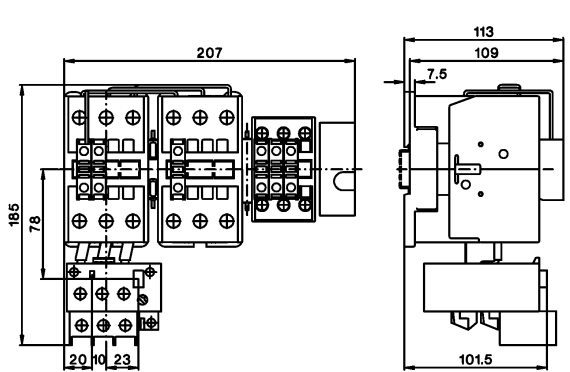
K3Y40 + U3/32  
K3Y52 + U3/32



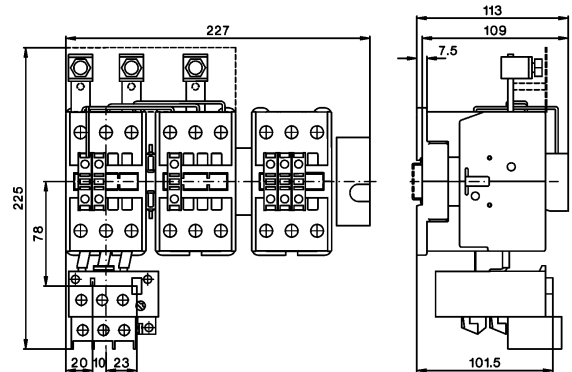
K3Y40 + U3/42  
K3Y52 + U3/42



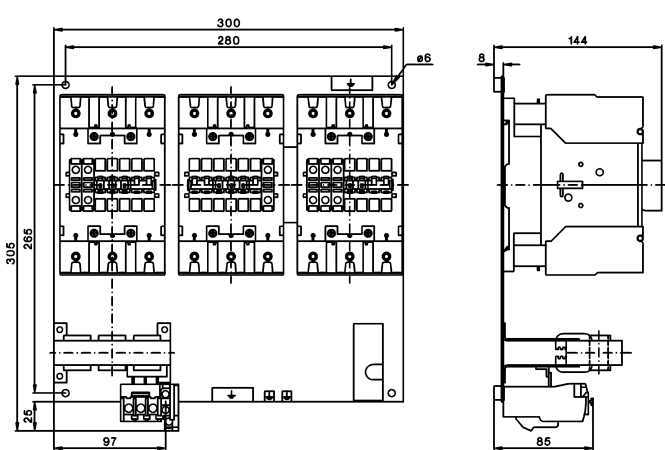
K3Y80 + U3/74



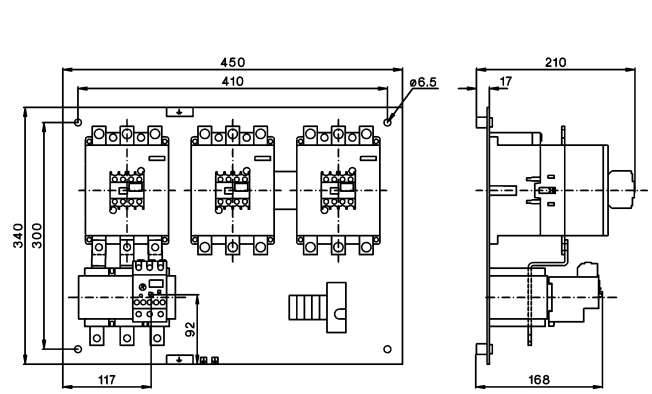
K3Y100 + U3/74



K3Y140 + U85  
K3Y200



K3Y240 + U180 + SU180/176  
K3Y300

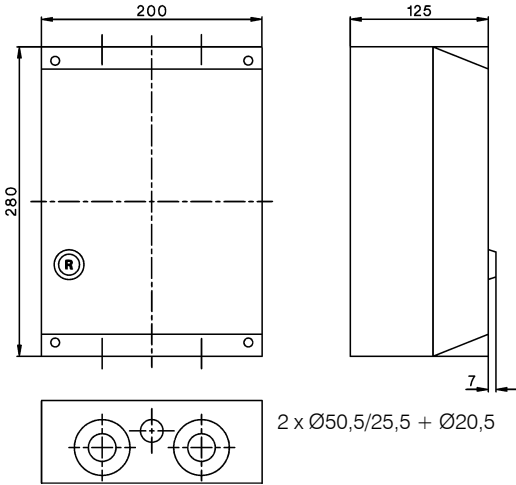


# Star-Delta Starters

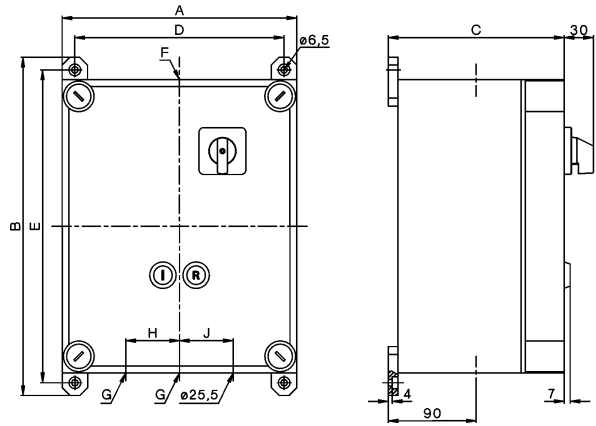
## Dimensions

Star-Delta Starters, plastic enclosed, protected to IP65

### K3NY26P



### K3Y40P to K2Y100P



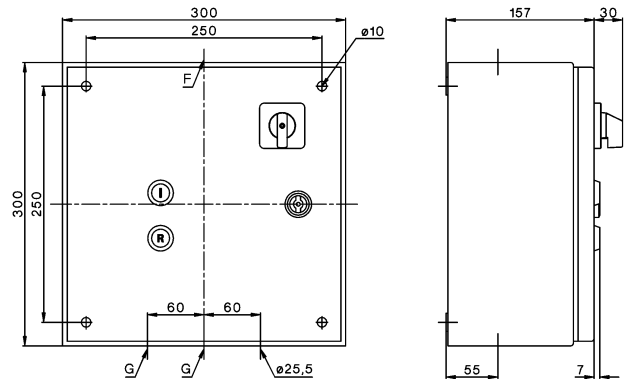
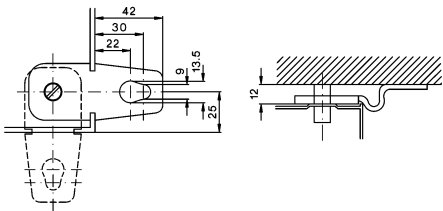
| Type    | A   | B   | C   | D   | E   | Ø F | Ø G  | H    | J  |    |
|---------|-----|-----|-----|-----|-----|-----|------|------|----|----|
| K3Y40P  | 300 | 346 | 180 | 272 | 320 | 6,5 | 32,5 | 32,5 | 60 | 60 |
| K3Y52P  | 300 | 346 | 180 | 272 | 320 | 6,5 | 32,5 | 32,5 | 60 | 60 |
| K3Y80P  | 300 | 446 | 180 | 272 | 420 | 6,5 | 40,5 | 40,5 | 70 | 70 |
| K3Y100P | 300 | 446 | 180 | 272 | 420 | 6,5 | 50,5 | 40,5 | 70 | 70 |

Star-Delta Starters, sheet steel enclosed, protected to IP54

### K3Y26B to K3Y52B

| Type    | Ø F  | Ø G  |
|---------|------|------|
| K3NY26B | 25,5 | 25,5 |
| K3Y40B  | 32,5 | 32,5 |
| K3Y52B  | 32,5 | 32,5 |

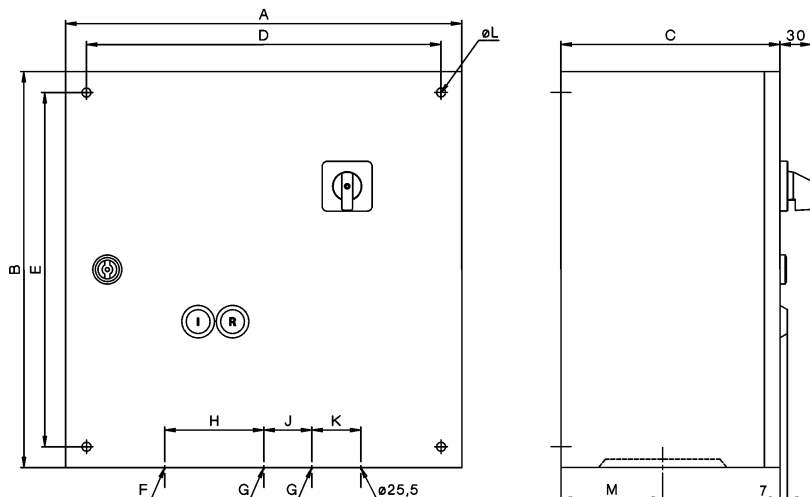
Mounting by included fixing link



### K3Y80B to K2Y200B

| Type    | A   | B   | C   | D   | E   | L   | M  |
|---------|-----|-----|-----|-----|-----|-----|----|
| K3Y80B  | 380 | 380 | 210 | 340 | 340 | 8,7 | 65 |
| K3Y100B | 380 | 380 | 210 | 340 | 340 | 8,7 | 65 |
| K3Y140B | 380 | 600 | 210 | 560 | 340 | 8,7 | 65 |
| K3Y200B | 380 | 600 | 210 | 560 | 340 | 8,7 | 65 |

| Type    | Ø F  | Ø G  | H  | J  | K  |
|---------|------|------|----|----|----|
| K3Y80B  | 40,5 | 40,5 | 70 | 70 | 60 |
| K3Y100B | 50,5 | 40,5 | 80 | 70 | 60 |
| K3Y140B | 50,5 | 50,5 | 80 | 80 | 70 |
| K3Y200B | 50,5 | 50,5 | 80 | 80 | 70 |

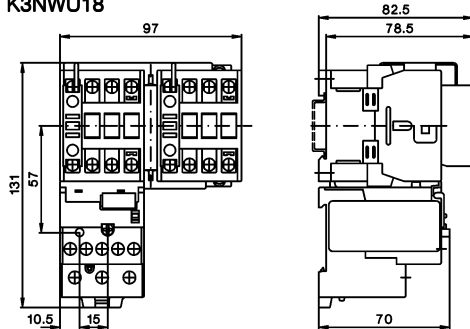


# Reversing Contactors

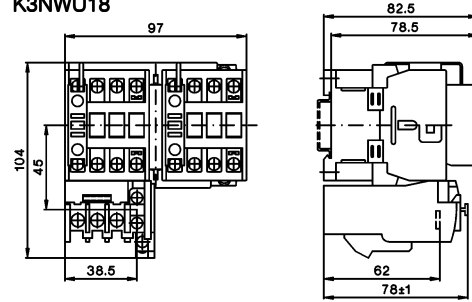
## Dimensions

Reversing Starters, AC operated, open type

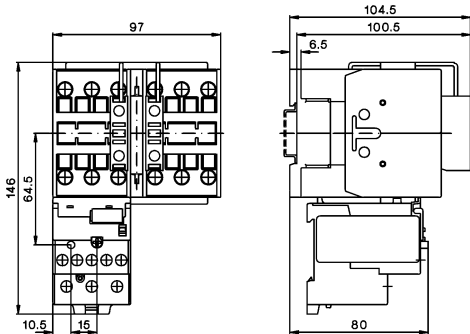
K3NWU10 + U3/32  
K3NWU18



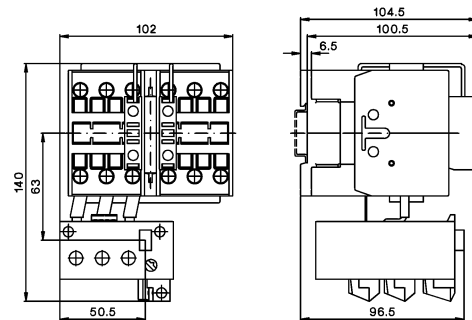
K3NWU10 + U12/16E G3  
K3NWU18



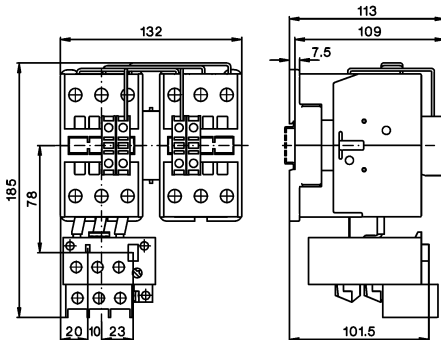
K3WU24 + U3/32  
K3WU32  
K3WU40



K3WU24 + U3/42  
K3WU32  
K3WU40



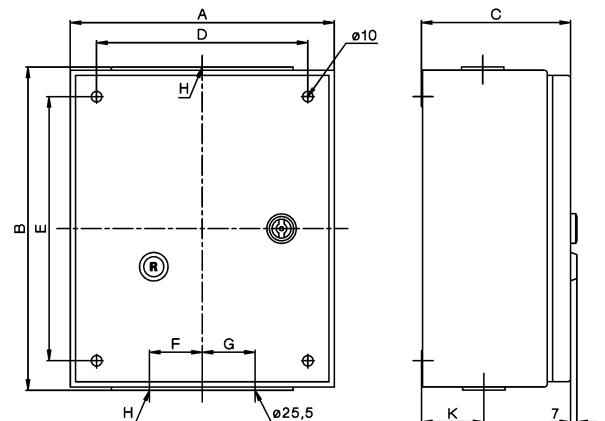
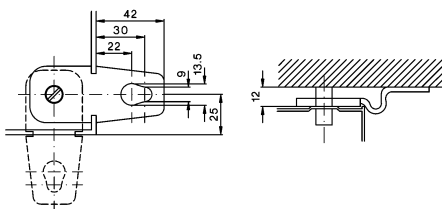
K3WU50 + U3/74  
K3WU62  
K3WU74



Reversing Contactors, sheet steel enclosed, protected to IP54

| Type     | A   | B   | C   | D   | E   | F  | G  | H     | K  |
|----------|-----|-----|-----|-----|-----|----|----|-------|----|
| K3NWU18B | 300 | 300 | 150 | 250 | 250 | 30 | 30 | Ø25,5 | 41 |
| K3WU24B  | 300 | 300 | 150 | 250 | 250 | 30 | 30 | Ø32,5 | 41 |
| K3WU32B  | 300 | 300 | 150 | 250 | 250 | 30 | 30 | Ø32,5 | 41 |
| K3WU50B  | 300 | 300 | 150 | 250 | 250 | 40 | 40 | Ø32,5 | 59 |
| K3WU62B  | 300 | 300 | 150 | 250 | 250 | 40 | 40 | Ø32,5 | 59 |

Mounting by included fixing link

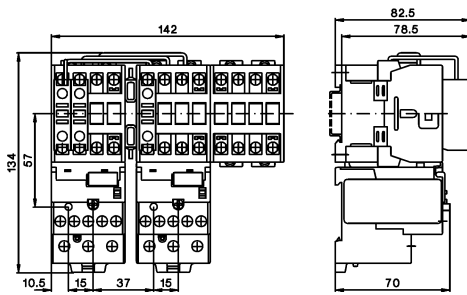


# Pole Changing Starters

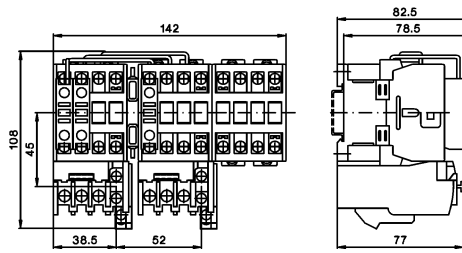
## Dimensions

Pole Changing Starters, AC operated, open type

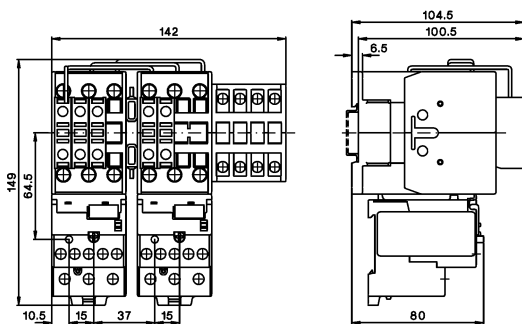
**K3NPU18 + 2x U3/32**



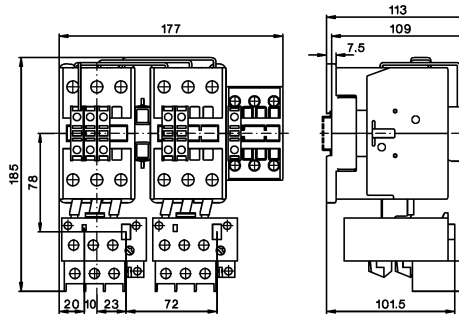
**K3NPU18 + 2x U12/16**



**K3PU24 + 2x U3/32**  
**K3PU32**



**K3PU50 + 2x U3/74**  
**K3PU62**

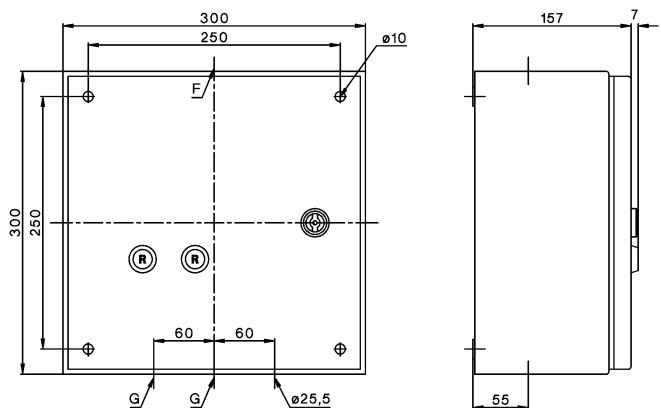
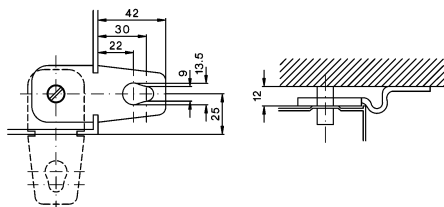


Pole Changing Starters, sheet steel enclosed, protected to IP54

**K3NPU18B to K3PU32B**

| Type            | Ø F  | Ø G  |
|-----------------|------|------|
| <b>K3NPU18B</b> | 25,5 | 25,5 |
| <b>K3PU24B</b>  | 32,3 | 32,5 |
| <b>K3PU32B</b>  | 32,3 | 32,5 |

Mounting by included fixing link





D.O.L. Starters With Start-Stop Buttons

106



D.O.L. Starters With Selector Switch

106



D.O.L. Starters With Selector Switch And Pneumatic Switch For Use In Moist Rooms

106



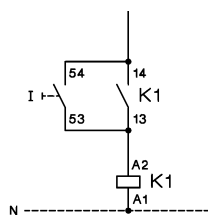
Enclosures

107



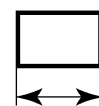
Accessories

107



Wiring Diagrams

108



Dimensions

110



## D.O.L. Starters In Plastic Enclosure

| Ratings<br>AC3 at<br>380V<br>400V<br>415V<br>kW | Included<br>Contactor<br>Type | Free<br>Space<br>f. Aux.<br>Cont.<br>HN..<br>pcs. | order<br>extra<br>Overload<br>Relay<br>Type | Protec-<br>tion<br>Degree | Conduit<br>Entries | Type | Coil voltage <sup>1)</sup><br>230 220-240V 50Hz 230-264V 60Hz<br>400 380-415V 50Hz 400-440V 60Hz | Pack<br>pcs. | Weight<br>kg/pc. |
|---|-------------------------------|---|---|---------------------------|--------------------|------|--|--------------|------------------|
|---|-------------------------------|---|---|---------------------------|--------------------|------|--|--------------|------------------|

## D.O.L. Starters with Start-Stop/Reset Push Buttons



|     |           |   |           |      |          |           |  |   |     |
|-----|-----------|---|-----------|------|----------|-----------|--|---|-----|
| 4   | K3-10ND10 | 2 | U12/16 K3 | IP65 | Ø 20,5mm | P1T10 ... |  | 1 | 0,6 |
| 7,5 | K3-18ND10 | 2 | U12/16 K3 | IP65 | Ø 20,5mm | P1T18 ... |  | 1 | 0,6 |
| 11  | K3-22ND10 | 2 | U12/16 K3 | IP65 | Ø 20,5mm | P1T22 ... |  | 1 | 0,6 |

## D.O.L. Starters with Selector Switch



|     |           |   |           |      |          |           |  |   |     |
|-----|-----------|---|-----------|------|----------|-----------|--|---|-----|
| 4   | K3-10ND10 | 2 | U12/16 K3 | IP65 | Ø 20,5mm | P1W10 ... |  | 1 | 0,6 |
| 7,5 | K3-18ND10 | 2 | U12/16 K3 | IP65 | Ø 20,5mm | P1W18 ... |  | 1 | 0,6 |
| 11  | K3-22ND10 | 2 | U12/16 K3 | IP65 | Ø 20,5mm | P1W22 ... |  | 1 | 0,6 |

## D.O.L. Starters with Selector Switch and Pneumatic Switch for moist rooms



|     |           |   |           |      |          |            |  |   |     |
|-----|-----------|---|-----------|------|----------|------------|--|---|-----|
| 7,5 | K3-18ND10 | 2 | U12/16 K3 | IP65 | Ø 20,5mm | P1W18P ... |  | 1 | 0,6 |
|-----|-----------|---|-----------|------|----------|------------|--|---|-----|

Push button and tube on request

**Ordering Example:** D.O.L. Starter with selector switch, plastic enclosed, rated AC3 at 400V 15,5A, rated control voltage 230V 50Hz - **Order Type: P1W18 230 + U12/16E 18 K3**

## Pneumatic Button



|  |  |  |  |  |  |      |  |   |  |
|--|--|--|--|--|--|------|--|---|--|
|  |  |  |  |  |  | P1LT |  | 1 |  |
|--|--|--|--|--|--|------|--|---|--|

## Air Pressure Hose



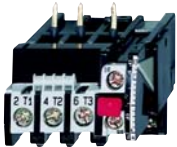
|           |  |  |  |  |  |        |  |   |  |
|-----------|--|--|--|--|--|--------|--|---|--|
| Length 5m |  |  |  |  |  | P1LS-5 |  | 1 |  |
|-----------|--|--|--|--|--|--------|--|---|--|

## Pneumatic Switch

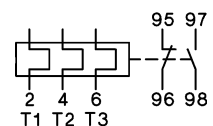


|  |  |  |  |  |  |        |  |   |      |
|--|--|--|--|--|--|--------|--|---|------|
| for refill of D.O.L. Starter P1W.. to P1W..P |  |  |  |  |  | P1-LDR |  | 1 | 0,02 |
|--|--|--|--|--|--|--------|--|---|------|

## Thermal Overload Relays



| Setting range<br>A | Type            | Pack<br>pcs. | Weight<br>kg/pc. |
|--------------------|-----------------|--------------|------------------|
| 0,12 - 0,18        | U12/16E 0,18 K3 | 1            | 0,10             |
| 0,18 - 0,27        | U12/16E 0,27 K3 | 1            | 0,10             |
| 0,27 - 0,4         | U12/16E 0,4 K3  | 1            | 0,10             |
| 0,4 - 0,6          | U12/16E 0,6 K3  | 1            | 0,10             |
| 0,6 - 0,9          | U12/16E 0,9 K3  | 1            | 0,10             |
| 0,8 - 1,2          | U12/16E 1,2 K3  | 1            | 0,10             |
| 1,2 - 1,8          | U12/16E 1,8 K3  | 1            | 0,10             |
| 1,8 - 2,7          | U12/16E 2,7 K3  | 1            | 0,10             |
| 2,7 - 4            | U12/16E 4 K3    | 1            | 0,10             |
| 4 - 6              | U12/16E 6 K3    | 1            | 0,10             |
| 6 - 9              | U12/16E 9 K3    | 1            | 0,10             |
| 8 - 11             | U12/16E 11 K3   | 1            | 0,10             |
| 10 - 14            | U12/16E 14 K3   | 1            | 0,10             |
| 13 - 18            | U12/16E 18 K3   | 1            | 0,10             |
| 17 - 23            | U12/16E 23 K3   | 1            | 0,10             |
| 22 - 30            | U12/16E 30 K3   | 1            | 0,13             |



manual reset

## Overload Relays with Quick Tripping Characteristic see page 115

Technical data see contactors page 56 and thermal overload relays page 119

1) Non-standard coil voltages see page 51

## Enclosures for Contactors



| Suitable for contactor   | Protection Degree | Conduit Entries Top | Conduit Entries Bottom | Type      | Pack pcs. | Weight kg/pc. |
|--|-------------------|---------------------|------------------------|-----------|-----------|---------------|
| <b>K3-07.. to K3-22..<br/>K3-24..<sup>1)</sup> to K3-40..<sup>1)</sup></b> | IP65              | 2 x Ø 20,5mm        | 2 x Ø 20,5mm           | <b>P1</b> | 1         | 0,35          |

with Reset Button



| Suitable for contactor                     | Protection Degree | Conduit Entries Top | Conduit Entries Bottom | Type       | Pack pcs. | Weight kg/pc. |
|--|-------------------|---------------------|------------------------|------------|-----------|---------------|
| <b>K3-10.. to K3-22..<br/>+U12/16.. K3</b> | IP65              | 2 x Ø 20,5mm        | 2 x Ø 20,5mm           | <b>P1R</b> | 1         | 0,35          |

with Selector Switch



| Suitable for contactor                     | Protection Degree | Conduit Entries Top | Conduit Entries Bottom | Type       | Pack pcs. | Weight kg/pc. |
|--|-------------------|---------------------|------------------------|------------|-----------|---------------|
| <b>K3-10.. to K3-22..<br/>+U12/16.. K3</b> | IP65              | 2 x Ø 20,5mm        | 2 x Ø 20,5mm           | <b>P1W</b> | 1         | 0,35          |

with Start-Stop Push Button



| Suitable for contactor                     | Protection Degree | Conduit Entries Top | Conduit Entries Bottom | Type       | Pack pcs. | Weight kg/pc. |
|--|-------------------|---------------------|------------------------|------------|-----------|---------------|
| <b>K3-10.. to K3-22..<br/>+U12/16.. K3</b> | IP65              | 2 x Ø 20,5mm        | 2 x Ø 20,5mm           | <b>P1T</b> | 1         | 0,35          |

## Indicator Units



| Specifications   | Voltage Range    | Type            | Pack pcs. | Weight kg/pc. |
|--|------------------|-----------------|-----------|---------------|
| <b>Coil Current Indicator</b> , green (LED)  | 24 - 660V AC/DC  | <b>K2-ING</b>   | 10        | 0,02          |
| <b>Coil Current Indicator</b> , red (LED)  | 24 - 660V AC/DC  | <b>K2-INR</b>   | 10        | 0,02          |
| To be connected in series with the contactor coil. In case of coil interruption the indicator goes out. Voltage drop approx. 2 volts |                  |                 |           |               |
| <b>Voltage Indicator</b> , clear (glow-disc. I.)   | 220 - 415V AC/DC | <b>K2-UN</b>    | 10        | 0,02          |
| <b>Voltage Indicator</b> , red (LED)   | 24 - 120V AC/DC  | <b>K2-UNR</b>   | 10        | 0,02          |
| To be connected parallel to the contactor coil. In case of applied voltage the indicator also lights at coil interruption.           |                  |                 |           |               |
| <b>Lens Caps For Indicator Units</b>   |                  |                 |           |               |
| Lens cap transparent   |                  | <b>LG9743T</b>  | 10        | 0,005         |
| Lens cap red   |                  | <b>LG9743R</b>  | 10        | 0,005         |
| Lens cap green   |                  | <b>LG9743GR</b> | 10        | 0,005         |
| Mounting instructions see page 112   |                  |                 |           |               |

## Heating Element



| Specifications   | Voltage Range    | Type             | Pack pcs. | Weight kg/pc. |
|--|------------------|------------------|-----------|---------------|
| To avoid condensed water on places where high humidity is given together with alterations of ambient temperature | 380 - 415V, 1,5W | <b>K2-HR</b>     | 10        | 0,02          |
|  | 220 - 240V, 1,5W | <b>K2-HR 230</b> | 10        | 0,02          |

## Additional Terminals, Start Contact



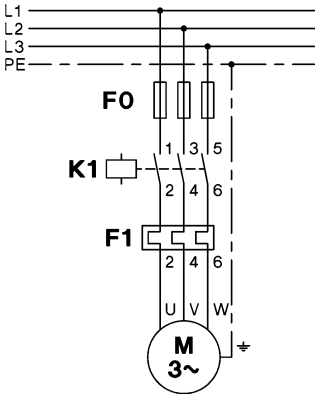
| Specification                      | Cable Cross-sections to clamp solid or stranded | flexible                                      | flexib. w. multi-core cable end | Type             | Pack pcs. | Weight kg/pc. |
|------------------------------------|---|---|---------------------------------|------------------|-----------|---------------|
| <b>Neutral Terminal</b>            | 2 x 0,75-4                                      | 2 x 0,75-2,5                                  | 2 x 0,5-2,5                     | <b>LG9744</b>    | 10        | 0,009         |
| <b>Earth Terminal</b>              | 2,5-16  | 1,5-10  | 1,5-10                          | <b>LG9750</b>    | 10        | 0,052         |
| Mounting instructions see page 112 |   |   |                                 |                  |           |               |
| <b>Start Contact</b>               | for contactor K3-10 to K3-22                    | to be snapped on top of the auxiliary contact |                                 | <b>LG9319-K3</b> | 10        | 0,03          |

# D.O.L. Starters

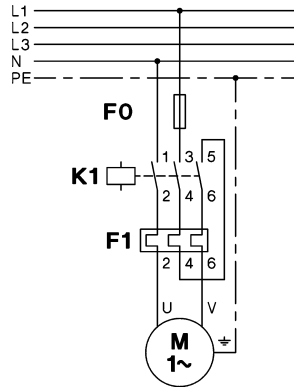
## Wiring Diagrams Main Circuit

All fuses F0 shown in the main circuits are not included.  
Terminal markings according to EN 50012

**P1...**  
with overload relay U12/16.. K3



## Wiring for single phase motors



## Wiring Diagrams Control Circuit

D.O.L. Starters P1 with standard coil voltages (see page 94) are supplied with connectors between main circuit and control circuit.

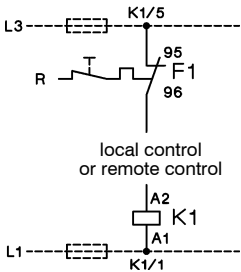
### Coil connectors

Coils for **380-415V 50Hz** and **400-440V 60Hz**: The starter is supplied with control circuit connectors between terminals 1 (L1) and 5 (L3).  
Coils for **220-240V 50Hz** and **230-264V 60Hz**: The starter is supplied with control circuit connectors between terminals 95 and 5 (L3). Connect neutral wire to terminal A1.  
Coils for **other voltages**: Without connectors between supply and control circuit. Connect supply to terminals A1 and 95.

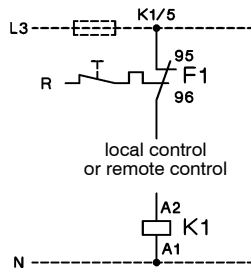
### Separate coil supply

Coils for **380-415V 50Hz** and **400-440V 60Hz**: Remove connectors A1-1 and 95-5, connect supply to terminals A1 and 95.  
Coils for **220-240V 50Hz** and **230-264V 60Hz**: Remove connectors 95-5 connect supply to terminals A1 and 95.  
Coils for **other voltages**: Connect supply to terminals A1 and 95.

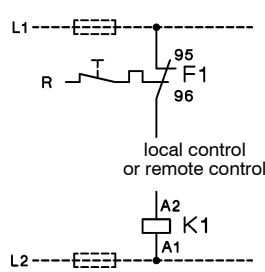
### Coil phase to phase (380-415V 50Hz)



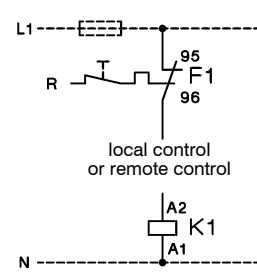
### Coil phase to neutral (220-240V 50Hz)



### Coil phase to phase

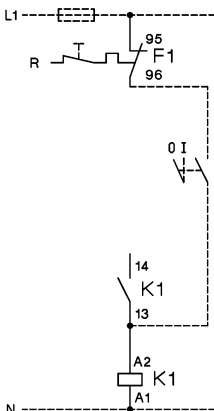


### Coil phase to neutral

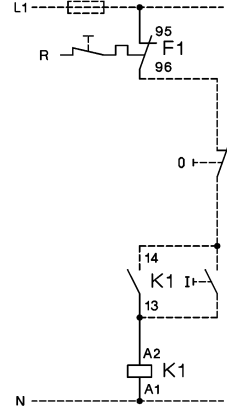


## D.O.L. Starters with remote control

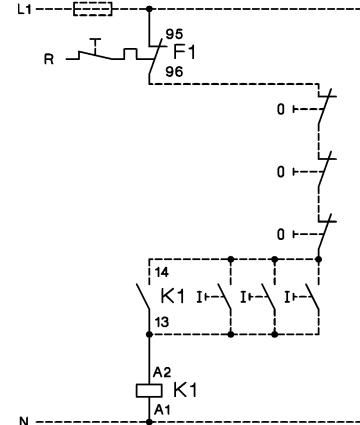
**P1..**  
Remote 2-wire (switch) control



Remote 3-wire (push button) control



Remote start-stop control  
(3 control stations)



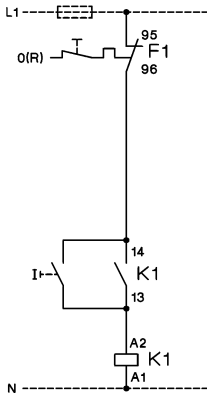
# D.O.L. Starters

## Wiring Diagrams Control Circuits

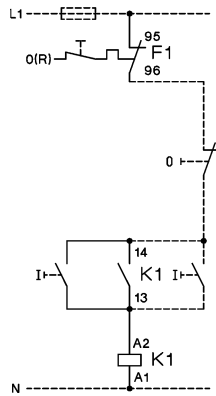
Typical circuit diagram (for separate coil supply, control circuit connected between L1 and N)  
Terminal markings according to EN 50012

### D.O.L. Starters with Start-Stop/Reset Push Buttons

**P1T10, P1T18, P1T22**  
with overload relay U12/16.. K3

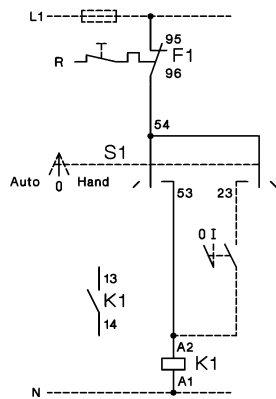


**P1T10, P1T18, P1T22**  
with external push buttons

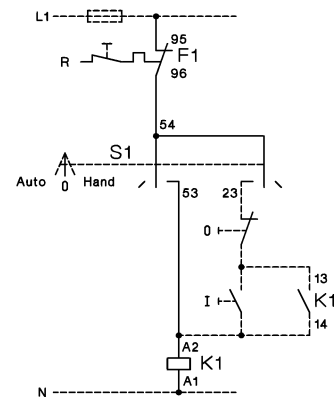


### D.O.L. Starters with Selector Switch

**P1W10, P1W18, P1W22**  
with external control switch

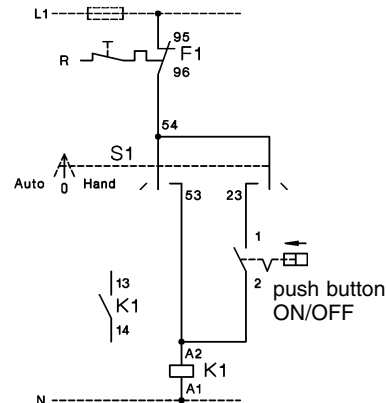


**P1W10, P1W18, P1W22**  
with external push buttons



### D.O.L. Starters with Selector Switch and Pneumatic Switch for Swimmingpool Control Gear and for use in Moist Rooms

**P1W18P**  
with overload relay U12/16.. K3

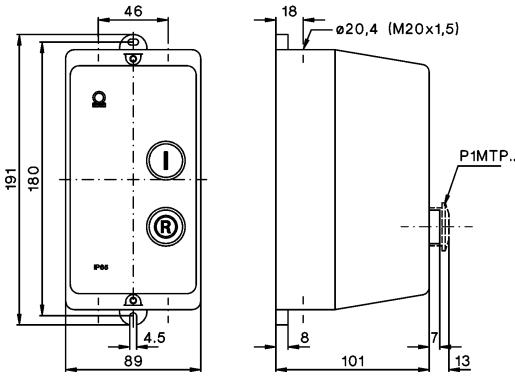


# D.O.L. Starters

## Dimensions

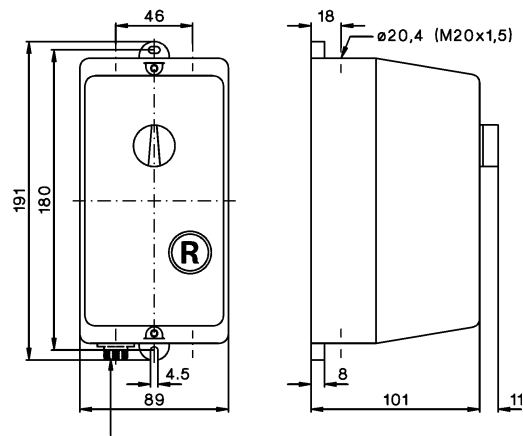
D.O.L. Starters with Start-Stop/Reset Push Buttons, Plastic Enclosed

P1T..., P1TP..



D.O.L. Starters with Selector Switch, Plastic Enclosed

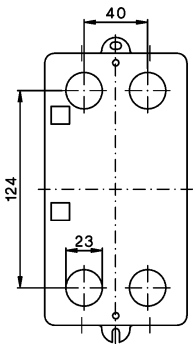
P1W..., P1W18P



P1W18P: plug-in for air tube inside diameter 3mm

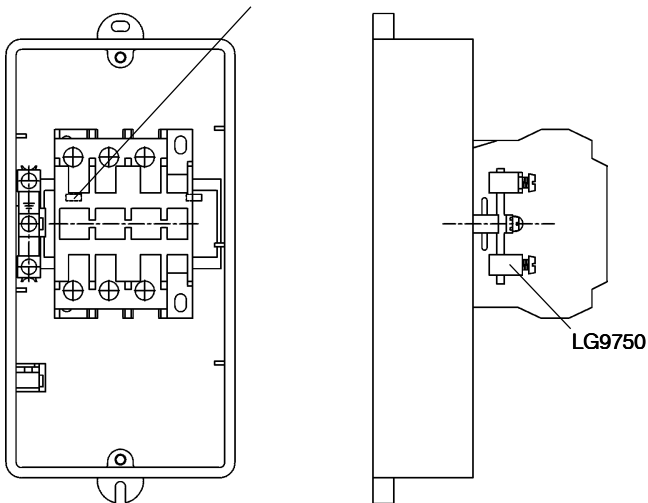
## Rear Conduit Entries

knockouts  
4 x  $\varnothing 23$

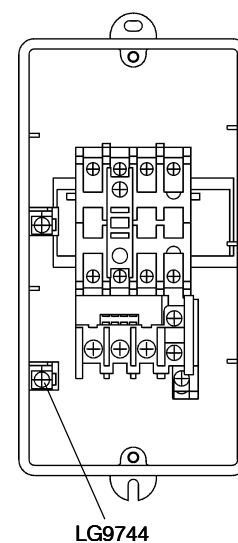


## Earth Terminal LG9750 for K2-23 and K2-30 in Enclosure P1

for K2-23 and K2-30 remove spacing piece



## Neutral Terminal LG9744

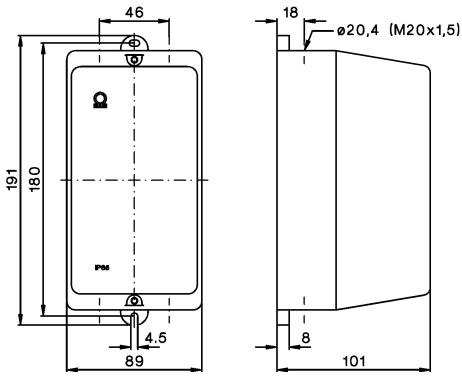


# Enclosures

## Dimensions

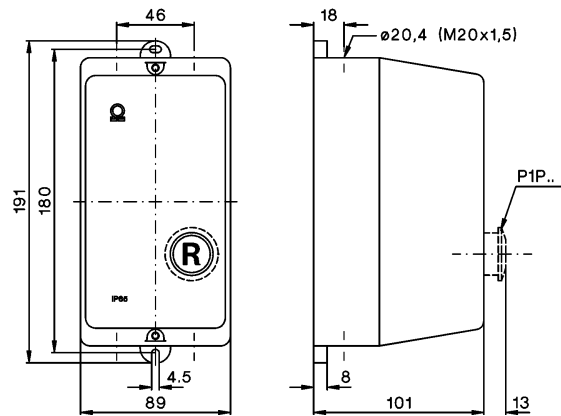
### Enclosures for Contactors

P1



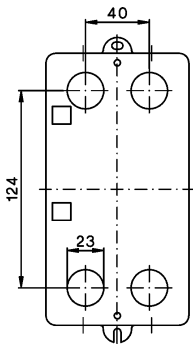
### Enclosures for D.O.L. Starters

P1R, P1P



### Rear Conduit Entries

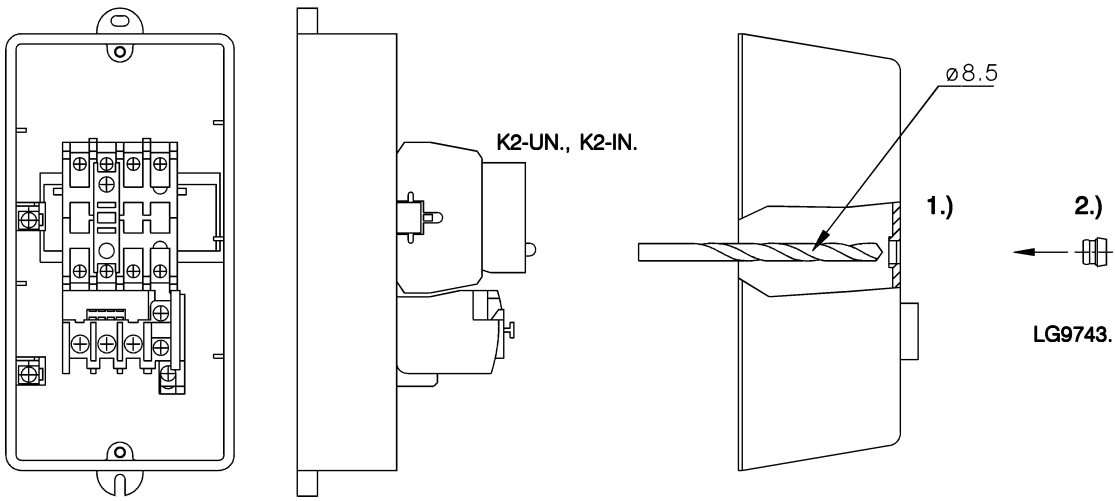
knockouts  
4 x  $\varnothing 23$



# D.O.L. Starters

## Mounting and Wiring Instructions

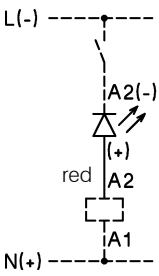
Indicators and Lens Caps for D.O.L. Starters P1



### Wiring Examples

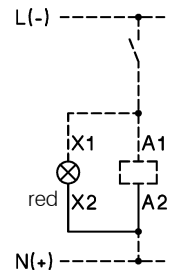
#### Coil Current Indicator

K2-ING  
K2-ISR



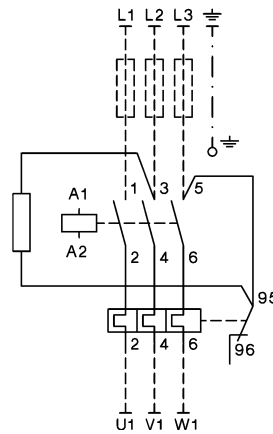
#### Voltage Indicator

K2-UN  
K2-UNR

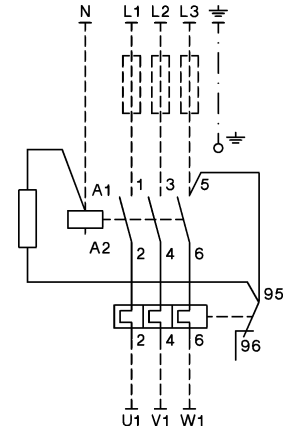


#### Heating Element

K2-HR

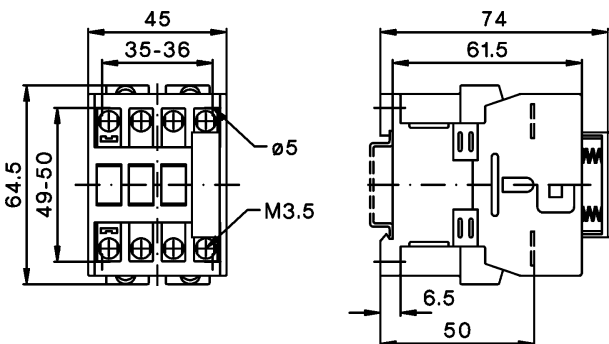


K2-HR 230



Colour mentioned in wiring diagrams refer to the outgoing connection wire of the device.

### Start Contact LG9319-K3 for K3-10ND10 up to K3-22ND10





Thermal Overload Relays for Direct Mounting 114



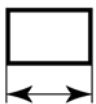
Thermal Overload Relays for Separate Mounting 116



Accessories 117



Technical Data 118



Dimensions 123

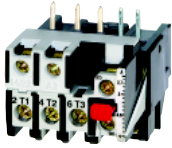


## Thermal Overload Relays for plug-in mounting

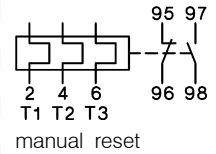
**Setting Range**  
D.O.L. (A)       $\Delta$  (A)

**Type**      Pack pcs.      Weight kg/pc.      Wiring Diagram

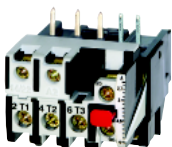
**With Manual Reset**, for contactors K1-..



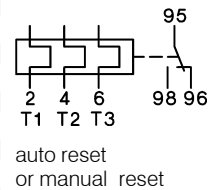
|                    |             |  |                        |   |      |
|--------------------|-------------|--|------------------------|---|------|
| 0,12 - <b>0,18</b> | -           |  | <b>U12/16E 0,18 K1</b> | 1 | 0,10 |
| 0,18 - <b>0,27</b> | -           |  | <b>U12/16E 0,27 K1</b> | 1 | 0,10 |
| 0,27 - <b>0,4</b>  | -           |  | <b>U12/16E 0,4 K1</b>  | 1 | 0,10 |
| 0,4 - <b>0,6</b>   | -           |  | <b>U12/16E 0,6 K1</b>  | 1 | 0,10 |
| 0,6 - <b>0,9</b>   | -           |  | <b>U12/16E 0,9 K1</b>  | 1 | 0,10 |
| 0,8 - <b>1,2</b>   | -           |  | <b>U12/16E 1,2 K1</b>  | 1 | 0,10 |
| 1,2 - <b>1,8</b>   | -           |  | <b>U12/16E 1,8 K1</b>  | 1 | 0,10 |
| 1,8 - <b>2,7</b>   | -           |  | <b>U12/16E 2,7 K1</b>  | 1 | 0,10 |
| 2,7 - <b>4</b>     | -           |  | <b>U12/16E 4 K1</b>    | 1 | 0,10 |
| 4 - <b>6</b>       | 7 - 10,5    |  | <b>U12/16E 6 K1</b>    | 1 | 0,10 |
| 6 - <b>9</b>       | 10,5 - 15,5 |  | <b>U12/16E 9 K1</b>    | 1 | 0,10 |
| 8 - <b>11</b>      | 14 - 19     |  | <b>U12/16E 11 K1</b>   | 1 | 0,10 |
| 10 - <b>14</b>     | 18 - 24     |  | <b>U12/16E 14 K1</b>   | 1 | 0,10 |



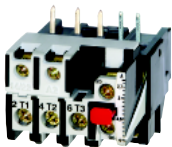
**With Auto Reset**, for contactors K1-..



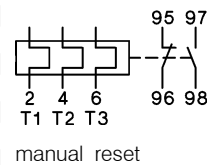
|                    |             |  |                        |   |      |
|--------------------|-------------|--|------------------------|---|------|
| 0,12 - <b>0,18</b> | -           |  | <b>U12/16A 0,18 K1</b> | 1 | 0,10 |
| 0,18 - <b>0,27</b> | -           |  | <b>U12/16A 0,27 K1</b> | 1 | 0,10 |
| 0,27 - <b>0,4</b>  | -           |  | <b>U12/16A 0,4 K1</b>  | 1 | 0,10 |
| 0,4 - <b>0,6</b>   | -           |  | <b>U12/16A 0,6 K1</b>  | 1 | 0,10 |
| 0,6 - <b>0,9</b>   | -           |  | <b>U12/16A 0,9 K1</b>  | 1 | 0,10 |
| 0,8 - <b>1,2</b>   | -           |  | <b>U12/16A 1,2 K1</b>  | 1 | 0,10 |
| 1,2 - <b>1,8</b>   | -           |  | <b>U12/16A 1,8 K1</b>  | 1 | 0,10 |
| 1,8 - <b>2,7</b>   | -           |  | <b>U12/16A 2,7 K1</b>  | 1 | 0,10 |
| 2,7 - <b>4</b>     | -           |  | <b>U12/16A 4 K1</b>    | 1 | 0,10 |
| 4 - <b>6</b>       | 7 - 10,5    |  | <b>U12/16A 6 K1</b>    | 1 | 0,10 |
| 6 - <b>9</b>       | 10,5 - 15,5 |  | <b>U12/16A 9 K1</b>    | 1 | 0,10 |
| 8 - <b>11</b>      | 14 - 19     |  | <b>U12/16A 11 K1</b>   | 1 | 0,10 |
| 10 - <b>14</b>     | 18 - 24     |  | <b>U12/16A 14 K1</b>   | 1 | 0,10 |



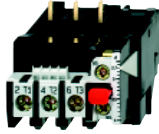
**With Quick Tripping Characteristic** for EEx e motors and submersible pumps, f. contactors K1-..



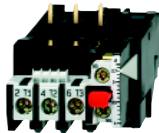
|                  |             |  |                        |   |      |
|------------------|-------------|--|------------------------|---|------|
| 0,4 - <b>0,6</b> | -           |  | <b>U12/16EQ 0,6 K1</b> | 1 | 0,10 |
| 0,6 - <b>0,9</b> | -           |  | <b>U12/16EQ 0,9 K1</b> | 1 | 0,10 |
| 0,8 - <b>1,2</b> | -           |  | <b>U12/16EQ 1,2 K1</b> | 1 | 0,10 |
| 1,2 - <b>1,8</b> | -           |  | <b>U12/16EQ 1,8 K1</b> | 1 | 0,10 |
| 1,8 - <b>2,7</b> | -           |  | <b>U12/16EQ 2,7 K1</b> | 1 | 0,10 |
| 2,7 - <b>4</b>   | -           |  | <b>U12/16EQ 4 K1</b>   | 1 | 0,10 |
| 4 - <b>6</b>     | 7 - 10,5    |  | <b>U12/16EQ 6 K1</b>   | 1 | 0,10 |
| 6 - <b>9</b>     | 10,5 - 15,5 |  | <b>U12/16EQ 9 K1</b>   | 1 | 0,10 |
| 8 - <b>11</b>    | 14 - 19     |  | <b>U12/16EQ 11 K1</b>  | 1 | 0,10 |
| 10 - <b>14</b>   | 18 - 24     |  | <b>U12/16EQ 14 K1</b>  | 1 | 0,10 |



# Thermal Overload Relays for plug-in mounting



| Setting Range   |              | Type                   | Pack pcs. | Weight kg/pc. | Wiring Diagram |
|---|--------------|------------------------|-----------|---------------|----------------|
| D.O.L. (A)  | $\Delta$ (A) |                        |           |               |                |
| <b>With Manual Reset</b> , for contactors K(G)3-10.. to K(G)3-22.. .. |              |                        |           |               |                |
| 0,12 - <b>0,18</b>  | -            | <b>U12/16E 0,18 K3</b> | 1         | 0,10          |                |
| 0,18 - <b>0,27</b>  | -            | <b>U12/16E 0,27 K3</b> | 1         | 0,10          |                |
| 0,27 - <b>0,4</b>   | -            | <b>U12/16E 0,4 K3</b>  | 1         | 0,10          |                |
| 0,4 - <b>0,6</b>  | -            | <b>U12/16E 0,6 K3</b>  | 1         | 0,10          |                |
| 0,6 - <b>0,9</b>  | -            | <b>U12/16E 0,9 K3</b>  | 1         | 0,10          |                |
| 0,8 - <b>1,2</b>  | -            | <b>U12/16E 1,2 K3</b>  | 1         | 0,10          |                |
| 1,2 - <b>1,8</b>  | -            | <b>U12/16E 1,8 K3</b>  | 1         | 0,10          |                |
| 1,8 - <b>2,7</b>  | -            | <b>U12/16E 2,7 K3</b>  | 1         | 0,10          |                |
| 2,7 - <b>4</b>  | -            | <b>U12/16E 4 K3</b>    | 1         | 0,10          |                |
| 4 - <b>6</b>  | 7 - 10,5     | <b>U12/16E 6 K3</b>    | 1         | 0,10          |                |
| 6 - <b>9</b>  | 10,5 - 15,5  | <b>U12/16E 9 K3</b>    | 1         | 0,10          |                |
| 8 - <b>11</b>   | 14 - 19      | <b>U12/16E 11 K3</b>   | 1         | 0,10          |                |
| 10 - <b>14</b>  | 18 - 24      | <b>U12/16E 14 K3</b>   | 1         | 0,10          |                |
| 13 - <b>18</b>  | 23 - 31      | <b>U12/16E 18 K3</b>   | 1         | 0,10          |                |
| 17 - <b>23</b>  | 30 - 40      | <b>U12/16E 23 K3</b>   | 1         | 0,10          |                |
| 22 - <b>30</b>  | 38 - 52      | <b>U12/16E 30 K3</b>   | 1         | 0,13          |                |



|  |             |                        |   |      |  |
|--|-------------|------------------------|---|------|--|
| <b>With quick Tripping Characteristic</b> for EEx e motors and under water pumps |             |                        |   |      |  |
| 0,4 - <b>0,6</b>   | -           | <b>U12/16EQ 0,6 K3</b> | 1 | 0,10 |  |
| 0,6 - <b>0,9</b>   | -           | <b>U12/16EQ 0,9 K3</b> | 1 | 0,10 |  |
| 0,8 - <b>1,2</b>   | -           | <b>U12/16EQ 1,2 K3</b> | 1 | 0,10 |  |
| 1,2 - <b>1,8</b>   | -           | <b>U12/16EQ 1,8 K3</b> | 1 | 0,10 |  |
| 1,8 - <b>2,7</b>   | -           | <b>U12/16EQ 2,7 K3</b> | 1 | 0,10 |  |
| 2,7 - <b>4</b>   | -           | <b>U12/16EQ 4 K3</b>   | 1 | 0,10 |  |
| 4 - <b>6</b>   | 7 - 10,5    | <b>U12/16EQ 6 K3</b>   | 1 | 0,10 |  |
| 6 - <b>9</b>   | 10,5 - 15,5 | <b>U12/16EQ 9 K3</b>   | 1 | 0,10 |  |
| 8 - <b>11</b>  | 14 - 19     | <b>U12/16EQ 11 K3</b>  | 1 | 0,10 |  |
| 10 - <b>14</b>   | 18 - 24     | <b>U12/16EQ 14 K3</b>  | 1 | 0,10 |  |



|   |             |                   |   |      |  |
|---|-------------|-------------------|---|------|--|
| <b>For contactors K(G)3-10.. to K(G)3-40A..</b> |             |                   |   |      |  |
| 0,12 - <b>0,18</b>                              | -           | <b>U3/32 0,18</b> | 1 | 0,14 |  |
| 0,18 - <b>0,27</b>                              | -           | <b>U3/32 0,27</b> | 1 | 0,14 |  |
| 0,27 - <b>0,4</b>                               | -           | <b>U3/32 0,4</b>  | 1 | 0,14 |  |
| 0,4 - <b>0,6</b>                                | -           | <b>U3/32 0,6</b>  | 1 | 0,14 |  |
| 0,6 - <b>0,9</b>                                | -           | <b>U3/32 0,9</b>  | 1 | 0,14 |  |
| 0,8 - <b>1,2</b>                                | -           | <b>U3/32 1,2</b>  | 1 | 0,14 |  |
| 1,2 - <b>1,8</b>                                | -           | <b>U3/32 1,8</b>  | 1 | 0,14 |  |
| 1,8 - <b>2,7</b>                                | -           | <b>U3/32 2,7</b>  | 1 | 0,14 |  |
| 2,7 - <b>4</b>                                  | -           | <b>U3/32 4</b>    | 1 | 0,14 |  |
| 4 - <b>6</b>                                    | 7 - 10,5    | <b>U3/32 6</b>    | 1 | 0,14 |  |
| 6 - <b>9</b>                                    | 10,5 - 15,5 | <b>U3/32 9</b>    | 1 | 0,14 |  |
| 8 - <b>11</b>                                   | 14 - 19     | <b>U3/32 11</b>   | 1 | 0,14 |  |
| 10 - <b>14</b>                                  | 18 - 24     | <b>U3/32 14</b>   | 1 | 0,14 |  |
| 13 - <b>18</b>                                  | 23 - 31     | <b>U3/32 18</b>   | 1 | 0,14 |  |
| 17 - <b>24</b>                                  | 30 - 41     | <b>U3/32 24</b>   | 1 | 0,14 |  |
| 23 - <b>32</b>                                  | 40 - 55     | <b>U3/32 32</b>   | 1 | 0,14 |  |



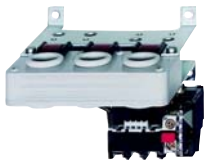
|   |         |                 |   |      |  |
|---|---------|-----------------|---|------|--|
| <b>For contactors K(G)3-24A.. to K(G)3-40A ..</b> |         |                 |   |      |  |
| 10 - <b>14</b>                                    | 18 - 24 | <b>U3/42 14</b> | 1 | 0,30 |  |
| 14 - <b>20</b>                                    | 24 - 35 | <b>U3/42 20</b> | 1 | 0,30 |  |
| 20 - <b>28</b>                                    | 35 - 48 | <b>U3/42 28</b> | 1 | 0,30 |  |
| 28 - <b>42</b>                                    | 48 - 73 | <b>U3/42 42</b> | 1 | 0,30 |  |

## Thermal Overload Relays for plug-in mounting



| Setting Range                       |              | Type            | Pack pcs. | Weight kg/pc. | Wiring Diagram |
|-------------------------------------|--------------|-----------------|-----------|---------------|----------------|
| D.O.L. (A)                          | $\Delta$ (A) |                 |           |               |                |
| For contactors K3-50A.. to K3-74A.. |              |                 |           |               |                |
| 20 - <b>28</b>                      | 35 - 48      | <b>U3/74 28</b> | 1         | 0,40          |                |
| 28 - <b>42</b>                      | 48 - 73      | <b>U3/74 42</b> | 1         | 0,40          |                |
| 40 - <b>52</b>                      | 70 - 90      | <b>U3/74 52</b> | 1         | 0,40          |                |
| 52 - <b>65</b>                      | 90 - 112     | <b>U3/74 65</b> | 1         | 0,40          |                |
| 60 - <b>74</b>                      | 104 - 128    | <b>U3/74 74</b> | 1         | 0,40          |                |

## Thermal Overload Relays for separate mounting

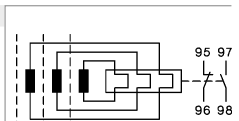


| Setting Range                           |              | Type           | Pack pcs. | Weight kg/pc. | Wiring Diagram |
|---|--------------|----------------|-----------|---------------|----------------|
| D.O.L. (A)                              | $\Delta$ (A) |                |           |               |                |
| For contactors K3-90, K3-115, K85, K110 |              |                |           |               |                |
| 60 - <b>90</b>                          | 104 - 156    | <b>U85 90</b>  | 1         | 0,90          |                |
| 80 - <b>120</b>                         | 140 - 207    | <b>U85 120</b> | 1         | 0,90          |                |



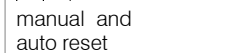
For contactors K3-151.. and K3-176.., busbars included

|                  |           |                 |   |     |
|------------------|-----------|-----------------|---|-----|
| 120 - <b>180</b> | 208 - 312 | <b>U180 180</b> | 1 | 1,5 |
|------------------|-----------|-----------------|---|-----|



For contactors K3-210.. up to K3-316.., busbars included

|                  |           |                 |   |     |
|------------------|-----------|-----------------|---|-----|
| 144 - <b>216</b> | 250 - 374 | <b>U320 216</b> | 1 | 1,8 |
| 216 - <b>320</b> | 374 - 554 | <b>U320 320</b> | 1 | 1,8 |



For contactors K3-315.. , K3-450.. , K3-550.. , K3-700.. , K3-860..

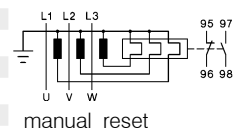
|                  |            |                 |   |     |
|------------------|------------|-----------------|---|-----|
| 240 - <b>360</b> | 416 - 623  | <b>U800 360</b> | 1 | 4,1 |
| 360 - <b>540</b> | 623 - 935  | <b>U800 540</b> | 1 | 4,1 |
| 540 - <b>800</b> | 935 - 1385 | <b>U800 800</b> | 1 | 4,1 |

### With Slow Tripping Characteristic for heavy duty starting with long run up times

For separate mounting, suitable for all contactors



|                  |             |                  |   |     |
|------------------|-------------|------------------|---|-----|
| 0,8 - <b>1,2</b> | 1,2 - 2,1   | <b>UAT21 1,2</b> | 1 | 1,0 |
| 1,2 - <b>1,8</b> | 2,1 - 3,1   | <b>UAT21 1,8</b> | 1 | 1,0 |
| 1,6 - <b>2,4</b> | 2,8 - 4,2   | <b>UAT21 2,4</b> | 1 | 1,0 |
| 2,4 - <b>3,7</b> | 4,2 - 6,4   | <b>UAT21 3,7</b> | 1 | 1,0 |
| 3,7 - <b>5,7</b> | 6,4 - 9,9   | <b>UAT21 5,7</b> | 1 | 1,0 |
| 5,3 - <b>8,2</b> | 9,2 - 14,2  | <b>UAT21 8,2</b> | 1 | 1,0 |
| 8 - <b>12</b>    | 13,9 - 20,1 | <b>UAT21 12</b>  | 1 | 1,0 |
| 12 - <b>18</b>   | 20,1 - 31,2 | <b>UAT21 18</b>  | 1 | 1,0 |
| 16 - <b>24</b>   | 27,7 - 41,6 | <b>UAT22 24</b>  | 1 | 1,1 |
| 24 - <b>37</b>   | 41,6 - 64   | <b>UAT23 37</b>  | 1 | 1,3 |
| 32 - <b>49</b>   | 55,4 - 85   | <b>UAT23 49</b>  | 1 | 1,3 |
| 48 - <b>72</b>   | 83 - 125    | <b>UAT23 72</b>  | 1 | 1,3 |



## Accessories

for overload relays      for contactors

### Type

Pack set      Weight kg/set



### Busbar Sets

|      |                    |                  |   |     |
|------|--------------------|------------------|---|-----|
| U800 | K3-450.., K3-550.. | <b>SU840/550</b> | 1 | 1,7 |
| U800 | K3-700.., K3-860.. | <b>SU840/860</b> |   | 2,1 |

Cable Cross-section (mm<sup>2</sup>)      Type

for overload relay

solid or  
stranded      flexible

Pack pcs.      Weight kg/pc.



### Set for Single Mounting on DIN-rail with terminals

|            |          |          |                 |   |       |
|------------|----------|----------|-----------------|---|-------|
| U12/16..K3 | 0,75 - 6 | 0,75 - 4 | <b>U12SM K3</b> | 1 | 0,035 |
|------------|----------|----------|-----------------|---|-------|



### Additional Terminals with fingertouch protection

|       |          |          |                |   |       |
|-------|----------|----------|----------------|---|-------|
| U3/32 | 0,75 - 6 | 0,75 - 4 | <b>U3/32SM</b> | 1 | 0,035 |
|-------|----------|----------|----------------|---|-------|



### Set for Single Mounting on DIN-rail

|              |   |   |               |   |       |
|--------------|---|---|---------------|---|-------|
| U3/42, U3/74 | - | - | <b>U3/42G</b> | 1 | 0,030 |
|--------------|---|---|---------------|---|-------|

### Connecting Wire Set for U3/42, U3/74 with Single Mounting



|              |            |                   |                 |   |       |
|--------------|------------|-------------------|-----------------|---|-------|
| U3/42, U3/74 | 150mm lang | 10mm <sup>2</sup> | <b>LG5830-4</b> | 1 | 0,060 |
| U3/42, U3/74 | 250mm lang | 10mm <sup>2</sup> | <b>LG5830-2</b> | 1 | 0,100 |

### Additional Terminals with fingertouch protection

|                         |           |          |               |   |       |
|-------------------------|-----------|----------|---------------|---|-------|
| 1-pole f. U12/16, U3/32 | 0,75 - 10 | 0,75 - 6 | <b>LG9339</b> | 1 | 0,009 |
| 3-pole for U3/42        | 4 - 35    | 6 - 25   | <b>LG7559</b> | 1 | 0,052 |



# Thermal Overload Relays, tripping times for selection to motors of protection degree EEx e

## Relays With Standard Tripping Characteristic

| Setting Range        |             | Tripping time depending on the multiple of the current setting from cold condition (tolerance $\pm 20\%$ of the tripping time) |                |                |                |                  |                |
|----------------------|-------------|--|----------------|----------------|----------------|------------------|----------------|
| A                    | A           | $I_A/I_N$<br>3   | $I_A/I_N$<br>4 | $I_A/I_N$<br>5 | $I_A/I_N$<br>6 | $I_A/I_N$<br>7,2 | $I_A/I_N$<br>8 |
| <b>U3/32 ..</b>      |             | s  | s              | s              | s              | s                | s              |
| 0,12 -               | <b>0,18</b> | 16,1   | 9,6            | 6,8            | 5,3            | 4,2              | 3,7            |
| 0,18 -               | <b>0,27</b> | 16,6   | 9,7            | 6,7            | 5,2            | 4,1              | 3,6            |
| 0,27 -               | <b>0,4</b>  | 19,4   | 11,4           | 7,9            | 6,1            | 4,7              | 4,2            |
| 0,4 -                | <b>0,6</b>  | 18,7   | 10,9           | 7,6            | 5,9            | 4,6              | 4,0            |
| 0,6 -                | <b>0,9</b>  | 19,2   | 11,2           | 7,7            | 5,9            | 4,6              | 4,1            |
| 0,8 -                | <b>1,2</b>  | 20,8   | 12,3           | 8,5            | 6,6            | 5,2              | 4,6            |
| 1,2 -                | <b>1,8</b>  | 25,5   | 14,1           | 9,8            | 7,6            | 5,9              | 5,2            |
| 1,8 -                | <b>2,7</b>  | 26,6   | 15,6           | 10,9           | 8,3            | 6,5              | 5,7            |
| 2,7 -                | <b>4</b>    | 22,7   | 13,6           | 9,5            | 7,4            | 5,8              | 5,1            |
| 4 -                  | <b>6</b>    | 22,2   | 13,3           | 9,3            | 7,1            | 5,6              | 4,9            |
| 6 -                  | <b>9</b>    | 20,4   | 11,9           | 8,2            | 6,1            | 4,7              | 4,0            |
| 8 -                  | <b>11</b>   | 20,9   | 11,8           | 7,9            | 5,7            | 4,3              | 3,5            |
| 10 -                 | <b>14</b>   | 21,3   | 11,7           | 7,4            | 5,1            | 3,7              | 3,0            |
| 13 -                 | <b>18</b>   | 21,2   | 12,1           | 8,0            | 6,2            | 4,6              | 4,1            |
| 17 -                 | <b>24</b>   | 20,4   | 12,0           | 8,6            | 6,3            | 4,5              | 3,7            |
| 23 -                 | <b>32</b>   | 20,2   | 10,2           | 6,7            | 4,7            | 3,4              | 2,8            |
| <b>U3/42</b>         |             | s  | s              | s              | s              | s                | s              |
| 10 -                 | <b>14</b>   | 21,8   | 11,4           | 7,0            | 5,0            | 3,7              | 2,8            |
| 14 -                 | <b>20</b>   | 22,4   | 11,2           | 6,7            | 4,5            | 3,2              | 2,4            |
| 20 -                 | <b>28</b>   | 21,8   | 10,8           | 6,5            | 4,5            | 3,3              | 2,5            |
| 28 -                 | <b>42</b>   | 25,2   | 13,3           | 8,0            | 5,5            | 4,0              | 3,1            |
| <b>U3/74</b>         |             | s  | s              | s              | s              | s                | s              |
| 20 -                 | <b>28</b>   | 21,8   | 10,8           | 6,5            | 4,5            | 3,3              | 2,5            |
| 28 -                 | <b>42</b>   | 25,2   | 13,3           | 8,0            | 5,5            | 4,0              | 3,1            |
| 40 -                 | <b>52</b>   | 18,3   | 9,2            | 5,6            | 3,9            | 2,8              | 2,2            |
| 52 -                 | <b>65</b>   | 17,8   | 8,7            | 5,2            | 3,4            | 2,5              | 1,9            |
| <b>U85 ..</b>        |             | s  | s              | s              | s              | s                | s              |
| 60 -                 | <b>90</b>   | 19,5   | 13,5           | 11,0           | 10,0           | 9,5              | 8,5            |
| 80 -                 | <b>120</b>  | 18,0   | 11,0           | 10,0           | 9,0            | 8,5              | 8,0            |
| <b>U840 ..</b>       |             | s  | s              | s              | s              | s                | s              |
| 260 -                | <b>360</b>  | 23,3   | 14,1           | 10,0           | 7,6            | 6,1              | 5,4            |
| 340 -                | <b>480</b>  | 23,0   | 13,8           | 9,6            | 7,6            | 6,1              | 5,4            |
| 440 -                | <b>620</b>  | 20,5   | 12,4           | 9,0            | 7,0            | 5,5              | 5,0            |
| 560 -                | <b>800</b>  | 21,0   | 12,5           | 9,0            | 7,0            | 5,6              | 5,2            |
| <b>U12/16E(A) ..</b> |             | s  | s              | s              | s              | s                | s              |
| 0,12 -               | <b>0,18</b> | 18,5   | 10,4           | 7,2            | 5,5            | 4,3              | 3,6            |
| 0,18 -               | <b>0,27</b> | 16,7   | 9,8            | 6,5            | 5,0            | 4,1              | 3,5            |
| 0,27 -               | <b>0,4</b>  | 19,4   | 12,1           | 8,2            | 5,9            | 4,9              | 4,2            |
| 0,4 -                | <b>0,6</b>  | 18,7   | 11,2           | 8,0            | 6,0            | 4,9              | 4,1            |
| 0,6 -                | <b>0,9</b>  | 19,7   | 11,6           | 8,1            | 6,1            | 4,9              | 4,2            |
| 0,8 -                | <b>1,2</b>  | 22,9   | 13,6           | 10,0           | 7,3            | 6,0              | 5,2            |
| 1,2 -                | <b>1,8</b>  | 22,2   | 13,2           | 9,2            | 7,6            | 5,8              | 5,3            |
| 1,8 -                | <b>2,7</b>  | 23,0   | 13,7           | 9,3            | 7,6            | 5,7              | 5,1            |
| 2,7 -                | <b>4</b>    | 24,0   | 14,4           | 9,9            | 7,8            | 5,9              | 5,1            |
| 4 -                  | <b>6</b>    | 24,7   | 13,8           | 9,9            | 7,3            | 5,6              | 4,8            |
| 6 -                  | <b>9</b>    | 22,0   | 13,4           | 8              | 5,7            | 4,1              | 3,5            |
| 8 -                  | <b>11</b>   | 17,4   | 9,2            | 5,9            | 4,1            | 2,9              | 2,3            |
| 10 -                 | <b>14</b>   | 26,4   | 12,9           | 7,6            | 5,2            | 3,5              | 2,8            |
| 13 -                 | <b>18</b>   | 14,7   | 7,7            | 4,8            | 3,2            | 2,3              | 1,7            |
| 17 -                 | <b>23</b>   | 16,2   | 8,4            | 5,0            | 3,6            | 2,4              | 1,8            |
| 22 -                 | <b>30</b>   | 16,8   | 8,5            | 5,0            | 3,6            | 2,3              | 1,9            |

## Relays With Quick Tripping Characteristic

preferably for motors with short  $t_E$  time and for submersible pumps

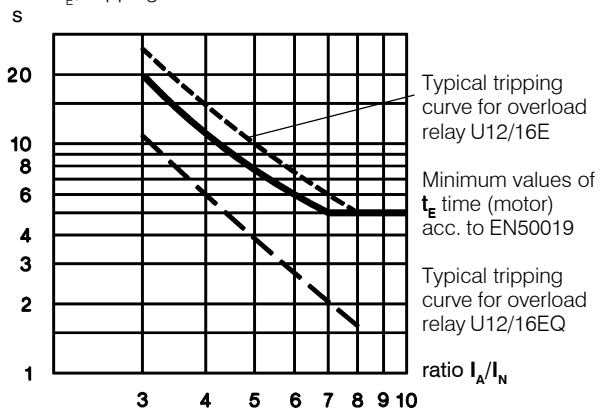
| Setting Range      |            | Tripping time depending on the multiple of the current setting from cold condition (tolerance $\pm 20\%$ of the tripping time) |                |                |                |                  |                |
|--------------------|------------|--|----------------|----------------|----------------|------------------|----------------|
| A                  | A          | $I_A/I_N$<br>3   | $I_A/I_N$<br>4 | $I_A/I_N$<br>5 | $I_A/I_N$<br>6 | $I_A/I_N$<br>7,2 | $I_A/I_N$<br>8 |
| <b>U12/16EQ ..</b> |            | s  | s              | s              | s              | s                | s              |
| 0,4 -              | <b>0,6</b> | 13,6   | 8,4            | 5,9            | 4,2            | 3,3              | 3,0            |
| 0,6 -              | <b>0,9</b> | 13,8   | 7,8            | 5,2            | 4,1            | 3,2              | 2,7            |
| 0,8 -              | <b>1,2</b> | 13,1   | 7,5            | 5,2            | 3,9            | 3,1              | 2,7            |
| 1,2 -              | <b>1,8</b> | 14,6   | 8,7            | 6,0            | 4,6            | 3,6              | 3,2            |
| 1,8 -              | <b>2,7</b> | 13,5   | 7,6            | 5,3            | 3,9            | 3,1              | 2,7            |
| 2,7 -              | <b>4</b>   | 11,0   | 6,0            | 4,1            | 2,6            | 1,7              | 1,4            |
| 4 -                | <b>6</b>   | 9,6  | 5,3            | 3,3            | 2,3            | 1,6              | 1,3            |
| 6 -                | <b>9</b>   | 10,2   | 5,4            | 3,4            | 2,3            | 1,6              | 1,3            |
| 8 -                | <b>11</b>  | 12,0   | 6,2            | 3,9            | 2,5            | 1,8              | 1,3            |
| 10 -               | <b>14</b>  | 12,8   | 6,6            | 4,0            | 2,6            | 1,8              | 1,4            |

All tripping times of overload relays U12/16EQ are shorter than the minimum values of the  $t_E$  time for motors of protection degree EEx e acc. to EN 50019 and therefore are suitable for all motors of protection degree EEx e. For these overload relays the selection on basis of tripping curves is thereby not necessary.

When selecting a standard overload, refer to the tripping curve. Determine the values of the starting current ratio  $I_A/I_N$  and the time  $t_E$  which is marked on the label of the motor. The overload must trip within the  $t_E$  time, which means that the tripping curve from cold condition must be (20% due to tolerance) below the co-ordination point  $I_A/I_N$  and the time  $t_E$ .

$I_A$  = Starting current of motor       $I_N$  = Rated current of motor  
 $t_E$  =  $t_E$ -time of motor

Time  $t_E$ /Tripping time



Labels of tripping curves for each setting range, sized 148x105mm (self-adhesive) are available on request.

Order No. D588, specify type and setting range.

### Example of selection for thermal overload relay:

Technical data of a motor protection EEx e  
 $P_N = 1,5\text{kW}$     $I_N = 3,6\text{A}$     $I_A/I_N = 5$     $t_E \text{ time} = 8\text{s}$

1) U12/16E 4 (2,7 - 4A)

Tripping time at  $5 \times I_N = 9,9\text{s}$

$9,9\text{s} + 20\% \text{ tolerance} = 11,9\text{s} > t_{E \text{ Motor}} = 8\text{s}$

The device U12/16E 4 is **not suitable**.

2) U12/16EQ 4 (2,7 - 4A)

Tripping time at  $5 \times I_N = 4,1\text{s}$

$4,1\text{s} + 20\% \text{ tolerance} = 4,9\text{s} < t_{E \text{ Motor}} = 8\text{s}$

The device U12/16EQ 4 is therefore suitable for motor protection

# Thermal Overload Relays

## Fuses for U3/32, U3/42, U3/74, U12/16E, U85, U180, U320 and U800

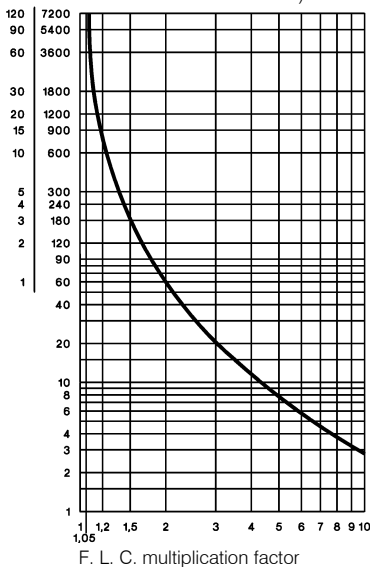
| Type               | Setting Range            |             |             |     | Max. Fuse Size According to Coordination-type   |                   |                   |      | Fuse UL | SCCR |
|--------------------|--------------------------|-------------|-------------|-----|---|-------------------|-------------------|------|---------|------|
|                    | DOL                      | A           |             | Δ   | "2" <sup>1)</sup>   |                   | "1" <sup>1)</sup> |      |         |      |
|                    |                          | A           | A           |     | quick A   | slow, gL(gG) A    | slow, gL(gG) A    | aM A | A       | kA   |
| U3/32<br>(U12/16E) | 0,12 -                   | <b>0,18</b> | -           |     | 0,5 <sup>2)</sup>   | 0,5 <sup>2)</sup> | 25                | -    | 15      | 5    |
|                    | 0,18 -                   | <b>0,27</b> | -           |     | 1,0 <sup>2)</sup>   | 1,0 <sup>2)</sup> | 25                | -    | 15      | 5    |
|                    | 0,27 -                   | <b>0,4</b>  | -           |     | 2   | 2                 | 25                | -    | 15      | 5    |
|                    | 0,4 -                    | <b>0,6</b>  | -           |     | 2   | 2                 | 25                | -    | 15      | 5    |
|                    | 0,6 -                    | <b>0,9</b>  | -           |     | 4   | 4                 | 25                | -    | 15      | 5    |
|                    | 0,8 -                    | <b>1,2</b>  | -           |     | 4   | 4                 | 25                | 2    | 15      | 5    |
|                    | 1,2 -                    | <b>1,8</b>  | -           |     | 6   | 6                 | 25                | 2    | 15      | 5    |
|                    | 1,8 -                    | <b>2,7</b>  | -           |     | 10  | 10                | 25                | 4    | 15      | 5    |
|                    | 2,7 -                    | <b>4</b>    | -           |     | 16  | 10                | 25                | 4    | 15      | 5    |
|                    | 4 -                      | <b>6</b>    | 7 - 10,5    |     | 20  | 16                | 25                | 6    | 15      | 5    |
|                    | 6 -                      | <b>9</b>    | 10,5 - 15,5 |     | 35  | 25                | 35                | 10   | 25      | 5    |
|                    | 8 -                      | <b>11</b>   | 14 - 19     |     | 35  | 25                | 35                | 16   | 30      | 5    |
|                    | 10 -                     | <b>14</b>   | 18 - 24     |     | 50  | 35                | 63                | 16   | 40      | 5    |
| 13 -               | <b>18</b>                | 23 - 31     |             | 50  | 35  | 63                | 20                | 50   | 5       |      |
| 17 -               | <b>(23)24</b>            | 30 - (40)41 |             | 63  | 50  | 63                | 25                | 60   | 5       |      |
| (22)23             | <b>-(30)32</b>           | (38)40      | -(52)55     | 80  | 63  | 80                | 35                | 70   | 5       |      |
| U3/42              | 10 -                     | <b>14</b>   | 18 - 24     | 50  | 35  | 80                | 16                | 40   | 5       |      |
|                    | 14 -                     | <b>20</b>   | 24 - 35     | 63  | 50  | 80                | 25                | 60   | 5       |      |
|                    | 20 -                     | <b>28</b>   | 35 - 48     | 80  | 63  | 80                | 35                | 80   | 5       |      |
|                    | 28 -                     | <b>42</b>   | 48 - 73     | 100 | 80  | 150               | 50                | 110  | 5       |      |
| U3/74              | 20 -                     | <b>28</b>   | 35 - 48     | 100 | 80  | 150               | 35                | 80   | 5       |      |
|                    | 28 -                     | <b>42</b>   | 48 - 73     | 125 | 100   | 150               | 50                | 110  | 5       |      |
|                    | 40 -                     | <b>52</b>   | 70 - 90     | 160 | 100   | 150               | 63                | 200  | 5       |      |
|                    | 52 -                     | <b>65</b>   | 90 - 112    | 160 | 125   | 150               | 80                | 250  | 10      |      |
|                    | 60 -                     | <b>74</b>   | 104 - 128   | 160 | 125   | 150               | 80                | 250  | 10      |      |
| U85                | 60 -                     | <b>90</b>   | 104 - 156   |     |   |                   |                   | 300  | 10      |      |
|                    | 80 -                     | <b>120</b>  | 140 - 207   |     |   |                   |                   | -    | 10      |      |
| U180, U320<br>U800 | all ranges<br>all ranges |             |             |     | For short circuit protecting overload relays with current transformer use fuse according to the contactor of the combination. |                   |                   |      | -       | -    |

### Tripping Characteristics for U3/32, U3/42, U3/74 and U12/16E

Detailed tripping times for each range see table page 118

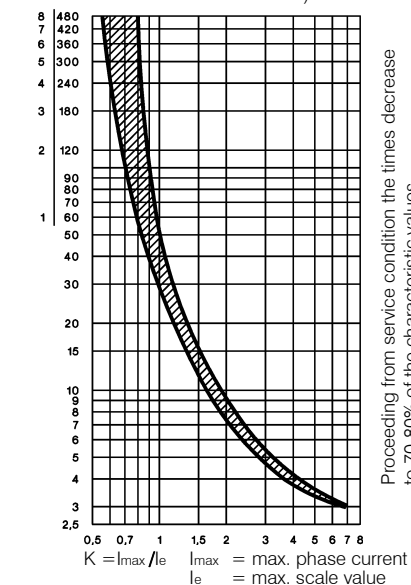
#### with three-phase load

Tripping time (Average value of typical tolerance curves from cold condition)



#### with two-pole load

Tripping time (Typical tolerance curve from cold condition)



1) Coordination-type according to IEC 947-4-1:  
"2": Light contact welding accepted. Thermal overload relay must not be damaged.  
"1": Welding of contactor and damage of the thermal overload relay allowed.  
2) Miniature fuse

3) Suitable for use on a capability of delivering not more than

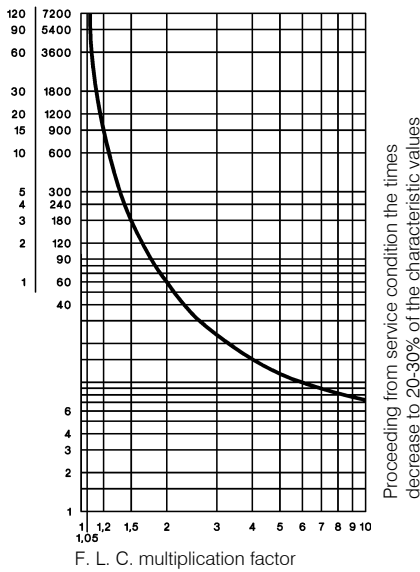
# Thermal Overload Relays

## Tripping Characteristics for U85, U180, U320, and U800

Detailed tripping times for each range of U85 see table page 118

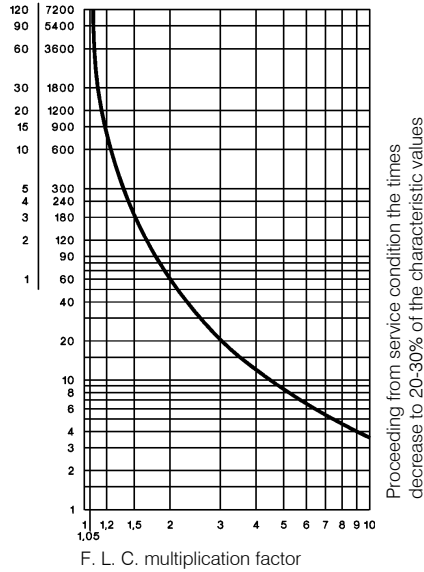
### U85 with three-phase load

Tripping time (Average value of typical tolerance curves from cold condition)  
min. s



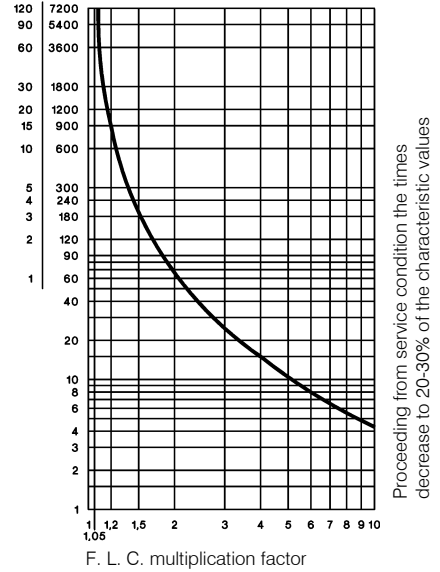
### U180, U320 with three-phase load

Tripping time (Average value of typical tolerance curves from cold condition)  
min. s



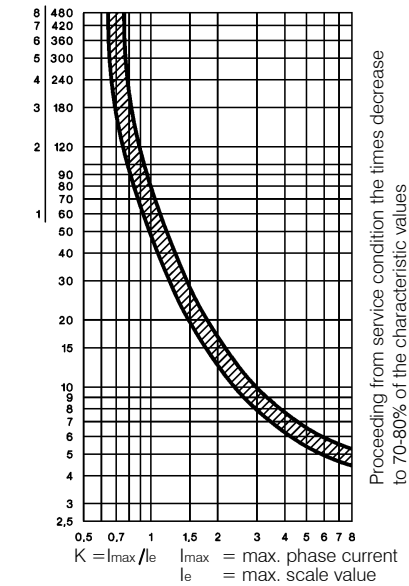
### U800 with three-phase load

Tripping time (Average value of typical tolerance curves from cold condition)  
min. s



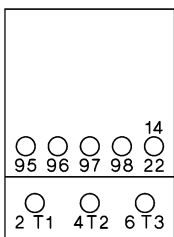
### U85 with two-pole load

Tripping time (Typical tolerance curve from cold condition)  
min. s

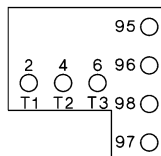


## Position of Terminals

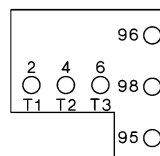
### U3/32



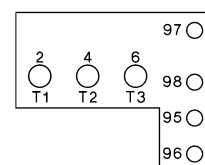
### U12/16E, U12/16EM, U12/16EQ



### U12/16A



### U3/42, U3/74



# Thermal Overload Relays in Special Version

## Fuse for U12/16EQ

| Setting Range    | Maximum Fuse Acc. to Coordination-type |                   |  |
|------------------|--|-------------------|--|
|                  | "2" <sup>1)</sup><br>quick<br>A        | slow, gL(gG)<br>A | "1" <sup>1)</sup><br>slow, gL(gG)<br>A |
| 0,4 - <b>0,6</b> | 2                                      | 2                 | 25                                     |
| 0,6 - <b>0,9</b> | 4                                      | 4                 | 25                                     |
| 0,8 - <b>1,2</b> | 4                                      | 4                 | 25                                     |
| 1,2 - <b>1,8</b> | 6                                      | 6                 | 25                                     |
| 1,8 - <b>2,7</b> | 10                                     | 10                | 25                                     |
| 2,7 - <b>4</b>   | 16                                     | 10                | 25                                     |
| 4 - <b>6</b>     | 20                                     | 16                | 25                                     |
| 6 - <b>9</b>     | 35                                     | 25                | 35                                     |
| 8 - <b>11</b>    | 35                                     | 25                | 35                                     |
| 10 - <b>14</b>   | 50                                     | 35                | 63                                     |

## Fuse for U12/16EM

| Setting Range      | Maximum Fuse Acc. to Coordination-type "2" <sup>1)</sup> |                           |                               |
|--------------------|--|---------------------------|-------------------------------|
|                    | 380-400V<br>slow, gL(gG)<br>A                            | 500V<br>slow, gL(gG)<br>A | 660-690V<br>slow, gL(gG)<br>A |
| 0,12 - <b>0,18</b> | none   | none                      | on request                    |
| 0,18 - <b>0,27</b> | none   | none                      | on request                    |
| 0,27 - <b>0,4</b>  | none   | none                      | on request                    |
| 0,4 - <b>0,6</b>   | none   | none                      | on request                    |
| 0,6 - <b>0,9</b>   | none   | none                      | on request                    |
| 0,8 - <b>1,2</b>   | none   | 10                        | on request                    |
| 1,2 - <b>1,8</b>   | none   | 16                        | on request                    |
| 1,8 - <b>2,7</b>   | 20   | 20                        | on request                    |
| 2,7 - <b>4</b>     | 35   | 35                        | on request                    |

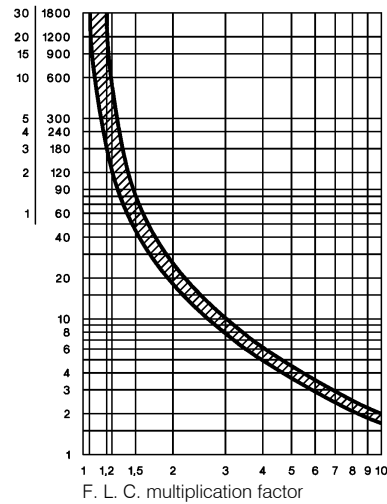
## Tripping Characteristic for U12/16EQ

Detailed tripping times for each range see table page 118

### with three-phase load

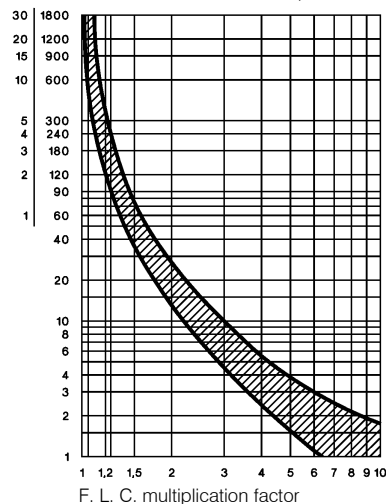
range 0,4-0,6 to 1,8-2,7A

Tripping time (Typical tolerance curve from cold condition)



range 2,7-4 to 10-14A

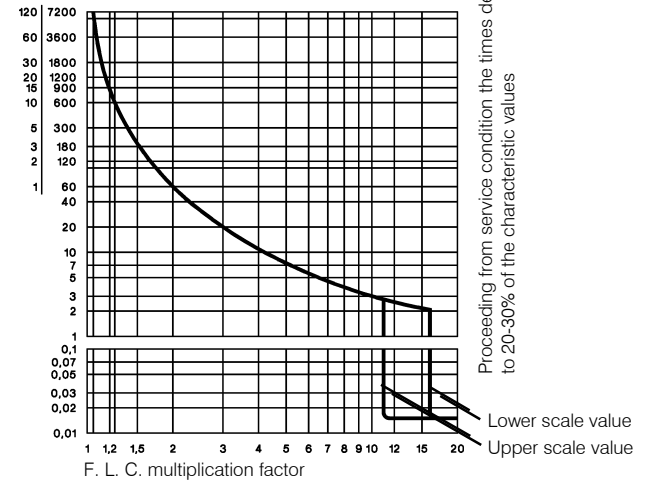
Tripping time (Typical tolerance curve from cold condition)



## Tripping Characteristic for U12/16EM

### with three-phase load

Tripping time (Average value of typical tolerance curves from cold condition)



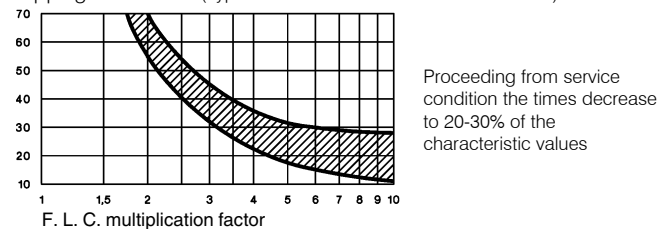
## Fuse for UAT21, UAT22, UAT23

For short circuit protecting thermal overload relays with current transformer use fuse according to the contactor of the combination.

## Tripping characteristic for UAT21, UAT22, UAT23

### with three-phase load

Tripping time in s (Typical tolerance curve from cold condition)



1) Coordination-type according to IEC 947-4-1:  
 "2": Light contact welding accepted. Thermal overload relay must not be damaged.  
 "1": Welding of contactor and damage of the thermal overload relay allowed.



# Thermal Overload Relays

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

| Type  |   | U3/32        | U12/16 <sup>6)</sup>          | U3/42                  | U3/74              | U85          | U180         | U320         | U800                | UAT21        | UAT22                  | UAT23        |
|---|---|--------------|-------------------------------|------------------------|--------------------|--------------|--------------|--------------|---------------------|--------------|------------------------|--------------|
| <b>Rated insulation voltage</b> $U_i$ <sup>1)</sup> | V~  | 690          | 690                           | 690                    | 690                | 750          | 1000         | 1000         | 1000                | 690          | 690                    | 690          |
| <b>Permissible ambient temperature</b>              |   |              |                               |                        |                    |              |              |              |                     |              |                        |              |
| operation   | open °C   |              |                               | -25 to +60             |                    |              |              |              | -25 to +55          | -25 to +60   |                        |              |
| storage   | °C  |              |                               | -50 to +70             |                    |              |              |              | -40 to +70          | -50 to +70   |                        |              |
| <b>Trip class according to IEC 947-4-110A</b>       |   | 10A          | 10A                           | 10A                    | 10A                | 20           | 10A          | 10A          | 10                  | 30           | 30                     | 30           |
| <b>Cable cross-section</b>                          |   |              |                               |                        |                    |              |              |              |                     |              |                        |              |
| main connector                                      | solid or stranded mm <sup>2</sup>                 | 0,75-6       | 0,75-6+0,75-2,5 <sup>2)</sup> | 0,75-10                | 4-35 <sup>2)</sup> | 3)           | 7)           | -            | 7)                  | 0,5-10       | 0,5-16                 | 0,5-25       |
|   | flexible mm <sup>2</sup>                          | 1-4          | 0,75-4+0,5-2,5 <sup>2)</sup>  | 0,75-6                 | 6-25 <sup>2)</sup> |              |              |              |                     | 0,5-6        | 0,5-10                 | 0,5-16       |
|   | flexible with multicore cable end mm <sup>2</sup> | 0,75-4       | 0,5-2,5+0,5-1,5               | 0,75-6                 | 4-25               |              |              |              |                     | 0,5-6        | 0,5-10                 | 0,5-16       |
| Cables per clamp                                    | number  | 2            | 1+1                           | 2                      | 1                  |              |              |              |                     | 1            | 1                      | 1            |
| auxiliary connector                                 | solid mm <sup>2</sup>                             |              |                               | 0,75-2,5 <sup>2)</sup> |                    |              |              |              | 1-2,5 <sup>2)</sup> |              | 0,75-2,5 <sup>2)</sup> |              |
|   | flexible mm <sup>2</sup>                          |              |                               | 0,5-2,5 <sup>2)</sup>  |                    |              |              |              | 1-2,5 <sup>2)</sup> |              | 0,5-2,5 <sup>2)</sup>  |              |
|   | flexible with multicore cable end mm <sup>2</sup> |              |                               | 0,5-1,5                |                    |              |              |              | 1-2,5 <sup>2)</sup> |              | 0,5-1,5                |              |
| Cables per clamp                                    | number  |              |                               | 2                      |                    |              |              |              | 2                   |              | 2                      |              |
| <b>Type</b>   |   | <b>U3/32</b> | <b>U12/16A</b>                | <b>U12/16E</b>         | <b>U12/16EQ</b>    | <b>U3/42</b> | <b>U85</b>   | <b>U180</b>  | <b>U800</b>         | <b>UAT21</b> | <b>UAT22</b>           | <b>UAT23</b> |
| <b>Auxiliary contacts</b>                           |   |              |                               |                        |                    |              |              |              |                     |              |                        |              |
| <b>Rated insulation voltage</b> $U_i$ <sup>1)</sup> |   |              |                               |                        |                    |              |              |              |                     |              |                        |              |
| same potential                                      | V~  | 690          | 690                           | 690                    | 690                | 690          | 690          | 690          | 500                 | 690          |                        |              |
| different potential                                 | V~  | 440          | -                             | 440                    | 440                | 250          | 440          | 440          | 500                 | 440          |                        |              |
| <b>Utilization category AC15</b>                    |   |              |                               |                        |                    |              |              |              |                     |              |                        |              |
| Rated operational current $I_e$                     | 24V A   | 3            | 4                             | 5                      | 5                  | 4            | 5            | 3            | 4 <sup>5)</sup>     | 5            |                        |              |
|   | 230V A  | 2            | 2,5                           | 3                      | 3                  | 2,5          | 3            | 2            | 2,5                 | 3            |                        |              |
|   | 400V A  | 1            | 1,5                           | 2                      | 2                  | 1,5          | 2            | 1            | 1,5                 | 2            |                        |              |
|   | 690V A  | 0,5          | 0,6                           | 0,6                    | 0,6                | 0,6          | 0,6          | 0,5          | 0,6                 | 0,6          |                        |              |
| <b>Utilization category DC13</b>                    |   |              |                               |                        |                    |              |              |              |                     |              |                        |              |
| Rated operational current $I_e$                     | 24V A   | 1            | 1,2                           | 1,2                    | 1,2                | 1,2          | 1,2          | 1,2          | 1,2                 | 1,2          |                        |              |
|   | 110V A  | 0,15         | 0,15                          | 0,15                   | 0,15               | 0,15         | 0,15         | 0,15         | 0,15                | 0,15         |                        |              |
|   | 220V A  | 0,1          | 0,1                           | 0,1                    | 0,1                | 0,1          | 0,1          | 0,1          | 0,1                 | 0,1          |                        |              |
| <b>Short circuit prot.</b> (without welding 1kA)    |   |              |                               |                        |                    |              |              |              |                     |              |                        |              |
| highest fuse rating                                 | gL (gG) A   | 4            | 4                             | 6                      | 6                  | 6            | 6            | 4            | 6                   | 6            |                        |              |
| <b>Type</b>   |   | <b>U3/32</b> | <b>U12/16</b>                 | <b>U12/16E</b>         | <b>U3/42</b>       | <b>U3/42</b> | <b>U3/74</b> | <b>U3/74</b> | <b>U3/74</b>        | <b>U85</b>   |                        |              |
| Setting range                                       |   | all          | to 23A                        | 22 - 30A               | to 28A             | 28 - 42A     | to 52A       | 52 - 65A     |                     | all          |                        |              |
| <b>Power loss per current path (max.)</b>           |   |              |                               |                        |                    |              |              |              |                     |              |                        |              |
| minimum setting value                               | W   | 1,1          | 1,1                           | 1,7                    | 1,3                | 1,3          | 2,0          | 2,9          | 1,1                 |              |                        |              |
| maximum setting value                               | W   | 2,3          | 2,3                           | 3,7                    | 2,6                | 3,3          | 3,7          | 4,5          | 2,5                 |              |                        |              |

## Data according to cULus

| Type                            |      | U3/32 | U12/16A | U12/16E | U12/16EQ | U3/42 | U3/74 | U85 |
|---------------------------------|------|-------|---------|---------|----------|-------|-------|-----|
| <b>Rated insulation voltage</b> | V~   | 600   | 600     | 600     | 600      | 600   | 600   | 600 |
| <b>Rated current</b>            | A    | 32    | 23      | 23      | 23       | 42    | 74    | 85  |
| <b>Auxiliary contacts</b>       |      |       |         |         |          |       |       |     |
| Rated voltage                   |      |       |         |         |          |       |       |     |
| same potential                  | V AC | 600   | 600     | 600     | 600      | 600   | 600   | 600 |
| different potential             | V~   | 150   | -       | 150     | 150      | 150   | 150   | 150 |
| <b>Switching capacity AC</b>    |      |       |         |         |          |       |       |     |
| of aux. contacts                | VA   | 500   | 500     | 500     | 500      | 600   | 600   | 600 |
|                                 | A    | 2     | 3       | 4       | 4        | 4     | 4     | 4   |

## Temperature Compensation

In case of higher ambient temperature use the following formula:  
 (Ambient temperature - 20) x 0,125 = correction factor in % of the full load motor current

Example: Ambient temperature 70°C, full load motor current 7A  
 (70 - 20) x 0,125 = 6,25%  
 Setting value: 7A + 6,25% = 7,44A

1) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry):  $U_{imp} = 4kV$  (at 440V), 6kV (at 690V).

Data for other conditions on request.

2) Maximum cable cross-section with prepared conductor

3) Without terminals, suitable for bushing one connector 70mm<sup>2</sup> (stranded) per phase

4) Switching capacity of the start contact: AC15 300VA, max. 1,5A, DC13 (max. 220V) 30W, max. 1,5A

5) Switching capacity of the make contact: AC15 400VA, max. 1,7A, DC13 (max. 220V) 10W, max. 1A

6) U12/16E 30: Cable cross-section for main connector like type U3/42, one connector only

7) Busbar sets see accessories page 117

# Thermal Overload Relays

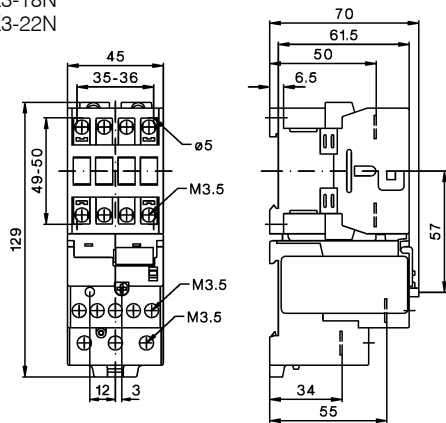
## Dimensions

K3-10N + U3/32

K3-14N

K3-18N

K3-22N

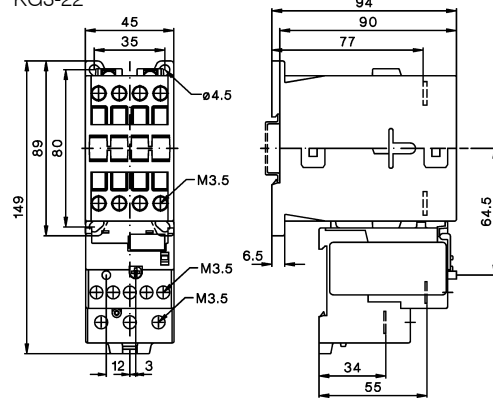


KG3-10 + U3/32

KG3-14

KG3-18

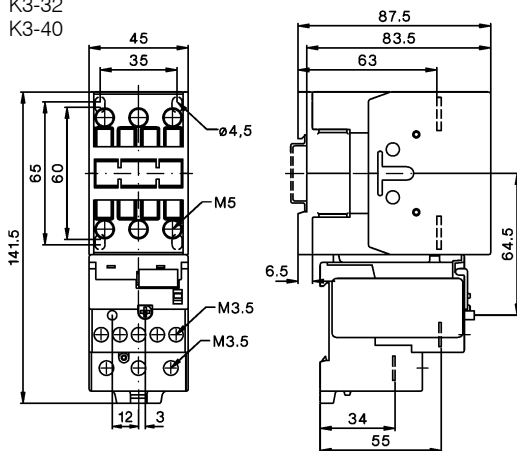
KG3-22



K3-24 + U3/32

K3-32

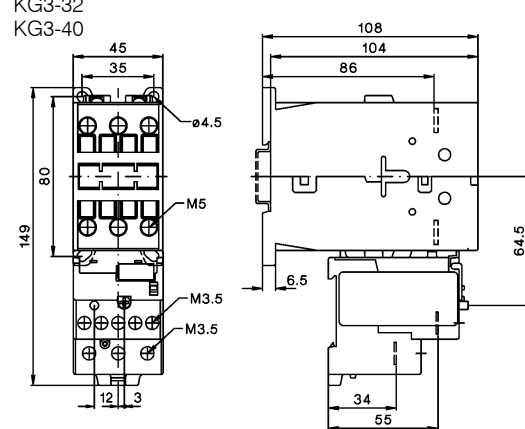
K3-40



KG3-24 + U3/32

KG3-32

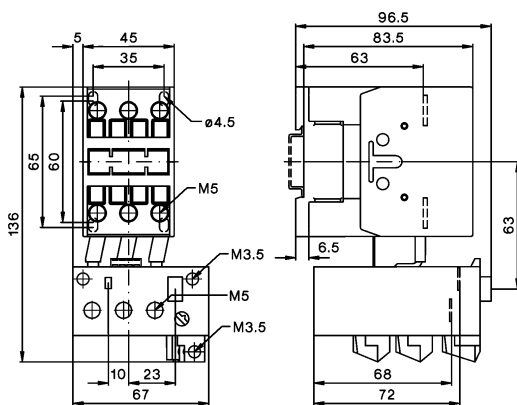
KG3-40



K3-24 + U3/42

K3-32

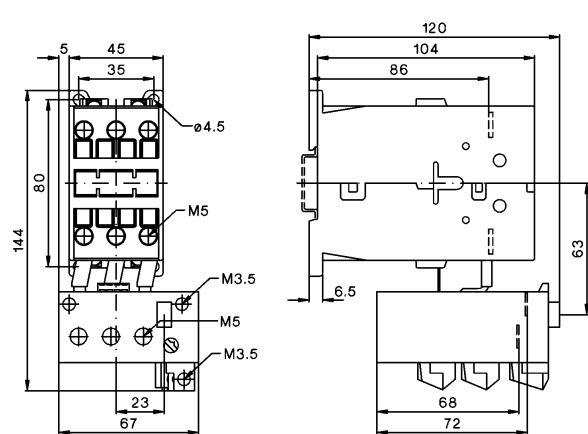
K3-40



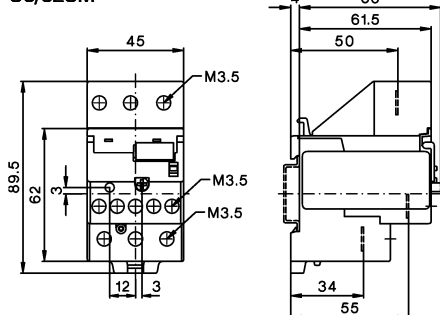
KG3-24 + U3/42

KG3-32

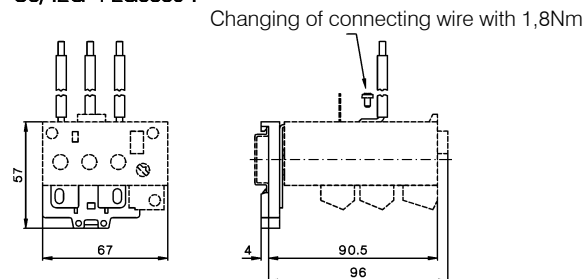
KG3-40



U3/32SM



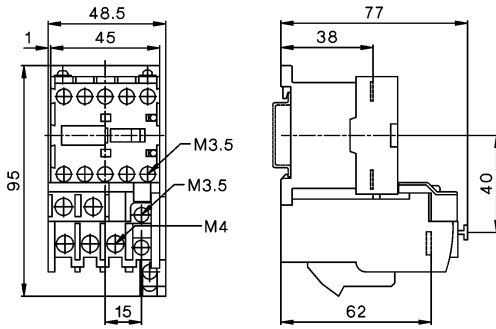
U3/42G + LG5830-



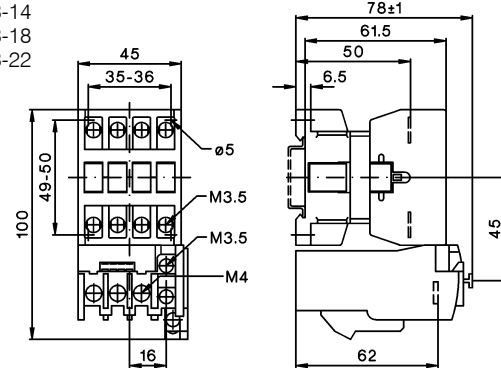
# Thermal Overload Relays

## Dimensions

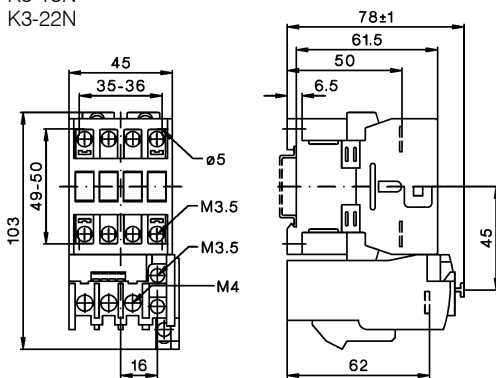
K1-09 + U12/16.. K1  
K1-12



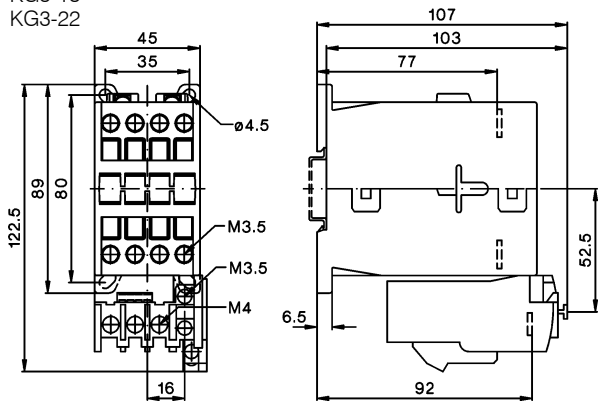
K3-10 + U12/16..K3  
K3-14  
K3-18  
K3-22



K3-10N + U12/16..K3  
K3-14N  
K3-18N  
K3-22N

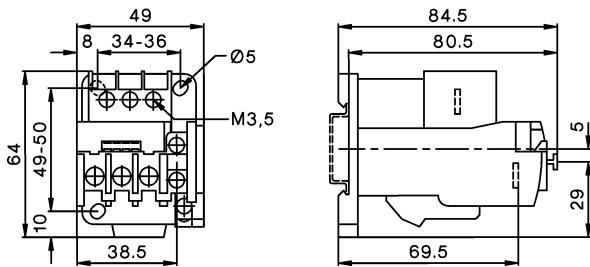


KG3-10 + U12/16..K3  
KG3-14  
KG3-18  
KG3-22

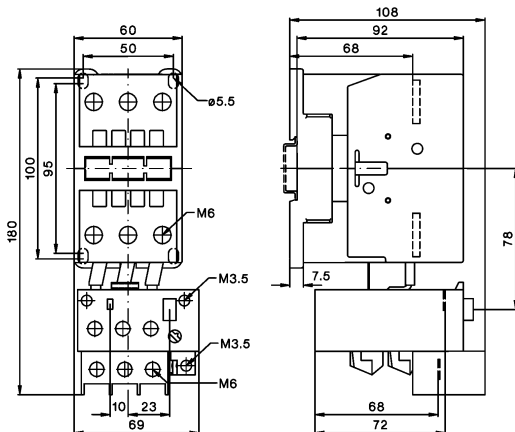


### U12SM K3

U12/16..K3 + U12SM K3 for snap-on 35mm DIN-rail according to DIN EN50022 and screw mounting (single mounting)



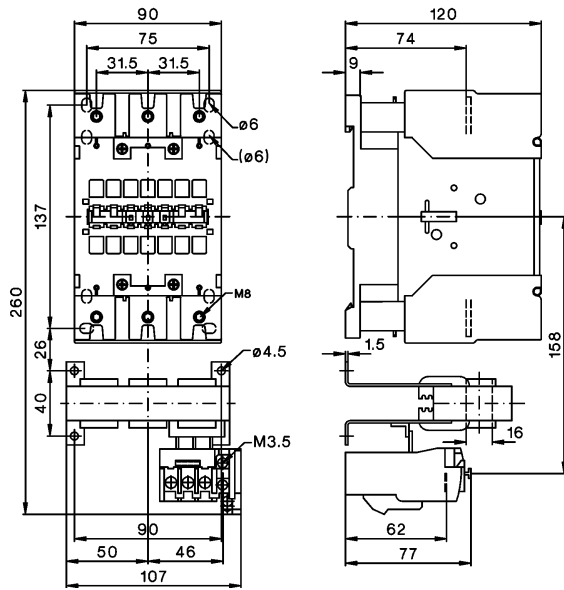
K3-50 + U3/74  
K3-62  
K3-74



# Thermal Overload Relays

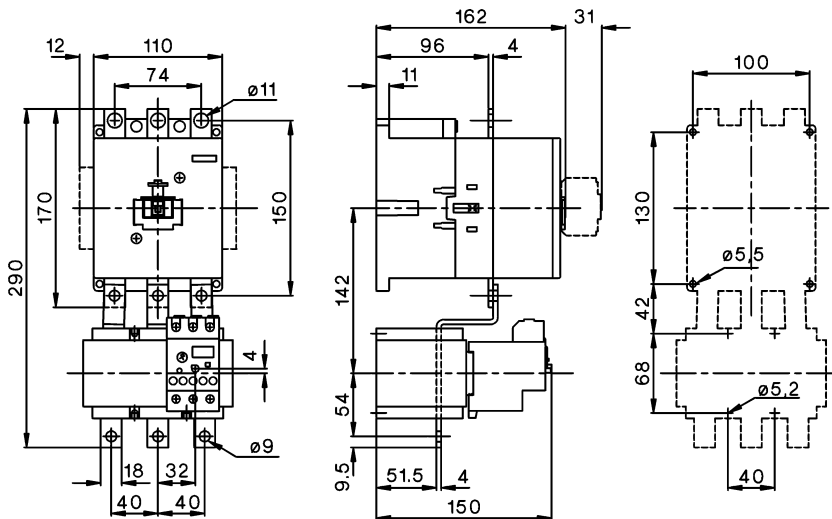
## Dimensions

K3-90A + U85  
K3-115A



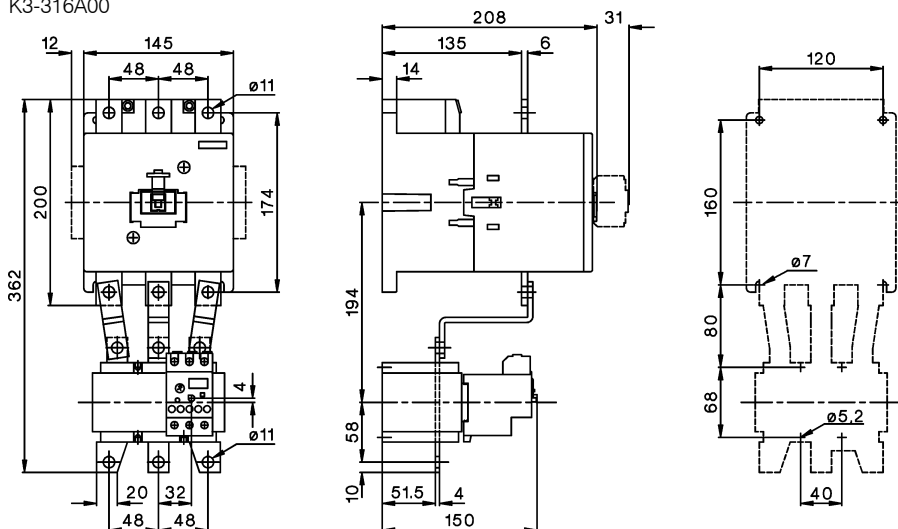
K3-151A00 + U180  
K3-176A00

Bohrplan



K3-210A00 + U320  
K3-260A00  
K3-316A00

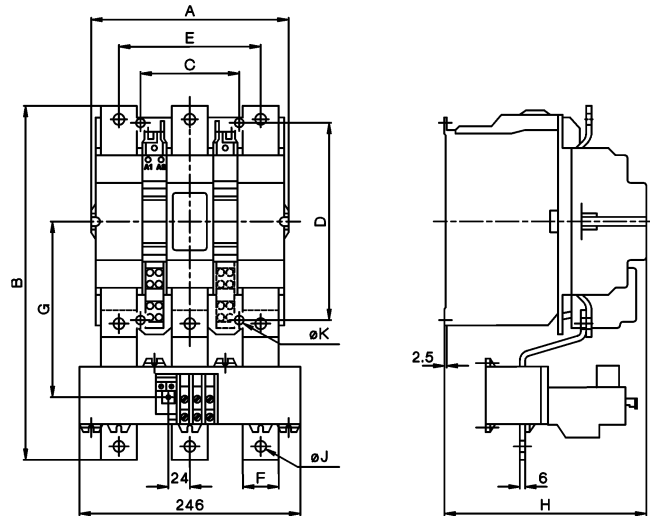
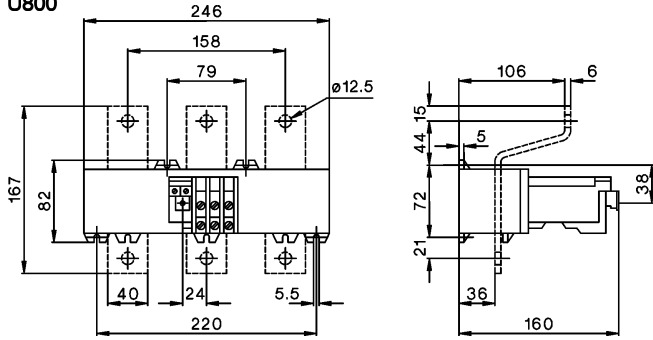
Bohrplan



# Thermal Overload Relays

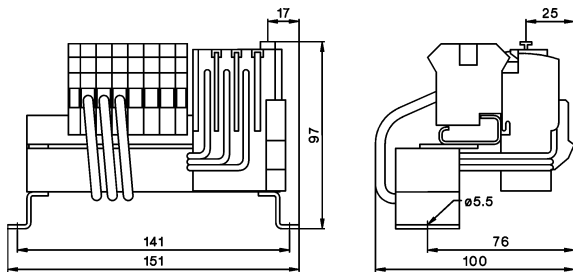
## Dimensions

### U800

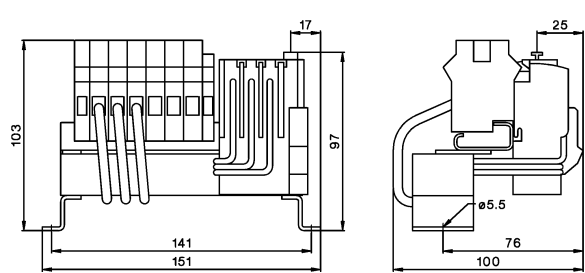


| U800 with     | A   | B   | C   | D   | E   | F  | G   | H   | J    | K  |
|---------------|-----|-----|-----|-----|-----|----|-----|-----|------|----|
| <b>K3-450</b> | 220 | 372 | 110 | 220 | 158 | 40 | 185 | 225 | 12,5 | 9  |
| <b>K3-550</b> | 220 | 395 | 110 | 220 | 158 | 40 | 196 | 225 | 12,5 | 9  |
| <b>K3-700</b> | 280 | 487 | 175 | 280 | 202 | 50 | 257 | 291 | 14,5 | 11 |
| <b>K3-860</b> | 280 | 540 | 175 | 280 | 202 | 50 | 280 | 291 | 14,5 | 11 |

### UAT21

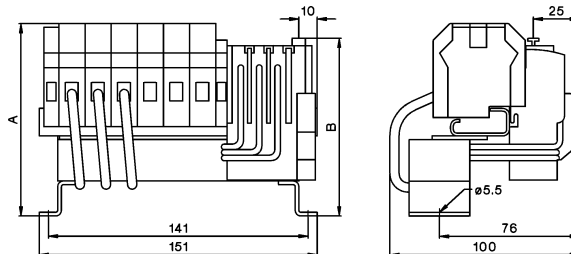


### UAT22



### UAT23

| Type            | Setting Range | A     | B    |
|-----------------|---------------|-------|------|
| <b>UAT23 37</b> | 23-37A        | 105,5 | 97,5 |
| <b>UAT23 49</b> | 32-49A        | 94    | 86   |
| <b>UAT23 72</b> | 48-72A        | 94    | 86   |





Modular Contactors

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Auxiliary Contact Block  
Accessories

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129



Day-Night Reloading Contactors

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Switching Of Lamps

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Technical Data

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Dimensions

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# Modular Contactors

| Rated Current | Heating Power AC1 at |         | Type   | coil voltage                 | Pack pcs. | Weight kg/pc. | Wiring Diagram |
|---------------|----------------------|---------|--|------------------------------|-----------|---------------|----------------|
|               | 1-phase              | 3-phase |  |                              |           |               |                |
| 400V          | 230V                 | 400V    | <b>24</b><br><b>230</b><br><b>24VM</b><br><b>230VM</b><br> | 24V 50/60Hz                  |           |               |                |
| A             | kW                   | kW      |  | 220-240V 50Hz, 230-264V 60Hz |           |               |                |
|               |                      |         |  | 24V 50/60Hz, 24V DC          |           |               |                |
|               |                      |         |  | 220-240V 50/60Hz, 220V DC    |           |               |                |

## One-pole 1 module (17,5mm), AC-operated (low noise)



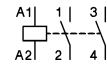
|    |     |   |            |    |      |
|----|-----|---|------------|----|------|
| 20 | 4,6 | - | R20-10 24  | 12 | 0,12 |
| 20 | 4,6 | - | R20-10 230 | 12 | 0,12 |



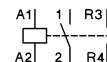
## Two-pole 1 module (17,5mm), AC-operated (low noise)



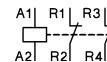
|    |     |   |            |    |      |
|----|-----|---|------------|----|------|
| 20 | 4,6 | - | R20-20 24  | 12 | 0,12 |
| 20 | 4,6 | - | R20-20 230 | 12 | 0,12 |



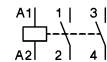
|    |     |   |            |    |      |
|----|-----|---|------------|----|------|
| 20 | 4,6 | - | R20-11 24  | 12 | 0,12 |
| 20 | 4,6 | - | R20-11 230 | 12 | 0,12 |



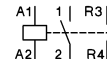
|    |     |   |            |    |      |
|----|-----|---|------------|----|------|
| 20 | 4,6 | - | R20-02 24  | 12 | 0,12 |
| 20 | 4,6 | - | R20-02 230 | 12 | 0,12 |



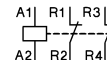
|    |     |   |            |    |      |
|----|-----|---|------------|----|------|
| 25 | 5,5 | - | R25-20 24  | 12 | 0,14 |
| 25 | 5,5 | - | R25-20 230 | 12 | 0,14 |



|    |     |   |            |    |      |
|----|-----|---|------------|----|------|
| 25 | 5,5 | - | R25-11 24  | 12 | 0,14 |
| 25 | 5,5 | - | R25-11 230 | 12 | 0,14 |



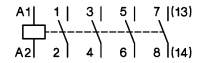
|    |     |   |            |    |      |
|----|-----|---|------------|----|------|
| 25 | 5,5 | - | R25-02 24  | 12 | 0,14 |
| 25 | 5,5 | - | R25-02 230 | 12 | 0,14 |



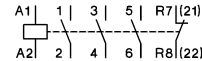
## Four-pole 2 modules (35mm)<sup>1)</sup>, AC-operated (low noise)



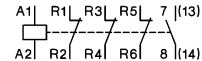
|    |     |    |            |   |      |
|----|-----|----|------------|---|------|
| 25 | 5,7 | 17 | R25-40 24  | 6 | 0,21 |
| 25 | 5,7 | 17 | R25-40 230 | 6 | 0,21 |



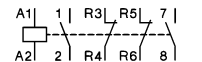
|    |     |    |            |   |      |
|----|-----|----|------------|---|------|
| 25 | 5,7 | 17 | R25-31 24  | 6 | 0,21 |
| 25 | 5,7 | 17 | R25-31 230 | 6 | 0,21 |



|    |     |    |            |   |      |
|----|-----|----|------------|---|------|
| 25 | 5,7 | 17 | R25-13 24  | 6 | 0,21 |
| 25 | 5,7 | 17 | R25-13 230 | 6 | 0,21 |



|    |     |   |            |   |      |
|----|-----|---|------------|---|------|
| 25 | 5,7 | - | R25-22 24  | 6 | 0,21 |
| 25 | 5,7 | - | R25-22 230 | 6 | 0,21 |



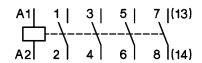
|    |     |    |            |   |      |
|----|-----|----|------------|---|------|
| 25 | 5,7 | 17 | R25-04 24  | 6 | 0,21 |
| 25 | 5,7 | 17 | R25-04 230 | 6 | 0,21 |



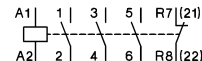
## Four-pole 2 modules(35mm), AC/DC-operated<sup>1)</sup>, (hum free)



|    |     |    |              |   |      |
|----|-----|----|--------------|---|------|
| 25 | 5,7 | 17 | R25-40 24VM  | 6 | 0,22 |
| 25 | 5,7 | 17 | R25-40 230VM | 6 | 0,22 |



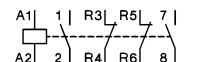
|    |     |    |              |   |      |
|----|-----|----|--------------|---|------|
| 25 | 5,7 | 17 | R25-31 24VM  | 6 | 0,22 |
| 25 | 5,7 | 17 | R25-31 230VM | 6 | 0,22 |



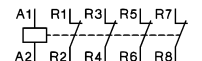
|    |     |    |              |   |      |
|----|-----|----|--------------|---|------|
| 25 | 5,7 | 17 | R25-13 24VM  | 6 | 0,22 |
| 25 | 5,7 | 17 | R25-13 230VM | 6 | 0,22 |



|    |     |   |              |   |      |
|----|-----|---|--------------|---|------|
| 25 | 5,7 | - | R25-22 24VM  | 6 | 0,22 |
| 25 | 5,7 | - | R25-22 230VM | 6 | 0,22 |



|    |     |    |              |   |      |
|----|-----|----|--------------|---|------|
| 25 | 5,7 | 17 | R25-04 24VM  | 6 | 0,22 |
| 25 | 5,7 | 17 | R25-04 230VM | 6 | 0,22 |



1) Sealable with Sealing Cover P721, available aux. contact block RH11(see page 129)  
 2) Sealable with Sealing Cover P721, available aux. contact block RH11-1(see page 129)

# Modular Contactors

| Rated Current | Heating Power AC1 at | Type | coil voltage                 | Pack pcs. | Weight kg/pc. | Wiring Diagram |
|---------------|----------------------|------|------------------------------|-----------|---------------|----------------|
| AC1           | 1-phase              | 24   | 24V 50/60Hz                  |           |               |                |
| 400V          | 3-phase              | 230  | 220-240V 50Hz, 230-264V 60Hz |           |               |                |
| A             | kW                   | ↓    |                              |           |               |                |

## Two-pole 2 modules (35mm), AC-operated (low noise)

|    |      |   |            |   |      |  |
|----|------|---|------------|---|------|--|
| 40 | 9    | - | R40-20 24  | 6 | 0,23 |  |
| 40 | 9    | - | R40-20 230 | 6 | 0,23 |  |
| 40 | 9    | - | R40-02 24  | 6 | 0,23 |  |
| 40 | 9    | - | R40-02 230 | 6 | 0,23 |  |
| 63 | 14,3 | - | R63-20 24  | 6 | 0,23 |  |
| 63 | 14,3 | - | R63-20 230 | 6 | 0,23 |  |
| 63 | 14,3 | - | R63-02 24  | 6 | 0,23 |  |
| 63 | 14,3 | - | R63-02 230 | 6 | 0,23 |  |



## Four-pole 3 modules (52,5mm) <sup>1)</sup>, AC-operated (low noise)

|    |      |      |            |   |      |  |
|----|------|------|------------|---|------|--|
| 40 | 9    | 27,5 | R40-40 24  | 4 | 0,35 |  |
| 40 | 9    | 27,5 | R40-40 230 | 4 | 0,35 |  |
| 40 | 9    | 27,5 | R40-31 24  | 4 | 0,35 |  |
| 40 | 9    | 27,5 | R40-31 230 | 4 | 0,35 |  |
| 40 | 9    | -    | R40-22 24  | 4 | 0,35 |  |
| 40 | 9    | -    | R40-22 230 | 4 | 0,35 |  |
| 40 | 9    | 27,5 | R40-04 24  | 4 | 0,35 |  |
| 40 | 9    | 27,5 | R40-04 230 | 4 | 0,35 |  |
| 63 | 14,3 | 43   | R63-40 24  | 4 | 0,36 |  |
| 63 | 14,3 | 43   | R63-40 230 | 4 | 0,36 |  |
| 63 | 14,3 | 43   | R63-31 24  | 4 | 0,36 |  |
| 63 | 14,3 | 43   | R63-31 230 | 4 | 0,36 |  |
| 63 | 14,3 | -    | R63-22 24  | 4 | 0,36 |  |
| 63 | 14,3 | -    | R63-22 230 | 4 | 0,36 |  |
| 63 | 14,3 | 43   | R63-04 24  | 4 | 0,36 |  |
| 63 | 14,3 | 43   | R63-04 230 | 4 | 0,36 |  |



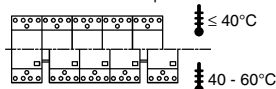
## Auxiliary Contact Block 1/2 module (8,8mm) for contactor R25 (4p.), R40, R63 (max. 1pc.)

| Rated current | Type                         | Pack pcs. | Weight kg/pc. | Wiring Diagram |
|---------------|------------------------------|-----------|---------------|----------------|
| AC15          |                              |           |               |                |
| 230V          |                              |           |               |                |
| A             | for contactor                |           |               |                |
| 3             | R25 <sup>2)</sup> , R40, R63 | 3         | 0,026         |                |
| 3             | R25-..VM                     | 3         | 0,026         |                |



## Accessories

| Type  | Pack pcs. | Weight kg/pc. |
|---|-----------|---------------|
| RC-unit 2x for R20.. to R63.. for 12V to 250V AC 220nF / 100 Ohm not for R25-..VM | 2         | 0,05          |
| Spacing piece 1/2 module (8,8mm) for R20.. to R63.. for ambient temperature >40°C | 10        | 0,012         |
| Sealing cover for R25.. (4p.)   | 10        | 0,002         |
| Sealing cover for R40.., R63..  | 10        | 0,003         |



1) Sealable with Sealing Cover P690, available aux. contact block RH11  
 2) AC-operated R25-..., 4-pole



## Day-Night Reloading Contactors

**Compact Module, for separate tariff counters** 2 modules (35mm), AC-operated (low noise)

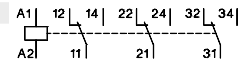


**3-pole 400V 25A** **R25-TN 230** 1 0,22

2 Switch positions:

**Day** (Reloading, contact 11-14 ... closed, remains in position Night, until the next occurs)

**Night** (Basis operation) contact 11-12 ... closed



**Contactor Module, for double tariff counters** 1 module (17,5mm), AC-operated (low noise)



**2-pole 400V 25A** **R25-TN20 230** 1 0,13

4 Switch position:

**Day** (Reloading, contact 1-2 ... closed, remains in position Night, until the next occurs)

**Night** (automatic operation, contact 1-2 ... only at night closed)

**On** (Permanently On)

**Off** (permanently Off)



**Switch Module** 1 module (17,5mm)



**2-pole 400V 25A** **RH25-20** 1 0,13



## Modular Contactors

### Switching of lamps

| Lamp Type  | Power<br>W | Current<br>A | Capacitors<br>µF | Max. lamps per pole at 230V 50Hz and max. 60°C |         |         |         |
|--|------------|--------------|------------------|--|---------|---------|---------|
|  |            |              |                  | R20..  | R25..   | R40..   | R63..   |
| <b>Incandescent lamps</b>  | 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       |
| <b>Fluorescent lamps</b><br>uncompensated or<br>serial compensated | 11         | 0,16         | 1,3              | 60   | 75      | 210     | 310     |
|  | 18         | 0,37         | 2,7              | 25   | 30      | 90      | 140     |
|  | 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      |
| <b>Fluorescent lamps</b><br>dual-connection                        | 11         | 0,07         | -                | 2 x 100  | 2 x 110 | 2 x 220 | 2 x 250 |
|  | 18         | 0,11         | -                | 2 x 50   | 2 x 55  | 2 x 130 | 2 x 200 |
|  | 24         | 0,14         | -                | 2 x 40   | 2 x 44  | 2 x 110 | 2 x 160 |
|  | 36         | 0,22         | -                | 2 x 30   | 2 x 33  | 2 x 70  | 2 x 100 |
|  | 58         | 0,35         | -                | 2 x 20   | 2 x 22  | 2 x 45  | 2 x 70  |
|  | 65         | 0,35         | -                | 2 x 15   | 2 x 16  | 2 x 40  | 2 x 60  |
|  | 85         | 0,47         | -                | 2 x 10   | 2 x 11  | 2 x 30  | 2 x 40  |
| <b>Fluorescent lamps</b><br>parallel compensated                   | 11         | 0,09         | 2,0              | 33   | 43      | 67      | 107     |
|  | 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      |

# Modular Contactors

## Switching of lamps

| Lamp Type   | Power<br>W   | Current<br>A | Capacitors<br>µF | Max. lamps per pole at 230V 50Hz and max. 60°C |       |       |       |     |
|---|--|--------------|------------------|--|-------|-------|-------|-----|
|   |  |              |                  | R20..  | R25.. | R40.. | R63.. |     |
| <b>Fluorescent lamps</b><br>with electronic fluorescent<br>lamp ballast   | 18   | 0,09         | -                | 40   | 40    | 100   | 150   |     |
|   | 36   | 0,16         | -                | 20   | 20    | 52    | 75    |     |
|   | 58   | 0,25         | -                | 15   | 15    | 30    | 55    |     |
|   | 80   | 0,4          | -                | 7  | 10    | 20    | 30    |     |
|   | 2 x 18   | 0,17         | -                | 20   | 20    | 50    | 60    |     |
|   | 2 x 28   | 0,25         | -                | 15   | 15    | 37    | 45    |     |
|   | 2 x 36   | 0,32         | -                | 10   | 10    | 25    | 30    |     |
|   | 2 x 58   | 0,49         | -                | 7  | 7     | 15    | 20    |     |
|   | 2 x 80   | 0,7          | -                | 4  | 4     | 8     | 10    |     |
|   | <b>Transformers<br/>for metal halid<br/>low voltage lamps</b>                          | 20           | 0,09             | -  | 40    | 52    | 110   | 174 |
| 50  |  | 0,22         | -                | 20   | 24    | 50    | 80    |     |
| 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   |  | 1,30         | -                | 3  | 4     | 9     | 14    |     |
| <b>Mercury-vapour lamps</b><br>(high-pressure lamps),<br>uncompensated<br>e. g. HQL, HPL  | 50   | 0,61         | -                | 16   | 21    | 38    | 55    |     |
|   | 80   | 0,8          | -                | 12   | 16    | 29    | 40    |     |
|   | 125  | 1,15         | -                | 8  | 11    | 20    | 28    |     |
|   | 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     |     |
|   | <b>Mercury-vapour lamps</b><br>(high-pressure lamps),<br>compensated<br>e. g. HQL, HPL | 50           | 0,28             | 7  | 14    | 18    | 36    | 50  |
| 80  |  | 0,41         | 8                | 12   | 16    | 31    | 44    |     |
| 125   |  | 0,65         | 10               | 10   | 13    | 25    | 35    |     |
| 250   |  | 1,22         | 18               | 5  | 7     | 14    | 19    |     |
| 400   |  | 1,95         | 25               | 4  | 5     | 10    | 14    |     |
| 700   |  | 3,45         | 45               | 2  | 3     | 6     | 8     |     |
| 1000  |  | 4,8          | 60               | 1  | 2     | 4     | 6     |     |
| <b>Metal halide lamps</b><br>uncompensated<br>e. g. HQI, HPI, CDM   |  | 35           | 0,53             | -  | 22    | 24    | 57    | 65  |
|   | 70   | 1            | -                | 12   | 14    | 30    | 35    |     |
|   | 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     |     |
|   | 400V per pole  | 2000         | 10,5             | -  | -     | 2     | 2     |     |
|   | 3500   | 18           | -                | -  | -     | 1     | 1     |     |
|   | <b>Metal halide lamps</b><br>compensated<br>e. g. HQI, HPI, CDM                        | 35           | 0,25             | 6  | 16    | 21    | 42    | 58  |
|   |  | 70           | 0,45             | 12   | 8     | 11    | 21    | 29  |
|   |  | 150          | 0,75             | 20   | 5     | 7     | 13    | 18  |
|   |  | 250          | 1,5              | 33   | 3     | 4     | 9     | 11  |
| 400   |  | 2,1          | 35               | 2  | 4     | 9     | 10    |     |
| 1000  |  | 5,8          | 95               | 1  | 1     | 3     | 4     |     |
| 2000  |  | 11,5         | 148              | -  | -     | 2     | 2     |     |
| 400V per pole   |  | 2000         | 6,6              | 58   | -     | -     | 3     | 4   |
| 3500  |  | 11,6         | 100              | -  | -     | 2     | 3     |     |
| <b>Metal halide lamps</b><br>with electronic fluorescent<br>lamp ballast (e. g.: PCI)<br>50-125 x I <sub>n</sub> 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    |     |
|   | <b>Sodium-vapour lamps</b><br>(low pressure lamps),<br>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    |     |

# Modular Contactors

## Switching of lamps

| Lamp Type  | Power<br>W   | Current<br>A | Capacitors<br>μF | Max. lamps per pole at 230V 50Hz and max. 60°C |       |       |       |
|--|--|--------------|------------------|--|-------|-------|-------|
|  |  |              |                  | R20..  | R25.. | R40.. | R63.. |
| Sodium-vapour lamps<br>(low pressure lamps),<br>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    |
| <b>Sodium-vapour lamps</b><br>(high pressure lamps),<br>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     |
| <b>Sodium-vapour lamps</b><br>(high pressure lamps),<br>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     |
| <b>Sodium-vapour lamps</b><br>(high pressure lamps)<br>with serial electronic<br>(e. g.: PCI)<br>50-125 x I <sub>nlamp</sub> for 0,6ms | 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    |
| <b>LED-Lamps</b><br>consider the inrush current<br>of the lamp ballast and<br>the cosφ of the lamp                                     | max. inrush current of contactor [A]<br>$\frac{\text{inrush current of contactor}}{\text{inrush current of lamp/EVG}} =$ |              |                  | 195A   | 233A  | 424A  | 565A  |
|  |  |              |                  | max. lamps per pole at 230V 50Hz and max. 60°C |       |       |       |

## Data according to IEC60 947-4-1, IEC 60947-5-1, VDE 0660-5-1

| Type   |                     | 2-pole<br>R20            | R25                      | R40                      | R63                      | 4-pole<br>R25            | R40                      | R63                      | RH11                     |
|--|---------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <b>Main Contacts</b> <sup>5) 6) 7)</sup>   |                     |                          |                          |                          |                          |                          |                          |                          |                          |
| <b>Rated insulation voltage</b> U <sub>i</sub>   | V~                  | <b>440</b> <sup>2)</sup> | <b>440</b> <sup>2)</sup> | <b>440</b> <sup>2)</sup> | <b>440</b> <sup>2)</sup> | <b>440</b> <sup>2)</sup> | <b>440</b> <sup>2)</sup> | <b>440</b> <sup>2)</sup> | <b>440</b> <sup>2)</sup> |
| Rated operation voltage U <sub>e</sub>   | V~                  | 440                      | 440                      | 440                      | 440                      | 440                      | 440                      | 440                      | 440                      |
| <b>Frequency of operations</b> z AC1, AC3  | 1/h                 | 300                      | 300                      | 600                      | 600                      | 300                      | 600                      | 600                      | 600                      |
| <b>Mechanical life</b>   | S x 10 <sup>6</sup> | 1                        | 1                        | 1                        | 1                        | 1                        | 1                        | 1                        | 1                        |
| <b>Utilization category AC1 / AC7a</b>   |                     |                          |                          |                          |                          |                          |                          |                          |                          |
| <b>Switching of resistive load</b>   |                     |                          |                          |                          |                          |                          |                          |                          |                          |
| Rated operational current I <sub>e</sub> (=I <sub>th</sub> )<br>open at 60°C                     | A                   | 20                       | 25                       | 40                       | 63                       | 25                       | 40                       | 63                       | -                        |
| <b>Contact life</b>  | S x 10 <sup>6</sup> | 0,1                      | 0,1                      | 0,1                      | 0,1                      | 0,1                      | 0,1                      | 0,1                      | -                        |
| <b>Minimum Switch Voltage</b>  | V/mA                | 24/100                   | 24/100                   | 24/100                   | 24/100                   | 24/100                   | 24/100                   | 24/100                   | 17/5                     |
| <b>Short time current</b>  | 10s-current<br>A    | 72                       | 72                       | 216                      | 240                      | 72                       | 216                      | 240                      | -                        |
| <b>Power loss</b> per pole at I <sub>e</sub> /AC1  | W                   | 2                        | 3                        | 3                        | 7                        | 2                        | 3                        | 7                        | 0,5                      |
| <b>Utilization category AC2 and AC3 / AC7b</b>   |                     |                          |                          |                          |                          |                          |                          |                          |                          |
| <b>Switching of three-phase motors</b>   |                     |                          |                          |                          |                          |                          |                          |                          |                          |
| Rated operational current I <sub>e</sub>   | A                   | -                        | -                        | -                        | -                        | 9                        | 27                       | 30                       | -                        |
| Rated operational power<br>of three-phase motors   |                     |                          |                          |                          |                          |                          |                          |                          |                          |
| 220V   | kW                  | -                        | -                        | -                        | -                        | 2,2                      | 7,5                      | 8                        | -                        |
| 230-240V   | kW                  | -                        | -                        | -                        | -                        | 2,5                      | 8                        | 8,5                      | -                        |
| 380-415V   | kW                  | -                        | -                        | -                        | -                        | 4                        | 12,5                     | 15                       | -                        |
| 2-pole motors  | 230V<br>kW          | 1,1                      | 1,3                      | 2,6                      | 5                        | -                        | -                        | -                        | -                        |
| <b>Contact life</b>  | S x 10 <sup>6</sup> | 0,15                     | 0,15                     | 0,15                     | 0,15                     | 0,15                     | 0,15                     | 0,15                     | -                        |
| <b>Power consumption of coils</b>  |                     |                          |                          |                          |                          |                          |                          |                          |                          |
| 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                |                          |                          | 1,5 - 2,5                | 2,6                      | 2,6                      | -                        |
| AC and DC-operated   | W                   | -                        | -                        |                          |                          | 3 - 4                    | -                        | -                        | -                        |
| <b>Operation range of coils</b><br>in multiples of control voltage U <sub>s</sub> (-40° - +40°C) |                     | 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               | -                        |

1) Suitable for: earthed-neutral systems, overvoltage category I to IV, pollution degree 3 (standard-industry): U<sub>imp</sub> = 8kV.

2) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): U<sub>imp</sub> = 4kV.

3) Maximum cable cross-section with prepared conductor

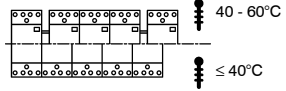
5) Rated frequency 50/60Hz

6) Max. occ. switching overvoltage < 4kV

7) Duty cycle: 100%

# Modular Contactors

Data according to IEC60 947-4-1, IEC 60947-5-1, VDE 0660-5-1

| Maximum ambient temperature                                  |                                   |                 |            |            |                   |                   |                   |  |                         |
|--|-----------------------------------|-----------------|------------|------------|-------------------|-------------------|-------------------|---|-------------------------|
| Operation  | open                              | °C              |            |            |                   |                   |                   | -40 to + 60   |                         |
|  | enclosed                          | °C              |            |            |                   |                   |                   | -40 to + 40   |                         |
| Storage  |                                   | °C              |            |            |                   |                   |                   | -50 to + 90   |                         |
| Type   |                                   |                 | R20        | R25 (2p.)  | R25 (4p.)         | R25...VM          | R40               | R63   | RH11                    |
| <b>Short circuit protection</b>                              |                                   |                 |            |            |                   |                   |                   |   |                         |
| max. fuse Coordination-type "1"gL (gG)                       | A                                 |                 | 35         | 35         | 35                | 35                | 63                | 80  | -                       |
| Rated short circuit current                                  | "I <sub>r</sub> "                 | kA              | 3          | 3          | 3                 | 3                 | 3                 | 3   | -                       |
|  | "I <sub>q</sub> "                 | kA              | 3          | 3          | 10                | 10                | 10                | 10  | -                       |
| <b>Switching time</b> at control voltage U <sub>s</sub> ±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   | -                       |
| <b>Cable cross-sections</b>                                  |                                   |                 |            |            |                   |                   |                   |   |                         |
| Main connector   | solid or stranded                 | mm <sup>2</sup> | 1,5 - 10   | 1,5 - 10   | 1,5 - 10          | 1,5 - 10          | 2,5 - 25          | 2,5 - 25  | 0,5 - 2,5 <sup>3)</sup> |
|  | flexible                          | mm <sup>2</sup> | 1,5 - 6    | 1,5 - 6    | 1,5 - 6           | 1,5 - 6           | 2,5 - 16          | 2,5 - 16  | 0,5 - 2,5 <sup>3)</sup> |
|  | flexible with multicore cable end | mm <sup>2</sup> | 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                 | mm <sup>2</sup> | 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                          | mm <sup>2</sup> | 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 | mm <sup>2</sup> | 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   | -                       |
| <b>Auxiliary Contacts</b> <sup>5) 6) 7)</sup>                |                                   |                 |            |            |                   |                   |                   |   |                         |
| Rated insulation voltage U <sub>i</sub> <sup>1)</sup>        | V AC                              |                 | -          | -          | 440 <sup>2)</sup> | 440 <sup>2)</sup> | 440 <sup>2)</sup> | 440 <sup>2)</sup>   | 440 <sup>2)</sup>       |
| Thermal rated current I <sub>th</sub>                        | 40°C                              | A               | -          | -          | 25                | 25                | 40                | 63  | 10                      |
| Ambient temperature  | 60°C                              | A               | -          | -          | 25                | 25                | 40                | 63  | 6                       |
| <b>Utilization category AC15</b>                             |                                   |                 |            |            |                   |                   |                   |   |                         |
| Rated operational current I <sub>e</sub>                     | 220-240V                          | A               | -          | -          | 3                 | 3                 | 3                 | 3   | 3                       |
|  | 380-415V                          | A               | -          | -          | 2                 | 2                 | 2                 | 2   | 2                       |
|  | 440V                              | A               | -          | -          | 1,6               | 1,6               | 1,6               | 1,6   | 1,6                     |
| <b>Utilization category DC13</b>                             |                                   |                 |            |            |                   |                   |                   |   |                         |
| Rated operational current I <sub>e</sub> per pole            | 24-60V                            | A               | -          | -          | 2                 | 2                 | 2                 | 2   | 2                       |
|  | 110V                              | A               | -          | -          | 0,4               | 0,4               | 0,4               | 0,4   | 0,4                     |
|  | 220V                              | A               | -          | -          | 0,1               | 0,1               | 0,1               | 0,1   | 0,1                     |
| <b>Short circuit protection</b>                              |                                   |                 |            |            |                   |                   |                   |   |                         |
| short-circuit current 1kA, contact welding not accepted      |                                   |                 |            |            |                   |                   |                   |   |                         |
| max. fuse size   | gL (gG)                           | A               | -          | -          | 10                | 10                | 10                | 10  | 10                      |

## Data according to UL508

| Main Contacts (cULus)  | Type                | R20  | R25 (2p.) | R25 (4p.) | R40  | R63  | RH11 |
|--|---------------------|------|-----------|-----------|------|------|------|
| Rated operational current "General Use"                      | A                   | 20   | 25        | 25        | 40   | 63   | 10   |
| Rated operational power of three-phase motors at 60Hz (3ph)  | 110-120V hp         | -    | -         | 1         | 2    | 3    | -    |
|  | 200-208V hp         | -    | -         | 2         | 5    | 7½   | -    |
|  | 220-240V hp         | -    | -         | 3         | 7½   | 10   | -    |
|  | 265-277V hp         | -    | -         | 3         | 7½   | 10   | -    |
| Rated operational power of AC motors at 60Hz (1ph)           | 110-120V hp         | ½    | ½         | ½         | 1    | 1½   | -    |
|  | 200-208V hp         | 1    | 1         | 1         | 2    | 3    | -    |
|  | 220-240V hp         | 1½   | 1 ½       | 1½        | 3    | 5    | -    |
|  | 265-277V hp         | 1½   | 2         | 2         | 3    | 5    | -    |
| Fuses  | A                   | 40   | 40        | 40        | 80   | 80   | -    |
| Suitable for use on a capability of delivering not more than | rms                 | 5000 | 5000      | 5000      | 5000 | 5000 | -    |
|  | V                   | 300  | 300       | 300       | 300  | 300  | 300  |
| Rated operation voltage                                      | V~                  | 300  | 300       | 300       | 300  | 300  | 300  |
| <b>Auxiliary Contacts (cULus)</b>                            | heavy pilot duty AC | -    | -         | -         | -    | -    | C300 |

2) Suitable for: earthed-neutral systems, overvoltage category I to III, pollution degree 3 (standard-industry): U<sub>imp</sub> = 4kV.

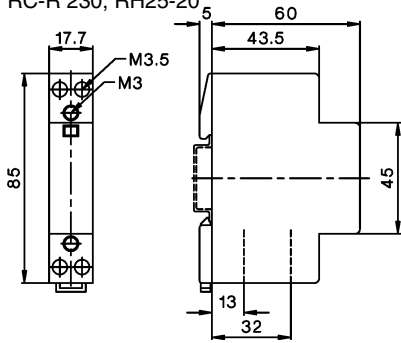
3) Maximum cable cross-section with prepared conductor 4) AC7b motor 2-pole 230V 1,1kW

5) Rated frequency 50/60Hz 6) Max. occ. switching overvoltage <4kV 7) Duty cycle: 100%

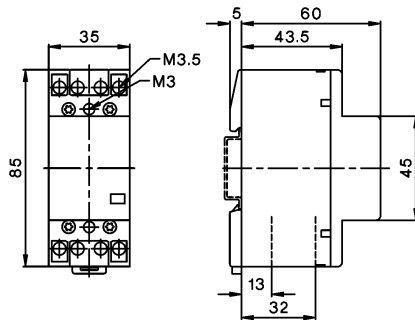
# Modular Contactors

## Dimensions

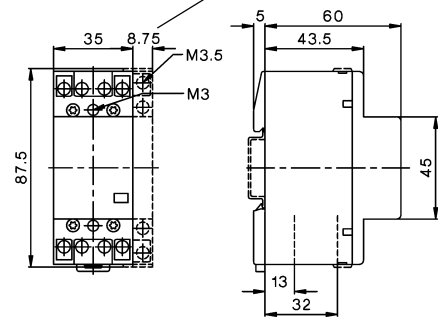
R20-..., R25-... (2-pole)  
RC-R 230, RH25-20



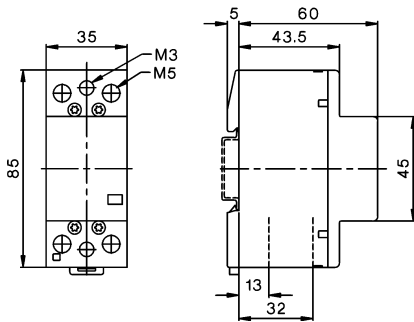
R25-TN



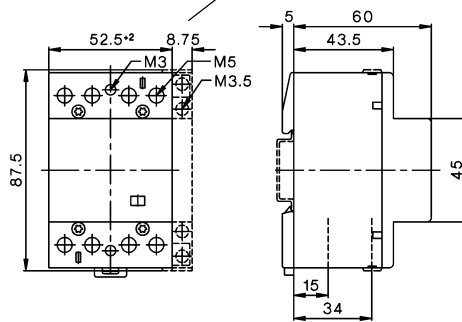
R25-... (4-pole) (+RH11)  
R25-...VM (+RH11-1)



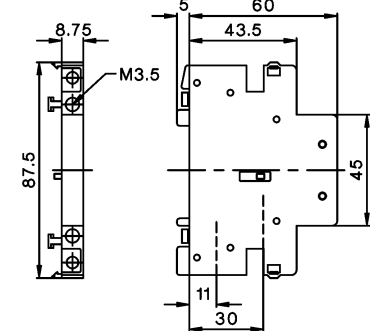
R40-... (2-pole)  
R63-... (2-pole)



R40-... (4-pole) (+RH11)  
R63-... (4-pole) (+RH11)



Aux. contact block  
RH11, RH11-1



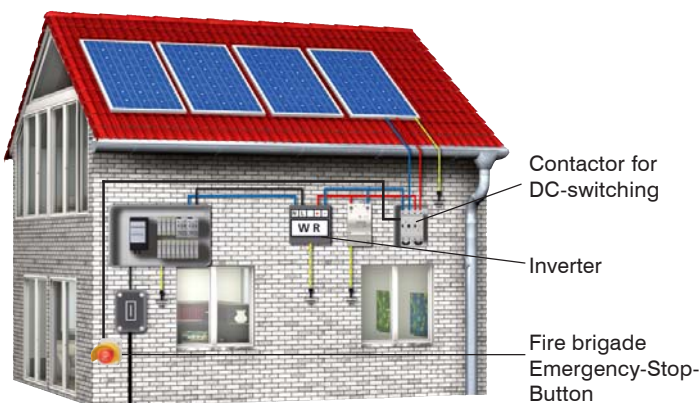
# Contactors for DC-Switching

# AC-operated



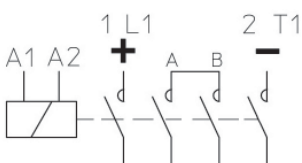
| Rated Operational Current |      |       | Additional Aux. Contacts | Type                                | Coil voltage <sup>1)</sup><br>230<br>↓<br>220-230V 50Hz, 240V 60Hz | Pack pcs. | Weight kg/pc. | Wiring diagram |
|---------------------------|------|-------|--------------------------|-------------------------------------|--|-----------|---------------|----------------|
| DC1                       | 600V | 1000V |                          |                                     |  |           |               |                |
| 20A                       | -    | -     | 2 HKA11                  | <b>K3DC-20A00 ...</b>               |  | 1         | 0,5           |                |
| 50A                       | -    | -     | +1 HKT.                  | <b>K3DC-48A00 ...</b>               |  | 1         | 0,5           |                |
| 60A                       | 30A  | -     | 2 HKA11                  | <b>K3DC-60A00...</b>                |  | 1         | 1,2           |                |
| 80A                       | 60A  | -     | +1 HKT.                  | <b>K3DC-80A00 ...</b>               |  | 1         | 1,2           |                |
| 100A                      | -    | -     |                          | <b>K3DC-100A00 ...</b>              |  | 1         | 1,8           |                |
| 12A                       | 12A  | 6A    | 2 HKA11<br>+2 HKT.       | <b>K3PV-12A00 ...</b>               |  | 1         | 0,8           |                |
| 30A                       | 30A  | -     | 2 HKA11                  | <b>K3PV-30A00 ...</b>               |  | 1         | 0,9           |                |
| 60A                       | 60A  | -     | +2 HKT.                  | <b>K3PV-60A00 ...</b>               |  | 1         | 0,9           |                |
| 80A                       | 80A  | -     | 2 HKA11                  | <b>K3PV-80A00 ...</b>               |  | 1         | 1,5           |                |
| 100A                      | 100A | -     | +1 HKT.                  | <b>K3PV-100A00 ...<sup>2)</sup></b> |  | 1         | 2,3           |                |
| 150A                      | 150A | -     | 2 HKA11                  | <b>K3PV-150A00 ...<sup>2)</sup></b> |  | 1         | 5             |                |
| 200A                      | 200A | -     | +1 HKT.                  | <b>K3PV-200A00 ...<sup>2)</sup></b> |  | 1         | 5             |                |
| 240A                      | 240A | -     |                          | <b>K3PV-240A00 ...<sup>2)</sup></b> |  | 1         | 5             |                |
| 300A                      | 300A | -     | 2 HKA11                  | <b>K3PV-300A00 ...<sup>2)</sup></b> |  | 1         | 7,5           |                |
| 400A                      | 400A | -     | +1 HKT.                  | <b>K3PV-400A00 ...<sup>2)</sup></b> |  | 1         | 7,5           |                |
| 450A                      | 450A | -     |                          | <b>K3PV-450A00 ...<sup>2)</sup></b> |  | 1         | 7,5           |                |

# Contactors for DC-Switching for PV-installations, as remote controlled fire protection defeat device

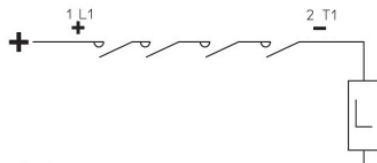


In most Photovoltaic-installations, the switch disconnectors according to IEC 60364-7-712 are integrated in the DC/AC-inverter. So the wires between solar-panels and inverter are continuously under voltage. According to ÖVE-R11-1: 2013, Photovoltaic-installations must have a fire protection defeat device. For this purpose, BENEDICT 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.

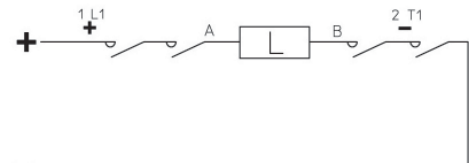
Switch diagram (4 contacts)



Connection diagram 1-pole



For using as two-poles contactor remove connection A-B



1) Other coil voltages from 24 to 600V AC, on request  
2) Type for AC- and DC-operating: e.g.: 230: 220-240V 50/60Hz and 220V=

# Contactors for DC-Switching

# DC-operated



| Type                                 | Coil voltage <sup>1)</sup> |        | Aux. Contacts |            | Pack pcs. | Weight kg/pc. | Wiring diagram |
|--------------------------------------|----------------------------|--------|---------------|------------|-----------|---------------|----------------|
|                                      | 24                         | 24V DC | build in      | additional |           |               |                |
| <b>K3DC-20A10= ...</b>               | 1                          | -      | 1             | HKA11      | 1         | 0,5           |                |
| <b>K3DC-48A10= ...</b>               | 1                          | -      | +1            | HKT.       | 1         | 0,5           |                |
| <b>K3DC-60A00=...</b>                | -                          | -      | 1             | HKA11      | 1         | 1,2           |                |
| <b>K3DC-80A00= ...</b>               | -                          | -      | +1            | HKT.       | 1         | 1,2           |                |
| <b>K3DC-100A00= ...</b>              | -                          | -      | -             | -          | 1         | 1,8           |                |
| <b>K3PV-12A10=</b>                   | 1                          | -      | 1             | HKA11      | 1         | 0,85          |                |
|                                      |                            |        | +2            | HKT.       |           |               |                |
| <b>K3PV-30A10= ...</b>               | 1                          | -      | 1             | HKA11      | 1         | 0,95          |                |
| <b>K3PV-60A10= ...</b>               | 1                          | -      | +2            | HKT.       | 1         | 0,95          |                |
| <b>K3PV-80A00= ...</b>               | -                          | -      | 2             | HKA11      | 1         | 1,5           |                |
| <b>K3PV-100A00 ... <sup>2)</sup></b> | -                          | -      | +1            | HKT.       | 1         | 2,3           |                |
| <b>K3PV-150A00 ... <sup>2)</sup></b> | -                          | -      | 2             | HKA11      | 1         | 5             |                |
| <b>K3PV-200A00 ... <sup>2)</sup></b> | -                          | -      | +1            | HKT.       | 1         | 5             |                |
| <b>K3PV-240A00 ... <sup>2)</sup></b> | -                          | -      | -             | -          | 1         | 5             |                |
| <b>K3PV-300A00 ... <sup>2)</sup></b> | -                          | -      | 2             | HKA11      | 1         | 7,5           |                |
| <b>K3PV-400A00 ... <sup>2)</sup></b> | -                          | -      | +1            | HKT.       | 1         | 7,5           |                |
| <b>K3PV-450A00 ... <sup>2)</sup></b> | -                          | -      | -             | -          | 1         | 7,5           |                |

## Auxiliary Contact Blocks for contactors K3DC-.. and K3PV-..

| Rated Operational Current                                       |      |      | For contactors        | Type                    | Pack pcs. | Weight kg/pc. | Wiring diagram |
|---|------|------|-----------------------|-------------------------|-----------|---------------|----------------|
| AC15  | AC15 | AC1  |                       |                         |           |               |                |
| 230V  | 400V | 690V |                       |                         |           |               |                |
| A   | A    | A    |                       |                         |           |               |                |
| <b>3</b>  | 2    | 10   | K3DC, K3PV-.. top     | <b>HKT11</b>            | 1         | 0,04          |                |
| <b>3</b>  | 2    | 10   | K3DC, K3PV-.. top     | <b>HKT22</b>            | 1         | 0,05          |                |
| <b>3</b>  | 2    | 10   | K3DC, K3PV-.. outside | <b>HKA11</b>            | 1         | 0,05          |                |
|   |      |      |                       |                         |           |               |                |
| <b>Fire Brigade-EMERGENCY STOP</b>                              |      |      |                       | <b>BG10P44S3-11 +SK</b> | 1         | 0,22          |                |
| key operated button Ø40mm,<br>according to EN418, unlock by key |      |      |                       |                         |           |               |                |

## Accessories



1) Other coil voltages from 24 to 250V DC, on request  
 2) Type for AC- and DC-operating: e.g.: 24: 24V 50/60Hz and 24V=

# Technical Data

Data according to IEC 60947-4-1, VDE 0660

| Type   |                  | K3DC-20..                      | K3DC-48.. | K3DC-60.. | K3DC-80.. | K3DC-100..      | K3PV-12.. | K3PV-30..          | K3PV-60.. | K3PV-80..    | K3PV-100.. | K3PV-150..                  | K3PV-200.. | K3PV-240..                | K3PV-300..                | K3PV-400.. | K3PV-450..                 |  |         |  |  |
|--|------------------|--------------------------------|-----------|-----------|-----------|-----------------|-----------|--------------------|-----------|--------------|------------|-----------------------------|------------|---------------------------|---------------------------|------------|----------------------------|--|---------|--|--|
| Rated insulation voltage<br>U <sub>imp</sub> | V=<br>kV         | 600<br>8                       | 600<br>8  | 1000<br>8 | 1000<br>8 | 600<br>8        | 1200<br>8 | 1000<br>8          | 1000<br>8 | 1000<br>8    | 1000<br>8  | 1000<br>8                   | 1000<br>8  | 1000<br>8                 | 1000<br>8                 | 1000<br>8  | 1000<br>8                  |  |         |  |  |
| poles in series                              |                  | 3                              | 3         | 3         | 3         | 3               | 8         | 6                  | 6         | 4            | 4          | 3                           | 3          | 3                         | 3                         | 3          | 3                          |  |         |  |  |
| DC1 600V dc                                  | I <sub>e</sub> A | 20                             | 50        | 60        | 80        | 100             | 12        | 30                 | 60        | 80           | 100        | 150                         | 200        | 240                       | 300                       | 400        | 450                        |  |         |  |  |
| DC1 1000V dc                                 | I <sub>e</sub> A | -                              | -         | 30        | 60        | -               | 12        | 30                 | 60        | 80           | 100        | 150                         | 200        | 240                       | 300                       | 400        | 450                        |  |         |  |  |
| DC1 1200V dc                                 | I <sub>e</sub> A | -                              | -         | -         | -         | -               | 6         | -                  | -         | -            | -          | -                           | -          | -                         | -                         | -          | -                          |  |         |  |  |
| DC3/5 310V dc                                | I <sub>e</sub> A | -                              | -         | -         | 40        | 60              | -         | 15                 | 24        | 40           | 90         | 125                         | 170        | 200                       | 230                       | 270        | 300                        |  |         |  |  |
| DC3/5 460V dc                                | I <sub>e</sub> A | -                              | -         | -         | -         | -               | -         | 15                 | 24        | 40           | 40         | 125                         | 170        | 200                       | 230                       | 270        | 300                        |  |         |  |  |
| DC3/5 600V dc                                | I <sub>e</sub> A | -                              | -         | -         | -         | -               | -         | -                  | -         | -            | -          | 50                          | 60         | 75                        | 120                       | 160        | 200                        |  |         |  |  |
| Main pole resistance                         | mΩ               | 1,8                            | 1,8       | 1,4       | 1,2       | 1               | 2,2       | 1,8                | 1,8       | 1,2          | 1          | 0,5                         | 0,5        | 0,35                      | 0,15                      | 0,15       | 0,15                       |  |         |  |  |
| poles in series resistance                   | mΩ               | 5,4                            | 5,4       | 4,2       | 3,6       | 3               | 17,6      | 10,8               | 10,8      | 4,8          | 4          | 1,5                         | 1,5        | 1,1                       | 0,5                       | 0,5        | 0,5                        |  |         |  |  |
| Mechanical life                              | 10 <sup>6</sup>  | 10                             |           |           |           |                 |           |                    |           |              |            | 10                          |            |                           | 8                         |            |                            |  |         |  |  |
| Protection degree                            |                  | IP20                           |           |           |           |                 |           |                    |           |              |            | IP00 / IP20 <sup>1)</sup>   |            |                           | IP00 / IP20 <sup>1)</sup> |            |                            |  |         |  |  |
| Main poles                                   |                  |                                |           |           |           |                 |           |                    |           |              |            |                             |            |                           |                           |            |                            |  |         |  |  |
| Cable cross sections                         | mm <sup>2</sup>  | 2 x 1,5 - 10                   |           | 2,5 - 35  |           | 4 - 35<br>+4-50 |           | 2x<br>1,5-2,5      |           | 2 x 1,5 - 10 |            | 2,5-35<br>4 - 35<br>+4 - 50 |            | Busbar 18 x 4<br>Screw M8 |                           |            | Busbar 25 x 6<br>Screw M10 |  |         |  |  |
| Tightening torque                            | Nm               | 2,3 - 2,7                      |           | 5 - 6     |           | 8 - 9,6         |           | 1,4 - 1,6          |           | 2,3 - 2,7    |            | 5 - 6                       |            | 8 - 9,6                   |                           | 17 - 20    |                            |  | 35 - 42 |  |  |
| Mounting                                     |                  | DIN-rail or screw              |           |           |           | screws          |           | DIN-rail or screws |           |              |            | Screws                      |            | Screws                    |                           |            | Screws                     |  |         |  |  |
| Operating range of coils                     | U <sub>c</sub>   | 0,85 - 1,1                     |           |           |           |                 |           |                    |           |              |            |                             |            |                           |                           |            |                            |  |         |  |  |
| Power consumption of coils                   |                  |                                |           |           |           |                 |           |                    |           |              |            |                             |            |                           |                           |            |                            |  |         |  |  |
| AC inrush                                    | VA               | 90                             |           | 250       |           | 180             |           | 250                |           | 350          |            | 360                         |            |                           |                           |            |                            |  |         |  |  |
| sealed                                       | VA/W             | 9 / 3                          |           | 18 / 4    |           | 18 / 6          |           | 18 / 4             |           | 5 / 5        |            | 6 / 6                       |            |                           |                           |            |                            |  |         |  |  |
| DC inrush                                    | W                | 120                            |           | 230       |           | 230             |           | 230                |           | 350          |            | 360                         |            |                           |                           |            |                            |  |         |  |  |
| sealed                                       | W                | 2                              |           | 4         |           | 5               |           | 4                  |           | 5            |            | 6                           |            |                           |                           |            |                            |  |         |  |  |
| Suppressor Unit                              |                  |                                |           |           |           |                 |           |                    |           |              |            |                             |            |                           |                           |            |                            |  |         |  |  |
| Coil   | AC               | -                              |           | -         |           | -               |           | -                  |           | -            |            | x                           |            | x                         |                           | x          |                            |  |         |  |  |
| x ... integrated                             | DC               | x                              |           | x         |           | -               |           | -                  |           | x            |            | x                           |            | x                         |                           | x          |                            |  |         |  |  |
| Switching time                               |                  |                                |           |           |           |                 |           |                    |           |              |            |                             |            |                           |                           |            |                            |  |         |  |  |
| AC make time                                 | ms               | 10 - 25                        |           | 12 - 30   |           | 12 - 30         |           | 10 - 25            |           | 12 - 30      |            | 15 - 50                     |            | 30 - 60                   |                           | 40 - 60    |                            |  |         |  |  |
| release time                                 | ms               | 6 - 18                         |           | 6 - 15    |           | 6 - 15          |           | 6 - 18             |           | 6 - 15       |            | 30 - 80                     |            | 30 - 80                   |                           | 40 - 60    |                            |  |         |  |  |
| DC make time                                 | ms               | 15 - 25                        |           | 15 - 25   |           | 20 - 30         |           | 15 - 25            |           | 15 - 25      |            | 15 - 50                     |            | 30 - 60                   |                           | 40 - 60    |                            |  |         |  |  |
| release time                                 | ms               | 40 - 70                        |           | 10 - 25   |           | 10 - 25         |           | 40 - 70            |           | 10 - 25      |            | 30 - 80                     |            | 30 - 80                   |                           | 40 - 60    |                            |  |         |  |  |
| Maximum ambient temperature                  |                  |                                |           |           |           |                 |           |                    |           |              |            |                             |            |                           |                           |            |                            |  |         |  |  |
| Operation °C                                 |                  | -40 to +40 (+70) <sup>2)</sup> |           |           |           |                 |           |                    |           |              |            |                             |            |                           |                           |            |                            |  |         |  |  |
| Storage °C                                   |                  | -40 to +70                     |           |           |           |                 |           |                    |           |              |            |                             |            |                           |                           |            |                            |  |         |  |  |
| Short circuit protection for contactors      |                  |                                |           |           |           |                 |           |                    |           |              |            |                             |            |                           |                           |            |                            |  |         |  |  |
| Coordination-type „1“ max. fuse size gPV     |                  |                                |           |           |           |                 |           |                    |           |              |            |                             |            |                           |                           |            |                            |  |         |  |  |
| 600VDC                                       | A                | 63                             | 80        | -         | -         | 160             | -         | -                  | -         | -            | -          | 160                         | 200        | 250                       | -                         | -          | -                          |  |         |  |  |
| 1000VDC                                      | A                | -                              | -         | -         | -         | -               | 12        | 63                 | 100       | -            | 160        | 160                         | 200        | 250                       | 315                       | 400        | 500                        |  |         |  |  |
| Coordination-type „2“ max. fuse size gPV     |                  |                                |           |           |           |                 |           |                    |           |              |            |                             |            |                           |                           |            |                            |  |         |  |  |
| 600VDC                                       | A                | 50                             | 63        | 80        | 100       | 125             | -         | -                  | -         | 100          | -          | -                           | -          | -                         | -                         | -          | -                          |  |         |  |  |
| 1000VDC                                      | A                | -                              | -         | 80        | 100       | -               | -         | 50                 | 80        | 100          | 125        | -                           | -          | -                         | -                         | -          | -                          |  |         |  |  |
| Short-circuit current                        | kA               | 3                              | 3         | 3         | 3         | 5               | 3         | 3                  | 3         | 5            | 5          | 10                          | 10         | 10                        | 10                        | 10         | 10                         |  |         |  |  |

## Data according to UL60947-4-1

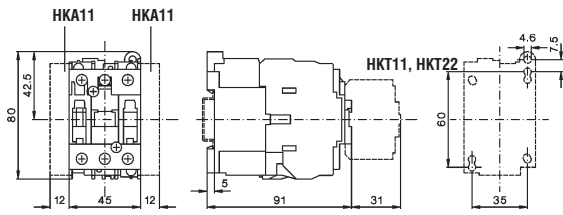
| Type                             |             | K3DC-20.. | K3DC-48.. | K3DC-60.. | K3DC-80.. | K3PV-80.. | K3PV-150.. | K3PV-200.. | K3PV-240.. | K3PV-300.. | K3PV-400.. | K3PV-450.. |
|----------------------------------|-------------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|
| General Use I <sub>e</sub> [A]   | 600V DC     | 20        | 40        | 60        | 80        | 80        | 130        | 160        | 200        | 300        | 330        | 360        |
|                                  | 1000V DC    | -         | -         | 30        | 60        | 80        | 130        | 160        | 200        | 300        | 330        | 360        |
| Motor Control I <sub>e</sub> [A] | 220-240V DC | 12        | 20        | 38        | 55        | 72        | 89         | 106        | 140        | 173        | 206        | 255        |
|                                  | 500V DC     | 12        | 16        | 34        | 51        | 67        | 83         | 99         | 123        | 164        | 205        | 246        |
|                                  | 550-600V DC | 12        | 16        | 38        | 46        | 61        | 90         | 111        | 148        | 185        | 222        | 294        |

1) IP20 w. terminal lug.  
2) > 40° ... 1% / C° de-rating (eg. at 60°C 20% de-rating)

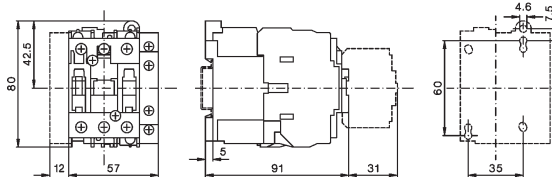


# Dimensions (mm)

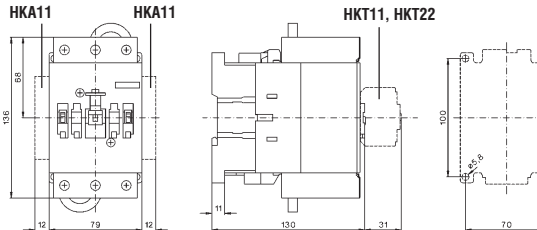
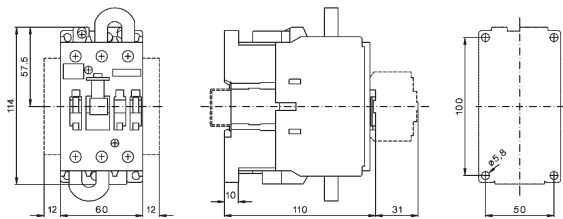
K3DC-20A00, K3DC-48A00



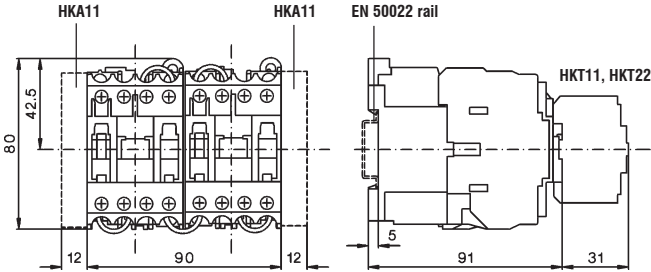
K3DC-20A10=, K3DC-48A10=



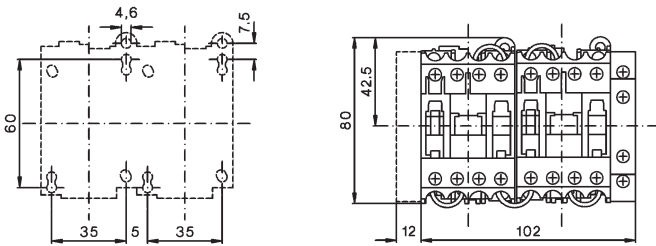
K3DC-60A00(=), K3DC-80A00(=), K3DC-100A00(=)



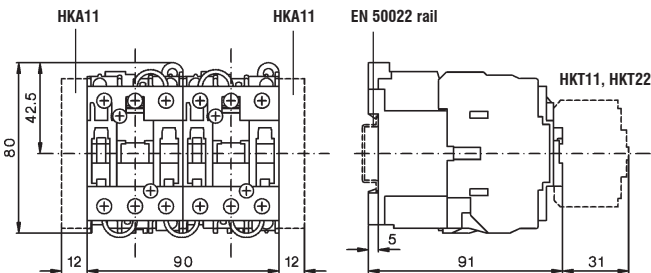
K3PV-12A00



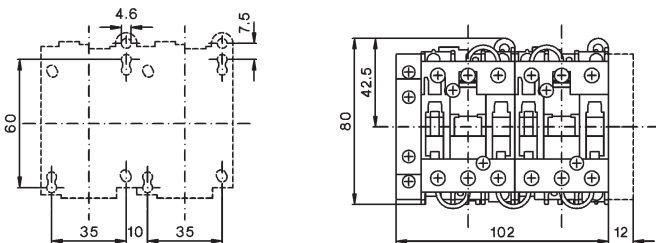
K3PV-12A10=



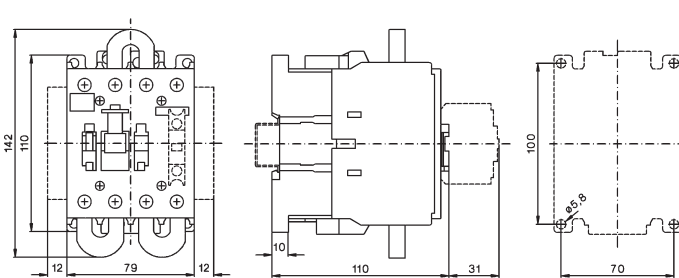
K3PV-30A00, K3PV-60A00



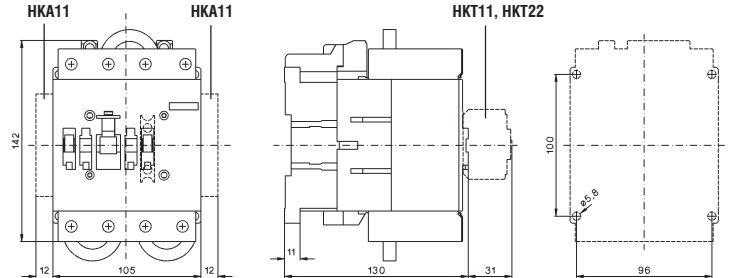
K3PV-30A10=, K3PV-60A10=



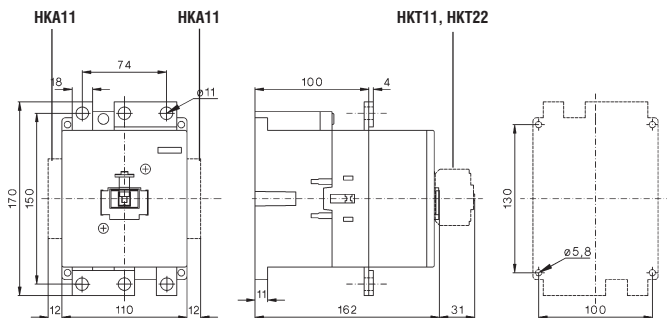
K3PV-80A00(=)



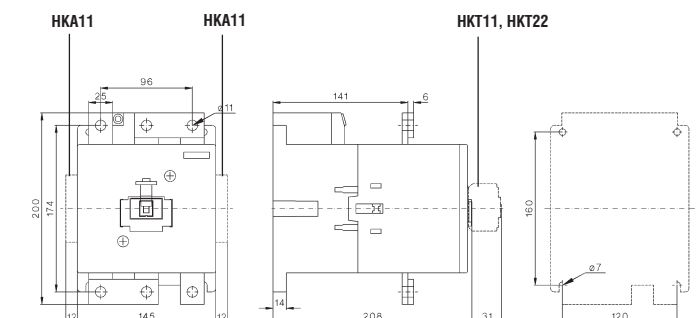
K3PV-100A00(=)



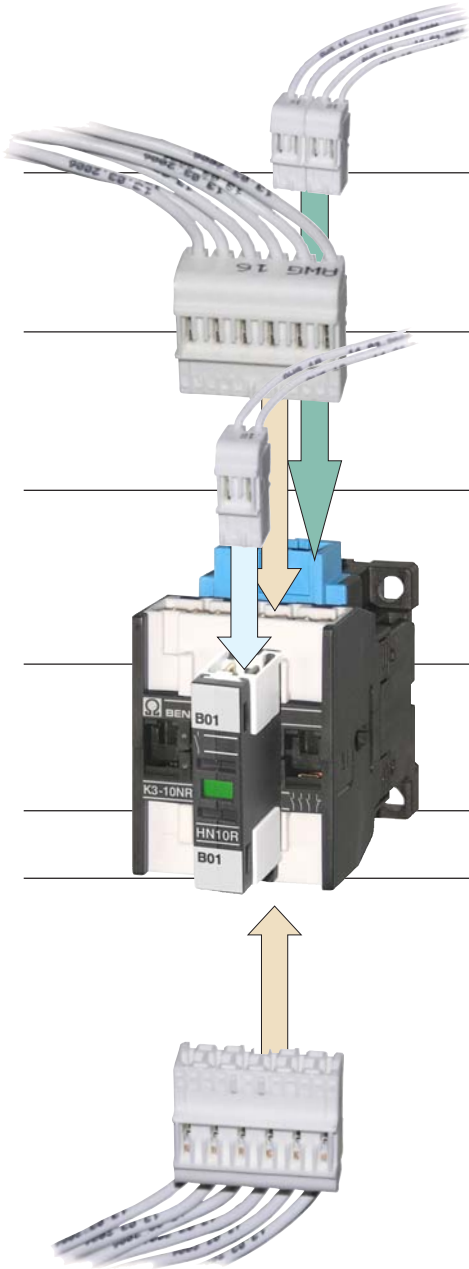
K3PV-150A00(=), K3PV-200A00(=), K3PV-240A00(=)



K3PV-300A00(=), K3PV-400A00(=), K3PV-450A00(=)



|                                 |                                     |     |
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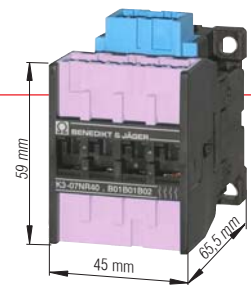


# RAST 5 - exclusiv for OEM-Partner

5 mm pitch connector system

## Advantages RAST 5 - Technology

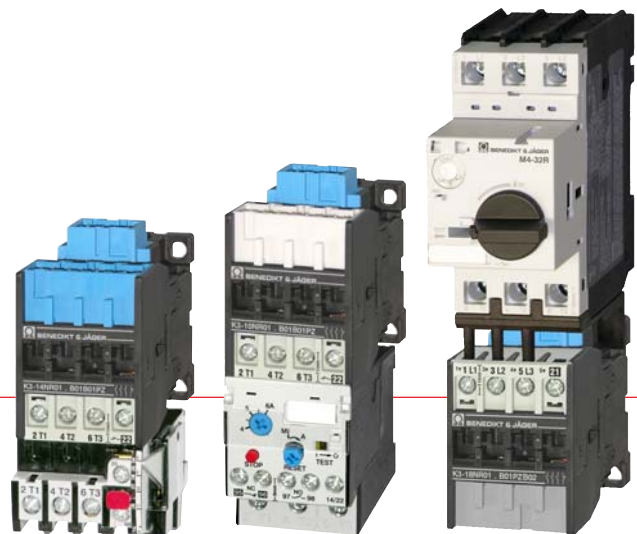
- Time saving installation
- Easy assembly without tools
- Tailor-made sockets, custom - designed codes
- Ambient temperatures up to +90°C/194°F
- Smallest sizes
- Plug technology up to 32 A / 415 V
- color coding for power ratings
- color coding for coil voltages



## RAST 5 - Accessories



## Combining switchgears with plug-in connections and screw connections













Contactors are available for plugs of many different producers



# Contactors, RAST 5


AC operated

| Ratings<br>AC2, AC3<br>380V<br>400V 220V<br>415V 230V<br>kW kW kW                   | Rated-<br>Current<br>AC1<br>415V<br>A | Auxilliary<br>Contacts<br>built in |    | Auxilliary<br>Contacts<br>snap on<br>HN10R.. | Type | Coil Voltage | Code Housing Coil | Code Housing IN (L) | Code Housing OUT (T) | Pack<br>pcs. | Weight<br>kg/pc. |
|---|---------------------------------------|------------------------------------|----|--|------|--------------|-------------------|---------------------|----------------------|--------------|------------------|
|   |                                       | NO                                 | NC |  |      |              |                   |                     |                      |              |                  |
| <b>● Contactor Relays</b>   |                                       |                                    |    |  |      |              |                   |                     |                      |              |                  |
|    | -                                     | -                                  | 10 | 4  | -    | 2            | K3-07NR40         |                     |                      | 1            | 0,23             |
|   | -                                     | -                                  | 10 | 2  | 2    | 2            | K3-07NR22         |                     |                      | 1            | 0,23             |
| <b>● Contactors</b>   |                                       |                                    |    |  |      |              |                   |                     |                      |              |                  |
|    | 4                                     | 3                                  | 3  | 25   | 1    | -            | 2                 | K3-10NR10           |                      | 1            | 0,23             |
|   | 4                                     | 3                                  | 3  | 25   | -    | 1            | 2                 | K3-10NR01           |                      | 1            | 0,23             |
|    | 5,5                                   | 4                                  | 4  | 25   | 1    | -            | 2                 | K3-14NR10           |                      | 1            | 0,23             |
|   | 5,5                                   | 4                                  | 4  | 25   | -    | 1            | 2                 | K3-14NR01           |                      | 1            | 0,23             |
|  | 7,5                                   | 5                                  | 5  | 32   | 1    | -            | 2                 | K3-18NR10           |                      | 1            | 0,23             |
|   | 7,5                                   | 5                                  | 5  | 32   | -    | 1            | 2                 | K3-18NR01           |                      | 1            | 0,23             |
|  | 11                                    | 6                                  | 7  | 32   | 1    | -            | 2                 | K3-22NR10           |                      | 1            | 0,23             |
|   | 11                                    | 6                                  | 7  | 32   | -    | 1            | 2                 | K3-22NR01           |                      | 1            | 0,23             |

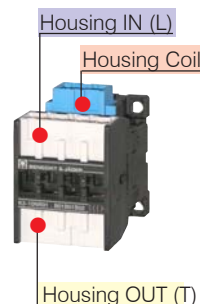
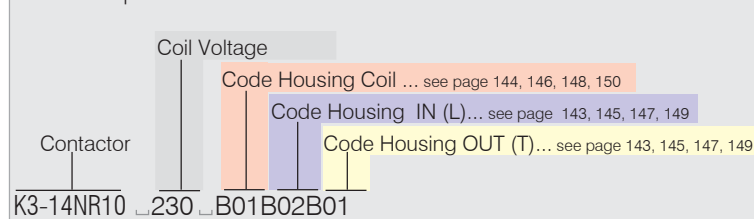
| Standard Coils  | Voltage          | Color of housing |
|---|------------------|------------------|
|  | 24V 50Hz         | white            |
|  | 110V 50Hz        | bright grey      |
|  | 180V 50Hz        | yellow           |
|  | 230V 50Hz        | blue             |
|  | special voltages | pink             |

## Auxilliary

### ● Auxilliary Contact Blocks

| for Contactors  | AC15<br>230V<br>A | I <sub>th</sub><br>A | Contacts | Type | Pack<br>pcs. | Weight<br>kg/pc. |
|---|-------------------|----------------------|----------|------|--------------|------------------|
|   |                   |                      | NO NC    |      |              |                  |
|  | K3-..R..          | 3                    | 10       | 1 -  | HN10R        | 10 0,02          |
|   | K3-..R..          | 3                    | 10       | - 1  | HN01R        | 10 0,02          |

Order Example for Contactors:



Technical data are subject to change without notice

Contactor, Motor-Starters  
Circuit Breakers  
Manual Motor-Starters  
Switches  
AC-Main Switches  
DC-Switch Disconnector  
Push Buttons  
Representatives, Suppliers

# Contactors, RAST 5 Combinations

AC operated





Motor  
AC2, AC3  
380V AC3 for  
400V 400V Circuit  
415V 415V Breakers  
**kW A M4...**

Type

Coil Voltage  
Code Housing Coil  
Screw Connection IN (L)  
Code Housing OUT (T)

Pack pcs. Weight kg/pc.

## ● Contactors for Fuseless Load Feeders

|  |     |    |                                 |                  |           |    |      |   |      |
|--|-----|----|---------------------------------|------------------|-----------|----|------|---|------|
|   | 4   | 10 | M4-32T(R)-0,16.... M4-32T(R)-10 | <b>K3-10NR10</b> | . . . . . | PZ | .VK3 | 1 | 0,23 |
|  | 4   | 10 | M4-32T(R)-0,16.... M4-32T(R)-10 | <b>K3-10NR01</b> | . . . . . | PZ | .VK3 | 1 | 0,23 |
|   | 5,5 | 14 | M4-32T(R)-13                    | <b>K3-14NR10</b> | . . . . . | PZ | .VK3 | 1 | 0,23 |
|  | 5,5 | 14 | M4-32T(R)-13                    | <b>K3-14NR01</b> | . . . . . | PZ | .VK3 | 1 | 0,23 |
|   | 7,5 | 18 | M4-32T(R)-17                    | <b>K3-18NR10</b> | . . . . . | PZ | .VK3 | 1 | 0,23 |
|  | 7,5 | 18 | M4-32T(R)-17                    | <b>K3-18NR01</b> | . . . . . | PZ | .VK3 | 1 | 0,23 |
|  | 11  | 22 | M4-32T(R)-22.... M4-32T(R)-32   | <b>K3-22NR10</b> | . . . . . | PZ | .VK3 | 1 | 0,23 |
|  | 11  | 22 | M4-32T(R)-22.... M4-32T(R)-32   | <b>K3-22NR01</b> | . . . . . | PZ | .VK3 | 1 | 0,23 |

Pozidriv . . . . .PZ  
Torx . . . . .TX





Motor  
AC2, AC3  
380V AC3  
400V 400V for  
415V 415V Overload Relays  
**kW A U12/16E.. and U3/32...**

Type

Coil Voltage  
Code Housing Coil  
Code Housing IN (L)  
Screw Connection OUT (T)

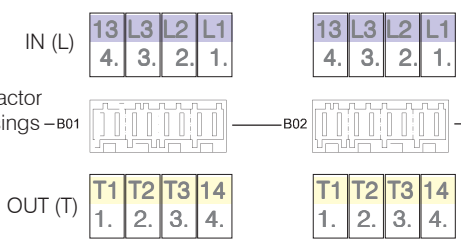
Pack pcs. Weight kg/pc.

## ● Contactors for Overload Relays

|   |     |    |  |                  |           |    |  |   |      |
|---|-----|----|--|------------------|-----------|----|--|---|------|
|  | 4   | 10 | U12/16E 0,18-..23 K3 and U3/32 0,18-..32 | <b>K3-10NR10</b> | . . . . . | PZ |  | 1 | 0,23 |
|   | 4   | 10 | U12/16E 0,18-..23 K3 and U3/32 0,18-..32 | <b>K3-10NR01</b> | . . . . . | PZ |  | 1 | 0,23 |
|  | 5,5 | 14 | U12/16E 0,18-..23 K3 and U3/32 0,18-..32 | <b>K3-14NR10</b> | . . . . . | PZ |  | 1 | 0,23 |
|   | 5,5 | 14 | U12/16E 0,18-..23 K3 and U3/32 0,18-..32 | <b>K3-14NR01</b> | . . . . . | PZ |  | 1 | 0,23 |
|  | 7,5 | 18 | U12/16E 0,18-..23 K3 and U3/32 0,18-..32 | <b>K3-18NR10</b> | . . . . . | PZ |  | 1 | 0,23 |
|   | 7,5 | 18 | U12/16E 0,18-..23 K3 and U3/32 0,18-..32 | <b>K3-18NR01</b> | . . . . . | PZ |  | 1 | 0,23 |
|  | 11  | 22 | U12/16E 0,18-..23 K3 and U3/32 0,18-..32 | <b>K3-22NR10</b> | . . . . . | PZ |  | 1 | 0,23 |
|   | 11  | 22 | U12/16E 0,18-..23 K3 and U3/32 0,18-..32 | <b>K3-22NR01</b> | . . . . . | PZ |  | 1 | 0,23 |

Pozidriv . . . . .PZ  
Torx . . . . .TX

# Selection of Contactor-Housings for Standard plugs acc. Industry Standard RAST 5



| Code Contactor-Housings | B01          | B02                          | B03          | B04 | further housings on request |
|-------------------------|--------------|------------------------------|--------------|-----|-----------------------------|
| 8-pole                  |              |                              |              |     |                             |
| 6-pole left             |              |                              |              |     |                             |
| 6-pole right            |              |                              |              |     |                             |
| 4-pole left             | -0A-         |                              |              |     |                             |
| 4-pole right            |              | -0B-                         |              |     |                             |
| 2-pole left             |              | -0A-<br>-0C-<br>-0I-<br>-0L- |              |     |                             |
| 2-pole center left      | -0A-<br>-0C- | -0K-<br>-0O-<br>-0Q-         |              |     |                             |
| 2-pole center right     |              | -0B-<br>-0F-<br>-0K-<br>-0L- |              |     |                             |
| 2-pole right            |              |                              | -0I-<br>-0L- |     |                             |

Standard plugs acc. Industry Standard RAST 5



Order Example for Contactors:

Contactor: K3-14NR10...230...B01 B02 B01

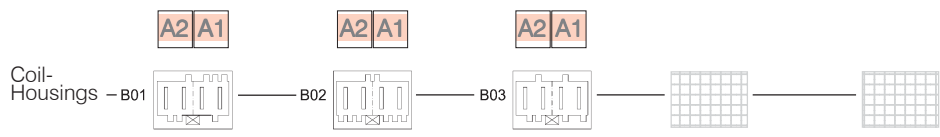
Coil Voltage: 230V

Code Housing Coil ...see page 144, 146, 148, 150

Code Housing IN (L)... see page 143, 145, 147, 149

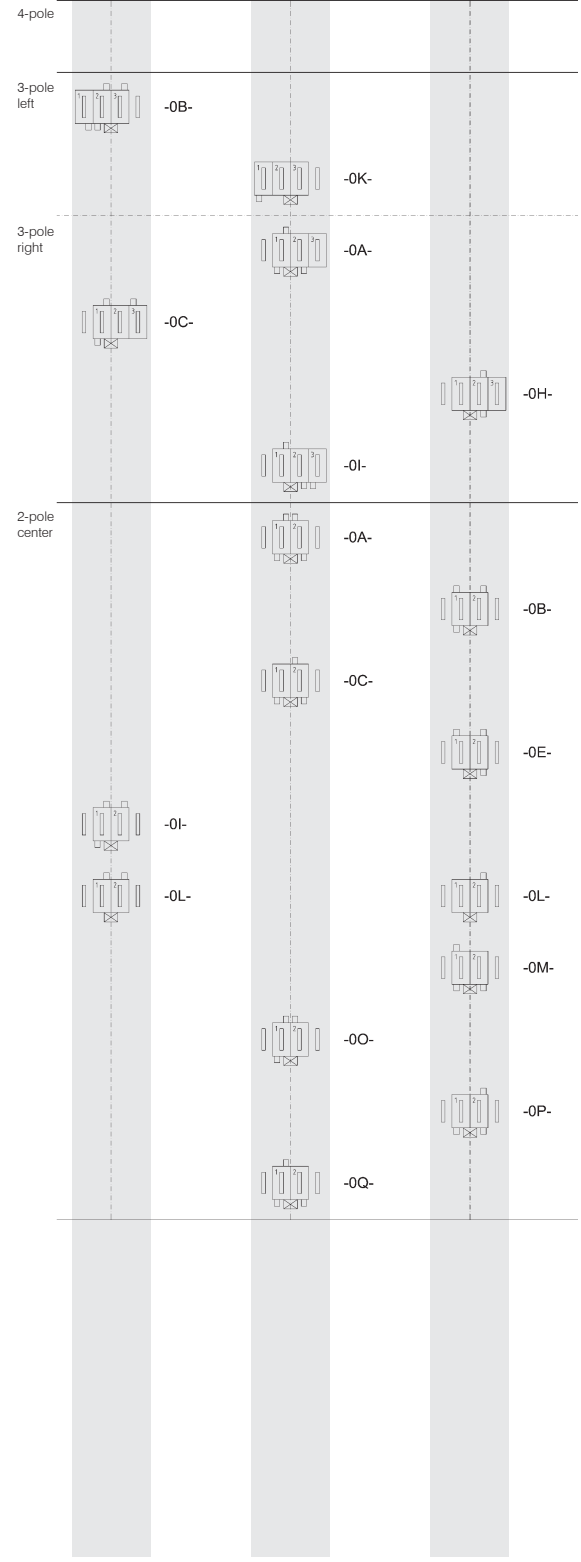
Code Housing OUT (T)...see page 143, 145, 147, 149

# Selection of Coil-Housings for Standard plugs acc. Industry Standard RAST 5

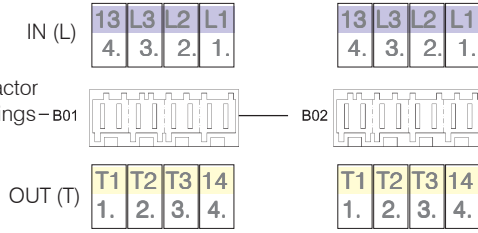


Code Coil-Housings — B01 — B02 — B03 — B04 — B05 — further housings on request →

Standard plugs acc. Industry Standard RAST 5



# Selection of Contactor-Housings for Standard plugs acc. System Stocko RAST 5



Code Contactor-Housings — B01 — B02 — B03 — B04 — further housings on request →

Standard plugs acc. System Stocko RAST 5



| Pole Configuration | B01 | B02 | B03 | B04 |
|--------------------|-----|-----|-----|-----|
| 8-pole             |     |     |     |     |
| 6-pole left        |     |     |     |     |
| 6-pole right       |     |     |     |     |
| 4-pole left        |     |     |     |     |
| 4-pole right       |     |     |     |     |
| 2-pole             |     |     |     |     |

Order Example for Contactors:

- Contactor
  - Coil Voltage
  - Code Housing Coil ...see page 144, 146, 148, 150
  - Code Housing IN (L) ... see page 143, 145, 147, 149
  - Code Housing OUT (T) ...see page 143, 145, 147, 149
- K3-14NR10...230...B01 B02 B01

see... Industry Standard RAST 5



# Selection of Coil-Housings for Standard plugs acc. System Stocko RAST 5



Coil-Housings – B01

A2 A1

A2 A1

A2 A1

A2 A1

A2 A1

A2 A1



## Code Coil-Housings

Standard plugs  
acc.  
System Stocko RAST 5



4-pole

3-pole  
left

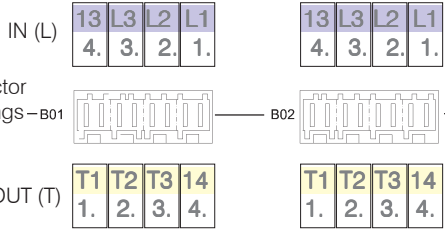
3-polig  
Rechts

2-polig  
Mitte

|             | B01  | B02  | B03  | B01  | B02  | B03  |
|-------------|------|------|------|------|------|------|
| 4-pole      | -42- | -64- | -78- |      | -02- | -02- |
|             | -78- | -78- | -78- |      | -04- | -03- |
|             | -79- |      | -79- |      |      | -18- |
| 3-pole left |      |      | -01- | -19- |      |      |
|             |      |      | -05- | -21- |      |      |
|             |      |      | -12- |      |      | -28- |
|             |      | -16- |      | -47- |      |      |
|             |      | -30- |      |      | -52- | -52- |
|             |      | -32- |      |      | -53- |      |
|             | -33- |      |      |      |      | -64- |
|             | -36- |      |      |      | -66- |      |
|             |      | -40- |      | -71- |      |      |
|             |      | -44- |      |      | -74- |      |
|             |      | -48- |      |      | -75- |      |
|             | -49- |      |      |      |      |      |
|             | -51- |      |      |      |      |      |
|             | -72- | -72- | -72- |      |      |      |
|             |      | -75- | -75- |      |      |      |

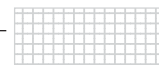
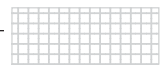
see... Industry Standard RAST 5

# Selection of Contactor-Housings for Standard plugs acc. System Tyco RAST 5



Contactor Housings - B01

B02



Code Contactor-Housings — B01 — B02 — B03 — B04 — further housings on request →

Standard plugs acc. System Tyco RAST 5



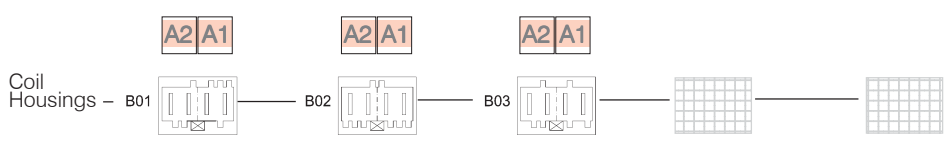
|                     | B01 | B02        | B03        | B04      |
|---------------------|-----|------------|------------|----------|
| 4-pole              |     |            |            |          |
| 6-pole left         |     | 928151-6   |            |          |
|                     |     | 2-928344-6 |            |          |
| 6-pole right        |     |            |            |          |
| 4-pole left         |     | 928344-4   |            |          |
|                     |     |            | 4-928344-4 |          |
| 4-pole right        |     |            |            |          |
| 2-pole left         |     |            | 928344-2   |          |
|                     |     |            | 3-964951-2 |          |
|                     |     | 2-964951-2 |            |          |
|                     |     | 928343-2   |            |          |
|                     |     |            | 964951-2   |          |
|                     |     |            | 4-928344-2 |          |
| 2-pole center left  |     | 928344-2   |            |          |
|                     |     | 3-964951-2 |            |          |
|                     |     | 4-928344-2 |            |          |
| 2-pole center right |     |            | 2-928344-2 |          |
|                     |     |            | 928343-2   |          |
| 2-pole right        |     | 2-928344-2 |            |          |
|                     |     |            | 2-964951-2 |          |
|                     |     | 928343-2   |            | 928343-2 |

Order Example for Contactors:

- Contactor
- Coil Voltage
- Code Housing Coil ...see page 144, 146, 148, 150
- Code Housing IN (L)... see page 143, 145, 147, 149
- Code Housing OUT (T)...see page 143, 145, 147, 149

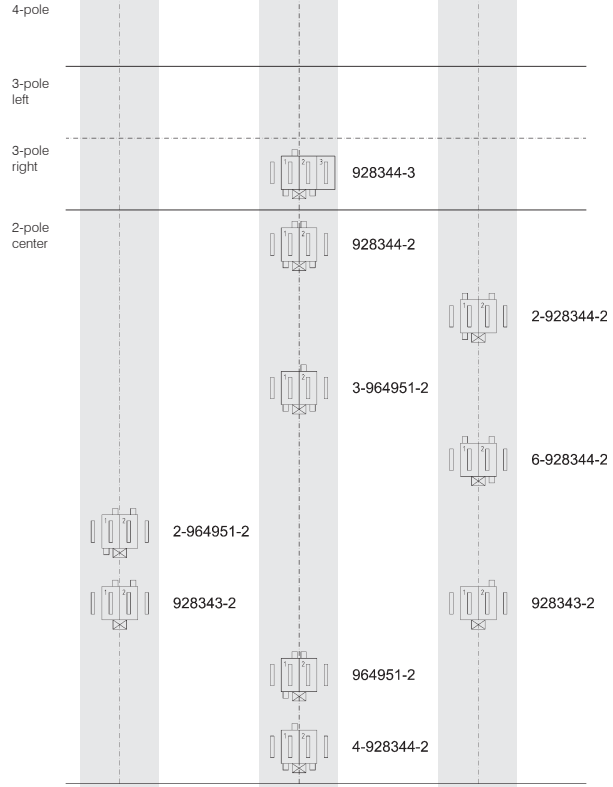
K3-14NR10...230...B01 B02 B01

# Selection of Coil-Housings for Standard plugs acc. System Tyco RAST 5

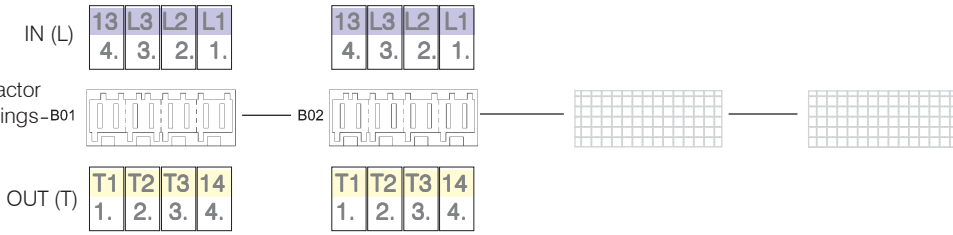


Code Coil-Housings — B01 — B02 — B03 — B04 — B05 — further housings on request →

Standard plugs  
acc.  
System Tyco RAST 5



# Selection of Contactor-Housings for Standard plugs acc. System Lumberg RAST 5



| Code                                      | Contactor-Housings  | B01 | B02 | B03 | B04 | further housings on request |
|---|---------------------|-----|-----|-----|-----|-----------------------------|
| Standard plugs acc. System Lumberg RAST 5 | 8-pole              |     |     |     |     |                             |
|   | 6-pole left         |     |     |     |     |                             |
|   | 6-pole right        |     |     |     |     |                             |
|   | 4-pole left         |     |     |     |     |                             |
|   | 4-pole right        |     |     |     |     |                             |
|   | 2-pole left         |     |     |     |     |                             |
|   | 2-pole center left  |     |     |     |     |                             |
|   | 2-pole center right |     |     |     |     |                             |
|   | 2-pole right        |     |     |     |     |                             |
|   |                     |     |     |     |     |                             |
|   |                     |     |     |     |     |                             |
|   |                     |     |     |     |     |                             |
|   |                     |     |     |     |     |                             |
|   |                     |     |     |     |     |                             |

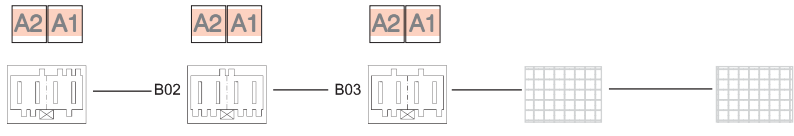
Order Example for Contactors:

Contactor: K3-14NR10...230...B01 B02 B01  
 Coil Voltage: 230  
 Code Housing Coil: 146, 148, 150  
 Code Housing IN (L): 143, 145, 147, 149  
 Code Housing OUT (T): 143, 145, 147, 149

# Selection of Coil-Housings for Standard plugs acc. **System Lumberg RAST 5**

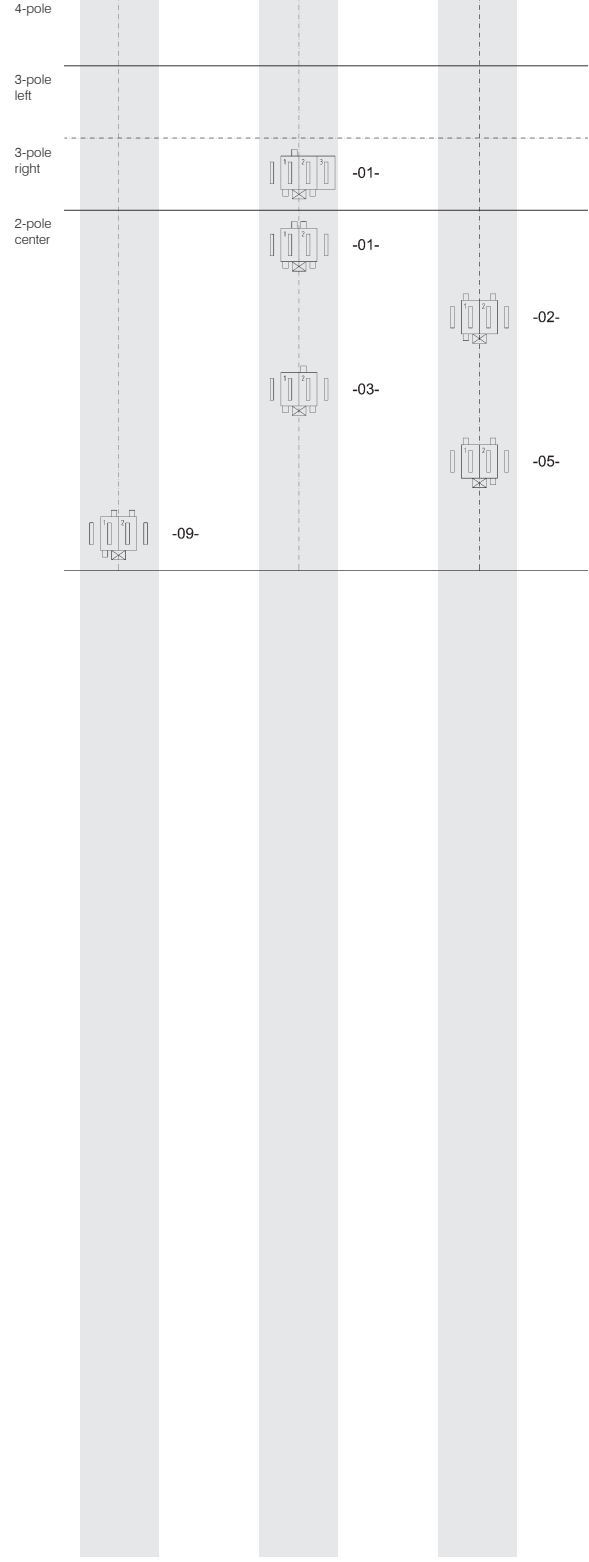


Coil Housings - B01



**Code Coil-Housings** ————— B01 ————— B02 ————— B03 ————— B04 ————— B05 ————— further housings on request —————>

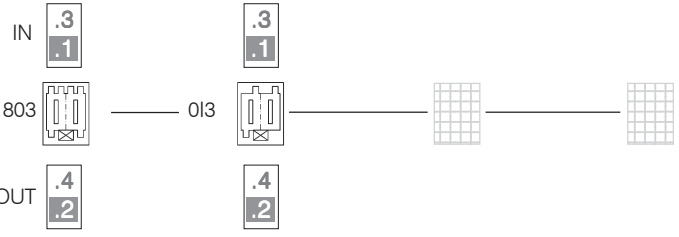
**Standard plugs acc. System Lumberg RAST 5**



# Selection of Auxilliary Contact Block-Housings for Standard plugs acc. Industry Standard RAST 5



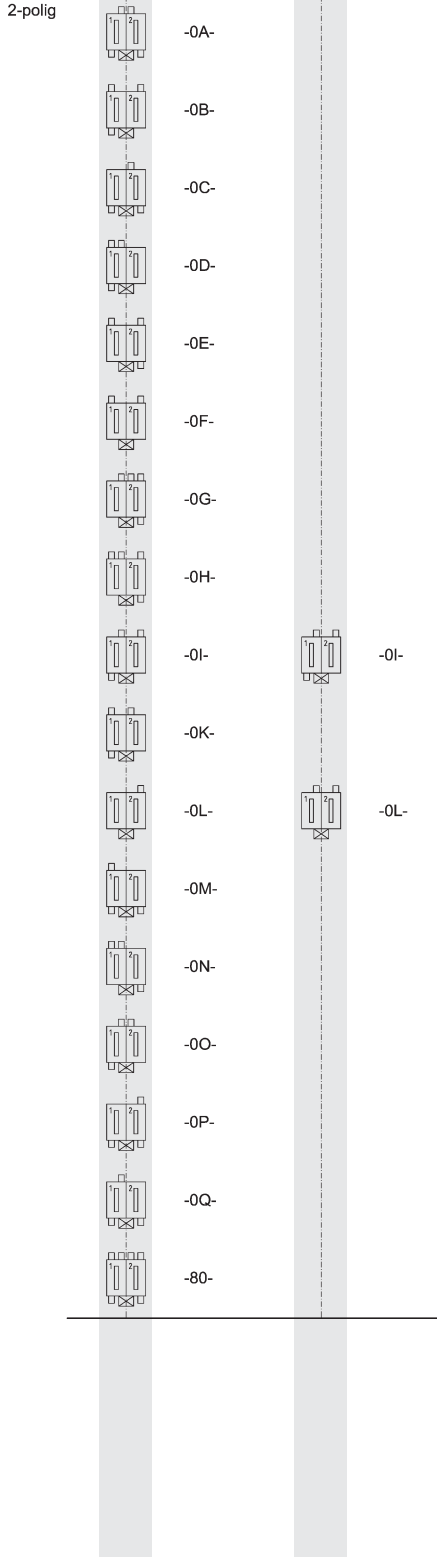
Auxilliary Contact Block-Housings



## Code Auxilliary-Contact Block-Housings



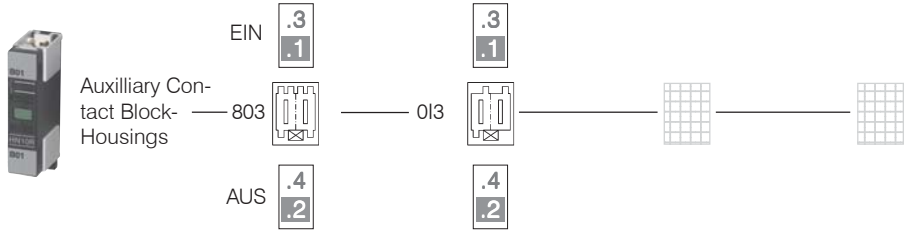
Standard plugs acc. Industry Standard RAST 5



Order Example for Aux. Contact Blocks:

- Auxilliary Contact Block
  - Code Aux. Block Housing IN (1,3)
  - Code Aux. Block Housing OUT (2,4)
- HN10R.803013

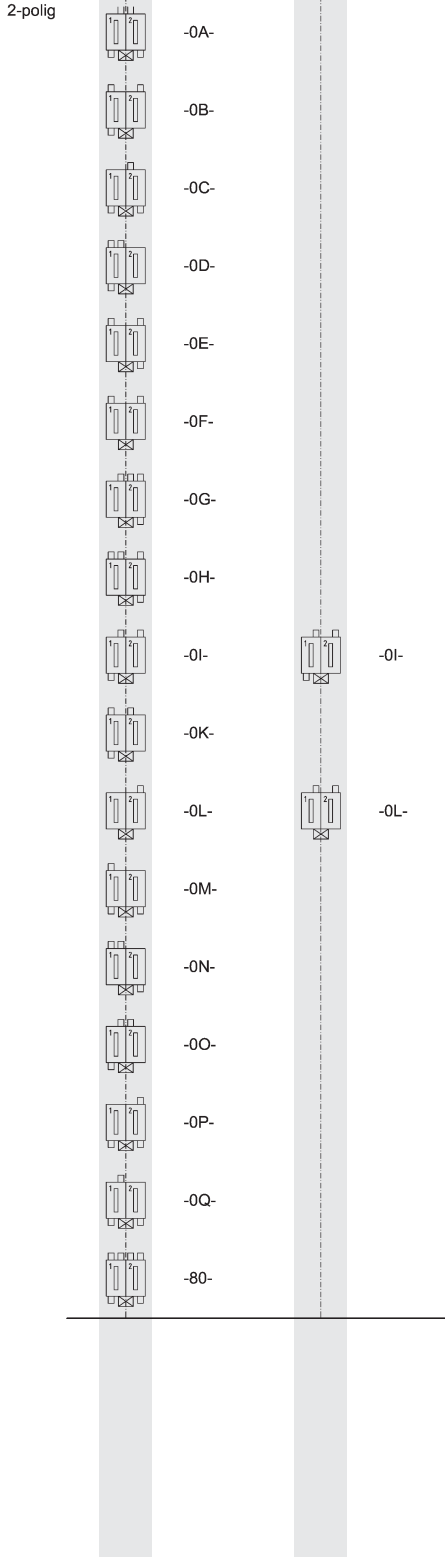
# Selection of Auxiliary Contact Block-Housings for Standard plugs acc. **System Stocko RAST 5**



## Code Auxiliary-Contact Block-Housings



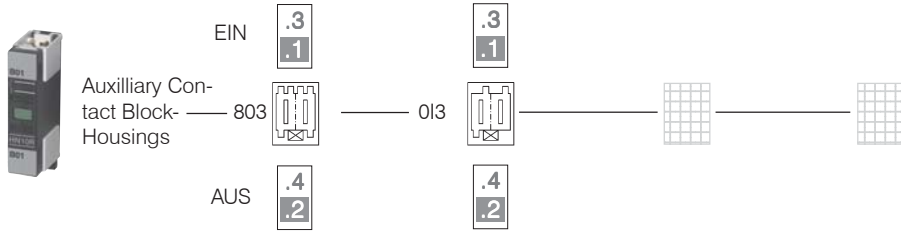
Standard plugs  
acc.  
System Stocko RAST 5



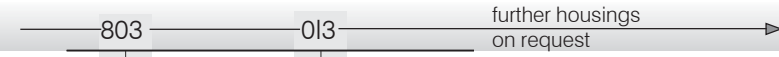
Order Example for  
Aux. Contact Blocks:

-Auxiliary Contact Block  
 -Code Aux. Block Housing IN (1,3)  
 -Code Aux. Block Housing OUT (2,4)  
 HN10R.8030I3

# Selection of Auxiliary Contact Block-Housings for Standard plugs acc. **System Tyco RAST 5**



## Code Auxiliary-Contact Block-Housings



Standard plugs  
acc.  
System Tyco RAST 5



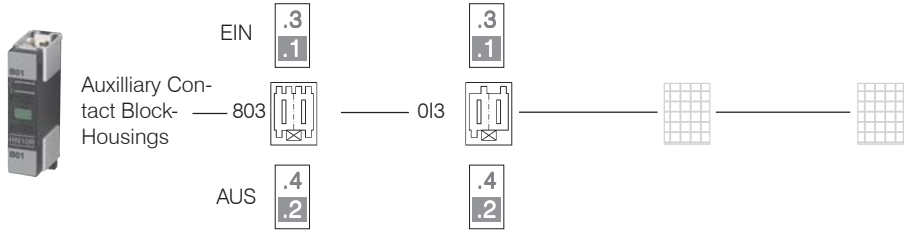
| 2-polig | 803        | 013        |
|---------|------------|------------|
|         | 928344-2   |            |
|         | 2-928344-2 |            |
|         | 3-964951-2 |            |
|         | 6-928344-2 |            |
|         | 5-928344-2 |            |
|         | 3-928344-2 |            |
|         | 2-964951-2 | 2-964951-2 |
|         | 928343-2   | 928343-2   |
|         | 964951-2   |            |
|         | 4-928344-2 |            |

Order Example for  
Aux. Contact Blocks:

-Auxiliary Contact Block  
 -Code Aux. Block Housing IN (1,3)  
 -Code Aux. Block Housing OUT (2,4)  
 HN10R.803013



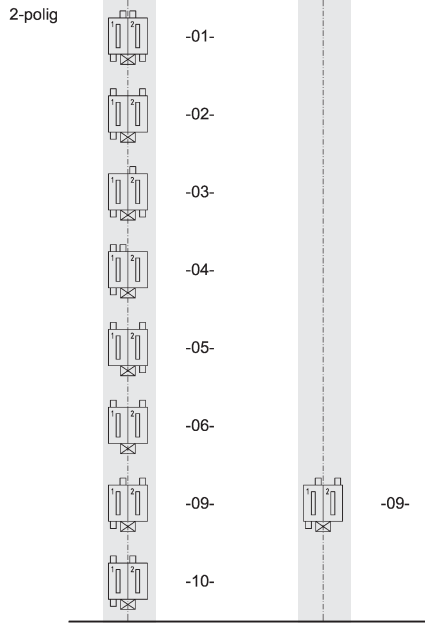
# Selection of Auxiliary Contact Block-Housings for Standard plugs acc. **System Lumberg RAST 5**



## Code Auxiliary-Contact Block-Housings



Standard plugs  
acc.  
System Lumberg RAST 5

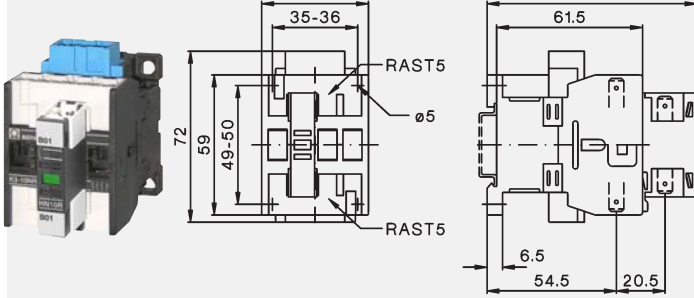


Order Example for  
Aux. Contact Blocks:

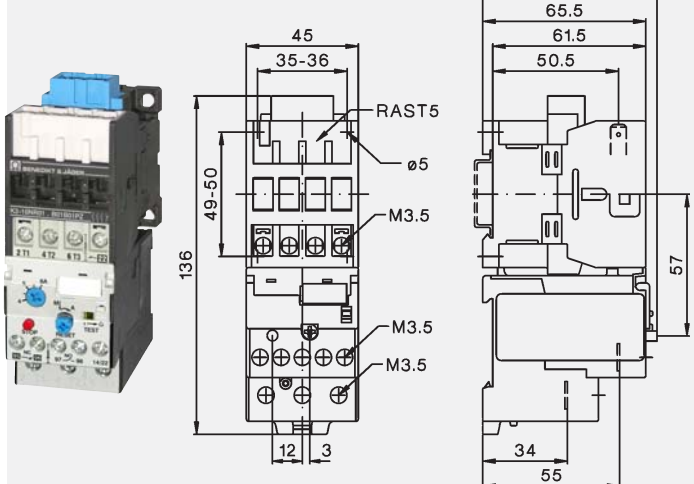
-Auxiliary Contact Block  
 -Code Aux. Block Housing IN (1,3)  
 -Code Aux. Block Housing OUT (2,4)  
 HN10R.803013

## Dimensions

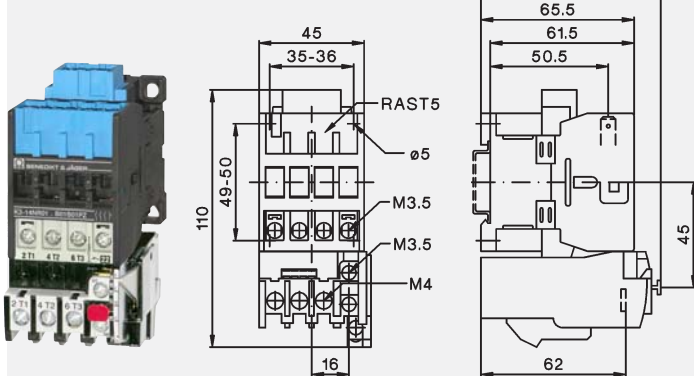
K3-..NR.. +HN..R



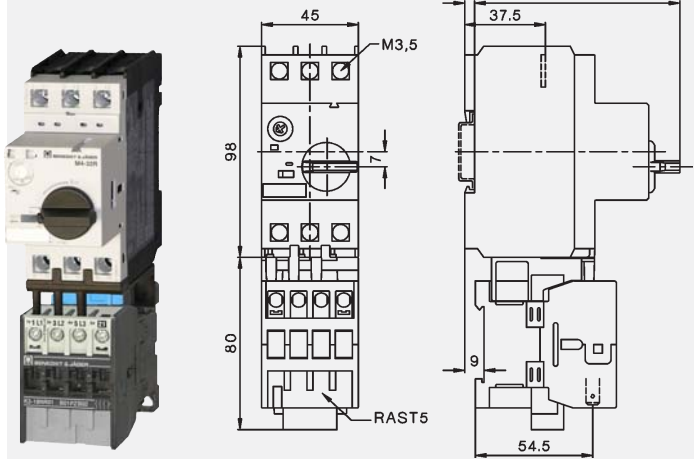
K3-..NR.....PZ + U3/32..



K3-..NR.....PZ + U12/16.. K3



K3-..NR....PZ...VK3 + M4..



## Color-Coding acc. to Ratings

| Contactor | Type | Ratings  | Color                    |
|-----------|------|----------|--------------------------|
|           |      | AC3/415V | <b>Contactor Housing</b> |

|                 |            |   |      |
|-----------------|------------|---|------|
| Contactor Relay | K3-07NR... | - | pink |
|-----------------|------------|---|------|

|           |            |        |             |
|-----------|------------|--------|-------------|
| Contactor | K3-10NR... | 4 kW   | bright grey |
|           | K3-14NR... | 5,5 kW | blue        |
|           | K3-18NR... | 7,5 kW | dark grey   |
|           | K3-22NR... | 11 kW  | yellow      |

## Color-Coding acc. to Coil Voltage

| Voltage | Color |
|---------|-------|
|---------|-------|

|                 |             |
|-----------------|-------------|
| 24V             | white       |
| 110V            | bright grey |
| 180V            | yellow      |
| 230V            | blue        |
| Special Voltage | pink        |

Data acc. to IEC 60947-4-1, VDE 0660

| Main Contacts  |  | Type | K3-07NR | K3-10NR | K3-14NR | K3-18NR | K3-22NR |
|--|--|------|---------|---------|---------|---------|---------|
| <b>Rated insulation voltage <math>U_i</math></b> <sup>1)</sup> |  | V~   | 415     | 415     | 415     | 415     | 415     |
| <b>Making capacity <math>I_{eff}</math></b>                    | at $U_e = 415V\sim$                      | A    | -       | 200     | 200     | 200     | 200     |
| <b>Breaking capacity <math>I_{eff}</math></b>                  | at $U_e = 415V\sim$<br>$\cos\phi = 0,65$ | A    | -       | 180     | 180     | 200     | 200     |

#### Utilization category AC1

##### Switching of resistive load

|   |      |          |           |           |           |           |           |
|---|------|----------|-----------|-----------|-----------|-----------|-----------|
| Rated operational current $I_e (=I_{th})$ | 415V | <b>A</b> | <b>10</b> | <b>25</b> | <b>25</b> | <b>32</b> | <b>32</b> |
| at 40°C, open                             |      |          |           |           |           |           |           |
| Rated operation power                     | 220V | kW       | -         | 9,5       | 9,5       | 12,2      | 12,2      |
| of three-phase resistive loads            | 230V | kW       | -         | 9,9       | 9,9       | 12,7      | 12,7      |
| 50-60Hz, $\cos\phi = 1$                   | 240V | kW       | -         | 10,4      | 10,4      | 13,3      | 13,3      |
|   | 380V | kW       | -         | 16,4      | 16,4      | 21,0      | 21,0      |
|   | 400V | kW       | -         | 17,3      | 17,3      | 22,1      | 22,1      |
|   | 415V | kW       | -         | 17,9      | 17,9      | 23,0      | 23,0      |

|   |      |    |   |      |      |      |      |
|---|------|----|---|------|------|------|------|
| Rated operational current $I_e (=I_{th})$ | 415V | A  | 6 | 25   | 25   | 32   | 32   |
| at 60°C, enclosed                         |      |    |   |      |      |      |      |
| Rated operational power                   | 220V | kW | - | 9,5  | 9,5  | 12,2 | 12,2 |
| of three-phase resistive loads            | 230V | kW | - | 9,9  | 9,9  | 12,7 | 12,7 |
| 50-60Hz, $\cos\phi = 1$                   | 240V | kW | - | 10,4 | 10,4 | 13,3 | 13,3 |
|   | 380V | kW | - | 16,4 | 16,4 | 21,0 | 21,0 |
|   | 400V | kW | - | 17,3 | 17,3 | 22,1 | 22,1 |
|   | 415V | kW | - | 17,9 | 17,9 | 23,0 | 23,0 |

|   |  |                 |                      |                      |                      |                      |                      |
|---|--|-----------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Minimum cross-section of conductor at load with $I_e (=I_{th})$ |  | mm <sup>2</sup> | 2 x 1,5 <sup>2</sup> | 2 x 1,5 <sup>2</sup> | 2 x 1,5 <sup>2</sup> | 2 x 2,5 <sup>2</sup> | 2 x 2,5 <sup>2</sup> |
|---|--|-----------------|----------------------|----------------------|----------------------|----------------------|----------------------|

#### Utilization category AC2 and AC3

##### Switching of three-phase motors

|                                 |                 |           |          |           |            |            |           |
|---------------------------------|-----------------|-----------|----------|-----------|------------|------------|-----------|
| Rated operational current $I_e$ | 220V            | A         | -        | 12        | 15         | 18         | 22        |
| open and enclosed               | 230V            | A         | -        | 11,5      | 14,5       | 18         | 22        |
|                                 | 240V            | A         | -        | 11        | 14         | 18         | 22        |
|                                 | <b>380-400V</b> | <b>A</b>  | <b>-</b> | <b>10</b> | <b>14</b>  | <b>18</b>  | <b>22</b> |
|                                 | 415V            | A         | -        | 9         | 14         | 18         | 22        |
| Rated operational power         | 220-230V        | kW        | -        | 3         | 4          | 5          | 6         |
| of three-phase motors           | 240V            | kW        | -        | 3         | 4          | 5          | 7         |
| 50-60Hz                         | <b>380-400V</b> | <b>kW</b> | <b>-</b> | <b>4</b>  | <b>5,5</b> | <b>7,5</b> | <b>11</b> |
|                                 | 415V            | kW        | -        | 4,5       | 6          | 8,5        | 12        |

#### Auxilliary Contacts

|   |      |    |     |     |     |     |     |
|---|------|----|-----|-----|-----|-----|-----|
| <b>Rated insulation voltage <math>U_i</math></b>            |      | V~ | 415 | 415 | 415 | 415 | 415 |
| <b>Thermal rated current <math>I_{th}</math></b> up to 415V |      |    |     |     |     |     |     |
| Ambient temperature   | 40°C | A  | 10  | 10  | 10  | 10  | 10  |
|   | 60°C | A  | 6   | 6   | 6   | 6   | 6   |

#### Utilization category AC15

|                                 |          |   |   |   |   |   |   |
|---------------------------------|----------|---|---|---|---|---|---|
| Rated operational current $I_e$ | 220-240V | A | 3 | 3 | 3 | 3 | 3 |
|                                 | 380-415V | A | 2 | 2 | 2 | 2 | 2 |

#### Utilization category DC13

|                                 |      |   |     |     |     |     |     |
|---------------------------------|------|---|-----|-----|-----|-----|-----|
| Rated operational current $I_e$ | 60V  | A | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 |
|                                 | 110V | A | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 |
|                                 | 220V | A | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |

#### Short circuit protection

|         |  |   |    |    |    |    |    |
|---------|--|---|----|----|----|----|----|
| gL (gG) |  | A | 20 | 20 | 20 | 20 | 20 |
|---------|--|---|----|----|----|----|----|

<sup>1)</sup>Suitable for: earthed -neutral systems, overvoltage category I to III, pollution degree 3 (Industry-Standard):  $U_{imp} = 4kV$ . Data for other conditions on request.

Data acc. to IEC 60947-4-1, VDE 0660

| Main Contacts   |                             | Type                | K3-07NR                           | K3-10NR | K3-14NR | K3-18NR | K3-22NR |  |
|---|-----------------------------|---------------------|-----------------------------------|---------|---------|---------|---------|--|
| <b>Maximum ambient temperature</b>  |                             |                     |                                   |         |         |         |         |  |
| Operation   | open                        | °C                  | -40 up to +60 (+90) <sup>1)</sup> |         |         |         |         |  |
|   | enclosed                    | °C                  | -40 up to +40                     |         |         |         |         |  |
| with thermal overload relay   | open                        | °C                  | -25 up to +60                     |         |         |         |         |  |
|   | enclosed                    | °C                  | -25 up to +40                     |         |         |         |         |  |
| Storage   |                             | °C                  | -25 up to +40                     |         |         |         |         |  |
|   |                             | °C                  | -50 up to +90                     |         |         |         |         |  |
| <b>Short circuit protection</b>   |                             |                     |                                   |         |         |         |         |  |
| for contactors without thermal overload relay   |                             |                     |                                   |         |         |         |         |  |
| Coordination-Type "1" acc. to IEC 947-4-1,  |                             |                     |                                   |         |         |         |         |  |
| Contact welding without hazard of persons   |                             |                     |                                   |         |         |         |         |  |
| max. fuse size  | gL (gG)                     | A                   | 20                                | 63      | 63      | 63      | 63      |  |
| Coordination-Type "2" acc. to IEC 947-4-1,  |                             |                     |                                   |         |         |         |         |  |
| light Contact welding accepted  |                             |                     |                                   |         |         |         |         |  |
| max. fuse size  | gL (gG)                     | A                   |                                   | 25      | 35      | 35      | 35      |  |
| Contact welding not accepted  |                             |                     |                                   |         |         |         |         |  |
| max. fuse size  | gL (gG)                     | A                   |                                   | 16      | 16      | 16      | 16      |  |
| for Contactors with thermal overload relay the device with the smaller admissible backup fuse (contactor or thermal overload relay) determines the fuse size. |                             |                     |                                   |         |         |         |         |  |
| <b>Frequency of operations z</b>  |                             |                     |                                   |         |         |         |         |  |
| Contactors without thermal overload relay   |                             |                     |                                   |         |         |         |         |  |
|   | without load                | 1/h                 | 10000                             | 10000   | 10000   | 10000   | 10000   |  |
|   | AC3, I <sub>e</sub>         | 1/h                 |                                   | 600     | 600     | 600     | 600     |  |
|   | AC4, I <sub>e</sub>         | 1/h                 |                                   | 120     | 120     | 120     | 120     |  |
|   | DC3, I <sub>e</sub>         | 1/h                 |                                   | 600     | 600     | 600     | 600     |  |
| <b>Mechanical life</b>  |                             |                     |                                   |         |         |         |         |  |
| AC-operated   |                             | S x 10 <sup>6</sup> | 10                                | 10      | 10      | 10      | 10      |  |
| DC-operated   |                             | S x 10 <sup>6</sup> | 10                                | 10      | 10      | 10      | 10      |  |
| <b>Short time current</b>   | 10sec.-current              | A                   |                                   | 96      | 120     | 144     | 176     |  |
| <b>Power loss</b> per pole  | at I <sub>e</sub> /AC3 400V | W                   |                                   | 0,21    | 0,35    | 0,5     | 0,75    |  |
| <b>Resistance to shock acc. to IEC 68-2-27</b>  |                             |                     |                                   |         |         |         |         |  |
| Shock time 20ms sine-wave   | NO                          | g                   |                                   |         | 10      |         |         |  |
|   | NC                          | g                   |                                   |         | 6       |         |         |  |
| <b>Control Circuit</b>  |                             |                     |                                   |         |         |         |         |  |
| <b>Power consumption of coils</b>   |                             |                     |                                   |         |         |         |         |  |
| AC operated   | inrush                      | VA                  | 33-45                             |         |         |         |         |  |
|   |                             | sealed              | VA                                | 7-10    |         |         |         |  |
|   |                             | W                   | 2,6-3                             |         |         |         |         |  |
| DC operated   | inrush                      | W                   | 75                                |         |         |         |         |  |
|   |                             | sealed              | W                                 | 2       |         |         |         |  |
| <b>Operating range of coils</b>   |                             |                     |                                   |         |         |         |         |  |
| in multiples of control voltage U <sub>s</sub>  |                             |                     |                                   |         |         |         |         |  |
|   | AC operated                 |                     | 0,85-1,1                          |         |         |         |         |  |
|   | DC operated                 |                     | 0,8-1,1                           |         |         |         |         |  |
| <b>Switching time</b> at control voltage U <sub>s</sub> ± 10% <sup>2) 3)</sup>  |                             |                     |                                   |         |         |         |         |  |
| AC operated   | make time                   | ms                  | 8-16                              |         |         |         |         |  |
|   | release time                | ms                  | 5-13                              |         |         |         |         |  |
|   | arc duration                | ms                  | 10-15                             |         |         |         |         |  |
| DC operated   | make time                   | ms                  | 8-12                              |         |         |         |         |  |
|   | release time                | ms                  | 8-13                              |         |         |         |         |  |
|   | arc duration                | ms                  | 10-15                             |         |         |         |         |  |

1) With reduced control voltage range 0,9 bis 1,0 x U<sub>s</sub> and with reduced rated current I<sub>e</sub>/AC1 acc. to I<sub>e</sub>/AC3

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 with coil suppressor (Varistor, RC-Unit, Diode-Unit).

## Data acc. to UL508

| Main Contacts (cULus)   |  | Type     | K3-10NR | K3-14NR | K3-18NR | K3-22NR |      |
|---|--|----------|---------|---------|---------|---------|------|
| Rated operational current "General Use"                             |  | A        | 25      | 25      | 30      | 30      |      |
| <b>Motor DOL 3-phase</b> at 60Hz                                    |  |          |         |         |         |         |      |
| Rated operational current   |  | 415V     | A       | 10      | 14      | 18      | 22   |
| Rated operational power   |  | 110-120V | hp      | 1½      | 2       | 2       | 3    |
|   |  | 200-208V | hp      | 3       | 3       | 5       | 5    |
|   |  | 220-240V | hp      | 3       | 3       | 5       | 5    |
|   |  | 265-277V | hp      | 3       | 5       | 7½      | 7½   |
|   |  | 380-415V | hp      | 5       | 5       | 10      | 10   |
| <b>Motor DOL 1-phase</b> at 60Hz                                    |  |          |         |         |         |         |      |
| Rated operational current   |  | 415V     | A       | 10      | 14      | 18      | 22   |
| Rated operational power of AC motor at 60Hz (1ph)                   |  | 110-120V | hp      | ½       | ¾       | 1       | 1½   |
|   |  | 200-208V | hp      | 1       | 1½      | 2       | 3    |
|   |  | 220-240V | hp      | 1½      | 2       | 3       | 3    |
|   |  | 265-277V | hp      | 2       | 3       | 3       | 3    |
|   |  | 380-415V | hp      | 3       | 3       | 5       | 5    |
| Fuses   |  |          | A       | 30      | 40      | 50      | 50   |
| Suitable for use on a capability of delivering not more than (SCCR) |  | rms      | A       | 5000    | 5000    | 5000    | 5000 |
|   |  |          | V       | 415     | 415     | 415     | 415  |
| Auxilliary Contacts (cULus)   |  |          | A300    | A300    | A300    | A300    |      |

## Accessories

Data acc. to IEC 60947-5-1, VDE 0660

| Auxilliary Contacts                                     |  | Type                | HN10R | HN01R |     |
|---|--|---------------------|-------|-------|-----|
| Rated insulation voltage $U_i$                          |  | V~                  | 415   | 415   |     |
| Thermal rated current $I_{th}$ up to 415V               |  |                     |       |       |     |
| Ambient temperature max. 40°C                           |  | A                   | 10    | 10    |     |
| max. 60°C   |  | A                   | 6     | 6     |     |
| Frequency of operations $z$                             |  | 1/h                 | 3000  | 3000  |     |
| Mechanical life   |  | S x 10 <sup>6</sup> | 10    | 10    |     |
| Power loss per pole at $I_e/AC1$                        |  | W                   | 0,5   | 0,5   |     |
| <b>Utilization category AC15</b>                        |  |                     |       |       |     |
| Rated operational current $I_e$                         |  | 220-240V            | A     | 3     | 3   |
|   |  | 380-415V            | A     | 2     | 2   |
| <b>Utilization category DC13</b>                        |  |                     |       |       |     |
| Rated operational current $I_e$                         |  | 60V                 | A     | 2     | 2   |
|   |  | 110V                | A     | 0,4   | 0,4 |
|   |  | 220V                | A     | 0,1   | 0,1 |
| <b>Short circuit protection</b>                         |  |                     |       |       |     |
| short circuit current 1kA, contact welding not accepted |  |                     |       |       |     |
| max. fuse size  |  | gL (gG)             | A     | 20    | 20  |

## Data acc. to UL508

|   |  |      |      |      |     |
|---|--|------|------|------|-----|
| Rated operational current "General Use" |  | A    | 10   | 10   |     |
| Rated operational voltage               |  | max. | V~   | 300  | 300 |
| Auxiliary Contacts                      |  |      | A300 | A300 |     |