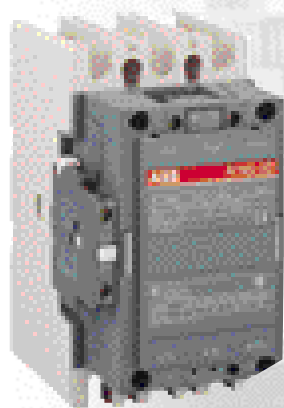


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# A., AF., 3-pole Contactors

## a.c. Circuit Switching

### Switching of 3-phase Cage Motors

**AC-3 utilization category**

When making, the motor current is about  $6 \times I_n$ .  
Breaking while the motor is running at  $I_n$  motor F.L.C.

|             |                           |                                                    |
|-------------|---------------------------|----------------------------------------------------|
| <b>AC-3</b> | Power rating              | ≤ 55 °C, 400 V                                     |
| <b>AC-3</b> | Rated operational current | ≤ 55 °C, 400 V<br>≤ 55 °C, 415 V<br>≤ 55 °C, 690 V |

| A9 | A12 | A16 | A26 | A30 | A40 |
|----|-----|-----|-----|-----|-----|

|    |   |     |     |    |    |      |
|----|---|-----|-----|----|----|------|
| kW | 4 | 5.5 | 7.5 | 11 | 15 | 18.5 |
| A  | 9 | 12  | 17  | 26 | 32 | 37   |
| A  | 9 | 12  | 17  | 26 | 32 | 37   |
| A  | 7 | 9   | 10  | 17 | 21 | 25   |

### Switching of Resistive Circuits

**AC-1 utilization category**

When making, the switched-on current is equal to the  $I_n$  load rated current with  $\cos \varphi \geq 0.95$ .

|                                     |                           |                               |
|-------------------------------------|---------------------------|-------------------------------|
| <b>AC-1</b>                         | Rated operational current | ≤ 40 °C<br>≤ 55 °C<br>≤ 70 °C |
| With conductor cross-sectional area |                           | mm <sup>2</sup>               |
| Rated operational voltage           |                           | V                             |

|                 |     |    |    |    |    |    |
|-----------------|-----|----|----|----|----|----|
| A               | 25  | 27 | 30 | 45 | 55 | 60 |
| A               | 22  | 25 | 27 | 40 | 55 | 60 |
| A               | 18  | 20 | 23 | 32 | 39 | 42 |
| mm <sup>2</sup> | 2.5 | 4  | 4  | 6  | 10 | 16 |
| V               | 690 |    |    |    |    |    |

## 3-pole contactors

### Selection & Ordering

- Select contactor type.
- Select contactor coil voltage on cover folding page 0/1, according to control circuit supply. (Please quote coil voltage in plain text).

|  |             |                                                    |       |                                       |                                        |
|--|-------------|----------------------------------------------------|-------|---------------------------------------|----------------------------------------|
|  | a.c.        | Control circuit supply                             | Types | A9-30-10<br>A12-30-10<br>A16-30-10    | A26-30-10<br>A30-30-10<br>A40-30-10    |
|  | a.c. & d.c. | Control circuit supply (Electronic coil interface) | Types | -                                     | -                                      |
|  | d.c.        | Control circuit supply                             | Types | AE9-30-00<br>AE12-30-00<br>AE16-30-00 | AE26-30-00<br>AE30-30-00<br>AE40-30-00 |

## Contactor Main Accessories

### Selection & Ordering

- Select accessory type and quote required data in plain text.

|                           |  |                                                                                                                           |       |                                                                                       |
|---------------------------|--|---------------------------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------|
| <b>Auxiliary contacts</b> |  | CA 5-..., 1-pole<br>CAL 5-..., 2-pole                                                                                     | Types | CA 5-10 1-pole, front mounting<br>CA 5-01 1-pole, front                               |
| <b>Timers</b>             |  | TP..., Pneumatic<br>TE..., Electronic<br>Supply voltages: 24 V a.c./d.c.,<br>110 ... 120; 220 ... 240; 380 ... 440 V a.c. | Types | TP 40 DA, TP 180 DA Direct timing - Front mounting<br>TP 40 TE5S Direct timing - Inde |
| <b>Interlocks</b>         |  | VE 5-., Mechanical / Electrical<br>VM..., Mechanical<br>mounting between 2 contactors                                     | Types | VE 5-1<br>VM 5-1                                                                      |
| <b>Surge suppressors</b>  |  | RV..., (Varistor) a.c./d.c.<br>RC..., (Capacitor) a.c.                                                                    | Types | RV 5<br>RC 5-1                                                                        |

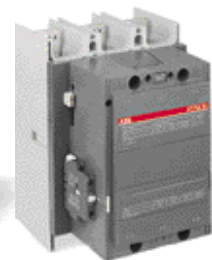
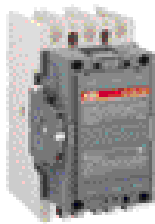
## Protection of 3-phase motors

### Selection & Ordering

- Select O/L relay type and setting range according to motor F.L.C.

|                   |                                                                                     |                                                                       |                                                          |                                                                        |                                                               |                                                            |                                          |
|-------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------|------------------------------------------|
| <b>O/L relays</b> |  | <b>TA..DU.., Thermal O/L relay<br/>E...DU.., Electronic O/L relay</b> | <b>Types<br/>&amp;<br/>setting<br/>range in<br/>Amps</b> | TA 25 DU                                                               |                                                               | TA 42 DU...                                                |                                          |
|                   |                                                                                     |                                                                       |                                                          | 0.10...0.16<br>0.16...0.25<br>0.25...0.40<br>0.40...0.63<br>0.63...1.0 | 1.0...1.4<br>1.3...1.8<br>1.7...2.4<br>2.2...3.1<br>2.8...4.0 | 3.5...5.0<br>4.5...6.5<br>6.0...8.5<br>7.5...11<br>10...14 | 13...19<br>18...25<br>24...32<br>29...42 |
|                   |                                                                                     |                                                                       |                                                          |                                                                        |                                                               | Please consult us for electronic solution                  |                                          |

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**A50 A63 A75****A95 A110****A145 A185****A210 A260 A300****AF400 AF460****AF580 AF750**

22 30 37

45 55

75 90

110 140 160

200 250

315 400

50 65 75  
50 65 75  
35 43 4696 110  
96 110  
65 82145 185  
145 185  
120 170210 260 305  
210 260 300  
210 220 280400 460  
400 460  
350 400580 750  
580 750  
500 650100 115 125  
85 95 105  
70 80 85145 160  
135 145  
115 130250 275  
230 250  
180 180350 400 500  
300 350 400  
240 290 325600 700  
500 600  
400 480800 1050  
700 800  
580 720

35 50 50

50 70

120 150

185 240 300

2 x 185 2 x 240

2 x 240

bar / mm  
2 x 80 x 5

1000

690

A50-30-00 A95-30-00  
A63-30-00  
A75-30-00

A145-30-11 A110-30-00

A210-30-11 A185-30-11

A260-30-11  
A300-30-11AF50-30-00 AF63-30-00  
AF75-30-00

AF95-30-00 AF110-30-00

AF145-30-11 AF185-30-11

AF210-30-11 AF260-30-11  
AF300-30-11

AF400-30-11 AF 460-30-11

AF 580-30-11 AF 750-30-11

CAL 5-11 2-pole, side mounting

CAL 5-11 2-pole, side mounting  
(1<sup>st</sup> block)CAL 5-11 B 2-pole, side mounting  
(2<sup>nd</sup> block)

Inverse timing - Front mounting

TE5S Independent mounting

TE5S Direct timing - Independent mounting

VE 5-2

VM 300H

VM 750H

RV 5  
RC 5-2

RC 5-2

The built-in coil interface eliminates the need of extra surge suppressors on these sizes

TA 75 DU...  
29...42  
36...52  
45...63  
60...80TA 80 DU...  
60...80  
TA 110 DU...  
65...90  
80...110TA 200 DU...  
130...175  
150...200E 200 DU  
60...200TA 450 DU...  
165...235  
220...310E 320 DU  
100...320

Please consult us for thermal solution

E 500 DU  
150...500E 800 DU  
250...800**Return to main index**

# A 9 ... A 110 3-pole Contactors

a.c. Operated



## Application

A 9 ... A 110 contactors are mainly used for controlling 3-phase motors and generally for controlling power circuits up to 690 V a.c. / 1000 V a.c. or 220 V d.c. / 440 V d.c. The contactors can also be used for many other applications such as isolation, capacitor switching, lighting.

## Description

The A... series 3-pole contactors are of the block type design.

- Main poles and auxiliary contact blocks

### A 9 ... A 40 1-stack contactors:

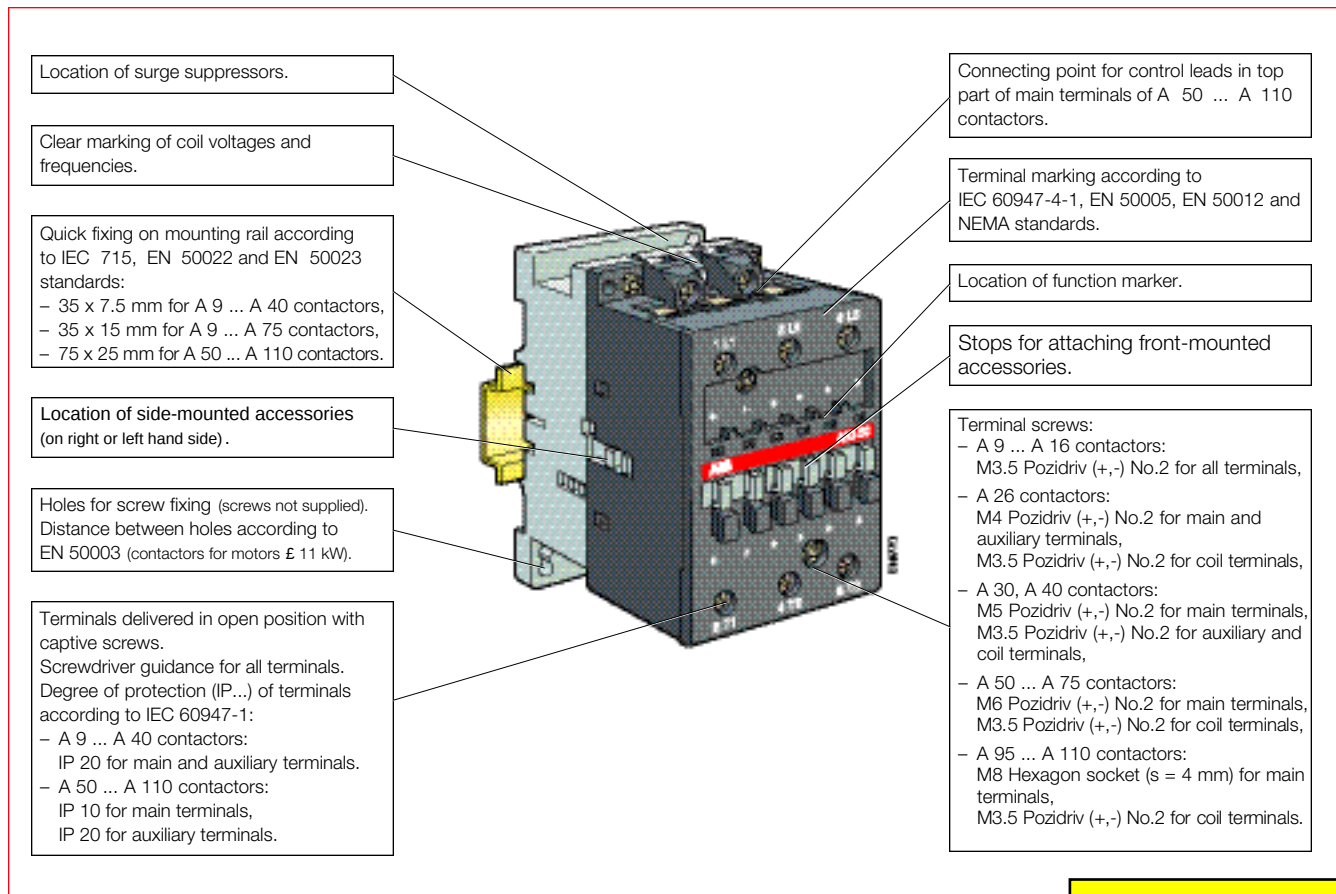
- 3 main poles,
- 1 built-in auxiliary contact,
- front and side mounted add-on auxiliary contact blocks.

### A 50 ... A 110 contactors:

- 3 main poles,
- front and side mounted add-on auxiliary contact blocks.
- Control circuit: a.c. operated with laminated magnet circuit
- Accessories: a wide range of accessories is available

## Variants

- 4-pole: A 9 ... A 75 contactors (with 4 N.O. or 2 N.O. + 2 N.C. main poles).
- a.c./d.c. operated controlled supply: AF 50 ... AF 110 contactors.
- d.c. operated: AE 9 ... AE 40 contactors.
- d.c. operated with large coil voltage range: TAE 50 ... TAE 110 contactors (on application).
- contactors for capacitor switching (UA..., UA...-R types),



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# A 9 ... A 110 3-pole Contactors

a.c. Operated



A9-30-10

SB7312C2



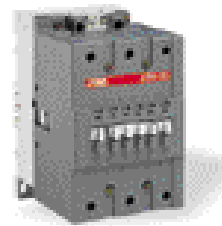
A26-30-10

SB7309C2



A50-30-11

SB5076C2



A95-30-11

SB7340C2

| Rated operational current |                    |      | Auxiliary contacts fitted                                                         |   | Weight kg | Footprint |     |     | Order Code                              |
|---------------------------|--------------------|------|-----------------------------------------------------------------------------------|---|-----------|-----------|-----|-----|-----------------------------------------|
| AC-3<br>400 V<br>A        | AC-1<br>40 °C<br>A | KW   | 1st stack                                                                         |   |           | H         | W   | D   |                                         |
|                           |                    |      |  |   |           |           |     |     | state coil voltage<br>(see table below) |
| 9                         | 25                 | 4    | 1                                                                                 | - | 0.34      | 74        | 44  | 74  | A9.30.10                                |
|                           |                    |      | -                                                                                 | 1 | 0.34      |           |     |     | A9.30.01                                |
| 12                        | 27                 | 5.5  | 1                                                                                 | - | 0.34      | 74        | 44  | 74  | A12.30.10                               |
|                           |                    |      | -                                                                                 | 1 | 0.34      |           |     |     | A12.30.01                               |
| 17                        | 30                 | 7.5  | 1                                                                                 | - | 0.34      | 74        | 44  | 74  | A16.30.10                               |
|                           |                    |      | -                                                                                 | 1 | 0.34      |           |     |     | A16.30.01                               |
| 26                        | 45                 | 11   | 1                                                                                 | - | 0.60      | 90        | 54  | 94  | A26.30.10                               |
|                           |                    |      | -                                                                                 | 1 | 0.60      |           |     |     | A26.30.01                               |
| 32                        | 55                 | 15   | 1                                                                                 | - | 0.71      | 90        | 54  | 108 | A30.30.10                               |
|                           |                    |      | -                                                                                 | 1 | 0.71      |           |     |     | A30.30.01                               |
| 37                        | 60                 | 18.5 | 1                                                                                 | - | 0.71      | 90        | 54  | 108 | A40.30.10                               |
|                           |                    |      | -                                                                                 | 1 | 0.71      |           |     |     | A40.30.01                               |
| 50                        | 100                | 22   | 1                                                                                 | 1 | 1.20      | 110       | 82  | 108 | A50.30.11                               |
| 65                        | 115                | 37   | 1                                                                                 | 1 | 1.20      | 110       | 82  | 108 | A63.30.11                               |
| 75                        | 125                | 40   | 1                                                                                 | 1 | 1.20      | 110       | 82  | 108 | A75.30.11                               |
| 96                        | 145                | 45   | 1                                                                                 | 1 | 2.04      | 148       | 102 | 124 | A95.30.11                               |
| 110                       | 160                | 55   | 1                                                                                 | 1 | 2.04      | 148       | 102 | 124 | A110.30.11                              |

## Coil voltages

| Voltage      | Voltage      |
|--------------|--------------|
| ... V - 50Hz | ... V - 60Hz |
| 24           | 24           |
| 48           | 48           |
| 110          | 110 ... 120  |
| 220 ... 230  | 230 ... 240  |
| 230 ... 240  | 240 ... 260  |
| 380 ... 400  | 400 ... 415  |
| 400 ... 415  | 415 ... 440  |

Other voltages on application

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# A 9 ... A 110 3-pole Contactors

## Main Accessories



### Auxiliary Contact Blocks

| Mounting on contactors | Positioning | Contacts | Weight kg | Order code |
|------------------------|-------------|----------|-----------|------------|
| A 9 ... A 110          | Front face  | 1 –      | 0.014     | CA 5-10    |
|                        |             | – 1      | 0.014     | CA 5-01    |
| A 9 ... A 40           | Front face  | 3 1      | 0.060     | CA 5-31 M  |
|                        |             | 2 2      | 0.060     | CA 5-22 M  |
| A 9 ... A 110          | Side        | 1 1      | 0.050     | CAL 5-11   |

### Pneumatic Timers

| Mounting on contactors | Timing range         | Contacts | Weight kg | Order code |
|------------------------|----------------------|----------|-----------|------------|
| A 9 ... A 75           | Direct 0.1 ... 40 s  | 1 1      | 0.070     | TP 40 DA   |
|                        | Direct 10 ... 180 s  | 1 1      | 0.070     | TP 180 DA  |
|                        | Inverse 0.1 ... 40 s | 1 1      | 0.070     | TP 40 IA   |
|                        | Inverse 10 ... 180 s | 1 1      | 0.070     | TP 180 IA  |

### Electronic Timers for star-delta starters (dwelling time 50 ms)

| Mounting    | Timing range | Supply voltage V | Weight kg | Order code |
|-------------|--------------|------------------|-----------|------------|
| Independent | Direct       | 24 a.c. / d.c.   | 0.080     | TE5S-24    |
|             | 0.8 ... 8 s  | 110 ... 120 a.c. | 0.080     | TE5S-120   |
|             | or           | 220 ... 240 a.c. | 0.080     | TE5S-240   |
|             | 6 ... 60 s   | 380 ... 440 a.c. | 0.080     | TE5S-440   |

### Interlocks

| Mounting on contactors | Feature            | Contacts | Weight kg | Order code |
|------------------------|--------------------|----------|-----------|------------|
| A 9 ... A 40           | Mech. / electrical | – 2      | 0.076     | VE 5-1     |
| A 50 ... A 110         |                    | – 2      | 0.146     | VE 5-2     |
| A 9 ... A 40           | Mechanical         | – –      | 0.066     | VM 5-1     |

Note: Use type VE 5-2 for mechanical and electrical interlocking between A 40 and A 50 contactors.

### Surge Suppressors

| Mounting on contactors | Feature  | Voltage range           | Weight kg | Order code |
|------------------------|----------|-------------------------|-----------|------------|
| A 9 ... A 110          | Varistor | 24 ... 50 V a.c./d.c.   | 0.015     | RV 5/50    |
|                        |          | 50 ... 133 V a.c./d.c.  | 0.015     | RV 5/133   |
|                        |          | 110 ... 250 V a.c./d.c. | 0.015     | RV 5/250   |
|                        |          | 250 ... 440 V a.c./d.c. | 0.015     | RV 5/440   |
| A 9 ... A 40           | RC       | 24 ... 50 V a.c.        | 0.012     | RC 5-1/50  |
|                        |          | 50 ... 133 V a.c.       | 0.012     | RC 5-1/133 |
|                        |          | 110 ... 250 V a.c.      | 0.012     | RC 5-1/250 |
|                        |          | 250 ... 440 V a.c.      | 0.012     | RC 5-1/440 |
| A 50 ... A 110         | RC       | 24 ... 50 V a.c.        | 0.015     | RC 5-2/50  |
|                        |          | 50 ... 133 V a.c.       | 0.015     | RC 5-2/133 |
|                        |          | 110 ... 250 V a.c.      | 0.015     | RC 5-2/250 |
|                        |          | 250 ... 440 V a.c.      | 0.015     | RC 5-2/440 |

### Other Accessories

A wide range of accessories are available:

- various auxiliary contact blocks for specific controls and use,
- interface relays,
- connecting auxiliaries: strips, connectors, additional pieces, etc.
- impulse contact blocks, lamp holder and fuse holder blocks,
- function marker.

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# A 9 ... A 110 3-pole Contactors

## Thermal O/L Relays



TA 25 DU

SB7360C2



TA 42 DU

SB7361C3



TA 75 DU

SB7367C2



TA 80 DU

SB7369C2



TA 110 DU

SB7368C4

### Thermal O/L Relays, Class 10A

| For contactors: | Setting range | Weight kg | Order code    |
|-----------------|---------------|-----------|---------------|
| A 9 ... A 30    | 0.10 ... 0.16 | 0.150     | TA 25 DU 0.16 |
|                 | 0.16 ... 0.25 | 0.150     | TA 25 DU 0.25 |
|                 | 0.25 ... 0.40 | 0.150     | TA 25 DU 0.4  |
|                 | 0.40 ... 0.63 | 0.150     | TA 25 DU 0.63 |
|                 | 0.63 ... 1.00 | 0.150     | TA 25 DU 1.0  |
|                 | 1.0 ... 1.4   | 0.150     | TA 25 DU 1.4  |
|                 | 1.3 ... 1.8   | 0.150     | TA 25 DU 1.8  |
|                 | 1.7 ... 2.4   | 0.150     | TA 25 DU 2.4  |
|                 | 2.2 ... 3.1   | 0.150     | TA 25 DU 3.1  |
|                 | 2.8 ... 4.0   | 0.150     | TA 25 DU 4.0  |
|                 | 3.5 ... 5.0   | 0.150     | TA 25 DU 5.0  |
|                 | 4.5 ... 6.5   | 0.150     | TA 25 DU 6.5  |
|                 | 6.0 ... 8.5   | 0.150     | TA 25 DU 8.5  |
|                 | 7.5 ... 11    | 0.150     | TA 25 DU 11   |
|                 | 10 ... 14     | 0.150     | TA 25 DU 14   |
|                 | 13 ... 19     | 0.150     | TA 25 DU 19   |
| A 30 ... A 40   | 18 ... 25     | 0.150     | TA 25 DU 25   |
|                 | 24 ... 32     | 0.170     | TA 25 DU 32   |
|                 | 18 ... 25     | 0.330     | TA 42 DU 25   |
|                 | 22 ... 32     | 0.330     | TA 42 DU 32   |
| A 50 ... A 75   | 29 ... 42     | 0.330     | TA 42 DU 42   |
|                 | 18 ... 25     | 0.330     | TA 75 DU 25   |
|                 | 22 ... 32     | 0.330     | TA 75 DU 32   |
|                 | 29 ... 42     | 0.330     | TA 75 DU 42   |
|                 | 36 ... 52     | 0.330     | TA 75 DU 52   |
| A 95 ... A 110  | 45 ... 63     | 0.330     | TA 75 DU 63   |
|                 | 60 ... 80     | 0.330     | TA 75 DU 80   |
|                 | 29 ... 42     | 0.360     | TA 80 DU 42   |
|                 | 36 ... 52     | 0.360     | TA 80 DU 52   |
|                 | 45 ... 63     | 0.360     | TA 80 DU 63   |
|                 | 60 ... 80     | 0.360     | TA 80 DU 80   |
|                 | 65 ... 90     | 0.750     | TA 110 DU 90  |
|                 | 80 ... 110    | 0.750     | TA 110 DU 110 |

### Separate Mounting Kit

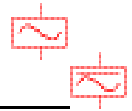
| For O/L relays:              | Weight kg | Order code |
|------------------------------|-----------|------------|
| TA 25 DU £ 25                | 0.050     | DB 25/25 A |
| TA 25 DU 32                  | 0.075     | DB 25/32 A |
| TA 42 DU, TA 75 DU, TA 80 DU | 0.170     | DB 80      |
| TA 110 DU                    | 0.230     | DB 200     |

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# A 145 ... AF 750 3-pole Contactors

a.c. Operated - A 145 ... A 300 Contactors

a.c. / d.c. Operated - AF 400 ... AF 750 Contactors



## Application

A 145 ... AF 750 contactors are mainly used for controlling 3-phase motors and generally for controlling power circuits up to 690 V a.c. or 220 V d.c. / 600 V d.c. The contactors can also be used for many other applications such as isolation, bypass, capacitor switching, lighting...

## Description

The **A 145 ... AF 750** 3-pole contactors are of the block type design.

- Main poles and auxiliary contact blocks
  - 3 main poles,
  - 1 N.O. and 1 N.C. auxiliary contact block (fitted on the left side).

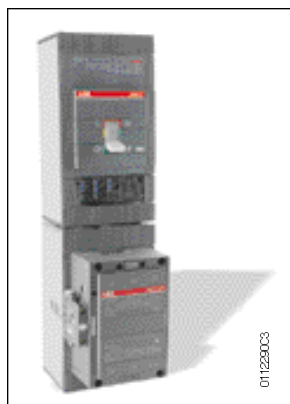
A maximum of 4 auxiliary contact blocks can be fitted on each contactor.
- Control circuit:
  - A 145 ... A 300** contactors: a.c. operated with laminated magnet circuit,
  - AF 400 ... AF 750** contactors: a.c. operated, large voltage range, with electronic coil interface, with laminated magnet circuit.

Contactors AF 400 ... AF 750 are fitted as standard with an electronic coil interface which accepts a wide control voltage range for a.c. 50/60 Hz supply or d.c. supply.

- Accessories: a wide range of accessories is available.

## Variants next pages in this section

- a.c./d.c. operated, large voltage range, with electronic coil interface: AF 145 ... AF 300 contactors.



A145 ... A300 contactors main terminals in line with Isomax circuit breakers.

Main terminals.  
Screws and nut insert holders are included.

Screw fixing, top and bottom.  
(Screws supplied).

Terminal shrouds for protection can easily be fitted from the front.

Location of surge suppressors on  
A 145 ... A 300 contactors.  
(built-in on AF 400 ... AF 750 contactors).

Quick release quarter turn screws for  
easy access to contact inspection.

Terminal markings according to  
IEC 60947-4-1, EN 50005, EN 50012  
and NEMA standards.

Easy access to the coil terminals.  
Clear marking of coil voltages and  
frequencies.

Front access to the coil, no need to  
remove power cables when changing coil.

On-Off position indicator.

Location of function marker.

Location of side-mounted mechanical  
interlock (on right or left hand side).

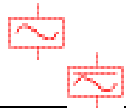
CAL 5-11 side mounted auxiliary contact  
block.  
Easy access to the terminals.

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# A 145 ... AF 750 3-pole Contactors

a.c. Operated - A 145 ... A 300 Contactors

a.c. / d.c. Operated - AF 400 ... AF 750 Contactors



A 145-30-11

SB00302



A 300-30-11

SB04703



AF 460-30-11

SB01703



AF 750-30-11

SB01703

| Rated operational current |                    | Auxiliary contacts fitted |   | Footprint |     |     | Weight kg | Order code                              |
|---------------------------|--------------------|---------------------------|---|-----------|-----|-----|-----------|-----------------------------------------|
| AC-3<br>400 V<br>A        | AC-1<br>40 °C<br>A |                           |   | H         | W   | D   |           | state coil voltage<br>(see table below) |
| 145                       | 250                | 1                         | 1 | 196       | 112 | 160 | 3.500     | A 145-30-11                             |
| 185                       | 275                | 1                         | 1 | 196       | 112 | 160 | 3.500     | A 185-30-11                             |
| 210                       | 350                | 1                         | 1 | 227       | 140 | 181 | 6.100     | A 210-30-11                             |
| 260                       | 400                | 1                         | 1 | 227       | 140 | 181 | 6.100     | A 260-30-11                             |
| 305                       | 500                | 1                         | 1 | 227       | 140 | 181 | 6.100     | A 300-30-11                             |
| 400                       | 600                | 1                         | 1 | 278       | 186 | 216 | 12.00     | AF 400-30-11                            |
| 460                       | 700                | 1                         | 1 | 278       | 186 | 216 | 12.00     | AF 460-30-11                            |
| 580                       | 800                | 1                         | 1 | 283       | 210 | 242 | 15.00     | AF 580-30-11                            |
| 750                       | 1050               | 1                         | 1 | 283       | 210 | 242 | 15.00     | AF 750-30-11                            |

## Coil voltages

| Voltage<br>V - 50Hz | Voltage<br>V - 60Hz |
|---------------------|---------------------|
| 24                  | 24                  |
| 48                  | 48                  |
| 110                 | 110 ... 120         |
| 220 ... 230         | 230 ... 240         |
| 230 ... 240         | 240 ... 260         |
| 380 ... 400         | 400 ... 415         |
| 400 ... 415         | 415 ... 440         |

Other voltages on application

## Coil voltages: AF 400 ...AF 750

| Voltage<br>V - 50/60Hz | Voltage<br>V d.c. |
|------------------------|-------------------|
| -                      | 24 ... 60         |
| 48 ... 130             | 48 ... 130        |
| 100 ... 250            | 100 ... 250       |

<sup>(1)</sup> The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.  
AF... contactors with electronic coil interface: electromagnetic compatibility and A or B environment definitions + page ????

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# A 145 ... AF 750 3-pole Contactors

## Main accessories



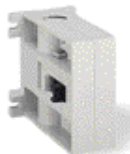
CAL 5-11

SB7375C2



TE5S-240

SB7558C2



VM 300H

SB6041C1



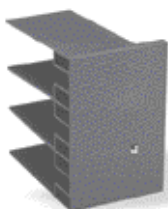
RC...

SB6060C2



LT...-AC

1SFT9009-010C3



LT...-AL

1SFT9009-125

### Auxiliary Contact Blocks

| Mounting on contactors | Positioning | Contacts | Weight kg | Order Code |
|------------------------|-------------|----------|-----------|------------|
| A 145 to               | Side        | 1 1      | 0.050     | CAL 5-11   |
| AF 750                 |             | 1 1      | 0.050     | CAL 5-11B  |

### Electronic Timers for star-delta starters (dwelling time 50 ms) - (Prohibited with AF... contactors)

| Mounting    | Timing range | Supply voltage V | Weight kg | Order Code |
|-------------|--------------|------------------|-----------|------------|
| Independent | Direct       | 24 a.c. / d.c.   | 0.080     | TE5S-24    |
|             | 0.8 ... 8 s  | 110 ... 120 a.c. | 0.080     | TE5S-120   |
|             | or           | 220 ... 240 a.c. | 0.080     | TE5S-240   |
|             | 6 ... 60 s   | 380 ... 440 a.c. | 0.080     | TE5S-440   |

### Interlocks for two horizontal mounted contactors

| Left contactor | Right contactor | Feature    | Weight kg | Order Code  |
|----------------|-----------------|------------|-----------|-------------|
| A 95 ... 300   | A 145 ... 300   | Mechanical | 0.150     | VM 300H     |
| A 210 ... 300  | AF 400 ... 460  | Mechanical | 0.150     | VM 300/460H |
| AF 400 ... 750 | AF 400 ... 460  | Mechanical | 0.200     | VM 750H     |

### Surge Suppressors

| Mounting on contactors | Feature | Voltage range      | Weight kg | Order Code |
|------------------------|---------|--------------------|-----------|------------|
| A 145 ... 300          | RC      | 24 ... 50 V a.c.   | 0.015     | RC 5-2/50  |
|                        |         | 50 ... 133 V a.c.  | 0.015     | RC 5-2/133 |
|                        |         | 110 ... 250 V a.c. | 0.015     | RC 5-2/250 |
|                        |         | 250 ... 440 V a.c. | 0.015     | RC 5-2/440 |

Note: The built-in coil interface eliminates the need of extra surge suppressors on the AF 400 to AF 750 contactors.

### Shrouds (terminal protection acc. to VDE 0106, part 100) (pack of 2)

| Mounting on contactors | Suitable for contactor with | Weight kg 1 piece | Order Code |
|------------------------|-----------------------------|-------------------|------------|
| A 145, A 185           | Cable connectors            | 0.100             | LT 185-AC  |
| A 145, A 185           | Cable lugs                  | 0.100             | LT 185-AL  |
| A 210 ... A 300        | Cable connectors            | 0.100             | LT 300-AC  |
| A 210 ... A 300        | Cable lugs                  | 0.100             | LT 300-AL  |
| AF 400, AF 460         | Cable connectors            | 0.150             | LT 460-AC  |
| AF 400, AF 460         | Cable lugs                  | 0.800             | LT 460-AL  |
| AF 580, AF 750         | Cable connectors            | 0.150             | LT 750-AC  |
| AF 580, AF 750         | Cable lugs                  | 0.850             | LT 750-AL  |

### Other Accessories

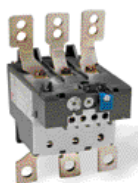
A wide range of accessories are available:

- LZ... connectors,
- LW... enlargement pieces for terminals,
- connecting auxiliaries: shorting bars, connection bars, additional pieces, etc.
- shrouds for shorting bars,
- interlocks for two vertical contactors,
- adapter plates.

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# A 145 ... AF 750 3-pole Contactors

## Thermal & Electronic O/L Relays



TA 200 DU

1SFT91193-006C3



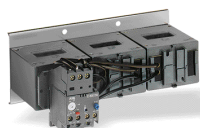
TA 450 DU

5B6046C3



E 320 DU

5B8175C3



E 800 DU

5B8175C4



A 185 contactor with  
E 200 DU electronic O/L relay and  
LT 200 E terminal shroud

0153301111C3

### Thermal O/L Relays, Class 10A

| For<br>contactors: | Setting range<br>A                     | Weight<br>kg | Order code    |
|--------------------|----------------------------------------|--------------|---------------|
| A 145, A 185       | 66 ... 90                              | 0.750        | TA 200 DU 90  |
|                    | 80 ... 110                             | 0.750        | TA 200 DU 110 |
|                    | 100 ... 135                            | 0.750        | TA 200 DU 135 |
|                    | 110 ... 150                            | 0.750        | TA 200 DU 150 |
|                    | 130 ... 175                            | 0.750        | TA 200 DU 175 |
|                    | 150 ... 200                            | 0.750        | TA 200 DU 200 |
| A 210 ... A 300    | 130 ... 185                            | 1.500        | TA 450 DU 185 |
|                    | 165 ... 235                            | 1.500        | TA 450 DU 235 |
|                    | 220 ... 310                            | 1.500        | TA 450 DU 310 |
| AF400...AF750      | Please consult us for thermal solution |              |               |

### Electronic O/L Relays, Adjustable Class 10, 20 and 30

| For<br>contactors: | Setting range<br>A | Weight<br>kg | Order code |
|--------------------|--------------------|--------------|------------|
| A 145, A 185       | 60 ... 200         | 1.120        | E 200 DU   |
| A 210 ... A 300    | 100 ... 320        | 1.260        | E 320 DU   |
| AF 400, AF 460     | 150 ... 500        | 1.210        | E 500 DU   |
| AF 580, AF 750     | 250 ... 800        | 4.240        | E 800 DU   |

### Kit for Mounting on the Contactors

| For<br>contactors: | For O/L relays: | Weight<br>kg | Order code      |
|--------------------|-----------------|--------------|-----------------|
| A 145, A 185       | TA 450 DU/SU    | 0.500        | DT 450/A 185    |
| A 210 ... A 300    |                 | 0.750        | DT 450/A 300    |
| AF 400, AF 460     | E 500 DU        | 0.720        | DT 500/AF 460 S |
| AF 580, AF 750     | E 800 DU        | 1.400        | DT 800/AF 750 S |

### Separate Mounting Kit

| For O/L relay: | Weight<br>kg | Order code |
|----------------|--------------|------------|
| TA 200 DU      | 0.230        | DB 200     |

### Terminal Shrouds for TA 200 DU Thermal O/L Relay

| Fitting                            | Weight<br>kg | Order code |
|------------------------------------|--------------|------------|
| Load side                          | 0.070        | LT 200/A   |
| Between TA 200 DU and A 145, A 185 | 0.050        | LT 185-AY  |

### Terminal Shrouds for Electronic O/L Relay

| For electronic<br>O/L relay | Weight<br>kg | Order code |
|-----------------------------|--------------|------------|
| E 200 DU                    | 0.120        | LT 200 E   |
| E 320 DU                    | 0.120        | LT 320 E   |
| E 500 DU                    | 0.240        | LT 500 E   |
| E 800 DU                    | 0.240        | LT 800 E   |

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# AF 50 ... AF 750 3-pole Contactors

a.c. / d.c. Operated - Large Voltage Range

Electronic Coil Interface



## Application

AF 50 ... AF 750 contactors are mainly used for controlling 3-phase motors and generally for controlling power circuits up to 690 V a.c. or 220 V d.c. / 600 V d.c. The contactors can also be used for many other applications such as bypass, capacitor switching, lighting, d.c. power circuits...

The AF... contactors are fitted with an electronic coil interface which accepts a wide control voltage range, on a.c. 50/60 Hz or d.c. supplies. The same contactor can accept various supply voltages according to different countries where the final machine will be used or some fluctuation in the control voltage due to the local supply or network.

The AF... contactors are also fully suitable for operation in a.c. or d.c. control circuit liable to voltage interruptions or voltage dip risks.

## Description

The AF 50 ... AF 750 3-pole contactors are of the block type design.

- Main poles and auxiliary contact blocks
  - 3 main poles,
  - AF50 ... AF110 front and side mounted add on auxiliary contact blocks
  - AF145 ... AF750 1 N.O. and 1 N.C. auxiliary contact block (fitted on the left side).A maximum of 4 auxiliary contact blocks can be fitted on each contactor.

### • Electronic control:

The contactors are fitted with an electronic interface that very precisely controls the voltage to the coil. The electronic control circuit always works using d.c. current through the coil and in a.c. operation the current is rectified before being applied to the coil. To achieve the levels of the currents required for making and holding respectively, the voltage is pulsed across the coil with the aid of a transistor. The pulsing also implies that the current in the coil can be optimally regulated all the time relatively independently of the voltage level. The function is controlled by a specific integrated circuit developed by ABB.

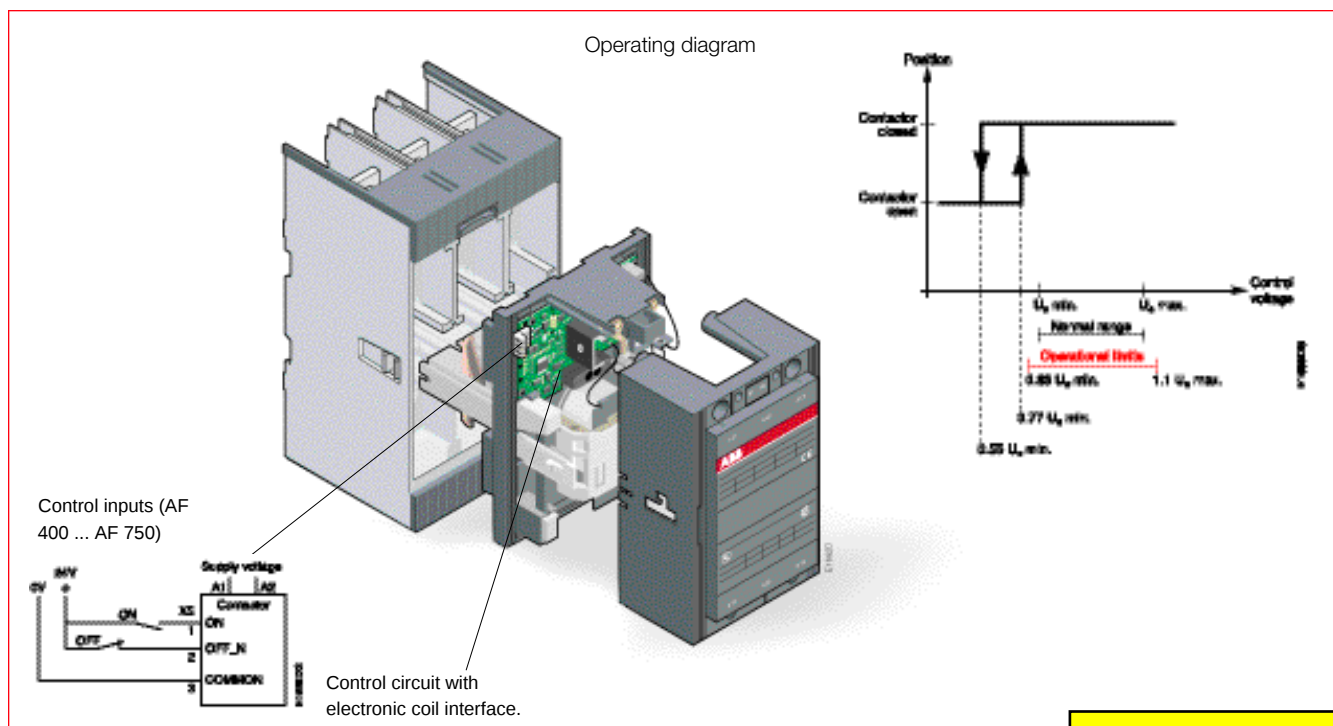
### • Advantages

- Wide voltage range, e.g. 100 ... 250 V a.c. and d.c.,
- Can manage large voltage variations,
- Reduced power consumption,
- Very distinct closing and opening,
- Noise free,
- Can withstand voltage interruptions or voltage dips in the control supply (< 20 ms).

### • Control inputs

The large sizes AF 400 ... AF 750 are as standard equipped with low voltage inputs for control, for example by a PLC (+ see drawing below).

- Accessories: a wide range of accessories is available.



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# AF 50 ... AF 750 3-pole Contactors

a.c. / d.c. Operated - Large Voltage Range

Electronic Coil Interface



AF 50-30-11

5B865003



AF 95-30-11

5B865103



AF 460-30-11

5B817003



AF 750-30-11

5B817103

| Rated operational current |                        | Auxiliary contacts fitted |   | Footprint |     |     | Weight kg | Order Code         |
|---------------------------|------------------------|---------------------------|---|-----------|-----|-----|-----------|--------------------|
| AC-3<br>400 V<br>A        | AC-1<br>q £ 40 °C<br>A |                           |   | H         | W   | D   |           |                    |
|                           |                        |                           |   |           |     |     |           | state coil voltage |
| 50                        | 100                    | 1                         | 1 | 110       | 82  | 108 | 1.220     | AF 50-30-11        |
| 65                        | 115                    | 1                         | 1 | 110       | 82  | 108 | 1.220     | AF 63-30-11        |
| 75                        | 125                    | 1                         | 1 | 110       | 82  | 108 | 1.220     | AF 75-30-11        |
| 96                        | 145                    | 1                         | 1 | 148       | 102 | 124 | 2.070     | AF 95-30-11        |
| 110                       | 160                    | 1                         | 1 | 148       | 102 | 124 | 2.070     | AF 110-30-11       |
| 145                       | 250                    | 1                         | 1 | 196       | 112 | 160 | 3.600     | AF 145-30-11       |
| 185                       | 275                    | 1                         | 1 | 196       | 112 | 160 | 3.600     | AF 185-30-11       |
| 210                       | 350                    | 1                         | 1 | 227       | 140 | 181 | 6.200     | AF 210-30-11       |
| 260                       | 400                    | 1                         | 1 | 227       | 140 | 181 | 6.200     | AF 260-30-11       |
| 305                       | 500                    | 1                         | 1 | 227       | 140 | 181 | 6.200     | AF 300-30-11       |
| 400                       | 600                    | 1                         | 1 | 278       | 186 | 216 | 12.00     | AF 400-30-11       |
| 460                       | 700                    | 1                         | 1 | 278       | 186 | 216 | 12.00     | AF 460-30-11       |
| 580                       | 800                    | 1                         | 1 | 283       | 210 | 242 | 15.00     | AF 580-30-11       |
| 750                       | 1050                   | 1                         | 1 | 283       | 210 | 242 | 15.00     | AF 750-30-11       |

## Coil voltages: AF 50 ... AF 300

| Voltage<br>V - 50/60Hz | Voltage<br>V d.c. |
|------------------------|-------------------|
| —                      | 20 ... 60         |
| 48 ... 130             | 48 ... 130        |
| 100 ... 250            | 100 ... 250       |

(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.

## Coil voltages: AF 400 ... AF 750

| Voltage<br>V - 50Hz | Voltage<br>V d.c. |
|---------------------|-------------------|
| —                   | 24 ... 60         |
| 48 ... 130          | 48 ... 130        |
| 100 ... 250         | 100 ... 250       |

(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.

## Electromagnetic compatibility:

AF... contactors comply with international standards IEC 60947-1 (2000-10-Ed.3.1), 60947-4-1 (2000-11-Ed.2) and European standards EN 60947-1, 60947-4-1.

Notice: This product has been designed for environment A. Use of this product in environment B may cause unwanted electromagnetic disturbances in which case the user may be required to take adequate mitigation measures.

## Definitions:

Environment A: "Mainly relates to low-voltage non public or industrial networks/locations/installations (+ EN 50082-2 article 4) including highly disturbing sources".

Environment B: "Mainly relates to low-voltage public networks (+ EN 50082-1 article 5) such as residential, commercial and light industrial locations/installations. Highly disturbing sources such as arc welders are not covered by this environment".

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# AE 3-pole Contactors

d.c. Operated with Double - Winding coil



## Application

AE9 ... AE 40 contactors are mainly used for controlling 3-phase motors and generally for controlling power circuits up to 690 V a.c. or 220 V d.c. / 440 V d.c.

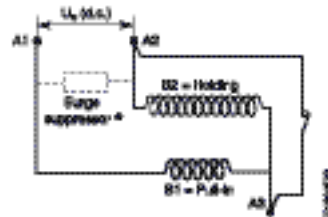
## Description

The AE... series 3-pole contactors are d.c. operated contactors.

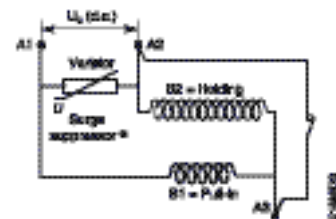
- Main poles and auxiliary contact blocks
  - 3 main poles,
  - front and side mounted add-on auxiliary contact blocks.
- auxiliary contacts for safety circuits page x/xx
- Control circuit: laminated magnet circuit and double-winding coil fed from d.c. supply via an insertion contact mounted on the device
  - AE9 ... AE40: built-in lagging contact for insertion of the second winding
- Accessories: a wide range of accessories are available

AE... contactors specific design

- AE 9 ... AE 40: Built-in lagging contact for insertion of the "holding" winding



\* Addition of RT 5 or RV 5 surge suppressor, if required.  
Please order separately



\* RV 5 surge suppressor fitted as standard (RT 5 type on request).

Coil voltages:  
AE...

Voltage -  $U_c$

V d.c.

12

24

42

48

50

60

75

110

125

220

240

250

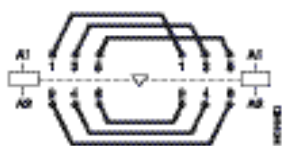
| Rated operational current |           | Auxiliary contacts fitted |   | Footprint |    |     | Order Code         |
|---------------------------|-----------|---------------------------|---|-----------|----|-----|--------------------|
|                           |           |                           |   | H         | W  | D   |                    |
| AC-3                      | AC-1      |                           |   |           |    |     | state coil voltage |
| 400 V                     | q £ 40 °C |                           |   |           |    |     |                    |
| A                         | A         |                           |   |           |    |     |                    |
| 9                         | 25        | -                         | - | 74        | 44 | 74  | AE 9-30-00         |
| 12                        | 27        | -                         | - | 74        | 44 | 74  | AE 12-30-00        |
| 16                        | 30        | -                         | - | 74        | 44 | 74  | AE 16-30-00        |
| 26                        | 45        | -                         | - | 90        | 54 | 94  | AE 26-30-00        |
| 32                        | 55        | -                         | - | 90        | 54 | 108 | AE 30-30-00        |
| 37                        | 60        | -                         | - | 90        | 54 | 108 | AE 40-30-00        |

For d.c. operation with solid magnetic circuit please consult us.

For accessories see main accessories A9 - A110 page x/xx

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# Connection Sets



BEM... connections



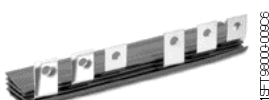
BEM 75-30



BEM 300-30



BES... for 3-pole connections



BES...

## Connections for Reversing Contactors

### Application

Connections between the main poles of two 3-pole contactors mounted side by side so that they operate as reversing contactors.

### Description

The sets are made up of three upstream connections and three downstream connections.

- BEM 16-30 – Insulated, solid, rigid copper wires
- BEM 26-30, BEM 40-30 – Insulated, stranded, rigid copper wires
- BEM 75-30 ... BEM 750-30 – Insulated, solid copper bars
- BSM 16-30, BSM 25-30 BC and BSM 30-30 BC – Insulated, solid, rigid copper wires

On the A... contactors, the power supply by bars or cables equipped with lugs is directly connected to the terminal pads of the main poles. For flange connectors (+ page ???), LX... terminal extension pieces should be used (+ page ???).

| Mounting on 3-pole contactors | Weight<br>kg<br>1 set | Order code   |
|-------------------------------|-----------------------|--------------|
| A 9 ... A 16                  | 0.025                 | BEM 16-30    |
| A 26                          | 0.056                 | BEM 26-30    |
| A 30, A 40                    | 0.096                 | BEM 40-30    |
| A 50 ... A 75                 | 0.243                 | BEM 75-30    |
| A 95, A 110                   | 0.450                 | BEM 110-30   |
| A 145, A 185                  | 0.900                 | BEM 185-30   |
| A 210 ... A 300               | 1.100                 | BEM 300-30   |
| AF 400, AF 460                | 4.400                 | BEM 460-30   |
| AF 580, AF 750                | 7.300                 | BEM 750-30   |
| BC 9, BC 16                   | 0.015                 | BSM 16-30    |
| BC 25                         | 0.020                 | BSM 25-30 BC |
| BC 30                         | 0.025                 | BSM 30-30 BC |

Note: The connections provided for the A... contactors can be used for the AF, AE and TAE types.  
The connections provided for the BC... contactors can be used for the TBC types.

## 3-pole Connections Phase to Phase

### Application

Connections between the main poles of two 3-pole contactors horizontal mounted.

### Description

This set is made up of three downstream or upstream connections.

| Mounting on 3-pole contactors | Weight<br>kg<br>1 set | Order code |
|-------------------------------|-----------------------|------------|
| A 50 ... A 75                 | 0.130                 | BES 75-30  |
| A 95, A 110                   | 0.250                 | BES 110    |
| A 145, A 185                  | 0.500                 | BES 185    |
| A 210 ... A 300               | 1.000                 | BES 300    |
| AF 400, AF 460                | 2.200                 | BES 460    |
| AF 580, AF 750                | 3.700                 | BES 750    |

Note: The connections provided for the A... contactors can be used for the AF, AE and TAE types.

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## BED... Connection Sets

### Connections for Star-Delta Starters

#### Application

Connections between the main poles of a star-delta starter.

#### Description

These sets are made up of:

- Three line contactor / delta contactor connections - Upstream side.
- Three connections for star and delta contactors mounting joined side by side - Downstream side.
- The necessary elements to create the star point upstream of the star contactor.

BED 16, BED 26

– Insulated, solid copper wires.

BED 40

– Insulated, stranded solid copper wires.

BED 50, BED 75

– Solid copper bars and insulated stranded copper wires.

BED 95 ... BED 750

– Insulated, solid copper bars.

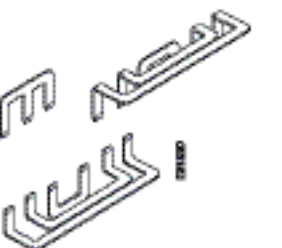
BED kits are designed to accommodate mechanical interlock



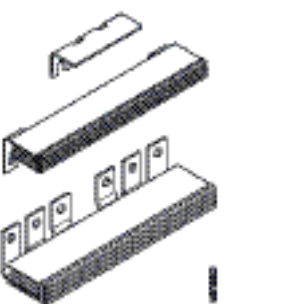
BED 40



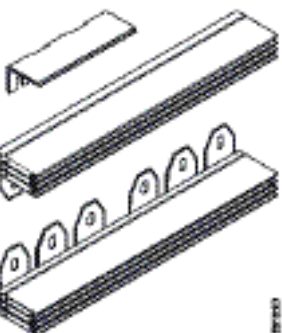
BED 75-1



BED 110



BED 185



BED 400

| For contactors<br>Line and Delta | Star            | Weight<br>kg | Order code |
|----------------------------------|-----------------|--------------|------------|
| A 9                              | A 9             | 0.040        | BED 16     |
| A 12                             | A 9             |              |            |
| A 16                             | A 12            |              |            |
| A 26                             | A 16            | 0.045        | BED 26     |
| A 30                             | A 26            | 0.070        | BED 40     |
| A 40                             | A 26            |              |            |
| A 50                             | A 30            |              |            |
| A 63                             | A 40            | 0.180        | BED 50     |
| A 75                             | A 50            | 0.180        | BED 75     |
| A 95                             | A 75            | 0.400        | BED 95     |
| A 110                            | A 95            | 0.500        | BED 110    |
| A 145                            | A 110           | 1.300        | BED 145 A  |
| A 185                            | A 145           | 1.100        | BED 185    |
| A 210                            | A 185           | 1.500        | BED 210    |
| A 260, A 300                     | A 210, A 260    | 2.100        | BED 300    |
| AF 400 / AF 460                  | A 260 / A 300   | 3.500        | BED 400    |
| AF 460                           | AF 400          | 4.700        | BED 460    |
| AF 580                           | AF 460 / AF 400 | 6.300        | BED 580    |
| AF 750                           | AF 580          | 7.700        | BED 750    |

Note: The connections provided for A... contactors can be used for the AF, AE, and TAE types.

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# Star-Delta Starting of Three-Phase Asynchronous Motors

## Controlgear Selection Guide

Ambient temperature = 55 °C.

Please consult us for type 1&2 coordinates combinations

| Motor power, kW |       |               |       |       |               | Max. starting<br>time from<br>cold (3) | Contactors |             |              | O/L Relay<br>(1) | Timer | Set of power<br>connections |     |
|-----------------|-------|---------------|-------|-------|---------------|----------------------------------------|------------|-------------|--------------|------------------|-------|-----------------------------|-----|
| 220-<br>230 V   | 240 V | 380-<br>400 V | 415 V | 500 V | 660-<br>690 V |                                        | seconds    | KM1<br>Main | KM3<br>Delta |                  |       |                             |     |
| 4               | 4     | 7.5           | 7.5   | 5.5   | 5.5           | 15                                     | A 9        | A 9         | A 9          | TA 25 DU         | TE5S  | BED 16                      | (4) |
| 5.5             | 5.5   | 11            | 11    | 7.5   | 7.5           | 15                                     | A 12       | A 12        | A 9          | TA 25 DU         | TE5S  | BED 16                      | (4) |
| 9               | 11    | 15            | 15    | 15    | 11            | 15                                     | A 16       | A 16        | A 12         | TA 25 DU         | TE5S  | BED 16                      | (4) |
| 12.5            | 12.5  | 22            | 22    | 22    | 15            | 15                                     | A 26       | A 26        | A 16         | TA 25 DU         | TE5S  | BED 26                      | (4) |
| 15              | 15    | 25            | 25    | 25    | 18.5          | 15                                     | A 30       | A 30        | A 26         | TA 25 DU         | TE5S  | BED 40                      | (4) |
| 18.5            | 22    | 37            | 37    | 37    | 37            | 30                                     | A 40       | A 40        | A 26         | TA 42 DU         | TE5S  | BED 40                      | (4) |
| 25              | 25    | 45            | 45    | 45    | 45            | 30                                     | A 50       | A 50        | A 30         | TA 75 DU         | TE5S  | BED 50                      | (4) |
| 30              | 33    | 55            | 55    | 63    | 59            | 30                                     | A 63       | A 63        | A 40         | TA 75 DU         | TE5S  | BED 50                      | (4) |
| 37              | 40    | 63            | 70    | 75    | 63            | 30                                     | A 75       | A 75        | A 50         | TA 75 DU         | TE5S  | BED 75                      | (4) |
| 45              | 45    | 75            | 75    | 90    | 90            | 20                                     | A 95       | A 95        | A 75         | TA 110 DU        | TE5S  | BED 95                      | (5) |
| 55              | 59    | 90            | 100   | 110   | 132           | 20                                     | A 110      | A 110       | A 95         | TA 110 DU        | TE5S  | BED 110                     | (5) |
| 75              | 75    | 132           | 132   | 160   | 160           | 20                                     | A 145      | A 145       | A 110        | TA 200 DU        | TE5S  | BED 145                     | (5) |
| 90              | 90    | 160           | 160   | 200   | 250           | 20                                     | A 185      | A 185       | A 145        | TA 200 DU        | TE5S  | BED 185                     | (5) |
| 110             | 110   | 200           | 200   | 250   | 315           | 20                                     | A 210      | A 210       | A 185        | TA 450 DU        | TE5S  | BED 210                     | (5) |
| 140             | 140   | 220           | 250   | 295   | 355           | 20                                     | A 260      | A 260       | A 210        | TA 450 DU        | TE5S  | BED 300                     | (5) |
| 160             | 160   | 250           | 250   | 355   | 450           | 20                                     | A 300      | A 300       | A 260        | TA 450 DU        | TE5S  | BED 300                     | (5) |
| 180             | 200   | 355           | 355   | 450   | 560           | 20                                     | AF 400     | AF 400      | A 260        | E 500 DU         | (2)   | BED 400                     | (5) |
| 250             | 250   | 450           | 475   | 560   | 670           | 20                                     | AF 460     | AF 460      | A 300        | E 500 DU         | (2)   | BED 400                     | (5) |
| 315             | 315   | 560           | 600   | 700   | 750           | 20                                     | AF 580     | AF 580      | AF 400       | E 800 DU         | (2)   | BED 580                     | (5) |
| 400             | 400   | 670           | 670   | 750   | 900           | 20                                     | AF 750     | AF 750      | AF 460       | E 800 DU         | (2)   | BED 580                     | (5) |

(1) The setting current value is: nominal motor current x 0.58.

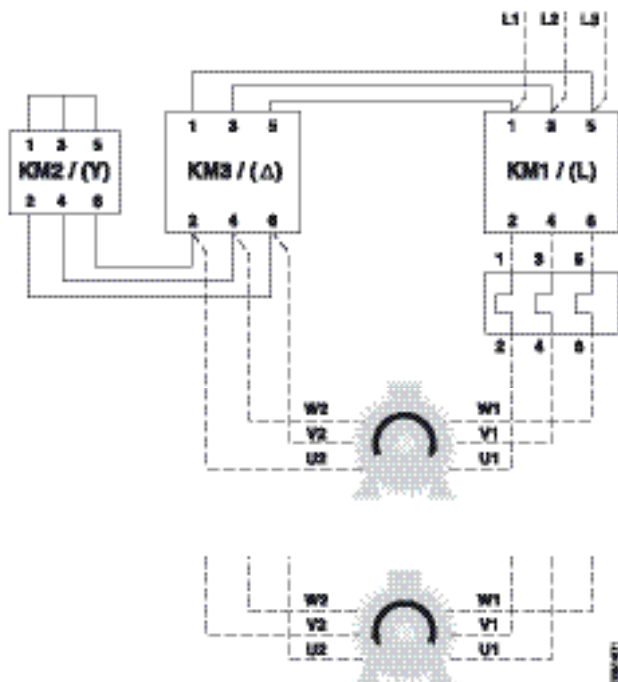
(2) Contactor Relay type N + TP timer can be used as the AF contactors have a slight delay in closing.

(3) Usual time value = 6 ... 10 s.

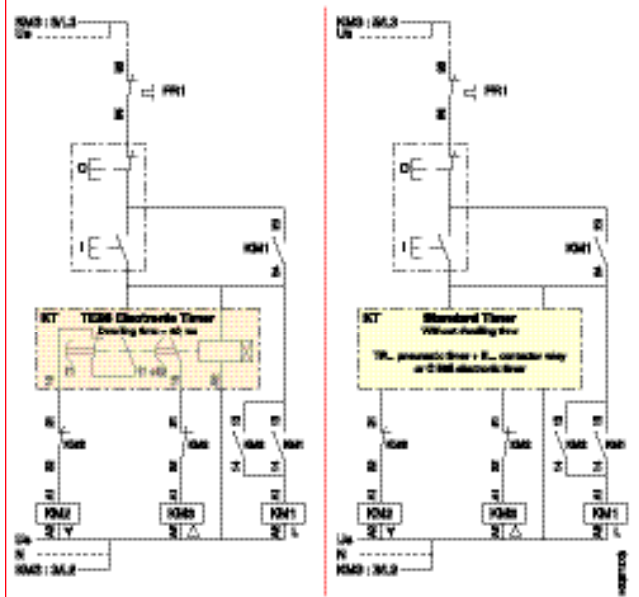
(4) Version without space for mechanical interlock.

(5) Version with space for mechanical interlock.

**Power circuit diagram**  
A 9 ... AF 750 Contactors



**Control circuit diagrams - Remote control**  
A 9 ... A 300 Contactors      AF 400 ... AF 750 Contactors



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# Star-Delta Starting of Three-Phase Asynchronous Motors

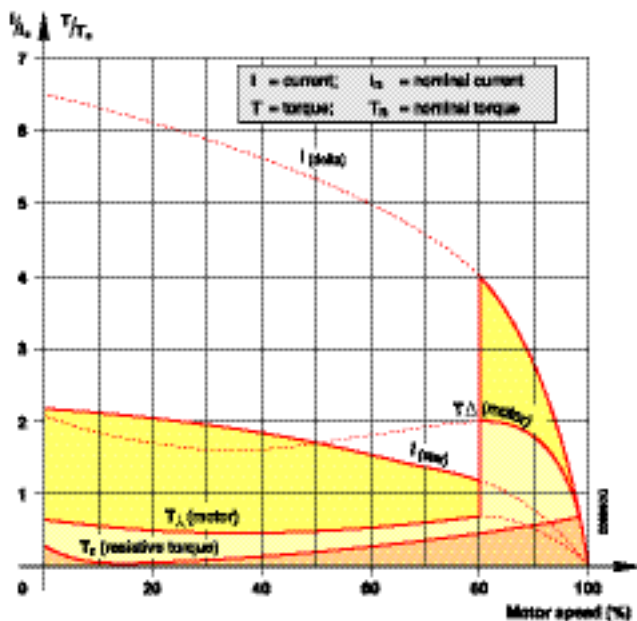
## General

When starting, the motor has to overcome the load torque and inertia of the driven machine. During this phase, current must remain within the limits acceptable by the mains.

Inertia, load torque and mains are commonly fixed data.

Although the type of starting reduces the inrush current as required, it also reduces the torque supplied by the motor. The result is a starting time that varies according to the starting process used.

## Star-delta starting



### Technical Data

When starting:

- inrush current is reduced to a third of direct starting current,
- motor torque is reduced to a third or even less of direct starting torque.

Transient currents are commonly read during star-delta switching.

### Utilization

During the initial starting phase ("star" connection), the resistive torque of the driven machine must remain, irrespective of speed, less than the "star" motor torque until "star-delta" switching occurs.

This starting mode is therefore ideal for machines with no-load starting:

- machine-tools,
- centrifugal compressors,
- wood working machines, etc.

**In order to prevent a high current peak, at least 80 - 85 % of nominal speed must be reached before switching from star to delta.**

### Precautions

Motor nominal voltage in delta connection must be equal to that of the mains.

Example:

A motor for 400 V star-delta starting must be designed for 400 V in "delta" connection. Its usual designation is "400 V / 690 V motor". The motor must be constructed with 6 terminal windings.

## Sequence

Starting is a three-stage process:

### 1st stage - "Star" connection

Press the "On" button on the control circuit to close the KM2 "star" contactor. The KM1 "line" contactor then closes and the motor starts. Countdown of programmed starting time (normally 6 to 10 s) then begins.

### 2nd stage - "Star" to "Delta" switching

When the programmed starting time is over, the KM2 "star" contactor opens.

### 3rd stage - "Delta" connection

A transition time (or dwelling time) of 50 ms is fixed between opening of the "star" contactor and closing of the "delta" contactor by the use of TE5S timer. This prevents short circuit between "star" and "delta".

Note: When AF... contactor types are used as delta and star contactors or an A... contactor as star contactor with an AF... contactor as delta contactor, the use of a timer including a dwelling time (or transition time) e.g. TE5S or similar is not necessary. A timer set for the starting duration in star connection is enough. An electrical interlock between star and delta is mandatory such as VE 5 or through auxiliary contacts.

Furthermore, in open transition, the current interruption may reach up to 95 ms: it shall be checked that this duration is compatible with the application i.e. mainly if the decreasing in rotation speed is acceptable during the starting phase.

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# Connection Bars for Contactor and MCCB

## Connection Bars for Contactor and Switch fuse

### Application

Connections between contactors/starters and moulded case circuit breakers or switch fuses.

### Description

These connection sets are solid copper bars either isolated or protected by shrouds.

#### Connection bars between contactor and MCCB

##### Vertical assembly

| Contactors        | MCCB     | Weight<br>kg | Order code    |
|-------------------|----------|--------------|---------------|
| A 145, A 185      | T 3      | 0.150        | BEA 185/T3    |
| A 145, A 185      | S 3, S 4 | 0.150        | BEA 185/S3/S4 |
| A 210             | S 4      | 0.160        | BEA 210/S4    |
| A 210 ... A 300   | S 5      | 0.200        | BEA 300/S5    |
| AF 400, AF 460    | S 5      | 0.250        | BEA 400/S5    |
| AF 400 ... AF 750 | S 6      | 0.410        | BEA 750/S6    |

##### Vertical assembly with control wire terminals (Also suitable when using busbar kits for starter combinations)

|                   |          |       |                |
|-------------------|----------|-------|----------------|
| A 145, A 185      | T 3      | 0.175 | BEA 185 D/T3   |
| A 145 ... A 185   | S 3, S 4 | 0.200 | BEA 185D/S3/S4 |
| A 210             | S 4      | 0.270 | BEA 210D/S4    |
| A 210 ... A 300   | S 5      | 0.320 | BEA 300D/S5    |
| AF 400, AF 460    | S 5      | 0.480 | BEA 400D/S5    |
| AF 400 ... AF 750 | S 6      | 0.720 | BEA 750D/S6    |

##### Horizontal assembly (Also suitable when using busbar kits for starter combinations)

|                |          |       |             |
|----------------|----------|-------|-------------|
| A 145, A 185   | S 3, S 4 | 0.520 | BEA 185H/S4 |
| A 210          | S 4      | 0.620 | BEA 210H/S4 |
| A 210, A 300   | S 5      | 1.280 | BEA 300H/S5 |
| AF 400, AF 460 | S 5      | 1.310 | BEA 400H/S5 |
| AF 400, AF 460 | S 6      | 2.450 | BEA 460H/S6 |
| AF 580, AF 750 | S 6      | 4.010 | BEA 750H/S6 |

**Note:** The BEA... connection bars provided for the A 145 ... A 300 contactors can be used for the AF 145 ... AF 300 contactors.

#### Connection bars between contactor and switch fuse

##### Vertical assembly

| Contactors        | Switch fuse | Weight<br>kg<br>1 piece | Order code      |
|-------------------|-------------|-------------------------|-----------------|
| A 185             | OESA 250    | 0.260                   |                 |
| A210 ... A 300    | OESA 250 to | 0.330                   | BEF 185/OESA250 |
|                   | OESA 400    |                         | BEF 300/OESA400 |
| AF 400 ... AF 460 | OESA 400    | 0.340                   |                 |
| AF 460 ... AF 750 | OESA 630 to | 0.740                   | BEF 460/OESA400 |
|                   | OESA 800    |                         | BEF 750/OESA800 |

##### Horizontal assembly

|                 |                 |       |                  |
|-----------------|-----------------|-------|------------------|
| A 145           | OS 160..LR      | 0.170 | OSZA 15          |
| A 145, A 185    | OESA 250..LR    | 0.550 | BEF 185H/OESA250 |
| A 210 ... A 300 | OESA 250..LR to |       | BEF 300H/OESA400 |
|                 | OESA 400..LR    |       |                  |
| AF 400, AF 460  | OESA 400..LR    | 1.250 | BEF 460H/OESA400 |

**Note:** The BEF... connection bars provided for the A 145 ... A 300 contactors can be used for the AF 145 ... AF 300 contactors.



A 300-30 contactor + MCCB on top

01123003



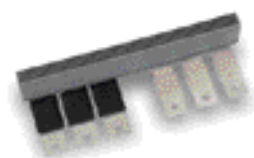
BEA 300/S5

1SF198001-00603



BEA...D/S

1SF198001-00703



BEA 300H/S5

1SF110001-000103



BEF 300/OESA400

1SF198001-00603



BEF 300H/OESA400

1SF198001-00603

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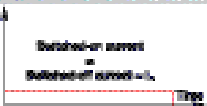
# A., AF., 4-pole Contactors

## a.c. Circuit Switching

### Switching of Resistive Circuits

**AC-1 utilization category**

When making, the switched-on current is equal to the  $I_N$  load rated current with  $\cos \varphi \geq 0.95$ .



**AC-1**

|                           |                                   |
|---------------------------|-----------------------------------|
| Rated operational current | $\leq 40\text{ }^{\circ}\text{C}$ |
|                           | $\leq 55\text{ }^{\circ}\text{C}$ |
|                           | $\leq 70\text{ }^{\circ}\text{C}$ |

- With conductor cross-sectional area
- Rated operational voltage

|                 | A 9 | A 16 | A 26 |
|-----------------|-----|------|------|
| A               | 25  | 30   | 45   |
| A               | 22  | 27   | 40   |
| A               | 18  | 23   | 32   |
| mm <sup>2</sup> | 2.5 | 4    | 6    |
| V               | 690 |      |      |

## 4-pole contactors

### Selection & Ordering

- Select 4 N.O. or 2 N.O. + 2 N.C. main poles
- Select contactor type.
- Select contactor coil voltage on cover folding page 0/1, according to control circuit supply. (Please quote coil voltage in plain text).

#### 4 N.O. main poles

|                                                                                    |                             |       |           |            |            |
|------------------------------------------------------------------------------------|-----------------------------|-------|-----------|------------|------------|
|   | a.c. Control circuit supply | Types | A 9-40-00 | A 16-40-00 | A 26-40-00 |
|  | d.c. Control circuit supply | Types | —         | —          | —          |

#### 2 N.O. + 2 N.C. main poles

|                                                                                     |                             |       |           |            |            |
|-------------------------------------------------------------------------------------|-----------------------------|-------|-----------|------------|------------|
|  | a.c. Control circuit supply | Types | A 9-22-00 | A 16-22-00 | A 26-22-00 |
|-------------------------------------------------------------------------------------|-----------------------------|-------|-----------|------------|------------|

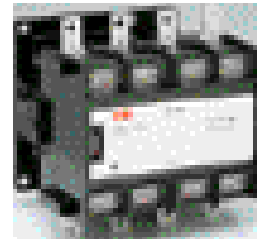
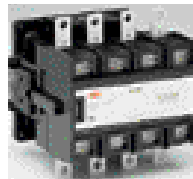
## Contactor Main Accessories

### Selection & Ordering

- Select accessory type and quote required data in plain text.

|                           |                                                                                     |                                                                                                                           |       |                                                                          |                         |
|---------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------|-------------------------|
| <b>Auxiliary contacts</b> |  | CA 5-..., 1-pole<br>CAL ...-..., 2-pole                                                                                   | Types | CA 5-10 1-pole, front mounting                                           | CA 5-01 1-pole, front n |
| <b>Timers</b>             |  | TP..., Pneumatic<br>TE..., Electronic<br>Supply voltages: 24 V a.c./d.c.,<br>110 ... 120; 220 ... 240; 380 ... 440 V a.c. | Types | TP 40 DA, TP 180 DA Direct timing - Front n<br>TE5S Direct timing - Inde |                         |
| <b>Interlocks</b>         |  | VE 5-., Mechanical / Electrical<br>VM..., VH... Mechanical<br>mounting between 2 contactors                               | Types | VE 5-1<br>VM 5-1                                                         |                         |
| <b>Surge suppressors</b>  |  | RV., (Varistor) a.c./d.c.<br>RC., (Capacitor) a.c.                                                                        | Types | RV 5<br>RC 5-1                                                           |                         |

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| A 45 | A 50 | A 75 | EK110 | EK150 | EK175 | EK210 | EK370   | EK550   | EK1000  |
|------|------|------|-------|-------|-------|-------|---------|---------|---------|
| 70   | 100  | 125  | 200   | 250   | 300   | 350   | 550     | 800     | 1000    |
| 60   | 85   | 105  | 180   | 230   | 270   | 310   | 470     | 650     | 800     |
| 50   | 70   | 85   | 155   | 200   | 215   | 250   | 400     | 575     | 720     |
| 25   | 35   | 50   | 95    | 150   | 185   | 240   | 2 x 185 | 2 x 240 | 2 x 300 |
| 690  |      |      | 1000  |       |       |       |         |         | 690     |

|            |            |            |             |             |             |             |             |             |              |
|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| A 45-40-00 | A 50-40-00 | A 75-40-00 | EK110-40-11 | EK150-40-11 | EK175-40-11 | EK210-40-11 | EK370-40-11 | EK550-40-11 | EK1000-40-11 |
| AF45-40-00 | AF50-40-00 | AF75-40-00 | EK110-40-21 | EK150-40-21 | EK175-40-21 | EK210-40-21 | EK370-40-21 | EK550-40-21 | EK1000-40-21 |

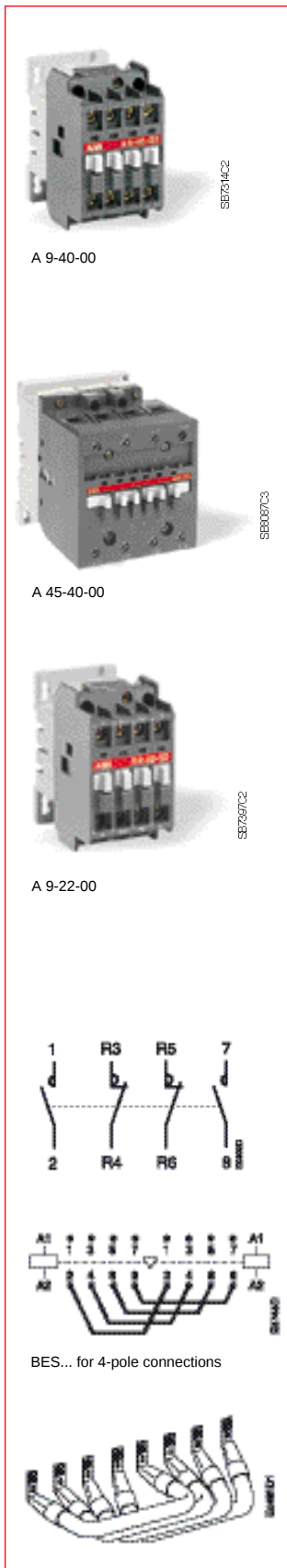
|            |   |            |   |   |   |   |
|------------|---|------------|---|---|---|---|
| A 45-22-00 | — | A 75-22-00 | — | — | — | — |
|------------|---|------------|---|---|---|---|

|                                               |                                                                                                       |                              |        |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------|--------|
| CAL 5-11 2-pole, side mounting                | CAL 16-11 2-pole, side mounting                                                                       |                              |        |
| IA, TP 180 IA Inverse timing - Front mounting | — TE5S Direct timing - Independent mounting (interpose an N.. contactor relay for EK 370 ... EK 1000) |                              |        |
| VE 5-2<br>—                                   | VH 145<br>(Mechanical / Electrical)                                                                   | —                            | VH 800 |
| RV 5<br>RC 5-2                                | —<br>RC-EH 300                                                                                        | RC-EH 800<br>(Varistor + RC) |        |

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# A 9 ... A 75 4-pole Contactors

a.c. Operated



| Rated operational current<br>AC-1<br>40 °C<br>A                                            | Auxiliary contacts fitted                                                                  | Footprint |    |     | Weight<br>kg | Order code         |
|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------|----|-----|--------------|--------------------|
|                                                                                            |           | H         | W  | D   |              | state coil voltage |
| 4 N.O. main poles                                                                          |                                                                                            |           |    |     |              |                    |
| 25                                                                                         | — —                                                                                        | 74        | 44 | 74  | 0.340        | A 9-40-00          |
| 30                                                                                         | — —                                                                                        | 74        | 44 | 74  | 0.340        | A 16-40-00         |
| 45                                                                                         | — —                                                                                        | 90        | 54 | 94  | 0.610        | A 26-40-00         |
| 70                                                                                         | — —                                                                                        | 110       | 92 | 120 | 1.390        | A 45-40-00         |
| 100                                                                                        | — —                                                                                        | 110       | 92 | 120 | 1.390        | A 50-40-00         |
| 125                                                                                        | — —                                                                                        | 110       | 92 | 120 | 1.390        | A 75-40-00         |
| 2 N.O. + 2 N.C. main poles                                                                 |                                                                                            |           |    |     |              |                    |
| 25                                                                                         | — —                                                                                        | 74        | 44 | 74  | 0.340        | A 9-22-00          |
| 30                                                                                         | — —                                                                                        | 74        | 44 | 74  | 0.340        | A 16-22-00         |
| 45                                                                                         | — —                                                                                        | 90        | 54 | 94  | 0.610        | A 26-22-00         |
| 70                                                                                         | — —                                                                                        | 110       | 92 | 120 | 1.400        | A 45-22-00         |
| 125                                                                                        | — —                                                                                        | 110       | 92 | 120 | 1.400        | A 75-22-00         |
| Coil voltages                                                                              |                                                                                            |           |    |     |              |                    |
| Voltage                                                                                    | Voltage                                                                                    |           |    |     |              |                    |
|  V - 50Hz |  V - 60Hz |           |    |     |              |                    |
| 24                                                                                         | 24                                                                                         |           |    |     |              |                    |
| 48                                                                                         | 48                                                                                         |           |    |     |              |                    |
| 110                                                                                        | 110 ... 120                                                                                |           |    |     |              |                    |
| 220 ... 230                                                                                | 230 ... 240                                                                                |           |    |     |              |                    |
| 230 ... 240                                                                                | 240 ... 260                                                                                |           |    |     |              |                    |
| 380 ... 400                                                                                | 400 ... 415                                                                                |           |    |     |              |                    |
| 400 ... 415                                                                                | 415 ... 440                                                                                |           |    |     |              |                    |

Other voltages on application

## Remark for A 9 ... A 75 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles

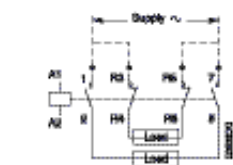
These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams below). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK before MAKE.

These contactors are not suitable for a reversing starter or star-delta starter or for controlling a single load from 2 separate supplies.

## Block diagrams

● Single supply and 2 separate loads

● 2 separate supplies and 2 separate loads



## Connections for 4-pole Changeover Contactors

### Application

Connection between the main poles of two 4-pole contactors mounted side by side so that they operate as source reversing contactors.

### Description

These sets are made up of four downstream connections, with insulated, stranded, rigid copper cables.

| Mounting on 4-pole contactors |   | Weight<br>kg<br>1 set | Order code |
|-------------------------------|---|-----------------------|------------|
|                               |   |                       | BES 75-40  |
| A 45, A 50, A 75              | 1 | 0.400                 |            |

Note: The connections provided for the A... contactors can be used for the AF, AE and TAE types.

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# A 9 ... A 75 4-pole Contactors

## Main Accessories



### Auxiliary Contact Blocks

| Mounting on contactors | Positioning | Contacts | Weight kg | Order code |
|------------------------|-------------|----------|-----------|------------|
| A 9 ... A 75           | Front face  | 1 –      | 0.014     | CA 5-10    |
|                        |             | – 1      | 0.014     | CA 5-01    |
|                        |             | 4 –      | 0.060     | CA 5-40 E  |
|                        |             | 2 2      | 0.060     | CA 5-22 E  |
| A 9 ... A 75           | Side        | 1 1      | 0.050     | CAL 5-11   |

### Pneumatic Timers

| Mounting on contactors | Timing range         | Contacts | Weight kg | Order code |
|------------------------|----------------------|----------|-----------|------------|
| A 9 ... A 75           | Direct 0.1 ... 40 s  | 1 1      | 0.070     | TP 40 DA   |
|                        | Direct 10 ... 180 s  | 1 1      | 0.070     | TP 180 DA  |
|                        | Inverse 0.1 ... 40 s | 1 1      | 0.070     | TP 40 IA   |
|                        | Inverse 10 ... 180 s | 1 1      | 0.070     | TP 180 IA  |

### Interlocks

| Mounting on contactors | Feature            | Contacts | Weight kg | Order code |
|------------------------|--------------------|----------|-----------|------------|
| A 9 ... A 26           | Mech. / electrical | – 2      | 0.076     | VE 5-1     |
| A 45 ... A 75          |                    | – 2      | 0.146     | VE 5-2     |
| A 9 ... A 26           | Mechanical         | – –      | 0.066     | VM 5-1     |

### Surge Suppressors

| Mounting on contactors | Feature  | Voltage range           | Weight kg | Order code |
|------------------------|----------|-------------------------|-----------|------------|
| A 9 ... A 75           | Varistor | 24 ... 50 V a.c./d.c.   | 0.015     | RV 5/50    |
|                        |          | 50 ... 133 V a.c./d.c.  | 0.015     | RV 5/133   |
|                        |          | 110 ... 250 V a.c./d.c. | 0.015     | RV 5/250   |
|                        |          | 250 ... 440 V a.c./d.c. | 0.015     | RV 5/440   |
| A 9 ... A 26           | RC       | 24 ... 50 V a.c.        | 0.012     | RC 5-1/50  |
|                        |          | 50 ... 133 V a.c.       | 0.012     | RC 5-1/133 |
|                        |          | 110 ... 250 V a.c.      | 0.012     | RC 5-1/250 |
|                        |          | 250 ... 440 V a.c.      | 0.012     | RC 5-1/440 |
| A 45 ... A 75          | RC       | 24 ... 50 V a.c.        | 0.015     | RC 5-2/50  |
|                        |          | 50 ... 133 V a.c.       | 0.015     | RC 5-2/133 |
|                        |          | 110 ... 250 V a.c.      | 0.015     | RC 5-2/250 |
|                        |          | 250 ... 440 V a.c.      | 0.015     | RC 5-2/440 |

### Other Accessories

A wide range of accessories are available.

- various auxiliary contact blocks for specific controls and use,
- interface relays,
- connecting auxiliaries: strips, connectors, additional pieces, etc.
- impulse contact blocks, lamp holder and fuse holder blocks,
- function marker.

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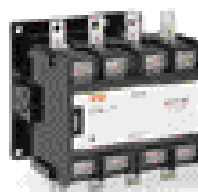
# EK 110 ... EK 1000 4-pole Contactors

a.c. Operated



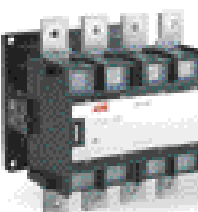
EK 175-40-11

SE734102



EK 370-40-11

SE734302



EK 1000-40-11

13FT18069-00902

| Rated operationa<br>current | Auxiliary contacts<br>fitted | Footprint |     |     | Weight<br>kg | Order code         |
|-----------------------------|------------------------------|-----------|-----|-----|--------------|--------------------|
| AC-1<br>q £40 °C<br>A       |                              | H         | W   | D   |              | state coil voltage |
| 200                         | 1 1                          | 156       | 165 | 155 | 4.300        | EK 110-40-11       |
| 250                         | 1 1                          | 172       | 165 | 155 | 4.350        | EK 150-40-11       |
| 300                         | 1 1                          | 198       | 201 | 172 | 6.600        | EK 175-40-11       |
| 350                         | 1 1                          | 198       | 201 | 172 | 6.600        | EK 210-40-11       |
| 550                         | 1 1                          | 272       | 270 | 226 | 17.20        | EK 370-40-11       |
| 800                         | 1 1                          | 272       | 270 | 226 | 17.20        | EK 550-40-11       |
| 1000                        | 1 1                          | 299       | 270 | 226 | 17.50        | EK 1000-40-11      |

- E □ = 40 ... 400 Hz coil with built-in rectifier.

Coil voltages and codes: EK 110 ... EK 1000

| Voltage<br>□ V - 50Hz | Voltage<br>□ V - 60Hz | Code |   |                     |
|-----------------------|-----------------------|------|---|---------------------|
| 48                    | —                     | A    | D |                     |
| —                     | 110                   | A    | E |                     |
| 110                   | 120                   | A    | F |                     |
| 220 ... 230           | *                     | A    | L | *Read 240V 60Hz for |
| 230 ... 240           | —                     | A    | M | EK 370 ... EK 1000. |
| —                     | 380                   | A    | N |                     |
| 380 ... 400           | 440                   | A    | P |                     |
| 400 ... 415           | —                     | A    | R |                     |

+ Other voltages: page 0/1.

Multi-frequency coils: EK 110 ... EK 210

| Voltage<br>□ V - 40 ... 400Hz | Code |   |
|-------------------------------|------|---|
| 110 ... 120                   | E    | F |
| 115 ... 127                   | E    | G |
| 220 ... 230                   | E    | L |
| 230 ... 240                   | E    | M |
| 380 ... 400                   | E    | P |
| 400 ... 415                   | E    | R |

Dual frequency coils (1): EK 370 ... EK 1000

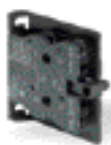
| Voltage<br>□ V - 50Hz | Voltage<br>□ V - 60Hz | Code |   |
|-----------------------|-----------------------|------|---|
| 110                   | 110 ... 120           | E    | F |
| 110 ... 115           | 115 ... 127           | E    | G |
| 220                   | 220 ... 240           | E    | L |
| 220 ... 230           | 230 ... 255           | E    | M |
| 380                   | 380 ... 415           | E    | P |
| 380 ... 400           | 400 ... 440           | E    | R |

(1) Two auxiliary contact blocks maximum per contactor, ambient temperature < 55 °C and mounting positions 2 and 6 excluded.

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# EK 110 ... EK 1000 4-pole Contactors

## Main Accessories



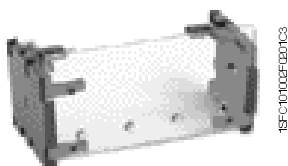
CAL 16-11 B



VH 145



RC-EH 300/48



LT 210-EK

### Auxiliary Contact Blocks

| Mounting on contactors | Positioning | Contacts                                                                                                                                                             | Weight kg | Order code  |
|------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|
| EK 110 ... EK 1000     | Side        |   | 0.050     | CAL 16-11 B |
|                        |             |   | 0.050     | CAL 16-11 C |
|                        |             |   | 0.050     | CAL 16-11 D |

### Interlocks for two horizontal mounted contactors

| Mounting on contactors           | Feature       | Contacts                                                                                                                                                             | Weight kg | Order code |
|----------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|
| EK 110, EK 150<br>EK 175, EK 210 | Mech. / elec. |   | 0.130     | VH 145     |
|                                  |               |   | 0.130     | VH 300     |
| EK 370, EK 550<br>EK 1000        | Mechanical    |   | 6.000     | VH 800     |

Note: For interlocking between two contactors of a different size: + section 4.

### Surge Suppressors

| Mounting on contactors | Feature | Voltage range      | Weight kg | Order code    |
|------------------------|---------|--------------------|-----------|---------------|
| EK 110 ... EK 210      | RC      | 24 ... 48 V a.c.   | 0.015     | RC-EH 300/48  |
|                        |         | 110 ... 415 V a.c. | 0.015     | RC-EH 300/415 |
| EK 370 ... EK 1000     | RC      | 48 ... 110 V a.c.  | 0.015     | RC-EH 800/110 |
|                        |         | 220 ... 600 V a.c. | 0.015     | RC-EH 800/600 |

### Shrouds (terminal protection VDE 106, part 100)

| Mounting on contactors | Suitable for contactor with | Weight kg | Order code |
|------------------------|-----------------------------|-----------|------------|
| EK 110, EK 150         | cable lugs                  | 0.139     | LT 150-EK  |
| EK 175, EK 210         | or                          | 0.152     | LT 210-EK  |
| EK 370, EK 550         | cable clamps                | 0.190     | LT 550-EK  |
| EK 1000                |                             | 0.200     | LT 1000-EK |

### Other Accessories

A wide range of accessories are available:

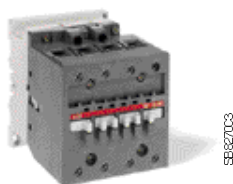
- auxiliary contact blocks for specific controls and use,
- connecting auxiliaries: connectors for main poles, connections sets,
- plates for changeover contactors, etc.

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# AF 45 ... AF 75 4-pole Contactors

a.c. / d.c. Operated - Large Voltage Range

Electronic Coil Interface



AF 75-40-00

| Rated operational<br>current<br>AC-1<br>£ 40 °C<br>A | Auxiliary contacts<br>fitted<br> | Footprint |    |     | Weight<br>kg | Order code         |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------|----|-----|--------------|--------------------|
|                                                      |                                                                                                                   | H         | W  | D   |              | state coil voltage |
| 4 N.O. main poles                                    |                                                                                                                   |           |    |     |              |                    |
| 70                                                   | — —                                                                                                               | 110       | 92 | 120 | 1.420        | AF 45-40-00        |
| 100                                                  | — —                                                                                                               | 110       | 92 | 120 | 1.420        | AF 50-40-00        |
| 125                                                  | — —                                                                                                               | 110       | 92 | 120 | 1.420        | AF 75-40-00        |
| 2 N.O. + 2 N.C. main poles                           |                                                                                                                   |           |    |     |              |                    |
| 70                                                   | — —                                                                                                               | 110       | 92 | 120 | 1.420        | AF 45-22-00        |
| 125                                                  | — —                                                                                                               | 110       | 92 | 120 | 1.420        | AF 75-22-00        |

## Coil voltages

| Voltage<br>V - 50/60Hz | Voltage<br>V d.c. |
|------------------------|-------------------|
| —                      | 20 ... 60         |
| 48 ... 130             | 48 ... 130        |
| 100 ... 250            | 100 ... 250       |

(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.

## Remark for AF 45 ... AF 75 4-pole contactors built with 2 N.O. + 2 N.C. main poles

These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (+ diagrams below). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK before MAKE.

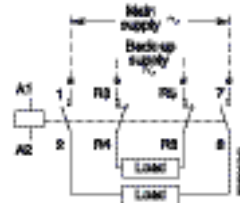
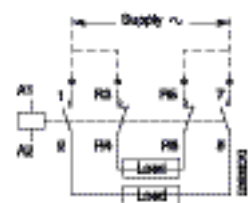


These contactors are not suitable for a reversing starter or star-delta starter or for controlling a single load from 2 separate supplies.

## Block Diagrams

● Single supply and 2 separate loads

● 2 separate supplies and 2 separate loads



## Electromagnetic compatibility:

AF... contactors comply with international standards IEC 60947-1 (2000-10-Ed.3.1), 60947-4-1 (2000-11-Ed.2) and European standards EN 60947-1, 60947-4-1.

Notice: This product has been designed for environment A. Use of this product in environment B may cause unwanted electromagnetic disturbances in which case the user may be required to take adequate mitigation measures.

## Definitions:

Environment A: "Mainly relates to low-voltage non public or industrial networks/locations/installations (+ EN 50082-2 article 4) including highly disturbing sources".

Environment B: "Mainly relates to low-voltage public networks (+ EN 50082-1 article 5) such as residential, commercial and light industrial locations/installations. Highly disturbing sources such as arc welders are not covered by this environment".

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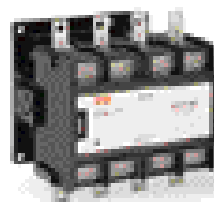
# EK 110 ... EK 1000 4-pole Contactors

d.c. Operated



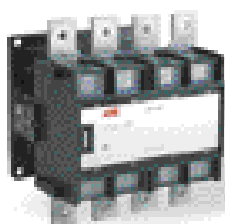
EK 175-40

SB7341C2



EK 370-40

SB7340C2



EK 1000-40

SB7340C2

| Rated operational<br>current<br>AC-1<br>£ 40 °C<br>A | Auxiliary contacts<br>fitted |   | Footprint |     |     | Weight<br>kg | Order code         |
|------------------------------------------------------|------------------------------|---|-----------|-----|-----|--------------|--------------------|
|                                                      |                              |   | H         | W   | D   |              | state coil voltage |
| 200                                                  | 2                            | 1 | 156       | 136 | 155 | 4.350        | EK 110-40-21       |
| 250                                                  | 2                            | 1 | 172       | 136 | 155 | 4.400        | EK 150-40-21       |
| 300                                                  | 2                            | 1 | 198       | 176 | 172 | 6.650        | EK 175-40-21       |
| 350                                                  | 2                            | 1 | 198       | 176 | 172 | 6.650        | EK 210-40-21       |
| 550                                                  | 2                            | 1 | 272       | 296 | 226 | 17.20        | EK 370-40-21       |
| 800                                                  | 2                            | 1 | 272       | 296 | 226 | 17.20        | EK 550-40-21       |
| 1000                                                 | 2                            | 1 | 299       | 296 | 226 | 17.50        | EK 1000-40-21      |

## Coil voltages and codes

| Voltage | Code                     |                          |
|---------|--------------------------|--------------------------|
| V d.c.  | <input type="checkbox"/> | <input type="checkbox"/> |
| 12 (1)  | D                        | A                        |
| 24      | D                        | B                        |
| 36      | D                        | C                        |
| 48      | D                        | D                        |
| 60      | D                        | T                        |
| 75      | D                        | G                        |
| 110     | D                        | E                        |
| 125     | D                        | U                        |
| 220     | D                        | F                        |

(1) Not for EK 370 ... EK 1000 contactors.

For Accessories see page ??

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# Contactors for Capacitor Switching

## AC-6b Utilization Category according to IEC 60947-4-1

### Capacitor Transient Conditions

In Low Voltage industrial installations, capacitors are mainly used for reactive energy correction (raising the power factor). When these capacitors are energized, overcurrents of high amplitude and high frequencies (3 to 15 kHz) occur during the transient period (1 to 2 ms). The amplitude of these current peaks, also known as "inrush current peaks", depends on the following factors:

- The network inductances.
- The transformer power and short-circuit voltage.
- The type of power factor correction.

**There are 2 types of power factor correction: fixed or automatic.**

Fixed power factor correction consists of inserting, in parallel on the network, a capacitor bank whose total power is provided by the assembly of capacitors of identical or different ratings.

The bank is energized by a contactor that simultaneously supplies all the capacitors (a single step).

The inrush current peak, in the case of fixed correction, can reach 30 times the nominal current of the capacitor bank.

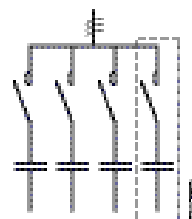


Fixed power factor correction

An automatic power factor correction system, on the other hand, consists of several capacitor banks of identical or different ratings (several steps), energized separately according to the value of the power factor to be corrected.

An electronic device automatically determines the power of the steps to be energized and activates the relevant contactors.

The inrush current peak, in the case of automatic correction, depends on the power of the steps already on duty, and can reach 100 times the nominal current of the step to be energized.



Automatic power factor correction

### Steady State Condition Data

The presence of harmonics and the network's voltage tolerance lead to a current, estimated to be 1.3 times the nominal current  $I_n$  of the capacitor, permanently circulating in the circuit.

Taking into account the manufacturing tolerances, the exact power of a capacitor can reach 1.15 times its nominal power.

Standard IEC 831-1 Edition 04/97 specifies that the capacitor must therefore have a maximum thermal current  $I_T$  of:

$$I_T = 1.3 \times 1.15 \times I_n = 1.5 \times I_n$$

### Consequences for the Contactors

To avoid malfunctions (welding of main poles, abnormal temperature rise, etc.), contactors for capacitor bank switching must be sized to withstand:

- **A permanent current that can reach 1.5 times the nominal current of the capacitor bank.**
- **The short but high peak current on pole closing (maximum permissible peak current  $\hat{I}$ ).**

### ABB offers 3 contactor versions according to the value of the inrush current peak and the power of the capacitor bank

A... and AF... standard contactors (A 12... A 300 and AF 400 ... AF 750)

UA... Contactors for capacitor switching (UA 16 ... UA 110)

UA...-R Contactors for capacitor switching (UA 16-R ... UA 75-R) with insertion of damping resistors

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# A... Standard 3-pole Contactors for Capacitor Switching



Peak Current  $\hat{I} < 30$  Times the rms Current

## Application

The **A...** and **AF...** contactors are suited for capacitor bank switching for the peak current and power values in the table below. The kvar ratings acc. to the table below are applicable to "star" connected capacitors (less current, cable savings). The capacitors must be discharged (maximum residual voltage at terminals  $\leq 50$  V) before being re-energized when the contactors are making. In these conditions, electrical durability of contactors is equal to 100 000 operating cycles.

## Description

- A 12 ... A 110 3-pole contactors
- A 145 ... AF 750 3-pole contactors

## Selection Table

| Type   | Powers in kvar 50/60 Hz (AC - 6b) |       |       |           |       |       |           |       |       |          |       |       |           |       |       | Max.<br>peak<br>current<br>İ (kA) |
|--------|-----------------------------------|-------|-------|-----------|-------|-------|-----------|-------|-------|----------|-------|-------|-----------|-------|-------|-----------------------------------|
|        | 220/240 V                         |       |       | 380/400 V |       |       | 415/440 V |       |       | 500/550V |       |       | 660/690 V |       |       |                                   |
|        | 40 °C                             | 55 °C | 70 °C | 40 °C     | 55 °C | 70 °C | 40 °C     | 55 °C | 70 °C | 40 °C    | 55 °C | 70 °C | 40 °C     | 55 °C | 70 °C |                                   |
| A 9    | –                                 | –     | –     | –         | –     | –     | –         | –     | –     | –        | –     | –     | –         | –     | –     | –                                 |
| A 12   | 7                                 | 7     | 6     | 11        | 11    | 9.5   | 12        | 12    | 10.5  | 14       | 14    | 12    | 19        | 19    | 16.5  | 0.7                               |
| A 16   | 7.5                               | 7.5   | 6     | 12.5      | 12.5  | 10    | 14        | 14    | 10.5  | 15.5     | 15.5  | 12    | 21.5      | 21.5  | 16.5  | 1                                 |
| A 26   | 11.5                              | 11.5  | 9     | 19        | 19    | 15    | 20        | 20    | 16.5  | 23       | 23    | 19    | 32        | 32    | 26    | 1.6                               |
| A 30   | 13                                | 13    | 11    | 22        | 22    | 18.5  | 24        | 24    | 20.5  | 28       | 28    | 23    | 38        | 38    | 32    | 1.9                               |
| A 40   | 15                                | 15    | 12    | 26        | 26    | 20    | 29        | 29    | 22    | 35       | 35    | 25    | 46        | 46    | 34.5  | 2.1                               |
| A 50   | 22                                | 22    | 20    | 38        | 38    | 34    | 42        | 42    | 37    | 48       | 48    | 42    | 65        | 65    | 58.5  | 2.3                               |
| A 63   | 25                                | 25    | 23    | 43        | 43    | 39    | 47        | 47    | 42.5  | 54       | 54    | 48.5  | 74        | 74    | 67    | 2.5                               |
| A 75   | 28                                | 28    | 24.5  | 48        | 48    | 41    | 52        | 52    | 45    | 60       | 60    | 51    | 82        | 82    | 70    | 2.6                               |
| A 95   | 35                                | 35    | 33    | 60        | 60    | 53    | 63        | 63    | 58    | 75       | 75    | 70    | 80        | 80    | 75    | 4                                 |
| A 110  | 40                                | 40    | 35    | 70        | 70    | 60    | 75        | 75    | 65    | 83       | 83    | 78    | 90        | 90    | 85    | 4                                 |
| A 145  | 50                                | 50    | 42    | 90        | 90    | 74    | 93        | 93    | 80    | 110      | 110   | 96    | 110       | 110   | 110   | 4                                 |
| A 185  | 60                                | 60    | 45    | 105       | 105   | 78    | 115       | 115   | 85    | 135      | 135   | 102   | 135       | 135   | 135   | 5                                 |
| A 210  | 75                                | 75    | 57    | 125       | 125   | 100   | 135       | 135   | 110   | 160      | 160   | 130   | 160       | 160   | 160   | 6.5                               |
| A 260  | 85                                | 85    | 70    | 140       | 140   | 130   | 155       | 155   | 140   | 180      | 180   | 165   | 200       | 200   | 200   | 8                                 |
| A 300  | 100                               | 100   | 85    | 160       | 160   | 150   | 180       | 180   | 163   | 210      | 210   | 196   | 240       | 240   | 240   | 8                                 |
| AF 400 | 120                               | 120   | 105   | 200       | 200   | 185   | 220       | 220   | 200   | 260      | 260   | 241   | 300       | 300   | 300   | 10                                |
| AF 460 | 140                               | 140   | 120   | 230       | 230   | 215   | 260       | 260   | 230   | 325      | 325   | 300   | 325       | 325   | 325   | 10                                |
| AF 580 | 170                               | 170   | 160   | 270       | 270   | 260   | 300       | 300   | 290   | 350      | 350   | 340   | 440       | 440   | 440   | 12                                |
| AF 750 | 220                               | 220   | 190   | 390       | 370   | 332   | 410       | 410   | 380   | 490      | 480   | 435   | 600       | 600   | 600   | 12                                |

If, in an application, the current peak is greater than the maximum peak current  $\hat{I}$  specified in the last column in the table, select a higher rating, refer to the **UA...** contactors (+ page 2/38) or add inductances (+ Application Guide "Contactors for Capacitor Switching").

The capacitor bank will be protected by gG type fuses whose rating is equal to 1.5 ... 1.8 times nominal current.

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# UA... 3-pole Contactors for Capacitor Switching



Peak Current  $\hat{I} < 100$  Times the rms Current

## Application

The UA... contactors have been specially developed for the switching of capacitor banks whose inrush current peaks are less than or equal to 100 times nominal rms current. The table below gives the permissible powers according to operational voltage and temperature close to the contactor. It also specifies the maximum peak current  $\hat{I}$  values accepted by the contactor.

The kvar ratings acc. to the table below are applicable to "star" connected capacitors (less current, cable savings).

The capacitors must be discharged (maximum residual voltage at terminals < 50 V) before being re-energized when the contactors are making.

In these conditions, electrical durability of contactors is equal to 100 000 operating cycles.

## Selection Table

| Type   | Powers in kvar 50/60 Hz (AC - 6b) |       |       |           |        |        |       |       |       |           |       |       |           |       |       | Max. permissible peak current $\hat{I}$ (kA) |                |
|--------|-----------------------------------|-------|-------|-----------|--------|--------|-------|-------|-------|-----------|-------|-------|-----------|-------|-------|----------------------------------------------|----------------|
|        | 230/240 V                         |       |       | 400/415 V |        |        | 440 V |       |       | 500/550 V |       |       | 660/690 V |       |       | U <sub>e</sub>                               | U <sub>e</sub> |
|        | 40 °C                             | 55 °C | 70 °C | 40 °C     | 55 °C  | 70 °C  | 40 °C | 55 °C | 70 °C | 40 °C     | 55 °C | 70 °C | 40 °C     | 55 °C | 70 °C | ≤ 500 V                                      | > 500 V        |
| UA 16  | 7.5                               | 6.7   | 6     | 12.5      | 11.7   | 10     | 13.7  | 13    | 11    | 15.5      | 14.7  | 12.5  | 21.5      | 20    | 17    | 1.8                                          | 1.6            |
| UA 26  | 12                                | 11    | 8.5   | 20        | 18.5   | 14.5   | 22    | 20    | 16    | 22        | 22    | 19.5  | 30        | 30    | 25    | 3                                            | 2.7            |
| UA 30  | 16                                | 16    | 11    | 27.5      | 27.5   | 19     | 30    | 30    | 20    | 34        | 34    | 23.5  | 45        | 45    | 32    | 3.5                                          | 3.1            |
| UA 50  | 20                                | 20    | 19    | 33        | 33     | 32     | 36    | 36    | 35    | 40        | 40    | 40    | 55        | 55    | 52    | 5                                            | 4.5            |
| UA 63  | 25                                | 25    | 21    | 45        | 43     | 37     | 50    | 48    | 41    | 50        | 50    | 45    | 70        | 70    | 60    | 6.5                                          | 5.8            |
| UA 75  | 30                                | 30    | 22    | 50        | 50     | 39     | 55    | 53    | 43    | 62        | 62    | 47.5  | 75        | 75    | 65    | 7.5                                          | 6.75           |
| UA 95  | 35                                | 35    | 29    | 60/65*    | 60/65* | 50/55* | 65    | 65    | 55    | 70        | 70    | 60    | 86        | 86    | 70    | 9.3                                          | 8              |
| UA 110 | 40                                | 39    | 34    | 74        | 70/75* | 65     | 75    | 75    | 67    | 80        | 80    | 75    | 90        | 90    | 85    | 10.5                                         | 9              |

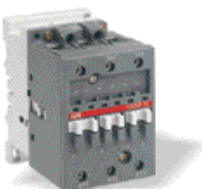
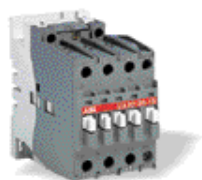
(\*) Use these values for U<sub>e</sub> = 415 V

For **220 V** and **380 V**, multiply by **0.9** the rated values at 230 V and 400 V respectively.

**Example:** 50 kvar/400 V corresponding to 0.9 x 50 = **45 kvar/380 V**.

If, in an application, the current peak is greater than the maximum peak current  $\hat{I}$  specified in the table above, select a higher rating, refer to the **UA...-R** contactors (+ page 2/40) or add inductances (+ Application Guide "Contactors for Capacitor Switching").

The capacitor bank will be protected by gG type fuses whose rating is equal to 1.5 ... 1.8 times nominal current.



| Power<br>400 V<br>£ 40 °C<br>kvar | Max. peak<br>current<br>U <sub>e</sub> £ 500V<br>kA | Auxiliary contacts<br>fitted | Footprint |     |     | Weight<br>kg | Order code         |
|-----------------------------------|-----------------------------------------------------|------------------------------|-----------|-----|-----|--------------|--------------------|
|                                   |                                                     |                              | H         | W   | D   |              | state coil voltage |
| 12.5                              | 1.8                                                 | 1 -                          | 74        | 44  | 74  | 0.340        | UA 16-30-10        |
| 20                                | 3                                                   | 1 -                          | 90        | 54  | 94  | 0.600        | UA 26-30-10        |
| 27.5                              | 3.5                                                 | 1 -                          | 90        | 54  | 109 | 0.710        | UA 30-30-10        |
| 33                                | 5                                                   | 1 1                          | 110       | 82  | 108 | 1.200        | UA 50-30-11        |
| 45                                | 6.5                                                 | 1 1                          | 110       | 82  | 108 | 1.200        | UA 63-30-11        |
| 50                                | 7.5                                                 | 1 1                          | 110       | 82  | 108 | 1.200        | UA 75-30-11        |
| 60                                | 9.3                                                 | 1 1                          | 148       | 102 | 124 | 2.040        | UA 95-30-11        |
| 74                                | 10.5                                                | 1 1                          | 148       | 102 | 124 | 2.040        | UA 110-30-11       |

### Coil voltages

| Voltage<br>V - 50Hz | Voltage<br>V - 60Hz |
|---------------------|---------------------|
| 24                  | 24                  |
| 48                  | 48                  |
| 110                 | 110...120           |
| 220...230           | 230...240           |
| 230...240           | 240...260           |
| 380...400           | 400...415           |
| 400...415           | 415...440           |

(1) Not for EK 370 ... EK 1000 contactors.

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# UA...-R 3-pole Contactors for Capacitor Switching



Peak Current  $\hat{I} \geq 100$  Times the rms Current

## Application

The **UA ...-R** contactors can be used in installations in which peak current far exceeds 100 times nominal rms current. The contactors are delivered complete with their damping resistors and must be used without additional inductances (+ table below).

The kvar ratings acc. to the table below are applicable to "star" connected capacitors (less current, cable savings).

The capacitors must be discharged (maximum residual voltage at terminals < 50 V) before being re-energized when the contactors are making.

Their electrical durability is 250 000 operating cycles for  $U_e < 500$  V and 100 000 operating cycles for  $U_e \geq 500$  V.

## Selection Table

| Type          | Powers in kvar - 50/60 Hz (AC-6b) |       |       |               |       |       |       |       |       |           |       |       |           |       |       | Max. permissible<br>peak current<br>$\hat{I}$ | gG type<br>fuses<br><br>max. (*) |
|---------------|-----------------------------------|-------|-------|---------------|-------|-------|-------|-------|-------|-----------|-------|-------|-----------|-------|-------|-----------------------------------------------|----------------------------------|
|               | 220/240 V                         |       |       | 380/400/415 V |       |       | 440 V |       |       | 500/550 V |       |       | 660/690 V |       |       |                                               |                                  |
|               | 40 °C                             | 55 °C | 70 °C | 40 °C         | 55 °C | 70 °C | 40 °C | 55 °C | 70 °C | 40 °C     | 55 °C | 70 °C | 40 °C     | 55 °C | 70 °C |                                               |                                  |
| UA 16-30-10-R | 8                                 | 7.5   | 6     | 12.5          | 12.5  | 10    | 15    | 13    | 11    | 18        | 16    | 12.5  | 22        | 21    | 17    | 80                                            |                                  |
| UA 26-30-10-R | 12.5                              | 11.5  | 9     | 22            | 20    | 15.5  | 24    | 20    | 17    | 30        | 25    | 20    | 35        | 31    | 26    | 125                                           |                                  |
| UA 30-30-10-R | 16                                | 16    | 11    | 30            | 27.5  | 19.5  | 32    | 30    | 20.5  | 34        | 34    | 25    | 45        | 45    | 32    | 200                                           |                                  |
| UA 50-30-00-R | 25                                | 24    | 20    | 40            | 40    | 35    | 50    | 43    | 37    | 55        | 50    | 46    | 72        | 65    | 60    | 200                                           |                                  |
| UA 63-30-00-R | 30                                | 27    | 23    | 50            | 45    | 39    | 55    | 48    | 42.5  | 65        | 60    | 50    | 80        | 75    | 65    | 200                                           |                                  |
| UA 75-30-00-R | 35                                | 30    | 25    | 60            | 50    | 41    | 65    | 53    | 45    | 75        | 65    | 55    | 100       | 80    | 70    | 200                                           |                                  |

(\*) The fuse ratings given in this column represent the maximum ratings ensuring type 1 co-ordination according to the definition of standard IEC 60947-4-1.



| Power<br>400 V<br>£ 40 °C<br>kvar | Auxiliary contacts<br>fitted |   | Footprint |    |     | Weight<br>kg | Order code    |
|-----------------------------------|------------------------------|---|-----------|----|-----|--------------|---------------|
|                                   |                              |   | H         | W  | D   |              |               |
| 12.5                              | 1                            | - | 140       | 44 | 106 | 0.460        | UA 16-30-10-R |
| 22                                | 1                            | - | 140       | 54 | 125 | 0.710        | UA 26-30-10-R |
| 30                                | 1                            | - | 140       | 54 | 140 | 0.810        | UA 30-30-10-R |
| 40                                | -                            | - | 160       | 70 | 139 | 1.350        | UA 50-30-00-R |
| 50                                | -                            | - | 160       | 70 | 139 | 1.350        | UA 63-30-00-R |
| 60                                | -                            | - | 160       | 70 | 139 | 1.350        | UA 75-30-00-R |

### Coil voltages

| Voltage<br>V - 50Hz | Voltage<br>V - 60Hz |
|---------------------|---------------------|
| 24                  | 24                  |
| 48                  | 48                  |
| 110                 | 110...120           |
| 220...230           | 230...240           |
| 230...240           | 240...260           |
| 380...400           | 400...415           |
| 400...415           | 415...440           |

please contact us for other voltages

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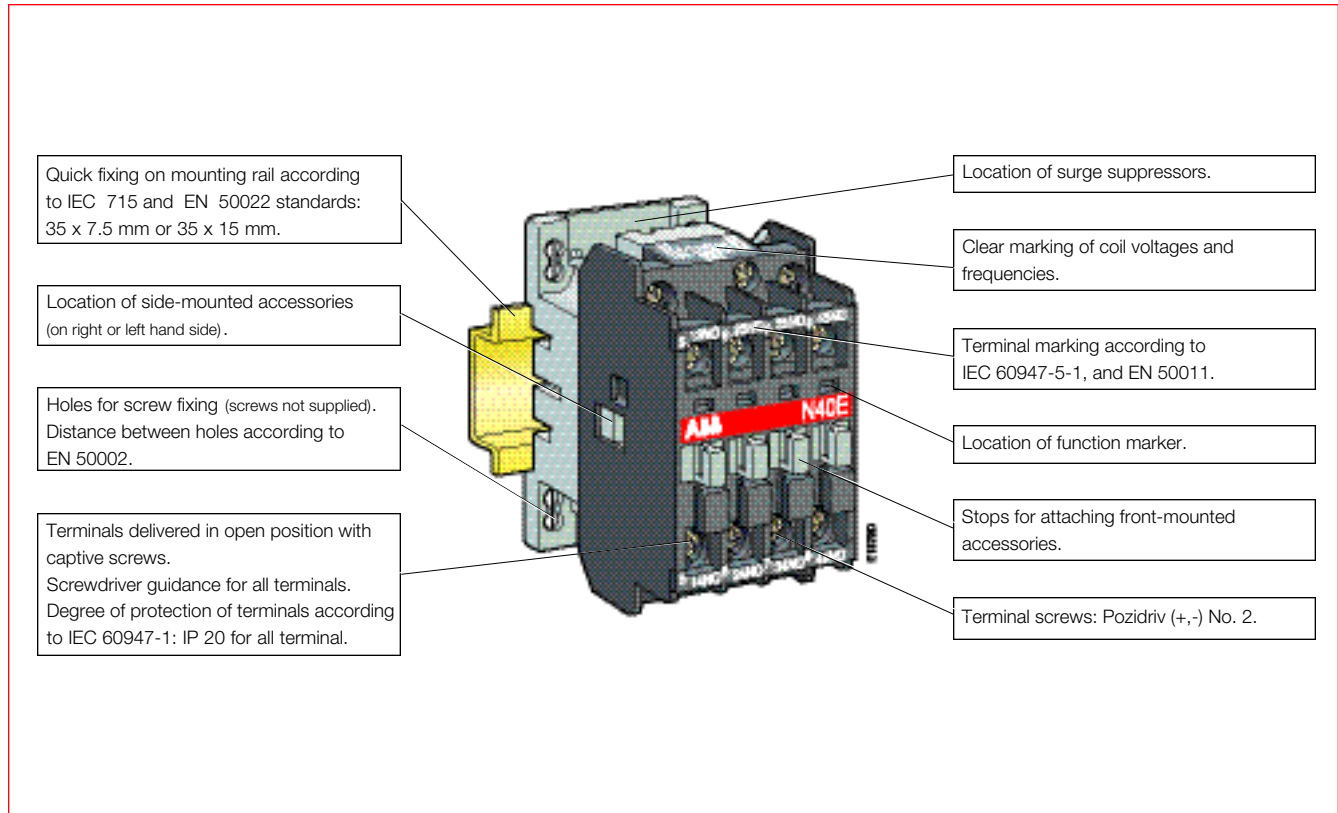
# N... Contactor Relays

a.c. Operated



## Application

N... contactor relays are used for switching auxiliary circuits and control circuits.



| Number of contacts |   | Footprint |    |    | Weight<br>kg | Order code         |
|--------------------|---|-----------|----|----|--------------|--------------------|
|                    |   | H         | W  | D  |              | state coil voltage |
| 4-pole, 1-stack    |   |           |    |    |              |                    |
| 2                  | 2 | 74        | 44 | 74 | 0.340        | N 22 E             |
| 3                  | 1 | 74        | 44 | 74 | 0.340        | N 31 E             |
| 4                  | – | 74        | 44 | 74 | 0.34         | N 40 E             |

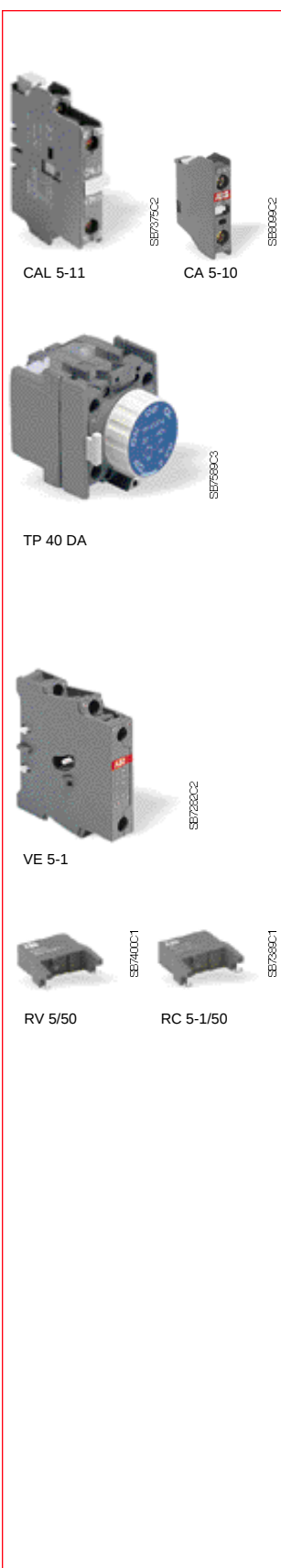
### Coil voltages

| Voltage<br>V - 50Hz | Voltage<br>V - 60Hz |
|---------------------|---------------------|
| 24                  | 24                  |
| 48                  | 48                  |
| 110                 | 110 ... 120         |
| 220 ... 230         | 230 ... 240         |
| 230 ... 240         | 240 ... 260         |
| 380 ... 400         | 400 ... 415         |
| 400 ... 415         | 415 ... 440         |

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# N/KC... Contactor Relays

## Main Accessories



### Auxiliary Contact Blocks

| Mounting on contactor relays | Positioning kg | Contacts | Weight | Order Code |
|------------------------------|----------------|----------|--------|------------|
| N/KC...                      | Front face     | 1 –      | 0.014  | CA 5-10    |
|                              |                | – 1      | 0.014  | CA 5-01    |
|                              |                | 4 –      | 0.060  | CA 5-40 N  |
|                              |                | 2 2      | 0.060  | CA 5-22 N  |
|                              |                | – 4      | 0.060  | CA 5-04 N  |
| N                            | Side           | 1 1      | 0.050  | CAL 5-11   |

### Pneumatic Timers

| Mounting on contactor relays | Timing range         | Contacts | Weight kg | Order Code |
|------------------------------|----------------------|----------|-----------|------------|
| N/KC...                      | Direct 0.1 ... 40 s  | 1 1      | 0.070     | TP 40 DA   |
|                              | Direct 10 ... 180 s  | 1 1      | 0.070     | TP 180 DA  |
|                              | Inverse 0.1 ... 40 s | 1 1      | 0.070     | TP 40 IA   |
|                              | Inverse 10 ... 180 s | 1 1      | 0.070     | TP 180 IA  |

### Interlocks

| Mounting on contactor relays | Feature            | Contacts | Weight kg | Order Code |
|------------------------------|--------------------|----------|-----------|------------|
| N...                         | Mech. / electrical | – 2      | 0.076     | VE 5-1     |
|                              | Mechanical         | – –      | 0.066     | VM 5-1     |
| KC                           | Mechanical         | - -      | 0.015     | VBC30      |

### Surge Suppressors

| Mounting on contactor relays | Feature  | Voltage range           | Weight kg | Order Code |
|------------------------------|----------|-------------------------|-----------|------------|
| N...                         | Varistor | 24 ... 50 V a.c./d.c.   | 0.015     | RV 5/50    |
|                              |          | 50 ... 133 V a.c./d.c.  | 0.015     | RV 5/133   |
|                              |          | 110 ... 250 V a.c./d.c. | 0.015     | RV 5/250   |
|                              |          | 250 ... 440 V a.c./d.c. | 0.015     | RV 5/440   |
|                              | RC       | 24 ... 50 V a.c.        | 0.012     | RC 5-1/50  |
|                              |          | 50 ... 133 V a.c.       | 0.012     | RC 5-1/133 |
|                              |          | 110 ... 250 V a.c.      | 0.012     | RC 5-1/250 |
|                              |          | 250 ... 440 V a.c.      | 0.012     | RC 5-1/440 |

### Other accessories

A wide range of accessories are available:

- various auxiliary contact blocks for specific controls and use,
- interface relays,
- fuse holder blocks,
- function marker.

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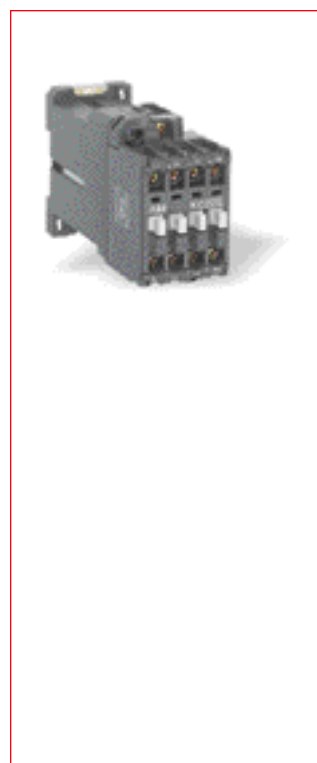
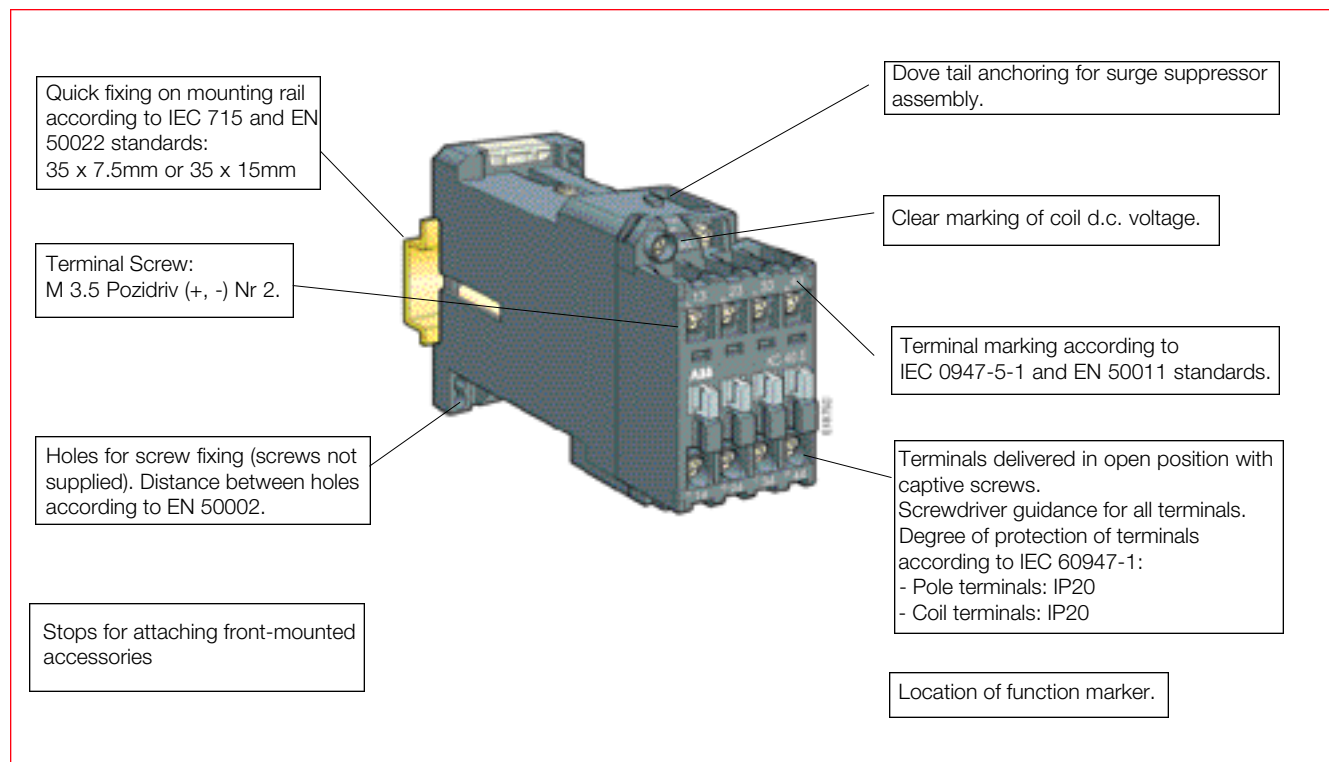
# KC... Contactor Relays

## d.c. Operated with Solid Magnetic Coil



### Application

KC... contactor relays are used for switching auxiliary circuits and control circuits.



| Number of contacts<br> | Footprint |    |     | Weight<br>kg | Order code<br>state coil voltage |
|-----------------------------------------------------------------------------------------------------------|-----------|----|-----|--------------|----------------------------------|
|                                                                                                           | H         | W  | D   |              |                                  |
| 4-pole, 1-stack                                                                                           |           |    |     |              |                                  |
| 2 2                                                                                                       | 81        | 44 | 114 | 0.540        | KC 22 E                          |
| 3 1                                                                                                       | 81        | 44 | 114 | 0.540        | KC 31 E                          |
| 4 -                                                                                                       | 81        | 44 | 114 | 0.540        | KC 40 E                          |

#### Coil voltages

Voltage - U<sub>c</sub>

 V d.c.

12  
24  
42  
48  
50  
60  
75  
110  
125  
220  
240  
250

Please consult us:  
For contactor relays with wide range coils  
For accessories (see pagex/xx)

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## Contactor Spares

### a.c. Operated coils for A9...A300 contactors and N contactor relays

| For contactors                                        | Weight (kg) | Order Code |
|-------------------------------------------------------|-------------|------------|
| A9...A16 : UA16 : UA16...-R : N                       | 0.093       | ZA16       |
| A26...A40 : UA26, UA30, UA26...-R, UA30...-R          | 0.148       | ZA40       |
| A45...A75 : UA50...UA75, UA50...-R to UA75...-R; GA75 | 0.166       | ZA75       |
| A95...A110 ; UA95...UA110                             | 0.170       | ZA110      |
| A145...A185                                           | 0.180       | ZA185      |
| A210...A300                                           | 0.400       | ZA300      |

### a.c./d.c. Operated coils c/w electronic interface for AF 45...AF750 contactors

| For contactors | Weight (kg) | Order Code |
|----------------|-------------|------------|
| AF45...AF75    | 0.170       | ZAF75      |
| AF95, AF110    | 0.200       | ZAF110     |
| AF145...AF185  | 0.225       | ZAF185     |
| AF210...AF300  | 0.450       | ZAF300     |
| AF400...AF460  | 0.525       | ZAF460     |
| AF580...AF750  | 1.335       | ZAF750     |

### d.c. Operated coils for AE9...AE110 contactors

| For contactors | Weight (kg) | Order Code |
|----------------|-------------|------------|
| AE9...AE16     | 0.093       | ZAE16      |
| AE26...AE40    | 0.148       | ZAE40      |

### a.c. or d.c. coils only

| For contactors       | Weight (kg) | Order Code |
|----------------------|-------------|------------|
| EK110, EK150         | 0.360       | KH210      |
| EK175, EK210         | 0.440       | KH300      |
| EK370, EK550, EK1000 | 0.950       | KH800      |

### Sets including a d.c. coil, an economy resistor and an insertion contact

| For contactors       | Weight (kg) | Order Code |
|----------------------|-------------|------------|
| EK110, 150           | 0.450       | KP210      |
| EK175, 210           | 0.550       | KP300      |
| EK370, EK550, EK1000 | 1.060       | KP800      |



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# Contactor Spares

## Main contact sets for 3-pole Contactors

The contact sets for 3-pole contactors consist of six fixed contacts, three moving contacts, springs and the necessary screws.

| For contactors     | Weight (kg) | Order Code |
|--------------------|-------------|------------|
| A/AF/AE/TAE 50-30  | 0.115       | ZL50       |
| A/AF/AE/TAE 63-30  | 0.130       | ZL63       |
| A/AF/AE/TAE 75-30  | 0.145       | ZL75       |
| A/AF/AE/TAE 95-30  | 0.190       | ZL95       |
| A/AF/AE/TAE 110-30 | 0.190       | ZL110      |
| A/AF 145           | 0.380       | ZL145      |
| A/AF 185           | 0.380       | ZL185      |
| A/AF 210           | 0.670       | ZL210      |
| A/AF 260           | 0.670       | ZL260      |
| A/AF 300           | 0.670       | ZL300      |
| AF 400             | 1.320       | ZL400      |
| AF 460             | 1.320       | ZL460      |
| AF 580             | 1.840       | ZL580      |
| AF 750             | 1.840       | ZL750      |
| UA 50, UA 50-R     | 0.115       | ZLU50      |
| UA 63, UA 63-R     | 0.145       | ZLU63      |
| UA 75, UA 75-R     | 0.145       | ZLU75      |
| UA 95              | 0.190       | ZLU95      |
| UA 110             | 0.190       | ZLU110     |

## Main contact sets for 4-pole Contactors

The contact sets for 4-pole contactors consist of eight fixed contacts, four moving contacts, springs and the necessary screws.

| For contactors | Weight (kg) | Order Code |
|----------------|-------------|------------|
| A/AF 45-40     | 0.150       | ZLT45      |
| A/AF 50-40     | 0.150       | ZLT50      |
| A/AF 75-40     | 0.160       | ZLT75      |

The contact sets for 4-pole contactors consist of eight fixed contacts, four moving contacts, springs and the necessary screws. In addition, the sets include four moving arcing contacts for EK370...EK1000 contactors.

| For contactors | Weight (kg) | Order Code |
|----------------|-------------|------------|
| EK 110         | 0.450       | KZK110     |
| EK 150         | 0.450       | KZK150     |
| EK 175         | 0.700       | KZK175     |
| EK 210         | 0.700       | KZK210     |
| EK 370         | 2.400       | KZK370     |
| EK 550         | 2.400       | KZK550     |
| EK 1000        | 3.000       | KZK1000    |

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# Mini contactors B6...B7, BC6...BC7

## Ordering details



B6-30-10



B6-30-10F



B6-30-10P



B7-30-10



B7-40-10



B7-40-10 + CAF6-11

| Rated current<br>AC-3<br>415 V<br>A                       | fitted<br>AC-1<br>< 40°C<br>A | Aux.<br>contacts<br><br>Kw | Footprint |   |    |    | Weight<br>kg | Order code |             |
|-----------------------------------------------------------|-------------------------------|----------------------------|-----------|---|----|----|--------------|------------|-------------|
|                                                           |                               |                            | H         | W | D  |    |              |            |             |
| <b>Screw</b> <b>3 &amp; 4 pole</b> <b>AC operation</b>    |                               |                            |           |   |    |    |              |            |             |
| 8.5                                                       | 20                            | 4                          | 1         | - | 58 | 53 | 47           | 0.18       | B6.30.10*   |
|                                                           |                               |                            | -         | 1 | 58 | 53 | 47           | 0.18       | B6.30.01*   |
|                                                           |                               |                            | -         | - | 58 | 53 | 47           | 0.18       | B6.40.00*   |
| 11.5                                                      | 20                            | 5.5                        | 1         | - | 58 | 53 | 47           | 0.18       | B7.30.10*   |
|                                                           |                               |                            | -         | 1 | 58 | 53 | 47           | 0.18       | B7.30.01*   |
|                                                           |                               |                            | -         | - | 58 | 53 | 47           | 0.18       | B7.40.00*   |
| <b>Flat pin</b> <b>3 &amp; 4 pole</b> <b>AC operation</b> |                               |                            |           |   |    |    |              |            |             |
| 8.5                                                       | 20                            | 4                          | 1         | - | 58 | 53 | 47           | 0.17       | B6.30.10F*  |
|                                                           |                               |                            | -         | 1 | 58 | 53 | 47           | 0.17       | B6.30.01F*  |
|                                                           |                               |                            | -         | - | 58 | 53 | 47           | 0.17       | B6.40.00F*  |
| 11.5                                                      | 20                            | 5.5                        | 1         | - | 58 | 53 | 47           | 0.17       | B7.30.10F*  |
|                                                           |                               |                            | -         | 1 | 58 | 53 | 47           | 0.17       | B7.30.01F*  |
|                                                           |                               |                            | -         | - | 58 | 53 | 47           | 0.17       | B7.40.00F*  |
| <b>Soldering pin</b> <b>3 pole</b> <b>AC operation</b>    |                               |                            |           |   |    |    |              |            |             |
| 8.5                                                       | 20                            | 4                          | 1         | - | 45 | 48 | 48           | 0.17       | B6.30.10P*  |
|                                                           |                               |                            | -         | 1 | 45 | 48 | 48           | 0.17       | B6.30.01P*  |
| 11.5                                                      | 20                            | 5.5                        | 1         | - | 45 | 48 | 48           | 0.17       | B7.30.10P*  |
|                                                           |                               |                            | -         | 1 | 45 | 48 | 48           | 0.17       | B7.30.01P*  |
| <b>Screw</b> <b>3 &amp; 4 pole</b> <b>DC operation</b>    |                               |                            |           |   |    |    |              |            |             |
| 8.5                                                       | 20                            | 4                          | 1         | - | 58 | 53 | 47           | 0.18       | BC6.30.10*  |
|                                                           |                               |                            | -         | 1 | 58 | 53 | 47           | 0.18       | BC6.30.01*  |
|                                                           |                               |                            | -         | - | 58 | 53 | 47           | 0.18       | BC6.40.00*  |
| 11.5                                                      | 20                            | 5.5                        | 1         | - | 58 | 53 | 47           | 0.18       | BC7.30.10*  |
|                                                           |                               |                            | -         | 1 | 58 | 53 | 47           | 0.18       | BC7.30.01*  |
|                                                           |                               |                            | -         | - | 58 | 53 | 47           | 0.18       | BC7.40.00*  |
| <b>Flat pin</b> <b>3 &amp; 4 pole</b> <b>DC operation</b> |                               |                            |           |   |    |    |              |            |             |
| 8.5                                                       | 20                            | 4                          | 1         | - | 58 | 53 | 47           | 0.17       | BC6.30.10F* |
|                                                           |                               |                            | -         | 1 | 58 | 53 | 47           | 0.17       | BC6.30.01F* |
|                                                           |                               |                            | -         | - | 58 | 53 | 47           | 0.17       | BC6.40.00F* |
| 11.5                                                      | 20                            | 5.5                        | 1         | - | 58 | 53 | 47           | 0.17       | BC7.30.10F* |
|                                                           |                               |                            | -         | 1 | 58 | 53 | 47           | 0.17       | BC7.30.01F* |
|                                                           |                               |                            | -         | - | 58 | 53 | 47           | 0.17       | BC7.40.00F* |
| <b>Soldering pin</b> <b>3 pole</b> <b>DC operation</b>    |                               |                            |           |   |    |    |              |            |             |
| 8.5                                                       | 20                            | 4                          | 1         | - | 45 | 48 | 48           | 0.17       | BC6.30.10P* |
|                                                           |                               |                            | -         | 1 | 45 | 48 | 48           | 0.17       | BC6.30.01P* |
| 11.5                                                      | 20                            | 5.5                        | 1         | - | 45 | 48 | 48           | 0.17       | BC7.30.10P* |
|                                                           |                               |                            | -         | 1 | 45 | 48 | 48           | 0.17       | BC7.30.01P* |

\*Please state coil voltage/frequency when ordering

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# Mini contactors VB6...VB7, VBC6...VBC7

## Reversing Pairs



VB 7-30-01

| Rated current<br>AC-3<br>415 V<br>A                                           | fitted<br>AC-1<br>< 40°C<br>A |     | Aux.<br>contacts<br>Kw |    | Footprint<br>H      W      D |    |      | Weight<br>kg | Order code |
|-------------------------------------------------------------------------------|-------------------------------|-----|------------------------|----|------------------------------|----|------|--------------|------------|
| <b>Screw                      3 pole                      AC operation</b>    |                               |     |                        |    |                              |    |      |              |            |
| 8.5                                                                           | 20                            | 4   | 1 -                    | 58 | 97                           | 47 | 0.34 | VB6.30.10*   |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VB6.30.01*   |            |
| 11.5                                                                          | 20                            | 5.5 | 1 -                    | 58 | 97                           | 47 | 0.34 | VB7.30.10*   |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VB7.30.01*   |            |
| <b>Flat pin                      3 pole                      AC operation</b> |                               |     |                        |    |                              |    |      |              |            |
| 8.5                                                                           | 20                            | 4   | 1 -                    | 58 | 97                           | 47 | 0.34 | VB6.30.10F*  |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VB6.30.01F*  |            |
| 11.5                                                                          | 20                            | 5.5 | 1 -                    | 58 | 97                           | 47 | 0.34 | VB7.30.10F*  |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VB7.30.01F*  |            |
| <b>Soldering pin      3 pole                      AC operation</b>            |                               |     |                        |    |                              |    |      |              |            |
| 8.5                                                                           | 20                            | 4   | 1 -                    | 58 | 97                           | 47 | 0.34 | VB6.30.10P*  |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VB6.30.01P*  |            |
| 11.5                                                                          | 20                            | 5.5 | 1 -                    | 58 | 97                           | 47 | 0.34 | VB7.30.10P*  |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VB7.30.01P*  |            |
| <b>Screw                      3 pole                      DC operation</b>    |                               |     |                        |    |                              |    |      |              |            |
| 8.5                                                                           | 20                            | 4   | 1 -                    | 58 | 97                           | 47 | 0.34 | VBC6.30.10*  |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VBC6.30.01*  |            |
| 11.5                                                                          | 20                            | 5.5 | 1 -                    | 58 | 97                           | 47 | 0.34 | VBC7.30.10*  |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VBC7.30.01*  |            |
| <b>Flat pin                      3 pole                      DC operation</b> |                               |     |                        |    |                              |    |      |              |            |
| 8.5                                                                           | 20                            | 4   | 1 -                    | 58 | 97                           | 47 | 0.34 | VBC6.30.10F* |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VBC6.30.01F* |            |
| 11.5                                                                          | 20                            | 5.5 | 1 -                    | 58 | 97                           | 47 | 0.34 | VBC7.30.10F* |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VBC7.30.01F* |            |
| <b>Soldering pin      3 pole                      DC operation</b>            |                               |     |                        |    |                              |    |      |              |            |
| 8.5                                                                           | 20                            | 4   | 1 -                    | 58 | 97                           | 47 | 0.34 | VBC6.30.10P* |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VBC6.30.01P* |            |
| 11.5                                                                          | 20                            | 5.5 | 1 -                    | 58 | 97                           | 47 | 0.34 | VBC7.30.10P* |            |
|                                                                               |                               |     | - 1                    | 58 | 97                           | 47 | 0.34 | VBC7.30.01P* |            |

\* Please state coil voltage/frequency when ordering

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# Mini Contactors 3 Pole BC6

## Interface Contactors



| Rated current<br>AC-3<br>415 V<br>A       | fitted<br>AC-1<br>< 40°C<br>A | Kw | Aux.<br>contacts | H  | Footprint<br>W | D  | Weight<br>kg | Order code      |
|-------------------------------------------|-------------------------------|----|------------------|----|----------------|----|--------------|-----------------|
| <b>Screw 3 pole DC 24v - 1.4w</b>         |                               |    |                  |    |                |    |              |                 |
| 8.5                                       | 20                            | 4  | 1 -              | 58 | 53             | 47 | 0.17         | BC6.30.10.1.4*  |
|                                           |                               |    | - 1              | 58 | 53             | 47 | 0.17         | BC6.30.01.1.4*  |
| <b>Flat pin 3 pole DC 24v - 1.4w</b>      |                               |    |                  |    |                |    |              |                 |
| 8.5                                       | 20                            | 4  | 1 -              | 58 | 53             | 47 | 0.17         | BC6.30.10.F1.4* |
|                                           |                               |    | - 1              | 58 | 53             | 47 | 0.17         | BC6.30.01.F1.4* |
| <b>Soldering pin 3 pole DC 24v - 1.4w</b> |                               |    |                  |    |                |    |              |                 |
| 8.5                                       | 20                            | 4  | 1 -              | 45 | 48             | 48 | 0.17         | BC6.30.10.P1.4* |
|                                           |                               |    | - 1              | 45 | 48             | 48 | 0.17         | BC6.30.01.P1.4* |

| Rated current<br>AC-3<br>415 V<br>A              | fitted<br>AC-1<br>< 40°C<br>A | Kw | Aux.<br>contacts | H  | Footprint<br>W | D  | Weight<br>kg | Order code      |
|--------------------------------------------------|-------------------------------|----|------------------|----|----------------|----|--------------|-----------------|
| <b>Screw 3 pole DC 17 ... 32v - 2.4w</b>         |                               |    |                  |    |                |    |              |                 |
| 8.5                                              | 20                            | 4  | 1 -              | 58 | 53             | 47 | 0.18         | BC6.30.10.2.4*  |
|                                                  |                               |    | - 1              | 58 | 53             | 47 | 0.18         | BC6.30.01.2.4*  |
| <b>Flat pin 3 pole DC 17 ... 32v - 2.4w</b>      |                               |    |                  |    |                |    |              |                 |
| 8.5                                              | 20                            | 4  | 1 -              | 58 | 53             | 47 | 0.18         | BC6.30.10.F2.4* |
|                                                  |                               |    | - 1              | 58 | 53             | 47 | 0.18         | BC6.30.01.F2.4* |
| <b>Soldering pin 3 pole DC 17 ... 32v - 2.4w</b> |                               |    |                  |    |                |    |              |                 |
| 8.5                                              | 20                            | 4  | 1 -              | 45 | 48             | 48 | 0.18         | BC6.30.10.P2.4* |
|                                                  |                               |    | - 1              | 45 | 48             | 48 | 0.18         | BC6.30.01.P2.4* |

Please consult us for 5.5kw version

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# Mini Relays 4 Pole K6/KC6

## Ordering details



KC6-40E-P

### AC Operation

#### Screw connection

#### 4 pole

#### Relay

| Rated current fitted<br>AC-1<br>< 40°C<br>A | Contact Configuration | Footprint |    |    | Weight<br>kg | Order code |
|---------------------------------------------|-----------------------|-----------|----|----|--------------|------------|
|                                             |                       | H         | W  | D  |              |            |
| 20                                          | 4 -                   | 58        | 53 | 47 | 0.18         | K6.40E*    |
|                                             | 3 1                   | 58        | 53 | 47 | 0.18         | K6.31Z*    |
|                                             | 2 2                   | 58        | 53 | 47 | 0.18         | K6.22Z*    |

#### Flat pin connection

#### 4 pole

#### Relay

|    |     |    |    |    |      |           |
|----|-----|----|----|----|------|-----------|
| 20 | 4 - | 58 | 53 | 47 | 0.17 | K6.40E-F* |
|    | 3 1 | 58 | 53 | 47 | 0.17 | K6.31Z-F* |
|    | 2 2 | 58 | 53 | 47 | 0.17 | K6.22Z-F* |

#### Soldering pin connection

#### 4 pole

#### Relay

|    |     |    |    |    |      |           |
|----|-----|----|----|----|------|-----------|
| 20 | 4 - | 45 | 48 | 48 | 0.18 | K6.40E-P* |
|    | 3 1 | 45 | 48 | 48 | 0.18 | K6.31Z-P* |
|    | 2 2 | 45 | 48 | 48 | 0.18 | K6.22Z-P* |

### DC Operation

#### Screw connection

#### 4 pole

#### Relay

| Rated current fitted<br>AC-1<br>< 40°C<br>A | Contact configuration | Footprint |    |    | Weight<br>kg | Order code |
|---------------------------------------------|-----------------------|-----------|----|----|--------------|------------|
|                                             |                       | H         | W  | D  |              |            |
| 20                                          | 4 -                   | 58        | 53 | 47 | 0.18         | KC6.40E*   |
|                                             | 3 1                   | 58        | 53 | 47 | 0.18         | KC6.31Z*   |
|                                             | 2 2                   | 58        | 53 | 47 | 0.18         | KC6.22Z*   |

#### Flat pin connection

#### 4 pole

#### Relay

|    |     |    |    |    |      |            |
|----|-----|----|----|----|------|------------|
| 20 | 4 - | 58 | 53 | 47 | 0.17 | KC6.40E-F* |
|    | 3 1 | 58 | 53 | 47 | 0.17 | KC6.31Z-F* |
|    | 2 2 | 58 | 53 | 47 | 0.17 | KC6.22Z-F* |

#### Soldering pin

#### 4 pole

#### Relay

|    |     |    |    |    |      |            |
|----|-----|----|----|----|------|------------|
| 20 | 4 - | 45 | 48 | 48 | 0.17 | KC6.40E-P* |
|    | 3 1 | 45 | 48 | 48 | 0.17 | KC6.31Z-P* |
|    | 2 2 | 45 | 48 | 48 | 0.17 | KC6.22Z-P* |

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# Accessories for mini contactors

## Ordering details



SST 182 91R



CAF6-11M

SST 011 98



Cover cap LT 6-B

SST 147 90R



Reversing  
connecting link  
BSM 6-30

SST 277 92R



### B, BC, K, KC Auxiliary contacts

| Mounting on       |   |   |  | Position   | Weight | Order code |
|-------------------|---|---|--|------------|--------|------------|
| B6.30.10 B7.30.10 | 1 | 1 |  | side       | 0.030  | CA6.11M    |
| B6.30.01 B7.30.01 | 1 | 1 |  | side       | 0.030  | CA6.11N    |
| B6.40.00 B7.40.00 | 1 | 1 |  | side       | 0.030  | CA6.11E    |
| B6.30.10 B7.30.10 | 1 | 1 |  | front face | 0.035  | CAF6.11M   |
| B6.30.10 B7.30.10 | 2 | - |  | front face | 0.035  | CAF6.20M   |
| B6.30.10 B7.30.10 | - | 2 |  | front face | 0.035  | CAF6.02M   |
| B6.30.01 B7.30.01 | 1 | 1 |  | front face | 0.035  | CAF6.11N   |
| B6.30.01 B7.30.01 | 2 | - |  | front face | 0.035  | CAF6.20N   |
| B6.30.01 B7.30.01 | - | 2 |  | front face | 0.035  | CAF6.02N   |
| B6.40.00 B7.40.00 | 1 | 1 |  | front face | 0.035  | CAF6.11E   |
| B6.40.00 B7.40.00 | 2 | - |  | front face | 0.035  | CAF6.20E   |
| B6.40.00 B7.40.00 | - | 2 |  | front face | 0.035  | CAF6.02E   |
| K, KC             | 1 | 1 |  | side       | 0.030  | CA6.11K    |
| K, KC             | 1 | 1 |  | front face | 0.035  | CAF6.11K   |
| K, KC             | 2 | - |  | front face | 0.035  | CAF6.20K   |
| K, KC             | - | 2 |  | front face | 0.035  | CAF6.02K   |

Note: Side or front mounted auxiliaries can be fitted, but not together.

### B, BC, K, KC Accessories

| Description           | Mounting on  | Weight kg | Order code |
|-----------------------|--------------|-----------|------------|
| with soldering pins   | B, BC, K, KC | 0.014     | LB6        |
| with soldering pins   | CA6.11       | 0.006     | LB6.CA     |
| identification marker | front face   | 0.017     | BA-50      |
| protective cover IP20 | B, BC, K, KC | 0.001     | LT6-B      |
| plunger (manual opp)  | B, BC, K, KC | 0.060     | BN6        |
| reversing links       | VB, VBC      | 0.010     | BSM6.30    |
| parallel links        | B, BC        | 0.001     | LP6        |

### T7 Thermal overloads

| Setting range A | Footprint<br>H W D | Weight kg | Order code |
|-----------------|--------------------|-----------|------------|
| 0.10 ... 0.16   | 55 45 56           | 0.070     | T7DU0.16   |
| 0.16 ... 0.24   | 55 45 56           | 0.070     | T7DU0.24   |
| 0.24 ... 0.40   | 55 45 56           | 0.070     | T7DU0.4    |
| 0.40 ... 0.60   | 55 45 56           | 0.070     | T7DU0.6    |
| 0.60 ... 1.0    | 55 45 56           | 0.070     | T7DU1.0    |
| 1.0 ... 1.6     | 55 45 56           | 0.070     | T7DU1.6    |
| 1.6 ... 2.4     | 55 45 56           | 0.070     | T7DU2.4    |
| 2.4 ... 4.0     | 55 45 56           | 0.070     | T7DU4.0    |
| 4.0 ... 6.0     | 55 45 56           | 0.070     | T7DU6.0    |
| 6.0 ... 9.0     | 55 45 56           | 0.070     | T7DU9.0    |
| 9.0 ... 12.0    | 55 45 56           | 0.070     | T7DU12.0   |

Note:

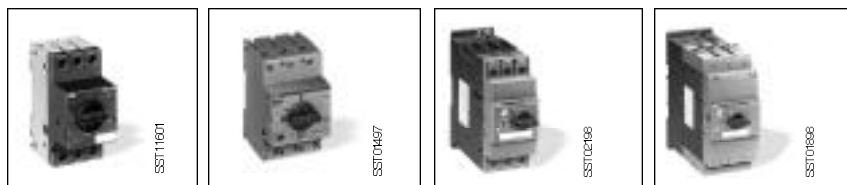
1 n/o + 1 n/c auxiliary contact fitted as standard to the overload

Dimension (H) is from the bottom of the contactor to the bottom of the overload

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# Manual Motor Starters

## Type series MS



| Manual motor starter | Type | MS 116 | MS 325 | MS 450 | MS 495 |
|----------------------|------|--------|--------|--------|--------|
|----------------------|------|--------|--------|--------|--------|

### General technical data

|                                                                                                                |             |                                      |                                      |     |                                      |     |                                      |     |
|----------------------------------------------------------------------------------------------------------------|-------------|--------------------------------------|--------------------------------------|-----|--------------------------------------|-----|--------------------------------------|-----|
| Standards: The devices comply with the major international, European and national regulations IEC 60../EN 60.. |             | 947-1<br>947-2<br>947-4-1<br>947-5-1 | 947-1<br>947-2<br>947-4-1<br>947-5-1 |     | 947-1<br>947-2<br>947-4-1<br>947-5-1 |     | 947-1<br>947-2<br>947-4-1<br>947-5-1 |     |
| Disconnecter characteristics (to IEC/EN 60947-1)                                                               |             | yes                                  | –                                    | yes | yes                                  | yes | yes                                  | yes |
| Mechanical service life in operations                                                                          |             | 100.000                              | 100.000                              |     | 50.000                               |     |                                      |     |
| Permissible ambient temperature                                                                                |             |                                      |                                      |     |                                      |     |                                      |     |
| - open                                                                                                         | °C          | – 20... + 55/70 <sup>1)</sup>        | – 25 ... + 55 <sup>1)</sup>          |     | – 20 ... + 60/70 <sup>1)</sup>       |     |                                      |     |
| - encapsulated (in protective housing)                                                                         | °C          | on request                           | – 25 ... + 40                        |     | – 20 ... + 35                        |     |                                      |     |
| - Storage temperature                                                                                          | °C          | – 50 ... + 80                        | – 50 ... + 80                        |     | – 50 ... + 80                        |     |                                      |     |
| Temperature compensation                                                                                       |             | with                                 |                                      |     |                                      |     |                                      |     |
| Mounting position                                                                                              |             | as illustrated <sup>6)</sup>         | any                                  |     |                                      |     |                                      |     |
| Permissible altitude m                                                                                         |             | 3000                                 | 3000                                 |     | 2000                                 |     |                                      |     |
| Permissible resistance to vibrations <sup>2)</sup><br>(IEC 68-2-6)                                             |             | 10-150 Hz<br>Amplitude 5 g           | 10-150 Hz<br>Amplitude 5 g           |     | on request                           |     | on request                           |     |
| Permissible resistance to shocks sinusoidal shock<br>(IEC 68-2-27)                                             |             | 25 g (11 ms)                         | 15 g (11 ms)                         |     | on request                           |     | on request                           |     |
| Mounting (mounting hardware not included in scope of delivery)                                                 |             |                                      |                                      |     |                                      |     |                                      |     |
| Screw fixing                                                                                                   |             | see accessories                      | see accessories                      |     | 2 x M5                               |     | 2 x M5                               |     |
| Quick fastening                                                                                                | to EN 50022 | 35 mm                                | 35 mm                                |     | 35 mm                                |     | 35 mm,                               |     |
| on top-hat rail                                                                                                | to EN 50023 | –                                    | –                                    |     | (15 mm high)<br>–                    |     | 75 mm                                |     |
| Electrical connection<br>of the main conductors (main circuits)                                                |             |                                      |                                      |     |                                      |     |                                      |     |
| Type                                                                                                           |             | Screw terminal                       | Box terminal                         |     | Box terminal<br>+ bus                |     | Box terminal                         |     |
| Screw                                                                                                          |             | Pozidrive size 2                     | Pozidrive size 2                     |     | Pozidrive size 2<br>4 mm             |     | Internal hexagon                     |     |
| Single-core1 x mm2                                                                                             |             | 1 ... 4                              | 1 ... 10                             |     | 0.75 ... 35                          |     | 2.5 ... 70                           |     |
| 2 x mm2                                                                                                        |             | 1 ... 4                              | 1 ... 4                              |     | 0.75 ... 25                          |     | 2.5 ... 50                           |     |
| Stranded1 x mm2                                                                                                |             | 1 ... 4                              | 1 ... 10                             |     | 0.75 ... 35                          |     | 2.5 ... 70                           |     |
| 2 x mm2                                                                                                        |             | 1 ... 4                              | –                                    |     | 0.75 ... 25                          |     | 2.5 ... 50                           |     |
| Flexible1 x mm2                                                                                                |             | 0.75 ... 2.5                         | 1 ... 6                              |     | 0.75 ... 25                          |     | 2.5 ... 50                           |     |
| 2 x mm2                                                                                                        |             | 0.75 ... 2.5                         | –                                    |     | 0.75 ... 16                          |     | 2.5 ... 35                           |     |
| of the auxiliary conductors (auxiliary circuits)                                                               |             |                                      |                                      |     |                                      |     |                                      |     |
| Type                                                                                                           |             | Screw<br>terminal                    | Screw<br>terminal <sup>4)</sup>      |     |                                      |     | Screw<br>terminal                    |     |
| Screw                                                                                                          |             | Pozidrive size 2                     | Pozidrive size 1                     |     |                                      |     | Pozidrive size 2                     |     |
| Single-core1 x mm2                                                                                             |             | 1 ... 2.5                            | 0.5 ... 2.5                          |     |                                      |     | 0.5 ... 2.5                          |     |
| 2 x mm2                                                                                                        |             | 1 ... 2.5 <sup>5)</sup>              | 0.5 ... 2.5                          |     |                                      |     | 0.5 ... 2.5                          |     |
| Flexible1 x mm2                                                                                                |             | 0.75 ... 2.5                         | 0.5 ... 2.5                          |     |                                      |     | 0.5 ... 1.5                          |     |
| 2 x mm2                                                                                                        |             | 0.75 ... 2.5                         | 0.5 ... 2.5                          |     |                                      |     | 0.5 ... 1.5                          |     |

1) Operating conditions up to 70° C on request

3) Also applies to auxiliary switches HKF1 and undervoltage release UA1

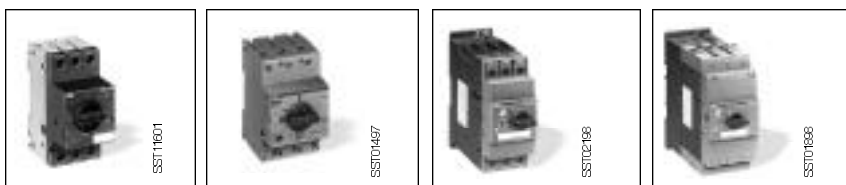
5) Applies to auxiliary switches HK1 and SK1

2) G-values refer to the mounting position subject to the highest shock sensitivity

4) For auxiliary switch HKF.. Pozidrive 2

6) Other mounting positions on request

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| Manual motor starter | Type | MS 116 | MS 325 | MS 450 | MS 495 |
|----------------------|------|--------|--------|--------|--------|
|----------------------|------|--------|--------|--------|--------|

|                                                                                                                     |              |            |               |                    |                  |
|---------------------------------------------------------------------------------------------------------------------|--------------|------------|---------------|--------------------|------------------|
| General electrical data                                                                                             |              |            |               |                    |                  |
| Rated insulation voltage $U_i$                                                                                      |              |            |               |                    |                  |
| to EN 60947                                                                                                         | V AC         | 690        | 690           | 690                | 690              |
| to CSA / UL / NEMA                                                                                                  | V AC         | 600        | 600           | 600                | 600              |
| Rated operating voltage $U_e$ up to                                                                                 |              | V          | 690 AC/440 DC | 690 AC/440 DC      | 690 AC/440 DC    |
| Rated impulse strength $U_{imp}$                                                                                    |              | kV         | 6             | – / 6              | 6                |
| Rated continuous thermal current $I_{th}$                                                                           |              | A          | 16            | 25                 | 50               |
| Rated operating current $I_e$ / AC 3 max.                                                                           |              |            |               |                    |                  |
| Rated frequency <sup>1)</sup>                                                                                       |              | Hz         | 50/60         |                    |                  |
| Rated current ranges $I_e$<br>(number of ranges)                                                                    |              | A          |               | 0.1 ... 25<br>(14) | 11 ... 50<br>(7) |
| Rated service short-circuit breaking capacity $I_{cs}$ and max. permissible back-up fuses on request                |              |            |               |                    |                  |
| DC rated operating voltage<br>in the case of series connection<br>of 3 main circuits<br>(wiring diagram on request) |              |            |               |                    |                  |
|                                                                                                                     | DC 1, 60 V A | on request | 25            | 50                 | 100              |
|                                                                                                                     | DC 3, 60 V A | on request | 25            | 50                 | 100              |
|                                                                                                                     | DC 5, 60 V A | on request | 25            | 50                 | 100              |
| Short circuit capacity for DC-rating                                                                                |              |            |               | on request         |                  |

|                                       |                       |            |         |                            |
|---------------------------------------|-----------------------|------------|---------|----------------------------|
| <b>Auxiliary circuits</b>             |                       |            |         |                            |
| Rated operating current $I_e$         | at AC 15 to 24 V AC A | 6          | 2.5     | –                          |
|                                       | 230 V AC A            | 4          | 2       | 3 / 0.5 / 6                |
|                                       | 400 V AC A            | 3          | 1       | 1.5 / – / 3                |
|                                       | at DC 13 to 24 V DC A | 2          | 2.5     | <sup>1) 2)</sup> – / – / – |
|                                       | 60 V DC A             | –          | 2.5     | – / 0.15 / –               |
|                                       | 110 V DC A            | 0.5        | 0.6     | 0.22 / – / 0.5             |
|                                       | 220 V DC A            | 0.25       | 0.25    | 0.1 / – / 0.25             |
|                                       | 440 V DC A            | 0.1        | –       | – / – / 0.1                |
| Short-circuit protection back-up fuse | gL A<br>aM A          | on request | 10<br>6 | gL / gG 10 A<br>–          |

1) Correction factors for other frequencies on request

2) On front side 1 changeover contact/on front side 1 NO + 1 NC / at side 1 NO + 1 NC, 2 NO, 2 NC

3) Other data on request

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# Manual Motor Starter

## MS 116



MS 116

SST11601



HKF 1-11

STO23014



MS 116 with mini contactor B6

MS116x3b



MS 116 with A-contactor

MS116x3b

Open design, enclosure IP 20, resistant to changeable climates. Quick fastening on mounting rails DIN EN 50 022, 35 mm without auxiliary switch.

Setting range

A...A

Weight

kg

Order code

MS 116 with thermal and electromagnetic trips, short-circuit-proof up to 50 kA

|                |       |               |
|----------------|-------|---------------|
| 0.10....0.16   | 0.268 | MS 116 - 0.16 |
| 0.16....0.25   | 0.268 | MS 116 - 0.25 |
| 0.25....0.40   | 0.268 | MS 116 - 0.4  |
| 0.40....0.63   | 0.268 | MS 116 - 0.63 |
| 0.63....1.00   | 0.268 | MS 116 - 1.0  |
| 1.00....1.60   | 0.268 | MS 116 - 1.6  |
| 1.60....2.50   | 0.268 | MS 116 - 2.5  |
| 2.50....4.00   | 0.268 | MS 116 - 4    |
| 4.00....6.30   | 0.268 | MS 116 - 6.3  |
| 6.30....10.00  | 0.268 | MS 116 - 10.0 |
| 10.00....16.00 | 0.268 | MS 116 - 16.0 |

### Accessories

Auxiliary switches, for front-panel installation

1 NO + 1 NC

Order code

HKF1-11

Auxiliary switches, lateral attachment at right

1 NO + 1 NC

2 NO

2 NC

HK1-11

HK1-20

HK1-02

Signal kontakt for general "tripped" signal, lateral attachment at right

1 NO + 1 NC

2 NO

2 NC

SK1-11

SK1-20

SK1-02

Undervoltage release, lateral attachment at left

24 V, 50 Hz

48 V, 50 Hz

60 V, 50 Hz

110/120 V, 50/60 Hz

208 V, 60 Hz

230 V, 50 Hz

400 V, 50 Hz

415 V, 50 Hz

UA1-24

UA1-48

UA1-60

UA1-110

UA1-208

UA1-230

UA1-400

UA1-415

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# Manual Motor Starter

## MS116

### Accessories

| Description                                      | Order code |
|--------------------------------------------------|------------|
| Phase buses for cross wiring MS 116, 63 A, 690 V |            |
| for 2 devices without auxiliary switches         | PS1-2-0    |
| for 3 devices without auxiliary switches         | PS1-3-0    |
| for 4 devices without auxiliary switches         | PS1-4-0    |
| for 5 devices without auxiliary switches         | PS1-5-0    |
| for 2 devices with 1 auxiliary switch            | PS1-2-1    |
| for 3 devices with 1 auxiliary switch            | PS1-3-1    |
| for 4 devices with 1 auxiliary switch            | PS1-4-1    |
| for 5 devices with 1 auxiliary switch            | PS1-5-1    |
| for 2 devices with 2 auxiliary switches          | PS1-2-2    |
| for 3 devices with 2 auxiliary switches          | PS1-3-2    |
| for 4 devices with 2 auxiliary switches          | PS1-4-2    |
| for 5 devices with 2 auxiliary switches          | PS1-5-2    |
| Busbar cover                                     | BSI-3      |

### Power infeed blocks, 63 A, 690 V, stranded 25 mm<sup>2</sup>, flexible 16 mm<sup>2</sup>

|      |       |
|------|-------|
| flat | S1-M1 |
| high | S1-M2 |

### Mounted enclosure IP 65, triple lockable in Off position, with N- und PE-terminal, metric cable gland

|                                  |          |
|----------------------------------|----------|
| Grey enclosure with black handle | IB 116-G |
| Yellow enclosure with red handle | IB 116-Y |

### Switch cubicle mounting kit IP 65, with axial extension triple lockable in Off position, locked in On position

|                                    |          |
|------------------------------------|----------|
| Twist knob black                   | OHB2AJM  |
| Twist knob red/yellow              | OHY2AJM  |
| axis 85 mm                         | OXS5X85  |
| axis 105 mm                        | OXS5X105 |
| axis 130 mm                        | OXS5X130 |
| axis 180 mm                        | OXS5X180 |
| driver <sup>1)</sup>               | MSMN     |
| driver spindle 32 mm <sup>2)</sup> | MSOX     |

### Locking device

|                                                       |     |
|-------------------------------------------------------|-----|
| lock adapter                                          | SA1 |
| locking device assy =(adaptor sai + padlock + 3 keys) | SA3 |

For connecting links between MMS + contactor (see page x/xx)

- 1) For accommodating spindle and attachment to manual motor starter  
2) Is screwed directly onto the manual motor starter

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# Manual Motor Starter

## MS 325



### Selection

Open design, enclosure IP 20, resistant to changeable climates. Quick fastening on mounting rails DIN EN 50 022, 35.

| Setting range<br>A...A                                                                                         | Weight<br>kg | Order code    |
|----------------------------------------------------------------------------------------------------------------|--------------|---------------|
| MS 325 with thermal and electromagnetic trips,<br>short-circuit-proof up to 100 kA, resp.50 kA <sup>1)2)</sup> |              |               |
| 0.10....0.16                                                                                                   | 0.347        | MS 325 – 0.16 |
| 0.16....0.25                                                                                                   | 0.347        | MS 325 – 0.25 |
| 0.25....0.40                                                                                                   | 0.347        | MS 325 – 0.4  |
| 0.40....0.63                                                                                                   | 0.347        | MS 325 – 0.63 |
| 0.63....1.00                                                                                                   | 0.347        | MS 325 – 1    |
| 1.00....1.60                                                                                                   | 0.347        | MS 325 – 1.6  |
| 1.60....2.50                                                                                                   | 0.347        | MS 325 – 2.5  |
| 2.50....4.00                                                                                                   | 0.347        | MS 325 – 4    |
| 4.00....6.30                                                                                                   | 0.347        | MS 325 – 6.3  |
| 6.30....9.00                                                                                                   | 0.347        | MS 325 – 9    |
| 9.00 ....12.50                                                                                                 | 0.347        | MS 325 – 12.5 |
| 12.50....16.00                                                                                                 | 0.347        | MS 325 – 16   |
| 16.00....20.00                                                                                                 | 0.347        | MS 325 – 20   |
| 20.00....25.00                                                                                                 | 0.347        | MS 325 – 25   |

Magnetic only versions on application



### Accessories

| Setting range                                                            | Weight<br>kg | Order code |
|--------------------------------------------------------------------------|--------------|------------|
| Auxiliary switches, lateral attachment at left, max. 2 pieces attachable |              |            |
| 1 NO + 1 NC                                                              | 0.031        | HK-11      |
| 2 NO                                                                     | 0.031        | HK-20      |
| 2 NC                                                                     | 0.031        | HK-02      |

Signal contact for general “tripped” signal, lateral attachment at the left max. 1 piece attachable

|             |       |       |
|-------------|-------|-------|
| 1 NO + 1 NC | 0.031 | SK-11 |
|-------------|-------|-------|

#### Locking device

|                                                       |       |     |
|-------------------------------------------------------|-------|-----|
| lock adapter                                          | 0.004 | SA1 |
| locking device assy. (Adapter SA1 + padlock + 3 keys) | 0.050 | SA3 |

For other accessories please consult us.  
For connecting links between MMS and contactor see page ??



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# Manual Motor Starters

## MS 4xx

Open design, enclosure IP 20, resistant to changeable climates. Quick fastening on mounting rails DIN EN 50 022, 35 mm without auxiliary switch



| Setting range<br>A . . . A                                                                           | Weight<br>kg | Order code  |
|------------------------------------------------------------------------------------------------------|--------------|-------------|
| MS 450 with thermal and electromagnetic trips,<br>tripping class 10, short-circuit-proof up to 50 kA |              |             |
| 11....16                                                                                             | 0.96         | MS 450 – 16 |
| 14....20                                                                                             | 0.96         | MS 450 – 20 |
| 18....25                                                                                             | 0.96         | MS 450 – 25 |
| 22....32                                                                                             | 0.96         | MS 450 – 32 |
| 28....40                                                                                             | 0.96         | MS 450 – 40 |
| 36....45                                                                                             | 0.96         | MS 450 – 45 |
| 40....50                                                                                             | 0.96         | MS 450 – 50 |

|                                                                                                      |     |              |
|------------------------------------------------------------------------------------------------------|-----|--------------|
| MS 495 with thermal and electromagnetic trips,<br>tripping class 10, short-circuit-proof up to 50 kA |     |              |
| 28....40                                                                                             | 2.1 | MS 495 – 40  |
| 36....50                                                                                             | 2.1 | MS 495 – 50  |
| 45....63                                                                                             | 2.1 | MS 495 – 63  |
| 57....75                                                                                             | 2.1 | MS 495 – 75  |
| 70....90                                                                                             | 2.1 | MS 495 – 90  |
| 80....100 <sup>2)</sup>                                                                              | 2.1 | MS 495 – 100 |

Magnetic only and heavy duty starving versions on application

### Retrofittable accessories

These parts may be procured in addition to the MS 4xx.  
They must be mounted by the user.

| Type                                             | Weight<br>kg | Order code |
|--------------------------------------------------|--------------|------------|
| Auxiliary switches, for front panel installation |              |            |
| 1 NO + 1 NC                                      | 0.02         | HK4-11     |
| 1 Changeover                                     | 0.02         | HK4-W      |

|                                                                         |      |         |
|-------------------------------------------------------------------------|------|---------|
| Auxiliary switches, for lateral attachment<br>at left, max. 1 mountable |      |         |
| 1 NO + 1 NC                                                             | 0.03 | HKS4-11 |
| 2 NO                                                                    | 0.03 | HKS4-20 |
| 2 NC                                                                    | 0.03 | HKS4-02 |

|                                                                                                                                                                      |      |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------|
| Pilot switch, for separate signalling of short-circuit<br>and general tripping, lateral attachment at left, max. 1<br>mountable, also together with auxiliary switch |      |        |
| for any signal 1 NO + 1 NC                                                                                                                                           | 0.07 | SK4-11 |

For other accessories please consult us.  
For connecting links between MMS and contactor see page ??

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# BEA 7 ... BEA 110

## Connecting Links for Contactors and Manual Motor Starters

### Application

The BEA... connecting link is used for direct linking between a contactor and the associated manual motor starter which are used together as DOL Starter Combination in type 1 or type 2 co-ordination, complying with IEC 60947-4-1 and EN 60947-4-1.

Database of co-ordination tables on the ABB Website:  
[www.abb.com/lowvoltage](http://www.abb.com/lowvoltage) + left menu: "Low Voltage On-Line" + select: "Support Tools".

### Description

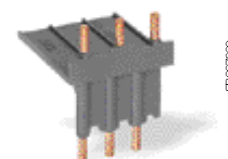
The BEA... insulated 3-pole connecting link (touch safe) ensures the electrical linking between the contactor and the corresponding manual motor starter.

The BEA... connecting links can be used with the A... series contactors (including AF..., AE... versions) and the MS... manual motor starter as indicated in the table below.

| For contactors & fixing | Screws not supplied | For MMS & fixing | Screws / rail not supplied | I <sub>e</sub> max. AC-3 400 V A | Weight kg | Order code  |
|-------------------------|---------------------|------------------|----------------------------|----------------------------------|-----------|-------------|
| B6, VB6A                | -                   | MS116            | 15 x 35 mm                 | 8                                | 0.013     | BEA7/116    |
| B7, VB7A                | -                   | MS116            |                            | 11                               | 0.013     | BEA7/116    |
| B6, VB6A                | -                   | MS325            |                            | 8                                | 0.021     | BEA7/325    |
| B7, VB7A                | -                   | MS325            |                            | 11                               | 0.021     | BEA7/325    |
| A 9                     | -                   | MS 116           | 15 x 35 mm                 | 9                                | 0.020     | BEA 16/116  |
| A 12                    | -                   | MS 116           |                            | 12                               | 0.020     | BEA 16/116  |
| A 16                    | -                   | MS 116           |                            | 16                               | 0.020     | BEA 16/116  |
| A 26                    | 2 x M4              | MS 116           |                            | 25                               | 0.024     | BEA 26/116  |
| A 9                     | -                   | MS 325           | 15 x 35 mm                 | 9                                | 0.031     | BEA 16/325  |
| A 12                    | -                   | MS 325           |                            | 12                               | 0.031     | BEA 16/325  |
| A 16                    | -                   | MS 325           |                            | 16                               | 0.031     | BEA 16/325  |
| A 26                    | 2 x M4              | MS 325           |                            | 25                               | 0.031     | BEA 26/325  |
| A 30                    | 2 x M4              | MS 450           | 2 x M5                     | 32                               | 0.061     | BEA 40/450  |
| A 40                    | 2 x M4              | MS 450           | 2 x M5                     | 37                               | 0.061     | BEA 40/450  |
| A 50                    | 2 x M4              | MS 450           | 2 x M5                     | 50                               | 0.062     | BEA 50/450  |
| A 50                    | 2 x M6              | MS 495           | 2 x M5                     | 50                               | 0.120     | BEA 75/495  |
| A 63                    | 2 x M6              | MS 495           | 2 x M5                     | 63                               | 0.120     | BEA 75/495  |
| A 75                    | 2 x M6              | MS 495           | 2 x M5                     | 75                               | 0.120     | BEA 75/495  |
| A 90                    | 2 x M6              | MS 495           | 2 x M5                     | 90                               | 0.124     | BEA 110/495 |
| A 110                   | 2 x M6              | MS 495           | 2 x M5                     | 100                              | 0.124     | BEA 110/495 |



BEA 16/116



BEA 40/450



A 9-30-10 + BEA 16/116 + MS 116  
DOL Starter Combination

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# FBP FieldBusPlug

## Communicative Motor Starters - Compact Devices



MSD11-FBP



MSR22-FBP



### Motorstarter Direct MSD11-FBP

Motor Branch circuit for 1 motor, 1 direction of rotation, IP20.

- Motor protection with thermal and electromagnetic trip
- Compact device with fieldbus-independent interface for connection to FBP fieldbus connector
- 400 V AC, max. 12 A, incl. motor connector,  $I_{es} = 10...50$  kA

| Designation |   | Setting Range |   | Order Code     |
|-------------|---|---------------|---|----------------|
| 0.16        | A | 0.1 - 0.16    | A | MSD11-FBP.0.16 |
| 0.25        | A | 0.16 - 0.25   | A | MSD11-FBP.0.25 |
| 0.40        | A | 0.25 - 0.40   | A | MSD11-FBP.0.4  |
| 0.63        | A | 0.40 - 0.63   | A | MSD11-FBP.0.63 |
| 1.0         | A | 0.63 - 1.0    | A | MSD11-FBP.1    |
| 1.6         | A | 1.0 - 1.6     | A | MSD11-FBP.1.6  |
| 2.5         | A | 1.6 - 2.5     | A | MSD11-FBP.2.5  |
| 4.0         | A | 2.5 - 4.0     | A | MSD11-FBP.4.0  |
| 6.3         | A | 4.0 - 6.3     | A | MSD11-FBP.6.3  |
| 10.0        | A | 6.3 - 10      | A | MSD11-FBP.10   |
| 12.0        | A | 8 - 12.0      | A | MSD11-FBP.12   |

### Motorstarter Direct MSR22-FBP

Motor Branch circuit for 1 motor, 2 directions of rotation, IP20.

- Motor protection with thermal and electromagnetic trip
- Compact device with fieldbus-independent interface for connection to FBP fieldbus connector
- 400 V AC, max. 12 A, incl. motor connector,  $I_{es} = 10...50$  kA

| Designation |   | Setting Range |   | Order Code     |
|-------------|---|---------------|---|----------------|
| 0.16        | A | 0.1 - 0.16    | A | MSR22-FBP.0.16 |
| 0.25        | A | 0.16 - 0.25   | A | MSR22-FBP.0.25 |
| 0.40        | A | 0.25 - 0.40   | A | MSR22-FBP.0.4  |
| 0.63        | A | 0.40 - 0.63   | A | MSR22-FBP.0.63 |
| 1.0         | A | 0.63 - 1.0    | A | MSR22-FBP.1    |
| 1.6         | A | 1.0 - 1.6     | A | MSR22-FBP.1.6  |
| 2.5         | A | 1.6 - 2.5     | A | MSR22-FBP.2.5  |
| 4.0         | A | 2.5 - 4.0     | A | MSR22-FBP.4.0  |
| 6.3         | A | 4.0 - 6.3     | A | MSR22-FBP.6.3  |
| 10.0        | A | 6.3 - 10      | A | MSR22-FBP.10   |
| 12.0        | A | 8 - 12.0      | A | MSR22-FBP.12   |

### Accessories for Motor Starters MSD11-FBP and MSR22-FBP

Busbar blocks for MSD11-FBP and MSR22-FBP for cross wiring.

Feeder block for busbar blocks MSD11-FBP and MSR22-FBP.

- Current-carrying capacity max.63 A, connection cross-section 25/16mm<sup>2</sup> multipole/fine-wire

| Designation                | Order Code |
|----------------------------|------------|
| Busbar block for 2 devices | PS1-2-0    |
| Busbar block for 3 devices | PS1-3-0    |
| Busbar block for 4 devices | PS1-4-0    |
| Busbar block for 5 devices | PS1-5-0    |
| Feeder block, flat design  | S1-M1      |
| Feeder block, high         | S1-M2      |

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# FBP FieldBusPlug

## Communicative Motor Starters with Control Function



MFI 21

### Motorstarter Fieldbus Interface MFI21-FBP

Fieldbus interface, IP20, for coupling to manual motor starter MS 325.

- Integrated motor control functions - direct, reverse-start, star-delta starting, diagnostic functions
- Integrated potentiometer, 3 digital inputs, 3 relay outputs, 1 direct-coupled digital input for detection of switch position of the MS 325
- Fieldbus-independent interface for connection to FBP fieldbus connector

| Designation                     | Order Code  |
|---------------------------------|-------------|
| Motorstarter Fieldbus Interface | MFI21-FBP.0 |

\*) Manual motor starter MS325 and accessories for MS 325, refer to main switch and technology catalogue



UMC 22

### Universal Motor Controller UMC22-FBP

Universal motor controller with thermal overload protection 0.2-63A in a single device type.

- Bushing-type current transformer, cable cross-section 25mm<sup>2</sup>
- Integrated motor control functions - direct, reverse-start, star-delta starting, servo-drive functions
- Diagnostic functions - overload, phase failure, trip - trip categories 10,20,30
- Integrated storage of parameters and motor data
- 6 digital inputs, 3 relay outputs
- Fieldbus-independent interface for connection to FBP fieldbus connector

| Designation                | Rated motor current | Order Code  |
|----------------------------|---------------------|-------------|
| Universal Motor Controller | 0.2 - 63 A          | UMC22-FBP.0 |

### Accessories for Universal Motor Controller UMC22-FBP

Busbar blocks for MSD11-FBP and MSR22-FBP for cross wiring.

Feeder block for busbar blocks MSD11-FBP and MSR22-FBP.

- Current-carrying capacity max.63 A, connection cross-section 25/16mm<sup>2</sup> multipole/fine-wire

| Designation   | Order Code |
|---------------|------------|
| Control Panel | ACS100-PAN |



Display - UMC 22

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# FBP FieldBusPlug

## Communicative Motor Starters - Compact Devices

(Please consult us for availability of other protocol's)

### AS-i FieldBusPlug Direct

Ready-made AS-i Slave fieldbus interface with various cable lengths.

- Applicable on the MSD11-FBP and on devices with max. 2 input signals and 1 output signal
- Degree of protection IP65, diagnostic LED

| Designation<br>FieldBusPlug | Cable Length |   | Order Code    |
|-----------------------------|--------------|---|---------------|
| AS-i Direct                 | 0.25         | m | ASD11-FBP.025 |
| AS-i Direct                 | 0.50         | m | ASD11-FBP.050 |
| AS-i Direct                 | 1.00         | m | ASD11-FBP.100 |
| AS-i Direct                 | 5.00         | m | ASD11-FBP.500 |

Field Bus Plug Direct

### AS-i FieldBusPlug Performance

Ready-made AS-i Slave fieldbus interface with various cable lengths.

- Applicable on all FBP motor starters and devices with max. 4 input signals and 3 output signals
- Degree of protection IP65, diagnostic LED

| Designation      | Cable Length |   | Order Code    |
|------------------|--------------|---|---------------|
| AS-i Performance | 0.25         | m | ASP22-FBP.025 |
| AS-i Performance | 0.50         | m | ASP22-FBP.050 |
| AS-i Performance | 1.00         | m | ASP22-FBP.100 |
| AS-i Performance | 5.00         | m | ASP22-FBP.500 |

Field Bus Plug Performance

### Accessories for AS-i Bus Connection

AS-i round cable for bus junctions

Ready-made bus cable with an M12 connector and an open cable end.

- Application on bus junctions such e.g. AS-i couplers or devices with an integrated AS-i interface

| Designation                               | Cable Length |   | Order Code    |
|-------------------------------------------|--------------|---|---------------|
| AS-i Round Cable<br>with female connector | 0.30         | m | ASF11-FBP.030 |
| AS-i Round Cable<br>with male connector   | 0.30         | m | ASM11-FBP.030 |

ST04901 ST05001

AS-i round cable for bus extension

Ready-made bus cable with M12 male and female connectors

| Designation          | Cable Length |   | Order Code    |
|----------------------|--------------|---|---------------|
| AS-i Extension Cable | 1.00         | m | ASX11-FBP.100 |
| AS-i Extension Cable | 3.00         | m | ASX11-FBP.300 |
| AS-i Extension Cable | 5.00         | m | ASX11-FBP.500 |

ST05101

AS-i round cable and accessories for bus extension

Bus cable and coupling accessories

| Designation                                    | Cable Length |   | Order Code    |
|------------------------------------------------|--------------|---|---------------|
| AS-i Extension Cable                           | 100          | m | ASC11-FBP.999 |
| AS-i Round Cable, male conn.                   |              |   | ASM11-FBP.0   |
| AS-i Round Cable, female conn.                 |              |   | ASF11-FBP.0   |
| AS-i Flat-Cable Branch Circuit with M12 socket |              |   | AST11-FBP.0   |

ST05501

ST05701

AS-i addressing device, power unit, miscellaneous accessories

| Designation                                 | Order Code     |
|---------------------------------------------|----------------|
| AS-i Addr. Device, incl. plug-in power unit | ASA21-FBP.0    |
| Power Unit PS 24V/5A, adjustable            | Systron PS24/5 |
| Address Signs for FieldBusPlug              | CAL11-FBP.0    |

ST05601

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# FBP FieldBusPlug

## DeviceNet Fieldbus Connectors and Accessories

(Please consult us for availability of other protocol's)

### DeviceNet FieldBusPlug

Ready-made DeviceNet fieldbus interface with various cable lengths.

- Applicable on all FBP motor starters and other devices
- Degree of protection IP65, diagnostic LED

| Designation<br>FieldBusPlug | Cable Length |   | Order Code    |
|-----------------------------|--------------|---|---------------|
| DeviceNet                   | 0.25         | m | DNP21-FBP.025 |
| DeviceNet                   | 0.50         | m | DNP21-FBP.050 |
| DeviceNet                   | 1.00         | m | DNP21-FBP.100 |
| DeviceNet                   | 5.00         | m | DNP21-FBP.500 |

B10

### Accessories for the DeviceNet Bus Connector

DeviceNet round cable for bus junctions

Ready-made bus cable with an M12 connector and an open cable end.

- Application on bus junctions such e.g. DeviceNet couplers or devices with an integrated DeviceNet interface

| Designation                                 | Cable Length |   | Order Code    |
|---------------------------------------------|--------------|---|---------------|
| DeviceNet Round Cable with female connector | 0.50         | m | DNF11-FBP.050 |
| DeviceNet Round Cable with male connector   | 0.50         | m | DNM11-FBP.050 |

ST05301

ST05201

DeviceNet round cable for bus extension

Ready-made bus cable with M12 male and female connectors

| Designation               | Cable Length |   | Order Code    |
|---------------------------|--------------|---|---------------|
| DeviceNet Extension Cable | 1.00         | m | DNX11-FBP.100 |
| DeviceNet Extension Cable | 3.00         | m | DNX11-FBP.300 |
| DeviceNet Extension Cable | 5.00         | m | DNX11-FBP.500 |

ST04801

DeviceNet round cable and accessories for bus extension

Bus cable and coupling accessories

| Designation                         | Cable Length |   | Order Code    |
|-------------------------------------|--------------|---|---------------|
| DeviceNet Extension Cable           | 100          | m | DNC11-FBP.999 |
| DeviceNet Round Cable, male conn.   |              |   | DNM11-FBP.0   |
| DeviceNet Round Cable, female conn. |              |   | DNF11-FBP.0   |

ST05501

ST05701

ST05401

Termination Resistor, Power Unit, Miscellaneous Accessories

| Designation                      | Extra Information | Order Code    |
|----------------------------------|-------------------|---------------|
| DeviceNet Termination Resistor   | 120 Ohm           | DNR11-FBP.120 |
| Power Unit PS 24V/5A, adjustable |                   | Syston PS24/5 |

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**Notes**

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# Softstarters

## Description

### Softstarters type PS S

ABB's solid state starter range is used when it is important to have a smooth start-up of various types of motor drives. Instead of switching directly to full voltage the softstarter ensures a gradual voltage increase.

**PS S 03...PS S 25** is a compact solution for small motors. Mounting is on 35 mm DIN-rail. This small softstarter has a built-in bypass contact.

**PS S 18/30...PS S 300/515** for normal duty applications and connection both "In Line" and "Inside Delta" (compare the connection with a standard Y/D starter). The result of "Inside Delta" connection is a 42 % reduction of the current exposed to the softstarter. It will then be possible, for example, to start and run a 100 A motor using a 58 A softstarter.

An optional "Current limit" function is available. Two signal relays are built in as standard. This softstarter has a service factor of 1.15, which means that the maximum operational current is  $I_e$  (rated current)  $\times 1.15$ .

Example: the PS S 18/30 connected in-line has an  $I_e$  of 18 A. The maximum operational current is then  $1.15 \times 18 \text{ A} = 20.7 \text{ A}$ .



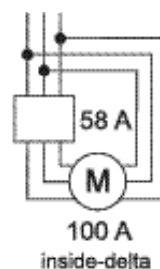
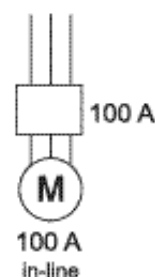
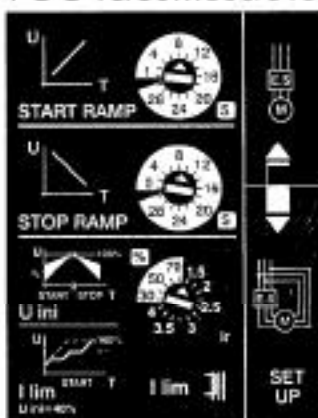
PS S 03...12



PS S 25



PS S 18/30...300/515



In-line and inside-delta connection of PS S 18/30...300/515

The operator panels for PS S, PS D and PS DH have LED's, potentiometers and switches for indication and settings.

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# Softstarters

## General Technical Data

### PS S 03...PS S 25 and PS S 18/30...PS S 300/515

|                                                     |                     | PS S03...PS S 12                           | PS S 25                                    | PS S 18/30...PS S 300/515                                                                                                                    |
|-----------------------------------------------------|---------------------|--------------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Rated insulation voltage $U_i$                      | V                   | 630                                        | 630                                        | 690                                                                                                                                          |
| Rated operational voltage $U_e$                     | V                   | 220 - 230<br>400 - 415<br>480 - 500<br>600 | 220 - 230<br>400 - 415<br>480 - 500<br>600 | 200 - 690<br>-<br>-<br>-                                                                                                                     |
| Starting Capacity at max.<br>Rated current $I_e$    | 5 x $I_e$ for 5 sec |                                            | 5 x $I_e$ for 5 sec                        | 4 x $I_e$ for 10 sec                                                                                                                         |
| Number of starts per hour                           |                     | 62 <sup>2)</sup>                           | 6 <sup>2)</sup>                            | 30 <sup>3)</sup>                                                                                                                             |
| Overload capability Overload class                  | A                   | 10                                         | 10                                         | 10                                                                                                                                           |
| Service factor                                      | %                   | 100                                        | 100                                        | 115 (PS S 18/30...250/430)<br>110 (PS S 300/515)                                                                                             |
| <b>Ambient temperature</b>                          |                     |                                            |                                            |                                                                                                                                              |
| During operation                                    | °C                  | -20 – +50                                  | -20 – +50                                  | -25 – +60 <sup>1)</sup>                                                                                                                      |
| During Storage                                      | °C                  | -40 – +70                                  | -40 – +70                                  | -40 – +70                                                                                                                                    |
| <b>Degree of protection</b>                         |                     |                                            |                                            |                                                                                                                                              |
| Main circuit                                        |                     | IP20                                       | IP20                                       | IP20 (PS S 18/30-500...44/76-500)<br>IP10 (PSS 50/85-500...72/124-500)<br>IP10 (PS S 18/30-690...75/124-690)<br>IP00 (PS S 85/147...300/515) |
| Supply and control circuit                          |                     | IP20                                       | IP20                                       | IP20                                                                                                                                         |
| <b>Settings</b>                                     |                     |                                            |                                            |                                                                                                                                              |
| Ramp time during start                              | s                   | 0.5 – 6.5 -+15%                            | 0.5 – 10 -+10%                             | 1 – 30                                                                                                                                       |
| Ramp time during stop                               | s                   | 0.5 – 8 -+25%                              | 0.5 – 20 -+10%                             | 0 – 30                                                                                                                                       |
| Initial voltage during start                        | %                   | 0 – 85 -+15%                               | 0.5 – 50 -+5%                              | 30 – 70                                                                                                                                      |
| Current limit voltage                               | x $I_e$             | No                                         | No                                         | 1.5 – 4 <sup>3)</sup>                                                                                                                        |
| <b>Switch for</b>                                   |                     |                                            |                                            |                                                                                                                                              |
| Inside delta connection ON/OFF                      |                     | No                                         | No                                         | Yes                                                                                                                                          |
| <b>Signal relay</b>                                 |                     |                                            |                                            |                                                                                                                                              |
| By-pass signal                                      |                     | No <sup>4)</sup>                           | No <sup>4)</sup>                           | Yes                                                                                                                                          |
| Fault signal                                        |                     | No                                         | No                                         | Yes                                                                                                                                          |
| Rated operational voltage $U_e$                     | V                   | -                                          | -                                          | 250                                                                                                                                          |
| Rated thermal current $I_{th}$                      | A                   | -                                          | -                                          | 5                                                                                                                                            |
| Rated operational current<br>at AC-15 ( $U_e=250$ ) | A                   | -                                          | -                                          | 1.5                                                                                                                                          |
| <b>Signal indication LED</b>                        |                     |                                            |                                            |                                                                                                                                              |
| Ready to start/stand by                             | On                  | Green                                      | Green                                      | Green                                                                                                                                        |
| Ramping up/down                                     |                     | Yellow                                     | Yellow (flashing)                          | No                                                                                                                                           |
| Completed start ramp                                | T.O.R.              | Yellow                                     | Yellow                                     | Green                                                                                                                                        |
| General fault                                       | F1                  | -                                          | Red                                        | Red                                                                                                                                          |
| External fault                                      | F2                  | -                                          | -                                          | Red                                                                                                                                          |

1) Above 40°C, up to max 60°C, reduce the rated current with 0.8% per °C.

2) When more than 6 starts per hour are required, contact your sales office.

3) Only if current transformer is connected (accessory).

4) The unit has built in by-pass contacts (AC-53b).

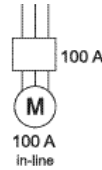
5) Valid for 50% on time and 50% off time. 3.5 x  $I_e$  for 7 sec., if other data is required, contact your sales office

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## Soft starters

### Soft starter PS S 03...25, PS S18/30...300/515

#### PS S 03...25 For normal starts

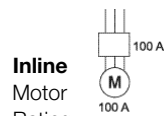


| Motor Rating         |                      | Motor Rating         |                      | Current<br>I <sub>e</sub><br>A |
|----------------------|----------------------|----------------------|----------------------|--------------------------------|
| 230 V                | 400 V                | 230 V                | 400 V                |                                |
| P <sub>e</sub><br>kW | P <sub>e</sub><br>kW | P <sub>e</sub><br>kW | P <sub>e</sub><br>kW |                                |
| -                    | 1.1                  | -                    | -                    | 3                              |
| -                    | 5.5                  | -                    | -                    | 12                             |
| -                    | 11.0                 | -                    | -                    | 25                             |

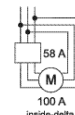
| Order code   |
|--------------|
| PS S 03-400B |
| PS S 12-400B |
| PS S 25-400B |

Control Voltage 40-110V AC/DC, 110-440 VAC.

#### PS S 18/30...142/245 For normal starts



##### Inside Delta



| Motor Rating         |                      | Motor Rating         |                      | Current<br>I <sub>e</sub><br>A | Order code       |    |
|----------------------|----------------------|----------------------|----------------------|--------------------------------|------------------|----|
| 230 V                | 400 V                | 500 V                | 690 V                |                                |                  |    |
| P <sub>e</sub><br>kW | P <sub>e</sub><br>kW | P <sub>e</sub><br>kW | P <sub>e</sub><br>kW |                                |                  |    |
| 4                    | 7.5                  | 11                   | -                    | 18                             | PS S 18/30-500   | ○● |
| 7.5                  | 15                   | 18.5                 | -                    | 30                             | PS S 30/52-500   | ○● |
| 9                    | 18.5                 | 22                   | -                    | 37                             | PS S 37/64-500   | ○● |
| 11                   | 22                   | 25                   | -                    | 44                             | PS S 44/76-500   | ○● |
| 12.5                 | 25                   | 30                   | -                    | 50                             | PS S 50/85-500   | ○● |
| 15                   | 30                   | 37                   | -                    | 60                             | PS S 60/105-500  | ○● |
| 18.5                 | 37                   | 45                   | -                    | 72                             | PS S 72/124-500  | ○● |
| 22                   | 45                   | 55                   | -                    | 85                             | PS S 85/147-500  | ○● |
| 30                   | 55                   | 75                   | -                    | 105                            | PS S 105/181-500 | ○● |
| 37                   | 75                   | 90                   | -                    | 142                            | PS S 142/245-500 | ○● |
| 45                   | 90                   | 110                  | -                    | 175                            | PS S 175/300-500 | ○● |
| 75                   | 132                  | 160                  | -                    | 250                            | PS S 250/430-500 | ○● |
| 90                   | 160                  | 200                  | -                    | 300                            | PS S 300/515-500 | ○● |

Code letter for supply voltage O is F = 110-120V, 50/60Hz; L = 220-240V 50/60Hz

Code letter for fault signal relay ● is Blank = NO; C = NC

Note: For heavy duty starting and 690V applications. Please Consult Us.

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## Soft starters Accessories

### PS S 18/3...300/515

#### Current transformer for current limit function

To be connected to terminals 11 and 12 on the soft starter.

The setting range (1.5 – 4) corresponds to a multiple of the transformer ratio.

Technical data below shows transformer ratio and number of turns for the primary winding.

| Current Transformer | For softstarter | Weight kg | Order Code |
|---------------------|-----------------|-----------|------------|
| 60/1 – 2 turns      | PS S 18/30      | 0.30      | PS CT-60   |
| 40/1 – 1 turn       | PS S 30/52      | 0.30      | PS CT-40   |
| 50/1 – 1 turn       | PS S 37/64      | 0.30      | PS CT-50   |
| 60/1 – 1 turn       | PS S 44/76      | 0.30      | PS CT-60   |
| 75/1 – 1 turn       | PS S 50/85      | 0.30      | PS CT-75   |
| 75/1 – 1 turn       | PS S 60/105     | 0.30      | PS CT-75   |
| 100/1 – 1 turn      | PS S 72/124     | 0.25      | PS CT-100  |
| 125/1 – 1 turn      | PS S 85/147     | 0.25      | PS CT-125  |
| 150/1 – 1 turn      | PS S 105/181    | 0.25      | PS CT-150  |
| 200/1 – 1 turn      | PS S 142/245    | 0.25      | PS CT-200  |
| 250/1 – 1 turn      | PS S 175/300    | 0.25      | PS CT-250  |
| 400/1 – 1 turn      | PS S 250/430    | 0.25      | PS CT-400  |
| 400/1 – 1 turn      | PS S 300/515    | 0.25      | PS CT-400  |

#### Cable connectors for Cu cables (set of 3)

| Wire range                  | Tightening torque max. Nm | For softstarter        | Weight kg | Order Code    |
|-----------------------------|---------------------------|------------------------|-----------|---------------|
| 6-185 mm <sup>2</sup>       | 16                        | PS S 85/147...142/245  | 0.2       | 1SDA023354R1  |
| 2x(50-1210) mm <sup>2</sup> | 16                        | PS S 85/147...142/245  | 0.3       | LZ 185-2C/120 |
| 16-240 mm <sup>2</sup>      | 25                        | PS S 175/300...300/515 | 0.4       | 1SDA023368R1  |

#### Cable connectors for Al and Cu cables (set of 3)

| Wire range              | Tightening torque | For softstarter        | Weight kg | Order Code   |
|-------------------------|-------------------|------------------------|-----------|--------------|
| 35-95 mm <sup>2</sup>   | 13.35             | PS S 85/147...142/245  | 0.1       | 1SDA023356R1 |
| 25-150 mm <sup>2</sup>  | 31                | PS S 85/147...142/245  | 0.1       | 1SDA023357R1 |
| 120-240 mm <sup>2</sup> | 43                | PS S 175/300...300/515 | 0.1       | 1SDA023379R1 |

#### Terminal shrouds (set of 2)

|                      | For softstarter        | Weight kg | Order Code |
|----------------------|------------------------|-----------|------------|
| For cable connectors | PS S 85/147...142/245  | 0.1       | LT 185-AC  |
| For compression lugs | PS S 85/147...142/245  | 0.1       | LT 185-AL  |
| For cable connectors | PS S 175/300...300/515 | 0.2       | LT 300-AC  |
| For compression lugs | PS S 175/300...300/515 | 0.2       | LT 300-AL  |

#### Terminal nut washer (set of 2)

| For softstarter        | Weight kg | Order Code |
|------------------------|-----------|------------|
| PS S 85/147...142/245  | 0.2       | LE 185     |
| PS S 175/300...300/515 | 0.3       | LE 300     |

#### Terminal shrouds (set of 2)

| For softstarter        | Weight kg | Order Code |
|------------------------|-----------|------------|
| PS S 18/30...44/76     | 0.1       | PS LW-44   |
| PS S 50/85...72/124    | 0.15      | PS LW-72   |
| PS S 85/147...142/245  | 0.25      | LW 185     |
| PS S 175/300...300/515 | 0.4       | LW-300     |

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## Pilot Devices, Compact Range

### non-illuminated

The compact range is a new competitive choice for OEM customers and Panel Builders with high requirements of cost efficient, easy to use and reliable products.

#### Features

- Reliable performance
- Less stock-keeping
- "All-in-one function"  
One Order Code = one complete function
- Robust design
- Easy mounting



#### Part of the ABB Family

The compact range can easily be combined with our modular Pilot Devices as they have the same front design.

#### Worldwide availability

ABB is represented in over 130 countries. Our pilot devices meet all major international and national standards.

#### Technical advantages

- High degree of protection
- One or two built-in electrically separated contacts (1NO, 1NC, 2NO, 2NC or 1NC + 1NO)
- Contacts with wiping action
- Low built-in depth



Same front design for both the modular and the compact range. Robust actuators in clear colors with large text and push area.



Samples of accessories

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# Pilot Devices

## Compact Range

### Pushbuttons, Non-Illuminated



| Contacts Included<br>No | NC | Momentary<br>Flush button | *Maintained<br>Flush button | Momentary<br>Extended button | *Maintained<br>Extended button |
|-------------------------|----|---------------------------|-----------------------------|------------------------------|--------------------------------|
| 1                       | -  | CP1-10□-10                | CP2-10□-10                  | CP3-10□-10                   | CP4-10□-10                     |
| 2                       | -  | CP1-10□-20                | CP2-10□-20                  | CP3-10□-20                   | CP4-10□-20                     |
| -                       | 1  | CP1-10□-01                | CP2-10□-01                  | CP3-10□-01                   | CP4-10□-01                     |
| -                       | 2  | CP1-10□-02                | CP2-10□-02                  | CP3-10□-02                   | CP4-10□-02                     |
| 1                       | 1  | CP1-10□-11                | CP2-10□-11                  | CP3-10□-11                   | CP4-10□-11                     |

chrome bezel available on request

| Colour | Code Letter | □ |
|--------|-------------|---|
| Red    | R           |   |
| Green  | G           |   |
| Yellow | Y           |   |
| Blue   | L           |   |
| White  | W           |   |
| Black  | B           |   |
| Grey   | U           |   |

#### Ordering Example

Requested: A compact pushbutton, momentary, with red extended button and one NO contact.

Order: 1 piece of CP3-10R-10



| Contacts Included | Momentary<br>Flush button, white |               |
|-------------------|----------------------------------|---------------|
|                   | With black I                     | with black II |
| 1                 | -                                | CP1-110W-10   |
| -                 | 1                                | CP1-210W-10   |

| *Maintained<br>Extended button, black<br>with white 0 |
|-------------------------------------------------------|
| -                                                     |
| CP3-310B-01                                           |

Chrome Bezel available on request

\*Maintained available Sept 2003 onwards

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## Pilot Devices, Compact Range

### Selector switches, non-Illuminated

#### Two Position

Contacts Included  
No NC

|   |   |              |
|---|---|--------------|
| 1 | - | C2SS1-10□-10 |
| 2 | - | C2SS1-10□-20 |
| - | 1 | C2SS1-10□-01 |
| - | 2 | C2SS1-10□-02 |
| 1 | 1 | C2SS1-10□-11 |



Maintained



Maintained



Momentary

chrome bezel available on request

| Colour | Code Letter | □ |
|--------|-------------|---|
| Red    | R           |   |
| Black  | B           |   |
| Grey   | U           |   |

#### Three Position

Contacts Included  
NO NC

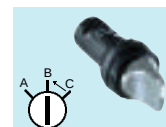
|   |   |              |
|---|---|--------------|
| 2 | - | C3SS1-10□-20 |
| - | 2 | C3SS1-10□-02 |
| 1 | 1 | C3SS1-10□-11 |



Maintained



Momentary



Momentary



Momentary

#### Ordering Example

Requested: A red compact selector switch with three positions, Momentary, spring return from A to B and maintained position in C. With 2 NC contacts.

Order: 1 piece of C3SS7-10R-02



#### Pilot Lights (max. 250V 3W)

Pilot light BA 9s base

| Colour | Order Code |
|--------|------------|
| Red    | CL-100R    |
| Green  | CL-100G    |
| Yellow | CL-100Y    |
| Blue   | CL-100L    |
| White  | CL-100W    |
| Clear  | CL-100C    |

Direct supply. Max. 250V 3W. Use filament bulb for best light. Alight diffusing lens is recommended for use with LED and neon bulbs.

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# Pilot Devices, Compact Range

## Technical data

### Technical Data

#### Standards

IEC 73, 529, 947-5-1, 947-5-5  
EN 50 013, 60 947-5-1  
UL 508  
CSA C22.2 No. 14

#### Degree of protection

##### Operators

|                         |      |
|-------------------------|------|
| Compact pushbutton      | IP66 |
| Compact pilot lights    | IP66 |
| Compact selector switch | IP66 |

#### Electrical functions

|           |      |
|-----------|------|
| Terminals | IP20 |
|-----------|------|

#### Mechanical life

|                   |                        |
|-------------------|------------------------|
| Pushbuttons       | 0.5 million operations |
| Selector switches | 0.5 million operations |

#### Temperature

|                                      |               |
|--------------------------------------|---------------|
| Ambient temperature during operation | -25 to +70 °C |
| Storage temperature                  | -30 to +85 °C |

#### Terminals

|                             |                                                                           |
|-----------------------------|---------------------------------------------------------------------------|
| Plus-minus Pozidrive Size 2 |                                                                           |
| Connectable area            | min. 1 x 0.5mm <sup>2</sup><br>max. 2 x 1.5mm <sup>2</sup> /<br>2 x AWG14 |

#### Contacts

##### Ratings as per UL, CSA, NEMA C300, R300

|                              |              |
|------------------------------|--------------|
| Rated insulation voltage     | 250 V        |
| Rated thermal current        | 2.5 A        |
| Rated operational current at | 120 V 1.5 A  |
|                              | 240 V 0.75 A |

##### Ratings as per IEC 947-5-1

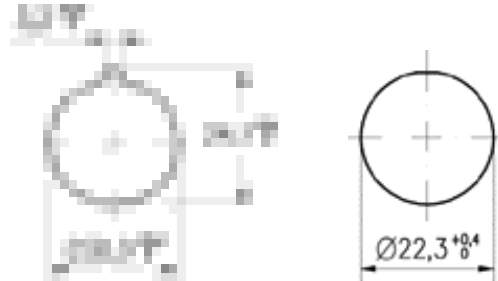
|                                          |             |
|------------------------------------------|-------------|
| Rated insulation voltage                 | 300 V       |
| Rated thermal current, I <sub>th</sub>   | 5 A         |
| Rated operational current I <sub>e</sub> |             |
| Utilization category AC 15, at           | 120 V 1.5 A |
|                                          | 240 V 1 A   |
| Utilization category DC 13, at           | 24 V 0.3 A  |
|                                          | 125 V 0.2 A |

#### Short circuit protection

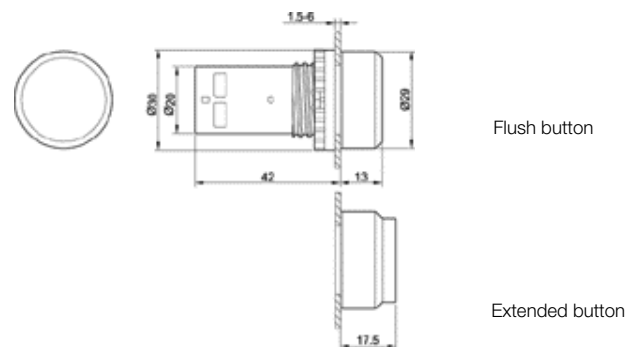
|                   |                               |
|-------------------|-------------------------------|
| Max. fuse at 1 kA | 16 A ordinary<br>10 A delayed |
|-------------------|-------------------------------|

|             |                |
|-------------|----------------|
| Pilot light | max. 3W, 240 V |
|-------------|----------------|

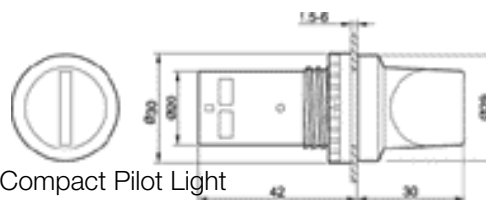
### Drilling Plan - for pushbuttons, switches and pilot lights



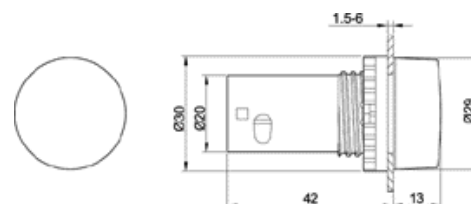
### Dimensions - Compact Pushbutton



### Compact Selector Switch



### Compact Pilot Light



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# Pushbutton & pilot devices

## CBK 22mm

### Momentary



### Maintained (push on push off)



### Momentary



### Maintained (push on push off)



### Momentary (LED)



### Maintained (LED) (push on push off)



## Standard & Illuminated Pushbuttons

| Description                                                                   | Bezel Type     | Order Code    |
|-------------------------------------------------------------------------------|----------------|---------------|
| Flush button momentary                                                        | chrome plastic | CBK-CP*       |
| Non-illuminated                                                               | chrome         | CBK-MP*       |
| Extended button momentary                                                     | chrome plastic | CBK-CPE*      |
| Non-illuminated                                                               | chrome         | CBK-MPE*      |
| Flush button maintained                                                       | chrome plastic | CBK-CPP*      |
| Non-illuminated                                                               | chrome         | CBK-MPP*      |
| Extended button maintained                                                    | chrome plastic | CBK-CPPE*     |
| Non-illuminated                                                               | chrome         | CBK-MPPE*     |
| Full voltage -extended momentary illuminated pushbutton c/w lamp block & lamp | chrome plastic | CBK-CPIF □*   |
|                                                                               | chrome         | CBK-MPIF □*   |
| Resistor -extended momentary illuminated pushbutton c/w lamp block & lamp     | chrome plastic | CBK-CPIR □*   |
|                                                                               | chrome         | CBK-MPIR □*   |
| Transformer -extended momentary illuminated pushbutton                        | chrome plastic | CBK-CPIT □*   |
|                                                                               | chrome         | CBK-MPIT □*   |
| Full voltage -extended maintained illuminated pushbutton (push-push)          | chrome plastic | CBK-CPPIF □*  |
|                                                                               | chrome         | CBK-MPPIF □*  |
| Resistor - extended maintained illuminated pushbutton (push-push)             | chrome plastic | CBK-CPPIR □*  |
|                                                                               | chrome         | CBK-MPPIR □*  |
| Transformer-extended maintained illuminated pushbutton (push-push)            | chrome plastic | CBKCPPIT □*   |
|                                                                               | chrome         | CBK-MPPIT □*  |
| Full voltage-extended momentary illuminated pushbutton                        | chrome plastic | CBK-CPIFL8 *  |
|                                                                               | chrome         | CBK-MPIFL8 *  |
| Resistor-extended momentary illuminated pushbutton                            | chrome plastic | CBK-CPIRL1 *  |
|                                                                               | chrome         | CBK-MPIRL1 *  |
| Transformer-extended momentary illuminated pushbutton                         | chrome plastic | CBK-CPITL □*  |
|                                                                               | chrome         | CBK-MPITL □*  |
| Full voltage -extended maintained illuminated pushbutton (push-push)          | chrome plastic | CBK-CPPIFL8 * |
|                                                                               | chrome         | CBK-MPPIFL8 * |
| Resistor-extended maintained illuminated pushbutton (push-push)               | chrome plastic | CBK-CPPIRL1 * |
|                                                                               | chrome         | CBK-MPPIRL1 * |
| Transformer-extended maintained illuminated pushbutton (push-push)            | chrome plastic | CBK-CPPITL □* |
|                                                                               | chrome         | CBK-MPPITL □* |

Note: Black plastic bezels available on request

### Colour Code

R = Red  
G = Green  
Y = Yellow  
L = Blue  
B = Black <sup>1)</sup>  
W = White <sup>2)</sup>  
C = Clear <sup>2)</sup>

- <sup>1)</sup> Only available for non-illuminated pushbuttons  
<sup>2)</sup> Not available for LED lamps

Voltages □ see page xx

Colour Code - Replace \* with colour

Contact Blocks see page xx

ORDER EXAMPLE: **CBK-CPIF 6R**

(illuminated pushbutton c/w lamp block & lamp - 6v Direct -Red)

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# Pushbutton & pilot devices

## CBK 22mm

### Emergency Stop (complies with EN 60947-55)

| Description         | Order Code |
|---------------------|------------|
| 40mm Emergency Stop |            |
| twist to release    | KPMT3-20R  |
| pull to release     | KPMP3-20R  |
| momentary           | KPM1-20R   |

|                     |           |
|---------------------|-----------|
| 60mm Emergency Stop |           |
| twist to release    | KPMT4-20R |
| pull to release     | KPMP4-20R |
| momentary           | KPM2-20   |

|                                 |           |
|---------------------------------|-----------|
| 40mm illuminated Emergency Stop |           |
| twist to release                | KPMT3-21R |
| pull to release                 | KPMP3-21R |
| momentary                       | KPM1-21R  |

|                                 |           |
|---------------------------------|-----------|
| 60mm illuminated Emergency Stop |           |
| twist to release                | KPMT4-21R |
| pull to release                 | KPMP4-21R |
| momentary                       | KPM2-21R  |

### Mushroom and Doubleheaded Pushbuttons.

|                          |             |
|--------------------------|-------------|
| 30mm Mushroom pushbutton |             |
| twist to release         | CBK-PMT3R * |
| push pull                | CBK-PMP3R * |
| momentary                | CBK-PM3R *  |

|                              |            |
|------------------------------|------------|
| Mushroom lockable pushbutton |            |
| 40mm maintained (red only)   | CBK-PMK40R |
| 45mm maintained (red only)   | CBK-PMKR   |

|                        |          |
|------------------------|----------|
| Double pushbutton      |          |
| momentary (start stop) | CBK-2P1C |
| momentary (blank)      | CBK-2P4C |

\*Standard actuator colour is RED  
if BLACK is required replace R with B

Eg. CBK-PM3B = 30mm mushroom in black

Contact Blocks see page xx

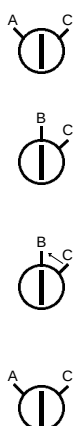
Lamp Blocks see page xx

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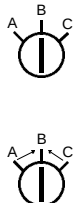
# Pushbutton & pilot devices

## CBK 22mm

### 2 Position



### 3 Position



### Selector switches non-illuminated

| Description                                                                          | Bezel Type               | Order Code                 |
|--------------------------------------------------------------------------------------|--------------------------|----------------------------|
| Non-illuminated 2 pos. short selector switches maintained (B&C)                      | chrome plastic<br>chrome | CBK-C2BMK *<br>CBK-M2BMK * |
| Non-illuminated 2 pos. short selector switches spring return (C to B)                | chrome plastic<br>chrome | CBK-C2BSK *<br>CBK-M2BSK * |
| Non-illuminated 2 pos. short selector switches maintained (A&C)                      | chrome plastic<br>chrome | CBK-C2AMK *<br>CBK-M2AMK * |
| Non-illuminated 2 pos. long selector switches maintained (B&C)                       | chrome plastic<br>chrome | CBK-C2BML *<br>CBK-M2BML * |
| Non-illuminated 2 pos. long selector switches spring return (C to B)                 | chrome plastic<br>chrome | CBK-C2BSL *<br>CBK-M2BSL * |
| Non-illuminated 2 pos. long selector switches maintained (A&C)                       | chrome plastic<br>chrome | CBK-C2AML *<br>CBK-M2AML * |
| Non-illuminated 3 pos. short selector switches maintained (A,B&C)                    | chrome plastic<br>chrome | CBK-C3MK *<br>CBK-M3MK *   |
| Non-illuminated 3 pos. short selector switches spring return (A&C to B)              | chrome plastic<br>chrome | CBK-C3SK *<br>CBK-M3SK *   |
| Non-illuminated 3 pos. short selector switches spring return (C to B) maintained (A) | chrome plastic<br>chrome | CBK-C3SRK *<br>CBK-M3SRK * |
| Non-illuminated 3 pos. long selector switches maintained (A,B&C)                     | chrome plastic<br>chrome | CBK-C3ML *<br>CBK-M3ML *   |
| Non-illuminated 3 pos. long selector switches spring return (A&C to B)               | chrome plastic<br>chrome | CBK-C3SL *<br>CBK-M3SL *   |
| Non-illuminated 3 pos. long selector switches spring return (C to B) maintained (A)  | chrome plastic<br>chrome | CBK-C3SRL *<br>CBK-M3SRL * |

Note: Black plastic bezels available on request

Standard actuator colour is BLACK  
if other colours are required replace \*  
R = RED G = GREY

Contact Blocks see page xx

Eg. CBK-C2BMKR = 2 pos switch in red

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# Pushbutton & pilot devices

## CBK 22mm

### 2 Position



### 3 Position



### Selector switches illuminatec (translucent actuator)

| Description                                                                               | Bezel Type               | Order Code                     |
|-------------------------------------------------------------------------------------------|--------------------------|--------------------------------|
| Illuminated 2 pos.<br>short selector switches<br>maintained (B&C)                         | chrome plastic<br>chrome | CBK-C2BMKI *<br>CBK-M2BMKI *   |
| Illuminated 2 pos.<br>short selector switches<br>spring return (C to B)                   | chrome plastic<br>chrome | CBK-C2BSKI *<br>CBK-M2BSKI *   |
| Illuminated 2 pos.<br>short selector switches<br>maintained (A&C)                         | chrome plastic<br>chrome | CBK-C2AMKI *<br>CBK-M2AMKI *   |
| Illuminated 2 pos.<br>long selector switches<br>maintained (B&C)                          | chrome plastic<br>chrome | CBK-C2BMLI *<br>CBK-M2BMLI *   |
| Illuminated 2 pos.<br>long selector switches<br>spring return (C to B)                    | chrome plastic<br>chrome | CBK-C2BSLI *<br>CBK-M2BSLI *   |
| Illuminated 2 pos.<br>long selector switches<br>maintained (A&C)                          | chrome plastic<br>chrome | CBK-C2AML I *<br>CBK-M2AML I * |
| Illuminated 3 pos.<br>short selector switches<br>fixed (A,B&C)                            | chrome plastic<br>chrome | CBK-C3MKI *<br>CBK-M3MKI *     |
| Illuminated 3 pos.<br>short selector switches<br>spring return (A&C to B)                 | chrome plastic<br>chrome | CBK-C3SKI *<br>CBK-M3SKI *     |
| Illuminated 3 pos.<br>short selector switches<br>spring return (C to B)<br>maintained (A) | chrome plastic<br>chrome | CBK-C3SRKI *<br>CBK-M3SRKI *   |
| Illuminated 3 pos.<br>long selector switches<br>maintained (A,B&C)                        | chrome plastic<br>chrome | CBK-C3MLI *<br>CBK-M3MLI *     |
| Illuminated 3 pos.<br>long selector switches<br>spring return (A&C to B)                  | chrome plastic<br>chrome | CBK-C3SLI *<br>CBK-M3SLI *     |
| Illuminated 3 pos.<br>long selector switches<br>spring return (C to B)<br>maintained (A)  | chrome plastic<br>chrome | CBK-C3SRLI *<br>CBK-M3SRLI *   |

**Contact Blocks see page xx**  
**Lamp Blocks see page xx**

Colour Code - Replace \* with colour

R = Red  
G = Green  
Y = Yellow  
L = Blue

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# Pushbutton & pilot devices

## CBK 22mm

### 2 Position



### 3 Position



### Key operated selector switches

| Description                                                                                             | Bezel Type | Order Code |
|---------------------------------------------------------------------------------------------------------|------------|------------|
| Key operated 2 pos. selector switches maintained, key removable all pos.                                | chrome     | CBK-S2KM4  |
| Maintained, key removable (B)                                                                           | chrome     | CBK-S2KM1  |
| Momentary, key removable (B)                                                                            | chrome     | CBK-S2KS1  |
| Key operated 3 pos. selector switches maintained, key removable all pos.                                | chrome     | CBK-S3KM4  |
| Momentary, key removable all pos. spring ret. from (A & C to B)                                         | chrome     | CBK-S3KS4  |
| Maintained, key removable (B)                                                                           | chrome     | CBK-S3KM2  |
| Momentary, key removable (B) spring ret. from (A&C to B)                                                | chrome     | CBK-S3KS2  |
| Momentary, key removable (A) spring ret. from (C to B)                                                  | chrome     | CBK-S3KSR1 |
| Key operated maintained pushbutton, locks when depressed release via key. Key removable both positions. | chrome     | CBK-PKM1   |

Contact Blocks see page 2/69

N.B. Different keys are available for the selector switches on request

The standard unit has key Type 71.

For key Type 72 add a "2" at the end of the reference or for key Type 73 add a "3".

Eg. CBK-S2KM1 Key 71.  
CBK-S2KM12 Key 72.  
CBK-S2KM13 Key 73.

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# Pushbutton & pilot devices

## CBK 22mm

### Lamp Holder



### Lamp Holder+ Resistor



### Lamp Holder + Transformer



### Filament



### Neon



### LED



## Pilot Lights

| Voltage     | Description                    | Order Code  |
|-------------|--------------------------------|-------------|
| 6V          | lamp & lamp block              | CBK-KLF6 *  |
| 12V         | lamp & lamp block              | CBK-KLF7 *  |
| 24V         | lamp & lamp block              | CBK-KLF8 *  |
| 48V         | lamp & lamp block              | CBK-KLF9 *  |
| 120V        | lamp & lamp block              | CBK-KLF1 *  |
| 110/60V     | lamp, lamp block & resistor    | CBK-KLR1 *  |
| 240/120V    | lamp, lamp block & resistor    | CBK-KLR2 *  |
| 110/6V      | lamp, lamp block & transformer | CBK-KLT1 *  |
| 240/6V      | lamp, lamp block & transformer | CBK-KLT2 *  |
| 415/6V      | lamp, lamp block & transformer | CBK-KLT3 *  |
| 480/6V      | lamp, lamp block & transformer | CBK-KLT4 *  |
| 24V LED     | lamp & lamp block              | CBK-KLFL8 * |
| 110/24V LED | lamp, lamp block & resistor    | CBK-KLRL1 * |
| 110/24V LED | lamp, lamp block & transformer | CBK-KLTL1 * |
| 240/24V LED | lamp, lamp block & transformer | CBK-KLTL2 * |
| 415/24V LED | lamp, lamp block & transformer | CBK-KLTL3 * |
| 480/24V LED | lamp, lamp block & transformer | CBK-KLTL4 * |

### Colour Code

Replace \* with colour code

R = Red

G = Green

Y = Yellow

L = Blue

W = White <sup>1)</sup>

C = Clear<sup>1)</sup>

<sup>1)</sup> Not available for LED lamps

## Lamps

| Description             | Order Code |
|-------------------------|------------|
| 6V filament             | CBK-LB6    |
| 12V filament            | CBK-LB12   |
| 24V filament            | CBK-LB24   |
| 30V filament            | CBK-LB30   |
| 48V filament            | CBK-LB48   |
| 60V filament            | CBK-LB60   |
| 130V filament           | CBK-LB1    |
| 220V neon (AC only)     | CBK-LBN2   |
| 24V Red LED             | CBK-LBD8R  |
| 24V Green LED           | CBK-LBD8G  |
| 24V Yellow LED          | CBK-LBD8Y  |
| 24V Blue LED            | CBK-LBD8L  |
| 24V Red Flashing LED    | CBK-LBDRF  |
| 24V Green Flashing LED  | CBK-LBDGF  |
| 24V Yellow Flashing LED | CBK-LBDYF  |

Other voltages on request

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# Pushbutton & pilot devices

## CBK 22mm

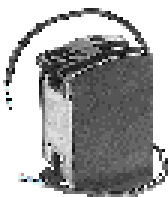
### Resistor



### Lamp Holder + Transformer



### Transformer



### Diode Block



### Resistor Type



## Pilot light front mounted accessories

| Description                                                                | Order Code |
|----------------------------------------------------------------------------|------------|
| Full Voltage (maximum 240v)                                                | CBK-LMF    |
| 110V/60V resistor type                                                     | CBK-LMR1   |
| 240V/120V resistor type                                                    | CBK-LMR2   |
| 24V <sup>1)</sup> resistor type                                            | CBK-LMR24  |
| 110V/24V <sup>2)</sup> resistor type                                       | CBK-LMLED  |
| 110/6V lamp holder + transformer                                           | CBK-LMT1   |
| 240/6V lamp holder + transformer                                           | CBK-LMT2   |
| 415/6V lamp holder + transformer                                           | CBK-LMT3   |
| 480/6V lamp holder + transformer                                           | CBK-LMT4   |
| 110/24V <sup>2)</sup> lamp holder + transformer                            | CBK-LMT124 |
| 240/24V <sup>2)</sup> lamp holder + transformer                            | CBK-LMT224 |
| 415/24V <sup>2)</sup> lamp holder + transformer                            | CBK-LMT324 |
| 480/24V <sup>2)</sup> lamp holder + transformer                            | CBK-LMT424 |
| 110/6V transformer                                                         | CBK-LT1    |
| 240/6V transformer                                                         | CBK-LT2    |
| 415/6V transformer                                                         | CBK-LT3    |
| 480/6V transformer                                                         | CBK-LT4    |
| 110/24V <sup>2)</sup> transformer                                          | CBK-LT124  |
| 240/24V <sup>2)</sup> transformer                                          | CBK-LT224  |
| 415/24V <sup>2)</sup> transformer                                          | CBK-LT324  |
| 480/24V <sup>2)</sup> transformer                                          | CBK-LT424  |
| 250V . 1A<br>for use with lamps connected to a common lamp test pushbutton | CBK-CBD    |

## Lamp blocks base mounted accessories

| Description                          | Order Code |
|--------------------------------------|------------|
| Full Voltage (maximum 240v)          | CBK-LMFB   |
| 110V/60V resistor type               | CBK-LMRB1  |
| 240V/120V resistor type              | CBK-LMRB2  |
| 24V <sup>1)</sup> resistor type      | CBK-LMRB24 |
| 120V/24V <sup>2)</sup> resistor type | CBK-LMRLED |

<sup>1)</sup> Designed for electronic circuits    <sup>2)</sup> Designed for LED 24V lamps

## Pilot Heads

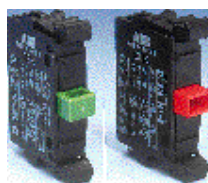
| Colour | Order Code |
|--------|------------|
| Red    | CBK-KAL R  |
| Green  | CBK-KAL G  |
| Yellow | CBK-KAL Y  |
| Blue   | CBK-KAL L  |
| White  | CBK-KAL W  |
| Clear  | CBK-KAL C  |

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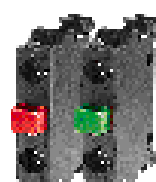
# Pushbutton & pilot devices

## CBK 22mm

### Actuator Mounted Blocks



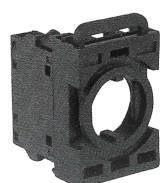
### Base Mounted Blocks



### Rear Mounted Blocks



### Contact Block Holders



### Contact blocks

| Description                                                                                                                                       | Type                            | Contact       | Order Code                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------|----------------------------------|
| Contact blocks are colour coded to easily identify the contact configuration.<br>GREEN = N/O<br>RED = N/C                                         | Standard                        | 1 N/O         | CBK-CB10<br>CBK-CB01             |
|                                                                                                                                                   |                                 | 1 N/C         |                                  |
| Contact blocks are colour coded to easily identify the contact configuration.<br>GREEN = N/O<br>RED = N/C                                         | Gold Plated Low Energy Contacts | 1 N/O         | CBK-CB10G<br>CBK-CB01G           |
|                                                                                                                                                   |                                 | 1 N/C         |                                  |
| Double contact block for use with 5 block holder (i.e. outer positions) and 3 block holder for selector switches when centre position is required |                                 | 2 N/O         | CBK-CB20<br>CBK-CB02<br>CBK-CB11 |
|                                                                                                                                                   |                                 | 2 N/C         |                                  |
|                                                                                                                                                   |                                 | 1 N/O + 1 N/C |                                  |

### Contact Block (rear mounted)

|                                                                                                                                         |                                 |               |                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------|-------------------------------------|
| Contact blocks are colour coded to easily identify the contact configuration.<br>GREEN = N/O<br>RED = N/C                               | Standard                        | 1 N/O         | CBK-CBR10<br>CBK-CBR01              |
|                                                                                                                                         |                                 | 1 N/C         |                                     |
| Contact blocks are colour coded to easily identify the contact configuration.<br>GREEN = N/O<br>RED = N/C                               | Gold Plated Low Energy Contacts | 1 N/O         | CBK-CBR10G<br>CBK-CBR01G            |
|                                                                                                                                         |                                 | 1 N/C         |                                     |
| Double contact block for use when 5 contacts are required (i.e. outer positions) and selector switches when centre position is required |                                 | 2 N/O         | CBK-CB20B<br>CBK-CB02B<br>CBK-CB11B |
|                                                                                                                                         |                                 | 2 N/C         |                                     |
|                                                                                                                                         |                                 | 1 N/O + 1 N/C |                                     |

|                        |        |
|------------------------|--------|
| 3 contact block holder | CBK-CH |
| 5 contact block holder | CBK-H5 |

### Safety holder for Emergency Stop

|                          |          |
|--------------------------|----------|
| (3 contact block holder) | KCBHS-00 |
|--------------------------|----------|

The safety holder can only be used on Emergency Stop Pushbuttons

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# Pushbutton & pilot devices

## Accessories

### Accessories

#### Protective Membrane

Of transparent, heat and cold resistant rubber.

Does not harden at low temperature. Gives IP 67 degrees of protection. When membrane is used, remove the gasket.

| For operator with | Weight (kg) | Order Code |
|-------------------|-------------|------------|
| Flush button      | 0.002       | CBK-KXB    |
| Extended button   | 0.002       | CBK-KXBE   |
| Double Pushbutton | 0.004       | CBK-XB2    |

#### Mounting Tool

|                                                       |       |                 |
|-------------------------------------------------------|-------|-----------------|
| Used for tightening the nut of the attachment device. | 0.100 | 1SFA616920R8015 |
|-------------------------------------------------------|-------|-----------------|

#### 30mm Adapters

For use when fitting the 22mm pilot devices in 30mm mounting holes. (1.5mm - 4mm panels)

For use with 22mm Compact Pilot Light

|               |       |                 |
|---------------|-------|-----------------|
| Black Plastic | 0.010 | 1SFA616920R8029 |
| Metal         | 0.035 | 1SFA616920R8030 |

#### Lamp changing tool

Designed for two different lamp diameters. The larger diameter fits filament bulbs and LEDS and the smaller diameter fits neon bulbs.

|                    |       |          |
|--------------------|-------|----------|
| Lamp changing tool | 0.002 | KA1-8072 |
|--------------------|-------|----------|

#### Legend Plates

Engraved fixed plates with symbol/text

Symbol / text

| For Push button | Legend plate material | Weight | Order Code |
|-----------------|-----------------------|--------|------------|
| Off             | Silver-grey aluminium | 0.002  | CBK-NPE10  |
| On              | Silver-grey aluminium | 0.002  | CBK-NPE11  |
| Start           | Silver-grey aluminium | 0.002  | CBK-NPE19  |
| Stop            | Silver-grey aluminium | 0.002  | CBK-NPE20  |

Symbol / text for two-position selector switch

| Centre | Right | Legend plate material | Weight | Order Code |
|--------|-------|-----------------------|--------|------------|
| Hand   | Auto  | Silver-grey aluminium | 0.002  | CBK-NPE22  |
| Off    | On    | Silver-grey aluminium | 0.002  | CBK-NPE24  |
| Stop   | Start | Silver-grey aluminium | 0.002  | CBK-NPE25  |

Symbol / text for three-position selector switch

| Left | Centre | Right | Legend plate material | Weight | Order Code |
|------|--------|-------|-----------------------|--------|------------|
| Hand | O      | Auto  | Silver-grey aluminium | 0.002  | CBK-NPE26  |
| Slow | Off    | Fast  | Silver-grey aluminium | 0.002  | CBK-NPE27  |

|                              |            |
|------------------------------|------------|
| Blank - Aluminium (1-2 line) | CBK-NPE28  |
| Blank - Aluminium (2-3 line) | CBK-NPE29  |
| Blank - Plastic (1-2 line)   | CBK-NPE28P |
| Blank - Plastic (2-3 line)   | CBK-NPE29P |
| Emergency Stop (70mm)        | CBK-NPE30  |

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# Pushbutton & pilot devices

## Accessories

### Pushbutton stations non-metallic IP 54/65

| Description                                                                                                       | Order Code   |
|-------------------------------------------------------------------------------------------------------------------|--------------|
| 1 Element enclosure IP65                                                                                          | CBK-EP1      |
| 2 Element enclosure IP65                                                                                          | CBK-EP2      |
| 3 Element enclosure IP65                                                                                          | CBK-EP3      |
| 4 Element enclosure IP65                                                                                          | CBK-EP4      |
| 6 Element enclosure IP65                                                                                          | CBK-EP6      |
| 1 Element yellow enclosure (only) IP65                                                                            | CBK-EPY      |
| 1 Element complete emergency stop station IP54<br>c/w twist to release mushroom headed button with 2 n/c contacts | CBK-EP1ES40R |

Metallic enclosures available on request

### Voltage Selection Chart

| Filament / Neon |              |          |             | LED          |          |             |
|-----------------|--------------|----------|-------------|--------------|----------|-------------|
| Voltage V       | Full Voltage | Resistor | Transformer | Full Voltage | Resistor | Transformer |
| 6               | 6            |          |             |              |          |             |
| 12              | 7            |          |             |              |          |             |
| 24              | 8            |          |             | 8            | 1        |             |
| 48              | 9            |          |             |              |          |             |
| 110             | 1            |          |             |              |          |             |
| 110/60          |              | 1        |             |              |          |             |
| 240/110         |              | 2        |             |              |          |             |
| 110/6           |              |          | 1           |              |          |             |
| 240/6           |              |          | 2           |              |          |             |
| 415/6           |              |          | 3           |              |          |             |
| 480/6           |              |          | 4           |              |          |             |
| 110/24          |              |          |             |              |          | 1           |
| 240/24          |              |          |             |              |          | 2           |
| 415/24          |              |          |             |              |          | 3           |
| 480/24          |              |          |             |              |          | 4           |

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# Switching power supplies

## CP Range



CP-5/3.0

The switching power supplies CP offer many advantages in comparison to conventional supplies:

- DIN-rail mount compact modules
- Low weight
- High efficiency
- Low Heating
- Wide range of supply voltage
- Constant output voltage with good regulation
- cULus listed, UL 1604 class I, Div 2
- EN 50178 (VDE 0160)
- Short-circuit and overload proof
- Fused input

| Type     | Supply Voltage                 | Output Voltage | Weight | Order Code      |
|----------|--------------------------------|----------------|--------|-----------------|
| CP-5/3.0 | 90 - 260V AC/<br>105 - 260V DC | 5VDC/3A        | 0.220  | 1SVR423418R3000 |

|                                          |                              |            |
|------------------------------------------|------------------------------|------------|
| Frequency, AC input: 47 - 400Hz          | Inrush current 25°C (E 2ms): | 7.5A       |
| Output load hold time: 10ms at 100% load | Internal input fuse:         | 3.0A(T)    |
| Input current at nominal load:           | Output voltage:              | 5V DC ± 3% |
| 0.4A(90V AC) / 0.2A (260V AC)            | Output current:              | 3A         |

| Type     | Supply Voltage           | Output Voltage | Weight | Order Code      |
|----------|--------------------------|----------------|--------|-----------------|
| CP-6/3.0 | 90-260VAC/<br>105-260VDC | 6VDC/3A        | 0.220  | 1SVR423418R4000 |

|                                          |                              |            |
|------------------------------------------|------------------------------|------------|
| Frequency, AC input: 47 - 400Hz          | Inrush current 25°C (E 2ms): | 7.5A       |
| Output load hold time: 10ms at 100% load | Internal input fuse:         | 3.0A(T)    |
| Input current at nominal load:           | Output voltage:              | 6V DC ± 3% |
| 0.5A(90V AC) / 0.25A (260V AC)           | Output current:              | 3A         |

| Type      | Supply Voltage           | Output Voltage | Weight | Order Code      |
|-----------|--------------------------|----------------|--------|-----------------|
| CP-12/2.0 | 90-260VAC/<br>105-260VDC | 12VDC/2A       | 0.220  | 1SVR423418R1000 |

|                                          |                              |             |
|------------------------------------------|------------------------------|-------------|
| Frequency, AC input: 47 - 400Hz          | Inrush current 25°C (E 2ms): | 7.5A        |
| Output load hold time: 10ms at 100% load | Internal input fuse:         | 3.0A(T)     |
| Input current at nominal load:           | Output voltage:              | 12V DC ± 3% |
| 0.6A (90V AC) / 0.27A (260V AC)          | Output current:              | 2A          |

### Adjustable output voltage

| Type          | Supply Voltage            | Output Voltage | Weight | Order Code      |
|---------------|---------------------------|----------------|--------|-----------------|
| CP-12/2.0 adj | 90-260VAC/<br>105-260V DC | 12VDC/2A       | 0.220  | 1SVR423418R1100 |

|                                          |                              |             |
|------------------------------------------|------------------------------|-------------|
| Frequency, AC input: 47 - 400Hz          | Inrush current 25°C (E 2ms): | 33A         |
| Output load hold time: 10ms at 100% load | Internal input fuse:         | 3.0A(T)     |
| Input current at nominal load:           | Output voltage:              | 12V DC ± 3% |
| 0.7A(90V AC) / 0.3A (260V AC)            | Output current:              | 2A / 48W    |

| Type          | Supply Voltage            | Output Voltage | Weight | Order Code      |
|---------------|---------------------------|----------------|--------|-----------------|
| CP-24/0.3 adj | 90-260VAC/<br>105-260V DC | 12VDC/2A       | 0.220  | 1SVR423418R1100 |

|                                          |                              |             |
|------------------------------------------|------------------------------|-------------|
| Frequency, AC input: 47 - 400Hz          | Inrush current 25°C (E 2ms): | 7.5A        |
| Output load hold time: 10ms at 100% load | Internal input fuse:         | 3.0A(T)     |
| Input current at nominal load:           | Output voltage:              | 24V DC ± 3% |
| 0.2A(90V AC) / 0.1A (260V AC)            | Output current:              | 0.3A        |



CP-24/0.3

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# Switching power supplies

## CP Range



CP-24/0.5

| Type      | Supply Voltage                 | Output Voltage | Weight | Order Code      |
|-----------|--------------------------------|----------------|--------|-----------------|
| CP-24/0.5 | 90 - 260V AC/<br>105 - 260V DC | 24V DC/0.5A    | 0.220  | 1SVR423414R0000 |

Frequency, AC input: 47 - 440Hz  
 Output load hold time: 10ms at 100% load  
 Input current at nominal load: 0.3A (90V AC) / 0.15A (230VAC)  
 Inrush current 25°C (E 2ms): 33A  
 Internal input fuse: 3.0A(T)  
 Output voltage: 24V DC  $\pm$  3%  
 Output current: 0.5A / 7.2W

| Type      | Supply Voltage                 | Output Voltage | Weight | Order Code      |
|-----------|--------------------------------|----------------|--------|-----------------|
| CP-24/1.0 | 90 - 260V AC/<br>105 - 260V DC | 24V DC/1A      | 0.220  | 1SVR423418R0000 |

Frequency, AC input: 47 - 440Hz  
 Output load hold time: 10ms at 100% load  
 Input current at nominal load: max. 0.58A (90V AC)  
 typ. 0.45A (115VAC) typ. 0.27A (230VAC)  
 Inrush current 25°C (E 2ms): 7.5A (260V)  
 Internal input fuse: 3.0A(T)  
 Output voltage: 24V DC  $\pm$  3%  
 Output current: 1A

### Adjustable output voltage

| Type         | Supply Voltage                 | Output Voltage | Weight | Order Code      |
|--------------|--------------------------------|----------------|--------|-----------------|
| CP-24/1.5adj | 90 - 260V AC/<br>105 - 260V DC | 24V DC/1.5A    | 0.220  | 1SVR423418R5000 |

Frequency, AC input: 47 - 440Hz  
 Output load hold time: 20ms at 100% load  
 Input current at nominal load: max. 0.8A (90VAC)  
 typ. 0.7A (117VAC) typ. 0.39A (230VAC)  
 Inrush current 25°C (E 2ms): 33A  
 Internal input fuse: 3.0A(T)  
 Output voltage: 24V DC  $\pm$  3%  
 Output current: 1.5A / 36W

| Type      | Supply Voltage                   | Output Voltage | Weight | Order Code      |
|-----------|----------------------------------|----------------|--------|-----------------|
| CP-24/2.0 | 90 - 140V AC                     | 24VDC/2A       | 0.300  | 1SVR423417R0000 |
| CP-24/2.0 | 140V - 260V AC/<br>160 - 260V DC | 24VDC/2A       | 0.300  | 1SVR423417R1000 |

Frequency, AC input: 47 - 63Hz (90 - 140VAC)  
 47 - 440Hz (140-260VAC / 160-260VAC)  
 Output load hold time: 10ms at 100% load  
 Input current at nominal load: max 1.0A (90V AC) / max. 0.8A (140VAC)  
 typ. 0.9A (230VAC) typ. 0.45A (230VAC)  
 Inrush current 25°C (E 2ms): 23A (140VAC / 9A (260VAC)  
 Internal input fuse: 3.0A(T)  
 Output voltage: 24V DC  $\pm$  3%  
 Output current: 2A / 48W

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# Switching power supplies

## CP Range



CP-24/2.0 adj

### Adjustable output voltage

| Type         | Supply Voltage                  | Output Voltage | Weight | Order Code      |
|--------------|---------------------------------|----------------|--------|-----------------|
| CP-24/2.0adj | 140 - 260V AC/<br>160 - 260V DC | 24V DC/2A      | 0.280  | 1SVR423417R1100 |

Frequency, AC input: 47 - 440Hz  
 Output load hold time: 10ms at 100% load  
 Input current at nominal load: max. 1.5A (90V AC)  
 typ. 1.1A (115V AC) typ. 0.52A(230VAC)  
 Inrush current 25°C (E 2ms): 40A (260V)  
 Internal input fuse: 2.0A(T)  
 Output voltage: 24V DC  $\pm$  3%  
 Output current: 2A / 48W

| Type      | Supply Voltage                 | Output Voltage | Weight | Order Code      |
|-----------|--------------------------------|----------------|--------|-----------------|
| CP-24/4.2 | 90 - 260V AC/<br>127 - 260V DC | 24V DC/4.2A    | 0.580  | 1SVR423416R1000 |

Frequency, AC input: 47 - 63Hz  
 Output load hold time: 20ms at 100% load  
 Input current at nominal load: max. 1.5A (90V AC)  
 typ. 1.1A (115VAC) typ. 0.52A (230VAC)  
 Inrush current 25°C (E 2ms): 40A (260V)  
 Internal input fuse: 2.0A(T)  
 Output voltage: 24V DC  $\pm$  3%  
 Output current at T E 55°C:  $V_{in}$  90-260VAC - 4.2A /  $V_{in}$  127-260VAC - 4.2A

| Type      | Supply Voltage                 | Output Voltage | Weight | Order Code      |
|-----------|--------------------------------|----------------|--------|-----------------|
| CP-24/5.0 | 90 - 260V AC/<br>127 - 260V DC | 24VDC/5.0A     | 0.580  | 1SVR423416R0000 |

Frequency, AC input: 47 - 63Hz  
 Output load hold time: 10ms at 100% load  
 Input current at nominal load: max. 1.8A (90VAC)  
 typ. 1.3A (115VAC) typ. 0.63A (230VAC)  
 Inrush current 25°C (E 2ms): 40A (260V)  
 Internal input fuse: 2.0A(T)  
 Output voltage: 24V DC  $\pm$  3%  
 Output current:  
 T E 40°C T > 40°C T = 55°C  
 $V_{in}$  > 45°C 5A - 0.054A/°C 4.2A  
 $V_{in}$  < 90VDC or < 140VAC 5A - 0.054A/°C 4.2A

### Adjustable output voltage

| Type          | Supply Voltage                  | Output Voltage | Weight | Order Code      |
|---------------|---------------------------------|----------------|--------|-----------------|
| CP-24/5.0 adj | 90V - 260V AC/<br>127 - 260V DC | 24VDC/5A       | 0.580  | 1SVR423416R0100 |

Frequency, AC input: 47 - 63Hz  
 Output load hold time: 10ms at 100% load  
 Input current at nominal load: max. 1.8A (90V AC)  
 typ. 1.3A (115VAC) typ. 0.63A (230VAC)  
 Inrush current 25°C (E 2ms): 40A (260V)  
 Internal input fuse: 2.0A(T)  
 Output voltage: 24VDC  $\pm$  3% (23-28VDC adjustable with poti., max. 120W)  
 Output current:  
 T E 40°C T > 40°C T = 55°C  
 $V_{in}$  > 45°C 5A/120W - 1.33W/°C 4.2A/100W  
 $V_{in}$  < 90VDC or < 140VAC 5A/120W - 1.33W/°C 4.2A/100W

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# Switching power supplies

## CP Range



CP-24/10 adj

### Adjustable output voltage

| Type         | Supply Voltage                | Output Voltage | Weight | Order Code      |
|--------------|-------------------------------|----------------|--------|-----------------|
| CP-24/10 adj | 93 - 132VAC/<br>187 - 264V DC | 24V DC/10A     | 1.050  | 1SVR432415R0000 |

|                                |                                                            |
|--------------------------------|------------------------------------------------------------|
| Frequency, AC input:           | 47 - 63Hz                                                  |
| Output load hold time:         | 20ms at 100% load                                          |
| Input current at nominal load: | max. 4.3A (93VAC)<br>typ. 3.5A (115VAC) typ. 1.7A (230VAC) |
| Inrush current 25°C (£ 1ms):   | max. 69A (230V)                                            |
| Internal input fuse:           | 4.0A(T)                                                    |
| Output voltage:                | 24V DC $\pm$ 1% (24 - 28VDC adjustable with a screwdriver) |
| Output current:                | T $\leq$ 60°C T > 60°C T = 70°C                            |
| V <sub>in</sub> 93 - 132VAC    | 10A - 2%/°C 8A                                             |
| V <sub>in</sub> 187 - 264VDC   | 10A - 2%/°C 8A                                             |

### Redundant module

| Type   | Input current | Output current | Weight | Order Code      |
|--------|---------------|----------------|--------|-----------------|
| CP-RUD | 5A max.       | 5A max.        | 0.150  | 1SVR423418R9000 |

Monitors two CP range power supplies up to 5A current each. If one power supply fails the CP-RUD automatically switches to the alternative supply without interruption of the load current. Max. voltage 40V.

### Adjustable output voltage

| Type         | Supply Voltage               | Output Voltage | Weight | Order Code      |
|--------------|------------------------------|----------------|--------|-----------------|
| CP-24/20 adj | 93 - 123VAC/<br>187 - 264VAC | 24V DC/20A     | 2.200  | 1SVR423415R1000 |

|                                |                                                            |
|--------------------------------|------------------------------------------------------------|
| Frequency, AC input:           | 47 - 63Hz                                                  |
| Output load hold time:         | 15ms at 100% load                                          |
| Input current at nominal load: | max. 8.9A (93VAC)<br>typ. 7.2A (115VAC) typ. 3.5A (230VAC) |
| Inrush current 25°C (£ 2ms):   | max. 65A (230V)                                            |
| Internal input fuse:           | 10A(T)                                                     |
| Output voltage:                | 24VDC $\pm$ 1% (28 - 24VDC adjustable with screwdriver)    |
| Output current:                | T $\leq$ 60°C T $\geq$ 60°C T = 70°C                       |
| V <sub>in</sub> 93 - 132VAC    | 20A - 2%/°C 16A                                            |
| V <sub>in</sub> 187 - 264VDC   | 20A - 2%/°C 16A                                            |

| Type      | Supply Voltage                 | Output Voltage | Weight | Order Code      |
|-----------|--------------------------------|----------------|--------|-----------------|
| CP-48/.07 | 90 - 260V AC/<br>105 - 260V DC | 48V DC/0.7A    | 0.300  | 1SVR423418R6000 |

|                                 |                                                             |
|---------------------------------|-------------------------------------------------------------|
| Frequency, AC input:            | 47 - 440Hz                                                  |
| Output load hold time:          | 10ms at 100% load                                           |
| Input current at nominal load:  | max 0.8A (90V AC)<br>typ. 0.7A (115VAC) typ. 0.35A (230VAC) |
| Inrush current 25°C (£ 2ms):    | 33A (260V)                                                  |
| Internal input fuse:            | 3.0A(T)                                                     |
| Output voltage:                 | 48V DC $\pm$ 3%                                             |
| Output current:                 | 0.7A                                                        |
| T <sub>a</sub> > 45°C           | - 10mA/°C                                                   |
| V <sub>in</sub> < 105VAC/120VDC | - 6.667mA/V                                                 |



CP-24/20 adj



CP-48/.07

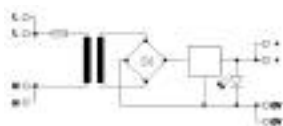
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# Linear power supplies

## CP-L Range



CP-L



5VDC, 12VDC  
15VDC, 24VDC

All power supplies are DINrail mountable and available with 230V or 115VAC input voltage, and deliver a stable and regulated DC output voltage with a low residual ripple of  $\pm 1\%$ .

- The output is short-circuit and overload protected
- A LED provides status operation

| Type      | Supply Voltage | Output Voltage | Weight | Order Code      |
|-----------|----------------|----------------|--------|-----------------|
| CP-L5/1.0 | 115VAC         | 5VDC/1A        | 0.820  | 1SVR419500R3000 |
|           | 230VAC         | 5VDC/1A        | 0.820  | 1SVR419500R3100 |

Frequency, AC input: 47 - 63Hz  
Mains buffering: min. 5 ms with 100% load  
Input current at nominal load: typ. 0.16A, 115V / typ. / 0.08A, 230V  
Internal input fuse: 0.2A (T) 115V / 0.125A (T) 230V

| Type       | Supply Voltage | Output Voltage | Weight | Order Code      |
|------------|----------------|----------------|--------|-----------------|
| CP-L12/0.5 | 115VAC         | 12VDC/0.5A     | 0.820  | 1SVR419501R1000 |
|            | 230VAC         | 12VDC/0.5A     | 0.820  | 1SVR419501R1100 |
| CP-L12/1.0 | 115VAC         | 12VDC/1A       | 0.780  | 1SVR419501R3000 |
|            | 230VAC         | 12VDC/1A       | 0.780  | 1SVR419501R3100 |

Frequency, AC input: 47 - 63Hz  
Mains buffering: min. 5 ms with 100% load  
Input current at nominal load: 0.5A: typ. 0.14A / typ. 0.07A  
Internal input fuse: 0.5A: 0.2A(T) / 0.125A (T)

1A: 0.32A / 0.16 (T)  
1A: 0.4A (T) / 0.2A (T)

| Type       | Supply Voltage | Output Voltage | Weight | Order Code      |
|------------|----------------|----------------|--------|-----------------|
| CP-L15/0.5 | 115VAC         | 15VDC/0.5A     | 0.820  | 1SVR419502R1000 |
|            | 230VAC         | 15VDC/0.5A     | 0.820  | 1SVR419502R1100 |
| CP-L15/1.0 | 115VAC         | 15VDC/1A       | 0.780  | 1SVR419502R3000 |
|            | 230VAC         | 15VDC/1A       | 0.780  | 1SVR419502R3100 |

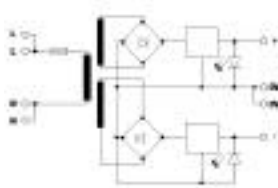
Frequency, AC input: 47 - 63Hz  
Mains buffering: min. 5 ms with 100% load  
Input current at nominal load: 0.5A: typ. 0.14A / typ. 0.07A  
Internal input fuse: 0.5A: 0.2A(T) / 0.125A (T)

1A: 0.35A / 0.175 (T)  
1A: 0.4A (T) / 0.2A (T)

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# Linear power supplies

## CP-L Range



± 12VDC stabilised  
± 15VDC stabilised

| Type        | Supply Voltage | Output Voltage | Weight | Order Code      |
|-------------|----------------|----------------|--------|-----------------|
| CP-L24/0.25 | 115VAC         | 24VDC/0.25A    | 0.820  | 1SVR419503R0000 |
|             | 230VAC         | 24VDC/0.25A    | 0.820  | 1SVR419503R0100 |
| CP-L24/0.75 | 115VAC         | 24VDC/0.75A    | 1.050  | 1SVR419503R2000 |
|             | 230VAC         | 24VDC/0.75A    | 1.050  | 1SVR419503R2100 |

Frequency, AC input: 47 - 63Hz  
Mains buffering: min. 5 ms with 100% load  
Input current at nominal load: 0.25A: typ. 0.14A / typ. 0.07A  
Internal input fuse: 0.25A: 0.2A(T) / 0.125A (T) 0.75A: 0.35A / 0.175 (T) 0.75A: 0.4A (T) / 0.2A (T)

| Type        | Supply Voltage | Output Voltage | Weight | Order Code      |
|-------------|----------------|----------------|--------|-----------------|
| CP-L±12/0.5 | 115VAC         | ± 12VDC/0.5A   | 1.070  | 1SVR419511R1000 |
|             | 230VAC         | ± 12VDC/0.5A   | 1.070  | 1SVR419511R1100 |

Frequency, AC input: 47 - 63Hz  
Mains buffering: min. 5 ms with 100% load  
Input current at nominal load: typ. 0.35A, 115V / typ. 0.16A, 230V  
Internal input fuse: 0.4A (T) 115V / 0.2A (T) 230V

| Type        | Supply Voltage | Output Voltage | Weight | Order Code      |
|-------------|----------------|----------------|--------|-----------------|
| CP-L±15/0.5 | 115VAC         | ± 15VDC/0.5A   | 1.070  | 1SVR419512R1000 |
|             | 230VAC         | ± 15VDC/0.5A   | 1.070  | 1SVR419512R1100 |

Frequency, AC input: 47 - 63Hz  
Mains buffering: min. 5 ms with 100% load  
Input current at nominal load: typ. 0.35A, 115V / typ. 0.175A, 230V  
Internal input fuse: 0.4A (T) 115V / 0.2A (T) 230V

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# Power supplies CP range

## Technical Data

| Description                                     | CP-5/3.0                                      | CP-6/3.0 | CP-12/2.0   | CP-12/2.0 adj | CP-24/0.3   |
|-------------------------------------------------|-----------------------------------------------|----------|-------------|---------------|-------------|
| Residual ripple / noise                         | max.50mVpp                                    |          | Max.300mVss | max.200mVss   | max.100mVss |
| Deviation of output with input change           | max. ±0.5%                                    |          | max. ±0.1%  | max. ±0.5%    |             |
| Deviation of output with static load change     |                                               |          | max. ±0.5%  |               |             |
| Dev. of output with static load change 10 - 90% |                                               |          | max. 5%     |               |             |
| Short circuit protection                        | overcurrent switch off with automatic restart |          |             |               |             |
| Overload protection                             | overtemperature and overcurrent switch off    |          |             |               |             |
| Reset after thermal overload                    | Disconnection of AC power input min. 30 s     |          |             |               |             |

### Standards, Tests

|                                                                               |                                                        |         |         |                      |         |
|-------------------------------------------------------------------------------|--------------------------------------------------------|---------|---------|----------------------|---------|
| Electrical safety standards                                                   | EN 50178 (VDE 0160) / UL 508 / CSA 22.2                |         |         |                      |         |
| Galvanic isolation                                                            | reliable isolation acc. to IEC 644-1, DIN VDE 0106-101 |         |         |                      |         |
| Voltage withstand input <-> output                                            | 2.5kVAC, 3 kVAC type test                              |         |         |                      |         |
| Clearance and creepage distances                                              | overvoltage category 2, pollution degree 2             |         |         |                      |         |
| Electromagnetic compatibility (EMC-tests) acc. to EN 50082-2                  | ESD:                                                   |         |         | EN 61000-4-2 level 3 | 6/8kV   |
|                                                                               | RF field:                                              |         |         | EN 61000-4-4 level 3 | 10V/m   |
|                                                                               | Burst:                                                 |         |         | EN 61000-4-5 level 4 | 4kV     |
|                                                                               | Surge:                                                 |         |         | EN 61000-4-5 level 3 | 3kV     |
|                                                                               | Conducted RF:                                          |         |         | EN 61000-4-6 level 3 | 10V     |
| Electromagn. compatibility (EMC) acc. to EN 500081-2, Radiated noise EN 55011 | class B                                                | class B | class B | class B              | class B |
| Input current harmonics                                                       | no limitation                                          |         |         |                      |         |
| Degree of protection terminals                                                | IP20                                                   | IP20    | IP20    | IP20                 | IP20    |
| Degree of protection enclosure                                                | IP50                                                   | IP30    | IP50    | IP30                 | IP50    |
| Protection class                                                              | 1                                                      | 1       | 1       | 1                    | 1       |

### General Data

|                            |                                                       |                               |                                |                               |                                |
|----------------------------|-------------------------------------------------------|-------------------------------|--------------------------------|-------------------------------|--------------------------------|
| Efficiency                 | approx. 84%                                           | approx. 82-84%<br>(90-260VAC) | approx. 83-86%<br>(102-260VAC) | approx. 82-86%<br>(90-260VAC) | approx. 83-86%<br>(140-260VAC) |
| Status indication          | green LED, power OK                                   |                               |                                |                               |                                |
| Operating temperature      | 0° – +55°C                                            |                               |                                |                               |                                |
| Storage temperature        | -25°C – +75°C                                         |                               |                                |                               |                                |
| Terminals                  | screw terminals, 2 x 14 AWG (2 x 2.5mm <sup>2</sup> ) |                               |                                |                               |                                |
| Weight                     | approx. 0.22kg (0.49 lb)                              |                               |                                |                               |                                |
| Dimensions (W x H x D), mm | 45 x 78 x 100                                         |                               |                                |                               |                                |

| Description                                     | CP-24/0.5                                     | CP-24/1.0        | CP-24/1.5        | CP-24/2.0        | CP-24/2.0 adj    |
|-------------------------------------------------|-----------------------------------------------|------------------|------------------|------------------|------------------|
| Residual ripple / noise                         | max.100mVss                                   |                  | max.300mVss      |                  | max.100mVss      |
| Deviation of output with input change           | max. $\pm 0.5\%$                              | max. $\pm 0.1\%$ | max. $\pm 0.5\%$ | max. $\pm 0.2\%$ | max. $\pm 0.5\%$ |
| Deviation of output with static load change     |                                               |                  | max. $\pm 0.5\%$ |                  |                  |
| Dev. of output with static load change 10 - 90% |                                               | max. 5%          |                  |                  |                  |
| Short circuit protection                        | overcurrent switch off with automatic restart |                  |                  |                  |                  |
| Overload protection                             | overtemperature and overcurrent switch off    |                  |                  |                  |                  |
| Reset after thermal overload                    | disconnection of AC power input min. 30s      |                  |                  |                  |                  |

### Standards, Tests

|                                                                               |                                                        |         |         |                      |         |
|-------------------------------------------------------------------------------|--------------------------------------------------------|---------|---------|----------------------|---------|
| Electrical safety standards                                                   | EN 50178 (VDE 0160) / UL508 / CSA 22.2                 |         |         |                      |         |
| Galvanic isolation                                                            | reliable isolation acc. to IEC 664-1, DIN VDE 0106-101 |         |         |                      |         |
| Voltage withstand input <-> output                                            | 2.5kVAC, 3kVAC type test                               |         |         |                      |         |
| Clearance and creepage distances                                              | overvoltage category 2, pollution degree 2             |         |         |                      |         |
| Electromagnetic compatibility (EMC-tests) acc. to EN 50082-2                  | ESD:                                                   |         |         | EN 61000-4-2 level 3 | 6/8kV   |
|                                                                               | RF field:                                              |         |         | EN 61000-4-4 level 3 | 10V/m   |
|                                                                               | Burst:                                                 |         |         | EN 61000-4-5 level 4 | 4kV     |
|                                                                               | Surge:                                                 |         |         | EN 61000-4-5 level 3 | 3kV     |
|                                                                               | Conducted RF:                                          |         |         | EN 61000-4-6 level 3 | 10V     |
| Electromagn. compatibility (EMC) acc. to EN 500081-2, Radiated noise EN 55011 | class B                                                | class B | class B | class B              | class B |
| Input current harmonics                                                       | no limitation                                          |         |         |                      |         |
| Degree of protection terminals                                                | IP20                                                   | IP20    | IP20    | IP20                 | IP20    |
| Degree of protection enclosure                                                | IP50                                                   | IP50    | IP30    | IP20                 | IP30    |
| Protection class                                                              | 1                                                      | 1       | 1       | 1                    | 1       |

### General Data

|                            |                                                  |                               |                                |                               |                                |
|----------------------------|--------------------------------------------------|-------------------------------|--------------------------------|-------------------------------|--------------------------------|
| Efficiency                 | approx. 84%                                      | approx. 82-84%<br>(90-260VAC) | approx. 83-86%<br>(102-260VAC) | approx. 82-86%<br>(90-260VAC) | approx. 83-86%<br>(140-260VAC) |
| Status indication          | green LED, power OK                              |                               |                                |                               |                                |
| Operating temperature      | 0°C – +55°C                                      |                               |                                |                               |                                |
| Storage temperature        | -25°C – +75°C                                    |                               |                                |                               |                                |
| Terminals                  | screw terminals, 2 x 14AWG (2.5mm <sup>2</sup> ) |                               |                                |                               |                                |
| Dimensions (W x H x D), mm | 22.5 x 78 x 100                                  | 45 x 78 x 100                 | 45 x 78 x 100                  | 45 x 78 x 120                 | 45 x 78 x 120                  |

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# Power supplies CP range

## Technical Data

| Description                                  | CP-24/4.2                                 | CP-24/5.0                                     | CP-24/5.0 adj                 | CP-48/0.7                      | CP-24/10 adj                                            | CP-24/20 adj                           |
|----------------------------------------------|-------------------------------------------|-----------------------------------------------|-------------------------------|--------------------------------|---------------------------------------------------------|----------------------------------------|
| Residual ripple / noise                      |                                           | max.200mVss                                   |                               | max.300mVss                    | max.50MVss                                              | max.100mVss                            |
| Deviation of output with input change        |                                           | max.±0.05%                                    |                               | max.±0.5%                      |                                                         | max.±0.2%                              |
| Deviation of output with static load change  |                                           | max.5%                                        |                               |                                |                                                         | max.±1.3<br>(±1.5% parallel operation) |
| Short circuit protection                     |                                           | overcurrent switch off with automatic restart |                               |                                |                                                         |                                        |
| Overload protection                          |                                           | overtemperature and overcurrent switch off    |                               |                                |                                                         | overcurrent limiting                   |
| Reset after thermal overload                 |                                           | disconnection of ACpower input min. 30s       |                               |                                |                                                         |                                        |
| Overvoltage protection                       |                                           |                                               |                               |                                | triggerpoint at typ. 140%<br>nom. output voltage        |                                        |
| Parallel operation (option)                  |                                           |                                               |                               |                                | up to 5 modules (must be enabled<br>by internal jumper) |                                        |
|                                              |                                           |                                               |                               |                                |                                                         |                                        |
| Standards, Tests                             |                                           |                                               |                               |                                |                                                         |                                        |
| Electrical safety standards                  |                                           | EN 50178 (VDE 0160)<br>UL 508/ CSA 22.2       |                               |                                | EN 50178 (VDE 0160) /<br>EN 9060 / UL 508 / CSA 22.2    |                                        |
| Gakvanic isolation                           |                                           | EN 60950                                      |                               | IEC 664-1 DIN/<br>VDE 0106-101 | EN 60950 DIN/<br>VDE 0106-101                           | EN 60950                               |
| reliable isolation acc. to                   |                                           | DIN/VDE 0106-101                              |                               |                                |                                                         |                                        |
| Voltage withstand input<->output             |                                           | 1.5kVAC, 3kVACtype test                       |                               | 2.5kVAC,<br>3kVAC type test    | 3kVACtype test                                          |                                        |
| Clearance and creepage distances             |                                           | overvoltage category 3,<br>pollution degree 2 |                               |                                | overvoltage category 2,<br>pollution degree 2           |                                        |
| Electromagn. comp. (EMC tests) to EN 50082-2 |                                           |                                               |                               |                                |                                                         |                                        |
| ESD:                                         |                                           | EN 61000-4-2 level 3                          | 6/8kV                         |                                | EN 61000-4-2 level 3                                    | 6/8kV                                  |
| RF Field:                                    |                                           | EN 61000-4-3 level 3                          | 10V/m                         |                                | EN 61000-4-3 level 3                                    | 10V/m                                  |
| Burst:                                       |                                           | EN 61000-4-4 level 3                          | 2kV (CP-48/0.7 4kV)           |                                | EN 61000-4-4 level 3                                    | 4kV                                    |
| Surge:                                       |                                           | EN 61000-4-5                                  | 2kV (CP-48/0.7 3kV)           |                                | EN 61000-4-5 level 4                                    | 2/4kV                                  |
| Conducted RF:                                |                                           | EN 61000-4-6 level 3                          | 10V                           |                                | EN 61000-4-6 level 3                                    | 10V                                    |
| Input current harmonics                      |                                           |                                               |                               | no limitation                  |                                                         |                                        |
| Degree of protection terminals               | IP20                                      | IP20                                          | IP20                          | IP20                           | IP20                                                    | IP20                                   |
| Degree of protection enclosure               | IP20                                      | IP20                                          | IP20                          | IP30                           | IP20                                                    | IP20                                   |
| Protection class                             | 1                                         | 1                                             | 1                             | 1                              | 1                                                       | 1                                      |
|                                              |                                           |                                               |                               |                                |                                                         |                                        |
| General Data                                 |                                           |                                               |                               |                                |                                                         |                                        |
| Efficiency                                   | approx. 77-85%<br>(90-260VAC)             | approx. 77-85%<br>(90-260VAC)                 | approx. 77-85%<br>(90-260VAC) | approx. 83-85%<br>(90-260VAC)  | typ.90%<br>(230VAC)                                     | typ. 88%<br>(230VAC)                   |
| Status indication                            | green LED, power OK                       |                                               |                               |                                |                                                         |                                        |
| Operating temperature                        | 0°C – +55°C                               |                                               |                               |                                | -25°C – +70°C                                           |                                        |
| Storage temperature                          | -25°C – +75°C                             |                                               |                               |                                | -25°C – +85°C                                           |                                        |
| Screw terminals                              | 2x14 AWG (2 x 2.5mm²)                     |                                               |                               |                                | 14AWG (2.5mm²)                                          |                                        |
| Dimensions ( W x H x D), mm                  | 90 x 78 x 120                             |                                               |                               | 45 x 78 x 100                  | 100 x 125 x 125                                         | 220 x 125 x 125                        |
| Mounting hints                               | Normal position: horizontal onto DIN-rail |                                               |                               |                                |                                                         |                                        |
| Spacing to other modules                     | left 1cm, vertical distances 5 cm         |                                               |                               |                                | both sides min. 5cm,<br>vertical distances min. 8 cm    |                                        |

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# Power supplies CP range

## Technical Data

| Description                           | CP-L5/1.0                                                                                                  | CP-L12/0.5<br>CP-L12/1.0 | CP-L15/0.5<br>CP-L15/1.0 | CP-L24/0.25<br>CP-L24/0.75 | CP-L±12/0.5<br>CP-L±15/0.5 |
|---------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|----------------------------|----------------------------|
| Residual ripple / noise               | ± 1%                                                                                                       |                          |                          |                            |                            |
| Short circuit protection              | overcurrent switch off with automatic restart                                                              |                          |                          |                            |                            |
| Overload protection                   | overtemperature and overcurrent switch off                                                                 |                          |                          |                            |                            |
| Reset after thermal overload          | automatic after cooling                                                                                    |                          |                          |                            |                            |
| Standards, Tests                      |                                                                                                            |                          |                          |                            |                            |
| Electrical safety standards           | EN 50178 (VDE 0160)                                                                                        |                          |                          |                            |                            |
| Galvanic isolation                    | reliable isolation EN 60950                                                                                |                          |                          |                            |                            |
| Voltage withstand input<->output      | 4kVAC, 4VAC test                                                                                           |                          |                          |                            |                            |
| Clearance and creepage distances      | overvoltage category III<br>pollution degree 2                                                             |                          |                          |                            |                            |
| Electromagn. compatibility (EMC-test) |                                                                                                            |                          |                          |                            |                            |
| ESD:                                  | EN61000-4-2 level 3 (6/8kV)                                                                                |                          |                          |                            |                            |
| RF fields                             | EN61000-4-3 level 3 (10V/m)                                                                                |                          |                          |                            |                            |
| Burst:                                | EN61000-4-4 level 3 (2kV)                                                                                  |                          |                          |                            |                            |
| Surge:                                | EN61000-4-5 level 3 (2kV)                                                                                  |                          |                          |                            |                            |
| Conducted RF:                         | EN61000-4-6 level 3 (10V)                                                                                  |                          |                          |                            |                            |
| Input current harmonics               | no limiting                                                                                                |                          |                          |                            |                            |
| Degree of protection                  |                                                                                                            |                          |                          |                            |                            |
| Terminals:                            | IP20                                                                                                       |                          |                          |                            |                            |
| Enclosures:                           | IP20                                                                                                       |                          |                          |                            |                            |
| Protection class:                     | 2 with external product protection                                                                         |                          |                          |                            |                            |
| General Data                          |                                                                                                            |                          |                          |                            |                            |
| Status indication                     | green LED                                                                                                  |                          |                          |                            |                            |
| Operating temperature                 | -20 – +50°C                                                                                                |                          |                          |                            |                            |
| Storage temperature                   | -40 – +80°C                                                                                                |                          |                          |                            |                            |
| Terminals                             | screw terminals 14AWG (2.5mm²)                                                                             |                          |                          |                            |                            |
| Dimensions (W x H x D) 0.25A          | 100 x 104 x 79mm                                                                                           |                          |                          |                            |                            |
| Dimensions (W x H x D) 0.25A          | 100 x 104 x 79mm                                                                                           |                          | 135 x 104 x 79mm         |                            |                            |
| Dimensions (W x H x D) 0.25A          |                                                                                                            |                          | 135 x 104 x 79mm         |                            |                            |
| Dimensions (W x H x D) 0.25A          | 100 x 104 x 79mm                                                                                           |                          |                          |                            |                            |
| Mounting hints                        | Normal position: horizontal onto DIN rail, Spacing to other modules<br>upper 100mm, lower 50mm, sides 20mm |                          |                          |                            |                            |

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