

# EF19, EF45 electronic overload relays

## 0.10 to 45.0 A

### For direct coupling to AF09 ... AF38 3-pole contactors



EF19-18.9



EF45-30



DB19EF



KPR-101L

#### Description

The EF19 and EF45 are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. The overload relays are connected directly to the contactors.

#### Ordering details

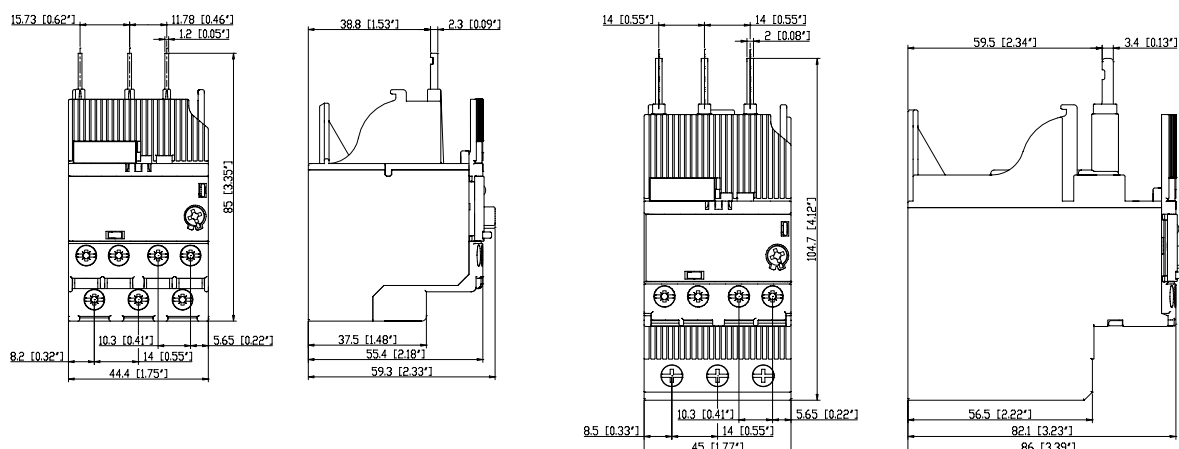
| Setting range                          | For contactors | Trip class    | Catalog number | Global reference code | Weight (1 pce) kg |
|----------------------------------------|----------------|---------------|----------------|-----------------------|-------------------|
| <b>A</b>                               |                |               |                |                       |                   |
| <b>EF19 electronic overload relays</b> |                |               |                |                       |                   |
| 0.10 ... 0.32                          | AF09 ... AF38  | 10E, 20E, 30E | EF19-0.32      | 1SAX121001R1101       | 0.158             |
| 0.30 ... 1.00                          | AF09 ... AF38  | 10E, 20E, 30E | EF19-1.0       | 1SAX121001R1102       | 0.158             |
| 0.80 ... 2.70                          | AF09 ... AF38  | 10E, 20E, 30E | EF19-2.7       | 1SAX121001R1103       | 0.158             |
| 1.90 ... 6.30                          | AF09 ... AF38  | 10E, 20E, 30E | EF19-6.3       | 1SAX121001R1104       | 0.158             |
| 5.70 ... 18.9                          | AF09 ... AF38  | 10E, 20E, 30E | EF19-18.9      | 1SAX121001R1105       | 0.158             |
| <b>EF45 electronic overload relays</b> |                |               |                |                       |                   |
| 9.00 ... 30.0                          | AF09 ... AF38  | 10E, 20E, 30E | EF45-30        | 1SAX221001R1101       | 0.362             |
| 15.0 ... 45.0                          | AF09 ... AF38  | 10E, 20E, 30E | EF45-45        | 1SAX221001R1102       | 0.362             |

#### Ordering details accessories

| For thermal overload relays | Description           | Catalog number | Global reference code | Weight (1 pce) kg |
|-----------------------------|-----------------------|----------------|-----------------------|-------------------|
| <b>A</b>                    |                       |                |                       |                   |
| EF19                        | Single mounting kit   | DB19EF         | 1SAX101910R1001       | 0.042             |
| EF19, EF45                  | Reset push button (1) | KPR-101L       | 1SFA616162R1014       | 0.019             |

(1) Note: for more information see catalog 1SXU000023C0202 Rev. A.

#### Main dimensions mm, inches



# EF65, EF96, EF146 electronic overload relays

## 25 to 150 A

### For direct coupling to AF40 ... AF146 3-pole contactors

3



EF65-70



EF96-100



EF146-150



KPR-101L

#### Description

The EF65, EF96 and EF146 are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. The overload relays are connected directly to the contactors.

#### Ordering details

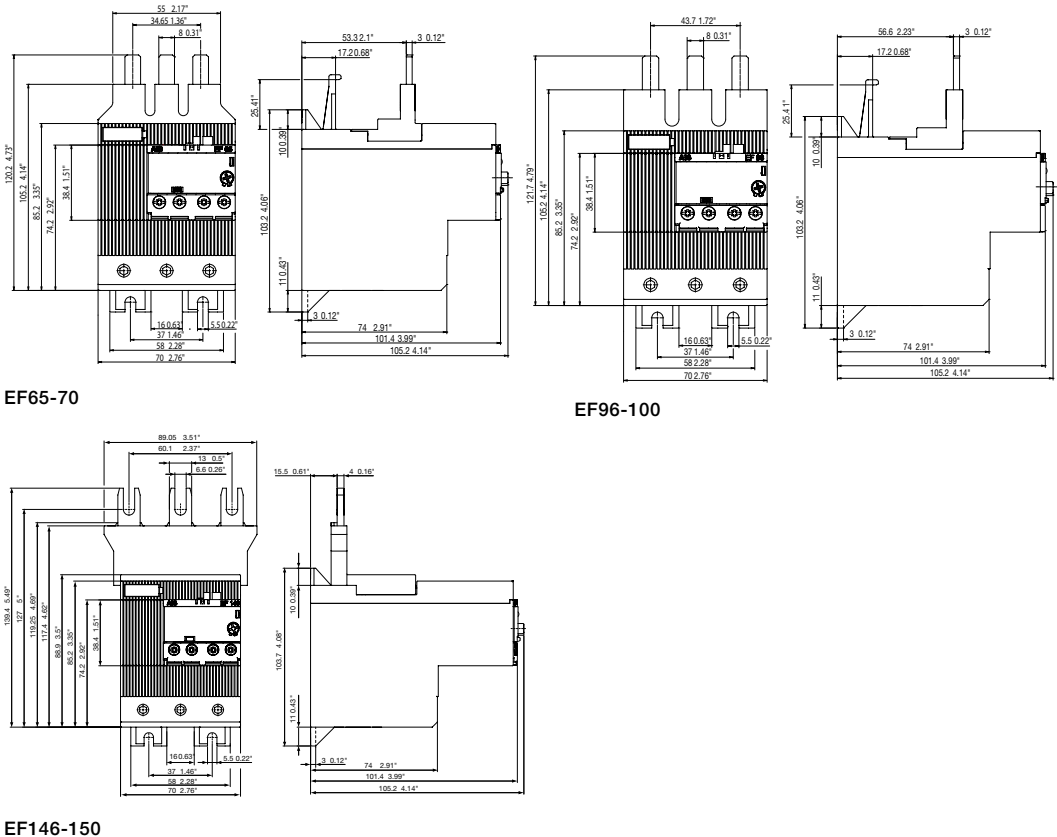
| Setting range | For contactors  | Trip class    | Catalog number | Global reference code | Weight (1 pce) kg |
|---------------|-----------------|---------------|----------------|-----------------------|-------------------|
| A             |                 |               |                |                       |                   |
| 25 ... 70     | AF40 ... AF65   | 10E, 20E, 30E | EF65-70        | 1SAX331001R1101       | 0.790             |
| 36 ... 100    | AF80, AF96      | 10E, 20E, 30E | EF96-100       | 1SAX341001R1101       | 0.780             |
| 54 ... 150    | AF116 ... AF146 | 10E, 20E, 30E | EF146-150      | 1SAX351001R1101       | 0.890             |

#### Ordering details accessories

| For thermal overload relays | Description           | Catalog number | Global reference code | Weight (1 pce) kg |
|-----------------------------|-----------------------|----------------|-----------------------|-------------------|
| A                           |                       |                |                       |                   |
| EF65, EF96, EF146           | Reset push button (1) | KPR-101L       | 1SFA616162R1014       | 0.027             |

(1) Note: for more information see catalog 1SXU000023C0202 Rev. A.

#### Main dimensions mm, inches



# EF205, EF370 electronic overload relays

## 63 to 380 A

### For direct coupling to AF190 ... AF370 3-pole contactors

3



EF205-210



EF370-380



KPR-101L

#### Description

The EF205 and EF370 are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. The overload relays are connected directly to the contactors.

#### Ordering details

| Setting range | For contactors  | Trip class    | Catalog number | Global reference code | Weight (1 pce) kg |
|---------------|-----------------|---------------|----------------|-----------------------|-------------------|
| A             |                 |               |                |                       |                   |
| 63 ... 210    | AF190, AF205    | 10E, 20E, 30E | EF205-210      | 1SAX531001R1101       | 1.210             |
| 115 ... 380   | AF265 ... AF370 | 10E, 20E, 30E | EF370-380      | 1SAX611001R1101       | 1.430             |

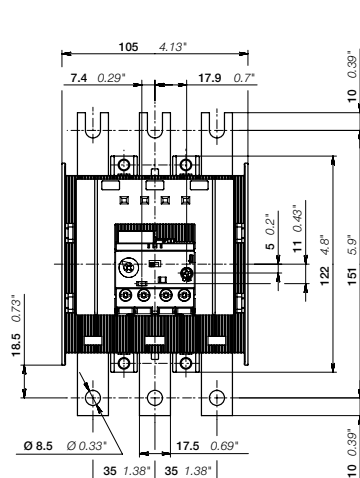
#### Ordering details accessories

| For thermal overload relays | Description                       | Catalog number | Global reference code | Weight (1 pce) kg |
|-----------------------------|-----------------------------------|----------------|-----------------------|-------------------|
| A                           |                                   |                |                       |                   |
| EF205, EF370                | Reset push button (1)             | KPR-101L       | 1SFA616162R1014       | 0.027             |
| EF205                       | Lug kit, 1-wire, 4 AWG... 300 MCM | ATK185         | (2)                   | 0.164             |
| EF370                       | Lug kit, 1-wire, 4 AWG... 400 MCM | ATK300         | (2)                   | 0.166             |
| EF370                       | Lug kit, 2-wire, 4 AWG... 500 MCM | ATK300/2       | (2)                   | 0.445             |
| EF205                       | LT200E Terminal shroud for EF205  | LT200E         | 1SAX501904R0001       | 0.145             |
| EF370                       | LT320E Terminal shroud for EF370  | LT320E         | 1SAX601904R0001       | 0.160             |

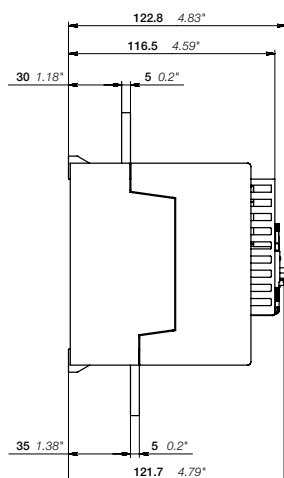
(1) Note: for more information see catalog 1SXU000023C0202 Rev. A.

(2) North American applications only.

#### Main dimensions mm, inches



EF205-210



EF370-380

# E500DU, E800DU, E1250DU electronic overload relays

## 150 to 1250 A

### For use with AF400 ... AF1650 3-pole contactors



E500DU-500



E800DU-800



E1250DU-1250



KPR-101L

#### Description

The E500DU up to E1250DU are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. Busbar kits are available as accessory for contactor mounting.

#### Ordering details

| Setting range | For contactors | Trip class | Catalog number | Global reference code | Weight (1 pce) kg |
|---------------|----------------|------------|----------------|-----------------------|-------------------|
| A             |                |            |                |                       |                   |

#### E500DU electronic overload relay

|             |              |               |            |                 |       |
|-------------|--------------|---------------|------------|-----------------|-------|
| 150 ... 500 | AF400, AF460 | 10E, 20E, 30E | E500DU-500 | 1SAX711001R1101 | 1.170 |
|-------------|--------------|---------------|------------|-----------------|-------|

#### E800DU electronic overload relay

|             |              |               |            |                 |       |
|-------------|--------------|---------------|------------|-----------------|-------|
| 250 ... 800 | AF580, AF750 | 10E, 20E, 30E | E800DU-800 | 1SAX811001R1101 | 3.905 |
|-------------|--------------|---------------|------------|-----------------|-------|

#### E1250DU electronic overload relay

|              |                |               |              |                 |        |
|--------------|----------------|---------------|--------------|-----------------|--------|
| 375 ... 1250 | AF1350, AF1650 | 10E, 20E, 30E | E1250DU-1250 | 1SFA739001R1000 | 12.181 |
|--------------|----------------|---------------|--------------|-----------------|--------|

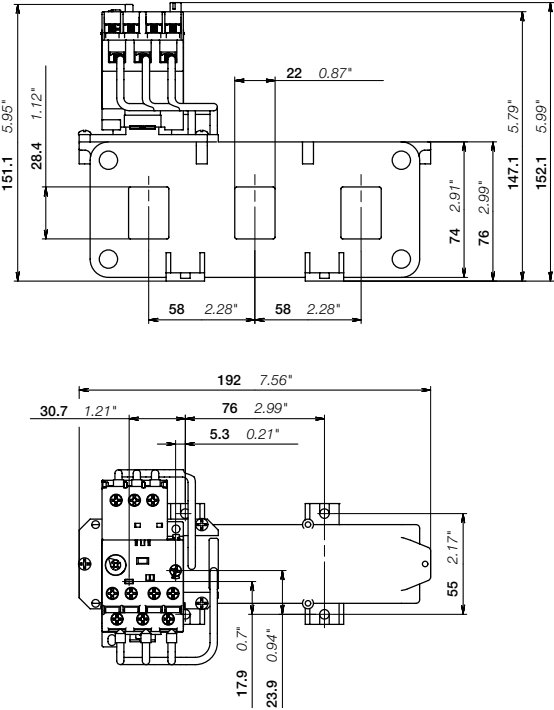
#### Ordering details accessories

| For electronic overload relays | Description                                      | Catalog number | Global reference code | Weight (1 pce) kg |
|--------------------------------|--------------------------------------------------|----------------|-----------------------|-------------------|
| E500DU                         | LT500E Terminal shroud for E500DU                | LT500E         | 1SAX701904R0001       | 0.360             |
| E800DU                         | LT320E Terminal shroud for E320DU                | LT800-E        | 1SAX601904R0001       | 0.105             |
| E500DU, E800DU                 | Reset push button (1)                            | KPR-101L       | 1SFA616162R1014       | 0.027             |
| E500DU                         | Lug kit, 3-wire, 2/0 AWG... 500 MCM, w/hardware  | ATK580/2HK     | (2)                   | 0.880             |
| E800DU                         | Lug kit, 3-wire, 2/0 AWG... 500 MCM, w/hardware  | ATK750/3HK     | (2)                   | 1.897             |
| E1250DU                        | Lug kit, 4-wire, 4/0 AWG... 500 MCM              | ATK1350/4      | (2)                   | 1.883             |
| E500DU                         | Panel mount adaptors, AF400, AF460 non-reversing | DT500/AF460S   | 1SAX701902R1011       | 0.650             |
| E500DU                         | Panel mount adaptors, AF400, AF460 reversing     | DT500/AF460L   | 1SAX701902R1001       | 0.755             |
| E800DU                         | Panel mount adaptors, AF580, AF750 non-reversing | DT800/AF750S   | 1SAX801902R1011       | 1.490             |
| E800DU                         | Panel mount adaptors, AF580, AF750 reversing     | DT800/AF750L   | 1SAX801902R1001       | 1.490             |

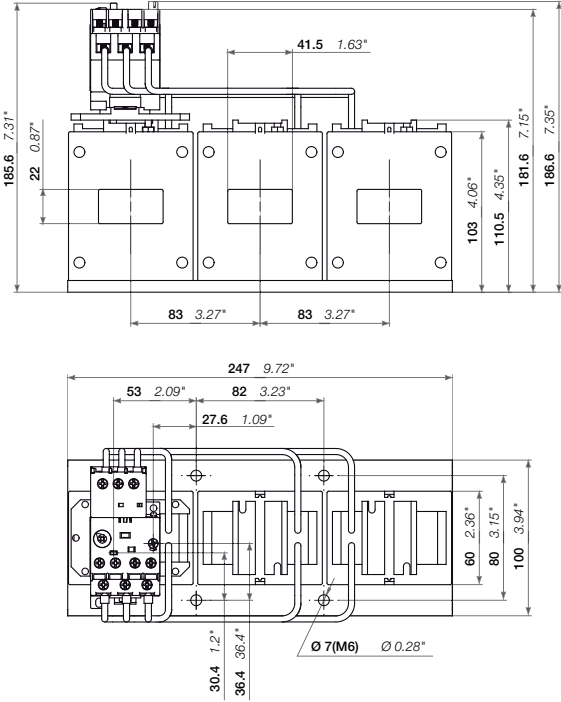
(1) Note: for more information see catalog 1SXU000023C0202 Rev. A.

(2) North American applications only.

Main dimensions mm, inches



E500DU



E800DU

# EF19, EF45 electronic overload relays

## Technical data

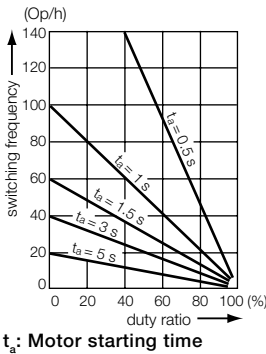
### Main circuit – Utilization characteristics according to IEC/EN

|                                            |                                                                             |      |
|--------------------------------------------|-----------------------------------------------------------------------------|------|
| Type                                       | EF19                                                                        | EF45 |
| Standards                                  | IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1                          |      |
| Rated operational voltage $U_n$            | 690 V AC                                                                    |      |
| Rated frequency                            | 50/60 Hz – not suitable for DC applications                                 |      |
| Trip class                                 | 10E, 20E, 30E, selectable                                                   |      |
| Number of poles                            | 3                                                                           |      |
| Duty time                                  | 100 %                                                                       |      |
| Operating frequency without early tripping | Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty" |      |
| Rated impulse withstand voltage $U_{imp}$  | 6 kV                                                                        |      |
| Rated insulation voltage $U_i$             | 690 V AC                                                                    |      |

### Auxiliary circuit according to IEC/EN

|                                                                                              |                   |        |
|----------------------------------------------------------------------------------------------|-------------------|--------|
| Type                                                                                         | EF19              | EF45   |
| Rated operational voltage $U_n$                                                              | 600 V AC / DC     |        |
| Conventional free air thermal current $I_n$                                                  | 6 A               |        |
| Rated frequency                                                                              | DC, 50/60 Hz      |        |
| Number of poles                                                                              | 1 N.C. + 1 N.O.   |        |
| $I_e$ / Rated operational current AC-15<br>acc. to IEC/EN 60947-5-1 for utilization category |                   |        |
| 110-120 V                                                                                    | 50/60 Hz          | 3.00 A |
| 220-230-240 V                                                                                | 50/60 Hz          | 3.00 A |
| 440 V                                                                                        | 50/60 Hz          | 1.10 A |
| 480-500 V                                                                                    | 50/60 Hz          | 0.75 A |
| $I_e$ / Rated operational current DC-13<br>acc. to IEC/EN 60947-5-1 for utilization category |                   |        |
| 24 V                                                                                         |                   | 1.50 A |
| 60 V                                                                                         |                   | 0.55 A |
| 110-120-125 V                                                                                |                   | 0.55 A |
| 250 V                                                                                        |                   | 0.27 A |
| Minimum switching capacity                                                                   | 12 V / 3 mA       |        |
| Short-circuit protective device                                                              | 6 A, Fuse type gG |        |
| Rated impulse withstand voltage $U_{imp}$                                                    | 6 kV              |        |
| Rated insulation voltage $U_i$                                                               | 690 V             |        |

### Technical diagram – Intermittent periodic duty



# EF19, EF45 electronic overload relays

## Technical data

### Main circuit – Utilization characteristics according to UL/CSA

|                                      |                                                                |      |
|--------------------------------------|----------------------------------------------------------------|------|
| Type                                 | EF19                                                           | EF45 |
| Standards                            | UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A           |      |
| Maximum operational voltage          | 600 V AC                                                       |      |
| Trip rating                          | 125 % of FLA                                                   |      |
| Full load amps (FLA)                 | See table "Full load amps and short-circuit protective device" |      |
| Short-circuit rating RMS symmetrical | See table "Full load amps and short-circuit protective device" |      |
| Short-circuit protective device      | See table "Full load amps and short-circuit protective device" |      |

### Auxiliary circuit according to UL/CSA

|                              |                            |                          |
|------------------------------|----------------------------|--------------------------|
| Type                         | EF19                       | EF45                     |
| Contact rating               | N.C., 95-96<br>N.O., 97-98 | B600, Q600<br>B600, Q600 |
| Conventional thermal current | 5 A                        |                          |

### Full load amps and short-circuit protective device

| Type      | Full load amps (FLA) | Short-circuit protective device |                | 600 V AC |                |        |               |
|-----------|----------------------|---------------------------------|----------------|----------|----------------|--------|---------------|
|           |                      | 480 V AC                        |                |          |                |        |               |
|           |                      | SCCR                            | Fuse type      | SCCR     | Fuse type      | SCCR   | Fuse type     |
| EF19-0.32 | 0.32 A               | 50 kA                           | 2 A, Class J   | 5 kA     | 2 A, K5 / RK5  | 100 kA | 2 A, Class J  |
| EF19-1.0  | 1.00 A               | 50 kA                           | 2 A, K5 / RK5  | 5 kA     | 2 A, K5 / RK5  | 100 kA | 2 A, Class J  |
| EF19-2.7  | 2.70 A               | 50 kA                           | 4 A, K5 / RK5  | 5 kA     | 4 A, K5 / RK5  | 100 kA | 4 A, Class J  |
| EF19-6.3  | 6.30 A               | 50 kA                           | 15 A, K5 / RK5 | 5 kA     | 15 A, K5 / RK5 | 100 kA | 15 A, Class J |
| EF19-18.9 | 18.90 A              | 50 kA                           | 30 A, K5 / RK5 | 5 kA     | 30 A, K5 / RK5 | 100 kA | 30 A, Class J |

| Type    | Full load amps (FLA) | Short-circuit protective device |                 | 600 V AC |                 |        |                |
|---------|----------------------|---------------------------------|-----------------|----------|-----------------|--------|----------------|
|         |                      | 480 V AC                        |                 |          |                 |        |                |
|         |                      | SCCR                            | Fuse type       | SCCR     | Fuse type       | SCCR   | Fuse type      |
| EF45-30 | 30 kA                | 18 kA                           | 150 A, K5 / RK5 | 18 kA    | 150 A, K5 / RK5 | 100 kA | 150 A, Class J |
| EF45-45 | 45 kA                | 18 kA                           | 200 A, K5 / RK5 | 18 kA    | 200 A, K5 / RK5 | 100 kA | 200 A, Class J |

# EF19, EF45 electronic overload relays

## Technical data

### General data

|                                                |                                                                             |                |
|------------------------------------------------|-----------------------------------------------------------------------------|----------------|
| Type                                           | EF19                                                                        | EF45           |
| Pollution degree                               | 3                                                                           |                |
| Phase loss sensitive                           | Yes                                                                         |                |
| Ambient air temperature                        |                                                                             |                |
| Operation                                      | Open - compensated                                                          | -25 ... +70 °C |
| Storage                                        |                                                                             | -50 ... +85 °C |
| Ambient air temperature compensation           | Acc. to IEC/EN60947-4-1                                                     |                |
| Maximum operating altitude permissible         | 2000 m                                                                      |                |
| Resistance to shock acc. to IEC 60068-2-27     | 15g / 11 ms                                                                 |                |
| Resistance to vibrations acc. to IEC 60068-2-6 | 1g / 3 ... 150 Hz                                                           |                |
| Mounting position                              | Position 1-6                                                                |                |
| Mounting                                       | Mount on the contactor and tighten the screws of the main circuit terminals |                |
| Degree of protection                           | Housing                                                                     | IP20           |
|                                                | Main circuit terminals                                                      | IP20           |

### Electrical connection

#### Main circuit

|                                                                                                                   |                                       |                                  |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------|
| Type                                                                                                              | EF19                                  | EF45                             |
| Connecting capacity                                                                                               |                                       |                                  |
|  Rigid                           | 1 or 2 x 1 ... 4 mm <sup>2</sup>      | 2.5 ... 16 mm <sup>2</sup>       |
|  Flexible with insulated ferrule | 1 or 2 x 0.75 ... 2.5 mm <sup>2</sup> | 2.5 ... 10 mm <sup>2</sup>       |
| Stranded acc. to UL/CSA                                                                                           | 1 or 2 x AWG 16-10                    | AWG 14-6                         |
| Flexible acc. to UL/CSA                                                                                           | 1 or 2 x AWG 16-10                    | AWG 14-6                         |
| Stripping length                                                                                                  | 9 mm                                  | 13 mm                            |
| Tightening torques                                                                                                | 0.8 ... 1.5 Nm / 7 ... 13 lb.in       | 2.3 ... 2.6 Nm / 20 ... 22 lb.in |
| Connection screw                                                                                                  | M3.5 (Pozidriv 2)                     |                                  |

#### Auxiliary circuit

|                                                                                                                     |                                       |      |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|
| Type                                                                                                                | EF19                                  | EF45 |
| Connecting capacity                                                                                                 |                                       |      |
|  Rigid                           | 1 or 2 x 1 ... 4 mm <sup>2</sup>      |      |
|  Flexible with ferrule           | 1 or 2 x 0.75 ... 2.5 mm <sup>2</sup> |      |
|  Flexible with insulated ferrule | 1 or 2 x 0.75 ... 2.5 mm <sup>2</sup> |      |
|  Flexible                        | 1 or 2 x 0.75 ... 2.5 mm <sup>2</sup> |      |
| Stranded acc. to UL/CSA                                                                                             | 1 or 2 x AWG 18-10                    |      |
| Flexible acc. to UL/CSA                                                                                             | 1 or 2 x AWG 18-10                    |      |
| Stripping length                                                                                                    | 9 mm                                  |      |
| Tightening torques                                                                                                  | 0.8 ... 1.2 Nm / 7 ... 11 lb.in       |      |
| Connection screw                                                                                                    | M3 (Pozidriv 2)                       |      |

# EF65, EF96, EF146 electronic overload relays

## Technical data

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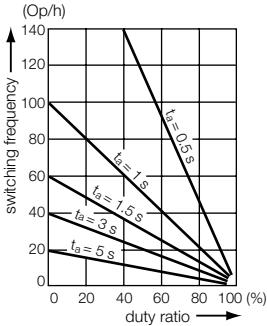
### Main circuit – Utilization characteristics according to IEC/EN

|                                            |                                                                             |
|--------------------------------------------|-----------------------------------------------------------------------------|
| Type                                       | EF65, EF96, EF146                                                           |
| Standards                                  | IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1                          |
| Rated operational voltage $U_e$            | 1000 V AC                                                                   |
| Rated frequency                            | 50/60 Hz – not suitable for DC applications                                 |
| Trip class                                 | 10E, 20E, 30E, selectable                                                   |
| Number of poles                            | 3                                                                           |
| Duty time                                  | 100 %                                                                       |
| Operating frequency without early tripping | Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty" |
| Rated impulse withstand voltage $U_{imp}$  | 8 kV                                                                        |
| Rated insulation voltage $U_i$             | 1000 V                                                                      |

### Auxiliary circuit according to IEC/EN

|                                                                                              |                   |
|----------------------------------------------------------------------------------------------|-------------------|
| Type                                                                                         | EF65, EF96, EF146 |
| Rated operational voltage $U_e$                                                              | 600 V AC / DC     |
| Conventional free air thermal current $I_{th}$                                               | 6 A               |
| Rated frequency                                                                              | DC, 50/60 Hz      |
| Number of poles                                                                              | 1 N.C. + 1 N.O.   |
| $I_e$ / Rated operational current AC-15<br>acc. to IEC/EN 60947-5-1 for utilization category |                   |
| 110-120 V 50/60 Hz                                                                           | 3.00 A            |
| 220-230-240 V 50/60 Hz                                                                       | 3.00 A            |
| 400 V 50/60 Hz                                                                               | 1.10 A            |
| 480-500 V 50/60 Hz                                                                           | 0.75 A            |
| $I_e$ / Rated operational current DC-13<br>acc. to IEC/EN 60947-5-1 for utilization category |                   |
| 24 V                                                                                         | 1.50 A            |
| 60 V                                                                                         | 0.55 A            |
| 110-120-125 V                                                                                | 0.55 A            |
| 250 V                                                                                        | 0.27 A            |
| Minimum switching capacity                                                                   | 12 V / 3 mA       |
| Short-circuit protective device                                                              | 6 A, Fuse type gG |
| Rated impulse withstand voltage $U_{imp}$                                                    | 6 kV              |
| Rated insulation voltage $U_i$                                                               | 690 V             |

### Technical diagram – Intermittent periodic duty



$t_a$ : Motor starting time

# EF65, EF96, EF146 electronic overload relays

## Technical data

### Main circuit – Utilization characteristics according to UL/CSA

|                                      |                                                                |
|--------------------------------------|----------------------------------------------------------------|
| Type                                 | EF65, EF96, EF146                                              |
| Standards                            | UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A           |
| Maximum operational voltage          | 600 V AC                                                       |
| Trip rating                          | 125 % of FLA                                                   |
| Full load amps (FLA)                 | See table "Full load amps and short-circuit protective device" |
| Short-circuit rating RMS symmetrical | See table "Full load amps and short-circuit protective device" |
| Short-circuit protective device      | See table "Full load amps and short-circuit protective device" |

### Auxiliary circuit according to UL/CSA

|                              |                                                  |
|------------------------------|--------------------------------------------------|
| Type                         | EF65, EF96, EF146                                |
| Contact rating               | N.C., 95-96 B600, Q600<br>N.O., 97-98 B600, Q600 |
| Conventional thermal current | 6 A                                              |

### Full load amps and short-circuit protective device

| Type      | Full load amps (FLA) | Short-circuit protective device |               | 600 V AC |               |        |           |
|-----------|----------------------|---------------------------------|---------------|----------|---------------|--------|-----------|
|           |                      | 480 V AC                        |               |          |               |        |           |
|           |                      | SCCR                            | Fuse type     | SCCR     | Fuse type     | SCCR   | Fuse type |
| EF65-70   | 70 A                 | 10 kA                           | 150 A, R5/RK5 | 10kA     | 150 A, R5/RK5 | 100 kA | 175 A, J  |
| EF96-100  | 100 A                | 10 kA                           | 200 A, R5/RK5 | 10kA     | 200 A, R5/RK5 | 100 kA | 225 A, J  |
| EF146-150 | 150 A                | 10 kA                           | 250 A, R5/RK5 | 10kA     | 250 A, R5/RK5 | 100 kA | 350 A, J  |

# EF65, EF96, EF146 electronic overload relays

## Technical data

### General data

|                                                |                                                                             |                |
|------------------------------------------------|-----------------------------------------------------------------------------|----------------|
| Type                                           | EF65, EF96, EF146                                                           |                |
| Pollution degree                               | 3                                                                           |                |
| Phase loss sensitive                           | Yes                                                                         |                |
| Ambient air temperature                        |                                                                             |                |
| Operation                                      | Open - compensated                                                          | -25 ... +70 °C |
| Storage                                        |                                                                             | -50 ... +85 °C |
| Ambient air temperature compensation           | Acc. to IEC/EN 60947-4-1                                                    |                |
| Maximum operating altitude permissible         | 2000 m                                                                      |                |
| Resistance to shock acc. to IEC 60068-2-27     | 15g / 11 ms                                                                 |                |
| Resistance to vibrations acc. to IEC 60068-2-6 | 5g / 3 ... 150 Hz                                                           |                |
| Mounting position                              | Position 1-6                                                                |                |
| Mounting                                       | Mount on the contactor and tighten the screws of the main circuit terminals |                |
| Degree of protection                           | Housing                                                                     | IP20           |
|                                                | Main circuit terminals                                                      | IP10           |

### Electrical connection

#### Main circuit

| Type                                                                                       |     | EF65                     | EF96                     | EF146                     |
|--------------------------------------------------------------------------------------------|-----|--------------------------|--------------------------|---------------------------|
| Connecting capacity                                                                        |     |                          |                          |                           |
|  Rigid    | 1 x | 4 ... 35 mm <sup>2</sup> | 6 ... 70 mm <sup>2</sup> | 10 ... 95 mm <sup>2</sup> |
|                                                                                            | 2 x | 4 ... 35 mm <sup>2</sup> | 6 ... 35 mm <sup>2</sup> | 10 ... 35 mm <sup>2</sup> |
|  Flexible | 1 x | 4 ... 35 mm <sup>2</sup> | 6 ... 50 mm <sup>2</sup> | 10 ... 70 mm <sup>2</sup> |
|                                                                                            | 2 x | 4 ... 35 mm <sup>2</sup> | 6 ... 35 mm <sup>2</sup> | 10 ... 35 mm <sup>2</sup> |
| Stranded acc. to UL/CSA                                                                    | 1 x | AWG 10-2                 | AWG 8-2                  | AWG 6-00                  |
|                                                                                            | 2 x |                          |                          | AWG 6-2                   |
| Flexible acc. to UL/CSA                                                                    | 1 x | AWG 10-2                 | AWG 8-2                  | AWG 6-00                  |
|                                                                                            | 2 x |                          |                          | AWG 6-2                   |
| Stripping length                                                                           |     | 20 mm                    | 20 mm                    | 20 mm                     |
| Tightening torques                                                                         |     | 4 Nm / 35 lb.in          | 6 Nm / 55 lb.in          | 8 Nm / 70 lb.in           |
| Connection screw                                                                           |     | M8 (Pozidriv 2)          | M8 (Hexagon 4)           | M8 (Hexagon 4)            |

#### Auxiliary circuit

|                                                                                                                     |                   |                                 |
|---------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------|
| Type                                                                                                                | EF65, EF96, EF146 |                                 |
| Connecting capacity                                                                                                 |                   |                                 |
|  Rigid                           | 1 or 2 x          | 1 ... 4 mm <sup>2</sup>         |
|  Flexible with ferrule           | 1 or 2 x          | 0.75 ... 2.5 mm <sup>2</sup>    |
|  Flexible with insulated ferrule | 1 or 2 x          | 0.75 ... 2.5 mm <sup>2</sup>    |
|  Flexible                        | 1 or 2 x          | 0.75 ... 2.5 mm <sup>2</sup>    |
| Stranded acc. to UL/CSA                                                                                             | 1 or 2 x          | AWG 18-10                       |
| Flexible acc. to UL/CSA                                                                                             | 1 or 2 x          | AWG 18-10                       |
| Stripping length                                                                                                    |                   | 9 mm                            |
| Tightening torques                                                                                                  |                   | 0.8 ... 1.2 Nm / 7 ... 11 lb.in |
| Connection screw                                                                                                    |                   | M3.5 (Pozidriv 2)               |

# EF205, EF370 electronic overload relays

## Technical data

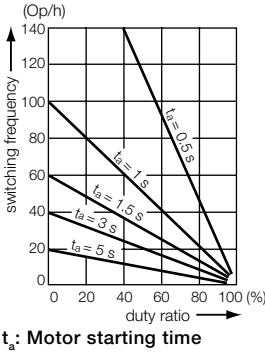
### Main circuit – Utilization characteristics according to IEC/EN

|                                            |                                                                             |
|--------------------------------------------|-----------------------------------------------------------------------------|
| Type                                       | EF205, EF370                                                                |
| Standards                                  | IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1                          |
| Rated operational voltage $U_n$            | 1000 V AC                                                                   |
| Rated frequency                            | 50/60 Hz – not suitable for DC applications                                 |
| Trip class                                 | 10E, 20E, 30E, selectable                                                   |
| Number of poles                            | 3                                                                           |
| Duty time                                  | 100 %                                                                       |
| Operating frequency without early tripping | Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty" |
| Rated impulse withstand voltage $U_{imp}$  | 8 kV                                                                        |
| Rated insulation voltage $U_i$             | 1000 V                                                                      |

### Auxiliary circuit according to IEC/EN

|                                                                                              |                   |
|----------------------------------------------------------------------------------------------|-------------------|
| Type                                                                                         | EF205, EF370      |
| Rated operational voltage $U_n$                                                              | 600 V AC / DC     |
| Conventional free air thermal current $I_n$                                                  | 6 A               |
| Rated frequency                                                                              | DC, 50/60 Hz      |
| Number of poles                                                                              | 1 N.C. + 1 N.O.   |
| $I_n$ / Rated operational current AC-15<br>acc. to IEC/EN 60947-5-1 for utilization category |                   |
| 110-120 V                                                                                    | 50/60 Hz : 3.00 A |
| 220-230-240 V                                                                                | 50/60 Hz : 3.00 A |
| 400 V                                                                                        | 50/60 Hz : 1.10 A |
| 480-500 V                                                                                    | 50/60 Hz : 0.75 A |
| $I_n$ / Rated operational current DC-13<br>acc. to IEC/EN 60947-5-1 for utilization category |                   |
| 24 V                                                                                         | 1.50 A            |
| 60 V                                                                                         | 0.55 A            |
| 110-120-125 V                                                                                | 0.55 A            |
| 250 V                                                                                        | 0.27 A            |
| Minimum switching capacity                                                                   | 12 V / 3 mA       |
| Short-circuit protective device                                                              | 6 A, Fuse type gG |
| Rated impulse withstand voltage $U_{imp}$                                                    | 6 kV              |
| Rated insulation voltage $U_i$                                                               | 690 V             |

### Technical diagram – Intermittent periodic duty



# EF205, EF370 electronic overload relays

## Technical data

3

### Main circuit – Utilization characteristics according to UL/CSA

|                                      |                                                                |
|--------------------------------------|----------------------------------------------------------------|
| Type                                 | EF205, EF370                                                   |
| Standards                            | UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A           |
| Maximum operational voltage          | 600 V AC                                                       |
| Trip rating                          | 125 % of FLA                                                   |
| Full load amps (FLA)                 | See table "Full load amps and short-circuit protective device" |
| Short-circuit rating RMS symmetrical | See table "Full load amps and short-circuit protective device" |
| Short-circuit protective device      | See table "Full load amps and short-circuit protective device" |

### Auxiliary circuit according to UL/CSA

|                              |                        |
|------------------------------|------------------------|
| Type                         | EF205, EF370           |
| Contact rating               | N.C., 95-96 B600, Q600 |
|                              | N.O., 97-98 B600, Q600 |
| Conventional thermal current | 6 A                    |

### Full load amps and short-circuit protective device

| Type      | Full load amps (FLA) | Short-circuit protective device |               | 600 V AC |               |        |           |
|-----------|----------------------|---------------------------------|---------------|----------|---------------|--------|-----------|
|           |                      | 480 V AC                        |               |          |               |        |           |
|           |                      | SCCR                            | Fuse type     | SCCR     | Fuse type     | SCCR   | Fuse type |
| EF205-210 | 210 A                | 10 kA                           | 400 A, R5/RK5 | 10kA     | 400 A, R5/RK5 | 100 kA | 400 A, J  |
| EF370-380 | 380 A                | 18 kA                           | 800 A, L/T    | 18kA     | 800 A, L/T    | -      | -         |

# EF205, EF370 electronic overload relays

## Technical data

### General data

|                                                |                                                                             |                |
|------------------------------------------------|-----------------------------------------------------------------------------|----------------|
| Type                                           | EF205, EF370                                                                |                |
| Pollution degree                               | 3                                                                           |                |
| Phase loss sensitive                           | Yes                                                                         |                |
| Ambient air temperature                        |                                                                             |                |
| Operation                                      | Open - compensated                                                          | -25 ... +70 °C |
| Storage                                        |                                                                             | -50 ... +85 °C |
| Ambient air temperature compensation           | Acc. to IEC/EN 60947-4-1                                                    |                |
| Maximum operating altitude permissible         | 2000 m                                                                      |                |
| Resistance to shock acc. to IEC 60068-2-27     | 25g / 11 ms                                                                 |                |
| Resistance to vibrations acc. to IEC 60068-2-6 | 5g / 3 ... 150 Hz                                                           |                |
| Mounting position                              | Position 1-6                                                                |                |
| Mounting                                       | Mount on the contactor and tighten the screws of the main circuit terminals |                |
| Degree of protection                           | Housing                                                                     | IP20           |
|                                                | Main circuit terminals                                                      | IP20           |

### Electrical connection

#### Main circuit

| Type                                                                                       | EF205             |                            | EF370                      |
|--------------------------------------------------------------------------------------------|-------------------|----------------------------|----------------------------|
| Connecting capacity                                                                        |                   |                            |                            |
|  Rigid    | 1 x               | 16 ... 185 mm <sup>2</sup> | 50 ... 240 mm <sup>2</sup> |
|                                                                                            | 2 x               | 16 ... 120 mm <sup>2</sup> | 50 ... 150 mm <sup>2</sup> |
|  Flexible | 1 x               | 16 ... 185 mm <sup>2</sup> | 50 ... 240 mm <sup>2</sup> |
|                                                                                            | 2 x               | 16 ... 120 mm <sup>2</sup> | 50 ... 150 mm <sup>2</sup> |
|  Lugs   | L ≤               | 24 mm                      | 32 mm                      |
|  Bars   | Ø >               | 8 mm                       | 10 mm                      |
| Stranded acc. to UL/CSA                                                                    | 1 x               | AWG 6-0000                 | AWG 1-500 kcmil            |
|                                                                                            | 2 x               | AWG 6-0000                 | AWG 1-500 kcmil            |
| Flexible acc. to UL/CSA                                                                    | 1 x               | AWG 6-0000                 | AWG 1-500 kcmil            |
|                                                                                            | 2 x               | AWG 6-0000                 | AWG 1-500 kcmil            |
| Stripping length                                                                           | -                 |                            | -                          |
| Tightening torques                                                                         | 18 Nm / 160 lb.in |                            | 28 Nm / 247 lb.in          |
| Connection screw                                                                           | M8                |                            | M10                        |

#### Auxiliary circuit

|                                                                                                                     |                                 |                              |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------------|
| Type                                                                                                                | EF205, EF370                    |                              |
| Connecting capacity                                                                                                 |                                 |                              |
|  Rigid                           | 1 or 2 x                        | 1 ... 4 mm <sup>2</sup>      |
|  Flexible with ferrule           | 1 or 2 x                        | 0.75 ... 2.5 mm <sup>2</sup> |
|  Flexible with insulated ferrule | 1 or 2 x                        | 0.75 ... 2.5 mm <sup>2</sup> |
|  Flexible                        | 1 or 2 x                        | 0.75 ... 2.5 mm <sup>2</sup> |
| Stranded acc. to UL/CSA                                                                                             | 1 or 2 x                        | AWG 18-10                    |
| Flexible acc. to UL/CSA                                                                                             | 1 or 2 x                        | AWG 18-10                    |
| Stripping length                                                                                                    | 9 mm                            |                              |
| Tightening torques                                                                                                  | 0.8 ... 1.2 Nm / 7 ... 11 lb.in |                              |
| Connection screw                                                                                                    | M3.5 (Pozidriv 2)               |                              |

# E500DU, E800DU, E1250DU electronic overload relays

## Technical data

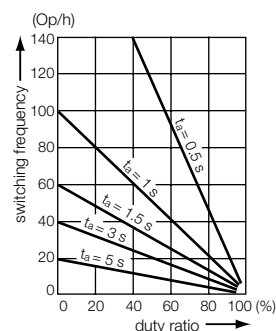
### Main circuit – Utilization characteristics according to IEC/EN

| Type                                       | E500DU                                                                      | E800DU | E1250DU |
|--------------------------------------------|-----------------------------------------------------------------------------|--------|---------|
| Standards                                  | IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1                          |        |         |
| Rated operational voltage $U_n$            | 1000 V AC                                                                   |        |         |
| Rated frequency                            | 50/60 Hz – not suitable for DC applications                                 |        |         |
| Trip class                                 | 10E, 20E, 30E, selectable                                                   |        |         |
| Number of poles                            | 3                                                                           |        |         |
| Duty time                                  | 100 %                                                                       |        |         |
| Operating frequency without early tripping | Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty" |        |         |
| Rated impulse withstand voltage $U_{imp}$  | 8 kV                                                                        |        |         |
| Rated insulation voltage $U_i$             | 1000 V AC                                                                   |        |         |

### Auxiliary circuit according to IEC/EN

| Type                                                      | E500DU            | E800DU | E1250DU |
|-----------------------------------------------------------|-------------------|--------|---------|
| Rated operational voltage $U_n$                           | 600 V AC / DC     |        |         |
| Conventional free air thermal current $I_{th}$            | 6 A               |        |         |
| Rated frequency                                           | DC, 50/60 Hz      |        |         |
| Number of poles                                           | 1 N.C. + 1 N.O.   |        |         |
| <b><math>I_e</math> / Rated operational current AC-15</b> |                   |        |         |
| acc. to IEC/EN 60947-5-1 for utilization category         |                   |        |         |
| 110-120 V                                                 | 50/60 Hz          | 3.00 A |         |
| 220-230-240 V                                             | 50/60 Hz          | 3.00 A |         |
| 440 V                                                     | 50/60 Hz          | 1.10 A |         |
| 480-500 V                                                 | 50/60 Hz          | 0.72 A |         |
| <b><math>I_e</math> / Rated operational current DC-13</b> |                   |        |         |
| acc. to IEC/EN 60947-5-1 for utilization category         |                   |        |         |
| 24 V                                                      |                   | 1.50 A |         |
| 60 V                                                      |                   | 0.55 A |         |
| 110-120-125 V                                             |                   | 0.55 A |         |
| 250 V                                                     |                   | 0.27 A |         |
| Minimum switching capacity                                | 12 V / 3 mA       |        |         |
| Short-circuit protective device                           | 6 A, Fuse type gG |        |         |
| Rated impulse withstand voltage $U_{imp}$                 | 8 kV              |        |         |
| Rated insulation voltage $U_i$                            | 690 V             |        |         |

### Technical diagram – Intermittent periodic duty



$t_a$ : Motor starting time

# E500DU, E800DU, E1250DU electronic overload relays

## Technical data

### Main circuit – Utilization characteristics according to UL/CSA

| Type                        | E500DU                                               | E800DU | E1250DU |
|-----------------------------|------------------------------------------------------|--------|---------|
| Standards                   | UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A |        |         |
| Maximum operational voltage | 600 V AC                                             |        |         |
| Trip rating                 | 125 % of FLA                                         |        |         |

### Auxiliary circuit according to UL/CSA

| Type                         | E500DU                     | E800DU                   | E1250DU |
|------------------------------|----------------------------|--------------------------|---------|
| Contact rating               | N.C., 95-96<br>N.O., 97-98 | B600, Q300<br>B600, Q300 |         |
| Conventional thermal current | 5 A                        |                          |         |

### General data

| Type                                           | E500DU                  | E800DU         | E1250DU |
|------------------------------------------------|-------------------------|----------------|---------|
| Pollution degree                               | 3                       |                |         |
| Phase loss sensitive                           | Yes                     |                |         |
| Ambient air temperature                        |                         |                |         |
| Operation                                      | Open - compensated      | -25 ... +70 °C |         |
| Storage                                        |                         | -50 ... +85 °C |         |
| Ambient air temperature compensation           | Acc. to IEC/EN60947-4-1 |                |         |
| Maximum operating altitude permissible         | 2000 m                  |                |         |
| Resistance to shock acc. to IEC 60068-2-27     | 15g / 11 ms             |                |         |
| Resistance to vibrations acc. to IEC 60068-2-6 | 5g / 3 ... 150 Hz       |                |         |
| Degree of protection                           | Housing                 | IP20           |         |
|                                                | Main circuit terminals  | IP20           |         |

### Electrical connection

#### Auxiliary circuit

| Type                                                                                |                                 | E500DU   | E800DU                   | E1250DU |
|-------------------------------------------------------------------------------------|---------------------------------|----------|--------------------------|---------|
| Connecting capacity                                                                 |                                 |          |                          |         |
|  | Rigid                           | 1 or 2 x | 1 ... 4 mm²              |         |
|  | Flexible with ferrule           | 1 or 2 x | 0.75 ... 2.5 mm²         |         |
|  | Flexible with insulated ferrule | 1 or 2 x | 0.75 ... 2.5 mm²         |         |
|  | Flexible                        | 1 or 2 x | 0.75 ... 2.5 mm²         |         |
|                                                                                     | Stranded acc. to UL/CSA         | 1 or 2 x | AWG 16-10                |         |
|                                                                                     | Flexible acc. to UL/CSA         | 1 or 2 x | AWG 16-10                |         |
| Stripping length                                                                    |                                 |          |                          |         |
|                                                                                     |                                 |          | 9 mm                     |         |
| Tightening torques                                                                  |                                 |          |                          |         |
|                                                                                     |                                 |          | 0.8 ... 1.2 Nm / 7 lb.in |         |
| Connection screw                                                                    |                                 |          |                          |         |
|                                                                                     |                                 |          | M3.5 (Pozidriv 2)        |         |