

Data sheet

# Minicontactors

## CI 5-



CI 5- minicontactors cover the power range up to 5.5 kW and are available for AC and DC coil voltages enabling reliable working with extremely low and high voltage fluctuations. Characteristic of the minicontactors is that they are compact and suitable for applications where space is at a premium. With add-on auxiliary contact blocks, timers and other additional accessories they offer high flexibility.

One of the most important features is status feedback provided by mechanically linked and mirror contact performance in conformity with IEC 60947-4-1 and 60947-5-1.

Additionally the CI 5- ensures safety against electric shock by extra protective distance between housing surfaces and live parts. The CI 5- programme includes dedicated bimetallic overload protection relay with a differential mechanism for sensitivity to phase-loss conditions.

### Features

- Compact design
- High flexibility
- Power range up to 5.5 kW
- For ac and dc coil voltages

## Ordering



Minicontactors CI 5-, for AC and DC coil voltage

| Type                     | Main circuit                        |                                     |                     |                                                      |                                                       |                      | Built-in auxiliary contacts Number/ Function | Code no. 1) |
|--------------------------|-------------------------------------|-------------------------------------|---------------------|------------------------------------------------------|-------------------------------------------------------|----------------------|----------------------------------------------|-------------|
|                          | AC-3 load                           |                                     |                     | I <sub>th</sub> <sup>2)</sup><br>(AC-1)<br>Open<br>A | I <sub>th</sub> <sup>3)</sup><br>(AC-1)<br>Encl.<br>A | Main contacts number |                                              |             |
|                          | U <sub>e</sub><br>230 – 240<br>V kW | U <sub>e</sub><br>400 – 690<br>V kW | I <sub>e</sub><br>A |                                                      |                                                       |                      |                                              |             |
| CI 5-2 40E <sup>4)</sup> | –                                   | –                                   | –                   | 10 <sup>4)</sup>                                     | 6 <sup>4)</sup>                                       | –                    | 4 NO                                         | 037H3500    |
| CI 5-2 22Z <sup>4)</sup> | –                                   | –                                   | –                   | 10 <sup>4)</sup>                                     | 6 <sup>4)</sup>                                       | –                    | 2 NO, 2 NC                                   | 037H3501    |
| CI 5-5 10                | 1.5                                 | 2.2                                 | 4.9                 | 20                                                   | 16                                                    | 3                    | 1 NO                                         | 037H3502    |
| CI 5-5 01                | 1.5                                 | 2.2                                 | 4.9                 | 20                                                   | 16                                                    | 3                    | 1 NC                                         | 037H3503    |
| CI 5-9 10                | 3.0                                 | 4.0                                 | 8.5                 | 20                                                   | 16                                                    | 3                    | 1 NO                                         | 037H3504    |
| CI 5-9 01                | 3.0                                 | 4.0                                 | 8.5                 | 20                                                   | 16                                                    | 3                    | 1 NC                                         | 037H3505    |
| CI 5-9 M40               | 3.0                                 | 4.0                                 | 8.5                 | 20                                                   | 16                                                    | 4                    | –                                            | 037H3506    |
| CI 5-12 10               | 3.0                                 | 5.5                                 | 11.5                | 20                                                   | 16                                                    | 3                    | 1 NO                                         | 037H3507    |
| CI 5-12 01               | 3.0                                 | 5.5                                 | 11.5                | 20                                                   | 16                                                    | 3                    | 1 NC                                         | 037H3508    |

<sup>1)</sup> Coil voltage/frequency or Suffix no. (see table below) must be added to the Danfoss code no.

<sup>2)</sup> The thermal current value I<sub>th</sub> gives the maximum load at 40 °C, which corresponds to installing the contactor in air (open).

<sup>3)</sup> The thermal current value I<sub>the</sub> gives the maximum load at 60 °C, corresponding installing the contactor inside an enclosure.

<sup>4)</sup> Control relay, rating according to AC-12 category

AC coil voltages for CI 5-

| Coil voltage <sup>1)</sup>   | Suffix no. |
|------------------------------|------------|
| 24 V, 50/60 Hz               | 13         |
| 110 V, 50 Hz<br>120 V, 60 Hz | 23         |
| 230 V, 50/60 Hz              | 32         |
| 240 V, 50/60 Hz              | 33         |
| 400 V, 50/60 Hz              | 37         |

<sup>1)</sup> Standard coil voltage tolerance -15%, +10%

Correct ordering of contactors

Example: CI 5-5 with NC auxiliary contact and 24 V, 50/60 Hz coil voltage.

Select the following form of ordering:

1. Danfoss code no. + Suffix no.: **037H350313**

DC coil voltages for CI 5-

| Coil voltage <sup>1)</sup> | Suffix no. |
|----------------------------|------------|
| *12 V DC                   | 01         |
| 24 V DC                    | 02         |

<sup>1)</sup> Standard coil voltage tolerance -30%, +25%

\* Code no. **037H3504** only



**Auxiliary contact  
CBN**

### Auxiliary contact blocks CI 5-

| Type   | Contact function           | Load                           |                                   |                                    |                     | Code no.        |
|--------|----------------------------|--------------------------------|-----------------------------------|------------------------------------|---------------------|-----------------|
|        |                            | I <sub>e</sub><br>(AC-15)<br>A | I <sub>th</sub> *)<br>(AC-1)<br>A | I <sub>the</sub> *)<br>(AC-1)<br>A | U <sub>e</sub><br>V |                 |
| CBN 40 | 4 make (NO)                | 2                              | 10                                | 6                                  | 500                 | <b>037H3511</b> |
| CBN 02 | 2 break (NC)               | 2                              | 10                                | 6                                  | 500                 | <b>037H3513</b> |
| CBN 11 | 1 make (NO) + 1 break (NC) | 2                              | 10                                | 6                                  | 500                 | <b>037H3514</b> |
| CBN 22 | 2 make (NO) + 2 break (NC) | 2                              | 10                                | 6                                  | 500                 | <b>037H3515</b> |
| CBN 04 | 4 break (NC)               | 2                              | 10                                | 6                                  | 500                 | <b>037H3512</b> |

\*) I<sub>th</sub> and I<sub>the</sub> are defined and specified under Technical data

CBN mirror contact block ensures reliable monitoring of the status of the CI 5 contactor according to IEC 60947-4-1.

Bifurcated, H-shaped CBN contacts provide outstanding contact reliability for low energy switching down to 15V/2mA.



**Mechanical interlock**

### Accessories for minicotators CI 5-

| Description     | Comments                                                                            | Code no.        |
|-----------------|-------------------------------------------------------------------------------------|-----------------|
| Mech. interlock | For interlocking of two adjacent contactors (Applies to versions with AC/DC coils)  | <b>037H3520</b> |
| Diode element   | Reduce over voltage on the de-energization of coils<br>Type DCN 250 (12 – 250 V DC) | <b>037H3510</b> |
| RC element      | Reduce over voltage on de-energization of coils<br>Type RCN 48 (24 – 48 V AC)       | <b>037H3518</b> |
|                 | RCN 280 (110 – 280 V AC)                                                            | <b>037H3519</b> |



**RC element  
RCN**

## Thermal overload relay TI 9C-5

### Introduction



Thermal overload relay TI 9C-5 is used with minicontactor CI 5- for protection of squirrel cage motors where compactness is required. The relay have single – phase protection, i.e. accelerated release if phase drop-out occurs.

This is particularly important for motors with delta connected windings.

Other features of TI 9C-5 :

- Stop / reset button
- Manual / automatic reset
- Test button
- Double scale for direct start or Y/D start
- Galvanically isolated signal contact

### Ordering

| Type    | Range                   |                        | Max. fuse <sup>1)</sup> |               |               |               | HRC <sup>2)</sup><br>Form II | Code no. |
|---------|-------------------------|------------------------|-------------------------|---------------|---------------|---------------|------------------------------|----------|
|         | Motor<br>starter<br>[A] | Y/D-<br>starter<br>[A] | gl, gL, gG              |               | BS 88, type T |               |                              |          |
|         |                         |                        | Type 1<br>[A]           | Type 2<br>[A] | Type 1<br>[A] | Type 2<br>[A] |                              |          |
| TI 9C-5 | 0.27 – 0.42             | –                      | 25                      | 2             | 32            | 2             | 1                            | 047H3132 |
|         | 0.4 – 0.62              | –                      | 25                      | 2             | 32            | 4             | 1                            | 047H3133 |
|         | 0.6 – 0.92              | –                      | 25                      | 4             | 32            | 6             | 3                            | 047H3134 |
|         | 0.85 – 1.3              | –                      | 25                      | 4             | 32            | 6             | 3                            | 047H3135 |
|         | 1.2 – 1.9               | –                      | 25                      | 6             | 32            | 10            | 6                            | 047H3136 |
|         | 1.8 – 2.8               | 3.2 – 4.8              | 25                      | 6             | 32            | 10            | 15                           | 047H3137 |
|         | 2.7 – 4.2               | 4.7 – 7.3              | 25                      | 16            | 32            | 20            | 15                           | 047H3138 |
|         | 4.0 – 6.2               | 6.9 – 10.7             | 35                      | 20            | 40            | 25            | 15                           | 047H3139 |
|         | 6.0 – 9.2               | 10 – 16                | 50                      | 20            | 50            | 25            | 35                           | 047H3140 |
|         | 8.0 – 12                | 13 – 20.8              | 63                      | 25            | 63            | 32            | 35                           | 047H3141 |

<sup>1)</sup> To IEC 947-4 coordination types 1 and 2:

**Coordination type 1:** Any type of damage to the motor starter is permissible. If the motor starter is in an enclosure, no external damage to the enclosure is permissible. After a short-circuit the thermal overload relay shall be partially or wholly replaced.

**Coordination type 2:** No damage to the motor starter is permissible, but slight contact burning and welding is permissible.

<sup>2)</sup> In accordance with HRC form II, TI 9C and TI 12C is suitable for operation in Canada and the USA.

### Selection of thermal overload relay:

The selection of a thermal overload relay must be based on the motor full load current and the method of starting:

- With direct start range for motor starter is used
- With star – delta start the range for Y/D starter is used

### Example:

**Full load current: 12A**

- With direct start the suitable motor starter range is 8.0 – 12A, i.e. thermal overload relay **047H3141**
- With Y/D – start, the suitable motor starter range is 10 – 16A, i.e. thermal overload relay **047H3140**

## Construction standards

Contactors, thermal overload relays and accessories are designed and tested in accordance with IEC 60974 / EN 60947 and 60068.

**Max. installation height:** 2000 m NN, in accordance with IEC 60947

|                                                        |                         |
|--------------------------------------------------------|-------------------------|
| Mechanically linked contacts<br>IEC 60947-5-1, Annex L | CI 5-5, -9, -12         |
| Mirror contacts<br>IEC 60947-4-1, Annex F              | CI 5-5, -9, -12 and CBN |

## CI 5- General data

| Rated impulse voltage<br>withstand<br>$U_{imp}$ | Rated isolation<br>voltage<br>$U_i$ |             |
|-------------------------------------------------|-------------------------------------|-------------|
| [kV]                                            | IEC [V]                             | UL, CSA [V] |
| 6                                               | 690                                 | 600         |

## Ambient temperature

| Type  | Ambient temperature |                     |
|-------|---------------------|---------------------|
|       | Operation           | Storage / Transport |
| CI 5- | -25 °C – 60 °C      | -55 °C – 80 °C      |

## Vibration and shock

Tested and passed in accordance with IEC 68-2 / EN 60068

| Type  | Vibration <sup>1)</sup> | Shock <sup>2)</sup> |
|-------|-------------------------|---------------------|
| CI 5- | 5g, 5 – 500 Hz          | 5g, 30ms            |

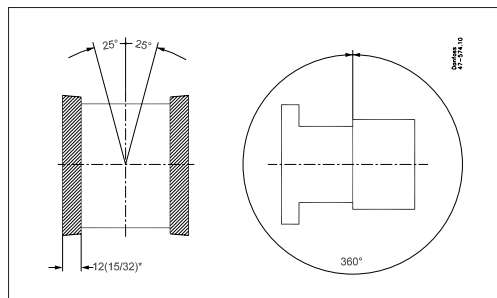
<sup>1)</sup> Operating conditions: All directions with de-energized coil.

<sup>2)</sup> Operating conditions: Parallel with armature and with de-energized coil

## Environment

| Type    | Temperature compensated | Ambient temperature | Vibration     | Shock perpendicular to contact system | Max. operations per hour |
|---------|-------------------------|---------------------|---------------|---------------------------------------|--------------------------|
| TI 9C-5 | -5 °C – 40 °C           | -50 °C – 60 °C      | 2 g at 200 Hz | 9 g for 7.5 ms                        | 30                       |

## Mounting direction



## Rated life

| Type                        | Mechanical life      | Electrical life<br>AC-3 load<br>Operations | Electrical life<br>AC-15 load<br>Operations | Switching per hour<br>AC-3 load<br>Operations |
|-----------------------------|----------------------|--------------------------------------------|---------------------------------------------|-----------------------------------------------|
| CI 5-2                      | 15 x 10 <sup>6</sup> | –                                          | 0.7 x 10 <sup>6</sup>                       | –                                             |
| CI 5-5<br>CI 5-9<br>CI 5-12 | 15 x 10 <sup>6</sup> | 0.7 x 10 <sup>6</sup>                      | –                                           | 600                                           |

## Approvals and standards

### UL approvals :

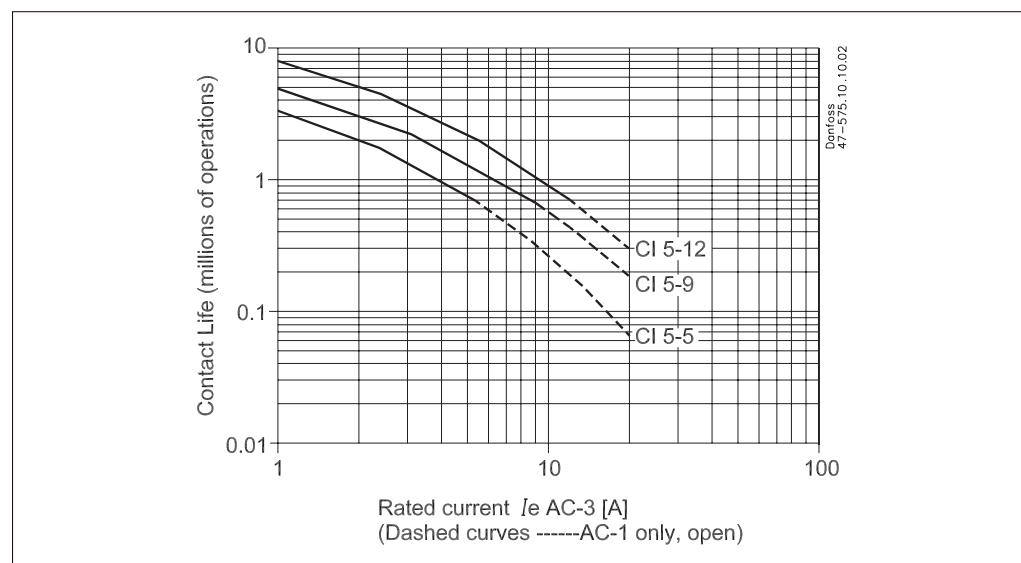
|              |                                  |                                        |
|--------------|----------------------------------|----------------------------------------|
| CI 5-:       | cULus                            | Standards UL 508, CSA C22.2 No. 14     |
| TI 9C-5:     | cULus                            | Standards UL 508, CSA C22.2 No. 14 M91 |
| CE           | IEC/EN 60947-1, -4-1, -5-1, -5-4 |                                        |
| EAC          | approved                         |                                        |
| LLC CDC TYSK | approved                         |                                        |

# Electrical life curves

Electrical life;  $U_e = 400 - 460V$  AC

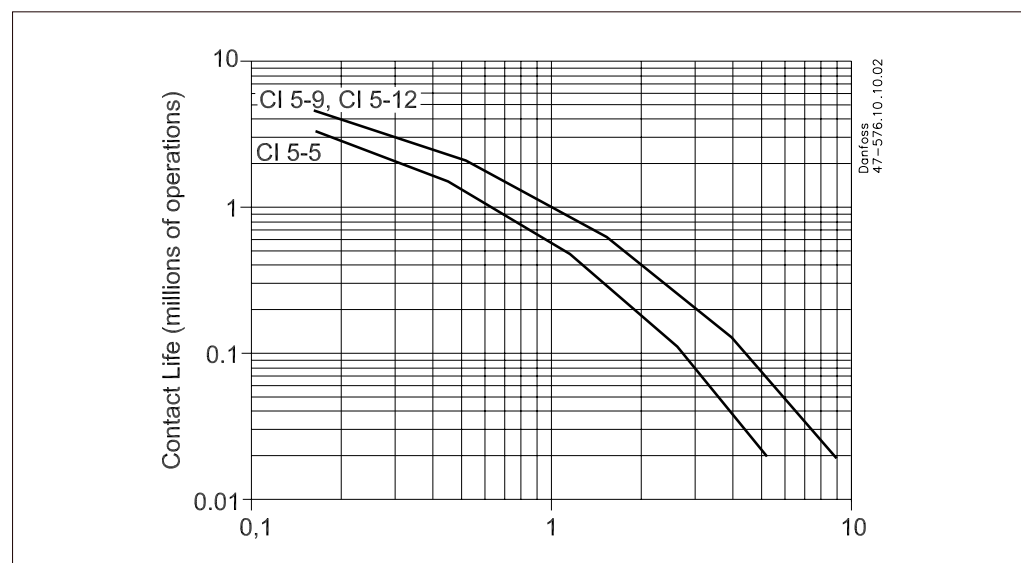
AC-3: Switching of squirrel-cage motors while starting.

AC-1: Non- or slightly inductive loads, resistance furnaces.



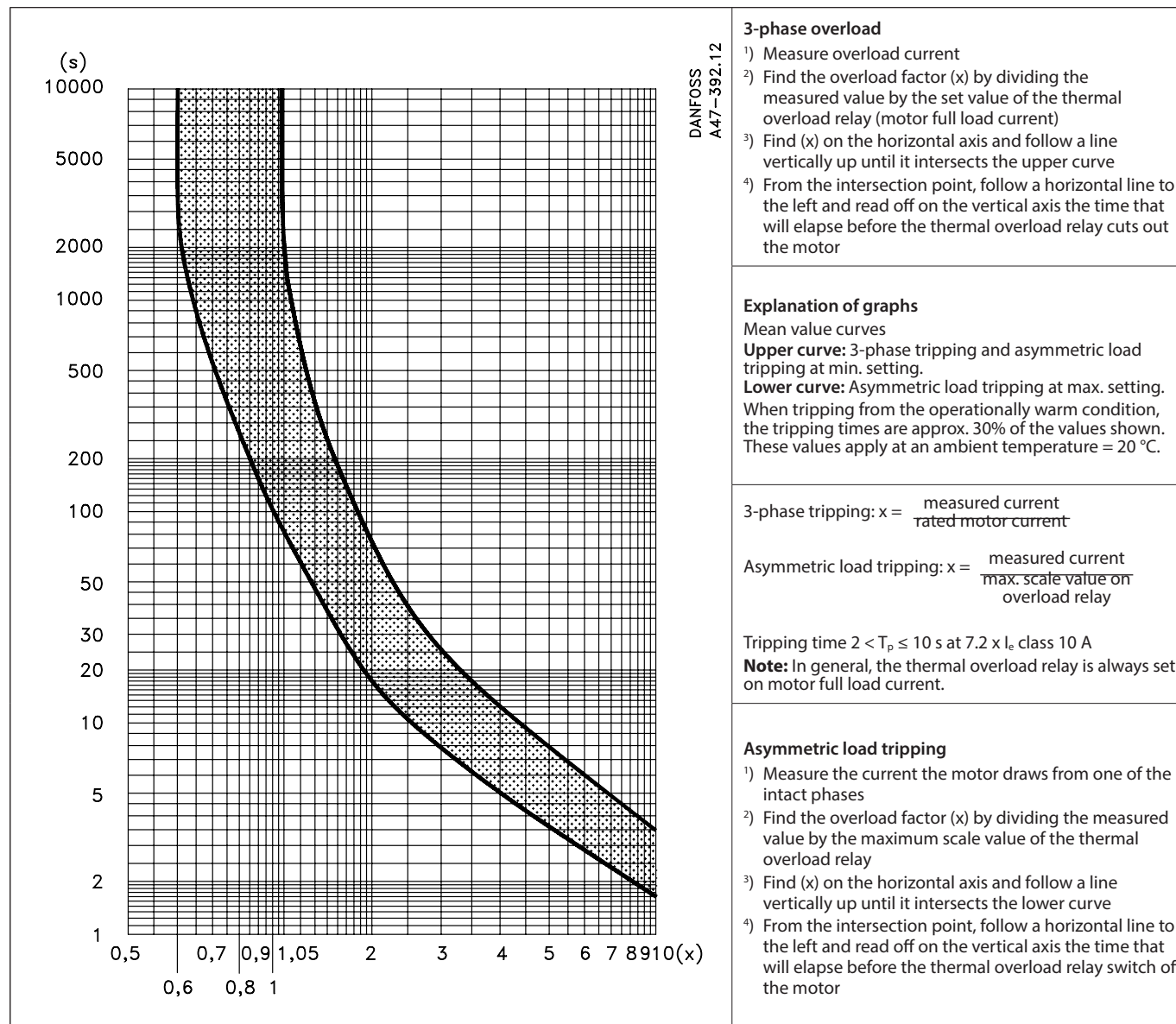
Electrical life;  $U_e = 400 - 460V$  AC

AC-4: Stepping of squirrel-cage motors.



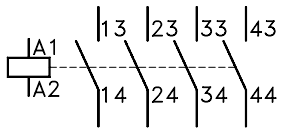
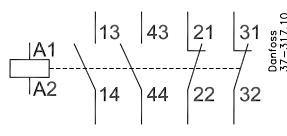
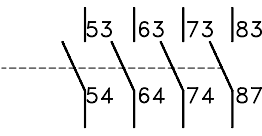
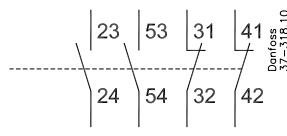
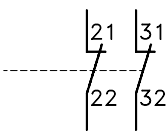
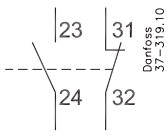
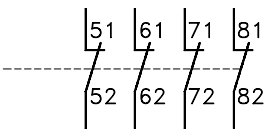
Tripping graph

TI 9C-5

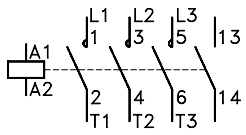
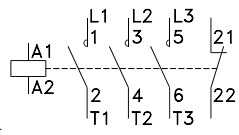
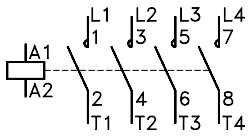


**Contact symbols and control relays terminal markings**

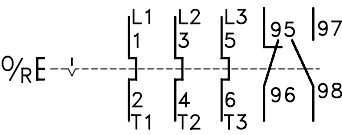
**Auxiliary contacts**

|                                                                                                                                |                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Control relay (4 NO)<br/>CI 5-2 40e</p>   |  <p>Control relay (2 NO + 2 NC)<br/>CI 5-2 22z</p> |
|  <p>Auxiliary contact (4 NO)<br/>CBN-40</p>   |  <p>Auxiliary contact (2 NO + 2 NC)<br/>CBN-22</p> |
|  <p>Auxiliary contact (2 NC)<br/>CBN-02</p>   |  <p>Auxiliary contact (1 NO + 1 NC)<br/>CBN-11</p> |
|  <p>Auxiliary contact (4 NC)<br/>CBN-04</p> |                                                                                                                                       |

**Contactors**

|                                                                                                                                           |                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Contactor<br/>CI 5-5 10, CI 5-9 10, CI 5-12 10</p> |  <p>Contactor<br/>CI 5-5 01, CI 5-9 01, CI 5-12 01</p> |
|  <p>Contactors<br/>CI 5-9 M40</p>                     |                                                                                                                                             |

**Thermal overload relay**

|                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------|
|  <p>Thermal overload relay<br/>TI 9C-5</p> |
|--------------------------------------------------------------------------------------------------------------------------------|

**Main circuit**
**Connections, main contacts**

| Type    | Connection method                    | Single core<br>[mm <sup>2</sup> ] / [AWG] | Multi core                                    |                                            | Recommended Tightening torque<br>[Nm] / [lb-in] |
|---------|--------------------------------------|-------------------------------------------|-----------------------------------------------|--------------------------------------------|-------------------------------------------------|
|         |                                      |                                           | without terminal sleeve<br>[mm <sup>2</sup> ] | with terminal sleeve<br>[mm <sup>2</sup> ] |                                                 |
| CI 5-   | Screw <sup>1)</sup> and clamp washer | 1 – 4 / 18 – 12                           | –                                             | 0.75 – 2.5                                 | 1.2 / 10.6                                      |
| TI 9C-5 | Screw <sup>2)</sup> and clamp washer | 0.75 – 4                                  | 0.75 – 4                                      | 1 – 4                                      | 0.8 – 2                                         |

<sup>1)</sup> Pozidrive No. 2 / Blade No. 3 screw

<sup>2)</sup> H2 screw

**Direct start, load categories AC-2, AC-3, AC-4**

| Type    |    | Rated loads at 50Hz, 60 °C |             |       |       |
|---------|----|----------------------------|-------------|-------|-------|
|         |    | 230 – 240 V                | 400 – 415 V | 500 V | 690 V |
| CI 5-5  | A  | 6.3                        | 4.9         | 3.9   | 2.8   |
|         | kW | 1.5                        | 2.2         | 2.2   | 2.2   |
| CI 5-9  | A  | 11.3                       | 8.5         | 6.8   | 4.9   |
|         | kW | 3                          | 4           | 4     | 4     |
| CI 5-12 | A  | 11.3                       | 11.5        | 9.2   | 6.7   |
|         | kW | 3                          | 5.5         | 5.5   | 5.5   |

**Load category AC-4 at approximately 200,000 operations**

| Type    |    | Rated loads |             |       |
|---------|----|-------------|-------------|-------|
|         |    | 230 – 240 V | 400 – 415 V | 500 V |
| CI 5-5  | A  | 2.3         | 2           | 1.9   |
|         | kW | 0.37        | 0.75        | 0.75  |
| CI 5-9  | A  | 3.9         | 3.6         | 3.2   |
|         | kW | 0.75        | 1.5         | 1.5   |
| CI 5-12 | A  | 3.9         | 3.6         | 3.2   |
|         | kW | 0.75        | 1.5         | 1.5   |

**Star-delta starting**

| Type    |    | Rated loads at 50 Hz |             |       |       |
|---------|----|----------------------|-------------|-------|-------|
|         |    | 230 – 240 V          | 400 – 415 V | 500 V | 690 V |
| CI 5-5  | A  | 11.3                 | 8.5         | 6.8   | 4.9   |
|         | kW | 3                    | 4           | 4     | 4     |
| CI 5-9  | A  | 20                   | 15.5        | 12.4  | 8.9   |
| CI 5-12 | kW | 5.5                  | 7.5         | 7.5   | 7.5   |

**Three phase ohmic load, load category AC-1**

| Type   |    | Operating temperature max. 40 °C (Open condition) |       |             |       |       |
|--------|----|---------------------------------------------------|-------|-------------|-------|-------|
|        |    | 230 V                                             | 240 V | 400 – 415 V | 500 V | 600 V |
| CI 5-5 | A  | 20                                                | 20    | 20          | 20    | 20    |
| CI 5-9 | kW | 8                                                 | 8.3   | 14          | 17    | 24    |

**Three phase ohmic load, load category AC-1**

| Type   |    | Operating temperature max. 60 °C (Enclosed condition) |       |       |       |       |       |
|--------|----|-------------------------------------------------------|-------|-------|-------|-------|-------|
|        |    | 230 V                                                 | 240 V | 400 V | 415 V | 500 V | 690 V |
| CI 5-5 | A  | 16                                                    | 16    | 16    | 16    | 16    | 16    |
| CI 5-9 | kW | 6.4                                                   | 6.7   | 11    | 12    | 14    | 19    |

**Rated thermal current AC-12**

| Type   | Rated thermal current I <sub>th</sub> [A] |             |             |                           |             |             |
|--------|-------------------------------------------|-------------|-------------|---------------------------|-------------|-------------|
|        | Ambient temperature 40 °C                 |             |             | Ambient temperature 60 °C |             |             |
|        | 24 – 240 V                                | 230 – 500 V | 230 – 690 V | 24 – 240 V                | 230 – 500 V | 230 – 690 V |
| CI 5-2 | 10                                        | 10          | 10          | 6                         | 6           | 6           |

## Data sheet | Minicontactors, Type CI 5-

### Load categories AC-15/B600

| Type   | Rated current [A]   |               |       |               |               |
|--------|---------------------|---------------|-------|---------------|---------------|
|        | 24 V / 48 V / 120 V | 230 V / 240 V | 400 V | 480 V / 500 V | 600 V / 690 V |
| CI 5-2 | 3                   | 2             | 1.2   | 1             | 0.6           |

### Switching of power transformers, AC-6a (50 Hz)

| Type    | Transformer load, (factor n = 30, inrush current = n × rated transformer current) |             |               |       |       |
|---------|-----------------------------------------------------------------------------------|-------------|---------------|-------|-------|
|         |                                                                                   | 230 – 240 V | 400 V / 415 V | 500 V | 600 V |
| CI 5-5  | A                                                                                 | 2.9         | 2.4           | 1.8   | –     |
|         | kV A                                                                              | 1.7         | 1.7           | 1.7   | 2     |
| CI 5-9  | A                                                                                 | 5.4         | 4.1           | 3.2   | –     |
|         | kV A                                                                              | 2           | 2.8           | 2.8   | 4     |
| CI 5-12 | A                                                                                 | 5.4         | 5.4           | 3.2   | –     |
|         | kV A                                                                              | 2           | 3.4           | 3.4   | 5     |

### Load categories AC-7a, AC-7b, AC-8a

| Type    | Max. operating current [A] |       |       |       |       |       |
|---------|----------------------------|-------|-------|-------|-------|-------|
|         | AC-7a                      |       | AC-7b |       | AC-8a |       |
|         | 230 V                      | 400 V | 230 V | 400 V | 400 V | 500 V |
| CI 5-5  | 20                         | 20    | 6     | 6     | 11    | 10    |
| CI 5-9  | 20                         | 20    | 11    | 11    | 18    | 15    |
| CI 5-12 | 20                         | 20    | 11    | 11    | 18    | 15    |

### Switching lighting

| Type    | Incandescent lamps                        | Fluorescent lamps AC-5a 220 – 240 V AC |        |                                                                          |       |
|---------|-------------------------------------------|----------------------------------------|--------|--------------------------------------------------------------------------|-------|
|         | Max. operating current at 230 / 240 V [A] | Max. operating current at 40 °C [A]    |        | Max capacitance [μF] at expected short-circuit current I <sub>cc</sub> = |       |
|         |                                           | open                                   | closed | 10 kA                                                                    | 20 kA |
| CI 5-5  | 5                                         | 18                                     | 14.5   | 750                                                                      | 400   |
| CI 5-9  | 9                                         | 18                                     | 14.5   | 750                                                                      | 400   |
| CI 5-12 | 9                                         | 18                                     | 14.5   | 750                                                                      | 400   |

### Switching direct current load

#### Load categories DC-3 and DC-5, contacts connected in series

| Type    | Max. operating current [A]     |           |       |       |       |                                |           |       |       |       |
|---------|--------------------------------|-----------|-------|-------|-------|--------------------------------|-----------|-------|-------|-------|
|         | DC-3, 3 poles in series, 60 °C |           |       |       |       | DC-5, 3 poles in series, 60 °C |           |       |       |       |
|         | 24 V                           | 48 / 60 V | 110 V | 220 V | 440 V | 24 V                           | 48 / 60 V | 110 V | 220 V | 440 V |
| CI 5-5  | 5                              | 4         | 2     | 0.8   | 0.15  | 5                              | 2         | 0.6   | 0.1   | –     |
| CI 5-9  | 9                              | 6         | 3     | 1.2   | 0.2   | 9                              | 3         | 1     | 0.1   | –     |
| CI 5-12 | 9                              | 6         | 3     | 1.2   | 0.2   | 9                              | 3         | 1     | 0.1   | –     |

### Switching direct current load

#### Load categories DC-1 at 60 °C, contact connected in series

| Type    | Max. operating current [A] |         |         |           |         |         |        |         |         |        |         |         |        |         |         |
|---------|----------------------------|---------|---------|-----------|---------|---------|--------|---------|---------|--------|---------|---------|--------|---------|---------|
|         | 24 V                       |         |         | 48 / 60 V |         |         | 110 V  |         |         | 220 V  |         |         | 440 V  |         |         |
|         | 1-pole                     | 2-poles | 3-poles | 1-pole    | 2-poles | 3-poles | 1-pole | 2-poles | 3-poles | 1-pole | 2-poles | 3-poles | 1-pole | 2-poles | 3-poles |
| CI 5-5  | 6                          | 6       | 6       | 4 / 1     | 6       | 6       | 0.6    | 4       | 6       | 0.2    | 0.8     | 3       | 0.08   | 0.2     | 0.4     |
| CI 5-9  | 9                          | 9       | 9       | 6 / 1.5   | 8       | 9       | 1      | 6       | 9       | 0.3    | 1.2     | 4       | 0.1    | 0.3     | 0.6     |
| CI 5-12 | 9                          | 9       | 9       | 6 / 1.5   | 8       | 9       | 1      | 6       | 9       | 0.3    | 1.2     | 4       | 0.1    | 0.3     | 0.6     |

### Continuous current

| Type   | General purpose [A] |          | DC-13/Q600 [A], 1-pole |         |               |               |               |       |
|--------|---------------------|----------|------------------------|---------|---------------|---------------|---------------|-------|
|        | 300 V AC            | 600 V AC | 24 V AC                | 48 V AC | 110 V / 125 V | 220 V / 250 V | 400 V / 440 V | 600 V |
| CI 5-2 | 5                   | 10       | 2.3                    | 1       | 0.55          | 0.27          | 0.15          | 0.1   |

## Power loss

Contact resistance and power losses

| Type    | Typical impedance per pole | Power losses 3 main poles AC-3/400 V |
|---------|----------------------------|--------------------------------------|
|         | [mΩ]                       | [W]                                  |
| CI 5-2  | 6.5                        | 2.6 <sup>1)</sup>                    |
| CI 5-5  | 2.2                        | 0.3                                  |
| CI 5-9  | 2.2                        | 0.9                                  |
| CI 5-12 | 2.2                        | 0.9                                  |

<sup>1)</sup> Power losses 4 main poles

| Type    | Average power    |                  |
|---------|------------------|------------------|
|         | Min. setting     | Max. setting     |
| TI 9C-5 | Typically 2.15 W | Typically 4.87 W |

## Short circuit coordination

| Type    | Short circuit coordination (Max. fuse or circuit breaker rating) |          |          |
|---------|------------------------------------------------------------------|----------|----------|
|         | DIN fuses - gG [A]                                               | Type "1" | Type "2" |
| CI 5-5  | 50 kA<br>Available<br>Fault current                              | 35       | 16       |
| CI 5-9  |                                                                  | 35       | 20       |
| CI 5-12 |                                                                  | 35       | 20       |

## Data sheet | Minicontactors, Type CI 5-

### Control circuit

### Connections

#### Auxiliary contacts

| Type/<br>Application | Connection method      | Single core     | Multi core                       |                               | Recommended<br>Tightening<br>torque<br>[Nm] / [lb-in] |
|----------------------|------------------------|-----------------|----------------------------------|-------------------------------|-------------------------------------------------------|
|                      |                        | [mm²] / [AWG]   | without terminal sleeve<br>[mm²] | with terminal sleeve<br>[mm²] |                                                       |
| CI 5- built in       | Screw and clamp washer | 1 – 4 / 18 – 12 | –                                | 0.75 – 2.5                    | 1.2 / 10.6                                            |
| CBN for CI 5-        | Screw and clamp washer | 1 – 4 / 18 – 12 | –                                | 0.75 – 2.5                    | 1.2 / 10.6                                            |
| TI 9C-5              | Screw and clamp washer | 0.75 – 2.5      | 0.75 – 1.5                       | 0.75 – 1.5                    | 0.78 – 1                                              |

#### Auxiliary contacts, load categories AC-15 and AC-12

| Type  | Comments           | Max. operating current [A] |       |       |       |       |       |       |       |       |
|-------|--------------------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|       |                    | AC-15                      |       |       |       |       |       |       | AC-12 |       |
|       |                    | 24 V – 120 V               | 240 V | 400 V | 480 V | 500 V | 600 V | 690 V | 40 °C | 60 °C |
| CI 5- | Built into contact | 6                          | 3     | 1.8   | 1.5   | 1.4   | 1.2   | 1     | 10    | 6     |
| CBN   | For contact CI 5-  | 3                          | 2     | 1.2   | 1     | 1     | 0.6   | 0.6   | 10    | 6     |

#### Auxiliary contacts, load categories DC-12, DC-13, DC-14

| Type  | Comments           | Max. operating current [A] |      |             |             |             |       |      |             |             |             |       |      |             |             |             |
|-------|--------------------|----------------------------|------|-------------|-------------|-------------|-------|------|-------------|-------------|-------------|-------|------|-------------|-------------|-------------|
|       |                    | DC-12                      |      |             |             |             | DC-13 |      |             |             |             | DC-14 |      |             |             |             |
|       |                    | 12 V                       | 48 V | 110 – 125 V | 220 – 250 V | 400 – 440 V | 12 V  | 48 V | 110 – 125 V | 220 – 250 V | 400 – 440 V | 12 V  | 48 V | 110 – 125 V | 220 – 250 V | 400 – 440 V |
| CI 5- | Built into contact | 6                          | 4    | 0.6         | 0.2         | 0.08        | 4     | 2.5  | 0.4         | 0.12        | 0.05        | 2.8   | 1.2  | 0.55        | 0.27        | 0.15        |
| CBN   | For contact CI 5-  | –                          | –    | –           | –           | –           | –     | –    | –           | –           | –           | 2.3   | 1    | 0.55        | 0.27        | 0.15        |

#### Coil consumption

| Type  | Inrush power |    |                 |                   | Holding power |     |                 |                   | Pull-in voltage           |                          | Drop-out voltage          |                           |
|-------|--------------|----|-----------------|-------------------|---------------|-----|-----------------|-------------------|---------------------------|--------------------------|---------------------------|---------------------------|
|       | AC           |    | DC              |                   | AC            |     | DC              |                   | AC                        | DC                       | AC                        | DC                        |
|       | VA           | W  | W               |                   | VA            | W   | W               |                   | V                         | V                        | V                         | V                         |
| CI 5- | 35           | 32 | 3 <sup>1)</sup> | 2.6 <sup>2)</sup> | 5             | 1.8 | 3 <sup>1)</sup> | 2.6 <sup>2)</sup> | $(0.85 - 1.1) \times U_s$ | $(0.8 - 1.1) \times U_s$ | $(0.2 - 0.75) \times U_s$ | $(0.1 - 0.75) \times U_s$ |

<sup>1)</sup> cold

<sup>2)</sup> warm

#### Coil operating times

| Type  | Make time |         |         | Break time   |        |                     |                   |
|-------|-----------|---------|---------|--------------|--------|---------------------|-------------------|
|       | AC        | DC      | AC      | AC+RC module | DC     | DC+integrated diode | DC+external diode |
|       | [ms]      | [ms]    | [ms]    | [ms]         | [ms]   | [ms]                | [ms]              |
| CI 5- | 15 – 40   | 18 – 40 | 15 – 33 | 15 – 28      | 6 – 12 | 8 – 12              | 35 – 50           |

#### RC element (charge suppressor)

| Type | Comments                      | overvoltage factor<br>$n = U_{max} / U_n$ |
|------|-------------------------------|-------------------------------------------|
| RCN  | Suitable for contactors CI 5- | 1 – 2.5                                   |

#### Max. load control circuit (contact system)

| Type    | Load                   |                      | Max. fuse  |              |
|---------|------------------------|----------------------|------------|--------------|
|         | AC-15                  | DC-13                | fI, gL, gG | Bs 88 type T |
| TI 9C-5 | 500 V<br>2 A<br>200 VA | 250 V<br>2 A<br>20 W | 4A         | 6A           |

## UL/ CSA specification

## UL/CSA approved loads

| Type    | General<br>purpose<br>current<br>(enclosed) | Rated power (enclosed) |      |       |     |         |     |       |     |       |     |       |     |
|---------|---------------------------------------------|------------------------|------|-------|-----|---------|-----|-------|-----|-------|-----|-------|-----|
|         |                                             | 1-phase                |      |       |     | 3-phase |     |       |     |       |     |       |     |
|         |                                             | 115 V                  |      | 230 V |     | 200 V   |     | 230 V |     | 460 V |     | 575 V |     |
|         | [A]                                         |                        | [A]  | [HP]  | [A] | [HP]    | [A] | [HP]  | [A] | [HP]  | [A] | [HP]  | [A] |
| CI 5-5  | 12                                          | 9.8                    | 0.5  | 8     | 1   | 6.9     | 1.5 | 6     | 1.5 | 4.8   | 3   | 3.9   | 3   |
| CI 5-9  | 15                                          | 9.8                    | 0.5  | 10    | 1.5 | 7.8     | 2   | 6.8   | 2   | 7.6   | 5   | 6.1   | 5   |
| CI 5-12 | 18                                          | 13.8                   | 0.75 | 12    | 2   | 11      | 3   | 9.6   | 3   | 11    | 7.5 | 9     | 7.5 |

## Star-delta (60 Hz)

| Type    | Rated power [HP] |       |       |       |
|---------|------------------|-------|-------|-------|
|         | 200 V            | 230 V | 460 V | 575 V |
| CI 5-5  | 2.5              | 2.5   | 5     | 5     |
| CI 5-9  | 3.3              | 3.3   | 8.5   | 8.5   |
| CI 5-12 | 5                | 5     | 12    | 12    |

## Auxiliary contacts, UL/CSA approved loads

| Type        | Comments           | AC            |                    | DC                |                    |
|-------------|--------------------|---------------|--------------------|-------------------|--------------------|
|             |                    | Rated voltage | Switching capacity | Rated voltage [V] | Switching capacity |
|             |                    | [V]           | [A]                | [V]               | [A]                |
| CI 5-2      | Built into contact | max. 600      | B600               | max. 600          | Q600               |
| CI 5, 9, 12 | Built into contact | max. 600      | A600               | max. 600          | Q600               |
| CBN         | For contact CI 5-  | max. 600      | B600               | max. 600          | Q600               |

## Dimensions [mm]

|                               |                                             |
|-------------------------------|---------------------------------------------|
| <p><b>Contactor CI 5-</b></p> | <p><b>Motor starter CI 5- + TI 9C-5</b></p> |
|-------------------------------|---------------------------------------------|