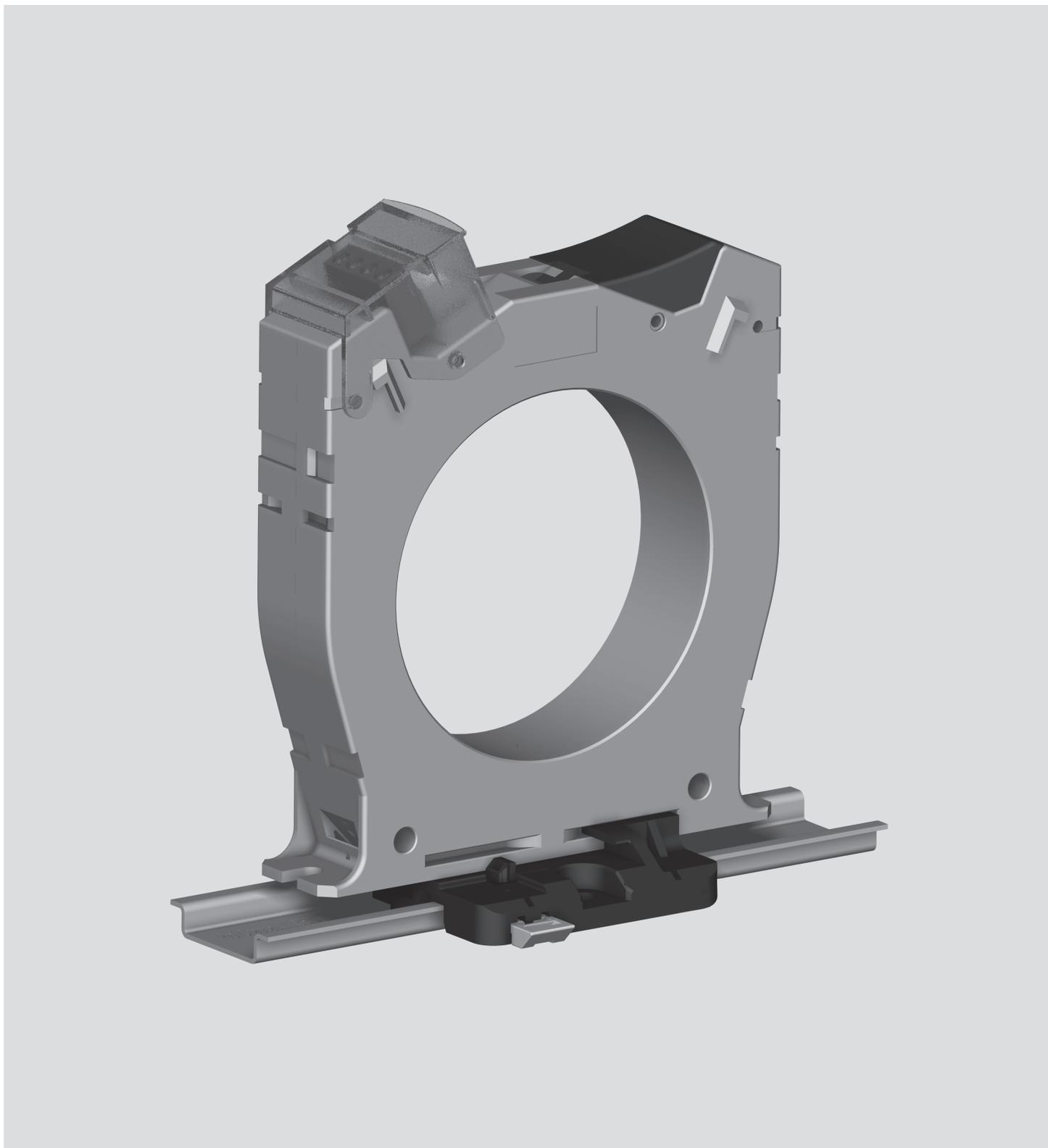


Differential toroid

$\Delta IC / \Delta IP$



| | |
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1. PRELIMINARY OPERATIONS

Check the following points upon delivery of the package containing the toroid:

- the packaging and product are in good condition
- the product reference corresponds to your order
- the contents of the package:
 - 1 product
 - 1 cover (Δ IP only)
 - 1 detachable terminal block (mounted)
 - 1 mounting accessory (Δ IP only)
 - 1 Quick Start Guide

2. WARNING



Risk of electrocution, burns or explosion.

- The devices must only be installed and serviced by qualified personnel.
- Switch off all power supplies before working on or in the equipment.
- Always use an appropriate voltage detection device to confirm the absence of voltage.
- Replace all devices, doors and covers before switching on the power to this equipment.
- Ensure that no metal objects are allowed to fall in the cabinet (risk of electrical arcing).

Failure to observe these safety instructions will expose the technician and those around him to the risk of serious injury or death.

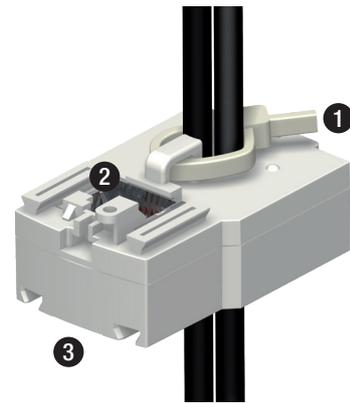
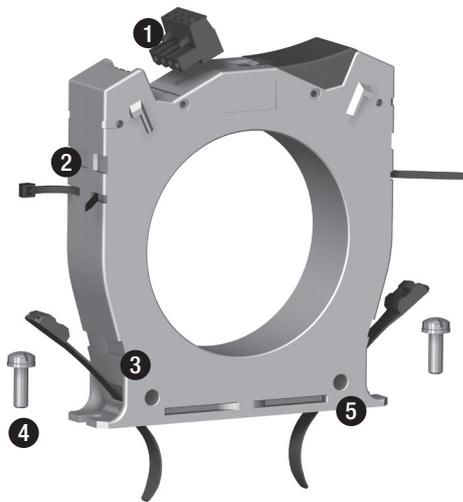


Risk of damaging device.

- If the toroid is dropped, there is a risk that the magnetic elements will be altered and the toroid should ideally be replaced.
- Ensure that the toroid is connected to the measuring or protection equipment indicated on the toroid

3. IN DETAIL

3.1. ΔIC / Resys - Diris Digiware RCM

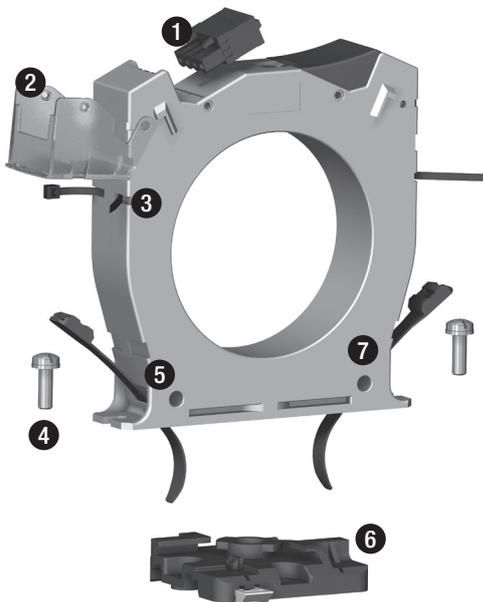


ΔIC Ø8
(Only with DIRIS Digiware R-60)

- ❶ Detachable screw terminal block
- ❷ Opening for fixing cables using clamps
- ❸ Opening for fixing the toroid using clamps
- ❹ Screwed connections
- ❺ Opening for bracket mounting screw

- ❶ Location for mounting the screw / DIN rail fixing kit
- ❷ RJ12 connector
- ❸ Recesses for staggered mounting (18mm pitch)

3.2. ΔIP / ISOM



- ❶ Detachable push-in terminal block
- ❷ Sealable protective cover
- ❸ Opening for fixing cables using clamps
- ❹ Screwed connections
- ❺ Opening for fixing the toroid using clamps
- ❻ Rotary mounting for DIN rail
- ❼ Opening for bracket mounting screw

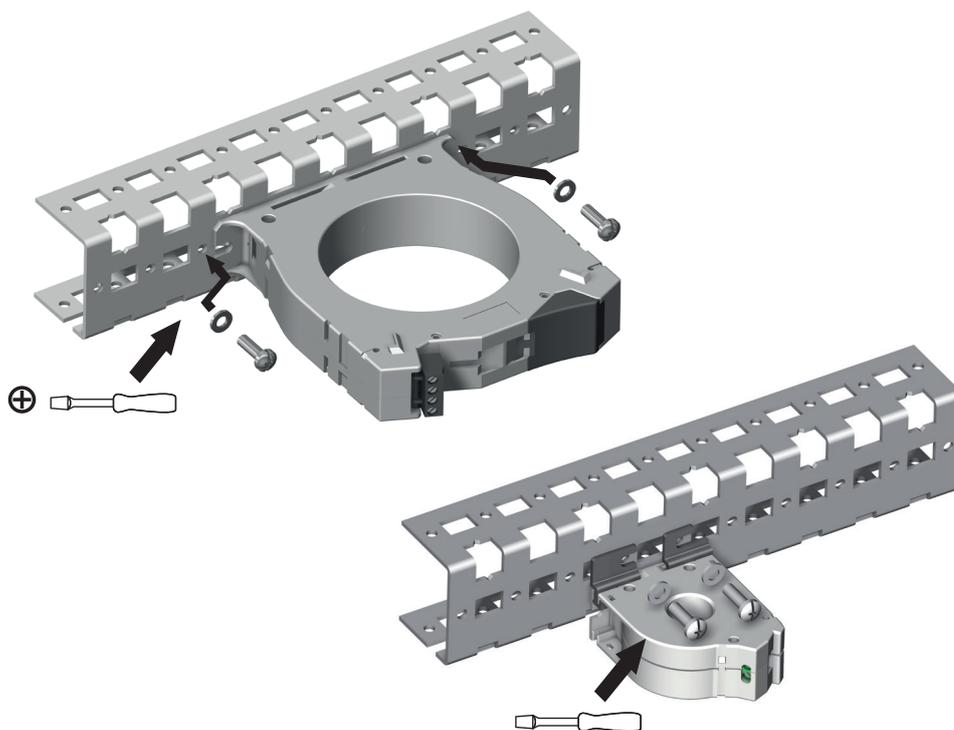
4. MOUNTING

4.1. ΔIC / ΔIP

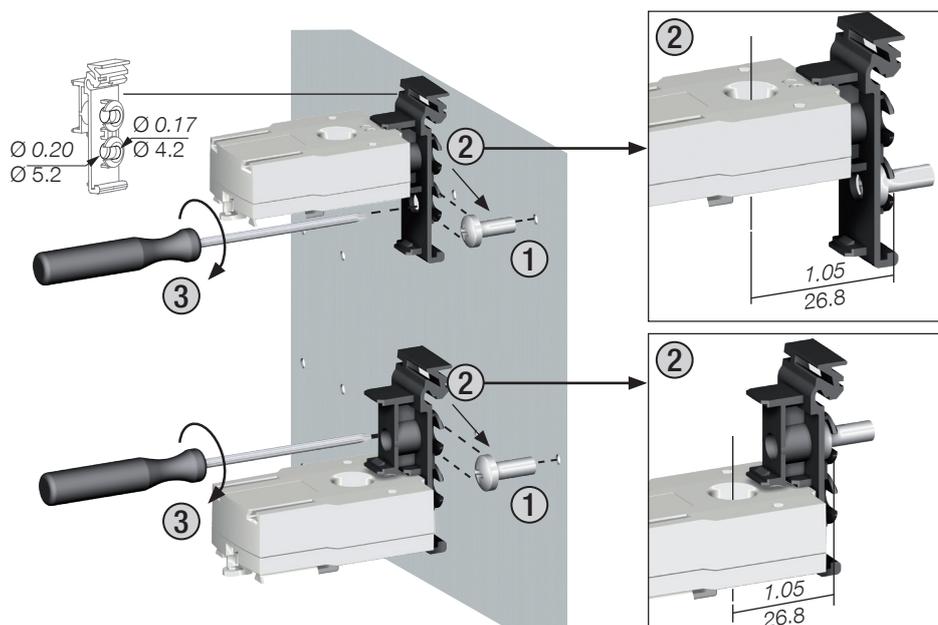
4.1.1. Direct screw mounting

Toroid mounted with 2 M4/1.5 Nm max. (Ø 15, 30 and 50 mm) screws, 2xM5/3.5 Nm max. (Ø 80 mm) screws, 2xM6/6 Nm max. (Ø 120 mm) screws or 4xM6/6 Nm max. (Ø 200 and 300 mm) screws + DIN433 washers. Use of self-cutting pan head screws, metric thread, Z-shaped cruciform (Pozidriv).

Screws not provided.



4.1.2. ΔIC Ø8

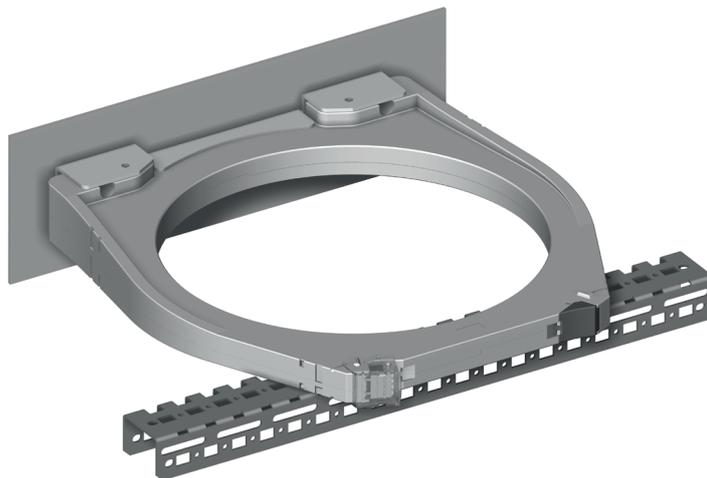


4.1.3. Clamp mounting (for toroid Ø 15 to 120 mm)

Toroid mounted with clamps of width 9 mm min. - 12 mm max., min. clamping radius less than 25 mm.
Clamps not supplied.



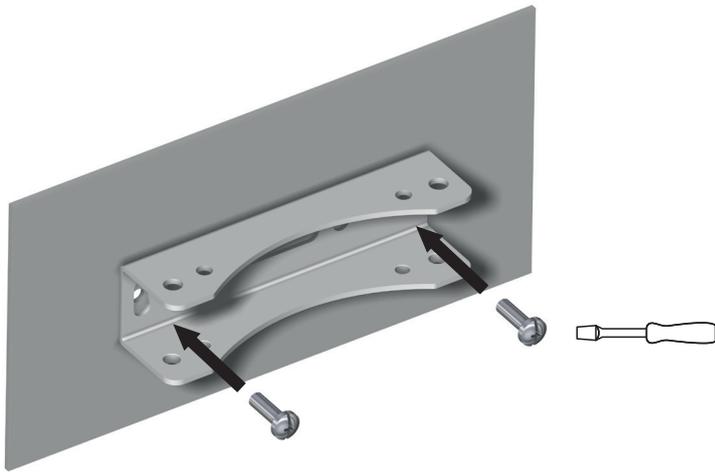
Mounting a Ø 300 mm toroid



Fit an additional cross member to support the toroid.

4.1.4. Metal bracket mounting (order as an accessory)

1

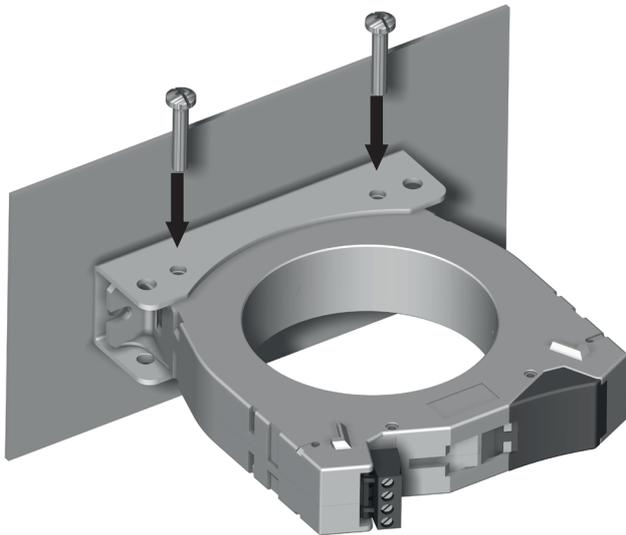


Mounting the bracket on a plate using M5 or M6 screws.

M5 max. torque: 3.5 Nm - M6 max. torque: 6 Nm.

Screws not provided.

2

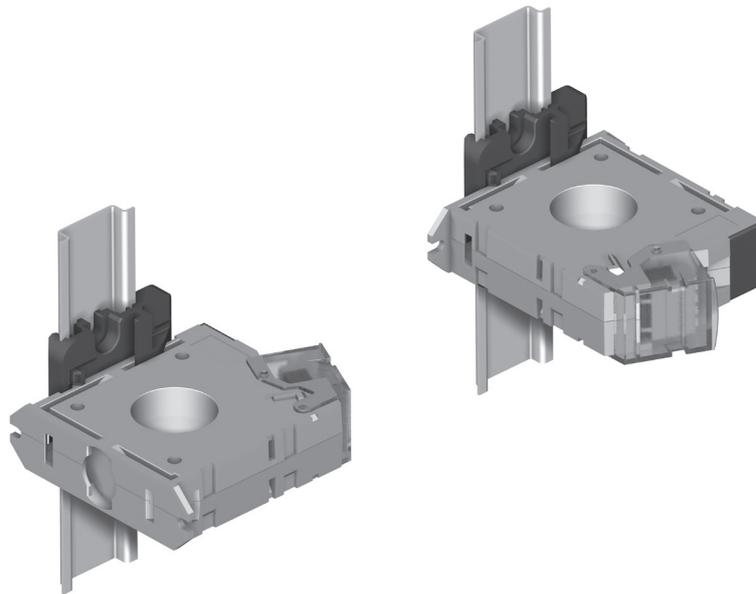


Mounting the toroid on the bracket with the supplied screws.

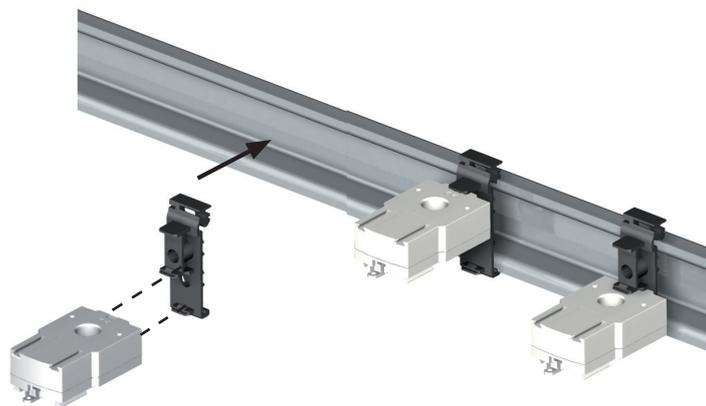
4.2. ΔIP (30, 50, 80 & 120 mm)

4.2.1. Mounting via DIN rail ("DELTA"IC to order as an accessory)

Option to mount on 2 sides for Ø 30 mm toroid.



4.2.2. ΔIC Ø8

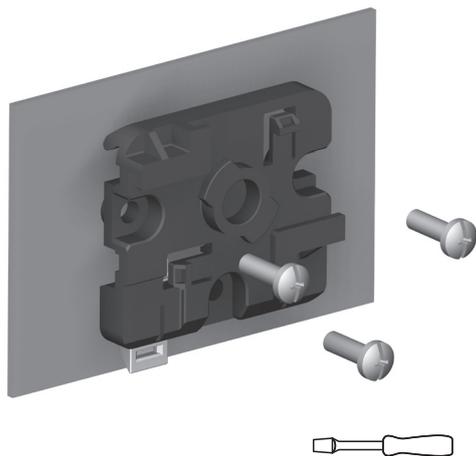


4.2.3. Mounting via plate support or DIN rail («DELTA»IC to order as an accessory)

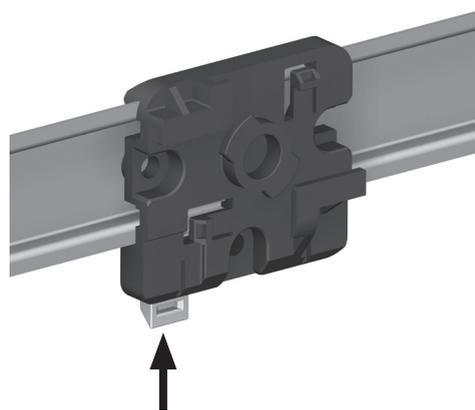
1

Plate-mounted

DIN rail-mounted



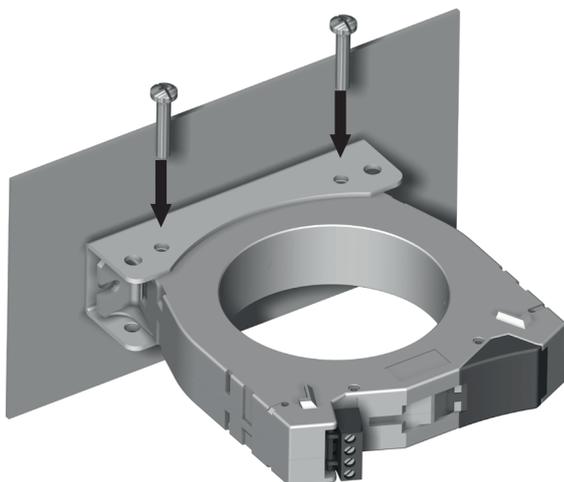
Secured with 3 M5 screws,
tightening torque 3.5Nm



Screws not provided

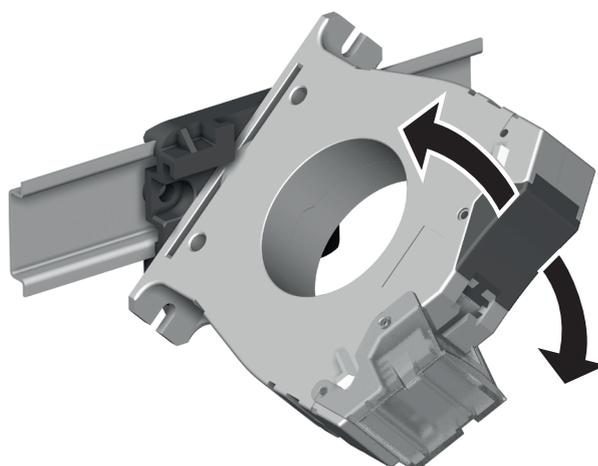
2

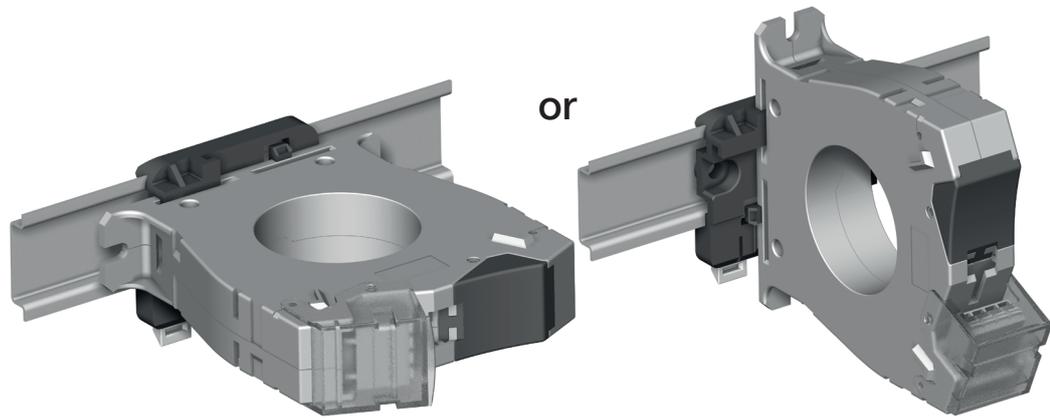
Offer up the toroid at an angle of 45° and press.



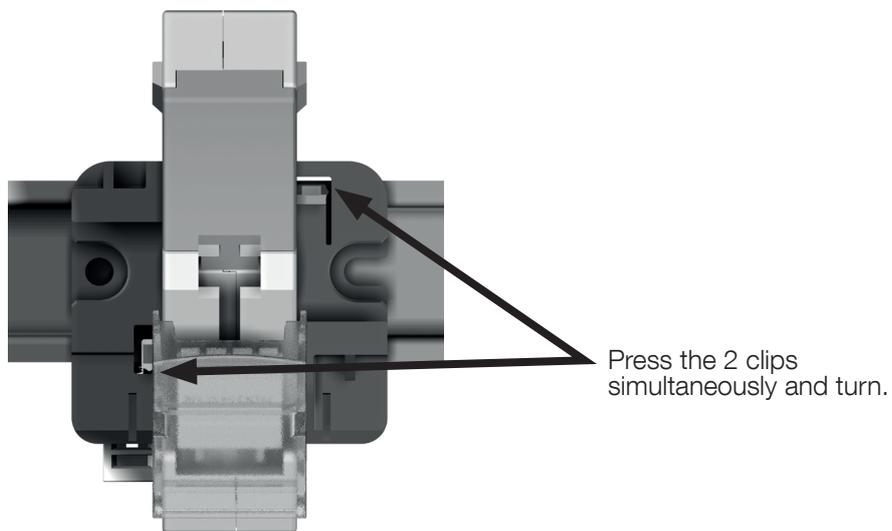
3

Turn the toroid 45° in the desired direction.

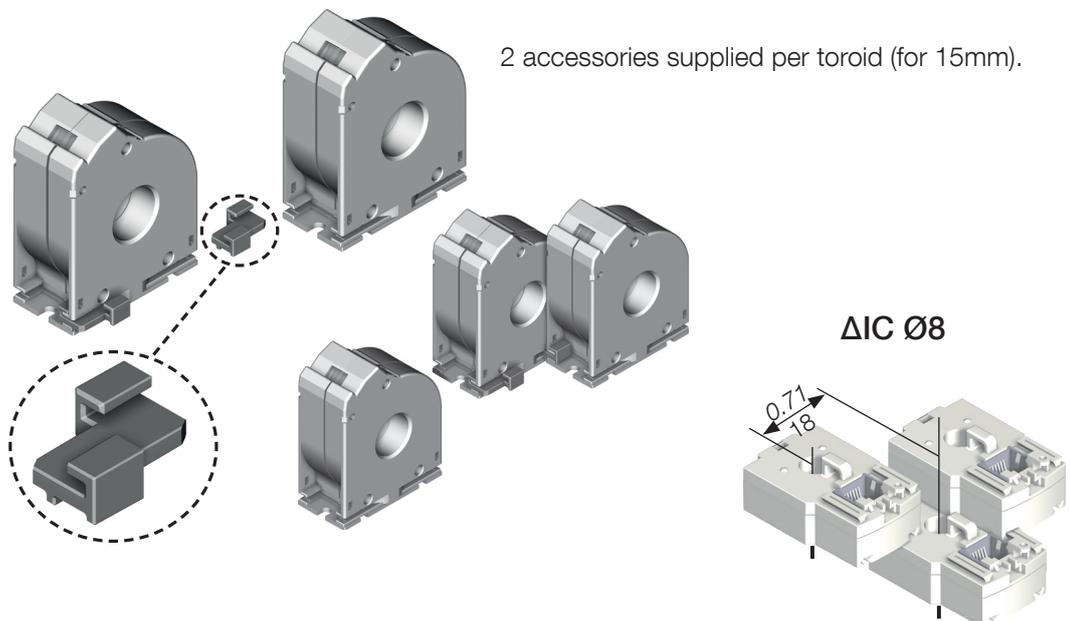




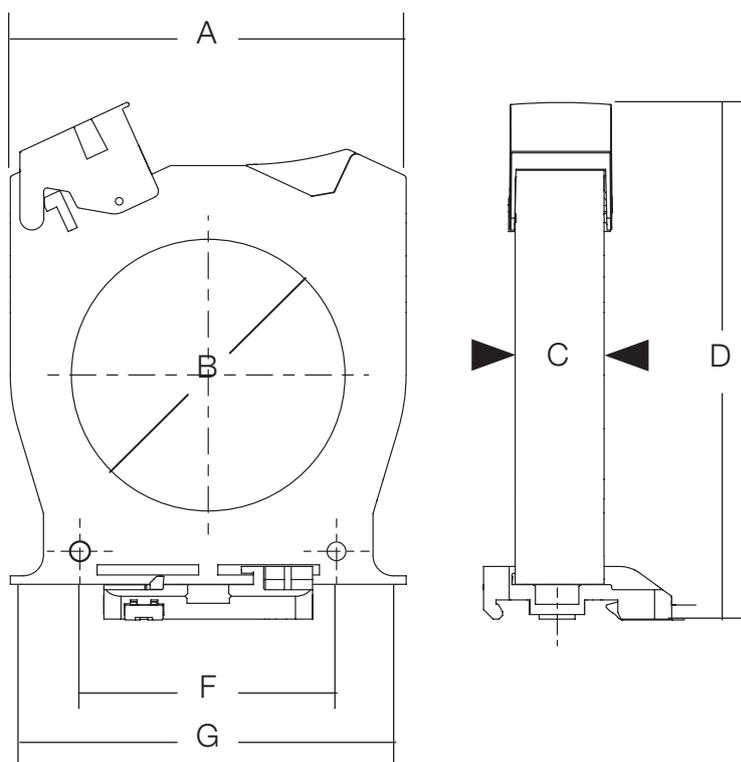
Dismantling the toroid



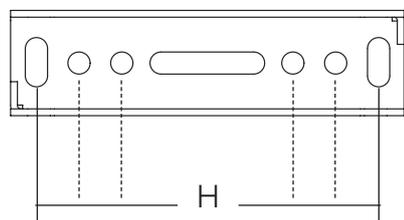
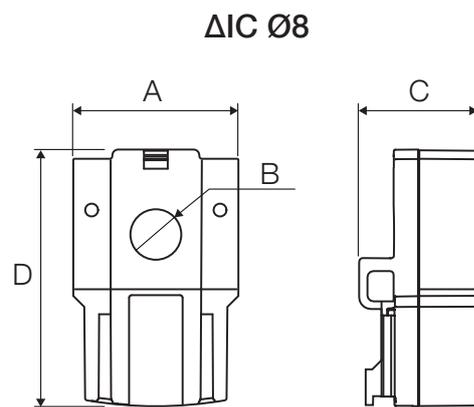
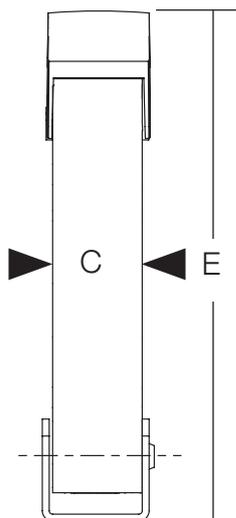
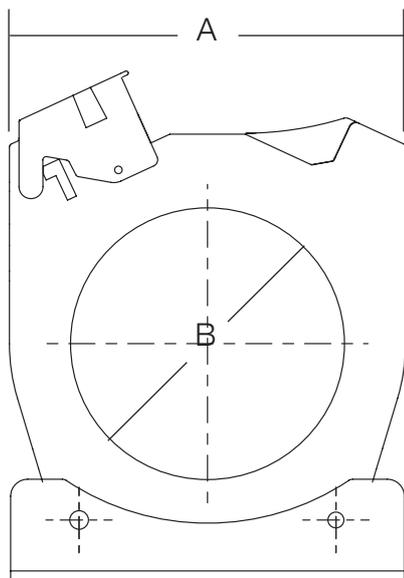
4.2.4. Staggered assembly of Ø 8 & 15 mm toroid



5. MECHANICAL CHARACTERISTICS



| | Ø 8 MM | Ø 15 MM | Ø 30 MM | Ø 50 MM | Ø 80 MM | Ø 120 MM | Ø 200 MM | Ø 300 MM |
|---|---|---|---|---|---|--|---|---|
| |  |  |  |  |  |  |  |  |
| ΔIC ΔIP ΔIP/8 | 4829 0520 - - | 4950 6015 4750 6015 4750 8015 | 4950 6030 4750 6030 4750 8030 | 4950 6050 4750 6050 | 4950 6080 4750 6080 | 4950 6120 4750 6120 | 4950 6200 4750 6200 | 4950 6300 4750 6300 |
| A (mm) | 28 | 53 | 92 | 102,5 | 116 | 163 | 253 | 370 |
| B (mm) | 8,4 | 17,3 | 30 | 50 | 80 | 120 | 200 | 300 |
| C (mm) | 20 | 26 | 26 | 26 | 26 | 26 | 51 | 50 |
| D (mm) | 45 | 81 | 103,5 | 125 | 142,5 | 182,5 | 274 | 390 |
| E (mm) | - | 71 | 112 | 133 | 152 | 192 | 282 | 150 |
| F (mm) | - | 27,8 | 50 | 50 | 75 | 100 | 150 | 200 |
| G (mm) | - | 50 | 85 | 90 | 105 | 150 | 175 X 41,2 | 250 X 41,5 |
| H (mm) | - | - | 25/50 | 25/50 | 50/75/100 | 50/75/100 | 50/100/175 | 200/225/250 X 25 |
| Weight (kg) ΔIC Weight (kg) ΔIP Weight (kg) ΔIP/8 | 0,03 | 0,10 0,10 0,12 | 0,13 0,15 0,18 | 0,18 0,27 | 0,22 0,38 | 0,38 0,72 | 0,88 1,74 | 1,72 3,60 |



6. CONNECTION

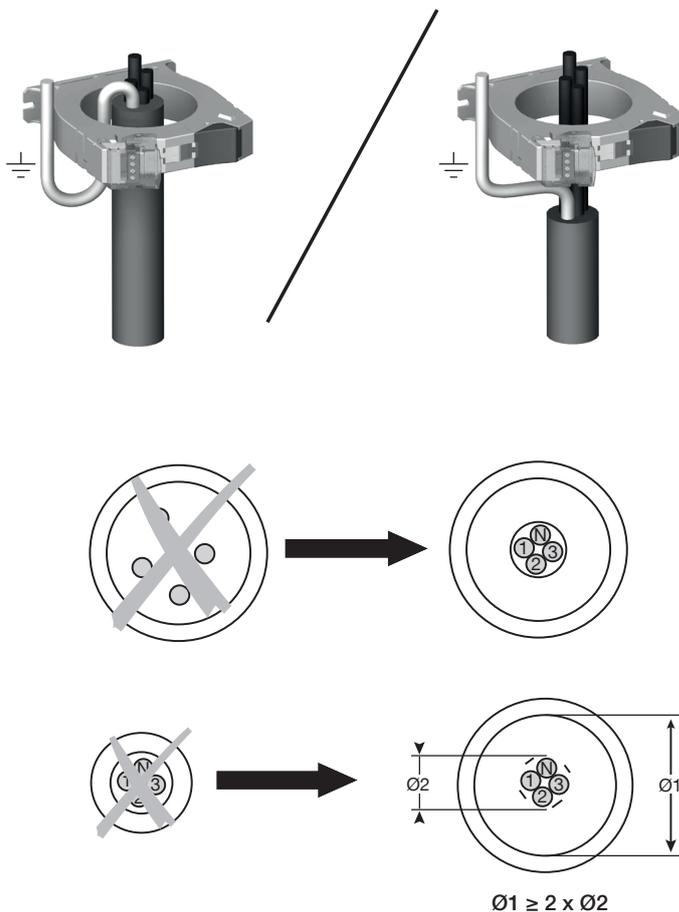
6.1. Conductor openings

Selection of toroids based on the power circuit and min. $I\Delta n$ value recommended for high homopolar current (as per 6xIn tests in accordance with CEI 60947-2 appendix M).

| Rated operational current I_n | Max. cross-section per conductor | Toroid | $I\Delta n$ |
|---------------------------------|----------------------------------|----------------------------------|----------------------------|
| 36 A | 6 mm ² | $\Delta IC/\Delta IP \ \phi 15$ | 30 mA |
| 65 A | 25 mm ² | $\Delta IC/\Delta IP \ \phi 30$ | 30 mA |
| 85 A | 50 mm ² | $\Delta IC/\Delta IP \ \phi 50$ | 30 mA |
| 160 A | 95 mm ² | $\Delta IC/\Delta IP \ \phi 80$ | 100 mA |
| 250 A | 240 mm ² | $\Delta IC/\Delta IP \ \phi 120$ | 300 mA ($\Delta IP:100$) |
| 400 A | 2 x 185 mm ² | $\Delta IC/\Delta IP \ \phi 200$ | 300 mA |
| 630 A | 2 x 240 mm ² | $\Delta IC/\Delta IP \ \phi 300$ | 300 mA |

Note: with Cu 3 P+N cables

Recommendation for commissioning toroids in relation to the power cables



6.2. Using the centring device for Ø30 to 120 mm toroids

To order as an accessory.

Patent application filed.

1 Open and secure the wires or cables



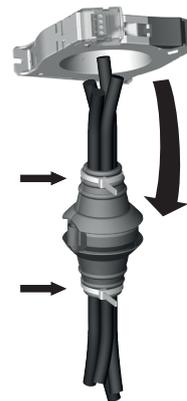
2 Adapt the centring device to the cable cross section



3 Close the centring device



4 Fit and tighten the clamps

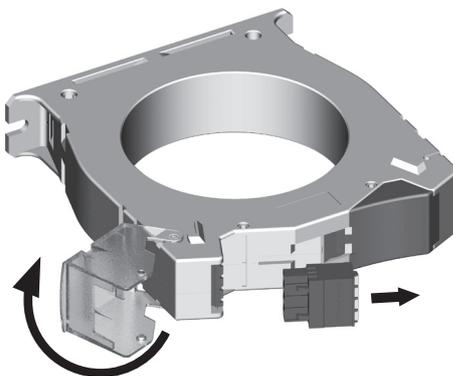


5 Insert the centring device in the toroid

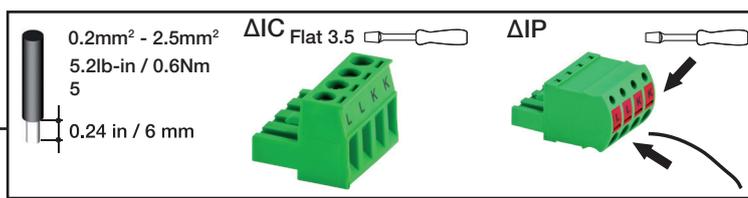
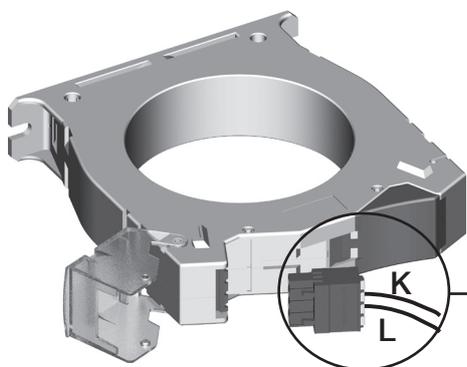


6.3. Connecting the toroid

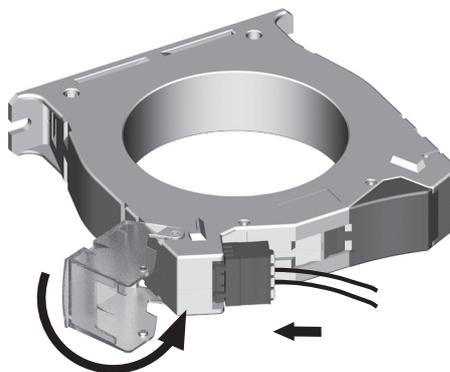
- 1 Open the cover (accessory for Δ IC)
Remove the detachable terminal block



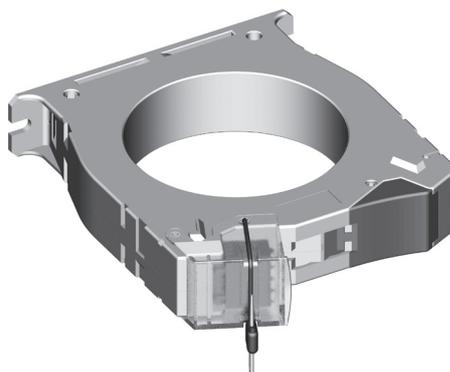
- 2 Cable terminals K (x1) and L (x1)
 Δ IC: screw terminal block
3.5 mm straight screwdriver, max. torque 0.6 Nm, cross section 0.2 to 2.5 mm² (recommendation 0.8 mm²)
 Δ IP: push-in terminal block
wire with end ferrule, cross section 0.2 to 2.5 mm²



- 3 Reconnect the detachable terminal block



- 4 Seal the cover (optional)

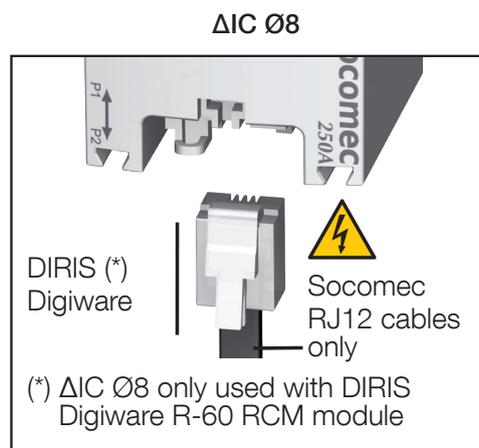
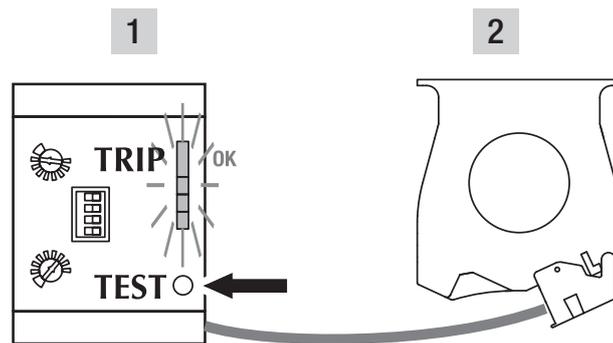


6.4. Testing the toroid

- 1 Connect the toroid to the relay (example below with RESYS M40 relay: see relay manual for connection details).
- 2 The final tests must be confirmed by «Test OK» (see table below).

Periodic testing must be carried out on the device to ensure compliance with regulations and to check the installation's connection and normative earth resistance values.

| Bar graph flashing | | |
|---|-----|-----|
| "Trip" LED and "Alarm" relay activated | | |
| > Permanent test | | |
| Test OK | NO | NO |
| Toroid input short circuit | NO | NO |
| Relay/Toroid connection break | YES | NO |
| > Press «test» button (> 1s) | | |
| Test OK | YES | YES |
| Toroid input short circuit | NO | NO |
| Relay/Toroid connection break | YES | NO |



7. TECHNICAL SPECIFICATIONS

| | Ø08 | Ø15 | Ø15/8 | Ø30 | Ø30/8 |
|---|---|----------------------|--------------------------|------------|------------|
| ΔIC reference | 4829 0520 | 4950 6015 | - | 4950 6030 | - |
| ΔIP reference | - | 4750 6015 | 4750 8015 | 4750 6030 | 4750 8030 |
| IEC 60664-1 insulation coordination | | | | | |
| Insulation voltage | 300 V | 800 V | | 800 V | |
| Surge voltage | 3 kV | 8 kV | | 8 kV | |
| Degree of pollution | III | III | | III | |
| Measurement circuit | | | | | |
| Rated primary current | 24 A | 10 A | 1 A | 10 A | 1 A |
| Rated secondary current | sortie tension | 0.0167 A | 0.000125 A | 0.0167 A | 0.000125 A |
| Winding ratio Kn | 24/0.12 | 10/0.0167 | 1/0.000125 | 10/0.0167 | 1/0.000125 |
| ΔIC rated load | Max 10 Ω | Max 47 Ω | - | Max 47 Ω | - |
| ΔIP rated load | TBD | Max 180 Ω | Max 2400 Ω | Max 180 Ω | Max 2400 Ω |
| ΔIC rated output (under maximum operating conditions) | - | 0.02 VA | - | 0.02 VA | - |
| ΔIP rated output (under maximum operating conditions) | - | 0.05 VA | 0.05 VA | 0.05 VA | 0.05 VA |
| Frequency domain | 50/60 Hz | 42 – 3 KHz | 42 – 3 KHz | 42 – 3 KHz | 42 – 3 KHz |
| Secondary protection by Transil diode | - | Oui | Oui | Oui | Oui |
| IΔn setting range recommended if there are pulsed DC current components | 30mA à 30A | 30mA to 3A | 30mA to 3A | 30mA to 3A | 30mA to 3A |
| Environment | | | | | |
| Operating temperature | -10°C...+70°C | | -25°C...+70°C | | |
| Storage temperature | -25°C...+85°C | | -25°C...+70°C | | |
| Climatic class - Mechanical conditions as per IEC 60721 | 3K5/3M4 | | 3K5/3M4 | | |
| Transport IEC 60721-3-2 | 2K5/2M2 | | 2K5/2M2 | | |
| EC 60721-3-1 long-term storage | 1K5/1M3 | | 1K5/1M3 | | |
| Connection / Wiring | | | | | |
| Connection type | RJ12 | | | | |
| Flexible/rigid cross-section | 0.2...2.5mm ² / 0.14mm ² ...1.5mm ² | | 0.2...2.5mm ² | | |
| Stripping length | 6mm | | 8...9mm | | |
| DLD connection distance | 10m | | | | |
| Single wire ≥ 0.75 mm ² | 0...1m | | 0...1m | | |
| Twisted single wire ≥ 0.75 mm ² | 0...10m | | 0...10m | | |
| Shielded cable ≥ 0.75 mm ² | 0...40m | | 0...40m | | |
| Recommended cable (shielding, shielding connected in a single location (terminal I), no earth connection) | SOCOMECS Straight RJ12 cable | J-Y(ST)Ymin 2x0.8 | J-Y(ST)Ymin 2x0.8 | | |
| Other features | | | | | |
| Internal IP rating | IP30 | IP40 | IP40 | | |
| Terminal block IP rating | IP20 | IP20 | IP20 | | |
| Flammability class | UL V0 | UL V0 | UL V0 | | |
| Product standards | 61869-1 and -2 | 61869-1 and -2 | 61869-1 and -2 | | |
| Homologation (pending) | UL 61010 | UL1053 | UL1053 | | |
| Centring device | | - | 4950 0011 | | |
| Bracket | | 4750 8015 | 4950 0001 | | |
| Sealable cover | | - | 4950 0020 | | |
| DIN rail mounting kit | included | 4950 0031 | 4950 0031 | | |
| Spare detachable screw terminal block | | - | 4950 0041 | | |
| Spare detachable push-in terminal block | | - | 4950 0040 | | |

* with mounting bracket

| | Ø50 | Ø80 | Ø120 | Ø200 | Ø300 |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| ΔIC reference | 4950 6050 | 4950 6080 | 4950 6120 | 4950 6200 | 4950 6300 |
| ΔIP reference | 4750 6050 | 4750 6080 | 4750 6120 | 4750 6200 | 4750 6300 |
| IEC 60664-1 insulation coordination | | | | | |
| Insulation voltage | 800 V |
| Surge voltage | 8 kV |
| Degree of pollution | III | III | III | III | III |
| Measurement circuit | | | | | |
| Rated primary current | 10 A |
| Rated secondary current | 0.0167 A |
| Winding ratio Kn | 10/0.0167 | 10/0.0167 | 10/0.0167 | 10/0.0167 | 10/0.0167 |
| ΔIC rated load | Max 47 Ω |
| ΔIP rated load | Max 180 Ω |
| ΔIC rated output (under maximum operating conditions) | 0.02 VA |
| ΔIP rated output (under maximum operating conditions) | 0.05 VA |
| Frequency domain | 42 – 3 KHz |
| Secondary protection by Transil diode | Oui | Oui | Oui | Oui | Oui |
| IΔn setting range recommended if there are pulsed DC current components | 30mA to 3A | 30mA to 5A | 30mA to 5A | 30mA to 5A | 30mA to 10A |
| Environment | | | | | |
| Operating temperature | -25°C...+70°C | | | | |
| Storage temperature | -25°C...+70°C | | | | |
| Climatic class - Mechanical conditions as per IEC 60721 | 3K5/3M4 | | | | |
| Transport IEC 60721-3-2 | 2K5/2M2 | | | | |
| EC 60721-3-1 long-term storage | 1K5/1M3 | | | | |
| Connection / Wiring | | | | | |
| Connection type | | | | | |
| Flexible/rigid cross-section | 0.2...2.5mm ² |
| Stripping length | 8...9mm | 8...9mm | 8...9mm | 8...9mm | 8...9mm |
| DLD connection distance | | | | | |
| Single wire ≥ 0.75 mm ² | 0...1m | 0...1m | 0...1m | 0...1m | 0...1m |
| Twisted single wire ≥ 0.75 mm ² | 0...10m | 0...10m | 0...10m | 0...10m | 0...10m |
| Shielded cable ≥ 0.75 mm ² | 0...40m | 0...40m | 0...40m | 0...40m | 0...40m |
| Recommended cable (shielding, shielding connected in a single location (terminal I), no earth connection) | J-Y(ST)Ymin 2x0.8 | J-Y(ST)Ymin 2x0.8 | J-Y(ST)Ymin 2x0.8 | J-Y(ST)Ymin 2x0.8 | J-Y(ST)Ymin 2x0.8 |
| Other features | | | | | |
| Internal IP rating | IP40 | IP40 | IP40 | IP40 | IP40 |
| Terminal block IP rating | IP20 | IP20 | IP20 | IP20 | IP20 |
| Flammability class | UL V0 |
| Product standards | 61869-1 and -2 |
| Homologation (pending) | UL1053 | UL1053 | UL1053 | UL1053 | UL1053 |
| Centring device | 4950 0012 | 4950 0013 | 4950 0014 | - | - |
| Bracket | 4950 0002 | 4950 0003 | 4950 0003 | 4950 0004 | 4950 0005 |
| Sealable cover | 4950 0020 | 4950 0020 | 4950 0020 | 4950 0020 | 4950 0020 |
| DIN rail mounting kit | 4950 0031 | 4950 0031 | 4950 0031 | - | - |
| Spare detachable screw terminal block | 4950 0041 | 4950 0041 | 4950 0041 | 4950 0041 | 4950 0041 |
| Spare detachable push-in terminal block | 4950 0040 | 4950 0040 | 4950 0040 | 4950 0040 | 4950 0040 |

* with mounting bracket

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