

# Core balance transformers - type A

Dedicated to RESYS



## The solution for

- > Industry
- > Infrastructure
- > Non critical buildings
- > OEM
- > Renewable energy



## Strong points

- > A complete product range
- > A wide range of fixing systems ( $\Delta$ IC &  $\Delta$ IP-R)
- > A patented cable locator ( $\Delta$ IC &  $\Delta$ IP-R)
- > A rapid installation and safe implementation ( $\Delta$ IP-R)

## Conformity to standards

- > IEC 61869-1



## Function

The installation of protection or monitoring systems such as earth leakage protection relays involves the use of **core balance transformers**.

Active conductors pass through the aperture of the core balance transformer, providing the differential summation of vector currents which enables the detection of leakage currents.

## Advantages

### A complete product range

All dimensions and types are available for compatibility with any bar and cable configurations or diameters.

### A wide range of fixing systems ( $\Delta$ IC & $\Delta$ IP-R)

$\Delta$ IC &  $\Delta$ IP-R core balance transformers can be mounted on DIN-rail, on back-plate or directly on the cable. These products can be adapted into confined spaces with high integration constraints and provide easy and rapid cabling.

The core balance transformers (toroids) proposed by SOCOMEC meet requirements in terms of measurement sensitivity and are suitable for earth leakage protection relays RESYS M40/P40.

Closed (series  $\Delta$ IC, WR and TFR) or split-core (series  $\Delta$ IP-R) types, suit all wiring configurations.

### A patented cable locator ( $\Delta$ IC & $\Delta$ IP-R)

The SOCOMEC cable locator is a patented innovation. The cable is perfectly centralised in the core balance transformer to ensure accurate measurement and enhanced immunity to network interferences. It also enables direct mounting of the core balance transformer onto the cable.

### A rapid installation and safe implementation ( $\Delta$ IP-R)

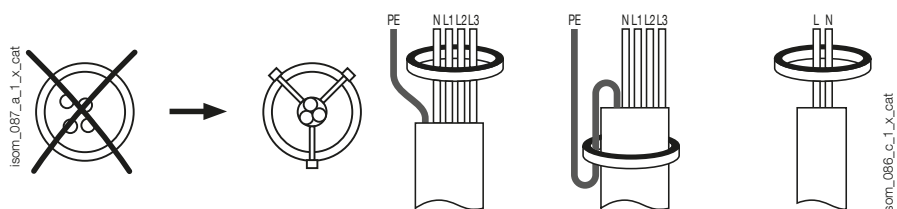
Thanks to an innovative "one click" opening/closing system, without the need of additional accessories, split-core  $\Delta$ IP-R toroids have been designed to ensure a fully safe installation.

## Implementation

All of the active conductors must be passed through the detection toroid's aperture. The protective conductor must pass on the outside of the toroid or pass once for each direction.

Installation limiting distortions during heavy load switching

### Installation of the detection toroids



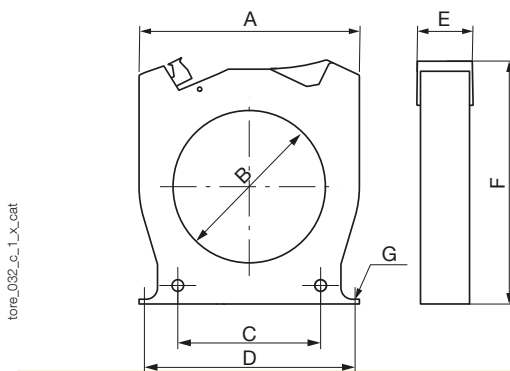
## Characteristics

| Electrical characteristics | $\Delta IC$              | $\Delta IP-R$            |
|----------------------------|--------------------------|--------------------------|
| Insulation coordination    | according to IEC 60664-1 | according to IEC 60664-1 |
| Max. operating voltage     | 720 VAC                  | 720 VAC                  |
| Rated impulse voltage      | 8 kV                     | 8 kV                     |
| Assigned withstand voltage | 3 kV                     | 3 kV                     |
| Degree of pollution        | 3                        | 3                        |
| Winding ratio              | 600 / 1                  | 600 / 1                  |
| Rated primary current      | 10 A                     | 10 A                     |
| Nominal power              | 20 mVA                   | 50 mVA                   |
| Max. accuracy class        | 3                        | 3                        |
| Operating temperature      | -40 ... +80 °C           | -40 ... +80 °C           |
| Flammability class         | UL94V-0                  | UL94V-0                  |

| Electrical characteristics WR & TFR series |                          |
|--|--------------------------|
| Insulation coordination                    | according to IEC 60664-1 |
| Insulation voltage                         | 690 VAC                  |
| Rated impulse voltage                      | 8 kV                     |
| Dielectric quality                         | 6 kV                     |
| Degree of pollution                        | 3                        |
| Winding ratio                              | 600 / 1                  |
| Rated primary current                      | 10 A                     |
| Nominal power                              | 50 mVA                   |
| Max. accuracy class                        | 5                        |
| Operating temperature                      | -10 ... +55 °C           |
| Flammability class                         | UL94V-0                  |

## Dimensions

### Closed toroids - $\Delta IC$ series

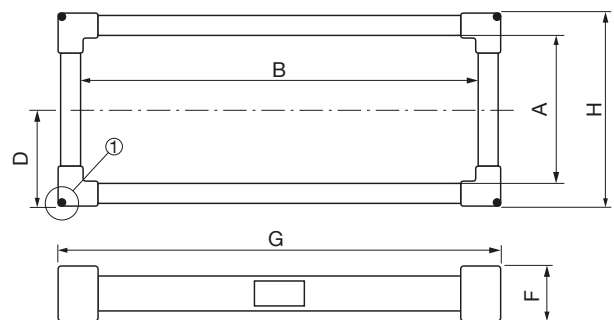


Rectangular closed toroids - WR series

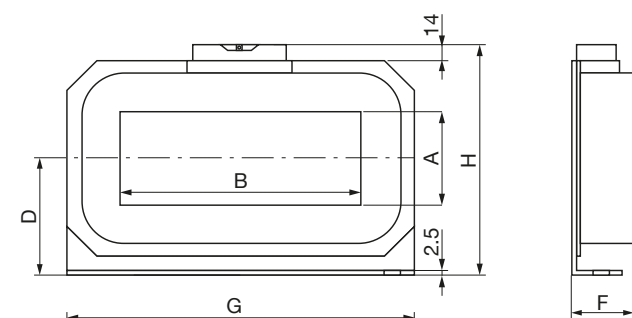
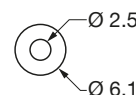
| Type                                 | A     | B    | C    | D          | E  | F     | G  | Weight (kg) |
|--------------------------------------|-------|------|------|------------|----|-------|----|-------------|
| $\Delta IC \text{ } \varnothing 15$  | 53    | 17.3 | 27.8 | 50         | 26 | 81    | M4 | 0.10        |
| $\Delta IC \text{ } \varnothing 30$  | 92    | 30   | 50   | 85         | 26 | 103.5 | M4 | 0.13        |
| $\Delta IC \text{ } \varnothing 50$  | 102.5 | 50   | 50   | 90         | 26 | 125   | M5 | 0.18        |
| $\Delta IC \text{ } \varnothing 80$  | 116   | 80   | 75   | 105        | 26 | 142.5 | M5 | 0.22        |
| $\Delta IC \text{ } \varnothing 120$ | 163   | 120  | 100  | 150        | 26 | 182.5 | M6 | 0.38        |
| $\Delta IC \text{ } \varnothing 200$ | 253   | 200  | 150  | 175 x 41.2 | 51 | 274   | M6 | 0.88        |
| $\Delta IC \text{ } \varnothing 300$ | 370   | 300  | 200  | 250 x 41.5 | 50 | 390   | M6 | 1.72        |

- A. Width
- B. Diameter
- C. Distance between fixing centres
- D. Distance between rear fixing brackets
- E. Depth
- F. Height
- G. Diameter of fixing screws

### Rectangular closed toroids - TFR series



① Detail for fastening the core balance transformer



| Type         | A   | B   | C   | D   | E  | F  | G   | H   | I   | Weight (kg) |
|--------------|-----|-----|-----|-----|----|----|-----|-----|-----|-------------|
| WR 70 x 175  | 70  | 175 | 225 | 85  | 22 | 46 | 261 | 176 | 7.5 | 2.9         |
| WR 115 x 305 | 115 | 305 | 360 | 116 | 25 | 55 | 402 | 240 | 8   | 6.3         |
| WR 150 x 350 | 150 | 350 | 415 | 140 | 28 | 55 | 460 | 285 | 8   | 8.2         |

- A. Height of gateway window
- B. Width of gateway window
- C. Entraxe de fixation
- D. Half-height from the base
- E. Position of oblong slot
- F. Depth
- G. Largeur
- H. Height
- I. Width of oblong slot

| Type          | A   | B   | D   | F  | G   | H   | Weight (kg) |
|---------------|-----|-----|-----|----|-----|-----|-------------|
| TFR 200 x 500 | 200 | 500 | 140 | 62 | 585 | 285 | 7.2         |

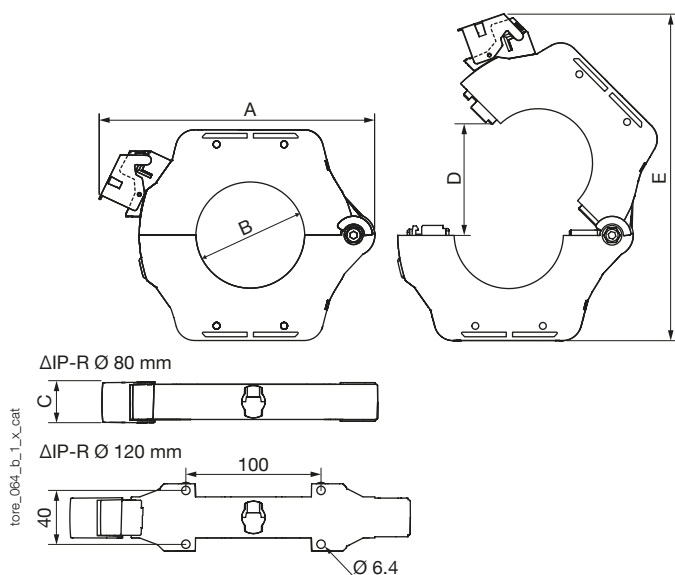
- A. Height of gateway window
- B. Width of gateway window
- D. Half-height from the base
- F. Depth
- G. Largeur
- H. Height

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## Dimensions (continued)

### Split-core toroids - $\Delta$ IP-R



| Type                | A   | B   | C  | D   | E   | Weight (kg) |
|---------------------|-----|-----|----|-----|-----|-------------|
| $\Delta$ IP-R Ø 80  | 204 | 79  | 30 | 108 | 260 | 0,85        |
| $\Delta$ IP-R Ø 120 | 252 | 119 | 30 | 149 | 328 | 1,5         |

A. Width  
B. Diameter  
C. Depth

D. Maximum opening.  
E. Device height when open

## References

### Closed toroids type A - $\Delta$ IC series

| Type              | Rated operational current $I_n$ (A) | Toroid diameter (mm) | Reference                |
|-------------------|-------------------------------------|----------------------|--------------------------|
| $\Delta$ IC Ø 15  | 36                                  | 15                   | 4950 6015 <sup>(1)</sup> |
| $\Delta$ IC Ø 30  | 65                                  | 30                   | 4950 6030 <sup>(1)</sup> |
| $\Delta$ IC Ø 50  | 85                                  | 50                   | 4950 6050 <sup>(1)</sup> |
| $\Delta$ IC Ø 80  | 160                                 | 80                   | 4950 6080 <sup>(1)</sup> |
| $\Delta$ IC Ø 120 | 250                                 | 120                  | 4950 6120 <sup>(1)</sup> |
| $\Delta$ IC Ø 200 | 400                                 | 200                  | 4950 6200 <sup>(1)</sup> |
| $\Delta$ IC Ø 300 | 630                                 | 300                  | 4950 6300 <sup>(1)</sup> |

(1) Toroids for RESYS relays M40 / P40.

### Rectangular closed toroids type A - WR and TFR series

| Type          | Toroid diameter (mm) | Reference                |
|---------------|----------------------|--------------------------|
| WR 70 x 175   | 70 x 175             | 4795 0717 <sup>(1)</sup> |
| WR 115 x 305  | 115 x 305            | 4795 1130 <sup>(1)</sup> |
| WR 150 x 350  | 150 x 350            | 4795 1535 <sup>(1)</sup> |
| TFR 200 x 500 | 200 x 500            | 4795 2050 <sup>(1)</sup> |

(1) Toroids for RESYS relays M40 / P40.

### Split-core toroids type A - WS series<sup>(2)</sup>

| Type                | Rated operational current $I_n$ (A) | Toroid diameter (mm) | Reference                |
|---------------------|-------------------------------------|----------------------|--------------------------|
| $\Delta$ IP-R Ø 80  | 160                                 | 80                   | 4750 6081 <sup>(1)</sup> |
| $\Delta$ IP-R Ø 120 | 250                                 | 120                  | 4750 6121 <sup>(1)</sup> |

(1) Toroids for RESYS relays M40 / P40.

(2) DELTA IP-R cores are supplied with a sealable protective cover, plug-in spring terminal block and DIN rail attachment.

## Accessories for $\Delta$ IC & $\Delta$ IP-R toroids

### Cable locator

Enables the cables to be centred in the toroid's aperture. Use of this accessory allows the core balance transformer to be directly mounted onto the cables.

| Description of accessories          | Reference |
|-------------------------------------|-----------|
| Cable locator, $\varnothing$ 30 mm  | 4950 0011 |
| Cable locator, $\varnothing$ 50 mm  | 4950 0012 |
| Cable locator, $\varnothing$ 80 mm  | 4950 0013 |
| Cable locator, $\varnothing$ 120 mm | 4950 0014 |



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### Mounting bracket

| Description of accessories             | Reference |
|--|-----------|
| Mounting bracket, $\varnothing$ 30 mm  | 4950 0001 |
| Mounting bracket, $\varnothing$ 50 mm  | 4950 0002 |
| Mounting bracket, $\varnothing$ 80 mm  | 4950 0003 |
| Mounting bracket, $\varnothing$ 120 mm | 4950 0003 |
| Mounting bracket, $\varnothing$ 200 mm | 4950 0004 |
| Mounting bracket, $\varnothing$ 300 mm | 4950 0005 |



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### Detachable screw terminal

| Description of accessories | Reference |
|----------------------------|-----------|
| Detachable screw terminal  | 4950 0041 |



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### Detachable push-in terminal

| Description of accessories  | Reference |
|-----------------------------|-----------|
| Detachable push-in terminal | 4950 0040 |



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### Sealable protection cover

| Description of accessories | Reference |
|----------------------------|-----------|
| Sealable protection cover  | 4950 0020 |



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### DIN-rail clip

For DIN-rail mounting SOCOMEC core balance transformers.

| Description of accessories | Reference |
|----------------------------|-----------|
| DIN-rail clip              | 4950 0031 |



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