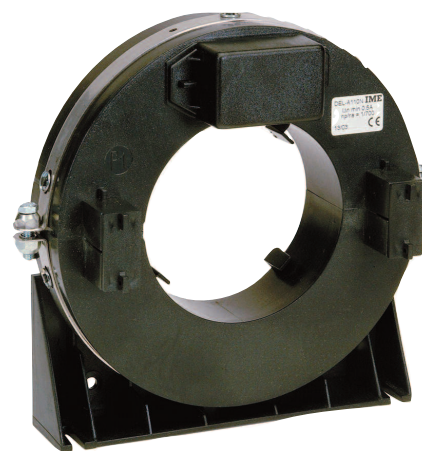


Trasformatori Transformers

Trasformatori toroidali per
relè differenziali DELTA
Nucleo chiuso o nucleo apribile
Diametro interno
(passaggio conduttori)
da 28 a 300mm
Collegamento toroide –
relè differenziale, 2 fili

Ring transformer for
DELTA residual current device
Closed-core or open-core
Inside diameter
(passing cable)
from 28 to 300mm
Transformer – residual current
device connection, 2-wire

TD



TDAA2 - TDAB2

TDGA2



TDAC2



MODELLO MODEL	Del-28	Del-35	Del-60	Del-80	Del-110	Del-140	Del-210	DelA-110	DelA-150	DelA-310
CODICE CODE	TDGA2	TDGB2	TDGH2	TDGC2	TDGD2	TDGE2	TDGF2	TDAA2	TDAB2	TDAC2

IMPIEGO

Abbinato ad un relè differenziale (serie DELTA) consente di rilevare correnti di dispersione verso terra causate da difetti di isolamento su macchine o impianti.

PRINCIPIO DI FUNZIONAMENTO

I conduttori attivi di linea attraversano il toroide creando ognuno un campo magnetico proporzionale alla propria corrente.

La somma vettoriale delle correnti (e dei relativi flussi magnetici) risulta zero, anche con carico squilibrato.

Una dispersione verso terra su uno o più conduttori, a valle del trasformatore, causa uno squilibrio nella somma vettoriale, di valore proporzionale a quello della corrente di dispersione. Lo squilibrio viene rilevato dal toroide e inviato al relè differenziale.

SCELTA DEL TRASFORMATORE

In funzione del valore minimo della corrente di dispersione da rilevare - diametro del foro entro cui devono passare tutti i conduttori attivi della linea da proteggere.

Qualora problemi di isolamento o di dimensioni dei cavi o delle sbarre della linea da proteggere non consentano l'impiego del trasformatore toroidale è possibile utilizzare dei trasformatori di corrente, selezionati con errori omogenei, abbinati ad un trasformatore speciale (NT 642).

INSTALLAZIONE CON FORTI CORRENTI TRANSITORIE (max.6In) IN ACCORDO CON EN/IEC 60947-2 ALLEGATO M.

MODELLO MODEL	Del-28	Del-35	Del-60	Del-80	Del-110	Del-140	Del-210	DelA-110	DelA-150	DelA-310
CODICE CODE	TDGA2	TDGB2	TDGH2	TDGC2	TDGD2	TDGE2	TDGF2	TDAA2	TDAB2	TDAC2
DIAMETRO DIAMETER	28mm	35mm	60mm	80mm	110mm	140mm	210mm	110mm	150mm	310mm
IΔn min	0,03A			0,05A	0,1A	0,3A		0,5A		1A
In	65A	70A	90A	170A	250A		400A	250A		630A
6In	390A	420A	540A	1020A	1500A		2400A	1500A		3780A

Diametro: diametro foro interno trasformatore (passaggio cavi/sbarre)

IΔn min: valore minimo di IΔn impostabile sul relè differenziale abbinato al toroide

In: corrente nominale dell'interruttore o sezionatore

I valori indicati sono validi unicamente con i conduttori passanti esattamente al centro del toroide

Es. Scelta trasformatore toroidale per corrente nominale interruttore (In) = 125A

Rispettando i parametri indicati dalla normativa EN/IEC 60947-2 allegato M. occorre utilizzare un trasformatore TDGC2

Corrente In = 170A

Corrente 6In = 1020A

In impianti con correnti transitorie deboli (< a 6In) è possibile utilizzare trasformatori toroidali di dimensioni inferiori, attenendosi alla seguente formula:

$6In$ (valore indicato in tabella)

$\frac{540A}{125A} = \text{max. sovraccarico ammesso}$

I_s (corrente nominale dell'interruttore utilizzato)

Es. Utilizzando un trasformatore TDGH2 con valore 6In = 540A con interruttore con corrente nominale In=125A

$$\frac{540A}{125A} = 4,32$$

Il massimo sovraccarico ammesso è pari a 4,32 volte la corrente dell'interruttore

APPLICATION

In connection with residual current device (DELTA series) it allows to detect leakage currents towards ground caused by insulation faults on machines or plants.

WORKING PRINCIPLE

Active line conductors cross the toroid creating a magnetic field proportional to their own current.

The vector sum of the currents (and relevant magnetic fluxes) is zero, even with unbalanced load.

A leakage towards ground on one or more conductors after the transformer causes an unbalance in the vector sum, with a value proportional to the leakage current. This unbalance is detected by the toroid and sent to the residual current device.

CHOICE OF TRANSFORMER

According to lowest value of residual current to be detected and hole diameter in which shall pass all the active conductors of line to be protected.

If insulation or dimension problems for cables or bars for line to be protected do not allow to use ring current transformer, it is possible to use current transformers chosen with homogeneous errors and connected with a special transformer (NT 642).

APPLICATION WITH HIGH TRANSIENTS CURRENTS (max.6In) IN ACCORDANCE WITH EN/IEC 60947-2 ANNEX M.

Diameter: internal hole of the transformer (bus bar and cable passage)

IΔn min: minimum value to be set on the Earth Leakage Relay in order to avoid unwanted tripping

In: rated current of the switch

The specified values are valid if the cables are positioned in the centre of the transformer

E.g. How to choose the correct transformer for a specific nominal current (In) = 125 A

To comply with the specification of the standard EN/IEC 60947-2 annex M, the type TDGC2 should be used

Current In = 170A

Current 6In = 1020A

Where the transients current are not so high, smaller transformers (< a 6In) may be used provided that the following calculation is respected:

$6In$ (see table)

$\frac{540A}{125A} = \text{max overload permissible}$

I_s (nominal current of the switch)

E.g. A TDGH2 type with value 6In = 540A in conjunction with a switch of In=125A

$$\frac{540A}{125A} = 4,32$$

Permissible maximum overload is 4,32 times the In of the switch.

COLLEGAMENTO TOROIDE - RELE

Preferibilmente da realizzare con cavo schermato; tale precauzione assume particolare importanza nell'installazione di relè differenziali ad elevata sensibilità ($I_{\Delta n} \leq 0,1A$). Particolare attenzione va prestata inoltre alla distanza fra il toroide e il relè (che deve essere la più breve possibile) e alla vicinanza di conduttori di potenza o di altre apparecchiature che possono indurre disturbi sul sistema. Nell'impossibilità di utilizzo della schermatura è opportuno attorcigliare i cavi di collegamento toroide-relè.

CARATTERISTICHE TECNICHE

Rapporto trasformazione primario/secondario di misura: 1/700
Circuito primario: conduttori della linea da proteggere che attraversano il foro del toroide.
Minima corrente $I_{\Delta n}$ (valore minimo di $I_{\Delta n}$ impostabile sul relè differenziale abbinato al toroide): vedere tabella.
Corrente di test corrispondente a 6 In: I_{max} (i valori indicati sono validi unicamente con i conduttori passanti esattamente al centro del toroide).
Corrente termica di cortocircuito I_{th} : 90kA secondo EN/IEC 61869-1, 61869-2

ISOLAMENTO

Tensione nominale del circuito controllato U_n : 720V (fase-neutro)
Tensione nominale di tenuta a frequenza industriale: 3kV (50Hz / 1min)
La tensione di prova è applicata tra, sbarra / cavo primario e terra
I terminali secondari connessi a terra
Tensione nominale di tenuta a impulso U_{imp} : 8kV 1,2/50µs
La tensione di prova è applicata tra, sbarra / cavo primario e terra
I terminali secondari connessi a terra

CONDIZIONI DI IMPIEGO

Temperatura di riferimento: 20°C ± 5°C
Temperatura di impiego: (EN/IEC 60947-2): -5 ÷ 40°C
Temperatura di funzionamento: - 10 ÷ 55°C
Temperatura di magazzino: -40 ÷ 70°C
Adatto all' utilizzo in clima tropicale
Conessioni: morsetti a vite,con coprimorsetto di protezione (sigillabile)
Materiale custodia : PC V0 autoestinguente secondo UL94
Fissaggio: a vite

RING CURRENT TRANSFORMER - RELAY CONNECTION

Preferably to carry out with a shielded cable; this protection is very important when high-sensitivity residual current device ($I_{\Delta n} \leq 0,1A$) are used.
Besides, a great attention must be paid to the distance between the ring transformer and residual current device (that has to be as short as possible) and to the nearness of power conductors or other devices that may induce noise on the system. In case the shielded- conductor cable cannot be used, we suggest to twist the wires connecting the current transformer to the residual current device.

SPECIFICATIONS

Primary/secondary measuring ratio: 1/700
Primary circuit: conductors of line to be protected that cross toroid hole
 $I_{\Delta n}$ lowest current ($I_{\Delta n}$ lowest value that can be set on earth leakage relay connected with toroid): see table.
Test current corresponding to 6 In: I_{max} (shown values are valid only for conductors passing exactly in the middle of toroid).
 I_{th} short circuit thermal current: 90kA according to EN/IEC 61869-1, 61869-2

INSULATION

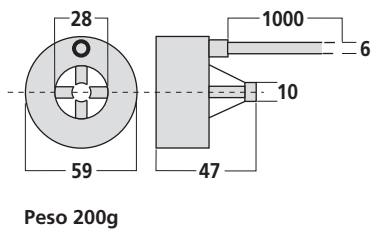
Rated voltage of the monitored circuit U_n : 720V (phase-neutral)
Rated power frequency withstand voltage: 3kV (50Hz / 1min)
The test voltage is applied between primary, bus bar / cables and earth
The secondary terminals connected to earth
Rated impulse withstand voltage U_{imp} : 8kV 1,2/50µs
The test voltage is applied between primary, bus bar / cables and earth
The secondary terminals connected to earth

WORKING CONDITIONS

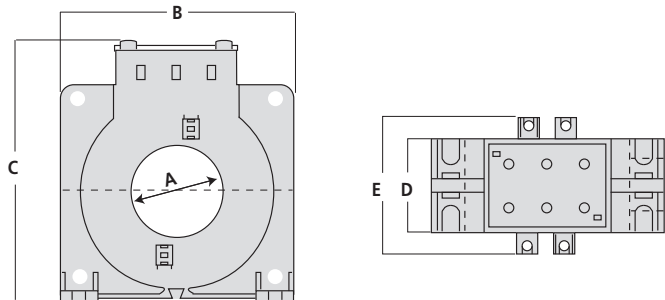
Reference temperature: 20°C ± 5°C
Nominal range temperature(EN/IEC 60947-2): -5÷40°C
Limit temperature range: - 10 ÷ 55°C
Limit temperature range for storage: -40 ÷ 70°C
Suitable for tropical climates
Connections: screw terminals with protection terminal cover (sealable)
Housing material: PC V0 self-extinguishing according to UL94
Mounting: screw type

Del

TDGA2



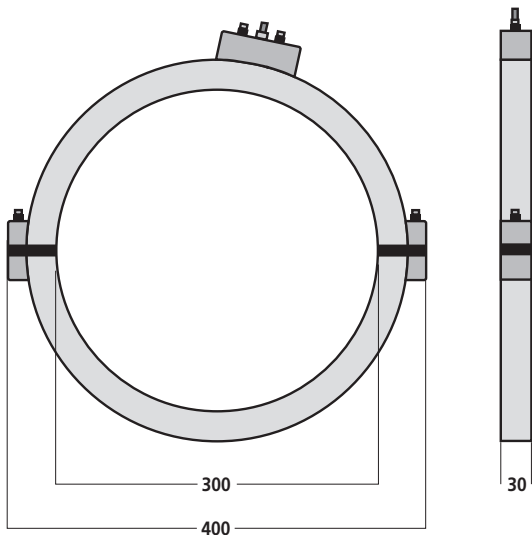
TDG.2 / TDS5...



Modello	A	B	C	D	E	Peso
TDGB2	35	92	113	36	56	250g
TDGH2	60	105	138	36	56	300g
TDGC2	80	125	160	36	56	350g
TDGD2	110	165	198	36	56	500g
TDGE2	140	200	234	36	56	700g
TDGF2	210	290	323	44	64	1200g
TDS5...	80	125	160	36	56	400g

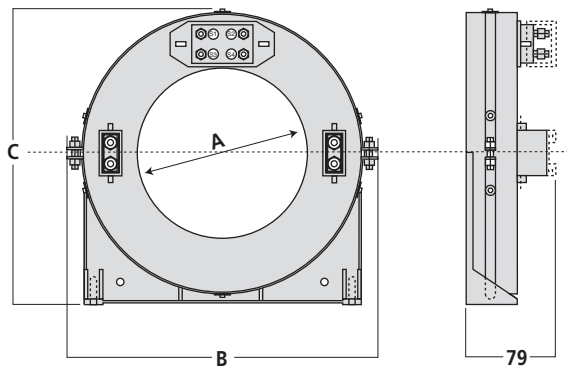
Del A

TDAC2



Peso 3,8kg

TDAA2 / TDAB2



Modello	A	B	C	Peso
TDAA2	110	235	219	2,35Kg
TDAB2	150	275	259	2,5Kg

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Transformateurs

Transformers

Transformateurs toroïdaux pour relais de protection DELTA
Tore fermé ou tore ouvrant
Diamètre interne
(passage de câble)
de 28 à 310mm
Transformateur toroïdal –
relais de protection, 2 fils

Ring transformer for
DELTA residual current device
Closed-core or open-core
Inside diameter
(passing cable)
from 28 to 300mm
Transformer – residual current
device connection, 2-wire

Del



Del-A110N / Del-A115N

Del28N



Del-A310N



MODELE MODEL	Del-28	Del-35	Del-60	Del-80	Del-110	Del-140	Del-210	DelA-110	DelA-150	DelA-310
REFERENCE CODE	4021 1028	4021 1035	4021 1060	4021 1080	4021 1105	4021 1140	4021 1210	4021 2210	4021 2215	4021 2230

APPLICATION

Associé au relais de protection (série DELTA) cet appareil permet de détecter les courants de fuite vers la terre dus aux défauts d'isolement sur les machines ou dans les usines.

PRINCIPE DE FONCTIONNEMENT

Des conducteurs de ligne actifs traversent le tore, créant un champ magnétique proportionnel à leur propre courant.
La somme vectorielle des courants (et des flux magnétiques correspondants) est égale à zéro, même dans le cas d'une charge déséquilibrée.
Une fuite vers la terre sur un ou plusieurs conducteurs après le transformateur entraîne un déséquilibre des sommes vectorielles proportionnel au courant de fuite. Ce déséquilibre est détecté par le tore et transmis au relais.

CHOIX DU TORE

Selon la valeur la plus basse du courant résiduel devant être détectée ainsi que du diamètre de passage par lequel doivent passer tous les conducteurs actifs de ligne à protéger.

Si des problèmes d'isolation ou de taille pour les câbles ou si les lignes à protéger ne permettent pas d'utiliser un tore circulaire, il est possible d'utiliser des transformateurs de courant choisis avec des erreurs homogènes et connectés à un transformateur spécial (NT 642).

APPLICATION AVEC FORTS COURANTS TRANSITOIRES (max.6In)
SELON EN/IEC 60947-2 ANNEX M.

MODELE MODEL	Del-28	Del-35	Del-60	Del-80	Del-110	Del-140	Del-210	DelA-110	DelA-150	DelA-310
REFERENCE CODE	4021 1028	4021 1035	4021 1060	4021 1080	4021 1105	4021 1140	4021 1210	4021 2210	4021 2215	4021 2230
DIAMETRE DIAMETER	28mm	35mm	60mm	80mm	110mm	140mm	210mm	110mm	150mm	310mm
IΔn min	0,03A			0,05A	0,1A	0,3A		0,5A		1A
In	65A	70A	90A	170A	250A		400A	250A		630A
6In	390A	420A	540A	1020A	1500A		2400A	1500A		3780A

Diamètre: ouverture interne du transformateur (passage barre et câble)

IΔn min: valeur minimum à fixer sur le relais différentiel pour éviter les déclenchements intempestifs

In: courant nominal du switch

Les valeurs spécifiées sont valables si les câbles sont positionnés au centre du transformateur.

Ex. Comment choisir le bon transformateur pour un courant nominal spécifique (**In**) = **125A**

Pour répondre aux spécifications de la norme **EN/IEC 60947-2 annex M**, le transformateur réf. **40211080** devrait être utilisé

Courant In = 170A

Courant 6In = 1020A

Lorsque les courants transitoires ne sont pas élevés (**<a 6In**), des transformateurs de dimensions inférieures peuvent être utilisés, à condition que la formule suivante soit respectée :

6In (voir tableau)

= surcharge max. admissible

Is (courant nominal du switch)

Ex. En utilisant la réf. **40211060** valeur **6In = 540A** avec un switch de **In=125A**

540A

=4,32

125A

La surcharge max. admissible est de 4,32 fois le In du switch

APPLICATION

In connection with residual current device (DELTA series) it allows to detect leakage currents towards ground caused by insulation faults on machines or plants.

WORKING PRINCIPLE

Active line conductors cross the toroid creating a magnetic field proportional to their own current.

The vector sum of the currents (and relevant magnetic fluxes) is zero, even with unbalanced load.

A leakage towards ground on one or more conductors after the transformer causes an unbalance in the vector sum, with a value proportional to the leakage current.

This unbalance is detected by the toroid and sent to the residual current device.

CHOICE OF TRANSFORMER

According to lowest value of residual current to be detected and hole diameter in which shall pass all the active conductors of line to be protected.

If insulation or dimension problems for cables or bars for line to be protected do not allow to use ring current transformer, it is possible to use current transformers chosen with homogeneous errors and connected with a special transformer (NT 642).

APPLICATION WITH HIGH TRANSIENTS CURRENTS (max.6In)
IN ACCORDANCE WITH EN/IEC 60947-2 ANNEX M.

Diameter: internal hole of the transformer (bus bar and cable passage)

IΔn min: minimum value to be set on the Earth Leakage Relay in order to avoid unwanted tripping

In: rated current of the switch

The specified values are valid if the cables are positioned on the centre of the transformer.

E.g. How to choose the correct transformer for a specific nominal current (**In**) = **125A**

To comply with the specification of the standard **EN/IEC 60947-2 annex M**, the type **40211080** should be used

Current In = 170A

Current 6In = 1020A

Where the transients current are not so high, smaller transformers (<a 6In) may be used provided that the following calculations is respected :

6In (see table)

= max overload permissible

Is (nominal current of the switch)

E.g. A **40211060** type with value **6In = 540A** in conjunction with a switch of **In=125A**

540A

=4,32

125A

Permissible maximum overload is 4,32 times the In of the switch

RACCORDEMENT TORE-RELAIS

A effectuer de préférence avec un câble blindé : cette protection est très importante lors de l'utilisation de relais de protection à haute sensibilité ($I_{\Delta n} \leq 0,1A$).

De plus, il est conseillé de réduire au maximum la distance entre le tore et le relais différentiel et de prendre garde à la proximité des conducteurs électriques et des autres appareils risquant de perturber le système.

Dans le cas où il serait impossible d'utiliser un câble blindé pour le conducteur, nous conseillons de torsader les fils raccordant le tore et l'appareil de courant résiduel.

CARACTERISTIQUES TECHNIQUES

Rapport de transformation primaire/secondaire: 1/700

Circuit primaire: conducteurs de la ligne à protéger traversant le tore.

Courant minimum $I_{\Delta n}$ (valeur minimum de $I_{\Delta n}$ sélectionnable sur le relais de protection en association avec le tore choisi): voir tableau.

Courant de test correspondant à 6 In: I_{max} (les valeurs indiquées sont uniquement valables lorsque les conducteurs sont exactement centrés).

Courant thermique de court circuit I_{th} : 90kA selon EN/IEC 61869-1, 61869-2

ISOLEMENT

Tension nominale du circuit contrôlé U_n : 720V (phase-neutre)

Fréquence nominale tension de tenue industrielle: 3kV (50Hz / 1 min)

La tension de test est appliquée entre primaire, barre / câbles et terre

Les bornes secondaires raccordées à la terre

Tension nominale de tenue d'une impulsion: 8kV 1,2/50 μ

La tension de test est appliquée entre primaire, barre / câbles et terre

Les bornes secondaires raccordées à la terre

CONDITIONS D'UTILISATION

Température de référence: 20°C $\pm$ 5°C

Température nominale d'utilisation: (IEC 60947-2): -5 $\div$ 40°C

Température de fonctionnement: - 10 $\div$ 55°C

Température de stockage: -40 $\div$ 70°C

Adapté pour l'utilisation en climat tropical

Raccordement: bornes à vis, avec cache bornes (plombable)

Matériau du boîtier : ABS autoextinguible

Raccordement: à vis

RING CURRENT TRANSFORMER - RELAY CONNECTION

Preferably to carry out with a shielded cable; this protection is very important when high-sensitivity residual current device ($I_{\Delta n} \leq 0,1A$) are used.

Besides, a great attention must be paid to the distance between the ring transformer and residual current device (that has to be as short as possible) and to the nearness of power conductors or other devices that may induce noise on the system. In case the shielded-conductor cable cannot be used, we suggest to twist the wires connecting the current transformer to the residual current device.

SPECIFICATIONS

Primary/secondary measuring ratio: 1/700

Primary circuit: conductors of line to be protected that cross toroid hole

$I_{\Delta n}$ lowest current ($I_{\Delta n}$ lowest value that can be set on earth leakage relay connected with toroid): see table.

Test current corresponding to 6 In: I_{max} (shown values are valid only for conductors passing exactly in the middle of toroid).

I_{th} short circuit thermal current: 90kA according to EN/IEC 61869-1, 61869-2

INSULATION

Rated voltage of the monitored circuit U_n : 720V (phase-neutral)

Rated power frequency withstand voltage: 3kV (50Hz / 1 min)

The test voltage is applied between primary, bus bar / cables and earth

The secondary terminals connected to earth

Rated impulse withstand voltage U_{imp} : 8kV 1,2/50 μ

The test voltage is applied between primary, bus bar / cables and earth

The secondary terminals connected to earth

WORKING CONDITIONS

Reference temperature: 20°C $\pm$ 5°C

Nominal range temperature(IEC 60947-2): -5 $\div$ 40°C

Limit temperature range: - 10 $\div$ 55°C

Limit temperature range for storage: -40 $\div$ 70°C

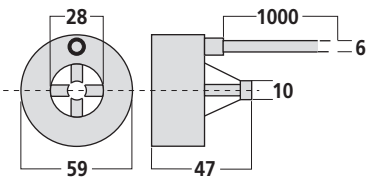
Suitable for tropical climates

Connections: screw terminals with protection terminal cover (sealable)

Housing material: PC V0 self-extinguishing according to UL94

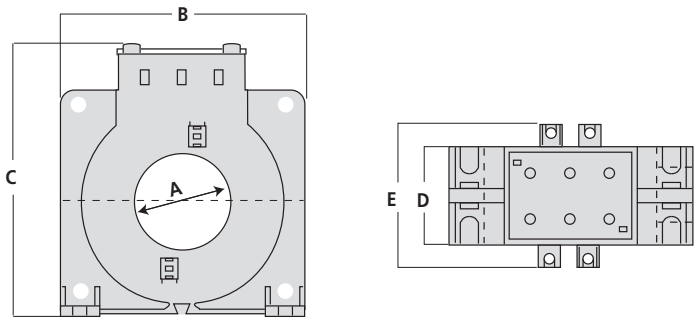
Mounting: screw type

Del28N



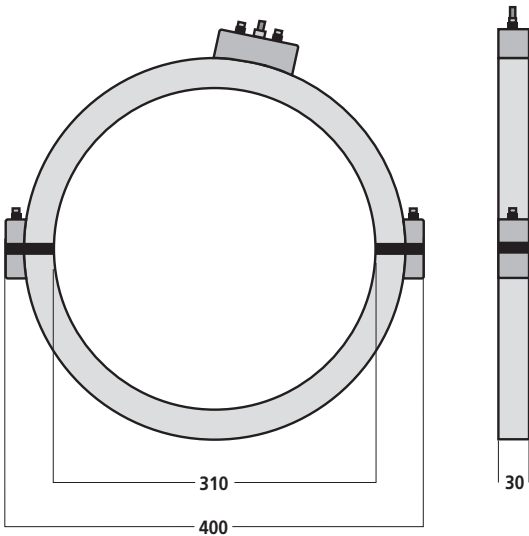
Poids 200g

Del35N - Del60N - Del80N - Del110N - Del140N - Del210N



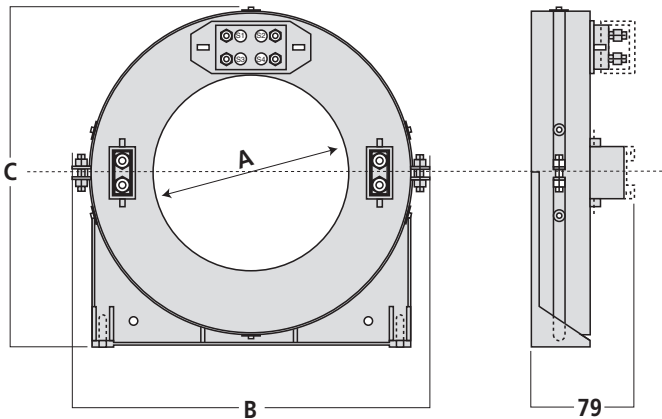
MODELE MODEL	A	B	C	D	E	POIDS WEIGHT
DEL35N	35	92	113	36	56	250g
DEL60N	60	105	138	36	56	300g
DEL80N	80	125	160	36	56	350g
DEL110N	110	165	198	36	56	500g
DEL140N	140	200	234	36	56	700g
DEL210N	210	290	323	44	64	1200g
TDS5	80	125	160	36	56	400g

Del-A310N



Poids 3,8Kg

Del-A110N
Del-A150N



MODELE MODEL	A	B	C	POIDS WEIGHT
DEL-A110N	110	235	219	2,35Kg
DEL-A150N	150	275	259	2,5Kg

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