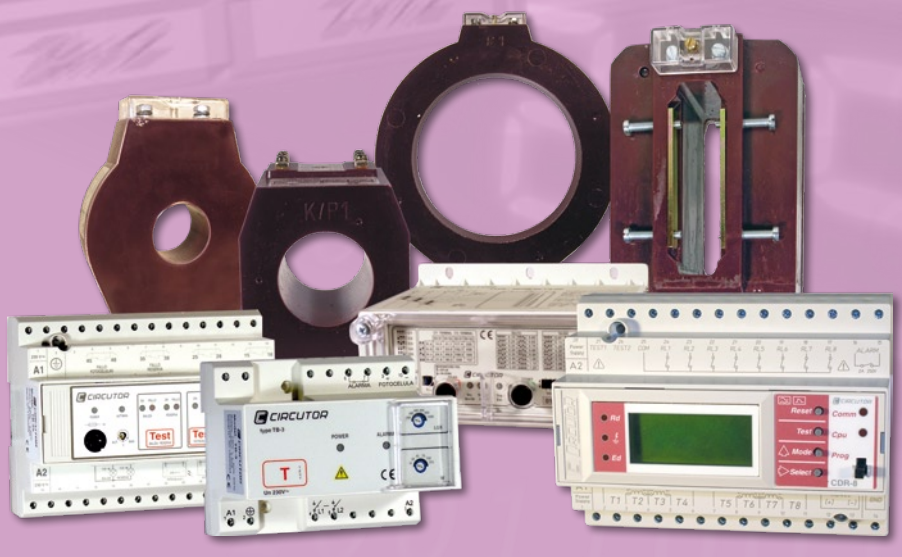
Protection and control



Protection relays and transformers

Protection relays and transformers

Protection relays and transformers

CIRCUTOR offers a range of protection relays for different and specific applications. Many of these products have been designed in compliance with the corresponding specifications, always catering for the needs of our clients.

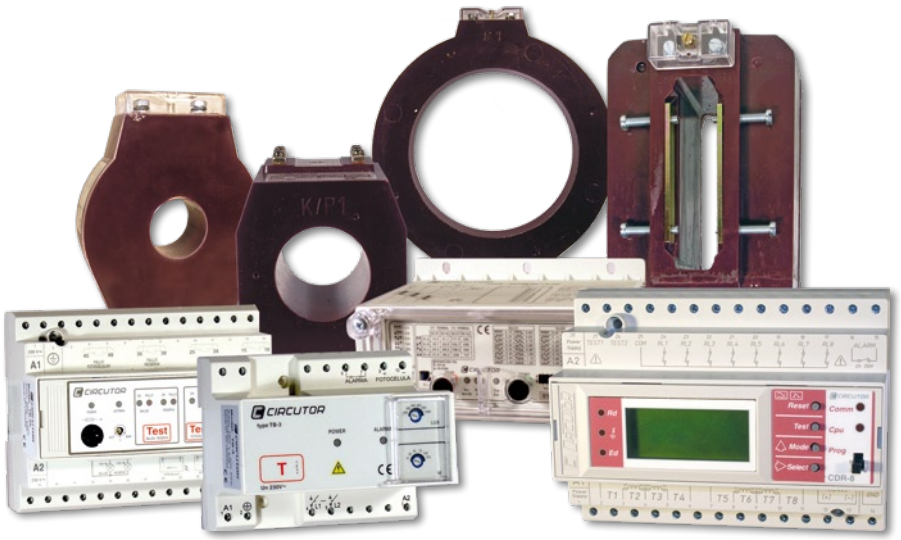
Our range of products includes simple relays that are very easy to use, such as current relays, or even protection relays used to assemble cells in substations.

We can highlight the following applications in this section:

- Beacon control relays
- Current control relays
- Harmonics relays
- Overload protection relays for substations.

There is also a full range of current transformers, the **TRP** and **TRM** Series, encapsulated in resin, used in measurement and/or protection applications. Transformers with other power, ratio, accuracy, class, dimensional, etc. features, different from those described in the following sections can be manufactured on demand. This range of transformers expands the offer of current transformers described in the Measurement section.

P.3/4/5



Protection transformers

Selection table of the type of transformer, in accordance with the list of transformers between the nominal current of the primary (I_p) and secondary (I_s)

	MEASUREMENT						PROTECTION						
5 000/5							TRM 180						TRP 180
4 000/5													
-						TRM 140						TRP 140	
3 000/5											TRP 100		
2 500/5					TRM 100								
2 000/5				TRM 80				TRP 400					
1 500/5			TRM 60							TRP 80			
1 000/5									TRP 60				
-													
800/5		TRM 40											
750/5													
700/5													
600/5													
500/5								TRP 40					
400/5	TRM 30												
-													
300/5													
250/5													
200/5													
-													
150/5													
125/5													
100/5													
-													
75/5													

CIRCUTOR offers a complete range of current transformers encapsulated in resin. One of the advantages of this type of transformers is that they increase the degree of robustness (high mechanical resistance, high electrical rigidity, tropicalization, etc.). In addition, this range fully prevents the manipulation of the transformer's core.

There are two types of transformers:

- **TRM**: Measurement transformers encapsulated in resin
- **TRP**: Protection transformers encapsulated in resin.

Features	
Primary current	75 ... 5000 A
Secondary current	5 A (1 A on demand)
Frequency	50 ... 60 Hz
Insulation voltage	3 kV
Highest operating voltage	0.72 kVac
Thermal class	B
Thermal short-circuit current	$I_{th} = 60\ I_n$
Dynamic current	$I_{dyn} = 2.5\ I_{th}$
Secondary terminals	Sealable
Indoor	Installation
Standards	
IEC 60044-1, UNE-EN 60044-1	

Selection

You must know the following before choosing the adequate transformer (measurement or protection):

- The application (measurement or protection)
- Features of the work environment or operating conditions (indoors or outdoors, maximum operating temperature, etc.)
- The features of the line where it will be installed:
  - Cable or plate dimensions
  - Measurement margin of the current being measured (maximum and minimum)
  - Overload (range and time)
  - Grid voltage (low, medium or high)
  - Short-circuit current
  - Grid frequency
- Features of the associated instrument or relay (accuracy, nominal current, consumption, etc.)
- Distance between the transformer and instrument, as well as the section of the cable used for the connection

Power of the transformer

This is an important parameter. In the transformer, the primary current must induce the necessary power in the secondary current in order to transmit it to

the measurement unit. Induced power must be equal to or more than the line losses plus the power consumed by the measurement equipment.

Line losses, P_L :

Power losses due to the transmission of current through the cabling resistor R_L of the secondary cabling circuit of the transformer.

Factors that must be taken into account:

- Secondary current. $P_L = R_L \cdot I^2$
- Cable diameter. R_L is inversely proportional to the diameter square
- Cable length. R_L is proportional to the cabling length (both ways)

Precision power:

Is the apparent nominal power (V·A), with a specific power factor, which the current transformer transmits to the secondary circuit with the current assigned when it is connected with its nominal load, $S(V \cdot A) = Z_s \cdot I_s^2$

In accordance with the regulations, the inductive power factor is 0.8 for an apparent power that is equal to or greater than 5 V·A. The power factor for smaller apparent power values is the unit.

Accuracy of a transformer

The type of error in the transformer is established by the IEC 44-1. 25% in measurement transformers and at 100% of the nominal power. In the case of protection transformers, only at 100% of the nominal power.

The transformer's response to saturation

A current transformer will become saturated when its primary current or load are above the nominal values. The linearity of the current transformation between the primary and secondary decreases, so that the error can be quite high. The saturation of the transformer is inversely proportional to the load, as shown on the following figure. (Fig 1)

The difference between current transformers used for measurement or protection purposes is the behaviour in the event of an overload in the primary.

In the case of measurement transformers, they are saturated by overloads in order to make sure that the equipment is not damaged from the secondary. In the case of protection transformers, they are not saturated until they reach a very high current.

A class **5P15** protection transformer will not become saturated until the nominal current passes 15 times through the primary.

The transformers used for the measurement of the **Safety Factor (FS)** parameter show the number of primary current transmissions the transformer is capable of transferring to the measurement equipment.

TYPE		5P	10P
± % Error for % I_n		± 1	± 3
Offset ± for % I_n	Minutes	± 60	---
	Centiradians	± 1,8	---
Compound error		5	10

In the case of protection transformers

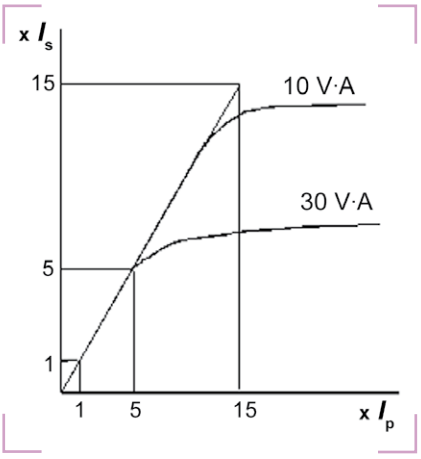
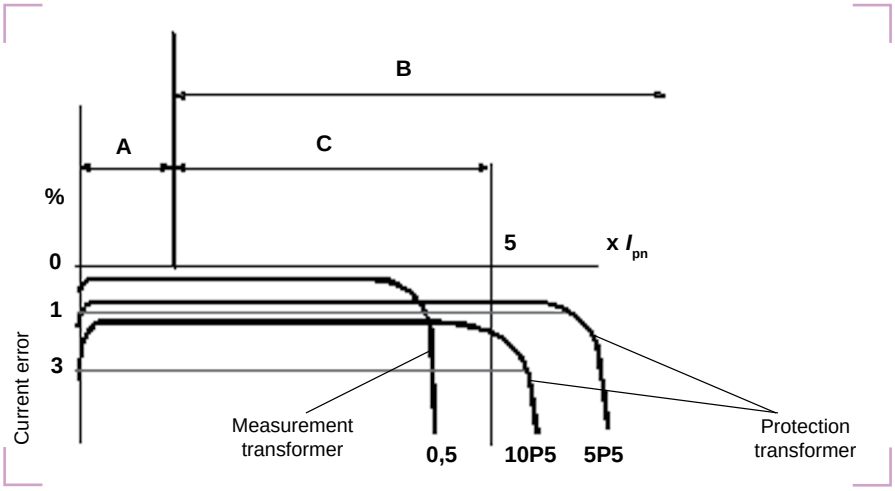


***Fig. 1**. Curve of the V·A measurement transformer*



Class curves

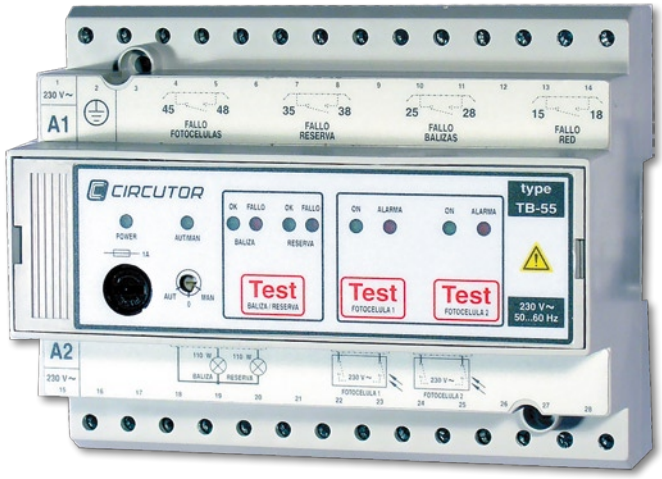
***A:** Nominal current zone*
***B:** Overload zone for protection transformers*
***C:** Maximum overload zone for measurement transformers FS < 5*

Product selection table

	Equipment	Sub-division	Application	Page
TB		P3	Beacon control equipment	7
TB-3		P3	Beacon control equipment	9
WDH		P3	Harmonics relay	13
WI		P3	Current relay	11
CDR-8		P3	Earth leakage current station	15
MPRB		P4	Transformer overload protection relays	17
TRP		P5	Protection and measurement transformer	21
TRM		P5	Measurement transformers	25

TB

Beacon control relays



Description

The **TB** type Beacon control system is in charge of the supervision, control and indication of anomalies detected in the different Beacon components of the telephony transmission towers.

TB / **TB-55** Features:

- Control and measurement of the consumption of the two sets of independent ballasts(230 Vac power supply): the main circuit and the reserve circuit. The reserve circuit is connected when there is a fault in the main circuit or when a lamp goes out.
- Control inputs of the two twilight photocells on the tower. When the light level is under the threshold, an internal contact is closed (applying a 230 Vac voltage at the input of the photocell of the **TB**), and the ballasts will be connected. Said photocells are not supplied with the equipment and can be purchased separately.
- Alarms indicated with LEDs on the front of the unit.
- Alarm signalling relay outputs

Application

Designed to control and supervise the night ballasts on metallic antennae support structures, with a dual Beacon circuit (main and reserve), and to supervise the operation of the dual photocell circuit. Said ballasts will start operating when the level of lighting is below a determined threshold, detected by twilight cells.

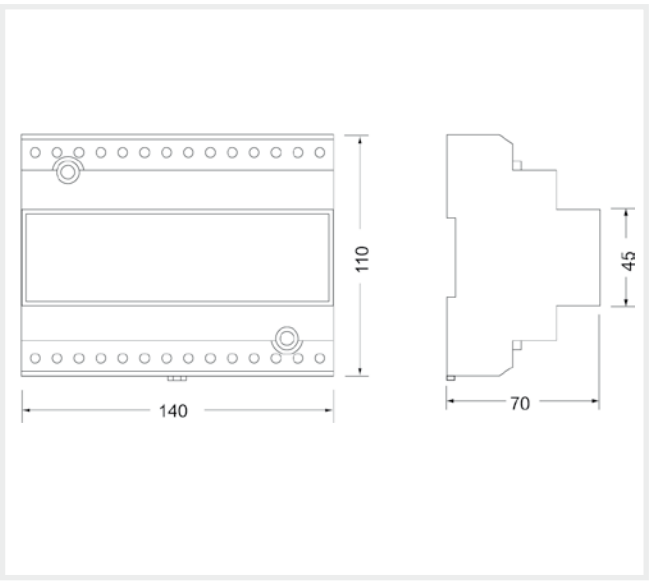
Features

Power circuit:	
Voltage	Single phase 230 Vac (± 25 %)
Frequency	50 ... 60 Hz
Consumption of the unit	5 V·A
Consumption of the unit + Ballasts	305 W
Ballasts	
Maximum number of ballasts (limited by power)	**TB-55**: 110 W main circuit + 110W reserve Example: Two 55 W ballasts or five 22 W ballasts per circuit **TB**: 150 W main circuit + 150W reserve Example: Two 75 W ballasts per circuit
Photocell input	
Number of inputs	2
Type of input	230 Vac ± 20%
Output relay features (alarm)	
Insulation voltage (U_i)	250 Vac / 30 Vdc
Thermal current I_{th}	5 A
Maximum switching voltage	1250 VA
Mechanical working life	1 x 10^5 operations
Electrical working life	1 x 10^5 operations
Build features:	
Type of box	Modular, self-extinguishing plastic material
Connection	Metallic terminals for "posidriv" screws
Fixing	DIN Rail 46277 (EN 50022) Optional fixing with screws (fixing drill hole Ø 4.2 mm)
Dimensions	8 modules (140 x 70 x 110) in accordance with DIN 43880
Degree of protection	Embedded relay : IP 41 / Terminals : IP 20
Safety	Category II, EN 61010
Ambient conditions	
Operating temperature	-5 ... +55 ºC
Standards	
IEC 60255-5, EN 61010, EN 60664, EN 61000	

TB

Beacon control relays

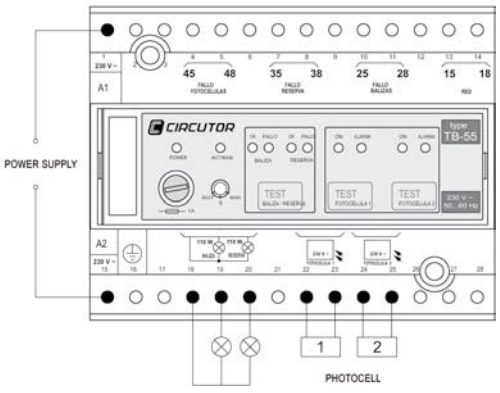
Dimensions



References

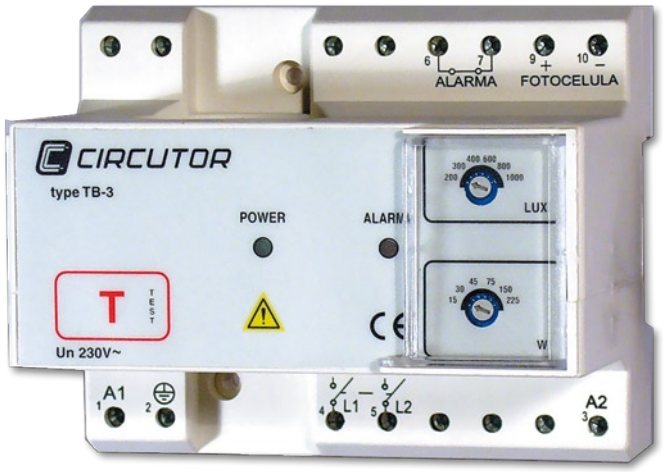
Description	Type	Code
Ballasts 110 W (2 x 55 W) Control of 2 circuits: Main (Beacon) and reserve4 fault alarm relays: Grid voltage, photocell, main and reserve circuit (The photocell is not included)	**TB-55**	**P30101**
Ballasts 150 W (2 x 75 W) Control of 2 circuits: Main (Beacon) and reserve4 fault alarm relays: Grid voltage, photocell, main and reserve circuit (The photocell is not included)	**TB**	**P30104**

Connections



TB-3

Beacon control relays



Description

The **TB-3** type Beacon control system is in charge of the supervision, control and transmission of anomalies detected in the different Beacon components of the telephony transmission towers.

TB-3 Features:

- Start-up control and measurement of the consumption of a single Beacon circuit: group of 1, 2 or 3 75W/230V or 15W/230Vac lamps.
- Inputs for a twilight photocell. The photocell will be supplied with the unit and is connected with the corresponding terminals (+ and - inputs of the photocell).
- Adjustments of the **TB-3**
  - Power of the 15 to 225 W lamp circuit.
  - Light level between 200 and 1000 lux.
- Relay output used to signal alarms.

Application

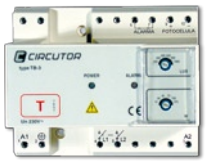
Simple unit used to control and supervise a simple Beacon circuit, in addition to the supervision of the photocell's operation.

Features

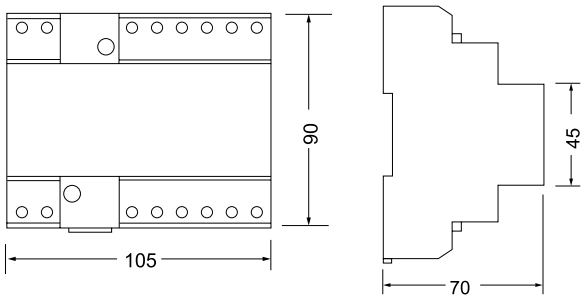
Power supply circuit	
Voltage (A1-A2)	230 Vac (± 20 %)
Frequency	50 ... 60 Hz
Consumption of the unit	5 V·A
Consumption of lamps	225 W maximum
Beacon lamps	
Power ratings	15, 30, 45, 75, 150, 225 W
Accuracy	± 10 %
Type of measurement	True root mean square
Light level	
Scales	200, 300, 400, 600, 800, 1000 lx
Accuracy	± 10 %
Inputs and outputs	
Photocell input	Photocell (+) (-)
Beacon lamp outputs	Power supply: 230 Vac (± 20 %)
Alarm relay output	Nominal switching current: 0.5 Aac Nominal switching voltage: 200 VacInsulation voltage between the coil and contacts: 2500 Vac
Insulation	
Dielectric rigidity (between the housing and terminals)	2500 Vac, 50 Hz, 1 min
Build features	
Type of box	Modular, self-extinguishing plastic material
Connection	Metallic terminals for "posidriv" screws
Fixing	DIN rail
Dimensions	6 modules
Degree of protection	Embedded relay : IP 41; Terminals: IP 20
Ambient conditions	
Operating temperature	-10 ... +50 ºC
Standards	
IEC 255-5, UNE 801-2, UNE 801-3, UNE 801-4, UNE 60730-1	

TB-3

Beacon control relays



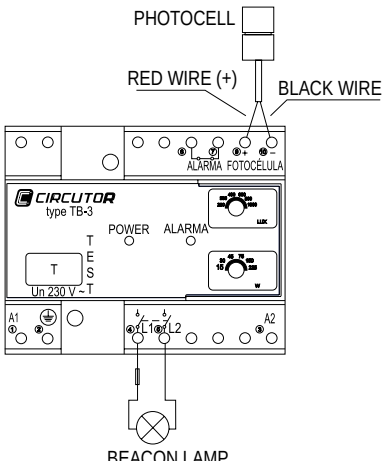
Dimensions



References

Description	Type	Code
Power can be programmed between 15 ... 225 W Control of 1 circuit (Beacon)Control of the light level with the photocell supplied with the unit. 1 alarm relay to detect faults in the circuit or photocell	**TB-3**	**P30102**

Connections



WI

Current detector control relay

Description

The **WI** current detectors are electronic devices with an output relay that is connected or disconnected, in accordance with the level of current detected in the circuit.

- The trip level is adjusted with the potentiometer on the front of the unit.
- The reset process is automatic with currents under 10% of the trip level (Hysteresis).
- Delay: the connection and disconnection times of the output relay can be adjusted separately.
- Measurement of the current, depending on the type:
  - With built-in current transformer (net diameter ∅ 25 mm)
  - Separate transformer, input.../5 Aac

Application

WIs can be used in any application that needs to control the load:

- Power supply units for grinders or aggregate grinding units.
- Loads in extrusion machines
- Pump control
- Load on motors, etc.

Features

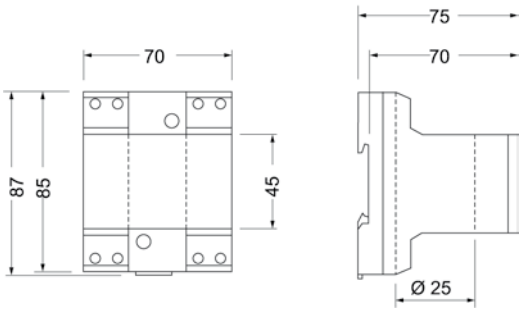
Power supply circuit	
Voltage*	230 Vac (-15 ... +10 %)
Frequency*	50 Hz
Consumption	2 VA
Testing voltages between the circuits and the grid	
Measurement circuit	2,500 V
Relay contacts	1,500 V
Output relay	
Insulation voltage (U_i)	250 Vac
Thermal current I_{th}	5 A
Interrupting power	(10^5 operations) with resistive load U_e/I_e: 240 Vac / 3.2 A with inductive load U_e/I_e: 240 Vac / 0.8 A 30 Vdc / 1.6 A
Build features	
Fixing	DIN rail
Dimensions	4 modules
Weight	250 g
Degree of protection	IP 41
Operating temperature	0 ... +50 º C
Standards	
IEC 605, IEC 1010-1, EN 61010-1, EN 50 081, EN 50 082, IEC 255, UL 94, UNE 20 607, UNE 21 136, VDE 0110	

(*) Other voltages and frequencies on demand.

WI

Current detector control relay

Dimensions

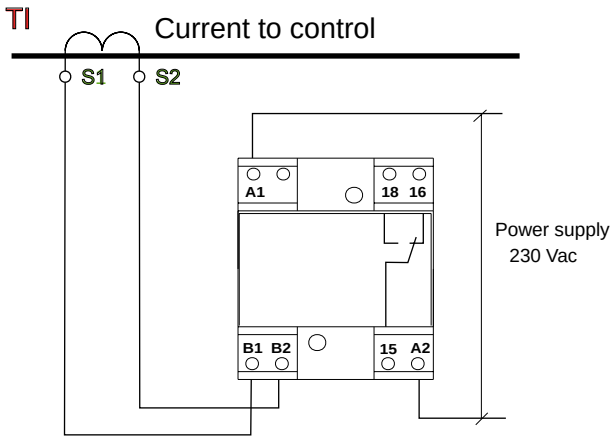


References

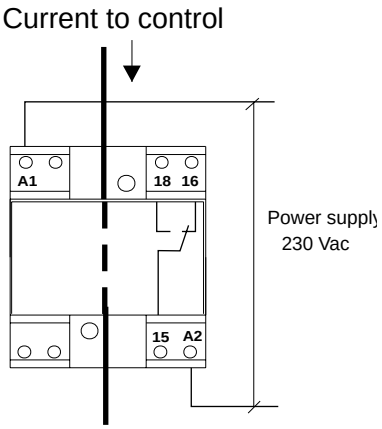
Trigger time (adjustable)	Adjustment margin (adjustable)	Type	Code
0.5 ... 30 s	0.5 ... 5 A	**WI / 005-30**	**P32011**
0.5 ... 30 s	1 ... 10 A	**WI / 010-30**	**P32012**
0.5 ... 30 s	2 ... 20 A	**WI / 020-30**	**P32013**
0.5 ... 30 s	5 ... 50 A	**WI / 050-30**	**P32014**
0.5 ... 30 s	10 ... 100 A	**WI / 0100-30**	**P32015**
0.5 ... 30 s	s / transformer ... / 5 A	**WI / TS**	**P32010**

Connections

With separate transformer

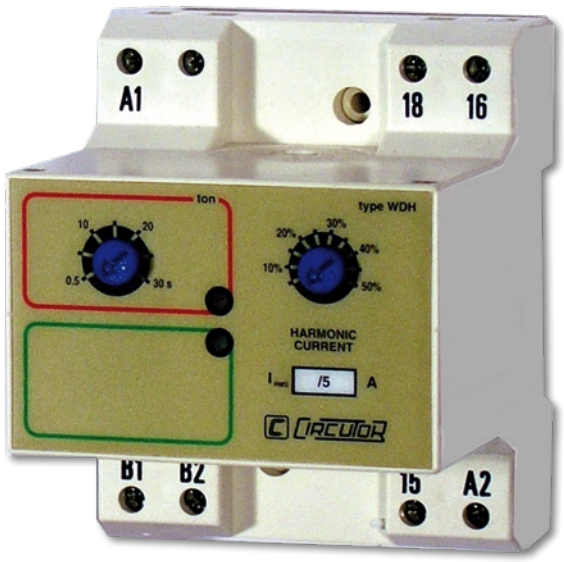


With built-in transformer



WDH

Harmonics detector control relay



Description

WDH harmonics detectors are electronic devices with an output relay that is connected when the harmonics current level measured in the circuit exceeds a threshold that can be adjusted.

- It monitors and acts in accordance with the true root mean square of the total harmonic current in a phase. The trigger level is adjusted with the potentiometer on the front of the unit.
- Delay: the output relay activation time can be adjusted (up to 30 s).
- The reset process is automatic with currents under 10% of the trip level (Hysteresis).
- Current measurement, depending on the type:
  - With built-in current transformer (net diameter ∅ 25 mm)
  - Separate transformer, input.../5 Aac

Application

The **WDH** current detectors are mainly used to protect transformers, capacitor banks, etc. In general, any receiver subject to harmonic overloads

Features

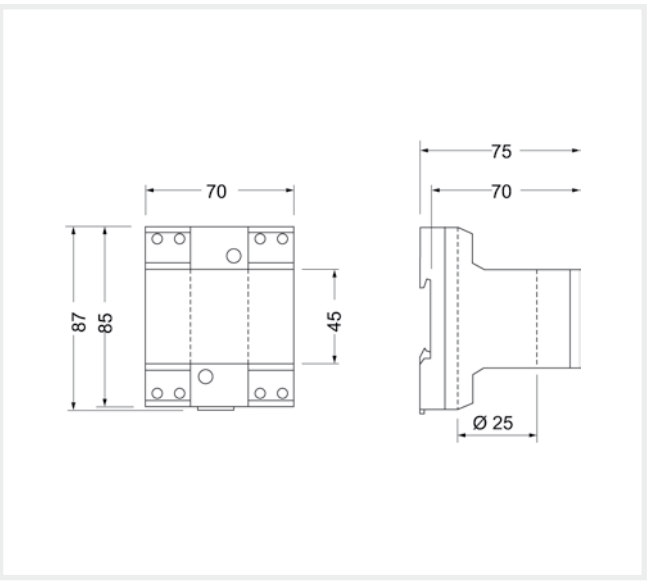
Power supply circuit	
Voltage*	230 Vac (-15 ... +10 %)
Frequency*	50 Hz
Consumption	2 VA
Testing voltages between the circuits and the grid	
Measurement circuit	2,500 V
Relay contacts	1,500 V
Output relay	
Insulation voltage (U_i)	250 Vac
Thermal current I_{th}	5 A
Interrupting power	(10^5 operations) with resistive load U_e/I_e: 240 Vac / 3.2 A with inductive load U_e/I_e: 240 Vac / 0.8 A 30 Vdc / 1.6 A
Build features	
Fixing	DIN rail
Dimensions	4 modules
Weight	250 g
Degree of protection	IP 41
Operating temperature	0 ... +50 º C
Standards	
IEC 605, IEC 1010-1, EN 61010-1, EN 50 081, EN 50 082, IEC 255, UL 94, UNE 20 607, UNE 21 136, VDE 0110	

(*) Other voltages and frequencies on demand.

WDH

Harmonics detector control relay

Dimensions

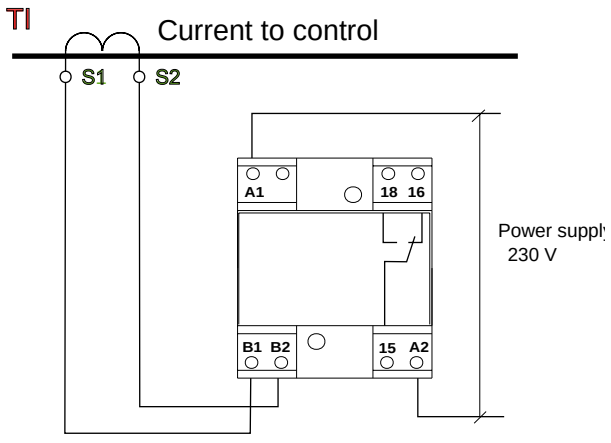


References

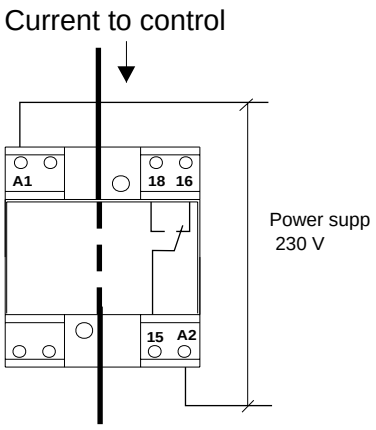
Trigger time (adjustable)	Nominal current I_n	Type	Code
0.5 ... 30 s	10 A	**WDH / 010-30**	**P32022**
0.5 ... 30 s	20 A	**WDH / 020-30**	**P32023**
0.5 ... 30 s	50 A	**WDH / 050-30**	**P32024**
0.5 ... 30 s	s / transformer ... / 5 A	**WDH / TS**	**P32020**

Connections

With separate transformer

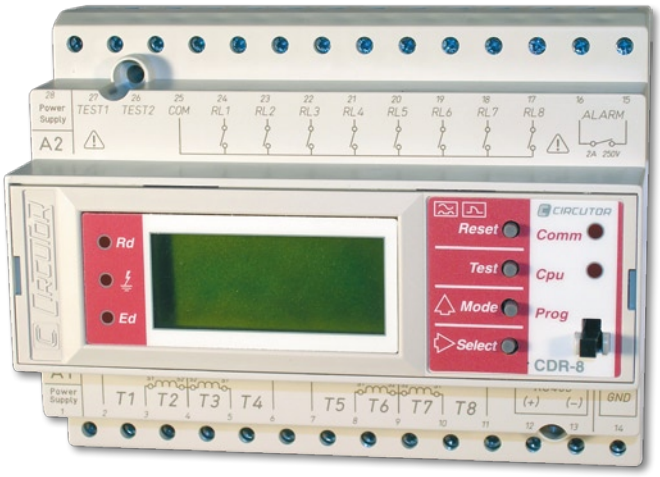


With built-in transformer



CDR-8

Current relay station



Description

The **CDR-8** unit measures, calculates and displays the current of 8 independent channels. Each channel can be configured as an earth leakage or current relay. It measures the true root mean square, taking decisions about the operations being carried out. It can work as a maximum or minimum current relay or as an earth leakage relay.

The **CDR-8** can show the earth leakage current and status of the operations relay of each of the 8 channels on an LCD display.

Application

This unit can be used to measure and control the current of up to 8 lines, with a set of reduced dimensions

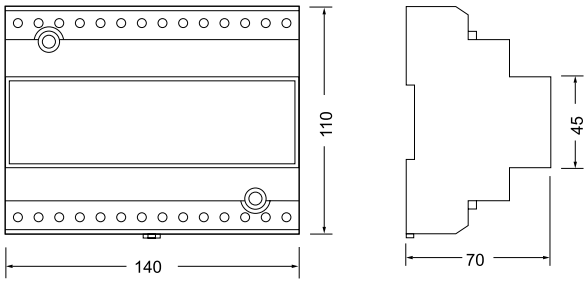
Features

Power supply	
Auxiliary power supply	230 Vac (-15 ... +20 %)
Output contacts	Configurable contact NO/NC 250 Vac, 5 A
Number of channels	8
Class in earth leakage mode	A (superimmunized)
Measurement	True root mean square. Accuracy: 5 %
Current threshold / Sensitivity	With transformer, **WG** Series: Programmable 0.03...6 A With transformer, **WGP** Series: Programmable 0.3..0.60 A
Delay	Inverse curve: instantaneous or selective Time defined: 0,1 ... 10 s
Earth leakage transformer	External, **WG/WGP**
Test and Reset	With keys
Associated circuit breaker	Minimum coil or emission trip
Automatic reclosing	
Number of earth leakage reclosures	Programmable: 0 ... 10
Time between reclosures	Programmable: 1 ... 900 s
Partial counter reset time	Double the reclosing time
Relay signaling	
LED	Trip LED, permanent: Protection trigger Trip LED, flashing: Pre-alarm CPU LED: Indicates the presence of voltage Ed LED: Interlocked earth leakage reclosing Rd LED: Self-reclosing enabled Comm LED: Relay communications through RS-485
Display	Indicator of the level of current in each channel Indicator of the status of each channel (ON-OFF)
Remote signaling (Outputs)	
Contacts	Configurable output NO/NC for the pre-alarm indicator
Communications	RS-485. *PowerStudio* supervision and remote control **Software**
Circuit breaker control	
Output contacts	Configurable contact NO/NC 250 Vac, 5 A
Ambient conditions	
Operating temperature	-10 ... +50 ºC
Build features	
Fixing	DIN rail
Dimensions	8 modules

CDR-8

Current relay station

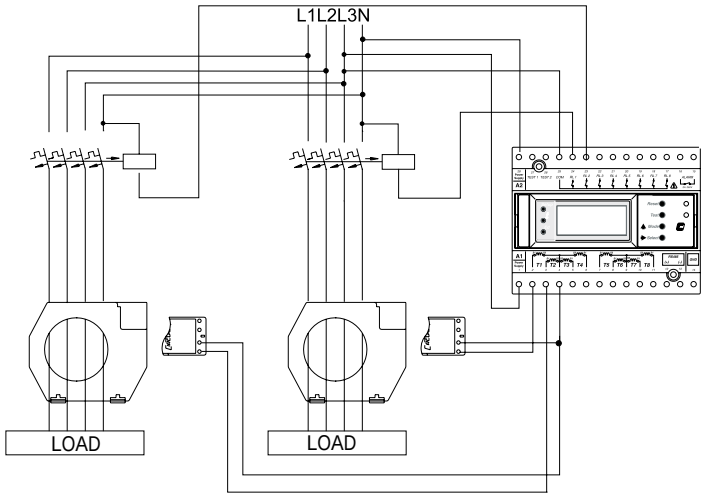
Dimensions



References

Size	Indicator	No. of reclosures	Time between reclosures	Type	Code
8 modules	LED and display	Prog.: 0 ... 10	Prog.: 1 ... 900 s	**CDR-8**	**P32111**

Connections



Relation between products and accessories

	WG	WGP
CDR-8 		
	Earth leakage transformers, **WG**	Earth leakage transformers, **WG**
	See P1	See P1

MPRB

Overload protection relays for substations

Description

The **MPRB** relay and **MPTA** transformers represent a three-phase protection system that protects transformers and medium voltage distribution stations from overloads.

A sequence of triggered impulses interrupts the supply system with a switch or circuit breaker. These impulses are generated by the **MPRB** relay when the overload lasts for a determined period of time.

The high protection degree (IP 67) of the relay and transformer box encapsulated in resin offers a series of excellent features for work under adverse conditions.

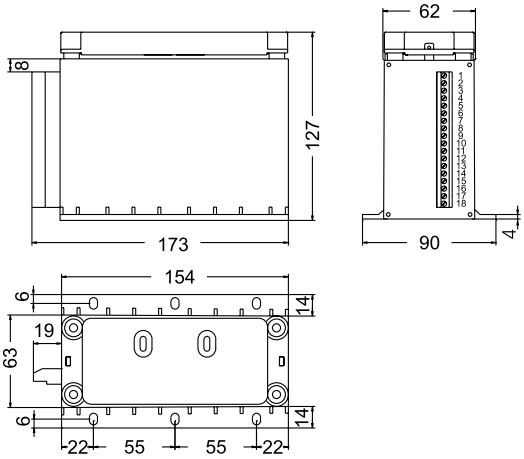
Features

Auxiliary power supply	
Voltage	230 Vac (± 20 %)
Power rating	5.6 V·A
Frequency	50 ... 60 Hz
Measurement circuit	
Adjustable start-up current I_n	0.3 / 0.39 / 0.51 / 0.66 A
Power, depending on the current	0.3 A: 1.95 V·A 0.39 A: 2.65 V·A 0.51 A: 3.75 V·A 0.66 A: 5.25 V·A
Frequency	50 ... 60 Hz
Current read error	±7,5 %
Maximum current during one second	I = 100 I_n ; I_n (0.3 A)
Exterior trigger with external self-powering system	
Voltage	230 Vac (± 20 %)
Power rating	0.25 V·A
Frequency	50 ... 60 Hz
Exterior trigger with self-powering system	Starting on 80 % I_n
Output relay characteristics	
Transistor	24 V Impulse train (coil of the external switch 100 µF, 24 Vdc)
Ambient conditions	
Operating temperature	-40 ... +85 ºC
Build features	
Dimensions	173 x 90 x 127 mm
Degree of protection	IP 67
Standards	
IEC 801-2/3/4, IEC 255	

MPRB

Overload protection relay

Dimensions



Features

	MPRB-96-1-25	MPRB-99-1
Equipment with microprocessor technology	●	●
5 trip curves	●	●
Calculation of the current values in RMS for most of the overload range	●	●
Overload measurement ranges, from 1 I_n to 11.82 I_n	●	●
Display of the trip cause (**Trip Ext** and **Trip I_n**)	●	●
Display of the timer start-up (I_n > , I_O> / I_n)	●	●
Display of the auxiliary power supply (this guarantees the exterior trip)	●	●
Exterior trip with 230 Vac and delay	●	●
Delay of the external trigger to avoid unwanted tripping	●	●
Repetition of trigger impulses while the current is not interrupted through the transformers	●	●
System test through the testing coils of the transformer	●	●
With external power supply: 16 adjustments of the fault earthed current from 0.1 to 1.2 I_O > / I_n		●
With external power supply, 15 delay adjustments of the fault earthed current, from 50 ms to 120 s		●
Fault earthed current function can be cancelled		●

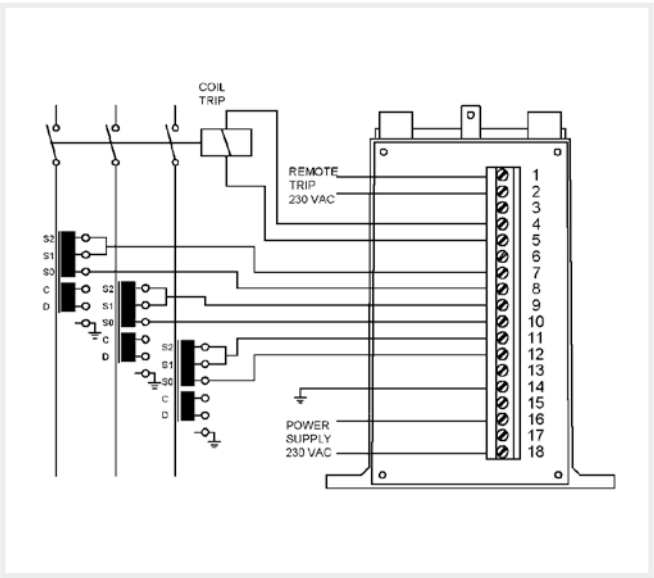
Current selection table

MPRB +					
MPTA-96-14-90			MPTA-93-117-737		
Selection I_n	**CT 1 | S0 - S1**	**CT 1 | S0 - S1**	**Selection I_n**	**CT 2 | S0 - S1**	**CT 2 | S0 - S1**
I_n a	14.4 A	41.1 A	**I_n a**	117.4 A	335 A
I_n b	18.7 A	53.4 A	**I_n b**	152.7 A	436 A
I_n c	24.3 A	69.5 A	**I_n c**	198.5 A	566 A
I_n d	31.6 A	90.3 A	**I_n d**	258 A	737 A

MPRB

Overload protection relay

Connections



References

Description	Type	Code
With homopolar protection (only **MPRB-99-1**) Three-phase overload protection relay Current range, depending on the **MPTA** Programmable, up to 5 trip curves Optional: detection of current in the same relay The auxiliary power supply can be adjusted between self-powered or 230 Vac	**MPRB-96-1-25**	**P40101**
	MPRB-99-1.0	**P40102**

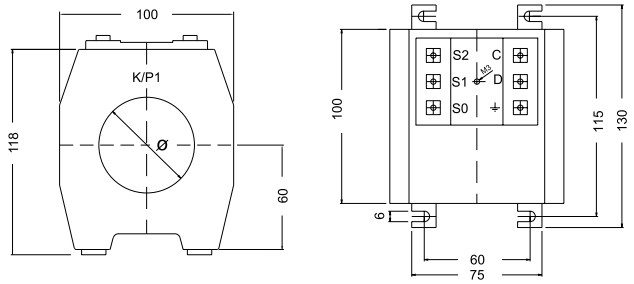
MPTA

Overload protection transformer

References

Diameter (mm)	Adjustable current (A)	Type	Code
42	14 ... 90	**MPTA96-14-90**	**P40201**
55	117 ... 737	**MPTA96-117-737**	**P40202**

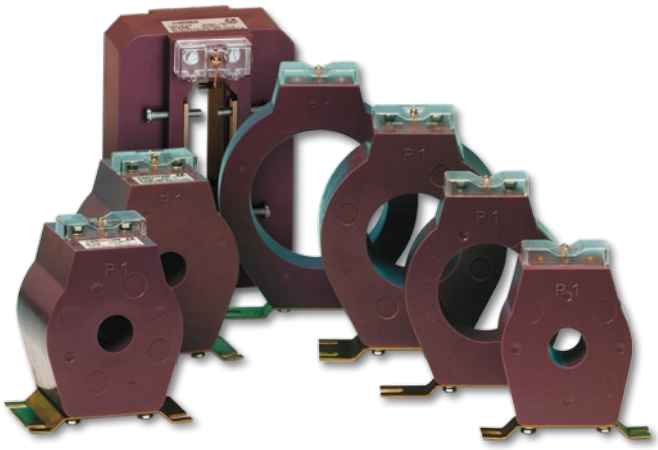
Dimensions



Type	Ø diameter (mm)
MPTA96-14-90	42
MPTA96-117-737	55

TRP

Protection transformers encapsulated in resin

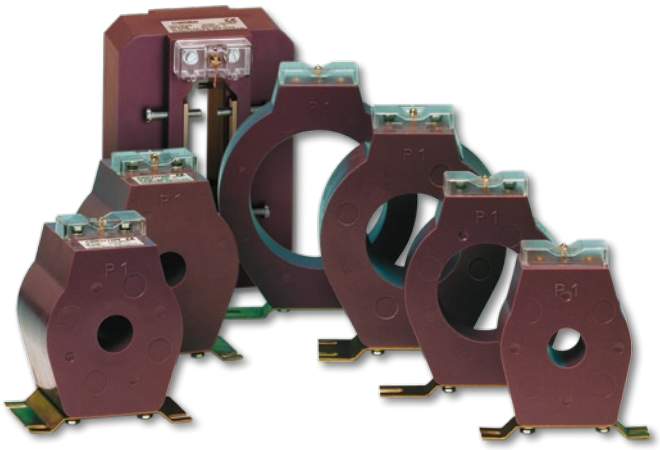


References

Tipo		TRP 40				TRP 60				
Ø inner		40				60				
Flat strip		Busbar				Busbar				
	a	205				229				
	b	160				190				
	c	93				110				
A	V·A	Code	Weight (kg)	Code	Weight (kg)	V·A	Code	Weight (kg)	Code	Weight (kg)
		5P10		5P20			5P10		5P20	
100/5	5	P50311	5,0	P50211	9,0	-	-	-	-	-
150/5	5	P50312	5,0	P50212	9,0	2,5	P50321	2,6	P50221	4,2
200/5	10	P50313	5,0	P50213	9,0	2,5	P50322	2,7	P50222	4,2
250/5	10	P50314	5,0	P50214	9,0	5	P50323	2,7	P50223	4,3
300/5	15	P50315	5,1	P50215	9,1	5	P50324	2,7	P50224	4,7
400/5	20	P50316	5,1	P50216	9,2	7,5	P50325	2,8	P50225	4,9
500/5	25	P50317	5,2	P50217	9,3	10	P50326	2,8	P50226	5,1
600/5	-	-	-	-	-	10	P50327	2,9	P50227	5,2
750/5	-	-	-	-	-	15	P50328	3,0	P50228	5,3
1 000/5	-	-	-	-	-	20	P50329	3,2	P50229	5,5

TRP

Protection transformers encapsulated in resin

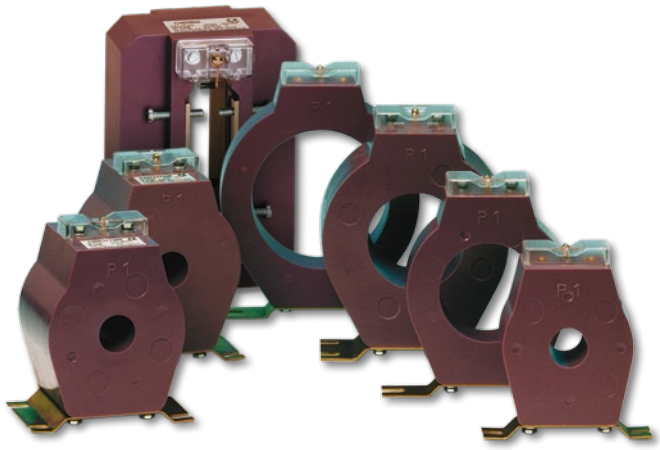


References

Type	TRP 80					Type	TRP 100				
inner Ø	80					inner Ø	100				
Flat strip	Busbar					Flat strip	Busbar				
c b a	a 205					c b a	a 230				
	b 160						b 190				
	c 93						c 96				
A	V·A	Code	Weight (kg)	Code	Weight (kg)	A	V·A	Code	Weight (kg)	Code	Weight (kg)
		5P10		5P20				5P10		5P20	
250/5	5	P50331	3,2	P50231	5,6	750/5	5	P50341	3,4	P50241	5,6
300/5	5	P50332	3,3	P50232	5,7	1 000/5	7,5	P50342	3,4	P50242	5,8
400/5	7,5	P50333	3,3	P50233	5,8	1 200/5	10	P50343	3,4	P50243	5,9
500/5	10	P50334	3,4	P50234	5,9	1 500/5	10	P50344	3,5	P50244	6,1
600/5	10	P50335	3,5	P50235	6,1	1 600/5	15	P50345	3,6	P50245	6,2
800/5	15	P50336	3,6	P50236	6,2	2 000/5	15	P50346	3,7	P50246	6,4
1 000/5	20	P50337	3,7	P50237	6,3	2 500/5	15	P50347	3,9	P50247	6,8
1 200/5	25	P50338	3,8	P50238	6,6	3 000/5	20	P50348	4,3	P50248	7,3
1 500/5	30	P50339	4,0	P50239	6,9	-	-	-	-	-	-
1 600/5	30	P5033A	4,1	P5023A	7,1	-	-	-	-	-	-
1 800/5	35	P5033B	4,2	P5023B	7,2	-	-	-	-	-	-

TRP

Protection transformers encapsulated in resin



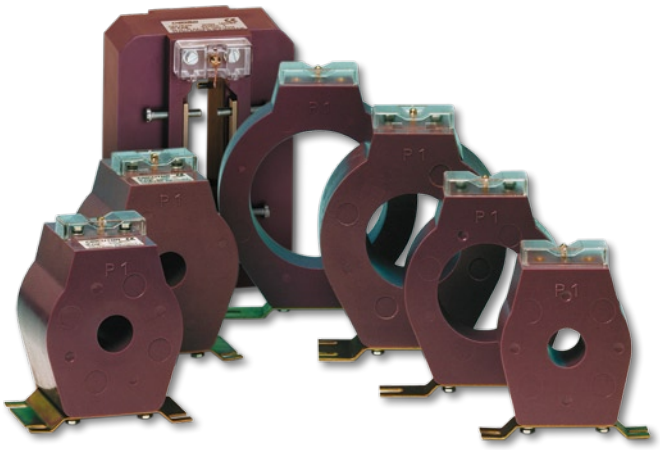
References

Type		TRP 140				TRP 180				
inner Ø		140				180				
Flat strip		Busbar				Busbar				
	a	272				308				
	b	223				223				
	c	98				98				
A	V·A	Code	Weight (kg)	Code	Weight (kg)	V·A	Code	Weight (kg)	Code	Weight (kg)
		5P10		5P20			5P10		5P20	
1 000/5	5	P50351	3,7	P50251	6,2	-	-	-	-	-
1 200/5	-	-	-	-	-	-	-	-	-	-
1 250/5	5	P50352	3,8	P50252	6,4	-	-	-	-	-
1 500/5	10	P50353	3,9	P50253	6,6	5	P50361	4,5	P50261	7,6
2 000/5	10	P50354	4,2	P50254	7,1	7,5	P50362	4,5	P50262	7,6
2 500/5	10	P50355	4,5	P50255	7,5	10	P50363	5,0	P50263	8,5
3 000/5	15	P50356	4,6	P50256	8,0	10	P50364	5,2	P50264	8,9
4 000/5	15	P50357	5,2	P50257	8,9	15	P50365	5,7	P50265	9,7
5 000/5	-	-	-	-	-	15	P50366	6,2	P50266	10,6

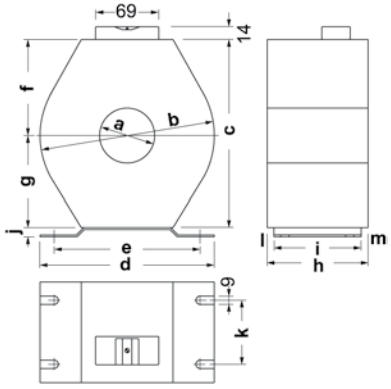
Type		TRP 400				
inner Ø		100 x 20				
Flat strip		Busbar				
	a	154				
	b	108				
	c	65				
A	V·A	Code	Weight (kg)	V·A	Code	Weight (kg)
		10 P10			5 P10	
750/5	7,5	P50371	2,1	5	P50271	2,1
800/5	7,5	P50372	2,2	5	P50272	2,2
1 000/5	10	P50373	2,4	10	P50273	2,4
1 200/5	10	P50374	2,4	10	P50274	2,4
1 500/5	15	P50375	2,6	10	P50275	2,6
2 000/5	20	P50376	2,7	15	P50276	2,7

TRP

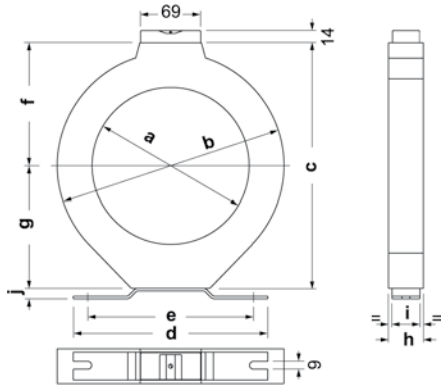
Protection transformers encapsulated in resin



Dimensions

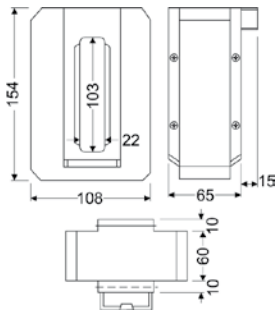


Type	a	b	c	d	e	f	g	h	i	j	k	l	m
TRP 40	40	160	181	160	135	91	90	93	86	10	60	5	2
TRP 60	60	160	181	160	135	91	90	93	86	10	60	5	2
TRP 80	80	160	181	160	135	91	90	93	86	10	60	5	2
TRP 100	100	181	204	190	159	104	100	96	95	12	70	0,5	0,5



Type	a	b	c	d	e	f	g	h	i	j
TRP 140	140	223	246	223	190	123	122	98	90	12
TRP 180	180	260	282	223	190	142	140	98	90	12

TRP 400



TRM

Measurement transformers encapsulated in resin

References

Type		TRM 30				TRM 40			TRM 60		
inner Ø		30				40			60		
Flat strip		Busbar				Busbar			Busbar		
	a	147				168			178		
	b	110				135			135		
	c	50				38			36		
A		Power (V·A) Class 0,5	1	Code	Weight (kg)	Power (V·A) Class 0,5	Code	Weight (kg)	Power (V·A) Class 0,5	Code	Weight (kg)
75/5		-	2	P50101	1,2	-	-	-	-	-	-
100/5		-	5	P50102	1,1	-	-	-	-	-	-
150/5		-	5	P50103	1,1	5	P50111	1,3	-	-	-
200/5		10	-	P50104	1,2	7,5	P50112	1,3	-	-	-
250/5		15	-	P50105	1,2	10	P50113	1,2	5	P50121	1,0
300/5		20	-	P50106	1,3	15	P50114	1,3	7,5	P50122	1,2
400/5		25	-	P50107	1,2	20	P50115	1,3	10	P50123	1,2
500/5		-	-	-	-	25	P50116	1,2	15	P50124	1,3
600/5		-	-	-	-	30	P50117	1,2	20	P50125	1,3
800/5		-	-	-	-	35	P50118	1,3	25	P50126	1,4
1 000/5		-	-	-	-	-	-	-	30	P50127	1,4
1 200/5		-	-	-	-	-	-	-	35	P50128	1,5

TRM

Measurement transformers encapsulated in resin

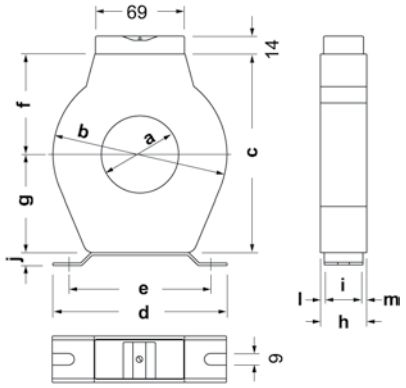
References

Type		TRM 80			TRM 100			TRM 140			TRM 180		
inner Ø		80			100			140			180		
Flat strip		Busbar			Busbar			Busbar			Busbar		
	a	178			228			271			308		
	b	135			175			223			223		
	c	36			38			40			40		
A		Power (V·A) Class 0.5	Code	Weight (kg)	Power (V·A) Class 0.5	Code	Weight (kg)	Power (V·A) Class 0.5	Code	Weight (kg)	Power (V·A) Class 0.5	Code	Weight (kg)
500/5		5	P50131	0,9	-	-	-	-	-	-	-	-	-
600/5		7,5	P50132	0,9	-	-	-	-	-	-	-	-	-
750/5		10	P50133	0,9	15	P50141	1,6	-	-	-	-	-	-
1 000/5		15	P50134	0,9	20	P50142	1,7	15	P50151	2,1	-	-	-
1 250/5		-	-	-	20	P50143	1,7	20	P50152	2,2	15	P50161	1,7
1 500/5		20	P50135	1,0	20	P50144	1,6	25	P50153	2,2	20	P50162	1,8
2 000/5		25	P50136	1,0	20	P50145	1,7	30	P50154	2,3	20	P50163	1,9
2 500/5		30	P50137	1,2	20	P50146	1,8	35	P50155	2,3	20	P50164	2,0
3 000/5		-	-	-	25	P50147	1,9	35	P50156	2,5	20	P50165	2,5
4 000/5		-	-	-	-	-	-	35	P50157	3,0	20	P50166	3,0
5 000/5		-	-	-	-	-	-	-	-	-	20	P50167	4,0

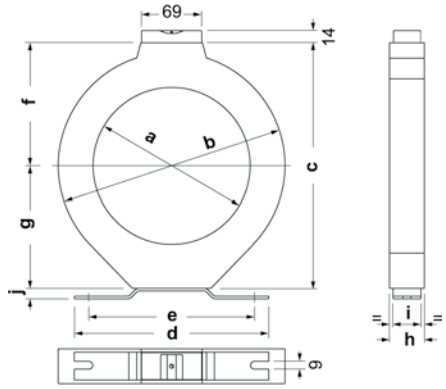
TRM

Measurement transformers encapsulated in resin

Dimensions



Type	a	b	c	d	e	f	g	h	i	j	l	m
TRM 30	30	105	123	110	98	63	60	50	28	10	4	18
TRM 40	40	125	144	135	110	73	71	38	30	10	1,5	6,5
TRM 60	60	135	154	135	110	78	76	36	30	10	3	3
TRM 80	60	135	154	135	110	78	76	36	30	10	3	3



Type	a	b	c	d	e	f	g	h	i	j
TRM 100	100	181	204	175	144	104	100	38	30	10
TRM 140	140	223	245	223	190	123	122	40	32	12
TRM 180	180	260	282	223	190	142	140	40	32	12