MV Instrument Transformers

Current transformer
Voltage transformer

Catalogue

2006

a brand of Schneider Electric

Merlin Gerin

The Guiding System, the new way to create your electrical installations

A comprehensive offer of products with consistent design

The Guiding System is first and foremost a Merlin Gerin product offer covering all electrical distribution needs. However, what makes all the difference is that these products have been designed to operate together: mechanical and electrical compatibility, interoperability, modularity, communication.
Thus the electrical installation is both optimised and more efficient: better continuity of supply, enhanced safety for people and equipment, guaranteed upgradeability, effective monitoring and control.

Tools to simplify design and implementation

With the Guiding System, you have a comprehensive range of tools - the Guiding Tools - that will help you increase your product knowledge and product utilisation. Of course this is in compliance with current standards and procedures.
These tools include technical booklets and guides, design aid software, training courses, etc. and are regularly updated.

The Guiding System, combined with the know-how and creativity, allows optimised, reliable, open-ended and standard compliant installations

For a genuine partnership with you

Because each electrical installation is unique, there is no standard solution. With the Guiding System, the variety of combinations allows for genuine customisation solutions. You can create and implement electrical installations to meet your creative requirements and design knowledge.
You and Merlin Gerin's Guiding System form a genuine partnership.

For more details on the Guiding System, consult www.merlin-gerin.com

A consistent design of offers from Medium Voltage to Ultra terminal

All Merlin Gerin offers are designed according to electrical, mechanical and communication consistency rules.
The products express this consistency by their overall design and shared ergonomics.

Discrimination guarantees co-ordination between the operating characteristics of serial-connected circuit-breakers. Should a fault occurs downstream, only the circuit-breaker placed immediately upstream from the fault will trip.

Electrical consistency:

Each product complies with or enhances system performance at co-ordination level: breaking capacity, Isc, temperature rise, etc. for more safety, continuity of supply (discrimination) or economic optimisation (cascading).
The leading edge technologies employed in Merlin Gerin's Guiding System ensure high performance levels in discrimination and cascading of protection devices, electrodynamic withstand of switches and current distributors, heat loss of devices, distribution blocks and enclosures.
Likewise, inter-product ElectroMagnetic Compatibilty (EMC) is guaranteed.

Prefabricated and tested solutions, upstream and downstream from the device complying with the IEC 60439-1 switchboard standard.

Mechanical consistency:

Each product adopts dimensional standards simplifying and optimising its use within the system.
It shares the same accessories and auxiliaries and complies with global ergonomic choices (utilisation mode, operating mode, setting and configuration devices, tools, etc.) making its installation and operation within the system a simpler process.

Transparent Ready

Thanks to the use of standard Web technologies, you can offer your customers intelligent Merlin Gerin switchboards allowing easy access to information: follow-up of currents, voltages, powers, consumption history, etc.

Communication consistency:

Each product complies with global choices in terms of communication protocols (Modbus, Ethernet, etc.) for simplified integration in the management, supervision and monitoring systems.

Guiding Tools for more efficient design and implementation of your installations.

SM6

Medium voltage switchboard system from 1 to 36 kV

Sepam

Protection relays

Masterpact

Protection switchgear from 100 to 6300 A

Trihal

MV/LV dry cast resin transformer from 160 to 5000 kVA

Evolis

MV vacuum switchgear and components from 1 to 24 kV.

The Technical guide

These technical guides help you comply with installation standards and rules i.e.:
The electrical installation guide, the protection guide, the switchboard implementation guide, the technical booklets and the co-ordination tables all form genuine reference tools for the design of high-performance electrical installations.
For example, the LV protection co-ordination guide - discrimination and cascading - optimises choice of protection and connection devices while also increasing markedly continuity of supply in the installations.

CAD software and tools

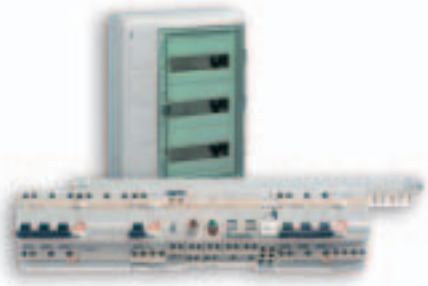
The CAD software and tools enhance productivity and safety.
They help you create your installations by simplifying product choice through easy browsing in the Guiding System offers.
Last but not least, they optimise use of our products while also complying with standards and proper procedures.

Compact

Protection switchgear system
from 100 to 630 A

Multi 9

Modular protection switchgear
system up to 125 A



Prisma Plus

Functional system for electrical
distribution switchboards
up to 3200 A

Pragma
Enclosures for
distribution
switchboards
up to 160 A

Canalis
Prefabricated Busbar
Trunking
from 25 to 4000 A

PowerLogic
Power
management

Training

Training allows you to acquire the Merlin Gerin expertise (installation design, work with power on, etc.) for increased efficiency and a guarantee of improved customer service.
The training catalogue includes beginner's courses in electrical distribution, knowledge of MV and LV switchgear, operation and maintenance of installations, design of LV installations to give but a few examples.

Guiding TOOLS

merlin-gerin.com

This international site allows you to access all the Merlin Gerin products in just 2 clicks via comprehensive range data-sheets, with direct links to:
- complete library: technical documents, catalogs, certificates, FAQs, brochures…
- selection guides from the e-catalog.
- product discovery sites and their Flash animations.

You will also find illustrated overviews, news to which you can subscribe, a discussion forum, the list of country contacts…

The technical guide

These technical guides help you comply with installation standards and rules i.e.:
the electrical installation guide, the protection guide, the switchboard implementation guide, the technical booklets and the co-ordination tables all form genuine reference tools for the design of high performance electrical installations.
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Contents

Presentation

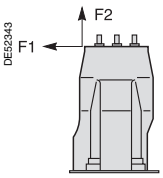
The Merlin Gerin range of instrument transformers is designed for voltages from 0.72 kV to 36 kV and rated currents from 5 A to 4000 A.
In order to meet requirements for increasingly high short circuit current values in installations, current transformers notably have a short-time thermal current of 60 kA x 1 second.
All Merlin Gerin instrument transformers are in conformity with IEC standards.
■ Current transformers can specifically meet requirements for:
□ accuracy classes "TPS - TPX - TPY - TPZ" defined by standards IEC 60044-6 relative to recommendations concerning transformer behavior during transient short circuit conditions
□ Standard IEC 60079-7 / EN 50.019 concerning enhanced safety electrical equipment for explosive gaseous atmospheres
■ Through their standardized configuration, their high electrical performance levels, their reduced weight and space requirement, these devices are particularly well suited for use with:
□ LSC2B type cubicles (metal clad)
□ LSC2A type cubicles (compartmented)
□ large motor terminals
□ explosive gaseous atmosphere environments (Eex).

Conformity with standards

All Merlin Gerin instrument transformers are in conformity with IEC standards, sections 2099 - 2134, and recommendations 60044-1/IEC 60044-2.
Transformers in conformity with specific country standards can also be supplied (AS 1675 - AS 1243, IEEE C57.13, BS7626 - BS7625, NFC 42502 - NFC 42501, VDE 0414 …).

Main features

The active part (windings and magnetic core) are fully encapsulated in a block of epoxy resin which has two main functions:
■ guaranteeing both internal and external electrical insulation of the device
■ providing enhanced mechanical strength.
■ The continuous quality of products is a result of both thirty years experience in manufacturing resin-insulated instrument transformers, but also the use of **epoxy-silica resin** which gives:
■ high dielectric strength, even at high temperatures (18 kV/mm at 180 °C for 20.000 hours)
■ insulation class B according to IEC 60044-1
■ high aging resistance, both thermal, resulting from increase in temperature of structures according to IEC 216 (more than 20 years at 120°C), and surface through salt mist withstand
■ lack of emissions of any harmful substances in the case of fire, in conformity with IEC standards IEC 60020-37, IEC 60020-22 and ASTM D 3286.
■ outstanding behavior in tropical climates
■ high mechanical strength, even at high service temperatures (Martens point of over 105 °C).



Forces applied non-simultaneously up to 100 °C
F1 = 500 daN
F2 = 300 daN

Rigorous production procedures enable:
■ sulfur bubbles to be avoided in the resin by vacuum molding
■ a partial discharge value with a low time constant, also due to the quality of insulating materials used
■ high resistance and very good electrical conductivity at the primary and secondary terminals, even at temperatures reached during short circuit, due to mechanical crimping
■ the consistency of production parameters over time, through a computer controlled system which manages and monitors the whole production line.

Presentation (cont.)

Quality is the result of scheduling and monitoring at each stage, from initial design through to production and testing, and right through to final delivery and after sales service.
This is expressed in terms of execution in conformity with the quality certification.
This procedure allows us to supply a product that has all of the specified characteristics and also to provide the customer with a production and execution schedule that guarantees product quality.

Certified quality system

Merlin Gerin's quality guarantee is certified in documents that are available on request:

- documents explaining the company's quality policy
- a schedule for each stage of each product's execution
- the continuous assessment of indicators checking all possible quality faults during the production process
- a set of technical/quality documents providing proof of what has happened throughout the production and testing processes so as to guarantee the required quality level.

The production process applies standardized methods for Quality Assurance and Control.
Quality Control plans ensure that the defined procedures are applied to the product, from testing through to delivery of equipment used in production right through to final production.
The initial phases of product design and industrialization are also subject to Quality Certification procedures.

As a subsidiary of Schneider Electric, the Merlin Gerin quality system is certified by the CSQ

The CSQ (independent certification organization for quality management systems) has certified Merlin Gerin's quality to be in conformity with IEC standard - EN 29001 (ISO 9001), which require a company to implement a comprehensive quality assurance system covering all aspects from product definition through to after sales service.

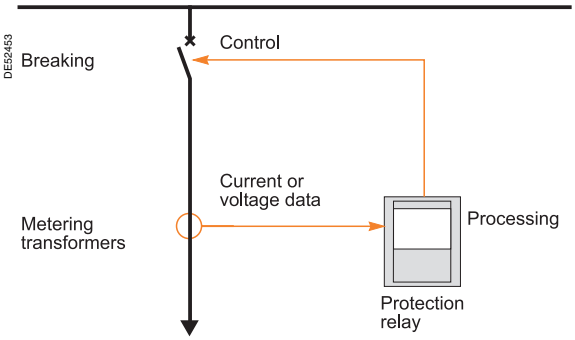
Applications and types

Protection or metering devices have to receive data on electrical values (current or voltage) from the equipment to be protected. For technical, economic and safety reasons, this data cannot be obtained directly on the equipment's MV power supply; we have to use intermediary sensors:
- *current transformers*
- *voltage transformers.*

These devices carry out the functions of:
- *reducing the size of value to be measured*
- *providing galvanic separation*
- *supplying the power needed to process the data, or even for the protection device to work.*

Metering transformer applications

In MV electrical distribution, the high current and voltage values mean that they cannot be used directly by metering or protection units.
Instrument transformers are necessary to provide values that can be used by these devices which can be:
- analogue devices, directly using the supplied signal
- digital processing units with a microprocessor, after analogue/digital conversion of the input signal (e.g.: Sepam or Power Logic System).



Example of a metering transformer application in a protection system.

Types

Instrument transformers are of the following types:

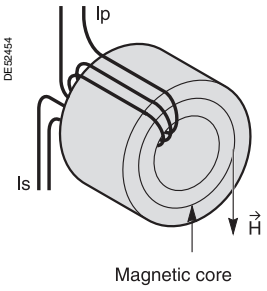
Current transformers

Connected on the MV network primary circuit, they supply a reduced current value to the secondary circuit, proportional to the network current on which they are installed.
There are two types:
- CT: current transformer
- LPCT (Low Power Current Transformer): electronic current transformers.

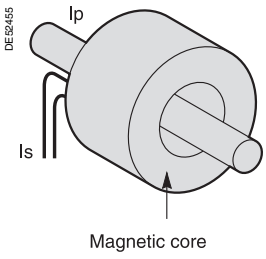
Voltage transformers

Connected to the MV network primary, they supply the secondary circuit with a reduced voltage value, proportional to the network voltage on which they are installed.

Current transformers (CT) meet standard IEC 60044-1.
Their function is to supply the secondary circuit with a current that is proportional to that of the MV circuit on which they are installed.
The primary is series-mounted on the MV network and subject to the same over-currents as the latter and withstands the MV voltage.
The secondary generally has one of its terminals connected to earth.
***The secondary must never be in an open circuit** (short circuit).*



Wound type primary current transformer.



Closed core type current transformer.

Current transformers

Current transformers have two basic functions:
- adapting the MV current value at the primary to the characteristics of the metering or protection devices by supplying a secondary current with a reduced, but proportional current value
- isolating power circuits from the metering and/or protection circuit.

Composition and types

A current transformer comprises a primary circuit and a secondary circuit connected via a magnetic core and an insulating coating system in epoxy-silica, in the case of Merlin Gerin transformers.
The device is of the following type:
- wound: when the primary and the secondary have a coil wound on the magnetic circuit
- slip-over: primary made up of a conductor that is not insulated from the installation
- core: primary made up of an insulated cable.

Characteristics

These are defined in standard IEC 60044-1.

Insulation
Characterized by the rated voltage:
- of the insulation, which is that of the installation (e.g.: 24 kV)
- of the power frequency withstand 1 mn (e.g.: 50 kV)
- of the impulse withstand (e.g.: 125 kV).

Rated frequency
50 or 60 Hz.

Rated primary current (Ipn)
Rms value of the maximum continuous primary current. Usual values are 25, 50, 75, 100, 200, 400, 600 A.

Rated secondary current (Isn)
This is equal to 1 A or 5 A.

Rated transformation ratio
Kn = I rated primary / I rated secondary (e.g.: 100 A / 5 A)

Short-time thermal current Ith - 1 second
This characterizes the thermal withstand under short circuit conditions for 1 second. It is expressed in kA or in a multiple of the rated primary current (e.g.: 80 x Ipn) for 1 second.
The value for a **duration that is different to 1 second** is given by:
$I'th = Ith/\sqrt{2}$
For example 16 kA - 1 s is equivalent for 2 s to $I'th = 16 \times \sqrt{2} = 22.6$ kA.

Selection guide
Technical description (cont.)

Characteristics (cont.)

Short-time thermal current peak value
This value is standardized from Ith - 1 s at:
- IEC: 2.5 Ith at 50 Hz and 2.6 Ith at 60 Hz
- ANSI: 2.7 Ith at 60 Hz.

Accuracy load
The value of the load on which is based the metered current accuracy conditions.

Accuracy power Pn
Apparent power (VA) that the CT can supply on the secondary for the rated secondary current for which the accuracy is guaranteed (accuracy load).
Usual value 5 - 7.5 - 10 - 15 VA (IEC)

Accuracy class
Defines the limits of error guaranteed on the transformation ratio and on the phase shift under the specified conditions of power and current. Classes **0.5** and **1** are used for metering class **P** for protection.

Current error ε (%)
Error that the transformer introduces in the measurement of a current when the transformation ratio is different from the rated value.

Phase shift or phase error ψ (minute)
Difference in phase between the primary and secondary currents, in angle minutes.

Table of current transformer characteristics

Characteristics	Rated values				
Rated voltage (kV)	7.2	12	1.5	24	36
Insulation level: ■ power frequency withstand (kV) 1 mn ■ lightning impulse withstand (kV - peak)	 20 60	 28 75	 38 95	 50 125	 70 170
Frequency (Hz)	50 - 60				
Primary current Ipn (A)	25 - 50 - 75 - 100 - 200 - 400 - 600...				
Short-time thermal current Ith (1 s)	12.5 - 16 - 20 - 25 - 31.5 - 40 - 50 kA or 40 - 80 - 100 - 200 - 300 x In				
Secondary current Isn (A)	1 - 5				
Accuracy power Pn (VA)	2.5 - 5 - 7.5 - 10 - 15				

Selection guide
Technical description (cont.)

The choice of CT is decisive in order for the overall metering or protection system to work properly.

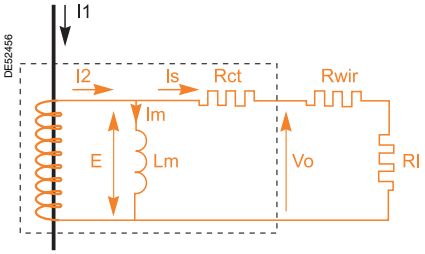
CT operation

Importance of CT selection

The operating accuracy of metering or protection devices depends directly on the CT accuracy.

Operating principle

A CT often has a load that is quite resistive (Rc + its wiring), as shown in the schematic diagram below.

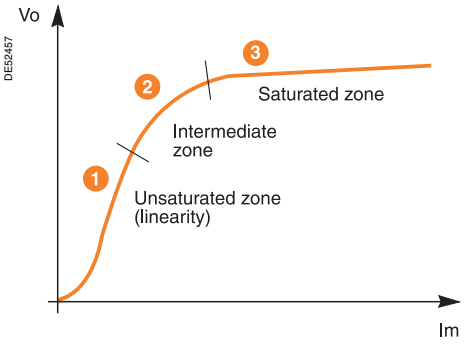


Schematic diagram for a current transformer
I1: primary current.
I2 = Kn I1: secondary current for a perfect CT.
Is: secondary current actually flowing through the circuit.
Im: magnetizing current.
E: induced electromotive force.
Vo: output voltage.
Lm: magnetization inductance (saturable) equivalent to the CT.
Rtc: resistance at the CT secondary.
Rfil: resistance of the connection wiring.
Rc: load resistance.

Current I2 is a perfect image of the primary current I1 in the transformation ratio. However, the actual output current (Is) is subject to an error due to the magnetization current (Im).

$\vec{I_2} = \vec{I_s} + \vec{I_m}$ if the CT was perfect, we would have Im = 0 and Is = I2.

A CT has a unique magnetization curve (for a given temperature and frequency). With the transformation ratio, this characterizes its operation.
This magnetization curve (voltage Vo, magnetizing current function Im) can be divided into 3 zones:
1 - non-saturated zone: Im is low and the voltage Vo (and therefore Is) increases virtually proportionately to the primary current.
2 - intermediary zone: there is no real break in the curve and it is difficult to situate a precise point corresponding to the saturation voltage.
3 - saturated zone: the curve becomes virtually horizontal; the error in transformation ratio is high, the secondary current is distorted by saturation.



Magnetization curve (excitation) for a CT.
Output voltage as a function of the magnetizing current.
Vs = f (Im)

Metering CT or protection CT

We have to choose a CT with characteristics that are suited to its application.

Metering CT

This requires good accuracy (linearity zone) in an area close to the **normal service current**; it must also protect metering devices from high currents by saturating earlier.

Protection CT

This requires good accuracy at **high currents** and will have a higher precision limit (linearity zone) for protection relays to detect the protection thresholds that they are meant to be monitoring.

Selection guide
Technical description (cont.)

Feasibility of a CT

We can define the over-current coefficient of the CT:

$$Ksi = \frac{Ith\ 1s}{Ipn}$$

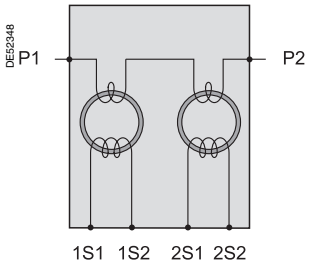
The lower Ksi, the easier the CT is to produce with a given volume, compatible with being integrated in a MV cubicle. A high Ksi leads to over-dimensioning of the CT and makes it difficult to produce.

Ksi order of magnitude	CT production
Ksi < 100	Standard
100 < Ksi < 300	Sometimes difficult for certain secondary characteristics
300 < Ksi < 400	Difficult
400 < Ksi < 500	Limited to certain secondary characteristics
Ksi > 500	Sometimes impossible.

CT connection

CT with a double (or triple) secondary

A CT can have one or two, and more rarely three, secondaries for the chosen application (protection and/or measurement).



Principle of a CT with 2 secondaries (2 windings in the same module) and markings of the input and output terminals.

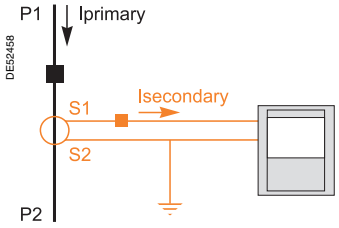
Safety

The CT secondary is used at low impedance (virtually in short circuit). **The secondary circuit should never be left open**, since this would mean connecting across an infinite impedance. Under these conditions, hazardous voltages for personnel and equipment may exist across the terminals.

Terminal marking

CT connection is made to the terminals identified according to the IEC:

- P1 and P2 on the MV side
- S1 and S2 on the corresponding secondary. In the case of a double output, the first output is identified by 1S1 and 1S2, the second by 2S1 and 2S2.



Current transformer shwing the terminals.

Selection guide
Technical description (cont.)

CT's for metering must have the right accuracy for the rated current.
They are characterized by their accuracy class (generally 0.5 or 1) as well as a safety factor Fs.

Example: 400/5 A, 15 VA, cl 0.5, FS 10

- 400/5 A: primary current / secondary current
- 15 VA: accuracy power (see explanation in example)
- cl 0.5: accuracy class
- FS 10: safety factor

Accuracy class according to application

Application	Class
Laboratory measurement	0.1 - 0.2
Accurate metering (calibration devices)	
Industrial metering	0.5 - 1
Billing metering	0.2 - 0.5 - 0.2S - 0.5S
Switchboard indicators statistical metering	0.5 - 1

Error limits according to the accuracy class

Accuracy class	% rated primary current	Current error ± %		Phase shift error ± mn	
			for S		for S
0.2 / 0.2S	1 (0.2S alone)		0.75		30
	5	0.75	0.35	30	15
	20	0.35	0.2	15	10
	100	0.2	0.2	10	10
	120	0.2	0.2	10	10
0.5 / 0.5S	1 (0.5S alone)		1.5		90
	5	1.5	0.75	90	45
	20	0.75	0.5	45	30
	100	0.5	0.5	30	30
	120	0.5	0.5	30	30
1	5	3		180	
	20	1.5		90	
	100	1		60	
	120	1		60	

CT for metering

Accuracy class
A metering CT is designed to send as accurate an image as possible of currents below **120 %** of the rated primary.
IEC standard 60044-1 determines the maximum error in the accuracy class for the phase and for the module according to the indicated operating range (see "error limits" table opposite).
These accuracy values must be guaranteed by the manufacturer for a secondary load of between 25 and 100 % of the accuracy power.
The choice of accuracy class is related to the application (table opposite).
The usual accuracy class is 0.5. there are metering classes of 0.2S and 0.5S specifically for metering applications.

Safety factor: FS
In order to protect the metering device connected to the CT from high currents on the MV side, instrument transformers must have early saturation characteristics.
The limit primary current (Ipl) is defined for which the current error in the secondary is equal to 10 %. The standard then defines the Safety Factor FS.

$$FS = \frac{Ipl}{Ipn}$$ (preferred value: **10**)

This is the multiple of the rated primary current from which the error becomes greater than 10 % for a load equal to the accuracy power.

Example of a metering CT
Metering CT **200/5 A, 15 VA, cl. 0.5, FS 10**
- rated primary current 200 A
- rated secondary current 5 A
- rated transformation ratio 200/5 A
- accuracy power 15 VA
- accuracy class 0.5.

The table or error limits given for class 0.5 for a primary current:
- between 100 % and 120 % of the rated current (here 200 A to 240 A), a current error ±0.5 % and the phase shift error of ±30 mn.
- at 20 % (here 40 A) the error imposed by the standard is less than or equal to 0.75 %
- between 20 % and 100 % of the rated current the standard does not give the metering point and the maximum error is between 0.5 and 0.75 %, with a normally permitted linear variation between these two points
- safety factor FS = 10

For a primary current greater than 10 times the rated current, in other words here 2000 A, we will have a metering error > 10 % if the load is equal to the accuracy load; for a load less than this we can still be in the linear part of the magnetization curve.

Selection guide
Technical Description (cont.)

CT's for protection must have suitable accuracy for fault currents. They are characterized by their accuracy class (generally 5P) and the accuracy limit factor FLP.

Example: 400/5 A, 15 VA, 5P10

CT for protection

Accuracy class

A protection CT is designed to send as reliable an image as possible of the **fault current** (overload or short circuit). The accuracy and the power are suited to these currents and different from those for metering applications.
IEC standard 60044-1 determines the maximum error for each accuracy class in the phase and in the module according to the indicated operating range.

Error limits according to the accuracy class

Accuracy class	Combined error for the accuracy limit current	Current error between Ipn and 2Ipn	Phase shift error for the rated current
5P	5 %	±1 %	±60 mn
10P	10 %	±3 %	no limit

For example for class 5P the maximum error is ⩽ ±5 % at the accuracy limit current and ⩽ ±1 % at the rated current.

Standardized classes are 5P and 10P. The choice depends on the application. The accuracy class is always followed by the accuracy limit factor.

Accuracy class according to application

Application	Class
Zero sequence protection differential protection	5P
Impedance relay amperemetric protection	5P - 10P

Accuracy limit factor: FLP

A protection CT must saturate at sufficiently high currents to enable sufficient accuracy in the measurements of fault currents by the protection device whose operating threshold can be very high.
We define the limit primary current (Ipl) for which current errors and phase shift errors in the secondary do not exceed values in the table opposite.
The standard then defines the accuracy limit factor FLP.

$$FLP = \frac{Ipl}{Ipn}$$ (standardized values: **5 - 10 - 15 - 20 - 30**)

In practice this corresponds to the linearity limit (saturation curve) of the CT.

Example

Protection CT: **100/5 A, 7.5 VA, 5P20**.
- rated primary current 100 A
- rated secondary current 5 A
- rated transformation ratio 100/5 A
- accuracy power 7.5 VA
- accuracy class 5P.

Under a load corresponding to the accuracy power of 7.5 VA, the error limit table gives an error ⩽ ±1 % and ±60 mn at Ipn (100 A).
- accuracy limit factor 20.

At a load corresponding to the accuracy power, the error ⩽ ±5 %.

Selection guide
Using the order forms

The tables on the following pages allow you to define the current transformer reference that corresponds to the necessary and required characteristics, and to place your order.
The selection factors enabling you to find the reference you require are explained in the example given below for a DIN type metering CT, in reference to the previous definitions.

Network insulation 12 kV

Rated primary current 75 A and secondary output 5 A

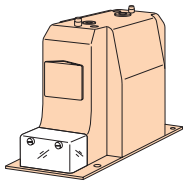
Short-time thermal current, MV side 31.5 A - 1s

Power supplied to the secondary 15 VA. Accuracy class 0.5 defines the metering error limits
The safety factor is < 10

Mark the quantity to be ordered

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power, accuracy class, safety factor FS	Type	Reference	Quantity
Ur 12 kV Ud 28 kV - 1 mn Up 75 kV peak	50 / 5	12.5	15 VA cl. 0.5 Fs < 10	AD12	**03811366N0**	
		16		AD12	**03811368N0**	
	75 / 5	25		AD12	**03811371N0**	
		31.5		AD12	**03811373N0**	
fr 50/60 Hz	100 / 5	25		AD12	**03811376N0**	
		31.5		AD12	**03811378N0**	
	200 / 5	25		AD12	**03811380N0**	
		31.5		AD12	**03811382N0**	
		40		AD12	**03811384N0**	
	400 / 5	40		AD12	**03811386N0**	
	600 / 5	50	20 VA cl. 0.5 Fs < 10	AD12	**03811388N0**	
	750 / 5	50		AD12	**03811390N0**	
	1000 / 5	50	30 VA cl. 0.5 Fs < 10	AD13	**03811392N0**	
	1250 / 5	50		AD13	**03811394N0**	

DE52428 DE52429



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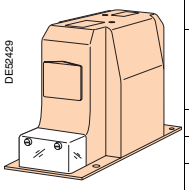


AD13N1

(dimensions page 6.23)

Calculating the power (VA)

Indicative metering consumptions

Device		Max consumption in VA (per circuit)
Ammeter	Electromagnetic	3
	Electronic	1
Transducer	Self-powered	3
	External powered	1
Meter	Induction	2
	Electronic	1
	Wattmeter, varmeter	1

Indicative protection consumption

Device	Max consumption in VA (per circuit)
Static over-current relay	0.2 to 1
Electromagnetic over-current relay	1 to 8

Indicative secondary cabling consumption

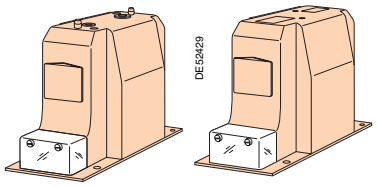
Cables (mm^2)	Consumption (VA/m)	
	1 A	5 A
2.5	0.008	0.2
4	0.005	0.13
6	0.003	0.09
10	0.002	0.05

Selection and order form
DIN standard 12 kV CT - Single and double secondary

Single secondary metering CT

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power, accuracy class, safety factor FS	Type	Reference	Qty
Ur 12 kV **Ud 28 kV - 1 mn** **Up 75 kV peak** **fr 50/60 Hz**	50 / 5	12.5	15 VA cl. 0.5 Fs < 10	AD12/N1	**03811366N0**	
		16		AD12/N1	**03811368N0**	
	75 / 5	25		AD12/N1	**03811371N0**	
		31.5		AD12/N1	**03811373N0**	
	100 / 5	25		AD12/N1	**03811376N0**	
		31.5		AD12/N1	**03811378N0**	
	200 / 5	25		AD12/N1	**03811380N0**	
		31.5		AD12/N1	**03811382N0**	
		40		AD12/N1	**03811384N0**	
	400 / 5	40		AD12/N1	**03811386N0**	
	600 / 5	50	20 VA cl. 0.5 Fs < 10	AD12/N1	**03811388N0**	
	750 / 5	50		AD12/N1	**03811390N0**	
	1000 / 5	50	30 VA cl. 0.5 Fs < 10	AD13/N1	**03811392N0**	
	1250 / 5	50		AD13/N1	**03811394N0**	

DE52428 DE52429



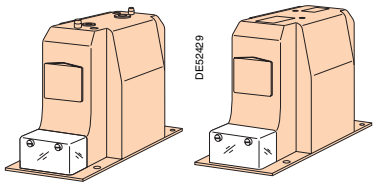
AD12 **AD13**

Dimensions page 23

Single secondary protection CT

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power and accuracy class (possible double use)	Type	Reference	Qty
Ur 12 kV **Ud 28 kV - 1 mn** **Up 75 kV peak** **fr 50/60 Hz**	50 / 5	12.5	15 VA 5P10 - 7.5 VA 5P20	AD12/N1	**03811367N0**	
		16		AD12/N1	**03811369N0**	
		25	7.5 VA 5P10	AD12/N1	**03811370N0**	
	75 / 5	25	15 VA 5P10 - 7.5 VA 5P10	AD12/N1	**03811372N0**	
		31.5	7.5 VA 5P10	AD12/N1	**03811374N0**	
		40		AD12/N1	**03811375N0**	
	100 / 5	25	15 VA 5P10 - 7.5 VA 5P20	AD12/N1	**03811377N0**	
		31.5		AD12/N1	**03811379N0**	
		40	7.5 VA 5P10	AD12/N1	**03811839N0**	
	200 / 5	25	15 VA 5P10 - 7.5 VA 5P20	AD12/N1	**03811381N0**	
		31.5		AD12/N1	**03811383N0**	
		40		AD12/N1	**03811385N0**	
	400 / 5	40		AD12/N1	**03811387N0**	
	600 / 5	50		AD12/N1	**03811389N0**	
	750 / 5	50		AD12/N1	**03811391N0**	
	1000 / 5	50	10 VA 5P20	AD13/N1	**03811393N0**	
	1250 / 5	50		AD13/N1	**03811395N0**	

DE52428 DE52429



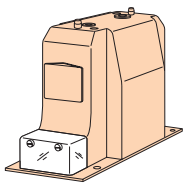
AD12 **AD13**

Dimensions page 23

Double secondary metering and protection CT

Insulation level Frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Metering secondary: power, accuracy class, safety factor FS	Metering secondary: power and accuracy class (possible dual usage)	Type	Reference	Qty
Ur 12 kV **Ud 28 kV - 1 mn** **Up 75 kV peak** **fr 50/60 Hz**	50 / 5-5	12.5	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	AD12/N2	**03811396N0**	
		16			AD12/N2	**03811397N0**	
	75 / 5-5	16			AD12/N2	**03811398N0**	
		25			AD12/N2	**03811399N0**	
	100 / 5-5	25			AD12/N2	**03811400N0**	
		31.5			AD12/N2	**03811401N0**	
	200 / 5-5	25	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	AD12/N2	**03811402N0**	
		31.5			AD12/N2	**03811403N0**	
		40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	AD12/N2	**03811404N0**	
	400 / 5-5	40	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	AD12/N2	**03811405N0**	
	600 / 5-5	50	20 VA cl. 0.5 Fs < 10		AD12/N2	**03811406N0**	
	750 / 5-5	50			AD12/N2	**03811407N0**	
	1000 / 5-5	50	30 VA cl. 0.5 Fs < 10	10 VA 5P20	AD13/N2	**03811408N0**	
	1250 / 5-5	50			AD13/N2	**03811409N0**	

DE52428



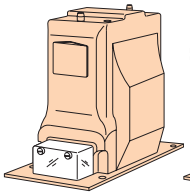
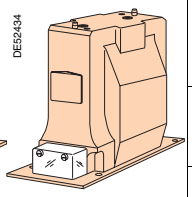
AD12

Dimensions page 23

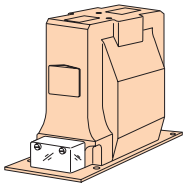
Selection and order form
DIN standard 24 kV CT- Single secondary

Single secondary metering CT

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power, accuracy class, safety factor FS	Type	Reference	Qty
Ur 24 kV **Ud 50 kV - 1 mn** **Up 125 kV peak** **fr 50/60 Hz**	25 / 5	16	15 VA cl. 0.5 Fs < 10	AD22/N1	**03811410N0**	
		20		AD22/N1	**03811413N0**	
	50 / 5	20		AD21/N1	**03811416N0**	
		20		AD22/N1	**03811419N0**	
		20		AD22/N1	**03811421N0**	
	75 / 5	16		AD21/N1	**03811424N0**	
		25		AD21/N1	**03811427N0**	
		31.5		AD21/N1	**03811430N0**	
		40		AD22/N1	**03811433N0**	
	100 / 5	25		AD21/N1	**03811436N0**	
		31.5		AD21/N1	**03811439N0**	
		40		AD22/N1	**03811442N0**	
	200 / 5	25		AD21/N1	**03811443N0**	
		31.5		AD21/N1	**03811445N0**	
		40		AD21/N1	**03811447N0**	
	400 / 5	40		AD21/N1	**03811450N0**	
	600 / 5	50	20 VA cl. 0.5 Fs < 10	AD21/N1	**03811452N0**	
	750 / 5	50		AD21/N1	**03811454N0**	
	1000 / 5	50	30 VA cl. 0.5 Fs < 10	AD23/N1	**03811456N0**	
	1250 / 5	50		AD23/N1	**03811458N0**	
	1500 / 5	50		AD23/N1	**03811460N0**	
	2000 / 5	50		AD23/N1	**03811462N0**	
	2500 / 5	50		AD23/N1	**03811464N0**	

DE52430 
DE52434 

AD21 **AD22**

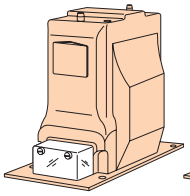
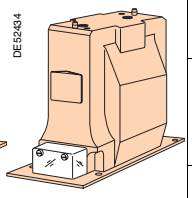
DE52433 

AD23

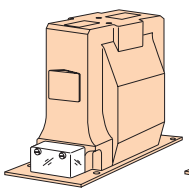
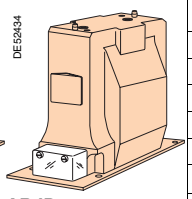
Dimensions page 23

Single secondary protection CT

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power and accuracy class (possible double use)	Type	Reference	Qty
Ur 24 kV **Ud 50 kV - 1 mn** **Up 125 kV peak** **fr 50/60 Hz**	25 / 5	16	7.5 VA 5P10	AD22/N1	**03811411N0**	
		16	15 VA 5P10 - 7.5 VA 5P20	ARJD/N1	**03811412N0**	
		20	7.5 VA 5P10	AD22/N1	**03811414N0**	
		20	15 VA 5P10 - 7.5 VA 5P20	ARJD/N1	**03811415N0**	
	50 / 5	20	7.5 VA 5P10	AD21/N1	**03811417N0**	
		16	15 VA 5P10 - 7.5 VA 5P20	AD22/N1	**03811418N0**	
		20		AD22/N1	**03811420N0**	
		20		ARJD/N1	**03811422N0**	
		20	7.5 VA 5P10	ARJD/N1	**03811423N0**	
	75 / 5	16		AD21/N1	**03811425N0**	
		16	15 VA 5P10 - 7.5 VA 5P20	AD22/N1	**03811426N0**	
		25	7.5 VA 5P10	AD21/N1	**03811428N0**	
		25	15 VA 5P10 - 7.5 VA 5P20	AD22/N1	**03811429N0**	
		31.5	7.5 VA 5P10	AD21/N1	**03811431N0**	
		31.5	15 VA 5P10 - 7.5 VA 5P20	AD22/N1	**03811432N0**	
		40	7.5 VA 5P10	AD22/N1	**03811434N0**	
		40	15 VA 5P10 - 7.5 VA 5P20	ARJD/N1	**03811435N0**	
	100 / 5	25	7.5 VA 5P10	AD21/N1	**03811437N0**	
		25	15 VA 5P10 - 7.5 VA 5P20	AD22/N1	**03811438N0**	
		31.5	7.5 VA 5P10	AD21/N1	**03811440N0**	
		31.5	15 VA 5P10 - 7.5 VA 5P20	AD22/N1	**03811441N0**	
	200 / 5	25		AD21/N1	**03811444N0**	
		31.5		AD21/N1	**03811446N0**	
		40	7.5 VA 5P10	AD21/N1	**03811448N0**	
		40	15 VA 5P10 - 7.5 VA 5P20	AD22/N1	**03811449N0**	
	400 / 5	40		AD21/N1	**03811451N0**	
	600 / 5	50		AD21/N1	**03811453N0**	
	750 / 5	50		AD21/N1	**03811455N0**	
	1000 / 5	50	10 VA 5P20	AD23/N1	**03811457N0**	
	1250 / 5	50		AD23/N1	**03811459N0**	
	1500 / 5	50	15 VA 5P20	AD23/N1	**03811461N0**	
	2000 / 5	50		AD23/N1	**03811463N0**	
	2500 / 5	50		AD23/N1	**03811465N0**	

DE52430 
DE52434 

AD21 **AD22**

DE52433 
DE52434 

AD23 **ARJD**

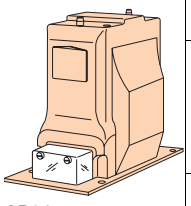
Dimensions page 23

Selection and order form
DIN standard 24 kV CT - Double secondary

Double secondary metering and protection CT

Insulation level Frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Metering secondary: power, accuracy class, safety factor FS	Metering secondary: power and accuracy class (possible dual usage)	Type	Reference	Qty
Ur 24 kV **Ud 50 kV - 1 mn** **Up 125 kV peak** **fr 50/60 Hz**	25 / 5-5	16	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	AD22/N2	**03811466N0**	
		20			ARJD/N2	**03811467N0**	
	50 / 5-5	16			AD21/N2	**03811468N0**	
		16		15 VA 5P10 - 7.5 VA 5P20	ARJD/N2	**03811469N0**	
		25		7.5 VA 5P10	AD22/N2	**03811470N0**	
		25	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJD/N2	**03811471N0**	
		31.5	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARJD/N2	**03811472N0**	
	75 / 5-5	16	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	AD21/N2	**03811473N0**	
		25			AD21/N2	**03811474N0**	
		31.5	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	AD22/N2	**03811475N0**	
		31.5	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJD/N2	**03811476N0**	
		40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARJD/N2	**03811477N0**	
	100 / 5-5	25	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	AD21/N2	**03811478N0**	
		31.5	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	AD21/N2	**03811479N0**	
		31.5	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	AD22/N2	**03811480N0**	
		40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	AD22/N2	**03811481N0**	
		40	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJD/N2	**03811482N0**	
	200 / 5-5	31,5			AD21/N2	**03811483N0**	
		40			AD21/N2	**03811484N0**	
		40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	AD21/N2	**03811485N0**	
		40	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	AD22/N2	**03811486N0**	
	400 / 5-5	40			AD21/N2	**03811487N0**	
	600 / 5-5	40	20 VA cl. 0.5 Fs < 10		AD21/N2	**03811488N0**	
	750 / 5-5	40			AD21/N2	**03811489N0**	
	1000 / 5-5	40	30 VA cl. 0.5 Fs < 10		AD23/N2	**03811490N0**	
	1250 / 5-5	40			AD23/N2	**03811491N0**	
	1500 / 5-5	40			AD23/N2	**03811492N0**	
	2000 / 5-5	40			AD23/N2	**03811493N0**	
	2500 / 5-5	40			AD23/N2	**03811494N0**	

DE52430



AD21

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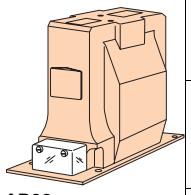

AD23

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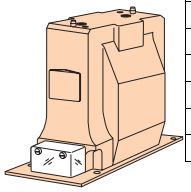

ARJD

Dimensions page 23

Selection and order form
24 kV primary conductor support CT - Single secondary

Single secondary metering CT

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power, accuracy class, safety factor FS	Type	Reference	Qty
Ur 24 kV **Ud 50 kV - 1 mn** **Up 125 kV peak** **fr 50/60 Hz**	25 / 5	16	15 VA cl. 0.5 Fs < 10	ARJM2/N1J	**03811495N0**	
		25		ARJM2/N1J	**03811498N0**	
	50 / 5	16		ARJP1/N1J	**03811501N0**	
		25		ARJM2/N1J	**03811504N0**	
		31.5		ARJM2/N1J	**03811507N0**	
	75 / 5	25		ARJP1/N1J	**03811510N0**	
		31.5		ARJP1/N1J	**03811513N0**	
		40		ARJM2/N1J	**03811516N0**	
	100 / 5	25		ARJP1/N1J	**03811519N0**	
		31.5		ARJP1/N1J	**03811522N0**	
		40		ARJM2/N1J	**03811525N0**	
	200 / 5	25		ARJP1/N1J	**03811526N0**	
		31.5		ARJP1/N1J	**03811528N0**	
		40		ARJP1/N1J	**03811530N0**	
	400 / 5	40		ARJP1/N1J	**03811533N0**	
	600 / 5	50	20 VA cl. 0.5 Fs < 10	ARJP1/N1J	**03811535N0**	
	750 / 5	50		ARJP1/N1J	**03811537N0**	
	1000 / 5	50	30 VA cl. 0.5 Fs < 10	ARJP3/N1J	**03811539N0**	
	1250 / 5	50		ARJP3/N1J	**03811541N0**	
	1500 / 5	50		ARJA1/N1J	**03811543N0**	
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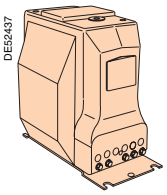

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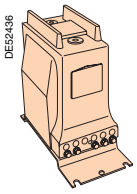

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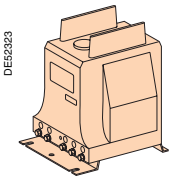
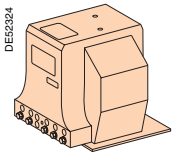


ARJP3

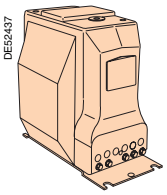


ARJA1

Dimensions page 24

Single secondary protection CT

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power and accuracy class (possible double use)	Type	Reference	Qty
Ur 24 kV **Ud 50 kV - 1 mn** **Up 125 kV peak** **fr 50/60 Hz**	25 / 5	16	7.5 VA 5P10	ARJM2/N1J	**03811496N0**	
		16	15 VA 5P10 - 7.5 VA 5P20	ARJH/N1J	**03811497N0**	
		25	7.5 VA 5P10	ARJM2/N1J	**03811499N0**	
		25	15 VA 5P10 - 7.5 VA 5P20	ARJH/N1J	**03811500N0**	
	50 / 5	16	7.5 VA 5P10	ARJP1/N1J	**03811502N0**	
		16	15 VA 5P10 - 7.5 VA 5P20	ARJP2/N1J	**03811503N0**	
		25	7.5 VA 5P10	ARJP2/N1J	**03811505N0**	
		25	15 VA 5P10 - 7.5 VA 5P20	ARJM2/N1J	**03811506N0**	
		31.5		ARJH/N1J	**03811508N0**	
		40	7.5 VA 5P10	ARJH/N1J	**03811509N0**	
	75 / 5	25		ARJP1/N1J	**03811511N0**	
		25	15 VA 5P10 - 7.5 VA 5P20	ARJP2/N1J	**03811512N0**	
		31.5	7.5 VA 5P10	ARJP2/N1J	**03811514N0**	
		31.5	15 VA 5P10 - 7.5 VA 5P20	ARJM2/N1J	**03811515N0**	
		40	7.5 VA 5P10	ARJP2/N1J	**03811517N0**	
		40	15 VA 5P10 - 7.5 VA 5P20	ARJH/N1J	**03811518N0**	
	100 / 5	25	7.5 VA 5P10	ARJP1/N1J	**03811520N0**	
		25	15 VA 5P10 - 7.5 VA 5P20	ARJP2/N1J	**03811521N0**	
		31.5	7.5 VA 5P10	ARJP1/N1J	**03811523N0**	
		31.5	15 VA 5P10 - 7.5 VA 5P20	ARJP2/N1J	**03811524N0**	
		40	7.5 VA 5P10	ARJP2/N1J	**03811840N0**	
		40	15 VA 5P10 - 7.5 VA 5P20	ARJH/N1J	**03811841N0**	
	200 / 5	31.5		ARJP1/N1J	**03811527N0**	
		40		ARJP1/N1J	**03811529N0**	
		40	7.5 VA 5P10	ARJP1/N1J	**03811531N0**	
		40	15 VA 5P10 - 7.5 VA 5P20	ARJP2/N1J	**03811532N0**	
	400 / 5	40		ARJP1/N1J	**03811534N0**	
	600 / 5	50		ARJP1/N1J	**03811536N0**	
	750 / 5	50		ARJP1/N1J	**03811538N0**	
	1000 / 5	50	10 VA 5P20	ARJP3/N1J	**03811540N0**	
	1250 / 5	50		ARJP3/N1J	**03811542N0**	
	1500 / 5	50	15 VA 5P20	ARJA1/N1J	**03811544N0**	
	2000 / 5	50		ARJA1/N1J	**03811546N0**	
	2500 / 5	50		ARJA1/N1J	**03811548N0**	



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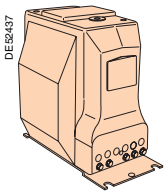

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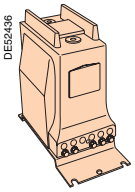

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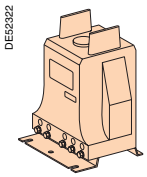

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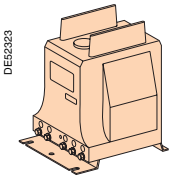

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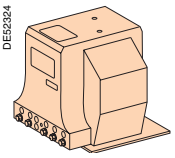

ARJA1

Dimensions page 24

Selection and order form
24 kV primary conductor support CT - Double secondary

Double secondary metering and protection CT

Insulation level Frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Metering secondary: power, accuracy class, safety factor FS	Metering secondary: power and accuracy class (possible dual usage)	Type	Reference	Qty
Ur 24 kV Ud 50 kV - 1 mn Up 125 kV peak fr 50/60 Hz	25 / 5-5	12.5	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARJH/N2J	**03811549N0**	
		20			ARJH/N2J	**03811550N0**	
	50 / 5-5	16			ARJP2/N2J	**03811551N0**	
		16	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJM2/N2J	**03811552N0**	
		25	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARJP2/N2J	**03811553N0**	
		25	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJH/N2J	**03811554N0**	
		31.5			ARJH/N2J	**03811555N0**	
	75 / 5-5	16	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARJP2/N2J	**03811556N0**	
		16	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJM2/N2J	**03811557N0**	
		25	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARJP2/N2J	**03811558N0**	
		25	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJM2/N2J	**03811559N0**	
		31.5	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARJP2/N2J	**03811560N0**	
		31.5	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJH/N2J	**03811561N0**	
		40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARJH/N2J	**03811562N0**	
	100 / 5-5	25			ARJP2/N2J	**03811563N0**	
		25	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJM2/N2J	**03811564N0**	
		31.5	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARJP2/N2J	**03811565N0**	
		31.5	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJH/N2J	**03811566N0**	
		40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARJP2/N2J	**03811567N0**	
		40	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJH/N2J	**03811568N0**	
	200 / 5-5	25			ARJP2/N2J	**03811569N0**	
		31.5			ARJP2/N2J	**03811570N0**	
		40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARJP2/N2J	**03811571N0**	
		40	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARJH/N2J	**03811572N0**	
	400 / 5-5	40			ARJP2/N2J	**03811573N0**	
	600 / 5-5	40	20 VA cl. 0.5 Fs < 10		ARJP2/N2J	**03406314F0**	
	750 / 5-5	40			ARJP2/N2J	**03406332F0**	
	1000 / 5-5	50	30 VA cl. 0.5 Fs < 10	10 VA 5P20	ARJP3/N2J	**03406333F0**	
	1250 / 5-5	50			ARJP3/N2J	**03406315F0**	
	1500 / 5-5	50		15 VA 5P20	ARJA1/N2J	**03406335F0**	
	2000 / 5-5	50			ARJA1/N2J	**03406336F0**	
	2500 / 5-5	50			ARJA1/N2J	**03406337F0**	

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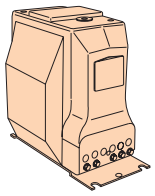

ARJH

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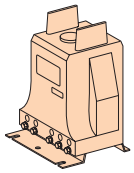

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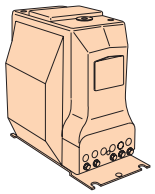

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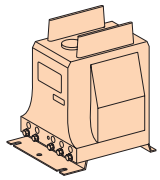

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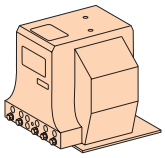

ARJA1

Dimensions page 24

Selection and order form
36 kV primary conductor support CT- Single secondary

Single secondary metering CT

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power, accuracy class, safety factor FS	Type	Reference	Qty
Ur 36 kV **Ud 70 kV - 1 mn** **Up 170 kV peak** **fr 50/60 Hz**	25 / 5	16	15 VA cl. 0.5 Fs < 10	ARM6T/N1	**03811574N0**	
		20		ARM6T/N1	**03811577N0**	
	50 / 5	16		ARM6T/N1	**03811580N0**	
		25		ARM6T/N1	**03811582N0**	
		31.5		ARM6T/N1	**03811584N0**	
	75 / 5	25		ARM6T/N1	**03811588N0**	
		31.5		ARM6T/N1	**03811590N0**	
		40		ARM6T/N1	**03811592N0**	
	100 / 5	25		ARM6T/N1	**03811595N0**	
		31.5		ARM6T/N1	**03811597N0**	
		40		ARM6T/N1	**03811599N0**	
	200 / 5	25		ARM6T/N1	**03811602N0**	
		31.5		ARM6T/N1	**03811604N0**	
		40		ARM6T/N1	**03811606N0**	
	400 / 5	40		ARM6T/N1	**03811608N0**	
	600 / 5	40	20 VA cl. 0.5 Fs < 10	ARM6T/N1	**03811610N0**	
	750 / 5	40		ARM6T/N1	**03811612N0**	
	1000 / 5	40	30 VA cl. 0.5 Fs < 10	ARM9T/N1	**03811614N0**	
	1250 / 5	40		ARM9T/N1	**03811616N0**	
	1500 / 5	40		ARM9T/N1	**03811618N0**	
	2000 / 5	40		ARM9T/N1	**03811620N0**	
	2500 / 5	40		ARM9T/N1	**03811622N0**	

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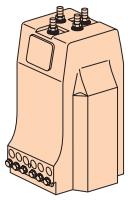

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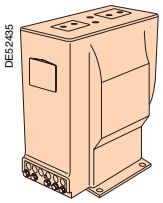

ARM6T **ARM9T**

Dimensions page 25

Single secondary protection CT

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power and accuracy class (possible double use)	Type	Reference	Qty
Ur 36 kV **Ud 70 kV - 1 mn** **Up 170 kV peak** **fr 50/60 Hz**	25 / 5	16	7.5 VA 5P10	ARM6T/N1	**03811575N0**	
		16	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N1	**03811576N0**	
		20	7.5 VA 5P10	ARM6T/N1	**03811578N0**	
		20	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N1	**03811579N0**	
	50 / 5	16		ARM6T/N1	**03811581N0**	
		25		ARM6T/N1	**03811583N0**	
		31.5	7.5 VA 5P10	ARM6T/N1	**03811585N0**	
		31.5	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N1	**03811586N0**	
		40	7.5 VA 5P10	ARM9T/N1	**03811587N0**	
	75 / 5	25	15 VA 5P10 - 7.5 VA 5P20	ARM6T/N1	**03811589N0**	
		31.5		ARM6T/N1	**03811591N0**	
		40	7.5 VA 5P10	ARM6T/N1	**03811593N0**	
		40	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N1	**03811594N0**	
	100 / 5	25		ARM6T/N1	**03811596N0**	
		31.5		ARM6T/N1	**03811598N0**	
		40	7.5 VA 5P10	ARM6T/N1	**03811600N0**	
		40	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N1	**03811601N0**	
	200 / 5	25		ARM6T/N1	**03811603N0**	
		31.5		ARM6T/N1	**03811605N0**	
		40		ARM6T/N1	**03811607N0**	
	400 / 5	40		ARM6T/N1	**03811609N0**	
	600 / 5	40		ARM6T/N1	**03811611N0**	
	750 / 5	40		ARM6T/N1	**03811613N0**	
	1000 / 5	40	10 VA 5P20	ARM9T/N1	**03811615N0**	
	1250 / 5	40		ARM9T/N1	**03811617N0**	
	1500 / 5	40	15 VA 5P20	ARM9T/N1	**03811619N0**	
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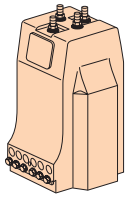

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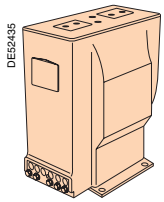

ARM6T **ARM9T**

Dimensions page 25

Selection and order form
36 kV primary conductor support CT- Double secondary

Double secondary metering and protection CT

Insulation level Frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Metering secondary: power, accuracy class, safety factor FS	Metering secondary: power and accuracy class (possible dual usage)	Type	Reference	Qty
Ur 36 kV Ud 70 kV - 1 mn Up 170 kV peak fr 50/60 Hz	25 / 5-5	16	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM6T/N2	**03811624N0**	
		20			ARM9T/N2	**03811625N0**	
	50 / 5-5	16			ARM6T/N2	**03811626N0**	
		16	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811627N0**	
		25	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM6T/N2	**03811628N0**	
		25	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811629N0**	
		31.5	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM9T/N2	**03811630N0**	
	75 / 5-5	25			ARM6T/N2	**03811631N0**	
		25	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811632N0**	
		31.5	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM6T/N2	**03811633N0**	
		31.5	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811634N0**	
		40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM9T/N2	**03811635N0**	
	100 / 5-5	25			ARM6T/N2	**03811636N0**	
		25	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811637N0**	
		31.5	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM6T/N2	**03811638N0**	
		31.5	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811639N0**	
		40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM6T/N2	**03811640N0**	
	200 / 5-5	25			ARM6T/N2	**03811641N0**	
		25	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811642N0**	
		31.5	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM6T/N2	**03811643N0**	
		31.5	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811644N0**	
		40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM6T/N2	**03811645N0**	
		40	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811646N0**	
	400 / 5-5	40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM6T/N2	**03811647N0**	
		40	15 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811648N0**	
	600 / 5-5	40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM6T/N2	**03811649N0**	
		40	20 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811650N0**	
	750 / 5-5	40	7.5 VA cl. 0.5 Fs < 10	7.5 VA 5P10	ARM6T/N2	**03811651N0**	
		40	20 VA cl. 0.5 Fs < 10	15 VA 5P10 - 7.5 VA 5P20	ARM9T/N2	**03811652N0**	
	1000 / 5-5	40	30 VA cl. 0.5 Fs < 10	10 VA 5P20	ARM9T/N2	**03811653N0**	
	1250 / 5-5	40			ARM9T/N2	**03811654N0**	
	1500 / 5-5	40		15 VA 5P20	ARM9T/N2	**03811655N0**	
	2000 / 5-5	40			ARM9T/N2	**03811656N0**	
	2500 / 5-5	40			ARM9T/N2	**03811657N0**	

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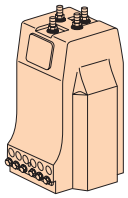

ARM6T

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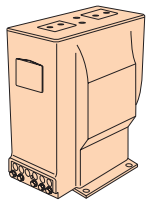


ARM9T

Dimensions page 25

Selection and order form
17.5 - 24 - 36 kV - slip-over CT- Single and double secondary

Single secondary metering CT

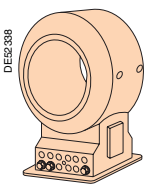
Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power, accuracy class, safety factor FS	Type	Reference	Qty
Ur 17.5 kV Ud 38 kV - 1 mn Up 95 kV peak fr 50/60 Hz	2500 / 5	50	30 VA cl. 0.5 Fs < 10	ARO1b/N1	**03811842N0**	
	3000 / 5	50		ARO1b/N1	**03811659N0**	
Ur 24 kV Ud 50 kV - 1 mn Up 125 kV peak fr 50/60 Hz	2500 / 5	50	30 VA cl. 0.5 Fs < 10	ARO2/N1	**03811661N0**	
	3000 / 5	50		ARO2/N1	**03811663N0**	
Ur 36 kV Ud 70 kV - 1 mn Up 170 kV peak fr 50/60 Hz	2500 / 5	50	30 VA cl. 0.5 Fs < 10	ARO2/N1	**03811665N0**	
	3000 / 5	50		ARO2/N1	**03811667N0**	

Single secondary protection CT

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power and accuracy class (possible double use)	Type	Reference	Qty
Ur 17.5 kV Ud 38 kV - 1 mn Up 95 kV peak fr 50/60 Hz	2500 / 5	50	15 VA 5P20	ARO1b/N1	**03811658N0**	
	3000 / 5	50		ARO1b/N1	**03811660N0**	
Ur 24 kV Ud 50 kV - 1 mn Up 125 kV peak fr 50/60 Hz	2500 / 5	50	15 VA 5P20	ARO2/N1	**03811662N0**	
	3000 / 5	50		ARO2/N1	**03811664N0**	
Ur 36 kV Ud 70 kV - 1 mn Up 170 kV peak fr 50/60 Hz	2500 / 5	50	15 VA 5P20	ARO2/N1	**03811666N0**	
	3000 / 5	50		ARO2/N1	**03811668N0**	

Double secondary metering and protection CT

Insulation level Frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Metering secondary: power, accuracy class, safety factor FS	Metering secondary: power and accuracy class (possible dual usage)	Type	Reference	Qty
Ur 17.5 kV Ud 38 kV - 1 mn Up 95 kV peak fr 50/60 Hz	2500 / 5 - 5	50	30 VA cl. 0.5 Fs < 10	15 VA 5P20	ARO1b/N2	**03811669N0**	
	3000 / 5 - 5	50			ARO1b/N2	**03811670N0**	
Ur 24 kV Ud 50 kV - 1 mn Up 125 kV peak fr 50/60 Hz	2500 / 5 - 5	50	30 VA cl. 0.5 Fs < 10	15 VA 5P20	ARO2/N2	**03811671N0**	
	3000 / 5 - 5	50			ARO2/N2	**03811672N0**	
Ur 36 kV Ud 70 kV - 1 mn Up 170 kV peak fr 50/60 Hz	2500 / 5 - 5	50	30 VA cl. 0.5 Fs < 10	15 VA 5P20	ARO2/N2	**03811673N0**	
	3000 / 5 - 5	50			ARO2/N2	**03811674N0**	



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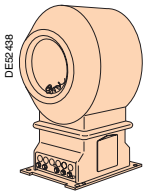

ARO2

Dimensions page 25

Selection and order form
0.72 kV closed core CT - Single and double secondary

Single secondary metering CT

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power, accuracy class, safety factor FS	Type	Reference	Qty
Ur 0.72 kV **Ud 3 kV - 1 mn** **fr 50/60 Hz**	150 / 5	50	7.5 VA cl. 0.5 Fs < 10	ARC2/N1	**03811675N0**	
	200 / 5	50		ARC2/N1	**03811676N0**	
	250 / 5	50	15 VA cl. 0.5 Fs < 10	ARC2/N1	**03811677N0**	
	300 / 5	50		ARC2/N1	**03811678N0**	
	400 / 5	50		ARC2/N1	**03811679N0**	
	600 / 5	50	20 VA cl. 0.5 Fs < 10	ARC2/N1	**03811680N0**	
	750 / 5	50		ARC3/N1	**03811681N0**	
	1000 / 5	50	30 VA cl. 0.5 Fs < 10	ARC3/N1	**03811682N0**	
	1250 / 5	50		ARC3/N1	**03811683N0**	

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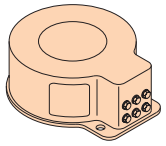

ARC2

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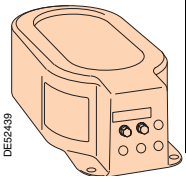

ARC3

Dimensions page 25

CT simple secondary protection

Insulation level and frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Power and accuracy class (possible double use)	Type	Reference	Qty
Ur 0.72 kV **Ud 3 kV - 1 mn** **fr 50/60 Hz**	75 / 5	50	2.5 VA 5P20	ARC2/N1	**03881124N0**	
	100 / 5	50		ARC2/N1	**03881125N0**	
	150 / 5	50	5 VA 5P20	ARC2/N1	**03881126N0**	
	200 / 5	50		ARC2/N1	**03881127N0**	
	250 / 5	50		ARC2/N1	**03881128N0**	
	300 / 5	50		ARC2/N1	**03881129N0**	
	400 / 5	50		ARC2/N1	**03881130N0**	
	600 / 5	50	7.5 VA 5P20	ARC2/N1	**03881131N0**	
	750 / 5	50		ARC3/N1	**03881302N0**	
	1000 / 5	50	10 VA 5P20	ARC3/N1	**03881303N0**	
	1250 / 5	50		ARC3/N1	**03881304N0**	

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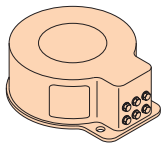

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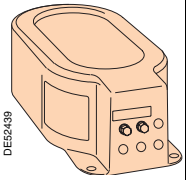

ARC3

Dimensions page 25

Double secondary metering and protection CT

Insulation level Frequency	Transformation ratio A / A	Short-time thermal current kA x 1 s	Metering secondary: power, accuracy class, safety factor FS	Metering secondary: power and accuracy class (possible dual usage)	Type	Reference	Qty
Ur 12 kV **Ud 28 kV - 1 mn** **Up 75 kV peak** **fr 50/60 Hz**	250 / 5-5	50	10 VA cl. 0.5 Fs < 10	5 VA 5P20	ARC2/N2	**03881141N0**	
	300 / 5-5	50			ARC2/N2	**03881142N0**	
	400 / 5-5	50	15 VA cl. 0.5 Fs < 10		ARC2/N2	**03881143N0**	
	600 / 5-5	50	20 VA cl. 0.5 Fs < 10	7.5 VA 5P20	ARC2/N2	**03881144N0**	
	750 / 5-5	50			ARC3/N2	**03881305N0**	
	1000 / 5-5	50	30 VA cl. 0.5 Fs < 10	15 VA 5P20	ARC3/N2	**03881306N0**	
	1250 / 5-5	50			ARC3/N2	**03881307N0**	

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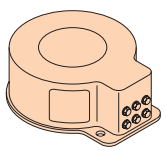

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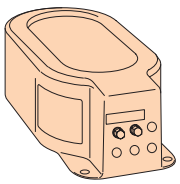

ARC3

Dimensions page 25

Dimensions

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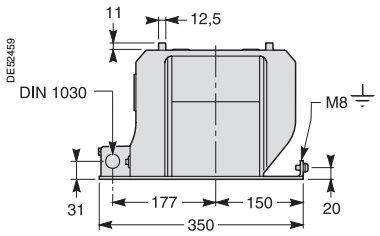

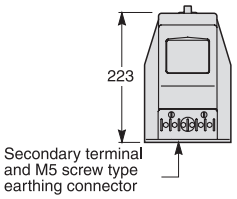

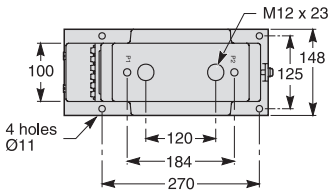

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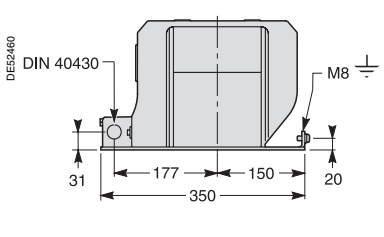

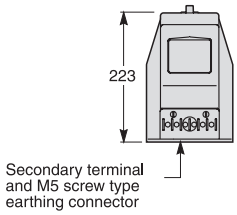

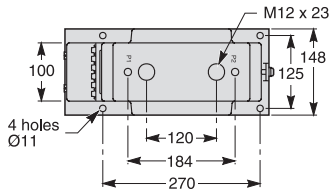

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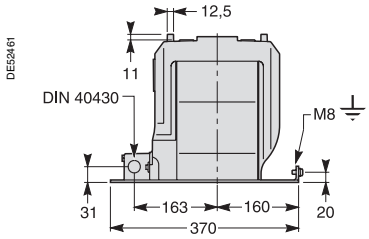

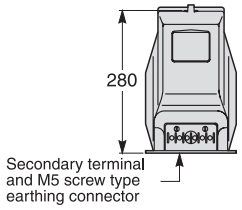

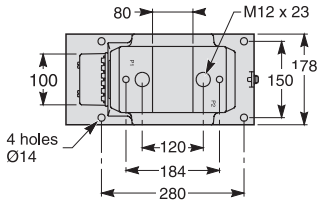

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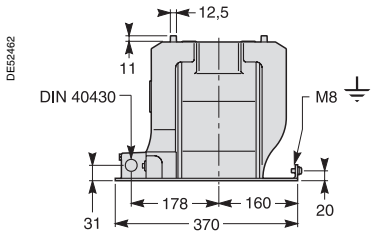

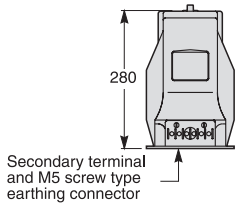

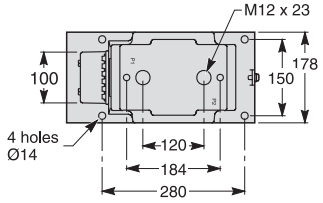

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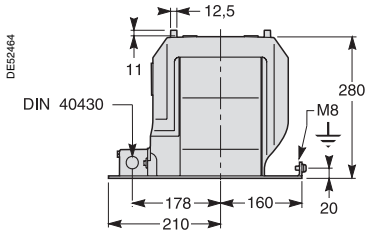

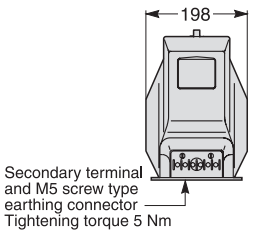

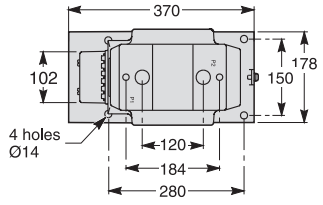

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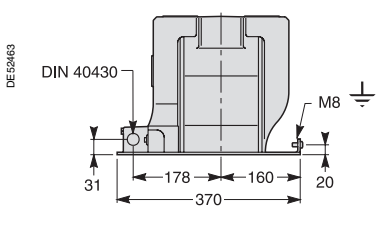

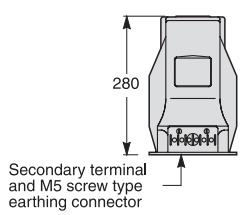

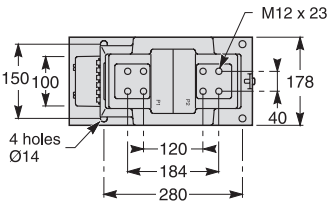

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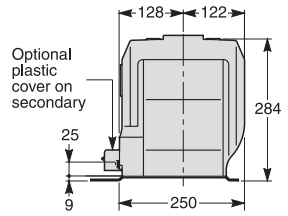

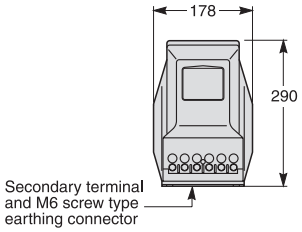

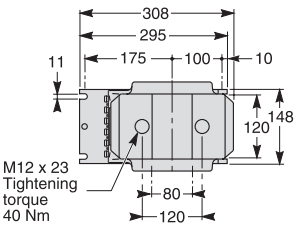

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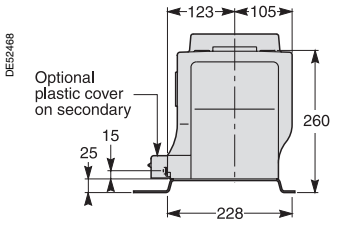

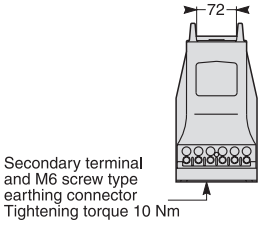

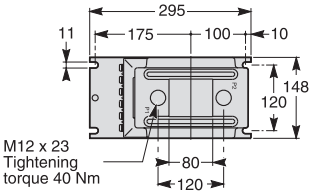

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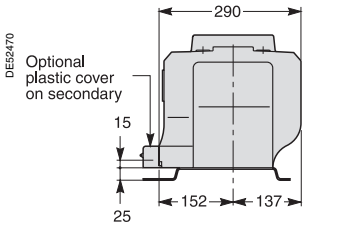

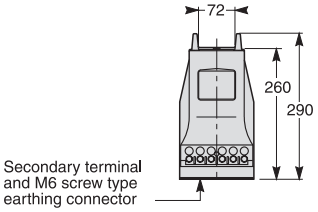

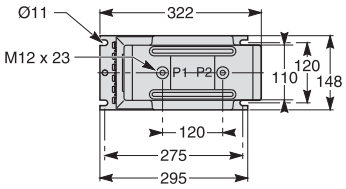

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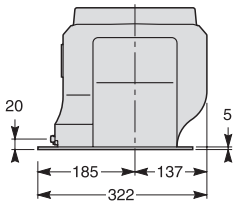

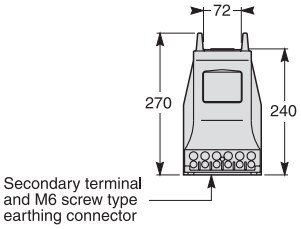

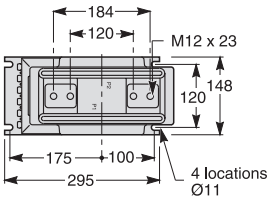

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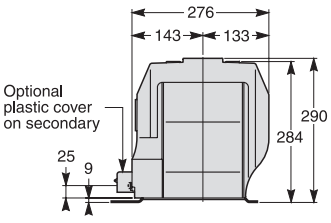

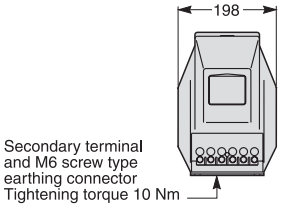

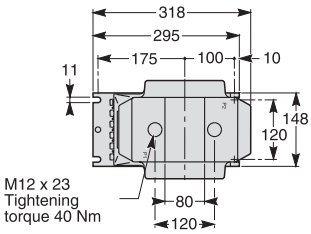

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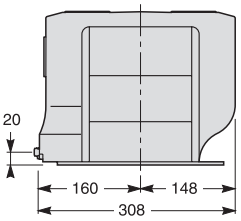

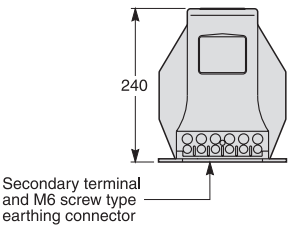

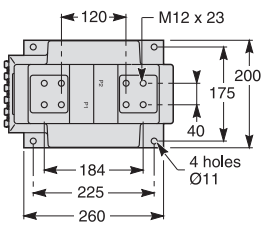

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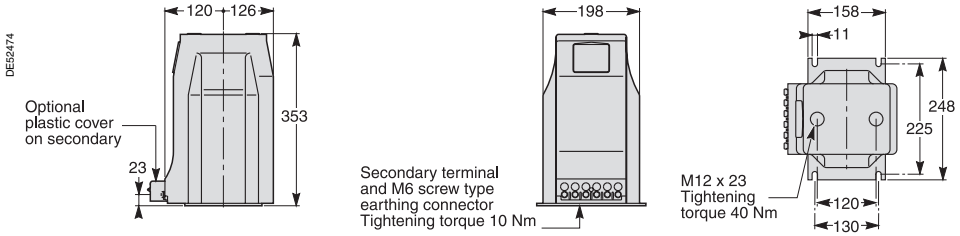
DE52474



ARM9T

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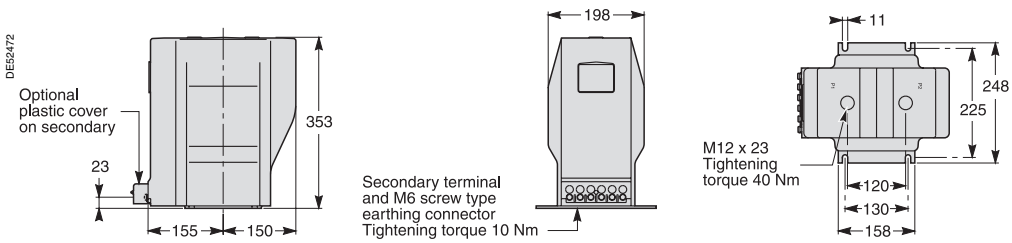

ARO1b

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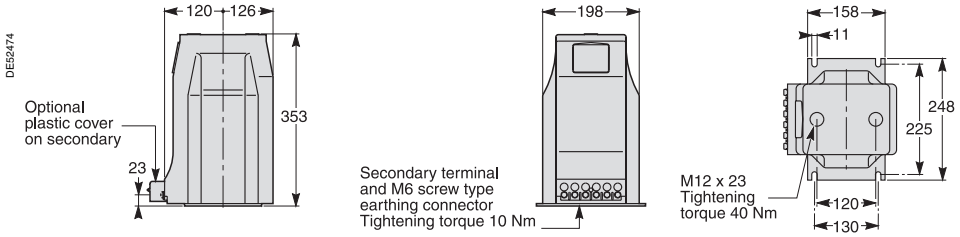

ARO2

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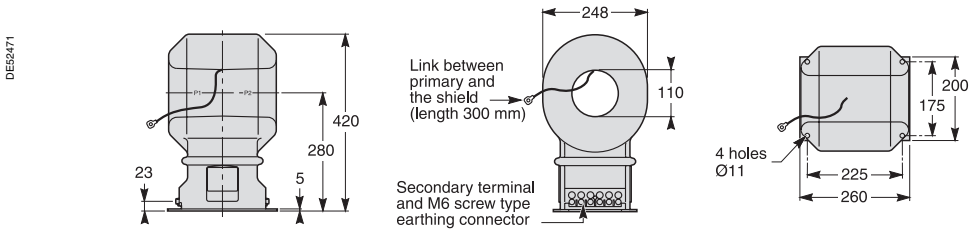

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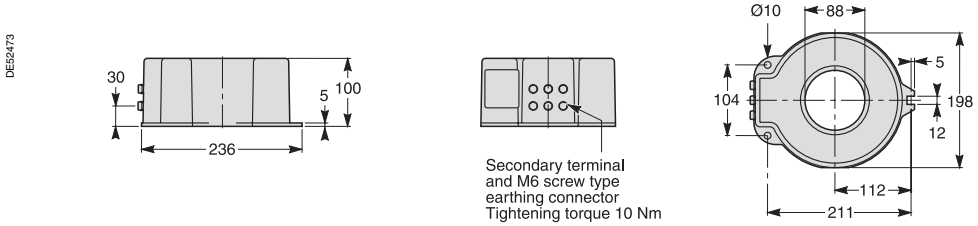
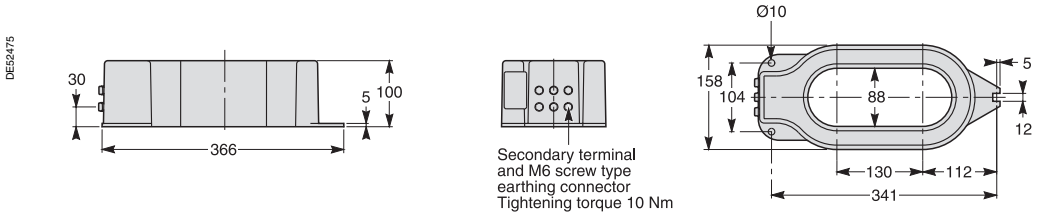


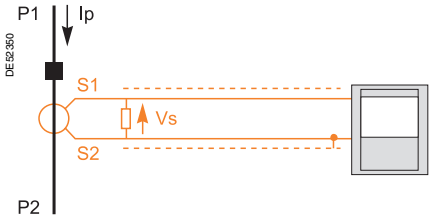
ARC3

DE52445

DE52475



LPCT's (Low Power Current Transformers) meet IEC standard IEC 60044-8.
These are CT's with a direct voltage output which has the advantage of having a very wide range of applications, simplifying selection.



LCPT low power current transformers

LPCT's are specific current sensors with a direct voltage output of the "Low Power Current Transformers" type, in conformity with standard IEC 60044-8.
LPCT's provide metering and protection functions.
They are defined by:
- the rated primary current
- the extended primary current
- the accuracy limit primary current or the accuracy limit factor.

These have a linear response over a large current range and do not start to saturate until beyond the currents to be broken.

Examples of LPCT characteristics according to IEC standard 60044-8

These characteristics are summarized in the curves below. They show the maximum error limits (as an absolute value) on the current and the phase corresponding to the accuracy class for the given examples.
They give the same error limits shown for these classes in page 6.11, but with much wider current ranges, which gives an advantage to this type of sensor.

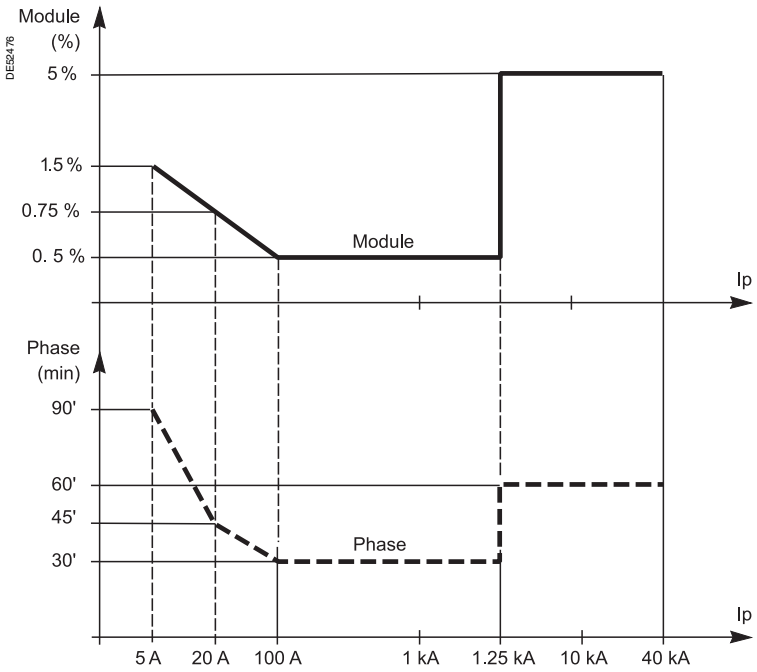
Example for metering class 0.5
- rated primary current Ipn = 100 A
- extended primary current Ipe = 1250 A
- secondary voltage Vsn = 22.5 mV (for 100 A on the secondary)
- class 0.5:
  - accuracy (see definitions on page 6.11) on:
    - the primary current module 0.5 % (error ⩽ ±0.5 %)
    - the primary current phase 60 (error ⩽ 30 minutes)

over a range of 100 A to 1250 A
- accuracy 0.75 % and 45 at 20 A
- accuracy 1.5 % and 90 at 5 A

which are two metering points specified by the standard.

Example for class 5P protection
- primary current Ipn = 100 A
- secondary voltage Vsn = 22.5 mV
- class 5P:
  - accuracy (see definitions page 6.11) on:
    - the primary current module 5 % (error ⩽ ±5 %)
    - the primary current phase 60 (error ⩽ 60 minutes) on a range of 1.25 kA to 40 kA.

The LPCT and Sepam guarantees a very high coverage range and flexibility of usage. Example: protection system with CLP1 or CLP2 and Sepam guaranteeing a usage range of 5 A to 1250 A.



Accuracy characteristics of a LPCT (example of Merlin Gerin's CLP1): the accuracy classes are given for extended current ranges (here class 0.5 for metering from 100 to 1250 A and protection class 5P from 1.25 to 40 kA).

Selection and order form

Primary current rated (A)	Primary current extended (A)	Secondary voltage (mV)	Accuracy class	Accuracy limit factor FLP	Short-time thermal current (kA - 1 s)	Rated insulation (kV)	Secondary connector	Internal diameter (mm)	Type	Reference	Qty
100	1250	22.5	0.5 – 5P	500	50	17.5	RJ45 - 8 pts		CLP1	62623	
100	1250	22.5	0.5 – 5P	400	40	24	RJ45 - 8 pts		CLP2	51238696F0	
100	2500	22.5	0.5 – 5P	400	40	24	RJ45 - 8 pts		CLP3	AAA10474	
100	2500	22.5	0.5 – 5P	400	40	0.72	RJ45 - 8 pts	160	TLP160	AAA10094	
100	2500	22.5	0.5 – 5P	400	40	0.72	RJ45 - 8 pts	190	TLP190	AAA10095	

Frequency and insulation

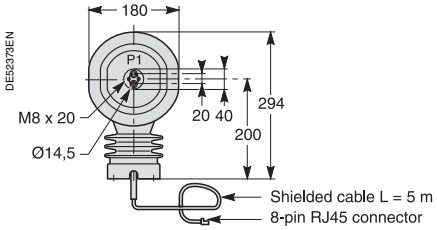
Frequency (Hz)	Ur (kV)	Ud (kV - 1 mn)	Up (kV peak)
50 / 60	24	50	125
	17.5	38	95
	0.72	3	

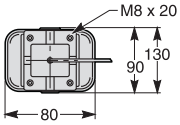
Dimensions

CLP1

DE52394

DE52373EN

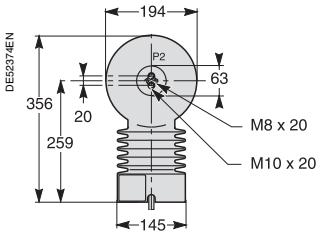


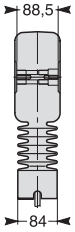


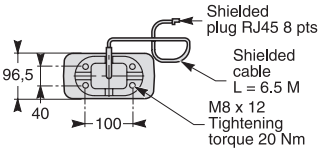
CLP2

DE52395

DE52374EN



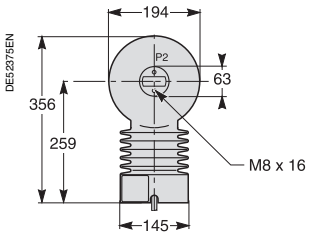


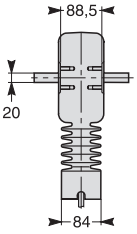


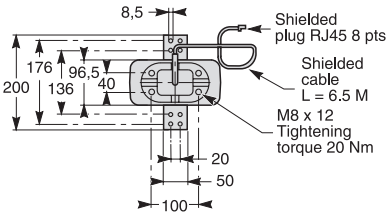
CLP3

DE52396

DE52375EN



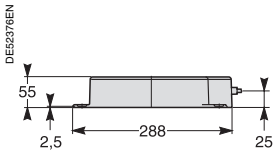


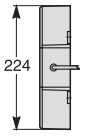


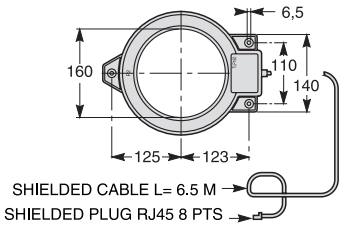
TLP160

DE52397

DE52376EN



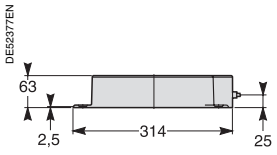


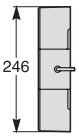


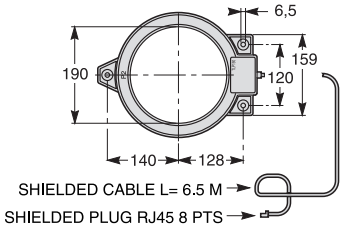
TLP190

DE52397

DE52377EN

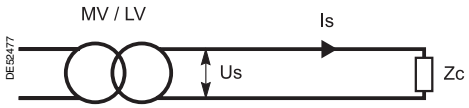






Selection guide
Technical description

Voltage transformers (VT) meet standards IEC 60044-2.
Their function is to supply a voltage proportional to the MV circuit that they are installed on to the secondary.
The primary, which is parallel mounted on the MV network between phases of from phase to earth, is subject to the same over-voltages as the latter. The secondary supplies a voltage that is virtually constant, whatever the load.
***The secondary must never be placed in short circuit**.*



Simplified schematic diagram of a voltage transformer
IS: secondary current
Us: secondary voltage
Zc: load impedance.

Voltage transformers (VT)

Voltage transformers have two key functions:
- adapting the value of MV voltage on the primary to the characteristics of metering or protection devices by supplying a secondary voltage that is proportional and lower
- isolating power circuits from the metering and/or protection circuit.

Composition and type

These comprise a primary winding, a magnetic core, one or several secondary windings, with everything encapsulated in an insulating resin.
There are two types, according to how they are connected:
- phase/phase: primary connected between two phases
- phase/earth: primary connected between a phase and the earth.

Characteristics

These are defined by standard IEC60044-2.

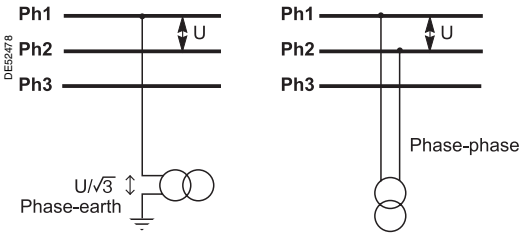
Insulation
Characterized by the rated voltages:
- insulation voltage, which will be that of the installation (e.g.: 24 kV)
- power frequency withstand 1mn (e.g.: 50 kV)
- impulse withstand (e.g.: 125 kV)

Rated frequency
50 or 60 Hz.

Rated primary voltage (Upn)
According to their design, voltage transformers are connected:
- either between phase and earth and in this case Upn = U/$\sqrt{3}$ (e.g.: 20/$\sqrt{3}$)
- or between phases and in this case Upn = U.

Rated secondary voltage (Usn)
This is equal to 100 or 110 V for phase/phase voltage transformers. For single phase, phase/earth transformers, the secondary voltage must be divided by $\sqrt{3}$ (e.g.: 100/$\sqrt{3}$).

Accuracy power Pn
Apparent power (VA) that the VT can supply the secondary for the rated secondary voltage for which the accuracy is guaranteed (accuracy load).
Standardized values 30, 50, 100 VA (IEC).



Connection of a VT.

Selection guide
Technical description (cont.)

Accuracy class
Defines the error limits guaranteed relative to the transformation ratio and the phase shift under specified conditions of power and voltage.

Voltage error ε (%)
Error that the transformer introduces into the voltage measurement when the transformation ratio is different from the rated value.

Phase shift or phase error (ψ in minutes)
Phase difference between primary and secondary voltages, in angle minutes.

Rated voltage factor KT
This is the factor, a multiple of the rated primary voltage, which determines the maximum voltage which the transformer must meet the specified temperature rise and accuracy recommendations. The maximum operating voltage depends on the network neutral system and the earthing conditions of the primary winding.

Table of voltage factors KT

Voltage factor	Rated duration	Connection mode of the primary winding	Network neutral system
1.2	Continuous	Between phases	Any
	Continuous	Between the star-connected transformer neutral point and earth	Any
1.2	Continuous	Between phase and earth	Directly earthed
1.5	30 s		
1.2	Continuous	Between phase and earth	Earthed via a limiting resistor with automatic earthing fault elimination
1.9	30 s		
1.2	Continuous	Between phase and earth	Insulated neutral without automatic earthing fault elimination
1.9	8 h		
1.2	Continuous	Between phase and earth	Earthed via a limiting resistance with automatic earthing fault elimination

Table of voltage transformer characteristics

Characteristics	Rated values				
Insulating voltage (kV)	7.2	12	17.5	24	36
■ power frequency withstand (kV) (1) 1 mn	20	28	38	50	70
■ lightning impulse withstand (kV - peak)	60	75	95	125	170
Frequency (Hz)	50 - 60				
Primary voltage U1n (kV) (divided by $\sqrt{3}$ if single phase)	3 - 3.3 - 5 - 5.5 - 6 - 6,6 - 10 - 11 - 13.8 - 15 - 20 - 22 - 30 - 33				
Secondary voltage U2n (V)	100 - 110 or 100/$\sqrt{3}$ - 110/$\sqrt{3}$				
Accuracy power (VA)	30 - 50 - 100				

(1) *When there is a major difference between the highest voltage for the equipment (Um) and the rated primary voltage, the power frequency must be limited to five times the rated voltage.*

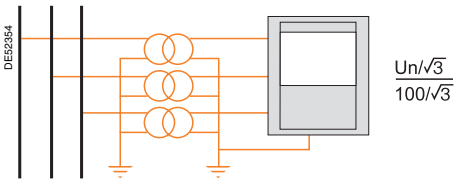
VT operating characteristics

Operation of a VT is more simple than that of a CT because the secondary voltage is virtually independent of the load, due to it being connected through a high impedance (virtually used in an open circuit).
Therefore, **the secondary must not be short circuited**. Under these conditions an excessively high current will damage the transformer.

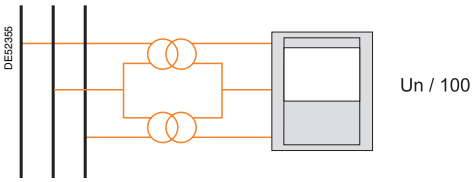
Selection guide
Technical description (cont.)

VT connections

Several metering connection arrangements are possible (fig. opposite)
- star-connection of 3 transformers: requires 1 isolated MV terminal for each transformer
- connecting to 2 transformers, so-called V-connection: requires 2 isolated MV terminals per transformer.



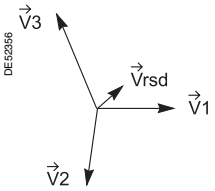
Star-connected VT and example of transformation ratio.



V-connected VT and example of the transformation ratio.

Residual voltage metering

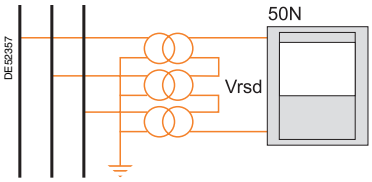
The residual voltage. which characterizes the voltage of the neutral point relative to earth, is equal to the vectorial sum of the three phase-earth voltages.
The residual voltage is equal to 3 times the zero-sequence voltage V0.



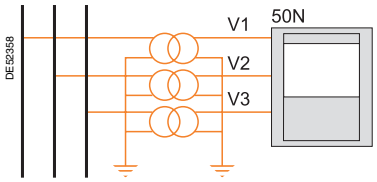
$$\overrightarrow{Vrsd} = 3 \bullet \overrightarrow{V0} = \overrightarrow{V1} + \overrightarrow{V2} + \overrightarrow{V3}$$

Please note, it is impossible to measure a residual voltage with ***phase/phase VT's.***

The appearance of this voltage signifies the existence of an earthing fault. It is obtained by measurement or by calculation:
- measuring by three voltage transformers whose primary circuits are star-connected and whose secondary circuits are open-delta connected, supplying the residual voltage ①
- calculation by the relay based on three voltage transformers whose primary and secondary circuits are star-connected ②.



① *Direct measurement of the residual voltage.*



② *Calculation of the residual voltage.*

Selection guide
Technical description (cont.)

Voltage transformer for metering

Accuracy class

These devices are intended to send an image as accurately as possible of the rated primary voltage between **80 and 120 %** of the latter.
The accuracy class determines the permissible error in the phase and in the module in this range for the accuracy load.
It is valid for all loads of between 25 and 100 % of the rated accuracy power with an inductive power factor of 0.8.
The table below gives the usual classes according to application.

Application	Class
Accurate laboratory metering applications (calibration devices)	0.2
Billing metering industrial measurements	0.2
Statistical switchboard metering indicators	0.5 - 1

■ **Class 0.5** corresponds to an error ⩽ ±0.5 % for the rated primary voltage, with the accuracy load over the secondary.
■ **Class 1** corresponds to an error ⩽ ±1 % in the same conditions.
For a given accuracy class, voltage and phase-shift errors must not exceed the values indicated in the table opposite.

Error limits according to the accuracy class

Accuracy class	Voltage error (ratio) ± %	Phase-shift error ± mn
0.2	0.2	10
0.5	0.5	20
1	1.0	40

Example:
Metering voltage transformer $\frac{20000}{3} / \frac{110}{3}$, 50 VA, cl. 0.5
■ rated primary voltage 20000 V/$\sqrt{3}$, rated secondary 110 V/$\sqrt{3}$
■ accuracy power 50 VA
■ accuracy class 0.5. The table of limit error values gives, under the specified conditions for the accuracy class:
□ a primary voltage 80 % to 120 % of the rated voltage (16 kV to 24 kV)
□ a load of between 25 % and 100 % of the accuracy power, i.e. between 12.5 VA and 50 VA with an inductive power factor of 0.8, the metering errors will be ⩽ ±0.5 % for voltage and ⩽ ±20 mn for phase shift.

Voltage transformer for protection

Accuracy class

These devices are intended to send an image that is as accurate as possible of the voltage in the case of a fault (voltage drop or overvoltage).
They must have the right accuracy and power for the fault voltages and therefore different from those used for instrument transformers.
In practice, the accuracy class **3P** is used for all applications and the error limits for voltage and phase given in the table below.
These are guaranteed for all loads of between 25 and 100 % of the accuracy power with an inductive power factor of 0.8.

Error limits for each accuracy class

Accuracy class	Voltage error (± %) between		Phase shift error (minutes) between	
	5% Upn and KT	2% Upn and Kt	5% Upn and KT	2 % Upn and Kt
3P	3	6	120	240
6P	6	12	240	480

KT over-voltage coefficient.
Upn rated primary voltage.

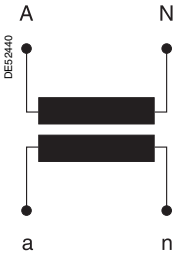
Example:
Protection voltage transformer $\frac{20000}{3} / \frac{110}{3}$, 100 VA, 3P, KT = 1.9 8h
■ the rated primary voltage 20000 V/$\sqrt{3}$, rated secondary 110 V/$\sqrt{3}$
■ accuracy power 100 VA
■ accuracy class 3P. The table of limit values shows that for:
□ a primary voltage of 5 % of the rated voltage at KT times the rated voltage, i.e. 20000 x 5 % = 1000 V at 20000 x 1.9 = 38000 V
□ a load of between 25 % and 100 % of the accuracy power, in other words of between 25 VA and 100 VA with a power factor of 0.8, the metering error will be ⩽ ±3 % in voltage and ⩽ ±120 mn in phase shift.

Selection guide
Technical description (cont.)

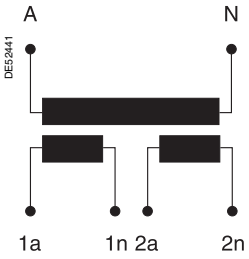
Connecting a VT

VT with a double (or triple) secondary
A VT can have one or two secondaries (figure opposite), and more rarely three secondaries for the appropriate applications (protection and/or metering).

Identifying terminals
A VT is connected across the terminals identified according to the IEC:
- A for phase and N for earth on the MV side
- a and n on the corresponding secondary side. In the case of a double output, the first output is shown by 1a and 1n, the second by 2a and 2n.



Single secondary.



Double secondary.

Calculating the power (VA)

Indicative metering consumption

Device		Max. consumption in VA (per circuit)
Voltmeter	electromagnetic	5
	electronic	1
Transducer	self-powered	5
	external power	2
Meter	induction	5
	electronic	4
	wattmeter, varmeter	5

Indicative protection consumption

Device	Consumption in VA (per circuit)
Static overvoltage relay	0.2 to 1
Electromagnetic overvoltage relay	1 to 8

Indicative secondary cabling consumption

Cables (mm^2)	Consumption	
	1 A	5 A
2.5	0.008	0.2
4	0.005	0.13
6	0.003	0.09
10	0.002	0.05

Order form
DIN standard phase-earth VT

Single secondary metering VT

Frequency: 50 - 60 Hz

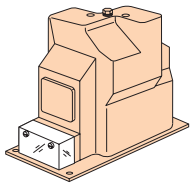
Rated voltage kV	Power frequency withstand kV-1 mn	Lightning impulse withstand kV-peak	Transformation ratio V / V	Power and accuracy class (double usage)	Type	Reference	Qty
7.2	9	60	3000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VDF11n/S1	**03811684N0**	
	10		3300:√3 / 110:√3		VDF11n/S1	**03811685N0**	
	15		5000:√3 / 100:√3		VDF11n/S1	**03811686N0**	
	16		5500:√3 / 110:√3		VDF11n/S1	**03811687N0**	
	20		6000:√3 / 100:√3		VDF11n/S1	**03811688N0**	
			6600:√3 / 110:√3		VDF11n/S1	**03811689N0**	
12	20	75	6000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VDF11n/S1	**03811690N0**	
			6600:√3 / 110:√3		VDF11n/S1	**03811691N0**	
	28		10000:√3 / 100:√3		VDF11n/S1	**03811692N0**	
			11000:√3 / 110:√3		VDF11n/S1	**03811693N0**	
17.5	38	95	13800:√3 / 110:√3	30 VA - 50 VA cl. 0.5	VDF21n/S1	**03811694N0**	
			15000:√3 / 100:√3		VDF21n/S1	**03811695N0**	
24	44	125	15000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VDF21n/S1	**03811696N0**	
	50		20000:√3 / 100:√3		VDF21n/S1	**03811697N0**	
			22000:√3 / 110:√3		VDF21n/S1	**03811698N0**	

Double secondary metering and protection VT

Frequency: 50 - 60 Hz

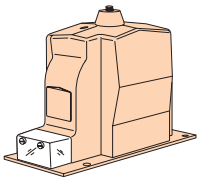
Rated voltage kV	Power frequency withstand kV-1 mn	Lightning impulse withstand kV-peak	Transformation ratio V / V	Power, accuracy class for metering secondary (double usage)	Power, accuracy class for protection secondary	Type	Reference	Qty
7.2	9	60	3000:√3 / 100:√3-100:3	30 VA - 50 VA cl. 0.5	50 VA 3P	VDF11n/S2	**03811699N0**	
	10		3300:√3 / 110:√3-110:3			VDF11n/S2	**03811700N0**	
	15		5000:√3 / 100:√3-100:3			VDF11n/S2	**03811701N0**	
	16		5500:√3 / 110:√3-110:3			VDF11n/S2	**03811702N0**	
	20		6000:√3 / 100:√3-100:3			VDF11n/S2	**03811703N0**	
			6600:√3 / 110:√3-110:3			VDF11n/S2	**03811704N0**	
12	20	75	6000:√3 / 100:√3-100:3	30 VA - 50 VA cl. 0.5	50 VA 3P	VDF11n/S2	**03811705N0**	
			6600:√3 / 110:√3-110:3			VDF11n/S2	**03811706N0**	
	28		10000:√3 / 100:√3-100:3			VDF11n/S2	**03811707N0**	
			11000:√3 / 110:√3-110:3			VDF11n/S2	**03811708N0**	
17.5	38	95	13800:√3 / 110:√3-110:3	30 VA - 50 VA cl. 0.5	50 VA 3P	VDF21n/S2	**03811709N0**	
			15000:√3 / 100:√3-100:3			VDF21n/S2	**03811710N0**	
24	44	125	15000:√3 / 100:√3-100:3	30 VA - 50 VA cl. 0.5	50 VA 3P	VDF21n/S2	**03811711N0**	
	50		20000:√3 / 100:√3-100:3			VDF21n/S2	**03811712N0**	
			22000:√3 / 110:√3-110:3			VDF21n/S2	**03811713N0**	

DE52442



VDF11

DE52443



VDF21

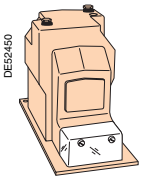
Dimensions page 41

Order form
DIN standard phase-phase VT

Single secondary metering VT

Frequency: 50 - 60 Hz

Rated voltage kV	Power frequency withstand kV-1 mn	Lightning impulse withstand kV-peak	Transformation ratio V / V	Power and accuracy class (double usage)	Type	Reference	Qty
7.2	15	60	3000 / 100	50 VA cl. 0.5	VDC11/S1	**03811777N0**	
	20	60	3300 / 110		VDC11/S1	**03811778N0**	
			5000 / 100		VDC11/S1	**03811779N0**	
			5500 / 110		VDC11/S1	**03811780N0**	
			6000 / 100		VDC11/S1	**03811781N0**	
			6600 / 110		VDC11/S1	**03811782N0**	
12	28	75	6000 / 100	50 VA cl. 0.5	VDC11/S1	**03811783N0**	
			6600 / 110		VDC11/S1	**03811784N0**	
			10000 / 100		VDC11/S1	**03811785N0**	
			11000 / 110		VDC11/S1	**03811786N0**	
17.5	38	95	10000 / 100	50 VA cl. 0.5	VDC21/S1	**03811787N0**	
				100 VA cl. 0.5	VDC21/S1	**03811788N0**	
			11000 / 110	50 VA cl. 0.5	VDC21/S1	**03811789N0**	
				100 VA cl. 0.5	VDC21/S1	**03811790N0**	
			13800 / 100	50 VA cl. 0.5	VDC21/S1	**03811791N0**	
				100 VA cl. 0.5	VDC21/S1	**03811792N0**	
			15000 / 100	50 VA cl. 0.5	VDC21/S1	**03811793N0**	
				100 VA cl. 0.5	VDC21/S1	**03811794N0**	
24	50	125	15000 / 100	50 VA cl. 0.5	VDC21/S1	**03811795N0**	
				100 VA cl. 0.5	VDC21/S1	**03811796N0**	
			20000 / 100	50 VA cl. 0.5	VDC21/S1	**03811797N0**	
				100 VA cl. 0.5	VDC21/S1	**03811798N0**	
			22000 / 110	50 VA cl. 0.5	VDC21/S1	**03811799N0**	
				100 VA cl. 0.5	VDC21/S1	**03811800N0**	



VDC11

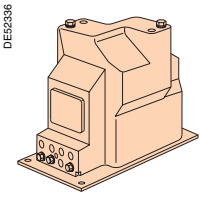
Dimensions page 41

Selection and order form
Phase-earth VT

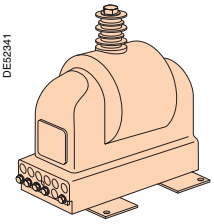
Single secondary metering VT

Frequency: 50 - 60 Hz

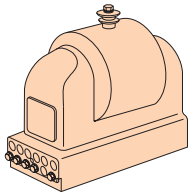
Rated voltage kV	Power frequency withstand kV-1 mn	Lightning impulse withstand kV-peak	Transformation ratio V / V	Power and accuracy class (double usage)	Type	Reference	Qty
7.2	9	60	3000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VRFRn/S1	**03811714N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811715N0**	
	10	60	3300:√3 / 110:√3	30 VA - 50 VA cl. 0.5	VRFRn/S1	**03811716N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811717N0**	
	15	60	5000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VRFRn/S1	**03811718N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811719N0**	
	16	60	5500:√3 / 110:√3	30 VA - 50 VA cl. 0.5	VRFRn/S1	**03811720N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811721N0**	
	20	60	6000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VRFRn/S1	**03811722N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811723N0**	
			6600:√3 / 110:√3	30 VA - 50 VA cl. 0.5	VRFRn/S1	**03811724N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811725N0**	
12	20	75	6000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VRFRn/S1	**03811726N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811727N0**	
			6600:√3 / 110:√3	30 VA - 50 VA cl. 0.5	VRFRn/S1	**03811728N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811729N0**	
	28	75	10000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VRFRn/S1	**03811730N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811731N0**	
			11000:√3 / 110:√3	30 VA - 50 VA cl. 0.5	VRFRn/S1	**03811732N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811733N0**	
17.5	28	95	10000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VRFRn/S1	**03811734N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811735N0**	
			11000:√3 / 110:√3	30 VA - 50 VA cl. 0.5	VRQ3n/S1	**03811736N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811737N0**	
	38	95	13800:√3 / 110:√3	30 VA - 50 VA cl. 0.5	VRQ3n/S1	**03811738N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811739N0**	
			15000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VRQ3n/S1	**03811740N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811741N0**	
24	44	125	15000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VRQ2n/S1	**03811742N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811743N0**	
	50	125	20000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VRQ2n/S1	**03811744N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811745N0**	
			22000:√3 / 110:√3	30 VA - 50 VA cl. 0.5	VRQ2n/S1	**03811746N0**	
				100 VA cl. 0.5	VRQ1n/S1	**03811747N0**	
36	70	170	30000:√3 / 100:√3	100 VA cl. 0.5	VRF3n/S1	**03811748N0**	
			33000:√3 / 110:√3	100 VA cl. 0.5	VRF3n/S1	**03811749N0**	



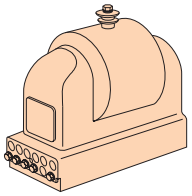
VRFR
Dimensions page 41



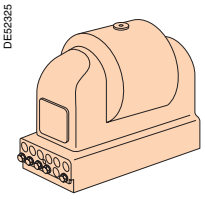
VRF3
Dimensions page 43



VRQ1
Dimensions page 41



VRQ2
Dimensions page 42



VRQ3
Dimensions page 42

Selection and order form
Phase-earth VT (cont.)

Double secondary metering and protection VT

Frequency: 50 - 60 Hz

Rated voltage kV	Power frequency withstand kV-1 mn	Lightning impulse withstand kV-peak	Transformation ratio V / V	Power, accuracy class for metering secondary (double usage)	Power, accuracy class for protection secondary	Type	Reference	Qty
7.2	9	60	3000:√3 / 100:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62558**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62559**	
				100 VA cl. 0.5		VRQ1n/S2	**03811750N0**	
	10	60	3300:√3 / 110:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62567**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62568**	
				100 VA cl. 0.5		VRQ1n/S2	**03811751N0**	
	15	60	5000:√3 / 100:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62561**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62562**	
				100 VA cl. 0.5		VRQ1n/S2	**03811752N0**	
	16	60	5500:√3 / 110:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62570**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62571**	
				100 VA cl. 0.5		VRQ1n/S2	**03811753N0**	
	20	60	6000:√3 / 100:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62564**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62565**	
				100 VA cl. 0.5		VRQ1n/S2	**03811754N0**	
			6600:√3 / 110:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62574**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62575**	
				100 VA cl. 0.5		VRQ1n/S2	**03811755N0**	
12	20	75	6000:√3 / 100:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62576**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62577**	
				100 VA cl. 0.5		VRQ1n/S2	**03811756N0**	
			6600:√3 / 110:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62582**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62583**	
				100 VA cl. 0.5		VRQ1n/S2	**03811757N0**	
	28	75	10000:√3 / 100:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62579**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62580**	
				100 VA cl. 0.5		VRQ1n/S2	**03811758N0**	
			11000:√3 / 110:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62585**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62586**	
				100 VA cl. 0.5		VRQ1n/S2	**03811759N0**	
17.5	28	95	10000:√3 / 100:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62588**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62589**	
				100 VA cl. 0.5		VRQ1n/S2	**03811760N0**	
			11000:√3 / 110:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62594**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62595**	
				100 VA cl. 0.5		VRQ1n/S2	**03811761N0**	
	38	95	13800:√3 / 110:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**03811762N0**	
				50 VA cl. 0.5		VRQ3n/S2	**03811763N0**	
				100 VA cl. 0.5		VRQ1n/S2	**03811764N0**	
			15000:√3 / 100:√3	30 VA cl. 0.5	50 VA 3P	VRQ3n/S2	**AAD62591**	
				50 VA cl. 0.5		VRQ3n/S2	**AAD62592**	
				100 VA cl. 0.5		VRQ1n/S2	**03811765N0**	
24	44	125	15000:√3 / 100:√3	30 VA cl. 0.5	50 VA 3P	VRQ2n/S2	**03811766N0**	
				50 VA cl. 0.5		VRQ2n/S2	**03811767N0**	
				100 VA cl. 0.5		VRQ1n/S2	**03811768N0**	
	50	125	20000:√3 / 100:√3	30 VA cl. 0.5	50 VA 3P	VRQ2n/S2	**03811769N0**	
				50 VA cl. 0.5		VRQ2n/S2	**03811770N0**	
				100 VA cl. 0.5		VRQ1n/S2	**03811771N0**	
			22000:√3 / 110:√3	30 VA cl. 0.5	50 VA 3P	VRQ2n/S2	**03811772N0**	
				50 VA cl. 0.5		VRQ2n/S2	**03811773N0**	
				100 VA cl. 0.5		VRQ1n/S2	**03811774N0**	
36	70	170	30000:√3 / 100:√3	30 VA cl. 0.5	50 VA 3P	VRF3n/S2	**03811775N0**	
			33000:√3 / 110:√3	50 VA cl. 0.5	50 VA 3P	VRF3n/S2	**03811776N0**	

Order form
Phase-earth VT with fuse-holder

Single secondary metering VT

Frequency: 50 - 60 Hz

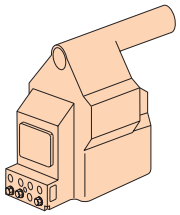
Rated voltage kV	Power frequency withstand kV-1 mn	Lightning impulse withstand kV-peak	Transformation ratio V / V	Power and accuracy class (double usage)	Type	Reference	Qty
7.2	9	60	3000:√3 / 100:√3	30 VA cl. 0.5	VRS3n/S1	**AAD62597**	
	10		3300:√3 / 110:√3		VRS3n/S1	**AAD62603**	
	15		5000:√3 / 100:√3		VRS3n/S1	**AAD62599**	
	16		5500:√3 / 110:√3		VRS3n/S1	**AAD62605**	
	20		6000:√3 / 100:√3		VRS3n/S1	**AAD62601**	
			6600:√3 / 110:√3		VRS3n/S1	**AAD62607**	
12	20	75	6000:√3 / 100:√3	30 VA cl. 0.5	VRS3n/S1	**AAD62609**	
			6600:√3 / 110:√3		VRS3n/S1	**AAD62613**	
	28		10000:√3 / 100:√3		VRS3n/S1	**AAD62611**	
			11000:√3 / 110:√3		VRS3n/S1	**AAD62615**	
17.5	30	95	10000:√3 / 100:√3	30 VA cl. 0.5	VRS3n/S1	**AAD62617**	
	32		11000:√3 / 110:√3		VRS3n/S1	**AAD62621**	
	38		15000:√3 / 100:√3		VRS3n/S1	**AAD62619**	
24	44	125	15000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VRS2Bn/S1	**03811885N0**	
				100 VA cl. 0.5	VRS2Bn/S1	**03811886N0**	
	50		20000:√3 / 100:√3	30 VA - 50 VA cl. 0.5	VRS2Bn/S1	**03811887N0**	
				100 VA cl. 0.5	VRS2Bn/S1	**03811888N0**	
			22000:√3 / 110:√3	30 VA - 50 VA cl. 0.5	VRS2Bn/S1	**03811889N0**	
				100 VA cl. 0.5	VRS2Bn/S1	**03811890N0**	

Double secondary metering and protection VT

Frequency: 50 - 60 Hz

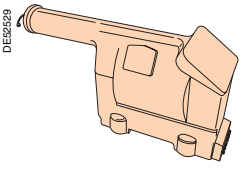
Rated voltage kV	Power frequency withstand kV-1 mn	Lightning impulse withstand kV-peak	Transformation ratio V / V	Power, accuracy class for metering secondary (double usage)	Power, accuracy class for protection secondary	Type	Reference	Qty
7.2	9	60	3000:√3 / 100:√3	30 VA cl. 0.5	30 VA 3P	VRS3n/S2	**03811891N0**	
	10		3300:√3 / 110:√3			VRS3n/S2	**03811892N0**	
	15		5000:√3 / 100:√3			VRS3n/S2	**03811893N0**	
	16		5500:√3 / 110:√3			VRS3n/S2	**03811894N0**	
	20		6000:√3 / 100:√3			VRS3n/S2	**03811895N0**	
			6600:√3 / 110:√3			VRS3n/S2	**03811896N0**	
12	20	75	6000:√3 / 100:√3	30 VA cl. 0.5	30 VA 3P	VRS3n/S2	**03811897N0**	
			6600:√3 / 110:√3			VRS3n/S2	**03811898N0**	
	28		10000:√3 / 100:√3			VRS3n/S2	**03811899N0**	
			11000:√3 / 110:√3			VRS3n/S2	**03811900N0**	
17.5	30	95	10000:√3 / 100:√3	30 VA cl. 0.5	30 VA 3P	VRS3n/S2	**03811901N0**	
	32		11000:√3 / 110:√3			VRS3n/S2	**03811902N0**	
	38		13800:√3 / 110:√3			VRS3n/S2	**03811903N0**	
			15000:√3 / 100:√3			VRS3n/S2	**03811904N0**	
24	44	125	15000:√3 / 100:√3	30 VA cl. 0.5	50 VA 3P	VRS2Bn/S2	**03811905N0**	
			15000:√3 / 100:√3	50 VA cl. 0.5		VRS2Bn/S2	**03811906N0**	
			15000:√3 / 100:√3	100 VA cl. 0.5		VRS2Bn/S2	**03811907N0**	
	50		20000:√3 / 100:√3	30 VA cl. 0.5		VRS2Bn/S2	**03811908N0**	
				50 VA cl. 0.5		VRS2Bn/S2	**03811909N0**	
				100 VA cl. 0.5		VRS2Bn/S2	**03811910N0**	
			22000:√3 / 110:√3	30 VA cl. 0.5		VRS2Bn/S2	**03811911N0**	
				50 VA cl. 0.5		VRS2Bn/S2	**03811912N0**	
				100 VA cl. 0.5		VRS2Bn/S2	**03811913N0**	

DE92326



VRS3

DE52539



VRS2B

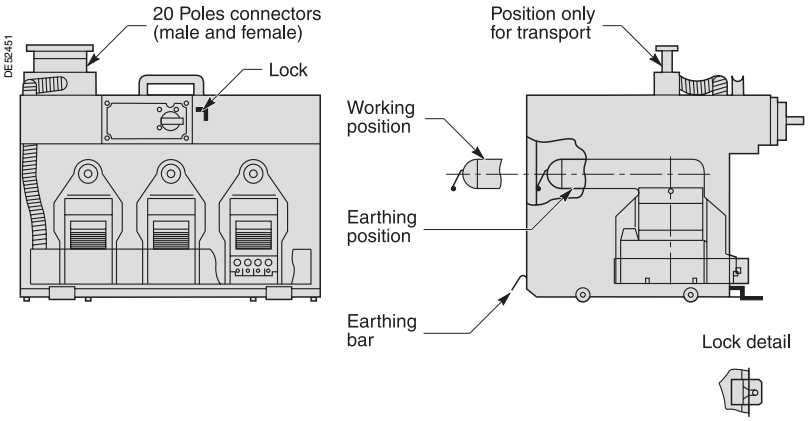
Dimensions page 42 and 43

Selection and order form
Installation structure for phase-earth VT with fuse-holder

Technical description
The mobile installation structure, ready to be assembled for phase-earth voltage transformers with fuse-holders comprises the following components:
- movement selector for the internal part
- movement control arm
- movement selector for the external plastic cover
- torsion spring selector
- self-adhesive VT mimic diagram
- control panel
- 12 contact entrelect unit
- contact rod
- self-adhesive VT indicator mimic diagram.

Type	Reference	Qty
Kit VT	AAD62630	

Example of a voltage transformer compartment



Order form
Phase-phase VT

Single secondary metering VT

Frequency: 50 - 60 Hz

Rated voltage kV	Power frequency withstand kV-1 mn	Lightning impulse withstand kV-peak	Transformation ratio V / V	Power and accuracy class (double usage)	Type	Reference	Qty
7.2	15	60	3000 / 100	50 VA cl. 0.5	VRCR/S1	**03811801N0**	
				100 VA cl. 0.5	VRC1/S1	**03811802N0**	
	20	60	3300 / 110	50 VA cl. 0.5	VRCR/S1	**03811803N0**	
				100 VA cl. 0.5	VRC1/S1	**03811804N0**	
			5000 / 100	50 VA cl. 0.5	VRCR/S1	**03811805N0**	
				100 VA cl. 0.5	VRC1/S1	**03811806N0**	
			5500 / 110	50 VA cl. 0.5	VRCR/S1	**03811807N0**	
				100 VA cl. 0.5	VRC1/S1	**03811808N0**	
			6000 / 100	50 VA cl. 0.5	VRCR/S1	**03811809N0**	
				100 VA cl. 0.5	VRC1/S1	**03811810N0**	
			6600 / 110	50 VA cl. 0.5	VRCR/S1	**03811811N0**	
				100 VA cl. 0.5	VRC1/S1	**03811812N0**	
12	28	75	6000 / 100	50 VA cl. 0.5	VRCR/S1	**03811813N0**	
				100 VA cl. 0.5	VRC1/S1	**03811814N0**	
			6600 / 110	50 VA cl. 0.5	VRCR/S1	**03811815N0**	
				100 VA cl. 0.5	VRC1/S1	**03811816N0**	
			10000 / 100	50 VA cl. 0.5	VRCR/S1	**03811817N0**	
				100 VA cl. 0.5	VRC1/S1	**03811818N0**	
			11000 / 110	50 VA cl. 0.5	VRCR/S1	**03811819N0**	
				100 VA cl. 0.5	VRC1/S1	**03811820N0**	
17.5	38	95	10000 / 100	50 VA cl. 0.5	VRC1/S1	**03811821N0**	
				100 VA cl. 0.5	VRC1/S1	**03811822N0**	
			11000 / 110	50 VA cl. 0.5	VRC1/S1	**03811823N0**	
				100 VA cl. 0.5	VRC1/S1	**03811824N0**	
			13800 / 100	50 VA cl. 0.5	VRC1/S1	**03811825N0**	
				100 VA cl. 0.5	VRC1/S1	**03811826N0**	
			15000 / 100	50 VA cl. 0.5	VRC1/S1	**03811827N0**	
				100 VA cl. 0.5	VRC1/S1	**03811828N0**	
24	50	125	15000 / 100	50 VA cl. 0.5	VRC2/S1	**03811829N0**	
				100 VA cl. 0.5	VRC2/S1	**03811830N0**	
			20000 / 100	50 VA cl. 0.5	VRC2/S1	**03811831N0**	
				100 VA cl. 0.5	VRC2/S1	**03811832N0**	
			22000 / 110	50 VA cl. 0.5	VRC2/S1	**03811833N0**	
				100 VA cl. 0.5	VRC2/S1	**03811834N0**	
36	70	170	30000 / 100	50 VA cl. 0.5	VRC3/S1	**03811835N0**	
				100 VA cl. 0.5	VRC3/S1	**03811836N0**	
			33000 / 110	50 VA cl. 0.5	VRC3/S1	**03811837N0**	
				100 VA cl. 0.5	VRC3/S1	**03811838N0**	

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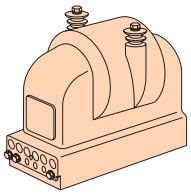

VRC1

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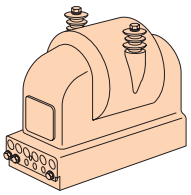

VRC2

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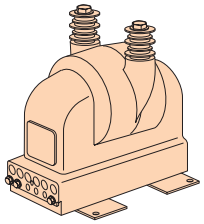


VRC3

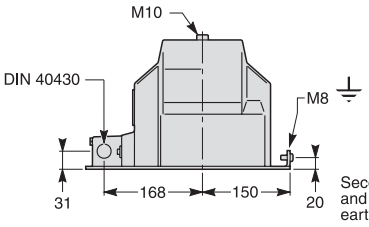
Dimensions page 42

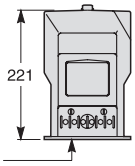
Dimensions

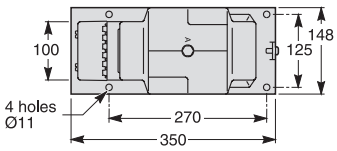
VDF11

DE52399

DE52479







VDF21

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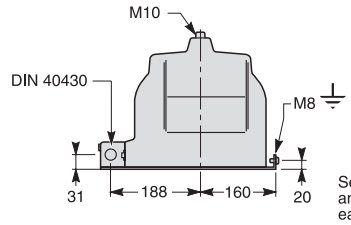

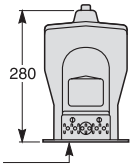

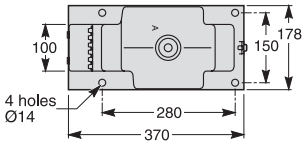

VDC11

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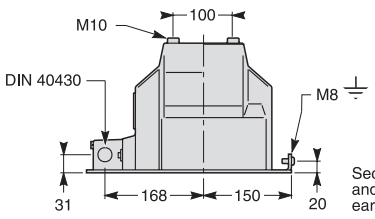

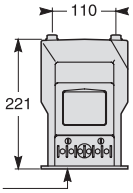

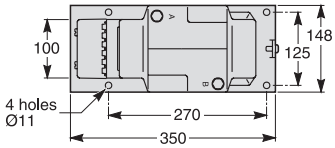

VDC21

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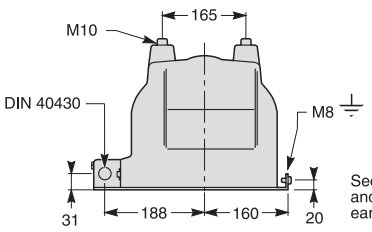

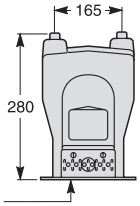

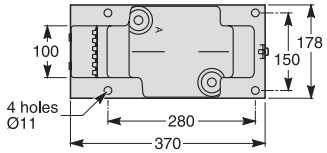

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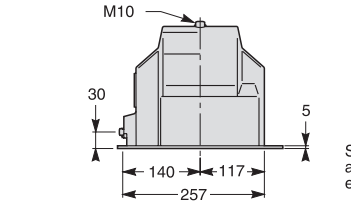

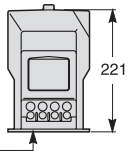

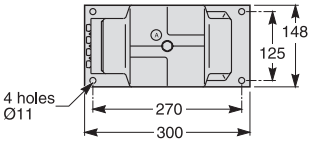

VRQ1

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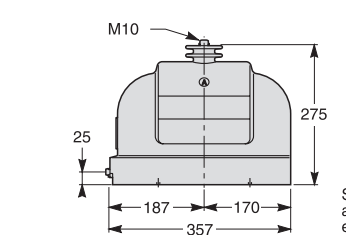

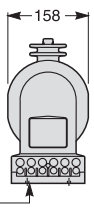

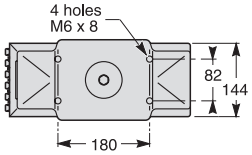

VRQ2

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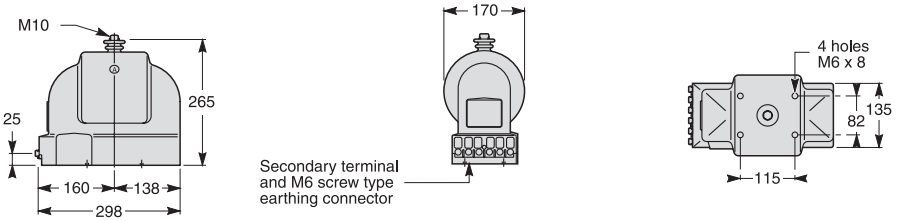

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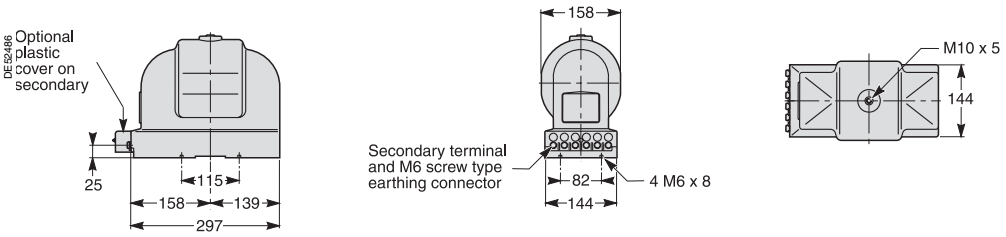

VRC1

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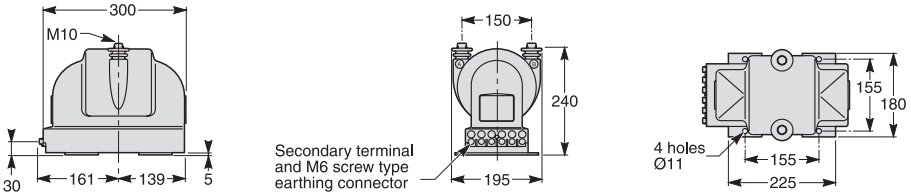

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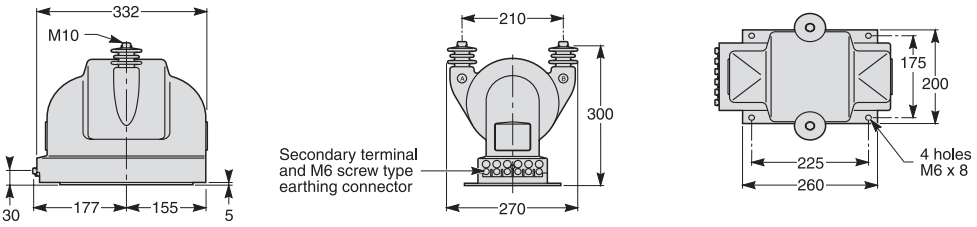

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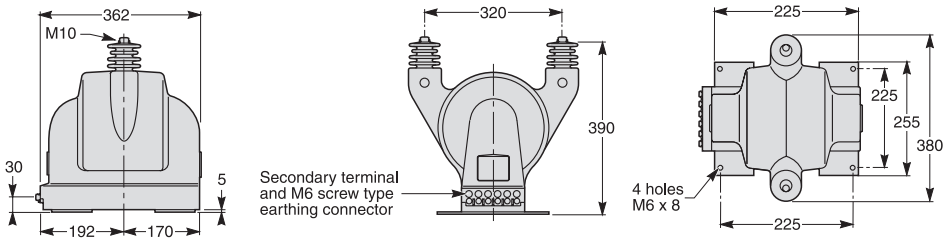

VRS3

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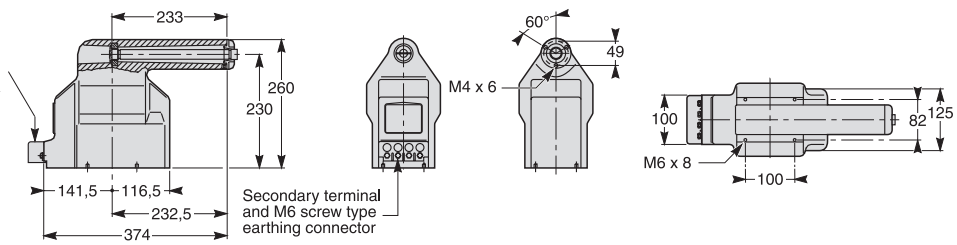

VRS2B

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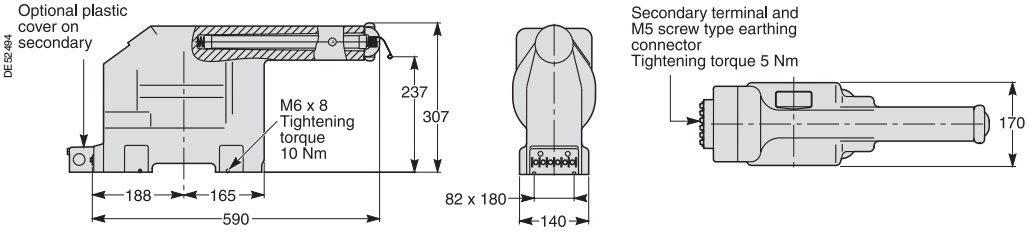

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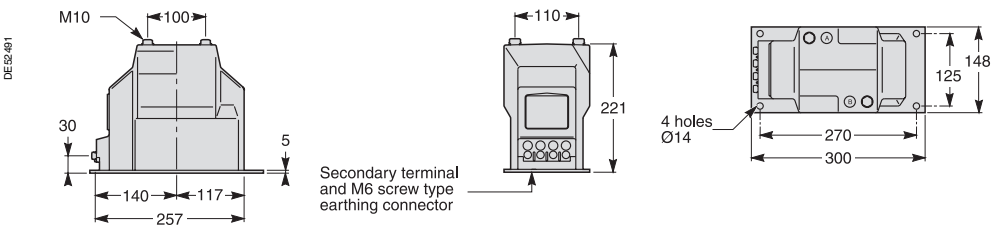

VRF1

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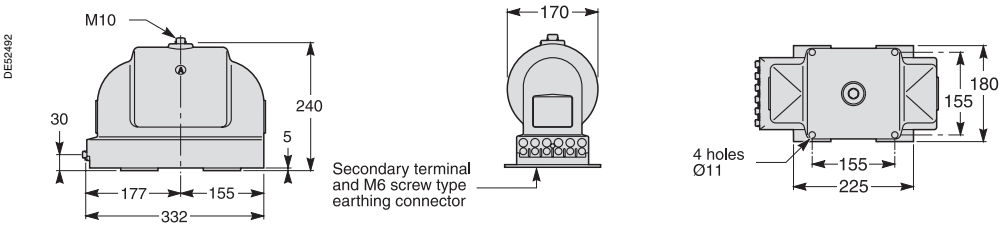

VRF3

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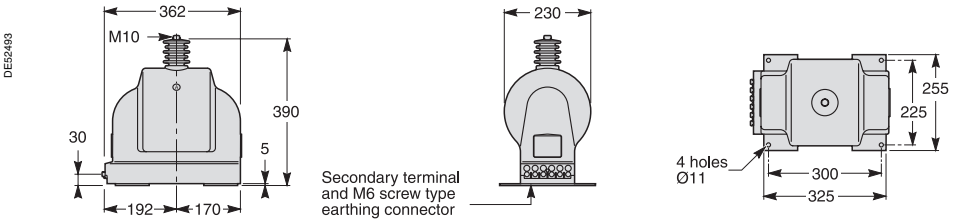

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