Expertise, our source of energy

PRODUCT CATALOGUE

LIGHTNING AND SURGE PROTECTION SPECIALISTS

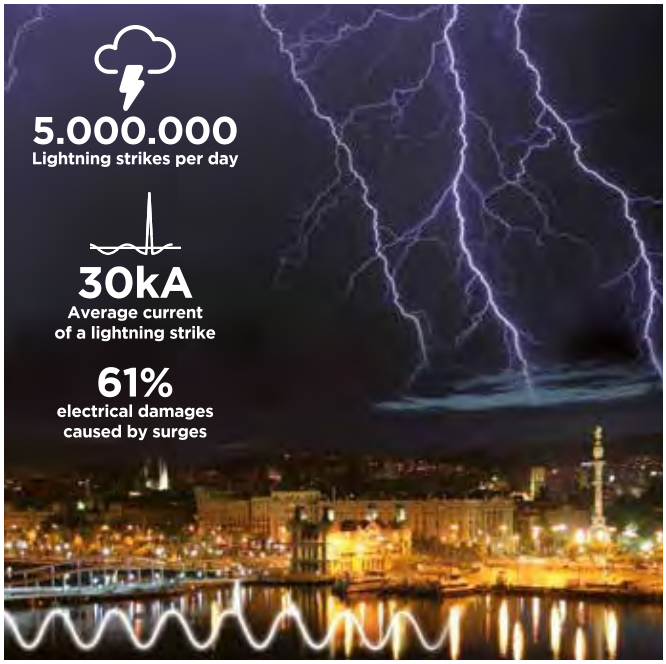
RISK OF ELECTRICAL SURGES

Lightning and surge protection

Electrical and electronic equipment is indispensable in the daily activities of today's businesses and individuals. Such devices are connected to the electricity grid, often exchanging data and signals through communication lines and are usually sensitive to disturbances. These interconnecting **networks provide a propagation path for overvoltages.**

Protection against lightning and overvoltages not only ensures the **safety of people, goods and equipment,** but also ensures **continuity of installation services** and meet criteria of **energy efficiency.**

Overvoltage protection **extends the life of the equipment by more than 20%,** which significantly **reduces the volume of electronic waste.** It also reduces the power consumption of the installations, all of which **translates into cost savings** and environmental sustainability.



Transient voltage surges in LV power lines

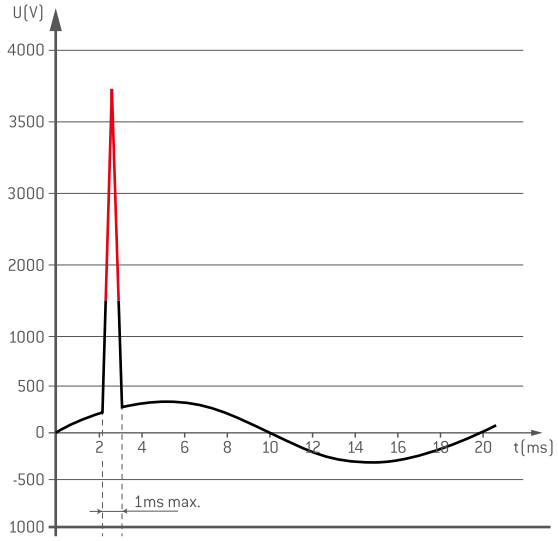
Transient overvoltages are voltage surges that can **reach tens of kilovolts** with a duration of the order of **microseconds.**

Despite their short duration, the high energy content can cause serious problems to equipment connected to the line, from **premature aging to destruction, causing disruptions to service and financial loss.**

This type of surge can have various different causes, including **atmospheric lightning** directly striking the external protection (lightning rods) on a building or transmission line or the associated **induction of electromagnetic fields on metallic conductors.** Outdoor and longer lines are the most exposed to these fields, which often receive high levels of induction.

It is also common for **non-weather phenomena,** such as **transformer centre switching** or the **disconnection of motors or other inductive loads** to cause voltage spikes in adjacent lines.

The protector will **discharge excess energy to earth,** thus limiting the peak voltage to a value acceptable for the electrical equipment connected.

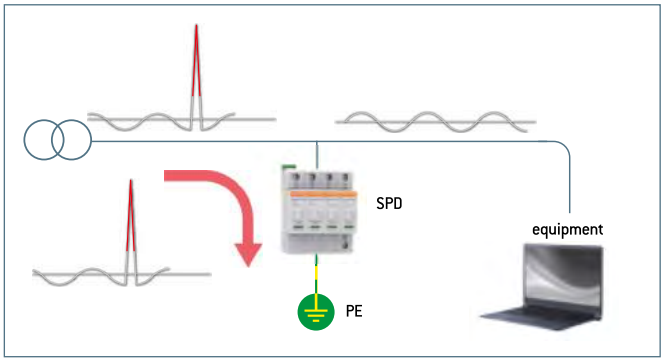


When the peak voltage reaches a value higher than the equipment can withstand, it causes its destruction.

The importance of the ground connection

A ground in proper conditions is therefore an aspect not to overlook when it comes to effective surge protection. Continuously monitoring the state of the ground connection ensures proper operation of surge protection devices. See page 27.

Operating principle of an SPD



Expertise in power quality

Your global electrical power partner

Mersen is a leading market player with innovative solutions in the field of lightning and surge protection.

We design, manufacture, test and certify our products and your systems.

Safety & reliability for surge protection

- **Bringing together the experience** of the principal international **manufacturing and test standards** for SPDs (IEC and UL)
- **Unique expertise in the combination of SPD and fuse technology,** one of the hot topics in the SPD industry
- **Innovative ranges combining surge protection and ground monitoring** to provide full safety and continuity of service
- **World-class surge test platform,** with laboratories holding accreditations for both IEC/EN 61643-11 (Terrassa) and UL 1449 3rd ed (Newburyport)
- **Global manufacturing footprint** of a comprehensive range of solutions covering both IEC and UL markets
- **Leadership in POP (TOV)** (Power-frequency Overvoltage Protection) and combined **SPD+POP** devices. EN 50550.
- Wide range of solutions targeting **industrial, commercial and residential applications**

Lightning and surge protection

Mersen offers a wide range of solutions along with advice and consulting services as well as after sale service

SPD – Surge-Trap®
Surge protective devices to IEC and NEMA/UL.
Also for telecom and signalling networks.

GND – Grounding system monitors.

REC – Smart automatic reclosers.
Fully programmable. POP (TOV) + RCD + MCB

POP (TOV) – Power-frequency Overvoltage Protection.
EN 50550. (Temporary Overvoltages TOV)

ESE – Electronic Early Streamer Emission lightning air terminals.

IMD – Insulation Monitoring Devices.
Electric vehicle, photovoltaic and IT power supplies.

World-class surge test platform

Mersen is committed to **innovation.** The proof of that quest for continual improvement: a total of more than a million tests in 25 years!

In the field of lightning and surge protection Mersen has a highly specialized team, test laboratories, high investment in R&D&i, international patents and presence on standards committees.

Mersen has two surge test labs: one in Newburyport, Massachusetts, and one state of the art Lightning and Surge protection test lab in Terrassa, Spain, namely the Global Center of Excellence for IEC Surge Protection. The two are complementary, in terms of the available resources, to be able to offer the **widest possible range of tests to IEC, UL and NFC standards.**

Mersen welcomes customers at both locations to run test campaigns focused on critical points in their own bills of requirements

SURGE-TRAP® RANGE OVERVIEW

FIRST STEP OF PROTECTION 50kA

STM T1

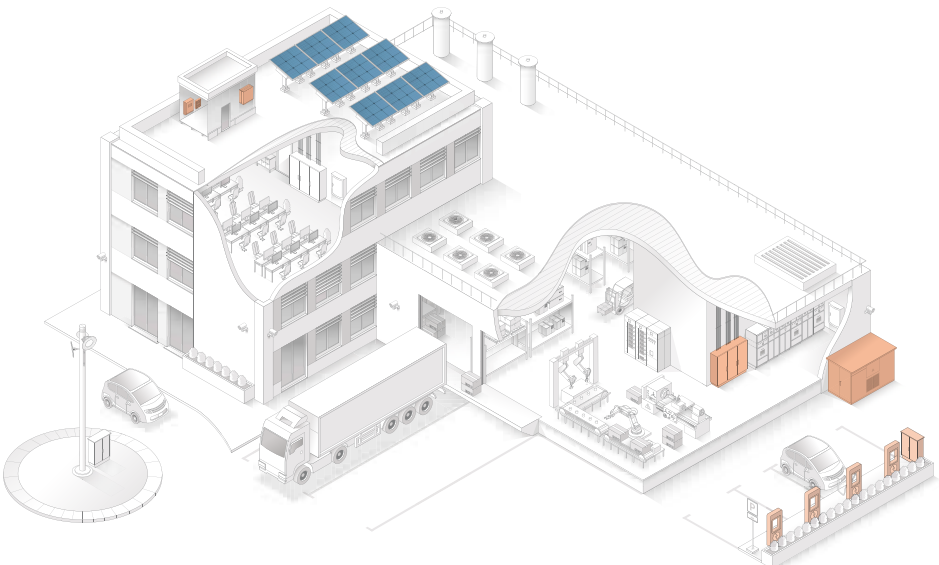
COMBINED TYPE 1+2

STP T12

WIDE RANGE

STP T2

Location	First step of protection		First step of protection		Second step of protection		
SPD Type	Type 1 lightning current arrester to IEC/EN 61643-11		Type 1+2 SPD to IEC/EN 61643-11		Type 2 SPD to IEC/EN 61643-11 Type 2 SPD to UL 1449 4th Ed.		
Iimp (10/350µs)	50kA (phase) / 100kA (N-PE)		12.5kA / 25kA				
Imax (8/20µs)			50kA / 100kA		40kA		
In (8/20µs)	50kA (phase) / 100kA (N-PE)		20kA / 25kA		20kA		
Uoc (1.2/50µs)							
Special features	Ifi = 50kA follow current interrupt rating. Multi-sparkgap technology. Leakage current free.		ELV: Extra Low Voltage models available. Reversible & coded cartridges.		ELV: Extra Low Voltage models available. Reversible & coded cartridges.		
Supply voltage Un (L-N/L-L)	120/208V, 230/400V, 277/480V		60V 120/208V, 230/400V, 277/480V 400/690V		48V, 60V 120/208V, 230/400V, 277/480V 400/690V + above		
Network configuration	TNS, TNC, TT	Single phase Split phase 3-phase WYE; Delta	TNS, TNC, TT, IT	Single phase Split phase 3-phase WYE; Delta	TNS, TNC, TT, IT	Single phase Split phase 3-phase WYE; Delta	
Format	DIN-rail mountable. Monobloc format		DIN-rail mountable. Pluggable format		DIN-rail mountable. Pluggable format		
Type according to EN 61643-11	**TYPE 1**		**TYPE 1+2**		**TYPE 2**		



ONE SOLUTION FOR EVERY STEP OF PROTECTION

FINE PROTECTION

STP T23

SLIM: SPACE SAVING

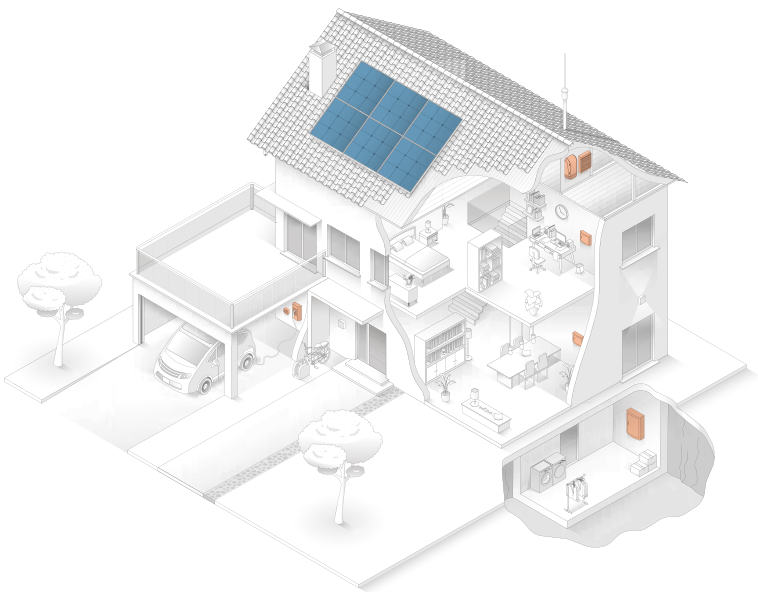
STM T23 SLIM

POWERFUL EMI FILTER

STE T23 EMI

Final stage of protection (very fine)		Final stage of protection (very fine)	Final stage of protection (very fine)
Type 2+3 SPD to IEC/EN 61643-11		Type 2+3 SPD to IEC/EN 61643 -11	Type 2+3 SPD to IEC/EN 61643 -11
20kA		20kA / 6kA	20kA
10kA		10kA / 3kA	10kA
10kV		10kV / 6kV	6kV
PLC: Power Line Communication friendly solutions (LCF). Reversible & coded cartridge.		Ideal for limited spaces (1 module).	Filter attenuation up to 82dB (common mode) vs electromagnetic disturbances. Rated current load up to 20A.
120/208V, 230/400V, 277/480V 400/690V		12V, 24V, 48V, 60V, 120V, 230V Also for use in DC voltage applications	120V, 230V
TNS, TNC, IT, TT	Single phase Split phase 3-phase WYE; Delta	Single Phase TT, TNS	Single Phase TT, TNS
DIN-rail mountable. Pluggable format		DIN-rail mountable. Monobloc format	DIN-rail mountable. Monobloc format

TYPE 2+3



SURGE-TRAP® HIGHLIGHTS

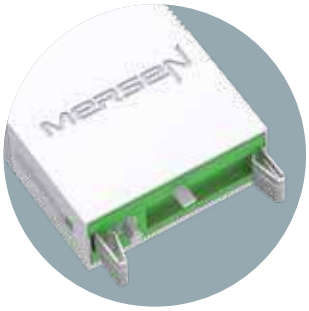
STP Surge-Trap® Pluggable

Remote indication

Dry contacts, optional in all ranges, for remote indication of protector end of life.

Biconnect connection

Two types of terminal: for rigid or flexible cable and for fork type comb busbar.

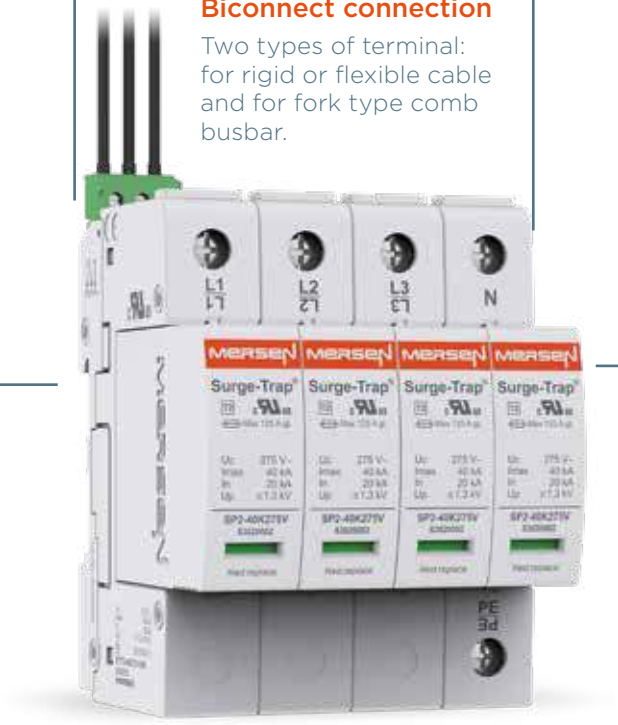


Mersen quality

Product range produced entirely by Mersen, with a thermal disconnection system. Use of the best materials and components. UL 1449 4th Ed.

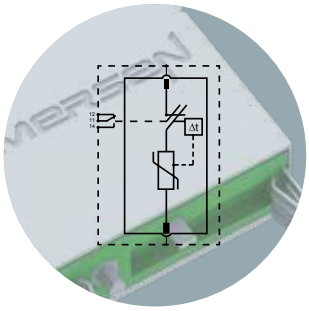
Protector lifetime status indication

Clear display of protection end of life.



Cartridge security system

Vibration proof according to the maximum levels specified in IEC 60721 (2M3 transport & 3M8 operation).



New, optimised disconnection system

Mersen has developed an optimised disconnection system for end of life. Complies with the disconnection tests of the standards for protectors for photovoltaic applications.

Reversible installation

Reversible chassis to allow cable entry from above or below.

Mechanical cartridge coding

Safety system to avoid possible cartridge replacement errors.

THE BEST PERFORMANCE IN THE MARKET

STM T1

Type 1 lightning current arrester

- Discharges impulse currents with a 10/350µs waveform: 50kA per phase.
- Leakage current free (LCF).

Multi Spark Gap

- Follow current suppressing capacity. Ifi: 50kA.
- Low residual voltage.

STM T23 SLIM

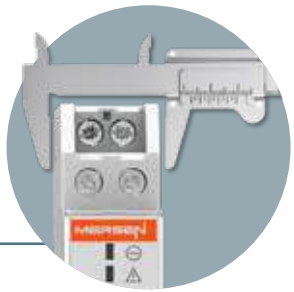
S

Status indication

- Remote and visual indication of life status of the protection device.

Type 2+3, 2 poles in 1 module

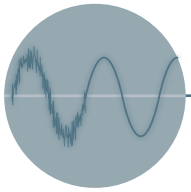
- Compact combined device (Type 2+3) for fine protection. Ideal for limited spaces.



STE T23 EMI

EMI / RFI Filter

- All models include an electromagnetic filter for network noise.

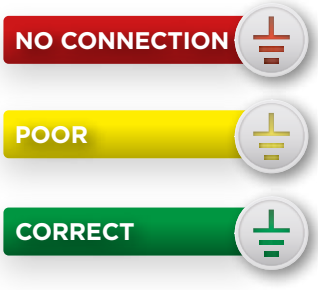


Combined SPD (Type 2+3)

- Combined devices for discharging induced transient overvoltages, while providing a very fine protection level for sensitive equipment.

STP TERRA

TERRA® is the first protection device in the market that, in addition to indicating that it is properly wired, guarantees that there is an adequate path to earth, which is essential if the protection device is to shunt the energy peaks to earth effectively.



Earth status indicator

- Continuous LED display of the earth status.

GROUNDING SYSTEM MONITORING

- SURGE-TRAP® TERRA
- GROUND MONITORING INSIDE THE SPD
- CONFIGURABLE GROUNDING SYSTEM MONITORING
- GMD®

SURGE-TRAP® TERRA

Monitoring the grounding system in the surge protection device itself

For the protection to work properly, the correct status of the grounding system in an electrical installation is essential.

DID YOU KNOW that nobody knows what percentage of installed surge protection devices are providing good protection?

TERRA® is the first protection device on the market that, in addition to indicating that it is properly wired, guarantees that there is an adequate path to ground, which is essential if the protection device is to shunt the energy peaks to ground effectively.

The premium solution for the most demanding installations

TERRA®'s simple information makes it the ideal solution for both unskilled personnel and maintenance professionals specialised in ground connections.

It helps to avoid situations that might cause power cuts and repair costs, with the resulting damage to your brand image.

It provides additional information about the grounding system, with potential synergies for protection and safety in general, not just for surge protection.

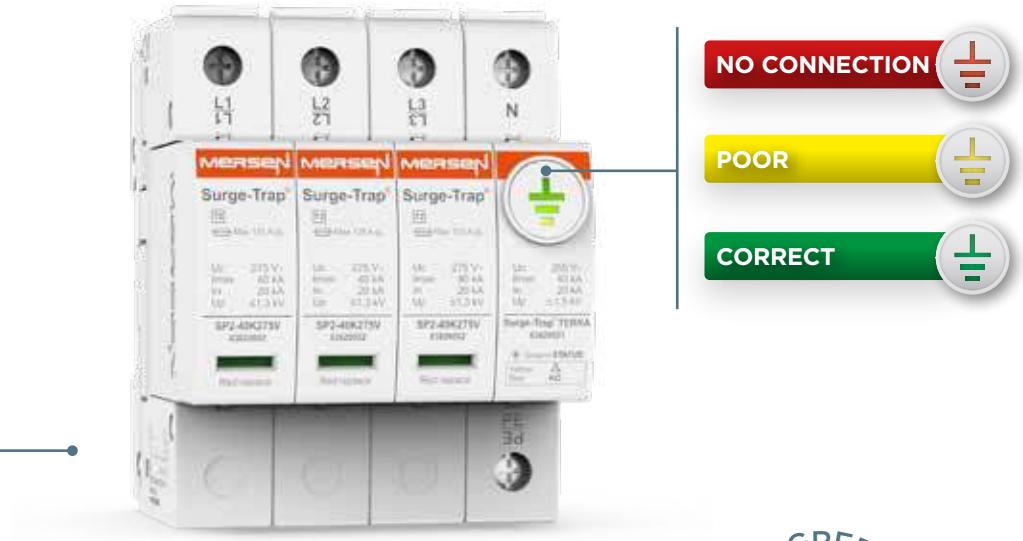
TERRA

Technology

TERRA® is based on the impedance loop technology already patented, sold and implemented by Mersen in thousands of protection solutions.
TERRA® patent pending.

Ground status indicator

Continuous LED display of ground status.



1st

The best SPD on the market

TERRA® is the premium protection device in the Mersen STP range, designed according to the most exacting standards. Intelligent protection.

GREEN FOR GO

Wiring safety

The only protection device on the market that tells you when it is properly installed, avoiding risks due to electrical wiring errors.

GROUND MONITORING INSIDE THE SPD

Confirmation of proper installation

Almost 25 years of experience in the sector confirm that it is relatively common for wiring **errors to occur** during the installation of surge protection devices. These errors result in the **loss of protection or risks to the installation itself.**

When the TERRA® LED is green, it means that the protection device is properly wired and powered up. Green for Go.

Effective surge protection

Even when equipped with surge protection devices, the electrical installation may still be subject to the effects of overvoltage if the ground connection is inadequate or in poor condition.

When the TERRA® LED is green, it indicates that the ground path is good enough to shunt the energy peaks to ground effectively. Green for Go.

Safety information in the event of indirect contact

Just as happens with surge protection devices, the safety of the electrical installation in the event of indirect contact is based on there being a grounding connection.

When TERRA® cannot detect any ground connection, it is advisable to check the installation status.

Ratings and features

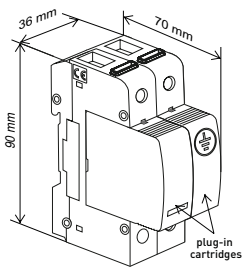
- Patented TERRA® technology for loop impedance monitoring
- Confirmation of correct device wiring at installation time
- Continuous indication of the effectiveness of the protection offered
- Additional safety information in the event of indirect contact
- Maximum discharge current (8/20 µs): 40 kA per phase
- Nominal discharge current (8/20 µs): 20 kA per phase
- TT and TNS networks
- Un (L-N/L-L): 230/400 V
- Plug-in DIN rail format

Catalogue numbers / Reference numbers

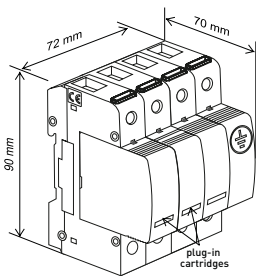
		Network						
REFERENCE NUMBER	Catalogue NUMBER	SYSTEM TYPE	ELECTRICAL DIAGRAM	Un [V]	Uc [V]	Imax (8/20) [kA]	In (8/20) [kA]	Up@In (8/20) [kV]
83020183	**STPT2-40K275V-2P-TE**	1Ph+N	A	230	275	40	20	≤1,3w
83020185	**STPT2-40K275V-4P-TE**	3Ph+N	B	230/400	275	40	20	≤1,3 (L-N) ≤1,5 (N-PE)

Dimensions

2 poles

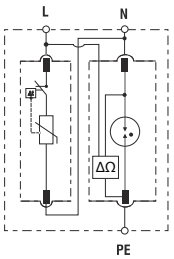


4 poles

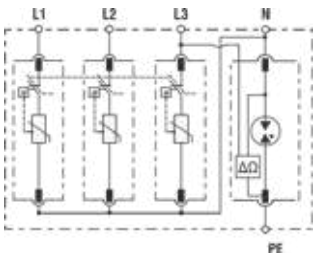


Electrical diagrams

A 1Ph+N



B 3Ph+N



CONFIGURABLE GROUNDING SYSTEM MONITORING

GMD®

GMD® is a control device that continuously monitors the state of the ground connection:

- Ensures proper operation of surge protection devices (SPDs) that discharge energy through the facility ground connection.
- Provides additional safety information to avoid indirect contact.
- Reduces preventative maintenance costs.

By the loop resistance calculation method, GMD® checks the impedance of the actual leakage path of an indirect contact, enabling it to **detect the following possible incidents,** both in the installation itself and in transformer centre to which it is connected:

- **Deterioration of the ground connection** due to ageing of the earth rods, due to theft or increased soil resistivity during dry periods.
- **Breakage or incorrect wiring of the neutral cable.**

Ratings and features

- The system of grounding measurement by loop impedance can be applied to the various neutral configurations: TT, TNS and TNC-S
- Un (L-N/L-L): 120/208 V, 230/400 V
- Monobloc DIN rail format
- Alarm function on the ground value (PE). Activates the output if it detects a value shown on the display exceeding a maximum preset by the user

24/7

Grounding system monitoring

Easy to install

Panel mounting

Assists with maintenance

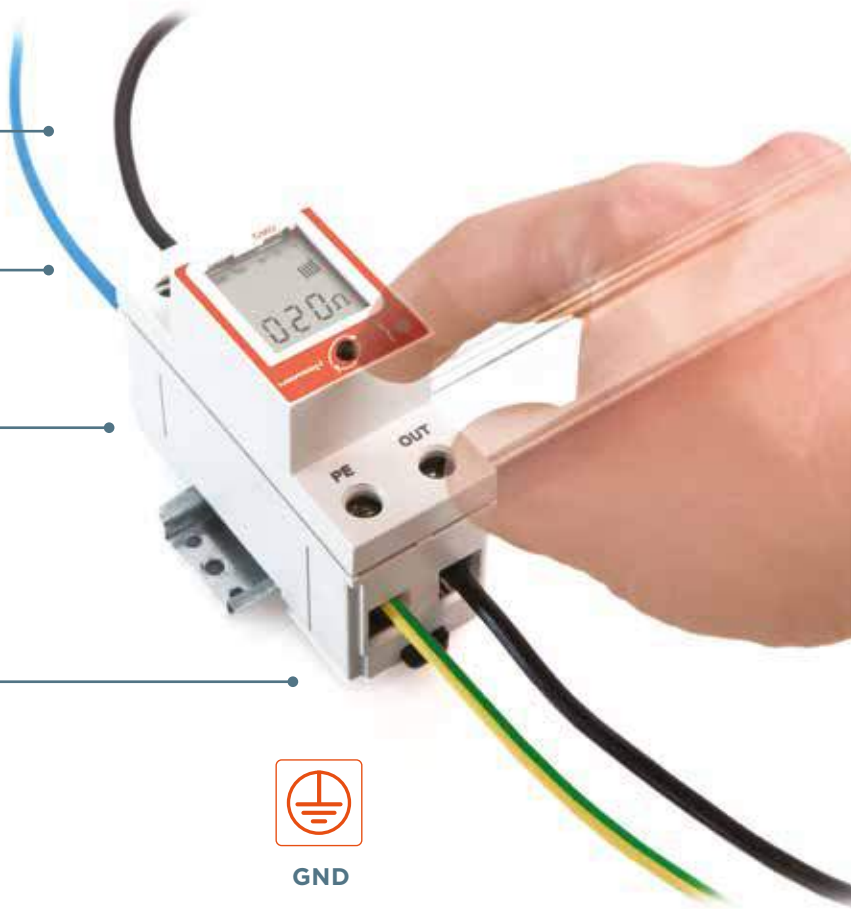
Complementary to regular grounding system maintenance

Real-time monitoring of the grounding system condition

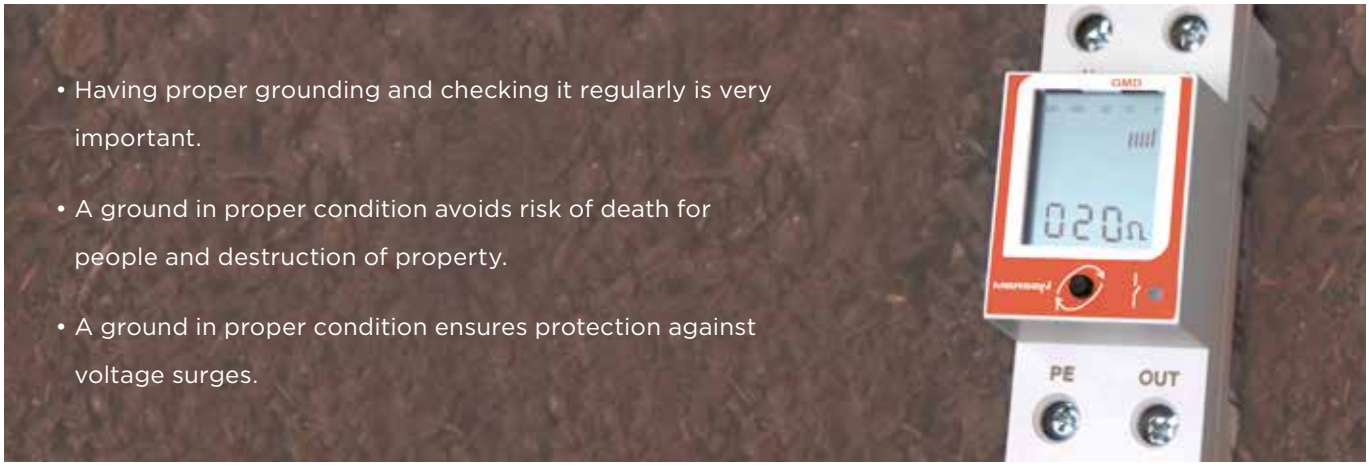
Monitors

Cable theft / Soil resistivity

Cable breakage / poor connection



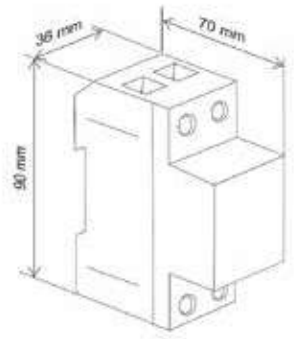
Importance of grounding systems



Catalogue numbers / Reference numbers

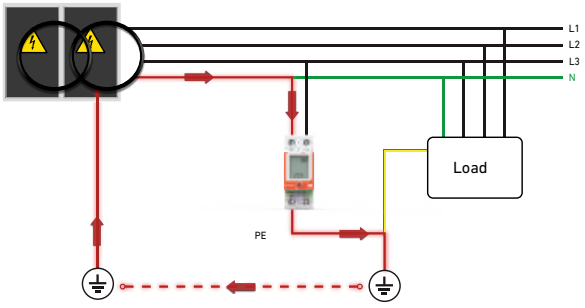
REFERENCE NUMBER	CATALOGUE NUMBER	Un [V]	FREQUENCY [Hz]	SETTING THRESHOLD	OUTPUT RELAY	RESPONSE TIME
83060251	**GMD-120V**	120	50 / 60	1...500 Ω	1 (OUT-N)	inst.
83060250	**GMD-230V**	230	50 / 60	1...500 Ω	1 (OUT-N)	inst.

Dimensions

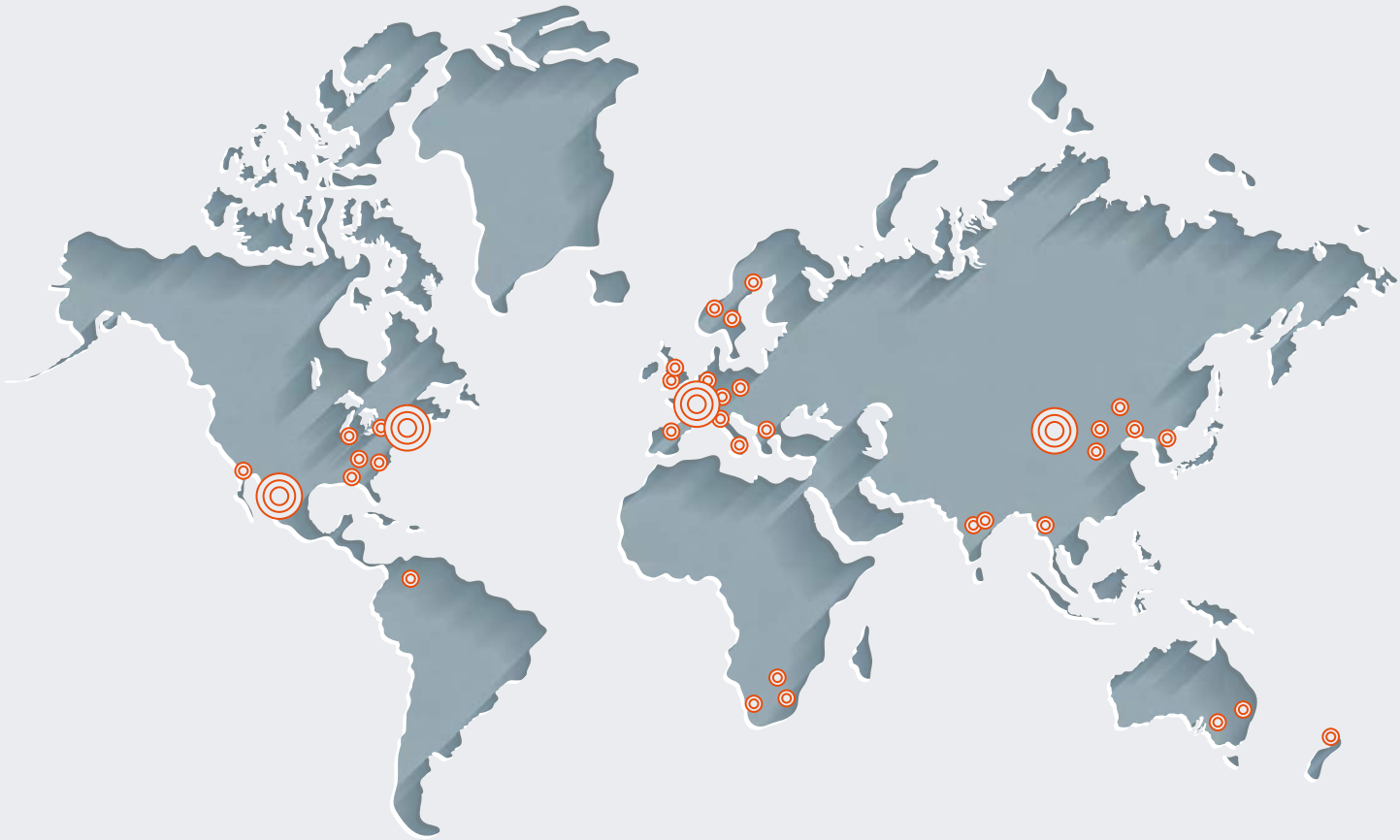


Measurement

Measurement loop or leakage current loop in TT systems.



TELECOM	WATER TREATMENT	COMMERCIAL	DATA CENTER	INDUSTRIAL
				



Mersen
Expertise, our source of energy

GLOBAL EXPERT
IN ELECTRICAL POWER
AND ADVANCED MATERIALS

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