Electrical network management

Vigilohm

The IT earthing system to improve electrical network availability

Catalogue
2012

Schneider Electric

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Ensuring continuity of service in the event of an insulation fault

Continuity of service in an essential operational requirement for power networks. The installation must also comply with specific rules to protect people and property.

These safety requirements involve the use of protective devices which operate when there is a risk that could cause the network to become partially unavailable.
The consequences can be significant:

> Total or partial stopping of the process.

> Partial or total loss of production.

An IT ("isolated from earth") earthing system is the only one in which safety is assured without the need for additional protective equipment. The installation can operate without endangering people even in the presence of an initial insulation fault.

What do the standards say?

The IT earthing system is described in several standards:

> IEC 60364-4-41
Electrical installation in buildings:
- protection for safety,
- protection against electric shock.

> IEC 60364-7-10
Requirements for special installations or locations - Medical locations.

> IEC 61557-8
Insulation monitoring devices for IT earthing systems.

> IEC 61557-9
Equipment for insulation fault location in IT earthing systems.

These standards clearly state that, with the IT earthing system, the installation must be isolated from earth or connected to earth through a sufficiently high impedance.

In the event of only one ground or earth fault, the fault current is very low and interruption is unnecessary.

Since a second fault would cause a circuit breaker to trip, an insulation monitoring device (IMD) is required to indicate an initial fault.

This device must activate an audible and/or visual signal.

IEC

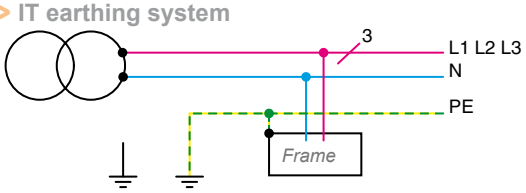
Our solution complies with international standards

The IT earthing system

The neutral of the transformer's secondary is not connected to earth, and the load casing is connected to earth.

In the event of an insulation fault, **current cannot loop** via the transformer's neutral:

> IT earthing system

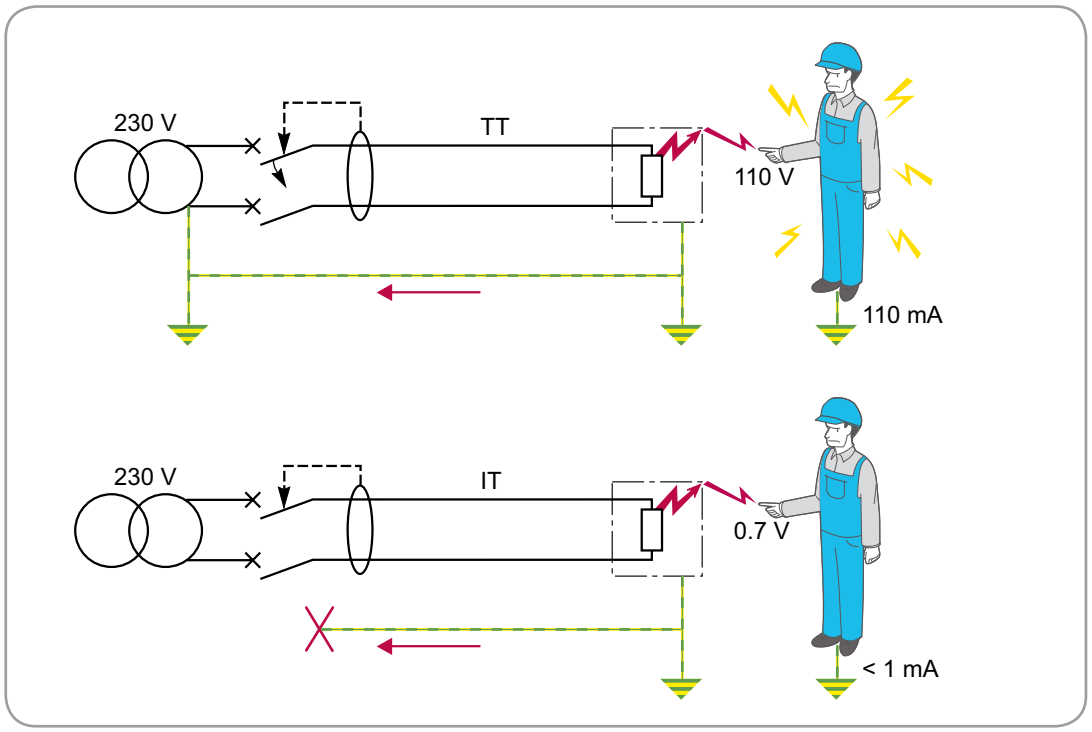


- No dangerous contact voltage when touching metal parts.
- Very low fault currents.

Therefore, an **IT** earthing system **guarantees the best continuity of service.**

The installation can operate **without endangering** people and equipment even in the presence of an insulation fault. As a result, protective devices are not triggered.

However, the faulty circuit must be detected and repaired **before a second fault occurs** because a second fault would cause a short circuit between phases and trigger protective devices.



Insulation monitoring devices

An indispensible solution for implementing an IT earthing network.

Insulation monitoring device (IMD):

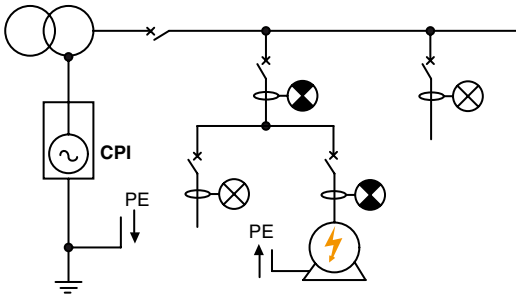
These devices are mandatory in an IT earthing system.
An insulation monitoring device injects DC or low-frequency AC voltage between the network and earth. The resulting current that flows through the IMD is then measured.
The insulation value is calculated from this low-frequency current.

Note: in an IT earthing system, a 50 Hz fault current is difficult to measure since it loops through the capacitances distributed in the network. The injected current will go through the insulation monitor.

The IMD indicates the fault locally on its front panel depending on the adjustable threshold set on the device. It also activates a relay output to a visual or audible indicator.

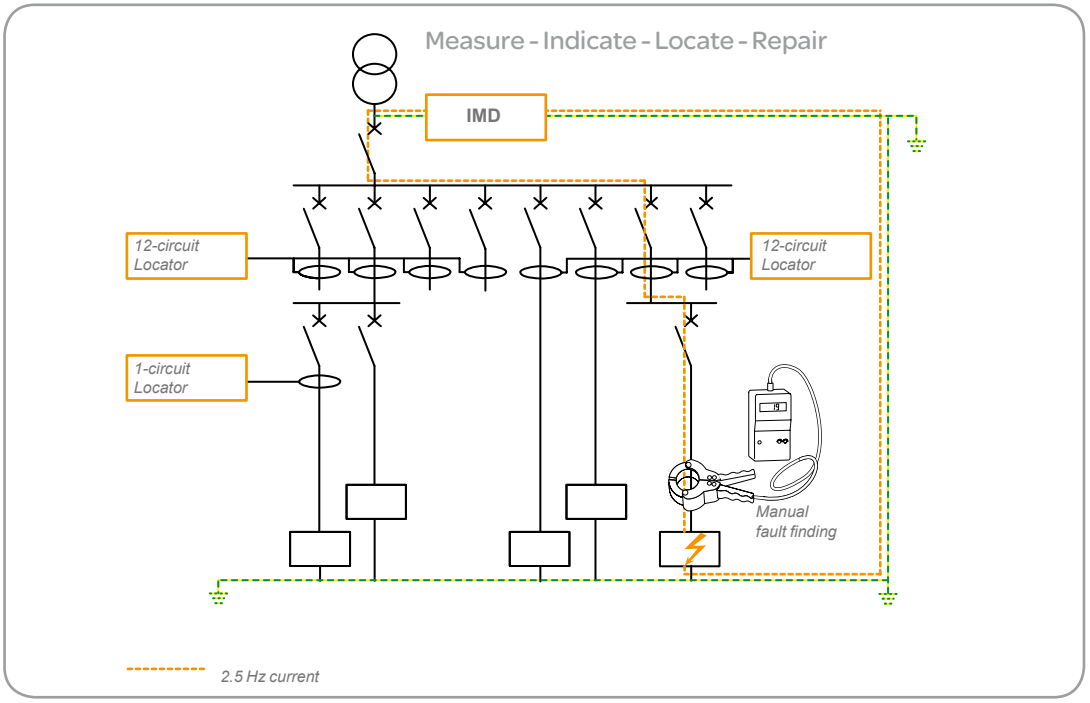
Depending on the device, it can also be used to:

- Display the insulation resistance value locally.
- Display the leakage capacitance value for the monitored network.
- Store time-stamped alarms.
- Communicate with a supervisor.



Fault location:

On networks with many circuits, the IMD can be associated with a locator (XD301 – XD312) that can identify the faulty circuit.
Such locators use the 2.5 Hz signal injected by the IMD to determine through which circuit the fault current is flowing. There is no link between the locators and the IMD.



No connection between the locator and the IMD.

Possibility of R and C measurements per circuit (XL and XML series).

These locators can be fixed devices connected to toroids that measure the injected current, or mobile. They can monitor 12 circuits or one separate circuit.

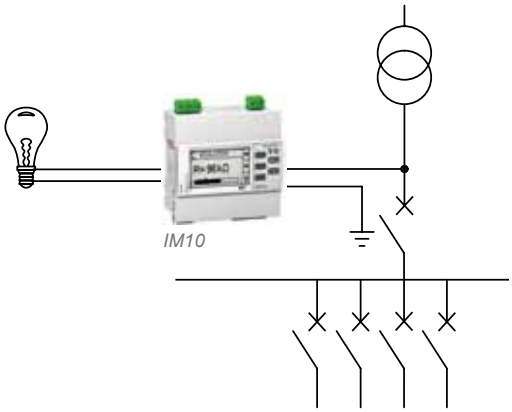
Advanced versions of these locators (XL and XML) provide the insulation value on a circuit by circuit basis. This simplifies maintenance of large networks.

A reliable and effective solution

Schneider Electric, a global specialist in electrical power management, offers a range of solutions tailored to your network.

We accommodate expanse, number of circuits, presence of coupling, etc. Schneider Electric has been in the IMD business for more than 50 years.

Small networks or islands
(C max = 40 µF)



Easy to install and use

> There is a transformer to create the IT island. Its neutral is not connected to earth.

> There is an IMD (IM9 or IM10) to detect the first fault:
- it is generally powered by the network that it monitors,
- it is connected to neutral (or to one phase) and earth,
- its only setting is the fault threshold level,
- it has a single relay output to a light or alarm sound.

These products are available in both DIN rail and flush-mount formats.

Further options depending on model include

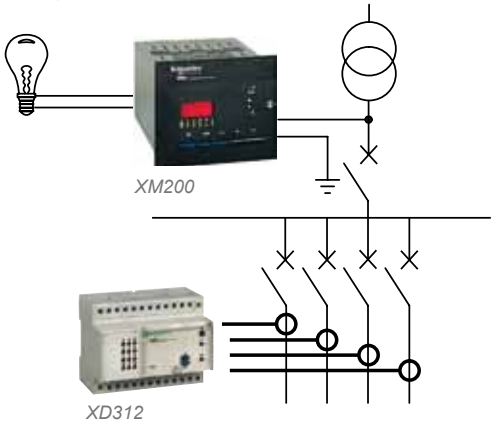
> Display of R value to facilitate preventive maintenance.

> Display of the network's C value.

> Modbus serial link.

> Alarm log.

Network with many feeders: simple solution



Advanced monitoring and fault location

This architecture is simple to implement since there are no connections between the various modules.The IMD (XM200) injects a 2.5 Hz current and measures R and C using this current.

When the XM200 indicates a fault, the maintenance team must locate and clear the fault.
On a continuous process, this fault tracing operation cannot be done by tripping circuit breakers.

The XD312 modules measure the 2.5 Hz current in each circuit and compare it with a threshold value. The fault can then be located without interference on the network.

Advantage of the Schneider Electric offer

Measurement and display of C
Monitoring of C is essential on large networks since the C-related impedance can cause these networks to drift towards a TT arrangement, which would give rise to a dangerous contact voltage and a high fault current after an insulation fault. Only Schneider Electric displays the C value.

Fault location without connection to the IMD
This feature can simplify the implementation and use of the system. It also removes any limit on the number of XD312 locators.

A reliable and effective solution

Per-feeder measurements for highly critical networks.

Large networks and/or several buildings

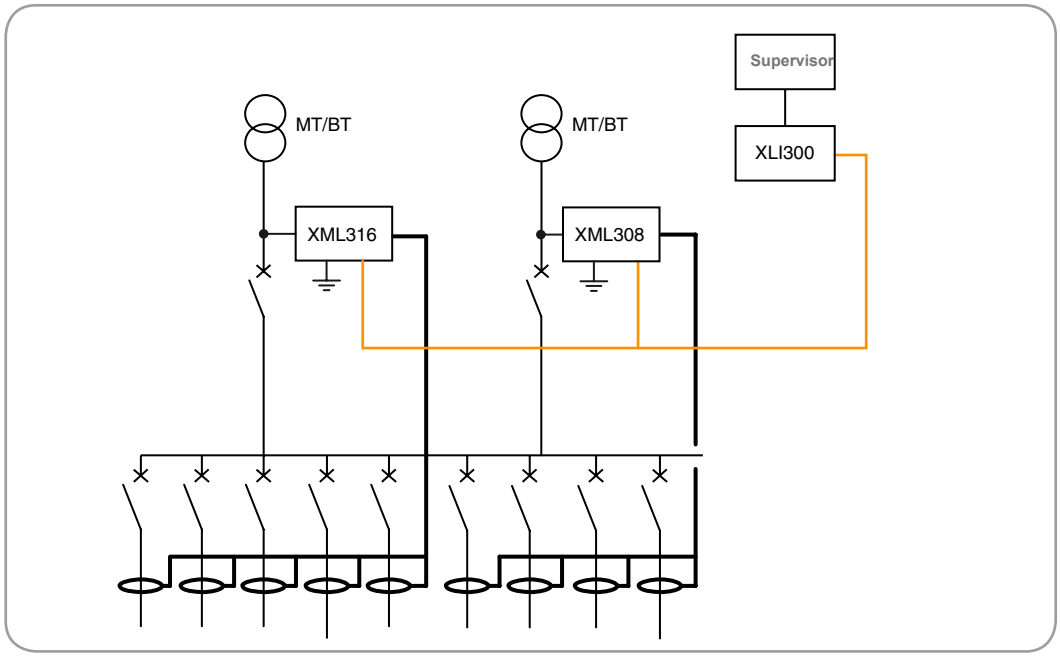
Easy to manage IT islands are ideal for large networks. If this is not possible, then it is beneficial to have R and C measurements per building or per critical circuit.

Improvement of preventive maintenance

Per-feeder measurements enable constant monitoring of the insulation change for each group of critical circuits.

This gives the maintenance team a better overview of the entire network and the capability to anticipate issues.

This feature, which is exclusive to Schneider Electric, can meet the following needs.



XML316

Per-feeder measurement

In this architecture, the XML products provide both the IMD function and per-feeder measurements.

All measurements and time-stamped alarms are accessed via the supervisor.

The XLI300 provides both a communication interface and IMD exclusion when the second circuit breaker is closed (1).

This solution can also be combined with fault location by an XD product, thereby enabling fault location lower down in the network tree.

(1) Exclusion

The IMD injects a low frequency into the network. In a network with several incoming feeders, depending on the circuit breaker position, there must be no more than one IMD injecting into the network. This injection exclusion is managed by the XLI300 interface.

→ At least one IMD, but no more than one, per subnetwork.

Fault locating

Fault locating

Once detected, an insulation fault must be located and eliminated in order to guarantee maximum continuity of supply.

Manual fault locating
The fault is located by testing different points in the installation, one after another, using a Vigilohm System XRM mobile receiver and a current probe. The receiver captures the low-frequency fault locating signal.
Two cases may be encountered:

- the installation is equipped with an XM200 or an XM300C. In this case, the manual system is used to fine-tune the results of the automatic locating system.
- the installation (relatively small or a sub-network) is equipped with an insulation monitoring device with a small measurement current (IM9, IM10, IM20). In this case, a Vigilohm XGR portable generator is used together with an XRM receiver.

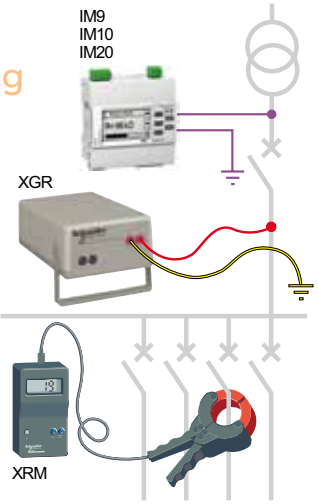
Automatic fault locating
For easy locating of insulation faults, the Vigilohm System makes it possible to combine the XM200 and XM300C insulation monitoring devices with:

- XD301/XD312 fault detectors to monitor the different circuits of the installation.
- XRM receivers for mobile fault locating.

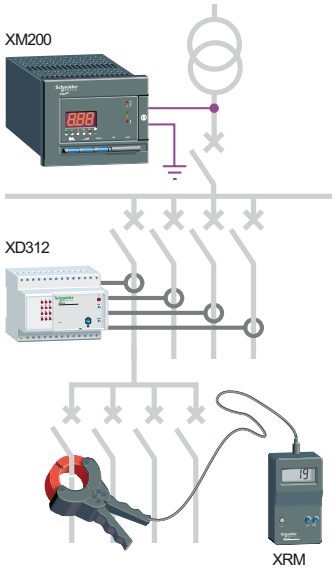
Fault locating in hospitals
The safety of the patient and operating room staff is critical and standards prohibit measurement currents greater than 1 mA. This is not compatible with automatic fault locating or the XGR portable generator. However, the need to have automatic fault locating is limited for two reasons:

- an insulation fault is rare in such a limited area. It is not so urgent to localize the fault as the probability of having a second fault is close to zero.
- it is easy to locate the fault by disconnecting equipment or sequentially opening the circuit breakers after using the room.

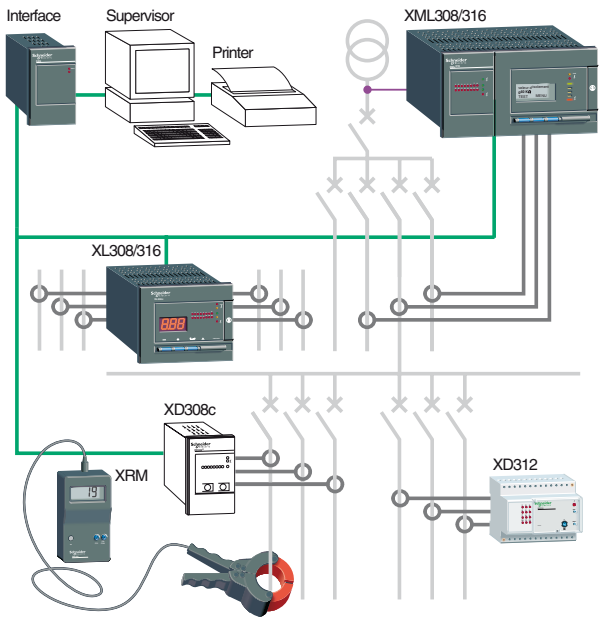
Manual fault locating



Automatic fault locating



Automatic fault locating with R & C measurement per feeder



Hospital: dedicated modules

To secure power distribution and monitoring solution for operating theatres.

Operating rooms require extremely high availability and quality of electric power to offer patients maximum safety.
For this reason, the standards lay down very strict rules to ensure the continuity of service of electrical installations.

What do the standards say?

- In group 2 rooms for medical use, the medical IT system should be used for the circuits powering medical electrical equipment and systems for survival and surgical applications, and the other equipment located in the environment of the patient.
- An audible and visual alarm must be provided in the room in question to alert medical personnel.
- Operating activities must have continuity of electric power supply.
- For the satisfactory operation of medical equipment, prevention of electromagnetic disturbances may be necessary.
- Monitoring of overload and high temperature for the medical IT transformer is required.
- An alarm should take place if the earth connection or the connection to the system is disconnected.

IEC

Our solution complies with international standard IEC 60364-7-710 and national standards and regulations

IM10-H and HRP (Hospital Remote Panel) for the "Classic" solution

- Graphic display.
- Bargraph.
- Smart HMI.
- 8 languages.
- Earth and injection connection monitoring.

Simple and efficent

- Audible and visual alarm for an insulation or electrical fault (transformer overload or circuit breaker tripping).
- Testing of the insulation monitoring system.
- Audible alarm stoppage.
- 24 V DC power supply.
- Antibacterial.
- Tested with Anios products (disinfection products).
- Complies with IEC 60601-1 (medical equipment).

IM20-H as a brick of the advanced solution

- Modbus Communication.
- Datalog with timestamping of all events.
- Transformer management:
  - secondary load current display,
  - alarm on threshold (in % of nominal current),
  - alarm on temperature through the sensor (bimetal).

Hospital version specificities

- Threshold minimum: 50 kOhm.
- Measurement current < 1 mA.
- Measurement voltage < 25 V.
- Transformer monitoring (IM20-H).

Product selection according to type of installation

Markets	Industrial & Marine (for hospital, see page 17)						
Networks	Small Networks		Medium & Large Networks (2)				
	Machine	Off-line Motor	Medium networks up to 40 µF (IT island)		Large or fault location		Measurement per Feeder
						+ Com	
Compatible control networks	No	No	Yes	Yes	No	Yes	Yes
Threshold + Alarm	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R Display	No	No	Yes	Yes	Yes	Yes	Yes
AC Network	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DC or AC with DC components Network	No	No	Yes	Yes	Yes	Yes	Yes
Communication	No	No	No	Yes	No	Yes	Yes
Automatic fault location compatible	No	No	No	No	Yes	Yes	Yes
C	No	No	No	Yes	Yes	Yes	Yes
Zc	No	No	No	Yes	No	No	No
Alarm Log	No	No	No	Yes	No	Yes	Yes
HV Subassembly	No	No	No	Yes	No	Yes	Yes
Motor Off-Line	No	Yes	No	No	No	No	No
Input for Injection inhibition	No	No	No	Yes	No	No	No
Form Factor	Multi 9 Insert screws for panel mount		Panel Mount & DIN Rail (Multi 9 compatible)		Panel Mount		
Insulation Monitoring Device	IM9 	IM9-OL 	IM10 	IM20 	XM200 	XM300C 	XML308/ 316 CPI + Measurement per feeder 
Auxiliary supply	110 - 415 V AC 125/250 V DC				115/127 or 220/240 or 380/415 V AC		
Fault Location Devices	No	No	No	No	XD301 		
					XD312/XD308C 		
Measurement per feeder	No	No	No	No	No	XL308/316 	
Communication interfaces	No	No	No	No	No	XLI300 or XTU300 	
Accessories (1)				HV-IM20		PHT1000	
	Cardews - Limiting impedance (ZX)						
					Toroids		
	Mobile fault locating						

(1) *Except IM9-OL.*
(2) *Choice between IM10/IM20 and XM200 - see page 12.*

Choosing the best architecture

A variety of possibilities depending on the type of network.

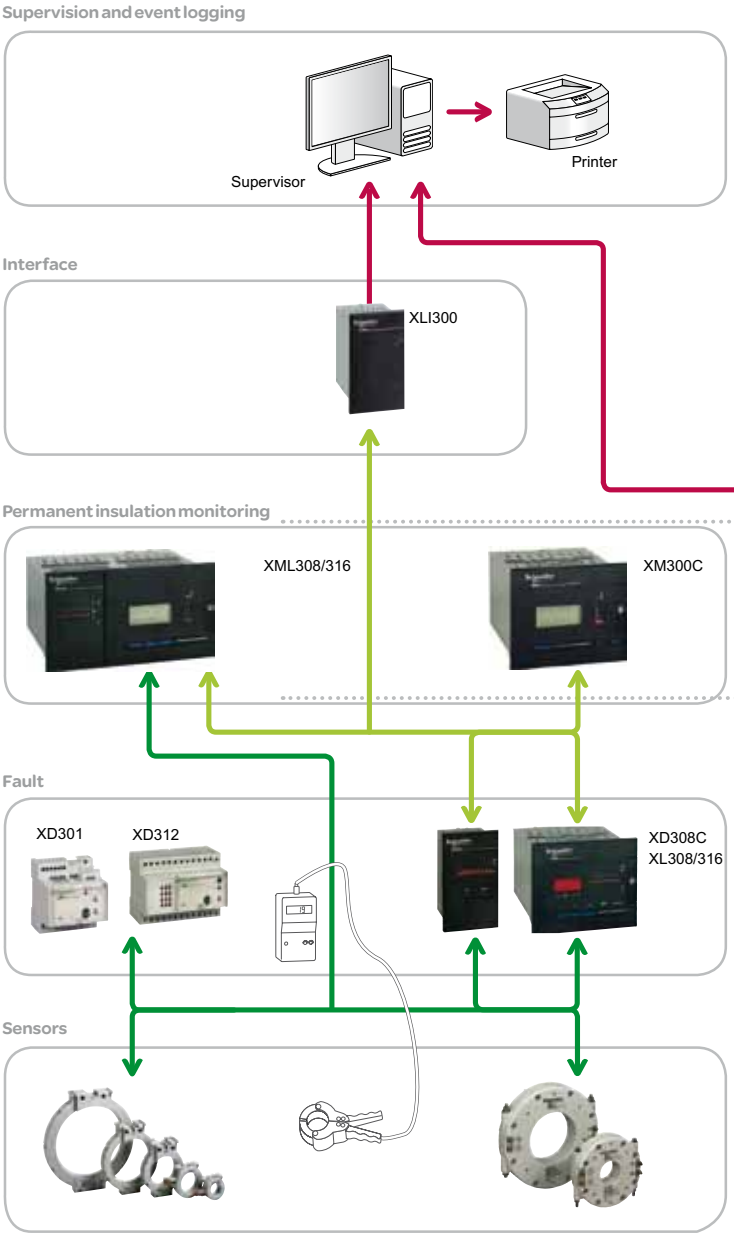
What kind of network?

- A simple motor or a small AC network: IM9.
- A motor that is normally off: IM9-OL.
- A small DC network, or for AC: the IM10 or IM20 range (IM10-H or IM20-H for hospitals).
- A larger network for which fault location would be a long and tedious task if done manually: XM200 + XDs.
- A very large network for which main-circuit measurements would be beneficial: XML308/ XML316 or XM300 + XL308/316 if the circuits are not in the same substation.

Selection criteria

Except in simple cases, particular features of the network to be supervised can also affect choice:

- is it a large network where it is preferable to measure the earth leakage capacitance?
- is there a requirement for a prevention threshold indicating a change in insulation to less than a non-critical value set by the user?
- is there coupling present in the network?
- are there electrical disturbances generated by consumers such as variable-speed drives, UPSs, etc.?



System choice

There are three steps to choosing a system:

1. To define the need: network size, DC or AC, display, automatic fault location, additional features…
2. Select the appropriate locators (XD locators, XML or XL local measurement).
3. Check whether an interface is necessary.

This system is scalable.

It is simply a matter of adding devices to adapt it to changes in the network or in the degree of monitoring.

Selecting the correct device

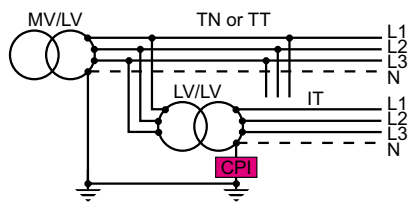
For monitoring different types of installation.

IT system for part of an installation

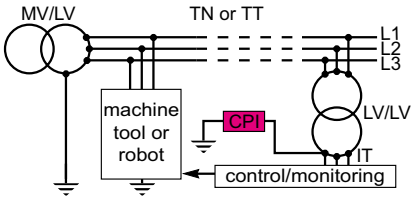
The requirement for continuity of supply may apply to only a part of an installation, for example a single shop or plant, or a circuit subject to special conditions (safety lighting). In this case, it is recommended to use the IT system for this part of the installation, whatever the system used for general distribution.

IMD = IM9 or IM10 or IM20 - Depending on the characteristics and function of the network (see table, page 10).

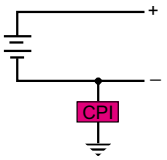
In hospitals, for the operating rooms, it is necessary to use either the IM10-H or the IM20-H according to the desired functionalities.



Sub-network



Control and auxiliary circuits



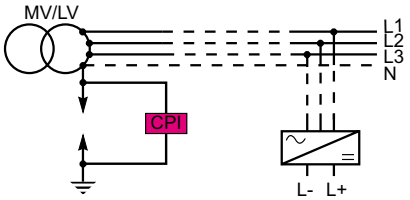
DC sub-network

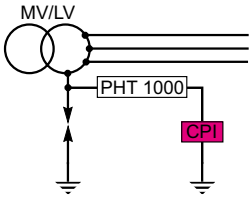
IT system for the entire installation

The requirement for continuity of supply may apply to the entire installation or to a large sub-network.

For this kind of network it is necessary to have a monitor compatible with the fault localization or the measurement per feeder.

IMD = XM200 or XM300C (communication with a supervisor) or XML308/316 (local measurement) (see table, page 10).





Choice between IM10/IM20 and XM200

Automatic fault location
The IM10/IM20 is not compatible with this feature; the XM200 is.

Medium or large networks
The limit is linked to the network capacitance as the maximum for the IM10/IM20 is 40 µF. To estimate this value it is necessary to take into account the cables and the loads. Cables: for 3 phases the capacitance is approximately 1 µF/km.

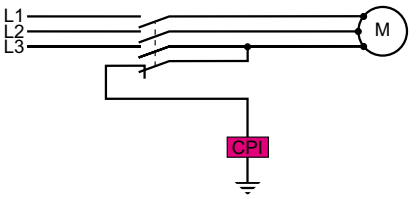
Loads (capacitive filters):
Guideline capacitive values for HF filters built into various devices

Device	Network/earth capacity
Micro-computer	20 nF to 40 nF
UPS	40 nF
Variable speed controllers	70 nF
Fluorescent tubes (in ramp of 10)	20 nF

Off-line insultation monitoring

Using motors in industrial processes creates further need for insulation monitoring. By checking insulation with power off, insulation faults can be determined before starting motors (fire pumps, smoke extractors, etc.).

It is also possible to automatically prevent motor starting if the insulation resistance is below a certain threshold.



Selecting a communication interface (for XM300C & XML308/316)

The power of a communicating system.

Connect all devices

The power of the Vigilohm System lies in the capacity it offers for communication between all its devices, thereby ensuring insulation monitoring and complementary functions such as automatic locating of faults or the anticipation of their occurrence.

In addition, the Vigilohm System is capable of communicating with a supervisor or a PLC, i.e. it can both transmit data to and receive data from such units. The transfer of information takes place:

> via the internal Vigilohm System bus for communication between the devices;

> via the external bus for communication with a supervisor or PLC.

In both cases, the use of an internal or external bus requires a communication interface.

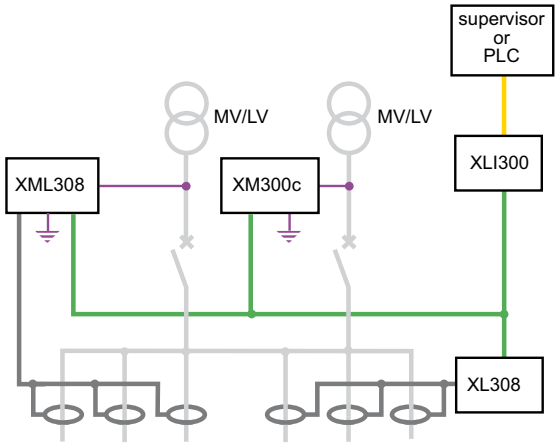
Two interfaces

> **XLI300 interface**, for the transmission of measurements and measurement parameters from the XM300C and XD308C devices to a supervisor. This interface is used on single busbar installations. The exclusion of other insulation monitoring devices found on the same installation is managed automatically.

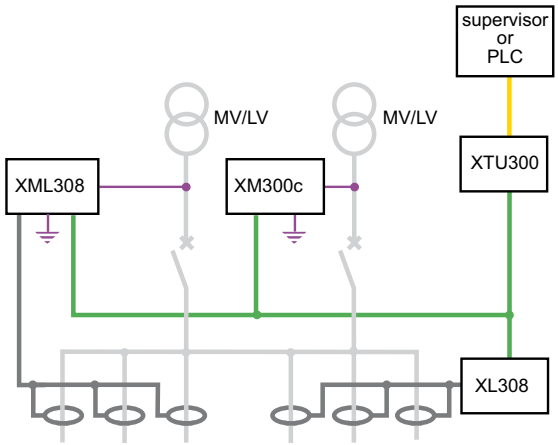
> **XTU300 interface**, for communication between the Vigilohm System and a supervisor, like the XLI300 interface. This interface is required for installations with multiple busbars and bus coupler circuit breakers. It manages the exclusion of other insulation monitoring devices found on the same installation and the link between the locators and their corresponding insulation monitoring devices.

Interface selection table

	One XML308/316 device	IMD with at least 1 locator + 1 set of busbars	IMD with at least 1 locator + serveral sets of busbars with bus coupling
Without supervision		XLI300	XTU3000
With supervision	XLI3000	XLI3000	XTU3000



One set of busbars with supervisor.



Several sets of busbars with coupling and with or without supervisor.

Application of the measurement voltage

Internal Vigilohm System bus

Modbus

Vigilohm IM9

PB106370_47

Use

IT systems:
- LV AC installations up to:
  - 415 V ph-ph
- one device only for each separate installation
- isolated from earth or connected to earth through an impedance
- remote test (for machine control).

Operation

- Injection of DC voltage.
- An electronic device measures insulation from the leakage current created in the installation by the voltage injected between the installation and earth and trips the alarm pre-set by the user.

Earth coupling capacitances do not affect insulation measurement.

Installation and connection

- Live part in moulded, insulating, disconnectable, modular case, eight 9 mm modules wide, with transparent sealable cover.
- Horizontal or vertical mounting on symmetrical rail.
- Connection by tunnel terminals for 2.5 mm² wiring.

Standards

- Product: IEC 61557-8.
- Safety: IEC 61010-1.

Auxiliaries

- Cardew C surge limiter (only downstream of MV/LV transformer): see page 33.
- ZX impedance: see page 34.

Vigilohm IM9

Type of installation to be monitored			
LV AC IT systems	Phase-to-phase voltage with IM9 connected to neutral		600 V AC max
	with IM9 connected to phase		480 V AC max
	Frequency		50-60-400 Hz
	Limited in size		IT subsystem
Electrical characteristics			
Fault signalling	Number of thresholds		2 (sealable)
	Thresholds	Pre-alarm:	2-5-10-20-50-100-200-500 kΩ
		Alarm	1-2,5-5-10-25-50-100-250 kΩ
Response time			≤ 7 s
Device operating test			Local and remote
Failsafe feature (1)		Option on the front face	
Output contact	Number		1 (standard or failsafe)
	Type of contact		Changeover
	Breaking capacity	AC 250 V	6 A
		DC 12 to 24 V	6 A
Maximum consumption			7 VA
Impedance		At 50 Hz	230 kΩ
Maximum current injected			70 µA
Auxiliary supply voltage		50/60/400 Hz	115/415 V AC ±15 %
		DC	125/250 V DC ±15 %
Mechanical characteristics			
Weight			< 0.2 kg
Thermoplastic case		Mounting	Horizontal or vertical
Degree of protection		Front	IP40
		Case	IP20
Other characteristics			
Temperature range	For operation		-25 °C to +55 °C
	For storage		-40 °C to +70 °C
Climatic conditions (2)			
Standards		Product	IEC 61557-8
		Safety	IEC 61010-1
		Marine	DNV approval
Fault locating with other device			
Mobile	XGR portable generator and XRM receiver + probes		

(1) Failsafe: the relay is disactivated either on occurrence of a fault or if the auxiliary supply voltage accidentally fails.

(2) Suitable for use in all climates:
- *damp heat, equipment not operating (IEC 60068-2-30)*
- *damp heat, equipment operating (IEC 60068-2-56)*
- *salt mist (IEC 60068-2-52).*

Commecial reference: IMD-IM9

Vigilohm IM9-OL
(Off-Line)

PB106371_47

Use
Monitors de-energised equipment (e.g. motors, fire pumps, etc.) whatever the earthing system (IT / TT / TN-S).
De-energised installations:
■ AC or DC (up to 690 V)
■ when associated with a circuit breaker possessing an MN or MX release or with a contactor, the IM9-OL protects motors against insulation faults that may be produced during operating shutdowns (e.g. due to condensation), by initiating an alarm or startup lock-out.

Operation
■ Injection of DC voltage.
Voltage is applied, with the motor de-energised, between the stator and earth, thereby creating a leakage current in the motor insulation resistances.
■ 2 pre-set thresholds:
□ 1 prealarm threshold, adjustable in 8 steps from 0.5 to 10 MΩ
□ 1 motor no start threshold, adjustable in 8 steps from 0.25 to 2 MΩ.
An electronic device measures insulation from the leakage current created by the voltage injected and activates the prealarm or prevents starting when insulation drops below the corresponding threshold.

Installation and connection
■ Live part in moulded, insulating, disconnectable, modular case, eight 9 mm modules wide, with transparent sealable cover.
■ Horizontal or vertical mounting on symmetrical rail.
■ Connection: wires up to 2.5 mm².
■ The IM9-OL is used with a contact that opens to disconnect the device from the installation when the installation is energised.

Standards
■ Product: IEC 61557-8.
■ Safety: IEC 61010-1.

Vigilohm IM9-OL

Type of installation to be monitored			
LV AC IT / TT /TN-S systems (de-energised)	Phase-to-phase voltage		≤ 690 V (1)
	Frequency		50-60-400 Hz
DC (de-energised)	Voltage between polarities		≤ 690 V (1)
Electrical characteristics			
Fault signalling	Number of thresholds		2
	Thresholds	Prealarm	0.5-1-1.5-2-3-5-7.5 - 10 MΩ
		Mtor no start	0.25-0.5-0.75-1-1.25-1.5-1.75-2 MΩ
Response time			≤ 2 s
Device operating test			Yes
Motor no start inhibition			By selector switch
Failsafe feature (2)		As standard (3)	
Internal impedance		DC	1 MΩ
		At 50-60 Hz	500 kΩ
Output contact	Number 2	Motor no start	1 standard
		Prealarm	1 failsafe
	Breaking	AC 250 V	6 A
	Capacity	DC 12 to 24 V	6 A
Auxiliary supply voltage		50/60/400 Hz	110/415 V AC ±15 %
		DC	125/250 V DC ±15 %
Mechanical characteristics			
Weight			< 0.2 kg
Thermoplastic case		Mounting	Horizontal or vertical
Degree of protection		Front	IP40
		Case	IP20
Other characteristics			
Temperature range	For operation		-25 °C to +55 °C
	For storage		-40 °C to +70 °C
Climatic conditions (4)			
Standards		Product	CEI 61557-8
		Safety	CEI 61010-1
		Marine	DNV approval

(1) Depends on rated voltage withstand of the contact used to disconnect the IM9-OL when the network is energised.
(2) Failsafe: the relay is desactivated on occurrence of a fault or if the auxiliary supply voltage accidentally fails.
(3) Only the first prealarm contact.
(4) Suitable for use in all climates:
■ *damp heat, equipment not operating (IEC 60068-2-30)*
■ *damp heat, equipment operating (IEC 60068-2-56)*
■ *salt mist (IEC 60068-2-52).*

Commercial reference: IMD-IM9-OL

Vigilohm IM10 and IM20

PB106374_55

Use

IT systems:
- LV AC/DC installations up to:
  - 415 V AC phase to phase
  - 300 V DC
- For sub-networks or small networks up to 40 µF without automatic insulation fault detectors (XD301/XD312).
- One device only for each separate installation.
- Isolated from earth or connected to earth through an impedance.

Operation

- Injection of low-frequency AC voltages between the installation and the earth.

Measurement

- Insulation resistance.
- Earth leakage capacitance (IM20).

Customer benefits

- Multi-frequency injection to enable reliable measurement in case of disturbances.

Indications

- Satisfactory insulation resistance (green light).
- Drop in insulation resistance:
  - below prevention threshold (white light)
  - below fault threshold (orange light + popup window)
  - transient fault (flashing orange light + popup window)
  - earth or injection connection lost.

Display (8 languages (5))

- All values, thresholds, settings are accessible on the graphic display.

(5) French, English, Spanish, Italian, Portuguese, German, Russian, Chinese.

Additional functions with IM20

- Modbus communication.
- Earth leakage capacitance.
- Impedance of the capacitance Zc.
- Input injection inhibition (for easy exclusion management).
- Datalog with timestamping of all events.
- Compatible with HV plate IMD-HV for networks up to 1.7 kV.

Installation

- Module compatible with DIN rail and panel mounting.

Vigilohm IM10 and IM20

Type of installation to be monitored			
LV AC / DC IT systems (4)	Phase-to-phase voltage With IM10/IM20 connected to neutral		600 V AC max
	With IM10/IM20 connected to phase		480 V AC max
	Frequency		50-60-400 Hz
DC or rectified systems	Line voltage		345 VDC max
	Limited in size		IT subsystem
Electrical characteristics			
Range for insulation resistance readings			0.1 kΩ to 10 MΩ
Range for capacitance readings (IM20)			0.1 µF to 40 µF
Fault signalling	Number of thresholds		2 (password protected)
	Prevent		1 kΩ to 1 MΩ
	Fault		0.5 kΩ to 500 kΩ
Accuracy			5 %
Response time			≤ 5 s typical
Device operating test			Self-test and manual
Internal impedance		At 50 Hz	110 kΩ
Failsafe feature (1)			1 (standard)
Output contact	Number		1 (standard or failsafe)
	Type of contact		Changeover
	Breaking	AC 250 V	6 A
	Capacity	DC 12 to 24	6 A
Input contact (injection inhibition input)		Voltage supplied	24 V
Circuit breaker position		Minimum load	5 mA
Time delay on signalling			0 s to 300 s
Auxiliary supply voltage		50/60/400 Hz	110 to 415 V AC ±15 %
		DC	125/250 V DC ±15 %
Maximum device consumption			12 VA
Measurement voltage			75 V peak
Measurement current			<0.4 mA
Dielectric strength			4000 V AC / 5500 V DC
Mechanical characteristics			
Weight			0.25 kg
Thermoplastic case		Mounting	Panel or DIN rail
Degree of protection		Front	IP52
Other characteristics			
Temperature range	For operation		-25 °C to +55 °C
	For storage		-40 °C to +70 °C
Climatic conditions (2)			IEC 60068
Others		Indoor use	
		Altitude	up to 3000m
		Pollution degree	2
		Maximum overvoltage	CAT III
Standards		Product	IEC 61557-8
		Safety	IEC 61010-1 (3)
		Installation	IEC 60364-4-41
		Marine	DNV approval
Fault locating with other device			
Mobile	XGR portable generator and XRM receiver + probes		
HV plate reference	IMD-HV-IM20 (for networks up to 1.7 kV)		

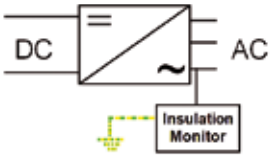
(1) Failsafe: the relay is disactivated either on occurrence of a fault or if the auxiliary supply voltage accidentally fails.

(2) Suitable for use in all climates:
- *damp heat, equipment not operating (IEC 60068-2-30)*
- *damp heat, equipment operating (IEC 60068-2-56)*
- *salt mist (IEC 60068-2-52).*

(3) The assigned voltage is 415 V AC / 300 V DC according to the IEC 61010-1.

(4) When the insulation monitor is linked to a non-insulated inverter it is necessary to take into account the DC voltage limit rather than the AC limit.

Inverter without transformer



Commecial references:
- **IMD-IM10**
- **IMD-IM20**

Vigilohm IM10-H and IM20-H
(For hospitals)

PB106375_55

Use
These modules are dedicated to hospital IT networks.

Operation
■ Injection of a low-frequency AC voltage between the network and the earth.

Measurement
■ Insulation measurement through the earth leakage current in the IMD.

Indication
■ Satisfactory insulation resistance (green light).
■ Drop in insulation resistance below the fault threshold (orange light).
■ Earth or injection connection lost.

Display (8 languages (3))
■ Insulation resistance.
■ Thresholds.
■ Alarms with dedicated pop-up windows.
(3) French, English, Spanish, Italian, Portuguese, German, Russian, Chinese.

Additional functions with IM20-H
■ Modbus communication.
■ Datalog with timestamping of all events.
■ Transformer management:
□ secondary load current display (in %)
□ alarm on a threshold (in % of nominal current)
□ alarm on temperature through the sensor (bimetal).

Accessories
Hospital Remote Panel HRP (ref 50168) see pages 36 and 37.
Or as part of the solution for operating theatres.

Vigilohm IM10-H and IM20-H

Type of installation to be monitored			
LV AC / DC IT systems	Phase-to-neutral voltage		⩽ 230 V AC +15 %
			⩽ 100 V DC +15 %
	Frequency		50/60 Hz
Electrical characteristics			
Range for insulation resistance readings			1 kΩ to 10 MΩ
Fault signalling	Number of thresholds		1 (password protected)
	Thresholds		50 kΩ to 500 kΩ
Response time			⩽ 1 s
Device operating test			Yes
Failsafe feature (1)		As standard	
Internal impedance		At 50 Hz	110 kΩ
Accuracy			5 %
Output contact	Number	1	Standard or failsafe
		Type	Changeover
	Breaking	AC 250 V	6 A
	Capacity	DC 12 to 24 V	6 A
Input contact		Voltage supplied	24 V
Transformer bimetal		Minimum load	5 mA
Auxiliary supply voltage		50/60 Hz	110/230 V AC ±15 %
		DC	125/250 V DC ±15 %
Cable size			0.2 to 2.5 mm²
Maximum device consumption			12 VA
Measurement voltage			25 V max
Measurement current			0.2 mA
Dielectric strength			4000 V AC / 5500 V DC
Mechanical characteristics			
Weight			0.25 kg
Thermoplastic case		Mounting	Panel mount or DIN rail
Degree of protection		Front	IP52
Installation		Cat. III, pollution 2, moulded case, disconnectable assembly, symetrical or embedded	
Other characteristics			
Temperature range	For operation		-25 °C to +55 °C
	For storage		-40 °C to +70 °C
Climatic conditions (2)			
Standards		Product	IEC 61557-8
		Safety	IEC 61010-1
		Installation	IEC 60364-7-710

(1) Failsafe: the relay is deactivated on occurrence of a fault or if the auxiliary supply voltage accidentally fails.
(2) Suitable for use in all climates:
■ *damp heat, equipment not operating (IEC 60068-2-30)*
■ *damp heat, equipment operating (IEC 60068-2-56)*
■ *salt mist (IEC 60068-2-52).*

Commercial references:
■ **IMD-IM10-H**
■ **IMD-IM20-H**

Vigilohm XM200

0441147_SE_52

Functions and characteristics

Use

Overall insulation monitoring

The XM200 provides overall insulation monitoring of electrical installations by injecting a low-frequency AC voltage between the installation and earth.

Main functions

■ Measurement
□ insulation resistance
□ earth leakage capacitance.
■ Indications
□ satisfactory insulation resistance (green light)
□ drop in insulation resistance:
- below prevention threshold (orange light and failsafe relay actuated)
- below fault threshold (red light and relay actuated).
□ transient faults (orange light).
■ Display:
□ measurements accessible locally on the display unit of the device.
■ Value of the last transient fault.

Additional functions with other devices

Identification of faulty circuits is obtained by using the XM200 with XD301/XD312 automatic insulation fault detectors. In addition, an XRM mobile receiver and a current probe can determine the exact location of the fault on the faulty circuit.

Standards

The XM200 complies with standards:
■ IEC 364, parts 4 and 5
■ IEC 61557-8.

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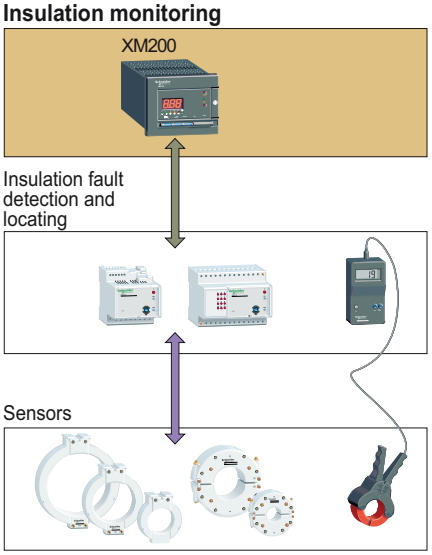
Insulation monitoring



Operating voltage

■ AC IT systems up to:
□ 440 V with neutral not distributed
□ 760 V with neutral distributed.
■ DC systems up to 500 V.

The XM200 cannot be adapted to higher voltage installations by connecting a PHT1000 subassembly. For higher voltage, use an XM300C.

Installation

■ Horizontal flush mounting on the front face of a cubicle or enclosure.
■ Easy mounting in Prisma enclosures using the corresponding mounting plates and front plates that come with the appropriate cut-outs.

Auxiliaries

Cardew surge limiter: page 33.
ZX impedance: page 34.

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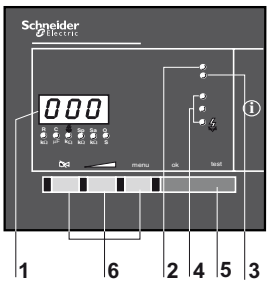
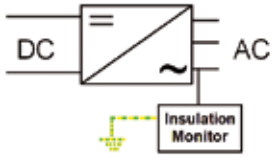


1. Display indicating:
- the value of the overall insulation resistance R
- other information as selected via function keys.

2. Red self-test light, indicating internal XM200 faults.
3. Light indicating that a transient fault has occurred.
4. Three lights indicating the insulation level.
5. Sealable cover ensuring tamperproof settings.
6. Function keys for:
- accessing earth coupling capacitance readings
- setting thresholds
- displaying the value of the last transient insulation fault
- setting time delays.

Inverter without transformer (1)



Vigilohm XM200

Type of installation to be monitored			
AC or mixed AC/DC IT systems (1)	Phase-to-phase voltage with XM200 connected to neutral		≤ 760 V AC +20%
	With XM200 connected to phase		≤ 440 V AC +20%
	Frequency		45-400 Hz
DC or rectified systems	Line voltage		< 500 V DC
Electrical characteristics and energy measurements			
Ohmmeter			Digital
Range for insulation resistance readings			0.1 kΩ to 999 kΩ
Range for capacitance readings			0.1 µF to 199 µF
Signalling	Number of thresholds		2 (sealable settings)
	Threshold settings	1st threshold (prevent)	10 to 100 kΩ
		2nd threshold (fault)	0.1 to 20 kΩ
Time delay for signalling		3 settings	0 s, 15 s, 30 s
Dielectric strength			2500 V
Auxiliary supply voltage		50/60 Hz	115/127 V AC
			220/240 V AC
			380/415 V AC
Auxiliary supply voltage tolerances			-15 % to +10 %
Maximum device consumption			30 VA
Measurement voltage		Variable	25 V max
Measurement current			3 mA max
50 Hz/DC impedance			33 kΩ
Device test			Self-test & manual test
Failsafe feature (2)		As standard	
Output contacts	Changeover	Quantity	2 (1 failsafe)
Breaking capacity		AC 400 V pf = 0.7	3 A
		AC 230 V pf = 0.7	5 A
		DC 220 V L/R = 1 ms	0.45 A
		DC 48 V L/R = 1 ms	2.5 A
		DC 24 V L/R = 1 ms	10 A
Connection cross-sections		Rigid conductors	1 to 1.5 mm²
		Flexible conductors	0.75 to 1.5 mm²
Mechanical characteristics			
Weight			2.5 kg
Sheet-metal case	Horizontal	Disconnectable screw terminal block	
Degree of protection		Flush mounting	IP30
Other characteristics			
Tamperproof settings		Behind sealable cover	
Temperature range		Operating	-5 °C to +55 °C
		Storage	-25 °C to +70 °C
Fault locating with other device			
Automatic		Detectors XD301/312	
Manual		Mobile receiver XRM + probes	

(1) When the insulation monitor is linked to a non insulated inverter it is necessary to take into account the DC voltage limit rather than the AC limit.
(2) Failsafe: a failsafe relay operates in the event of an accidental interruption of auxiliary power or a fault.

Commercial references:
- 115/127 V AC: **50727**
- 220/240 V AC: **50728**
- 380/415 V AC: **50729**

Vigilohm XM300C

044148_SE_52

Functions and characteristics

Overall insulation monitoring

The XM300C provides overall insulation monitoring of electrical installations by injecting a low-frequency AC voltage between the installation and earth.

Main functions

■ Measurement:
□ insulation resistance
□ earth leakage capacitance.
■ Indications:
□ satisfactory insulation resistance (green light)
□ drop in insulation resistance:
- below prevention threshold (orange light and relay actuated)
- below fault threshold (red light and two relay actuated, including one with failsafe feature).
□ transient faults (orange light).
■ Display:
□ measurements
□ events detected by any XL308/316 locators connected.

All this data is accessible locally on the LCD screen of the insulating monitoring device and remotely via the Vigilohm System bus.

Additional functions with other devices

Locating faulty circuits obtained by using the XM300C with:
■ XL308 and XL316 locators connected to 8 or 16 toroids; they are linked to the XM300C by the Vigilohm System bus.
■ XD308C communicating detectors; they are linked to the XM300C by the Vigilohm System bus and connected to the toroids on the circuits being monitored.
■ XD301 and XD312 detectors connected to toroids on the circuits being monitored.
■ XRM mobile receiver and current probe to fine-tune automatic locating results.

All these devices can be combined on a given installation.

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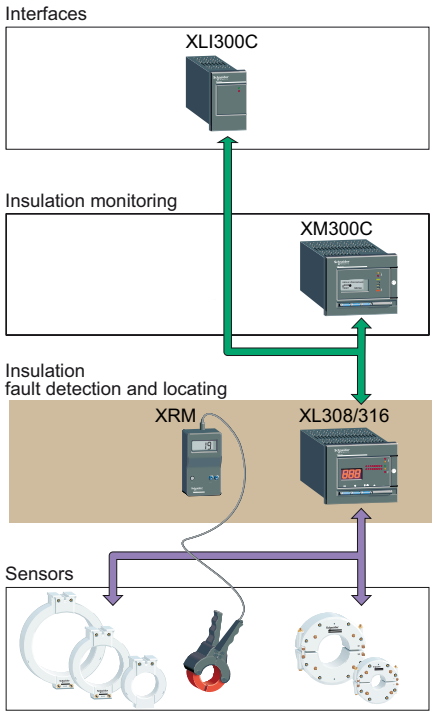

Distributed measurements

This function is provided by combining an XM300C (or an XML308/316) with XL308 or XL316 locators. These locators measure insulation resistance and earth leakage capacitance of each circuit. They have a fault alarm threshold that can be set to different levels for each channel.

Communication

XLI300 and XTU300 interfaces allow monitoring devices, locators, and communicating detectors to exchange data with a supervision system via Modbus protocol. The XLI300 and XTU300 interfaces connect to the Vigilohm System bus and allow timestamping of insulation monitoring events.

Configuration management

On installations with monitoring devices covering variable configurations, only one device at once is allowed to inject a voltage between earth and the installation downstream on the incoming circuit breaker. The system must therefore manage the exclusion of other monitoring devices and each locator must identify the monitoring device it is capturing the signal from. This is handled by either:
■ by the XTU300 interface for multiple busbar installations
■ by the XLI300 inrterface for single busbar installations.

In both cases, the circuit breaker position indication contacts are wired to the digital inputs of the XM300C or the XML308/316. If only XD308C detectors are associated with the XM300C, monitoring device exclusion is handle by the XLI300.

Standards

The XM300C complies with the following standards:
■ IEC 364 parts 4 and 5
■ IEC 61557-8.

Installation and connection

■ Horizontal flush mounting on the front face of a cubicle or enclosure.
■ Easy mounting in Prisma enclosures using the corresponding mounting plates and front plates appropriate cutouts.
■ The devices are interconnected by shielded cables (double 0.75 mm^2 twisted pair).

The resistance between the two most distant points must not exceed 12 Ω.
The coupling capacitance between pairs must not exceed 250 nF.

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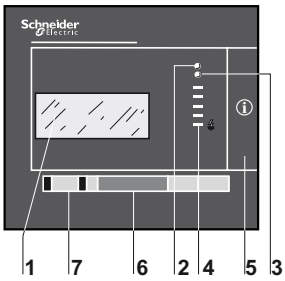


1. Display indicating:
- the value of the overall insulation resistance R
- other information as selected via function keys.

2. Red self-test light, indicating internal XM300C faults.

3. Light indicating that a transient fault has occurred.

4. Five lights indicating the insulation level.

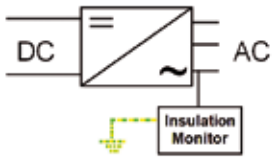
5. Instruction manual stored in a drawer on the front face of the device.

6. Sealable cover ensuring tamperproof settings.

7. Function keys for:
- accessing earth coupling capacitance readings
- setting thresholds
- displaying the value of the last transient insulation fault
- choosing language.

Auxiliaries
- Cardew surge limiter: page 33.
- ZX limiting impedance to create an impedance-earthed neutral: page 34.
- PHT1000 subassembly if the device is used on 1000-1700 V installations: page 34.

Inverter without transformer *(4)*



Vigilohm XM300C

Type of installation to be monitored

AC or mixed AC/DC IT systems *(4)*	Phase-to-phase voltage with XM300C connected to neutral		≤ 760 +20% or 1700 V AC *(1)*
	With XM300C connected to phase		≤ 440 +20% or 1000 V AC *(1)*
	Frequency		45-400 Hz
DC or rectified systems	Line voltage		< 500 V DC or 1200 V DC *(1)*

Electrical characteristics and energy measurements

Ohmmeter			Digital
Range for insulation resistance readings			0.1 kΩ to 999 kΩ
Range for capacitance readings			0.1 µF to 999 µF
Signalling	Number of thresholds		2 (sealable settings)
	Threshold settings	1st threshold (prevent)	1 to 299 kΩ
		2nd threshold (fault)	0.2 to 99.9 kΩ
Dielectric strength			2500 V
Auxiliary supply voltage		50/60 Hz	115/127 V AC
			220/240 V AC
			380/415 V AC
Auxiliary supply voltage tolerances			-15 % to +10 %
Maximum device consumption			30 VA
Measurement voltage			6 V max
Measurement current			5 mA max
50 Hz/DC impedance			22 kΩ
Device test			Self-test & manual test
Failsafe feature *(2)*		As standard	
Output contacts	Changeover	Quantity	3 (1 failsafe)
Breaking capacity		AC 400 V pf = 0.7	3 A
		AC 230 V pf = 0.7	5 A
		DC 220 V L/R = 1 ms	0.45 A
		DC 48 V L/R = 1 ms	2.5 A
		DC 24 V L/R = 1 ms	10 A
Circuit breaker position indication contacts *(3)* (voltage and current supplied by XLI or XTU interfaces)		Voltage supplied	24 V
		Max current supplied	10 mA (short circuit)
Connection cross-sections		Rigid conductors	1 to 1.5 mm²
		Flexible conductors	0.75 to 1.5 mm²

Mechanical characteristics

Weight			3.5 kg
Sheet-metal case	Horizontal	Disconnectable screw terminal block	
Degree of protection		Flush mounting	IP30

Other characteristics

Interfacing possible with supervisor		
Multi-language display	English/French	
Tamperproof settings	Behind sealable cover	
Temperature range	Operating	-5 °C to +55 °C
	Storage	-25 °C to +70 °C

Fault locating with other device

Automatic	Detectors XD301/312
Manual	Mobile receiver XRM + probes

(1) The upper limit is extended to the second value by adding a PHT1000 subassembly.
(2) Failsafe: a failsafe relay operates in the event of an accidental interruption of auxiliary power or a fault.
(3) This contact is an auxiliary switch mounted on the circuit breaker and used to indicate its operating status.
(4) When the insulation monitor is linked to a non insulated inverter it is necessary to take into account the DC voltage limit rather than the AC limit.

Commercial references:
- 115/127 V AC: **50540**
- 220/240 V AC: **50541**
- 380/415 V AC: **50542**

Vigilohm XML308 and XML316

044149_SE_60

Functions and characteristics

Overall and individual circuit insulation monitoring

The XML308 and XML316 monitoring-locating devices combine the functions of:
- the XM300C insulation monitoring device
- XL308 or XL316 insulation fault locators, they monitor the insulation of:
  - the whole installation by injection of a low-frequency AC voltage between the installation and earth
  - 8 or 16 individual circuits via detection toroids.

Main functions
- Measurement of the overall installation and each monitored circuit:
  - insulation resistance
  - earth leakage capacitance.
- Indications:
  - satisfactory insulation resistance (green light)
  - drop in insulation resistance:
    - for the overall installation, below prevention threshold (orange light and relay actuated)
    - for the overall installation and each monitored circuit, below adjustable fault threshold (red light and two relays actuated, including one with a failsafe feature).
  - transient faults (orange light) last three values stored
  - faulty circuit by 8 or 16 indicator lights (1 per circuit).
- Display:
  - measurements accessible locally on the display unit of the device
  - events detected by connected XL308/316.

All this data available on the LCD screen and remotely via Vigilohm System bus.

Additional functions with other devices

Monitor more than 8 or 16 circuits by adding:
- XL308 or XL316 locators
- XD308C to automatically detect faults and communicate via XLI300 or XTU300
- XD301 and XD312 detectors that provide local indications.

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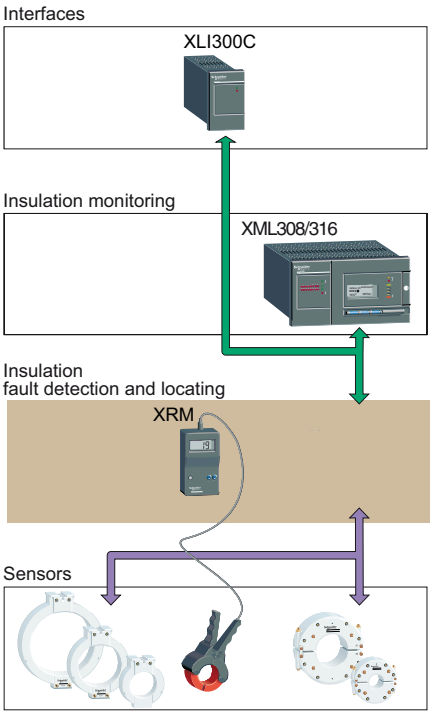


Communication

XLI300 and XTU300 interfaces allow monitoring devices, locators, and communicating detectors to exchange data with a supervisor. The XLI300 and XTU300 interfaces connect to the Vigilohm System bus and allow timestamping of insulation monitoring events.

Configuration management

On installations with monitoring devices covering variable configurations, only one device at once is allowed to inject a voltage between earth and the installation downstream on the incoming circuit breaker. The system must manage the exclusion of other monitoring devices and each locator must identify the monitoring device it is capturing the signal from. This is handled by either:
- the XTU300 interface for multiple busbar installations
- the XLI300 inrterface for single busbar installations.

In both cases, the circuit breaker position indication contacts are wired to the digital inputs of the XM300C or the XML308/316.

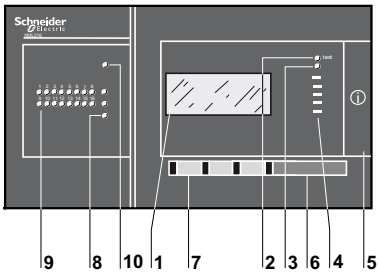
Standards
- IEC 364, parts 4 and 5
- IEC 61557-8.

Toroids

XML308 and XML316 can operate with type A , OA, and XS toroids.

Installation and connection
- Horizontal flush mounting on the front face of a cubicle or enclosure
- Easy mounting in Prisma enclosures using the corresponding mounting plates and front plates appropriate cutouts
- The devices are interconnected by shielded cables (double 0.75 mm^2 twisted pair). The resistance between the two most distant points must not exceed 12 Ω. The coupling capacitance between pairs must not exceed 250 nF.

DB127893



1. Display indicating:
- ■ the value of the overall insulation resistance R
- ■ other information as selected via function keys.

2. Red self-test light, indicating internal device faults.
3. Light indicating that a transient fault has occurred.
4. Five lights indicating the insulation level.
5. Instruction manual stored in drawer on front of device.
6. Sealable cover ensuring tamperproof settings.
7. Function keys for:
- ■ accessing earth coupling capacitance readings
- ■ setting thresholds
- ■ displaying three last values of transient insulation faults
- ■ reading measurements made on individual circuits by the internal locator
- ■ remote access to faults located by XL308 or XL316 detectors
- ■ choice of language (English or French).

8. Two indicator lights continuously display insulation level of the whole installation.
9. 8 or 16 lights indicating faulty circuits.
10. Light indicating transient fault event.

Auxiliaries
- ■ Cardew surge limiter: page 33.
- ■ ZX limiting impedance to create an impedance-earthed neutral: page 34.
- ■ PHT1000 subassembly if the device is used on 1000-1700 V installations: page 34.

Vigilohm XML308 and XML316

Type of installation to be monitored

AC or mixed AC/DC IT systems	Phase-to-phase voltage with XM308/316 connected to neutral		≤ 760 or 1700 V AC (1)
	With XM308/316 connected to phase		≤ 440 or 1000 V AC (1)
	Frequency		45-400 Hz
	Size of installation		0 to 30 km of cable
DC or rectified systems	Line voltage		< 500 or 1200 V DC (1)

Electrical characteristics and energy measurements

Ohmmeter			Digital
Range for insulation resistance readings			0.1 kΩ to 999 kΩ
Range for capacitance readings			0.1 µF to 999 µF
Signalling	Number of thresholds per installation		2 (sealable settings)
	Number of thresholds per circuit		1 (sealable settings)
	Threshold settings	1st threshold (prevent)	1 to 299 kΩ
		2nd threshold (fault)	0.2 to 99.9 kΩ
Dielectric strength			2500 V
Auxiliary supply voltage		50/60 Hz	115/127 V AC
			220/240 V AC
			380/415 V AC
Auxiliary supply voltage tolerances			-15 % to +10 %
Maximum device consumption			30 VA
Measurement voltage			6 V max
Measurement current			5 mA max
50 Hz/DC impedance			22 kΩ
Device test			Self-test & manual test
Failsafe feature (2)		As standard	
Output contacts	Changeover	Quantity	3 (1 failsafe)
Breaking capacity		AC 400 V pf = 0.7	3 A
		AC 230 V pf = 0.7	5 A
		DC 220 V L/R = 1 ms	0.45 A
		DC 48 V L/R = 1 ms	2.5 A
		DC 24 V L/R = 1 ms	10 A
Circuit breaker position indication contacts (3) (voltage and current supplied by XLI or XTU interfaces)		Voltage supplied	24 V
		Max current supplied	10 mA (short circuit)
Connection cross-sections		Rigid conductors	1 to 1.5 mm²
		Flexible conductors	0.75 to 1.5 mm²

Mechanical characteristics

Weight			4.5 kg
Sheet-metal case	Horizontal	Disconnectable screw terminal block	
Degree of protection		Flush mounting	IP30

Other characteristics

Types of toroid used	A, OA, (XS compliant)	
Interfacing possible with supervisor		
Multi-language display	English/French	
Tamperproof settings	Behind sealable cover	
Temperature range	Operating	-5 °C to +55 °C
	Storage	-25 °C to +70 °C

(1) The upper limit is extended to the second value by adding a PHT1000 subassembly.
(2) Failsafe: a failsafe relay operates in the event of an accidental interruption of auxiliary power or a fault.
(3) This contact is an auxiliary switch mounted on the circuit breaker and used to indicate its operating status.

Commercial references:
- ■ XML308:
  - □ 115/127 V AC: **50490**
  - □ 220/240 V AC: **50491**
  - □ 380/415 V AC: **50492**
- ■ XML316:
  - □ 115/127 V AC: **50322**
  - □ 220/240 V AC: **50323**
  - □ 380/415 V AC: **50324**

Vigilohm XD301 / XD312 / XD312-H
Automatic insulation fault locators

044144_SE_52

Use

XD301 & XD312 insulation fault locators have two functions:
- fault detection (with respect to the fault threshold)
- automatic locating of the faulty circuit.

Operation

- XD301 and XD312 insulation fault detectors are fixed receivers used with (but not connected to) XM300C, XML308/316 and XM200 insulation monitoring devices. Via measurement toroids, they detect and automatically locate insulation faults.
- The XD312-H is compatible with IM10-H and IM20-H.
- The XD312/XD312-H detector, with 12 channels connected to a maximum of 12 toroids installed on different circuits of the installation, includes the following features on its front face:
  - 12 fault indicator lights corresponding to 12 channels
  - a selector to enable or disable latching of transient fault indications until reset.
- Detector XD301 is a single-channel version designed for use with one measurement toroid.

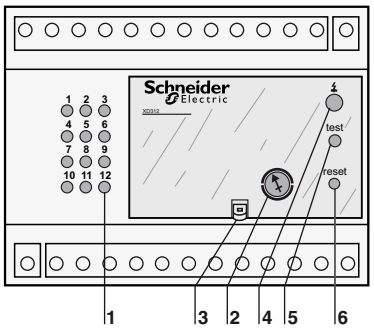
Installation and connection

- Live part is in an insulated case with a sealable, transparent sealable cover. Width equal to 8 (XD301) or 12 (XD312) 9 mm width modules.
- Horizontal flush or surface mounting on DIN rail.
- Tunnel terminals for 1.5 mm² wiring.

Toroids

- XD301 and XD312 insulation fault detectors operate with type A and OA toroids. They are also compatible with the older type N and O toroids.
- The XD312-H must be used with the toroid TA30 with a specific wiring.

DB127884



1. Lights indicating the faulty circuit.
2. Selector to enable or disable transient fault indication latching
3. Sealable cover.
4. General fault indicator light.
5. Test button for indicator lights and output relay.
6. Reset button (to clear fault indications).

Insulation fault detectors		XD301	XD312	XD312-H
Electrical characteristics				
Type of installation to be monitored		Low voltage AC 45-400 Hz / DC		Hospital
Operating threshold		2.5 mA at 2.5 Hz		50KΩ
Polling time		20 s	20 s per channel	
Fault indications		1 indicator light	12 channel indicator lights (+ 1 general)	
Local tests		For indicator lights and output relay		
Clearing of indications		Reset button on device		
Latching of transient fault indications		On/off via selector		
Output relay	Number of contacts	1 failsafe		
Breaking capacity of output contacts	AC 400 V pf = 0.7	3 A		
	AC 230 V pf = 0.7	5 A		
	DC 220 V L/R = 1 ms	0.45 A		
	DC 120 V L/R = 1 ms	0.65 A		
	DC 48 V L/R = 1 ms	2.5 A		
	DC 24 V L/R = 1 ms	10 A		
Auxiliary supply voltage	50/60 Hz	115/127 V AC		-
		220/240 V AC		
		380/415 V AC		-
Auxiliary supply voltage tolerances		-15 % to +10 %		
Consumption		6 V A		
Dielectric strength		2500 V		
Connection with insulation monitoring device		None		
Mechanical characteristics				
Weight		0.3 kg	0.6 kg	
Thermoplastic case		Horizontal mounting		
Degree of protection	Flush mount	IP30		
	Surface mount	IP20		
Other characteristics				
Temperature range	For operation	-5 °C to +55 °C		
	For storage	-25 °C to +70 °C		
Types of toroids to be used		A, OA, (N and O compatible)		TA30
Toroid for direct connection to case		30 & 50 mm type A	None	
Fault locating with other device				
Mobile		XGR portable generator and XRM receiver + probes		

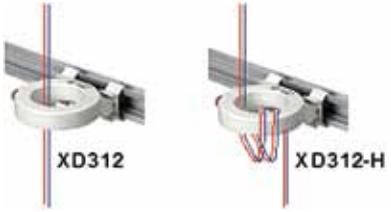
(1) The operating threshold of the XD301/312 detectors is not adjustable. These devices are designed to detect low-impedance faults. The detection threshold varies between 100 Ω and 2 kΩ depending on the characteristics of the installation, and around 50K Ω for the XD312-H.

Commercial references

- XD301:
  - 115/127 V AC: **50506**
  - 220/240 V AC: **50507**
  - 380/415 V AC: **50508**
- XD312:
  - 115/127 V AC: **50535**
  - 220/240 V AC: **50536**
  - 220/240 V AC: **50536-H**
  - 380/415 V AC: **50537**

NEED XD312 and XD312-H toroid wiring pictures

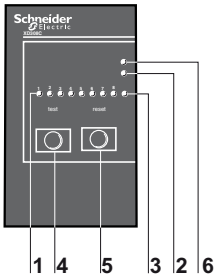
To improve the toroid sensitivity it is necessary to have two loops (3 crossings) in the toroid.



Vigilohm XD308C
Communicating automatic insulation fault locator

044143_SE_29

DB127895



1. Lights indicating faulty circuit.
2. Power on.
3. General fault indicator light.
4. Test button for indicator lights.
5. Device internal fault indication (self-test).
6. Self-test fault indicator light.

Type of installation to be monitored

Electrical characteristics

Type of installation to be monitored		Low voltage AC 45-400 Hz /DC
Operating threshold		2.5 mA at 2.5 Hz (1)
Polling time		20 s per channel
Fault indications		8 indicator lights
Operating tests		Local
Functions tested		Indicator lights and electronics
Clearing of memorised faults		Local reset on front face
		Remote reset from supervisor
Auxiliary supply voltage	50/60 Hz	115/127 V AC
		220/240 V AC
		380/415 V AC
Auxiliary supply voltage tolerances		-15 % to +10 %
Consumption		6 V A
Dielectric strength		2500 V
Connection with insulation monitoring device		Via 4-wire Vigilohm System bus

Mechanical characteristics

Weight		0.6 kg
Metal case with insulated front		Vertical mounting
Degree of protection		Flush mount IP 30

Other characteristics

Temperature range	For operation	-5 °C to +55 °C
	For storage	-25 °C to +70 °C
Types of toroids to be used		A, OA, (N and O compatible)

(1) The operating threshold of the XD308C detectors is not adjustable. This device is designed to detect low-impedance faults. The detection threshold varies between 100 Ω and 2 kΩ depending on the characteristics of the installation.

Commercial references
- 115/127 V AC: **50723**
- 220/240 V AC: **50724**
- 380/415 V AC: **50725**

Use

The XD308C provides 3 functions:
- detection of insulation faults
- automatic locating of the faulty circuit, identified by the number of the illuminated indicating light
- communication of this information to an XLI300 or XTU300 interface for transmission to a supervisor or PLC.

Operation

- The XD308C is a fault locator with communication. When associated with an XM200 it enables a simple solution for remote fault location. It can also be used with the XM300C and the XML308/316.
- The XD308C detector, with 8 channels connected to a maximum of 8 toroids installed on different circuits of the installation, includes the following features:
  - 8 fault indicator lights corresponding to the 8 channels
  - 1 general fault indicator light signalling that a fault has occurred
  - 1 light indicating the device operating status
  - 2 pushbuttons (self-test and reset).

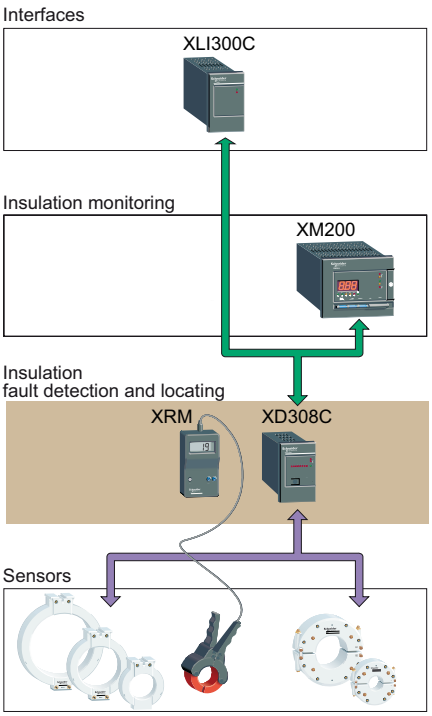
Installation and connection

- Live parts in a disconnectable metal case.
- Vertical mounting on front plate.
- Tunnel terminals for 1.5 mm² wires.
- The devices are interconnected by shielded cables (double 0.75 mm² twisted pairs). Resistance between the two most distant points must not exceed 12 Ω. Coupling capacitance between pairs must not exceed 250 nF.

Toroids

- XD308C insulation fault detectors operate with type A and OA toroids. They are also compatible with the older type N and O toroids.

DB127887



Vigilohm XL308 & XL316
Insulation fault local measurement

044145_SE_51

Functions and characteristics

Basic function

Local insulation fault monitoring. Used together with an XM300C or XML308/316 monitoring device, XL308 and XL316 locators monitor the insulation of 8 or 16 individual circuits and automatically locate any faults.

Main functions

- Measurement:
  - insulation resistance of each monitored circuit
  - earth leakage capacitance of each monitored circuit.
- Indications:
  - satisfactory insulation resistance (green light)
  - drop in insulation resistance below fault threshold (red light and two relays actuated, including one with a failsafe feature). The fault threshold is adjustable for each of the 8 or 16 channels corresponding to the monitored circuits
  - transient faults on each of the monitored circuits.
- Display:
  - faulty circuits are indicated by the corresponding LEDs (8 or 16 depending on the model)
  - a flashing LED indicates a transient fault on the corresponding circuit.

Communication

Faults detected by XL308/316 locators can be displayed on the insulation monitoring device associated with the locator. The information transmitted to the insulation monitoring device can be transmitted to a supervisor via an XLI300 or XTU300 interface connect to the Vigilohm System bus.

Standards

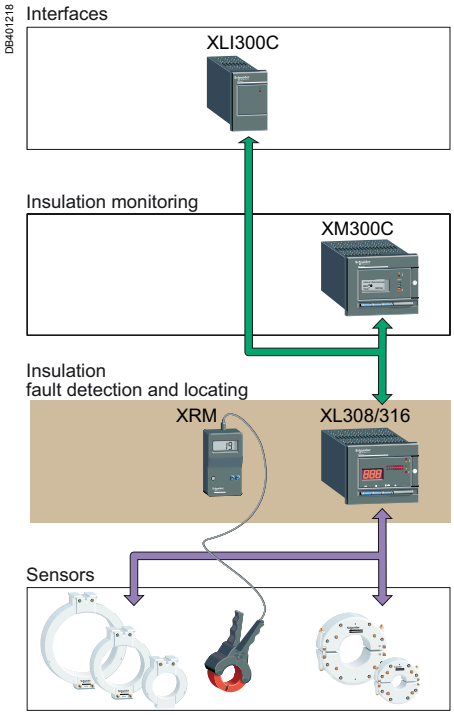
XL308 and XL316 locators comply with the following standards:

- IEC 364, parts 4 and 5
- class DLD/M of UTE C 63-080 They are implemented in accordance with standard NF C 15-100 paragraph 413.4
- IEC 61557-8.

Toroids

XL308 and XL316 locators operate with type A and OA toroids.

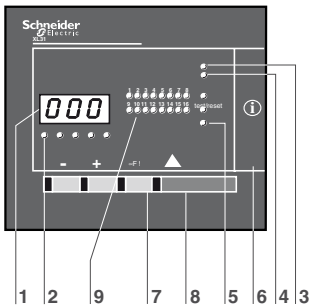
DB401218



Installation and connection

- Horizontal flush mounting on the front face of a cubicle or enclosure.
- Easy mounting in Prisma enclosures using the corresponding mounting plates and front plates that come with the appropriate cut-outs.
- The devices are interconnected by shielded cables (double 0.75 mm^2 twisted pairs). The resistance between the two most distant points must not exceed 12 Ω. The coupling capacitance between pairs must not exceed 250 nF.
- Connection of toroids using twisted, shielded cable (1 pair).

DB127896



1. Display indicating measured insulation resistance and earth coupling capacitance value.
2. Light indicating measurement units for displayed value (kΩ, µF, etc.).
3. Red self-test light, indicating device faults
4. Yellow light indicating that a transient fault has occurred.
5. 2 lights indicating the insulation level:
   - ■ green light: normal
   - ■ red light: insulation resistance below fault threshold on one of the circuits.
6. Instruction manual stored in a drawer on the front face.
7. Function keys for:
   - ■ accessing earth leakage capacitance readings
   - ■ setting thresholds
   - ■ accessing three last values of transient insulation faults.
8. Sealable cover ensuring tamperproof settings.
9. Lights indicating faulty circuits.

Insulation fault locators		XL308	XL316
Electrical characteristics			
Ohmmeter		Digital	
Range for insulation resistance readings		0.1 to 999 kΩ	
Range for capacitance readings		0.1 µF to 999 µF	
Signalling		8 lights (1/channel)	16 lights (1/channel)
Signalling threshold and setting range (per channel)		1	
	Fault threshold	0.2 to 99.9 kΩ	
Polling time		15 seconds per channel	
Device test		Self-test and manual test	
Dielectric strength		2500 V	
Auxiliary supply voltage	50/60 Hz	115/127 V AC	
		220/240 V AC	
		380/415 V AC	
Auxiliary supply voltage tolerances		-15 % to +10 %	
Consumption		30 V A	
Indicator and output relay		Local or from insulation monitoring device	
Output relays		2 (1 failsafe)	
Breaking capacity of output contacts	AC 400 V pf = 0.7		3 A
	AC 230 V pf = 0.7		5 A
	DC 220 V L/R = 1 ms		0.45 A
	DC 120 V L/R = 1 ms		0.65 A
	DC 48 V L/R = 1 ms		2.5 A
	DC 24 V L/R = 1 ms		10 A
Connection with insulation monitoring device		Via 4-wire communication bus	
Connection cross-sections	Rigid conductors	1 to 1.5 mm^2	
	Flex conductors	0.75 to 1.5 mm^2	
Mechanical characteristics			
Weight		3.5 kg	
Sheet-metal case		Horizontal mounting	
		Disconnectable screw terminal block	
Other characteristics			
Temperature range	For operation	-5 °C to +55 °C	
	For storage	-20 °C to +70 °C	
Types of toroids to be used		A, OA, (N and O compatible)	

Commercial references

■ XL308:
- □ 115/127 V AC: **50606**
- □ 220/240 V AC: **50607**
- □ 380/415 V AC: **50608**

■ XL316:
- □ 115/127 V AC: **50615**
- □ 220/240 V AC: **50616**
- □ 380/415 V AC: **50617**

Vigilohm XLI300, XTU300

044141_SE_30

Use

When two or more communicating devices (XM300C, XML308/316, XL308/316 or XD308C) are used or when communication with a supervisor is required, it is necessary to connect one (and only one) interface to the communication bus.

Functions

The interface allows communication between the Vigilohm System and a supervisor or PLC using a Modbus type protocol.
It transmits the information provided by the Vigilohm System:
- prevention and fault alarms from XM300C or XML308/316 monitoring devices
- fault alarms from XML308/316 or XM308/316 locators
- insulation resistance and capacitance measurements
- threshold settings
- fault alarms and faulty circuit identification from XD308C detectors.

The interface also allows the thresholds to be set form the supervisor.

As the IMD injects a low frequency into the network, it is necessary to have at least one IMD, but no more than one, per subnetwork.

Exclusion

This injection exclusion is managed by the interface. With two or several set of busbars with bus coupling, the exclusion becomes more complex and is managed by a PLC inside the XTU300.

XTU300 = XLI300 + PLC function. The configuation is made by Schneider Electric according to the wiring diagram.

Device			XLI300 / XTU300
Function			
Interface between the Vigilohm System bus and a supervisor or PLC			■
Power supply to Vigilohm System bus			■
Operates with	Monitoring device	XM300C	■
	Mon./locating device	XML308/316	■
	Locator	XL308/316	■
	Detector	XD301/312	-
		XD308C	■
Maximum configuration	Monitoring device XM300C and/or XML308/316		4
	Locator	XL308/316	8
	Detector	XD308C	8
Electrical characteristics			
Auxiliary supply voltage		50/60 Hz	115/127 V AC
			220/240 V AC
			380/415 V AC
Maximum device consumption			30 VA
Dielectric strength			2500 V
Mechanical characteristics			
Weight			1.864 kg
Metal case with insulated front			■
Degree of protection			IP30
Degree of protection of front			IP40
Other characteristics			
Interface possible with supervisor			■
Modbus connector		Sub D 9-pin (not supplied)	■
Communication with other devices		Via 4-wire data bus	■
Temperature range		Operation	-5 °C to +55 °C
		Storage	-25 °C to +70 °C
Installation			
Vertical mounting on front plate			■
Connection			
Vigilohm System bus	1.5 mm^2 tunnel terminals		■
External bus	RS485	Sub D9 female connector	■
Communication			
Speed (baud)	Adjustable		300... 19200
	Per fault		9600
Data length (bits)			8
Parity			None
Start bits			1
Stop bits			1

Commercial references
- XLI300 115/127 V AC: **50515**
- XLI300 220/240 V AC: **50516**
- XLI300 380/415 V AC: **50517**
- XTU300 220/240 V AC: **50546** (1)
- XTU300 380/415 V AC: **50547** (1)

(1) Please consult Schneider Electric for configuration.

XRM mobile fault locating
Receiver & current probes

051350_SE_25

XRM receiver.

DB101070

DB100471_SE_50

Functions and characteristics

Operation
The XRM mobile receiver, used with a current probe, is mainly intended as an enhancement to automatic fault locating systems.

It can be placed at various points along a faulty circuit, capturing the signal emitted by an XM300C, XML308/316 or XM200 insulation monitoring device to determine the exact location of the fault.

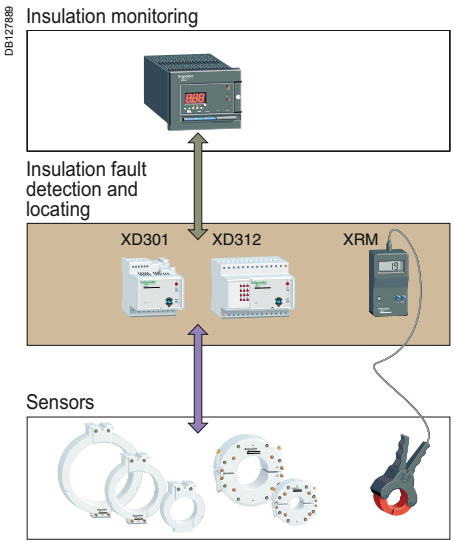
Three current probes are available, the XP15, XP50 and XP100. The set of live conductors to be tested must have a maximum diameter of 12, 50 and 100 mm respectively.

Display
The XRM receiver displays a number from 0 to 19, corresponding to the insulation level:
- 0: no fault
- 19: solid fault (no insulation).

Note: *the photographs are for information purposes only. There are two types of probes that function in the same way but are different in shape and colour.*

The XP15, XP50 and XP100 current probes.

DB127889



Vigilohm mobile fault locating
Kit XGR + XRM + probes

053130_SE_63

Presentation
The mobile fault locating kit comes in the form of a case containing:
- a locating signal generator, XGR, supplied with 220 - 240 V AC
- a locating signal receiver XRM
- three tong-type current probes: XP15, XP50 and XP100.

The devices making up the kit and the XGR for other voltages are all available individually. See catalogue number tables.

Use
The kit is used on LV IT systems (i.e. installations with an unearthed or impedance-earthed neutral).
It enables fault locating on:
- AC installations 50 to 400 Hz
- DC installations.

It is used mainly with insulation monitoring devices that inject DC currents (IM9) or too small AC current (IM10, IM20).

Operation of the XGR
- The XGR generator injects a 2.5 Hz AC voltage between the installation and the earth, thereby creating a leakage current which passes through the installation insulation impedance.
- The XRM mobile receiver is associated with one of the three tong-type probes, XP15, XP50 or XP100, and detects this leakage current at 2.5 Hz. It displays a value between 1 and 19 according to the current passing through the probe, thus detecting the leakage current.
- Three current probes are available, the XP15, XP50 and the XP100, for cables with diameters up to 12, 50 and 100 mm respectively. Older probe models are not compatible with the XRM.

047166_SE_30

XGR locating signal generator.

Type of installation to be monitored			
General			
LV AC or mixed AC/DC IT systems	Phase-to-phase voltage with XGR connected to neutral		≤ 760 V AC
	With XGR connected to phase		≤ 440 V AC
	Frequency		45-400 Hz
DC or rectified systems	Voltage between polarities		500 V DC
Electrical characteristics			
Auxiliary supply voltage	XGR	50/60 Hz	115/127 V AC
			220/240 V AC
			380/415 V AC
		Max consumption	15 VA
	XRM	IEC alkaline 9 V cell	PP3 or 6 LR61 type (not supplied)
Display	XRM	Type	Digital
		Scale	0 to 19
Calibration	XRM		By potentiometer
Impedance	XGR		40 kΩ
Maximum current injected	XGR		2.5 mA
Mechanical characteristics			
Weight	XGR		0.85 kg
	XRM		0.2 kg
Case	XGR	Plastic	Portable
	XRM	Plastic	Portable
Associated equipment			
Probes (1)	XP15	For cables up to	12 mm
	XP50	For cables up to	50 mm
	XP100	For cables up to	100 mm
Fault locating with other device			
Automatic		Detectors XD301/312	
Manual		Mobile receiver XRM + probes	

(1) Maximum diameter of all live conductors together.

Commercial references:
- Kit case: **50310**
- XP15 probe: **50494**
- XRM: **50278**
- XP50 probe: **50498**
- XGR 115/127 V AC: **50281**
- XP100 probe: **50499**
- XGR 220/240 V AC: **50282**
- Empty case: **50285**
- XGR 380/415 V AC: **50283**

DB101070

DB100471_SE_36

051350_SE_19

XRM locating signal receiver.

051352_SE_60

Closed toroids (type A).

042588_SE_46

Split toroids (type OA).

DB127910

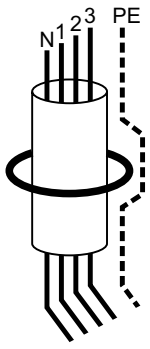


Figure 1.

DB127911

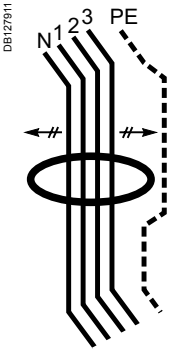


Figure 2.

Toroids

Use

The toroids are used to detect the earth leakage currents. They are used with the Vigilohm System for the detection, locating and measurement of earth fault currents on IT systems.
Closed toroids (type A) are suitable for new installations and extensions.
Split toroids (type OA) are suitable for renovated installations and extensions.

Functions

These toroids detect leakage current and transmit a proportional signal to the associated receiver.

Compatibility

All type A and OA toroids are compatible with the various devices of the Vigilohm System range: XD301, XD312, XD308C, XL308, XL316, XML308 and XML316.

Installation and connection

Closed toroids (type A)

- Enclosed in an insulated casing.
- 2 possibilities for mounting:
  - diam. 30-50-80 mm on symmetrical rail
  - all diameters on plate and cables.
- Connection:
  - diam. 30 to 200 mm by tunnel terminals for 0.22 mm² wires (minimum)
  - diam. 300 mm by 6.35 mm tab connectors.

Split toroids (type OA)

- Enclosed in an insulated casing
- Mounting on plate and cable
- Connection by 5 mm diam. screws for 0.22 mm² wires.

(see table page 32)

Immunity to line overcurrents

Line overcurrents, due to motor starting or transformer energising, may result in unnecessary fault detection by the detector.
A number of simple precautions can help prevent this from happening: when used together they are even more effective:

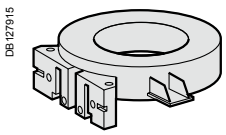
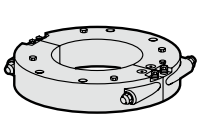
- place the toroid on a straight part of the cable
- carefully centre the cable in the toroid
- use a toroid with a diameter far larger than the diameter of the cable (2 x diameter) (figure 1).

For severe operating conditions, use of a mild steel sleeve placed around the cable, in the toroid, considerably increases immunity.

Recommended characteristics

- Mild steel foil, 1/10 mm thick, to be wound several times around the cable in the toroid (at least 1 mm thick).
- Internal diameter of toroid > 1.4 x external diameter of the cable bundle (figure 2).
- Toroid-detector link:
  - resistance ⩽ 3 Ω
  - cross-sectional area of wires: 0.75 mm² to 1.5 mm².
- Maximum length: 100 m (see the toroid user manual for details).

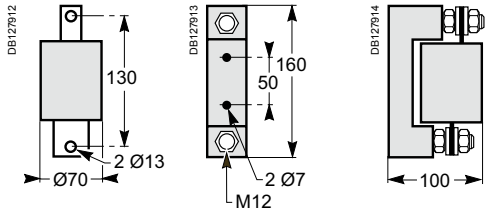
Vigilohm toroids
Type A closed toroid, Type OA split toroid

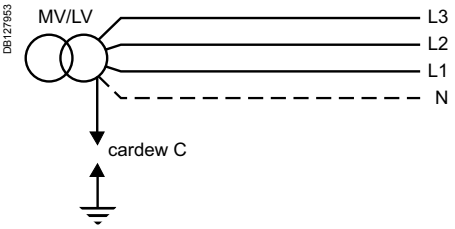
Sensors	Type A closed toroid						Type OA split toroid	
	 DB127915						 DB127916	
General characteristics								
Type of installation to be monitored	LV 45-440 Hz & DC						LV 45-440 Hz & DC	
Insulation voltage Ui	1000 V						1000 V	
Closed sensor	■						-	
Split sensor	-						■	
Operating temperature	-35 °C to +70 °C						-35 °C to +70 °C	
Storage temperature	-55 °C to +85 °C						-55 °C to +85 °C	
Degree of protection	IP30 (IP20 connections)						IP30 (IP20 connections)	
Electrical characteristics								
Transformation ratio	1/1000						1/1000	
3-phase short-circuit withstand current Icw of 100 kA/0.5 s	■						■	
Differential short-circuit withstand current IΔw of 85 kA/0.5 s (as per IEC60947-2 in kA rms)	■						■	
Overvoltage category	4						4	
Rated impulse withstand voltage Uimp (kV)	12						12	
Sensor characteristics	**TA30**	**PA50**	**IA80**	**MA120**	**SA200**	**GA300**	**POA**	**GOA**
Max cross-section area of conductors per phase (mm² of copper)	25	50	95	240	2 x 185	2 x 240	50	240
Mechanical characteristics								
Type of sensor	**Diameter (mm)**			**Weight (kg)**			**Diameter (mm)**	**Weight (kg)**
Toroid TA30	Ø 30			0.120			-	-
Toroid PA50	Ø 50			0.200			-	-
Toroid IA80	Ø 80			0.420			-	-
Toroid MA120	Ø 120			0.590			-	-
Toroid SA200	Ø 200			1.320			-	-
Toroid GA300	Ø 300			2.230			-	-
Toroid POA	-			-			46	1.300
Toroid GOA	-			-			110	3.200
Mounting								
Horizontal or vertically on symmetrical DIN rail	TA30, PA50, IA80, MA120						-	
On plain or slotted backplate or profiled sheet metal	TA30, PA50, IA80, MA120, SA200						POA, GOA	
On cable	IA80, MA120, SA200, GA300						-	
Environment (1)								
Damp heat, equipment not operating (IEC 60068-2-30)	28 cycles +25 °C/+55 °C / HR 95 %						28 cycles +25 °C/+55 °C / HR 95 %	
Damp heat, equipment operating (IEC 60068-2-56)	48 hours, environment category C2						48 hours, environment category C2	
Salt mist (IEC 60068-2-52)	KB test, severity 2						KB test, severity 2	
Degree of pollution (IEC 60664-1)	3						3	
Calorific value (MJ)	0.98	1.42	3.19	3.89	7.05	-	8.02	16.35

(1) Allows use in all climates.

Commercial references:
- TA30: **50437**
- PA50: **50438**
- IA80: **50439**
- SA200: **50441**
- MA120: **50440**
- GA300: **50442**
- Open POA: **50485**
- Open GOA: **50486**
- 100 m cable (shielded): **50136**

Vigilohm auxiliaries
Accessories for various installations (Cardew)





Auxiliary characteristics Cardew C surge limiter

- On LV network with isolated or impedance earthed neutral.
- Connected to the secondary of the MV/ LV transformer to discharge overvoltages to earth.
- Capable of withstanding the short-circuit current of the transformer.
- Its operation causes continuous indication on the insulation monitor.

Connection

Characteristics

- Non-arcing voltage at 50 Hz ⩽ 1.6 x nominal U.
- Certain arcing voltage at 50 Hz >2.5 x nominal U (3 x nominal U for 220 V).
- Maximum current after arcing: 40 kA/0.2 sec.
- Insulation resistance > 10^{10} Ω.
- Cartridge not reusable.
- Temperature range:
  - operating: -5 °C to +40 °C
  - storage: -25 °C to +70 °C.

Standards

- NF C 63-150, NF C 15-100.
- Weight: 1 kg.

Cardew selection table

The selection depends on:

- the operating voltage Un of the installation
- the installation insulation level
- the connection point (neutral-earth or phase-earth).

Connecting conductor size

- Cable or bar with a size adapted to the transformer rating.
- The connecting conductor should be considered to be a protective conductor (PE) and the calculation of its crosssectional area must satisfy applicable installation standards, considering that this part of the installation is protected by protective devices located upstream of the MV/LV transformer.
- According to standard IEC 364, the formula for the calculation of the of the size of the PE conductor is: $S = \sqrt{I^2t/k}$ where S is the cross-sectional area of the PE conductor in mm^2, I is the fault current, t is the operating time of the protective device and k is a coefficient that depends on the metal and insulation material used for the conductor.
- **Recommendation:** if insulation monitoring is provided using the Vigilohm System, install a type A toroid on the Cardew earthing circuit in order to monitor operation of the Cardew. The toroid can be connected to an XD301/312 detector or an XL308/316 or XML308/316 locating device.

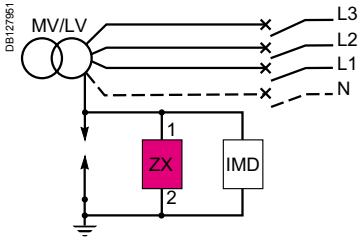
Un: ph-ph operating voltage of AC installation		Ui arcing voltage	Cardew C
Neutral distributed	Neutral not distributed	-	“type”
U ⩽ 380 V	U ⩽ 220 V	400 V < Ui ⩽ 750 V	“250 V”
380 V < U ⩽ 660 V	220 V < U ⩽ 380 V	700 V < Ui ⩽ 1100 V	“440 V”
660 V < U ⩽ 1000 V	380 V < U ⩽ 660 V	1100 V < Ui ⩽ 1600 V	“660 V”
1000 V < U ⩽ 1560 V	660 V < U ⩽ 1000 V	1600 V < Ui ⩽ 2400 V	“1000 V”

Vigilohm auxiliaries
Accessories for various installations

ZX limiting impedance subassembly

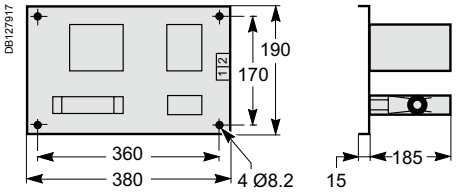
Connection

■ Creates an installation with an impedance earthed neutral.
■ Remains connected during fault locating at 2.5 Hz:
□ 1500 Ω at 50 Hz
□ 1M Ω at 2.5 Hz.
■ U ⩽ 500 V AC.



Dimension, mounting

Weight: 3.500 kg

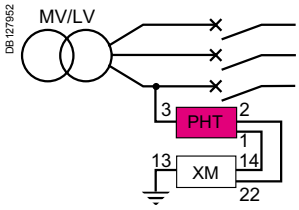


Commercial reference: 50159

PHT1000 additional subassembly

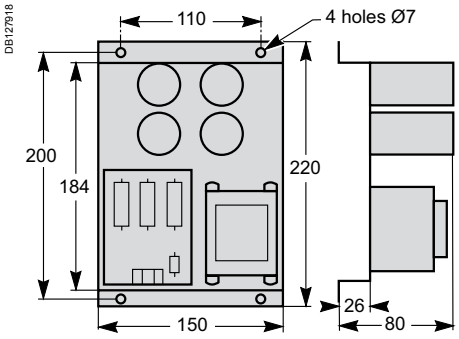
Connection

■ For use with Vigilohm System XM300C and XML308/316 on the following installations:
□ 440 V AC ⩽ U ⩽ 1000 V AC neutral not accessible
□ 760 V AC ⩽ U ⩽ 1700 V AC neutral, accessible
□ 500 V DC ⩽ U ⩽ 1200 V DC: installation.



Dimension, mounting

Weight: 2 kg



Commercial reference: 50248

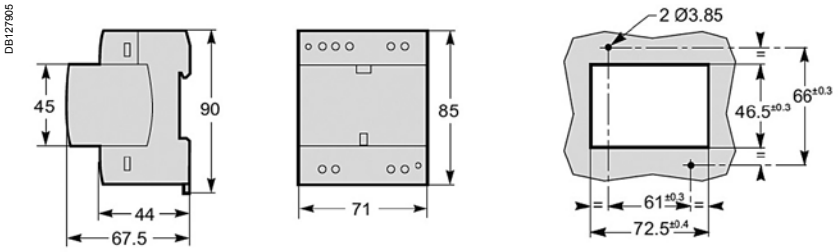
HV-IM20 additional subassembly

Connection

■ For use with Vigilohm System IM20 on the following installations:
□ 600 V AC ⩽ U ⩽ 1700 V L-L AC neutral accessible
□ 440 V AC ⩽ U ⩽ 1000 V L-L AC neutral not accessible
□ 345 V DC ⩽ U ⩽ 1000 V DC
It is recommended to have the subassembly close to the IM20 (max 3m)

Dimension, mounting

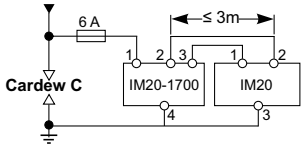
Weight: 0.2 kg



Commercial reference: IMD-IM20-1700

Wiring diagram

440 V∼ ⩽ U ⩽ 1000 V ~ L-L (injection on phase)
440 V∼ ⩽ U ⩽ 1700 V ~ L-L (injection on neutral)
345 VDC∼ ⩽ U ⩽ 1000 V DC



Vigilohm auxiliaries
Selection table

Selection of auxiliaries - some are required for Vigilohm installations, some are optional

■ Essential auxiliary □ Optional auxiliary

Vigilohm	XM200 / XM300C / XML308 / XML316		XGR	IM10 IM20	IM9	Commercial references
	U < 760 V AC (3)	760 to 1700 V AC (3)				
	U < 440 V AC (4)	440 to 1000 V AC (4)				
	U < 500 V AC (5)	500 to 1200 V AC (5)				
"250 V" Cardew C (1) or	■			■	■	**50170**
"440 V" Cardew C (1) or	■			■	■	**50171**
"660 V" Cardew C (1) or	■			■	■	**50172**
"1000 V" Cardew C (1) or		■		■	■	**50183**
Cardew C base	□	□		□	□	**50169**
HV-IM20-1700 subassembly				■ (2)		**IMD-IM20-1700**
ZX limiting impedance	□		□	□	□	**50159**
PHT1000 additional subassembly		■ Except XM200				**50248**

(1) See choice of the type of Cardew C (250, 440, 600 or 1000 V).
(2) Required for IM20 used on installation with U > 440 V.
(3) Neutral distributed.
(4) Neutral not distributed.
(5) DC installation.

HRP
Hospital Remote Panel

PB105943_58

Presentation

This accessory provides the interface for an electrical installation monitoring system in hospitals.
Installed in the operating theatre, the Vigilohm HRP informs hospital personnel, in real time, of correct operation or the presence of a fault:
- faulty insulation of operating theatre equipment
- electrical fault following a circuit breaker trip or transformer overload.

Use

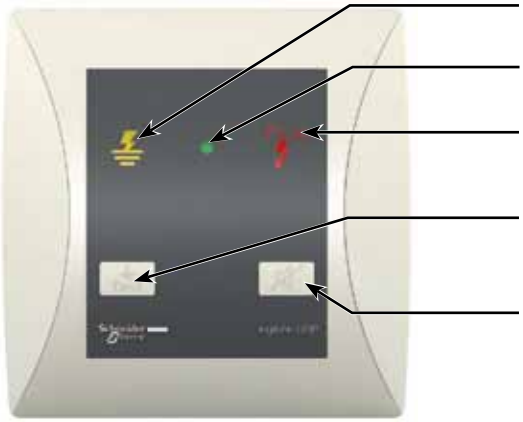
- Insulation fault signal light (orange).
- Electrical fault signal light (red).
- Correct operation signal light (green).
- Push button to test installation insulation.
- Push button to stop alarm buzzer.

Vigilohm HRP		
Mechanical characteristics		
Weight		0.5 kg
Case	Plastic	Vertical mounting
Degree of protection		IP54
		IK08
Dimensions	Height	170 mm
	Width	170 mm
	Depth	20 mm
Buzzer	Factory setting	80 db
Electrical characteristics		
Auxiliary supply voltage	24 V DC	65 mA
Environment		
Operating temperature		0 °C to 40 °C
Storage temperature		-25 °C to +70 °C
Maximum relative humidity		90 %
Altitude		2000 m
Standards		
Complies with	IEC 60364-7-710	Medical locations
	IEC 61557-8	Electrical safety
	IEC 60601-1	Medical electrical equipment

Tested with Anios products (disinfection, antiseptis and detergency products).

Commercial reference: 50168.

PB105945



Functions identification

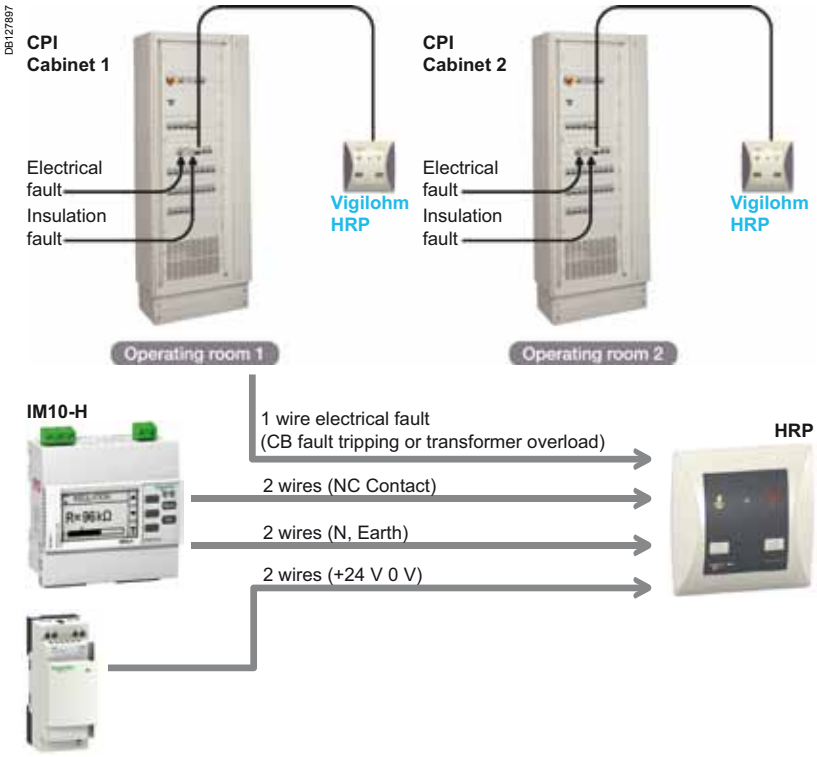
Visual alarm on insulation fault

Right operation lamp

Visual alarm on electrical fault (overload or overheating transformer or circuit-breaker fault tripping)

Test button of the insulation monitoring system (daily test in compliance with IEC 60364-7-710 standard)

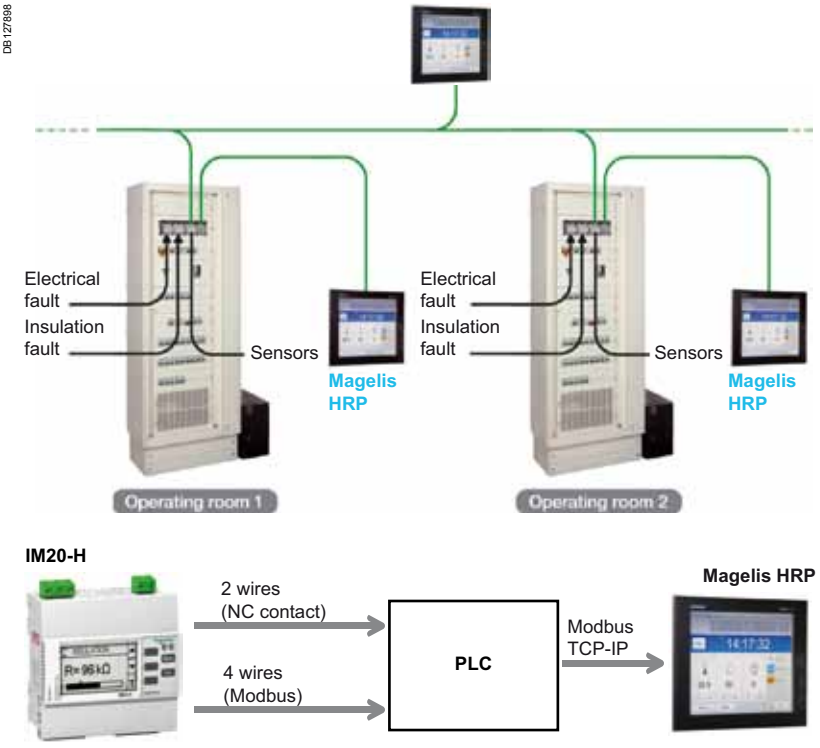
Audible alarm stoppage, in case of insulation fault or electrical fault. The alarm volume setting is made at the mounting phase (available in the rear)



Existing or specific power supply
Ex: ABL8MEM24003

Example architecture 1 using IM10-H and HRP

This monitoring system makes it possible, with the Vigilohm HRP in the operating room, to gather and display information concerning the alarms generated by the electrical installation.



Example architecture 2 using IM20-H and Supervision

The Modbus communication provides the operating room, and/or the maintenance personnel:

- insulation value
- transformer load level
- alarms
- timestamping of events.

This enables event traceability.

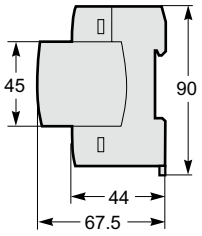
Note: It is also possible to have a variant of the architecture 1, with an IM20-H linked through Modbus to a supervisor outside the operating room.

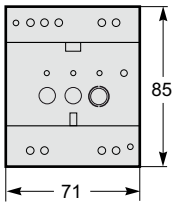
Installation and connection
Product dimensions

IM9, IM9-OL

Mounting on symmetrical DIN rail

DB127905





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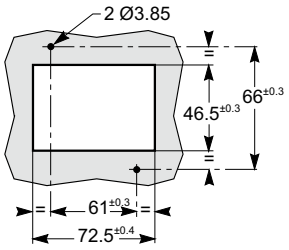
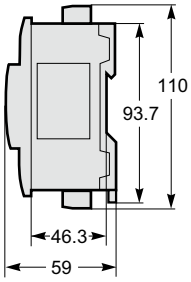
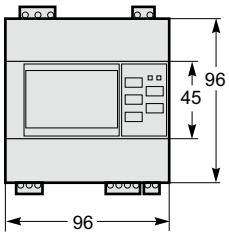


IM10, IM20, IM10-H, IM20-H

Mounting on symmetrical DIN rail

DB127906





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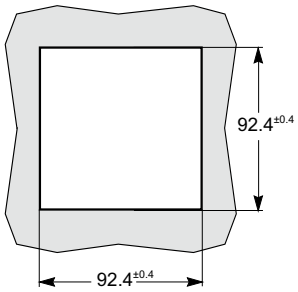
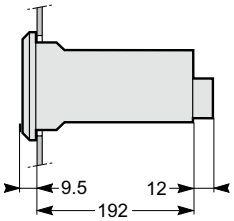
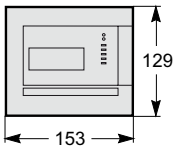


XM200, XM300C, XL308, XL316

Flush mounting

DB127899





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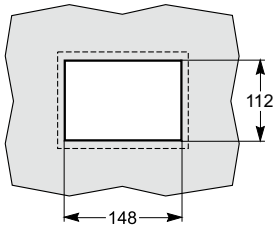
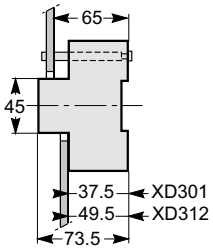


XD301, XD312

Flush mounting

DB127936



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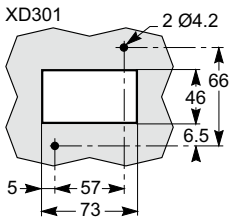
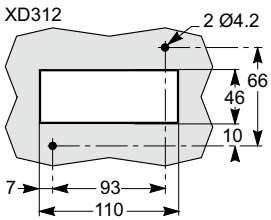
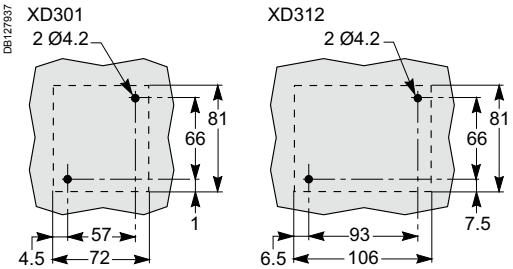




Surface mounting

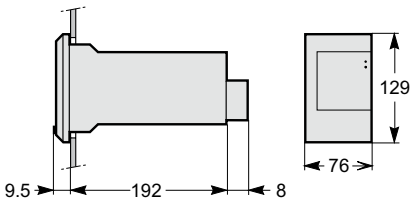
DB127937



XLI300, XTU300

Flush mounting

DB127900



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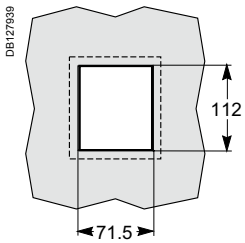
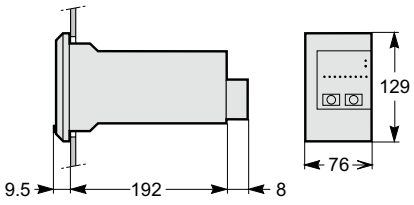
DB127939



XD308C

Flush mounting

DB127901



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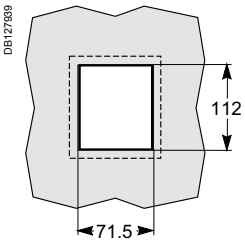
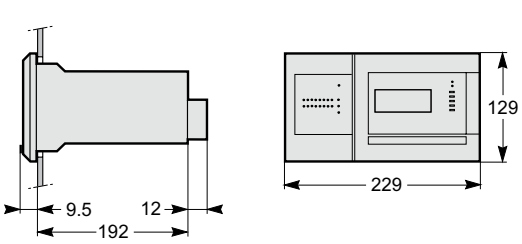


XML308, XML316

Flush mounting

DB127902



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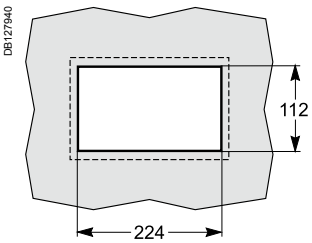
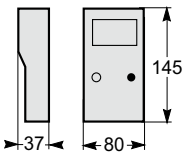


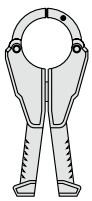
XRM + probes

XRM manual receiver

DB127903



DB127941

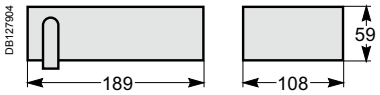


XP15, XP50 and XP100 probes.

Inside dimensions:
XP15: 12 mm
XP50: 50 mm
XP100: 100 mm

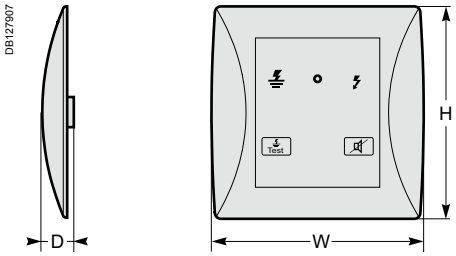
Installation and connection
Product dimensions

XGR

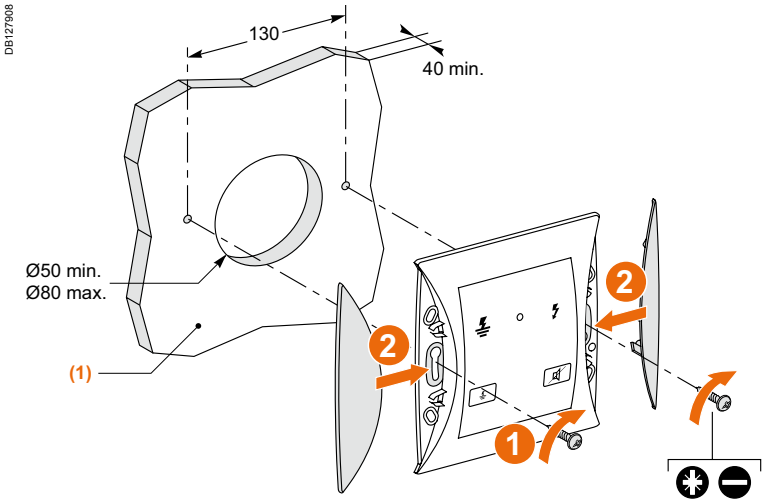


HRP

Flush mounting



H	W	D	Weight
170 mm	170 mm	20 mm	0.5 kg



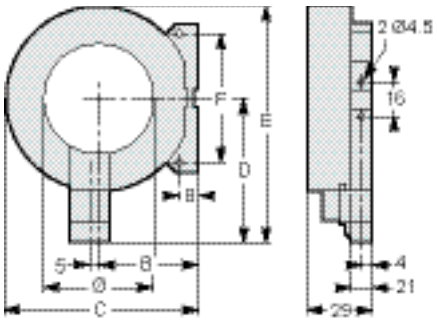
(1) Support in nonflammable material: concrete, plasterboard, stainless steel...

Toroids (type A and OA)

Flush mounting

Type A Ø30 and Ø50

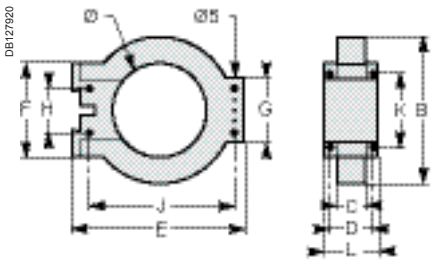
DB127919



Type	Ø	B	C	D	E	F
TA30	30	31	60	53	82	50
PA50	50	45	88	66	108	60

Types A Ø80 to Ø300

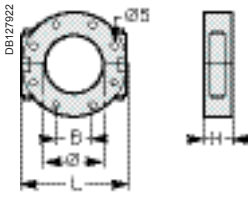
DB127920



Type	Ø	B	C	D	E	F	G	H	J	K	L
IA80	80	122	26.5	35	150	80	55	40	126	65	44
MA120	120	164	26.5	35	190	80	55	40	166	65	44
SA200	196	256	29	37	274	120	90	60	254	104	46
GA300	291	360	28	37	390	120	90	60	369	104	46

Type A Ø30, type OA Ø46 and Ø110

DB127922



Type	Ø	H	L	B
POA	46	38	148	57
GOA	110	44	224	76

Mounting examples for Type A torids

On XD301 detector Ø30 to Ø50

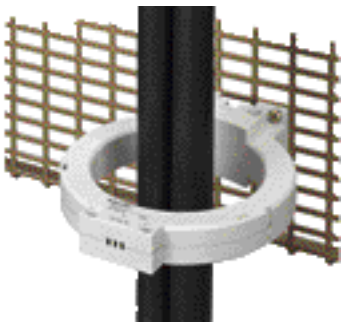
044666_SE_42

On rail Ø30 to Ø80 mm

042593_SE_45

On plate or section Type A Ø30 to Ø200 mm

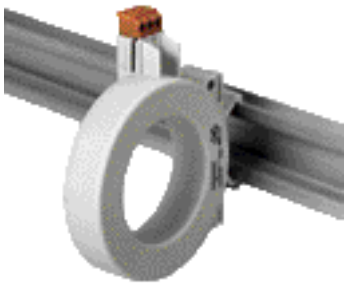
042591_SE_45



On cable Ø120 to Ø300 mm

044865_SE_49

042592_SE_45



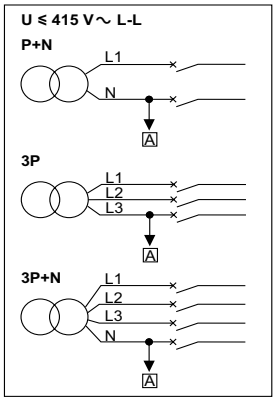
042590_SE_39

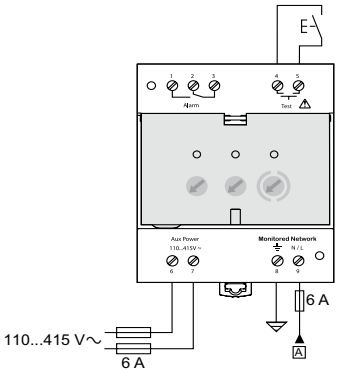
Installation and connection
Product connection

IM9

PB106370_32

DB127954

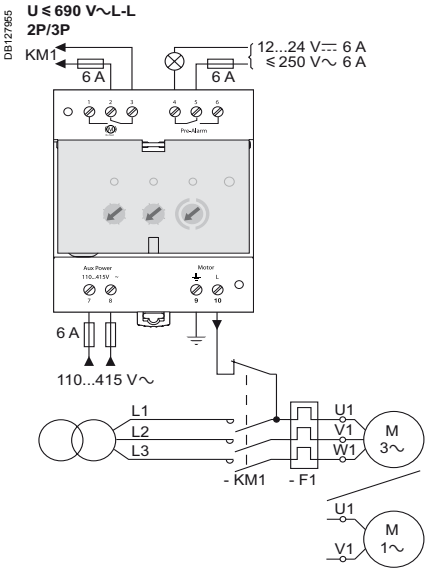


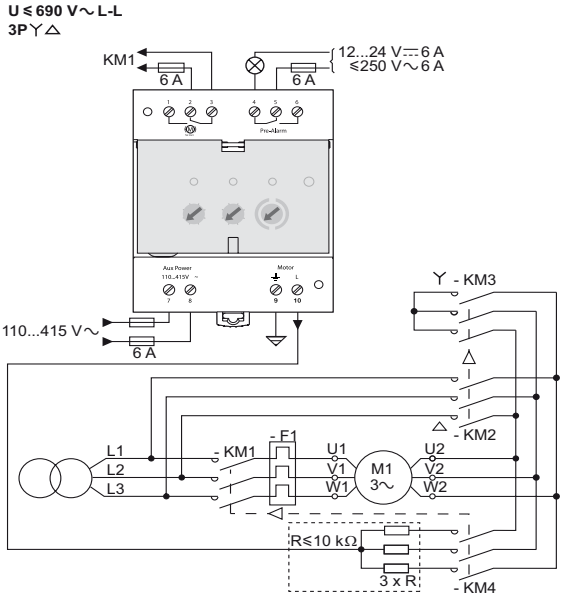


IM9-OL

PB106371_32

DB127955

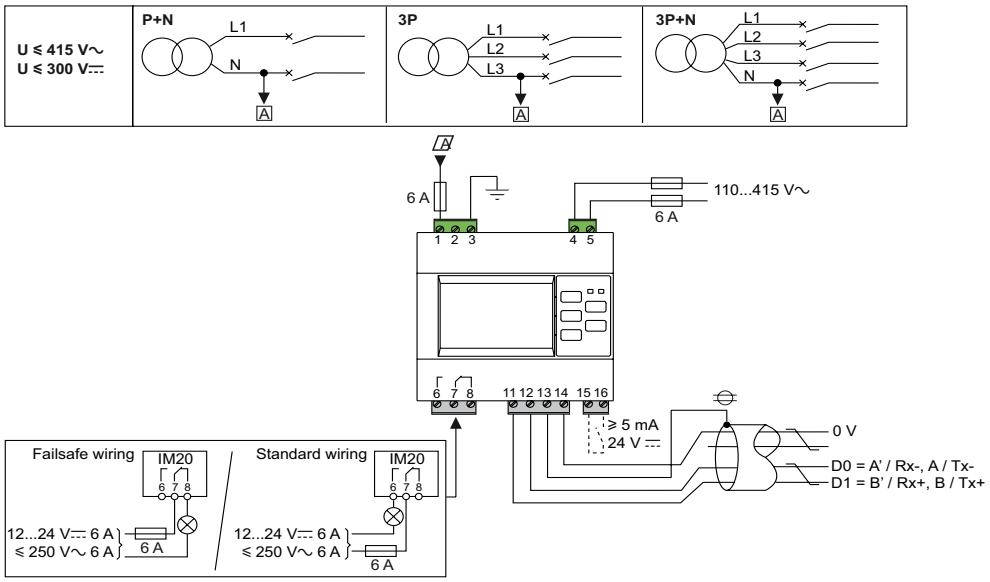




IM10, IM20

PB106374_32

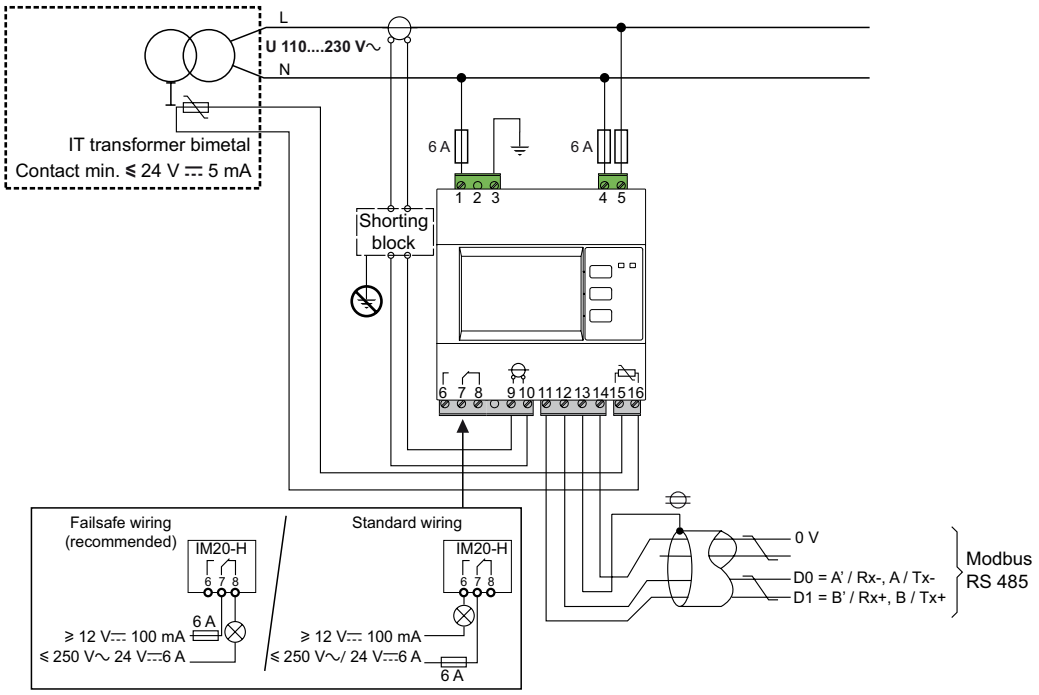
DB127956



IM10-H, IM20-H

PB106375_32

DB127957

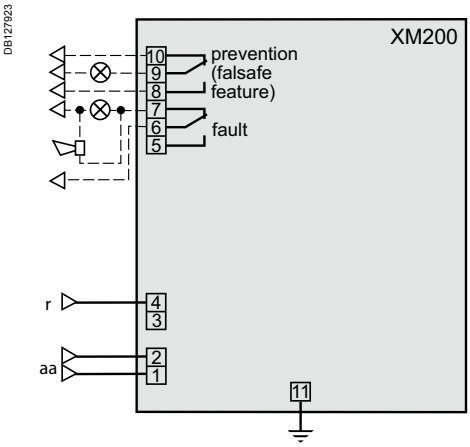


XM200

044147_SE_32

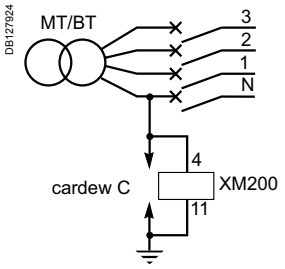
Tunnel terminals for 1.5 mm² wiring

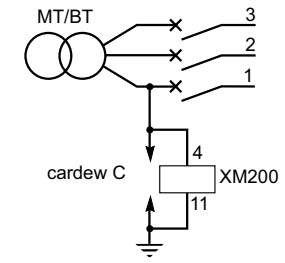
DB127923

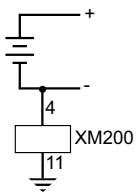


Legend
***aa**: AC auxiliary supply ~ 15 %, +10 %, 50-60 Hz*
***ut:** application*
***r:** installation*
***terminal 13:** earth connection by round lug (4 mm diameter) to be crimped.*

DB127924







Installation and connection
Product connection

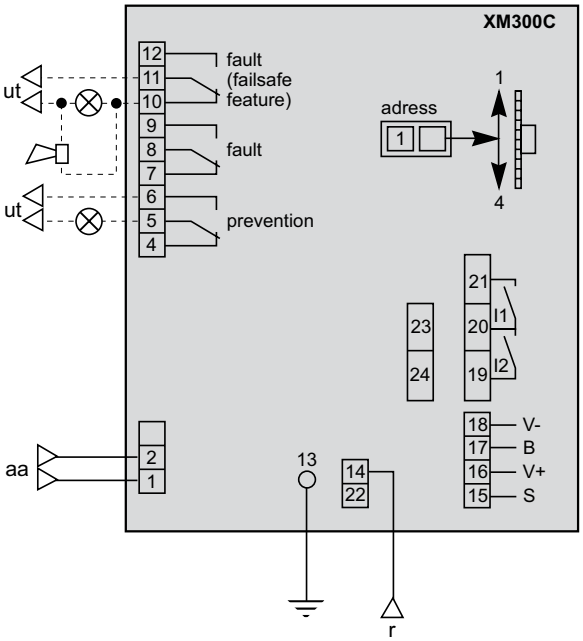
XM300C

044148_SE_32

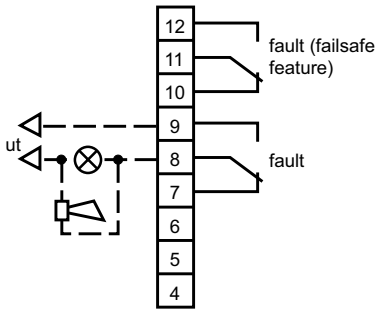
Tunnel terminals for 1.5 mm² wiring

Legend
aa: *AC auxiliary supply ~ 15 %, +10 %, 50-60 Hz*
ut: *application*
r: *installation*
terminal 13: *earth connection by round lug (4 mm diameter) to be crimped.*
**connection supplied with PHT1000.*

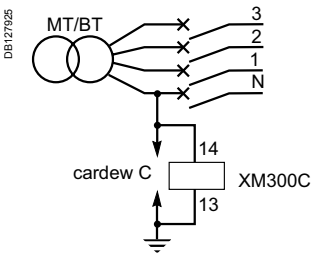
DB400264

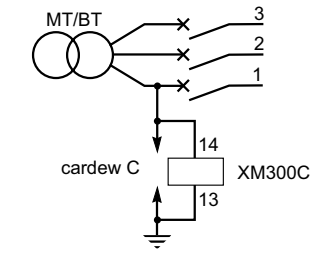


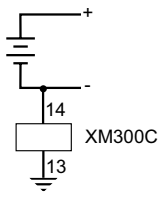
DB127926



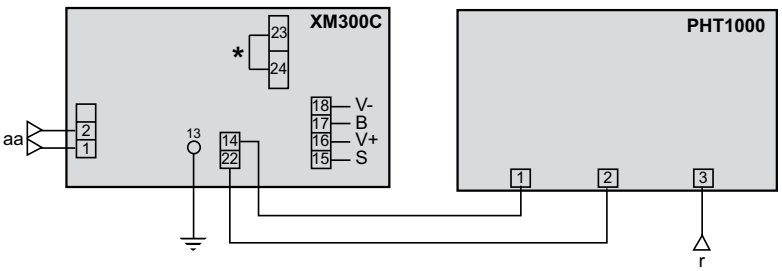
DB127925







DB127961



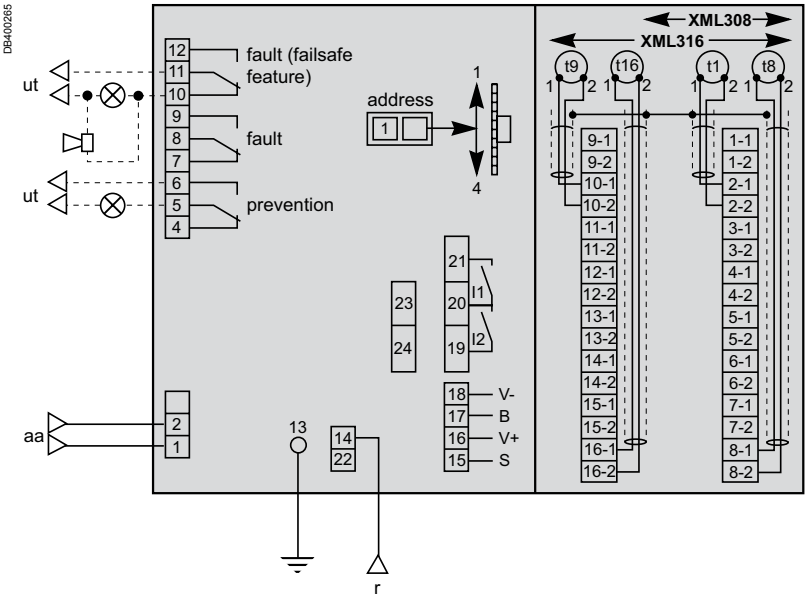
XML308, XML316

044149_SE_60

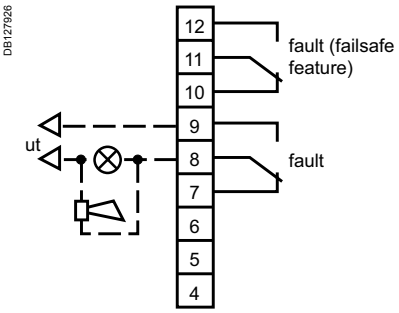
Tunnel terminals for 1.5 mm² wiring

Legend
aa: *AC auxiliary supply ~ 15 %, +10 %, 50-60 Hz*
ut: *application*
r: *installation*
terminal 13: *earth connection by round lug (4 mm diameter) to be crimped.*
**connection supplied with PHT1000.*

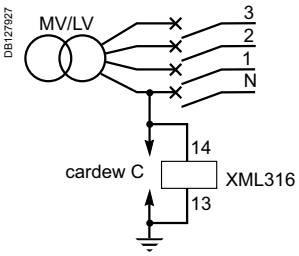
DB400265

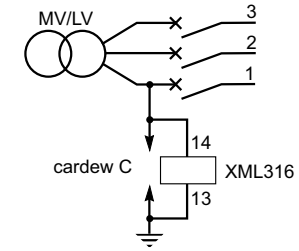


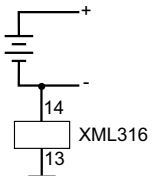
DB127926



DB127927







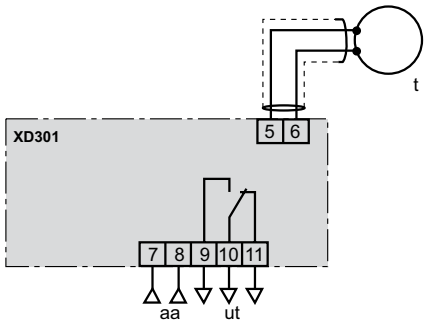
Installation and connection
Product connection

XD301

044144_SE_32

Tunnel terminals for 1.5 mm² wiring

DB127928



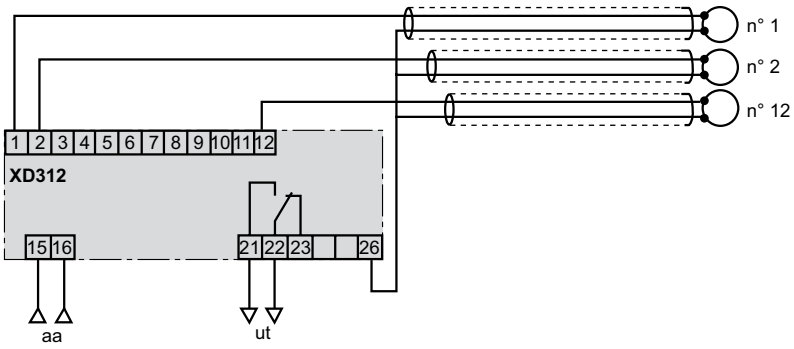
Legend
aa: *AC auxiliary supply ∿ 15 %, +10 %, 50-60 Hz*
ut: *application*
t: *toroid A or OA*

XD312

044144_SE_32

Tunnel terminals for 1.5 mm² wiring

DB127929



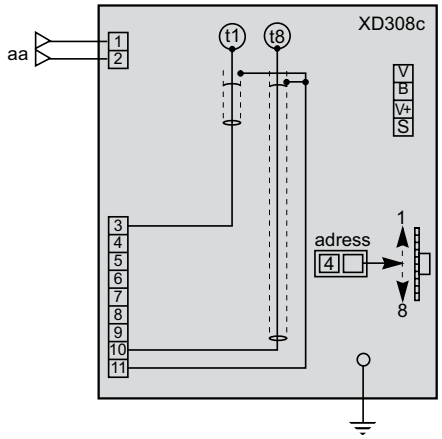
Legend
aa: *AC auxiliary supply ∿ 15 %, +10 %, 50-60 Hz*
ut: *application*
t: *toroid A or OA*

XD308C

044143_SE_32

Tunnel terminals for 1.5 mm² wiring

DB127930

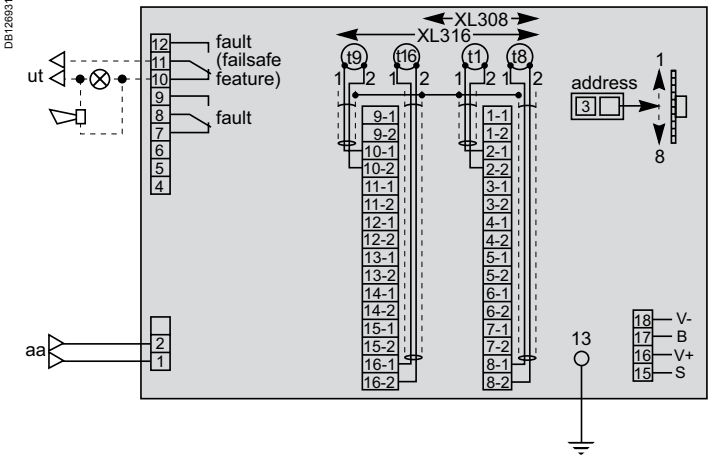


Legend
aa: *AC auxiliary supply ∿ 15 %, +10 %, 50-60 Hz*
t: *toroid A or OA*

XL308, XL316

044145_SE_60

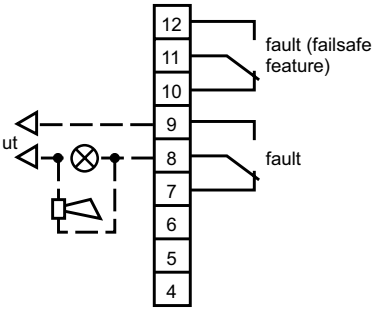
DB126931



Tunnel terminals for 1.5 mm² wiring

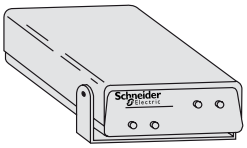
Legend
aa: *AC auxiliary supply ∿ 15 %, +10 %, 50-60 Hz*
ut: *application*
t: *toroid A or OA*
terminal 13: *earth connection by round lug (4 mm diameter) to be crimped.*
**connection supplied with PHT1000.*

DB127926

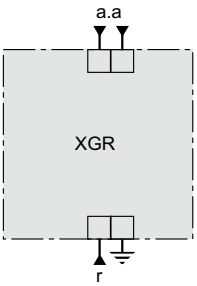


XGR

DB127890

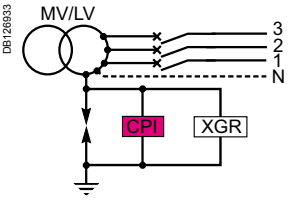


DB126932

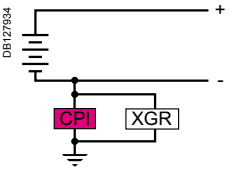


Legend
aa*: auxiliary supply*
r: *installation*

DB126933



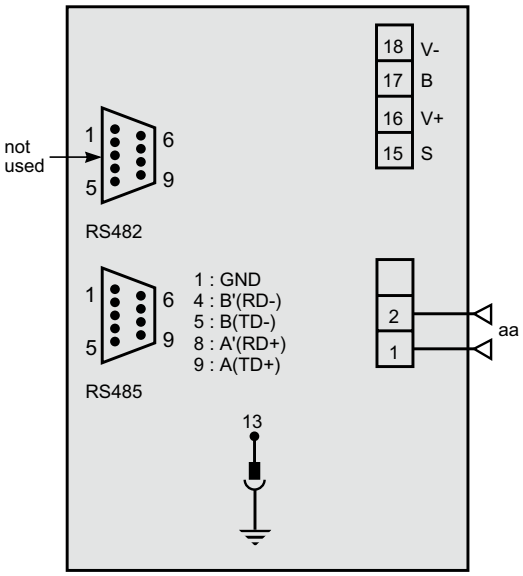
DB127934



Installation and connection
Product connection

XLI300, XTU300

DB127949

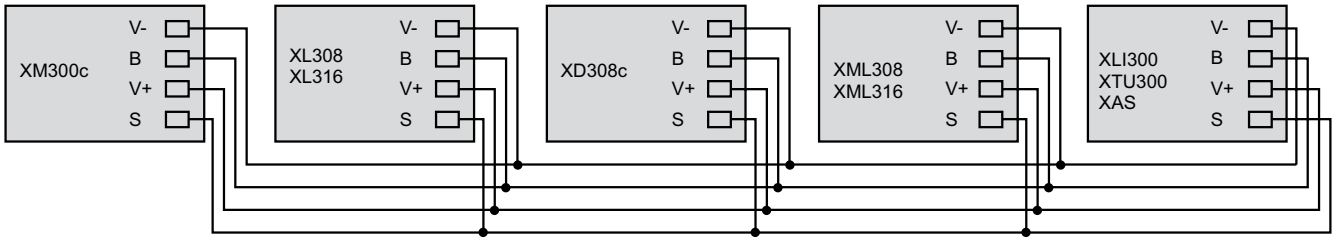


- Never connect more than one interface to the Vigilohm System bus.
- To connect devices to the communication bus (shielded, double twisted pair) it is recommended to interconnect their respective terminals S, B, V+ and V-.

XLI300 Sub D9
RS485
1 signal ground
4 received data -
5 transmitted data -
8 received data +
9 transmitted data +

Example of line connection

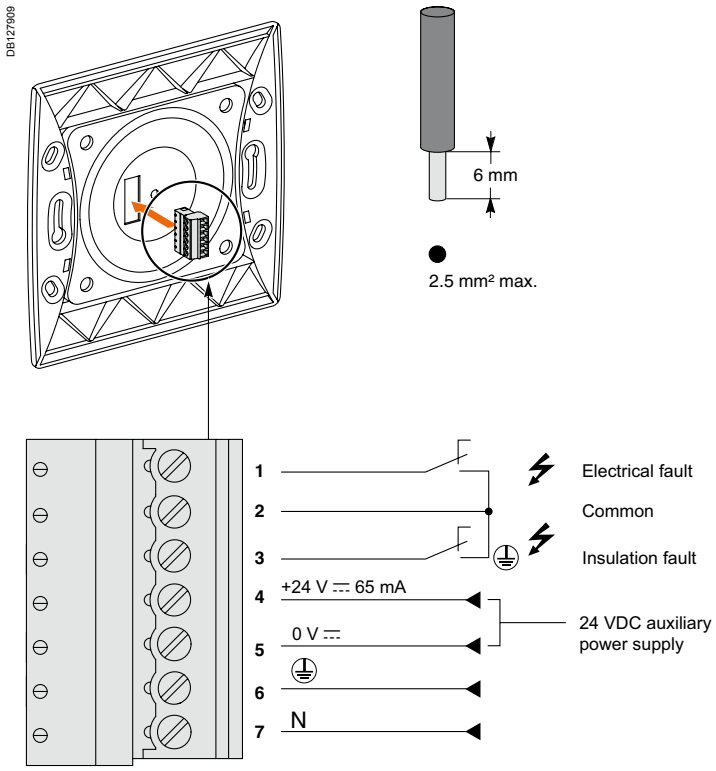
DB127935



HRP

PB105943_42

DB127909



Vigilohm insulation monitoring

Vigilohm commercial references

PB106370_15

PB106374_15

044147_SE_20

044148_SE_20

044149_SE_30

044144_SE_20

044143_SE_12

044145_SE_22

	Product	Voltage range	Reference
IM9	**Insulation monitoring device**		
	IM9	110/415 V AC 50/60 Hz	**IMD-IM9**
IM9-OL	**Off-line insulation monitoring device**		
	IM9-OL	110/415 V AC 50/60 Hz	**IMD-IM9-OL**
IM10 & IM20	**Insulation monitoring devices**		
	IM10	110/415 V AC 50/60 Hz	**IMD-IM10**
	IM20	110/415 V AC 50/60 Hz	**IMD-IM20**
IM10-H & IM20-H	**Insulation monitoring devices for hospitals**		
	IM10-H	110/240 V AC 50/60 Hz	**IMD-IM10-H**
	IM20-H	110/240 V AC 50/60 Hz	**IMD-IM20-H**
XM200	**Insulation monitoring device**		
	XM200	115/127 V AC 50/60 Hz	**50727**
	XM200	220/240 V AC 50/60 Hz	**50728**
	XM200	380/415 V AC 50/60 Hz	**50729**
XM300C	**Insulation monitoring device**		
	XM300C	115/127 V AC 50/60 Hz	**50540**
	XM300C	220/240 V AC 50/60 Hz	**50541**
	XM300C	380/415 V AC 50/60 Hz	**50542**
XML308 & XML316	**Monitoring-locating devices**		
	XML308	115/127 V AC 50/60 Hz	**50490**
	XML308	220/240 V AC 50/60 Hz	**50491**
	XML308	380/415 V AC 50/60 Hz	**50492**
	XML316	115/127 V AC 50/60 Hz	**50322**
	XML316	220/240 V AC 50/60 Hz	**50323**
	XML316	380/415 V AC 50/60 Hz	**50324**
XD301 & XD312	**Automatic insulation fault detectors**		
	XD301	115/127 V AC 50/60 Hz	**50506**
	XD301	220/240 V AC 50/60 Hz	**50507**
	XD301	380/415 V AC 50/60 Hz	**50508**
	XD312	115/127 V AC 50/60 Hz	**50535**
	XD312	220/240 V AC 50/60 Hz	**50536**
	XD312-H	220/240 V AC 50/60 Hz	**50536-H**
	XD312	380/415 V AC 50/60 Hz	**50537**
XD308C	**Communicating automatic insulation fault detector**		
	XD308C	115/127 V AC 50/60 Hz	**50723**
	XD308C	220/240 V AC 50/60 Hz	**50724**
	XD308C	380/415 V AC 50/60 Hz	**50725**
XL308 & XL316	**Insulation fault locators**		
	XL308	115/127 V AC 50/60 Hz	**50606**
	XL308	220/240 V AC 50/60 Hz	**50607**
	XL308	380/415 V AC 50/60 Hz	**50608**
	XL316	115/127 V AC 50/60 Hz	**50615**
	XL316	220/240 V AC 50/60 Hz	**50616**
	XL316	380/415 V AC 50/60 Hz	**50617**

Vigilohm insulation monitoring

Vigilohm commercial references

051350_SE_10

PB100471_SE_25

044141_SE_15

051352_SE_25

042589_SE_20

041857_SE_10

044139_SE_18

PB105843_22

	Product	Voltage range	Reference
XGR & XRM & probes	**Mobile fault locating**		
	Kit case: XGR (50282) + XRM + XP15 + XP50 + XP100		**50310**
	XRM		**50278**
	XGR	115/127 V AC 50/60 Hz	**50281**
	XGR	220/240 V AC 50/60 Hz	**50282**
	XP15 probe		**50494**
	XP50 probe		**50498**
	XP100 probe		**50499**
	Empty case		**50285**
XLI300 & XTU300	**Communication interfaces**		
	XLI300	115/127 V AC 50/60 Hz	**50515**
	XLI300	220/240 V AC 50/60 Hz	**50516**
	XLI300	380/415 V AC 50/60 Hz	**50517**
	XTU300	220/240 V AC 50/60 Hz	**50546** (1)
	XTU300	380/415 V AC 50/60 Hz	**50547** (1)
Toroids	**Earth leakage current detectors**		
	TA30		**50437**
	PA50		**50438**
	IA80		**50439**
	MA120		**50440**
	SA200		**50441**
	GA300		**50442**
	Open POA		**50485**
	Open GOA		**50486**
	100 m cable (shielded)		**50136**
Auxiliaries (2)	**Accessories for various installations**		
	250 V Cardew C		**50170**
	440 V Cardew C		**50171**
	660 V Cardew C		**50172**
	1000 V Cardew C		**50183**
	Cardew C base		**50169**
	HV-IM20-1700 subassembly		**IMD-IM20-1700**
	ZX limiting impedance		**50159**
	PHT1000 additional subassembly		**50248**
	HRP		**50168**

(1) Please consult Schneider Electric for configuration.
(2) See choice of Cardew on page 33 and auxiliary selection table on page 35.

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