Technical collection

The IT earthing system:

a solution to improve electrical network availability

Application guide

Schneider Electric

The IT earthing system

A solution to improve electrical network availability

Ensuring continuity of service in the event of an insulation fault

Continuity of service is an essential operational requirement for power networks. At the same time, the installation must comply with specific rules for the protection of 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 of which 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 60364-7-710
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

Earthing systems

Protecting people

Why several earthing systems?

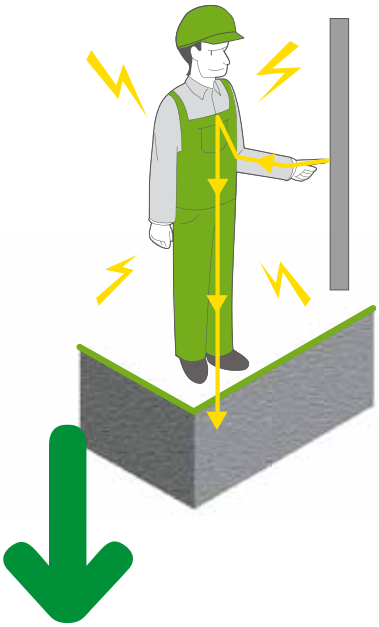
These systems arose from research into the best ways to protect people and property.
Once this requirement is met, further choice depends on cost, physical- and energy-availability requirements.

Protecting people from electric shocks

There are two sources of electric shock:

Direct contact

When a person touches
a live are conductor



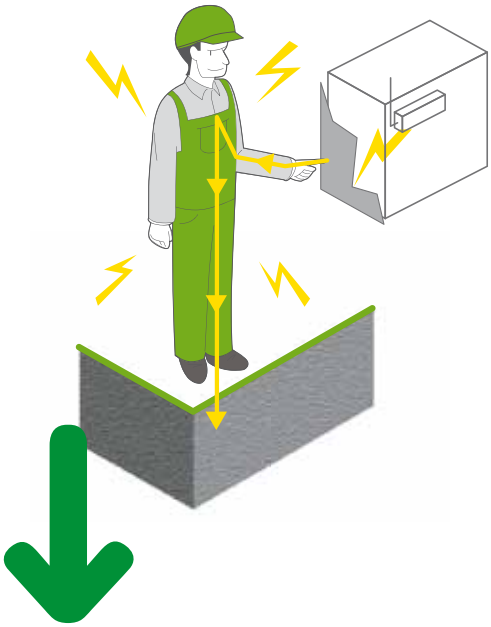
Protection

The protective measures are insulation and/or distancing.

These measures may be reinforced at a terminal distribution unit through the protection afforded by residual current devices (RCDs).

Indirect contact

when a person touches
the metal casing of an electrical device (consumer) that has an insulation fault



Protection

The basic solution is to connect all the exposed conductive parts of the consumer to earth via protective conductors.

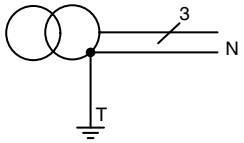
However, this does not eliminate the possibility of a contact voltage that is dangerous if it is higher than the safety limit voltage.

This contact voltage depends on the earthing system.

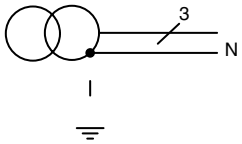
Earthing systems

Earthing (neutral) systems are defined by **two letters:**

1 The first letter defines how the transformer's neutral point is connected to earth:

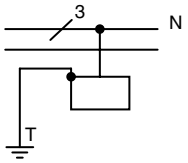


Neutral linked to the earth **T**

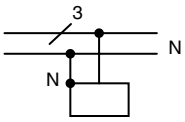


Neutral insulated from the earth I

2 The second letter defines how casings or exposed conductive parts are connected to earth:



Load casing linked to the earth T



Load casing linked to the neutral N

Depending on the application, **there are three types of earthing systems:**

1 TT
for tertiary-sector and domestic networks.

2 TN
for industrial networks.

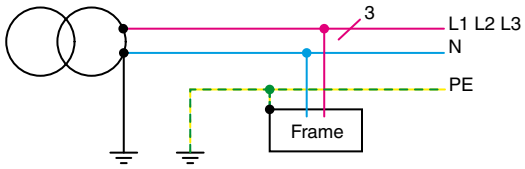
3 IT
for the navy, specific areas in hospitals, and high-availability requirement applications in industry.

TT earthing system:

This is suitable for tertiary-sector distribution over long distances. An earth connection is made at each building.

In the presence of an insulation fault, the contact voltage depends on the earth resistances, but it can still reach dangerous levels.

The fault is detected by a residual current device that trips a circuit breaker. The fault current is limited by the earth resistances.

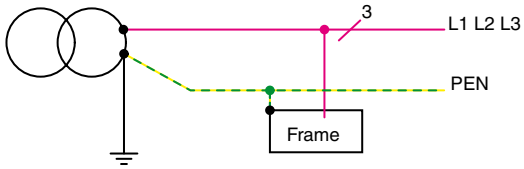


TN earthing system:

This system is simpler to implement and more cost-effective on a building or industrial-site scale. An insulation fault is a short circuit.

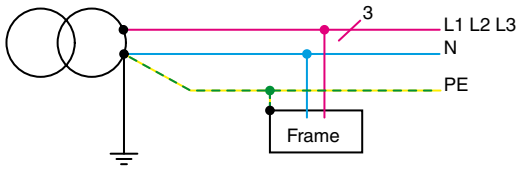
Therefore, a protective device would be triggered, leading to a very high fault current.

> TN-**C** earthing system



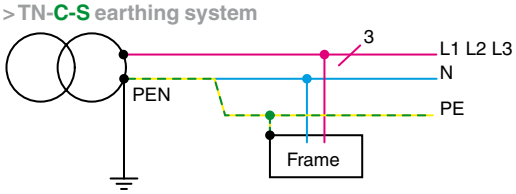
The neutral and PEN are **C**ombined

> TN-**S** earthing system



The neutral and PEN are **S**eparate

> TN-**C-S** earthing system



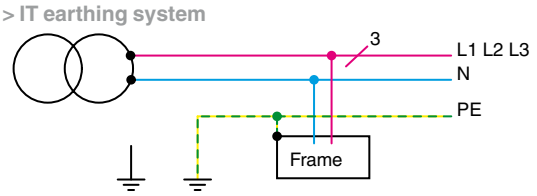
The neutral and PEN are partly **C**ombined and partly **S**eparate

The IT earthing system

In an 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.

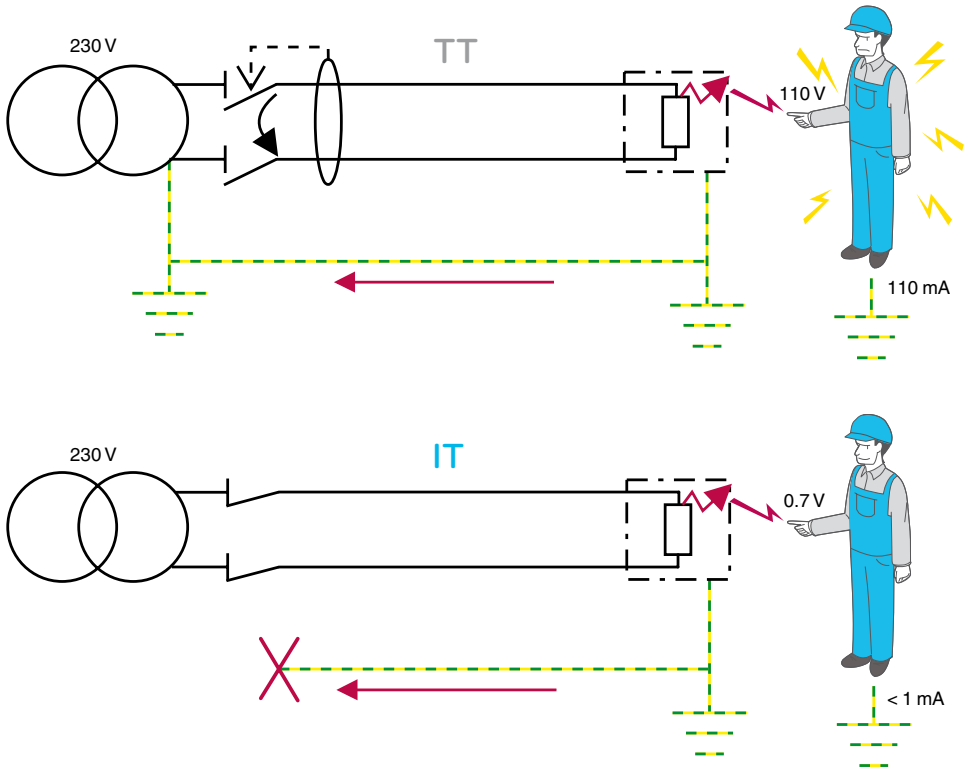
Therefore, an **IT** earthing system **guarantees the best continuity of service.**

The installation can operate **without endangering** people and equipment even in the presence of an initial 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.

Example:



Advantages of an IT earthing system

The main advantage of an IT earthing system is continuity of service. It also offers advantages related to low fault currents.

Improving
energy availability

Controlling this risk is becoming increasingly important. If clearing a fault involves automatic disconnection of the faulty part, the following may result:

- Financial risk due to production loss.
This risk is a particular concern for process industries since restarts can be drawn-out and costly affairs.
- Risk to personnel. For example:
  - sudden loss of lighting,
  - unavailability of safety-related equipment.

Eliminating
fire risks

Many fires are started by intense, concentrated heating or by an electric arc from an insulation fault. The higher the fault current, the greater the risk.

(A point of contact between a conductor and a metal part may, in particularly sensitive areas, start a fire when the fault current exceeds 500 mA).

explosion risks

The same approach applies here.
This risk is present particularly in mines, silos, oil rigs and the chemical industry.

Optimizing
corrective maintenance

The standard recommends clearing the first fault as quickly as possible. However, since a characteristic of the IT earthing system is to allow the installation to continue operating in complete safety, without endangering people or equipment, the degree of urgency is very much a relative judgement.

In TN and TT earthing systems, the only solution is to clear the fault before resetting the circuit.
In an IT earthing system, clearing the fault can be postponed for a few hours depending on the probability of a second fault occurring rapidly.

Hence, the IT earthing system is used in processes that can tolerate an interruption but have the aim of optimizing maintenance: 24-hour x 7-day continuous processes with a maintenance team present during working hours.

Facilitating
preventive maintenance

The IT earthing system requires the presence of an insulation monitoring device (IMD). This device also provides good visibility over the electrical network.

Even when there is no fault, monitoring the insulation resistance enables identification of the degradation in the insulation of a circuit or a device, so intervention is possible before an actual failure occurs.

Limiting
indirect costs (increasing the life of the installation)

A high fault current can result in significant damage to the installation or the consumer, which would therefore require the cost and time for repairs.

By having very limited fault currents, equipment is subjected to less stress and its life cycle is increased.

At the first fault:

In TT : 5 A < fault current < 50 A
In TN : 1 KA < fault current < 100 KA
In IT : 70 ma < fault current < 2 A (highly capacitive circuit)

Limitations of an IT earthing system

Is an IT earthing system more beneficial than other earthing systems?

Each earthing system has its pros and cons. Ideally the application should determine the type of earthing system to choose. Often the best compromise is the coexistence of various earthing systems. For example, in an industrial environment, a TN earthing system can be applied to non-critical parts and an IT earthing system to critical parts.

The main disadvantage of an IT earthing system is the need for a transformer and a CPI per island. Nevertheless, the cost of these items can be recovered very quickly through gains in productivity and maintenance.

The maintenance team must be capable of locating the fault. This is possible through a knowledge of earthing systems and associated equipment.

What do the standards say?

According to the IEC 60364-4-41, in a.c systems:

$R_A \times I_d \leq 50$ V
R_A is the sum of the resist ance in Ω of the earth electrode
I_d is the fault current in A of the first fault

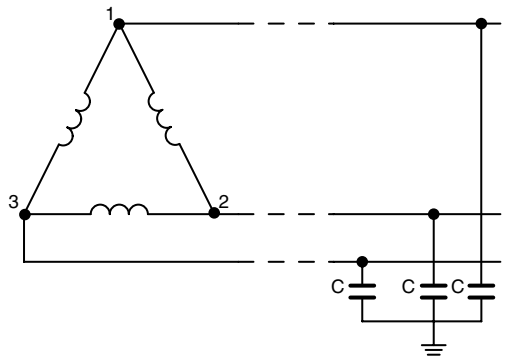
It is so necessary to have a very low earth resistance. It is also necessary to monitor C as I_d depends on the impedance of C (Id = U/Zc).
Only Schneider Electric monitors permanently C.

What is the limitation of an IT earthing system?

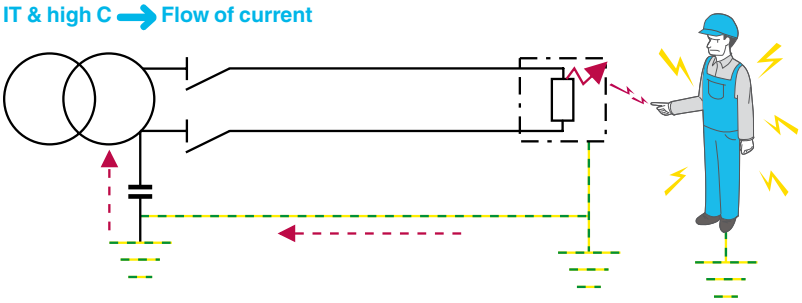
The limitation is associated with the size and complexity of a network. On a very large network, the impedance between the phases and earth (associated with the coupling capacitance of cables and loads with respect to earth) will be low.

Beyond a certain limit – several tens of kilometres – this system becomes equivalent to a TT earthing system, and a dangerous contact voltage will occur in the event of an insulation fault.

The network's distributed capacitances are impedances through which the 50 Hz current will flow.



IT & high C → Flow of current



Solutions

- Display the value of C to check whether the limit has been reached, thereby preventing an entire industrial site from being on a single isolating transformer.
- Apply multiple earthing systems according to the application and/or islanding.

(Example limits: 70 µF for 440 V, 40 µF for 690 V).

In short

★★★★ Excellent
★★★ Good
★★ Average
★ Poor

Earthing system		TT	TN-C	TN-S	IT
Safety and services					
Safety of persons		★★★	★★★	★★★	★★★
Safety of equipments	against the fire hazard	★★★	★	★★	★★★
	for machine protection (1)	★★★	★	★	★★★
Availability of electrical power		★★	★★	★★	★★★★
Electromagnetic influences (2)		★★	★	★★	★★

(1) In case of an insulation fault
(2) All electromagnetic influences:
external: a default on the HV network, operating overvoltages, atmospheric overvoltages etc.

IT earthing system applications

There are many applications which vary from country to country.

- Operating theatres and certain medical quarters in hospitals
- Ships
- Cold storage
- Nuclear power stations

- Airports: control tower, runway lighting
- Official buildings: parliaments, stock exchanges, government departments, etc.

- Tunnels
- Mines
- Silos
- Oil rigs
- Laboratories
- Solar

- Industrial applications with continuous or sensitive processes
- Oil and Gas Refinery
- Automotive
- Rail
- Hydro

Apart from mandatory situations (hospitals, the navy), the IT earthing system is typically used in instances where the unavailability of power would result in lost production or incur a significant non-production cost. Other applications concern minimizing the risk of fire and explosion.

Lastly, the IT earthing system is chosen in certain cases because it can help facilitate preventive and corrective maintenance operations.

Insulation monitoring devices

An indispensable solution for implementing an IT earthing network.

Insulation monitoring device (IMD):

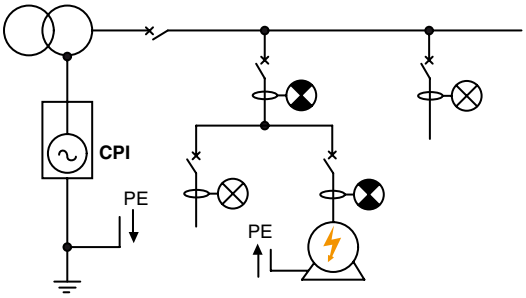
These devices are mandatory in an IT earthing system.

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 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.



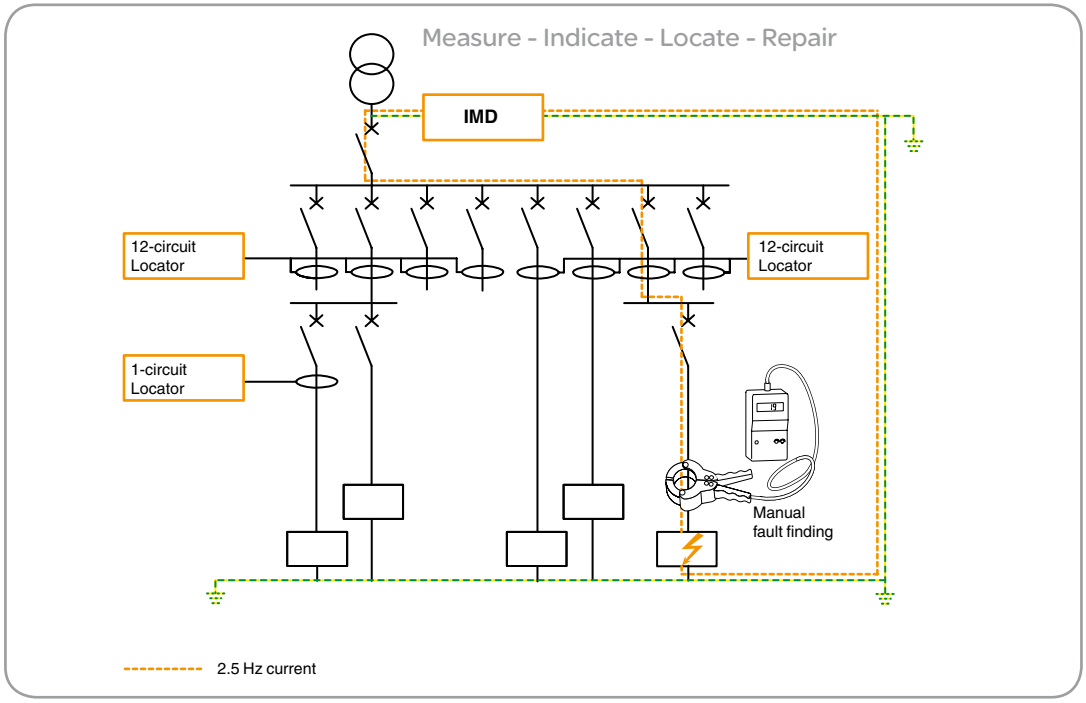
Depending on the device, it can also be used to:

- 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.

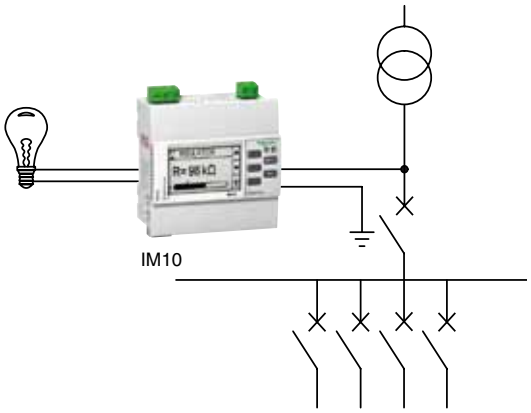
Advanced versions of these locators (XL and XML) provide the insulation value on a circuit by circuit basis. This simplifies maintenance of large networks.

A reliable and effective architecture

Schneider Electric, a global specialist in electrical power management, offers a range of architectures tailored to your network: expanse, number of circuits, presence of coupling, etc. Schneider Electric is highly experienced in this area. We have been in the IMD business for more than 50 years.

Small networks or islands

(c max = 40 µF)



Easy to install and use

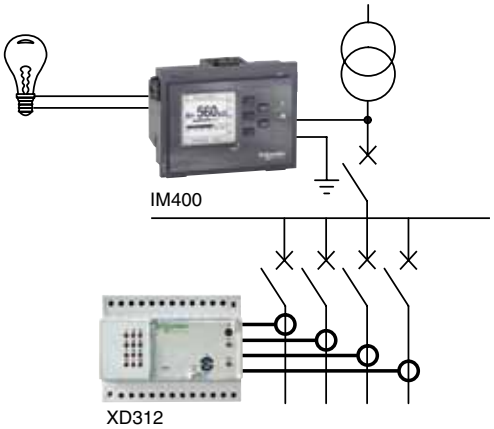
- There is a transformer to create the IT island. Its neutral is not connected to earth.
- There is an IMD (EM9) to detect the first fault:
  - It is generally powered by the network that it monitors,
  - It is connected to neutral (or to one phase) and earth,
  - Its only setting is the fault threshold level,
  - It has a single relay output to a light or alarm sound.

These products are available in both Multi 9 (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 (IM400) injects a 2.5 Hz current and measures R and C using this current.

When the IM400 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.

The + 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 sytem. It also removes any limit on the number of XD312 locators.

A reliable and effective solution

Per-feeder measurements for highly critical networks.

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

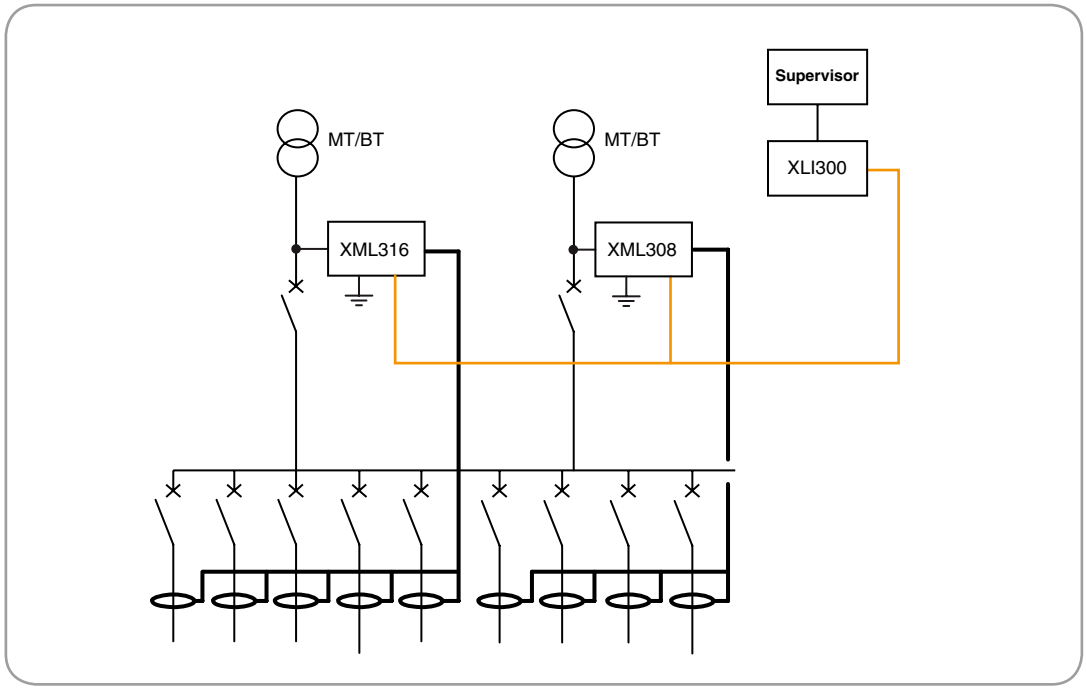
Large networks and/or several buildings

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.



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*.

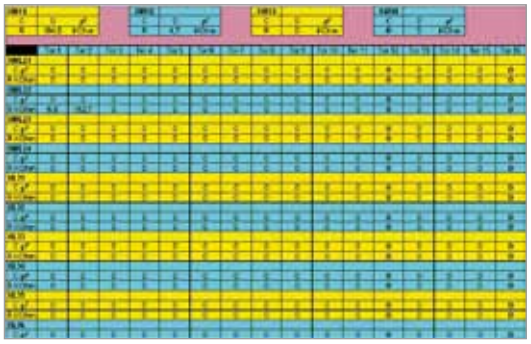
This solution can also be combined with fault location by an XD product, thereby enabling fault location lower down in the network tree.

*** 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.

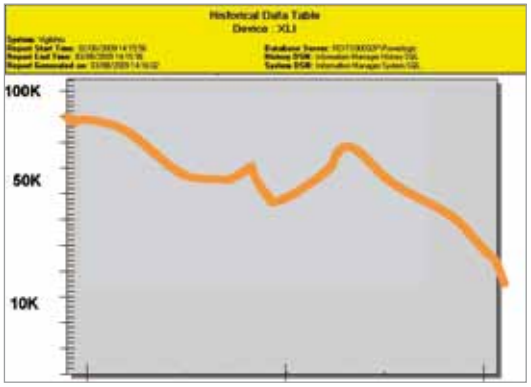
→ At least one IMD, but no more than one, per subnetwork.

Operation by the supervision system

Power Monitoring Expert software



Data table



Trend line

Ethernet gateway

Trend line

Timestamped values

Data table

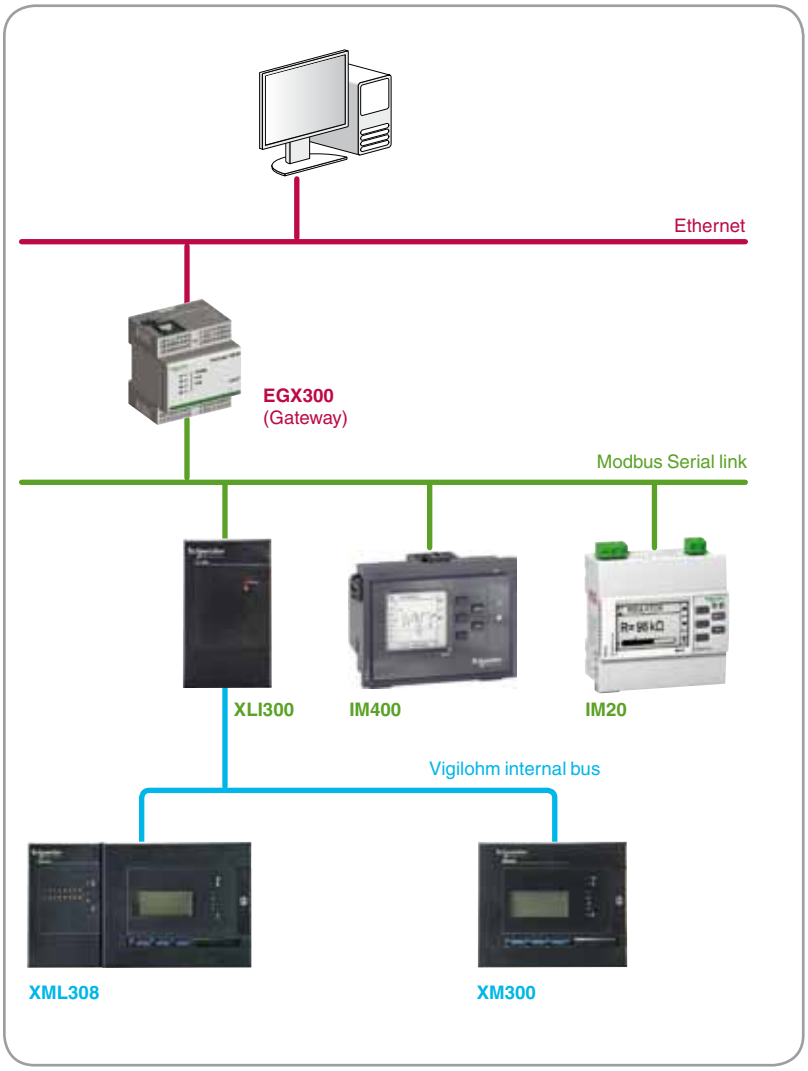
Communication with a supervisor over a Modbus serial link is possible through the XLI300 interface*.

The data can be used locally on the supervisor or remotely via an Ethernet network.

Integration with an existing system is simple since only a limited amount of information is transmitted.

Architecture

Example with Ethernet gateway



* The IM20 has a direct Modbus serial link.

Choosing the best architecture

Rather than a single architecture, there are a variety of possibilities depending on the type of network to be supervised:

- A simple motor or a small AC network: IM9.
- A motor that is normally off: IM9-OL.
- A small DC or AC network: IM10 or IM20.
- A larger network for which fault location would be a long and tedious task if done manually: IM400 + XD's.
- 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

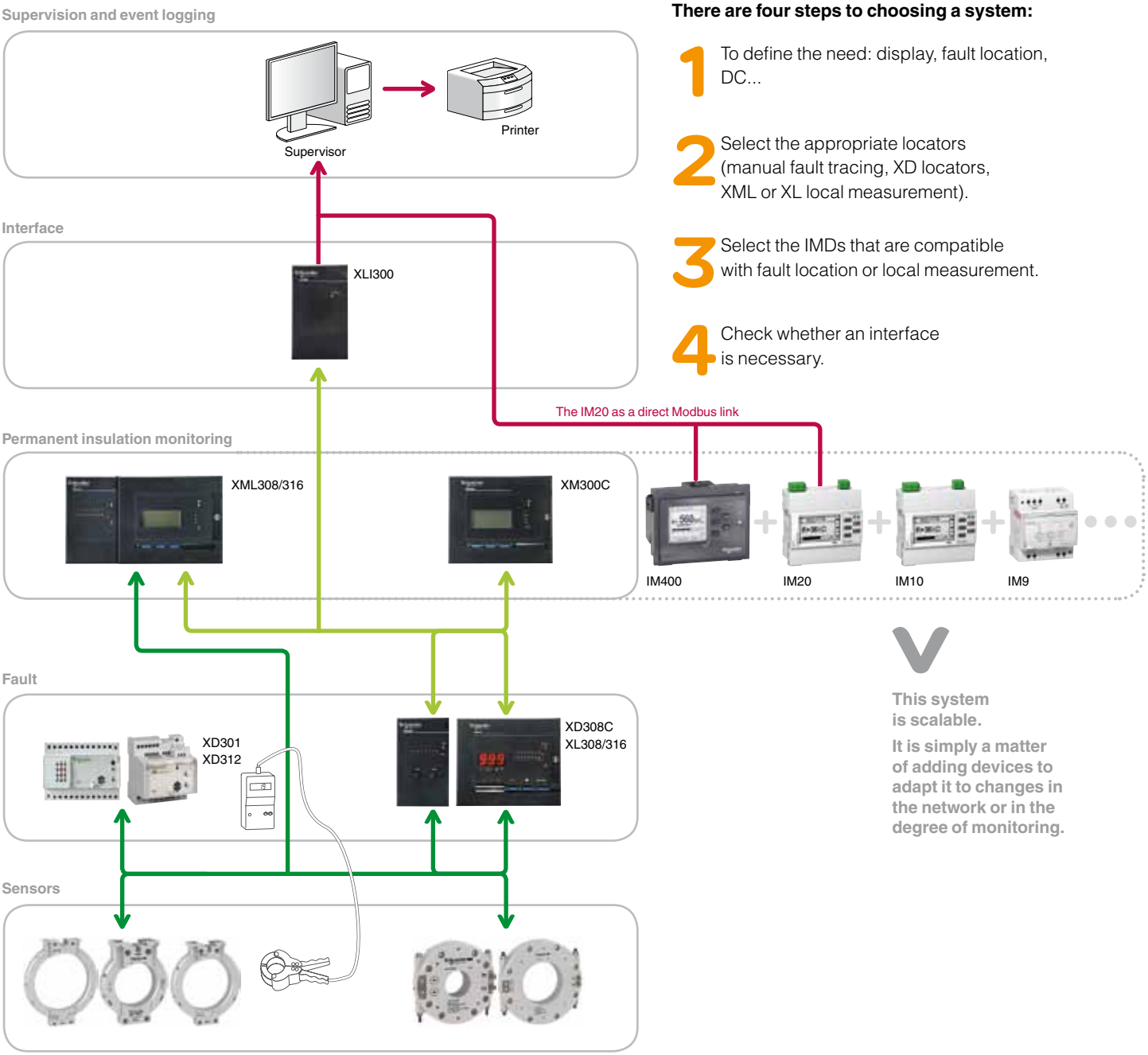
Except in simple cases, particular features of the network to be supervised can also affect choice:

- 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 four steps to choosing a system:

1. To define the need: display, fault location, DC...
2. Select the appropriate locators (manual fault tracing, XD locators, XML or XL local measurement).
3. Select the IMDs that are compatible with fault location or local measurement.
4. Check whether an interface is necessary.



This system is scalable.

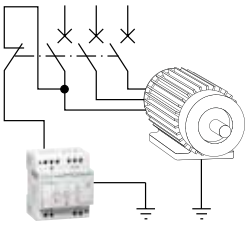
It is simply a matter of adding devices to adapt it to changes in the network or in the degree of monitoring.

Off-line insulation monitoring

For all earthing systems: IT, TN, TT

Failure to start some motors can have serious consequences.

Such motors are used in:
- Safety equipment (fire pumps, smoke extractors),
- Certain industrial processes.



IM9-OL

The risk of a motor failing to start is often due to insulation problems caused by humidity that accumulates in the microscopic cracks of the insulation during periods when the motor is not running.

In the event of a dead short, powering up the motor can result in a high fault current that can destroy the motor (if the motor is configured as TN).

The IMD constantly monitors the insulation of strategic motors during periods when they are not running.

Depending on the insulation value:
- It only signals the fault (pre-alarm threshold),
- It prevents start-up (alarm threshold).

Example application:

On a car carrier ship,
there are many elevators for passing cargo from one level to another.

The cargo-elevator motors are used only during loading and unloading.

An insulation fault on one cargo elevator will bring the entire process to a halt.

By monitoring the motors when they are off, a fault can be anticipated to ensure the availability of the installation.

The same approach applies to fire pumps, smoke extractors and motors for handling or lifting operations.

Smoke extraction from a tunnel

Handling operations

The IT system is the rule for ships

Continuity of service is a fundamental requirement for the operation of electrical networks on ships.

Limiting the risk of fire and explosion on ships is also imperative.
At the same time, the system must comply with the rules for protection of property and human life.

The IT earthing system is the only earthing system suitable for the specific conditions required by ships.

Architectures adaptable to a variety of needs

Ship electrical networks are very diverse.

In all cases there will be at least one insulation monitoring device for each sub-network.
In complex networks where there are numerous couplings, monitor exclusion must be managed according to the couplings.
This exclusion is ensured by a module which manages inter-monitor dialogue.

The fault location: invaluable on certain types of ships

When operating conditions are severe (humidity, etc.), insulation faults can be frequent.

If there are a large number of feeders, these faults are hard to locate.
Vigilohm allows fast and easy pinpointing because the locating devices do not need to communicate with the insulation monitoring devices.

Potential that is still not well known

Whereas, in industrial environments, advanced solutions are very widespread, this is not the case on ships.

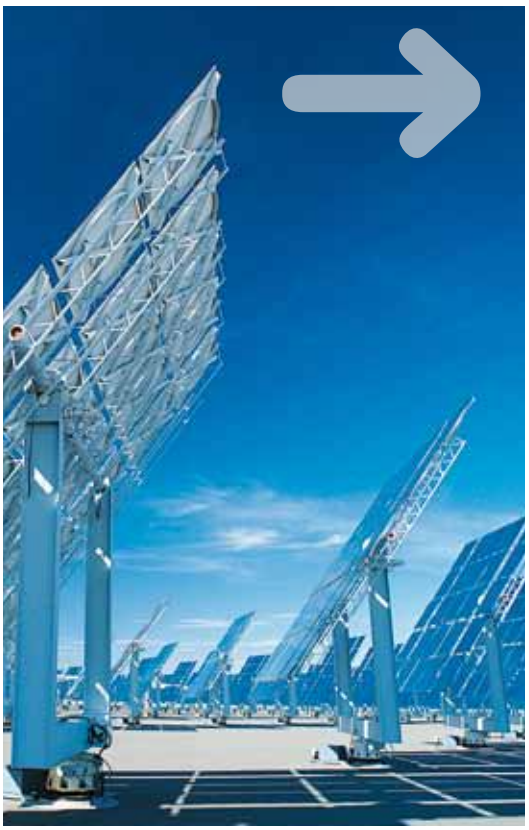
Except for some types of ship, such as navy ships and liners, they often have minimal equipment, with mere fault threshold monitoring.

The use of monitoring devices capable of displaying the insulation value and recording time tagged events greatly facilitates corrective and preventive maintenance.

The more systematic use of fault pinpointing is also greatly appreciated by users and can reduce the number of maintenance personnel for critical applications.

IEC

Our solution complies with international standards.



Photovoltaic

Photovoltaic is a unique application with unique specifications

Choice of the IT power system

In industry, the IT power system is used when availability is required. It's the only grounding scheme that provides people safety on first insulation fault without having to operate the protection devices and interrupting the power system.

It also allows limiting the faulty current on insulation fault in area that shows fire or explosion risks. Insulation Monitoring Devices such as Vigilohm provide then an insulation alarm but do not trig the interruption of the power system.

In photovoltaic applications, the IT power system allows limiting of the faulty current. People safety against the risk of electric shock is provided by using class II DC power system (double isolation) in combination with class II PV modules.

Within a grounded photovoltaic installation, an insulation fault may allow the circulation of an important faulty current with risk of fire and/or destruction of material. Using the IT power system (ungrounded power system) would allow limiting the faulty current on a first insulation fault thus preventing any risk for the installation. However it is then required to correct the insulation fault reported by the IMD as in case of a second insulation fault the faulty current would be very important. In some cases, upon detection of a first insulation fault the faulty part of the PV field and/or the inverter may be disconnected; insulation fault correction is to be executed however.

Increased value of C

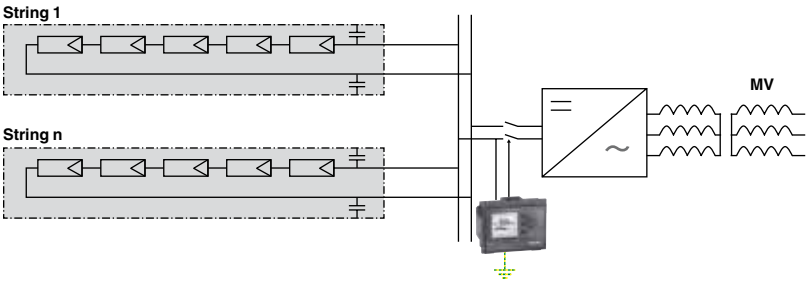
Given the large surface area of PV modules constituting the photovoltaic field or the installation condition, it is possible to have a value of the leakage capacitance (C) much higher than those usually witnessed in industry.

In industry, if the C value is very high, the impedance (Zc) linked to C could drive this network towards a TT network leading to risk of dangerous contact voltage and high faulty current.

In photovoltaic applications like every DC applications, the high value of C has no consequences on people's safety nor on the faulty current. On installation with non isolated inverter, the IMD can be placed either on AC or on the DC side.

On installation with isolated inverter, the IMD must be placed on the DC side. Optionally an IMD can be placed on the AC side (if in IT power system).

Architecture



Example of an architecture using the IM400 insulation alarm to disconnect the PV field from the inverter.

IM20

or

IM400

- **IM20 for PV field with up-to 150 µF** leakage capacitance (generally 750 kW peak).
- **IM400 for demanding installation with up to 2000 µF** capacitance (generally above 750 kW peak) including installation with paralleled inverters.

Example:
IT system in hospital

The IT isolated system is particularly well adapted for operating theatres.

Application

Context:

- The patient's survival is highly dependant on continuity and quality of electrical supply.
- Many electronic instruments / appliances are used by the medical staff.
- The major design problem is to avoid electrical hazards and obtain continuity of supply simultaneously.

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.
- Schneider Electric offers an innovative solution for operating theatres.

IEC

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

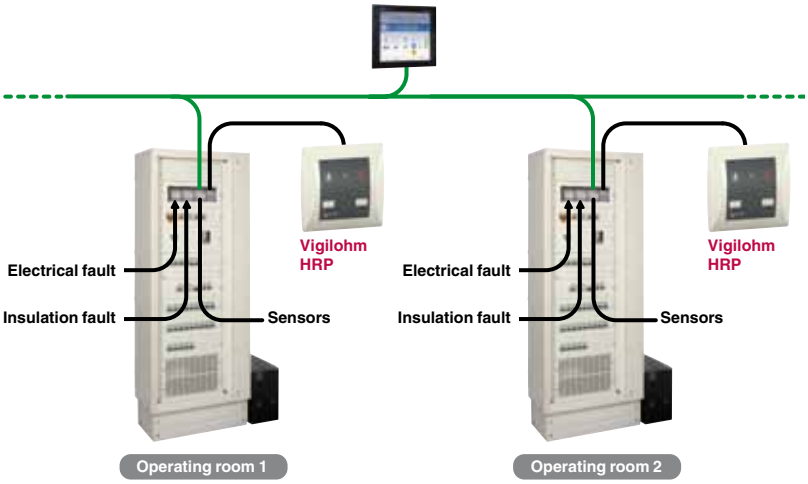
Architecture: Secure power distribution and monitoring solution for operating theater

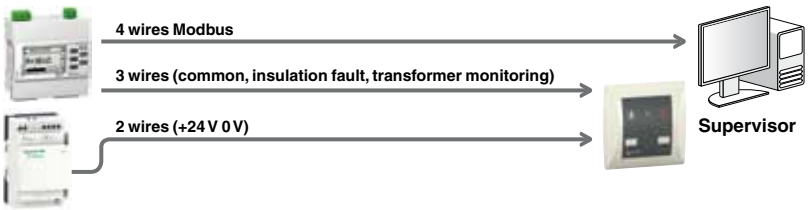
Example architecture 2 using IM20-H the HRP in the operating room and a global supervision

The Modbus communication provides the nurses' room and/or the maintenance personnel:

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

This ensures event traceability.





ABL8 MEM24003
Existing or specific power supply
Ex.: ABL8 MEM24003

Customer benefits

- No power cutoff on first fault.
- Permanent digital display of insulation value.
- Fault indication by failsafe contact.

Example: Continuous process

Cement works in Spain

Application

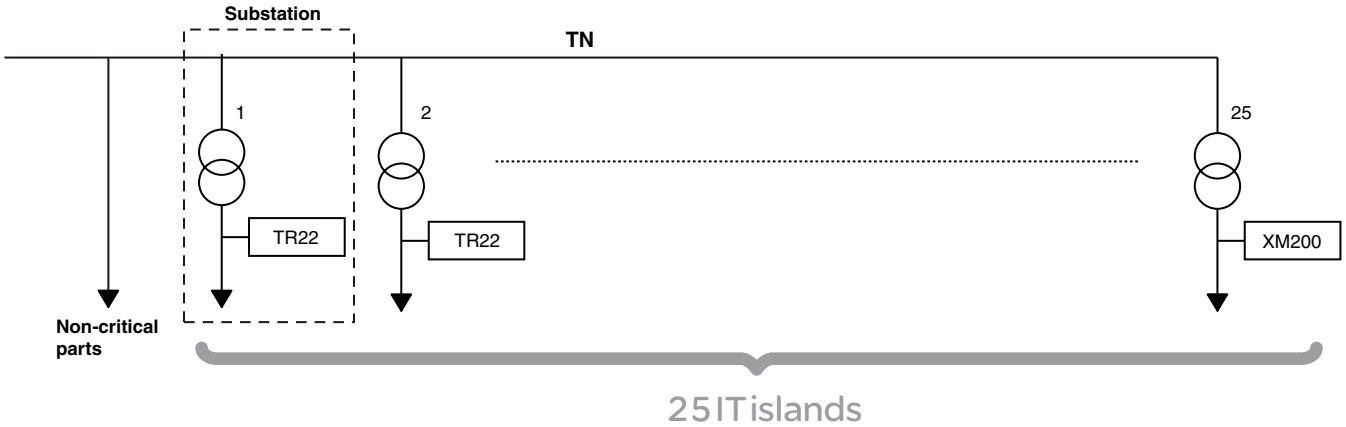
Spain. Cement manufacturing.

The site has about 25 IT islands that mainly supply motors.

The IT earthing system is chosen because of the availability requirement for continuous processes.

Faults occur frequently, especially when it rains, because the motors are only partly protected.

Architecture



The IMDs are essentially TR22s. On some "polluted" circuits, XM200s are used.

A few previous-generation IMDs are also present. These have been in place for 25 years and are still in perfect working order.

Fault location is carried out by the portable system.

Customer benefits

- By choosing the IT earthing system, availability and safety are combined in an environment in which faults occur frequently.
- The architecture is simple.
- Fault location is carried out by the portable system.
- The client is considering replacing the oldest products with the latest-generation products in order to take advantage of automatic fault location (XM200 + XD).

Example: Optimizing maintenance scheduling

Transforming plastic material in France

Application

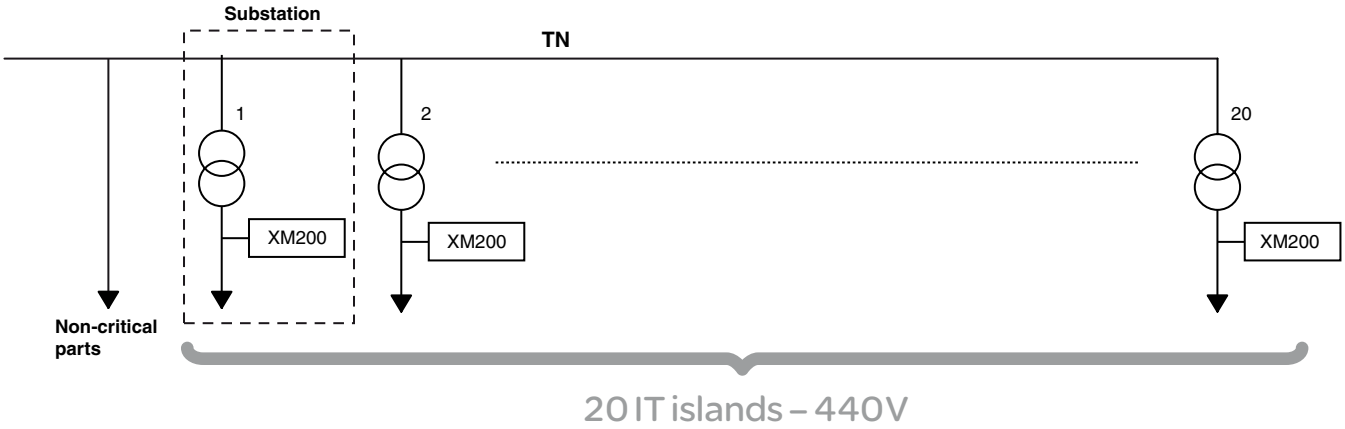
Tarare. Manufacturing of PVC flooring.

The site has approximately 20 IT islands that mainly supply variable-speed drives. The overall capacity of the site is 17 MW.

The IT earthing system is chosen, not in relation to a continuous process, but to simplify maintenance. In a TN earthing system a fault would trip a circuit breaker, and the maintenance team would have to intervene immediately. This would involve a qualified technician being permanently available.

In an IT earthing system, a fault that occurs during the night or over a weekend is inconsequential, so the maintenance team can wait to deal with it during work hours.

Architecture



The IMDs are XM200s. In this instance the alarm output of each IMD is connected to a single light outside the substation. A fault will be noticed from outside during patrols.

Since the process is not continuous, fault location is unnecessary and the fault can be traced by sequentially tripping circuit breakers.

The TR22 has not been used because the variable-speed drives generate disturbances that are incompatible with DC injection.

Customer benefits

- The architecture is simple to implement and operate.
- Initial investment is limited to the transformers and the IMDs.
- The return on investment is realized within a few years through maintenance optimization and power supply continuity for the process.
- The choice of an IT earthing system provides other customer benefits:
  - Preventive maintenance by monitoring changes in insulation values. The failure of certain equipment, particularly electric motors, can be anticipated.
  - Increased equipment life by virtue of low fault currents. An IT earthing system limits the stress endured by equipment during a fault condition.

Example:
Continuous process in a food-processing plant

Transforming agricultural products in China

Application

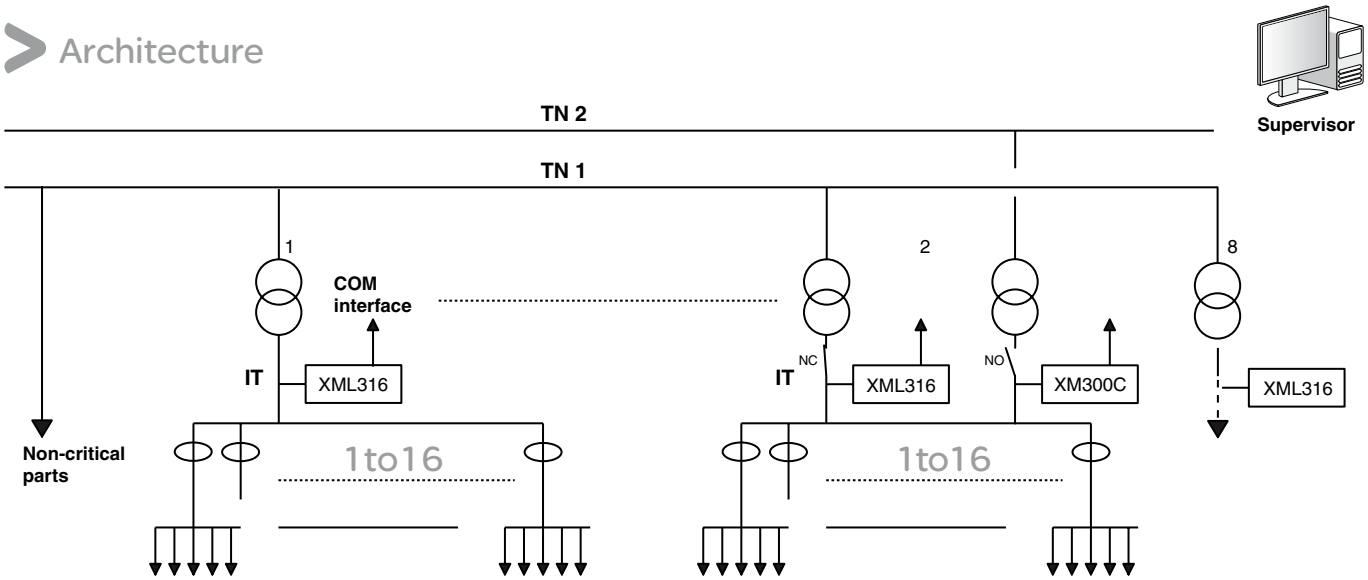
Lian Yun Gang. Food processing plant.

A large part of the electrical installation is an IT earthing system.

Three agricultural products (maize, wheat and potatoes) are transformed into food ingredients. The transformation process is continuous and takes about one week. Interrupting this process would lead to lost production and spoil the products being transformed.

The IT earthing system is the logical solution in this scenario.

Architecture



This architecture exploits all the Vigilohm system capabilities. Since the network is large, there are eight islands (one per building). There are also a large number of secondary circuits. Each main circuit is measured locally (only Schneider Electric offers this local measurement solution).

In the event of an insulation fault, the fault is first located automatically at the main-circuit level, and then at secondary-circuit level via the mobile search process.

Each XML316 provides the IMD function and 16-circuit measurement in the same unit.

Of the eight islands, two are critical and therefore have dual incoming-feeder circuits (normal/backup).

The IMD that is active when the island is supplied by a backup feeder is an XM300C, which does not need to provide the local measurement already carried out by the XML316.

All the data is transmitted to a supervisor.

Customer benefits

- The architecture provides all the usual advantages of an IT earthing system.
- All the values can be accessed on the supervisor.
- Additionally, it provides for a more detailed awareness of the change in insulation for all of the main circuits. This capability is exclusive to Schneider Electric.

Example: Refrigerated Container Ships

Application

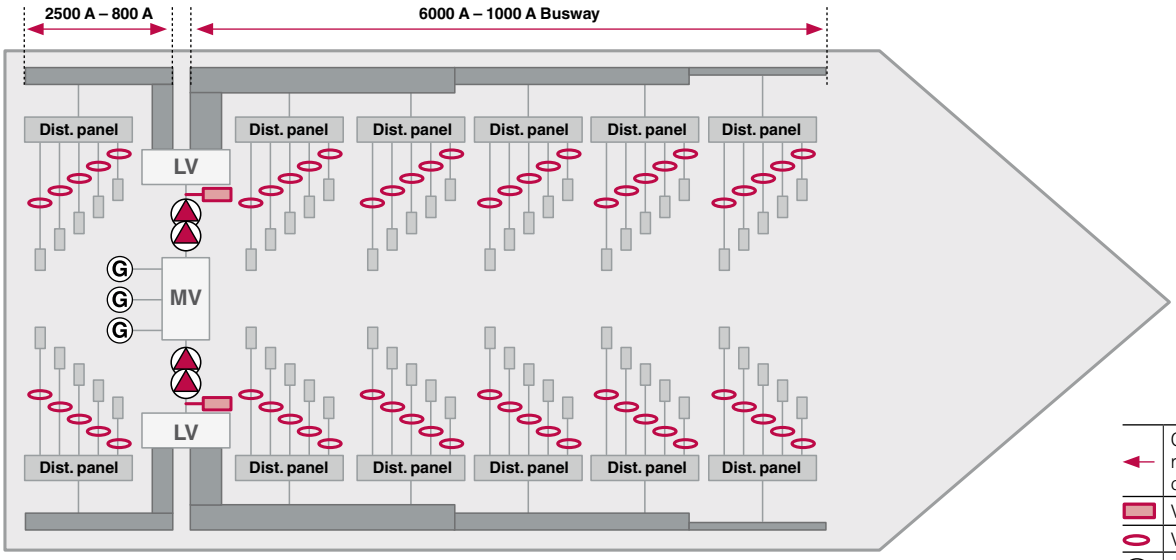
Transport of refrigerated containers.

On this type of ship faults are frequent because the electricity distribution system is subjected to weather conditions.

The IT system makes it possible to maintain the power supply for the refrigeration units, in complete safety, despite the existence of an insulation fault.

The fault must be pinpointed quickly because another fault on another phase will trip the circuit breaker. A prolonged loss of power will cause the whole of the container's cargo to be lost.

Architecture



The system comprises two Vigilohm insulation monitoring devices, one for each busway.

In addition, locating modules can indicate the faulty feeder.

Installation is easy, because there is no link between the monitor and the locating devices.

Customer benefits

Benefits of advanced IMD's

- Basic IMD's provide only the fault detection alarm. Advanced IMD's also provide:
  - Preventive maintenance using the insulation value and pre-alarms
  - Fast and easy maintenance via the event log and communication to a supervisor.
- Fault location helps simplify corrective maintenance so you can quickly realize your return on investment (e.g., saving sensitive cargo in shelters that require constant refrigeration at specific temperatures).
- With communication it is possible to have a global view of the electrical network, which helps facilitate both preventive and corrective maintenance.

The IT earthing system

A solution to improve electrical network availability

High-value-added services

Throughout the world, our Schneider Electric Service experts and our local partners are attentive to your needs and propose to you a comprehensive and unique service offering.

Expert services

For improved performance...

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> Reduced capital expenditure,
> Reduced power consumption,
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> Reduction in downtime and repair time,
> Training of operation and maintenance teams,
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... Over the entire life cycle of the installation

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> Operating aid,
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> Sustainable development is key in Schneider Electric's strategy. Our solutions help those without electricity obtain access to it and favour a reduction in energy consumption.

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