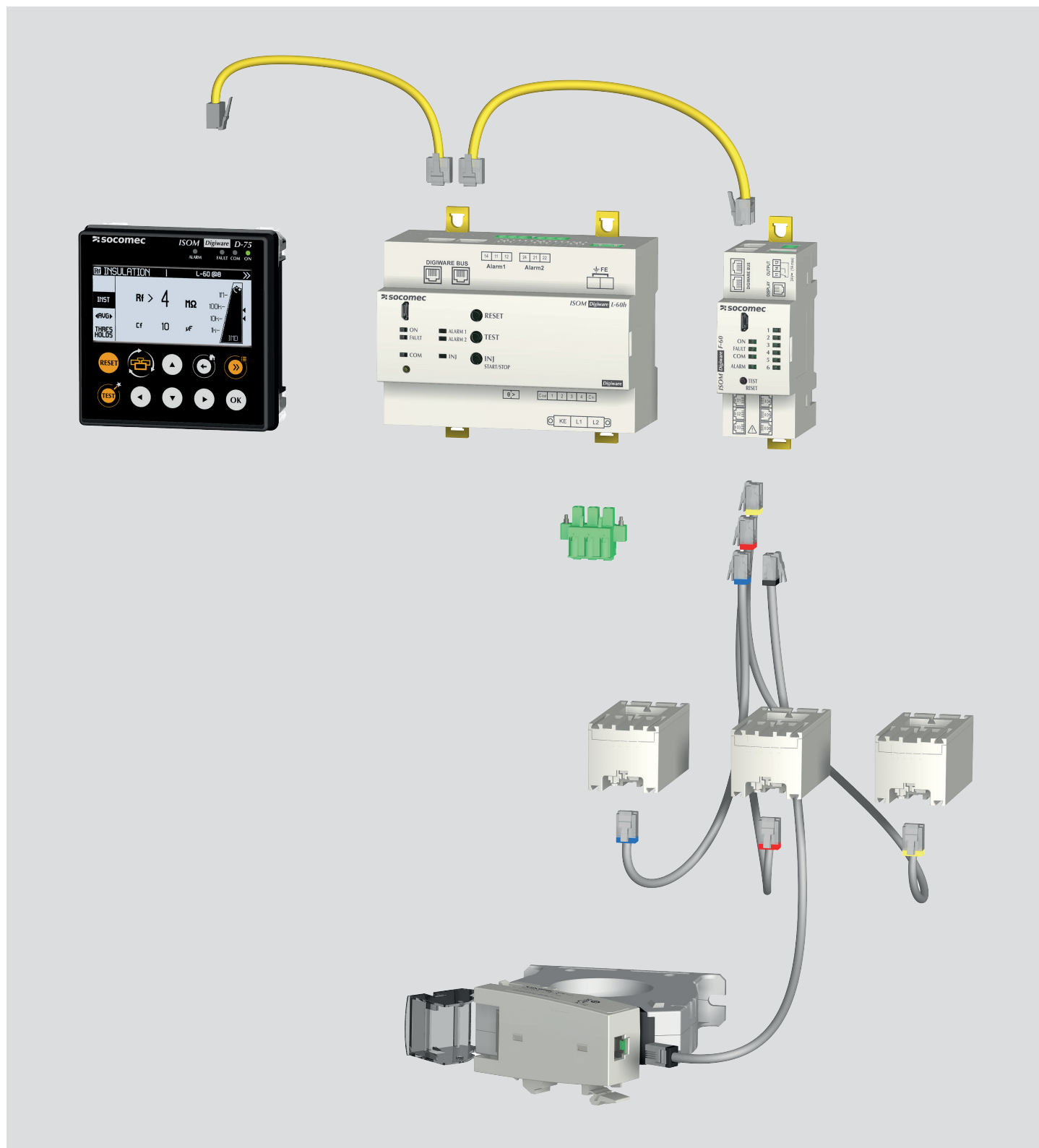


# Insulation monitoring measurement system for electrical installations in an IT system

## *ISOM Digiware*



1. DOCUMENTATION .....	6
2. HAZARDS AND WARNINGS .....	6
2.1. Risk of electrocution, burns or explosion .....	6
2.2. Risk of damaging the unit .....	8
2.3. Responsibility .....	8
3. BEFORE YOU START .....	9
4. PRESENTATION .....	10
4.1. About ISOM Digiware .....	10
4.1.1. Range .....	11
4.1.2. Principle .....	12
4.1.3. Functions .....	14
4.1.4. Electrical readings .....	15
4.1.5. Dimensions .....	17
4.2. Presentation of associated current sensors .....	18
4.2.1. Locating core balance transformers $\Delta$ IP, $\Delta$ IP-R, WR and TFR .....	19
4.2.1.1. Range .....	19
4.2.1.2. Dimensions .....	20
4.2.2. Adapter ISOM T-15 .....	22
4.2.3. TE solid-core current sensors .....	22
4.2.3.1. Range .....	23
4.2.3.2. Dimensions .....	24
4.2.4. TR split-core current sensors .....	25
4.2.4.1. Range .....	25
4.2.4.2. Dimensions .....	25
4.2.5. TF flexible current sensors .....	26
4.2.5.1. Range .....	26
4.2.5.2. Dimensions .....	26
4.2.6. Adapters for 5A sensors .....	27
4.2.6.1. Range .....	27
4.2.6.2. Dimensions .....	27
5. INSTALLATION .....	28
5.1. Recommendations and safety .....	28
5.2. Installing ISOM Digiware units .....	28
5.2.1. ISOM Digiware L-60, F-60, T-15 – mounted on DIN rail .....	28
5.2.2. ISOM Digiware L-60, F-60 – board-mounted .....	29
5.3. Installing TE solid-core sensors .....	29
5.3.1. Mounting accessories .....	29
5.3.2. DIN rail mounted .....	30
5.3.3. Plate mounting .....	31
5.3.4. Installing on a cable with clamping collar .....	32
5.3.5. Bar mounting .....	33
5.3.6. Sensors assembly .....	35
5.3.7. Sealing accessories for sensors .....	35
5.4. Installing TR split-core sensors .....	36
5.4.1. Cable mounting .....	36
5.5. Stranded sensors TE mounting .....	37
5.5.1. Cable or bus bar-mounting .....	37
5.6. Installing the 5A adapter .....	38

<b>6. CONNECTION</b> .....	<b>39</b>
6.1. Connecting ISOM Digiware .....	39
6.2. Connecting the current sensors .....	42
6.2.1. Connection concept .....	42
6.2.2. Details of the RJ12 connections for each current sensor .....	43
6.3. Connecting to the electrical network and circuits .....	44
6.3.1. Configurable loads based on the network type .....	44
6.3.2. Description of the main network and circuit combinations .....	45
6.3.2.1. ISOM Digiware F-60 .....	45
6.3.3. Coupled networks .....	47
6.3.3.1. Simple coupled networks without fault-locating options .....	47
6.3.3.2. Simple coupled networks with fault-locating options .....	48
6.3.3.3. Complex coupled networks .....	48
<b>7. DIGIWARE BUS</b> .....	<b>49</b>
7.1. Principle .....	49
7.1.1. Digiware bus connection cable .....	49
7.1.2. Digiware Bus Termination .....	50
7.2. Sizing of the power supply .....	50
7.2.1. Equipment consumption .....	51
7.2.2. Calculation rules for the max. number of products on the Digiware bus .....	51
7.2.3. Digiware bus repeater .....	52
<b>8. STATUS LEDS, BUTTONS AND AUTO-ADDRESSING</b> .....	<b>53</b>
8.1. Status LEDs and buttons .....	53
8.1.1. L-60 / L-60h .....	53
8.1.2. F-60 .....	54
8.1.3. T-15 .....	54
8.1.4. Autotest .....	55
8.2. Auto-addressing .....	55
<b>9. COMMUNICATION</b> .....	<b>56</b>
9.1. General information .....	56
9.2. RS485 and ISOM Digiware bus rule .....	56
9.2.1. Connection with the D-55 or D-75 screen .....	56
9.3. Communication tables .....	57
<b>10. CONFIGURATION</b> .....	<b>58</b>
10.1. Configuration using Easy Config .....	58
10.1.1. Connection modes .....	58
10.1.2. Using Easy Config .....	59
10.1.2.1. Configuring the device .....	60
10.1.2.2. Network configuration .....	61
10.1.2.3. Configuration of the insulation .....	62
10.1.2.4. Configuration of inputs-outputs (I/O) .....	65
10.1.2.5. Configuring loads (ISOM F-60 only) .....	67
10.1.2.6. Calculation method .....	68
10.1.2.7. Synchronisation of products .....	68
10.2. Configuration from the ISOM Digiware D remote display .....	69
10.2.1. Connection mode .....	69

11. ALARMS.....	70
11.1. Alarms upon events.....	70
11.1.1. Insulation and measurement alarm .....	70
11.1.2. Digital inputs .....	71
11.1.3. Combination of alarms.....	72
11.1.4. System alarms .....	72
11.2. Setting up alarms.....	73
11.2.1. ALARM LED on front .....	73
11.2.2. Activation of an output.....	73
11.2.3. Acknowledging alarms by input .....	73
11.2.4. RS485 Modbus.....	73
11.2.5. Display and WEBVIEW.....	73
12. SPECIFICATIONS.....	74
12.1. Specifications ISOM Digiware L-60, F-60 and T-15 .....	74
12.1.1. Mechanical specifications .....	74
12.1.2. Electrical characteristics .....	74
12.1.3. Measurement characteristics .....	75
12.1.4. Input/output specifications HMI .....	76
12.1.5. Communication specifications .....	76
12.1.6. Environmental specifications.....	77
12.1.7. Electromagnetic specifications (Directive 2014/30/EU) .....	77
12.1.8. Standards and safety.....	77
12.1.9. Longevity CEM directive 2014/30/EU .....	78
12.2. Display characteristics – ISOM D-15h and ISOM Digiware D-55 / D-55h / D-75.....	78
12.2.1. Mechanical specifications .....	78
12.2.2. Electrical specifications .....	78
12.2.3. ISOM D-55 / D-55h communication features.....	78
12.2.4. ISOM Digiware D-75 communication features .....	78
12.2.5. Environmental specifications.....	79
12.3. Toroids characteristics.....	79
12.3.1. $\Delta$ IP toroids.....	79
12.3.2. $\Delta$ IP-R toroids.....	80
12.4. ISOM Digiware L-60 response curves.....	81
12.5. ISOM Digiware F-60 response curves.....	82
13. PERFORMANCE CLASSES .....	84
13.1. Specification of the characteristics .....	84
13.2. Evaluation of the power supply quality .....	85



# 1. DOCUMENTATION

All documentation relating to ISOM Digiware and its sensors is available on the SOCOMEC website at the following address: [www.socomec.com](http://www.socomec.com)









## 2. HAZARDS AND WARNINGS

The term "unit" used in the following paragraphs encompasses ISOM and DIRIS Digiware and its associated current sensors ( $\Delta$ IP, TE, TR or TF).

The assembly, use, servicing (including cleaning) and maintenance of this equipment must only be carried out by trained, qualified professionals (in case of failure, please contact our Customer Services).

SOCOMECE shall not be held responsible for failure to comply with the instructions in this manual.

### 2.1. Risk of electrocution, burns or explosion

	Caution: risk of electric shock	Ref. ISO 7000-0434B (2004-01)
	Caution: refer to the documentation whenever you see this symbol	Ref. ISO 7010-W001 (2011-05)
	DC and AC	IEC 60417-5033 (2002-10)
	DC	IEC 60417-5031 (2002-10)
	Fuse	IEC 60417-5016 (2002-10)
	The CE marking means that this product meets all the essential requirements of each applicable directive.	-
	The DEEE marking means that this product must not be disposed of with unsorted waste, but must be sent to separate collection facilities for reuse and recycling.	-
	The RoHS China marking means that this product is without environmental risks during its period of use.	-

- This device must only be installed and serviced (cleaning with a dry cloth) by qualified personnel who have in-depth knowledge of installing, commissioning and operating the device and who have had appropriate training. He or she should have read and understood the various safety measures and warnings stated in the instructions.
- Be aware of protection devices (insulation monitoring system), annual preventive maintenance should be carried out to test the system's basic functions. (Manual activation of the test function)
- Use connection cables compatible with the voltage and connection terminals of the devices.
- If, for usage reasons, the device is connected by terminals L1, L2 to a powered IT network, terminals KE and FE should not be separated from the protective conductor (PE).
- Prior to any work on or in the unit, disconnect all power sources (voltage inputs, the unit's auxiliary power supply and dry contact supplies).
- The isolation options must be:
  - within the electrical installation itself
  - located somewhere convenient and easily accessible
  - labelled as the unit's power switching device
- Always use an appropriate voltage detection device to confirm the absence of voltage.
- Replace all devices, doors and covers before turning on power to this equipment.
- Always power the device with the correct rated voltage.
- Install the unit following the recommended installation instructions and in a suitable electrical cabinet.
- These devices are designed to be integrated; they must be installed in an additional enclosure providing protection against electric shocks and fire.
- Always connect  $\Delta$ IP, TE, TR or TF current sensors using the recommended connection cables and observing the maximum prescribed currents.
- For safety reasons, only use accessories that conform to the manufacturer's specifications.
- During installation, the safety of any system integrating the device is the responsibility of the system installer.
- The installation of  $\Delta$ IP-R toroids must be done on conductors with double insulation.
- Installation of the ISOM Digiware system should only be done near insulated conductors.
- Socomec RJ45 and RJ12 cables must be fixed and positioned in such a way as to avoid any risk of contact with uninsulated conductors under dangerous voltage.



Do NOT clamp or pull out NON-INSULATED conductors carrying DANGEROUS VOLTAGE which could cause an electric shock, burn or arc flash. Ref. IEC 61010-2-032

**Failure to take these precautions could cause death or serious injuries.**

If there is a problem, please contact  
 SOCOMEC, 1 rue de Westhouse, 67235 BENFELD, FRANCE  
 Tel. +33 3 88 57 41 41  
 info.scp.isd@socomec.com

## 2.2. Risk of damaging the unit

To ensure that the unit operates correctly, make sure that:

- The unit is correctly installed.
- The auxiliary power supply voltage indicated on the device: 24 VDC  $\pm$  10%.
- Use a 230 VAC / 24 VDC SOCOMEC power supply (4829 0120) or use a 1 A gG 24 VDC fuse.
- The 24VDC power supply should be a SELV (safety extra-low voltage).
- The network frequency indicated on the device: 50 to 460 Hz.
- There is a maximum voltage at the voltage input terminals of 480 VAC phase/phase or 480 VAC phase/neutral or 480 VDC.
- Always connect  $\Delta$ IP, TE, TR or TF current sensors using the recommended connection cables and observing the maximum prescribed currents.
- Only use RJ45 SOCOMEC cables to interconnect the modules via the Digiware bus.
- During specific checks, disconnect the devices from the network before attempting to insulate or carry out dielectric testing.
- The devices are designed for indoor use.
- If the ambient temperature exceeds +50°C, the minimum temperature of the copper conductors to connect to terminals should be +85°C.
- Observe the maximum temperatures for using  $\Delta$ IP and  $\Delta$ IP-R toroids.
- Observe the maximum frequency of use of the  $\Delta$ IP and  $\Delta$ IP-R toroids.

**Failure to respect these precautions could cause damage to the unit or cause an electrical shock.**

## 2.3. Responsibility

- Assembly, connection and use must be carried out in accordance with the installation standards currently in force.
- The unit must be installed in accordance with the rules given in this manual.
- Failure to observe the rules for installing this unit may compromise the device's intrinsic safety.
- The unit must be positioned within an installation which complies with the standards currently in force.
- Any cable which needs to be replaced may only be replaced with a cable with the correct rating.



### 3. BEFORE YOU START

To ensure the safety of personnel and the product, please carefully read the contents of these instructions before installation.

Check the following points as soon as you receive the package containing the unit, one or several sensors:

- The packaging is in good condition
- The unit has not been damaged during transportation
- The device reference number conforms to your order
- The packaging includes the unit fitted with removable terminal blocks and a Quick Start guide.

# 4. PRESENTATION

## 4.1. About ISOM Digiware

ISOM Digiware is an all-in-one insulating monitoring system incorporating IMD\* and FLD\*\* functions. It can also carry out PMD\*\*\* measurements and monitoring.

ISOM Digiware essentially allows you to monitor the insulation of IT systems, by delivering alerts if the insulation level drops below the thresholds set by the operator. It also combines the function of locating insulation faults under voltage, simultaneously across multiple circuits.

ISOM Digiware offers a number of options including measuring the insulation, leakage capacity, voltage network, current, frequency and temperature.

ISOM Digiware is an innovative concept based on a smart connection that sends the voltage data and other synchronisation signals. Most importantly, this concept means you can view an insulation and leakage capacity reading for each circuit monitored.

The insulation is monitored by an IMD\* module and locating-signal booster for ISOM Digiware L-60 interrupted networks, and insulation faults are located by FLD\*\* ISOM Digiware F-60 modules. The voltage and current, as well as the ISOM synchronisation signals are sent via the Digiware bus. On ISOM Digiware F-60 modules, six measuring channels (which can both locate faults and measure load currents) manage one or multiple circuits at once. Several modules can be connected to the Digiware bus to ensure the full monitoring of an IT electrical system.

The ISOM Digiware system offers an innovative mapping function (OhmScanner technology); used mainly for predicting insulation faults.

Wiring is made easier with "plug & play" RJ-type connections. The connection mode of the current sensors

(fault-locating core balance transformers with adapter ISOM T-15 or DIRIS Digiware current sensors) also helps with quick and easy installation. Their automatic identification (type and size) significantly reduces the risk of errors during installation. In addition, combining the current sensor with the ISOM Digiware means the overall accuracy of the ISOM Digiware + Current sensor detection chain and overall measuring can be guaranteed for all values measured.

ISOM Digiware is configured from its ISOM Digiware D-x5 remote display or via the Easy Config software. You can view the readings on the WEBVIEW web server embedded into the ISOM Digiware D-75 display (DGW: Data GateWay - product standard IEC 62974-1), integrating the functions of monitoring electrical volumes and insulating the installation, as well as managing energy data, and the surveillance, logging, monitoring of data.

Thanks to its architecture, ISOM Digiware can be easily integrated into a building automation system or energy management system which requires the full monitoring of a large number of loads.

ISOM Digiware is available in models specific to medical IT systems for use on Group 2 premises (version "h").

ISOM Digiware comes in a heavy-duty model (version "t") compatible with extreme environments.

\* IMD: Insulation monitoring device (product standard IEC 61557-8)

\*\* FLD: Fault-locating device (product standard IEC 61557-9)

\*\*\* PMD: Power Metering and Monitoring Device in accordance with the product standard IEC 61557-12.

## 4.1.1. Range

### Control and power supply interfaces (24VDC)



#### Multipoint display

ISOM Digiware D-55 Ref. 4729 0203  
ISOM Digiware D-75 Ref. 4729 0205 (with web server)  
ISOM Digiware D-75t Ref. 4729 0206 (with web server + heavy-duty version)

### Alert notifications for surgeries

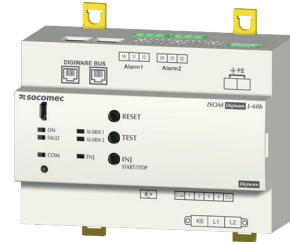


**Single-point self-powered reporting**  
ISOM Digiware D-15h Ref. 4729 0200



**Multipoint reporting for medical premises (24VDC power supply)**  
ISOM Digiware D-55h Ref. 4729 0204

### Modules that are both an Insulation Monitoring Device and locating current booster



**Insulation monitoring device for disrupted IT networks**

ISOM Digiware L-60 Ref. 4729 0110  
**Insulation monitoring device for disrupted IT networks – heavy-duty version**  
ISOM Digiware L-60t Ref. 4729 0111  
**Insulation monitoring device for medical IT networks**  
ISOM Digiware L-60h Ref. 4729 0112

### Insulation fault-locating modules (FLD)



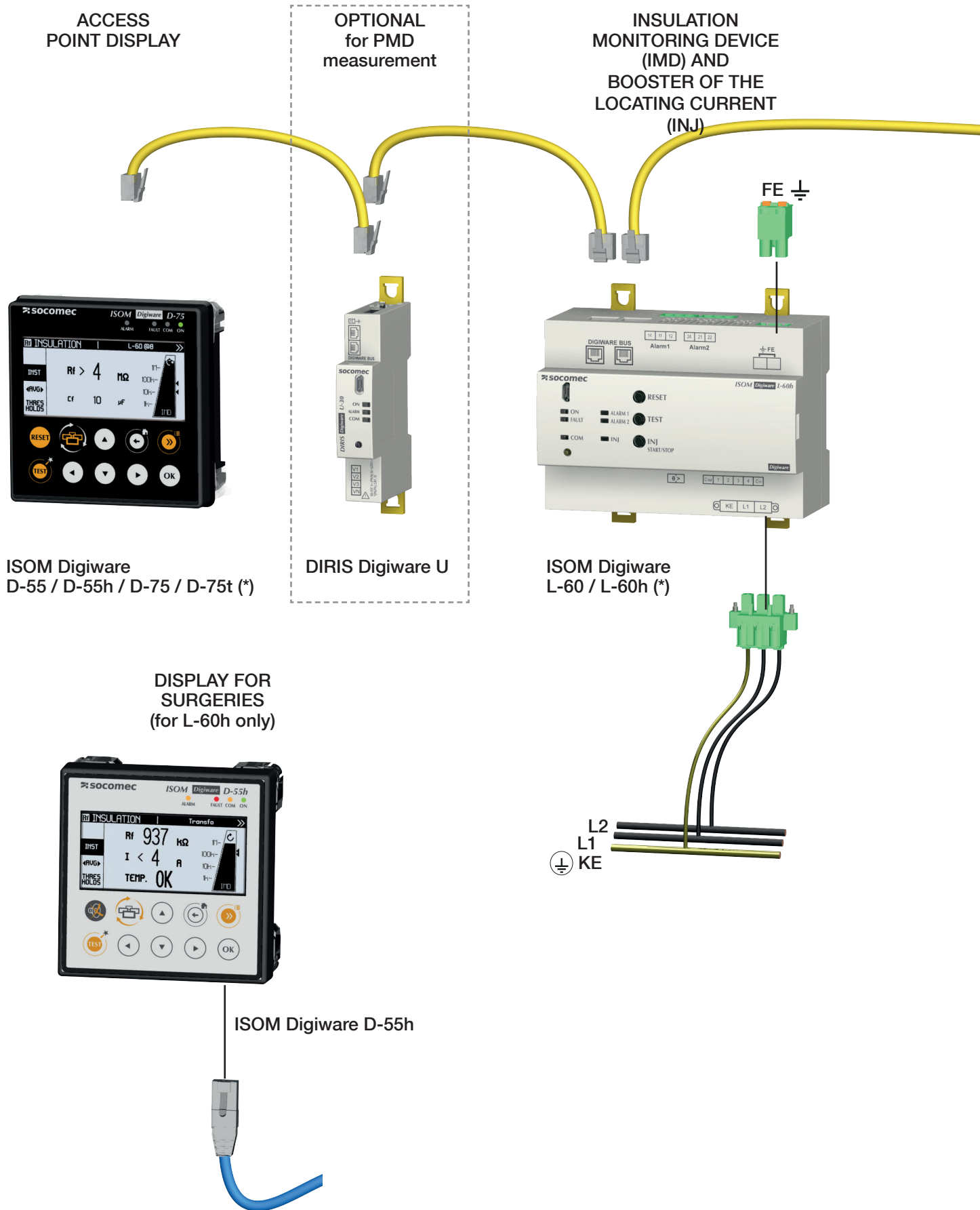
**Fault-locating devices, 6 circuits for power networks or medical premises**  
ISOM Digiware F-60 Ref. 4729 0126  
**Fault-locating devices, 6 circuits – heavy-duty version**  
ISOM Digiware F-60t Ref. 4729 0127

### Adapter for locating core balance transformer



**Adapter for locating core balance transformer  $\Delta$ IP**  
ISOM T-15 Ref. 4729 0590  
**Adapter for locating core balance transformer  $\Delta$ IP – heavy-duty version**  
ISOM T-15t Ref. 4729 0591

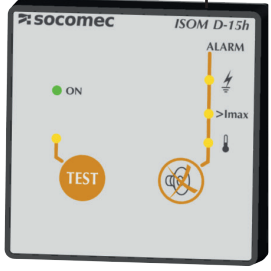
## 4.1.2. Principle



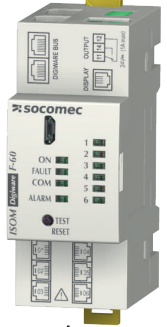
(\*) version h for medical buildings

FAULT-LOCATING  
DEVICE (FLD)

Digiware bus  
terminals

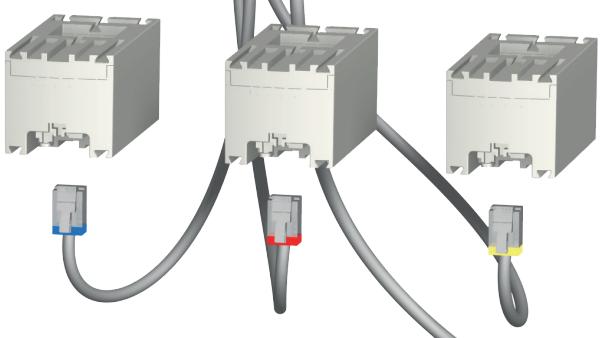


ISOM Digiware D-15h

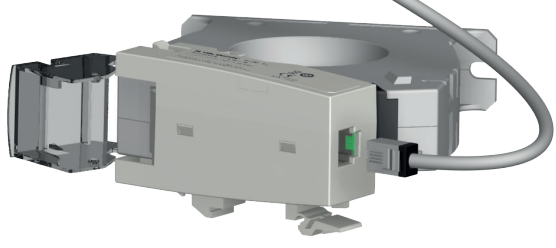


ISOM Digiware F-60

I4 ④  
I3 ③  
I2 ②      ① I1



Current sensor  
TE, TR or TF



Adapter  
ISOM T-15

Locating core  
balance transformer  
 $\Delta$ IP

### 4.1.3. Functions

ISOM Digiware offers a number of options, including:

#### Insulation monitoring

- Measuring Rf, Ce, network frequency F
- Multi-load current measurement
- Insulation curve over 5 periods: hour, day, week, month, year
- "Mapping" mode (OhmScanner technology) to regularly track the insulation by circuit

#### General measurements (with DIRIS Digiware U module)

- Voltage measurement
- Operation across 4 quadrants
- Guarantees the overall accuracy of the DIRIS Digiware + Sensor measurement chain in terms of power and active energy up to class 0.5, as per IEC standard 61557-12

#### Quality of the voltage (with module DIRIS Digiware U-30)

- Direct, inverse and zero-sequence voltages
- THD and harmonics up to order 63 for voltage
- Voltage imbalance
- EN50160 events (Uswl, Udip, Uint)

#### Data-logging

- Recording and timestamping of min/max electrical values

#### Metering

- Partial and total apparent, reactive and active power
- Multi-tariff (max. 8)
- Load curves

#### Alarm

- Timestamped alarms with boolean combination

#### Current and/or fault-locating inputs

- Measuring/monitoring 6 currents or 6 circuits.
- Current inputs with quick connection and automatic recognition of the current sensors
- Simultaneous management of several single-phase, two-phase and three-phase loads
- Connection of solid-core, split-core and flexible sensors
- Checking the connection, detecting the CT and auto-configuring the networks
- Guarantees the overall accuracy of ISOM/DIRIS Digiware + Sensor measurement chain at Class 0.5 in terms of power and active energy as per IEC 61557-12

#### Communication

- Ethernet Modbus TCP output
- Embedded web server WEBVIEW-M available on the ISOM Digiware D-75 screen
- Time-synchronised with the ISOM Digiware D-x5 screen.
- Auto-detection and auto-addressing of devices connected from ISOM Digiware D-x5 displays

#### 4.1.4. Electrical readings

	ISOM Digiware				
	D-15h	D-55	D-55h	D-75	D-75t
Heavy-duty model for extreme environments (humidity, impact, vibrations)					•
<b>Function</b>					
Centralises single-device measurements	•				
Centralises multi-device measurements		•	•	•	•
Clearer display with LED	•				
High-resolution LCD display (configuration, selection and visualisation display of circuits)		•	•	•	•
<b>Power supply</b>					
Digiware	•				
24 VAC		•	•	•	•
<b>Communication</b>					
Master RS485 modbus		•	•	•	•
Digiware bus	•	•	•	•	•
Ethernet TCP Modbus		•	•	•	•
Ethernet Webserver				•	•
<b>Format</b>					
Width / number of modules / installation	Mounted on the outside of the enclosure D67mm P40mm	Enclosed mounting DIN 96x96	Enclosed mounting DIN 96x96	Enclosed mounting DIN 96x96	Enclosed mounting DIN 96x96
<b>Reference</b>	<b>4729 0200</b>	<b>4729 0203</b>	<b>4729 0204</b>	<b>4729 0205</b>	<b>4729 0206</b>

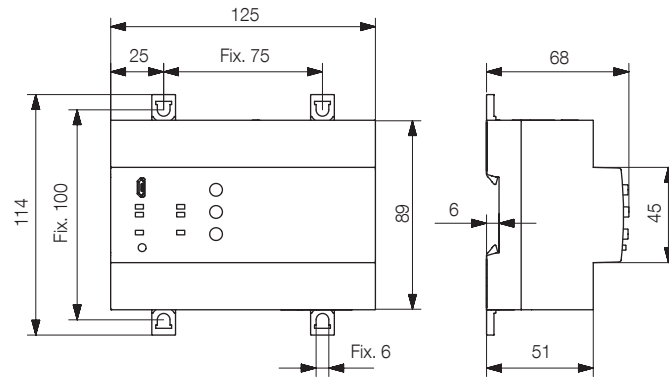
	ISOM Digiware		
	L-60	L-60t	L-60h
Heavy-duty model for extreme environments (humidity, impact, vibrations)		•	
<b>Multi-measurement</b>			
$R_f$ , $C_f$	•	•	•
U on AC or DC network, F	•	•	•
<b>Alarms</b>			
At thresholds ( $R_f$ , U, T°C)	•	•	•
<b>History of average values</b>			
Insulation curve over 5 periods (hour, day, week, month, year)	•	•	•
<b>Format</b>			
Width/Number of modules	125 mm / 7	125 mm / 7	125 mm / 7
<b>Reference</b>	<b>4729 0110</b>	<b>4729 0111</b>	<b>4729 0112</b>

	ISOM Digiware	
	F-60	F-60t
Heavy-duty model for extreme environments (humidity, impact, vibrations)		•
<b>Application</b>		
Number of measurement channels	6	6
<b>Fault-locating</b>		
Locating current by circuit $I_L$	•	•
Insulation value $R_f$ by circuit	•	•
<b>History of average values</b>		
Insulation curve over 5 periods (hour, day, week, month, year)	•	•
<b>Metering</b>		
+/- kWh, +/- kvarh, kVAh	•	•
Multi-tariff (max. 8)	•	•
Load curves	•	•
<b>Multi-measurement</b>		
$I_1, I_2, I_3, \sum P, \sum Q, \sum S$	•	•
Phi	•	•
<b>Alarms</b>		
Thresholds	•	•
<b>ON/OFF inputs / outputs</b>		
Numbers	0 / 1	0 / 1
<b>Format</b>		
Width	36 mm	36 mm
Number of modules	2	2
<b>Reference</b>	<b>4729 0126</b>	<b>4729 0127</b>

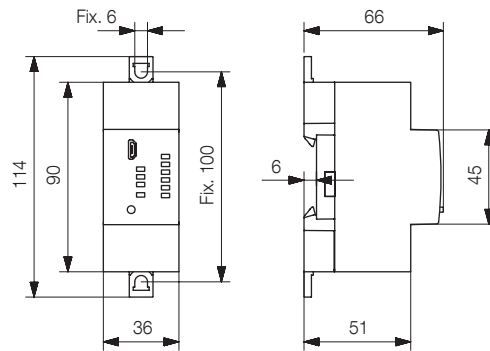


## 4.1.5. Dimensions

### ISOM Digiware L-60



### ISOM Digiware F-60



## 4.2. Presentation of associated current sensors

Various types of current sensors can be connected to ISOM Digiware:

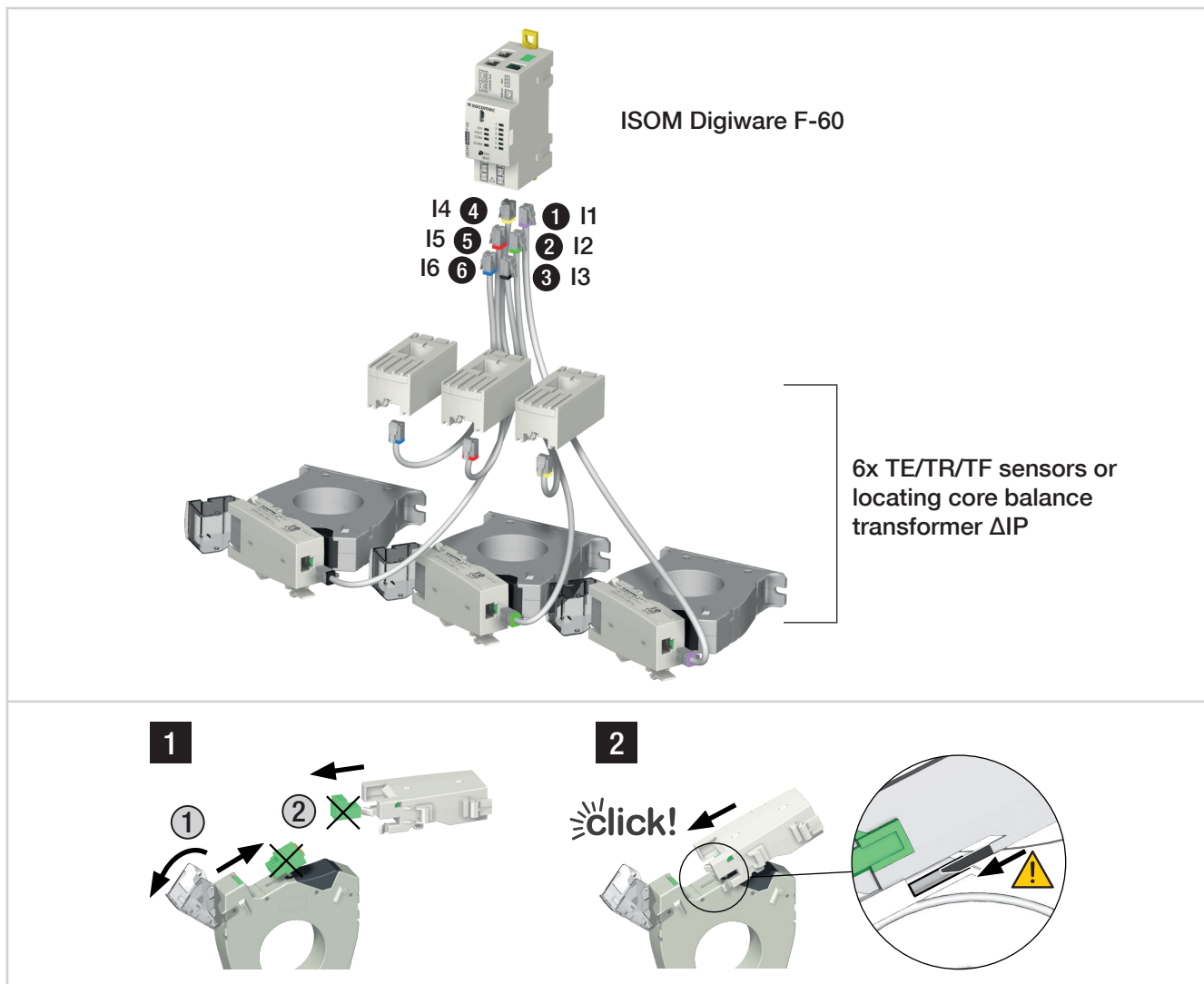
### Fault-locating core balance transformers

- Solid-core ( $\Delta$ IP)
- Split-core ( $\Delta$ IP-R)
- Rectangular (WR, TFR)

### Current sensors for measuring load currents

- Solid-core (TE)
- Split-core (TR) or flexible (TF).

The difference between these sensors means they can be adapted to any type of new, existing or high-current existing installation. They all use a specific link with the fault-locating module ISOM Digiware F-60. This link provides a quick connection, with no cabling errors. ISOM Digiware recognises the sensor size and type. In addition, combining them means the overall accuracy of ISOM Digiware + current sensor measurement chain can be guaranteed over a large measurement range.



### Important:

To connect the current sensors, use only SOCOMEC cables, RJ12 straight cables, twisted pair, unshielded, 600 V,  $-10^{\circ}\text{C}$  /  $+70^{\circ}\text{C}$  as per IEC 61010-1 version 3.0. We recommend that all the current sensors are installed in the same direction.

### Connection cables for current sensors:

\* When laying cables, do not exceed a maximum length of 10 metres.

## 4.2.1. Locating core balance transformers $\Delta$ IP, $\Delta$ IP-R, WR and TFR

The locating core balance transformers house the active conductors and bring out the differential sum of the vector currents, to highlight a fault in the current. These core balance transformers meet measurement sensitivity requirements.

Solid-core ( $\Delta$ IP, WR and TFR series) or split-core ( $\Delta$ IP-R series), they are suitable for all cabling configurations.

Available in all shapes and sizes for use with any cable/bar size and configuration.

With a choice of multiple fasteners ( $\Delta$ IP and  $\Delta$ IP-R), they can be DIN rail-mounted, board-mounted or attached directly to the cable.

A centring solution (for  $\Delta$ IP and  $\Delta$ IP-R) which uses a flexible clamping unit means you can centre the cable in the core balance transformer to ensure accurate measuring and improve its immunity to disruptions in the mains power. It also means you can mount the core balance transformer directly on a cable.

$\Delta$ IP-R split core balance transformers are quick and easy to install with their innovative "one-click" open/close system. This system, designed without any parts, guarantees safe installation.

### 4.2.1.1. Range

Connection cables for current sensors:




RJ12 connection cables	Cable length (m)								
	0.1	0.2	0.3	0.5	1	2	5	10	50 m reel + 100 connectors*
Number of cables	Réf.	Réf.	Réf.	Réf.	Réf.	Réf.	Réf.	Réf.	Réf.
1	-	-	-	-	-	-	4829 0602	4829 0603	4829 0601
3	4829 0580	4829 0581	4829 0582	4829 0595	4829 0583	4829 0584	-	-	-
4				4829 0596	4829 0588	4829 0589	-	-	-
6	4829 0590	4829 0591	4829 0592	4829 0597	4829 0593	4829 0594	-	-	-

\* When producing cables, do not exceed a maximum length of 10 metres.

### $\Delta$ IP circular solid-core balance transformers

							
	$\Delta$ IP15	$\Delta$ IP30	$\Delta$ IP50	$\Delta$ IP80	$\Delta$ IP120	$\Delta$ IP200	$\Delta$ IP300
Diameter	15 mm	30 mm	50 mm	80 mm	120 mm	200 mm	300 mm
I max	36 A	65 A	85 A	160 A	250 A	400 A	630 A
Reference	4750 6015	4750 6030	4750 6050	4750 6080	4750 6120	4750 6200	4750 6300

### $\Delta$ IP circular split-core balance transformers

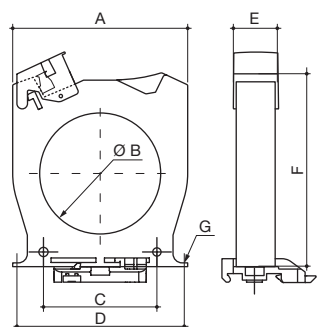
			
	$\Delta$ IP-R50	$\Delta$ IP-R80	$\Delta$ IP-R120
Diameter	50 mm	80 mm	120 mm
I max	85 A	160 A	250 A
Reference	4750 6051	4750 6081	4750 6121

## WR/TFR rectangular solid-core balance transformers

				
	<b>WR70x175</b>	<b>WR115x305</b>	<b>WR150x350</b>	<b>TFR200x500</b>
<b>Diameter</b>	70 x 175 mm	115 x 305 mm	150 x 350 mm	200 x 500 mm
<b>I max</b>	500 A	500 A	500 A	500 A
<b>Reference</b>	4795 0717	4795 1130	4795 1535	4795 2050

### 4.2.1.2. Dimensions

#### ΔIP circular solid-core balance transformers

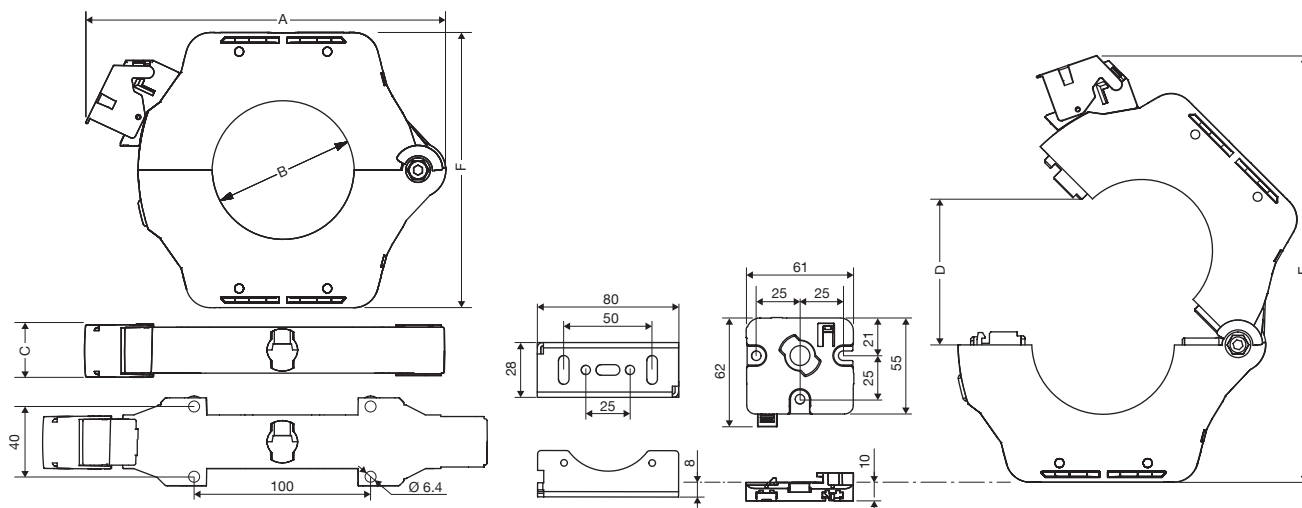


Type	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	Weight (kg)
ΔIP diameter 15	53	17.3	25	50	26	81	M4	0.10
ΔIP diameter 30	92	30	50	85	26	103.5	M4	0.15
ΔIP diameter 50	102.5	50	50	90	26	125	M5	0.27
ΔIP diameter 80	116	80	75	105	26	142.5	M5	0.38
ΔIP diameter 120	163	120	100	150	26	182.5	M6	0.72
ΔIP diameter 200	253	200	150	175x41.2	51	274	M6	1.74
ΔIP diameter 300	370	300	200	250x41.5	50	390	M6	3.60

A. Width  
B. Diameter  
C. Spacers  
D. Rear bracket spacers

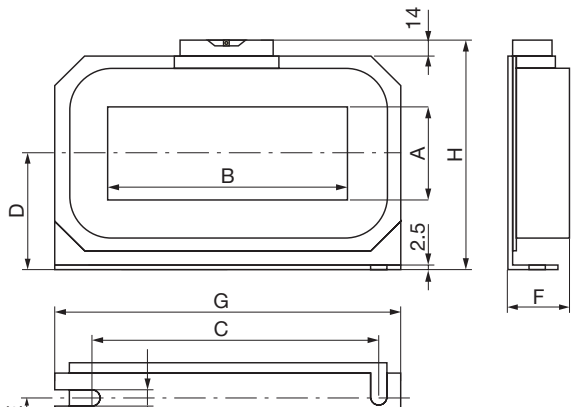
E. Depth  
F. Height  
G. Diameter of fixing screws

#### ΔIP-R circular split-core balance transformers



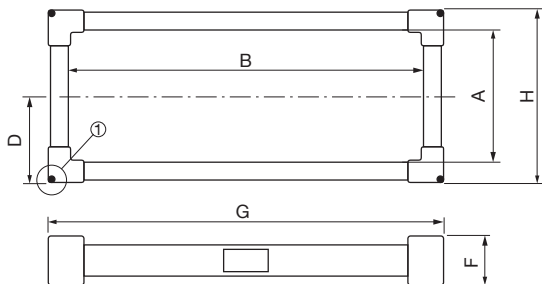
ΔIP	Ø 50 mm	Ø 80 mm	Ø 120 mm
A	160	204	252
B	49	79	119
C	30	30	30
D	77	108	149
E	200	260	328
F	116	156	204
Weight (g)	380	850	1500

WR/TFR rectangular solid-core balance transformers



Type	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	I (mm)	Weight (kg)
WR 70x175	70	175	225	85	22	46	261	176	7,5	2,9
WR 115x305	115	305	360	116	25	55	402	240	8	6,3
WR 150x350	150	350	415	140	28	55	460	285	8	8,2

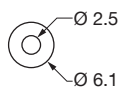
- A. Gateway width
- B. Gateway length
- C. Spacers
- D. Half-height
- E. Depth of mounting spacer
- F. Depth
- G. Width
- H. Height
- I. Width of oblong fixing holes



Type	A (mm)	B (mm)	D (mm)	F (mm)	G (mm)	H (mm)	Weight (kg)
TFR 200x500	200	500	140	62	585	285	7,2

- A. Gateway width
- B. Gateway length
- D. Half-height
- F. Depth
- G. Width
- H. Height

① Attachments for core balance transformer



## 4.2.2. Adapter ISOM T-15

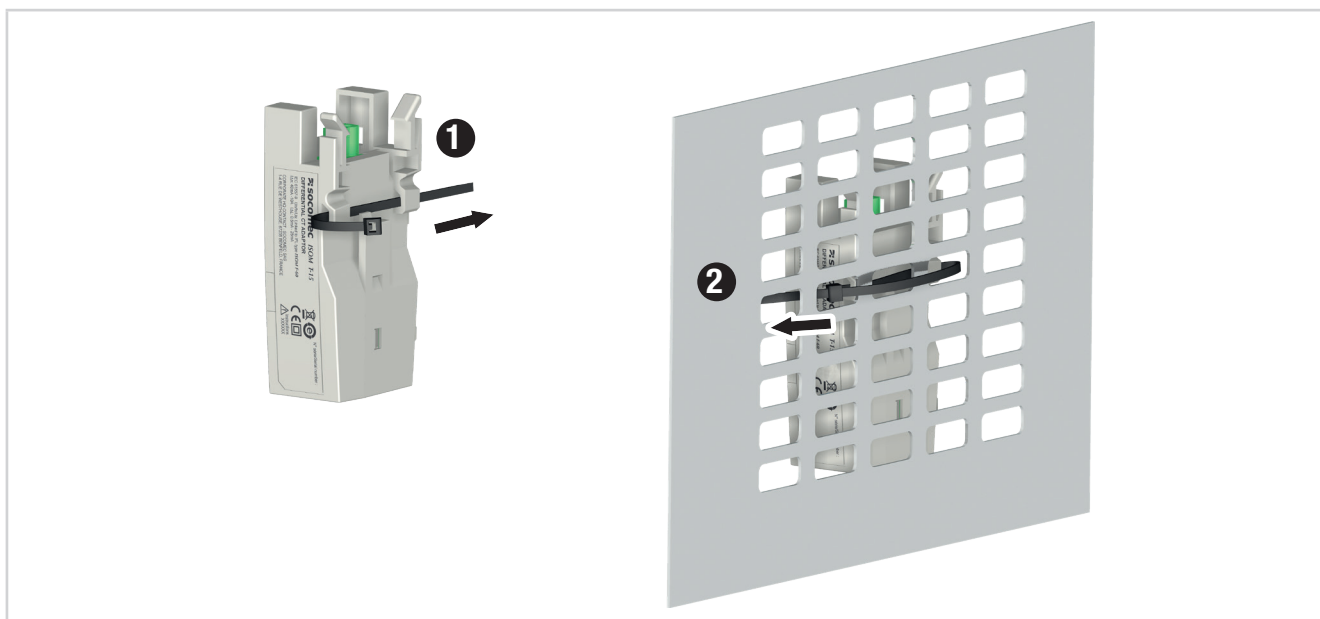
Use the ISOM T-15 adapter to ensure the conversion and analysis of the signal between the output of the locating core balance transformer and the fault-locating device ISOM Digiware F-60.

It can be mounted directly onto the core balance transformers  $\Delta$ IP (diameter >30mm) or DIN rail.

It comes with all the connectivity required for any kind of application.



Do not install the adapter close to or touching any live parts, or close to breakers or other equipment carrying dangerous voltage.





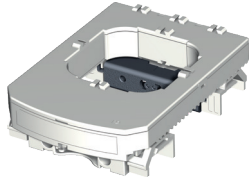
## 4.2.3. TE solid-core current sensors

The TE solid-core current sensors are used to set up measurement points in a new or existing installation. They are easy to integrate as they are compact and respect the pitch of the circuit breakers. A wide range of accessories are also available for direct fitting on all type of cabling (cable, flexible or rigid busbar) or on a DIN rail support or plate.

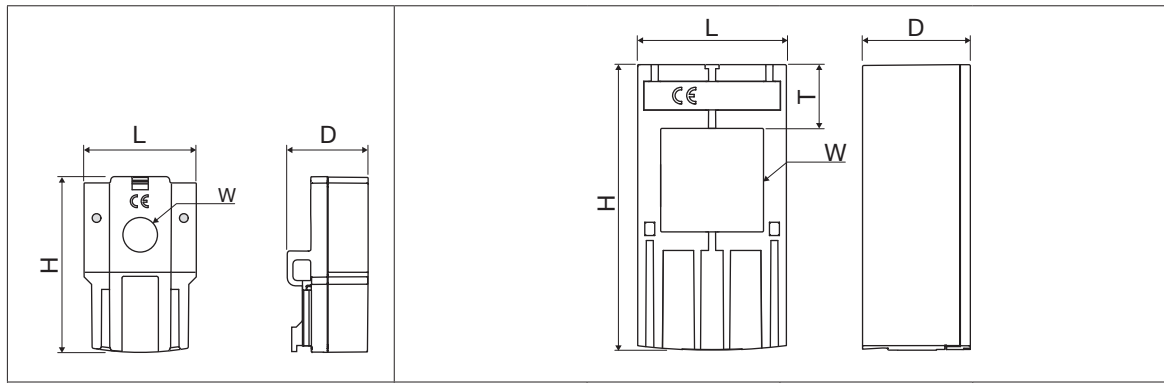
Thanks to the specific link, they are recognised by the ISOM Digiware and a high level of overall accuracy for the measurement chain is guaranteed.

#### 4.2.3.1. Range

						
	<b>TE-18</b>	<b>TE-18</b>	<b>TE-25</b>	<b>TE-35</b>	<b>TE-45</b>	<b>TE-55</b>
<b>Pitch</b>	18 mm	18 mm	25 mm	35 mm	45 mm	55 mm
<b>Nominal current range I<sub>n</sub></b>	5 to 20 A	25 to 63 A	40 to 160 A	63 to 250 A	160 to 630 A	400 to 1000 A
<b>I max</b>	24 A	75.6 A	192 A	300 A	756 A	1200 A
<b>Reference</b>	4829 0500	4829 0501	4750 6052	4829 0503	4829 0504	4829 0505

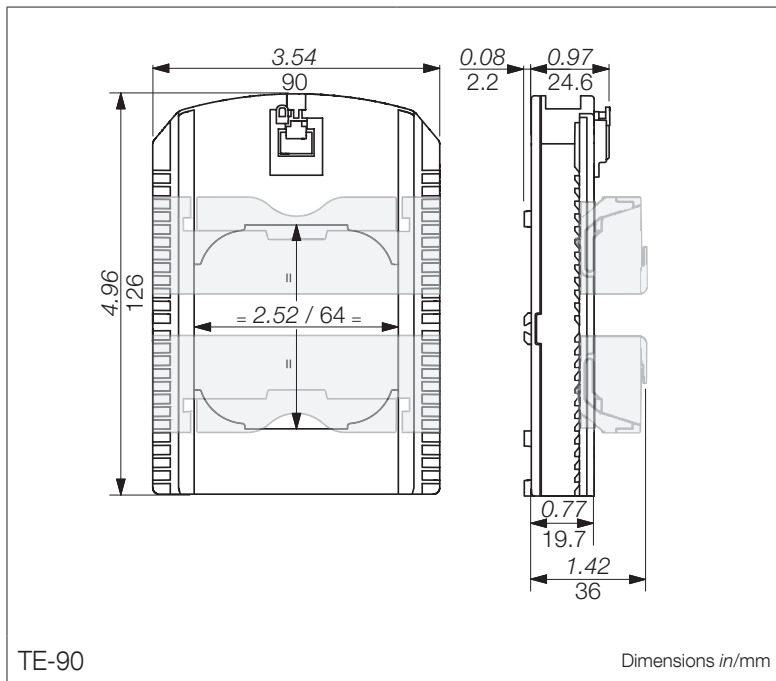
	
	<b>TE-90</b>
<b>Pitch</b>	90 mm
<b>Nominal current range I<sub>n</sub></b>	600 to 2000 A
<b>I max</b>	2400 A
<b>Reference</b>	4829 0506

### 4.2.3.2. Dimensions



Dimensions in mm

	TE-18	TE-25	TE-35	TE-45	TE-55
<b>Pitch</b>	18	25	35	45	55
<b>LxHxD</b>	28 x 45 x 20	25 x 65 x 32.5	35 x 71 x 32.5	45 x 86 x 32.5	55 x 100 x 32.5
<b>Ø W</b>	ø 8.4	-	-	-	-
<b>□ W</b>	-	13.5 x 13.5	21 x 21	31 x 31	41 x 41
<b>(T)</b>	-	17.5	17.5	19.5	21.5




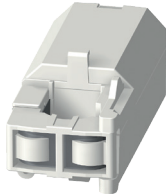
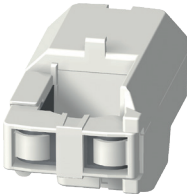
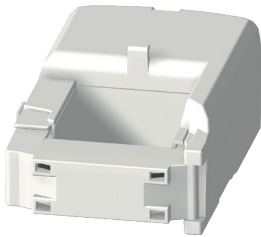


## 4.2.4. TR split-core current sensors

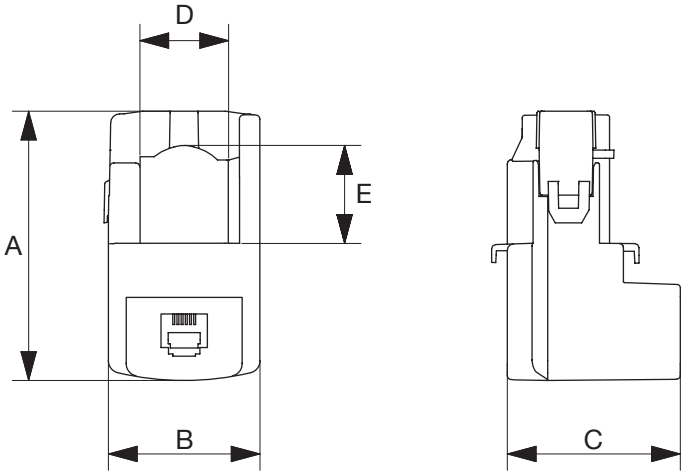
The TR split-core current sensors are used to set up measurement points in a new or existing installation without interfering with its cabling. Thanks to the specific link, they are recognised by the DIRIS B and the overall accuracy of the measurement chain is guaranteed.

### 4.2.4.1. Range

Four models are available from 25A to 600A to analyse several types of loads.

				
	TR-10 / iTR-10	TR-14 / iTR-14	TR-21 / iTR-21	TR-32 / iTR-32
<b>Cable passage diameter</b>	ø10 mm	ø14 mm	ø21 mm	ø32 mm
<b>Recommended cable section</b>	6 mm <sup>2</sup> (iTR-10)	10 mm <sup>2</sup> (iTR-14)	50 mm <sup>2</sup> (iTR-21)	50 mm <sup>2</sup> (iTR-32)
<b>Nominal current range I<sub>n</sub></b>	25 - 63 A	40 - 160 A	63 - 250 A	160 - 600 A
<b>Maximum I</b>	75.6 A	192 A	300 A	720 A
<b>Part number</b>	4829 0555 / 4829 0655	4829 0556 / 4829 0656	4829 0557 / 4829 0657	4829 0558 / 4829 0658

### 4.2.4.2. Dimensions

				
Dimensions in/mm	TR-10 / i TR-10	TR-14 / i TR-14	TR-21 / iTR-21	TR-32 / iTR-32
<b>A</b>	1.74 44	2.63 67	2.56 65	3.38 86
<b>B</b>	1.02 26	1.14 29	1.45 37	2.08 53
<b>C</b>	1.10 28	1.10 28	1.69 43	1.85 47
<b>D</b>	-	0.55 14	0.82 21	1.26 32
<b>E</b>	-	0.59 15	0.90 23	1.30 33
<b>Ø</b>	0.39 10	0.55 14	0.82 21	1.26 32

## 4.2.5. TF flexible current sensors

The TF flexible current sensors use the Rogowski principle, covering a wide current range without saturation.

Their flexible design and easy opening system enables a quick installation inside electrical panels, making them particularly well suited for adding measuring points in existing electrical installations, especially when space is limited.

The secure lock technology prevents non voluntary openings of the Rogowski rope.

### 4.2.5.1. Range

Six models are available, covering a large current range up to 6000 A with openings of different shapes and sizes. They include a compact and self-supplied integrator, required to shape the current signal.

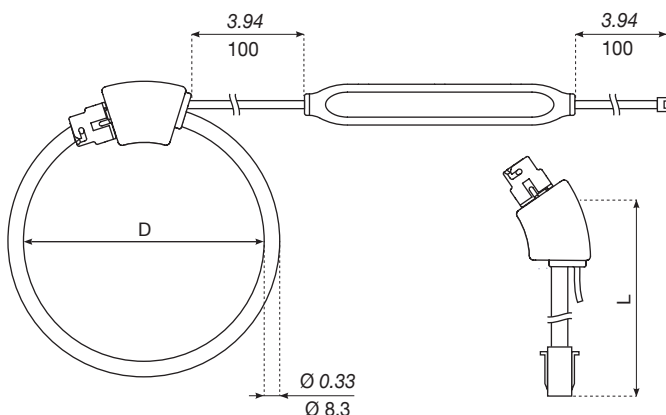


Due to the specific RJ12 connection, the TF current sensors can only be used with DIRIS Digiware I, DIRIS B and DIRIS A-40. Used in conjunction with these PMD equipped with RJ12 connectors, the overall accuracy of the measurement chain is guaranteed.

	TF-40	TF-80	TF-120	TF-200	TF-300	TF-600
Ø (mm)	40	80	120	200	300	600
I nom. (a.c.)	100 - 400 A	150 - 600 A	400 - 2000 A	600 - 4000 A	1600 - 6000 A	1600 - 6000 A
Part number	4829 0573	4829 0574	4829 0575	4829 0576	4829 0577	4829 0578

### 4.2.5.2. Dimensions

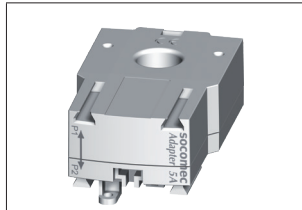
Dimensions in/mm	TF-40	TF-80	TF-120	TF-200	TF-300	TF-600
Diameter D	1,57 40	3,15 80	4,72 120	7,87 200	11,81 300	23,62 600
Perimeter P	4,96 126	9,88 251	14,84 377	24,72 628	37,09 942	74,21 1885
Integrator	8,04 x 0,75 x 0,6 128 x 19 x 15					



## 4.2.6. Adapters for 5A sensors

The adapter lets you use a standard sensor supplying a 1A or 5A current to the secondary sensor. Using this kind of sensor does not guarantee the overall accuracy of ISOM Digiware + sensor, as it depends on the accuracy of the associated sensor (see standard "IEC 61557-12 annex D" for more information). The primary current is max. 10000 A / 5 A or 2000 A / 1 A.

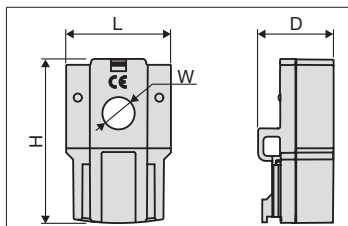
### 4.2.6.1. Range



**5 A Adapter**

<b>I nom.</b>	5 A
<b>I max.</b>	6 A
<b>REfErence</b>	4829 0599

### 4.2.6.2. Dimensions



Dimensions in/mm

**5 A Adapter**

<b>LxHxP</b>	28 x 20 x 45
<b>APERTURE (W)</b>	∅ 8.4

## 5. INSTALLATION

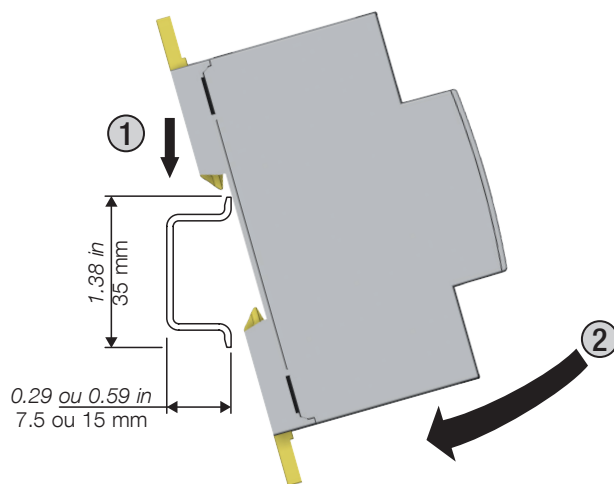
The following paragraphs describe the installation of ISOM Digiware and associated sensors.

### 5.1. Recommendations and safety

Refer to the safety instructions (section "2) Hazards and Warnings", page 5)

### 5.2. Installing ISOM Digiware units

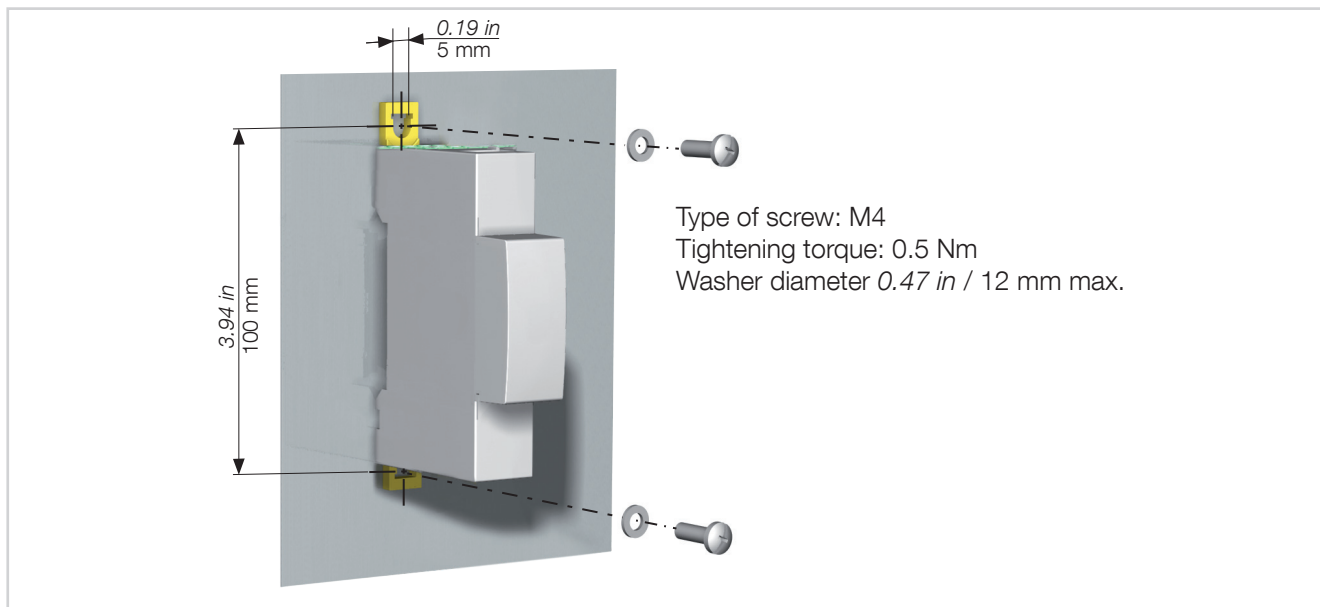
#### 5.2.1. ISOM Digiware L-60, F-60, T-15 – mounted on DIN rail



#### PLEASE NOTE:

- When the ISOM T-15 adapter is mounted on DIN rail, do not fix the core balance transformer  $\Delta$ IP to the T-15
- Make sure the housing (e.g. enclosure) is large enough to take the ISOM Digiware L-60 (enough thermal ventilation around the device)
- Make sure that the DIN rail is earthed
- Do not install the ISOM T-15 or ISOM Digiware F-60 close to or touching any live parts, or close to breakers or other equipment carrying dangerous voltage (does not apply to ISOM Digiware L-60).

## 5.2.2. ISOM Digiware L-60, F-60 – board-mounted







If using a metal bracket, make sure it is earthed.

## 5.3. Installing TE solid-core sensors

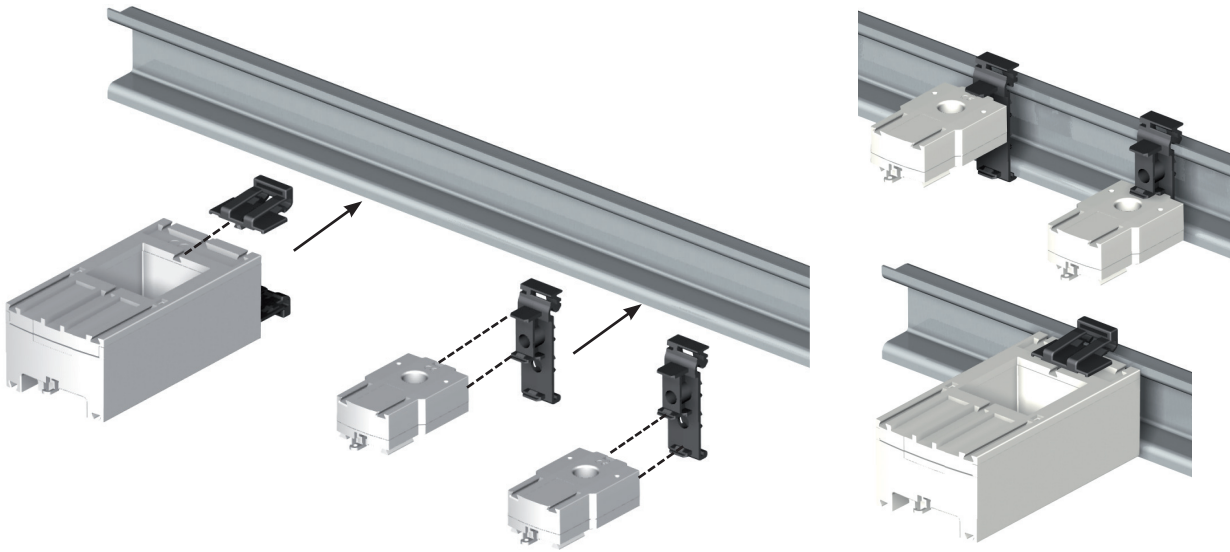
### 5.3.1. Mounting accessories

The mounting accessories supplied with the sensors are listed below:

Reference		PITCH	 DIN rail and plate mounting	 DIN rail mounting	 Plate mounting	 Busbar mounting
4829 0500 4829 0501	<b>TE-18</b>	<b>18 mm</b>	x 1			
4829 0502	<b>TE-25</b>	<b>25 mm</b>		x 2	x 4	
4829 0503	<b>TE-35</b>	<b>35 mm</b>		x 2	x 4	x 2
4829 0504	<b>TE-45</b>	<b>45 mm</b>		x 2	x 4	x 2
4829 0505	<b>TE-55</b>	<b>55 mm</b>		x 2	x 4	x 2
4829 0506	<b>TE-90</b>	<b>90 mm</b>	x 2		x 6	

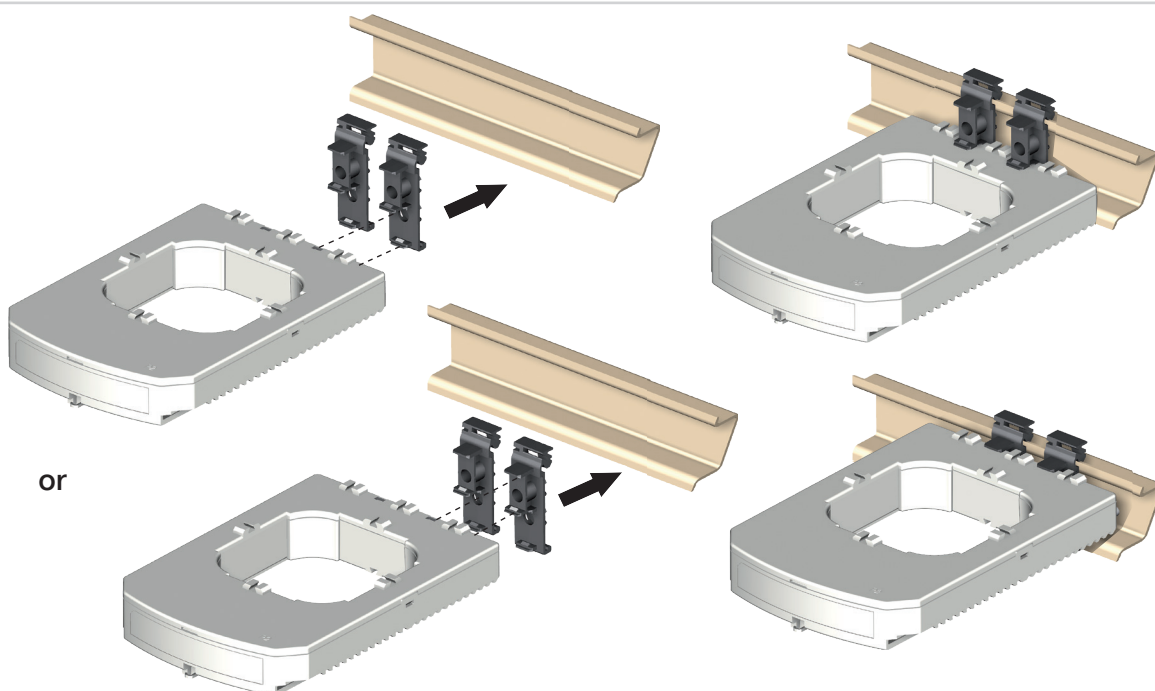
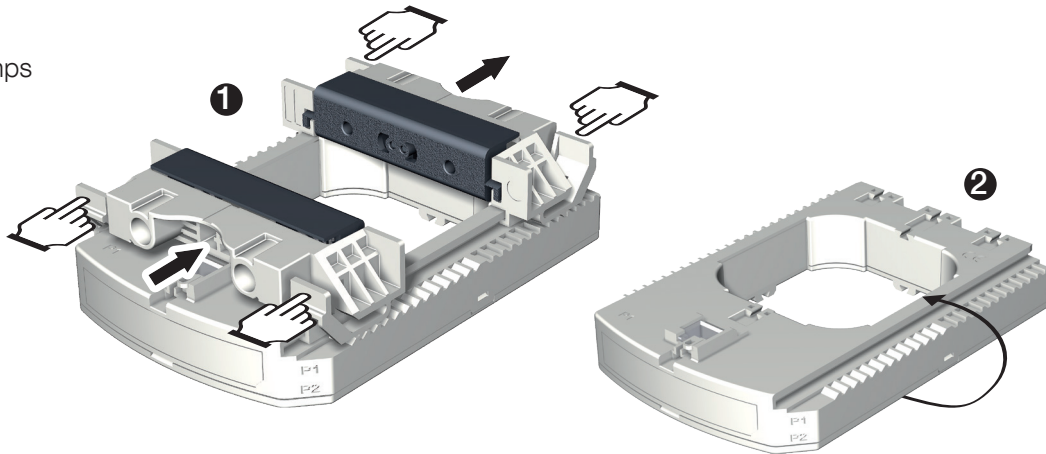
### 5.3.2. DIN rail mounted

TE-18 -> TE-55



TE-90

Removing clamps

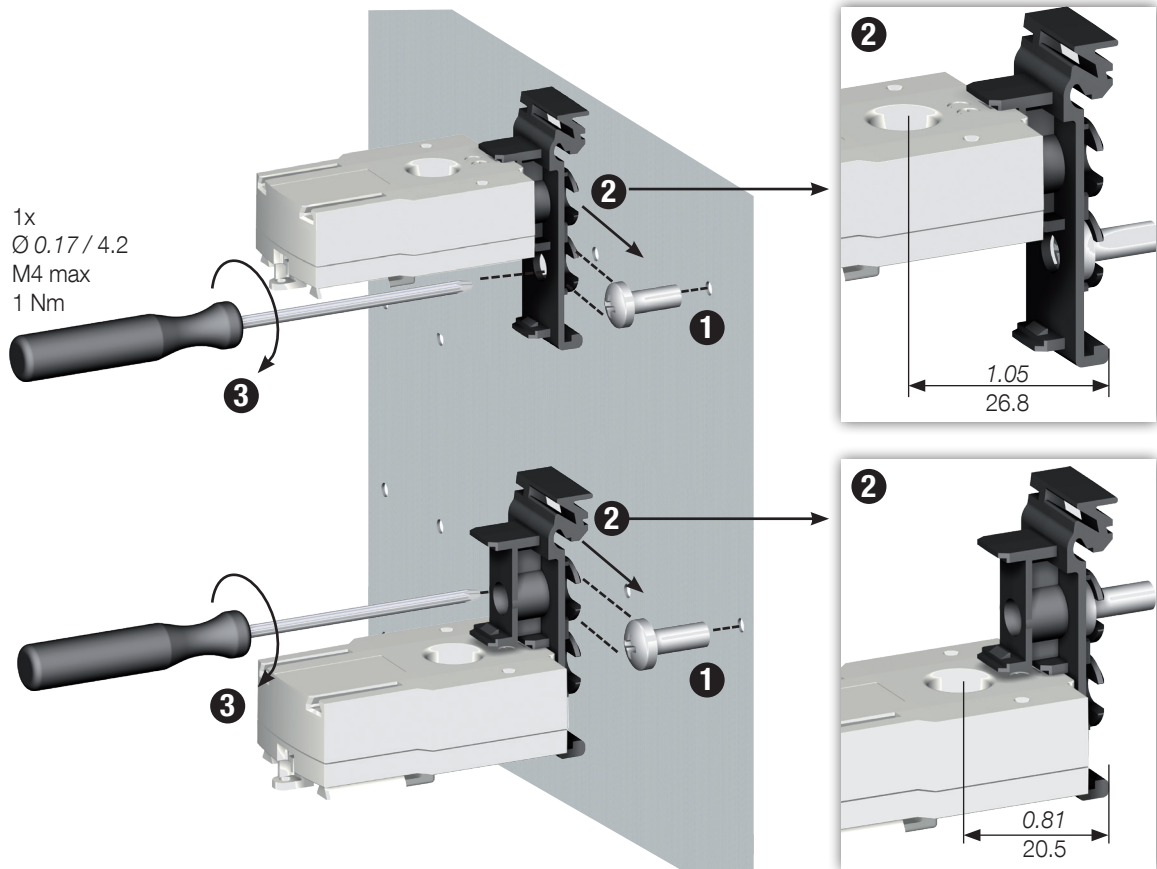




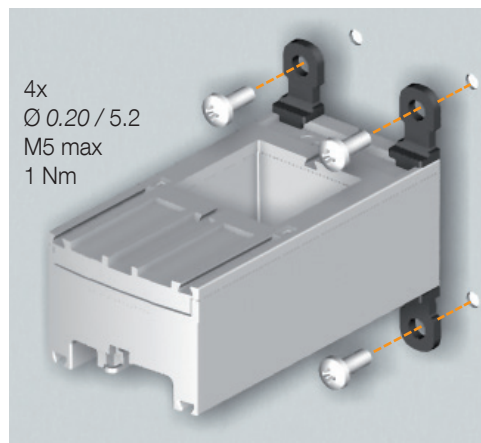
**Note:** fix sensor TE-90 to the DIN rail to make it easier to install. This is a temporary installation. Use the clamps to install the TE-90 sensors on the DIN rail.

### 5.3.3. Plate mounting

TE-18

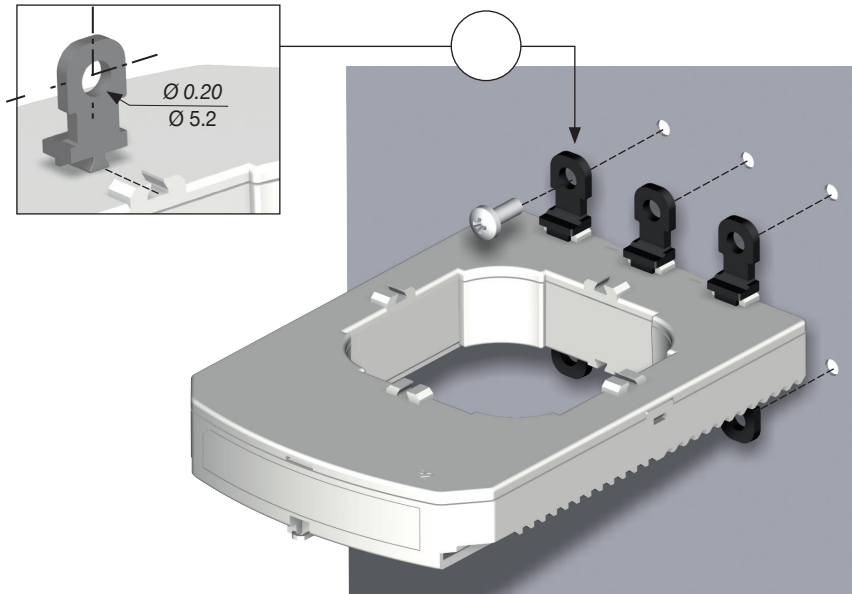
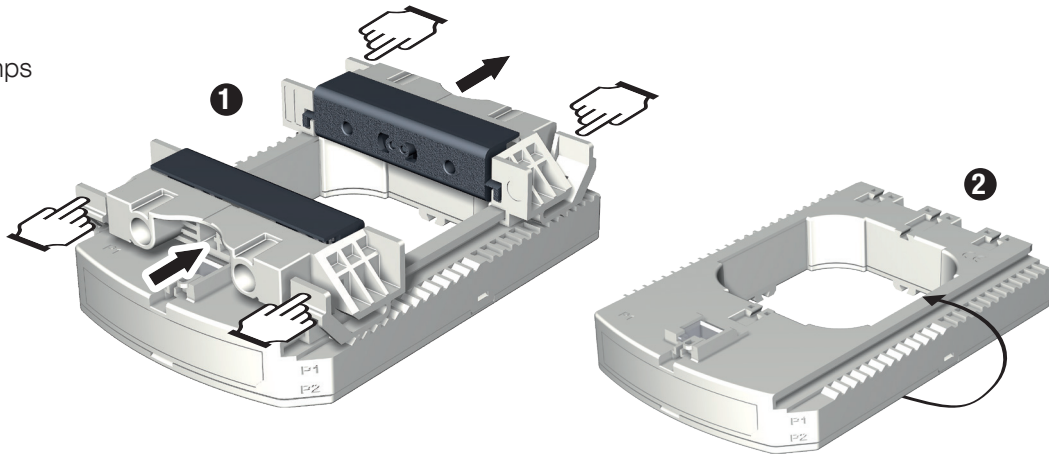


TE-25 -> TE-55



TE-90

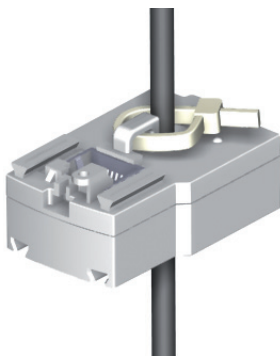
Removing clamps



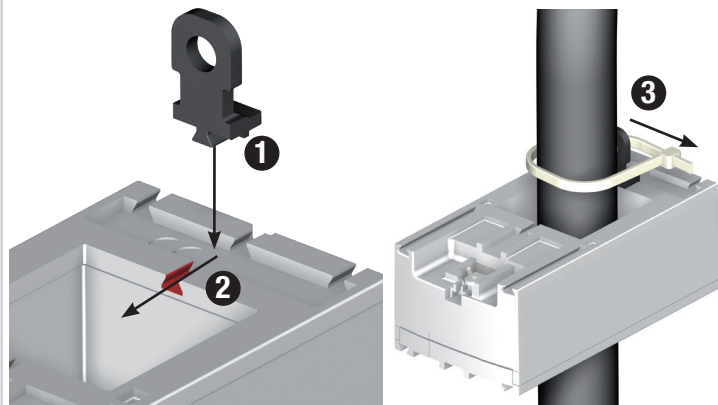
**Note:** use the clamps to install the TE-90 sensors on the board.

### 5.3.4. Installing on a cable with clamping collar

TE-18



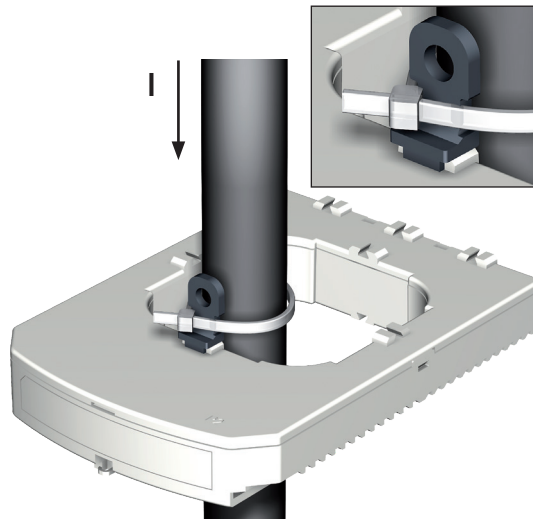
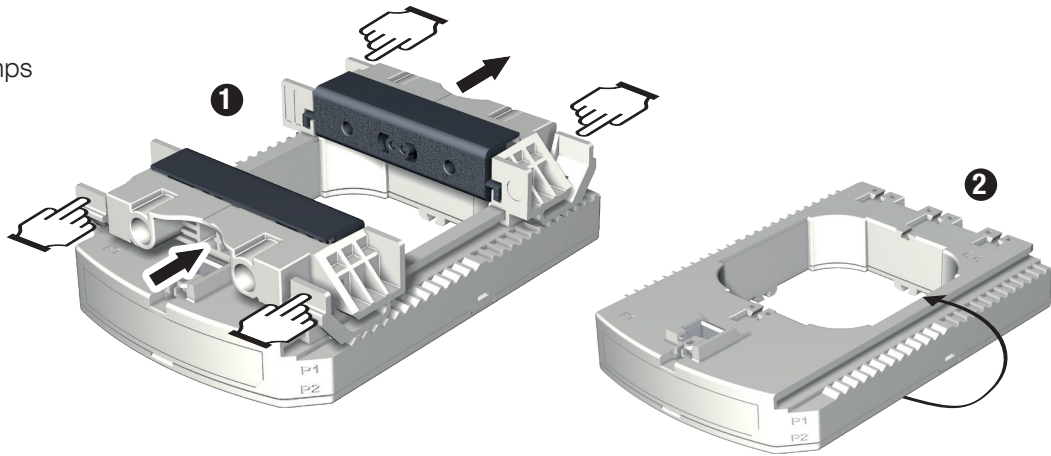
TE-25 -> TE-55





## TE-90

Removing clamps



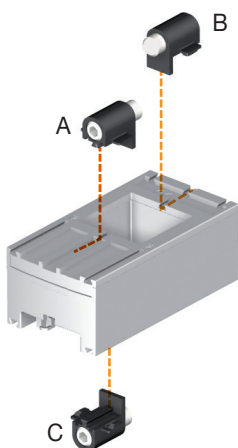
**Note:** use the clamps to install the TE-90 sensors on a cable with clamping collar.



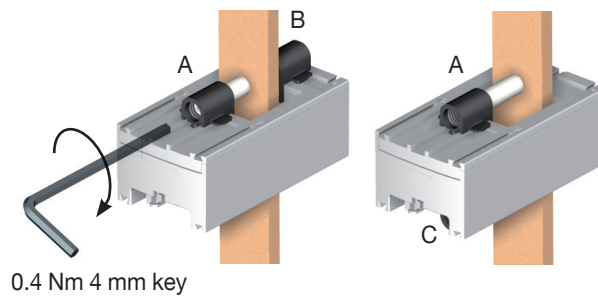
Do NOT clamp or pull out NON-INSULATED conductors carrying DANGEROUS VOLTAGE which could cause an electric shock, burn or arc flash. Ref. IEC 61010-2-032

### 5.3.5. Bar mounting

TE-35 -> TE-55



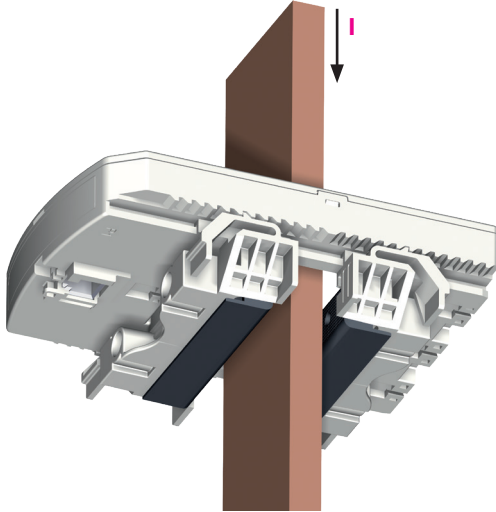
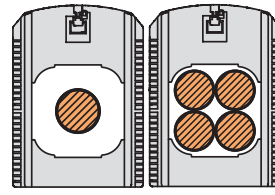
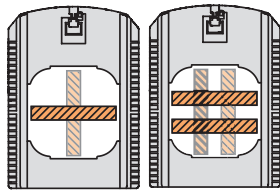
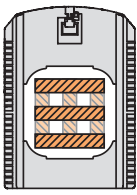
Installation options :  
A+B, A+C



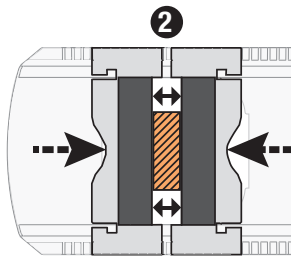
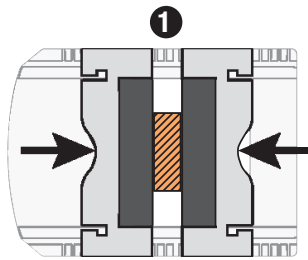
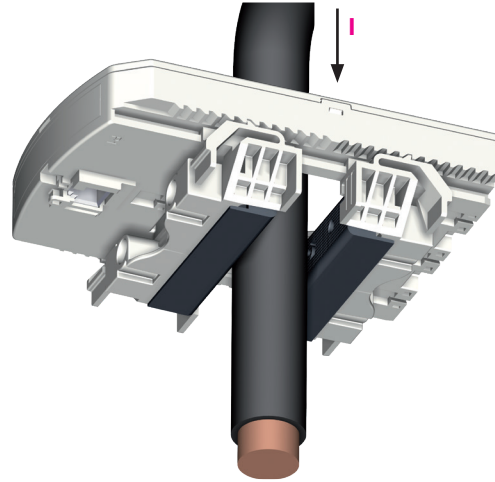
TE-90

50x10 mm

60x10 mm



ou

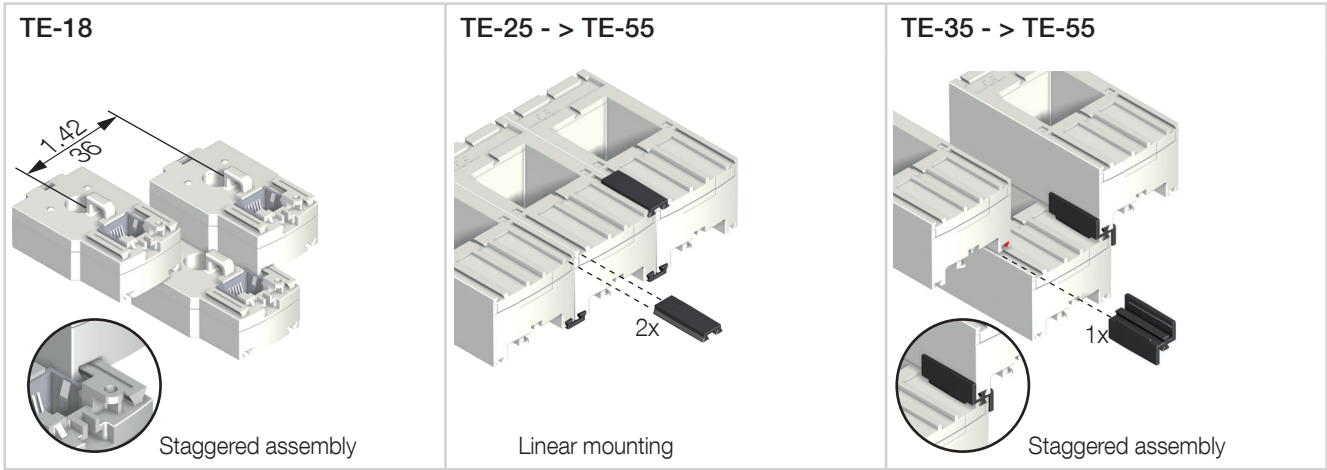


Tighten the jaws on both sides of the cable by applying pressure. The jaws must be perpendicular to the holding notches.

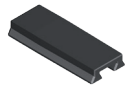
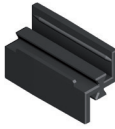


Do NOT clamp or pull out NON-INSULATED conductors carrying DANGEROUS VOLTAGE which could cause an electric shock, burn or arc flash. Ref. IEC 61010-2-032

### 5.3.6. Sensors assembly

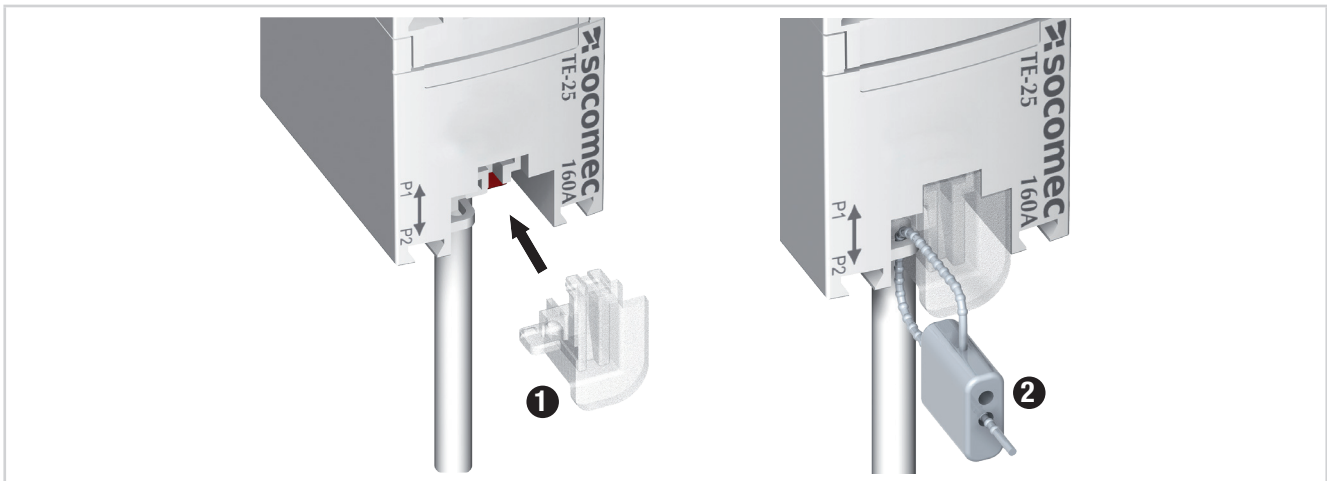


Mounting accessories for combining sensors:

		
<b>REfErrence</b>	Linear assembly	Staggered assembly
<b>4829 0598</b>	x30	

These accessories must be ordered separately.

### 5.3.7. Sealing accessories for sensors

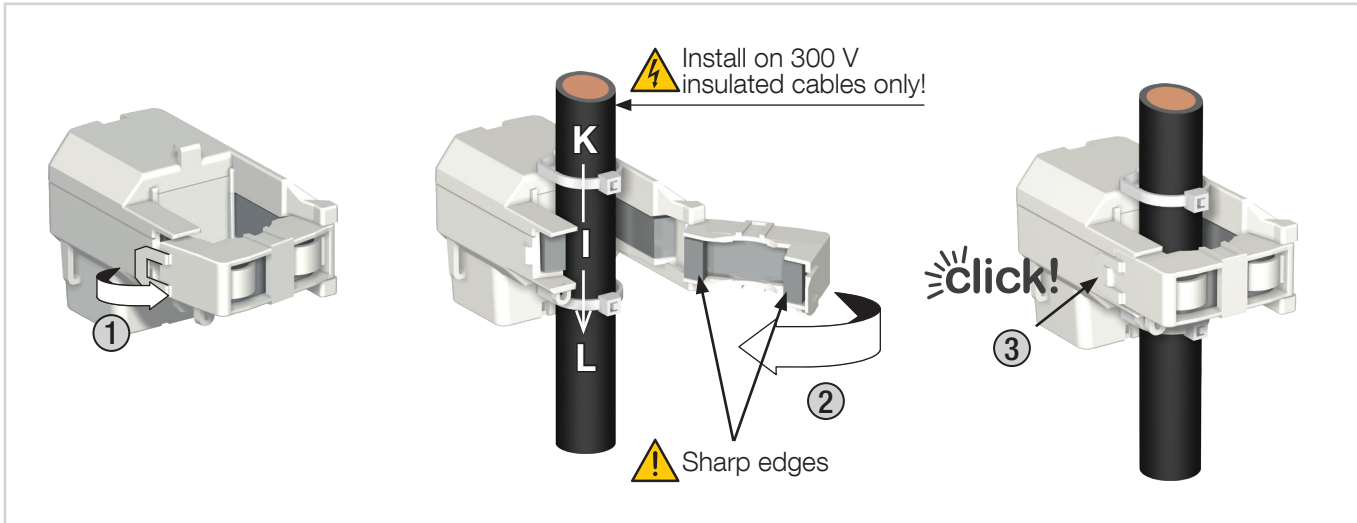


<b>REfErrence</b>	Sealing case for terminal
<b>4829 0600</b>	x20

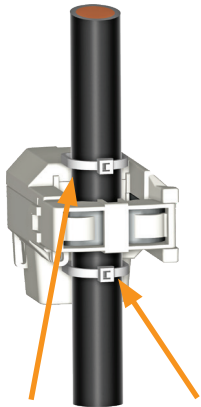
These accessories must be ordered separately.

## 5.4. Installing TR split-core sensors

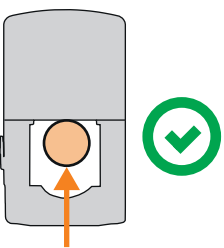
### 5.4.1. Cable mounting



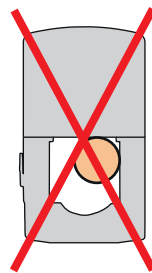
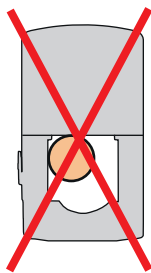
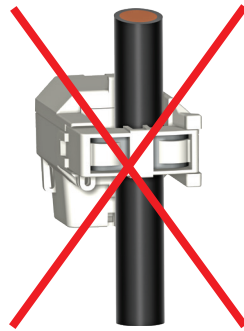
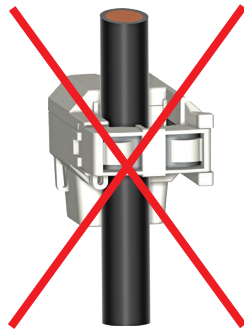
#### Recommended installation:



Use cable ties to push the conductor against the base of the aperture



#### Not recommended



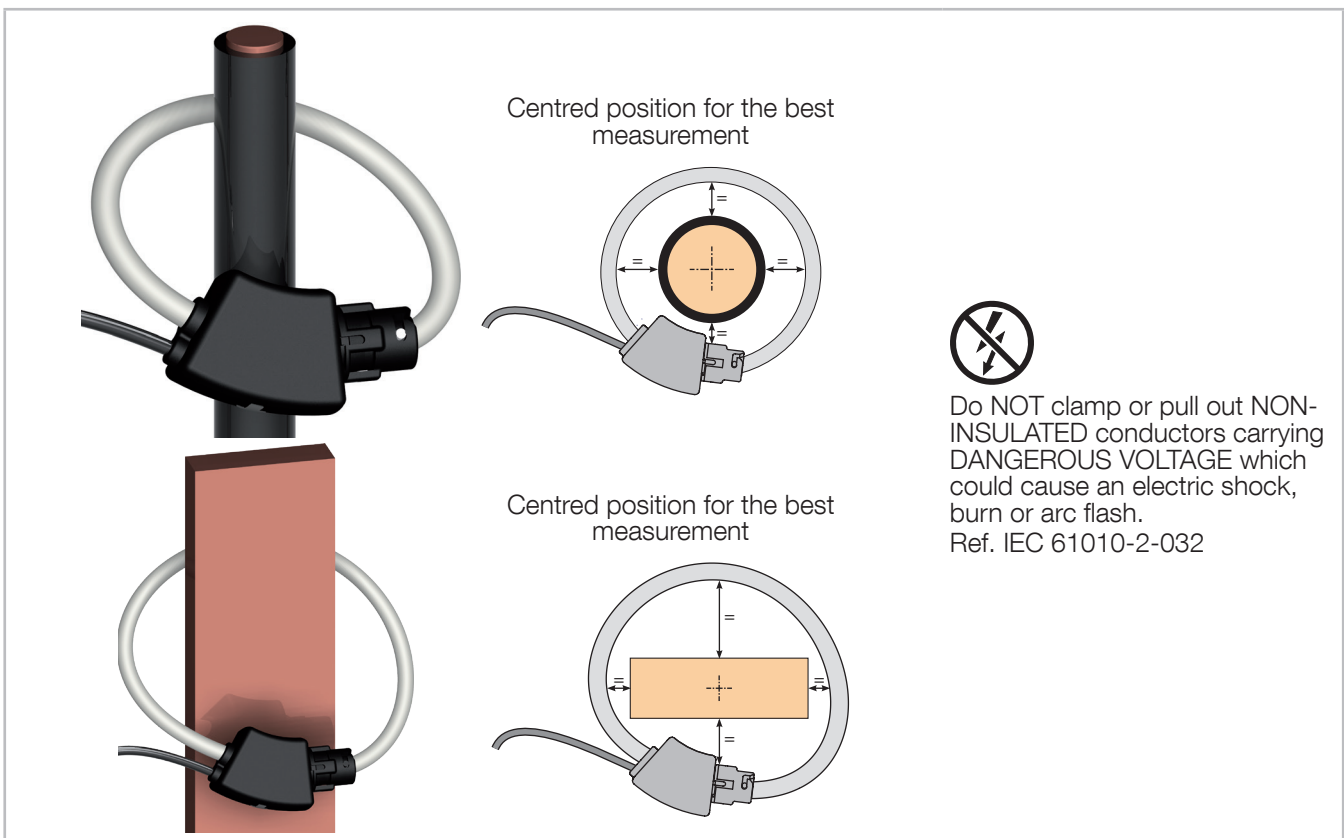
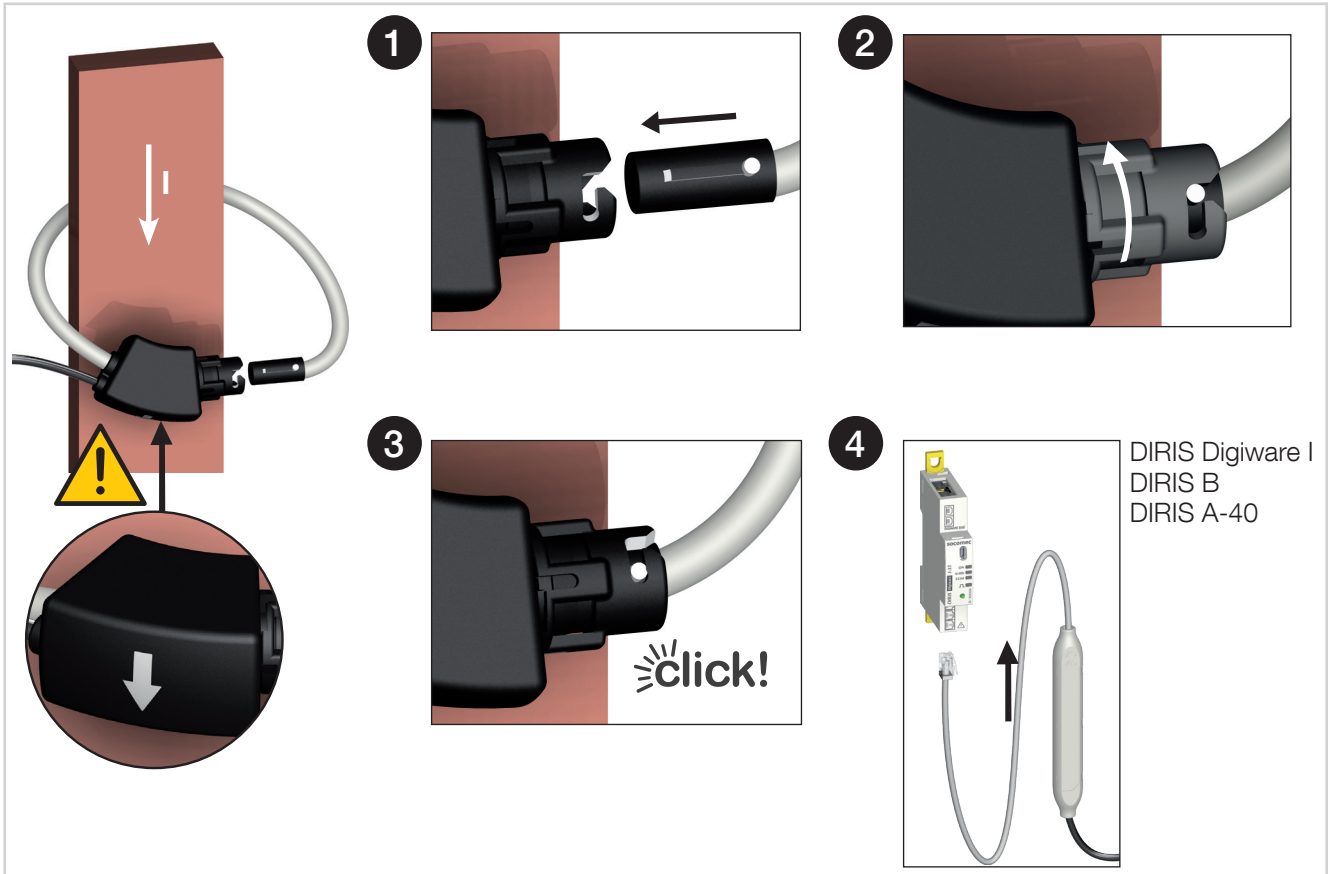
Do NOT clamp or pull out NON-INSULATED conductors carrying DANGEROUS VOLTAGE which could cause an electric shock, burn or arc flash. Ref. IEC 61010-2-032.



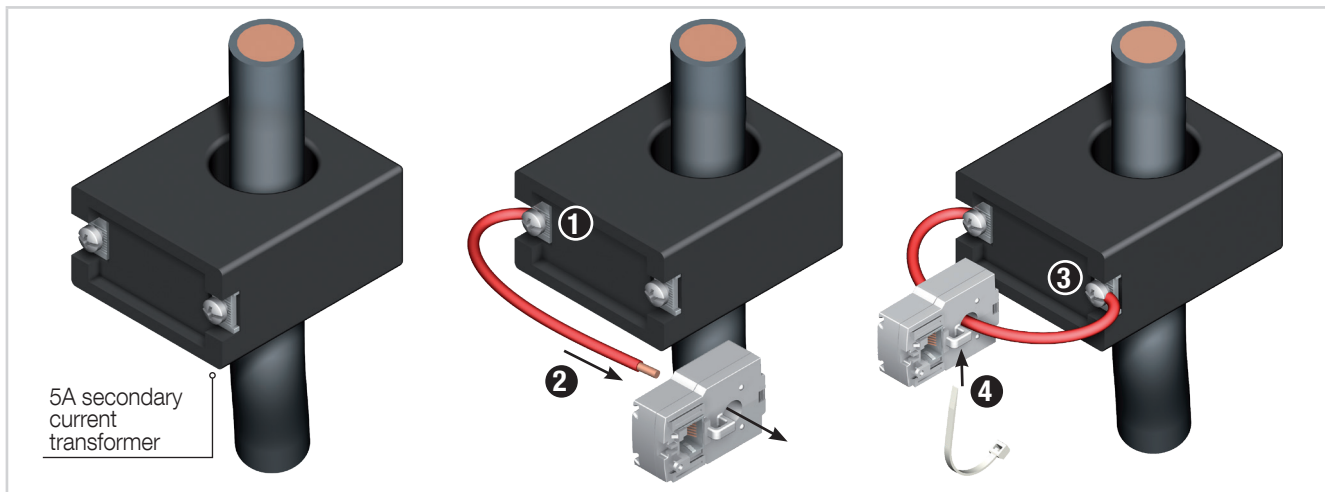
Before closing the TR /iTR sensor, check that the air gap is clean (no contamination or corrosion).

## 5.5. Stranded sensors TE mounting

### 5.5.1. Cable or bus bar-mounting



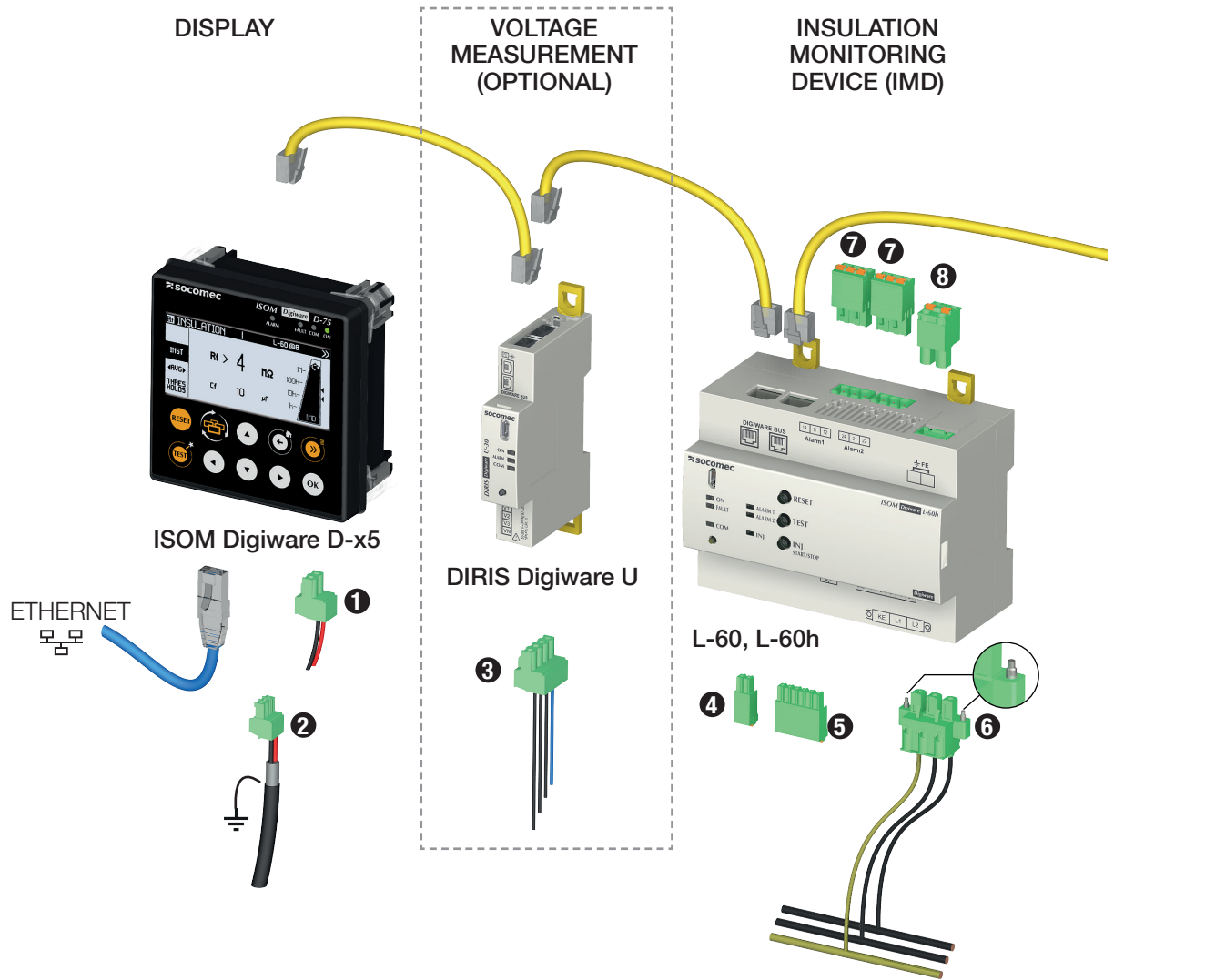
## 5.6. Installing the 5A adapter



Do NOT clamp or pull out NON-INSULATED conductors carrying DANGEROUS VOLTAGE which could cause an electric shock, burn or arc flash. Ref. IEC 61010-2-032.

# 6. CONNECTION

## 6.1. Connecting ISOM Digiware



	1	2	3	4	5	6	6	7	8	9
	Power supply 24VDC	COM RS485 Modbus	U 300 Vac ph/n	1x I/O input PTC 120°C (ref: 4729 0560)	4x I/O 24 VDC / 40 mA max	U/PE inputs L-60: 0-480 VAC/VDC Ph/Ph	U/PE inputs L-60h: 0-250 VAC/VDC Ph/Ph	2x alarm outputs 250Vac or 30Vdc, 3A max	FE input ⏏	1x digital output ON/OFF 24 VDC - 1A max
	••	•••	••••	••	••••••	•••	•••	•••	••	••
	0.2 - 2.5 mm <sup>2</sup> x= 7 mm	0.14 - 1.5 mm <sup>2</sup> x= 7 mm	0.2 - 2.5 mm <sup>2</sup> x= 7 mm	0.2 - 1.5 mm <sup>2</sup> x= 10 mm	0.2 - 1.5 mm <sup>2</sup> x= 10 mm	0.2 - 2.5 mm <sup>2</sup> x= 10 mm	0.2 - 2.5 mm <sup>2</sup> x= 10 mm	0.2 - 2.5 mm <sup>2</sup> x= 10 mm	0.2 - 2.5 mm <sup>2</sup> x= 10 mm	0.14 - 1.5 mm <sup>2</sup> x= 7 mm

(1) Earth must not be used in a neutral IT system

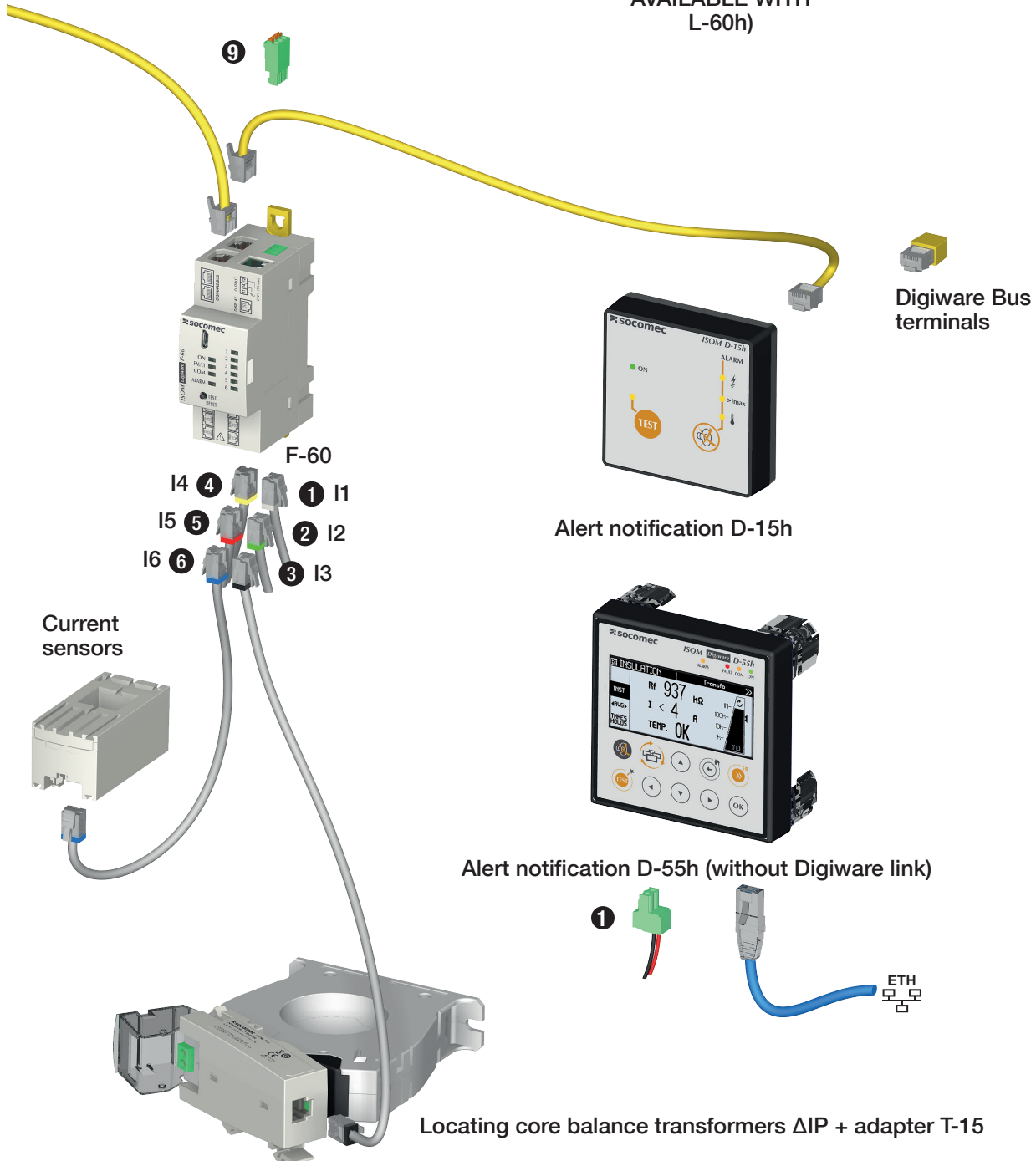


### IMPORTANT :

- Only use Digiware bus RJ45 cables (UTP RJ45 straight, twisted pair, unshielded, AWG24, 600V CAT 5, -10 / +70°C in accordance with IEC 61010-1 version 3.0) between all the Digiware bus modules.
- The points in the table above are defined as SELV in accordance with IEC 61010: 1 to 5, 8, 9, as well as the core balance transformer inputs/outputs of the F-60.
- When connecting, make sure you separate the low voltage (LV) section and the very low voltage (SELV) section to prevent any risk of electric shock.
- Conductors should be clamped to the closest terminals to avoid them detaching themselves and reducing the insulation distances.

### INSULATION FAULT-LOCATING DEVICE

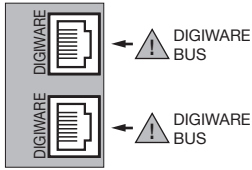
### ALERT NOTIFICATION DISPLAY FOR SURGERIES (ONLY AVAILABLE WITH L-60h)



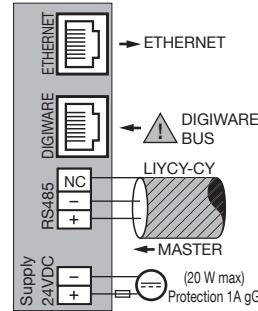


## DESCRIPTION OF THE TERMINALS

### ISOM Digiware D-15h

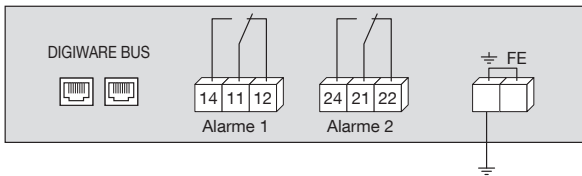


### ISOM Digiware D-55 / D-55h / D-75



### ISOM Digiware L-60

#### Upper terminal



**Digiware Bus:** Digiware bus connection with other equipment and the Digiware range

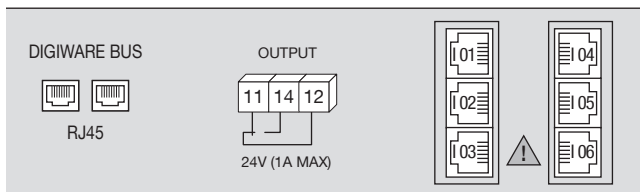
**14 - 11 - 12:** alarm relay output 1  
(L-60: insulation / L-60h: overload or overheating).  
**24 - 21 - 22:** alarm relay output 2  
(L-60/L-60h: insulation).

⚠ It is not permitted for use on a 230V relay or a SELV signal.

You can use different phases on the 2 output relays, but they must be from the same three-phase network.  
The relay's dry contacts should be protected with a 2A gG fuse => use up to 2A with resistive load.  
And T3AH250V => use up to 3A with resistive load.

**EARTH FE:** connection to the earth

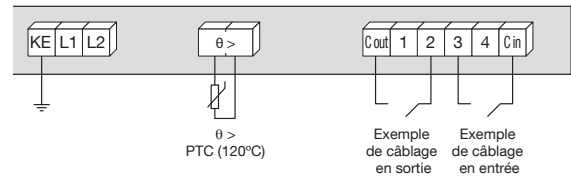
### ISOM Digiware F-60



**Digiware bus:** Digiware bus connection with other Digiware devices

**11 - 12 - 14:** alarm relay output (fuse 1A gG)  
**I01 - I02 - I03 - I04 - I05 - I06:** ISOM T-15 connection (to core balance transformers) or current sensors TE/TR/TF

#### Lower terminal



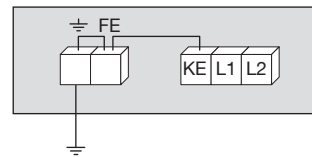
**KE - L1 - L2:** network voltage  $U_n$  + earth of booster  
 $\theta >$ : link to la temperature probe (PTC)

**C out:** shared output link  
(Output: 12-24VDC Min 600 $\Omega$  40 mA max Input: Max 100 $\Omega$ )

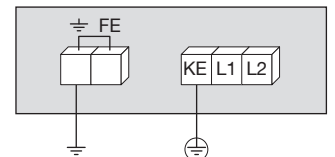
**C in:** shared input link (Max 100 $\Omega$ )

**1 - 2 - 3 - 4:** input or output connection (as per configuration)

#### ⚠ L-60 / L-60h connection



**Not allowed** ⚠



**Authorised**

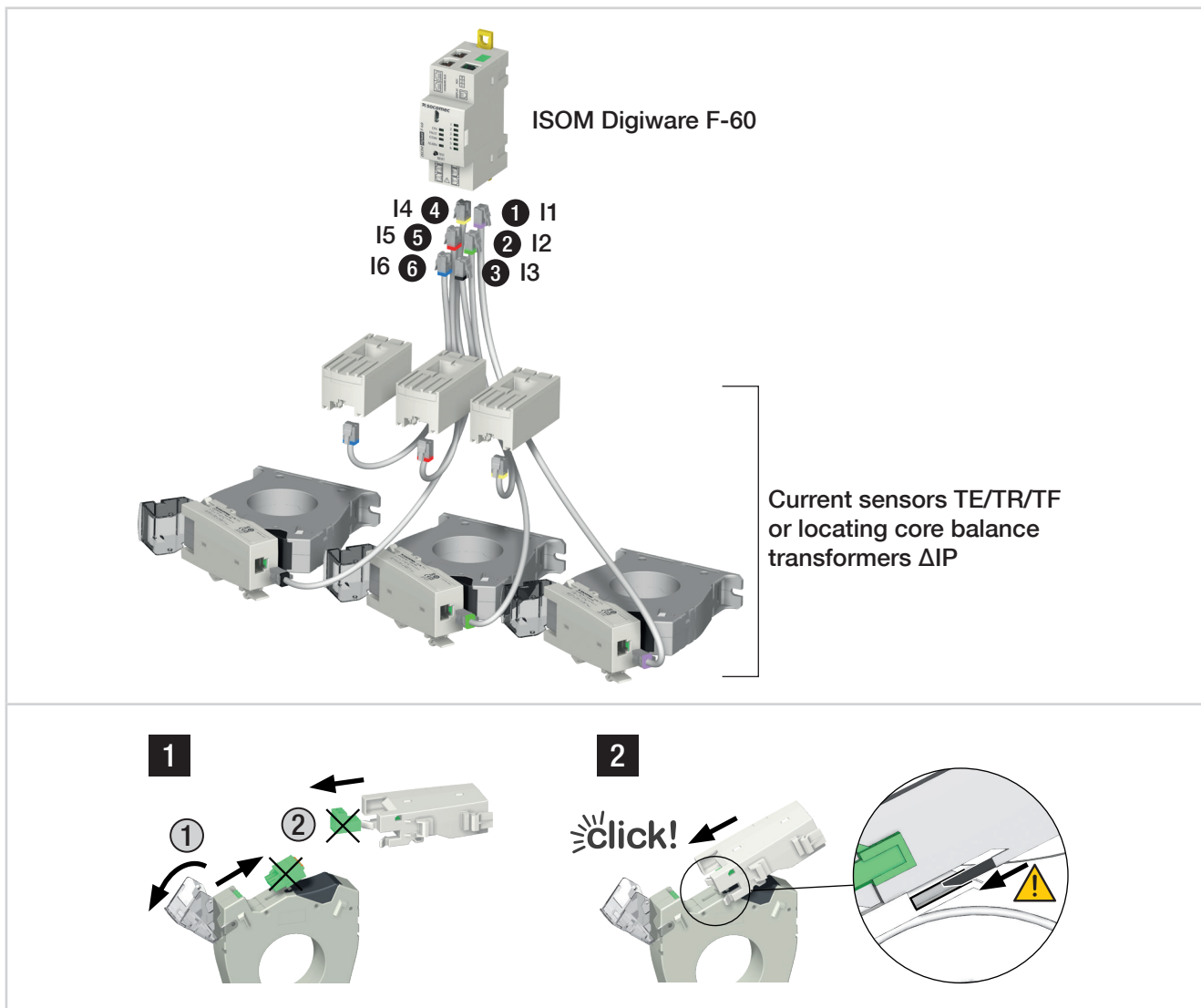


#### IMPORTANT :

- Screw on the «network to be monitored» connector of the ISOM Digiware L-60 to ensure the insulation is monitored.
- On all your ISOM Digiware devices, use RJ plugs at the RJ-45 connectors left free to prevent the accumulation of conductive dust.
- A single ISOM Digiware L-60 insulation monitoring device should be connected or active on each network or inter-connected IT circuit.
- Always observe the auxiliary power supply voltage shown on the device: 24 VDC  $\pm$  10%.
- Use a P30 24 VDC power supply, available as 30 W (ref. 4729 0603), or protect the device with a 1 A gG 24 VDC fuse.
- Provide a 2A gG fuse on main voltage inputs.

## 6.2. Connecting the current sensors

### 6.2.1. Connection concept



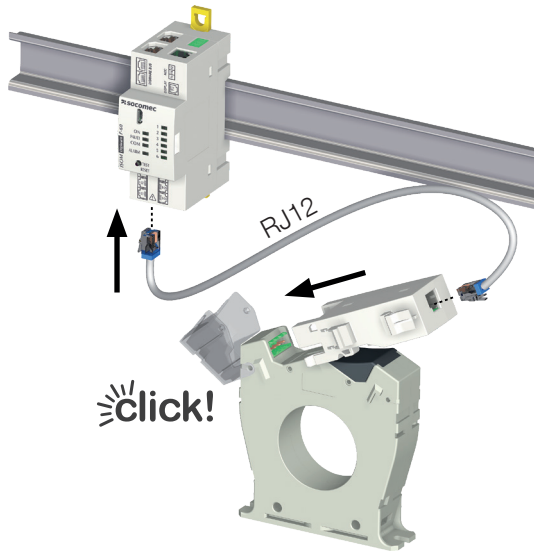
#### Important:

- To connect the current sensors or locating core balance transformers, use SOCOMEC cables or equivalent only, RJ12 straight cables, twisted pair, unshielded, 600 V -10 degC / +70degC in accordance with IEC 61010-1 version 3.0.
- We recommend that current sensors are installed in the same direction.
- Always connect input I01 first.
- In the same order as inputs I01 to I06, start by cabling the locating core balance transformers, followed by the current sensors.

## 6.2.2. Details of the RJ12 connections for each current sensor

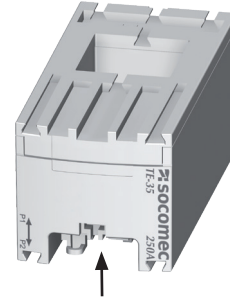
### $\Delta$ IP/ $\Delta$ IP-R

Mounting the ISOM T-15 on a locating core balance transformer.  
(T-15: do not mount on a busbar!)

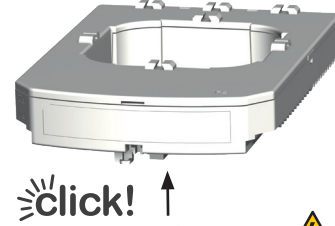


### TE

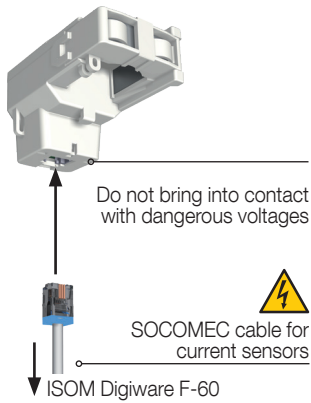
#### TE-18 à TE-55



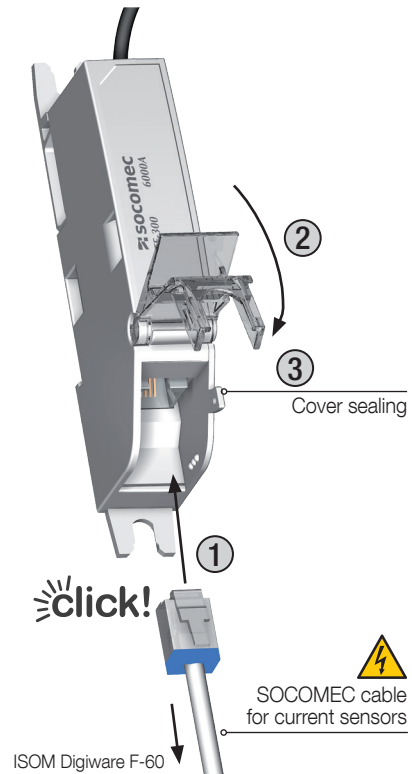
#### TE-90



### TR



### TF



## 6.3. Connecting to the electrical network and circuits

The insulation monitoring system ISOM Digiware is suitable for single-phase, two-phase, three-phase and continuous networks.

The insulation monitoring module ISOM Digiware L-60 ensures the insulation of a complete powered IT system is monitored. It automatically detects a DIRIS Digiware U module to ensure PMD measuring.

Each ISOM Digiware F-60 fault-locating module can monitor multiple live circuits at the same time. This approach allows great flexibility in terms of where it is fitted in the installation.

The circuits are monitored (faults located on AC and DC and load currents measured on AC only) using several types of current sensor (closed, open, flexible) selected depending on the new, existing or high-current installations.

The link between each ISOM Digiware F-60 fault-locating module and its associated sensors is made using specific cables. With this connection you can quickly and easily install the units without any risk of cabling error and in complete safety. The connected sensors are automatically detected.

In addition, ISOM Digiware can identify the majority of load types to be measured: single-phase, three-phase with or without neutral using 1, 2, 3 or 4 sensors for balanced or unbalanced loads.

The overall accuracy of the ISOM Digiware + sensors measurement chain is guaranteed. To guarantee this accuracy, SOCOMEC current sensor connection cables or equivalent must be used.

### 6.3.1. Configurable loads based on the network type

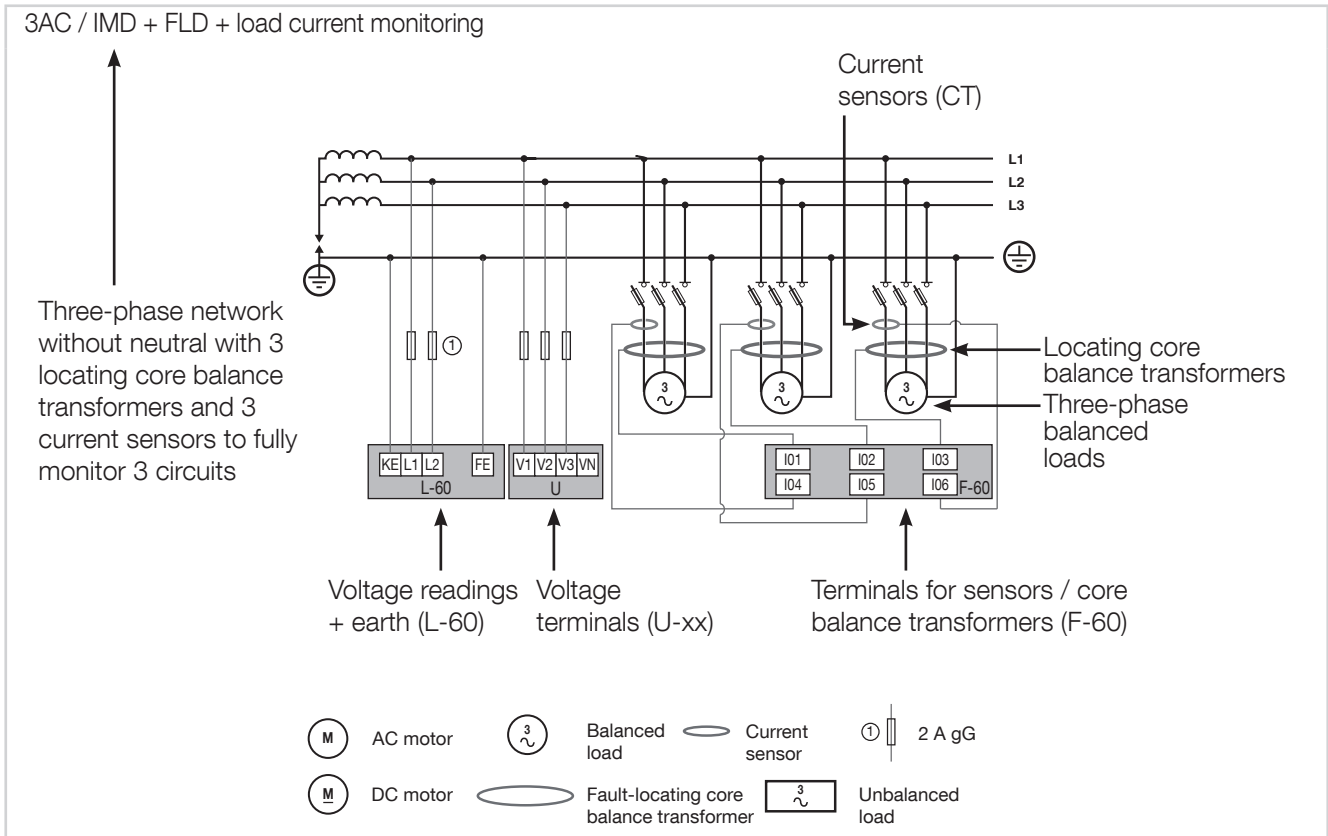
The following table summarises the loads which can be configured based on the system's network type

Network type	Configurable load
1P+N	1P+N – 1CT
2P	2P – 1CT
2P+N	2P+N – 2CT / 2P – 1CT / 1P+N – 1CT
3P*	3P – 3CT / 3P – 2CT / 3P – 1CT
3P+N	3P+N – 4CT / 3P+N – 3CT / 3P+N – 1CT / 3P – 3CT / 3P – 2CT / 3P – 1CT / 1P+N – 1CT

(\*) Note: Single-phase loads cannot exist on a 3P network.

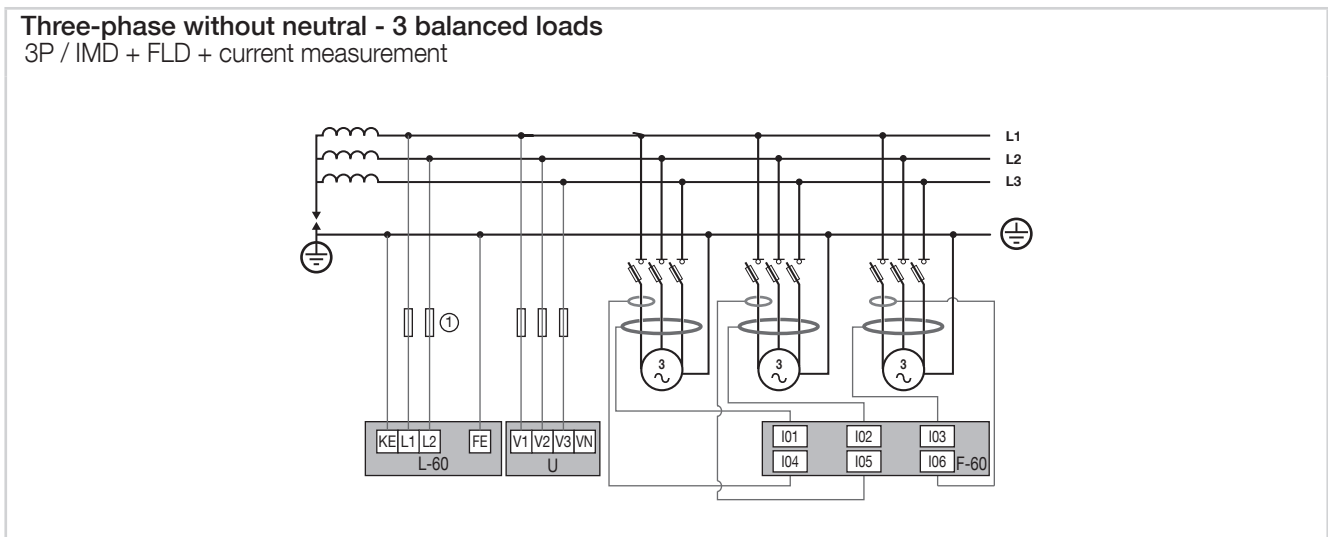
## 6.3.2. Description of the main network and circuit combinations

### Legend:



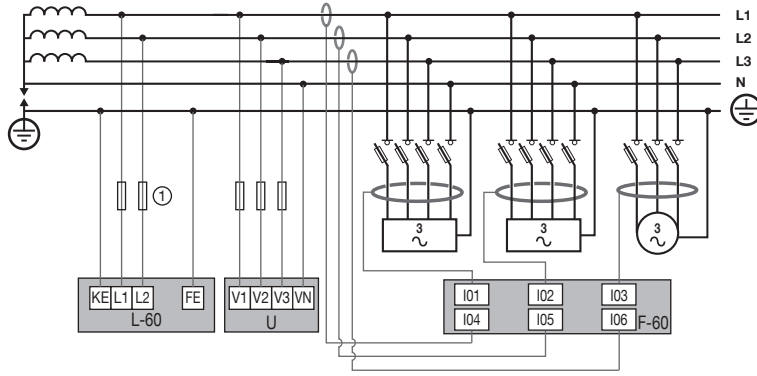
Each current input is individual; see below for some connection examples:

### 6.3.2.1. ISOM Digiware F-60



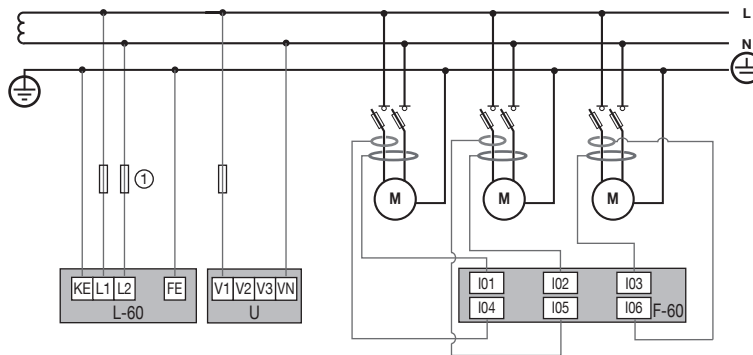
### Three-phase with neutral - 3 circuits

3P+N / IMD + FLD + input current measurement



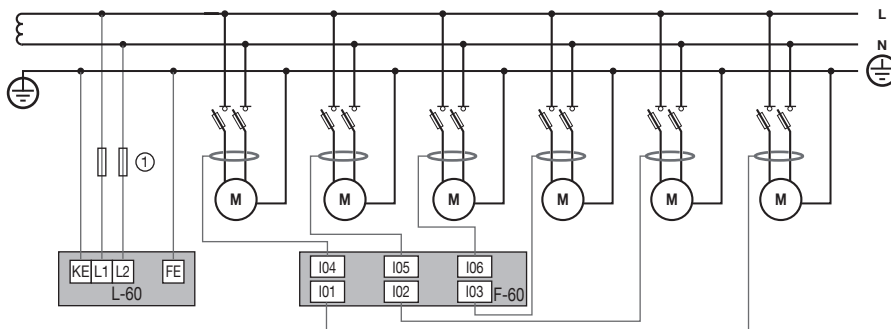
### Single-phase - 3 circuits

1P+N / IMD + FLD

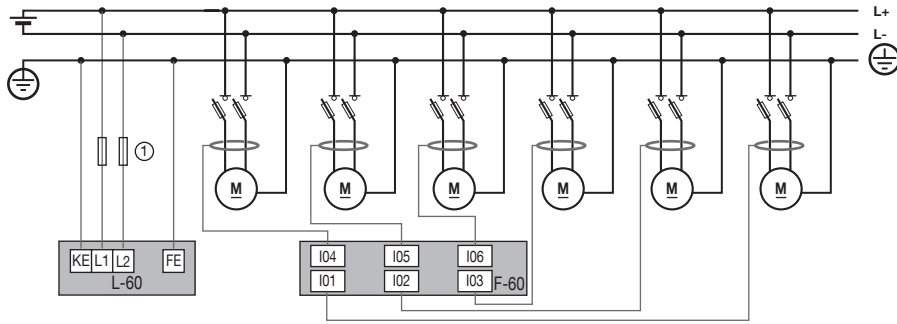


### Single-phase - 6 circuits

1P+N / IMD + FLD



**Continuous current - 6 circuits**  
DC / IMD + FLD



**Note relating to connections:**

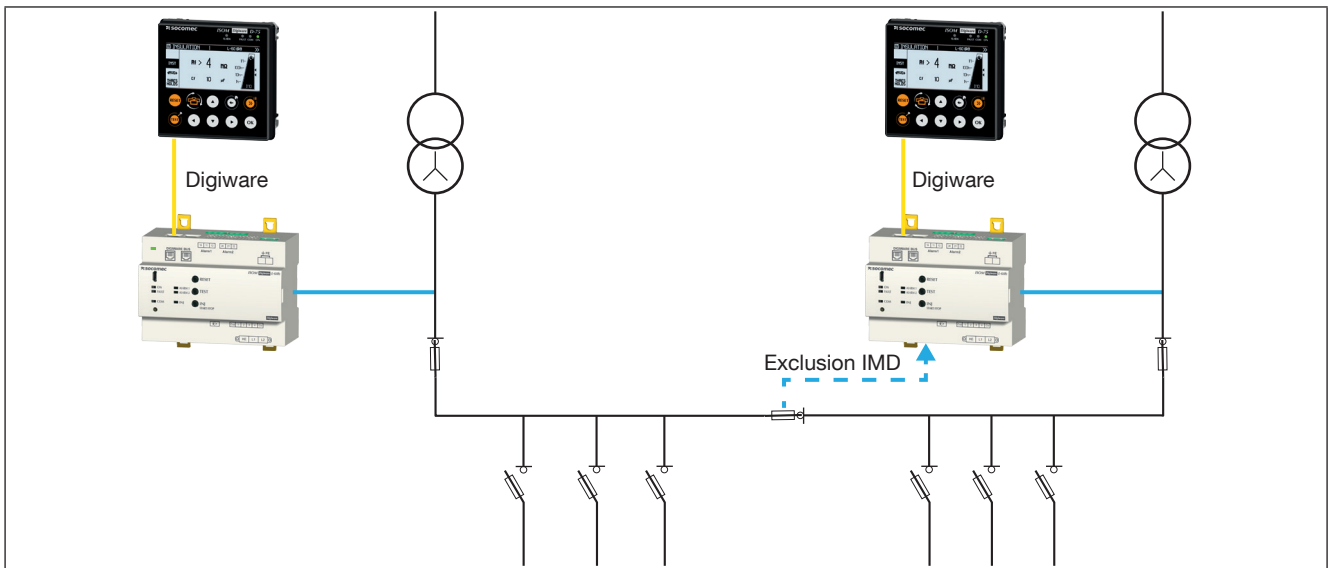
The Easy Config software can also be used to select numerous other configuration variants for the types of loads and associated network voltages. (see section «10.1.2.2. Network configuration», page 61).

**6.3.3. Coupled networks**

**6.3.3.1. Simple coupled networks without fault-locating options**

In the case of coupled networks, you must ensure that only one IMD is active. You can do this by setting and using I/O configurations for the ISOM Digiware L-60 (see section «10.1.2.4. Configuration of inputs-outputs (I/O)», page 65 on how to configure I/O in "disconnection" mode).

Principle diagram:



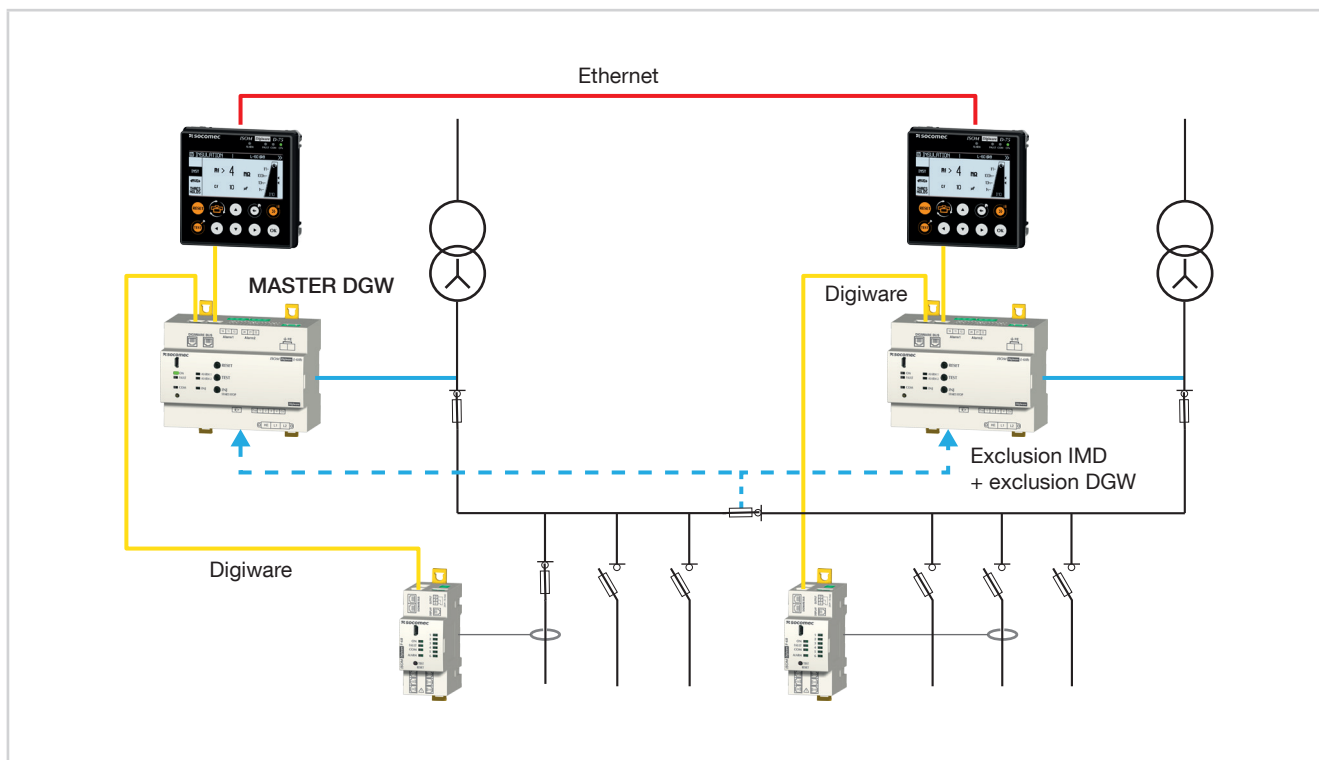
**Note:** some applications may require you to manage the positions of general cut-off devices of the 2 transformers, as part of excluding the IMD.

### 6.3.3.2. Simple coupled networks with fault-locating options

When using fault location on coupled networks, the operability of the IMD ISOM Digiware L-60 must be guaranteed so it remains active with the whole set of ISOM Digiware F-60 locating devices.

This management is made possible by the 2 ISOM Digiware systems communicating with one another via an inter-screen Ethernet communication D-X5.

Principle diagram:



**Note:** some applications may require you to manage the positions of general cut-off devices of the 2 transformers, as part of excluding the IMD

### 6.3.3.3. Complex coupled networks

In the case of complex coupled networks (transformers > 2 and/or if using multiple general cut-off devices), it must always be ensured that just one IMD is active on the interconnected network.

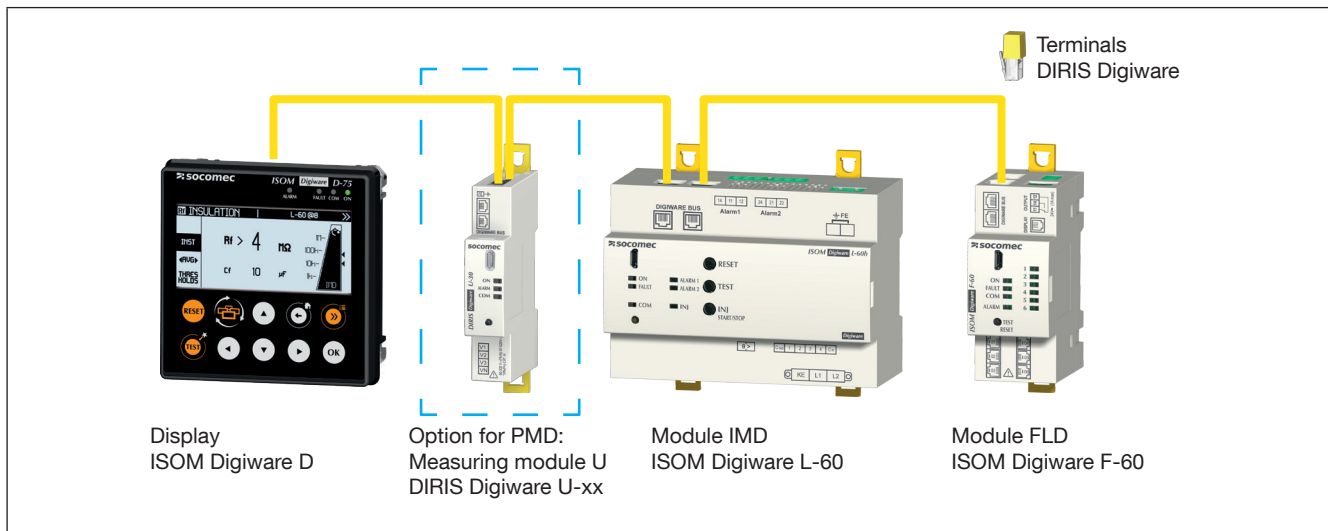


**Note:** for more details on the cabling and settings required for managing the network coupling, please see the technical instructions, «Isom Digiware architecture».



# 7. DIGIWARE BUS

## 7.1. Principle



ISOM Digiware is a system which must comprise the following elements:

- A remote display ISOM Digiware D-x5
- An ISOM Digiware L-60 IMD module
- A Digiware bus terminal resistor (ref. 4829 0180). This is supplied with the ISOM Digiware D display.

It can also be linked to:

- One or multiple ISOM Digiware F-60 FLD measuring modules for locating insulation faults when live.
- One or multiple adapter modules for ISOM T-15 locating core balance transformers.
- A U measuring module to make use of the PMD functionality.

When a DIRIS Digiware U-xx module is added to the system, always make sure you adjust the communication baudrate of the Digiware bus to 115200 bauds in the Easy Config software from the DIRIS Digiware U-xx module.

### 7.1.1. Digiware bus connection cable

Length (m)	Quantity	reference
0.06	1	4829 0189
0.1	1	4829 0181
0.2	1	4829 0188
0.5	1	4829 0182
1	1	4829 0183
2	1	4829 0184
5	1	4829 0186
10	1	4829 0187
Bobine 50 m + 100 connecteurs		4829 0185

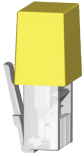
Use the shortest possible length of cable to optimise the electromagnetic emissions.

The total max. width must not exceed 100 metres.



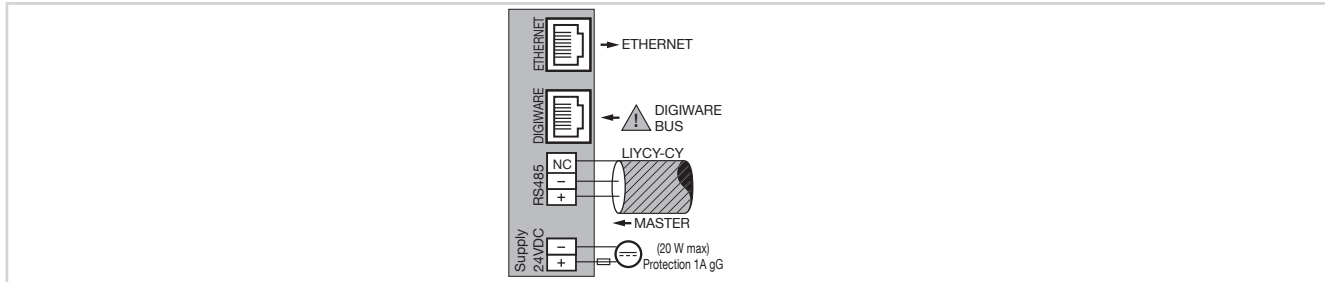
Use only SOCOMEC cables for the Digiware bus.

## 7.1.2. Digiware Bus Termination

	Quantity	rEfErence
	1	4829 0180

A DIRIS Digiware bus terminal resistor is supplied with every ISOM Digiware D display.

## 7.2. Sizing of the power supply



ISOM Digiware units are powered by a single 24 VDC port on the ISOM Digiware D screen.

2 power units are available:

- The P15 24 VDC power unit is available as a 15 W version (ref. 4829 0120):
- 230 VAC / 24 VDC – 0.63 A - 15 W
- Modular format
- Dimensions (H x W): 90 x 36 mm

The P30 24 VDC power unit is available as a 30 W version (ref. 4729 0603):

- 230 VAC / 24 VDC – 1.75 A - 30 W
- Modular format
- Dimensions (H x W): 90 x 54 mm

## 7.2.1. Equipment consumption

Product	Power supplied (W)	Power consumed (W)
<b>Power supply</b>		
P15 230V / 24V	15	
P30 230V / 24V	30 (*)	
<b>Cables</b>		
Forfait 25 mètres		0.75
<b>System interface</b>		
ISOM Digiware D-x5		2.5
<b>IMD / voltage module</b>		
ISOM Digiware L-60 / L-60h		2.3
DIRIS Digiware U-xx		0.72
<b>Module FLD</b>		
ISOM Digiware F-60 (with 6x T-15 and 6x differential current sensors)		0.8
<b>Single-point alert report</b>		
ISOM D-15h		0.5
<b>Repeater</b>		
DIRIS Digiware C-32		1.5
<b>Single-point display</b>		
ISOM T-15		0.05

(\*) Max 20 W for use by the Digiware system

## 7.2.2. Calculation rules for the max. number of products on the Digiware bus

The total power consumed by the equipment connected to the Digiware bus must not exceed the power from the 24 VDC power supply.

### Size with P15 power supply (ref: (4829 0120) delivering 15 W

You can use the following, for example:

- 1 ISOM Digiware D-75 (2.5 W) display
- 1 IMD ISOM Digiware L-60 (2.3W) module
- 25 metres of cable (0.75 W)

and

- 2 FLD ISOM Digiware F-60 (1 x 0.5 = 5.5 W) modules
- 6 ISOM T-15 adapters (6 x 0.05 = 3.3 W)

→ Total power = 14.35 W

### Dimensioning with a P30 power supply (ref. 4729 0603) delivering a maximum usable power of 20 W by the Digiware system

You can use the following, for example

- 1 ISOM Digiware D-75 (2.5 W) display
- 1 ISOM Digiware L-60 IMD module (2.3 W)
- 1 DIRIS Digiware voltage module U-xx (0.72 W)
- 25 metres of cable (0.75 W)

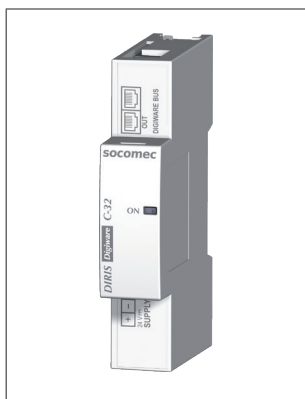
and

- 17 FLD ISOM Digiware F-60 (17 x 0.5 = 8.5 W) modules
- 102 ISOM T-15 adapters (102 x 0.05 = 5.1 W)

→ Total power = 19.87 W

### 7.2.3. Digiware bus repeater

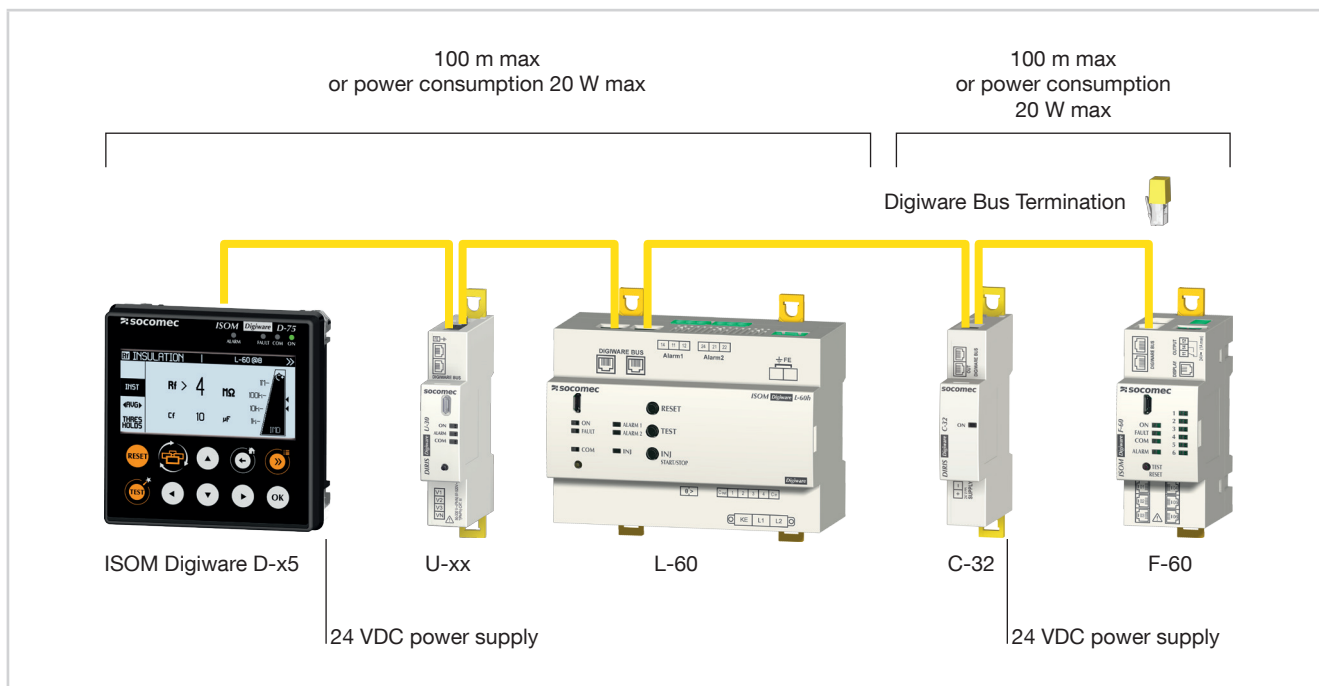
Whenever the power consumption is higher than 15 or 20 W (depending on the type of power supply used) or the distance is greater than 100 m, a DIRIS Digiware C-32 repeater is required. In an ISOM Digiware system, a maximum of 2 repeaters may be used.



**DIRIS Digiware C-32 repeater**

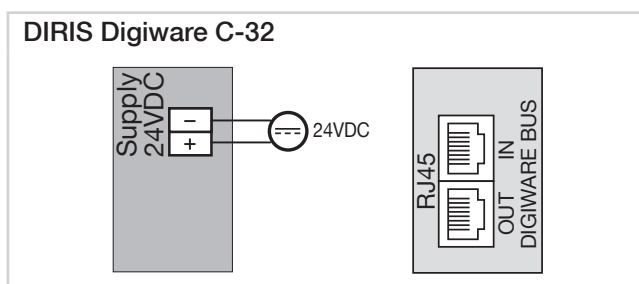
Reference	4829 0103
-----------	-----------

Configuration example:



The DIRIS Digiware U voltage module must be located upstream of the repeater.

The repeater requires a 24VDC power supply.

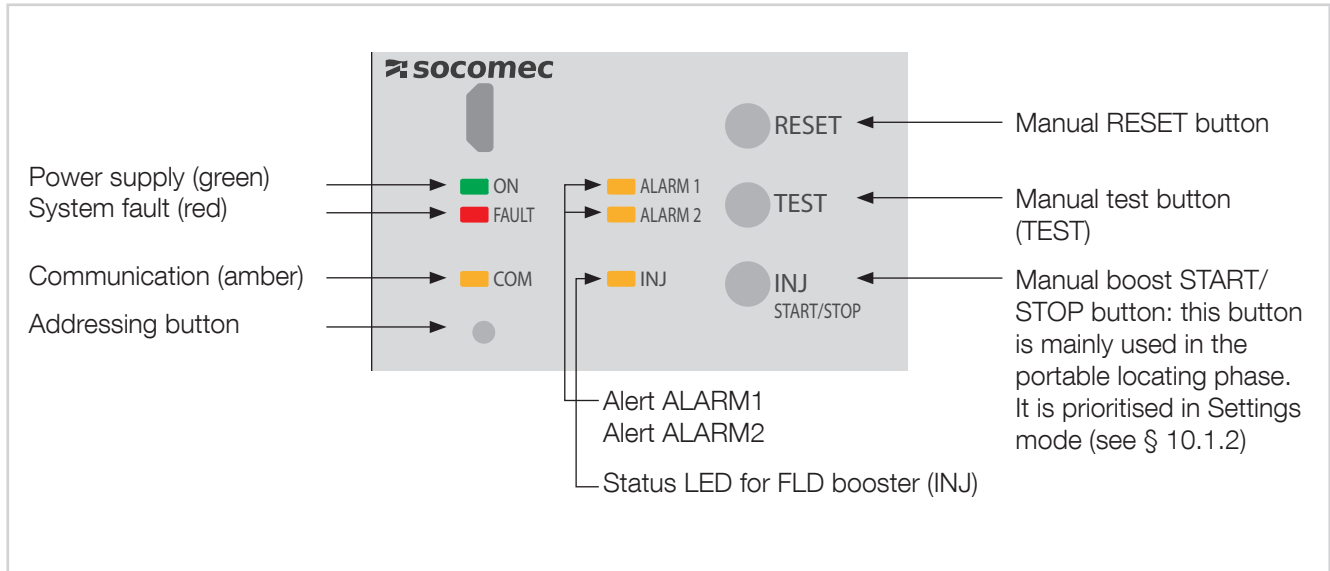


# 8. STATUS LEDS, BUTTONS AND AUTO-ADDRESSING

## 8.1. Status LEDs and buttons

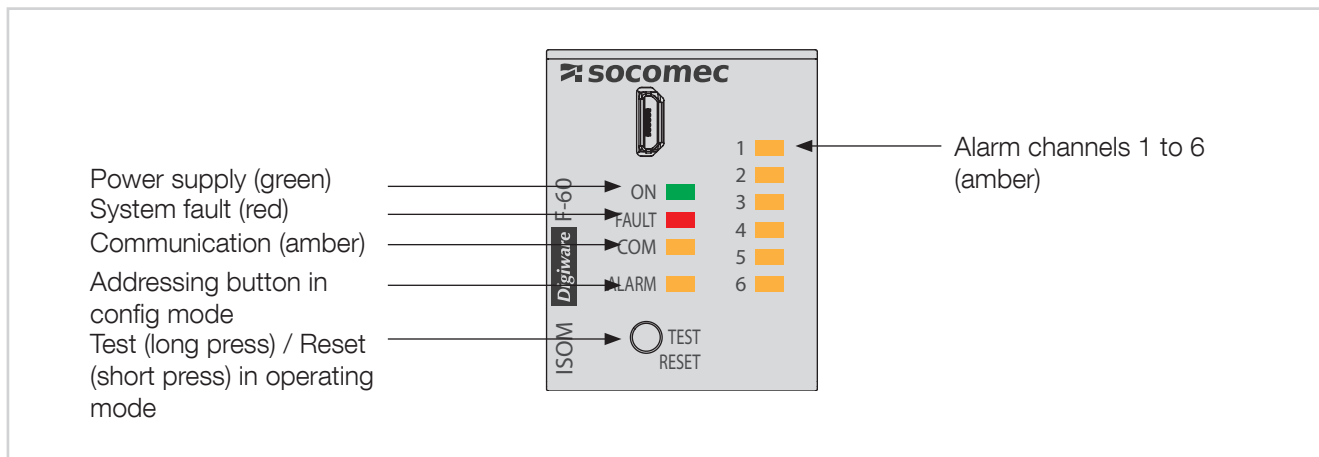
These LEDs can be used to find out the status of the product at any time. Use specific buttons to go straight to the devices' main functions.

### 8.1.1. L-60 / L-60h



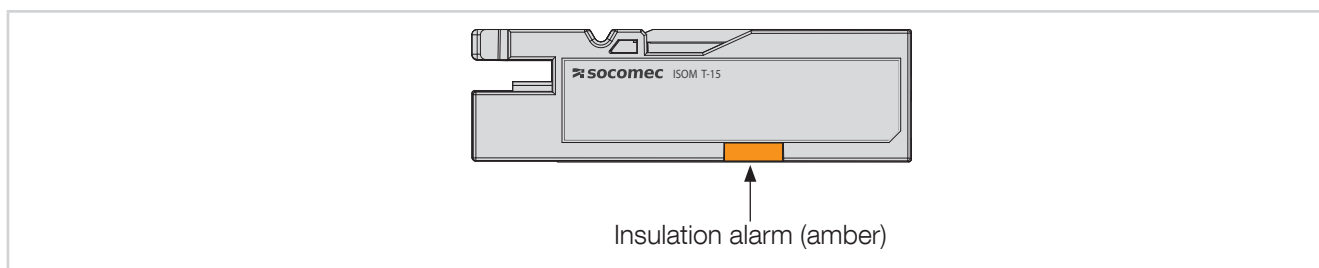
LED state	Fixed	Blinking	Pulse
<b>ON</b>	In operation	The screen communicates with the device to retrieve the values/ data to display.  10 seconds – on request by a Modbus control command to identify the device (remote screen...)	1 second to start-up
<b>FAULT</b>	An alarm (logical/analogue) is active (does not take priority if there is a setup alarm at the same time)	At least one startup alarm is active.	1 second to start-up
<b>COM</b>	Addressing problem.	Address OK	1 second to start-up and when a frame received is processed
<b>ALARM 1</b>	L-60: Alarm sent when lowest threshold is not met – ALARM1 L-60h: Presence of an alarm linked to an overload or overheating of the medical IT transformer		
<b>ALARM 2</b>	L-60 / L-60h : Alarm sent when lowest threshold is not met – ALARM2		
<b>INJ</b>	Injection in fault-locating mode is ON	When the device is in manual test mode	

### 8.1.2. F-60



LED state	Fixed	Blinking	Pulse
<b>ON</b>	In operation	The screen communicates with the device to retrieve the values/ data to display.  10 seconds – on request via a Modbus command to identify the device (remote screen...)	1 second to start-up
<b>FAULT</b>	An alarm (logical/analogue) is active (does not take priority if there is a setup alarm at the same time)	At least one setup alarm is active (current sensor disconnected, V/I not compatible)	1 second to start-up
<b>COM</b>	Addressing problem.	Address OK	1 second to start-up and when a frame received is processed
<b>/ALARM</b>	At least one of the 6 channels is showing an insulation fault (the LED(s) for the faulty channels are also constantly on)	Presence of a saturation current (the LED(s) for the faulty channels are flashing) or the measuring system is blinded  Problem connecting the locating core balance transformer or the T-15  Manual test in progress	

### 8.1.3. T-15



LED state	Fixed	Blinking	Pulse
<b>/ALARM</b>	Presence of an insulation fault on the remote device monitored by the connected core balance transformer	Problem with connecting to the core balance transformer or the measuring system is blinded	

### 8.1.4. Autotest

In order to ensure a high degree of safety when measuring the insulation and in operation, ISOM Digiware offers advanced autotesting functions.

After powering on the devices, all their internal measurement functions as well as the data memories and connections to the network and the PE protection conductor are tested.

You can follow the progress of the autotest option on the D-x5 screen (Manual TEST message).

During operation, you can also run the auto-test at any time by pressing the TEST button (locally or remotely via the input on the ISOM Digiware L-60).

The ALARM 1 and ALARM 2 signalling relay can be configured to switch if the auto-test fails (see section 11.1.4)

To ensure the smooth running of the system, Socomec recommends you regularly run the AUTOTEST.

## 8.2. Auto-addressing

In auto-addressing mode, you can automatically allocate addresses to ISOM and DIRIS Digiware devices, connected to the remote ISOM Digiware D-x5 displays. The addresses are allocated manually on other devices (DIRIS A, COUNTIS...)

Two modes are available:

- Mode 1 - Auto-detection and automatic addressing
- Mode 2 - Auto-detection and address selection

Mode 1 is done from the ISOM Digiware D-x5 display (see the relevant instructions on this)

Mode 2 is carried out from a PC with Easy Config installed.



The ISOM Digiware L-60 and ISOM Digiware F-60 modules have an auto-addressing option. They are always connected to an ISOM Digiware D-x5 display



**Note:** during the auto-addressing process, the RS485 line is reserved for allocating addresses and no other exchange of data is possible at this time..

# 9. COMMUNICATION

## 9.1. General information

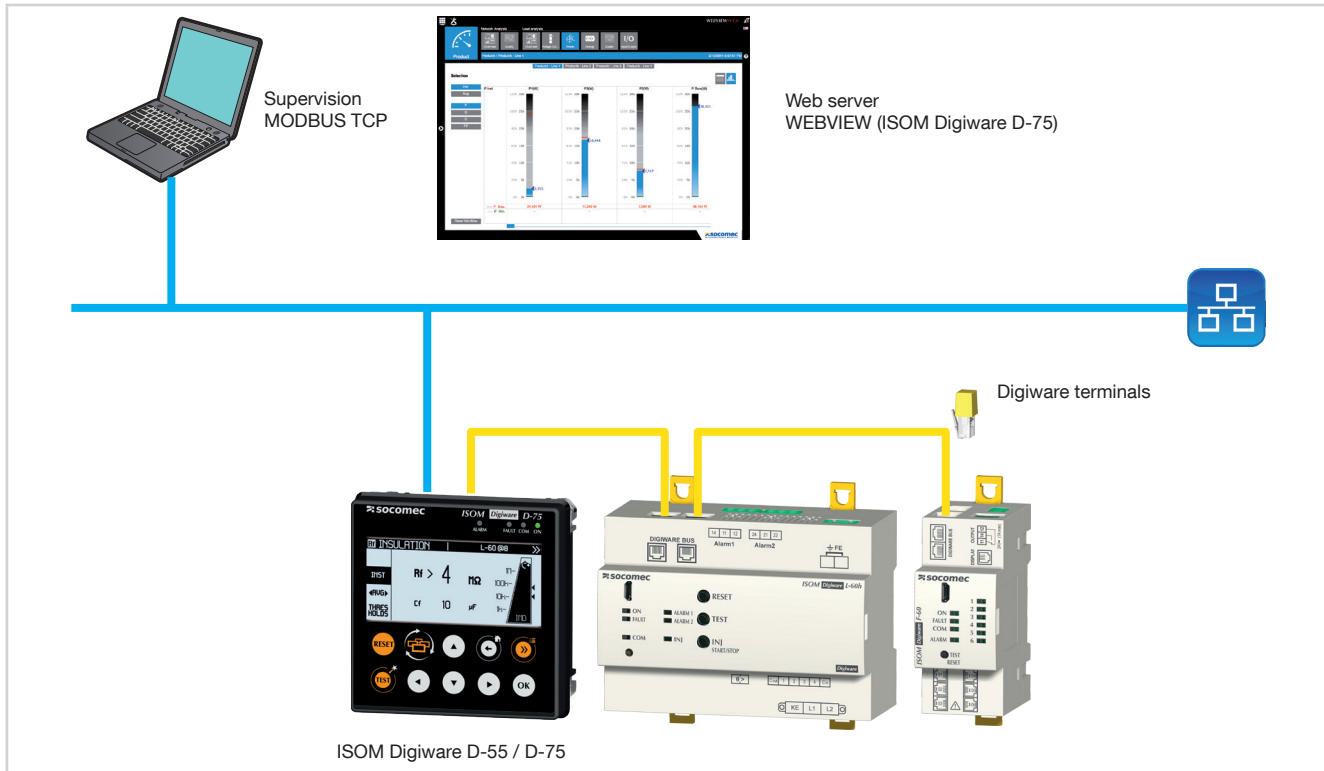
ISOM Digiware communicates via RS485 using the Modbus protocol. RS485 communication is available at a single point on the ISOM Digiware D-55 or D-75 display.

It takes place via an RS485 serial link (2- or 3-wire) in accordance with the Modbus RTU protocol.

With the RS485 link, ISOM Digiware can be connected directly to a PC to retrieve the data.

The Modbus protocol requires a dialogue with a master/slave structure. The mode of communication is the RTU (Remote Terminal Unit). In a standard setup, an RS485 link enables the interconnection of 32 RS485 devices (ISOM Digiware D-55 or D-75 counting as one device), to a PC or a PLC etc. over a distance of 1,200 metres.

Example of the architecture of an ISOM Digiware D-55 or D-75 screen:



## 9.2. RS485 and ISOM Digiware bus rule

A certain number of rules must be respected when ISOM Digiware is connected using RS485. These rules are set out in the paragraphs below.

### 9.2.1. Connection with the D-55 or D-75 screen

The ISOM Digiware D-55 or D-75 screen is a master device of the RS485 bus and links to the DIRIS Digiware bus. It is used like an Ethernet gateway.

They can be placed anywhere in the RS485 link.

The following rules must be observed:

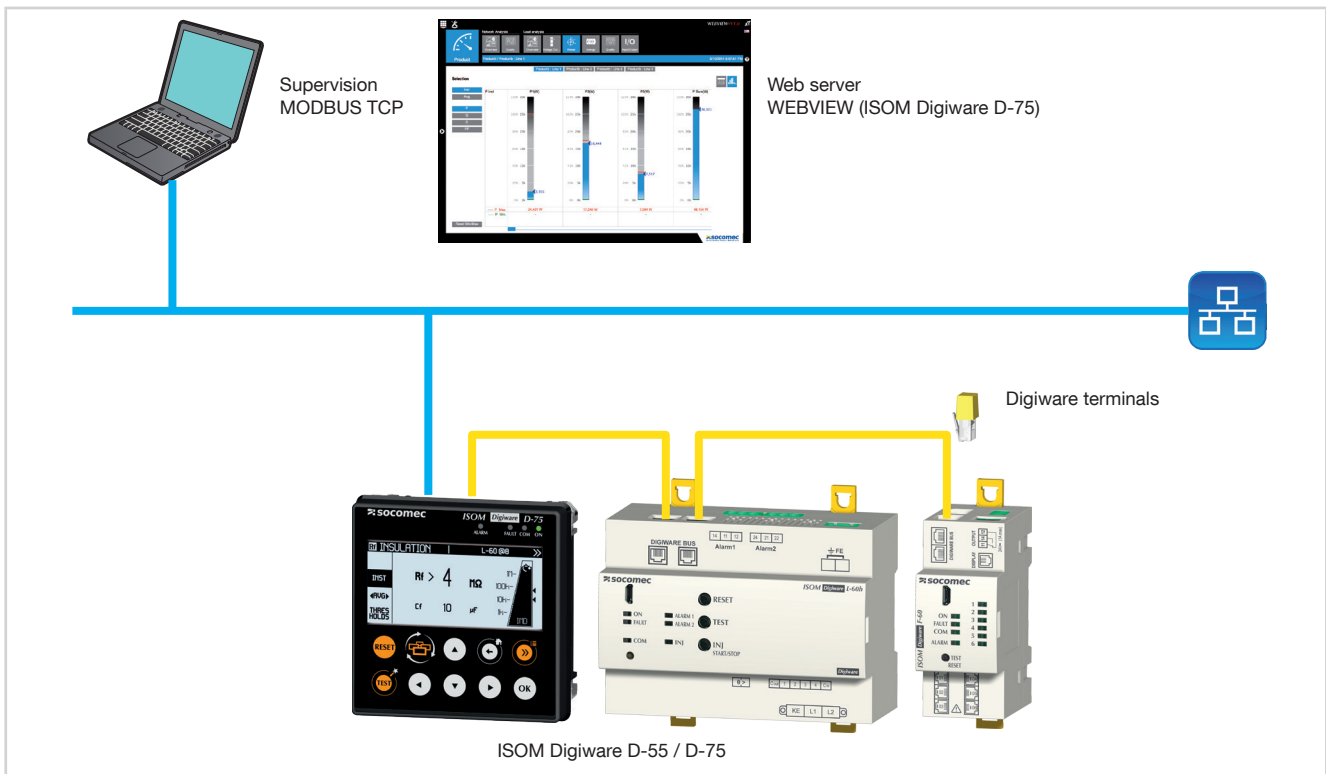
- A 120  $\Omega$  resistor must be added at the start of the RS485 link
- A 120  $\Omega$  resistor must be added at the end of the RS485 link
- A terminal must be added at the end of the Digiware bus.

You can show 32 devices on an ISOM Digiware D-55/D-75 display.

Apart from acting as an Ethernet gateway, the ISOM Digiware D-75 screen also features a WEBVIEW web server.

Other connections are possible with ISOM Digiware D remote display; refer to its manual for more details.





### 9.3. Communication tables

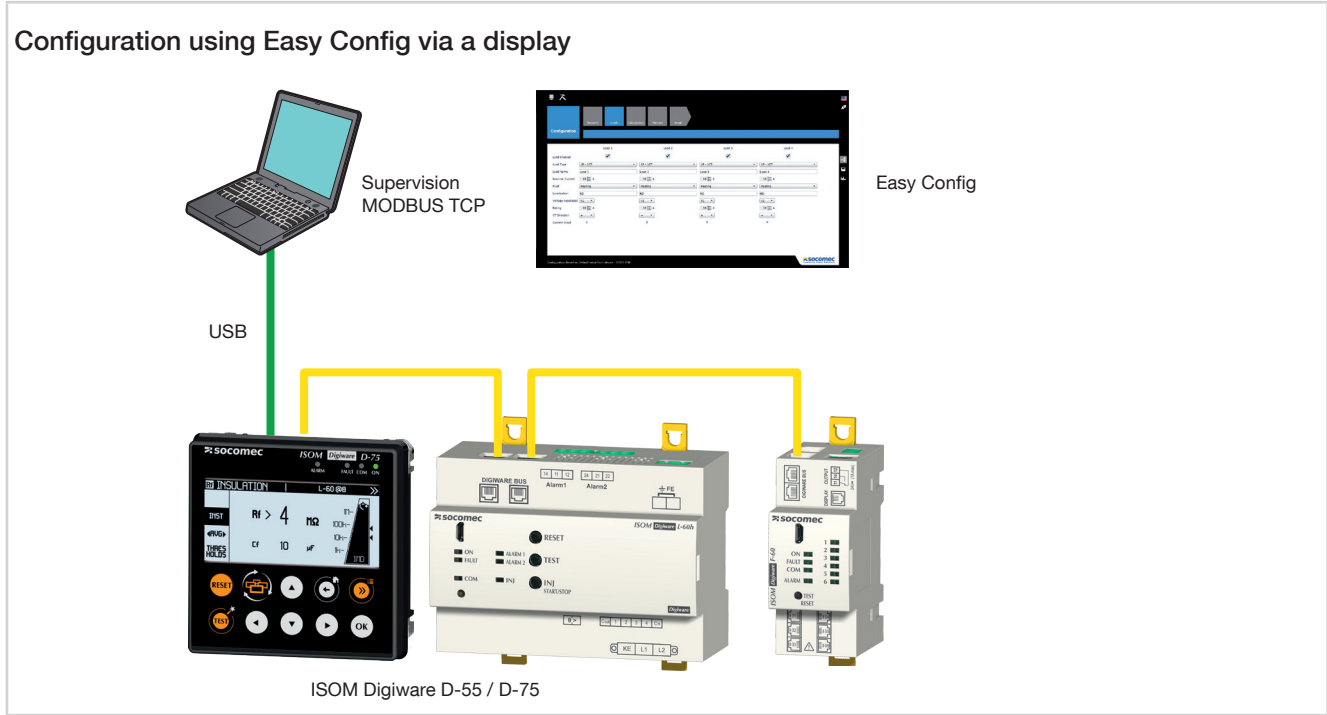
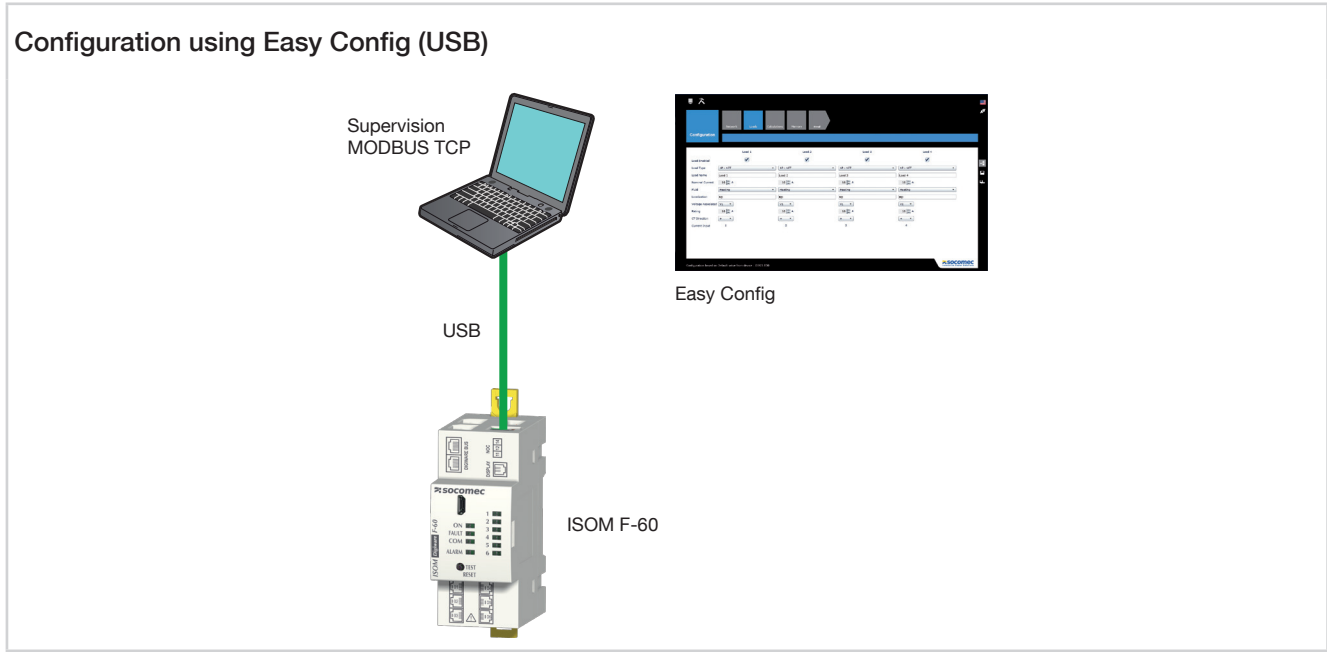
The communication tables and associated explanations can be found on the documentations page for ISOM Digiware on the SOCOMEC website: [www.socomec.com/en/isom-digiware](http://www.socomec.com/en/isom-digiware)

# 10. CONFIGURATION

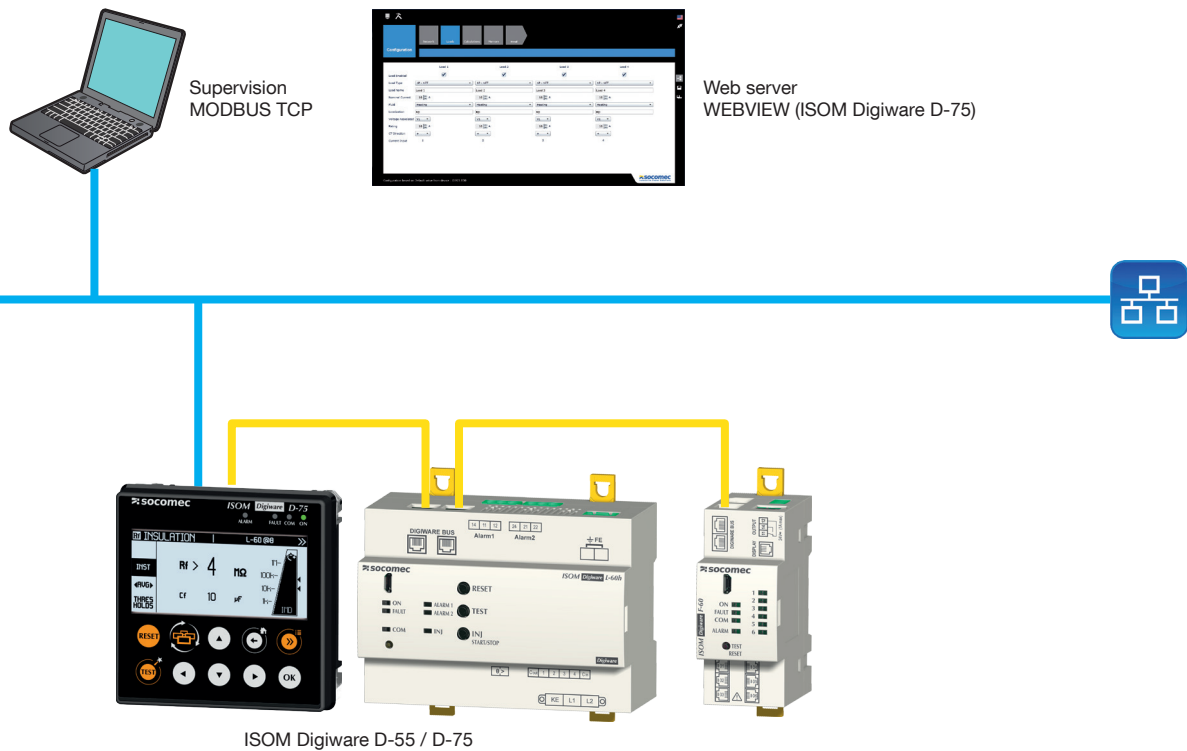
Configuration can be carried out using the Easy Config configuration software or directly from the remote display. The Easy Config software is used to configure ISOM Digiware directly via Ethernet or USB. Easy Config must be installed before using the USB connection. To set the parameters from the remote display D-75 or D-55, refer to the manual for the display.

## 10.1. Configuration using Easy Config

### 10.1.1. Connection modes



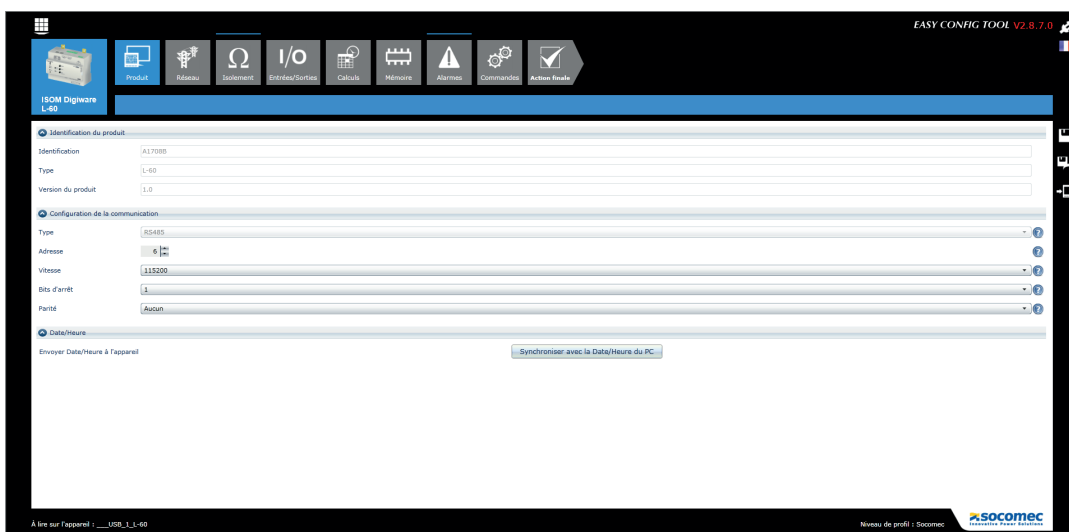
## Configuration using Easy Config via an ISOM Digiware D-55 / D-75 display (Ethernet)



These products must be connected to the power supply before you configure them. For the Digiware bus and 120-ohm termination resistors, see «Communication» on page “9. COMMUNICATION”, page 56.

### 10.1.2. Using Easy Config

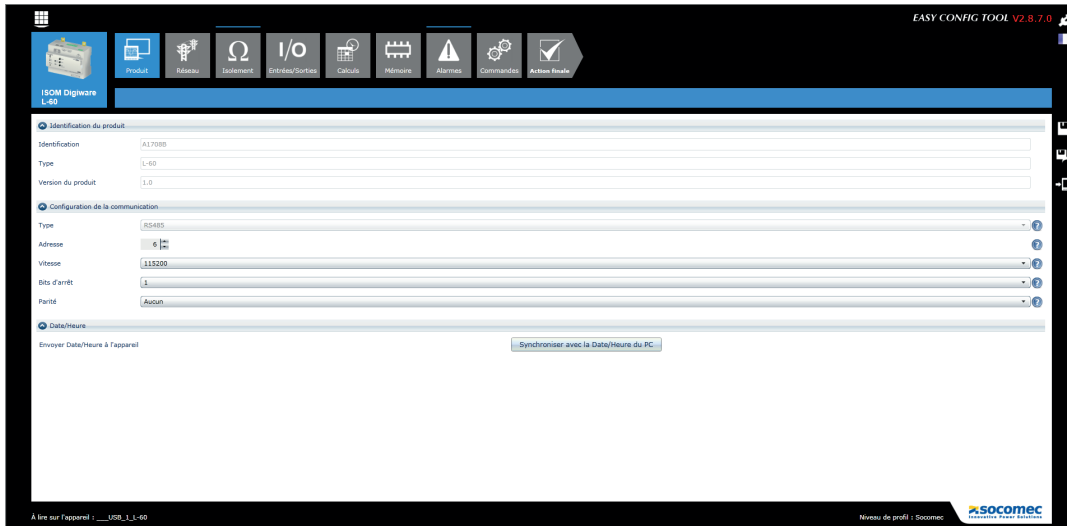
Easy Config is configuration software used to set product parameters easily and quickly. Settings are made in sequence: Device → Network → Insulation → Measurement method → Values to be stored → Alarms → End of configuration  
Other steps may appear, depending on the version of your device (example: Loads or Inputs/Outputs)



For each setting selected (1) a customised screen appears, depending on the connected device (2).

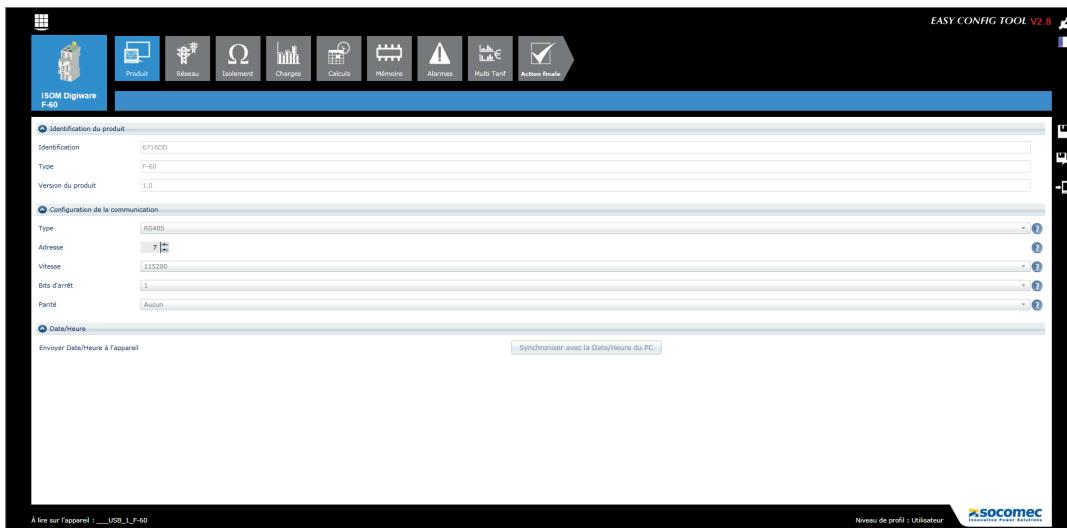
## 10.1.2.1. Configuring the device

### ISOM L-60: Configuring L-60 output in positive safety



This screen shows all the key details about the device (read-only). You can also make communication settings (address, baudrate, parity). Add a synchronisation time and date by pressing the relevant button.

### ISOM F-60



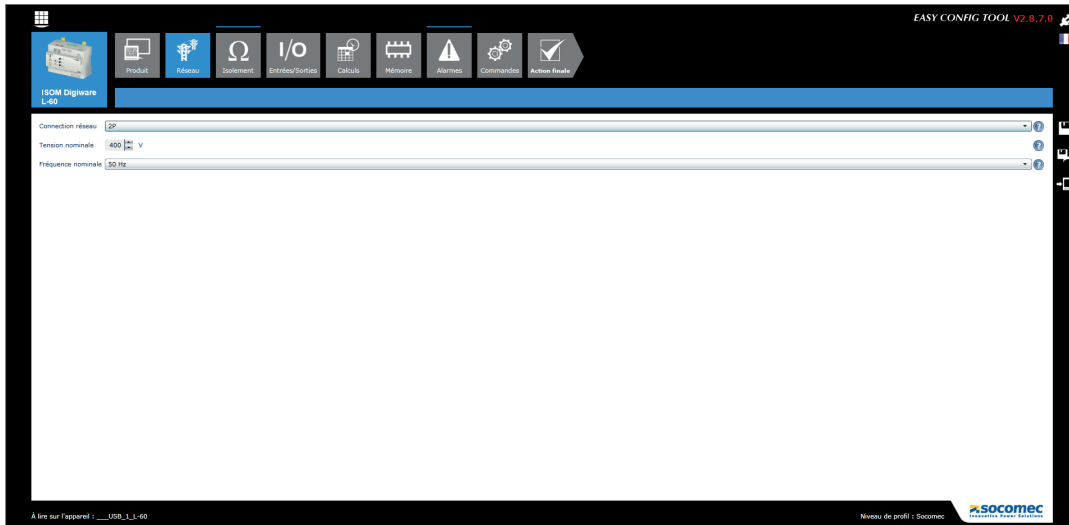
This screen shows all the key details about the device (read-only). Only the address can be edited here (make communication settings on the L-60)

### 10.1.2.2. Network configuration

In the electrical network configuration menu, the user selects the type of network (three-phase, single-phase, etc.), the nominal voltage, the network frequency, the direction of phase rotation and whether or not a voltage transformer is used.

Configuration can only be done from the ISOM L-60

#### Example: three-phase network 400VAC:



On this screen you can configure the type of IMD connection:

Three-phase or two-phase → "2P"

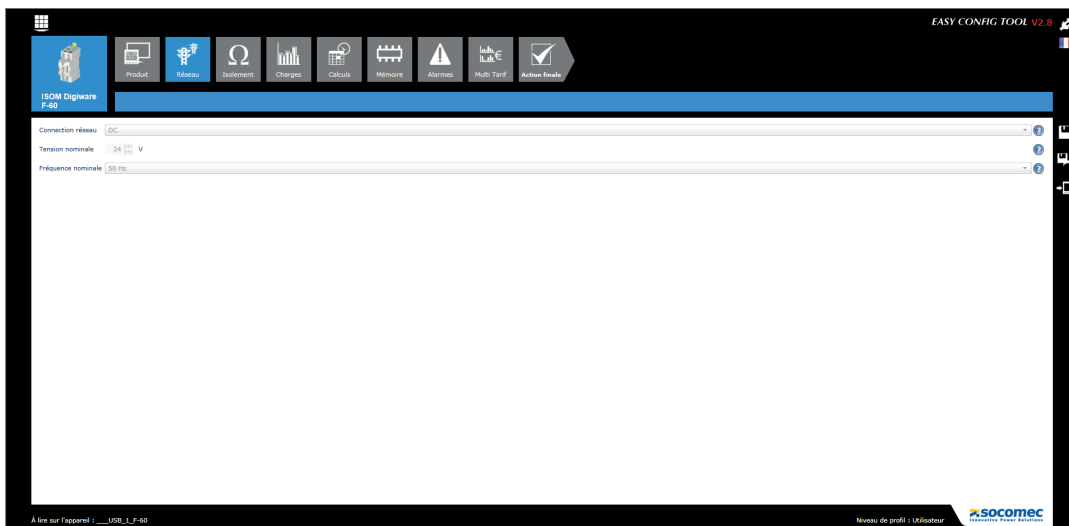
Single-phase: 1P+N

Continuous → "DC"

The basic voltage, as well as the rated frequency of the network (50Hz, DC...)

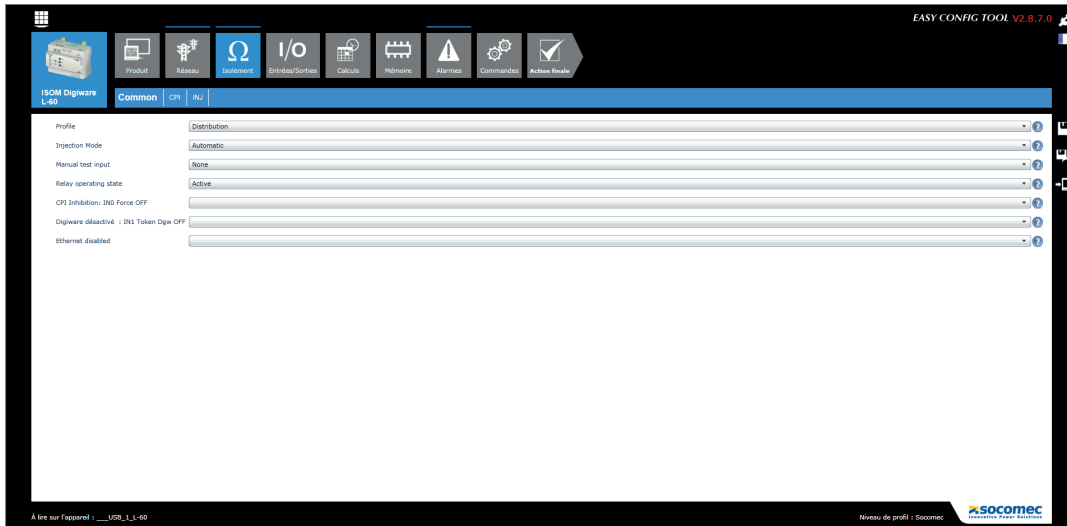
On the F-60, you get one reminder of the initially set values from the L-60

#### Example of a 24 VDC continuous network:



## 10.1.2.3. Configuration of the insulation

### ISOM L-60



The "Common" screen defines the general settings of the device:

1) the network profile:

Choosing the profile is an easy way to support the measurement algorithm on the intended application, with improved filtering/measurement times.

You can choose between 3 profiles:

- Custom
- Cabinet
- Control/command

2) The booster startup mode for finding the fault:

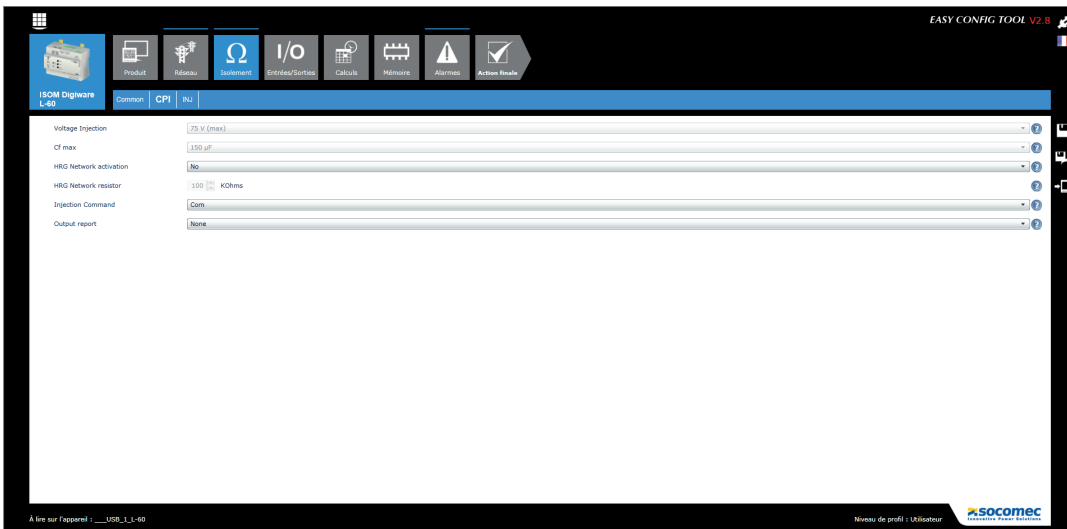
- Automatic: start the "LCI" booster when the "ALARM 2" threshold is reached
- Manual: start up the "LCI" booster only with the BP "INJ START/STOP"

3) Manual test input:

Defines which ON/OFF input (1 to 4) on the device is used to carry out a remote internal test of the device.

4) Operating mode of the relays:

Defines if these relays are active or stopped.



The "IMD" screen defines the general settings of the device in IMD mode:

1) Measuring voltage:

This data can set the measurement voltage according to the type of network. It either depends on the profile or you can select it in the "custom" profile.

2) Maximum permissible leakage capacity:

This data has a major impact on the integrity of the reading. Above all, it influences the measuring time of the device. It either depends on the profile or you can select it in the "custom" profile.

3) Filter level:

Adjust the filter level of the device.

4) RHG network:

With this option you can monitoring the insulation on a high-resistance network (network earthed via a high-value resistance).

5) RHG resistance:

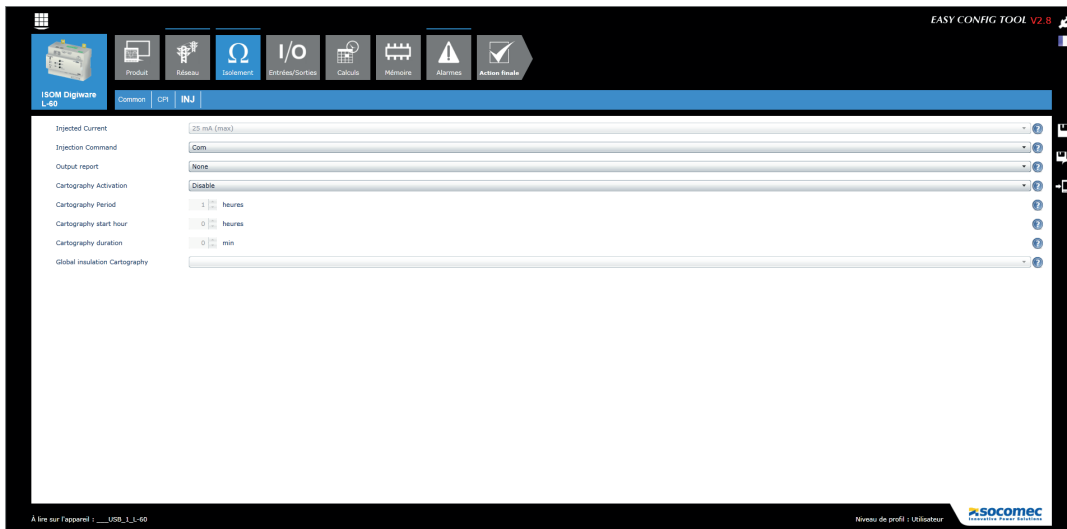
Lets you adjust the ohm value of the earth resistance (only if RHG is active)

6) Boost command:

In manual boost mode, this defines how the IMD boost is controlled: via the logical input or via the communication bus (Modbus or from the ISOM Digiware D-x5 display).

7) Output report:

Activate an output when the IMD is ON.



The "INJ" screen defines the general settings in FLD mode:

1) Boost current:

This lets you set the maximum value of the locating current. It depends on the selected profile.

2) Boost command:

In manual boost mode, this defines how the IMD boost is controlled: via the logical input or via the communication bus (Modbus or from the ISOM Digiware D-x5 display)

3) Output report:

Activate an output when INJ mode is ON.

4) Activate "mapping" mode (OhmScanner technology)

With "mapping" mode you can track the flow over a selected period; the progress of the insulation by circuit. This mode is very useful when you start to plan scheduled maintenance actions.

5) Mapping period

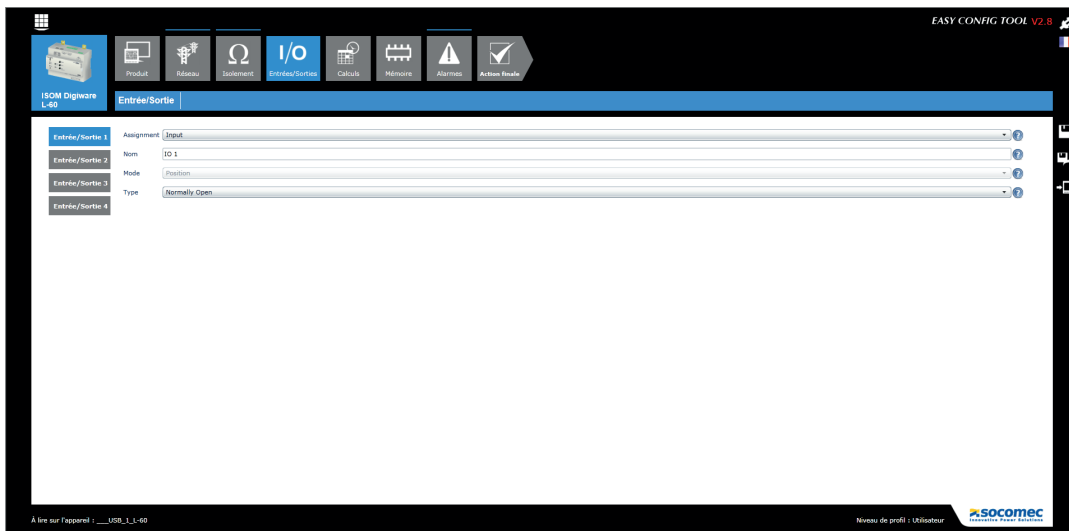
Adjust the time interval between 2 measurements generated in mapping mode.

6) Mapping duration

Adjust the boosting time in mapping mode.



## 10.1.2.4. Configuration of inputs-outputs (I/O)



The ISOM L-60 has 4 I/Os which are fully configurable.

In this screen you can set each I/O separately:

### 1) Function of the I/O

Defines if it is used as an input or an output

### 2) Name:

Name the I/O

### 3) Mode:

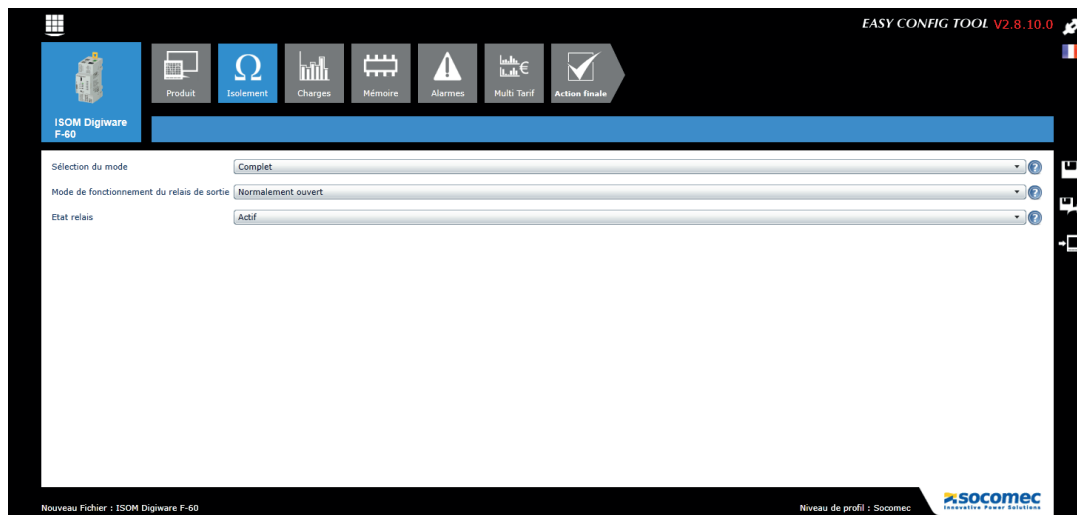
Defines the I/O operating mode:

As an input, you can set the following 4 modes:

- Injection cutoff
- External TEST
- External RESET
- Measurement restart

### 4) Type:

Defines if it is active, either in an open or closed state.



The "Insulation" screen defines the following settings:

1) The operating mode:

Full mode: In this mode you can measure both the residual locating current and the insulation – by circuit. This is for the high-performance locating of present or emerging insulation faults.

Required in mapping mode.

Degraded mode: in this mode you can only measure the residual locating current, to highlight ongoing insulation faults.

You can also remotely connect locating units on a system where there is no Digiware bus connection.

2) The operating mode of the output relay

N/C (positive safety = relay stimulated during standby if there is no alarm)

N/O (negative safety = relay stimulated only if there is an alarm)

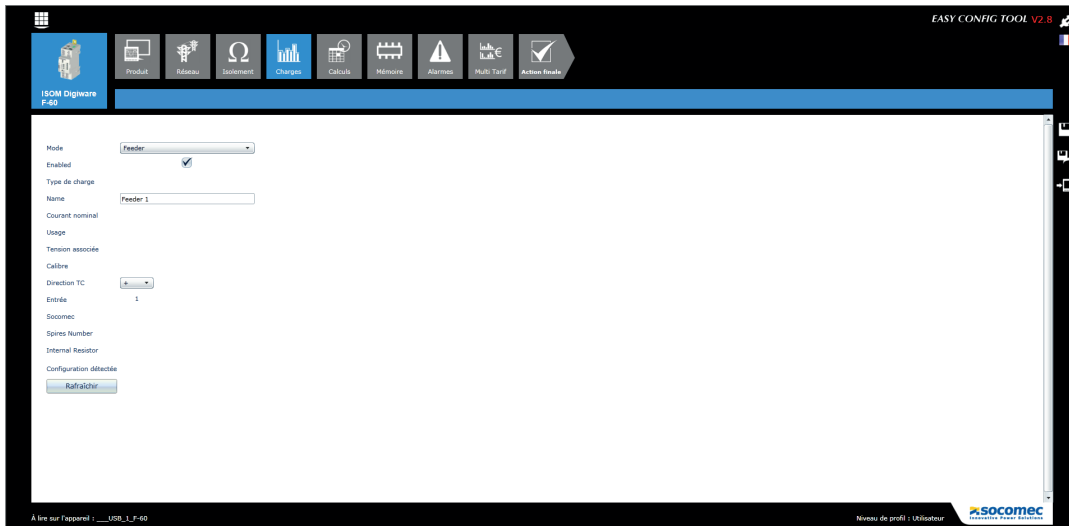
Note: a normally closed operation can be used to also generate an alarm in case the auxiliary power of the device is lost.

3) Relay status

Can be enabled or disabled (enabled by default).

### 10.1.2.5. Configuring loads (ISOM F-60 only)

The number and type of loads can be accessed in the load configuration menu. The user can also define its nominal current, the name of the load, its usage and its location within the electrical installation.

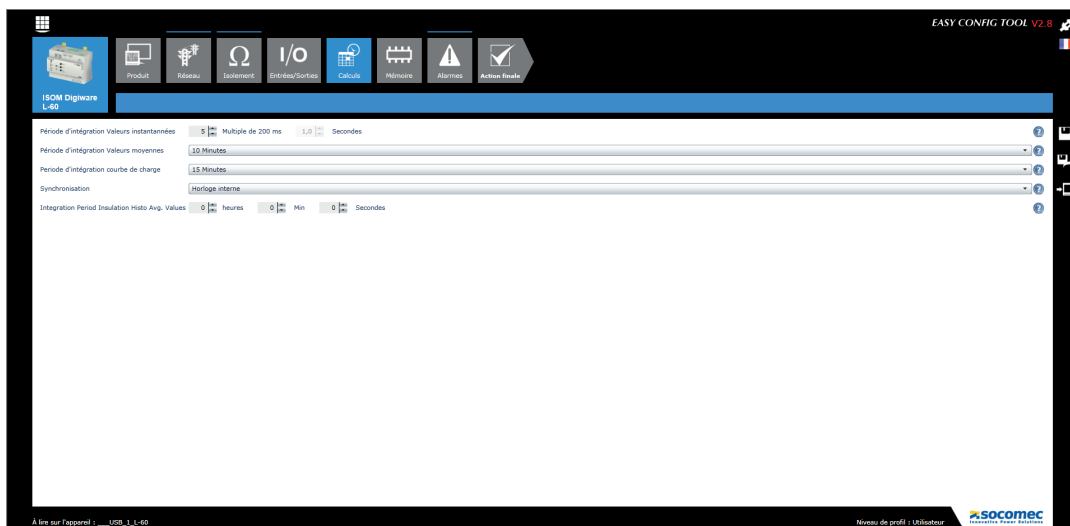


The "Circuits" screen defines the following settings:

1. Type: insulation circuit
2. Activate the channel
3. Type of load
4. Name of load
5. The rated current
6. Usage
7. Related voltage
8. Size
9. Direction of the sensor
10. Current input
11. Number of turns
12. Internal resistance
13. Detecting configuration

## 10.1.2.6. Calculation method

The calculation methods for the various electrical parameters and the integration time are defined in this screen.



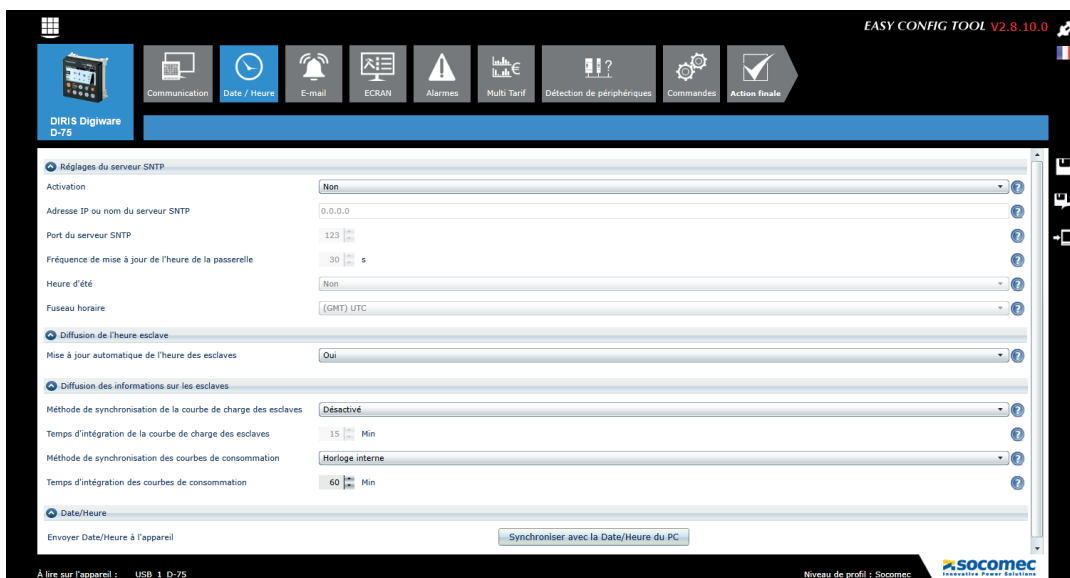
## Alarms

The type of alarm and the configuration are set in Easy Config, see section "11. ALARMS", page 70 for more.

## 10.1.2.7. Synchronisation of products

Ensure that all connected devices are set to the same time, their time is controlled on an SNTP server (ISOM Digiware D-55 / D-75) or manually (ISOM Digiware D-55 / D-75).

The screen below shows the configuration of the update from the ISOM Digiware D-75 screen. The update is done either from an SNTP server or manually. The time may be displayed on connected products automatically based on a configurable update schedule.



## 10.2. Configuration from the ISOM Digiware D remote display

### 10.2.1. Connection mode



You can also configure the ISOM Digiware system from the ISOM Digiware D-x5 display itself. Refer to the manual for the ISOM Digiware D display for more.

# 11. ALARMS

Threshold alarms are available on the ISOM Digiware L-60 and F-60.

The alarms on digital inputs with change of output status are only available on ISOM Digiware L-60. These inputs are mainly used for remotely reporting on the status of third-party devices.

## 11.1. Alarms upon events

Alarms can be generated when a threshold is exceeded for the electrical measurements (insulation) or if there is a change in input status. Also, combinations can be made on the alarms created.

Up to 25 alarms detected are saved and timestamped; an alarm can have 3 distinct statuses: Alarm active, Alarm completed, Alarm completed and acknowledged. Alarms can be acknowledged either automatically or by user action, as required.

Up to 4 alarms are configured for an electrical measurement or insulation measurement per device and 4 for changes in status of a digital input (digital inputs are available only on the ISOM Digiware L-60).

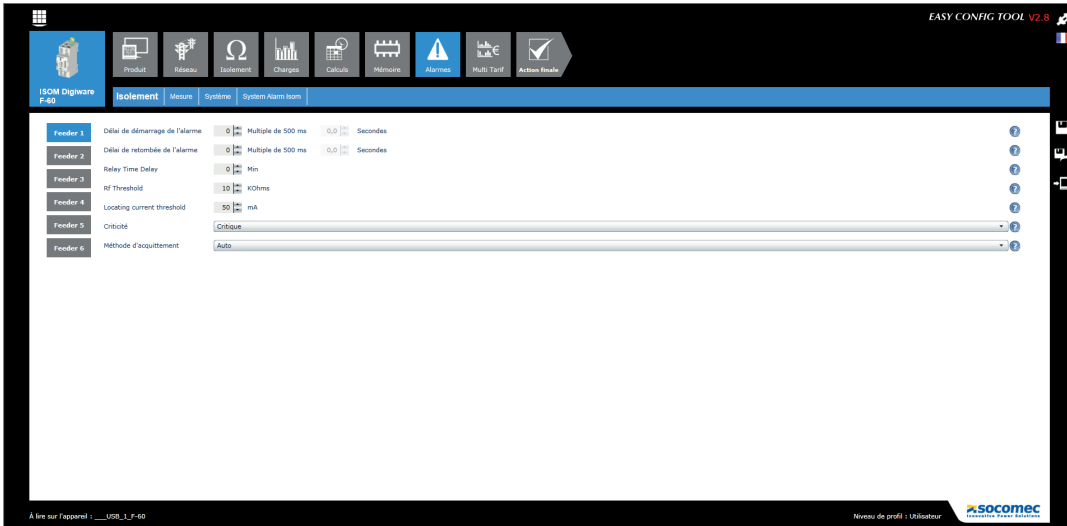
The alarms are configured via the Easy Config software.

### 11.1.1. Insulation and measurement alarm

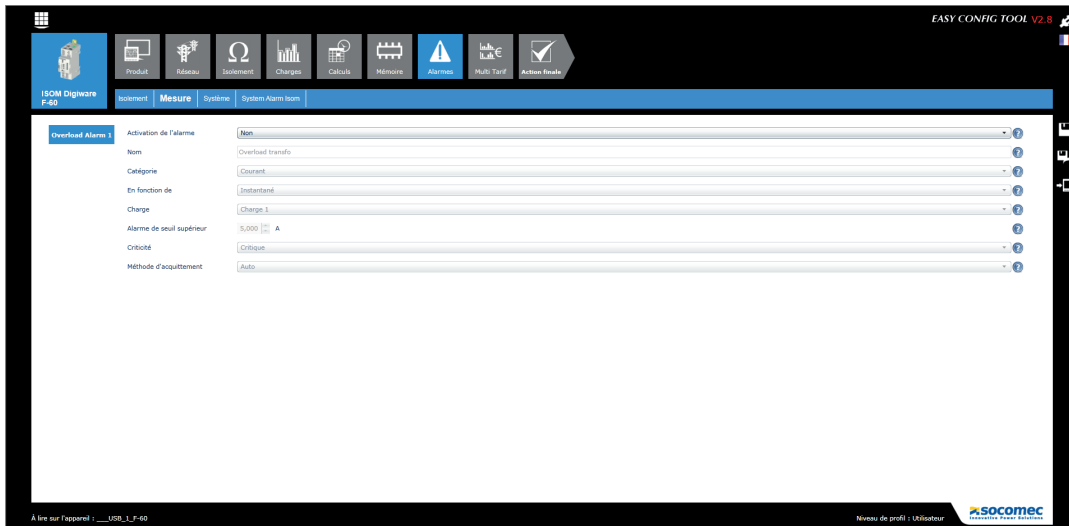
The alarms available will be based on electrical parameters measured in the products.

- Alarm if there is a variation in the realtime or average value of an electrical value:  
L-60: insulation, voltage, frequency / F-60: current, insulation
- Selection of the hysteresis and high/low threshold
- Setting a time delay at the start and end of the alarm

F-60: Example of configuring an insulation alarm via Easy Config:



## F-60: Example of setting an alarm on overload of single-phase or three-phase transformers via Easy Config:

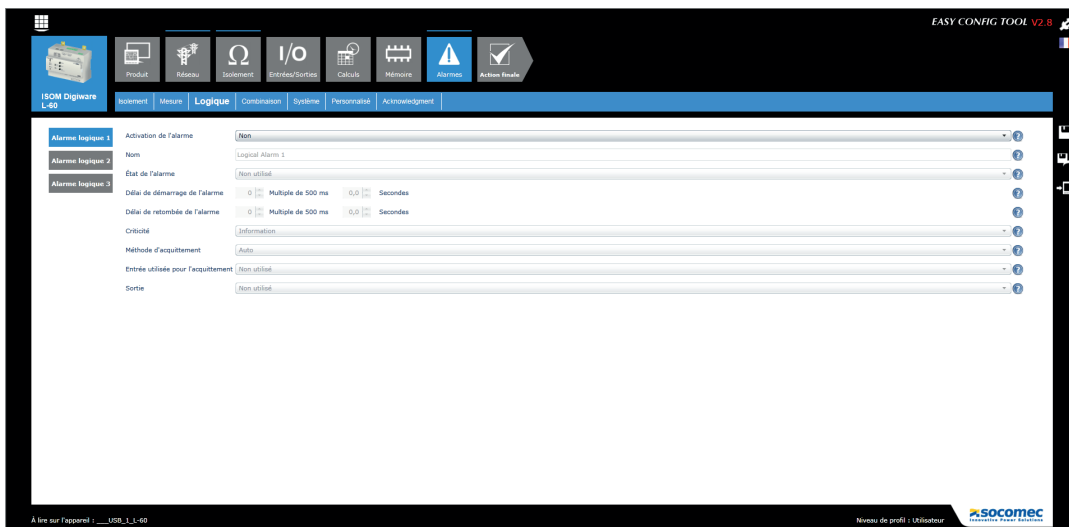


The configuration of this alarm is frequent or even systematic in the case of use of ISOM Digiware L-60h used for monitoring the medical IT network.

### 11.1.2. Digital inputs

This option is available on the ISOM Digiware L-60

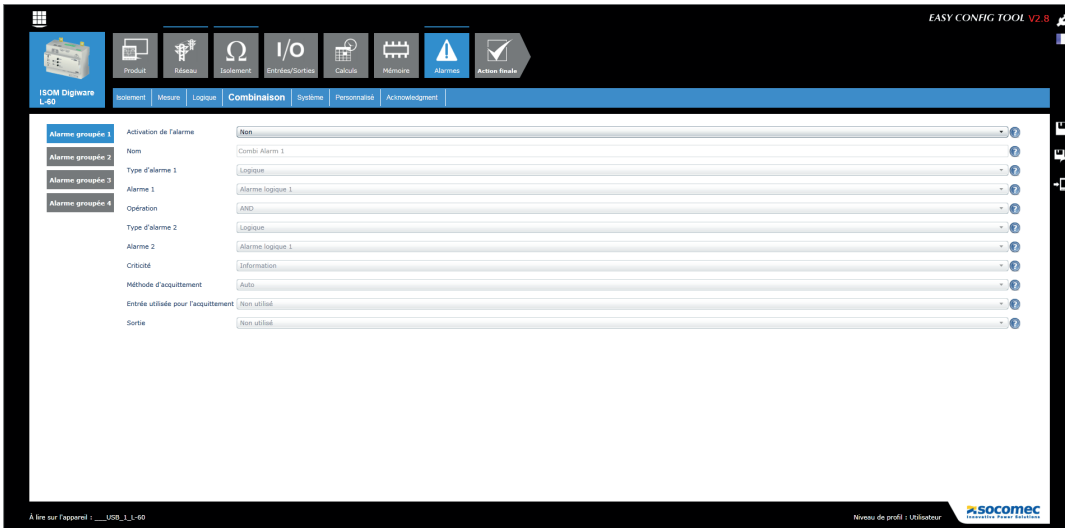
- Alarm upon change of status for a digital input
- Choice of a rising or falling edge
- Setting a time delay at the start and end of the alarm



Example of configuring an alarm on a digital input via Easy Config:

### 11.1.3. Combination of alarms

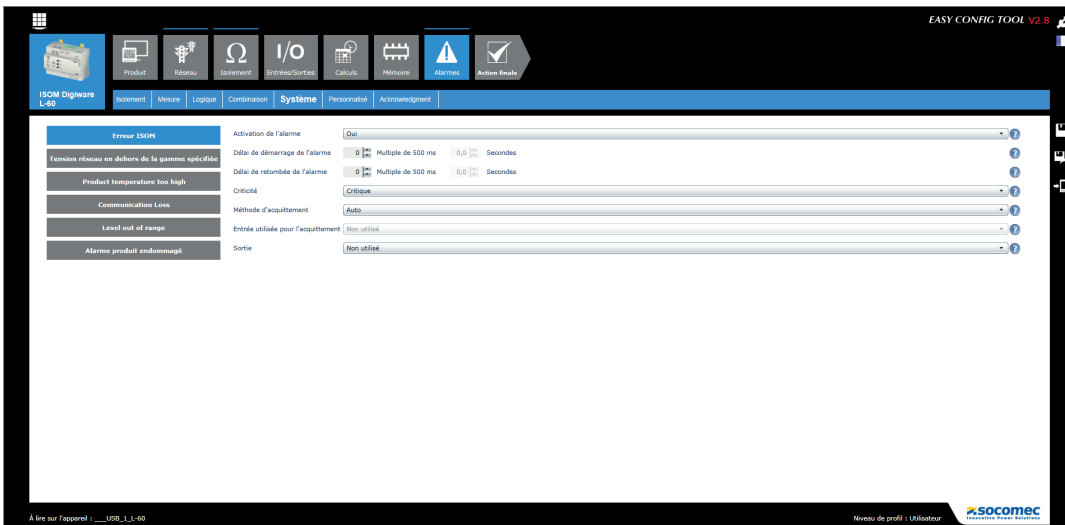
- 4 boolean combinations (OR, AND) on the defined alarms (electrical values, energy, inputs, etc.)



Example of configuring an alarm on a digital input via Easy Config:

### 11.1.4. System alarms

If an installation error is detected during setup, an alarm will be automatically generated.



- No IMD measuring circuit connection (L-60)

Alarm if there is a connection problem with the measuring circuit of the IMD ISOM Digiware L-60 on the electrical network you want to monitor:

- L1 and/or L2
- PE (2x)

- Voltage network outside specified range (L-60)

The voltage network connected is outside the working range.

- Device temperature too high (L-60)

The device is overheating (automatically stop the LCI booster)



- Loss of communication (L-60)

The device is no longer connected to a master of the Digiware bus

- Level outside of the operating range (L-60)

IMD measurement is outside the tolerance range and cannot be shown, the L60 is blind

When using the OhmScanner function or during enforced grid-feeding, add a delay on this system alarm in case of high capacity (Cf/Rf connection)

- Core balance transformer disconnected (F-60)

Alarm for detecting the absence of a current sensor

- VI link alarm (F-60)

Alarm for connection error between the current and the voltage

Requires a specific load level:  $0.6 < PF < 1$  and  $I > 2\% I_n$

- Alert for bad primary TC (F-60)

Configuration error in the primary circuit of the core balance transformer.

## 11.2. Setting up alarms

The installation alarms are automatically detected and alarms upon events are configured with the Easy Config software.

There are several ways of identifying the presence of an alarm:

### 11.2.1. ALARM LED on front

- Flashing: Setup alarm
- Constant: Alarm for an event (takes priority if there is a setup alarm at the same time)

### 11.2.2. Activation of an output

- On ISOM Digiware L-60 and t F-60, one or more outputs can be activated when an alarm is detected

### 11.2.3. Acknowledging alarms by input

- If an input is present, the alarm can be acknowledged from this input. Acknowledgement of an alarm can only be taken into account if the alarm is complete

### 11.2.4. RS485 Modbus

- Information on the alarms with timestamping available via the RS485 communication bus
- Sends alarm acknowledgement

### 11.2.5. Display and WEBVIEW

- Information on alarms with timestamping
- Sends alarm acknowledgement

## 12. SPECIFICATIONS

### 12.1. Specifications ISOM Digiware L-60, F-60 and T-15

#### 12.1.1. Mechanical specifications

Casing type	L-60, F-60: DIN-rail mounting module and base T-15: Only is mounted directly on the core balance transformer, DIN rail or board with Rilsan®
Casing protection index	IP20
Front panel protection index	IP40 on the nose in modular assembly
Material and flammability class of housing	Polycarbonate UL94-V0
Weights ISOM Digiware L-60 / F-60 / T-15	373 g / 103 g / 47 g

#### 12.1.2. Electrical characteristics

DIRIS Digiware C-31	
P15 power supply	Specifications 230 VAC / 24 VDC – 0.63A – 15W
Modular format – Dimensions (H x W): 90 x 25 mm	Removable screw terminal block, 2 positions, stranded or solid 0.2 - 2.5 mm <sup>2</sup> cable
Monitored IT network ISOM Digiware L-60	
AC or combined AC/DC	L-60: ≤ 480VAC L/L <sup>1</sup> or L/N L-60h: ≤ 250 VAC CAT III
AC frequency	50 - 460 Hz
DC	L-60: ≤ 480 VDC
Power consumption	L-60: 2.3 W F-60: 0.8 W

### 12.1.3. Measurement characteristics

Measurement accuracy	
Accuracy	L-60 / L-60h: in accordance with IEC 61557-8 F-60 / T-15: In accordance with IEC 61557-9 with $\Delta$ IPR, WR and TFR In accordance with IEC 61557-12 classification PMD DD with TE, TR, TF with U-xx
ISOM Digiware L-60 performance	
Specific response value $R_{an}$	L-60: ALARM1: 500 $\Omega$ – 1M $\Omega$ ALARM2: 500 $\Omega$ – 1M $\Omega$ L-60h: ALARM2: 50 k $\Omega$ – 500 k $\Omega$
Max. leakage capacity $C_e$	300 $\mu$ F, according to profile
Incertitude of specific response value	+/- 10% according to profile
Response time $t_{an}$	For $C_e=1\mu$ F: typical 4s See curves § 12.3
Measurement voltage $U_m$	L-60: 25, 75 or 120 V according to profile L-60h: 25 V
Measurement current $I_m$	Max 1 mA
Max. external DC voltage $U_{fg}$	552 V
Internal impedance	$Z_i = 120$ kOhms
Internal resistance with continuous current	$R_i = 120$ kOhms
Locating current	L-60: 1, 5, 10 or 25 mA according to profile L-60h: 1 mA
Measurement range $C_e$	0-300 $\mu$ F (L-60)
ISOM Digiware F-60 performance (with DIRIS Digiware U-3x)	
Number of sensor inputs	6
Associated current sensors	Locating core balance transformers $\Delta$ IP, closed sensors TE, open TR, flexible TF
Accuracy of current measurement	0.2 DIRIS Digiware class only Class 0.5 with TE or TF sensors Class 1 with TR sensors With module U and in accordance with IEC 61557-12
Connection	Specific Socomec cable with RJ12 connectors
Link to ISOM Digiware L-60	Link via Digiware bus
Link to ISOM Digiware F-60	Link via Digiware bus
Power factor measurement	
Accuracy	Class 0.5 with TE or TF sensors Class 1 with TR sensors
Voltage readings – ISOM L-60	
Characteristics of the network measured	L-60: 24-480VAC/VDC (ph/ph or ph/n) - CAT.III L-60h: 24-250VAC/VDC (ph/ph or ph/n) - CAT.III
Operating range of the voltage network	+/- 10%
Frequency range	50 to 460 Hz for L60 50 to 60 Hz for L60h
Network type	DC, 1P+N or 2P
Input consumption	$\leq 0.1$ VA
Rated impulse voltage	Rated impulse voltage 6kV (IEC60364-4-44)
Connection	Removable screw terminal block, 4 positions, stranded or solid 0.2 - 2.5 mm <sup>2</sup> cable
Frequency readings	
Measurement range $f_n$	In ISOM mode: 50 Hz to 460 Hz
Measurement voltage range $f_n$	AC 24 to 480 V for L60 AC24 to 250 V for L60h

## 12.1.4. Input/output specifications HMI

Digital inputs/outputs – ISOM Digiware L-60	
Number of inputs	4
Type / Power supply	Output: 12-24VDC min 600Ω 40 mA max Input: Max 100 Ω Insulated input, internal polarisation, dry contact (default impedance max 100 Ω) - SELV in accordance with IEC61010
Input functions	Logical status (state of the circuit breaker: position, trigger, drawer) TEST, external RESET, stop measurement, start measurement
Output functions	Configurable alarm on breach of threshold 3A
Connection	Removable spring-cage terminal block, 6 positions - 4 dedicated to outputs, 1 input polarisation, 1 common output point, stranded or solid 0.2 - 1.5 mm <sup>2</sup> cable

Relay outputs – ISOM Digiware L-60	
Number of outputs	2
Type	Changeover switch Rated voltage AC: 250 V Rated voltage DC: 30 V Sustained current: 3 A Operating mode: standby/working Default operating mode: standby
Output functions	Alarm
Connection	0.2 - 2.5 mm <sup>2</sup>

PTC inputs – ISOM Digiware L-60	
Number of inputs	1
Type / Power supply	Logical status (temperature sensor) Analogue input: PTC probe
Input functions	Alarm
Connection	0.2 - 2.5 mm <sup>2</sup>

## 12.1.5. Communication specifications

Digiware BUS	
Function	Connection between DIRIS Digiware modules
Cable type	Specific SOCOMEC cable with RJ45 connections
USB	
Protocol	Modbus RTU on USB
Function	Configuration of ISOM Digiware modules L and F
Location	On each ISOM Digiware module L and F
Connection	Type B micro USB connector

## 12.1.6. Environmental specifications

Standard model	
Ambient operating temperature	-10 to +55°C (IEC 60068-2-1 / IEC 60068-2-2)
Storage temperature	-40 to +70°C (IEC 60068-2-1 / IEC 60068-2-2)
Operating humidity	55°C / 90% RH (IEC 60068-2-30)
Operating altitude	< 2000 m
Vibration	2 Hz to 13.2 Hz – amplitude ± 1 mm (IEC 60068-2-6) 13.2 Hz to 100 Hz – acceleration ± 0.7g (IEC 60068-2-6)
Impact resistance	IK08 (5J) front panel IK06 (1J) other panels IK06 (1J) ΔIP/ ΔIP-R toroids 10 g / 11 ms, 3 pulses (IEC 60068-2-27)
PEP ecopassport - ISO 14025	ISOM Digiware: SOCO-00009-V01.01.
Reinforced model "t"	
Operating temperature	-10°C to +70°C (IEC 60068-2-1 / IEC 60068-2-2)
Storage temperature	-40°C to +85°C (IEC 60068-2-1 / IEC 60068-2-2)
Operating humidity	55°C / 97% RH (IEC 60068-2-30)
Operating altitude	< 2000 m
Vibration	2.0 Hz to 25.0 Hz – amplitude ± 1.6 mm (IEC 60068-2-6) 25.0 Hz to 100 Hz – acceleration ± 4g (IEC 60068-2-6) 3Hz to 8.7Hz- amplitude ± 10 mm (IEC 60068-2-6) 8.7Hz to 150Hz – acceleration ± 3 g (IEC 60068-2-6)
Impact resistance	IK08 (5J) front panel IK06 (1J) other panels 10 g / 11 ms, 3 pulses (IEC 60068-2-27) 30 g / 18 ms, 3 pulses (IEC 60068-2-27) 40 g / 6 ms, 3 pulses (IEC 60068-2-27)
PEP ecopassport – ISO 14025	ISOM Digiware: SOCO-00009-V01.01.

## 12.1.7. Electromagnetic specifications (Directive 2014/30/EU)

Immunity to electrostatic discharges	IEC 61000-4-2 - LEVEL III - CLASS A
Immunity to radiated radio-frequency fields	IEC 61000-4-3 - LEVEL III - CLASS A
Immunity to electrical fast transients/bursts	IEC 61000-4-4 - LEVEL IV - CLASS B
Immunity to impulse waves	IEC 61000-4-5 - LEVEL IV - CLASS B
Immunity to radio interference	IEC 61000-4-6 - LEVEL III
Immunity to power frequency magnetic fields	IEC 61000-4-8 - 400A/m LEVEL IV - CLASS A
Conducted emissions	CISPR11 Gr:1 - CLASS B
Radiated emissions	CISPR11 Gr:1 - CLASS B

## 12.1.8. Standards and safety

Product	L-60: Conformity with IEC 61557-8: IMD Conformity with IEC 61557-9: LCI F-60: Conformity with IEC 61557-9: IFL Conformity with PMD IEC 61557-12 T-15: Conformity with IEC 61557-9: IFL
Safety	Conformity with Low Voltage Directive 2014/35/EU of 26 February 2014 (EN 61010-1:2010 and EN 61010-2-030)
Insulation coordination	Overvoltage category III – degree of pollution 2

## 12.1.9. Longevity CEM directive 2014/30/EU

MTTF (mean time to failure)	> 100 years
-----------------------------	-------------

## 12.2. Display characteristics – ISOM D-15h and ISOM Digiware D-55 / D-55h / D-75

### 12.2.1. Mechanical specifications

HMI models	D-15h 3 LEDs - 2 keys D-55 / D-55h / D-75 Capacitive touchscreen technology, 10 keys, 4 LEDs
Screen resolution	D-55 / D-55h / D-75: 350 x 160 pixels
Front panel protection index	D-15h: IP54 – marking conforms with IEC 60601-1 as on the ISO105-X12 D-55 / D-55h / D-75: IP65
Material and flammability class of housing	Polycarbonate UL94-V0
Weight	D-15h: 100 g D-55 / D-55h / D-75: 210 g

### 12.2.2. Electrical specifications

Power supplies	
Power supply	24 VDC $\pm$ 10%
Power consumption	D-15h: 0.5 VA D-55 / D-55h / D-75: 2.5 VA

### 12.2.3. ISOM D-55 / D-55h communication features

Type of screen	Multipoint remote screen
Ethernet RJ45 10/100 Mbs	Modbus TCP gateway function
RJ45 Digiware	Control and power supply interface function
RS485 2-3 wires	RS485 2-3 wire Master communication function Modbus RTU
USB	USB upgrade and configuration via type B micro USB connector

### 12.2.4. ISOM Digiware D-75 communication features

Type of screen	Multipoint remote screen
Ethernet RJ45 10/100 Mbs	Gateway function: - Modbus TCP - Embedded web server WEBVIEW-M
SNTP protocol	Updates the screen from an NTP server. The display updates the connected devices.
SMTS protocol	Sends email notifications.
FTPS protocol	Automatically exports data via standard or secure FTP server (consumption curves, load curves, measurement logs)
RJ45 Digiware	Control and power supply interface function
RS485 2-3 wires	RS485 2-3 wire Master communication function Modbus RTU
USB	USB upgrade and configuration via type B micro USB connector

## 12.2.5. Environmental specifications

Standard model	
Operating temperature	-10°C to + 55°C
Storage temperature	-40°C to +70°C
Humidity	97%RH at +55°C (D-75t)
Installation category, Degree of pollution	Device powered by SELV, 2

## 12.3. Toroids characteristics

### 12.3.1. ΔIP toroids

ΔIP Toroid	Ø15	Ø30	Ø50	Ø80	Ø120	Ø200	Ø300
ΔIP reference	4750 6015	4750 6030	4750 6050	4750 6080	4750 6120	4750 6200	4750 6300
<b>IEC 60664-1 insulation coordination</b>							
Insulation voltage	800 V	800 V	800 V	800 V	800 V	800 V	800 V
Surge voltage	8 kV	8 kV	8 kV	8 kV	8 kV	8 kV	8 kV
Degree of pollution	III	III	III	III	III	III	III
<b>Measurement circuit</b>							
Rated primary current	10 A	10 A	10 A	10 A	10 A	10 A	10 A
Rated secondary current	0.0167 A	0.0167 A	0.0167 A	0.0167 A	0.0167 A	0.0167 A	0.0167 A
Winding ratio Kn	10/0.0167	10/0.0167	10/0.0167	10/0.0167	10/0.0167	10/0.0167	10/0.0167
ΔIC rated load	Max 47 Ω	Max 47 Ω	Max 47 Ω	Max 47 Ω	Max 47 Ω	Max 47 Ω	Max 47 Ω
ΔIP rated load	Max 180 Ω	Max 180 Ω	Max 180 Ω	Max 180 Ω	Max 180 Ω	Max 180 Ω	Max 180 Ω
ΔIC rated output (under maximum operating conditions)	0.02 VA	0.02 VA	0.02 VA	0.02 VA	0.02 VA	0.02 VA	0.02 VA
ΔIP rated output (under maximum operating conditions)	0.05 VA	0.05 VA	0.05 VA	0.05 VA	0.05 VA	0.05 VA	0.05 VA
Frequency domain	42 – 3 KHz	42 – 3 KHz	42 – 3 KHz	42 – 3 KHz	42 – 3 KHz	42 – 3 KHz	42 – 3 KHz
Secondary protection by Transil diode	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IΔn setting range recommended if there are pulsed DC current components	30mA to 3A	30mA to 3A	30mA to 3A	30mA to 5A	30mA to 5A	30mA to 5A	30mA to 10A
<b>Environment</b>							
Operating temperature	-25°C...+70°C						
Storage temperature	-25°C...+70°C						
Climatic class - Mechanical conditions as per IEC 60721	3K5/3M4						
Transport IEC 60721-3-2	2K5/2M2						
EC 60721-3-1 long-term storage	1K5/1M3						
<b>Connection / Wiring</b>							
<b>Connection type</b>							
Flexible/rigid cross-section	0.2...2.5mm <sup>2</sup> / 0.14mm <sup>2</sup> ...1.5mm <sup>2</sup>	0.2...2.5mm <sup>2</sup>	0.2...2.5mm <sup>2</sup>	0.2...2.5mm <sup>2</sup>	0.2...2.5mm <sup>2</sup>	0.2...2.5mm <sup>2</sup>	0.2...2.5mm <sup>2</sup>
Stripping length	6mm	8...9mm	8...9mm	8...9mm	8...9mm	8...9mm	8...9mm
<b>DLD connection distance</b>							
Single wire ≥ 0.75 mm <sup>2</sup>	0...1m	0...1m	0...1m	0...1m	0...1m	0...1m	0...1m
Twisted single wire ≥ 0.75 mm <sup>2</sup>	0...10m	0...10m	0...10m	0...10m	0...10m	0...10m	0...10m
Shielded cable ≥ 0.75 mm <sup>2</sup>	0...40m	0...40m	0...40m	0...40m	0...40m	0...40m	0...40m
Recommended cable (shielding, shielding connected in a single location (terminal I), no earth connection)	J-Y(ST)Ymin 2x0.8	J-Y(ST)Ymin 2x0.8	J-Y(ST)Ymin 2x0.8	J-Y(ST)Ymin 2x0.8	J-Y(ST)Ymin 2x0.8	J-Y(ST)Ymin 2x0.8	J-Y(ST)Ymin 2x0.8
<b>Other features</b>							
Internal IP rating	IP40	IP40	IP40	IP40	IP40	IP40	IP40
Terminal block IP rating	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Flammability class	M5	M5	M5	M5	M5	M5	M5
Product standards	IEC60044-1	IEC60044-1	IEC60044-1	IEC60044-1	IEC60044-1	IEC60044-1	IEC60044-1
Homologation (pending)	UL1053	UL1053	UL1053	UL1053	UL1053	UL1053	UL1053
IK impact test	IK06	IK06	IK06	IK06	IK06	IK06	IK06

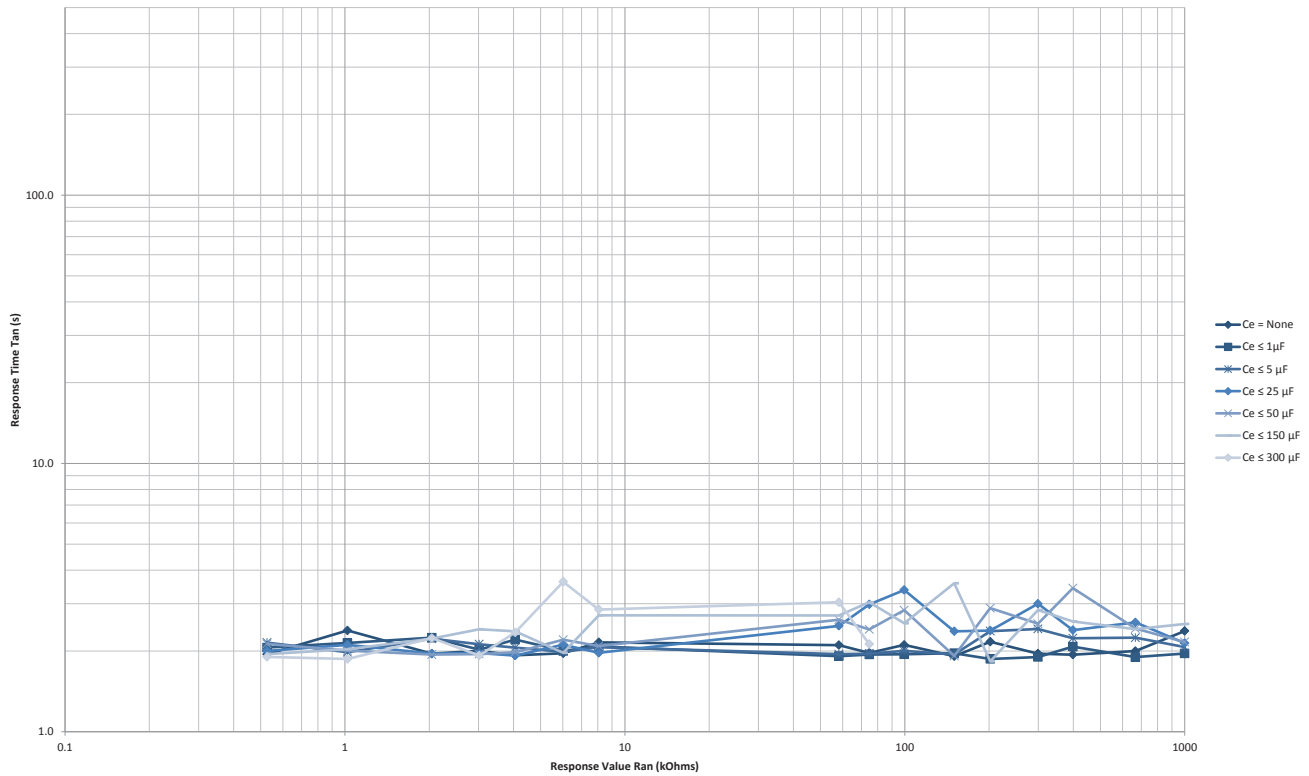
## 12.3.2. ΔIP-R toroids

ΔIP-R Toroid	Ø 50	Ø 80	Ø 120
Reference	4750 6051	4750 6081	4750 6121
<b>IEC 60664-1 insulation coordination</b>			
Insulation voltage	720 V		
Surge voltage	8 kV		
Rated withstand voltage	3 kV		
<b>Measurement circuit</b>			
Rated primary current	10 A	10 A	10 A
Rated secondary current	0,0167 A	0,0167 A	0,0167 A
Winding ratio Kn	10 / 0,0167	10 / 0,0167	10 / 0,0167
Rated load	Max 180 Ω	Max 180 Ω	Max 180 Ω
Rated output (under maximum operating conditions)	0,05 VA		
Frequency domain	42 – 3 KHz		
Secondary protection by Transil diode	Oui		
IΔn setting range recommended if there are pulsed DC current components	30 mA à 3 A	30 mA à 3 A	30 mA à 3 A
<b>Environment</b>			
Operating temperature	-25 °C ... +70 °C		
Storage temperature	-25 °C ... +70 °C		
Vibration resistance	±1 mm / 0,7 g / 5-100 Hz		
<b>Connection / Wiring</b>			
Flexible/rigid cross-section	0,2 ... 2,5 mm <sup>2</sup>		
Stripping length	8 ... 9 mm		
Distance de connexion DLD Single wire ≥ 0.75 mm <sup>2</sup> Twisted single wire ≥ 0.75 mm <sup>2</sup> Shielded cable ≥ 0.75 mm <sup>2</sup>	0 ... 1 m 0 ... 10 m 0 ... 40 m		
Recommended cable (shielding, shielding connected in a single location (terminal I), no earth connection)	J-Y(ST)Ymin 2 x 0,8		
<b>Other features</b>			
Internal IP rating	IP40		
Terminal block IP rating	IP20		
Flammability class	M5		
Product standards	CEI 61869-1		
IK impact test	IK06		

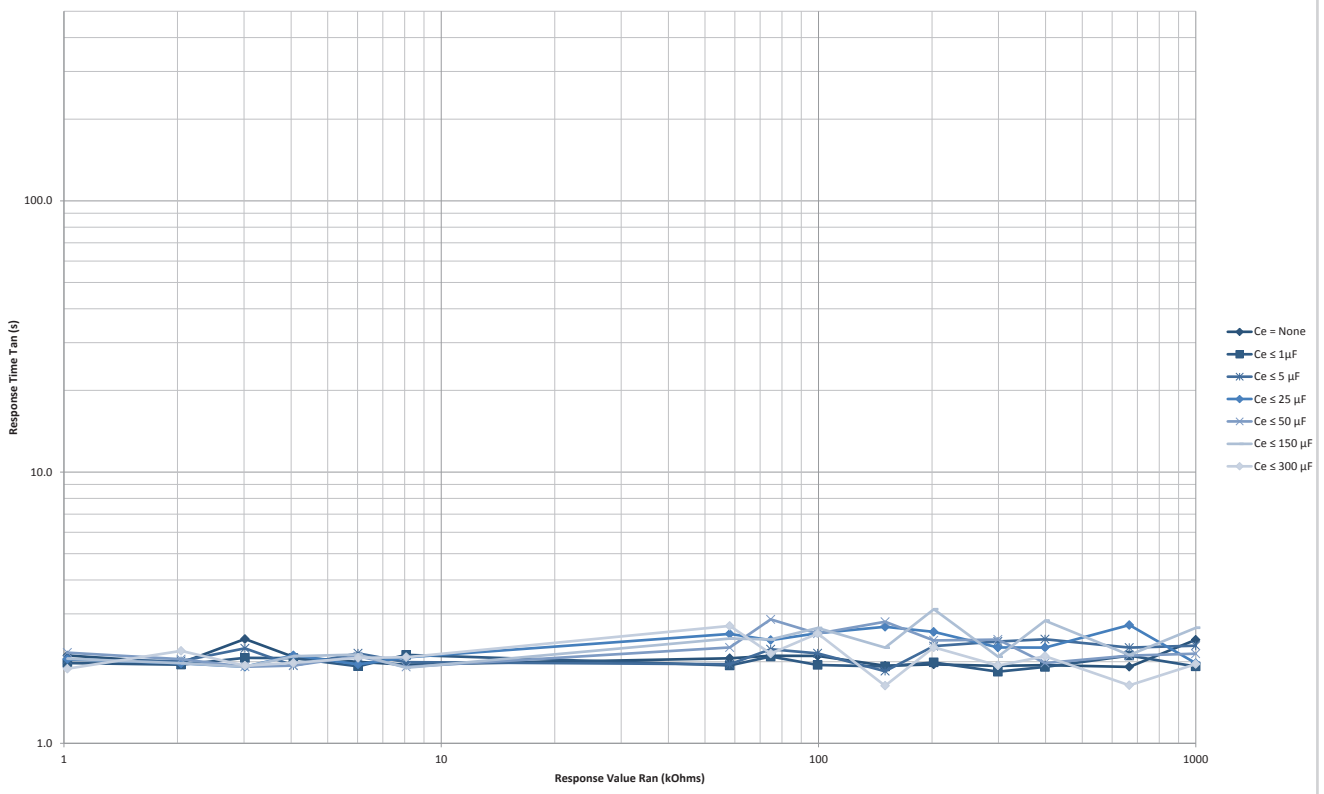


## 12.4. ISOM Digiware L-60 response curves

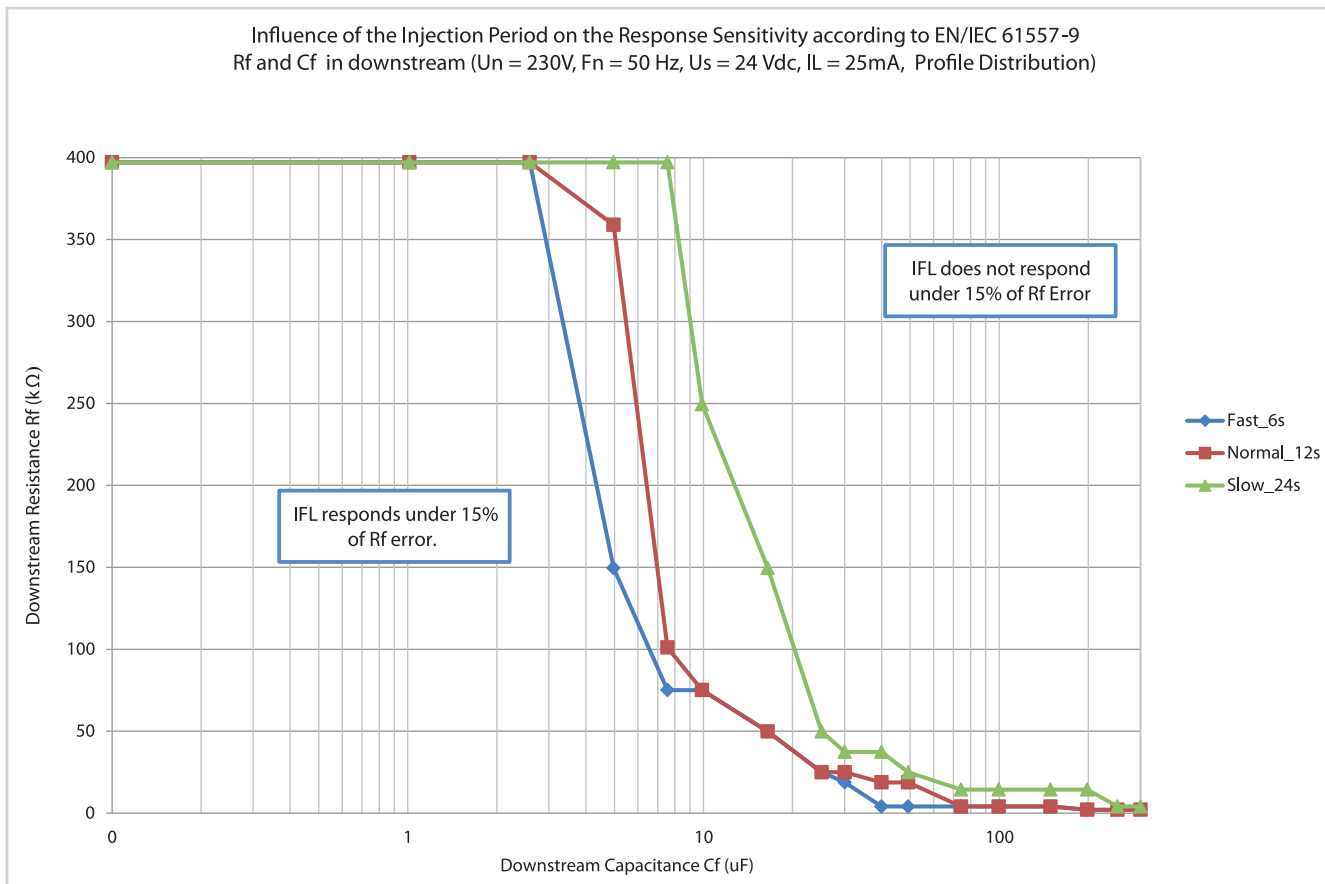
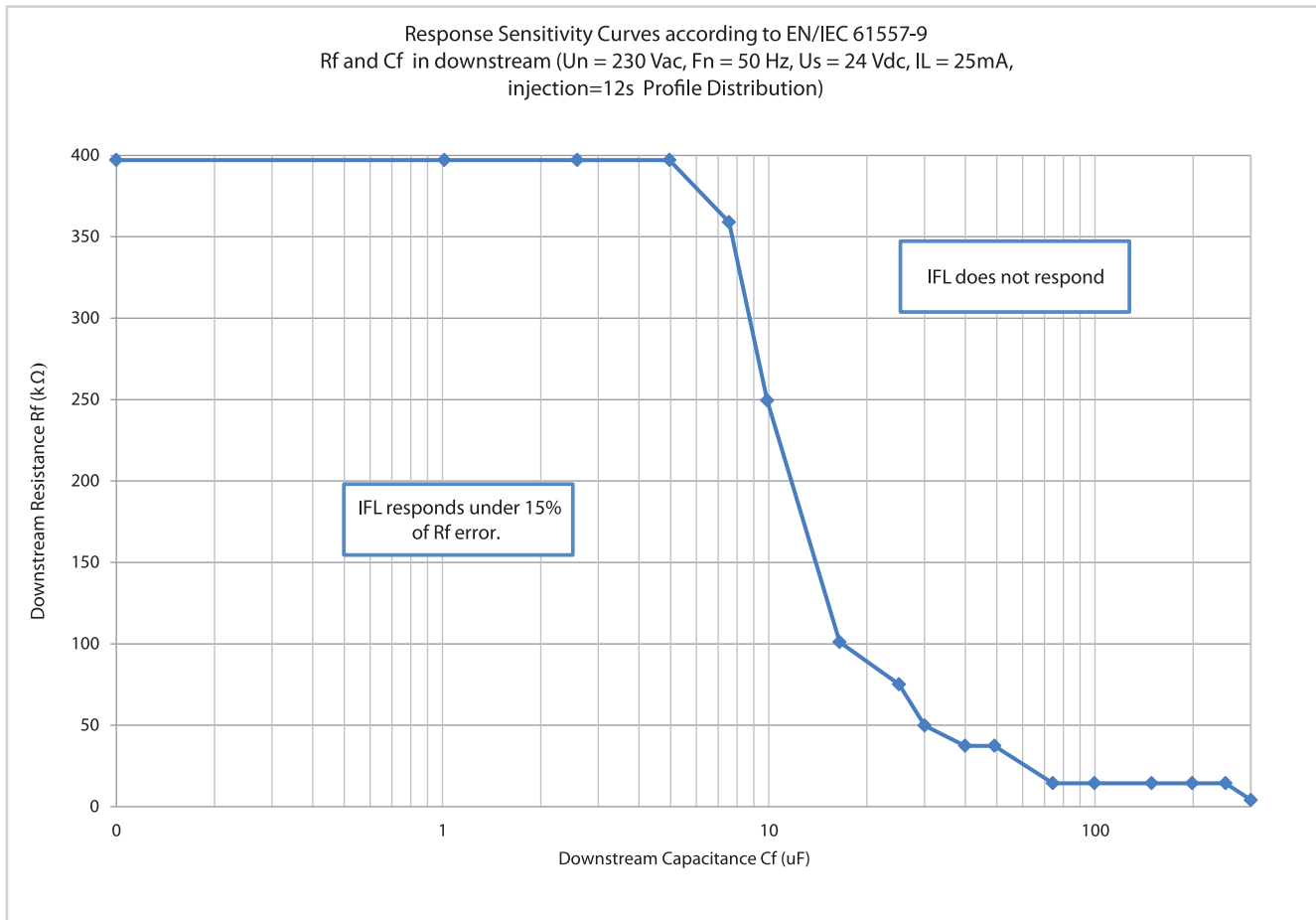
Response time ( $T_{an}$ ) as a function of the response value ( $R_{an}$ ) and system leakage capacitance ( $C_e$ ) according to EN/IEC 61557-8  
 ( $U_n = 400 \text{ Vac}$ ,  $F_n = 50 \text{ Hz}$ ,  $U_s = 24 \text{ Vdc}$ ,  $U_m = 75 \text{ V}$ , Injection Period = 1s, Low filtering, Distribution profile)



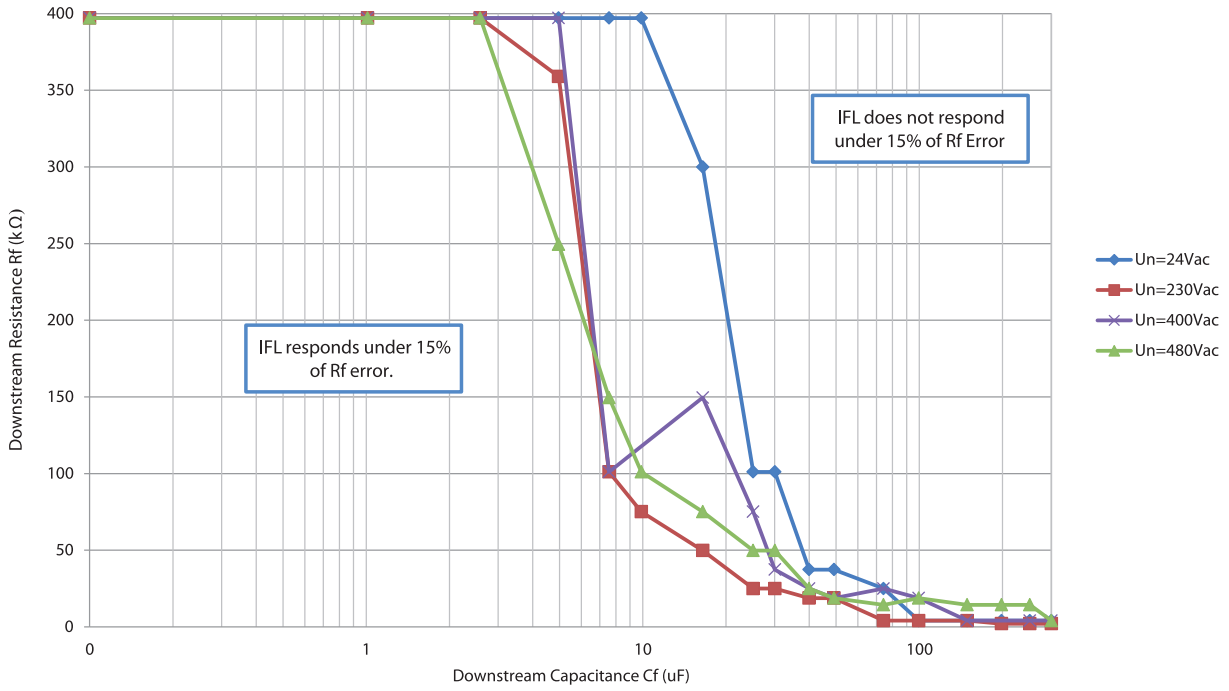
Response time ( $T_{an}$ ) as a function of the response value ( $R_{an}$ ) and system leakage capacitance ( $C_e$ ) according to EN/IEC 61557-8  
 ( $U_n = 230 \text{ Vac}$ ,  $F_n = 50 \text{ Hz}$ ,  $U_s = 24 \text{ Vdc}$ ,  $U_m = 25 \text{ V}$ , Injection Period = 1s, Filtering Low, control/command profile)



## 12.5. ISOM Digiware F-60 response curves



Influence of the Network Voltage on the Response Sensitivity according to EN/IEC 61557-9  
 Rf and Cf in downstream (Un = Multiple, Fn = 50 Hz, Us = 24 Vdc, IL = 25mA,  
 Injection Period=12s, Distribution profile)



# 13. PERFORMANCE CLASSES

Performance classes are drawn up in compliance with IEC 61557-12

DIRIS Digiware classification	DD in combination with dedicated sensors (TE, TR, TF)
Temperature	K55
Overall operating performance class for active power or active energy	0.5 in combination with TE or TF solid-core sensors 1 in combination with TR split-core sensors

## 13.1. Specification of the characteristics

Symbol	Function	Overall operating performance class of DIRIS Digiware + dedicated sensors* (TE, TR, TF) + one module U compliant with IEC 61557-12	Measurement range
Pa	Total active power	0.2 DIRIS Digiware only 0.5 with TE or TF sensors 1 with TR sensors	10% - 120% In 2% - 120% In 2% - 120% In
Q <sub>A</sub> , Q <sub>V</sub>	Total reactive power (arithmetic, vectorial)	1 with TE, TR or TF sensors	5% - 120% In
S <sub>A</sub> , S <sub>V</sub>	Total apparent power (arithmetic, vectorial)	0.5 with TE or TF sensors 1 with TR sensors	10% - 120% In
Ea	Total active energy	0.2 DIRIS Digiware only 0.5 with TE or TF sensors 1 with TR sensors	10% - 120% In 2% - 120% In 2% - 120% In
Er <sub>A</sub> , Er <sub>V</sub>	Total reactive energy (arithmetic, vectorial)	2 with TE, TR or TF sensors	5% - 120% In
Eap <sub>A</sub> , Eap <sub>V</sub>	Total apparent energy (arithmetic, vectorial)	0.5 with TE or TF sensors 1 with TR sensors	10% - 120% In
f	Frequency	0.02	45 - 65 Hz
I, IN	Phase current, measured neutral current	0.2 DIRIS Digiware only 0.5 with TE or TF sensors 1 with TR sensors	5% - 120% In 10% - 120% In 10% - 120% In
INc	Calculated neutral current	1 with TE or TF sensors 2 with TR sensors	10% - 120% In
U	Voltage (Lp-Lg or Lp-N)	0.2	50 - 300 VAC Ph/N
PF <sub>A</sub> , PF <sub>V</sub>	Power factor (arithmetic, vectorial)	0.5 with TE or TF sensors 1 with TR sensors	0.5 inductive to 0.8 capacitive
Pst, Plt	Flicker (short, long)	-	-
Udip	Voltage dip (Lp-Lg or Lp-N)	0.5	-
Uswl	Temporary overvoltages (Lp-Lg or Lp-N)	0.5	-
Uint	Voltage outage (Lp-Lg or Lp-N)	0.2	-
Unba	Voltage amplitude imbalance (Lp-N)	0.5	-
Unb	Voltage phase and amplitude imbalance (Lp-Lg or Lp-N)	0.2	-
THDu, THD-Ru	Total harmonic distortion rate of the voltage (relative to the fundamental, relative to the efficient value)	1	Orders 1 to 63
Uh	Voltage harmonics	1	-
THDi, THD-Ri	Total harmonic distortion rate of the current (relative to the fundamental, relative to the efficient value)	1 with sensors TE, TR or TF	Orders 1 to 63
Ih	Current harmonics	1 with sensors TE, TR or TF	-
Msv	Centralised remote control signals	-	-

\*With SOCOMEC connection cables.

## 13.2. Evaluation of the power supply quality

Symbol	Function	Overall operating performance class DIRIS Digiware + dedicated sensors (TE, TR, TF) in compliance with IEC 61557-12	Measurement range
f	Frequency	0.02	45 - 65 Hz
I, IN	Phase current, measured neutral current	0.2 DIRIS Digiware only 0.5 with TE or TF sensors 1 with TR sensors	5% - 120% In 10% - 120% In 10% - 120% In
INc	Calculated neutral current	1 with solid-core TE or TF sensors 2 with TR sensors	10% - 120% In
U	Voltage (Lp-Lg or Lp-N)	0.2	50 - 300 VAC Ph/N
Pst, Plt	Flicker (short, long)	-	-
Udip	Voltage dip (Lp-Lg or Lp-N)	0.5	-
Uswl	Temporary overvoltages (Lp-Lg or Lp-N)	0.5	-
Uint	Voltage outage (Lp-Lg or Lp-N)	0.2	-
Unba	Voltage amplitude imbalance (Lp-N)	0.5	-
Unb	Voltage phase and amplitude imbalance (Lp-Lg or Lp-N)	0.2	-
Uh	Voltage harmonics	1	-
Ih	Current harmonics	1 with sensors TE, TR or TF	-
Msv	Centralised remote control signals	-	-

---

CORPORATE HQ CONTACT:  
SOCOMECSAS  
1-4 RUE DE WESTHOUSE  
67235 BENFELD, FRANCE

---

[www.socomec.com](http://www.socomec.com)

Non contractual document. © 2022, Socomec SAS. All rights reserved.



 **socomec**  
Innovative Power Solutions