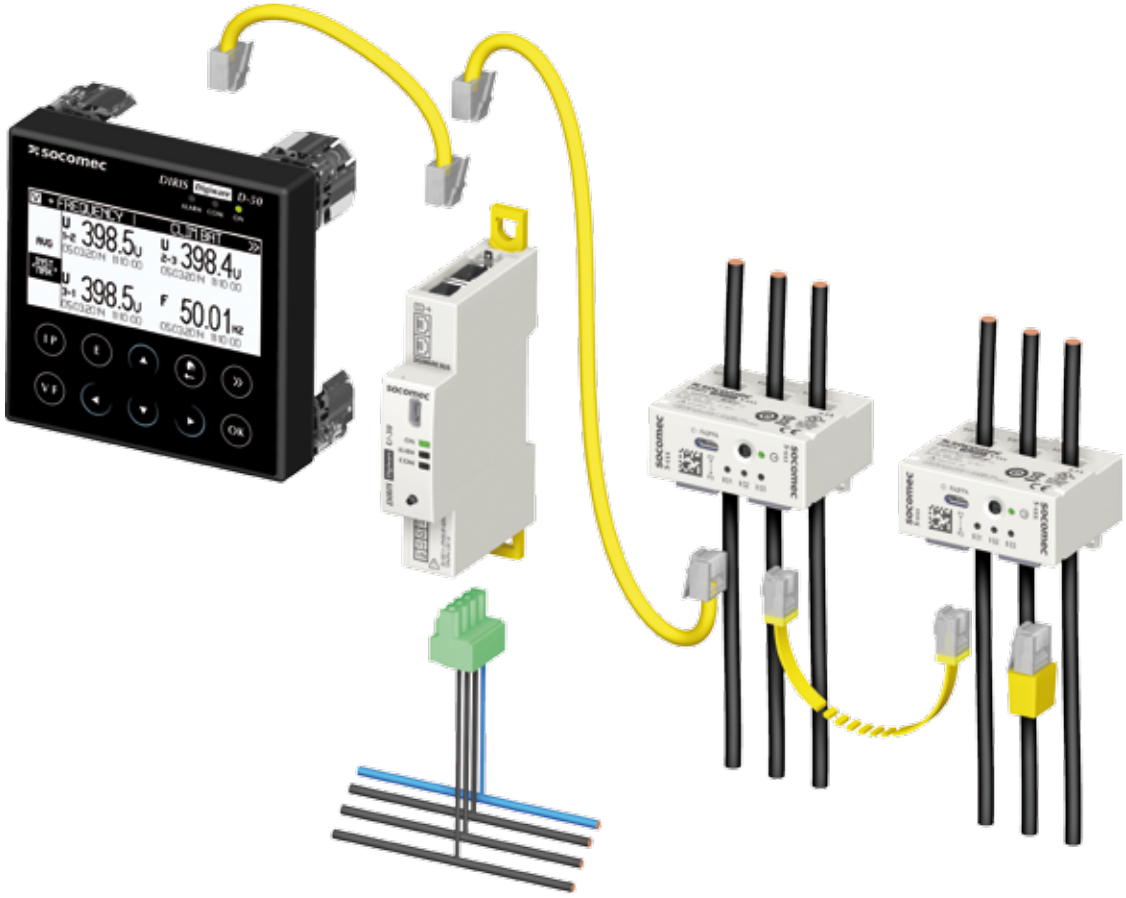
INSTRUCTION MANUAL

DIRIS Digiware S

Power Metering and Monitoring Device with integrated current sensors

EN



www.socomec.com/
en/diris-digiware

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Innovative Power Solutions

EN CONTENTS

1. DOCUMENTATION

All documentation relating to DIRIS Digiware and its associated sensors is available on the SOCOMEC website at the following address:
www.socomec.com/en/diris-digiware

2. HAZARDS AND WARNINGS

The term "device" used in the following paragraphs encompasses DIRIS Digiware.
The assembly, use, servicing and maintenance of this equipment must only be carried out by trained, qualified professionals.

SOCOMEC 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, burns or explosion. Do not use DIRIS Digiware S for voltage testing purposes. A voltage tester must be used instead. Failure to follow these instructions will result in death or serious injury.	Ref. ISO 7000-0434B (2004-01)
	Caution: refer to the accompanying documentation each time this symbol is shown	Ref. ISO 7000-0434B (2004-01)

- Only duly authorised and qualified personnel may work or install/uninstall the device.
- The instructions are valid together with the specific instructions for the device.
- The device is designed only for its intended purpose as set out in the instructions.
- Only accessories authorised or recommended by SOCOMEC may be used in association with the device.
- Before proceeding with installation, maintenance, cleaning, disassembly, connection, or maintenance work, the device and system must be cut off from the mains to avoid electrocution and damaging the system and device.
- This device is not designed to be repaired by the user.
- For any questions related to the disposal of the device, please contact SOCOMEC.

Failure to comply with the instructions of the device and this safety information can cause bodily injury, electric shock, burns, death or damage to property.

2.2. Risk of damaging the device

	Caution: risk of electric shock	Ref. ISO 7000-0434B (2004-01)
	Caution: refer to the accompanying documentation each time this symbol is shown	Ref. ISO 7010-W001 (2011-05)

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

- The device is correctly installed.
- The auxiliary power supply voltage indicated on the device is observed: 24 VDC ± 15%.
- The use of a SOCOMEC 230 VAC / 24 VDC power unit or a 24 VDC max 20 W class 2 power unit / SELV. The device must be protected with a 1A 24 VDC fuse.
- The network frequency indicated on the device is observed: 50 or 60 Hz.
- A maximum voltage at the voltage input terminals of 520 VAC phase/phase or 300 VAC phase/neutral is observed.
- Always connect the DIRIS Digiware S device observing the maximum prescribed currents (63A).
- Only use RJ45 SOCOMEC cables to interconnect the modules via the Digiware bus. When the ambient temperature exceeds +50°C, the minimum temperature rating of the copper cable to be connected to terminal must be +85°C.
- The device must not be cleaned.
- The device must not be installed outdoor.

Failure to respect these precautions could cause damage to the device.

2.3. Responsibility

- Assembly, connection and use must be carried out in accordance with the installation standards currently in force.
- The device 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 protection.
- The device must be placed in a system which itself complies with the applicable standards and safety regulations of the country of installation.
- Any cable which needs to be replaced may only be replaced with a cable having the correct rating.
- Despite constantly striving for quality in preparing this manual, errors or omissions are always a possibility and are not the responsibility of SOCOMEC.

3. PRELIMINARY OPERATIONS

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

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

- The packaging is in good condition
- The device has not been damaged during transit
- The device part number matches your order
- The packaging includes the device fitted with removable terminal blocks and a Quick Start Guide.

4. INTRODUCTION

4.1. DIRIS Digiware S current sensing module

DIRIS Digiware is a measurement system (PMD*) with modular format. It always comprises a voltage measurement module (U-xx) and one or several current measurement modules.

The current measurement modules can be of two types:
- DIRIS Digiware S with integrated current sensors to measure circuits up to 63A
- DIRIS Digiware I associated with TE, TR and TF sensors for the measurement from 5A up to 6000A

This instruction manual only addresses DIRIS Digiware S modules. Please refer to the DIRIS Digiware manual for more information on other current measurement modules.

Altogether, the DIRIS Digiware system is designed for monitoring and reporting electrical energy by offering a range of functions for measuring voltage, current, power, energy and power quality.
It can be used to jointly analyse single-phase and three-phase loads.

DIRIS Digiware is an innovative concept based on centralising the voltage measurement by a dedicated DIRIS Digiware U module and the current by dedicated DIRIS Digiware I or S modules. The voltage and current measurements are interconnected by the Digiware bus.

On DIRIS Digiware S modules, three current inputs are available enabling one or several loads to be monitored simultaneously. Several modules may be connected to the Digiware bus. This approach offers the possibility of characterising a high number of loads from a single voltage tap.

The DIRIS Digiware system is configured from its remote display or via the Easy Config software. The measurements can be accessed on a local display, via standard communication protocols or via the WEBVIEW web-based software solution embedded in the DIRIS G communication gateways, in the DIRIS Digiware D-70 display, or in the DATALOG H80/H81. Consumption data can also be accessed in the N'VIEW energy management software. Thanks to its architecture, the DIRIS Digiware can be easily integrated into an energy management system which requires a large number of loads to be monitored.

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

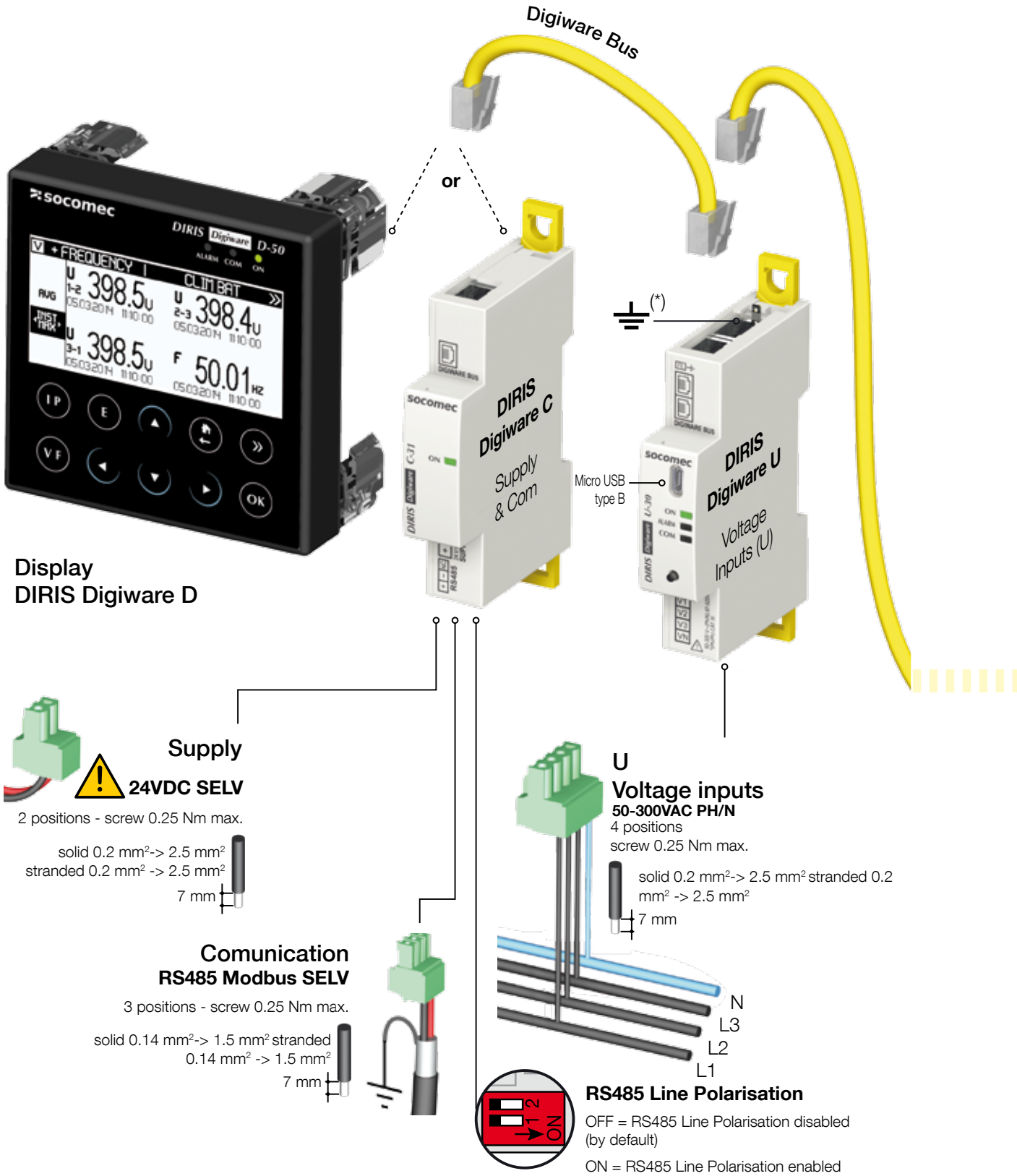
4.1.1. Range

Control and power supply interface (24 VDC)	
	
DIRIS Digiware D **Multipoint display** DIRIS Digiware D-40 Ref. 4829 0199 DIRIS Digiware D-50 Ref. 4829 0201 DIRIS Digiware D-70 Ref. 4829 0202	**DIRIS Digiware C** **System interface*** DIRIS Digiware C-31 Ref. 4829 0101 DIRIS Digiware C-32 Ref. 4829 0103 ** if there is no multipoint display*

Voltage measurement module	Current measurement and sensing module
	
DIRIS Digiware U **Voltage measurement** DIRIS Digiware U-10 Ref. 4829 0105 DIRIS Digiware U-20 Ref. 4829 0106 DIRIS Digiware U-30 Ref. 4829 0102	**DIRIS Digiware S** **3 current measurement inputs** DIRIS Digiware S-130 Ref. 4829 0160 DIRIS Digiware S-135 Ref. 4829 0161 DIRIS Digiware S-Datacenter Ref. 4829 0162

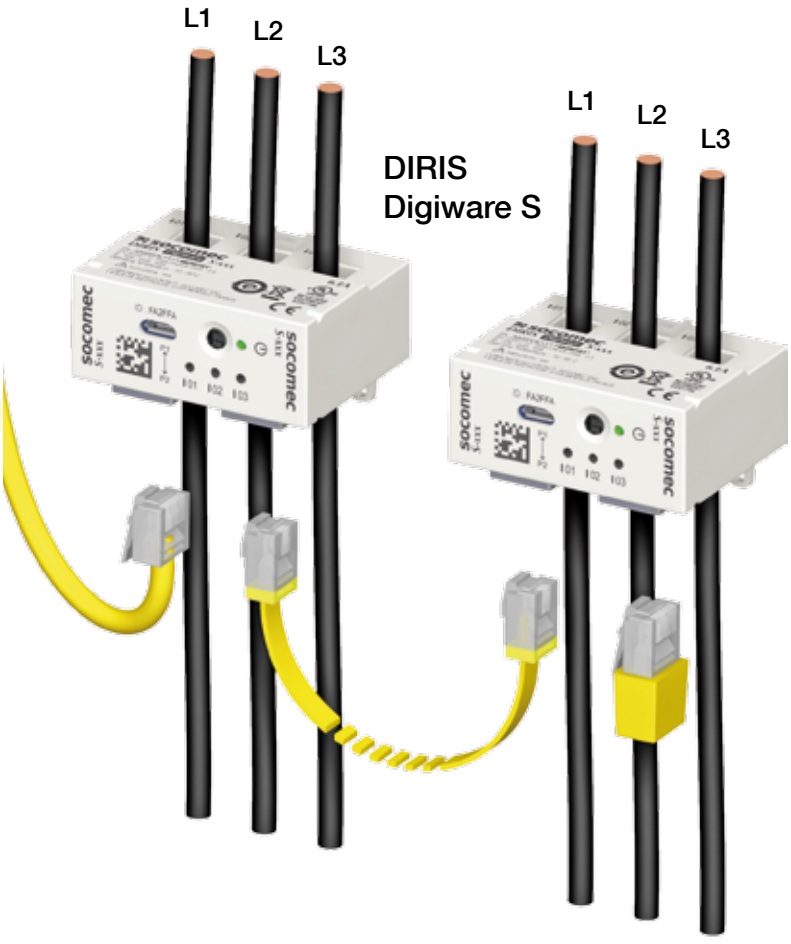
IO input/output modules	
	
DIRIS Digiware IO-10 **Digital inputs/outputs** DIRIS Digiware IO-10 Ref. 4829 0140	**DIRIS Digiware IO-20** **Analogue inputs** DIRIS Digiware IO-20 Ref. 4829 0145

4.1.2. Principle



SELV: Safety Extra Low Voltage
(*) Earth should not be wired in unearthed systems

The Device must be fitted on insulated cables only:
300V or 600V insulation depending on the voltage level of the electrical installation



4.1.3. Functions

DIRIS Digiware S modules enable, when associated with a voltage measurement module DIRIS Digiware U-xx and input/output modules DIRIS Digiware IO-xx, the measurement of many parameters:

- **General measurements**
  - Voltage measurement
  - Multi-load current measurement
  - Powers, power factor, phi, cos phi and tan phi
  - Operation across 4 quadrants
  - Predictive power
  - Accuracy of the active energy class 0.5 according to the IEC 61557-12 standard
- **Power quality**
  - THD and harmonics up to 63rd for voltage and current
  - K-factor
  - Crest Factor for voltage and current
  - Current and voltage unbalance
  - Direct, inverse and zero-sequence voltages and currents
  - EN50160 events (Uswl, Udip, Uint) and inrush currents
- **Data logging**
  - Recording of average electrical values
  - Recording and timestamping of min/max electrical values
- **Metering**
  - Total and partial active, reactive and apparant energies (+/- kWh, +/- kVarh, kVAh)
  - Load curves / demand profiles
- **Alarm**
  - Timestamped alarms
- **Current inputs**
  - Measurement of 3 currents per DIRIS Digiware S-xx module
  - Simultaneous management of several single-phase, two-phase and three-phase loads
- **Voltage detection**
  - On DIRIS Digiware S, three LEDs indicating the presence or the absence of voltage on each line
  - The voltage detection feature is only an indication and must not replace the use of a voltage tester.
- **Inputs/outputs**
  - Digital inputs/outputs and analog inputs (with DIRIS Digiware IO-10 and IO-20 modules)
- **VirtualMonitor**

On DIRIS Digiware S:

  - Monitoring of protective devices: position (open/closed), trip status
  - Protection counters: manual operation counters and trip counter
  - Without the use of auxiliary contacts

- **AutoCorrect**
  - On DIRIS Digiware S, automatic load configuration and correction of wiring errors

• **Communication**

- The DIRIS Digiware system includes several interfaces which can handle multiple communication protocols (Modbus, BACnet IP, SNMP)
- Measurements are available from the DIRIS Digiware D-xx displays or from the Web server WEBVIEW, embedded in the DIRIS Digiware D-70, in the DIRIS G communication gateways, and in the DATALOG H80/H81
- SNTP time synchronization from the DIRIS Digiware D-70 display or the DIRIS G gateway
- FTPS export from the DIRIS Digiware D-70 display and DATALOG H80/H81 and FTP export from the DIRIS G-50 communication gateway
- Auto detection and addressing of products connected downstream of the DIRIS Digiware D-xx displays and DIRIS G gateways

4.1.4. Electrical readings

	DIRIS Digiware			
	D-40	**D-50**	**D-70**	**C-31**
Function				
Centralisation of measurement points	•	•	•	•
High-resolution LCD display (configuration, selection and visualisation of multiple circuits)	•	•	•	
Power supply				
24 VDC	•	•	•	•
Communication				
Slave RS485 modbus	•			•
Master RS485 modbus		•	•	
Digiware bus	•	•	•	•
Ethernet Modbus TCP		•	•	
BACnet IP Ethernet			•	
SNMP Ethernet v1, v2, v3			•	
Webview embedded web server			•	
Format				
Width/Number of modules	97x97 mm	97x97 mm	97x97 mm	18 mm / 1
Part number	4829 0199	4829 0201	4829 0202	4829 0101

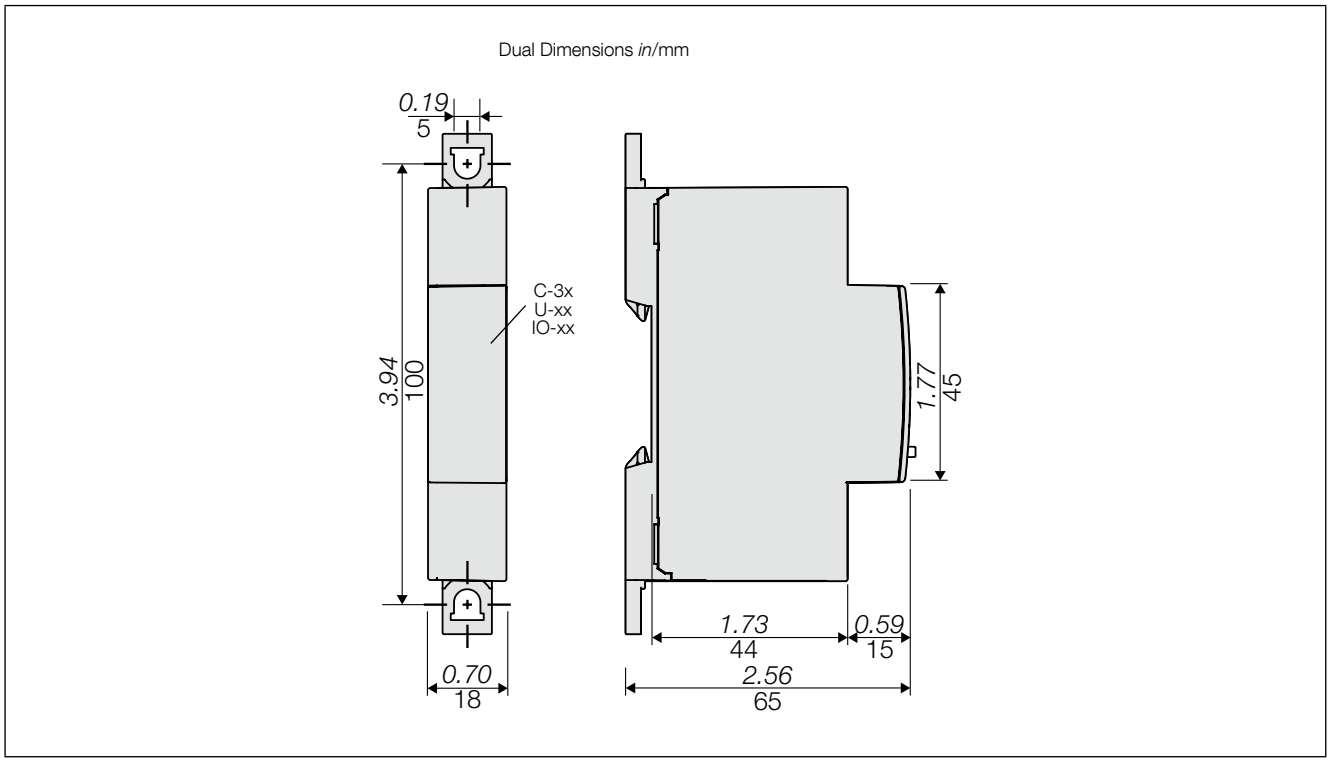
	DIRIS Digiware U		
	U-10	**U-20**	**U-30**
Multi-measurement			
U12, U23, U31, V1, V2, V3, Vn, F	•	•	•
U system, V system			•
Ph/N unbalance (Vnb, Vnba, Vdir, Vinv, Vhom)			•
Ph/Ph unbalance (Unb, Unba, Udir, Uinv)			•
Power quality			
THDv1, THDv2, THDv3, THDu12, THDu23, THDu31, THD Vsys, THD Usys		•	•
Individual harmonics U & V (up to rank 63)			•
Crest Factor			•
Voltage dips /sags, swells and interruptions according to EN50160			•
Alarms			
Thresholds			•
History of average values			
			•
Format			
Width/Number of modules	18 mm / 1	18 mm / 1	18 mm / 1
Part number	4829 0105	4829 0106	4829 0102

	DIRIS Digiware S		
	S-130	**S-135**	**S-Datacenter**
Application	Metering	Analysis	Monitoring
Number of current inputs	3	3	3
Basic current Ib / Maximum current Imax	10A / 63A	10A / 63A	10A / 63A
Load type accepted	1P+N 2P 2P+N 3P 3P+N	1P+N 2P 2P+N 3P 3P+N	1P+N
Metering			
± kWh, ± kvarh, kVAh	•	•	•
Multi-tariff (max 8)		•	
Load curves / demand profiles		•	•
Multi-measurement			
I1, I2, I3, In, ΣP, ΣQ, ΣS, ΣPF	•	•	•
P, Q, S, PF per phase		•	•
Predictive power		•	•
Current unbalance (Inba, Idir, Iinv, Ihom, Inb)		•	
Phi, cos Phi, tan Phi		•	•
Power Quality			
THDi1, THDi2, THDi3, THDin, THD Isys		•	•
Individual harmonics I (up to rank 63)		•	
Crest Factor I1, I2, I3		•	
Inrush		•	
Alarms			
Thresholds		•	•
Load levels			•
System alarms		•	•
Protection alarms		•	•
Protection counters		•	•
Boolean combination of alarms		•	•
Trends			
Average values		•	•
Advanced features			
Voltage detection	•	•	•
VirtualMonitor technology	•	•	•
AutoCorrect technology	•	•	•
Format			
Width	54 mm	54 mm	54 mm
Part number	4829 0160	4829 0161	4829 0162

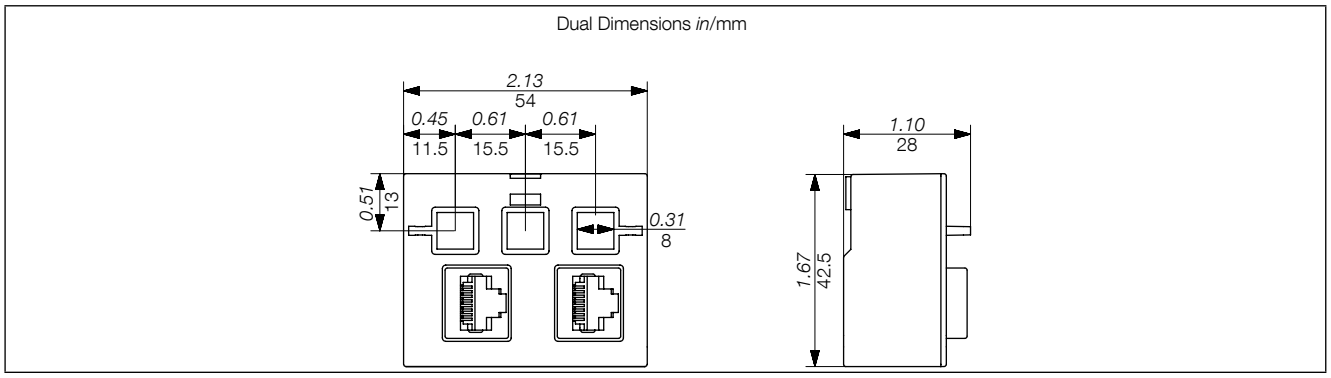
	DIRIS Digiware IO	
	IO-10	**IO-20**
Application	Measuring / Monitoring / Analysis	
Number of digital inputs/ outputs	4/2	-
Number of analogue inputs	-	2
Format		
Width	18 mm	18 mm
Number of modules	1	1
Part number	4829 0140	4829 0145

4.1.5. Dimensions

4.1.5.1. DIRIS Digiware C-3x, U-xx & IO-xx



4.1.5.2. DIRIS Digiware S-xx



5. INSTALLATION

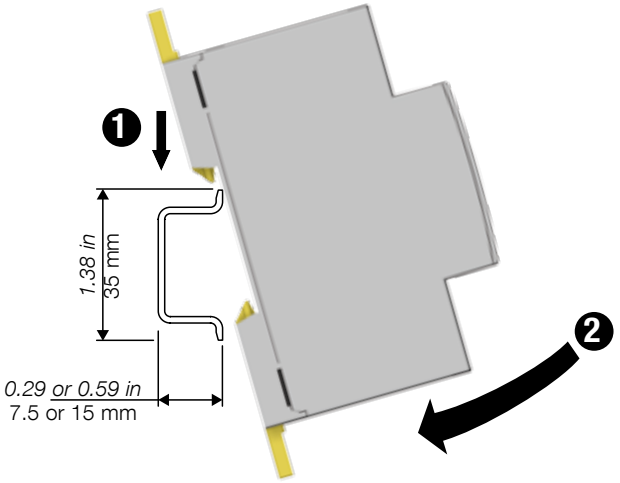
The following paragraphs describe the installation of the DIRIS Digiware system.

5.1. Recommendations and safety

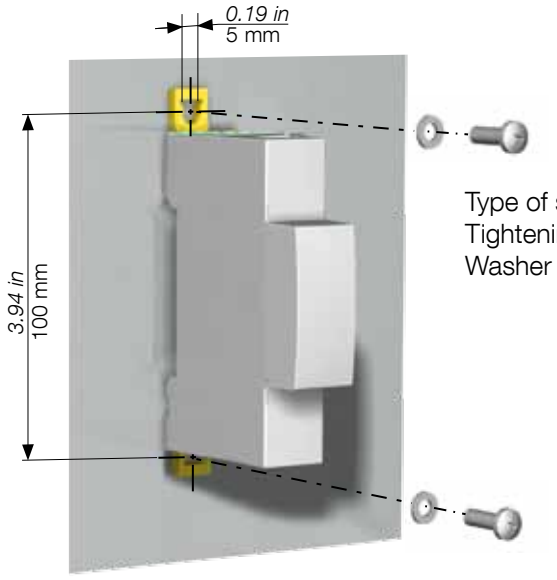
Refer to the safety instructions (section “2. Hazards and warnings”, page 5)

5.2. DIRIS Digiware mounting

5.2.1. DIRIS Digiware C, U, IO - DIN rail mounting

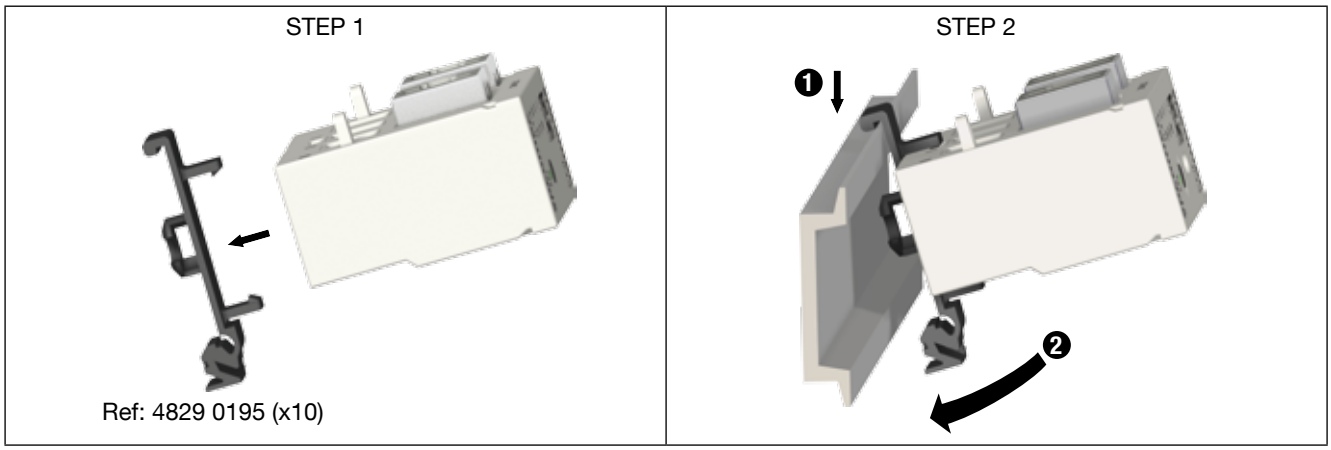


5.2.2. DIRIS Digiware C, U, IO - back plate mounting

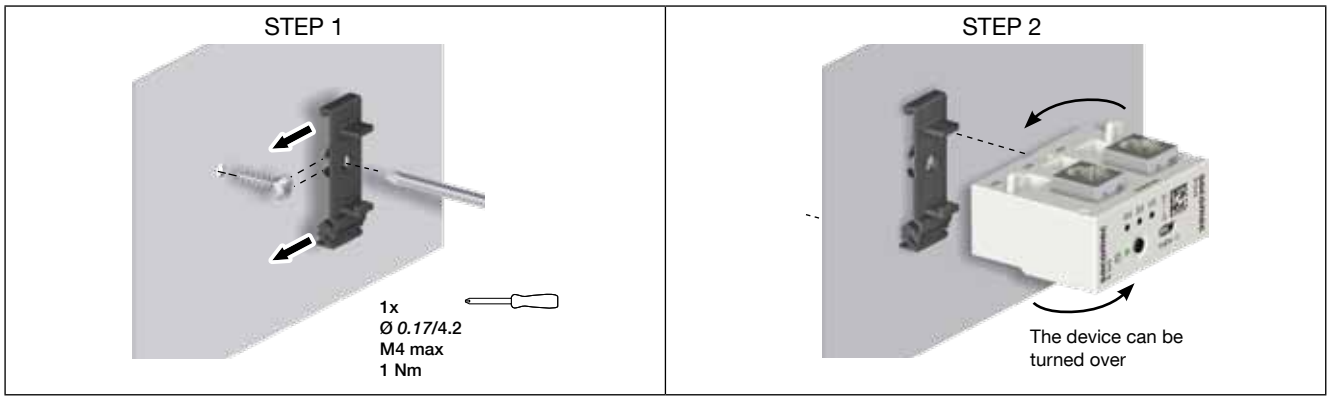


Type of screw: M4
Tightening torque: 0.5 Nm
Washer diameter *0.47 in* / 12 mm max.

5.2.3. DIRIS Digiware S – DIN rail mounting



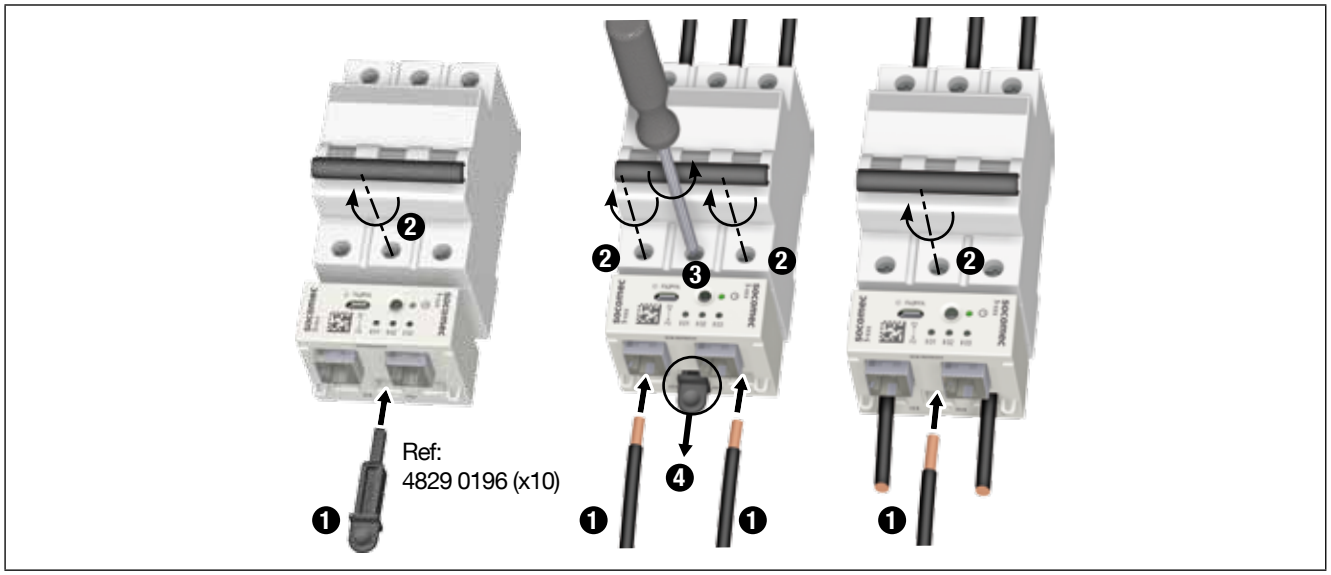
5.2.4. DIRIS Digiware S – Back plate mounting



5.2.5. DIRIS Digiware S holding

• Temporary MCB insert:

The DIRIS Digiware S module can be fixed and transported directly on top or under the protective device using a temporary insert tool:
Step 1: Insert the tool through one of the current inputs and into the corresponding breaker terminal.
Step 2: Tighten the associated screw(s).
Please refer to the operating instructions of the protective device for additional information related to its installation.



• Cable tie tethers:

The DIRIS Digiware S module has 2 tethers which can be used with tightening clamps:

The dimensions of the tightening clamp must not exceed 4 mm x 2 mm.

5.2.6. Accessories overview

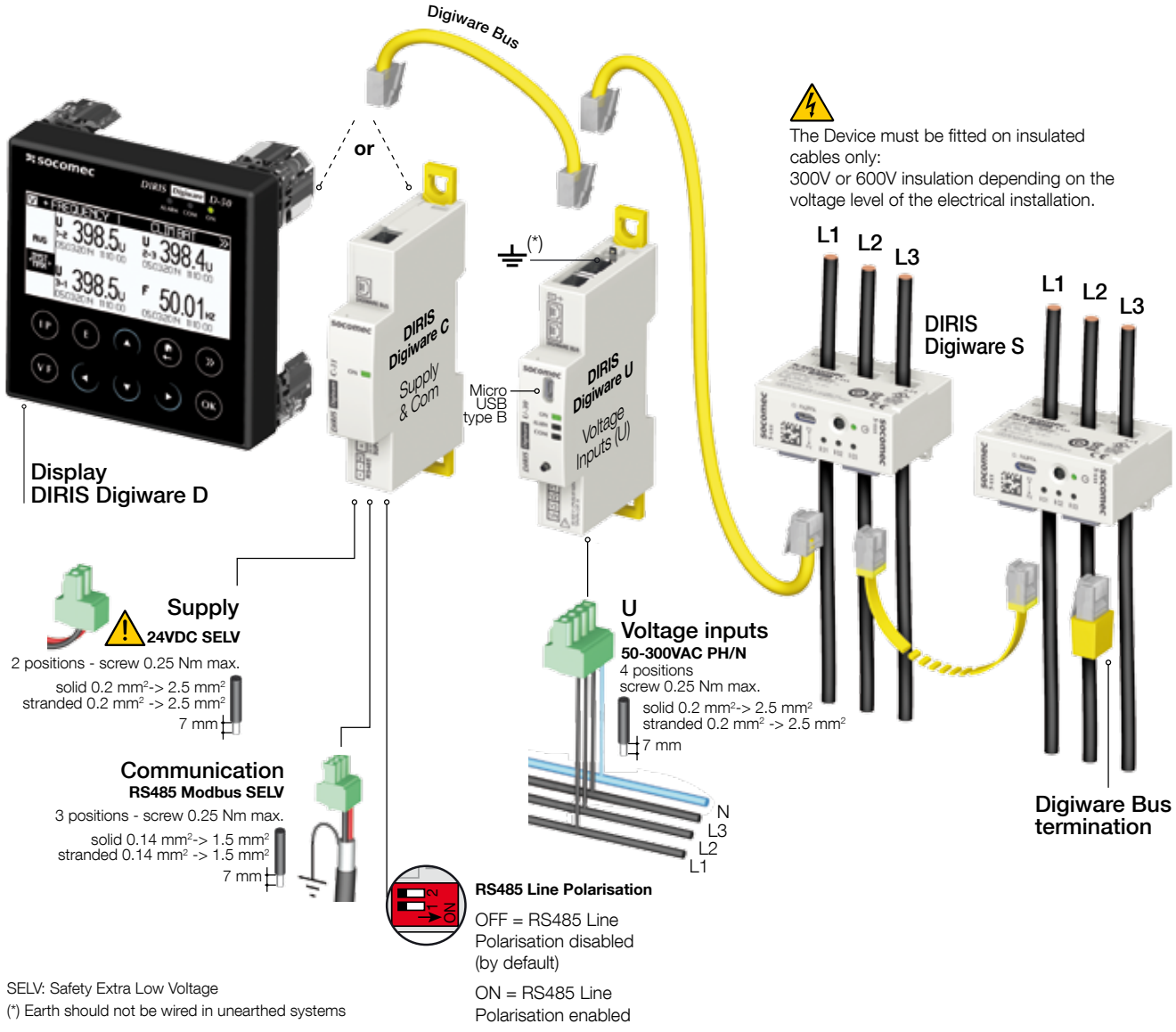
	Part number	Description
	4829 0195	DIN-rail and back plate fixing tool (x10)
	48290196	Temporary MCB insert (x10)

6. CONNECTION

6.1. DIRIS Digiware S connection

⚠	Use **RJ45 Digiware Bus cables** (UTP RJ45 straight, twisted pairs, unshielded, AWG24, 600V, Cat 5 rated, -10 / +70 °C) between all DIRIS Digiware modules. Do not put single insulated cables or active parts near the micro-USB or Digiware RJ45 port of the device.

⚠	Do not pull on the RJ45 cable more than 20N.

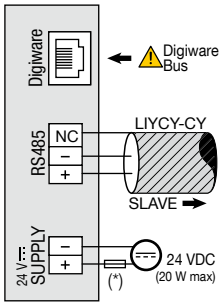


SELV: Safety Extra Low Voltage

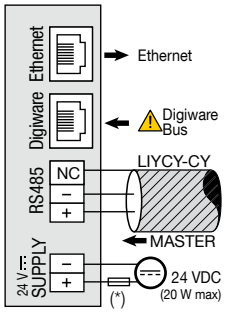
(*) Earth should not be wired in unearthed systems

Description of the terminals

DIRIS Digiware D-40



DIRIS Digiware D-50 / D-70

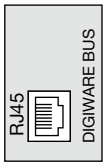


(*) 1 A gG/Am fuse if using a non-SOCOMEC supply

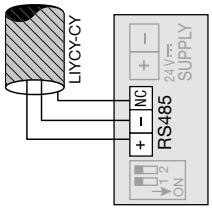
DIRIS Digiware C-31

Power supply

Digiware BUS



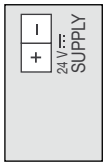
Communication



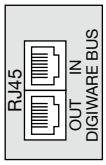
Line polarisation

DIRIS Digiware C-32

Power supply

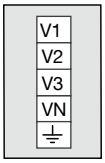


Digiware BUS

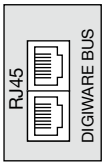


DIRIS Digiware U

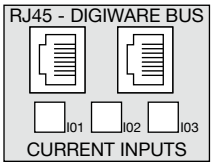
Voltage measurement



Digiware BUS

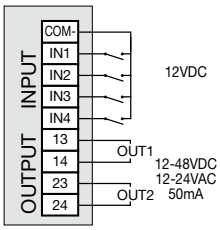


DIRIS Digiware S

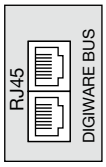


DIRIS Digiware IO-10

Inputs/outputs

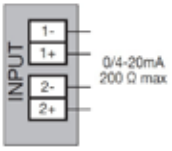


Digiware BUS

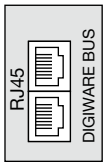


DIRIS Digiware IO-20

Inputs



Digiware BUS



6.2. Connecting to the electrical network and loads

The DIRIS Digiware U-xx modules can be used on single-phase, two-phase or three-phase electrical networks.

Each DIRIS Digiware S-xx current sensing module can use its three current inputs to simultaneously measure several loads, for example three single-phase loads.

In addition, within one DIRIS Digiware system, different load types may be measured. For example, several Digiware S-xx modules may be configured as single-phase loads while others may be configured to measure three-phase loads.

This approach allows great flexibility within the electrical installation which may contain several different load types.

6.2.1. Configurable loads based on the network type

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

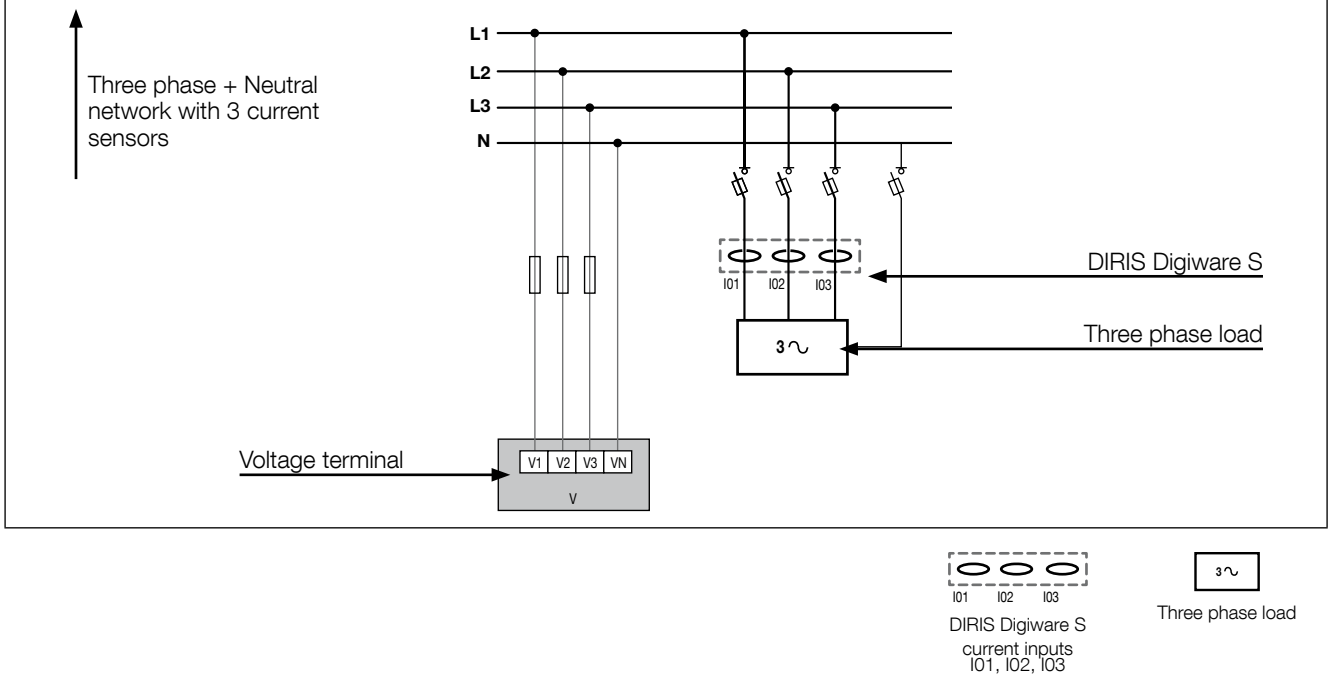
Network type	Configurable load
1P+N	1P+N – 1CT
2P	2P – 1CT
2P+N	2P+N – 2CT / 2P – 1CT / 1P+N – 1CT
3P*	3P – 3CT / 3P – 2CT / 3P – 1CT
3P+N	3P+N – 3CT / 3P+N – 1CT / 3P – 3CT / 3P – 2CT / 3P – 1CT / 1P+N – 1CT

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

6.2.2. Description of the main network and load combinations

Legend:

3P+N – 3CT



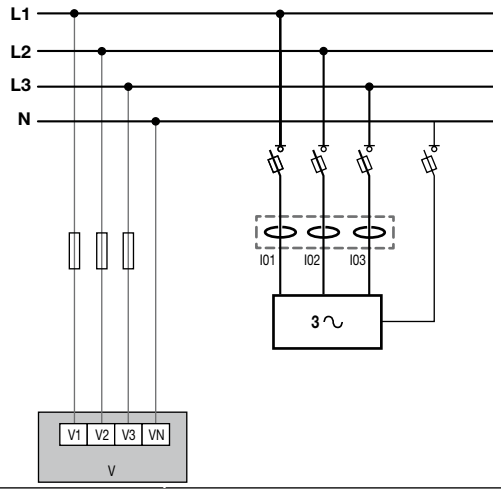
DIRIS Digiware S current inputs I01, I02, I03

Three phase load

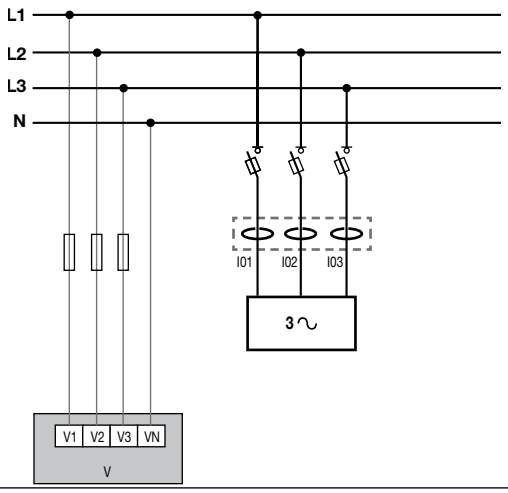
Below are some connection examples of the DIRIS Digiware S module:

6.2.2.1. DIRIS Digiware S-xx

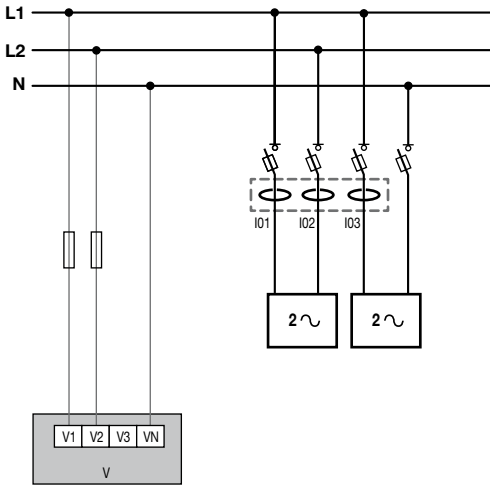
3P+N - 3CT



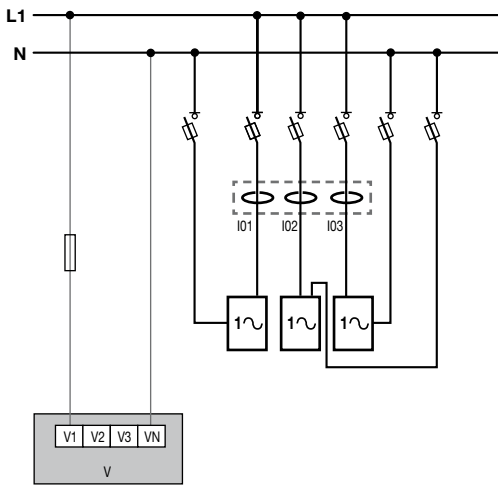
3P - 3CT



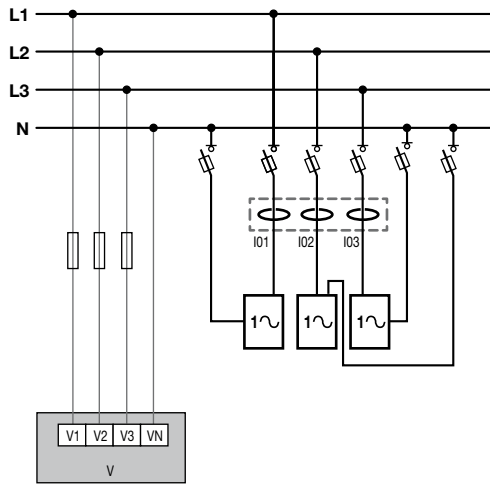
2P+N-2CT & 2P+N-1CT



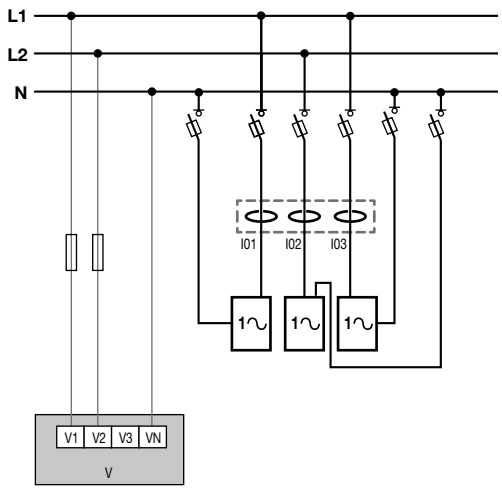
1P+N - 1CT (3x)



3P+N - 1 CT (x3)



2P+N - 1CT (x3)



Fuse: 0.5 A gG / BS 88 2A gG / 0.5 A class CC
Listed fuses for UL application.

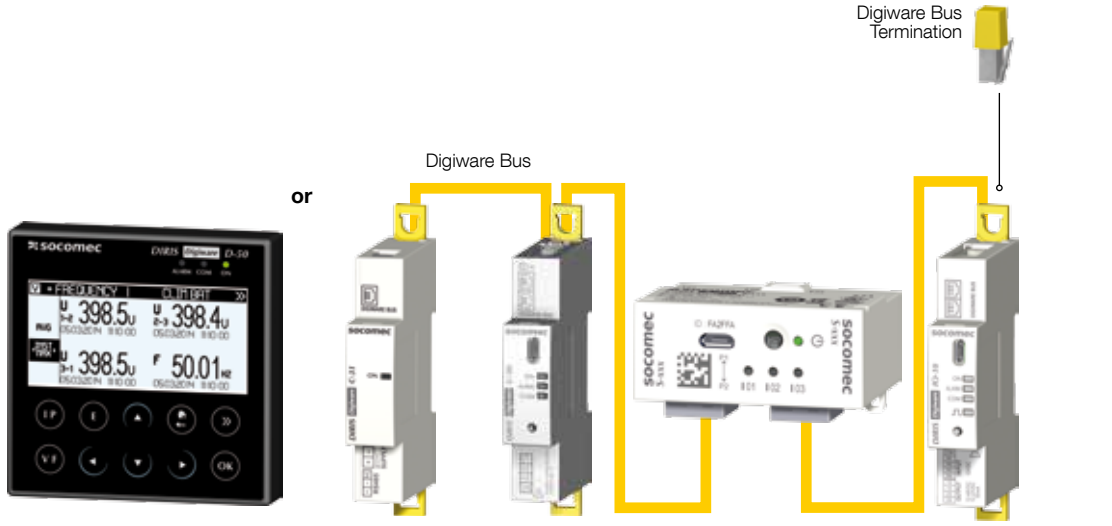
6.2.3. Connection of the functional earth

It is recommended that the functional earth be connected to guarantee optimum measuring accuracy and better emissivity/immunity for the electromagnetic compatibility (class B in conducted emission). Earth must not be used in a neutral IT system.

	Earth must be connected on the DIRIS Digiware U module in order to use the voltage detection feature, the VirtualMonitor and AutoCorrect technologies.

7. DIGIWARE BUS

7.1. Principle



DIRIS Digiware is a system comprising the following elements:

- One DIRIS Digiware D remote display or one DIRIS Digiware C-31 system interface module
- A DIRIS Digiware U voltage measurement module
- One or multiple DIRIS Digiware S current sensing modules
- One or multiple DIRIS Digiware IO input/output modules
- A Digiware bus termination (ref. 4829 0180) positioned on the last module. It is provided with the DIRIS Digiware D display and the DIRIS Digiware C-31 system interface module.

Note: For the measurement of circuits with a higher current rating, DIRIS Digiware I-xx current measurement modules associated with TE, TR/iTR or TF current sensors can be used, making the DIRIS Digiware system suitable for all levels within the electrical installation (MAIN, subfeed, terminal circuits...)

7.1.1. Digiware Bus connection cables

Length (m)	Quantity	Part number
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
50-m reel + 100 connectors		4829 0185

Use the shortest possible cables to optimise the electromagnetic emissions.

The total max. length must not exceed 100 metres.

⚠	Use only SOCOMEC cables for the Digiware bus.

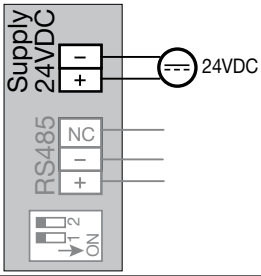
7.1.2. Digiware Bus Termination

	Quantity	Part number
	1	4829 0180

A DIRIS Digiware bus termination is supplied with each DIRIS Digiware D display and with each DIRIS Digiware C system interface module.

7.2. Sizing of the power supply

DIRIS Digiware units are supplied by a single 24VDC power point via the DIRIS Digiware C-31 system interface module.



A P15 24VDC power supply is available in a 15 W version (part no. 4829 0120).

Specifications:

- 230 VAC / 24 VDC - 0.63 A - 15 W
- Modular format
- Dimensions (H x W): 90 x 36 mm

7.2.1. Equipment consumption

Device	Power supplied (W)	Power consumed (W)
Power supply		
P15 230 V / 24 V	15	
Cables		
50 metre package		1.5
System interface		
DIRIS Digiware D-40/D-50		2
DIRIS Digiware D-70		2.5
DIRIS Digiware C-31		0.8
Voltage measurement module		
DIRIS Digiware U-xx		0.72
Current sensing module		
DIRIS Digiware S-xx		0.35
Input/Output modules		
DIRIS Digiware IO-10		0.5
DIRIS Digiware IO-20		0.5
Repeater		
DIRIS Digiware C-32		1.5

7.2.2. Calculation rules for the max. number of devices 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 supply.
Power supply must not exceed 20 W.

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

For example, it is possible to use

- 1 DIRIS Digiware D-50 (2 W) display
- 1 DIRIS Digiware U-xx (0.72 W) voltage module
- 50 metres of cable (1.5 W)

and

- 14 DIRIS Digiware current sensing modules S-xx (14 x 0.35 = 4.9W)

⇨ **Total power = 9.12 W**

Size with a 24 VDC power supply delivering a maximum of 20 W

For example, it is possible to use

- 1 DIRIS Digiware D-70 (2.5W) display
- 1 DIRIS Digiware U-xx (0.72 W) voltage module
- 50 metres of cable (1.5 W)

and

- 2 DIRIS Digiware current modules I-4x (2 x 1.125 = 2.25W)
- 28 DIRIS Digiware current sensing modules S-xx (28 x 0.35 = 9.8W)

⇨ **Total power = 16.77 W**

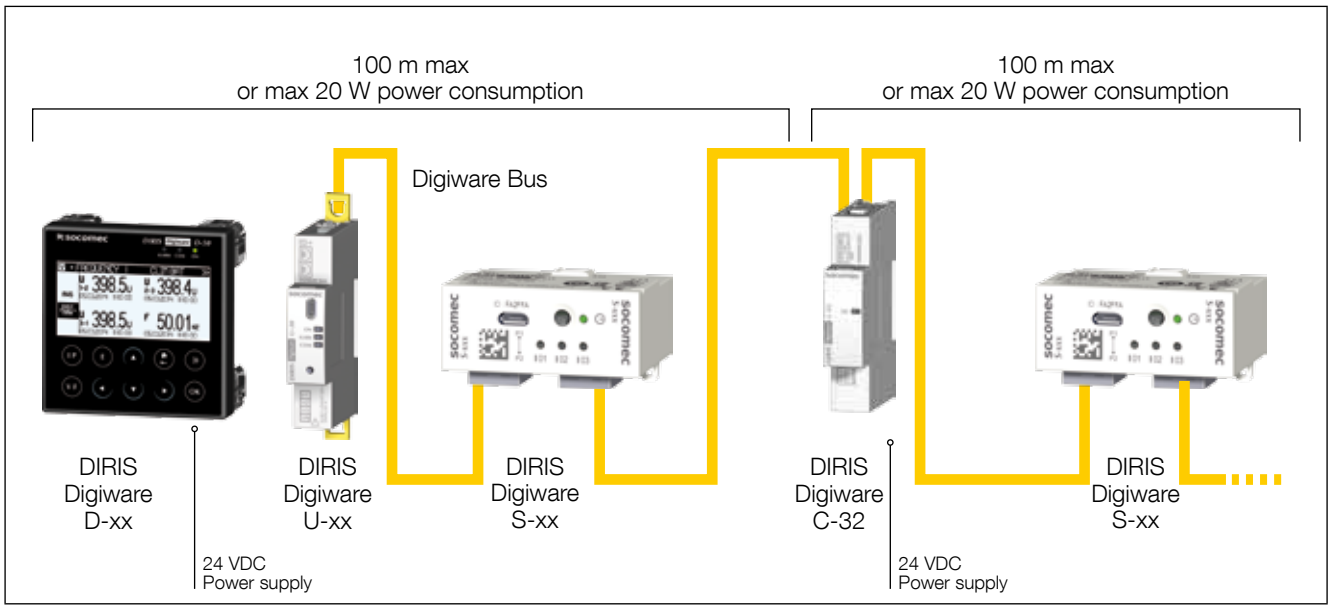
7.2.3. Digiware bus repeater

Whenever the power consumption is higher than 20 W or the distance is greater than 100 m, a DIRIS Digiware C-32 repeater is required.

In a DIRIS Digiware system, a maximum of 2 repeaters may be used.

	
	DIRIS Digiware C-32 repeater
Part number	4829 0103

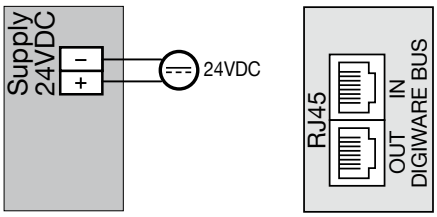
Configuration example:



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

The repeater has a 24VDC power supply.

DIRIS Digiware C-32

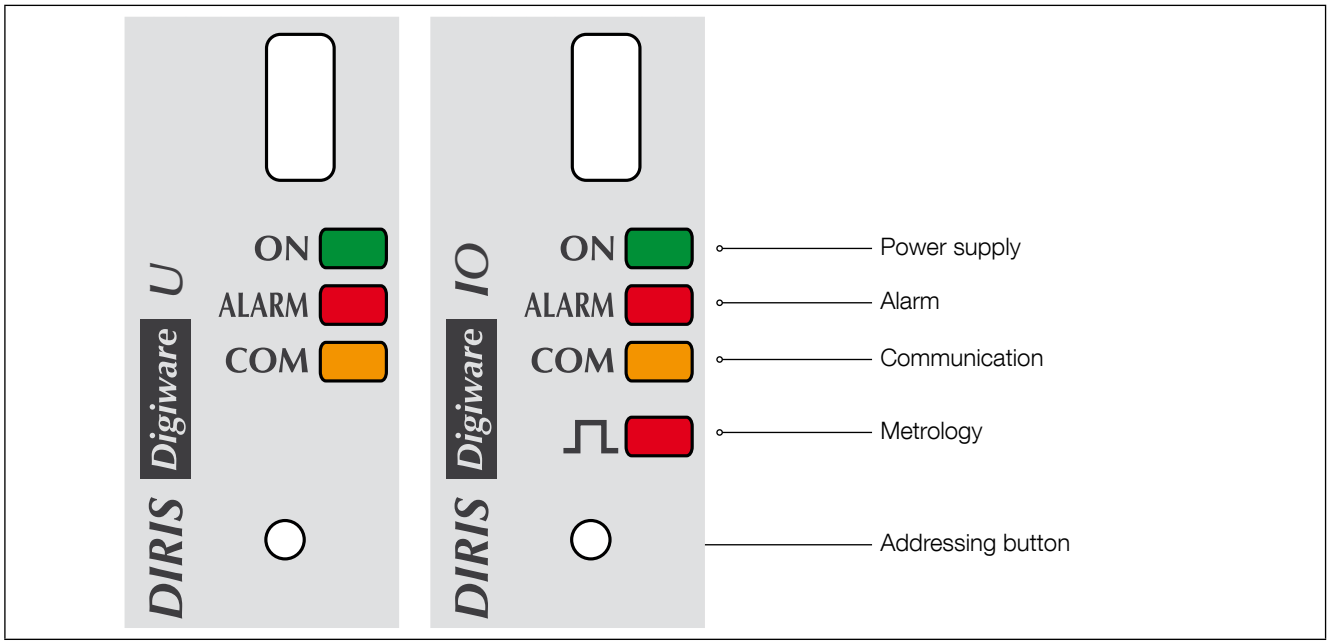


8. STATUS AND AUTO-ADDRESSING LEDS

8.1. Device LEDs

Several LEDs can be used to easily identify the status of the devices at any time.

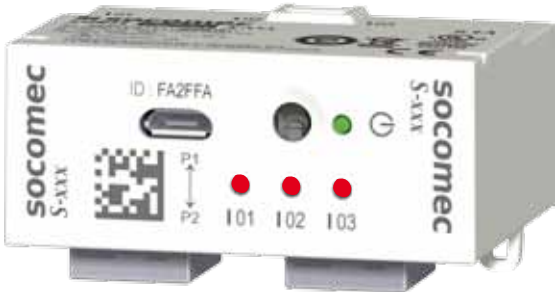
- **DIRIS Digiware U-xx and IO-xx:**



LED state	Fixed	Blinking	Pulse
ON	In operation	During 10 seconds, if an identification request is initiated from the Easy Config software	1 second to start-up
ALARM	Indicates the presence of a measurement alarm or logical alarm (do not have priority over system alarms)	U-xx: Indicates the presence of a system alarm (*) IO-xx: Not available	1 second to start-up
COM	Address conflict during an auto detection process initiated from a D-xx display or a G-xx	Address OK	1 second during startup and when a frame received is processed
⎍	Not available	U-xx: not available IO-10: Corresponds to the change of state of the inputs (IN1, IN2, IN3, IN4) which are configured in logical mode	U-xx: not available IO-10: The metrological pulse weight of input 1 (IN1) configured in pulse counter mode

(*) Network rotation alarm possibly indicating a configuration error

• **DIRIS Digiware S-xx:**



Main LED	Fixed	Blinking
Green	Product in normal operation	Product in communication and During 10 seconds, if an identification request is initiated from the Easy Config software
Red	Indicates the presence of a measurement alarm (does not have priority over system alarms)	Indicates the presence of a system alarm (**)
Orange	Address conflict during an auto detection process initiated from a D-xx display or a G-xx gateway	Not available

I01, I02 & I03 LEDs (***)	Fixed	Pulse
Red	Indicates that no voltage is detected on a phase.	Corresponds to the metrological pulse weight (1Wh by default)

(**) System alarms for the DIRIS Digiware S module can be a bad V/I association indicating a possible wiring error.

(***) By default, I01, I02, I03 LEDs are configured in voltage detection mode.
Settings can be changed to metrological LED mode from the Easy Config configuration software.

⚠	The voltage detection feature is an indication of the presence or the absence of voltage on one of the phases. It should only be used as an indication, and must not replace the use of a voltage tester. In addition, the nominal voltage must be correctly configured in the DIRIS Digiware U module

8.2. Auto-addressing

With the auto-addressing mode you can have the system automatically assign addresses to devices connected to the DIRIS G gateways or DIRIS Digiware D remote displays. This mode is only compatible with DIRIS B-30 , DIRIS A-40 and DIRIS Digiware PMDs. The addresses will need to be allocated manually on the other PMD (DIRIS A) and meters (COUNTIS).

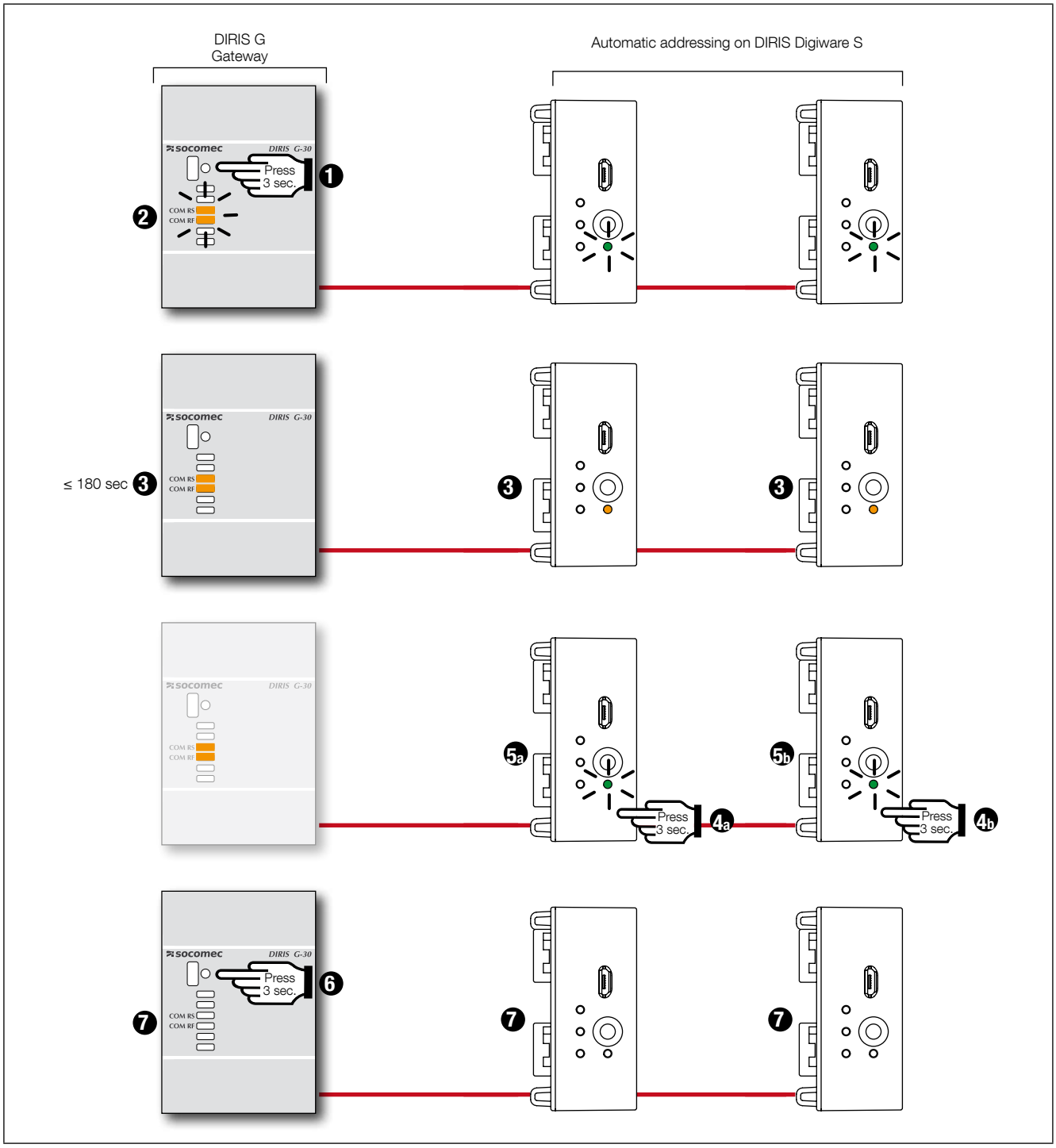
Two modes are available:

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

Mode 1 is without external equipment (see description below).
Mode 2 is carried out from a PC equipped with Easy Config.

Description of mode 1

Flashing LED / LED continuously on



⚠	The DIRIS Digiware U, DIRIS Digiware S, and DIRIS Digiware IO modules benefit from the auto-addressing mode. The auto addressing can be launched from the DIRIS Digiware D-40 / D-50 / D-70 remote displays or from the DIRIS G communication gateway. The modules are always connected to the DIRIS G gateway via a DIRIS Digiware C-31 interface or via a DIRIS Digiware D-40 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

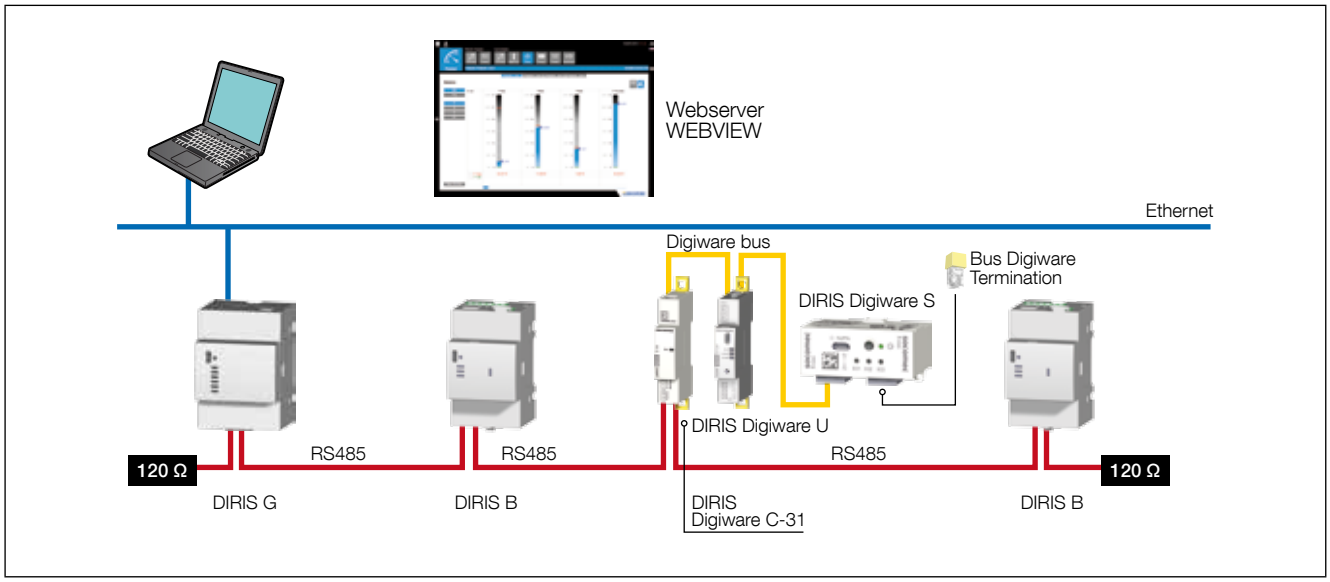
9.1. General information

With DIRIS Digiware, communication is available at a single point from the system interface. Depending on the system interface used, DIRIS Digiware can communicate over Ethernet or over an RS485 serial link (2- or 3-wire) via multiple protocols (Modbus RTU, TCP, BACnet and SNMP).

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 to a PC (with DIRIS Digiware C-31 counting as one device), a PLC or the gateway over a distance of 1,200 meters.

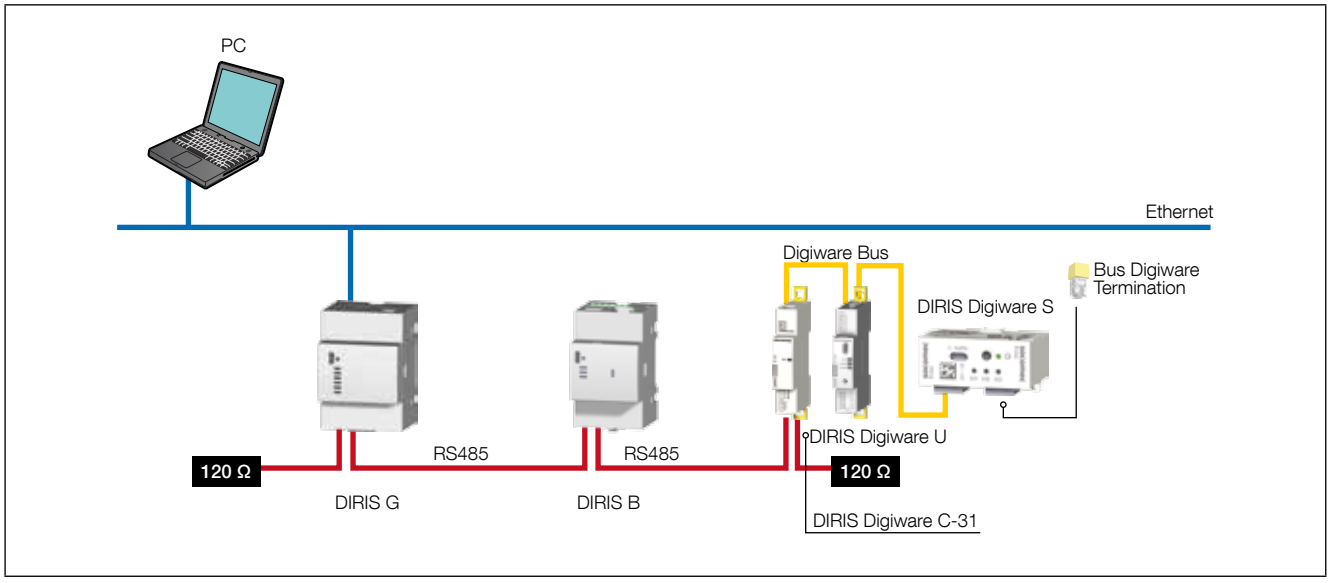
BACnet and SNMP protocols are available from the DIRIS Digiware D-70 display. For more information about these protocols, please refer to the instruction manual of the DIRIS Digiware D-70.

Example of architecture in combination with the DIRIS G gateway:



9.2. RS485 and Bus DIRIS Digiware rules

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



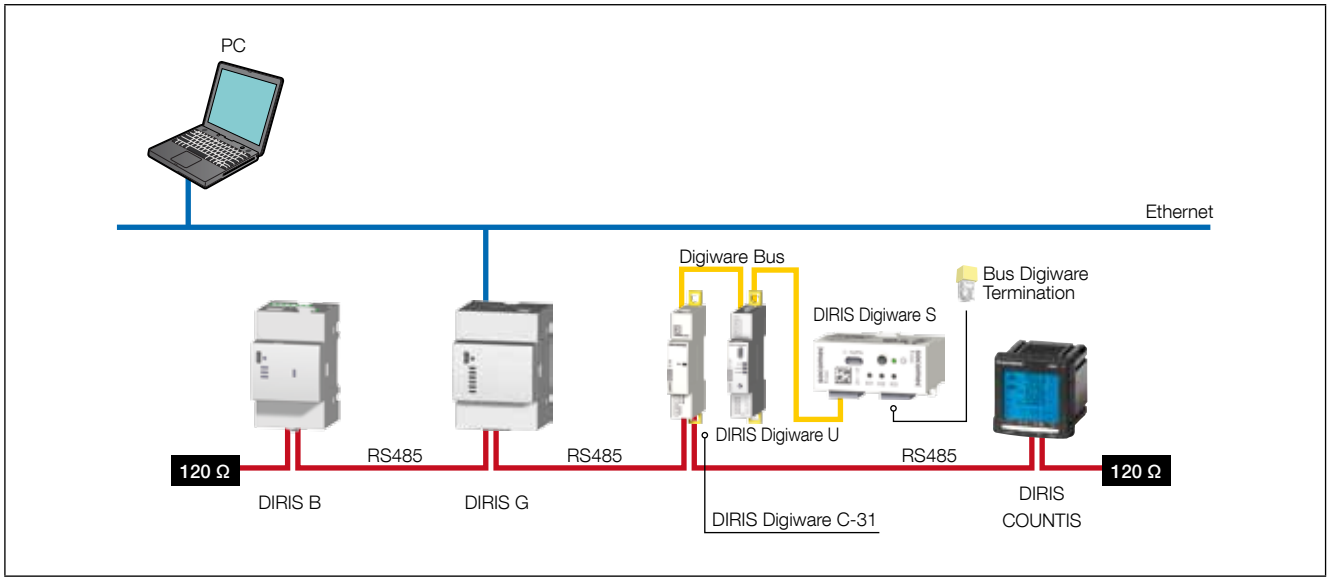
9.2.1. Connection with the DIRIS Digiware C-31 system interface module

In an RS485 link, the DIRIS Digiware C-31 system interface module may be placed anywhere in the RS485 link.

The following rules must be observed:

- A 120 Ω resistor must be added at the start of the RS485 link
- A 120 Ω resistor must be added at the end of the RS485 link
- A termination must be added at the end of the Digiware bus.

Connection example:



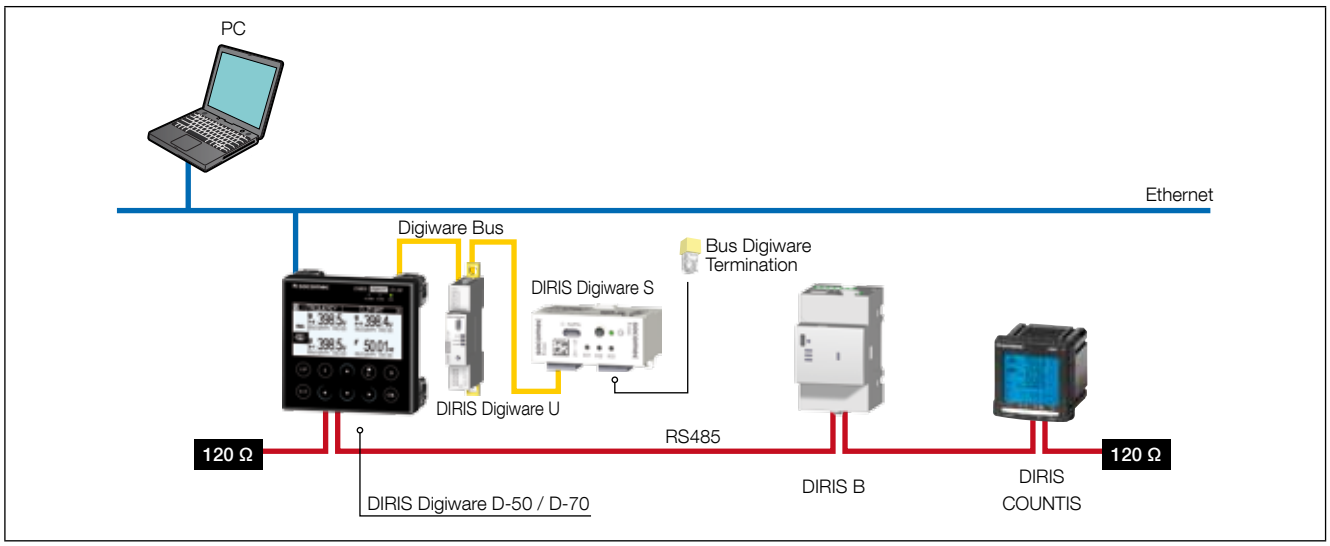
9.2.2. Connection with the DIRIS Digiware D-50/D-70 remote display

In an RS485 link, a DIRIS Digiware D-50/D-70 remote display is a master device of the RS485 bus and links to the DIRIS Digiware bus. It is used like an Ethernet gateway.

The following rules must be observed:

- A 120 Ω resistor must be added at the start of the RS485 link
- A 120 Ω resistor must be added at the end of the RS485 link
- A termination must be added at the end of the Digiware bus.

Connection example:



You can show up to 32 devices on DIRIS Digiware D-50/D-70 display.

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

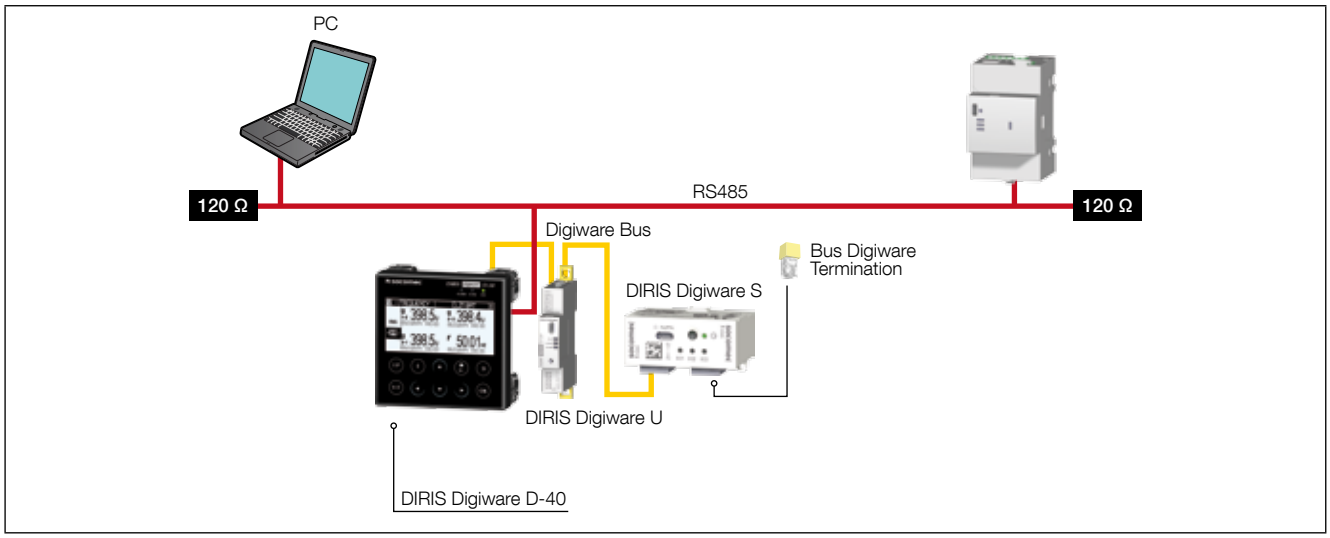
9.2.3. Connection with the DIRIS Digiware D-40 remote display

In an RS485 link, a DIRIS Digiware D-40 remote display is a slave device of the RS485 bus and links to the DIRIS Digiware bus.

The following rules must be observed:

- A 120 Ω resistor must be added at the start of the RS485 link
- A 120 Ω resistor must be added at the end of the RS485 link
- A termination must be added at the end of the Digiware bus.

Connection example:



You can show up to 32 devices on the DIRIS Digiware D-40 display.

9.3. Communication tables

The full communication tables for each module can be found on the SOCOMEC website at the following address:
www.socomec.com/en/diris-digiware

The communication tables are sent via JBUS (Modbus).

Below is an extract of the DIRIS Digiware S-135 communication tables representing some instantaneous electrical parameters.
Since a device can be configured to measure up to 3 loads, the Modbus registers are organized in 3 parts from load 1 to 3.

- **Load #1**

Dec address	Hex address	Words count	Description	Unit	Data type
18436	0x4804	2	System Voltage Ph-N	V / 100	U32
18438	0x4806	2	System Voltage Ph-Ph	V / 100	U32
18440	0x4808	2	System Current	mA	U32
18442	0x480A	2	Frequency	mHz	U32
18444	0x480C	2	Ph-N Voltage : V1	V / 100	U32
18446	0x480E	2	Ph-N Voltage : V2	V / 100	U32
18448	0x4810	2	Ph-N Voltage : V3	V / 100	U32
18450	0x4812	2	Ph-N Voltage : Vn	V / 100	U32
18452	0x4814	2	Ph-Ph Voltage : U12	V / 100	U32
18454	0x4816	2	Ph-Ph Voltage : U23	V / 100	U32
18456	0x4818	2	Ph-Ph Voltage : U31	V / 100	U32
18458	0x481A	2	Current : I1	mA	U32
18460	0x481C	2	Current : I2	mA	U32
18462	0x481E	2	Current : I3	mA	U32
18464	0x4820	2	Current : In	mA	U32
18466	0x4822	1	Current unbalance Inba	% / 100	U16
18467	0x4823	2	Direct component Idir	mA	U32
18469	0x4825	2	Indirect component Iind	mA	U32
18471	0x4827	2	Homopolar component Ihom	mA	U32
18473	0x4829	1	Current unbalance Inb	% / 100	U16
18474	0x482A	2	Snom	VA	U32
18476	0x482C	2	Total active power	W	S32
18478	0x482E	2	Total reactive power	var	S32
18480	0x4830	2	Total lagging reactive power	var	S32
18482	0x4832	2	Total leading reactive power	var	S32
18484	0x4834	2	Total apparent power	VA	U32
18486	0x4836	1	Total power factor	-	S16

- **Load #2**

Dec address	Hex address	Words count	Description	Unit	Data type
20484	0x5004	2	System Voltage Ph-N	V / 100	U32
20486	0x5006	2	System Voltage Ph-Ph	V / 100	U32
20488	0x5008	2	System Current	mA	U32
20490	0x500A	2	Frequency	mHz	U32
20492	0x500C	2	Ph-N Voltage : V1	V / 100	U32
20494	0x500E	2	Ph-N Voltage : V2	V / 100	U32
20496	0x5010	2	Ph-N Voltage : V3	V / 100	U32
20498	0x5012	2	Ph-N Voltage : Vn	V / 100	U32
20500	0x5014	2	Ph-Ph Voltage : U12	V / 100	U32
20502	0x5016	2	Ph-Ph Voltage : U23	V / 100	U32
20504	0x5018	2	Ph-Ph Voltage : U31	V / 100	U32
20506	0x501A	2	Current : I1	mA	U32
20508	0x501C	2	Current : I2	mA	U32

20510	0x501E	2	Current : I3	mA	U32
20512	0x5020	2	Current : In	mA	U32
20514	0x5022	1	Current unbalance Inba	% / 100	U16
20515	0x5023	2	Direct component Idir	mA	U32
20517	0x5025	2	Indirect component Iind	mA	U32
20519	0x5027	2	Homopolar component Ihom	mA	U32
20521	0x5029	1	Current unbalance Inb	% / 100	U16
20522	0x502A	2	Snom	VA	U32
20524	0x502C	2	Total active power	W	S32
20526	0x502E	2	Total reactive power	var	S32
20528	0x5030	2	Total lagging reactive power	var	S32
20530	0x5032	2	Total leading reactive power	var	S32
20532	0x5034	2	Total apparent power	VA	U32
20534	0x5036	1	Total power factor	-	S16

• **Load #3**

Dec address	Hex address	Words count	Description	Unit	Data type
22532	0x5804	2	System Voltage Ph-N	V / 100	U32
22534	0x5806	2	System Voltage Ph-Ph	V / 100	U32
22536	0x5808	2	System Current	mA	U32
22538	0x580A	2	Frequency	mHz	U32
22540	0x580C	2	Ph-N Voltage : V1	V / 100	U32
22542	0x580E	2	Ph-N Voltage : V2	V / 100	U32
22544	0x5810	2	Ph-N Voltage : V3	V / 100	U32
22546	0x5812	2	Ph-N Voltage : Vn	V / 100	U32
22548	0x5814	2	Ph-Ph Voltage : U12	V / 100	U32
22550	0x5816	2	Ph-Ph Voltage : U23	V / 100	U32
22552	0x5818	2	Ph-Ph Voltage : U31	V / 100	U32
22554	0x581A	2	Current : I1	mA	U32
22556	0x581C	2	Current : I2	mA	U32
22558	0x581E	2	Current : I3	mA	U32
22560	0x5820	2	Current : In	mA	U32
22562	0x5822	1	Current unbalance Inba	% / 100	U16
22563	0x5823	2	Direct component Idir	mA	U32
22565	0x5825	2	Indirect component Iind	mA	U32
22567	0x5827	2	Homopolar component Ihom	mA	U32
22569	0x5829	1	Current unbalance Inb	% / 100	U16
22570	0x582A	2	Snom	VA	U32
22572	0x582C	2	Total active power	W	S32
22574	0x582E	2	Total reactive power	var	S32
22576	0x5830	2	Total lagging reactive power	var	S32
22578	0x5832	2	Total leading reactive power	var	S32
22580	0x5834	2	Total apparent power	VA	U32
22582	0x5836	1	Total power factor	-	S16

Note 1: if one load (3P+N - 3CT) is configured, the Modbus registers related to loads 2 and 3 are not used and will return 0xFFFF.

Note 2: if 3 loads (1P+N - 1CT) are configured, Modbus registers related to phase 2 and 3 (ex: V2, V3, I2, I3...) are not used and will return 0xFFFF.

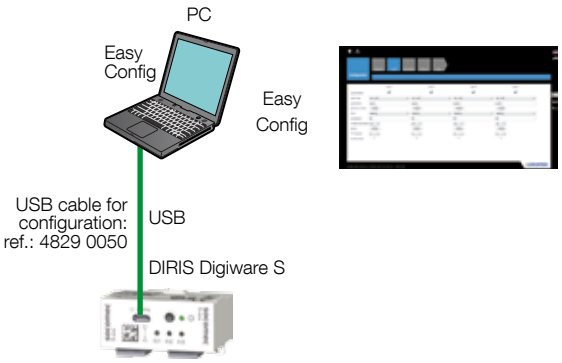
10. CONFIGURATION

Configuration can be carried out using the Easy Config configuration software or directly from the DIRIS Digiware D-xx remote display. The Easy Config software is used to configure DIRIS Digiware directly via USB, RS485 or Ethernet.
When the DIRIS Digiware system contains a DIRIS Digiware D-xx display or a DIRIS G-xx communication gateway, connecting the USB cable to the display or gateway allows you to configure the full system without disconnecting the USB cable.
To set the parameters from the remote display, refer to the manual for the display.

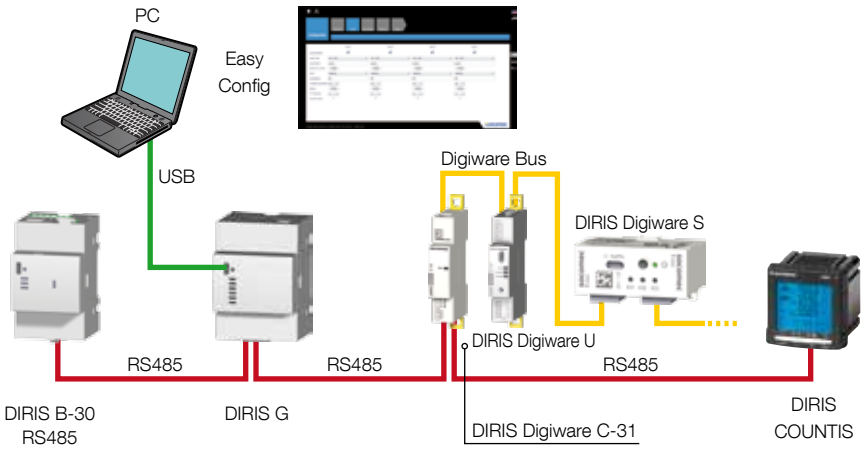
10.1. Configuration using Easy Config

10.1.1. Connection modes

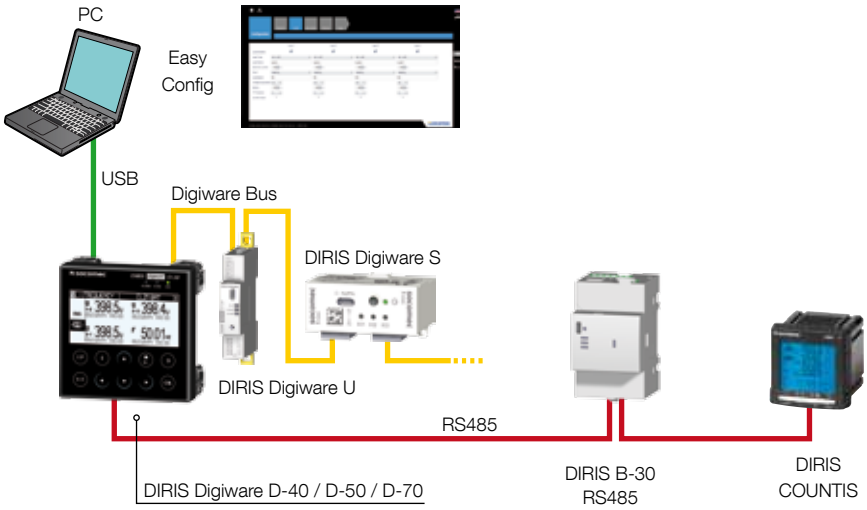
Configuration using Easy Config directly (USB)



Configuration using Easy Config via a DIRIS G gateway (USB)

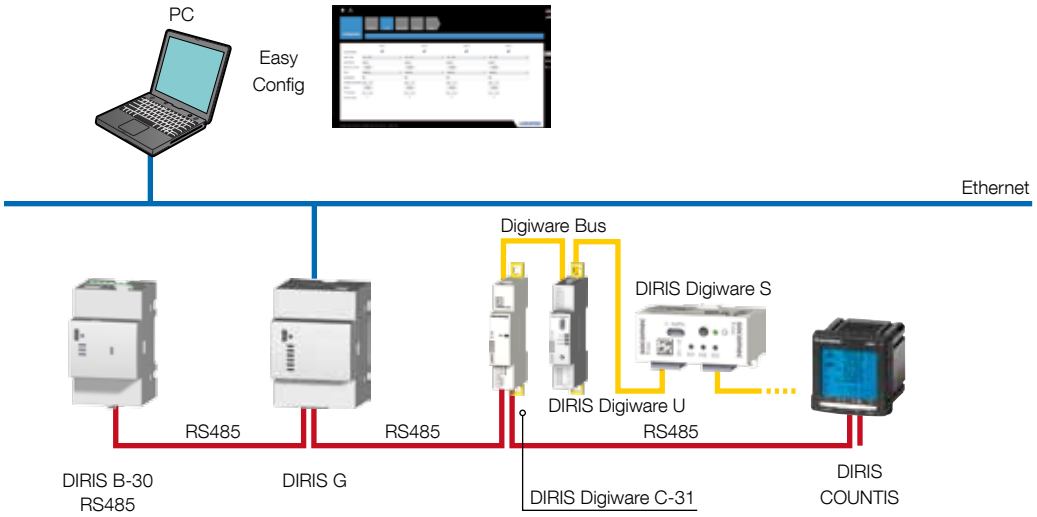


Configuration using Easy Config via a DIRIS Digiware D-xx display (USB)

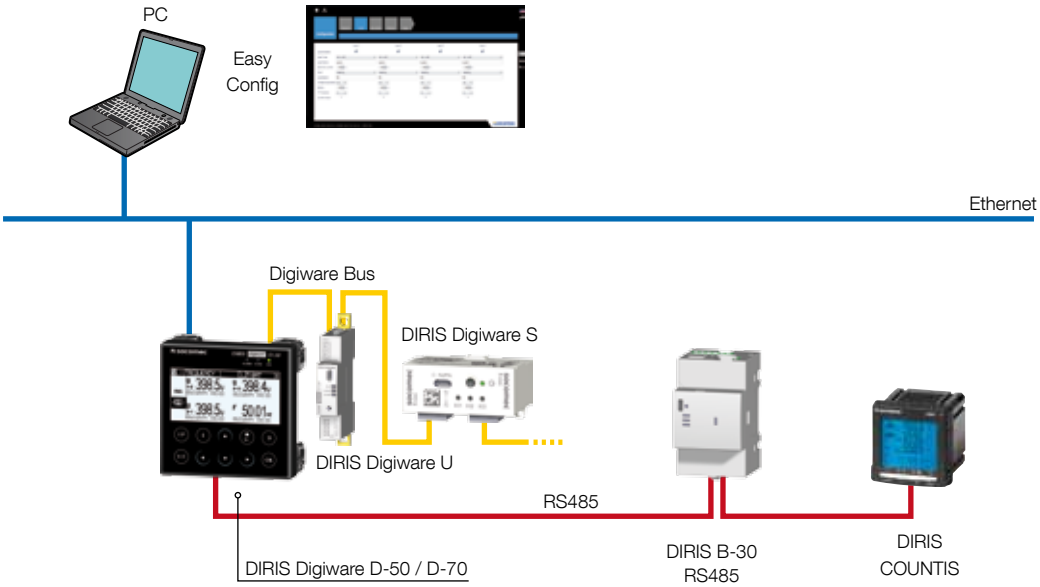


* RS485 input only with DIRIS Digiware D-50 and D-70 displays

Configuration using Easy Config via a DIRIS G gateway (Ethernet)



Configuration using Easy Config via a DIRIS Digiware D-50/D-70 display (Ethernet)



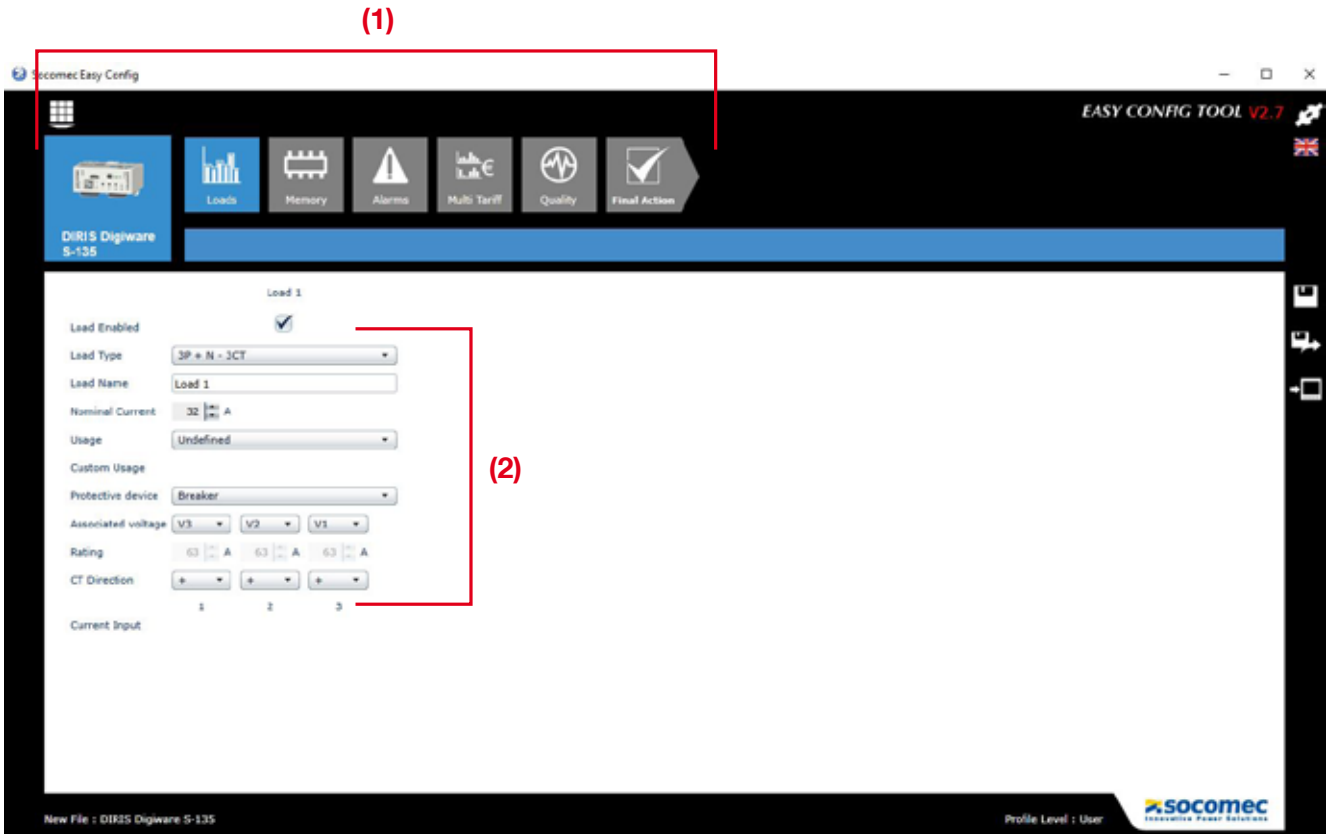
These devices must be connected to the power supply before you configure them.

For the Digiware bus and 120-ohm termination resistors, see section “Communication”, page 32.

10.1.2. Using Easy Config

Easy Config is the configuration software used to set device parameters easily and quickly. Parameters are set in successive steps:

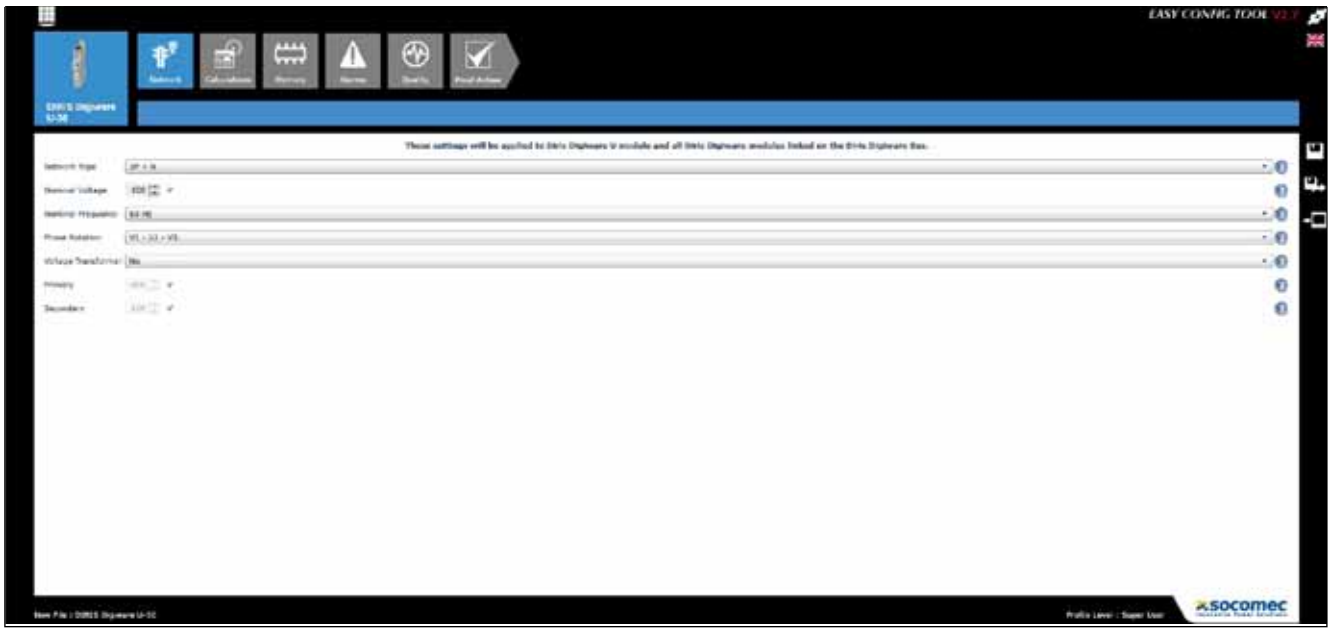
Network —> Loads —> Measurement method —> Values to be stored —> Alarms —> End of configuration



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

Network configuration

In the electrical network configuration menu, The electrical network is configured from the DIRIS Digiware U module. In this menu, the user selects the type of network (three-phase, single-phase, etc.), the nominal voltage (must be correctly configured for the voltage detection feature to work properly), the network frequency, the direction of phase rotation and whether or not a voltage transformer is used.



Configuring the loads

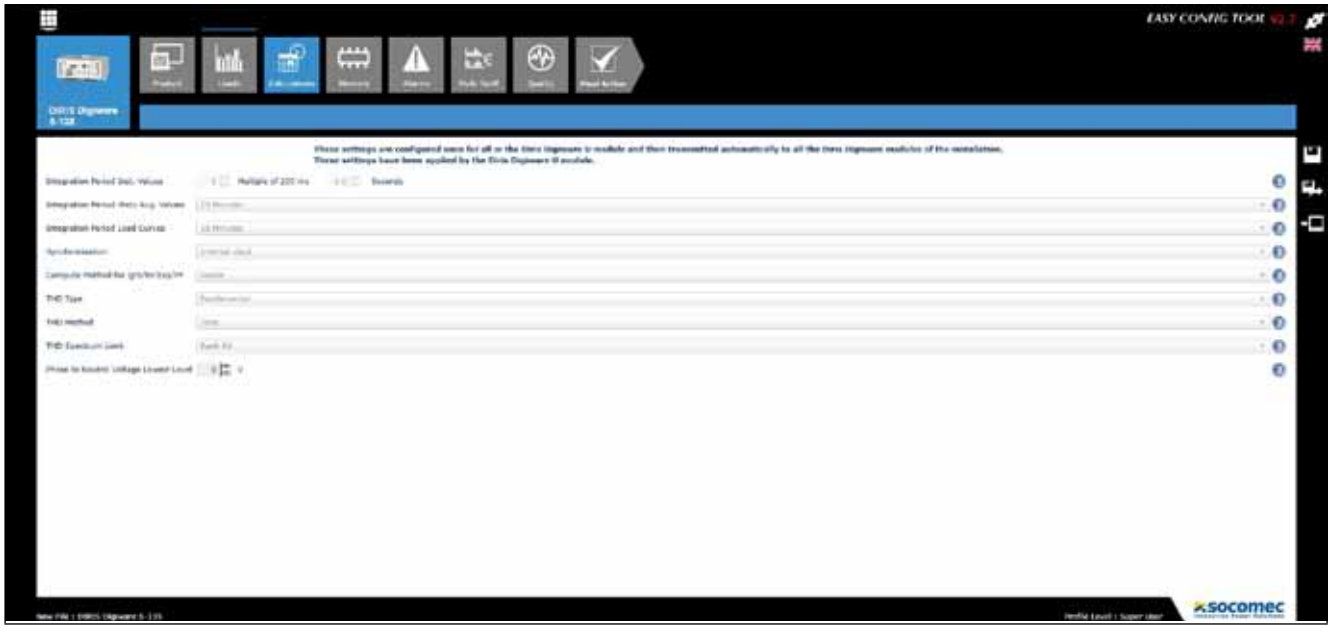
The number and type of loads can be accessed in the load configuration menu in the DIRIS Digiware S modules. The user can also define its nominal current, the name of the load, its usage and its location within the electrical installation.

In the load configuration menu, the user can select the type of protective device used:
- breaker
- switch
- fusible switch
- fuse.

This is used for the VirtualMonitor technology (see section “11. VirtualMonitor technology: monitoring of protective devices”, page 42 for more details).

Calculation method

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



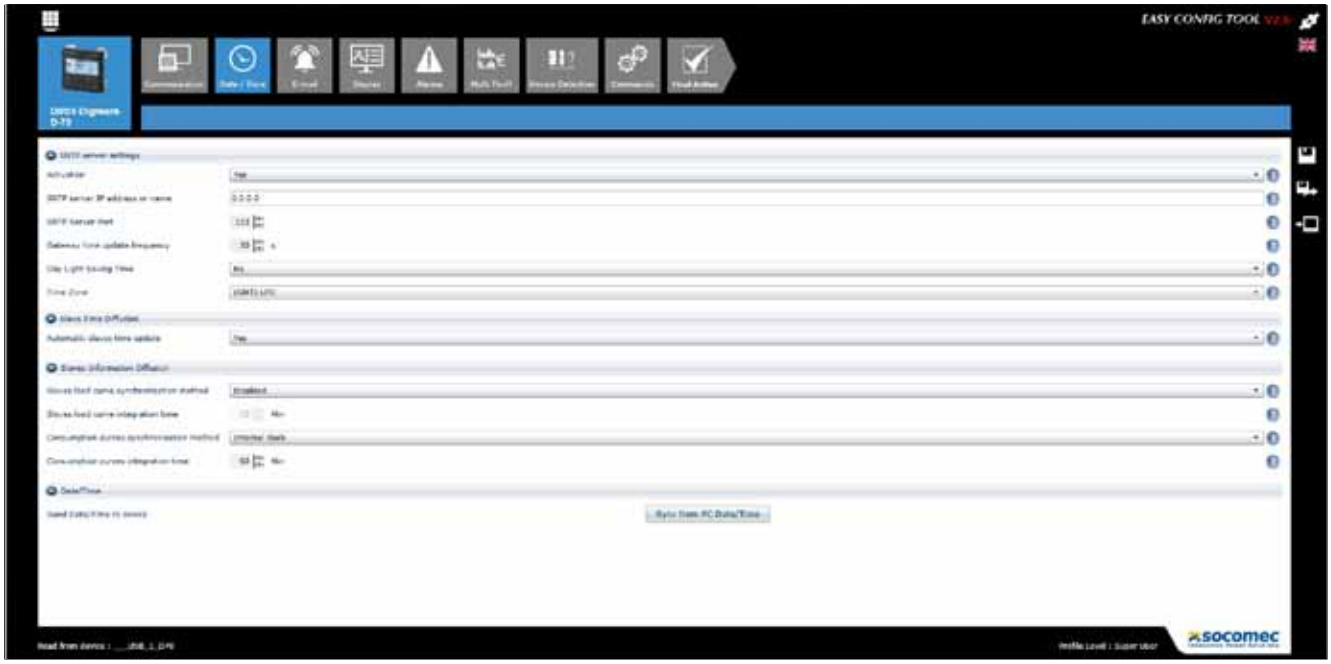
Alarms

The type of alarm and the configuration is performed via Easy Config, see section “13. ALARMS”, page 46 for more details.

10.1.3. Synchronising devices

In order for all connected devices to be set at the same time, their time can be synchronized with an NTP server (DIRIS G, DIRIS Digiware D-50/D-70) or manually (DIRIS G, DIRIS Digiware D-40/D-50/D-70).

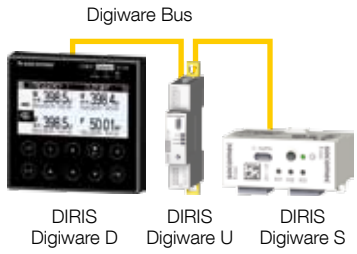
The screen below shows how to set the time from the DIRIS Digiware D-70 display. The time setting is done from an SNTP server or manually. The time may be sent to connected devices automatically based on a configurable update schedule.



10.2. Configuration from the DIRIS Digiware D remote display

10.2.1. Connection mode

Configuration from the remote display (Digiware Bus)



Refer to the manual for the DIRIS Digiware D display for more details.

11. VIRTUALMONITOR TECHNOLOGY: MONITORING OF PROTECTIVE DEVICES

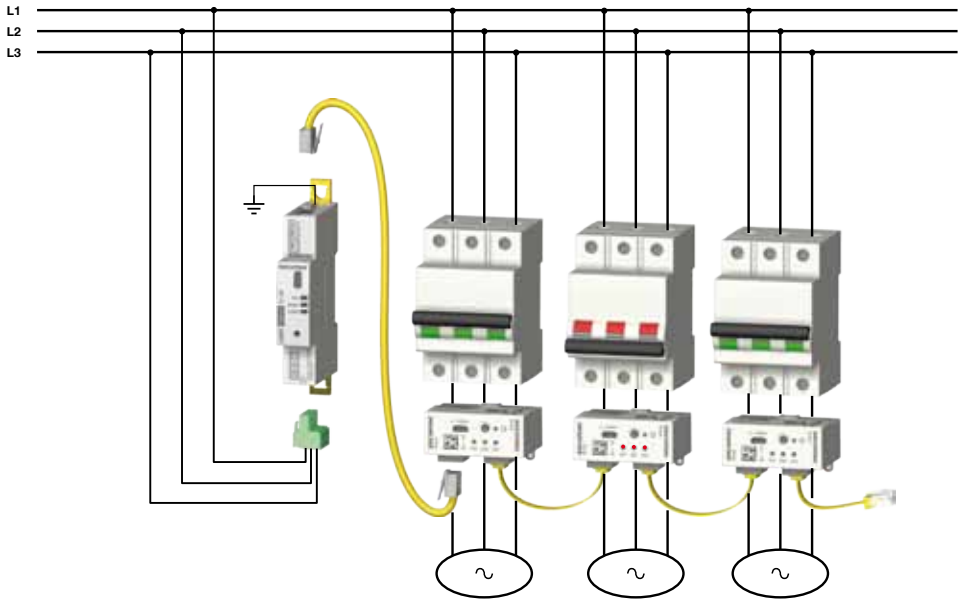
DIRIS Digiware S modules embed the VirtualMonitor technology enabling an advanced real-time monitoring of protective devices (circuit breakers, fusible switches, fuses…) without using auxiliary contacts:

- Position (open/closed) of the protective device
- Trip information
- Operation and trip counters
- Alarms on the opening or the defect of the protective device or on operation/trip counters exceeding configurable thresholds

Visualisation is available from the DIRIS Digiware D-xx displays or in WEBVIEW, embedded in the DIRIS Digiware D-70, DIRIS G and DATALOG H80/H81.

In the Easy Config software Easy Config, the type of protective device must be configured in the “Loads” configuration menu for the VirtualMonitor function to be used:

VirtualMonitor can only be used if the DIRIS Digiware U module is connected upstream of the protective device, and the DIRIS Digiware S module downstream. This is illustrated in the architecture below:



Thanks to its voltage detection capability, the DIRIS Digiware S module can detect the position of the protective device. An example corresponding to the above illustration is given in the table below:

Voltage measured on U module (*)	Yes, 230V L-N		
Voltage detected on S modules	Yes	No, 0V	Yes
Position of protective device	Closed	Open	Closed

(*) Earth must be connected on the DIRIS Digiware U module

When a Circuit breaker is used, the technology also enables to detect and count trips. A trip is detected if the 2 following conditions are met:

- the DIRIS Digiware S module records an opening of the protective device
- the DIRIS Digiware S module records a current surge ≥ 120% In(**)

(**) It is important to configure the nominal current correctly in the “Loads” configuration menu for the Virtual monitor function to work correctly.

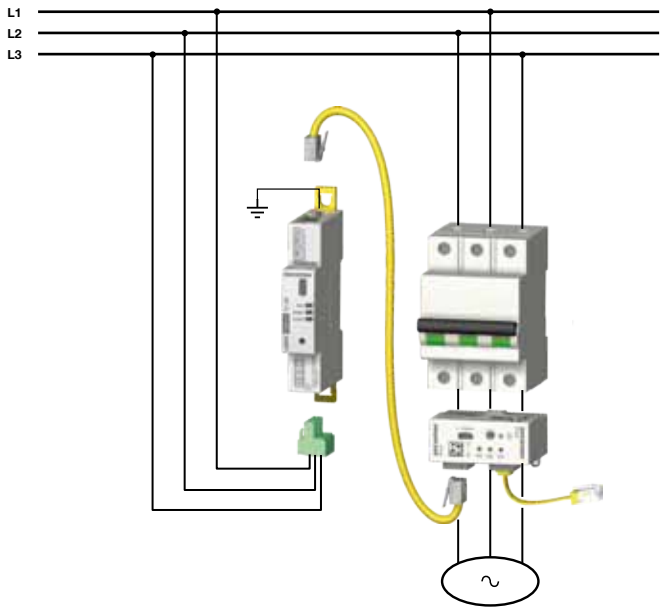
Several protection counters are also accessible thanks to the VirtualMonitor technology:

Protection counter type	Description
Total operation counter	Number of times the protective device was opened
Low-load operation counter	Number of times the protective device was opened when load current was ≤ 5% Inom
On-load operation counter	Number of times the protective device was opened when load current was [5% Inom – 100% Inom]
Overload operation counter	Number of times the protective device was opened when load current was ≥ 100% Inom
Trip Counter	Number of times the protective device tripped (only available if the protective device is a breaker).

DIRIS Digiware S is able to detect several successive openings of a protective device if the interval between 2 openings is greater than or equal to 200ms.

12. AUTOCORRECT TECHNOLOGY: AUTOMATIC DETECTION AND CORRECTION OF WIRING ERRORS

The AutoCorrect technology enables a detection and possible software correction of wiring errors such as a phase inversion on the current inputs of the DIRIS Digiware S module. This is illustrated in the example below:



- Changing phase association using the device's front button

Pressing the front button of the DIRIS Digiware S module for 5s will automatically correct the wiring and inform you with an LED sequence of the physical connection between the device's current inputs and the network lines.

After launching AutoCorrect from the device's push-button, the I01, I02 and I03 LEDs will blink with the specific sequence:

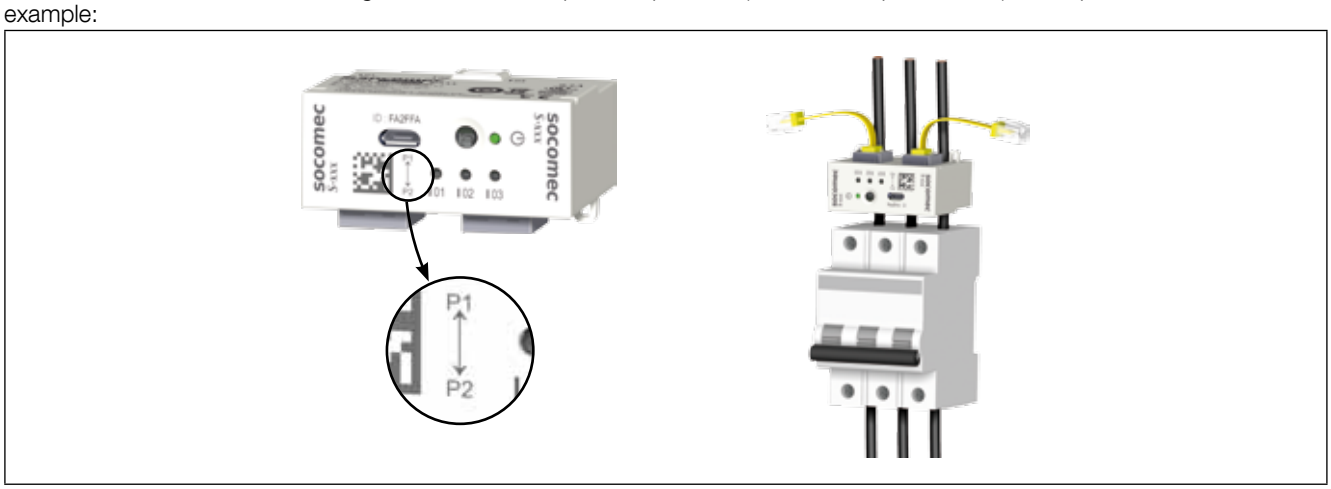
One blink means the current input is associated to the network line 1,
Two blinks means the current input is associated to the network line 2,
Three blinks means the current input is associated to network line 3.

Ex: After pressing the device's push-button for 5s, the following LED sequence is given:

Current, Input	Blink
I01, I02, I03	Blink once simultaneously indicating the start of the AutoCorrect process
I01	Three times
I02	Twice
I03	Once
I01, I02, I03	Blink once simultaneously indicating the end of the AutoCorrect process

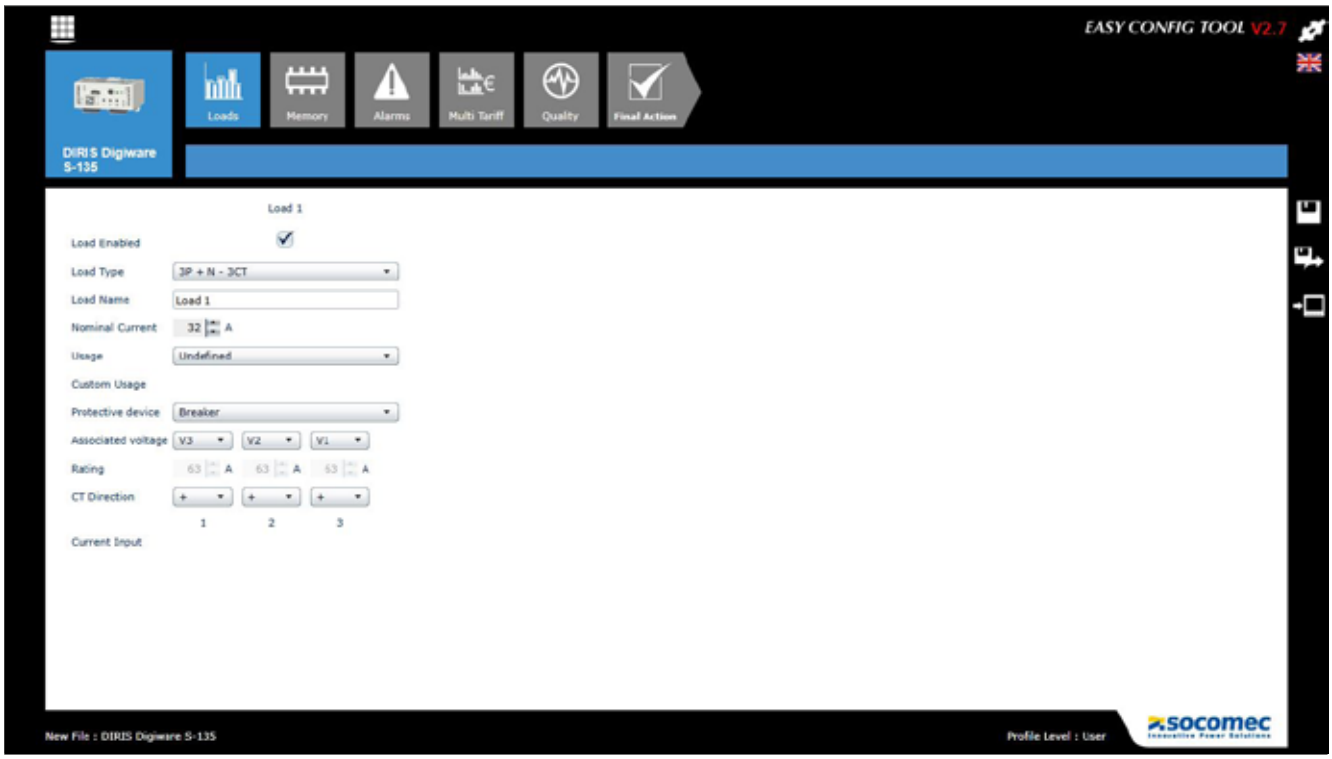
This sequence indicates that:
Current input I01 is associated to Network line 3
Current input I02 is associated to Network line 2
Current input I03 is associated to Network line 1

This will be the case if the DIRIS Digiware S module is placed upstream (and turned upside down) of the protective device for example:



• Advanced Wiring diagnostic from DIRIS Digiware D-xx displays:

In the DIRIS Digiware D-xx displays, an advanced wiring diagnostic screen is available to help to detect wiring errors while configuring the DIRIS Digiware S module. The user has the choice between a manual correction (using the display directly or via the Easy Config software.) or an automatic correction using the push button on the front face of the DIRIS Digiware S module. The manual correction using Easy Config is shown in the picture below:



13. ALARMS

The threshold alarms on measurements are only available with DIRIS Digiware U-30, S-135, S-Datacenter and IO-20.

The alarms on digital inputs with change of output status are available on DIRIS Digiware IO-10.

13.1. Alarms upon events

Alarms can be generated when a threshold is exceeded for electrical measurements, consumption, variations in level or change in input status. Also, combinations can be made on the alarms created.

Up to 23 detected alarms are saved and timestamped; an alarm can have 3 distinct statuses: Alarm active, Alarm finished, Alarm finished and acknowledged. Alarms can be acknowledged either automatically or by user action, as required.

Up to 9 alarms on electrical measurements can be configured per equipment and 4 for the status change of a digital input. The digital inputs are available on DIRIS Digiware IO-10.

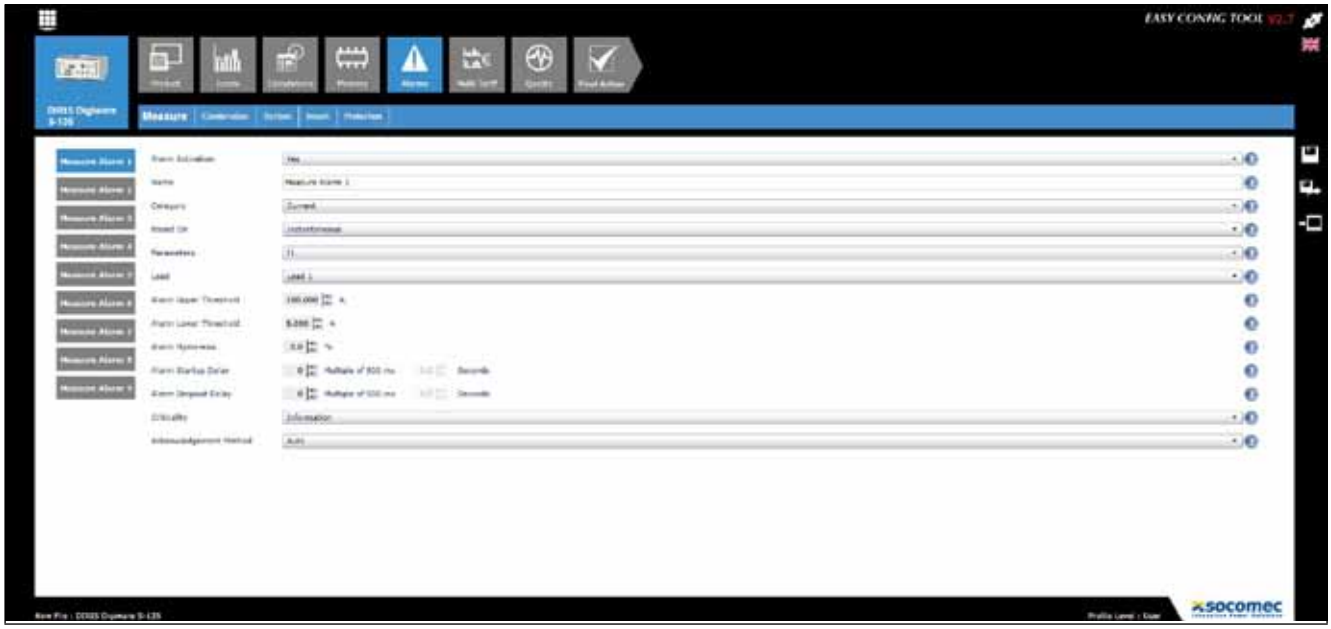
The alarms are configured via the Easy Config software.

13.1.1. Electrical parameters

The alarms available are based on electrical parameters measured in the devices.

- Alarm upon variation in the instantaneous or average value of an electrical value: Current, voltage, frequency, power, power factor, Cos phi, harmonic distortion or an analogue quantity on the DIRIS Digiware IO-20 module.
- Selection of the hysteresis and high/low threshold.
- Setting a time delay at the start and end of the alarm.
- For the associated total harmonic distortion, voltage and current three-phase values, an alarm may be generated if the condition is fulfilled on a combination of phases:
  - On a single-phase: Phase1, Phase2, Phase3
  - On all the phases simultaneously: Phase1 and Phase2 and Phase3
  - On one phase of the three phases: Phase1 or Phase2 or Phase3

Example of configuring an alarm on the current via Easy Config:



13.1.2. Voltage and current unbalance (in a three-phase network)

- Alarms on voltage unbalances: Unba, Unb
- Alarm upon current unbalance: Inba, Inb
- Selection of the hysteresis and high/low threshold
- Setting a time delay at the start and end of the alarm

13.1.3. EN 50160 voltage quality events

- Alarms on quality events for the voltage provided: voltage sags/dips (Udip), voltage swells (Uswl) and voltage interruptions (Uint), taking the occurrence into account: number, reference period.

13.1.4. Consumption

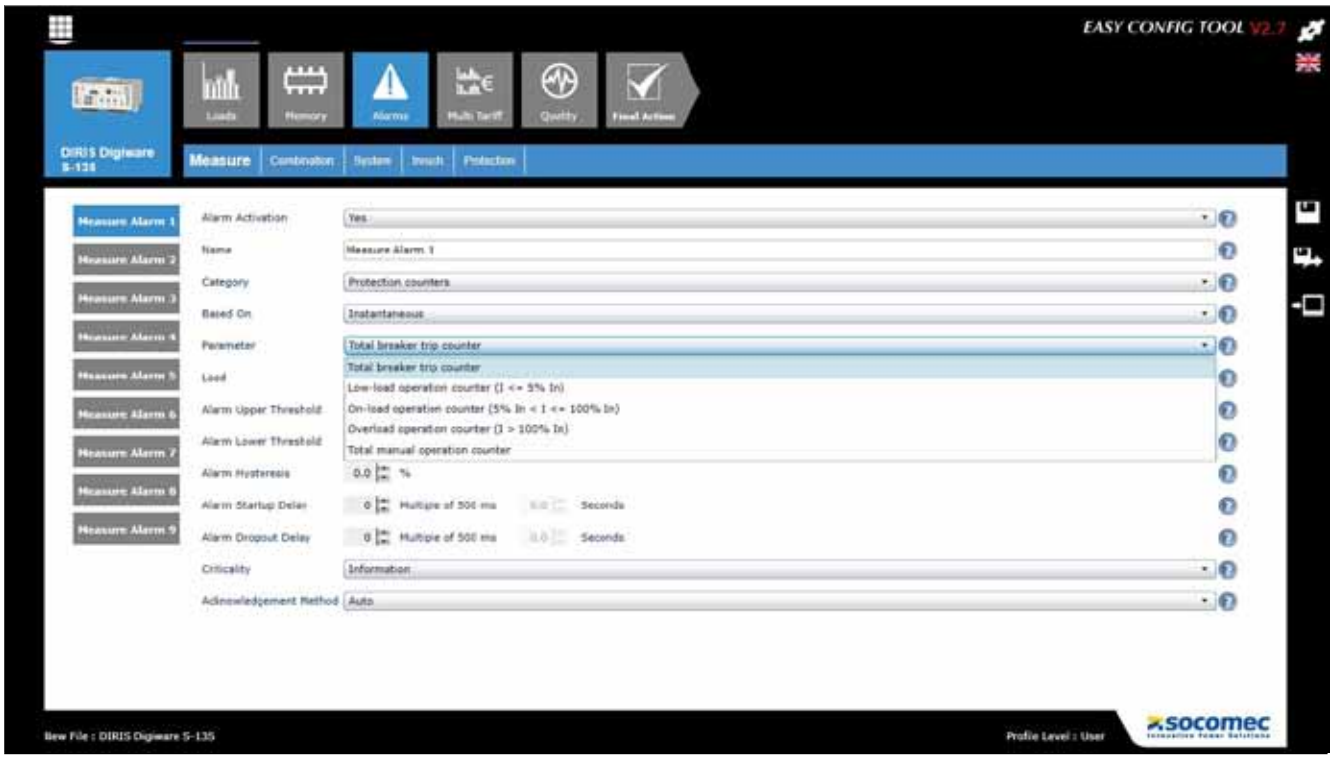
- Alarm on the energies: Partial Ea+, Ea-, Er+, Er-, Eap
- Selection of a high threshold (excessive consumption)

13.1.5. Protection counters

Alarms on protection counters can be configured thanks to the VirtualMonitor technology (only available with DIRIS Digiware S):
- Total operation counter
- Low-load operation counter
- On-load operation counter
- Overload operation counter
- Total Trip Counter (this feature is also available using the inputs of the DIRIS Digiware IO-10)

Refer to the VirtualMonitor paragraph (section 11 of this instruction manual) for more information on protection counters.

Example of configuring an alarm on the protection counters via Easy Config:

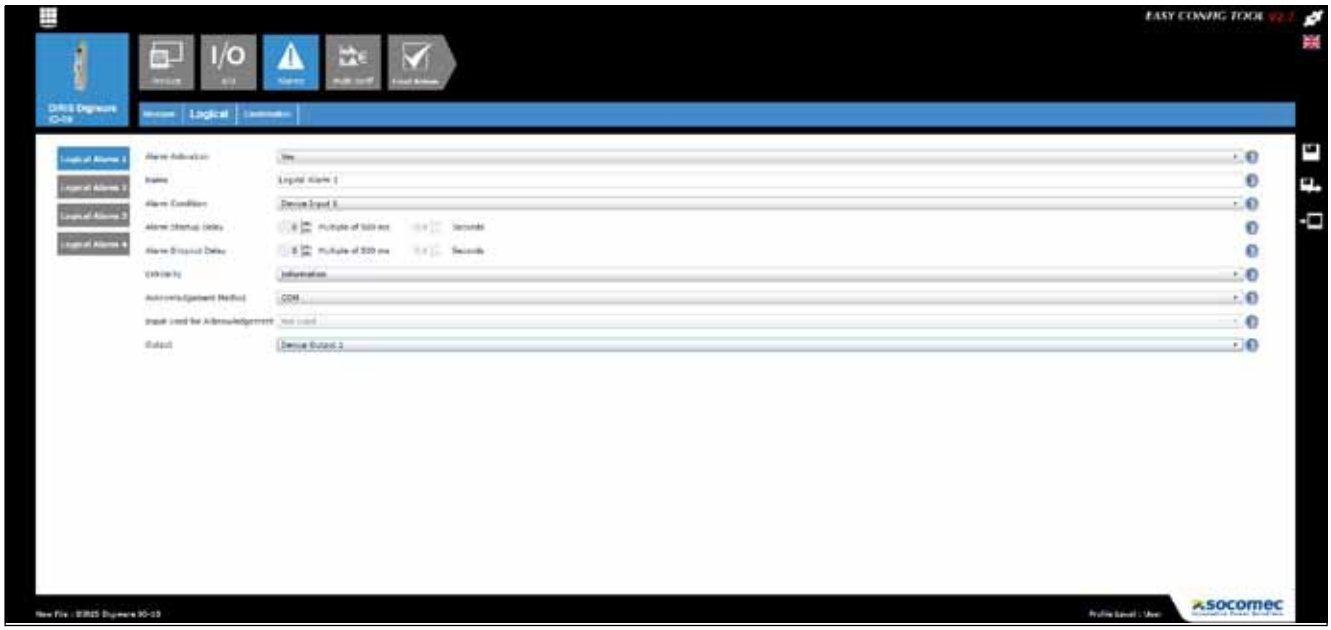


13.1.6. Digital inputs

This function is available on DIRIS Digiware IO-10.

- Alarm upon change of status of 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:



13.1.7. Preconfigured load management alarms (only available with DIRIS Digiware S-Datacenter)

DIRIS Digiware S-Datacenter has 9 preconfigured alarms, alerting the user of the load level on each current input:

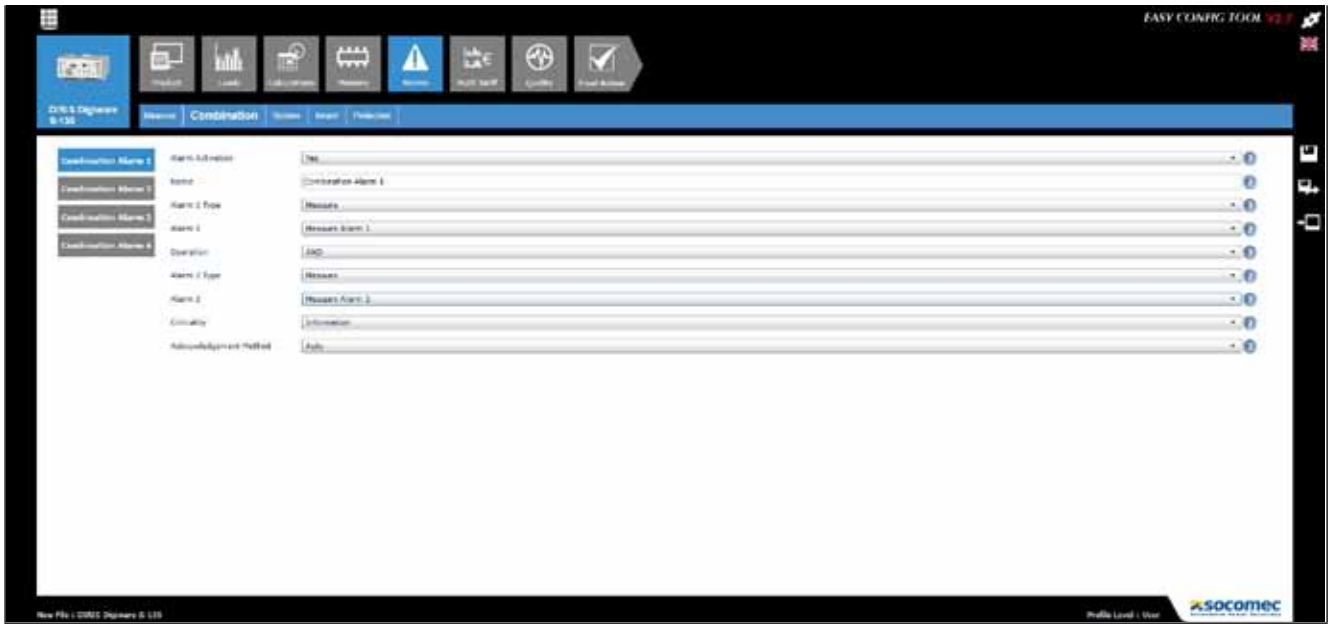
- Full load: when the load level reaches 80% of the nominal current.
- High load: when the load level reaches 60% of the nominal current.
- No load: when the load level drops to 0% of the nominal current.

The nominal current is 32A by default. It can be changed from the “Loads” configuration menu of the DIRIS Digiware S module in Easy Config or from the DIRIS Digiware D-xx display.

13.2. 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:



13.3. System alarms

If an installation error is detected during setup, a system alarm is automatically generated.

13.3.1. Voltage/current association

- Alarm upon connection error: wrong association between the current inputs of the DIRIS Digiware S module and the voltage inputs on the DIRIS Digiware U module

13.3.2. Incorrect direction of rotation (three-phase network)

- Alarm upon identification of the incorrect direction of phase rotation (for example 3-2-1 instead of 1-2-3)

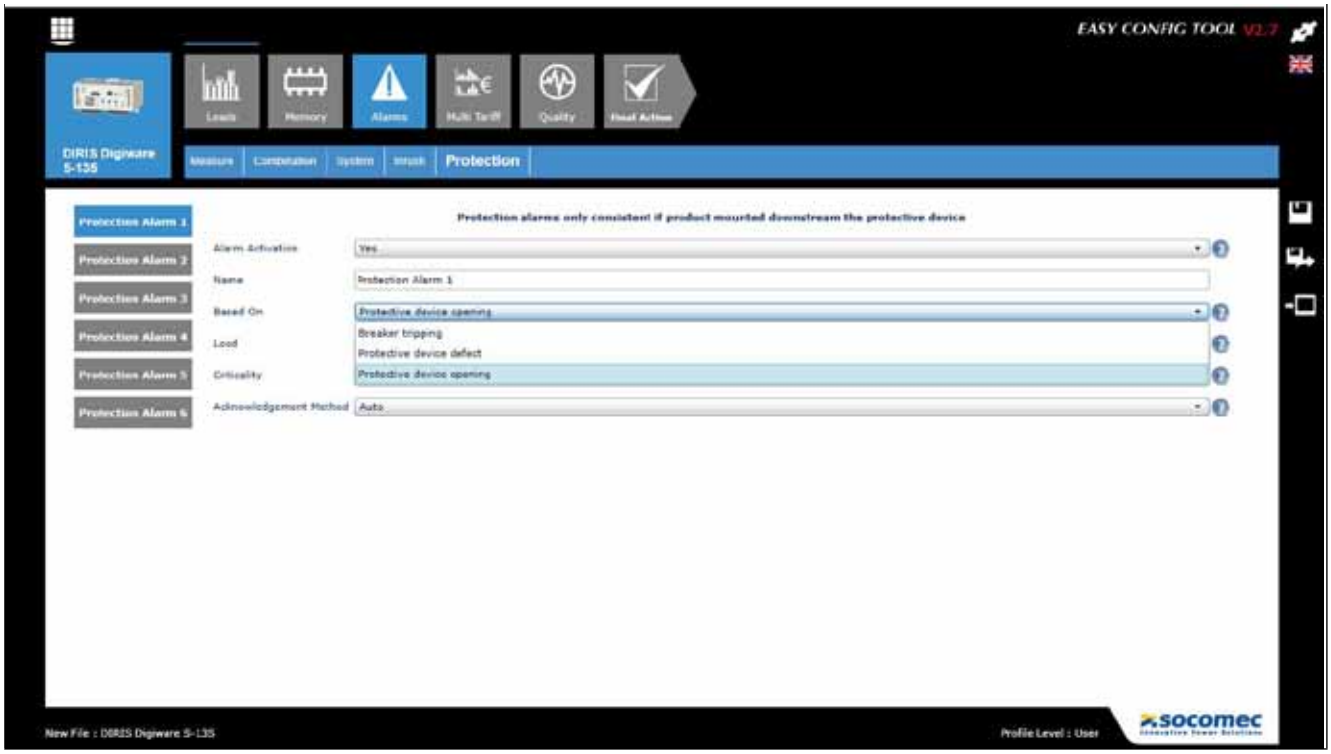
13.4. Protection alarms

DIRIS Digiware S modules have 6 protection alarms alerting the user of an event on a protective device.

Make sure you have configured the protective device type used in the “Loads” configuration menu in order to use the Protection alarms.

The protection alarms can be based on the opening of the protective device, the Tripping of the circuit breaker, or the defect of the protective device.

Example of configuring a protection alarm via Easy Config



13.5. Setting up alarms

Alarms can be activated or deactivated from the Easy Config configuration software.

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

13.5.1. LED on front of module

- Blinking: System alarm
- Fixed: Alarm upon event (has priority over system alarms when both alarms are on-going at the same time)

13.5.2. Activation of an 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 completed

13.5.3. RS485 Modbus

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

13.5.4. Display and Webview

- Information on the alarms with timestamping
- Sends alarm acknowledgement

14. TECHNICAL CHARACTERISTICS

14.1. DIRIS Digiware C, U, S and IO

14.1.1. Mechanical characteristics

Casing type	Modular for DIN rail or back plate mounting
Casing protection index	IP20
Front panel protection index	IP40 on the nose in modular assembly
Weight of DIRIS Digiware C-3x / U-xx / S-xx / IO	65 g / 64 g / 54 g / 63 g

14.1.2. Electrical characteristics

DIRIS Digiware C-31	
Input voltage	24 VDC ± 15 % - 20 W max - SELV
Connection	Removable screw terminal block, 2 positions, stranded or solid 0.2 - 2.5 mm^2 cable
Link with DIRIS Digiware U voltage module	The DIRIS Digiware U voltage module is linked to the DIRIS Digiware C-31 by a Digiware Bus
P15 power supply	Features: 230 VAC / 24 VDC - 0.63 A - 15 W Modular format - Dimensions (H x L): 90 x 25 mm

14.1.3. Power consumption of DIRIS Digiware devices

Power consumption	
DIRIS Digiware D-40/D-50	2 W
DIRIS Digiware D-70	2.5 W
DIRIS Digiware C-31	0.8 W
DIRIS Digiware C-32	1.5 W
DIRIS Digiware U-xx	0.72 W
DIRIS Digiware S-xx	0.35 W
DIRIS Digiware IO-xx	0.5 W

14.1.5. Measuring characteristics

Measurement accuracy	
Accuracy	According to IEC 61557-12 PMD DD classification
Measuring energy and power	
Active energy and active power accuracy	Class 0.5 for active energy Class 1 for active power
Accuracy of reactive energy	Class 2
Power factor measurement	
Accuracy	Class 1
Voltage measurement - DIRIS Digiware U	
Characteristics of the network measured	Nominal voltage: 480Y/277 VAC Range: 87-520 VAC (Ph/Ph); 50-300 VAC (Ph/N) CAT III
Frequency range	45 - 65 Hz

Frequency accuracy	Class 0.02
Network type	Single-phase/ Two-phase / Two-phase with neutral / Three-phase / Three-phase with neutral
Measurement by voltage transformer	Primary: 400,000 VAC Secondary: 60, 100, 110, 173, 190 VAC
Input consumption	≤ 0.1 VA
Rated impulse voltage	IEC 60947-1 V. IMP: 6.4 kV
Accuracy of voltage measurement	Class 0.2
Connection	Removable screw terminal block, 4 positions, stranded or solid 0.2 - 2.5 mm^2 cable
Link with DIRIS Digiware S current sensing module	The first DIRIS Digiware S current sensing module is linked to the DIRIS Digiware U voltage module by a Digiware Bus

Current sensing - DIRIS Digiware S	
Number of current inputs	3
Accuracy of current measurement	Class 0.5
Basic current Ib Maximum current Imax	10 A 63 A
Link with DIRIS Digiware U voltage module	The first DIRIS Digiware S current sensing module is linked to the DIRIS Digiware U voltage module by a Digiware Bus
Link with DIRIS Digiware S current module	The DIRIS Digiware S current modules are interconnected by the Digiware Bus with bus termination for the last module
Digital inputs/outputs- DIRIS Digiware IO-10	
Number of inputs	4
Type / Power supply	Insulated input, internal polarisation 12 VDC max., 3 mA - SELV
Input functions	Logical status State of the circuit breaker: position, trip status, drawer status Pulse counter: choice of pulse weight, measurement unit, tariff rates (max. 8)
Connection	Removable screw terminal block, 9 positions - 5 dedicated to inputs, stranded or solid 0.14 - 1.5 mm² cable
Number of outputs	2
Type	Insulated output, 48 VDC max., 50 mA and 24 VAC max. - SELV
Output functions	Configurable alarm on threshold overruns Remote control of devices
Connection	Removable screw terminal block, 9 positions - 4 dedicated to outputs, stranded or solid 0.14 - 1.5 mm² cable
Analog inputs - DIRIS Digiware IO-20	
Number of inputs	2
Type / Power supply	0/4-20mA, 200 Ω max - SELV
Accuracy	0.5% full scale
Function	Connection of analogue sensors (pressure, humidity, temperature...) with linear or quadratic interpolation
Connection	Removable screw terminal block, 2x2 positions, stranded or solid 0.14 - 1.5 mm² cable

14.1.6. Communication characteristics

Digiware BUS	
Function	Connection between DIRIS Digiware modules
Cable type	Specific SOCOMEC cable with RJ45 connections
RS485	
Connection type	2 - 3 half duplex wires
Protocol	Modbus RTU
Baudrate	9600 to 115200 bauds
Function	Configuration and reading of centralised data on the DIRIS Digiware U and all of the DIRIS Digiware I linked by the Digiware bus
Location	Single-point on DIRIS Digiware C
Connection	Removable screw terminal block, 3 positions, stranded or solid 0.14 - 1.5 mm² cable
USB	
Protocol	Modbus RTU on USB
Function	Configuration of DIRIS Digiware U and I modules
Location	On each DIRIS Digiware U and I measurement module
Connection	Type B micro USB connector

14.1.7. Environmental characteristics

Ambient operating temperature	-10 … +55°C (IEC 60068-2-1/IEC 60068-2-2)
Storage temperature	-25 … +70°C (IEC 60068-2-1/IEC 60068-2-2)
Operating humidity	55°C / 97% RH (IEC 60068-2-30)
Operating altitude	< 2000 m
Vibration	0.35 mm, 25 Hz, 20 min/axe (IEC 61557-12)
Impact resistance	Front panel: 5J - casing: 1J (IEC 61010-1 Ed 3.0)
PEP ecopassport - ISO 14025	DIRIS Digiware U: SOCO-2014-05-v1-FR, SOCO-2014-05-v1-EN DIRIS Digiware IO: SOCO-00001-V01.01-FR, SOCO-00001-V01.01-EN DIRIS Digiware S: SOCO-00006-V01.01-FR; SOCO-00006-V01.01-EN

14.1.8. Electromagnetic characteristics

Immunity to electrostatic discharges	IEC 61000-4-2 LEVEL III
Immunity to radiated radio-frequency fields	IEC 61000-4-3 LEVEL III
Immunity to electrical fast transients/bursts	IEC 61000-4-4 LEVEL III
Immunity to impulse waves	IEC 61000-4-5 LEVEL III
Immunity to conducted disturbances	IEC 61000-4-6 LEVEL III
Immunity to power frequency magnetic fields	IEC 61000-4-8 400A/m
Radiated emissions	CISPR11 Group1 - CLASS B

14.1.9. Standards and safety

Device	IEC 61557-12, performance measuring and monitoring device (PMD)
Safety	Compliant with Low Voltage Directive: 2014/35/EU of February 26th 2014 (IEC EN61010-1 & IEC EN61010-2-030). Compliant with Electromagnetic Compatibility Directive: 2014/30/EU of February 26th 2014.
Insulation	Overvoltage category III (300VAC Ph/N), degree of pollution 2
UL	UL 61010-1 & 61010-2-030 compliant UL installation: The DIRIS Digiware system must be enclosed in an NRTL certified electrical/fire enclosure, listed Industrial Control Panel Equipment, or similar equipment.

14.1.10. Service life

MTTF (mean time to failure)	> 100 years

14.2. DIRIS Digiware D-40/D-50/D-70

14.2.1. Mechanical characteristics

Type of screen	Capacitive touch-screen technology, 10 keys
Screen resolution	350 x 160 pixels
Front panel protection index	IP65
Weight of the DIRIS Digiware D-40/D-50/D-70	160 g / 180 g / 185 g

14.2.2. DIRIS Digiware D-40 communication characteristics

Type of screen	Multipoint remote screen
RJ45 Digiware	Control and power supply interface function
RS485 2-3 wires	Modbus RTU slave communication function
USB	Upgrade and configuration via type B micro USB connector
UL	UL 61010 conformity

14.2.3. DIRIS Digiware D-50 communication characteristics

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	Modbus RTU master communication function
USB	Upgrade and configuration via type B micro USB connector
UL	UL 61010 conformity

14.2.4. DIRIS Digiware D-70 communication characteristics

Type of screen	Multipoint remote screen
Ethernet RJ45 10/100 Mbs (use a shielded Ethernet cable)	Gateway function: - Modbus TCP (max. 32 simultaneous connections) - Webview embedded web server (Power & Energy Monitoring version) - BACnet IP - SNMP v1, v2 & v3
SNTP protocol	Allows time synchronisation of the display with an SNTP server from an NTP server. The display updates the connected devices.
SMTP protocol(s)	Sends email notifications from the display.
FTP protocol(s)	Automatically exports data via FTP standard or secure server (consumption curves, load curves, measurement logs)
RJ45 Digiware	Control and power supply interface function
RS485 2-3 wires	Modbus RTU master communication function
USB	Upgrade and configuration via type B micro USB connector
UL	UL 61010 conformity

14.2.5. Electrical characteristics

Power supply	24 VDC +10% / -20% SELV (Safety Extra Low Voltage) - 20 W max

14.2.6. Environmental characteristics

Storage temperature	-20 … +70°C
Operating temperature	-10 … +55°C
Humidity	95% at 40°C
Installation category - degree of pollution	CAT III, 2

15. PERFORMANCE CLASSES

Performance classes are given in compliance with IEC 61557-12

Classification of DIRIS Digiware	DD
Temperature	K55
Overall operating performance class	0.5 for active energy 1 for active power

15.1. Specification of the characteristics

Symbol	**Function**	**Overall operating performance class DIRIS Digiware with integrated current sensors in compliance with IEC 61557-12**	**Measurement range**
Pa	Total active power	1	5% Ib ... Imax
Q_A, Q_V	Total reactive power (arithmetic, vectorial)	1	5% Ib ... Imax
S_A, S_V	Total apparent power (arithmetic, vectorial)	1	5% Ib ... Imax
Ea	Total active energy	0.5	2% Ib ... Imax
Er_A, Er_V	Total reactive energy (arithmetic, vectorial)	1	5% Ib ... Imax
Eap_A, Eap_V	Total apparent energy (arithmetic, vectorial)	2 according to IEC 61557-12 1 according to IEC 62053-24	5% Ib ... Imax
f	Frequency	0.02	45 - 65 Hz
I	Phase current	0.5	20% Ib ... Imax
INc	Calculated neutral current	1	20% Ib ... Imax
U	Voltage (Lp-Lg or Lp-N)	0.2	50 - 300 VAC Ph/N
PF_A, PF_V	Power factor (arithmetic, vectorial)	1	0.5 lagging to 0.8 leading
Pst, Plt	Flicker (short-term, long-term)	-	-
Udip	Voltage dip (Lp-Lg or Lp-N)	0.5	-
Uswl	Voltage swell (Lp-Lg or Lp-N)	0.5	-
Uint	Voltage interruption (Lp-Lg or Lp-N)	0.2	-
Unba	Voltage amplitude unbalance (Lp-N)	0.5	-
Unb	Voltage phase and amplitude unbalance (Lp-Lg or Lp-N)	0.2	-
THDu, THD-Ru	Total harmonic distortion rate of the voltage (relative to the fundamental, relative to the RMS value)	1	Rank 1 to 63
Uh	Voltage harmonics	1	-
THDi, THD-Ri	Total harmonic distortion rate of the current (relative to the fundamental, relative to the RMS value)	1	Rank 1 to 63
Ih	Current harmonics	1	-
Msv	Centralised remote control signals	-	-

15.2. Evaluation of the power quality

Symbol	Function	Overall operating performance class DIRIS Digiware in compliance with IEC 61557-12	Measurement range
f	Frequency	0.02	45 - 65 Hz
I	Phase current	0.5	20% Ib ... Imax
INc	Calculated neutral current	1	20% Ib ... Imax
U	Voltage (Lp-Lg or Lp-N)	0.2	50 - 300 VAC Ph/N
Pst, Plt	Flicker (short-term, long-term)	-	-
Udip	Voltage dip (Lp-Lg or Lp-N)	0.5	-
Uswl	Voltage swell (Lp-Lg or Lp-N)	0.5	-
Uint	Voltage interruption (Lp-Lg or Lp-N)	0.2	-
Unba	Voltage amplitude unbalance (Lp-N)	0.5	-
Unb	Voltage phase and amplitude unbalance (Lp-Lg or Lp-N)	0.2	-
Uh	Voltage harmonics	1	-
Ih	Current harmonics	1	-
Msv	Centralised remote control signals	-	-

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