Single-circuit metering, measurement & analysis

DIRIS A10

Multifunction meters - PMD

modular multifunction meter

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DIRIS A10

The solution for

> Industry
> Infrastructures
> Data centres

Strong points

> Easy to use
> Integrated temperature sensor
> Detects wiring errors
> Compliant with IEC 61557-12

Conformity to standards

> IEC 61557-12
> IEC 62053-22 class 0.5S
> IEC 62053-23 class 2
> UL

Function

The DIRIS A10 is a modular multifunction meter for measuring electrical values in low voltage networks.
It allows all electrical parameters to be displayed and utilised for communication and/or output functions.

Advantages

Easy to use

Five direct access pushbuttons enable all measurements to be clearly viewed on its backlit LCD display.

Integrated temperature sensor

It allows variations in temperature to be detected.

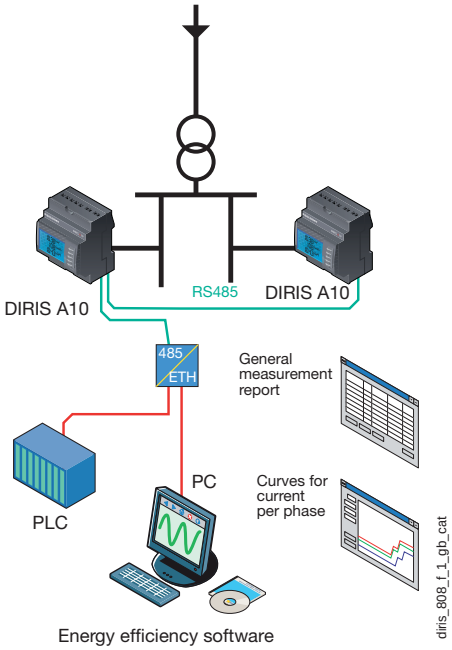
Detects wiring errors

An integrated test function can be utilised to detect incorrect wiring and to automatically correct CT installation errors.

Compliant with IEC 61557-12

IEC 61557-12 is a high-level standard for all PMDs (Performance Monitoring Devices) that are designed to measure and monitor electrical parameters in distribution networks.
Compliance with IEC 61557-12 ensures a high level of equipment performance, in terms of metrology, and the mechanical and environmental aspects (EMC, temperature, etc.).

Principle diagram



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Functions

Multi-measurement
- Currents
  - instantaneous: I1, I2, I3, In
  - maximum average: I1, I2, I3, In
- Voltages & frequency
  - instantaneous: V1, V2, V3, U12, U23, U31, F
- Power
  - instantaneous: 3P, ΣP, 3Q, ΣQ, 3S, ΣS
  - maximum average: ΣP, ΣQ, ΣS
- Power factors
  - instantaneous: 3PF, ΣPF
- Metering
- Active energy: + kWh
- Reactive energy: + kVarh
- Hours:
- Harmonic analysis
- Total harmonic distortion (level 51)
  - Currents: thd I1, thd I2, thd I3
  - Phase-to-neutral voltage: thd V1, thd V2, thd V3
  - Phase-to-phase voltage: thd U12, thd U23, thd U31

Dual tariff function
Selection of one out of 2 billing tariffs

Events
Alarms on all electrical values
Communications(1)
RS485 with MODBUS protocol
Input
- Tariff selection
- Remote device status

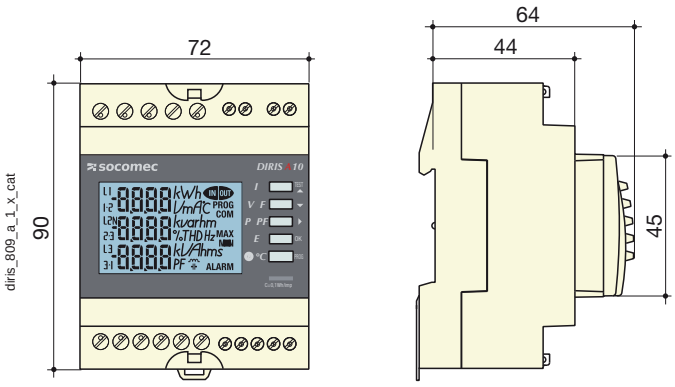
Output
- Remote command of device
- Alarm report
- Pulse report

(1) Available on specific version (see the following pages).

Front panel

1. Backlit LCD display.
2. Direct access key for currents (instant and maximum), current THD and test function.
3. Direct access key for voltages, frequency and voltage THD.
4. Direct access key for active, reactive and apparent power (instantaneous and max. values) and power factor.
5. Direct access key for energies.
6. Pushbutton for hour meter, temperature and programming menu access.
7. Metrological LED.

Case



Type	modular
Number of modules	4
Dimensions W x H x D	72 x 90 x 64 mm
Case degree of protection	IP 30
Front degree of protection	IP 52
Display type	backlit LCD display
Voltage and current connection cross-section	4 mm^2
Connection cross-section for AUX supply, input, output and comms.	2.5 mm^2
Weight	205 g (4825 0010) - 215 g (4825 0011)

Electrical characteristics

Current measurement (TRMS)	
Via CT primary	9 999 A
Via CT secondary	5 A
Measurement range	0 … 11 kA
Input consumption	0.6 VA
Measurement updating period	1 s
Accuracy	0.2 %
Permanent overload	6 A
Intermittent overload	10 I_n for 1 s
Voltage measurements (TRMS)	
Direct measurement between phases	50 … 500 VAC
Direct measurement between phase and neutral	28 … 289 VAC
Input consumption	≤ 0.1 VA
Measurement updating period	1 s
Accuracy	0.2 %
Permanent overload	800 VAC
Power measurement	
Measurement updating period	1 s
Accuracy	0.5 %
Power factor measurement	
Measurement updating period	1 s
Accuracy	0.5 %
Frequency measurement	
Measurement range	45 … 65 Hz
Measurement updating period	1 s
Accuracy	0.1 %

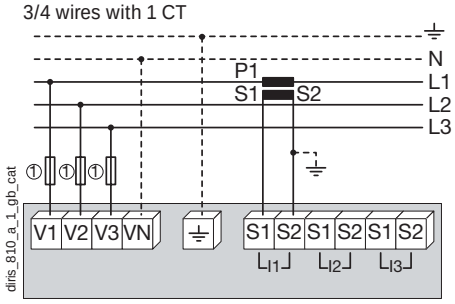
Energy accuracy	
Active (according to IEC 62053-22)	Class 0.5 S
Reactive (according to IEC 62053-23)	Class 2
Auxiliary power supply	
Alternating voltage	110 … 277 VAC
AC tolerance	± 15 %
Frequency	50 / 60 Hz
Consumption	< 3 VA
Digital output (pulses or on/off)	
Number	1
Type	20 / 30 VDC - 0.5 A - 10 VA
Max. number of operations	≤ 10^8
Input (tariff)	
Number	1
Type	0 VAC: T1 / 200-277 VAC: T2
Communication	
Link	RS485
Type	2 … 3 half duplex wires
Protocol	MODBUS RTU
MODBUS® speed	2400 … 38400 bauds
Operating conditions	
Operating temperature	- 10 … + 55 °C
Storage temperature	- 20 … + 70 °C
Relative humidity	85 %

Connection

Recommendation:
- For IT earthing systems, it is recommended that the CT secondary is not connected to earth.
- When disconnecting the DIRIS, the secondary of each current transformer must be short-circuited. This operation can be carried out automatically by a SOCOMEC PTI, an accessory which is included in this catalogue. Please consult us.
- It is recommended that the earthing point for the DIRIS A10 and the current transformer secondaries are not earthed at the same time.

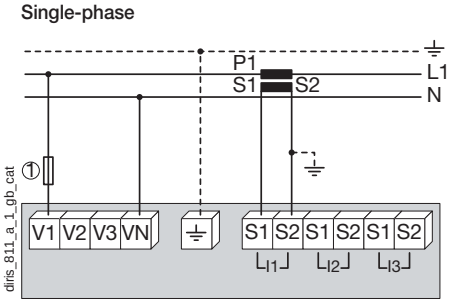
Low voltage balanced network

3/4 wires with 1 CT



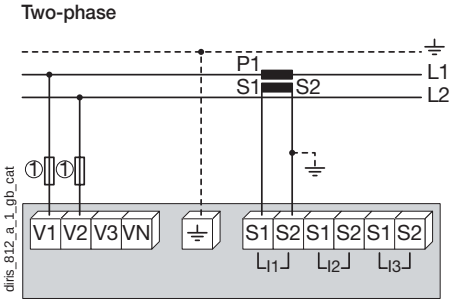
1. Fuses 0.5 A gG / 0.5 A class CC.

Single-phase



1. Fuses 0.5 A gG / 0.5 A class CC.

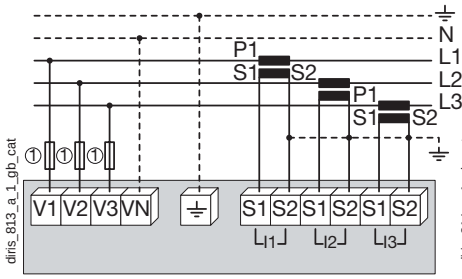
Two-phase



1. Fuses 0.5 A gG / 0.5 A class CC.

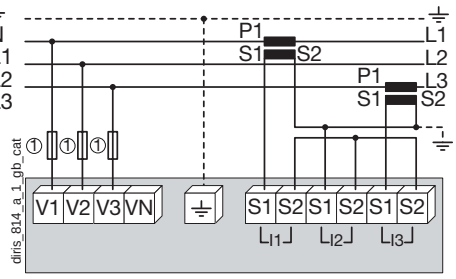
Low voltage unbalanced network

3/4 wires with 3 CTs



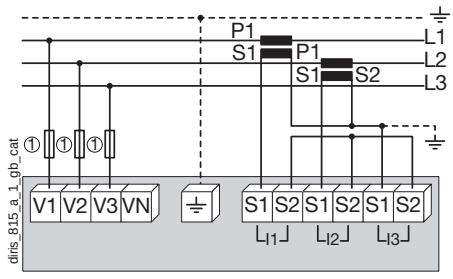
1. Fuses 0.5 A gG / 0.5 A class CC.

3 wires with 2 CTs



Use of 2 CTs reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.
1. Fuses 0.5 A gG / 0.5 A class CC.

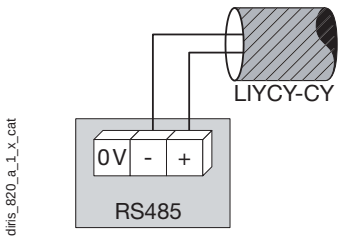
3 wires with 2 CTs



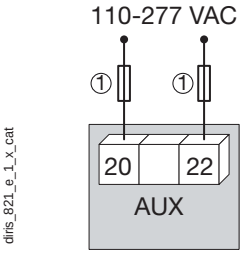
Use of 2 CTs reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.
1. Fuses 0.5 A gG / 0.5 A class CC.

Additional information

Communication via RS485 link

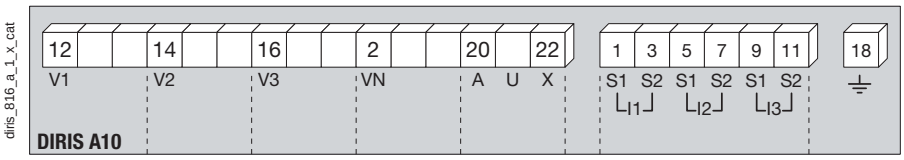


AC auxiliary power supply



1. Fuses 0.5 A gG / 0.5 A class CC.

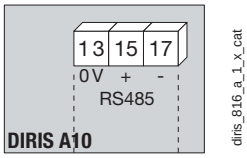
Terminals



AUX: auxiliary power supply U_s.
V1, V2, V3 & VN: voltage inputs.

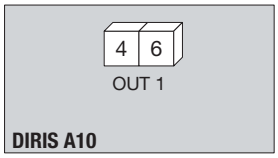
S1 - S2: current inputs.

Communication terminals



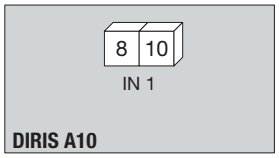
RS485 link.

Pulse or alarm output terminals



4 - 6: output n°1

Input terminals



8 - 10: input n°1

References

Basic device Description		DIRIS A10 Reference
DIRIS A10 (available in light grey on request)		4825 0010
DIRIS A10 with RS485 MODBUS communication (available in light grey on request)		4825 0011
Description of accessories	To be ordered in multiples of	Reference
Fuse disconnect switches for the protection of voltage inputs (type RM) 3 poles	4	5601 0018
Fuse disconnect switches for the protection of the auxiliary supply (type RM) 1 pole + neutral	6	5601 0017
Fuses type gG 10x38 0.5 A	10	6012 0000
Current transformer range	1	see pages584
Management software for DIRIS		see pages 618

Expert Services

> Study, definition, advice, implementation, maintenance and training… Our experts “Expert Services” offer complete support for the success of your project.

DIRIS A14

Multifunction measuring unit - PMD - MID

multi-measurement

Single-circuit metering, measurement & analysis

new

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DIRIS A14 panel mounted

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DIRIS A14 DIN rail mounted

The solution for

> Industry
> Infrastructures
> Data centers

Strong points

> Single phase and three phase MID certified
> Bi-directional metering
> Multi-measurement and load curves
> IEC 61557-12 measuring method
> Detection of connection errors

Compliance with standards

> IEC 61557-12
> IEC 62053-23 class 2
> EN50470-1
> EN50470-3 class C

Function

The DIRIS A14 is an MID approved multifunction meter - for measuring electrical values in low voltage networks.

It allows all electrical parameters to be displayed and utilised for communication and/or output functions.

Advantages

Single phase and three phase MID certified

DIRIS A14 products with MID certification provide the guaranteed accuracy required for applications in which sub-billing of the electrical energy consumed is necessary, whether on a three-phase or single-phase network. “Module B+D” certification guarantees that the design and manufacturing process of products are approved by an accredited laboratory.

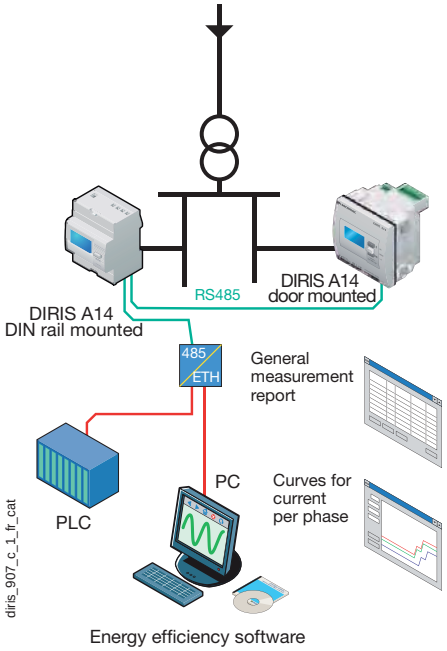
Bi-directional metering (four quadrants)

This function is for metering energy production or energy consumption.

Multi-measurement and load curve

Display of electrical values(I, U, V, ΣP, ΣQ, ΣS, PF) and P+ load curve over a 7 day period via communication.

Functional diagram



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IEC 61557-12 measuring method

IEC 61557-12 is a high-level standard covering all PMDs (Performance Monitoring Devices). By using the measuring method of IEC 61557-12 ensures a high level of equipment performance, in terms of metrology.

Detection of connection errors

The product is protected against phase/neutral inversion and detects wiring errors. The power supply internally derived from the voltage connections ensures realtime MID counting as soon as the mains voltage is present.

Functions

Multi-measurement
- Currents
  - instantaneous: I1, I2, I3, In
  - maximum average: I1, I2, I3, In
- Frequency
- Voltages
  - instantaneous: V1, V2, V3, U12, U23, U31, F
- Powers
  - instantaneous: ΣP, ΣQ, ΣS
  - maximum average: ΣP, ΣQ, ΣS
- Power factor (cos φ)
  - instantaneous: Σ cos φ
  - maximum average: Σ cos φ

Total and partial metering
- Active energy: + kWh, - kWh
- Reactive energy: + kvarh, - kvarh

Harmonic analysis (via communication)
- Total harmonic distortion (rank 63)
  - Currents: thd I1, thd I2, thd I3
  - Phase-to-neutral voltage: thd V1, thd V2, thd V3

  Phase-to-phase voltage: thd U12, thd U23, thd U31

Multi tariff function (via communication)

Selection of one out of 4 billing tariffs

Events (via communication)
- Active energy consumption: day n-1 / week n-1 / month n-1
- Active power load curves: P 10 minutes over 7 days with time-log

Communications

RS485 with MODBUS protocol

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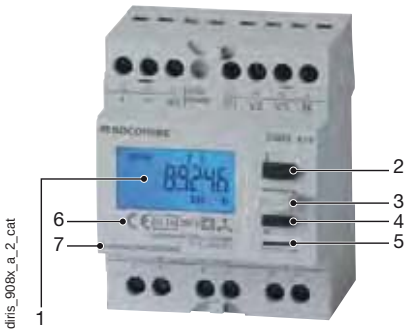
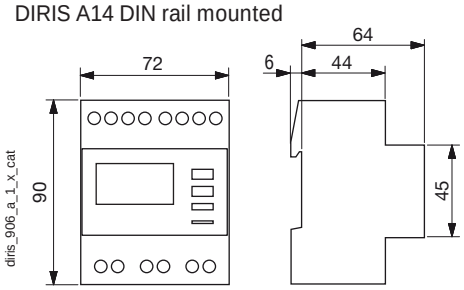
Front panel



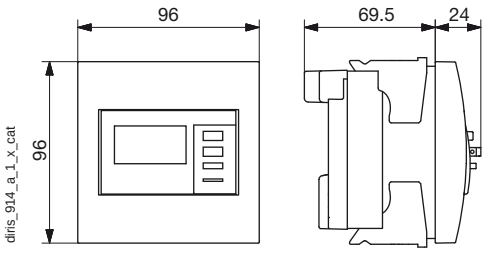
1. Backlit LCD display
2. Direct access for energies and validation key
3. Programming key
4. Navigation key for measurements
5. Metrological LED
6. MID marking
7. Serial Number

Case

DIRIS A14 DIN rail mounted



DIRIS A14 door mounted



	DIRIS A14 DIN rail mounted	DIRIS A14 door mounted
Type	modular	Recessed
Number of modules	4	-
Dimensions W x H x D	72 x 90 x 64 mm	96 x 96 x 69.5 mm
Case degree of protection	IP20	
Front degree of protection	IP51	
Display type	Backlit LCD	
Rigid cable cross-section	1.5 … 10 mm²	
Flexible cable cross-section	1 … 6 mm²	
Weight	240 g	450 g

Electrical characteristics

Current measurement (TRMS)	
Via CT primary	10 … 2500 A
Via CT secondary	5 A
Input consumption	0.6 VA
Startup current (Ist)	5 mA
Minimum current (Imin)	50 mA
Transmission current (Itr)	250 mA
Reference current (Iref)	5 A
Measurement updating period	1 s
Accuracy	0.5%
Permanent overload	6 A
Intermittent overload	120 A for 0.5 s
Voltage measurements (TRMS)	
Direct measurement (four phases)	50 …460 VAC
Input consumption	2 VA
Measurement updating period	1 s
Accuracy	0.2%
Permanent overload	480 V (phase-to-phase measurement)
Power measurement	
Measurement updating period	1 s
Accuracy	0.5%
Power factor measurement (cos φ)	
Measurement updating period	1 s
Accuracy	0.01

Energy accuracy	
Active (according to IEC 62053-22)	Class 0.5 S
Reactive (according to IEC 62053-23)	Class 2
Active (according to EN 50470)	Class C
Metrological LED (EA^+,EA^-)	
Pulse weight	10000 pulses/kWh
Colour	Red
Auxiliary power supply	
Self-powered	Yes
Frequency	50 / 60 Hz
Communication	
Link	RS485
Type	2 to 3 half duplex wires
Protocol	MODBUS® RTU
MODBUS® speed	4800 … 38400 bauds
Operating conditions	
Operating temperature	-10 … +55°C
Storage temperature	-20 … +70°C
Relative humidity	95% non-condensing

Connection

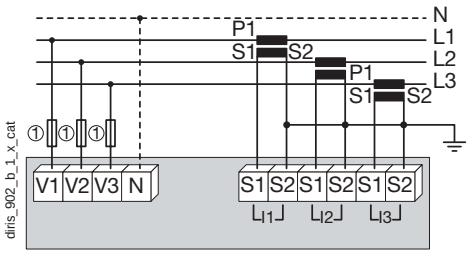
Low voltage balanced network

Recommendation:
- For IT earthing systems, it is recommended that the CT secondary is not connected to earth.
- When disconnecting the DIRIS, the secondary of each current transformer must be short-circuited.

This operation can be carried out automatically by a SOCOMEC PTI, which can be found in the SOCOMEC catalogue: please consult us.

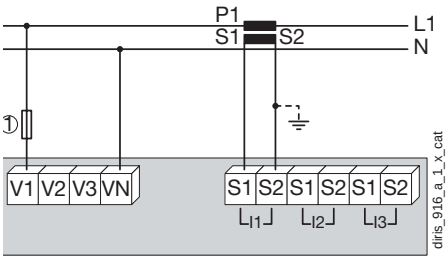
Low voltage unbalanced network

3/4 wires with 3 CTs



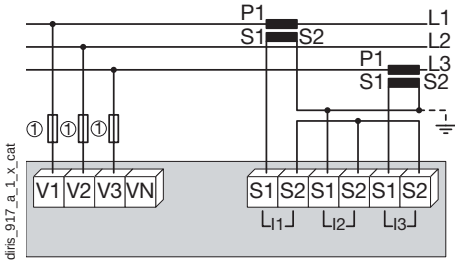
1. 0.5 A gG / 0.5 A class CC fuses.

Single-phase



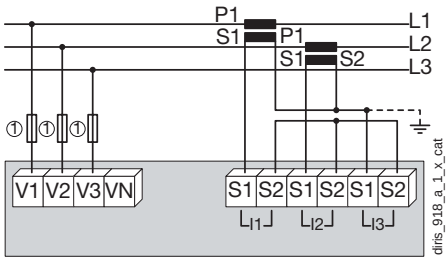
1. 0.5 A gG / 0.5 A class CC fuses.

3 wires with 2 CTs



1. 0.5 A gG / 0.5 A class CC fuses.

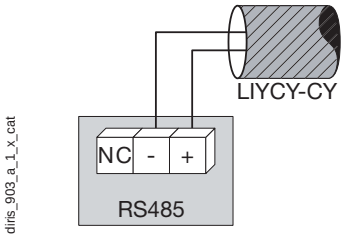
3 wires with 2 CTs



1. 0.5 A gG / 0.5 A class CC fuses.

Additional information

Communication via RS485 link



Terminals

Voltage outlets	
V	12
V2	14
V3	16
N	2
ICM (Intelligent Communication Module)	
RS485 "+"	15
RS485 "-"	17
RS485'NC	13

Current inputs	
I1 S1	1
I1 S2	3
I2 S1	5
I2 S2	7
I3 S1	9
I3 S2	11

References

Basic device Description	DIRIS A14 Reference
DIRIS A14 MID DIN rail mounted	4825 0020
DIRIS A14 MID door mounted	4825 0021

Expert Services

> Study, definition, advice, implementation, maintenance and training… Our experts "Expert Services" offer complete support for the success of your project.

DIRIS A20

Multifunction meters - PMD

multi-measurement meter - dimensions 96 x 96 mm

Single-circuit metering, measurement & analysis

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DIRIS A20

The solution for

> Industry
> Infrastructure
> Data centre

Strong points

> Easy to use
> Compliant with IEC 61557-12
> Detects wiring errors

Conformity to standards

> IEC 61557-12
> IEC 62053-22 class 0.5S
> IEC 62053-23 class 2
> UL

Management software

> To get the most effective use from your Socomec measurement and metering devices, we offer a range of dedicated software tools.

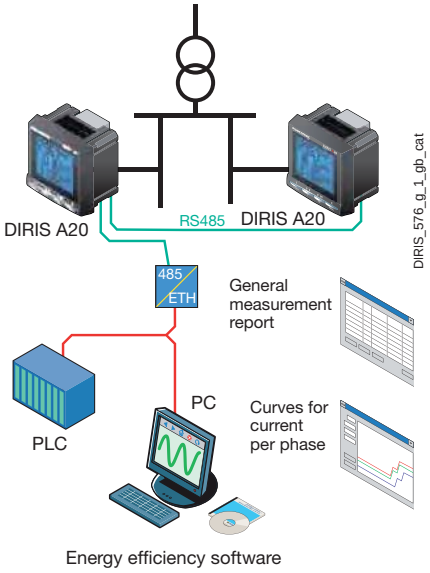
See page 618.

Function

DIRIS A20 are panel mounted measurement units which ensure the user has access to all the measurements required for successfully carrying out energy efficiency projects and ensuring the electrical distribution is monitored.

All this information can be analysed remotely using an energy management software solution.

Principle diagram



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Advantages

Easy to use

Thanks to its large backlit LCD display and its multiple viewing screens with direct pushbutton access, DIRIS A20 provide clear readings and are easy to use.

They directly display a number of multi-measurement and metering values : + kWh, + kvarh, I, U, V, F, P, Q, S, PF, etc.

Compliant with IEC 61557-12

IEC 61557-12 is a high-level standard for all PMDs (Performance Monitoring Devices) that are designed to measure and monitor electrical parameters in distribution networks.

Compliance with IEC 61557-12 ensures a high level of equipment performance, in terms of metrology, and the mechanical and environmental aspects (EMC, temperature, etc.).

Detects wiring errors

An integrated test function can be utilised to detect incorrect wiring and to automatically correct CT installation errors.

Functions

Multi-measurement
- Currents
  - instantaneous: I1, I2, I3, In
  - maximum average: I1, I2, I3, In
- Voltages & frequency
  - instantaneous: V1, V2, V3, U12, U23, U31, F
- Power
  - instantaneous: 3P, ΣP, 3Q, ΣQ, 3S, ΣS
  - maximum average: ΣP, ΣQ, ΣS
- Power factors
  - instantaneous: 3PF, Σ

Metering
- Active energy: + kWh
- Reactive energy: + kvarh
- Hours:

Harmonic analysis
- Total harmonic distortion (level 51)
  - Currents: thd I1, thd I2, thd I3
  - Phase-to-neutral voltage: thd V1, thd V2, thd V3
  - Phase-to-phase voltage: thd U12, thd U23, thd U31

Events
Alarms on all electrical values

Communications(1)
RS485 with MODBUS protocol

Output
- Remote command of device
- Alarm report
- Pulse report

Inputs
- Remote status device

(1) Available as an option (see the following pages).

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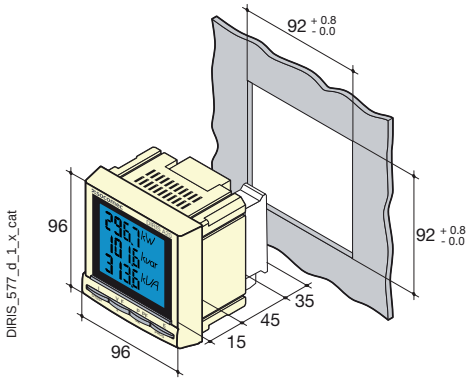
Front panel

1. Backlit LCD display.
2. Direct access key for currents (instantaneous and max. values), current THD and test function.
3. Direct access key for voltages, frequency and voltage THD.
4. Pushbutton for active, reactive, and apparent power (instantaneous and max. values) and power factor.
5. Direct access key for energies, hour meter and programming menu.

Case



Type	panel mounting
Dimensions W x H x D	96 x 96 x 60 mm
Case degree of protection	IP30
Front degree of protection	IP52
Display type	backlit LCD display
Terminal block type	Fixed or plug-in
Voltage and other connection cross-section	0.2 ... 2.5 mm^2
Current connection cross-section	0.5 ... 6 mm^2
Weight	400 g

Plug-in modules

DIRIS A20

1 Output

1 output assignable to:
- Pulses: configurable (type, weight, duration) in kWh or kvarh.
- Monitoring: 3I, In, 3V, 3U, F, ΣP, ΣQ, ΣS, ΣPFL/C, THD 3I, THD 3V, THD 3U and timer.
- Remote command of device.

Communication

RS485 link with JBUS / MODBUS protocol (speed up to 38400 bauds)

3 inputs, 1 output

3 inputs assignable to:
- Remote status device.

1 output assignable to:
- Pulses: configurable (type, weight, duration) in kWh or kvarh.
- Monitoring: 3I, In, 3V, 3U, F, ΣP, ΣQ, ΣS, ΣPFL/C, THD 3I, THD 3V, THD 3U and timer.
- Remote command of device.

Accessories

Current transformers
(See page 584)

IP65 protection

Panel mounting kit
for a 144 x 96 mm cut-out

DIRIS A20

Multifunction meters - PMD

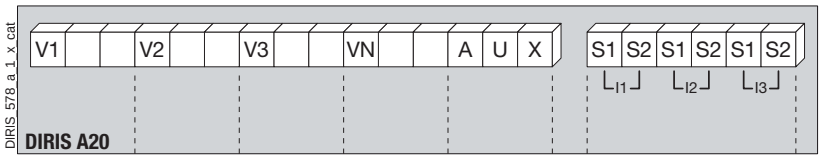
multi-measurement meter - dimensions 96 x 96 mm

Electrical characteristics

Current measurement (TRMS)	
Via CT primary	9 999 A
Via CT secondary	5 A
Measurement range	0 … 11 kA
Input consumption	0.6 VA
Measurement updating period	1 s
Accuracy	0.2 %
Permanent overload	6 A
Intermittent overload	10 I_n for 1 s
Voltage measurements (TRMS)	
Direct measurement between phases	50 … 500 VAC
Direct measurement between phase and neutral	28 … 289 VAC
Input consumption	≤ 0.1 VA
Measurement updating period	1 s
Accuracy	0.2 %
Permanent overload	800 VAC
Power measurement	
Measurement updating period	1 s
Accuracy	0.5 %
Power factor measurement	
Measurement updating period	1 s
Accuracy	0.5 %
Frequency measurement	
Measurement range	45 … 65 Hz
Measurement updating period	1 s
Accuracy	0.1 %

Energy accuracy	
Active (according to IEC 62053-22)	Class 0.5 S
Reactive (according to IEC 62053-23)	Class 2
Auxiliary power supply	
Alternating voltage	110 … 400 VAC
AC tolerance	± 10 %
Direct voltage	120 … 350 VDC
DC tolerance	± 20 %
Frequency	50 / 60 Hz
Consumption	10 VA
Pulse or alarm output	
Number	1
Type	100 VDC - 0.5 A - 10 VA
Max. number of operations	≤ 10^8
Inputs	
Number	3
Power supply	10 … 30 VDC
Minimum signal width	10 ms
Minimum duration between 2 pulses	18 ms
Type	Phototransistors
Communication	
Link	RS485
Type	2 … 3 half duplex wires
Protocol	MODBUS RTU
MODBUS® speed	1400 … 38400 bauds
Operating conditions	
Operating temperature	- 10 … + 55 °C
Storage temperature	- 20 … + 85 °C
Relative humidity	95 %

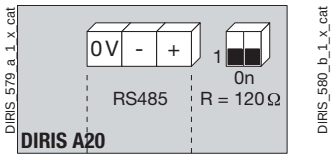
Terminals



S1 - S2: current inputs.

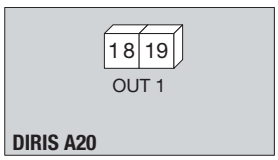
AUX: auxiliary power supply U_s.
V1, V2, V3 & VN: voltage inputs.

Communication module



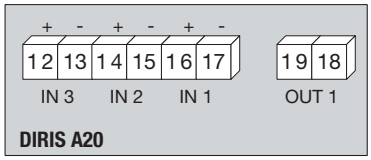
RS485 link.
R = 120 Ω: selectable internal resistance for RS485 end of line termination.

Output or alarm module



18 - 19 : output n°1

3 inputs, 1 output module

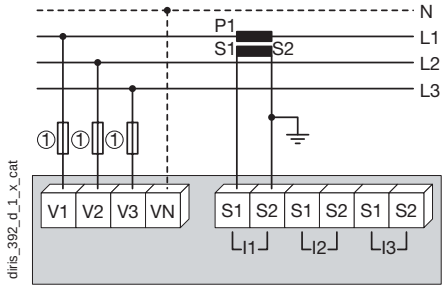


Connection

Recommendation:
- For IT earthing systems, it is recommended that the CT secondary is not connected to earth.
- When disconnecting the DIRIS, the secondary of each current transformer must be short-circuited. This operation can be carried out automatically by a SOCOMEC PTI, an accessory which is included in this catalogue. Please consult us.

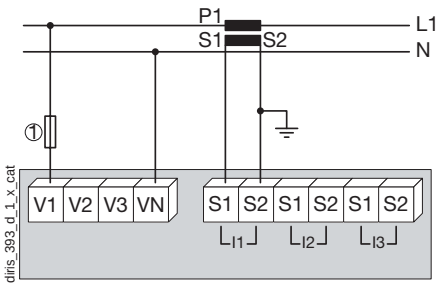
Low voltage balanced network

3/4 wires with 1 CT



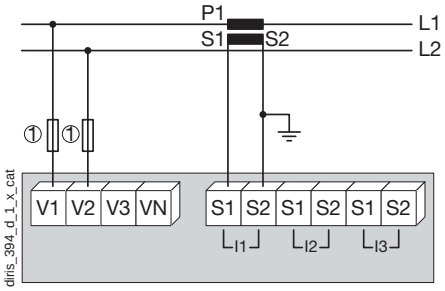
Use of 1 CT reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.
1. Fuses 0.5 A gG / 0.5 A class CC.

Single-phase



1. Fuses 0.5 A gG / 0.5 A class CC.

Two-phase



1. Fuses 0.5 A gG / 0.5 A class CC.

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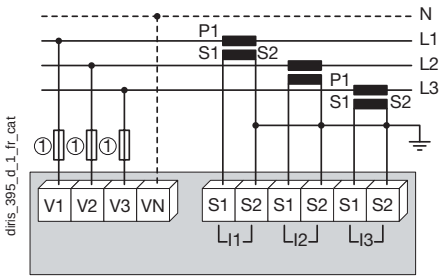
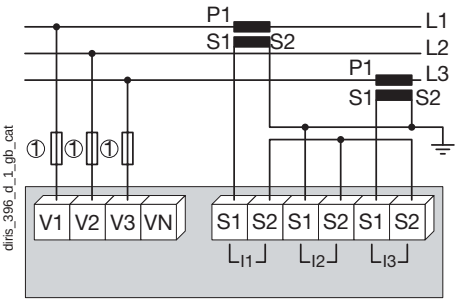
Low voltage unbalanced network

3/4 wires with 3 CTs



1. Fuses 0.5 A gG / 0.5 A class CC.

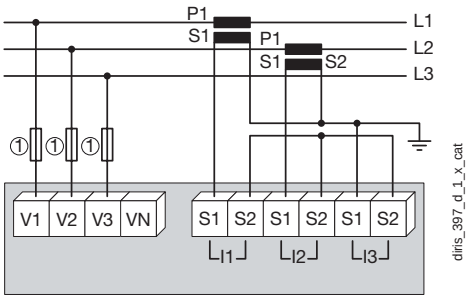
3 wires with 2 CTs



Use of 2 CTs reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.

1. Fuses 0.5 A gG / 0.5 A class CC.

3 wires with 2 CTs

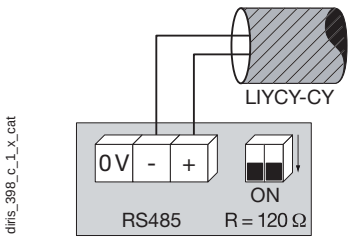


Use of 2 CTs reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.

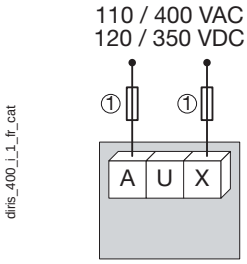
1. Fuses 0.5 A gG / 0.5 A class CC.

Additional information

Communication via RS485 link



AC & DC auxiliary power supply



1. Fuses 0.5 A gG / 0.5 A class CC.

References

Basic device		DIRIS A20
Auxiliary power supply U_s		Reference
110 ... 400 VAC / 120 ... 350 VDC		4825 0200
Optional plug-in modules		Reference
1 output		4825 0080
RS485 MODBUS® communication		4825 0082
3 inputs, 1 output		4825 0083
Accessories		
Description of accessories	To be ordered in multiples of	Reference
IP65 protection	1	4825 0089
Panel mounting kit for a 144 x 96 mm cut-out	1	4825 0088
Fuse disconnect switches for the protection of voltage inputs (type RM) 3 poles	4	5601 0018
Fuse disconnect switches for the protection of the auxiliary supply (type RM) 1 pole + neutral	6	5601 0017
Fuse type gG 10x38 0.5 A	10	6012 0000
Ferrite to be associated with communication modules	1	4899 0011
Current transformer range	1	See page 584
Management software for DIRIS		See page 618

Expert Services

> Study, definition, advice, implementation, maintenance and training… Our experts “Expert Services” offer complete support for the success of your project.

Single-circuit metering, measurement & analysis

DIRIS A40/A41

Multifunction meters - PMD

multi-measurement meter - dimensions 96 x 96 mm

DIRIS A41

The solution for

> Industry
> Data centres
> Infrastructures

Function

DIRIS A40 and A41are panel mounted measurement units which ensure the user has access to all the measurements required for successfully carrying out energy efficiency projects and ensuring the electrical distribution is monitored.

All this information can be analysed remotely using an energy management software solution.

The DIRIS A41 has a CT current input for measuring the neutral current.

Advantages

Easy to use

Thanks to its large backlit LCD display and its multiple viewing screens with direct pushbutton access, DIRIS A4x provide clear readings and are easy to use.

They directly display a number of multi-measurement and metering values : +/- kWh, +/- kvarh, kVAh, I, U, V, F, P, Q, S, PF, etc.

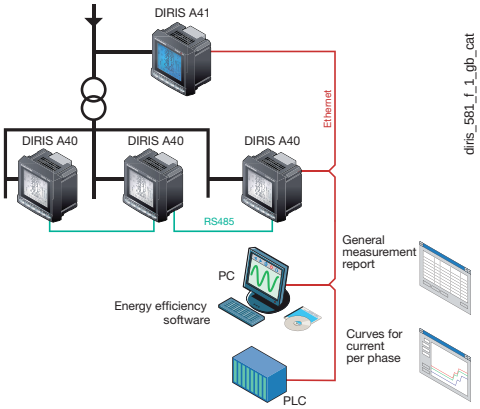
Detects wiring errors

An integrated test function can be utilised to detect incorrect wiring and to automatically correct CT installation errors.

Customisable

Thanks to the wide range of optional modules, the product can be customised or upgraded after installation.

Principle diagram



Webserver function

Optional Ethernet communication modules include a Webserver function for monitoring and exploiting data remotely without additional software.

Compliant with IEC 61557-12

IEC 61557-12 is a high-level standard for all PMDs (Performance Monitoring Devices) that are designed to measure and monitor electrical parameters in distribution networks.

Compliance with IEC 61557-12 ensures a high level of equipment performance, in terms of metrology, and the mechanical and environmental aspects (EMC, temperature, etc.).

Strong points

> Easy to use
> Detects wiring errors
> Customisable
> Webserver function
> Compliant with IEC 61557-12

Conformity to standards

> IEC 61557-12
> IEC 62053-22 class 0.5S
> IEC 62053-23 class 2
> UL

Functions

Multi-measurement
- Currents
  - instantaneous: I1, I2, I3, In, Isystem
  - average/maximum average: I1, I2, I3, In
- Voltages & frequency
  - instantaneous: V1, V2, V3, U12, U23, U31, F, Vsystem, Usystem
  - average/maximum average: V1, V2, V3, U12, U23, U31, F
- Power
  - instantaneous: 3P, ΣP, 3Q, ΣQ, 3S, ΣS
  - maximum average: ΣP, ΣQ, ΣS
  - predictive: (ΣP), (ΣQ), (ΣS)
- Power factors
  - instantaneous: 3PF, ΣPF
  - average/maximum average: ΣPF
- Temperatures(1)
  - internal
  - external via 3 PT100 sensors

Metering
- Active energy: +/- kWh
- Reactive energy: +/- kvarh
- Apparent power: kVAh
- Hours:

Harmonic analysis
- Total harmonic distortion
  - Currents: thd I1, thd I2, thd I3, thd In
  - Phase-to-neutral voltage: thd V1, thd V2, thd V3
  - Phase-to-phase voltage: thd U12, thd U23, thd U31
- Individual up to level 63
  - Currents: HI1, HI2, HI3, HIn
  - Phase-to-neutral voltage: HV1, HV2, HV3,
  - Phase-to-phase voltage: HU12, HU23, HU31

Load curves(1)
- Active and reactive power: ΣP+/-; ΣQ+/-
- Voltages & frequency: V1, V2, V3, U12, U23, U31, F

Events(1)
- Alarms on all electrical values.

Communications(1)
- RS485 MODBUS RTU & PROFIBUS DP
- Ethernet (MODBUS TCP or RTU over TCP and Web server)
- Ethernet with RS485 gateway MODBUS RTU over TCP

Inputs / Outputs(1)
- Pulse metering
- Remote control/command
- Alarm report
- Pulse report

Analogue output
- 0/4- 20 mA analogue output

(1) Available as an option (see the following pages).

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Front panel

1. Backlit LCD display.
2. Direct access key for currents and test function.
3. Direct access key for voltages and frequency.
4. Direct access key for active, reactive, and apparent powers and power factor.
5. Direct access key for maximum and average current and power values.
6. Direct access key for harmonic values.
7. Direct access key for energies, hour meter and programming menu.

Plug-in modules

DIRIS A40

DIRIS A41*

* with a factory fitted neutral CT module.

Pulse outputs

2 configurable pulse outputs (type, weight and duration) on ± kWh, ±kvarh and kVAh.

Communication MODBUS

RS485 link with MODBUS® protocol (speed up to 38400 bauds).

PROFIBUS DP communication

SUB-D9 link with PROFIBUS® DP protocol (speed up to 12 Mbauds).

Ethernet communication
- Ethernet connection with MODBUS TCP or MODBUS RTU over TCP protocol.
- Embedded Webserver function (1).

Ethernet communication with RS485 MODBUS gateway
- Ethernet connection with MODBUS TCP or MODBUS RTU over TCP protocol.
- Connection of 1 to 247 RS485 MODBUS slaves.
- Embedded Webserver function (1).

Analogue outputs

A maximum of 2 modules may be connected, providing up to 4 analogue outputs.
Per module 2 outputs assignable to:
3I, In, 3V, 3U, F, ± ΣP, ± ΣQ, ΣS, ΣPFL/C, I sys, Vsys, Usys, Ppred, Q pred, Spred, T°C internal, T°C 1, T°C 2, T°C3 and to 30 VDC power supply.

2 inputs - 2 outputs

A maximum of 3 modules may be connected, providing up to 6 inputs and 6 outputs.
Per module 2 outputs assignable to:
- monitoring: 3I, In, 3V, 3U, F, ±ΣP, ±ΣQ, SS, ΣPFL/C, THD 3I, THD In, THD 3V, THD 3U, Ppred, Qpred, Spred, internal T°C, T°C 1, T°C2, T°C3 and hour meter,
- remote control,
- timed remote control.
- 2 inputs for pulse metering.

Memory
- Storing up to a maximum of 62 days of P+, P-, Q+, Q- with an internal or external synchronisation signal of 5, 8, 10, 15, 20, 30 and 60 minutes.
- Storing of 10 hour-dated last alarms.
- Storing of the last minimum and maximum instantaneous values for 3U, 3V, 3I, In, F, ΣP±, ΣQ±, ΣS, THD 3U, THD 3V, THD, 3U, THD, 3V, THD, 3I, THD In.
- Storing of 3U, 3V and F average values based on synchronisation function (maximum 60 days).

Temperature(2)
Temperature indication:
- internal,
- external sensor PT 100 (T°C 1),
- external sensor PT 100 (T°C 2),
- external sensor PT 100 (T°C 3),.

(1) See "Management software for DIRIS" page 618.
(2) See "external sensor PT 100" page 600.

DIRIS A40/A41

Multifunction meters - PMD

multi-measurement meter - dimensions 96 x 96 mm

Accessories

Current transformers
(see page 584)

trafo_024_a_2_cat

trafo_077_b_2_cat

IP65 protection

diris_720_a_2_cat

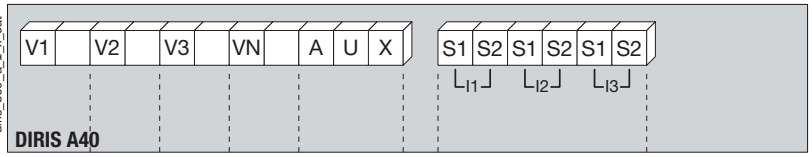
Panel mounting kit for a 144 x 96 mm cut-out

diris_718_b_1_cat

Terminals

DIRIS A40

diris_569_a_1_x_cat

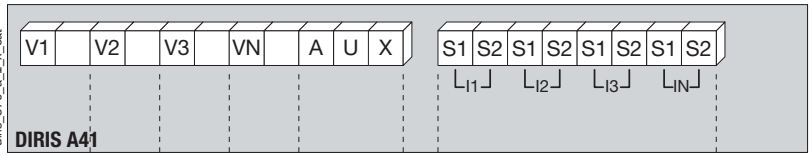


S1 - S2: current inputs

AUX: auxiliary power supplies U_s
V1- V2 - V3 - VN: voltage inputs

DIRIS A41

diris_570_a_1_x_cat

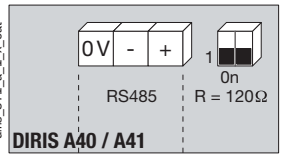


S1 - S2: current inputs

AUX: auxiliary power supplies U_s
V1- V2 - V3 - VN: voltage inputs

Communication module

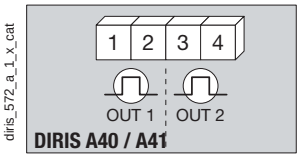
diris_571_a_1_x_cat



RS485 link.
R = 120 Ω: selectable internal resistance for RS485 end of line termination.

Pulse output module

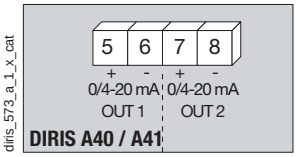
diris_572_a_1_x_cat



1 - 2: pulse output n°1.
3 - 4: pulse output n°2.

Analogue output module

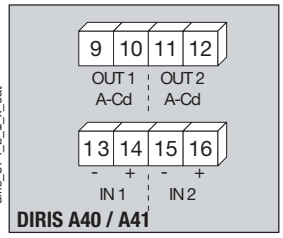
diris_573_a_1_x_cat



5 - 6: analogue output n°1.
7 - 8: analogue output n°2.

2 inputs / 2 outputs module

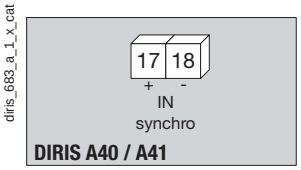
diris_574_b_1_x_cat



9 - 10: relay output n°1.
11 - 12: relay output n°2.
13 - 14: opto input n°1.
15 - 16: opto input n°2.

Memory module

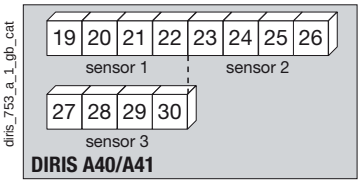
diris_683_a_1_x_cat



17 - 18: synchronisation input.

Temperature module

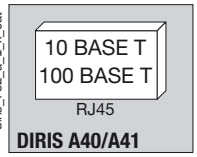
diris_753_a_1_gb_cat



Sensor 1	Sensor 2	Sensor 3
19: red	**23:** red	**27:** red
20: red	**24:** red	**28:** red
21: white	**25:** white	**29:** white
22: white	**26:** white	**30:** white

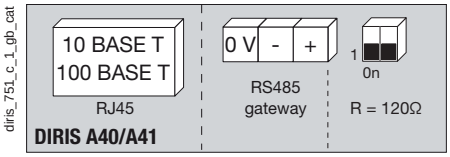
Ethernet Module

diris_752_a_1_x_cat



Ethernet module + RS485 MODBUS gateway

diris_751_c_1_gb_cat



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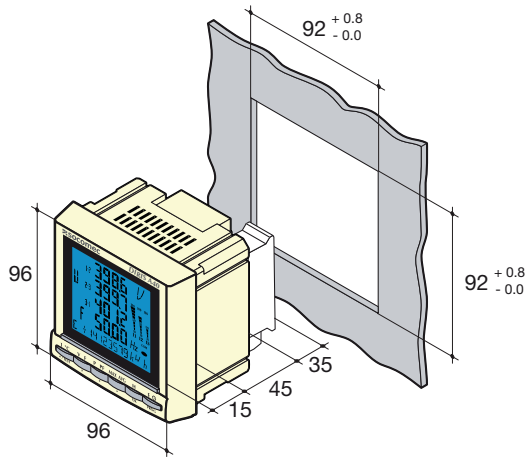
Electrical characteristics

Current measurement on insulated inputs (TRMS)	
Via CT primary	9 999 A
Via CT secondary	1 or 5 A
Measurement range	0 ... 11 kA
Input consumption	≤ 0.1 VA
Measurement updating period	1 s
Accuracy	0.2 %
Permanent overload	6 A
Intermittent overload	10 I_n for 1 s
Voltage measurements (TRMS)	
Direct measurement between phases	50 ... 700 VAC
Direct measurement between phase and neutral	28 ... 404 VAC
VT primary	500 000 VAC
VT secondary	60, 100, 110, 173, 190 VAC
Frequency	50 / 60 Hz
Input consumption	≤ 0.1 VA
Measurement updating period	1 s
Accuracy	0.2 %
Permanent overload	800 VAC
Current-voltage product	
Limitation for 1A CT	10 000 000
Limitation for 5A CT	10 000 000
Power measurement	
Measurement updating period	1 s
Accuracy	0.5 %
Power factor measurement	
Measurement updating period	1 s
Accuracy	0.5 %
Frequency measurement	
Measurement range	45 ... 65 Hz
Measurement updating period	1 s
Accuracy	0.1 %
Energy accuracy	
Active (according to IEC 62053-22)	Class 0.5 S
Reactive (according to IEC 62053-23)	Class 2
Auxiliary power supply	
Alternating voltage	110 ... 400 VAC
AC tolerance	± 10 %
Direct voltage	120 ... 350 VDC / 12 ... 48 VDC
DC tolerance	± 20 % / - 6 ... + 20 %
Frequency	50 / 60 Hz
Consumption	≤ 10 VA

2 inputs / 2 outputs module: Outputs (alarms / control)	
Number of relays	2(1)
Type	250 VAC - 5 A - 1150 VA
2 inputs / 2 outputs module: Phototransistor inputs	
Number	2(1)
Power supply	10 ... 30 VDC
Minimum signal width	10 ms
Minimum duration between 2 pulses	18 ms
Type	phototransistors
Pulse output module	
Number of relays	2
Type	100 VDC - 0.5 A - 10 VA
Max. number of operations	≤ 10^8
Analogue output module	
Number of outputs	2(2)
Type	insulated
Range	0 / 4 ... 20 mA
Load resistance	600 Ω
Maximum current	30 mA
MODBUS communication module	
Link	RS485
Type	2 ... 3 half duplex wires
Protocol	MODBUS RTU
MODBUS® speed	4800 ... 38400 bauds
PROFIBUS-DP communication module	
Link	SUB-D9
Protocol	PROFIBUS® DP
PROFIBUS® speed	9.8 kbauds ... 12 Mbauds
Ethernet communication module	
Connection	RJ45
Speed	10 base T / 100 base T
Protocol	MODBUS TCP or MODBUS RTU over TCP
Temperature module (inputs)	
Type	PT100
Connection	2, 3 or 4 wires
Dynamic	- 20 ... 150 °C
Accuracy	±1 digit
Maximum length	300 cm
Operating conditions	
Operating temperature	- 10 ... + 55 °C
Storage temperature	- 20 ... + 85 °C
Relative humidity	95 %

(1) Max. 3 modules / DIRIS.
(2) Max. 2 modules / DIRIS.

Case



diris_582_e_1_x_cat

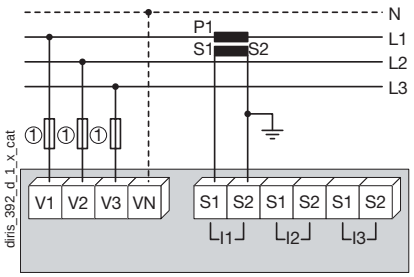
Type	panel mounting
Dimensions W x H x D	96 x 96 x 60 mm
Case degree of protection	IP30
Front degree of protection	IP52
Display type	backlit LCD display
Terminal blocks type	fixed or plug-in
Voltage and other connection cross-section	0.2 ... 2.5 mm²
Current connection cross-section	0.5 ... 6 mm²
Weight	400 g

Connections

Recommendation: When disconnecting the DIRIS, the secondary of each current transformer must be short-circuited. This operation can be carried out automatically by a SOCOMEC PTI, an accessory which is included in this catalogue. Please consult us.
In TNC neutral systems it is recommended to use the functional earth module.

Low voltage balanced network for DIRIS A40

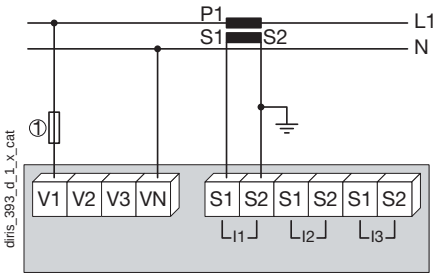
3/4 wires with 1 CT



Use of 1 CT reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.

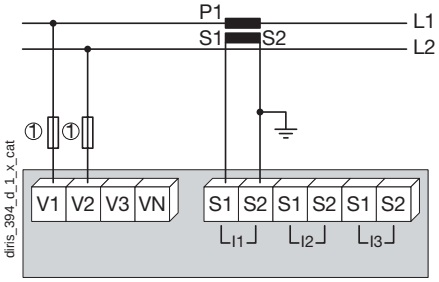
1. Fuses 0.5 A gG / 0.5 A class CC.

Single-phase



1. Fuses 0.5 A gG / 0.5 A class CC.

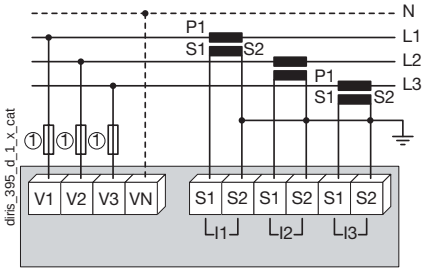
Two-phase



1. Fuses 0.5 A gG / 0.5 A class CC.

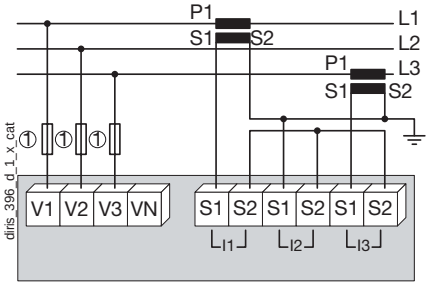
Low voltage unbalanced network for DIRIS A40

3/4 wires with 3 CTs



1. Fuses 0.5 A gG / 0.5 A class CC.

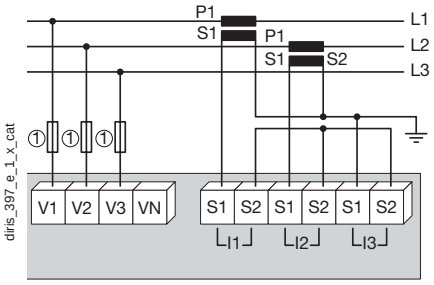
3 wires with 2 CTs



Use of 2 CTs reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.

1. Fuses 0.5 A gG / 0.5 A class CC.

3 wires with 2 CTs

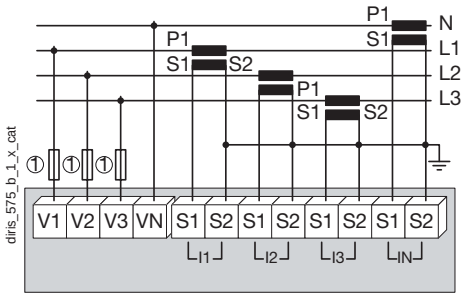


Use of 2 CTs reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.

1. Fuses 0.5 A gG / 0.5 A class CC.

Low voltage unbalanced network for DIRIS A41

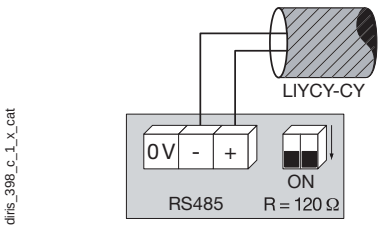
4 wires with 4 CTs



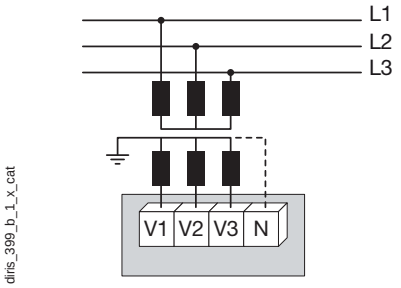
1. Fuses 0.5 A gG / 0.5 A class CC.

Additional information

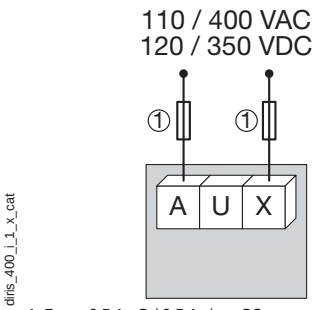
Communication via RS485 link



Connection of voltage transformer for HV networks



AC & DC auxiliary power supply



1. Fuses 0.5 A gG / 0.5 A class CC.

References

Basic device	DIRIS A40		DIRIS A41 with CT on the neutral
Auxiliary power supply U_s	Reference		Reference
110 ... 400 VAC / 120 ... 350 VDC	4825 0201		4825 0202
12 ... 48 VDC	4825 1201		4825 1202

Options Plug-in modules(1)	Reference		Reference
Pulse outputs	4825 0090		4825 0090
RS485 MODBUS® communication	4825 0092		4825 0092
Analogue outputs	4825 0093		4825 0093
2 inputs / 2 outputs	4825 0094		4825 0094
Communication Sub D9 PROFIBUS®DP(2)	4825 0205		4825 0205
Memory	4825 0097		4825 0097
Embedded Webserver function (2).	4825 0203		4825 0203
Ethernet communication + RS485 MODBUS gateway (Embedded Webserver function)(2)	4825 0204		4825 0204
Temperature inputs	4825 0206		4825 0206

(1) Ease of integration for additional functions (maximum 4 slots on A40 and 3 on A41).
(2) Dimension of the plug-in module: 2 slots.

Accessories Description of accessories	To be ordered in multiples of	Reference	To be ordered in multiples of	Reference
IP65 protection	1	4825 0089	1	4825 0089
Panel mounting kit for a 144 x 96 mm cut-out	1	4825 0088	1	4825 0088
Fuse disconnect switches for the protection of voltage inputs (type RM) 3 poles	4	5601 0018	4	5601 0018
Fuse disconnect switches for the protection of the auxiliary supply (type RM) 1 pole + neutral	6	5601 0017	6	5601 0017
Fuse type gG 10 x 38 0.5 A	10	6012 0000	10	6012 0000
Current transformer range	1	see page 584	1	see page 584
Ferrite to be associated with communication modules	1	4899 0011		4899 0011
Temperature sensor PT100 - M6 screw type	1	4825 0208	1	4825 0208
Temperature sensor PT100 - M6 eyelet type	1	4825 0209	1	4825 0209
Management software for DIRIS				see page 618

Expert Services

> Study, definition, advice, implementation, maintenance and training… Our experts “Expert Services” offer complete support for the success of your project.

DIRIS A60

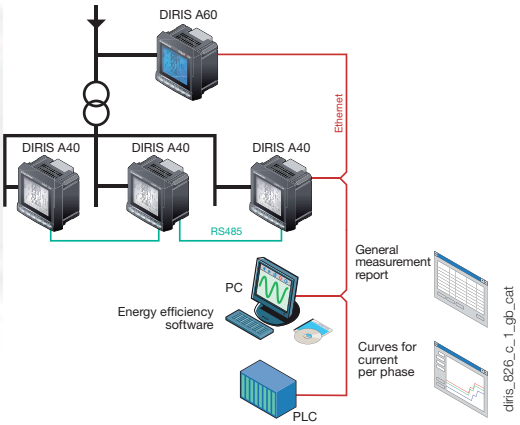
Multifunction meters - PMD

energy monitoring and event analysis - dimensions 96 x 96 mm

Single-circuit metering, measurement & analysis

DIRIS A60

Principle diagram



The solution for

> Industry
> Infrastructure
> Data centre

Strong points

> Easy to use
> Detects wiring errors
> Compliant with IEC 61557-12
> Management softwares
> Conformity to standard EN 50160

Conformity to standards

> IEC 61557-12
> IEC 62053-22 class 0.5S
> IEC 62053-23 class 2
> EN 50160

Function

DIRIS A60 is a panel mounted multifunction meter which incorporates all functions of the DIRIS A40 with the addition of enhanced data logging functions, recording curves for quality events. All this information can be analysed remotely using the Analysis software which is available at no charge and can be downloaded from the SOCOMEC website www.socomec.com.

Advantages

Easy to use

Thanks to its large backlit LCD display and its multiple viewing screens with direct key access, the DIRIS A60 provides clear readings and is easy to use.

It directly displays a number of multi-measurement and metering values : +/- kWh, +/- kvarh, kVAh, I, U, V, F, P, Q, S, PF, etc.

Detects wiring errors

An integrated test function can be utilised to detect incorrect wiring and to automatically correct CT installation errors.

Compliant with IEC 61557-12

IEC 61557-12 is a high-level standard for all PMDs (Performance Monitoring Devices) that are designed to measure and monitor electrical parameters in distribution networks.

Compliance with IEC 61557-12 ensures a high level of equipment performance, in terms of metrology, and the mechanical and environmental aspects (EMC, temperature, etc.).

Management softwares

- Optional Ethernet module with Webserver function: For measurement monitoring, data exploitation and the export of load curves remotely without a specific software (web browser access).
- Analysis software: For the analysis of events data in order to improve the reliability of the electrical installation.
- Easy Config software: For quick and easy remote device configuration; configuration files can be copied from and sent to the DIRIS A60, or they can be created without communication and sent at a later time. Multiple devices can be configured from a single file, which is especially useful for OEMs and panel builders.

Conformity to standard EN 50160

EN 50160 is a standard which defines events relating to the quality of electrical networks. The DIRIS A60 captures voltage events in accordance with this standard.

Functions

In addition to the functions of the DIRIS A40, the DIRIS A60 also:

- shows the current and voltage unbalance
- shows the tangent φ
- stores the load curves (60 days with an interval of 10 minutes) for the active, reactive and apparent power: ΣP+/-; ΣQ+/-, ΣS
- detects and stores the last 40 events concerning:
  - overvoltage
  - voltage dips
  - cut-offs
  - overcurrent.

For each stored event, the DIRIS A60 records the relevant RMS 10 ms interval curves for the voltages V1, V2, V3, U12, U23, U31 and the currents I1, I2, I3, In, giving a total of 400 curves.

Other functions:

Multi-measurement

Currents
- instantaneous: I1, I2, I3, In, Isystem,
- average/maximum average: I1, I2, I3, In,
- unbalance: I unb.

- Voltages & frequency
  - instantaneous: V1, V2, V3, U12, U23, U31, F, Vsystem, Usystem
  - average/maximum average: V1, V2, V3, U12, U23, U31, F
  - unbalance: U unb.
- Power
  - instantaneous: 3P, ΣP, 3Q, ΣQ, 3S, ΣS
  - maximum average: ΣP, ΣQ, ΣS
  - predictive: ΣP, ΣQ, ΣS.
- Power factor - PF, ΣPF
- Instantaneous total tangent φ
- Instantaneous, average and max. average unbalance
- Temperatures(1)
  - internal,
  - external via 3 PT100 sensors

Metering
- Active energy: +/- kWh
- Reactive energy: +/- kvarh
- Apparent power: kVAh
- Hours:

Harmonic analysis (level 63)
- Total harmonic distortion
  - Currents: thd I1, thd I2, thd I3, thd In
  - Phase-to-neutral voltage: thd V1, thd V2, thd V3
  - Phase-to-phase voltage: thd U12, thd U23, thd U31
- Individual
  - Currents: HI1, HI2, HI3, HIn
  - Phase-to-neutral voltage: HV1, HV2, HV3,
  - Phase to phase voltage: HU12, HU23, HU31

Events (1)
- Alarms on all electrical values

Communications(1)
- 0/4- 20 mA analogue output
- RS485 MODBUS RTU
- Ethernet (MODBUS TCP or MODBUS RTU over TCP and Webserver)
- Ethernet (MODBUS TCP or MODBUS RTU over TCP and Webserver) with RS485 MODBUS RTU gateway

Inputs / Outputs (1)
- Pulse metering
- Remote control/command
- Alarm report
- Pulse report

(1) Available as an option (see the following pages).

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Front panel

1. Backlit LCD display.
2. Direct access key for currents, temperatures and test function.
3. Direct access key for voltages and frequency.
4. Direct access key for active, reactive, and apparent powers and power factor.
5. Direct access key for maximum and average current, voltage and power values.
6. Direct access key for harmonics values.
7. Direct access key for energies, hour meter and programming menu.

Plug-in modules

DIRIS A60*

* With integrated memory module.

Pulse outputs

- 2 configurable pulse outputs (type, weight and duration) on ± kWh, ±kvarh and kVAh.

Communication MODBUS

- RS485 link with MODBUS® protocol (speed up to 38400 bauds).

Ethernet communication

- Ethernet connection with MODBUS TCP or MODBUS RTU over TCP protocol.
- Embedded Webserver function (1).

Ethernet communication with RS485 MODBUS gateway

- Ethernet connection with MODBUS TCP or MODBUS RTU over TCP protocol.
- Connection of 1 to 247 RS485 MODBUS slaves.
- Embedded Webserver function (1).

Analogue outputs

- A maximum of 2 modules may be connected, providing up to 4 analogue outputs.
- Per module 2 outputs assignable to: 3I, In, 3V, 3U, F, ± ΣP, ± ΣQ, ΣS, ΣPFL/C, Isys, Vsys, Usys, Ppred, Q pred, Spred, T°C internal, T°C 1, T°C 2, T°C3 and to 30 VDC power supply.

2 inputs - 2 outputs

- A maximum of 3 modules may be connected, providing up to 6 inputs and 6 outputs.
- Per module 2 outputs assignable to:
  - monitoring: 3I, In, 3V, 3U, F, ± ΣP, ± ΣQ, ΣS, ΣPFL/C, THD 3I, THD In, THD 3V, THD 3U, Ppred, Qpred, Spred, T°C internal, T°C 1, T°C2, T°C3 and hour meter,
  - remote control,
  - timed remote control,
- 2 inputs for pulse metering.

Temperature(2)

Temperature indication:
- Internal
- External sensor PT 100 (T°C 1)
- External sensor PT 100 (T°C 2)
- External sensor PT 100 (T°C 3).

(1) See Management softwares for DIRIS p. 618.
(2) See External sensor PT 100 p. 600.

DIRIS A60

Multifunction meters - PMD

energy monitoring and event analysis - dimensions 96 x 96 mm

Accessories

Current transformers
(see page 584)

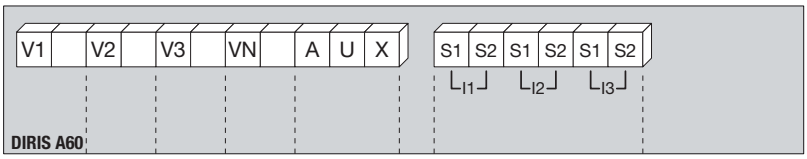
Split-core current transformers

IP65 protection

Panel mounting kit
for a 144 x 96 mm cut-out

Terminals

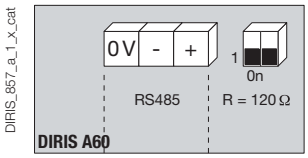
DIRIS A60



S1 - S2: current inputs

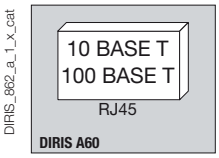
AUX: auxiliary power supplies U_s
V1- V2 - V3 - VN: voltage inputs

RS485 MODBUS module

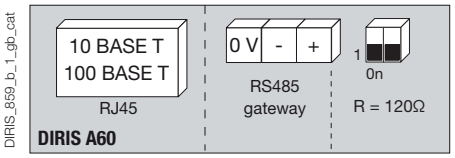


RS485 link.
R = 120 Ω: selectable internal resistance for RS485 end of line termination.

Ethernet module

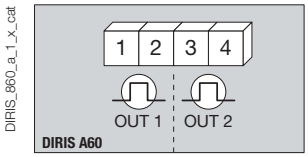


Ethernet module + RS485 MODBUS gateway



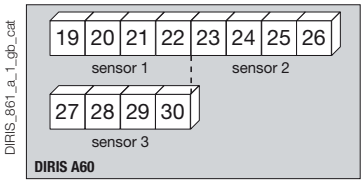
RS485 gateway resistor.
R = 120 Ω: selectable internal resistance for RS485 end of line termination.

Pulse output module

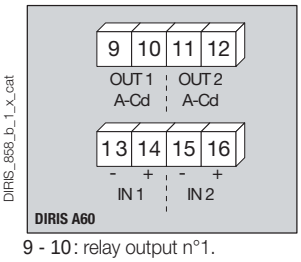


1 - 2: pulse output n°1.
3 - 4: pulse output n°2.

Temperature module

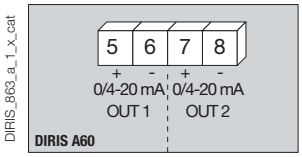


2 inputs / 2 outputs module



9 - 10: relay output n°1.
11 - 12: relay output n°2.
13 - 14: opto input n°1.
15 - 16: opto input n°2.

Analogue output module



5 - 6: analogue output n°1.
7 - 8: analogue output n°2.

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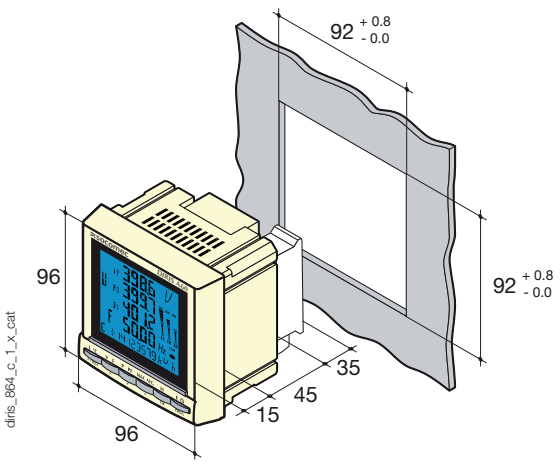
Electrical characteristics

Current measurement on insulated inputs (TRMS)	
Via CT primary	9 999 A
Via CT secondary	1 or 5
Measurement range	0 … 11 kA
Input consumption	≤ 0.1 VA
Measurement updating period	1 s
Accuracy	0.2 %
Permanent overload	6 A
Intermittent overload	10 I_n for 1 s
Voltage measurements (TRMS)	
Direct measurement between phases	50 … 700 VAC
Direct measurement between phase and neutral	28 … 404 VAC
VT primary	500 000 VAC
VT secondary	60, 100, 110, 173, 190 VAC
Frequency	50 / 60 Hz
Input consumption	≤ 0.1 VA
Measurement updating period	1 s
Accuracy	0.2 %
Permanent overload	800 VAC
Current-voltage product	
Limitation for 1A CT	10 000 000
Limitation for 5A CT	10 000 000
Power measurement	
Measurement updating period	1 s
Accuracy	0.5 %
Power factor measurement	
Measurement updating period	1 s
Accuracy	0.5 %
Frequency measurement	
Measurement range	45 … 65 Hz
Measurement updating period	1 s
Accuracy	0.1 %
Energy accuracy	
Active (according to IEC 62053-22)	Class 0.5 S
Reactive (according to IEC 62053-23)	Class 2
Auxiliary power supply	
Alternating voltage	110 … 400 VAC
AC tolerance	± 10 %
Direct voltage	120 … 350 VDC
DC tolerance	± 20 %
Frequency	50 / 60 Hz
Consumption	≤ 10 VA

2 inputs / 2 outputs module: Outputs (alarms / control)	
Number of relays	2(1)
Type	250 VAC - 5 A - 1150 VA
2 inputs / 2 outputs module: Phototransistor inputs (pulse metering)	
Number	2(1)
Power supply	10 … 30 VDC
Minimum signal width	10 ms
Minimum duration between 2 pulses	18 ms
Type	phototransistors
Pulse output module	
Number of relays	2
Type	100 VDC - 0.5 A - 10 VA
Max. number of operations	≤ 10^8
Analogue output module	
Number of outputs	2(2)
Type	insulated
Range	0 / 4 … 20 mA
Load resistance	600 Ω
Maximum current	30 mA
MODBUS communication module	
Link	RS485
Type	2 … 3 half duplex wires
Protocol	MODBUS RTU
MODBUS® speed	4800 … 38400 bauds
Ethernet communication module	
Connection	RJ45
Speed	10 base T / 100 base T
Protocol	MODBUS TCP or MODBUS RTU over TCP
Temperature inputs	
Type	PT100
Connection	2, 3 or 4 wires
Dynamic	- 20 … 150 °C
Accuracy	± 1 digit
Maximum length	300 cm
Operating conditions	
Operating temperature	- 10 … + 55 °C
Storage temperature	- 20 … + 85 °C
Relative humidity	95 %

(1) Max. 3 modules / DIRIS.
(2) Max. 2 modules / DIRIS.

Case



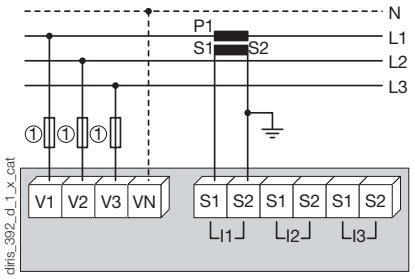
Type	panel mounting
Dimensions W x H x D	96 x 96 x 80 mm
Case degree of protection	IP30
Front degree of protection	IP52
Display type	backlit LCD display
Terminal blocks type	fixed or plug-in
Voltage and other terminals connection cross-section	0.2 … 2.5 mm^2
Current connection cross-section	0.5 … 6 mm^2
Weight	450 g

Connection

Low voltage balanced network for DIRIS A60

Recommendation: When disconnecting the DIRIS, the secondary of each current transformer must be short-circuited. This operation can be carried out automatically by a SOCOMEC PTI, which can be found in the SOCOMEC catalogue: please consult us.

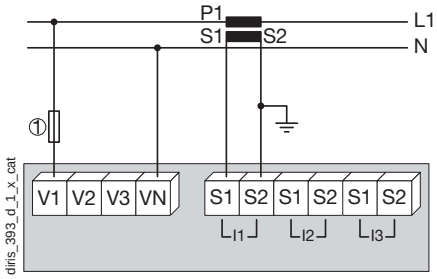
3/4 wires with 1 CT



Use of 1 CT reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.

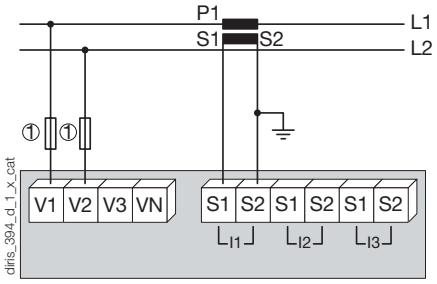
1. Fuses 0.5 A gG / 0.5 A class CC.

Single-phase



1. Fuses 0.5 A gG / 0.5 A class CC.

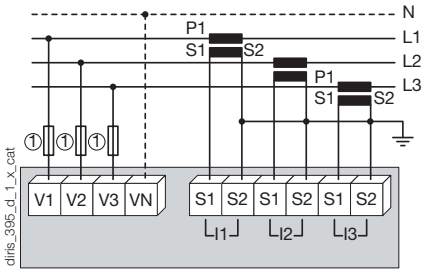
Two-phase



1. Fuses 0.5 A gG / 0.5 A class CC.

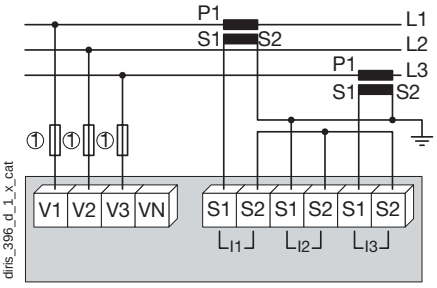
Low voltage unbalanced network for DIRIS A60

3/4 wires with 3 CTs



1. Fuses 0.5 A gG / 0.5 A class CC.

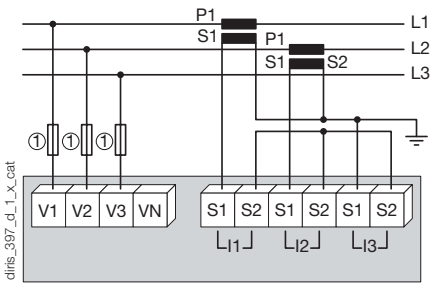
3 wires with 2 CTs



Use of 2 CTs reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.

1. Fuses 0.5 A gG / 0.5 A class CC.

3 wires with 2 CTs

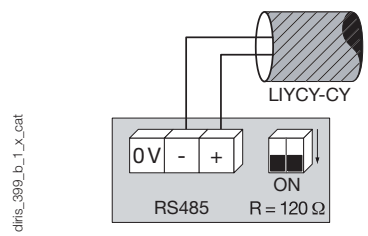


Use of 2 CTs reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.

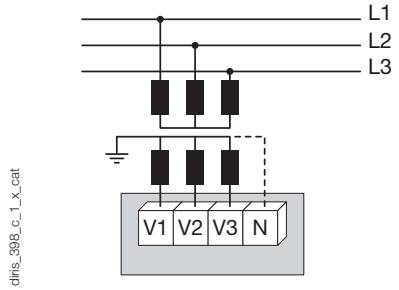
1. Fuses 0.5 A gG / 0.5 A class CC.

Additional information

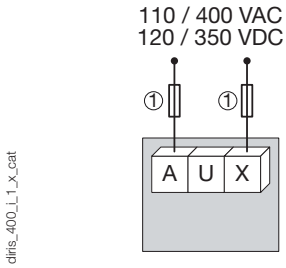
Communication via RS485 link



Connection of voltage transformer for HV networks



AC & DC auxiliary power supply



1. Fuses 0.5 A gG / 0.5 A class CC.

References

Basic device	DIRIS A60
Auxiliary power supply U_s	Reference
110 ... 400 VAC / 120 ... 350 VDC	4825 0207
Options	
Plug-in-modules(1)	Reference
Pulse outputs	4825 0090
RS485 MODBUS® communication	4825 0092
Analogue outputs	4825 0093
2 inputs / 2 outputs	4825 0094
Ethernet communication (embedded Ethernet Webserver)(2)	4825 0203
Ethernet communication + RS485 MODBUS gateway (embedded Ethernet Webserver)(2)	4825 0204
Temperature inputs	4825 0206

(1) Easy integration of additional functions (maximum 3 slots per device).
(2) Dimension of the plug-in module: 2 slots.

Options Description of accessories	To be ordered in multiples of	Reference
IP65 protection	1	4825 0089
Panel mounting kit for a 144 x 96 mm cut-out	1	4825 0088
Fuse disconnect switches for the protection of voltage inputs (type RM) 3 poles	4	5601 0018
Fuse disconnect switches for the protection of the auxiliary supply (type RM) 1 pole + neutral	6	5601 0017
Fuse type gG 10 x 38 0.5 A	10	6012 0000
Ferrite to be associated with communication modules	1	4899 0011
Current transformer range	1	see page 584
Temperature sensor PT100 - M6 screw type	1	4825 0208
Temperature sensor PT100 - M6 eyelet type	1	4825 0209
Management softwares for DIRIS		see page 618

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DIRIS A80

Multifunction meters - PMD + RCM

monitoring energy and fault currents - dimensions 96 x 96 mm

diris_876_a_1_cat

DIRIS A80

The solution for

> Industry
> Infrastructure
> Health care buildings
> Data centre

Strong points

> Compact
> Patent pending
> Management softwares
> Compliant with IEC 61557-12
> Conformity to standard EN 50160

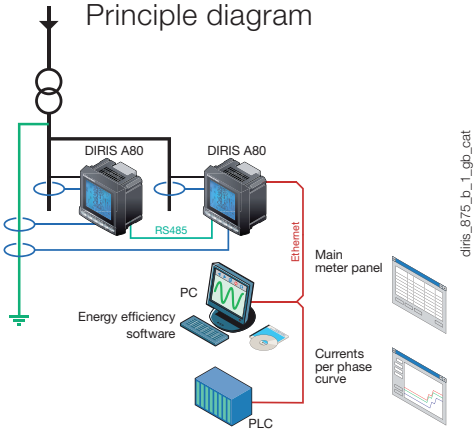
Conformity to standards

> IEC 62053-22 class 0.5S
> IEC 62053-23 class 2
> IEC 61557-12
> IEC 62020
> EN 50160

Function

DIRIS A80 is a complete panel mounted multifunction meter which incorporates RCM current monitoring (Residual Current Monitoring), for networks with TN-S and TT neutral systems, and enhanced data logging functions for recording curves for quality and RCM events. The DIRIS A80 supplies all the measurements required for energy efficiency projects while its RCM function provides preventative earth leakage information, essential in critical applications to avoid installation shutdowns.

Principle diagram



diris_875_b_1_gb_cat

Advantages

Compact

The DIRIS A80 combines two complementary products within a single 96 x 96 mm panel mounted case, enabling faster installation and utilising less space. The DIRIS A80 comprises:

- a multifunction meter with enhanced event logging functions which records curves for quality events.
- an RCM fault current monitoring device (Residual Current Monitoring).

Conformity to standard EN 50160

- EN 50160 is a standard which defines events relating to the quality of electrical networks. The DIRIS A80 captures voltage events in accordance with this standard.

Patent pending

Automatic adjustment of the leakage current alarm threshold in accordance with the load current to avoid false alarms.

Compliant with IEC 61557-12.

IEC 61557-12 is a high-level standard for all PMDs (Performance Monitoring Devices) that are designed to measure and monitor electrical parameters in distribution networks.

Compliance with IEC 61557-12 ensures a high level of equipment performance, in terms of metrology, and the mechanical and environmental aspects (EMC, temperature, etc.).

Management softwares

- Optional Ethernet module with Webserver function: For measurement monitoring, data exploitation and the export of load curves remotely without a specific software (web browser access).
- Analysis software: For the analysis of events data in order to improve the reliability of the electrical installation.
- Easy Config software: For quick and easy remote device configuration; configuration files can be copied from and sent to the DIRIS A80, or they can be created without communication and sent at a later time. Multiple devices can be configured from a single file, which is especially useful for OEMs and panel builders.

Functions

The DIRIS A80 offers the following functions:

- The monitoring of fault currents
- (Residual Current Monitoring)
- Multi-measurement (current, voltage, frequency, power, …)
- Energy metering
- Harmonic analysis
- Event detection

Fault currents (RCM)

- Measurement of currents IΔn (I1+I2+I3+In) and IPE (protection conductor)
- Permanent monitoring of IΔn and IPE
  - Fault current alarms depending on the load current
  - Record of events IΔn and IPE (time, duration and curves stored)
  - Alarm report output

Multi-measurement

- Currents
  - instantaneous: I1, I2, I3, In, Isystem,
  - average/maximum average: I1, I2, I3, In,
  - unbalance: I unb

  Voltages & frequency
  - instantaneous: V1, V2, V3, U12, U23, U31, F, Vsystem, Usystem
  - average/maximum average: V1, V2, V3, U12, U23, U31, F
  - unbalance: U unb
- Power
  - instantaneous: 3P, ΣP, 3Q, ΣQ, 3S, ΣS
  - maximum average: ΣP, ΣQ, ΣS
  - predictive: ΣP, ΣQ, ΣS
  - storing of load curves (60 days with an interval of 10 minutes) for the active, reactive and apparent power: ΣP+/-; ΣQ+/-, ΣS
- Power factor PF, ΣPF
- Instantaneous total tangent phi
- Instantaneous, average and max. average unbalance

Metering

- Active energy: +/- kWh
- Reactive energy: +/- kvarh
- Apparent power: kVAh
- Hours

Harmonic analysis (level 63)

- Total harmonic distortion
  - Currents: thd I1, thd I2, thd I3, thd In
  - Phase-to-neutral voltage: thd V1, thd V2, thd V3
  - Phase-to-phase voltage: thd U12, thd U23, thd U31.
- Individual
  - Currents: HI1, HI2, HI3, HIn
  - Phase-to-neutral voltage: HV1, HV2, HV3
  - Phase-to-phase voltage: HU12, HU23, HU31.

Events

- Alarms on all electrical values
- Detection and storing of the last 60 events:
  - overvoltage
  - voltage dips
  - cut-offs
  - overloads.

For each stored event, the DIRIS A80 records the relevant RMS 10 ms interval curves for the voltages V1, V2, V3, U12, U23, U31, the currents I1, I2, I3 and In. These curves can be synchronised with the event curves IΔn and IPE.

Communications(1)

- RS485 MODBUS RTU
- Ethernet (MODBUS TCP or MODBUS RTU over TCP and Webserver)
- Ethernet (MODBUS TCP or MODBUS RTU over TCP and Webserver) with RS485 MODBUS RTU gateway

(1) Available as an option (see the following pages).

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Front panel

1. Backlit LCD display.
2. Direct access key for the currents, RCM function and alarm reset.
3. Direct access key for voltages and frequency.
4. Direct access key for active, reactive, and apparent powers and power factor.
5. Direct access key for maximum and average current, voltage and power values.
6. Direct access key for harmonic values and the connection and RCM test functions.
7. Direct access key for energies, hour meter and programming menu.

Accessories

Core balance transformer ΔIC
(see page 636)

Plug-in modules

DIRIS A80

Communication MODBUS

- RS485 link with MODBUS® protocol (speed up to 38400 bauds).

Ethernet communication

- Ethernet connection with MODBUS TCP or MODBUS RTU over TCP protocol.
- Embedded Webserver function(1).

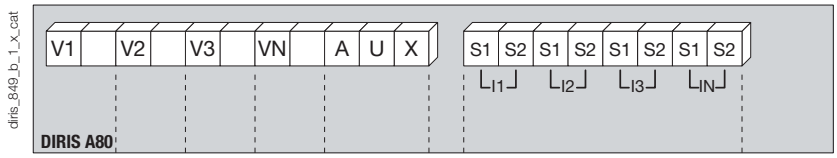
Ethernet communication with RS485 MODBUS gateway

- Ethernet connection with MODBUS TCP or MODBUS RTU over TCP protocol.
- Connection of 1 to 247 RS485 MODBUS slaves.
- Embedded Webserver function(1).

(1) See "Management softwares for DIRIS" page 618.

Terminals

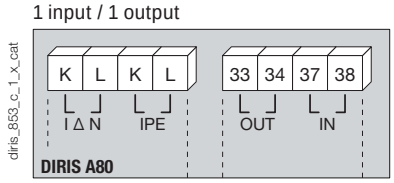
DIRIS A80



S1 - S2: current inputs

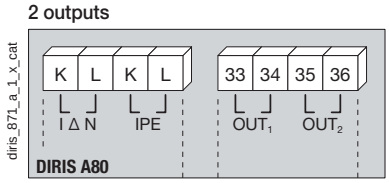
AUX: Auxiliary power supply U_s
V1- V2 - V3 - VN: voltage inputs

RCM module
1 input / 1 output



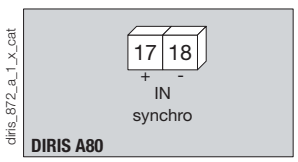
K-L / IΔN: residual current
K-L / IPE: ground fault current
33-34: relay outputs
37-38: opto inputs

RCM module
2 outputs

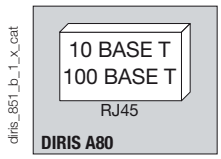


K-L / IΔN: residual current
K-L / IPE: ground fault current
33-34: relay output n°1
35-36: relay output n°2

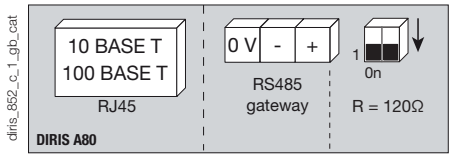
Memory module



Ethernet module

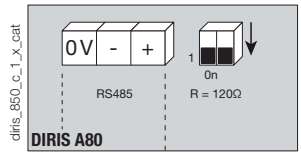


Ethernet module + RS485 MODBUS gateway



RS485 gateway resistor.
R = 120 Ω: selectable internal resistance for RS485 end of line termination.

RS485 MODBUS module



RS485 link
R = 120 Ω: selectable internal resistance for RS485 end of line termination.

DIRIS A80

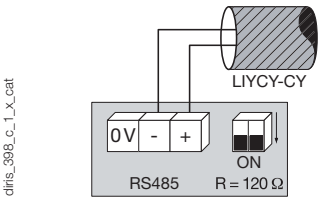
Multifunction meters - PMD + RCM

monitoring energy and fault currents - dimensions 96 x 96 mm

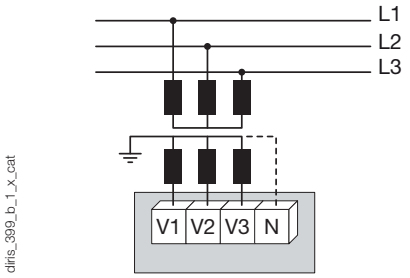
Connections

Additional information

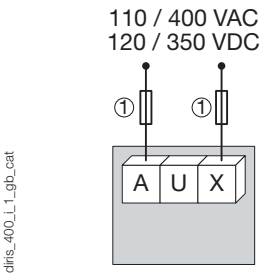
Communication via RS485 link



Connection of voltage transformer for HV networks

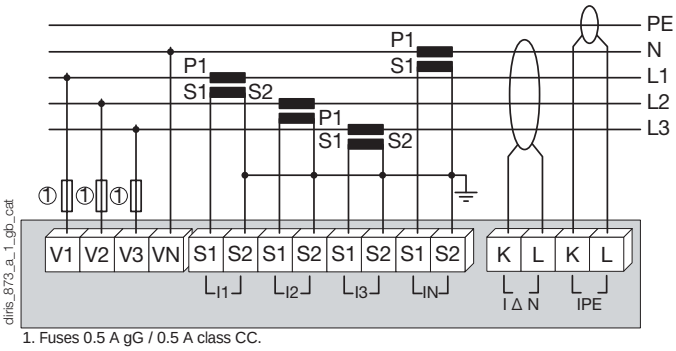


AC & DC auxiliary power supply



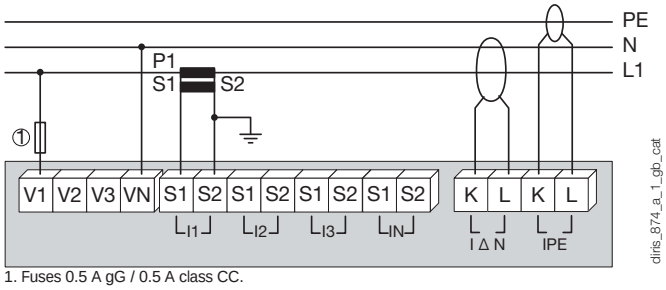
1. Fuses 0.5 A gG / 0.5 A class CC.

Three-phase + N network with RCM



1. Fuses 0.5 A gG / 0.5 A class CC.

Single-phase network with RCM



1. Fuses 0.5 A gG / 0.5 A class CC.

Electrical characteristics

Current measurement on insulated inputs (TRMS)	
Via CT primary	9 999 A
Via CT secondary	1 or 5 A
Measurement range	0 … 11 kA
Input consumption	≤ 0.1 VA
Measurement updating period	1 s
Accuracy	0.2 %
Permanent overload	6 A
Intermittent overload	10 I_n for 1 s

Voltage measurements (TRMS)	
Direct measurement between phases	50 … 700 VAC
Direct measurement between phase and neutral	28 … 404 VAC
VT primary	500 000 VAC
VT secondary	60, 100, 110, 173, 190 VAC
Frequency	50 / 60 Hz
Input consumption	≤ 0.1 VA
Measurement updating period	1 s
Accuracy	0.2 %
Permanent overload	800 VAC
Current-voltage product	
Limitation for 1A CT	10 000 000
Limitation for 5A CT	10 000 000
Power measurement	
Measurement updating period	1 s
Accuracy	0.5 %
Power factor measurement	
Measurement updating period	1 s
Accuracy	0.5 %
Frequency measurement	
Measurement range	45 … 65 Hz
Measurement updating period	1 s
Measurement updating period	0.1 %
Energy accuracy	
Active (according to IEC 62053-22)	Class 0.5 S
Reactive (according to IEC 62053-23)	Class 2
Operating conditions	
Operating temperature	- 10 … + 55 °C
Storage temperature	- 20 … + 85 °C
Relative humidity	95 %

Auxiliary power supply	
Alternating voltage	110 … 400 VAC
AC tolerance	± 10 %
Direct voltage	120 … 350 VDC
DC tolerance	± 20 %
Frequency	50 / 60 Hz
Consumption	≤ 10 VA
MODBUS communication module	
Link	RS485
Type	2 … 3 half duplex wires
Protocol	MODBUS® RTU
MODBUS® speed	4800 … 38400 bauds
Ethernet Communication Module	
Connection	RJ45
Speed	10 base T / 100 base T
Protocol	MODBUS TCP or MODBUS RTU over TCP
Fault current monitoring characteristics (IΔn and I_{PE})	
Inputs IΔn and I_{PE}	
Number of inputs	2
Dedicated core balance transformers	range ΔIC – transformer ratio 600/1
Measurement of fault current IΔn / I_{PE}	6 mA … 30 A
Accuracy	1 %
Alarms IΔn and I_{PE}	
Thresholds	adjustment depending on the load currents
Time setting	0 to 10 s
Logging	values, dates, durations and curves
Number of events	max. 1000 events
Optocoupler input	
Number	specific to the reference
Power supply	5 … 24 VDC
Minimum signal width	10 ms
Minimum duration between 2 pulses	20 ms
Type	optocoupler
Alarm outputs	
Number of relays	specific to the reference
Type	230 VAC – 1 A
Max. N° of operations	10^4

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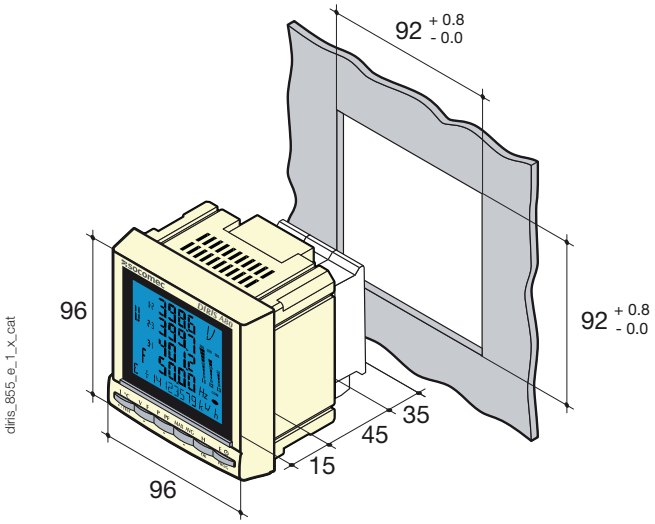
Case



Type	panel mounting
Dimensions W x H x D	96 x 96 x 80 mm
Case degree of protection	IP30
Front degree of protection	IP52
Display type	backlit LCD display
Terminal blocks type	fixed or plug-in
Current connection cross-section	0.5 … 6 mm^2
Cable cross-section for currents ΔIn and I_{PE}	0.14 … 1.5 mm^2
Voltage and other connection cross-section	0.2 … 2.5 mm^2
Weight	560 g

References

Basic device	DIRIS A80
Type	Reference
With 2 outputs	4825 0213
With 1 input / 1 output	4825 0214
Options	
Plug-in modules	Reference
RS485 MODBUS® communication	4825 0092
Ethernet communication (embedded Ethernet Webserver)(1)	4825 0203
Ethernet communication + RS485 MODBUS gateway (embedded Ethernet Webserver)(1)	4825 0204

(1) Dimensions: 2 slots.

Accessories		
Description of accessories	To be ordered in multiples of	Reference
IP65 protection	1	4825 0089
Panel mounting kit for a 144 x 96 mm cut-out	1	4825 0088
Fuse disconnect switches for the protection of voltage inputs (type RM) 3 poles	4	5601 0018
Fuse disconnect switches for the protection of the auxiliary supply (type RM) 1 pole + neutral	6	5601 0017
Fuses type gG 10 x 38 0.5 A	10	6012 0000
Ferrite to be associated with communication modules	1	4899 0011
Current transformer range	1	see page 584

Core balance transformer ΔIC		
Type	Toroid diameter (mm)	Reference
ΔIC Ø15	15	4950 6015
ΔIC Ø30	30	4950 6030
ΔIC Ø50	50	4950 6050
ΔIC Ø80	80	4950 6080
ΔIC Ø120	120	4950 6120
ΔIC Ø200	200	4950 6200
ΔIC Ø300	300	4950 6300
Management softwares for DIRIS		see page 618

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