DIRIS *A40*

Multifunction meters - PMD

Multi-measurement meter - dimensions 3.78 x 3.78 in/96 x 96 mm

DIRIS A40

Function

DIRIS A40 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 analyzed remotely using the software solution.

Advantages

Easy to use

Thanks to its large backlit LCD display and its multiple viewing screens with direct pushbutton access, DIRIS A40 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.
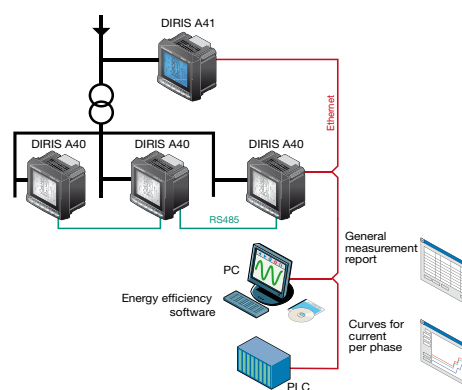
Detects wiring errors

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

Customizable

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

Principle diagram

DIRIS A41
DIRIS A40 DIRIS A40 DIRIS A40
Ethernet
RS485
General measurement report
PC
Energy efficiency software
Curves for current per phase
PLC

diris_581_f_1_us_cat

Webserver function

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

Compliant with ANSI C12.20 and 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.).

The solution for

> Industry
> Data centres
> Infrastructures

Strong points

> Easy to use
> Detects wiring errors
> Customizable
> Webserver function
> Compliant with ANSI C12.20 and IEC 61557-12

Conformity to standards

> UL 61010
  File E257746
> ANSI C12.20

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

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

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

Demand profiles[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

Analog output
- 0/4- 20 mA analog output

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

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Front panel

diris_742x_a_1_cat

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.

1 2 3 4 5 6 7

Plug-in modules

DIRIS® A40

diris_773_a

diris_445_a_1_cat

Pulse outputs

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

diris_447_a_1_cat

Communication MODBUS®

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

diris_775_a_1_cat

PROFIBUS® DP communication

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

diris_777_a_1_cat

Ethernet communication
• Ethernet connection with MODBUS TCP or MODBUS RTU over TCP protocol.
• Embedded Webserver function [1].

diris_776_a_1_cat

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].

diris_448_a_1_cat

Analog outputs

A maximum of 2 modules may be connected, providing up to 4 analog 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 17 VDC power supply.

diris_449_a_1_cat

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.

diris_682_a_1_cat

Memory
• Storing up to a maximum of 62 days of P+, P-, Q+, Q- with an internal or external synchronization 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 synchronization function (maximum 60 days).

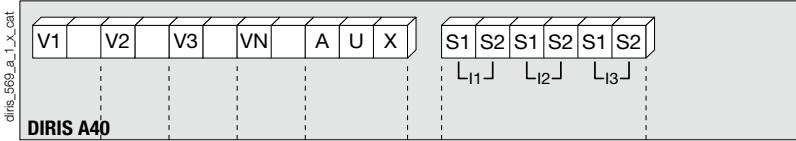*(1) See "Management software for DIRIS" page 64.*

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DIRIS *A40*
Multifunction meters - PMD
Multi-measurement meter - dimensions 3.78 x 3.78 in/96 x 96 mm

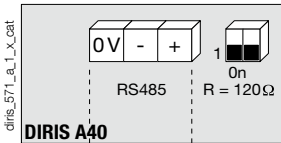## Terminals

DIRIS A40

S1 - S2: current inputs

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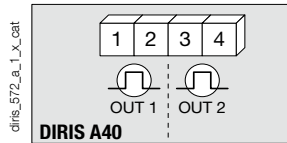**V1 - V2 - V3 - VN:** voltage inputs

Communication module

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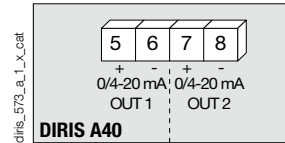
Pulse output module

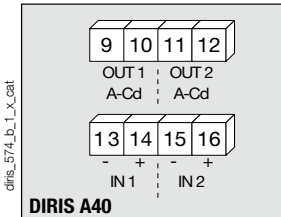**1 - 2:** pulse output n°1.
3 - 4: pulse output n°2.

Analog output module

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

2 inputs / 2 outputs module
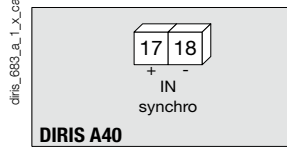

9 - 10: relay output n°1.
11 - 12: relay output n°2.
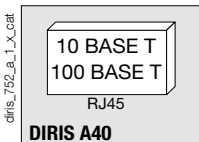**13 - 14:** opto input n°1.
15 - 16: opto input n°2.
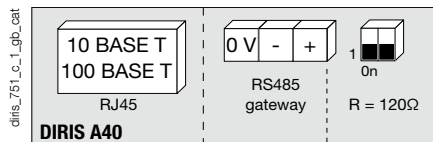
Memory module

17 - 18: synchronization input.

Ethernet Module

Ethernet module + RS485 MODBUS gateway

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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 … 500 VAC
Direct measurement between phase and neutral	28 … 289 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 … 240 VAC
AC tolerance	± 10 %
Direct voltage	120 … 250 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	
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]
Analog 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
Operating conditions	
Operating temperature	- 10 … + 55 °C / +14 °F … +131 °F
Storage temperature	- 20 … + 85 °C / -4 °F … +185 °F
Relative humidity	95 %

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

Case
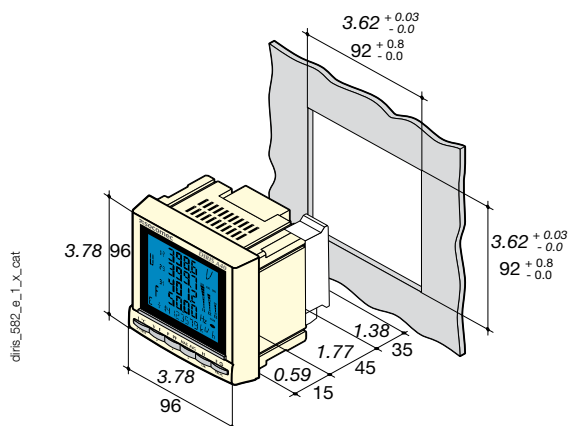
Type	panel mounting
Dimensions W x H x D	3.78 x 3.78 x 2.36 in / 96 x 96 x 60 mm
Case degree of protection	IP30
Front degree of protection	IP52
Display type	backlit LCD display
Terminal blocks type	fixed or plug-in
Voltage and other connection cross-section	AWG 34 … 10 / 0.2 … 2.5 mm²
Current connection cross-section	AWG 20 … 9 / 0.5 … 6 mm²
Weight	14.11 oz / 400 g

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DIRIS A40
Multifunction meters - PMD
Multi-measurement meter - dimensions 3.78 x 3.78 in/96 x 96 mm

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.
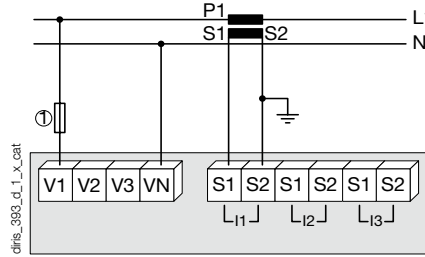
Low voltage balanced network for DIRIS A40

3/4 wires with 1 CT
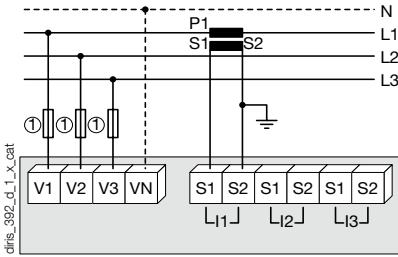
Use of 1 CT reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.
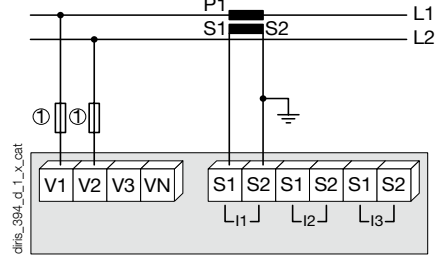
1. Fuses 0.5 A gG / 0.5 A class CC.

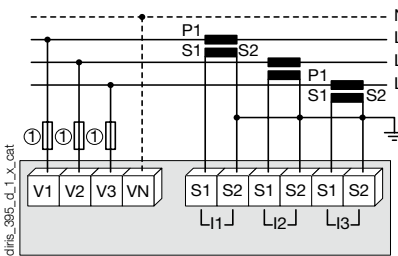**Single-phase**

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

Two-phase
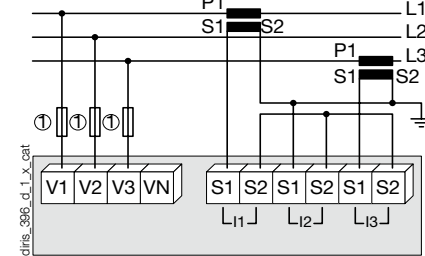
1. Fuses 0.5 A gG / 0.5 A class CC.

Low voltage unbalanced network for DIRIS A40

3/4 wires with 3 CTs
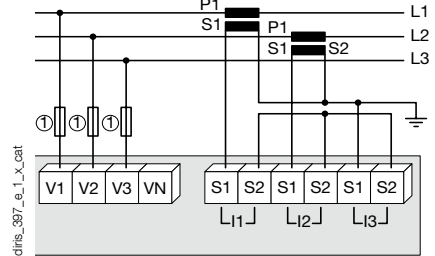
1. Fuses 0.5 A gG / 0.5 A class CC.

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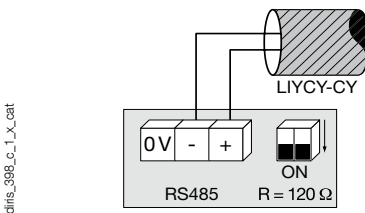
Use of 2 CTs reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.
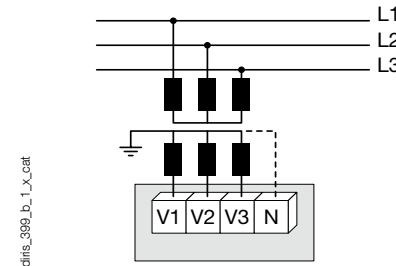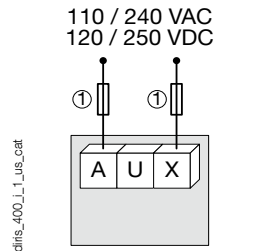*1. Fuses 0.5 A gG / 0.5 A class CC.*

Additional information

Communication via RS485 link

Connection of voltage transformer for HV networks

AC & DC auxiliary power supply

110 / 240 VAC
120 / 250 VDC

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

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References

Basic device Auxiliary power supply U_s	DIRIS A40 Reference
110 ... 240 VAC / 120 ... 250 VDC	4825 **U201**
12 … 48 VDC	4825 **1U01**

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

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

Accessories	Reference
Management software for DIRIS	See page 64

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