

Monitoring and managing energy for high/low voltage electrical installations

Function

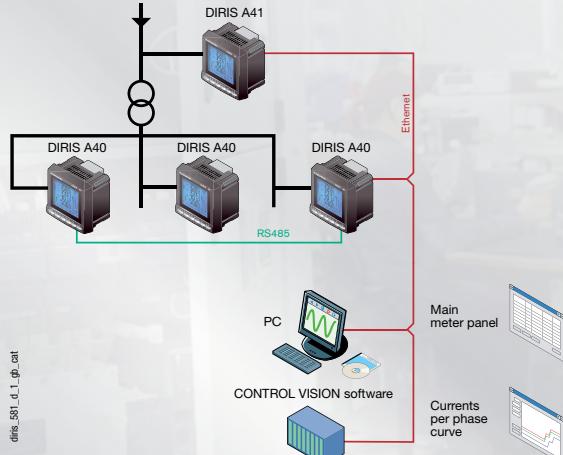
DIRIS A40 and A41 are multimeasurement units which ensure the user has access to all the measurements requirement for energy efficiency projects and monitoring of the electrical distribution.

All this information can be used and analysed remotely using the CONTROL VISION software.

Conformity to standards

- IEC 61557-12
- IEC 62053-22 class 0,5 S
- IEC 62053-23 class 2

Applications



Multimeasurement

- Currents
 - instantaneous: $I_1, I_2, I_3, I_n, I_{\text{system}}$
 - maximum: I_1, I_2, I_3, I_n
- Voltages & frequency
 - instantaneous: $U_1, U_2, U_3, U_{12}, U_{23}, U_{31}, F, V_{\text{system}}, U_{\text{system}}$
 - maximum: $U_1, U_2, U_3, U_{12}, U_{23}, U_{31}, F$
- Power
 - instantaneous: $3P, \Sigma P, 3Q, \Sigma Q, 3S, \Sigma S$
 - maximum: $\Sigma P, \Sigma Q, \Sigma S$
 - predictive: $\Sigma P, \Sigma Q, \Sigma S$
- Power factor
 - instantaneous: $3PF, \Sigma PF$
 - maximum: ΣPF
- Temperatures⁽¹⁾
 - Internal
 - external via 3 PT100 sensors

Energy meters

- Active energy: +/- kWh
- Reactive energy: +/- kvarh
- Apparent energy: kVAh
- Hours num: \odot

Harmonic analysis

- Harmonic distortion rate
 - Currents: $\text{thd } I_1, \text{thd } I_2, \text{thd } I_3, \text{thd } I_n$
 - Phase-to-neutral voltage: $\text{thd } U_1, \text{thd } U_2, \text{thd } U_3$
 - Phase to phase voltage: $\text{thd } U_{12}, \text{thd } U_{23}, \text{thd } U_{31}$
- Individual up to level 63
 - Currents: $H_{11}, H_{12}, H_{13}, H_{ln}$
 - Phase-to-neutral voltage: H_{U1}, H_{U2}, H_{U3}
 - Phase to phase voltage: $H_{U12}, H_{U23}, H_{U31}$

PLC

Load curves⁽¹⁾

- Active and reactive power: $\Sigma P +/- ; \Sigma Q +/-$
- Voltages & frequency $U_1, U_2, U_3, U_{12}, U_{23}, U_{31}, F$

Events⁽¹⁾

- Alarms on all electrical values
- Voltage dips
- Voltage swells
- Voltage interruptions

Communications⁽¹⁾

- Analogue 0/4- 20 mA
- Digital RS485 (Jbus/Modbus & Profibus-DP)
- Ethernet (modbus/TCP or Jbus/Modbus RTU over TCP and Web server)
- Ethernet with RS485 gateway Jbus/Modbus RTU over TCP

Inputs/outputs⁽¹⁾

- Pulse metering
- Remote control/command
- Alarm report
- Pulse report

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

Front panel



1. Backlit LCD display.
2. Direct access key for currents and setup wiring correction
3. Direct access key for voltages and frequency.
4. Direct access key for active, reactive and apparent power and power factor.
5. Direct access key for maximum and mean values for current and power.
6. Direct access key for harmonics values.
7. Direct access key for pulse, hours and electrical energy meters

Plug-in modules

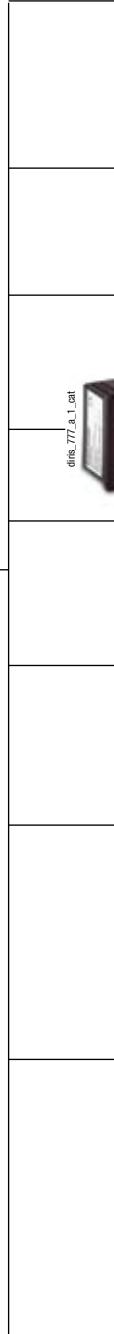
DIRIS® A40

diris_773_a



DIRIS® A41

diris_774_a



Pulse outputs

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



JBUS / MODBUS® communication

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



PROFIBUS® DP communication

RS485 link with PROFIBUS® DP protocol (speed up to 12 Mbauds).



Ethernet communication

- Ethernet link with MODBUS/TCP or JBUS/MODBUS RTU over TCP.



Ethernet communication with RS485 JBUS/MODBUS gateway

- Ethernet link with MODBUS/TCP or JBUS/MODBUS RTU over TCP
- Connection of 1 to 247 RS485 JBUS/MODBUS slaves.



Analogue outputs

A maximum of 2 modules may be connected, giving 4 analogue outputs.

2 outputs assignable to:

3I, In, 3V, 3U, F, \pm Σ P, \pm Σ Q, Σ S, Σ PFL/C, I sys, Vsys, Usys, Ppred, Q pred, Spred, internal T°C 1, T°C 2, T°C3 and to 17 VDC power supply.



2 inputs - 2 outputs

A maximum of 3 modules may be connected, giving 6 inputs

2 outputs assignable to:

- monitoring: 3I, In, 3V, 3U, F, \pm Σ P, \pm Σ Q, Σ S, Σ PFL/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.



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, Σ P \pm , Σ Q \pm , Σ S, THD 3U, THD 3V, THD 3U, THD 3V, THD 3I, THD In.

• Timestamped storing of the last 10:

- voltage dips,
- voltage swells
- voltage interruptions
- Storing of 3U, 3V and F average values based on synchronisation function (maximum 60 days).



Temperature

Temperature indication

- Internal
- External sensor PT 100 (T°C 1)
- External sensor PT 100 (T°C 2)
- External sensor PT 100 (T°C 3)

Accessories

Current transformer
(see page XXX)



IP65 protection

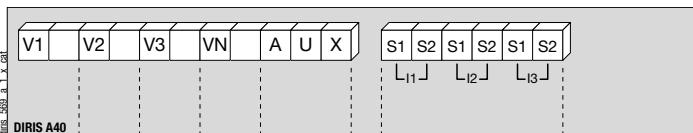


Mounting kit for 144 x 96 mm
cut out plate



Terminals

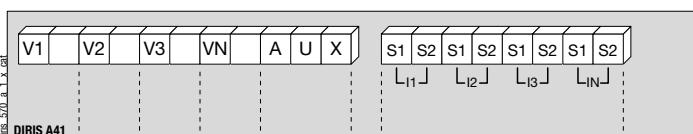
DIRIS A40



S1 - S2: current inputs.

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

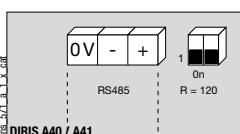
DIRIS A41



S1 - S2: current inputs.

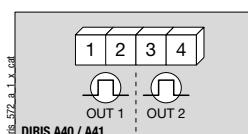
AUX: auxiliary power supply U_s
V1 - V2 - V3 - VN: voltage inputs.

Communication module



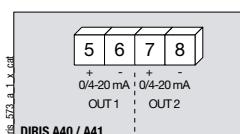
RS485 link.
R = 120 Ω: internal resistance for the RS485 link.

Pulse output module



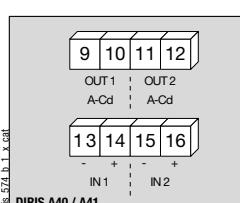
1 - 2: pulse output n°1.
3 - 4: pulse output n°2.

Analogue outputs module



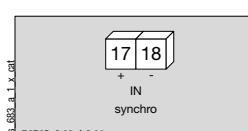
5 - 6: analogue output n°1.
7 - 8: analogue output n°2.

2 inputs / 2 outputs module



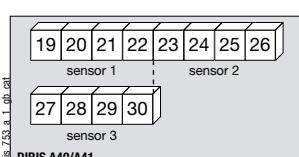
9 - 10: relay output n°1.
11 - 12: relay output n°2.
13 - 14: opto input n°1.
15 - 16: opto input n°2.

Memory module



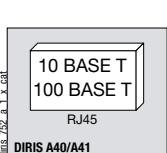
17 - 18: synchronisation input

Temperature module

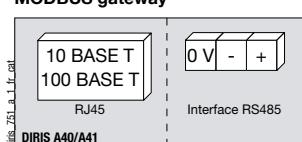


Sensor 1	Sensor 2	Sensor 3
19 : Red	23 : Red	27 : Red
20 : Red	24 : Red	28 : Red
21 : White	25 : White	29 : White
22 : White	26 : White	30 : White

Ethernet Module



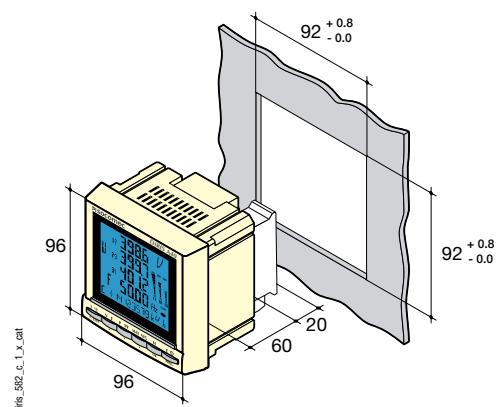
Ethernet module + RS485 JBUS/ MODBUS gateway



Electrical Characteristics

Current measurement on insulated inputs (TRMS)		Outputs (alarms / control)	
CT primary	10 000 A	Number of relays	2 ... 6
CT secondary	1 or 5 A	Type	250 VAC - 5 A - 1150 VA
Measurement range	0 ... 11 kA		
Input consumption	≤ 0,1 VA		
Measurement updating period	1 s		
Accuracy	0,2 %		
Sustained overload	6 A		
Intermittent overload	10 I _o for 1 s		
Voltage measurements (TRMS)		Phototransistor inputs	
Direct measurement between phases	50 ... 700 VAC	Number	2 ... 6
Direct measurement between phase and neutral	28 ... 404 VAC	Power supply	10 ... 17 VDC
VT primary	500 000 VAC	Minimum signal width	10 ms
VT secondary	60, 100, 110, 173, 190 VAC	Minimum length between 2 impulses	18 ms
Frequency	50 / 60 Hz	Type	phototransistor
Input consumption	≤ 0,1 VA		
Mesaurement updating period	1 s		
Accuracy	0,2 %		
Sustained overload	760 VAC		
Current-voltage product		Outputs (pulses)	
Limitation for 1A CT	10 000 000	Number of relays	2
Limitation for 5A CT	10 000 000	Type	100 VDC - 0.5 A - 10 VA
		Max. number of operations	≤ 10 ⁶
Power measurement		Outputs (analogue)	
Mesaurement updating period	1 s	Number of outputs	2 ... 4
Accuracy	0,5 %	Type	insulated
		Range	0 / 4 ... 20 mA
Power factor measurement		Charging resistance	600 Ω
Measurement updating period	1 s	Maximum current	30 mA
Accuracy	0,5 %		
Frequency measurement		Communication	
Measurement range	45 ... 65 Hz	Link	RS485
Measurement updating period	1 s	Type	2 ... 3 half duplex wires
Accuracy	0,1 %	Protocol	JBUS/MODBUS® in RTU mode
		JBUS/MODBUS® speed	1400 ... 38400 bauds
Energy accuracy		Protocol	PROFIBUS® DP
Active (according to IEC 62053-22)	class 0,5 S	PROFIBUS® speed	9,8 kbauds ... 12 Mbauds
Reactive (according to IEC 62053-23)	class 2		
Auxiliary supply		Ethernet communication	
AC voltage	110 ... 400 VAC	Link	RJ45
AC tolerance	± 10 %	Speed	10 base T / 100 base T
DC voltage	120 ... 350 VDC / 12 ... 48 VDC	Protocol	MODBUS TCP or JBUS/MODBUS RTU over TCP
DC tolerance	± 20 % / - 6 ... + 20 %		
Frequency	50 / 60 Hz		
Consumption	≤ 10 VA		
Temperature inputs		Operating conditions	
Type	PT100	Operating temperature	- 10 ... + 55 °C
Link	2 or 4 wires	Storage temperature	- 20 ... + 85 °C
Range	- 20°C ... 150°C	Relative humidity	95 %
Accuracy	+/- 1 digit		
Maximum length	300 cm		
Dimensions		Dimensions	
Width	96 mm	Width	96 mm
Height	96 mm	Depth	60 mm
Front panel thickness	20 mm		

Casing



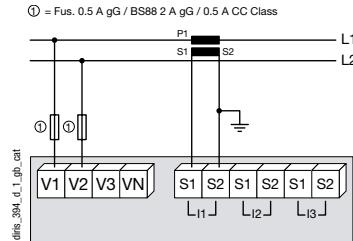
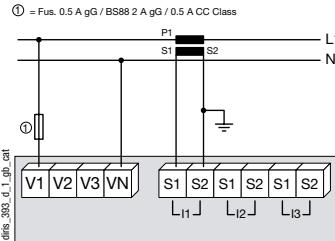
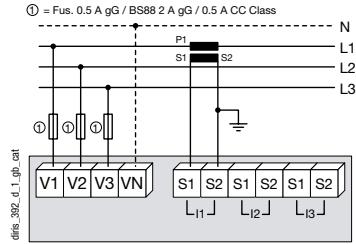
Ref. 582_1_X.pdf

Type	built in
Dimensions W x H x D	96 x 96 x 60 mm
Case protection rating	IP30
Front protection rating	IP52
Display type	LCD
Terminal blocks type	fixed and plug in
Voltage and other connection section	0,2 ... 2,5 mm ²
Current connection section	0,5 ... 6 mm ²
Weight	400 g

Connection

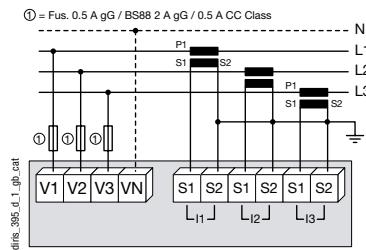
Recommendation: when disconnecting the DIRIS, the secondaries of each current transformer must be short-circuited. This operation can be carried out automatically from a product in the SOCOMEC catalogue, PTI: please consult us.

Low voltage balanced network for DIRIS A40

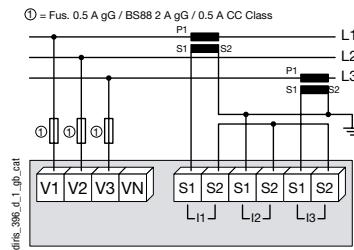


Low voltage unbalanced network for DIRIS A40

3/4 wires with 3 CTs

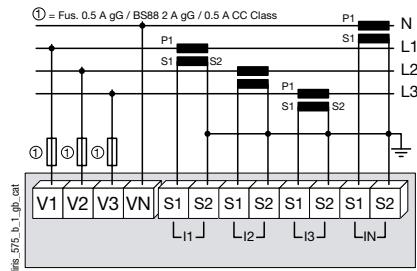


3 wires with 2 CTs



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

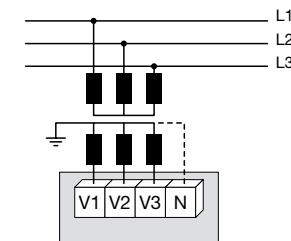
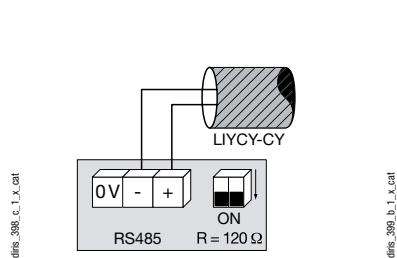
Low voltage unbalanced network for DIRIS A41



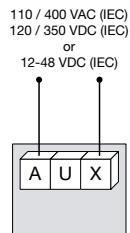
Other information

Communication via RS485 link

Connection of voltage transformer for HV networks



diris_400_d_1_gb_cat



It is recommended that the auxiliary power supply be protected by the use of 500 mA gG, BS88 2A gG or 500 mA CC Class fuses

References



Switches	DIRIS A40 Reference	DIRIS A41 with CT on the neutral Reference
Auxiliary power supply Us		
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 JBUS / MODBUS® communication	4825 0092	4825 0092
Analogue outputs	4825 0093	4825 0093
2 inputs / 2 outputs	4825 0094	4825 0094
RS485 PROFIBUS®DP communication	4825 0205	4825 0205
Storage capability	4825 0097	4825 0097
Ethernet communication	4825 0203	4825 0203
Ethernet communication + RS485 gateway JBUS/MODBUS	4825 0204	4825 0204
Temperature inputs	4825 0206	4825 0206

(1) Ease of integration for additional functions (maximum 4 on A40 and 3 on A41).

Accessories

Accessories description	Reference	Reference
IP65 protection	4825 0089	4825 0089
Embedding kit for 144 x 96 mm cut out plate	4825 0088	4825 0088