

NEW



## Modular multi function meter

### Function

The **DIRIS A10** is a multi function meter for measuring electrical values in low voltage networks in modular format. It allows all electrical parameters to be displayed and the measurement, energy metering and communication functions to be used. In addition, the DIRIS A10 has a function for correcting errors in CT connections. It also allows variations in temperature to be detected thanks to its internal temperature measurement function.

### Conformity to standards

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

### Applications

#### Multi-function meter

- Current
  - instantaneous: I1, I2, I3, In
  - maximum average: I1, I2, I3, In
- Voltages & frequency
  - instantaneous: U1, U2, U3, U12, U23, U31, F
- Power
  - instantaneous: 3P, ΣP, 3Q, ΣQ, 3S, ΣS
  - maximum average: ΣP, ΣQ, ΣS
- Power factor
  - instantaneous: 3PF, ΣPF
- Internal temperature

#### Metering

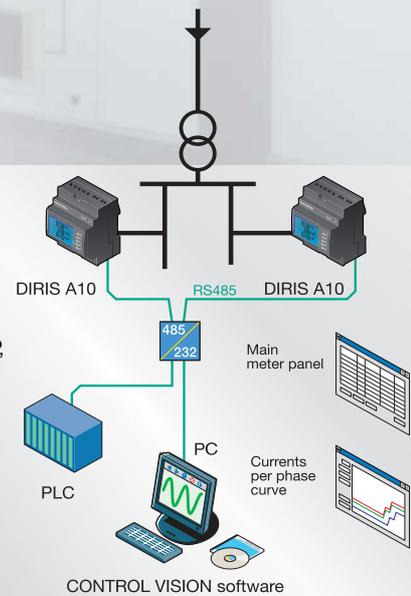
- Active energy: + kWh
- Reactive energy: + kvarh
- Hours: ⌚

#### Harmonic analysis

- Total harmonic distortion (level 51)
  - Currents: thd I1, thd I2, thd I3
  - Phase-to-neutral voltage: thd U1, thd U2, thd U3
  - 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<sup>(1)</sup>

RS485 (JBUS/MODBUS) digital

#### Output

- Remote comand of apparatus
- Alarm report
- Pulse report

#### Input

- Remote control

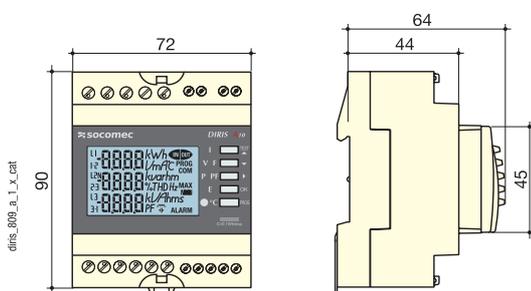
(1) Available as an option (see the following pages).

➔ Front panel



1. Backlit LCD screen.
2. Direct access key for currents (instant and maximum) and current THD.
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 and hour meter.
6. Pushbutton for currents, temperatures and CT setup wiring correction.
7. Metrological LED.

➔ Case



Type	Modular
Number of optional modules	4
Dimensions W x H x D	72 x 90 x 64 mm
Case protection index	30
Front protection rating	52
Display type	LCD
Voltage and other connection section	4 mm <sup>2</sup>
Connection cross-section of others	2.5 mm <sup>2</sup>
Weight	205 g (4825 0010) - 215 g (4825 0011)

➔ Electrical characteristics

Current measurement on high-impedance inputs (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 %
Sustained overload	6 A
intermittent overload	10 I <sub>n</sub> 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 %
Sustained 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	220 ... 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 <sup>8</sup>

Communication	
Link	RS485
Type	2 ... 3 half duplex wires
Protocol	JBUS/MODBUS® in RTU mode
JBUS/MODBUS® speed	1400 ... 38400 bauds

Operating conditions	
Operating temperature	- 10 ... + 55 °C
Storage temperature	- 20 ... + 70 °C
Relative humidity	85 %

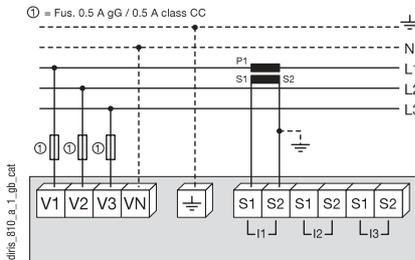
## DIRIS A10 - Connection

### Low voltage balanced network

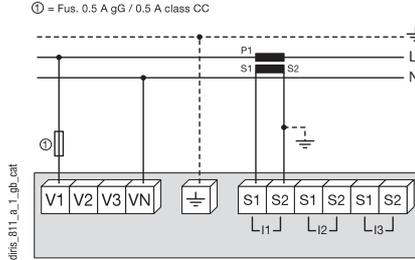
#### Recommendation:

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

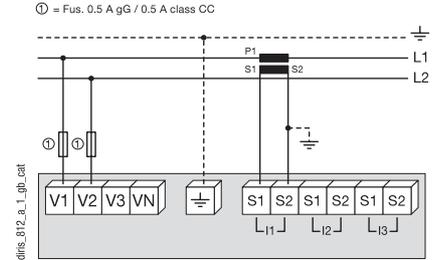
#### 3/4 wires with 1 CT



#### Single phase

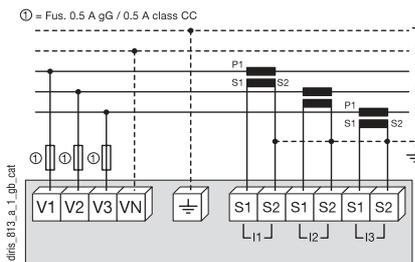


#### Two phase

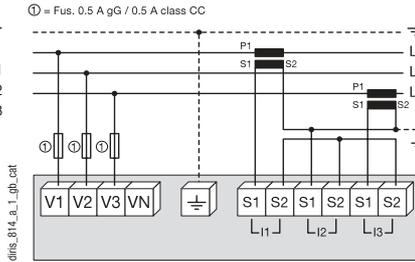


### Low voltage unbalanced network

#### 3/4 wires with 3 CTs

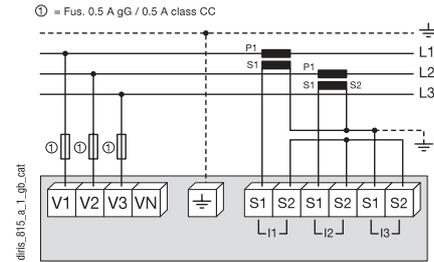


#### 3 wires with 2 CTs



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

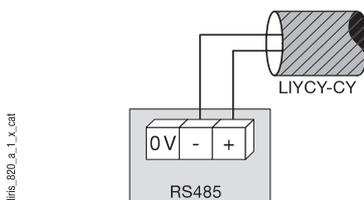
#### 3 wires with 2 CTs



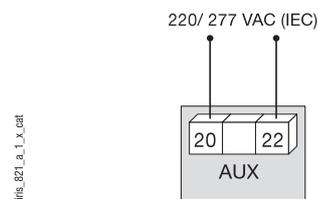
Use of 2 CTs reduces by 0.5% the accuracy of the phase, whose current is worked out by vector calculation.

### Additional information

#### Communication via RS485 link

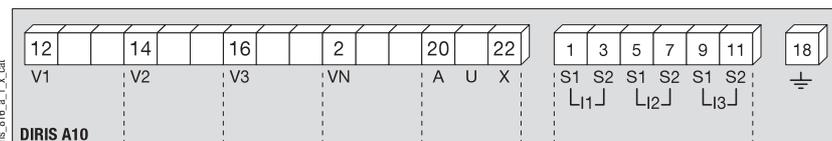


#### AC & DC auxiliary power supply



It is recommended that the auxiliary power supply be protected by the use of 500 mA gG fuses.

## ↳ Terminals

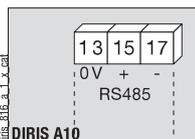


S1 - S2: current inputs.

AUX: auxiliary power supply Us.

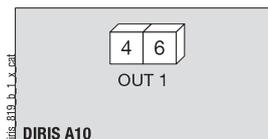
V1, V2, V3 & VN: voltage inputs.

### Communication (option)



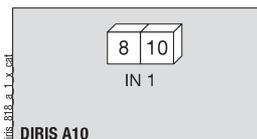
DIRIS A10  
RS485 link.

### Output



DIRIS A10  
4 - 6: output n°1

### Input



DIRIS A10  
8 - 10: input n°1

## ↳ References



diris\_791\_b\_1\_cat

### DIRIS A10 Reference

4825 **0010**  
4825 **0011**

### Basic device

#### Description

DIRIS A10 (grey colour available on request)

DIRIS A10 with JBUS/MODBUS communication via RS485 (grey colour available on request)

#### Description of accessories

Description of accessories	To be ordered by multiple	Reference
Fuse combination switches for the protection of voltage inputs (type RM) 3 poles	4	5601 <b>0018</b>
Fuse combination switches for the protection of the auxiliary supply (type RM) 1 pole + neutral	6	5601 <b>0017</b>
Fuses type gG 10x38 0.5 A	10	6012 <b>0000</b>
Current transformers range		See page 334

## ↳ Services and Technical assistance

Our expertise extends to a complete offer of services like commissioning installation audit, training, maintenance and project engineering.



NEW



diris\_750\_a\_1\_cat

## Monitoring and managing energy for low voltage electrical installations

### Function

**DIRIS A20** are 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 used and analysed remotely using the CONTROL VISION software.

### Conformity to standards

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

### Applications

#### Multi-function meter

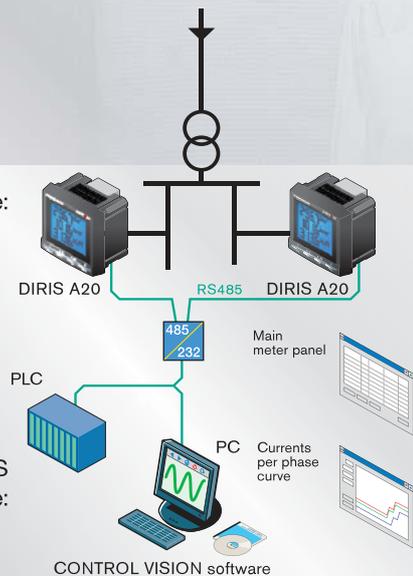
- Current
  - instantaneous: I1, I2, I3, In
  - maximum average: I1, I2, I3, In
- Voltages & frequency
  - instantaneous: U1, U2, U3, U12, U23, U31, F
- Power
  - instantaneous: 3P,  $\Sigma P$ , 3Q,  $\Sigma Q$ , 3S,  $\Sigma S$
  - maximum average:  $\Sigma P$ ,  $\Sigma Q$ ,  $\Sigma S$
- Power factor
  - instantaneous: 3PF,  $\Sigma PF$

#### 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 U1, thd U2, thd U3
  - Phase to phase voltage: thd U12, thd U23, thd U31



diris\_576\_d\_1\_00\_cat

#### Events<sup>(1)</sup>

Alarms on all electrical values

#### Communications<sup>(1)</sup>

RS485 (JBUS/MODBUS) digital

#### Output<sup>(1)</sup>

- Remote comand of apparatus
- Alarm report
- Pulse report

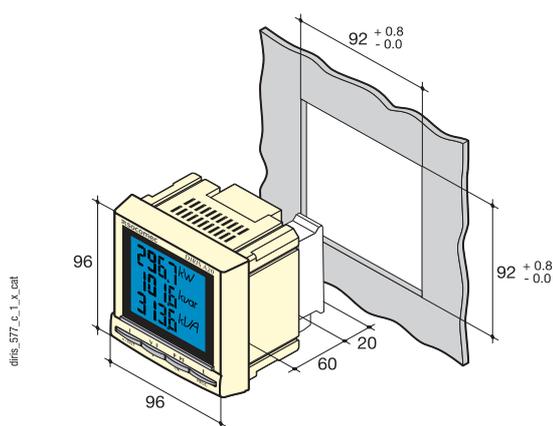
<sup>(1)</sup> Available as an option (see the following pages).

➔ Front panel



1. Backlit LCD screen.
2. Direct access key for currents (instantaneous and max. values), current THD and set up wiring correction.
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 and hour meter.

➔ Case



Type	Panel mounting
Dimensions W x H x D	96 x 96 x 60 mm
Case protection index	IP30
Front protection rating	IP52
Display type	LCD
Terminal blocks type	fixed or pull-out
Voltage and other connection section	0.2 ... 2.5 mm <sup>2</sup>
Current connection section	0.5 ... 6 mm <sup>2</sup>
Weight	400 g

➔ Plug-in modules



**1 Output**

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

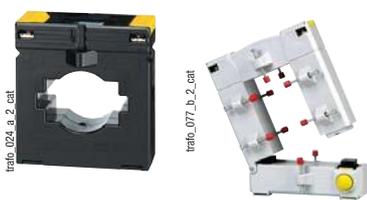


**Communication**

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

➔ Accessories

Current transformer (see page 334)



IP65 protection



Mounting kit for 144 x 96 mm cut out plate



## ↳ DIRIS A20 - Electrical characteristics

### Current measurement on high-impedance inputs (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 %
Sustained overload	6 A
Intermittent overload	10 I <sub>n</sub> 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 %
Sustained 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 <sup>8</sup>

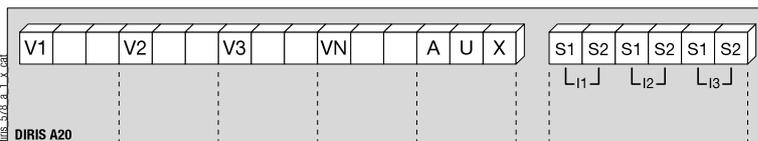
### Communication

Link	RS485
Type	2 ... 3 half duplex wires
Protocol	JBUS/MODBUS® in RTU mode
JBUS/MODBUS® speed	1400 ... 38400 bauds

### Operating conditions

Operating temperature	- 10 ... + 55 °C
Storage temperature	- 20 ... + 85 °C
Relative humidity	95 %

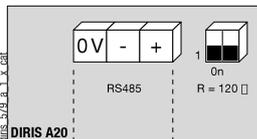
## ↳ Terminals



S1 - S2: current inputs.

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

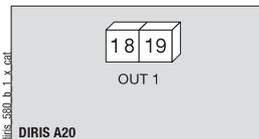
### Communication module



RS485 link.

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

### Output or alarm module



18 - 19: output n°1

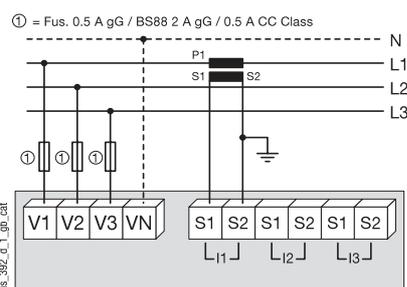
## ↳ Connection

### Recommendation:

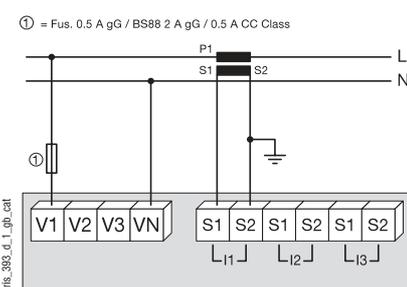
- For IT earthing systems, it is recommended that the CT secondary is not connected to earth.
- When disconnecting the DIRIS, the secondaries of each current transformer must be short-circuited. This operation can be carried out automatically from a product in the SOCOMEC catalogue, PTI: consult us.

### Low voltage balanced network

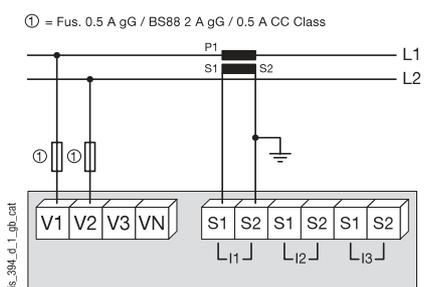
3/4 wires with 1 CT



Single phase



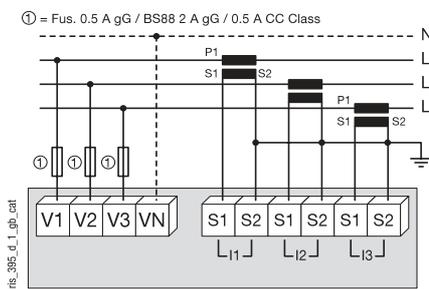
Two phase



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

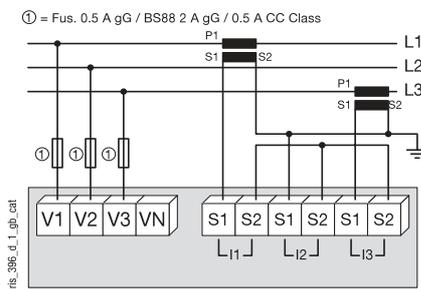
### Low voltage unbalanced network

3/4 wires with 3 CTs



diris\_395\_d\_1\_gb\_cat

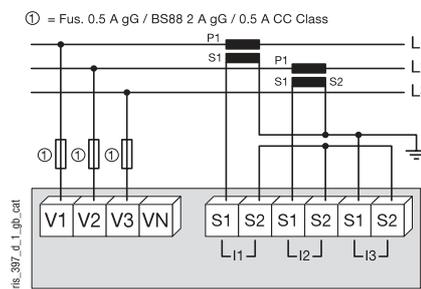
3 wires with 2 CTs



diris\_396\_d\_1\_gb\_cat

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

3 wires with 2 CTs

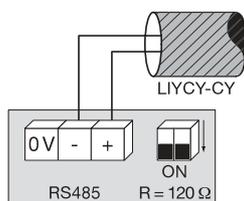


diris\_397\_d\_1\_gb\_cat

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

### Additional information

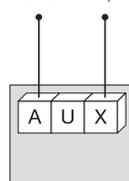
Communication via RS485 link



diris\_398\_c\_1\_x\_cat

AC & DC auxiliary power supply

110 / 400 VAC (IEC)  
120 / 350 VDC (IEC)



diris\_501\_d\_1\_gb\_cat

It is recommended that the auxiliary power supply be protected by the use of 500 mA gG fuses.

### References



diris\_756\_a\_1\_cat

**DIRIS A20**  
Reference  
4825 0200

#### Basic device

Auxiliary power supply Us  
110 ... 400 VAC / 180 ... 350 VDC

#### Options

##### Plug-in modules

1 output  
RS485 JBUS / MODBUS® communication

##### Reference

4825 0080  
4825 0082

#### Accessories

Description of accessories	To be ordered by multiple	Reference
IP65 protection	1	4825 0089
Panel mounting kit for a 144 x 96 mm cutout	1	4825 0088
Fuse combination switches for the protection of voltage inputs (type RM) 3 poles	4	5601 0018
Fuse combination 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 transformers range		See page 334

### Services and Technical assistance

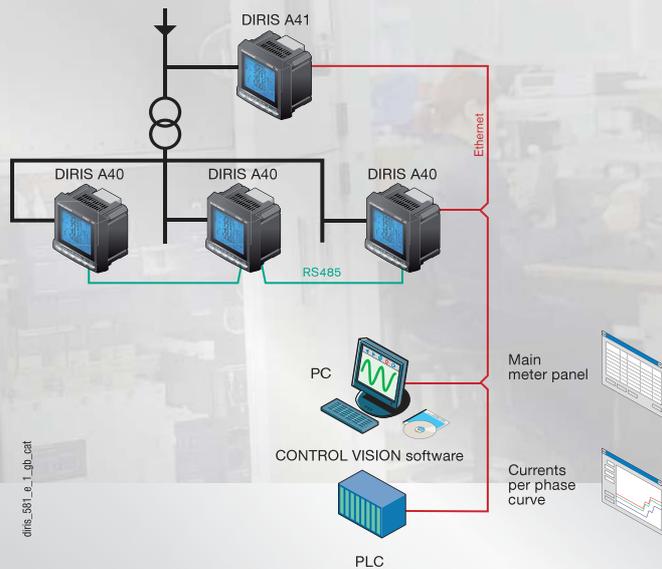
Our expertise extends to a complete offer of services like commissioning installation audit, training, maintenance and project engineering.





diris\_744\_e\_1\_cat

## Applications



diris\_581\_e\_1\_cat

appli\_384\_b

## Monitoring and managing energy for high/low voltage electrical installations

### Function

The DIRIS A40 and A41 are multifunction meters which ensure the user has access to all the measurements required for energy efficiency projects and monitoring of 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 0.5S
- IEC 62053-23 class 2

### Multi measurement

- Current
  - instantaneous: I1, I2, I3, In, Isystem
  - average/maximum average: I1, I2, I3, In
- Voltages & frequency
  - instantaneous: U1, U2, U3, U12, U23, U31, F, Vsystem, Ussystem
  - average/maximum average: U1, U2, U3, U12, U23, U31, F
- Power
  - instantaneous: 3P, ΣP, 3Q, ΣQ, 3S, ΣS
  - average/maximum average: ΣP, ΣQ, ΣS
  - predictive: (ΣP), (ΣQ), (ΣS)
- Power factor
  - instantaneous: 3PF, ΣPF
  - average/maximum average: ΣPF
- Temperatures<sup>(1)</sup>
  - internal
  - external via 3 PT100 sensors

### Metering

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

### Harmonic analysis

- Harmonic distortion rate
  - Currents: thd I1, thd I2, thd I3, thd In
  - Phase-to-neutral voltage: thd U1, thd U2, thd U3
  - Phase to phase voltage: thd U12, thd U23, thd U31

- Individual up to level 63
  - Currents: HI1, HI2, HI3, HIn
  - Phase-to-neutral voltage: HU1, HU2, HU3,
  - Phase to phase voltage: HU12, HU23, HU31

### Load curves<sup>(1)</sup>

- Active and reactive power: ΣP+/-; ΣQ+/-
- Voltages & frequency: U1, U2, U3, U12, U23, U31, F

### Events<sup>(1)</sup>

- Alarms on all electrical values.

### Communications<sup>(1)</sup>

- Analogues 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<sup>(1)</sup>

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

<sup>(1)</sup> Available as an option (see the following pages).

➔ Front panel



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

➔ Plug-in modules

DIRIS® A40

diris\_773\_a



DIRIS® A41

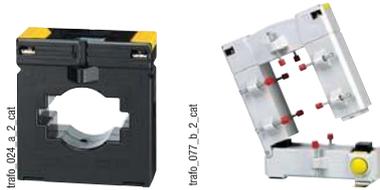
diris\_774\_a



<p>diris_445_a_1_cat</p>	<p><b>Pulse outputs</b></p> <p>2 configurable pulse outputs (type, weight and run) on <math>\pm</math> kWh, <math>\pm</math> kvarh and kVAh</p>
<p>diris_447_a_1_cat</p>	<p><b>JBUS / MODBUS® communication</b></p> <p>RS485 link with JBUS / MODBUS® protocol (speed up to 38400 bauds).</p>
<p>diris_775_a_1_cat</p>	<p><b>PROFIBUS® DP communication</b></p> <p>SUB-D9 link with PROFIBUS® DP protocol (speed up to 12 Mbauds).</p>
<p>diris_777_a_1_cat</p>	<p><b>Ethernet communication</b></p> <ul style="list-style-type: none"> <li>• Ethernet link with MODBUS/TCP or JBUS/MODBUS RTU over TCP</li> </ul>
<p>diris_776_a_1_cat</p>	<p><b>Ethernet communication with RS485 JBUS/MODBUS gateway</b></p> <ul style="list-style-type: none"> <li>• Ethernet link with MODBUS/TCP or JBUS/MODBUS RTU over TCP</li> <li>• Connection of 1 to 247 RS485 JBUS/MODBUS slaves</li> </ul>
<p>diris_448_a_1_cat</p>	<p><b>Analogue outputs</b></p> <p>A maximum of 2 modules may be connected, that is 4 analogue outputs. 2 outputs assignable to: 3I, In, 3V, 3U, F, <math>\pm</math><math>\Sigma</math>P, <math>\pm</math><math>\Sigma</math>Q, <math>\Sigma</math>S, <math>\Sigma</math>PFL/C, I sys, Vsys, Usys, Ppred, Q pred, Spred, internal T°C, T°C 1, T°C 2, T°C 3 and to 17 VDC power supply</p>
<p>diris_449_a_1_cat</p>	<p><b>2 inputs - 2 outputs</b></p> <p>A maximum of 3 modules may be connected, giving 6 inputs. 2 outputs assignable to: - monitoring: 3I, In, 3V, 3U, F, <math>\pm</math><math>\Sigma</math>P, <math>\pm</math><math>\Sigma</math>Q, SS, <math>\Sigma</math>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.</p>
<p>diris_882_a_1_cat</p>	<p><b>Memory</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Storing of 10 hour-dated last alarms.</li> <li>• Storing of the last minimum and maximum instantaneous values for 3U, 3V, 3I, In, F, <math>\Sigma</math>P<math>\pm</math>, <math>\Sigma</math>Q<math>\pm</math>, <math>\Sigma</math>S, THD 3U, THD 3V, THD, 3U, THD, 3V, THD, 3I, THD In.</li> <li>• Storing of 3U, 3V and F average values based on synchronisation function (maximum 60 days).</li> </ul>
<p>diris_747_a_2_cat</p>	<p><b>Temperature</b></p> <p>Temperature indication</p> <ul style="list-style-type: none"> <li>• Internal</li> <li>• External sensor PT 100 (T°C 1)</li> <li>• External sensor PT 100 (T°C 2)</li> <li>• External sensor PT 100 (T°C 3)</li> </ul>

## ↳ DIRIS A40 / A41 - Accessories

Current transformer  
(see page 334)



IP65 protection

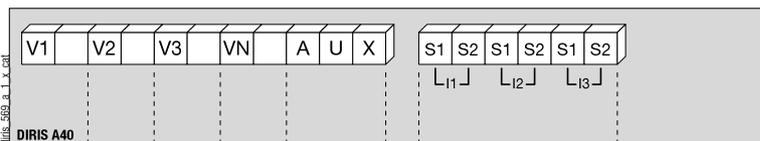


Mounting kit for 144 x 96 mm cut out plate



## ↳ Terminals

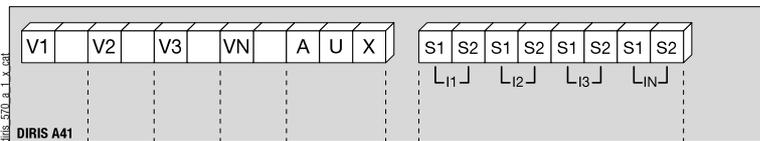
DIRIS A40



S1 - S2: current inputs

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

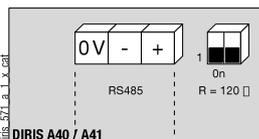
DIRIS A41



S1 - S2: current inputs

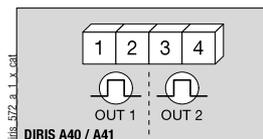
AUX: auxiliary power supply  $U_s$   
V1 - V2 - V3 - VN: voltage inputs

Communication module



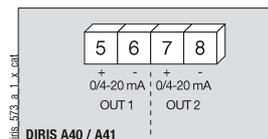
DIRIS A40 / A41  
RS485 link.  
 $R = 120 \Omega$ : internal resistance for the RS485 link.

Pulse output module



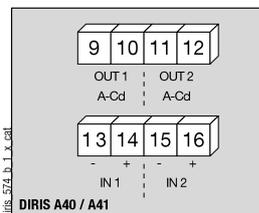
DIRIS A40 / A41  
1 - 2: pulse output n°1.  
3 - 4: pulse output n°2.

Analogue output module



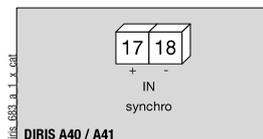
DIRIS A40 / A41  
5 - 6: analogue output n°1.  
7 - 8: analogue output n°2.

2 inputs / 2 outputs module



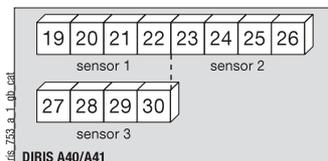
DIRIS A40 / A41  
9 - 10: relay output n°1.  
11 - 12: relay output n°2.  
13 - 14: opto input n°1.  
15 - 16: opto input n°2.

Memory module



DIRIS A40 / A41  
17 - 18: synchronisation input.

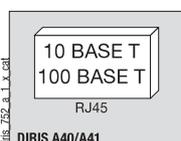
Temperature module



DIRIS A40/A41

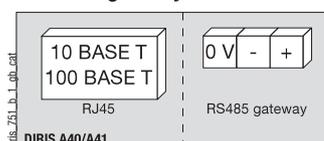
Sensor 1	Sensor 2	Sensor 3
19: Red	23: Red	27: Red
20: Red	24: Red	28: Red
21: White	25: White	29: White
22: White	26: White	30: White

Ethernet Module



DIRIS A40/A41

Ethernet module + RS485 JBUS / MODBUS gateway



DIRIS A40/A41

## Electrical characteristics

Current measurement on insulated inputs (TRMS)	
Via CT primary	10 000 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 %
Sustained overload	6 A
intermittent overload	10 I <sub>n</sub> 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 %
Sustained overload	760 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 <sup>(1)</sup>
Type	250 VAC - 5 A - 1150 VA

2 inputs / 2 outputs module: Phototransistor inputs	
Number	2 <sup>(1)</sup>
Power supply	10 ... 17 VDC
Minimal signal width	10 ms
Minimum length between 2 impulses	18 ms
Type	phototransistor

Pulse outputs module	
Number of relays	2
Type	100 VDC - 0.5 A - 10 VA
Max. number of operations	≤ 10 <sup>6</sup>

Analogue output module	
Number of outputs	2 <sup>(2)</sup>
Type	insulated
Scale	0 / 4 ... 20 mA
Load resistance	600 Ω
Maximum current	30 mA

JBUS/MODBUS communication module	
Link	RS485
Type	2 ... 3 half duplex wires
Protocol	JBUS/MODBUS® in RTU mode
JBUS/MODBUS® speed	1400 ... 38400 bauds

PROFIBUS-DP communication module	
Link	SUB-D9
Protocol	PROFIBUS® DP
PROFIBUS® speed	9.8 kbauds ... 12 Mbauds

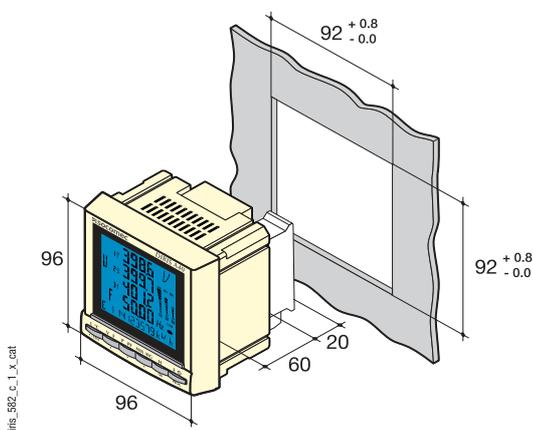
Ethernet Communication Module	
Connectique	RJ45
Speed	10 base T / 100 base T
Protocol	MODBUS TCP or JBUS/MODBUS RTU over TCP

Module temperature (inputs)	
Type	PT100
Connection	2, 3 or 4 wires
Dynamic	- 20°C ... 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 60 mm
Case protection index	IP30
Front protection rating	IP52
Display type	LCD
Terminal blocks type	fixed or pull-out
Voltage and other connection section	0.2 ... 2.5 mm <sup>2</sup>
Current connection section	0.5 ... 6 mm <sup>2</sup>
Weight	400 g

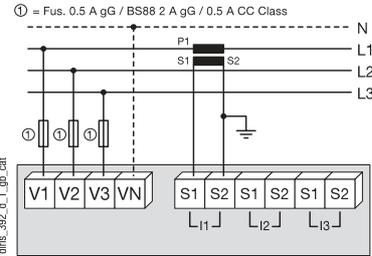
diris\_S92\_c\_1\_x\_cmt

## ➔ DIRIS A40 / A41 - Connections

Recommendation: when disconnecting the DIRIS, the secondaries of each current transformer must be short-circuited. This operation can be carried out automatically by a product in the SOCOMEC catalogue, PTI: consult us.  
In TNC neutral system it is recommended to use functional earth module.

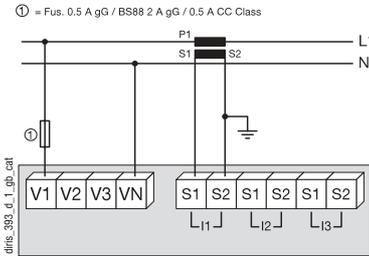
### Low voltage balanced network for DIRIS A40

3/4 wires with 1 CT

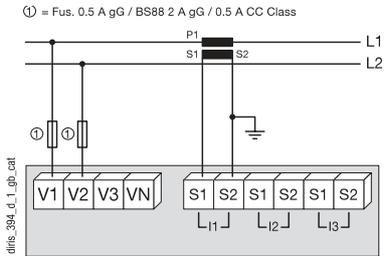


Use of 1 CT reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.

Single phase

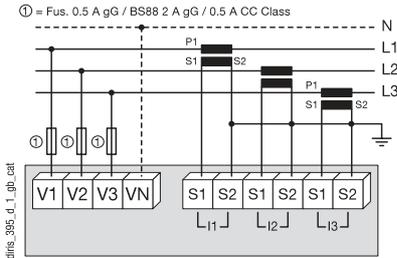


Two phase

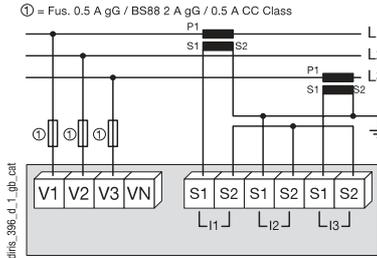


### Low voltage unbalanced network for DIRIS A40

3/4 wires with 3 CTs

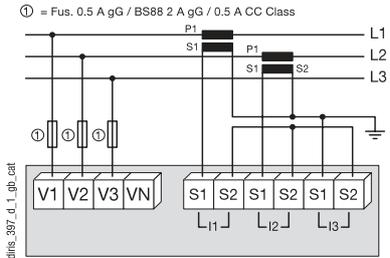


3 wires with 2 CTs



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

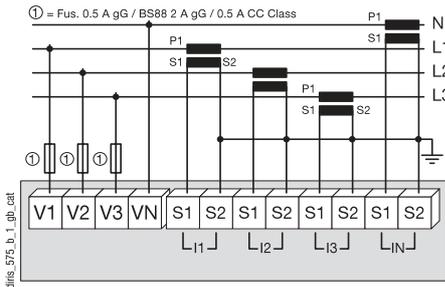
3 wires with 2 CTs



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

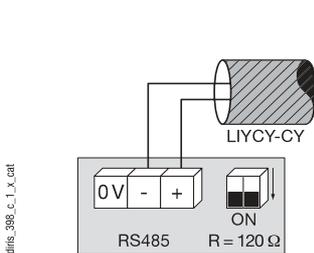
### Low voltage unbalanced network for DIRIS A41

4 wires with 4 CTs

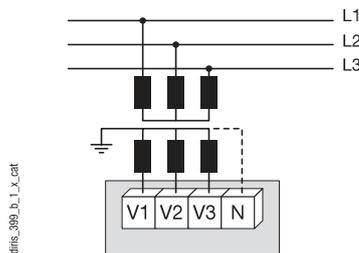


### Additional information

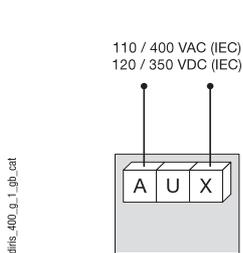
Communication via RS485 link



Voltage transformer for HV networks



AC & DC auxiliary power supply



It is recommended that the auxiliary power supply be protected by the use of 500 mA gG fuses.

➤ References



diris\_744\_a\_1\_cut

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

Options

Plug-in modules <sup>(1)</sup>	Reference	Reference
Pulse outputs	4825 0090	4825 0090
Sub D9 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
Memory	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
Functional Earth	4825 0087	4825 0087

Accessories

Description of accessories	To be ordered in multiples of		To be ordered in multiples of	
		Reference		Reference
IP65 protection	1	4825 0089	1	4825 0089
Panel mounting kit for a 144 x 96 mm cutout	1	4825 0088	1	4825 0088
Fuse combination switches for the protection of voltage inputs (type RM) 3 poles	4	5601 0018	4	5601 0018
Fuse combination switches for the protection of the auxiliary supply (type RM) 1 pole + neutral	6	5601 0017	6	5601 0017
Fuses type gG 10x38 0.5 A	10	6012 0000	10	6012 0000
Current transformers range		See page 334		See page 334

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

➤ Services and Technical assistance

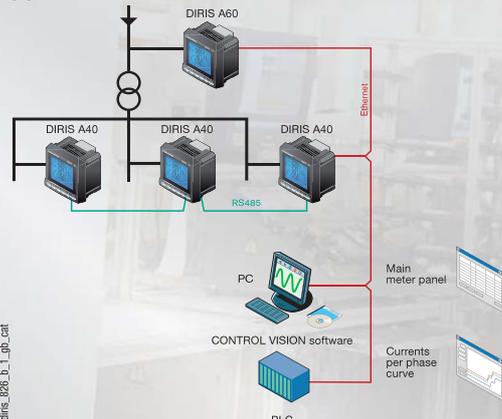
Our expertise extends to a complete offer of services like commissioning installation audit, training, maintenance and project engineering.





diris\_a24\_a\_1\_cat

## Applications



diris\_a26\_b\_1\_op\_cat

## Events monitoring and managing energy for high/low voltage electrical installations

### Function

**DIRIS A60** is a measurement station which takes over all the functions of DIRIS A40 and which is enhanced by a history of harmful events for installation. A graphic representation of these harmful events is associated and provided to the user. All this information can be used and analysed remotely using free quality measurement software that can be downloaded on the site [www.socomec.com](http://www.socomec.com).

### Conformity to standards

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

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

- shows the current and voltage unbalance
- shows the tangent phi
- stores the load curves (50 days with an interval of 10 minutes) for:
  - Active, reactive and apparent power:  $\Sigma P$  +/-;  $\Sigma Q$  +/-,  $\Sigma S$
- 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 1/2 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-function meter

- Current
  - instantaneous: I1, I2, I3, In, Isystem,
  - average/maximum average: I1, I2, I3, In,
  - unbalance: I unb.
- Voltages & frequency
  - instantaneous: U1, U2, U3, U12, U23, U31, F, Vsystem, Ussystem
  - average/maximum average: U1, U2, U3, U12, U23, U31, F
  - unbalance: U unb.
- Power
  - instantaneous: 3P,  $\Sigma P$ , 3Q,  $\Sigma Q$ , 3S,  $\Sigma S$
  - maximum average:  $\Sigma P$ ,  $\Sigma Q$ ,  $\Sigma S$
  - predictive:  $\Sigma P$ ,  $\Sigma Q$ ,  $\Sigma S$ .
- Power factor
  - FP,  $\Sigma FP$
- Instantaneous total tangent phi
- Instantaneous, averaged, max averaged disbalance

- Temperatures<sup>(1)</sup>
  - internal
  - external via 3 PT100 sensors

### Metering

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

### Harmonic analysis (level 63)

- Harmonic distortion rate
  - Currents: thd I1, thd I2, thd I3, thd In
  - Phase-to-neutral voltage: thd U1, thd U2, thd U3
  - Phase to phase voltage: thd U12, thd U23, thd U31
- Individual
  - Currents: HI1, HI2, HI3, HIn
  - Phase-to-neutral voltage: HU1, HU2, HU3,
  - Phase to phase voltage: HU12, HU23, HU31

### Events<sup>(1)</sup>

- Alarms on all electrical values

### Communications<sup>(1)</sup>

- Analogues 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<sup>(1)</sup>

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

<sup>(1)</sup> Available as an option (see the following pages).

➔ **Front panel**



1. Backlit LCD screen.
2. Pushbutton for currents, temperatures and CT setup wiring correction.
3. Pushbutton for voltages and frequency.
4. Pushbutton for active, reactive, and apparent power and power factor.
5. Pushbutton for maximum and average current and power values.
6. Pushbutton for harmonics values.
7. Pushbutton for energies and hour run meter.

➔ **Plug-in modules**

DIRIS® A60



**Pulse outputs**

- 2 configurable pulse outputs (type, weight and run) 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, that is 4 analogue outputs. 2 outputs assignable to: 3I, In, 3V, 3U, F,  $\pm$   $\Sigma$ P,  $\pm$   $\Sigma$ Q,  $\Sigma$ S,  $\Sigma$ PFL/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.



**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,  $\pm$   $\Sigma$ P,  $\pm$   $\Sigma$ Q,  $\Sigma$ S,  $\Sigma$ PFL/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 pulses metering.



**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)

## ↳ DIRIS A60 - Accessories

Current transformer  
(see page 334)



Current transformer



IP65 protection

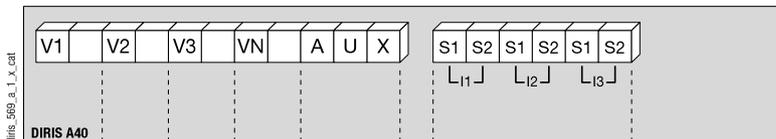


Mounting kit for kit 144 x 96 mm  
cut out plate



## ↳ Terminals

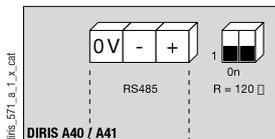
DIRIS A60



S1 - S2: current inputs

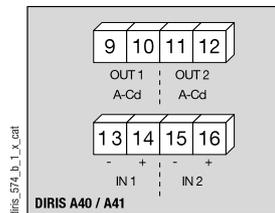
AUX: auxiliary power supply  $U_s$   
V1 - V2 - V3 - VN: voltage inputs

Communication module



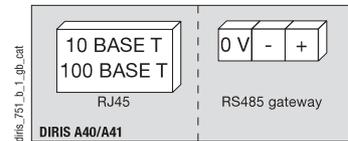
RS485 link.  
R = 120  $\Omega$ : internal resistance for the RS485 link.

2 inputs / 2 outputs module

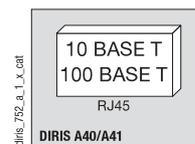


9 - 10: relay output  $n^{\circ}1$ .  
11 - 12: relay output  $n^{\circ}2$ .  
13 - 14: opto input  $n^{\circ}1$ .  
15 - 16: opto input  $n^{\circ}2$ .

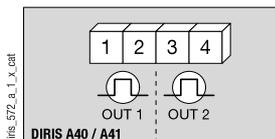
Ethernet module + RS485 JBUS /  
MODBUS gateway



Ethernet Module

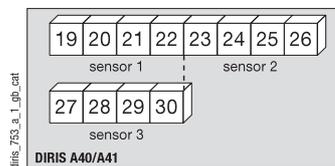


Pulse output module

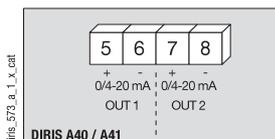


1 - 2: pulse output  $n^{\circ}1$ .  
3 - 4: pulse output  $n^{\circ}2$ .

Temperature module



Analogue output module



5 - 6: analogue output  $n^{\circ}1$ .  
7 - 8: analogue output  $n^{\circ}2$ .

## ↪ Electrical characteristics

### Current measurement on insulated inputs (TRMS)

Via CT primary	10 000 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 %
Sustained overload	6 A
intermittent overload	10 I <sub>n</sub> 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 %
Sustained overload	760 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 <sup>(1)</sup>
Type	250 VAC - 5 A - 1150 VA

### 2 inputs / 2 outputs module: Phototransistor inputs

Number	2 <sup>(1)</sup>
Power supply	10 ... 30 VDC
Minimal signal width	10 ms
Minimum length between 2 impulses	18 ms
Type	phototransistor

### Pulse outputs module

Number of relays	2
Type	100 VDC - 0.5 A - 10 VA
Max. number of operations	≤ 10 <sup>6</sup>

### Analogue output module

Number of outputs	2 <sup>(2)</sup>
Type	insulated
Scale	0 / 4 ... 20 mA
Load resistance	600 Ω
Maximum current	30 mA

### JBUS/MODBUS communication module

Link	RS485
Type	2 ... 3 half duplex wires
Protocol	JBUS/MODBUS® in RTU mode
JBUS/MODBUS® speed	1400 ... 38400 bauds

### PROFIBUS-DP communication module

Link	SUB-D9
Protocol	PROFIBUS® DP
PROFIBUS® speed	9.8 kbauds ... 12 Mbauds

### Ethernet Communication Module

Connectique	RJ45
Speed	10 base T / 100 base T
Protocol	MODBUS TCP or JBUS/MODBUS RTU over TCP

### Temperature inputs

Type	PT100
Connection	2, 3 or 4 wires
Dynamic	- 20°C ... 150°C
Accuracy	+/- 1 digit
Maximum length	300 cm

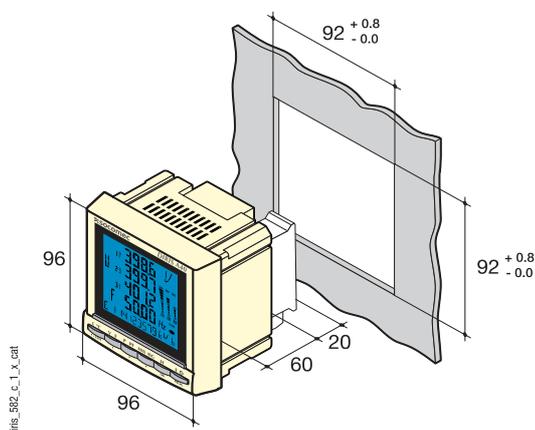
### Operating conditions

Operating temperature	- 10 ... + 55 °C
Storage temperature	- 20 ... + 85 °C
Relative humidity	95 %

(1) Max. 3 modules / DIRIS.

(2) Max. 2 modules / DIRIS.

## ↪ Case



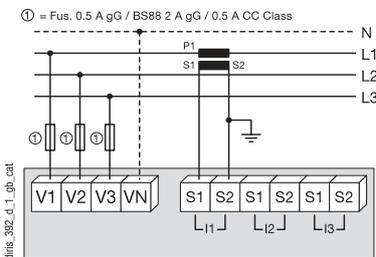
Type	Panel mounting
Dimensions W x H x D	96 x 96 x 60 mm
Case protection index	IP30
Front protection rating	IP52
Display type	LCD
Terminal blocks type	fixed or pull-out
Voltage and other connection section	0.2 ... 2.5 mm <sup>2</sup>
Current connection section	0.5 ... 6 mm <sup>2</sup>
Weight	400 g

## ➔ DIRIS A60 - Connection

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

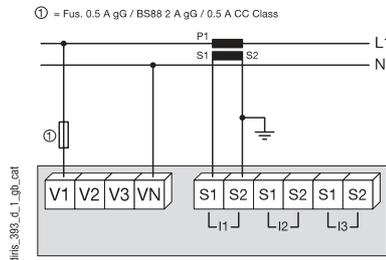
### Low voltage balanced network for DIRIS A60

3/4 wires with 1 CT

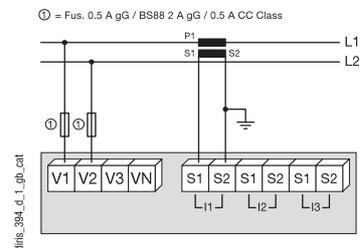


Use of 1 CT reduces by 0.5% the accuracy of the phases, the current of which is worked out by vector calculation.

Single phase

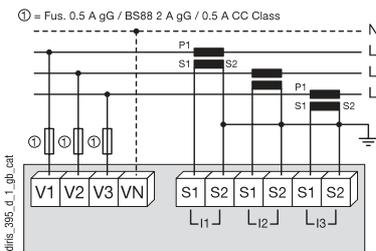


Two phase

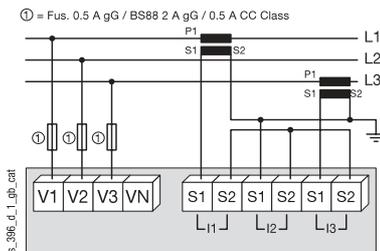


### Low voltage unbalanced network for DIRIS A60

3/4 wires with 3 CTs

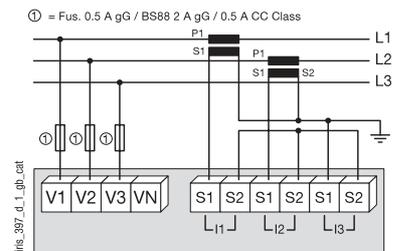


3 wires with 2 CTs



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

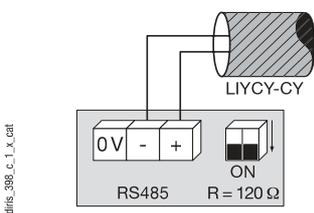
3 wires with 2 CTs



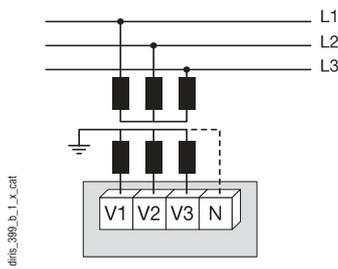
Use of 2 CTs reduces by 0.5% the accuracy of the phase, whose current is worked out by vector calculation.

### Additional information

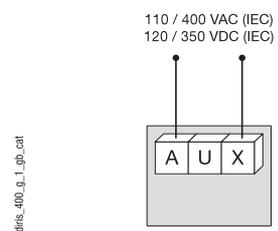
Communication via RS485 link



Connection of voltage transformer for HV networks



AC & DC auxiliary power supply



It is recommended that the auxiliary power supply be protected by the use of 500 mA gG fuses.

➤ **Software**

**Visualize the SAG, SWELL, CUT-OFF and Over current curves**

This software allows the DIRIS A60 event monitoring system to help you improve the reliability of your electrical installation, by detecting and allowing the analysis of the events through graphic display. It provides the following functions:

- List of voltage dips, cuts, and surges, and over current
- Display of the 10 curves (3V, 3U, 3I, 3In) related to the event with advanced zoom in functions
- Classification of the events according to EN50160
- Export pictures or XLM files of curves.

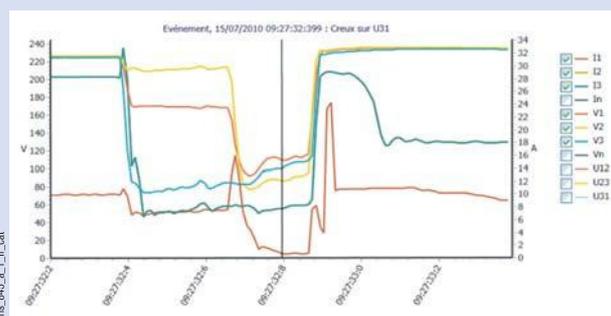
Software can be connected to the DIRIS either in Modbus TCP / Modbus RTU over TCP or Modbus RTU over RS485.

Software can be downloaded on the SOCOMEC website : [www.socomec.com](http://www.socomec.com)

Event log: Display



Curve display



➤ **References**

**Basic device**

**Auxiliary power supply Us**

110 ... 400 VAC / 120 ... 350 VDC



diris\_a60\_a\_1\_fr\_cat

**DIRIS A60**  
**Reference**  
**4825 0207**

Options

**Plug-in-modules<sup>(1)</sup>**

	Reference
Pulse outputs	4825 <b>0090</b>
RS485 JBUS/MODBUS® communication	4825 <b>0092</b>
Analogue outputs	4825 <b>0093</b>
2 inputs / 2 outputs	4825 <b>0094</b>
RS485 PROFIBUS®/DP communication	4825 <b>0205</b>
Ethernet communication	4825 <b>0203</b>
Ethernet communication + RS485 gateway JBUS/MODBUS	4825 <b>0204</b>
Temperature inputs	4825 <b>0206</b>

(1) Ease of integration for additional functions (maximum 3).

Accessories

Description of accessories	To be ordered by multiple	Reference
IP65 protection	1	4825 <b>0089</b>
Panel mounting kit for a 144 x 96 mm cutout	1	4825 <b>0088</b>
Fuse combination switches for the protection of voltage inputs (type RM) 3 poles	4	5601 <b>0018</b>
Fuse combination switches for the protection of the auxiliary supply (type RM) 1 pole + neutral	6	5601 <b>0017</b>
Fuses type gG 10x38 0.5 A	10	6012 <b>0000</b>
Current transformers range		See page 334

➤ **Services and Technical assistance**

Our expertise extends to a complete offer of services like commissioning installation audit, training, maintenance and project engineering.

