**DIRIS® A40/A41**

Multifunction meters - PMD
multi-measurement meter - dimensions 96 x 96 mm

**Function**

DIRIS® A40 and A41 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. 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.

**Functions**

**Multi-measurement**
- Currents: instantaneous: I1, I2, I3, In, system average/maximum average: I1, I2, I3, In
- Voltages & frequency: instantaneous: V1, V2, V3, U12, U23, U31, F, Uv, Uw, U, Us
- Average/maximum average: V1, V2, V3, U12, U23, U31, F
- Power: instantaneous: S, P, Q, S, ±S
- Maximum average: ±P, ±Q, ±S
- Predictive: ±P, ±Q, ±S
- Power factors: instantaneous: ±PF
- Average/maximum average: ±PF
- Temperatures: internal, external via 3 PT100 sensors

**Metering**
- Active energy: +/- kWh
- Reactive energy: +/- kvarh
- Apparent power: kVAh
- Active and reactive power: ±P, ±Q, ±S, ±Q/+-
- Voltages & frequency: V1, V2, V3, U12, U23, U31, F
- Events: Alarms on all electrical values.
- Individual up to level 63
- Phasors: H1, H2, H3, Hn
- Phase-to-neutral voltage: H1, H2, H3, H1, H2, H3, H1
- Phase-to-phase voltage: H12, H23, H31, H12, H23, H31

**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

**Communications**
- RS485 MODBUS RTU & PROFIBUS DP
- Ethernet (MODBUS TCP or RTU over TCP and Web server)
- Ethernet with RS485 MODBUS RTU over TCP protocol
- RS485 link with MODBUS® protocol
- SUB-D9 link with PROFIBUS® DP communication (speed up to 12 Mbauds)
- RS485 link with MODBUS® RTU over TCP protocol
- Ethernet connection with MODBUS TCP or MODBUS RTU over TCP protocol

**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
- IEC 62053-22 class 0.5S
- IEC 62053-23
- UL

**Principle diagram**

DIRIS® A40

DIRIS® A41

Energy efficiency software

RS485

Modbus TCP

Ethernet (MODBUS RTU over TCP)

RS485 MODBUS RTU over TCP

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.).
Single-circuit metering, detect incorrect wiring and to automatically detect wiring errors. An integrated test function can be utilised to read readings and are easy to use.

Thanks to its large backlit LCD display and measuring the neutral current. All this information can be analysed remotely and exploiting data remotely without additional equipment performance, in terms of metrology, and the mechanical and environmental aspects (EMC, temperature, etc.).

That are designed to measure and monitor electrical parameters in distribution networks. All PMDs (Performance Monitoring Devices) are panel mounted and include a Webserver function for monitoring software.

Compliant with IEC 61557-12 (speed up to 38400 bauds).

3I, In, 3U, F, ± 2P, ± ΣQ, ±Σ3P, ±Σ3Q, ±Σ3PFL/C, ±1 sys, Vsys, Usys, Qpred, Ppred, Spred, T°C internal, T°C 1, T°C 2, T°C3 and to ± 50 VDC power supply.

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

A maximum of 2 modules may be connected, providing up to 4 analogue outputs. Per module 2 outputs assignable to: 3I, In, 3U, F, ± 2P, ± ΣQ, ±Σ3P, ±Σ3Q, ±Σ3PFL/C, I sys, Vsys, Usys, Qpred, Ppred, Spred, T°C internal, T°C 1, T°C 2, T°C3 and to ± 50 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, 3U, F, ± 2P, ± ΣQ, ±Σ3P, ±Σ3Q, ±Σ3PFL/C, T°C 3I, T°C In, T°C 3U, T°C 3V, T°C 3I, T°C In, T°C 3U, T°C 3V, T°C 3I, T°C In, T°C 3U, T°C 3V, T°C 3I, T°C In, T°C 3U, T°C 3V.
- 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, ± 2P, ± ΣQ, ±Σ3P, ±Σ3Q, ±Σ3PFL/C, T°C 3I, T°C In, T°C 3U, T°C 3V.
- 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),

(1) See “Management software for DIRIS” page 615.
(2) See “external sensor PT 100” page 600.

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

- Pulse outputs
- Communication MODBUS®
- PROFIBUS® DP communication
- Ethernet communication
- Ethernet communication with RS485 MODBUS gateway
- Analogue outputs
- Memory
- Temperature

DIRIS® A41

* with a factory fitted neutral CT module.
**DIRIS A40/A41**

Multifunction meters - PMD

multi-measurement meter - dimensions 96 x 96 mm

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### Accessories

**Current transformers**

(see page 584)

**IP65 protection**

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

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### Terminals

**DIRIS A40**

**DIRIS A41**

**Communication module**

**Pulse output module**

**Analogue output module**

**Memory module**

**Temperature module**

**2 inputs / 2 outputs module**

**Ethernet Module**

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**S1 - S2: current inputs**

**AUX:** auxiliary power supplies \( U_s \)

**V1 - V2 - V3 - VN:** voltage inputs

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**Accessories**

**Current transformers**

(see page 584)

**IP65 protection**

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

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

2 inputs / 2 outputs module: Outputs (alarms / control)

<table>
<thead>
<tr>
<th>Number of relays</th>
<th>Type</th>
<th>Power supply</th>
<th>Power supply number</th>
<th>Minimum signal width</th>
<th>Minimum duration between 2 pulses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>250 VAC - 5 A - 1150 VA</td>
<td>10 ... 30 VDC</td>
<td>10 ms</td>
<td>18 ms</td>
<td></td>
</tr>
</tbody>
</table>

2 inputs / 2 outputs module: Phototransistor inputs

<table>
<thead>
<tr>
<th>Number of relays</th>
<th>Type</th>
<th>Power supply</th>
<th>Power supply number</th>
<th>Minimum signal width</th>
<th>Minimum duration between 2 pulses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Photo transistors</td>
<td>10 ... 30 VDC</td>
<td>10 ms</td>
<td>18 ms</td>
<td></td>
</tr>
</tbody>
</table>

Pulse output module

<table>
<thead>
<tr>
<th>Number of relays</th>
<th>Type</th>
<th>Maximum current</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>100 VDC - 0.5 A - 10 VA</td>
<td>30 mA</td>
</tr>
</tbody>
</table>

Analogue output module

<table>
<thead>
<tr>
<th>Number of relays</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Insulated</td>
</tr>
</tbody>
</table>

**MODBUS communication module**

<table>
<thead>
<tr>
<th>Link</th>
<th>Type</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS485</td>
<td>2 ... 3 half duplex wires</td>
<td>MODBUS RTU</td>
</tr>
</tbody>
</table>

PROFIBUS-DP communication module

<table>
<thead>
<tr>
<th>Link</th>
<th>Type</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUB-D9</td>
<td>9.8 kbauds ... 12 Mbauds</td>
<td>PRFIBUS® DP</td>
</tr>
</tbody>
</table>

**Ethernet communication module**

<table>
<thead>
<tr>
<th>Connection</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ45</td>
<td>10 base T / 100 base T</td>
</tr>
</tbody>
</table>

**Temperature module (inputs)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT100</td>
<td>2, 3 or 4 wires</td>
</tr>
</tbody>
</table>

**Operating conditions**

<table>
<thead>
<tr>
<th>Operating temperature</th>
<th>Storage temperature</th>
<th>Relative humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 10 ... + 55 °C</td>
<td>- 20 ... + 85 °C</td>
<td>95 %</td>
</tr>
</tbody>
</table>

**Case**

<table>
<thead>
<tr>
<th>Type</th>
<th>Panel mounting</th>
</tr>
</thead>
</table>

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

Low voltage unbalanced network for DIRIS A40
3/4 wires with 3 CTs

Low voltage unbalanced network for DIRIS A41
4 wires with 4 CTs

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.

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.

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.

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.

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.
Communication via RS485 link

Additional information

4 wires with 4 CTs
Low voltage unbalanced network for DIRIS A41
Use of 2 CTs reduces by 0.5% the accuracy of the phases,

3/4 wires with 3 CTs
Low voltage unbalanced network for DIRIS A40
the current of which is worked out by vector calculation.
Use of 1 CT reduces by 0.5% the accuracy of the phases,

3/4 wires with 1 CT
Low voltage balanced network for DIRIS A40
In TNC neutral systems it is recommended to use the functional earth module.

automatically by a SOCOMEC PTI, an accessory which is included in this catalogue. Please consult us.

Recommendation:

Connections

multi-measurement meter - dimensions 96 x 96 mm
Multifunction meters - PMD
DIRIS A40/A41

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

References

Basic device
Auxiliary power supply $U_n$
110 ... 400 VAC / 120 ... 350 VDC
12 ... 48 VDC

Options
Plug-in modules(1)
Pulse outputs 4825 0090
RS485 MODBUS® communication 4825 0092
Analogue outputs 4825 0093
2 inputs / 2 outputs 4825 0094
Communication Sub D9 PROFIBUS®(2) 4825 0205
Memory 4825 0097
Embedded Webservice function(2) 4825 0203
Ethernet communication + RS485 MODBUS gateway (Embedded Webservice function)(2) 4825 0204
Temperature inputs 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 G3 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 1 4899 0011
Temperature sensor PT100 - M6 screw type 1 4825 0208 1 4825 0208
Temperature sensor PT100 - M6 eylet type 1 4825 0209 1 4825 0209
Management software for DIRIS

Expert Services

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