



# DIRIS A-40

Multi-function meters

Single-circuit metering and measurement



DIRIS A-40

## Function

The **DIRIS A-40** is a panel-mounted power monitoring device (PMD). It is designed for measuring, monitoring and reporting electrical energy.

The DIRIS A-40 offers a range of functions for measuring voltage, current, power, energy and quality. It allows the analysis of a single-phase or three-phase load.

## Advantages

### Assisted configuration

The configuration wizard guides the user step by step. It also detects and corrects configuration errors. This cuts the commissioning time in half and always delivers a reliable result.

### Smart sensors

Three current sensor formats (solid-core TE, split-core TR and Rogowski coil TF) allow integration of the DIRIS A-40 into new and existing electrical installations. See page

### Connected to the Cloud

The range comprises IoT ready connected products that enable data to be exported automatically for remote operation without any limit on time, distance and time in storage.

### Compliant with IEC 61557-12

Reference standard for PMDs (Performance metering & monitoring devices), IEC 61557-12 standard guarantees performance levels and satisfactory performance from the PMDs under the environmental conditions typical of industrial and tertiary applications.

## The solution for

- > Industry
- > Building
- > Infrastructure



## Strong points

- > Assisted configuration
- > Connected to the Cloud
- > Compliant with IEC 61557-12
- > Smart sensors

## Integrated technologies



For more information, see page

## Conformity to standards

- > IEC 61557-12
- > UL E257746
- > EN 50160



## Functions

### Multi-measurement

- Currents
  - I1, I2, I3, In, Isystem
- Voltages & frequency
  - V1, V2, V3, VN, Vsystem, U12, U23, U31, Usystem, f
- Powers
  - P1, P2, P3, ΣP, Q1, Q2, Q3, ΣQ, S1, S2, S3, ΣS
  - Predictive powers ΣP, ΣQ, ΣS
- Power factor
  - PF1, PF2, PF3, ΣPF
- Cos φ & tangent φ
  - Instantaneous values per phase

### Metering

- Active energy: +/- kWh
- Reactive energy: +/- kvarh
- Apparent power: kVAh
- Multi-tariff (8 max.)
- Hour Meter

### Quality

- Voltage Unbalance
  - Vdir, Vinv, Vhom, Udir, Uinv, Unba, Vnba, Vnb, Unb
- Current unbalance
  - Idir, linv, Ihom, Inba, Inb
- Total harmonic distortion
  - Currents THDi1, THDi2, THDi3, THDiN, TDDI
  - Phase-to-neutral voltage THDv1, THDv2, THDv3
  - Phase-to-phase voltage THDu12, THDu23, THDu31
- Individual harmonics up to rank 63
  - Currents: I1h, I2h, I3h, INh
  - Phase-to-neutral voltage: V1h, V2h, V3h
  - Phase-to-phase voltage: U12h, U23h, U31h
- Quality events
  - Voltage sags, cut-offs and swells EN50160
  - Kfactor & Crest factor
- Events according to EN 50160
  - Voltage dips, outages, voltage surges

### Monitoring of protection

- Auxiliary contact monitoring
- Report and alarm on trips
- Number of operations

### Load curves and historical records (max. 130 days)

- Active, reactive and apparent power
- Currents, voltages and frequency

### Alarms

- Alarms for all electrical values, events and input status changes, possibility of logical combination
- Time-stamping of events

### Communication

- DIRIS A-40 RS485 Modbus as standard
- DIRIS A-40 Ethernet Modbus
- DIRIS A-40 PROFIBUS DPV1

### Inputs

- 3 digital inputs
  - Power supplied from DIRIS A-40 or an external source
  - Function: logic status, status of circuit breaker, counting of pulses or synchronization multifund metering
- 2 logical outputs
  - Function: Command, energy pulse output, load shedding, alarm

## Functions

### Monitoring

- Real-time measurement of electrical values.
- View data as graphs or tables.
- Power quality analysis of the utility supply and of loads.



### Metering

- Measurement of active, reactive and apparent energies.
- Historical record of measurements.
- Graphic display on monthly, weekly, daily or hourly basis.

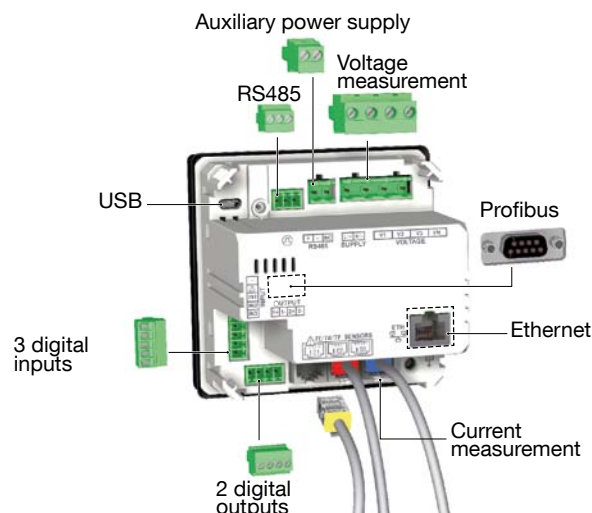


### Alarming

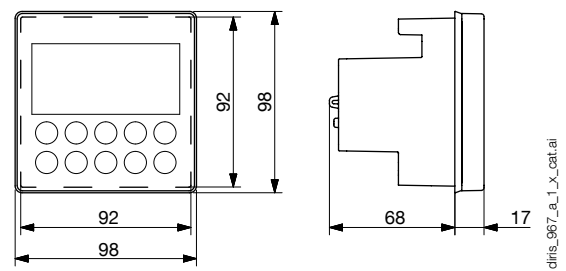
- Display of alarms.
- History of alarms.



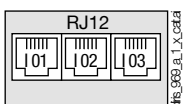
## Terminals



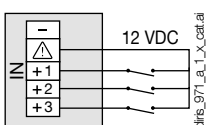
## Dimensions (mm)



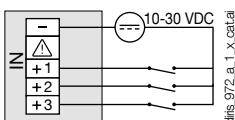
### Current measurement



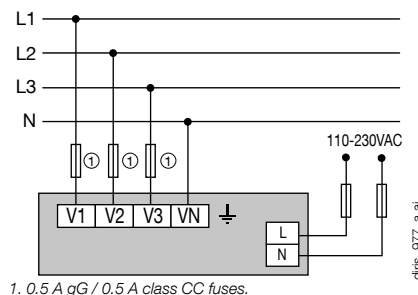
### 3 inputs supplied by the product



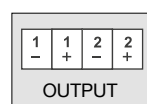
### 3 inputs with external power supply



### Voltage connections inc auxiliary power supply



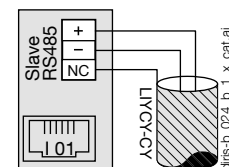
### 2 outputs



### Earth



### RS485



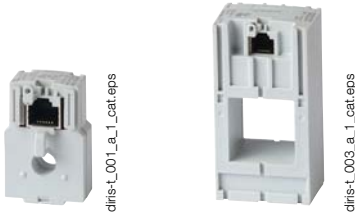
## Connections

### Associated current sensors

Various types of current sensors can be connected to the DIRIS A-40: solid-core (TE), split-core (TR) or Rogowski (TF). This range of sensors is suitable for all types of new or existing installations. A quick RJ12 connection makes wiring easy and reliable and prevents wiring errors. The DIRIS A-40 automatically recognizes the sensor size and type. This guarantees the overall accuracy of the DIRIS A-40 + current sensor measurement chain.

For more information: see page 488)

TE solid current sensors



TR split-core current sensors



TF Rogowski current sensors



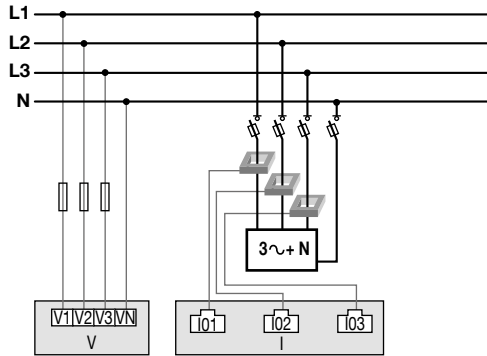
TE / TR / TF current sensors



### Network and connection examples

#### Three phase + Neutral

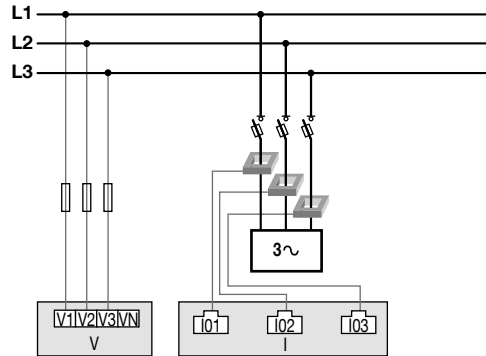
3P+N - 3 CT (1 three-phase load + calculated Neutral)



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#### Three-phase

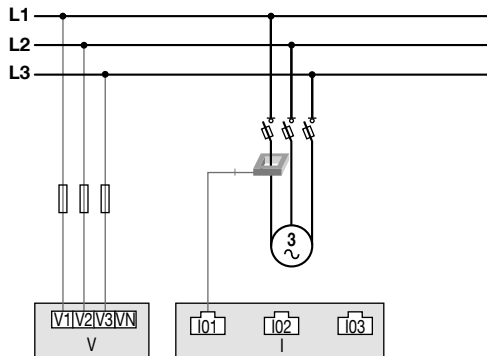
3P - 3CT (1 three-phase load)



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#### Three-phase

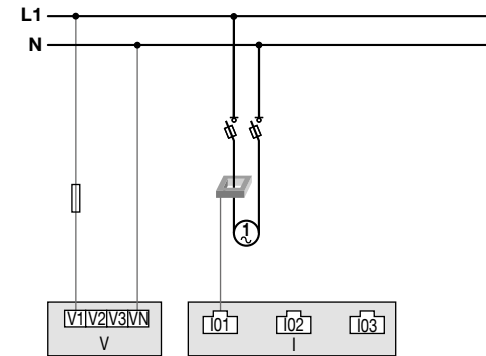
3P - 1CT (1 balanced three-phase load)



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#### Single-phase

1P+N - 1CT (1 single-phase load)



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1. 0.5 A gG / 0.5 A class CC fuses.  
If self-supplied, a fuse must always be added to the Neutral.



## DIRIS A-40 characteristics

### Electrical characteristics

| <b>Auxiliary power supply</b> |   |
|-------------------------------|---|
| Alternative voltage           | 110/400 VAC or 120/300 VDC - Cat III  |
| Frequency                     | 50/60 Hz  |
| Power consumption             | 5VA AC / 1,5VA DC (48250500)<br>8VA AC / 2,5VA DC (48250501 & 48250502)   |
| Connection                    | Removable spring-cage terminal block, 2x 2 positions, 0.5 - 2.5 mm <sup>2</sup> solid cable or 0.25 - 1.5 mm <sup>2</sup> stranded cable with end piece |

### Measurement characteristics

| <b>Power and energy measurement</b> |   |
|-------------------------------------|---|
| Accuracy                            | 0.2 DIRIS A-40 class only                                       |
| Active energy and active power      | Class 0.5 with TE, TF or iTR sensors<br>Class 1 with TR sensors |
| Accuracy of reactive energy         | Class 2 with TE, TR or TF sensors                               |

| <b>Power factor measurement</b> |   |
|---------------------------------|---|
| Accuracy                        | Class 0.5 with TE, TF or iTR sensors<br>Class 1 with TR sensors |

| <b>Voltage measurement</b>              |  |
|---|--|
| Characteristics of the network measured | 50-300VAC (Ph/N) - 87-520VAC (Ph/Ph) - CAT III   |
| Frequency range                         | 45 to 65Hz   |
| Frequency accuracy                      | Class 0.02   |
| Network type                            | Single-phase / Two-phase / Two-phase with neutral / Three-phase / Three-phase with neutral   |
| Measurement by voltage transformer      | Primary: 400 000 VAC<br>Secondary: 60, 100, 110, 173, 190 VAC  |
| Input consumption                       | ≤ 0,1 VA   |
| Accuracy of voltage measurement         | Class 0.2  |
| Connection                              | Removable spring-cage terminal block, 4 positions, 0.5 - 2.5 mm <sup>2</sup> solid cable or 0.25 - 1.5 mm <sup>2</sup> stranded cable with end piece |

| <b>Current measurement</b> |  |
|----------------------------|--|
| Number of current inputs   | 3  |
| Associated current sensors | Solid TE, split-core TR, flexible TF current sensors   |
| Accuracy                   | 0.2 DIRIS A-40 class only<br>Class 0.5 with TE, TF or iTR sensors<br>Class 1 with TR sensors |
| Connection                 | Specific Socomec cable with RJ12 connectors  |

### Input characteristics

|                     |   |
|---------------------|---|
| Number              | 3   |
| Type / Power supply | Optocoupler with internal (12 VDC ± 10%) or external (12-24 VDC ± 20%) polarisation             |
| Input function      | Logic status, status of circuit breaker, synchronization topography, multifluid pulse metering  |
| Connection          | Removable screw terminal block, 5 positions, stranded or solid 0.14 - 1.5 mm <sup>2</sup> cable |

### Output characteristics

|                 |   |
|-----------------|---|
| Number          | 2   |
| Type            | Optocoupler 30 Vd.c. max 20mA max - SELV  |
| Output function | Command, energy pulse output, load shedding, alarm  |
| Connection      | Removable screw terminal block, 4 positions, stranded or solid 0.14 - 1.5 mm <sup>2</sup> cable |

### Communication characteristics

| <b>DIRIS A-40 RS485</b> |                             |
|-------------------------|-----------------------------|
| Link                    | RS485                       |
| Connection type         | 2 to 3 half duplex wires    |
| Protocol                | Modbus RTU                  |
| Baud rate               | 1200 to 115 200 baud        |
| USB                     | Configuration of DIRIS A-40 |

## References

| <b>DIRIS A-40 monitoring devices</b> |   | <b>Reference</b> |
|--------------------------------------|---|------------------|
| DIRIS A-40                           | RS485 Modbus - 3 inputs / 2 outputs                                     | 4825 0500        |
| DIRIS A-40                           | Ethernet Modbus TCP and webserver - RS485 Modbus - 3 inputs / 2 outputs | 4825 0501        |
| DIRIS A-40                           | Profibus DPV1 - RS485 Modbus - 3 inputs / 2 outputs                     | 4825 0502        |