# Energy Metering Specifications

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<th>Type</th>
<th>DIRIS A40/41</th>
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<tr>
<td>X</td>
<td>Multi-Function Power Measurement Meter (PMD)</td>
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## X.1.0 SCOPE

This specification sets out the requirements for a quality multi-function Three phase AC energy meter with features which include Instantaneous RMS values, Average and Maximum values, Power Quality values and Metering Performance measuring device allowing multi measuring and monitoring of electrical parameters, energy metering, quality of energy analysis and the transmission of this information through communication.

## X.1.1 Standards and Approvals

Energy Accuracy shall be in accordance with IEC 62053-22 class 0.5S Reactive Energy Accuracy in accordance with IEC 62053-23 class 2 The energy meter shall comply with the New standards IEC 61557-12 (PMD) and UL 61010-1 Current and Voltage measurement accuracy 0.2%, Power and Power Factor measurement accuracy 0.5% Frequency accuracy 0.1% Degree of protection (front frame) IP52

## X.1.2 Display and Programming

The electronic display digit size shall be of 6.0 mm in height with Blue LCD Backlit display for clear indication of all values specified in this document Programming shall be via key on front panel or via dedicated PC Programming the meter, password protected as standard

The instrument shall be equal in functionality and parameters displayed to IPD Socomec Energy Management Metering Systems The meter must have the facility to record electrical parameters listed, for recording, monitoring & tracking of real time energy consumption
X.1.3 Design

Front Panel dimensions W 96 x H 96 x D 60 mm

The Power Measurement Meter shall be capable of displaying voltage, current, kilowatts, kilovolt amperes, power factor, and frequency and kilowatt hours on a high resolution numerical display.

In addition to the standard functions, the energy meter shall include add-on plug-in modules to provide the following functions:

- **Pulse outputs**
  - 2 configurable pulse outputs module (alarms, pulses, command of devices)

- **Analogue outputs**
  - 2 configurable outputs for all values measured

- **2 Inputs - 2 Outputs**
  - 2 to 6 outputs allocated to monitoring of all values measured

- **Communication**
  - RS 485 communication module - RS485 JBUS/MODBUS or Profinet-DP
  - Ethernet communication module - MODBUS TCP or JBUS/MODBUS RTU over TCP
  - Ethernet communication RS485 gateway (JBUS TCP or MODBUS RTU over TCP)

- **Memory**
  - Memory module for P+/P-/Q+/Q- with internal synchronisation signal of 5,10,15,20 and 30 minutes for 31 or 62 days

- **Temperature Inputs**
  - Temperature module for measuring the internal temperature and 3 x external temperatures spots via standard PT 100 sensors

X.1.4 Measuring Characteristics

The power measurement meter shall have the following measurement characteristics:

- **Multi measurement**
  - Current
    - Instantaneous: I1, I2, I3, In
    - Average/Maximum average: I1, I2, I3, In
  - Voltage & frequency
    - Instantaneous: U1, U2, U3. & U12, U23, U31, F
    - Average/Maximum average: U1, U2, U3. & U12, U23, U31, Frequency
  - Power
    - Instantaneous: 3P, 3Q, 3S, 3P, 3Q, 3S
    - Average/Maximum average: 3P, 3Q, 3S
    - Predictive: (3P), (3Q), (3S)
  - Power factor
    - Instantaneous: 3PF, 3PF
    - Average/Maximum average: 3PF
  - Temperature
    - Internal and External via 3 x PT 100 sensors
X.1.5 Metering Characteristics

The power measurement meter shall have the following metering characteristics:

- **Metering**
  - Active energy: +/- kWh
  - Reactive energy: +/- kvarh
  - Apparent energy: +/- kVAh
  - Real Time Clock

- **Harmonic distortion rate:** up to 63
  - Current: thd I₁, thd I₂, thd I₃, thd Iₚ
  - Phase-to-neutral voltage: thd U₁, thd U₂, thd U₃
  - Phase-to-phase voltage: thd U₁₉, thd U₂₉, thd U₃₁

- **Individual harmonic analysis up to level 63**
  - Current: H₁₁, H₁₂, H₁₃, H₁ₚ
  - Phase-to-neutral voltage: HU₁, HU₂, HU₃
  - Phase-to-phase voltage: HU₁₂, HU₂₉, HU₃₁

- **Load Curves**
  - Active and reactive power: ΣP +/-, ΣQ +/
  - Voltages & frequency: U₁, U₂, U₃, U₁₂, U₂₉, U₃₁, F

- **Events**
  - Alarms on all electrical values

- **Communication**
  - Analogues 0/4 – 20 mA
  - Digital RS485 (Jbus/Modbus)
  - Ethernet (Modbus/TCP or Jbus/Modbus RTU over TCP and Web server)
  - Ethernet with RS485 gateway Jbus/Modbus RTU over TCP

- **Inputs/Outputs**
  - Pulse metering
  - Remote control/command
  - Alarm report
  - Pulse report

- **Voltage Supply**
  - Auxiliary power supply from 110 to 400 VAC and for 120 to 350 VDC
    - (12 to 48 VDC optional)
  - Direct measuring of voltages up to 700VAC and 500kV by using voltage transformers.
  - Connection test to allow correction of CT and supply voltage reversal
X.1.6 Energy Monitoring and Reporting

Provide a software solution to centrally collect, store and deliver information via a real-time interface as well as comprehensive historical reporting upon an open Architecture model.

Software to be of a standardised format, which allows cross pollination of energy information from one system to another.

Components of software to include:-
- Central data collection and processing energy that uses Microsoft SQL data base technology
- Administration console used to centrally configure and manage the software
- Reporting system that is delivered via internet/intranet technology for historical data analysis
- The data should be viewed via a web access to the control server, thus able to be viewed from an IPT business computer

The software will have the capability to provide the following information subject to the data collection by the metering:
- Energy consumption
- Real Power
- Apparent Power & Reactive Power
- Volts & Amps
- Total Power & Power factor

The software should have the flexibility to allow you to group electrical circuits in any number of configurations:
- Individual meters
- Whole building floors
- Individual light & power sections in DB’s
- Entire Building

System specifications required for software operation:-
- Windows XP 32 and 64 Bit Variants
- Windows Vista 32 and 64 Bit Variants
- Windows 7 32 and 64 Bit Variants
- Windows 2003 Server 32 and 64 Bit Variants
- Windows 2008 Server 32 and 64 Bit Variants
- Windows 2008 R2

Software to be IPD Energy Tracker or approved equivalent.
Energy Management Metering Specifications

### Multi – Function Meter

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<tr>
<th>Type</th>
<th>DIRIS A20</th>
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Performance measuring device allowing multi measuring and monitoring of electrical parameters, energy metering, quality of energy analysis and transmission of this information through communication.

In addition to the standard functions of the PMD, modules can also be plugged to this device to provide new functions like:

- Digital output (alarms, pulses, command of devices),
- RS485 communication (Jbus/Modbus)

The multi-function meter will have the following characteristics:

- TRMS up to row 51,
- THD up to row 51 for I1, I2, I3, V1, V2, V3, U12, U23, U3

- Conformity to norm IEC61557-12,
- Active energy accuracy : class 0.5S,
- Voltage and currents accuracy : class 0.2,
- Auxiliary power supply from 110 to 400 VAC and from 120 to 350 VDC,
- Direct measuring of voltages up to 500 VAC.
- Hour metering starting on a current or voltage threshold or on an auxiliary power supply.
- Connection test to allow a software correction of connection mistakes.
Energy Management Metering Specifications

Type | DIRIS A10
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X | Multi-Function Power Measurement Meter (PMD)

X.1.0 SCOPE

This specification sets out the requirements for a quality multi-function
Three phase AC energy meter with features which include
Instantaneous RMS values, Average and Maximum values, Power Quality values
and metering
Performance measuring device allowing multi measuring and monitoring of electrical
parameters, energy metering, quality of energy analysis and the transmission of this

X.1.1 Standards and Approvals

Energy Accuracy shall be in accordance with IEC 62053-22 class 0.5S
Reactive Energy Accuracy in accordance with IEC 62053-23 class 2
The energy meter shall comply with the New standards IEC 61557-12
(PMD) and UL 61010-1
Current and Voltage measurement accuracy 0.2%,
Power and Power Factor measurement accuracy 0.5%
Frequency accuracy 0.1%
Degree of protection (front frame) IP52

X.1.2 Display and Programming

The electronic display with Blue LCD Backlit display for clear indication of all
values specified in this document
Programming shall be via key on front panel or via dedicated PC
Programming the meter, password protected as standard

The instrument shall be equal in functionality and parameters displayed to
IPD Socomec Energy Management Metering Systems
The meter must have the facility to record electrical parameters listed,
for recording, monitoring & tracking of real time energy consumption
information through communication.
X.1.3 Design

DIN Rail mount, dimensions W 72 x H 90 x D 64 mm

The Power Measurement Meter shall be capable of displaying voltage, current, kilowatts, kilovolt amperes, power factor, and frequency and kilowatt hours on a high resolution numerical display

In addition to the standard functions of the PMD, this device shall provide functions like:

- Digital output (alarms, pulses, command)
- Digital input for changing of tariff of activation of hour metering
- Indication of the internal temperature
- RS485 communication (JBUS/MODBUS)
- TRMS up to row 51,
- THD up to row 51 for I1, I2, I3, V1, V2, V3, U12, U23, U31,
- Hour metering starting on a current or voltage threshold, an auxiliary power supply or a digital input
- Connection test to allow a software correction of connection mistakes.

X.1.5 Metering Characteristics

The power measurement meter shall have the followings metering characteristics:

- **Metering**
  - Active energy: +/- kWh
  - Reactive energy: +/- kvarh
  - Apparent energy: +/- kVAh
  - Real Time Clock

- **Harmonic distortion rate: up to 63**
  - Current: 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 harmonic analysis up to level 63**
  - Current: H11, H12, H13, Hln
  - Phase- to- neutral voltage: HU1, HU2, HU3
  - Phase- to- phase voltage: HU12, HU23, HU31

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

- **Events**
  - Alarms on all electrical values

- **Communication**
  - Analogues 0/4 – 20 mA
  - Digital RS485 (Jbus/Modbus)
  - Ethernet (Modbus/TCP or Jbus/Modbus RTU over TCP and Web server)
  - Ethernet with RS485 gateway Jbus/Modbus RTU over TCP)

- **Inputs/ Outputs**
  - Pulse metering
  - Remote control/command
  - Alarm report
  - Pulse report
Voltage Supply
- Auxiliary power supply from 110 to 400 VAC and for 120 to 350 VDC (12 to 48 VDC optional)
- Direct measuring of voltages up to 700VAC and 500kV by using voltage transformers.
- Connection test to allow correction of CT and supply voltage reversal

Energy Management Metering Specifications

Multi – Function Meter

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<thead>
<tr>
<th>Type</th>
<th>DIRIS A60</th>
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<tbody>
<tr>
<td>Performance measuring device allowing multi measuring and monitoring of electrical parameters, energy metering, quality of energy analysis and transmission of this information through communication.</td>
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<tr>
<td>In addition to the standard functions of the PMD, modules can also be plugged to this device to provide new functions like:</td>
<td></td>
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<tr>
<td>- 2 to 6 Digital inputs and outputs (alarms, pulses, command of devices),</td>
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<td>- 2 to 4 Analogue outputs which can be affected to every measured data</td>
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<td>- Measuring of the internal temperature and of 3 external temperatures</td>
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<td>- (through PT 100 sensors)</td>
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<tr>
<td>- RS 485 communication (Jbus/Modbus; RS485 Profibus-DP)</td>
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<tr>
<td>- Ethernet communication (TCP ; Jbus/Modbus RTU over TCP ; RS485 gateway),</td>
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The multi-function meter will have the followings characteristics:

- Detection and recording of the 40 last following events:
  - Voltage sag, swell and interruption according to norm EN50160 and IEC 61000-4-30
  - Detection of currents overloads
- Each event will have its own RMS ½ period curve for V1, V2, V3, I1, I2, I3
- Memorization of load curves for P+/P-; Q+/Q- up to 62 days,
- TRMS up to row 63,
- THD and harmonics spectral analysis (range/range and phase/phase) for every current, phase/phase and phase/neutral voltages up to row 63.
- The calculation of active (P), reactive (Q) and (S) predictive power
- Current and voltage unbalance,
- Tangent Phi
- Hour metering starting on a current or voltage threshold, an auxiliary power supply or a digital input
- Conformity to norm IEC61557-12
- Active energy accuracy : class 0.5s
- Current and voltages accuracy : class 0.2,
- Auxiliary power supply from 110 to 400 VAC and for 120 to 350 VDC (12 to 48 VDC optional)
- Direct measuring of voltages up to 700VAC and 500kV by using voltage transformers.
- Connection test to allow a software correction of connection mistakes.