**EM-DR Multi-circuit power meter (DIN rail)**

**Description**

Provide high accuracy measurement, display and remote communication of single phase & three phase parameters (V, A, P, Q, S, PF, Hz, Kwh). Multi-circuit design and relay output modular expansion design decrease the overall cost and make the functionality more flexible. All monitored data is available via a RS485 serial PLC communication for the needs in energy management, alarming, and remote controlling. Embedded flash memory for Data-Logging can avoid any data missing once the communication is interrupted. Moreover, its ultra compact size DIN-rail mounting makes itself mountable in virtually any panel, enclosure or indoor Cabinet.

**Feature**

- Metering parameters of Voltage, Current, Frequency, Power factor, Active Power, Reactive Power, Apparent Power, Energy (Watt-Hr), etc in 1P2W, 1P3W, 3P3W, 3P4W unbalanced system
- 2-line display both with 6 digits, able to view the name and value of the parameter at the same time
- Modular Expansion Design, able to correspond to different parameters individually
- Relay output with Start Delay, Hysterisis, Energized, and de-energized delay functions
- With RS485 serial or a PLC communication port as standard for remote controlling relay output
- Standard DIN-Rail mounting
- According to CE standards
- Embedded 1MB flash memory for Data-Logging
- With 20 words variables in Modbus address for acquiring the demand measurement at cost

**Applications**

- **Rental Building Electricity Charging Management**
- **Market/Vender/Stand Electricity Charging Management**
- **Rental Apartment Electricity Charging Management**
- **Booth Electricity Charging Management**
- **Dormitory Electricity Charging Management**

**ORDERING INFORMATION**

**Measurement and Wiring**

<table>
<thead>
<tr>
<th>Phase &amp; Wiring</th>
<th>Voltage</th>
<th>Current</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1P2W</td>
<td>50~500V,</td>
<td>depends on external CT</td>
<td>45~65Hz</td>
</tr>
<tr>
<td>1P3W</td>
<td>50~500V,</td>
<td>depends on external CT</td>
<td>45~65Hz</td>
</tr>
<tr>
<td>3P3W</td>
<td>50~500V,</td>
<td>depends on external CT</td>
<td>45~65Hz</td>
</tr>
<tr>
<td>3P4W</td>
<td>50~500V,</td>
<td>depends on external CT</td>
<td>45~65Hz</td>
</tr>
</tbody>
</table>

**Accuracy & Resolutions**

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>ACCURACY</th>
<th>RESOLUTION</th>
<th>INPUT RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>0.2%</td>
<td>0.1V</td>
<td>0~9999</td>
</tr>
<tr>
<td>Current</td>
<td>0.2%</td>
<td>0.001A</td>
<td>0~9999</td>
</tr>
<tr>
<td>Neutral Current</td>
<td>1.0%</td>
<td>0.001A</td>
<td>0~9999</td>
</tr>
<tr>
<td>Active Power</td>
<td>0.5%</td>
<td>0.1W</td>
<td>-32768~32767</td>
</tr>
<tr>
<td>Reactive Power</td>
<td>0.5%</td>
<td>0.1VA</td>
<td>-32768~32767</td>
</tr>
<tr>
<td>Apparent Power</td>
<td>0.5%</td>
<td>0.1VA</td>
<td>-32768~32767</td>
</tr>
<tr>
<td>Power factor</td>
<td>0.5%</td>
<td>0.001</td>
<td>8.0~0.020&gt;1.000</td>
</tr>
<tr>
<td>Frequency</td>
<td>0.2%</td>
<td>0.01Hz</td>
<td>45.00~65.00</td>
</tr>
<tr>
<td>Active Energy</td>
<td>0.5%</td>
<td>0.1kWh</td>
<td>0~999999</td>
</tr>
<tr>
<td>Reactive Energy</td>
<td>0.5%</td>
<td>0.1kvar</td>
<td>0~999999</td>
</tr>
</tbody>
</table>

* Current specification 400A or more, because the instrument can not be calibrated with the accuracy required to add additional error of 0.5% *

**Measurement:** True RMS measuring Parameters
Display update period: 0.5 Sec
Wiring: 1P2W, 1P3W, 3P3W, 3P4W
Input range: Voltage: As metering and Wiring
PT Primary setting: 0 or KV
PT Primary setting: 50.0V~99.99KV
PT Secondary setting: 50.0~500.0V
Direct Input: Primary = Secondary ≤ 500V
Current: depends on external CT
CT Primary setting: 1~9999A
Frequency: 45~65Hz
Max. input withstand:
Voltage: 1.2 X Rated voltage continuous(600V max)
Current: Clamp CT Specification 2X Rate voltage continuous

**Communication function**

Port: RS-485 PLC(power line communication) Half-duplex Transmission
Protocol: Modbus RTU Mode
Address: 1~255 selectable
Baud rate: 1200, 2400, 4800, 9600, 19200 or 38400 bps selectable
Parity check: N81, N82. odd. even selectable
Wire distance: 1200M max
Terminal resistance: 150Ω
Variable Communication address: Customizing from 0100h to

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EM-DR-2013-08-27 0113h, 20 address parameters A6-05-1/3
Recording
Memory: Internal 1MB
Capacity: Depends, i.e. saving up to 100,000 records with recording kWh parameters only.
Recording interval: 1~32767
Time units: Second, minute, hour, day

Display
LCD backlight: 2-line, 6 digits for each. Top pane: 6.5mm high; bottom pane: 9.6mm high
Comm. status indication: With Communication status display icon
Parameter indication: show parameters and channels in words
Alarm status indication: R1~R5 with Relay contact status display icon

Relay Output Module EM-OR5

Control function
Remote Control: 5 relay outputs (Option) which can be control via communication directly
Alert Management:
Set point: 5 set points can corresponding individually to each relay output

Relay output: R1 & R2 FORM-A, R3~R5 FORM-A Common mode
1A/230Vac, 3A/115V
Relay parameter corresponding:
Selected from various power parameters ≥
Relay mode: Hi / Lo / Hi, HLD / Lo, HLD / Ro / off
Energizing functions: Start delay / Energize time delay & de-energize time delay / Hysteresis / Energized Latch
Start band: 0~9999 counts
Start delay: 0:00.0~9(Seconds): 59.9(Second)
Energize time delay:
De-energize time delay:
Hysteresis: 0~9999 counts

Security
Password: two groups password in 4 digits for "parameter setting" & "reset to zero for WATT"
Parameter setting: Password is able to set
Reset to zero for WATT: password is unable to set
Function Lock: There are 4 options
User Level: User Level lock. User can get into User Level only for checking but unable to change the setting
Programming Level: Programming Level lock. User can get into programming level only for checking but unable to change the setting
ALL: All lock. Lock both User Level & Programming Level. User can get into all level for checking but unable to change the setting
None: No Lock
Parameter storage methods: F-RAM (Ferroelectric RAM), a random-access memory

Operating environment
Operation temperature & humidity:
0~60℃; Display 0~60℃/0~80%RH, No-condensing
Storage Temperature & Humidity:
-20~70℃/0~80%RH, Non-condensing

Electrical Safety
Surge test: 6KV, 1.2x50usec
Common mode & differential mode
Insulating resistance: ≥100M ohm, DC500V
Dielectric strength: AC 2KV, 50/60Hz, Input/Output/Power/Casing Standard: EN61010:EN61326

Mechanical
Case material: PC fireproof
Mounting: DIN rail
Weight: EM-DR:185g, EM-RO5:75g

Power
Aux Power: ADH: 85~346Vac, 50/60Hz, 100~300Vdc
ADL: 20~56Vdc
Power consumption: AC:10VA, DC:4W
Temperature Coefficient: 100 ppm/℃

Dimension

EM-OR5
EM-DR
(Secondary output wire of CT must be wiring separately as protection. DO NOT parallel or ground.)

Wiring Diagram

1P2W 5 Loop

1P3W 2 Loop

3P3W 2 Loop

3P4W 1 Loop

Power Supply

RS485 Communication Port

1A Fuse

Filter transformer

AD/HAC~264V
50/60Hz
DC100~300V
ADL/AC/DC 20~65V

Max. wiring distance: 1200M
Terminal resistors (the farthest device):
120~300 ohm/0.25W
(typical: 150 ohm)
**Accessory**

**Clamp CT Specification**

**US-CTA**

<table>
<thead>
<tr>
<th>CODE</th>
<th>Size</th>
<th>Rated Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Φ10</td>
<td>5A</td>
</tr>
<tr>
<td>16</td>
<td>Φ16</td>
<td>60A</td>
</tr>
<tr>
<td>24</td>
<td>Φ24</td>
<td>100A</td>
</tr>
<tr>
<td>35</td>
<td>Φ35</td>
<td>150A</td>
</tr>
</tbody>
</table>

No inventory for the specifications marked with *. Minimum order is 100pcs.

**Picture of CT**

<table>
<thead>
<tr>
<th>Model</th>
<th>Primary Current (A)</th>
<th>Secondary Current (mA)</th>
<th>Accuracy %F.S.</th>
<th>Variable ratio</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>US-CTA-10-005</td>
<td>5A</td>
<td>2.5</td>
<td>1.0</td>
<td>2000:1</td>
<td>50g</td>
</tr>
<tr>
<td>US-CTA-16-060</td>
<td>60A</td>
<td>20</td>
<td>0.5</td>
<td>3000:1</td>
<td>100g</td>
</tr>
<tr>
<td>US-CTA-16-100</td>
<td>100A</td>
<td>32.3</td>
<td>0.5</td>
<td>3000:1</td>
<td>100g</td>
</tr>
<tr>
<td>US-CTA-24-150</td>
<td>150A</td>
<td>50</td>
<td>0.5</td>
<td>3000:1</td>
<td>205g</td>
</tr>
<tr>
<td>US-CTA-24-200</td>
<td>200A</td>
<td>66.6</td>
<td>0.5</td>
<td>3000:1</td>
<td>205g</td>
</tr>
<tr>
<td>US-CTA-35-300</td>
<td>300A</td>
<td>100</td>
<td>0.5</td>
<td>3000:1</td>
<td>375g</td>
</tr>
<tr>
<td>US-CTA-35-400</td>
<td>400A</td>
<td>133.3</td>
<td>0.5</td>
<td>3000:1</td>
<td>375g</td>
</tr>
<tr>
<td>US-CTA-35-600</td>
<td>600A</td>
<td>200</td>
<td>0.5</td>
<td>3000:1</td>
<td>375g</td>
</tr>
</tbody>
</table>

**Application**

- **LOAD**
- **Alert Settings**

- **RS485**
- **USB**
- **SD Card**