Ziegler

Redefine Innovative Metering

# Technical Datasheet

## ZAM MM40

MULTI CHANNEL MONITOR

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ZAM MM40 – 12 Channels single phase and 4 channels 3 phase versatile AC power monitoring meter is specially designed to measure, display and communicate AC Voltage, Current, Power, Demand, Energy and Harmonics to monitor and control an external system control. It provides quick, easy and error free current connections with plug and play connectors.

## Product Features


- Multi-channel monitoring of 4x 3phase loads and 12x single phase loads (with common voltage channel)(Hybrid)
- Residual Current Monitoring
- Three Phase Load Health Monitoring
- Tariff Based Tripping
- Monitoring of individual harmonics up to 31st
- Direct remote access via Modbus / Ethernet
- Analog graphical representation of load current
- On-site fully programmable
- THD and Individual Harmonic measurement up to 31$^{st}$ harmonics
- Hour Run, ON Hour, Number of Interruptions
- User Assignable Screens
- Back depth 51mm without option / 70mm with option
- Various interface options like Modbus RS485, Ethernet and USB
- Compliance to International safety standard IEC 61010-1-2001
- Optional feature of data logging with real time stamping
- Active energy accuracy 0.5s as per IEC 62053-22
- Datalogging (optional)
- Relay Functions
    - Limit Switch
    - Pulse Output
    - Timer
    - Remote Operation
    - Reverse Locking Alarm
    - RTC Relay
    - Residual Current Monitoring
    - Energy Tariff based tripping
- Conforms to IP 54 (front face) as per IEC60529
- Compliance to International Safety standard IEC 61010 - 1 - 2010
- EMC Compatibility : IEC 61326 – 2012

## Technical Specifications

| **Display** | |
|---|---|
| Type | Back-lit LCD display - 4 Line 4 Digit with a separate 9 digit energy counter |
| Update Rate | 1 sec approx |
| Real Time Clock (RTC): | Uncertainty ±2 minutes / month (23°C +/- 2°C) |

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| **Input Voltage** | |
|---|---|
| Nominal Input Voltage | 100VLL to 600VLL (57.5 VLN to 346.42 VLN)<br>programmable on site |
| System PT primary values | 100VLL to 1200kVLL programmable on site |
| Operating Measuring Range | 20...120% of nominal value |
| Burden | < 0.3VA approx. per phase (at nominal 240V) |
| Max continuous input voltage | 120% of nominal value |
| Overload Capacity | 2 x UN for 1 second, repeated 10 times at 10 second intervals |
| **Input Current** | |
| Nominal input current | 100 mA |
| System CT primary values | 1A – 9999A |
| Starting Current | As per Standard IEC62053-22 |
| Operating Measuring Range | 1...120% of nominal value |
| Burden | < 0.05VA approx. per phase |
| Max continuous input current | 120% of nominal value |
| Overload Capacity | 5 x rated value for 1 second, repeated 5 times at 5 minute intervals |
| Input Frequency | 45 – 66Hz |
| Power Factor | 0.5 Lag ... 1... 0.8 Lead |

| **Output Data** | |
|---|---|
| Impulse LED | For Energy Testing |
| Relay Output (Optional) | 250 VAC / 30 VDC, 5 A |
| Modbus (Optional) | RS485, max. 1200 m<br>Baud rate: 4800, 9600, 19200, 38400, 57600 bps |
| Ethernet (Optional) | Ethernet access on Modbus TCP/IP Protocol. |
| USB (Optional) | Baud rate: 57600 bps |

| **Power Supply** | |
|---|---|
| Auxiliary Supply | 100-550VAC/DC 45 to 65 Hz<br>Burden –<br>With Add-on card<br>< 8 VA approx ( 2 Relay)<br>< 10 VA approx ( 4 Relay )<br>With Ethernet card<br>< 9 VA approx |

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| **Accuracy** | |
|---|---|
| Voltage | ± 0.5% of Nominal value |
| Current | ± 0.5% of Nominal value |
| Frequency | ± 0.2% of mid frequency |
| Active Power | ± 0.5% of Nominal value |
| Re-Active Power | ± 1.0% of Nominal value |
| Apparent Power | ± 0.5% of Nominal value |
| Active Energy (kWh) | Class 0.5s as per IEC 62053- 22 |
| Re-Active Energy (kVArh) | Class 2 as per IEC 62053 - 23 |
| Apparent Energy (kVAh) | Class 1 |
| Power Factor / Phase angle | ±3° |
| Total Harmonic Distortion | ±3% |
| Current (RCM) | ±5.0% of reading |
| **Reference conditions for Accuracy** | |
| Reference temperature | 23°C +/- 2°C |
| Input frequency | 50/60 Hz ± 2% |
| Input Waveform | Sinusoidal(distortion factor 0.005) |
| Auxiliary supply | 230V AC/DC ± 1%, 50/60 Hz ± 1% |
| Voltage range | 50%.....100% of nominal value |
| Total Harmonic distortion | 50% up to 15th Harmonics<br>10% up to 31st Harmonics<br>(Current range 20%...100% of nominal value) |

| **Applicable Standards** | |
|---|---|
| EMC | IEC 61326-1:2012, Table 2 |
| Safety | IEC 61010-1-2010 , Permanently connected use |
| IP for water & dust | IEC60529 |
| Pollution degree | 2 |
| Installation category | III |
| Protection Class | 2 |
| High Voltage Test | Input + Aux vs Surface 4kV RMS, 50Hz, 1min<br>Input vs Remaining Circuit 3.3kV RMS, 50Hz, 1min |

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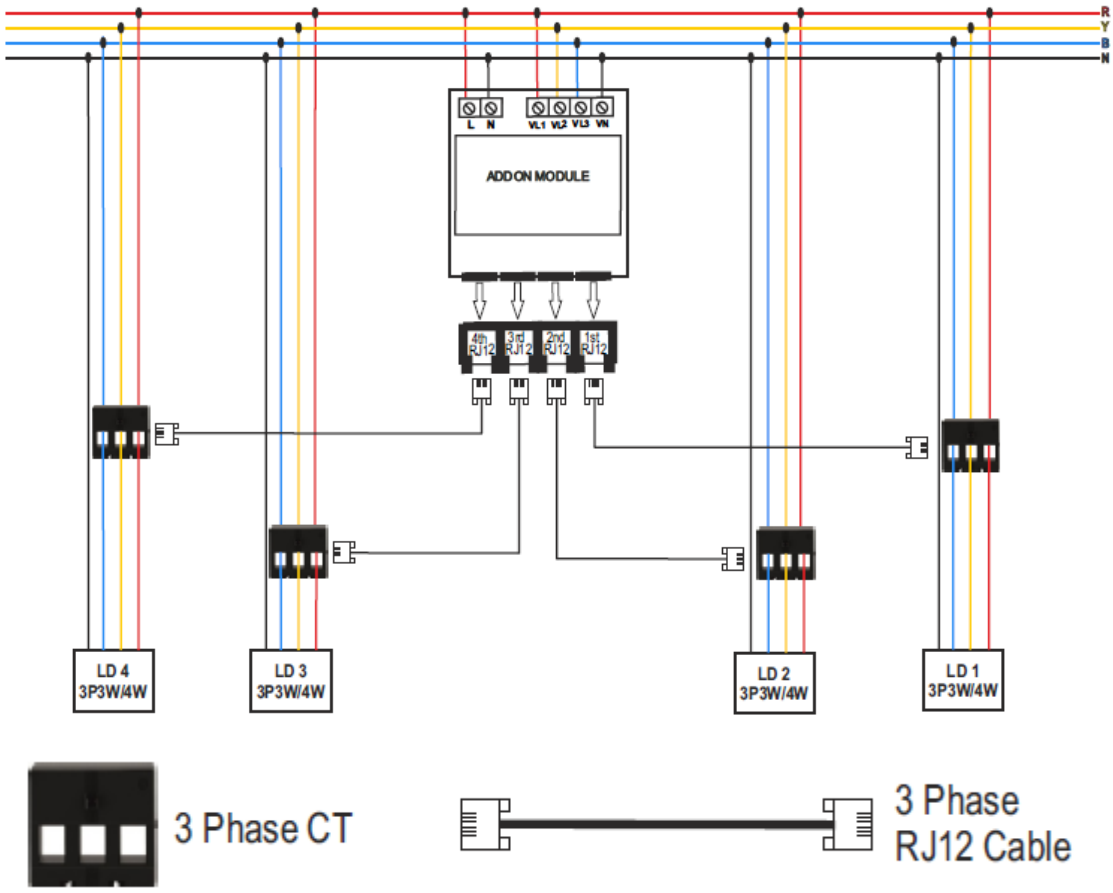
| Environmental | |
|---|---|
| Nominal range of use | -20 to +70°C |
| Storage temperature | -25 to +75°C |
| Relative humidity of annual mean | 0... 95% non condensing |
| Warm up time | Minimum 3 minute |
| Enclosure | IP54 (Front Side) and IP20 (Terminal Side) |

## Electrical Connections

All 3Phase Load Connections with 3Phase RJ12 CT






3 Phase CT

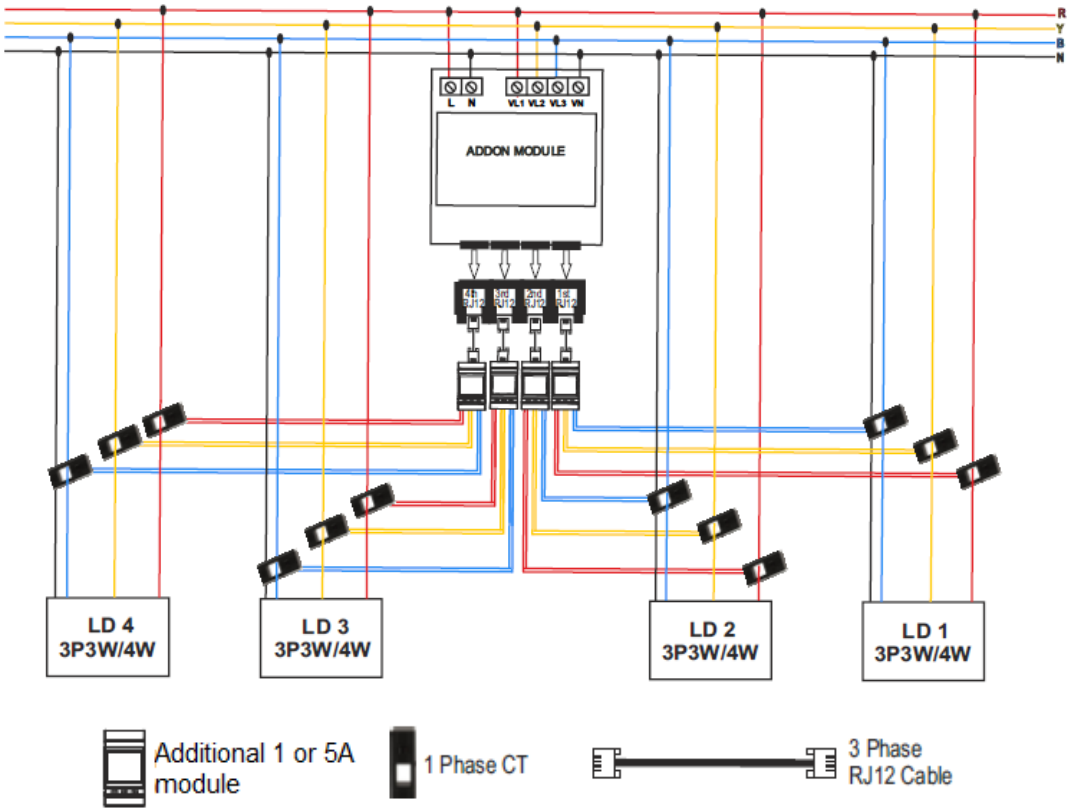


3 Phase
RJ12 Cable

# ZAM MM40

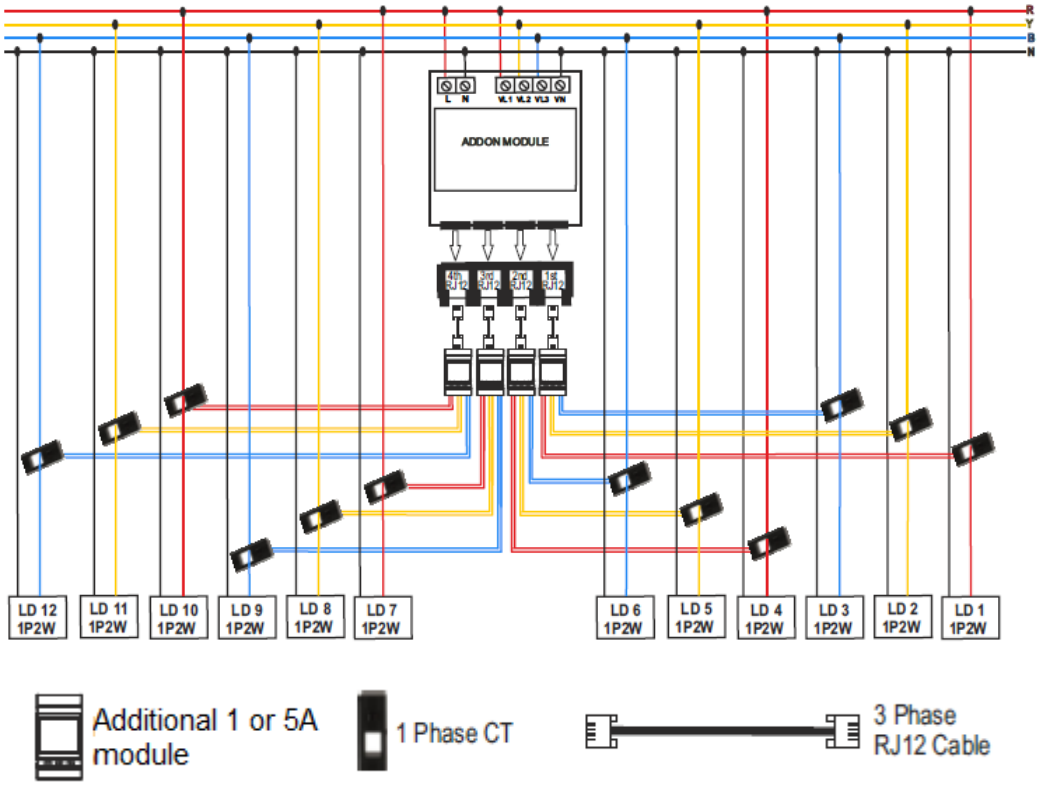
## MULTI CHANNEL MONITOR

### All 3Phase Load Connections With 1Phase 5A/1A CT




Note : User can use 3 phase 5A/1A CT instead of 3x 1 phase 5A/1A CT

### All 1Phase Load Connections With 1Phase 5A/1A CT



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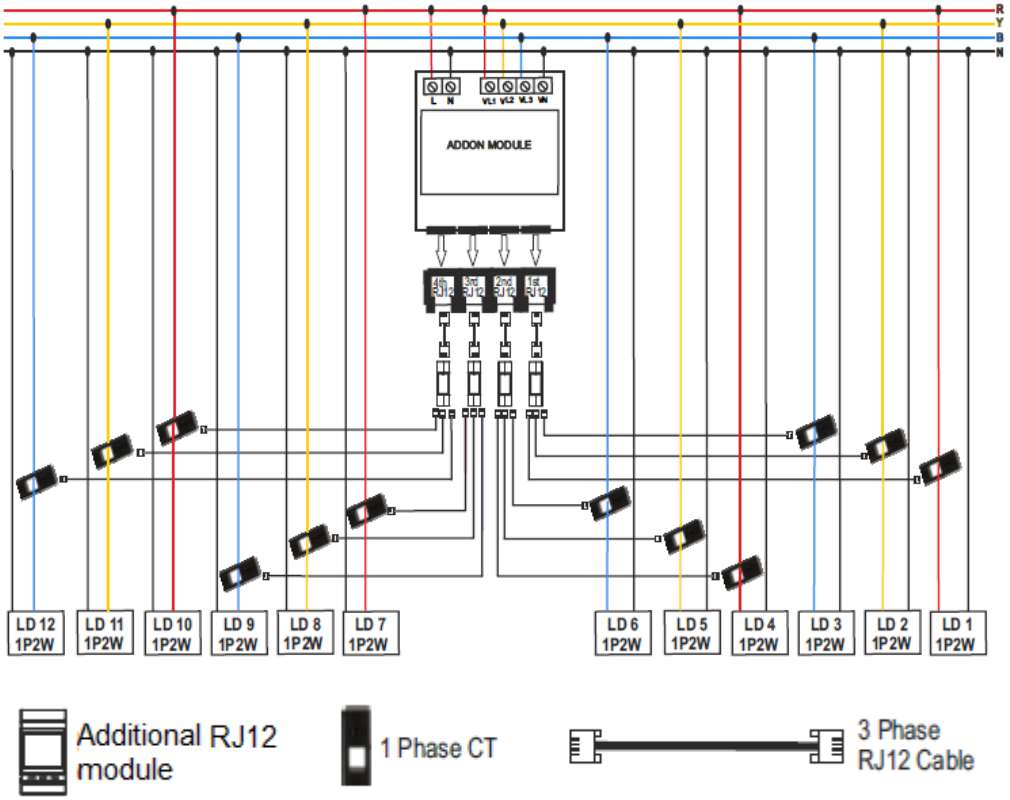
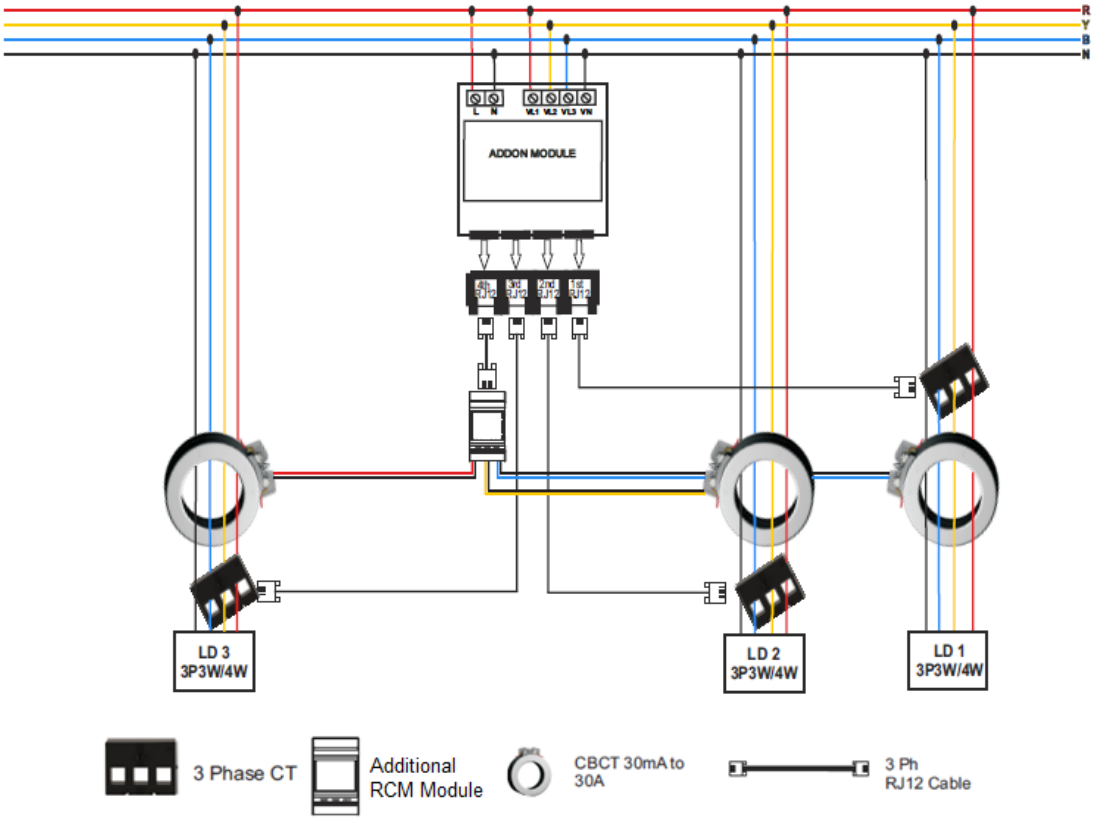
All 1Phase Load Connections With 1Phase RJ12 CT




All 3Phase Load Plus RCM Connections



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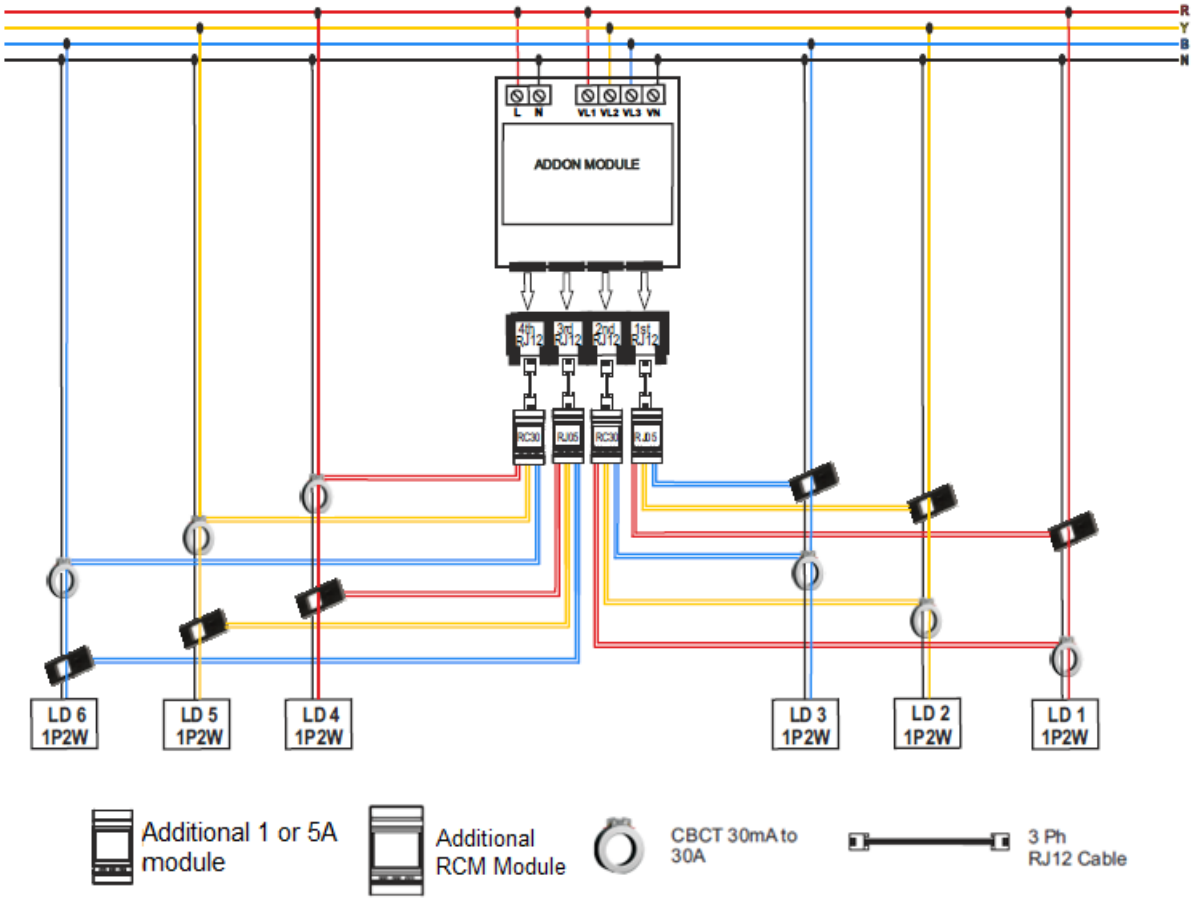
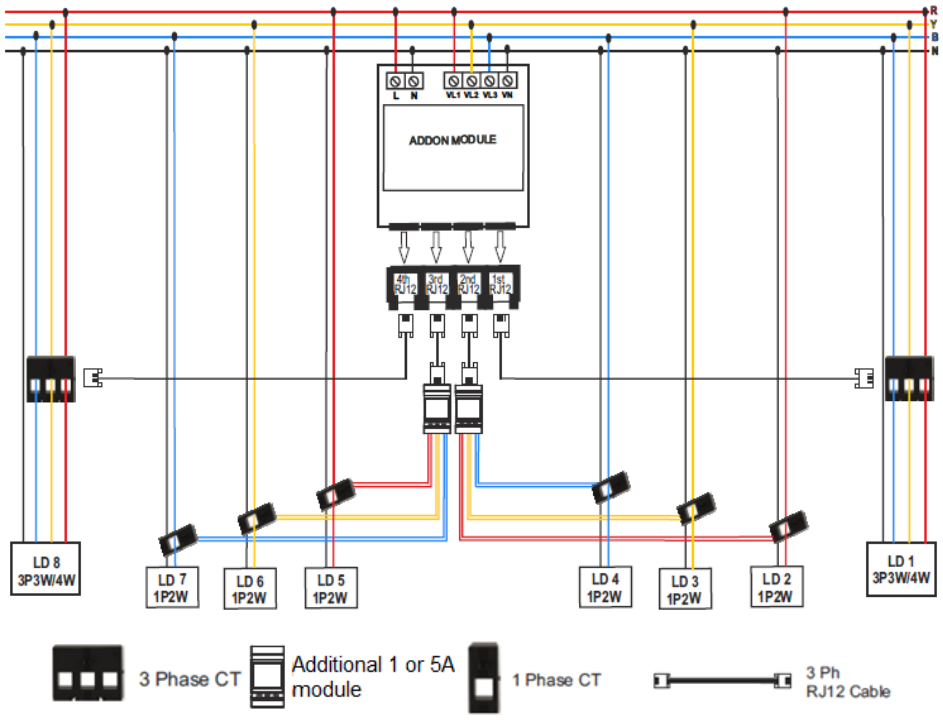
### All 1Phase 5A/1A CT Plus RCM Connections




### Hybrid Load Connections




Note : Many combinations of 1 Phase 3 Phase load along with RCM are possible in above hybrid Load Connection

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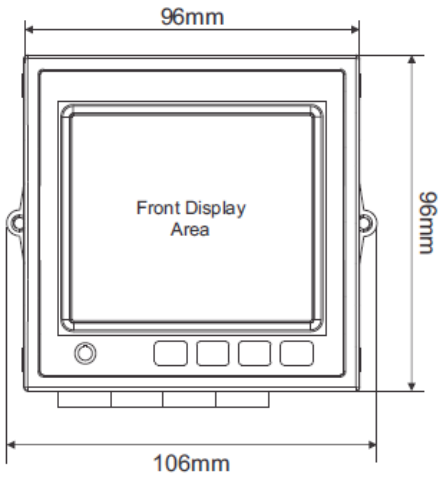
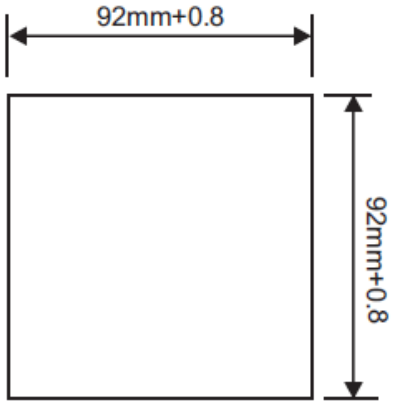
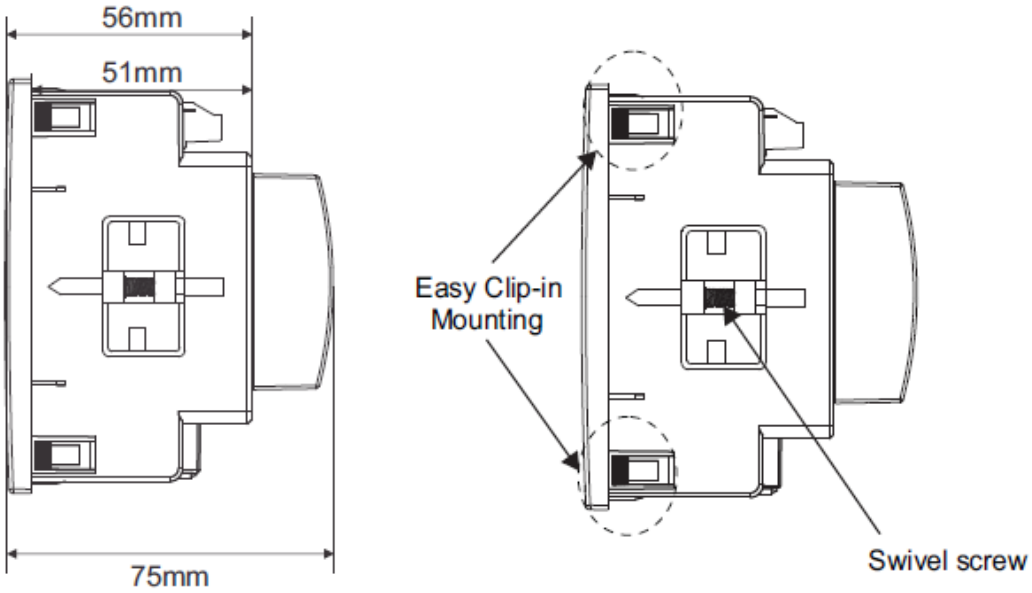
Dimensions (In mm)




Front View




Panel Cutout




Side View & Installation

Bezel Size - 96 mm x 96 mm DIN 43 718
Panel Cut-out - 92 + 0.8 mm x 92 + 0.8 mm
Overall Depth - 75 mm , with addon card
Weight- 320 gm. approx.

MULTI CHANNEL MONITOR

| Measurement & Energy/Counter Screens for Load Menu | | | |
|---|---|---|---|
| Screen No. | 3P 4W Load | 3P 3W Load | 1P 2W Load |
| 1 | System(V, A, W, HZ) | System(V, A, W, HZ) | Channel(V, A, W, HZ) |
| 2 | Phase Volt(L1, L2, L3, AVG) | x | x |
| 3 | Line to Line Volt(L12, L23, L31) | Line to Line Volt(L12, L23, L31) | x |
| 4 | Phase Current(L1, L2, L3, N) | Phase Current(L1, L2, L3) | x |
| 5 | Phase L1(VA, VAr, W, PF) | x | x |
| 6 | Phase L2(VA, VAr, W, PF) | x | x |
| 7 | Phase L3(VA, VAr, W, PF) | x | x |
| 8 | Phase Angle(L1, L2, L3) | x | x |
| 9 | System W DMD(Imp,Exp) | System W DMD(Imp, Exp) | Channel W DMD(Imp, Exp) |
| 10 | System Var DMD(Cap,Ind) | System Var DMD(Cap, Ind) | Channel Var DMD(Cap, Ind) |
| 11 | System DMD(VA, A) | System DMD(VA, A) | Channel DMD(VA, A) |
| 12 | W Imp DMD(L1, L2, L3) | x | x |
| 13 | W Exp DMD(L1, L2, L3) | x | x |
| 14 | VAr Cap DMD(L1, L2, L3) | x | x |
| 15 | VAr Ind DMD(L1, L2, L3) | x | x |
| 16 | VA DMD(L1, L2, L3) | x | x |
| 17 | Current DMD(L1, L2, L3) | x | x |
| 18 | Max System W DMD(Imp,Exp) | Max System W DMD(Imp,Exp) | Max Channel W DMD(Imp,Exp) |
| 19 | Max System VAr DMD(Cap,Ind) | Max System VAr DMD(Cap,Ind) | Max Channel VAr DMD(Cap,Ind) |
| 20 | Max System DMD(VA, A) | Max System DMD(VA, A) | Max Channel DMD(VA, A) |
| 21 | Max W Imp DMD(L1, L2, L3) | x | x |
| 22 | Max W Exp DMD(L1, L2, L3) | x | x |
| 23 | Max VAr Cap DMD(L1, L2, L3) | x | x |
| 24 | Max VAr Ind DMD(L1, L2, L3) | x | x |
| 25 | Max VA DMD(L1, L2, L3) | x | x |
| 26 | Max Current DMD(L1, L2, L3) | x | x |
| 27 | RPM, Frequency | RPM, Frequency | RPM, Frequency |
| 28 | System(VA, VAr, W) | System(VA, VAr, W) | Channel(VA, VAr, W) |
| 29 | System(VA, Var, PA, PF) | System(VA, Var, PA, PF) | Channel(VA, Var, PA, PF) |
| 30 | Min system (V, A) | Min system (V, A) | Min Channel (V, A) |
| 31 | Max system(V, A) | Max system(V, A) | Max Channel(V, A) |
| 32 | Min Volt(L1, L2, L3) | x | x |
| 33 | Max Volt(L1, L2, L3) | x | x |
| 34 | Min Volt(L12, L23, L31) | Min Volt(L12, L23, L31) | x |
| 35 | Max Volt(L12, L23, L31) | Max Volt(L12, L23, L31) | x |
| 36 | Min Current(L1, L2, L3) | Min Current(L1, L2, L3) | x |
| 37 | Max Current(L1, L2, L3) | Max Current(L1, L2, L3) | x |
| 38 | %THD Volt(L1, L2, L3) | %THD Volt(L1, L2, L3) | x |
| 39 | %THD Current(L1, L2, L3) | %THD Current(L1, L2, L3) | x |
| 40 | System %THD(V, A) | System %THD(V, A) | Channel %THD(V, A) |
| 41 | Current reverse | x | Current reverse |
| 42 | Phase reversal | Phase reversal | x |

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| Measurement & Energy/Counter Screens for Load Menu | | | |
|---|---|---|---|
| 43 | Phase absent screen | x | x |
| 44 | Individual harmonic(V%) | Individual harmonic(V%) | Individual harmonic(V%) |
| 45 | Individual harmonic(A%) | Individual harmonic(A%) | Individual harmonic(A%) |
| 46 | System Wh(Imp, Exp) | System Wh(Imp, Exp) | Channel Wh (Imp, Exp) |
| 47 | System VArh(Cap, Ind) | System VArh(Cap, Ind) | Channel VArh(Cap, Ind) |
| 48 | System VAh | System VAh | Channel VAh |
| 49 | System Run hour | System Run hour | Channel Run hour |
| Note 1: Screens with screen number 46 to 49 are not available for selectable Userscreens. | | | |
| Note 2: Energy on display is Auto-Ranging, for details refer the Operating Manual. | | | |

| **Measurement Screens (Menu-wise)** | | | |
|---|---|---|---|
| Screen No. | Total System Menu | Load Channel Info Sub-menu | RCM Menu |
| 1 | Total (V, A, W) | Channel 1 Load information | Residual Current |
| 2 | Total (VA, VAr, W) | Channel 2 Load information | Min Residual Current |
| 3 | Total (Angle) | Channel 3 Load information | Max Residual Current |
| 4 | Total (Power factor) | Channel 4 Load information | |
| 5 | Total (RPM) | Channel 5 Load information | |
| 6 | Total (Frequency) | Channel 6 Load information | |
| 7 | Total import W demand | Channel 7 Load information | |
| 8 | Total export W demand | Channel 8 Load information | |
| 9 | Total VAr demand (ind., cap.) | Channel 9 Load information | |
| 10 | Total demand (VA, A) | Channel 10 Load information | |
| 11 | Max Total import W demand | Channel 11 Load information | |
| 12 | Max Total export W demand | Channel 12 Load information | |
| 13 | Max Total VAr demand (ind.,cap.) | | |
| 14 | Max Total demand (VA, A) | | |
| 15 | Total Energy(kW,VAr,VA) | | |
| 16 | Instrument On Hour | | |
| 17 | Instrument interruptions | | |

| **Ordering Information** | **(√)** |
|---|---|
| **Model – ZAM MM40** (100-600VLL, 100mA, 100-550V AC/DC aux), Class 0.5s | |
| Output | |
| RS485 - 2 Relay Outputs | |
| RS485 - 2 Relay Outputs - USB – Data-logging (Optional) | |
| RS485 - 4 Relay (Optional) | |
| RS485 - 4 Relay – Data-logging (Optional) | |
| Ethernet (Optional) | |
| Ethernet – Data-logging (Optional) | |

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**Ziegler Instrumentation UK Ltd.**

Central Buildings, Woodland close old woods Trading Estate, Torquay Devon, TQ2 7BB, United Kingdom
+44-1376 335 271 | info@ziegler-instrument.com | ziegler-instrument.com