Ziegler

Redefine Innovative Metering

# Technical Datasheet

## ZAM LD10 | LD20 | TS10 | TS20 | TS30

DIGITAL POWER MONITORING METER - ADVANCE

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# ZAM LD10 | LD20 | TS10 | TS20 | TS30

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ZAM TS10/20 are touch screen Power meters, whereas ZAM LD 10/20 are LED models. Both ranges can measure and display almost all electrical parameters like AC current, Voltage, frequency, Power, Energy (Active / Reactive/Apparent), and Demand & Harmonic Distortion.

## Product Features

- Onsite fully programmable
- Onsite selection of Auto scroll / Fixed Screen
- User selectable Low Current suppression (below 30 mA)
- Phasor Diagram & Waveforms for Touch screen graphics LCD ( ZAM TS10 / TS20)
- Total Harmonic Distortion (THD)
- Hour Run, ON Hour, Number of Interruptions
- User Assignable Registers for MODBUS
- Conforms to IP 54 (front face) as per IEC60529
- Compliance to International Safety standards IEC 61010-1- 2001
- EMC compliance to International standard IEC 61326


## Technical Specifications

| | |
|---|---|
| **Display** | |
| Display type variants | Touch screen graphics display and 4Digit 3Line LED Display |
| Dimensions | 96 x 96 x 80mm |
| Update Rate | 1 sec approx |
| **Interface** | |
| Relay (optional) | 1 or 2 Relay 250 VAC,5 A AC 30VDC, 5A DC |
| Modbus (optional) | RS485,max.1200m |
| Ethernet (optional) | Ethernet access on Modbus TCP/IP Protocol |
| Analog output (optional) | 4mA - 20mA |
| **Conforms standards** | |
| EMC | IEC 61326 |
| Immunity | IEC 61000-4-3 10V/m – Level 3 industrial Low level |
| Safety | IEC 61010-1-2001 |
| IP for water & dust | IEC60529 |
| Pollution degree | 2 |
| Installation category | III |
| High Voltage Test | 2.2 kV AC, 50Hz for 1 minute between all electrical circuits |

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| Model | ZAM LD10 | ZAM LD20 | ZAM TS10 | ZAM TS20/30 |
|---|---|---|---|---|
| Number of parameters measured | 48 | 61 | 48 | 61 |
| System | 3Ph 3W / 3Ph 4W | | | |
| **Input Details** | | | | |
| **Input Voltage** | | | | |
| Nominal input voltage (AC RMS) | L-L 100 - 600V (L-N 57.7 - 346 V) | | | |
| PT primary values | 100VLL - 692kVLL (on-site programmable)* | | | |
| Maximum continuous input voltage | 120% of rated value | | | |
| **Input Current** | | | | |
| Nominal input current | 1A/5A AC RMS | | | |
| CT secondary values | 1A & 5A (on-site programmable) | | | |
| CT primary values | 1A...9999A* (1A or 5A) | | | |
| Maximum continuous input current | 120% of rated value | | | |
| **Operating Measuring Range** | | | | |
| Voltage (of rated value) | 10...120% | | | |
| Current (of rated value) | 5...120% | | | |
| Frequency | 40...70Hz | | | |
| Power Factor | 0.5 Lag...1...0.5 Lead | 0.5 Lag...1...0.8 Lead | | |
| **VA Burden (approx.)** | | | | |
| Nominal input voltage burden | < 0.35 VA / phase | | < 0.35 VA / phase | |
| Nominal input current burden | < 0.3 VA | | < 0.3 VA | |
| Auxiliary supply burden | < 5 VA | | < 6.5 VA | |
| | | | < 8 VA for analog / Ethernet option | |
| **Overload Withstand** | | | | |
| Voltage | 2x rated value for 1 sec, repeated 10 times at 10 second intervals | | | |
| Current | 20x for 1 second, repeated 5 times at 5 min | | | |
| **Accuracy** | | | | |
| Voltage | ± 0.2% of Nominal value | | | |
| Current | ± 0.2% of Nominal value | | | |
| Frequency | ± 0.15% of mid frequency | | | |
| Active Power | ± 0.2% of Nominal value | | | |
| Re-Active Power | ± 0.4% of Nominal value | | | |
| Apparent Power | ± 0.2% of Nominal value | | | |
| Active Energy (kWh) | ± 0.2% of Nominal value | | | |
| Re-Active Energy (kVArh) | ± 0.5% of Nominal value | | | |
| Apparent Energy (kVAh) | ± 0.2% of Nominal value | | | |
| Accuracy of Analog Output | 1% of output end value | | | |
| Power Factor | ±1% of unity | | | |
| Angle | ±1% of range | | | |
| Total Harmonic Distortion | ±1% | | | |
| **Reference Conditions for Accuracy** | | | | |
| Reference temperature | 23°C +/- 2°C | | | |
| Input Waveform | Sinusoidal (distortion factor 0.005) | | | |
| Input frequency | 50/60 Hz ± 2% | | | |
| Auxiliary supply | 230V AC/DC ± 1% | | | |
| Auxiliary supply frequency | 50/60 Hz ± 1% | | | |
| Total Harmonic distortion | 50% up to 15th Harmonics<br>10% up to 31st Harmonics | | | |

| | |
|---|---|
| | (Current range 20%...100% of nominal value) |
| Voltage range | 50%.....100% of nominal value<br>60... 100% of Nominal Value for THD. |
| Current Range | 10... 100% of Nominal Value.<br>20... 100% of Nominal Value for THD. |
| Power | Cos phi / sin phi = 1 for Active / Reactive Power & Energy. |
| | 10... 100% of Nominal Current & 50... 100% of Nominal Voltage. |
| Power Factor / Phase Angle | 40... 100% of Nominal Current & 50... 100% of Nominal Voltage. |

## Parameter Measurement

| **Parameter measurement and display** | | | | | |
|---|---|---|---|---|---|
| **Sr.No.** | **Parameter** | **ZAM LD10** | **ZAM LD20** | **ZAM TS10** | **ZAM TS20/30** |
| 1 | System Volts | √ | √ | √ | √ |
| 2 | System Current | √ | √ | √ | √ |
| 3 | Volts L1 – N | √ | √ | √ | √ |
| 4 | Volts L2 – N | √ | √ | √ | √ |
| 5 | Volts L3 – N | √ | √ | √ | √ |
| 6 | Volts L1 – L2 | √ | √ | √ | √ |
| 7 | Volts L2 – L3 | √ | √ | √ | √ |
| 8 | Volts L3 – L1 | √ | √ | √ | √ |
| 9 | Current L1 | √ | √ | √ | √ |
| 10 | Current L2 | √ | √ | √ | √ |
| 11 | Current L3 | √ | √ | √ | √ |
| 12 | Neutral Current | √ | √ | √ | √ |
| 13 | Frequency | √ | √ | √ | √ |
| 14 | System Active Power (kW) | √ | √ | √ | √ |
| 15 | Active Power L1 (kW) | √ | √ | √ | √ |
| 16 | Active Power L2 (kW) | √ | √ | √ | √ |
| 17 | Active Power L3 (kW) | √ | √ | √ | √ |
| 18 | System Re-active Power (kVAr) | √ | √ | √ | √ |
| 19 | Re-active Power L1 (kVAr) | √ | √ | √ | √ |
| 20 | Re-active Power L2 (kVAr) | √ | √ | √ | √ |
| 21 | Re-active Power L3 (kVAr) | √ | √ | √ | √ |
| 22 | System Apparent Power (kVA) | √ | √ | √ | √ |
| 23 | Apparent Power L1 (kVA) | √ | √ | √ | √ |
| 24 | Apparent Power L2 (kVA) | √ | √ | √ | √ |
| 25 | Apparent Power L3 (kVA) | √ | √ | √ | √ |
| 26 | System Power Factor | √ | √ | √ | √ |
| 27 | Power Factor L1 | √ | √ | √ | √ |
| 28 | Power Factor L2 | √ | √ | √ | √ |
| 29 | Power Factor L3 | √ | √ | √ | √ |
| 30 | Phase Angle L1 | √ | √ | √ | √ |
| 31 | Phase Angle L2 | √ | √ | √ | √ |
| 32 | Phase Angle L3 | √ | √ | √ | √ |
| 33 | Import kWh (8 digit resolution) | √ | √ | √ | √ |
| 34 | Export kWh (8 digit resolution) | √ | √ | √ | √ |

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| | | | | | |
|---|---|---|---|---|---|
| 35 | Import kVArh (8 digit resolution) | √ | √ | √ | √ |
| 36 | Export kVArh (8 digit resolution) | √ | √ | √ | √ |
| 37 | kVAh (8 digit resolution) | √ | √ | √ | √ |
| 38 | KAh (8 digit resolution) | – | √ | – | √ |
| 39 | Current Demand | – | √ | – | √ |
| 40 | KVA Demand | – | √ | – | √ |
| 41 | KW Import Demand | – | √ | – | √ |
| 42 | KW Export Demand | – | √ | – | √ |
| 43 | Max Current Demand | – | √ | – | √ |
| 44 | Max KVA Demand | – | √ | – | √ |
| 45 | Max KW Import Demand | – | √ | – | √ |
| 46 | Max KW Export Demand | – | √ | – | √ |
| 47 | Run Hour | – | √ | – | √ |
| 48 | On Hour | – | √ | – | √ |
| 49 | Number of Interruptions | – | √ | – | √ |
| 50 | Phase Reversal Indication | – | √ | – | √ |
| 51 | THD Volts L1-N | √ | √ | √ | √ |
| 52 | THD Volts L2-N | √ | √ | √ | √ |
| 53 | THD Volts L3-N | √ | √ | √ | √ |
| 54 | THD Volts L1-L2 | √ | √ | √ | √ |
| 55 | THD Volts L2-L3 | √ | √ | √ | √ |
| 56 | THD Volts L3-L1 | √ | √ | √ | √ |
| 57 | THD Current L1 | √ | √ | √ | √ |
| 58 | THD Current L2 | √ | √ | √ | √ |
| 59 | THD Current L3 | √ | √ | √ | √ |
| 60 | THD Voltage Mean | √ | √ | √ | √ |
| 61 | THD Current Mean | √ | √ | √ | √ |

**Limit Output Option**

Limit can be assigned to different measured parameters. It can be configured in one of the four modes given below.

1) Hi alarm & Energized Relay

2) Hi alarm & De-energized Relay

3) Lo alarm & Energized Relay

4) Lo alarm & De-energized Relay

With user selectable Trip point, Hysteresis, Energizing delay and De-energizing delay

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**Energy (can be programmed for different energy parameters simultaneously):**

Relay contact : 1 NO + 1 NC

Switching Voltage & Current for Relay : 240 VDC ,5 A

Other Pulse rate divisors (applicable only when Energy on RS485 is in W)

| | | | |
|---|---|---|---|
| 10 | 1 per 10 Wh (upto 3600W) | 1 per 10 kWh (upto 3600 kW) | 1 per 10 MWh (upto 3600 kW) |
| 100 | 1 per 100 Wh (upto 3600W) | 1 per 100 kWh (upto 3600 kW) | 1 per 100 MWh (upto 3600 kW) |
| 1000 | 1 per 1000 Wh (upto 3600W) | 1 per 1000 kWh (upto 3600 kW) | 1 per 1000 MWh (upto 3600 kW) |

Pulse duration : 60 ms, 100 ms or 200 ms

Above options are also applicable to Apparent & reactive Energy

**Ampere Hour :**

| | |
|---|---|
| Default pulse rate | CT secondary = 1A Max pulse rate 3600 pulses/Ah * |
| divisor | CT secondary = 5A Max pulse rate 720 pulses/Ah |

Other Pulse rate divisors (applicable only when Energy on RS485 is in W):

| | |
|---|---|
| 10 | CT secondary = 1A Max pulse rate 3600 pulses/10Ah * |
| | CT secondary = 5A Max pulse rate 720 pulses/10Ah |
| 100 | CT secondary = 1A Max pulse rate 3600 pulses/100Ah * |
| | CT secondary = 5A Max pulse rate 720 pulses/100Ah |
| 1000 | CT secondary = 1A Max pulse rate 3600 pulses/1000Ah * |
| | CT secondary = 5A Max pulse rate 720 pulses/1000Ah |
| Pulse duration | 60 ms, 100 ms or 200 ms |

$$*\text{No. of pulses} = \frac{\text{Maximum pulse}}{\text{CT Ratio}}$$

$$\text{Where, CT Ratio} = (\text{CT Primary/CT Secondary})$$

# ZAM LD10 | LD20 | TS10 | TS20 | TS30

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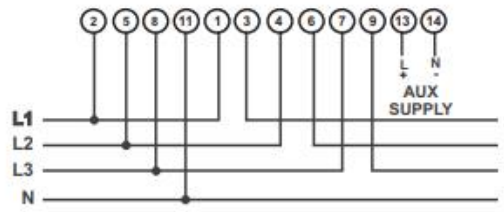
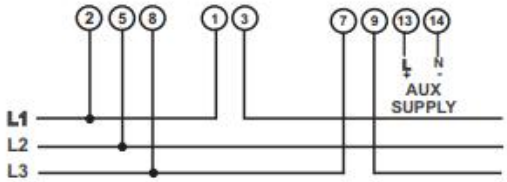
## Connection Diagram and Installation

**For 3 Phase 4 Wire Unbalanced Load**

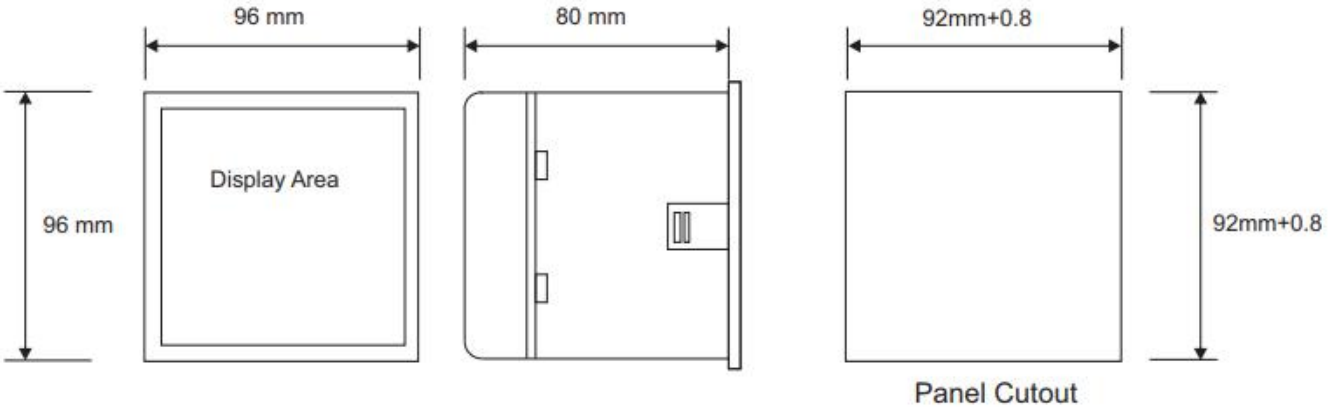



**For 3 Phase 3 Wire Unbalanced Load**




It is recommended that the wires used for connections to the instrument should have lugs soldered at the end. That is, the connections should be made with Lugged wires for secure connections. The Maximum diameter of the lug should be 7.0 mm and maximum thickness 3.5 mm.
Permissible cross section of the connection wires: <= 4.0 $mm^2$ single wire or 2 × 2.5 $mm^2$ fine wire.

## Dimensions




**Output combinations available on request**

1. Modbus RS485 + 2Relay/ Pulse Output
2. Modbus RS485 + 1Relay/Pulse + 2 Analog Outputs
3. Ethernet Modbus (TCP/IP) - RS45

# ZAM LD10 | LD20 | TS10 | TS20 | TS30

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## Ordering Information

| **Model** | (✓) |
|---|---|
| ZAM LD10 | |
| ZAM LD20 | |
| ZAM TS10 | |
| ZAM TS20 | |
| ZAM TS30 | |
| **Auxiliary Supply** | |
| 60-300V AC/DC | |
| 12-60V AC/DC | |
| **Option** | |
| Modbus RS485 + 2Relay/ Pulse Output | |
| Modbus RS485 + 1Relay/Pulse + 2 Analog Outputs | |
| Ethernet Modbus (TCP/IP) - RS45 | |

**Example –** ZAM LD10, 60-300VAC/DC, Modbus RS485 + 1Relay/Pulse + 2 Analog Outputs

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