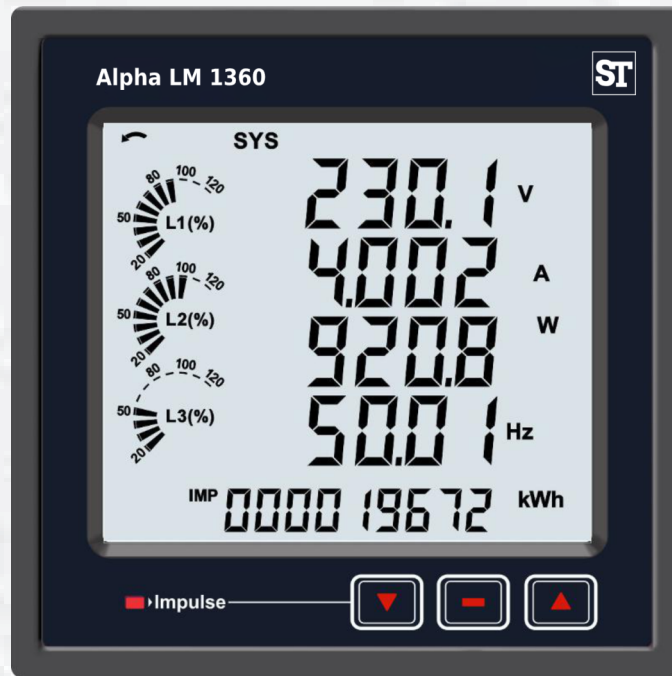




Technical Data Sheet

Alpha LM 1350/1360



Alpha LM 1350/LM 1360 measures important electrical parameters in 3 phase 4 wire, 3 phase 3 wire and 1 phase 2 wire Network. It displays many parameters at a glance. It measures electrical parameters like Active / Reactive / Apparent energy, power and all basic parameter. The instrument has two optional outputs. It can be configured as pulse output for energy measurement, limit output, timer function and RTC relay.

Applications

- Internal Energy billing/monitoring/auditing
- Sub-metering
- Electrical load monitoring
- Genset, Test Benches and Laboratories

Product Features

| | | | | | | | | | | |
|---|---|--|--|---|--|--|---|---|--------------------------|--|
| Energy as per IEC 62053: | <ul style="list-style-type: none"> • Alpha LM1350/LM1360 is available in Accuracy class 0.2s or 0.5s option. • Active Energy accuracy 0.5s as per 62053-22 or optional 0.2s as per 62053-22 • Independent Import and Export Energy counter. Active energy (kWh), Reactive energy (kVArh), Apparent energy (kVAh) measurement. | <p>Data logging (Optional): Meter has inbuilt 8MB Flash for data logging.</p> <ul style="list-style-type: none"> • Event Logging: Previous 5 events of factory default parameters can be logged with Date and time. • Time based logging: User selectable parameters (1 to 30) can be logged at regular intervals (1 to 60min) with Date and Time stamp in internal memory and can be accessed via Modbus or Ethernet or USB. • If 1 Parameter for example energy is selected with logging interval of 15 minutes, log of maximum 948 days are available for user • If 30 Parameters are selected with logging interval of 60 minutes, log of maximum 355 days are available for user. • Load Profile logging : Logging of energy consumed and peak Demand(Power and Current) in a day and in month for efficient tracking of load behaviors. <p>Maximum 1 year daily and 14years of monthly log is available for user</p> | | | | | | | | |
| THD and Individual Harmonics Measurement: | <ul style="list-style-type: none"> • The instrument measures per phase THD and individual harmonic up to 31st harmonics for voltage & current | | | | | | | | | |
| Limit (Alarm) or Pulse or RTC relay or Timer Relay Output (optional) | <ul style="list-style-type: none"> • Potential free, very fast acting relay contact. Configurable as pulse output which can be used to drive an external counter for energy measurement. Configurable as limit (alarm) switch. • RTC relay can be used to control some instrument automatically over the period of a week repetitively. • Timer output can be used to operate relay in cyclic manner | | | | | | | | | |
| USB Interface (Optional with datalogging): | <ul style="list-style-type: none"> • Isolated USB Interface for configuration of the Instrument, onsite access of measured parameter and downloading of logged data | | | | | | | | | |
| User Assignable Screens | <ul style="list-style-type: none"> • Instrument measures more than 85 parameters and these parameters are displayed through 28 different screens. For some applications user does not require all 28 screens, only few screens are required. • So to have flexibility, STI has added feature "User assignable screens". In which user can select minimum 1no. and maximum 10 nos of screens out of 28 screens as per application requirement. • For example: If 5 screens are selected out of 28 screens, then display will scroll among that 5 selected screens | | | | | | | | | |
| RTC (Real Time Clock - Optional with data logging): | <ul style="list-style-type: none"> • Inbuilt real time clock for display of date and time, along with time stamping for data logging and Event recording. | <table border="1"> <tr> <td data-bbox="816 1181 1084 1360"> Big LCD display with Back-lit : </td> <td data-bbox="1084 1181 1541 1360"> LCD shows 4 measurement parameters along with 9 digit energy parameter at a glance. It also shows load graphics and phase rotation symbol </td> </tr> <tr> <td data-bbox="816 1360 1084 1532"> Direct remote access(Optional): </td> <td data-bbox="1084 1360 1541 1532"> Remote configuration of the Instrument and access of measured parameter via Modbus or through Ethernet interface (Modbus TCP/IP) </td> </tr> <tr> <td data-bbox="816 1532 1084 1640"> Compliance to International Safety standards </td> <td data-bbox="1084 1532 1541 1640"> Compliance to International Safety standard IEC 61010-1- 2010 </td> </tr> <tr> <td data-bbox="816 1640 1084 1748"> EMC Compatibility </td> <td data-bbox="1084 1640 1541 1748"> Compliance to International standard IEC 61326 </td> </tr> </table> | Big LCD display with Back-lit : | LCD shows 4 measurement parameters along with 9 digit energy parameter at a glance. It also shows load graphics and phase rotation symbol | Direct remote access(Optional): | Remote configuration of the Instrument and access of measured parameter via Modbus or through Ethernet interface (Modbus TCP/IP) | Compliance to International Safety standards | Compliance to International Safety standard IEC 61010-1- 2010 | EMC Compatibility | Compliance to International standard IEC 61326 |
| Big LCD display with Back-lit : | LCD shows 4 measurement parameters along with 9 digit energy parameter at a glance. It also shows load graphics and phase rotation symbol | | | | | | | | | |
| Direct remote access(Optional): | Remote configuration of the Instrument and access of measured parameter via Modbus or through Ethernet interface (Modbus TCP/IP) | | | | | | | | | |
| Compliance to International Safety standards | Compliance to International Safety standard IEC 61010-1- 2010 | | | | | | | | | |
| EMC Compatibility | Compliance to International standard IEC 61326 | | | | | | | | | |

Technical Specifications

Input Voltage

| | |
|--|--|
| Nominal input voltage (AC RMS) programmable on site. | 100VLL to 600 VLL 57.5VLN to 346.42 VLN |
| System PT primary values | 100VLL to 1200kVLL programmable on site |
| Max continuous input voltage | 120% of nominal value |
| Overload Withstand: | 2 x rated value for 1 second, repeated 10 times at 10 second intervals |
| Overload Indication | "-OL-" >121% of Nominal value |
| Nominal input voltage burden | < 0.3VA approx. per phase (at nominal 240V) |

Input Current:

| | |
|------------------------------|---|
| Nominal input current | 1A / 5A onsite programmable |
| System CT primary values | From 1A to 9999A |
| Max continuous input current | 200% of nominal value |
| Overload Indication | "-OL-" >205% of Nominal value |
| Nominal input current burden | < 0.3VA approx. per phase |
| Overload Withstand: | 20 x rated value for 1 second, repeated 5 times at 5 minute intervals |

Auxiliary Supply:

| | |
|--|--|
| Higher Auxiliary supply range | 100-550V AC/DC (230V AC/DC nominal) |
| Lower Auxiliary supply range | 12-60V AC/DC (24 V AC / 48 V DC nominal) |
| Aux Supply frequency | 45 to 65 Hz range |
| Auxiliary Supply burden (at nominal value) | |
| With Addon card | < 6VA approx |
| With Ethernet card | < 8 VA approx |

Operating Measuring Ranges:

| | |
|------------------------------|---|
| Current (Energy Measurement) | 1....200% of nominal value |
| Starting current : | as per Standard IEC62053-22(0.5s) as per Standard IEC62053-22(Class 0.2s) (optional) |
| Voltage | 20... 120% of nominal value |
| Power Factor | 0.5 Lag ... 1... 0.8 Lead |
| Frequency | 45Hz to 66Hz |

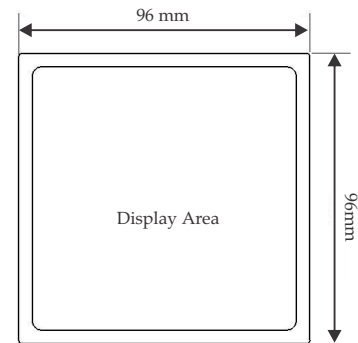
Reference Conditions for Accuracy

| | |
|----------------------------|---|
| Reference temperature | 23°C +/- 2°C |
| Input Waveform | Sinusoidal(distortion factor 0.005) |
| Input frequency | 50/60 Hz ± 2% |
| Auxiliary supply frequency | 50/60 Hz ± 1% |
| Total Harmonic distortion | 50% up to 15th Harmonics 10% up to 31st Harmonics (Current range 20%...100% of nominal value) |
| Voltage range | 50%.....100% of nominal value |
| Current range | 1%.....120% of nominal value |

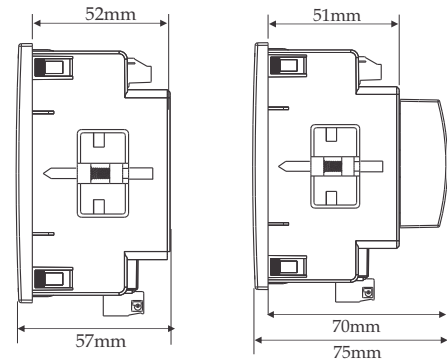
Accuracy

| | |
|-----------------|---|
| Active Energy | Class 0.5s as per IEC 62053 - 22 Class 0.2s as per IEC 62053- 22(optional) |
| Apparent Energy | Class 1 |
| Reactive Energy | Class 2 as per IEC 62053 - 23 |

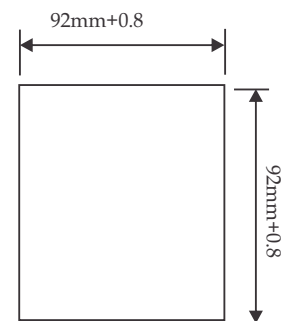
Dimensions Details



Front View



Side View



Panel Cutout

All the dimensions are in mm.

Technical Specifications

Accuracy

| | Class 0.5s (Standard) | Class 0.2s (on request) |
|------------------------|-------------------------|-------------------------|
| Voltage | ± 0.5% of Nominal value | ± 0.2% of Nominal value |
| Current | ± 0.5% of Nominal value | ± 0.2% of Nominal value |
| Frequency | ± 0.2% of mid frequency | ± 0.2% of mid frequency |
| Active Power | ± 0.5% of Nominal value | ± 0.2% of Nominal value |
| Re-Active Power | ± 1.0% of Nominal value | ± 1.0% of Nominal value |
| Apparent Power | ± 0.5% of Nominal value | ± 0.2% of Nominal value |
| Power Factor/angle | ±3° | ±3° |
| THD (Voltage/ Current) | ±3% | ±3% |

Display update rate:

| | |
|-----------------------------|--------------|
| Response time to step input | 1 sec approx |
|-----------------------------|--------------|

Applicable Standards:

| | |
|------------------------|---|
| EMC | IEC 61326 - 1 : 2012,Table 2 |
| Immunity | IEC 61000-4-3. 10V/m – Level 3 industrial Low level |
| Safety | IEC 61010-1-2010 , Permanently connected use |
| IP for water & dust | IEC60529 |
| Pollution degree: | 2 |
| Installation category: | III |

Isolation:

| | |
|----------------------------|---------------------|
| Protective Class | 2 |
| High voltage test | |
| Input+Aux Vs Surface | 4kV RMS, 50Hz,1min |
| Input Vs Remaining Circuit | 3.3kV RMS,50Hz,1min |

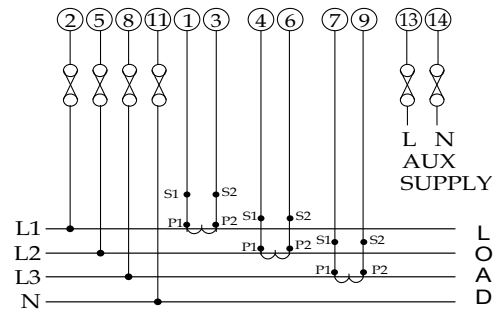
Environmental

| | |
|------------------------------|--|
| Operating temperature | -20 to +70°C |
| Storage temperature | -25 to +75°C |
| Relative humidity | 0... 95%RH (non condensing) |
| Warm up time | Minimum 3 minute |
| Shock (As per IEC60068-2-27) | Half sine wave, Peak acceleration 30gn (300 m/s ²),duration 18ms |
| Vibration | 10... 150...10 Hz, 0.15mm amplitude |
| Number of Sweep cycles | 10 per axis |
| Enclosure | IP 20 (Terminal side) and IP54 (Front side) |

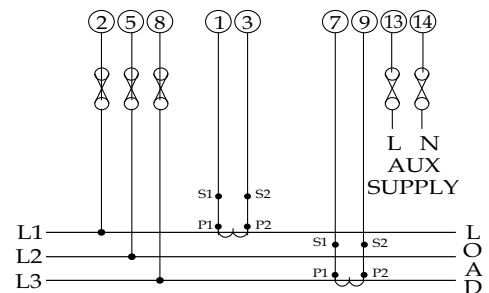
Interfaces

| | |
|---------------------|---|
| Impulse Led | For Energy testing |
| Relay(Optional) | 250 VAC,5 A AC 30VDC, 5A DC |
| Modbus (Optional) | RS485,max.1200m Baud rate : 4.8k, 9.6k, 19.2k, 38.4k, 57.6kbps. |
| Ethernet (Optional) | Ethernet access on Modbus TCP/ IP Protocol. |

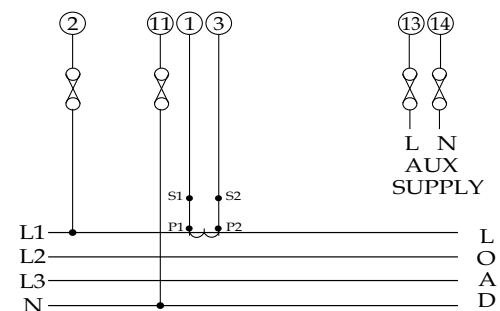
Electrical Connection:



a) 3 Phase 4 Wire



b) 3 Phase 3 Wire



c) Single Phase 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.

Memory calculations for Time based data logging :

| | |
|--|--|
| Max Memory Locations | = 273030 |
| Actual parameter stored in Each log | = Date +time+Number of parameter selected by user |
| for ex. Number of parameter selected by user | = 1. |
| Actual parameter stored in Each log | = 1(Date) +1(time)+ 1 = 3 |
| Maximum log that can be stored | = Max Memory Location/Actual parameter stored in Each log = 273030/3= 91010 |
| Timelog Interval setting | = 15 minutes |
| Log in one day | = (60 /Timelog Interval setting) * 24 = (60/15)*24 = 96 |
| Max Days | = Maximum log that can be stored / log in one day = 91010/ 96 = 948.20 days |

Measured Parameter System wise: ✓ : Available × : Not Available

| Sr No. | Parameters | 3 Phase 4Wire | 3Phase 3Wire | 1Phase 2Wire |
|--------|---|---------------|--------------|--------------|
| 1 | Import Active Energy ¹ | ✓ | ✓ | ✓ |
| 2 | Export Active Energy ¹ | ✓ | ✓ | ✓ |
| 3 | Inductive Reactive Energy ¹ | ✓ | ✓ | ✓ |
| 4 | Capacitive Reactive Energy ¹ | ✓ | ✓ | ✓ |
| 5 | Apparent Energy ¹ | ✓ | ✓ | ✓ |
| 6 | System Active Power (kW) | ✓ | ✓ | ✓ |
| 7 | Active Power L1 (kW) | ✓ | × | × |
| 8 | Active Power L2 (kW) | ✓ | × | × |
| 9 | Active Power L3 (kW) | ✓ | × | × |
| 10 | System Re-active Power (kVAr) | ✓ | ✓ | ✓ |
| 11 | Re-active Power L1 (kVAr) | ✓ | × | × |
| 12 | Re-active Power L2 (kVAr) | ✓ | × | × |
| 13 | Re-active Power L3 (kVAr) | ✓ | × | × |
| 14 | System Apparent Power (kVA) | ✓ | ✓ | ✓ |
| 15 | Apparent Power L1 (kVA) | ✓ | × | × |
| 16 | Apparent Power L2 (kVA) | ✓ | × | × |
| 17 | Apparent Power L3 (kVA) | ✓ | × | × |
| 18 | System Power Factor | ✓ | ✓ | ✓ |
| 19 | Power Factor L1 | ✓ | × | × |
| 20 | Power Factor L2 | ✓ | × | × |
| 21 | Power Factor L3 | ✓ | × | × |
| 22 | System Phase Angle | ✓ | ✓ | ✓ |
| 23 | Phase Angle L1 | ✓ | × | × |
| 24 | Phase Angle L2 | ✓ | × | × |
| 25 | Phase Angle L3 | ✓ | × | × |
| 26 | Current Demand | ✓ | ✓ | ✓ |
| 27 | kVA Demand | ✓ | ✓ | ✓ |
| 28 | Import kW Demand | ✓ | ✓ | ✓ |
| 29 | Export kW Demand | ✓ | ✓ | ✓ |
| 30 | Inductive Var Demand | ✓ | ✓ | ✓ |
| 31 | Capacitive Var Demand | ✓ | ✓ | ✓ |
| 32 | Max Current Demand | ✓ | ✓ | ✓ |
| 33 | Max kVA Demand | ✓ | ✓ | ✓ |
| 34 | Max Import kW Demand | ✓ | ✓ | ✓ |
| 35 | Max Export kW Demand | ✓ | ✓ | ✓ |

Measured Parameter System wise:

✓ : Available

✗ : Not Available

| Sr No. | Parameters | 3 Phase 4Wire | 3Phase 3Wire | 1Phase 2Wire |
|--------|--|---------------|--------------|--------------|
| 36 | Max Inductive Var Demand | ✓ | ✓ | ✓ |
| 37 | Max Inductive Var Demand | ✓ | ✓ | ✓ |
| 38 | Run Hour | ✓ | ✓ | ✓ |
| 39 | On Hour | ✓ | ✓ | ✓ |
| 40 | Number of Interruptions | ✓ | ✓ | ✓ |
| 41 | System Voltage | ✓ | ✓ | ✓ |
| 42 | Voltage L1 | ✓ | ✗ | ✗ |
| 43 | Voltage L2 | ✓ | ✗ | ✗ |
| 44 | Voltage L3 | ✓ | ✗ | ✗ |
| 45 | Voltage L12 | ✓ | ✓ | ✗ |
| 46 | Voltage L23 | ✓ | ✓ | ✗ |
| 47 | Voltage L31 | ✓ | ✓ | ✗ |
| 48 | System Voltage THD | ✓ | ✓ | ✓ |
| 49 | Voltage L1 THD | ✓ | ✓ | ✗ |
| 50 | Voltage L2 THD | ✓ | ✓ | ✗ |
| 51 | Voltage L3 THD | ✓ | ✓ | ✗ |
| 52 | System Current | ✓ | ✓ | ✓ |
| 53 | Current L1 | ✓ | ✓ | ✗ |
| 54 | Current L2 | ✓ | ✓ | ✗ |
| 55 | Current L3 | ✓ | ✓ | ✗ |
| 56 | System Current THD | ✓ | ✓ | ✓ |
| 57 | Current L1 THD | ✓ | ✓ | ✗ |
| 58 | Current L2 THD | ✓ | ✗ | ✗ |
| 59 | Current L3 THD | ✓ | ✓ | ✗ |
| 60 | Individual Harmonics of VL1 (Up to 31st Harmonics) | ✓ | ✓ | ✓ |
| 61 | Individual Harmonics of VL2 (Up to 31st Harmonics) | ✓ | ✓ | ✗ |
| 62 | Individual Harmonics VL3 (Up to 31st Harmonics) | ✓ | ✓ | ✗ |
| 63 | Individual Harmonics IL1 (Up to 31st Harmonics) | ✓ | ✓ | ✓ |
| 64 | Individual Harmonics IL2 (Up to 31st Harmonic) | ✓ | ✗ | ✗ |
| 65 | Individual Harmonics IL3 (Up to 31st Harmonics) | ✓ | ✓ | ✗ |
| 66 | Neutral Current | ✓ | ✗ | ✗ |
| 67 | Frequency | ✓ | ✓ | ✓ |
| 68 | RPM | ✓ | ✓ | ✓ |
| 69 | Phase Reversal Indication | ✓ | ✗ | ✗ |
| 70 | Current Reversal Indication | ✓ | ✗ | ✓ |
| 71 | Phase Absent Indication | ✓ | ✗ | ✗ |
| 72 | Old Import Active Energy ² | ✓ | ✓ | ✓ |
| 73 | Old Export Active Energy ² | ✓ | ✓ | ✓ |
| 74 | Old Inductive Reactive Energy ² | ✓ | ✓ | ✓ |
| 75 | Old Capacitive Reactive Energy ² | ✓ | ✓ | ✓ |
| 76 | Old Apparent Energy ² | ✓ | ✓ | ✓ |
| 77 | Old Run Hour ² | ✓ | ✓ | ✓ |
| 78 | Old On Hour ² | ✓ | ✓ | ✓ |
| 79 | Old Number of Interruptions ² | ✓ | ✓ | ✓ |
| 80 | Old Max kW Import Demand ² | ✓ | ✓ | ✓ |
| 81 | Old Max kW Export Demand ² | ✓ | ✓ | ✓ |
| 82 | Old Max Var Inductive Demand ² | ✓ | ✓ | ✓ |
| 83 | Old Max Var Capacitive Demand ² | ✓ | ✓ | ✓ |
| 84 | Old Max VA Demand ² | ✓ | ✓ | ✓ |
| 85 | Old Max A Demand ² | ✓ | ✓ | ✓ |

Note: 1. Energy on display is autoranging & unit for Energy parameters on modbus are dependent on CT PT ratio or unit selected by user.

2. Parameters are available only on modbus.

Measured Parameter Model wise:

✓ : Available

✗ : Not Available

| Sr No. | Parameters | Alpha LM1350 | Alpha LM1360 |
|--------|---|--------------|--------------|
| 1 | Import Active Energy ¹ | ✓ | ✓ |
| 2 | Export Active Energy ¹ | ✓ | ✓ |
| 3 | Inductive Reactive Energy ¹ | ✓ | ✓ |
| 4 | Capacitive Reactive Energy ¹ | ✓ | ✓ |
| 5 | Apparent Energy ¹ | ✓ | ✓ |
| 6 | System Active Power (kW) | ✓ | ✓ |
| 7 | Active Power L1 (kW) | ✓ | ✓ |
| 8 | Active Power L2 (kW) | ✓ | ✓ |
| 9 | Active Power L3 (kW) | ✓ | ✓ |
| 10 | System Re-active Power (kVAr) | ✓ | ✓ |
| 11 | Re-active Power L1 (kVAr) | ✓ | ✓ |
| 12 | Re-active Power L2 (kVAr) | ✓ | ✓ |
| 13 | Re-active Power L3 (kVAr) | ✓ | ✓ |
| 14 | System Apparent Power (kVA) | ✓ | ✓ |
| 15 | Apparent Power L1 (kVA) | ✓ | ✓ |
| 16 | Apparent Power L2 (kVA) | ✓ | ✓ |
| 17 | Apparent Power L3 (kVA) | ✓ | ✓ |
| 18 | System Power Factor | ✓ | ✓ |
| 19 | Power Factor L1 | ✓ | ✗ |
| 20 | Power Factor L2 | ✓ | ✗ |
| 21 | Power Factor L3 | ✓ | ✗ |
| 22 | System Phase Angle | ✓ | ✓ |
| 23 | Phase Angle L1 | ✓ | ✗ |
| 24 | Phase Angle L2 | ✓ | ✗ |
| 25 | Phase Angle L3 | ✓ | ✗ |
| 26 | Current Demand | ✓ | ✗ |
| 27 | kVA Demand | ✓ | ✗ |
| 28 | Import kW Demand | ✓ | ✗ |
| 29 | Export kW Demand | ✓ | ✗ |
| 30 | Inductive Var Demand | ✓ | ✗ |
| 31 | Capacitive Var Demand | ✓ | ✗ |
| 32 | Max Current Demand | ✓ | ✗ |
| 33 | Max kVA Demand | ✓ | ✗ |
| 34 | Max Import kW Demand | ✓ | ✗ |
| 35 | Max Export kW Demand | ✓ | ✗ |
| 36 | Max Inductive Var Demand | ✓ | ✗ |
| 37 | Max Capacitive Var Demand | ✓ | ✗ |
| 38 | Run Hour | ✓ | ✓ |
| 39 | On Hour | ✓ | ✓ |
| 40 | Number of Interruptions | ✓ | ✓ |
| 41 | System Voltage | ✓ | ✓ |
| 42 | Voltage L1 | ✓ | ✓ |
| 43 | Voltage L2 | ✓ | ✓ |
| 44 | Voltage L3 | ✓ | ✓ |
| 45 | Voltage L12 | ✓ | ✓ |
| 46 | Voltage L23 | ✓ | ✓ |
| 47 | Voltage L31 | ✓ | ✓ |
| 48 | System Voltage THD | ✓ | ✓ |
| 49 | Voltage L1 THD | ✓ | ✗ |
| 50 | Voltage L2 THD | ✓ | ✗ |
| 51 | Voltage L3 THD | ✓ | ✗ |

Measured Parameter Model wise:

✓ : Available

✗ : Not Available

| Sr No. | Parameters | Alpha LM1350 | Alpha LM1360 |
|--------|--|--------------|--------------|
| 52 | System Current | ✓ | ✓ |
| 53 | Current L1 | ✓ | ✓ |
| 54 | Current L2 | ✓ | ✓ |
| 55 | Current L3 | ✓ | ✓ |
| 56 | System Current THD | ✓ | ✓ |
| 57 | Current L1 THD | ✓ | ✗ |
| 58 | Current L2 THD | ✓ | ✗ |
| 59 | Current L3 THD | ✓ | ✗ |
| 60 | Individual Harmonics of VL1 (Up to 31st Harmonics) | ✓ | ✗ |
| 61 | Individual Harmonics of VL2 (Up to 31st Harmonics) | ✓ | ✗ |
| 62 | Individual Harmonics VL3 (Up to 31st Harmonics) | ✓ | ✗ |
| 63 | Individual Harmonics IL1(Up to 31st Harmonics) | ✓ | ✗ |
| 64 | Individual Harmonics IL2 (Up to 31st Harmonic) | ✓ | ✗ |
| 65 | Individual Harmonics IL3 (Up to 31st Harmonics) | ✓ | ✗ |
| 66 | Neutral Current | ✓ | ✓ |
| 67 | Frequency | ✓ | ✓ |
| 68 | RPM | ✓ | ✓ |
| 69 | Phase Reversal Indication | ✓ | ✓ |
| 70 | Current Reversal Indication | ✓ | ✓ |
| 71 | Phase Absent Indication | ✓ | ✓ |
| 72 | Old Import Active Energy ² | ✓ | ✗ |
| 73 | Old Export Active Energy ² | ✓ | ✗ |
| 74 | Old Inductive Reactive Energy ² | ✓ | ✗ |
| 75 | Old Capacitive Reactive Energy ² | ✓ | ✗ |
| 76 | Old Apparent Energy ² | ✓ | ✗ |
| 77 | Old Run Hour ² | ✓ | ✗ |
| 78 | Old On Hour ² | ✓ | ✗ |
| 79 | Old Number of Interruptions ² | ✓ | ✗ |
| 80 | Old Max Current Demand ² | ✓ | ✗ |
| 81 | Old Max VA Demand ² | ✓ | ✗ |
| 82 | Old Max Import W Demand ² | ✓ | ✗ |
| 83 | Old Max Export W Demand ² | ✓ | ✗ |
| 84 | Old Max Inductive VAr Demand ² | ✓ | ✗ |
| 85 | Old Max Capacitive VAr Demand ² | ✓ | ✗ |

Note: 1. Energy on display is autoranging & unit for Energy parameters on modbus are dependent on CT PT ratio or unit selected by user.

2. Parameters are available only on modbus.

Ordering information

| Product Code | Pa10- | X | XX | XX | X | XX | X | 0 | 0ST |
|--------------|-------|---|----|----|---|----|---|---|-----|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Order Code Example:

MA4L-430102RH20000

Alpha LM1360 3Phase input with input voltage 100-600VLL with 1A/5A internal CT , auxiliary voltage 100 to 550 V AC DC ,with MODBUS (RS485), with 2 pulse output with accuracy class 0.2s.



sifam tinsley
PRECISION INSTRUMENTATION

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Web: www.sifamtinsley.com/uk
Contact: +44(0)1803615139



Technical Data Sheet

Alpha LMXX_RJ12



Alpha LM 1350/LM 1360 measures important electrical parameters in 3 phase 4 wire, 3 phase 3 wire and 1 phase 2 wire Network. It displays many parameters at a glance. It measures electrical parameters like Active / Reactive / Apparent energy, power and all basic parameter. The instrument has two optional outputs. It can be configured as pulse output for energy measurement, limit output, timer function and RTC relay.

Applications

- Internal Energy billing/monitoring/auditing
- Sub-metering
- Electrical load monitoring
- Genset, Test Benches and Laboratories

Product Features

| | | | |
|---|--|--|--|
| Plug and Play Current transformer: | <ul style="list-style-type: none"> • RJ 12 connector is available for External CT connection, which enables Easy, fast and error free Installation. 2 meter long cable is provided with CT. | <p>RTC(Real Time Clock - Optional with datalogging): Inbuilt real time clock for display of date and time, along with time stamping for data logging and Event recording.</p> <p>Data logging(Optional): Meter has inbuilt 8MB Flash for datalogging.</p> <ul style="list-style-type: none"> • Event Logging: Previous 5 events of factory default parameters can be logged with Date and time • Time based logging: User selectable parameters (1 to 30) can be logged at regular intervals (1 to 60min) with Date and Time stamp in internal memory and can be accessed via Modbus or Ethernet or USB. • If 1 Parameter for example energy is selected with logging interval of 15 minutes, log of maximum 948 days are available for user • If 30 Parameters are selected with logging interval of 60 minutes, log of maximum 355 days are available for user. • Load Profile logging : Logging of energy consumed and peak Demand (Power and Current) in a day and in month for efficient tracking of load behaviors. <p>Maximum 1 year daily and 14 years of monthly log is available for user.</p> | |
| Limit (Alarm) or Pulse or RTC relay or Timer Relay Output (optional) | <ul style="list-style-type: none"> • Potential free, very fast acting relay contact. Configurable as pulse output which can be used to drive an external counter for energy measurement. Configurable as limit (alarm) switch. • RTC relay can be used to control some instrument automatically over the period of a week repetitively. • Timer output can be used to operate relay in cyclic manner. | | |
| Energy as per IEC 62053: | <ul style="list-style-type: none"> • Independent Import and Export Energy counter. Active energy (kWh), Reactive energy (kVARh), Apparent energy (kVAh) measurement • Active Energy accuracy Class 1 as per IEC 62053 - 21. | | |
| THD and Individual Harmonics Measurement: | <ul style="list-style-type: none"> • The instrument measures per phase THD and individual harmonic up to 31st harmonics for voltage & current. | | |
| USB Interface (Optional with datalogging): | <ul style="list-style-type: none"> • Isolated USB Interface for configuration of the Instrument, onsite access of measured parameter and downloading of logged data | Big LCD display with Back-lit : | LCD shows 4 measurement parameters along with 9 digit energy parameter at a glance. It also shows load graphics and phase rotation symbol. |
| User Assignable Screens: | <ul style="list-style-type: none"> • Instrument measures more than 85 parameters and these parameters are displayed through 28 different screens. For some applications user does not require all 28 screens, only few screens are required. • So to have flexibility, Rishabh has added feature "User assignable screens". In which user can select minimum 1 no. and maximum 10 nos. of screens out of 28 screens as per application requirement. • For example: If 5 screens are selected out of 28 screens, then display will scroll among that 5 selected screens. | Direct remote access (Optional): | Remote configuration of the Instrument and access of measured parameter via Modbus or through Ethernet interface (Modbus TCP/IP). |
| | | EMC Compatibility | Compliance to International standard IEC 61326 |
| | | Compliance to International Safety standards | Compliance to International Safety standard IEC 61010-1- 2010 |

Technical Specifications

Input Voltage:

| | |
|---|--|
| Nominal input voltage (AC RMS) programmable on site | 100VLL to 600 VLL 57.5VLN to 346.42 VLN |
| System PT primary values | 100VLL to 1200kVLL programmable on site |
| Max continuous input voltage | 120% of nominal value |
| Overload Withstand: | 2 x rated value for 1 second, repeated 10 times at 10 second intervals |
| Overload Indication | "-OL-" >121% of Nominal value |
| Nominal input voltage burden | < 0.3VA approx. per phase (at nominal 240V) |

Input Current:

| | |
|------------------------------|---|
| Nominal input current | 100mA |
| System CT primary values | From 1A to 9999A |
| Max continuous input current | 200% of nominal value |
| Overload Indication | "-OL-" >121% of Nominal value |
| Nominal input current burden | < 0.05VA approx. per phase |
| Overload Withstand: | 20 x rated value for 1 second, repeated 5 times at 5 minute intervals |

Auxiliary Supply:

| | |
|--|--|
| Higher Auxiliary supply range | 100-550V AC/DC (230 V AC/DC nominal) |
| Lower Auxiliary supply range | 12-60V AC/DC (24 V AC / 48 V DC nominal) |
| Aux Supply frequency | 45 to 65 Hz range |
| Auxiliary Supply burden (at nominal value) | |
| With Addon card | < 6VA approx |
| With Ethernet card | < 8 VA approx |

Operating Measuring Ranges:

| | |
|------------------------------|--------------------------------------|
| Current (Energy Measurement) | 1....200% of nominal value |
| Starting current : | as per Standard IEC62053-21(Class 1) |
| Voltage | 20... 120% of nominal value |
| Power Factor | 0.5 Lag ... 1... 0.8 Lead |
| Frequency | 45Hz to 66Hz |

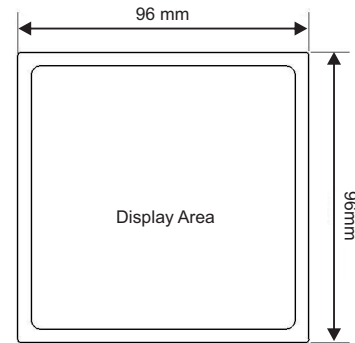
Reference Conditions for Accuracy

| | |
|----------------------------|---|
| 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 10% up to 31st Harmonics (Current range 20%...100% of nominal value) |
| Voltage range | 50%.....100% of nominal value |

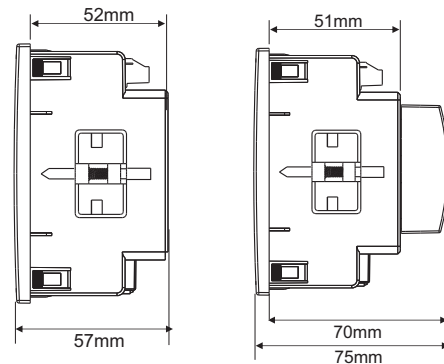
Accuracy

| | |
|-----------------|-------------------------------|
| Active Energy | Class 1 as per IEC 62053 - 21 |
| Apparent Energy | Class 1 |
| Reactive Energy | Class 2 as per IEC 62053 - 23 |
| Active Power | ±0.5% of nominal value |

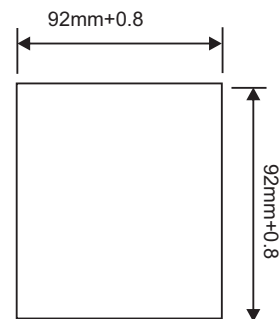
Dimensions Details



Front View



Side View



Panel Cutout

All the dimensions are in mm.

Technical Specifications

Accuracy

| | |
|--------------------------|-------------------------|
| Re-Active Power | ±1.0% of nominal value |
| Apparent Power | ±0.5% of nominal value |
| Power Factor/Phase Angle | ±3° |
| Voltage | ±0.5% of nominal value |
| Current | ±0.5% of nominal value |
| Frequency | ± 0.2% of mid frequency |
| THD (Voltage / Current) | ± 3.0% |

Display update rate:

| | |
|-----------------------------|--------------|
| Response time to step input | 1 sec approx |
|-----------------------------|--------------|

Applicable Standards:

| | |
|------------------------|---|
| EMC | IEC 61326-1:2012, Table 2 |
| Immunity | IEC 61000-4-3. 10V/m – Level 3 industrial Low level |
| Safety | IEC 61010-1-2010 , Permanently connected use |
| IP for water & dust | IEC60529 |
| Pollution degree: | 2 |
| Installation category: | III |

Isolation:

| | |
|----------------------------|---------------------|
| Protective Class | 2 |
| High voltage test | |
| Input+Aux Vs Surface | 4kV RMS, 50Hz,1min |
| Input Vs Remaining Circuit | 3.3kV RMS,50Hz,1min |

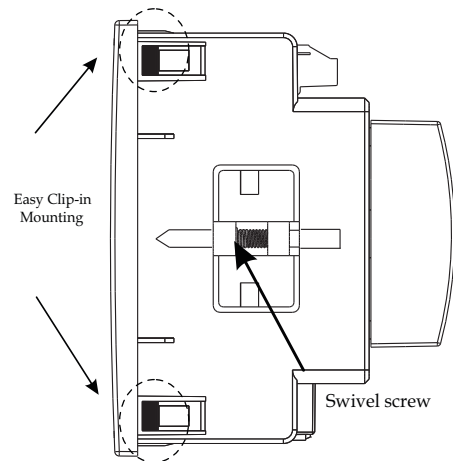
Environmental

| | |
|----------------------------------|---|
| Operating temperature | -20 to +70°C |
| Storage temperature | -25 to +75°C |
| Relative humidity | 0... 95%RH (non condensing) |
| Warm up time | Minimum 3 minute |
| Shock (As per IEC60068-2-27) | Half sine wave, Peak acceleration 30gn (300 m/s ²),duration 18ms. |
| Vibration Number of Sweep cycles | 10... 150...10 Hz, 0.15mm amplitude 10 per axis |
| Enclosure | IP 20 (Terminal side) and IP54 (Front side) |

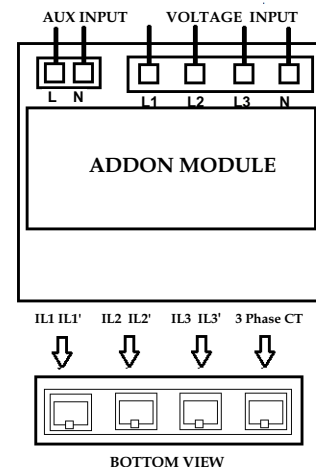
Interfaces

| | |
|---------------------|---|
| Impulse Led | For Energy testing |
| Relay(Optional) | 250 VAC,5 A AC 30VDC, 5A DC |
| Modbus (Optional) | RS485, max.1200m Baud rate : 4.8k, 9.6k, 19.2k, 38.4k, 57.6kbps. |
| Ethernet (Optional) | Ethernet access on Modbus TCP/ IP Protocol. |

Installation:

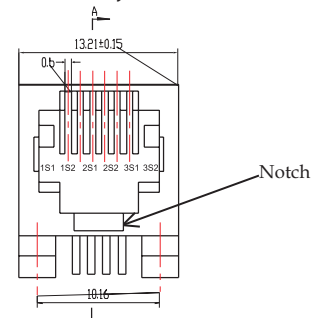


Electrical Connection:



Connection diagram for External CT

Meter Side RJ 12 Connection



Memory calculations for Time based datalogging :

| | |
|--|--|
| Max Memory Locations | = 273030 |
| Actual parameter stored in Each log | = Date +time+Number of parameter selected by user |
| for ex. Number of parameter selected by user | = 1. |
| Actual parameter stored in Each log | = 1(Date) +1(time)+ 1 = 3 |
| Maximum log that can be stored | = Max Memory Location/ Actual parameter stored in Each log |
| | = 273030/3= 91010 |
| Timelog Interval setting | = 15 minutes |
| Log in one day | = (60 /Timelog Interval setting) * 24 |
| | = (60/15)*24 = 96 |
| Max Days | = Maximum log that can be stored / log in one day |
| | = 91010/ 96 = 948.20 days |

Measured Parameter System wise: ✓ : Available × : Not Available

| Sr No. | Parameters | 3 Phase 4Wire | 3Phase 3Wire | 1Phase 2Wire |
|--------|---|---------------|--------------|--------------|
| 1 | Import Active Energy ¹ | ✓ | ✓ | ✓ |
| 2 | Export Active Energy ¹ | ✓ | ✓ | ✓ |
| 3 | Inductive Reactive Energy ¹ | ✓ | ✓ | ✓ |
| 4 | Capacitive Reactive Energy ¹ | ✓ | ✓ | ✓ |
| 5 | Apparent Energy ¹ | ✓ | ✓ | ✓ |
| 6 | System Active Power (kW) | ✓ | ✓ | ✓ |
| 7 | Active Power L1 (kW) | ✓ | × | × |
| 8 | Active Power L2 (kW) | ✓ | × | × |
| 9 | Active Power L3 (kW) | ✓ | × | × |
| 10 | System Re-active Power (kVAr) | ✓ | ✓ | ✓ |
| 11 | Re-active Power L1 (kVAr) | ✓ | × | × |
| 12 | Re-active Power L2 (kVAr) | ✓ | × | × |
| 13 | Re-active Power L3 (kVAr) | ✓ | × | × |
| 14 | System Apparent Power (kVA) | ✓ | ✓ | ✓ |
| 15 | Apparent Power L1 (kVA) | ✓ | × | × |
| 16 | Apparent Power L2 (kVA) | ✓ | × | × |
| 17 | Apparent Power L3 (kVA) | ✓ | × | × |
| 18 | System Power Factor | ✓ | ✓ | ✓ |
| 19 | Power Factor L1 | ✓ | × | × |
| 20 | Power Factor L2 | ✓ | × | × |
| 21 | Power Factor L3 | ✓ | × | × |
| 22 | System Phase Angle | ✓ | ✓ | ✓ |
| 23 | Phase Angle L1 | ✓ | × | × |
| 24 | Phase Angle L2 | ✓ | × | × |
| 25 | Phase Angle L3 | ✓ | × | × |
| 26 | Current Demand | ✓ | ✓ | ✓ |
| 27 | kVA Demand | ✓ | ✓ | ✓ |
| 28 | Import kW Demand | ✓ | ✓ | ✓ |
| 29 | Export kW Demand | ✓ | ✓ | ✓ |
| 30 | Inductive Var Demand | ✓ | ✓ | ✓ |
| 31 | Capacitive Var Demand | ✓ | ✓ | ✓ |
| 32 | Max Current Demand | ✓ | ✓ | ✓ |
| 33 | Max kVA Demand | ✓ | ✓ | ✓ |
| 34 | Max Import kW Demand | ✓ | ✓ | ✓ |
| 35 | Max Export kW Demand | ✓ | ✓ | ✓ |

Measured Parameter System wise:

✓ : Available

✗ : Not Available

| Sr No. | Parameters | 3 Phase 4Wire | 3Phase 3Wire | 1Phase 2Wire |
|--------|--|---------------|--------------|--------------|
| 36 | Max Inductive Var Demand | ✓ | ✓ | ✓ |
| 37 | Max Inductive Var Demand | ✓ | ✓ | ✓ |
| 38 | Run Hour | ✓ | ✓ | ✓ |
| 39 | On Hour | ✓ | ✓ | ✓ |
| 40 | Number of Interruptions | ✓ | ✓ | ✓ |
| 41 | System Voltage | ✓ | ✓ | ✓ |
| 42 | Voltage L1 | ✓ | ✗ | ✗ |
| 43 | Voltage L2 | ✓ | ✗ | ✗ |
| 44 | Voltage L3 | ✓ | ✗ | ✗ |
| 45 | Voltage L12 | ✓ | ✓ | ✗ |
| 46 | Voltage L23 | ✓ | ✓ | ✗ |
| 47 | Voltage L31 | ✓ | ✓ | ✗ |
| 48 | System Voltage THD | ✓ | ✓ | ✓ |
| 49 | Voltage L1 THD | ✓ | ✓ | ✗ |
| 50 | Voltage L2 THD | ✓ | ✓ | ✗ |
| 51 | Voltage L3 THD | ✓ | ✓ | ✗ |
| 52 | System Current | ✓ | ✓ | ✓ |
| 53 | Current L1 | ✓ | ✓ | ✗ |
| 54 | Current L2 | ✓ | ✓ | ✗ |
| 55 | Current L3 | ✓ | ✓ | ✗ |
| 56 | System Current THD | ✓ | ✓ | ✓ |
| 57 | Current L1 THD | ✓ | ✓ | ✗ |
| 58 | Current L2 THD | ✓ | ✗ | ✗ |
| 59 | Current L3 THD | ✓ | ✓ | ✗ |
| 60 | Individual Harmonics of VL1 (Up to 31st Harmonics) | ✓ | ✓ | ✓ |
| 61 | Individual Harmonics of VL2 (Up to 31st Harmonics) | ✓ | ✓ | ✗ |
| 62 | Individual Harmonics VL3 (Up to 31st Harmonics) | ✓ | ✓ | ✗ |
| 63 | Individual Harmonics IL1 (Up to 31st Harmonics) | ✓ | ✓ | ✓ |
| 64 | Individual Harmonics IL2 (Up to 31st Harmonic) | ✓ | ✗ | ✗ |
| 65 | Individual Harmonics IL3 (Up to 31st Harmonics) | ✓ | ✓ | ✗ |
| 66 | Neutral Current | ✓ | ✗ | ✗ |
| 67 | Frequency | ✓ | ✓ | ✓ |
| 68 | RPM | ✓ | ✓ | ✓ |
| 69 | Phase Reversal Indication | ✓ | ✗ | ✗ |
| 70 | Current Reversal Indication | ✓ | ✗ | ✓ |
| 71 | Phase Absent Indication | ✓ | ✗ | ✗ |
| 72 | Old Import Active Energy ² | ✓ | ✓ | ✓ |
| 73 | Old Export Active Energy ² | ✓ | ✓ | ✓ |
| 74 | Old Inductive Reactive Energy ² | ✓ | ✓ | ✓ |
| 75 | Old Capacitive Reactive Energy ² | ✓ | ✓ | ✓ |
| 76 | Old Apparent Energy ² | ✓ | ✓ | ✓ |
| 77 | Old Run Hour ² | ✓ | ✓ | ✓ |
| 78 | Old On Hour ² | ✓ | ✓ | ✓ |
| 79 | Old Number of Interruptions ² | ✓ | ✓ | ✓ |
| 80 | Old Max kW Import Demand ² | ✓ | ✓ | ✓ |
| 81 | Old Max kW Export Demand ² | ✓ | ✓ | ✓ |
| 82 | Old Max Var Inductive Demand ² | ✓ | ✓ | ✓ |
| 83 | Old Max Var Capacitive Demand ² | ✓ | ✓ | ✓ |
| 84 | Old Max VA Demand ² | ✓ | ✓ | ✓ |
| 85 | Old Max A Demand ² | ✓ | ✓ | ✓ |

Note: 1. Energy on display is autoranging & unit for Energy parameters on modbus are dependent on CT PT ratio or unit selected by user.

2. Parameters are available only on modbus.

Measured Parameter Model wise:

✓ : Available

✗ : Not Available

| Sr No. | Parameters | Alpha LM1350 | Alpha LM1360 |
|--------|---|--------------|--------------|
| 1 | Import Active Energy ¹ | ✓ | ✓ |
| 2 | Export Active Energy ¹ | ✓ | ✓ |
| 3 | Inductive Reactive Energy ¹ | ✓ | ✓ |
| 4 | Capacitive Reactive Energy ¹ | ✓ | ✓ |
| 5 | Apparent Energy ¹ | ✓ | ✓ |
| 6 | System Active Power (kW) | ✓ | ✓ |
| 7 | Active Power L1 (kW) | ✓ | ✓ |
| 8 | Active Power L2 (kW) | ✓ | ✓ |
| 9 | Active Power L3 (kW) | ✓ | ✓ |
| 10 | System Re-active Power (kVAr) | ✓ | ✓ |
| 11 | Re-active Power L1 (kVAr) | ✓ | ✓ |
| 12 | Re-active Power L2 (kVAr) | ✓ | ✓ |
| 13 | Re-active Power L3 (kVAr) | ✓ | ✓ |
| 14 | System Apparent Power (kVA) | ✓ | ✓ |
| 15 | Apparent Power L1 (kVA) | ✓ | ✓ |
| 16 | Apparent Power L2 (kVA) | ✓ | ✓ |
| 17 | Apparent Power L3 (kVA) | ✓ | ✓ |
| 18 | System Power Factor | ✓ | ✓ |
| 19 | Power Factor L1 | ✓ | ✗ |
| 20 | Power Factor L2 | ✓ | ✗ |
| 21 | Power Factor L3 | ✓ | ✗ |
| 22 | System Phase Angle | ✓ | ✓ |
| 23 | Phase Angle L1 | ✓ | ✗ |
| 24 | Phase Angle L2 | ✓ | ✗ |
| 25 | Phase Angle L3 | ✓ | ✗ |
| 26 | Current Demand | ✓ | ✗ |
| 27 | kVA Demand | ✓ | ✗ |
| 28 | Import kW Demand | ✓ | ✗ |
| 29 | Export kW Demand | ✓ | ✗ |
| 30 | Inductive Var Demand | ✓ | ✗ |
| 31 | Capacitive Var Demand | ✓ | ✗ |
| 32 | Max Current Demand | ✓ | ✗ |
| 33 | Max kVA Demand | ✓ | ✗ |
| 34 | Max Import kW Demand | ✓ | ✗ |
| 35 | Max Export kW Demand | ✓ | ✗ |
| 36 | Max Inductive Var Demand | ✓ | ✗ |
| 37 | Max Capacitive Var Demand | ✓ | ✗ |
| 38 | Run Hour | ✓ | ✓ |
| 39 | On Hour | ✓ | ✓ |
| 40 | Number of Interruptions | ✓ | ✓ |
| 41 | System Voltage | ✓ | ✓ |
| 42 | Voltage L1 | ✓ | ✓ |
| 43 | Voltage L2 | ✓ | ✓ |
| 44 | Voltage L3 | ✓ | ✓ |
| 45 | Voltage L12 | ✓ | ✓ |
| 46 | Voltage L23 | ✓ | ✓ |
| 47 | Voltage L31 | ✓ | ✓ |
| 48 | System Voltage THD | ✓ | ✓ |
| 49 | Voltage L1 THD | ✓ | ✗ |
| 50 | Voltage L2 THD | ✓ | ✗ |
| 51 | Voltage L3 THD | ✓ | ✗ |

Measured Parameter Model wise:

✓ : Available

✗ : Not Available

| Sr No. | Parameters | Alpha LM1350 | Alpha LM1360 |
|--------|--|--------------|--------------|
| 52 | System Current | ✓ | ✓ |
| 53 | Current L1 | ✓ | ✓ |
| 54 | Current L2 | ✓ | ✓ |
| 55 | Current L3 | ✓ | ✓ |
| 56 | System Current THD | ✓ | ✓ |
| 57 | Current L1 THD | ✓ | ✗ |
| 58 | Current L2 THD | ✓ | ✗ |
| 59 | Current L3 THD | ✓ | ✗ |
| 60 | Individual Harmonics of VL1(Up to 31st Harmonics) | ✓ | ✗ |
| 61 | Individual Harmonics of VL2 (Up to 31st Harmonics) | ✓ | ✗ |
| 62 | Individual Harmonics VL3 (Up to 31st Harmonics) | ✓ | ✗ |
| 63 | Individual Harmonics IL1(Up to 31st Harmonics) | ✓ | ✗ |
| 64 | Individual Harmonics IL2(Up to 31st Harmonic) | ✓ | ✗ |
| 65 | Individual Harmonics IL3(Up to 31st Harmonics) | ✓ | ✗ |
| 66 | Neutral Current | ✓ | ✓ |
| 67 | Frequency | ✓ | ✓ |
| 68 | RPM | ✓ | ✓ |
| 69 | Phase Reversal Indication | ✓ | ✓ |
| 70 | Current Reversal Indication | ✓ | ✓ |
| 71 | Phase Absent Indication | ✓ | ✓ |
| 72 | Old Import Active Energy ² | ✓ | ✗ |
| 73 | Old Export Active Energy ² | ✓ | ✗ |
| 74 | Old Inductive Reactive Energy ² | ✓ | ✗ |
| 75 | Old Capacitive Reactive Energy ² | ✓ | ✗ |
| 76 | Old Apparent Energy ² | ✓ | ✗ |
| 77 | Old Run Hour ² | ✓ | ✗ |
| 78 | Old On Hour ² | ✓ | ✗ |
| 79 | Old Number of Interruptions ² | ✓ | ✗ |
| 80 | Old Max Current Demand ² | ✓ | ✗ |
| 81 | Old Max VA Demand ² | ✓ | ✗ |
| 82 | Old Max Import W Demand ² | ✓ | ✗ |
| 83 | Old Max Export W Demand ² | ✓ | ✗ |
| 84 | Old Max Inductive VAr Demand ² | ✓ | ✗ |
| 85 | Old Max Capacitive VAr Demand ² | ✓ | ✗ |

Note: 1. Energy on display is autoranging & unit for Energy parameters on modbus are dependent on CT PT ratio or unit selected by user.

2. Parameters are available only on modbus.

Ordering information

| Product Code | Pa10- | X | XX | XX | X | XX | X | 0 | 0ST |
|--------------|-------|---|----|----|---|----|---|---|-----|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Order Code Example:

MA4L-430102RH20000

3Phase input with input voltage 100-600VLL with 1A/5A internal CT , auxiliary voltage 100 to 550 V AC DC ,with MODBUS (RS485), with 2 pulse output with accuracy class 0.2s.



sifam tinsley
PRECISION INSTRUMENTATION

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