



# Technical Data Sheet

## ALPHA 70A+



*ALPHA 70A+* is a compact, multi-function panel mount power quality monitor, which measures, calculates and displays major electrical parameters of three phase power system

### Special Features

- Phasor Representation of All 3 Phases for System Analysis
  - Energy Class 0.5S as per standard IEC 62053 - 22
  - True representation of Voltage & Current Waveforms
  - Real Time Clock(RTC)
  - Individual Harmonics up to 56th Harmonics
  - Time of use with configurable Zones, seasons, tariff profiles which helps Energy analysis
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## Application

ALPHA 70A+ is a compact, multi-function panel mount power quality monitor, which measures, calculates and displays major electrical parameters of three phase power system like voltage, current, active/ fundamental reactive, apparent power and energy, individual harmonics, sags and swells.

## Product Features

<b>Measures &amp; Monitors more than 80 parameters</b>	All basic electrical parameters. Power quality parameters (Overcurrent, Sag & Swell). Individual harmonics contains of per phase voltage and current.	<b>Time of DAY (TOD / TOU)</b>	Easy programmable tariff schedule 4 seasons 4 tariffs 6 time zones per day 4 types of days 5 tariff energy registers Automatic daily profile storage for a one day, one month & one year Cost per kWh calculation.
<b>True RMS measurement</b>	The instrument measures distorted waveform up to 56th Harmonic for 50Hz and up to 46th Harmonic for 60Hz.	<b>Real Time Clock (RTC)</b>	Displays time and date.
<b>Power Quality Measurement</b>	Sags & Swells detection Measurable up to 56th for 50Hz and upto 46th harmonic for 60 Hz harmonic on each phase. Maximum any 6 harmonics can be monitored simultaneously for each phase. Measurement of RMS value of fundamental and per phase voltage and current harmonics. (%) THD of per phase voltage and current Distortion factor of individual harmonics Time stamping of sags & swells.	<b>Phase sequence detection</b>	Incorrect phase sequence indication or phase failure indication on any of the input voltages.
<b>Graphical Analysis</b>	Per phase individual harmonic bar graph representation. Real time vector representation of all 3 Phases for complete system analysis.	<b>Direct remote access</b>	Remote access of measured parameters. User Assignable Registers for MODBUS. Programmable baud rates up to 38.4kbps. Remote configuration of the Instrument via MODBUS.
<b>Energy class 0.5S as per IEC 62053</b>	Independent Import and Export energy counter. Active energy (kWh), Fundamental Reactive energy (kVArh) & Apparent energy (kVArh) measurement. Accuracy as per IEC 62053-22, IEC62053-23 Impulse for energy verification	<b>Limit (Alarm) &amp; Pulse Relay Output</b>	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
<b>Onsite programmable for user desired application</b>	Onsite programmable input voltage (100VLL to 500 VLL), input current (1A or 5A) and system configuration (3 phase 4Wire (unbalanced) or 3phase 3Wire (unbalanced) network). Onsite programmable CT ratio & PT ratio. Wide auxiliary power supply range: 60-300VAC/DC.	<b>Compliance to International Safety standards</b>	Compliance to International Safety standard IEC 61010-1- 2010
		<b>EMC Compatibility</b>	Compliance to International standard IEC 61326.
		<b>Custom color setting</b>	User can assign individual color for each phase as per the application requirement through display and MODBUS.

## Technical Specifications

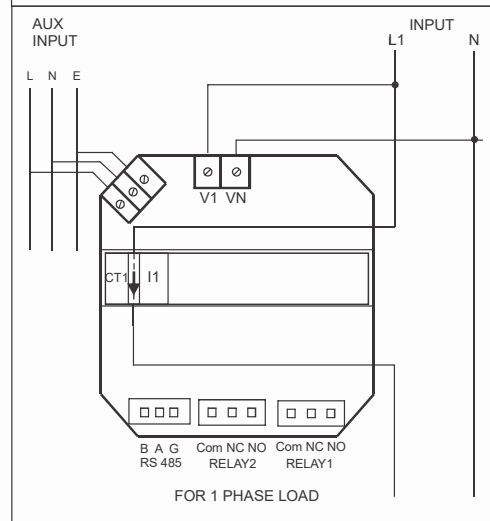
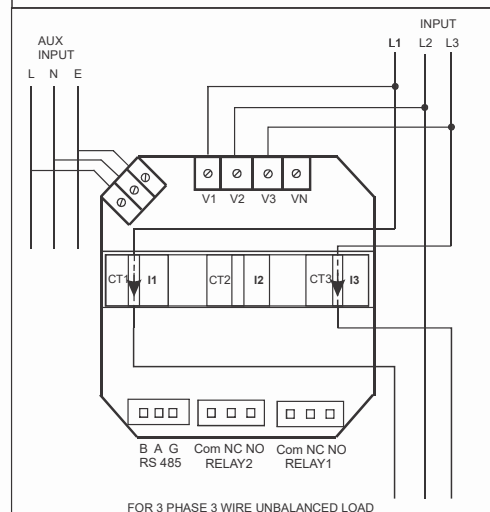
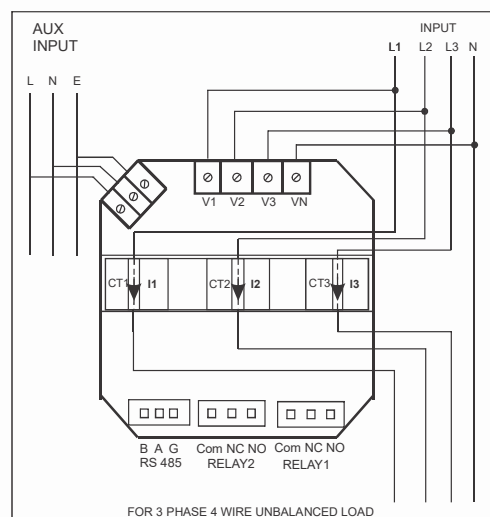
### Accuracy

Active Energy	Class 0.5S as per IEC 62053-22
Apparent Energy	Class 0.5S as per IEC 62053-22
Fundamental Reactive Energy	Class 2 as per IEC 62053-23
Reference Conditions (As per. IEC/EN 60688)	Ambient 23°C ± 1°C Sinusoidal (distortion factor 0.005), 60 Hz
Active Power	±0.2% of Nominal value
Fundamental Reactive Power	±0.2% of Nominal value
Apparent Power	±0.2% of Nominal value
Power Factor/ Phase Angle	±2°
Voltage	±0.2% of Nominal value
Current	±0.2% of Nominal value
Frequency	±0.1% of mid frequency
Harmonics	±1.0%
THD Voltage/Current	±2.0% (Voltage - 60...100% of Nominal Value Current - 20...100% of Nominal Value)
Neutral Current	±4.0% of Range

### Input Voltage

Nominal input voltage (AC RMS)	57.7 - 288.68 VL-N On site Programmable ( Line-Line 100 - 500 VL-L)
System PT primary values	100VLL to 692.8 kVLL On site Programmable
Max continuous input voltage	347 VLN, 600 VLL
Voltage Measuring Range	5 VLN.... 347 VLN, 9 VLL.... 600 VLL.
Overload Withstand	2x times of Nominal voltage for 1 second, repeated 10 times at 10 second intervals
Frequency Measuring Range	45Hz to 66Hz

## Electrical Connections



## Technical Specifications

Input Current	
Nominal input current	1A / 5A AC RMS On site Programmable
System CT primary values	From 1A up to 9999A On site Programmable
Max continuous input current	120% of Nominal value
Current Measuring Range	5% to 120% of Nominal current
Overload Withstand	20x times of Nominal current for 1 second, repeated 5 times at 5 min intervals
Starting Current for energy as per IEC 62053-22 class 0.5S	1 mA for 1A range 5 mA for 5A range

### Auxiliary Supply

External Aux	60 V - 300V 45-66Hz AC/DC
Higher Aux Nominal Value	230 V DC /230 V AC, 50-60 Hz
Frequency	50/60 Hz ( $\pm 10\%$ )

### Environmental Conditions

Operating Temperature	-20 to +70°C
Storage Temperature	-30 to +80°C
Relative Humidity	0... 95% non condensing
Warm up Time	Minimum 3 minute
Shock	15g in 3 planes
Vibration	10... 150... 10 Hz, 0.075mm amplitude
Temperature Conflict	0.05%/°C

### Display update rate

Response Time to Step Input	1 Sec. approx.
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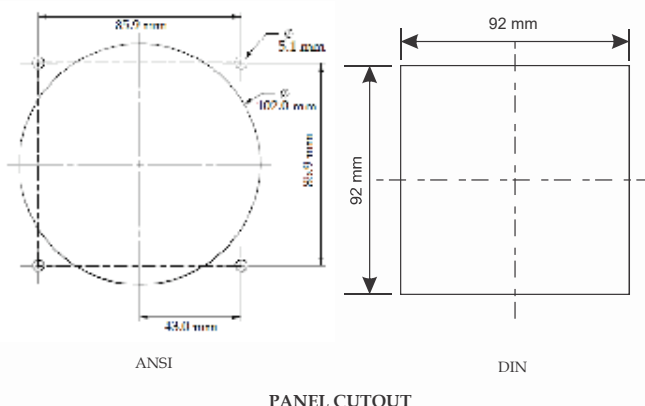
### Real Time Clock (RTC)

Uncertainty	$\pm 2$ minutes/month (23°C $\pm 1^\circ\text{C}$ ) (trimmable through display or MODBUS)
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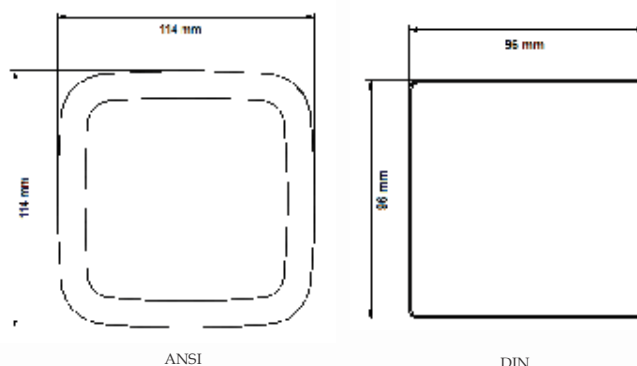
### V A Burden

Nominal input voltage burden	< 0.2 VA approx. per phase
Nominal input Current burden	< 0.2 VA approx. per phase
Auxiliary Supply burden	< 6.5 VA for AC Aux 5.5W for DC Aux

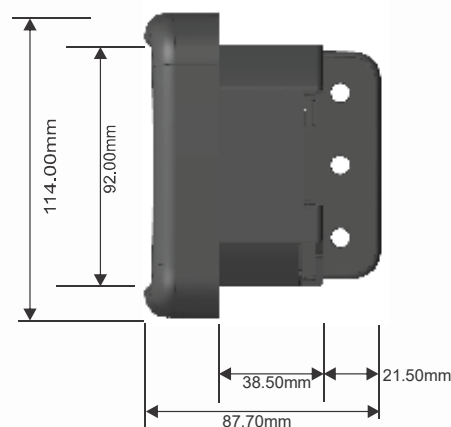
## Dimensions



PANEL CUTOUT



Meter Front View



Meter Side View

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 connecting wires should be  $\leq 4.0$  mm 2 Single wire or 2X2.5mm<sup>2</sup> fine wire.

## Technical Specifications

### Applicable Standards

EMC	IEC 61326
Immunity	IEC 61000-4-3, 10V/m min – Level 3 industrial Low level
Safety	IEC 61010-1-2010 , Permanently connected use
IP for water and dust	Front IP 54, Front IP (optional) 65 Back IP 20, as per IEC60529
Pollution degree	2
Installation Category	III
High Voltage Test	3.7 kV AC RMS, for 1 minute

## Power Quality Parameters

Sag Threshold*	Adjustable.. 10%.... 90% of Nominal Value
Swell Threshold*	Adjustable.. 110%.... 150% of Nominal Value
Over Current*	Adjustable.. 110%.... 150% of Nominal Value

\*Detects sag / swell / Over current if Voltage/Current waveform remains below or above threshold for at least 500msec with an interval of 500ms respectively.

## Display Parameter

Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire
1.	System Voltage	✓	✓
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 Fundamental Reactive Power (kVAr)	✓	✓
19.	Fundamental Reactive Power L1 (kVAr)	✓	✗
20.	Fundamental Reactive Power L2 (kVAr)	✓	✗
21.	Fundamental Reactive 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 (Up to 14 digit resolution)	✓	✓
34.	Export kWh (Up to 14 digit resolution)	✓	✓
35.	Fundamental Import kVArh (Up to 14 digit resolution)	✓	✓
36.	Fundamental Export kVArh (Up to 14 digit resolution)	✓	✓

✓ : Available      ✗ : Not Available

## Display Parameter

Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire
37.	kVAh (Up to 14 digit resolution)	✓	✓
38.	Current Demand	✓	✓
39.	kVA Demand	✓	✓
40.	kW Import Demand	✓	✓
41.	kW Export Demand	✓	✓
42.	Max Current Demand	✓	✓
43.	Max kVA Demand	✓	✓
44.	Max kW Import Demand	✓	✓
45.	Max kW Export Demand	✓	✓
46.	Run Hour	✓	✓
47.	On Hour	✓	✓
48.	Number of Interruption	✓	✓
49.	Phase Reversal Indication	✓	✗
50.	Phasor Diagram	✓	✗
51.	Voltage Waveform	✓	✓
52.	Current Waveform	✓	✓
53.	% THD Voltage L1-N	✓	✗
54.	% THD Voltage L2-N	✓	✗
55.	% THD Voltage L3-N	✓	✗
56.	% THD Voltage L1-L2	✗	✓
57.	% THD Voltage L2-L3	✗	✓
58.	% THD Voltage L3-L1	✗	✓
59.	% THD Current L1	✓	✓
60.	% THD Current L2	✓	✗
61.	% THD Current L3	✓	✓
62.	% THD Voltage Mean	✓	✓
63.	% THD Current Mean	✓	✓
64.	RMS voltage of Harmonics	✓	✓
65.	RMS Current of Harmonics	✓	✓
66.	Fundamental Active Power per phase	✓	✗
67.	Fundamental Reactive Power per phase	✓	✗
68.	Fundamental Apparent Power per phase	✓	✗
69.	Fundamental Power Factor per phase	✓	✗
70.	Individual Harmonic Active Power per phase	✓	✗
71.	Individual Harmonic Reactive Power per phase	✓	✗
72.	Individual Harmonic Apparent Power per phase	✓	✗
73.	Distortion Factor of all harmonics on phase voltage	✓	✓
74.	Distortion Factor of all harmonics on phase Current	✓	✓
75.	Power Factor of Individual Harmonic per phase	✓	✗
76.	Fundamental voltage RMS per phase	✓	✓
77.	Fundamental current RMS per phase	✓	✓
78.	Swell indication	✓	✓
79.	Over current indication	✓	✓
80.	Sag indication	✓	✓

✓ : Available      ✗ : Not Available

## Ordering Information

Product Code	ALPHA 70A+	X	X	X	X	X	X	X	00AN
System Type	3 Phase 3W/4W	3							
Input Voltage	100-500V LL		8F						
Input Current	1A/5A			75					
Power Supply	60-300U				H				
RS 485 MODBUS	With RS 485						R		
	Without RS 485						Z		
Pulse Output	2 Pulse output							S	
	Pulse O/P not used							Z	
Impulse LED	With impulse LED								I
	Without impulse LED								Z
Customer Specified									AN



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