Technical Data Sheet

Alpha 70



Alpha 70 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

Application

Alpha 70 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

Measures & Monitors more than 80 parameters	All basic electrical parameters. Power quality parameters (Overcurrent, Sag & Swell). Individual harmonics contains of per phase voltage and current.
True RMS measurement	The instrument measures distorted waveform up to 56th Harmonic for 50Hz and up to 46th Harmonic for 60Hz.
Power Quality Measurement	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.
Graphical Analysis	Per phase individual harmonic bar graph representation. Real time vector representation of all 3 Phases for complete system analysis.
Energy class 0. 5S as per IEC 62053	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
Onsite programmable for user desired application	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.

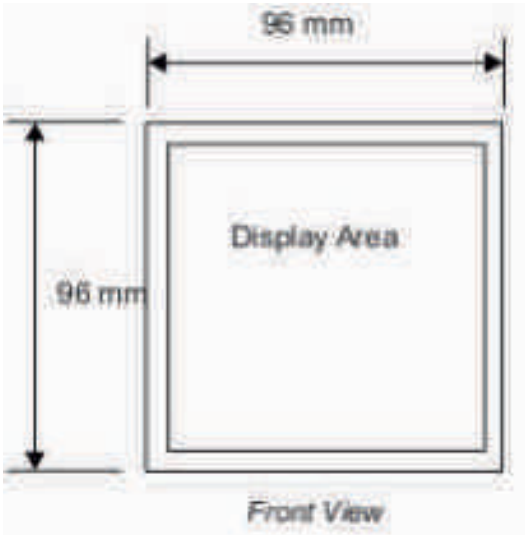
Time of DAY (TOD / TOU)	Easy programmable tariff schedule 4 seasons 4 tariffs 6 time zones per day 4 types of days 5 tariff energy registers Automatic daily profile storage for a one day, one month & one year Cost per kWh calculation.
Real Time Clock (RTC)	Displays time and date.
Phase sequence detection	Incorrect phase sequence indication or phase failure indication on any of the input voltages.
Direct remote access	Remote access of measured parameters. User Assignable Registers for MODBUS. Programmable baud rates up to 38.4kbps. Remote configuration of the Instrument via MODBUS.
Limit (Alarm) & Pulse Relay Output	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
Compliance to International Safety standards	Compliance to International Safety standard IEC 61010-1- 2010
EMC Compatibility	Compliance to International standard IEC 61326.

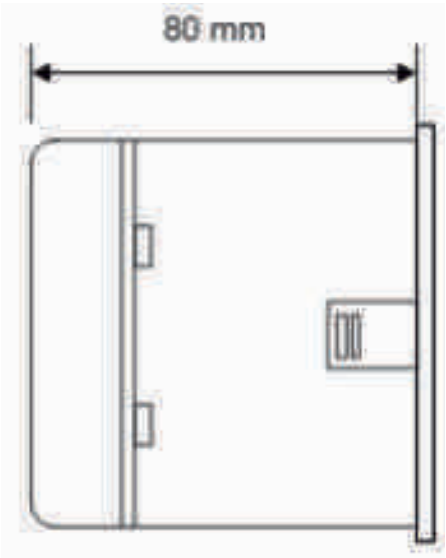
Technical Specifications

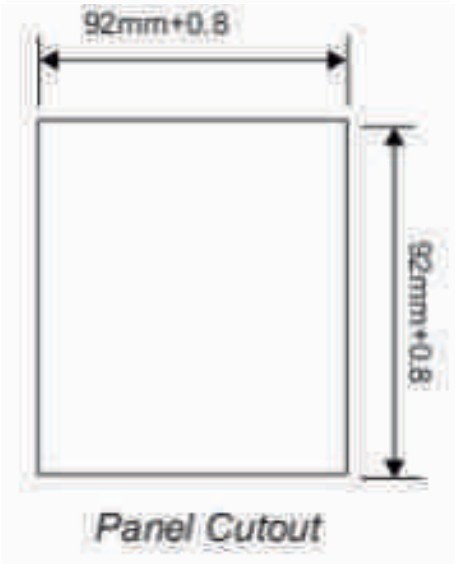
Accuracy	
Active Energy	Class 0.5S as per IEC 62053-22
Apparent Energy	Class 0.5S as per IEC 62053-22
Fundamental Reactive Energy	Class 2 as per IEC 62053-23
Reference Conditions (As per. IEC/EN 60688)	Ambient 23°C ± 1°C Sinusoidal (distortion factor 0.005), 60 Hz
Active Power	±0.2% of Nominal value
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 Nominal value
Harmonics	±1.0%
THD Voltage/Current	±1.0%

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

Dimensions







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 AC-DC
Aux Supply Frequency	50/60 Hz (± 10 %)

Environmental Conditions

Operating Temprature	-20 to +70°C
Storage Temprature	-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.

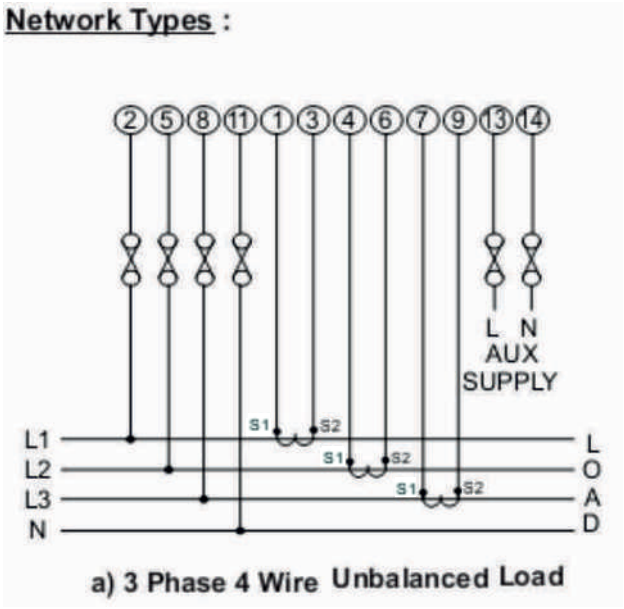
Real Time Clock (RTC)

Uncertainty	± 2 minutes/month (23°C ± 1°C) (trimmable through display or MODBUS)

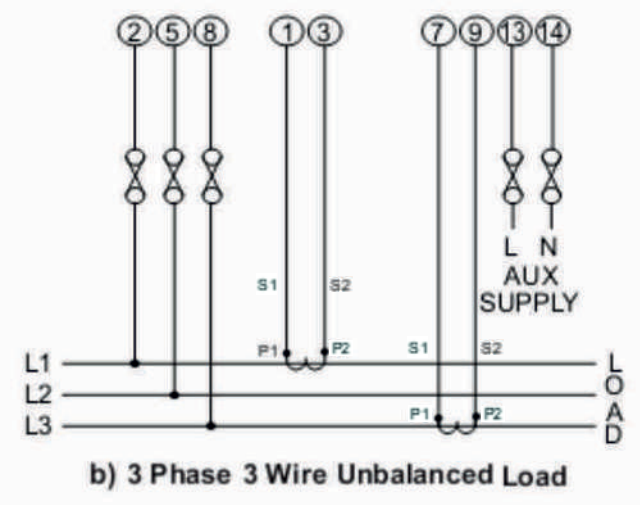
V A Burden

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 approx.

Electrical Connections



a) 3 Phase 4 Wire Unbalanced Load



b) 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 connecting wires should be < = 4.0 mm 2 Single wire or 2X2.5mm2 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	(IP 54 for Front) IEC60529
Pollution degree	2
Installation Category	III
High Voltage Test	5.23 kV DC for 1 minute between all Electrical circuits.

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	AP70 -	X	XX	XX	X	X	X	X	0000
Network	1 Ph	1							
	3Ph. (PR. 3W or 4W)	3							
Input Voltage	100 -500 VLL		8F						
Input Current	1/5 A			75					
Power Supply	20 -40A/ 20-60 D				Q				
	60 -300 U				H				
RS-485	With RS-485					R			
	Without RS-485					Z			
Pulse Output	1 Pulse output						S		
	2 Pulse output						D		
	Pulse O/P not used						Z		
Impulse	With Impulse LED							I	
	Without Impulse LED							Z	

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