Alpha 30

Alpha 30 is a compact multifunction instrument which measures important electrical parameters in 3 phase 4 Wire and 3 phase 3 Wire Network & replaces the multiple analog panel meters.

Special Features

→ MODBUS (RS-485) Communication (optional)

→ Pulse/Limit Switch output (optional)

→ 3 Line 4 Digits ultra bright LED Display (up to 9999)

→ On site Programmable CT/PT Ratios

→ User selectable CT Secondary 1A/5A

→ Measurement & Display of RPM, Run hours, On hours, No. of interruption

Application

Alpha 30 measures important electrical parameters like AC Voltage, AC Current, Frequency, Active, Reactive, Apparent Power, Import & Export Energy & many more.

Product Features

On site programmable PT/CT ratios	It is possible to program primary of external potential Transformer (PT), primary of external Current Transformer (CT) on site locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS-485)	Total Harmonic Distortion (THD)	The instrument can measure per phase THD of voltage and THD of current.
User selectable CT Secondary 5A/1A	The secondary of external Current Transformer (CT) can be programmed on site to either 5A or 1A locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS-485)	Energy Count storage:	In case of power failure, the instrument memorizes the last energy count. Every 40 sec, the instrument updates the energy counter in the nonvolatile memory.
User selectable PT Secondary	The secondary of external potential Transformer (PT) can be programmed on locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS-485)	Programmable Energy format & Energy rollover count	Customer can assign the format for energy display on MODBUS (RS-485) in terms of W, kW or MW. Additional to this, customer can also set a rollover count from 7 to 14 digits (for W), 7 to 12 digits (for kW) & 7 to 9 digits (for MW), after which the energy will roll back to zero. The above settings are applicable for all types of energy.
User selectable 3 phase 3W or 4W	User can program on site the network connection as either 3 Phase 3 Wire or 4 Wire locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS-485). For single phase applications, single phase version is available.	Hour Run, ON Hour, Number of Interruptions	Hour run records the number of hours load is connected. ON Hour is the period for which the auxiliary supply is ON. Number of Interruptions indicates the number of times the Auxiliary Supply was interrupted.
Low back depth	The instrument has very low back depth (behind the panel) of less than 80 mm in spite of optional features like pulse output	Optional MODBUS (RS485) Output	The optional ModBus output enables the instrument to transmit all the measured parameters over standard MODBUS (RS-485).
Onsite selection of Auto scroll / Fixed Screen	User can set the display in auto scrolling mode or fixed screen mode locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485).	User Assignable Registers for MODBUS	Customer can assign MODBUS register address as per his need for faster response time.
Phase reversal indication	The instrument can detect wrong phase sequence or failure of one of the input voltages and displays "phase" error message.	Optional Pulse Output (1 or 2 Relay output) / Limit switch	The instrument can be programmed as Pulse output or Limit Switch.
Energy measurement (Import and Export)	Active energy (kWh), Reactive energy (kVArh), Apparent energy (kVAh) & Ampere Hour (kAh). Any of the parameters can be freely assigned to 2 optional pulse outputs.	Pulse Output	The optional pulse output is a potential free, very fast acting relay contact which can be used to drive an external mechanical counter for energy measurement.
True RMS measurement	The instrument measures distorted waveform up to 15th Harmonic.	Limit switch	The instrument will trip the one or two relays if the programmed parameter exceeds the programmed High & Low Limits.
High brightness 3 line 4 digits LED display	Simultaneous display of 3 Parameters	**Configuration of the Instrument via MODBUS**	The instrument settings can be configured locally via front panel keys by entering into Programming mode or r emotely via MODBUS (RS-485). **Note:** The MODBUS communication parameters can only be set locally via front panel keys in the Programming mode.
User selectable Low Current suppression (below 30 mA)	User can suppress the readings below 30 mA in the current measurement by onsite programming if required.		

Product Features

Min Max storage of parameters possible	The instrument stores minimum and maximum values for System Voltage and System Current. Every 40 sec minimum and maximum readings are updated.
Number of parameters measured: more than 46	The instrument measures more than 46 electrical parameters of 3 Phase network.
Parameter Screen recall	In case of power failure, the instrument memorizes the last displayed screen. The displayed screen will get memorized only if user keeps this screen for minimum 40 sec duration before power failure for fixed screen mode.

Optional Analog Outputs (1 or 2 Outputs)	1 or 2 Analog outputs can be programmed from a list of input parameters.
Ethernet Interface (Modbus TCP/IP Protocol)	The optional Ethernet Interface output transmit all the measured parameters on Modbus TCP/IP. Also user can configure their instrument via Ethernet Interface.
Enclosure Protection for dust and water	conforms to IP 54 (front face) as per IEC60529
Compliance to International Safety standards	Compliance to International Safety standard IEC 61010-1- 2001
EMC Compatibility	Compliance to International standard IEC 61326

Technical Specifications

Accuracy

	Accuracy 0.5	Accuracy 0.2
Voltage	± 0.5% of Nominal value	± 0.2% of Nominal value
Current	± 0.5% of Nominal value	± 0.2% of Nominal value
Frequency	± 0.15% of mid frequency	± 0.15% of mid frequency
Active Power	± 0.5% of Nominal value	± 0.2% of Nominal value
Re-Active Power	± 0.5% of Nominal value	± 0.2% of Nominal value
Apparent Power	± 0.5% of Nominal value	± 0.2% of Nominal value
Active energy (kWh)	± 0.5% of Nominal value	± 0.2% of Nominal value
Re Active energy (kVArh)	± 0.5% of Nominal value	± 0.2% of Nominal value
Apparent energy (kVAh)	± 0.5% of Nominal value	± 0.2% of Nominal value
Accuracy of Analog Output	1 % of Output end value	1 % of Output end value
Power Factor	±1% of Unity	±1.0% of Unity
Angle	±1% of range	±1% of range
Total Harmonic Distortion	±1%	±1%

Reference conditions for Accuracy

Reference temperature	23°C +/- 2°C
Input waveform	Sinusoidal (distortion factor 0.005)
Input frequency	50 or 60 Hz ±2%
Auxiliary supply voltage	Rated Value ±1%
Auxiliary supply frequency	Rated Value ±1%
Voltage Range	50... 100% of Nominal Value. 60... 100% of Nominal Value for THD.
Current Range	10... 100% of Nominal Value. 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.

Applicable Standards

EMC	IEC 61326
Immunity	IEC 61000-4-3. 10V/m min – Level 3 industrial low level
Safety	IEC 61010-1-2001 , Permanently connected use
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

Technical Specifications

Input Voltage

Nominal input voltage (AC RMS)	Phase –Neutral 63.5 / 133 / 239.6 / 254 VL-N Line-Line 110 / 230 / 415 / 440 VL-L
System PT primary values	100VLL to 692kVLL programmable on site.
Max continuous input voltage	120% of rated value

Input Current

Nominal input current	5A AC RMS.
System CT secondary values	1A & 5A programmable on site.
System CT primary values	From 1A up to 9999A (for 1 or 5 Amp)
Max continuous input current	120% of rated value

PT Secondary is onsite settable

Auxiliary Supply

AC-DC Auxiliary Supply	100V… 250 VAC DC +/- 10%
DC Auxiliary Supply	12…..48 VDC +/- 10%
AC Auxiliary supply frequency range	45 to 66 Hz

VA Burden

Nominal input voltage burden	< 0.2 VA approx. per phase
Nominal input current burden	< 0.6 VA approx. per phase
Auxillary Supply burden	< 4 VA approx OR < 5VA approx with 4-20mA analog output option

Overload Withstand

Voltage	2 x rated value for 1 second, repeated 10 times at 10 second intervals
Current	20x for 1 second, repeated 5 times at 5 min

Operating Measuring Ranges

Voltage	5… 120% of rated value
Current	5 … 120% of rated value
Frequency	40…70Hz / 400Hz
Power Factor	0.5 Lag ... 1... 0.8 Lead

Influence of Variations

Temperature coefficient	0.025%/°C for Voltage (50... 120% of rated value) 0.05%/°C for Current (10... 120% of rated value)

Display update rate

Response time to step input	1 sec approx.

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 RS-485 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

*No. of Pulses = $\dfrac{\text{Maximum Pulses}}{\text{CT Ratio}}$

Where, CT Ratio = (CT primary/ CT Secondary)

PT Secondary Ranges for Various Input Voltage

Input Voltage	PT Secondary Settable Range
110V L-L (63.5V L-N)	100V – 120V L-L (57V – 69V L-N)
230V L-L (133V L-N)	121V – 239V L-L (70V – 139V L-N)
415V L-L (239.6V L-N)	240V – 480V L-L (140V – 277V L-N)

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.

Technical Specifications

Environmental

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... 55 Hz, 0.15mm amplitude

Pulse output

Energy (can be programmed for different energy parameters simultaneously)	
Relay contact	(1NO+1NC)
Switching Voltage & current for Relay	240 VDC ,5 A

Default pulse rate divisor		
1 per Wh (up to 3600W)	1 per kWh (up to 3600kWh)	1 per MWh (above 3600kW)

Other Pulse rate divisors (applicable only when Energy on RS-485 is in W)			
10	1 per 10 Wh (up to 3600W)	1 per 10 kWh (up to 3600kWh)	1 per 10 MWh (above 3600kW)
100	1 per 100 Wh (up to 3600W)	1 per 100 kWh (up to 3600kWh)	1 per 100 MWh (above 3600kW)
1000	1 per 1000 Wh (up to 3600W)	1 per 1000 kWh (up to 3600kWh)	1 per 1000 MWh (above 3600kW)

Pulse Duration 60 ms, 100 ms, 200 ms
Above options are also applicable to Apparent and Reactive Energy.

Electrical Connections

For 3 Phase 4 Wire Unbalanced Load
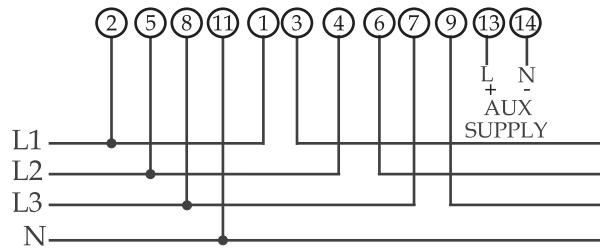
For 3 Phase 3 Wire Unbalanced Load
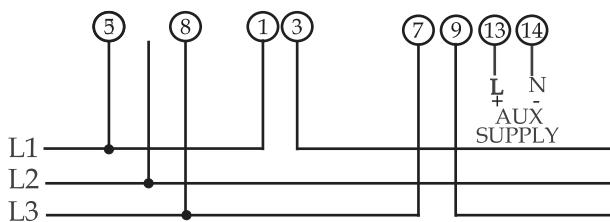
For Single Phase
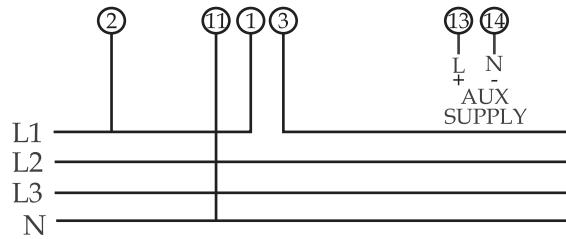
It is recommended that the wires used for connections to the instrument should have lugs soldered at the end. That is, the connections should be made with Lugged wires for secure connections. The Maximum diameter of the lug should be 7.0 mm and maximum thickness 3.5 mm.
Permissible cross section of the connection wires: <= 4.0 mm^2 single wire or 2 × 2.5 mm^2 fine wire.

Parameter Measurement and Display

| Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire	Single Phase 2W
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)	✓	✓	✓
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	✗	✓	✗

✓ - Available ✗ - Not available

Parameter Measurement and Display

Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire	Single Phase 2W
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	✓	✓	✓

 - Available - Not available

Dimensional Details

96 mm

92mm+0.8

96 mm

Display Area

92mm+0.8
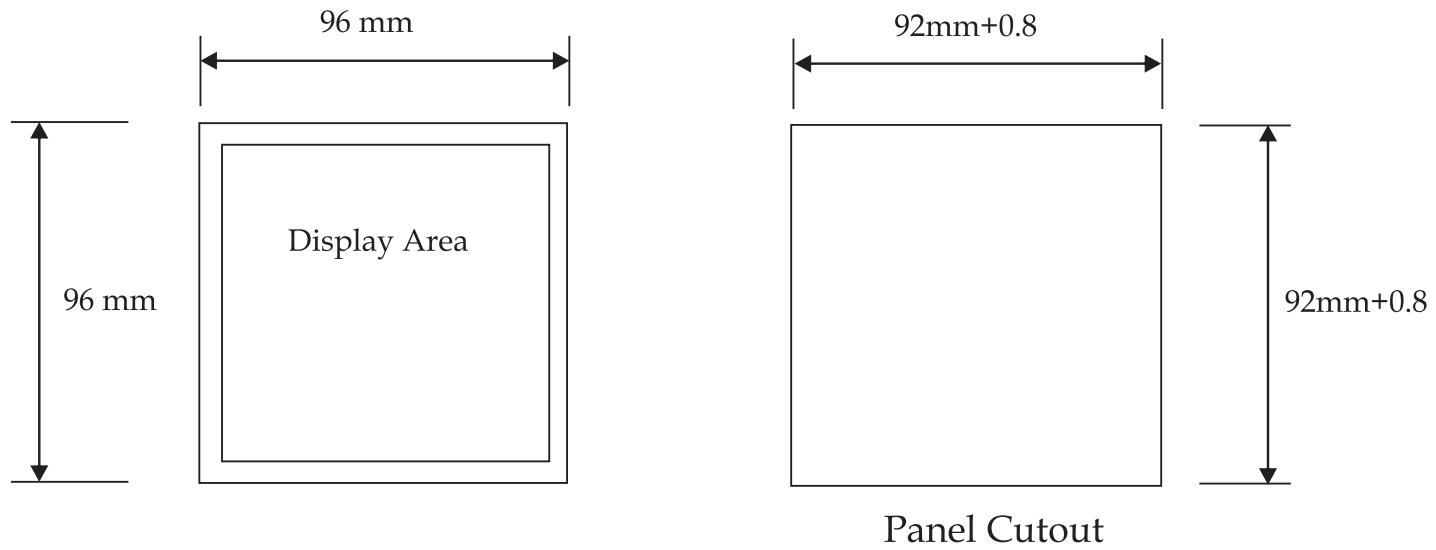
Panel Cutout

80 mm

Ordering information

		X	X	X	X	X	X	X	X	00000
Product Code	AP30-									
Accuracy	Class - 1.0%	1								
	Class - 0.5% (On request)	5								
	Class - 0.2% (On request)	2								
System Type	3 Ph. (PR. 3W or 4W)		3							
	1 Ph.		1							
Input Voltage / Current	120V L-N 1/5A			J						
	150V L-N 1/5A			O						
	208V L-N 1/5A			P						
	120V L-L 1/5A			N						
	150V L-L 1/5A			K						
	208V L-L 1/5A			8						
	277V L-L 1/5A			L						
	400V L-L 1/5A			C						
	415V L-L 1/5A			D						
	440V L-L 1/5A			E						
	480V L-L 1/5A			G						
Power Supply	100-250 V AC/DC +/-10%				U					
	12V-48 V DC +/-10%				D					
RS 485	MODBUS (RS-485) Output					R				
	Ethernet Port					E				
	MODBUS / Ethernet Not Used					Z				
Pulse Output	1 Pulse output						S			
	2 Pulse output						D			
	Pulse O/P not used						Z			
Analog Output	2 outputs (0 – 1mA)							1		
	2 outputs (4 – 20 mA)							2		
	Analog Outputs option not used							Z		
Input frequency	50 or 60 Hz								0	
	400 Hz								4	