Alpha 30

V	x1000
V L1-L2	IN
kVAr ●	kVArh
Sys	L1
	kAh
A	x1000
V L2-L3	Hz ●
kVA	kVAh
Min	L2
	%THD
kW	x1000 ●
V L3-L1	P.F.
Angle	kWh
Max	L3
	Demand

ST

Application

Alpha 30 measures important electrical parameters & replaces the multiple analog panel meters. It measures electrical parameters like AC current, Voltage, frequency, active energy import & active energy export, Current Demand, kW Demand, kVA Demand and Max Current Demand, Max kW Demand and Max kVA Demand. The instrument has optional output as one pulse output or two pulse output for energy measurement.

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 (Rs485)

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 (Rs485)

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 (RS485)

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 (RS485).

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

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).

Phase reversal indication

The instrument can detect wrong phase sequence or failure of one of the input voltages and displays "phase" error message.

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.

True RMS measurement

The instrument measures distorted waveform up to 15th Harmonic.

High brightness 3 line 4 digits LED display

Simultaneous display of 3 Parameters

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.

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.

Total Harmonic Distortion (THD)

The instrument can measures per phase THD of voltage and THD of current

Energy Count storage

In case of power failure, the instrument memorizes the last energy count

Programmable Energy format & Energy rollover count

Customer can assign the format for energy display on MODBUS (RS485) 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

Product Features

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.

Optional MODBUS (RS485) Output

The optional ModBus output enables the instrument to transmit all the measured parameters over standard MODBUS (RS485).

User Assignable Registers for MODBUS

Customer can assign MODBUS register address as per his need for faster response time.

Optional 2 Relay Output
(Pulse output / Limit switch)

The instrument can be programmed as Pulse output or Limit Switch.

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.

Limit switch: The instrument will trip the one or two relays if the programmed parameter exceeds the programmed High & Low Limits.

Configuration of the Instrument via MODBUS:

The instrument settings can be configured locally via front panel keys by entering into Programming mode or remotely via MODBUS (Rs485).

Optional Analog Outputs (2 Outputs):

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

Input Voltage

Nominal input voltage (AC RMS)	Phase –Neutral 57.7 - 346 V_{L-N} Line-Line 100 - 600 V_{L-L}
System PT primary values	100VLL to 692kVLL programmable on site
System PT secondary values	100VLL to 600VLL programmable on site
Max continuous input voltage	120% of rated value

Input Current:

Nominal input current	1A / 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

Auxiliary Supply

Auxiliary Supply	60 - 300 V AC DC OR 65 - 300 V AC DC for Ethernet Option OR 12 - 60 V AC DC
AC Auxiliary supply frequency range	45 to 66 Hz

VA Burden

Nominal input voltage burden	< 0.35 VA approx. per phase
Nominal input current burden	< 0.3 VA approx. per phase
Auxiliary Supply burden	< 5 VA approx OR < 7 VA approx with 4-20mA analog output or Ethernet 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	10… 120% of rated value
Current	5 … 120% of rated value
Frequency	40…70 Hz
Power Factor	0.5 Lag … 1… 0.8 Lead

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

Technical Specifications

Accuracy

	Class 1.0 (Standard)	Class 0.5 (on request)	Class 0.2 (on request)
Voltage	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Current	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Frequency	± 0.15% of mid frequency	± 0.15% of mid frequency	± 0.15% of mid frequency
Active Power	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Re-Active Power	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.4% of Nominal value
Apparent Power	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Active energy (kWh)	± 1.0% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Re Active energy (kVArh)	± 1.0% of Nominal value	± 0.5% of Nominal value	± 0.5% of Nominal value
Apparent energy (kVAh)	± 1.0% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Accuracy of Analog Output	1 % of Output end value	1 % of Output end value	1 % of Output end value
Power Factor	±1% of Unity	±1% of Unity	±1.0% of Unity
Angle	±1% of range	±1% of range	±1% of range
Total Harmonic Distortion	±1%	±1%	±1%

Note:- Measurement error is normally much less than the error specified above. Variation due to influence quantity is less than twice the error allowed for reference condition

Influence of Variations:

Temperature coefficient : (for rated value range of use (0…50°C)	0.025%/°C for Voltage (50… 120% of rated value) and 0.05%/°C for Current (10… 120% of rated value)

Display update rate

Response time to step input	1 sec approx

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

Environmental

Operating temperature	-10 to +55°C
Storage temperature	-20 to +65°C
Relative humidity	0... 90% non condensing
Warm up time	Minimum 3 minute
Shock	15g in 3 planes
Vibration	10... 55 Hz, 0.15mm amplitude

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 (up to 3600W),	1 per 10kWh (up to 3600kW),	1 per 10MWh (above 3600 kW)
100	1 per 100Wh (up to 3600W),	1 per 100kWh (up to 3600kW),	1 per 100MWh (above 3600 kW)
1000	1 per 1000Wh (up to 3600W),	1 per 1000kWh (up to 3600kW),	1 per 1000MWh (above 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 divisor	CT secondary = 1A Max pulse rate 3600 pulses/Ah * 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

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

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

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.

Parameter Measurement and Display

Sr No	Displayed Parameters	3Phase 4Wire	3Phase 3Wire
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)	✓	✓

Parameter Measurement and Display

Sr No	Displayed Parameters	3Phase 4Wire	3Phase 3Wire
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 Current 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	✓	✓

Electrical Connections

For 3 Phase 4 Wire Unbalanced Load
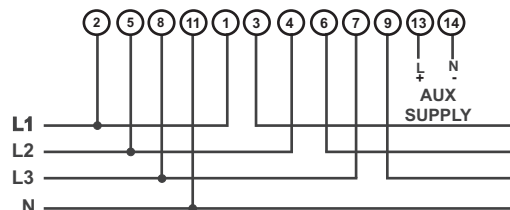
For 3 Phase 3 Wire Unbalanced Load
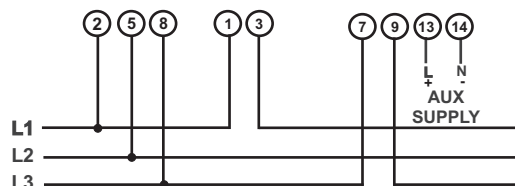
It is recommended that the wires used for connections to the instrument should have lugs soldered at the end. That is, the connections should be made with Lugged wires for secure connections. The Maximum diameter of the lug should be 7.0 mm and maximum thickness 3.5 mm.

Permissible cross section of the connection wires: <= 4.0 mm2 single wire or 2 × 2.5 mm2 fine wire.

Dimensions

96 mm

Display Area

96 mm

80 mm

92mm+0.8

92mm+0.8

Panel Cutout
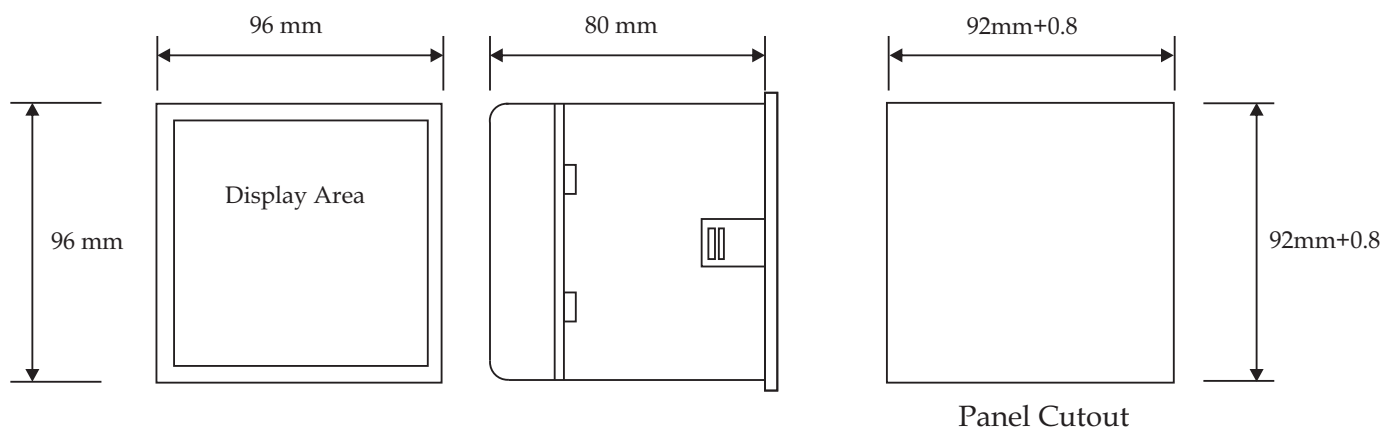
Ordering information

Product Code	AP30-
Accuracy Class	
Accuracy 1.0% **(Standard)**	1.0
Accuracy 0.5% **(on request)**	0.5
Accuracy 0.2% **(on request)**	0.2
Auxiliary Voltage	
60-300V AC DC	H
12-60V AC DC	L
Optional	
RS 485 + 2 Pulse output	1
RS 485 + 1 Pulse output + 2 Analog output	2
Ethernet	3
Option not used	Z

Order Code Example

Alpha 30 0.2 - H - 1