Technical Datasheet

Alpha 20X

Multifunction Meter



Alpha 20X measures important electrical parameters in 3 Phase 4 Wire, 3 Phase 3 Wire, 1 Phase 2 Wire and 1 Phase 3 Wire network. It displays many parameters at a glance. It measures electrical parameters like Active / Reactive / Apparent energy, power and all basic parameters. The instrument has one optional built in Relay output which can be configured as pulse output for energy measurement, as well as limit output. Optional MODBUS RTU over RS485 is built in for remote monitoring and configuration.

Application

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

Product Features

Energy Measurement As Per IEC 62053-21 & IEC 61557-12

- Alpha 20X is available in Accuracy Class 1
- Active Energy accuracy Class 1 as per IEC 62053-21 & IEC 61557-12
- Independent Import and Export Energy counter Active energy (kWh), Reactive energy (kVArh), Apparent energy (kVAh) measurement.

THD Measurement

- The instrument measures per phase and system THD up to 31st harmonics for voltage and current

True RMS Measurement

- The instrument measures distorted waveform up to 31st harmonics.

On-site Programmable PT/CT Ratios

- It is possible to program primary, secondary of external potential transformer (PT) & primary, secondary of external current transformer (CT) via front panel keys and MODBUS RTU.

Limit (Alarm) or Pulse Output (Optional)

- Available in Potential-free output
- Configurable as pulse output which can be used to drive an external counter for energy measurement.
- Configurable as limit (alarm) switch.

MODBUS RTU (RS485) Output (Optional)

- RS485 output enables the instrument to transmit all the Measured parameters over standard MODBUS RTU protocol
- The instrument can be configured locally via front panel keys as well as MODBUS RTU communication.

Storage Of Parameters Possible

- The instrument stores minimum and maximum values of System Voltage, System Current. Also Run Hour, ON Hour and number of AUX interrupts are stored.

Energy Count Storage

- In case of power failure, the instrument memorizes the last energy count. The instrument updates the energy counter in the non-volatile memory.

Impulse LED

- Impulse LED on the front of the instrument is useful for checking the accuracy of energy measured by the instrument.

Display

- 3-line, 4-digit bright red LED display and indication LEDs
- Display can be configured for automatic scrolling of parameters or manual scrolling through 4 keys as per requirement and application of user.

Demand

- Alpha 20X integrates demand value for Active Power (kW), Apparent Power (kVA) and Current (A).
- The demand integration time can be configured from 1min to 60min

Compliance To International Safety Standards

- Compliance to International Safety standard IEC 61010-1:2018

EMC Compatibility

- Compliance to International standard IEC 61326

Technical Specifications

Input Voltage	
Nominal input voltage (AC RMS)	100V L-L to 500V L-L
programmable on site.	(57.5V L-N to 288.67V L-N)
System PT primary values	100V L-L to 1200kV L-L programmable on site. (1000 MVA maximum power per phase) (1200kV L-L when CT primary ≤ 1002A)
Max continuous input voltage	120% of nominal value
Overload Indication	"-OL-" >121% of Nominal value
Nominal input voltage burden	< 0.3VA approx. per phase (at nominal 240V)
Overload Withstand	2 x rated value for 1 second, repeated 10 times at 10 second intervals
Input Current	
Nominal input current	1A/5A, on-site programmable
System CT primary values	From 1A to 9999A (1000 MVA maximum power per phase) (9999A when PT primary ≤ 120k VL-L)
Max continuous input current	120% of nominal value (average value)
Overload Indication	"-OL-" >121% 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	60-300V AC/DC (230V AC/DC nominal)
Lower Auxiliary supply range	20-60V AC/DC (24V AC / 48V DC nominal)
Aux Supply frequency	45 to 65 Hz range
Auxiliary Supply burden	< 6VA approx
Operating Measuring Ranges	
Current (Energy Measurement)	1 to 120% of nominal value
Starting current	As per Standard IEC 62053-21 (Class 1)
Voltage	19V L-L to 600V L-L (11V L-N to 346V L-N)
Power Factor	0.5 Lag ... 1 ... 0.5 Lead
Frequency	40Hz to 70Hz
Reference Conditions for Accuracy	
Reference Temperature	23°C +/- 2°C
Influence of Temperature	0.015%/°C for Voltage & 0.025%/°C for Current
Input Waveform	Sinusoidal (distortion factor 0.005)
Input frequency	50/60 Hz ± 2%
Auxiliary supply frequency	50/60 Hz ± 1%
Voltage Range	20 ... 120% of nominal value
Current Range	10 ... 120% of nominal value
Total Harmonic distortion	40 (up to 31st Harmonics)
Voltage range for THD	50... 100% of nominal value
Current range for THD	20... 100% of nominal value

Technical Specifications

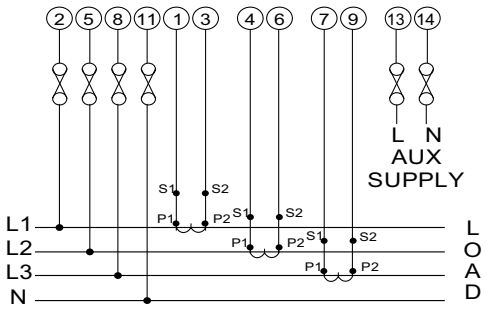
Accuracy (Energy)	
Active Energy	Class 1 as per IEC 62053-21 & IEC 61557-12
Apparent Energy	Class 1 as per IEC 61557-12
Reactive Energy	Class 2 as per IEC 62053-23 & IEC 61557-12
Accuracy	
Voltage	± 0.5% of nominal value
Current	± 0.5% of nominal value
Frequency	± 0.1% of mid-frequency
Active Power	± 1% of nominal value
Reactive Power	± 1% of nominal value
Apparent Power	± 1% of nominal value
Power Factor/ angle	± 2°
THD (Voltage / Current)	± 3%
Display Update Rate	
Response time to step input	1 sec approx.
Applicable Standards	
EMC	IEC 61326–1:Table 2
Safety	IEC 61010-1:2018 use
Ingress Protection (IP) for water & dust	IEC 60529
Isolation	
Pollution degree	2
Installation category	III
High voltage test :	
Input + AUX vs Surface	4 kV RMS, 50 Hz, 1 min
Input + AUX vs Remaining Circuit	3.3 kV RMS, 50 Hz, 1 min
MODBUS vs Relay	2 kV RMS, 50 Hz, 1 min
Environmental	
Operating temperature	-20 to +70°C
Storage temperature	-25 to +75°C (Tested as per IEC 60688)
Relative humidity	0... 95% RH (non-condensing)
Warm up time	Minimum 3 minutes
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	IP20 (Terminal side) and IP54 (Front side)
Altitude	2000m

Technical Specifications

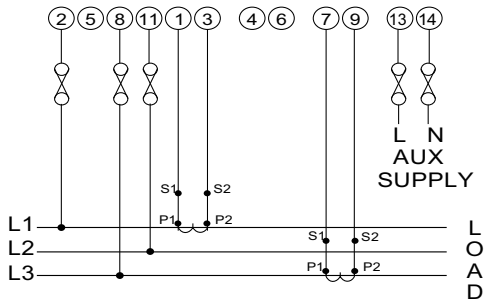
Installation	
Mechanical Housing	Lexan 940 (polycarbonate), Flammability Class, V-0 acc. to UL 94,
	self-extinguishing, non-dripping, free of halogen
Mounting Position	Panel Mounted (96X96)
Connection Element	Conventional screw type terminal with indirect wire terminals
	(Screw Torque: 0.5 Nm)
Connection Terminal	$4mm^2$ solid or $2.5mm^2$ stranded cable
Weight	250 Gram Approx.

Interfaces	
Impulse LED	For Energy testing
Relay (Optional)	250V AC, 5A AC; 30V DC, 5A DC
MODBUS (Optional)	RS485, max.1200 m.
	Baud rate: 2.4k, 4.8k, 9.6k, 19.2k, 38.4k, 57.6k bps (Response time < 200ms)

Electrical Connections

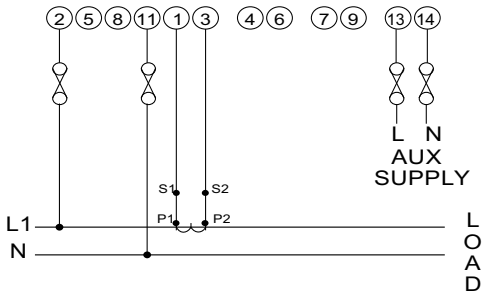


a) 3 Phase 4 Wire

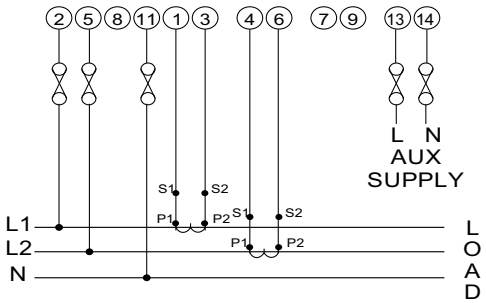


b) 3 Phase 3 Wire

Note : L2 phase needs to be connected in terminal 11 instead of terminal 5 only for 3 Phase 3 Wire connections.



c) Single Phase Load (1 Phase 2 Wire)



d) Split Phase Load (1 Phase 3 Wire)

It is recommended that the wires used for connections to the instrument should have lugs crimped at the end. That is, the connections should be made with Lugged wires for secure connections.

Technical Specifications

Parameter Measurement and Display

✓ : Available × : Not Available

Sr. No.	Parameter	3 Phase 4 Wire	3 Phase 3 Wire	1 Phase 2 Wire	1 Phase 3 Wire
1	System Volts	✓	✓	✓	✓
2	System Current	✓	✓	✓	✓
3	Voltage L1	✓	×	×	✓
4	Voltage L2	✓	×	×	✓
5	Voltage L3	✓	×	×	×
6	Voltage L1-2	✓	✓	×	✓
7	Voltage L2-3	✓	✓	×	×
8	Voltage L3-1	✓	✓	×	×
9	Current L1	✓	✓	×	✓
10	Current L2	✓	✓	×	✓
11	Current L3	✓	✓	×	×
12	Frequency	✓	✓	✓	✓
13	System Active Power	✓	✓	✓	✓
14	Active Power L1	✓	×	×	✓
15	Active Power L2	✓	×	×	✓
16	Active Power L3	✓	×	×	×
17	System Reactive Power	✓	✓	✓	✓
18	Reactive Power L1	✓	×	×	✓
19	Reactive Power L2	✓	×	×	✓
20	Reactive Power L3	✓	×	×	×
21	System Apparent Power	✓	✓	✓	✓
22	Apparent Power L1	✓	×	×	✓
23	Apparent Power L2	✓	×	×	✓
24	Apparent Power L3	✓	×	×	×
25	System Phase Angle	✓	✓	✓	✓
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 Active Energy	✓	✓	✓	✓
34	Export Active Energy	✓	✓	✓	✓
35	Inductive Reactive Energy	✓	✓	✓	✓
36	Capacitive Reactive Energy	✓	✓	✓	✓
37	Apparent Energy	✓	✓	✓	✓
38	RPM	✓	✓	✓	✓
39	Min and Max System Voltage	✓	✓	✓	✓
40	Min and Max System Current	✓	✓	✓	✓
41	Run Hour	✓	✓	✓	✓
42	On Hour	✓	✓	✓	✓
43	Number of Interruptions	✓	✓	✓	✓
44	Current Demand	✓	✓	✓	✓

Technical Specifications

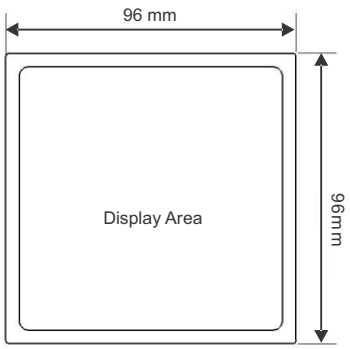
Parameter Measurement and Display

✓ : Available × : Not Available

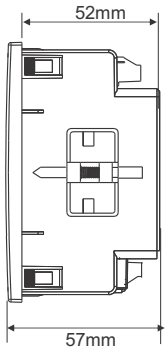
Sr. No.	Parameter	3 Phase 4 Wire	3 Phase 3 Wire	1 Phase 2 Wire	1 Phase 3 Wire
45	kVA Demand	✓	✓	✓	✓
46	Import kW Demand	✓	✓	✓	✓
47	Export kW Demand	✓	✓	✓	✓
48	Max Current Demand	✓	✓	✓	✓
49	Max kVA Demand	✓	✓	✓	✓
50	Max Import kW Demand	✓	✓	✓	✓
51	Max Export kW Demand	✓	✓	✓	✓
52	Neutral Current	✓	×	×	✓
53	Max Neutral Current	✓	×	×	✓
54	%THD Voltage L1	✓	✓	×	✓
55	%THD Voltage L2	✓	×	×	✓
56	%THD Voltage L3	✓	✓	×	×
57	%THD Current L1	✓	✓	×	✓
58	%THD Current L2	✓	×	×	✓
59	%THD Current L3	✓	✓	×	×
60	System Voltage THD	✓	✓	✓	✓
61	System Current THD	✓	✓	✓	✓
62	Min and Max Import Active Power*	✓	✓	✓	✓
63	Min and Max Export Active Power*	✓	✓	✓	✓
64	Min and Max Inductive Reactive Power*	✓	✓	✓	✓
65	Min and Max Capacitive Reactive Power*	✓	✓	✓	✓
66	Min and Max Apparent Power*	✓	✓	✓	✓
67	Min and Max Line Voltage*	✓	✓	✓	✓
68	Min and Max Line Current*	✓	✓	✓	✓

*Note - Line and System parameters Min Max values are shown on Modbus only.

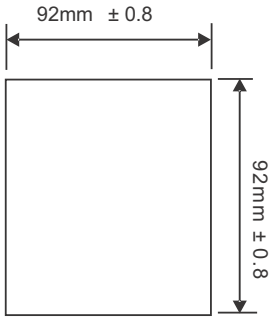
Dimensions



Front View



Side View



Panel Cutout

Wiring Guidelines

Solid with Pin-type lugs (sq. mm)	1 to 2.5
Stranded with pin-types lugs (sq. mm)	1 to 2.5
Torque value (Nm) 1. Aux and Voltage terminals 2. Current Terminals 3. RS485 and Relay terminals	 0.5 to 0.6 0.4 to 0.5 0.3 to 0.4
Length available for lug entry in terminal (mm)	9.5

Ordering Information

Ordering Information	DE30-	3	3	01	02	X	X	5	00ST
Product Type	Alpha 20X								
System Type	3 Phase (On-site configurable as 1/3 Phase)								
Input voltage	100-500VLL 50/60Hz								
Input Current	CT-1/5A								
Output Option	NONE					Z			
	RS485 - 1 Relay Output					R			
Auxiliary Supply	20-60VAC/DC						L		
	60-300V AC/DC						H		
Accuracy	Class 1								

Order Code Example

Order Code Example : DE30-330102RH500ST

Alpha 20X - Input 500VLL 50/60Hz, 1/5A, With RS485 + 1 Relay Output, Aux 60-300V AC/DC

sifam tinsley
PRECISION INSTRUMENTATION

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