POWER QUALITY MONITORS

Monitor the healthiness of the power systems effectively.

## IDENTIFY POTENTIAL ISSUES AND MAXIMIZE POWER QUALITY.

- Power quality inspection of main incomer
- Protection of equipment from Under/ Over Voltage or Current or Frequency
- Process control
- Protection of 3 phase equipment from Single phase prevention, Overload etc
- RTC setup available through communication.

REMOTELY MONITOR, EASILY VISUALISE AND ANALYSE POWER DATA.

- **Dual communication port- RS485, Ethernet-** simultaneous polling
- **Built in web server** displays all the parameters and waveform for Voltage and current
- **256MB storage** downloadable through USB - Continuous logging in pen drive up to 8GB
- **12AM snapshot**, 31st day snapshot
- Measures THD and Individual harmonics upto **63rd order** with a sampling rate of **512 samples/cycle** (PN)

BETTER EQUIPMENT AND ELECTRICAL SYSTEM DESIGN.

- Captures and measures power quality events: K Factor, Crest factor, Dip/Swell, Interruption and unbalance in accordance with EN 50160
- Record events such as Dip/Swell for voltage with the time stamp in 1s duration
- Representation of waveforms for instantaneous V,I, Dip/Swell. Voltage and Current harmonics histogram (PN only)
- Phase wise voltage Dip/Swell waveforms (PN only)

63rd Harmonics recording

512 SAMPLING RATE For detailed monitoring

SAG | SWELL PQ Measurements
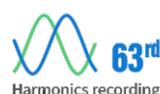
CAPTURE.
ANALYSE.
EXECUTE.

Collect various electrical load parameters from the field, visualize hidden patterns through an EMS solution, and make data-driven management decisions.
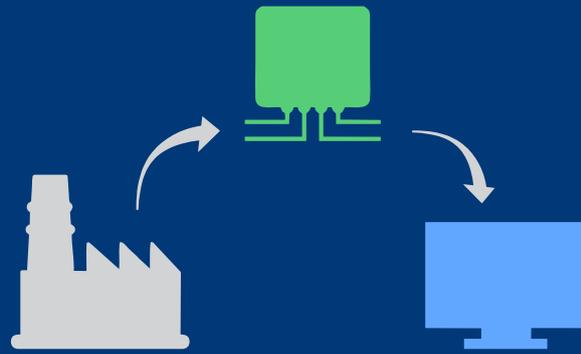
Features

- Simultaneous sampling of voltage and current
- Programmable PT & CT ratio
- **High / Low recording for last one minute VLL and A**
- Accuracy class 1.0 as per IEC 62053-21, Class 0.2s - IEC 62053-22, 0.5s - IEC 62053-22 (optional)
- User programmable Password Protection
- Measures THD and Individual harmonics up to 63rd order for PN and 31st order for EN
- Sampling rate of 512 samples / cycle for PN and 256 samples / cycle for EN
- **Voltage measurements up to 600 VLL**
- Representation of waveforms for instantaneous V, I, voltage and current harmonics histogram for PN.
- Records events and waveforms of such as **Dip & Swell** for voltage input with the time stamp in 1s duration applicable for power quality (PN)
- CO_2 emission, ON Hrs, Power Interruptions
- **Max demand, 12am snapshot,** 31st day snapshot.
- **Demand update every second** to forecast VA, W & VAR
- True PF and Displacement PF(EN)
- Programmable starting current in % of 5A secondary (Default 10mA)
- Programmable Auto scrolling time - 1 sec. to 10 sec. (Default 5 sec.) - available in PN
- Programmable Energy display - Counter or Resolution based
- Energy resetting at 99999999kVAh x MF
- Front POP for better accuracy 16000 Imp/KWh
- 8 Parameter display at a time, 8 digits energy (PN)
- Byte order option - Field Programmable Float/ Little Endian/data format (PN)
- Optional **neutral current measurement** (EN 7500)

Optional Features

- **Digital outputs - 2/4** potential free contacts with programmable time delay Hysteresis of 1%. Trip time delay: 1 to 180 sec. Single relay o/p configurable up to 23 parameters (VLL, A, F, PF, kW, kVA….) with auto/manual recovery. Manual override option available
- TOD option (Energy & Demand upto 8 slots)
- Analog Input upto 2. Accuracy of class 1% FS - Input signal 4-20 mA or 0-20mA selectable
- Digital Input upto 4 - Four digital input (5-24V) - Programmable for high frequency (72000 RPM) or low frequency (6 RPM). ON and OFF time for low frequency input
- Analog Output - Two independently programmable to 0-20 mA (or) 4-20 mA (On Request)
- Individual Harmonics upto 63rd order for PN, 31st for EN
- Upto 100/200A direct measurements using Hanging CT or Clip on or Split Core CT (MOQ).
- Dual Source (Only for EN)
- Ethernet Interface - Modbus TCP, BACNET IP
- 4 Relay Demand Controller - 8 TOD optional.
- Rogowski Coil up to 3000A

High Profile Multifunctional Meter

Demand Controller

- Demand Prediction based on sliding or fixed
- Forecast interval 1% to 50% of demand period (manually set)
- **Max Demand 4 high/4 low** (PN)
- Demand control based on programmable parameters kVA, kW & kVAR.
- Either 2 or 4 Relay outputs for circuit breaker or contactor control for demand controller
- Optional **8 Demand and Energy TOD slots**

High Profile Dual Source Meter

- 240V AMF Input
- Dual source with Demand Monitor

Ethernet Communication - Only for EN & PN

- User configurable **MQTT data transfer time interval**
- Programming option for MODBUS or MQTT
- DNS server connection configuration option for MQTT
- **Web browser** for configuration and setup
- Configuring through web page for selected parameters (RAW-JSON data)

BACNET IP Meter

Ethernet Interface:
BACNET IP Protocol supports read & read multiple for 240 parameter as Analog Input (restricted option).

Multiplication Factor
Counter based energy mode

Full Scale in Watts : $\sqrt{3} \times$ VPri x Apri	0.4k to 4.0k	4.01k to 40k	40.1k to 400k	400.1k to 4000k	4M to 40 M	40 M to 400 M	400M to 4000M
Multiplication Factor:	0.01	0.1	1.0	10	100	1000	10000
Unit of display	kWh					MWh	GWh

Product Selection:	EN 8400	EN 8420	EN 7500	EN 7520	PN 8700
ACCURACY OPTION	Customised LED		Segmented LCD		Graphical LCD
CLASS 1.0	■	■	■		■
CLASS 0.2S/0.5S	□	□ 0.5S	■ 0.5S	■ 0.5S	□
BASIC PARAMETERS					
V12 V23 V31	■	■	■	■	■
V V1 V2 V3	■	■	■	■	■
A A1 A2 A3	■	■	■	■	■
Hz	■	■	■	■	■
Angle V & A, RPM	■	■	■	■	■
Unbalance V & A	■	■	■	■	■
Neutral Current (Calculated)	■	■	■	■	■
POWER PARAMETERS					
W W1 W2 W3	■	■	■	■	■
VA VA1 VA2 VA3	■	■	■	■	■
PF PF1 PF2 PF3	■	■	■	■	■
VAR VAR1 VAR2 VAR3	■	■	■	■	■
POWER QUALITY PARAMETERS					
THD - Voltage and Current	■	■	■	■	■
Individual Harmonics	31st □ *	31st □ *	31st □ *	31st □ *	63rd □
K Factor, Crest Factor					■
High Low - Instantaneous					■
High Low - Last Minute (VLL and Amps)	■ *	■ *	■ *	■ *	■ *
Voltage Sag, Swell and Interruptions					□
Power Cycles	■	■	■	■	■
TEHD and TOHD					■
Power THD and TDD					■
INTEGRATED PARAMETERS					
Wh	■	■	■	■	■
VAh	■	■	■	■	■
VARh -Ind	■	■	■	■	■
VARh-Cap	■	■	■	■	■
Load Hours	■	■	■	■	■
Phase Energy and Load hours	■ *	■ *	■ *	■ *	■ *
RD (Import & export)	■	DS	■	DS	■
Wh- Total and Net					■
VAh- Total and Net					■
VARh - Total and Net					■
ON hours	■	■	■	■	■
CO2 Emission	■	■			■
Bargraph (% Load)	■	■	■	■	
Volt squared hours					■
Amp squared hours					■
TOD PARAMETERS					
TOD Demand - Import	□ *	□ *	□ *	□ *	□
TOD Energy - Import and Export	□ *	□ * Imp	□ *		□
DEMAND PARAMETERS					
Rising Demand (Sliding/Block - Programmable)	□	□	□	□	□
Forecast demand	□	□	□	□	□
Maximum demand	□	□	□	□	□
Demand Profile 4High & 4 Low					□ *
ADDITIONAL FEATURES					
12am & 31st day snap shot	■ *	■ *	■ *	■ *	■ *
Data Logger - 512kb, Time interval 1 min to 12 hrs selectable. Programmable Parameters upto 29.	512kb □ *	512kb □ *	512kb □ *	512kb □ *	□ *
Load Efficiency	■ *	■ *	■ *	■ *	■ *
Energy Trends					■ *
Dynamic communication	■ *	■ *	■ *	■ *	■ *
DUAL SOURCE		■		■	
4th CT (Neutral)			□	□	
ADDITIONAL OPTIONAL FEATURES(ANY ONE)					
Ethernet +256 MB Data Logging	□				□
Ethernet (TCP IP)	□				
2DI + 2DO	□				▲ *
2AI + 2DO	□				▲ *
2DO	□		2DO □	1DO □	
2AO (on request)	▲ *				
4DI	▲ *				▲ *
4DO	▲ *				▲ *
DMC	4R ▲ *		2R □		4R ▲ *
COMMUNICATION					
RS485 (MODBUS)	■	■	■	■	■
WiFi	▲		▲		▲
ETHERNET	▲				▲
TCP/IP(MODBUS) - with 2DI, 2DO	▲				▲
BACNET IP - without I/O)	▲				

■ Default   □ Optional   ▲ Restricted option   * Through communication only

Technical Specification

Specification	Description
GENERAL CHARACTERISTICS	
Display type:	Graphical LCD for PN, LED for EN 84xx, LCD for EN 75xx. Integrated 8 digits, Instantaneous 4 digits.
Sensing / Measurement:	True RMS, 1 sec update time, 4 Quadrant power & energy
Rated Voltage:	50 - 600 VLL
Rated Current:	10 mA - 6A
Frequency:	45 - 65 Hz
Sampling rate	512 samples / cycle / channel for PN, 256 for EN
Measured accuracy class:	Class 1 as per IEC 62053-21 / Class 0.5 / Class 0.2S as per IEC 62053-22 (Optional)
Permissible overload:	120%, Burden: 0.2VA per phase
External fuse rating:	200 mA
CT PT ratio max.:	2000 MVA programmable
Auxiliary supply:	80 - 300V AC / DC (Lower AUX. on request based on MOQ)
Power consumption:	4VA nominal. 5VA for DMC
Data update rate:	1 sec.
COMMUNICATION	
Rs485 MODBUS:	*Device ID & Parity:* 1-247 & odd, even, none (preferred even) *Baud rate:* 9600 bps to 38400 bps (preferred 9600 bps) *Isolation:* 2000 volts AC isolation for 1 minute between communication & other circuits.
Optional	ETHERNET TCP IP / BACNET IP, **WiFi:** WiFi Protocol: 802.11 b/g/n; Frequency: 2.4 Ghz - 2.5 Ghz Security: WP/WPA2, WPA-PSK/WPA2-PSK Encryption: WEP/TKIP/AES; Network Protocol: IPV4, TCP Receive Sensitivity: -83 dBm Typical
ENVIRONMENTAL CHARACTERISTICS	
Operating temperature:	-10°C to +55°C (14°F - 130°F)
Storage temperature:	-25°C to +70°C (-13°F - 158°F)
Humidity:	5% to 95% non-condensing
Altitude:	Below 2000 mts
Measurement category:	CAT III
Pollution degree:	2 (As per IEC 61010)
PROTECTION CLASS	
Ingress protection:	IP20 - terminal side, IP 54 - Front facia panel mount (Double insulation as per IEC 61010-1)
SAFETY AND STANDARDS	
Construction:	IEC/EN 61010-1 EDITION 3, CAT III, 300V LN / 600V LL, Protection Class II
Standards:	UL 61010-1, IEC/EN 62052-11
MECHANICAL CHARACTERISTICS	
Weight:	Unpacked: 600gms, Packed: 800gms
Torque:	1 N-m (For 5A)
Wire-guage:	11 AWG (For 5A)
ELECTROMAGNETIC COMPATIBILITY	
Electrostatic discharge:	IEC 61000-4-2
Immunity to electromagnetic RF fields:	IEC 61000-4-3
Conducted immunity:	IEC 61000-4-6
Immunity to magnetic fields:	IEC 61000-4-8
Immunity to voltage dips and interruptions:	IEC 61000-4-11
Immunity to surge waves:	IEC 61000-4-5
Fast transient:	IEC 61000-4-4
Conducted and radiated emission:	CISPR - 22

Mechanical Specification

EN / PN

EN / PN with Ethernet / BacNet

EN 7500