



# POWER QUALITY MONITORS

Monitor the **healthiness** of the power systems effectively.

## MAXIMIZE POWER QUALITY AND SYSTEM RELIABILITY.

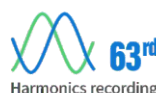
- Power quality inspection of main incomer
- Protection of equipment from Under/ Over Voltage or Current or Frequency
- Process control
- Protection of 3 phase equipment from Single phase prevention, Overload etc
- RTC setup available through communication.

## 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)

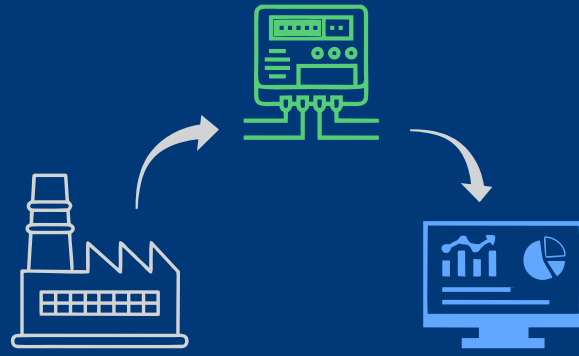
## BETTER EQUIPMENT AND ELECTRICAL SYSTEM DESIGN.

- 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)



# 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

- **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 128 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
- CO2 emission, ON Hrs, Power Interruptions
- **Max demand, 12am snapshot**, 31st day snapshot and programmable Data-logger up to 1 MB
- Simultaneous sampling of voltage and current, programmable PT & CT ratio
- **Demand update every second** to forecast VA, W & VAR
- True PF and Displacement PF
- 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), Flash 1MB, 12 am snapshot, 31st day snapshot
- Demand update every second to forecast kVA, kW & kVAR **concurrently**
- 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 (MQTT)

- 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
- Supports **SMTP protocol** to send an alert email
- 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 : $\sqrt{3} \times V_{Pri} \times A_{Pri}$	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	PN 8700
<b>ACCURACY OPTION</b>	Customised LED		Graphical LCD	
CLASS 1.0	■	■		■
CLASS 0.2S/0.5S	□	□ 0.5S	■ 0.5S	□
<b>BASIC PARAMETERS</b>				
V12 V23 V31	■	■	■	■
V V1 V2 V3	■	■	■	■
A A1 A2 A3	■	■	■	■
Hz	■	■	■	■
Angle V & A, RPM	■	■	■	■
Unbalance V & A	■	■	■	■
Neutral Current ( Calculated)	■	■	■	■
<b>POWER PARAMETERS</b>				
W W1 W2 W3	■	■	■	■
VA VA1 VA2 VA3	■	■	■	■
PF PF1 PF2 PF3	■	■	■	■
VAR VAR1 VAR2 VAR3	■	■	■	■
<b>POWER QUALITY PARAMETERS</b>				
THD - Voltage and Current	■	■	■	■
Individual Harmonics	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				■
<b>INTEGRATED PARAMETERS</b>				
Wh	■	■	■	■
VAh	■	■	■	■
VARh -Ind	■	■	■	■
VARh-Cap	■	■	■	■
Load Hours	■	■	■	■
Phase Energy and Load hours	■ *	■ *	■ *	■ *
RD (IE)	■	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				■
<b>TOD PARAMETERS</b>				
TOD Demand - Import	□ *	□ *	□ *	□
TOD Energy - Import and Export	□ *	□ *	□ *	□
<b>DEMAND PARAMETERS</b>				
Rising Demand (Sliding/Block - Programmable)	□	□	□	□
Forecast demand	□	□	□	□
Maximum demand	□	□	□	□
Demand Profile 4High & 4 Low				□ *
<b>ADDITIONAL FEATURES</b>				
12am & 31st day snap shot	■ *	■ *	■ *	■ *
Data Logger - 512kb (fixed parameter with 15/30min interval, 1MB (programmable parameters 1min to 12hrs)	512kb □ *	512kb □ *	512kb □ *	1MB □ *
Load Efficiency	■ *	■ *	■ *	■ *
Energy Trends				■ *
Dynamic communication	■ *	■ *	■ *	■ *
DUAL SOURCE		■		
<b>ADDITIONAL OPTIONAL FEATURES(ANY ONE)</b>				
Ethernet +256 MB Data Logging				□
2DI				▲ *
4 DI				▲ *
2DO				▲ *
2AI	▲ *			▲ *
2AO (on request)	▲ *			▲ *
2AI, 2DO	▲ *			▲ *
4DO	▲ *			▲ *
DMC	4R ▲ *		2R □	4R ▲ *
<b>COMMUNICATION</b>				
RS485 (MODBUS)	■	■	■	■
WiFi	▲		▲	
ETHERNET	▲			▲
TCP/IP(MODBUS) - with 2DI, 2DO	▲			▲
BACNET IP - without I/O	▲			

■ Default □ Optional ▲ Restricted option \* Through communication only

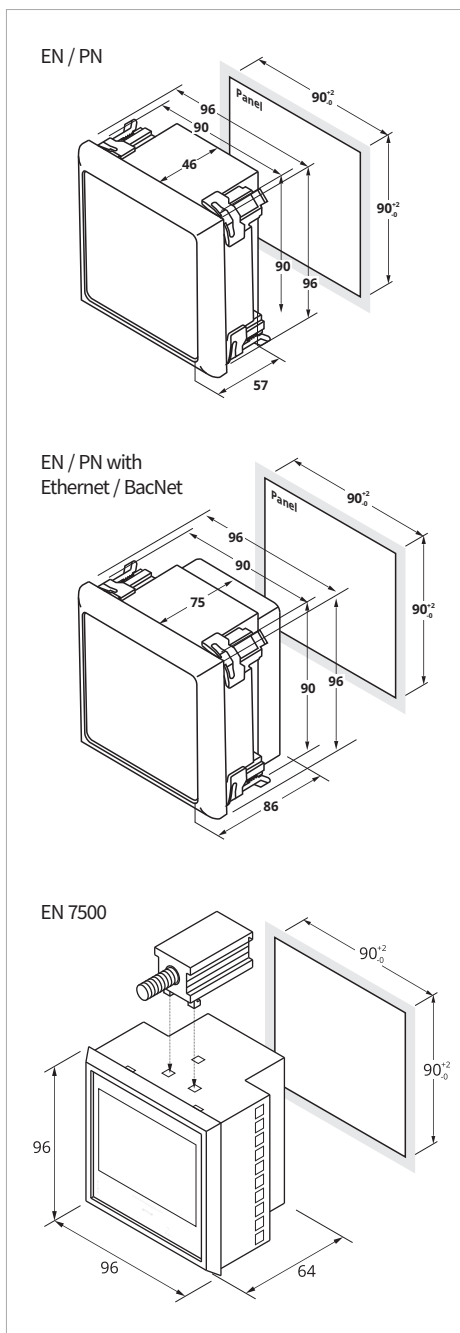
# Rogowski Coil

for EN8400



Rogowski Coil 3000A or Clip on CT upto 200A

## Mechanical Specification



## Technical Specification

Specification	Description
<b>GENERAL CHARACTERISTICS</b>	
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, 128 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.
<b>COMMUNICATION</b>	
RS485 MODBUS:	<i>Device ID &amp; Parity:</i> 1 - 125 for EN, 1-247 for PN & odd, even (preferred even) <i>Baud rate:</i> 9600 bps to 38400 bps (preferred 9600 bps) <i>Isolation:</i> 2000 volts AC isolation for 1 minute between communication & other circuits.
Optional	ETHERNET TCP IP / BACNET IP, <b>WiFi:</b> 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
<b>ENVIRONMENTAL CHARACTERISTICS</b>	
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)
<b>PROTECTION CLASS</b>	
Ingress protection:	IP 51 (IP 54 front facia optional) & Double insulation (as per IEC 61010-1)
<b>SAFETY AND STANDARDS</b>	
Construction:	IEC/EN 61010-1 EDITION 3, CAT III, 300V LN / 600V LL, Protection Class II
Standards:	UL 61010-1, IEC/EN 62052-11
<b>MECHANICAL CHARACTERISTICS</b>	
Weight:	Unpacked: 600gms, Packed: 800gms
Torque:	1 N-m (For 5A)
Wire-guage:	11 AWG (For 5A)
<b>ELECTROMAGNETIC COMPATIBILITY</b>	
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