Data Sheet

RISH PQM

Power Quality Monitor

RoHS   C E

Measure   Control   Record   Analyze

RISH PQM is a compact, multi-function panel mount power quality monitor, which measures, calculates and displays major electrical parameters of three phase power system like Voltage, Current, Active / Fundamental Reactive / Apparent Power and Energy, Individual Harmonics, Sags and Swells.

Application :

- Energy billing
- Electrical load monitoring
- Sub-metering
- Test Benches and Laboratories

Product Features:

Measures & Monitors more than 80 parameters:
☞All basic electrical parameters.
☞Power quality parameters (Overcurrent ,Sag & Swell).
☞Individual harmonics contains of per phase voltage and current.

True RMS measurement:
☞The instrument measures distorted waveform upto 56th Harmonic for 50Hz and upto 46th Harmonic for 60Hz.

Power Quality Measurement :
☞Sags & Swells detection

☞Measurable up to 56th (50Hz) harmonic on each phase. Maximum any 6 harmonics can be monitored simultaneously for each phase.

☞Measurement of RMS value of fundamental and per phase voltage and current harmonics.

☞(%) THD of per phase voltage and current

☞Distortion factor of individual harmonics.

☞Time stamping of sags & swells.

Graphical Analysis:
☞Per phase individual harmonic bar graph representation.
☞Real time vector representation of all 3 Phases for complete system analysis.

Energy class 0.5S as per IEC 62053 :
☞Independent Import and Export energy counter.
☞Active energy (kWh), Fundamental Reactive energy (kVArh) & Apparent energy (kVAh) measurement.
☞Accuracy as per IEC 62053-22, IEC62053-23
☞Impulse for energy verification

Onsite programmable for user desired application:
☞Onsite programmable input voltage (100V$_{LL}$ to 500 V$_{LL}$), input current (1A or 5A) and system configuration (3 phase 4Wire (unbalanced) or 3phase 3Wire (unbalanced) network).
☞Onsite programmable CT ratio & PT ratio.
☞Wide auxiliary power supply range: 60-300VAC/DC.

Time Of DAY (TOD / TOU):
☞Easy programmable tariff schedule
☞4 seasons
☞4 tariffs
☞6 time zones per day
☞4 types of days
☞5 tariff energy registers
☞Automatic daily profile storage for a one day, one month & one year
☞Cost per kWh calculation

Custom color setting:
☞User can assign individual colour for each phase as per the application requirement through display and MODBUS.

Real Time Clock (RTC):
☞Displays time and date.

Phase sequence detection:
☞Incorrect phase sequence indication or phase failure indication on any of the input voltages.

Direct remote access via MODBUS:
☞Remote access of measured and configuration parameters.
☞User Assignable Registers for MODBUS.
☞Programmable baud rates up to 38.4kbps.

Limit (Alarm) & Pulse Relay Output:
☞Potential free, very fast acting relay contact
☞Configurable as pulse output which can be used to drive an external counter for energy measurement.
☞Configurable as limit (alarm) switch for voltage, current, power, total harmonic distortion(%) etc.

Ethernet Interface (Modbus TCP/IP Protocol):
☞The optional Ethernet Interface output transmit all the measured parameters on Modbus TCP/IP.
☞ Also user can configure instrument via Ethernet Interface.

Compliance to International Safety standards:
☞Compliance to International Safety standard IEC 61010-1- 2010

EMC Compatibility:
☞Compliance to International standard IEC 61326.
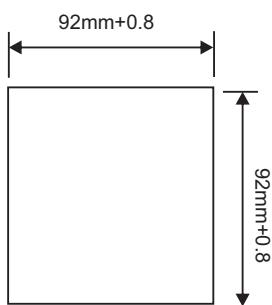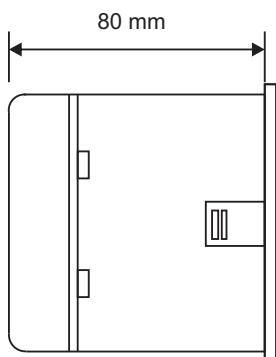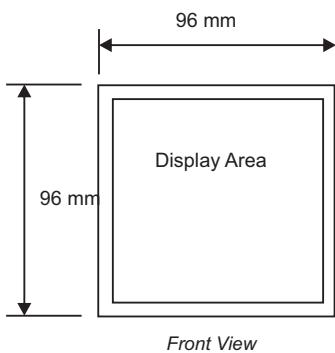
Measure   Control   Record   Analyze

Dimensions Details:

96 mm

Display Area

96 mm

Front View

80 mm

Side View

92mm+0.8

92mm+0.8

Panel Cutout

Technical Specifications:

Accuracy :

Active Energy	Class 0.5S as per IEC 62053 - 22
Apparent Energy	Class 0.5S as per IEC 62053 - 22
Fundamental Reactive Energy	Class 2 as per IEC 62053 - 23
Reference conditions (As per. IEC/EN 60688)	Ambient 23°C ± 1°C Sinusoidal (distortion factor 0.005), 50 / 60 Hz
Active Power	±0.2% of Nominal value
Fundamental Reactive Power	±0.2% of Nominal value
Apparent Power	±0.2% of Nominal value
Power Factor / Phase Angle	±2°
Voltage	±0.2% of Nominal value
Current	±0.2% of Nominal value
Frequency	±0.1% of mid frequency
Harmonics	±1.0%
THD Voltage / Current	±1.0%

Input Voltage:

Nominal input voltage (AC RMS)	57.7 - 288.68 V_{L-N} On site Programmable (Line-Line 100 - 500 V_{L-L})
System PT primary values	100V_{LL} to 692.8 kV_{LL} On site Programmable
Max continuous input voltage	347 V_{LN}, 600 V_{LL}
Voltage Measuring Range	5 V_{LN}.... 347 V_{LN}, 9 V_{LL}.... 600 V_{LL}.
Overload Withstand	2x times of Nominal voltage for 1 second, repeated 10 times at 10 second intervals
Frequency Measuring Range	45Hz to 66Hz

Input Current:

Nominal input current	1A / 5A AC RMS On site Programmable
System CT primary values	From 1A up to 9999A On site Programmable
Max continuous input current	120% of Nominal value
Current Measuring Range	5% to 120% of Nominal current.
Overload Withstand	20x times of Nominal current for 1 second, repeated 5 times at 5 min intervals
Starting Current for energy as per IEC 62053-22 class 0.5S	1 mA for 1A range 5 mA for 5A range

Auxiliary Supply:
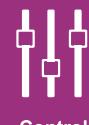
External Aux	60 V – 300V AC-DC (Without Ethernet) 70 V – 300V AC-DC (With Ethernet)
Aux supply frequency	50 / 60 Hz (± 10 %)

VA Burden:

Nominal input voltage burden	< 0.2 VA approx. per phase
Nominal input current burden	< 0.2 VA approx. per phase
Auxiliary Supply burden	< 6.5 VA approx (Without Ethernet Option)
Auxiliary Supply burden	< 8.5 VA approx (With Ethernet Option)
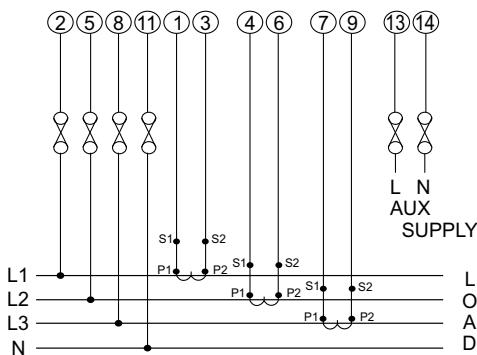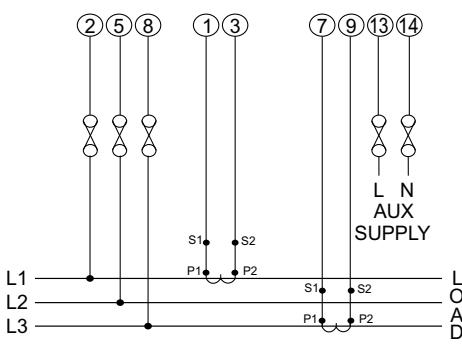
**Measure** **Control** **Record** **Analyze**

Electrical Connection:

Network Types :

a) 3 Phase 4 Wire Unbalanced Load

b) 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 3.5mm.

Permissible cross section of the connections wires:
 <= 4.0 mm sqr. single wire or 2x2.5mm sqr. fine wire

Technical Specifications:

Real Time Clock (RTC):

Uncertainty	± 2 minutes / month (23°C ± 1°C) (trimmable through display or Modbus)

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 61010-1-2010 , Permanently connected use
IP for water & dust	(IP 54 for Front) IEC60529
Pollution degree:	2
Installation category:	III
High Voltage Test	5.23 kV DC for 1 minute between all Electrical circuits.

Environmental Conditions, Other information

Operating temperature	-10 to +55°C
Storage temperature	-20 to +65°C
Relative humidity	0... 95% non condensing
Warm up time	Minimum 3 minute
Shock	15g in 3 planes
Vibration	10... 150.... 10 Hz, 0.075mm amplitude
Temperature Coefficient	0.05%/°C

Interfaces

Impulse Led	At the rear of the instrument with an Impulse constant of 4000 impulses/kWh.
Relay	Configured as Limit or Pulse output
Load Capacity	240 V AC ,5 A
Contact	Change over contact, bistable
ModBus / RTU	RS485,max. 1200m Baud rate: 4.8k, 9.6k, 19.2k, 38.4k bps
Ethernet option (TCP/IP)**	Available

Power Quality Parameters:

Sag Threshold*	Adjustable.. 10%.... 90% of Nominal Value
Swell Threshold*	Adjustable.. 110%.... 150% of Nominal Value
Over Current*	Adjustable.. 110%.... 150% of Nominal Value

*Detects sag / swell / Overcurrent if Voltage/Current waveform remains below or above threshold for at least 500msec with an interval of 500ms respectively.

** With Ethernet option Relay , Impulse unavailable

Measure   **Control**   **Record**   **Analyze**
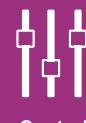
Display Parameter:

✓ : Available   ✗ : Not Available

Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire
1.	System Voltage	✓	✓
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 Fundamental Reactive Power (kVAr)	✓	✓
19.	Fundamental Reactive Power L1 (kVAr)	✓	✗
20.	Fundamental Reactive Power L2 (kVAr)	✓	✗
21.	Fundamental Reactive 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 (Up to 14 digit resolution)	✓	✓
34.	Export kWh (Up to 14 digit resolution)	✓	✓
35.	Fundamental Import kVArh (Up to 14 digit resolution)	✓	✓
36.	Fundamental Export kVArh (Up to 14 digit resolution)	✓	✓
37.	kVAh (Up to 14 digit resolution)	✓	✓
38.	Current Demand	✓	✓
39.	kVA Demand	✓	✓
40.	kW Import Demand	✓	✓
41.	kW Export Demand	✓	✓
42.	Max Current Demand	✓	✓
43.	Max kVA Demand	✓	✓
44.	Max kW Import Demand	✓	✓
45.	Max kW Export Demand	✓	✓
46.	Run Hour	✓	✓
47.	On Hour	✓	✓
48.	Number of Interruption	✓	✓
49.	Phase Reversal Indication	✓	✗
50.	Phasor Diagram	✓	✗

Measure   Control   Record   Analyze

Display Parameter:

✓ : Available   ✗ : Not Available

Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire
51.	Voltage Waveform	✓	✓
52.	Current Waveform	✓	✓
53.	% THD Voltage L1-N	✓	✗
54.	% THD Voltage L2-N	✓	✗
55.	% THD Voltage L3-N	✓	✗
56.	% THD Voltage L1-L2	✗	✓
57.	% THD Voltage L2-L3	✗	✓
58.	% THD Voltage L3-L1	✗	✓
59.	% THD Current L1	✓	✓
60.	% THD Current L2	✓	✗
61.	% THD Current L3	✓	✓
62.	% THD Voltage Mean	✓	✓
63.	% THD Current Mean	✓	✓
64.	RMS voltage of Harmonics	✓	✓
65.	RMS Current of Harmonics	✓	✓
66.	Fundamental Active Power per phase	✓	✗
67.	Fundamental Reactive Power per phase	✓	✗
68.	Fundamental Apparent Power per phase	✓	✗
69.	Fundamental Power Factor per phase	✓	✗
70.	Individual Harmonic Active Power per phase	✓	✗
71.	Individual Harmonic Reactive Power per phase	✓	✗
72.	Individual Harmonic Apparent Power per phase	✓	✗
73.	Distortion Factor of all harmonics on phase voltage	✓	✓
74.	Distortion Factor of all harmonics on phase Current	✓	✓
75.	Power Factor of Individual Harmonic per phase	✓	✗
76.	Fundamental voltage RMS per phase	✓	✓
77.	Fundamental current RMS per phase	✓	✓
78.	Swell indication	✓	✓
79.	Over current indication	✓	✓
80.	Sag indication	✓	✓

Ordering Information:

Ordering information	Ordering Code
RISH PQM without Impulse LED	RISH PQM - NM - NR - NI
RISH PQM with Impulse LED	RISH PQM - NM - NR - I
RISH PQM with ModBus (RS485) output*	RISH PQM - M - NR - I
RISH PQM with ModBus (RS485) output + 2 Relay Output*	RISH PQM - M - 2R - I
RISH PQM with Ethernet Interface(Modbus TCP/IP)	RISH PQM - E

*Models by Default have Impulse LED

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RISHABH

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