

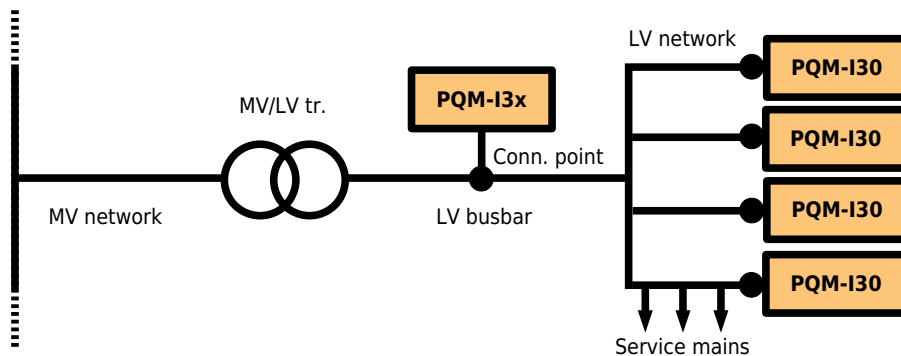
PQM-I PORTABLE LOW VOLTAGE POWER QUALITY ANALYZER



- Compact design - measurement, powering and communication in a single unit
- Real-time clock synchronized to GNSS or to a time server
- Local data storing of 365+ days
- High data security - secured remote data access only
- Replaceable LTE/NB-IoT/Cat-M/2G communication module

GENERAL DESCRIPTION

The purpose of the COMTECH PQM-I is real-time monitoring of medium-voltage and low-voltage networks, furthermore finding quickly the existing and potential fault locations. The device has a compact design, it contains the measuring and analyzing unit, the power supply as well as the communication circuit. Two main types are available, the PQM-I3x that should be placed directly at the transformer, and the PQM-I30 that should be placed at the end of the line. Both versions can be connected to a network connection point built by an electrician with live work permit without breaking the circuit or shutdown. In this case the connection can be done without live work permit as well.



The base devices installed to perform primarily casual measurements are suitable for measuring the RMS voltage of the investigated network section in all the three phases, for determining the total harmonic distortion and voltage unbalance with an averaging period of 1 minute. The PQM-I30 completes this by performing flicker-measurement, while the PQM-I3x allows measuring RMS current in each phase (and in the neutral wire if required) with calculating the harmonic content, furthermore the active and reactive energy flow with direction information, also using 1 minute averaging (based on the ordered options).

Both types are able to store the rapid voltage change values classified into categories, as well as registering events about the extent of voltage dips and swells. These are stored not only on the local storage medium with a capacity of more than a year, but also can be forwarded to a central database. If the event is a voltage interruption, the message with these information will still be forwarded - thanks to the built-in power supply fed from the measured network, which keeps the device alive at least for 5 seconds after the powering was cut off. The powering is ensured from the measured network. If any of the phases provides at least 70 V, the device can work stably.

In order to avoid unauthorized access, the registered data as well as the settings are available only via a secured remote

Specifications are subject to change without notice!

session. The communication chain can be changed to an another one (with another standard) if required, is based on a GSM module supporting LTE/NB-IoT/Cat-M/2G modes, and forwards the data into a cloud database using standard TCP/IP and MQTT protocols. The events can be synchronized to a time server or to GNSS, the positioning is done using GNSS.

The devices mounted into a robust portable housing are available with a wide range of options, as can be seen in the chart below.

OPTION CHART

	PQM-I3x			PQM-I30		
	N	S	B	N	S	B
Voltage measurement						
One cycle RMS refreshed each half cycle (per phase)		✓			✓	
10 cycle RMS (per phase)		✓			✓	
Voltage average for 1-10 minutes (per phase)	✓	✓	✓	✓	✓	✓
THD average for 1-10 minutes (per phase)	✓	✓		✓	✓	
Harmonics analysis		✓			✓	
Voltage unbalance averaged for 1-10 minutes	✓	✓		✓	✓	
Classified recording of rapid voltage change events for 1-10 minutes, per phase ⁽¹⁾	✓	✓		✓	✓	
Recording of dip and swell events per phase	✓	✓		✓	✓	
Flicker measurement (PST) per phase		✓		✓	✓	
Recording minimum and maximum values (RMS, within the set averaging period)		✓	✓		✓	✓
Dip and swell triggered disturbance recording per phase		✓			✓	
Continuous measurement (streaming) of one cyc. RMS voltage refreshed each half cycle		✓			✓	
Current measurement						
One cycle RMS refreshed each half cycle (per phase)		✓				
10 cycle RMS (per phase)		✓				
Current average for 1-10 minutes (per phase)	✓	✓	✓			
THD average for 1 minute (per phase)	✓	✓				
Harmonics analysis		✓				
Recording minimum and maximum values (RMS, within the set averaging period)		✓	✓			
Classified recording of inrush current, per phase ⁽¹⁾		✓				
Overcurrent triggered disturbance recording per phase		✓				
Continuous measurement (streaming) of one cyc. RMS current refreshed each half cycle		✓				
Instant alarming in case of exceeding a user-set inrush current threshold		✓				
Power measurement						
10 cycle RMS (per phase)		✓				
Active and reactive energy flow measurement with sign - averaged for 1-10 min., per ph.	✓	✓	✓			

(1) 6 or 2 classes depending on the settings

Further, customer specified functions not listed in this table can be implemented by a firmware upgrade!

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TECHNICAL SPECIFICATIONS

Voltage measurement	PQM-I...-N / B	PQM-I...-S
Nominal RMS phase voltage (U_n) [VAC]		230
Measurement RMS voltage range [VAC]		65...450
Frequency range [Hz]		45...65
Measurement accuracy in accordance with EN 61000-4-30 [%]		± 0.5
Accuracy of measuring dips and swells [%]		<1
RMS averaging period [min]	1	1...10
Measurement sample rate [Hz]		6400
Classified storing of rapid voltage changes [%]	0,7-1,5 / 1,5-2,5 / 2,5-5 / 5-7,5 / 7,5-10 / >10 or 4-6 / >6	
Overload capacity [U_n]		>1.5 (1 min)
Rated insulation voltage [kV]		6
Pulse withstand [kV]		>6 (8/20 waveform)
Overcurrent protection device	fuse with breaking capacity of 20 kA	
Measuring harmonics		up to 50 th harmonic
Measurement method		EN 61000-4-30
Current measurement (except PQM-I30)		
Measurement range [A]		0...6000 ⁽¹⁾
Measurement accuracy in accordance with EN 61000-4-30 [%]		± 0.5 ⁽²⁾
RMS averaging period [min]	1	1...10
Measurement sample rate after preprocessing [Hz]		6400
Overload capacity [kA]		~20 (1000 ms)
Measuring harmonics		up to 50 th harmonic
Type of current sensor		Rogowski-coil
Current sensor connection		Connector
Power measurement (except PQM-I30)		
RMS averaging period [min]	1	1...10
Measurement methods		EN 62053, EN 50470-3
Communication parameters		
Modem construction		Pluggable, replaceable
Antenna		Built-in or external antenna
Supported SIM-cards		LTE / NB-IoT / Cat-M / 2G (GSM) ⁽³⁾
Protocol set for forwarding events		TCP/IP, MQTT v3.1.1 (QoS 0,1,2), IEC 61850-90-17
Protocol set for downloading firmware or settings		TCP/IP, HTTPS / Mender.io
Communication security		TLS 1.2, 1.3; X.509 certificates
Storing usernames and passwords		AES256 algorithm
Method for setting up the IP-address (for downloading fw. and settings)		Dedicated DNS
Method for synchronizing real-time clock		GNSS, Time server
Accuracy of real-time clock [s/day]		<1
Positioning systems		GPS / BeiDou / GLONASS / Galileo
Local storage medium (replaceable SD-card) capacity [GB]		16

(1) Depends on the current transformer

(2) Accuracy without current transformers or Rogowski coils!

(3) The communication solutions actually available from the list are determined by the type of modem installed!

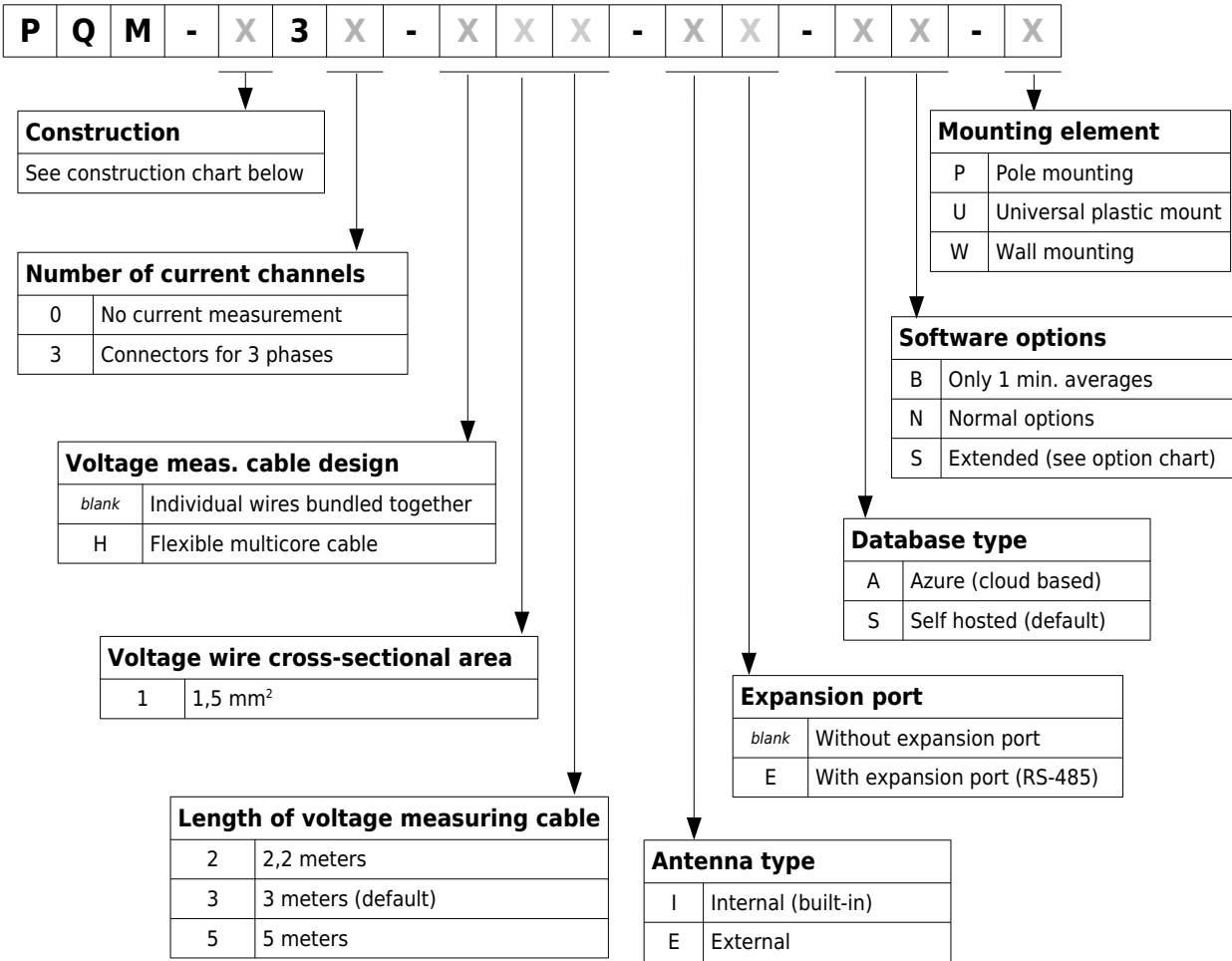
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General parameters

Powering source	Measured network (via voltage taps)
Power consumption [W]	4
UIPS bridging capacity [s]	>5
Restart cycle after power outage [s]	<20
Device providing bridging capability	Capacitor
Dimensions [mm]	160x160x90
Phase marking	Coloring and text
Degree of protection	IP65
Operating temperature range [°C]	-20...+75
Weight [kg]	2.1 ⁽⁴⁾

(4) The weight depends on the number of connectors, and meant WITHOUT current sensors.

ORDERING INFORMATION



Specifications are subject to change without notice!

CONSTRUCTION CHART

Feature	I
Type of housing	Portable (UV-proof)
Communication	GSM
GNSS positioning	Yes
Status indication	RGB LEDs
Current sensor connection	Connector (3 sensor on a common connector)
Expansion port and door sensor available	Only expansion port
Antenna type	External or Built-in

ACCESSORIES

Hardware options	Ordering information
3 pcs Rogowski-coil set (for measuring 3xL)	PQM-CRIxx-x3 *

* xx gives in the ordering code the construction and nominal primary current. 30 - 3000 A (standard construction), x gives the cable length.

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