



- Designed for non-grounded networks with Frequency Converters
- Direct connection up to 690V line voltage, up to 1,4kV with HV Adapter for both single or three phase systems
- Monitoring during both live and standby conditions
- For use in land, marine and offshore Installations
- Complies with IMCA D 045 Code of Practice
- "Megger" - safe to 1.4kVDC when aux power is OFF
- Analogue output proportional to meter reading (F-version)
- With Modbus RTU (see Megacon modbus datasheet)

Specifications

Auxiliary AC Supply:	100-120, 200-240, 380-415 or 440-460VAC, 40-70Hz (Fuse 0.5A)
Optional DC Voltage:	12, 24-48 or 100-250VDC (Fuse 2A)
Supply tolerance:	± 10%
Power rating AC/DC:	3VA/3W
Contact rating:	AC: 100VA - 250V/2A max. DC: 50W - 100V/1A max.
Analogue Output:	Up to 20mA, max 500R
F-versions	Up to 10V, min 100kohm (other on request)
Temperature:	-20 to +70°C
Weight:	0.85kgs
Front protection:	IP52 (IP65 optional)
Communication:	Modbus RTU

INTELLIGENT SETTING ASSISTANCE

KPM161xQx has a built-in Assistance tool for setting/verification of the trip levels and the analogue output.

When either the **Warning** or **Alarm** potmeter on the rear is operated by user, the meter goes into **Assistance Mode** and meter reading and analogue output will reflect the potmeter setting.

How to set alarm levels:

Firstly adjust potmeter fully clockwise (see that meter goes to the top), then adjust potmeter down to required **Warning** or **Alarm** setpoint. In this mode, the Alarm or Warning LEDs (depending on which potmeter is adjusted) will flash quickly Red/Yellow.



Without any movement of potmeters, the meter will revert to normal Insulation Monitoring Mode after approximately 10 seconds.

How to test analogue output signal:

Adjust any trip level potmeter to activate Assistance Mode.
Example: On a 4-20mA output, adjust potmeter fully anti clockwise for 4mA and fully clockwise for 20mA.

The KPM161xQx range is designed to comply with specification IMCA D 045 "Code of Practice for the Safe Use of Electricity Under Water" issued by IMCA.

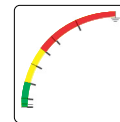
The unit meets EN 61010-1 Cat. III, Pollution degree 2 and the relevant environmental and EMC tests specified in EN 61326-2-4 to comply with the requirements of the major Classification Societies.

Application

The digitally controlled KPM161xQx is designed to monitor the insulation level between a non-grounded (IT) AC mains and its protective earth in systems with frequency converters. The unit is for land, marine and offshore use. With built-in Modbus RTU.

An AC or DC auxiliary voltage is required for the unit, if powered from a separate source the network can also be monitored during inactive (standby) conditions. Only **ONE** KPM161xQx can be connected to each IT-system. The ohmmeter and the triple-zone status LEDs give at a glance the clear safety message:

- **ALARM** (red zone)
- **WARNING** (yellow zone)
- **HEALTHY** (green zone)



General

IDV MEASURING PRINCIPLE

Insulation is measured between the complete galvanically interconnected AC network and its protective earth.

The unit injects a DC measuring signal into the monitored system. The signal flows to ground via the path of the insulation fault, the level of flow indicates the insulation resistance. The measuring accuracy is not influenced by any normal kind of load attached to the AC network.

This unit is used for any land, marine or offshore installations. Start of monitoring function is delayed when auxiliary power is switched on (default 5 secs delay). The unit has minimum of 9 seconds detection time for any insulation fault. Trip levels and delays are settable on unit rear. A trip LED flashes when the trip level is passed, the relay.

Test Function

The test function is initiated by closing external input terminals 29 – 30 via the connection of an external test button. The test function can operate in one of two modes:

Mode 1: Single press (close and hold). In this mode, relay contacts are inhibited and only the indicators and analogue output respond to the test signal. The green LED flashes rapidly to indicate Test Mode 1 is running.

Mode 2: Dual press (close, release, close). In this mode, relay contacts change state in addition to the Mode 1 responses. The second press of the test button must be performed within 3 seconds of the first to enter mode 2. The green LED flashes at twice the rate of Mode 1 to indicate Mode 2 is running.

Both test modes result in a 65kOhm "fault" measurement. The indicators, meter, mA output and, if in Mode 2: the relay contacts, will respond according to the rear pot settings as expected for a 65kOhm Line-Earth resistance.

Releasing the test button will exit test mode and revert to the operating state that existed prior to the test being engaged. A 4-minute timeout function reverts to normal operation automatically to guard against inadvertent latching of the test button input.

DC protection

When a "foreign" positive DC voltage exceeding 17V or a negative DC voltage exceeding 3V are detected on the monitored AC voltage the DC detection function will activate an alarm after some seconds. Depending on the internal measured temperature the unit will disconnect terminal 4 (after app. 1-5 min). Alarm LED will flashes yellow and the DC Exposure LED will be red/blue for pos/neg failure indication. It is not recommended to reset this alarm before an investigation on what the DC voltage is and the cause of this as it can damage the instrument over time.

Description

KPM161EQ & KPM161FQ - KPM161EQG & KPM161FQG

This unit is used for industrial, marine and offshore installations with frequency converters. Start of monitoring function is delayed when auxiliary power is switched on (default 5 secs delay).

The unit has a detection time of 6-9 seconds for any insulation fault.

Direct connection up to 690V line voltage. Up to 1,4kVAC via HV adaptor.

SAFETY

When a voltage adapter (CHx) is used the signal to terminals 4 and 6 on KPM261x and KPM263x is limited to a safe level, avoiding any dangerous voltage exposure to personnel.

Relay Operation

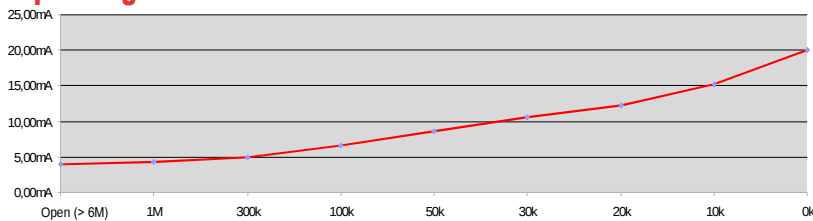
Scale range: 0-1000kΩ - ∞ (>6MΩ)

Relay	Warning	Alarm	Fail Safe	Latch
R1	X			
R2		X	X	*X
R3		X		*X

Model	Latch	Output	Adjustments	Trip level	Delay
KPM161EQ	-	-	WARNING:	0-1MΩ	0-30secs
KPM161EQG*	X	-	ALARM:	0-1MΩ	0,1-3secs
KPM161FQ	-	X			
KPM161FQG*	X	X			

Coloured sectors show recommended areas of settings:
 - Indicates alarm trip zone
 - Indicates warning trip zone
 - Indicates healthy zone

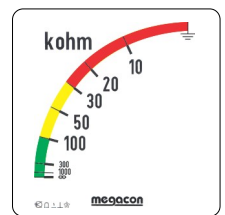
Output diagram



Output table (example for 4-20mA)

Value (scale)	mA output
0kΩ	20.00mA
10kΩ	15.22mA
20kΩ	12.32mA
30kΩ	10.61mA
50kΩ	8.68mA
100kΩ	6.69mA
300kΩ	4.98mA
1MΩ	4.28mA
Open (>6MΩ)	4.00mA

Range (slave indicator)



High Voltage Adaptors up to 1,4kVAC for KPM161xQx series

- HV Adaptor for AC Insulation Guards
- CH163x series, up to 1400V Line Voltage live or non-live (standby)
- Creates safety barrier from live HT network to LV switchboard
- Limits measuring output signal to safe levels
- No restrictions on distance between adapter and LV switchboard

Voltage Adaptors CH163x series are used for Insulation Guard KPM161xQx when the monitored line voltage is higher than 690VAC. These adaptors are a passive low-pass filter for use in 50, 60 or 400Hz networks, and are potted in polyurethane.

These units includes high inductance reactance modules, connected in a special configuration to avoid DC saturation. Connection to the star-point (Neutral) is Preferable. These adaptors maintain a high AC suppression of its signal output to very low, safe levels, under all conditions.

Caution

Terminal 1 must be disconnected during "megger" test.



CH163/1,4 up to 1.4kVAC

The MEGACon policy is one of continuous improvement, consequently equipment supplied may vary in detail from this publication.

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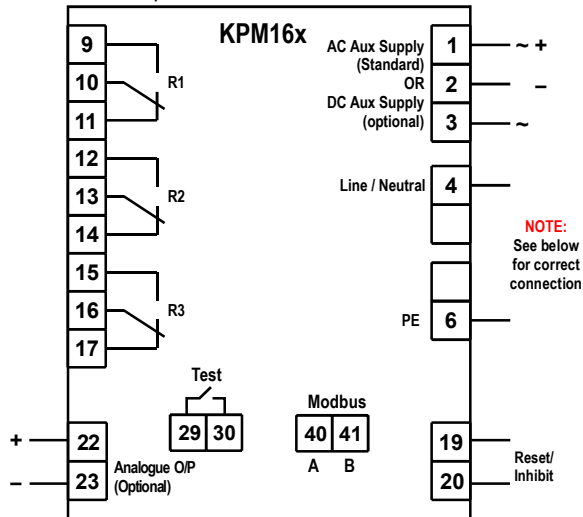
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Connection

Relays shown de-energised,
a fail-safe relay energises
when unit is powered.



Analogue Output

KPM161FQ and KPM161FQG have an analogue output proportional to meter reading.
(Special outputs are available on request)

Add suffix from table below to type designation to specify output required:

O/P1	0 - 10mA	O/P6	N/A
O/P2	0 - 20mA	O/P7	N/A
O/P3	4 - 20mA	O/P8	0 - 10VDC
O/P4	N/A	O/P9	N/A
O/P5	N/A	O/P10	N/A

Reset / Paralleling Disable Function

KPM161xQx has a built-in disable function. When connecting two or more IT-networks together **only one unit** can be active, the other(s) must be disabled. When unit is disabled the power led will flash every 2 seconds to indicate that unit is inactive.

Use a potential free contact on terminal 19 & 21 to activate the disable function (after 2 secs). When activated the measuring input terminal 4 will be internally disconnected. A pulse (60mS - 2 secs) on terminal 19 & 21 will only reset any latching alarm.

Communication

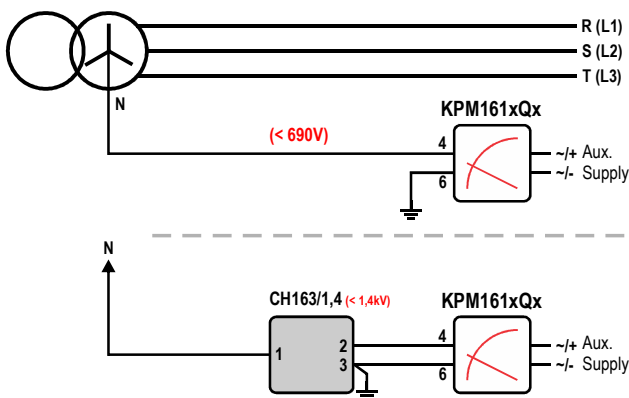
The KPM161xQx is fitted with modbus RTU communication. Details can be found in Megacon datasheet KxM16x-modbus protocol.

OUTPUTS

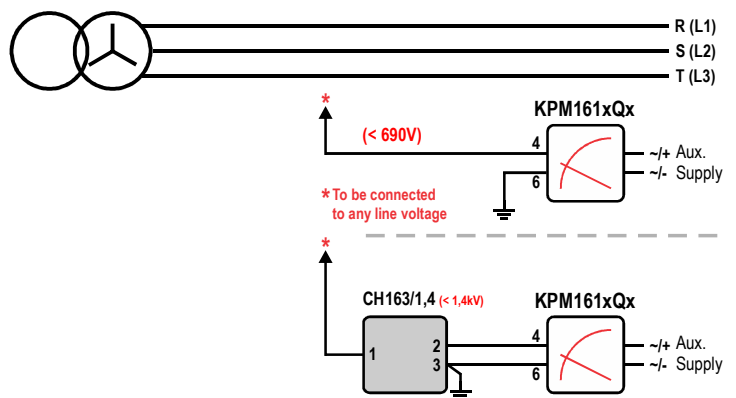
All F versions have an isolated **analogue output** proportional to meter reading. If output is used for remote meter reading, we recommend 0-1mA for the slave indicator.

Connection

NEUTRAL VOLTAGE INPUT



LINE VOLTAGE INPUT

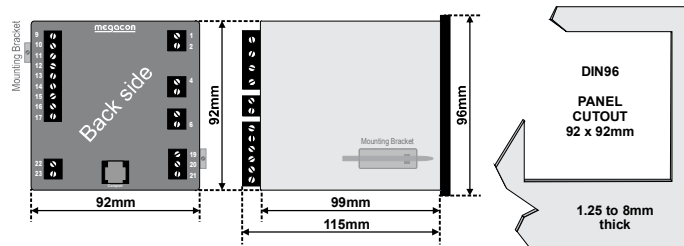


The instrument will detect earth fault on all phases independent of which phase is connected to terminal 4.

MEGGER SAFE

When auxiliary power is **OFF** the unit input is automatically protected against "megger" test voltages up to 1.4kVDC, and incorrect measurements caused by the unit's input impedance are avoided.

Dimensions



The MEGACon policy is one of continuous improvement, consequently equipment supplied may vary in detail from this publication.

ORDERING EXAMPLE:

Type: KPM161FQ
Aux. Supply: 200-240VAC
Network Voltage: 690VAC
Analogue O/P: (O/P3) 4-20mA
Range: 0 - 1000kohm

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