KPM161x

INSULATION GUARD FOR NON-GROUNDED AC NETWORKS

• Direct connection up to 690V line voltage, up to 1.4kV with HV adapter CH163/1,4
• Monitoring during both live and standby conditions
• For use in land, marine, offshore, sub-sea and ocean floor installations
• Complies with IMCA D 045 Code of Practice
• “Megger” - safe to 1.4kVDC when aux power is OFF
• Immune to earth capacitance and voltage surges
• Analogue output proportional to meter reading (F-version)

Specifications

| Auxiliary Supply: 100-120, 200-240, 380-415 or 440-460VAC, 40-70Hz (Fuse 0.5A) |
| Optional Voltage: 12-24, 48 or 110VDC (Fuse 2A) |
| Supply tolerance: ± 10% |
| Power rating: 1.5VA |
| Contact rating: AC: 100VA - 250V/2A max. DC: 50W - 100V/1A max. |
| Analogue Output: Up to 20mA, max 500R |
| Temperature: -20 to +70°C |
| Weight: 0.85kgs |
| Front protection: IP52 (IP65 optional) |

Application

The digitally controlled KPM161x series monitors insulation level between a non-grounded (IT) AC mains and its protective earth, regardless of whether the mains is live or non-live (standby). The unit is for land, marine, offshore, sub-sea and ocean floor use.

An AC or DC auxiliary voltage is required for the unit, if powered from a separate source then the network can also be monitored during standby conditions. Only ONE KPM161x 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 voltage 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.

Trip levels and delays are settable on unit rear. A trip LED flashes when the trip level is passed, the relay trips when the delay has elapsed. The timer resets if the fault is removed during countdown.

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.

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.

NOTE
Special versions of the KPM161x are available as:

KPM161xM series - Insulation Guards with DC detection function, protected against high-energy DC voltage imposed on the monitored AC supply.

KPM261x series - Insulation Guards with measuring loop continuity monitoring.

Intelligent Setting Assistance
KPM161x has a built-in Assistance tool for setting/verification of the trip levels and the analogue output.

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 KPM161x 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.

Norway
Denmark
United Kingdom

www.megacon.com
ELECTRONIC CONTROL AND INSTRUMENTATION

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INSULATION GUARD FOR NON-GROUNDED AC NETWORKS

KPM161x

Description

KPM161E2 & KPM161F - KPM161G & KPM161GF

This unit is used for hospital, industrial, marine and offshore installations.

Start of monitoring function is delayed when auxiliary power is switched on. (default 5 secs delay)

The unit has minimum 150 mS detection time for any insulation fault.

Direct connection up to 690V line voltage. Up to 1,4kV via HV adaptor CH163/1,4.

Output diagram

Output table

Value (scale) mA output

0kΩ 20.00mA
10kΩ 15.22mA
20kΩ 12.32mA
30kΩ 10.61mA
50kΩ 8.69mA
100kΩ 6.69mA
300kΩ 4.98mA
1MΩ 4.28mA
Open (>6MΩ) 4.00mA

Range

0.00mA 5.00mA 10.00mA 15.00mA 20.00mA

0kΩ 20.00mA
10kΩ 15.22mA
20kΩ 12.32mA
30kΩ 10.61mA
50kΩ 8.69mA
100kΩ 6.69mA
300kΩ 4.98mA
1MΩ 4.28mA
Open (>6MΩ) 4.00mA

Relay Operation

Scale range: 0-1000Ω - ∞ (>6MΩ)

<table>
<thead>
<tr>
<th>Model</th>
<th>Latch</th>
<th>Output</th>
<th>Fail Safe</th>
<th>Adjustments</th>
<th>Trip level</th>
<th>Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>0-1MΩ</td>
<td>0.3-3secs</td>
</tr>
<tr>
<td>R2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>0-1MΩ</td>
<td>0.1-3secs</td>
</tr>
<tr>
<td>R3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>0-1MΩ</td>
<td>0.1-3secs</td>
</tr>
</tbody>
</table>

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

The MEGACON policy is one of continuous improvement, consequently equipment supplied may vary in detail from this publication.
INSULATION GUARD FOR NON-GROUNDED AC NETWORKS

KPM161x

Description
KPM161E2-SKK & KPM161F-SKK - KPM161G-SKK & KPM161GF-SKK

These optional units are similar to KPM161E2 & KPM161F - KPM161G & KPM161GF.

The only difference is that the delay before the start of monitoring function is shorter. (default 1 secs delay)

The unit has minimum 150 mS detection time for any insulation fault.

Direct connection up to 690V line voltage. Up to 1,4kV via HV adaptor CH163/1,4.

Relay Operation

<table>
<thead>
<tr>
<th>Model</th>
<th>Latch</th>
<th>Output</th>
<th>Fail Safe</th>
<th>Adjustments</th>
<th>Trip level</th>
<th>Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPM161E2-SKK</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>0-1MDQ</td>
<td>0.3secs</td>
</tr>
<tr>
<td>KPM161F-SKK</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>0-1MDQ</td>
<td>0.3secs</td>
</tr>
<tr>
<td>KPM161G-SKK</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>0-1MDQ</td>
<td>0.3secs</td>
</tr>
<tr>
<td>KPM161GF-SKK</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>0-1MDQ</td>
<td>0.3secs</td>
</tr>
</tbody>
</table>

High Voltage Adaptors up to 1,4kVAC for KPM161x 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 KPM161x when the monitored line voltage is higher than 690VAC. These adapters 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 adapters 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.

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KPM161x

**Analogue Output**

KPM161F, KPM161GF, KPM161F3, KPM161GF3, KPM161F-SKK and KPM161GF-SKK 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:

<table>
<thead>
<tr>
<th>O/P</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>0 - 10mA</td>
</tr>
<tr>
<td>P2</td>
<td>0 - 20mA</td>
</tr>
<tr>
<td>P3</td>
<td>4 - 20mA</td>
</tr>
<tr>
<td>P4</td>
<td>N/A</td>
</tr>
<tr>
<td>P5</td>
<td>N/A</td>
</tr>
<tr>
<td>P6</td>
<td>0 - 10VDC</td>
</tr>
<tr>
<td>P7</td>
<td>N/A</td>
</tr>
<tr>
<td>P8</td>
<td>N/A</td>
</tr>
<tr>
<td>P9</td>
<td>N/A</td>
</tr>
<tr>
<td>P10</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Reset / Paralleling Disable Function**

KPM161x 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 and 21 to activate the disable function (after 2 secs). When activated the measuring input terminal 4 will be internally disconnected.

A pulse (60mS-2 Sec) on terminal 19, 21 will only reset any latching alarm.

**Dimensions**

**NEUTRAL VOLTAGE INPUT**

R (L1) S (L2) T (L3)

N

CH163/1,4 (<1,4kV)

KPM161x

Reset/Disable

KPM161x

R1 R2 R3

4 6

1 2 3

DIN 96 PANEL CUTOUT 92 x 92mm 1.25 to 8mm thick

92mm 99mm 115mm

**LINE VOLTAGE INPUT**

+ ~ ~ +

R (L1) S (L2) T (L3)

N

+ ~ ~ +

CH163/1,4 (<1,4kV)

KPM161x

Reset/Disable

KPM161x

R1 R2 R3

4 6

1 2 3

DIN 96 PANEL CUTOUT 92 x 92mm 1.25 to 8mm thick

92mm 99mm 115mm

**ORDERING EXAMPLE:**

Type: KPM161F
Aux. Supply: 200-240VAC
Network Voltage: 1.4kVAC
Analogue O/P: (O/P3) 4-20mA
Range: 0 - 1000kohm

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