



- For 12, 24 or 48VDC battery systems
- With test function
- All inputs and outputs fully isolated
- Triple-zone insulation monitoring and Supervision relay
- “Pathfinder” Indicates polarity of dominant earth fault
- Response time: 125-165mS
- Analogue output proportional to meter reading (F-versions)
- With Modbus RTU (see Megacon modbus datasheet)

Specifications

Auxiliary Supply:	Nom: 12-48VDC as standard (>9 - <60VDC, Fuse 2A)
Optional Voltage:	100-120, 200-240, 380-415 or 440-460VAC, 40-70Hz (Fuse 0,5A)
Supply tolerance:	± 10%
Power rating:	1,5VA
Contact rating:	AC: 100VA - 250V/2A max. DC: 50W - 100V/1A max.
Analogue Output: (other on request)	Up to 20mA, max 500R Up to 10V, min 100kohm
Temperature:	-20 to +70°C
Weight:	0.62kgs
Front protection:	IP52 (IP65 optional)
Communication:	Modbus RTU

INTELLIGENT SETTING ASSISTANCE

KPM169C2x 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

The unit meets IEC60092-504 and the relevant environmental and EMC tests specified in IEC60068/60092 and IEC61000/60533 respectively, to comply with the requirements of the major Classification Societies.

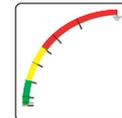
Description

The digitally controlled KPM169C2x monitors insulation level between a live non-grounded (IT) battery or live DC network and its protective earth. With built-in Modbus RTU com.

Only ONE KPM169C2x can be connected to the same DC-system. An AC or DC (standard) auxiliary voltage is required for the unit. A green LED indicates AUX POWER on. Start of monitoring function is delayed when auxiliary power is switched on (default 2 secs delay). In this way false tripping during power up, caused by initial charging of network spread capacitance, is avoided.

The DIN96 front-of-panel mounted instrument reads the insulation level directly in kΩ. The meter has reflection free glass. The ohmmeter and the triple-zone status LEDs at a glance gives the clear safety message:

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



General

SEV MEASURING PRINCIPLE

Insulation is measured between the complete galvanically interconnected DC network and its protective earth. The signal flows to ground via the path of the insulation fault, the level of flow expresses the insulation resistance, the direction of flow expresses the fault polarity. The measuring accuracy is not influenced by any normal kind of load attached to the network. The detection time for an insulation fault is 125-165mS.

PATHFINDER / POLARITY FUNCTION

During a Warning or Alarm condition the Polarity LED indicates the polarity causing the trip:

- POSITIVE EARTH FAULT: LED not lit**
- NEGATIVE EARTH FAULT: blue LED lit**

RELAY OUTPUTS

The unit has non-latching C/O relay outputs for Warning (R1), Alarm (R2) and System Error (R3). The Alarm and error relays are fail to safety configured. A trip LED flashes when the trip level is passed, the relay trips after elapsed delay. The timer resets if the fault is removed during countdown. Trip levels and delays are settable on unit rear. Recommended trip level settings will depend on application and priority of safety hazards.

ANALOGUE OUTPUT

All F versions have an isolated analogue output proportional to meter reading.

SYSTEM SUPERVISION

If voltage of the monitored DC system not connected to the unit input or is too low, the NEG POLARITY LED will flash red, and relay 3 (System Error) will trip. If polarity of the input connection reversed, the NEG POLARITY LED will flash red and blue, and relay 3 will trip. Trip of relay 3 will inhibit operation of the warning and alarm relay and their respective trip LEDs.

Test Function

The external test input activates the self test function. A 20kohm resistor is then connected between the negative pole and PE as long as the button is pressed.

Communication

The KPM169C2x is fitted with modbus RTU communication. Details can be found in Megacon datasheet KxM16x-modbus protocol.

Relay and LED Operation

	<p>POWER OFF All LED's are off. Relays shown de-energised.</p>	<p>ALARM WARNING NEG POLARITY POWER DC INSULATION GUARD</p>	<p>R1 R2 R3 9 10 11 12 13 14 15 16 17</p>
	<p>POWER ON The GREEN LED (POWER) will lit when unit is powered in normal condition (Positive Polarity). Fail Safe relays R2 and R3 are activated. *) NB! The BLUE LED (NEG POLARITY) will also lit if the unit detect a minor earth fault.</p>	<p>ALARM WARNING NEG POLARITY POWER DC INSULATION GUARD</p>	<p>R1 R2 R3 9 10 11 12 13 14 15 16 17</p>
	<p>WARNING POSITIVE The YELLOW LED (WARNING) flashes when the trip level is passed, the warning relay R1 trips after elapsed delay. Steady light after countdown.</p>	<p>ALARM WARNING NEG POLARITY POWER DC INSULATION GUARD</p>	<p>R1 R2 R3 9 10 11 12 13 14 15 16 17</p>
	<p>WARNING NEGATIVE The BLUE LED (NEG POLARITY) will lit and the YELLOW LED (WARNING) flashes when the trip level is passed, the warning relay R1 trips after elapsed delay. Steady light after countdown.</p>	<p>ALARM WARNING NEG POLARITY POWER DC INSULATION GUARD</p>	<p>R1 R2 R3 9 10 11 12 13 14 15 16 17</p>
	<p>ALARM POSITIVE The RED LED (WARNING) flashes when the trip level is passed, the warning relay R2 trips after elapsed delay. Steady light after countdown.</p>	<p>ALARM WARNING NEG POLARITY POWER DC INSULATION GUARD</p>	<p>R1 R2 R3 9 10 11 12 13 14 15 16 17</p>
	<p>ALARM NEGATIVE The BLUE LED (NEG POLARITY) will lit and the RED LED (WARNING) flashes when the trip level is passed, the warning relay R2 trips after elapsed delay. Steady light after countdown.</p>	<p>ALARM WARNING NEG POLARITY POWER DC INSULATION GUARD</p>	<p>R1 R2 R3 9 10 11 12 13 14 15 16 17</p>
	<p>FAULT STATUS / SYSTEM ERROR The NEG POLARITY LED (RED) flashes, this indicates missing measuring voltage (positive or negative) and status relay R3 will activate. In this mode the unit will not indicate any earth fault.</p>	<p>ALARM WARNING NEG POLARITY POWER DC INSULATION GUARD</p>	<p>R1 R2 R3 9 10 11 12 13 14 15 16 17</p>
	<p>FAULT STATUS / SYSTEM ERROR The NEG POLARITY LED flashes and changes colour between BLUE and RED. This will indicate reversed polarity and status relay R3 will activate. In this mode the unit may indicate earth fault but alarm and warning relays will not be activated.</p>	<p>ALARM WARNING NEG POLARITY POWER DC INSULATION GUARD</p>	<p>R1 R2 R3 9 10 11 12 13 14 15 16 17</p>

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



Description

KPM169C2x models for 9- 60VDC

These units are used for industrial, marine and offshore installations. Start of monitoring function is delayed when auxiliary power is switched on (default 2 secs delay).

Direct connection for 12, 24 or 48VDC systems.

Relay Operation

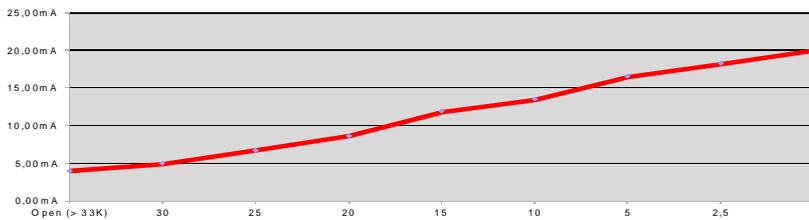
Scale range: 0-30kΩ - ∞ (>33kΩ)

	Warning	Alarm	System Error	Fail Safe	Latch
R1	✓				
R2		✓		✓	✓
R3			✓	✓	

Model	Latch	Output	Fail-safe	Adjustments	Trip level	Delay
KPM169C2	-	-	X	WARNING:	0-30kΩ	0-30secs
KPM169C2F	-	X	X	ALARM:	0-30kΩ	0,1-3secs
KPM169C2G	X	-	X			
KPM169C2GF	X	X	X			
KPM169C2H	-	-	-			
KPM169C2FH	-	X	-			
KPM169C2GH	X	-	-			
KPM169C2GFH	X	X	-			

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

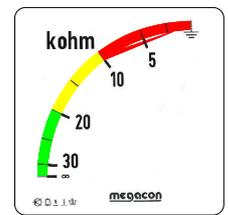
Output diagram



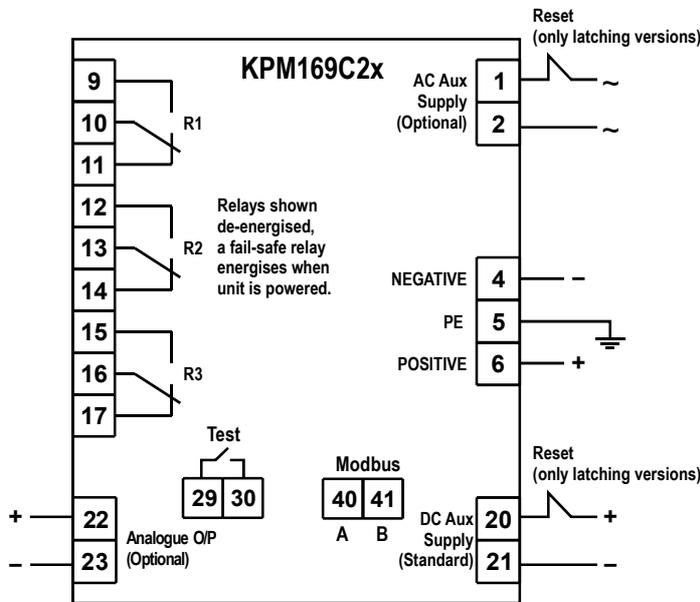
Output table (example for 4-20mA)

Value (scale)	mA output
0kΩ	20.00mA
2,5kΩ	18.24mA
5kΩ	16.51mA
10kΩ	13.47mA
15kΩ	11.86mA
20kΩ	8.64mA
25kΩ	6.68mA
30kΩ	4.95mA
open (>33kΩ)	4.00mA

Range



Connection



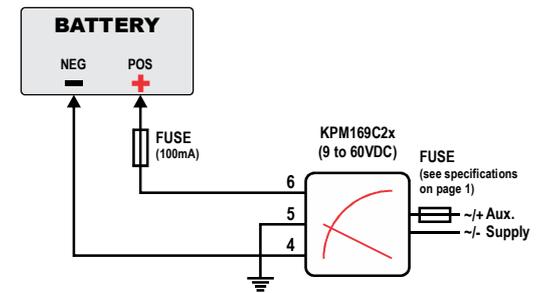
Analogue Output

KPM169C2F and KPM169C2GF have an analogue output proportional to meter reading. (Special outputs are available on request)

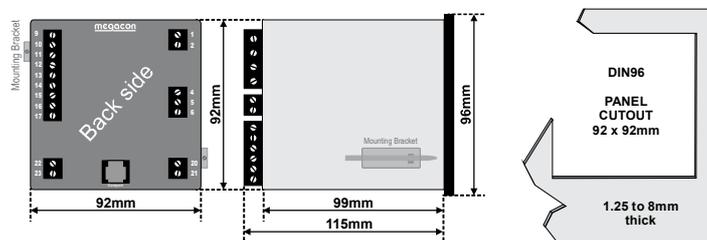
Add suffix from table below to type designation to specify output required:

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

DIRECT INPUT <60VDC



Dimensions



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

ORDERING INFORMATION

Type	: KPM169C2F
Aux. Supply	: 24VDC
Network Voltage	: 24VDC
Analogue O/P	: 4-20mA
Range	: -

