



- Direct connection 12 to 48 VDC systems, up to 1600VDC with RH adapter
- Precision reading unaffected of system voltage
- 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/L-version)

Specifications

KPM169x for 9-60VDC systems		
Scale range:	0-100kΩ - ∞ (open >100kΩ)	
Network line voltage:	Nom: 12 - 48VDC (>9 - <60VDC)	
Adjustments	Trip level	Delay
WARNING:	0-100kΩ	0-30secs
ALARM:	0-100kΩ	0,1-3secs
KPM169x for 60-1600VDC systems		
Scale range:	<10kΩ - 5MΩ	
Network line voltage:		
Adapter RH2	Min. 60VDC - max. 200VDC	
Adapter RH4	Min. 200VDC - max. 400VDC	
Adapter RH8	Min. 400VDC - max. 800VDC	
Adapter RH12	Min. 800VDC - max. 1200VDC	
Adapter RH16	Min. 1200VDC - max. 1600VDC	
Adjustments	Trip level	Delay
WARNING:	10kΩ - 5MΩ	0-30secs
ALARM:	10kΩ - 5MΩ	0,1-3secs
General		
Auxiliary Supply:	Nom: 12-48VDC as standard (>9 - <60VDC, Fuse 0.5A)	
Optional Voltage:	100-120, 200-240, 380-415 or 440-460VAC, 40-70Hz (Fuse 2A)	
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)	

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.

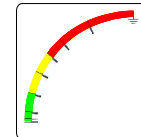
Application

The digitally controlled KPM169x monitors insulation level between a live non-grounded (IT) battery or live DC network and its protective earth.

Only ONE KPM169x 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 and L 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.

SAFETY

When the Voltage Adapter is connected to the instrument, max output from RHx adapters is 60VDC.



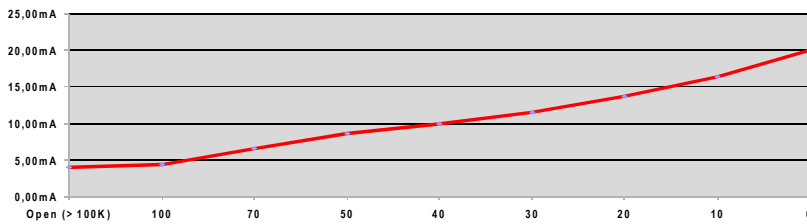
Description

KPM169x 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.

Output diagram



Relay Operation

Scale range: 0-100kΩ - ∞ (>100kΩ)

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

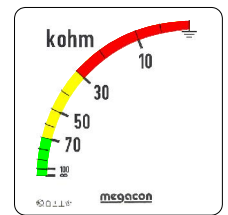
Model	Latch	Output	Fail-safe	Adjustments	Trip level	Delay
KPM169E	-	-	X	WARNING:	0-100kΩ	0-30secs
KPM169F	-	X	X	ALARM:	0-100kΩ	0,1-3secs
KPM169G	X	-	X			
KPM169GF	X	X	X			
KPM169EH	-	-	-			
KPM169FH	-	X	-			
KPM169GH	X	-	-			
KPM169GFH	X	X	-			

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

Output table (example for 4-20mA)

Value (scale)	mA output
0kΩ	20.00mA
10kΩ	16.41mA
20kΩ	13.66mA
30kΩ	11.56mA
40kΩ	9.91mA
50kΩ	8.56mA
70kΩ	6.51mA
100kΩ	4.42mA
open (>100kΩ)	4.00mA

Range



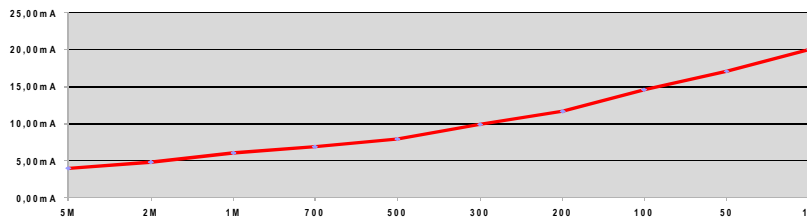
Description

KPM169x models for 60-200VDC

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).

This unit use the voltage adapter RH2 for voltage from 60V to max.200VDC.

Output diagram



Relay Operation

Scale range: <10kΩ-5MΩ

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

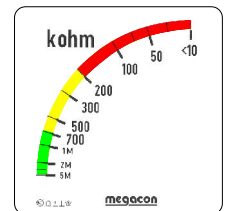
Model	Latch	Output	Fail-safe	Adjustments	Trip level	Delay
KPM169K2	-	-	X	WARNING:	10kΩ - 5MΩ	0-30secs
KPM169L2	-	X	X	ALARM:	10kΩ - 5MΩ	0,1-3secs
KPM169GK2	X	-	X			
KPM169GL2	X	X	X			
KPM169K2N	-	-	-			
KPM169L2N	-	X	-			
KPM169GK2N	X	-	-			
KPM169GL2N	X	X	-			

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

Output table (example for 4-20mA)

Value (scale)	mA output
<10kΩ	20.00mA
50kΩ	17.05mA
100kΩ	14.60mA
200kΩ	11.62mA
300kΩ	9.89mA
500kΩ	7.95mA
700kΩ	6.91mA
1MΩ	5.91mA
2MΩ	4.78mA
5MΩ	4.00mA

Range



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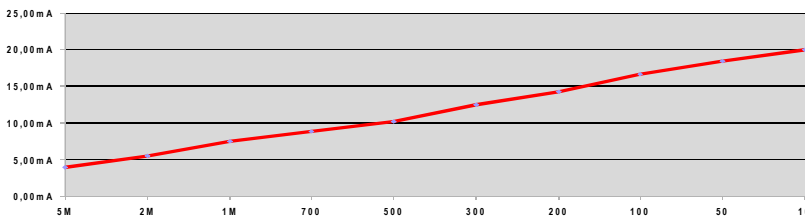
Description

KPM169x models for 200-400VDC

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).

This unit use the voltage adapter RH4 for voltage systems from 200V to max. 400VDC.

Output diagram



Relay Operation

Scale range: <10kΩ-5MΩ

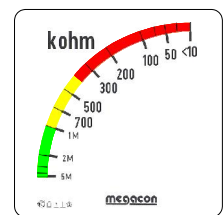
	Warning	Alarm	System Error	Fail Safe	Latch
R1	✓				
R2		✓		✓	✓
R3			✓	✓	

Model	Latch	Output	Fail-safe	Adjustments	Trip level	Delay
KPM169K4	-	-	X	WARNING:	10kΩ - 5MΩ	0-30secs
KPM169L4	-	X	X	ALARM:	10kΩ - 5MΩ	0,1-3secs
KPM169GK4*	X	-	X			
KPM169GL4*	X	X	X			
KPM169K4N**	-	-	-			
KPM169L4N**	-	X	-			
KPM169GK4N**	X	-	-			
KPM169GL4N**	X	X	-			

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

Output table (example for 4-20mA)

Value (scale)	mA output
<10kΩ	20.00mA
50kΩ	18.40mA
100kΩ	16.69mA
200kΩ	14.24mA
300kΩ	12.51mA
500kΩ	10.24mA
700kΩ	8.83mA
1MΩ	7.50mA
2MΩ	5.50mA
5MΩ	4.00mA



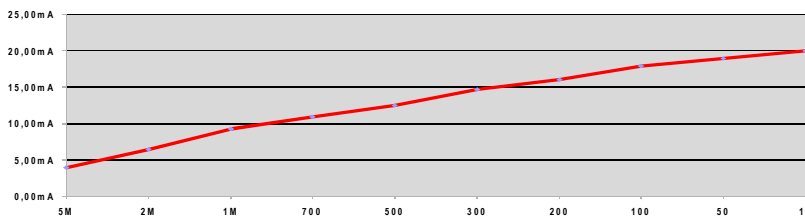
Description

KPM169x models for 400-800VDC

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).

This unit use the voltage adapter RH8 for voltage systems from 400V to max. 800VDC.

Output diagram



Relay Operation

Scale range: <10kΩ-5MΩ

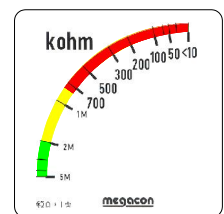
	Warning	Alarm	System Error	Fail Safe	Latch
R1	✓				
R2		✓		✓	✓
R3			✓	✓	

Model	Latch	Output	Fail-safe	Adjustments	Trip level	Delay
KPM169K8	-	-	X	WARNING:	10kΩ - 5MΩ	0-30secs
KPM169L8	-	X	X	ALARM:	10kΩ - 5MΩ	0,1-3secs
KPM169GK8	X	-	X			
KPM169GL8	X	X	X			
KPM169K8N	-	-	-			
KPM169L8N	-	X	-			
KPM169GK8N	X	-	-			
KPM169GL8N	X	X	-			

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

Output table (example for 4-20mA)

Value (scale)	mA output
<10kΩ	20.00mA
50kΩ	18.98mA
100kΩ	17.89mA
200kΩ	16.07mA
300kΩ	14.64mA
500kΩ	12.49mA
700kΩ	10.95mA
1MΩ	9.31mA
2MΩ	6.47mA
5MΩ	4.00mA



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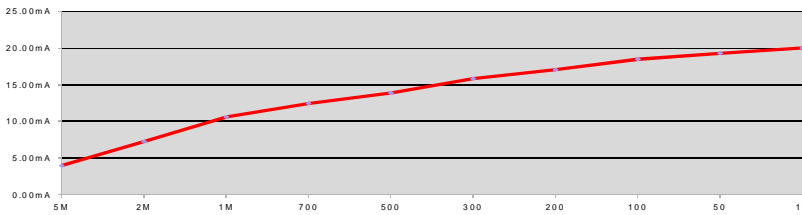
Description

KPM169x models for 800-1200VDC

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).

This unit use the voltage adapter RH12 for Voltage systems From 800V to max. 1200VDC.

Output diagram



Relay Operation

Scale range: <10kΩ-5MΩ

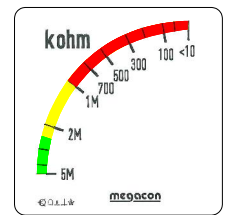
	Warning	Alarm	System Error	Fail Safe	Latch
R1	✓				
R2		✓		✓	✓
R3			✓	✓	

Models	Latch	Output	Fail-safe	Adjustments	Trip level	Delay
KPM169K12	-	-	X	WARNING:	10kΩ - 5MΩ	0-30secs
KPM169L12	-	X	X	ALARM:	10kΩ - 5MΩ	0,1-3secs
KPM169GK12	X	-	X			
KPM169GL12	X	X	X			
KPM169K12N	-	-	-			
KPM169L12N	-	X	-			
KPM169GK12N	X	-	-			
KPM169GL12N	X	X	-			

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

Output table (example for 4-20mA)

Value (scale)	mA output
<10kΩ	20.00mA
50kΩ	19.30mA
100kΩ	18.50mA
200kΩ	17.07mA
300kΩ	15.85mA
500kΩ	13.90mA
700kΩ	12.40mA
1MΩ	10.65mA
2MΩ	7.23mA
5MΩ	4.00mA



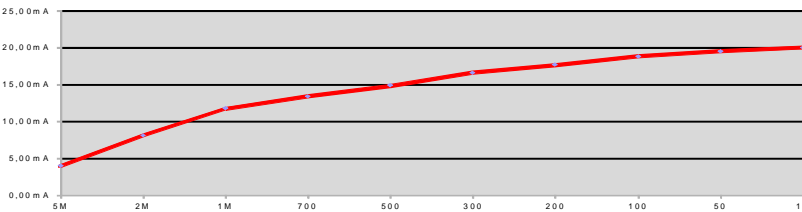
Description

KPM169x models for 1200-1600VDC

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).

This unit use the voltage adapter RH16 for voltage from 1200V to max. 1600VDC.

Output diagram



Relay Operation

Scale range: <10kΩ-5MΩ

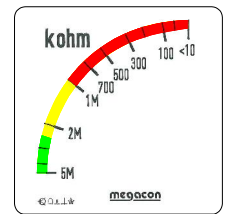
	Warning	Alarm	System Error	Fail Safe	Latch
R1	✓				
R2		✓		✓	✓
R3			✓	✓	

Model	Latch	Output	Fail-safe	Adjustments	Trip level	Delay
KPM169K16	-	-	X	WARNING:	10kΩ - 5MΩ	0-30secs
KPM169L16	-	X	X	ALARM:	10kΩ - 5MΩ	0,1-3secs
KPM169GK16	X	-	X			
KPM169GL16	X	X	X			
KPM169K16N	-	-	-			
KPM169L16N	-	X	-			
KPM169GK16N	X	-	-			
KPM169GL16N	X	X	-			

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

Output table (example for 4-20mA)

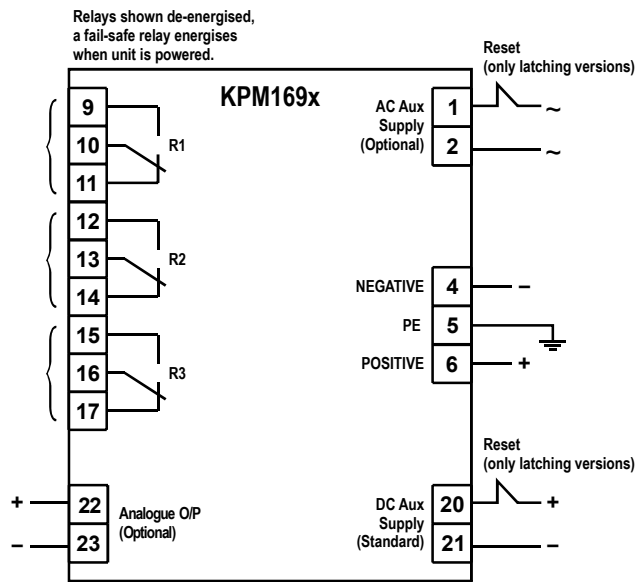
Value (scale)	mA output
<10kΩ	20.00mA
50kΩ	19.52mA
100kΩ	18.84mA
200kΩ	17.69mA
300kΩ	16.62mA
500kΩ	14.88mA
700kΩ	13.46mA
1MΩ	11.77mA
2MΩ	8.14mA
5MΩ	4.00mA



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Connection



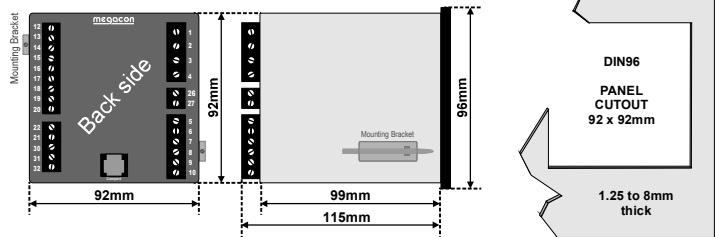
Analogue Output

KPM169F, KPM169GF, KPM169L2, KPM169GL2, KPM169L4, KPM169GL4, KPM169L8, KPM169GL8, KPM169L12, KPM169GL12, KPM169L16 and KPM169GL16 have an analogue output proportional to meter reading. (Special outputs are available on request)

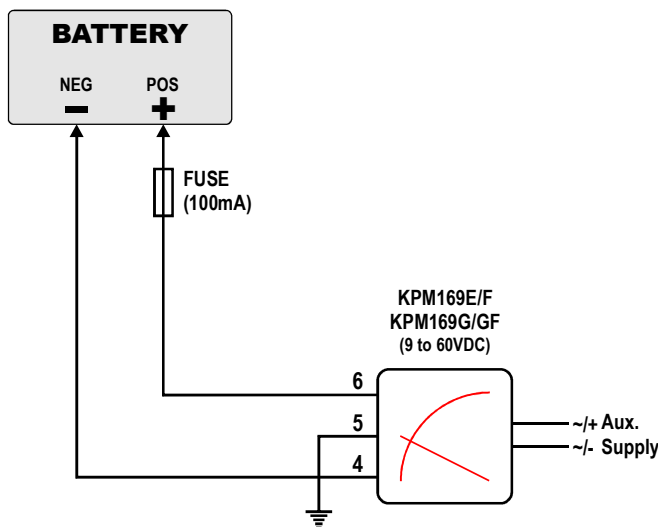
Add suffix from table below to type designation to specify output required:

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

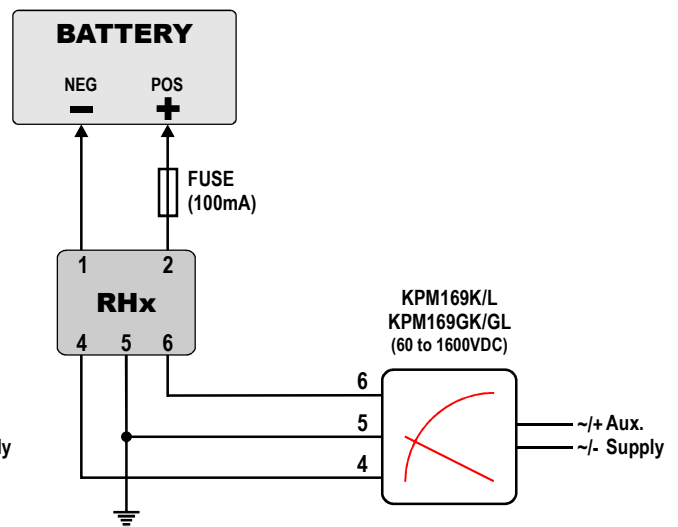
Dimensions



DIRECT INPUT <60VDC



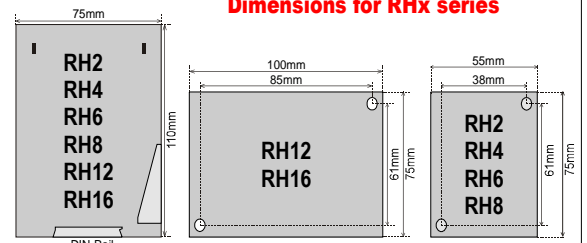
INPUT VIA RH ADAPTOR



High Voltage Adaptors (RHx) for KPM169Kx/Lx series



Dimensions for RHx series



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ORDERING INFORMATION

Type : KPM169F
 Aux. Supply : 230VAC
 Network Voltage : 24VDC
 Analogue O/P : 4-20mA
 Range : -

