



- Direct connection up to 690V line voltage, up to 25kV with HV adapter for both single or three phase systems
- 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
- Optional slave indicator

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
Analogue Output:	Up to 20mA, max 500R Up to 10V, min 100kohm (other on request)
Temperature:	-20 to +70°C
Weight:	0.5kgs
Front protection:	IP21

The Ultra-Reliability Concept (Paralleling of Transducers)

To obtain ultimate operational safety multiple MCM165x transducer inputs and outputs can be permanently paralleled.

At any time only ONE transducer should be enabled. The selected transducer is activated by applying auxiliary power to unit. Accidental enabling of more than one transducer will give distorted reading, but will not harm the transducer.

The MCM165x range is designed to comply with specification IMCAD 045 "Code of Practice for the Safe Use of Electricity Under Water" issued by IMCA.

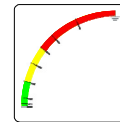
The unit meets IEC60092-504 and the relevant environmental and EMC tests specified in IEC60068/60092 and IEC61000/60533 respectively, to comply with the requirements of the major Classification Societies.

Application

The digitally controlled MCM165x 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).

An AC or DC auxiliary voltage is required for the unit, if powered from a separate source the network can also be monitored during standby conditions. Only ONE MCM165x can be connected to each IT-system. The optional slave indicator 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.

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

The unit is supplied with an isolated **analogue output** proportional to insulation level. If output is used for remote meter reading, we recommend 0-1mA for the slave indicator.

SAFETY

When a voltage adapter (ARx or ANx) is used the signal to terminals 4 and 6 on MCM165x is limited to a safe level, avoiding any dangerous voltage exposure to personnel.

Description

MCM165HF

Scale range: 10kΩ-500MΩ - ∞ (>2GΩ)

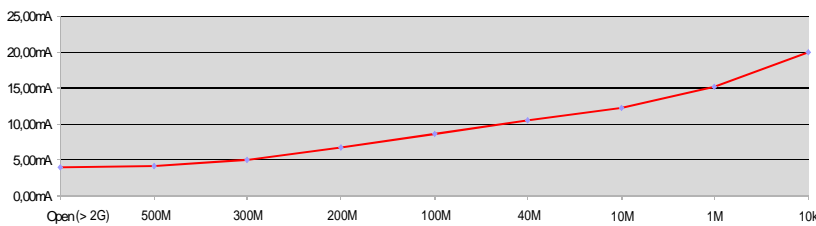
This unit is used for marine, offshore, seabed and down hole installations. Start of monitoring function is delayed when auxiliary power is switched on (default 30 secs delay). In this way false tripping during power up, caused by initial charging of network spread capacitance, is avoided.

The start delay can be pre-programmed to allow operation into any level of spread capacitance.

Direct connection up to 690V line voltage. Up to 25kV via HV adaptor ARx or ANx series.

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

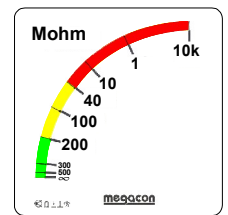
Output diagram



Output table (example for 4-20mA)

Value (scale)	mA output
10kΩ	20.00mA
1MΩ	14.84mA
10MΩ	12.28mA
40MΩ	10.57mA
100MΩ	8.63mA
200MΩ	6.64mA
300MΩ	4.93mA
500MΩ	4.20mA
Open (>2GΩ)	4.00mA

Range (slave indicator)



Description

MCM165GF

Scale range: 500kΩ-5GΩ - ∞ (>6GΩ)

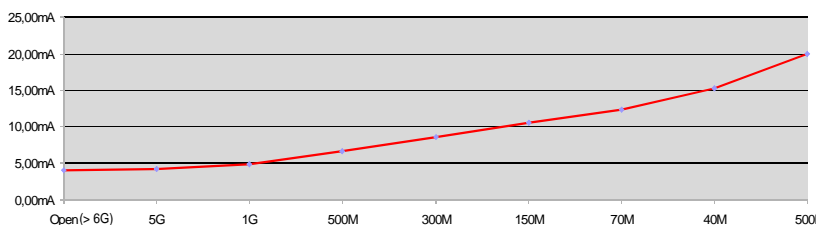
This unit is used for marine, offshore, seabed and down hole installations. Start of monitoring function is delayed when auxiliary power is switched on (default 30 secs delay). In this way false tripping during power up, caused by initial charging of network spread capacitance, is avoided.

The start delay can be pre-programmed to allow operation into any level of spread capacitance.

Direct connection up to 690V line voltage. Up to 25kV via HV adaptor ARx or ANx series.

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

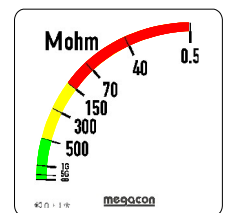
Output diagram



Output table (example for 4-20mA)

Value (scale)	mA output
500kΩ	20.00mA
40MΩ	15.18mA
70MΩ	12.28mA
150MΩ	10.57mA
300MΩ	8.63mA
500MΩ	6.64mA
1GΩ	4.93mA
5GΩ	4.20mA
Open (>6GΩ)	4.00mA

Range (slave indicator)



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



Description

MCM165F

Scale range: 15MΩ-10GΩ - ∞ (>12GΩ)

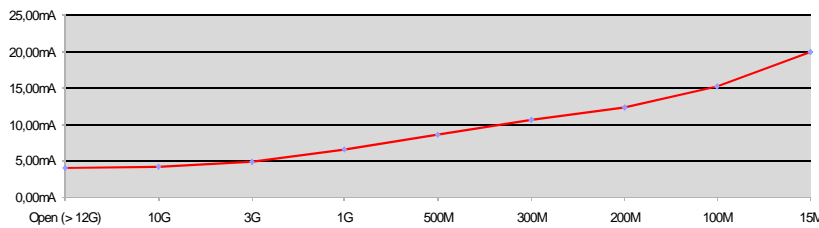
This unit is used for marine, offshore, seabed and down hole installations. Start of monitoring function is delayed when auxiliary power is switched on (default 30 secs delay). In this way false tripping during power up, caused by initial charging of network spread capacitance, is avoided.

The start delay can be pre-programmed to allow operation into any level of spread capacitance.

Direct connection up to 690V line voltage. Up to 25kV via HV adaptor ARx or ANx series.

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

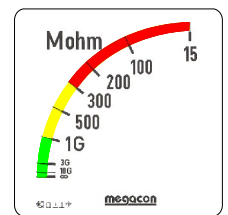
Output diagram



Output table (example for 4-20mA)

Value (scale)	mA output
15MΩ	20.00mA
100MΩ	15.18mA
200MΩ	12.28mA
300MΩ	10.57mA
500MΩ	8.63mA
1GΩ	6.64mA
3GΩ	4.93mA
10GΩ	4.20mA
Open (>12GΩ)	4.00mA

Range (slave indicator)



High Voltage Adaptors up to 25kVAC for MCM165x series

- HV Adaptor for AC Insulation Guards
- ARx series, up to 14kV Line Voltage live or non-live (standby)
- ANx series, up to 25kV System Voltage live or non-live (Starpoint/Neutral connection only)
- 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 ARx and ANx are used together with Insulation Guard MCM165x 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 is potted in polyurethane.

These units includes high inductance reactance modules, connected in a special configuration to avoid DC saturation. These Adapters maintains 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.



AR7 up to 7kVAC

AR14 up to 14kVAC

AN7 up to 7kVAC

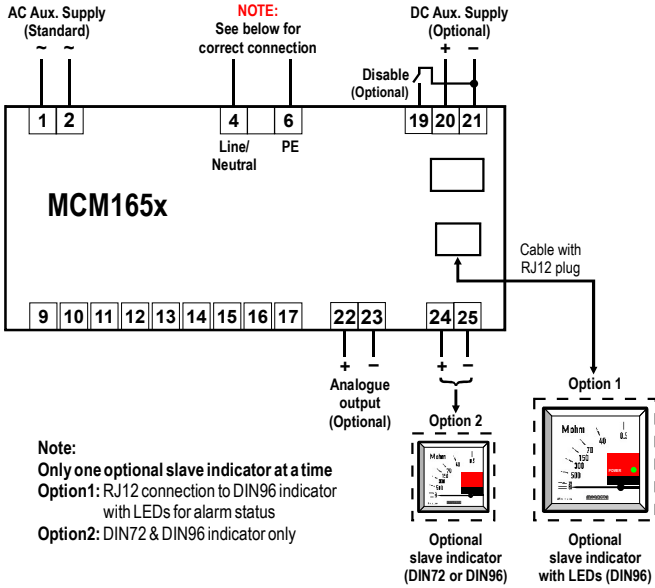
AN14 up to 14kVAC

AN25 up to 25kVAC

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Connection



Analogue Output

MCM165HF, MCM165GF and MCM165F have an analogue output proportional to insulation level. (Special outputs are available on request)

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

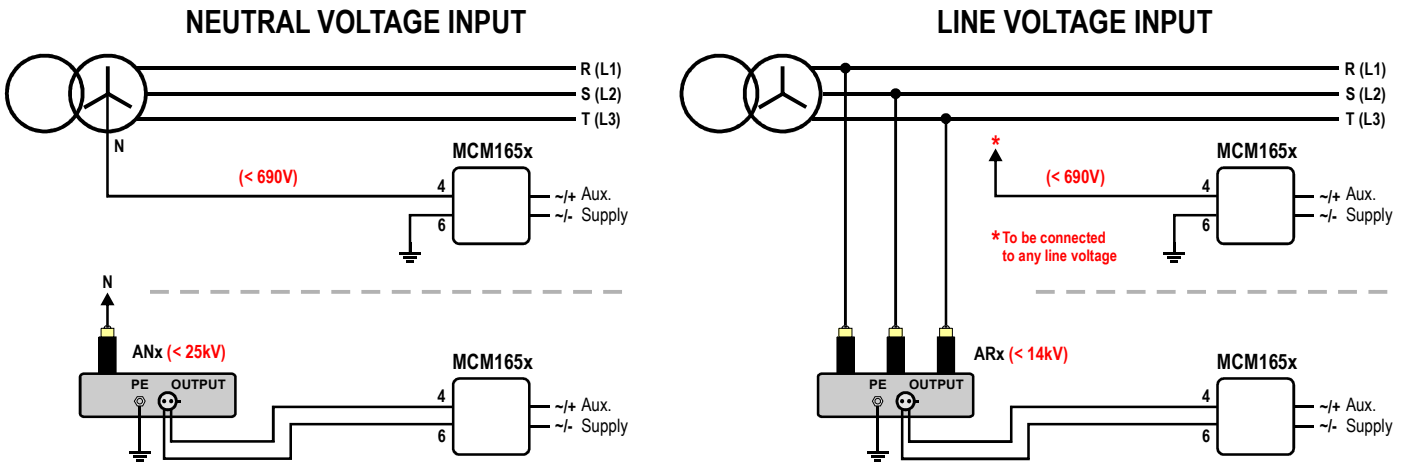
O/P1	0 - 10mA	O/P6	N/A
O/P2	0 - 20mA	O/P7	N/A
O/P3	4 - 20mA	O/P8	0 - 10VDC
O/P4	N/A	O/P9	N/A
O/P5	N/A	O/P10	N/A

Paralleling Disable Function

MCM165x has a built-in disable function (available only when DC Aux. Supply is applied). 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.

Connection



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

Dimensions

Dimensions for Slave instrument

	DIN 72	DIN96
A	72 x 72mm	96 X 96mm
B	68 x 68mm	92 x 92mm
C	64mm	64mm

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ORDERING EXAMPLE:

Type: MCM165F
 Aux. Supply: 200-240VAC
 Network Voltage: 14kVAC
 Analogue O/P: (O/P3) 4-20mA
 Range: 15Mohm - 10Gohm

