



- 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

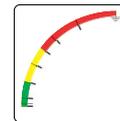
Auxiliary Supply:	100-120, 200-240, 380-415 or 440-460VAC, 40-70Hz (Fuse 0.5A)
Optional Voltage:	12-24, 48 or 110VDC (Fuse 2A)
Supply tolerance:	± 10%
Power rating:	1,5VA
Analogue Output:	Up to 20mA, max 500R Up to 10V, min 100kohm (other on request)
Temperature:	-20 to +70°C
Weight:	0.5kgs
Front protection:	IP21

## 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)



### 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 IMCA D 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.

## 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

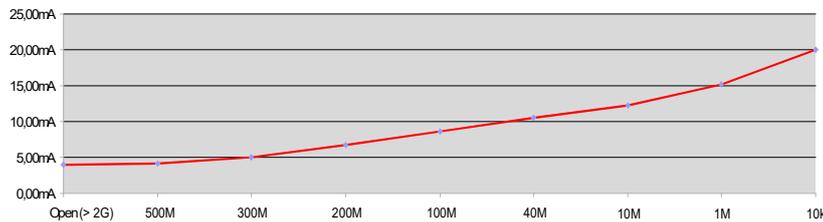
**MCM165HF** Scale range: 10kΩ-500MΩ - ∞ (>2GΩ)

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 CH163Bx, AN6,6B, ARx or ANxB series.

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

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

Range (slave indicator)



Description

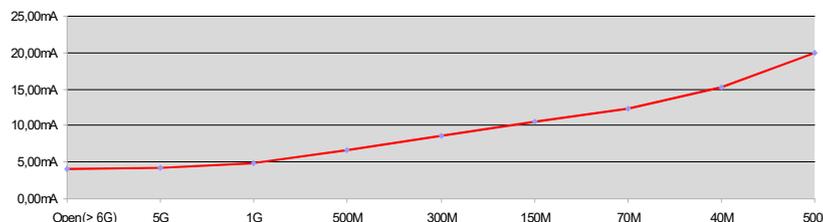
**MCM165GF** Scale range: 500kΩ-5GΩ - ∞ (>6GΩ)

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 CH163Bx, AN6,6B, ARx or ANxB series.

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

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

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)

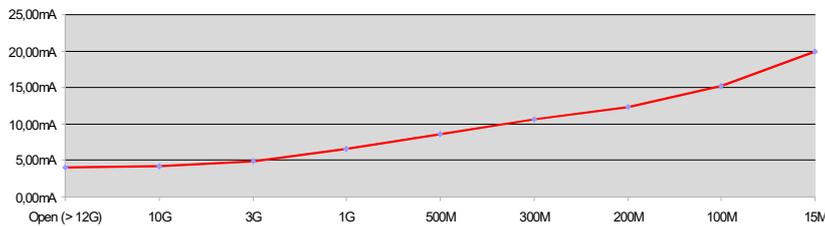
This unit is used for marine, offshore, seabed and down hole installations. Start of monitoring function is delayed when auxiliary power is switched on (default 30 secs delay). In this way false tripping during power up, caused by initial charging of network spread capacitance, is avoided.

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 CH163Bx, AN6,6B, ARx or ANxB series.

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

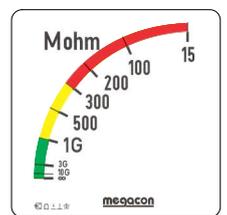
Output diagram



Output table (example for 4-20mA)

Value (scale)	mA output
15kΩ	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
- CH163Bx series, up to 5000V Line Voltage live or non-live (standby)
- AN6,6B up to 6600V System Voltage live or non-live (Starpoint/Neutral connection only)
- ARx series, up to 14kV Line Voltage live or non-live (standby)
- ANxB 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 CH163Bx, AN6,6B, ARx and ANxB series are used for Insulation Guard MCM165x 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. 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



CH163B/3,6 up to 3.6kVAC  
CH163B/5 up to 5kVAC  
AN6,6B up to 6,6kVAC



AR7 up to 7kVAC  
AR14 up to 14kVAC

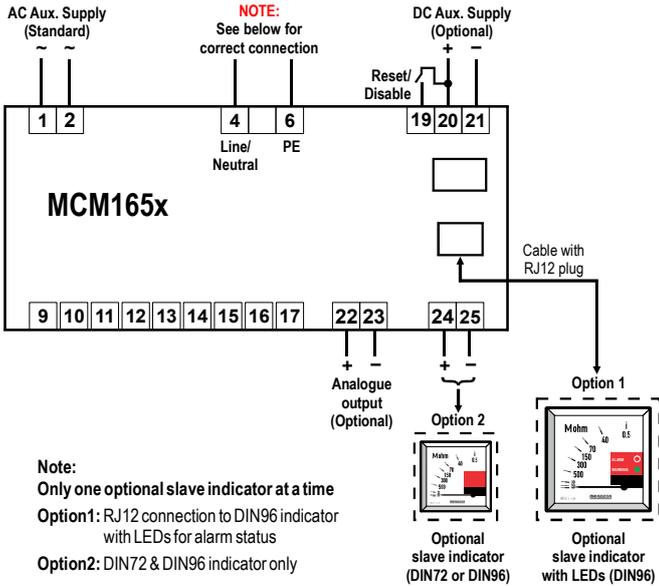


AN7B up to 7kVAC  
AN14B up to 14kVAC  
AN25B up to 25kVAC

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## Connection



## Analogue Output

MCM165HF, MCM165GF and MCM165F 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:

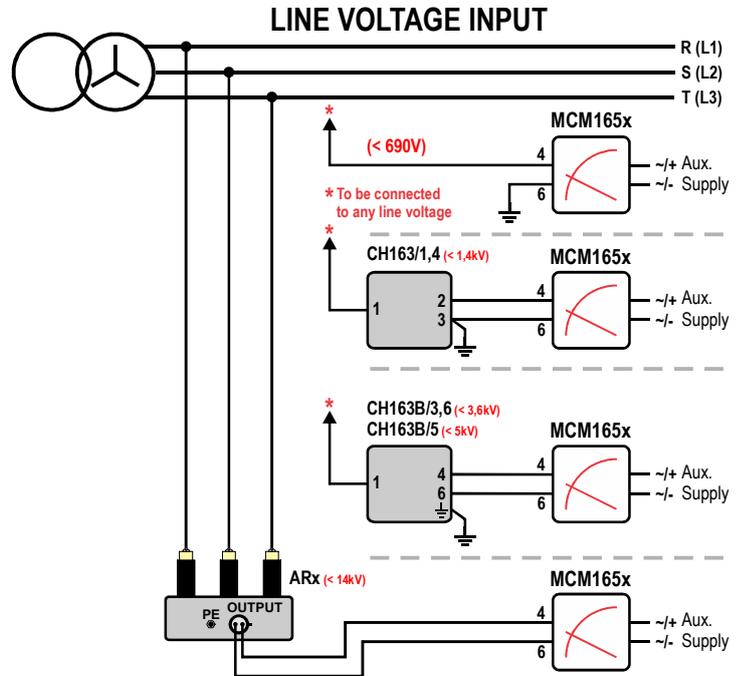
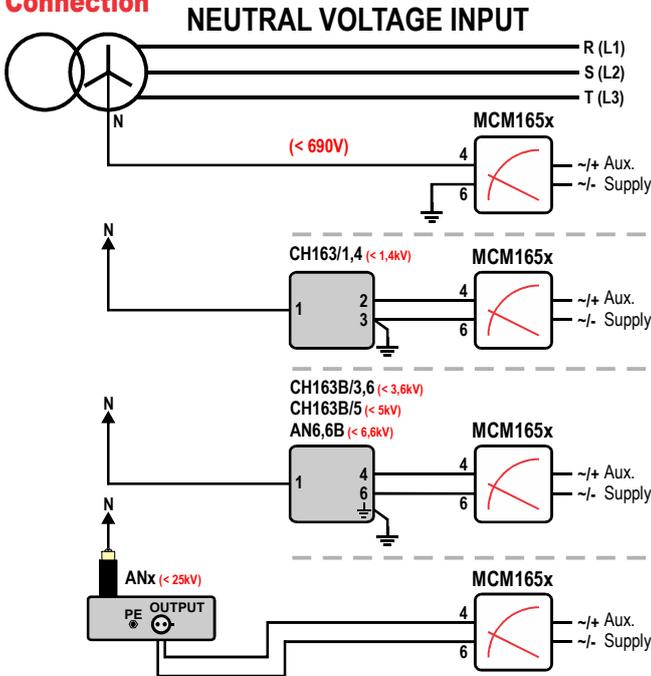
O/P1	0 - 10mA	O/P6	N/A
O/P2	0 - 20mA	O/P7	N/A
O/P3	4 - 20mA	O/P8	0 - 10VDC
O/P4	N/A	O/P9	N/A
O/P5	N/A	O/P10	N/A

## Reset / Paralleling Disable Function

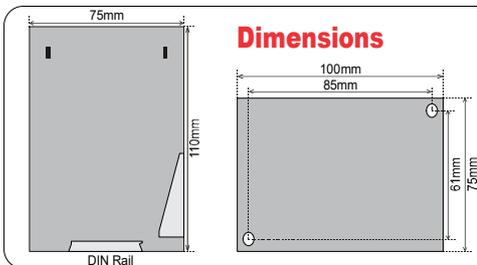
MCM165x has a built-in disable function. When connecting two or more IT-networks together **only one unit** can be active, the other(s) must be disabled. When unit is disabled the power led will flash every 2 seconds to indicate that unit is inactive.

Use a potential free contact on terminal 19 & 20 to activate the disable function (after 2 secs). When activated the measuring input terminal 4 will be internally disconnected.

## Connection

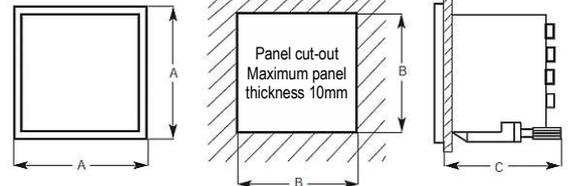


**The instrument will detect earth fault on all phases independent of which phase is connected to terminal 4.**



### Dimensions 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

