



overview catalogue



Insulation
Monitoring
Device



Hakel is a dynamic company which since foundation in 1994 has quickly developed in terms of turnover and the product assortment. This dynamism can also be observed in the approach to developing the quality of the manufacturing products.

Hakels experience in the use of power electronics in industry, is related to its leading position in the Czech Republic and Europe. Hakel produces and exports to all countries and all continents.

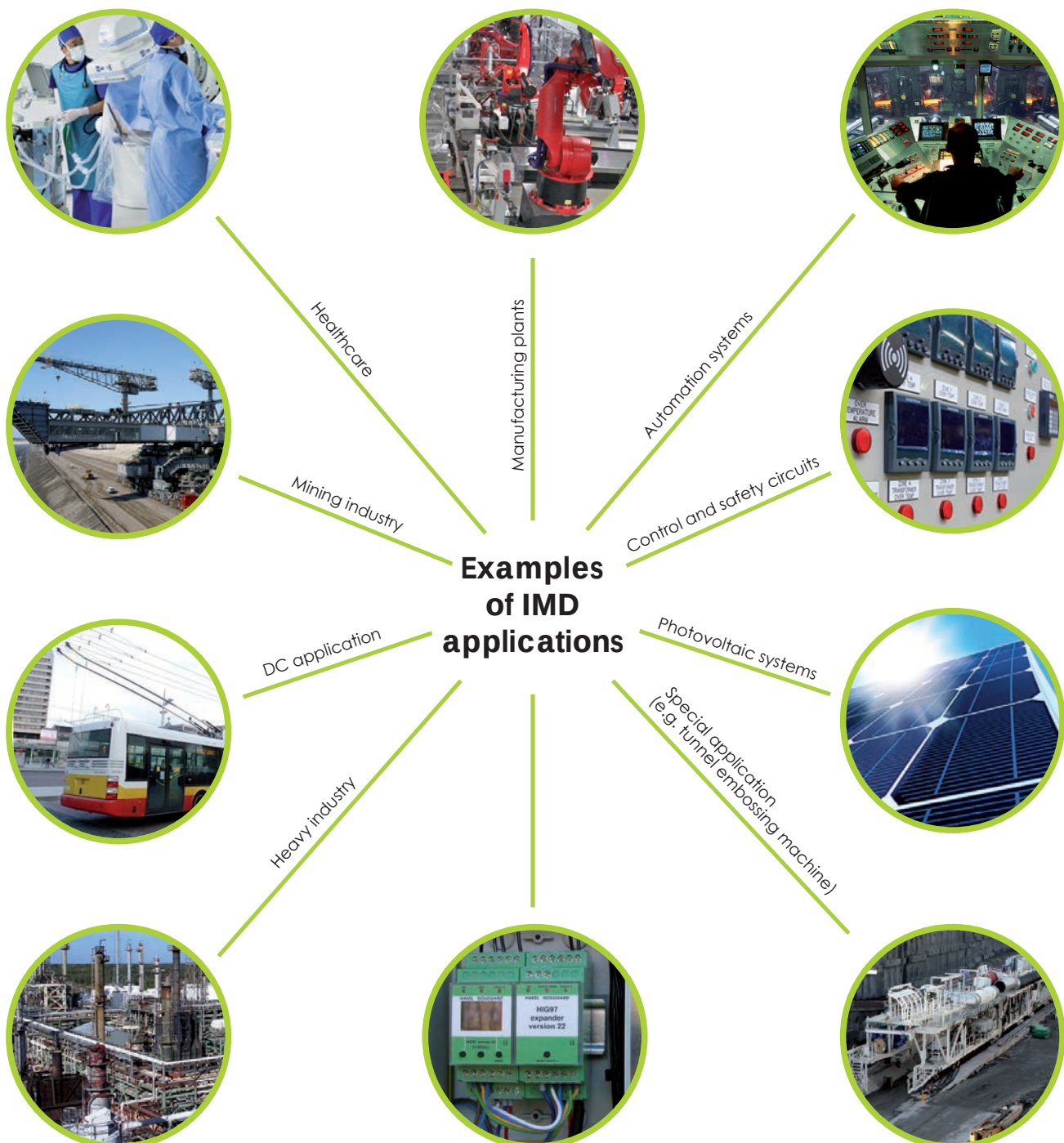
The insulation monitoring devices offered by the company are used for easy application in ungrounded IT power supply systems in metallurgy, civil engineering, shipbuilding, in hospitals and the transport environment.



IT power supply network

IT power supply system is an insulated system that has all active parts isolated from the earth or one point of the network grounded via high impedance. Inactive parts of the electrical installation are grounded. Ungrounded system increases the operational reliability and human safety. Therefore it is used in the metallurgy, mechanical engineering, shipbuilding, traction systems, public transport and hospitals. The advantage of the ungrounded system is that the device connected to this system can work continuously even in the case of first fault (so-called earth fault). The phase voltage of the undamaged phase (or phases in the three-phase system) is increased to the value of the delta voltage during the first fault. The system is safe if inactive parts are properly grounded. The reason is that there occur no bigger than safe current levels. The relevant responsible person must be informed about this failure and the first fault must be eliminated as soon as possible. However, the second fault (double earth fault) must result in immediate disconnection of the power supply system. The insulation monitoring devices or residual current relays are used for monitoring of the ungrounded system. These devices indicate the insulation level decrease below the set value.

IMD (Insulation Monitoring Device) utilization is at every IT power supply system.





HIG9x BASIC SERIES, COMMUNICATION VIA RS485 OR ETHERNET

The ISOLGUARD HIG9x series are designed for monitoring the status of the insulation of single-phase and 3-phase ungrounded IT power supply systems. HIG9x insulation monitoring devices communicate with the master computer through a via RS485 industrial bus-bar with the protocol derived from the PROFIBUS protocol. HIG9x/E communicate via Ethernet.



HIG95+ HEALTHCARE, COMMUNICATION VIA RS485

The insulation monitoring device HIG95+ produced by HAKEL for the ISOLGUARD series is designed for monitoring the insulation status of single-phase and 3-phase ungrounded IT power supply systems in the health sector. It is also equipped with measuring circuits which ensure evaluation and failure signalling of the monitoring system originated due to thermal (ϑ) or current overloading of the medical transformer.



HIG97 EXTREMELY FAST RESPONSE

ISOLGUARD HIG97 is designed for monitoring the insulating status of 3-phase ungrounded IT power supply systems with the extremely fast evaluation and signalling of the status of the inspected network.



MDS10T + MPS

Modules MDS10T and MDS10T+MPS (MPS... module for auxiliary signalling) are designed for remote signalling of the status of ungrounded IT power supply systems.



MDS-D

The remote monitoring module MDS-D is a device equipped with a touchscreen display showing the status of ungrounded IT power supply system(s), monitored by insulation monitoring device(s) HIG9x.

ISOLGUARD insulation monitoring devices HIG9x

The insulation monitoring devices produced by HAKEL for the ISOLGUARD HIG9x series are designed for monitoring the insulation status of single-phase and 3-phase ungrounded IT power supply systems designed and operated according to standards EN 61010-1 ed. 2, EN 50522, EN 61936-1.

Enable monitoring of single-phase and 3-phase ungrounded IT power supply systems up to the maximum operating voltage 275V AC, or 3x275V AC. If monitoring the insulation status of a single-phase or 3-phase ungrounded IT power supply system with higher operating voltage is required, it is necessary to create an artificial centre using TL400 (catalogue number 70504), TL600 inductors (catalogue number 70601), TL1600 (catalogue number 71601) or TL6003 (catalogue number 70603). Such a created centre is connected to the terminal of insulation monitoring device HIG9x.

The insulation monitoring devices are equipped to display the numeric value of the measured insulation resistance. In addition, the control buttons for setting the parameters of insulation monitoring devices and signalling LED diodes can be used to display the status of the checked network. According to the type, it is possible to connect to the insulation monitoring device modules for remote signalling of the status of the controlled MDS10T or MDS-D network produced by HAKEL.

HIG9x insulation monitoring devices communicate with the master computer through an industrial RS485 bus-bar with the protocol derived from the PROFIBUS protocol.

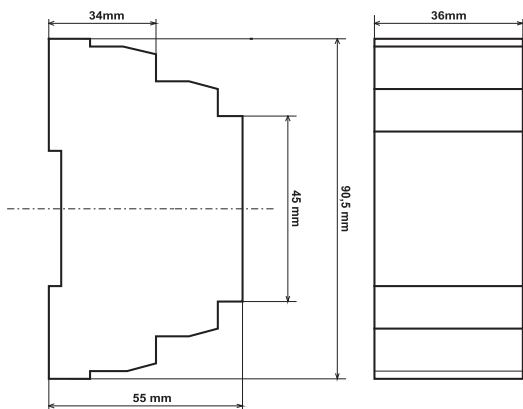
One or two built-in signalling relays with a switch contact enable the connection of equipment for signalling of alarm. The insulation monitoring device has an optional alarm memory function with the option to cancel the alarm using the button on the insulation monitoring device. Local and remote testing of the function of the insulation monitoring device can also be conducted.

Only one insulation monitoring device can be connected to the same ungrounded IT power supply system.

Insulation monitoring device versions HIG9x	Signalling relay 1	Signalling relay 2	Connection MDS10T	Range of display	Critical insulation resistance
HIG91 Art. number 70 911	1P	-	Yes	5 kΩ ÷ 900 kΩ	Adjustable 5 kΩ÷300 kΩ
HIG92 Art. number 70 913	1P	-	Yes	200 kΩ ÷ 5 MΩ	Adjustable 200 kΩ÷900 kΩ
HIG93 Art. number 70 915	1P	1P	-	5 kΩ ÷ 900 kΩ	Adjustable 5 kΩ÷300 kΩ
HIG94 Art. number 70 917	1P	1P	-	200 kΩ ÷ 5 MΩ	Adjustable 200 kΩ÷900 kΩ
HIG95 + Art. number 70 919	1P	-	Yes	5 kΩ ÷ 900 kΩ	Adjustable 50 kΩ÷200 kΩ

Note: 1P signalling relay with one switching contact

+ Use in health sector in accordance with the requirements of standards IEC 60364-7-710, IEC 61557-1 and IEC 61557-8.



Basic characteristics

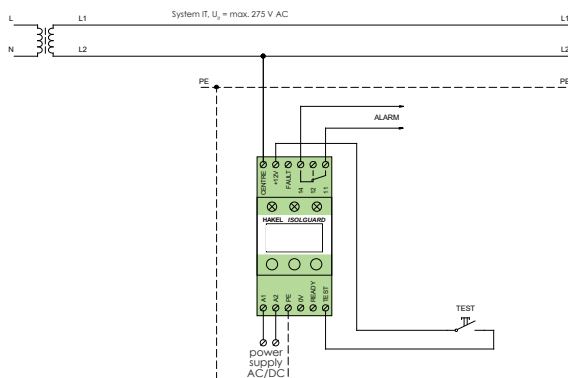
- The monitor for insulating statuses of AC networks with the voltage 0 to 275 V without additional equipment, higher voltages with additional inductor
- Display of measured value of the R_{isol} insulation resistance on the display within the range 5 kΩ to 900 kΩ or 200 kΩ to 5 MΩ
- Signalling relay of the status of the insulating resistance with the switching contact
- Connection to the RS485 bus-bar, insulation strength 2500 V_{rms} against internal circuits and network circuits
- Optional memory of the activated alarm with option unblocking by button on the insulation monitoring device
- Connection options for remote signalling MDS10T or MDS-D modules produced by HAKEL.
- Option to set the monitored value of the insulating resistance R_{CRIT} using the display and buttons within the range according to the type insulation monitoring devices
- Adjustable hysteresis of the limit value of the insulating resistance within the range 0 to 100% using the display and buttons
- Adjustable delay t_{ON} response of signalling relay using the displays and buttons within the range 0 to 60 sec
- Access to setting the insulation monitoring device by button can be locked, the insulation monitoring device is unlocked by a combination of buttons
- Separated supply voltage enables to also monitor a network which is not under voltage

Technical data HIG9x

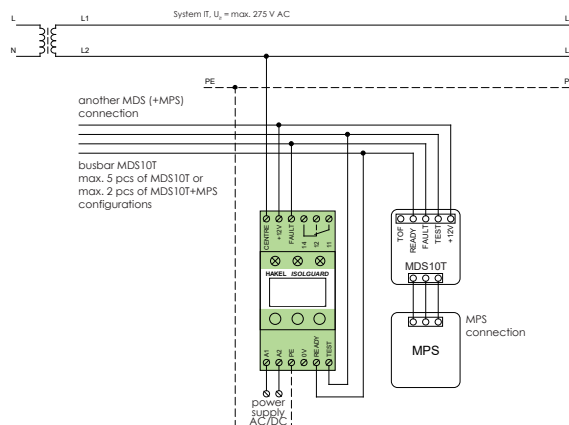
Type		HIG91	HIG92	HIG93	HIG94	HIG95
Supply voltage	U _n	90 to 265 V AC or 90 to 370 V DC				
Maximum operating voltage of the monitored ungrounded IT power supply system	U _{it}	275 V AC				
Consumption	P	max. 5 VA				
Measuring voltage	U _M	12 V DC				
Measuring current	I _M	< 0,6 mA				
Alternate inside resistance of the measuring input	R _i	> 2 MΩ				
Range of the value shown on the display	R _{isol}	5 kΩ to 900 kΩ	200 kΩ to 5MΩ	5 kΩ to 900 kΩ	200 kΩ to 5 MΩ	5 kΩ to 900 kΩ
Precision of measurement 5 kΩ ... 10 kΩ 10 kΩ ... 900 kΩ		2 kΩ ± 10%		2 kΩ ± 10%		2 kΩ ± 10%
Precision of measurement 200 kΩ ... 1 MΩ 1 MΩ ... 5 MΩ			± 10% ± 15%		± 10% ± 15%	
Critical insulation resistance	R _{crit}	adjustable 5 kΩ to 300 kΩ	adjustable 200 kΩ to 900 kΩ	adjustable 5 kΩ to 300 kΩ	adjustable 200 kΩ to 900 kΩ	adjustable 50 kΩ to 200 kΩ
Hysteresis of monitored insulation resistance	R _{hyst}	adjustable 0 to +100% R _{crit}				
Delay in response of signalling	t _{ON}	adjustable 0 to 60 sec.				
Outputs						
Signalling potential-free switching contact relay 1		250 V AC / 1 A				
Electric strength against internal circuits		3750 V _{rms}				
Electric strength against supply circuits		3750 V _{rms}				
Signalling potential-free switching contact relay 2				250 V AC / 1 A		
Electric strength against internal circuits				3750 V _{rms}		
Electric strength against supply circuits				3750 V _{rms}		
Remote signalling		Terminals for connection of the MDS10T(+MPS) module produced by HakeI				Terminals for connection of the MDS10T(+MPS) module max. 5 x MDS10T modules or max. 2 x MDS10T+MPS modules
		max. 5 x MPS10T modules or max. 2 x MDS10T+MPS modules				
		Line RS485 and remote monitoring module MDS-D produced by HakeI				
Communication line: RS485 type MASTER-SLAVE, 9600 Bd, even parity		Yes				
Insulating strength against internal circuits and network circuits		2500 V _{rms}				
General data						
Degree of protection according to EN 60 529		IP20				
Weight	m	160 g				
Method of assembly		on the DIN bar				
Recommended cross-section of connected conductors	S	1 mm²				
Catalogue number		70911	70913	70915	70917	70919
Operating conditions						
Working temperature		-10°C ~ +60°C				
Relative moisture of the environment		28 g H ₂ O /kg of dry air				
Atmospheric pressure		86 to 106 kPa				
Working position		any				
External magnetic and electric field		max. 400A/m				
Category of over-voltage / testing voltage		III according EN 60664-1				
Pollution degree		2 according EN 60664-1				
Type of operation		permanent				

Recommended connection HIG9x to monitored ungrounded IT power supply system

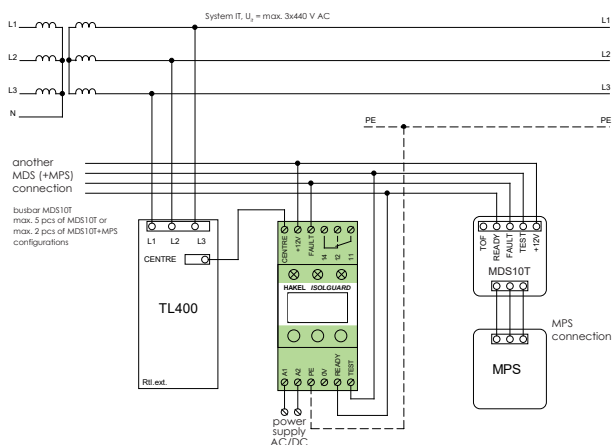
1-phase ungrounded IT power supply system, module HIG91, HIG92 and HIG95 with the signalling of the alarm and remote testing button



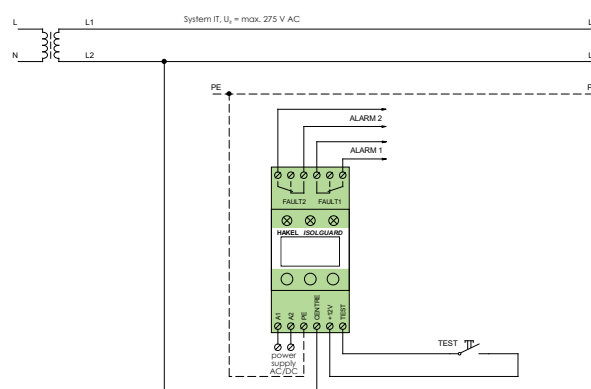
1-phase ungrounded IT power supply system, module HIG91, HIG92 and HIG95 with the remote signalling MDS10T+MPS module



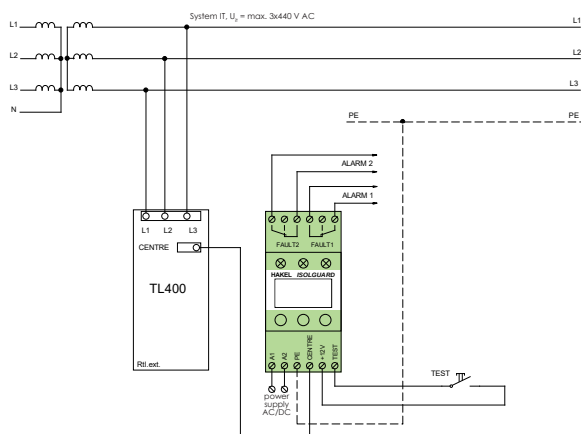
3-phase ungrounded IT power supply system, HIG91, HIG92 and HIG95 module in the connection with remote signalling MDS10T+MPS module



1-phase ungrounded IT power supply system (max. 275 V AC), module HIG93, HIG94 with signalling of the alarm and remote testing button



3-phase ungrounded IT power supply system (3x440 V AC), module HIG93, HIG94 with signalling of the alarm and remote testing button



ISOLGUARD insulation monitoring devices HIG9x/E

Insulation monitoring devices produced by HAKEL in the ISOLGUARD HIG91/E, HIG92/E, HIG93/E, HIG94/E, HIG95/E series are designed for monitoring the insulating status of single-phase and 3-phase ungrounded IT power supply systems, designed and operated according to standards EN 61010-1 ed. 2, EN 50522, EN 61936-1.

Enable monitoring of single-phase and 3-phase ungrounded IT power supply systems up to the maximum operating voltage of 275V AC, or 3x275V AC. If monitoring the insulation status of a single-phase or 3-phase ungrounded IT power supply system with higher operating voltage is required, it is necessary to create an artificial centre using TL400 (catalogue number 70504), TL600 inductor (catalogue number 70601), TL1600 (catalogue number 71601) or TL6003 (catalogue number 70603). Such a created centre is connected to insulation monitoring device terminal HIG9x/E.

The insulation monitoring devices are equipped to display the numeric value of the measured insulation resistance. In addition, the control buttons for setting the parameters of the insulation monitoring devices and signalling LED diodes display the status of the checked network and the insulation monitoring device. According to the type, it is possible to connect to the insulation monitoring device modules for remote signalling of the status of the controlled MDS10T network produced by HAKEL.

HIG9x/E insulation monitoring devices are fitted with the HIG-ETH module, which enables direct connection of the insulation monitoring device to the ETHERNET computer network, on which it is possible to communicate with PC.

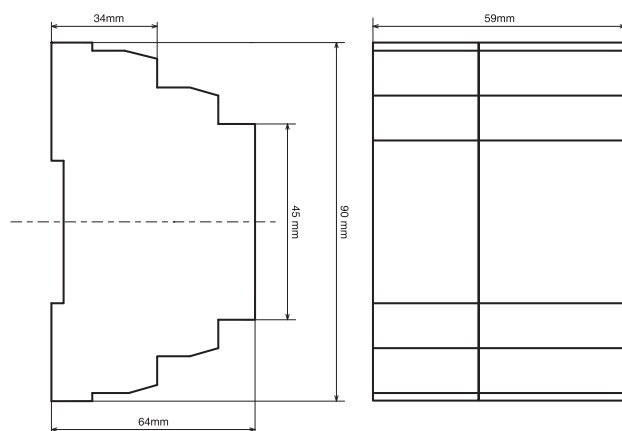
One or two built-in signalling relays with a switch contact enable the connection of equipment for signalling of alarm. The insulation monitoring device has an optional alarm memory function with the option to cancel the alarm using the button on the insulation monitoring device. Local and remote testing of the function of the insulation monitoring device can also be conducted.

Only one insulating status insulation monitoring device can be connected to the same ungrounded IT power supply system.

Indication	Signalling relay 1	Signalling relay 2	Connection MDS10T	Range of displayed value	Critical insulation resistance	Connection to ETH
HIG91/E Art. number 70 920	1P	-	Yes	5 kΩ ÷ 900 kΩ	Adjustable 5 kΩ÷300 kΩ	Yes
HIG92/E Art. number 70 922	1P	-	Yes	200 kΩ ÷ 5 MΩ	Adjustable 200 kΩ÷900 kΩ	Yes
HIG93/E Art. number 70 924	1P	1P	-	5 kΩ ÷ 900 kΩ	Adjustable 5 kΩ÷300 kΩ	Yes
HIG94/E Art. number 70 926	1P	1P	-	200 kΩ ÷ 5 MΩ	Adjustable 200 kΩ÷900 kΩ	Yes
HIG95/E + Art. number 70 928	1P	-	Yes	5 kΩ ÷ 900 kΩ	Adjustable 50 kΩ÷200 kΩ	Yes

Notes: 1P signalling relay with one switching contact MDS10 remote signalling module for the status of the insulation monitoring device

+ Use in health sector in accordance with the requirements of standards IEC 60364-7-710, IEC 61557-1 and IEC 61557-8.



Basic characteristics

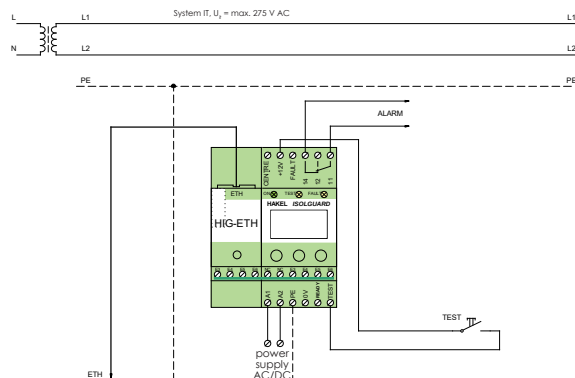
- The monitor for insulating statuses of AC networks with the voltage 0 to 275 V without additional equipment, higher voltages with additional inductor
- Display of measured value of the R_{iso} insulation resistance on the display within the range 5 kΩ to 900 kΩ or 200 kΩ to 5 MΩ
- Signalling relay of the status of the insulating resistance with the switching contact
- Connection to the computer network ETHERNET 10Base-T or 100Base TX (automatic recognition), connector RJ45
- Communication protocols HTTP (WEB, XML), SNMP, MODBUS TCP
- Internal web pages for displaying actual values and configurations
- Optional memory of the alarm called with the option to unblock with the button on the insulation monitoring device
- Connection options for remote signalling MDS10T modules produced by HAKEL.
- Option to set the monitored value of insulating resistance R_{CRIT} by means of the display and buttons within the range 5 kΩ to 300 kΩ or 200 kΩ to 900 kΩ according to the type of insulation monitoring device
- Adjustable hysteresis of the limit value of the insulating resistance within the range 0 to 100% by means of the display and buttons
- Adjustable delay t_{ON} signalling relay response use the displays and buttons within the range 0 to 60 sec
- Access to setting the insulation monitoring device with buttons can be locked. The insulation monitoring device is unlocked by a combination of buttons.
- Separated supply voltage enables to also monitor a network which is not under voltage
- Modules for assembly on the DIN 35 rail, the total width of both modules is 59 mm

Technical data HIG9x/E

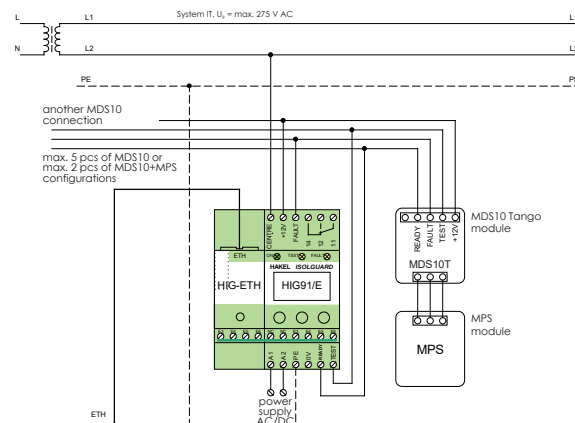
Typ		HIG91/E	HIG92/E	HIG93/E	HIG94/E	HIG95/E
Supply voltage	U _n	90 to 265 V AC or 90 to 370 V DC				
Maximum operating voltage of the monitored ungrounded IT power supply system	U _{it}	275 V AC				
Consumption	P	max. 5 VA				
Measuring voltage	U _M	12 V DC				
Measuring current	I _M	< 0,6 mA				
Alternative internal resistance of the measuring input	R _i	> 2 MΩ				
Range of the value shown on the display	R _{isol}	5 kΩ to 900 kΩ	200 kΩ to 5 MΩ	5 kΩ to 900 kΩ	200 kΩ to 5 MΩ	5 kΩ to 900 kΩ
Precision of measurement 5 kΩ ... 10 kΩ 10 kΩ ... 900 kΩ		2 kΩ ± 10%	-	2 kΩ ± 10%	-	2 kΩ ± 10%
Precision of measurement 200 kΩ ... 1 MΩ 1 MΩ ... 5 MΩ		-	± 10% ± 15%	-	± 10% ± 15%	
Critical insulation resistance	R _{crit}	adjustable 5 kΩ to 300 kΩ	adjustable 200 kΩ to 900 kΩ	adjustable 5 kΩ to 300 kΩ	adjustable 200 kΩ to 900 kΩ	adjustable 50 kΩ to 200 kΩ
Hysteresis of monitored insulation resistance	R _{hyst}	adjustable 0 to +100% R _{crit}				
Delay in response of signalling	t _{ON}	adjustable 0 to 60 sec.				
Outputs						
Signalling potential-free switching contact relay 1		250 V AC / 1A		250 V AC / 1A		250 V AC / 1A
Electric strength against internal circuits		3750 V _{rms}		3750 V _{rms}		3750 V _{rms}
Electric strength against supply circuits		3750 V _{rms}		3750 V _{rms}		3750 V _{rms}
Signalling potential-free switching contact relay 2				250 V AC / 1A		
Electric strength against internal circuits				3750 V _{rms}		
Electric strength against supply circuits				3750 V _{rms}		
Remote monitoring		Terminals for connection of the MDS10T + MPS produced by HakeI				Terminals for connection of the MDS10 Tango module+MPS
		max. 5 x MDS10T modules or max. 2 x MDS10T + MPS				max. 5 x MDS10T modules or 2 x MDS10T+MPS
		Ethernet interface				
Communication line: RJ45 Ethernet 10BASE-T/100BASE-TX Ethernet: Version 2.0/IEEE802.3		Yes	Yes	Yes	Yes	Yes
Insulating strength against internal circuits		3000 V _{rms}	3000 V _{rms}	3000 V _{rms}	3000 V _{rms}	3000 V _{rms}
General data						
Degree of protection according to EN 60 529		IP20				
Weight	m	220 g				
Method of assembly		on the bar DIN				
Recommended cross-section of connected conductors	S	1 mm²				
Catalogue number		70 920	70 922	70 924	70 926	70 928
Operating conditions						
Working temperature		-10°C ~ +60°C				
Relative moisture of the environment		28 g H ₂ O /kg of dry air				
Atmospheric pressure		86 to 106 kPa				
Working position		any				
External magnetic and electric field		max. 400A/m				
Category of over-voltage / testing voltage		III according EN 60664-1				
Pollution degree		2 according EN 60664-1				
Type of operation		permanent				

Recommended connection HIG9x to monitored ungrounded IT power supply system

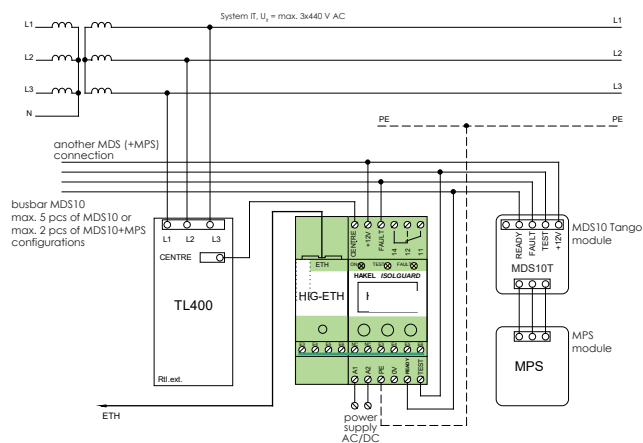
1-phase ungrounded IT power supply system, module HIG91/E, HIG92/E, HIG95/E with the signalling of the alarm and remote testing button



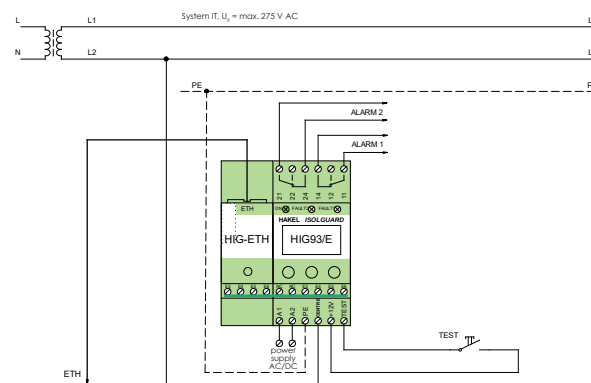
1-phase ungrounded IT power supply system, module HIG91/E, HIG92/E, HIG95/E with remote signalling MDS 10T (+MPS) module



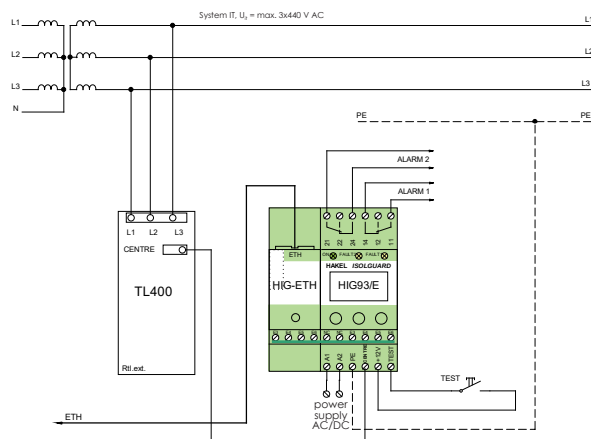
3-phase ungrounded IT power supply system, module HIG91/E, HIG92/E, HIG95/E in connection with the TOM module and remote signalling MDS 10T+MPS



1-phase ungrounded IT power supply system (max. 275 V AC), module HIG93/E, HIG94/E with the signalling of the alarm and remote testing button



3-phase ungrounded IT power supply system (3x440 V AC), HIG93/E, HIG94/E module



ETHERNET interface

Insulation monitoring devices HIG9x/E

Monitoring of the status and control of the insulation monitoring device, in addition to the previously mentioned control using the display and buttons, through the Ethernet and by connection to the computer network. This connection is ensured by the HIG-ETH module, which is part of insulation monitoring device with the indication. In the HIG-ETH module is a built-in WEB Server ISOLGUARD MonitorETH, by which it is possible to monitor and set all the parameters of the HIG9x/E sensor.

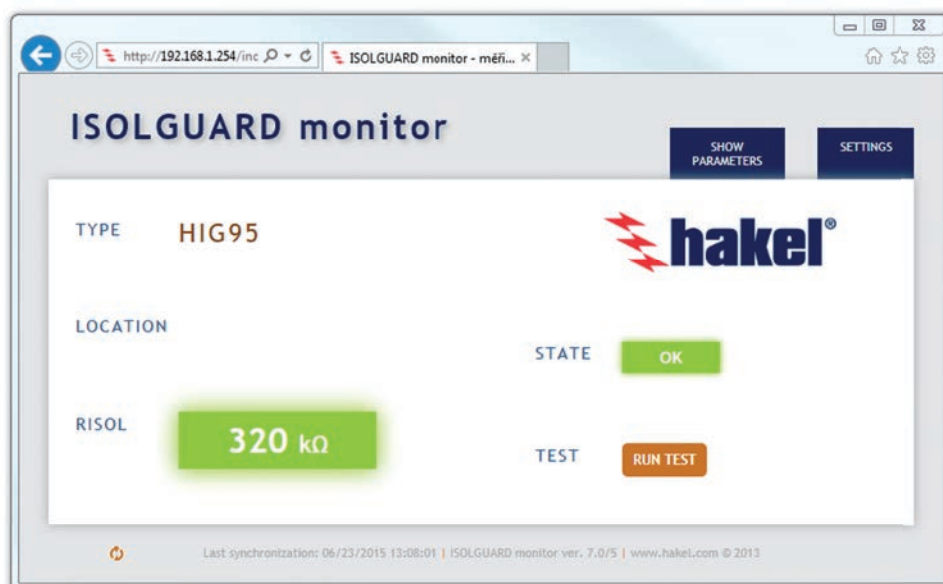
Before installation into the operation and use, the HIG9x/E module must be set, mainly to assign a new IP address. This address must be unique in the local network and is usually assigned by the network administrator.

The address must be in the valid range of the sub-network in which the HIG9x/E unit will be connected. It is recommended that the setting will be done by an employee familiarized with network issues from the viewpoint of topology, as well as experience with configuration of the network on the computer and they can diagnose common defects. It is recommended to assign this setting to an IT technician who is responsible for network administration.

The description of the requested setting is contained in the insulation monitoring devices HIG9x/E documentation.

The direct and simplest method of administration of the insulation monitoring device is access through the Internet web page of the browser.

The web interface is accessible at the IP address set in the HIG-ETH module. Connect the insulation monitoring device into your local network and in the browser on the computer enter the IP address of the insulation monitoring device. The initial IP address of each insulation monitoring device HIG9x/E during the delivery is set to the value 192.168.1.254.



The web interface is accessible in the Czech and English and Russian languages. The language is set in the „SETTING“ menu.

Access to the ISOLGUARD monitor is divided into two levels; each level has a separate name and password. Without entering the user name and the password, it is only possible to browse the actual values of the status of the insulation monitoring device. It is not possible to change the parameters for testing the insulation monitoring device.

- Information about the status of the insulation monitoring device is immediately shown after the connection. The menu option „Display parameters“ shows the actual set values of all the parameters. To change the parameters or remote testing of the insulation monitoring device, it is necessary to enter the name and password used.
- The level of the user enables to set selected parameters of the insulation monitoring device and to remotely test the insulation monitoring device. In particular, the user may :
 - set the selected parameters of the insulation monitoring device. The selection of parameters which can be set is stated by the user „admin“.
 - if the testing button is shown, then the insulation monitoring device can conduct the test
 - to enter the text displayed in the „Place“ item on the main page
 - selection of language used in the monitor
 - change of user password
- Level of the administrator „admin“ enables to set all the parameters of the insulation monitoring device. In addition, it enables to set the parameters of the network connection and to also set the appearance and web page option for users.
 - In particular, the user „admin“ may:
 - directly set all the parameters of the insulation monitoring device
 - select the parameters of the insulation monitoring device and set the „user“
 - select which data is to be displayed on the main page
 - select or cancel the display of the button for remote testing of the insulation monitoring device on the basis page
 - configure the network parameters of the insulation monitoring device for connection to the ETHERNET interface
 - set the sending of e-mails during the origination and termination of an error in the monitored insulation resistance
 - select and set the further communication protocol

ISOLGUARD insulation monitoring device HIG97

The HIG97 insulating status insulation monitoring device produced by HAKEL for the ISOLGUARD series is designed for monitoring the insulation status of 3-phase insulated IT-systems with extremely fast evaluation and signalling of the status of the inspected network. With the use of external inductor TL1200 for the creation of the artificial centre, the insulation monitoring device enables to monitor 3-phase ungrounded IT power supply systems up to the maximum operating voltage of 3x1000V AC. Such created centre is connected to insulation monitoring device terminal HIG97.

The insulation monitoring devices display the value of the measured insulation resistance. In addition, the control buttons for setting the parameters of the insulation monitoring devices and signalling LED diodes display the status of the checked network and the insulation monitoring device.

HIG9x insulation monitoring devices communicate with the master computer through the RS485 industrial bus-bar with the protocol derived from the PROFIBUS protocol. The built-in signalling relay enables the connection of the equipment for the supervision and signalling of the status of the supervised ungrounded IT power supply system.

The insulation monitoring device contains four signalling relays.

The signalling relay with fast response FAULT1 signals the actual status of the inspected network.

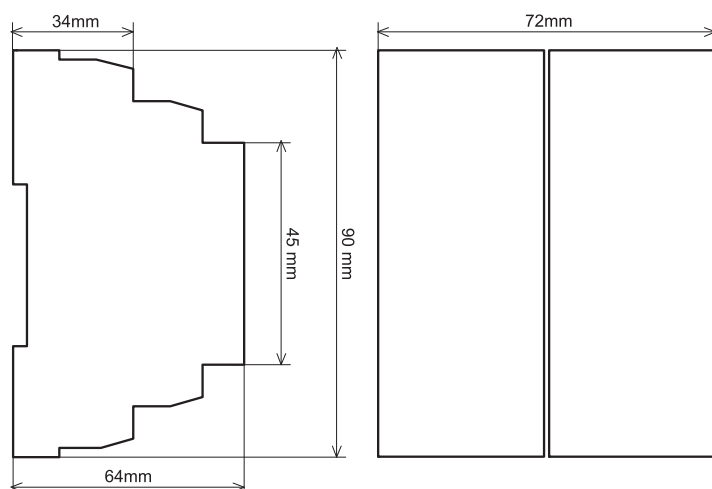
Signalling relay with fast response and FAULT1 MEM memory signals the origination of the first error of the inspected network. Operator action is required to remove the erroneous status. This signalling relay does not change the status even in the case of activation and deactivation of the insulation monitoring device supply. The signalling relay with fast response FAULT2 signals the actual status of the inspected network. In the insulation monitoring device menu, it is possible to select the function of this relay with or without the memory. If the operator selects the function with memory, operator intervention is required for the cancellation of the signalling. In the case of disconnection of the supply, the FAULT2 relay is set in the basic position.

The ERROR signalling relay signals the function of the insulation monitoring device. The relay is equipped if the insulation monitoring device is active and there is measurement of the inspected network.

Local and remote testing of the function of the insulation monitoring device can also be conducted.

Only one insulation monitoring device can be connected to the same ungrounded IT power supply system.

Indication	Signalling relay	Range of displayed value	Critical insulation resistance
HIG97 Art. number 70 963	4 relay 1P	5 k Ω ÷ 900 k Ω	Adjustable 5 k Ω ÷300 k Ω



Basic characteristics

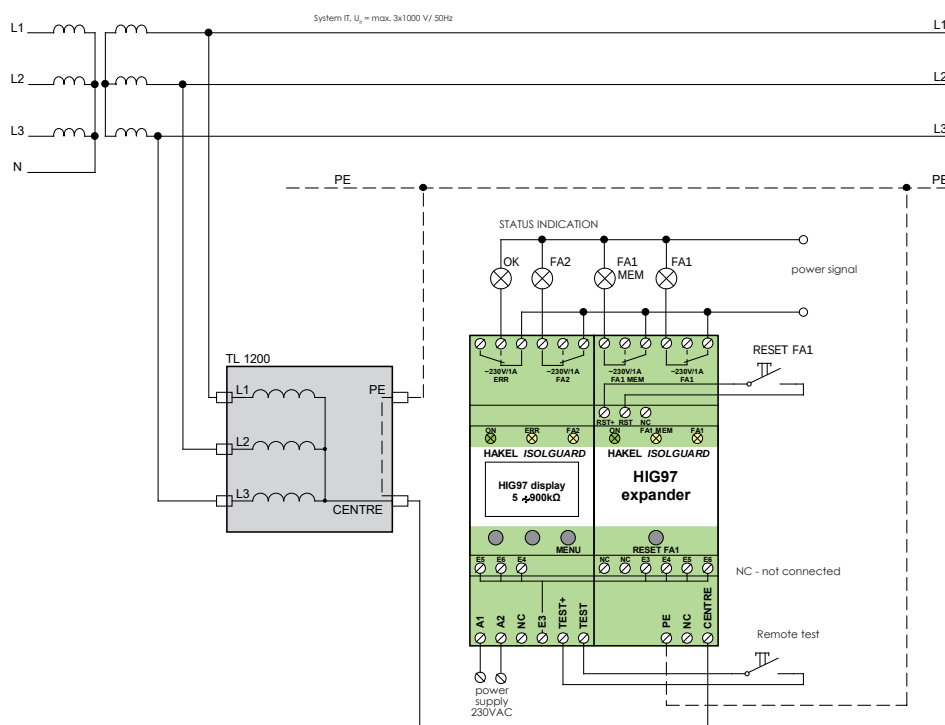
- Monitor for insulating status of AC networks with the voltage 230 V AC/500 V AC or 1000 V AC with fast response.
- Signalling relay of the actual status of the insulating resistance with a fast response.
- The signalling relay of the insulation value with fast response and memory, de-blocking of the error status by the button on the insulation monitoring device or the remote button.
- Signalling relay of the status of insulating resistance with slow response and optional alarm memory. Unblocking of the button on the insulation monitoring device or by remote button.
- Signalling relay of the function of insulation monitoring device
- Display of the measured value of R_{isol} insulation resistance on the display within the range 5 k Ω to 900 k Ω .
- Connection to the bus-bar RS485, insulation strength 2500 V_{rms} against internal circuits and network circuits
- Option to set the monitored value of the insulating resistance R_{CRIT} use the display and buttons within the range 5 k Ω to 300 k Ω .
- Adjustable hysteresis of the limit value of the insulating resistance within the range 0 to 100% by means of the display and buttons
- Adjustable delay t_{ON} signalling relay response FAULT2 with slow response within the range 0 to 60 sec.
- Access to setting the insulation monitoring device by button can be locked, the insulation monitoring device is unlocked by a combination of buttons
- Separate supply voltage enables to also monitor the network which is not under voltage
- Two modules for assembly on the DIN 35 bar with the total width 4M (72mm).

Technical data HIG97

Type		HIG97
Supply voltage	U_n	80 to 305 V AC or 113 to 430 V DC
Maximum operating voltage of the monitored ungrounded IT power supply system (with external inductor)	U_{II}	optional 230 V AC/500 V AC/1000 V AC
Consumption	P	max. 5 VA
Measuring voltage	U_M	18 V DC
Measuring current	I_M	< 0,48 mA
Alternative internal resistance of the measuring input	R_i	> 100 k Ω
Range of the value shown on the display	R_{isol}	5 k Ω to 900 k Ω
Precision of measurement 5 k Ω ... 100 k Ω 100 k Ω ... 900 k Ω		10 k Ω $\pm 10\%$
Properties of signalling with fast response		
Critical insulation resistances with fast response	R_{crit1}	adjustable 5 k Ω to 300 k Ω
Basic time of response for signalling with fast response	t	(80 to 500 msec) According to the adjustment of service parameters
Basic time of delay for signalling with fast response	t_{ON1}	adjustable 0 to 9,99 sec. with the step 0,01 sec
Signalling properties with slow response		
Critical insulation resistances with slow response	R_{crit2}	adjustable 5 k Ω to 300 k Ω
Basic signalling response with slow response	t	< 3 sec
Additional time of delay of signalling with slow response	t_{ON2}	adjustable 0 sec to 60 sec. with the step 1 sec
Hysteresis of monitored insulation resistance	R_{hyst}	adjustable 0 to +100% R_{crit}
Outputs		
Signalling FAULT1 MEM with fast response and memory of the status potential-free switching contact: electric strength against internal circuits and against supply circuits		250 V AC / 1 A 3750 V _{rms}
Signalling FAULT1 with fast response without memory of the status of potential-free switching contact: electric strength against internal circuits and against supply circuits		250 V AC / 1 A 3750 V _{rms}
Signalling FAULT2 with slow response Potential-free switching contact: electric strength against internal circuits and against supply circuits		250 V AC / 1 A 3750 V _{rms}
Signalling ERROR insulation monitoring device function Potential-free switching contact: electric strength against internal circuits and against supply circuits		250 V AC / 1 A 3750 V _{rms}
Communication line: RS485 type MASTER-SLAVE, 9600 Bd, even parity Insulating strength against internal circuits and network circuits		Yes 2500 V _{rms}
General data		
Degree of protection according to EN 60 529		IP20
Weight	m	290 g
Method of assembly		on the DIN bar
Recommended cross-section of connected conductors	S	1 mm ²
Catalogue number		70 936
Operating conditions		
Working temperature		-10°C ~ +60°C
Relative moisture of the environment		28 g H ₂ O / kg of dry air
Atmospheric pressure		86 to 106 kPa
Working position		any
External magnetic and electric field		max. 400A/m
Category of over-voltage / testing voltage		III according EN 60664-1
Pollution degree		2 according EN 60664-1
Type of operation		permanent

Recommended connection HIG97 to monitored ungrounded IT power supply system

3-phase ungrounded IT power supply system (max. 3x1000 VAC), module HIG97 in connection with inductor TL1200



ISOLGUARD insulation monitoring device HIG95+

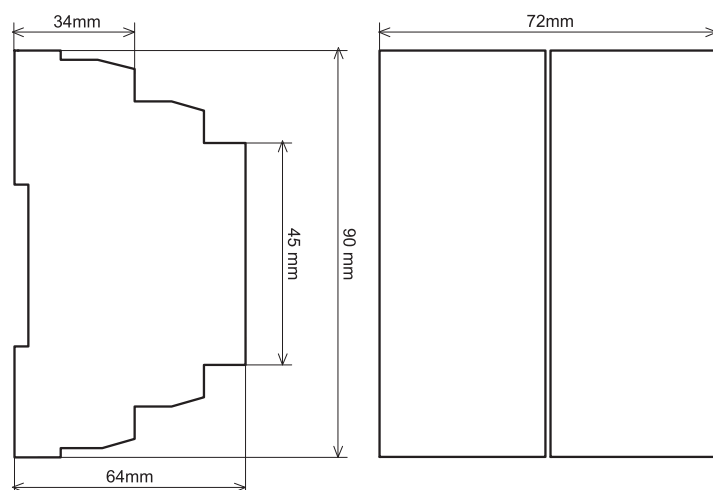
The insulation monitoring device HIG95+ produced by HAKEL for the ISOLGUARD series is designed for monitoring the insulation status of single-phase ungrounded IT power supply systems in the health sector. The insulation monitoring device enables monitoring of the ungrounded IT power supply systems according to standards EN 61010-1 ed. 2, EN 50522, EN 61936-1 up to the maximum operating voltage 275V AC. It is also equipped with measuring circuits which ensure evaluation and failure signalling of the monitoring system originated due to thermal (ϑ) or current overloading of the medical transformer.

The insulation monitoring devices are equipped to display the numeric value of the measured insulation resistance. In addition, the control buttons for setting the parameters of insulation monitoring devices and signalling LED diodes can be used to display the status of the checked network.

It is possible to connect to the insulation monitoring device modules for remote signalling of the status MDS10T or MDS-D produced by HAKEL.

Built-in alarm relay with a switching contact enables connect devices for signaling the insulation status error and the thermal (ϑ) or current overloading error.

Only one insulation monitoring device can be connected to the same ungrounded IT power supply system.



NEW



Basic characteristics

- The monitor for insulating statuses of AC networks with the voltage 0 to 275 V
- Measured value display of the Risol insulation resistance, thermal (ϑ) and current overloading
- Temperature scan of the isolation transformer with one of three types of sensors
- Current overloading scan of the isolation transformer via measuring current transformer
- Signalling relay of the status of the insulating resistance with the switching contact
- Connection to the RS485 bus-bar, insulation strength 2500 V_{rms} against internal circuits and network circuits
- Option to connect the Hakei MDS-D remote monitoring panel equipped with a touch screen
- Connection for remote signalling MDS10T or MDS-D modules produced by HAKEL.
- Option to set critical values, hysteresis values and other parameters via insulation monitoring device's buttons
- Access to setting the insulation monitoring device by button can be locked, the insulation monitoring device is unlocked by a combination of buttons
- Separated supply voltage enables to also monitor a network which is not under voltage
- Modul width 4M (72mm) for mounting on a DIN rail 35

Type	Display Menu	Signalling relay	Range of displayed value	Critical insulation resistance	Current load sensor	Heat load sensor	Connection MDS10T	Connection MDS-D	RS485	Version SW
HIG95+ +	Yes	1x 1P	Adjustable 5 kΩ ÷ 900 kΩ	Adjustable 50 ÷ 200 kΩ	Measuring transformer of the current TAR 25/5 up to 100/5.	Temperature sensor PT100 or PTC thermistor or thermal switching contact	Yes	Yes	Yes	V5.0
Art. number 70 929										

Notes: 1P signaling relay with one switching contact

MDS10T remote monitoring module of the insulation monitoring device

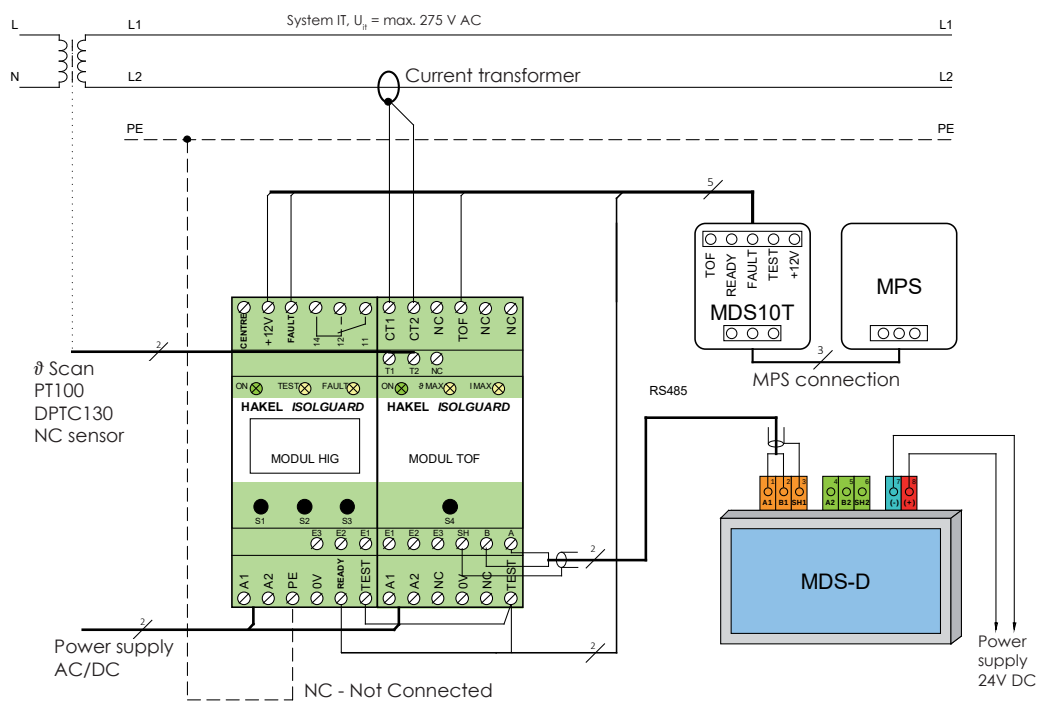
MDS-D remote monitoring module including a display

+ Use in health sector in accordance with the requirements of standards IEC 60364-7-710, IEC 61557-1 and IEC 61557-8.

Technical data HIG95+

Type		Evaluation module of the insulation status (HIG module)						
Supply voltage	U _n	90 to 265 V AC(47÷440Hz) or 90 to 370 V DC						
Maximum operating voltage of the monitored IT power supply system	U _{It}	275 V AC						
Consumption	P	max. 5 VA						
Measuring voltage	U _M	12 V DC						
Measuring current	I _M	< 0,6 mA						
Alternate inside resistance of the measuring input	R _i	> 2 MΩ						
Range of the value shown on the display	R _{isol}	5 kΩ to 900 kΩ						
Precision of measurement	5 kΩ ... 10 kΩ 10 kΩ ... 900 kΩ		2 kΩ ± 10%					
Critical insulation resistance	R _{crit}	adjustable 50 kΩ to 200 kΩ						
Hysteresis of the monitored insulation resistance	R _{hyst}	adjustable 0 to +100% R _{crit}						
Delay in response of signalling the insulation status	t _{ON}	adjustable 0 to 60 sec, with the step 1 sec						
Type		Evaluation module of the thermal and current overload of the isolation transformer (TOF module)						
Supply voltage	U _n	90 to 265 V AC(47÷440Hz) or 90 to 370 V DC						
Possible type of the monitored IT power supply system		single-phase AC						
Consumption	P	max. 4 VA						
Current load scan		by measuring transformer with a transmission ratio (A):						
		25/5	40/5	50/5	60/5	80/5	100/5	
Range of the current load shown on the display	I tr	0,25 - 100A (depending on the type of the measuring transformer)						
Critical current load value	I _{crit}	adjustable in the range I tr , with the step 1A						
Hysteresis of the current load	I _{hyst}	adjustable 0 to 20% I _{crit}						
Measurement precision of the current load		± 5%						
Thermal sensor of the isolation transformer		NC thermal sensor, PTC thermistor or PT100 sensor						
Thermal sensor selection		adjustable in the IMD menu						
Range of the isolation transformer temperature shown on the display	∅ tr	5-190 ° C (only for PT100)						
Critical value of the isolation transformer temperature	∅ _{crit}	for the PT100 adjustable in the range of 70 ÷ 130 ° C , for the PTC and the NC sensor solid 1.6 kΩ						
Hysteresis of the isolation transformer temperature	∅ _{hyst}	adjustable from 0 to 20 % Icrit (only for PT100)						
Measurement precision of the isolation transformer temperature		± 5 % (excluding the sensor's deviations)						
Delay in response of signalling the temperature or current fault	t _{ON}	adjustable 0 to 60 sec, with the step1 sec						
Outputs								
Signalling potential-free switching contact relay 1 Electric strength against internal circuits Electric strength against supply circuits		250 V AC / 1A 3750 V _{ef} 3750 V _{ef}						
Remote signalling		Terminals for connection of the MDS10T(+MPS) module produced by Hakel max. 5 x MPS10T modules or max. 2 x MDS10T+MPS modules						
		Line RS485 and remote monitoring module MDS-D produced by Hakel						
Communication line: RS485 type MASTER-SLAVE,9600 Bd, even parity Insulating strength against internal circuits and network circuits		Yes 2500 V _{ef}						
General data								
Degree of protection according to EN 60 529		IP20						
Weight	m	295 g						
Mounting on		DIN rail 35						
Cross-section of the connected conductors	S	1 mm²						
Article number		70 929						

Connection example



ISOLGUARD insulation monitoring device HIG24VDC

The insulation monitoring device ISOLGUARD HIG24VDC produced by HAKEL is designed for monitoring the insulation status of direct current IT power supply systems with a nominal voltage of 24V DC. The device continuously monitors the insulation state of the positive and negative output of an insulation power supply system against the base point. For stationary devices it is usually PE conductor. The potential free switching contact of the signalization relay FAULT will switch during the insulation resistance decrease of + or - output. A fault is also indicated by LEDs on the front panel.

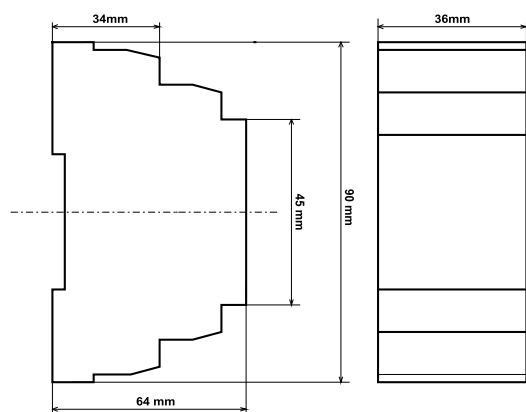
The insulation monitoring device is equipped to display the numeric values of the measured insulation resistance. The measured resistance value of the positive and negative output of a controlled network is displayed on the device's screen. There are buttons for setting the parameters of the insulation monitoring device and signalling LEDs to display the status of the controlled network and the device itself.

It is possible to connect the insulation monitoring device to the panel MDS-D equipped with a touchscreen by means of the RS485 busbar. The MDS-D panel displays the actual measured values and the actual insulation monitoring device setting.

HIG24VDC can communicate with the master computer through an industrial RS485 bus-bar with the protocol derived from the PROFIBUS protocol.

Only one insulation monitoring device can be connected to the same ungrounded IT power supply system.

Type	Display Menu	Signalling relay	Range of displayed value	Critical insulation resistance	RS485	Version SW
HIG24VDC Art. number 70 933	Yes	2 relays 1P	5 kΩ ÷ 990 kΩ	Adjustable 5 kΩ ÷ 300 kΩ	Yes	V1.4

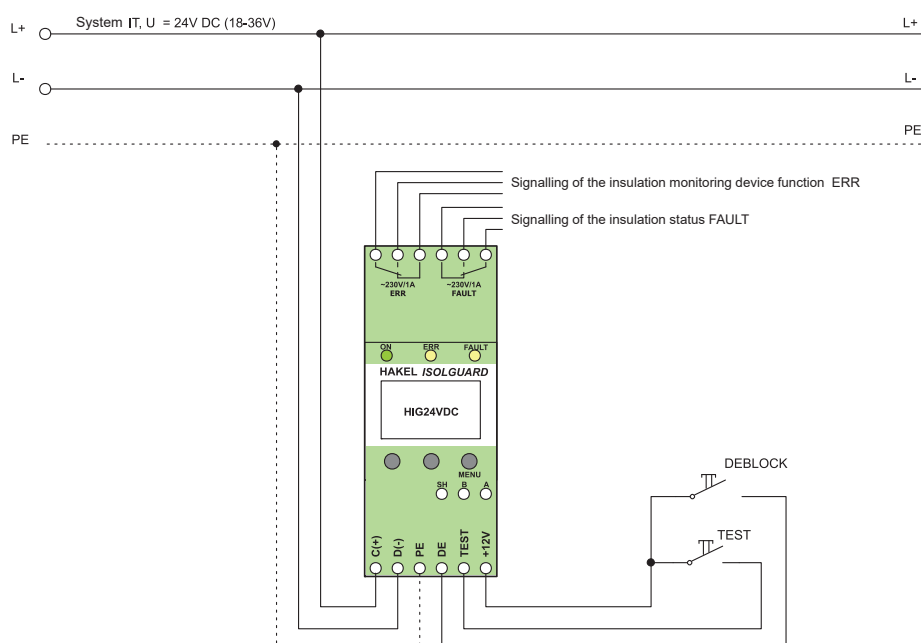


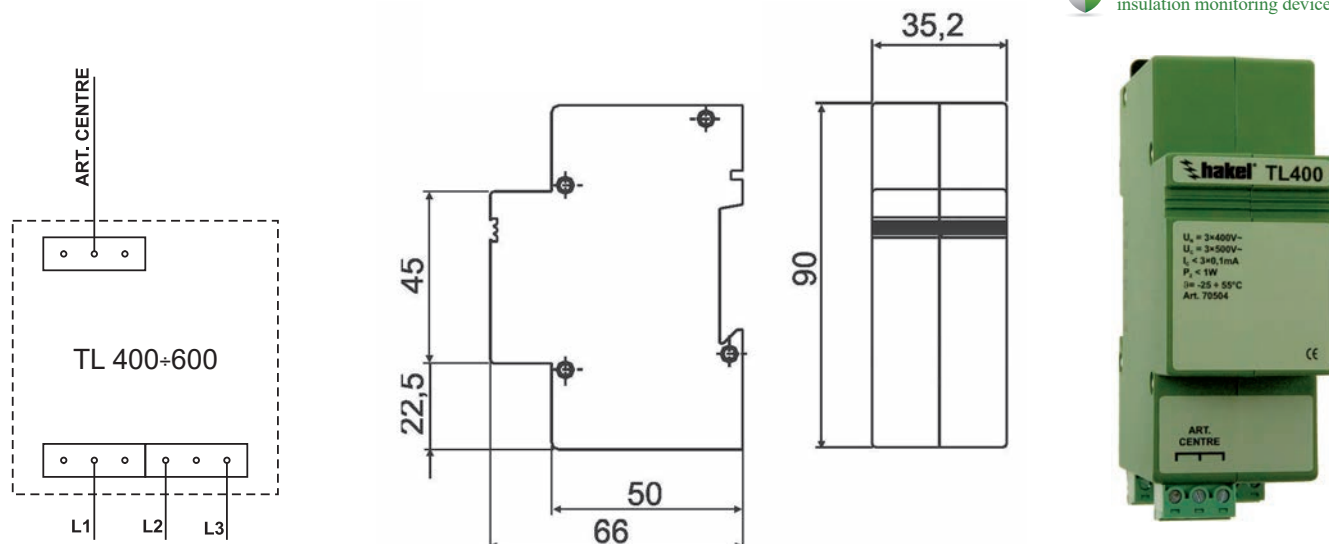
Basic characteristics

- The monitor for insulating statuses of DC networks with the voltage 24V DC
- Displaying the measured values of the positive and negative output of a controlled network on the device's screen
- Signalling relay of the status of the insulating resistance with the switching contact
- Signalling relay of the insulation monitoring device function with the switching contact
- Optional memory of the alarm called with the option to unblock with the button on the insulation monitoring device
- Connection to the RS485 bus-bar, insulation strength 2500 V against internal circuits and network circuits
- Option to set the critical values, hysteresis values and other parameters using the insulation monitoring device buttons
- Access to setting the insulation monitoring device by button can be locked, the insulation monitoring device is unlocked by a combination of buttons
- Module for assembly on the DIN 35 rail with the total width 2M (36mm).

Technical data HIG24VDC

Type		HIG24VDC
Maximum operating voltage of the monitored ungrounded IT power supply system	U_{It}	18 to 36V DC
Consumption	P	max. 2 VA
Internal impedance of the measuring input	R_v	> 200k Ω
Range of the value shown on the display	R_{sol}	5 k Ω to 900 k Ω
Precision of measurement		$\pm 10\%$
Critical insulation resistance	R_{crit}	adjustable 5 k Ω to 300 k Ω
Hysteresis of monitored insulation resistance	R_{hyst}	adjustable 0 to +100% R_{crit}
Additional time of delay of signalling the insulation status	t_{ON}	adjustable 0 to 60 sec, with the step 1 sec
Outputs		
Signalling of the insulation status FAULT Potential-free switching contact: Electric strength against internal circuits and supply circuits		250 V AC / 1 A 3750 V _{ef}
Signalling of the insulation monitoring device function ERR Potential-free switching contact: Electric strength against internal circuits and supply circuits		250 V AC / 1 A 3750 V _{ef}
Communication line: RS485 type MASTER-SLAVE, 9600 Bd, even parity Insulating strength against internal circuits		Yes 2500 V _{ef}
General data		
Coverage according to EN 60 529		IP20
Weight	m	295g
Method of assembly		on the DIN rail
Recommended cross-section of connected conductors	S	1 mm ²
Operating conditions		
Working temperature		-10°C ~ +60°C
Relative moisture of the environment		28 g 3 /kg of dry air
Atmospheric pressure		86 to 106 kPa
Working position		any
External magnetic and electric field		max. 400A/m
Category of over-voltage / testing voltage		III according EN 60664-1
Level of pollution		2 according EN 60664-1
Type of operation		permanent



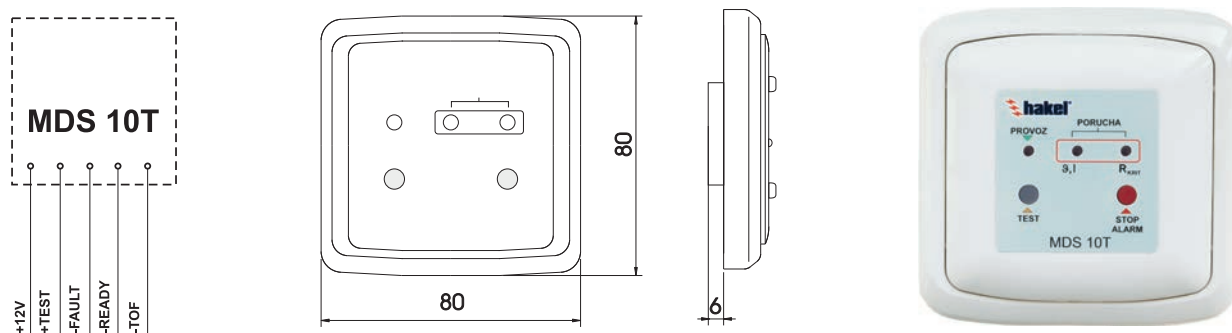


Inductors TL400, TL500, TL600

TL* serves for the adaption of HIG* circuits to 3-phase ungrounded IT power supply system 3 x 400 V AC (or 500 ev. 600 V AC).

Commonly, these 3-phase inductors are produced on the basis of special requirement up to the voltage $U_c = 3 \times 7200 \text{ V AC}$.

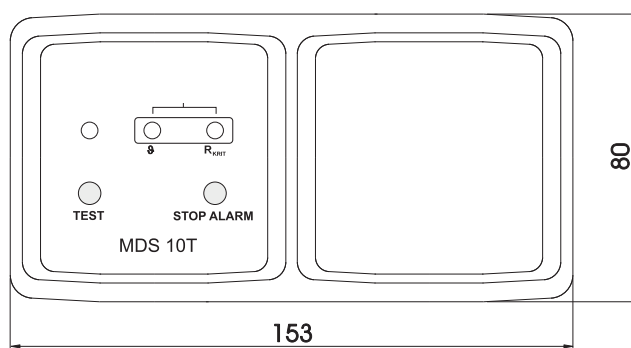
Type		TL 400	TL 500	TL 600
Nominal voltage	U_n	3 x 400 V	3 x 500 V	3 x 600 V
Max. continuous operating voltage	U_c	3 x 500 V	3 x 600 V	3 x 720 V
Catalogue number		70 504	70 501	70 601



Module for remote signalling MDS10, MDS10T

MDS remote signalling module is designed for checking the status of the monitored ungrounded IT power supply system in a distant place from the HIG insulation monitoring device. On insulation monitoring device HIG91/92/95 it is possible to connect 5 MDS10T. Interconnection HIG95+→MDS10T is performed 5-by conductors. Under normal conditions, on the front panel of the MDS10T only a green signal lamp OPERATION shines. In the case of failure evaluated by the HIG sensor, on the module MDS10T, red FAILURE signal lamp starts to shine (R_{crit}) and, at the same time, the piezo-siren is activated. The operator of the health or supervising workplace has the option to disconnect the acoustic warning by pressing the STOP ALARM button. In the case of error due to overheating or current overloading of the medical transformer, on the MDS10T module, a yellow FAULT signal lamp starts to flash (ϑ, I) and the piezo siren is activated. In this case, the operator does not have the option to disconnect the acoustic warning because it concerns the fatal status of the monitored ungrounded IT power supply system which must be resolved by qualified technical staff.

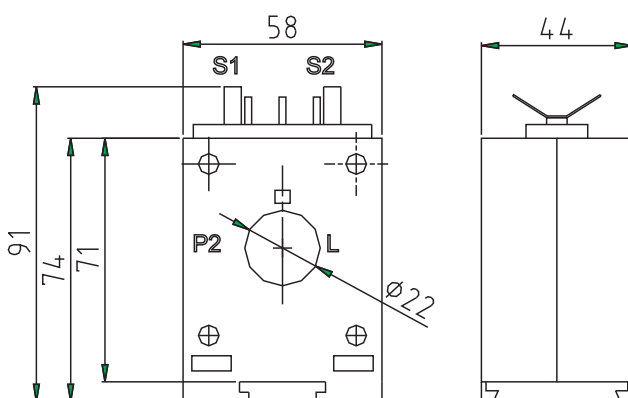
Type		MDS10	MDS10T	MDS10 Tango	MDS10T Tango
Nominal working voltage (supplied from the HIG module)	U_n	12 V DC			
Permanent working current	I_c	15 mA			
Max. number of modules connected to HIG91/92/95		5			
Working temperature		- 25 to + 55 °C			
Method of assembly		into round flush-mount box			
Design		Classic		Tango	
Failure indication		R_{crit}	$R_{crit}/I, \vartheta_{max}$	R_{crit}	$R_{crit}/I, \vartheta_{max}$
Catalogue number		70 050	70 053	70 054	70 055



Module for remote signalling MDS10T+MPS

Module for remote signalling MDS10T or set MDS10T+MPS (MPS... module for auxiliary signalling) are designed for inspection of the status of the monitored ungrounded IT power supply system in a distant place of the HIG insulation monitoring device. It is possible to connect 5 pcs MDS10T or 2 pcs sets MDS10T+MPS to one HIG91, 92 and 95. Interconnection HIG95+→MDS10T+(MPS) is performed by 5 conductors. Under normal conditions, on the front MDS10T panel, only a green READY/OPERATION signal lamp shines. In the case of the failure of the insulating status evaluated by the HIG insulation monitoring device on the module MDS10T red FAULT signal lamp starts to flash (R_{CRIT}). The built-in siren is activated and light signalling is activated MPS module. The operation of the health or supervising workplace has the option of acoustic warning and flashing of the module disconnect by pressing the STOP ALARM button. In the case that due to the overheating or current overloading of the medical transformer, on the MDS10T module a yellow signal lamp starts to flash FAILURE (ϑ, I). At the same time, the built in siren is activated and lighting signalling the MPS module is activated. The health operators or supervising workplace has the option to disconnect the acoustic warning and flashing of the MPs module by the STOP ALARM buttons.

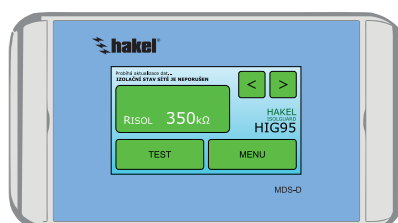
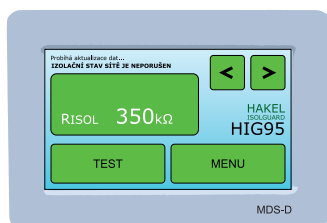
Type		MDS10T + MPS
Nominal working voltage (supplied from the HIG module)	U_n	12 V DC
Maximum consumption of fully activated module	I_c	33 mA
Max. number of modules connected to HIG91, 92 and 95		2
Working temperature		- 25 to + 55 °C
Method of assembly		into round flush-mount box
Catalogue number		70 056



Current transformer TAR

Current transformers TAR are designed for reading the values of off-taken current from the medical transformer. In the standard version it is provided in the ratio 100 A / 5 A / 3 VA / 1 % in the ring-type version with a cable. The current transformers with another ratio than 100 A / 5 A are supplied by the company on the **basis of the request of the client.**

Type		TAR CLA 25/5A	TAR 1D 40/5A	TAR 1D 50/5A	TAR 1D 60/5A	TAR 1D 80/5A	TAR 1D 100/5A
Ratio		25 A / 5 A / 50 Hz	40 A / 5 A / 50 Hz	50 A / 5 A / 50 Hz	60 A / 5 A / 50 Hz	80 A / 5 A / 50 Hz	100 A / 5 A / 50 Hz
Voltage monitored by IT - network	U_{IT}	max. 1200 V AC					
Consumption	P	3 W					
Measuring current	I_M	max. 5 A / 50 Hz					
Catalogue number		71 509	71 508	71 510	71 513	71 512	71 405



ISOLGUARD module for remote signalling MDS-D

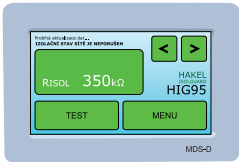
The remote monitoring module including the display (MDS-D) from the ISOLGUARD range is a device equipped with a touchscreen display showing the status of ungrounded IT power supply systems, monitored by insulation monitoring device HIG9x from the HAKEL production. Communication with the insulation monitoring devices takes place via RS485 using the internal protocol.

The MDS-D panel further includes a second RS485 line (external busbar), which transfers the collected data to the user master system. The communication protocol on this line is derived from Profibus protocol.

MDS-D type devices are intended primarily for surveillance and monitoring sites to continuously display the status of ungrounded IT power supply systems guarded by insulation monitoring devices type HIG9x or HIG95+.

Basic MDS-D panel characteristics

- Simultaneous status (isolation resistance, thermal and current overload) of up to 24 ungrounded IT power supply systems, monitored by HIG9x or HIG95+ units
- Allocating names to insulation monitoring devices for easier identification
- Two variants of MDS-D panel, depending on the panel target location and fitting method
- Sound and visual fault and failure signalization
- Display of the actual measured values from the HIG9x insulation monitoring devices
- Touch screen control
- English menu - other languages can be added
- Protection of degree up to IP66
- Automatic searching for connected IMDs on the RS485 busbar
- External RS485 busbar, designed for communication with a master system
- Ability to perform the test of each connected insulation monitoring device
- General visual display of detailed settings of the Insulation Monitoring Devices
- Password-protected access to the panel setting

MDS-D type	MDS-D	MDS-D/IP66
Display	TFT LCD 4,3"	
Control method	Screen touching - resistive layer	
Acoustic signalization	Yes - Speaker	
Voltage supply	9-36V DC	
Maximum consumption	2W	
Communication busbar type	Internal RS485, External RS485	
Connectable devices	Internal busbar HIG9x	
	External busbar user system	
Max. connected insulation monitoring devices	24	
Panel location	On the wall, on the panel	
Dimensions (WxHxD mm)	125x84x26	200x110x60
Typical application	Nurses station, Supervisory workplace	Operating room
Assembling method	into round flush-mount box	wall plugs
Protection of degree	IP20	IP66
Article number	70 060	70 061
Illustrative image		

MDS-D connection

For the MDS-D connection is necessary to bring 18-36V DC power supply and twisted pair to the panel for internal RS485. External RS485 can be connected by applying another twisted pair.

It is recommended to use FTP cables for connecting the busbar in a noisy environment or as a protection against the electromagnetic radiation. The FTP cables contains not only twisted pairs but also the shielding. This shielding is connected to the SH clamps.

It is recommended to use the HAKEL ISOLGUARD PowerSupply DC24V as a power supply.

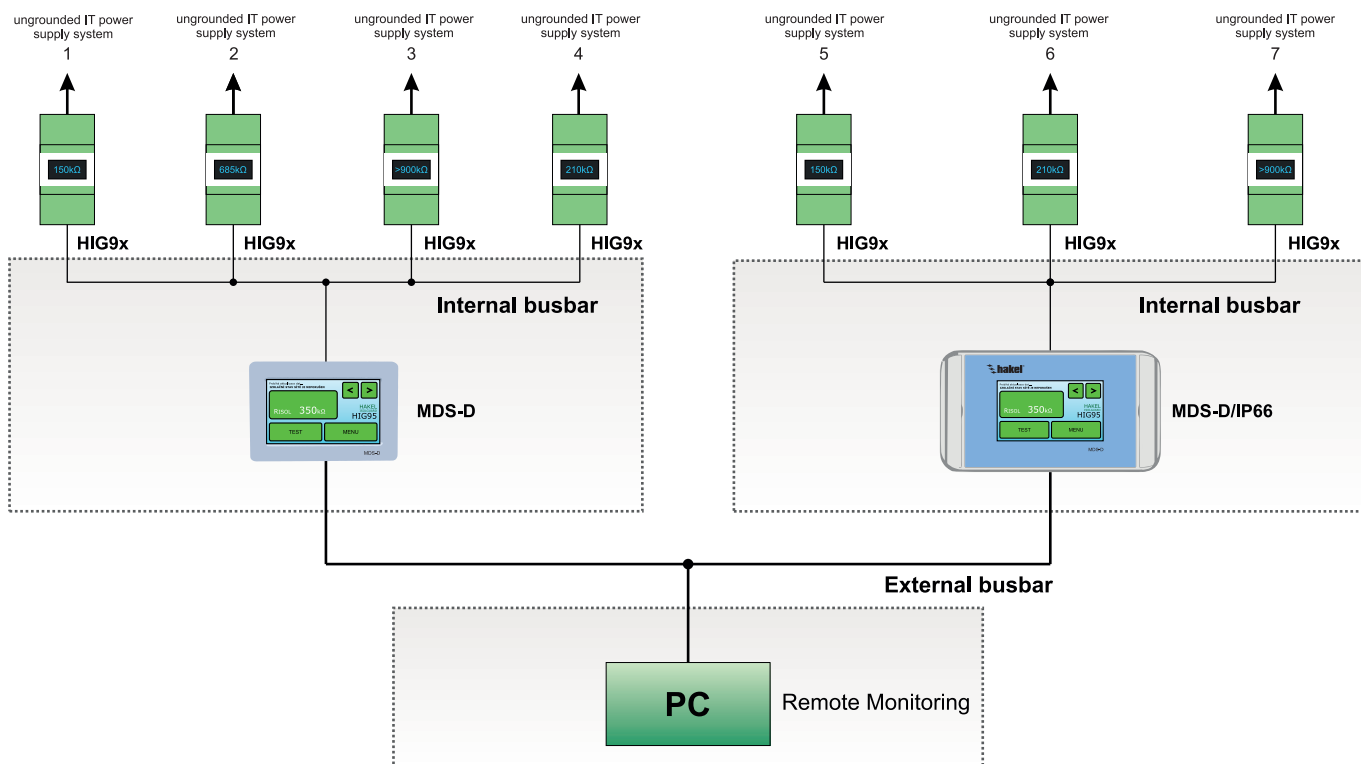
Communication levels of the ISOLGUARD system

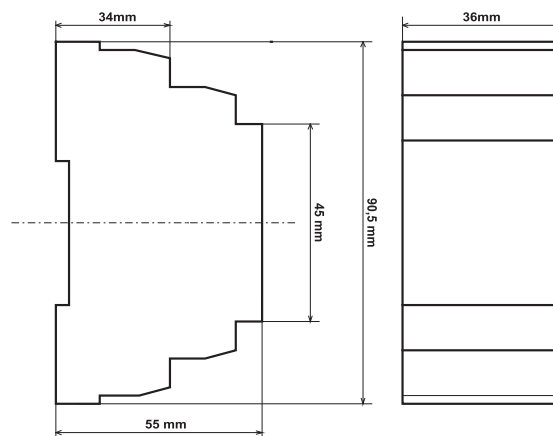
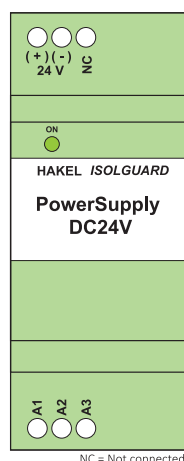
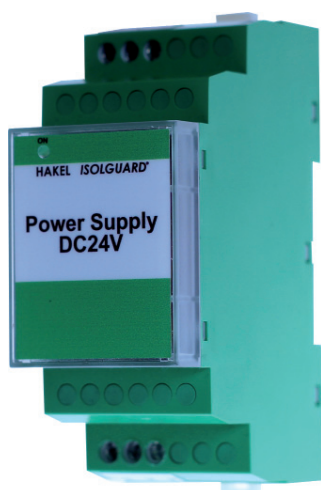
Communication levels of the ISOLGUARD system are divided into two:

Internal busbar – Busbar used for collecting the data from individual devices produced by HAKEL, designed to monitor ungrounded IT power supply systems. Communication on this busbar is controlled by the MDS-D panel. It is forbidden to affix other devices or otherwise interfere with the prescribed configuration on this line.

External busbar – Busbar used for connecting the MDS-D panel to a superior system. The MDS-D panel is in the position of the slave station and responds to queries from the master unit. The master unit may be a PC, RS485 data recorder or another user system which is able to communicate via RS485 interface. A description of communication telegrams can be found in a separate External Line RS485 Programming Manual produced by HAKEL.

Sample power supply





PowerSupply DC24V

PowerSupply DC24V, ISOLGUARD series is an universal power supply for mounting on the 35mm DIN rail. The product is primarily intended for powering the remote monitoring module MDS-D produced by HAKEL company.

Output voltage is stabilized for 24 V DC. The supply voltage can be DC or AC in the ranges which are written below in the specification table.

This power supply source is also designed for industrial use such as current loop power supply of the two-wire transmitters, sensors power supply, indication devices power supply etc. For the safety viewpoints it meets the standard IEC 61010-1:2010 (Safety requirements for electrical equipment for measurement, control, and laboratory use).

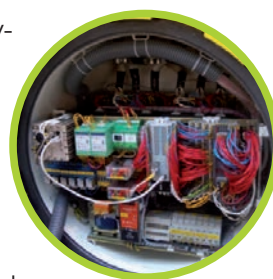
Connecting the PowerSupply DC24V to the voltage is signalled by a green LED on the top of the product.

Type		PowerSupply DC24V
Supply voltage AC	U_{nAC}	90 ÷ 265 V AC (47 ÷ 440 Hz)
Supply voltage DC	U_{nDC}	90 ÷ 370 V DC
Output voltage	U_o	24 V DC
Maximum output current	I_{max}	110 mA
Power	P	max. 2,5 VA
Operation signalling		green LED
Short-circuit protection		Yes, on the output, with an automatic renewal of the power supply after the fault
Thermal fuse		Yes, with an automatic renewal of the power supply after the fault
Isolation voltage input / output		4000 V AC
General data		
Degree of protection according to EN 60 529		IP20
Weight	m	95 g
Mounting on		on the DIN rail
Cross-section of the connected conductors	S	1 mm ²
Article number		70 062
Operating conditions		
Working temperature		-10°C ÷ +65°C
Relative moisture of the environment		28 g H ₂ O /kg of dry air
Atmospheric pressure		86 to 106 kPa
Working position		any
Category of over-voltage / testing voltage		III according EN 60664-1
Pollution degree		2 according EN 60664-1
Type of operation		permanent

References

OKD coal mines - HIG97

Czech State Mining Administration Regulation No. 22/1989 stipulates that the low-voltage side of the mine transformer stations must be equipped with a monitoring system measuring the outlet cable insulation status both during operation and before switching-on. HIG97 insulation monitoring devices (IMDs) manufactured by HAKEL s.r.o. were for OKD coal mines chosen based on cooperation with REPOS TECHNIK s.r.o. and following successful tests. This device type not only meets the frequent requirement of response time <80 ms but also includes suitable signalling and control terminals, features reliable operation, is substantially smaller in size than other comparable devices, and offers convenient connection to the system monitored.



Steelmaking company Moravia Steel - HIG97

The HIG97 monitoring device was developed specifically to satisfy customers' demand for very rapid network status evaluation and signalling. In this product, an additional microprocessor (in the expander module) is used in order to achieve a rapid response. This concept enabled the engineers to design a network status evaluation algorithm which is not only significantly faster but is also more precise and can be adjusted to suit the particular customer's application. As a result, the monitoring device's reaction time was suppressed to below 80 ms. Extremely rapid signalling at the output terminals is required, e.g., in some applications in the mining industry. The HIG 97 has been tested and then deployed in the heavy industry of continuous steel casting at Moravia Steel, where the previously used monitoring devices were unable to reliably measure the network insulation resistance because of frequent transients and interferences from frequency converters. The monitoring device is installed in the distribution box, where it is connected to a 3×500 VAC / IT power supply system via a TL 500 inductor.



Railway tunnel under the hill Homolka and Chlum near Pilsen - HIG97

The largest railway tunnel in the Czech Republic started to be built at the Ejpovice site under the Homolka and Chlum hills in late January 2015. It is driven by using the biggest driving shield in the Czech Republic, TBM S-799, christened "Viktorie". HAKEL s.r.o. in cooperation with REPOS TECHNIK s.r.o. developed a solution for monitoring the 22 kV line insulation status within the segment from the isolation transformer to the transformers on the driving machine. The 22 kV / 22 kV isolation transformer has an outlet in the secondary winding junction to which a TL22001 HV inductor is connected through an HV cable. To the TL22001 inductor is connected an ISOLGUARD HIG97 version 22 insulation monitoring device (IMD), which is specifically modified and adjusted for this application.



Hospitals - HIG95 or HIG95+

GENERAL UNIVERSITY HOSPITAL PRAGUE - Czech Republic
SILESIAN HOSPITAL OPAVA - Czech Republic
UNIVERSITY HOSPITAL OSTRAVA - Czech Republic
UNIVERSITY HOSPITAL BRATISLAVA - Slovakia

