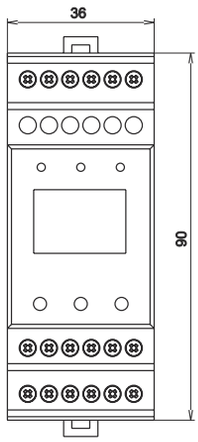
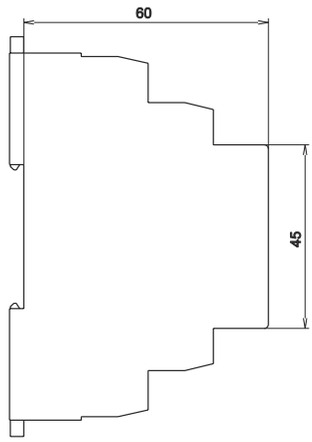




ISOLGUARD insulation monitoring device HIG95-DELTA

The insulation monitoring device HIG95-DELTA 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 IEC 60364-7-710:2002 (requirements for medical location), IEC 61557-1 and IEC 61557-8 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 MDS-DELTA or MDS-D produced by HAKEL.

Built-in alarm relay with a switching contact enables to connect devices for signalling 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.

Basic characteristics

- The monitor for insulating statuses of AC networks with the voltage 0 to 275 V
- Measured value display of the R_{isol} insulation resistence, 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 busbar, insulation strength 2500 V_{rms} against internal circuits and network circuits
- Option to connect the Hakel MDS-D remote monitoring panel equipped with a touch screen
- Connection for remote signalling MDS-DELTA or MDS-D modules produced by HAKEL.
- Option to set critical values, hysteresis values and other parameters via IMD's buttons
- Access to setting the insulation monitoring device 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
- Module width 2M for mounting on DIN rail 35

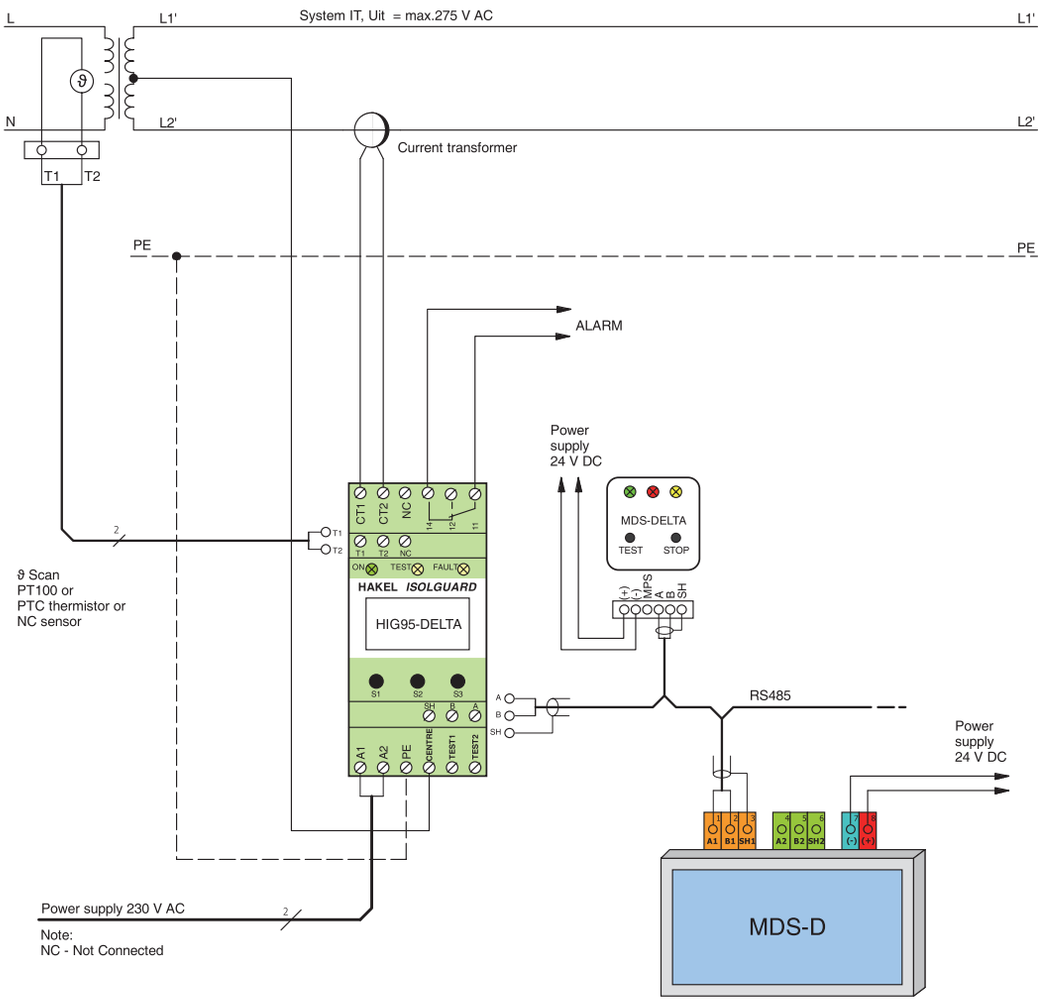
Type	Signalling relay	Range of displayed value	Critical insulation resistance	Current load sensor	Number of temperature sensors	Temperature sensor	Remote monitoring	RS485
HIG95-DELTA ✚	1x 1P	Adjustable 5 kΩ ÷ 900 kΩ	Adjustable 50 ÷ 200 kΩ	Measuring transformer of the current 25/5 up to 100/5.	1	Temperature sensor PT100 or PTC thermistor or thermal switching contact	MDS-D MDS-DELTA	Yes
Art. number 70 929								

Notes: 1P signalling relay with one switching contact

MDS-D remote monitoring module including a display

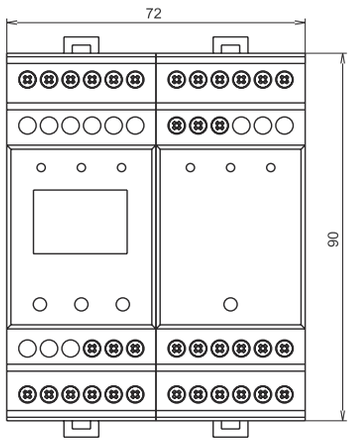
✚ Use in health sector in accordance with the requirements of standards IEC 60364-7-710, IEC 61557-1 and IEC 61557-8.

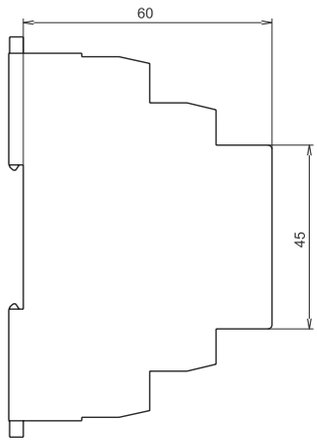
Recommended connection of HIG95-DELTA to monitored ungrounded IT power supply system



Notes:

1. Type of measuring transformer should be selected according to the power of chosen isolation transformer
2. Recommended types and values of cables for busbar RS485 are mentioned in the description of module MDS-D
3. When using shielded cable for the RS485 busbar, the busbar shielding has to be connected throughout the whole length and grounded in one point
4. It is necessary to follow the line wiring of busbar RS485, it is not allowed to make any taps.





ISOLGUARD insulation monitoring device HIG95+, HIG95+/2T

The insulation monitoring device HIG95+, HIG95+/2T 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 IEC 60364-7-710:2002 (requirements for medical location), IEC 61557-1 and IEC 61557-8 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, MDS-D or MDS-DELTA produced by HAKEL.

Built-in alarm relay with a switching contact enables to connect devices for signalling 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.

Basic characteristics

- The monitor for insulating statuses of AC networks with the voltage 0 to 275 V
- Measured value display of the R_{isol} insulation resistence, 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 busbar, insulation strength 2500 V_{rms} against internal circuits and network circuits
- Option to connect the Hakel MDS-D remote monitoring panel equipped with a touch screen
- Connection for remote signalling MDS10T, MDS-D or MDS-DELTA modules produced by HAKEL.
- Option to set critical values, hysteresis values and other parameters via IMD's buttons
- Access to setting the insulation monitoring device 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
- Module width 4M (72mm) for mounting on DIN rail 35

Type	Signalling relay	Range of displayed value	Critical insulation resistance	Current load sensor	Number of temperature sensors	Temperature sensor	Remote monitoring	RS485
HIG95+ ✚	1x 1P	Adjustable 5 kΩ ÷ 900 kΩ	Adjustable 50 ÷ 200 kΩ	Measuring transformer of the current 25/5 up to 100/5.	1	Temperature sensor PT100 or PTC thermistor or thermal switching contact	MDS10T MDS-D MDS-DELTA	Yes
Art. number 70 929								
HIG95+/2T ✚					2			
Art. number 70 930								

Notes: 1P signalling relay with one switching contact

MDS10T remote monitoring module of the insulation monitoring device

MDS-D remote monitoring module including a display

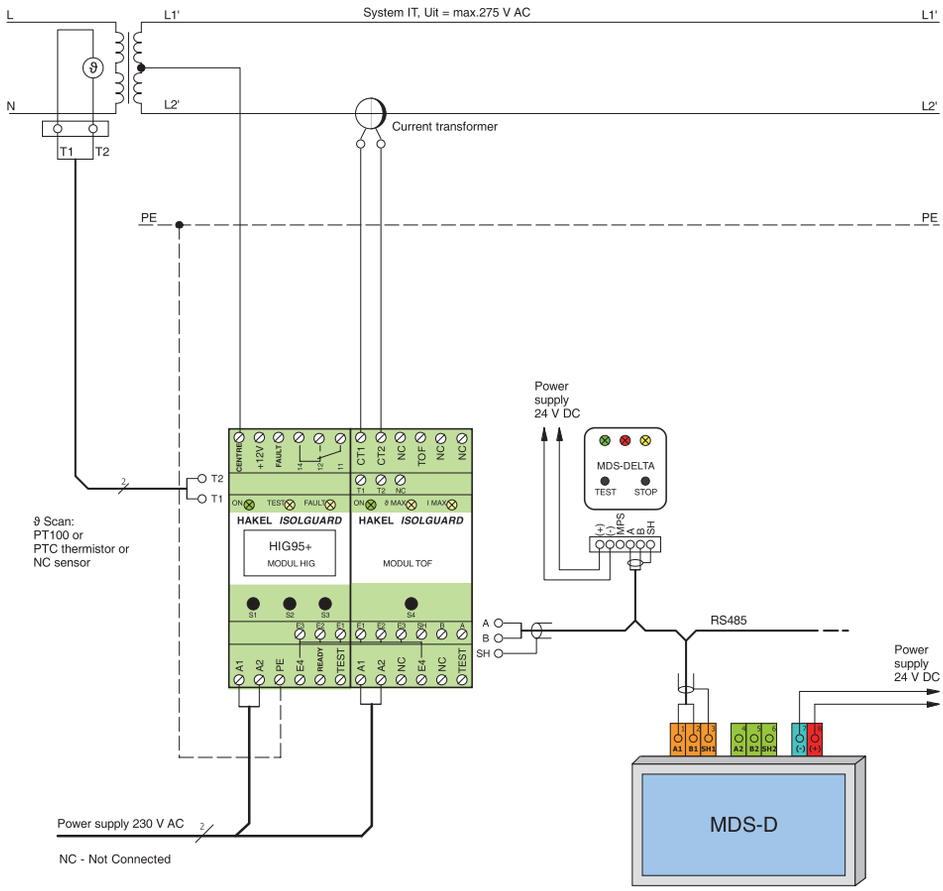
✚ Use in health sector in accordance with the requirements of standards IEC 60364-7-710, IEC 61557-1 and IEC 61557-8.

Technical data HIG95+, HIG95+/2T

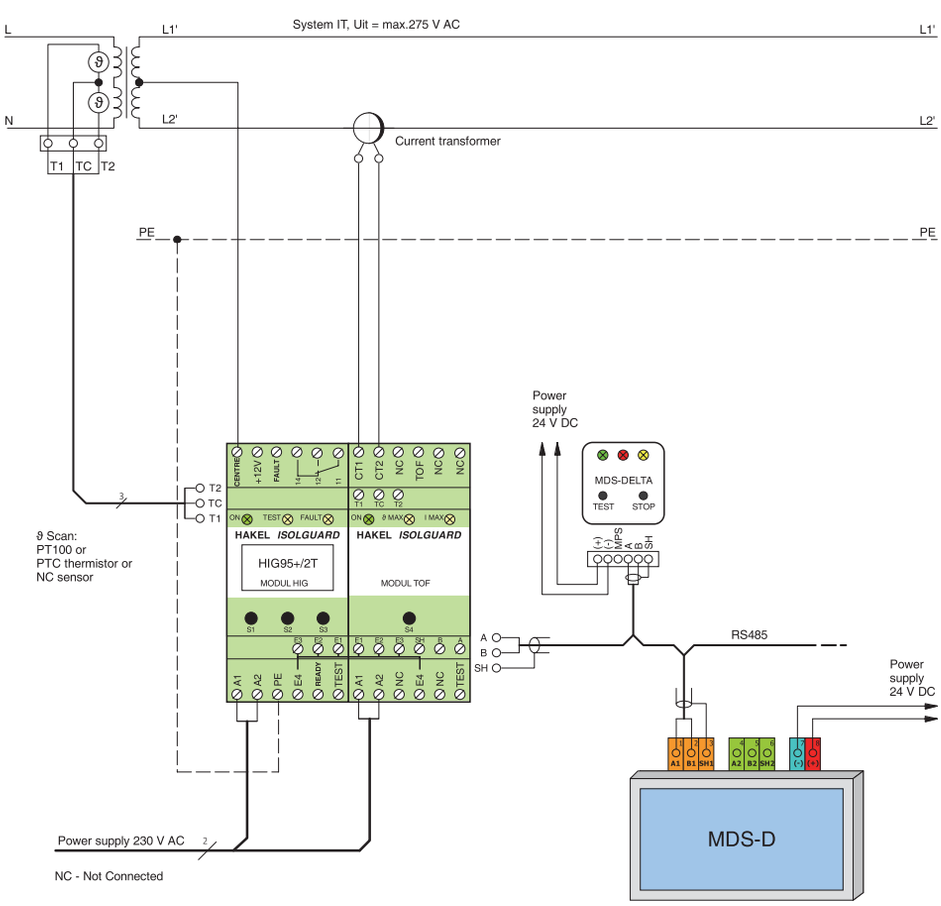
		Evaluation module of the insulation status (HIG module)	
Type		**HIG95+**	**HIG95+/2T**
Supply voltage	U_n	90 to 265 V AC(47÷440Hz) or 90 to 370 V DC	
Maximum operating voltage of the monitored IT power supply system	U_{it}	275 V AC	
Consumption	P	max. 5 VA	
Measuring voltage	U_M	12 V DC	
Measuring current	I_M	< 0,6 mA	
Alternate inside resistance of the measuring input	R_i	> 1 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 resistence	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	
		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 | 30/5 | 40/5 | 50/5 | 60/5 | 80/5 | 100/5	
Range of the current load shown on the display	I tr	0,5 - 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}	
Delay in response of signalling the temperature fault	t_{ON}	adjustable 0 to 60 sec, with the step1 sec	
Measurement precision of the current load		± 5%	
Number of temperature sensor		1	2
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	ϑ tr	5-190 ° C (only for PT100)	
Critical value of the isolation transformer temperature	ϑ_{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	ϑ_{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 current fault	ϑ_{tON}	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_{rms} 3750 V_{rms}	
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_{rms}	
General data			
Protection type according to IEC 60 529		IP20	
Weight	m	295 g	
Housing material		PA-UL94 V0	
Mounting on		DIN rail 35	
Cross-section of the connected conductors	S	1 mm^2	
Art. number		70 929	70 930

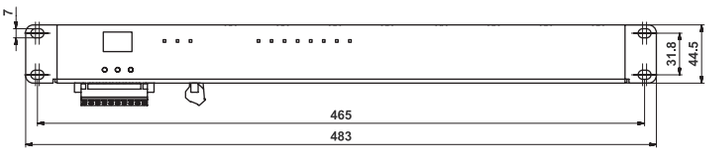
Operating conditions	
Working temperature	-10°C ~ +60°C
Relative moisture of the environment	28 g H_2O /kg of dry air
Atmospheric pressure	86 to 106 kPa
Working position	any
External magnetic and electric field	max. 400A/m
Category of over-voltage / testing voltage	III according IEC 60664-1:2007
Pollution degree	2 according IEC 60664-1:2007
Type of operation	permanent

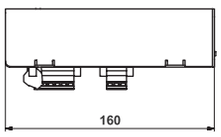
Recommended connection of HIG95+ to monitored ungrounded IT power supply system



Recommended connection of HIG95+/2T to monitored ungrounded IT power supply system







HAKEL ISOLGUARD HIG-IFL1

Insulating monitoring device with fault location

HAKEL ISOLGUARD HIG-IFL1 insulating monitoring device with fault location is a system designed for comprehensive insulating status monitoring of single-phase insulated IT systems (e.g. in the health sector). The device allows systems designed and operated in accordance with standards IEC 60364-7-710:2002 (electrical installations at healthcare facilities), IEC 61010-1:2010, IEC 61557-1, IEC 61557-8, IEC 61557-9 up to 275 V AC maximum operating voltage to be monitored.

The device enables the thermal and current load of the isolation transformer to be evaluated. The HIG-IFL1 insulating monitoring device (IMD) is equipped with the fault location function (IFLS), owing to which the user can easily and precisely locate that segment of the system (channel) where the insulation resistance has dropped.

The device is equipped with a screen to display the numerical value of the observed insulation resistance and also the values of the isolation transformer's current and thermal load. Furthermore, the device has pushbuttons for IMD parameter setting and LED controls indicating the insulated system status, including the condition of the various segments (in the channels) of the system.

An MDS-D panel with a touch screen can be connected to the device via the RS485 busbar for displaying the currently observed values and the current IMD setting. Communication via the RS485 line uses a protocol which is based on the PROFIBUS protocol. Description of the communication protocol is available on request.

The built-in contacts enable remote signalling of insulation status faults in the system monitored and/or of thermal/current overload of the isolation transformer.

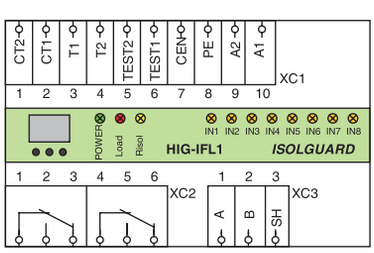
Only one insulation monitoring device can be connected to the same ungrounded IT power supply system.

Basic characteristics

- Insulation monitoring device for AC systems 0 to 275 V voltage
- Insulation fault evaluation in 8 independent circuits (channels) of the IT system, this number can be increased by using extension modules
- Display of the observed insulation resistance, current load and thermal load
- Isolation transformer temperature measurement by using one of 3 sensor types
- Isolation transformer current load measurement by means of a measuring current transformer
- Signalling contacts for IT system faults
- Connection to the RS485 busbar, insulation strength 2500 V_{rms} against the internal circuits and circuits of the system monitored
- Optional communication with a master system via the RS485 busbar
- Communication protocol description available on request
- Pushbuttons available for setting the critical values, hysteresis values and other parameters
- Access to the IMD parameter setting with the pushbuttons can be locked/ unlocked by a button combination
- Separate supply voltage allow also such IT systems as are not under voltage to be monitored
- Module of the *rack case 19"* standard 1U height

Type	Display range	Critical insulation resistance	Number of fault point evaluation channels	Current load measuring system	Temperature sensor	Remote monitoring	RS485
HIG-IFL1 ✚ Art. number 70 950	5 kΩ to 900 kΩ	Adjustable 50 to 200 kΩ	8 (without expander module)	TAR 25/5 to 100/5 measuring current transformer	Temperature sensor PT100 or PTC thermistor or thermal switching contact	MDS-D MDS-DELTA	Yes

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



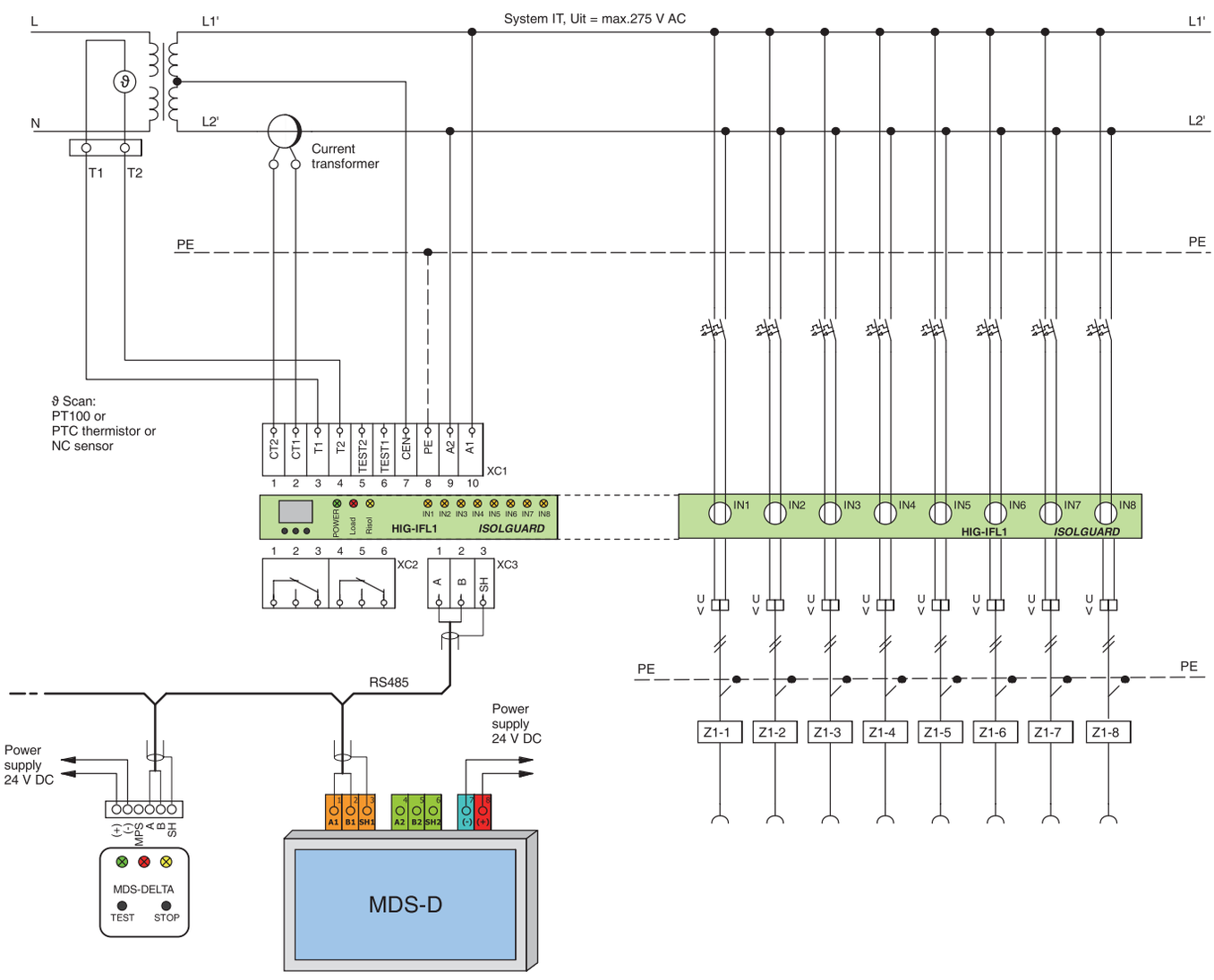
Installation

HAKEL ISOLGUARD HIG-IFL1 insulation monitoring device is designed to enable easy installation into a 19" rack. A reduction system allowing the product to be mounted to the rear panel of a distribution cabinet or to a wall is available in case the user application is not equipped for connection to the above rail system.

Mounting the product in to a 19" rack

Use of the reduction system and product mounting to the rear panel of a distribution cabinet

Recommended connection of HIG-IFL1 to monitored ungrounded IT power supply system



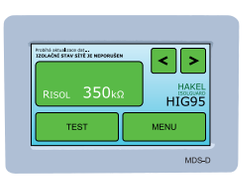
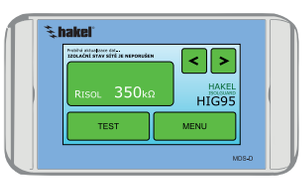
ISOLGUARD module for remote signalling MDS-D

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 HAKEL ISOLGUARD 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 HAKEL ISOLGUARD.

Basic characteristics

- Simultaneous status (isolation resistance, thermal and current overload) of up to 24 ungrounded IT power supply systems, monitored by HAKEL ISOLGUARD IMDs
- 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 insulation monitoring devices
- Touch screen control
- English menu - other languages can be added
- Protection type 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

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 HAKEL ISOLGUARD IMDs	
	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 type	IP20	IP66
Illustrative image		
Art. number	70 060	70 061

MDS-D connection

For the MDS-D connection is necessary to bring 18-36 V 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 Power Supply DC24V as a power supply.

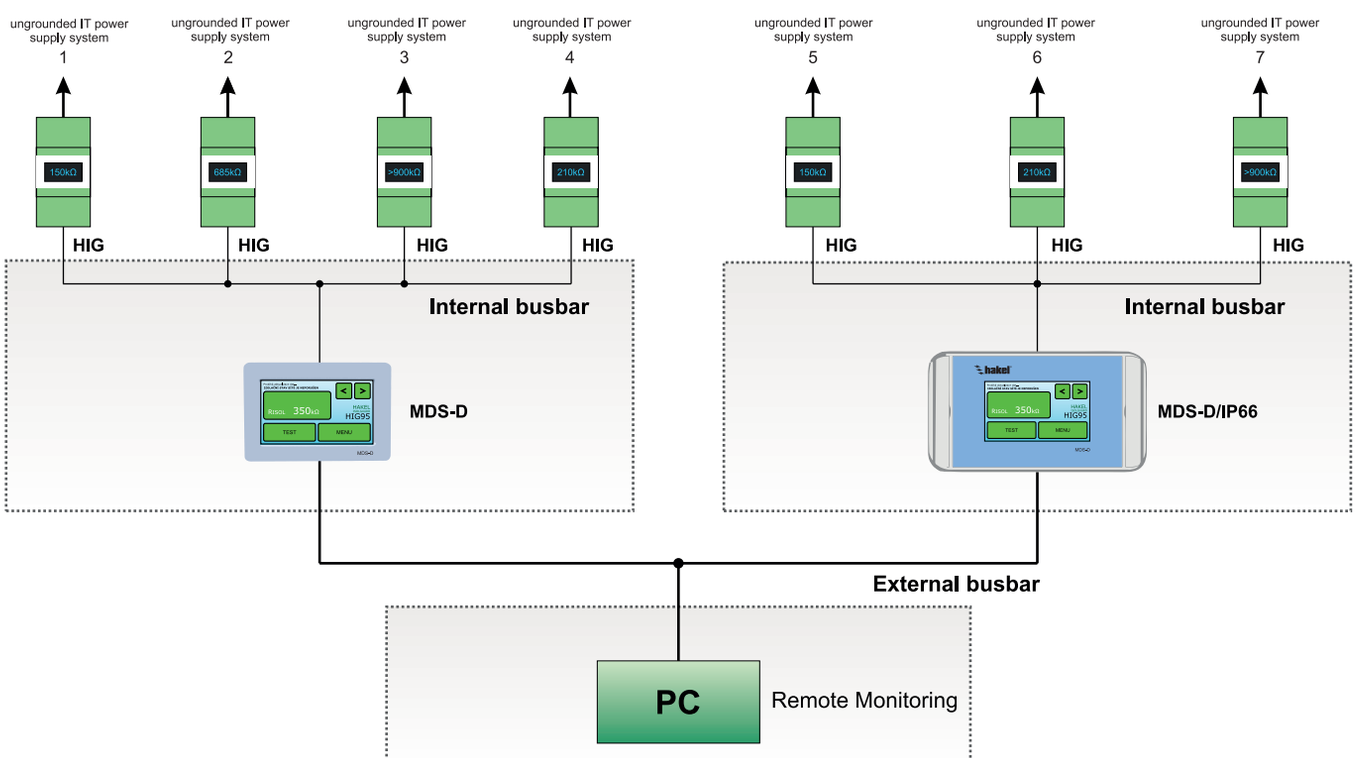
Communication levels of the ISOLGUARD system

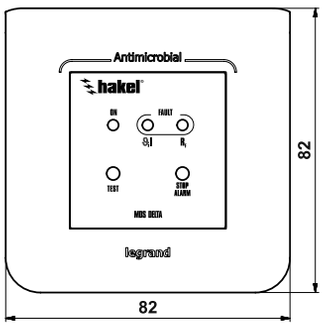
Communication levels of the ISOLGUARD system are divided into two:.

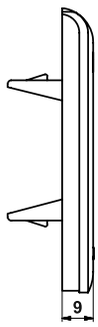
Internal busbar – Busbar used for collecting the data from individual devices produced by HAKEL, designed to monitor ungrounded IT power supply systems. Communication on this busbar is controlled by the MDS-D panel. It is forbidden to affix other devices or otherwise interfere with the prescribed configuration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

Connection example







HAKEL ISOLGUARD MDS-DELTA
Remote signalling module for ISOLGUARD series products

MDS-DELTA is a signalling module for HAKEL ISOLGUARD series insulation monitoring devices (IMDs). The module is fitted with a visual and acoustic signalling system, warning the user in the event of a fault detected by the ISOLGUARD device. The MDS-DELTA module is designed for supervisory/monitoring sites as a component of systems constantly informing the user of the status of an ungrounded IT power supply system.

The MDS-DELTA module signals the insulation status by means of a yellow control, any current and/or temperature overload, by means of a red control. The module's own function is signalled with a green control. If a fault occurs, the respective control will flash and the piezo siren will be sounded. Acoustic signalling can be stopped by using the "STOP ALARM" button on the device. Furthermore, the product is equipped with a "TEST" button to initiate remote testing of the IMD. In this manner the MDS-DELTA product meets the requirements for remote signalling of insulation monitoring devices as stipulated by IEC 61557-8. The module design is in a standard profile 45 mm x 45 mm from Legrand, suitable for installation in cable distribution troughs.

One IMD can be interfaced to as many as 10 MDS-DELTA modules. Communication with the IMD proceeds via RS485 line by means of an internal protocol.

The MDS-DELTA modules can be combined with the MDS-D supervisory system.

Basic characteristics

- Remote signalling module for HAKEL ISOLGUARD insulation monitoring devices
- Design in the Legrand 45 x 45 mm standard, for installation in cable troughs
- Antimicrobial surface for use in hospitals
- Protection type up to IP44, for use in harsh conditions
- Visual and acoustic signalling of insulation status faults
- Visual and acoustic signalling of isolating transformer overload
- Connection to the IMD via RS485 communication line
- Power supply 24 V DC
- Testing button to verify the function of both the IMD and the signalling module
- Button to deactivate sound
- MPS-DELTA can be connected in order to make the visual signalling more alerting
- Up to 10 MDS-DELTA modules can be connected to a one HAKEL ISOLGUARD IMD

MDS-DELTA module signalling

Type	Insulation fault signalling	Transformer overload signalling	Supported IMDs	Signalling means	Antimicrobial surface	Protection type
MDS-DELTA	Yes	Yes	HAKEL ISOLGUARD with the RS485 communication facility (SW version 5.5 or higher)	Visual (LED controls) Acoustic (piezo siren)	Yes, Legrand Antimicrobial technology	IP 20
Art. number 70 063						
MDS-DELTA/IP44						IP 44
Art. number 70 064						