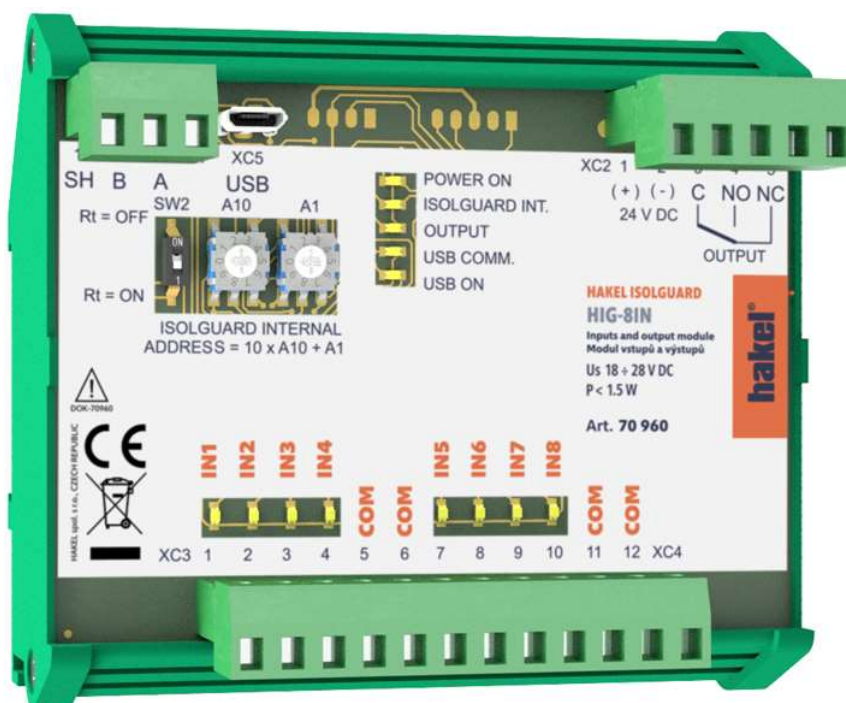


Inputs and output module

ISOLGUARD HIG-IN8

Operating instructions



Content

1.	BASIC DESCRIPTION.....	3
1.1	BASIC CHARACTERISTICS	3
2.	TECHNICAL CHARACTERISTIC - ISOLGUARD HIG-8IN.....	4
3.	CONTROL ELEMENTS AND CONNECTION TERMINALS OF HIG-8IN MODULE.....	6
4.	RECOMMENDED CONNECTION OF HIG-8IN INTO THE HAKEL ISOLGUARD SYSTEM.....	8
4.1	CONNECTION OF INPUTS AND OUTPUT OF HIG-8IN MODULE	8
4.2	ILLUSTRATION OF HIG-8IN MODULE AND AUTOMATIC TRANSFER SOCOMEC ATyS M SWITCHES CONNECTION	9
5.	HIG-8IN MODULE'S FUNCTION SETTINGS POSSIBILITIES.....	10
5.1	INPUT'S FUNCTION SETTINGS POSSIBILITIES.....	10
5.2	OUTPUT FUNCTION SETTINGS POSSIBILITIES.....	10
5.3	HIG-8IN MODULE SETTINGS USING HAKEL ISOLGUARD MDS-D PANEL.....	12
5.4	HIG-8IN MODULE SETTINGS USING PC SOFTWARE	14
6.	COMMUNICATION PROTOCOL.....	17
6.1	RS485 LINE PARAMETER SETTINGS.....	17
6.2	COMMUNICATION BETWEEN HIG-8IN MODULE AND MDS-D REMOTE MONITORING MODULE	17
6.3	INTERNAL RS485 BUS ISOLGUARD TERMINATION	17
7.	DIMENSIONS OF MODULE	18
8.	INSTALLATION INSTRUCTIONS.....	18
9.	MAINTENANCE AND SERVICE.....	18
10.	PRODUCER	18

Picture list

Picture 1:	Terminal designation	6
Picture 2:	HIG-8IN module connection.....	8
Picture 3:	Logical inputs connected to NC contacts	8
Picture 4:	Example of connection HIG-8IN module and automatic transfer switch	9
Picture 5:	MDS-D screen - icons.....	12
Picture 6:	MDS-D screen – I/O module listing.....	12
Picture 7:	MDS-D screen – I/O module settings.....	12
Picture 8:	MDS-D – Input settings vol 1.	13
Picture 9:	MDS-D – Input settings.....	13
Picture 10:	MDS-D screen – text change.....	13
Picture 11:	ISOLGUARD HIG-8IN Setter	14
Picture 12:	ISOLGUARD HIG-8IN Setter – with connected HIG-8IN	14
Picture 13:	ISOLGUARD HIG-8IN Setter – input's setting change	16
Picture 14:	Connection of modules to internal RS485 bus ISOLGUARD.....	17
Picture 15:	Dimensions of module (mm)	18

Tables

Table 1:	HIG-8IN characteristic.....	3
Table 2:	Technical characteristic of HIG-8IN module, part 1	4
Table 3:	Technical characteristic of HIG-8IN module, part 2	4
Table 4:	Technical characteristic of HIG-8IN module, part 3	5

Used symbols



Warning, caution

This symbol informs about very important installation and operation instructions of the device or about hazardous situations that may happen during the installation and the operation.



Information

This symbol highlights particularly important characteristics of the device.



Note

This symbol indicates useful additional information.

1. Basic description

Input and output module HIG-8IN is designed as extension equipment for HAKEL ISOLGUARD insulation status monitoring system. Module allows completing the IT system control of any signalling using 8 digital inputs and 1 output switched contact. Using HIG-8IN can be for example monitored UPS or automatic power supply switches status, read pressing of alarm or panic push-buttons (hospital applications typically) or of any other device, which is able to signal information using logical value.

Inputs statuses, read by the HIG-8IN, are signalled on HAKEL ISOLGUARD MDS-D remote monitoring module. These statuses are then displayed on MDS-D as individual lines with the possibility of displayed text user's settings, input logic, alarm signalling and others. HIG-8IN setting is also done by the MDS-D module.

RS485 data bus with ISOLGUARD protocol is used to send data between HIG-8IN and MDS-D. More HIG-8IN modules can be connected to the same RS485 bus.

HIG-8IN is mainly used in combination with HAKEL ISOLGUARD MDS-D remote monitoring modules.



Inputs output module for HAKEL ISOLGUARD system signalisation.

Type	Logical inputs	Logical output	Power supply	Signalisation via	SW version
HIG-8IN	8x 0 ÷ 36 V DC 8 mA	1x SPDT 230 V AC / 1 A	24 V DC	MDS-D	V1.3
Art. No. 70 960					

Table 1: HIG-8IN characteristic

Notes: MDS-D is a remote signaling module with display and communication via the RS485 ISOLGUARD bus from HAKEL
SPDT – potential-free signaling relay with one changeover contact

HIG-8IN I/O complies with standards:

- IEC 61557-1:2007 Equipment for testing, measuring or monitoring of protective measures
- IEC 60664-1:2007 Insulation coordination for equipment within low-voltage systems – Principles, requirements and tests
- IEC 61326-2-4:2012 Electrical equipment for measurement, control and laboratory use – EMC Requirement
- IEC 61000-6-2:2005 Electromagnetic compatibility (EMC) – Immunity
- IEC 61000-6-3:2006 Electromagnetic compatibility (EMC) – Emission

1.1 Basic characteristics

- HIG-8IN module extends HAKEL ISOLGUARD system's possibilities for logic inputs status signalling
- Allows connected inputs status display on ISOLGUARD MDS-D panel
- HIG-8IN module settings can be done using ISOLGUARD MDS-D panel or computer
- Any text, that is displayed while close and open input status, can be assigned to each input
- Each input can be set as alarm or as informational with colour resolution and with possibility of sound signalisation start up while fault status
- It is possible to assign a fault colour, red or yellow, to each input
- Inputs statuses signalisation is done directly on HIG-8IN module using 8 LED diodes
- Inputs are galvanic isolated by 3 800 V AC insulating barrier from the internal circuits
- All the 8 inputs are connected to the common ground, all the COM terminals are interconnected
- 24 V DC power supply
- One potential free switch contact with load possibility 230 V AC/1 A is at user's disposal
- Communication with MDS-D panel is done via RS485 data bus bar and ISOLGUARD protocol
- Communication address setting on ISOLGUARD RS485 bus in the range of 1-99 using rotary switches
- RS485 bus terminating resistance can be connected by integrated DIP switch
- Assembling on DIN rail, 101 mm total wide

2. Technical characteristic - ISOLGUARD HIG-8IN

Type		HIG-8IN
Nominal power supply voltage	U_s	24 V DC
Power supply voltage range	U_s	18 ÷ 28 V DC
Power consumption	P	Max. 1.5 W
Power supply type requirement		SELF
Number of digital inputs		8
Number of digital outputs		1
Inputs status display on equipment type		HAKE! ISOLGUARD MDS-D
Input parameters		
Digital input operational range	U_i	0 ÷ 36 V DC
Input consumption in closed state	I_i	8 mA / 24 V
Insulating barrier to the internal circuits		3 800 V AC / 1 min
Logic delay in response to open/close	t_i	< 0.5 sec
Input voltage representing logical 1		10 ÷ 36 V DC
Input voltage representing logical 0		0 ÷ 5 V DC
Output parameters		
Signalling potential-free switch contacts insulating barrier to the internal circuits		230 V AC / 1 A 3750 V AC
RS485 bus		
Termination		Can be enabled by switch SW2
Insulating barrier to the internal circuits		2500 V AC / 1 min
Address setting range		1 ÷ 99
Communication protocol of RS485 bus		ISOLGUARD V2.0
Recommended cable for bus connection		J-Y(St)Y 2 x 2 x 0,8 mm

Table 2: Technical characteristic of HIG-8IN module, part 1

General data		
Degree of protection according to IEC 60529		IP00
Weight	m	120 g
Case material		PA - UL 94 V0
Method of attachment		on DIN rail, wide 101 mm
Recommended cross-section of connected wires	S	0.5 ÷ 1 mm ²
Recommended circuit breaker		6 A / gG
Maximum cross-section of wires	S_{max}	1.5 mm ²
Minimum cross-section of wires	S_{min}	0.1 mm ²
Maximum torque moment		0.2 Nm
Wire stripping length		7.6 mm
Article number		70 960

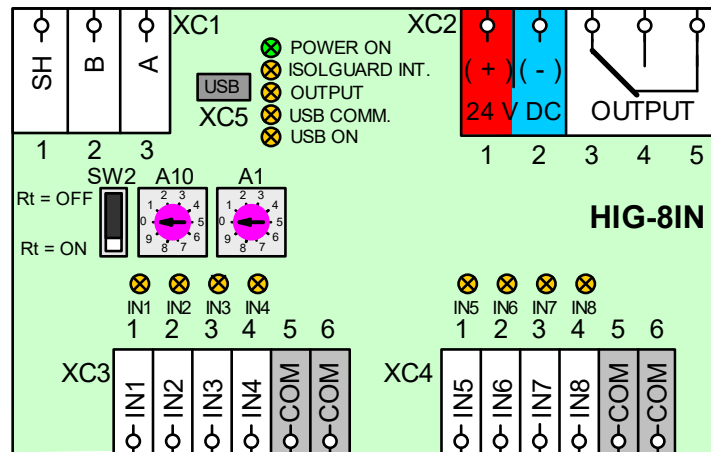
Table 3: Technical characteristic of HIG-8IN module, part 2

Operating conditions	
Ambient climatic conditions	according to IEC 61557-8:2007
Operating temperature	-10 °C ÷ +60 °C
Storage temperature	-25 °C ÷ +70 °C
Transformation temperature	-25 °C ÷ +70 °C
Altitude	max. 2000 m above sea level
Protection class	II, according to IEC 61140
Overvoltage category / testing voltage	III, according to IEC 60664-1:2007
Pollution degree	2, according to IEC 60664-1:2007
Operating position	any
Duty type	permanent

Table 4: Technical characteristic of HIG-8IN module, part 3

3. Control elements and connection terminals of HIG-8IN module

HIG-8IN input/output module consists of information LED diodes, switches and six connectors. Power supply voltage, communication line and I/O ports are connected to wire terminals.



Picture 1: Terminal designation

Green indicator lamp POWER ON

Control lights up after power supply voltage connection. It glimmers slightly after module activation.

Yellow indicator lamp ISOLGUARD INT.

Control lights up when receiving message via RS485 bus. Diode shines for a short period after receiving message that was evaluated as valid by the module. Diode is off, when there is no communication with the module. The module uses address set by rotary switches A10 and A1.

Yellow indicator lamp OUTPUT

The lamp signals OUTPUT relay status. It lights when relay is switched (connected C-NO). When does not light, relay is not switched (connected C-NC).

Yellow indicator lamp USB COMM.

The lamp flashes during communication with PC software via USB (XC5 connector). It helps to user control if the communication between PC and HIG-8IN module was established.

Yellow indicator lamp USB ON

Control lights up after connection to PC via USB connector (XC5). It signals the voltage on USB bus.

Yellow indicator lamps IN1 – IN8

Control is on when corresponding input is closed. Input setting have no impact on indicator lamp function, it mainly serves to inform about switch state while device connection.

Rotary switches A10, A1

Switches serve to set module's address on RS485 ISOLGUARD bus. Each station on the bus must be set with one unique address. This address is assigned by combination of settings A10 and A1 switches in range from 1 to 99.

Addresses can be freely changed over the time.

Formula for address setting: Address = (Switch A10 setting * 10) + Switch A1 setting.

Addresses can be freely changed over the time.

Examples:

- A10 = 3; A1 = 8: Address setting = 38
- A10 = 0; A1 = 1: Address setting = 1
- A10 = 9; A1 = 0; Address setting = 90
- A10 = 0; A1 = 0; Address setting = not valid. This combination cannot be used.

DIP switch SW2

It serves to enable or disable 120 Ω terminating resistor of RS485 ISOLGUARD bus. When the switch is in *Rt = ON* position, terminating resistor is connected between *A* and *B* lines of RS485 bus. When the switch is in *Rt = OFF* position, resistor is not connected.

XC1 connector – A, B, SH terminals

Terminals are used for ISOLGUARD RS485 bus connection to joint HIG-8IN module with MDS-D display module. This communication line is galvanic isolated from other input facilities. Individual modules are connected by twisted pair between *A* and *B* outlets. *SH* terminal is referential ground for module's transceiver and is used for interconnecting potentials of all transceivers on bus.

XC2 connector – (+) / (-) 24 V DC terminals

Terminals are used for HIG-8IN module's power supply voltage connection. The positive pole of the source is connected on (+) terminal and negative pole on (-) terminal. Allowed power supply voltage range is 18 to 28 V DC, recommended voltage value is 24 V DC. Internal circuits of HIG-8IN module are not isolated from the power supply.

XC2 connector – OUTPUT (230 V AC/1 A) signalling relay terminals

Potential free switch contact of ALARM status signalisation. Relay is switched when at least one input has an ALARM status (fault signalisation) and POWER ON signalisation flashes slightly. ALARM status is logical sum of all inputs in fault status which have set fault status ending by deblock push-button, see *HIG-8IN module's inputs function settings possibilities*.

XC3, XC4 connectors – IN1 to IN8, COM terminals

Terminals are intended for logical inputs connection. *COM* terminals serve as a ground for logical inputs and are interconnected. *IN1* to *IN8* terminals are logical inputs. Logical inputs are isolated from internal circuits and HIG-8IN module's power supply voltage by 3 800 V AC isolation barrier.

Potential against *COM* terminal is connected on *IN1* to *IN8* terminals and applies:

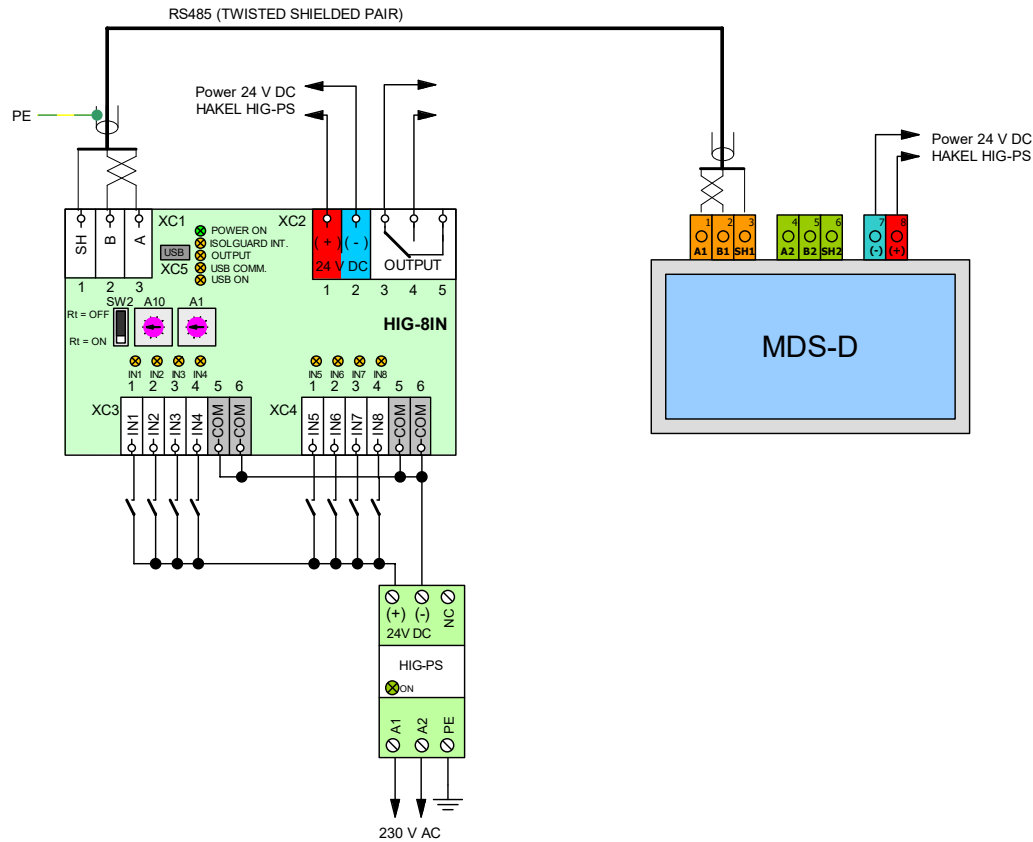
- Voltage at terminals *INx* and *COM* in 10 to 36 V DC range sets logical input to 1 state
- Voltage at terminals *INx* and *COM* in 0 to 5 V DC range sets logical input to 0 state
- *INx* input status with open contact is evaluated as logical 0 state
- Voltage in 5 to 10 V DC range is considered as a zone of uncertainty. The user must avoid this hazardous zone.

XC5 connector – micro USB XC5

It serves to connection HIG-8IN module with computer. It is possible to configure the module via the Windows system using USB and *ISOLGUARD HIG-8IN Setter* program. For more information about module configuration through computer see chapter *HIG-8IN module settings through PC software*.

4. Recommended connection of HIG-8IN into the HAKEL ISOLGUARD system

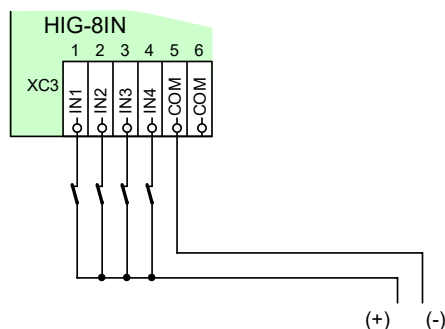
4.1 Connection of inputs and output of HIG-8IN module



Picture 2: HIG-8IN module connection

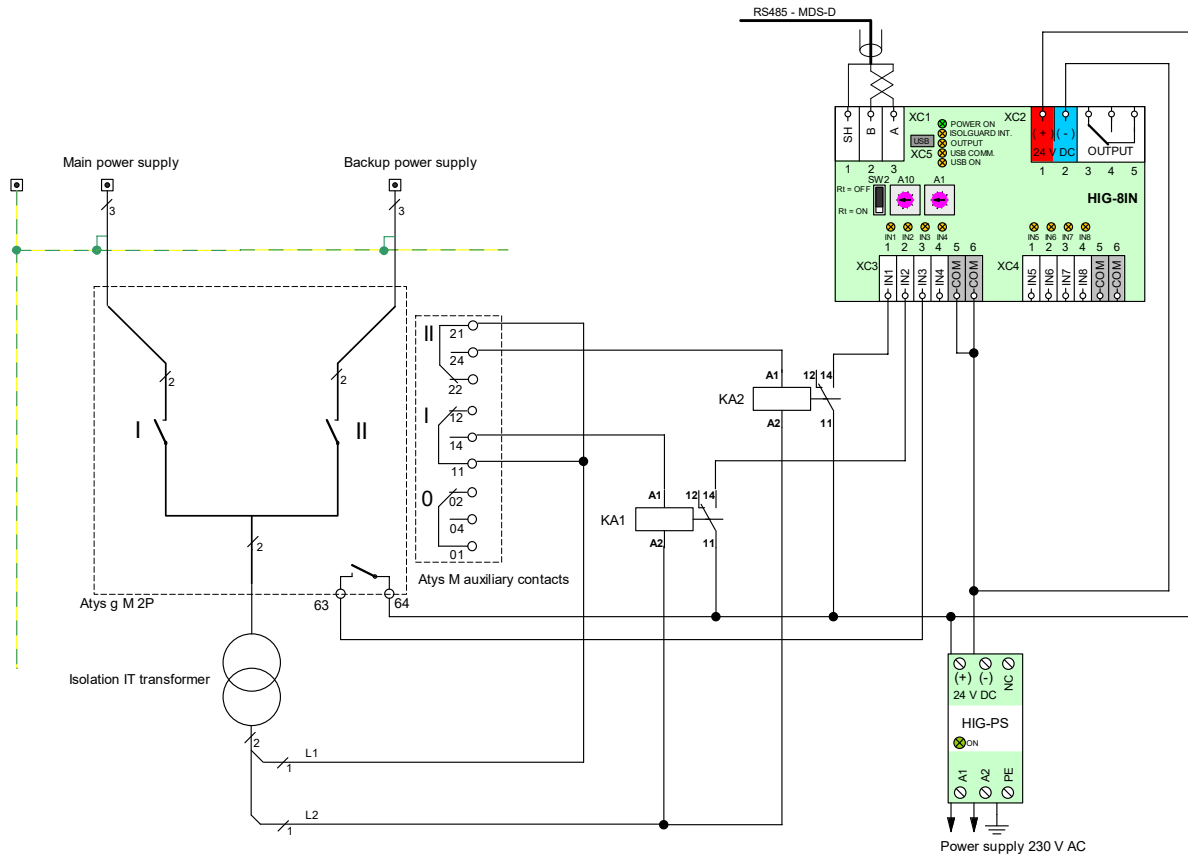
Notes:

1. When using a shielded cable for the RS485 bus, bus shielding has to be connected across whole length and grounded at one point.
2. Only one type of cable is installed along the entire length of the RS485 ISOLGUARD bus. A and B wires are routed as a twisted pair, and the SH terminals of all devices are interconnected. The shield is not connected to conductors A, B or SH potential
3. It is necessary to follow a linear wiring of the RS485 bus, any taps are not allowed.
4. To power the MDS-D and HIG-8IN, it is necessary to use a galvanically isolated voltage source and implement the power supply as SELF. Both devices can be powered from the same source. The recommended value of the supply voltage is 24 V DC. The HAKEL HIG-PS 24V series is recommended for powering device.
5. Power supply of HIG-8IN module logical inputs and HIG-8IN module's own power supply can be done by common source. Insulating barrier between internal circuits and logical inputs does not apply in this case
6. It is possible to use NC contacts for status signalisation. The signalling logic is changed in the device settings via MDS-D or USB bus.



Picture 3: Logical inputs connected to NC contacts

4.2 Illustration of HIG-8IN module and automatic transfer SOCOMEC ATyS M switches connection



Picture 4: Example of connection HIG-8IN module and automatic transfer switch

Notes:

- This usage gives information from which power supply system (and if at all) is the IT system supplied.
- As a result, there are statuses signalled via HIG-8IN on MDS-D:

input IN1: IT system is supplied from the main lead	x	IT system is not supplied from the main lead
input IN2: IT system is supplied from the standby lead	x	IT system is not supplied from the standby lead
- Recommended KA1 and KA2 relay type is SCHRACK RT315730; eventually any other relay with 230 V AC coil and with gilded contacts; for switching small voltages (typically 24 V) and circuits (8 mA current via input).
- Using a switch in ATyS M equipment can be for example signalled ATyS M automatic transfer switch function on IN3 input of HIG-8IN module.

ATyS g M 2P:	terminals 63,64
ATyS g M 4P:	terminals 63,64
ATyS p M s:	using any programmable output
ATyS t M:	terminals 63,64 with power supply availability signalisation



5. HIG-8IN module's function settings possibilities

5.1 Input's function settings possibilities

Each HIG-8IN module's input can be freely set, independent of other inputs. The settings must be made for each application separately, exactly according to the requirements of the system operator and related technologies.



There are two ways to do this setting:

- Using RS485 communication line and MDS-D display panel (see *HIG-8IN module settings using HAKEL ISOLGUARD MDS-D panel*)
- Using USB connection by XC5 connector and computer (see *HIG-8IN module settings using PC software*)

Both approaches are equivalent. It is only up to the user which one to choose.

5.2 Output function settings possibilities

Several features, that affect function, are defined for each input. The following text describes these functions.

Input status

Each input on HIG-8IN module can only be in one of two possible logic statuses over time either in the closed input status (logical 1) or in the opened input status (logical 0). One of these statuses is considered as a fault status, the other as a non-fault status.

Status fault

It is a condition, where the input on MDS-D unit is displayed with a fault colour (red or yellow) or triggers an acoustic signal.

Status no-fault

It is an informational state, when the input is displayed in an information colour (green) on MDS-D unit.

Default settings: Fault status occurs when the input is closed



Example of fault status setting:

Signalling of the state of charge of the UPS battery is fed to input IN1. If the battery is charged, the input IN1 is closed. If the battery is discharged, the input IN1 is opened. In such a case, the Input's fault status will be set to "Open status fault". The MDS-D panel will then display a Fault, if the UPS battery is low.

Fault status termination

If the input fault status is signalling and the input fault status changes to no-fault status, it is possible to terminate the fault signalisation on the MDS-D panel. There are two ways to terminate the signalisation:

Automatic fault status termination

As soon as the status corresponding to the no-fault status appears at the input, the fault signalling is automatically terminated. The fault termination is immediate and does not require user intervention. In this mode, the signalling on the MDS-D panel always reflects the current state of the input.

Termination by pressing deblock button

After returning to the no-fault status of the input, the fault is still signalled and this signalisation must be removed by operator intervention. Removal is done by pressing a button on the MDS-D panel's touch screen.

Default settings: Fault termination by pressing deblock button.



Example of fault status termination settings:

It is appropriate to use option "Termination by pressing deblock button" for panic buttons. This option ensures that the operator is aware of the fault status even if the fault status occurs for a short time.

It is appropriate to use option "Automatic termination" for power supply statuses so that currently valid option is always displayed.

In general, it is good to terminate long-term signs, e.g. power supply source, UPS status, etc., automatically and short-term signs, e.g. panic buttons, terminate by deblock.

Fault status colour

For display on MDS-D panel, it is possible to choose one of two fault colours for each input. Possible colours are red and yellow. Red fault signalling colour means serious fault, yellow colour has a character of a warning (i.e. a lower priority error).

Default setting: Red colour



Example of fault status colour settings:

It is appropriate to use yellow colour as a fault level warning, eventually as information about non-standard operation, which is not critical. Typical example of yellow colour fault can be power supply network operation from backup network or UPS operation from battery. Example of red colour fault can be power supply voltage loss, automatic switch fault or internal UPS defect.

Acoustic fault report

Using this option, it is possible to assign to each input whether acoustic signalling on MDS-D panel starts when input fault status occurs. This option ensures faster operator's attention. If the acoustic input fault signalling is switched on, the siren of the MDS-D panel will sound when a fault status occurs. If the acoustic signalling is off, only input colour (green) will change to fault colour (red/yellow).

Default settings: Acoustic signalling is on



Example of acoustic notification settings:

Acoustic notification makes sense to use in cases where the operator of the MDS-D panel should be informed of a change in the input status as soon as possible. A representative of these cases is, for example, power outages or malfunctions of the UPS charging system, when their occurrence must be evaluated by the operator as quickly as possible.

Another example that usually does not require an urgent response would be common UPS conditions. Some UPS signalling states are not important enough to be announced acoustically. For example, battery operation is standard for UPS systems and there is no reason to inform the operator about this other than by text and changing the colour of the input.

Input display

Each input can be displayed on the MDS-D panel in one of four different variants. This is because, for example, the operator only wants information about the error state of the input, or vice versa only about the non-error state.

The variants are:

Always display input

Input is always displayed whether or not is in fault or non-fault status.

Display input when fault occurs

The input is displayed only if it is in an error state (or in a state of waiting for an acknowledgement - see Ending an error state).

Display input when there is no fault

Input is only displayed when it is in non-fault status.

Do not display input

Input is never displayed. Typical when input is not in use, is not connected.

Default settings: Input is always displayed, regardless the fault.



Example of fault status termination settings:

For example, the panic button status can only be displayed when input is in fault status, likewise for example ATS/UPS system faults. Or, conversely, information about the power supply status is displayed only if the power supply is present.

Fault and no-fault text

Two arbitrary user texts can be assigned to each input. One text will be displayed on the MDS-D panel in fault status and the other in non-fault status.

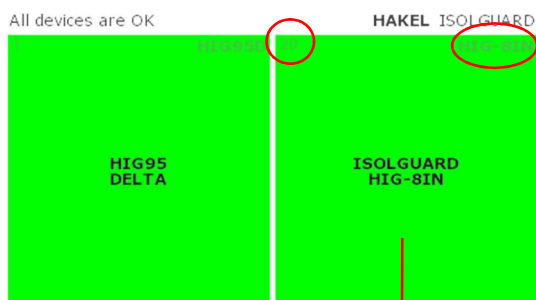
If text is not set, the default information about input error status is displayed.

5.3 HIG-8IN module settings using HAKEL ISOLGUARD MDS-D panel

Module settings using MDS-D panel can be simply realized via touch screen. It is necessary to meet several conditions to change settings:

1. HIG-8IN module is connected to the power supply and is on. POWER ON control light glimmers slightly.
2. HIG-8IN module has set unique communication address using A10 and A1 switches.
3. HIG-8IN module is connected on MDS-D panel's *Internal* RS485 bus.
4. HIG-8IN module's address is monitored by MDS-D panel.

If all conditions are met, the following is displayed on **MDS-D panel's** main screen:



Picture 5: MDS-D screen - icons

Screen Icons

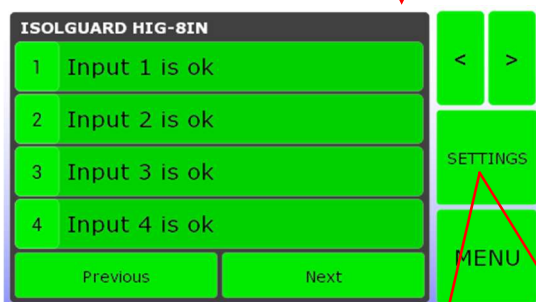
This is main screen, if more devices are connected to MDS-D.

It is necessary to select setting I/O module on this screen.

This is done by simple pressing the icon corresponding to the module.

Communication address is always indicated in upper left corner and model designation of connected device in upper right corner to clearly identify the icon.

If I/O module is the only device connected to the MDS-D, the *I/O module listing* will appear straight away.



Picture 6: MDS-D screen – I/O module listing

Screen IO module listing

This is main screen for inputs information display. Inputs in ascending order from the first input are displayed on this screen. The exception is inputs in fault status that are always sorted up.

It is possible to browse between inputs using *Next* and *Previous* buttons. Arrows in upper right corner serve to switch to other monitored devices. Button *Menu* has a function of panel's main offer display and serves to return to Icon screen.

Button *SETTINGS* serves to change input's features.

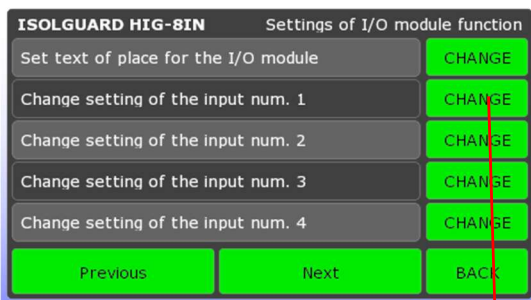


Screen Enter the PIN

MDS- D can require access PIN from the user after *SETTINGS* button press.

This PIN serves to prevent unauthorized accesses. Default value is **1234**.

It is necessary to enter correct PIN and then press **OK**.



Picture 7: MDS-D screen – I/O module settings

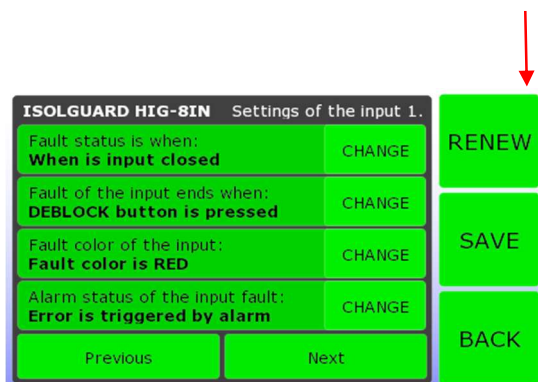
Screen I/O module function settings

First item on this screen is for user text of I/O module description settings or its place. This text is displayed on the MDS-D panel in the middle of each device's *icon* and also in upper left corner on all the I/O module's screens. It serves the operator to easier identify the device.

I/O module's input, whose parameters wants the user to modify, is selected in next items.

It is possible to browse between individual items using *Previous* and *Next* buttons. Screen matching specific input settings is displayed by pressing relevant *CHANGE* button.

Button *BACK* returns the user on the *I/O module listing* screen.



Picture 8: MDS-D – Input settings
vol 1.

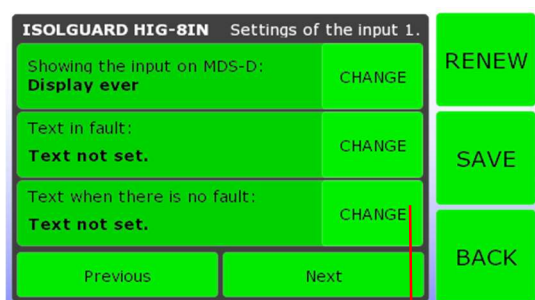
First screen *Input settings vol 1.*

After entering this screen, the present input settings will be read. The individual lines correspond to the properties described in the *HIG-8IN module function setting* chapter.

By pressing *EDIT* on individual lines, the user has the option to edit the property of the input.

Use the *RESTORE* button to read the settings from the module again. All changes made are cancelled.

The *Next* and *Previous* buttons cycle between the two Input Settings screens



Picture 9: MDS-D – Input settings
vol 2.

Second screen *Input settings vol 2.*

In this part of the *Input Settings* screen, you can modify the texts that are displayed for the input on the *Input Status Overview* screen.

These texts can be changed using the *CHANGE* button. This is followed by a transition to the screen *Input Settings – text change*.

Press the *SAVE* button to write to the IO module. After writing, an automatic transfer to the *I/O module function settings* screen occurs and the HIG-8IN module is already working with the new settings.

The *BACK* button exits the screen without making any changes to the HIG-8IN module settings.



Picture 10: MDS-D screen – text change

Screen *Input settings – text change*

This screen is used to change the text of the fault and non-fault status of the input.

Any text, which will be displayed on the MDS-D panel, can be written using a keyboard.

DELETE button deletes the entire string completely, button *<-* deletes only the last character.

Pressing the *SAVE* button returns to the previous screen and saves the new text.

The *BACK* button will return without saving the change.

5.4 HIG-8IN module settings using PC software

Module settings using PC software can be realized via single-purpose *ISOLGUARD HIG-8IN Setter* program. This program is available from the HAKEL company and is supported by Windows 7 and newer.

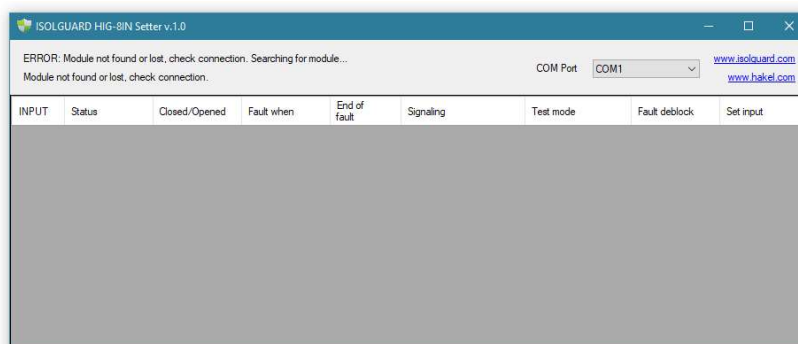


PC connection is realized using standard USB connector type *USB micro*. This connector is labelled as XC5 on HIG-8IN module.

USB output is not galvanic separated from HIG-8IN module's power supply.

Virtual COM port will be created in Windows systems after HIG-8IN module connection. If Windows system could not install device controllers automatically, it is possible to download them at <http://www.ftdichip.com/Drivers/VCP.htm>.

It is possible to turn on *ISOLGUARD HIG-8IN Setter* program after connection of module and installation of controllers.



Picture 11: ISOLGUARD HIG-8IN Setter

Running the program

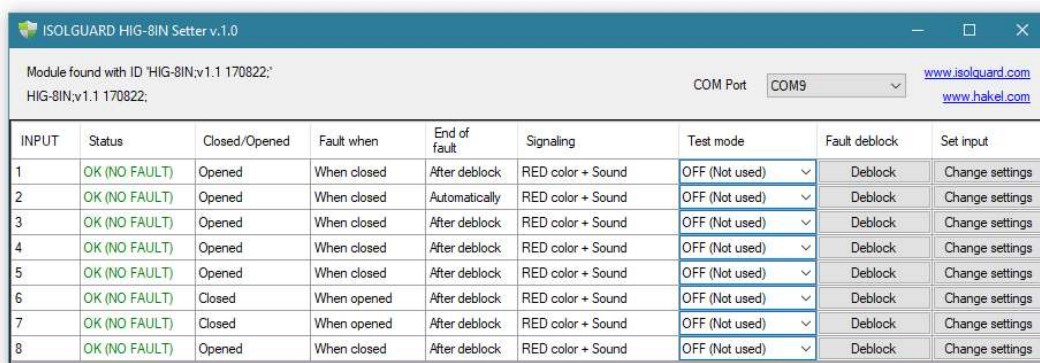
First it is necessary to select correct COM port, on which the communication with the module runs.

Field in upper right corner serves for COM port selection and change. Communication with the module starts automatically after click on new port.

If the COM port is missing in the list, check the module connection, validity of installed controllers and run the program again.

Program operation

Status of the communication with the module is listed in program's upper left corner. If a text "*Module found with ID*" is displayed, it means that communication with the module is established and ongoing. Firmware version uploaded in the module is indicated under this text.



Picture 12: ISOLGUARD HIG-8IN Setter – with connected HIG-8IN

All the information about module inputs is listed automatically after module's connection. It is possible to find information about each input in the table in order columns from left:

1. **INPUT** – input serial number
2. **Status** – actual fault of input status
 - status *OK (NO FAULT)* means that input is in no fault status
 - status *FAULT* means that input is in fault status
3. **Closed/Opened** – information about which logical level is currently at the input
 - *Opened* – input is opened = logical 0
 - *Closed* – input is closed= logical 1
4. **Fault when** – information about in which logical level (viz. Closed/Opened) input's fault status is
5. **End of fault** – it says, how the fault mode is terminated
 - *After deblock* – fault is terminated after deblock button pressing
 - *Automatically* – fault is automatically terminated after fault status termination at the input
6. **Signalling** – it described, how the fault is signalled
 - *RED color* – red colour
 - *YELLOW color* – yellow colour
 - + *Sound* – acoustic signalization is on
7. **Test mode** – it allows input closing/opening simulation for settings needs
 - *OFF (not used)* – simulation is off, module uses real status on input terminals for the operation
 - *ON (Closed input)* – simulation is on – input is closed
 - *ON (Opened input)* – simulation is off – input is opened
8. **Fault deblock** – pressing DEBLOCK button realize return to no fault status within fault status with deblock termination
9. **Set input** – *Change settings* button displays form for relevant input's settings change

Input's settings change

A window that allows inputs features change displays after pressing *Change settings* button. Features changes are made by selection from the menu, texts change by filling in a text field. Entering new data to the HIG-8IN module is done by *Save to the module* button.

1. **Fault status when** – fault status settings
 - a. *When input is closed* – Fault status when input is closed (logical 1)
 - b. *When input is opened* – Fault status when input is opened (logical 0)
2. **Fault ends** – fault status termination
 - a. *After DEBLOCK* – after deblock button pressing
 - b. *Automatically* – automatic after fault termination
3. **Fault color** – fault mode colour settings
 - a. *RED* – red colour
 - b. *YELLOW* – yellow colour
4. **Use acoustic signalling** – use of acoustic fault signalling
 - a. *With acoustic sound* – acoustic signalling will start when entering the fault mode
 - b. *Without sound* – fault will be signalled without acoustic signalling
5. **Show this input on MDS-D** – the way the input is displayed on MDS-D
 - a. *Ever* – input will be always displayed
 - b. *Only when fault* – input will be displayed only when fault status
 - c. *Only when no fault* – input will be displayed only when no fault status
 - d. *Never* – input will be never displayed
6. **Text when fault** – text, displayed on MDS-D in fault status
 - a. Text is filling in into the text field
 - b. Text must be without diacritics, numbers and some special characters are allowed
 - c. Maximal text length is 44 characters
7. **Text when ok (no fault)** – text, displayed on MDS-D in no fault status
 - a. The same principles apply to this text as to point 6

Picture 13: ISOLGUARD HIG-8IN Setter – input's setting change

6. Communication protocol

The HIG-8IN module communicates via the industrial RS485 bus using the ISOLGUARD protocol. Communication proceeds in the request – response mode. One MASTER station must be connected to the bus, whereas this MASTER station sends requests to the other SLAVE stations. The slave stations only respond to requests, they never start communication. The HIG-8IN module is in the position of the slave station.

Individual stations are connected with TWISTED PAIR-TP. The first conductor is labelled A, the second one B. Logical 1 (respectively 0) is determined by the voltage between these conductors. During an idle state (logical 1), the A conductor is more positive than the B conductor (at least by 200mV).

The length of the line can be up to 1200 meters; in view of proper installation, both ends of the line need to be terminated, namely by using the resistance of 120 Ω.

In the ISOLGUARD system is the MASTER station MDS-D unit, produced by HAKEL. The MDS-D unit allows remote displaying of measured values and parameters and data transferring to the user master system.

An individual address must be set for each station being connected to the bus. The address for the HIG-8IN module is adjustable within a range 1 to 99.

6.1 RS485 line parameter settings

A10 and A1 switches set **HIG-8IN** module's address on the bus line. In detail described in chapter 3.

SW2 switch sets internal termination resistance R_t connection to the RS485 bus. SW2 can be switched to **Rt = ON** position when resistance 120 Ω is internally connected to module's RS485 bus or to **Rt = OFF** position without connected resistance.



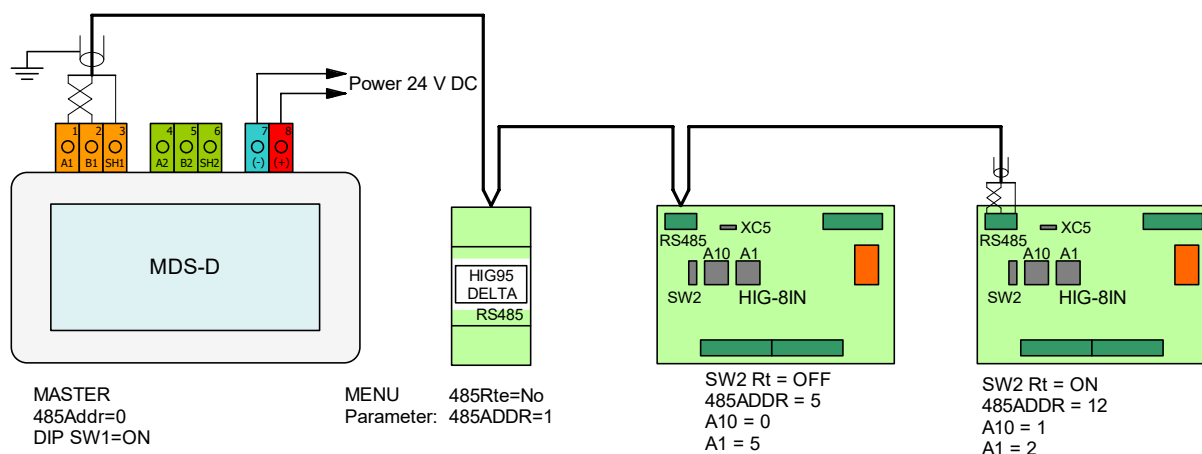
6.2 Communication between HIG-8IN module and MDS-D remote monitoring module

Using MDS-D as the MASTER station allows the user smooth and comfortable supervision of up to 24 HAKEL ISOLGUARD devices status. MDS-D touch panel communicates with modules via ISOLGUARD protocol fully automatically, including the ability to search devices on the connected bus.

For proper function it is only necessary to set unique addresses to all devices and interconnect them with MDS-D panel by twisted pair.

ISOLGUARD devices are always connected to the internal RS485 bus of the MDS-D module, i.e. terminals A1 B1.

HIG-8IN modules can be freely combined with HAKEL ISOLGUARD HIG insulation monitoring devices.



Picture 14: Connection of modules to internal RS485 bus ISOLGUARD

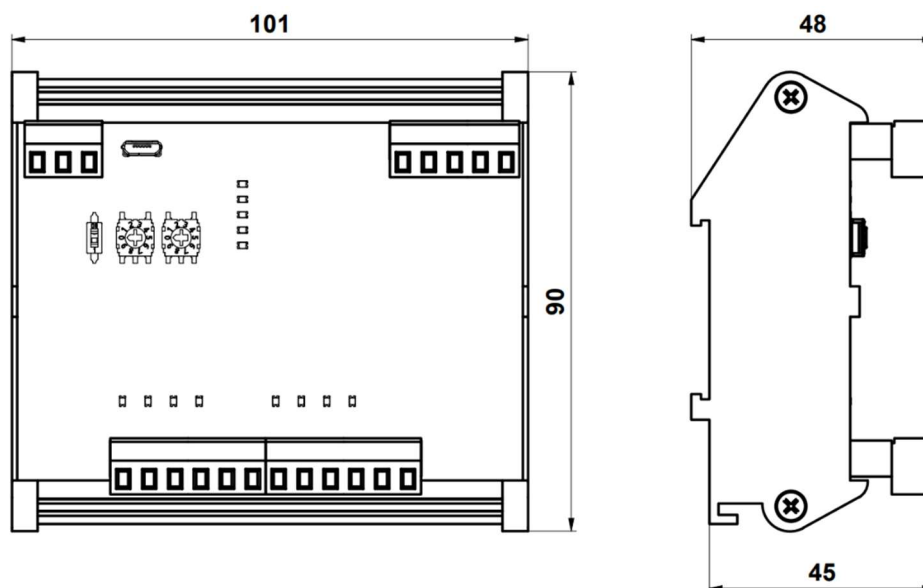
6.3 Internal RS485 bus ISOLGUARD termination

RS485 bus termination at the MDS-D side is made by a switch available inside the case. The switch labelled SWITCH1 connects terminating resistance 120 Ω to internal RS485 bus (A1 B1) in the ON position. The switch labelled SWITCH2 connects terminating resistance 120 Ω to external RS485 bus (A2 B2) in the ON position.

In HIG95-DELTA IMD can be the bus termination enabled in device's menu.

In HIG-8IN module can be the bus termination enabled with SW2 switch, see above.

7. Dimensions of module



Picture 15: Dimensions of module (mm)

8. Installation instructions

The operation, installation and maintenance of this device may only be carried out by a qualified worker in accordance with the installation and safety regulations. If the device is used in a manner not specified by the manufacturer, the protection provided by the device may be impaired.



Standard mounting of the HIG-8IN module

The HIG-8IN module is standardly mounted on a DIN35 rail according to ČSN EN 60715. Any working position.

- Terminals (+) (-)24 V on the XC2 terminal block are intended for powering the module according to the recommended connection.
- The Rt switch can be used to terminate the *ISOLGUARD RS485* bus on XC1 terminal block.
- Observe the linear connection of the RS485 *ISOLGUARD* bus, no branches can be created.
- Install only one type of cable along the entire length of the *ISOLGUARD RS485* bus.

9. Maintenance and service

It is necessary to follow specified conditions for reliable operation, do not expose the device to rough handling, keep it clean and do not exceed the maximum ambient temperature.

Only qualified person is allowed to install and set up the device. Only the producer provides repairs of the device. No personnel are needed to operate the insulation monitoring device. Technology service is during the operation informed by local and remote monitoring signalization about the input and output statuses.



10. Producer

Producer of I/O module HIG-8IN is

HAKE! spol. s r. o.,
Bratři Štefanů 980, 500 03 Hradec Králové
Czech Republic
www.hakel.com