

Insulation monitoring device ISOLGUARD HIG93/E, HIG94/E

Operating instructions



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Used symbols

**Warning, caution**

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

**Information**

This symbol highlights particularly important characteristics of the device.

**Note**

This symbol indicates useful additional information.

1. ISOLGUARD Insulation monitoring devices HIG93/E, HIG94/E

The insulation monitoring devices HIG93 and HIG94 produced by HAKEL for the ISOLGUARD series are designed for monitoring the insulation status of single-phase and 3-phase ungrounded IT power supply systems, are designed and operated according to standards IEC 61557-1:2007, IEC 61557-8:2014, HD 60364-4-41:2017.

Devices enable monitoring of single-phase and 3-phase ungrounded IT power supplies systems up to the maximum operating voltage 275V AC, eventually 3x275V AC. If the insulation status monitoring 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 TL* inductors produced by HAKEL. Such a created centre is connected to the terminal of insulation monitoring device HIG93/E or HIG94/E. The insulation monitoring devices enable to display the numeric value of the measured insulation resistance, there are also buttons for setting module parameters and signalling LED diodes for displaying the status of monitored power supply system and equipment.

Two inbuilt signalling relays with switching contacts enable alarm signalling for two independently set values of critical insulation resistance. The insulation monitoring device has an optional alarm memory function with the option to terminate the alarm using the button on the insulation monitoring device. Local and remote testing of the insulation monitoring device function can be done.

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



1.1. HAKEL ISOLGUARD HIG93/E, HIG94/E

Model	Display menu	Signalling relay 1	Signalling relay 2	Range of displayed value	Critical insulation resistance	ETH connection	SW version
HIG93/E	Yes	1x SPDT	1x SPDT	5 kΩ to 900 kΩ	Adjustable 5 kΩ to 300 kΩ	Yes	V5.9
Art. no. 70 924							
HIG94/E	Yes	1x SPDT	1x SPDT	200 kΩ to 5 MΩ	Adjustable 200 kΩ to 900 kΩ	Yes	
Art. No. 70 926							

Table 1: Variants of devices

Note: SPDT signalling relay with single-pole double-throw contact

HIG93/E, HIG94/E complies with standards:

- HD 60364-4-41:2017 Low-voltage electrical installations- Protection against electric shock
- IEC 61557-8:2014 Insulation monitoring devices for IT systems
- IEC 61557-1:2007 Equipment for testing, measuring or monitoring of protective measures
- IEC 60664-1:2007 Insulation coordination for equipment within low-voltage system - Principles, requirements and tests

1.2. Basic characteristics

- Insulation monitoring device for AC systems with 0 to 275 V voltage without additional devices, for greater voltages additional inductor is needed
- Display of the measured insulation resistance R_{isol} in the range 5 kΩ to 900 kΩ or 200 kΩ to 5 MΩ
- Two insulation resistance status signalling relays equipped with switching contact
- Connection to the ETHERNET computer network 10Base-T or 100Base-TX (automatic recognition), connector RJ45
- Communication protocols HTTP (WEB, XML), SNMP, MODBUS TCP
- Internal web sites for actual values and configurations display
- Optional memory of the invoked alarm with possibility to unlock by button on the device
- Option to set two values of monitored insulation resistance R_{crit1} and R_{crit2} using the display and push-buttons, namely in the range from 5 kΩ to 300 kΩ or from 200 kΩ to 900 kΩ according to the type of device
- Adjustable hysteresis of the insulation resistance limit value in the range from 0 to 100 % using the display and push-buttons
- Adjustable delay in signalling relay response t_{ON} in the range from 0 to 60 seconds using the display and push-buttons
- Access to the IMD parameter setting with the pushbuttons can be locked. Unlocking is possible by a button combination
- Separate supply voltage also allows to monitor IT power supply systems which are not under voltage
- Modules for assembling on DIN rail 35, total width of both modules 59 mm

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2. Technical characteristics HIG93/E, HIG94/E

Type		HIG93/E	HIG94/E
Monitored IT power supply system type		AC	
Supply voltage range	U _s	90 ÷ 265 V AC (47 ÷ 63 Hz) or 90 ÷ 370 V DC	
Maximum IT power supply system operating voltage (without external inductor)	U _n	275 V AC	
Power consumption	P	max. 5 VA	
Measuring circuit			
Measuring voltage	U _M	12 V DC	
Measuring current	I _M	< 0,6 mA	
Alternate internal resistance of the measuring input	R _i	> 2 MΩ	
Displayed value's range	R _{isol}	5 kΩ ÷ 900 kΩ	200 kΩ ÷ 5 MΩ
Measurement accuracy 5 kΩ ... 10 kΩ 10 kΩ ... 900 kΩ		2 kΩ ± 10%	
Measurement accuracy 200kΩ ... 1MΩ 1MΩ ... 5MΩ			± 10% ± 15%
Critical insulation resistance	R _{crit1} , R _{crit2}	adjustable 5 kΩ ÷ 300 kΩ	adjustable 200 kΩ ÷ 900 kΩ
Insulation resistance hysteresis	R _{hyst}	adjustable 0 ÷ +100 % R _{crit}	
Delay in response of signalling	t _{ON}	adjustable 0 to 60 sec	
Outputs			
Two relay with one changeover contact (SPDT) electric strength to the internal circuits electric strength to the supply circuits		250 V AC / 1 A 3750 V _{rms} 3750 V _{rms}	
Communication line: RJ45 Ethernet 10BASE-T / 100BASE-TX (auto-sensing) Ethernet: Version 2.0/IEEE 802.3 Insulation strength to the internal circuits and supply circuits		Yes 3000 V _{rms}	Yes 3000 V _{rms}
General data			
Degree of protection according to IEC 60529		front panel IP40 covers except front panel IP20	
Weight	m	160 g	
Housing material		PA - UL 94 V0	
Method of assembly		on the 35 DIN rail	
Recommended section of the connected conductors	S	1 mm ²	
Article number		70 924	70 926

Table 2: HIG93/E, HIG94/E technical characteristics, part 1

Operating conditions	
Operating temperature	-10 °C ~ +60 °C
Storage temperature	-25 °C ~ +70 °C
Shipping temperature	-25 °C ~ +70 °C
Altitude	Up to 2000 m a.s.l.
Protection class	II according to IEC 61140:2016
Electromagnetic compatibility	IEC 61326-2-4:2012
Overvoltage category	III, according to IEC 60664-1:2007
Pollution degree	2, according to IEC 60664-1:2007
Working position	any
Operation type	permanent

Table 3: HIG93/E, HIG94/E technical characteristics, part 2

Measuring principle

DC voltage 12 V. Plus pole connected to a CENTRE terminal.

3. Controls and connecting terminals of HIG93/E, HIG94/E modules

Green indicator lamp ON

This control lights up when the supply voltage is connected. It glimmers slightly after module activation.

Yellow indicator lamp FAULT1

It lights up, when the measured insulation resistance value is lower than the set critical resistance R_{crit1} value. It even lights after the fault status removal, if the fault memory function is active. At the same time, this status is signalled by the FAULT1 relay contacts.

Yellow indicator lamp FAULT2

It lights up, when the measured insulating strength value is lower than the set critical resistance R_{crit2} value. It even lights after the fault status removal, if the fault memory function is active. At the same time, this status is signalled by the FAULT2 relay contacts.

Display

It serves to display the measured values, shows current function of the S1 – S3 push-buttons, serves to set the parameters and displays important information. For description of displayed information, see page 9.

FAULT1 or FAULT2 relay status change, eventually starting and ending device test is signalled by short display flash.

Display will go off if no button is pressed during a 5-minute period and will be restored by pressing any button. The device is operational even if the display is not active.

Left push-button S1

This is a module control button whose meaning in each menu is shown on the display. When the insulation resistance R_{isol} is displayed, this button has the meaning of **TEST** button. See the section Information on the display, page 9.

Middle push-button S2

This is a module control button whose meaning in each menu is shown on the display. When the fault memory function is active, it releases the relay FAULT. It activates display of temperature inside the module if the insulation resistance R_{isol} is displayed.

Right push-button S3 MENU

This is a module control button whose meaning in each menu is shown on the display. When the insulation resistance R_{isol} is viewed, it activates the parameter setting menu

Within the parameter setting menu, the prolonged pressing of this push-button terminates the data entering with memorizing the new value, whereas the short pressing of this push-button causes exit from the menu without memorizing the new parameter value.

Terminals A1, A2

These terminals serve to connect the module's power supply. The power supply voltage is 90 to 265 V AC (47÷440 Hz) or 90 to 370 V DC.

Terminals CENTRE, PE

Input terminals for the insulation resistance measurement, see recommended connections of the device. If the monitoring of IT power supply system with operational voltage higher than 275 V AC (without brought-out neutral conductor) is required, it is necessary to create an artificial centre using TL* inductors. This way created neutral is connected to the **CENTRE** terminal. The value of external inductor direct resistance is set within the Parameter setting menu.

Terminals of the signalling relay FAULT1 230 V AC/1A

Terminals of the signalling relay FAULT2 230 V AC/1A

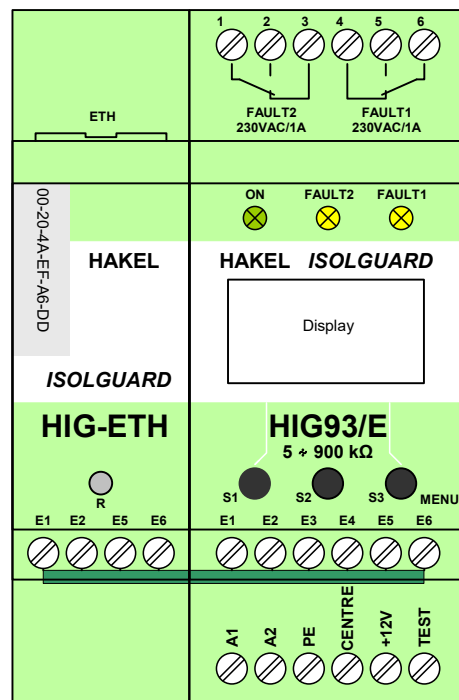
Potential-free switching contacts **FAULT1** and **FAULT** relay for signalling the status of the monitored IT power supply system. **FAULT1** and **FAULT2** relay status when insulation status fault occurs is determined by the setting of **Relay FA logic** parameter, (menu **Set Relay FA**). One of two values **N/C** and **N/O** can be assigned to each of the two relays using this parameter, separately for each relay.

The signalling is performed as follows when parameter **Relay FA logic** is set to **N/C** value:

Relay **is released**, when the device is connected to the power supply, is functional (the indicator lamp **ON** glimmers slightly) and insulation status **fault is not indicated**. The insulation resistance of the monitored system is therefore higher than the set critical value R_{crit1} for **FAULT1** relay or R_{crit2} for **FAULT2** relay.

The signalling is performed as follows when parameter **Relay FA logic** is set to **N/O** value:

Relay **is released**, when the device is connected to the power supply, is functional (the indicator lamp **ON** glimmers slightly) and insulation status **fault is indicated**. The insulation resistance of the monitored system is therefore lower than the set critical value R_{crit1} for **FAULT1** relay or R_{crit2} for **FAULT2** relay.



Picture 1: Terminals designation

When R_{isol} is displayed, the insulation status is indicated by the symbol of contact. In case of the insulation status fault, the close contact is displayed.

The status of **FAULT1** and **FAULT2** relays in individual device statuses for both **N/C** and **N/O** values of the parameter **Relay FA logic** can be expressed by the table:

IMD power status	IMD status	Parametr <i>Relay FA logic</i> = N/C	Parametr <i>Relay FA logic</i> = N/O
Off	no power supply	relay is not released	relay is not released
After turning on IMD power	IMD initialization 1)	relay is not released	relay is not released
On	$R_{isol} > R_{crit}$	relay is released	relay is not released
On	$R_{isol} < R_{crit}$	relay is not released	relay is released
On	Internal fault	relay is not released	relay is not released
No power supply	power loss	relay is not released	relay is not released

Table 4: Meaning of the parameter for the **FAULT1** and **FAULT2** relay

Note:

1) The initialization status lasts until the first complete insulation status measurement is performed

Terminal TEST

Terminal for connection with the remote test push-button. Remote test push-button is connected between **TEST** and **+12V** terminals.

Terminal +12V

Terminal for connection with the remote monitoring push-button. See recommended connections of the device.

Terminals E1, E2, E3, E4, E5, E6

These terminals are intended for connection modules HIG9x/E and communication module HIG-ETH. A rail, which is part of the product, serves for the connection. It is not allowed to connect other equipment to these terminals. Modules HIG9x/E and HIG-ETH must be sort as shown on the picture for the correct connection. Module HIG-ETH must be always on the left side and module HIG9x/E on the right side.

Modules cannot be connected in an opposite arrangement.

Connector ETH

Interface of the computer network ETHERNET is connected to this connector. It is standard RJ45 connector for 10/100 Ethernet. Connection is done by direct straight through cable with switch (or HUB) or by crossover cable with computer.

Push-button R

There is a push-button for setting the HIG-ETH communication module to the default (factory) values under the hole in the HIG-ETH module cover. Setup procedure, parameters values and following module behaviour is indicated in a HIG-ETH module communication description.

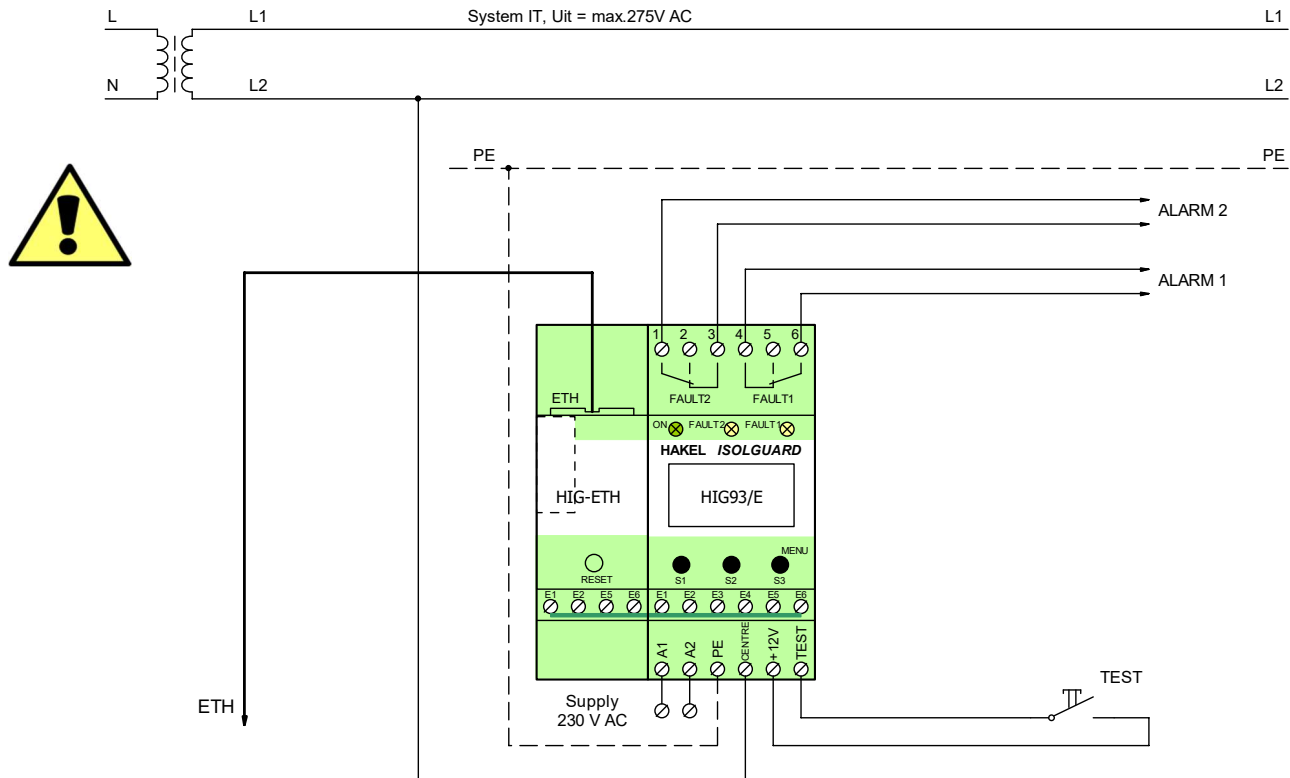
Notes:

- 1) Terminals **+12** and **TEST** are intended only for test push-button connection. These terminals cannot be used for any other equipment connection.
- 2) Terminals **E1** to **E6** are intended only for device modules connection. These terminals cannot be used for any other equipment connection.



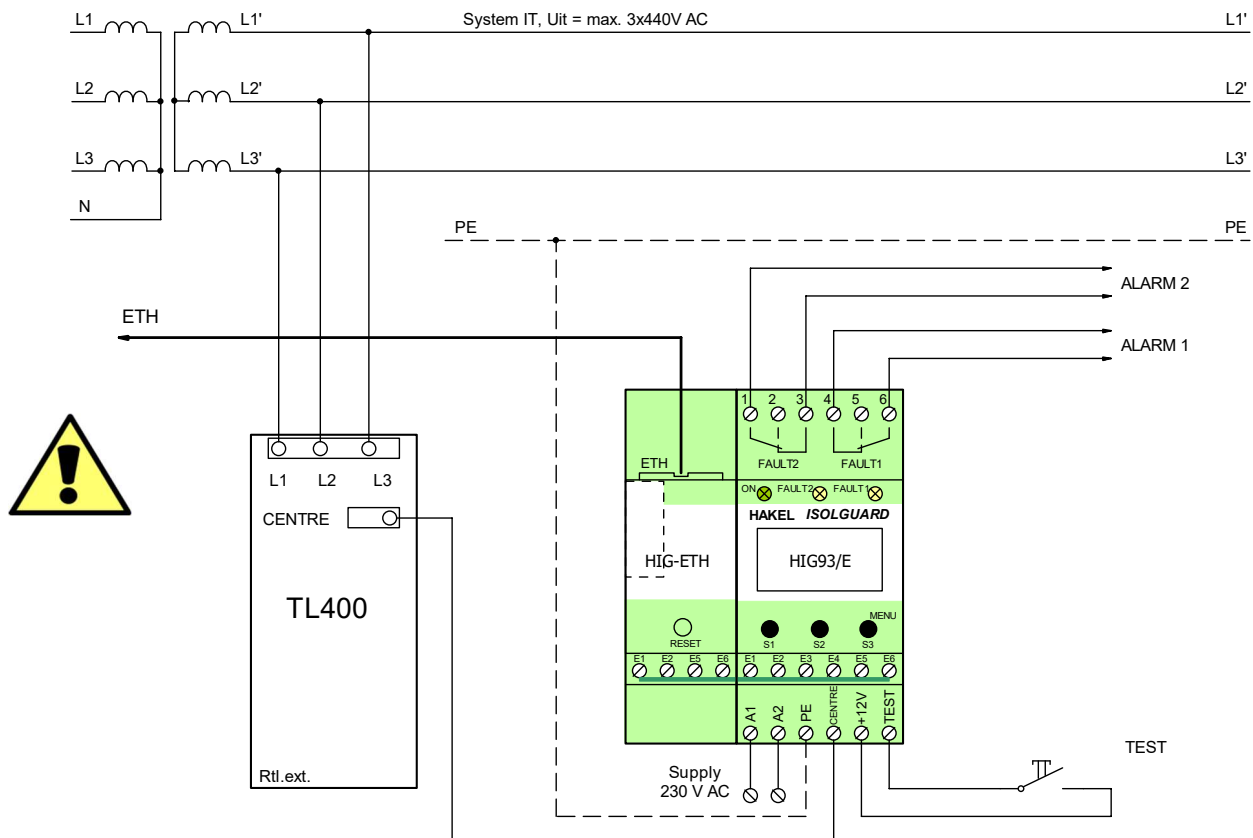
4. Recommended connection of HIG93/E, HIG94/E to the monitored IT power supply system

Single-phase IT power supply system (maximum 275 V AC), HIG93/E, HIG94/E modules with alarm signalling and with the remote test push-button



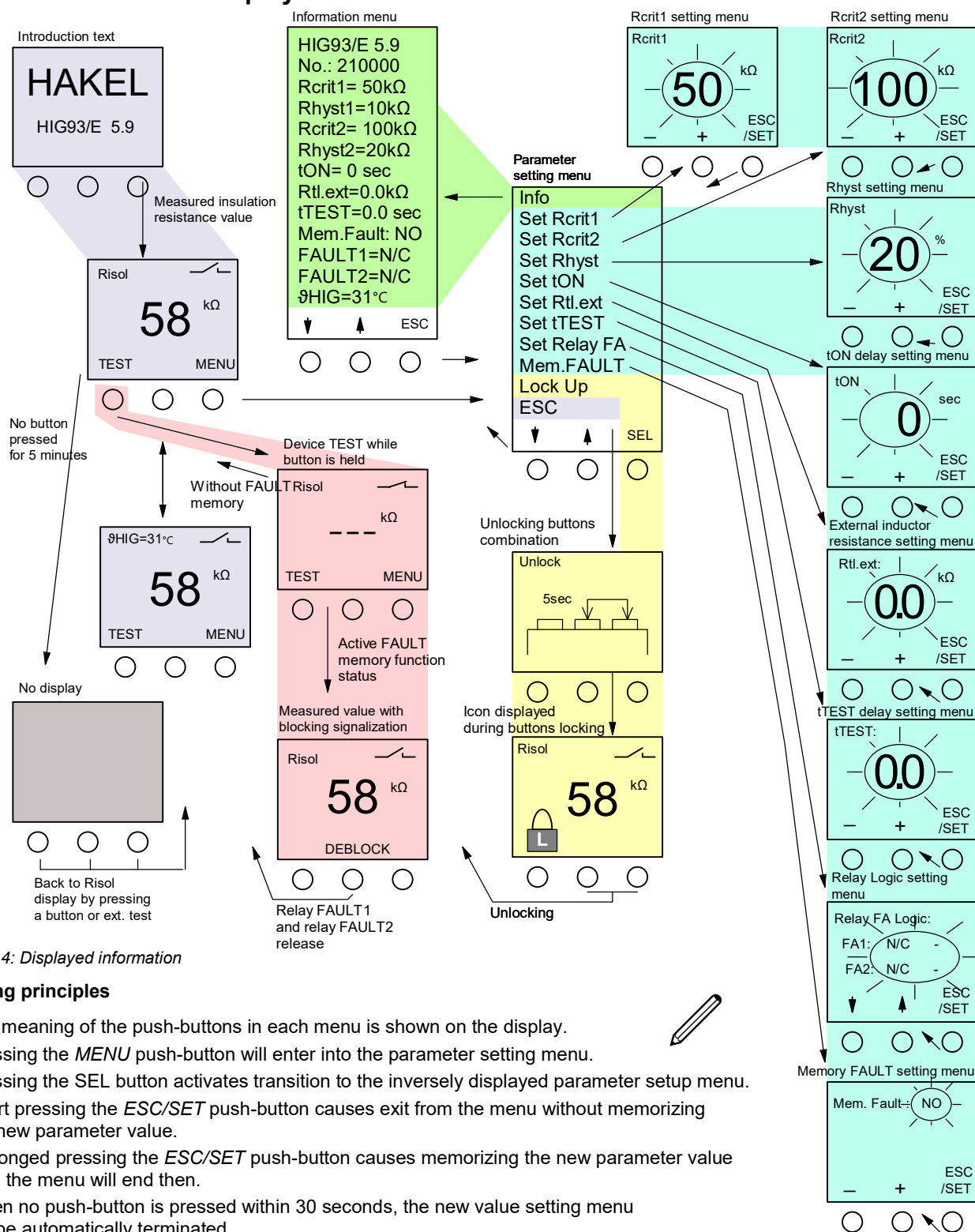
Picture 2: Connection of HIG93/94 device in the 1-phase IT power supply system

Three-phase IT power supply system (3 x 440 VAC), modules HIG93/E, HIG94/E with alarm signalling and with the remote test push-button



Picture 3: Connection of HIG93/94 device in the 3-phase IT power supply

5. Information on the display



Picture 4: Displayed information

Operating principles

- The meaning of the push-buttons in each menu is shown on the display.
- Pressing the **MENU** push-button will enter into the parameter setting menu.
- Pressing the **SEL** button activates transition to the inversely displayed parameter setup menu.
- Short pressing the **ESC/SET** push-button causes exit from the menu without memorizing the new parameter value.
- Prolonged pressing the **ESC/SET** push-button causes memorizing the new parameter value and the menu will end then.
- When no push-button is pressed within 30 seconds, the new value setting menu will be automatically terminated.
- When no push-button is pressed within 5 minutes, display goes OFF.
- The device is operational even if there is nothing shown on the display (display is not active).
- The display will be recovered by pressing any of the push-buttons below the display.
- The display is also restored by pressing the remote test push-button if tTEST period is set to a value greater than zero.
- After selecting the menu Lock Up the control push-buttons are locked and the measured value is displayed.
- The unlocking of the device's control push-buttons is realized while holding the middle and right button for 5 seconds.
- Releasing of the FAULT relay while fault's memory is set is realized by the middle device push-button or by the web site's menu.
- FAULT1 or FAULT2 relay status change, eventually initiation and termination the device test is indicated by a short display flash.

5.1 Displayed information HIG93/E, HIG94/E

Introductory text

It is displayed for a short time after switching ON the module. The name of the module and software version is displayed. After the insulation status measuring is started, the measured value of insulation resistance is displayed automatically.

Measured value of insulation resistance

It is displayed in a range as specified in the table of technical characteristics in units of kΩ or MΩ. The value is rounded to units of kΩ within the adjustable critical insulation resistance range and to tens of kΩ if lying beyond that range.

Pressing **TEST** push-button activates test of the HIG module, pressing **MENU** push-button displays parameter setting menu. By pressing the middle push-button current temperature inside the module is indicated in the upper part of the display. The signalling relay's status is indicated by the symbol of contact. If both relays are released (there is no fault in the monitored power supply system) the open contact is displayed. If there is **R_{crit1}** or **R_{crit2}** fault signalled, the close contact is displayed.

If the time value **tON** is set to a value greater than zero (time until the error signal), the time measurement **tON** starts when **Risol** falls below the value **Rcrit**. The display shows the time until fault signalling. After the time is expired, the fault will be signalled.

Test of the insulation monitoring device

Test may be performed by pressing **TEST** push-button on the HIG module, by remote **TEST** push-button or by inbuilt web server **ISOLGUARD MONITOR** through Ethernet interface.

Testing of the insulation monitoring device is performed for at least 5 seconds or during the time of holding the button. The insulation resistance value is set lower than **R_{crit1}** and **R_{crit2}** value. The fault is signalled by indicator lamp **FAULT1**, **FAULT2** and by **FAULT1** and **FAULT2** signalling relays' status according to **Relay FA logic** parameter. The insulation resistance value is not shown on the display while testing.

The test starts running immediately when using the test push-button on the module.

When using the remote test push-button, the test starts after **tTEST** parameter delay. When the **tTEST** value is set greater than zero the display is recovered immediately after pressing the remote test push-button and test is performed after **tTEST** parameter delay.

Remote test via the Ethernet interface is performed immediately after pressing the **TEST** button in the ISOLGUARD monitor and takes 5 seconds.

If the **FAULT** memory is set (**Mem.FAULT** menu), the signalling relay remains in a status of alarm indication even after the test is over, until it is released by the operator pressing the button on the module. In the case of remote test via Ethernet interface the alarm signalization is terminated also by pressing the button in the ISOLGUARD monitor.

FAULT memory

This parameter is set in the menu as **Mem.FAULT**.

If this parameter is set to **YES**, the **FAULT1**, **FAULT2** relay stays in the fault signalling status even after insulation resistance fault termination and the word **DEBLOCK** appears on the display. It is possible to release the relay by pushing device's middle button **S2**. This button can be also used when locked device is indicated by the padlock symbol on the display.

The usage of the **FAULT** memory including its fault signalling status after termination is defined by the user.

Parameter setup menu

The following menus can be selected by scrolling up and down by means of the buttons

- set parameters display of the device, menu **Info**
- monitored critical resistance, menu **Set R_{crit1}**, **Set R_{crit2}**
- insulation resistance hysteresis, menu **Set R_{hyst}**
- delay in response of signalling the insulation status fault, menu **Set t_{on}**
- external inductor resistance, menu **Set R_{ll.ext}**
- delay in module test start by remote test push-button, menu **tTEST**
- **FAULT1** and **FAULT2** relay status when insulation status fault, menu **Set Relay FA**
- **FAULT** memory parameter, menu **Mem.FAULT**
- device's control buttons can be locked

For initiating all menus, use the push-button **SEL**, for exit select the menu **ESC**.

Information menu

Displays the version of the HIG93/E, HIG94/E control program and set operating parameters of the device. The serial number of the device is also displayed. For exit select the menu **ESC**.

Menu set R_{crit1}, R_{crit2}

New value of the critical insulation resistance is set in kΩ by pressing or holding the + or - buttons. The value can be set in the range of 5 kΩ to 300 kΩ for HIG93/E or in the range of 200 kΩ to 900 kΩ for HIG94/E. New value is saved by long holding the **ESC/SET**, pressing this button shortly ends setting procedure and **R_{crit}** value remains unchanged. Both **R_{crit1}** and **R_{crit2}** parameter can be set independently across the entire value range.

Menu set R_{hyst}

In order to set new value for hysteresis of critical insulation resistance in %, press or hold the + or - push-buttons. The setting range of this value is 0 to 100 % **R_{crit}**. New value is saved by long holding the **ESC/SET**, pressing this button shortly ends

setting procedure and the R_{hyst} value will remain unchanged. The hysteresis level in % applies to both of the critical insulation resistance levels R_{crit1} and R_{crit2} .

Menu set t_{ON} time

New value of the delay in response of signalling the insulation status fault is set in seconds by pressing or holding the + or – buttons. The value can be set in the range of 0 to 60 sec. New value is saved by long holding the **ESC/SET**, pressing this button shortly ends setting procedure and t_{ON} value remains unchanged. The set t_{ON} value applies to both of the critical insulation resistance levels R_{crit1} and R_{crit2} .

Menu set $R_{tl,ext}$

External inductor connected in front of the HIG93/E, HIG94/E is necessary when monitoring higher operational voltages, see recommended connection diagrams. Value of $R_{tl,ext}$ direct resistance of the connected inductor winding is set in this menu. This value must be set zero in case of application without the external inductor.

New value of the $R_{tl,ext}$ resistance is set in k Ω to one decimal place by pressing or holding the + or - buttons. The value can be set in the range of 0 to 20,0 k Ω with 0,1 k Ω step. New value is saved by long holding the **ESC/SET**, pressing this button shortly ends setting procedure and $R_{tl,ext}$ value remains unchanged.

The value of $R_{tl,ext}$ inductor's direct resistance winding is indicated on the inductor's label as R_{in} . Typical values for three-phase HAKEL inductors are as follows: TL400 4,5 k Ω , TL500 4,5 k Ω , TL600 4,5 k Ω , TL1600 12,5 k Ω , TL6003 19,6 k Ω . Exact values may be obtained by measuring the inductor's resistance winding with interconnected L outlets at the operational temperature.

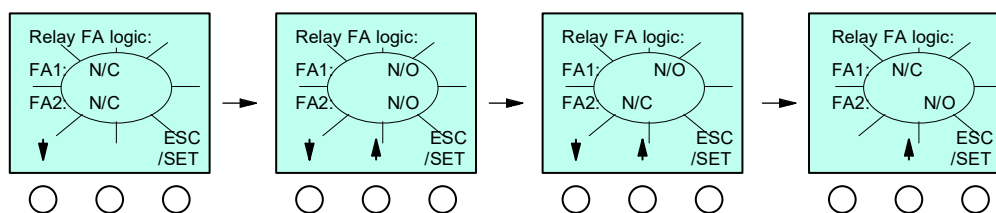
Menu set t_{TEST} time

New value of the device test delay after pressing the remote test push-button is set in seconds by pressing or holding the + or – buttons. The value can be set in the range of 0 to 6 seconds with 0,1 second step. New value is saved by long holding the **ESC/SET**, pressing this button shortly ends setting procedure and t_{TEST} value remains unchanged.

When set t_{TEST} value is greater than 0 the display is reactivated immediately after pressing the remote test button.

Menu Set Relay FA

FAULT1 and FAULT2 relay status when insulation status fault occurs is determined by **Relay FA logic** parameter setting. One of two values **N/C** and **N/O** can be assigned to each of the two relays using this parameter, separately for each relay.



Picture 5: Relay FA logic parameter settings menu

The signalling is performed as follows when parameter **Relay FA logic** is set to **N/C** value:

Relay **is released**, when the device is connected to the power supply, is functional (the indicator lamp **ON** glimmers slightly) and insulation status **fault is not indicated**. The insulation resistance of the monitored system is therefore higher than the set critical value R_{crit1} for FAULT1 relay or R_{crit2} for FAULT2 relay.

The signalling is performed as follows when parameter **Relay FA logic** is set to **N/O** value:

Relay **is released**, when the device is connected to the power supply, is functional (the indicator lamp **ON** glimmers slightly) and insulation status **fault is indicated**. The insulation resistance of the monitored system is therefore lower than the set critical value R_{crit1} for FAULT1 relay or R_{crit2} for FAULT2 relay.

When R_{isol} is displayed, the insulation status is indicated by the symbol of contact. In case of the insulation status fault, the close contact is always displayed regardless of the **Relay FA logic** parameter setting.

Menu Mem.FAULT

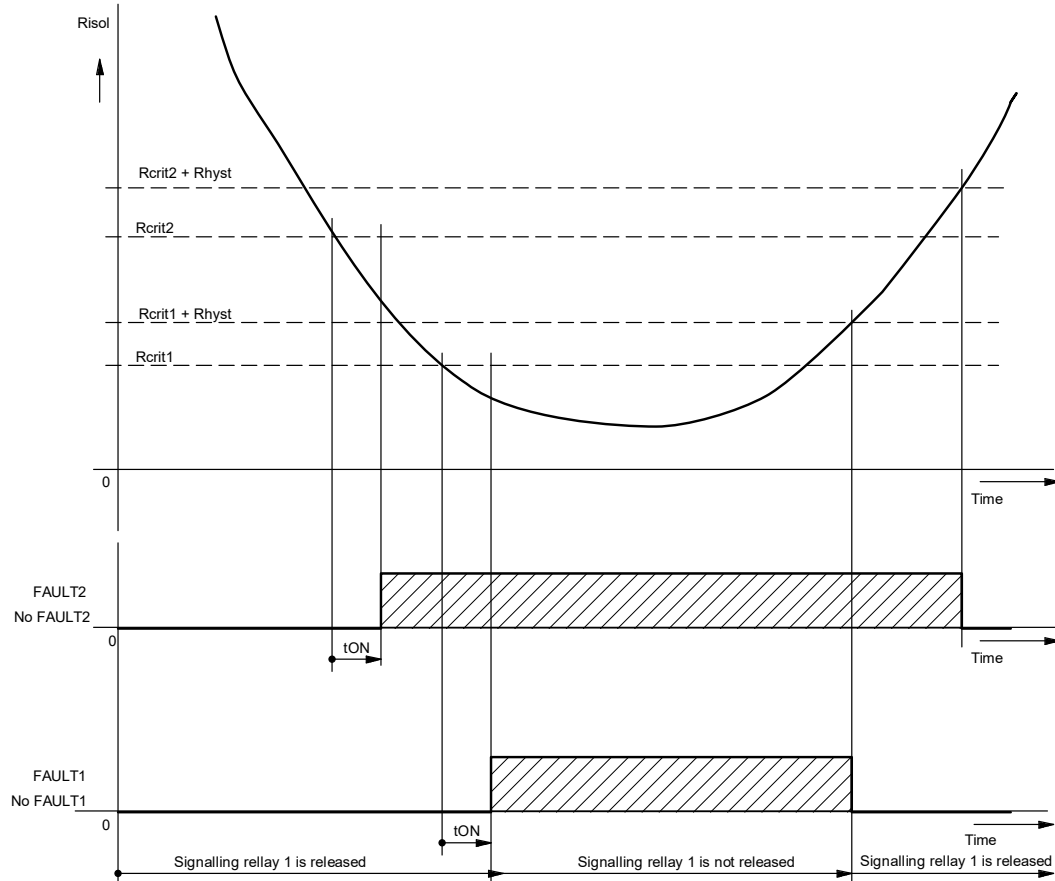
Menu for setting the FAULT memory. This parameter can be set to **YES**, when the relay continues signalling even after the fault has been eliminated and the button on the module must be pressed to release the relay. Parameter can be set to **NO** without fault memorizing.

Menu Lock Up

Menu is intended for locking the device's control buttons. After selecting this menu, button combination for unlocking the module is displayed. When setting is finished measured R_{isol} value and lock symbol are displayed. The module is unlocked while holding the middle and right button for 5 sec.

6. Insulation resistance fault evaluation

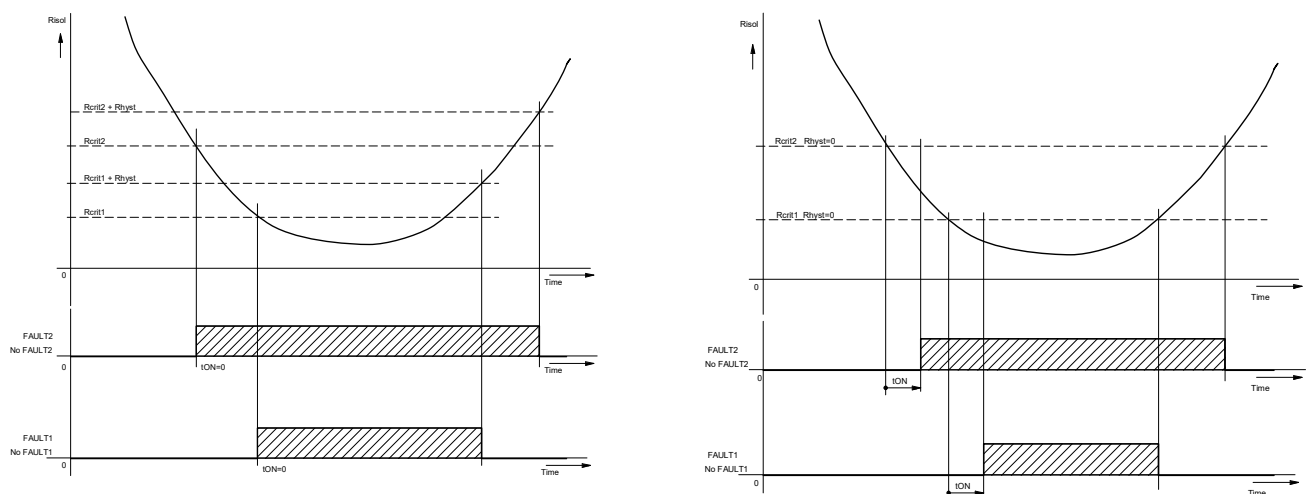
Evaluation of the *FAULT1*, *FAULT2* according to set t_{ON} and R_{hyst} parameter values is shown in the following figure.



Picture 6: Insulation resistance fault evaluation

In this example, the set non-zero value for t_{ON} and hysteresis R_{hyst} without setting the FAULT memory parameter is shown. **Relay FA logic** parameter is set to *N/C* value for both relays. When the insulation resistance value of the monitored power supply system decreases below R_{crit1} or R_{crit2} , the countdown of the time t_{ON} starts. The remaining time is displayed. Once the time t_{ON} is expired, the fault is signaled and the *FAULT1*, *FAULT2* indicator lamps on the device light up. Particular signalling relay release is cancelled and its contacts are set to the rest position. The *FAULT1* and *FAULT2* is only terminated when the insulation resistance increases above the value $R_{crit1} + R_{hyst}$ or $R_{crit2} + R_{hyst}$. Signalling relay is released and *FAULT1*, *FAULT* signalling is terminated.

The following left figure shows fault evaluation when insulation monitoring device is set with zero t_{ON} value. The following right figure shows example for setting the insulation monitoring device with the zero R_{hyst} hysteresis value.



Picture 7: Insulation status fault evaluation with time t_{ON} or hysteresis zero value

7. ETHERNET interface

Insulation monitoring devices HIG93/E, HIG94/E

Except already listed control by display and push-buttons, monitoring of device status and its administration can be also done by Ethernet and computer network connection. This connection provides HIG-ETH module that is part of devices with label HIG9x/E.

Web server **ISOLGUARD monitor**, that enables monitoring and setting all the HIG9x/E parameters, is inbuilt in the module HIG-ETH.

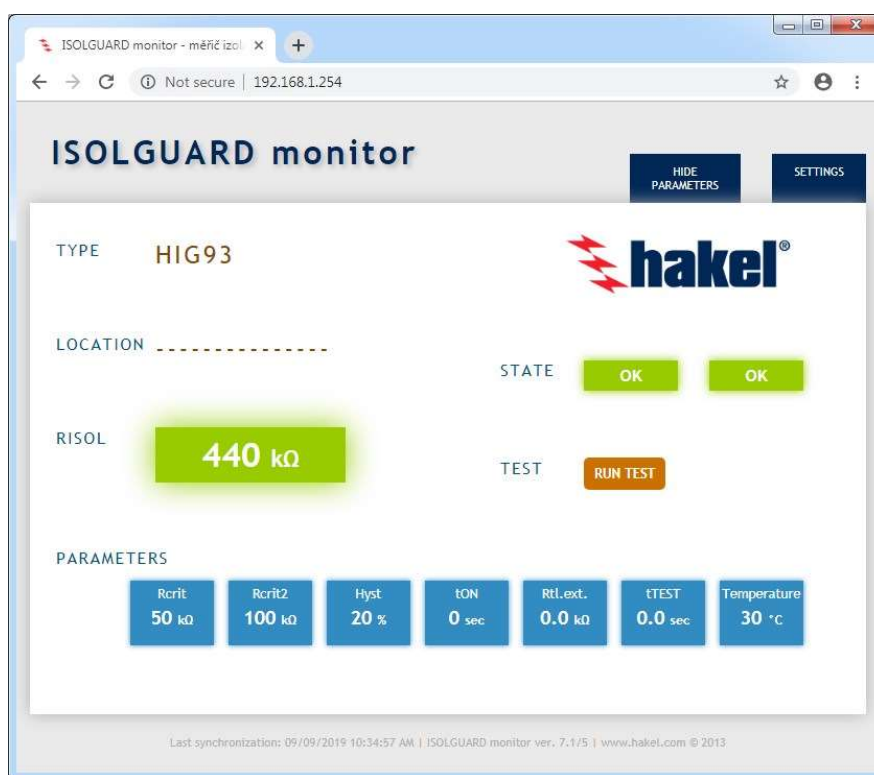
It is necessary to adjust HIG9x/E module before its installation and usage, especially assign new IP address. This address must be unique in a local network and it is usually assigned by administrator.

The address must be in a full range of subnet addresses in which will be the HIG9x/E connected. It is assumed that this adjustment will be done by personnel who is familiar with network issues, both in terms of topology and experience with network configuration on the computer, and that he will be able to diagnose common faults. It is usual to entrust this adjustment to IT technician who is in charge of managing the network.

Required setting description is listed in chapter “*First HIG9x/E connection*”, see page 23.

Direct and the simplest way to manage the device is access through internal web site using a browser.

Web interface is accessible on the IP address that is set in the HIG-ETH module. Connect the device into your local network and type the device IP address to the browser on the used computer. Each HIG9x/E device default IP address is preset to 192.168.1.254.



Picture 8: Web interface

Web interface is available in Czech, English and Russian language. Language setting is done in menu “*SETTINGS*”.

Access to the **ISOLGUARD monitor** is divided into two levels. Each level has own user name and password. It is only possible to monitor actual values and device status without filling in the user name and password. It is not possible to change parameters or test the device.

- Information about device status is displayed right after connection. Actual set values of all parameters are displayed in the menu “*Show parameters*”. It is necessary to fill in user name and password for parameters change or remote device test.
- Level “*user*” allows selected device parameters setting and possibly perform remote device test. The “*user*” specifically can:
 - set selected device parameters. User “*admin*” specifies parameters selection that can be set.
 - perform remote device test if the test button is displayed
 - fill in text that is displayed in “*Location*” on the homepage
 - select language used in monitor
 - change own “*user*” password

“*User*” possibilities description is listed in chapter “*User menu*”, see page 14.

- Level “admin” allows setting of all device parameters. Than allows network connection parameters setting and also setting appearance and options of web page for the “user”.

The “admin” specifically can:

- set all the device parameters directly
- choose device parameters that can be set by the „user“
- select data to be displayed on the homepage
- select or cancel device's remote test button display on the homepage
- configure device's network parameters for ETHERNET interface connection
- set an e-mail sending when monitored insulation resistance fault occurs or terminates
- choose and set other communication protocol

“Admin” possibilities description is listed in chapter “Admin menu”, see page 18.

Quick help to each menu item is available in the menu “SETTINGS” for both “user” and “admin” accesses. It displays when roll the cursor over relevant input field.

Notice:

Remote access via Ethernet interface at “admin” level allows all the device parameters change. Therefore, we recommend change, keep a not publish administrator's password after the installation.

It is also necessary to use carefully access at “user” level and its options settings. Always secure with nontrivial password and take into account the requirements of “user” activities.

Communication through network can be also done by another of several implemented protocols from the TCP/IP line. This allows the user to select the appropriate protocol for the application. Measured insulation resistance value and parameters values are available in physical quantities, so no complicated conversions are necessary.

Connection allows also communication by SNMP protocol through MODBUS TCP. It is also possible send an e-mail when exceeding the set limit. Risol value from the device can be easily insert into own websites (HTTP GET). It is also possible to read measuring result and device statuses from XML file. Complete communication options are listed in separate document about communication protocols of HIG9x/E devices.

8. ISOLGUARD monitor










Fill preset IP address into web browser (Internet Explorer, Mozilla Firefox, Google Chrome). The address for HIG9x/E devices in default setting (without IP address change) is <http://192.168.1.254>. Main menu of internal website opens. Select menu “Show parameters”.



Picture 9: ISOLGUARD monitor


Actual measured insulation resistance values, device status and set parameters can be displayed on the main website. Remote test button is available. Each device's specific display can differ according to display on the homepage define by the user with authority “admin”. All the available information is displayed on the shown picture

8.1 ISOLGUARD monitor displayed information

TYPE	HIG93 device type is displayed, text is determined by the unit type and cannot be changed.
LOCATION	text entered by the user for monitored network description or device location is displayed, implicit text are dashes. It is possible to change the text in menu  .
STATE	device status display. Text  in green field, if no FAULT, FAULT2 is signalled. Or text  in yellow field, if FAULT, FAULT2 is signalled.
RISOL	measured insulation resistance value is displayed. Value is displayed in green field  , if no FAULT is signalled, or in yellow field  when FAULT occurs.
TEST	HIG9x/E device remote test can start by pressing button  . Device goes to the test state with a legend  . When the test finished, test result  and menu  is displayed. Device test process is the same as test done by the push-button on the device. Signalling relay is switched to position fault and back.

PARAMETERS set parameters values and actual temperature inside the device are displayed here.

						
50 kΩ	100 kΩ	20 %	0 sec	0,0 kΩ	0,0 sec	29 °C


It is possible to hide or show parameters again using menu .

8.2 Parameters

Device parameters meaning is explain in this manual in description of the device control, see page 10.

Rcrit	critical insulation resistance value in kΩ. Value can be set in a range 5 kΩ to 300 kΩ for HIG93/E or in a range 200 kΩ to 900 kΩ for HIG94/E.
Hyst	critical insulation resistance hysteresis in %. Value can be set in a range 0 to 100 % Rcrit .
tON	delay in response of signalling FAULT in seconds. Value can be set in a range 0 to 60 sec.
Rtl.ext.	external inductor's direct resistance connected in front of the device HIG93/E, HIG94/E. Value can be set in a range 0 to 20 kΩ with a 0,1 kΩ step. See recommended connections of the device.
tTEST	delay in device test start by remote test button. Value can be set in a range 0 to 6 seconds with a 0,1 sec step.
Temperature	actual temperature value inside the module.

8.3 Parameters setting

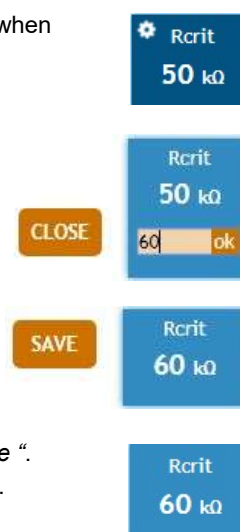
Parameters that can be set, are displayed with a sign  in upper left corner when rolling over the cursor. Parameters without this sign cannot be changed. Their change was not allowed by the administrator.

Value can be filling in after parameter selection.

Requested value is saved by „OK“ (Enter). Using menu „Close“ ends setting procedure without memorizing the value.

Menu „Save“ is displayed when changing the parameter value (one at least). Confirmation is necessary for the set parameters to be permanently saved into the HIG9x/E module.

Parameters values are saved only temporarily if user does not use menu „Save “. Original parameters values will be set again by next device's switch on and off.



8.4 Device remote test

Device test is done by selecting a test menu.

Information about test process is displayed while running test.

Information about the test result is displayed when the test is finished.

Test ends using the menu “Acknowledge”.



8.5 Ethernet interface factory setting

Inbuilt ISOLGUARD monitor's web server setting to factory (default) values is realized as follows:

- Switch off device.
- Push inner button, that is available on the HIG-ETH module under the hole labelled „R“ and hold. Button location is visible in the picture on page 6.
- Switch on device with pushed button and hold 15 seconds.
- Release button „R“.

When factory setting is done IP address is set to 192.168.1.254 value, access passwords for “user” and “admin” are reset back to original values, see table on page 27 . This push-button sets only connection parameters to the Ethernet network. This push-button does not change own device parameters (Rcrit, etc.).

8.6 Menu „Settings“ for „user“

Access to the **ISOLGUARD monitor** is divided into two levels. Each level has own user name and password. First level is „user“. This user can do remote operation and HIG9x/E device setting but cannot do communication setting via Ethernet.

Level “user” allows

- set selected device parameters. User “admin” specifies parameters selection that can be set.
- perform remote device test if the test button is displayed
- fill in text that is displayed in “Location” on the homepage
- select language used in monitor
- change own “user” password

For access to the setting use menu **SETTINGS** top right on the main website of the ISOLGUARD monitor.

Fill in username “user” and valid password to the displayed window.

Note:

Window form that serves to fill in user's name and password depends on the used browser and may differ from the picture above.

Default setting leaves the password empty.

Default language of the web site Czech. English and Russian are other supported languages. Language can be changed in panel “Other”, parameter “Language”. Help for all the setting items is automatically displayed after rolling cursor over the particular field.

Menu “Settings” for “user” is organized into 3 panels.

8.7 “User” setting panels

Security access panel

New “user” password value is set here. Password can have maximum 8 characters. Letters, numbers, dot, dash and underscore are allowed. Only characters without diacritics can be used. It is necessary to confirm selected password by re-entering. Fault is signalled and password is not changed if there is a difference.

The screenshot shows the 'ISOLGUARD HIG - ISOLGUARD monitor - Settings' page with the 'Security' tab selected. Under 'Security settings', there are two input fields: 'User password' and 'Confirm user password'.

Panel for further settings

The screenshot shows the 'ISOLGUARD HIG - ISOLGUARD monitor - Settings' page with the 'Other' tab selected. Under 'Other settings', there are two input fields: 'Name of the device' (with a dotted line placeholder) and 'Language' (with a dropdown menu showing 'English').

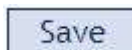
Name of the device

Fill in naming string of the device. Typed text is displayed on the homepage, parameter “Location”. Text shown in the picture is displayed for factory setting. It is valid for all device types. Naming string can have maximum 15 characters. Letters „a” to „z”, „A” to „Z”, numbers, dash and underscore are allowed. Only characters without diacritics can be used.

Language

Select the language you want this site to communicate with. Language Czech, English or Russian is possibility.

It is necessary to save set parameters by button



8.8 Device information panel

Information about the device are displayed here, MAC address, firmware version and other useful links.

The screenshot shows the 'ISOLGUARD HIG - ISOLGUARD monitor - Settings' page with the 'Info' tab selected. It displays 'Information about the device' with fields for MAC address (00-80-A3-A8-F1-00), Firmware version (7.1/5), Core (HIG93;v5.4 160530;F97), and Engine (win/webkit v.525). Below this is 'Supplier of the device' with fields for Name (HAKEL spol. s r.o.) and Web site (www.hakel.com). At the bottom are 'Links' for XML file containing current configuration (settings.xml) and XML file containing current measured-out values (fresh.xml).

Information about SW installed versions are listed in information menu.

“Firmware version” SW web server installed version v XPort circuit

“Core” module’s HIG9x/E SW version

meaning: device type, program version, program-built date, SPINEL protocol type

“Xml” files links load particular data from connected device.

8.9 Menu “Settings” for “admin”

Access to the **ISOLGUARD monitor** is divided into two levels. Each level has own user name and password. Second and the highest level is “**admin**”. This user can do full setting of HIG9x/E device. Level “admin” allows parameters setting of network connection to Ethernet interface and also setting appearance and options of web page for the “user”.

Level “**admin**” allows

- set all the device parameters directly
- choose device parameters that can be set by the „user“
- select data to be displayed on the homepage
- select or cancel device’s remote test button display on the homepage
- perform device remote test
- configure device’s network parameters for ETHERNET interface connection
- set an e-mail sending when monitored insulation resistance fault occurs or terminates
- choose and set other communication protocol
- filling in text that is displayed in “*Location*” on the homepage
- select language used in monitor
- change password for “user” and “admin”

For access to the setting use menu **SETTINGS** top right on the main website of the ISOLGUARD monitor.

Fill in username “**admin**” and valid password to the displayed window.

Password for default setting is text “1234”.

Note:

Window form that serves to fill in user’s name and password depends on the used browser and may differ from the picture here.

Menu “Settings” for “admin” user is organized into 9 panels.

Default language of the web site Czech. English and Russian are other supported languages. Language can be changed in panel “*Other*”, parameter “*Language*”. Help for all the setting items is automatically displayed after rolling cursor over the particular field.

8.10 “Admin” settings panels

Communication network setting panel

Network parameters as IP address etc. are set in this part. Changes in this settings part required device’s restart.

Device IP address

Device’s network address. Fill in the address in a numeric shape divided by dots. Default IP address is 192.168.1.254.

Netmask

Netmask, where the device is connected, is set here (IP address range used within the network segment).

IP gate address

Computer’s or router’s IP address that mediates to the device connection with other networks (master). If is the device in separate network or does not have access to external networks, fill in the address 0.0.0.0.

DNS server IP address

Fill in DNS server address.

Web interface port

Default port value where web sites are available can be changed here. This option is useful in a case that the device is behind firewall or router, which's port 80 is blocked (standard web port). In such a situation find out which port is free and type it in this setting. You will enter the website from the internet browser using the address in a form *http://[IP-adresa]:[port]*. For example, *http://192.168.1.254:8080* port 8080. Leave 80 value for ordinary setting.

Other communication protocol

Select one of the listed communication protocols that should the device also communicate by. Possible types are "none / SMTP / HTTP GET / MODBUS TCP".

Port for MODBUS TCP

Fill in port number, on which the device will communicate by MODBUS TCP protocol.

Device's reset

This button allows you to reset the device, clear memory, clear passwords and do device's reset. IP address will not be changed. Web port will be set on the value 80.

It is necessary to save set parameters by button .

8.11 Security access panel

New "user" and "admin" password value is set here. Passwords can have maximum 8 characters. Letters, numbers, dot, dash and underscore are allowed. Only characters without diacritics can be used. It is necessary to confirm selected password by re-entering. Fault is signalled and password is not changed if there is a difference.



The screenshot shows the 'Security settings' panel. At the top, there is a navigation bar with tabs: Network, Security (selected), E-mail, SNMP, Http GET, Display, Parameters, Other, and Info. Below the tabs, the title 'Security settings' is displayed. The panel contains four input fields: 'User password', 'Confirm user password', 'Administrator's password' (masked with dots), and 'Administrator's password for confirmation'.

8.12 E-mail setting panel

E-mail account that the device uses is set in here. Also e-mail address where to send e-mails about FAULT origin/cancelation is set. It is necessary to set in a tab "Network" item "Other communication protocol" to SMTP value for e-mails sending. It is necessary to save set parameters by button "Save".



The screenshot shows the 'E-mail settings' panel. At the top, there is a navigation bar with tabs: Network, Security, E-mail (selected), SNMP, Http GET, Display, Parameters, Other, and Info. Below the tabs, the title 'E-mail settings' is displayed. A red message states: 'E-mail sending function is inactive. (Sets in Network tab.)'. The panel contains several input fields: 'SMTP server's name' (with '0.0.0.0' entered), 'Sender's e-mail address', 'Recipient's e-mail address', and a section for 'SMTP authorization' which includes a checkbox for 'SMTP server requires verification', 'Verification name', 'Verification password', and 'Re-enter the password'.

SMTP server's name

Fill in domain name or SMTP servr IP address. Name can have maximum 30 characters.

Sender's e-mail address

Fill in e-mail an address from which information e-mails will be sent. It can be any fictional address. According to spam filters we do recommend that as a sender's name will be used name of some existing server. Maximum 30 characters can be used. Expected form *name@server.com*.

Recipient's e-mail address

Fill in an e-mail address where to send the e-mail. Maximum 30 characters can be used. Expected form *name@server.com*.

SMTP server requires verification

Check, if SMTP server requires sender's identity verification. Fill in also next three boxes.

Verification name

Fill in verification names for SMTP server login. Menu serves only for typing the value. No data is displayed after saving due to security reasons.

Verification password**Re-enter the password**

Fill in a password for SMTP server login. Maximum 30 characters can be used. Menu serves only for typing the value. No data is displayed after saving due to security reasons. Re-enter the password for verification.

Test

Web server use actual saved setting and try to send test e-mail after pressing the button.

8.13 SNMP protocol setting panel

Parameters for communication via SNMP protocol are set here.

SNMP settings	
SNMP manager's IP address	0.0.0.0
Read community name	public
Write community name	private
Periodical sending of measured-out values	0

SNMP manager's IP address

IP address of a server, that collects SNMP messages into the device.

Read community name

Fill in SNMP community name for reading. Maximum is 16 characters.

Write community name

Fill in SNMP community name for writing. Maximum is 16 characters.

Periodical sending measured-out values

In seconds fill in an interval about how often trap with actual states should be sent. Number 0 to 3600 is expected. Set 0 value to switch off this function.

8.14 HTTP GET setting panel

Parameters for automatic measured values sending to the server as HTTP GET type request can be set here. It is essential to set “*Second communication protocol*” item to HTTP GET value in the tab “*Network*” for sending via HTTP GET protocol. It is necessary to save set values by button “*Save*”.

Web server's address

Fill in web server's address that should receive measured value. URL address in a *www.server.com* (maximum 30 characters) format or IP address in dot format is expected. Leave the field empty if you will not use HTTP GET.

Web port

Server's web port number that should receive measured value.

Folder containing scripts

Fill in local track to a folder with scripts. For example, if complete script address is *http://www.server.czomscript/myscript.php* type only this: *script/*. Maximum is 30 characters.

Script name

Fill in script name on the server. For example, if complete script address is *http://www.server.com/script/myscript.php*, type only this: *myscript.php*.

Sending interval

Fill in sending period of HTTP GET with actual measured state. Type data in seconds. It is possible to enter values in a range 0 to 3600 seconds. Set 0 value to switch off Get sending.

If you send HTTP GET to a server in another network, your gateway IP address in “*Network*” tab has to be properly configured.

8.15 Displayed data setting panel

In this menu, administrator defines which information will be displayed on the homepage and which parameters will be “*user*” authorized to set.

Menu allows permitting remotely the entire device's parameters values setting via Ethernet interface also to the "user". We recommend using this option carefully, always secured with nontrivial password and with regards to work requirements of the "user".

Usually it is enough to access test button remotely via network Ethernet interface. If it is technologically permissible switching signalling relay FAULT to the "fault" position at any time.

Other parameter setting is done only when installing the device in regards to its connection and overall required attributes. These parameters values change via Ethernet interface is not expected and not recommended.

There must be special reasons to permit change of the monitored critical insulation resistance Rcrit by the "user" and this setting is fully in competence of the administrator.

"Admin" always has the option to change all the device's parameters. Therefore, we recommend changing, keeping and not publishing administrator's password after the installation.

Menu for setting selected parameters

In this menu administrator chooses parameters their values can be changed by "user".

Show location

This choice determines display of the typed monitored network's description text by the user or device location. Dashes are the implicit text. Text can be changed in menu *"Other"/"Name of the device"*. This text is displayed under the item *"Location"* on the homepage.

Show Rcrit status

This choice determines display of the information about device's Rcrit fault status. This data is displayed under the item *"STATE"* with the text *"OK"* or *"FAULT"* on the homepage.

Show Rcrit2status

This choice determines display of the information about device's HIG93 and HIG94 Rcrit2 fault status. This data is displayed as a second *"STATE"* item with the text *"OK"* or *"FAULT"* on the homepage.

Show Run test button

This choice determines TEST button display on the homepage. Button is only set if it is required and it is possible to run remote device's test at any time via Ethernet interface. FAULT signalling relay will be switched to "fault" position during the test as it is during the test by push-button on the device.

Show Rcrit, Rcrit2 parameter edit function

This choice allows setting the Rcrit, Rcrit2 monitored insulation resistance limit values in the menu *"Parameters"* on the homepage. Administrator must consider and permit Rcrit, Rcrit2 parameter value setting via Ethernet interface. Setting this value via Ethernet interface is not recommended.

Show Hysteresis parameter edit function

This choice allows setting monitored insulation resistance hysteresis value in the menu *"Parameters"* on the homepage. Administrator must permit Rcrit parameter value setting via Ethernet interface. Setting this value via Ethernet interface is not expected and not recommended.

Show tON parameter edit function

This choice allows setting tON delay value in menu *"Parameters"* on the homepage. tON parameter value is usually set locally and only during the installation. Setting this value via Ethernet interface is not expected and not recommended.

Show Rtl.ext. parameter edit function

This choice allows setting direct resistance value of external inductor connected in front of the device in menu *"Parameters"* on the homepage. Rtl.ext parameter value is usually set locally and only during the installation. Setting this value via Ethernet interface is not expected and not recommended.

Show tTEST parameter edit function

This choice allows setting the delay in module test by pressing remote test button on menu *"Parameters"* on the homepage. tTEST parameter value is usually set locally and only during the installation. Setting is done according to connected remote test button's required attributes. Setting this value via Ethernet interface is not expected and not recommended.

8.16 Device's parameters setting panel

This menu allows administrator **direct setting of the entire device's parameters values** regardless of the setting for "user". Administrator can change device's parameters values in this menu even if the parameter's change is not permitted on the homepage.

Parameter	Value
Rcrit [kΩ] (min: 5; max: 300)	50
Rcrit2 [kΩ] (min: 5; max: 300)	100
Hysteresis [%] (min: 0; max: 100)	20
tON [sec] (min: 0; max: 60)	0
Rtl.ext. [kΩ] (min: 0; max: 20)	0
tTEST [sec] (min: 0; max: 6)	0
Address	1

Parameters meaning is listed in parameters description, see page 10.
Parameter „Address“ is designed for future use and is not set.

8.17 Panel for other settings

Name of the device	<input type="text"/>
Language	English

Name the device

Fill in monitored network text description or device's location. Text is displayed in "Location" parameter on the homepage. Text shown in the picture is displayed for the factory setting and is valid for all the device types. Naming string can have maximum 15 characters. Letters „a“ to „z“, „A“ to „Z“, numbers, dash and underscore are allowed. Only characters without diacritics can be used.

Language

Select the language you want this site to communicate with. Language Czech, English or Russian is possible.

It is necessary to save set parameters by button

Save

8.18 Information about the device panel

Information about the device is displayed here, MAC address, firmware version and other useful links.

Information about the device	
MAC address:	00-80-A3-A8-F1-00
Firmware version:	7.1/5
Core:	HIG93;v5.4 160530;F97
Engine:	win/webkit v.525
Supplier of the device	
Name:	HAKEL spol. s r.o.
Web site:	www.hakel.com
Links	
XML file containing current configuration:	settings.xml
XML file containing current measured-out values:	fresh.xml

Information about SW installed versions is listed in information menu.

"Firmware version" SW web server installed version v XPort circuit

"Core" module's HIG9x/E SW version

meaning: device type, program version, program creation date, SPINEL protocol type

"Xml" files links load particular data from connected device.

9. ISOLGUARD monitor secure access

Following example can be used for secure remote access with minimal display size.

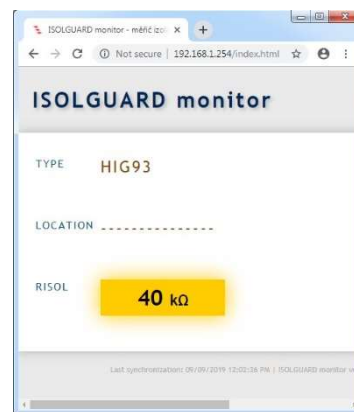
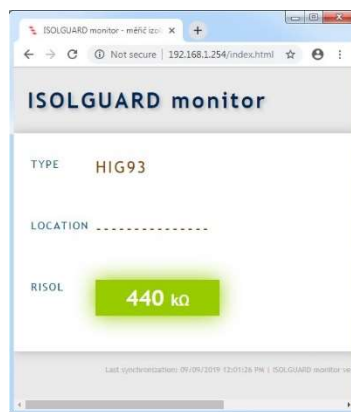
Setting in displayed information panel done by administrator is as follows:

Display settings	
Show location	<input checked="" type="checkbox"/>
Show Rcrit status	<input type="checkbox"/>
Show Rcrit2 status (93/94 only)	<input type="checkbox"/>
Show Run test button	<input type="checkbox"/>
Show Rcrit parameter edit function	<input type="checkbox"/>
Show Rcrit2 parameter edit function	<input type="checkbox"/>
Show Hysteresis parameter edit function	<input type="checkbox"/>
Show tON parameter edit function	<input type="checkbox"/>
Show Rtl.ext. parameter edit function	<input type="checkbox"/>
Show tTEST parameter edit function	<input type="checkbox"/>

ISOLGUARD monitor display

- status without FAULT
- status with FAULT

Launched from html file using
tag iframe.

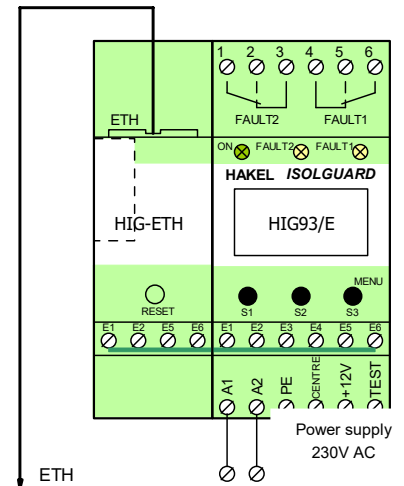


10. HIG9x/E first connection

It is necessary to adjust HIG9x/E module before its installation and usage, especially assign new IP address. This address must be unique in a local network and it is usually assigned by administrator.

Connect HIG9x/E module according to recommended connection in shown picture for the first switching on.

It is enough to connect power supply and Ethernet for the first trying and setting.



11. HIG9x/E module's IP address setting

It is anticipated that this adjustment will be made by a person familiar with network problems, both in terms of topology and network configuration experience on the computer, and will be able to diagnose common faults.

Also mask and gateway are set while setting the IP address.

IP address setting can be done in several ways

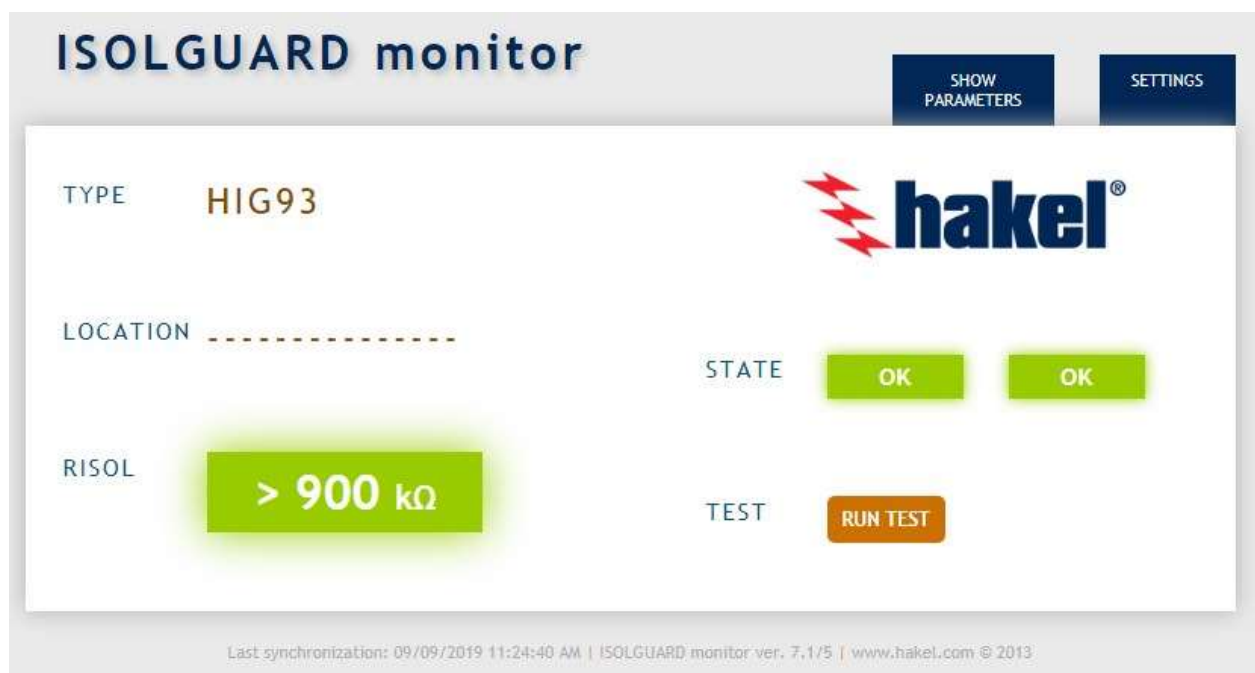
- setting through **ISOLGUARD monitor** web interface
- by specialized program *DeviceInstaller* for HIG-ETH module IP address setting
- by program *Telnet*

Only IP address setting via web interface is listed in this document. Other ways how to set IP address are listed in separate document describing HIG9x/E devices communication protocols.

11.1 IP address setting via ISOLGUARD monitor web interface

It is possible to change implicitly set default IP address 192.168.1.254 by following process.

- Connect the device in accordance with above shown picture.
- Connect it by net cable to the Ethernet (computer network) than. If your network does not have compatible range with default IP address (192.168.1.254), connect the device directly to the computer by crossover cable and adjust its IP address and device's setting to the network.
- Type the IP address to web browser. The address for default devices <http://192.168.1.254/>. Internal web site's main menu will open.



Last synchronization: 09/09/2019 11:24:40 AM | ISOLGUARD monitor ver. 7.1/5 | www.hakel.com © 2013

- Select menu “Settings” and fill in user name and password. Type “admin” with “1234” password in default setting. Network communication parameters setting menu will displayed.

Network settings	
Device's IP address	192.168.1.254
Netmask	255.255.255.0
Gateway IP address	0.0.0.0
DNS server's IP address	0.0.0.0
WEB port	80
Second communication protocol	None
MODBUS TCP port	502

- Fill in network parameters for connection to your network. Parameters must be saved by button “Save” after the setting.

IP address

Device's network address. Fill in the numeric address separated by dots. In case that you are not sure if the IP address is correct, consult it with your administrator.

Netmask

Set netmask where is (will be) HIG9x/E device connected.

Gateway IP address

Computer's or router's IP address, that provides connection with other (master) networks to the device. Fill in 0.0.0.0 address, if is the device in separate network or does not have access to external networks.

Web port

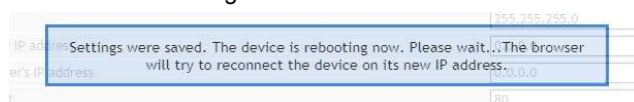
Default port value, where web sites are available, can be changed in this menu. This choice is useful when the device is behind firewall or router, that have port 80 (standard web port) blocked. In such a situation find out which port is available and fill it in to this setting. Using the address [http://\[IP-adresa\]:\[port\]](http://[IP-adresa]:[port]) you can enter the page from internet browser. For example, <http://192.168.1.254:8080> port 8080. Leave the value 80 for common settings.

Second communication protocol

MODBUS TCP port

Leave the values at implicit setting shown in the picture while setting the IP address.

- Select menu “Save” and wait for device rebooting



- Device will be reconnecting and displayed in the browser, if the new IP address is in the same network.
- Device will not be found and the browser reports connection fault when changing the network address.



- Switch off device's power supply, connect it to the computer network whose address you set and switch the device on again.

In a case device's IP address is unknown or it is not possible to connect it to the browser, make device's factory settings according to the description on page 16 and repeat mentioned setting process.

If it is not possible to make IP address setting according to mentioned process or after the factory settings, it is necessary to use some process listed in HIG9x/E device communication protocol document.

12. Factory setting parameters of HIG93/E, HIG94/E

Factory settings of the insulation monitoring device are as follows:

Parameter	Menu	Symbol	HIG93/E value	HIG94/E value
Critical insulation resistance 1	Set Rcrit1	R _{crit1}	50 kΩ	300 kΩ
Critical insulation resistance 2	Set Rcrit2	R _{crit2}	100 kΩ	500 kΩ
Insulation resistance hysteresis	Set Rhyst	R _{hyst}	20 %	20 %
Delay in response of signalling the insulation resistance fault	Set tON	t _{ON}	0 sec	0 sec
External inductor resistance	Set TL ext.	R _{tl.ext.}	0 kΩ	0 kΩ
Delay in module test start by remote TEST push-button	Set tTEST	t _{TEST}	0 sec	0 sec
FAULT memory	Mem.FAULT	Mem.FAULT	NO	NO
FAULT1 relay status when insulation status fault	Set Relay FA	Relay FA1 logic	N/C	N/C
FAULT2 relay status when insulation status fault	Set Relay FA	Relay FA2 logic	N/C	N/C

Table 5: Factory values of device's parameters

Devices with HIG-ETH communication module have network connection parameters preset to default (factory) values:

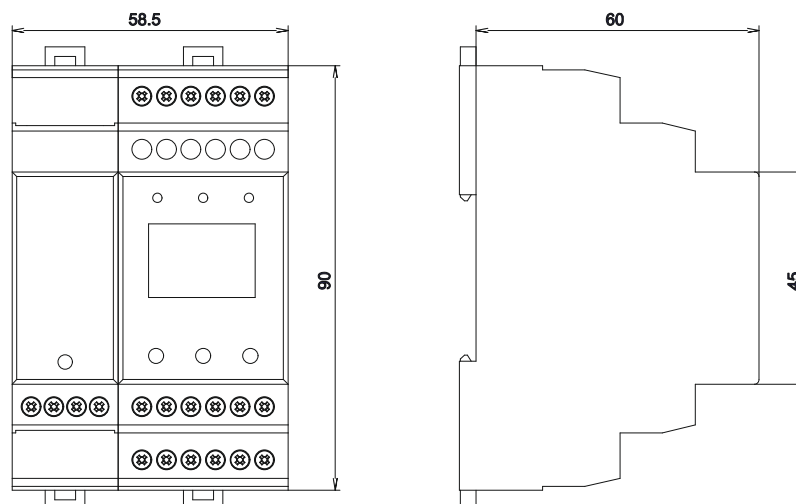
Parameter	Value
Device's IP address	192.168.1.254
Network's mask	255.255.255.0
Gateway's IP address	0.0.0.0
DNS server's IP address	0.0.0.0
Web interface's port	80
Password for user „user“	Password is not set
Password for user „admin“	„1234“

Table 6: Factory values of HIG-ETH module parameters

Notes:

- 1) Parameter values listed in the table are preset before delivering the device.
- 2) Meaning of network connection parameters is listed in web interface description.
- 3) Listed values can be changed according to web interface description.

13. Device dimensions



Picture 10: Device dimensions

14. Device installation

HIG93/E, HIG94/E are intended for assembling on 35 mm DIN rail according to IEC 60715:2017. Any working position.



Operation, installation and maintenance can be done only by qualified personnel according to assembling and safety regulations. If the device is used in the way not specified by the producer, protection provided by the device could be disrupting.

15. 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 ensure maximum admissible temperature of the environment.

Only qualified personnel are 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 monitored power supply and transformer status.

16. Producer

Producer of HIG93/E, HIG94/E insulation monitoring device is

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