

Quick Startup Guide

FG-200 HSE/FF Modbus

FOUNDATION fieldbus network integration via Modbus
including redundancy



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1 Introduction



Read this manual before starting

For damages due to improper connection, implementation or operation Softing refuses any liability according to our existing warranty obligations.

1.1 Intended use

Softing's FG-200 HSE/FF Modbus is used to integrate up to four FF H1 links into control systems supporting Modbus. The device can be used as a redundant link. It provides fast access to process data, while making use of FOUNDATION Fieldbus advantages such as reduced cabling, central field device parametrization, comprehensive diagnostics or intrinsically safe device segments. It is compatible with the R. STAHL bus-Carrier Series 9419 and Power Supply 9412 products for easy commissioning.

Use in hazardous areas

The FG-200 is an electrical equipment with degree of protection Ex nA, approved for use in hazardous areas of Zone 2 or in the safe area. The four FF-H1 interfaces are designed according to the protection method Ex ic. Only certified circuits with an according protection method shall be connected to these FF-H1 interfaces.

Special hints for safe use



- Before setting the FG-200 into operation, the corresponding marking field has to be signed (e.g. if the device is used in ic environment, the upper marking field on the type label has to be signed).

IECEX BVS 15.0055 X

Ex nA [ic] IIC T4 Gc

Ex nA IIC T4 Gc

- Use an appropriate permanent pen for signing, e.g. an etching pen.
- More than one marking is not allowed. If you need a second marking, you must replace the existing equipment with a new one.
- An equipment which has been operated under non-intrinsically safe conditions is no longer permitted to be used under intrinsically safe conditions.

The FG-200 HSE/FF Modbus is only approved for intended and appropriate use. In case of noncompliance, the warranty and manufacturer's liability do no longer apply!

1.2 System requirements

When using the FOUNDATION fieldbus Configuration Tool FF-CONF

- PC with operating system Windows 7 or Windows 8.1 (both 32 bit or 64 bit supported)

Browsers supported

- Microsoft Internet Explorer version 8.0 or higher
- Mozilla Firefox version version 35 or higher

1.3 Scope of delivery

The FG-200 HSE/FF Modbus comprises the following parts:

- the FG-200 HSE/FF Modbus device
- CD-ROM including drivers, firmware and manuals
- a Quick Startup Guide

**Note**

The FG-200 is available in two variants. They have identical technical specifications. Their only differentiating characteristic is their mount direction that is mirrored, i.e. rotated by 180°.

1.4**Safety precautions****CAUTION**

During operation, the device's surface will be heated up. Avoid direct contact. When servicing, turn off the power supply and wait until surface has cooled down.

**Note**

Do not open the housing of the FG-200. It does not contain any parts that need to be maintained or repaired. In the event of a fault or defect, remove the device and return it to the vendor. Opening the device will void the warranty!

2 Hardware installation

2.1 Installation in hazardous locations

The FG-200 HSE/FF Modbus can be used in hazardous locations and is certified according to ATEX, IEC and North America Approval cULus.



WARNING

Use only according to operating conditions from instructions!

Use the FG-200 in accordance with its designated use only! Otherwise, the manufacturer's liability and warranty will expire. The device is only to be used according to the operating conditions described in these instructions.



WARNING

Do not connect or disconnect energized conductors!

Be aware that energized conductors are not to be connected or disconnected! This can lead to danger of life if potentially explosive atmosphere is present there at that time!

2.1.1 General requirements

Following general requirements must be observed while installing FG-200 on hazardous locations:

- The details of this document must be observed along with the conditions for use and the applicable details stated on the marking and type labels of each.
- Any selection and operation of the device must be done as per the technical rules.
- Adequate precautions must be taken to prevent unintended actuation or impairment of the device.
- Connectors must not be connected or disconnected when area is known to be hazardous. This can be life threatening in a potentially explosive atmosphere. Open or not securely closed sockets shall not be energized in the Ex-atmosphere!
- Ensure the installed equipment comply with the types of protection applicable to the corresponding zones.
- All connected electrical equipment must be suitable for the respective intended use.
- The operator must ensure protection against lightning in compliance with the locally applicable regulations.
- Electrostatic aspects must be considered when mounting the bus-modules. Electrostatic charges have to be prevented.
- In explosion group IIC and Zone 2 no protected plastic surfaces $> 20 \text{ cm}^2$ are allowed; in IIB or dust-Ex, 100 cm^2 may be reached.
- The hazard of any objects falling onto the bus-module must be prevented.

- The FG-200 does not meet the requirements of impact protection and IP54 (according to IEC 60529). It must be installed in a protective enclosure which meets the requirements for resistance to impact and IP as stated in section 26.4 of IEC/EN 60079-0. This enclosure must be fully mounted and intact. If the enclosure is damaged, the operation is not permitted.
- The FG-200 is defined as instruments and apparatus of low energy according to clause 23 of IEC/EN 60079-15; thus the requirement stated in sub-clause C, limiting the transient characteristic to 40% above the rated voltage, has to be adhered to when erecting the equipment.
- When removing the packaging ensure that no dirt can enter the enclosure or the plugs.
- If any vibration during the operation may cause parts of the plugs to loosen, then the plugs have to be provided with a light firm varnish used for securing screws. An extraction force of 0.5 Nm has to be achieved at an equivalent thread.
- To circuits of Zone 2 only such equipment may be connected that is suitable for operation in this zone and has been certified accordingly.
- Components may only be replaced by original spare parts which are also approved for the use in Ex-atmospheres. Spare parts are ordered as complete units giving the material number stated on the device (marking, type label).
- Only such auxiliary components may be used in potentially explosive atmospheres which meet all requirements of European and national directives and legislation.
- The environmental conditions specified in the manual have to be followed strictly.

- The FG-200 is not to be used in systems where cathodic systems for corrosion protection are in place. Although special precautions may allow the use in such systems (additional earthing bridges), the manufacturer has to be consulted in each case.
- The operator has to provide measures for protection against lightning.
- According to the local conditions and in compliance with the environmental rules, the operator is responsible to visually inspect the system and to remove dust settlements in a regularly interval (every 6 months).
- The company installing the device has to ensure that the transient characteristic is limited to 40% above the service voltage.
- Additional precautions have to be taken, if the presence of hydrosulfide, ethylene oxide and/or carbon monoxide is to be expected: those substances are of a vary low ignition energy.
- Icing is not permitted.

Pair of values for fieldbus voltage and current for Intrinsic Safety Fieldbus (ic):

	Pair 1	Pair 2	Pair 3
Fieldbus Voltage	Ui = 14 Volt DC	Ui = 17.5 Volt DC	Ui = 32 Volt DC
Fieldbus Current	li = 570 mA	li = 319 mA	li = 100 mA



CAUTION

Make sure that the sum of power supply voltage and fieldbus supply voltage does not exceed 60 VDC!

**Explosion hazard**

Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.

**Observe relevant national regulations, standards and directives**

This manual does not supersede the relevant national regulations, standards and directives. These must be observed and have to be applied according to the national conditions!

2.1.2 Hazardous Location - European and International Approval (ATEX, IECEx)

The equipment was assessed as based on the following standards and editions:

- a) IEC 60079-0:2011 Ed. 6, modified Cor. 2012 + Cor. 2013 / EN 60079-0:2012 + A11:2013
- b) IEC 60079-11:2011 Ed. 6 + Corr. 2012 / EN 60079-11:2012
- c) IEC 60079-15:2010 Ed. 4 / EN 60079-15:2010

If indicated on the device label or by technical documentation, the FG-200 is suitable for use in gas-Ex atmospheres of Zone 2 in the explosion groups IIA, IIB and IIC in temperature class T4, if accommodated in a tested enclosure.

- IECEx marking for explosion protection: Ex nA [ic] IIC T4 Gc.
- ATEX marking for explosion protection: Ⓔ II 3G nA [ic] IIC T4 Gc.

The Ex protection method [ic] corresponds only to the FF-H1 fieldbus interfaces.

The FG-200 HSE/FF Modbus complies with the applicable standards and regulations and meets the requirements of Directive 94/9/EC. The requirements for erecting the device as part of the system in potentially explosive atmospheres (e.g. IEC / EN 60079-14) must be strictly adhered.

Certificates

ATEX The EC type examination number for ATEX is:

BVS 15 ATEX E 063 X

A copy of the certificate is available in section [ATEX Type Examination Certificate](#)^[47].

IECEX The type examination number for IECEX is: **IECEX BVS 15.0055X**

The certificate can be downloaded from <http://iecex.iec.ch>

2.1.3 Hazardous Location - North American Approval (cULus)

If indicated on the device label, the FG-200 is suitable for use in Class 1, Division 2, Groups A, B, C and D hazardous or non-hazardous locations.

The device must be installed in a protective enclosure which meets the requirements for resistance to impact and IP54 according to IEC 60529.

Marking for explosion protection: Class I Div.2 Groups A,B,C,D.

Certificate

cULus The cULus Certificate of Compliance number is:

20151215-E356500

A copy of the certificate is available in section [UL Certificate of Compliance](#)^[44].

2.2 Mounting and dismounting



Note

Make sure the FG-200 is mounted in a manner that the power supply disconnecting device or interrupt facility can always be reached easily.



Note

Depending on the installation position, the maximum ambient operating temperature may differ. Refer to [Technical Data](#) ^[35] for detailed information.

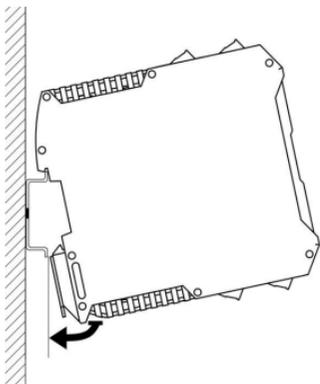


Installation and inspection

Installation and inspection tasks are to be carried out by qualified personnel only, i.e. personnel qualified according to TRBS 1203 or similar! The definition of terms can be found in IEC 60079-17.

Mounting

1. For mounting the FG-200 on a DIN rail (35 mm), attach the two upper notches to the rail.
2. Press the device down towards the rail until it locks into place.

**Note**

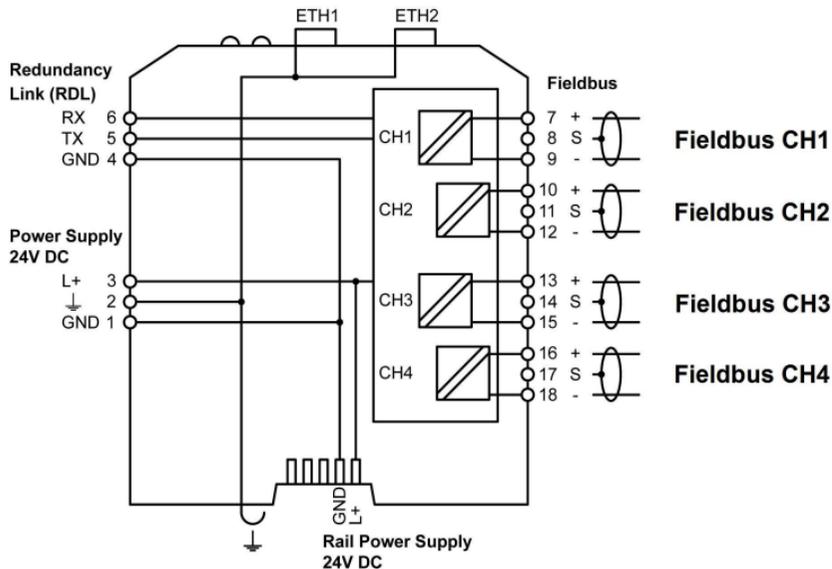
Do not put stress on the system by bending or torsion.

Dismounting

To dismount the FG-200 from the DIN rail, slide a screw driver horizontally underneath the housing into the locking bar, slide the bar downwards – without tilting the screw driver - and fold the device upwards.

2.3 Connection diagram

The following connection diagram gives an overview about the different plugs and interfaces:





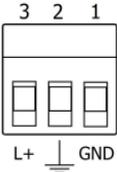
Note

If ambient temperatures exceed 55 °C at the place of installation, it may occur that the temperatures of connecting cables strongly rise if those cables have been put in place in an unfavorable condition. In such cases, either perform measurements to confirm that the service temperature of the cables is not exceeded (i.e. 80 °C), or use such variants that withstand temperatures of minimum 90 °C.

2.4 Connecting the power supply

1. Connect the FG-200 to a 24 V DC power supply.
2. Use different or redundant power supplies for redundant FG-200s.
3. Turn on the power supply. The boot process takes approx. 50 seconds. For indication of proper operation of a FG-200 acting in non-redundant mode or as primary device in redundant mode refer to [Status indicators - LEDs](#) ²⁸.

The supply voltage (18 VDC ... 32 VDC) is connected by a 3-pole terminal block. The power supply is connected to the plug connector via flexible wires with a cross section of 0.75 to 1.5 mm². The ground connection wire must have a cross section of 1.5 mm².

	Pin	Signal	Description
	3	L+	Positive supply voltage
	2		Functional Earth
	1	GND	Ground

**CAUTION**

The Functional Earth (FE) connection of the device has to be connected at low inductance with the Protective Earth (PE) of the system.

**Note**

As indicated in the connection diagram, the power can be applied alternatively by a special DIN rail connector (Rail Power Supply). For further information contact Softing Industrial Automation.

2.5**Connect to network**

Connect the FG-200 to the network using the upper network connection.

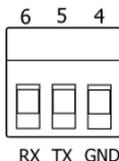
**Note**

The FG-200 is able to communicate with the HSE (High Speed Ethernet protocol of Fieldbus Foundation) and Modbus TCP over the same Ethernet port.

Refer also to [Use two FG-200s as a redundant set](#)^[19].

2.6 Modbus serial connection

When connecting the FG-200 via serial connection use the connector from your delivery with the following pin assignment:



Pin No.	Signal	Connector symbol
6	RX	+
5	TX	S
4	GND	-



Note

If you are working with two FG-200 in redundant mode, the serial connection cannot be used, refer to [Use two FG-200s as a redundant set](#)¹⁹.

2.7 Use two FG-200s as a redundant set

When using two FG-200s as a redundant set, the redundancy link interfaces (RDL) of both FG-200s (primary and secondary) must be connected by a cable, thus forming a redundancy link. If the redundancy link is not installed during start-up (power-on), the FG-200 will operate in non-redundant mode.

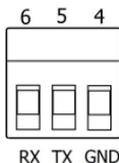


Note

The interface is not galvanically isolated. Thus make sure that there is no potential difference between the two connected devices.

The maximum cable length is 0.5 m according to EMC requirements. The pin assignment is as follows:

Pin	Signal	Description
6	RX	Receives data from redundant device
5	TX	Transmits data to redundant device
4	GND	Ground

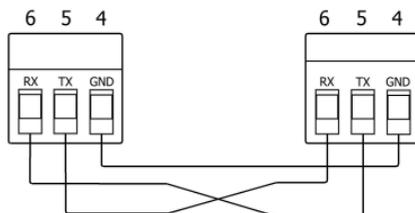


Note

The receive (RX) and transmit (TX) signals must be cross-linked.

RDL of primary
Linking Device

RDL of secondary
Linking Device



**Do not power up FG-200s while the serial link is missing**

If the two FG-200s forming a redundant set are powered while the serial link is missing, both devices will behave like independent, non-redundant Primary Devices. If they operated in redundant mode before and therefore have identical configuration information, both will use the same H1 node addresses, which will cause problems on the H1 links. The ERR (error) LED will blink. In this case, remove the power, install the serial link and apply the power again.

**First powered device operates as primary device**

When using a redundant set of two FG-200s, the device which is powered first will operate as primary device. If both devices are powered at the same time, the one with the lower IP address will operate as primary device.

**Before removing the power supply from primary device make sure the secondary device is operational**

In a redundant set of FG-200s, removing the power supply, the Ethernet cable or the redundancy link interface cable from the primary device causes a redundancy change-over. Before doing so, make sure that the secondary device is operational (and not still booting due to a prior change-over). Otherwise the system breaks down or the configuration information might get lost. Therefore wait at least one minute between such checks.

2.8 Connect FF-H1 interfaces

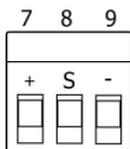
Connect the H1 links to the terminal blocks of the H1 interfaces. Since the FG-200 does not provide power to the H1 links, a power supply, a power conditioner and a bus termination is required for each H1 link. When using a redundant set of two FG-200s, make sure to connect each H1 link to the same

channel (FF 1 .. FF 4) on both FG-200s.

The FG-200 provides four Foundation Fieldbus H1 interfaces. These interfaces are named CH1 to CH4 and are used to connect an FF-H1 bus to the FG-200.

FF H1 bus line channel 1

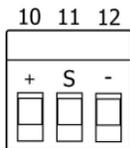
CH1



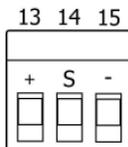
Pin	Signal	Description
7	+	Fieldbus +
8	S	Fieldbus shield
9	-	Fieldbus -

FF H1 bus line channel 2

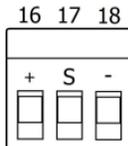
CH2



Pin	Signal	Description
10	+	Fieldbus +
11	S	Fieldbus shield
12	-	Fieldbus -

FF H1 bus line channel 3**CH3**

Pin	Signal	Description
13	+	Fieldbus +
14	S	Fieldbus shield
15	-	Fieldbus -

FF H1 bus line channel 4**CH4**

Pin	Signal	Description
16	+	Fieldbus +
17	S	Fieldbus shield
18	-	Fieldbus -

**Note**

The fieldbus shield is not connected directly to functional earth. For EMC reasons, it is only connected via a capacitor. If a direct connection to functional earth or protective earth is required, you need to implement this separately.

2.9 Power up the device

Turn on the power supply. The boot process takes a few seconds. For indication of proper operation of a FG-200 refer to Status indicators - LEDs.

2.10 Add a second FG-200 to form a redundant set of FG-200

For adding a second FG-200 to an already commissioned FG-200 that is operating in the role "Primary, no backup", the following steps are required:

1. Set the IP configuration (IP address and subnet mask) of the second FG-200 in a way that it is in the same IP subnet as the primary device (refer to Settings - Internet Protocol).
2. Connect the H1 links to the terminal blocks of the H1 interfaces. Make sure to connect each H1 link to the same channel (FF 1 .. FF 4) on both FG-200s.
3. Connect the second FG-200 to the Ethernet switch or hub.
4. Connect both serial ports by means of a redundancy link interface cable.
5. Connect the second FG-200 to a 24 V DC power supply. Use different or redundant power supplies for redundant FG-200s.
6. After turning on the power supply the boot process takes approx. 50 seconds.
7. The second FG-200 will take over the configuration data from the primary device and will start operation in the role "secondary". For indication of proper operation as a secondary device refer to [Status indicators - LEDs](#) [28].



Hint

Refer to [Use FG-200 as a redundant set](#) [19] for more information on the redundancy concept.

3 Commissioning the FG-200 HSE/FF Modbus

3.1 Install FF-CONF

New installation

1. Insert your FG-200 HSE/FF Modbus CD into your CD drive.
2. If Autorun is enabled on your system, the startup page is opened. Select FF-CONF from line "Install First".
3. If Autorun is disabled, open an Explorer window, select your CD drive and double-click the file *FFConfSetup.exe* located in `<CD drive>:\delivery\FF-CONF\`.
4. Follow the instructions from the installation wizard.

Update installation

If you have already installed a previous version of FF-CONF (lower than version 1.3), perform the following steps:

1. Uninstall your existing version (**Start → Control Panel → Uninstall Program → Softing - FF-CONF → Uninstall**).
2. Switch to `..\ProgramData` and delete the subdirectories `\Softing\FF-CIT` and `Softing\FF-CONF` including their complete data content.
3. Then start your installation as described above.

3.2 Configure IP address and Modbus parameters

The FG-200 is delivered with the pre-configured IP address 192.168.0.10. Connect the FG-200 to the PC either directly or via an Ethernet switch.



Note

Before connecting the FG-200 to your LAN network, make sure that its IP address is not used by another network station.

To assign a new IP address to your PC, you must have administrator rights.

1. Open a browser (e.g. Internet Explorer or Firefox).
2. Enter the URL address 192.168.0.10 and press **Enter**.
3. Login with the following data:
login name: **administrator**
login password: **fgadmin**
4. Select **Configuration** → **Settings** → **Internet Protocol**.

5. Change **IP Address** and **Subnet Mask**.
6. Click [**Change Settings and Reebot**]:

Configuration > Settings > Internet Protocol

Change Settings

Obtain an IP Address from a DHCP Server

Specify an IP Address

Hostname	FG200-FF/HSE Modbus
IP Address	172.17.210.109
Subnet Mask	255.255.0.0
Default Gateway	172.17.0.160

Change Settings and Reebot Read Current Values

7. The FG-200 performs a reboot.

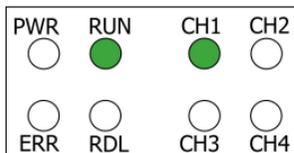
3.3 Setting up an FF-CONF project and working with the web server user interface

For information about how to set up a new project with the Configuration tool FF-CONF and working with the FG-200 webserver interface please refer to the User Manual. This document is available

- on your FG-200. Login as described in [Configure IP address and Modbus parameters](#) [26] and select **Information** → **Manual** to open the document.
- on the CD-ROM from your product delivery.
- at the Softing download center (**Homepage** → **Industrial** → **Downloads**) with <http://industrial.softing.com/en/downloads.html>

4 Status indicators - LEDs

The FG-200 is equipped with eight LEDs on its front side:



- PWR** stands for power supply - refer to [PWR - power supply](#)^[29]
- RUN** stands for running - refer to [Device LED statuses \(PWR, RUN, ERR and RDL\) in stand-alone mode](#)^[29]
- ERR** stands for error- refer to [Device LED statuses \(PWR, RUN, ERR and RDL\) in stand-alone mode](#)^[29]
- RDL** stands for redundancy link - refer to [RUN / ERR / RDL - LED statuses in redundant mode](#)^[30]
- CH1 to CH4** stands for H1 channel 1 to H1 channel 4 - refer to [Status indications of the four H1 channels](#)^[34]

The LEDs may be on permanently or flash in different colors and frequencies. We use the following symbols:

Symbol	Color	Lighting
	none	off
	red	permanent

Symbol	Color	Lighting
	green	permanent
	red	flashing
	green	flashing
	green	flashing slowly (0.5 Hz)
	green	flashing quickly (5 Hz)

4.1 PWR - power supply

	permanent green	24V DC power supply is ok
	off	no power supply

4.2 Device LED statuses (PWR, RUN, ERR and RDL) in stand-alone mode

The following table shows possible LED combinations in stand-alone mode:

LEDs	Meaning
PWR RUN  green 	Start-up phase (approximately 7 seconds) During this phase redundancy role is determined.
  ERR RDL	

LEDs		Meaning
PWR  green  ERR	RUN  green  RDL	Non redundant device, ready. The device is operational; it is not part of a redundant set.
PWR  green  red ERR	RUN  green  RDL	Permanent hardware fault detection during startup. A fatal error has been detected.

4.3 RUN / ERR / RDL - LED statuses in redundant mode

The redundancy link LED is used to indicate if traffic via the serial line is performed. It will flash green if a valid message is received. It will switch to red if serial communication is lost and it will be off if no serial response has been received after startup.

	flashing green	redundancy link communication is ok (triggered by redundancy link packets)
	red	link communication interrupted or aborted (broken down)
	off	no link communication at all

LEDs		Meaning
PWR RUN  green    ERR RDL		Start-up phase (approx. 7 seconds) During this phase redundancy role is determined.
PWR RUN  green  green   ERR RDL		Non redundant device, ready. The device is operational; it is not part of a redundant set. Primary Device is redundant set. The device is operational, acting as Primary Device in a redundant set. The secondary device is ready
PWR RUN  green  green  red  ERR RDL		Permanent hardware fault detection during startup. A fatal error has been detected. Possible failure could be a missing Ethernet connection.
PWR RUN  green  green  red  ERR RDL		Primary device or non-redundant device, hardware failure. The device is acting as non-redundant device, but a minor hardware failure has been detected during start-up. In the case of a Primary Device on a redundant set, the secondary device is not ready

LEDs	Meaning																
<table border="0"> <tr> <td data-bbox="181 120 245 146">PWR</td> <td data-bbox="261 161 325 187">green</td> <td data-bbox="336 120 400 146">RUN</td> <td data-bbox="416 161 479 187">green</td> </tr> <tr> <td data-bbox="181 151 245 203"></td> <td></td> <td data-bbox="336 151 400 203"></td> <td></td> </tr> <tr> <td data-bbox="181 203 245 254"></td> <td data-bbox="261 213 325 239">red</td> <td data-bbox="336 203 400 254"></td> <td></td> </tr> <tr> <td data-bbox="181 254 245 280">ERR</td> <td></td> <td data-bbox="336 254 400 280">RDL</td> <td></td> </tr> </table>	PWR	green	RUN	green						red			ERR		RDL		<p>Primary device or non-redundant device, failure.</p> <p>The device is acting as non-redundant device, but a failure has been detected.</p> <p>or</p> <p>Secondary device, not ready.</p> <p>The device is acting as secondary device in a redundant set, but it is not ready to take over the primary role due to e.g. not synchronized configuration information or a non-operational redundancy link.</p> <p>or</p> <p>Primary Device or non-redundant device, failure.</p> <p>The device is acting as Primary Device in a redundant set or as non-redundant device, but a failure has been detected.</p> <p>In the case of a Primary Device in a redundant set or as non redundant set, the secondary device is not ready.</p>
PWR	green	RUN	green														
																	
	red																
ERR		RDL															
<table border="0"> <tr> <td data-bbox="181 703 245 729">PWR</td> <td data-bbox="261 744 325 770">green</td> <td data-bbox="336 703 400 729">RUN</td> <td data-bbox="416 744 479 770">green</td> </tr> <tr> <td data-bbox="181 734 245 786"></td> <td></td> <td data-bbox="336 734 400 786"></td> <td></td> </tr> <tr> <td data-bbox="181 786 245 838"></td> <td></td> <td data-bbox="336 786 400 838"></td> <td data-bbox="416 786 479 812">green</td> </tr> <tr> <td data-bbox="181 838 245 864">ERR</td> <td></td> <td data-bbox="336 838 400 864">RDL</td> <td></td> </tr> </table>	PWR	green	RUN	green								green	ERR		RDL		<p>Secondary device, operational.</p> <p>The device is operational as secondary device in a redundant set. The configuration information has been successfully transferred from the Primary Device and the redundancy link is operational.</p>
PWR	green	RUN	green														
																	
			green														
ERR		RDL															

LEDs		Meaning
PWR  green  red ERR	RUN   RDL	Secondary device, hardware failure. The device is acting as secondary device in a redundant set, but a hardware failure has been detected. Details are available on the web page Diagnostics of the device.
PWR  green  red ERR	RUN  green  RDL	Primary with H1 error state
PWR  green  red ERR	RUN  green  RDL	Primary not ready
PWR  green  red ERR	RUN  green  RDL	Secondary with H1 error

LEDs		Meaning
PWR  green  red ERR	RUN   RDL	Primary, configuration error

4.4 Status indications of the four H1 channels

The following table shows the channel LEDs and their meaning for all four channels (CH1 - CH4):

Symbol	Color / frequency	Meaning
	green	Visitor address
	flashing slowly (0.5 Hz)	not in LAS role
	flashing quickly (5 Hz)	LAS role
	red	no carrier or H1 link is disconnected
	flashing red	no token received
	off	H1 link unused

5 Technical Data

5.1 Specifications

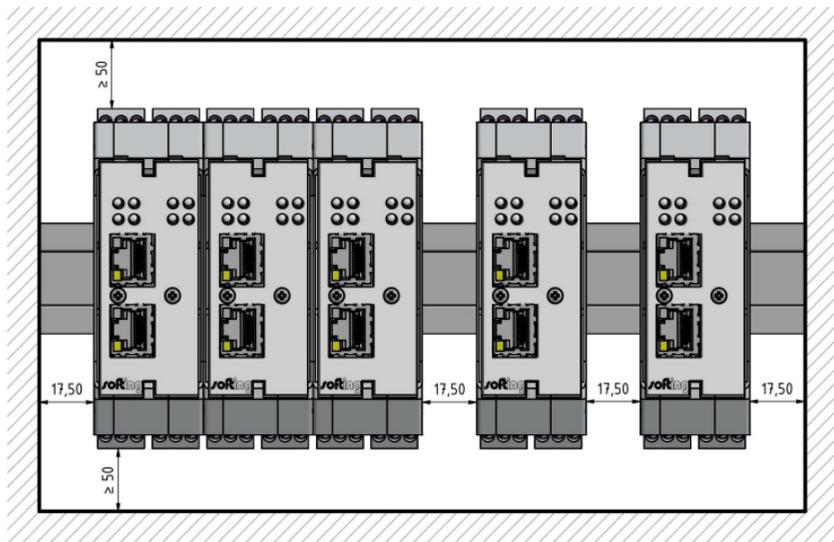
Power supply	18 VDC...32 VDC; SELV/PELV supply mandatory Typical input current is 200 mA; maximum is 1 A (considering the rush-in current at switch-on).
FF-H1	Four FF-H1 channels, compliant with type 114 of the FF physical layer profile. The Fieldbus voltage range is from 9 VDC...32 VDC. Preferred value is 24 VDC.
Ethernet	IEEE 802.3 100BASE-TX/10BASE-T Only ETH 1 is supported. Do not use ETH 2 (reserved for further use).
Minimum ambient operating temperature	-40 °C
Storage temperature	-40 °C...+85 °C
Relative humidity	10 %...95 % (non-condensing)
Altitude	Must not exceed 2,000 m
Location	Indoor use only; no direct sunlight
Coating	Conformal Coating based on ANSI/ISA-S71.04 G3

Safety standard	IEC/EN/UL 61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements IEC/EN/UL 61010-2-201 Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-201: Particular requirements for control equipment (both with CB scheme).
Ingress protection	IP20

5.2 Installation position and related ambient operating temperature

Depending on the installation position, different ambient operating temperatures (T_A) are allowed:

Horizontal installation position



Maximum number of fieldbus channels used	Maximum fieldbus voltage	Minimum distance	Maximum permissible ambient temperature T_a
4	32 VDC	0 mm	55 °C
2	24 VDC	0 mm	60 °C
4	32 VDC	17.5 mm	65 °C
2	24 VDC	17.5 mm	70 °C



50 mm minimum distance to the air inlet and air outlet

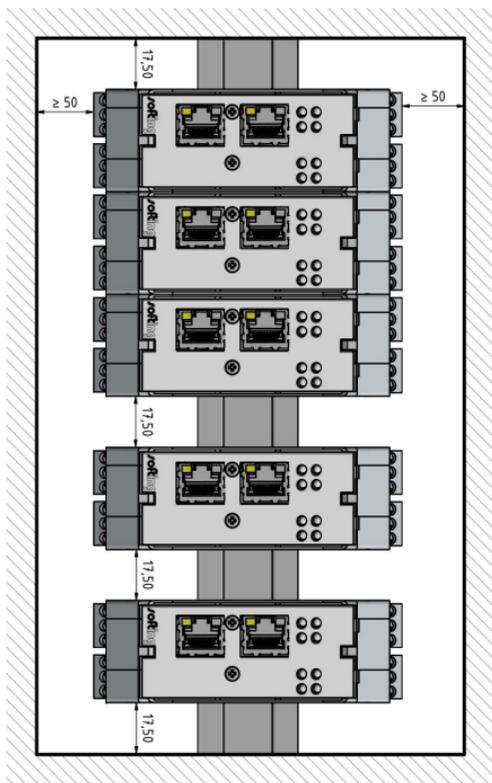
Provide a minimum space of 50 mm to the air inlet and air outlet. Thus you ensure a natural convection.



Rotated installation position

The maximum permissible ambient temperature values are also valid for a 180° rotated installation position.

Vertical installation position



Maximum number of fieldbus channels used	Maximum fieldbus voltage	Minimum distance	Maximum permissible ambient temperature T_a
4	32 VDC	0 mm	40 °C
2	24 VDC	0 mm	50 °C
4	32 VDC	17.5 mm	55 °C
2	24 VDC	17.5 mm	60 °C



50 mm minimum distance to the air inlet and air outlet

Provide a minimum space of 50 mm to the air inlet and air outlet. Thus you ensure a natural convection.



Rotated installation position

The maximum permissible ambient temperature values are also valid for a 180° rotated installation position.

6 ATEX Type Examination Certificate

Translation

(1) Type Examination Certificate

(2) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC

(3) No. of Type Examination Certificate: **BVS 15 ATEX E 063 X**

(4) Equipment: **Linking Device type FG-200 HSE/FF**

(5) Manufacturer: **Softing Industrial Automation GmbH**

(6) Address: **Richard-Reitzner-Allee 6, 85540 Haar, Germany**

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this type examination certificate.

(8) The certification body of DEKRA EXAM GmbH certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design of Category 3 equipment intended for use in potentially explosive atmospheres, given in Annex II to the Directive. The examination and test results are recorded in the Test and Assessment Report BVS PP 15.2.103 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with:

EN 60079-0:2012 + A11:2013 General requirements
EN 60079-11:2012 Intrinsic Safety "i"
EN 60079-15:2010 Equipment protection by type of protection „t“

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the appendix to this certificate.

(11) This Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

Ex II 3G Ex nA IIC T4 Gc or
II 3G Ex nA [ic] IIC T4 Gc

DEKRA EXAM GmbH
 Bochum, dated 2015-06-09

Signed: Simanski
 Certification body

Signed: Dr. Eickhoff
 Special services unit

Page 1 of 3 of BVS 15 ATEX E 063 X
 This certificate may only be reproduced in its entirety and without any change.

DEKRA EXAM GmbH, Dorotheenhofstrasse 5, 44803 Bochum, Germany,
 telephone +49 234 3869-100, Fax +49 234 3869-110, ex-exam@dekra.com

(13) Appendix to

(14) Type Examination Certificate
BVS 15 ATEX E 063 X

(15) 15.1 Subject and type

Linking Device type FG-200 HSE/FF

15.2 Description

The linking device acts as a gateway between Ethernet-based host systems with foundation field-bus HSE and the foundation field-bus H1 bus system. It is suited for network configuration, device parameterization and the recording of production data. The data circuits are galvanically isolated. The Fieldbus circuits may operate as intrinsically safe circuits (level of protection Ex ic) or as non-intrinsically safe circuits; details see manual.

15.3 Parameters

15.3.1 Electrical parameters

15.3.1.1 Power supply circuit (terminals 1 – 3 or Rail Power Supply L+ and GND)

Nominal voltage	DC	18...32	V
Power consumption			< 5,6 W
Max. voltage	DC	40	V

15.3.1.2 Redundancy Link circuit (terminals 4,5,6)

Nominal voltage	DC	up to 32	V
Max. voltage	DC	40	V

15.3.1.3 Ethernet Ports (connectors ETH1, ETH2)

Nominal voltage	DC	up to 32	V
Max. voltage	DC	40	V

15.3.1.4 Fieldbus circuits (terminals 7,8,9 and 10,11,12 and 13,14,15 and 16,17,18)

(if operated as non-intrinsically safe circuits)			
Nominal voltage	DC	24/32	V

(if operated as intrinsically safe circuits, each channel)			
Voltage	U _i	DC	32 V
Current	I _i	DC	570 mA

15.3.2 Ambient temperature range

-40 °C ≤ T_a ≤ see Manufacturer's instructions

15.3.2.1 Horizontal installation position

Minimum distance	Maximum number of fieldbus channels used per device	Maximum voltage of fieldbus circuits	Maximum permissible ambient temperature
0 mm	4	32 VDC	T _a 55 °C
0 mm	2	24 VDC	60 °C
17,5 mm	4	32 VDC	65 °C
17,5 mm	2	24 VDC	70 °C



15.3.2.2 Vertical installation position

Minimum distance	Maximum number of fieldbus channels used per device	Maximum voltage of fieldbus circuits	Maximum permissible ambient temperature T_a
0 mm	4	32 VDC	40 °C
0 mm	2	24 VDC	50 °C
17.5 mm	4	32 VDC	55 °C
17.5 mm	2	24 VDC	60 °C

 (16) Test and Assessment Report

BVS PP 15.2105 EG as of 09.08.2015

 (17) Special conditions for safe use

- 17.1 The equipment is defined as "instruments and apparatus of low energy" according to clause 13 of EN 60079-15; thus the requirement stated in sub-clause c) (limiting the transient characteristic to 40% of the rated voltage) has to be adhered to when erecting the equipment.
- 17.2 The equipment has to be installed in a protective enclosure which meets the requirements for resistance to impact and IP54 defined in EN 60079-0 clause 25.4
- 17.3 Before the first use of the device one marking field (Ex nA IIC T4 Gc or Ex nA (IC) IIC T4 Gc) has to be selected and marked; once the device has operated at non-intrinsically safe fieldbus circuits it may not operate at intrinsically safe fieldbus circuits without reconsideration by the manufacturer.
- 17.4 The ambient temperature range depends on various installation conditions of the devices; see manufacturer's instructions.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA EXAM GmbH
44809 Bochum, 2015-07-16
BVS-Pe/W/Ma A 20150654

Certification body

Special services unit

7 UL Certificate of Compliance

CERTIFICATE OF COMPLIANCE

Certificate Number 20151215-E356500
Report Reference E356500-20151214
Issue Date 2015-DECEMBER-15

Issued to: SOFTING AG
 RICHARD-REITZNER-ALLEE 6
 85540 HAAR GERMANY

This is to certify that representative samples of PROGRAMMABLE CONTROLLERS FOR USE IN HAZARDOUS LOCATIONS
 Class I, Division 2 Groups A,B,C and D.

Enclosed Type Fieldbus Gateways Model – FG-200
 HSE/FF

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/ISA 12.12.01, Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
 CAN/CSA C22.2 No. 213-15, Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.


 Bruce Mikulak, Director North American Certification Program

UL LLC

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8 Declarations by the manufacturer

This device complies with the requirements of the EC directive 2004/108/EG, "Electromagnetic Compatibility" (EMC directive). It meets the following requirements:

▪ **Emission:**

- EN 55011 Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio frequency equipment, group 1, class A
- EN 55022 Information technology equipment; Radio disturbance characteristics; Limits and methods of measurement, class A
- EN 61000-6-4 Electromagnetic compatibility (EMC); Part 6-4: Generic standard – Emission standard for industrial environments

▪ **Immunity:**

- EN 61000-6-2 Electromagnetic compatibility (EMC); Part 6-2: Generic standard - Immunity for industrial environments



A Declaration of Conformity in compliance with the above standards has been made and can be requested from Softing Industrial Automation.



ROHS

The FG-200 HSE/FF Modbus device is ROHS compliant.

**Note**

To fulfill the EMC requirements, the other components of your installation (DC adapter, Industrial Ethernet devices, etc.) also have to meet the EMC requirements. A shielded cable must be used. In addition, the cable shield must be grounded properly.

**CAUTION**

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures!

**FCC**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**WEEE**

Electrical and electronic equipment must be disposed of separately from normal waste at the end of its operational lifetime. Packaging material and worn components shall be disposed of according to the regulations applicable in the country of installation.

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Related documentation

FG-200 HSE/FF Modbus - User Manual

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