

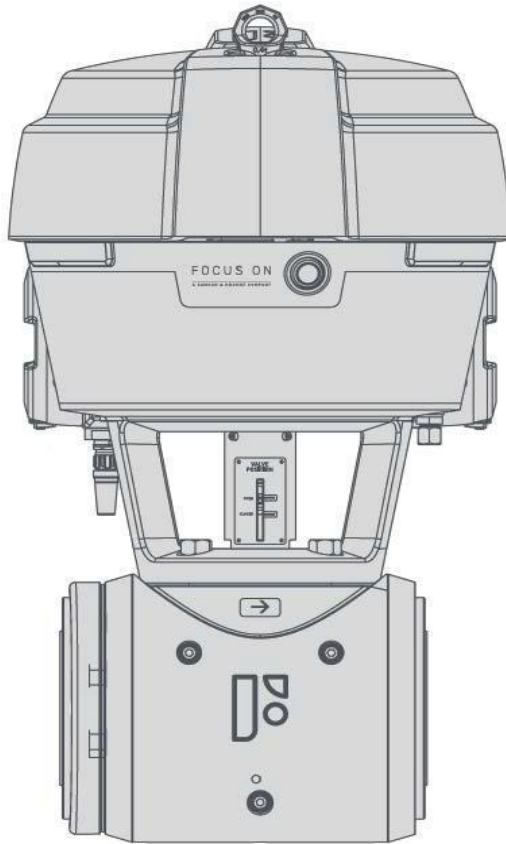


FOCUS ON



# FOCUS-1

Multipurpose Flow Control Instrument



User Manual  
HW\_V-4.5

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# 1. Design and principle of operation

## 1.1. Device description

FOCUS-1 has four instruments in one device. It measures liquid flow through the device using the Ultrasonics measurement principle. A pneumatic controlled globe valve controls the flow in the device. Two identical combined pressure and temperature sensors measure the inlet, outlet pressure, and pressure loss over the valve.

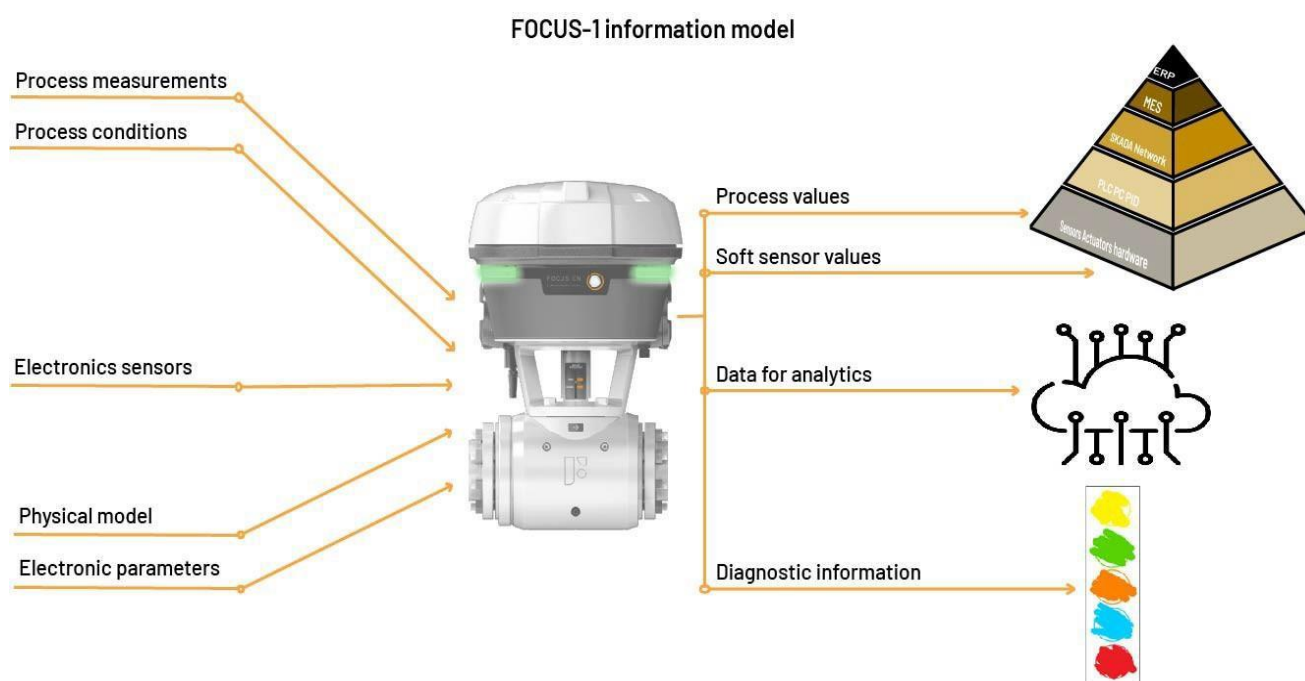
The main function of FOCUS-1 is controlling liquid flow. The device can be used in two different ways, a smart globe control valve or a smart flow control device.

All integrated instruments communicate with a central computer located in the electronics housing. This computer is responsible for:

- The control
- The interaction of device instrumentation
- Diagnostics
- Alarming

When configured as a smart control valve, the device responds exactly as a normal globe control valve to a given input signal.

When configured as a smart flow control device, the device behaves as a single loop controller. A given set-point inflow will be used to determine the correct valve position.



## 1.2. About this manual / device

Please compare this overview with the attached type plate on FOCUS-1 and with the order documentation to verify the product. All CE Directives and International legislation mandatory information can be found in the chapter [Safety information](#).

Device specifications:

Property	Value
Nominal diameter	DN50 / 2" inch   DN80 / 3" inch   DN100 / 4" inch
Nominal pressure	PN16 - EN 1092-1   PN40 - EN1092-1 CL 150 lb. ASME RF   CL 300 lb. ASME RF
Materials	Body / Bonnet Material: ASTM A351 Gr.CF8M / 1.4408 Stem & Seat Material: 316L / 1.4404 Plug Material: 316L / 1.4409 Plug & Seat facing: Metallic / Stellite® Sensor Diaphragm: 17-4PH / 1.4548 Sensor O-Ring: Silicone
Compliance/approval	EU - CE (RED, PED, RoHS); North America - Electrical safety, CRN Non-Ex variant
Flow direction	Left to Right   Right to Left
Safety position	Air fail Open   Air fail close
Power supply	AC : 100...250VAC, +10%...-15%, 30VA, 50-60 Hz DC : 18...36VDC Nominal current: 500mA @24VDC
Communication protocol	HART®, PROFINET, Ethernet/IP
Alarm configuration	Device critical alarms Advanced device & process alarms
Wireless broadcasting	Normal, button-operated Permanent ON
Seat bore configuration	SB 24 [0...130m <sup>3</sup> /h] SB 38 [0...40m <sup>3</sup> /h] SB 48 [0...80m <sup>3</sup> /h] SB 63 [0...80m <sup>3</sup> /h] SB 80 [0...130m <sup>3</sup> /h] SB 100 [0...40m <sup>3</sup> /h]
Actuator size	350cm <sup>2</sup>   750cm <sup>2</sup>

The generic device information is given in the next table.

Generic device information	
Overvoltage category	II
Material group	III (CTI:175...250)
Pollution degree	3
Humidity	1...100%
Ingress protection	Minimum IP44
Altitude	2000 m
Ambient temperatures	- 20...+ 55°C
Process temperatures	- 40...+ 180°C

### 1.3. Communication LEDs

Three groups of multiple LEDs located at the top cover of the FOCUS-1 device communicate the health status of the device and the process conditions in every direction. The 5 different colors each have an individual message and are according to the Namur NE107 guideline.

Color	Description
GREEN	Process and device are operating normally
RED	FOCUS-1 is in safety state and the valve is in the safe position
BLUE	FOCUS-1 needs maintenance
ORANGE	Someone is configuring the FOCUS-1
YELLOW	FOCUS-1 is operating but one or more process issues or device errors could reduce the lifetime or accuracy of the FOCUS-1

For more in-depth information about the message behind the communicated color, a connection with a smart device is needed as well as a person with the correct access rights.

### 1.4. Control functionality

In case FOCUS-1 is configured as a decentralized controller, the device will take over the control on flow from the DCS/PLC. The device receives from the DCS/PLC a set-point on flow value and uses that set-point to control the flow of the medium with a PID control algorithm. The PID algorithm can be auto-tuned via the user interface to specific process needs. The device can also be configured as a "normal" control valve. In that case, the DCS/PLC provides a valve set-point via the device input like a normal control valve.

### 1.5. Dashboard layout



## 1.6. Power connection

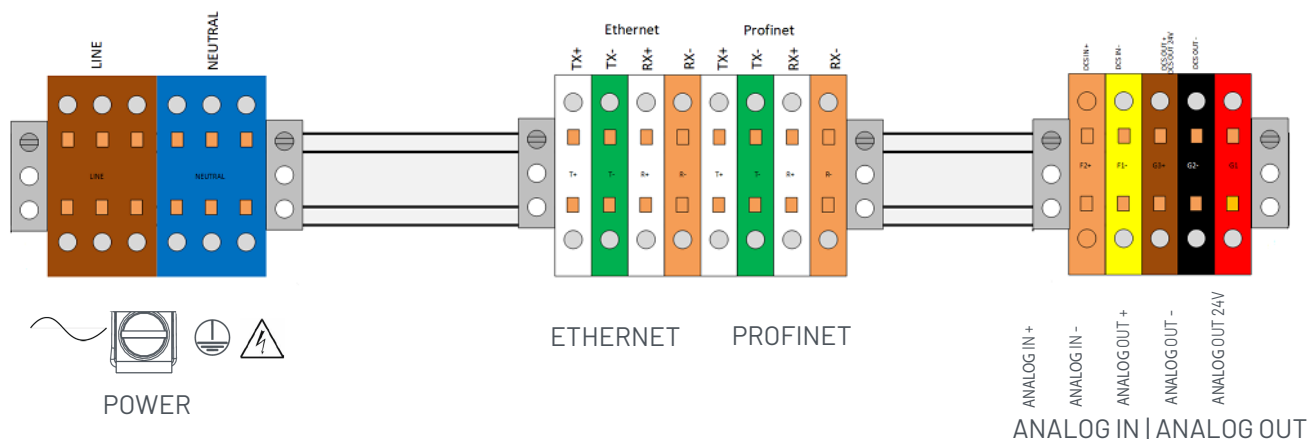
FOCUS-1 is intended for a permanent connection to the electrical power. The disconnecting means shall disconnect all current-carrying conductors. And needs to fulfill all below-mentioned requirements:

- ✓ A switch or circuit breaker must be included in the installation.
- ✓ The switch or circuit breaker and wirings have to be suitable for the installation and following the local (safety) requirements of the IEC60947-1 and/or IEC60947-3
- ✓ It must be suitably located and easily reached
- ✓ It must be marked as the disconnecting device for the equipment for example by mentioning the serial number on or just near the disconnection element
- ✓ it shall not be incorporated in a MAINS supply cable.
- ✓ it shall not interrupt the protective Earthing cable.

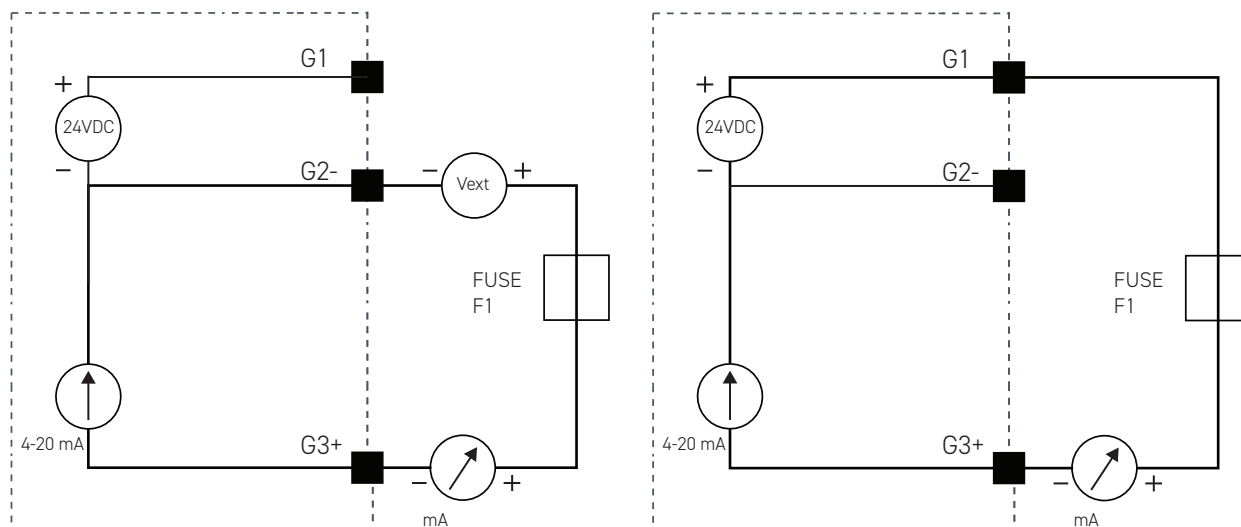
### FOCUS-1 AC terminals

AC range power supply:  
Nominal current:

85-250 VAC, 50/60Hz, 15VA,  
200 mA VRMS @230 VAC



#### AC ACTIVE AND PASSIVE 4-20 mA OUTPUT CONNECTION



AC Terminal marking	Description
Line	Connect line to the line terminal
Neutral	Connect neutral to the neutral terminal

	Min	Typ	Max
Vac[Vrms]	85		250
AC[freq]	50		60
Power[W]		15	
Withstand voltage input to PE/chassis/other circuits			1500VAC 1min
Withstand voltage input to other circuits			1500VAC 1min

AC Terminal marking	Description
Line	Mains wiring. Connect Line to these terminals
Neutral	Mains wiring. Connect Neutral to these terminals
TX+/ TX-	Ethernet: Transmit pair (white, orange/orange)
RX+/ RX-	Ethernet: Receive pair (white, green/green)
F2+	4-20mA input: + terminal
F1-	4-20mA input: - terminal
G3+	4-20mA output: + terminal
G2-	4-20mA output: - terminal
G1	4-20mA output: 24VDC

AC Power cable(copper core)	3 x 0,75 wires [mm <sup>2</sup> ]
LINE wire	Connect to the L terminal(green connector/brown wire)
NEUTRAL wire	Connect to the N terminal(grey connector / blue wire)
Earthing wire	Connect to the Earth block(yellow/green wire)
Cable gland	M12x1,5

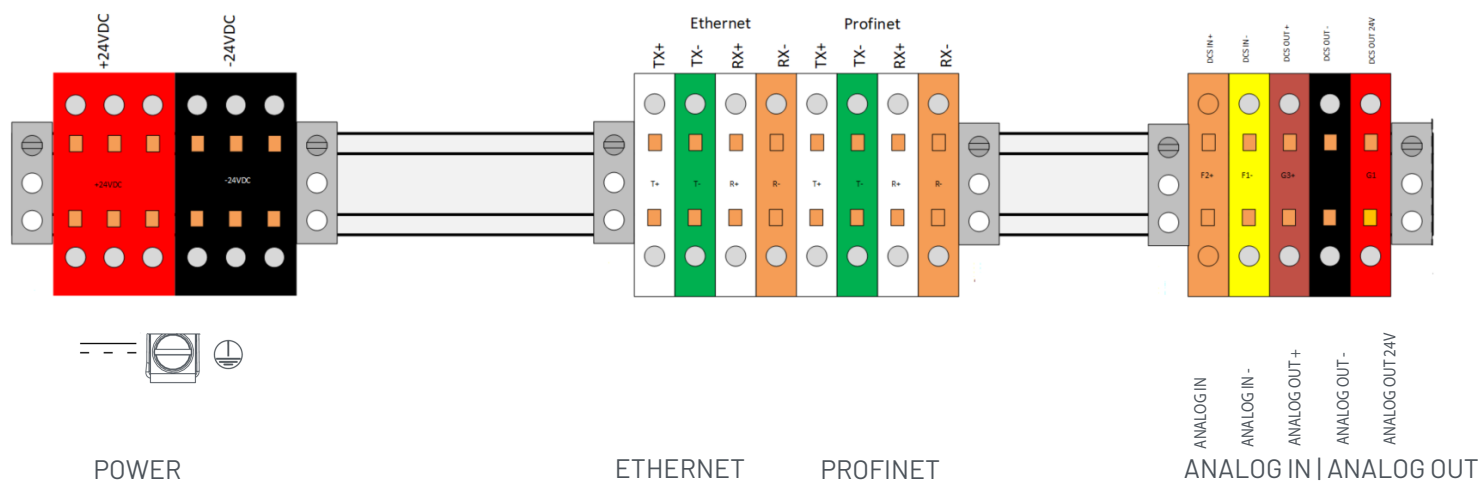
- ✓ Earthing(yellow/green) wire must be connected to the Earthing block inside the enclosure.
- ✓ The cable glands and the cables must be suitable for the application and follow the local safety requirements of the installation.
- ✓ On the external Earthing block (situated on the bottom of the connection compartment) can be connected an additional Earthing wire connected directly to the end user's Earthing system.



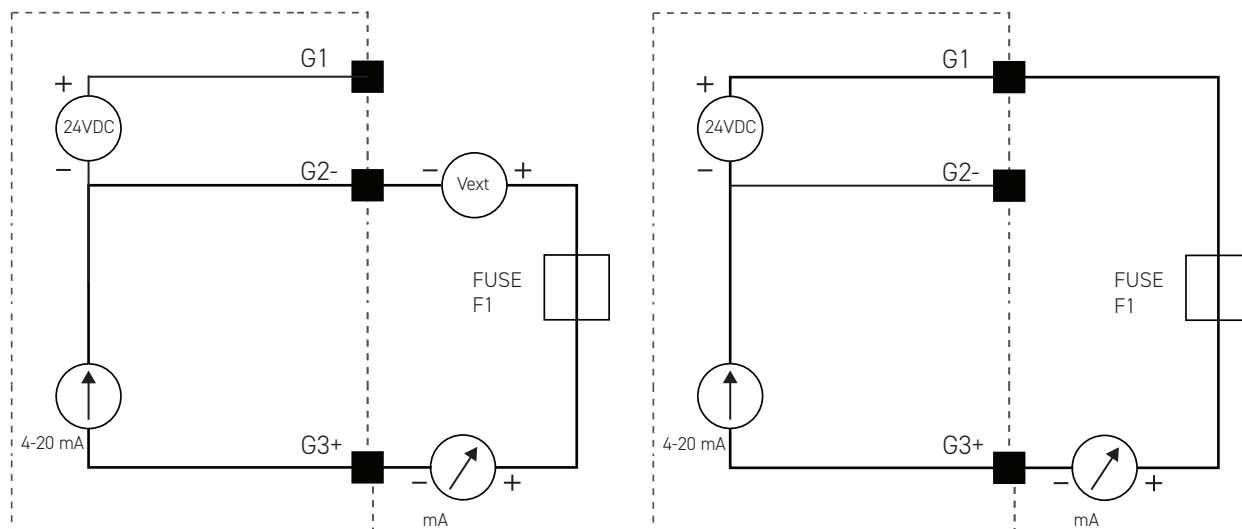
## FOCUS-1 DC terminals

DC range power supply:  
Nominal current:

18-32 VDC, 15 W  
500 mA @24 VDC



## DC ACTIVE AND PASSIVE 4-20 mA OUTPUT CONNECTION



DC Terminal marking description	Description
+24VDC	24VDC power supply: + terminal
-24VDC	24VDC power supply: - terminal

	Min	Typ	Max
VDC[V]	18		32
Power[W]		15	
The continuous voltage input to Chassis/PE			42
Withstand voltage input to other circuits			1500VDC 1 min

DC Terminal marking Description	Description
+24VDC	24 VDC power supply: + terminal
-24VDC	24 VDC power supply: - terminal
TX+/ TX-	Ethernet: Transmit pair (white-orange/orange)
RX+/ RX	Ethernet: Receive pair (white green/green)
F2+	4-20mA input: + terminal
F1-	4-20mA input: - terminal
G3+	4-20mA output: + terminal
G2-	4-20mA output: - terminal
G1	4-20mA output: 24VDC

DC Power cable (copper core)	2 x 0,75 wires [mm <sup>2</sup> ]
+24VDC wire	+24VDC terminal (red connector/brown wire)
-24VDC wire	-24VDC terminal (black connector/blue wire)
FE functional earthing wire	Do not disconnect yellow/green wire from the Earthing block
Cable gland	M12x1,5

- ✓ The DC FOCUS-1 power supply is protected using a 6.3A fuse slow blow fuse (Little fuse 047706.3MXP). The fuse can be changed only by the authorized persons of FOCUS-ON.
- ✓ The DC FOCUS-1 device is protected against polarity reversal on the 24VDC terminals.
- ✓ The FOCUS-1 DC variant requires a Functional earth (FE) connection to the chassis (see picture below). This connection is made, during manufacturing, inside the connection compartment and it should never be disconnected.
- ✓ The second Earthing block (situated on the bottom of the connection compartment) has to be used for the Protective Earth (PE) can be connected to the Earthing wire connected directly to the end user's Earthing system.

## 2. Device communication

### 2.1. Interacting with FOCUS-1

For interacting with FOCUS-1 there are no specific applications or software tools needed. The integrated on-board computer has an easy-to-access webserver. Via this webserver user can directly interact with the device. Please check the quick start document on how to connect to FOCUS-1 with a laptop, smart-phone, or tablet.

Users can configure the device to a specific situation and can evaluate and take action on every notification the device communicates. At first startup, the user will be guided in configuring the device.

All selected diagnostics messages will be communicated via the LEDs to see from a far distance that the overall status of the device is clear.

Via the HART7 protocol, a high-level alarm will be communicated to the asset management system. The HART7 protocol is too limited to be able to configure the device. The configuration of the device via HART7 is limited to the Universal Commands and some common practice commands. For complete and easy configuration, the connection needs to be made to the device directly.

For more information on the available HART functionality, please read the Field Device Description which is download-able from FOCUS-1.



We strongly suggest setting up this device according to the company's own IT security standard guidelines with password control and user access rights.

### 2.2. Connecting to FOCUS-1

FOCUS-1 is one of the first devices that integrates a compute module. This compute module gives more control and user-friendly access to FOCUS-1. Any user can connect to the device to see the FOCUS-1 main dashboard. For configuration, download of data, or any other activity, login credentials are required.

The FOCUS-1 device has an integrated webserver. This means no need for downloading any app to interact with FOCUS-1. A laptop, smart-phone, or tablet with a working WIFI connection is sufficient. A three-second button press and the WPA password 1234focus, are needed to connect to the device. For more information on how to connect to the device, please check the QuickStart guide.

To support the usability of the software, detailed help screens are integrated into the software. On every screen of FOCUS-1, a click-able "?" icon is available. Clicking this icon gives detailed information on what can and needs to be done.

There are two ways to connect to FOCUS-1:

- 1) When close to FOCUS-1, via the device button on the device and enabled Wi-Fi communication on smart-phone, tablet, or laptop
- 2) Via hard-wired connected Ethernet connection

Connecting to FOCUS-1 can be done via a smart-phone, tablet, or computer. Make sure that the smart-phone, laptop, or tablet has WIFI communication enabled.

Please see the quick start manual for connecting to the device.

### 2.3. Wi-Fi, Ethernet, Profinet and web server

FOCUS-1 has an integrated webserver. This means that the user does not need to download an application for interacting with FOCUS-1. A smart device with an operating WIFI connection is enough. It is also possible to connect a physical ethernet cable for a permanent connection to the device via connectors 1...4.

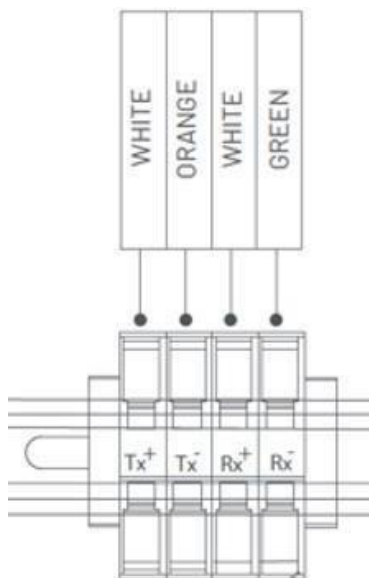


#### Wi-Fi - General Specification

Wireless Standard	802.11 b/g/n
Module Type	Standalone or Host Controller Interface (HCI)
OS Compatibility	Linux
Security	WPA, WPA-PSK, WPA2, WPA2-PSK and WEP (64bit & 128bit)
Interface	USB 2.0
Range	Up to 180 m
Data transfer Rate	802.11b:1, 2, 5.5, 11Mbps; 802.11g:6, 9, 12, 24, 36, 48, 54 Mbps 802.11n, MCS0 to 7 for HT20MHz, MCS0 to 7 for HT40MHz
Frequency	2.4 GHz to 2.4835 GHz
Operating channel	11: (Ch. 1-11) - USA & North America 13: (Ch. 1-13) - Europe 14: (Ch. 1-14) - Japan

## Ethernet

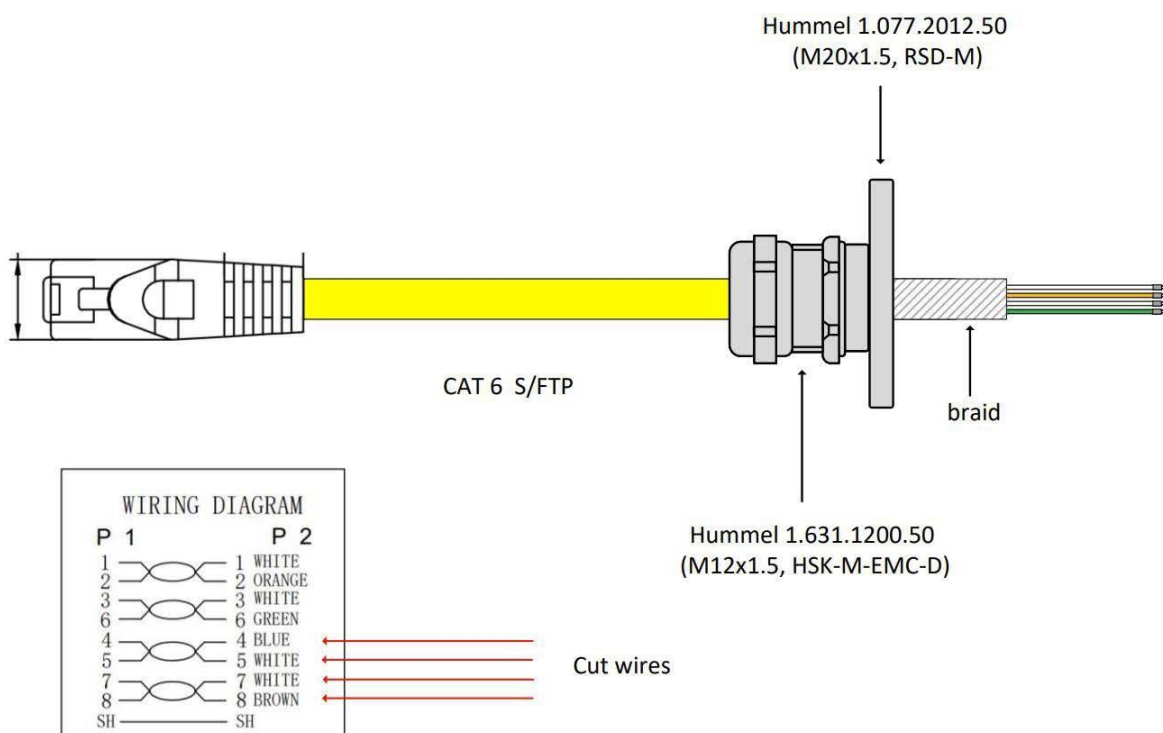
- ✓ Ethernet connection is released using the special selected 4 blocks connector transmit (Tx+/Tx-) and receive (Rx+/Rx-).
- ✓ Ethernet interface supports HP-AUTO-MDIX, TX+/TX- can function as RX+/RX- and vice-versa. For connection to Ethernet use a shielded cable in combination with an EMC cable gland.



Ethernet	Min	Typ	Max
Isolation	Ethernet input is electrically isolated from all other circuits		
Withstand voltage to other circuits			1500 VAC 1min
Continuous voltage to other circuits			250 VAC

- ✓ For an Ethernet connection, a shielded cable has to be used in combination with the suitable cable gland. The shielding of the cable has to have good contact with the metal enclosure through the cable gland.
- ✓ When an entry of the connection compartment is not used, the empty entry has to be provided with a metal blind plug with a minimum ingress protection of IP44 depending on the IP value of the FOCUS-1 device.

FOCUS-1 generates large amounts of data that can be used for asset management and process optimization. On the device is enough storage capacity to store the device and process data for a period of one year. At any time, the user can remotely connect via WIFI or ethernet to the device to download data and process information. FOCUS-1 will function normally when it is not connected via WIFI or ethernet.



For a stable connection over the ethernet connection, a shielded ethernet cable must be used in combination with the suitable cable gland. Please pay close attention to identifying the right colored cables and connector numbers, and use cable lugs for a robust connection.

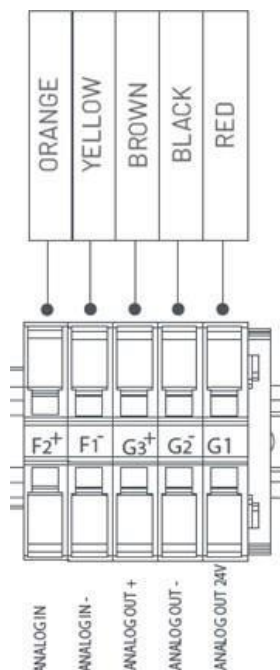
When the ethernet port is not used and leaves an empty entry, the empty entry has to be provided with a metal blind plug with a minimum ingress protection of IP44.

	Min	Typ	Max
Withstand voltage to other circuits			1500VAC 1min
Continuous voltage withstand to other circuits			300VAC

Isolation, Ethernet input is electrically isolated from all other circuits.

## 2.4. Analog HART input

FOCUS-1 has one analog 4...20mA input and one analog 4...20mA output. The 2-wire 4...20mA current loop is connected to the two terminals marked '4-20mA IN'. Terminal F2+ is for the positive and terminal F2- is for the negative connection. We strongly suggest that shielded cables are used for the connection.



Analog input 4-20mA	Min	Typ	Max
Input voltage [V]			38
Protection	Input is protected against polarity reversal. Electronic fuse limits input current to 35mA		

Only the analog input has HART7 functionality. For more information on the available HART functionality, please see the Field Device Description that can be downloaded from the device.

Since the device can be configured in two ways depending on the process conditions and the preferred automation solution, the input is also freely configurable. The input can be configured as follows:

Valve position setpoint

FOCUS-1 can be configured as a normal globe control valve. The analog input signal will be interpreted as a valve setpoint.

Liquid flow setpoint control

FOCUS-1 can also be configured to act as a local single loop controller. In this case, the input signal will be interpreted as a given setpoint inflow.

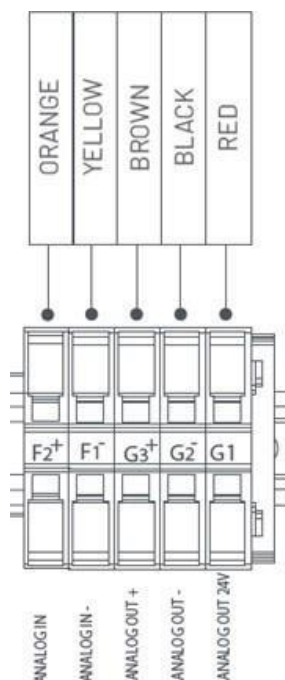
If FOCUS-1 is configured to control the process flow via FOCUS-1, then the device offers an autotuning functionality. This functionality will help set up the process behavior of the device.

For more information on HART integration, please see the Field Device Description document.

### 2.4.1. Analog output

FOCUS-1 device has been provided with an active or a passive 4-20 mA output; The passive 4-20 mA output requires an external 24 VDC power supply.

Depending on the electronics version, the user can select the active or passive current output for the 4...20mA. The far-most right connector blocks are for the 4-20mA output.



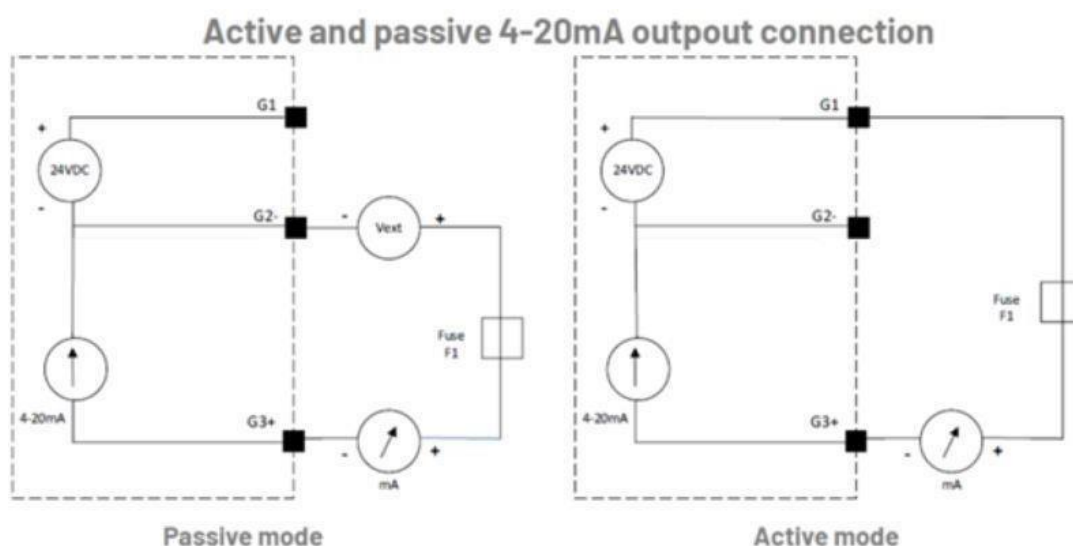
Analog output (4-20mA)	Min	Typ	Max
Passive output current [mA]	0		22
Input voltage [V]		24	38
Protection	Output is protected for polarity reversal		
Active 4-20 [mA] output			
Input voltage [V]	23,4	24	24,3
Output current [mA]	0		42

Analog In/Out Isolation	Functional isolation between Analog IN/Analog OUT/ Analog POWER Analog circuits (IN/OUT/POWER) are isolated from all other circuits and chassis/PE		
	Min	Typ	Max
Withstand voltage to chassis			1500VDC 60s
Withstand voltage to other circuits			1500VDC 60s
Continuous voltage to chassis			250VAC
Continuous voltage other circuits			250VAC



Terminal Marking	Description
G3+	4-20mA output: + terminal
G2-	4-20mA output: - terminal
G1	4-20mA output: 18-32VDC
F2+	4-20mA input: + terminal
F1-	4-20mA input: - terminal

The figure below shows how to connect the 4-20mA output for active and passive configuration.



The current output is freely selectable and can communicate the user's desired process values.

The analog output from FOCUS-1 gives the user the freedom to communicate the specific process measurement value that is needed in the process. Users can choose from the following:

- Volume flow
- Valve position
- Downstream pressure
- Upstream pressure
- Pressure loss over the FOCUS-1 device

At the first startup of the device, the user will be guided through the configuration of the in- and output settings of FOCUS-1.

If the user selects valve position as the output value, then the range is already set. Depending on the hardware configuration, *Air to Open* or *Air to Close*, 4 mA or 20 mA is either fully open or fully closed. The analog value communicates percentage open or closed.

## Volume flow

The actual volume flow can be communicated like a "normal" flow meter over the 4...20mA output. The range is configurable via the integrated webserver.

## Upstream pressure

The actual upstream process pressure can be communicated like a "normal" pressure sensor over the 4...20mA output. The range is configurable via the integrated webserver.

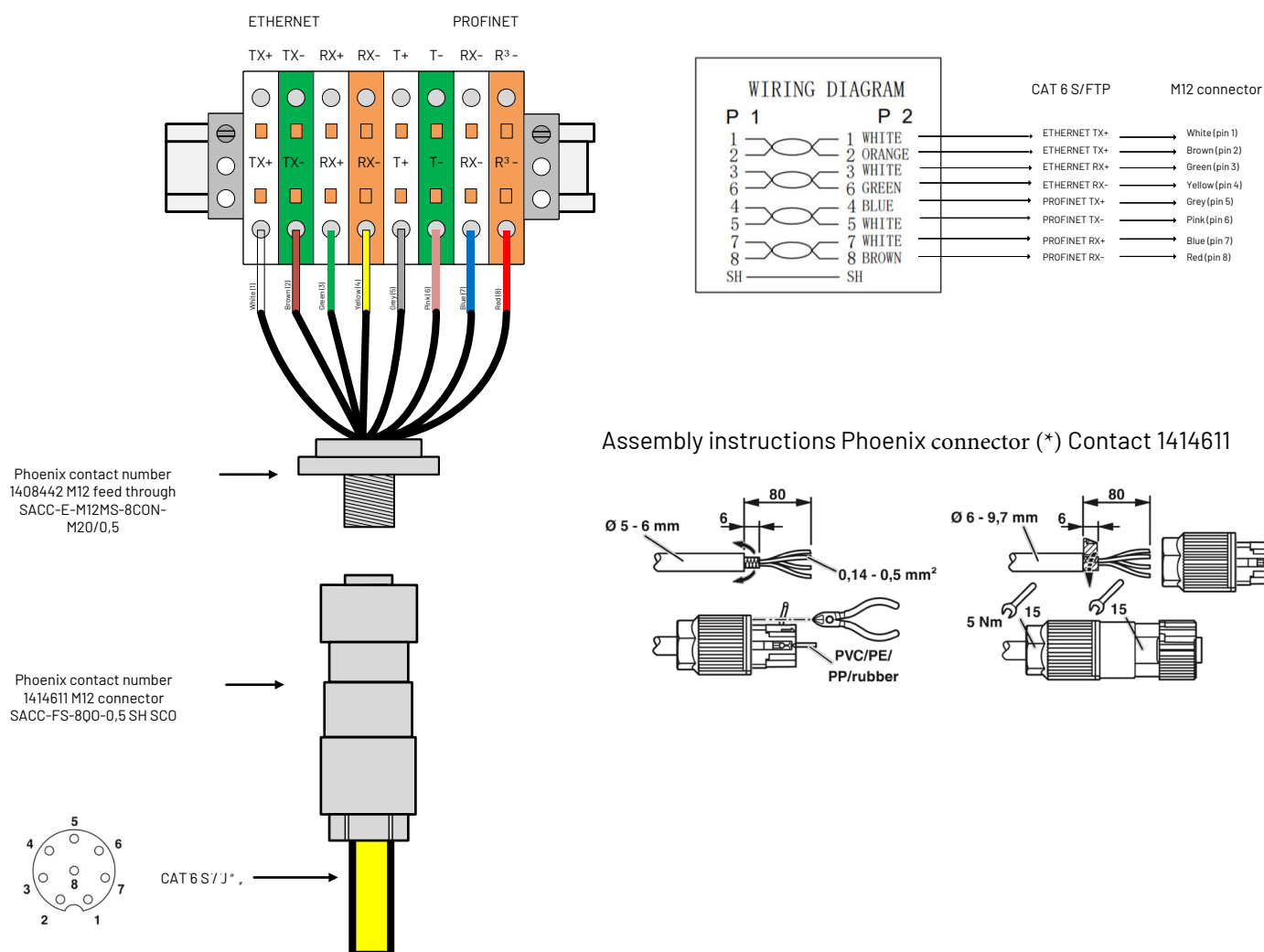
## Downstream pressure FOCUS-1

The actual downstream pressure can be communicated like a "normal" pressure sensor over the 4...20mA output. The range is configurable via the integrated webserver.

## Pressure loss over FOCUS-1

The pressure loss over the valve can be communicated via the 4...20mA. Fully opened results in minimal pressure difference and fully closed in maximum pressure difference. The range is configurable via the integrated webserver.

## 2.5. Profinet connection



For further detail about the Profinet connection the device to a PROFINET IO network, consult FOCUS-1 Profinet Supplementary Instructions (TD-088) and Assembly instruction (TD-091).

(\*) the connector is not part of the delivery, it is an recommendation/example

## 2.5. User roles and permissions

FOCUS-1 has integrated user roles with different access rights and the administrator can assign users to the available user roles. All activities are logged in the audit trail.

FOCUS-1 has five different user roles:

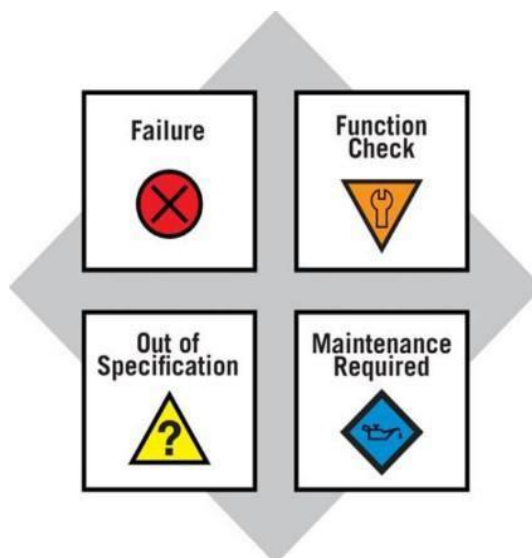
- User administrator
- Superuser
- Process operator
- Service (E&I) engineer
- FOCUS-ON service engineer

The roles and permissions of each role are described in the following table:

Roles & permissions	Administrator	Superuser	Process operator	Service (E&I) engineer
Main FOCUS-1 Dashboard	X	X	X	X
User administration	X	X		
Process & device data download		X		
Maintenance (manual operation)		X	X	X
Configuration & Control		X	X	X
Process medium settings		X	X	X
IO configuration		X		X
Network settings		X		X
System update		X		
Restore factory settings		X		X
Audit log download	X			

### 3. Alarms and notifications

FOCUS-1 communicates alarms and precautions by the Namur NE107 standard. This standard simplifies the device and process condition communication.



Color	Status	Remarks
RED	Failure	The device is not functioning
ORANGE blinking slow	Function check	The device is currently being configured
YELLOW	Out of specification	The device is working but might be out of specification
BLUE	Maintenance required	One or more parts are broken down and require maintenance
BLUE blinking fast	wifi connecting	After button press device ready for pairing
BLUE blinking slow	wifi connected	Device webserver available
ORANGE blinking fast	HART Squawk command enabled	HART command for finding FOCUS1 in multi-drop or multi-pair cable installation

All alarms including descriptions are stored for a period of one year and can be downloaded from FOCUS-1. Details on the different colors of the LED are given in the next subsections.

### 3.1. LED is red

If the LED is red, the FOCUS-1 is not functioning.

There are two different causes for the product to fail in its function:

- 1) Ambient related, outside the scope of FOCUS-1
- 2) Device related, failing parts within FOCUS-1

When an ambient-related alarm is solved, FOCUS-1 automatically switches to normal operation.

All critical alarms:

Alarm code Red	Description	Ambient & Process	Device	Remark	Alarm configuration
Two or more sensors are failing	FOCUS-1 is not able to control the flow anymore. FOCUS-1 can be reconfigured to operate as a "normal" control valve		X	Please plan maintenance as soon as possible.	Device critical
Analog input not present	There is no 4-20mA signal available on the input	X		FOCUS-1 is in its safe position	Device critical
Loss of air pressure	No instrument air pressure available.	X		FOCUS-1 is in its safe position	Device critical
Positioner is failing	No actuator control is possible.		X	FOCUS-1 is in its safe position	Device critical

### 3.2. LED is orange

If the LED is orange, the FOCUS-1 is being configured by the user.

The user accesses the device and places it in maintenance mode. At that moment the device will activate the orange LED and communicates this status via HART.

### 3.3. LED is yellow

If the LED is yellow, the FOCUS-1 is operational but likely running out of specifications.

Alarm code Yellow	Description	Ambient & Process	Device	Remark	Alarm configuration
Air pressure too low	FOCUS-1 air supply pressure is too low, control functionality is not guaranteed.	X		Increase air pressure to FOCUS-1	Device critical
Air pressure too high	FOCUS-1 air supply pressure is too high, control functionality is not guaranteed.	X		Decrease air pressure to FOCUS-1	Device critical
Process pressure too high	The process pressure is more than 40 Bar and below 80 Bar.	X		Check process	Process critical
Cavitation	Cavitation in FOCUS-1 due to process conditions can decrease the life expectancy of the body, plug & seat.	X		Check process	Process Indictive
Flashing	Flashing in FOCUS-1 due to process conditions.	X		Check process	Process indictive
Flow Setpoint deviation	The requested setpoint is deviating (>3%) from the actual flow value.	X	X	Consider autotuning and check process	Device critical
Empty pipe	No liquid is present in the pipe.	X		Check process	Process predictive
Ambient temperature too high	Ambient temperature >55°C. This will affect the lifetime of the electronics. Device specifications are no longer guaranteed.	X		Try to reduce ambient temperature	Process critical
Ambient temperature too low	Ambient temperature <-40°C. A lifetime of electronics will be affected. Device specifications are no longer guaranteed. Try to increase the ambient temperature.	X		Try to increase the ambient temperature	Process critical
Process medium temperature too high	Process temperature is >180°C. Pressure & Temperature sensors could break down.	X		Check process	Process critical

Alarm code Yellow	Description	Ambient & Process	Device	Remark	Alarm configuration
Process medium temperature too low	Process temperature is $<-40^{\circ}\text{C}$ . Pressure & Temperature sensors could break down.	X		Check process	Process critical
The flow sensor is failing	The ultrasonic flow measurement is failing due to process conditions. Flow value is calculated. Device specifications can no longer be guaranteed.	X	X	Check process to assure correct process conditions	Device predictive
Pressure 1 sensor is failing	The upstream sensor is not measuring. Measurement values are calculated.		X	Plan maintenance	Device predictive
Pressure 2 sensor is failing	The downstream sensor is not measuring. Measurement values are calculated		X	Plan maintenance	Device predictive
Internal Valve leakage	The process flow is measured while the valve is closed		X	Plain maintenance	Device predictive

### 3.4. LED is blue

If the LED is blue, the FOCUS-1 requires service.

Alarm code Blue	Description	Ambient & Process	Device	Remark	Alarm configuration
Two or more sensors are failing	FOCUS-1 is configured as a control valve and is still able to control		X		Device predictive
Setpoint deviation on valve position	Setpoint deviation, ( $>3\%$ ) from the actual position		X		Device predictive

## 4. Software

FOCUS-1 has a web server onboard which gives a simple and clear interaction with the device. To be able to interact with the device, the user has to create a wired or wireless Ethernet connection to the device. Please see the QuickStart for making this connection.

Once the connection is made between FOCUS-1 and a laptop, smart-phone, or tablet, the user will be guided through the configuration steps. This will only happen once, at the first startup of the device. Every screen has a question mark icon, when clicked this icon will give more information about the relating topic.

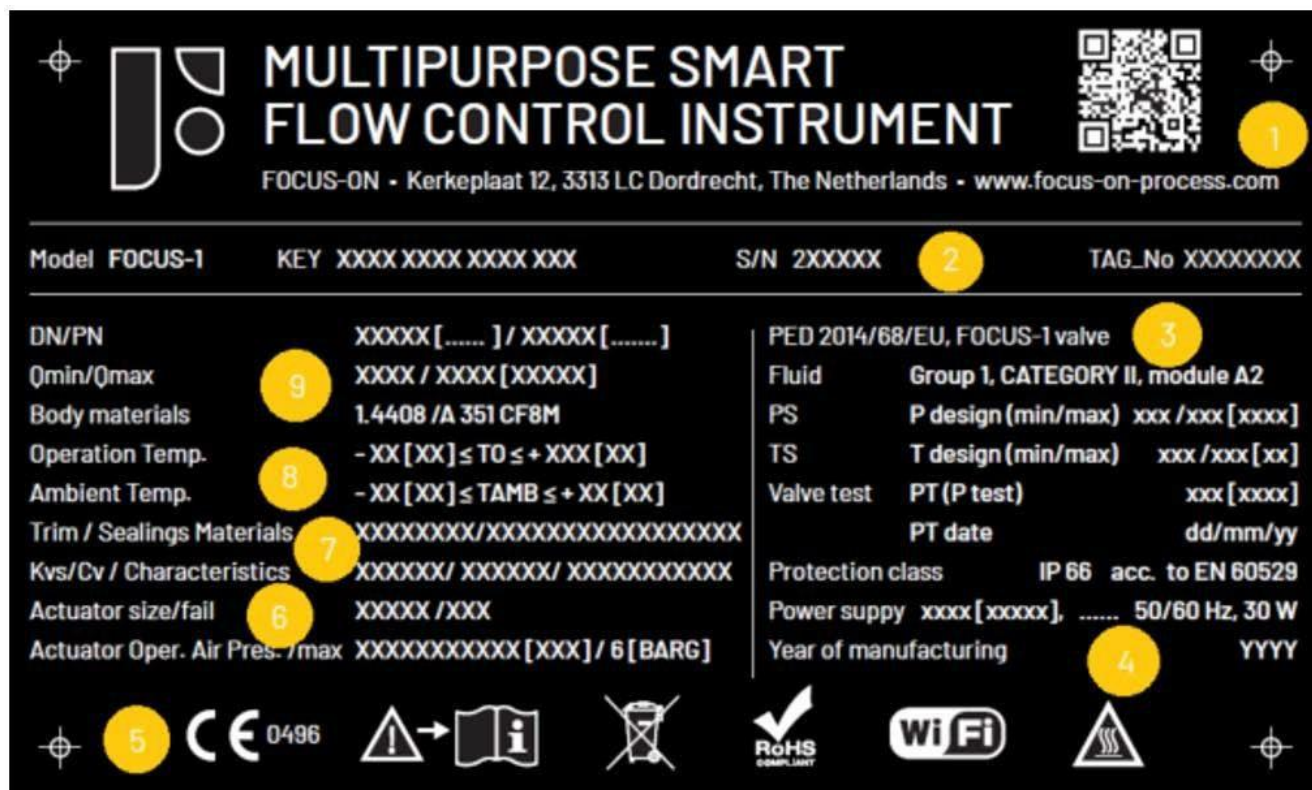
### IT Security

As FOCUS-1 has a computer on-board with wired/wireless TCP/IP, IT security functionality is integrated into the device. For accessing the device via a wireless connection, a WPA code is needed. This WPA code is 1234focus. Connecting to the device gives the user direct access to the device dashboard without any restrictions. The important device, process information, and diagnostics are visible in one overview. Configuration changes need a unique user and password. Besides the WPA access code, an extensive user administration is integrated with unique user roles. Only the administrator can create unique users with their unique passwords. After that users can change their password, the administrator can reset the passwords of the other users. Every action of every user is being logged and the complete audit trail can be downloaded by the administrator from the device for analysis purposes.



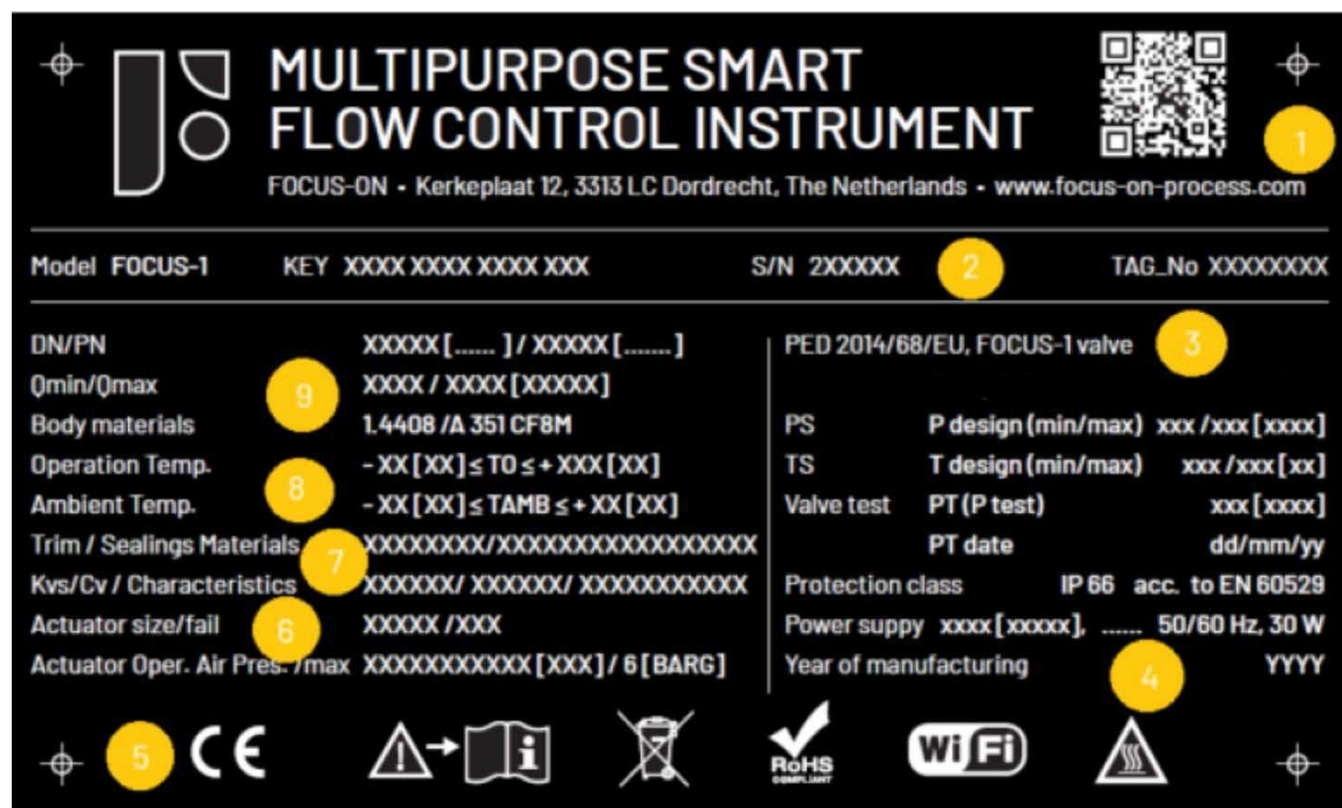


## 5. Markings on the device









- ✓ Name and address of the manufacturer
- ✓ S/N: Serial number (unique number)
- ✓ PED Data
- ✓ Power supply information
- ✓ Warnings
- ✓ Actuator specifications
- ✓ Valve specifications
- ✓ Ambient and operating temperature
- ✓ Device specifications

CE 0496 - PED NoBo number: DNV GL Business Assurance, Via Energy Park 14, 20871 - Vimercate (MB) Italy



- ✓ Name and address of the manufacturer
- ✓ S/N: Serial number (unique number)
- ✓ PED Data
- ✓ Power supply information
- ✓ Warnings
- ✓ Actuator specifications
- ✓ Valve specifications
- ✓ Ambient and operating temperature
- ✓ Device specifications

More information about the warning and information icons is given in the next overview.

	<p>CE marking: The FOCUS-1 device is compliant with the essential requirements of health, safety, and environmental protection standards within the European Economic Area (see the Declaration of Conformity); NoBo 2388 DNV-GS assists FOCUS-ON to establish the compliance with PED Directive.</p>
	<p>Read the user manual and quick start guide before starting operation.</p>
	<p>The symbol for separated collecting and recycling of electrical and electronic equipment.</p>
	<p>Compliance symbol for the Restriction of Hazardous substances guideline.</p>
	<p>FOCUS-1 is provided with a Wifi communication module.</p>
	<p>Depending on the medium flowing through FOCUS-1, the valve body can be hot.</p>

## 6. Decommissioning

The work described in this section is only to be done by personnel qualified for the assignment and when they use personal protection if process media or ambient conditions require this.

To decommission FOCUS-1 for service work or to remove it from the pipeline, do the following steps:

- 1) Close shut-off valves if these are present.
- 2) Completely drain the pipelines and valve.
- 3) Switch off the power supply to the device.
- 4) Unscrew all wirings from the electronics cabinet.
- 5) Remove the air pressure from the device.
- 6) Mount the hoisting eye bolts on top of the device.
- 7) Open the valve covers so that flange bolts become reachable.
- 8) Make sure that the device is held in position with the help of lift support via a strap through the hoisting eyes.
- 9) Unscrew all bolts.
- 10) Reattach the valve covers.
- 11) Remove the device from the pipeline.

## 7. Repairs

It is highly recommended that all repairs are done by FOCUS-ON certified personnel.

If FOCUS-1 does not function properly according to how it was originally sized or does not function at all, it is defective and must be repaired or exchanged.

Risk of damage due to incorrect repair work

- FOCUS-1 is a highly intelligent product that integrates multiple functionalities. We gladly offer our knowledge and experience in servicing this unique device.
- Only FOCUS-ON certified parts and software may be used on FOCUS-1.
- Contact FOCUS-ON's after-sales service for repair work.

Returning FOCUS-1 to FOCUS-ON

If the FOCUS-1 cannot be repaired, the defective device can be returned to FOCUS-ON for repair. Proceed as follows:



- 1) Send an e-mail > to register the return shipment with the following information:
  - Serial Number, see type plate on the back of the device
  - Completed declaration on contamination which can be found in Appendix A of this manual
  - Company address to return FOCUS-1 after repairs have been done
  - Contact detailsWe will send a Return Merchandise Authorization (RMA) after checking the registration.
- 2) Attach the RMA (together with the declaration of decontamination) on the outside of the packaging so the documents are visible.
- 3) Ship to the address given on the RMA.

Further information on returning FOCUS-1 and how it should be handled can be found in Appendix B.

FOCUS-1 has one long-life battery implemented in the electronics for keeping the real-time clock functionality when there is no power available for FOCUS-1. This is a 3V Lithium Battery CR1225. Only FOCUS ON service employees is allowed to charge this battery.

## 8. Safety information

### 8.1. Intended use

 CAUTION!	Responsibility for the use of the measuring devices about the suitability, intended use, and corrosion resistance of the used materials against the measured fluid lies solely with the operator.
	The manufacturer is not liable for any damage resulting from improper use or use other than the intended purpose.

The FOCUS-1 device is designed exclusively for controlling conductive and/or non-conductive fluids in closed-filled pipelined circuits.

### 8.2. Certification



The device fulfills the statutory requirements of the following EU directives:










- Radio Equipment Directive (RED)-2014/53/EU
- Pressure Equipment Directive-2014/68/EU
- Machine Directive-2006/42/EU
- RoHS Directive 2011/65/EU
- WEEE-2012/19/EU

The manufacturer certifies successful testing of the product by applying the CE marking.

### 8.3. Safety instructions from the manufacturer

Warnings and symbols used

Safety warnings are indicated by the following symbols:

<i>DANGER!</i> 	This warning refers to the immediate danger when working with electricity.
<i>DANGER!</i> 	This warning refers to the immediate danger of burns caused by heat or hot surfaces.
<i>DANGER!</i> 	This warning refers to the immediate danger when using this device in a hazardous atmosphere.
<i>DANGER!</i> 	These warnings must be observed without fail. Even partial disregard of this warning can lead to serious health problems and even death. There is also the risk of seriously damaging the device or parts of the operator's plant.
<i>WARNING!</i> 	Disregarding this safety warning, even if only in part, poses the risk of serious health problems. There is also the risk of damaging the device or parts of the operator's plant.
<i>CAUTION!</i> 	Disregarding these instructions can result in damage to the device or parts of the operator's plant.
<i>INFORMATION!</i> 	These instructions contain important information for the handling of the device.
<i>LEGAL NOTICE!</i> 	This note contains information on statutory directives and standards.
<i>HANDLING!</i> 	This symbol designates all instructions for actions to be carried out by the operator in the specified sequence.

### Copyright and data protection

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We draw your attention to the fact that data transmission over the Internet (e.g. when communicating by e-mail) may involve security gaps. It is not possible to protect such data completely against access by third parties.

### Disclaimer

The manufacturer will not be liable for any damage of any kind by using its product, including, but not limited to direct, indirect or incidental, and consequential damages.

The disclaimer does not apply in case the manufacturer has acted on purpose or with gross negligence. In the event any applicable law does not allow such limitations on implied warranties or the execution of limitation of certain damages, you may, if such law applies to you, not be subject to some or all of the above disclaimer, exclusions, or limitations.

Any product purchased from the manufacturer is warranted by the relevant product and Terms and Conditions of Sale.

The manufacturer reserves the right to alter the content of its documents, including this disclaimer in any way, at any time, for any reason, without prior notification, and will not be liable in any way for possible consequences of such changes.

### Product liability and warranty

The operator shall bear responsibility for the suitability of the device for a specific purpose. The manufacturer accepts no liability for the consequences of misuse by the operator. Improper installation or operation of the devices (systems) will cause the warranty to be void. The respective "Standard terms and Conditions" which form the basis for the sales contract shall also apply.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.




The manufacturer accepts no liability for the consequences of misuse by the operator. Improper installation or operation of the devices (systems) will cause the warranty to be void. The respective "Standard terms and Conditions" which form the basis for the sales contract shall also apply.



### Information concerning the documentation

To prevent any injury to the user or damage to the device it is essential that you read the information in this document and observe applicable national standards, safety requirements, and accident prevention regulations. If this document is not in your native language and if you have any problems understanding the text, we advise you to contact your local office for assistance. The manufacturer cannot accept responsibility for any damage or injury caused by a misunderstanding of the information in this document. This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device. Special considerations and precautions are also described in the document, which appears in the form of icons as shown below.

## 8.4. Safety instructions for the operator

<p><i>WARNING!</i></p> 	<p>In general, devices from the manufacturer may only be installed, commissioned, operated, and maintained by properly trained and authorized personnel. This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device.</p>
	<p>FOCUS-1 device is not suitable to be used in a hazardous atmosphere. FOCUS-1 device is intended for permanent connection to the mains power. It is required to mount an external power supply switch or circuit-breaker for disconnecting the device from the mains power. It shall be easily reachable by the operator. The switch or circuit breaker and wirings have to be suitable for the application and shall also be by the local(safety) requirements of the (building) installation (e.g. IEC 609-1/-31). The cable glands and the wirings have to be suitable for the application and also by the local safety requirements of the installation. For an Ethernet connection, a shielded cable has to be used in combination with the suitable cable gland. The shielding of the cable has to have good contact with the metal enclosure through the cable gland. When an entry is not used of the electronic connection cabinet, the provided metal IP68 blind plug must be used.</p>
<p><i>DANGER!</i></p> 	<p>FOCUS-1 device has to be grounded by regulations to protect personnel against electric shocks. The protective ground PE of the power supply must be connected to the separate U-clamp terminal.</p>

## 8.5. Responsibilities of the operator

The operator is responsible for proper operation and compliance with the safety regulations. Operators are obliged to provide the mounting and operating instructions as well as the referenced documents to the operating personnel and to instruct them in proper operation. Furthermore, the operator must ensure that operating personnel or third persons are not exposed to any danger.

## 8.6. Responsibilities of operating personnel

Operating personnel must read and understand the mounting and operating instructions as well as the referenced documents and observe the specified hazard statements, warnings, and caution notes. Furthermore, the operating personnel must be familiar with the applicable health, safety, and accident prevention regulations and comply with them.

## 8.7. Personal protective equipment

We recommend checking the hazards posed by the process medium being used (e.g. GESTIS (CLP) hazardous substance database). Depending on the process medium and/or the activity, the protective equipment required includes:

- Protective clothing, safety gloves, and eye protection in applications with hot, cold, and/or corrosive media
- Wear hearing protection when working near the valve
- Hard hat
- Safety harness when working at height
- Safety footwear, ESD (electrostatic discharge) footwear, if necessary

Check with the plant operator for details on further protective equipment.

## 8.8. Notes on personal injury

Notes on possible severe personal injury:

FOCUS-1 and pipelines are pressure equipment. Impermissible pressure or improper opening can lead to FOCUS-1 components bursting.

- Disconnect FOCUS-1 from power.
- Observe the maximum permissible pressure for FOCUS-1 and plant.
- Before starting any work on FOCUS-1, depressurize all plant sections affected as well as the valve.
- Drain the process medium from all the plant sections concerned as well as FOCUS-1.

Notes on possible personal injury:

Depending on the process medium, FOCUS-1 components and pipelines may get very hot or cold and cause burn injuries.

- Wear protective clothing and safety gloves.
- Allow components and pipelines to cool down or heat up.

Risk of hearing loss or deafness due to loud noise:

The noise emissions depend on process conditions, plant facilities, and the process medium.

- Wear hearing protection when working near FOCUS-1.

Risk of personal injury due to exhaust air being vented:

While FOCUS-1 is operating, the actuator may vent during closed-loop control, or when FOCUS-1 opens or closes.

- Install FOCUS-1 in such a way that vent holes are not located at eye level and the actuator does not vent at eye level work position.
- Wear eye protection when working near FOCUS-1.

Crush hazard arising from moving parts:

FOCUS-1 contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into FOCUS-1.

- Do not insert hands or fingers into the yoke while the air supply is connected to the actuator.
- Before working on FOCUS-1, disconnect and lock the pneumatic air supply as well as the control signal.
- Do not impede the movement of FOCUS-1 and plug the stem by inserting objects into the yoke.

Risk of personal injury due to preloaded springs:

FOCUS-1 has preloaded springs that are under tension.

- Before starting any work on the actuator, relieve the compression from the preloaded springs (see Service documentation)

Risk of personal injury due to residual process medium in valve:

While working on FOCUS-1, residual process medium can escape and, depending on its properties, may lead to personal injury (e.g. chemical burns).

- If possible, drain the process medium from all the plant sections affected and the valve.
- Wear protective clothing, safety gloves, and eye protection.

## 8.9. Notes on property damage & misuse

FOCUS-1 is designed for measuring and controlling liquid media in the process industry. FOCUS-1 can be damaged in the wrong process conditions:

- Process conditions that lead to cavitation
- More than 5% solid particles in the process
- Operating outside design specifications
- Installation errors

Cavitation conditions

Certain process conditions can lead to the introduction of cavitation by FOCUS-1. FOCUS-1 will generate an alarm as soon as it detects cavitation. This allows users to adapt the process to reduce cavitation. In case process adaption is not possible the lifetime of FOCUS-1 can be reduced.

Solid particles

FOCUS-1 can be damaged due to contamination (e.g. abrasive solid particles) in the pipeline. The plant operator is responsible for cleaning the pipelines in the plant. Flush the pipelines before start-up.

### Operating outside design specifications

FOCUS-1 is developed with a broad application range in mind. Using FOCUS-1 outside its design parameters will cause the device to fail. Therefore, use FOCUS-1 in the right ambient and process conditions.

### Installation and in-use precautions

FOCUS-1 combines the best mechanical, electronic, and software technology, currently available. To protect the sensors and wiring, covers may only be removed at installation. After installation covers must be reinstalled immediately.

In warm climate conditions, please protect FOCUS-1 from direct sunshine by using a sunshade. When the electronics get too warm, an alarm will be given via the LED'S and, when selected, also via HART.



### Installation errors

Observe the specified torques mentioned on the packing and follow the tightening sequence mentioned in the FOCUS-1 QuickStart. Excessively tightened torques lead to parts wearing out quicker. Parts that are too loose may cause leakage.

## 8.10. Qualifications of operating personnel

The main components used in FOCUS-1 are all sourced from SAMSON and KROHNE. Nevertheless, FOCUS-1 is built according to the latest available technology with sophisticated sensors, software models, and an integrated onboard computer. A fully trained and equipped FOCUS-ON service team is at your disposal. An extensive training package is available. Please contact your local sales partner for more information.

Due to the fact FOCUS-1 has a computer onboard, we highly recommend that during installation and the lifetime of FOCUS-1, an IT officer is appointed who has administrator rights. This person is responsible for user administration and FOCUS-1 IT security on site.

## 8.11. Transporting and lifting FOCUS-1

Risk of personal injury due to tipping over of FOCUS-1

- Observe the center of gravity of FOCUS-1.
- Secure FOCUS-1 against tipping over or turning.

Risk of injury due to incorrect lifting without the use of lifting equipment

Lifting FOCUS-1 without the use of lifting equipment may lead to injuries (back injury in particular) due to the weight of FOCUS-1.

- Observe the occupational health and safety regulations valid in the country of use.

Risk of FOCUS-1 damage due to incorrectly attached slings

The lifting eyelet/eyebolt on FOCUS-1 is to be used for lifting and handling the complete device.

Transporting FOCUS-1

FOCUS-1 can be transported using lifting equipment (e.g., crane or forklift).

- Leave FOCUS-1 in its transport container or in the pallet to transport it.

Transport instructions

- Protect FOCUS-1 against external influences (e.g., impact).

## 8.12. Warning against residual hazards

To avoid personal injury or property damage, plant operators and operating personnel must prevent hazards that could be caused in FOCUS-1 by the process medium, the operating pressure, the signal pressure, or by moving parts by taking appropriate precautions. They must observe all hazard statements, warning, and caution notes in these mounting and operating instructions.

Hazards resulting from the special working conditions at the installation site of FOCUS-1 must be identified in a risk assessment and prevented through the corresponding safety instructions drawn up by the operator.

## 8.13. Storing conditions

Risk of device damage due to improper storage

- Observe the storage instructions.
- Avoid long storage times.
- Contact FOCUS-ON in case of different storage conditions or long storage periods.

We recommend regularly checking FOCUS-1 and the prevailing storage conditions during long storage periods.

Storage instructions

- Keep FOCUS-1 in its original package
- Avoid direct continues sunlight exposure
- Protect FOCUS-1 against external influences (e.g., impact).
- Secure FOCUS-1 in the stored position against slipping or tipping over.
- Do not damage the corrosion protection (e.g., paint, surface coatings). Repair any damage immediately.
- Protect FOCUS-1 against moisture and dirt. Store it at a relative humidity of less than 75%. In damp spaces, prevent condensation. If necessary, use a drying agent or heating.
- Make sure the ambient air is free of acids or other corrosive media.
- The permissible storage temperature of FOCUS-1 ranges from -50...+70°C (-58...+158 °F).
- Do not place any objects on the FOCUS-1.

Our after-sales service can provide more detailed storage instructions on request.

## 8.14. Serial number

Serial number: see the markings label on the device

## Declaration on contamination

Delivery address: FOCUS-ON VoF Service Building K2 Kerkeplaat 12-16, 3313 LC Dordrecht, The Netherlands	For queries: <a href="mailto:service@fon.com">service@fon.com</a>
--	--

Before returning the FOCUS-1 device, please fill in, where applicable, the below table:

Reference number (FOCUS-ON):.....

Reference number (customer):.....






The Declaration on Contamination is for compliance with legal requirements, as well as the protection of our employees and premises. We can only process your order if this declaration has been completed, signed, and returned to us. Please attach a hardcopy of the Declaration to the outside of your package and ensure that it is always visible.

Device type:

Serial number: .....

Medium (process type the device has been used): the following table must always be filled out completely, otherwise the service cannot be possible!

Please indicate any dangers by the Safety Datasheet of the medium. The safety data sheet has to be accompanied by the return.

	Medium	Concentration [%]	Flammable liquids 	Acute toxicity 	Irritation toxicity 	Corrosivity 	Other hazards 
Medium in process							
Medium for process cleaning							
Medium for final cleaning							

Other hazards description (e.g. biological threat, radioactivity):

Shipping as dangerous goods Yes ☐ No ☒

Dangerous goods class/number:

Short description of the defect:

Sender:

Company:

Telephone:

Contact Person:

E-mail:

Address sender:

Sender order number:

I hereby confirm that the parts/devices contained in this return have been carefully cleaned. This delivery does not contain residual amounts of dangerous goods.

The product may still contain residual amounts of dangerous goods. In this case, please contact us before shipment: [service@fon.com](mailto:service@fon.com)

.....  
Place and date

.....  
Signature