

SITRANS F

Coriolis flowmeters SITRANS MASS 2100 & FC300 (FCT030)

Compact Operating Instructions

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7ME481 (MASS 2100/FC300 with FCT030)

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction

1.1 Purpose of this documentation

These instructions contain all information required to commission and use the device. Read the instructions carefully prior to installation and commissioning. In order to use the device correctly, first review its principle of operation.

The instructions are aimed at persons mechanically installing the device, connecting it electronically, configuring the parameters and commissioning it, as well as service and maintenance engineers.

1.2 Document history

The following table shows major changes in the documentation compared to the previous edition.

Edition	Note
05/2020	Second edition • Chapter Technical data (Page 53) updated • Overall revision of chapters and contents
11/2019	First edition

1.3 Nameplate layout

1.3.1 Device identification

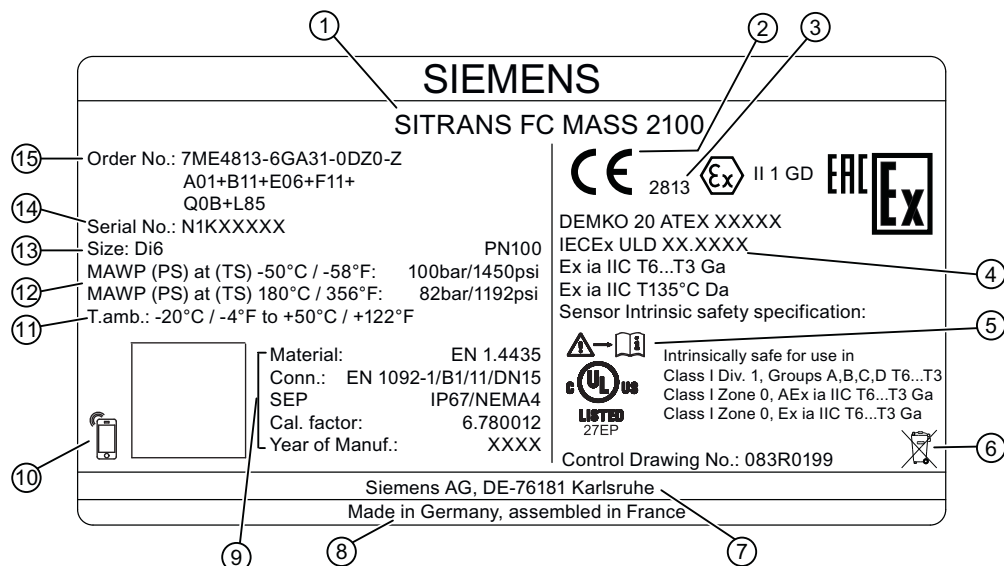
Each part of the FC Coriolis flowmeter has three nameplate types showing the following information:

- product identification
- product specifications
- certificates and approvals

Note**Identification**

Identify your device by comparing your ordering data with the information on the product and specification nameplates.

1.3.2 MASS 2100 Sensor nameplate



①	SITRANS FC MASS 2100	Product name
②	CE	CE mark
③	2813	Notified Body ID (ATEX example)
④	Ex approvals	Classification for hazardous locations
⑤		Consult the operating instructions
⑥		WEEE symbol, see Disposal (Page 52)
⑦	Manufacturer	Manufacturer name and location
⑧	Country	Manufacturing country
⑨	Material	Material of pipe
	Conn.	Process connector
	SEP	Degree of protection
	Cal. factor	Calibration factor
	Year of Manuf.	Manufacturing year
⑩	QR code	Product-specific QR code
⑪	T.amb.	Range of ambient temperature
⑫	MAWP	Maximum allowable working pressure
⑬	Size	Size
⑭	Serial No.	Device specific serial number
⑮	Order No.	Device specific order number

Figure 1-1 MASS 2100 nameplate example

Flowmeter serial number construction

The flowmeter serial number is constructed as follows:

PPYMDDxxxxxx

where

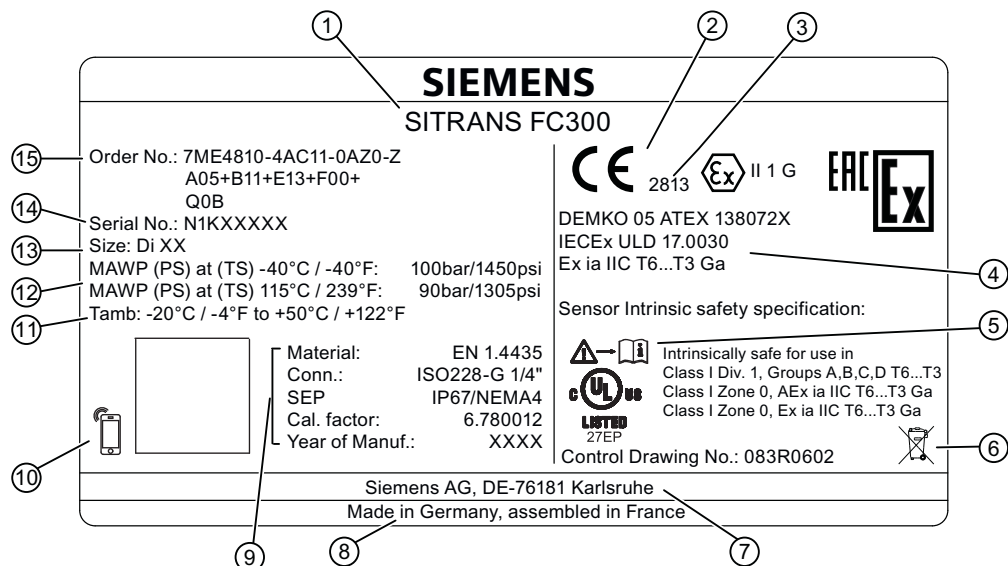
PP = Production factory (Siemens S.A.S. Haguenau: N1)

Y = Production year (for encryption, see below)
M = Production month (for encryption, see below)
DD = Production date (for encryption, see below)
xxxxxx = Sequential number

Encryption:

Calendar year (Y)	Code
1950, 1970, 1990, 2010	A
1951, 1971, 1991, 2011	B
1952, 1972, 1992, 2012	C
1953, 1973, 1993, 2013	D
1954, 1974, 1994, 2014	E
1955, 1975, 1995, 2015	F
1956, 1976, 1996, 2016	H (G)
1957, 1977, 1997, 2017	J
1958, 1978, 1998, 2018	K
1959, 1979, 1999, 2019	L
1960, 1980, 2000, 2020	M
1961, 1981, 2001, 2021	N
1962, 1982, 2002, 2022	P
1963, 1983, 2003, 2023	R
1964, 1984, 2004, 2024	S
1965, 1985, 2005, 2025	T
1966, 1986, 2006, 2026	U
1967, 1987, 2007, 2027	V
1968, 1988, 2008, 2028	W
1969, 1989, 2009, 2029	X
Month (M)	Code
January	1
February	2
March	3
April	4
May	5
June	6
July	7
August	8
September	9
October	O
November	N
December	D
Date (DD)	Code
Day 1 to 31	01 to 31 (corresponding to the actual date)

1.3.3 FC300 Sensor nameplate

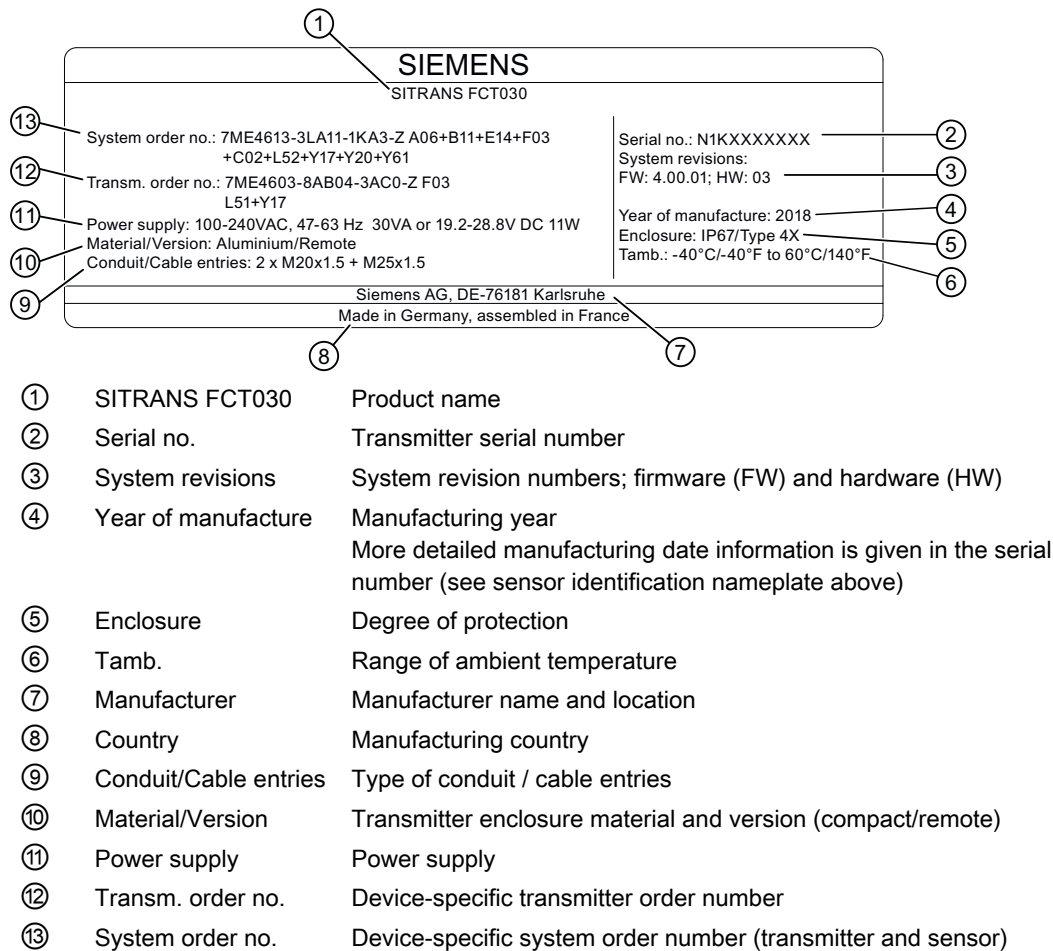


①	SITRANS FC300	Product name
②	CE	CE mark
③	2813	Notified Body ID (ATEX example)
④	Ex approvals	Classification for hazardous locations
⑤	⚠	Consult the operating instructions
⑥	WEEE symbol	WEEE symbol, see Disposal (Page 52)
⑦	Manufacturer	Manufacturer name and location
⑧	Country	Manufacturing country
⑨	Material	Material of pipe
	Conn.	Process connector
	SEP	Degree of protection
	Cal. factor	Calibration factor
	Year of Manuf.	Manufacturing year
⑩	QR code	Product-specific QR code
⑪	Tamb.	Range of ambient temperature
⑫	MAWP	Maximum allowable working pressure
⑬	Size	Size
⑭	Serial No.	Device specific serial number
⑮	Order No.	Device specific order number

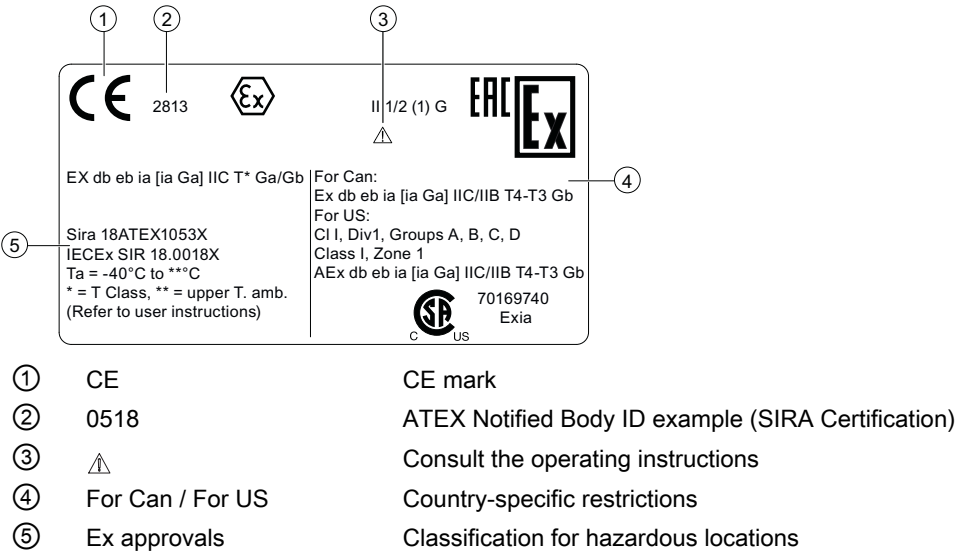
Figure 1-2 FC300 nameplate example

1.3.4 FCT030 Transmitter nameplates

FCT030 transmitter: Nameplate with general information



FCT030 transmitter: Nameplate with specific information

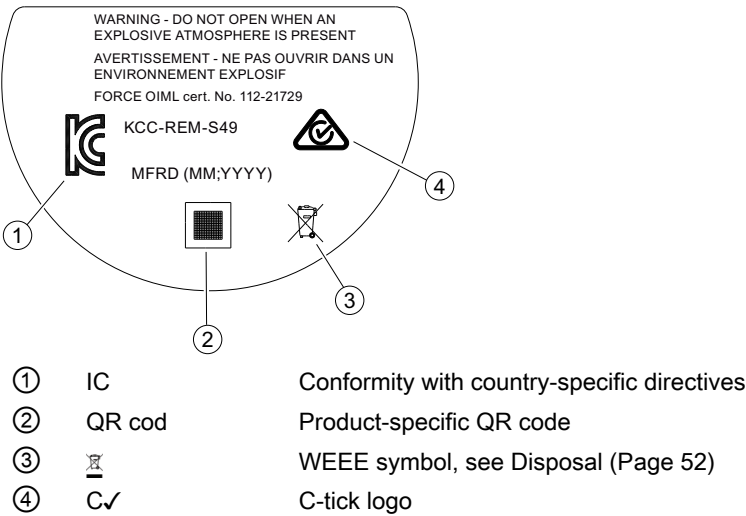


Note

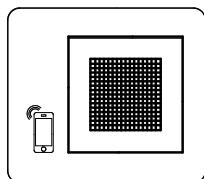
Approval identifications

Approval certificates and notified body identifications are available for download at www.siemens.com.

FCT030 transmitter: Nameplate with approval information



QR code



With the use of a smart phone, the QR code provides a direct link to

- the product support portal, which includes access to the "How to Install" YouTube video
- the product and production-specific documentation maintained in the production database.

1.4 Designated use

Use the device in accordance with the information on the nameplate and in the Technical data (Page 53).

NOTICE

Use in a domestic environment

This Class A Group 1 equipment is intended for use in industrial areas.

In a domestic environment this device may cause radio interference.

1.5 Product compatibility

Edition	Remarks	Product compatibility	Compatibility of device integration package	
05/2020	Manual updated	Compact FW revision 4.xx.xx-xx Remote FW revision 4.xx.xx-xx	Service channel: SIMATIC PDM V8.2 Service Pack 1 or later	EDD: 5.00.01 or later
			Modbus: SIMATIC PDM V8.2 Service Pack 1 or later	EDD: 5.00.01 or later
			HART: SIMATIC PDM V8.2 Service Pack 1 or later	EDD: 5.00.01 or later
			HART: SITRANS DTM V4.1	DTM: 5.00.01 or later
			HART: AMS Device manager V12 or later	EDD: 5.00.01 or later
			PROFIBUS: SIMATIC PDM V8.2 Service Pack 1 or later	EDD: 1.00.01 or later
			PROFIBUS: AMS Device manager V12	EDD: 1.00.xx-xx
			PROFIBUS: SITRANS DTM V4.1	DTM: 1.00.01 or later

Edition	Remarks	Product compatibility	Compatibility of device integration package	
11/2019	First revision	Compact FW revision 4.xx.xx-xx Remote FW revision 4.xx.xx-xx	Service channel: SIMATIC PDM V8.2 Service Pack 1 or later	EDD: 5.00.01 or later
			Modbus: SIMATIC PDM V8.2 Service Pack 1 or later	EDD: 5.00.01 or later
			HART: SIMATIC PDM V8.2 Service Pack 1 or later	EDD: 5.00.01 or later
			HART: SITRANS DTM V4.1	DTM: 5.00.01 or later
			HART: AMS Device manager V12 or later	EDD: 5.00.01 or later
			PROFIBUS: SIMATIC PDM V8.2 Service Pack 1 or later	EDD: 1.00.01 or later
			PROFIBUS: AMS Device manager V12	EDD: 1.00.xx-xx
			PROFIBUS: SITRANS DTM V4.1	DTM: 1.00.01 or later

1.6 Checking the consignment

1. Check the packaging and the delivered items for visible damages.
2. Report any claims for damages immediately to the shipping company.
3. Retain damaged parts for clarification.
4. Check the scope of delivery by comparing your order to the shipping documents for correctness and completeness.



WARNING

Using a damaged or incomplete device

Risk of explosion in hazardous areas.

- Do not use damaged or incomplete devices.

1.7 Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit <https://www.siemens.com/industrialsecurity>.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under <https://www.siemens.com/industrialsecurity>.

1.8 Transportation and storage

To guarantee sufficient protection during transport and storage, observe the following:

- Keep the original packaging for subsequent transportation.
- Devices/replacement parts should be returned in their original packaging.
- If the original packaging is no longer available, ensure that all shipments are properly packaged to provide sufficient protection during transport. Siemens cannot assume liability for any costs associated with transportation damages.

NOTICE
Insufficient protection during storage
The packaging only provides limited protection against moisture and infiltration.
• Provide additional packaging as necessary.

Special conditions for storage and transportation of the device are listed in Technical data (Page 53).

The contents of this manual shall not become part of or modify any prior or existing agreement, commitment or legal relationship. The sales contract contains all obligations on the part of Siemens as well as the complete and solely applicable warranty conditions. Any statements regarding device versions described in the manual do not create new warranties or modify the existing warranty.

The content reflects the technical status at the time of publishing. Siemens reserves the right to make technical changes in the course of further development.

Safety notes

2.1 Preconditions for safe use

This device left the factory in good working condition. In order to maintain this status and to ensure safe operation of the device, observe these instructions and all the specifications relevant to safety.

Observe the information and symbols on the device. Do not remove any information or symbols from the device. Always keep the information and symbols in a completely legible state.

Symbol	Explanation
	Consult operating instructions

	WARNING
Improper device modifications Risk to personnel, system and environment can result from modifications to the device, particularly in hazardous areas. Only carry out modifications that are described in the instructions for the device. Failure to observe this requirement cancels the manufacturer's warranty and the product approvals.	

Observe the safety rules, provisions and laws applicable in your country during connection, assembly and operation. These include, for example:

- National Electrical Code (NEC - NFPA 70) (USA)
- Canadian Electrical Code (CEC) (Canada)

Further provisions for hazardous area applications are for example:

- IEC 60079-14 (international)
- EN 60079-14 (EU)

2.1.1 FCC Conformity

US Installations only: Federal Communications Commission (FCC) rules

Note

- 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 operating instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference to radio communications, in which case the user will be required to correct the interference at his own expense.
-

2.1.2 Conformity with European directives

The CE marking on the device symbolizes the conformity with the following European directives:

Electromagnetic compatibility EMC 2014/30/EU	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility
Low voltage directive LVD 2014/35/EU	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
Atmosphère explosive ATEX 2014/34/EU	Directive of the European Parliament and the Council on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres
Pressure equipment directive PED 2014/68/EU	Directive of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2011/65/EU RoHS	Directive of the European Parliament and the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment

The applicable directives can be found in the EC conformity declaration of the specific device.

Note

Functional safety applications (SIL)

If the device is used in a functional safety application, refer to the functional safety manual.

2.2 Requirements for special applications

Due to the large number of possible applications, each detail of the described device versions for each possible scenario during commissioning, operation, maintenance or operation in systems cannot be considered in the instructions. If you need additional information not covered by these instructions, contact your local Siemens office or company representative.

Note

Operation under special ambient conditions

We highly recommend that you contact your Siemens representative or our application department before you operate the device under special ambient conditions as can be encountered in nuclear power plants or when the device is used for research and development purposes.

2.3 Use in hazardous areas

Qualified personnel for hazardous area applications

Persons who install, connect, commission, operate, and service the device in a hazardous area must have the following specific qualifications:

- They are authorized, trained or instructed in operating and maintaining devices and systems according to the safety regulations for electrical circuits, high pressures, aggressive, and hazardous media.
- They are authorized, trained, or instructed in carrying out work on electrical circuits for hazardous systems.
- They are trained or instructed in maintenance and use of appropriate safety equipment according to the pertinent safety regulations.

WARNING
Use in hazardous area Risk of explosion. • Only use equipment that is approved for use in the intended hazardous area and labeled accordingly. • Do not use devices that have been operated outside the conditions specified for hazardous areas. If you have used the device outside the conditions for hazardous areas, make all Ex markings unrecognizable on the nameplate.

**WARNING****Loss of safety of device with type of protection "Intrinsic safety Ex i"**

If the device or its components have already been operated in non-intrinsically safe circuits or the electrical specifications have not been observed, the safety of the device is no longer ensured for use in hazardous areas. There is a risk of explosion.

- Connect the device with type of protection "Intrinsic safety" solely to an intrinsically safe circuit.
- Observe the specifications for the electrical data on the certificate and/or in Technical data (Page 53).

2.3.1**Special conditions for safe use**

In general, it is required that:

- The transmitter electronic compartment shall not be opened when energized and when an explosive gas or dust atmosphere may be present.
- The terminal compartment may be opened when an explosive gas or dust atmosphere may be present at any time. Access power terminals by lifting the cover only when de-energized.
- Appropriate cable connectors are used.
- Substitution of components may impair Intrinsic Safety.
- Sensor and transmitter are connected to the potential equalization throughout the hazardous area.
- EN/IEC 60079-14 is considered for installation in hazardous areas.

Further information and instructions including approval-specific special conditions for safe use in Ex applications can be found in the certificates on the accompanying literature CD and at the product web page (<https://w3.siemens.com/mcms/sensor-systems/en/process-instrumentation/flow-measurement/coriolis-flow-meter/sensors/Pages/sensors.aspx>).

**WARNING****Laying of cables
Explosion hazard**

Cable for use in hazardous areas must satisfy the requirements for having a proof voltage of at least 500 V AC applied between the conductor/ground, conductor/shield and shield/ground.

Connect the devices that are operated in hazardous areas as per the stipulations applicable in the country of operation.

**WARNING****Field wiring installation**

Ensure that the national requirements of the country in which the devices are installed are met.

Installing/mounting

3.1 Basic safety notes

CAUTION

Hot surfaces resulting from hot process media

Risk of burns resulting from surface temperatures above 65 °C (149 °F).

- Take appropriate protective measures, for example contact protection.
- Make sure that protective measures do not cause the maximum permissible ambient temperature to be exceeded. Refer to the information in Technical data (Page 53).

WARNING

Wetted parts unsuitable for the process media

Risk of injury or damage to device.

Hot, toxic and corrosive media could be released if the wetted parts are unsuitable for the process medium.

- Ensure that the material of the device parts wetted by the process medium is suitable for the medium. Refer to the information in Technical data (Page 53).

Note

Material compatibility

Siemens can provide you with support concerning selection of sensor components wetted by process media. However, you are responsible for the selection of components. Siemens accepts no liability for faults or failures resulting from incompatible materials.

WARNING

Unsuitable connecting parts

Risk of injury or poisoning.

In case of improper mounting, hot, toxic, and corrosive process media could be released at the connections.

- Ensure that connecting parts (such as flange gaskets and bolts) are suitable for connection and process media.

See also

Technical data (Page 53)

 WARNING

Exceeded maximum permissible operating pressure

Risk of injury or poisoning.

The maximum permissible operating pressure depends on the device version, pressure limit and temperature rating. The device can be damaged if the operating pressure is exceeded. Hot, toxic and corrosive process media could be released.

Ensure that maximum permissible operating pressure of the device is not exceeded. Refer to the information on the nameplate and/or in Technical data (Page 53).

 WARNING

Incorrect mounting at Zone 0

Risk of explosion in hazardous areas.

- Ensure sufficient tightness at the process connection.
- Observe the standard IEC/EN 60079-14.

 CAUTION

External stresses and loads

Damage to device by severe external stresses and loads (e.g. thermal expansion or pipe tension). Process media can be released.

- Prevent severe external stresses and loads from acting on the device.

3.1.1 Installation location requirements

NOTICE

Strong vibrations

Damage to device.

- In installations with strong vibrations, mount the transmitter in a low vibration environment.

NOTICE

Aggressive atmospheres

Damage to device through penetration of aggressive vapors.

- Ensure that the device is suitable for the application.

NOTICE

Direct sunlight

Damage to device.

The device can overheat or materials become brittle due to UV exposure.

- Protect the device from direct sunlight.
- Make sure that the maximum permissible ambient temperature is not exceeded. Refer to the information in Technical data (Page 53).



WARNING

Insufficient air supply

The device may overheat if there is an insufficient supply of air.

- Install the device so that there is sufficient air supply in the room.
- Observe the maximum permissible ambient temperature. Refer to the information in the section Technical data (Page 53).

3.1.2 Proper mounting

NOTICE

Incorrect mounting

The device can be damaged, destroyed, or its functionality impaired through improper mounting.

- Before installing ensure there is no visible damage to the device.
- Make sure that process connectors are clean, and suitable gaskets and glands are used.
- Mount the device using suitable tools. Refer to the information in Technical data (Page 53).

3.2 Sensor installation

3.2.1 Determining a location



CAUTION

Electromagnetic fields

Do not install the flowmeter in the vicinity of strong electromagnetic fields, for example near motors, variable frequency drives, transformers etc.

Upstream / downstream

- No pipe run requirements, that is straight inlet/outlet sections, are necessary.
- Avoid long drop lines downstream from the sensor to prevent process media separation causing air / vapor bubbles in the tube (min. back pressure: 0.2 bar).
- Avoid installing the flowmeter immediately upstream of a free discharge in a drop line.

Location in the system

The optimum location in the system depends on the application:

- Liquid applications
Gas or vapor bubbles in the fluid may result in erroneous measurements, particularly in the density measurement.
 - Do not install the flowmeter at the highest point in the system, where bubbles will be trapped.
 - Install the flowmeter in low pipeline sections, at the bottom of a U-section in the pipeline.

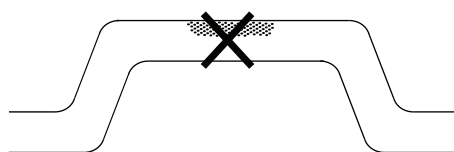


Figure 3-1 Liquid applications, wrong location with trapped air/gas

- Gas applications
Vapor condensation or oil traces in the gas may result in erroneous measurements.
 - Do not install the flowmeter at the lowest point of the system.
 - Install a filter.

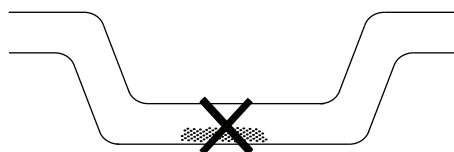


Figure 3-2 Gas applications, wrong location with trapped oil

3.2.2 Orientation of the sensor

Flow direction

The calibrated flow direction is indicated by the arrow on the sensor. Flow in this direction will be indicated as positive by default. The sensitivity and the accuracy of the sensor do not change with reverse flow.

The indicated flow direction (positive/negative) is configurable.

CAUTION

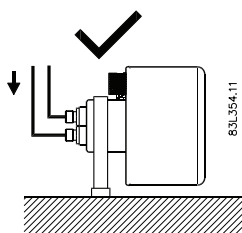
Accurate measurement

The sensor must always be completely filled with process media in order to measure accurately.

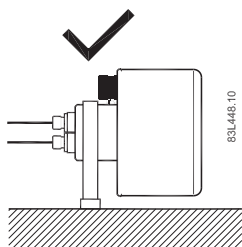
Orienting the sensor

The sensor operates in any orientation. The optimal orientation depends on the process fluid and the process conditions. Siemens recommends orienting the sensor in one of the following ways:

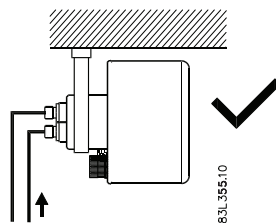
3.2.3 MASS 2100 DI 1.0 - 2.1



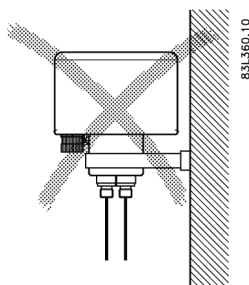
Horizontal installation, correct



Vertical installation, correct (liquids without solid particles only)



Horizontal installation, correct



Vertical installation, wrong

Note

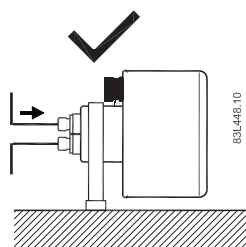
Air / gas bubbles in the liquid

Install the flowmeter horizontally

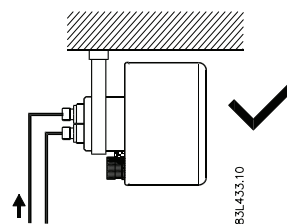
Note

Solid particles in the liquid

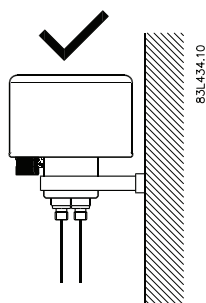
Install the flowmeter horizontally



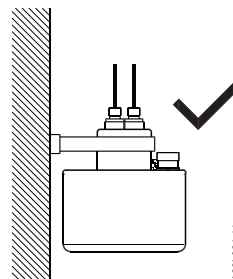
Horizontal installation 1



Horizontal installation 2

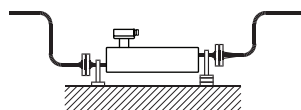


Vertical installation 1

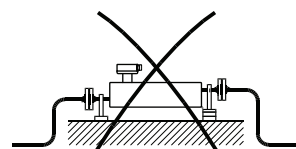


Vertical installation 2

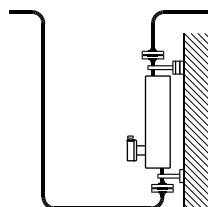
3.2.4 MASS 2100 DI 3 - 15



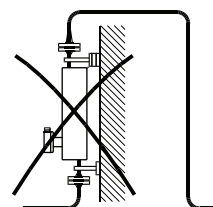
Horizontal installation, correct



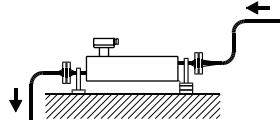
Horizontal installation, wrong



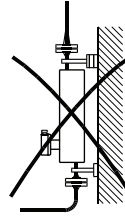
Vertical installation, correct



Vertical installation, wrong



Horizontal installation

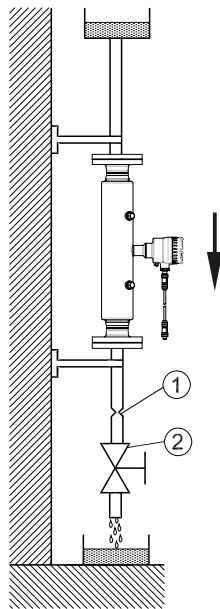


Vertical installation (not recommended)

3.2.5 Installation in a drop line

Installation in a drop line

Installation in a dropline is only possible if a pipeline reduction or orifice with a smaller cross-section can be installed to prevent the sensor from being partially drained during the measurements.



① Orifice Pipe

② Valve

Figure 3-3 Installation in drop line

3.3 Disassembly

WARNING

Incorrect disassembly

The following risks may result from incorrect disassembly:

- Injury through electric shock
- Risk through emerging media when connected to the process
- Risk of explosion in hazardous area

In order to disassemble correctly, observe the following:

- Before starting work, make sure that you have switched off all physical variables such as pressure, temperature, electricity etc. or that they have a harmless value.
- If the device contains hazardous media, it must be emptied prior to disassembly. Make sure that no environmentally hazardous media are released.
- Secure the remaining connections so that no damage can result if the process is started unintentionally.

Connecting

4.1 Basic safety notes

WARNING

Unsuitable cables, cable glands and/or plugs

Risk of explosion in hazardous areas.

- Use only cable glands/plugs that comply with the requirements for the relevant type of protection.
- Tighten the cable glands in accordance with the torques specified in Technical data (Page 53).
- Close unused cable inlets for the electrical connections.
- When replacing cable glands, only use cable glands of the same type.
- After installation, check that the cables are seated firmly.

WARNING

Incorrect conduit system

Risk of explosion in hazardous areas as result of open cable inlet or incorrect conduit system.

- In the case of a conduit system, mount a spark barrier at a defined distance from the device input. Observe national regulations and the requirements stated in the relevant approvals.

See also

Technical data (Page 53)

WARNING

Hazardous contact voltage

Risk of electric shock in case of incorrect connection.

- For the electrical connection specifications, refer to the information in Technical data (Page 53).
- At the mounting location of the device observe the applicable directives and laws for installation of electrical power installations with rated voltages below 1000 V.

NOTICE**Condensation in the device**

Damage to device through formation of condensation if the temperature difference between transportation or storage and the mounting location exceeds 20 °C (36 °F).

- Before taking the device into operation, let the device adapt for several hours in the new environment.

**WARNING****Missing PE/ground connection**

Risk of electric shock.

Depending on the device version, connect the power supply as follows:

- **Power plug:** Ensure that the used socket has a PE/ground conductor connection. Check that the PE/ground conductor connection of the socket and power plug match each other.
- **Connecting terminals:** Connect the terminals according to the terminal connection diagram. First connect the PE/ground conductor.

NOTICE**Ambient temperature too high**

Damage to cable sheath.

- At an ambient temperature ≥ 60 °C (140 °F), use heat-resistant cables suitable for an ambient temperature at least 20 °C (36 °F) higher.

**WARNING****Improper power supply**

Risk of explosion in hazardous areas as result of incorrect power supply.

- Connect the device in accordance with the specified power supply and signal circuits. The relevant specifications can be found in the certificates, in Technical data (Page 53) or on the nameplate.

**WARNING****Lack of equipotential bonding**

Risk of explosion through compensating currents or ignition currents through lack of equipotential bonding.

- Ensure that the device is potentially equalized.

Exception: It may be permissible to omit connection of the equipotential bonding for devices with type of protection "Intrinsic safety Ex i".

**WARNING****Unprotected cable ends**

Risk of explosion through unprotected cable ends in hazardous areas.

- Protect unused cable ends in accordance with IEC/EN 60079-14.

**WARNING****Improper laying of shielded cables**

Risk of explosion through compensating currents between hazardous area and the non-hazardous area.

- Shielded cables that cross into hazardous areas should be grounded only at one end.
- If grounding is required at both ends, use an equipotential bonding conductor.

**WARNING****Uncovered non-intrinsically safe circuits**

Risk of explosion in hazardous areas or electric shock when working on non-intrinsically safe circuits.

If intrinsically safe and non-intrinsically safe circuits are operated in an enclosure with the type of protection "Increased safety Ex e", the connections of the non-intrinsically safe circuits must be additionally covered.

- Ensure that the cover of the non-intrinsically safe circuits complies with degree of protection IP30 or higher according to IEC/EN 60529.
- Separate connections of the non-intrinsically safe circuits in accordance with IEC/EN 60079-14.

**WARNING****Insufficient isolation of intrinsically safe and non-intrinsically safe circuits**

Risk of explosion in hazardous areas.

- When connecting intrinsically safe and non-intrinsically safe circuits ensure that isolation is carried out properly in accordance with local regulations for example IEC 60079-14.
- Ensure that you observe the device approvals applicable in your country.

 WARNING

Connecting or disconnecting device in energized state

Risk of explosion in hazardous areas.

- Connect or disconnect devices in hazardous areas only in a de-energized state.

Exceptions:

- Devices having the type of protection "Intrinsic safety Ex i" may also be connected in energized state in hazardous areas.

 WARNING

Incorrect selection of type of protection

Risk of explosion in areas subject to explosion hazard.

This device is approved for several types of protection.

1. Decide in favor of one type of protection.
2. Connect the device in accordance with the selected type of protection.
3. In order to avoid incorrect use at a later point, make the types of protection that are not used permanently unrecognizable on the nameplate.

Note

Electromagnetic compatibility (EMC)

You can use this device in industrial environments, households and small businesses.

For metal enclosures there is an increased electromagnetic compatibility compared to high-frequency radiation. This protection can be increased by grounding the enclosure.

See also

Connecting (Page 29)

Note

Improvement of interference immunity

- Lay signal cables separate from cables with voltages > 60 V.
 - Use cables with twisted wires.
 - Keep device and cables at a distance from strong electromagnetic fields.
 - Take account of the conditions for communication specified in the Technical data (Page 53).
 - Use shielded cables to guarantee the full specification according to HART/PA/FF/Modbus/EIA-485/Profibus DP.
-

4.2 Connecting MASS 2100/FC300

4.2.1 Cable requirements

- When installing sensor cable, use cable with at least same degree of protection as the sensors. It is recommended to use cables supplied by Siemens:
 - blue cables for installation of intrinsically safe circuits in hazardous areas
 - gray cables for installation of non-intrinsically safe circuitsFurther information on Siemens-supplied cables, see Technical data (Page 53).
- The wire length inside the connection compartment, from the cable gland to the terminals, must be kept as short as possible. Wire loops in the terminal compartment must be avoided.
- To guarantee the degree of ingress protection, ensure that both ends of the cables are given equivalent protection from ingress of moisture.

WARNING

Cable requirements

Cables must be suitable for the temperature (at least 70 °C) and be flammability-rated to at least V-2.

Note

Output cables

If long cables are used in extreme EMC environments, it is recommended to use shielded cables.

4.2.2 Connection safety information

WARNING

Tightness

Only when the cable is connected to the sensor, the IP67 protection is achieved.

WARNING

Installation in hazardous areas

When making electrical connections, observe the national statutes and provisions for hazardous areas valid for the particular country.

- Operational safety regulations
- Directive for the installation of electrical systems in hazardous areas DIN EN 60079-14

4.2.3 Transmitter power supply and I/Os connection

4.2.3.1 Connecting the current loop with or without HART communication (CH1)

Note

4 to 20 mA output

It is not required to use shielded cables for the pure 4 to 20 mA current output.

Note

HART communication

It is recommended by the FieldComm Group (FCG) to use shielded cables for the HART communication.

Note

Passive channels only

Channel 1 power supply must be separated from that for channels 2 to 4.

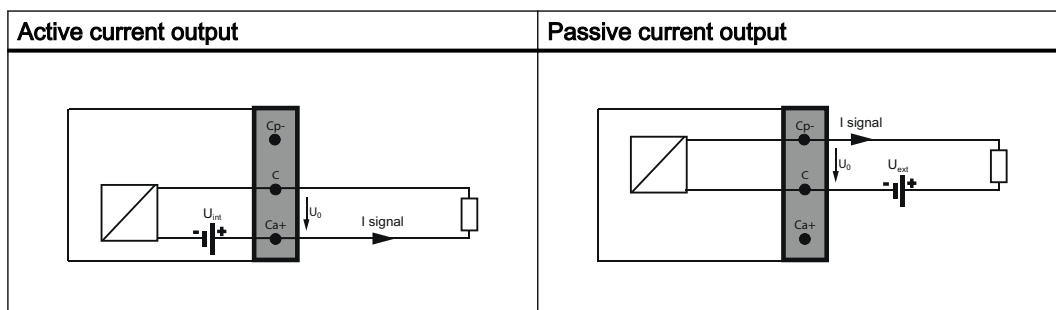
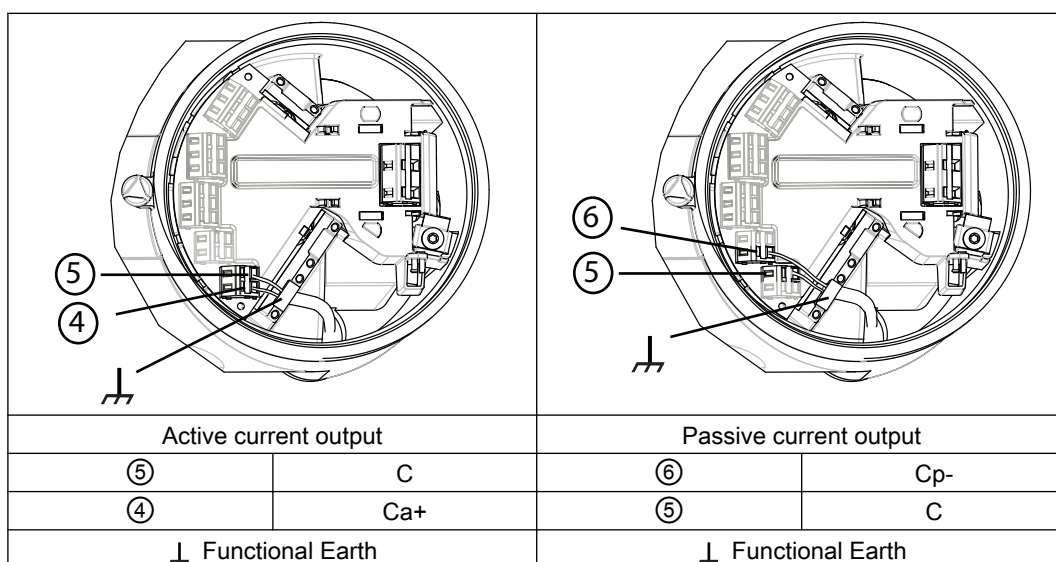
Signal return (or common) can be joined.

Procedure

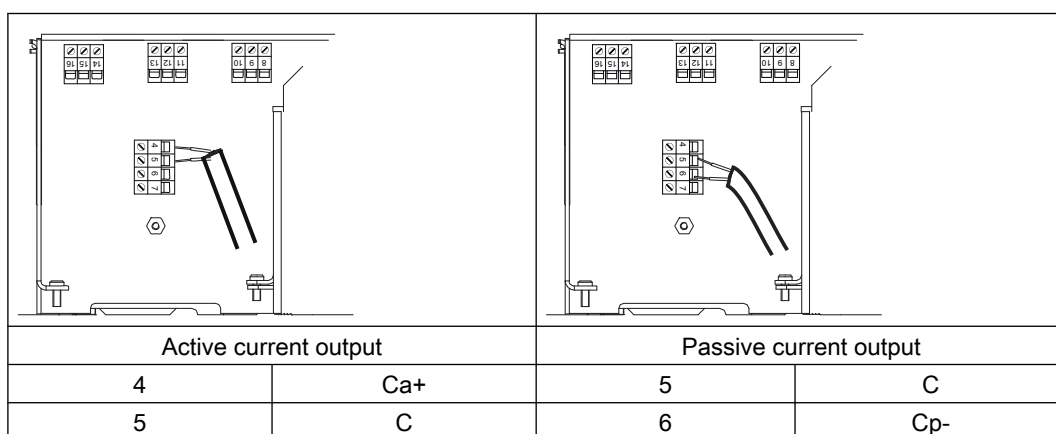
1. Remove cap and ferrule from cable gland and slide onto cable.
2. Push cable through open gland and cable path.
3. Restore ferrule and tighten cap to lightly hold cable in place.
4. Signal cable screen is folded back over outer sheath and grounded beneath cable clamp.

5. Connect wires to terminals using wiring tool.

– Industrial enclosure:



– Wallbox:



6. Tighten cable gland.

Note

For Ex versions active or passive current output is preselected at ordering and cannot be changed.

Non-Ex versions can be connected as either active or passive.

Note

Load

Signal output: < 500 Ω at 14 to 24 VDC (active), 14 to 30 VDC (passive)

Relay output: 30 VAC/VDC, 100 mA

Passive signal input: 15 to 30 VDC, 2 to 15 mA

4.2.3.2 Connecting the Modbus or PROFIBUS (CH1)



WARNING

Passive channels only

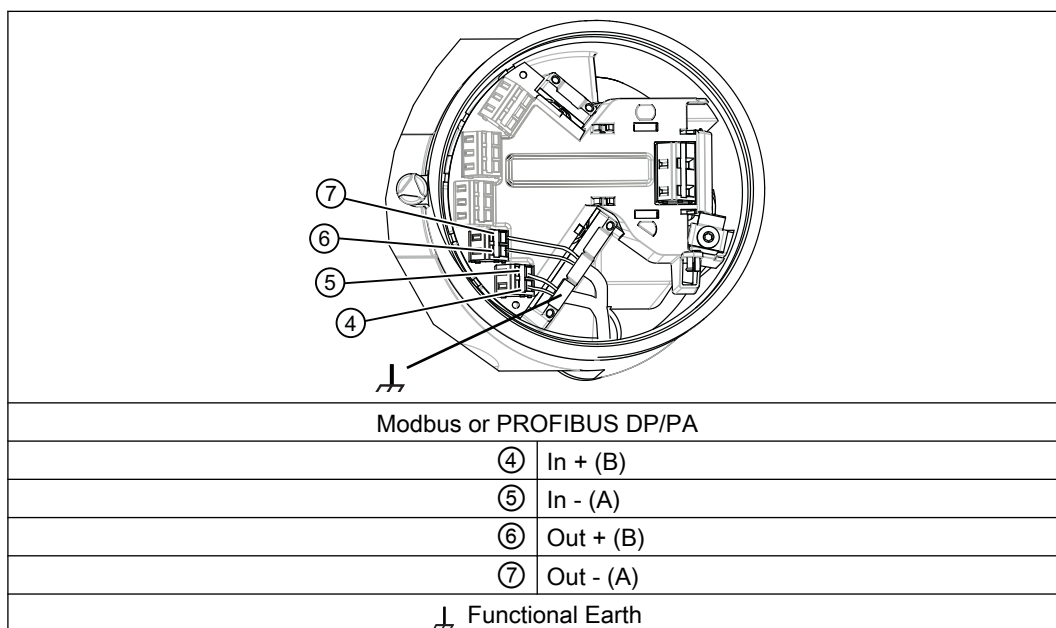
Channel 1 power supply must be separated from the power supply for channels 2 to 4.

Signal return (or common) can be joined.

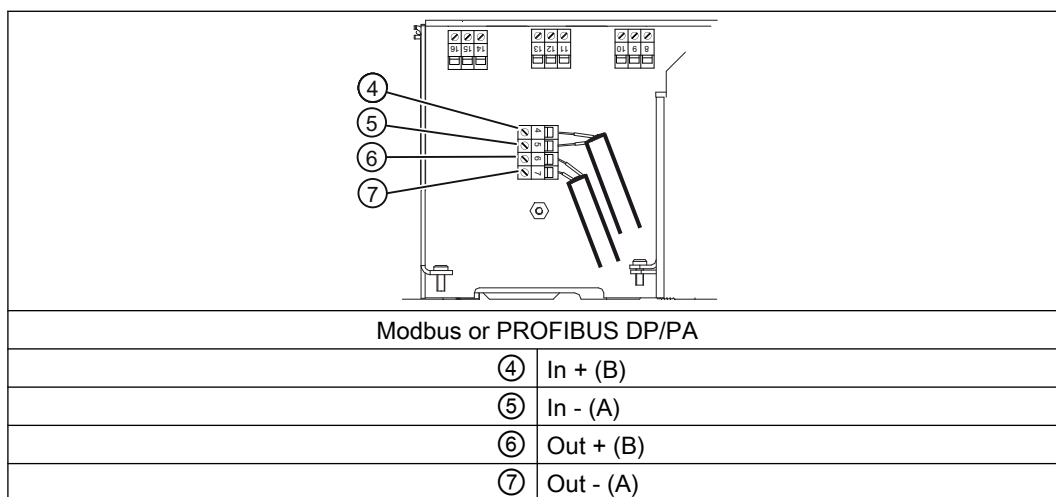
1. Remove cap and ferrule from cable gland and slide onto cable.
2. Push cable through open gland and cable path.
3. Restore ferrule and tighten cap to lightly hold cable in place.
4. Signal cable screen is folded back over outer sheath and grounded beneath cable clamp.

5. Connect wires to terminals using wiring tool.

– **Industrial enclosure:**



– **Wallbox:**

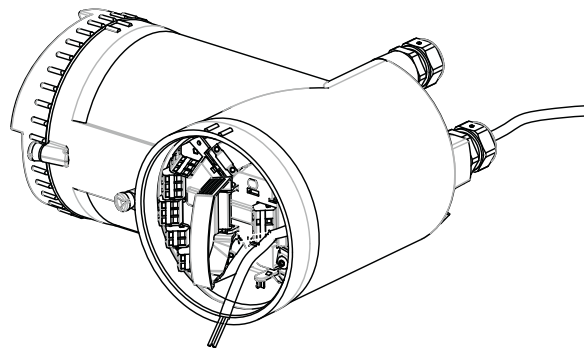


6. Tighten cable gland.

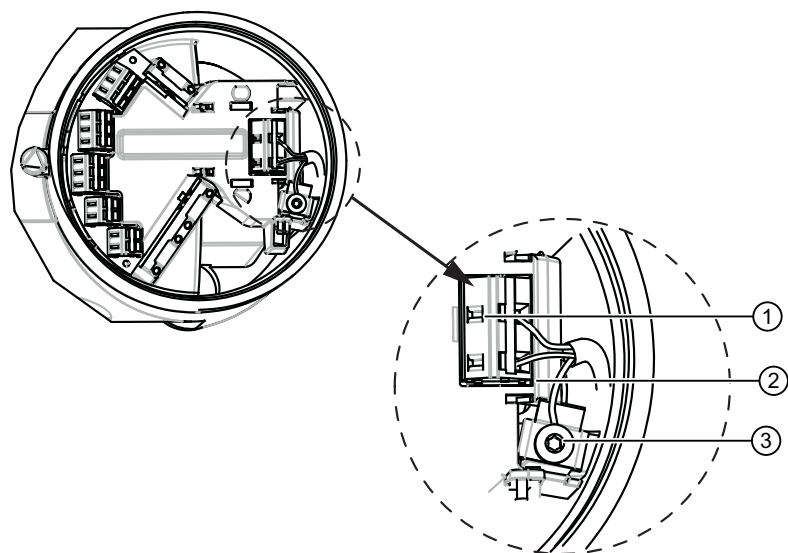
4.2.3.3 Connecting the power supply (Industrial enclosure)

1. Open power supply terminal protection cover.
2. Remove cap and ferrule from cable gland and slide onto cable.

3. Push cable through open gland and cable path.



4. Restore ferrule and tighten cap to lightly hold cable in place.
5. Connect ground to terminal $\oplus$ and power to terminals L/+ and N/- using wiring tool in the manner shown below at right.



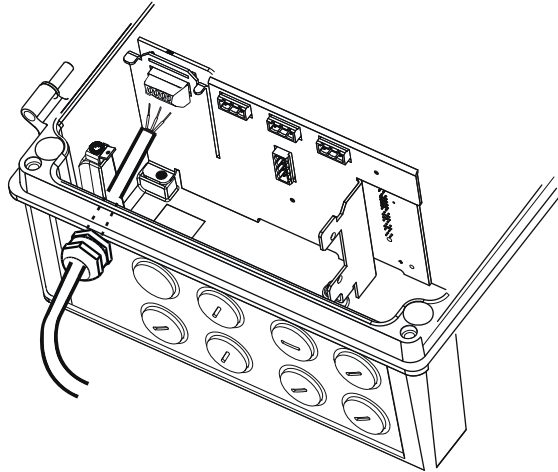
- ① L/+
- ② N/-
- ③ $\oplus$ Protective Earth (PE)

AC connection	DC connection												
<table><tr><td>L/+</td><td>← L</td></tr><tr><td>N/-</td><td>← N</td></tr><tr><td>$\oplus$</td><td>$\oplus$</td></tr></table> Power: 100 to 240 V AC, 47 to 63 Hz	L/+	← L	N/-	← N	$\oplus$	$\oplus$	<table><tr><td>L/+</td><td>← +</td></tr><tr><td>N/-</td><td>← -</td></tr><tr><td>$\oplus$</td><td>$\oplus$</td></tr></table> Power: 20 to 90 V DC	L/+	← +	N/-	← -	$\oplus$	$\oplus$
L/+	← L												
N/-	← N												
$\oplus$	$\oplus$												
L/+	← +												
N/-	← -												
$\oplus$	$\oplus$												

6. Close and latch power supply terminal protection cover.
7. Tighten cable gland.

4.2.3.4 Connecting the power supply (Wallbox)

1. Open enclosure lid.
2. Unscrew power supply terminal protection cover screw.
3. Remove protection cover.
4. Remove blind plug and fit cable gland.
5. Push cable through open gland and cable path.



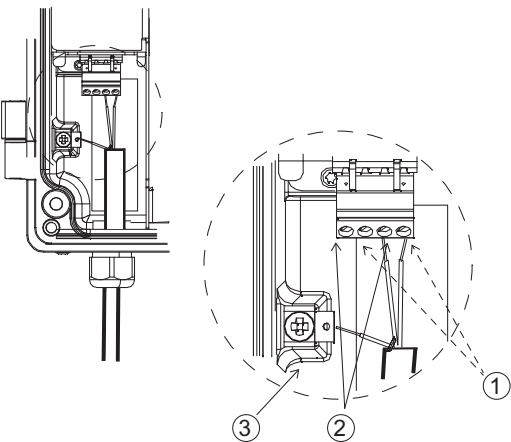
6. Restore ferrule and tighten cap to lightly hold cable in place.

7. Connect ground to terminal $\oplus$ and power supply to terminals L/+ and N/- in the manner shown below at right using a screwdriver.

Note

The terminal box is detachable

For easier access unplug the terminal box. After connecting the wires, plug the terminal box back in.



- ① L/+
② N/-
③ $\oplus$ Protective Earth (PE)

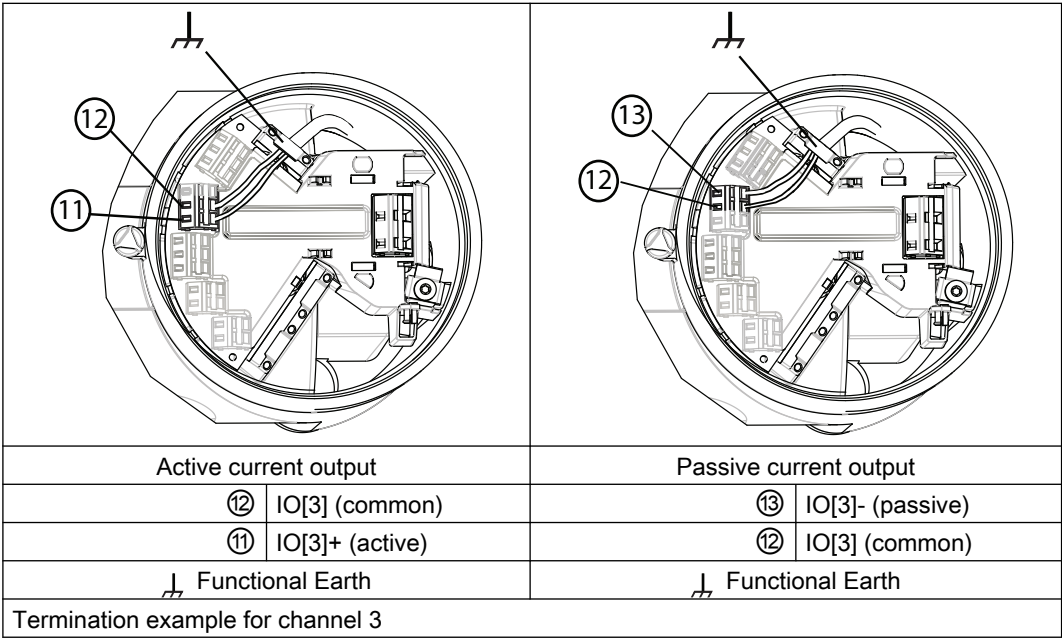
AC connection	DC connection												
<table><tr><td>L/+</td><td>← L</td></tr><tr><td>N/-</td><td>← N</td></tr><tr><td>$\oplus$</td><td>$\oplus$</td></tr></table> Power: 100 to 240 V AC, 47 to 63 Hz	L/+	← L	N/-	← N	$\oplus$	$\oplus$	<table><tr><td>L/+</td><td>← +</td></tr><tr><td>N/-</td><td>← -</td></tr><tr><td>$\oplus$</td><td>$\oplus$</td></tr></table> Power: 20 to 90 V DC	L/+	← +	N/-	← -	$\oplus$	$\oplus$
L/+	← L												
N/-	← N												
$\oplus$	$\oplus$												
L/+	← +												
N/-	← -												
$\oplus$	$\oplus$												

8. Tighten cable gland.
9. Mount power supply protection cover and fasten protection cover screw.

4.2.3.5 Connecting the inputs and outputs (channels 2 to 4)

1. Remove cap and ferrule from cable gland and slide onto cable.
2. Push cable through open gland and cable path.
3. Restore ferrule and tighten cap to lightly hold cable in place.
4. Fold signal cable screen back over outer sheath and ground beneath cable clamp.

5. Connect wires to terminals using wiring tool.

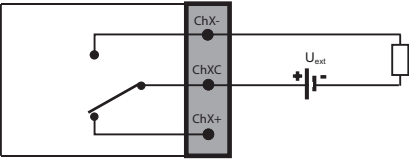
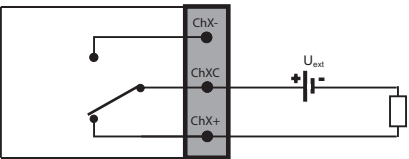


6. Tighten cable gland.

Note
Active or passive current output is preselected at ordering.

Factory configuration

Factory configuration	Software configuration	Channel 2	Channel 3, Channel 4	
Signal output Active	Current Output Pulse Output Frequency Output Digital output Digital output: - Alarm Class - Individual alarms - One on/off valve - Secondary Valve Dosing control	X	X	
Signal output Passive	Current Output Pulse Output Frequency Output Digital output If Digital output: Alarm Class Individual alarms One on/off valve Two on/off valves	X	X	
Signal input Active	Start Dosing Stop Dosing Reset Totalizer 1 Reset Totalizer 2 Reset Totalizer 3 Reset All Totalizers Start Zero Point Adjustment Pause/Resume dosing Force Output Freeze Output		X	
Signal input Passive	Start Dosing Stop Dosing Reset Totalizer 1 Reset Totalizer 2 Reset Totalizer 3 Reset All Totalizers Start Zero Point Adjustment Pause/Resume dosing Force Output Freeze Output		X	

Factory configuration	Software configuration	Channel 2	Channel 3, Channel 4	
Relay output	Alarm Class Individual alarms One on/off valve Two on/off valves		X	 Normally open
Relay output	Alarm Class Individual alarms One on/off valve Two on/off valves		X	 Normally closed

Load

Ensure the total load connected to the output is sufficient to obtain the voltage level required by the module.

Load [Ω]	Voltage (active Ex) [V]	Voltage (active non Ex) [V]	24 V DC Power supply (passive) [V] Ex and Non Ex
			Measured
100	3	3	17.7
200	5.9	5.9	19.6
500	11.4	14.9	21.0
1000	14.8	19.2	21.6
2000	17.4	20.1	21.9
5000	19.4	20.4	22.2
10000	20.3	21	22.3
20000	20	20.4	22.4
50000	20.4	20.6	22.5
100000	20.6	20.7	22.6

Note

Load

Signal output: < 500 Ω at 14 to 24 VDC (active), 14 to 30 VDC (passive)

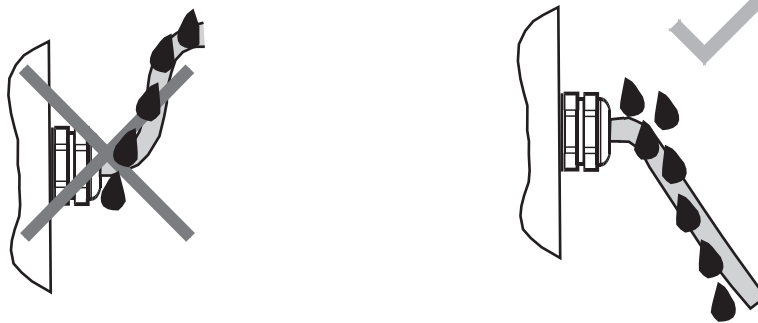
Relay output: 30 VAC/VDC, 100 mA

Passive signal input: 15 to 30 VDC, 2 to 15 mA

4.2.3.6 Finishing the transmitter connection (Industrial enclosure)

Connection check-up

1. Check individual wire installation by tugging firmly.
2. Firmly tighten cable glands and insert blanking plugs in unused cable entries.
3. Remove O-ring from lid.
4. Reinstall lid and screw in until mechanical stop. Wind back lid by one turn.
5. Mount O-ring by pulling it over the lid and tighten lid cover until you feel friction from the O-ring on both sides. Wind lid further by one quarter of a turn to seal on the O-ring.
6. Reinstall and tighten lid lock screw.
7. Ensure that moisture does not penetrate the inside of electronics enclosure. Bend cables downward immediately before cable glands.



4.2.3.7 Finishing the transmitter connection (Wallbox)

Connection check-up

1. Check individual wire installation by tugging firmly.
2. Firmly tighten cable glands and insert blanking plugs in unused cable entries.
3. Close lid.
4. Tighten the four spring screws.
5. Ensure that moisture does not penetrate to inside of electronics enclosure.

Commissioning

5.1 Basic safety notes

WARNING

Improper commissioning in hazardous areas

Device failure or risk of explosion in hazardous areas.

- Do not commission the device until it has been mounted completely and connected in accordance with the information in Technical data (Page 53).
- Before commissioning take the effect on other devices in the system into account.

WARNING

Commissioning and operation with pending error

If an error message appears, correct operation in the process is no longer guaranteed.

- Check the gravity of the error.
- Correct the error.
- If the error still exists:
 - Take the device out of operation.
 - Prevent renewed commissioning.

WARNING

Hazardous contact voltage

Risk of injury through hazardous contact voltage when the device is open or not completely closed.

The degree of protection specified on the nameplate or in Technical data (Page 53) is no longer guaranteed if the device is open or not properly closed.

- Make sure that the device is securely closed.

See also

Installing/mounting (Page 19)

 DANGER

Toxic gases and liquids

Danger of poisoning when venting the device: if toxic process media are measured, toxic gases and liquids can be released.

- Before venting ensure that there are no toxic gases or liquids in the device, or take the appropriate safety measures.

 WARNING

Loss of explosion protection

Risk of explosion in hazardous areas if the device is open or not properly closed.

- Close the device as described in Installing/mounting (Page 19).

See also

Technical data (Page 53)

 WARNING

Opening device in energized state

Risk of explosion in hazardous areas

- Only open the device in a de-energized state.
- Check prior to commissioning that the cover, cover locks, and cable inlets are assembled in accordance with the directives.

Exception: Devices having the type of protection "Intrinsic safety Ex i" may also be opened in energized state in hazardous areas.

Service and maintenance

6.1 Basic safety notes

Note

The device is maintenance-free.

6.1.1 Maintenance

The device is maintenance-free. However, a periodic inspection according to pertinent directives and regulations must be carried out.

An inspection can include, for example, check of:

- Ambient conditions
- Seal integrity of the process connections, cable entries, and cover
- Reliability of power supply, lightning protection, and grounds

WARNING
--

Impermissible repair of explosion protected devices
--

Risk of explosion in hazardous areas

- | |
|--|
| <ul style="list-style-type: none">• Repair must be carried out by Siemens authorized personnel only. |
|--|

WARNING
--

Dust layers above 5 mm

Risk of explosion in hazardous areas.

Device may overheat due to dust build up.

- | |
|---|
| <ul style="list-style-type: none">• Remove dust layers in excess of 5 mm. |
|---|

NOTICE

Penetration of moisture into the device
--

Damage to device.

- | |
|---|
| <ul style="list-style-type: none">• Make sure when carrying out cleaning and maintenance work that no moisture penetrates the inside of the device. |
|---|



WARNING

Leaks in the sample gas path

Risk of poisoning.

When measuring toxic process media, these can be released or collect in the device if there are leaks in the sample gas path.

- Purge the device as described in Commissioning (Page 45).
- Dispose of the toxic process media displaced by purging in an environmentally friendly manner.



CAUTION

Releasing button lock

Improper modification of parameters could influence process safety.

- Make sure that only authorized personnel may cancel the button locking of devices for safety-related applications.



WARNING

Use of a computer in a hazardous area

If the interface to the computer is used in the hazardous area, there is a risk of explosion.

- Ensure that the atmosphere is explosion-free (hot work permit).

6.2 Cleaning

6.2.1 Cleaning the enclosure

Cleaning the enclosure

- Clean the outside of the enclosure with the inscriptions and the display window using a cloth moistened with water or a mild detergent.
- Do not use any aggressive cleansing agents or solvents, e.g. acetone. Plastic parts or the painted surface could be damaged. The inscriptions could become unreadable.

See also

Cleaning the enclosure (Page 48)

 WARNING

Electrostatic charge

Risk of explosion in hazardous areas if electrostatic charges develop, for example, when cleaning plastic surfaces with a dry cloth.

- Prevent electrostatic charging in hazardous areas.

6.3 Maintenance and repair work

 WARNING

Maintenance during continued operation in a hazardous area

There is a risk of explosion when carrying out repairs and maintenance on the device in a hazardous area.

- Isolate the device from power.
- or -
- Ensure that the atmosphere is explosion-free (hot work permit).

 WARNING

Impermissible accessories and spare parts

Risk of explosion in areas subject to explosion hazard.

- Only use original accessories or original spare parts.
- Observe all relevant installation and safety instructions described in the instructions for the device or enclosed with the accessory or spare part.

 WARNING

Humid environment

Risk of electric shock.

- Avoid working on the device when it is energized.
- If working on an energized device is necessary, ensure that the environment is dry.
- Make sure when carrying out cleaning and maintenance work that no moisture penetrates the inside of the device.

 CAUTION

Hot surfaces

Risk of burns during maintenance work on parts having surface temperatures exceeding 70 °C (158 °F).

- Take corresponding protective measures, for example by wearing protective gloves.
- After carrying out maintenance, remount touch protection measures.

 CAUTION

Hot parts in the device

Temperatures that can burn unprotected skin may be present for some time after the device has been switched off.

- Observe the waiting time specified in Technical data (Page 53) or on the device before starting with maintenance work.

 WARNING

Enclosure open

Risk of explosion in hazardous areas as a result of hot components and/or charged capacitors inside the device.

To open the device in a hazardous area:

1. Isolate the device from power.
2. Visually inspect sensor inlet and outlet.

Exception: Devices exclusively having Intrinsic safety (Ex i) may be opened in an energized state in hazardous areas.

 CAUTION

Hazardous voltage at open device

Risk of electric shock when the enclosure is opened or enclosure parts are removed.

- Before you open the enclosure or remove enclosure parts, de-energize the device.
- If maintenance measures in an energized state are necessary, observe the particular precautionary measures. Have maintenance work carried out by qualified personnel.

! WARNING**Hot, toxic or corrosive process media**

Risk of injury during maintenance work.

When working on the process connection, hot, toxic or corrosive process media could be released.

- As long as the device is under pressure, do not loosen process connections and do not remove any parts that are pressurized.
- Before opening or removing the device ensure that process media cannot be released.

! WARNING**Improper connection after maintenance**

Risk of explosion in areas subject to explosion hazard.

- Connect the device correctly after maintenance.
- Close the device after maintenance work.

Refer to Connecting (Page 29).

6.4 Replacing the device

! CAUTION**Corrosive substances**

Risk of chemical burns when replacing the sensor.

The sensor in the device contains corrosive substances that result in burns on unprotected skin.

- Make sure that the sensor enclosure is not damaged when replacing the sensor.
- If contact with the corrosive substances occurs, rinse the affected skin immediately with large amount of water to dilute substance.

6.5 Return procedure

Enclose the bill of lading, return document and decontamination certificate in a clear plastic pouch and attach it firmly to the outside of the packaging.

Required forms

- Delivery note
- Return goods delivery note (<http://www.siemens.com/processinstrumentation/returngoodsnote>)
with the following information:
 - Product (item description)
 - Number of returned devices/replacement parts
 - Reason for returning the item(s)
- Decontamination declaration (<http://www.siemens.com/sc/declarationofdecontamination>)
With this declaration you warrant "that the device/replacement part has been carefully cleaned and is free of residues. The device/replacement part does not pose a hazard for humans and the environment."
If the returned device/replacement part has come into contact with poisonous, corrosive, flammable or water-contaminating substances, you must thoroughly clean and decontaminate the device/replacement part before returning it in order to ensure that all hollow areas are free from hazardous substances. Check the item after it has been cleaned. Any devices/replacement parts returned without a decontamination declaration will be cleaned at your expense before further processing.

6.6 Disposal



Devices described in this manual should be recycled. They may not be disposed of in the municipal waste disposal services according to the Directive 2012/19/EC on waste electronic and electrical equipment (WEEE).

Devices can be returned to the supplier within the EC, or to a locally approved disposal service for eco-friendly recycling. Observe the specific regulations valid in your country.

Further information about devices containing batteries can be found at: Information about battery / product return (WEEE) (<https://support.industry.siemens.com/cs/document/109479891/>)

Note

Special disposal required

The device includes components that require special disposal.

- Dispose of the device properly and environmentally through a local waste disposal contractor.
-

Technical data

7.1 Power

7.1.1 Power

Table 7-1 Power supply

Description	Specification
Supply voltage	100 to 240 V AC, 47 to 63 Hz 30 VA 20 - 90 V DC 11 W
Environmental conditions:	- Transient over voltages up to the levels of overvoltage category II - Temporary over voltages occurring on mains supply only - MAINS AC supply voltage fluctuations up to ± 10 % of the nominal voltage. - Altitude up to 2 000 m
Reverse polarity protection	Yes
Galvanic isolation	2500 V AC

7.2 Ex relevant parameters FCT030

	Circuit type	Active IIC	Active IIB
SSL Interface M12 Connector - Pins 1 to 4	U_o	17.42 V	
	I_o	459 mA	
	P_o	2.0 W	
	C_i	840 pF	
	C_o	338 nF	1.96 μ H
	L_i	4 μ H	
	L_o	134 μ H	675 μ H
	L_o/R_o	17.8 μ H/ Ω	

7.2 Ex relevant parameters FCT030

	Circuit type	Active IIC	Passive IIC	Active IIB
IO (Channel 2)	U _o	28 V	N/A	N/A
	I _o	87 mA	N/A	N/A
Active Terminal: IO2+ (8) and IO2 (9)	P _o	0.61 W	N/A	N/A
	C _o	78 nF	61 nF	645 nF
	L _o	1.46 mH	3.6 mH	15.7 mH
Passive Terminal: IO2 (9) and IO2- (10)	U _i	N/A	30 V	
	I _i	N/A	100 mA	
	P _i	N/A	1 W	
	C _i	N/A	7.3 nF	
	L _i	N/A	36 µH	

	Circuit type	Active IIC	Passive IIC	Relay	Active IIB
IO (Channel 3)	U _o	28 V	N/A	N/A	
	I _o	87 mA	N/A	N/A	
Active Terminal: IO3+ (11) and IO3 (12)	P _o	0.61 W			
	C _o	78 nF	61 nF	59 nF	645 nF
	L _o	1.46 mH	3.6 mH	3.4 mH	15.7 mH
Passive Terminal: IO3 (12) and IO3- (13)	U _i	N/A	30 V	30 V	
	I _i	N/A	100 mA	100 mA	
	P _i	N/A	1 W	1 W	
	C _i	4.2 nF	7.3 nF	7.3 nF	
	L _i	34 µH	36 µH	36 µH	
Relay Terminal: NC (11), C (12) and NO (13)					

	Circuit type	Active IIC	Passive IIC	Relay	Active IIB
IO (Channel 4) Active Terminal: IO4+ (14) and IO4 (15) Passive Terminal: IO4 (15) and IO4- (16) Relay Terminal: NC (14), C (15) and NO (16)	U_o	28 V	N/A	N/A	
	I_o	87 mA	N/A	N/A	
	P_o	0.61 W			
	C_o	78 nF	61 nF	59 nF	645 nF
	L_o	1.46 mH	3.6 mH	3.4 mH	15.7 mH
	U_i	N/A	30 V	30 V	
	I_i	N/A	100 mA	100 mA	
	P_i	N/A	1 W	1 W	
	C_i	4.2 nF	7.3 nF	7.3 nF	
	L_i	34 μ H	36 μ H	36 μ H	

	Circuit type	Active IIC	Active IIB
HART (Active) Terminal: Ca+ (4) and C (5)	U_o	28 V	
	I_o	85 mA	
	P_o	0.584 W	
	C_o	72 nF	639 nF
	L_o	1.64 mH	16.4 mH

	Circuit type	Passive IIC	Passive IIB
HART (Passive) Terminal: C (5) and Cp- (6)	U_i	30 V	N/A
	I_i	100 mA	N/A
	P_i	1 W	N/A
	C_i	15.8 nF	N/A
	L_i	36 μ H	N/A

	Modbus input, ia IIC	Modbus output, ia IIC	Modbus output, ia IIB
Modbus Terminal (4) and (5)	$U_i = 4.2$ V	$U_o = 4.2$ V	$U_o = 4.2$ V
	$I_i = 149$ mA	$I_o = 117.8$ mA	$I_o = 117.8$ mA
	$P_i = 156$ mW	$P_o = 124$ mW	$P_o = 124$ mW
	$C_i < 500$ pF	$C_o = 420$ μ F	$C_o = 1000$ μ F
	$L_i < 50$ μ H	$L_o = 2.51$ mH	$L_o = 10.198$ mH

	Application with linear	Application according to FISCO (IIB)
Profibus Terminal (4) and (5)	$U_i = 30 \text{ V}$	$U_i = 17.5 \text{ V}$
	$I_i = 380 \text{ mA}$	$I_i = 380 \text{ mA}$
		$P_i = 5.32 \text{ W}$
	$C_i = 258 \text{ pF}$	$C_i = 258 \text{ pF}$
	$L_i = 2.3 \text{ }\mu\text{H}$	$L_i = 2.3 \text{ }\mu\text{H}$

Note

External capacitance and inductance

The C_o and L_o values already take into consideration the combined effects of external capacitance and inductance. No further reduction of external capacitance and inductance is required.

7.3 Bus communication

Table 7-2 HART, Modbus and PROFIBUS communication

Description	Specification	More information
Manufacturer ID	42 (2A Hex)	Manufacturer ID parameter
Device ID	34 (22 Hex)	Device type parameter
HART protocol revision	7.5	HART protocol revision parameter
PROFIBUS profile	4.0	PROFIBUS protocol revision parameter
Modbus RS-485 RTU	-	-
Number of device variables	11	Number of process values, both measured and derived
Physical layers supported	FSK	Frequency Shift Keyed
Loop-powered	No	4-wire device

7.4 Operating conditions

Table 7-3 Basic conditions

Description	Specification
Ambient temperature ($^{\circ}\text{C}$ [$^{\circ}\text{F}$]) (Humidity max. 90 %)	Operation: Transmitter without display -40 to +60 [-40 to +140] Transmitter with display -20 to +60 [-4 to +140]*
Ambient temperature ($^{\circ}\text{C}$ [$^{\circ}\text{F}$]) (Humidity max. 90 %)	Storage: Transmitter without display -40 to +70 [-40 to +158] Transmitter with display -40 to +70 [-40 to +158]
Climate class	DIN 60721-3-4

Description	Specification
Altitude	Up to 2000 m (6560 ft)
Relative humidity [%]	95
EMC performance	EN/IEC 61326-1 (Industry)

* Display can be unreadable below -20°C

Table 7-4 Cleaning and sterilizing conditions

Description	Specification
Cleaning method	• CIP • SIP

Note

Device-specific approvals

Always refer to nameplates on the device for device-specific approvals.

7.5 Certificates and approvals

FCT030 transmitter	
"Intrinsic safety" type of protection	
ATEX/IECEX Sira 11ATEX1342X	II 2(1) GD Ex db eb ia [ia Ga] IIC T6 Gb Ex tb [ia Da] IIIC T85°C Db Ta = -40°C to +60°C
FM FM18US0063X	Class I, II, III, Division 1, Groups A, B, C, D, E, F, G Class I Zone 1, AEx d e ia [ia Ga] IIC T3-T6 Zone 21, AEx tb [ia Da] IIIC T85°C
cCSAus (Canada, USA) 2508628	Canada: Ex db eb ia [ia Ga] IIC T6 Gb Ex tb [ia Da] IIIC T85°C USA: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G Class I Zone 1: AEx db eb ia [ia Ga] IIC T6 Gb Zone 21: AEx tb [ia Da] IIIC T85°C
EU Declaration of Conformity	A5E46799085A/001
Pressure equipment	• 2014/68/EU Pressure Equipment Directive (PED) • Canadian Registration Number (CRN)

FC300 (can be installed in Zone 0)	
"Intrinsic safety" type of protection	
ATEX/IECEX	II 1G Ex ia IIC T6...T3 Ga
DEMKO 05 ATEX 138072X	
cCSAus (Canada, USA)	Canada: Class I Division 1. Class I Div. 1 Grp. A, B, C, D. Ex ia IIC T6...T3 IIC Ga USA: Class I Division 1. Class I Div. 1 Grp. A, B, C, DA AEx ia IIC T6...T3 IIC Ga
EU Declaration of Conformity	A5E31814816A/010
Pressure equipment	2014/68/EU Pressure Equipment Directive (PED) - Canadian Registration Number (CRN)
MASS 2100 (can be installed in Zone 0, 20)	
"Intrinsic safety" type of protection	
ATEX/IECEX	Ex ia IIC T6...T3 Ga Ex ia IIIC T135°C Da (For dust applications (IIIC) the maximum ambient temperature is limited to 100°C according to IEC 60079-11 table 4.)
cULus (Canada, USA)	Canada: Class I+II+III Division 1. Grp. A, B, C, D, E, F, G Ex ia IIC T6...T3 Ga Ex ia IIIC T135°C Da USA: Class I Division 1. Class I+II+III Division 1. Grp. A, B, C, D, E, F, G AEx ia IIC T6...T3 Ga AEx ia IIIC T135°C Da (For dust applications (IIIC) the maximum ambient temperature is limited to 100°C according to IEC 60079-11 table 4.)
EU Declaration of Conformity	A5E31814816A/010
Pressure equipment	2014/68/EU Pressure Equipment Directive (PED) - Canadian Registration Number (CRN)

See also

Special conditions for safe use (Page 18)

Product documentation and support

A.1 Product documentation

Process instrumentation product documentation is available in the following formats:

- Certificates (<http://www.siemens.com/processinstrumentation/certificates>)
- Downloads (firmware, EDDs, software) (<http://www.siemens.com/processinstrumentation/downloads>)
- Catalog and catalog sheets (<http://www.siemens.com/processinstrumentation/catalogs>)
- Manuals (<http://www.siemens.com/processinstrumentation/documentation>)
You have the option to show, open, save, or configure the manual.
 - "Display": Open the manual in HTML5 format
 - "Configure": Register and configure the documentation specific to your plant
 - "Download": Open or save the manual in PDF format
 - "Download as html5, only PC": Open or save the manual in the HTML5 view on your PC

You can also find manuals with the Mobile app at Industry Online Support (<https://support.industry.siemens.com/cs/ww/en/sc/2067>). Download the app to your mobile device and scan the device QR code.

Product documentation by serial number

Using the PIA Life Cycle Portal, you can access the serial number-specific product information including technical specifications, spare parts, calibration data, or factory certificates.

Entering a serial number

1. Open the PIA Life Cycle Portal (<https://www.pia-portal.automation.siemens.com>).
2. Select the desired language.
3. Enter the serial number of your device. The product documentation relevant for your device is displayed and can be downloaded.

To display factory certificates, if available, log in to the PIA Life Cycle Portal using your login or register.

Scanning a QR code

1. Scan the QR code on your device with a mobile device.
2. Click "PIA Portal".

To display factory certificates, if available, log in to the PIA Life Cycle Portal using your login or register.

A.2 Technical support

Technical support

If this documentation does not completely answer your technical questions, you can enter a Support Request (<http://www.siemens.com/automation/support-request>).

Additional information on our technical support can be found at Technical Support (<http://www.siemens.com/automation/csi/service>).

Service & support on the Internet

In addition to our technical support, Siemens offers comprehensive online services at Service & Support (<http://www.siemens.com/automation/serviceandsupport>).

Contact

If you have further questions about the device, contact your local Siemens representative at Personal Contact (<http://www.automation.siemens.com/partner>).

To find the contact for your product, go to "all products and branches" and select "Products & Services > Industrial automation > Process instrumentation".

Contact address for business unit:

Siemens AG

Digital Industries

Process Automation

Östliche Rheinbrückenstr. 50

76187 Karlsruhe, Germany

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