TRICOR®

TCD 9100/9200 Modbus RTU Communication

TRICOR
Coriolis Technology

Manual-Version

TCD_9x00_COMO_S_EN_200428_E003

This document is supplied as standard in electronic media with the device. Latest version can be downloaded at www.tricorflow.com.

NOTE:

This manual applies to the Coriolis Flow Meter with the brand TRICOR.

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1. Introduction

1.1. Purpose of this Documentation

This manual contains all information needed to integrate the process instruments into a communications network. The manual is aimed at control system designers, system integrators, instrument engineers.

Safe operation of the product requires reading and following instructions in the product specific manual that contains more detailed information. It is available for download from TRICOR Flow website: https://tricorflow.com/support/downloads/manuals/).

This manual applies to the TCD 9100/TCD 9200 transmitter Modbus version only.

NOTE:

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.

1.2. 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.

NOTE:

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 KEM products

Note the following:

WARNING!

KEM 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 KEM. 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.

NOTE:

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.

Trademarks

All names identified by ® are registered trademarks of KEM. 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.

# 2.	Communication

## 2.1.	System integration

This chapter provides information on how to integrate the device in a point-to-point or multidrop Modbus RTU network in non-hazardous or hazardous areas. Many details of network design are beyond the scope of these operating instructions. The points below provide an overview of the major design criteria. For further details contact KEM Küppers Elektromechanik GmbH (KEM).

## 2.2.	System configuration

Non-hazardous areas

The following figures show examples of installations in point-to-point and multidrop configurations in non-hazardous areas.
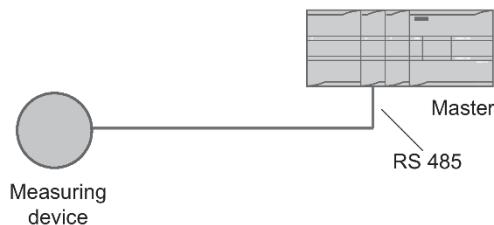
Fig. 1: Point to point configuration in non-hazardous locations
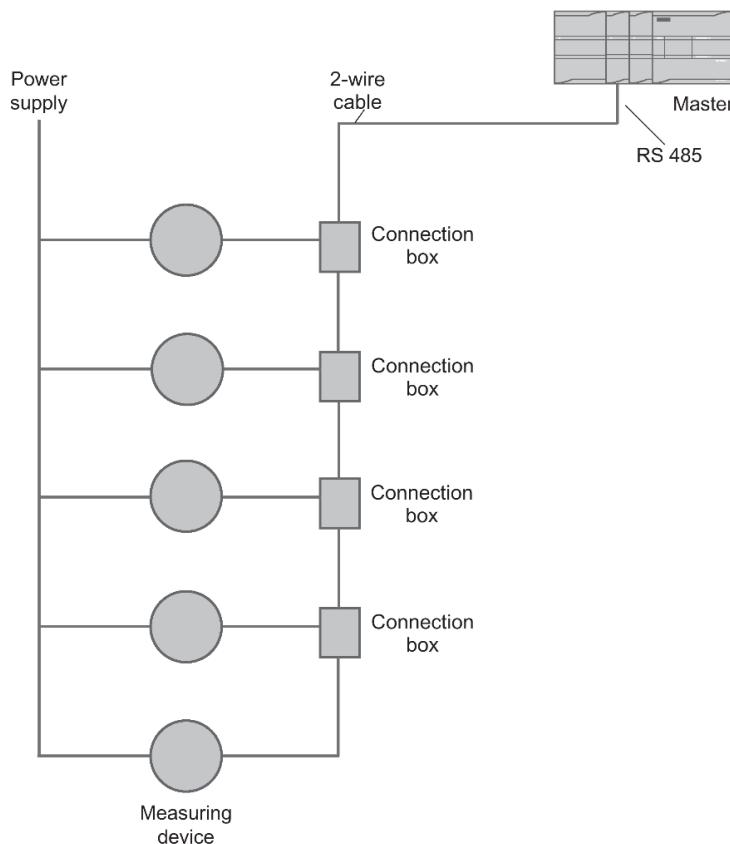
Fig. 2: Multidrop configuration (branch) in non-hazardous area
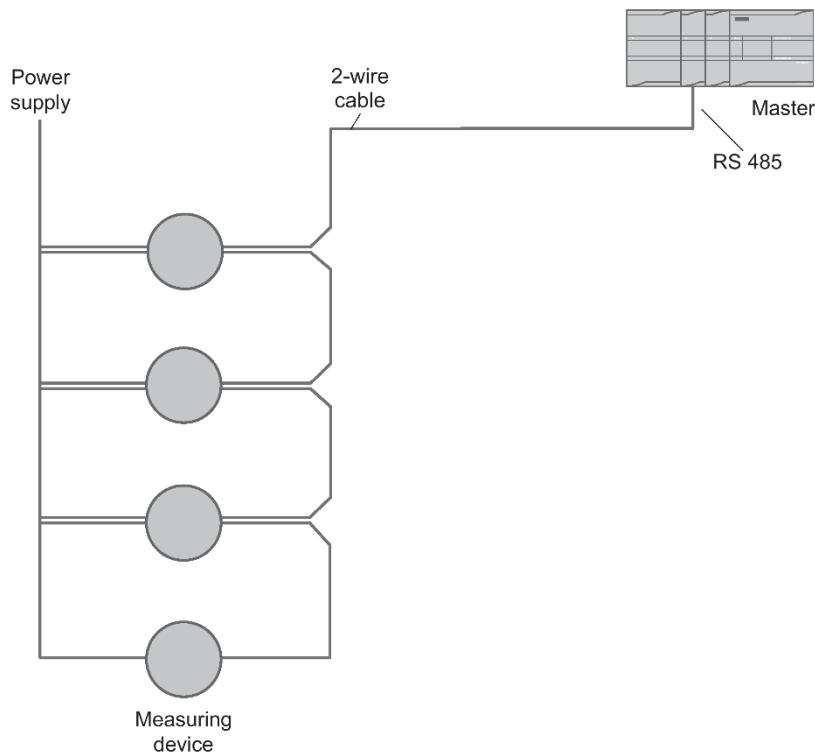
Fig. 3: Point-to-point configuration in hazardous area

Hazardous areas

The following figures show examples of installations in point-to-point and multidrop configurations in hazardous areas.
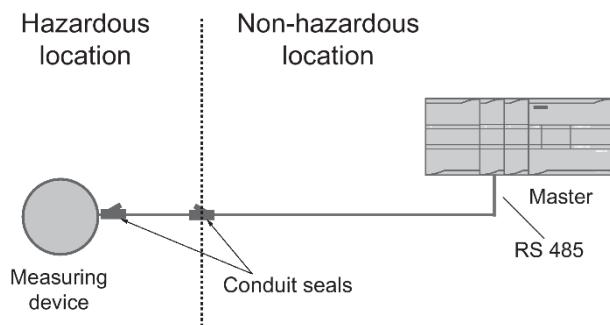
Fig. 4: Point-to-point configuration in hazardous area
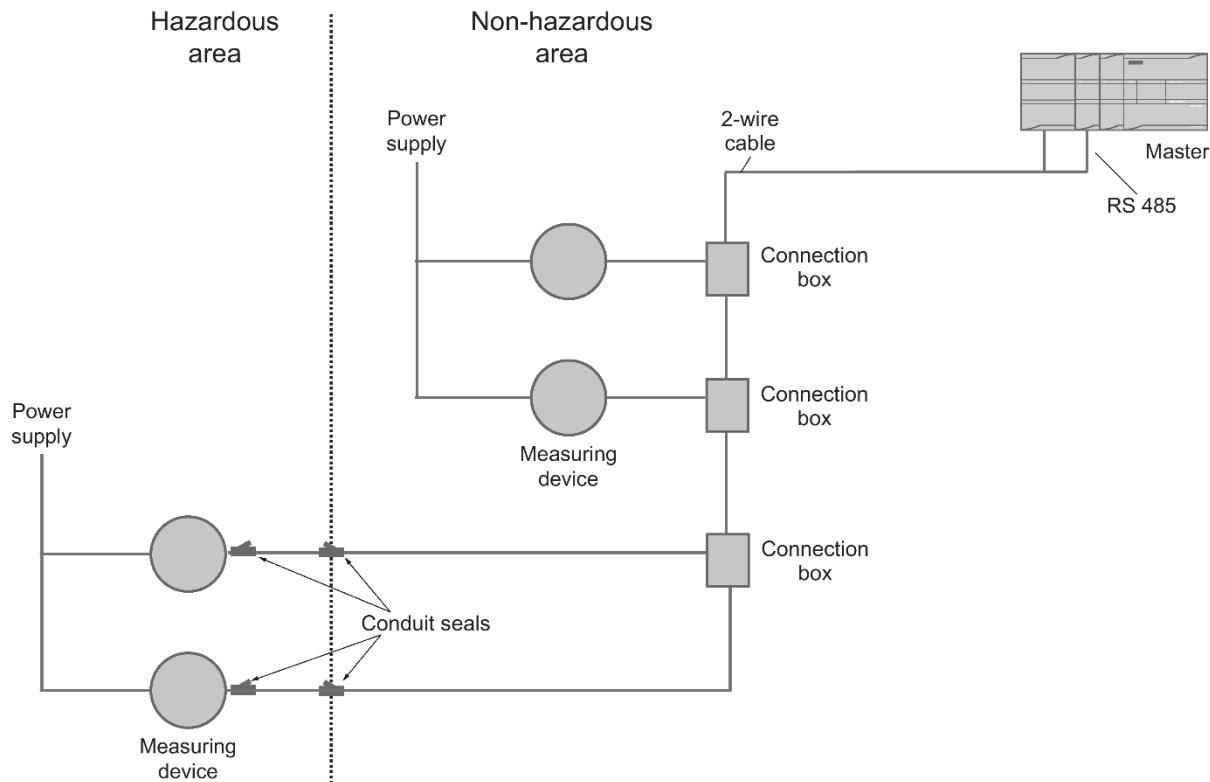
Fig. 5: Multidrop configuration in hazardous area

NOTE:

Flameproof conduit seals

Two flameproof conduit seals are required for each device in hazardous area installations.

NOTE:

Equipment approved for hazardous areas

Ensure that the equipment is approved for installation in hazardous areas.

2.3. System writing

The device is slave in a 2-wire Modbus RTU RS485 bus system. Terminal A on the device must be connected to terminal A on the master/host system. Terminal B on the device must be connected to terminal B on the master/host system This corresponds to a half-duplex communication where the slave will only reply to a request from the master.

This example shows an EMC shielded enclosure for multidrop installation. Cable shield must be grounded at host system, in connection box, and at flowmeter to comply with EMC requirements. Keep the cable shield to the ground as short as possible.
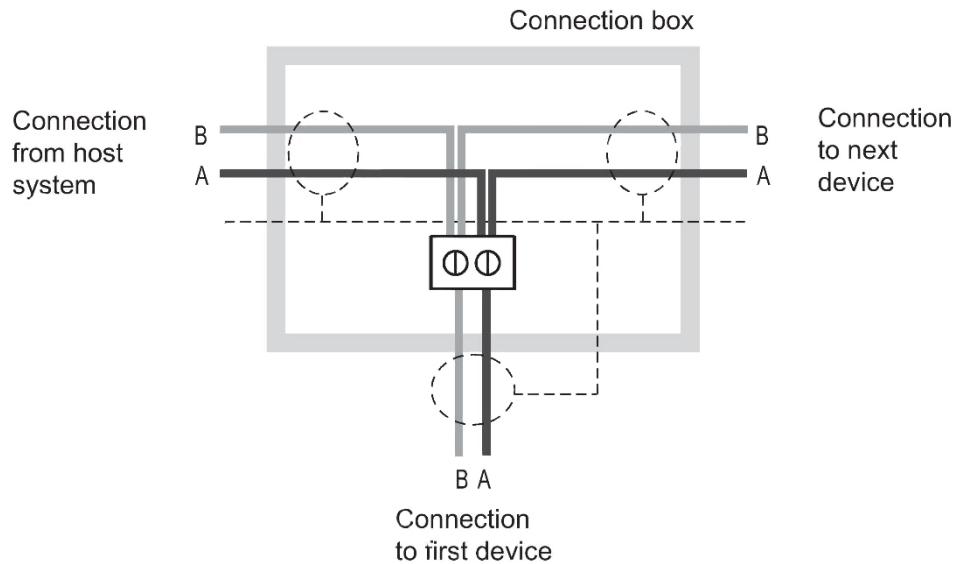
Fig. 6: EMC shielded enclosure for multidrop installation

Topology

The device supports a two-wire electrical interface in accordance with EIA/TIA-485 standard.

An RS485 Modbus configuration without repeater has one trunk cable, along which devices are connected, directly (daisy chaining) or by short branch cables.

NOTE:

Multidrop examples in this document show a trunk cable with short branch cables.

Maximum cable lengths

The end to end length of the trunk cable must be limited. The maximum length depends on the baud rate, the cable (gauge, capacitance or characteristic impedance), the number and types of loads on the daisy chain, and the network configuration.

NOTE:
Maximum branch cable length

Branch cables must be short, never more than 20 m.
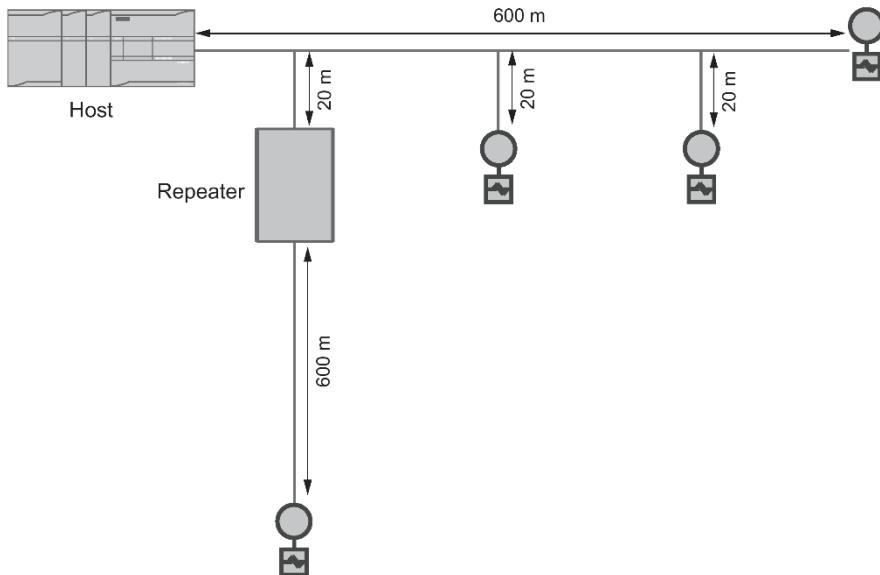
Fig. 7: Maximum cable lengths in multidrop configuration

2.4.   Connecting

NOTE:

End Of Line (EOL) termination
The TCD 9x00 EOL termination DIP switch is default set to EOL active. Avoid DIP switch settings not shown in the table below. Otherwise, reduced communication interface reliability will occur.
The DIP switch is located on the frontend cassette (main transmitter /Ch1 cassette).

DIP switch Communication set-up

Description	Switch 1	Switch 2	Switch 3	Switch 4
EOL Active	OFF	OFF	OFF	OFF
EOL Inactive	ON	ON	OFF	OFF

2.5. Connecting the Modbus (CH1)

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, field mount transmitter
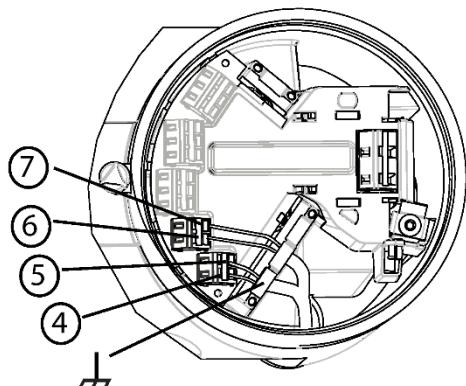
④	In + (B)
⑤	In - (A)
⑥	Out + (B)
⑦	Out - (A)
⏚	Functional Earth

6. Tighten cable gland.

7. Set Modbus communication parameters to factory settings

COM PORT	Depending on instrument
Device Address	1
Baudrate	19200
Parity/Stopbits	Even, 1

3. Modbus commands

3.1. Modbus addressing model

The device allows read/write access to one holding register block. All devices are mapped to this Modbus address space.

The device allows read/write access to the following standard Modbus RTU data holding register blocks:

Holding registers (ref. 4x address range)

- The minimum value allowed to be written to a **holding register** (that allows Read/Write) can be read by adding 10000 to the Modbus address of the register.
- The maximum value allowed to be written to a **holding register** (that allows Read/Write) can be read by adding 20000 to the Modbus address of the register.
- The default value of a **holding register** (that allows Read/Write) can be read by adding 30000 to the Modbus address of the register.

3.2. Modbus communication

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8291	Unsigned/2	Restart com-munication	Restarts the communication using configured slave address, baud rate and parity/framing.	-	0: Cancel 1: Restart	Write only
8005	Unsigned/2	Slave address (HW)	DIP switch setting on the transmitter cassette. Address is used if DIP switch is set to a value > 0.	-	-	Read only
8297	Unsigned/2	Slave address (SW)	Software address of Modbus interface. Address is used if switch is set to 0.	1	1 - 147	Read/ write
8298	Unsigned/2	Baud rate	Baud rate of Modbus interface.	19200 Bit/s	0: 9600 Bit/s 1: 19200 Bit/s 2: 115200 Bit/s 3: Reserved 4: 38400 Bit/s 5: 57600 Bit/s 6: 76800 Bit/s 7: 1200 Bit/s 8: 2400 Bit/s 9: 4800 Bit/s	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8299	Unsigned/2	Parity and framing	Parity and framing of the Modbus communication interface.	Even parity, 1 stop	0: Even parity, 1 stop 1: Odd parity, 1 stop 2: No parity, 2 stops	Read/write

Tab. 1: General Modbus settings

3.3. Coil configuration

The device provides 20 coil definitions which can be configured.

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units][1] (units register)	Value range / Setting options	Access level
10300	Unsigned/2	Modbus coil address 1	Specifies the coil address with which the following bit coded register value is accessible. The register and bit(s) are specified by Modbus coil register 1 and Modbus coil bitmask 1.	1	0 - 65535	Read/write
10301	Unsigned/2	Modbus coil register 1	Specifies the Modbus register whose value is checked against Modbus coil bitmask 1 to determine the coil value (false or true). A register value of 65535 specifies that this coil mapping is undefined.	Un-defined	0 - 65535	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units][1] (units register)	Value range / Setting options	Access level
10302	Unsigned/4	Modbus coil bitmask 1	Bit mask which is compared against the register value specified with Modbus coil register 1 to determine the coil value. If any bit of the register value is set which is also set in the bit mask then the coil value is true, otherwise the coil is false.	0	0 - 4294967295	Read/write
10304	Unsigned/2	Modbus coil length 1	Output parameter that informs about the size in bytes of the parameter that is specified by Modbus coil address 1. Could be used to identify the relevant bits of the Modbus coil bitmask 1.	-		Read only
10305	Unsigned/2	Modbus coil address 2	Specifies the coil address with which the following bit coded register value is accessible. The register and bit(s) are specified by Modbus coil register 2 and Modbus coil bitmask 2.	2	0 - 65535	Read/write
10306*	Unsigned/2	Modbus coil register 2	Specifies the Modbus register whose value is checked against Modbus coil bitmask 2 to determine the coil value (false or true). A register value of 65535 specifies that this coil mapping is undefined.	Undefined		Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units][1] (units register)	Value range / Setting options	Access level
10307	Unsigned/4	Modbus coil bitmask 2	Bit mask which is compared against the register value specified with Modbus coil register 2 to determine the coil value. If any bit of the register value is set which is also set in the bit mask then the coil value is true otherwise false.	0	0 - 4294967295	Read/ write
10309	Unsigned/2	Modbus coil length 2	Output parameter that informs about size in bytes of parameter that is specified by Modbus coil address 2. Could be used to identify the relevant bits of the Modbus coil bitmask 2.	-		Read only
...						
10399	Unsigned/2	Modbus coil length 20	Output parameter that informs about the size in bytes of the parameter that is specified by Modbus coil address 20. Could be used to identify the relevant bits of the Modbus coil bitmask 20.	-		Read only

[1] If default value is "-" the command "Set to default" will not set this parameter to default.

Tab. 2: Coil configuration

3.4. Modbus register mapping

The device provides the possibility to map each existing parameter to a freely chosen Modbus register for communication purposes over channel 1.

The device provides means to remap 20 Modbus registers.

Modbus register	Data type/ Size in bytes	Parameter	Description	Default value [units] (units register)	Value range/ Setting options	Access level
10448	Unsigned/4	Enable mapping	Activation/deactiva-tion of the register mapping. A set bit means that the map-ping pair is activated, a cleared bit that the mapping pair is deac-tivated. Bit 0: Requested register 1/ Target register 1 ... Bit 19: Requested register 20/Target register 20	0	0 - 1048575	Read/ write
10450	Unsigned/2	Register 1 source	Modbus register that appears within Mod-bus request is redi-rected to the parame-ter specified by Target register 1.	65535	0 - 65535	Read/ write
10451	Unsigned/2	Register 1 target	Register of an existing product parameter to which a Modbus re-quest is redirected.	65535	0 - 65535	Read/ write
...						
10488	Unsigned/2	Register 20 source	Modbus register that appears within Mod-bus request is redi-rected to the parame-ter specified by Target register 20.	65535	0 - 65535	Read/ write
10489	Unsigned/2	Register 20 target	Register of an existing product parameter to which a Modbus request is redirected.	65535	0 - 65535	Read/ write

Tab. 3: Modbus register mapping

3.5.   Integer byte order

The device is able to adjust the byte order of integer values.

Modbus register	Data type/ Size in bytes	Parameter	Description	Default value [units] (units register)	Value range/ Setting options	Access level
8295	Unsigned/2	Integer order byte	The integer byte order used in Modbus messages. 0: MSB - LSB (big endian) 1: LSB - MSB (little endian) MSB = most significant byte / high byte LSB = least significant byte / low byte	MSB - LSB (big endian)	0 - 1	Read/ write

Tab. 4: Integer byte order

3.6.   Float transmission

The Float Byte Order function ensures that the master and slave use the same sequence of the bytes when transmitting float values. This enables the user to configure the TRICOR Coriolis transmitter and operate the device with all types of PLCs without reprogramming the PLC. The transmission order is configured by setting the parameter Byte Order in the submenu Device -> Communication.

NOTE:

The command Restart Communication must be executed to activate the new byte order setting.

3.7.   Float byte order

The device is able to adjust the byte order of floating-point values.

Modbus register	Data type/ Size in bytes	Parameter	Description	Default value [units] (units register)	Value range/ Setting options	Access level
8296	Unsigned/2	Float byte order	The float byte order used in Modbus messages. 0: 1-0-3-2 1: 0-1-2-3 2: 2-3-0-1 3: 3-2-1-0 The first mentioned byte is the first byte sent. Byte 3 corresponds to the left-most byte (MSB) of a 32 bit floating point number in big endian format, byte 0 to the right-most byte.	3-2-1-0	0 - 3	Read/ write

Tab. 5: Float byte order

3.8. Modbus function codes

Function code	Command text	Description
01	Read Coils	Reads the status of single bit(s)
02	Read Discrete Inputs	Reads the status of single input bit(s)
03	Read Holding Registers	Reads the binary content of multiple 16-bit registers
04	Read Input Registers	Reads the binary content of multiple 16-bit registers
05	Write Single Coil	Writes a single on/off bit
06	Write Single Register	Writes the binary content of single 16-bit register
07	Read Exception Status	Delivers the global alarm status of the device
08	Diagnostics	Provides a series of tests for checking the communication system
15	Write Multiple Coils	Writes multiple on/off bits
16	Write Multiple Registers	Writes the binary content of multiple 16-bit registers
17	Report Slave ID	The device will respond to a Report Slave ID command (command 17) request from the master by giving information about device type, vendor, and revision level
23	Read/Write Multiple Registers	Combined Write Multiple Registers / Read Holding Registers call

Tab. 6: General Modbus settings

Function code 7 (Read exception status)

The device provides the content of the parameter Global alarm status as exceptions.

Function code 8 (Diagnostics)

The diagnostics function provides means for checking the communication between MODBUS master and slave. The function uses a sub-function code to select the functionality.

The following sub-function codes are supported:

Sub-function code	Name	Description
0	Return query data	The data passed in the request data field will be returned (looped back) in the response. The entire response message should be identical to the request.
1	Restart communications option	After having restarted the communication, select the baud rate, framing or Modbus address to get access to the device again.

Function code 17 (Report Slave ID)

The transmitter will respond to a Report Slave ID request from the master by giving information about device type, vendor, and firmware version in a format as shown:

Response

Slave address	1 byte	
Function code	1 byte	17
Byte count	1 byte	62
Slave ID	1 byte	Sensor device type 0: TRICOR
Run indicator	1 byte	255: Running
Manufacturer name	12 bytes	KEM
Product name	32 bytes	TRICOR
Product firmware version	16 bytes	
CRC	2 bytes	

3.9.   Access control

Access control manages whether the Modbus master is allowed to modify device parameters. Reading of parameters is always possible. The general access control rules are:

- The Modbus interface has an access level that can be changed by providing PIN information via the Modbus register 2207 (User PIN) or 2208 (Expert PIN).
- Each parameter has a protection level assigned that specifies the required access level to modify the parameter via the Modbus interface.
- If the access level of the Modbus interface is lower than the protection level of the parameter that is desired to be modified, then the attempt to modify the parameter is rejected by the device.

The device is designed to support custody transfer (CT) device as a FUTURE OPTION by including a CT write protection DIP switch. The CT write protection DIP switch is ON (locked), the device will deny all writes to CT parameters independent of the access control.

Access level	Description
Read only	The Modbus master is not able to modify the device configuration (setup parameters). The Modbus master is only able to execute the command, to reset PINs. This is the default level of the Modbus interface.
User	The Modbus master must provide the correct user PIN with Modbus register 8292 to reach this access level (for TCD 9010 use Modbus Register 404). The Modbus master is able to modify a subset of the device configuration.
Expert	The Modbus master must provide the correct expert PIN with Modbus register 8293 to reach this access level. The Modbus master is able to modify the configuration of the device. (for TCD 9010 use Modbus Register 405).

Tab. 7: Access control

3.10. Modbus holding registers tables

3.10.1. Modbus holding registers tables (intro)

In the following the Modbus RTU holding registers available for TRICOR TCD 9x00 are described.

NOTE:
All Write parameters require password access.

3.10.2. Process values

Standard TRICOR Coriolis applications

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
3000	Float/4	Mass flow	Measured mass flow	[kg/s] (7400)	-	Read only
3002	Float/4	Volume flow	Measured volume flow	[m³/s] (7500)	-	Read only
3004	Float/4	Density	Measured density	[kg/s] (7600)	-	Read only
3010	Float/4	Medium temperature	Measured medium temperature	[°C] (7700)	-	Read only
7950	Float/4	Standard volume flow	Calculated volume flow	[°C] (7964)	-	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7871	Float/4	Fraction A	Fractional flow of medium A	[Kg/h] (7865) mass flow [m³/h] (7867) volume flow	-	Read only
7881	Float/4	Fraction B	Fractional flow of medium B	[Kg/h] (7865) mass flow [m³/h] (7867) volume flow		Read only
7800	Float/4	Fraction A %	Fraction Flow Media A in Percent	-		Read only
7810	Float/4	Fraction B %	Fraction Flow Media B in Percent	-		Read only

Tab. 8: Process values for standard TRICOR Coriolis applications

IO values

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8803	Float/4	Loop current CH2	Calculated current at output channel 2.	- [mA]		Read only
8900	Float/4	Output frequency CH2	Calculated frequency at output channel 2.	- [Hz]		Read only
8969	Float/4	Amount on CH2	Current totalized amount according to pulse output channel 2.	- (Mass: 7400 / Volume: 7500 / Standard Volume: 7964)		Read only
8840	Unsigned/2	Status output CH2	Calculated status at output channel 2.	-	0 - 1	Read only
9103	Float/4	Loop current CH3	Calculated current at output channel 3.	- [mA]		Read only
9200	Float/4	Output frequency CH3	Calculated frequency at output channel 3.	- [Hz]		Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9269	Float/4	Amount on CH3	Current totalized amount according to pulse output channel 3.	- (Mass: 7400 / Volume: 7500 / Standard Volume: 7964)		Read only
9140	Unsigned/2	Status output CH3	Calculated status at output channel 3.	-	0 - 1	Read only
10503	Float/4	Input current CH3	Measured current at input channel 3.	- [mA]		Read only
9129	Float/4	Digital input signal CH3	Detected logical level at channel 3.	-	0 - 1	Read only
9303	Float/4	Loop current CH4	Calculated current at output channel 3	- [mA]		Read only
9400	Float/4	Output frequency CH4	Calculated frequency at output channel 4.	- [Hz]		Read only
9469	Float/4	Amount on CH4	Current totalized amount according to pulse output channel 4.	- (Mass: 7400 / Volume: 7500/ Standard Volume: 7964)		Read only
9340	Unsigned/2	Status output CH4	Calculated status at output channel 4.	-	0 - 1	Read only
10603	Float/4	Input current CH4	Measured current at input channel 4.	- [mA]		Read only
9329	Unsigned/2	Digital input signal CH4	Detected logical level at channel 4.	-	0 - 1	Read only

Tab. 9: IO values

3.10.3. Totalizers

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8300	Float/4	Totalizer 1 value	Totalized value of totalizer 1. Units depends on the selected process value the totalizer is configured to. Write access if Totalizer 1 target mode is set to 16: Manual.	- (8321/ 8320/ 8322)	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8303	Unsigned/2	Totalizer 1 set	Run, reset, or preset totalizer 1.	0	0: Totalizer 1: Reset 2: Preset to Totalizer 1 preset value	Read/write
8304	Unsigned/2	Totalizer 1 direction	Totalizer 1 direction.	1	0: Balance 1: Positive 2: Negative 3: Hold	Read/write
8316	Float/4	Totalizer 1 preset value	Preset value which will be used when Totalizer 1 set is set to 2.	- (8321/ 8320/ 8322)	-	Read/write
8319	Unsigned/2	Totalizer 1 target mode	Sets the desired mode for the totalizer.	8	8: Auto, the totalizer algorithm running. 16: Man, the totalizer algorithm is stopped. The totalizer value can be written.	Read/write
8400	Float/4	Totalizer 2 value	Totalized value of totalizer 2. Units depends on the selected process value the totalizer is configured to. Write access if Totalizer 2 target mode is set to 16: Manual.	- 8321/ 8320/ 8322)	-	Read/write
8403	Unsigned/2	Totalizer 2 set	Run, reset, or preset totalizer 2. Possible selections:	0	0: Totalizer 1: Reset 2: Preset to Totalizer 1 preset value	Read/write
8404	Unsigned/2	Totalizer 2 direction	Totalizer 2 direction.	1	0: Balance 1: Positive 2: Negative 3: Hold	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8416	Float/4	Totalizer 2 preset value	Preset value which will be used when Totalizer 2 set is set to 2.	- (8321/ 8320/ 8322)	-	Read/ write
8419	Unsigned/2	Totalizer 3 target mode	Sets the desired mode for the totalizer.	8	8: Auto, the totalizer algorithm running 16: Man, the totalizer algorithm is stopped. The totalizer value can be written	Read/ write
8500	Float/4	Totalizer 3 value	Totalized value of totalizer 3. Units depends on the selected process value the totalizer is configured to. Write access if Totalizer 3 target mode is set to 16: Manual.	- 8321/ 8320/ 8322)	-	Read/ write
8503	Unsigned/2	Totalizer 3 set	Run, reset, or preset totalizer 3.	0	0: Totalizer 1: Reset 2: Preset to Totalizer 1 preset value	Read/ write
8504	Unsigned/2	Totalizer 3 direction	Totalizer 3 direction.	1	0: Balance 1: Positive 2: Negative 3: Hold	Read/ write
8516	Float/4	Totalizer 3 preset value	Preset value which will be used when Totalizer 3 set is set to 2.	- (8321/ 8320/ 8322)	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8519	Unsigned/2	Totalizer 3 target mode	Sets the desired mode for the totalizer.	8	8: Auto, the totalizer algorithm running. 16: Man, the totalizer algorithm is stopped. The totalizer value can be written.	Read/ write
8549	Unsigned/2	Reset all totalizers	Reset command for totalizers 1 to 3.	0	0: Run 1: Reset all totalizers 11: Reset totalizer 1 12: Reset totalizer 2 13: Reset totalizer 3	Write only

Tab. 10: Totalizers

3.10.4. Units

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7500	Unsigned/2	Volume flow units	Units for volume flow values.	19	15: ft³/min (cubic feet per minute) 16: gal/min (US gallons per minute) 17: l/min (liters per minute) 18: i.gal/min (Imperial gallons per minute) 19: m³/h (cubic meters per hour) 22: gal/s (US gallons per second) 23: Mgal/d (million US gallons per day) 24: l/s (liters per second)	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
					25: Ml/d (million liters per day) 26: ft³/s (cubic feet per second) 27: ft³/d (cubic feet per day) 28: m³/s (cubic meters per second) 29: m³/d (cubic meters per day) 30: i.gal/h (Imperial gallons per hour) 31: i.gal/d (Imperial gallons per day) 130: ft³/h (cubic feet per hour) 131: m³/min (cubic meters per minute) 132: BBL42/s (1 barrel = 42 US gallons) 133: BBL42/min (1 barrel = 42US gallons) 134: BBL42/h (1 barrel = 42 US gallons 135: BBL42/d (1 barrel = 42 US gallons 136: gal/h (US gallons per hour) 137: i.gal/s (Imperial gallons per second) 138: l/h (liters per hour) 170: BBL31/s (1 barrel = 31 US gallons 171: BBL31/min (1 barrel = 31 US gallons) 172: BBL31/h (1 barrel = 31 US gallons	
7400	Unsigned/2	Mass flow units	Units for mass flow values.	75	70: g/s (grams per second) 71: g/min (grams per min) 72: g/h (grams per hour) 73: kg/s (kilograms per second) 74: kg/min (kilograms per minute) 75: kg/h (kilograms per hour)	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
					76: kg/d (kilograms per day) 77: t/min (1 t = 1000 kg) 78: t/h (1 t = 1000 kg) 79: t/d (1 t = 1000 kg) 80: lb/s (pounds per second) 81: lb/min (pounds per minute) 82: lb/h (pounds per hour) 83: lb/d (pounds per day) 84: STon/min (1 STon = 2000 lb) 85: STon/h (1 STon = 2000 lb) 86: STon/d (1 STon = 2000 lb) 87: T/h (1 T = 2240 lb) 88: T/d (1 T = 2240 lb) 253: custom units (see Custom mass flow units string (8458) / factor (8456))	
7964	Unsigned/2	Standard volume flow units	Units for standard volume flow values.	188	121: Nm³/h (normal cubic meters per hour) 122: Nl/h (normal liters per hour) 123: Sft³/min (standard cubic feet per minute) 174: Nl/d (normal liters per day) 175: Nl/min (normal liters per minute) 176: Nl/s (normal liters per second) 177: Sl/d (standard liters per day) 178: Sl/h (standard liters per hour) 179: Sl/min (standard liters per minute) 180: Sl/s (standard liters per second) 181: Nm³/d (normal cubic meters per day)	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
					182:Nm³/min (normal cubic meters per minute) 183:Nm³/s (normal cubic meters per second) 184:Sft³/d (standard cubic feet per day) 185:Sft³/h (standard cubic feet per hour) 186:Sft³/s (standard cubic feet per second) 187:Sm³/d (standard cubic meters per day) 188:Sm³/h (standard cubic meters per hour) 189:Sm³/min (standard cubic meters per minute) 190:Sm³/s (standard cubic meters per second) 253:custom units (see Custom standard volume flow units string (7518) / factor (7516))	
7600	Unsigned/2	Density units	Units for density values.	92	91: g/cm³ (grams per cubic) centimeters 92: kg/m³ (kilograms per cubic meter) 93: lb/gal (pounds per US gallon) 94: lb/ft³ (pounds per cubic foot) 95: g/ml (grams per mililiter) 96: kg/l (kilograms per liter) 97: g/l (grams per liter) 98: lb/in³ (pounds per cubic inch) 99: STon/yd³ (1 STon = 2000 lb) 146:µg/l (micrograms per liter) 147:µg/m³ (micrograms per cubic meter)	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
					170:mg/l (milligrams per liter) 253:custom units (see Custom density units string (8464) / factor (8462))	
7700	Unsigned/2	Tempera-ture units	Units for temperature values.	32	32: °C (degrees Celsius) 33: °F (degrees Fahrenheit) 34: °R (degrees Rankine) 35: K (kelvins)	Read/write
8321	Unsigned/2	Totalizer 1 units	Units for volume quantities of totalizer 1 (totalizer 1 is configured to volume flow).	41	40: US gallons 41: l (liters) 42: i.gal (Imperial gallons) 43: m³ (cubic meters) 46: BBL42 (1 barrel = 42 US gallons) 110:bush (bushels) 111:yd³ (cubic yards) 112:ft³ (cubic feet) 113:in³ (cubic inches) 124:BBL31.5 (1 barrel = 31.5 US gallons) 170:BBL31 (1 barrel = 31 US gallons) 236:hl (hectoliters) 253:custom units (see Custom volume units string (8452) / factor (8450))	Read/write
8320	Unsigned/2	Totalizer 1 units	Units for mass quantities of totalizer 1 (totalizer 1 is configured to mass flow).	61	60: g (grams) 61: kg (kilograms) 62: t (1 t = 1000 kg) 63: lb (pounds) 64: STon (1 STon = 2000 lb) 65: T (1 T = 2240 lb) 125:oz (ounces) 253:custom units (see Custom mass units string (8476) / factor (8474))	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8322	Unsigned/2	Totalizer 1 units	Units for standard volume quantities of totalizer 1 (totalizer 1 is configured to standard volume flow).	171	166:Nm³ (normal cubic meters) 167:Nl (normal liters) 168:Sft³ (standard cubic feet) 171:Sl (standard liters) 172:Sm³ (standard cubic meters)	Read/write
8421	Unsigned/2	Totalizer 2 units	Units for volume quantities of totalizer 2 (totalizer 2 is configured to volume flow).	41	40: US gallons 41: l (liters) 42: i.gal (Imperial gallons) 43: m³ (cubic meters) 46: BBL42 (1 barrel = 42 US gallons) 110:bush (bushels) 111:yd³ (cubic yards) 112:ft³ (cubic feet) 113:in³ (cubic inches) 124:BBL31.5 (1 barrel = 31.5 US gallons) 170:BBL31 (1 barrel = 31 US gallons) 236:hl (hectoliters) 253:custom units (see Custom volume units string (8452) / factor (8450))	Read/write
8420	Unsigned/2	Totalizer 2 units	Units for mass quantities of totalizer 2 (totalizer 2 is configured to mass flow).	61	60: g (grams) 61: kg (kilograms) 62: t (1 t = 1000 kg) 63: lb (pounds) 64: STon (1 STon = 2000 lb) 65: T (1 T = 2240 lb) 125:oz (ounces) 253:custom units (see Custom mass units string (8476) / factor (8474))	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8422	Unsigned/2	Totalizer 2 units	Units for standard volume quantities of totalizer 2 (totalizer 2 is configured to standard volume flow).	171	166:Nm³ (normal cubic meters) 167:Nl (normal liters) 168:Sft³ (standard cubic feet) 171:Sl (standard liters) 172:Sm³ (standard cubic meters)	Read/write
8520	Unsigned/2	Totalizer 3 units	Units for mass quantities of totalizer 3 (totalizer 3 is configured to mass flow).	61	60: g (grams) 61: kg (kilograms) 62: t (1 t = 1000 kg) 63: lb (pounds) 64: STon (1 STon = 2000 lb) 65: T (1 T = 2240 lb) 125:oz (ounces) 253:custom units (see Custom mass units string (8476) / factor (8474))	Read/write
8521	Unsigned/2	Totalizer 3 units	Units for volume quantities of totalizer 3 (totalizer 3 is configured to volume flow).	41	40: US gallons 41: l (liters) 42: i.gal (Imperial gallons) 43: m³ (cubic meters) 46: BBL42 (1 barrel = 42 US gallons) 110:bush (bushels) 111:yd³ (cubic yards) 112:ft³ (cubic feet) 113:in³ (cubic inches) 124:BBL31.5 (1 barrel = 31.5 US gallons) 170:BBL31 (1 barrel = 31 US gallons) 236:hl (hectoliters) 253:custom units (see Custom volume units string (8452) / factor (8450))	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8522	Unsigned/2	Totalizer 3 units	Units for standard volume quantities of totalizer 3 (totalizer 3 is con-figured to standard volume flow).	171	166:Nm³ (normal cubic meters) 167:Nl (normal liters) 168:Sft³ (standard cubic feet) 171:Sl (standard liters) 172:Sm³ (standard cubic meters)	Read/write
8976	Unsigned/2	Pulse width units CH2	Units of pulse duration values of CH2 in pulse mode.	51	51: s (seconds)	Read/write
8993	Unsigned/2	Volume units CH2	Units for volume quantities related to CH2 if in pulse mode.	41	40: US gallons 41: l (liters) 42: i.gal (Imperial gallons) 43: m³ (cubic meters) 46: BBL42 (1 barrel = 42 US gallons) 110:bush (bushels) 111:yd³ (cubic yards) 112:ft³ (cubic feet) 113:in³ (cubic inches) 124:BBL31.5 (1 barrel = 31.5 US gallons) 170:BBL31 (1 barrel = 31 US gallons) 236:hl (hectoliters) 253:custom units (see Custom volume units string (8452) / factor (8450))	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8992	Unsigned/2	Mass units CH2	Units for mass quantities related to CH2 if in pulse mode.	61	60: g (grams) 61: kg (kilograms) 62: t (1 t = 1000 kg) 63: lb (pounds) 64: STon (1 STon = 2000 lb) 65: T (1 T = 2240 lb) 125:oz (ounces) 253:custom units (see Custom mass units string (8476) / factor (8474))	Read/write
8994	Unsigned/2	Standard volume units CH2	Units for standard volume quantities related to CH2.	171	166:Nm³ (normal cubic meters) 167:Nl (normal liters) 168:Sft³ (standard cubic feet) 171:Sl (standard liters) 172:Sm³ (standard cubic meters)	Read/write
9276	Unsigned/2	Pulse width units CH3	Units of pulse duration of CH3 in pulse mode.	51	51: s (seconds)	Read/write
9293	Unsigned/2	Volume units CH3	Units for volume quantities related to CH3 if in pulse mode.	41	40: US gallons 41: l (liters) 42: i.gal (Imperial gallons) 43: m³ (cubic meters) 46: BBL42 (1 barrel = 42 US gallons) 110:bush (bushels) 111:yd³ (cubic yards) 112:ft³ (cubic feet) 113:in³ (cubic inches) 124:BBL31.5 (1 barrel = 31.5 US gallons) 170:BBL31 (1 barrel = 31 US gallons) 236:hl (hectoliters) 253:custom units (see Custom volume units string (8452) / factor (8450))	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9292	Unsigned/2	Mass units CH3	Units for mass quantities related to CH3 if in pulse mode.	61	60: g (grams) 61: kg (kilograms) 62: t (1 t = 1000 kg) 63: lb (pounds) 64: STon (1 STon = 2000 lb) 65: T (1 T = 2240 lb) 125:oz (ounces) 253:custom units (see Custom mass units string (8476) / factor (8474))	Read/ write
9294	Unsigned/2	Standard volume units CH3	Units for standard volume quantities related to CH3.	171	166:Nm³ (normal cubic meters) 167:Nl (normal liters) 168:Sft³ (standard cubic feet) 171:Sl (standard liters) 172:Sm³ (standard cubic meters)	Read/ write
9476	Unsigned/2	Pulse width units CH4	Units of pulse dura-tion values of CH4 in pulse mode.	51	51: s (seconds)	Read/ write
9493	Unsigned/2	Volume units CH4	Units for volume quantities related to CH4 if in pulse mode.	41	40: US gallons 41: l (liters) 42: i.gal (Imperial gallons) 43: m³ (cubic meters) 46: BBL42 (1 barrel = 42 US gallons) 110:bush (bushels) 111:yd³ (cubic yards) 112:ft³ (cubic feet) 113:in³ (cubic inches) 124:BBL31.5 (1 barrel = 31.5 US gallons) 170:BBL31 (1 barrel = 31 US gallons) 236:hl (hectoliters) 253:custom units (see Custom volume units string (8452) / factor (8450))	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9492	Unsigned/2	Mass units CH4	Units for mass quantities related to CH4 if in pulse mode.	61	60: g (grams) 61: kg (kilograms) 62: t (1 t = 1000 kg) 63: lb (pounds) 64: STon (1 STon = 2000 lb) 65: T (1 T = 2240 lb) 125: oz (ounces) 253: custom units (see Custom mass units string (8476) / factor (8474))	Read/ write
9494	Unsigned/2	Standard volume units CH4	Units for standard volume quantities related to CH4.	171	166: Nm³ (normal cubic meters) 167: Nl (normal liters) 168: Sft³ (standard cubic feet) 171: Sl (standard liters) 172: Sm³ (standard cubic meters)	Read/ write
8470	String/8	Custom volume flow units string	User specific string for volume flow values.	--------	-	Read/ write
8468	Float/4	Custom volume flow units factor	Conversion factor for user specific volume flow values related to m³/s.	1.0	-	Read/ write
7518	String/8	Custom standard volume flow units string	User specific string for standard volume flow values.	--------	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7516	Float/4	Custom standard volume flow units factor	Conversion factor for user specific standard volume flow values related to Sm^3/s.	1.0	-	Read/ write
8458	String/8	Custom mass flow units string	User specific string for mass flow values.	--------	-	Read/ write
8456	Float/4	Custom mass flow units factor	Conversion factor for user specific mass flow values related to kg/s.	1.0	-	Read/ write
8464	String/8	Custom density units string	User specific string for density values.	--------	-	Read/ write
8462	Float/4	Custom density units factor	Conversion factor for user specific density values related to kg/m^3.	1.0	-	Read/ write
8494	String/8	Custom velocity units string	User specific string for velocity values.	--------	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8492	Float/4	Custom velocity units factor	Conversion factor for user specific velocity values related to m/s.	1.0	-	Read/ write
8452	String/8	Custom volume units string	User specific string for volume quantities.	--------	-	Read/ write
8450	Float/4	Custom volume units factor	Conversion factor for user specific volume quantities related to m³.	1.0	-	Read/ write
8476	String/8	Custom mass units string	User specific string for mass quantities.	--------	-	Read/ write
8474	Float/4	Custom mass units factor	Conversion factor for user specific mass quantities related to kg.	1.0	-	Read/ write

Tab. 11: Units settings for values and quantities communicated via Modbus

3.10.5.   Setup

3.10.5.1.   Sensor settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
2100	Unsigned/2	Flow direction	Define positive and negative flow direction. Default positive flow direction is indicated by an arrow on the sensor.	1	Negative: The flow is measured '+' in default negative direction and '-' in default positive direction. Positive: The flow is measured '+' in default positive direction and '-' in default negative direction.	Read/write
2130	Unsigned/2	Process Noise Damping	Select process noise damping level: 0: 55 ms filtering (Centrifugal-Pump) 1: 110 ms filter-ing (TriplexPump) 2: 220 ms filtering (DuplexPump) 3: 400 ms filtering (Simplex-Pump) 4: 800 ms filtering (CamPump)	1	0 Low to 4 High	Read/write
2125	Float/4	Low mass flow Cut-Off	Set mass flow limit for lowflow cut-off. Below this limit mass flow output is forced to zero.If Low Flow Cut-Off is set to 0, the cut-off func-tionality is disa-bled. Notice: It is recom-mended to set alower value for gas applications.	Sensor size specific [kg/s][1]	0 to 1023	Read/write
2426	Float/4	Mass flow Correc-tion Factor	Specify correction factor for use in the mass flow calculation.	1	-1.999 to +1.999	Read/write

Tab. 12: General sensor settings

3.10.5.2. Density settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
2127	Float/4	Empty Tube Limit	Define threshold value of empty tube.	500 [kg/m^3]	14 000 to +14 000	Read/write
2129	Unsigned/2	Empty Tube Detection	Set automatic detection of Empty Tube On/Off 0: off (Empty tube is off). 1: on (a density value below Empty Tube Limit triggers an alarm. All flow rate values are forced to zero %).	0	0 to1	Read/write
2442	Float/4	Density Correc-tion Factor	Set density compensation value (gain) in order to make a density correction (scale factor). To increase the displayed density value with +0.5 %, set the density factor to 1.005. The displayed density value will now be 0.5 % higher than before.	1	-1.999 to +1.999	Read/write
2444	Float/4	Density Correc-tion Offset	Set density compensation value (offset) in order to make an offset on the measured density. To make the flowmeter show + 2 kg/m^3, change the density offset to 2.000 kg/m^3 in the 'Sensor' menu.	1 [kg/m^3]	-1 400 to +1 400	Read/write

Tab. 13: Density settings

3.10.5.3. Aerated flow

HMI menu ID	Parameter	Description	Default value [unit]	Value range	Access level
3.9.1	Aerated Flow Filter	Set the process value filter for aerated flow. Auto means that filtering starts automatically when measuring aerated flow.	Auto	Off On Auto	User
3.9.2	Filter Time Constant	"Select process value filter level. * 0.5: Low … 30: High"	10 seconds	10 seconds 20 second 30 seconds User defined value	User
3.9.3	Alarm Limit	Set alarm limit in percent of accepted bad measurements.	80 [%]	0 to 99	Expert
3.9.4	Warning Limit	Set warning limit in percent of accepted bad measurements.	0 [%]	0 to 99	Expert
3.9.5	Measurement Sample Time	Set the time period over which the actual percentage of unstable measurements is calculated.	5 [s]	1 to 10	Expert
3.9.6	Filter Start Hysteresis	Set the hysteresis value. The filter is active when the hysteresis value is exceeded.	0.02 [mV]	0 to 0.124	Expert
3.9.7	Minimum Filtering Time	Set the filtering time. The filtering time is reset each time hysteresis band is exceeded.	100 [cycles]	0 to 65535	Expert
3.9.8	Filter Iteration	Set the number of times to repeat the same filter. Increasing the number will increase the damping.	3	1 to 5	Expert
3.9.9	Bandwidth Factor	Increase the Bandwidth Factor to reduce the LP (low pass) bandwidth filtering.	2	0 to 4	Expert
3.9.10	Filter Pole Shift	Configure the bandwidth and damping in the stop band. A high number will give a small bandwidth and an increased damping in the stop band.	2	1 to 5	Expert

Tab. 14: Aerated Flow

3.10.5.4.   Zero point adjustment

In the following the automatic zero point adjustment function is described. For further details, see Zero point adjustment.

NOTE:

Preconditions

Before a zero point adjustment is initiated, the pipe must be flushed, filled and at an absolute flowrate of zero preferably also at operating pressure and temperature. Refer to appendix Zero point adjustment for more details.

NOTE:

Change of parameters during zero point adjustment

Do not change any other parameter during the zero point adjustment procedure.

Automatic zero point adjustment

The device measures and calculates the correct zero point automatically.

The automatic zero point adjustment of the Flow Meter is set by the following parameters:

- Duration (Modbus address 2135)
- Start Zero Point Adjustment (Modbus address 2180)

When zero adjust is initiated by selecting Start Zero Point Adjustment, the mass flow values are acquired and totalized for the configured period (Duration). The default zero point adjustment period (30 s.) is normally sufficient for a stable zero point measurement.

NOTE:

Extremely low flow quantity

If the flow quantity is extremely small, extremely precise measurement is necessary. In this case, a long zero point adjustment period can be selected for improved zero point adjustment.

Zero point calculation

During zero point adjustment, an average value is automatically calculated using the following formula:

Zero Point Offset Value

Average of N flow values	$$\bar{x} \equiv \frac{\sum_{i=1}^{N} x_i}{N}$$	x_i is an instantaneous flow value sampled in the time domain N = Number of samples during zero point adjustment

The offset value must be within the determined **Zero Point Offset Limit** (Modbus address 2140).

NOTE:

Exceeded zero point offset limit
If the offset value is greater than the configured limit, proceed as follows:
- Check that the tube is completely filled and that the flowrate is absolute zero.
- Check the validity of the configured zero point offset limit.
- Repeat the zero point adjustment.

Zero point standard deviation

After completion of the procedure, the standard deviation is calculated in accordance with the following formula:

Zero Point Standard Deviation

Standard deviation of N values

$$s \equiv \sqrt{\frac{\sum_{i=1}^{N}(x_i - \overline{x})^2}{N-1}} = \sqrt{\frac{-N\overline{x}^2 + \sum_{i=1}^{N}x_i^2}{N-1}}$$

The standard deviation contains important feedback on the homogeneity of the fluid, for example on the presence of bubbles or particles.

The standard deviation must be within the determined Standard Deviation Limit (Modbus address 2138).

NOTE:

Exceeded standard deviation limit
If the standard deviation is greater than the configured limit, proceed as follows:
- Check that the tube is completely filled and that the flow rate is absolute zero.
- Check that the installation is vibration-free.
- Check the validity of the configured standard deviation limit in parameter 2.6.4 Standard Deviation Limit.
- Repeat the zero point adjustment.

Successful automatic zero point adjustment

If the new zero point offset value is valid, it is automatically stored as the new zero point for the sensor. It remains stored in the case of a power failure.

Manual zero point adjustment

In case an automatic zero point adjustment cannot be performed, it is possible to do a manual zero point adjustment by entering the zero point offset value.

1. Select Modbus address 2132 **Zero Point Adjustment** and set the value to 1 = **Manual Zero Point Adjustment.**

2. Select Modbus address 2133 **Manual Zero Point** Offset and enter the desired offset value.

3.10.5.5. Quality codes for process values

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7409	Unsigned/2	Mass flow status	Quality status code of the process value mass flow.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	Read only
7509	Unsigned/2	Volume flow status	Quality status code of the process value volume flow.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	Read only
7609	Unsigned/2	Density status	Quality status code of the process value Density.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	
7709	Unsigned/2	Media temperature status	Quality status code of the process value Media temperature.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7855	Unsigned/2	Fraction A Percent status	Quality status code of the process value Fraction A Percent.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	
7856	Unsigned/2	Fraction B Percent status	Quality status code of the process value Fraction B Percent.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	
7891	Unsigned/2	Fraction A low status	Quality status code of the process value Fraction A flow.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	Read only
7892	Unsigned/2	Fraction B flow status	Quality status code of the process value Fraction B flow.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	Read only

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7919	Unsigned/2	Reference Density status	Quality status code of the pro-cess value Reference density.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	Read only
7963	Unsigned/2	Corrected volume flow status	Quality status code of the pro-cess Corrected value volume flow.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	Read only
8318	Unsigned/2	Totalizer 1 status	Quality status code of the pro-cess value Totalizer 1.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	Read only
8418	Unsigned/2	Totalizer 2 status	Quality status code of the pro-cess value Totalizer 2.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	Read only

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8518	Unsigned/2	Totalizer 3 status	Quality status code of the pro-cess value Totalizer 3.		Limit status bit 4 & 5: 11: Constant 01: Low limited 10: High limited 00: Not limited Process data status bit 6 & 7: 11: Good 01: Poor Accuracy 10: Manual/Fixed 00: Bad	Read only

Tab. 15: Quality codes for process value

3.10.5.6.   Process values

Volume flow settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7510	Float/4	Low flow cut-off	Volume flow limit for low flow cut-off. Below limit volume flow out-put is forced to zero.	Sensor size specific	0 - max. volume flow	Read/write
7501	Float/4	Upper alarm limit	Exceeding this limit causes an alarm.	max. volume flow [m³/s] (7500)	-(max. volume flow) - +(max. volume flow)	Read/write
7503	Float/4	Upper warning limit	Exceeding this limit causes a warning.	max. volume flow [m³/s] (7500)	-(max. volume flow) - +(max. volume flow)	Read/write
7505	Float/4	Lower warning limit	Falling below this limit causes a warning.	-max. volume flow [m³/s] (7500)	-(max. volume flow) - +(max. volume flow)	Read/write
7507	Float/4	Lower alarm limit	Falling below this limit causes an alarm.	-max. volume flow [m³/s] (7500)	-(max. volume flow) - +(max. volume flow)	Read/write

Modbus commands

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7512	Float/4	Hysteresis	Hysteresis that affects the alarm and warning limits.	0.0 [m³/s] (7500)	0 - max. volume flow	Read/write

Tab. 16: Volume flow settings

Mass flow settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7410	Float/4	Low flow cut-off	Mass flow limit for low flow cut-off. Below limit mass flow output is forced to zero.	0.001 x max. mass flow [kg/s] (7400)	0 - max. volume flow	Read/write
7401	Float/4	Upper alarm limit	Exceeding this limit causes an alarm.	max. mass flow [kg/s] (7400)	-(max. volume flow) - +(max. volume flow)	Read/write
7403	Float/4	Upper warning limit	Exceeding this limit causes a warning.	max. mass flow [kg/s] (7400)	-(max. volume flow) - +(max. volume flow)	Read/write
7405	Float/4	Lower warning limit	Falling below this limit causes a warning.	-max. mass flow [kg/s] (7400)	-(max. volume flow) - +(max. volume flow)	Read/write
7407	Float/4	Lower alarm limit	Falling below this limit causes an alarm.	-max. mass flow [kg/s] (7400)	-(max. volume flow) - +(max. volume flow)	Read/write
7412	Float/4	Hysteresis	Hysteresis that affects the alarm and warning limits.	0 [kg/s] (7400)	0 - max. volume flow	Read/write

Tab. 17: Mass flow settings

Density settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7601	Float/4	Upper alarm limit	Exceeding this limit causes an alarm.	max. density [kg/m^3] (7600)	0 - max. density	Read/write
7603	Float/4	Upper warning limit	Exceeding this limit causes a warning.	max. density [kg/m^3] (7600)	0 - max. density	Read/write
7605	Float/4	Lower warning limit	Falling below this limit causes a warning.	1.0 [kg/m^3] (7600)	0 - max. density	Read/write
7607	Float/4	Lower alarm limit	Falling below this limit causes an alarm.	1.0 [kg/m^3] (7600)	0 - max. density	Read/write
7612	Float/4	Hysteresis	Hysteresis that affects the alarm and warning limits.	0 [kg/m^3] (7600)	0 - max. density	Read/write

Tab. 18: Density settings

Medium temperature settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7701	Float/4	Upper alarm limit	Exceeding this limit causes an alarm.	max. medium temperature [°C] (7700)	min. medium temperature - max. medium temperature	Read/write
7703	Float/4	Upper warning limit	Exceeding this limit causes a warning.	max. medium temperature [°C] (7700)	min. medium temperature - max. medium temperature	Read/write
7705	Float/4	Lower warning limit	Falling below this limit causes a warning.	min. medium temperature [°C] (7700)	min. medium temperature - max. medium temperature	Read/write
7707	Float/4	Lower alarm limit	Falling below this limit causes an alarm.	min. medium temperature [°C] (7700)	min. medium temperature - max. medium temperature	Read/write
7712	Float/4	Hysteresis	Hysteresis that affects the alarm and warning limits.	0.0 [K]	0.0 - 200.0	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7715	Float/4	Upper alarm limit	Exceeding this limit causes an alarm.	max. medium temperature [°C] (7700)	min. medium temperature - max. medium temperature	Read/ write
7717	Float/4	Upper warning limit	Exceeding this limit causes a warning	max. medium temperature [°C] (7700)	min. medium temperature - max. medium temperature	Read/ write
7719	Float/4	Lower warning limit	Falling below this limit causes a warning.	min. medium temperature [°C] (7700)	min. medium temperature - max. medium temperature	Read/ write
7721	Float/4	Lower alarm limit	Falling below this limit causes an alarm.	min. medium temperature [°C] (7700)	min. medium temperature - max. medium temperature	Read/ write
7723	Float/4	Hysteresis	Hysteresis that affects the alarm and warning limits.	0.0 [K]	0.0 - 200.0	Read/ write

Tab. 19: Medium temperature settings

Fraction Flow Media A in Percent settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7802	Float/4	Upper alarm limit	Exceeding this limit causes an alarm.	100	0 - 100	Read/ write
7804	Float/4	Upper warning limit	Exceeding this limit causes a warning.	100	0 - 100	Read/ write
7806	Float/4	Lower warning limit	Falling below this limit causes a warning.	0	0 - 100	Read/ write
7808	Float/4	Lower alarm limit	Falling below this limit causes an alarm.	0	0 - 100	Read/ write
7857	Float/4	Hysteresis	Hysteresis that affects the alarm and warning limits.	0	0 - 100	Read/ write

Tab. 20: Fraction Flow Media A in Percent settings

Fraction Flow Media B in Percent settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7812	Float/4	Upper alarm limit	Exceeding this limit causes an alarm.	100	0 - 100	Read/ write
7814	Float/4	Upper warning limit	Exceeding this limit causes a warning.	100	0 - 100	Read/ write
7816	Float/4	Lower warning limit	Falling below this limit causes a warning.	0	0 - 100	Read/ write
7818	Float/4	Lower alarm limit	Falling below this limit causes an alarm.	0	0 - 100	Read/ write
7859	Float/4	Hysteresis	Hysteresis that affects the alarm and warning limits.	0	0 - 100	Read/ write

Tab. 21:Fraction Flow Media B in Percent settings

Fraction mass flow A settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7873	Float/4	Upper alarm limit	Exceeding this limit causes an alarm.	100	0 - 100	Read/ write
7875	Float/4	Upper warning limit	Exceeding this limit causes a warning	100	0 - 100	Read/ write
7877	Float/4	Lower warning limit	Falling below this limit causes a warning.	0	0 - 100	Read/ write
7879	Float/4	Lower alarm limit	Falling below this limit causes an alarm.	0	0 - 100	Read/ write
7861	Float/4	Hysteresis	Hysteresis that affects the alarm and warning limits.	0	0 - 100	Read/ write

Tab. 22: Fraction mass flow A settings

Fraction volume flow A settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7782	Float/4	Upper alarm limit	Exceeding this limit causes an alarm.	100	0 - 100	Read/ write
7784	Float/4	Upper warning limit	Exceeding this limit causes a warning	100	0 - 100	Read/ write
7786	Float/4	Lower warning limit	Falling below this limit causes a warning.	0	0 - 100	Read/ write
7788	Float/4	Lower alarm limit	Falling below this limit causes an alarm.	0	0 - 100	Read/ write
7790	Float/4	Hysteresis	Hysteresis that affects the alarm and warning limits.	0	0 - 100	Read/ write

Tab. 23: Fraction volume flow A settings

Fraction mass flow B settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7883	Float/4	Upper alarm limit	Exceeding this limit causes an alarm.	100	0 - 100	Read/ write
7885	Float/4	Upper warning limit	Exceeding this limit causes a warning.	100	0 - 100	Read/ write
7887	Float/4	Lower warning limit	Falling below this limit causes a warning.	0	0 - 100	Read/ write
7889	Float/4	Lower alarm limit	Falling below this limit causes an alarm.	0	0 - 100	Read/ write
7863	Float/4	Hysteresis	Hysteresis that affects the alarm and warning limits.	0	0 - 100	Read/ write

Tab. 24: Fraction mass flow B settings

Fraction volume flow B settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7923	Float/4	Upper alarm limit	Exceeding this limit causes an alarm.	100	0 - 100	Read/write
7925	Float/4	Upper warning limit	Exceeding this limit causes a warning.	100	0 - 100	Read/write
7927	Float/4	Lower warning limit	Falling below this limit causes a warning.	0	0 - 100	Read/write
7929	Float/4	Lower alarm limit	Falling below this limit causes an alarm.	0	0 - 100	Read/write
7931	Float/4	Hysteresis	Hysteresis that affects the alarm and warning limits.	0	0 - 100	Read/write

Tab. 25: Fraction volume flow B settings

3.10.5.7. Totalizers

Totalizer 1 settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8305	Unsigned/2	Process value	Select process value for totalization.	0	0: Cut-off filtered mass flow 1: Cut-off filtered volume flow 4: Corrected volume flow 5: Fractional flow medium A 5: Fractional flow medium B	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8302	Unsigned/2	Fail-safe behavior	Behavior of the totalizer during the occurence of bad input value.	0	0: RUN; totalization is continued using the bad input value. 1: HOLD; totalization is stopped. 2: MEMORY; totalization is continued based on the last incoming good value.	Read/write
8323	Float/4	Volume upper alarm limit	Exceeding this limit causes an alarm when volume flow is selected as input.	Max. floating point value [m³] (8321)	-	Read/write
8325	Float/4	Volume upper warning limit	Exceeding this limit causes a warning when volume flow is selected as input.	Max. floating point value [m³] (8321)	-	Read/write
8327	Float/4	Volume lower warning limit	Falling below this limit causes a warning when volume flow is selected as input.	Min. floating point value [m³] (8321)	-	Read/write
8329	Float/4	Volume lower alarm limit	Falling below this limit causes an alarm when volume flow is selected as input.	Min. floating point value [m³] (8321)	-	Read/write
8331	Float/4	Volume alarm hysteresis	Hysteresis that affects the alarm and warning limits when volume flow is selected as input.	0.0 [m³] (8321)	-	Read/write
8306	Float/4	Mass upper alarm limit	Exceeding this limit causes an alarm when mass flow is selected as input.	Max. floating point value [kg] (8320)	-	Read/write
8308	Float/4	Mass upper warning limit	Exceeding this limit causes a warning when mass flow is selected as input.	Max. floating point value [kg] (8320)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8310	Float/4	Mass lower warning limit	Falling below this limit causes a warning when mass flow is selected as input.	Min. floating point value [kg] (8320)	-	Read/write
8312	Float/4	Mass lower alarm limit	Falling below this limit causes an alarm when mass flow is selected as input.	Min. floating point value [kg] (8320)	-	Read/write
8314	Float/4	Mass alarm hysteresis	Hysteresis that affects the alarm and warning limits when mass flow is selected as input.	0.0 [kg] (8320)	-	Read/write
8333	Float/4	Standard volume upper alarm limit	Exceeding this limit causes an alarm when volume flow is selected as input.	Max. floating point value [Sl] (8322)	--	Read/write
8335	Float/4	Standard volume upper warning limit	Exceeding this limit causes a warning when volume flow is selected as input.	Max. floating point value [Sl] (8322)	-	Read/write
8337	Float/4	Standard volume lower warning limit	Falling below this limit causes a warning when volume flow is selected as input.	Min. floating point value [Sl] (8322)	-	Read/write
8339	Float/4	Standard volume lower alarm limit	Falling below this limit causes an alarm when volume flow is selected as input.	Min. floating point value [Sl] (8322)	-	Read/write
8341	Float/4	Standard volume alarm hysteresis	Hysteresis that affects the alarm and warning limits when volume flow is selected as input.	0.0 [Sl] (8322)	-	Read/write

Tab. 26: Totalizer 1 settings

Totalizer 2 settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8405	Unsigned/2	Process value	Select process value for totalization.	0	0: Cut-off filtered mass flow 1: Cut-off filtered volume flow 4: Corrected volume flow 5: Fractional flow medium A 5: Fractional flow medium B	Read/write
8402	Unsigned/2	Fail-safe behavior	Behavior of the totalizer during the occurence of bad input value.	0	0: RUN; totalization is continued using the bad input value. 1: HOLD; totalization is stopped. 2: MEMORY; totalization is continued based on the last incoming good value.	Read/write
8423	Float/4	Volume upper alarm limit	Exceeding this limit causes an alarm when volume flow is selected as input.	Max. floating point value [m^3] (8421)	-	Read/write
8425	Float/4	Volume upper warning limit	Exceeding this limit causes a warning when volume flow is selected as input.	Max. floating point value [m^3] (8421)	-	Read/write
8427	Float/4	Volume lower warning limit	Falling below this limit causes a warning when volume flow is selected as input.	Min. floating point value [m^3] (8421)	-	Read/write
8429	Float/4	Volume lower alarm limit	Falling below this limit causes an alarm when volume flow is selected as input.	Min. floating point value [m^3] (8421)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8431	Float/4	Volume alarm hysteresis	Hysteresis that affects the alarm and warning limits when volume flow is selected as input.	0.0 [m³] (8421)	-	Read/ write
8406	Float/4	Mass upper alarm limit	Exceeding this limit causes an alarm when mass flow is selected as input.	Max. floating point value [kg] (8420)	-	Read/ write
8408	Float/4	Mass upper warning limit	Exceeding this limit causes a warning when mass flow is selected as input.	Max. floating point value [kg] (8420)	-	Read/ write
8410	Float/4	Mass lower warning limit	Falling below this limit causes a warning when mass flow is selected as input.	Min. floating point value [kg] (8420)	-	Read/ write
8412	Float/4	Mass lower alarm limit	Falling below this limit causes an alarm when mass flow is selected as input.	Min. floating point value [kg] (8420)	-	Read/ write
8414	Float/4	Mass alarm hysteresis	Hysteresis that affects the alarm and warning limits when mass flow is selected as input.	0.0 [kg] (8420)	-	Read/ write
8433	Float/4	Standard volume upper alarm limit	Exceeding this limit causes an alarm when volume flow is selected as input.	Max. floating point value [Sl] (8422)	-	Read/ write
8435	Float/4	Standard volume upper warning limit	Exceeding this limit causes a warning when volume flow is selected as input.	Max. floating point value [Sl] (8422)	-	Read/ write
8437	Float/4	Standard volume lower warning limit	Falling below this limit causes a warning when volume flow is selected as input.	Min. floating point value [Sl] (8422)	-	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8439	Float/4	Standard volume lower alarm limit	Falling below this limit causes an alarm when volume flow is selected as input.	Min. floating point value [SI] (8422)	-	Read/write
8441	Float/4	Standard volume alarm hysteresis	Hysteresis that affects the alarm and warning limits when volume flow is selected as input.	0.0 [SI] (8422)	-	Read/write

Tab. 27: Totalizer 2 settings

Totalizer 3 settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8505	Unsigned/2	Process value	Select process value for totalization.	0	0: Cut-off filtered mass flow 1: Cut-off filtered volume flow 4: Corrected volume flow 5: Fractional flow medium A 5: Fractional flow medium B	Read/write
8502	Unsigned/2	Fail-safe behavior	Behavior of the totalizer during the occurence of bad input value.	0	0: RUN; totalization is continued using the bad input value. 1: HOLD; totalization is stopped. 2: MEMORY; totalization is continued based on the last incoming good value.	Read/write
8523	Float/4	Volume upper alarm limit	Exceeding this limit causes an alarm when volume flow is selected as input.	Max. floating point value [m^3] (8521)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8525	Float/4	Volume upper warning limit	Exceeding this limit causes a warning when volume flow is selected as input.	Max. floating point value [m³] (8521)	-	Read/ write
8527	Float/4	Volume lower warning limit	Falling below this limit causes a warning when volume flow is selected as input.	Min. floating point value [m³] (8521)	-	Read/ write
8529	Float/4	Volume lower alarm limit	Falling below this limit causes an alarm when volume flow is select-ed as input.	Min. floating point value [m³] (8521)	-	Read/ write
8531	Float/4	Volume alarm hysteresis	Hysteresis that affects the alarm and warning limits when volume flow is selected as input.	0.0 [m³] (8521)	-	Read/ write
8506	Float/4	Mass upper alarm limit	Exceeding this limit causes an alarm when mass flow is selected as input.	Max. floating point value [kg] (8520)	-	Read/ write
8508	Float/4	Mass upper warning limit	Exceeding this limit causes a warning when mass flow is selected as input.	Max. floating point value [kg] (8520)	-	Read/ write
8510	Float/4	Mass lower warning limit	Falling below this limit causes a warning when mass flow is selected as input.	Min. floating point value [kg] (8520)	-	Read/ write
8512	Float/4	Mass lower alarm limit	Falling below this limit causes an alarm when mass flow is selected as input.	Min. floating point value [kg] (8520)	-	Read/ write
8514	Float/4	Mass alarm hysteresis	Hysteresis that affects the alarm and warning limits when mass flow is selected as input.	0.0 [kg] (8520)	-	Read/ write
8533	Float/4	Standard volume upper alarm limit	Exceeding this limit causes an alarm when volume flow is select-ed as input.	Max. floating point value [Sl] (8522)	-	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8535	Float/4	Standard volume upper warning limit	Exceeding this limit causes a warning when volume flow is selected as input.	Max. floating point value [SI] (8522)	-	Read/ write
8537	Float/4	Standard volume lower warning limit	Falling below this limit causes a warning when volume flow is selected as input.	Min. floating point value [SI] (8522)	-	Read/ write
8539	Float/4	Standard volume lower alarm limit	Falling below this limit causes an alarm when volume flow is selected as input.	Min. floating point value [SI] (8522)	-	Read/ write
8541	Float/4	Standard volume alarm hysteresis	Hysteresis that affects the alarm and warning limits when volume flow is selected as input.	0.0 [SI] (8522)	-	Read/ write

Tab. 28: Totalizer 3 settings

3.10.5.8. Inputs and outputs

General channel 2 settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8801	Unsigned/2	Operation mode	Operation mode.	0	0: Off 1: Current output 2: Frequency output 3: Pulse output 4: Signal output	Read/ write
7420	Unsigned/2	Active/ passive operation	Shows application possibilities.	-	0: Active opera-tion not possi-ble, use pas-sive wiring! 1: Active opera-tion possible, hardware is able to drive the current loop.	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9590	Unsigned/2	Fail-safe activa-tion condition	Fail-safe activation condition.	1	0: Bad status of selected pro-cess value 1: Active Mainte-nance alarm or Failure (NAMUR)	Read/write
8981	Unsigned/2	Fail-safe min. time	Minimum time the output stays in fail-safe behavior.	0 [s]	0 - 100	Read/write

Tab. 29: General channel 2 settings

Channel 2 current output settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8802	Unsigned/2	Process value	Select process value for the current output.	-	0: Mass flow 1: Volume flow 2: Density 3: Medium temperature	Read/write
8809	Unsigned/2	Flow direction	Flow direction filter applicable for Pro-cess values (8802) = 0, 1, 19 and 27.	0	0: Positive direction 1: Negative direction 2: Positive and Negative directions 3: Positive and Negative Directions (symmetric mode)	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8806	Unsigned/2	Current mode	Mode of current output.	0	0: 4-20 mA (3.5) 3.8-20.5 (22.6) NAMUR 1: 4-20 mA (3.75) 4.0-20.8 (22.6) US 2: 4-20 mA (2.0) 4.0-20.5 (22.0) 3: 4-20 mA (2.0) 4.0-24.0 (25.0) 4: 0-20 mA (0.0) 0.0-20.5 (22.0) 5: 0-20 mA (0.0) 0.0-24.0 (25.0)	Read/write
8866	Float/4	Upper range value volume flow	Upper volume flow value that is mapped to the upper nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 1.	0.004 max. volume flow [m^3/s] (7500)	-	Read/write
8868	Float/4	Lower range value volume flow	Lower volume flow value that is mapped to the lower nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 1.	0 [m^3/s] (7500)	-	Read/write
8810	Float/4	Upper range value mass flow	Upper mass flow value that is mapped to the upper nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 0.	0.2 max. mass flow [kg/s] (7400)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8812	Float/4	Lower range value mass flow	Lower mass flow value that is mapped to the lower nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 0.	0.0 [kg/s] (7400)	-	Read/write
8870	Float/4	Upper range value density	Upper process density value that is mapped to the upper nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 2.	Max. density [kg/m^3] (7600)	-	Read/write
8872	Float/4	Lower range value density	Lower process density value that is mapped to the lower nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 2.	0.08 [kg/m^3] (7600)	-	Read/write
8874	Float/4	Upper range value tempera-ture	Upper medium temperature value that is mapped to the upper nominal range bound-ary selected by Cur-rent mode (8806). Applicable if Process value (8802) = 3.	Max. medium temperature [°C] (7700)	-	Read/write
8876	Float/4	Lower range value tempera-ture	Lower medium temperature value that is mapped to the lower nominal range boundary selected by Cur-rent mode (8806). Applicable if Process value (8802) = 3.	Min. medium temperature [°C] (7700)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8878	Float/4	Upper range value standard volume flow	Upper standard volume flow value that is mapped to the upper nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 27.	0.4 % (standard volume flow) [Sm^3/h] (7964)	-	Read/ write
8880	Float/4	Lower range value standard volume flow	Lower standard volume flow value that is mapped to the lower nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 27.	0.0 [Sm^3/h] (7964)	-	Read/ write
10000	Float/4	Upper range value velocity	Upper velocity value that is mapped to the upper nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 18, 19 or 31.	1.0 [m/s] (8014/7648)	-	Read/ write
10002	Float/4	Lower range value velocity	Lower velocity value that is mapped to the lower nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 18, 19 or 31.	0.0 [m/s] (8014/7648)	-	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10004	Float/4	Upper range value pressure	Upper process pressure value that is mapped to the upper nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 20.	100000.0 [Pa] (7548)	-	Read/write
10006	Float/4	Lower range value pressure	Lower process pressure value that is mapped to the lower nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 20.	0.0 [Pa] (7548)	-	Read/write
10008	Float/4	Upper range value dimen-sionless	Upper dimension-less value that is mapped to the upper nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 28, 32, 33, 34, or 36.	1.0	-	Read/write
10010	Float/4	Lower range value dimen-sionless	Lower dimension-less value that is mapped to the lower nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 28, 32, 33, 34, or 36.	0.0	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10012	Float/4	Upper range value current	Upper current value that is mapped to the upper nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 25 or 26.	20.0 [mA]	-	Read/ write
10014	Float/4	Lower range value current	Lower current value that is mapped to the lower nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 25 or 26.	4.0 [mA]	-	Read/ write
10016	Float/4	Upper range value viscosity	Upper process viscosity value that is mapped to the upper nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 21 or 29.	1.0 [m²/s] (7524)	-	Read/ write
10018	Float/4	Lower range value viscosity	Lower process viscosity value that is mapped to the lower nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 21 or 29.	0.0 [m²/s] (7524)	-	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10064	Float/4	Upper range value ROC	Upper rate of change value that is mapped to the upper nominal range boundary selected by Current mode (8806). Applicable if Process value (8802) = 36.	1.0 [m/s²] (8564)	-	Read/write
10066	Float/4	Lower range value ROC	Lower rate of change value that is mapped to the lower nominal range boundary selected by current mode (8806). Applicable if Process value (8802) = 36.	0.0 [m/s²] (8564)	-	Read/write
8807	Float/4	Damping value	Time constant of damping filter for current output signal.	0.0 [s]	0.0 - 100.0	Read/write
8814	Unsigned/2	Fail-safe be-havior	Current output reaction in case of a fault.	0	0: Lower fault current 1: Upper fault current 2: Last valid value 3: Disabled 4: Custom value	Read/write
8815	Float/4	Fail-safe value	Output value in case of a fault and when Fail-safe behavior (8814) is configured to 4.	0.0 [mA]	0.0 - 25.0	Read/write
7146	Float/4	Forced value	Forced value when forcing is active.	4.0 [mA]	3.5 - 25.0	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8886	Float/4	Offset adjust-ment	Command to trim the lower range value of the loop current. Simulate a loop current of 4.0 mA, measure the cur-rent with an am-pere meter and write the measured value to this regis-ter.	[mA]	0.0 - 25.0	Read/ write
8888	Float/4	Gain adjust-ment	Command to trim the upper range value of the loop current. Simulate a loop current of 20.0 mA, measure the cur-rent with an am-pere meter and write the measured value to this register.	[mA]	0.0 - 25.0	Read/ write

Tab. 30: Channel 2 current output settings

Channel 2 frequency output settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8904	Unsigned/2	Process value	Select process value for the current output.	-	0: Mass flow 1: Volume flow 2: Density 3: Medium temperature	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8910	Unsigned/2	Flow direction	Flow direction filter applicable for Process values (8802) = 0, 1, 19 and 27.	0	0: Positive direction 1: Negative direction 2: Positive and Negative directions 3: Positive and Negative Directions (symmetric mode)	Read/write
8935	Float/4	Frequen-cy value high	Upper frequency value. Upper nominal output range boundary.	10000.0 [Hz]	0.0 - 12500.0	Read/write
8937	Float/4	Frequen-cy value low	Lower frequency value. Lower nominal output range boundary.	0.0 [Hz]	0.0 - 12500.0	Read/write
8915	Float/4	Upper range value volume flow	Upper volume flow value that is mapped to the upper nominal range boundary selected by Frequency value high (8935). Applicable if Process value (8904) = 1.	0.4 % max. volume flow [m³/s] (7500)	-	Read/write
8917	Float/4	Lower range value volume flow	Lower volume flow value that is mapped to the lower nominal range boundary selected by Frequency value low (8937). Applicable if Process value (8904) = 1.	0.0 [m³/s] (7500)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8911	Float/4	Upper range value mass flow	Upper mass flow value that is mapped to the upper nominal range boundary selected by Frequency value high (8935). Applicable if Process value (8904) = 0.	0.2 max. mass flow [kg/s] (7400)	-	Read/write
8913	Float/4	Lower range value mass flow	Lower mass flow value that is mapped to the lower nominal range boundary selected by Frequency value low (8937). Applicable if Process value (8904) = 0.	0.0 [kg/s] (7400)	-	Read/write
8919	Float/4	Upper range value density	Upper process density value that is mapped to the upper nominal range boundary selected by Frequency value high (8935). Applicable if Process value (8904) = 2.	1600 [kg/m^3] (7600)	-	Read/write
8921	Float/4	Lower range value density	Lower process density value that is mapped to the lower nominal range boundary selected by Frequency value low (8937). Applicable if Process value (8904) = 2.	600 [kg/m^3] (7600)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8923	Float/4	Upper range value tempera-ture	Upper medium temperature value that is mapped to the upper nominal range boundary selected by Frequency value high (8935). Applicable if Process value (8904) = 3.	Max. medium temperature [°C] (7700)	-	Read/write
8925	Float/4	Lower range value tempera-ture	Lower medium temperature value that is mapped to the lower nominal range boundary selected by Frequency value low (8937). Applicable if Process value (8904) = 3.	Min. medium temperature [°C] (7700)	-	Read/write
8927	Float/4	Upper range value standard volume flow	Upper standard volume flow value that is mapped to the upper nominal range boundary selected by Frequency value high (8935). Applicable if Process value (8904) = 27.	0.4 % max. standard volume flow [Sm^3/h] (7964)	-	Read/write
8929	Float/4	Lower range value standard volume flow	Lower standard volume flow value that is mapped to the lower nominal range boundary selected by Frequency value low (8937). Applicable if Process value (8904) = 27.	0.0 [Sm^3/h] (7964)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10036	Float/4	Upper range value current	Upper current value that is mapped to the upper nominal range boundary selected by Frequency value high (8935). Applicable if Process value (8904) = 25 or 26.	20.0 [mA]	-	Read/ write
10038	Float/4	Lower range value current	Lower current value that is mapped to the lower nominal range boundary selected by Frequency value low (8937). Applicable if Process value (8904) = 25 or 26.	4.0 [mA]	-	Read/ write
8908	Float/4	Damping value	Time constant of damping filter for frequency output signal.	0.0 [s]	0.0 - 100.0	Read/ write
8939	Unsigned/2	Fail-safe behavior	Frequency output reaction in case of a fault.	2	0: Frequency value low 1: Frequency value high 2: Last valid value 3: Disabled 4: Custom value	Read/ write
8940	Float/4	Fail-safe value	Output value in case of a fault and when Fail-safe behavior (8939) is configured to 4.	0.0 [Hz]	0.0 - 12500.0	Read/ write
7149	Float/4	Forced value	Forced value when forcing is active.	1.0 [Hz]	0.0 - 12500.0	Read/ write

Tab. 31: Channel 2 frequency output settings

Channel 2 pulse output settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8960	Unsigned/2	Process value	Select process value for the pulse output.	0	0: Mass flow 1: Volume flow 27: Standard volume flow rate (only hydrocarbon and gas applications)	Read/write
8962	Unsigned/2	Flow direction	Flow direction filter.	0	0: Positive direction 1: Negative direction 2: Positive and Negative directions	Read/write
8965	Float/4	Amount of volume	Amount value to generate an output pulse. Applicable if Process value (8960) is set to 1.	0.001 [m^3] (8993)	-	Read/write
8963	Float/4	Amount of mass	Amount value to generate an output pulse. Applicable if Process value (8960) is set to 0.	1.0 [kg] (8992)	-	Read/write
8967	Float/4	Amount of standard volume	Amount value to generate an output pulse. Applicable if Process value (8960) is set to 27.	1.0 [Nl] (8994)	-	Read/write
10055	Unsigned/2	Pulses per amount	Number of pulses which will be output when configured amount is reached.	1	-	Read/write
8974	Float/4	Pulse width	Pulse duration.	0.1 [s]	0.00004 - 4.0	Read/write
8977	Unsigned/2	Polarity	Logical polarity of pulse output.	0	0: Active high level 1: Active low level	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8961	Unsigned/2	Fail-safe behavior	Pulse output reaction in case of a fault.	2	0: Last valid value 1: Hold. Value 0.0 substitutes the actual input value 2: Disabled 3: Custom value 4: Maximum pulses/s on CH2 and no pulses on CH3. Only if CH3 is configured to redundancy mode	Read/ write
7421	Float/4	Fail-safe value	Output value in case of a fault and when Fail-safe behavior (8939) is configured to 4.	0.0 [pulses/s]	0.0 - 12500.0	Read/ write
7151	Float/4	Forced value	Forced value when forcing is active.	1.0 [pulses/s]	0.0 - 12500.0	Read/ write

Tab. 32: Channel 2 pulse output settings

Channel 2 status output settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8841	Unsigned/2	Status mode	Select the functionality for the status output.	0	0: Alarm class 1: Alarm item	Read/write
8858	Unsigned/2	Alarm class	Bit encoded selection of alarm classes which impact the status output. Each diagnostic event is allocated to an alarm class. See Alarm items (Page 133). Applicable if Status mode = 0.	0	Bit 0: Process value alarm (PA) Bit 1: Process value warning (PW) Bit 2: Maintenance alarm (MA) Bit 3: Maintenance warning (MW) Bit 4: Maintenance required (MR) Bit 5: Function check (FC)	Read/write
8899	Unsigned/2	NAMUR status signals	Bit encoded selection of NAMUR status sig-nals which impacts the status output. Applicable if Status mode = 0. NAMUR status is derived from Alarm class (8858).	0	Bit 0: Out of Specification (PA, PW) Bit 1: Failure (MA) Bit 2: Maintenance required (MR, MD) Bit 3: Function check (FC)	Read/write
8842	Unsigned/4	Alarm items 1	Bit encoded selection of alarm items that impact the output. Mainly sensor alarms. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/write
8844	Unsigned/2	Alarm items 2	Bit encoded selection of alarm items that impact the output. Mainly sensor alarms. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8848	Unsigned/2	Alarm items 4	Bit encoded selection of alarm items that impact the output. See Alarm items (Page 133). Applicable if Status mode = 1.	0	-	Read/write
8850	Unsigned/2	Alarm items 5	Bit encoded selection of alarm items that impact the output. See Alarm items (Page 133). Applicable if Status mode = 1.	0	-	Read/write
8856	Unsigned/4	Alarm items 8	Bit encoded selection of alarm items that impact the output. See Alarm items (Page 133). Applicable if Status mode = 1.	0	-	Read/write
10056	Unsigned/4	Alarm items 9	Bit encoded selection of alarm items that impact the output. See Alarm items (Page 133). Applicable if Status mode = 1.	0	-	Read/write
8854	Unsigned/4	Alarm items 7	Bit encoded selection of alarm items that impact the output. See Alarm items (Page 133). Applicable if Status mode = 1.	0	-	Read/write
8852	Unsigned/4	Alarm items 6	Bit encoded selection of alarm items that impact the output. Mainly simulation alarms. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/write
8859	Unsigned/2	Polarity	Logical polarity of status output.	0	0: Active high level 1: Active low level	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8860	Float/4	On delay	Time to delay the leading edge of the output.	0.0 [s]	0.0 - 100.0	Read/write
8862	Float/4	Off delay	Time to delay the trail-ing edge of the output.	0.0 [s]	0.0 - 100.0	Read/write
7148	Unsigned/4	Forced value	Forced value when forcing is active.	0	0 1	Read/write

Tab. 33: Channel 2 status output settings

General channel 3 settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9101	Unsigned/2	Operation mode	Operation mode.	0	0: Off 1: Current output 2: Frequency out-put 3: Pulse output 4: Signal output 5: Discrete input 6: Analog input	Read/write
7430	Unsigned/2	Active/passive operation	Shows application possibilities.	-	0: Active operation not possible, use passive wiring! 1: Active operation possible, hard-ware is able to drive the current loop	Read/write

Tab. 34: General channel 3 settings

Channel 3 current output settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9102	Unsigned/2	Process value	Select process value for the current output.	0	0: Mass flow 1: Volume flow 2: Density 3: Medium temperature	Read/ write
9109	Unsigned/2	Flow direction	Flow direction filter applicable for Process values (9102) = 0, 1, 19 and 27.	0	0: Positive direction 1: Negative direction 2: Positive and Negative directions 3: Positive and Negative Directions (symmetric mode)	Read/ write
9106	Unsigned/2	Current mode	Mode of current output.	0	0: 4-20 mA (3.5) 3.8-20.5 (22.6) NAMUR 1: 4-20 mA (3.75) 4.0-20.8 (22.6) US 2: 4-20 mA (2.0) 4.0-20.5 (22.0) 3: 4-20 mA (2.0) 4.0-24.0 (25.0) 4: 0-20 mA (0.0) 0.0-20.5 (22.0) 5: 0-20 mA (0.0) 0.0-24.0 (25.0)	Read/ write
9166	Float/4	Upper range value volume flow	Upper volume flow value that is mapped to the upper nominal range boundary se-lected by Current mode (9106). Aplica-ble if Process value (9102) = 1.	0.4 % max. volume flow [m^3/s] (7500)	-	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9168	Float/4	Lower range value volume flow	Lower volume flow value that is mapped to the lower nominal range boundary selected by Current mode (9106). Applicable if Process value (9102) = 1.	0.0 [m^3/s] (7500)	-	Read/write
9110	Float/4	Upper range value mass flow	Upper mass flow value that is mapped to the upper nominal range boundary selected by Current mode (9106). Applicable if Process value (9102) = 0.	0.2 max. mass flow [kg/s] (7400)	-	Read/write
9112	Float/4	Lower range value mass flow	Lower mass flow value that is mapped to the lower nominal range boundary selected by Current mode (9106). Applicable if Process value (9102) = 0.	0.0 [kg/s] (7400)	-	Read/write
9170	Float/4	Upper range value density	Upper process density value that is mapped to the upper nominal range boundary se-lected by Current mode (9106). Applicable if Process value (9102) = 2.	Max. density [kg/m^3] (7600)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9172	Float/4	Lower range value density	Lower process density value that is mapped to the lower nominal range boundary selected by Current mode (9106). Applicable if Process value (9102) = 2.	0.08 [kg/m^3] (7600)	-	Read/write
9174	Float/4	Upper range value tempera-ture	Upper medium temperature value that is mapped to the upper nominal range boundary selected by Cur-rent mode (9106). Applicable if Process value (9102) = 3.	Max. medium temperature [°C] (7700)	-	Read/write
9176	Float/4	Lower range value tempera-ture	Lower medium temperature value that is mapped to the lower nominal range boundary selected by Cur-rent mode (9106). Applicable if Process value (9102) = 3.	Min. medium temperature [°C] (7700)	-	Read/write
9178	Float/4	Upper range value standard volume flow	Upper standard vol-ume flow value that is mapped to the upper nominal range bound-ary selected by Cur-rent mode (9106). Applicable if Process value (9102) = 27.	0.4 % max. standard volume flow [Sm^3/s] (7964)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9180	Float/4	Lower range value standard volume flow	Lower standard volume flow value that is mapped to the lower nominal range boundary selected by Cur-rent mode (9106). Applicable if Process value (9102) = 27.	0.0 [Sm^3/s] (7964)	-	Read/ write
10112	Float/4	Upper range value current	Upper current value that is mapped to the upper nominal range boundary selected by Current mode (9106). Applicable if Process value (9102) = 25 or 26.	20.0 [mA]	-	Read/ write
10114	Float/4	Lower range value current	Lower current value that is mapped to the lower nominal range boundary selected by Current mode (9106). Applicable if Process value (9102) = 25 or 26.	4.0 [mA]	-	Read/ write
9107	Float/4	Damping value	Time constant of damping filter for current output signal.	0.0 [s]	0.0 - 100.0	Read/ write
9591	Unsigned/2	Filter-safe activation condition	Fail-safe activation condition.	1	0: Bad status of selected pro-cess value 1: Active Mainte-nance alarm or Failure (NAMUR)	Read/ write
9281	Unsigned/2	Fail-safe min. time	Minimum time the output stays in fail-safe behavior.	0 [s]	0 - 100	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9114	Unsigned/2	Fail-safe behavior	Current output reaction in case of a fault.	0	0: Lower fault current 1: Upper fault current 2: Last valid value 3: Disabled 4: Custom value	Read/write
9115	Float/4	Fail-safe value	Output value in case of a fault and when Fail-safe behavior (9114) is configured to 4.	0.0 [mA]	0.0 - 25.0	Read/write
7153	Float/4	Forced value	Forced value when forcing is active.	4.0 [mA]	3.5 - 25.0	Read/write
9186	Float/4	Offset adjust-ment	Command to trim the lower range value of the loop current. Simulate a loop current of 4.0 mA, measure the current with an ampere meter and write the measured value to this register.	-	0 - 25	Write only
9188	Float/4	Gain adjust-ment	Command to trim the upper range value of the loop current. Simulate a loop current of 20.0 mA, measure the current with an ampere meter and write the measured value to this register.	-	0 - 25	Write only

Tab. 35: Channel 3 current output settings

Channel 3 frequency output settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9299	Unsigned/2	Redun-dancy mode	Redundancy mode.	0	0: Off. Channel 3 runs independently. 1: 90°. Channel 3 follows frequency on channel 2 with a 90° shift. 2: 180°. Channel 3 follows frequency on channel 2 with a 180° shift.	Read/write
9204	Unsigned/2	Process value	Select process value for the current output.	0	0: Mass flow 1: Volume flow 2: Density 3: Medium temperature	Read/write
9210	Unsigned/2	Flow direction	Flow direction filter applicable for Process values (9204) = 0, 1, 19 and 27.	0	0: Positive direction 1: Negative direction 2: Positive and negative directions 3: Positive and negative directions (symmetric mode)	Read/write
9235	Float/4	Frequency value high	Upper frequency value. Upper nominal output range boundary.	10000.0 [Hz]	0.0 - 12500.0	Read/write
9237	Float/4	Frequency value low	Lower frequency value. Lower nominal output range boundary.	0.0 Hz	0.0 - 12500.0	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9215	Float/4	Upper range value volume flow	Upper volume flow value that is mapped to the upper nominal range boundary selected by Frequency value high (9235). Applicable if Process value (9204) = 1.	0.4 % max. volume flow [m³/s] (7500)	-	Read/write
9217	Float/4	Lower range value volume flow	Lower volume flow value that is mapped to the lower nominal range boundary selected by Frequency value low (9237). Applicable if Process value (9204) = 1.	0.0 [m³/s] (7500)	-	Read/write
9211	Float/4	Upper range value mass flow	Upper mass flow value that is mapped to the upper nominal range boundary selected by Frequency value high (9235). Applicable if Process value (9204) = 0.	0.2 max. mass flow [kg/s] (7400)	-	Read/write
9213	Float/4	Lower range value mass flow	Lower mass flow value that is mapped to the lower nominal range boundary selected by Frequency value low (9237). Applicable if Process value (9204) = 0.	0.0 [kg/s] (7400)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9219	Float/4	Upper range value density	Upper process density value that is mapped to the upper nominal range boundary selected by Frequency value high (9235). Applicable if Process value (9204) = 2.	Max. density [kg/m^3] (7600)	-	Read/ write
9221	Float/4	Lower range value density	Lower process density value that is mapped to the lower nominal range boundary selected by Frequency value low (9237). Applicable if Process value (9204) = 2.	0.08 [kg/m^3] (7600)	-	Read/ write
9223	Float/4	Upper range value tempera-ture	Upper medium temperature value that is mapped to the upper nominal range boundary selected by Fre-quency value high (9235). Applicable if Process value (9204) = 3.	Max. medium temperature [°C] (7700)	-	Read/ write
9225	Float/4	Lower range value tempera-ture	Lower medium temperature value that is mapped to the lower nominal range boundary selected by Fre-quency value low (9237). Applicable if Process value (9204) = 3.	Min. medium temperature [°C] (7700)	-	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9227	Float/4	Upper range value standard volume flow	Upper standard volume flow value that is mapped to the upper nominal range boundary selected by Fre-quency value high (9235). Applicable if Process value (9204) = 27.	0.4 % max. standard volume flow [Sm³/h] (7964)	-	Read/ write
9229	Float/4	Lower range value standard volume flow	Lower standard volume flow value that is mapped to the lower nominal range boundary selected by Fre-quency value low (9237). Applicable if Process value (9204) = 27.	0.0 [Sm³/h] (7964)	-	Read/ write
10136	Float/4	Upper range value current	Upper current value that is mapped to the upper nominal range boundary selected by Frequency value high (9235). Applicable if Process value (9204) = 25 or 26.	20.0 [mA]	-	Read/ write
10138	Float/4	Lower range value current	Lower current value that is mapped to the lower nominal range boundary selected by Frequency value low (9237). Applicable if Process value (9204) = 25 or 26.	4.0 [mA]	-	Read/ write
9208	Float/4	Damping value	Time constant of damping filter for frequency output signal.	0.0 [s]	0.0 - 100.0	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9591	Unsigned/2	Fail-safe activation condition	Fail-safe activation condition.	1	0: Bad status of selected process value 1: Active maintenance alarm or failure (NAMUR)	Read/write
9281	Unsigned/2	Fail-safe min. time	Minimum time the output stays in fail-safe behavior.	0 [s]	0 - 100	Read/write
9239	Unsigned/2	Fail-safe behavior	Frequency output reaction in case of a fault.	2	0: Frequency value low 1: Frequency value high 2: Last valid value 3: Disabled 4: Custom value	Read/write
9240	Float/4	Fail-safe value	Output value in case of a fault and when Fail-safe behavior (9239) is configured to 4.	0.0 [Hz]	0.0 - 12500.0	Read/write
7156	Float/4	Forced value	Forced value when forcing is active.	1.0 [Hz]	0.0 - 12500.0	Read/write

Tab. 36: Channel 3 frequency output settings

Channel 3 pulse output settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9280	Unsigned/2	Redundan-cy mode	Redundancy mode.	0	0: Off. Channel 3 Runs inde-pendently. 1: 90° Channel 3 fol-lows pulses on channel 2 with a 90° shift. 2: 180° Channel 3 fol-lows pulses on channel 2 with a 180° shift.	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9260	Unsigned/2	Process value	Select process value for the pulse output.	0	0: Mass flow 1: Volume flow 27: Standard volume flow rate (only hydrocarbon and gas applications)	Read/ write
9262	Unsigned/2	Flow direction	Flow direction filter.	0	0: Positive direction 1: Negative direction 2: Positive and Negative directions	Read/ write
9265	Float/4	Amount of volume	Amount value to generate an output pulse. Applicable if process value (9260) is set to 1.	0.001 [m³] (8993)	-	Read/ write
9263	Float/4	Amount of mass	Amount value to generate an output pulse. Applicable if process value (9260) is set to 0.	1.0 [kg] (8992)	-	Read/ write
9267	Float/4	Amount of standard volume	Amount value to generate an output pulse. Applicable if process value (9260) is set to 27.	1.0 [Sl] (8994)	-	Read/ write
10155	Unsigned/2	Pulses per amount	Number of pulses which will be output when configured amount is reached.	1	-	Read/ write
9274	Float/4	Pulse width	Pulse duration.	0.1 [s]	0.00004 - 4.0	Read/ write
9277	Unsigned/2	Polarity	Logical polarity of pulse output.	0	0: Active high level 1: Active low level	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9591	Unsigned/2	Fail-safe activation condition	Fail-safe activation condition.	1	0: Bad status of selected process value 1: Active Maintenance alarm or Failure (NAMUR)	Read/write
9281	Unsigned/2	Fail-safe min. time	Minimum time the output stays in fail-safe behavior.	0 [s]	0 - 100	Read/write
9261	Unsigned/2	Fail-safe behavior	Pulse output reaction in case of a fault. Only applicable if Redundancy mode (9280) = 0.	0	0: Last valid value 1: Hold. Value 0.0 substitutes the actual input value 2: Disabled 3: Custom value	Read/write
7431	Float/4	Fail-safe value	Output value in case of a fault and when Fail-safe behavior (9261) is configured to 4.	0.0 [pulses/s]	0.0 - 12500.0	Read/write
7158	Float/4	Forced value	Forced value when forcing is active.	1.0 [pulses/s]	0.0 - 12500.0	Read/write

Tab. 37: Channel 3 pulse output settings

Channel 3 status output settings (relay)

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9141	Unsigned/2	Status mode	Select the functionality for the status output.	0	0: Alarm class 1: Alarm item	Read/write
9158	Unsigned/2	Alarm class	Bit encoded selection of alarm classes which impact the status output. Each diagnostic event is allocated to an alarm class. See Alarm items (Page 133). Applicable if Status mode = 0.	0	Bit 0: Process value alarm (PA) Bit 1: Process value warning (PW) Bit 2: Maintenance alarm (MA) Bit 3: Maintenance warning (MW) Bit 4: Maintenance required (MR) Bit 5: Function check (FC)	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9199	Unsigned/2	NAMUR status signals	Bit encoded selection of NAMUR status signals which impacts the status output. Applicable if Status mode = 0. NAMUR status is derived from Alarm class (9158).	0	Bit 0: Out of specification (PA, PW) Bit 1: Failure (MA) Bit 2: Maintenance required (MR, MD) Bit 3: Function check (FC)	Read/ write
9142	Unsigned/4	Alarm items 1	Bit encoded selection of alarm items that impact the output. Mainly sensor alarms. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/ write
9144	Unsigned/4	Alarm items 2	Bit encoded selection of alarm items that impact the output. Mainly sensor alarms. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/ write
9148	Unsigned/4	Alarm items 4	Bit encoded selection of alarm items that impact the output. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/ write
9150	Unsigned/4	Alarm items 5	Bit encoded selection of alarm items that impact the output. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/ write
9156	Unsigned/4	Alarm items 8	Bit encoded selection of alarm items that impact the output. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10156	Unsigned/4	Alarm items 9	Bit encoded selection of alarm items that impact the output. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/ write
9154	Unsigned/4	Alarm items 7	Bit encoded selection of alarm items that impact the output. See Alarm items (Page Page 133. Applicable if Status mode = 1.	0	-	Read/ write
9152	Unsigned/4	Alarm items 6	Bit encoded selection of alarm items that impact the output. Mainly simulation alarms. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/ write
9159	Unsigned/2	Polarity	Logical polarity of status output.	0	0: Active high level 1: Active low level	Read/ write
9160	Float/4	On delay	Time to delay the leading edge of the output.	0.0 [s]	0.0 - 100.0	Read/ write
9162	Float/4	Off delay	Time to delay the trailing edge of the output	0.0 [s]	0.0 - 100.0	Read/ write
7155	Unsigned/2	Forced value	Forced value when forcing is active.	0	0 1	Read/ write

Tab. 38: Channel 3 status output settings

Channel 3 discrete input settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9131	Unsigned/2	Input leading edge function	Select the functionality for the leading edge of the active discrete input signal.	0	0: Off 6: Reset totalizer 1 7: Reset totalizer 2 8: Reset totalizer 3 9: Reset all totalizers 10: Start zero point adjustment 11: Force outputs 12: Freeze process values 13: Stop forcing outputs 14: Unfreeze process values	Read/write
9132	Unsigned/2	Input trailing edge function	Select the functionality for the trailing edge of the active discrete input signal.	0	0: Off 6: Reset totalizer 1 7: Reset totalizer 2 8: Reset totalizer 3 9: Reset all totalizers 10: Start zero point adjustment 11: Force outputs 12: Freeze process values 13: Stop forcing outputs 14: Unfreeze process values	Read/write
9135	Unsigned/2	Polarity	Logical polarity of discrete input signal.	0	0: Active high level 1: Active low level	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9139	Unsigned/2	Debounce time	Debounce time to filter the input signal.	0	0: 0 ms 1: 0.5 ms 2: 1 ms 3: 1.5 ms 4: 2 ms 5: 2.5 ms 6: 3 ms 7: 3.5 ms 8: 4 ms 9: 4.5 ms 10: 5 ms 11: 5.5 ms 12: 6 ms 13: 6.5 ms 14: 7 ms 15: 7.5 ms	Read/write

Tab. 39: Channel 3 discrete input settings

Channel 3 analog input settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10522	Unsigned/2	Current mode	Mode of current output	0	0: 4-20 mA (3.5) 3.8-20.5 (22.6) NAMUR 1: 4-20 mA (3.75) 4.0-20.8 (22.6) US 2: 4-20 mA (2.0) 4.0-20.5 (22.0) 3: 4-20 mA (2.0) 4.0-24.0 (25.0) 4: 0-20 mA (0.0) 0.0-20.5 (22.0) 5: 0-20 mA (0.0) 0.0-24.0 (25.0)	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10531	Float/4	Upper range value tempe-rature	Upper medium tem-perature value that is mapped to the upper nominal range boundary selected by Current mode (10522). Applicable if Process value (10523) = 1.	Max. medium tempera-ture [°C] (7700)	-	Read/write
10533	Float/4	Lower range value tempe-rature	Lower medium tem-perature value that is mapped to the lower nominal range boundary selected by Current mode (10522). Applicable if Process value (10523) = 1.	Min. medium tempera-ture [°C] (7700)	-	Read/write
10537	Float/4	Upper range value density	Upper process density value that is mapped to the upper nominal range boundary selected by Current mode (10522). Applicable if Process value (10523) = 2.	1600.0 [kg/m^3] (7600)	-	Read/write
10539	Float/4	Lower range value density	Lower process density value that is mapped to the lower nominal range boundary selected by Current mode (10522). Applicable if Process value (10523) = 2.	600.0 [kg/m^3] (7600)	-	Read/write
10524	Unsigned/2	Fail-safe behavior	Reaction in case of a fault at the current input.	0	0: Last valid value 1: Custom value	Read/write
10535	Float/4	Fail-safe tempe-rature value	Input value in case of a fault and when Fail-safe behavior (10524) configured to 1. Applicable if Process value (10523) = 1.	Min. medium tempera-ture [°C] (7700)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10541	Float/4	Fail-safe value density	Input value in case of a fault and when Fail-safe behavior (10524) configured to 1. Applicable if Process value (10523) = 2.	600.0 [kg/m^3] (7600)	-	Read/ write
10520	Float/4	Trimmed input value	Provides the measured current value.	-	-	Read/ write
10508	Float/4	Offset adjust-ment	Command to trim the lower range value of the analog input. Provide a loop current of 4.0 mA, read out the value of Trimmed input value and write the value to this register.	-	-	Write only
10510	Float/4	Gain adjust-ment	Command to trim the upper range value of the loop current. Simulate a loop cur-rent of 20.0 mA, measure the current with an ampere meter and write the measured value to this register.	-	-	Write only

Tab. 40: Channel 3 analog input settings

General channel 4 settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9301	Unsigned/2	Opera-tion mode	Operation mode.	0	0: Off 1: Current output 2: Frequency output 3: Pulse output 4: Signal output 5: Discrete input 6: Analog input	Read/ write
7440	Unsigned/2	Active/ passive opera-tion	Shows application possibilities.	0	0: Active operation not possible, use passive wiring! 1: Active operation possible, hardware is able to drive the current loop.	Read only

Tab. 41: General channel 4 settings

Channel 4 current output settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9302	Unsigned/2	Process value	Select process value for the current output.	0	0: Mass flow 1: Volume flow 2: Density 3: Medium temperature	Read/ write
9309	Unsigned/2	Flow direction	Flow direction filter applicable for Process values (9302) = 0, 1, 19 and 27.	0	0: Positive direction 1: Negative direction 2: Positive and negative directions 3: Positive and negative directions (symmetric mode)	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9306	Unsigned/2	Current mode	Mode of current output.	0	0: 4-20 mA (3.5) 3.8 20.5 (22.6) NAMUR 1: 4-20 mA (3.75) 4.0 20.8 (22.6) US 2: 4-20 mA (2.0) 4.0 20.5 (22.0) 3: 4-20 mA (2.0) 4.0 24.0 (25.0) 4: 0-20 mA (0.0) 0.0 20.5 (22.0) 5: 0-20 mA (0.0) 0.0 24.0 (25.0)	Read/write
9366	Float/4	Upper range value volume flow	Upper volume flow value that is mapped to the upper nominal range boundary selected by Current mode (9306). Aplicable if Process value (9302) = 1.	0.4 % max. volume flow [m^3/s] (7500)	-	Read/write
9368	Float/4	Lower range value volume flow	Lower volume flow value that is mapped to the lower nominal range boundary selected by Current mode (9306). Applicable if Process value (9302) = 1.	0.0 [m^3/s] (7500)	-	Read/write
9310	Float/4	Upper range value mass flow	Upper mass flow value that is mapped to the upper nominal range boundary selected by Current mode (9306). Applicable if Process value (9302) = 0.	0.2 max. mass flow [kg/s] (7400)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9312	Float/4	Lower range value mass flow	Lower mass flow value that is mapped to the lower nominal range boundary selected by Current mode (9306). Applicable if Process value (9302) = 0.	0.0 [kg/s] (7400)	-	Read/write
9370	Float/4	Upper range value density	Upper process density value that is mapped to the upper nominal range boundary selected by Current mode (9306). Applica-ble if Process value (9302) = 2.	Max. density [kg/m³] (7600)	-	Read/write
9372	Float/4	Lower range value density	Lower process density value that is mapped to the lower nominal range boundary selected by Current mode (9306). Applica-ble if Process value (9302) = 2.	0.08 [kg/m³] (7600)	-	Read/write
9374	Float/4	Upper range value tempera-ture	Upper medium temperature value that is mapped to the upper nominal range bound-ary selected by Cur-rent mode (9306). Applicable if Process value (9302) = 3.	Max. medium temperature [°C] (7700)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9376	Float/4	Lower range value tempera-ture	Lower medium tem-perature value that is mapped to the lower nominal range bound-ary selected by Cur-rent mode (9306). Applicable if Process value (9302) = 3.	Min. medium temperature [°C] (7700)	-	Read/write
9378	Float/4	Upper range value standard volume flow	Upper standard volume flow value that is mapped to the upper nominal range boundary selected by Cur-rent mode (9306). Applicable if Process value (9302) = 27.	0.4 % max. standard volume flow [Sm^3/h] (7964)	-	Read/write
9380	Float/4	Lower range value standard volume flow	Lower standard vol-ume flow value that is mapped to the lower nominal range boundary selected by Cur-rent mode (9306). Applicable if Process value (9302) = 27.	0.0 [Sm3/h] (7964)	-	Read/write
10212	Float/4	Upper range value current	Upper current value that is mapped to the upper nominal range boundary selected by Current mode (9306). Applicable if Process value (9302) = 25 or 26.	20.0 [mA]	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10214	Float/4	Lower range value current	Lower current value that is mapped to the lower nominal range boundary selected by Current mode (9306). Applicable if Process value (9302) = 25 or 26.	4.0 [mA]	-	Read/write
9307	Float/4	Damping value	Time constant of damping filter for current output signal.	0.0 [s]	0.0 - 100.0	Read/write
9592	Unsigned/2	Filter-safe activation condition	Fail-safe activation condition.	1	0: Bad status of selected process value 1: Active Maintenance alarm or Failure (NAMUR)	Read/write
9481	Unsigned/2	Fail-safe min. time	Minimum time the output stays in fail-safe behavior.	0 [s]	0 - 100	Read/write
9314	Unsigned/2	Fail-safe behavior	Current output reaction in case of a fault.	0	0: Lower fault current 1: Upper fault current 2: Last valid value 3: Disabled 4: Custom value	Read/write
9315	Float/4	Fail-safe value	Output value in case of a fault and when Fail-safe behavior (9314) is configured to 4.	0.0 [mA]	0.0 - 25.0	Read/write
7160	Float/4	Forced value	Forced value when forcing is active.	4.0 [mA]	3.5 - 25.0	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9386	Float/4	Offset adjustment	Command to trim the lower range value of the loop current. Simulate a loop cur-rent of 4.0 mA, measure the current with an ampere meter and write the measured value to this register.	-	0 - 25	Write only
9388	Float/4	Gain adjustment	Command to trim the upper range value of the loop current. Simulate a loop cur-rent of 20.0 mA, meas-ure the current with an ampere meter and write the measured value to this register.	-	0 - 25	Write only

Tab. 42: Channel 4 current output settings

Channel 4 frequency output settings

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9404	Unsigned/2	Process value	Select process value for the current output.	0	0: Mass flow 1: Volume flow 2: Density 3: Medium temperature	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9410	Unsigned/2	Process value	Flow direction filter applicable for Process values (9404) set to 0, 1, 19, or 27.	0	0: Positive direction 1: Negative direction 2: Positive and negative directions 3: Positive and negative directions (symmetric mode)	Read/ write
9435	Float/4	Frequency value high	Upper frequency value. Upper nominal output range boundary.	10000.0 [Hz]	0.0 - 12500.0	Read/ write
9437	Float/4	Frequency value low	Lower frequency value. Lower nominal output range boundary.	0.0 Hz	0.0 - 12500.0	Read/ write
9415	Float/4	Frequency value low	Upper volume flow value that is mapped to the upper nominal range boundary se-lected by Frequency value high (9435). Applicable if Process value (9404) = 1.	0.4 % max. volume flow [m^3/s] (7500)	-	Read/ write
9417	Float/4	Upper range value volume flow	Lower volume flow value that is mapped to the lower nominal range boundary se-lected by Frequency value low (9437). Ap-plicable if Process value (9404) = 1.	0.0 [m^3/s] (7500)	-	Read/ write
9411	Float/4	Upper range value mass flow	Upper mass flow value that is mapped to the upper nominal range boundary selected by Frequency value high (9435). Applicable if Process value (9404) = 0.	0.2 max. mass flow [kg/s] (7400)	-	Read/ write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9413	Float/4	Lower range value mass flow	Lower mass flow value that is mapped to the lower nominal range boundary selected by Frequency value low (9437). Applicable if Process value (9404) = 0.	0.0 [kg/s] (7400)	-	Read/write
9419	Float/4	Upper range value density	Upper process density value that is mapped to the upper nominal range boundary selected by Frequency value high (9435). Applicable if Process value (9404) = 2.	Max. density [kg/m^3] (7600)	-	Read/write
9421	Float/4	Lower range value density	Lower process density value that is mapped to the lower nominal range boundary selected by Frequency value low (9437). Applicable if Process value (9404) = 2.	0.08 [kg/m^3] (7600)	-	Read/write
9423	Float/4	Upper range value tempera-ture	Upper medium tem-perature value that is mapped to the upper nominal range boundary selected by Frequency value high (9435). Applicable if Process value (9404) = 3.	Max. medium temperature [°C] (7700)	-	Read/write
9425	Float/4	Lower range value tempera-ture	Lower medium tem-perature value that is mapped to the lower nominal range boundary selected by Frequency value low (9437). Applicable if Process value (9404) = 3.	Min. medium temperature [°C] (7700)	-	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9427	Float/4	Upper range value standard volume flow	Upper standard volume flow value that is mapped to the upper nominal range boundary selected by Frequency value high (9435). Applicable if Process value (9404) = 27.	0.4 % max. standard volume flow [Sm³/h] (7964)	-	Read/write
9429	Float/4	Lower range value standard volume flow	Lower standard volume flow value that is mapped to the lower nominal range boundary selected by Frequency value low (9437). Applicable if Process value (9404) = 27.	[Sm³/h] (7964)	-	Read/write
10236	Float/4	Upper range value current	Upper current value that is mapped to the upper nominal range boundary selected by Frequency value high (9435). Applicable if Process value (9404) = 25 or 26.	20.0 [mA]	-	Read/write
10238	Float/4	Lower range value current	Lower current value that is mapped to the lower nominal range boundary selected by Frequency value low (9437). Applicable if Process value (9404) = 25 or 26.	4.0 [mA]	-	Read/write
9408	Float/4	Damping filter	Time constant of damping filter for frequency output signal.	0.0 [s]	0.0 - 100.0	Read/write
9592	Unsigned/2	Fail-safe activa-tion condition	Fail-safe activation condition.	1	0: Bad status of selected process value 1: Active Maintenance alarm or Failure (NAMUR)	Read/write

Modbus register	Data type / Size in bytes	Para-meter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9481	Unsigned/2	Fail-safe min. time	Minimum time the output stays in fail-safe behavior.	0 [s]	0 - 100	Read/ write
9439	Unsigned/2	Fail-safe behavior	Frequency output reaction in case of a fault.	2	0: Frequency value low 1: Frequency value high 2: Last valid value 3: Disabled 4: Custom value	Read/ write
9440	Float/4	Fail-safe value	Output value in case of a fault and when Fail-safe behavior (9439) is configured to 4.	0.0 [Hz]	0.0 - 12500.0	Read/ write
7163	Float/4	Forced value	Forced value when forcing is active.	1.0 [Hz]	0.0 - 12500.0	Read/ write

Tab. 43: Channel 4 frequency output settings

Channel 4 pulse output settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9460	Unsigned/2	Process value	Select process value for the pulse output.	0	0: Mass flow 1: Volume flow 27: Standard volume flow rate (only hydrocarbon and gas applications)	Read/ write
9462	Unsigned/2	Flow direction	Flow direction filter.	0	0: Positive direction 1: Negative direction 2: Positive and negative directions	Read/ write
9465	Float/4	Amount of volume	Amount value to generate an output pulse. Applicable if process value (9460) is set to 1.	0.001 [m^3] (8993)	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9463	Float/4	Amount of mass	Amount value to generate an output pulse. Applicable if process value (9460) is set to 0	1.0 [kg] (8992)	-	Read/ write
9467	Float/4	Amount of standard volume	Amount value to generate an output pulse. Applicable if process value (9460) is set to 27.	1.0 [Sl] (8994)	-	Read/ write
10255	Unsigned/2	Pulses per amount	Number of pulses which will be output when configured amount is reached.	1	-	Read/ write
9474	Float/4	Pulse width	Pulse duration.	0.1 [s]	0.00004 - 4.0	Read/ write
9477	Unsigned/2	Polarity	Logical polarity of pulse output.	0	0: Active high level 1: Active low level	Read/ write
9592	Unsigned/2	Fail-safe activation condition	Fail safe activation condition.	1	0: Bad status of selected process value 1: Active Maintenance alarm or Failure (NAMUR)	Read/ write
9481	Unsigned/2	Fail-safe min. time	Minimum time the output stays in Fail-safe behavior.	0 [s]	0 - 100	Read/ write
9461	Unsigned/2	Fail-safe behavior	Pulse output reaction in case of a fault.	0	0: Last valid value 1: Hold. Value 0.0 substitutes the actual input value 2: Disabled 3: Custom value	Read/ write
7441	Float/4	Fail-safe value	Output value in case of a fault and when Fail-safe behavior (9461) is configured to 4.	0.0 [pulses/s]	0.0 - 12500.0	Read/ write
7165	Float/4	Forced value	Forced value when forcing is active.	1.0 [pulses/s]	0.0 - 12500.0	Read/ write

Tab. 44: Channel 4 pulse output settings

Channel 4 status output settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9341	Unsigned/2	Status mode	Select the functionality for the status output	0	0: Alarm class 1: Alarm item	Read/ write
9358	Unsigned/2	Alarm class	Bit encoded selection of alarm classes which impact the status output. Each diagnostic event is allocated to an alarm class. See Alarm items (Page Page 133). Applicable if Status mode = 0.	0	Bit 0: Process value alarm (PA) Bit 1: Process value warning (PW) Bit 2: Maintenance alarm (MA) Bit 3: Maintenance Warning (MW) Bit 4: Maintenance required (MR) Bit 5: Function check (FC)	Read/ write
9399	Unsigned/2	NAMUR status signals	Bit encoded selection of NAMUR status signals which impacts the status output. Applicable if Status mode = 1. NAMUR status is derived from Alarm class (9358).	0	Bit 0: Out of Specification (PA, PW) Bit 1: Failure (MA) Bit 2: Maintenance required (MR, MD) Bit 3: Funtion check (FC)	Read/ write
9342	Unsigned/4	Alarm items 1	Bit encoded selection of alarm items that impact the output. Mainly sensor alarms. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/ write
9344	Unsigned/4	Alarm items 2	Bit encoded selection of alarm items that impact the output. Mainly sensor alarms. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/ write
9348	Unsigned/4	Alarm items 4	Bit encoded selection of alarm items that impact the output. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9350	Unsigned/4	Alarm items 5	Bit encoded selection of alarm items that impact the output. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/write
9356	Unsigned/4	Alarm items 8	Bit encoded selection of alarm items that impact the output. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/write
10256	Unsigned/4	Alarm items 9	Bit encoded selection of alarm items that impact the output. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/write
9354	Unsigned/4	Alarm items 7	Bit encoded selection of alarm items that impact the output. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/write
9352	Unsigned/4	Alarm items 6	Bit encoded selection of alarm items that impact the output. Mainly simulation alarms. See Alarm items (Page Page 133). Applicable if Status mode = 1.	0	-	Read/write
9359	Unsigned/2	Polarity	Logical polarity of status output.	0	0: Active high level 1: Active low level	Read/write
9360	Float/4	On delay	Time to delay the leading edge of the output.	0.0 [s]	0.0 - 100.0	Read/write
9362	Float/4	Off delay	Time to delay the trailing edge of the output.	0.0 [s]	0.0 - 100.0	Read/write
7162	Unsigned/2	Forced value	Forced value when forcing is active.	0	0 1	Read/write

Tab. 45: Channel 3 status output settings

Channel 4 discrete input settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9331	Unsigned/2	Input leading edge function	Select the functionality for the leading edge of the active discrete input signal.	0	0: Off 6: Reset totalizer 1 7: Reset totalizer 2 8: Reset totalizer 3 9: Reset all totalizers 10: Start zero point adjustment 11: Force outputs 12: Freeze process values 13: Stop forcing outputs 14: Unfreeze process values	Read/write
9335	Unsigned/2	Polarity	Logical polarity of discrete input signal.	0	0: Active high level 1: Active low level	Read/write
9339	Unsigned/2	Debounce time	Debounce time to filter the input signal.	0	0: 0 ms 1: 0.5 ms 2: 1 ms 3: 1.5 ms 4: 2 ms 5: 2.5 ms 6: 3 ms 7: 3.5 ms 8: 4 ms 9: 4.5 ms 10: 5 ms 11: 5.5 ms 12: 6 ms 13: 6.5 ms 14: 7 ms 15: 7.5 ms	Read/write

Tab. 46: Channel 4 discrete input settings

Channel 4 analog input settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10622	Unsigned/2	Current mode	Mode of current output.	0	0: 4-20 mA (3.5) 3.8 20.5 (22.6) NAMUR 1: 4-20 mA (3.75) 4.0 20.8 (22.6) US 2: 4-20 mA (2.0) 4.0 20.5 (22.0) 3: 4-20 mA (2.0) 4.0 24.0 (25.0) 4: 0-20 mA (0.0) 0.0 20.5 (22.0) 5: 0-20 mA (0.0) 0.0 24.0 (25.0)	Read/ write
10631	Float/4	Upper range value temperature	Upper medium temperature value that is mapped to the upper nominal range boundary selected by current mode (10622). Applicable if process value (10623) = 1.	[°C] (7700)	-	Read/ write
10633	Float/4	Lower range value temperature	Lower medium temperature value that is mapped to the lower nominal range boundary selected by current mode (10622). Applicable if process value (10623) = 1.	[°C] (7700)	-	Read/ write
10637	Float/4	Upper range value density	Upper process density value that is mapped to the upper nominal range boundary selected by current mode (10622). Applicable if process value (10623) = 2.	1600.0 [kg/m^3] (7600)	-	Read/ write
10639	Float/4	Lower range value density	Lower process density value that is mapped to the lower nominal range boundary selected by current mode (10622). Applicable if process value (10623) = 2.	600.0 [kg/m^3] (7600)	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10624	Unsigned/2	Fail-safe behavior	Reaction in case of a fault at the current input.	0	0: Last valid value 1: Custom value	Read/write
10629	Float/4	Fail-safe value pressure	Input value in case of a fault and when Fail-safe behavior config-ured to 1. Applicable if process value (10623) = 0.	0.0 [Pa] (7548)	-	Read/write
10635	Float/4	Fail-safe value tempera-ture	Input value in case of a fault and when Fail-safe behavior config-ured to 1. Applicable if process value (10623) = 1.	Min. medium tempe-rature [°C] (7700)	-	Read/write
10641	Float/4	Fail-safe value density	Input value in case of a fault and when Fail-safe behavior config-ured to 1. Applicable if process value (10623) = 2.	600.0 [kg/m^3] (7600)	-	Read/write
10620	Float/4	Trimmed input value	Provides the meas-ured current value.	-	-	Read only
10608	Float/4	Offset adjust-ment	Command to trim the lower range value of the analog input. Provide a loop current of 4.0 mA, read out the value of Trimmed input value and write the value to this register.	-	-	Write only
10610	Float/4	Gain adjust-ment	Command to trim the upper range value of the loop current. Simulate a loop cur-rent of 20.0 mA, meas-ure the current with an ampere meter and write the measured value to this register.	-	-	Write only

Tab. 47: Channel 4 analog input settings

3.10.5.9. Date and time

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6185	Unsigned/2	Year	Holds current year after Get time command was carried out. Holds year before Set time command is carried out.	2016	2001 - 2099	Read/write
6186	Unsigned/2	Month	Holds current month after Get time command was carried out. Holds month before Set time command is carried out.	1	1 - 12	Read/write
6187	Unsigned/2	Day	Holds current day after Get time command was carried out. Holds day before Set time command is carried out.	1	1 - 31	Read/write
6188	Unsigned/2	Hours	Holds current hours after Get time command was carried out. Holds hours before Set time command is carried out.	0	0 - 23	Read/write
6189	Unsigned/2	Minutes	Holds current minutes after Get time command was carried out. Holds minutes before Set time command is carried out.	0	0 - 59	Read/write
6669	Unsigned/2	Seconds	Holds current seconds after Get time command was carried out. Holds seconds before Set time command is carried out.	0	0 - 59	Read/write
6184	Unsigned/2	Get time	Command to get the device's current time by using the separate parameters above.	-	0: Cancel 1: Get time	Write only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6198	Unsigned/2	Set time	Command to set the device's current time by using the separate parameters above.	-	0: Cancel 1: Set time	Write only
6190	String/16	Current time	Current time in ISO 8610 format (YYYY-MM-DD hh:mm).	-	-	Read only
10864	String/32	Current time high resolution	Current time in ISO 8610 format (YYYY-MM-DD hh:mm).	-	-	Read only

Tab. 48: General settings

3.10.5.10. Local Display

General settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9002	Unsigned/2	Language	Language	0	0: English 1: German 2: French 3: Italian 4: Spanish 5: Chinese	Read/write
9098	Unsigned/2	Backlight	Duration of backlight activity after last key press.	30 [s]	0 - 240	Read/write
9094	Unsigned/2	Inactivity timeout	Duration of display activity after last key press.	10 [min]	0 (always on) - 60	Read/write
9095	Unsigned/2	Auto logout	Defines the need to enter PIN after leaving the menu and return-ing to any top level view	1	0: Enter menu without PIN for 10 min 1: Automatic logout	Read/write
9096	Unsigned/2	Help ap-pearance	Duration until help text appears.	3 [s]	0 - 20	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9097	Unsigned/2	Enable local access control	Controls local access	1	0: Disabled. Allows users to modify settings without PIN. Expert access is excluded. 1: Enabled	Read/ write
9040	Unsigned/2	Status icons	Type of alarm icons shown in local display.	Order-specific.	0: Standard 1: NAMUR	Read/ write
6409	Float/4	Filter time constant	Damping filter time for process values to be displayed.	1.0	0.0 - 100.0	Read/ write
6411	Unsigned/4	Process values (1)	Bit encoded selection group 1 of process values the display damping filter impacts. See Process value filter masks (page 125).	0xFFFE37FF	-	Read/ write
6413	Unsigned/4	Process values (2)	Bit encoded selection group 2 of process values the display damping filter impacts. See Process value filter masks (page page 125).	0x00001E7F	-	Read/ write

Tab. 49: General settings

View 1 settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9007	Unsigned/2	View	Type of appearance	3	1: Single value 3: Three values 6: 1 value and bar graph 7: 1 value and graph 8: Six values 9: Six diagnostic values	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9018	Unsigned/2	1st value	Selection of the first value.	0	See Selectable values dependent on the view type (Page 123).	Read/ write
9019	Unsigned/2	2nd value	Selection of the second value. Depending on the number of values.	2	See Selectable values dependent on the view type (Page 123).	Read/ write
9020	Unsigned/2	3rd value	Selection of the third value. Depending on the number of values.	3	See Selectable values dependent on the view type (Page 123).	Read/ write
9075	Unsigned/2	4th value	Selection of the fourth value. Depending on the number of values.	1	See Selectable values dependent on the view type (Page 123).	Read/ write
9076	Unsigned/2	5th value	Selection of the fifth value. Depending on the number of values.	11	See Selectable values dependent on the view type (Page 123).	Read/ write
9077	Unsigned/2	6th value	Selection of the sixth value. Depending on the number of values.	12	See Selectable values dependent on the view type (Page 123).	Read/ write
8050	Unsigned/2	Trend scale mode	Scaling mode for the graph and totalizer view.	0	0: Automatic scaling 1: Fixed scaling defined by Trend scale lower limit (8052) and Trend scale upper limit (8054)	Read/ write
8051	Unsigned/2	Trend log time window	Scaling of the time axis. Effective when Trend scale mode (8050) is set to 1.	1	0: 1 min 1: 5 min 2: 15 min 3: 30 min 4: 1 h 5: 2 h 6: 3 h	Read/ write
8052	Float/4	Trend scale lower limit	Scaling of the y-axis. Lower limit. Effective when Trend scale mode (8050) is set to 1.	0.0	-	Read/ write
8054	Float/4	Trend scale upper limit	Scaling of the y-axis. Upper limit. Effective when Trend scale mode (8050) is set to 1.	0.0	-	Read/ write

Tab. 50: View 1 settings

View 2 settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9013	Unsigned/2	Enable or disable	Enable or disable view.	1	0: Disabled 1: Enabled	Read/write
9008	Unsigned/2	View	Type of appearance.	1	1: Single value 2: Active diagnostic events, Alarm list 3: Three values 4: Totalizer 6: 1 value and bar graph 7: 1 value and graph 8: Six values 9: Six diagnostic values	Read/write
9021	Unsigned/2	1st value	Selection of the first value.	2	See Selectable values dependent on the view type (Page 123).	Read/write
9022	Unsigned/2	2nd value	Selection of the second value. Depending on the number of values.	0	See Selectable values dependent on the view type (Page 123).	Read/write
9023	Unsigned/2	3rd value	Selection of the third value. Depending on the number of values.	3	See Selectable values dependent on the view type (Page 123).	Read/write
9078	Unsigned/2	4th value	Selection of the fourth value. Depending on the number of values.	1	See Selectable values dependent on the view type (Page 123).	Read/write
9079	Unsigned/2	5th value	Selection of the fifth value. Depending on the number of values.	11	See Selectable values dependent on the view type (Page 123).	Read/write
9080	Unsigned/2	6th value	Selection of the sixth value. Depending on the number of values.	12	See Selectable values dependent on the view type (Page 123).	Read/write
8056	Unsigned/2	Trend scale mode	Scaling mode for the graph and totalizer view.	0	0: Automatic scaling 1: Fixed scaling defined by Trend scale lower limit (8058) and Trend scale upper limit (8060)	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8057	Unsigned/2	Trend log time window	Scaling of the time axis. Effective when Trend scale mode (8056) is set to 1.	1	0: 1 min 1: 5 min 2: 15 min 3: 30 min 4: 1 h 5: 2 h 6: 3 h	Read/ write
8058	Float/4	Trend scale lower limit	Scaling of the y-axis. Lower limit. Effective when Trend scale mode (8056) is set to 1.	0.0	-	Read/ write
8060	Float/4	Trend scale upper limit	Scaling of the y-axis. Upper limit. Effective when Trend scale mode (8056) is set to 1.	0.0	-	Read/ write

Tab. 51: View 2 settings

View 3 settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9014	Unsigned/2	Enable or disable	Enable or disable view	1	0: Disabled 1: Enabled	Read/ write
9009	Unsigned/2	View	Type of appearance	6	1: Single value 2: Active diagnostic events 3: Three values 4: Totalizer 6: 1 value and bar graph 7: 1 value and graph 8: Six values 9: Six diagnostic values	Read/ write
9024	Unsigned/2	1st value	Selection of the first value	3	See Selectable values dependent on the view type (Page 123).	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9025	Unsigned/2	2nd value	Selection of the second value. Depending on the number of values	2	See Selectable values dependent on the view type (Page 123).	Read/ write
9026	Unsigned/2	3rd value	Selection of the third value. Depending on the number of values	0	See Selectable values dependent on the view type (Page 123).	Read/ write
9081	Unsigned/2	4th value	Selection of the fourth value. Depending on the number of values	1	See Selectable values dependent on the view type (Page 123).	Read/ write
9082	Unsigned/2	5th value	Selection of the fifth value. Depending on the number of values.	11	See Selectable values dependent on the view type (Page 123).	Read/ write
9083	Unsigned/2	6th value	Selection of the sixth value. Depending on the number of values.	12	See Selectable values dependent on the view type (Page 123).	Read/ write
8062	Unsigned/2	Trend scale mode	Scaling mode for the graph and totalizer view.	0	0: Automatic scaling 1: Fixed scaling defined by Trend scale lower limit (8064) and Trend scale upper limit (8066)	Read/ write
8063	Unsigned/2	Trend log time window	Scaling of the time axis. Effective when Trend scale mode (8062) is set to 1	1	0: 1 min 1: 5 min 2: 15 min 3: 30 min 4: 1 h 5: 2 h 6: 3 h	Read/ write
8064	Float/4	Trend scale lower limit	Scaling of the y-axis. Lower limit. Effective when Trend scale mode (8062) is set to 1.	0.0	-	Read/ write
8066	Float/4	Trend scale upper limit	Scaling of the y-axis. Upper limit. Effective when Trend scale mode (8062) is set to 1.	0.0	-	Read/ write

Tab. 52: View 3 settings

View 4 settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9015	Unsigned/2	Enable or disable	Enable or disable view	1	0: Disabled 1: Enabled	Read/write
9010	Unsigned/2	View	Type of appearance.	8	1: Single value 2: Active diagnostic events 3: Three values 4: Totalizer 6: 1 value and bar graph 7: 1 value and graph 8: Six values 9: Six diagnostic values	Read/write
9027	Unsigned/2	1st value	Selection of the first value.	1	See Selectable values dependent on the view type (Page 123).	Read/write
9028	Unsigned/2	2nd value	Selection of the second value. Depending on the number of values.	2	See Selectable values dependent on the view type (Page 123).	Read/write
9029	Unsigned/2	3rd value	Selection of the third value. Depending on the number of values.	3	See Selectable values dependent on the view type (Page 123).	Read/write
9084	Unsigned/2	4th value	Selection of the fourth value. Depending on the number of values.	0	See Selectable values dependent on the view type (Page 123).	Read/write
9085	Unsigned/2	5th value	Selection of the fifth value. Depending on the number of values.	11	See Selectable values dependent on the view type (Page 123).	Read/write
9086	Unsigned/2	6th value	Selection of the sixth value. Depending on the number of values.	12	See Selectable values dependent on the view type (Page 123).	Read/write
8068	Unsigned/2	Trend scale mode	Scaling mode for the graph and totalizer view.	0	0: Automatic scaling 1: Fixed scaling defined by Trend scale lower limit (8070) and Trend scale upper limit (8072)	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8069	Unsigned/2	Trend log time window	Scaling of the time axis. Effective when Trend scale mode (8068) is set to 1.	1	0: 1 min 1: 5 min 2: 15 min 3: 30 min 4: 1 h 5: 2 h 6: 3 h	Read/ write
8070	Float/4	Trend scale lower limit	Scaling of the y-axis. Lower limit. Effective when Trend scale mode (8068) is set to 1.	0.0	-	Read/ write
8072	Float/4	Trend scale upper limit	Scaling of the y-axis. Upper limit. Effective when Trend scale mode (8068) is set to 1.	0.0	-	Read/ write

Tab. 53: View 4 settings

View 5 settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9016	Unsigned/2	Enable or disable	Enable or disable view.	1	0: Disabled 1: Enabled.	Read/ write
9011	Unsigned/2	View	Type of appearance.	3	1: Single value 2: Active diagnostic events 3: Three values 4: Totalizer 6: 1 value and bar graph 7: 1 value and graph 8: Six values. 9: Six diagnostic values	Read/ write
9030	Unsigned/2	1st value	Selection of the first value.	11	See Selectable values dependent on the view type (Page 123).	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9031	Unsigned/2	2nd value	Selection of the second value. Depending on the number of values.	2	See Selectable values dependent on the view type (Page 123).	Read/ write
9032	Unsigned/2	3rd value	Selection of the third value. Depending on the number of values.	3	See Selectable values dependent on the view type (Page 123).	Read/ write
9087	Unsigned/2	4th value	Selection of the fourth value. Depending on the number of values.	1	See Selectable values dependent on the view type (Page 123).	Read/ write
9088	Unsigned/2	5th value	Selection of the fifth value. Depending on the number of values.	0	See Selectable values dependent on the view type (Page 123).	Read/ write
9089	Unsigned/2	6th value	Selection of the sixth value. Depending on the number of values.	12	See Selectable values dependent on the view type (Page 123).	Read/ write
8074	Unsigned/2	Trend scale mode	Scaling mode for the graph and totalizer view.	0	0: Automatic scaling 1: Fixed scaling defined by Trend scale lower limit (8076) and Trend scale upper limit (8078)	Read/ write
8075	Unsigned/2	Trend log time window	Scaling of the time axis. Effective when Trend scale mode (8074) is set to 1.	1	0: 1 min 1: 5 min 2: 15 min 3: 30 min 4: 1 h 5: 2 h 6: 3 h	Read/ write
8076	Float/4	Trend scale lower limit	Scaling of the y-axis. Lower limit. Effective when Trend scale mode (8074) is set to 1.	0.0	-	Read/ write
8078	Float/4	Trend scale upper limit	Scaling of the y-axis. Upper limit. Effective when Trend scale mode (8074) is set to 1.	0.0	-	Read/ write

Tab. 54: View 5 settings

View 6 settings

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9017	Unsigned/2	Enable or disable	Enable or disable view.	1	0: Disabled 1: Enabled	Read/write
9012	Unsigned/2	View	Type of appearance.	2	1: Single value 2: Active diagnostic events 3: Three values 4: Totalizer 6: 1 value and bar graph 7: 1 value and graph 8: Six values 9: Six diagnostic values	Read/write
9033	Unsigned/2	1st value	Selection of the first value.	12	See Selectable values dependent on the view type (Page 123).	Read/write
9034	Unsigned/2	2nd value	Selection of the second value. Depending on the number of values.	2	See Selectable values dependent on the view type (Page 123).	Read/write
9035	Unsigned/2	3rd value	Selection of the third value. Depending on the number of values	3	See Selectable values dependent on the view type (Page 123).	Read/write
9090	Unsigned/2	4th value	Selection of the fourth value. Depending on the number of values.	1	See Selectable values dependent on the view type (Page 123).	Read/write
9091	Unsigned/2	5th value	Selection of the fifth value. Depending on the number of values	11	See Selectable values dependent on the view type (Page 123).	Read/write
9092	Unsigned/2	6th value	Selection of the sixth value. Depending on the number of values.	0	See Selectable values dependent on the view type (Page 123).	Read/write
8080	Unsigned/2	Trend scale mode	Scaling mode for the graph and totalizer view.	0	0: Automatic scaling 1: Fixed scaling defined by Trend scale lower limit (8082) and Trend scale upper limit (8084)	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8081	Unsigned/2	Trend log time window	Scaling of the time axis. Effective when Trend scale mode (8080) is set to 1.	1	0: 1 min 1: 5 min 2: 15 min 3: 30 min 4: 1 h 5: 2 h 6: 3 h	Read/ write
8082	Float/4	Trend scale lower limit	Scaling of the y-axis. Lower limit. Effective when Trend scale mode (8080) is set to 1.	0.0	-	Read/ write
8084	Float/4	Trend scale upper limit	Scaling of the y-axis. Upper limit. Effective when Trend scale mode (8080) is set to 1.	0.0	-	Read/ write

Tab. 55: View 6 settings

3.10.5.11.   Selectable values dependent on the view type

Selected view type	Setting options
Single value, Three values, 1 value and bar graph, 1 value and graph	0: Mass flow 1: Volume flow 2: Density 3: Medium temperature 4: Standard volume flow 5: Fraction Flow Media A 6: Fraction Flow Media B 7: Fraction Flow Media A in Percent 8: Fraction Flow Media B in Percent 9: Reference density 11: Totalizer 1 12: Totalizer 2 13: Totalizer 3
Totalizer	11: Totalizer 1 12: Totalizer 2 13: Totalizer 3

Selected view type	Setting options
Six values	0: Mass flow 1: Volume flow 2: Density 3: Medium temperature 4: Standard volume flow 5: Fraction Flow Media A 6: Fraction Flow Media B 7: Fraction Flow Media A in Percent 8: Fraction Flow Media B in Percent 9: Reference density 11: Totalizer 1 12: Totalizer 2 13: Totalizer 3
Six diagnostic values	0: Mass flow 1: Volume flow 2: Density 3: Medium temperature 4: Corrected volume flow 5: Fraction Flow Media A 6: Fraction Flow Media B 7: Fraction Flow Media A in Percent 8: Fraction Flow Media B in Percent 9: Reference density 10: Transmitter internal temperature 11: Totalizer 1 12: Totalizer 2 13: Totalizer 3 43: Ch1 value (only Hart communication interface) 44: Ch2 value 45: Ch3 value 46: Ch4 value 118: Driver current 119: Pickup S1 120: Pickup S1 121: Sensor frequency 123: Sensor electronics temperature (DSL) 124: Mass RAW signal 125: Volume RAW signal
Alarm list	No selections possible.

Tab. 56: Selectable values dependent on the view type

3.10.5.12. Process value filter masks

Selected view type	Setting options
Process value filter mask 1	Bit coded mask to specify the process values that are filtered. Bit set means filtered: 0: Mass flow 1: Volume flow 2: Density 3: Medium temperature 4: Standard volume flow 5: Fraction Flow Media A 6: Fraction Flow Media B 7: Fraction Flow Media A in Percent 8: Fraction Flow Media B in Percent 9: Reference density 10: Transmitter internal temperature 11: Totalizer 1 12: Totalizer 2 13: Totalizer 3

Tab. 57: Process value filter masks

3.10.6. Maintenance and diagnostics

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6004	Unsigned/2	Configuration counter	Configuration counter. Counts number of parameter content modified.	-	-	Read only

Tab. 58: Maintenance & diagnostics

3.10.6.1. Identification

System with TCD 9100/9200/9010 transmitter

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6592	String/12	Manufacturer	Device manufacturer.	KEM	-	Read only
6104	String/32	Product name	Product name. Also shown on the device nameplate.	TRICOR	-	Read only
6020	String/16	Version	Product version according to order.	-	-	Read only
6120	String/32	System order number	System order number part 1 (MLFB). Also shown on the device nameplate.	-	-	Read only
7236	String/32	System order number	System order number part 2 (MLFB). Also shown on the device nameplate.	-	-	Read only
7268	String/32	System order number	System order number part 3 (MLFB). Also shown on the device nameplate.	-	-	Read only
6088	Unsigned/4	Final assembly number	Final assembly number. Can be used to identify device upgrades.	-	-	Read/write
6576	String/32	Product serial number	Unique alpha numerical serial number. Also shown on the device name plate.	-	-	Read only
6334	String/16	Hardware version	System hardware version. Also shown on the device name plate.	-	-	Read /write (Expert)
6030	String/16	Firmware version	Product firmware version. Also shown on the device name plate.	-	-	Read /write (Expert)
8120	String/32	Long TAG	Unique TAG name.	-	-	Read/write
8176	String/16	Descriptor	Description of the measuring point.	-	-	Read/write
8136	String/32	Message	Additional information.	-	-	Read/write
8152	String/32	Location	Device location in the plant.	-	-	Read/write
8168	String/16	Installation date	Installation date of the device.	-	-	Read/write

Tab. 59: Identification System

Transmitter TCD 9100/9200

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8104	String/32	Transmitter order number	Transmitter order number part 1 (MLFB).	-	-	Read only
7310	String/32	Transmitter order number	Transmitter order number part 2 (MLFB).	-	-	Read only
7342	String/32	Transmitter order number	Transmitter order number part 3 (MLFB).	-	-	Read only

Tab. 60: Identification Transmitter TCD 9100/9200

Transmitter cassette

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6136	String/16	HW version	Hardware version of the cassette.	-	-	Read only
6040	String/16	FW version	Firmware version of the cassette.	-	-	Read only
7326	String/16	Serial number	Serial number of the cassette.	-	-	Read only
7386	String/16	Comm. HW version	Hardware version of the communication plug in module	-	-	Read only
7358	String/16	Comm. serial number	Serial number of the communication plug in module.	-	-	Read only

Tab. 61: Identification Transmitter cassette

Local display

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9041	String/16	HW version	Hardware version of the module.	-	-	Read only
9063	String/16	FW version	Firmware version of the module.	-	-	Read only
7475	String/16	HMI config. version	Version of the HMI configuration.	-	-	Read only

Tab. 62: Identification Local display

I/O cassette

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7260	String/16	HW version	Hardware version of the cassette.	-	-	Read only
8184	String/16	FW version	Firmware version of the cassette.	-	-	Read only
7284	String/16	Serial number	Serial number of the cassette.	-	-	Read only

Tab. 63: Identification I/O cassette

Sensor cassette

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
4135	String/10	HW version	Hardware version of the cassette.	-	-	Read only
4020	String/10	FW version	Firmware version of the cassette.	-	-	Read only
4145	String/10	Serial number	Serial number of the cassette.	-	-	Read only

Tab. 64: Identification Sensor cassette

Sensor

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
4010	String/16	Sensor type	Name of the sensor.	-	-	Read only
4033	String/20	Sensor serial number	Sensor serial number of inline sensor.	-	-	Read only
4020	String/10	Sensor firmware version	Sensor firmware version.	-	-	Read only
4095	String/10	Sensor firmware version	Sensor firmware version.	-	-	Read only

Tab. 65: Identification Sensor

3.10.7. Diagnostic events

3.10.7.1. Active events

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6200	Unsigned/4	Active alarm items 1	Bitwise indication of active alarms in alarm items 1. See Alarm items (Page 133).	-	-	Read only
6202	Unsigned/4	Active alarm items 2	Bitwise indication of active alarms in alarm items 2. See Alarm items (Page 133)	-	-	Read only
6206	Unsigned/4	Active alarm items 4	Bitwise indication of active alarms in alarm items 4. See Alarm items (Page 133).	-	-	Read only
6208	Unsigned/4	Active alarm items 5	Bitwise indication of active alarms in alarm items 5. See Alarm items (Page 133).	-	-	Read only
6210	Unsigned/4	Active alarm items 6	Bitwise indication of active alarms in alarm items 6. See Alarm items (Page 133).			Read only
6212	Unsigned/4	Active alarm items 7	Bitwise indication of active alarms in alarm items 7. See Alarm items (Page 133)	-	-	Read only
6214	Unsigned/4	Active alarm items 8	Bitwise indication of active alarms in alarm items 8. See Alarm items (Page 133).	-	-	Read only
7000	Unsigned/4	Active alarm items 9	Bitwise indication of active alarms in alarm items 9. See Alarm items (Page 133).	-	-	Read only

Tab. 66: Active events

Supported events

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6250	Unsigned/4	Supported alarm items 1	Bitwise indication of supported alarms in alarm items 1. See Alarm items (Page 133).	-	-	Read only
6252	Unsigned/4	Supported alarm items 2	Bitwise indication of supported alarms in alarm items 2. See Alarm items (Page 133).	-	-	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6256	Unsigned/4	Supported alarm items 4	Bitwise indication of supported alarms in alarm items 4. See Alarm items (Page 133).	-	-	Read only
6258	Unsigned/4	Supported alarm items 5	Bitwise indication of supported alarms in alarm items 5. See Alarm items (Page 133).	-	-	Read only
6260	Unsigned/4	Supported alarm items 6	Bitwise indication of supported alarms in alarm items 6. See Alarm items (Page 133).	-	-	Read only
6262	Unsigned/4	Supported alarm items 7	Bitwise indication of supported alarms in alarm items 7. See Alarm items (Page 133)	-	-	Read only
6264	Unsigned/4	Supported alarm items 8	Bitwise indication of supported alarms in alarm items 8. See Alarm items (Page 133).	-	-	Read only
7016	Unsigned/4	Supported alarm items 9	Bitwise indication of supported alarms in alarm items 9. See Alarm items (Page 133).	-	-	Read only

Tab. 67: Supported events

Enable events

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6266	Unsigned/4	Active alarm items 1	Bitwise indication of active alarms in alarm items 1. See Alarm items (Page 133).	-	-	Read/write
6268	Unsigned/4	Active alarm items 2	Bitwise indication of active alarms in alarm items 2. See Alarm items (Page 133).	-	-	Read/write
6272	Unsigned/4	Active alarm items 4	Bitwise indication of active alarms in alarm items 4. See Alarm items (Page 133).	-	-	Read/write
6274	Unsigned/4	Active alarm items 5	Bitwise indication of active alarms in alarm items 5. See Alarm items (Page 133).	-	-	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6276	Unsigned/4	Active alarm items 6	Bitwise indication of active alarms in alarm items 6. See Alarm items (Page 133).	-	-	Read/write
6278	Unsigned/4	Active alarm items 7	Bitwise indication of active alarms in alarm items 7. See Alarm items (Page 133).	-	-	Read/write
6280	Unsigned/4	Active alarm items 8	Bitwise indication of active alarms in alarm items 8. See Alarm items (Page 133).	-	-	Read/write
7008	Unsigned/4	Active alarm items 9	Bitwise indication of active alarms in alarm items 9. See Alarm items (Page 133).	-	-	Read/write

Tab. 68: Enable events

Acknowledge events

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6248	Unsigned/2	Acknow-ledge mode	Mode to acknowledge active events.	1	0: Manual alarm Acknowledge (indication will remain even when event is gone) 1: Automatic acknowledge (indication will disappear when event is gone)	Read only
6294	Unsigned/2	Alarm acknow-ledgement	Command to acknowledge a specific alarm item in manual acknowledge mode. Enter ID related to the item. See Alarm items (Page 133).	-	-	Read only

Tab. 69: Acknowledge events

Assign alarm class

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6328	Unsigned/2	Trans-mitter temp. too high	Defines the mapping of this event to an alarm class respective NAMUR status signal.	1	1: Process alarm (PA) resp. Out of specification. 4: Maintenance alarm (MA) resp. Failure.	Read/write
6329	Unsigned/2	Trans-mitter temp. too low	Defines the mapping of this event to an alarm class respective NAMUR status signal.Enter ID related to the item. See Alarm items (Page 133).	-	1: Process alarm (PA) resp. Out of specification. 4: Maintenance alarm (MA) resp. Failure.	Read/write

Tab. 70: Assign alarm class

3.10.7.2. Diagnostic log

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6600	Unsigned/2	Newest entry number	Entry number of newest entry. Older entries have a smaller entry number. (Wrap around from 0 - 100).	-	-	Read only
6614	Unsigned/2	Entry number	Selection of the entry number.	0	0 - 100	Read/write
6615	String/32	Time stamp	Time stamp of the diagnostic log entry specified by Entry number. Format is YYYY-MM-DD hh-mm.	-	-	Read only
10800	String/32	Time stamp	Time stamp of the diagnostic log entry specified by Entry number. Format is YYYY-MM-DD hh-mm-ss.	-	-	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6623	Unsigned/2	State	Alarm state of the entry specified by Entry number.	-	0: Event is reset (going). 1: Event is set (coming). 2: Alarm is acknowledged	Read only
6624	Unsigned/2	Alarm ID	Alarm ID of the entry specified by Entry number. See Alarm items (Page 133). 65335 specifies an empty entry that can be ignored.	-	-	Read only
6625	Unsigned/2	Alarm class	Alarm class of the entry specified by Entry number. See Alarm items (Page 133). 65335 specifies an empty entry that can be ignored.	-	1: Process value alarm (PA) 2: Process value warning (PW) 4: Maintenance alarm (MA) 8: Maintenance warning (MW) 16: Maintenance required (MR) 32: Function check (FC)	Read only
6638	Unsigned/2	Avail-able entries	Current number of available diagnostic log entries.	-	-	Read/ write
6601	Unsigned/2	Reset log	Command to clear the alarm history log.	-	0: Cancel 1: Clear log	Read only

Tab. 71: Diagnostic log

3.10.7.3. Alarm items

Group	Bit	Alarm	ID	Restrictions	Associated alarm class
Alarm items 1 (Sensor alarm 1)	0	Sensor startup	0		
	1	Safety critical user parameters not validated	1		
	2	Safety critical factory parameters not validated	2		
	3	Safety critical factory parameters not validated	3		
	4	Safety critical factory parameters not validated	4		

Group	Bit	Alarm	ID	Restrictions	Associated alarm class
	5	DSL voltages	5		
	6	Storage malfunction	6		
	7	Flow measurement	7		
	8	DSL internal error	8		
	9	Oil measurement: Density	9		
	10	Oil measurement: Viscosity	10		
	11	Oil measurement: Spec. gravity	11		
	14	Path 1: No signal	14		
	15	Path 2: No signal	15		
	16	Path 3: No signal	16		
	17	Path 4: No signal	17		
	18	Path 5: No signal	18		
	19	Electronics temperature	19		
	20	Totalizer above alarm limit	20		
	21	Totalizer above warning limit	21		
	22	Density calculation failure	22		
	23	Medium temperature calculation failure	23		
	24	Pressure calculation failure	24		
	25	Viscosity calculation failure	25		
	26	Sensor temperature compensation failure	26		
	27	Scraper pig detected	27		
	28	Configuration error 1	28		
	29	Aeration detected	29		
	30	Turbulence detected	30		
	31	Sensor temperature out of specification	31		
Alarm items 2 (Sensor alarms 2)	0	Auxiliary input failure	32		
	1	DSL Functional Safety event	33		
	2	Unreliable flow measurement	34		
	3	Failure on channel 5 or channel 6	35		
	4	Configuration error 2	36		
	5	DSL system monitor	37		
Alarm items 4 (Process alarms 1)	0	Mass flow above alarm limit	96		PA
	1	Mass flow above warning limit	97		PW
	2	Mass flow below warning limit	98		PW
	3	Mass flow below alarm limit	99		PA
	4	Volume flow above alarm limit	100		PW
	5	Volume flow above warning limit	101		PW
	6	Volume flow below warning limit	102		PW
	7	Volume flow below alarm limit	103		PA
	8	Density above alarm limit	104		PA
	9	Density above warning limit	105		PW
	10	Density below warning limit	106		PW
	11	Density below alarm limit	107		PA
	12	Medium temperature above alarm limit	108		PA
	13	Medium temperature above warning limit	109		PW

Group	Bit	Alarm	ID	Restrictions	Associated alarm class
	14	Medium temperature below warning limit	110		PW
	15	Medium temperature below alarm limit	111		PA
	16 - 31	Reserved			
Alarm items 5 (Process alarms 2, totalizer alarms)	1 - 3	Reserved			
	4	Standard volume flow above alarm limit	132	Only hydrocarbon and gas applications	PA
	5	Standard volume flow above warning limit	133		PW
	6	Standard volume flow below warning limit	134		PW
	7	Standard volume flow below alarm limit	135	Only hydrocarbon and gas applications	PA
	8	Totalizer 1 above alarm limit	136		PA
	9	Totalizer 1 above warning limit	137		PW
	10	Totalizer 1 below warning limit	138		PW
	11	Totalizer 1 below alarm limit	139		PA
	12	Totalizer 2 above alarm limit	140		PA
	13	Totalizer 2 above warning limit	141		PW
	14	Totalizer 2 below warning limit	142		PW
	15	Totalizer 2 below alarm limit	143		PA
	16	Totalizer 3 above alarm limit	144		PA
	17	Totalizer 3 above warning limit	145		PW
	18	Totalizer 3 below warning limit	146		PW
	19	Totalizer 3 below alarm limit	147		PA
	20	Transmitter temperature above alarm limit	148		See Assign alarm class (Page 132)
	21	Transmitter temperature below alarm limit	149		See Assign alarm class (Page 132)
	22	Sensor signal disrupted	150		MA
	23	Sensor SD Card backup disabled	151		FC
	24	Sensor SD Card backup disabled	152		FC
	25	Reserved	153		
	26	Reserved	154		
	27	Reserved	155		
	28	Safety validation state	156		FC
	29	Functional Safety	157		MA
	30	Loop current cable break	158		MA
	31	Internal error in transmitter	159		MA
	0	Mass flow simulated	160		FC
	1	Volume flow simulated	161		FC
	2	Density simulated	162		FC
Alarm items 6 (Simulation alarms)	3	Medium temperature simulated	163		FC
	4 - 5	Reserved			
	6	Standard volume flow simulated	165		FC

Group	Bit	Alarm	ID	Restrictions	Associated alarm class
	7	Totalizer 1 simulated	166		FC
	8	Totalizer 2 simulated	168		FC
	9	Totalizer 3 simulated	169		FC
	10	Loop current simulated	170		FC
	11	Product firmware incompatible	171		MA
	12	Transmitter FW incompatible	172		MA
	13	Sensor FW incompatible	173		MA
	14	Display FW incompatible	174		MA
	15	IO FW incompatible	175		MA
	16	Sensor type incompatible	176		MA
	17	Device is starting	177		FC
	18	Display configuration version mismatch	178		MA
	19	Alarm class simulation enabled	179		-
	20	Reserved	180		
	21	Sensor SD Card Chkdsk failed	181		MA
	23	Reserved	183		
	24	Reserved	184		
	25	Reserved	185		
	26	Channel 3 input current too low	186	If channel configured to analog input	PA
	27	Channel 3 input current too high	187		PA
	28	Channel 3 external failure	188		PA
	29	Channel 4 input current too low	189	If channel configured to analog input	PA
	30	Channel 4 input current too high	190		PA
	31	Channel 4 external failure	191		PA
	0	Reserved	192		
	1	Reserved	193		
	2	Reserved	194		
Alarm items 7 (Inputs and outputs alarms)	3	Channel 2 loop current in lower saturation	195	If channel configured to current output	PA
	4	Channel 2 loop current in upper saturation	196		PA
	5	Channel 2 cable break	197		MA
	6	Channel 2 output frequency too low	198	If channel configured to frequency output If channel configured to pulse output	PA
	7	Channel 2 output frequency too high	199		PA
	8	Channel 2 pulse overflow	200		PA
	9	Channel 3 loop current in lower saturation	201	If channel configured to current output	PA
	10	Channel 3 loop current in upper saturation	202		PA

Group	Bit	Alarm	ID	Restrictions	Associated alarm class
	11	Channel 3 cable break	203	If channel configured to pulse output	MA
	12	Channel 3 output frequency too low	204	If channel configured to frequency output If channel configured to pulse output	PA
	13	Channel 3 output frequency too high	205		PA
	14	Channel 3 pulse overflow	206		PA
	15	Channel 4 loop current in lower saturation	207	If channel configured to current output	PA
	16	Channel 4 loop current in upper saturation	208		PA
	17	Channel 4 cable break	209	If channel configured to pulse output	MA
	18	Channel 4 output frequency too low	210	If channel configured to frequency output If channel configured to frequency output If channel configured to pulse output	PA
	19	Channel 4 output frequency too high	211		PA
	20	Channel 4 pulse overflow	212		PA
	21	Reserved	213		
	22	Channel 2 simulated	214	If channel configured to output	FC
	23	Channel 3 simulated	215	If channel configured to output	FC
	24	Channel 4 simulated	216	If channel configured to output	FC
	25	Process values frozen	217		FC
	26	All outputs forced	218		FC
	27	Channel 2 loop current deviation	219		MA
	28	Channel 3 loop current deviation	220		MA
	29	Channel 4 loop current deviation	221		MA
	30	Invalid register mapping	222		MA
	31	Invalid coil configuration	223		MA

Group	Bit	Alarm	ID	Restrictions	Associated alarm class
	0	Reserved	224		
	1	Reserved	225		
	2	Reserved	226		
Alarm items 8 (Process alarms 3)	3	Reserved	227		
	4	Sound velocity above alarm limit	228		PA
	5	Sound velocity above warning limit	229		PW
	6	Sound velocity below warning limit	230		PW
	7	Sound velocity below alarm limit	231		PA
	8	Flow velocity above alarm limit	232		PA
	9	Flow velocity above warning limit	233		PW
	10	Flow velocity below warning limit	234		PW
	11	Flow velocity below alarm limit	235		PA
	12	Pressure above alarm limit	236		PA
	13	Pressure above warning limit	237		PW
	14	Pressure below warning limit	238		PW
	15	Pressure below alarm limit	239		PA
	16	Concentration above alarm limit	240		PA
	17	Concentration above warning limit	241		PW
	18	Concentration below warning limit	242		PW
	19	Concentration below alarm limit	243		PA
	20	Viscosity above alarm limit	244		PA
	21	Viscosity above warning limit	245		PW
	22	Viscosity below warning limit	246		PW
	23	Viscosity below alarm limit	247		PA
	24	Rate of change above alarm limit	248	Only hydrocarbon applications	PA
	25	Rate of change above warning limit	249		PW
	26	Reserved	250		
	27	Reserved	251		
	28	Standard kinematic viscosity above alarm limit	252	Only hydrocarbon applications	PA
	29	Standard kinematic viscosity above warning limit	253		PW
	30	Standard kinematic viscosity below warning limit	254		PW
	31	Standard kinematic viscosity below alarm limit	255	Only hydrocarbon applications	PA
	0	Standard density above alarm limit	256		PA
	1	Standard density above warning limit	257	Only hydrocarbon applications	PW
	2	Standard density below warning limit	258		PW
Alarm items 9 (Process alarms 4)	3	Standard density below alarm limit	259	Only hydrocarbon applications	PA
	4	API gravity above alarm limit	260		PA
	5	API gravity above warning limit	261		PW

Group	Bit	Alarm	ID	Restrictions	Associated alarm class
	6	API gravity below warning limit	262	Only hydrocarbon applications	PW
	7	API gravity below alarm limit	263	Only hydrocarbon applications	PA
	8	Standard API gravity above alarm limit	264		PA
	9	Standard API gravity above warning limit	265		PW
	10	Standard API gravity below warning limit	266	Only hydrocarbon applications	PW
	11	Standard API gravity below alarm limit	267	Only hydrocarbon applications	PA
	12	Specific gravity above alarm limit	268		PA
	13	Specific gravity above warning limit	269		PW
	14	Specific gravity below warning limit	270	Only hydrocarbon applications	PW
	15	Specific gravity below alarm limit	271	Only hydrocarbon applications	PA
	16	Standard specific gravity above alarm limit	272		PA
	17	Standard specific gravity above warning limit	273	Only hydrocarbon applications	PW
	18	Standard specific gravity below warning limit	274		PW
	19	Standard specific gravity below alarm limit	275	Only hydrocarbon applications	PA
	20	LiquIdent above alarm limit	276		PA
	21	LiquIdent above warning limit	277	Only hydrocarbon applications	PW
	22	LiquIdent below warning limit	278		PW
	23	LiquIdent below alarm limit	279		PA
	24	Reserved	280		
	25	Reserved	281		
	26	Reserved	282		
	27	Reserved	283		
	28	Reserved	284		
	29	Reserved	285		
	30	Reserved	286		
	31	Reserved	287		

Tab. 72: Alarm items

PA	Process value alarm (NAMUR: Out of specification)
PW	Process value warning (NAMUR: Out of specification)
FC	Function check
MR	Maintenance required (NAMUR: Maintenance required)
MD	Maintenance demanded (NAMUR: Maintenance required)
MA	Maintenance alarm (NAMUR: Failure)

3.10.8. Diagnostics

3.10.8.1. Device diagnostics

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
2756	Float/4	Driver Current	Actual sensor driver current.	- [A]	0 to 0.124	Read only
2758	Float/4	Pick-up Amplitude 1	The actual driver current is.	- [V]	0 to 0 9999	Read Only
2760	Float/4	Pick-up Amplitude 2	viscosity and sensor size dependent.	- [V]	0 to 0 9999	Read Only
2762	Float/4	Sensor Frequency	Actual pick-up 1 amplitude.	- [Hz]	0 to 1023	Read Only

Tab. 73: Device diagnostics

3.10.8.2. Temperatur monitoring

Transmitter temperature

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8200	Float/4	Transmitter temperature	Measured value of transmitter internal temperature.	-	-	Read only
3032	Float/4	DSL temperature	Measured value of the DSL transmitter at sensor internal temperature.	-	-	Read only

Tab. 74: Transmitter temperature

3.10.8.3. Dosing

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8550	Unsigned/2	Dosing mode	Select dosing modes.	-	0: Off, dosing disabled 1: 1-stage dosing 2: 2-stage dosing 3: analog dosing	Read/write
8596	Unsigned/2	Dosing command	Command parameter to execute a batch command.	-	0: do nothing 1: start batch 2: stop batch 3: pause batch 4: resume batch 5: start cleaning	Read/write
8597	Unsigned/2	Dosing status	Returns the Dosing status.	-	0: batch stopped 1: batch running 2: batch paused 3: cleaning (all valves are set to "open valve")	Read only
8578	Unsigned/2	Dosing status	Dosing fault status.	-	Bit 0: Batch Timeout Bit 1: Batch Overrun Bit 2: Not all values have been good in current batch cycle	Read only
8551	Unsigned/2	Dosing process value	Selection of the process value for the dosing.	-	0: Mass flow 1: Volume flow 4: Corrected Volume Flow 5: Fraction Flow MediaA 6: Fraction Flow MediaB	Read/write
8581	Float/4	Dosing amount done	Current amount that is totalized since the start of the batch cycle.	-	-	Read only
8585	Float/4	Dosing amount remaining	Amount that is missing to complete the current batch.	-	-	Read only
8594	Unsigned/2	Dosing amount done status	Quality code of the dosing amount done.	-	0: bad 192:good	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8583	Unsigned/4	Dosing cycle counter	Number of completed batch cycles since start-up.	-		Read only
8599	Unsigned/2	Dosing cycle counter reset	Command to reset the dosing cycle counter.	-	0: do nothing 1: reset cycle counter	Read/ write
8595	Unsigned/2	Dosing active recipe	Activate recipe (1 to 5) parameter set. Every recipe consists of an own set of parameters.	-	1: Recipe 1 active 2: Recipe 2 active 3: Recipe 3 active 4: Recipe 4 active 5: Recipe 5 active	Read/ write

Tab. 75: Dosing

Dosing - recipe 1

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8600	String/16	Recipe 1 name	Name of recipe parameter set.	-	-	Read/ write
8678	Unsigned/2	Recipe 1 unit mass flow	Mass flow unit for dosing parameters.	61	60: grams 61: kilograms 62: metric tons 63: pounds 64: short tons 65: long tons 125:ounces	Read/ write
8679	Unsigned/2	Recipe 1 unit volume flow	Volume flow unit for dosing parameters.	41	40: US gallons 41: liters 42: imperial gallons 43: cubic meters 46: oil barrels 110:bushels 111:cubic yards 112:cubic feet 113:cubic inches 124:liquid barrels 170:beer barrels 236:hectoliters	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8680	Unsigned/2	Recipe 1 unit corrected volume flow	Corrected volume flow unit for dosing parameters.	166	166:normal cubic meters 167:normal liters 168:standard cubic feet 171:standard liters 172:standard cubic meters	Read/write
8608	Float/4	Recipe 1 amount mass flow	Target amount for dosing mass flow.	-	-	Read/write
8610	Float/4	Recipe 1 amount volume flow	Target amount for dosing volume flow.	-	-	Read/write
8612	Float/4	Recipe 1 amount corrected volume flow	Target amount for dosing corrected volume flow.	-	-	Read/write
7583	Unsigned/2	Recipe 1 Dec. point mass flow	Specify the selected number of decimals for mass flow.	-	-	Read/write
7584	Unsigned/2	Recipe 1 Dec. point volume flow	Specify the selected number of decimals for volume flow.	-	-	Read/write
7585	Unsigned/2	Recipe 1 Dec. point corrected volume flow	Specify the selected number of decimals for corrected volume flow.	-	-	Read/write
8615	Float/4	Recipe 1 fixed compensation	Fixed compensation mass flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/write
8617	Float/4	Recipe 1 fixed compensation	Fixed compensation volume flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8619	Float/4	volume flow	Fixed compensation corrected volume flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/write
8691	Unsigned/2	Recipe 1 fixed compensation	Compensation algorithm, fixed or adaptive compensation.	0	0: fixed compensa-tion value is taken 1: On Target 2: Target plus 3: Target minus	Read/write
8625	Float/4	Corrected volume flow	When the amount mass flow has reached this value a dosing overrun fault is raised.	-	-	Read/write
8627	Float/4	Recipe 1 compensation mode	When the amount volume flow has reached this value a dosing overrun fault is raised.	-	-	Read/write
8629	Float/4	Recipe 1 overrun mass flow value	When the amount corrected volume flow has reached this value a dosing overrun fault is raised.	-	-	Read/write

Tab. 76: Dosing – recipe 1

Dosing - recipe 2

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8700	String/16	Recipe 2 name	Name of recipe parameter set.	-	-	Read/ write
8778	Unsigned/2	Recipe 2 unit mass flow	mass flow unit for dosing parameters.	61	60: grams 61: kilograms 62: metric tons 63: pounds 64: short tons 65: long tons 125:ounces	Read/ write
8779	Unsigned/2	Recipe 2 unit volume flow	Volume flow unit for dosing parameters.	41	40: US gallons 41: liters 42: imperial gallons 43: cubic meters 46: oil barrels 110:bushels 111:cubic yards 112:cubic feet 113:cubic inches 124:liquid barrels 170:beer barrels 236:hectoliters	Read/ write
8780	Unsigned/2	Recipe 2 unit corrected volume flow	Corrected volume flow unit for dosing parameters.	166	166:normal cubic meters 167:normal liters 168:standard cubic feet 171:standard liters 172:standard cubic meters	Read/ write
8708	Float/4	Recipe 2 amount mass flow	Target amount for dosing mass flow.	-	-	Read/ write
8710	Float/4	Recipe 2 amount volume flow	Target amount for dosing volume flow.	-	-	Read/ write
8712	Float/4	Recipe 2 amount corrected volume flow	Target amount for dosing corrected volume flow.	-	-	Read/ write
7586	Unsigned/2	Recipe 2 Dec. point mass flow	Specify the selected number of decimals for mass flow.	-	-	Read/ write
7587	Unsigned/2	Recipe 2 Dec. point volume flow	Specify the selected number of decimals for volume flow.	-	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7588	Unsigned/2	Recipe 2 Dec. point corrected volume flow	Specify the selected number of decimals for corrected volume flow.	-	-	Read/ write
8715	Float/4	Recipe 2 fixed compensation	Fixed compensation mass flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/ write
8717	Float/4	mass flow	Fixed compensation volume flow value that is used to close the valve(s) before the measured amount value has reached the target amount	-	-	Read/ write
8719	Float/4	Recipe 2 fixed compensation	Fixed compensation corrected volume flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/ write
8791	Unsigned/2	Volume flow	Compensation algorithm, fixed or adaptive compensation.	-	0: fixed compensation value is taken 1: On Target 2: Target plus 3: Target minus	Read/ write
8725	Float/4	Recipe 2 fixed compensation	When the amount mass flow has reached this value a dosing overrun fault is raised.	-	-	Read/ write
8727	Float/4	Corrected volume flow	When the amount volume flow has reached this value a dosing overrun fault is raised.	-	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8729	Float/4	Recipe 2 compensation mode	When the amount corrected volume flow has reached this value a dosing overrun fault is raised.	-	-	Read/ write

Tab. 77: Dosing – recipe 2

Dosing - recipe 3

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9600	String/16	Recipe 3 name	Name of recipe parameter set.	-	-	Read/ write
9678	Unsigned/2	Recipe 3 unit mass flow	Mass flow unit for dosing parameters.	61	60: grams 61: kilograms 62: metric tons 63: pounds 64: short tons 65: long tons 125:ounces	Read/ write
9679	Unsigned/2	Recipe 3 unit volume flow	Volume flow unit for dosing parameters.	41	40: US gallons 41: liters 42: imperial gallons 43: cubic meters 46: oil barrels 110:bushels 111:cubic yards 112:cubic feet 113:cubic inches 124:liquid barrels 170:beer barrels 236:hectoliters	Read/ write

9680	Unsigned/2	Recipe 3 unit corrected volume flow	Corrected volume flow unit for dosing parameters.	166	166:normal cubic
					      meters
					167:normal liters
					168:standard cubic
					      feet
					171:standard liters
					172:standard cubic
					      meters
						Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9608	Float/4	Recipe 3 amount mass flow	Target amount for dosing mass flow.	-	-	Read/ write
9610	Float/4	Recipe 3 amount volume flow	Target amount for dosing volume flow.	-	-	Read/ write
9612	Float/4	Recipe 3 amount corrected volume flow	Target amount for dosing corrected volume flow.	-	-	Read/ write
7589	Unsigned/2	Recipe 3 Dec. point mass flow	Specify the selected number of decimals for mass flow.	-	-	Read/ write
7590	Unsigned/2	Recipe 3 Dec. point volume flow	Specify the selected number of decimals for volume flow.	-	-	Read/ write
7591	Unsigned/2	Recipe 3 Dec. point corrected volume flow	Specify the selected number of decimals for corrected volume flow.	-	-	Read/ write
9615	Float/4	Recipe 3 fixed compensation	Fixed compensation mass flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/ write
9617	Float/4	Mass flow	Fixed compensation volume flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/ write
9619	Float/4	Recipe 3 fixed compensation	Fixed compensation corrected volume flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9691	Unsigned/2	Volume flow	Compensation algorithm, fixed or adaptive compensation.	0	0: fixed Compensation value is taken 1: On Target 2: Target plus 3: Target minus	Read/write
9625	Float/4	Recipe 3 fixed compensation	When the amount mass flow has reached this value a dosing overrun fault is raised.	-	-	Read/write
9627	Float/4	Corrected volume flow	When the amount volume flow has reached this value a dosing overrun fault is raised.	-	-	Read/write
9629	Float/4	Recipe 3 compensation mode	When the amount corrected volume flow has reached this value a dosing overrun fault is raised.	-	-	Read/write

Tab. 78: Dosing – recipe 3

Dosing - recipe 4

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9700	String/16	Recipe 4 name	Name of recipe parameter set.	-	-	Read/write
9778	Unsigned/2	Recipe 4 unit mass flow	Mass flow unit for dosing parameters.	61	60: grams 61: kilograms 62: metric tons 63: pounds 64: short tons 65: long tons 125: ounces	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9779	Unsigned/2	Recipe 4 unit volume flow	Volume flow unit for dosing parameters.	41	40: US gallons 41: liters 42: imperial gallons 43: cubic meters 46: oil barrels 110:bushels 111:cubic yards 112:cubic feet 113:cubic inches 124:liquid barrels 170:beer barrels 236:hectoliters	Read/write
9780	Unsigned/2	Recipe 4 unit corrected volume flow	Corrected volume flow unit for dosing parameters.	166	166:normal cubic meters 167:normal liters 168:standard cubic feet 171:standard liters 172:standard cubic meters	Read/write
9708	Float/4	Recipe 4 amount mass flow	Target amount for dosing mass flow.	-	-	Read/write
9710	Float/4	Recipe 4 amount volume flow	Target amount for dosing volume flow.	-	-	Read/write
9712	Float/4	Recipe 4 amount corrected volume flow	Target amount for dosing corrected volume flow.	-	-	Read/write
7592	Unsigned/2	Recipe 4 Dec. point mass flow	Specify the selected number of decimals for mass flow.	-	-	Read/write
7593	Unsigned/2	Recipe 4 Dec. point volume flow	Specify the selected number of decimals for volume flow.	-	-	Read/write
7594	Unsigned/2	Recipe 4 Dec. point corrected volume flow	Specify the selected number of decimals for corrected volume flow.	-	-	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9715	Float/4	Recipe 4 fixed compensation mass flow	Fixed compensation mass flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/ write
9717	Float/4	Recipe 4 fixed compensation volume flow	Fixed compensation volume flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/ write
9719	Float/4	Recipe 4 fixed compensation Corrected volume flow	Fixed compensation corrected volume flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/ write
9791	Unsigned/2	Recipe 4 compensation mode	Compensation algorithm, fixed or adaptive compensation.	-	0: fixed Compensation value is taken 1: On Target 2: Target plus 3: Target minus	Read/ write
9725	Float/4	Recipe 4 overrun mass flow value	When the amount mass flow has reached this value a dosing overrun fault is raised.	-	-	Read/ write
9727	Float/4	Recipe 4 overrun volume flow value	When the amount volume flow has reached this value a dosing overrun fault is raised.	-	-	Read/ write
9729	Float/4	Recipe 4 overrun corrected volume flow value	When the amount corrected volume flow has reached this value a dosing overrun fault is raised.	-	-	Read/ write

Tab. 79: Dosing – recipe 4

Dosing - recipe 5

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9800	String/16	Recipe 5 name	Name of recipe parameter set.	-		Read/write
9878	Unsigned/2	Recipe 5 unit mass flow	Mass flow unit for dos-ing parameters.	61	60: grams 61: kilograms 62: metric tons 63: pounds 64: short tons 65: long tons 125:ounces	Read/write
9879	Unsigned/2	Recipe 5 unit volume flow	Volume flow unit for dosing parameters.	41	40: US gallons 41: liters 42: imperial gallons 43: cubic meters 46: oil barrels 110:bushels 111:cubic yards 112:cubic feet 113:cubic inches 124:liquid barrels 170:beer barrels 236:hectoliters	Read/write
9880	Unsigned/2	Recipe 5 unit corrected volume flow	Corrected volume flow unit for dosing parameters.	166	166:normal cubic meters 167:normal liters 168:standard cubic feet 171:standard liters 172:standard cubic meters	Read/write
9808	Float/4	Recipe 5 amount mass flow	Target amount for dosing mass flow.	-	-	Read/write
9810	Float/4	Recipe 5 amount volume flow	Target amount for dosing volume flow.	-	-	Read/write
9812	Float/4	Recipe 5 amount cor-rected volume flow	Target amount for dosing corrected volume flow.	-	-	Read/write
7595	Unsigned/2	Recipe 5 Dec. point mass flow	Specify the selected number of decimals for mass flow.	-	-	Read/write
7596	Unsigned/2	Recipe 5 Dec. point volume flow	Specify the selected number of decimals for volume flow.	-	-	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7597	Unsigned/2	Recipe 5 Dec. point corrected volume flow	Specify the selected number of decimals for corrected volume flow.	-	-	Read/ write
8595	Unsigned/2	Dosing active recipe	Activate recipe (1 to 5) parameter set. Every recipe consists of an own set of parameters.	-	1 : Recipe 1 active 2 : Recipe 2 active 3 : Recipe 3 active 4 : Recipe 4 active 5 : Recipe 5 active	Read/ write
9815	Float/4	Recipe 5 fixed compen-sation mass flow	Fixed compensation mass flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/ write
9817	Float/4	Recipe 5 fixed compen-sation volume flow	Fixed compensation volume flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/ write
9819	Float/4	Recipe 5 fixed compen-sation Corrected volume flow	Fixed compensation corrected volume flow value that is used to close the valve(s) before the measured amount value has reached the target amount.	-	-	Read/ write
9891	Unsigned/2	Recipe 5 com-pensation mode	Compensation algo-ritm, fixed or adaptive compensation.	-	0: fixed Compensation value is taken 1: On Target 2: Target plus 3: Target minus	Read/ write
9825	Float/4	Recipe 5 over-run mass flow value	When the amount mass flow has reached this value a dosing overrun fault is raised.	-	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9827	Float/4	Recipe 5 overrun volume flow value	When the amount volume flow has reached this value a dosing overrun fault is raised.	-	-	Read/ write
9829	Float/4	Recipe 5 overrun corrected volume flow value	When the amount corrected volume flow has reached this value a dosing overrun fault is raised.	-	-	Read/ write

Tab. 80: Dosing - recipe 5

3.10.8.4. Inputs and Outputs

General

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8799	Unsigned/2	Reset pulse counter	Command to reset pulse counters.	0	0: Cancel 1: Reset all pulse totalizers and pulse counts 2: Reset pulse totalizer in channel 2 3: Reset pulse totalizer in channel 3 4: Reset pulse totalizer in channel 4	Write only

Tab. 81: Inputs and Outputs- General

Channel 2

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8803	Float/4	Current output value	Output current value if configured to current output.	-	-	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8828	Unsigned/2	Error status	Error status if configured to current output.	-	Bit 0: Overflow Bit 1: Underflow Bit 2: Fail mode activated Bit 3: Cable break Bit 4: Output current cannot be established (read back deviation > 0.1 mA)	Read only
8840	Unsigned/2	Status output	Status value if configured to status output.	-	-	Read only
8969	Float/4	Pulse status output	Amount done if configured to pulse output.	-	-	Read only
8972	Unsigned/2	Error status	Error status if configured to pulse output.	-	Bit 0: The pulse putput has reached the maximum pulse output frequency Bit 1: Fail mode is activated	Read only
8987	Unsigned/4	Pulse counter	Pulse output since startup.	-	-	Read only
8900	Float/4	Frequency output value	Frequency value if configured to frequency output.	-	-	Read only
8903	Unsigned/2	Error status	Error status if configured to frequency output.	-	Bit 0: Overflow Bit 1: Underflow Bit 2: Fail mode activated	Read only

Tab. 82: Inputs and Outputs- Channel 2

Channel 3

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9103	Float/4	Current output value	Output current value if configured to current output.	-	-	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options		Access level
9128	Unsigned/2	Error status	Error status if configured to current output.	-	Bit 0: Overflow Bit 1: Underflow Bit 2: Fail mode acti-vated Bit 3: Cable break Bit 4: Output current cannot be estab-lished (read back deviation > 0.1mA)		Read only
9140	Unsigned/2	Status output	Status value if configured to status output.	-	-		Read only
9269	Float/4	Pulse status output	Amount done if configured to pulse output.	-	-		Read only
9272	Unsigned/2	Error status	Error status if configured to pulse output.	-	Bit 0: The pulse output has reached the maximum pulse output frequency Bit 1: Fail mode is activated		Read only
9287	Unsigned/4	Pulse counter	Pulse output since startup.	-	-		Read only
9200	Float/4	Frequency output value	Frequency value if configured to frequency output.	-	-		Read only
9203	Unsigned/2	Error status	Error status if configured to frequency output.	-	Bit 0: Overflow Bit 1: Underflow Bit 2: Fail mode activated		Read only
10503	Float/4	Current input value	Input current value if configured to current input.	-	-		Read only
10558	Unsigned/2	Error status	Error status if configured to current input.	-	Bit 0: Overflow (> 25 mA) Bit 1: Underflow (< 0 mA) Bit 2: Measured current out of measuring range		Read only
9129	Unsigned/2	Digital input value	Input value if configured to digital input.	-	-		Read only

Tab. 83: Inputs and Outputs- Channel 3

Channel 4

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9303	Float/4	Current output value	Output current value if configured to current output.	-	-	Read only
9328	Unsigned/2	Error status	Error status if configured to current output.	-	Bit 0: Overflow Bit 1: Underflow Bit 2: Fail mode acti-vated Bit 3: Cable break Bit 4: Output current cannot be estab-lished (read back deviation > 0.1 mA)	Read only
9340	Unsigned/2	Status output	Status value if configured to status output.	-	-	Read only
9469	Float/4	Pulse status output	Amount done if configured to pulse output.	-	-	Read only
9472	Unsigned/2	Error status	Error status if configured to pulse output.	-	Bit 0: The pulse output has reached the maximum pulse output frequency Bit 1: Fail mode is activated	Read only
9487	Unsigned/4	Pulse counter	Pulse output since startup.	-	-	Read only
9400	Float/4	Frequency output value	Frequency value if configured to frequency output.	-	-	Read only
9403	Unsigned/2	Error status	Error status if configured to frequency output.	-	Bit 0: Overflow Bit 1: Underflow Bit 2: Fail mode activated	Read only
10603	Float/4	Current input value	Input current value if configured to current input.	-	-	Read only
10658	Unsigned/2	Error status	Error status if configured to current input.	-	Bit 0: Overflow (> 25 mA) Bit 1: Underflow (< 0 mA) Bit 2: Measured current out of measuring range	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9329	Unsigned/2	Digital input value	Input value if configured to digital input.	-	-	Read only

Tab. 84: Inputs and Outputs- Channel 4

3.10.8.5. Peak values

Process value 1

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
11200	Unsigned/2	Process value	Process value configured to be monitored.	Disabled	3000: Mass flow 3002: Volume flow 3004: Density 3010: Medium temperature 7950: Corrected volume flow 7871: Fraction A 7881: Fraction B 7800: Fraction A in % 7810: Fraction B in % 65535: Disabled	Read/ write
11226	Float/4	Maximum value	Drag indicator of maximum value specified by Process value (11200).	Min. floating point value [units depending on process value]	-	Read only
11228	String/32	Maximum value timestamp	Shows timestamp of recorded maximum value specified by Process value (11200).		-	Read only
11208	Float/4	Minimum value	Drag indicator of minimum value specified by Process value (11200).	Max. floating point value [units depending on process value]	-	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
11210	String/32	Minimum value timestamp	Shows timestamp of recorded minimum value specified by Process value (11200).	-	-	Read only
11204	Unsigned/2	Reset logging	Command to reset the drag pointers to the process value's default value.	-	-	Write only

Tab. 85: Process value 1

Process value 2

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
11201	Unsigned/2	Process value	Process value configured to be monitored.	Disabled	3000: Mass flow 3002: Volume flow 3004: Density 3010: Medium temperature 7950: Corrected volume flow 7871: Fraction A 7881: Fraction B 7800: Fraction A in % 7810: Fraction B in % 65535: Disabled	Read/ write
11262	Float/4	Maximum value	Drag indicator of maximum value specified by Process value (11201).	Min. floating point value [units depending on process value]	-	Read only
11264	String/32	Maximum value timestamp	Shows timestamp of recorded maximum value specified by Process value (11201).	-	-	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
11244	Float/4	Minimum value	Drag indicator of minimum value specified by Process value (11201).	Max. floating point value [units depending on process value]	-	Read only
11246	String/32	Minimum value timestamp	Shows timestamp of recorded minimum value specified by Process value (11201).	-	-	Read only
11205	Unsigned/2	Reset logging	Command to reset the drag pointers to the process value's default value.	-	-	Write only

Tab. 86: Process value 2

Process value 3

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
11202	Unsigned/2	Process value	Process value configured to be monitored.	Disabled	3000: Mass flow 3002: Volume flow 3004: Density 3010: Medium temperature 7950: Corrected volume flow 7871: Fraction A 7881: Fraction B 7800: Fraction A in % 7810: Fraction B in % 65535: Disabled	Read/ write
11298	Float/4	Maximum value	Drag indicator of maximum value specified by Process value (11202).	Min. floating point value [units depending on process value]	-	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
11300	String/32	Maximum value timestamp	Shows timestamp of recorded maximum value specified by Process value (11202).	-	-	Read only
11280	Float/4	Minimum value	Drag indicator of minimum value specified by Process value (11202).	Max. floating point value [units depending on process value]	-	Read only
11282	String/32	Minimum value timestamp	Shows timestamp of recorded minimum value specified by Process value (11202).	-	-	Read only
11206	Unsigned/2	Reset logging	Command to reset the drag pointers to the process value's default value.	-	-	Write only

Tab. 87: Process value 3

Process value 4

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
11203	Unsigned/2	Process value	Process value configured to be monitored.	Disabled	3000: Mass flow 3002: Volume flow 3004: Density 3010: Medium temperature 7950: Corrected volume flow 7871: Fraction A 7881: Fraction B 7800: Fraction A in % 7810: Fraction B in % 65535: Disabled	Read/ write
11334	Float/4	Maximum value	Drag indicator of maximum value specified by Process value (11203).	Min. floating point value [units depending on process value]	-	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
11336	String/32	Maximum value timestamp	Shows timestamp of recorded maximum value specified by Process value (11203).		-	Read only
11316	Float/4	Minimum value	Drag indicator of minimum value specified by Process value (11203).	Max. floating point value [units de-pending on process value]	-	Read only
11318	String/32	Minimum value timestamp	Shows timestamp of recorded minimum value specified by Process value (11203).	-	-	Read only
11207	Unsigned/2	Reset logging	Command to reset the drag pointers to the process value's default value.	-	-	Write only

Tab. 88: Process value 4

3.10.9. Characteristics

3.10.9.1. Product

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6019	Unsigned/2	CT variant	FUTURE OPTION: Shows whether or not this product is allowed to be operated in cus-tody transfer mode. CT certification is not currently a released option.	-	0: No 1: Yes	Read only
6199	Unsigned/2	CT active	FUTURE OPTION: Shows whether custo-dy transfer mode is activated. CT certification is not currently a released option.	-	0: No 1: Yes	Read only

Tab. 89: Product

3.10.9.2. Transmitter

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6500	String/32	Design 1	Information of design.	-	-	Read only
6516	String/32	Design 2	Information of design continued.	-	-	Read only
6532	String/32	Design 3	Information of design continued.	-	-	Read only
6548	String/32	Design 4	Information of design continued.	-	-	Read only
6144	String/32	Hazardous area approval	Text describing the hazardous area approval of the transmitter.	-	-	Read only

Tab. 90: Transmitter

3.10.10. Sensor SD Card

3.10.10.1. Sensor SD Card

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6164	Unsigned/2	Installed	Shows status of SD card.	-	0: Sensor SD Card not installed 1: Sensor SD Card installed 2: Sensor SD Card used as mass storage device	Read only
6165	Unsigned/4	Capacity total	Total capacity of installed Sensor SD Card. 0 kB if card is not installed.	- [KB]	-	Read only
6564	String/12	Capacity total	Total capacity of installed Sensor SD Card.	-	-	Read only
6167	Unsigned/4	Capacity available	Free capacity of installed Sensor SD Card. 0 kB if card is not installed.	- [KB]	-	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6570	String/12	Capacity available	Free capacity of in-stalled Sensor SD Card.	-	-	Read only
9499	Unsigned/2	Check disc	Check disc command.	-	1: Execute check disc with repair	Write only
6182	Unsigned/2	Backup	Command to overwrite the existing backup data sets. This ensures that the current sensor serial number and transmitter serial numbers are updated in the backup dataset. This enables the automatic backup.	-	1: Overwrite existing backup files	Write only
6099	Unsigned/2	Restore	Command to restore backup data. Coding is bitwise.	-	Bit 0: Restore sensor setup parameters Bit 1: Restore sensor application setup parameters Bit 2: Restore transmitter application setup parameters Bit 3: Restore customer Transmitter configuration setup parameters Bit 4: Restore totalizers Bit 5: Restore system setup Bit 6: Restore customer Sensor configuration setup parameters	Write only

Tab. 91: Sensor SD Card

3.10.10.2. Data logging

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
11400	Unsigned/2	Enable/ disable	Controls data logging.	0	0: Disabled 1: Enabled	Read/ write
11401	Unsigned/2	Data logging mode	Controls data logging mode.	0	0: Log instantaneous 1: Log average value	Read/ write
11402	Unsigned/4	Logging interval	Defines interval for logging. Granularity is 10 ms.	500 [x 10 ms]	1 - 8640000	Read/ write
11404	Unsigned/2	Register 1	Modbus register that defines the parameter to be logged. Only parameter of type float or unsigned can be logged. 65535: No logging	65535	-	Read/ write
11405	Unsigned/2	Register 2	Modbus register that defines the parameter to be logged. Only parameter of type float or unsigned can be logged.	11405	Unsigned/2	Register 2
…						
11493	Unsigned/2	Register 90	Modbus register that defines the parameter to be logged. Only parameter of type float or unsigned can be logged.	11493	Unsigned/2	Register 90

Tab. 92: Data logging

3.10.11. Simulation

3.10.11.1. Inputs and outputs

Channel 2 output current

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8825	Unsigned/2	Simulation	Enables or disables simulation of channel 2 output current.	0	0: Disabled 1: Enabled	Read/write
8826	Float/4	Simulated value	Current value that is output on the channel when simulation is enabled.	0 [mA]	0 - 25	Read/write

Tab. 93: Channel 2 output current

Channel 2 output status

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8864	Unsigned/2	Simulation	Enables or disables simulation of channel 2 output status.	0	0: Disabled 1: Enabled	Read/write
8865	Unsigned/2	Simulated value	Signal level that is output on the channel when simulation is enabled.	0	0, 1	Read/write

Tab. 94: Channel 2 output status

Channel 2 output frequency

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8905	Unsigned/2	Simulation	Enables or disables simulation of channel 2 output frequency.	0	0: Disabled 1: Enabled	Read/ write
8906	Float/4	Simulated value	Frequency value that is output on the channel when simulation is enabled.	1.0 [Hz]	0.0 - 12500.0	Read/ write

Tab. 95: Channel 2 output frequency

Channel 2 output pulse

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8973	Unsigned/2	Simulation	Enables or disables simulation of channel 2 output pulses.	0	0: Disabled 1: Enabled	Read/ write
8978	Float/4	Simulated value	Pulse frequency value that is output on the channel when simulation is enabled.	0.0 [pulses/s]	0.0 - 12500.0	Read/ write

Tab. 96: Channel 2 output pulse

Channel 3 output current

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9125	Unsigned/2	Simulation	Enables or disables simulation of channel 3 output current.	0	0: Disabled 1: Enabled	Read/ write
9126	Float/4	Simulated value	Current value that is output on the channel when simulation is enabled.	0 [mA]	0.0 - 12500.0	Read/ write

Tab. 97: Channel 3 output current

Channel 3 output status

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9164	Unsigned/2	Simulation	Enables or disables simulation of channel 3 output status.	0	0: Disabled 1: Enabled	Read/ write
9165	Unsigned/2	Simulated value	Signal level that is output on the channel when simulation is enabled.	0	0, 1	Read/ write

Tab. 98: Channel 3 output status

Channel 3 output frequency

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9205	Unsigned/2	Simulation	Enables or disables simulation of channel 3 output frequency.	0	0: Disabled 1: Enabled	Read/ write
9206	Float/4	Simulated value	Frequency value that is output on the channel when simulation is enabled.	1.0 [Hz]	0.0 - 12500.0	Read/ write

Tab. 99:Channel 3 output frequency

Channel 3 output pulse

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9273	Unsigned/2	Simulation	Enables or disables simulation of channel 3 output pulses.	0	0: Disabled 1: Enabled	Read/ write
9278	Float/4	Simulated value	Pulse frequency value that is output on the channel when simulation is enabled.	0.0 [pulses/s]	0.0 - 12500.0	Read/ write

Tab. 100: Channel 3 output pulse

Channel 3 input current

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10505	Unsigned/2	Simulation	Enables or disables simulation of channel 3 output current.	0	0: Disabled 1: Enabled	Read/ write
10506	Float/4	Simulated value	Current value that is output on the channel when simulation is enabled.	0 [mA]	0 - 25	Read/ write

Tab. 101: Channel 3 input current

Channel 3 discrete input signal

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9136	Unsigned/2	Simulation	Enables or disables simulation of channel 3 discrete input signal.	0	0: Disabled 1: Enabled	Read/ write
9137	Unsigned/2	Simulated value	Signal level that that substitutes the input signal on the channel when simulation is enabled.	0	0, 1	Read/ write

Tab. 102: Channel 3 discrete input signal

Channel 4 output current

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9325	Unsigned/2	Simulation	Enables or disables simulation of channel 4 output current.	0	0: Disabled 1: Enabled	Read/ write
9326	Float/4	Simulated value	Current value that is output on the channel when simulation is enabled.	0 [mA]	0 - 25	Read/ write

Tab. 103: Channel 4 output current

Channel 4 output status

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9364	Unsigned/2	Simulation	Enables or disables simulation of channel 4 output status.	0	0: Disabled 1: Enabled	Read/write
9365	Unsigned/2	Simulated value	Signal level that is output on the channel when simulation is enabled.	0	0, 1	Read/write

Tab. 104: Channel 4 output status

Channel 4 output frequency

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9405	Unsigned/2	Simulation	Enables or disables simulation of channel 4 output frequency.	0	0: Disabled 1: Enabled	Read/write
9406	Float/4	Simulated value	Frequency value that is output on the channel when simulation is enabled.	1.0 [Hz]	0.0 - 12500.0	Read/write

Tab. 105: Channel 4 output frequency

Channel 4 output pulse

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9473	Unsigned/2	Simulation	Enables or disables simulation of channel 4 output pulses.	0	0: Disabled 1: Enabled	Read/write
9478	Float/4	Simulated value	Pulse frequency value that is output on the channel when simulation is enabled.	0.0 [pulses/s]	0.0 - 12500.0	Read/write

Tab. 106: Channel 4 output pulse

Channel 4 input current

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
10605	Unsigned/2	Simulation	Enables or disables simulation of channel 4 output current.	0	0: Disabled 1: Enabled	Read/write
10606	Float/4	Simulated value	Current value that is output on the channel when simulation is enabled.	0 [mA]	0 - 25	Read/write

Tab. 107: Channel 4 input current

Channel 4 discrete input signal

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9336	Unsigned/2	Simulation	Enables or disables simulation of channel 4 discrete input signal.	0	0: Disabled 1: Enabled	Read/write
9337	Unsigned/2	Simulated value	Signal level that that substitutes the input signal on the channel when simulation is enabled.	0	0, 1	Read/write

Tab. 108: Channel 4 discrete input signal

3.10.11.2. Process values

Simulate process values

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
2780	Unsigned/4	Enable simulation	Defines enabling or disabling simulation of multiple process values at a time.	0	Set bit means enabling: Bit 0: Mass flow Bit 1: Density Bit 2: Volume flow Bit 3: Media temperature	Read/write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
7850	Unsigned/2	Enable simulation fraction	Defines enabling or disabling simulation of fraction.	0	Set bit means enabling: Bit 0: Fraction	Read/ write
2764	Float/4	Mass flow	Process mass flow simulation value.	0 [kg/s]	-1023 - 1023	Read/ write
2766	Float/4	Density	Process density simulation value.	1000 [kg/m^3]	-32767 - 32767	Read/ write
2768	Float/4	Media temperature	Process media temperature simulation value.	0 [°C]	-50 - 200	Read/ write
2772	Float/4	Process volume flow	Process volume flow simulation value.	0 [m^3/s]	0,2499 – 0,2499	Read/ write
7851	Float/4	Fraction A%	Fraction A % simulation value.	0 [%]	0 - 100	Read/ write
7853	Float/4	Fraction B%	Fraction B % simulation value.	0 [%]	0 - 100	Read/ write

Tab. 109: Channel 2 output current

3.10.11.3. Alarms

Simulate alarms

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6229	Unsigned/2	Simulation mode	Defines mode of alarm simulation.	0	0: Off 1: Simulate alarm item 2: Simulate alarm class	Read/ write
6230	Unsigned/4	Alarm items 1	Bitwise enabling of alarms in alarm items 1. Set bit means alarm item simulation activated. See Alarm items (Page 133).	0	-	Read/ write
6232	Unsigned/4	Alarm items 2	Bitwise enabling of alarms in alarm items 2. Set bit means alarm item simulation activated. See Alarm items (Page 133).	0	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6236	Unsigned/4	Alarm items 4	Bitwise enabling of alarms in alarm items 4. Set bit means alarm item simulation activated. See Alarm items (Page 133).	0	-	Read/ write
6238	Unsigned/4	Alarm items 5	Bitwise enabling of alarms in alarm items 5. Set bit means alarm item simulation activated. See Alarm items (Page 133).	0	-	Read/ write
6240	Unsigned/4	Alarm items 6	Bitwise enabling of alarms in alarm items 6. Set bit means alarm item simulation activated. See Alarm items (Page 133).	0	-	Read/ write
6242	Unsigned/4	Alarm items 7	Bitwise enabling of alarms in alarm items 7. Set bit means alarm item simulation activated. See Alarm items (Page 133).	0	-	Read/ write
6244	Unsigned/4	Alarm items 8	Bitwise enabling of alarms in alarm items 8. Set bit means alarm item simulation activated. See Alarm items (Page 133).	0	-	Read/ write
7032	Unsigned/4	Alarm items 9	Bitwise enabling of alarms in alarm items 9.Set bit means alarm item simulation activated. See Alarm items (Page 133).	0	-	Read/ write

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6247	Unsigned/2	Alarm class	Bit encoded selection of alarm classes. Applicable if simula-tion mode = 2. Set bit means alarm class simulation activated: Bit 0: Process value alarm (PA) Bit 1: Process value warning (PW) Bit 2: Maintenance alarm (MA) Bit 3: Maintenance warning (MW) Bit 4: Maintenance required (MR) Bit 5: Function check (FC)	0	0 - 63	Read/ write
6249	Unsigned/2	NAMUR status	Bit encoded selection of NAMUR status sig-nals. Applicable if simulation mode = 2. Set bit means NAMUR status signal simula-tion activated: Bit 0: Out of specifica-tion (PA, PW) Bit 1: Failure (MW) Bit 2: Maintenance required (MR, MD) Bit 3: Function check (FC)	0	0 - 15	Read/ write

Tab. 110: Simulate alarms

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3.10.12. Audit trail

3.10.12.1. Operating time

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6160	Unsigned/4	Operating time total	Operating time of the transmitter.	- [h]	-	Read only
6162	Unsigned/4	Operating time	Operating time of the transmitter since last startup.	- [h]	-	Read only

Tab. 111: Operating time

3.10.12.2. Parameter change log

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6650	Unsigned/2	Newest entry number	Entry number of new-est entry. Older entries have a smaller entry number. (Wrap around for 0 - 100).	-	-	Read only
6651	Unsigned/2	Available entries	Current number of available parameter change log entries.	-	-	Read only
6652	Unsigned/2	Clear parameter change log	Command to clear the parameter change log.	-	0: Cancel 1: Clear log	Write only
6750	Unsigned/2	Entry number	Selection of the entry number.	-	0 - 100	Read/ write
6751	String/16	Time stamp	Time stamp of the parameter change log entry specified by Entry number. Format is YYYY-MM-DD hh-mm.	-	-	Read only
10832	String/32	Time stamp	Time stamp of the parameter change log entry specified by Entry number. Format is YYYY-MM-DD hh-mm-ss.	-	-	Read only
6759	Unsigned/2	Modbus register	Modbus register specified by Entry number.	-	-	Read only

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6760	Unsigned/2	Data type	Data type of Modbus register specified by Entry number.	-	0: No entry 1: Unsigned8 2: Unsigned16 3: Unsigned32 4: Float32 5: String	Read only
6761	Unsigned/2	Old value unsigned8	Parameter value of type unsigned8 before modification.	-	-	Read only
6762	Unsigned/2	Old value unsigned16	Parameter value of type unsigned16 before modification.	-	-	Read only
6763	Unsigned/4	Old value unsigned32	Parameter value of type unsigned32 before modification.	-	-	Read only
6765	Float/4	Old value float	Parameter value of type float before modification. (Unit is corresponding default unit).	-	-	Read only
6767	String/32	Old value string	Parameter value of type string before modification.	-	-	Read only
6783	Unsigned/2	New value unsigned8	Parameter value of type unsigned8 after modification.	-	-	Read only
6784	Unsigned/2	New value unsigned16	Parameter value of type unsigned16 after modification	-	-	Read only
6785	Unsigned/4	New value unsigned32	Parameter value of type unsigned32 after modification.	-	-	Read only
6787	Float/4	New value float	Parameter value of type float after modification. (Unit is corresponding default unit. See Units (Page 26)	-	-	Read only
6789	String/32	New value string	Parameter value of type string after modification.	-	-	Read only
6805	Unsigned/2	Initiator	Host that initiated the parameter change.	-	1: Transmitter internal 2: Communi-cation channel 3: Local display 4: USB	Read only

Tab. 112: Parameter change log

3.10.12.3. FW update change log

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
6900	Unsigned/2	Newest entry number	Entry number of new-est entry. Older entries have a smaller entry number. (Wrap around for 0 - 100).	-	-	Read only
6981	Unsigned/2	Entry number	Selection of the entry number.	-	0 - 20	Read/ write
6919	String/16	Time stamp	Time stamp of the parameter change log entry specified by Entry number. Format is YYYY-MM-DD hh-mm.	-	-	Read only
6927	String/16	Version	Version string speci-fied by Entry number.	-	-	Read only
6952	Unsigned/2	Available entries	Current number of available firmware updates log entries.	-	-	Read only
6953	Unsigned/2	Clear parameter change log	Command to clear the parameter change log.	-	0: Cancel 1: Clear log	Write only (Expert)

Tab. 113: FW update change log

3.10.12.4. Device reset

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
700	Unsigned/2	Set to default	Command to set all changeable parameters to their defined values.	0	0: Command not running/ command done 1: Reset parameters	Write only
6000	Unsigned/2	Restart device	Command to restart device.	-	0: Command not running/ command done 1: Restart device	Write only

Tab. 114: Device reset

3.10.13. Communication

3.10.13.1. Service channel

Service channel

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
9594	Unsigned/2	USB mode	Returns the USB mode.	-	0: USB commu-nication 1: Mass storage device (MSD)	Read only
9595	Unsigned/2	Auto mode	Automatically connected as MSD when USB cable is plugged.	-	0: Disabled 1: Enabled	Read/write
9596	Unsigned/2	MSD connect	Command to connect/disconnect to PC.	-	0: Cancel 1: Connect 2: Disconnect	Write only

Tab. 115: Service channel

3.10.14. Security

3.10.14.1. Access management

Modbus register	Data type / Size in bytes	Parameter	Description	Default value [units] (units register)	Value range / Setting options	Access level
8292	Unsigned/2	User PIN	Input of user PIN.	-	-	Write only
8293	Unsigned/2	Expert PIN	Input of expert PIN.	-	-	Write only
8294	Unsigned/2	Access level	Granted access level.	-	16: Read only 32: User privilege 64: Expert privilege	Read only
6169	Unsigned/2	New user PIN	Input to change user PIN.	-	-	Write only
6170	Unsigned/2	New expert PIN	Input to change expert PIN.	-	-	Write only (Expert)
7326	Unsigned/2	Unique ID code	Unique ID code needed to request a PUK from customer support.	-	-	Read only
6177	Unsigned/2	PUK	PUK to reset all PINs to default values.	-	-	Write only

Tab. 116: Access management

4. Listings

4.1. List of Figures

4.2. List of Tables

5. Subject catalog

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