

## IO-Link Interface Description

SMF320

EN



## Device variant

<p><b>SMF320</b> <b>Magnetic-inductive flow meter, 0.30...45.00 m<sup>3</sup>/h</b></p>		
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Vendor ID	310 / Bytes 1-54 (hex: 01-36)
Device ID	1789 / Bytes 0-6-253 (hex: 00-06-FD)
Bit rate	COM3
Minimum cycle time	1,9 ms
SIO mode supported	Yes
Block parameterization	Yes
Data storage	Yes
Supported profiles	27 / hex: 0x1B SSP 4.3.4 - Measuring and Switching Sensor, floating point, 4 channel 48 / hex: 0x30 BLOB, Binary Large Objects 16384 / hex: 0x4000 Identification and Diagnosis 32783 / hex: 0x800F Sensor control wide 32788 / hex: 0x8014 Quantity detection 33025 / hex: 0x8101 Locator 33026 / hex: 0x8102 ProductURI



### NOTE:

If the Vendor ID and Device ID are specified in your PLC system, it is ensured that

- the correct device is connected,
- the IO-Link data storage is enabled,
- your application is still able to function, even if your device is replaced by a successor model at a later date



For the process value update rate, as well as further information regarding sensor performance, see data sheet.



## Unit conversion

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This list provides conversion formulas to convert the transmitted IO-Link raw data into physical units.

### Totaliser

Value in [m <sup>3</sup> ]	= Transferred value	* 1
Value in [hl]	= Transferred value	* 10
Value in [L]	= Transferred value	* 1000

### Flow

Value in [m <sup>3</sup> /h]	= Transferred value	* 1
Value in [m/s]	= Transferred value	* 0.138889 + -0.0528
Value in [m <sup>3</sup> /min]	= Transferred value	* 0.0166667
Value in [hl/h]	= Transferred value	* 10
Value in [hl/min]	= Transferred value	* 0.166667
Value in [L/h]	= Transferred value	* 1000
Value in [L/min]	= Transferred value	* 16.6667
Value in [μS/cm]	= Transferred value	* 10000
Value in [mS/cm]	= Transferred value	* 10
Value in [S/m]	= Transferred value	* 1



## Process data

Process data input		RecordT (144 Bit)
<b>Totaliser</b>		Float32T
Quantity meter which continuously totals the volumetric flow since the last reset		
Value range [m <sup>3</sup> ]	(-999999.999999 to 999990.0) * 1 3.30E38	(NoData)
<b>Flow</b>		Float32T
Current flow		
Value range [m <sup>3</sup> /h]	(-54.0 to 54.0) * 1 -2.65E38 2.65E38 3.30E38	(UL - underload) (OL - overload) (NoData)
<b>Temperature</b>		Float32T
Current temperature		
Value range [°C]	(-20.0 to 150.0) * 1 -2.65E38 2.65E38 3.30E38	(UL - underload) (OL - overload) (NoData)
<b>Conductivity</b>		Float32T
Current conductivity value		
Value range [s/m]	(0.0 to 10.0) * 1 3.30E38	(NoData)
<b>Device Status</b>		UIntegerT (4 Bit)
Current device status, a copy of the parameter [Device Status, Index 36] in the process data channel		
Value range	0 1 2 3 4	(Device is OK) (Maintenance required) (Out of specification) (Functional check) (Failure)
<b>SSC4.2 / COND</b>		BooleanT
Current status of the digital signal [SSC4.2 / COND]		
Value range	false true	(OFF) (On)
<b>SSC4.1 / COND</b>		BooleanT
Current status of the digital signal [SSC4.1 / COND]		
Value range	false true	(OFF) (On)
<b>SSC3.2 / TEMP</b>		BooleanT
Current status of the digital signal [SSC3.2 / TEMP]		
Value range	false true	(OFF) (On)
<b>SSC3.1 / TEMP</b>		BooleanT
Current status of the digital signal [SSC3.1 / TEMP]		
Value range	false true	(OFF) (On)
<b>SSC2.2 / FLOW</b>		BooleanT
Current status of the digital signal [SSC2.2 / FLOW]		
Value range	false true	(OFF) (On)
<b>SSC2.1 / FLOW</b>		BooleanT
Current status of the digital signal [SSC2.1 / FLOW]		
Value range	false true	(OFF) (On)
<b>SSC1.2 / TOTL</b>		BooleanT



## Process data

Current status of the digital signal [SSC1.2 / TOTL]

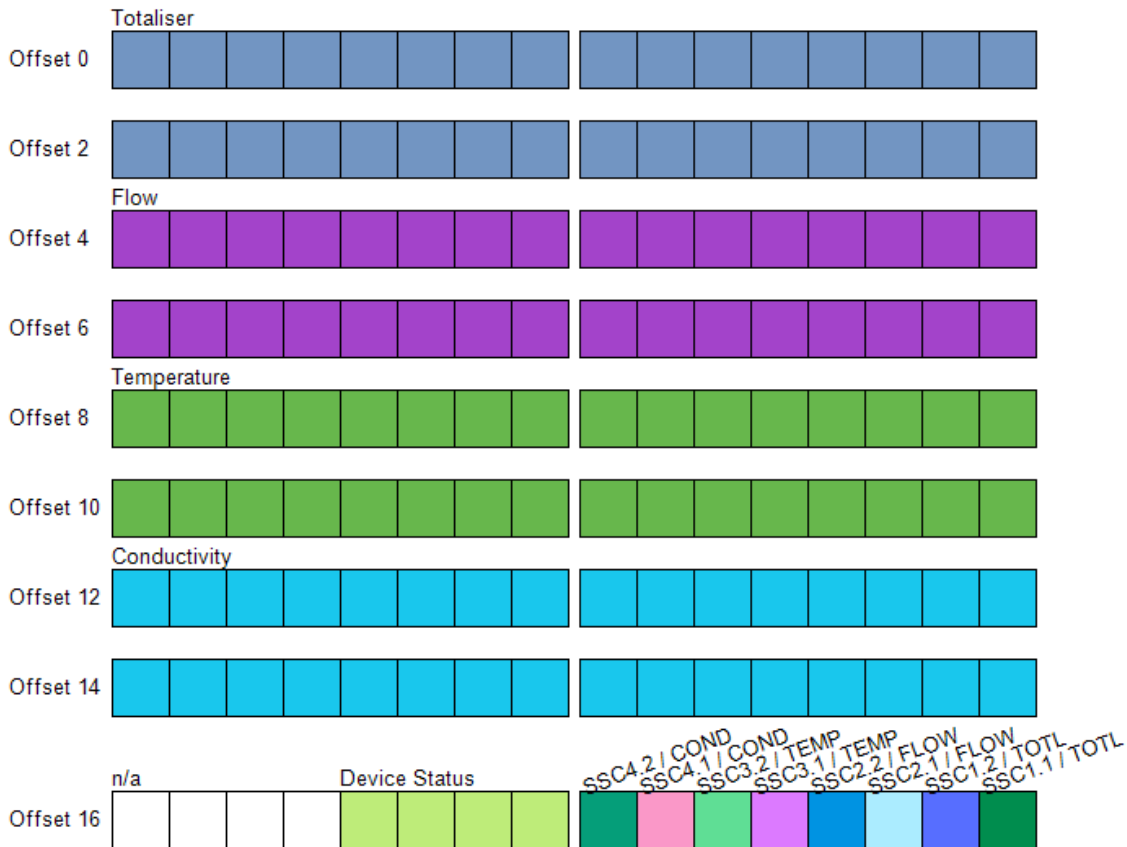
Value range	false	(OFF)
	true	(On)

SSC1.1 / TOTL

BooleanT

Current status of the digital signal [SSC1.1 / TOTL]

Value range	false	(OFF)
	true	(On)

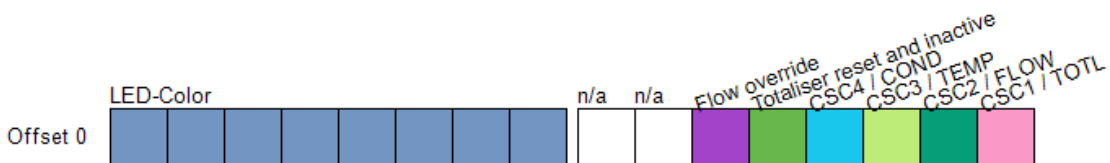


Data is transmitted in BigEndian format.  
 The position of the process data bytes is shown according to the device transmission sequence.  
 The content of your PLCs input buffer may vary according to your PLCs data format.  
 Please do not apply any byte swap feature.  
 Example function blocks incl. documentation are available on [www.ifm.com](http://www.ifm.com) --> Startup Packages



## Process data

Process data output		RecordT (16 Bit)
<b>LED-Color</b>		UIntegerT (8 Bit)
LED-Color controls the color of the LED, if LED mode is set to 'PDOOUT'		
Value range	0 1 2 4 6	(OFF / Off) (Blue / Blue) (Green / Green) (Red / Red) (Yellow / Yellow)
<b>Flow override</b>		BooleanT
Sets the digital signal [FlowOverride]		
Value range	false true	(OFF) (On)
<b>Totaliser reset and inactive</b>		BooleanT
Sets the digital signal [TotaliserInactive]		
Value range	false true	(OFF) (On)
<b>CSC4 / COND</b>		BooleanT
Sets the digital signal [CSC4 / COND]		
Value range	false true	(OFF) (On)
<b>CSC3 / TEMP</b>		BooleanT
Sets the digital signal [CSC3 / TEMP]		
Value range	false true	(OFF) (On)
<b>CSC2 / FLOW</b>		BooleanT
Sets the digital signal [CSC2 / FLOW]		
Value range	false true	(OFF) (On)
<b>CSC1 / TOTL</b>		BooleanT
Sets the digital signal [CSC1 / TOTL]		
Value range	false true	(OFF) (On)





## Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
Device Access Locks	12		RecordT (16 Bit)	false (Unlocked)	17
Local Parameterizat...	12		BooleanT		
Vendor name	16		StringT (19 Byte)	ifm electronic gmbh	16
Vendor text	17		StringT (11 Byte)	www.ifm.com	16
Product Name	18		StringT (6 Byte)	SMF320	16
Product ID	19		StringT (6 Byte)	SMF320	16
Product Text	20		StringT (29 Byte)	Magnetic inductive flow meter	16
Serial Number	21		StringT (12 Byte)		16
Hardware Revision	22		StringT (2 Byte)		16
Firmware Revision	23		StringT (5 Byte)		16
Application-specific Tag	24		StringT (32 Byte)	***	16
Function Tag	25		StringT (32 Byte)	***	16
Location Tag	26		StringT (32 Byte)	***	16
Product URI	27		StringT (100 Byte)		16
Device Status	36		UIntegerT (8 Bit)	0 (Device is OK)	39
Detailed Device Status	37		OctetStringT (3 Byte) [17]	0x00,0x00,0x00	39
Process data input	40		RecordT (144 Bit)		4
Totaliser	40		Float32T		4
Flow	40		Float32T		4
Temperature	40		Float32T		4
Conductivity	40		Float32T		4
Device Status	40		UIntegerT (4 Bit)		4
SSC4.2 / COND	40		BooleanT		4
SSC4.1 / COND	40		BooleanT		4
SSC3.2 / TEMP	40		BooleanT		4
SSC3.1 / TEMP	40		BooleanT		4
SSC2.2 / FLOW	40		BooleanT		4
SSC2.1 / FLOW	40		BooleanT		4
SSC1.2 / TOTL	40		BooleanT		4
SSC1.1 / TOTL	40		BooleanT		5
Process data output	41		RecordT (16 Bit)		6
LED-Color	41		UIntegerT (8 Bit)		6
Flow override	41		BooleanT		6
Totaliser reset and...	41		BooleanT		6
CSC4 / COND	41		BooleanT		6
CSC3 / TEMP	41		BooleanT		6
CSC2 / FLOW	41		BooleanT		6
CSC1 / TOTL	41		BooleanT		6
BLOB ID	49		IntegerT (16 Bit)	0 (Idle / Idle)	17
Teach Select	58		UIntegerT (8 Bit)		17
Teach Result	59		RecordT (8 Bit)		17
State	59		UIntegerT (4 Bit)		17
SSC1.1 Param	60		RecordT (64 Bit)		17
SP1	60	1	Float32T	250000.0	17
SP2	60	2	Float32T	230000.0	17



## Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
SSC1.1 Config	61		RecordT (48 Bit)		18
Logic	61	1	UIntegerT (8 Bit)	0 (High active)	18
Mode	61	2	UIntegerT (8 Bit)	3 (Two point)	18
Hyst	61	3	Float32T	0.0	18
SSC1.2 Param	62		RecordT (64 Bit)		18
SP1	62	1	Float32T	250000.0	18
SP2	62	2	Float32T	230000.0	18
SSC1.2 Config	63		RecordT (48 Bit)		18
Logic	63	1	UIntegerT (8 Bit)	0 (High active)	18
Mode	63	2	UIntegerT (8 Bit)	3 (Two point)	18
Hyst	63	3	Float32T	0.0	19
SSC1.1 Delay	320		RecordT (64 Bit)		19
Switching delay	320	1	Float32T	0.0	19
Reset delay	320	2	Float32T	0.0	19
SSC1.2 Delay	321		RecordT (64 Bit)		19
Switching delay	321	1	Float32T	0.0	19
Reset delay	321	2	Float32T	0.0	19
SSC2.1 Delay	324		RecordT (64 Bit)		19
Switching delay	324	1	Float32T	0.0	19
Reset delay	324	2	Float32T	0.0	19
SSC2.2 Delay	325		RecordT (64 Bit)		20
Switching delay	325	1	Float32T	0.0	20
Reset delay	325	2	Float32T	0.0	20
SSC3.1 Delay	328		RecordT (64 Bit)		20
Switching delay	328	1	Float32T	0.0	20
Reset delay	328	2	Float32T	0.0	20
SSC3.2 Delay	329		RecordT (64 Bit)		20
Switching delay	329	1	Float32T	0.0	20
Reset delay	329	2	Float32T	0.0	20
SSC4.1 Delay	332		RecordT (64 Bit)		20
Switching delay	332	1	Float32T	0.0	20
Reset delay	332	2	Float32T	0.0	20
SSC4.2 Delay	333		RecordT (64 Bit)		21
Switching delay	333	1	Float32T	0.0	21
Reset delay	333	2	Float32T	0.0	21
SSC Counter	349		RecordT (256 Bit)		21
SSC1.1 TOTL	349	1	IntegerT (32 Bit)	0	21
SSC1.2 TOTL	349	2	IntegerT (32 Bit)	0	21
SSC2.1 FLOW	349	3	IntegerT (32 Bit)	0	21
SSC2.2 FLOW	349	4	IntegerT (32 Bit)	0	21
SSC3.1 TEMP	349	5	IntegerT (32 Bit)	0	21
SSC3.2 TEMP	349	6	IntegerT (32 Bit)	0	21
SSC4.1 COND	349	7	IntegerT (32 Bit)	0	22
SSC4.2 COND	349	8	IntegerT (32 Bit)	0	22
Serial No tube	399		StringT (16 Byte)		16



## Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
P-n	500		UIntegerT (8 Bit)	0 (PnP)	13
SEL2	521		UIntegerT (8 Bit)	2 (FLOW)	22
dFU1	524		UIntegerT (8 Bit)	6 (Flow direction)	22
dFU2	525		UIntegerT (8 Bit)	6 (Flow direction)	22
FOU2	532		UIntegerT (8 Bit)	4 (OFF)	22
Operating hours	542		IntegerT (32 Bit)	0	39
Internal temperature	543		Float32T		43
Active Events	545		RecordT (32 Bit)		39
Bit_31	545		BooleanT		39
Bit_30	545		BooleanT		39
Bit_24	545		BooleanT		39
Bit_23	545		BooleanT		39
Bit_22	545		BooleanT		39
Bit_18	545		BooleanT		39
Bit_17	545		BooleanT		39
Bit_16	545		BooleanT		39
Bit_15	545		BooleanT		39
Bit_14	545		BooleanT		39
Bit_12	545		BooleanT		39
Bit_9	545		BooleanT		39
Bit_8	545		BooleanT		39
Bit_5	545		BooleanT		39
Bit_2	545		BooleanT		39
Bit_1	545		BooleanT		39
Bit_0	545		BooleanT		40
Param configuration fault	546		UIntegerT (32 Bit) [10]	0 (OK)	42
Loc	550		UIntegerT (8 Bit)	1 (uLoc)	22
Hi.F	562		Float32T		22
Lo.F	563		Float32T		23
Hi.T	564		Float32T		23
Lo.T	565		Float32T		23
Hi.C	566		Float32T		23
Lo.C	567		Float32T		23
S.On	570		UIntegerT (8 Bit)	0 (OFF)	23
S.Tim	571		UIntegerT (8 Bit)	2 (3 min)	23
S.FLW	573		Float32T	22.5	24
S.TMP	574		Float32T	65	24
S.CND	575		Float32T	5	24
S.DIAG	576		UIntegerT (8 Bit)	0 (OK)	24
ou1	580		UIntegerT (8 Bit)	9 (ImP / Impulse output)	24
ou2	590		UIntegerT (8 Bit)	1 (I / Analog signal 4...20 mA)	24
ASP2 - FLOW	632		Float32T	0	24
AEP2 - FLOW	633		Float32T	11	25
ASP2 - TEMP	634		Float32T	-20	25
AEP2 - TEMP	635		Float32T	150	25



## Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
ASP2 - COND	636		Float32T	0	25
AEP2 - COND	637		Float32T	10	25
DIn2	676		UIntegerT (8 Bit)	2 (+EDG)	25
Rate ECO	702		IntegerT (16 Bit)	60	25
diS.U	800		UIntegerT (8 Bit)	1 (d2 / medium)	25
diS.R	801		UIntegerT (8 Bit)	0 (0 °)	26
diS.B	802		UIntegerT (8 Bit)	50 (50 %)	26
diS.L	803		UIntegerT (8 Bit)	0 (L1)	26
Eco-Mode	805		UIntegerT (8 Bit)	0 (OFF / Device works with full performn...	26
diS.B ECO	806		UIntegerT (8 Bit)	25 (25 %)	26
LED-Mode ECO	807		UIntegerT (8 Bit)	9 (Notification)	26
coL.F	811		UIntegerT (8 Bit)	16 (bk/wh / Value black and white)	27
coL.T	812		UIntegerT (8 Bit)	16 (bk/wh / Value black and white)	27
coL.C	813		UIntegerT (8 Bit)	16 (bk/wh / Value black and white)	27
Installation date	834		StringT (32 Byte)		16
Date and Time	835		TimeT		13
Time format	836		UIntegerT (8 Bit)		13
Set the time	837		UIntegerT (8 Bit)	0 (no)	13
uni.F	841		UIntegerT (8 Bit)	5 (m³/h)	13
uni.C	843		UIntegerT (8 Bit)	0 (µS/cm)	13
cFL.F	861		Float32T	0.3	27
cFL.T	862		Float32T	-20	27
cFL.C	863		Float32T	0.01	27
cFH.F	871		Float32T	45	27
cFH.T	872		Float32T	150	27
cFH.C	873		Float32T	10	28
dAP.F	880		Float32T	0.6	28
LanG	923		UIntegerT (8 Bit)	0 (EN)	13
Power supply voltage	940		Float32T		39
Loop current 2	944		Float32T		39
LED mode	1400		UIntegerT (8 Bit)	8 (On / LED on by default / yellow for w...	28
LED-Color	1401		UIntegerT (8 Bit)	0 (OFF / Off)	28
T.Cmp	1606		Float32T	2.1	28
Signal_Quality	2002		UIntegerT (16 Bit)	1 (Normal)	42
rEF.T	3001		Float32T	25	28
LFC - FLOW	3006		Float32T	0.3	28
FPro1	3011		UIntegerT (8 Bit)	1 (0+)	29
Fdir	3012		UIntegerT (8 Bit)	0 (+)	29
rTo1	3015		IntegerT (16 Bit)	0 (OFF)	29
Vol.1	3017		RecordT (96 Bit)		29
Value	3017	1	Float32T		29
Memory	3017	2	Float32T		29
Time	3017	3	IntegerT (32 Bit)		30
FPro2	3021		UIntegerT (8 Bit)	1 (0+)	30
rTo2	3025		IntegerT (16 Bit)	0 (OFF)	30



## Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
Vol.2	3027		RecordT (96 Bit)		30
Value	3027	1	Float32T		30
Memory	3027	2	Float32T		30
Time	3027	3	IntegerT (32 Bit)		31
CGA - FLOW	3030		Float32T	100	31
CGA - COND	3032		Float32T	100	31
Lifetime Totaliser	3050		RecordT (64 Bit)		31
Predominated volume	3050	1	Float32T		31
Non predominated vo...	3050	2	Float32T		31
ImPR1	3060		UIntegerT (8 Bit)	1 (YES)	31
ImPS1 - TOTL	3065		Float32T	0.000002	31
ImPR2	3160		UIntegerT (8 Bit)	1 (YES)	31
ImPS2 - TOTL	3165		Float32T	0.000002	31
FD.On	3201		UIntegerT (8 Bit)	0 (OFF)	13
Value shown on Display	3909		RecordT (32 Bit)		32
Tile 1	3909	1	UIntegerT (8 Bit)	0 (FLOW / Flow)	32
Tile 2	3909	2	UIntegerT (8 Bit)	2 (TOTL / Totaliser)	32
Tile 3	3909	3	UIntegerT (8 Bit)	1 (TEMP / Temperature)	32
Tile 4	3909	4	UIntegerT (8 Bit)	4 (COND)	32
coF - FLOW	5007		Float32T	0	32
coF - COND	5009		Float32T	0	32
SSC2.1 Param	16396		RecordT (64 Bit)		32
SP1	16396	1	Float32T	11.25	32
SP2	16396	2	Float32T	10.35	33
SSC2.1 Config	16397		RecordT (48 Bit)		33
Logic	16397	1	UIntegerT (8 Bit)	0 (High active)	33
Mode	16397	2	UIntegerT (8 Bit)	3 (Two point)	33
Hyst	16397	3	Float32T	0.0	33
SSC2.2 Param	16398		RecordT (64 Bit)		33
SP1	16398	1	Float32T	11.25	33
SP2	16398	2	Float32T	10.35	33
SSC2.2 Config	16399		RecordT (48 Bit)		33
Logic	16399	1	UIntegerT (8 Bit)	0 (High active)	33
Mode	16399	2	UIntegerT (8 Bit)	3 (Two point)	34
Hyst	16399	3	Float32T	0.0	34
SSC3.1 Param	16412		RecordT (64 Bit)		34
SP1	16412	1	Float32T	22.5	34
SP2	16412	2	Float32T	19.1	34
SSC3.1 Config	16413		RecordT (48 Bit)		34
Logic	16413	1	UIntegerT (8 Bit)	0 (High active)	34
Mode	16413	2	UIntegerT (8 Bit)	3 (Two point)	34
Hyst	16413	3	Float32T	0.0	34
SSC3.2 Param	16414		RecordT (64 Bit)		35
SP1	16414	1	Float32T	22.5	35
SP2	16414	2	Float32T	19.1	35



## Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
SSC3.2 Config	16415		RecordT (48 Bit)		35
Logic	16415	1	UIntegerT (8 Bit)	0 (High active)	35
Mode	16415	2	UIntegerT (8 Bit)	3 (Two point)	35
Hyst	16415	3	Float32T	0.0	35
SSC4.1 Param	16428		RecordT (64 Bit)		35
SP1	16428	1	Float32T	2.5	35
SP2	16428	2	Float32T	2.3	35
SSC4.1 Config	16429		RecordT (48 Bit)		36
Logic	16429	1	UIntegerT (8 Bit)	0 (High active)	36
Mode	16429	2	UIntegerT (8 Bit)	3 (Two point)	36
Hyst	16429	3	Float32T	0.0	36
SSC4.2 Param	16430		RecordT (64 Bit)		36
SP1	16430	1	Float32T	2.5	36
SP2	16430	2	Float32T	2.3	36
SSC4.2 Config	16431		RecordT (48 Bit)		36
Logic	16431	1	UIntegerT (8 Bit)	0 (High active)	36
Mode	16431	2	UIntegerT (8 Bit)	3 (Two point)	36
Hyst	16431	3	Float32T	0.0	37
MDC Descriptor	16512		RecordT (88 Bit)		37
Lower Value	16512		Float32T	0.000001 ( 0.000001)	37
Upper Value	16512		Float32T	999990.0	37
Unit Code	16512		UIntegerT (16 Bit)	1034 (m³)	37
Scale	16512		IntegerT (8 Bit)	0 (0)	37
MDC2 Descriptor	16513		RecordT (88 Bit)		37
Lower Value	16513		Float32T	0.3	37
Upper Value	16513		Float32T	45.0	37
Unit Code	16513		UIntegerT (16 Bit)	1349 (m³/h)	37
Scale	16513		IntegerT (8 Bit)	0 (0)	38
MDC3 Descriptor	16514		RecordT (88 Bit)		38
Lower Value	16514		Float32T	-20.0	38
Upper Value	16514		Float32T	150.0	38
Unit Code	16514		UIntegerT (16 Bit)	1001 (°C)	38
Scale	16514		IntegerT (8 Bit)	0 (0)	38
MDC4 Descriptor	16515		RecordT (88 Bit)		38
Lower Value	16515		Float32T	0.01	38
Upper Value	16515		Float32T	10.0	38
Unit Code	16515		UIntegerT (16 Bit)	1299 (s/m)	38
Scale	16515		IntegerT (8 Bit)	0 (0)	38



## Basic settings

P-n	Index 500	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Output polarity for the switching outputs.				
<b>Factory setting</b>	<b>0</b>	<b>(PnP)</b>		
Value range	0 1	(PnP) (nPn)		
Date and Time	Index 835	Subindex 0	TimeT	ReadWrite
Displays the device clock.				
Time format	Index 836	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Switches the local user interface from 24h to 12h format.				
Value range	0 1	(24 h) (12 h)		
Set the time	Index 837	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Yes sets the clock to the edited value.				
<b>Factory setting</b>	<b>0</b>	<b>(no)</b>		
Value range	0 1	(no) (yes)		
uni.F	Index 841	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Selection of flow unit.				
<b>Factory setting</b>	<b>5</b>	<b>(m³/h)</b>		
Value range	0 1 2 3 4 5 6	(l/min) (l/h) (hl/min) (hl/h) (m³/min) (m³/h) (m/s)		
uni.C	Index 843	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Selection of conductivity unit.				
<b>Factory setting</b>	<b>0</b>	<b>(µS/cm)</b>		
Value range	0 1 2	(µS/cm) (mS/cm) (S/m)		
Lang	Index 923	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Select device menu language.				
<b>Factory setting</b>	<b>0</b>	<b>(EN)</b>		
Value range	1 0 3 2 4 5 9 6 7	(DE) (EN) (FR) (IT) (ES) (PT) (ZH) (JA) (KO)		
FD.On	Index 3201	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Fluid detection.				
<b>Factory setting</b>	<b>0</b>	<b>(OFF)</b>		
Value range	1 0	(On) (OFF)		



## System Command



Command interface for applications. A positive acknowledge indicates the complete and correct finalization of the requested function.

System Command information:

- Address: Index 2, Subindex 0
- Datatype: UInteger (8 Bit)
- AccessRight: Write Only

#	Text	Description
1	Upload Start	Start block parameter upload
2	Upload End	End block parameter upload
3	Download Start	Start block parameter download
4	Download End	Stop block parameter download
5	Store	Finalize block parameterization and start Data Storage
6	Break	Cancel block parameterization
65	Teach SP1	Determine setpoint 1 in a single teach procedure.
66	Teach SP2	Determine setpoint 2 in a single teach procedure.
126	Locator Start	The visual indicators of the device are switched to the localization display pattern, which makes it easier to spot a device in an application.
127	Locator Stop	The localization indication pattern is stopped. The optical indicators of the device will show again the device specific states of operation.
129	Application Reset	The parameter of the technology-specific application are set to default values. Identification parameter remain unchanged. An upload to the data storage of the master will be executed, if activated in the port configuration of the master.
131	Back-to-box	The parameter of the device are set to factory default values and communication will be inhibited until the next power cycle. Note: Directly detach the device from the master port!
161	Reset [Hi.F] and [Lo.F] memory	
162	Reset [Lo.F] memory	
163	Reset [Hi.F] memory	
164	Reset Totaliser 1	
165	Reset [Hi.T] and [Lo.T] memory	



## System Command

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166 Reset [Lo.T] memory

167 Reset [Hi.T] memory

175 BLOB-Reset / Event Log

176 Start simulation

177 Stop simulation

208 Reset Totaliser 2

209 Reset [Hi.C] and [Lo.C] memory

210 Reset [Lo.C] memory

211 Reset [Hi.C] memory

228 Reset counter to zero

240 IO-Link 1.1 system test command 240,  
Event 8DFE appears

241 IO-Link 1.1 system test command 241,  
Event 8DFE disappears

242 IO-Link 1.1 system test command 242,  
Event 8DFF appears

243 IO-Link 1.1 system test command 243,  
Event 8DFF disappears



## Identification

<b>Vendor name</b>	<b>Index 16</b>	<b>Subindex 0</b>	<b>StringT (19 Byte)</b>	<b>ReadOnly</b>
The vendor name that is assigned to a Vendor ID.				
<b>Factory setting</b>	<b>ifm electronic gmbh</b>			
<b>Vendor text</b>	<b>Index 17</b>	<b>Subindex 0</b>	<b>StringT (11 Byte)</b>	<b>ReadOnly</b>
Additional information about the vendor.				
<b>Factory setting</b>	<b>www.ifm.com</b>			
<b>Product Name</b>	<b>Index 18</b>	<b>Subindex 0</b>	<b>StringT (6 Byte)</b>	<b>ReadOnly</b>
Complete product name.				
<b>Factory setting</b>	<b>SMF320</b>			
<b>Product ID</b>	<b>Index 19</b>	<b>Subindex 0</b>	<b>StringT (6 Byte)</b>	<b>ReadOnly</b>
Vendor-specific product or type identification (e.g., item number or model number).				
<b>Factory setting</b>	<b>SMF320</b>			
<b>Product Text</b>	<b>Index 20</b>	<b>Subindex 0</b>	<b>StringT (29 Byte)</b>	<b>ReadOnly</b>
Additional product information for the device.				
<b>Factory setting</b>	<b>Magnetic inductive flow meter</b>			
<b>Serial Number</b>	<b>Index 21</b>	<b>Subindex 0</b>	<b>StringT (12 Byte)</b>	<b>ReadOnly</b>
Unique, vendor-specific identifier of the individual device.				
<b>Hardware Revision</b>	<b>Index 22</b>	<b>Subindex 0</b>	<b>StringT (2 Byte)</b>	<b>ReadOnly</b>
Unique, vendor-specific identifier of the hardware revision of the individual device.				
<b>Firmware Revision</b>	<b>Index 23</b>	<b>Subindex 0</b>	<b>StringT (5 Byte)</b>	<b>ReadOnly</b>
Unique, vendor-specific identifier of the firmware revision of the individual device.				
<b>Application-specific Tag</b>	<b>Index 24</b>	<b>Subindex 0</b>	<b>StringT (32 Byte)</b>	<b>ReadWrite</b>
Possibility to mark a device with user- or application-specific information.				
<b>Factory setting</b>	<b>***</b>			
<b>Function Tag</b>	<b>Index 25</b>	<b>Subindex 0</b>	<b>StringT (32 Byte)</b>	<b>ReadWrite</b>
Possibility to mark a device with function-specific information.				
<b>Factory setting</b>	<b>***</b>			
<b>Location Tag</b>	<b>Index 26</b>	<b>Subindex 0</b>	<b>StringT (32 Byte)</b>	<b>ReadWrite</b>
Possibility to mark a device with location-specific information.				
<b>Factory setting</b>	<b>***</b>			
<b>Product URI</b>	<b>Index 27</b>	<b>Subindex 0</b>	<b>StringT (100 Byte)</b>	<b>ReadOnly</b>
Provides a unique instance identification compliant to DIN-SPEC 91406.				
<b>Serial No tube</b>	<b>Index 399</b>	<b>Subindex 0</b>	<b>StringT (16 Byte)</b>	<b>ReadOnly</b>
Serialnumber of measurement tube.				
<b>Installation date</b>	<b>Index 834</b>	<b>Subindex 0</b>	<b>StringT (32 Byte)</b>	<b>ReadWrite</b>
Date of device installation within the plant or machine. Please note: This parameter will not be restored on device replacement. A new installation date must be written to the device after replacement.				



## Parameters

Device Access Locks	Index 12	Subindex 0	RecordT (16 Bit)	ReadWrite
The access to the device parameters can be restricted by setting appropriate flags within this parameter.				
<b>Factory setting</b>	<b>false</b>			
Bit offset 2	Local Parameterization		This lock prevents the device settings from being changed via local operating elements on the device.	
Value range	true		(Locked)	
	false		(Unlocked)	
BLOB ID	Index 49	Subindex 0	IntegerT (16 Bit)	ReadOnly
ID of the BLOB that is currently transferred.				
<b>Factory setting</b>	<b>0</b>	<b>(Idle / Idle)</b>		
Value range	0 -5001 -5006	(Idle / Idle) (Read_Event-Log / Read event log) (Read_Temp_Histogram)		
Teach Select	Index 58	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Selects the switching signal channel for which a teach procedure will be applied.				
Value range	1 2 11 12 21 22 31 32	(SSC1.1 TOTL) (SSC1.2 TOTL) (SSC2.1 FLOW) (SSC2.2 FLOW) (SSC3.1 TEMP) (SSC3.2 TEMP) (SSC4.1 COND) (SSC4.2 COND)		
Teach Result	Index 59	Subindex 0	RecordT (8 Bit)	ReadOnly
Shows the complete result information of the teach procedure including current state and result flags.				
<b>State</b>		<b>Bit offset 0</b>	<b>UIntegerT (4 Bit)</b>	
Indicates the current state of the teach procedure.				
Value range	0 1 2 5 7	(Idle / Idle) (SP1 success) (SP2 success) (Busy / Busy) (Error / Error)		
SSC1.1 Param	Index 60	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 1 of sensor 1.				
<b>SP1</b>		<b>Subindex 1</b>	<b>Float32T</b>	
Defines the setpoint 1 value for the switching signal channel.				
<b>Factory setting</b>	<b>250000.0</b>			
Value range [m <sup>3</sup> ]	(-999990.0 to 999990.0) * 1			
<b>SP2</b>		<b>Subindex 2</b>	<b>Float32T</b>	
Defines the setpoint 2 value for the switching signal channel.				
<b>Factory setting</b>	<b>230000.0</b>			
Value range [m <sup>3</sup> ]	(-999990.0 to 999990.0) * 1			



## Parameters

SSC1.1 Config	Index 61	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 1 of sensor 1.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
<b>Factory setting</b>	<b>0</b>	<b>(High active)</b>		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
<b>Factory setting</b>	<b>3</b>	<b>(Two point)</b>		
Value range	3 0 1 2	(Two point) (Deactivated) (Single point) (Window)		
Hyst		Subindex 3	Float32T	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [m³]	(2000.0 to 100000.0) * 1 0	(Auto)		
SSC1.2 Param	Index 62	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 2 of sensor 1.				
SP1		Subindex 1	Float32T	
Defines the setpoint 1 value for the switching signal channel.				
<b>Factory setting</b>	<b>250000.0</b>			
Value range [m³]	(-999990.0 to 999990.0) * 1			
SP2		Subindex 2	Float32T	
Defines the setpoint 2 value for the switching signal channel.				
<b>Factory setting</b>	<b>230000.0</b>			
Value range [m³]	(-999990.0 to 999990.0) * 1			
SSC1.2 Config	Index 63	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 2 of sensor 1.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
<b>Factory setting</b>	<b>0</b>	<b>(High active)</b>		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
<b>Factory setting</b>	<b>3</b>	<b>(Two point)</b>		
Value range	3 0 1 2	(Two point) (Deactivated) (Single point) (Window)		



## Parameters

SSC1.2 Config	Index 63	Subindex 0	RecordT (48 Bit)	ReadWrite
Hyst		Subindex 3	Float32T	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [m <sup>3</sup> ]	(2000.0 to 100000.0) * 1 0	(Auto)		
SSC1.1 Delay	Index 320	Subindex 0	RecordT (64 Bit)	ReadWrite
Delays for the switching signal channel 1.1.				
Switching delay		Subindex 1	Float32T	
Set delay time for the switching.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
Reset delay		Subindex 2	Float32T	
Set delay time for the reset.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
SSC1.2 Delay	Index 321	Subindex 0	RecordT (64 Bit)	ReadWrite
Delays for the switching signal channel 1.2.				
Switching delay		Subindex 1	Float32T	
Set delay time for the switching.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
Reset delay		Subindex 2	Float32T	
Set delay time for the reset.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
SSC2.1 Delay	Index 324	Subindex 0	RecordT (64 Bit)	ReadWrite
Delays for the switching signal channel 2.1.				
Switching delay		Subindex 1	Float32T	
Set delay time for the switching.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
Reset delay		Subindex 2	Float32T	
Set delay time for the reset.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			



## Parameters

SSC2.2 Delay	Index 325	Subindex 0	RecordT (64 Bit)	ReadWrite
Delays for the switching signal channel 2.2.				
Switching delay		Subindex 1	Float32T	
Set delay time for the switching.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
Reset delay		Subindex 2	Float32T	
Set delay time for the reset.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
SSC3.1 Delay	Index 328	Subindex 0	RecordT (64 Bit)	ReadWrite
Delays for the switching signal channel 3.1.				
Switching delay		Subindex 1	Float32T	
Set delay time for the switching.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
Reset delay		Subindex 2	Float32T	
Set delay time for the reset.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
SSC3.2 Delay	Index 329	Subindex 0	RecordT (64 Bit)	ReadWrite
Delays for the switching signal channel 3.2.				
Switching delay		Subindex 1	Float32T	
Set delay time for the switching.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
Reset delay		Subindex 2	Float32T	
Set delay time for the reset.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
SSC4.1 Delay	Index 332	Subindex 0	RecordT (64 Bit)	ReadWrite
Delays for the switching signal channel 4.1.				
Switching delay		Subindex 1	Float32T	
Set delay time for the switching.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
Reset delay		Subindex 2	Float32T	
Set delay time for the reset.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			



## Parameters

SSC4.2 Delay	Index 333	Subindex 0	RecordT (64 Bit)	ReadWrite
Delays for the switching signal channel 4.2.				
Switching delay		Subindex 1	Float32T	
Set delay time for the switching.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
Reset delay		Subindex 2	Float32T	
Set delay time for the reset.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s]	(0.0 to 50.0) * 1			
SSC Counter	Index 349	Subindex 0	RecordT (256 Bit)	ReadOnly
Available switching signal counters. Counts the SSC transitions from 0 to 1.				
SSC1.1 TOTL		Subindex 1	IntegerT (32 Bit)	
SSC1.1 counter				
<b>Factory setting</b>	<b>0</b>			
Value range	(0 to 2147482880) 2147483644	(NoData) 0x7FFFFFFC		
SSC1.2 TOTL		Subindex 2	IntegerT (32 Bit)	
SSC1.2 counter				
<b>Factory setting</b>	<b>0</b>			
Value range	(0 to 2147482880) 2147483644	(NoData) 0x7FFFFFFC		
SSC2.1 FLOW		Subindex 3	IntegerT (32 Bit)	
SSC2.1 counter				
<b>Factory setting</b>	<b>0</b>			
Value range	(0 to 2147482880) 2147483644	(NoData) 0x7FFFFFFC		
SSC2.2 FLOW		Subindex 4	IntegerT (32 Bit)	
SSC2.2 counter				
<b>Factory setting</b>	<b>0</b>			
Value range	(0 to 2147482880) 2147483644	(NoData) 0x7FFFFFFC		
SSC3.1 TEMP		Subindex 5	IntegerT (32 Bit)	
SSC3.1 counter				
<b>Factory setting</b>	<b>0</b>			
Value range	(0 to 2147482880) 2147483644	(NoData) 0x7FFFFFFC		
SSC3.2 TEMP		Subindex 6	IntegerT (32 Bit)	
SSC3.2 counter				
<b>Factory setting</b>	<b>0</b>			
Value range	(0 to 2147482880) 2147483644	(NoData) 0x7FFFFFFC		



## Parameters

SSC Counter	Index 349	Subindex 0	RecordT (256 Bit)	ReadOnly
SSC4.1 COND		Subindex 7	IntegerT (32 Bit)	
SSC4.1 counter				
<b>Factory setting</b>	<b>0</b>			
Value range	(0 to 2147482880) 2147483644	(NoData)	0x7FFFFFFC	
SSC4.2 COND		Subindex 8	IntegerT (32 Bit)	
SSC4.2 counter				
<b>Factory setting</b>	<b>0</b>			
Value range	(0 to 2147482880) 2147483644	(NoData)	0x7FFFFFFC	
SEL2	Index 521	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Selection of the measurand for the evaluation via [OUT 2].				
<b>Factory setting</b>	<b>2</b>	<b>(FLOW)</b>		
Value range	2 3 4	(FLOW) (TEMP) (COND)		
dFU1	Index 524	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Configuration of the diagnostic output [OUT 1]. For more information please refer to the operating manual.				
<b>Factory setting</b>	<b>6</b>	<b>(Flow direction)</b>		
Value range	6 4	(Flow direction) (Fluid detection)		
dFU2	Index 525	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Configuration of the diagnostic output [OUT 2]. For more information please refer to the operating manual.				
<b>Factory setting</b>	<b>6</b>	<b>(Flow direction)</b>		
Value range	6 4	(Flow direction) (Fluid detection)		
FOU2	Index 532	Subindex 0	UIntegerT (8 Bit)	ReadWrite
[OUT 2] behaviour in case of fault.				
<b>Factory setting</b>	<b>4</b>	<b>(OFF)</b>		
Value range	1 2 4	(OU) (On) (OFF)		
Loc	Index 550	Subindex 0	UIntegerT (8 Bit)	ReadWrite
[Loc] locks the local user interface to prevent unintentional changes, [Loc] is resettable at the device.				
<b>Factory setting</b>	<b>1</b>	<b>(uLoc)</b>		
Value range	0 1	(Loc) (uLoc)		
Hi.F	Index 562	Subindex 0	Float32T	ReadOnly
Maximum memory value for flow.				
Value range [m <sup>3</sup> /h]	(-54.0 to 54.0) * 1 -2.65E38 2.65E38 3.30E38	(UL - underload) (OL - overload) (NoData)		



## Parameters

Lo.F	Index 563	Subindex 0	Float32T	ReadOnly
Minimum memory value for flow.				
Value range [m³/h]	(-54.0 to 54.0) * 1 -2.65E38 2.65E38 3.30E38	(UL - underload) (OL - overload) (NoData)		
Hi.T	Index 564	Subindex 0	Float32T	ReadOnly
Maximum memory value for temperature.				
Value range [°C]	(-20.0 to 150.0) * 1 -2.65E38 2.65E38 3.30E38	(UL - underload) (OL - overload) (NoData)		
Lo.T	Index 565	Subindex 0	Float32T	ReadOnly
Minimum memory value for temperature.				
Value range [°C]	(-20.0 to 150.0) * 1 -2.65E38 2.65E38 3.30E38	(UL - underload) (OL - overload) (NoData)		
Hi.C	Index 566	Subindex 0	Float32T	ReadOnly
Maximum memory value for conductivity.				
Value range [s/m]	(0.0 to 10.0) * 1 3.30E38	(NoData)		
Lo.C	Index 567	Subindex 0	Float32T	ReadOnly
Minimum memory value for conductivity.				
Value range [s/m]	(0.0 to 10.0) * 1 3.30E38	(NoData)		
S.On	Index 570	Subindex 0	UIntegerT (8 Bit)	ReadOnly
Simulation state.				
<b>Factory setting</b>	<b>0</b>	<b>(OFF)</b>		
Value range	0 1	(OFF) (On)		
S.Tim	Index 571	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Simulation duration.				
<b>Factory setting</b>	<b>2</b>	<b>(3 min)</b>		
Value range	0 1 2 3 4 5 6 7 8 9 10	(1 min) (2 min) (3 min) (4 min) (5 min) (10 min) (15 min) (20 min) (30 min) (45 min) (60 min)		



## Parameters

S.FLW	Index 573	Subindex 0	Float32T	ReadWrite
Simulation of flow.				
<b>Factory setting</b>	<b>22.5</b>			
Value range [m³/h]	(-54.0 to 54.0) * 1 2.65E38 3.00E38 3.3E38 -2.65E38 -3.00E38	(OL - overload) (cr.OL - critical overload) (NoData) (UL - underload) (cr.UL - critical underload)		
S.TMP	Index 574	Subindex 0	Float32T	ReadWrite
Simulation of temperature.				
<b>Factory setting</b>	<b>65</b>			
Value range [°C]	(-20.0 to 150.0) * 1 2.65E38 3.00E38 3.3E38 -2.65E38 -3.00E38	(OL - overload) (cr.OL - critical overload) (NoData) (UL - underload) (cr.UL - critical underload)		
S.CND	Index 575	Subindex 0	Float32T	ReadWrite
Simulation of conductivity.				
<b>Factory setting</b>	<b>5</b>			
Value range [s/m]	(0.0 to 10.0) * 1 3.3E38	(NoData)		
S.DIAG	Index 576	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Simulation of diagnostic states.				
<b>Factory setting</b>	<b>0</b>	<b>(OK)</b>		
Value range	0 7	(OK) (Fluid_Detect)		
ou1	Index 580	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Output configuration [OUT 1].				
<b>Factory setting</b>	<b>9</b>	<b>(ImP / Impulse output)</b>		
Value range	9 12 16	(ImP / Impulse output) (dOU / Diagnostic output) (OFF / Output Off)		
ou2	Index 590	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Output configuration [OUT 2].				
<b>Factory setting</b>	<b>1</b>	<b>(I / Analog signal 4...20 mA)</b>		
Value range	1 9 12 14 16	(I / Analog signal 4...20 mA) (ImP / Impulse output) (dOU / Diagnostic output) (In.D / Digital input) (OFF / Output Off)		
ASP2 - FLOW	Index 632	Subindex 0	Float32T	ReadWrite
Analogue start point 2 / Flow. Measured value for the minimum value of the analogue signal at the output 2 / Flow. For details, see operating manual.				
<b>Factory setting</b>	<b>0</b>			
Value range [m³/h]	(-45.0 to 36.0) * 1			



## Parameters

<b>AEP2 - FLOW</b>	<b>Index 633</b>	<b>Subindex 0</b>	<b>Float32T</b>	<b>ReadWrite</b>
Analogue end point 2 / Flow. Measured value for the maximum value of the analogue signal at the output 2 / Flow. For details, see operating manual.				
<b>Factory setting</b>	<b>11</b>			
Value range [m <sup>3</sup> /h]	(-36.0 to 45.0) * 1			
<b>ASP2 - TEMP</b>	<b>Index 634</b>	<b>Subindex 0</b>	<b>Float32T</b>	<b>ReadWrite</b>
Analogue start point 2 / Temperature. Measured value for the minimum value of the analogue signal at the output 2 / Temperature. For details, see operating manual.				
<b>Factory setting</b>	<b>-20</b>			
Value range [°C]	(-20.0 to 116.0) * 1			
<b>AEP2 - TEMP</b>	<b>Index 635</b>	<b>Subindex 0</b>	<b>Float32T</b>	<b>ReadWrite</b>
Analogue end point 2 / Temperature. Measured value for the maximum value of the analogue signal at the output 2 / Temperature. For details, see operating manual.				
<b>Factory setting</b>	<b>150</b>			
Value range [°C]	(14.0 to 150.0) * 1			
<b>ASP2 - COND</b>	<b>Index 636</b>	<b>Subindex 0</b>	<b>Float32T</b>	<b>ReadWrite</b>
Analogue start point 2 / Conductivity. Measured value for the minimum value of the analogue signal at the output 2 / Conductivity. For details, see operating manual.				
<b>Factory setting</b>	<b>0</b>			
Value range [s/m]	(0.0 to 8.0) * 1			
<b>AEP2 - COND</b>	<b>Index 637</b>	<b>Subindex 0</b>	<b>Float32T</b>	<b>ReadWrite</b>
Analogue end point 2 / Conductivity. Measured value for the maximum value of the analogue signal at the output 2 / Conductivity. For details, see operating manual.				
<b>Factory setting</b>	<b>10</b>			
Value range [s/m]	(2.0 to 10.0) * 1			
<b>DIn2</b>	<b>Index 676</b>	<b>Subindex 0</b>	<b>UIntegerT (8 Bit)</b>	<b>ReadWrite</b>
Configuration of digital input (Pin 2).				
<b>Factory setting</b>	<b>2</b>	<b>(+EDG)</b>		
Value range	2 3 0 1	(+EDG) (-EDG) (HIGH) (LOW)		
<b>Rate ECO</b>	<b>Index 702</b>	<b>Subindex 0</b>	<b>IntegerT (16 Bit)</b>	<b>ReadWrite</b>
Current measurement rate in Eco-Mode.				
<b>Factory setting</b>	<b>60</b>			
Value range [s]	(0 to 900) * 1			
<b>diS.U</b>	<b>Index 800</b>	<b>Subindex 0</b>	<b>UIntegerT (8 Bit)</b>	<b>ReadWrite</b>
Current display update rate.				
<b>Factory setting</b>	<b>1</b>	<b>(d2 / medium)</b>		
Value range	0 1 2	(d1 / fast) (d2 / medium) (d3 / slow)		



## Parameters

diS.R	Index 801	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Current display rotation clockwise.				
<b>Factory setting</b>	<b>0</b>	<b>(0 °)</b>		
Value range	0 1 2 3	(0 °) (90 °) (180 °) (270 °)		
diS.B	Index 802	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Current display brightness.				
<b>Factory setting</b>	<b>50</b>	<b>(50 %)</b>		
Value range	25 50 75 100 0	(25 %) (50 %) (75 %) (100 %) (OFF)		
diS.L	Index 803	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Current layout of the display.				
<b>Factory setting</b>	<b>0</b>	<b>(L1)</b>		
Value range	0 1 2 3	(L1) (L2) (L3) (L4)		
Eco-Mode	Index 805	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Setting of the energy saving mode.				
<b>Factory setting</b>	<b>0</b>	<b>(OFF / Device works with full performance)</b>		
Value range	0 1 2	(OFF / Device works with full performance) (Eco / Local display elements elements are dimmed or off) (Eco+ / Eco-mode 'Eco' + reduced measuring rate (see parameter Reate ECO) )		
diS.B ECO	Index 806	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Display brightness in Eco-Mode. If device is in Eco-Mode, 'diS.B ECO' has higher priority than 'diS.B'.				
<b>Factory setting</b>	<b>25</b>	<b>(25 %)</b>		
Value range	25 50 75 100 0	(25 %) (50 %) (75 %) (100 %) (OFF)		
LED-Mode ECO	Index 807	Subindex 0	UIntegerT (8 Bit)	ReadWrite
LED mode in Eco-Mode. If device is in Eco-Mode, 'LED-Mode ECO' has higher priority than 'LED-Mode'.				
<b>Factory setting</b>	<b>9</b>	<b>(Notification)</b>		
Value range	8 255 9 4 3	(On) (OFF) 0xFF (Notification) (Para) (PDOUT)		



## Parameters

coL.F	Index 811	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Colour configuration volumetric flow.				
<b>Factory setting</b>	<b>16</b>	<b>(bk/wh / Value black and white)</b>		
Value range	16	(bk/wh / Value black and white)		
	10	(r-cF / Value red when the measured value is inside the limits of [cFL.F] and [cFH.F])		
	11	(G-cF / Value green when the measured value is inside the limits of [cFL.F] and [cFH.F])		
coL.T	Index 812	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Colour configuration temperature.				
<b>Factory setting</b>	<b>16</b>	<b>(bk/wh / Value black and white)</b>		
Value range	16	(bk/wh / Value black and white)		
	10	(r-cF / Value red when the measured value is inside the limits of [cFL.T] and [cFH.T])		
	11	(G-cF / Value green when the measured value is inside the limits of [cFL.T] and [cFH.T])		
coL.C	Index 813	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Colour configuration conductivity.				
<b>Factory setting</b>	<b>16</b>	<b>(bk/wh / Value black and white)</b>		
Value range	16	(bk/wh / Value black and white)		
	10	(r-cF / Value red when the measured value is inside the limits of [cFL.F] and [cFH.F])		
	11	(G-cF / Value green when the measured value is inside the limits of [cFL.F] and [cFH.F])		
cFL.F	Index 861	Subindex 0	Float32T	ReadWrite
Lower value for flow colour change. cFL.F shall be below cFH.F.				
<b>Factory setting</b>	<b>0.3</b>			
Value range [m <sup>3</sup> /h]	(0.3 to 44.775) * 1			
cFL.T	Index 862	Subindex 0	Float32T	ReadWrite
Lower value for temperature colour change. cFL.T shall be below cFH.T.				
<b>Factory setting</b>	<b>-20</b>			
Value range [°C]	(-20.0 to 149.15) * 1			
cFL.C	Index 863	Subindex 0	Float32T	ReadWrite
Lower value for conductivity colour change. cFL.C shall be below cFH.C.				
<b>Factory setting</b>	<b>0.01</b>			
Value range [s/m]	(0.01 to 9.95) * 1			
cFH.F	Index 871	Subindex 0	Float32T	ReadWrite
Upper value for flow colour change. cFH.F shall be above cFL.F. For details, see operating manual.				
<b>Factory setting</b>	<b>45</b>			
Value range [m <sup>3</sup> /h]	(0.525 to 45.0) * 1			
cFH.T	Index 872	Subindex 0	Float32T	ReadWrite
Upper value for temperature colour change. cFH.T shall be above cFL.T. For details, see operating manual.				
<b>Factory setting</b>	<b>150</b>			
Value range [°C]	(-19.15 to 150.0) * 1			



## Parameters

cFH.C	Index 873	Subindex 0	Float32T	ReadWrite
Upper value for conductivity colour change. cFH.C shall be above cFL.C. For details, see operating manual.				
<b>Factory setting</b>	<b>10</b>			
Value range [s/m]	(0.06 to 10.0) * 1			
dAP.F	Index 880	Subindex 0	Float32T	ReadWrite
Damping of the flow signal.				
<b>Factory setting</b>	<b>0.6</b>			
Value range [s]	(0.0 to 5.0) * 1			
LED mode	Index 1400	Subindex 0	UIntegerT (8 Bit)	ReadWrite
LED mode sets the source of LED control and chooses the colour scheme. The colour change if Event active is determined by the Event Class, see table 'Events' Warning = yellow, Error = red				
<b>Factory setting</b>	<b>8</b>	<b>(On / LED on by default / yellow for warning / red for error)</b>		
Value range	8 255 9 4 3	(On / LED on by default / yellow for warning / red for error) (OFF / LED deactivated) 0xFF (Notification / LED off by default / yellow for warning / red for error) (Para / LED controlled by parameter LED-Color) (PDOOUT / PLC controlled)		
LED-Color	Index 1401	Subindex 0	UIntegerT (8 Bit)	ReadWrite
LED-Color controls the color of the LED, if LED mode is set to 'Para'.				
<b>Factory setting</b>	<b>0</b>	<b>(OFF / Off)</b>		
Value range	0 1 2 4 6	(OFF / Off) (Blue / Blue) (Green / Green) (Red / Red) (Yellow / Yellow)		
T.Cmp	Index 1606	Subindex 0	Float32T	ReadWrite
Temperature compensation.				
<b>Factory setting</b>	<b>2.1</b>			
Value range [%]	(0.0 to 20.0) * 1			
rEF.T	Index 3001	Subindex 0	Float32T	ReadWrite
Reference temperature which refers to all measured and displayed values.				
<b>Factory setting</b>	<b>25</b>			
Value range [°C]	(15.0 to 35.0) * 1			
LFC - FLOW	Index 3006	Subindex 0	Float32T	ReadWrite
Low flow cutoff.				
<b>Factory setting</b>	<b>0.3</b>			
Value range [m³/h]	(0.0 to 36.0) * 1			



## Parameters

FPro1	Index 3011	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Totaliser 1. Counting rule.				
Factory setting	1	(0+)		
Value range	0	(-+)		
	1	(0+)		
	2	(++)		
	4	(-0)		

Fdir	Index 3012	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Preferred direction of flow.				
Factory setting	0	(+)		
Value range	0	(+)		
	1	(-)		

rTo1	Index 3015	Subindex 0	IntegerT (16 Bit)	ReadWrite
Totaliser 1. Determines the time for the next reset.				
Factory setting	0	(OFF)		
Value range	0	(OFF)		
	4001	(1 h)		
	4002	(2 h)		
	4003	(3 h)		
	4004	(4 h)		
	4005	(5 h)		
	4006	(6 h)		
	4007	(7 h)		
	4008	(8 h)		
	4009	(9 h)		
	4010	(10 h)		
	4011	(11 h)		
	4012	(12 h)		
	4013	(13 h)		
	4014	(14 h)		
	4015	(15 h)		
	4016	(16 h)		
	4017	(17 h)		
	4018	(18 h)		
	4019	(19 h)		
	4020	(20 h)		
	4021	(21 h)		
	4022	(22 h)		
	4023	(23 h)		
	5001	(1 d)		
	5002	(2 d)		
	5003	(3 d)		
	5004	(4 d)		
	5005	(5 d)		
	5006	(6 d)		
	6001	(1 w)		
	6002	(2 w)		
	6003	(3 w)		
	6004	(4 w)		
	6005	(5 w)		
	6006	(6 w)		
	6007	(7 w)		
	6008	(8 w)		

Vol.1	Index 3017	Subindex 0	RecordT (96 Bit)	ReadOnly
Totaliser 1. Continuously providing the volumetric properties since the last reset.				
Value		Subindex 1	Float32T	
Current consumed quantity				
Value range [m³]	(-999990.0 to 999990.0) * 1			
Memory				
		Subindex 2	Float32T	
Consumed quantity before the last reset				
Value range [m³]	(-999990.0 to 999990.0) * 1			



## Parameters

Vol.1	Index 3017	Subindex 0	RecordT (96 Bit)	ReadOnly
Time		Subindex 3	IntegerT (32 Bit)	
Time in minuten since the last reset of totaliser				
Value range [min]	(-1 to 2147483647) * 1			
FPro2	Index 3021	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Totaliser 2. Counting rule.				
Factory setting	1	(0+)		
Value range	0	(-+)		
	1	(0+)		
	2	(++)		
	4	(-0)		
rTo2	Index 3025	Subindex 0	IntegerT (16 Bit)	ReadWrite
Totaliser 2. Determines the time for the next reset.				
Factory setting	0	(OFF)		
Value range	0	(OFF)		
	4001	(1 h)		
	4002	(2 h)		
	4003	(3 h)		
	4004	(4 h)		
	4005	(5 h)		
	4006	(6 h)		
	4007	(7 h)		
	4008	(8 h)		
	4009	(9 h)		
	4010	(10 h)		
	4011	(11 h)		
	4012	(12 h)		
	4013	(13 h)		
	4014	(14 h)		
	4015	(15 h)		
	4016	(16 h)		
	4017	(17 h)		
	4018	(18 h)		
	4019	(19 h)		
	4020	(20 h)		
	4021	(21 h)		
	4022	(22 h)		
	4023	(23 h)		
	5001	(1 d)		
	5002	(2 d)		
	5003	(3 d)		
	5004	(4 d)		
	5005	(5 d)		
	5006	(6 d)		
	6001	(1 w)		
	6002	(2 w)		
	6003	(3 w)		
	6004	(4 w)		
	6005	(5 w)		
	6006	(6 w)		
	6007	(7 w)		
	6008	(8 w)		
Vol.2	Index 3027	Subindex 0	RecordT (96 Bit)	ReadOnly
Totaliser 2. Continuously providing the volumetric properties since the last reset.				
Value		Subindex 1	Float32T	
Current consumed quantity				
Value range [m³]	(-999990.0 to 999990.0) * 1			
Memory		Subindex 2	Float32T	
Consumed quantity before the last reset				
Value range [m³]	(-999990.0 to 999990.0) * 1			



## Parameters

<b>Vol.2</b>	<b>Index 3027</b>	<b>Subindex 0</b>	<b>RecordT (96 Bit)</b>	<b>ReadOnly</b>
Time		Subindex 3	IntegerT (32 Bit)	
Time in minuten since the last reset of totaliser				
Value range [min]	(-1 to 2147483647) * 1			
<b>CGA - FLOW</b>	<b>Index 3030</b>	<b>Subindex 0</b>	<b>Float32T</b>	<b>ReadWrite</b>
Calibration gain.				
<b>Factory setting</b>	<b>100</b>			
Value range [%]	(50.0 to 150.0) * 1			
<b>CGA - COND</b>	<b>Index 3032</b>	<b>Subindex 0</b>	<b>Float32T</b>	<b>ReadWrite</b>
Calibration gain.				
<b>Factory setting</b>	<b>100</b>			
Value range [%]	(50.0 to 150.0) * 1			
<b>Lifetime Totaliser</b>	<b>Index 3050</b>	<b>Subindex 0</b>	<b>RecordT (64 Bit)</b>	<b>ReadOnly</b>
Quantity meter continuously providing the volumetric flow values in all flow directions over the entire device lifetime.				
Predominated volume		Subindex 1	Float32T	
Consumed quantity in predominated direction				
Value range [m <sup>3</sup> ]	(0.0 to 999990.0) * 1			
Non predominated volume		Subindex 2	Float32T	
Consumed quantity in non predominated direction				
Value range [m <sup>3</sup> ]	(-999990.0 to 0.0) * 1			
<b>ImPR1</b>	<b>Index 3060</b>	<b>Subindex 0</b>	<b>UIntegerT (8 Bit)</b>	<b>ReadWrite</b>
Pulse repetition active (= pulse output) or not active (= function preset meter).				
<b>Factory setting</b>	<b>1</b>	<b>(YES)</b>		
Value range	1	(YES)		
	0	(no)		
<b>ImPS1 - TOTL</b>	<b>Index 3065</b>	<b>Subindex 0</b>	<b>Float32T</b>	<b>ReadWrite</b>
Pulse value.				
<b>Factory setting</b>	<b>0.000002</b>			
Value range [m <sup>3</sup> ]	(0.000002 to 99999.0) * 1			
<b>ImPR2</b>	<b>Index 3160</b>	<b>Subindex 0</b>	<b>UIntegerT (8 Bit)</b>	<b>ReadWrite</b>
Pulse repetition active (= pulse output) or not active (= function preset meter).				
<b>Factory setting</b>	<b>1</b>	<b>(YES)</b>		
Value range	1	(YES)		
	0	(no)		
<b>ImPS2 - TOTL</b>	<b>Index 3165</b>	<b>Subindex 0</b>	<b>Float32T</b>	<b>ReadWrite</b>
Pulse value.				
<b>Factory setting</b>	<b>0.000002</b>			
Value range [m <sup>3</sup> ]	(0.000002 to 99999.0) * 1			



## Parameters

Value shown on Display	Index 3909	Subindex 0	RecordT (32 Bit)	ReadWrite
Select process value to be shown on different display tiles.				
Tile 1		Subindex 1	UIntegerT (8 Bit)	
Select value to be shown on display's tile				
<b>Factory setting</b>	<b>0</b>	<b>(FLOW / Flow)</b>		
Value range	0	(FLOW / Flow)		
	2	(TOTL / Totaliser)		
	3	(FLOW_DIRECTION / Flow direction)		
	1	(TEMP / Temperature)		
	4	(COND)		
Tile 2		Subindex 2	UIntegerT (8 Bit)	
Select value to be shown on display's tile				
<b>Factory setting</b>	<b>2</b>	<b>(TOTL / Totaliser)</b>		
Value range	0	(FLOW / Flow)		
	2	(TOTL / Totaliser)		
	3	(FLOW_DIRECTION / Flow direction)		
	1	(TEMP / Temperature)		
	4	(COND)		
Tile 3		Subindex 3	UIntegerT (8 Bit)	
Select value to be shown on display's tile				
<b>Factory setting</b>	<b>1</b>	<b>(TEMP / Temperature)</b>		
Value range	0	(FLOW / Flow)		
	2	(TOTL / Totaliser)		
	3	(FLOW_DIRECTION / Flow direction)		
	1	(TEMP / Temperature)		
	4	(COND)		
Tile 4		Subindex 4	UIntegerT (8 Bit)	
Select value to be shown on display's tile				
<b>Factory setting</b>	<b>4</b>	<b>(COND)</b>		
Value range	0	(FLOW / Flow)		
	2	(TOTL / Totaliser)		
	3	(FLOW_DIRECTION / Flow direction)		
	1	(TEMP / Temperature)		
	4	(COND)		
<b>coF - FLOW</b>	<b>Index 5007</b>	<b>Subindex 0</b>	<b>Float32T</b>	<b>ReadWrite</b>
Zero-point calibration (Calibration offset) / Flow.				
<b>Factory setting</b>	<b>0</b>			
Value range [m³/h]	(-4.5 to 4.5) * 1			
<b>coF - COND</b>	<b>Index 5009</b>	<b>Subindex 0</b>	<b>Float32T</b>	<b>ReadWrite</b>
Zero-point calibration (Calibration offset) / Conductivity.				
<b>Factory setting</b>	<b>0</b>			
Value range [s/m]	(-5.0 to 5.0) * 1			
<b>SSC2.1 Param</b>	<b>Index 16396</b>	<b>Subindex 0</b>	<b>RecordT (64 Bit)</b>	<b>ReadWrite</b>
Defines the setpoint values for switching signal channel 1 of sensor 2.				
SP1		Subindex 1	Float32T	
Defines the setpoint 1 value for the switching signal channel.				
<b>Factory setting</b>	<b>11.25</b>			
Value range [m³/h]	(-45.0 to 45.0) * 1			



## Parameters

SSC2.1 Param	Index 16396	Subindex 0	RecordT (64 Bit)	ReadWrite
SP2		Subindex 2	Float32T	
Defines the setpoint 2 value for the switching signal channel.				
<b>Factory setting</b>	<b>10.35</b>			
Value range [m³/h]	(-45.0 to 45.0) * 1			
SSC2.1 Config	Index 16397	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 1 of sensor 2.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
<b>Factory setting</b>	<b>0</b>	<b>(High active)</b>		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
<b>Factory setting</b>	<b>3</b>	<b>(Two point)</b>		
Value range	3 0 1 2	(Two point) (Deactivated) (Single point) (Window)		
Hyst		Subindex 3	Float32T	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [m³/h]	(0.09 to 4.5) * 1 0	(Auto)		
SSC2.2 Param	Index 16398	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 2 of sensor 2.				
SP1		Subindex 1	Float32T	
Defines the setpoint 1 value for the switching signal channel.				
<b>Factory setting</b>	<b>11.25</b>			
Value range [m³/h]	(-45.0 to 45.0) * 1			
SP2		Subindex 2	Float32T	
Defines the setpoint 2 value for the switching signal channel.				
<b>Factory setting</b>	<b>10.35</b>			
Value range [m³/h]	(-45.0 to 45.0) * 1			
SSC2.2 Config	Index 16399	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 2 of sensor 2.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
<b>Factory setting</b>	<b>0</b>	<b>(High active)</b>		
Value range	0 1	(High active) (Low active)		



## Parameters

SSC2.2 Config	Index 16399	Subindex 0	RecordT (48 Bit)	ReadWrite
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
<b>Factory setting</b>	<b>3</b>	<b>(Two point)</b>		
Value range	3 0 1 2	(Two point) (Deactivated) (Single point) (Window)		
Hyst		Subindex 3	Float32T	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [m <sup>3</sup> /h]	(0.09 to 4.5) * 1 0	(Auto)		
SSC3.1 Param	Index 16412	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 1 of sensor 3.				
SP1		Subindex 1	Float32T	
Defines the setpoint 1 value for the switching signal channel.				
<b>Factory setting</b>	<b>22.5</b>			
Value range [°C]	(-20.0 to 150.0) * 1			
SP2		Subindex 2	Float32T	
Defines the setpoint 2 value for the switching signal channel.				
<b>Factory setting</b>	<b>19.1</b>			
Value range [°C]	(-20.0 to 150.0) * 1			
SSC3.1 Config	Index 16413	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 1 of sensor 3.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
<b>Factory setting</b>	<b>0</b>	<b>(High active)</b>		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
<b>Factory setting</b>	<b>3</b>	<b>(Two point)</b>		
Value range	3 0 1 2	(Two point) (Deactivated) (Single point) (Window)		
Hyst		Subindex 3	Float32T	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [°C]	(0.34 to 17.0) * 1 0	(Auto)		



## Parameters

SSC3.2 Param	Index 16414	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 2 of sensor 3.				
SP1		Subindex 1	Float32T	
Defines the setpoint 1 value for the switching signal channel.				
<b>Factory setting</b>	<b>22.5</b>			
Value range [°C]	(-20.0 to 150.0) * 1			
SP2		Subindex 2	Float32T	
Defines the setpoint 2 value for the switching signal channel.				
<b>Factory setting</b>	<b>19.1</b>			
Value range [°C]	(-20.0 to 150.0) * 1			
SSC3.2 Config	Index 16415	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 2 of sensor 3.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
<b>Factory setting</b>	<b>0</b>	<b>(High active)</b>		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
<b>Factory setting</b>	<b>3</b>	<b>(Two point)</b>		
Value range	3 0 1 2	(Two point) (Deactivated) (Single point) (Window)		
Hyst		Subindex 3	Float32T	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [°C]	(0.34 to 17.0) * 1 0	(Auto)		
SSC4.1 Param	Index 16428	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 1 of sensor 4.				
SP1		Subindex 1	Float32T	
Defines the setpoint 1 value for the switching signal channel.				
<b>Factory setting</b>	<b>2.5</b>			
Value range [s/m]	(0.01 to 10.0) * 1			
SP2		Subindex 2	Float32T	
Defines the setpoint 2 value for the switching signal channel.				
<b>Factory setting</b>	<b>2.3</b>			
Value range [s/m]	(0.01 to 10.0) * 1			



## Parameters

SSC4.1 Config	Index 16429	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 1 of sensor 4.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
<b>Factory setting</b>	<b>0</b>	<b>(High active)</b>		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
<b>Factory setting</b>	<b>3</b>	<b>(Two point)</b>		
Value range	3 0 1 2	(Two point) (Deactivated) (Single point) (Window)		
Hyst		Subindex 3	Float32T	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s/m]	(0.02 to 1.0) * 1 0	(Auto)		
SSC4.2 Param	Index 16430	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 2 of sensor 4.				
SP1		Subindex 1	Float32T	
Defines the setpoint 1 value for the switching signal channel.				
<b>Factory setting</b>	<b>2.5</b>			
Value range [s/m]	(0.01 to 10.0) * 1			
SP2		Subindex 2	Float32T	
Defines the setpoint 2 value for the switching signal channel.				
<b>Factory setting</b>	<b>2.3</b>			
Value range [s/m]	(0.01 to 10.0) * 1			
SSC4.2 Config	Index 16431	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 2 of sensor 4.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
<b>Factory setting</b>	<b>0</b>	<b>(High active)</b>		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
<b>Factory setting</b>	<b>3</b>	<b>(Two point)</b>		
Value range	3 0 1 2	(Two point) (Deactivated) (Single point) (Window)		



## Parameters

SSC4.2 Config	Index 16431	Subindex 0	RecordT (48 Bit)	ReadWrite
Hyst		Subindex 3	Float32T	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
<b>Factory setting</b>	<b>0.0</b>			
Value range [s/m]	(0.02 to 1.0) * 1 0	(Auto)		
MDC Descriptor	Index 16512	Subindex 0	RecordT (88 Bit)	ReadOnly
Descriptor for the characteristic of the measurement data channel (process data MV).				
Lower Value		Bit offset 56	Float32T	
Shows the lower value of measurement range.				
<b>Factory setting</b>	<b>0.000001</b>	<b>( 0.000001)</b>		
Value range	0.000001	( 0.000001)		
Upper Value		Bit offset 24	Float32T	
Shows the upper value of measurement range.				
<b>Factory setting</b>	<b>999990.0</b>			
Value range	999990.000000	(999990.000000)		
Unit Code		Bit offset 8	UIntegerT (16 Bit)	
Shows the unique code for the physical unit.				
<b>Factory setting</b>	<b>1034</b>	<b>(m³)</b>		
Value range	1034	(m³)		
Scale		Bit offset 0	IntegerT (8 Bit)	
Shows the multiplier for measurement value - 10exp(scale).				
<b>Factory setting</b>	<b>0</b>	<b>(0)</b>		
Value range	0	(0)		
MDC2 Descriptor	Index 16513	Subindex 0	RecordT (88 Bit)	ReadOnly
Descriptor for the characteristic of the measurement data channel 2 (process data MV).				
Lower Value		Bit offset 56	Float32T	
Shows the lower value of measurement range.				
<b>Factory setting</b>	<b>0.3</b>			
Value range	0.300000	( 0.300000)		
Upper Value		Bit offset 24	Float32T	
Shows the upper value of measurement range.				
<b>Factory setting</b>	<b>45.0</b>			
Value range	45.000000	(45.000000)		
Unit Code		Bit offset 8	UIntegerT (16 Bit)	
Shows the unique code for the physical unit.				
<b>Factory setting</b>	<b>1349</b>	<b>(m³/h)</b>		
Value range	1349	(m³/h)		



## Parameters

MDC2 Descriptor	Index 16513	Subindex 0	RecordT (88 Bit)	ReadOnly
Scale		Bit offset 0	IntegerT (8 Bit)	
Shows the multiplier for measurement value - $10^{\text{exp}(\text{scale})}$ .				
<b>Factory setting</b>	<b>0</b>	<b>(0)</b>		
Value range	0	(0)		
MDC3 Descriptor	Index 16514	Subindex 0	RecordT (88 Bit)	ReadOnly
Descriptor for the characteristic of the measurement data channel 3 (process data MV).				
Lower Value		Bit offset 56	Float32T	
Shows the lower value of measurement range.				
<b>Factory setting</b>	<b>-20.0</b>			
Value range	-20.000000	(-20.000000)		
Upper Value		Bit offset 24	Float32T	
Shows the upper value of measurement range.				
<b>Factory setting</b>	<b>150.0</b>			
Value range	150.000000	(150.000000)		
Unit Code		Bit offset 8	UIntegerT (16 Bit)	
Shows the unique code for the physical unit.				
<b>Factory setting</b>	<b>1001</b>	<b>(°C)</b>		
Value range	1001	(°C)		
Scale		Bit offset 0	IntegerT (8 Bit)	
Shows the multiplier for measurement value - $10^{\text{exp}(\text{scale})}$ .				
<b>Factory setting</b>	<b>0</b>	<b>(0)</b>		
Value range	0	(0)		
MDC4 Descriptor	Index 16515	Subindex 0	RecordT (88 Bit)	ReadOnly
Descriptor for the characteristic of the measurement data channel 4 (process data MV).				
Lower Value		Bit offset 56	Float32T	
Shows the lower value of measurement range.				
<b>Factory setting</b>	<b>0.01</b>			
Value range	0.010000	( 0.010000)		
Upper Value		Bit offset 24	Float32T	
Shows the upper value of measurement range.				
<b>Factory setting</b>	<b>10.0</b>			
Value range	10.000000	(10.000000)		
Unit Code		Bit offset 8	UIntegerT (16 Bit)	
Shows the unique code for the physical unit.				
<b>Factory setting</b>	<b>1299</b>	<b>(s/m)</b>		
Value range	1299	(s/m)		
Scale		Bit offset 0	IntegerT (8 Bit)	
Shows the multiplier for measurement value - $10^{\text{exp}(\text{scale})}$ .				
<b>Factory setting</b>	<b>0</b>	<b>(0)</b>		
Value range	0	(0)		



## Diagnosis

Device Status	Index 36	Subindex 0	UIntegerT (8 Bit)	ReadOnly
Indicator for the current device condition and diagnosis state.				
<b>Factory setting</b>	<b>0</b>	<b>(Device is OK)</b>		
Value range	0 1 2 3 4	(Device is OK) (Maintenance required) (Out of specification) (Functional check) (Failure)		
Detailed Device Status	Index 37	Subindex 0	OctetStringT (3 Byte) [17]	ReadOnly
List of all currently pending events in the device.				
<b>Factory setting</b>	<b>0x00,0x00,0x00</b>			
Power supply voltage	Index 940	Subindex 0	Float32T	ReadOnly
Input voltage.				
Value range	(16.0 to 30.0) * 1			
Loop current 2	Index 944	Subindex 0	Float32T	ReadOnly
Actual loop current for analogue output 2.				
Value range	(0.0 to 24.0) * 1			
Operating hours	Index 542	Subindex 0	IntegerT (32 Bit)	ReadOnly
Counter of the operating hours since delivery.				
<b>Factory setting</b>	<b>0</b>			
Value range [h]	(0 to 2147482880) * 1			
Active Events	Index 545	Subindex 0	RecordT (32 Bit)	ReadOnly
Bit mask for current pending events.				
Bit offset 31	(0x8DFF)	Test Event 2. Device Status = 1 (Maintenance required)		
Bit offset 30	(0x8DFE)	Test Event 1. Device Status = 1 (Maintenance required)		
Bit offset 24	(0x8CC1)	Measuring pipe not sufficiently filled. Too low conductivity of medium. Device Status = 2 (Out of specification)		
Bit offset 23	(0x8CBF)	Signal quality low		
Bit offset 22	(0x8CC5)	No media detected		
Bit offset 18	(0x8CE0)	Local user interface disturbed. Device Status = 1 (Maintenance required)		
Bit offset 17	(0x8CA5)	Load for analogue output of too high impedance. Device Status = 2 (Out of specification)		
Bit offset 16	(0x8C01)	Simulation active		
Bit offset 15	(0x4210)	Device temperature overrun		
Bit offset 14	(0x4220)	Device temperature underrun		
Bit offset 12	(0x8C20)	Measurement range exceeded		
Bit offset 9	(0x8C30)	Process variable range underrun		
Bit offset 8	(0x8C10)	Process variable range overrun		
Bit offset 5	(0x5010)	Component malfunction		
Bit offset 2	(0x7710)	Short circuit		
Bit offset 1	(0x6320)	Parameter error		
Bit offset 0	(0x5000)	Device hardware fault		
Value range	true	Event active		
	false	Event inactive		





## Diagnosis

Param configuration fault	Index 546	Subindex 0	UIntegerT (32 Bit) [10]	ReadOnly
Displays the incorrectly set parameters.				
Factory setting	0	(OK)		
Value range	0	(OK)		
	786432	(Device Access Locks, Index = 12)		
	38010880	(ou1, Index = 580)		
	34340864	(dFU1, Index = 524)		
	200867840	(ImPS1 - TOTL, Index = 3065)		
	200540160	(ImPR1, Index = 3060)		
	38666240	(ou2, Index = 590)		
	34406400	(dFU2, Index = 525)		
	34144256	(SEL2, Index = 521)		
	41418752	(ASP2 - FLOW, Index = 632)		
	41549824	(ASP2 - TEMP, Index = 634)		
	41680896	(ASP2 - COND, Index = 636)		
	41484288	(AEP2 - FLOW, Index = 633)		
	41615360	(AEP2 - TEMP, Index = 635)		
	41746432	(AEP2 - COND, Index = 637)		
	34865152	(FOU2, Index = 532)		
	207421440	(ImPS2 - TOTL, Index = 3165)		
	207093760	(ImPR2, Index = 3160)		
	44302336	(DIn2, Index = 676)		
	197328896	(FPro1, Index = 3011)		
	197984256	(FPro2, Index = 3021)		
	55115776	(uni.F, Index = 841)		
	55246848	(uni.C, Index = 843)		
	57671680	(dAP.F, Index = 880)		
	32768000	(P-n, Index = 500)		
	197001216	(LFC - FLOW, Index = 3006)		
	197394432	(Fdir, Index = 3012)		
	54722560	(Date and Time, Index = 835)		
	328138752	(coF - FLOW, Index = 5007)		
	198574080	(CGA - FLOW, Index = 3030)		
	105250816	(T.Cmp, Index = 1606)		
	196673536	(rEF.T, Index = 3001)		
	52494336	(diS.R, Index = 801)		
	60489728	(LanG, Index = 923)		
	52625408	(diS.L, Index = 803)		
	198705152	(CGA - COND, Index = 3032)		
	52756480	(Eco-Mode, Index = 805)		
	209780736	(FD.On, Index = 3201)		
	54657024	(Installation date, Index = 834)		
	91815936	(LED-Color, Index = 1401)		
	91750400	(LED mode, Index = 1400)		
	52887552	(LED-Mode ECO, Index = 807)		
	36044800	(Loc, Index = 550)		
	256180224	(Value shown on Display, Index = 3909)		
	256180225	(Value shown on Display, Index = 3909, Subindex = 1)		
	256180226	(Value shown on Display, Index = 3909, Subindex = 2)		
	256180227	(Value shown on Display, Index = 3909, Subindex = 3)		
	256180228	(Value shown on Display, Index = 3909, Subindex = 4)		
	46006272	(Rate ECO, Index = 702)		
	37683200	(S.CND, Index = 575)		
	37748736	(S.DIAG, Index = 576)		
	37552128	(S.FLW, Index = 573)		
	37617664	(S.TMP, Index = 574)		
	37421056	(S.Tim, Index = 571)		
	3997696	(SSC1.1 Config, Index = 61)		
	3997697	(SSC1.1 Config, Index = 61, Subindex = 1)		
	3997698	(SSC1.1 Config, Index = 61, Subindex = 2)		
	3997699	(SSC1.1 Config, Index = 61, Subindex = 3)		
	20971520	(SSC1.1 Delay, Index = 320)		
	20971521	(SSC1.1 Delay, Index = 320, Subindex = 1)		
	20971522	(SSC1.1 Delay, Index = 320, Subindex = 2)		
	3932160	(SSC1.1 Param, Index = 60)		
	3932161	(SSC1.1 Param, Index = 60, Subindex = 1)		
	3932162	(SSC1.1 Param, Index = 60, Subindex = 2)		
	4128768	(SSC1.2 Config, Index = 63)		
	4128769	(SSC1.2 Config, Index = 63, Subindex = 1)		
	4128770	(SSC1.2 Config, Index = 63, Subindex = 2)		
	4128771	(SSC1.2 Config, Index = 63, Subindex = 3)		
	21037056	(SSC1.2 Delay, Index = 321)		
	21037057	(SSC1.2 Delay, Index = 321, Subindex = 1)		
	21037058	(SSC1.2 Delay, Index = 321, Subindex = 2)		
	4063232	(SSC1.2 Param, Index = 62)		
	4063233	(SSC1.2 Param, Index = 62, Subindex = 1)		
	4063234	(SSC1.2 Param, Index = 62, Subindex = 2)		
	1074593792	(SSC2.1 Config, Index = 16397)		
	1074593793	(SSC2.1 Config, Index = 16397, Subindex = 1)		
	1074593794	(SSC2.1 Config, Index = 16397, Subindex = 2)		
	1074593795	(SSC2.1 Config, Index = 16397, Subindex = 3)		
	21233664	(SSC2.1 Delay, Index = 324)		
	21233665	(SSC2.1 Delay, Index = 324, Subindex = 1)		
	21233666	(SSC2.1 Delay, Index = 324, Subindex = 2)		



## Diagnosis

1074528256	(SSC2.1 Param, Index = 16396)
1074528257	(SSC2.1 Param, Index = 16396, Subindex = 1)
1074528258	(SSC2.1 Param, Index = 16396, Subindex = 2)
1074724864	(SSC2.2 Config, Index = 16399)
1074724865	(SSC2.2 Config, Index = 16399, Subindex = 1)
1074724866	(SSC2.2 Config, Index = 16399, Subindex = 2)
1074724867	(SSC2.2 Config, Index = 16399, Subindex = 3)
21299200	(SSC2.2 Delay, Index = 325)
21299201	(SSC2.2 Delay, Index = 325, Subindex = 1)
21299202	(SSC2.2 Delay, Index = 325, Subindex = 2)
1074659328	(SSC2.2 Param, Index = 16398)
1074659329	(SSC2.2 Param, Index = 16398, Subindex = 1)
1074659330	(SSC2.2 Param, Index = 16398, Subindex = 2)
1075642368	(SSC3.1 Config, Index = 16413)
1075642369	(SSC3.1 Config, Index = 16413, Subindex = 1)
1075642370	(SSC3.1 Config, Index = 16413, Subindex = 2)
1075642371	(SSC3.1 Config, Index = 16413, Subindex = 3)
21495808	(SSC3.1 Delay, Index = 328)
21495809	(SSC3.1 Delay, Index = 328, Subindex = 1)
21495810	(SSC3.1 Delay, Index = 328, Subindex = 2)
1075576832	(SSC3.1 Param, Index = 16412)
1075576833	(SSC3.1 Param, Index = 16412, Subindex = 1)
1075576834	(SSC3.1 Param, Index = 16412, Subindex = 2)
1075773440	(SSC3.2 Config, Index = 16415)
1075773441	(SSC3.2 Config, Index = 16415, Subindex = 1)
1075773442	(SSC3.2 Config, Index = 16415, Subindex = 2)
1075773443	(SSC3.2 Config, Index = 16415, Subindex = 3)
21561344	(SSC3.2 Delay, Index = 329)
21561345	(SSC3.2 Delay, Index = 329, Subindex = 1)
21561346	(SSC3.2 Delay, Index = 329, Subindex = 2)
1075707904	(SSC3.2 Param, Index = 16414)
1075707905	(SSC3.2 Param, Index = 16414, Subindex = 1)
1075707906	(SSC3.2 Param, Index = 16414, Subindex = 2)
1076690944	(SSC4.1 Config, Index = 16429)
1076690945	(SSC4.1 Config, Index = 16429, Subindex = 1)
1076690946	(SSC4.1 Config, Index = 16429, Subindex = 2)
1076690947	(SSC4.1 Config, Index = 16429, Subindex = 3)
21757952	(SSC4.1 Delay, Index = 332)
21757953	(SSC4.1 Delay, Index = 332, Subindex = 1)
21757954	(SSC4.1 Delay, Index = 332, Subindex = 2)
1076625408	(SSC4.1 Param, Index = 16428)
1076625409	(SSC4.1 Param, Index = 16428, Subindex = 1)
1076625410	(SSC4.1 Param, Index = 16428, Subindex = 2)
1076822016	(SSC4.2 Config, Index = 16431)
1076822017	(SSC4.2 Config, Index = 16431, Subindex = 1)
1076822018	(SSC4.2 Config, Index = 16431, Subindex = 2)
1076822019	(SSC4.2 Config, Index = 16431, Subindex = 3)
21823488	(SSC4.2 Delay, Index = 333)
21823489	(SSC4.2 Delay, Index = 333, Subindex = 1)
21823490	(SSC4.2 Delay, Index = 333, Subindex = 2)
1076756480	(SSC4.2 Param, Index = 16430)
1076756481	(SSC4.2 Param, Index = 16430, Subindex = 1)
1076756482	(SSC4.2 Param, Index = 16430, Subindex = 2)
54853632	(Set the time, Index = 837)
3801088	(Teach Select, Index = 58)
54788096	(Time format, Index = 836)
57212928	(cFH.C, Index = 873)
57081856	(cFH.F, Index = 871)
57147392	(cFH.T, Index = 872)
56557568	(cFL.C, Index = 863)
56426496	(cFL.F, Index = 861)
56492032	(cFL.T, Index = 862)
328269824	(coF - COND, Index = 5009)
53280768	(coL.C, Index = 813)
53149696	(coL.F, Index = 811)
53215232	(coL.T, Index = 812)
52559872	(diS.B, Index = 802)
52822016	(diS.B ECO, Index = 806)
52428800	(diS.U, Index = 800)
197591040	(rTo1, Index = 3015)
198246400	(rTo2, Index = 3025)

Signal_Quality	Index 2002	Subindex 0	UIntegerT (16 Bit)	ReadOnly
Signal quality at receiver.				
Factory setting	1	(Normal)		
Value range	0	(Low)		
	1	(Normal)		
	65535	(NoSignal)	0xFFFF	



## Diagnosis

Internal temperature	Index 543	Subindex 0	Float32T	ReadOnly
Current internal temperature of the device. Value range [°C]	(-20.0 to 150.0) * 1 -2.65E38 2.65E38 3.3E38	(UL - underload) (OL - overload) (NoData)		



## Events

Code	Device status	PQ *	Class	Name	Description
0x4210 16912d	2 (Out of specification)	valid	Warning	Device temperature overrun	Clear source of heat
0x4220 16928d	2 (Out of specification)	valid	Warning	Device temperature underrun	Insulate device
0x5000 20480d	4 (Failure)	invalid	Error	Device hardware fault	Exchange device
0x5010 20496d	3 (Functional check)	valid	Error	Component malfunction	Repair or exchange
0x6320 25376d	3 (Functional check)	invalid	Error	Parameter error	Check datasheet and values
0x7710 30480d	3 (Functional check)	valid	Error	Short circuit	Check installation
0x8C01 35841d	3 (Functional check)	valid	Warning	Simulation active	Check operating mode
0x8C10 35856d	2 (Out of specification)	valid	Warning	Process variable range overrun	Process data uncertain
0x8C20 35872d	3 (Functional check)	valid	Error	Measurement range exceeded	Check application
0x8C30 35888d	2 (Out of specification)	valid	Warning	Process variable range underrun	Process data uncertain
0x8CA5 36005d	2 (Out of specification)	valid	Warning	Load for analogue output of too high impedance. Device Status = 2 (Out of specification)	Check wiring
0x8CBF 36031d	1 (Maintenance required)	valid	Warning	Signal quality low	Check application
0x8CC1 36033d	2 (Out of specification)	valid	Warning	Measuring pipe not sufficiently filled. Too low conductivity of medium. Device Status = 2 (Out of specification)	Please check your application
0x8CC5 36037d	2 (Out of specification)	valid	Warning	No media detected	Check application
0x8CE0 36064d	1 (Maintenance required)	valid	Warning	Local user interface disturbed. Device Status = 1 (Maintenance required)	Check device's user interface
0x8DFE 36350d	1 (Maintenance required)	valid	Warning	Test Event 1. Device Status = 1 (Maintenance required)	Event appears by setting index 2 to value 240, Event disappears by setting index 2 to value 241
0x8DFF 36351d	1 (Maintenance required)	valid	Warning	Test Event 2. Device Status = 1 (Maintenance required)	Event appears by setting index 2 to value 242, Event disappears by setting index 2 to value 243



Events are reported by the device itself to signal irregular device states.  
PQ\* = Process data quality.



## Error types

Code	Name	Description
0x8000 32768d	Device application error - no details	Service was denied by the technology-specific application. No detailed root-cause information is available.
0x8011 32785d	Index not available	Read or write access attempt to a non-existing index.
0x8012 32786d	Subindex not available	Read or write access attempt to a non-existing subindex of an existing index.
0x8020 32800d	Service temporarily not available	Parameter not accessible due to the current state of the technology-specific application.
0x8021 32801d	Service temporarily unavailable - local control	Parameter not accessible. The device is currently in an ongoing, locally controlled operation.
0x8022 32802d	Service temporarily unavailable - device control	Parameter not accessible. The technology-specific application is currently in a remotely triggered operation.
0x8023 32803d	Access denied	Write access to a read-only parameter or read access to write-only parameter.
0x8030 32816d	Parameter value out of range	Written parameter value is outside of the permitted value range.
0x8031 32817d	Parameter value above limit	Written parameter value is above its specified value range.
0x8032 32818d	Parameter value below limit	Written parameter value is below its specified value range.
0x8033 32819d	Parameter length overrun	Written parameter is longer than specified.
0x8034 32820d	Parameter length underrun	Written parameter is shorter than specified.
0x8035 32821d	Function unavailable	Written command is not supported by the technology-specific application.
0x8036 32822d	Function temporarily unavailable	Written command is unavailable due to the current state of the technology-specific application.
0x8040 32832d	Invalid parameter set	Written single parameter value collides with other existing parameter settings.
0x8041 32833d	Inconsistent parameter set	Parameter set inconsistencies at the end of block parameter transfer. Device plausibility check failed.
0x8082 32898d	Application not ready	Read or write access denied. The technology-specific application is temporarily unavailable.



Error types are used for the ISDU response. Values unequal to '0' indicate the cause of a failed ISDU read or write procedure.



## ErrorTypes

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The table shows all IO-Link ISDU error codes.  
The device does not need to support all listed error types.