

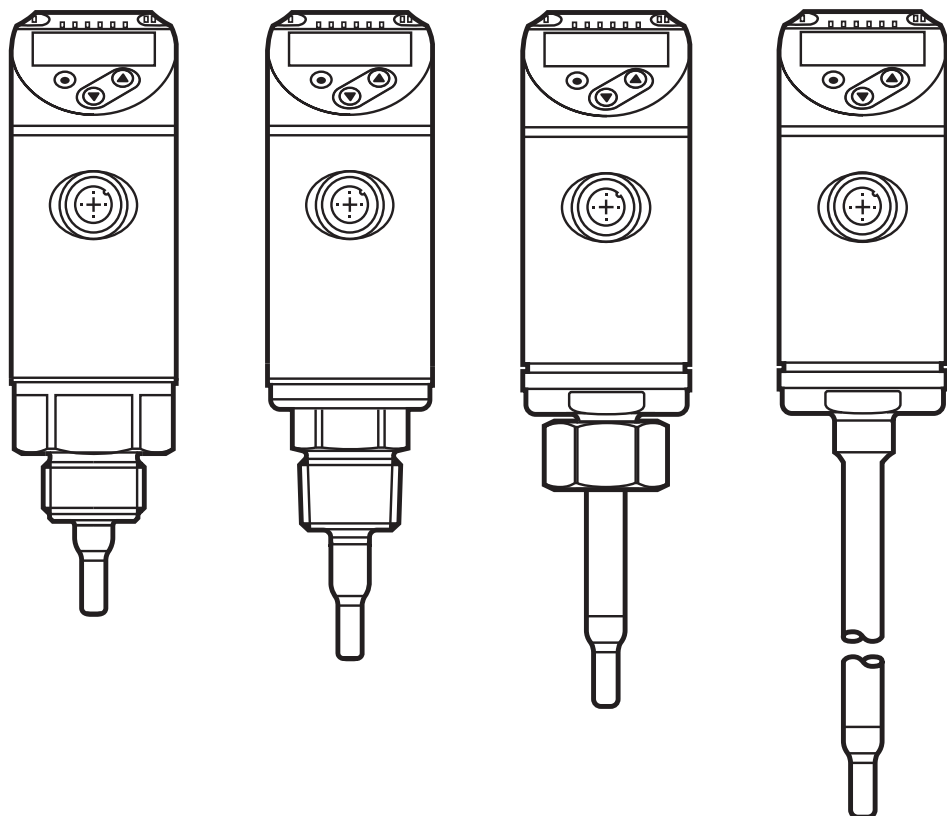


Supplement to the operating instructions:
Selection of the operating mode via IO-
Link interface

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SAxxxx

706416 / 01 04 / 2017



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1 Preliminary note



Please read the supplied operating instructions for all articles described below prior to set-up.

These instructions are an amendment to the supplied operating instructions of the SAxxxx flow sensors in which all setting options via the pushbuttons on the sensor are described.

These present instructions also give alternative options for parameter setting via the IO-Link interface.

2 Operating modes

With regard to the software the SAxxxx flow sensor behaves like 3 sensors on a hardware platform: The following three operating modes can be selected for flow measurement.

Operating mode	Medium	Process value display
REL	liquids, air	% of the taught range
LIQU	liquids	m/s, l/min, m ³ /h (fps, gpm, cfm)
GAS	air	m/s, l/min, m ³ /h (fps, gpm, cfm)

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The operating modes can be set via the pushbuttons on the sensor. As an alternative the operating mode can be changed as follows:

- By means of the memory plug E30398 (→ 3)
- Via the LR SENSOR software (→)
- Via the LR DEVICE software (→ 4.3)
- By setting the vendor ID and device ID at the IO-Link master port (→ 5).

3 Operating mode selection via memory plug E30398

By means of the memory plug E30398 it is possible to duplicate the parameter set and therefore the operating mode of a sensor to several sensors of the same type.



Detailed function description

→ Operating instructions E30398 at www.ifm.com.

3.1 Approach

1. Set the operating mode on the sensor:

- ▶ Change from the RUN mode to the initialisation menu [INI]
- ▶ Select [ModE] and define the operating mode: REL, GAS, LIQU.



A medium and an internal pipe diameter must be entered for the operating modes LIQU and GAS.

When the factory setting is changed (ModE = REL), the unit displays [≡≡≡≡] to force these entries:

- ▶ Press [●].
- > [MEdI] is displayed.
- ▶ Define the medium.
- > [diA] is displayed.
- ▶ Define the internal pipe diameter in mm or inch.



The operating mode REL requires a flow adjustment.



A change of the operating mode leads to a restart of the unit.

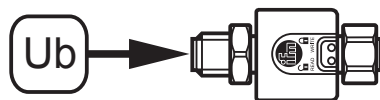
The settings are saved in the respective operating mode, i.e. after a change of the operating mode the settings are not lost.

2. Save the parameter set of the sensor on the memory plug:

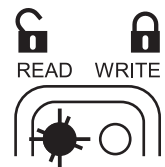
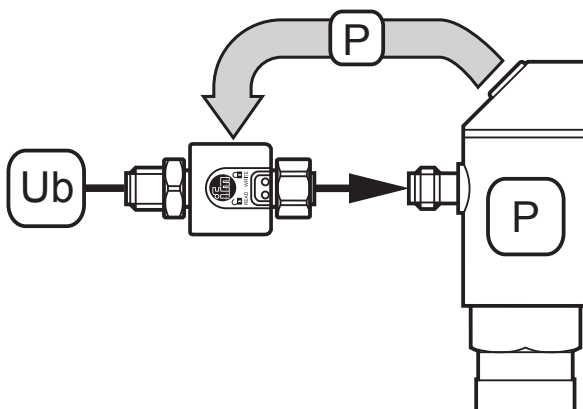
Requirement:

The memory plug is used as delivered (empty / [Write protected])

- ▶ Connect the memory plug to the supply voltage.



- ▶ Connect memory plug and sensor.
- > The memory plug reads the parameter set of the sensor and saves it.

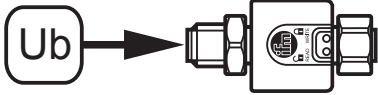

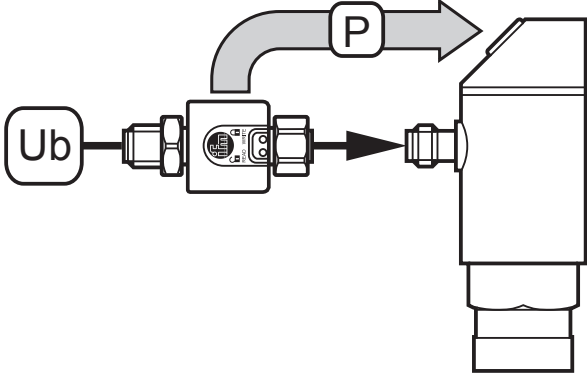


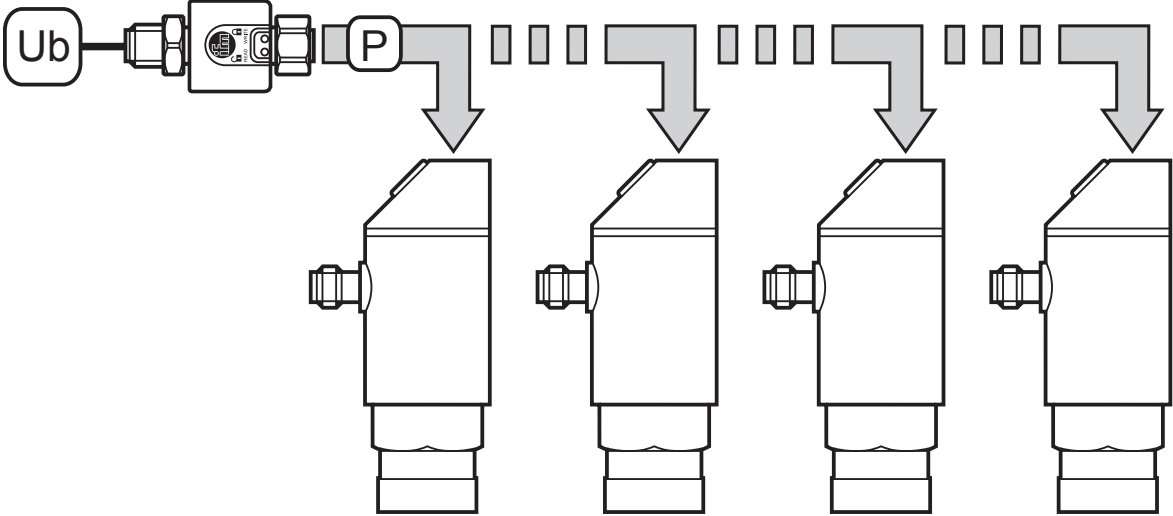


Reading process



Process terminated.
Memory plug full / [Write protected].

3. Transfer a parameter set to other sensors:

<p>▶ Connect the memory plug to the supply voltage.</p> 	
<p>▶ Connect the memory plug with a sensor of the same type. > The memory plug writes its parameter set to the sensor.</p> 	 <p>Writing process</p>  <p>Process terminated</p>
<p>▶ Repeat the process with sensors of the same type as often as you wish.</p> 	

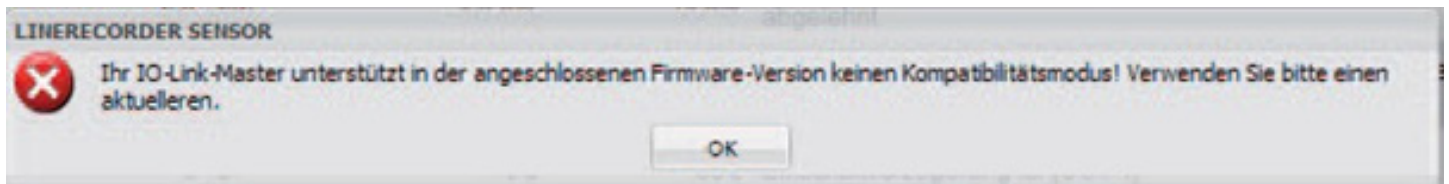
4 Operating mode selection via a parameter setting software

4.1 System requirements

4.1.1 IO-Link interface E30390

Required version: from firmware 2.1.5 – 1.2.5
(production after 17/02/2016, see label on the unit).

If the firmware is older, the following error message is displayed. In this case, an update of the firmware is necessary.



The latest firmware is available for download at www.ifm.com.

► Download firmware and overwrite firmware on the IO-Link interface.



Detailed function description → Operating instructions E30390 at www.ifm.com.

4.1.2 IODD (IO Device Description) for SAxxxx flow sensors

There is a separate IODD for each operating mode which is available for download via ifm's homepage:

SA5030, SA5040, SA2000, SA5000, SA4100, SA4300 IO-Link Device Description IODD

IODD Release V1.3.25.555560 supports IODD1.0.1 and IODD1.1 - Standard

Date	Type	Size
1 Dec 2016	.zip	894.4 kB

[Download](#)

SA5030_GAS, SA5040_GAS, SA2000_GAS, SA5000_GAS, SA4100_GAS, SA4300_GAS IO-Link Device Description IODD

IODD Release V1.3.23.543158 supports IODD1.0.1 and IODD1.1 - Standard

Date	Type	Size
1 Dec 2016	.zip	894.4 kB

[Download](#)

SA5030_LIQU, SA5040_LIQU, SA2000_LIQU,
SA5000_LIQU, SA4100_LIQU, SA4300_LIQU

IO-Link Device Description IODD

IODD Release V1.3.23.543158 supports IODD1.0.1 and IODD1.1 - Standard

Date	Type	Size
1 Dec 2016	.zip	894.4 kB

 Download

- SAxxxx Operating mode REL for flow measurement in liquids and air
- SAxxx_GAS Operating mode GAS for flow measurement in air
- SAxxx_LIQU Operating mode LIQU for flow measurement in liquids

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For ifm units a number of IODDs is stored in the LR SENSOR / LR DEVICE software. If the required IODD is missing, it can be loaded into the software via the marked cloud symbol:



If the symbol is pink, new IODD files are available for download.

4.2 LR SENSOR

Required version: from 4.1.0.43.

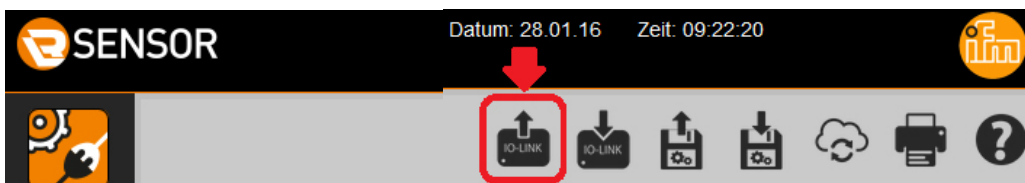


Detailed function description → Operating instructions QA0001 at www.ifm.com.

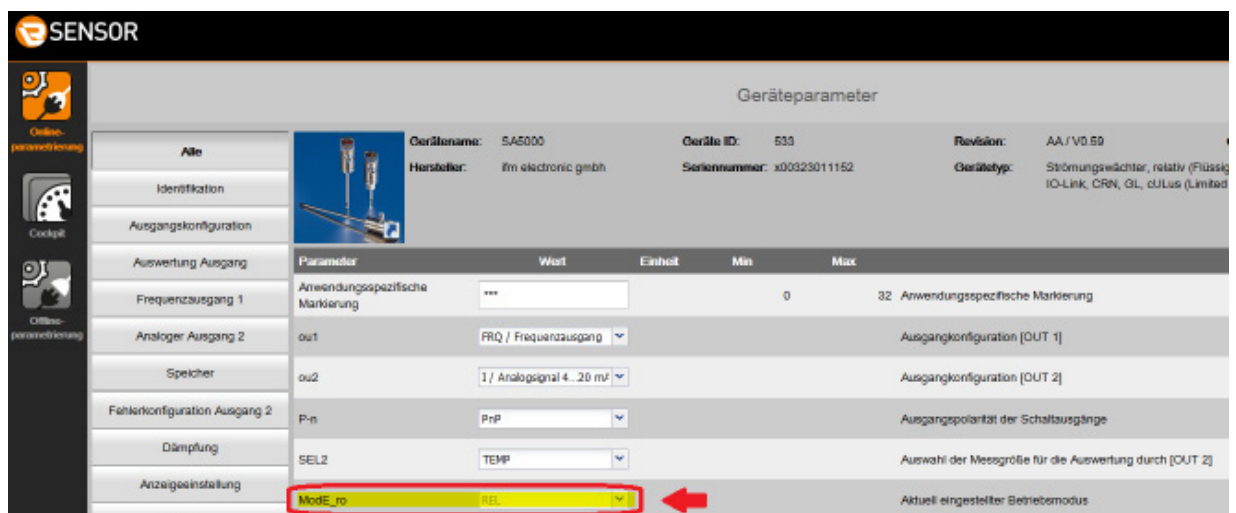
4.2.1 Approach

Example: SA5000 flow sensor.

1. ► Connect sensor to PC via IO-Link interface and read parameter settings via the LR SENSOR.



The parameter for the operating mode [ModE] is displayed but cannot be changed.



The factory setting for SAxxxx is the operating mode [ModE] = REL.

2. ► Change to the offline mode.



3. ▶ Select IODD for the required operating mode.

The screenshot shows the 'Geräteparameter' (Device Parameters) screen in the SENSOR software. On the left, the 'Gerätecatalog' (Device Catalog) is displayed with a search bar and a list of devices. The selected device is 'Hersteller > ifm electronic gmbh > SA5 > SA5000_GAS', which is highlighted with a red box and a red arrow. The right side of the screen shows the 'Geräteparameter' section with fields for 'Gerätename', 'Geräte ID', 'Hersteller', and 'Seriennummer'. Below this is a table with columns for 'Parameter', 'Wert', 'Einheit', 'Min', and 'Max'.



If the required IODD is not available in the unit catalogue, it has to be downloaded in the online mode (→ 4.1.2).

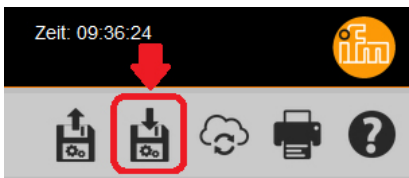
4. ▶ Change parameter settings of the sensor.

The screenshot shows the 'Geräteparameter' (Device Parameters) screen in the SENSOR software. The 'Geräteparameter' section is visible, showing the selected device 'SA5000_GAS' by 'ifm electronic gmbh'. The 'Parameter' table is highlighted with a red box. The table has columns for 'Parameter', 'Wert', 'Einheit', 'Min', 'Max', and 'Beschreibung'. The parameters listed are:

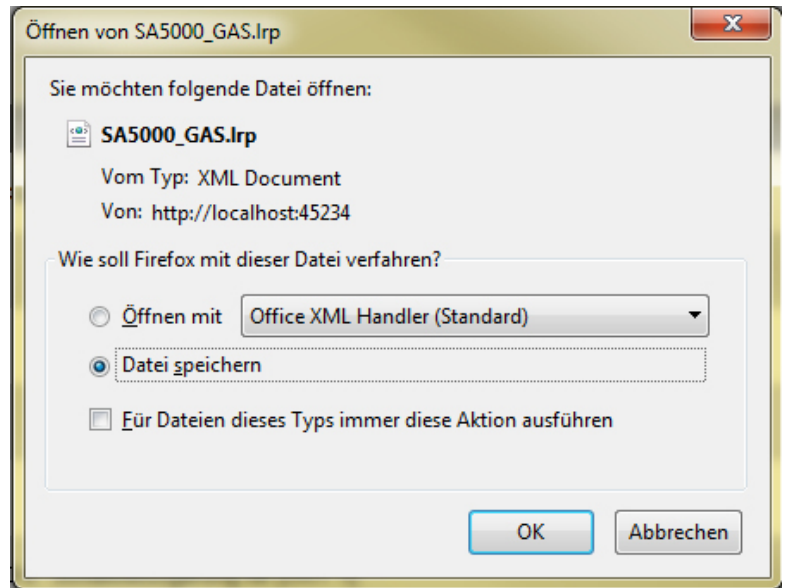
Parameter	Wert	Einheit	Min	Max	Beschreibung	
Anwendungsspezifische Markierung			0	32	Anwendungsspezifische Markierung	
Analoger Ausgang 1	cu1	lno / Hysteresefunktion, v			Ausgangskonfiguration [OUT 1]	
Analoger Ausgang 2	cu2	l / Analogsignal 4...20 mA v			Ausgangskonfiguration [OUT 2]	
Fehlerkonfiguration Ausgang 1	P-n	FnP v			Ausgangspolarität der Schaltsausgänge	
Fehlerkonfiguration Ausgang 2	SEL2	FLOW v			Auswahl der Messgröße für die Auswertung durch [OUT 2]	
Dämpfung	dS1		0 s	60 s	Schaltverzögerung für [OUT 1]	
Anzeigeinstellung	dR1		0 s	60 s	Rückschaltverzögerung für [OUT 1]	
Kalibrierung	SP_FH1_FLOW		20 m/s	7 m/s	100 m/s	Schaltpunkt 1 / Strömung, [SP1] muss größer als [FP1] sein. Bitte berücksichtigen sie den aktuellen [FP1]. Wird der [SP1] unter den [FP1] gestellt, so wird dies abgelehnt. [SP] = [FH] und [FP] = [FL] bei [OU1] = Fno, Fnc.
Grundeinstellungen	FP_FL1_FLOW		15 m/s	2 m/s	95 m/s	Rückschaltpunkt 1 / Strömung, [FP1] muss kleiner als [SP1] sein. Bitte berücksichtigen sie den aktuellen [SP1]. Wird der [FP1] über den [SP1] gestellt, so wird dies abgelehnt. [FP] = [FL] und [SP] = [FH] bei [OU1] = Fno, Fnc.
Diagnose	ASP2_FLOW		0 m/s	0 m/s	81 m/s	Analoger Startpunkt 2 / Strömung, [ASP2] muss kleiner als [AEP2] sein Bitte berücksichtigen sie den aktuellen [AEP2]. Infos zur min Hysterese [AEP2]-[ASP2] entnehmen Sie bitte der Bedienungsanleitung

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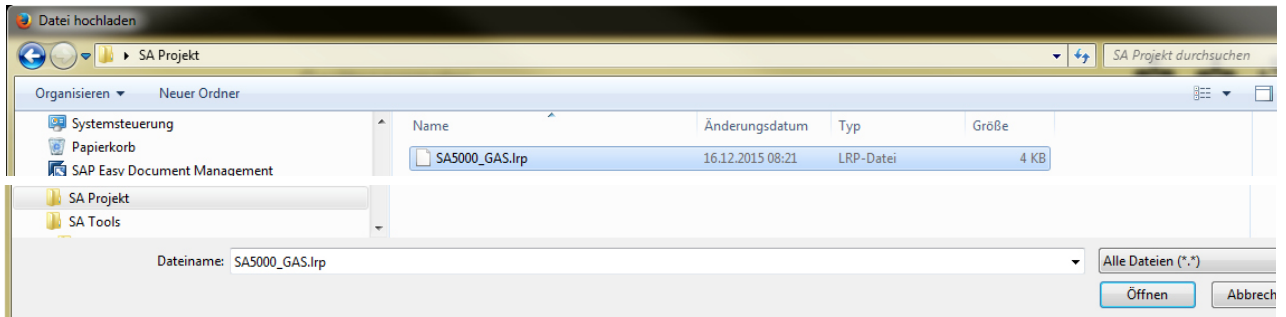
5. ► Save changed parameter set as lrp file.



>



>

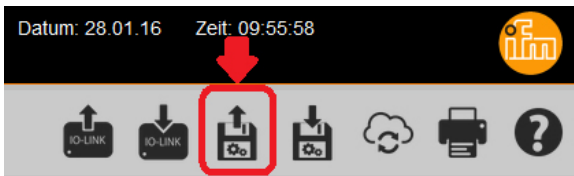


6. ► Change to the online mode.

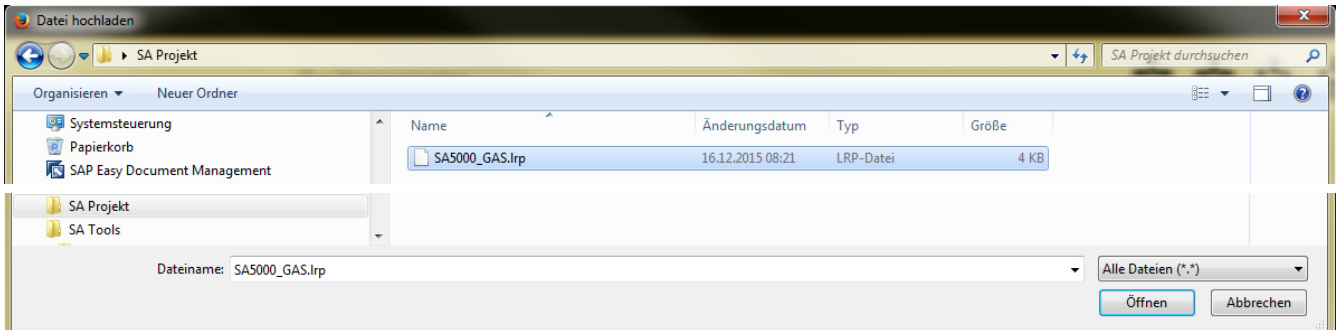


In the offline mode, reading or writing to a connected device is not possible. The saved file with the parameter set can only be accessed in the online mode and then be written to the device.

7. ▶ Load parameter set as file.



▶ Open the Irp file stored in step 5.

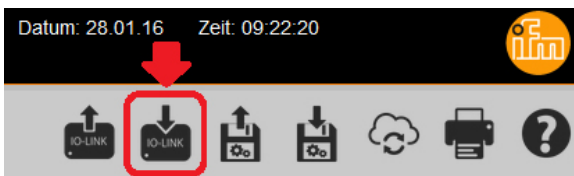


The Irp file contains the operating mode selected in step 3 with the parameter settings adapted in step 4.



The setting of the medium [MEdI] is not stored in the Irp file. It has to be set manually under the menu item [MEdI].

8. ▶ Write the parameter set to the sensor.



> The sensor carries out a reset and restarts:



> The sensor is now in the GAS operating mode:



In case of a new parameter setting via the LR SENSOR the software detects the newly set operating mode automatically.

4.3 LR DEVICE

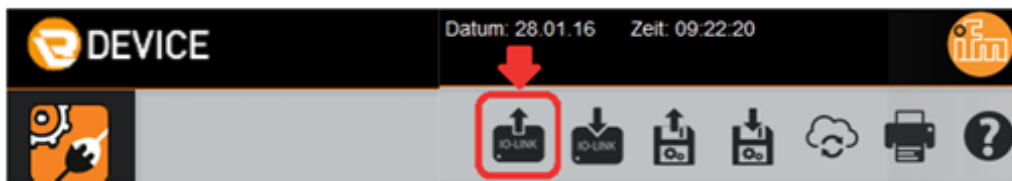


Detailed function description → Operating instructions QA0011 at www.ifm.com.

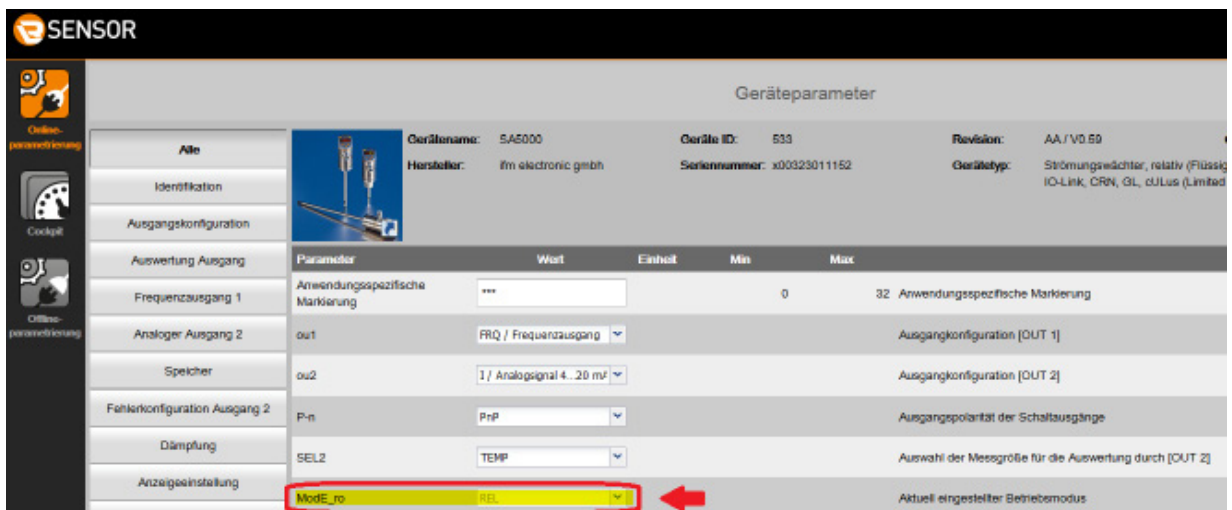
4.3.1 Approach

Example: SA5000 flow sensor.

1. ► Connect sensor to PC via IO-Link interface and read parameter settings via the LR DEVICE.

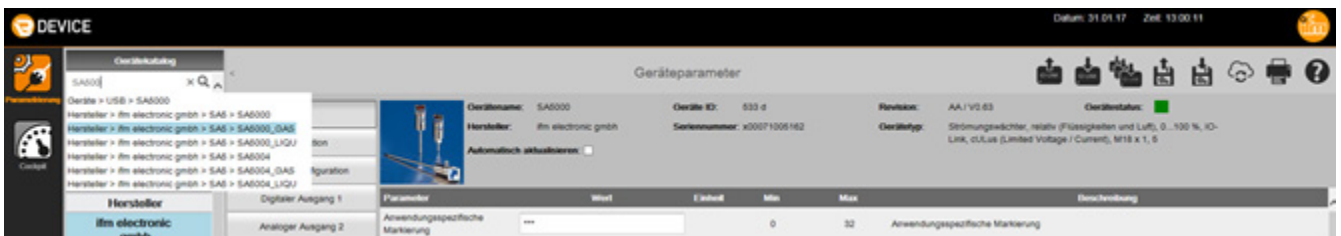


The parameter for the operating mode [ModE] is displayed but cannot be changed.



The factory setting for SAxxxx is the operating mode [ModE] = REL.

2. ► Select IODD for the required operating mode.

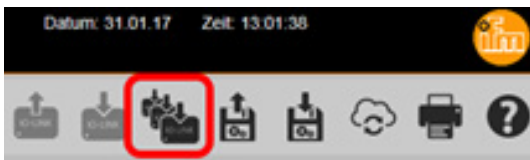


If the required IODD is not available in the unit catalogue, it has to be downloaded in the online mode (→ 4.1.2).

3. ► Change parameter settings of the sensor.

Parameter	Wert	Einheit	Min	Max	Beschreibung
Anwendungsspezifische Markierung	---		0	32	Anwendungsspezifische Markierung
out1	Wb / Hydratefunktion, Schalter				Ausgangskonfiguration [OUT 1]
out2	I / Analogsignal 4...20 mA				Ausgangskonfiguration [OUT 2]
SEL2	FLOW				Auswahl der Messgröße für die Auswertung durch [OUT 2]
P-n	PNP				Ausgangspolarität der Schaltungslänge
SP_FH1_FLOW	20,00	mls	6,00 mls	100,40 mls	Schaltpunkt 1 / Strömung. [SP1] muss größer als [FP1] sein. Bitte berücksichtigen Sie den aktuellen [FP1]. Wird der [SP1] unter den [FP1] gestellt, so wird das abgelehnt. [SP] + [FH] und [FP] + [FH] bei [OU1] = Fno, Fnc.
FP_FL1_FLOW	15,00	mls	2,00 mls	96,00 mls	Rückschaltpunkt 1 / Strömung. [FP1] muss kleiner als [SP1] sein. Bitte berücksichtigen Sie den aktuellen [SP1]. Wird der [FP1] über den [SP1] gestellt, so wird dies abgelehnt. [FP] + [FL] und [SP] + [FL] bei [OU1] = Fno, Fnc.
st1	0,0	s	0,0 s	80,0 s	Schaltverzögerung für [OUT 1]
st1	0,0	s	0,0 s	80,0 s	Rückschaltverzögerung für [OUT 1]
ASP2_TEMP	-20,0	°C	-20,0 °C	76,0 °C	Analoger Startpunkt 2 / Temperatur. [ASP2] muss kleiner als [AEP2] sein. Bitte berücksichtigen Sie den aktuellen [AEP2]. Bitte zur max Hysterese [AEP2] [ASP2] entnehmen Sie bitte zur Bedienungsanleitung.

4. ► Write the parameter set to the sensor.



Geräteparameter	Topologie	kompatibel
SA5000	Geräte > USB > SA5000	Nein

> The sensor carries out a reset and restarts:



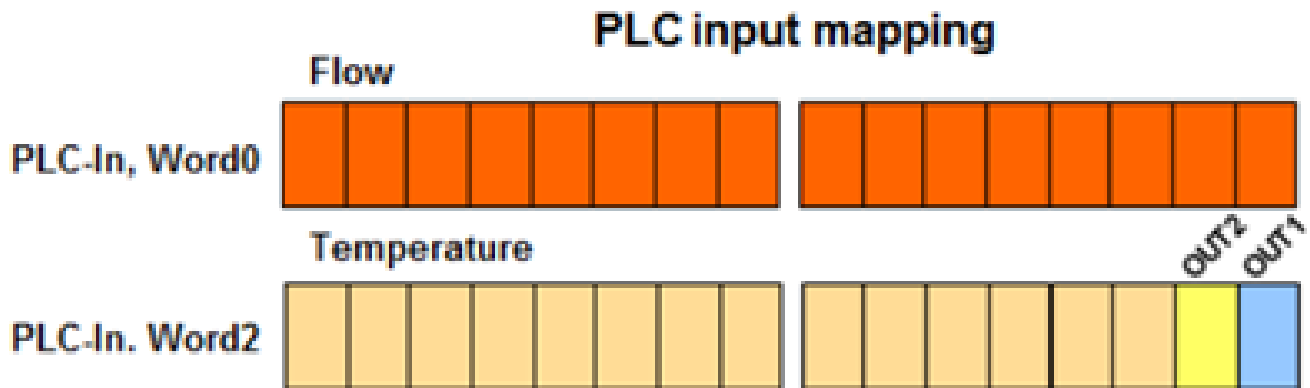
> The sensor is now in the GAS operating mode:



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5 Selection of the operating mode at the IO-Link master port

The SA sensors have a process data width of 4 bytes:

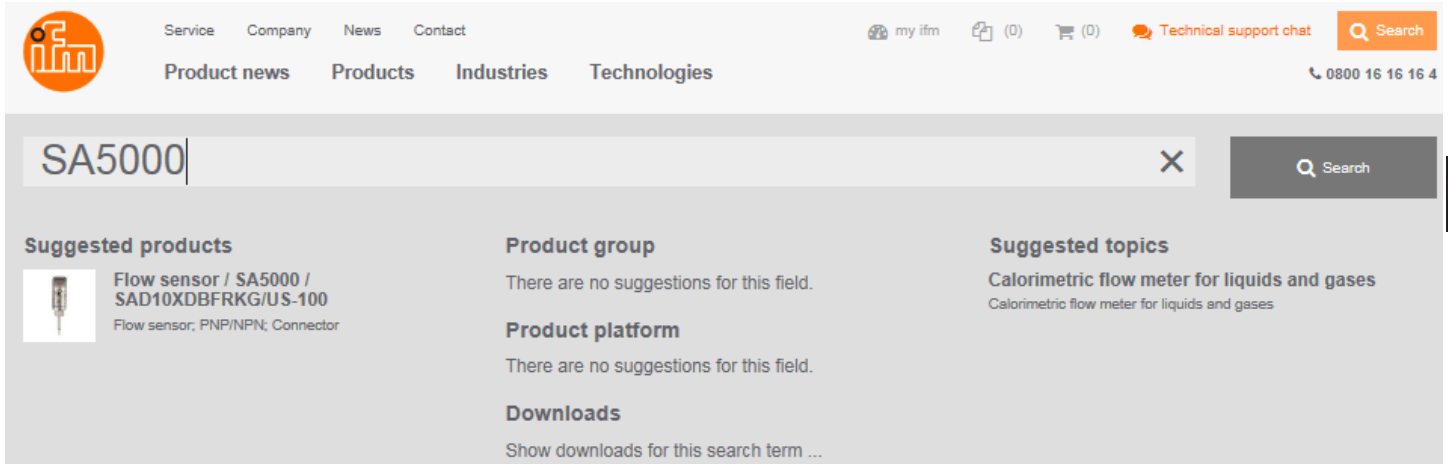


5.1 Determine vendor ID and device ID

- ▶ Vendor ID and device ID for the respective sensor and the requested operating mode can be found on our website at www.ifm.com.

5.1.1 Example for SA5000

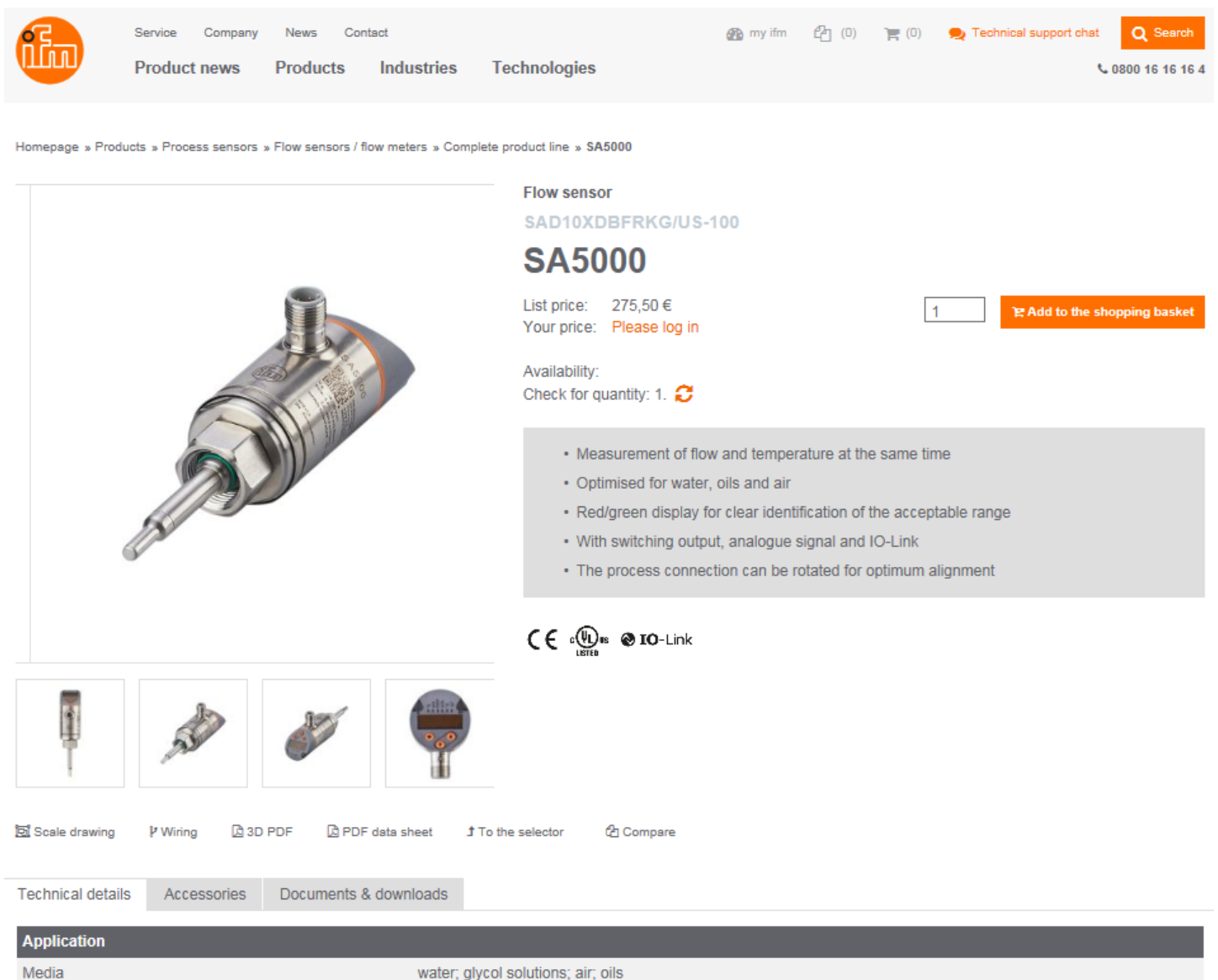
- ▶ Enter the article number under Search.



The screenshot shows the IFM website's search interface. The search bar contains 'SA5000'. Below the search bar, there are three columns of suggested results:

- Suggested products:** A product card for 'Flow sensor / SA5000 / SAD10XDBFRKG/US-100' with a small image of the sensor.
- Product group:** A message stating 'There are no suggestions for this field.'
- Product platform:** A message stating 'There are no suggestions for this field.'
- Downloads:** A message stating 'Show downloads for this search term ...'
- Suggested topics:** A topic titled 'Calorimetric flow meter for liquids and gases' with a sub-description.

- > The article is displayed:



The screenshot shows the product page for the SA5000 flow sensor. The page includes a navigation bar, a breadcrumb trail, a large product image, and detailed product information.

Flow sensor
SAD10XDBFRKG/US-100
SA5000

List price: 275,50 €
Your price: **Please log in**

Availability:
Check for quantity: 1

Add to the shopping basket

- Measurement of flow and temperature at the same time
- Optimised for water, oils and air
- Red/green display for clear identification of the acceptable range
- With switching output, analogue signal and IO-Link
- The process connection can be rotated for optimum alignment

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Technical details | Accessories | Documents & downloads

Application
Media: water; glycol solutions; air; oils

- ▶ Select the tab "Documents & downloads".
- ▶ Open PDF for the requested operating mode and language.

IODD Downloads

IO Device Description - IODD

Language

English



[IO Device Description PDF](#)

IO Device Description PDF GAS

IO Device Description PDF LIQUID

- PDF Operating mode REL for flow measurement in liquids and air
- PDF GAS Operating mode GAS for flow measurement in air
- PDF LIQUID Operating mode LIQU for flow measurement in liquids

- ▶ Note down vendor ID and device ID:

Version V1.3.25.555560 Release date 2016-10-25

Copyright 2016, Builder: 3.1.2.1, Time: 09:09:39

SA

Vendor ID	310 / 0x0136 - Bytes: 01 54 / 0x01 0x36
Device ID	533 / 0x000215 - Bytes: 00 02 21 / 0x00 0x02 0x15
Vendor name	ifm electronic gmbh
Vendor text	www.ifm.com
Vendor URL	http://www.ifm.com/ifmgb/web/io-link-download.htm

5.2 Set vendor ID and device ID at the master port



In this example the software Siemens Step7 and the ifm IO-Link master AL1100 are used. The procedure may be slightly different with other control systems and other IO-Link masters.

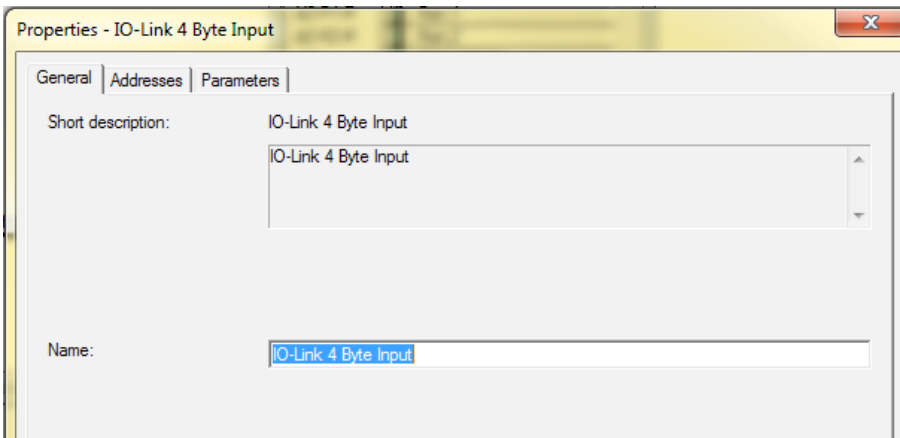
- ▶ Select the module IO-Link 4 Byte Input in the device catalogue and drag and drop it to the respective port.

Slot	Module	Order number	I Addr.	Q addr.	Diagnostic Addr.	Comm.	Access
0	AL 1000	AL 1000			2042*		Full
X1	PN40				2041*		Full
X1 P1 R	Part 1				2040*		Full
X1 P2 R	Part 2				2039*		Full
1	IO-Link Master				0*		
1.1	Status/Control Module		0...3	0...3			Full
1.2	IO-Link 4 Byte Input		256...259				Full
1.3	Digital Input				2037*		Full
1.4	Digital Input				2036*		Full
1.5	Digital Input				2035*		Full
1.6	Digital Input				2034*		Full
1.7	Digital Input				2033*		Full
1.8	Digital Input				2032*		Full
1.9	Digital Input				2031*		Full

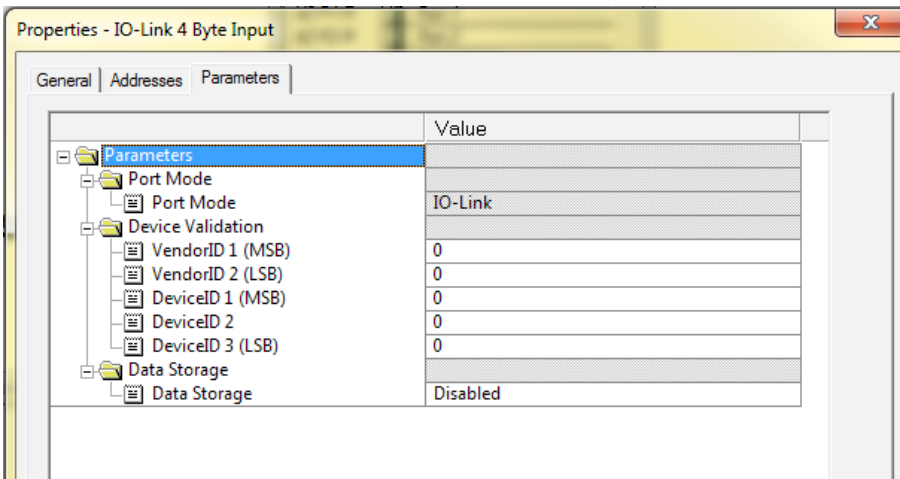
Slot	Module	Order number	I Addr...	Q addr...	Diagnostic Addr...	Comm...	Access
0	AL 1000	AL 1000			2042*		Full
X1	PN40				2041*		Full
X1 P1 R	Part 1				2040*		Full
X1 P2 R	Part 2				2039*		Full
1	IO-Link Master				0*		
1.1	Status/Control Module		0...3	0...3			Full
1.2	IO-Link 4 Byte Input		256...259				Full
1.3	Digital Input				2037*		Full
1.4	Digital Input				2036*		Full
1.5	Digital Input				2035*		Full
1.6	Digital Input				2034*		Full
1.7	Digital Input				2033*		Full
1.8	Digital Input				2032*		Full
1.9	Digital Input				2031*		Full

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► Double-click the module to open the Properties window.

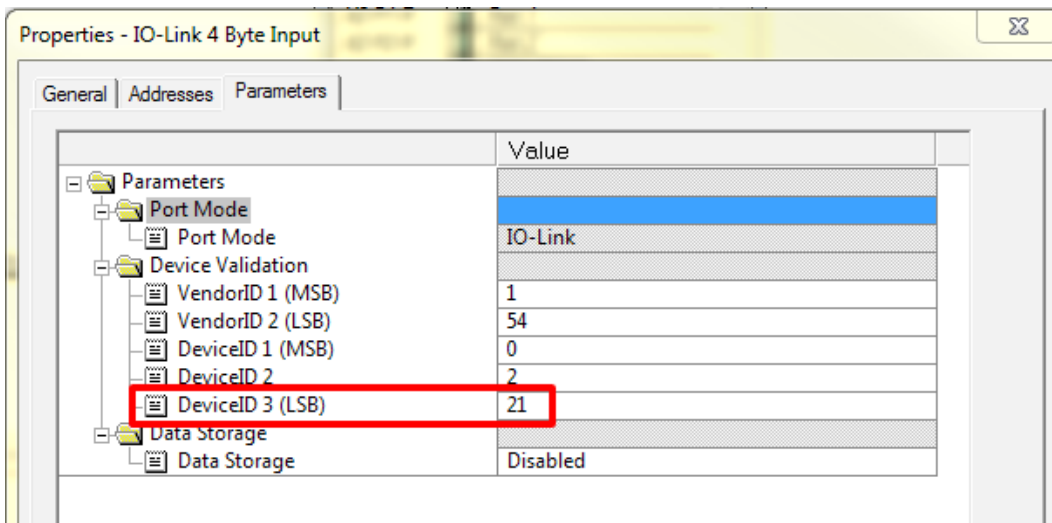


► Select the tab "Parameters".

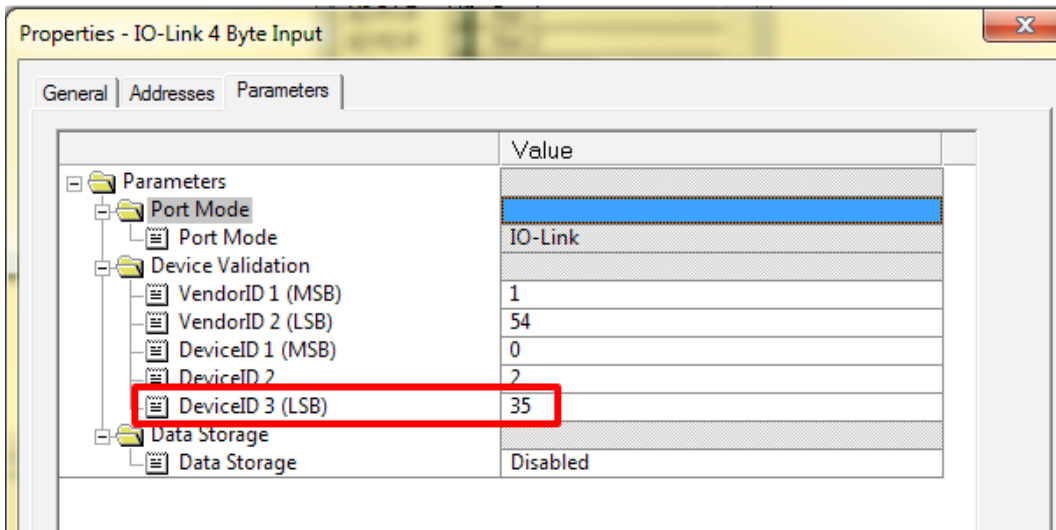


► Enter vendor ID and device ID (→ 5.1):

- Operating mode REL:

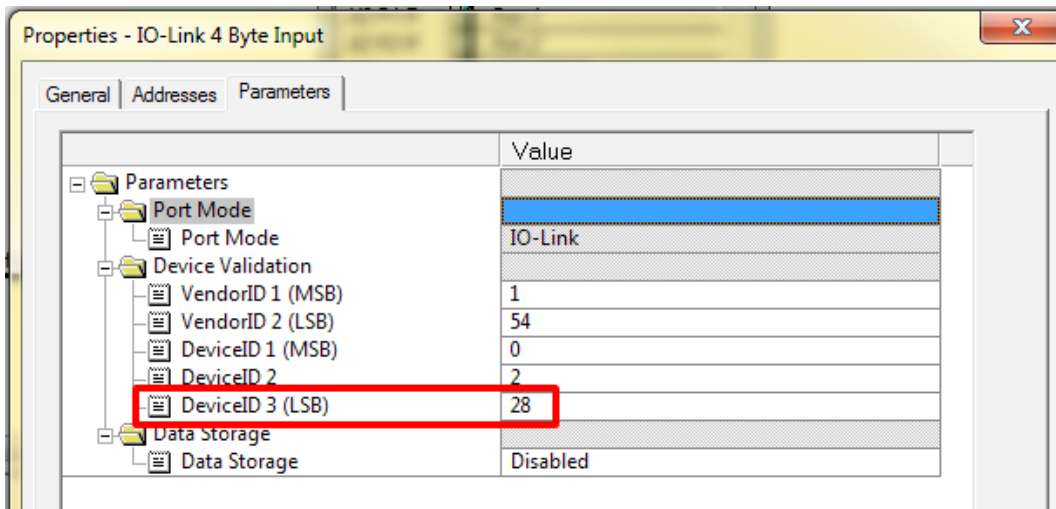


- Operating mode GAS:



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- Operating mode LIQU:



- > When communication is initiated the master calls up the selected operating mode, the connected SA sensor adjusts automatically.