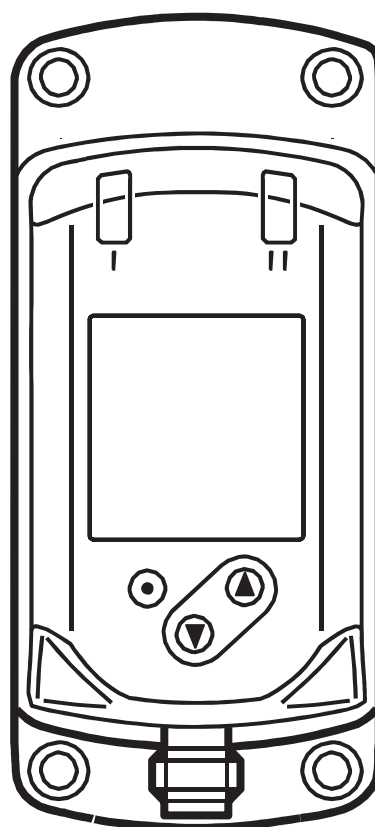


lfm electronic



Programming instructions
IO-Link Display 1,44"
E30391



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Technical data, approvals, accessories and further information at www.ifm.com

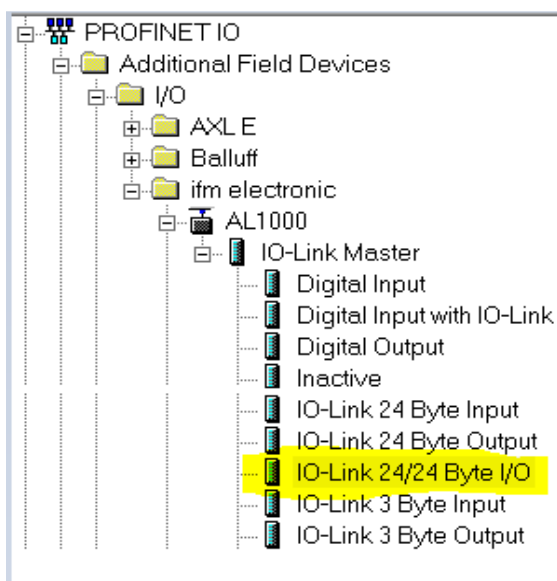
1. Installation and electrical connection

For installation and electrical connection please read see the operating instructions → www.ifm.com.

2. Set-up

When the IO-Link Display is connected to an IO-Link master the IO-Link port has to be configured.

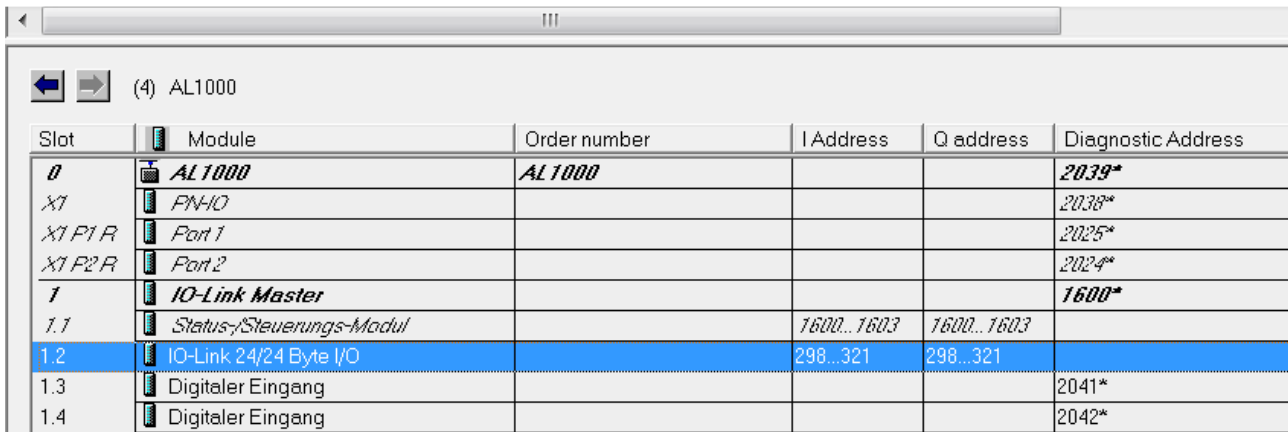
In this example the IO-Link master AL1000 from ifm electronic is used with the Siemens software Step 7.



The IO-Link Display has an interface with 1-byte input (→ 4.2 Input data) and 14-byte output (→ 4.1 Output data).

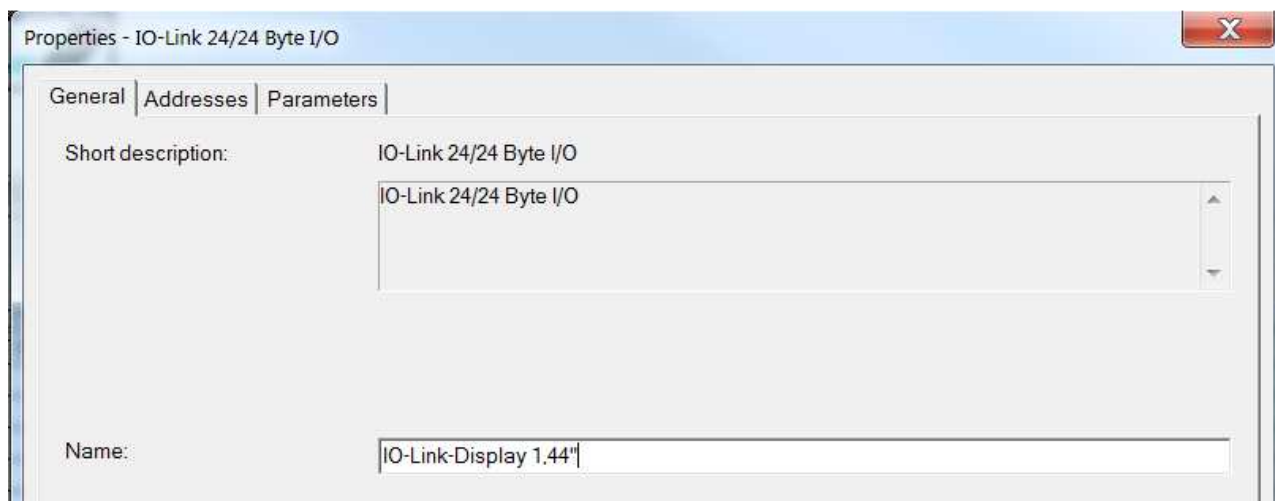
If there is no explicit module on the master used it is possible to use an existing module with a wider interface.

1. Drag, for example, a 24/24-byte I/O module to the master port to which the IO-Link Display is to be connected.
2. Double click on the module:

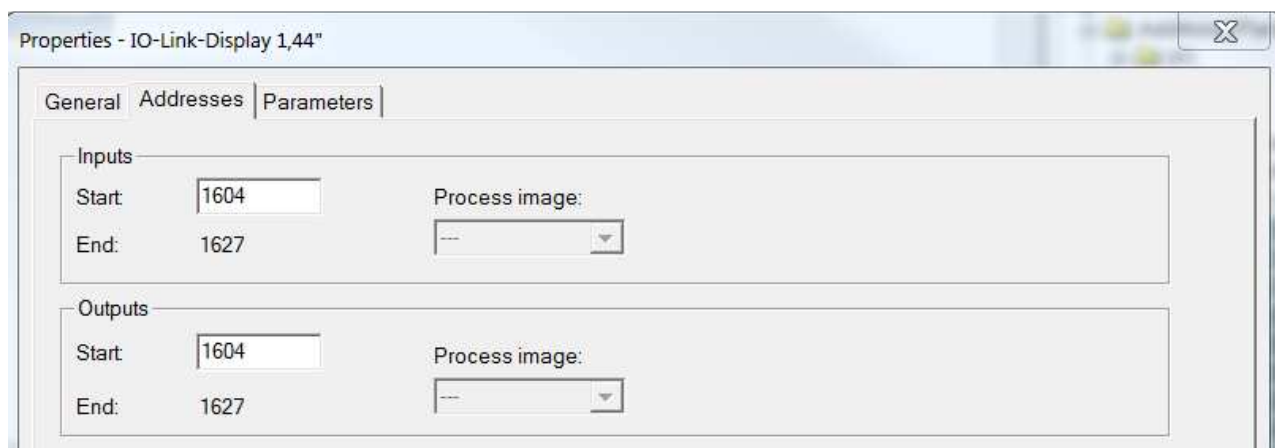


Slot	Module	Order number	I Address	Q address	Diagnostic Address
0	AL1000	AL1000			2039*
X1	PN-I/O				2038*
X1 P1 R	Port 1				2025*
X1 P2 R	Port 2				2024*
1	IO-Link Master				1600*
1.1	Status-/Steuerungs-Modul		1600...1603	1600...1603	
1.2	IO-Link 24/24 Byte I/O		298...321	298...321	
1.3	Digitaler Eingang				2041*
1.4	Digitaler Eingang				2042*

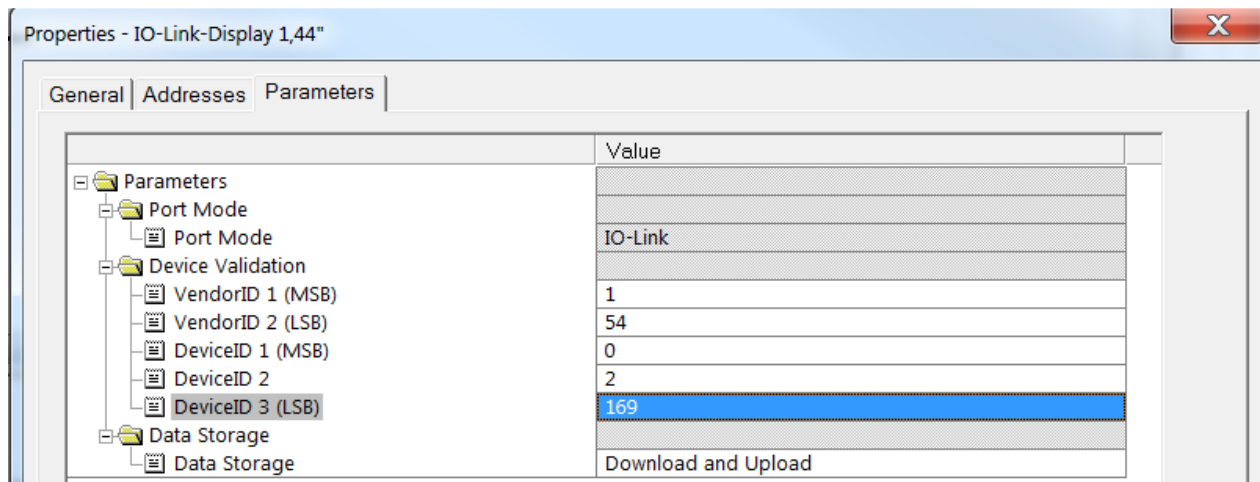
3. Enter name and comment as an option:



4. Enter addresses for input and output ranges:



5. Enter vendor ID and device ID to ensure that only an IO-Link Display 1,44" can be operated at that port.
6. Set the data storage according to the application's requirements:



7. Write the configuration to the controller or PLC.
8. Connect the IO-Link Display to the master using a 3-wire cable.

3.Parameter setting (acyclic communication)

Settings can be made and predefined text can be entered by means of the IO-Link parameter setting tool or a PLC by writing the corresponding parameters.

The LINERECORDER DEVICE can for example be used as IODD-based parameter setting tool (→ 3.1).

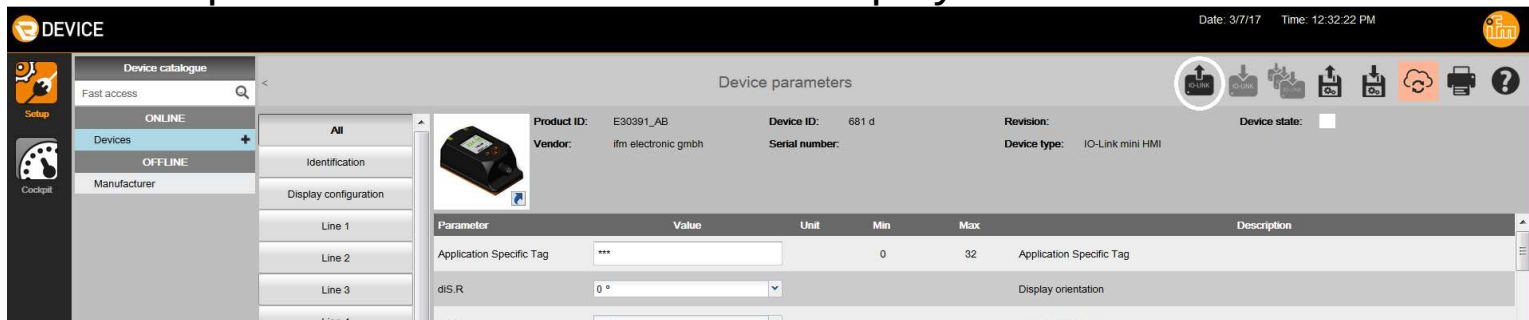
It is possible to configure the following properties:

- Process value display (unit, description text, decimal places) → 3.2
- Text content for info pages → 3.3
- Background colour of the info page → 3.4
- Text instead of process values → 3.5; → 0
- Display layout → 3.7
- Content of a QR code → 3.8

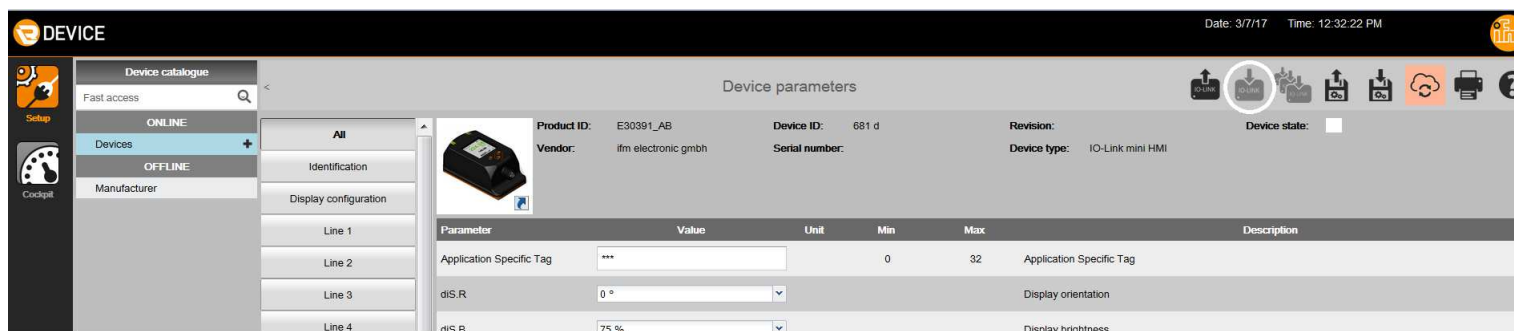
The process values, colours and layout switching are controlled via the cyclic communication of the controlling PLC. (→ 4)

3.1. Parameter setting with LINERECORDER DEVICE

- ▶ Connect the IO-Link Display via the USB interface E30390.
- ▶ Start the LINERECORDER DEVICE.
- ▶ Read parameters from the IO-Link Display:



- ▶ Change parameters.
- ▶ Write parameters to the IO-Link Display:



> The IO-Link Display can now be connected to the IO-Link master.

3.2. Process value display

Name	Index / subindex	Type / length	Content
Unit 1	80/0	String/8	Units of the process values
Unit 2	81/0		
Unit 3	82/0		
Unit 4	83/0		
Description 1	90/0	String/16	Description text of the process values
Description 2	91/0		
Description 3	92/0		
Description 4	93/0		
Decimal place 1	100/0	UINT8/1	Number of decimal places of the process values: 0 = no decimal place 1 = 1 decimal place 2 = 2 decimal places 3 = 3 decimal places
Decimal place 2	101/0		
Decimal place 3	102/0		
Decimal place 4	103/0		

3.3. Text content for info pages

Up to 16 characters per line can be used.

Name	Index / subindex	Type / length	Content
Info page 1, line 1	120/0	String/16	Text content of page 1
Info page 1, line 2	121/0		
Info page 1, line 3	122/0		
Info page 1, line 4	123/0		
Info page 1, line 5	124/0		
Info page 2, line 1	125/0	String/16	Text content of page 2
Info page 2, line 2	126/0		
Info page 2, line 3	127/0		
Info page 2, line 4	128/0		
Info page 2, line 5	129/0		

Name	Index / subindex	Type / length	Content
Info page 3, line 1	130/0	String/16	Text content of page 3
Info page 3, line 2	131/0		
Info page 3, line 3	132/0		
Info page 3, line 4	133/0		
Info page 3, line 5	134/0		
Info page 4, line 1	135/0	String/16	Text content of page 4
Info page 4, line 2	136/0		
Info page 4, line 3	137/0		
Info page 4, line 4	138/0		
Info page 4, line 5	139/0		
Info page 5, line 1	12100/0	String/16	Text content of page 5
Info page 5, line 2	12101/0		
Info page 5, line 3	12102/0		
Info page 5, line 4	12103/0		
Info page 5, line 5	12104/0		
Info page 6, line 1	12105/0	String/16	Text content of page 6
Info page 6, line 2	12106/0		
Info page 6, line 3	12107/0		
Info page 6, line 4	12108/0		
Info page 6, line 5	12109/0		
Info page 7, line 1	12110/0	String/16	Text content of page 7
Info page 7, line 2	12111/0		
Info page 7, line 3	12112/0		
Info page 7, line 4	12113/0		
Info page 7, line 5	12114/0		
Info page 8, line 1	12115/0	String/16	Text content of page 8
Info page 8, line 2	12116/0		
Info page 8, line 3	12117/0		
Info page 8, line 4	12118/0		
Info page 8, line 5	12119/0		

Name	Index / subind	Type /	Content
Info page 9, line 1	12120/0	String/16	Text content of page 9
Info page 9, line 2	12121/0		
Info page 9, line 3	12122/0		
Info page 9, line 4	12123/0		
Info page 9, line 5	12124/0		
Info page 10, line 1	12125/0	String/16	Text content of page 10
Info page 10, line 2	12126/0		
Info page 10, line 3	12127/0		
Info page 10, line 4	12128/0		
Info page 10, line 5	12129/0		

3.4. Background colour of the info pages

Name	Index / subindex	Type / length	Content
Background colour info page	140/0	INT8/1	Page colour: 0 = black-white 1 = red 2 = green 3 = yellow
Background colour info page	141/0		
Background colour info page	142/0		
Background colour info page	143/0		
Background colour info page	144/0		
Background colour info page	145/0		
Background colour info page	146/0		
Background colour info page	147/0		
Background colour info page	148/0		
Background colour info page	149/0		

3.5. Free text instead of process values

Text defined by the user which can be displayed instead of process values.

Name	Index / subindex	Type / length	Content
Text 1	161/0	String/16	Text which can be freely defined. Maximum length: 16 bytes
Text 2	162/0		
Text 3	163/0		
Text 4	164/0		
Text 5	165/0		
Text 6	166/0		
Text 7	167/0		
Text 8	168/0		
Text 9	169/0		
Text 10	170/0		
Text 11	171/0		
Text 12	172/0		
Text 13	173/0		
Text 14	174/0		
Text 15	175/0		
Text 16	176/0		
Text 17	177/0		
Text 18	178/0		
Text 19	179/0		
Text 20	180/0		
Text 21	181/0		
Text 22	182/0		
Text 23	183/0		
Text 24	184/0		
Text 25	185/0		
Text 26	186/0		
Text 27	187/0		
Text 28	188/0		
Text 29	189/0		
Text 30	190/0		
Text 31	191/0		
Text 32	192/0		

3.6. Predefined text instead of process values

Text defined in the device which can be used instead of process values.

Index / subindex	Type / length	Text
1000/0	String/16	C
1001/0	String/16	°C
1002/0	String/16	°F
1004/0	String/16	rad
1005/0	String/16	°
1010/0	String/16	m
1012/0	String/16	cm
1013/0	String/16	mm
1019/0	String/16	in
1034/0	String/16	m ³
1038/0	String/16	l
1040/0	String/16	ml
1048/0	String/16	gal
1053/0	String/16	ft ³ std.
1054/0	String/16	s
1056/0	String/16	ms
1058/0	String/16	min
1061/0	String/16	m/s
1062/0	String/16	mm/s
1067/0	String/16	ft/s
1076/0	String/16	m/s ²
1077/0	String/16	Hz
1081/0	String/16	kHz
1082/0	String/16	1/s
1083/0	String/16	1/min
1085/0	String/16	rpm
1130/0	String/16	Pa
1132/0	String/16	MPa

Index / subindex	Type / length	Text
1133/0	String/16	kPa
1136/0	String/16	hPa
1137/0	String/16	bar
1138/0	String/16	mbar
1141/0	String/16	psi
1146/0	String/16	inH2O
1149/0	String/16	mmH2O
1155/0	String/16	inHg
1157/0	String/16	mmHg
1211/0	String/16	mA
1212/0	String/16	μA
1240/0	String/16	V
1243/0	String/16	mV
1342/0	String/16	%
1348/0	String/16	m ³ /min
1349/0	String/16	m ³ /h
1352/0	String/16	l/min.
1353/0	String/16	l/h
1357/0	String/16	ft ³ /min
1358/0	String/16	ft ³ /h
1360/0	String/16	ft ³ /min std.
1361/0	String/16	ft ³ /h std.
1363/0	String/16	gal/min
1364/0	String/16	gal/h
1563/0	String/16	ml/min
1573/0	String/16	Nm ³
1574/0	String/16	NI
1589/0	String/16	Nm ³ /min
1590/0	String/16	Nm ³ /h
1593/0	String/16	NI/min

3.7. Display configuration

Definition of rotation, brightness and colour scheme of the display.

Name	Index / subindex	Type / length	Content
diS.R	801/0	UINT8/1	Rotation of the display Setting values: 0°, 90°, 180°, 270°
diS.B	802/0		Brightness of the display: 0 %, 25 %, 50 %, 75 %, 100 %
diS.S	803/0		Colour scheme of the display: 0 = black background 1 = white

3.8. QR code

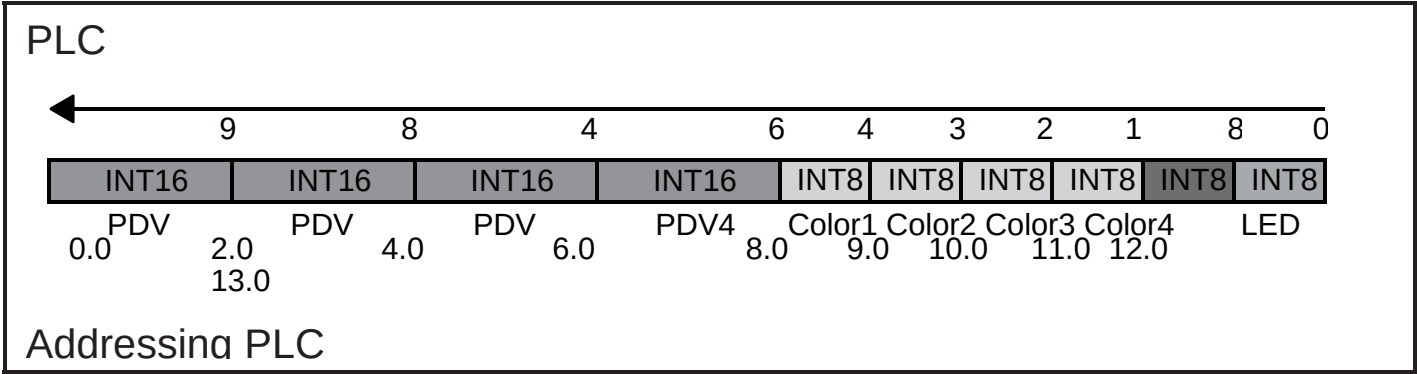
To display the content defined in this index as QR code on the screen set the layout type of the display to [QR-Code] → 4.1

Name	Index / subindex	Type / length	Content
QR code	830/0	String/122	URL or short free text

4.IO-Link process data (cyclic communication)

4.1. Output data

The connected PLC transmits process values in the output data stream and controls the display of the process values.
It is defined in the layout byte which layout is to be displayed, e.g. 1 large process value or an info page.



Addressing PLC

Name	Byte offset	Type / length	Note / content
PDV1: value line 1	0.0	INT16/2	Process value x or text saved instead of the process value (→ 3.5; → 3.5).
PDV2: value line 2	2.0		
PDV3: value line 3	4.0		
PDV4: value line 4	6.0		

Name	Byte offset	Type / length	Note / content
Color1: Display line 1	8.0	INT8/1	Colour and flashing (frequency 2 Hz) Colour of the static process value: 0 = black-white 1 = red 2 = green 3 = yellow Colour of the static display text: 80 = text black and white 81 = text red 82 = text green 83 = text yellow Colour of the flashing process value: 40 = black-white 41 = red 42 = green 43 = yellow Colour of the flashing display text: 120 = text black and white 121 = text red 122 = text green 123 = text yellow
Color2: Display line 2	9.0		
Color3: Display line 3	10.0		
Color1: Display line 4	11.0		
LEDs	12.0	Bool / 1	0 = LED I off 1 = LED I yellow
	12.1	Bool / 1	reserved
	12.2	Bool / 1	0 = LED II off 1 = LED II yellow
	12.3...12.7		reserved

Name	Byte offset	Type / length	Note / content
Display layout	13.0	INT8/1	0 = Start screen 1 = layout 1 for one process value 2 = layout 2 for two process values 3 = layout 3 for three process values 4 = layout 4 for four process values 11 = display info page 1 12 = Display info page 2 13 = Display info page 3 14 = Display info page 4 15 = Display info page 5 16 = Display info page 6 17 = Display info page 7 18 = Display info page 8 19 = Display info page 9 20 = Display info page 10 21 = display of the QR code

4.2. Input data

Bit	7	6	5	4	3	2	1	0
Function	PDout inv	Content inv	Reserved		ESC	Enter	Up	Down

If a key is pressed, the corresponding flag is active.
 During the runtime the following input data is available as INT8 value:

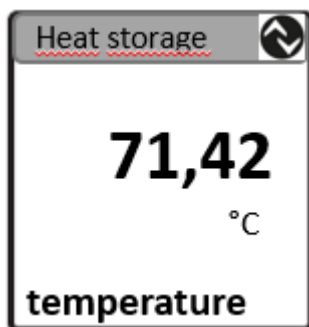
Address / bit	Function	Description
0	Down	Down key pressed
1	Up	Up key pressed
2	Enter	Enter key pressed
3	ESC	Up and down keys pressed

Address / bit	Function	Description
4	---	Reserved
5	---	Reserved
6	Content inv	The device found out that at least one of the received output data (→ 9.1 Output data) is inconsistent.
7	PDout inv	The device confirms that the received output data (→ 9.1 Output data) had already been marked as invalid by the transmitter.

4.3. Examples

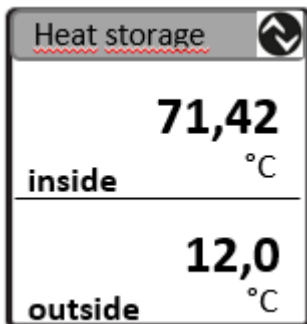
4.3.1. Example 1: display one process value

1. Define unit, description text and number of decimal places (index 80, 90 and 100 → 3.2).
2. In the output data stream, set the layout to 1 (byte 13 → 4.1).
3. As an option, define a text colour (byte 8 → 4.1).
4. Write the display value as Integer16, starting at byte 0 in the output data (→ 4.1).



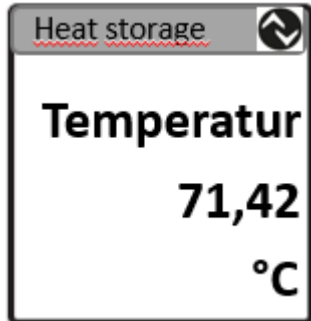
4.3.2. Example 2: display two process values

1. Define unit, description text and number of decimal places (index 80, 90 and 100 → 3.2)
2. In the output data stream, set the layout to 2 (byte 13 → 4.1).
3. As an option define the text colours (byte 8 → 4.1).
4. Write both display values as Integer16, starting at byte 0 in the output data (→ 4.1).



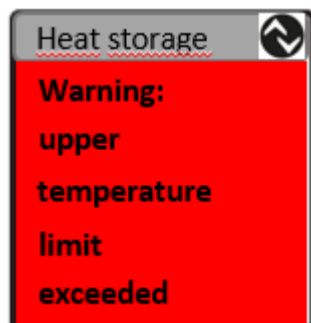
4.3.3. Example 3: display text instead of process values

1. Define text for a certain text ID (index 160 to 174 → 3.5; 0).
2. Use this text ID for the requested process value by setting text red or text black and white. At the same time this defines a text colour (bytes 8 to 11 → 4.1).



4.3.4. Example 4: display info pages

1. Define text of info page 1. Up to 16 characters per line can be used (index 120 to 124 → 3.3).
2. As an option select a background colour (index 140 → 3.4).
3. During the runtime set the layout to 11 to display info page 1 (byte 13 → 4.1).



4.3.5. Example 5: Display QR-Code

1. Define the QR-Code's text (Index 830 → 3.8).
2. In order to display the QR-Code on the display set the layout to 21 during run time (Byte 13 → 4.1).



5. Technical data

Technical data and scale drawing at www.ifm.com.

5.1. Identification parameters

These parameters contain the identification data of the IO-Link device.

Name	Index / subind	Type / length	Content
Vendor name	16/0	String/19	ifm electronic gmbh
Vendor text	17/0	String/11	www.ifm.com
Product name	18/0	String [9	E30391_AB
Product ID	19/0	String/6	E30391
Product text	20/0	String/15	IO-Link Display
Serial number	21/0	String/12	Unique device identification
Hardware version	22/0	String/2	Hardware version
Software Version	23/0	String/5	Software Version
User-specific marking	24/0	String/32	Free text of measuring point or device