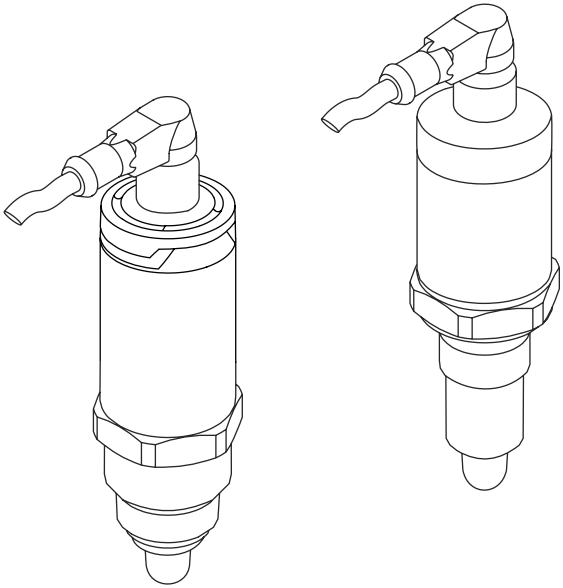
Endress+Hauser Liquipoint FTW23 IO-Link

Capacitance point level measurement
Interface Description



IO-Link

IO-Link FTW23

1 General Specifications

- •Vendor ID: 0x0011
- •Device ID: v01.00.00 = 0x000200
- IO-Link specification: version 1.1
- IO-Link Smart Sensor Profile 2nd Edition
- SIO mode: yes
- Speed: COM2; 38.4 kBaud
- Minimum cycle time: 6 msec.
- Process data width: 16 bit (Input)
- IO-Link data storage: yes
- Block configuration: no

2 Process data

The measuring device has two switch outputs. Both outputs are transmitted as process data via IO-Link.

- In the SIO mode, switch output 1 is switched at pin 4 of the M12 plug. In the IO-Link communication mode, this pin is reserved exclusively for communication.
- In addition, switch output 2 is always switched at pin 2 of the M12 plug.
- The process output data of the point level switch are transmitted cyclically in 16-bit chunks.

Bit	0 (LSB)	1	...	12	13 (MSB)	14	15
Measuring device	Coverage [0 to 16384], resolution approx. 0.05%					OU1	OU2

Bit 14 reflects the status of switch output 1 and bit 15 the status of switch output 2. Here, the logical state “1” at the specific switch output corresponds to “closed” or 24 VDC.

The remaining 14 bits contain the coverage value [0 to 16 384] following conversion using the calculation factor. The raw value (R) must be converted to the coverage value (C) = Coverage by the target system.

$$C = \frac{200}{16\,384} * R$$

Bit	Process value	Value range
0 to 13	Raw measured value, not coverage [0 to 100]	u_Integer
14	OU1	0 = open 1 = closed
15	OU2	0 = open 1 = closed

In addition, the coverage value can be read via ISDU (hex) 0x0028 – acyclic service.

3 Reading out and writing device data (ISDU – Indexed Service Data Unit)

Device data are always exchanged acyclically and at the request of the IO-Link master. Using the device data, the following parameter values or device statuses can be read out:

3.1 Endress+Hauser-specific device data

Designation	ISDU (dec)	ISDU (hex)	Size (byte)	Data type	Access	Default value	Value range	Offset / Gradient	Data storage	Range limits
Extended Ordercode	259	0x0103	60	String	ro					
ENP_VERSION	257	0x0101	16	String	ro	02.03.00				
Active switchpoints	64	0x0040	1	UInt8	r/w	Standard	0 ~ Standard 1 ~ User			

Designation	ISDU (dec)	ISDU (hex)	Size (byte)	Data type	Access	Default value	Value range	Offset / Gradient	Data storage	Range limits
Reset user switchpoints	65	0x0041	1	UIntegerT	r/w	False	0 ~ False 1 ~ Switchpoints OU1 2 ~ Switchpoints OU2			
Simulation switch output (OU1)	89	0x0059	1	UInt8	r/w	Off	0 ~ Off 1 ~ High 2 ~ Low	0 / 0	No	0...2
Simulation switch output (OU2)	68	0x0044	1	UInt8	r/w	Off	0 ~ Off 1 ~ High 2 ~ Low	0 / 0	No	0...2
Device search	69	0x0045	1	UInt8	r/w	Off	0 ~ Off 1 ~ On	0 / 0	No	0...1
Sensor check	70	0x0046	1	UInt8	w			0 / 0	No	
Calibrate coverage, Output 1 (OU1)	87	0x0057	1	UInt8	w		1			
Switch point value (Coverage), Output 1 (SP1/FH1)	71	0x0047	2	UInt16	r/w	77.5 %		0 / 0.1	Yes	0...200
Switchback point value (Coverage), Output 1 (rP1/FL1)	72	0x0048	2	UInt16	r/w	73.0 %		0 / 0.1	Yes	0...200
Switching delay time, Output 1 (dS1)	81	0x0051	2	UInt16	r/w	0.5 s		0 / 0.1	Yes	0.3 to 600
Switchback delay time, Output 1 (dR1)	82	0x0052	2	UInt16	r/w	1.0 s		0 / 0.1	Yes	0.3 to 600
Output 1 (OU1)	85	0x0055	1	UInt8	r/w	HNO	0 ~ HNO[1)] 1 ~ HNC[1)] 2 ~ FNO[1)] 3 ~ FNC[1)]		Yes	0 to 3
Calibrate coverage, Output 2 (OU2)	88	0x0058	1	UInt8	w		1			
Switch point value (Coverage), Output 2 (SP2/FH2)	75	0x004B	2	UInt16	r/w	77.5 %		0 / 0.1	Yes	0...200
Switchback point value (Coverage), Output 2 (rP2/FL2)	76	0x004C	2	UInt16	r/w	73.0 %		0 / 0.1	Yes	0...200
Switching delay time, Output 2 (dS2)	83	0x0053	2	UInt16	r/w	0.5 s		0 / 0.1	Yes	0.3 to 600
Switchback delay time, Output 2 (dR2)	84	0x0054	2	UInt16	r/w	1.0 s		0 / 0.1	Yes	0.3 to 600
Output 2 (OU2)	86	0x0056		UInt8	r/w	HNC	0 ~ HNO[1)] 1 ~ HNC[1)] 2 ~ FNO[1)] 3 ~ FNC[1)]			0 to 3
Operating hours	96	0x0060	4	UInt32	r	0		0 / 0.016667	No	0 to 2^32
µC-Temperature	91	0x005B	1	Int8	r			°C: 0 / 1 °F: 32 / 1.8 K: 273.15 / 1	No	-128...127
Unit changeover (UNI) - µC-Temperature	80	0x0050	1	UInt8	r/w	°C	0 ~ °C 1 ~ °F 2 ~ K	0 / 0	Yes	0...2

Designation	ISDU (dec)	ISDU (hex)	Size (byte)	Data type	Access	Default value	Value range	Offset / Gradient	Data storage	Range limits
Minimum µC-Temperature	92	0x005C	1	Int16	r/w	127		°C: 0 / 1 °F: 32 / 1.8 K: 273.15 / 1	No	-128...127
Maximum µC-Temperature	93	0x005D	1	Int16	r/w	-128		°C: 0 / 1 °F: 32 / 1.8 K: 273.15 / 1	No	-128...127

3.2 IO-Link-specific device data

Designation	ISDU (dec)	ISDU (hex)	Size (byte)	Data type	Access	Default value	Data storage
Serial number	21	0x0015	max. 16	String	ro		
Firmware version	23	0x0017	max. 64	String	ro		
ProductID	19	0x0013	max. 64	String	ro	FTW23	
ProductName	18	0x0012	max. 64	String	ro	Liquipoint	
ProductText	20	0x0014	max. 64	String	ro	Capacitance point level switch	
VendorName	16	0x0010	max. 64	String	ro	Endress+Hauser	
VendorText	17	0x0011	max. 64	String	ro	People for Process Automation	
Hardware Revision	22	0x0016	max. 64	String	ro		
Application Specific Tag	24	0x0018	32	String	r/w		
Device Type	256	0x0100	2	Uinteger16	ro	0x91FF	
Actual Diagnostics (STA)	260	0x0104	4	String	ro		No
Last Diagnostic (LST)	261	0x0105	4	String	ro		No

3.3 System commands

Designation	ISDU (dec)	ISDU (hex)	Value range	Access
Reset to factory settings (RES)	2	0x0002	130	w
Device Access Locks.Data Storage Lock	12	0x000C	0 ~ False 2 ~ True	rw

4 Overview of diagnostic events

Status signal/ Diagnostic event	Diagnostic behavior	EventCode	Event text	Cause	Corrective measure
F270	Problem	0x5000	Defect in electronics/ sensor	Electronics/sensor defective	Replace device
S804	Warning	0x1801	Load current > 200 mA per output	Load current > 200 mA	Increase load resistance at switch output
			Overload at switch output 2	Overload at switch output 2	• Check output circuit • Replace device
C485	Warning	0x8C01 [1)]	Simulation active	When the simulation of a switch output is active, the device displays a warning.	Switch off simulation.
C182	Message	0x1807 [1)]	Invalid calibration	Switch point/switchback point are too close together or interchanged.	• Check probe coverage • Perform configuration again.
C103	Message	0x1813	Sensor check failed	Sensor check failed	• Repeat cleaning • Replace device
-	Message	0x1814	Sensor check passed	Sensor check	-
-	Information	0x1815	Timeout Reedcontact	Timeout reed contact	Remove text magnet
S825	Warning	0x1812	Ambient temperature outside of specification	Ambient temperature outside of specification	Operate device in the specified temperature range

1) EventCode as per IO-Link standard 1.1