



ENDRESS+HAUSER PICOMAG DMA IO-LINK

Magnetic-Inductive Liquid Flow Meter
Interface Description



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1 IO-Link Process Data

1.1 Data structure

Bit number	119... 112	111... 104	103... 96	95... 88	87... 80	79... 72	71... 64	63... 56	55... 48	47... 40	39... 32	31... 24	23... 16	15... 8	7... 0
Data	Conductivity in $\mu\text{S/cm}$				Totalizer in l				Volume flow in l/s				Temperature in $\frac{1}{10}^\circ\text{C}$	Status	
Data type	32-bit floating point number with single precision (IEEE 754)				32-bit floating point number with single precision (IEEE 754)				32-bit floating point number with single precision (IEEE 754)				16-bit two's complement	8-bit	

Data structure of the status bits 7 to 0

Bit	Description
0	Switches once per sampling rate
1	Reserved
2	Current status S-Out 1
3	Current status S-Out 2
4	Reserved
5	Reserved
6	Reserved
7	Reserved

1.2 Diagnostic information

Diagnostic code		Display text	Coding (hex)	PDValid Validity	Priority
Status NE 107	Diagnostic number				
	–	SYSTEM OK	0x0000	1	1
F	181	COIL CIRC.FAIL.	0x5000	0	2
F	180	TEMP.CIRC.FAIL.	0x5000	0	3
F	201	DECICE FAIL.	0x5000	0	4
F	283	MEMORY FAIL.	0x8C00	0	5
C	446	I/O 1 OVERLOAD	0x180C	1	6
C	447	I/O 2 OVERLOAD	0x180C	1	7
C	485	SIMULATION ACT.	0x8C01	1	8
C	453	FLOW OVERRIDE	0x180D	1	9
S	441	I-OUT 1 RANGE	0x180A	1	10
S	444	U-OUT 1 RANGE	0x1809	1	11
S	443	P-OUT 1 RANGE	0x180B	1	12
S	442	I-OUT 2 RANGE	0x180A	1	13
S	445	U-OUT 2 RANGE	0x1809	1	14
S	962	EMPTY PIPE	0x180E	1	15
S	834	TEMPERAT. RANGE	0x8C20	1	16

1.3 IO-Link ISDU parameter list

The individual parts of a parameter description are described in the following sections:

Designation	ISDU (hex)	ISDU (dec)	Size (byte)	Data type	Access	Value range	Factory setting	Range limits
Identification								
Device Tag First 10 characters displayed (starting from left)	0x0018	24	32 (max.)	string	r/w		EH_DMA_XXZZ	
Device Name	0x0012	18	16 (max.)	string	r		Picomag	
Device ID1	0x0009	9	1	uint	r		0x01	
Device ID2	0x000A	10	1	uint	r		0x01	
Device ID3	0x000B	11	1	uint	r		0x00	
Vendor Name	0x0010	16	32 (max.)	string	r		Endress+Hauser	
Vendor ID1	0x0007	7	1	uint	r		0x00	
Vendor ID2	0x0008	8	1	uint	r		0x11	
Device Serial No. e.g. (YMXXXZZ)	0x0015	21	11 (max.)	string	r		see nameplate	
Firmware Version e.g. 01.00.00	0x0017	23	8 (max.)	string	r			
Order Code e.g. DMA15-AAAAA1	0x0102	258	18 (max.)	string	r		see nameplate	
Device Type	0x0100	256	2	uint	r		0x94FF	
Diagnostics								
Actual Diagnostics e.g. C485 (= SIMULATION ACT.)	0x0104	260	4	string	r			
Last Diagnostics e.g. S962 (= EMPTY PIPE)	0x0105	261	4	string	r			
Simulation Proc. Var.	0x015F	351	2	uint	r/w	enable=1 disable=0		
Sim.Proc.Var.Value Volumeflow Unit selection list from Unit Volumeflow	0x0166	358	4	float	r/w		0.0	-10 ⁶ 10 ⁶
Sim.Proc.Var.Value Temperature Unit selection list from Unit Temperature	0x0168	360	4	float	r/w		0.0	-10 ⁴ 10 ⁴
Sim.Proc.Var.Value Conductivity Unit selection list from Unit Conductivity	0x0167	359	4	float	r/w		0.0	0 10 ⁶
Measured Values								
Volumeflow Current volume flow measured value	0x0161	353	4	float	r			
Temperature Current temperature measured value	0x0163	355	4	float	r			
Conductivity Current conductivity measured value	0x0164	365	4	float	r			
Totalizer Current totalizer measured value	0x0169	361	4	float	r/w		0.0	

Designation	ISDU (hex)	ISDU (dec)	Size (byte)	Data type	Access	Value range	Factory setting	Range limits
Totalizer Reset	0x016A	362	2	uint	w	cancel=0 reset=1	cancel	
System Units								
Unit Volumeflow	0x0226	550	2	uint	r/w	l/s=0 l/h=5 fl. oz/min=4 m³/h=1 l/min=2 Usgpm=3	l/min	
Unit Volume	0x0227	551	2	uint	r/w	ml=0 USozf=1 l=2 m³=3 Usgal=4	ml	
Unit Temperature	0x0228	552	2	uint	r/w	°C=0 °F=1	°C	
Unit Conductivity	0x0229	553	2	uint	r/w	µS/cm=0 S/m=1 mS/cm=2	µS/cm=0	
Unit Totalizer	0x016B	363	2	uint	r/w	USozf=1 l=2 m³=3 Usgal=4 kl=5 Ml=6 kUsg=7	m³	
Sensor								
Install. Direction In relation to direction of arrow on the device	0x015E	350	2	uint	r/w	forward=0 reverse=1	forward	
Low Flow Cut Off The flow rate below the selected value is zero Unit selection list from Unit Volumeflow	0x0160	352	4	float	r/w		0.4/0.75/1.2/5.0 l/min	0 10 ⁶
Damping Volume flow damping via the PT1 element Unit: s	0x01A4	420	4	float	r/w		0 s	0 100

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Designation	ISDU (hex)	ISDU (dec)	Size (byte)	Data type	Access	Value range	Factory setting	Range limits
Output 1								
Operating Mode IO-Link is set if connected to a master	0x01F4	500	2	uint	r/w	P-Out=0 I-Out=1 S-In=2 S-Out=3 IO-Link=4 U-Out=5 off=6	IO-Link	
Current output I-Out 1								
I - OUT Assign	0x0258	600	2	uint	r/w	off=0 volume flow=1 temperature=2 conductivity=4	volume flow	
Q-Start-Value ASP ¹⁾ for volume flow Unit selection list from Unit Volumeflow	0x0259	601	4	float	r/w		0 l/min	-9.9·10 ⁹ 9.9·10 ⁹
Q-End-Value AEP ²⁾ for volume flow Unit selection list from Unit Volumeflow	0x025A	602	4	float	r/w		25/50/100/750 l/min	-9.9·10 ⁹ 9.9·10 ⁹
T-Start-Value ASP ¹⁾ for temperature Unit selection list from Unit Temperature	0x025F	607	4	float	r/w		-10 °C	-9.9·10 ⁹ 9.9·10 ⁹
T-End-Value AEP ²⁾ for temperature Unit selection list from Unit Temperature	0x0260	608	4	float	r/w		+70 °C	-9.9·10 ⁹ 9.9·10 ⁹
s-Start-Value ASP ¹⁾ for conductivity Unit selection list from Unit Conductivity	0x025D	605	4	float	r/w		0	-9.9·10 ⁹ 9.9·10 ⁹
s-End-Value AEP ²⁾ for conductivity Unit selection list from Unit Conductivity	0x025E	606	4	float	r/w		1000	-9.9·10 ⁹ 9.9·10 ⁹

Designation	ISDU (hex)	ISDU (dec)	Size (byte)	Data type	Access	Value range	Factory setting	Range limits
Pulse output P-Out								
Pulse Value Unit selection list from Unit Volume	0x03E8	1000	4	float	r/w		0.5/1.0/2.0/10.0 ml	10 ⁻⁹ 9.9·10 ⁹
Switch output S-Out 1								
Switch Polarity	0x032B	811	2	uint	r/w	PNP=0 NPN=1	PNP	
Switch Function	0x0320	800	2	uint	r/w	alarm=0 off=1 on=2 lim.vol.flow=3, lim.temp.=4 lim.vol.=5 lims=11 win.vol.flow=6 win.temp.=7 win.vol.=8 wins=13 epd=9	alarm	
Q-ON-Value Unit selection list from Unit Volumeflow	0x0321	801	4	float	r/w		20/40/80/600 l/min	-9.9·10 ⁹ 9.9·10 ⁹
Q-OFF-Value Unit selection list from Unit Volumeflow	0x0322	802	4	float	r/w		15/30/60/450 l/min	-9.9·10 ⁹ 9.9·10 ⁹
T-ON-Value Unit selection list from Unit Temperature	0x0327	807	4	float	r/w		+ 60 °C	-9.9·10 ⁹ 9.9·10 ⁹
T-OFF-Value Unit selection list from Unit Temperature	0x0328	808	4	float	r/w		+ 50 °C	-9.9·10 ⁹ 9.9·10 ⁹
V-ON-Value Unit selection list from Unit Totalizer	0x0329	809	4	float	r/w		0.2/0.4/0.8/6.0 m ³	-9.9·10 ⁹ 9.9·10 ⁹
V-OFF-Value Unit selection list from Unit Totalizer	0x032A	810	4	float	r/w		0.15/0.3/0.6/4.5 m ³	-9.9·10 ⁹ 9.9·10 ⁹
s-ON-Value Unit selection list from Unit Conductivity	0x0325	805	4	float	r/w		500	-9.9·10 ⁹ 9.9·10 ⁹
s-OFF-Value Unit selection list from Unit Conductivity	0x0326	806	4	float	r/w		200	-9.9·10 ⁹ 9.9·10 ⁹
Voltage output U-Out 1								
U - OUT Assign	0x02BC	700	2	uint	r/w	off=0 volume flow=1 temperature=2 conductivity=4	volume flow	
Q-Start-Value ASP ¹⁾ for volume flow Unit selection list from Unit Volumeflow	0x02BD	701	4	float	r/w		0 l/min	
Q-End-Value AEP ²⁾ for volume flow Unit selection list from Unit Volumeflow	0x02BE	702	4	float	r/w		25/50/100/750 l/min	

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Designation	ISDU (hex)	ISDU (dec)	Size (byte)	Data type	Access	Value range	Factory setting	Range limits
T-Start-Value ASP ¹⁾ for temperature Unit selection list from Unit Temperature	0x02C3	707	4	float	r/w		-10 °C	
T-End-Value AEP ²⁾ for temperature Unit selection list from Unit Temperature	0x02C4	708	4	float	r/w		+70 °C	
s-Start-Value ASP ¹⁾ for conductivity Unit selection list from Unit Conductivity	0x02C1	705	4	float	r/w		0 µS/cm	
s-End-Value AEP ²⁾ for conductivity Unit selection list from Unit Conductivity	0x02C2	706	4	float	r/w		1000 µS/cm	
Digital input D-In 1								
D-IN Polarity	0x0385	901	2	uint	r/w	low=0 high=1	high	
D-IN Function	0x0384	900	2	uint	r/w	off=0 res.tot.=1 zero ret.=2	res.tot.	
IO-Link								
IO-LINK Vendor Name	0x0010	16	32 (max.)	string	r		Endress+Hauser	
IO-LINK Product Name	0x0012	18	16 (max.)	string	r		Picomag	
IO-LINK RevisionID	0x0004	4	1	uint	r		0x11	
Output 2								
Operating Mode	0x01F5	501	2	uint	r/w	I-Out=1 S-In=2 S-Out=3 U-Out=5 off=6	off	
Current output I-Out 2								
I - OUT Assign	0x028A	650	2	uint	r/w	off=0 volume flow=1 temperature=2	temperature	
Q-Start-Value ASP ¹⁾ for volume flow Unit selection list from Unit Volumeflow	0x028B	651	4	float	r/w		0 l/min	
Q-End-Value AEP ²⁾ for volume flow Unit selection list from Unit Volumeflow	0x028C	652	4	float	r/w		25/50/100/750 l/min	
T-Start-Value ASP ¹⁾ for temperature Unit selection list from Unit Temperature	0x0291	657	4	float	r/w		-10 °C	
T-End-Value AEP ²⁾ for temperature Unit selection list from Unit Temperature	0x0292	658	4	float	r/w		+70 °C	
s-Start-Value ASP ¹⁾ for conductivity Unit selection list from Unit Conductivity	0x028F	655	4	float	r/w		0	-9.9·10 ⁹ 9.9·10 ⁹

Designation	ISDU (hex)	ISDU (dec)	Size (byte)	Data type	Access	Value range	Factory setting	Range limits
s-End-Value AEP ²⁾ for conductivity Unit selection list from Unit Conductivity	0x0290	656	4	float	r/w		1000	-9.9·10 ⁹ 9.9·10 ⁹
Switch output S-Out 2								
Switch Polarity	0x035D	861	2	uint	r/w	PNP=0 NPN=1	PNP	
Switch Function	0x0352	850	2	uint	r/w	alarm=0 off=1 on=2 lim.vol.flow=3 lim.temp.=4 lim.vol.=5, win.vol.flow=6 lims=11 win.temp.=7 win.vol.=8 wins=13 epd=9	alarm	
Q-ON-Value Unit selection list from Unit Volumeflow	0x0353	851	4	float	r/w		20/40/80/600 l/min	
Q-OFF-Value Unit selection list from Unit Volumeflow	0x0354	852	4	float	r/w		15/30/60/450 l/min	
T-ON-Value Unit selection list from Unit Temperature	0x0359	857	4	float	r/w		+ 60 °C	
T-OFF-Value Unit selection list from Unit Temperature	0x035A	858	4	float	r/w		+ 50 °C	
V-ON-Value Unit selection list from Totalizer	0x035B	859	4	float	r/w		0.2/0.4/0.8/6.0 m ³	
V-OFF-Value Unit selection list from Totalizer	0x035C	860	4	float	r/w		0.15/0.3/0.6/4.5 m ³	
s-ON-Value Unit selection list from Conductivity	0x0357	855	4	float	r/w		500	
s-OFF-Value Unit selection list from Conductivity	0x0358	856	4	float	r/w		200	
Voltage output U-Out 2								
U - OUT Assign	0x02EE	750	2	uint	r/w	off=0 volume flow=1 temperature=2	temperature	
Q-Start-Value ASP ¹⁾ for volume flow Unit selection list from Unit Volumeflow	0x02EF	751	4	float	r/w		0 l/min	
Q-End-Value AEP ²⁾ for volume flow Unit selection list from Unit Volumeflow	0x02F0	752	4	float	r/w		25/50/100/750 l/min	
T-Start-Value ASP ¹⁾ for temperature from Unit Temperature	0x02F5	757	4	float	r/w		-10 °C	

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Designation	ISDU (hex)	ISDU (dec)	Size (byte)	Data type	Access	Value range	Factory setting	Range limits
T-End-Value AEP ²⁾ for temperature from Unit Temperature	0x02F6	758	4	float	r/w		+70 °C	
s-Start-Value ASP ¹⁾ for temperature from Conductivity	0x02F3	755	4	float	r/w		0 µS/cm	
s-End-Value AEP ²⁾ for temperature from Conductivity	0x02F4	756	4	float	r/w		1000 µS/cm	
Digital input D-In 2								
D-IN Polarity	0x0395	917	2	uint	r/w	low=0 high=1	high	
D-IN Function	0x0394	916	2	uint	r/w	off=0 res.tot.=1 zero ret.=2	res.tot.	
Display								
Display Layout	0x01C3	451	2	uint	r/w	QV=0 QT=1 Qs=3 VT=2, Vs=4 Ts=5 QVTs=6 QVTs_m=7	QT	
Display Rotation	0x01C4	452	2	uint	r/w	0 °=0 90 °=1 180 °=2 270 °=3 auto=4	Auto	
Display Backlight	0x01C2	450	2	uint	r/w	0...100	50	
Bluetooth configuration								
Bluetooth Function	0x041A	1050	2	uint	r/w	on=1 off=0	on	
Bluetooth Tx Pwr Level	0x041B	1051	2	uint	r	0...4		
Bluetooth Conn. Status	0x041C	1052	1	uint	r			
Administration								
Set Access Code Define the access code	0x0108	264	2	uint	w		0000	
Access Code Enter the access code	0x0107	263	2	uint	w			
Reset Device	0x010E	270	2	uint	w	cancel=0 restore fact.=1 restart=4	cancel	
Product Specific Process Values								
Status IO 1	0x0386	902	2	uint	r	low=0 high=1		
Status IO 2	0x0396	918	2	uint	r	low=0 high=1		

1) Analog Start Point

2) Analog End Point

2 System Integration

The measuring device has an IO-Link communication interface. The IO-Link interface allows direct access to process and diagnostics data and enables the user to configure the measuring device on the fly.

Properties:

- IO-Link Specification: Version 1.1
- IO-Link Smart Sensor Profile 2nd Edition
- SIO mode: yes
- Speed: COM2 (38.4 kBaud)
- Minimum cycle time: 10 ms
- Process data width: 120 bit
- IO-Link data storage: yes
- Block configuration: no
- Device operational: The measuring device is operational 4 seconds after the supply voltage is applied

2.1 Device Master File

In order to integrate field devices into a digital communication system, the IO-Link system needs a description of the device parameters, such as output data, input data, data format, data volume and supported transfer rate.

These data are available in the device master file (IODD 1)), provided to the IO-Link master when the communication system is commissioned.