

Installation
IO-Link



KRACHT®
FLUID TECHNOLOGY AND SYSTEMS

Content

Technical data	4
Installation	
Terminal layout Connector pin assignment	5
Process data IO-Link mode	6
Variables	7
Calibration of the tooth volume Calibration of the weight calculation Firmware versions and changes	8

Technical data

IO-Link overview	
Name	VC IO-Link
Vendor ID	0x0524 / 1316
Device ID	0x000001 / 1
Vendor name	KRACHT GmbH
Communication parameters	
IO-Link revision	V1.1
Bit rate	COM3 / 230,4 kBaud
Minimum cycle time	500 µs
Standard-I/O-mode (SIO) supported	Yes
ISDU (Indexed Service Data Unit) used	Yes
DS data storage usable	Yes

Notice

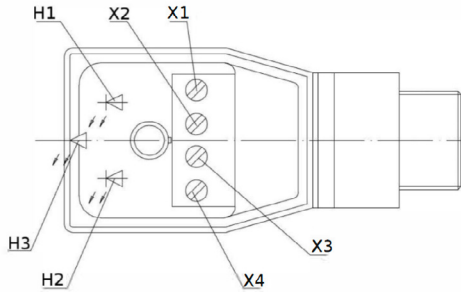
With currents of max. 200 mA between the IO-Link device and the IO-Link master, core cross-sections of min. 0.35 mm² up to a maximum cable length of 20 m are permissible. The design of the supply line of the IO-Link master from the power supply unit is not affected by this and is the responsibility of the installer/operating company.

Electrical data	IO-Link mode	SIO mode
Number of measuring channels	1 or 2	
Operating voltage U_B	24 V	12 ... 24 V
Impulse amplitude U_{out}	$Min_{High} \geq U_B - 2V$ $Max_{Low} \leq 2 V$	
Signal output $I_{out max}$	active push-pull I_{max} 25 mA	
Impulse shape with symmetrical output signal	–	Rectangular, Pulse duty factor/Channel 1:1±15 %
Impuls offset between the two channels	–	90° ± 30°
Power requirement $P_{b max}$	2 W	
Protection class	IP 65	
Ambient temperature ϑ_{max}	50 °C (Higher temperatures on request)	

Installation

I Terminal layout

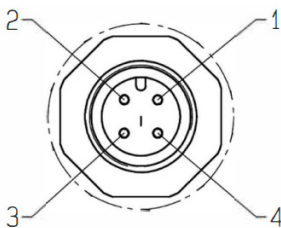
In the SIO mode, the terminal assignment for Channel 1 or 2 influences the displayed direction of rotation of the measuring unit.



		IO-Link mode	SIO mode
X1 ¹⁾	Blue	0 Volt	
X2 ¹⁾	Brown	U _B	
X3 ¹⁾	White	I/Q	Channel 1
X4 ¹⁾	Black	C/Q	Channel 2
H1	Red	Transmitter channel 1	
H2	Red	Transmitter channel 2	
H3	Green	Flashing, at intervals of about one second	Permanent light, ready for operation

¹⁾ Colours according to IEC 60947-5-2

I Connector pin assignment (M12x1/-4 pins)



	IO-Link mode	SIO mode
1	U _B	
2	I/Q	Channel 1
3	0 Volt	
4	C/Q	Channel 2

According to IEC 61076-2-101 A-coded

Port class A! Additional power supply not required.

Installation

I Input process data IO-Link mode

PD input (Process data input): Length 32 bit Adjustable via variable: Output unit (Index 64)					
Name	Description	Data type	Length	Value range	Unit
PDIN_Impulse	Selected by "Output Unit (64)", tooth pulses are output directly.	IntegerT	32 bit	-2.147.483.648 bis 2.147.483.647	–
PDIN_Volume	Selected by "Output Unit (64)", volume is output directly.	Float32T	32 bit	1.175.494.351e-29 bis 3.402.823.466e+38	l (Liter)
PDIN_Weight	Selected by "Output Unit (64)", weight is output directly.	Float32T	32 bit	1.175.494.351e-29 bis 3.402.823.466e+38	kg (Kilogram)
PDIN_FlowRate	Selected by "Output Unit (64)", flow rate is output directly.	Float32T	32 bit	1.175.494.351e-29 bis 3.402.823.466e+38	l/min (Liter per minute)
PDIN_MassFlow	Selected by "Output Unit (64)", mass flow is output directly.	Float32T	32 bit	1.175.494.351e-29 bis 3.402.823.466e+38	kg/min (Kilogram per minute)

I Output process data IO-Link mode

PD output (Process data output): Length 1 bit Adjustable via variable: Output unit (Index 64)					
Name	Description	Data type	Length	Value range	Unit
PDOUT_Impulse	Reset activated sets "PDIN_Impulse" to value "0" until "Reset deactivated" is set.	BooleanT	1 bit	true / false	true : Reset activated false : Reset deactivated
PDOUT_Volume	Reset activated sets "PDIN_Volume" to value "0" until "Reset deactivated" is set.	BooleanT	1 bit	true / false	true : Reset activated false : Reset deactivated
PDOUT_Weight	Reset activated sets "PDIN_Weight" to value "0" until "Reset deactivated" is set.	BooleanT	1 bit	true / false	true : Reset activated false : Reset deactivated
PDOUT_FlowRate	No effect on measurement	BooleanT	1 bit	true / false	–
PDOUT_MassFlow	No effect on measurement	BooleanT	1 bit	true / false	–

Installation

I Variables

Name	Index	Sub-index	Data type	Length	Access-right	Factory setting	Value range	Factor	Unit	Description
"Identification menu"										
Vendor name	16	0	StringT	11 byte	ro	KRACHT GmbH	–	–	–	–
Vendor text	17	0	StringT	52 byte	ro	Gear pumps Flow measurement Hydraulics Valves	–	–	–	–
Product name	18	0	StringT	16 byte	ro	Flow meter	–	–	–	–
Product ID	19	0	StringT	2 byte	ro	VC	–	–	–	–
Product text	20	0	StringT	32 byte	ro	VC XXX	–	–	–	–
Serial number	21	0	StringT	10 byte	ro	See type plate	–	–	–	–
Hardware version	22	0	StringT	8 byte	ro	–	–	–	–	–
Firmware version	23	0	StringT	8 byte	ro	Description of the firmware version Firmware versions and changes (Index 23)[>40]	–	–	–	–
Application specific tag	24	0	StringT	32 byte	rw	***	–	–	–	–

Name	Index	Sub-index	Data type	Length	Access-right	Factory setting	Value range	Factor	Unit	Description
"Observation menu"										
Pulses	110	0	IntegerT	32 bit	ro	–	-2.147.483.648 up to 2.147.483.647	–	–	Impulses can be queried in each setting of process data.
Flow	111	0	Float32T	32 bit	ro	–	1.175.494.351e-29 up to 3.402.823.466e+38	–	l/min	Flow rate can be queried in each setting of process data.
"Parameter menu"										
Output unit	64	0	UIntegerT	8 bit	rw	0	(0) Pulses (15) Liter (52) Kilogram (101) l/min (154) kg/min	–	–	Setting content of process data
V _{gz} Factor	80	0	Float32T	4 byte	rw	1	0.5 up to 1.5	–	–	Factor for adjusting V _{gz} Calibration of the tooth volume (Index 80) [>40]
Density	81	0	Float32T	4 byte	rw	1	0.5 up to 15	–	–	Density of medium Calibration of the weight calculation (Index 81) [>80]
"Diagnosis menu"										
Operating hours	100	0	UIntegerT	2 byte	ro	0	0 up to 65.534	1	–	Operating hours since initial commissioning
Total impulses	101	0	UIntegerT	4 byte	ro	0	0 up to 4.294.967.294	1.000	–	Total impulses since initial commissioning

Installation

I Calibration of the tooth volume (Index 80)

If necessary, it is possible to calibrate the V_{gz} factor. Such a calibration may be necessary due to deviating viscosity, temperature or other external influences and is taken into account in the measurement as follows:

Calculation of the V_{gz} factor

$$V_{gz} \text{ Factor} = \text{Measured volume} / \text{PDOUT_Volume}$$

Example:

1. V_{gz} Factor = 1
2. Measured volume = 100 l
3. Output electronics PDOUT_Volume = 98 l
4. Calculation of the V_{gz} Factors:

$$V_{gz} = 100 \text{ l} / 98 \text{ l} = 1.02$$
5. Set the calculated V_{gz} Factor and transmit it to the IO-Link device
6. Measured volume = 100 l
 Output electronics PDOUT_Volume = 100 l

I Calibration of the weight calculation (Index 81)

The weight determination of the flow of fluid is calculated via the flow volume and density. The value of the density is factory set to 1 kg/l.

I Firmware versions and changes (Index 23)

Firmware version	Information	Date
FW-V0.56	First delivery status	First customer version
FW-V0.58	Processing frequency extended	From 11.01.2022
FW-V1.03	Stack update to V1.1.3 Hardware redesign	From 01.09.2023
FW-V1.07	Adjustments of volume and weight output as Float32T value	From 16.12.2024

Notes

Notes

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