

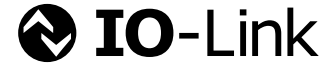
IO-Link Compatible



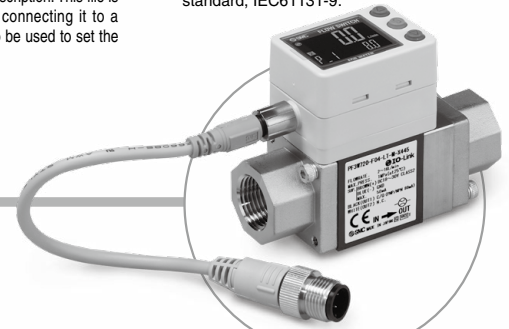
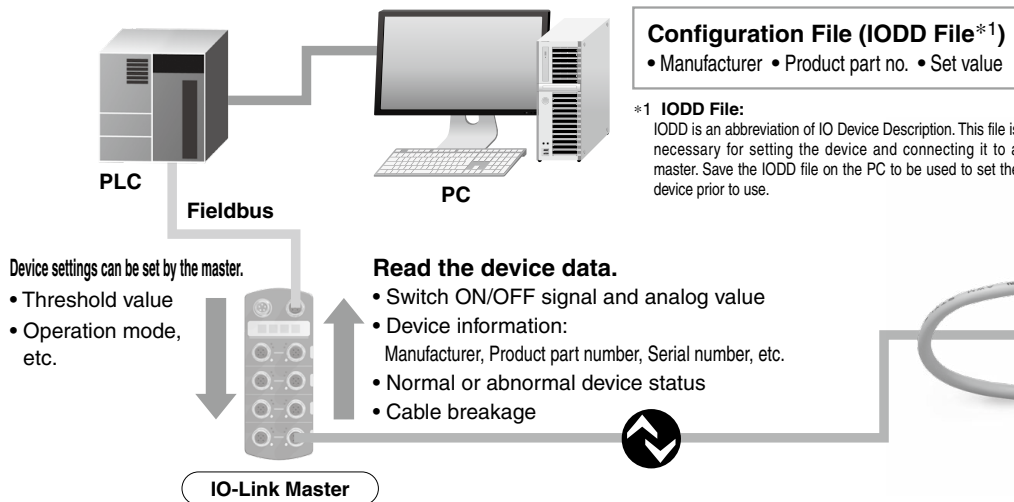
3-Color Display Digital Flow Switch for Water

Supports the IO-Link communication protocol

IP65



IO-Link is an open communication interface technology between the sensor/actuator and the I/O terminal that is an international standard, IEC61131-9.



IO-Link Compatible Device:
Digital Flow Switch for Water

Implement diagnostic bits in the process data.

The diagnostic bit in the cyclic process data makes it easy to find problems with the equipment.

It is possible to find problems with the equipment in real time using the cyclic (cycle) data and to monitor such problems in detail with the noncyclic (aperiodic) data.

Process Data

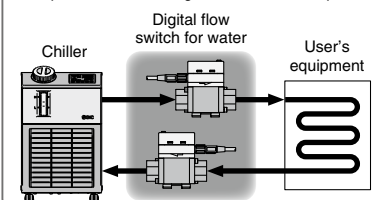
Bit offset	Item	Note	Diagnosis items															
0	OUT1 output	0: OFF 1: ON	• Over current error • Above the rated flow range • Accumulated flow error • Above the rated temperature range • Below the rated temperature range • Internal product malfunction • Temperature sensor failure															
1	OUT2 output	0: OFF 1: ON																
8	Diagnosis (error)	0: OFF 1: ON																
9	Diagnosis (flow rate)	0: OFF 1: ON																
10	Diagnosis (temperature)	0: OFF 1: ON																
16 to 31	Measured temperature value	Signed 16 bit																
32 to 47	Measured flow rate value	Signed 16 bit																
Bit offset	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32		
Item	Measured flow rate value (PD)																	
Bit offset	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16		
Item	Measured temperature value (PD)																	
Bit offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
Item	Reservation					Temperature	Flow rate	Error	Reservation					OUT2		OUT1		
						Diagnosis								Switch output				

Application Examples

For the predictive maintenance of cooling water problems

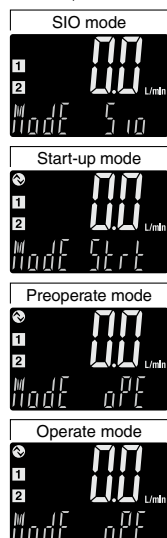
Monitors flow rate and temperature's "switch ON/OFF signals" and "analog values" to determine the cooling status

The process and cooling status can be compared.



Display function

Displays the output communication status and indicates the presence of communication data



Operation and Display

Communication with master	IO-Link status indicator light	Status	Screen display	Description
Yes	*1	Normal	Operate	Normal communication status (readout of measured value)
			Start up	At the start of communication
			Preoperate	
	*1 (Flashing)	Abnormal	Version does not match	The IO-Link version does not match that of the master. The master uses version 1.0.
			Lock	Backup and restore required due to data storage lock
			Communication disconnection	Normal communication was not received for 1 second or longer.
No	OFF	SIO mode		General switch output

*1 In IO-Link mode, the IO-Link indicator will be ON or flashing.

PF3W7□-X445



17-E689

IO-Link Compatible

3-Color Display

Digital Flow Switch for Water

PF3W7□-X445

How to Order

PF3W 7 20 - 04 - LT Q - M - X445

Integrated display type

Rated flow range (Flow range)

04	0.5 to 4 L/min
20	2 to 16 L/min
40	5 to 40 L/min

Thread type

Nil	Rc
N	NPT
F	G*1

*1 ISO 228 compliant

Piping port size

Symbol	Port size	Applicable flow range		
		04	20	40
03	3/8	●	●	—
04	1/2	—	●	●
06	3/4	—	—	●

Output specification/Temperature sensor

Symbol	Output specification		Temperature sensor
	OUT1	OUT2	
LT	IO-Link: Switch output (N/P)	—	With temperature sensor

IO-Link compatible

Calibration certificate (Only for flow rate)

Nil	None
A	With calibration certificate

* The certificate is written in both Japanese and English.
The integrated display type with temperature sensor can only display the flow rate.
The temperature sensor is not calibrated.

Bracket/Option

Nil	None
R	With bracket

Unit specification

Symbol	Instantaneous flow rate	Accumulated flow	Temperature
Nil	gal/min	gal	°C
M	L/min	L	°C

* Under the New Measurement Act, units other than SI (symbol "M") cannot be used in Japan.

* Reference: 1 [L/min] = 0.2642 [gal/min]
1 [gal/min] = 3.785 [L/min]

Lead wire/Option

Nil	With lead wire with M8 connector (3 m)
N	Without lead wire with M8 connector (3 m)
Q	With M12-M8 conversion lead wire (0.1 m)*2

*2 A cable (3 m) with an M12 connector is also available separately.
Refer to the **Web Catalog** for details.

Options/Part Nos.

When only optional parts are required, order with the part numbers listed below.

Option	Part no.	Qty.	Note	
Bracket	ZS-40-K	1	For PF3W704/720	With 4 tapping screws (3 x 8)
	ZS-40-L	1	For PF3W740	With 4 tapping screws (3 x 8)
Lead wire with M8 connector	ZS-40-A	1	Lead wire length 3 m	
M12-M8 conversion lead wire	ZS-40-M12M8-A	1	Lead wire length 0.1 m*1	

*1 A cable (3 m) with an M12 connector is also available separately. Refer to the **Web Catalog** for details.

Specifications

Model	PF3W704	PF3W720	PF3W740
Applicable fluid	Water and ethylene glycol aqueous solution (Viscosity: 3 mPa·s (3 cP) or less)*1		
Detection method	Karman vortex		
Rated flow range	0.5 to 4 L/min	2 to 16 L/min	5 to 40 L/min
Display flow range	0.35 to 5.50 L/min (Flow of under 0.35 L/min is displayed as "0.00")	1.7 to 22.0 L/min (Flow of under 1.7 L/min is displayed as "0.0")	3.5 to 55.0 L/min (Flow of under 3.5 L/min is displayed as "0.0")
Set flow range	0.35 to 5.50 L/min	1.7 to 22.0 L/min	3.5 to 55.0 L/min
Smallest settable increment	0.01 L/min	0.1 L/min	
Conversion of accumulated pulse (Pulse width: 50 ms)	0.05 L/pulse	0.1 L/pulse	0.5 L/pulse
Fluid temperature	0 to 90°C (No freezing or condensation)		
Display unit	Instantaneous flow rate: L/min, Accumulated flow: L		
Accuracy	±3% F.S.		
Repeatability	±2% F.S.*2		
Temperature characteristics	±5% F.S. (25°C standard)		
Operating pressure range*3	Refer to the graph of operating pressure and proof pressure. (Refer to the Web Catalog .)		
Proof pressure*3	Refer to the graph of operating pressure and proof pressure. (Refer to the Web Catalog .)		
Pressure loss	Refer to the graph of pressure loss. (Refer to the Web Catalog .)		
Accumulated flow range*4	999999999.9 L		9999999999 L
	By 0.1 L		By 1 L
Switch output	Select from NPN or PNP open collector output.		
Maximum load current Maximum applied voltage Internal voltage drop Delay time*5 Hysteresis Hysteresis mode Window comparator mode Output protection Output mode Flow rate Temperature	80 mA		
	30 V (NPN output)		
	1.5 V or less (at load current of 80 mA)		
	3.5 ms or less, variable from 0 to 60 s/0.01 s increments		
	Variable from 0		
	Short-circuit protection		
	Select from Hysteresis, Window comparator, Accumulated output, Accumulated pulse output, Error output, or Switch output OFF modes. Select from Hysteresis mode or Window comparator mode.		
Display method	2-screen (Main screen, Sub screen) Main screen: 4-digit, 7-segment, 2-color, Red/Green; Sub screen: 9-digit, 11-segment, (Only the 5th digit is a 7-segment LED.) White Display values updated 5 times per second		
Indicator light	Output 1, Output 2: Orange		
Power supply voltage	When used as a switch output device	12 to 24 VDC, including ripple (p-p) 10%	
	When used as an IO-Link device	18 to 30 VDC, including ripple (p-p) 10%	
Current consumption	50 mA or less		
Digital filter*6	Select from 0.5 s, 1.0 s, 2.0 s, 5.0 s, 10.0 s, 15.0 s, 20.0 s, or 30.0 s.		
Environment	Enclosure	IP65	
	Operating temperature range	0 to 50°C (No freezing or condensation)	
	Operating humidity range	Operating/Stored: 35 to 85% RH (No condensation)	
	Withstand voltage	250 VAC for 1 minute between external terminals and case	
Insulation resistance		50 MΩ or more (500 VDC measured via megohmmeter) between external terminals and case	
Standards and regulations	CE marking, RoHS		
Main materials of parts in contact with fluid	PPS, Stainless steel 304, FKM, SCS13		
	Non-grease		
Piping port size*7	3/8	3/8, 1/2	1/2, 3/4
Weight	With temperature sensor	285 g	335 g
	With lead wire	+85 g	

*1 Please refer to the graph of measurable range for ethylene glycol aqueous solution on the [Web Catalog](#). Measurement is possible as long as the fluid does not corrode the wetted parts and viscosity is 3 mPa·s (3 cP) or less. Be aware that water leakage may occur due to internal seal shrinkage or swelling depending on the type of fluid.

*2 If 0.5 s is selected by setting the digital filter, the repeatability will be ±3% F.S.

*3 The operating pressure range and proof pressure may change according to the fluid temperature. Refer to the [Web Catalog](#).

*4 Cleared when the power supply is turned off. The hold function can be selected. (Intervals of 2 or 5 minutes can be selected.)

If the 5-minute interval is selected, the life of the memory element (electronic parts) is limited to 3.7 million times. (If energized for 24 hours, life is calculated as 5 minutes x access times (3.7 million) = 18.5 million minutes = about 35 years.) Therefore, if using the hold function, calculate the memory life for your operating conditions, and use within this life.

*5 Does not include the value of the digital filter

*6 The response time until the set value reaches 90% in relation to the step input (The response time is 7 s when it is output by the temperature sensor.)

*7 When the piping diameter or piping passage is restricted, the specifications may not be satisfied.

- The form of the G thread (including the major and minor diameter and pitch of the internal thread) is based on JIS B 0202 (ISO 228-1).

- Products indicated as ISO 1179-1 (G thread for hydraulics/pneumatics) or ISO 16030 (G thread for pneumatics) are based on JIS B 0202 (ISO 228-1) for effective depth of thread, seat surface area, surface roughness, and squareness.

- For ISO 1179-1 (G thread for hydraulics/pneumatics), the withstand pressure is specified for each product. SMC does not guarantee the withstand pressure specified in ISO 1179-1, ISO 1179-2, ISO 1179-3, or ISO 1179-4.

- For ISO 16030 (G thread for pneumatics), the withstand pressure is specified for each product. SMC does not guarantee the withstand pressure specified in ISO 16030.

* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

Communication Specifications (IO-Link mode)

IO-Link type	Device
IO-Link version	V1.1
Communication speed	COM2 (38.4 kbps)
Minimum cycle time	3.5 ms
Process data length	Input data: 6 bytes, Output data: 0 byte
On request data communication	Yes
Data storage function	Yes
Event function	Yes
Vendor ID	131 (0x0083)
Device ID*1	PF3W704-□-LT□-M-X445: 330 (0x014A)
	PF3W720-□-LT□-M-X445: 310 (0x0136)
	PF3W740-□-LT□-M-X445: 317 (0x013D)

*1 The device ID differs according to each product type (flow range, whether or not a temperature sensor is provided, etc.).

Temperature Sensor Specifications

Items	Specifications
Rated temperature range	0 to 100°C*1
Set/Display temperature range	-10 to 110°C
Smallest settable increment/Minimum display unit	1°C
Display unit	°C
Display accuracy	±2°C
Response time	7 s*2
Ambient temperature characteristics	±5% F.S.

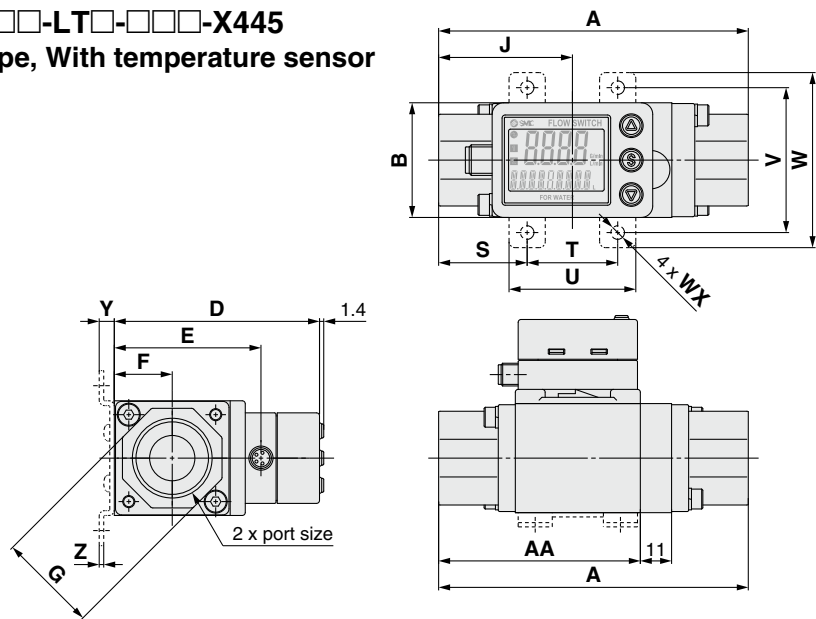
*1 The rated temperature range refers solely to that of the temperature sensor. The fluid temperature range specification of the flow switch as a whole is 0 to 90°C.

*2 The response time refers solely to that of the temperature sensor.

PF3W7□-X445

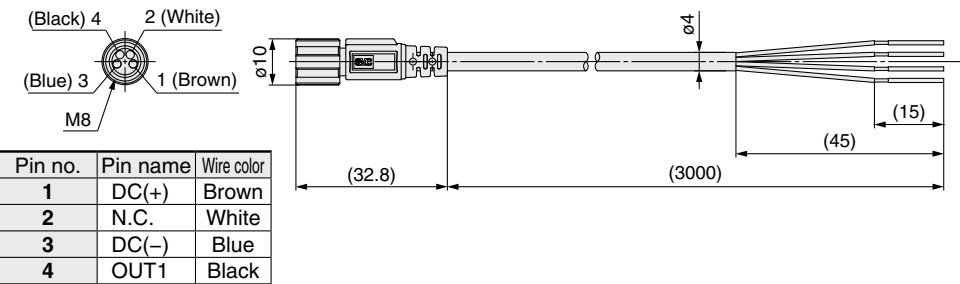
Dimensions

PF3W704/720/740-□□-LT□-□□□-X445
Integrated display type, With temperature sensor



Model	Port size (Rc, NPT, G)	A	AA	B	D	E	F	G	J	Bracket dimensions							
										S	T	U	V	W	WX	Y	Z
PF3W704	3/8	70	50	30	60	40.6	15.2	24	35	24	22	32	40	50	4.5	5	1.5
PF3W720	3/8, 1/2	78	54	30	60	40.6	15.2	27	39	28	22	32	40	50	4.5	5	1.5
PF3W740	1/2, 3/4	98	71	38	68	48.6	19.2	32	49	34	30	42	48	58	4.5	5	1.5

ZS-40-A Lead wire with M8 connector

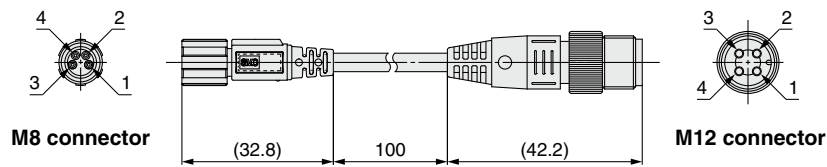


Pin no.	Pin name	Wire color
1	DC(+)	Brown
2	N.C.	White
3	DC(-)	Blue
4	OUT1	Black

Lead Wire Specifications

Conductor	Nominal cross section	AWG23
	O.D.	Approx. 0.7 mm
Insulator	Material	Heat resistant PVC
	O.D.	Approx. 1.1 mm
Sheath	Color	Brown, White, Black, Blue
	Material	Heat and oil resistant PVC
Finished O.D.		ø4

ZS-40-M12M8-A M12-M8 conversion lead wire



M8 (Female)		M12 (Male)	
①	Brown	①	
②	White	②	
③	Blue	③	
④	Black	④	

Wiring diagram

Refer to the Operation Manual in our website (<http://www.smcworld.com>) for wiring.

⚠ Safety Instructions Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.