

3-Screen Display



IO-Link



CE



UL

us



# High-Precision Digital Pressure Switch: For Air

# ISE70/71 Series



## How to Order

ISE70 - 02 - L2 - M

### Pressure range

Model	Description
ISE70	0 to 1 MPa
ISE71	0 to 1.6 MPa

### Piping specification

Symbol	Description
02	Rc1/4
N02	NPT1/4
F02	G1/4*1

\*1 ISO 1179-1 compliant

### Output specification\*1

Symbol	Description
L2	IO-Link: Switch output 1 + Switch output 2 (Switch output: NPN or PNP switching type)
AB	Switch output 1 + Switch output 2 (NPN or PNP switching type)

\*1 Refer to pages 8 and 13 for details.

### Unit specification

Symbol	Description
Nil	Units selection function*1
M	SI units only*2

\*1 Under the New Measurement Act, switches with the units selection function are no longer allowed for use in Japan.

\*2 Fixed units: MPa, kPa

### Option 3

Symbol	Description
Nil	Operation manual
Y	None
K	Operation manual + Calibration certificate
T	Calibration certificate

### Option 2

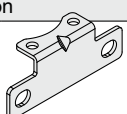
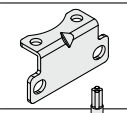
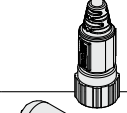
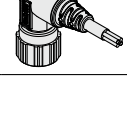
Symbol	Description
Nil	None
A	Bracket A (Interchangeable with ISE70)
B	Bracket B

### Option 1

Symbol	Description
Nil	None
S	Lead wire with M12 connector (Straight, 5 m)
L	Lead wire with M12 connector (Right-angled, 5 m)

## Options/Part Nos.

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

Description	Part no.	Note
Bracket A 	ZS-50-A	Interchangeable with ISE70 With 2 mounting screws (M4 x 6 L)
Bracket B 	ZS-50-B	With 2 mounting screws (M4 x 6 L)
Lead wire with M12 connector: Straight 	ZS-31-B	Lead wire length: 5 m
Lead wire with M12 connector: Right-angled 	ZS-31-C	Lead wire length: 5 m



For pressure switch precautions and specific product precautions, refer to the "Operation Manual" on the SMC website.

## Specifications

Model			ISE70	ISE71	
Applicable fluid			Air, Non-corrosive gas, Non-flammable gas		
Pressure	Rated pressure range		0 to 1.000 MPa	0 to 1.600 MPa	
	Display/Set pressure range		-0.105 to 1.050 MPa	-0.105 to 1.680 MPa	
	Display/Smallest settable increment		0.001 MPa	0.001 MPa	
	Withstand pressure		1.5 MPa	2.4 MPa	
Power supply	Power supply voltage	When used as a switch output device	12 to 24 VDC $\pm$ 10% with 10% voltage ripple or less		
		When used as an IO-Link device	18 to 30 VDC, including ripple (p-p) 10%		
	Current consumption		35 mA or less		
	Protection		Polarity protection		
Accuracy	Display accuracy		$\pm$ 2% F.S. $\pm$ 1 digit (Ambient temperature of 25 $\pm$ 3°C)		
	Repeatability		$\pm$ 0.5% F.S.		
	Temperature characteristics		$\pm$ 2% F.S. (25°C standard)		
Switch output (During SIO mode for output specifications "AB" or "L2")	Output type		Select from NPN or PNP open collector output.		
	Output mode		Hysteresis, Window comparator, Error output, Output OFF		
	Switch operation		Normal output, Reversed output		
	Max. load current		80 mA		
	Max. applied voltage		30 V (NPN output)		
	Internal voltage drop (Residual voltage)		1.5 V or less (at load current of 80 mA)		
	Delay time*1		1.5 ms or less, variable from 0 to 60 s/0.01 s increments		
	Hysteresis	Hysteresis mode		Variable from 0*2	
		Window comparator mode			
	Short circuit protection		Yes		
Display	Unit*3		MPa, kPa, kgf/cm <sup>2</sup> , bar, psi		
	Display type		LCD		
	Number of screens		3-screen display (Main screen, Sub screen x 2)		
	Display color		Main screen: Red/Green, Sub screen: Orange		
	Number of display digits		Main screen: 4 digits (7 segments), Sub screen: 4 digits (Upper 1 digit 11 segments, 7 segments for other)		
	Indicator light		Lights up when switch output is turned ON (OUT1, OUT2: Orange)		
Digital filter*4			Variable from 0 to 30 s/0.01 s increments		
Environmental resistance	Enclosure		IP67		
	Withstand voltage		1000 VAC for 1 min between terminals and housing		
	Insulation resistance		50 M $\Omega$ or more (500 VDC measured via megohmmeter) between terminals and housing		
	Fluid temperature range		0 to 50°C (No condensation or freezing)		
	Operating temperature range		Operating: 0 to 50°C, Stored: -10 to 60°C (No condensation or freezing)		
	Operating humidity range		Operating/Stored: 35 to 85% RH (No condensation)		
Standards			UL/CSA (E216656), CE marking (EMC Directive, RoHS Directive)		
Piping	Port size		Rc1/4, NPT1/4, G1/4		
	Materials of parts in contact with fluid		Sensor pressure receiving area: Silicon Piping port: C3604 (Electroless nickel plating), Sensor seal: HNBR		
Weight	Body	Port size Rc1/4	153 g		
		Port size NPT1/4	152 g		
		Port size G1/4	150 g		
	Lead wire with connector		139 g		
Communication (IO-Link mode)	IO-Link type		Device		
	IO-Link version		V1.1		
	Communication speed		COM2 (38.4 kbps)		
	Configuration file		IODD file*5		
	Min. cycle time		2.3 ms		
	Process data length		Input data: 2 bytes, Output data: 0 byte		
	On request data communication		Yes		
	Data storage function		Yes		
	Event function		Yes		
	Vendor ID		131 (0 x 0083)		

\*1 Value without digital filter (at 0 ms)

\*2 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value more than the amount of fluctuation, or chattering will occur.

\*3 Setting is only possible for models with the units selection function. Only MPa or kPa is available for models without this function.

\*4 The response time indicates when the set value is 90% in relation to the step input.

\*5 The configuration file can be downloaded from the SMC website, <https://www.smcworld.com>



\* 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.

# ISE7□/7□G/79S Series

## Set Pressure Range and Rated Pressure Range

Set the pressure within the rated pressure range. The set pressure range is the range of pressure within which switch output can be set. The rated pressure range is the range of pressure that satisfies the specifications (accuracy, linearity, etc.) of the product. Although it is possible to set a value outside the rated pressure range, the specifications cannot be guaranteed even if the value stays within the set pressure range.

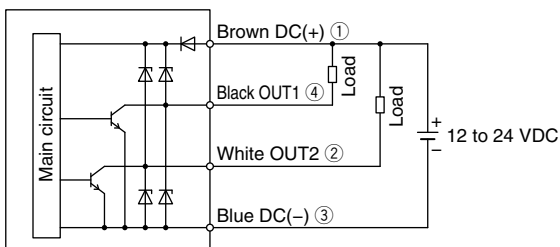
Switch		Pressure range								
		-2 MPa	-0.1 MPa	0	1 MPa	2 MPa	5 MPa	10 MPa	15 MPa	50 MPa
For 1 MPa (For Air and General fluids)	ISE70			0	1 MPa					
	ISE70G	-0.105 MPa			1.05 MPa					
For 1.6 MPa (For Air)	ISE71			0	1.6 MPa					
		-0.105 MPa			1.68 MPa					
For 2 MPa (For General fluids)	ISE75G			0	2 MPa					
		-0.105 MPa			2.1 MPa					
For 5 MPa (For General fluids)	ISE76G			0	5 MPa					
		-0.25 MPa			5.25 MPa					
For 10 MPa (For General fluids)	ISE77G			0	10 MPa					
		-0.50 MPa			10.5 MPa					
For 16 MPa (For General fluids)	ISE78G			0	16 MPa					
		-0.80 MPa			16.8 MPa					
For 50 MPa (For General fluids)	ISE79S			0	50 MPa					
		-2.5 MPa			52.5 MPa					

 Rated pressure range of the switch  
 Set pressure range of the switch

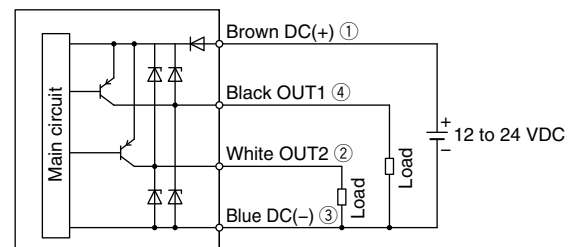
## Internal Circuits and Wiring Examples

### When used as a switch output device Setting of NPN open collector 2 outputs

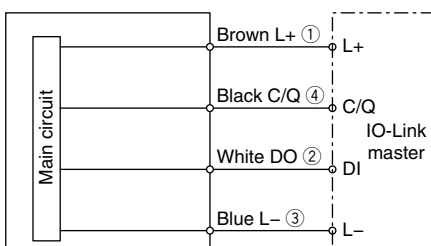
\* The numbers in the circuit diagrams show the connector pin layout.



### Setting of PNP open collector 2 outputs

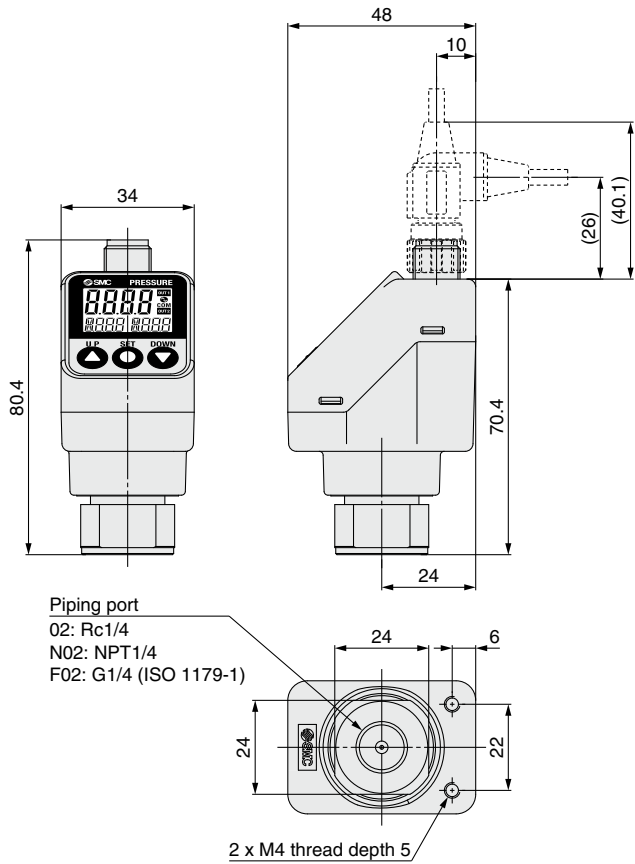


### When used as an IO-Link device

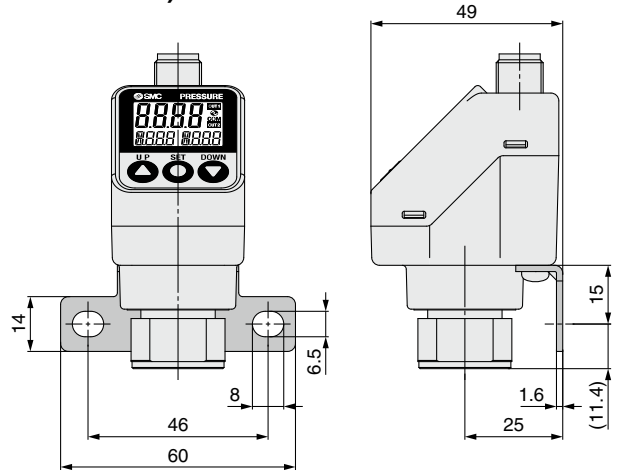


**Dimensions**

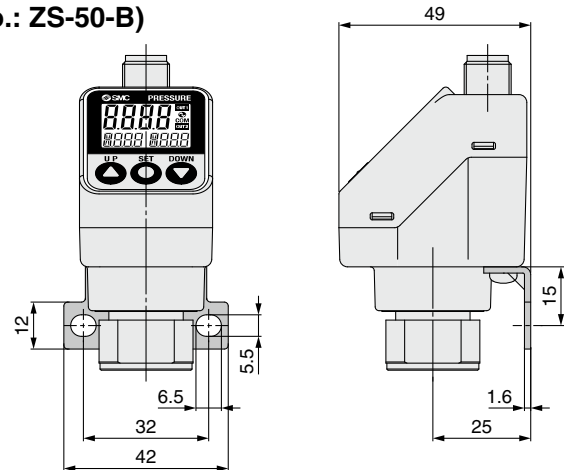
**Without bracket**



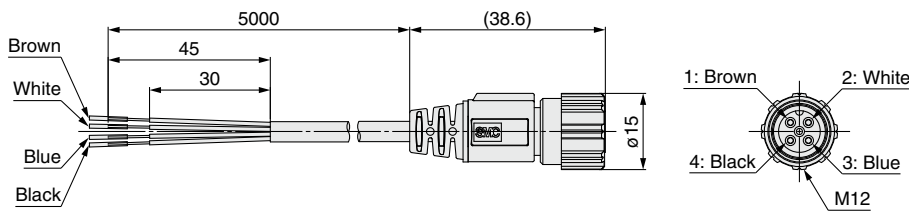
**Bracket A (Interchangeable with ISE70/ISE75(H))  
 (Part no.: ZS-50-A)**



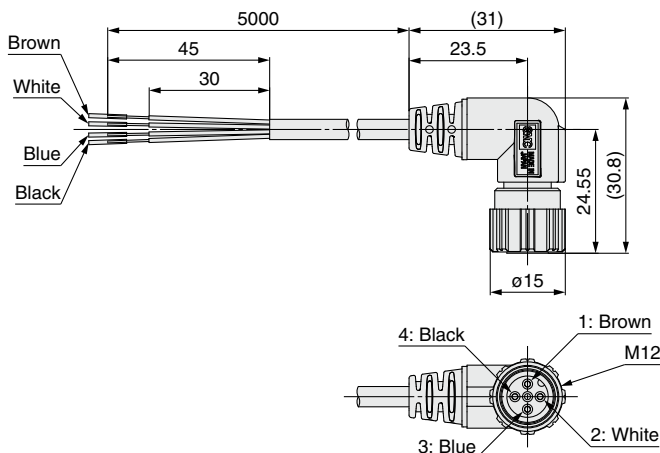
**Bracket B  
 (Part no.: ZS-50-B)**



**Lead wire with M12 connector  
 (Part no.: ZS-31-B)**



**(Part no.: ZS-31-C)**



**Cable Specifications**

Conductor	Nominal cross section	AWG23
	Outside diameter	0.72 mm
Insulator	Material	Cross-linked vinyl chloride
	Outside diameter	1.14 mm
	Number of cores	4
Sheath	Material	Oil-resistant vinyl chloride
	Finished outside diameter	ø4

**When used as a switch output device**

No.	Description	Lead wire color	Note
1	DC(+)	Brown	12 to 24 VDC
2	OUT2	White	Switch output 2
3	DC(-)	Blue	0 V
4	OUT1	Black	Switch output 1

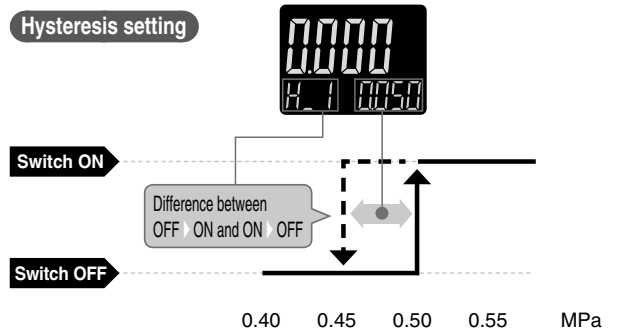
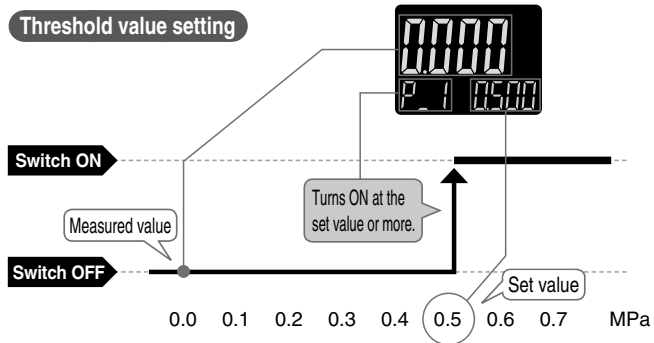
**When used as an IO-Link device**

No.	Description	Lead wire color	Note
1	L+	Brown	18 to 30 VDC
2	DO	White	Switch output 2
3	L-	Blue	0 V
4	C/Q	Black	Communication data (IO-Link)/ Switch output 1 (SIO)

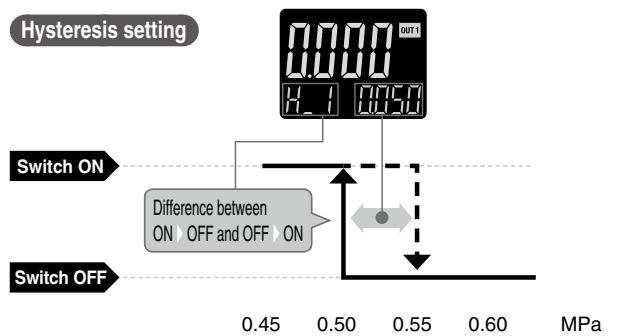
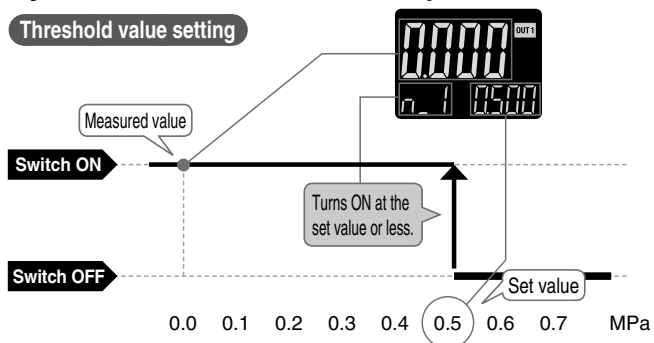
# ISE7□/7□G/79S Series Function Details

Display examples of the main and sub (set value) screens of each mode.

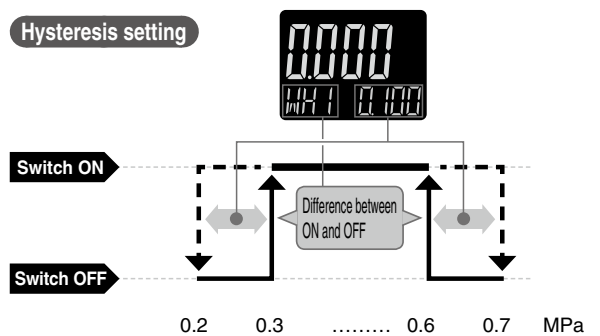
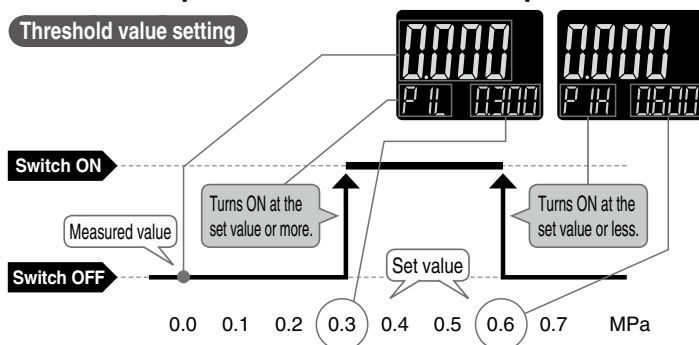
## Hysteresis mode Normal output



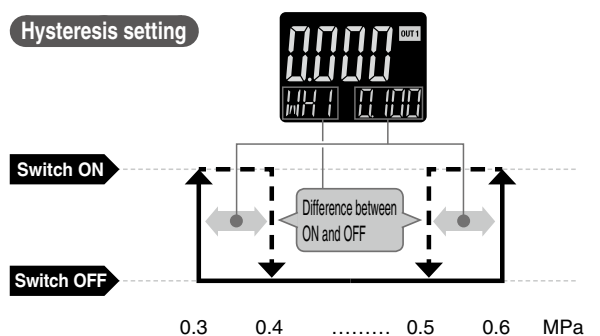
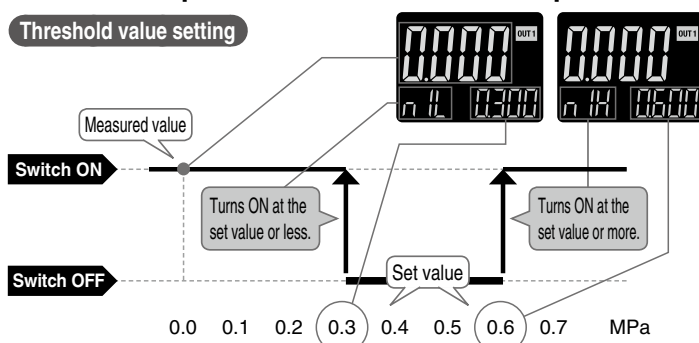
## Hysteresis mode Reversed output



## Window comparator mode Normal output



## Window comparator mode Reversed output



## Function Details

### A Auto-preset function (F4) \* When using with IO-Link, the set values cannot be changed by communication.

This function, when selected in the initial setting, calculates and stores the set value from the measured pressure.

Using this function is possible to automatically determine the optimum set value based on the variation in measured pressure due to the repeated operation of the device.

#### Formula for Obtaining the Set Value

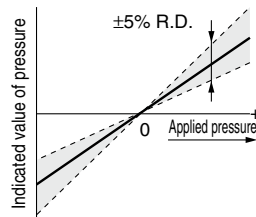
Set value (Threshold value)	Hysteresis value
$P_{-1}(P_{-2}) = A - (A-B)/4$	$H_{-1}(H_{-2}) =  (A-B)/2 $
$n_{-1}(n_{-2}) = B + (A-B)/4$	

A: Max. pressure value in auto-preset mode

B: Min. pressure value in auto-preset mode

### B Display value fine adjustment function (F6)

Fine adjustment of the indicated value of the pressure sensor can be made within the range of ±5% of the read value. (This eliminates wide variations of the indicated value.)



— Indicated value at the time of shipment  
 [ ] Adjustable range of display value fine adjustment function

\* When the display value fine adjustment function is used, the set pressure value may change ±1 digit.

### C Peak/Bottom value indication function

This function constantly detects and updates the max. (min.) pressure when the power is supplied, and allows to hold the max. (min.) pressure value.

The held value is maintained even if the power supply is cut.

When the SET and DOWN buttons are simultaneously pressed for 1 s or longer, while “holding,” the held value will be reset.

### D Key-lock function

This function prevents operation errors such as accidentally changing setting values.

### E Zero-clear function

This function clears and resets the zero value on the display of the measured pressure.

The indicated value can be adjusted within ±7% F.S. of the pressure at the time of shipment from the factory.

### F Error display function

When an error or abnormality arises, the location and contents are displayed.

Error name	Display	Description	Action
Over current error		A load current applied to the switch output has exceeded the max. value.	Eliminate the cause of the over current by turning OFF the power supply and then turn it ON again.
Residual pressure error		During zero-clear operation, a pressure over ±7% F.S. has been applied. Note that the mode is returned to measurement mode automatically after 1 s. The zero-clear range varies by ±1% F.S. due to variation between individual products.	Retry the zero-clear operation after restoring the applied pressure to an atmospheric pressure condition.
Applied pressure error		Supply pressure exceeds the max. set pressure.	Reset the applied pressure to a level within the set pressure range.
		Supply pressure is below the min. set pressure.	
System error		An internal data error has occurred.	Turn the power OFF and turn it ON again. If the error cannot be solved, please contact SMC for investigation.
IO-Link master version error		The IO-Link version does not match that of the master. The master uses version 1.0.	Ensure that the master IO-Link version matches the device version.

If the error cannot be solved after the instructions above are performed, or errors other than those above are displayed, please contact SMC for investigation.

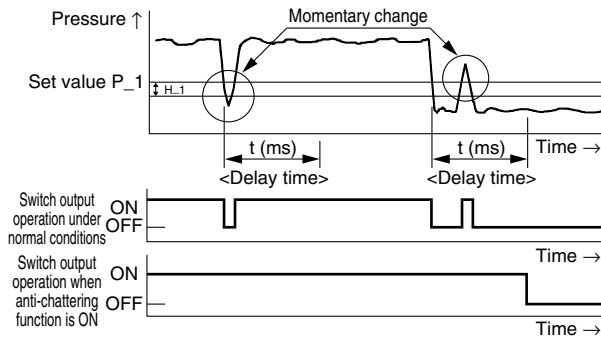
## Function Details

### G Anti-chattering function (Simple setting mode or F1, F2)

A function to delay the switch output response time to prevent chattering or prevent the detection of temporary changes in source pressure. For example, large bore cylinders and ejectors consume a large volume of air during operation and may experience a temporary drop in the supply pressure. The delay time can be set in the range of 0.00 to 60.00 [s] in 0.01 [s] increments.

<Principle>

This function averages pressure values measured during the response time set by the user and then compares the average pressure value with the pressure set point value to output the result on the switch.



### H Units selection function (F0)

Display units can be switched with this function.

Model	Rated pressure range	Smallest settable increment				
		MPa	kPa	kgf/cm <sup>2</sup>	bar	psi
ISE70/70G	0 to 1 MPa	0.001	1	0.01	0.01	0.1
ISE71	0 to 1.6 MPa					0.2
ISE75G	0 to 2 MPa					
ISE76G	0 to 5 MPa	0.01	/	0.1	0.1	1
ISE77G	0 to 10 MPa					
ISE78G	0 to 16 MPa	0.1	/	1	1	10
ISE79S	0 to 50 MPa					

### I Zero cut-off setting (F14)

When the pressure display value is close to zero, this function forces the display to zero.

The range to display zero can be changed within the range of 0.0 to 10.0%.

Example: When the ISE70 (1 MPa range), zero-cut value = 1.0%, 0 is displayed in the range of -9 to 9 kPa.

### J Power saving mode (F80)

The power saving mode can be selected.

With this function, if no buttons are pressed for 30 s, it shifts to power saving mode.

At the time of shipment from the factory, the product is set to the normal mode (the power saving mode is turned OFF).

(During power saving mode, [ECo] will flash in the sub screen and the operation light will be ON (only when the switch is ON).)

### K Setting of a security code (F81)

The user can select whether a security code must be entered to release the key lock.

At the time of shipment from the factory, it is set such that a security code is not required.



### 3-Screen Display

# High-Precision Digital Pressure Switch: For Air

## ISE70/71-X2



[Click here for details](#) on the specifications and dimensions.

### How to Order



**ISE70-02-L2-M**       **-X2**

#### Pressure range

Symbol	Description
<b>ISE70</b>	0 to 1 MPa
<b>ISE71</b>	0 to 1.6 MPa

#### Piping specification

Symbol	Description
<b>02</b>	Rc1/4
<b>N02</b>	NPT1/4
<b>F02</b>	G1/4*1

\*1 ISO 1179-1 compliant

#### Output specification\*1

Symbol	Description
<b>L2</b>	IO-Link: Switch output 1 + Switch output 2 (Switch output: NPN or PNP switching type)
<b>AB</b>	Switch output 1 + Switch output 2 (NPN or PNP switching type)

\*1 Refer to the **Web Catalog** for details.

#### Unit specification

Symbol	Description
<b>Nil</b>	Unit selection function*1
<b>M</b>	SI unit only*2

\*1 Under the New Measurement Act, switches with the unit selection function are not permitted for use in Japan.

\*2 Fixed unit: MPa, kPa

• Fluid contact parts: Grease-free

#### Option 3

Symbol	Description
<b>Nil</b>	Operation manual
<b>Y</b>	None
<b>K</b>	Operation manual + Calibration certificate
<b>T</b>	Calibration certificate

#### Option 2

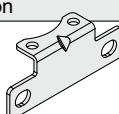
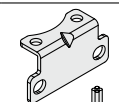
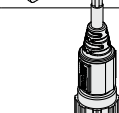
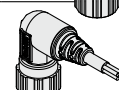
Symbol	Description
<b>Nil</b>	None
<b>A</b>	Bracket A (Interchangeable with ISE70)
<b>B</b>	Bracket B

#### Option 1

Symbol	Description
<b>Nil</b>	None
<b>S</b>	Lead wire with M12 connector (Straight, 5 m)
<b>L</b>	Lead wire with M12 connector (Right-angled, 5 m)

### Options/Part Nos.

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

Description	Part no.	Note
Bracket A 	<b>ZS-50-A</b>	Interchangeable with ISE70 With 2 mounting screws (M4 x 6L)
Bracket B 	<b>ZS-50-B</b>	With 2 mounting screws (M4 x 6L)
Lead wire with M12 connector: Straight 	<b>ZS-31-B</b>	Lead wire length: 5 m
Lead wire with M12 connector: Right-angled 	<b>ZS-31-C</b>	Lead wire length: 5 m