

1 Output

3-Screen Display High-Precision Digital Pressure Switch

ZSE20(F)/ISE20 Series

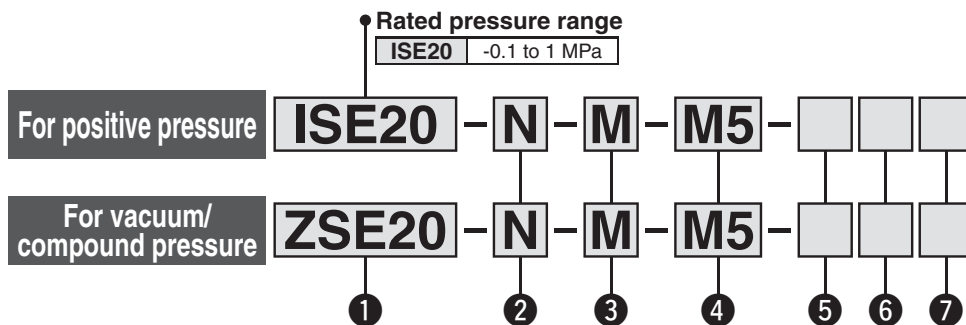


RoHS

IP40



How to Order



1 Rated pressure range

ZSE20	0 to -101 kPa
ZSE20F	-100 to 100 kPa

2 Output specification

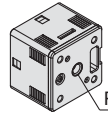
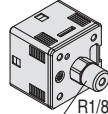
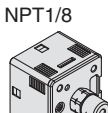
Symbol	Description
N	NPN open collector 1 output
P	PNP open collector 1 output

3 Unit specification

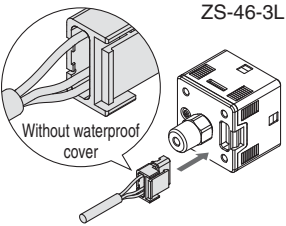
Symbol	Description
—	Units selection function
M	SI unit only*1
P	Units selection function (Initial value psi)

*1 Fixed unit: kPa, MPa

4 Piping specification

Symbol	Description
M5	M5 female thread 
O1	R1/8 
N01	NPT1/8 

5 Option 1

Symbol	Description
—	Without lead wire
L	Lead wire with connector (3-core, 2 m lead wire) 

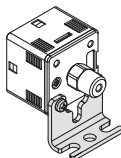
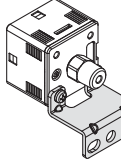
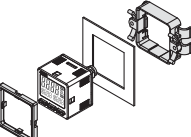
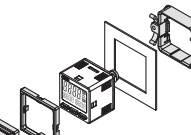
* For the lead wire with M12 connector, refer to p. 38.

7 Option 3

Symbol	Operation manual*1	Calibration certificate*1
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Y	<input type="radio"/>	—
K	<input type="radio"/>	<input type="radio"/>
T	<input type="radio"/>	<input type="radio"/>



*1 All texts are in both English and Japanese.

6 Option 2

Symbol	Description
—	None
A1	Bracket A (Vertical mounting) 
A2	Bracket B (Horizontal mounting) 
B	Panel mount adapter 
D	Panel mount adapter + Front protection cover 

Options/Part Nos.

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

Description	Part no.	Note
Bracket A	ZS-46-A1	Tapping screw: Nominal size 3 x 8 L (2 pcs.)
Bracket B	ZS-46-A2	Tapping screw: Nominal size 3 x 8 L (2 pcs.)
Panel mount adapter	ZS-46-B	—
Panel mount adapter + Front protection cover	ZS-46-D	—
Lead wire with connector	ZS-46-3L	3-core, 2 m, Non-waterproof (Without waterproof cover)
Front protection cover	ZS-27-01	—
R1/8 Piping adapter	ZS-46-N1	
NPT1/8 Piping adapter	ZS-46-N2	

3-Screen Display High-Precision Digital Pressure Switch **ZSE20(F)/ISE20 Series**

For details on the specific product precautions, refer to the "Operation Manual" on the SMC website.

Specifications

Model		ZSE20 (Vacuum pressure)	ZSE20F (Compound pressure)	ISE20 (Positive pressure)	
Applicable fluid		Air, Non-corrosive gas, Non-flammable gas			
Pressure	Rated pressure range	0.0 to -101.0 kPa	-100.0 to 100.0 kPa	-0.100 to 1.000 MPa	
	Display/Set pressure range	10.0 to -105.0 kPa	-105.0 to 105.0 kPa	-0.105 to 1.050 MPa	
	Display/Smallest settable increment	0.1 kPa		0.001 MPa	
	Withstand pressure	500 kPa		1.5 MPa	
Power supply	Power supply voltage	12 to 24 VDC $\pm 10\%$, Ripple (p-p) 10% or less			
	Current consumption	25 mA or less			
	Protection	Polarity protection			
Accuracy	Display accuracy	$\pm 2\%$ F.S. ± 1 digit (Ambient temperature of 25 ± 3 °C)			
	Repeatability	$\pm 0.2\%$ F.S. ± 1 digit			
	Temperature characteristics	$\pm 2\%$ F.S. (25 °C standard)			
Switch output	Output type	NPN or PNP open collector 1 output			
	Output mode	Hysteresis mode, Window comparator mode, Error output, Output OFF			
	Switch operation	Normal output, Reversed output			
	Max. load current	80 mA			
	Max. applied voltage (NPN only)	28 V			
	Internal voltage drop (Residual voltage)	1 V or less (at load current of 80 mA)			
	Delay time*1	1.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000, 5000 ms)			
	Hysteresis	Hysteresis mode	Variable from 0*2		
		Window comparator mode			
Short circuit protection	Yes				
Display	Unit*3	MPa, kPa, kgf/cm ² , bar, psi, inHg, mmHg	MPa, kPa, kgf/cm ² , bar, psi		
	Display type	LCD			
	Number of screens	3-screen display (Main screen, Sub screen x 2)			
	Display colour	1) Main screen: Red/Green 2) Sub screen: Orange			
	Number of display digits	1) Main screen: 4 digits (7 segments) 2) Sub screen: 4 digits (Upper 1 digit 11 segments, 7 segments for other)			
	Indicator light	Lights up when switch output is turned ON. OUT1: Orange			
Digital filter*4	0, 10, 50, 100, 500, 1000, 5000 ms				
Environment	Enclosure	IP40			
	Withstand voltage	1000 VAC for 1 minute between terminals and housing			
	Insulation resistance	50 M Ω or more (500 VDC measured via megohmmeter) between terminals and housing			
	Operating temperature range	Operating: -5 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, RoHS				
Length of lead wire with connector	2 m				

*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 greater 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.

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

Piping Specifications and Weights

Model		M5	01	N01
Port size		M5 x 0.8	R1/8	NPT1/8
Materials of parts in contact with fluid	Sensor pressure receiving area	Silicon		
	Piping port (Common)	PBT, CB156, Heat-resistant PPS, O-ring: HNBR		
	Piping port	—	C3604 (Electroless nickel plating), Stainless steel 304, NBR	
Weight	Body	22 g	32 g	34 g
	Lead wire with connector	+35 g		

Cable Specifications

Conductor area	0.15 mm ² (AWG26)	
Insulator	O.D.	1.0 mm
	Colour	Brown, Blue, Black (3-core)
Sheath	Finished O.D.	\varnothing 3.4

"Set Pressure Range and Rated Pressure Range," "Functions" → p. 17
"Internal Circuits and Wiring Examples" → p. 18 "Dimensions" → From p. 20

2 Outputs + Analogue Output (Voltage/Current)



3-Screen Display High-Precision Digital Pressure Switch

RoHS

IP40

ZSE20A(F)/ISE20A Series



How to Order

For positive pressure

ISE20A - X - M - M5 - [] - [] - []

For vacuum/compound pressure

ZSE20A - X - M - M5 - [] - [] - []

Rated pressure range

ISE20A -0.1 to 1 MPa

1 Rated pressure range

ZSE20A	0 to -101 kPa
ZSE20AF	-100 to 100 kPa

2 Output specification

Symbol	Description
R	NPN open collector 2 outputs + Analogue voltage output*1
S	NPN open collector 2 outputs + Analogue current output*1
T	PNP open collector 2 outputs + Analogue voltage output*1
V	PNP open collector 2 outputs + Analogue current output*1
X	NPN open collector 2 outputs + Copy function
Y	PNP open collector 2 outputs + Copy function

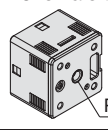
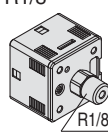
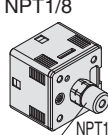
*1 Can be switched to auto-shift or copy function

3 Unit specification

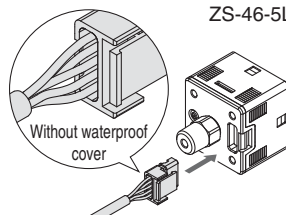
Symbol	Description
—	Units selection function
M	SI unit only*1
P	Units selection function (Initial value psi)

*1 Fixed unit: kPa, MPa

4 Piping specification

Symbol	Description
M5	M5 female thread 
01	R1/8 
N01	NPT1/8 

5 Option 1

Symbol	Description
—	Without lead wire
J	Lead wire with connector (5-core, 2 m lead wire) 

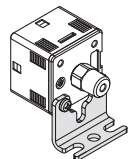
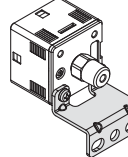
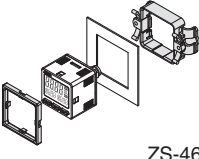
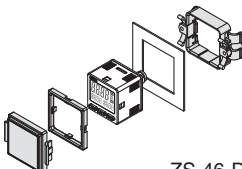
* For the lead wire with M12 connector, refer to p. 38.

7 Option 3

Symbol	Operation manual*1	Calibration certificate*1
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Y	<input type="radio"/>	—
K	<input type="radio"/>	<input type="radio"/>
T	<input type="radio"/>	<input type="radio"/>



*1 All texts are in both English and Japanese.

6 Option 2

Symbol	Description
—	None
A1	Bracket A (Vertical mounting) 
A2	Bracket B (Horizontal mounting) 
B	Panel mount adapter 
D	Panel mount adapter + Front protection cover 

Options/Part Nos.

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

Description	Part no.	Note
Bracket A	ZS-46-A1	Tapping screw: Nominal size 3 x 8 L (2 pcs.)
Bracket B	ZS-46-A2	Tapping screw: Nominal size 3 x 8 L (2 pcs.)
Panel mount adapter	ZS-46-B	—
Panel mount adapter + Front protection cover	ZS-46-D	—
Lead wire with connector	ZS-46-5L	5-core, 2 m, Non-waterproof (Without waterproof cover)
Front protection cover	ZS-27-01	—
R1/8 Piping adapter	ZS-46-N1	
NPT1/8 Piping adapter	ZS-46-N2	

3-Screen Display High-Precision Digital Pressure Switch **ZSE20A(F)/ISE20A Series**

For details on the specific product precautions, refer to the "Operation Manual" on the SMC website.

Specifications

Model		ZSE20A (Vacuum pressure)	ZSE20AF (Compound pressure)	ISE20A (Positive pressure)	
Applicable fluid		Air, Non-corrosive gas, Non-flammable gas			
Pressure	Rated pressure range	0.0 to -101.0 kPa	-100.0 to 100.0 kPa	-0.100 to 1.000 MPa	
	Display/Set pressure range	10.0 to -105.0 kPa	-105.0 to 105.0 kPa	-0.105 to 1.050 MPa	
	Display/Smallest settable increment	0.1 kPa		0.001 MPa	
	Withstand pressure	500 kPa		1.5 MPa	
Power supply	Power supply voltage	12 to 24 VDC $\pm 10\%$, Ripple (p-p) 10% or less			
	Current consumption	35 mA or less			
	Protection	Polarity protection			
Accuracy	Display accuracy	$\pm 2\%$ F.S. ± 1 digit (Ambient temperature of 25 ± 3 °C)			
	Repeatability	$\pm 0.2\%$ F.S. ± 1 digit			
	Analogue output accuracy	$\pm 2.5\%$ F.S. (Ambient temperature of 25 ± 3 °C)			
	Analogue output linearity	$\pm 1\%$ F.S.			
	Temperature characteristics	$\pm 2\%$ F.S. (25 °C standard)			
Switch output	Output type	NPN or PNP open collector 2 outputs			
	Output mode	Hysteresis mode, Window comparator mode, Error output, Output OFF			
	Switch operation	Normal output, Reversed output			
	Max. load current	80 mA			
	Max. applied voltage (NPN only)	28 V			
	Internal voltage drop (Residual voltage)	1 V or less (at load current of 80 mA)			
	Delay time*1	1.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000, 5000 ms)			
	Hysteresis	Hysteresis mode	Variable from 0*2		
		Window comparator mode			
	Short circuit protection	Yes			
Analogue output	Voltage output	Output type	Voltage output: 1 to 5 V	Voltage output: 0.6 to 5 V	
		Output impedance	Approx. 1 k Ω		
	Current output	Output type	Current output: 4 to 20 mA	Current output: 2.4 to 20 mA	
		Load impedance	Maximum load impedance at power supply voltage of 12 V: 300 Ω at power supply voltage of 24 V: 600 Ω Minimum load impedance: 50 Ω		
Auto-shift input	Input type	Non-voltage input: 0.4 V or less			
	Input mode	Select from Auto-shift or Auto-shift zero.			
	Input time	5 ms or more			
Display	Unit*3	MPa, kPa, kgf/cm ² , bar, psi, inHg, mmHg	MPa, kPa, kgf/cm ² , bar, psi		
	Display type	LCD			
	Number of screens	3-screen display (Main screen, Sub screen x 2)			
	Display colour	1) Main screen: Red/Green 2) Sub screen: Orange			
	Number of display digits	1) Main screen: 4 digits (7 segments) 2) 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	0, 10, 50, 100, 500, 1000, 5000 ms				
Environment	Enclosure	IP40			
	Withstand voltage	1000 VAC for 1 minute between terminals and housing			
	Insulation resistance	50 M Ω or more (500 VDC measured via megohmmeter) between terminals and housing			
	Operating temperature range	Operating: -5 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, RoHS				
Length of lead wire with connector		2 m			

*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 greater 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.

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

Piping Specifications and Weights

Model		M5	01	N01
Port size		M5 x 0.8	R1/8	NPT1/8
Materials of parts in contact with fluid	Sensor pressure receiving area	Silicon		
	Piping port (Common)	PBT, CB156, Heat-resistant PPS, O-ring: HNBR		
	Piping port	—	C3604 (Electroless nickel plating), Stainless steel 304, NBR	
Weight	Body	24 g	34 g	36 g
	Lead wire with connector	+39 g		

Cable Specifications

Conductor area		0.15 mm ² (AWG26)
Insulator	O.D.	1.0 mm
	Colour	Brown, Blue, Black, White, Grey (5-core)
Sheath	Finished O.D.	$\varnothing 3.5$

"Set Pressure Range and Rated Pressure Range," "Functions" → p. 17
"Internal Circuits and Wiring Examples" → From p. 18 "Dimensions" → From p. 20

2 Outputs + Analogue Output (Voltage/Current)



3-Screen Display High-Precision Digital Pressure Switch

RoHS

IP65

ZSE20B(F)/ISE20B Series



For the IO-Link compatible type, refer to p. 15.

How to Order

For positive pressure

ISE20B - X - M - M5 - [] - [] - []

For vacuum/compound pressure

ZSE20B - X - M - M5 - [] - [] - []

Rated pressure range
ISE20B -0.1 to 1 MPa

1 Rated pressure range

ZSE20B	0 to -101 kPa
ZSE20BF	-100 to 100 kPa

2 Output specification

Symbol	Description
R	NPN open collector 2 outputs + Analogue voltage output*1
S	NPN open collector 2 outputs + Analogue current output*1
T	PNP open collector 2 outputs + Analogue voltage output*1
V	PNP open collector 2 outputs + Analogue current output*1
X	NPN open collector 2 outputs + Copy function
Y	PNP open collector 2 outputs + Copy function

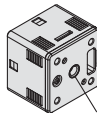
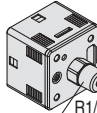
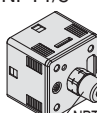
*1 Can be switched to auto-shift or copy function

3 Unit specification

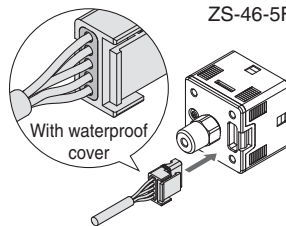
Symbol	Description
—	Units selection function
M	SI unit only*1
P	Units selection function (Initial value psi)

*1 Fixed unit: kPa, MPa

4 Piping specification

Symbol	Description
M5	M5 female thread 
01	R1/8 
N01	NPT1/8 

5 Option 1

Symbol	Description
—	Without lead wire
W	Lead wire with connector (5-core, 2 m lead wire, With waterproof cover) 

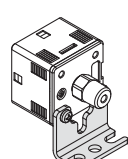
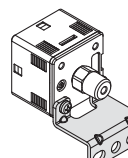
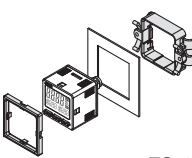
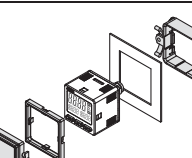
* For the lead wire with M12 connector, refer to p. 38.

7 Option 3

Symbol	Operation manual*1	Calibration certificate*1
—	<input type="radio"/>	—
Y	<input type="radio"/>	—
K	<input type="radio"/>	<input type="radio"/>
T	<input type="radio"/>	<input type="radio"/>



*1 All texts are in both English and Japanese.

6 Option 2

Symbol	Description
—	None
A1	Bracket A (Vertical mounting) 
A2	Bracket B (Horizontal mounting) 
B	Panel mount adapter 
D	Panel mount adapter + Front protection cover 

Options/Part Nos.

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

Description	Part no.	Note
Bracket A	ZS-46-A1	Tapping screw: Nominal size 3 x 8 L (2 pcs.)
Bracket B	ZS-46-A2	Tapping screw: Nominal size 3 x 8 L (2 pcs.)
Panel mount adapter	ZS-46-B	—
Panel mount adapter + Front protection cover	ZS-46-D	—
Lead wire with connector	ZS-46-5F	5-core, 2 m, Waterproof (With waterproof cover)
Front protection cover	ZS-27-01	—
R1/8 Piping adapter	ZS-46-N1	
NPT1/8 Piping adapter	ZS-46-N2	

3-Screen Display High-Precision Digital Pressure Switch **ZSE20B(F)/ISE20B Series**

For details on the specific product precautions, refer to the "Operation Manual" on the SMC website.

Specifications

Model		ZSE20B (Vacuum pressure)	ZSE20BF (Compound pressure)	ISE20B (Positive pressure)
Applicable fluid		Air, Non-corrosive gas, Non-flammable gas		
Pressure	Rated pressure range	0.0 to -101.0 kPa	-100.0 to 100.0 kPa	-0.100 to 1.000 MPa
	Display/Set pressure range	10.0 to -105.0 kPa	-105.0 to 105.0 kPa	-0.105 to 1.050 MPa
	Display/Smallest settable increment	0.1 kPa		0.001 MPa
	Withstand pressure	500 kPa		1.5 MPa
Power supply	Power supply voltage	12 to 24 VDC $\pm 10\%$, Ripple (p-p) 10% or less		
	Current consumption	35 mA or less		
	Protection	Polarity protection		
Accuracy	Display accuracy	$\pm 2\%$ F.S. ± 1 digit (Ambient temperature of 25 ± 3 °C)		
	Repeatability	$\pm 0.2\%$ F.S. ± 1 digit		
	Analogue output accuracy	$\pm 2.5\%$ F.S. (Ambient temperature of 25 ± 3 °C)		
	Analogue output linearity	$\pm 1\%$ F.S.		
	Temperature characteristics	$\pm 2\%$ F.S. (25 °C standard)		
Switch output	Output type	NPN or PNP open collector 2 outputs		
	Output mode	Hysteresis mode, Window comparator mode, Error output, Output OFF		
	Switch operation	Normal output, Reversed output		
	Max. load current	80 mA		
	Max. applied voltage (NPN only)	28 V		
	Internal voltage drop (Residual voltage)	1 V or less (at load current of 80 mA)		
	Delay time*1	1.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000, 5000 ms)		
	Hysteresis	Hysteresis mode	Variable from 0*2	
		Window comparator mode		
	Short circuit protection	Yes		
Analogue output	Voltage output	Output type	Voltage output: 1 to 5 V	Voltage output: 0.6 to 5 V
		Output impedance	Approx. 1 k Ω	
	Current output	Output type	Current output: 4 to 20 mA	Current output: 2.4 to 20 mA
		Load impedance	Maximum load impedance at power supply voltage of 12 V: 300 Ω at power supply voltage of 24 V: 600 Ω Minimum load impedance: 50 Ω	
Auto-shift input	Input type	Non-voltage input: 0.4 V or less		
	Input mode	Select from Auto-shift or Auto-shift zero.		
	Input time	5 ms or more		
Display	Unit*3	MPa, kPa, kgf/cm ² , bar, psi, inHg, mmHg	MPa, kPa, kgf/cm ² , bar, psi	
	Display type	LCD		
	Number of screens	3-screen display (Main screen, Sub screen x 2)		
	Display colour	1) Main screen: Red/Green 2) Sub screen: Orange		
	Number of display digits	1) Main screen: 4 digits (7 segments) 2) 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	0, 10, 50, 100, 500, 1000, 5000 ms			
Environment	Enclosure	IP65		
	Withstand voltage	1000 VAC for 1 minute between terminals and housing		
	Insulation resistance	50 M Ω or more (500 VDC measured via megohmmeter) between terminals and housing		
	Operating temperature range	Operating: -5 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, RoHS			
Length of lead wire with connector		2 m		

*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 greater 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.

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

Piping Specifications and Weights

Model		M5	01	N01
Port size		M5 x 0.8	R1/8	NPT1/8
Materials of parts in contact with fluid	Sensor pressure receiving area	Silicon		
	Piping port (Common)	PBT, CB156, Heat-resistant PPS, O-ring: HNBR		
	Piping port	—	C3604 (Electroless nickel plating), Stainless steel 304, NBR	
Weight	Body	24 g	34 g	36 g
	Lead wire with connector	+39 g		

Cable Specifications

Conductor area		0.15 mm ² (AWG26)
Insulator	O.D.	1.0 mm
	Colour	Brown, Blue, Black, White, Grey (5-core)
Sheath	Finished O.D.	$\varnothing 3.5$

"Set Pressure Range and Rated Pressure Range," "Functions" → p. 17
"Internal Circuits and Wiring Examples" → From p. 18 "Dimensions" → From p. 20

IO-Link Compatible (1 Output)



RoHS

IP65

3-Screen Display High-Precision Digital Pressure Switch

ZSE20B(F)-L/ISE20B-L Series



For 2 outputs + analogue output type, refer to p. 13.

How to Order

For positive pressure

ISE20B - L - M - M5 - [] - [] - []

For vacuum/compound pressure

ZSE20B - L - M - M5 - [] - [] - []

Rated pressure range

ISE20B 0 to 1 MPa

1 Rated pressure range

ZSE20B	0 to -100 kPa
ZSE20BF	-100 to 100 kPa

2 Output specification

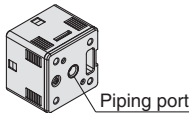
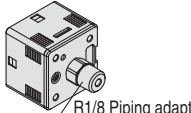
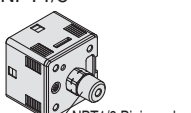
Symbol	Description
L	IO-Link/Switch: 1 output ← (PNP or NPN switching type for switch output)

3 Unit specification

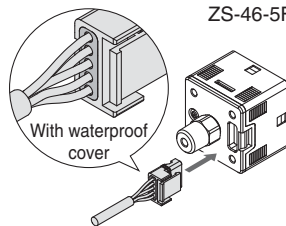
Symbol	Description
—	Units selection function
M	SI unit only*1
P	Units selection function (Initial value psi)

*1 Fixed unit: kPa, MPa

4 Piping specification

Symbol	Description
M5	M5 female thread 
01	R1/8 
N01	NPT1/8 

5 Option 1

Symbol	Description
—	Without lead wire
W	Lead wire with connector (5-core, 2 m lead wire, With waterproof cover) 

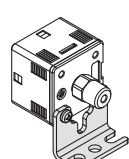
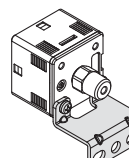
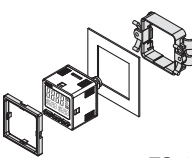
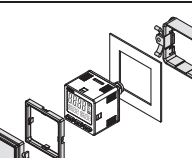
* For the lead wire with M12 connector, refer to p. 38.

7 Option 3

Symbol	Operation manual*1	Calibration certificate*1
—	○	—
Y	—	—
K	○	○
T	—	○



*1 All texts are in both English and Japanese.

6 Option 2

Symbol	Description
—	None
A1	Bracket A (Vertical mounting) 
A2	Bracket B (Horizontal mounting) 
B	Panel mount adapter 
D	Panel mount adapter + Front protection cover 

Options/Part Nos.

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

Description	Part no.	Note
Bracket A	ZS-46-A1	Tapping screw: Nominal size 3 x 8 L (2 pcs.)
Bracket B	ZS-46-A2	Tapping screw: Nominal size 3 x 8 L (2 pcs.)
Panel mount adapter	ZS-46-B	—
Panel mount adapter + Front protection cover	ZS-46-D	—
Lead wire with connector	ZS-46-5F	5-core, 2 m, Waterproof (With waterproof cover)
Front protection cover	ZS-27-01	—
R1/8 Piping adapter	ZS-46-N1	
NPT1/8 Piping adapter	ZS-46-N2	

3-Screen Display High-Precision Digital Pressure Switch **ZSE20B(F)-L/ISE20B-L Series**

For details on the specific product precautions, refer to the "Operation Manual" on the SMC website.

Specifications/IO-Link Compatible

Model		ZSE20B-L (Vacuum pressure)	ZSE20BF-L (Compound pressure)	ISE20B-L (Positive pressure)
Applicable fluid		Air, Non-corrosive gas, Non-flammable gas		
Pressure	Rated pressure range	0.0 to -100.0 kPa	-100.0 to 100.0 kPa	0.000 to 1.000 MPa
	Display/Set pressure range	10.0 to -105.0 kPa	-105.0 to 105.0 kPa	-0.105 to 1.050 MPa
	Display/Smallest settable increment	0.1 kPa		0.001 MPa
	Withstand pressure	500 kPa		1.5 MPa
Power supply	Power supply voltage	12 to 24 VDC $\pm 10\%$ with 10 % voltage ripple or less		
		When used as a switch output device (When not used as an IO-Link device)		
		When used as an IO-Link device		
	Current consumption	35 mA or less		
	Protection	Polarity protection		
Accuracy	Display accuracy	$\pm 2\%$ F.S. ± 1 digit (Ambient temperature of 25 ± 3 °C)		
	Repeatability	$\pm 0.2\%$ F.S. ± 1 digit		
	Temperature characteristics	$\pm 2\%$ F.S. (25 °C standard)		
Switch output (SIO mode)	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	Variable from 0*2		
		Window comparator mode		
		Short circuit protection	Yes	
Display	Unit*3	MPa, kPa, kgf/cm ² , bar, psi, inHg, mmHg		MPa, kPa, kgf/cm ² , bar, psi
	Display type	LCD		
	Number of screens	3-screen display (Main screen, Sub screen x 2)		
	Display colour	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			
Length of lead wire with connector	2 m			
Environment	Enclosure	IP65		
	Withstand voltage	1000 VAC for 1 minute between terminals and housing		
	Insulation resistance	50 M Ω or more (500 VDC measured via megohmmeter) between terminals and housing		
	Operating temperature range	Operating: -5 to 50 °C, Stored: -10 to 60 °C (No condensation or freezing)		
	Operating humidity range	Operating/Stored: 35 to 85 %RH (No condensation)		
Standards	CE, RoHS			
Communication (IO-Link mode)	IO-Link type	Device		
	IO-Link version	V1.1		
	Communication speed	COM2 (38.4 kbps)		
	Configuration file	IODD file*5		
	Minimum cycle time	2.3 ms		
	Process data length	Input data: 2 bytes, Output data: 0 bytes		
	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 greater 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, <http://www.smcworld.com>

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

Piping Specifications and Weights

Model		M5	01	N01
Port size		M5 x 0.8	R1/8	NPT1/8
Materials of parts in contact with fluid	Sensor pressure receiving area	Silicon		
	Piping port (Common)	PBT, CB156, Heat-resistant PPS, O-ring: HNBR		
	Piping port	—	C3604 (Electroless nickel plating), Stainless steel 304, NBR	
Weight	Body	24 g	34 g	36 g
	Lead wire with connector	+39 g		

Cable Specifications

Conductor area		0.15 mm ² (AWG26)
Insulator	O.D.	1.0 mm
	Colour	Brown, Blue, Black, White, Grey (5-core)
Sheath	Finished O.D.	∅ 3.5

"Set Pressure Range and Rated Pressure Range," "Functions" → p. 17
 "Internal Circuits and Wiring Examples" → p. 19 "Dimensions" → From p. 20

ZSE20□(F)/ISE20□ Series

Set Pressure Range and Rated Pressure Range

Set the pressure within the rated pressure range.

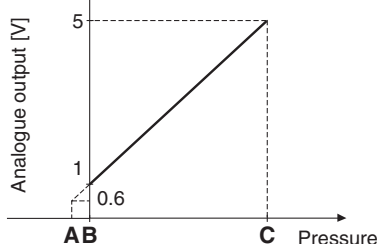
The set pressure range is the range of pressure within which setting is possible. The rated pressure range is the range of pressure that satisfies the specifications (accuracy, linearity, etc.) of the switch. Although it is possible to set a value outside the rated pressure range, the specifications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

Switch	Pressure range					
	-100 kPa	0	100 kPa	500 kPa	1 MPa	
For vacuum pressure	ZSE20 ZSE20A ZSE20B ZSE20B-L	-101 kPa	0			
		-105 kPa	10 kPa			
		-100 kPa	0			
For compound pressure	ZSE20F ZSE20AF ZSE20BF ZSE20BF-L	-100 kPa	100 kPa			
		-105 kPa	105 kPa			
		-100 kPa	100 kPa			
For positive pressure	ISE20 ISE20A ISE20B ISE20B-L	-100 kPa				1 MPa
		-105 kPa (-0.105 MPa)				1.05 MPa
		0				1 MPa

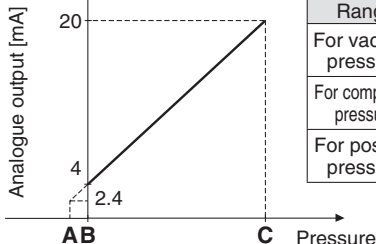
Rated pressure range of the switch
 Set pressure range of the switch
 Rated pressure range of the IO-Link product

Analogue Output*1

Voltage output



Current output



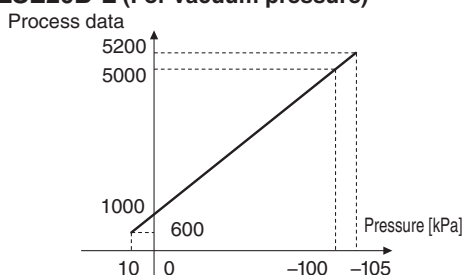
Range	Rated pressure range	A	B	C
For vacuum pressure	0.0 to -101.0 kPa	10.1 kPa	0	-101.0 kPa
For compound pressure	-100.0 to 100.0 kPa	—	-100.0 kPa	100.0 kPa
For positive pressure	-0.100 to 1.000 MPa	-0.100 MPa	0	1.000 MPa

*1 Excluding the 20/20B(F)-L

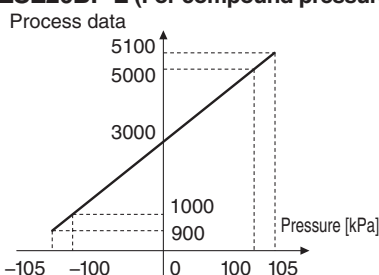
IO-Link: Process Data

Relationship between the process data and pressure value

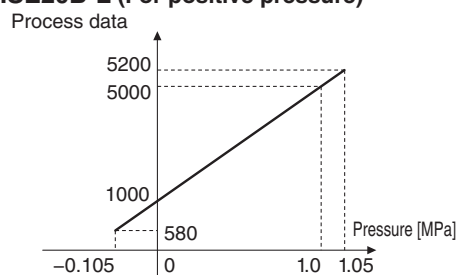
ZSE20B-L (For vacuum pressure)



ZSE20BF-L (For compound pressure)



ISE20B-L (For positive pressure)

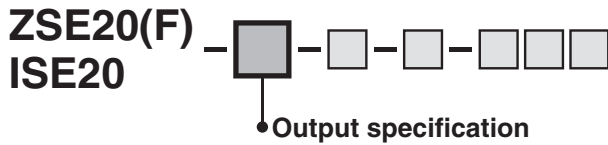


Functions

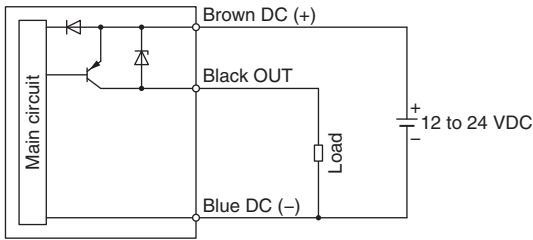
Sub screen setting function	The display of the sub screen can be selected.
Auto-preset function	This function calculates a rough set value automatically based on the on-going operation.
Display value fine adjustment function	Evens out deviations in the displayed value
Peak value indication function	Can retain the maximum pressure value displayed during measurement
Bottom value indication function	Can retain the minimum pressure value displayed during measurement
Keylock function (Selectable security code)	The keyboard can be locked to prevent the accidental operation of the operation switch.
Zero-clear function	The pressure display can be set to zero when the pressure is open to the atmosphere.
Error indication function	This function displays the error location and content when a problem or error has occurred.
Anti-chattering function	Prevents possible malfunctions due to sudden fluctuations in the primary pressure by adjusting the delay time
Units selection function	Can convert the display value
Power saving mode	Reduces power consumption
Display resolution switch function	Converts the display resolution from the normal value of 1/1000 to 1/100 Can reduce flickering of the monitor
kPa ↔ MPa switch function	Converts the unit between kPa and MPa
Copy function*1	The settings of the master sensor can be copied to the slave sensors.
Auto-shift function*1	Measures the pressure at the time of external input and uses it as a reference to correct the set value of the switch

*1 Not available for the 20/20B-L

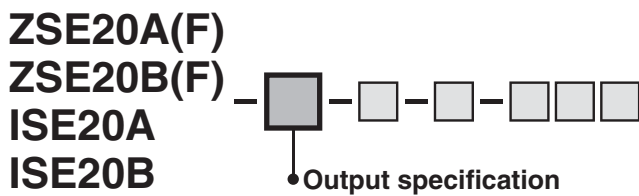
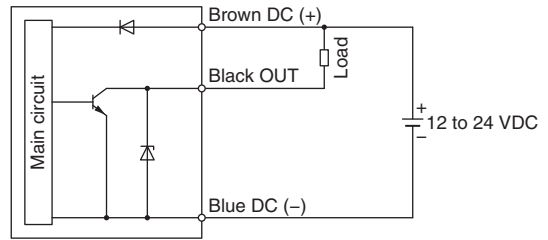
Internal Circuits and Wiring Examples



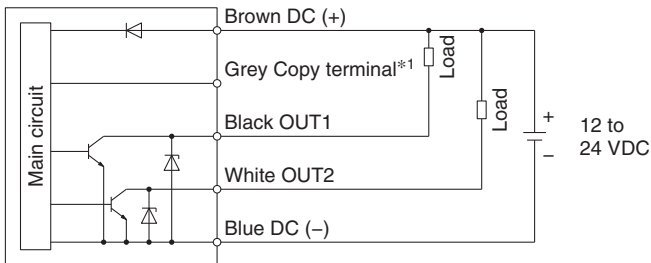
-P
PNP (1 output)



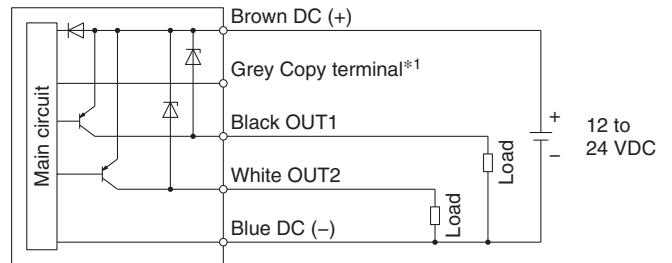
-N
NPN (1 output)



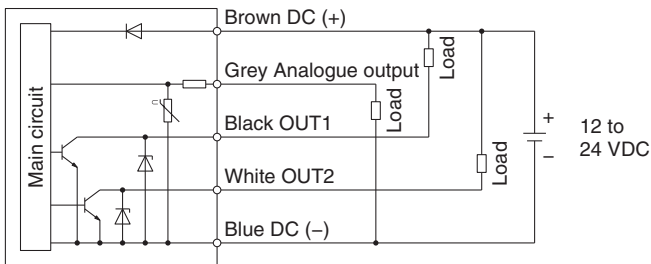
-X
NPN (2 outputs) + Copy function



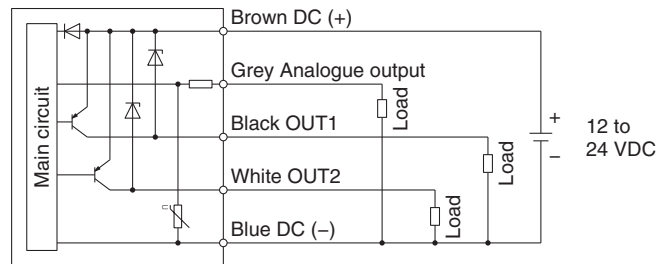
-Y
PNP (2 outputs) + Copy function



-R: NPN (2 outputs) + Analogue voltage output
-S: NPN (2 outputs) + Analogue current output



-T: PNP (2 outputs) + Analogue voltage output
-V: PNP (2 outputs) + Analogue current output



*1 Refer to p. 37.

ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

Function Details

Made to Order

ZSE20□(F)/ISE20□ Series

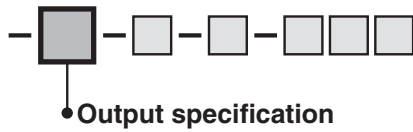
Internal Circuits and Wiring Examples

ZSE20A(F)

ZSE20B(F)

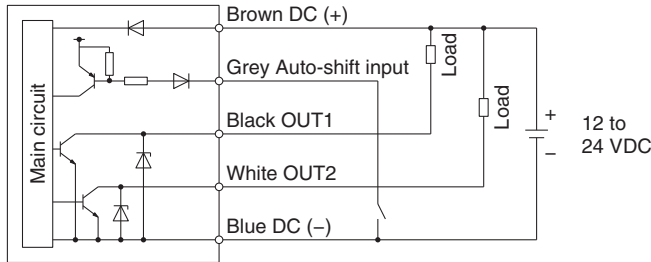
ISE20A

ISE20B



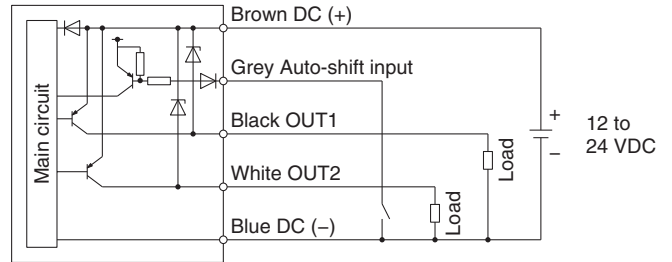
-R: NPN (2 outputs) + Auto-shift input

-S: NPN (2 outputs) + Auto-shift input



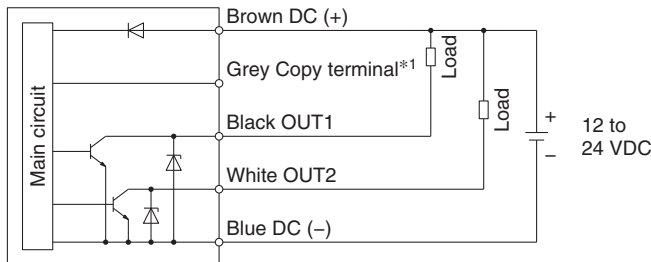
-T: PNP (2 outputs) + Auto-shift input

-V: PNP (2 outputs) + Auto-shift input



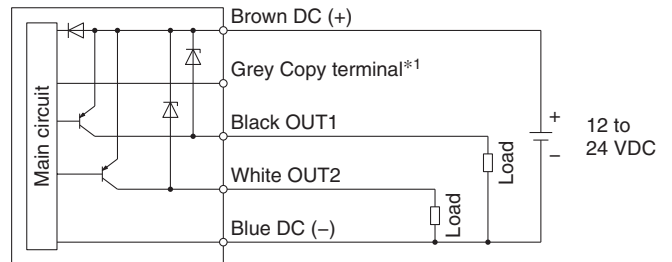
-R: NPN (2 outputs) + Copy function

-S: NPN (2 outputs) + Copy function



-T: PNP (2 outputs) + Copy function

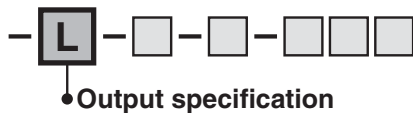
-V: PNP (2 outputs) + Copy function



*1 Refer to p. 37.

ZSE20B(F)

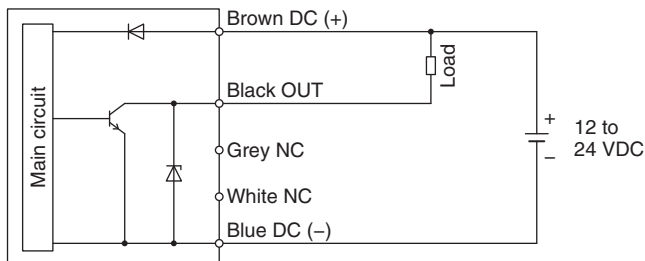
ISE20B



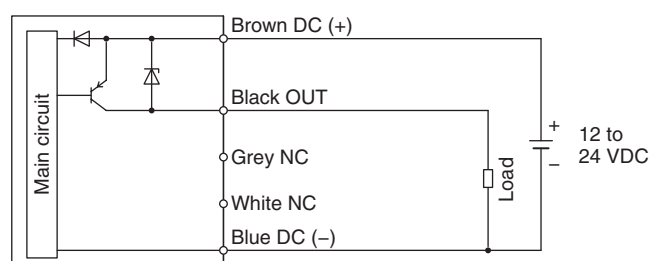
-L: (IO-Link/Switch: 1 output)

When used as a switch output device (When not used as an IO-Link device = When in SIO mode)

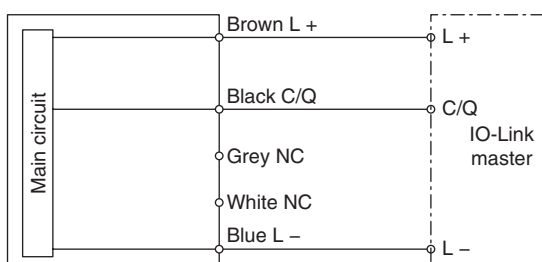
NPN open collector 1 output setting



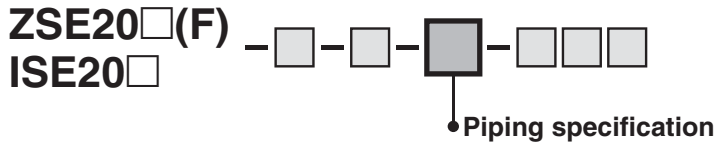
PNP open collector 1 output setting



When used as an IO-Link device



Dimensions



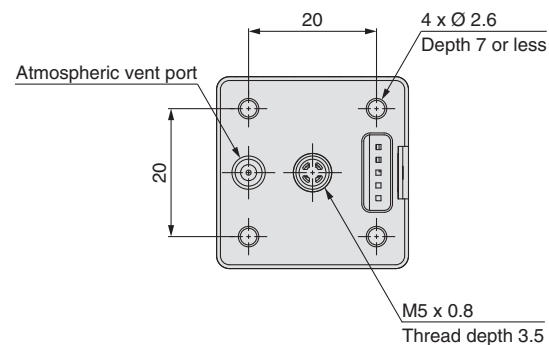
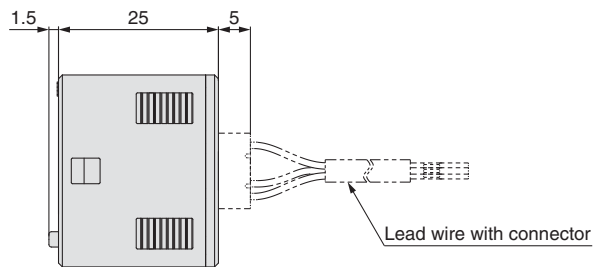
M5

M5 female thread

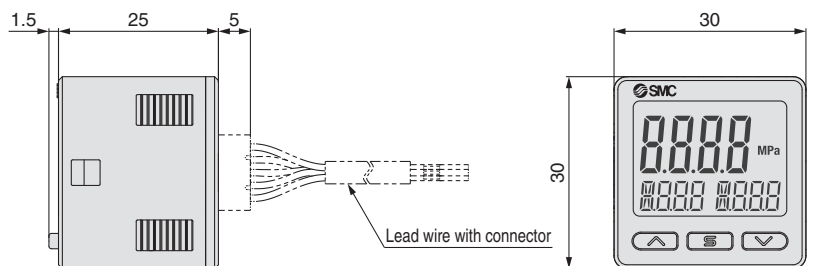
If there is a possibility that the atmospheric vent port of the switch will be exposed to water or dust, insert a tube into the atmospheric vent port and route the other end of the tube to a safe place away from water or dust. (Z/ISE20B)

* For tubing, please use the SMC TU 0 4 2 5 (polyurethane, O.D. $\varnothing 4$, I.D. $\varnothing 2.5$) for the pressure switch.

For 20



For 20A/20B

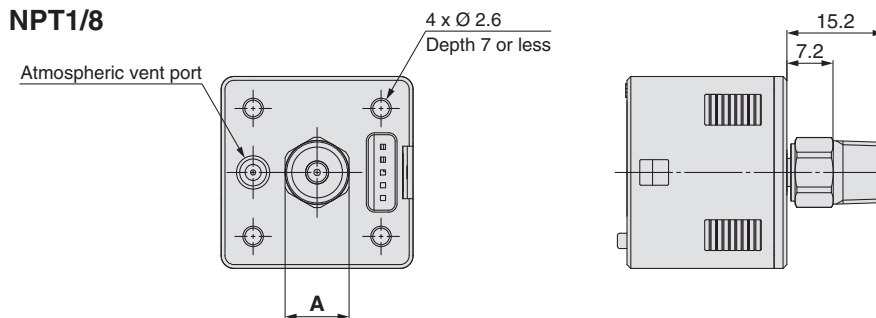


01

R1/8

N01

NPT1/8



Piping specification	Port size	A
01	R1/8	Width across flats 10
N01	NPT1/8	Width across flats 12

ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

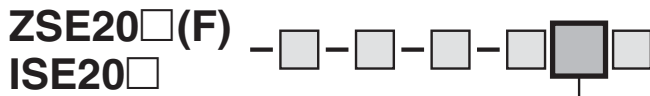
Function Details

Made to Order

ZSE20□(F)/ISE20□ Series

Dimensions

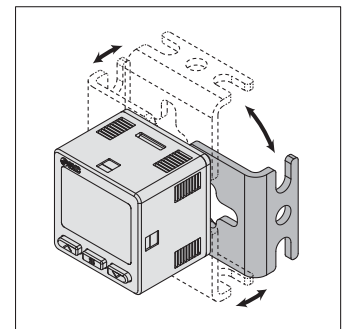
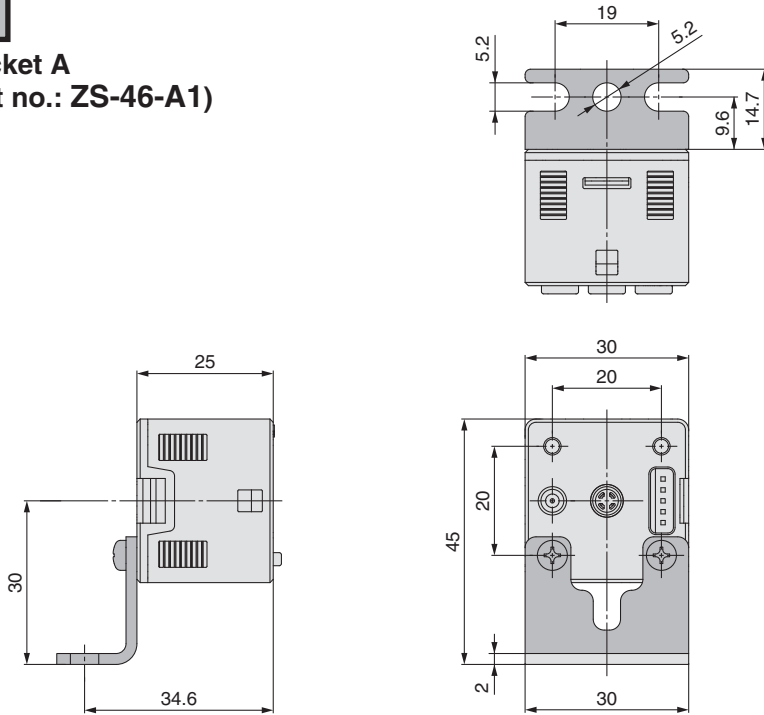
With bracket



• Option 2

A1

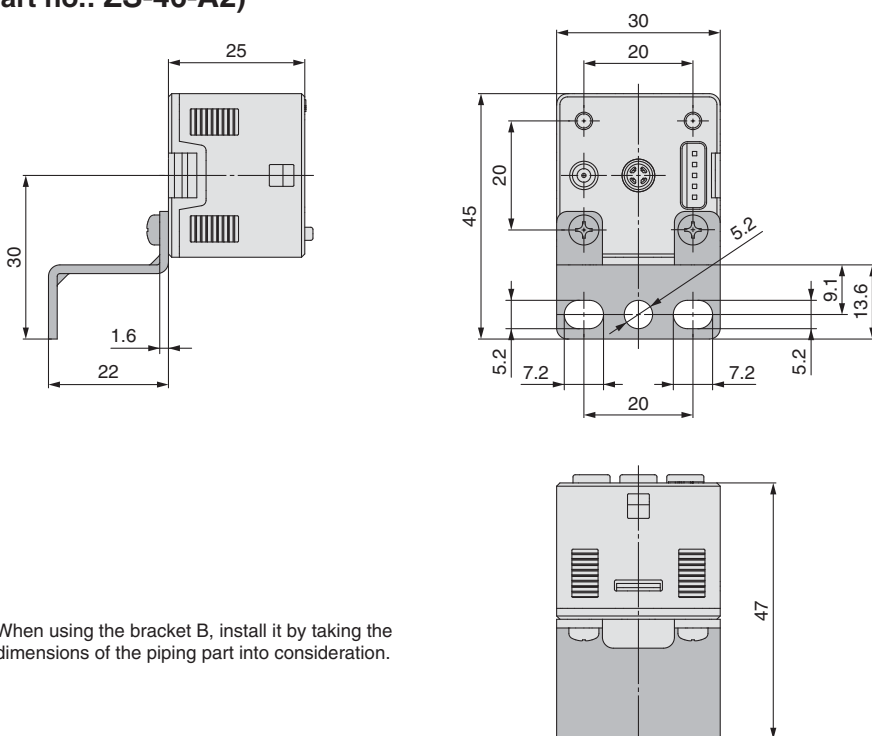
Bracket A
(Part no.: ZS-46-A1)



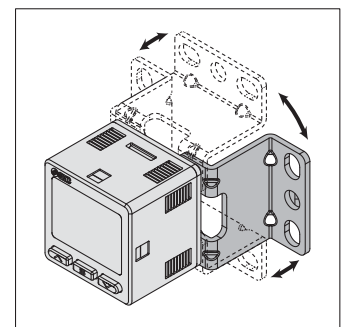
* The bracket configuration allows for mounting in four orientations.

A2

Bracket B
(Part no.: ZS-46-A2)



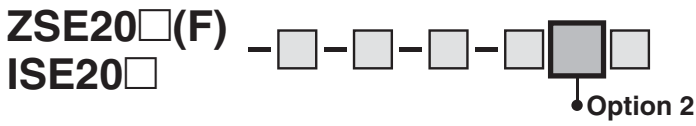
* When using the bracket B, install it by taking the dimensions of the piping part into consideration.



* The bracket configuration allows for mounting in four orientations.

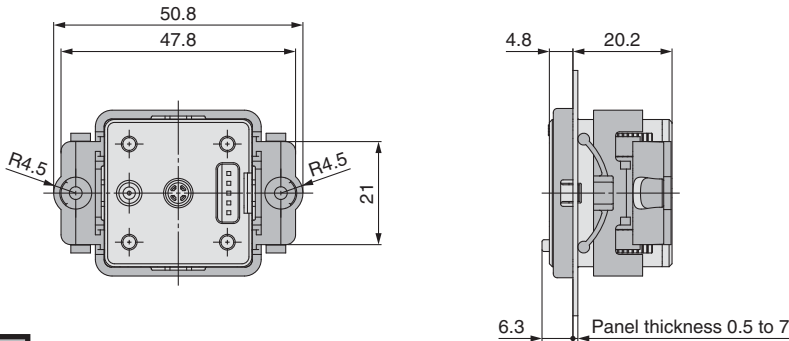
Dimensions

Panel mount adapter



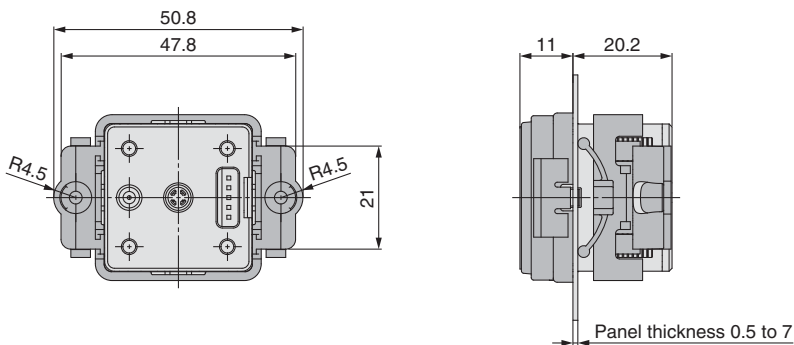
B

**Panel mount adapter
(Part no.: ZS-46-B)**



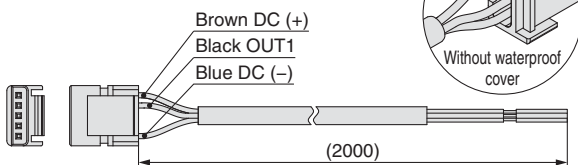
D

**Panel mount adapter + Front protection cover
(Part no.: ZS-46-D)**

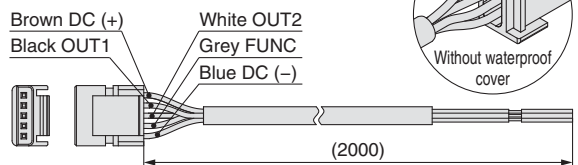


Lead wire with connector

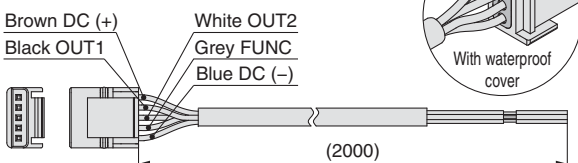
**For Z/ISE20(F)
(Part no.: ZS-46-3L)**



**For Z/ISE20A(F)
(Part no.: ZS-46-5L)**



**For Z/ISE20B(F)(-L)
(Part no.: ZS-46-5F)**



ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

Function
Details

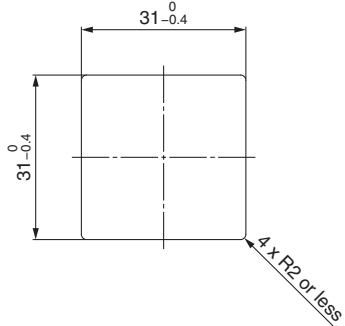
Made to
Order

ZSE20□(F)/ISE20□ Series

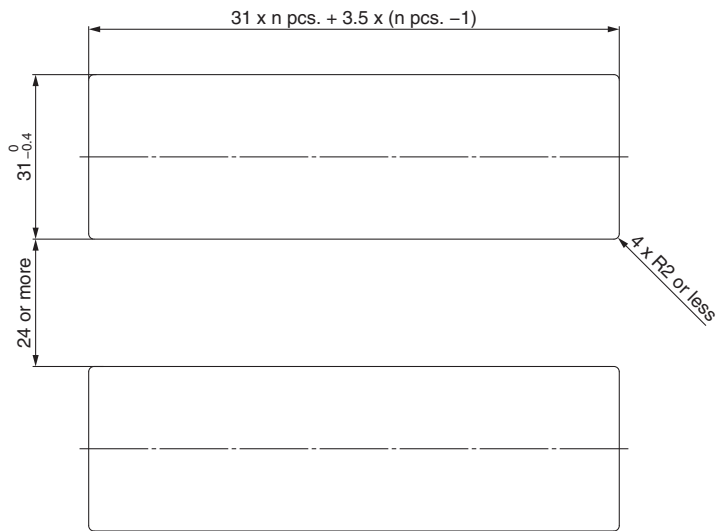
Dimensions

Panel fitting dimensions

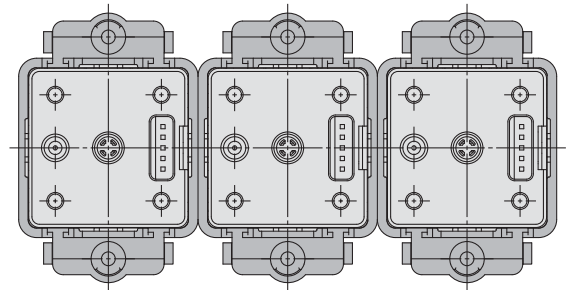
Individual mounting



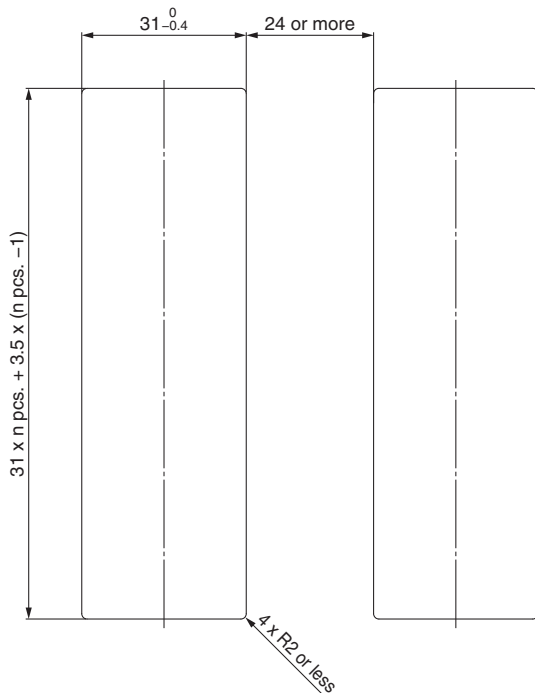
Multiple (2 pcs. or more) secure mounting <Horizontal>



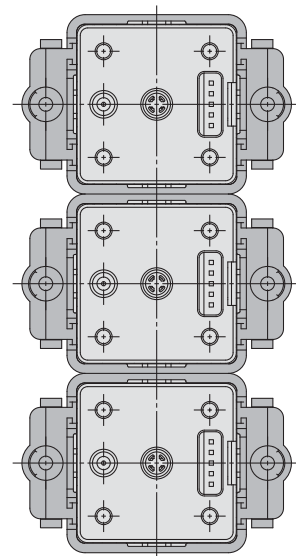
Panel mount example <Horizontal>



<Vertical>



Panel mount example <Vertical>



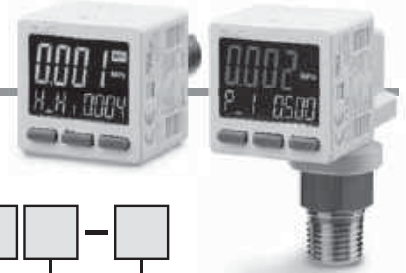
2 Outputs + Analogue Output (Voltage/Current)



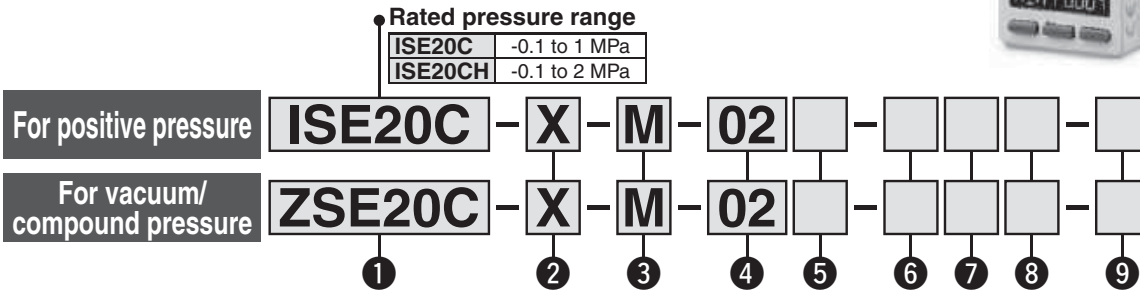
3-Screen Display High-Precision Digital Pressure Switch for General Fluids

RoHS
IP65

ZSE20C(F)/ISE20C(H) Series



How to Order



1 Rated pressure range

ZSE20C	0 to -101 kPa
ZSE20CF	-100 to 100 kPa

2 Output specification

Symbol	Description
R	NPN open collector 2 outputs + Analogue voltage output*1
S	NPN open collector 2 outputs + Analogue current output*1
T	PNP open collector 2 outputs + Analogue voltage output*1
V	PNP open collector 2 outputs + Analogue current output*1
X	NPN open collector 2 outputs + Copy function
Y	PNP open collector 2 outputs + Copy function

*1 Can be switched to auto-shift or copy function

3 Unit specification

Symbol	Description
—	Units selection function
M	SI unit only*2
P	Units selection function (Initial value psi)*2

*2 Fixed unit: kPa, MPa

4 Piping specification

Symbol	Description
02	R1/4 (M5 female threaded)
N02	NPT1/4 (M5 female threaded)
F02	G1/4 (M5 female threaded)
C01	Rc1/8
A2	URJ1/4 (Face seal fitting)
B2	TSJ1/4 (Compression fitting)

7 Option 2

* Note that the optional parts that can be used vary depending on the piping direction.

Symbol	Description
—	None

Rear ported (5 Piping direction: —)

Symbol	Description	Symbol	Description
A1	Bracket A 	B	Panel mount adapter
D	Panel mount adapter + Front protection cover 		

5 Piping direction

—	Rear ported
L	Bottom ported

6 Option 1

Symbol	Description
—	Without lead wire
W	Lead wire with connector, 5-core (2 m lead wire, With waterproof cover)

* For the lead wire with M12 connector, refer to p. 38.

Bottom ported (5 Piping direction: L)

Symbol	Description
A3	Bracket C
E	Panel mount adapter
F	Panel mount adapter + Front protection cover

Options/Part Nos.

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

Description	Part no.	Note
Bracket A	ZS-46-A1	For rear ported/Tapping screw: Nominal size 3 x 8 L (2 pcs.)
Bracket C	ZS-46-E	For bottom ported/Tapping screw: Nominal size 3 x 10 L (2 pcs.)
Panel mount adapter	ZS-46-B	Rear ported
	ZS-35-B	Bottom ported
Panel mount adapter + Front protection cover	ZS-46-D	Rear ported
	ZS-35-E	Bottom ported
Lead wire with connector	ZS-46-5F	5-core, 2 m, Waterproof (With waterproof cover)
Front protection cover	ZS-27-01	Rear ported
	ZS-35-01	Bottom ported

8 Option 3

Symbol	Operation manual*4	Calibration certificate*4
—	○	—
Y	—	—
K	○	○
T	—	○

*4 All texts are in both English and Japanese.

9 Made to Order

X500	Parts in contact with fluid: Stainless steel 316L
X510	Restrictor-installed fitting

ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

Function Details

Made to Order

ZSE20C(F)/ISE20C(H) Series

For details on the specific product precautions, refer to the "Operation Manual" on the SMC website.

Specifications

Model		ZSE20C (Vacuum pressure)	ZSE20CF (Compound pressure)	ISE20C (Positive pressure)	ISE20CH (Positive pressure)	
Applicable fluid		Liquids and gases that do not corrode stainless steel 630 and 304				
Pressure	Rated pressure range	0.0 to -101.0 kPa	-100.0 to 100.0 kPa	-0.100 to 1.000 MPa	-0.100 to 2.000 MPa	
	Display/Set pressure range	10.0 to -105.0 kPa	-105.0 to 105.0 kPa	-0.105 to 1.050 MPa	-0.105 to 2.100 MPa	
	Display/Smallest settable increment	0.1 kPa		0.001 MPa		
	Withstand pressure	500 kPa		2 MPa	4 MPa	
Power supply	Power supply voltage	12 to 24 VDC $\pm 10\%$ with 10 % voltage ripple or less				
	Current consumption	35 mA or less				
	Protection	Polarity protection				
Accuracy	Display accuracy	$\pm 2\%$ F.S. ± 1 digit (Ambient temperature of 25 ± 3 °C)				
	Repeatability	$\pm 0.2\%$ F.S. ± 1 digit				
	Analog output accuracy	$\pm 2.5\%$ F.S. (Ambient temperature of 25 ± 3 °C)				
	Analog output linearity	$\pm 1\%$ F.S.				
	Temperature characteristics	$\pm 3\%$ F.S. (25 °C standard)				
Switch output	Output type	NPN or PNP open collector 2 outputs				
	Output mode	Hysteresis mode, Window comparator mode, Error output, Output OFF				
	Switch operation	Normal output, Reversed output				
	Max. load current	80 mA				
	Max. applied voltage (NPN only)	28 V				
	Internal voltage drop (Residual voltage)	1 V or less (at load current of 80 mA)				
	Delay time*1	1.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000, 5000 ms)				
	Hysteresis	Hysteresis mode	Variable from 0*2			
		Window comparator mode				
Short circuit protection	Yes					
Analog output	Voltage output	Output type	Voltage output: 1 to 5 V	Voltage output: 0.6 to 5 V	Voltage output: 0.8 to 5 V	
		Output impedance	Approx. 1 k Ω			
	Current output	Output type	Current output: 4 to 20 mA	Current output: 2.4 to 20 mA	Current output: 3.2 to 20 mA	
		Load impedance	Maximum load impedance at power supply voltage of 12 V: 300 Ω at power supply voltage of 24 V: 600 Ω Minimum load impedance: 50 Ω			
Auto-shift input	Input type	Non-voltage input: 0.4 V or less				
	Input mode	Select from Auto-shift or Auto-shift zero.				
	Input time	5 ms or more				
Display	Unit*3	MPa, kPa, kgf/cm ² , bar, psi, inHg, mmHg	MPa, kPa, kgf/cm ² , bar, psi			
	Display type	LCD				
	Number of screens	3-screen display (Main screen, Sub screen x 2)				
	Display color	1) Main screen: Red/Green 2) Sub screen: Orange				
	Number of display digits	1) Main screen: 4 digits (7 segments) 2) 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	0, 10, 50, 100, 500, 1000, 5000 ms					
Environment	Enclosure	IP65				
	Withstand voltage	250 VAC for 1 minute between terminals and housing				
	Insulation resistance	2 M Ω or more (50 VDC measured via megohmmeter) between terminals and housing				
	Operating temperature range	Operating: -5 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, RoHS					
Length of lead wire with connector	2 m					

*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 greater 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.

* 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.

Piping Specifications and Weights

Model	02	N02	F02	C01	A2	B2
Port size	R1/4	NPT1/4	G1/4	Rc1/8	URJ1/4	TSJ1/4
Materials of parts in contact with fluid	Pressure sensor: Stainless steel 630, Fitting: Stainless steel 304					
Weight	Body (Rear ported)	51 g	51 g	48 g	47 g	46 g
	Body (Bottom ported)	77 g	78 g	74 g	65 g	72 g
	Lead wire with connector	+39 g				

Cable Specifications

Conductor area	0.15 mm ² (AWG26)	
Insulator	O.D.	1.0 mm
	Colour	Brown, Blue, Black, White, Grey (5-core)
Sheath	Finished O.D.	\varnothing 3.5

Set Pressure Range and Rated Pressure Range

Set the pressure within the rated pressure range.

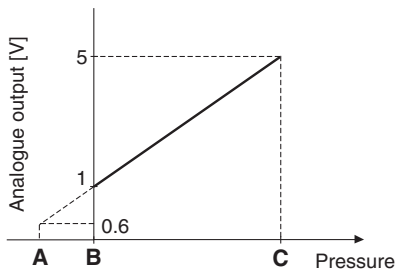
The set pressure range is the range of pressure within which setting is possible. The rated pressure range is the range of pressure that satisfies the specifications (accuracy, linearity, etc.) of the switch. Although it is possible to set a value outside the rated pressure range, the specifications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

Switch	Pressure range					
	-100 kPa	0	100 kPa	500 kPa	1 MPa	2 MPa
For vacuum pressure ZSE20C	-101 kPa	0				
	-105 kPa	10 kPa				
For compound pressure ZSE20CF	-100 kPa		100 kPa			
	-105 kPa		105 kPa			
For positive pressure	-100 kPa				1 MPa	
	-105 kPa (-0.105 MPa)				1.05 MPa	
ISE20C	-100 kPa					2 MPa
	-105 kPa (-0.105 MPa)					2.1 MPa
ISE20CH	-100 kPa					2 MPa
	-105 kPa (-0.105 MPa)					2.1 MPa

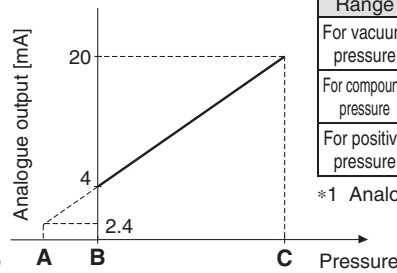
Rated pressure range of the switch
 Set pressure range of the switch

Analogue Output

Voltage output



Current output



Range	Rated pressure range	A	B	C
For vacuum pressure	0.0 to -101.0 kPa	10.1 kPa	0	-101.0 kPa
For compound pressure	-100.0 to 100.0 kPa	—	-100.0 kPa	100.0 kPa
For positive pressure	-0.100 to 1.000 MPa	-0.100 MPa	0	1.000 MPa
	-0.100 to 2.00 MPa	-0.100 MPa ⁻¹	0	2.00 MPa

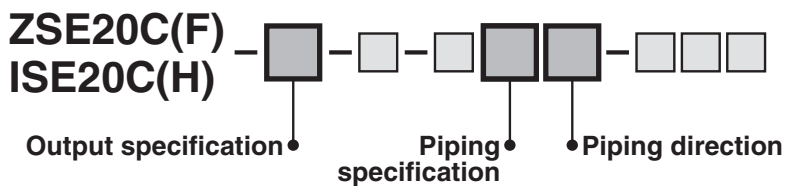
*1 Analogue output is 0.8 [V] or 3.2 [mA] at the pressure A.

Functions

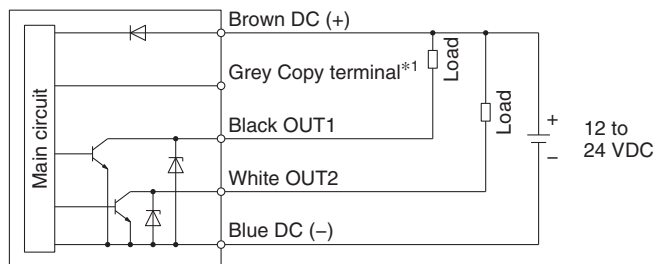
Sub screen setting function	The display of the sub screen can be selected.
Auto-preset function	This function calculates a rough set value automatically based on the on-going operation.
Display value fine adjustment function	Evens out deviations in the displayed value
Peak value indication function	Can retain the maximum pressure value displayed during measurement
Bottom value indication function	Can retain the minimum pressure value displayed during measurement
Key lock function (Selectable security code)	The keyboard can be locked to prevent the accidental operation of the operation switch.
Zero-clear function	The pressure display can be set to zero when the pressure is open to the atmosphere.
Error indication function	This function displays the error location and content when a problem or error has occurred.
Anti-chattering function	Prevents possible malfunctions due to sudden fluctuations in the primary pressure by adjusting the delay time
Units selection function	Can convert the display value
Power saving mode	Reduces power consumption
Display resolution switch function	Converts the display resolution from the normal value of 1/1000 to 1/100
kPa ↔ MPa switch function	Can reduce flickering of the monitor
kPa ↔ MPa switch function	Converts the unit between kPa and MPa
Copy function	The settings of the master sensor can be copied to the slave sensors.
Auto-shift function	Measures the pressure at the time of external input and uses it as a reference to correct the set value of the switch

ZSE20C(F)/ISE20C(H) Series

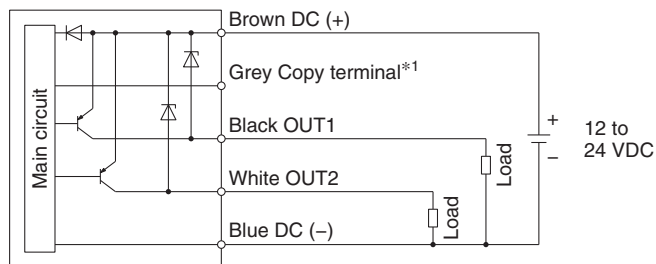
Internal Circuits and Wiring Examples



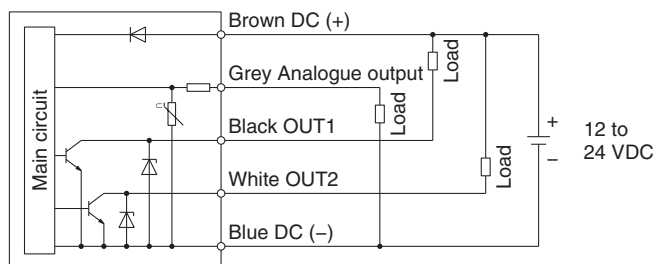
-X
NPN (2 outputs) + Copy function



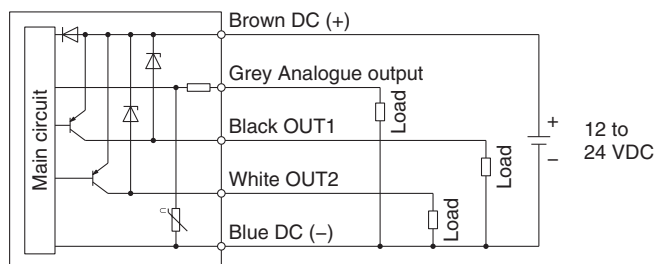
-Y
PNP (2 outputs) + Copy function



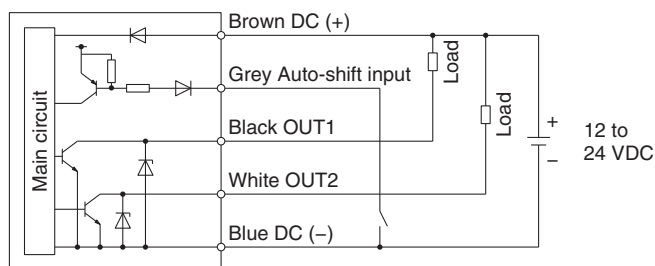
-R: NPN (2 outputs) + Analogue voltage output
-S: NPN (2 outputs) + Analogue current output



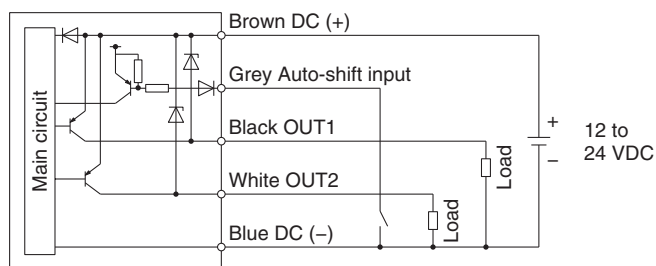
-T: PNP (2 outputs) + Analogue voltage output
-V: PNP (2 outputs) + Analogue current output



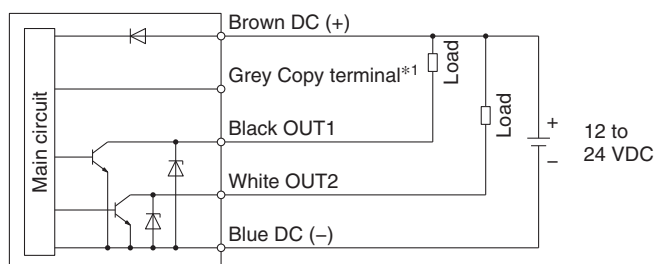
-R: NPN (2 outputs) + Auto-shift input
-S: NPN (2 outputs) + Auto-shift input



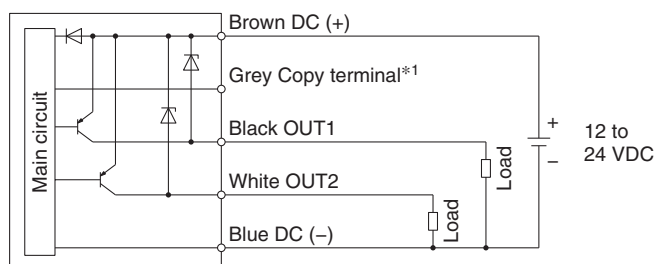
-T: PNP (2 outputs) + Auto-shift input
-V: PNP (2 outputs) + Auto-shift input



-R: NPN (2 outputs) + Copy function
-S: NPN (2 outputs) + Copy function



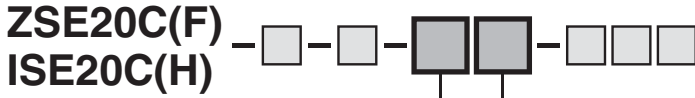
-T: PNP (2 outputs) + Copy function
-V: PNP (2 outputs) + Copy function



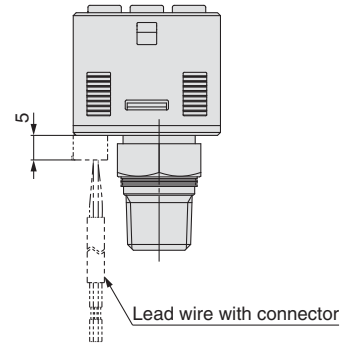
*1 Refer to p. 37.

3-Screen Display High-Precision Digital Pressure Switch for General Fluids **ZSE20C(F)/ISE20C(H) Series**

Dimensions



Piping specification **Piping direction**



02

R1/4

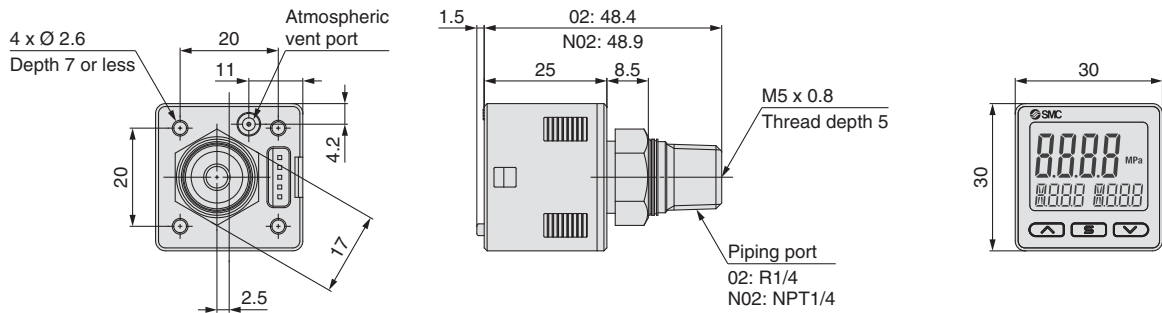
If there is a possibility that the atmospheric vent port of the switch will be exposed to water or dust, insert a tube into the atmospheric vent port and route the other end of the tube to a safe place away from water or dust.

* For tubing, please use the SMC TU0425 (polyurethane, O.D. \varnothing 4, I.D. \varnothing 2.5) for the pressure switch.

N02

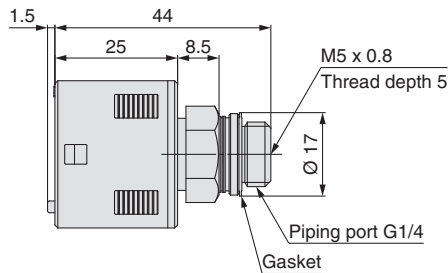
NPT1/4

* If it is expected that the pressure, such as water hammer or surge pressure, will fluctuate rapidly, refer to the precautions in the Operation Manual on the SMC website (<http://www.smcworld.com>).



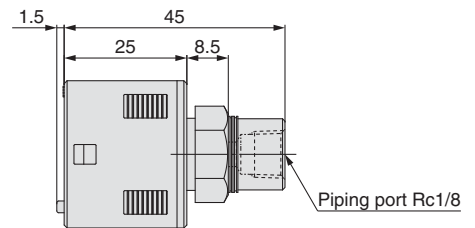
F02

G1/4



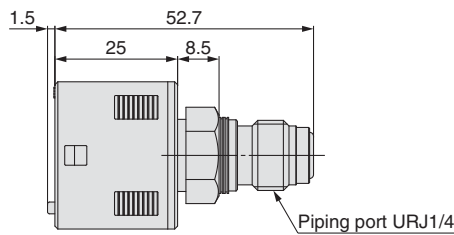
C01

Rc1/8



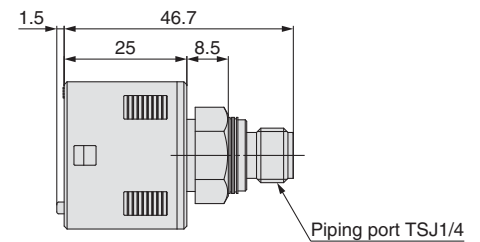
A2

URJ1/4



B2

TSJ1/4



ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

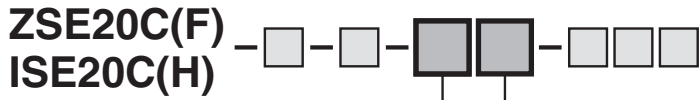
ZSE20C(F)/ISE20C(H)

Function
Details

Made to
Order

ZSE20C(F)/ISE20C(H) Series

Dimensions



Piping specification Piping direction

O2L

R1/4

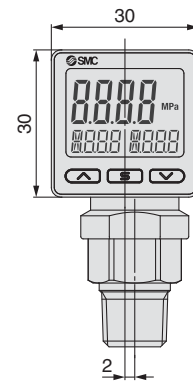
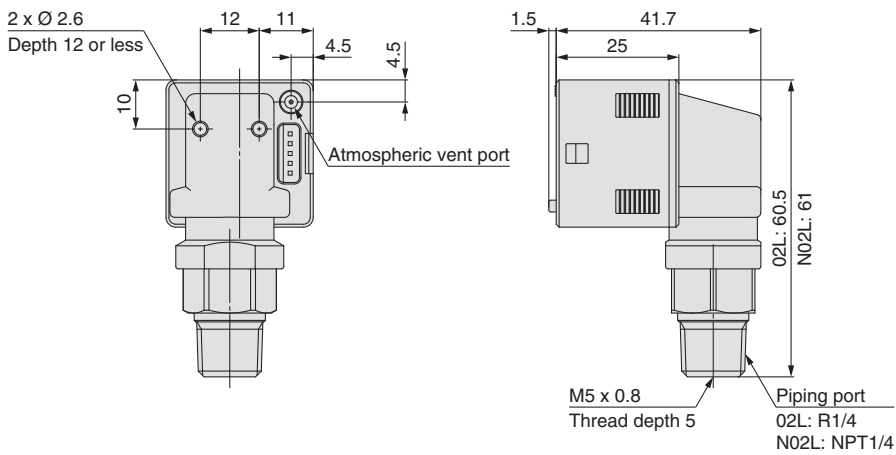
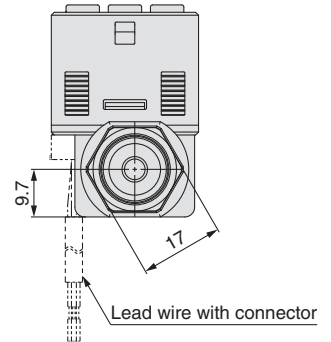
N02L

NPT1/4

If there is a possibility that the atmospheric vent port of the switch will be exposed to water or dust, insert a tube into the atmospheric vent port and route the other end of the tube to a safe place away from water or dust.

* For tubing, please use the SMC TU0425 (polyurethane, O.D. \varnothing 4, I.D. \varnothing 2.5) for the pressure switch.

* If it is expected that the pressure, such as water hammer or surge pressure, will fluctuate rapidly, refer to the precautions in the Operation Manual on the SMC website (<http://www.smcworld.com>).

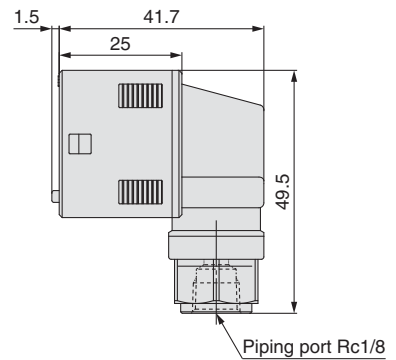
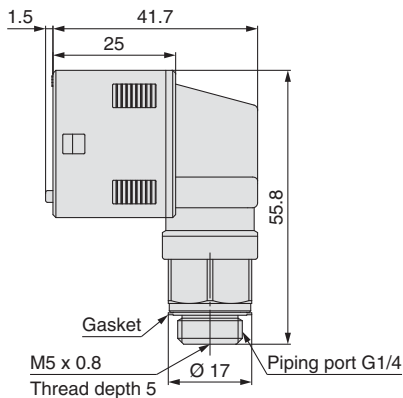


F02L

G1/4

C01L

Rc1/8

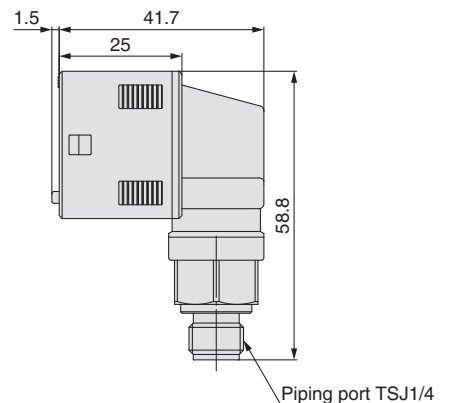
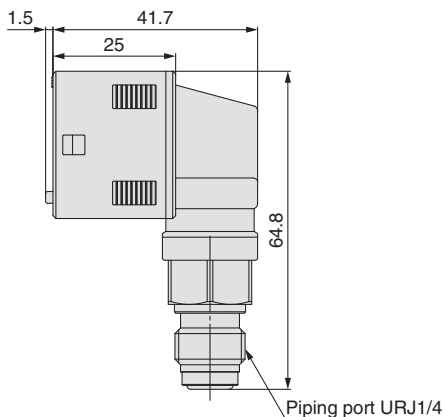


A2L

URJ1/4

B2L

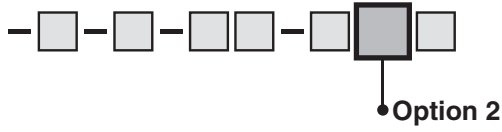
TSJ1/4



Dimensions

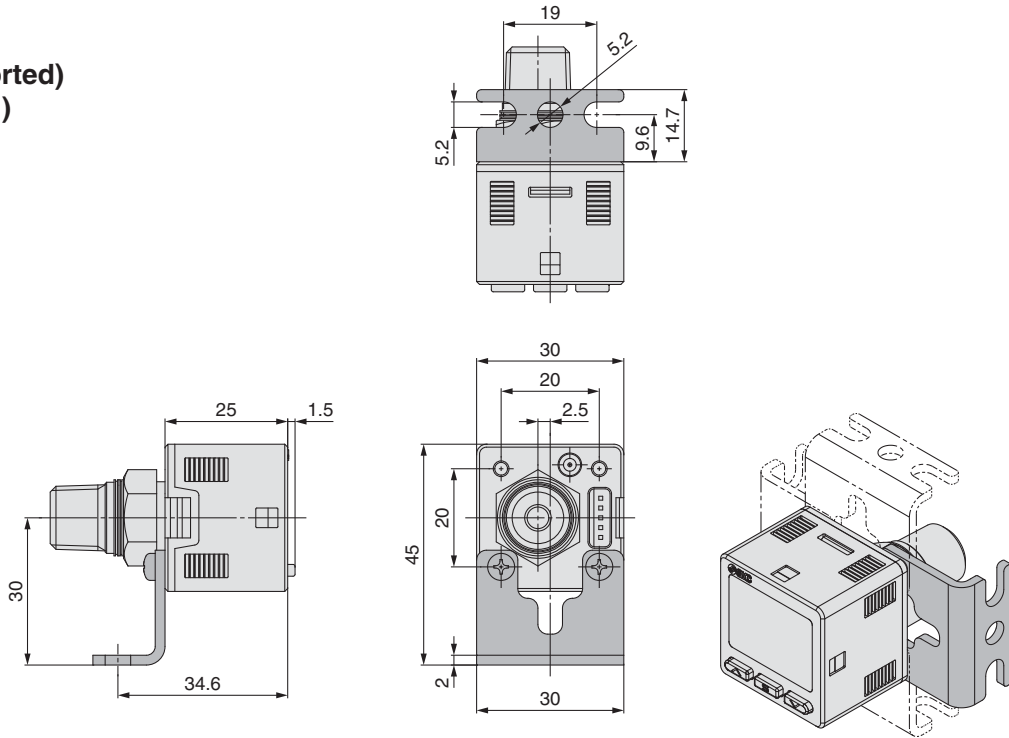
With bracket

ZSE20C(F)
ISE20C(H)



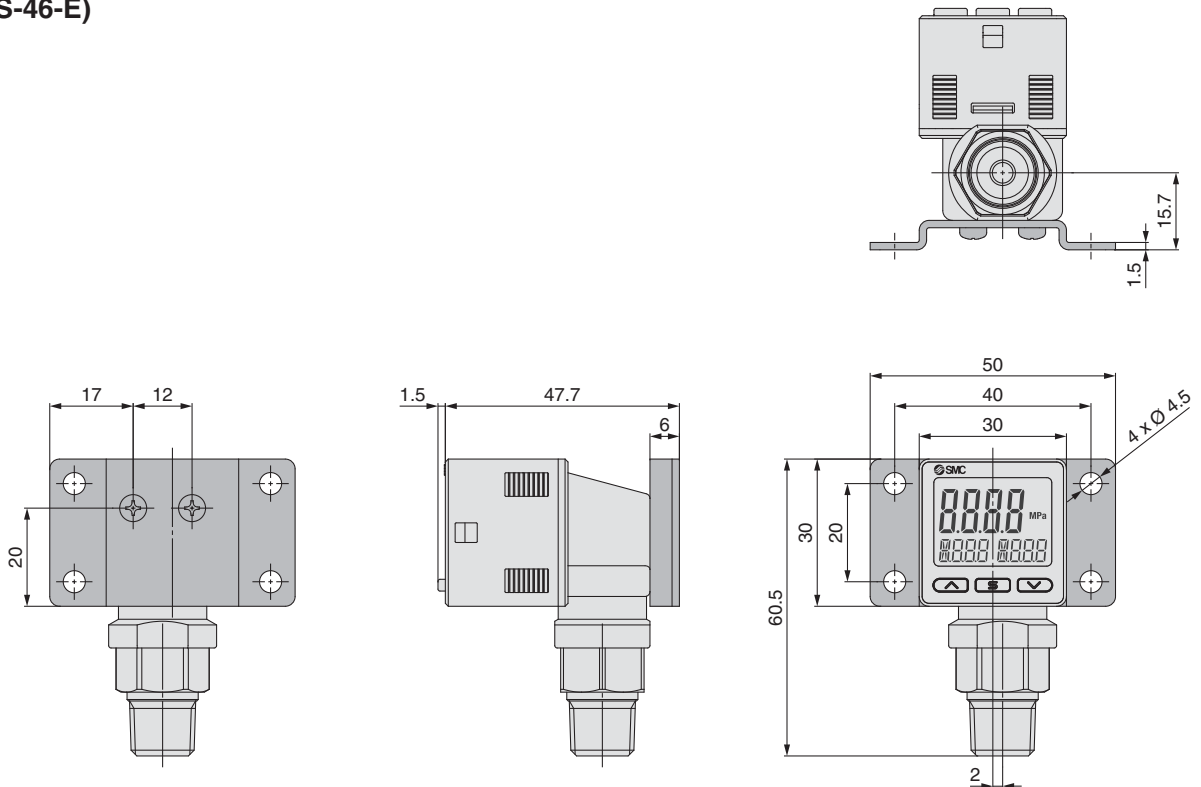
A1

Bracket A (Rear ported)
(Part no.: ZS-46-A1)



A3

Bracket C (Bottom ported)
(Part no.: ZS-46-E)



ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

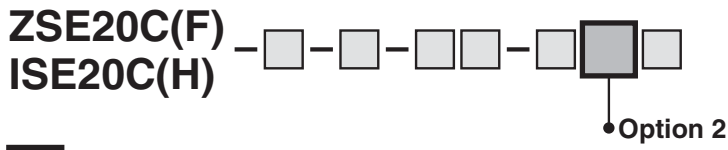
Function Details

Made to Order

ZSE20C(F)/ISE20C(H) Series

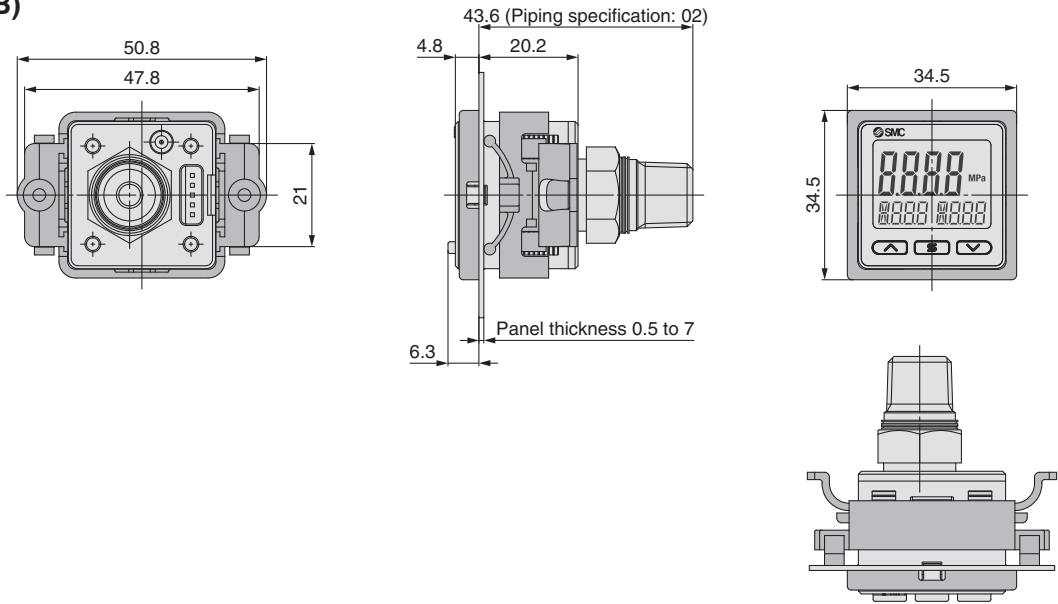
Dimensions

Panel mount adapter



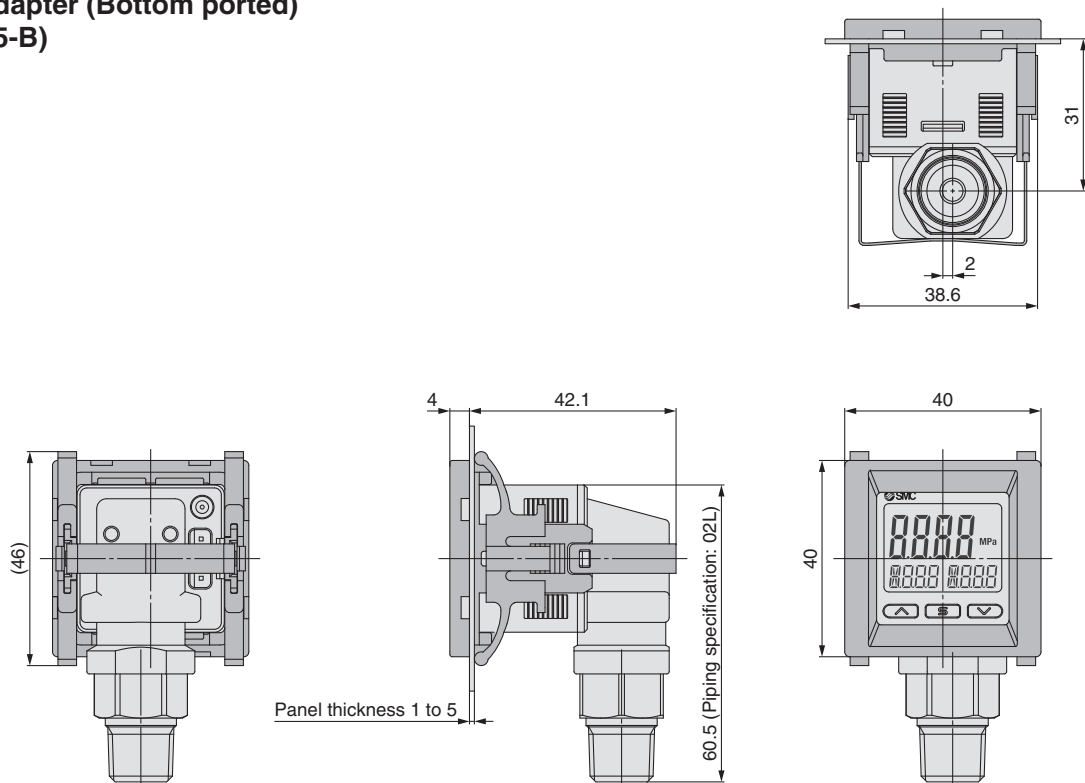
B

Panel mount adapter (Rear ported) (Part no.: ZS-46-B)



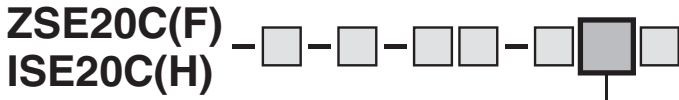
E

Panel mount adapter (Bottom ported) (Part no.: ZS-35-B)

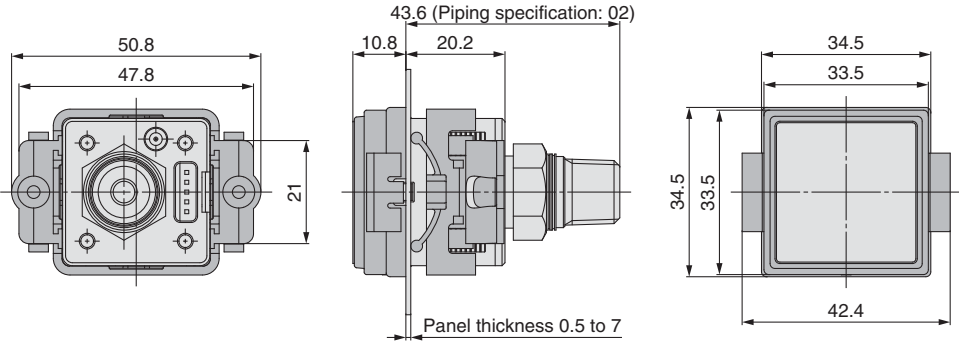


Dimensions

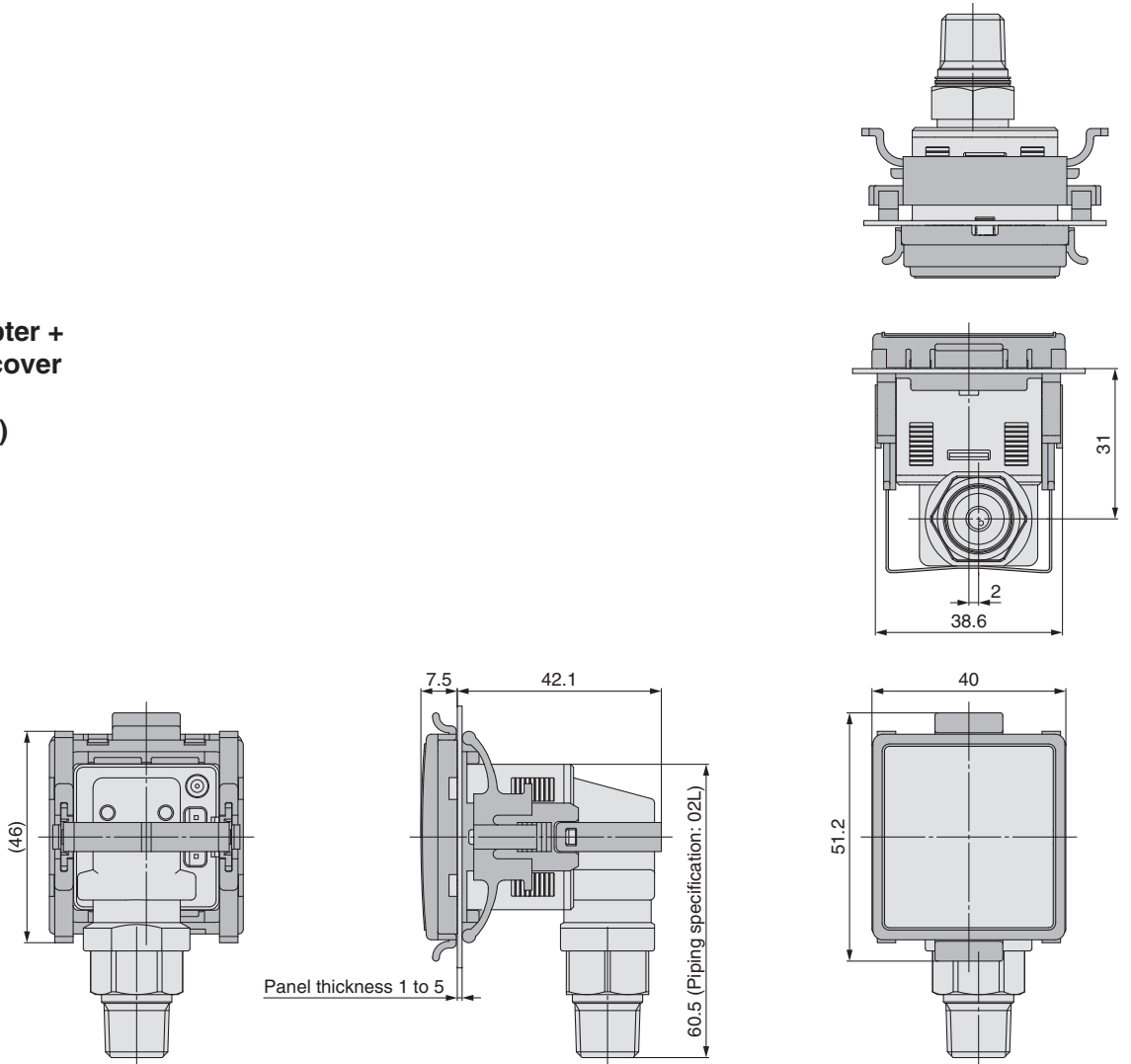
Panel mount adapter



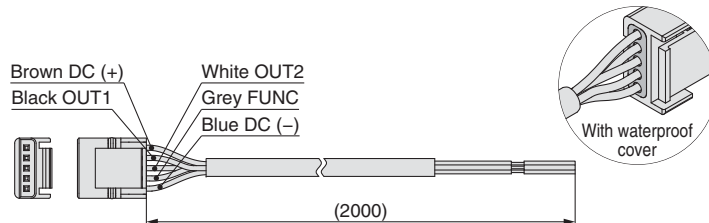
D
Panel mount adapter + Front protection cover (Rear ported)
(Part no.: ZS-46-D)



F
Panel mount adapter + Front protection cover (Bottom ported)
(Part no.: ZS-35-E)



Lead wire with connector
For ZSE20C(F)/ISE20C(H)
(Part no.: ZS-46-5F)



ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

Function Details

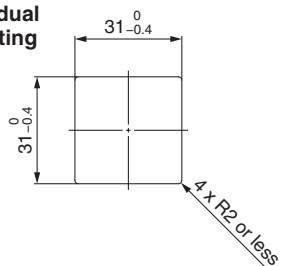
Made to Order

ZSE20C(F)/ISE20C(H) Series

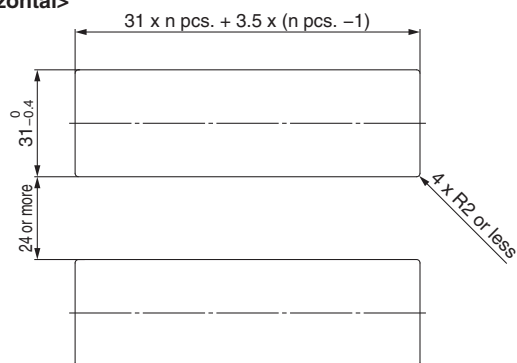
Dimensions

Panel fitting dimensions (Rear ported)

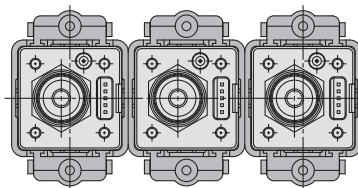
Individual mounting



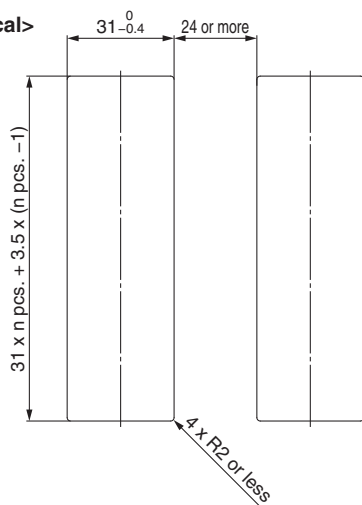
Multiple (2 pcs. or more) secure mounting
<Horizontal>



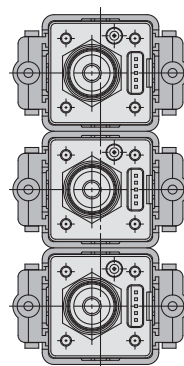
Panel mount example
<Horizontal>



<Vertical>

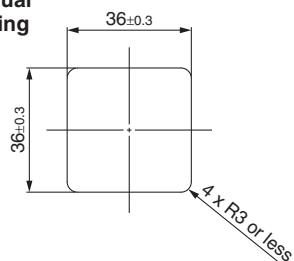


Panel mount example
<Vertical>

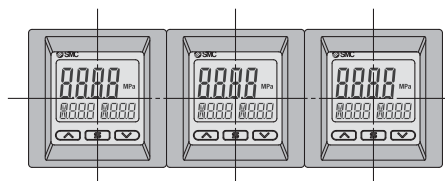
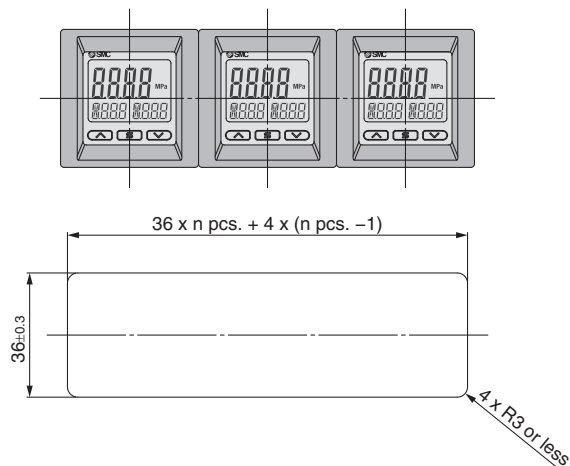


Panel fitting dimensions (Bottom ported)

Individual mounting



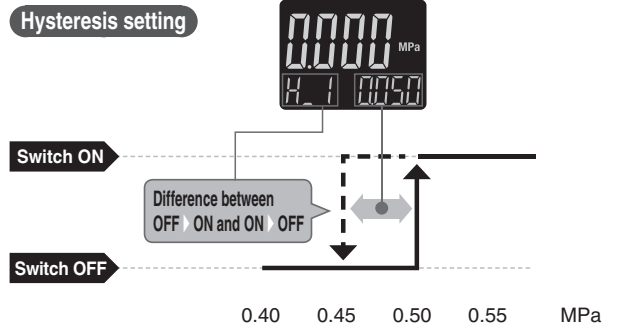
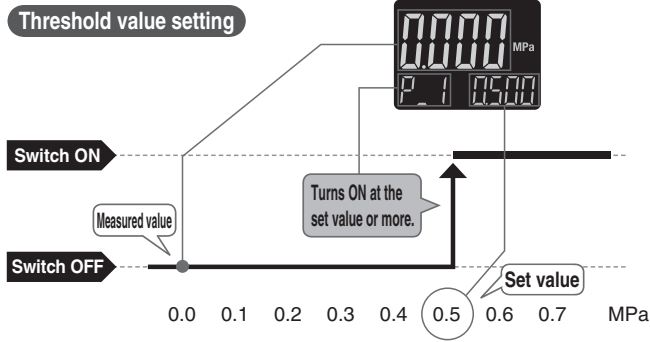
Multiple (2 pcs. or more) secure mounting
<Horizontal>



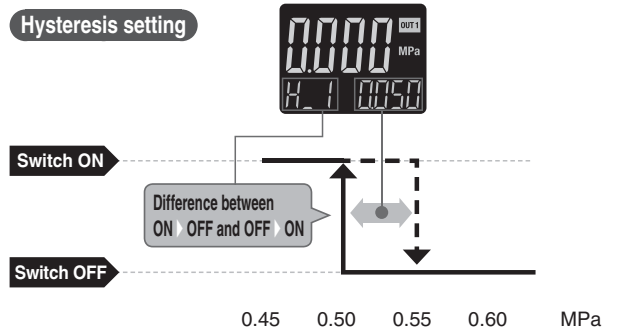
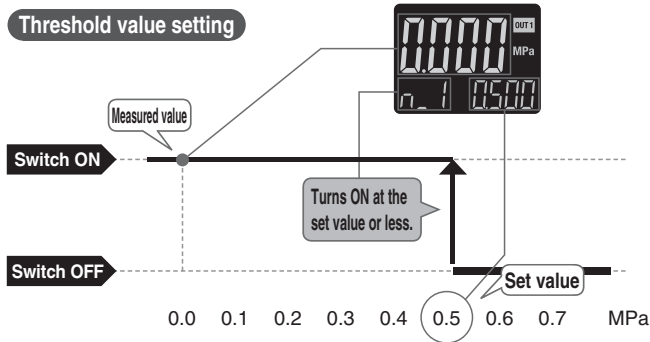
ZSE20□(F)/ISE20□ Series Function Details

Display examples of the main and sub (set value) screens of each mode. (For ISE20□ (for Positive pressure))

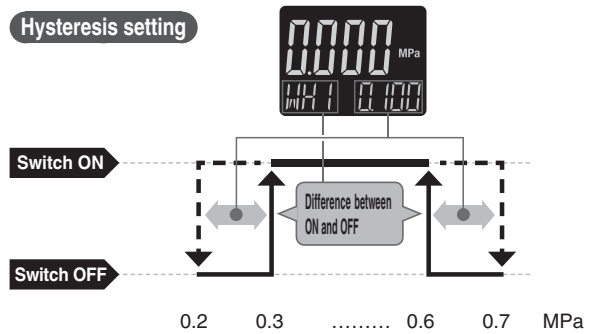
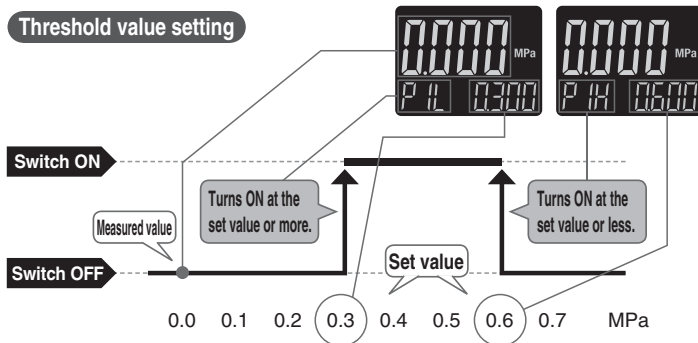
Hysteresis mode Normal output



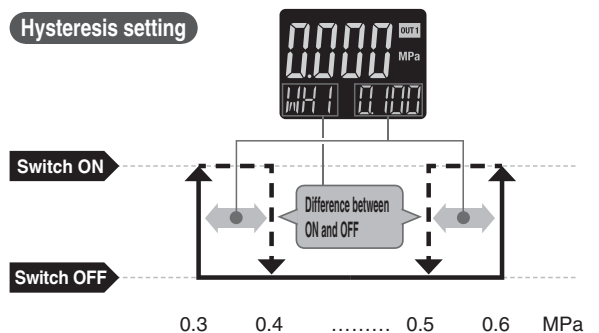
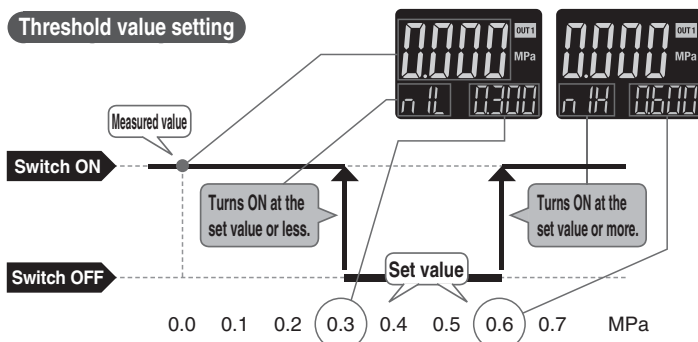
Hysteresis mode Reversed output



Window comparator mode Normal output



Window comparator mode Reversed output



ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

Function
Details

Made to
Order

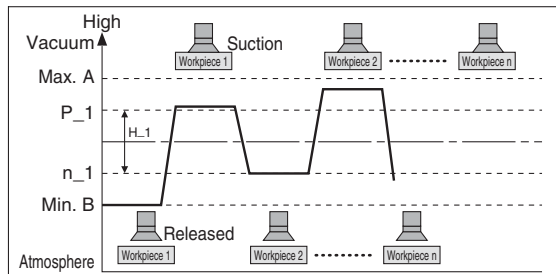
The F□ in () shows the function code number. Refer to the operation manual for details about operation procedures and function codes.

Function Details

A Auto-preset function (F4)

Auto-preset function, when selected in the initial setting, calculates and stores the set value from the measured pressure. For example, if this function is used for suction verification, the optimum set value is determined automatically by performing suction and release of several workpieces.

Suction Verification



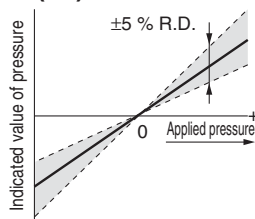
* When using with IO-Link, the set values cannot be changed by communication.

Formula for Obtaining the Set Value

P_1 or n_1	H_1
$P_1 = A - (A - B) / 4$	$H_1 = (A - B) / 2 $
$n_1 = B + (A - B) / 4$	

B Display value fine adjustment function (F6)

Fine adjustment of the indicated value of the pressure sensor can be made within the range of $\pm 5\%$ of the read value. (The scattering of the indicated value can be eliminated.)



— Indicated value at the time of shipment
 [Shaded Area] 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 display

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

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

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

D Key lock 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 measured pressure.

The indicated value can be adjusted within $\pm 7\%$ F.S. of the pressure when ex-factory. (ZSE20□F (for compound pressure): $\pm 3.5\%$ F.S.)

F Error display function

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

Error name	Error code	Description	Action
Over current error		Load current of 80 mA or more is applied to the switch output.	Turn the power off and remove the cause of the over current. Then supply the power again.
Residual pressure error		During zero-clear operation, pressure over $\pm 7\%$ F.S. ($\pm 3.5\%$ F.S. for compound pressure) is present. Note that the mode is returned to measurement mode automatically 1 second later. The zero clear range varies by $\pm 1\%$ F.S. due to variation between individual products.	Perform zero-clear operation again after restoring the applied pressure to an atmospheric pressure condition.
Applied pressure error		Supply pressure exceeds the maximum set pressure.	Reset applied pressure to a level within the set pressure range
		Supply pressure is below the minimum set pressure.	
System error	 	Internal data error	Turn the power off and then on again. If the failure cannot be solved, please contact SMC for investigation.
Copy error		The copy function does not operate properly.	After clearing the error by pressing the and buttons simultaneously for a minimum of 1 second, check the wiring and the model, and then attempt to copy again.
IO-Link master version error		IO-Link version does not match that of the master.	Ensure that the master IO-Link version matches the device version.

If the error cannot be reset after the above measures are taken, or errors other than those above are displayed, please contact SMC for investigation.

The F□ in () shows the function code number. Refer to the operation manual for details about operation procedures and function codes.

Function Details

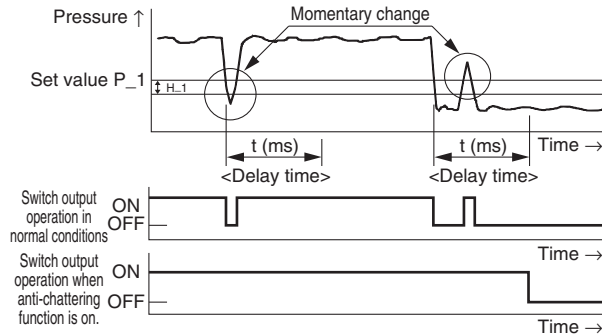
G Anti-chattering function (Simple setting mode or F1)

A large bore cylinder or ejector consumes a large volume of air in operation and may experience a temporary drop in the supply pressure. This function prevents detection of such temporary drops in the supply pressure as an error by changing the delay time setting.

Available delay time settings
1.5 ms or less, 20 ms, 100 ms, 500 ms, 1000 ms, 2000 ms, 5000 ms

<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.

Display unit	MPa	kPa	kGF	bAr	PSi	inCH	mmHG
Smallest settable increment	MPa*1	kPa	kgf/cm ²	bar	psi	inHg	mmHg
ZSE20□ (Vacuum pressure)	0.001	0.1	0.001	0.001	0.01	0.1	1
ZSE20□F (Compound pressure)	0.001	0.1	0.001	0.001	0.02	0.1	1
ISE20□ (Positive pressure)	0.001	1	0.01	0.01	0.1		
ISE20□H (Positive pressure)	0.001	1	0.01	0.01	0.2		

*1 The ZSE20□ (vacuum pressure) and ZSE20□F (compound pressure) will have different setting and display resolution when the unit is set to MPa.

I Selection of power saving mode (F80)

The power saving mode can be selected.

It shifts to the power saving mode without button operation for 30 seconds.

It is set to the normal mode (Power saving mode is OFF.) at a time of shipment from the factory.

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

J Setting of security code (F81)

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

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

ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

Function Details

Made to Order

ZSE20□(F)/ISE20□ Series

The F□ in () shows the function code number. Refer to the operation manual for details about operation procedures and function codes.

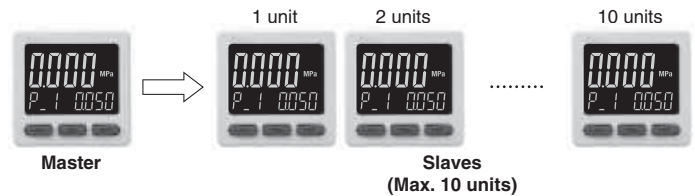
Function Details

K Copy function (F97) (Z/ISE20A, 20B, 20C series only)

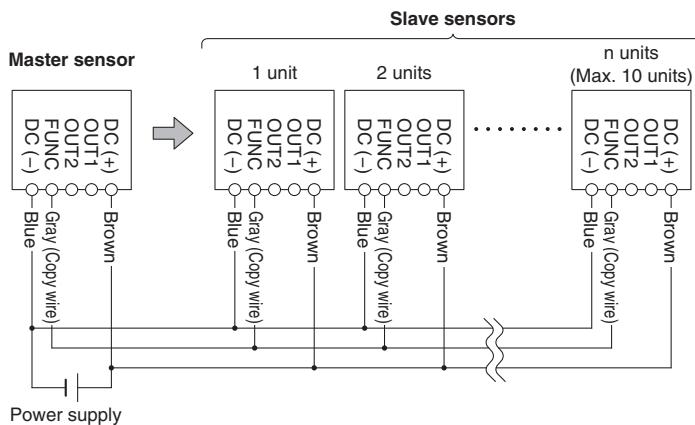
The settings of the master sensor can be copied to the slave sensors, reducing setting labour and minimizing the risk of setting mistakes.

The set value can be copied to up to 10 switches simultaneously.

(Maximum transmission distance: 4 m)



* This function is not provided with the IO-Link compatible type.

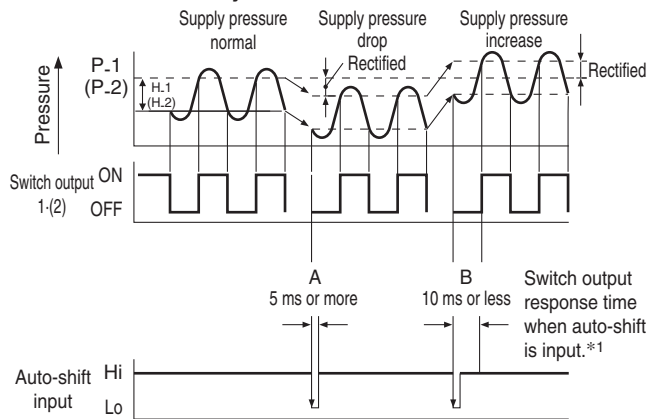


- 1) Wire as shown in the figure on the left.
- 2) Select the slave sensor which is to be the master, and change it into a master using the buttons. (In the default setting, all sensors are set as slaves.)
- 3) Press the **5** button on the master sensor to start copying.

L Auto-shift function (F5) (Z/ISE20A, 20B, 20C series only)

When there are large fluctuations in the supply pressure, the switch may fail to operate correctly. The auto-shift function compensates for such supply pressure fluctuations. It measures the pressure at the time of auto-shift signal input and uses it as the reference pressure to correct the set value on the switch.

Set value correction by auto-shift function



*1 When delay time is 1.5 ms or less

When the auto-shift function is selected, "P5 in 000" will be displayed on the sub screen for about 1 second, and the pressure value at that point will be saved as reference value "E_5." Based on the saved reference value, output on-off points controlled by set values*2 such as "P_1," "H_1," "P_2," and "H_2" will also be rectified.

*2 When an output is reversed, output on-off points displayed at "n_1," "H_1," "n_2," and "H_2" will be rectified.

The above is an example in hysteresis mode. On-off points are similarly rectified in window comparator mode. Outputs that enable the auto-shift function can be changed via the settings.

* This function is not provided with the IO-Link compatible type.

Settable Range for Auto-Shift Input

	Set pressure range	Settable range
Compound pressure	-105.0 to 105.0 kPa	-210 to 210 kPa
Vacuum pressure	10.0 to -105.0 kPa	115.0 to -115.0 kPa
Positive pressure	-0.105 to 1.050 MPa	-1.155 to 1.155 MPa
Positive pressure*3	-0.105 to 2.100 MPa	-2.20 to 2.205 MPa

*3 Z/ISE20C series only

Auto-shift zero

The basic function of auto-shift zero is the same as that of auto-shift. However, it corrects values on the display based on a pressure value of "0", which is set as the reference value when auto-shift function is selected.

ZSE20□(F)/ISE20□ Series

Made to Order

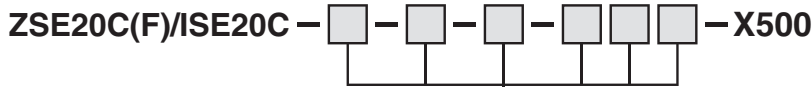
Please contact SMC for detailed dimensions, specifications, and delivery times.



1 Parts in Contact with Fluid: Stainless Steel 316L

This pressure switch has better corrosion resistance because it uses stainless steel 316L for the parts in contact with fluid (pressure sensor and fitting).

How to Order



Specifications

Model	ZSE20C(F)	ISE20C
Withstand pressure	500 kPa	1.5 MPa
Applicable fluid	Liquids and gases do not corrode stainless steel 316L.	

Models other than those above have the same specifications as the standard product.

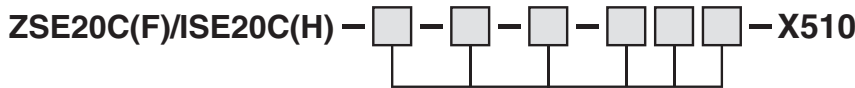
Enter the standard product number. (Refer to p. 24.)

- * Not applicable to the rated pressure -0.1 to 2 MPa specifications (ISE20CH).
- * A restrictor (equivalent to -X510) is installed inside the fitting. (Piping specifications A2(L) and B2(L) are excluded.)

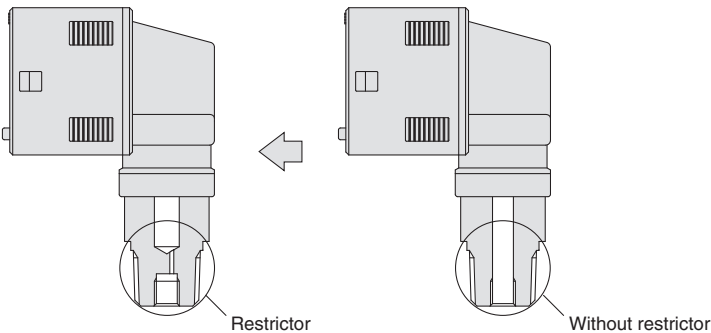
2 Restrictor-installed Fitting

A restrictor is installed inside the fitting in order to reduce the effects of water collision with inertia force in the piping when adsorption is broken.

How to Order



Enter the standard product number. (Refer to p. 24.)



Made to Order: “-X510”

Standard

- * Not applicable for piping specifications A2(L) and B2(L).
- * There are cases in which this product will not effectively suppress of the effects of water hammer. It is advised that other measures be taken in such cases.

3 M12 4-pin Pre-wired Connector (Lead wire length 100 mm)

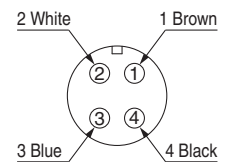
Lead Wire with M12 Connector

Series	20	20A	20B(-L)	20C
ZS-46-5LM12 (Non-waterproof)	○	○	—	—
ZS-46-5FM12 (Waterproof)	—	—	○	○

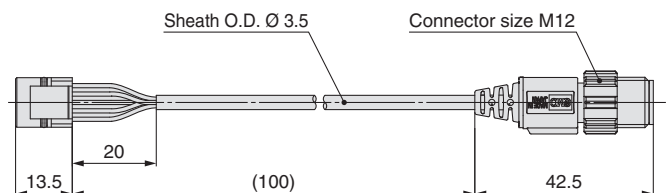
* If you wish for the sensor (switch body) and the lead wire to be shipped together, please contact SMC.

Pin no.	Pin name	Lead wire colour	M12 Pin no.
1	DC (-)	Blue	3
2	Function	Grey	—
3	OUT (2)	White	2
4	OUT (1)	Black	4
5	DC (+)	Brown	1

Connector pin assignment



* Nothing is connected to “Function.”
If you intend to make a connection to “Function,” please contact SMC.



ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L




ZSE20C(F)/ISE20C(H)

Function Details

Made to Order

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

-  **Caution:** Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
-  **Warning:** Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
-  **Danger:** Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

- *1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
- ISO 4413: Hydraulic fluid power – General rules relating to systems.
- IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
- ISO 10218-1: Manipulating industrial robots - Safety.
etc.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2) Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

*2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

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