

1 Output

# 3-Screen Display High-Precision Digital Pressure Switch

# ZSE20(F)/ISE20 Series

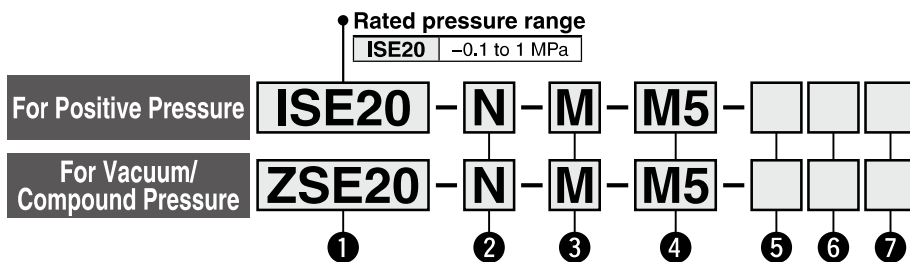


RoHS

IP40



## How to Order



Made to Order  
(pp. 38 to 42)

### 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
Nil	Units selection function*1
M	SI units only*2
P	Units selection function (Initial value psi)*1

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

\*2 Fixed units: kPa, MPa

### ④ Piping specification

Symbol	Description	Symbol	Description
M5	M5 female thread Piping port	C4H	One-touch fitting ø4 mm Straight type
		C6H	One-touch fitting ø6 mm
		N7H	One-touch fitting ø1/4 inch
01	R1/8 R1/8 Piping adapter ZS-46-N1	C4L	One-touch fitting ø4 mm Elbow type
		C6L	One-touch fitting ø6 mm
		N7L	One-touch fitting ø1/4 inch
N01	NPT1/8 NPT1/8 Piping adapter ZS-46-N2	* One-touch fitting is shipped together with the product.	

### ⑤ Option 1

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

\* For the lead wire with M12 connector, refer to page 39.

### ⑦ Option 3

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

\*1 All texts are in both English and Japanese.

### ⑥ Option 2

Symbol	Description
Nil	None
A1	Bracket A (Vertical mounting) ZS-46-A1
A2	Bracket B (Horizontal mounting) ZS-46-A2
B	Panel mount adapter ZS-46-B
D	Panel mount adapter + Front protection cover ZS-46-D

## 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)
Lead wire with M12 connector	ZS-46-5LM12	Made to order (Refer to page 39.)
Front protection cover	ZS-27-01	—
R1/8 Piping adapter	ZS-46-N1	R1/8
NPT1/8 Piping adapter	ZS-46-N2	NPT1/8
One-touch fitting ø4 mm straight	ZS-46-C4H	—
One-touch fitting ø6 mm straight	ZS-46-C6H	—
One-touch fitting ø1/4 inch straight	ZS-46-N7H	—
One-touch fitting ø4 mm elbow	ZS-46-C4L	—
One-touch fitting ø6 mm elbow	ZS-46-C6L	—
One-touch fitting ø1/4 inch elbow	ZS-46-N7L	—
Spacer for fitting extension	P3311276A	Made to order (Refer to page 40.)

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

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

## Specifications

Model	ZSE20 (Vacuum pressure)	ZSE20F (Compound pressure)	ISE20 (Positive pressure)		
<b>Applicable fluid</b>	Air, Non-corrosive gas, Non-flammable gas				
<b>Pressure</b>	<b>Rated pressure range</b>	0.0 to -101.0 kPa	-100.0 to 100.0 kPa	-0.100 to 1.000 MPa	
	<b>Display/Set pressure range</b>	10.0 to -105.0 kPa	-105.0 to 105.0 kPa	-0.105 to 1.050 MPa	
	<b>Display/Smallest settable increment</b>	0.1 kPa		0.001 MPa	
	<b>Withstand pressure</b>	500 kPa		1.5 MPa	
<b>Power supply</b>	<b>Power supply voltage</b>	12 to 24 VDC ±10%, Ripple (p-p) 10% or less			
	<b>Current consumption</b>	25 mA or less			
	<b>Protection</b>	Polarity protection			
<b>Accuracy</b>	<b>Display accuracy</b>	±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)			
	<b>Repeatability</b>	±0.2% F.S. ±1 digit			
	<b>Temperature characteristics</b>	±2% F.S. (25°C standard)			
<b>Switch output</b>	<b>Output type</b>	NPN or PNP open collector 1 output			
	<b>Output mode</b>	Hysteresis mode, Window comparator mode, Error output, Output OFF			
	<b>Switch operation</b>	Normal output, Reversed output			
	<b>Max. load current</b>	80 mA			
	<b>Max. applied voltage (NPN only)</b>	28 V			
	<b>Internal voltage drop (Residual voltage)</b>	1 V or less (at load current of 80 mA)			
	<b>Delay time*1</b>	1.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000, 5000 ms)			
	<b>Hysteresis</b>	<b>Hysteresis mode</b>	Variable from 0*2		
		<b>Window comparator mode</b>			
	<b>Short circuit protection</b>	Yes			
<b>Display</b>	<b>Unit*3</b>	MPa, kPa, kgf/cm <sup>2</sup> , bar, psi, inHg, mmHg		MPa, kPa, kgf/cm <sup>2</sup> , bar, psi	
	<b>Display type</b>	LCD			
	<b>Number of screens</b>	3-screen display (Main screen, Sub screen x 2)			
	<b>Display color</b>	1) Main screen: Red/Green 2) Sub screen: Orange			
	<b>Number of display digits</b>	1) Main screen: 4 digits (7 segments) 2) Sub screen: 4 digits (Upper 1 digit 11 segments, 7 segments for other)			
	<b>Indicator light</b>	Lights up when switch output is turned ON. OUT1: Orange			
<b>Digital filter*4</b>	0, 10, 50, 100, 500, 1000, 5000 ms				
<b>Environmental resistance</b>	<b>Enclosure</b>	IP40			
	<b>Withstand voltage</b>	1000 VAC for 1 minute between terminals and housing			
	<b>Insulation resistance</b>	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing			
	<b>Operating temperature range</b>	Operating: -5 to 50°C, Stored: -10 to 60°C (No condensation or freezing)			
	<b>Operating humidity range</b>	Operating/Stored: 35 to 85% RH (No condensation)			
<b>Standards</b>	UL/CSA (E216656), CE marking (EMC directive/RoHS directive)				
<b>Length of lead wire with connector</b>	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	M5	O1	N01	C4H	C6H	N7H	C4L	C6L	N7L	
<b>Port size</b>	Model	M5 x 0.8	R1/8	NPT1/8	—	—	—	—	—	
	<b>One-touch fitting Straight type</b>	—	—	—	ø4 mm ø5/32 inch	ø6 mm	ø1/4 inch	—	—	
	<b>One-touch fitting Elbow type</b>	—	—	—	—	—	ø4 mm ø5/32 inch	ø6 mm	ø1/4 inch	
<b>Materials of parts in contact with fluid</b>	<b>Sensor pressure receiving area</b>	Silicon								
	<b>Piping port (Common)</b>	PBT, CB156, Heat-resistant PPS, O-ring: HNBR								
	<b>Piping port</b>	—	C3604 (Electroless nickel plating), Stainless steel 304, NBR			POM, Stainless steel 304, NBR, C3604				
<b>Weight</b>	<b>Body</b>	22 g	32 g	34 g	25 g	26 g	27 g	28 g	28 g	34 g
	<b>Lead wire with connector</b>	+35 g								

## Cable Specifications

<b>Conductor cross section</b>	0.15 mm <sup>2</sup> (AWG26)	
<b>Insulator</b>	<b>O.D.</b>	1.0 mm
	<b>Color</b>	Brown, Blue, Black (3-core)
<b>Sheath</b>	<b>Finished O.D.</b>	ø3.4

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



ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

Function Details

Made to Order

2 Outputs + Analog 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 - [ ] - [ ] - [ ]



Made to Order  
(pp. 38 to 42)

### 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 + Analog voltage output*1
S	NPN open collector 2 outputs + Analog current output*1
T	PNP open collector 2 outputs + Analog voltage output*1
V	PNP open collector 2 outputs + Analog 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
Nil	Units selection function*1
M	SI units only*2
P	Units selection function (Initial value psi)*1

\*1 Under the New Measurement Act, switches with the units selection function are no longer allowed for use in Japan.  
\*2 Fixed units: kPa, MPa

### 4 Piping specification

Symbol	Description	Symbol	Description	
M5	M5 female thread Piping port	C4H	One-touch fitting ø4 mm	Straight type
		C6H	One-touch fitting ø6 mm	
		N7H	One-touch fitting ø1/4 inch	
O1	R1/8 R1/8 Piping adapter ZS-46-N1	C4L	One-touch fitting ø4 mm	Elbow type
		C6L	One-touch fitting ø6 mm	
		N7L	One-touch fitting ø1/4 inch	
N01	NPT1/8 NPT1/8 Piping adapter ZS-46-N2	* One-touch fitting is shipped together with the product.		

### 5 Option 1

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

\* For the lead wire with M12 connector, refer to page 39.

### 7 Option 3

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

\*1 All texts are in both English and Japanese.

### 6 Option 2

Symbol	Description
Nil	None
A1	Bracket A (Vertical mounting) ZS-46-A1
A2	Bracket B (Horizontal mounting) ZS-46-A2
B	Panel mount adapter ZS-46-B
D	Panel mount adapter + Front protection cover ZS-46-D

## 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)
Lead wire with M12 connector	ZS-46-5LM12	Made to order (Refer to page 39.)
Front protection cover	ZS-27-01	—
R1/8 Piping adapter	ZS-46-N1	R1/8
NPT1/8 Piping adapter	ZS-46-N2	NPT1/8
One-touch fitting ø4 mm straight	ZS-46-C4H	—
One-touch fitting ø6 mm straight	ZS-46-C6H	—
One-touch fitting ø1/4 inch straight	ZS-46-N7H	—
One-touch fitting ø4 mm elbow	ZS-46-C4L	—
One-touch fitting ø6 mm elbow	ZS-46-C6L	—
One-touch fitting ø1/4 inch elbow	ZS-46-N7L	—
Spacer for fitting extension	P3311276A	Made to order (Refer to page 40.)

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

For pressure switch precautions and 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 ±10%, Ripple (p-p) 10% or less			
	Current consumption	35 mA or less			
	Protection	Polarity protection			
Accuracy	Display accuracy	±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)			
	Repeatability	±0.2% F.S. ±1 digit			
	Analog output accuracy	±2.5% F.S. (Ambient temperature of 25 ±3°C)			
	Analog output linearity	±1% F.S.			
	Temperature characteristics	±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			
Analog output	Voltage output	Output type	Voltage output: 1 to 5 V	Voltage output: 0.6 to 5 V	
		Output impedance	Approx. 1 kΩ		
	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 <sup>2</sup> , bar, psi, inHg, mmHg		MPa, kPa, kgf/cm <sup>2</sup> , bar, psi	
	Display type	LCD			
	Number of screens	3-screen display (Main screen, Sub screen x 2)			
	Display color	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				
Environmental resistance	Enclosure	IP40			
	Withstand voltage	1000 VAC for 1 minute between terminals and housing			
	Insulation resistance	50 MΩ 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 marking (EMC directive/RoHS directive)				
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	M5	01	N01	C4H	C6H	N7H	C4L	C6L	N7L	
Port size	M5 x 0.8	R1/8	NPT1/8	—	—	—	—	—	—	
One-touch fitting	Straight type	—	—	ø4 mm ø5/32 inch	ø6 mm	ø1/4 inch	—	—	—	
	Elbow type	—	—	—	—	—	ø4 mm ø5/32 inch	ø6 mm	ø1/4 inch	
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	POM, Stainless steel 304, NBR, C3604						
Weight	Body	24 g	34 g	36 g	27 g	28 g	29 g	30 g	30 g	36 g
	Lead wire with connector	+39 g								

## Cable Specifications

Conductor cross section	0.15 mm <sup>2</sup> (AWG26)	
Insulator	O.D.	1.0 mm
	Color	Brown, Blue, Black, White, Gray (5-core)
Sheath	Finished O.D. ø3.5	

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