

Specification for IO-Link communication of  
Z/ISE20B(F)-※-X101

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Product Name : Pressure switch with IO-Link

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Model : ISE20B-T-※-X101

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ZSE20B-T-※-X101

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ZSE20BF-T-※-X101

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## Pressure switch with IO-Link

Specification for IO-Link communication of pressure switch Z/ISE20B(F)-T-※-X101

### <Communication specification>

IO-Link version	V.1.1
Communication speed	COM2(38.4kbps)
Minimum cycle time	2.3 ms
Process data length	Input Data: 2byte, Output Data: 0 byte

### <Process data>

Bit	Data	Description
0	OUT1	0 : OFF 1 : ON
1	OUT2	0 : OFF 1 : ON
2	Diagnosis	0 : normal 1 : error Set at index 0x03EB
3~15	Pressure measurement value	Unsigned 13bit *: Refer to the table below(Unit specification and pressure measurement value (PD))

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Data	Pressure measurement value												Diagnosis	OUT2	OUT1	

### <Unit specification and pressure measurement value (PD) >

Series	Unit	Rated pressure range			Display / settable range			
		0	to			to		
ISE20B	MPa	0	to	1.0000	-0.105	to	1.050	*
	kPa	0	to	1000.0	-105	to	1050	
	kgf/cm <sup>2</sup>	0	to	10.197	-1.07	to	10.71	
	bar	0	to	10.000	-1.05	to	10.50	
	psi	0	to	145.04	-15.2	to	152.3	
	Pressure measurement value (PD)	1000	to	5000	580	to	5200	*
ZSE20B	MPa	0	to	-0.1000	0.01	to	-0.105	
	kPa	0	to	-100.00	10.0	to	-105.0	
	kgf/cm <sup>2</sup>	0	to	-1.0197	0.102	to	-1.071	
	bar	0	to	-1.0000	0.100	to	-1.050	
	psi	0	to	-14.504	1.45	to	-15.23	
	inchHg	0	to	-29.53	3.0	to	-31.0	
	mmHg	0	to	-750.1	75	to	-788	
	Pressure measurement value (PD)	1000	to	5000	600	to	5200	
ZSE20BF	MPa	-0.1000	to	0.1000	-0.105	to	0.105	
	kPa	-100.00	to	100.00	-105.0	to	105.0	
	kgf/cm <sup>2</sup>	-1.0197	to	1.0197	-1.071	to	1.071	
	bar	-1.0000	to	1.0000	-1.050	to	1.050	
	psi	-14.504	to	14.504	-15.22	to	15.22	
	inchHg	-29.53	to	29.53	-31.0	to	31.0	
	mmHg	-750.1	to	750.1	-788	to	788	
	Pressure measurement value (PD)	1000	to	5000	900	to	5100	

\* : The figure below describes the relationship between the pressure measurement value (PD) and pressure value in the unit specification (MPa) of the ISE20B series.

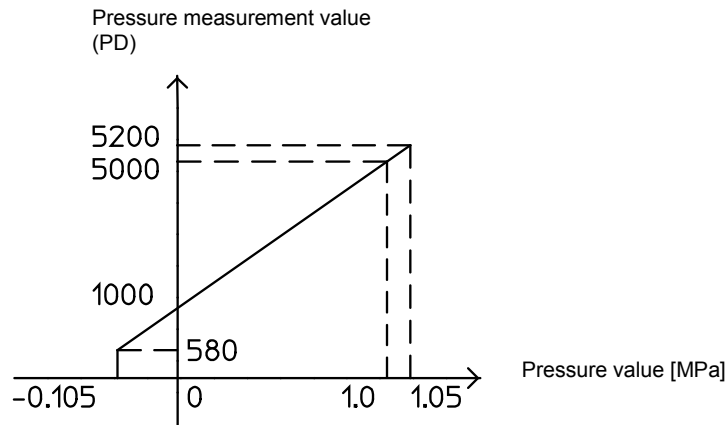


Figure 1: Relationship between the pressure measurement value (PD) and pressure value (e.g. : ISE20B unit MPa)

**【Conversion formula from process data to pressure measurement value】**

$$Pr = a \times (PD) + b$$

**【Conversion formula from pressure measurement value to process data】**

$$(PD) = (Pr - b) / a$$

Pr : Pressure measurement value and pressure setting value

PD : Process data

a : Inclination

b : Intercept

**【Inclination and intercept to unit specification】**

Series	unit	Inclination a	Intercept b
ISE20B	MPa	0.00025	-0.25
	kPa	0.25	-250
	kgf/cm <sup>2</sup>	0.00254925	-2.54925
	bar	0.0025	-2.5
	psi	0.03626	-36.26
ZSE20B	MPa	-0.000025	0.025
	kPa	-0.025	25
	kgf/cm <sup>2</sup>	-0.000254925	0.254925
	bar	-0.00025	0.25
	psi	-0.003626	3.626
	inchHg	-0.0073825	7.3825
	mmHg	-0.187525	187.525
ZSE20BF	MPa	0.00005	-0.15
	kPa	0.05	-150
	kgf/cm <sup>2</sup>	0.00050985	-1.52955
	bar	0.0005	-1.5
	psi	0.007252	-21.756
	inchHg	0.014765	-44.295
	mmHg	0.37505	-1125.15

### <Direct parameters>

Direct parameters are as follows.

DPP1 address	Access	Parameter name	Initial value (dec)	Contents
0x07	R	Vendor ID	0x0083 (131)	“SMC Corporation”
0x08				
0x09	R	Device ID	0x0130 (304)	“ISE20B-T-*-X101”
0x0A			0x0131 (305)	“ZSE20B-T-*-X101”
0x0B			0x0132 (306)	“ZSE20BF-T-*-X101”

### <ISDU parameters>

Index (dec)	Sub index	Access	Parameters	Initial value	Remarks
0x0002 (2)	0	W	System command	—	See P.3 “System Command”
0x000C (12)	0	R/W	Device access lock	0x0000	Refer to P.4 “Device Lock”
0x0010 (16)	0	R	Vendor name	SMC Corporation	
0x0011 (17)	0	R	Vendor text	www.smcworld.com	
0x0012 (18)	0	R	Product name	e.g. ISE20B-T	
0x0013 (19)	0	R	Product ID	e.g. ISE20B-T	
0x0014 (20)	0	R	Product text	Pressure sensor	
0x0015 (21)	0	R	Serial number	—	“xxxxxxx”
0x0016 (22)	0	R	Hardware version	HW-Vx.y	x: Large revision number y: Small revision number
0x0017 (23)	0	R	Software version	FW-Vx.y	x: Large revision number y: Small revision number
0x0024 (36)	0	R	Device status parameter	—	Refer to “Device Status Parameter” on P.4
0x0025 (37)	0	R	Device detailed state parameter	—	Refer to “Device detailed state parameter” on page 4
0x0028 (40)	0	R	Process data input	—	The latest value of process data can be read.

### <System Command (index 2)>

The writable commands are as follows.

Data type: 8-bit Ulnteger

Value (dec)	Function definition	Description
0x80 (128)	Device Reset	Restarts the device
0x81 (129)	Application Reset	Clears peak / bottom value
0x82 (130)	Restore Factory Settings	Restores factory default values
0xA0 (160)	Zero Clear	Executes zero clear

### <Device Access Lock Parameter (index 12) >

The contents are as follows.

Data type: 16-bit Record

Value (dec)	Contents
0x0000 (0)	Key lock release, DS unlock
0x0002 (2)	Key lock release, DS lock
0x0008 (8)	Key lock, DS unlock
0x000A (10)	Key lock, DS lock

#### Key lock:

This function prevents the user from physically changing the setting of the pressure switch (button operation is not accepted).

Even when key lock function is activated, settings can be changed by IO-Link communication. Restoration by data storage (overwriting parameter data) can be performed.

#### Lock data storage (DS lock):

Locking "Data storage" will invalidate the data storage function of the pressure switch.

In this case, access will be denied for backup and restoration of data storage

### <Device State Parameters (Index 36) >

Readable device states are as follows.

Data type : 8-bit UInteger

Value	State definition	Description
0x00	Normal operation	-
0x01	Maintenance inspection required	Not available
0x02	Outside specification range	Device temperature upper limit exceeded Measured pressure range upper limit exceeded Falls below measured pressure range lower limit
0x03	Function check	Not available
0x04	Failure	Internal failure of digital pressure switch

### <Device Detail Status Parameters (index 37) >

Detailed event contents of readable device status are as follows.

Array	Event content	Event classification		Event code
		Definition	Value	
1	Internal failure of digital pressure switch	error	0xF4	0x8D01
2	Internal failure of digital pressure switch	error	0xF4	0x8D02
3	Internal failure of digital pressure switch	error	0xF4	0x8D03
4	Internal failure of digital pressure switch	error	0xF4	0x8D04
5	Internal failure of digital pressure switch	error	0xF4	0x8D05
6	Internal failure of digital pressure switch	error	0xF4	0x8D06
7	Internal failure of digital pressure switch	error	0xF4	0x8D07
8	—	—	0xF4	0x8CC0

Array	Event content	Event classification		Event code
		Definition	Value	
9	Device temperature upper limit exceeded	warning	0xE4	0x4210
10	Measured pressure range upper limit exceeded	warning	0xE4	0x8C10
11	Fell below measured pressure range lower limit	warning	0xE4	0x8C30
12	—	—	0x00	0x0000
13	—	—	0x00	0x0000
14	Data storage upload request	notification	0x54	0xFF91

### <Product Specific Parameters>

Index (dec)	Sub index	Access	Parameter name	Data storage	Data type	Initial value (dec)	Contents
0x03E8 (1000)	0	R/W	Unit (Display unit selection)	●	U8	0x00 (0)	Setting of display unit 0 : MPa 1 : kPa
0x03E9 (1001)	0	R/W	NorP (Output polarity NPN / PNP selection)	●	U8	0x01 (1)	Setting of switch output specification 0 : NPN 1 : PNP
0x03EA (1002)	0	R/W	CoL (Display color selection)	●	U8	0x02 (2)	Setting of display color. 0 : red (Always red) 1 : Grn (Always green) 2 : 1SoG (OUT1 is Green when on) 3 : 1Sor (OUT1 is Red when on) 4 : 2SoG (OUT2 is Green when on) 5 : 2Sor (OUT2 is Red when on)
0x03EB (1003)	0	R/W	diAg (Diagnostic information selection)	●	U8	0x00 (0)	Sets the diagnostic information bit of the input process data. 0 : Not used (always OFF) 1 : ON in the following cases All errors Device temperature upper limit exceeded Measured pressure range upper limit exceeded Fall short of Measured pressure range lower limit 2 : ON in the following cases Measured pressure range upper limit exceeded Fall short of measured pressure range lower limit
0x03F2 (1010)	0	R/W	oUt1 (Output mode selection of OUT1)	●	U8	0x00 (0)	Setting of OUT1 output mode. 0 : HYS 1 : Wind 2 : Err 3 : oFF
0x03F3 (1011)	0	R/W	1ot (Reversed output setting of OUT1)	●	U8	0x00 (0)	Setting of OUT1 normal and reversed output. 0 : 1_P (Normal output) 1 : 1_n (Reversed output)

Index (dec)	Sub index	Access	Parameter name	Data storage	Data type	Initial value (dec)	Contents
0x03F4 (1012)	0	R/W	P_1(n_1) (Setting of switch point of OUT1)	●	U16	Z/ISE20B : 0x0BB8 (3000) ZSE20BF : 0x0FA0 (4000)	Setting of OUT1 output set value. ISE20B : 0x0244~0x1450 (580~5200) ZSE20B : 0x0258~0x1450 (600~5200) ZSE20BF : 0x0384~0x13EC (900~5100)
0x03F5 (1013)	0	R/W	H_1 (Hysteresis value of OUT1)	●	U16	ISE20B : 0x04B0 (1200) ZSE20B : 0x04B0 (1200) ZSE20BF : 0x0C1C (3100)	Setting of OUT1 hysteresis. ISE20B : 0x03E8~0x15F4 (1000~5620) ZSE20B : 0x03E8~0x15E0 (1000~5600) ZSE20BF : 0x0BB8~0x1C20 (3000~7200)
0x03F6 (1014)	0	R/W	P1L(n1L) (OUT1 output switch point setting _ Window comparator lower limit value)	●	U16	ISE20B : 0x0898 (2200) ZSE20B : 0x0898 (2200) ZSE20BF : 0x0E10 (3600)	Setting of OUT1 output set value (lower limit of window comparator). ISE20B : 0x0244~0x1450 (580~5200) ZSE20B : 0x0258~0x1450 (600~5200) ZSE20BF : 0x0384~0x13EC (900~5100)
0x03F7 (1015)	0	R/W	P1H(n1H) (OUT1 output switch point setting 1 _ Wind comparator upper limit value)	●	U16	ISE20B : 0x0D48 (3400) ZSE20B : 0x0D48 (3400) ZSE20BF : 0x1068 (4200)	Setting of OUT1 output set value (upper limit of window comparator). ISE20B : 0x0244~0x1450 (580~5200) ZSE20B : 0x0258~0x1450 (600~5200) ZSE20BF : 0x0384~0x13EC (900~5100)
0x03F8 (1016)	0	R/W	WH1 (Hysteresis value of OUT1 _ Window comparator hysteresis)	●	U16	ISE20B : 0x0578 (1400) ZSE20B : 0x0578 (1400) ZSE20BF : 0x0C80 (3200)	Setting of OUT1 hysteresis (window comparator hysteresis). ISE20B : 0x03E8~0x0CEE (1000~3310) ZSE20B : 0x03E8~0x0CE4 (1000~3300) ZSE20BF : 0x0BB8~0x13EC (3000~5100)
0x03F9 (1017)	0	R/W	dtH1 (Delay time when OUT1 is ON)	●	U16	0x0000 (0)	Setting of OUT1 delay time at ON. 0x0000~0x1770 (0~6000) 0.01s increments
0x03FA (1018)	0	R/W	dtL1 (Delay time when OUT1 is OFF)	●	U16	0x0000 (0)	Setting of OUT1 delay time at OFF. 0x0000~0x1770 (0~6000) 0.01s increment
0x03FC (1020)	0	R/W	oUt2 (Output mode selection of OUT2)	●	U8	0x00 (0)	Setting of OUT2 output mode. 0 : HYS 1 : Wind 2 : Err 3 : oFF
0x03FD (1021)	0	R/W	2ot (Reversed output setting of OUT2)	●	U8	0x00 (0)	Setting of OUT2 normal and reversed output. 0 : 1_P (Normal output) 1 : 1_n (Reversed output)

Index (dec)	Sub index	Access	Parameter name	Data storage	Data type	Initial value (dec)	Contents
0x03FE (1022)	0	R/W	P_2(n_2) (Setting of switch point of OUT2)	●	U16	ISE20B : 0x0BB8 (3000) ZSE20B : 0x0BB8 (3000) ZSE20BF : 0x0FA0 (4000)	Setting of OUT2 output set value. ISE20B : 0x0244~0x1450 (580~5200) ZSE20B : 0x0258~0x1450 (600~5200) ZSE20BF : 0x0384~0x13EC (900~5100)
0x03FF (1023)	0	R/W	H_2 (Hysteresis value of OUT2)	●	U16	ISE20B : 0x04B0 (1200) ZSE20B : 0x04B0 (1200) ZSE20BF : 0x0C1C (3100)	Setting of OUT2 hysteresis. ISE20B : 0x03E8~0x15F4 (1000~5620) ZSE20B : 0x03E8~0x15E0 (1000~5600) ZSE20BF : 0x0BB8~0x1C20 (3000~7200)
0x0400 (1024)	0	R/W	P2L(n2L) (OUT2 output switch point setting _ Window comparator lower limit value)	●	U16	ISE20B : 0x0898 (2200) ZSE20B : 0x0898 (2200) ZSE20BF : 0x0E10 (3600)	Setting of OUT2 output set value (lower limit of window comparator). ISE20B : 0x0244~0x1450 (580~5200) ZSE20B : 0x0258~0x1450 (600~5200) ZSE20BF : 0x0384~0x13EC (900~5100)
0x0401 (1025)	0	R/W	P2H(n2H) (OUT2 output switch point setting _ Window comparator upper limit value)	●	U16	ISE20B : 0x0D48 (3400) ZSE20B : 0x0D48 (3400) ZSE20BF : 0x1068 (4200)	Setting of OUT2 output set value (upper limit of window comparator). ISE20B : 0x0244~0x1450 (580~5200) ZSE20B : 0x0258~0x1450 (600~5200) ZSE20BF : 0x0384~0x13EC (900~5100)
0x0402 (1026)	0	R/W	WH2 (Hysteresis value of OUT2 _ Window comparator hysteresis)	●	U16	ISE20B : 0x0578 (1400) ZSE20B : 0x0578 (1400) ZSE20BF : 0x0C80 (3200)	Setting of OUT2 hysteresis (window comparator hysteresis). ISE20B : 0x03E8~0x0CEE (1000~3310) ZSE20B : 0x03E8~0x0CE4 (1000~3300) ZSE20BF : 0x0BB8~0x13EC (3000~5100)
0x0403 (1027)	0	R/W	dtH2 (Delay time when OUT2 is ON)	●	U16	0x0000 (0)	Setting of OUT2 delay time at ON. 0x0000~0x1770 (0~6000) 0.01s increments
0x0404 (1028)	0	R/W	dtL2 (Delay time when OUT2 is OFF)	●	U16	0x0000 (0)	Setting of OUT2 delay time at OFF. 0x0000~0x1770 (0~6000) 0.01s increment
0x0406 (1030)	0	R/W	FiL (Digital filter)	●	U16	0x0000 (0)	Setting of digital filter. 0x0000~0x0BB8 (0~3000) 0.01s increment
0x0424 (1060)	0	R/W	FSC (Display value fine adjustment)		S16	0x0000 (0)	Displayed pressure value can be adjusted within ± 5% R.D. (-50 to 50) 0.1% increments
0x0456 (1110)	0	R/W	drE (Display value resolution selection)	●	U8	0x00 (0)	Setting of display value resolution. 0: normal split 1: Low resolution (1/10)



Index (dec)	Sub index	Access	Parameter name	Data storage	Data type	Initial value (dec)	Contents
0x0708 (1808)	0	R/W	ECo (Eco mode)	●	U8	0x00 (0)	Setting of power saving mode. 0: OFF 1: ON
0x0712 (1810)	0	R/W	Pin (Use of PIN)	●	U8	0x00 (0)	Setting of use or unuse of the security code. 0: Unused 1: Used
0x0713 (1811)	0	R/W	PinCode (Security code)	●	U16	0x0000 (0)	Setting of security code. 0~999