Installation and Maintenance Manual IS1000 Pressure Switch (Reed Switch Type) ISE1, ISE2 Pressure Switch (Solid State Type)

For future reference, please keep this manual in a safe place

This manual should be read in conjunction with the current product catalogue

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage.These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO4414 (Note1), JIS B 8370 (Note2) and other safety practices.
Note 1: ISO 4414: Pneumatic fluid power – Recommendations for the application of equipment to transmission and control systems.
Note 2: JIS B 8370: Pneumatic system axiom.

⚠ **CAUTION :** *Operator error could result in injury or equipment damage.*

⚠ **WARNING:** *Operator error could result in serious injury or loss of life.*

⚠ **DANGER :** *In extreme conditions, there is a possible result of serious injury or loss of life.*

⚠ WARNING

1. **The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.**
   Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements.
2. **Only trained personnel should operate pneumatically operated machinery and equipment.**
   Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.
3. **Do not service machinery/equipment or attempt to remove component until safety is confirmed.**
   1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
   2) When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.
   3) Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Bleed air into the system gradually to create back-pressure, i.e. incorporate a soft-start valve).
4. **Contact SMC if the product is to be used in any of the following conditions:**
   1) Conditions and environments beyond the given specifications, or if product is used outdoors.
   2) Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
   3) An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

⚠ CAUTION

Ensure that the air supply system is filtered to 5 micron.

IS1000 (Reed switch)

Specifications

Model	IS1000-01
Proof pressure	0.98 MPa {10 kgf/cm²}
Max. operating pressure	0.69 MPa {7 kgf/cm²}
Pressure range	0.1 ~ 0.39 MPa {1~4 kgf/cm²}
Differential	78 KPa {0.8 kgf/cm²} or less
Contact	1a
Electrical entry	Grommet-Lead wire length 0.5m (standard)
Fluid	Air
Ambient and fluid temperature	5~60°C
Port size	1/8 (male)

Switch characteristics

Max. contact capacity	2VAC,2WDC		
Voltage	24VAC,DC or less	48VAC,DC	100VAC,DC
Max. operating current	50mA	40mA	20mA
Shock resistance	30G		

Installation

⚠ WARNING

Ensure all air and power supplies are ISOLATED before commencing installation.
Do not install these switches in explosive atmospheres.
If these switches are exposed to oil and/or water droplets ensure that they are protected.
If it is intended to energise a switch for an extended period please consult SMC.

Electrical circuit (Fig 1)

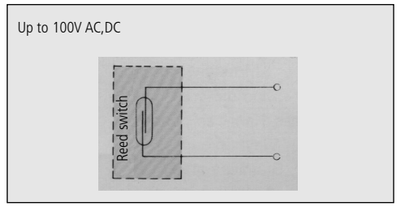


Fig 1

Setting pressure range (Fig 2)

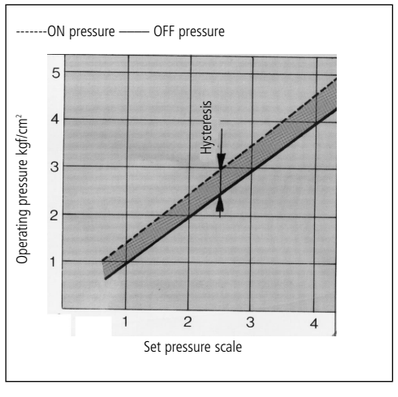


Fig 2

Construction/Parts list (Fig 3)

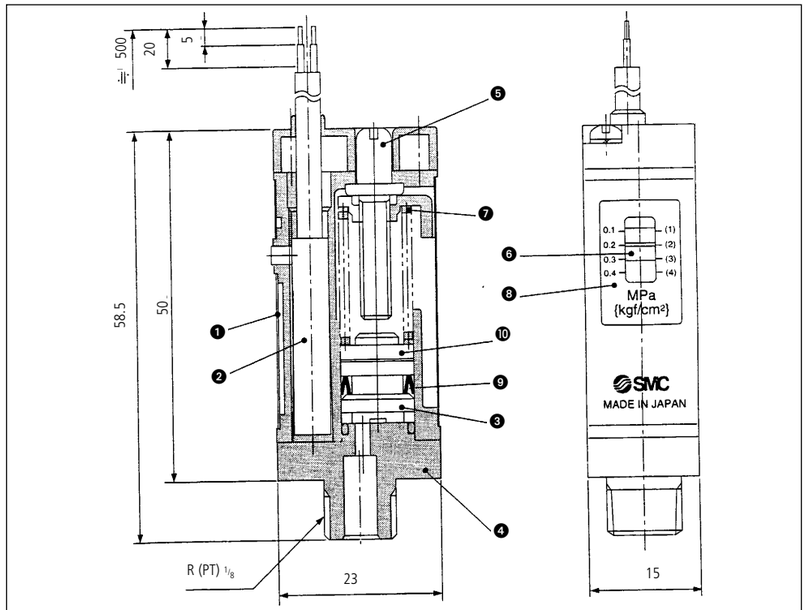


Fig 3

Parts list

No.	Description	Material
❶	Shield plate	Rolled steel plate
❷	Switch assembly	-
❸	Piston	Polyacetal
❹	Fittings	Zinc die-cast
❺	Regulation screw	Brass (Electrical nickel plated)
❻	Pointer	Vinyl chloride
❼	Spring	Stainless steel
❽	Scale plate	Rigid vinyl chloride
❾	Miniseal Y type	NBR
❿	Magnet	Rare earth magnet

Contact protection box/internal circuit (Fig 4)

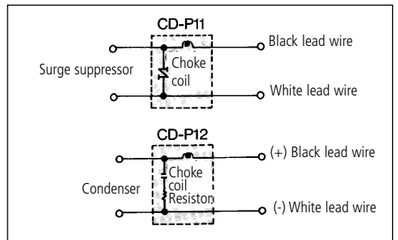


Fig 4

The compact pressure switch is not fitted with a contact protection circuit. Therefore when an induction load is present, the lead wire length exceeds 5m in length, or high frequency operation a contact protection box should be fitted (Fig 5).

Part No.	Voltage	Lead wire length
CD-P11	100VAC	Switch side 0.5m
CD-P12	24VDC	Load side 0.5m

Fig 5

Pressure adjustment (Fig 3)

Pressure adjustment is carried out via the regulation screw Fig 3, ❺.

⚠ CAUTION

Before setting the ON pressure please note that the indication on the scale plate Fig 3, ❽ will be the OFF pressure.
Ensure that a load is connected before connecting a power source.
Ensure that the operating current is kept within the maximum operating current.
Avoid using this switch in a high magnetic environment. DO NOT rely on the shield plate Fig 3, ❶.
When handling the switch, protect from excessive shock loads.
When the ON pressure is being detected note that this pressure will be made up of the 'set' pressure plus the ON-OFF differential.
During piping of the switch DO NOT hold the wire, hold the body. DO NOT apply excessive force to the wire.

ISE1 (Solid State Switch)

Note: The ISE series is available in 3 function types, single setting with adjustable hysteresis, double setting/double output type, and an analogue output type with adjustable hysteresis. All are available with high or low-pressure range.

Hysteresis (Fig 6)

Hysteresis is the pressure difference between the ON pressure and the OFF pressure of the output signal. The set pressure is the pressure selected to switch from the OFF to the ON condition.

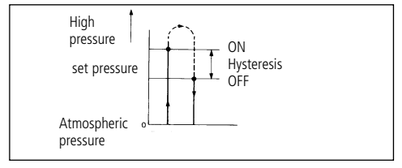


Fig 6

Specifications (Fig 7)

Model		ISE1L -01-14	ISE1L -01-15	ISE1L -01-16	ISE1L -01-17	ISE1L -01-18	ISE1L -01-19	ISE1 -01-14	ISE1 -01-15	ISE1 -01-16	ISE1 -01-17	ISE1 -01-18	ISE1 -01-19
Fluid		Air											
Pressure range		0~100kPa {0~1.02 kgf/cm²}						0~1 MPa {0~10.2 kgf/cm²}					
Hysteresis		Pressure range 1~10% (variable)		3% F.S. or less (fixed)		Pressure range 1~10% (variable)				3% F.S. or less (fixed)		Pressure range 1~10% (variable)	
Accuracy		±3% F.S. (including temperature characteristics)											
Voltage		12~24VDC (ripple ±10% or less)											
Output	ON-OFF	Open collector 30V, 80mA											
	Analog	Nil				1~5V		Nil				1~5V	
Number of settings		One switch		Two switches		One switch				Two switches		One switch	
Indicator light		Lighting under ON condition		Lighting under ON condition (Output1: Red) (Output2: Green)		Lighting under ON condition				Lighting under ON condition (Output1: Red) (Output2: Green)		Lighting under ON condition	
Trimmer adjustment		3 revolutions	200°	3 revolutions	200°	3 revolutions	200°	3 revolutions	200°	3 revolutions	200°	3 revolutions	200°
Consumption current		17mA (24VDC under ON condition)											
Max. pressure		200 kPa {2.04 kgf/cm²}						1 MPa {10.2 kgf/cm²}					
Temperature range		0~60°C											
Port size		1/8											

Circuit and electrical connection (Fig 7)

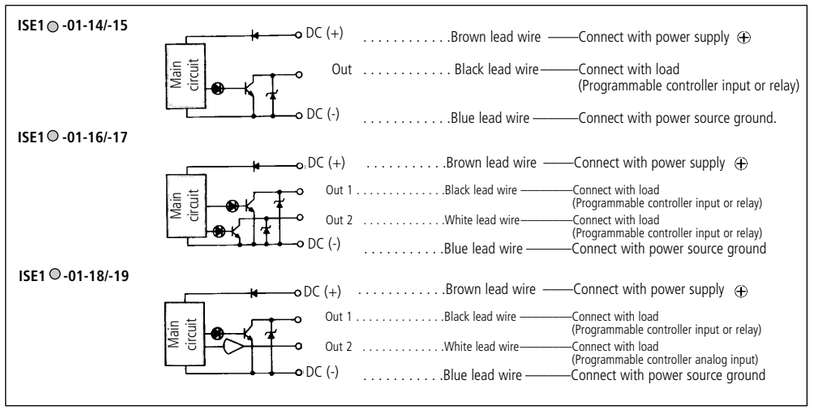


Fig 7

Wiring (Fig 8)

Standard connection circuit	Connection with programmable controller/at ⊖ common terminal
ISE1 ○ -01-14/-15	**ISE1 ○ -01-14/-15**
ISE1 ○ -01-16/-17	**ISE1 ○ -01-16/-17**
ISE1 ○ -01-18/-19	**ISE1 ○ -01-18/-19**

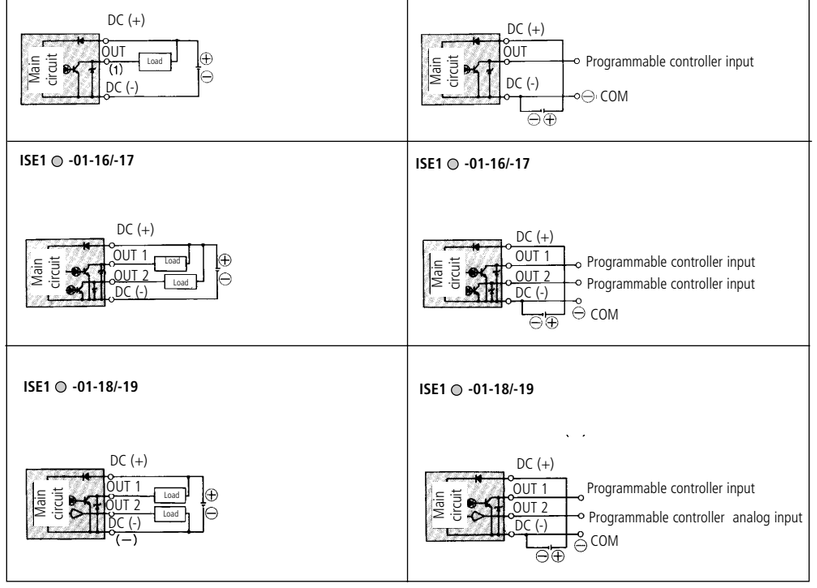


Fig 8

Pressure detector (Fig 9)

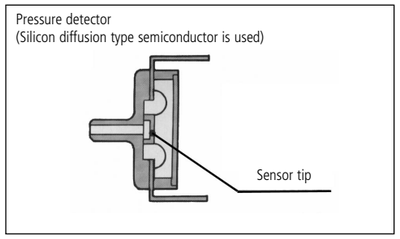


Fig 9

Electrical connection (Fig 10)

When assembling the connector to the switch housing (Fig 10) ensure that the connector is pushed onto the pins (Fig 10) in a straight line and until the lever (Fig 10) locks into the housing slot.
When removing the connector from the switch housing, push the lever down to unlock it from the slot (Fig 10) and withdraw the connector in a straight line.

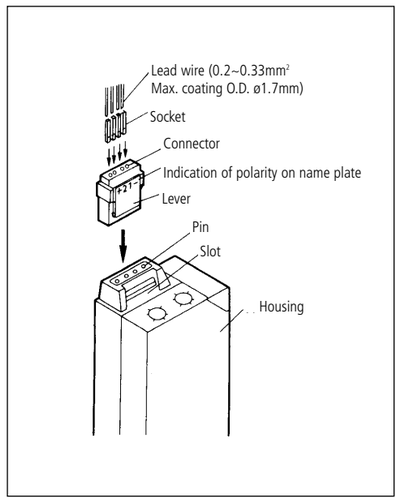


Fig 10

Setting vacuum pressure (Fig 11)

Rotate the vacuum trimmer clockwise to increase vacuum pressure. (ON switching position).
DO NOT use excessive force when adjusting the trimmer.
(ISE1- ○1-14/ -15/-18/-19

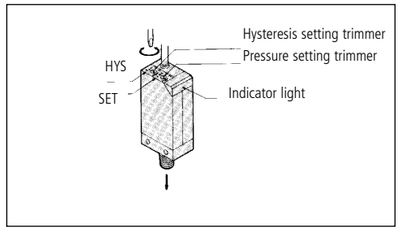


Fig 11

Hysteresis can be adjusted by means of the trimmer within the range 1~10% of the ON pressure.
Note: Clockwise rotation will reduce the hysteresis.
Initially adjust the ON pressure setting, adjust the hysteresis, and finally re-adjust the ON pressure setting.

ISE- ○1-16/-17

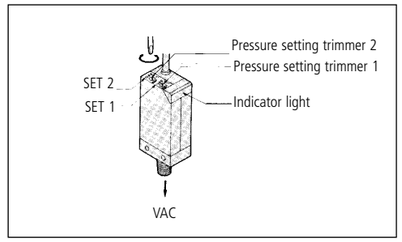


Fig 12

Rotating the trimmer 1 (SET 1) will adjust the ON pressure setting of output 1 (white lead wire, red LED).
Rotating trimmer 2 (SET 2) will adjust the ON pressure setting of output 2 (green lead wire, green LED).

Precautions
When piping the switch, hold the body and NOT the wire.
When installing the ISE place the spanner on the metal section of the body (see Fig 13).

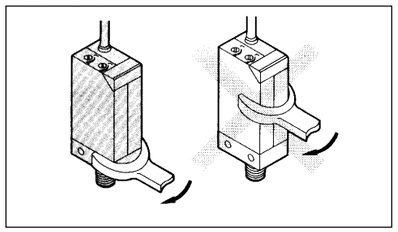


Fig 13

ISE2 (Solid state)

Specifications

Model	ISE2L	ISE2
Fluid	Air, N_2 gas	
Pressure range	0~100 kPa {0~1.02 kgf/cm²}	0~1MPa {0~10.2 kgf/cm²}
Differential	3% or less	
Accuracy	±3% F.S. (5~40°C) ±5% F.S. (0~60°C)	
Voltage	12~24VDC (ripple ±10% or less)	
Output	Open collector 30V, 80mA	
Indicator light	Lighting under ON condition	
Consumption	17mA (24VDC under ON condition)	
Max. operating pressure	200 kPa {2.04 kgf/cm²}	1 MPa {10.2 kgf/cm²}
Temperature range	0~60°C	
Port size	1/8	

Circuit and electrical connection (Fig 14)

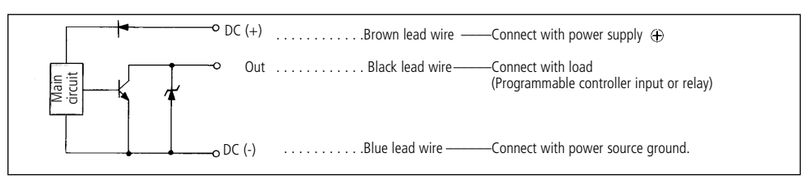
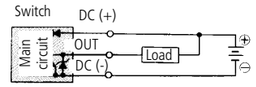


Fig 14

Wiring (Fig 15)

ISE2, ISE2L
/Connections



Connection with programmable controller
/At ⊖ common terminal

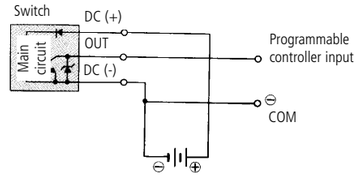


Fig 15

Electrical connection (Fig 16)

When assembling the connector to the switch housing (Fig 16), push the connector on to the pins in a straight line ensuring that the lever locks into the housing slot (Fig 16).
When removing the connector from the switch housing, push the lever down (Fig 16) to unlock it from the slot and withdraw the connector in a straight line off of the pins.

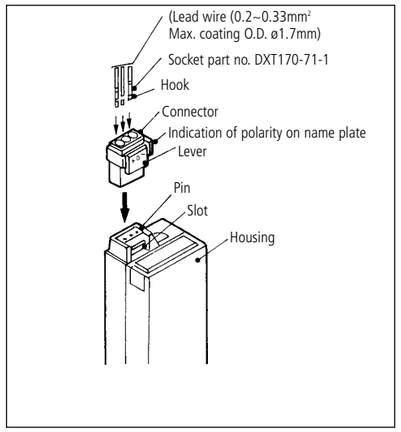


Fig 16

Pressure detector (Fig 17)

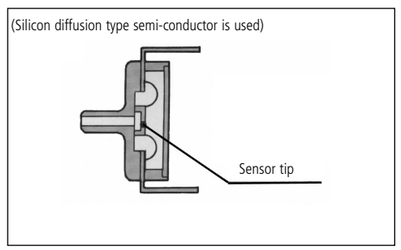


Fig 17

Hysteresis (Fig 18)

Hysteresis is the pressure difference between the On pressure and the OFF pressure of the output signal. The set pressure is the pressure selected to switch from the OFF to the ON condition.

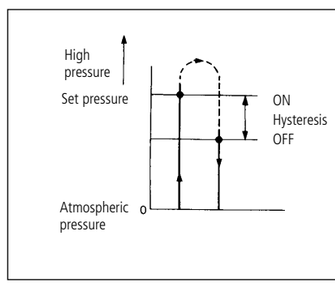


Fig 18

Setting the vacuum pressure (Fig 19)

Rotate the pressure trimmer clockwise to increase the ON setting.

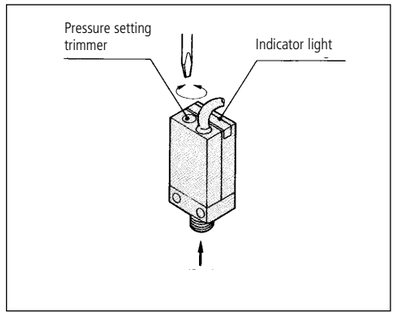


Fig 19

Grommet type: ISE2 ● -01-15 (Fig 20)

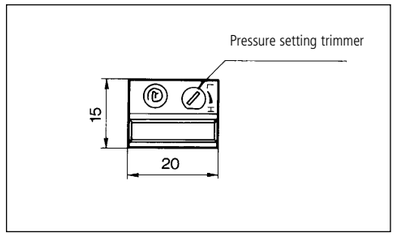


Fig 20

Connector type ISE2 ● -01-15C (Fig 21)

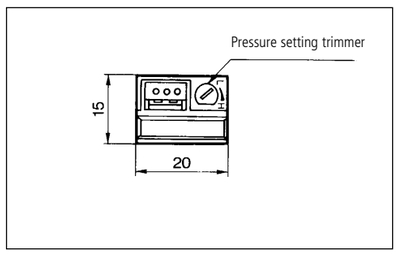


Fig 21

⚠ CAUTION

When piping a switch hold the body and NOT the wire.
DO NOT apply excessive force to the wire.
DO NOT subject the switch to any form of impact.
When installing a switch place the spanner on the metal area of the switch body to screw in the switch (see Fig 22).

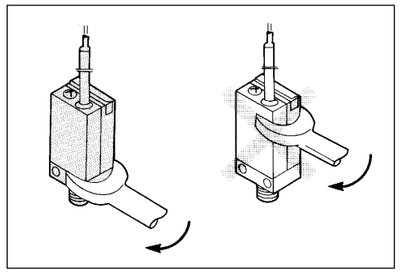


Fig 22

For additional information please contact your local SMC office.

When you enquire about the product, please contact the following
SMC Corporation:

ENGLAND	Phone 01908-563888	**TURKEY**	Phone 212-2211512
ITALY	Phone 02-92711	**GERMANY**	Phone 6103-402-0
HOLLAND	Phone 020-5318888	**FRANCE**	Phone 01-64-76-10-00
SWITZERLAND	Phone 052-34-0022	**SWEDEN**	Phone 08-603 07 00
SPAIN	Phone 945-184100	**AUSTRIA**	Phone 02262-62-280
	Phone 902-255255	**IRELAND**	Phone 01-4501822
GREECE	Phone 01-3426076	**DENMARK**	Phone 8738-0800
FINLAND	Phone 09-68 10 21	**NORWAY**	Phone 67-12 90 20
BELGIUM	Phone 03-3551464	**POLAND**	Phone 48-22-6131847