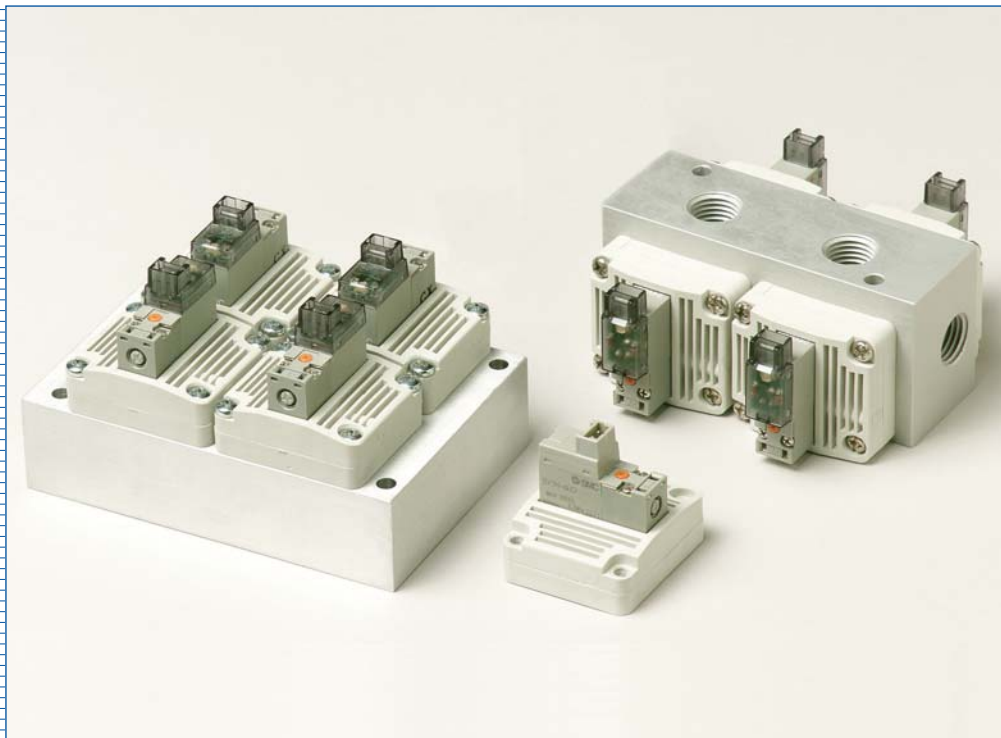




2 Port Diaphragm Valve  
*Series DXT474*

Base Mounted Configurations



Compact Design  
High Flow (Cv 1.2)  
Low Power Consumption (0.75W)  
Long Life (Exceeds 30 million cycles)

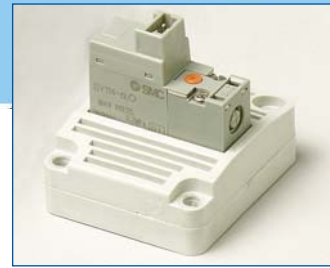
# 2 Port Diaphragm Valve

## Series DXT474

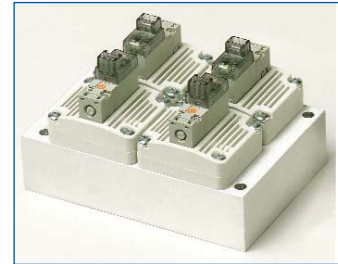
### Diaphragm Valve

The DXT474 diaphragm valve was developed as an operating valve for an oxygen concentrator application for the medical industry, but it can be a valuable solution for applications that require a low pressure 2 port valve that has a high reliability and life.

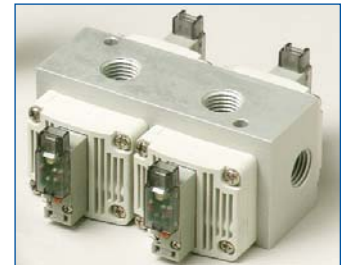
- There are no sliding parts in the valve (ex: spool, pistons, etc.), so the valve is able to function continuously and reliably at low pressure.
- The sealing function is performed by a diaphragm. Therefore, the valve is non-lubricated for applications that are sensitive to lubrication.
- Except for the SY100 pilot valve, fluorine rubber seals (Viton) are used to aid in protection against ozone.
- SY 100 is used for the pilot valve to provide low power consumption.
- Simple structure allows for compactness (12 mm height without pilot valve) and high flow (max. Cv 1.2).
- Normally open and normally closed type valves are available.
- Air operated type valves available for applications where two or more valves are to be shifted by one pilot valve.
- Manifold mounted to aid in many types of manifold interfaces and flow requirements. Currently, two type of manifold designs are available (side ported and top ported type) for oxygen concentrator.
- In the manifolds, the pilot exhaust is routed to the main system exhaust to reduce noise.



L type plug connector



Manifold assembly (Side ported type)



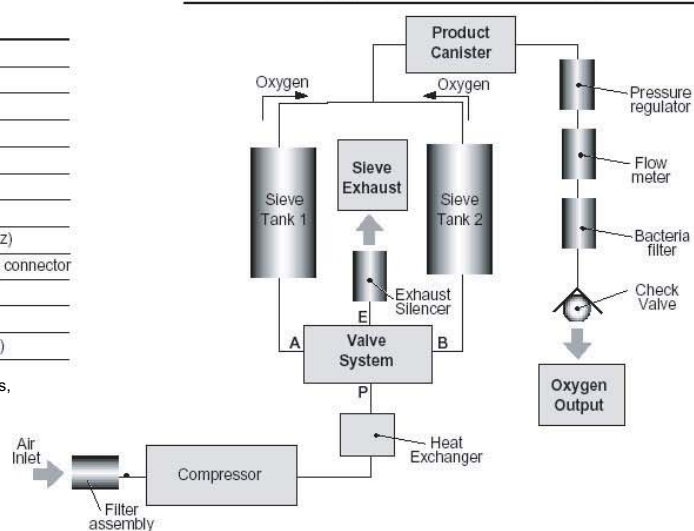
Manifold assembly (Top ported type)

### Valve Specifications

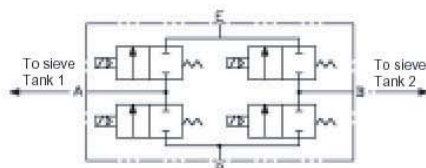
Fluid	Air
Operating pressure range MPa (psi)	0.04~0.3 (6~43)
Effective area mm <sup>2</sup> (Cv)	Max. 21.6 (1.2)
Response time (ms)	Less than 75
Fluid and ambient temperature (°C)	Max. 50
Max. operating frequency (Hz)	5
Lubrication	Not required
Impact/Vibration m/s <sup>2</sup>	150/30 (8.3 - 2000Hz)
Electrical Entry	Grommet, L and M type plug connector
Coil rated voltage VDC	24, 12, 6, 5, 3
Allowable voltage	-10 to +10%
Power consumption (W)	0.75 (with light: 0.8)

NOTE: Currently DC volts are only available. For other voltages, special order request will have to be submitted.

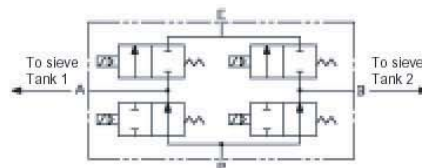
### Oxygen concentrator system



### Valve System circuit



Valve system circuit: N.C. supply and exhaust



Valve system circuit: N.O. supply and N.C. exhaust

How to Order

Solenoid Operated Valve

DXT474 - \* \* - \* \* \* \*

Type of Actuation

1	Normally Closed
2	Normally Open

Valve Type

P	Supply Valve
E	Exhaust Valve

Rated Voltage

5	24VDC
6	12VDC
V	6VDC
S	5VDC
R	3VDC

Manual Override

Nil	Non-locking push type
B	Locking slotted type
D	Push-locking slotted type
E	Push-locking lever type

Light and Surge Suppressor

Nil	No light or surge suppressor
R	With surge suppressor (non-polar)
U	With light and surge suppressor (non-polar)
S	With surge suppressor
Z	With light and surge suppressor

U type only available for 12 and 24VDC

Electrical Entry

G	Grommet, 300 mm lead wire
H	Grommet, 600 mm lead wire
L	L type connector w/ plug and 300 mm lead wire
LO	L type connector w/o plug and lead wire
LN	L type connector with plug and pins
M	M type connector w/ plug and 300 mm lead wire
MO	M type connector w/o plug and lead wire
MN	M type connector w/ plug and pins

Air Operated Valve

DXT474-A

Valve Manifold Assembly

DXT475 - A \* \* - \* \* \* \* - 02 \*

Valve Actuation Type

	Sup. Side	Exh. Side
1	N.C.	N.C.
2	N.O.	N.O.
3	N.C.	N.O.
4	N.O.	N.C.

Thread Type

Nil	Rc
F	G
F	NPT
T	NPTF

Manifold Type

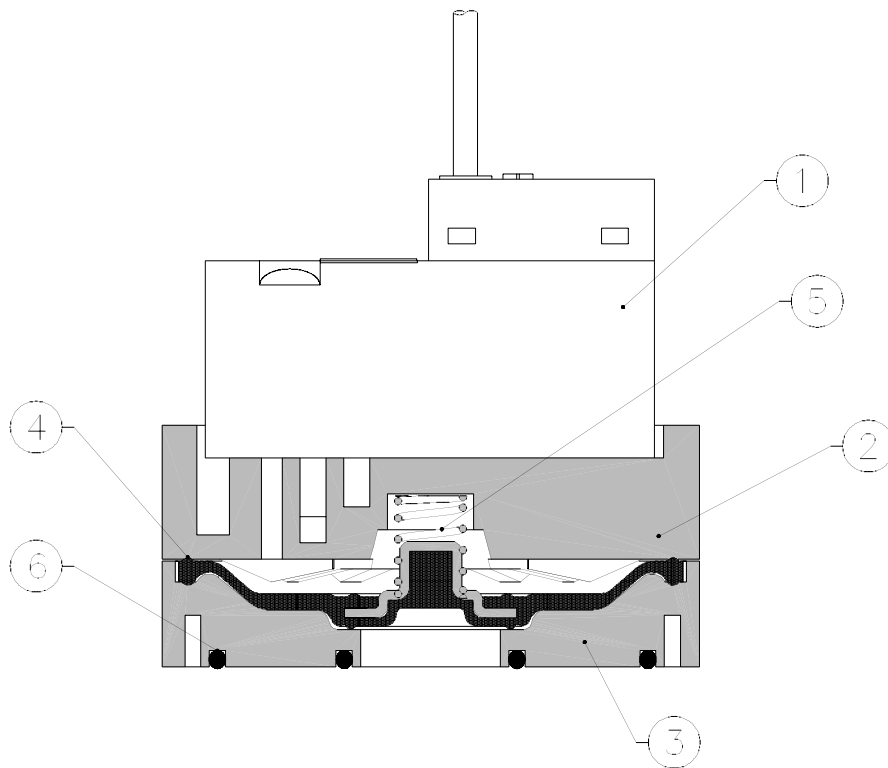
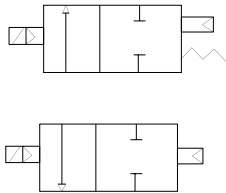
0	Side Ported
1	Top Ported

Rated Voltage, Elec. Entry, Light and Surge Suppressor, Manual Override Same "How to Order" as for Valve

NOTE: Electrical Entry types 'M', 'MO', and 'MN' cannot be used with the SIDE PORTED (0) type manifold.

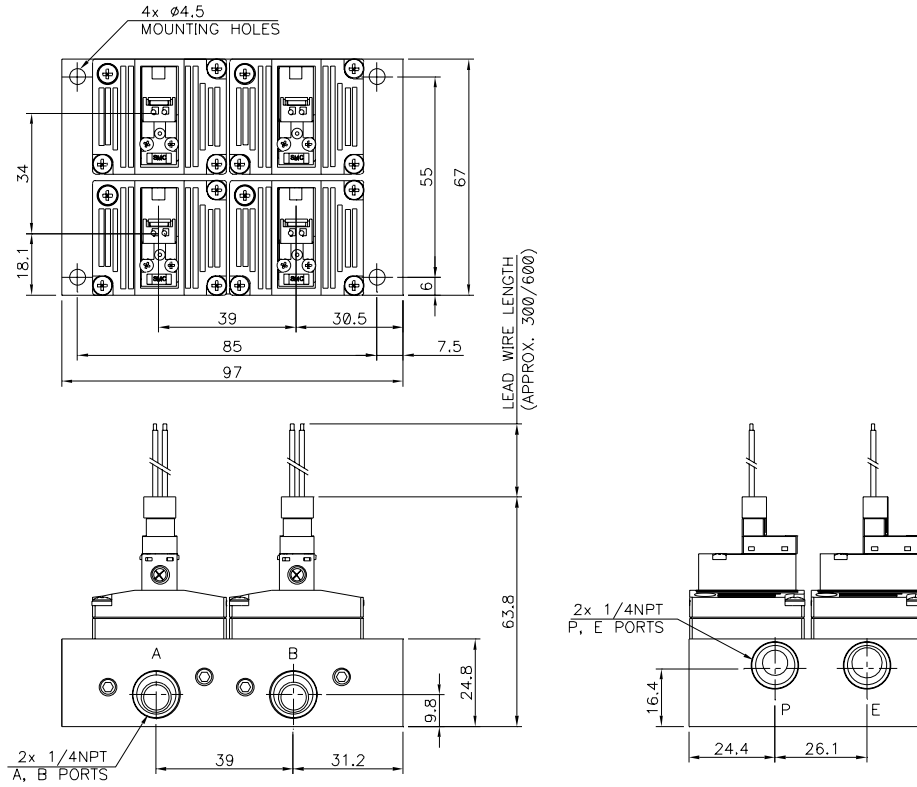
## Construction

### Pneumatic Symbol

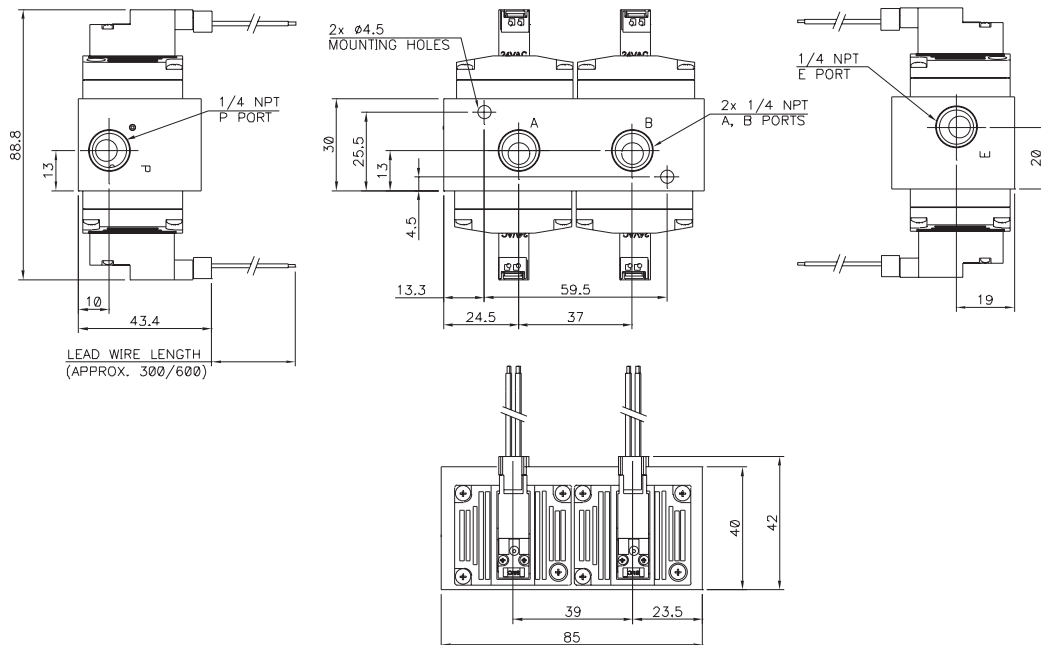


Main Parts			
Item	Parts Name	Material	Notes
1	Pilot valve (SY114A / SY124A)		Gray
2	Cover	Resin	White
3	Body	Resin	White
4	Diaphragm	FKM (Fluorine Rubber)	
5	Spring	Stainless Steel	
6	Mounting Gasket	FKM (Fluorine Rubber)	
7	Mounting Screws (M3x0.5x14)	Zinc Plated Steel	Not Shown

## Manifold Assembly (Side Ported Type)

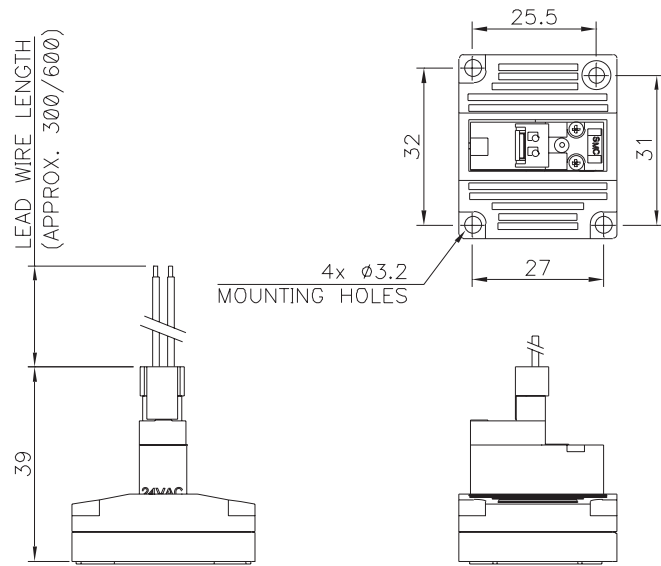


## Manifold Assembly (Top Ported Type)

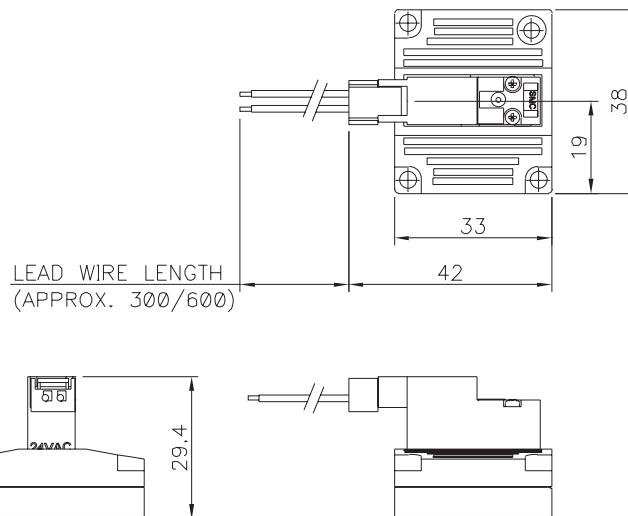


## Valve Assembly

### L TYPE PLUG CONNECTOR



### M TYPE PLUG CONNECTOR



\* OTHER DIMENSIONS ARE THE SAME AS "L" TYPE

**System Design Precautions**

**1 Operation of actuator**

When an actuator, e.g. cylinder, is to be operated using a valve, take appropriate measures to prevent potential injuries to personnel caused by the actuators movement.

**2 Effect of back pressure when using manifold**

Possible malfunction due to back-pressure may result when valves are used on a manifold. If this problem occurs, take appropriate countermeasures.

**3 Holding pressure (including vacuum)**

Since the valve may have slight internal air leakage, it may not be suitable for holding pressure (including vacuum) in a tank or other vessel for an extended period of time.

**4 Not suitable for use as an emergency shutoff valve**

The valve represented in this catalogue is not intended for use as an emergency shutoff valve. If the valve is used in this type of system, other positive shutoff components should be used in conjunction.

**5 Maintenance space**

Installation should consider that enough space is provided for maintenance (removal of valve, etc.).

**6 Release of residual pressure**

Install a method for the release of residual pressure for maintenance purposes.

**7 Using in vacuum condition**

When valve is used for switching vacuum, take precautions for the suction of external dust or other contaminants that may lead to valve malfunction.

**Selection**

**1 Confirm specifications**

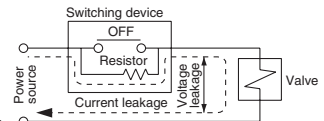
Product represented in this catalogue is designed only for compressed air systems (including vacuum). Do not use with pressure or temperature beyond the specification range. Contact SMC when using a fluid other than compressed air (including vacuum).

**2 Long period of continuous energization**

Contact SMC when the valve is to be continuously energized for a long period.

**1 Leakage Voltage**

When a C-R device (Surge voltage suppressor) is used for the protection of switching device, note that leakage voltage may be slightly increased.



Suppress residual leakage voltage as follows :  
 DC coil : 3% or less of rated voltage  
 AC coil : 8% or less of rated voltage

**2 Use in low temperature environments**

Valve use is possible to temperature of  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ). Take appropriate measures to avoid freezing of drain, moisture, etc., by use of an air dryer.

**3 Mounting orientation**

Mounting position is free. No specific orientation is necessary.

**Installation**

**1 If air leakage is increasing or equipment is not properly operating, cease use of the valve and investigate the cause.**

Check mounting conditions after air and power supplies are connected. Initial function and leakage tests should be performed after installation.

**2 Install only after reading and understanding the safety instructions.**

Keep the catalog on file so that it can be referred to when necessary.

**3 Label/Markings**

Warnings or specifications indicated on the product should not be erased, removed, or covered up. If paint is applied to resinous parts it may have an adverse effect due to paint solvent.

### Piping

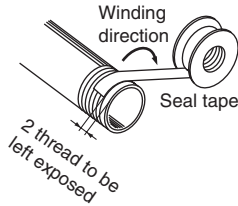
#### 1 Before piping

Make sure that chips, cutting oil, dust etc., in contact with piping is cleaned up or air blown (flushing) before piping.

#### 2 Sealant tape

When installing piping or fittings into a port, ensure that sealant material does not enter the port internally.

When using sealing tape, leave 1.5~2 threads exposed on the end of pipe/fitting.



#### 3 Tightening torques

When installing fitting, etc., follow the given torque levels below.

##### Tightening torque

Thread	Appropriate tightening torque N·m (kgf·cm)
M3	0.3 to 0.5 (3 to 5)
M5	1.5 to 2 (15 to 20)

### Wiring

#### 1 Polarity

When DC power is to be connected to a solenoid valve equipped with light and/or surge voltage suppressor, check for polarity indications.

Without diode to protect polarity:

If polarity connection is wrong, the diode in the valve or switching device at control equipment or power supply may be damaged.

With diode to protect polarity :

If polarity connection is wrong, the valve will not switch.

#### 2 Applied voltage

When electricity is applied to the solenoid valve, be careful to apply the proper voltage. Improper voltage may cause malfunction or coil damage.

#### 3 Connection

Make sure connections are secure after wiring.

### Lubrication

#### 1 Lubrication

① The valve has been lubricated for life at manufacture, and does not require lubrication in service.

② If a lubricant is used in the system, use turbine oil Class 1, ISO VG32 (no additives). Once lubricant is used in the system, you must continue to lubricate as the original lubricant applied during manufacturing will be washed away.

Contact SMC for recommended turbine oil Class 2, ISO VG32 (with additives).

### Supply Air

#### 1 Use clean air

When compressed air supply includes chemicals, synthetic materials (including organic solvents), salinity, corrosive gas, etc., it can cause damage or malfunction.

#### 2 Install an air filter

Install an air filter at the upper stream side of the valve. Filtration degree should be 5 $\mu$ m or less.

#### 3 Install an air dryer, after cooler, etc..

Air that includes excessive condensate may cause malfunction of valve and other pneumatic equipment. To prevent this, install an air dryer, after cooler, etc..

#### 4 If excessive carbon powder is present, install a mist separator on the upstream side of the valve.

Refer to "Air Cleaning Equipment" catalogue regarding further compressed air quality.



**Environment**

- 1 **Do not use in atmospheres where the valve is in direct contact with corrosive gases, chemicals, salt water, water or steam.**
- 2 **Do not use in an explosive atmosphere.**
- 3 **Do not use in a place subjected to heavy vibration and/or shock. Check the specifications for each series.**
- 4 **The valve should not be exposed to prolonged sun light. Use a protective cover.**
- 5 **Remove emissive heat.**
- 6 **If using in an atmosphere where there is possible contact with water droplets, oil, weld spatter, etc., take suitable protectionary measures.**
- 7 **When the solenoid valve is mounted in a control panel or its energizing time is long, make sure temperature in valve specification range. ambient temperature is within valve specification range.**

**Maintenance**

- 1 **Maintenance procedures are shown in operation manual.**  
If handling is wrong, it causes malfunction and damage of machine or equipment.
  - 2 **Machine maintenance and supply/exhaust of compressed air**  
When machine is to be serviced, first check for removal of workpieces and run-away of equipment, etc. Then cut the supply pressure and power and exhaust all compressed air from the system. (Lock-out valve for release of residual pressure is recommended) When the machine is to be restarted, check first that actuators are in their proper startup positions.
  - 3 **Low frequency operation**  
Valve should be switched at least once every 30 days to avoid malfunction.
  - 4 **Manual override**  
When manual override is engaged the connected equipment starts to operate. Check for safe operation.
- 1 **Drain**  
Remove condensate from air filter regularly.
  - 2 **Lubrication**  
If a lubricant for rubber seal type valve is introduced, continue to lubricate and use turbine oil Class 1, VG32 (no additives).  
If other lubricant oil is used, it may cause malfunction. Contact us for suggested turbine oil Class 2, VG32 (with additives).

**How to Calculate Flow Rate (At an air temperature 20°C)**

Subsonic flow :  $P_1+0.1013 < 1.89(P_2+0.1013)$

$$Q = 226S \sqrt{\Delta P (P_2 + 0.1013)}$$

Sonic flow :  $P_1+0.1013 \geq 1.89(P_2+0.1013)$

$$Q = 113S (P_1 + 0.1013)$$

Q : Flow rate [ℓ /min(ANR)]

S : Effective area (mm<sup>2</sup>)

ΔP : Pressure differential (P<sub>1</sub>-P<sub>2</sub>) [MPa]

P<sub>1</sub> : Upstream pressure [MPa]

P<sub>2</sub> : Downstream pressure [MPa]

When the air temperature is different, multiply the flow rate calculated with the above formula by the following coefficient for compensation.

Air temperature (°C)	-20	-10	0	10	30	40	50	60
Coefficient for compensation	1.08	1.06	1.04	1.02	0.98	0.97	0.95	0.94

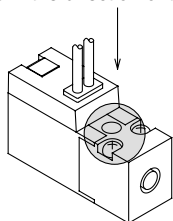
## ⚠ Warning

### Operation of Manual Override

Use caution since manual override operation will operate any connected actuators.

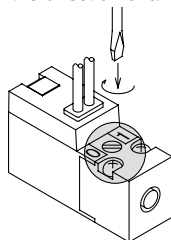
#### ■ Non-locking push type [Standard type]

Press in the direction of the arrow.

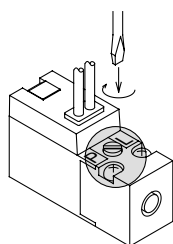


#### ■ Locking slotted type [B]

Turn in the direction of arrow.



#### ■ Push-locking slotted type [D]



#### ⚠ Caution

Gently operate locking manual override types B, D using a small screw driver.  
[Torque : 0.1N·m {1kgf/cm<sup>2</sup>} or less]

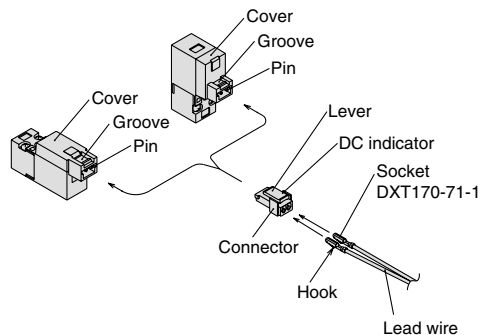
(While pressing, turn in the direction of the arrow. If you do not turn, the mechanism does not lock in position.)

## ⚠ Caution

### How to Use Plug Connector

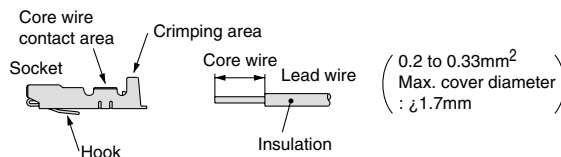
#### ① Insertion/Removal of Connector

- Insertion Push the connector straight on to the pins of the solenoid, making sure the lip of the lever securely "locks" into the groove of the solenoid cover.
- Removal Press the lever against the connector housing and pull it outward from the solenoid.



#### 2 Crimping Connection of Lead Wire and Socket

Strip 3.2 to 3.7mm of the lead wire ends, insert each stripped wire into a socket and crimp contact using special crimping tool. Be careful that the outer insulation of lead wires does not interfere with the socket contact part. (Contact SMC for special crimping tool.)



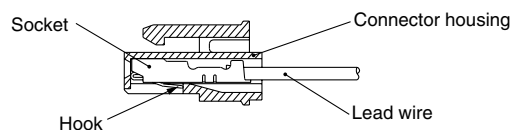
#### ③ Connection/Disconnection of Socket with Lead Wire

##### ● Connection

Insert lead wire and crimped socket into square holes (indicated as A, B, COM) of connector. Press the socket in fully until the hook of the socket locks into the groove of the connector housing. Confirm the locked position by lightly pulling on the lead wire.

##### ● Disconnection

To remove the socket from the connector, pull out lead wire while depressing the hook of the socket with a fine screwdriver. If the socket is to be re-used, reposition the hook again.



### Plug Connector Type Lead Wire Length

Standard length is 300mm, but the following lengths are also available.

#### How to Order Connector Ass'y

For DC : **SY100-30-4A**

For 100VAC : **SY100-30-1A**

For 200VAC : **SY100-30-2A**

For other voltages of AC : **SY100-30-3A**

#### How to Order

To order a valve with lead wire length of other than 300mm, indicate part nos. of the valve without connector and the required connector ass'y separately.  
(Example) 2000mm lead wire length

For DC **SY114-5LOZ**      For AC **SY114-1LOZ**  
**SY100-30-4A-20**    **SY100-30-1A-20**

#### ● Lead wire length

	300mm
<b>6</b>	600mm
<b>10</b>	1000mm
<b>15</b>	1500mm
<b>20</b>	2000mm
<b>25</b>	2500mm
<b>30</b>	3000mm
<b>50</b>	5000mm

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