



ORIGINAL INSTRUCTIONS



Refer to Declaration of Conformity for relevant Directives

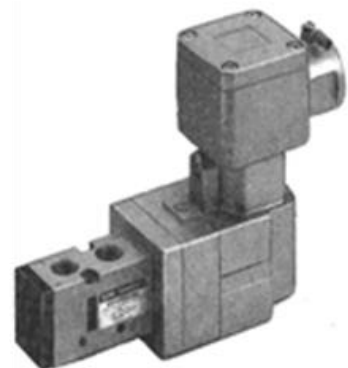
Instruction Manual

Solenoid operated 3 and 5 port valves

50-VFE/VPE-X60, 50-VFE3#90-X60 NAMUR

**ATEX Classification:**  
 II 2G Ex db IIC T6..(T5) Gb -10°C ≤ Ta ≤ +40°C(+50°C)  
 II 2D Ex tb IIIC T85°C (T100°C) Db -10°C ≤ Ta ≤ +40°C(+50°C)

Certificate reference: KEMA 09ATEX0024 X  
 'X' Special conditions of safe use apply, see section 1.2.



For ISO symbols see section 3.4.

The intended use of this product is to provide directional control to pneumatic actuators (or similar industrial pneumatic equipment).

1 Safety Instructions

1.1 General 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<sup>(1)</sup>), and other safety regulations.

<sup>(1)</sup> 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.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

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

**Warning**

- Always ensure compliance with relevant safety laws and standards.
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.
- The product is only suitable for use in Zones 1 and 2(Zones 21 and 22).
- Do not open when energised.
- Do not energise both solenoids at the same time, as this can cause higher surface temperatures than under normal operating conditions.
- Do not refurbish the flameproof joints.

1 Safety Instructions - continued

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of product. Electrostatic charges on the non-metallic parts of the equipment shall be avoided.
- Exhaust air can blow up dust and create an explosive dust atmosphere. Make sure the exhaust air is exhausted into a non-hazardous area.
- This product has components made of aluminium alloy. When mounting this product, it must be installed such that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- Use of 50-VFE3000/5000-X60 5-port valve as a 3-port valve**  
 Series 50-VFE3000/5000-X60 valves can be used as normally closed (N.C.) or normally open (N.O.) 3 port valves by closing one of the cylinder ports (A or B) with a plug (see Table 1).

Note: Do not exceed the maximum specified operating frequency.

Plug position		2(B) port (CYL.1 port)	4(A) port (CYL.2 port)
Switching type		N.C.	N.O.
Solenoid	Single		
	Double		

Table 1

1.2 Special conditions for safe use

**Warning**

- The solenoid valves are provided with special fasteners of property class A2-50.
- The manufacturer shall be contacted for information regarding the flameproof joints.

- Electrostatic charges on the non-metallic parts of the enclosure shall be avoided.

2 Specifications

2.1 General specifications

SERIES 50-VFE3000/5000-X60 SOLENOID VALVE

Series	50-VFE3000	50-VFE5000
Fluid	Air and inert gas	
Operating pressure range	2 position single	0.15 to 0.9 MPa
	3 position	
	2 position double	
Ambient and fluid temperature (No freezing)	-10 to 50°C (T5) -10 to 40°C (T6)	
Max. operating frequency <sup>(1)</sup>	2 position single	1 Hz
	2 position double	
	3 position	
Lubrication	Not required	
Mounting position	Unrestricted	
Impact/Vibration resistance <sup>(2)</sup>	150/30 m/s <sup>2</sup>	

SERIES 50-VPE500/700-X60 SOLENOID VALVE

Fluid	Air and inert gas		
Type of actuation	N.C or N.O. (convertible)		
Pilot style	Internal pilot	External pilot	
Operating pressure range	0.2 to 0.8 MPa	Supply pressure	-101.2 kPa to 0.8 MPa
		External pilot pressure	0.2 to 0.8 MPa
Ambient and fluid temperature (No freezing)	-10 to 50°C (T5) -10 to 40°C (T6)		
Max. operating frequency <sup>(1)</sup>	1Hz		
Lubrication	Not required		

Mounting position	Unrestricted
Impact/Vibration resistance <sup>(2)</sup>	150/30 m/s <sup>2</sup>

2 Specifications - continued

SERIES 50-VFE3#90-X60 NAMUR SOLENOID VALVE

Fluid	Air and inert gas
Type of actuation	N.C or N.O. (convertible)
Operating pressure range	0.15 to 0.9 MPa
Ambient and fluid temperature (No freezing)	-10 to 50°C (T5) -10 to 40°C (T6)
Max. operating frequency <sup>(1)</sup>	1Hz
Lubrication	Not required
Mounting position	NAMUR Interface
Impact/Vibration resistance <sup>(2)</sup>	150/30 m/s <sup>2</sup>

Note 1) Do not exceed the maximum specified operating frequency.

Note 2) Impact resistance: There should be no malfunction of the valve after testing along the valve axis and at right angles to the valve and armature. Carry out each test with the valve energised and de-energised (value at initial stage).

Vibration resistance: There should be no malfunction of the valve after testing using a 8.3 to 2000Hz sweep along the valve axis and at right angles to the valve and armature. Carry out each test with the valve energised and de-energised (value at initial stage).

SERIES 50-VF3-#-X60 PILOT VALVE

External connection method		Metal conduit type/ (Cable gland type)
Coil rated voltage	AC (50/60 Hz)	100, 200, 12, 24, 48, 110, 220, 240V
	DC	24, 12, 6, 48, 110V
Allowable voltage fluctuation	-15% to +10% of rated voltage	
Coil insulation type	Type B	
Apparent power	AC	Inrush 9.1VA (50Hz) 7.8VA (60Hz) Holding 6.2VA (50Hz) 4.6VA (60Hz)
	DC	3.5W 3.9W (48, 110V)
Electric circuit	Non-polar type	

Batch codes and Construction month:

The product control number is shown by two characters and two figures. The character shows Year and Month of manufacturing.

Construction	Production batch codes											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	Xo	XP	XQ	XR	XS	XT	XU	XV	XW	XX	Xy	XZ
2020	yo	yP	yQ	yR	yS	yT	yU	yV	yW	yX	yy	yZ
...	...	...	...	...	...	...	...	...	...	...	...	...
2024	Co	CP	CQ	CR	CS	CT	CU	CV	CW	CX	Cy	CZ

The figures show a serial number stamp.

This stamp indicates the year and month of production, the month of the production request and the order in which work order has been processed.

3 Installation

3.1 Installation

**Warning**

- Do not install the product unless the safety instructions have been read and understood.

3.2 Environment

**Warning**

- The product is only suitable for use in Zones 1 and 2. (Zones 21 and 22)
- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

3 Installation - continued

- When the solenoid valve is mounted in a control panel or is energised for a long time, make sure the ambient temperature is within the valve specification range.

3.3 Piping

**Caution**

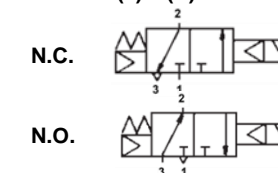
- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque, see Table 2.

Thread	Tightening Torque (N·m)
M5	1 to 1.5
1/8	3 to 5
1/4	8 to 12
3/8	15 to 20
1/2	20 to 25

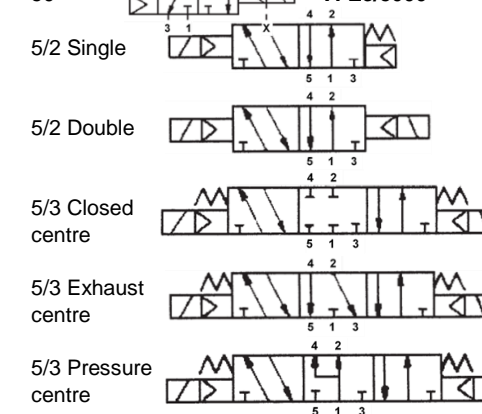
Table 2

3.4 ISO symbols

- 50-VPE5(7)42(R)



- 50-VFE3/5000



3.5 Electrical entry (see Figure 1)

- The terminal box can be rotated 300° about plane 'A'.
- Loosen screw 'C' and rotate the terminal box to the desired position.
- Re-tighten screw to lock the terminal box in position.

The cover can be rotated 360° about plane 'B'.

- Undo screw 'D' and rotate the cover to the desired position – there are 4 positions – in increments of 90°.
- Re-assemble screw to lock the cover in place.

**3 Installation - continued**

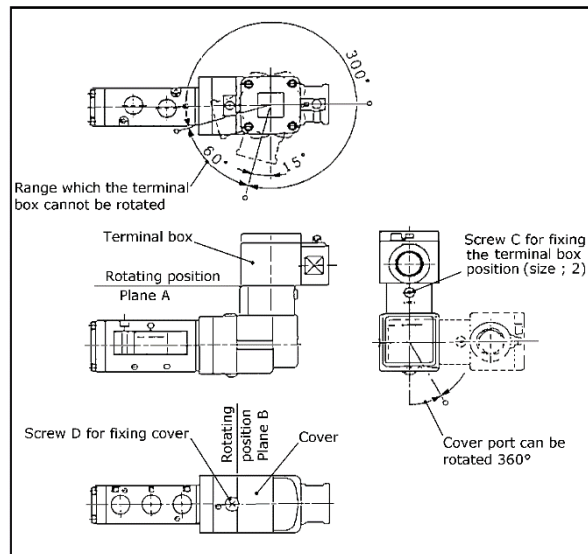


Figure 1

**3.5 Electrical Connection**

**Caution**

- The power supply should be fitted with a switch or circuit breaker in close proximity to the equipment and within easy reach of the operator. It shall be clearly marked as the disconnecting device for the equipment.
- Avoid mis-wiring, as this can cause malfunction, damage and fire to the product.
- Use voltage that is within -15% to +10% of the rated voltage. Application of incorrect voltage may cause malfunction or damage.
- Use electrical circuits that do not generate chattering in their contacts.
- Do not bend or pull cables repeatedly.
- The power supply should be fitted with a suitable fuse, see Table 3.

Voltage		Appropriate fuse (Amps)
AC (50/60Hz)	100, 200, 12, 24, 48, 110, 220, 240V	1.5
DC	24, 12, 6, 48, 110V	

Table 3

- When connecting C-R element parallel to switching element, leakage current flows through C-R element and the leakage voltage increases.

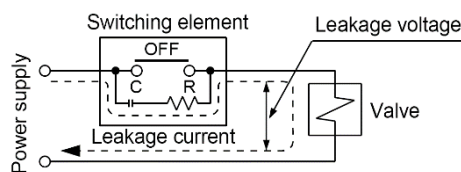


Figure 2

Ensure that the voltage leakage across the coil is as follows:

With AC coil: 15% or less of rated voltage.

With DC coil: 3% or less of rated voltage

**Danger**

- **Disconnect power supply before removing or making electrical connections.**
- **Cable entry must be made using metal conduit or cable gland, see Figure 5 and Figure 7.**

**Assembly of terminals to cable**

- Use cables with insulated wires, stranded, 1.04 to 2.63 mm<sup>2</sup>.
- Terminate wires using crimp terminals (part number V2-M4 – made by J.S.T.MFG.CO.,LTD or equivalent) to suit M4 screws.
- Use crimping tool to attach terminals (part number YNT-1614 – made by J.S.T.MFG.CO.,LTD or equivalent).

**3 Installation - continued**

- After crimping, check the crimp by slightly pulling the insulated wire.
- Internal earthing: Use at least 2.63 mm<sup>2</sup> or large wire

**Assembly of external ground terminal to cable**

- Use cables with insulated wires, stranded, 4 to 6.64 mm<sup>2</sup>.
- Terminate wires using crimp terminals (part number V5.5-S4 – made by J.S.T.MFG.CO.,LTD or equivalent) to suit M4 screws.
- Use crimping tool to attach terminals (part number YNT-1210S – made by J.S.T.MFG.CO.,LTD or equivalent).
- After crimping, check the crimp by slightly pulling the insulated wire.

**Assembly of cable to valve**

- Ensure cables have correct crimp terminals to suit M4 screws.
- Ensure the terminal box is locked in position.
- Remove the four M4 x 10 screws and carefully remove terminal cover ensuring mating surfaces are not damaged.
- Feed cable through cable entry and attach wires to valve using M4 x 6 round head screws with M4 washers.
- Ensure wires are correctly connected to the corresponding terminals.
- Replace terminal cover, ensuring mating surfaces are not damaged, and torque tighten cover screws to 1.35 to 1.45 N•m.

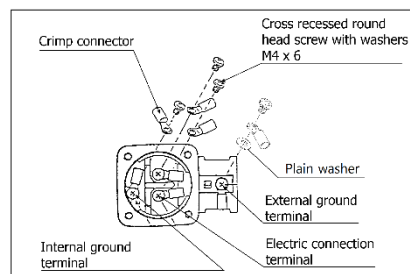


Figure 3

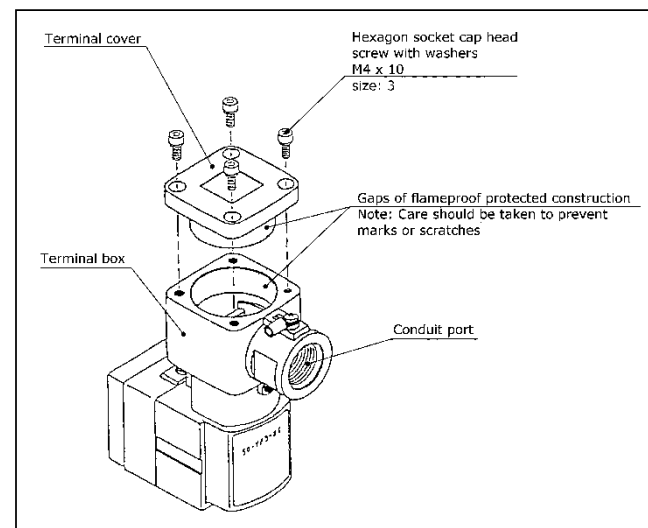


Figure 4

**Metal conduit threaded type entry**

- Metal conduit should be heavy gauge steel with parallel M20 thread.
- Ensure a minimum engagement of five full threads and secure with locknut.
- During assembly, prevent excessive force being applied to the solenoid valve, by using a spanner on the flats provided on the valve.
- In humid environment, coat the threads with a liquid gasket.

**3 Installation - continued**

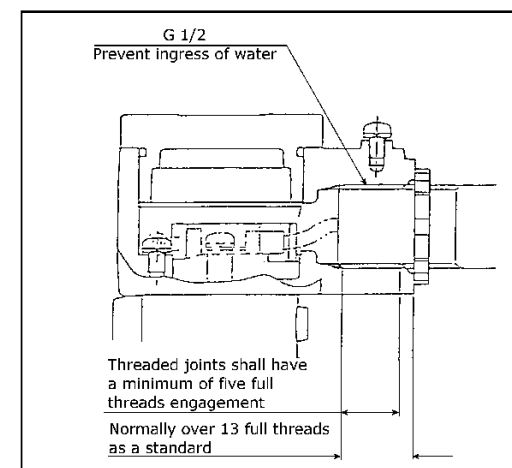


Figure 5

Be sure to protect the cable used for earth from twisting.

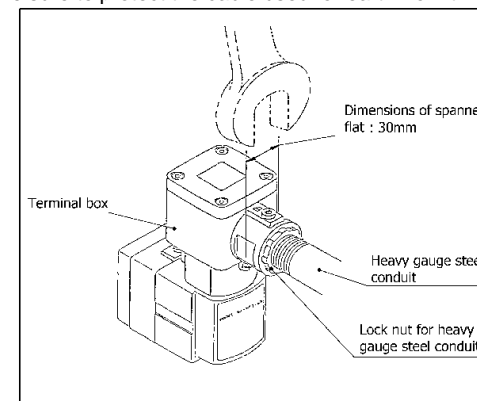


Figure 6

**Flameproof enclosure cable gland (not supplied) type entry**

- The cable gland connector must have the following certification.

ATEX	II 2 G Ex db IIC Gb
	II 2 D Ex tb IIIC T85°C...T100°C Db

- Select cable gland connector applicable to flexible cable O/D and with a parallel M20 or 1/2 NPT thread.
- Follow instructions supplied with cable gland on how to assemble to cable.
- Ensure a minimum engagement of five full threads and secure with locknut.
- During assembly, prevent excessive force being applied to the solenoid valve, by using a spanner on the flats provided on the valve.
- In humid environment, coat the threads with a liquid gasket.
- Use a cable and cable gland rated for at least +90°C for temperature class T5.

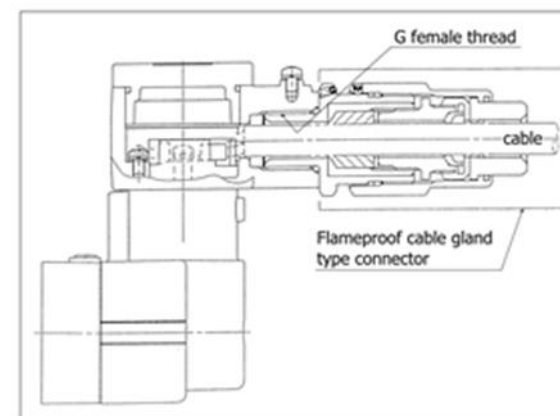


Figure 7

**3 Installation - continued**

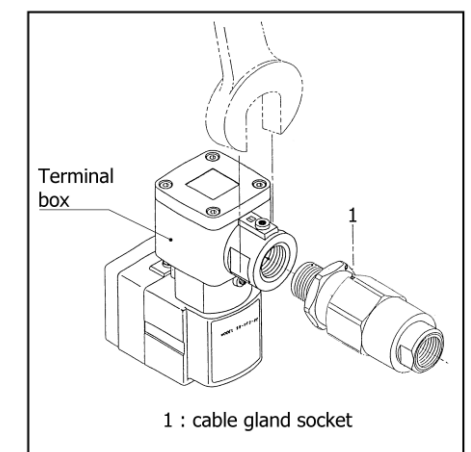


Figure 8

**3.6 Lubrication**

**Caution**

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, refer to catalogue for details.

**4 Settings**

**4.1 Manual Override**

**Caution**

- Since connected equipment will operate when the manual override is activated, confirm that conditions are safe prior to activation.

**Non-locking push type (tool required)**

- Push down the manual override button with a small screwdriver, etc. until it stops ON.
- Hold this position for the duration of the check (ON position).
- The manual override will return when released to the OFF position.

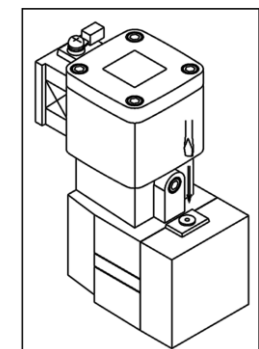


Figure 9

**Slotted locking push type (tool required)**

- Push down the manual override button with a small flat head screwdriver until it stops and turn 90° clockwise to lock (ON position).
- Turn anti-clockwise to release to the OFF position.

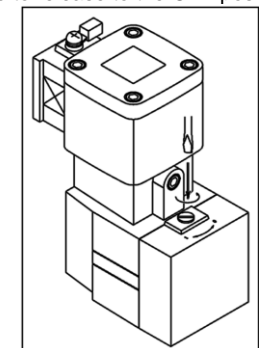


Figure 10

### 4 Settings - continued

#### 4.2 Change of Actuation

50-VPE500-X60 and 50-VPE700-X60 Body ported

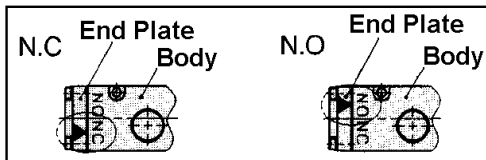


Figure 11

- When changing the actuation from normally closed to normally open type, remove the end plate from the body and reset the ▼ mark on the end plate to correspond with the 'NO' mark on the body as shown in Figure 11.
- Refer to Table 4 for piping.

Actuation	Port	1(P)	2(A)	3(R)
N.C.		Inlet side	Outlet side	Exhaust side
N.O.		Exhaust side	Outlet side	Inlet side

Table 4

### 5 How to Order

Please contact SMC for details.

### 6 Outline Dimensions

Please contact SMC for details.

### 7 Maintenance

#### 7.1 General Maintenance



- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.

- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

#### 7.2 Mounting



- Never add or remove a valve from the manifold when energised.
- Never remove terminal box cover when power is connected to the manifold.
- Never disconnect or reconnect cables or connectors when power is connected to the valves.



- Be sure to cut off power and the air supply and confirm that no air is left in actuators, piping and manifolds before disassembling, as remaining air may cause an accident.
- Before assembly and installations, confirm that rubber parts such as gaskets and O rings are assembled to every block. If rubber parts are missing, air leakage may occur.

#### Manifold 50-VFE-X60:

##### Removal of valve

- Remove screws and gently lift valve from manifold.
- Ensure gasket and spacer are not misplaced or damaged.
- Disconnect electrical connection.

### 7 Maintenance - continued

#### Assembly of valve

- Reconnect the electrical connection.
- Assemble valve to the manifold in the correct orientation, ensuring spacer and all gaskets are present.
- Torque tighten screws to torque shown in Table 5.

Valve Series	Appropriate tightening torque N•m
50-VFE3000	1.3 to 1.5
50-VFE5000	1.3 to 1.5

Table 5

#### 50-VFE-X60 Valve mounting:

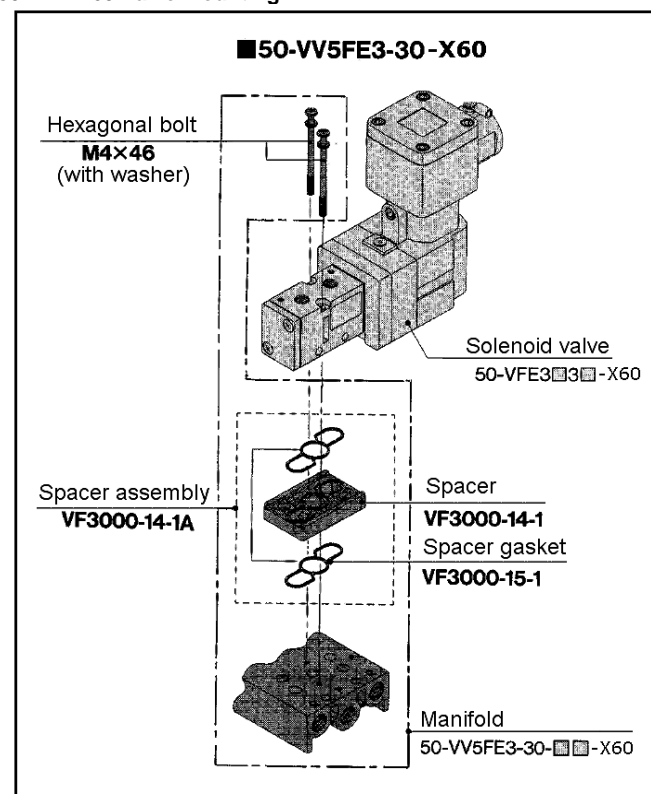


Figure 12

### 7 Maintenance - continued

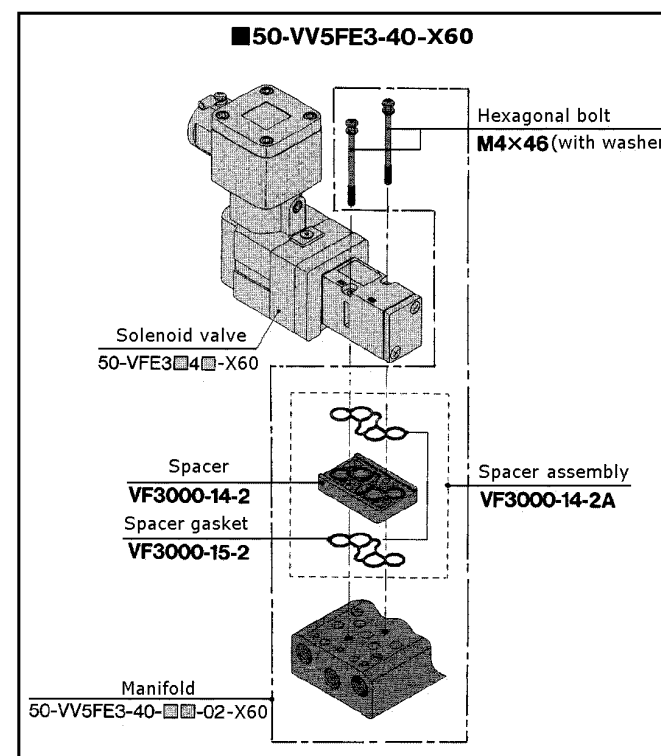


Figure 13

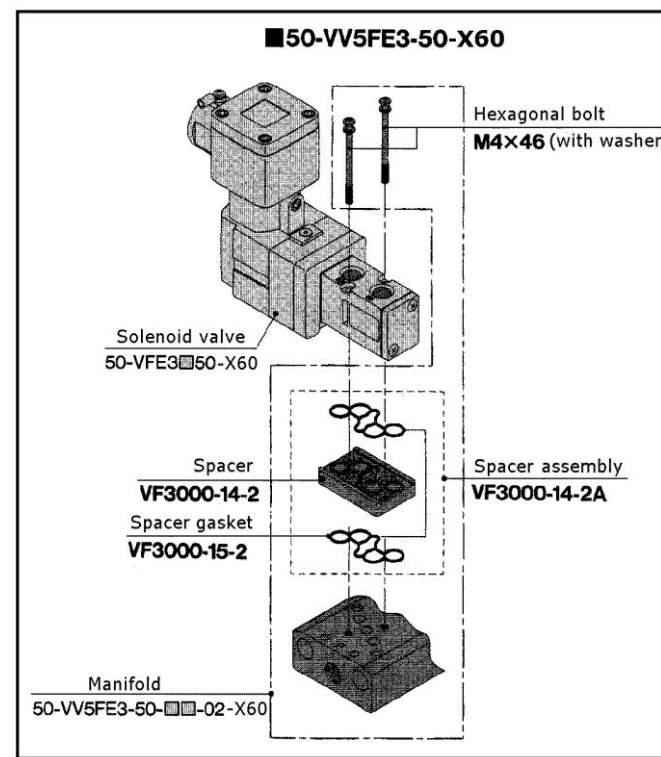


Figure 14

### 7 Maintenance - continued

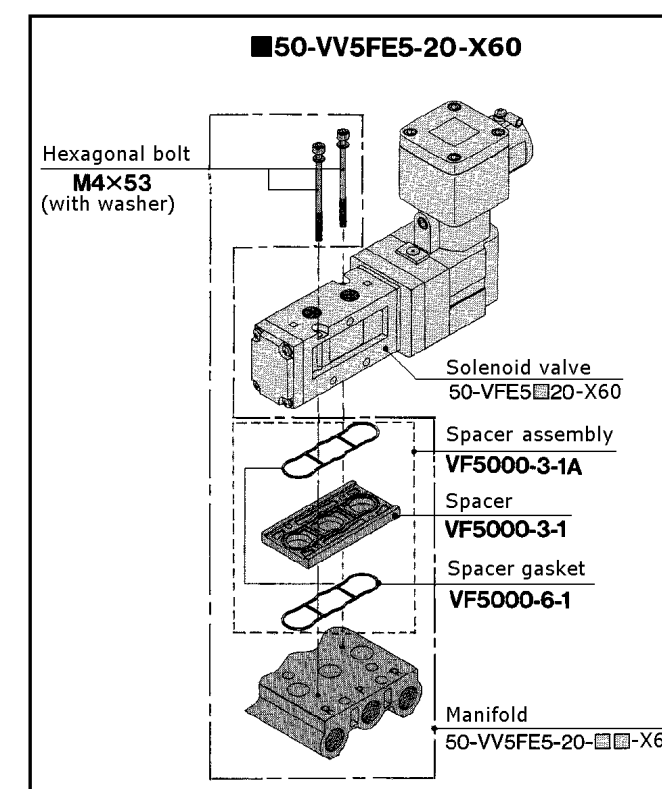


Figure 15

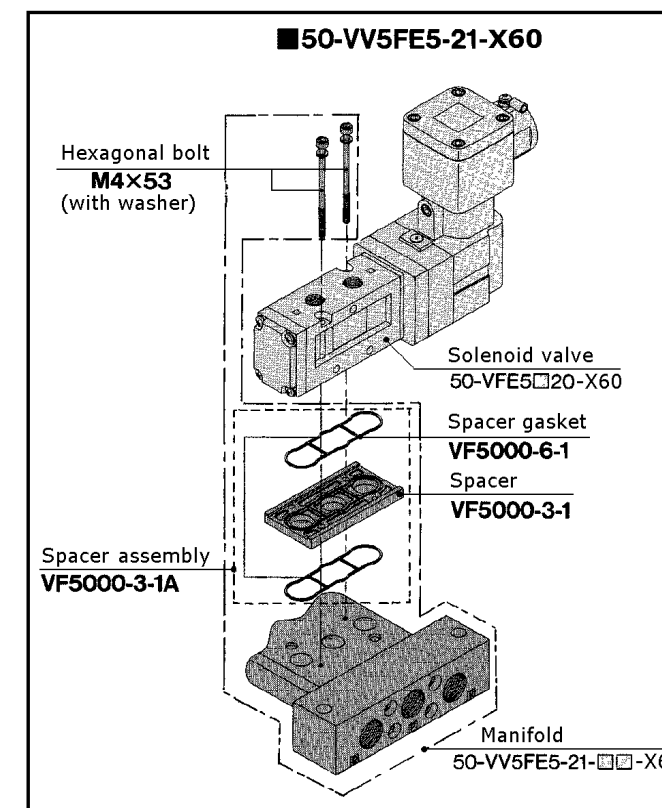


Figure 16

## 7 Maintenance - continued

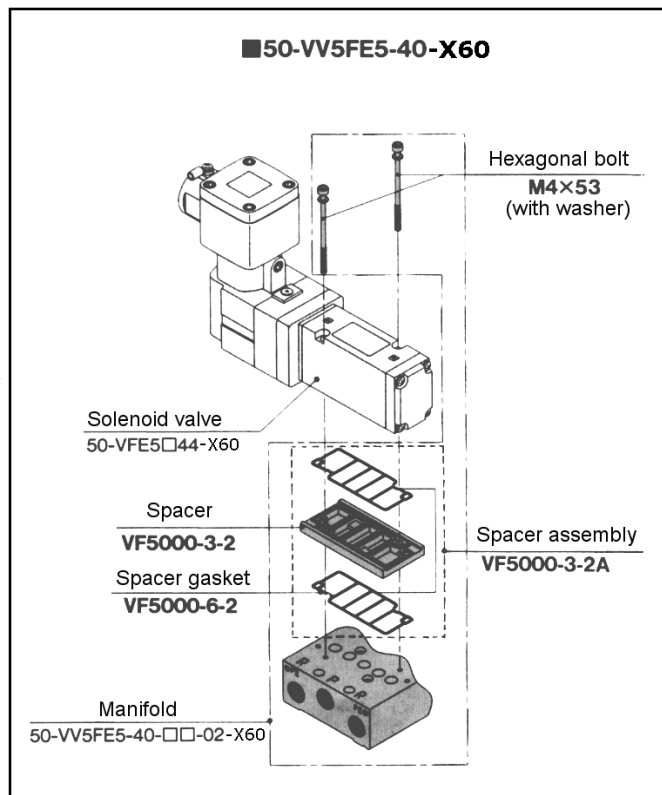


Figure 17

### 50-VFE3190-X60 NAMUR Valve mounting:

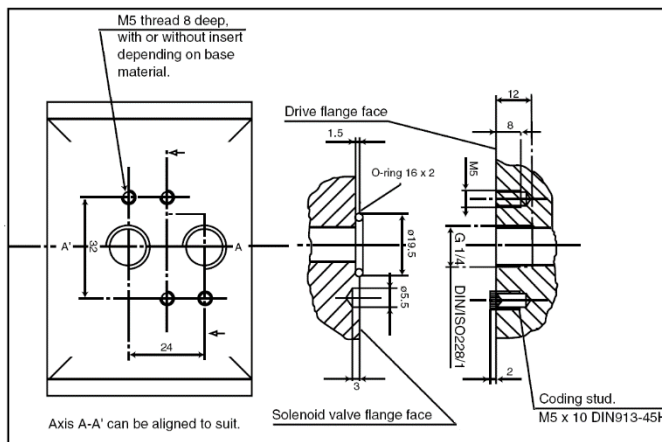


Figure 18

- The NAMUR solenoid valve can be attached with 2 mounting bolts.
- The position of the coding stud hole is up to the manufacturer and thus also determines the location of the coding stud.

### Caution

- Ensure all gaskets are present before mounting valves.
- Do not let foreign matter stick to gaskets or sealing faces of the valve to avoid air leaks.

## 8 Limitations of Use

### 8.1 Limited warranty and Disclaimer/Compliance Requirements

- Refer to Handling Precautions for SMC Products.

### Warning

- Refer to the ATEX classification for the product.
- The product is suitable for use in ATEX Zones 1 and 2 (Zones 21 and 22) applications only.
- Do not operate the valves above the maximum specified operating frequency of 1 Hz.
- When using this product, always consider the risks associated with the gaseous and dusty environment in the area of use and ensure that measures are taken to reduce these risks.

## 9 Product disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

## 1 Contacts

Refer to [www.smcworld.com](http://www.smcworld.com) or [www.smc.eu](http://www.smc.eu) for contacts.

## SMC Corporation

URL : <http://www.smcworld.com> (Global) <http://www.smc.eu> (Europe)  
 SMC Corporation, Akihabara UD $\times$ 15F, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101 0021  
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