



# Installation and Maintenance Manual

## Series VKF300

### 3 Port Direct Operated Poppet Solenoid Valve



Read this manual before using this product.

- The information within this document is to be used by pneumatically trained personnel only.
- For future reference, please keep manual in a safe place.
- This manual should be read in conjunction with the current catalogue.

## 1 SAFETY RECOMMENDATION

### 1.1 General recommendation

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.

Note1: ISO 4414: Pneumatic fluid power - General rules relating to systems.

Note2: JIS B 8370: Pneumatic system axiom.



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



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



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



### WARNING

- 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.
- 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.
- Do not service machinery/equipment or attempt to remove components until safety is confirmed.**
  - Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
  - 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.
  - 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 backpressure, i.e. incorporate a soft-start valve).
- Contact SMC if the product is to be used in any of the following conditions:**
  - Conditions and environments beyond the given specifications, or if product is used outdoors.
  - Installations on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
  - 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.

### 1.2 Conformity to standard

This product is certified to and complies with the following standards:

EMC Directive	EN 61000-6-2, EN 55011
Low Voltage Directive	DIN VDE 0580

## 2 INTENDED CONDITIONS OF USE

### 2.1 Specifications

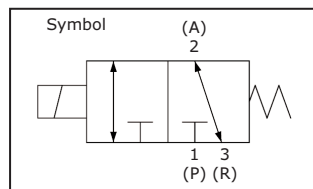
Valve specifications		
Type of operation	Direct operated 2 position single solenoid	
Operating fluid	Air	
Operating pressure range	Standard	0~0.7MPa
	Vacuum	-101.2kPa~0.1MPa
Ambient and fluid temperature	Maximum 50°C	
Response time <sup>Note 1)</sup>	Standard	10ms or less
	Low power consumption	15ms or less
Manual operation	Non-lock push style	
Lubrication	Not required	
Mounting position	Unrestricted	
Impact resistance/vibration resistance <sup>Note 2)</sup>	300/50 m/s <sup>2</sup>	
Enclosure	Dust proof	

Note 1) In accordance with dynamic performance test of JIS B 8374-1981 (coil temperature 20°C, at rated voltage, without surge voltage suppressor)

Note 2) **Impact resistance:** No malfunction resulted from test using a drop impact tester. The test was performed one time each in the axial and right angle directions of the main valve and armature, for both energized and de-energized status  
**Vibration resistance:** No malfunction resulted in a 45 to 2000Hz one sweep test performed in the axial and right angle directions of the main valve and armature, for both energized and de-energized status.

Electrical specifications			
Electrical entry		Grommet (G), DIN terminal (D)	
Rated voltage	AC	100V, 110V, 200V, 220V, 240V	
	DC	6V, 12V, 24V, 48V	
Allowable voltage fluctuation		±10% of rated voltage	
Apparent power (AC)	Standard	Starting	9.5VA/50Hz, 8VA/60Hz
		Holding	7VA/50Hz, 5VA/60Hz
Power consumption (DC)	Without light	4W (standard), 2W (low power consumption type)	
	With light	4.3W (standard), 2.3W (low power consumption type)	
Surge voltage suppressor	AC	Varistor	
	DC	Diode (varistor for 12VDC or less)	
Indicator light	AC	Neon bulb	
	DC	LED	

### 2.2 Circuit Symbols



## 3 INSTALLATION



### WARNING

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

### 3.1 Environment



### WARNING

- Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.
- Do not use in an explosive atmosphere.
- The product should not be exposed to prolonged sunlight. Use a protective cover.
- Do not mount the product in a location where it is subject to strong vibrations and/or shock. Check the product specifications for above ratings.
- Do not mount the product in a location where it is exposed to radiant heat.

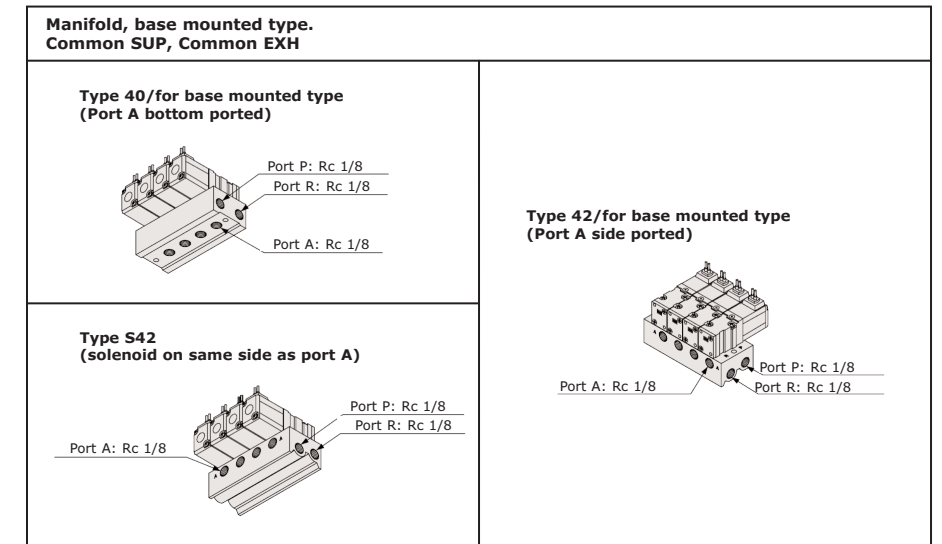
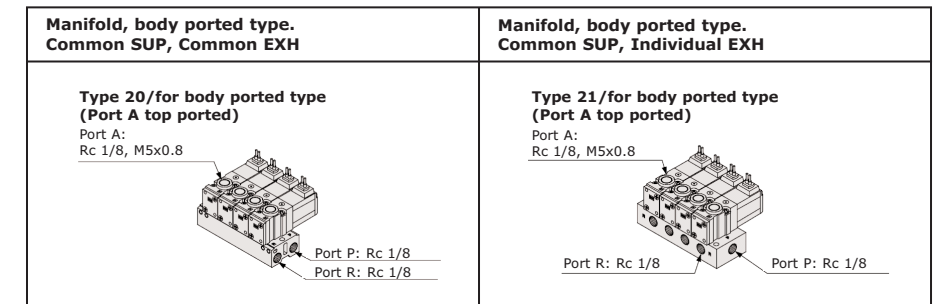
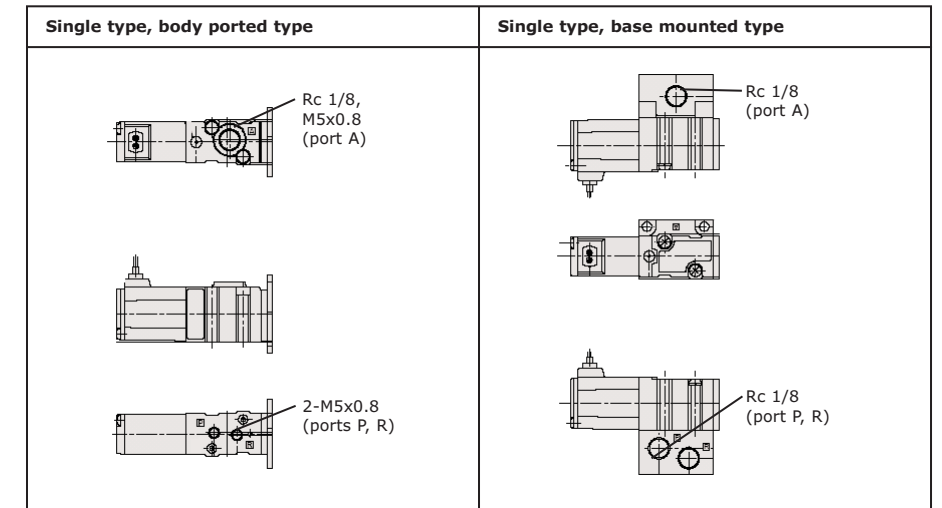
### 3.2 Piping



### CAUTION

- Before piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fitting into a port, ensure that sealant material does not enter the port inside. When using seal tape, leave 1.5 to 2 threads exposed on the end of pipe/fitting.

Thread	Appropriate tightening torque (Nm)
M5	1.5 to 2
Rc 1/8	7 to 9



### 3.3 Electrical connection

#### CAUTION

- When DC power is connected to a solenoid valve equipped with light and/or surge voltage suppressor, check for polarity indications.
- For polarity indications:
  - No 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 does not switch.

#### CAUTION: Light/surge voltage suppressor

#### CAUTION: Connection of 24V or more DC

	Grommet type (G)	DIN terminal (D)	Part No. symbol
AC	Without light	No.1 ♂ No.2 ♀	S
	With light	None	Z
12 VDC or less	Without light	No.1 ♂ No.2 ♀	S
	With light	None	Z
24 VDC or more	Without light	No.1 ♂ (+) No.2 ♀ (-)	S
	With light	None	Z

For the grommet type, connect the positive (+) side to the red lead wire and connect the negative (-) side to the black lead wire. For the DIN terminal, connect the positive (+) side to the connector's No.1 terminal and connect the negative (-) side to the No.2 terminal. (See the markings on the terminal block.)

- For 12V or less DC, positive (+) and negative (-) can be connected in either direction.

Grommet type	DIN terminal

* Markings	
For AC and 12V or less DC	For 24V or more DC

### 3.4 Mounting

#### CAUTION

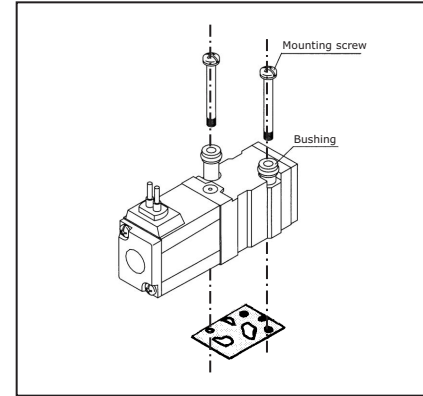
- After confirming the installation of the gaskets, securely tighten the screws to the tightening torque shown in the table below:

Appropriate tightening torque (Nm)
0.6 to 0.8

The bushing may be damaged if the tightening torque of 0.8Nm is exceeded. In the event that damage does occur, be sure to replace the bushing.

Bushing assembly part no.	VKF300-6A-1
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- 2 sets per unit are required.



### 3.5 Lubrication

#### CAUTION

- SMC products have been lubricated for life at manufacturer, and do not require lubrication in service.
- If a lubricant is used in the system, use turbine oil Class 1 (no additive), ISO VG32. Once lubricant is used in the system, lubrication must be continued because the original lubricant applied during manufacturing will be washed away.

## 4 SETTINGS AND PROGRAMMING

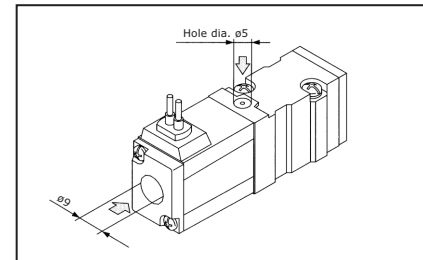
### 4.1 Manual override operation

#### WARNING

- When the manual override is operated, connected equipment will be actuated. Confirm safety before operating.

Non-locking push type (tool required)

There are manual overrides in 2 directions, on the top and on the side (solenoid side). By pressing either of the manual overrides in the direction of the arrow (→) until it stops (approx. 1mm), it will turn ON, and it turns OFF when released.



## 5 MAINTENANCE

#### WARNING

- Not following proper procedures could cause the product to malfunction and could lead to damage to the equipment or machine.
- If handled improperly, compressed air can be dangerous. Assembly, handling and repair of pneumatic system should be performed by qualified personnel only.
- Drain: remove condensate from the filter bowl on a regular basis.
- Shut-down before maintenance: before attempting any kind of maintenance make sure the supply pressure is shut off and all residual air pressure is released from the system to be worked on.
- Start-up after maintenance: apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, please verify product set-up parameters.
- Do not make any modification to the product
- Do not disassemble the product, unless required by installation or maintenance instructions.

### 5.1 Manifold mounting

Refer to paragraph 3.4, for mounting valves onto manifolds.

## 6 LIMITATIONS OF USE

#### WARNING

- Do not exceed any of the specifications laid out in section 2 of this document or the specific product catalogue.

#### Long continuous loading time

When power will be applied continuously for extended periods of time, use type VKF33\*E. However, it cannot be used with high frequency. Contact SMC if it will be operated more than once a day.

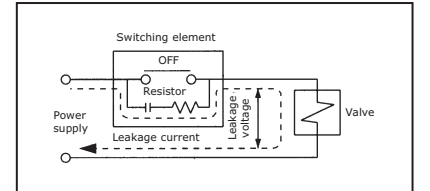
Be sure to perform switching at least once every 30 days.

#### CAUTION

#### Leakage voltage

Particularly when using a resistor in parallel with a switching element, take note that leakage voltage will increase due to leakage current flowing through the resistor. Limit the amount of residual leakage voltage to the following values.

For AC coil: 20% or less of rated voltage  
For DC coil: 2% or less of rated voltage



#### Low temperature operation

Operation is possible to -10°C, but measures should be taken to avoid solidification or freezing of drainage and moisture, etc.

#### Mounting orientation

The mounting orientation is unrestricted.

## 7 EUROPEAN CONTACT LIST

### SMC Corporation

Country	Telephone	Country	Telephone
Austria	(43) 2262-62 280	Italy	(39) 02-92711
Belgium	(32) 3-355 1464	Netherlands	(31) 20-531 8888
Czech Republic	(420) 5-414 24611	Norway	(47) 67 12 90 20
Denmark	(45) 70 25 29 00	Poland	(48) 22-548 50 85
Finland	(358) 9-859 580	Portugal	(351) 22 610 89 22
France	(33) 1-64 76 1000	Spain	(34) 945-18 4100
Germany	(49) 6103 4020	Sweden	(46) 8-603 0700
Greece	(30) 1- 342 6076	Switzerland	(41) 52-396 3131
Hungary	(36) 1-371 1343	Turkey	(90) 212 221 1512
Ireland	(351) 1-403 9000	United Kingdom	(44) 1908-56 3888

### Websites

SMC Corporation	www.smcworld.com
SMC Europe	www.smceu.com

#### CAUTION: Use of DIN Connector

#### Connection procedure

Loosen the holding screw, and pull the connector out of the solenoid valve terminal block.

After removing the holding screw, insert the flat head screw driver, etc. into the notch on the bottom of the terminal block and pry it up, separating the terminal block and the housing.

Loosen the terminal screws (slotted screws) on the terminal block, insert the core of the lead wire into the terminal in accordance with the prescribed connection method, and attach securely with the terminal screws.

Fasten the cord by screwing in the gland nut.

#### Cord entry changing procedure

After separating the terminal block and housing, the cord entry direction can be changed by attaching the housing in the desired direction (4 directions in 90° increments).

\*When equipped with light, handle with care so that the light is not damaged by the cord's lead wires, etc.

#### Precautions

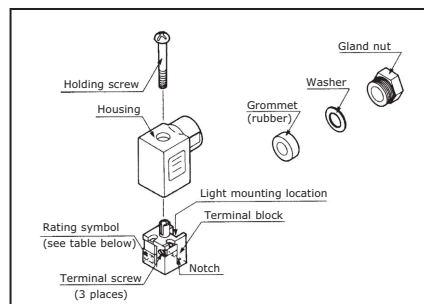
The connector should be inserted and pulled out in a straight line without tilting diagonally.

#### Compatible cables

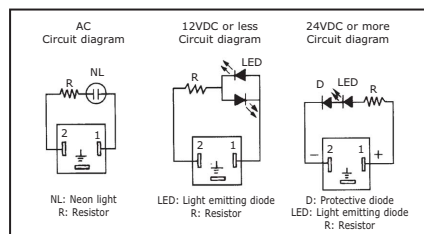
Cord outside diameter: ø4 to ø6.5 (Reference)  
0.5mm<sup>2</sup> equivalent to JISC3306, 2 wire or 3 wire

#### Connector part no.: VK300-37-1

#### Part No. for connector with light



#### Circuit diagram for connector with light



Rated voltage	Rating symbol	Part No.
100VAC	A1	VK300-37-2-01
200VAC	A2	VK300-37-2-02
240VAC	A3	VK300-37-2-07
6VDC	LW06	VK300-37-4-51
12VDC	LW2	VK300-37-4-06
24VDC	LD4	VK300-37-3-05
48VDC	LD8	VK300-37-3-53