042A/Eng VQ20,30-TFM31

Installation and Maintenance Manual Series VQ20/30 2 Port Solenoid Valves

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

This manual should be read in conjunction with the current valve 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. **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.

Specifications (Fig 1)

	Series		VQ20		VQ30	
Valve specification	Valve type		Pilot type 2 port poppet type			
	Fluid		Air, inert gas			
	Min. operating pressure		0.01MPa (0.1 kgf/cm²)			
	Max. operating pressure		0.6MPa (6.1 kgf/cm²)		0.5MPa (5.1 kgf/cm²)	
	Effective area (Cv/Effective orifice)	C6	7.2mm² (Cv0.4ø3)	C10	14.4mm² (Cv0.8/ø4.3)	
		C8	9mm² (Cv0.5ø3.4)	C12	17.5mm² (Cv1/ø4.8)	
	Body orifice		ø6		ø13.8	
	Response time Note 1)		5ms or less		20ms or less	
	Max. operating frequency		100cps		30cps	
	Ambient and fluid temperature		-10 to 50°C Note 2)			
	Lubrication		Not required			
	Manual override		Locking type (tool type) Note 3)			
	Shock resistance/vibration resistance		150/30m/s2 Note 4)			
	Enclosure		IP65 Note 5)			
	Mounting position		Free			
	Weight		46g		80g	
Solenoid specification	Coil rated voltage		12, 24VDC 100VAC Note 6)			
	Allowable voltage		±10% of rated voltage			
	Coil insulance		Class B			
	Power consumption (Current value)	24VDC	2.5WDC (104mA)			
		12VDC	2.5WDC (208mA)			
		100VAC	Inrush: 2VA (20mA) Holding: 2VA (20mA)			
	Electrical entry		Grommet, DIN terminal			

Note 1: Subject to JISB8375-1981. Supply pressure 0.5MPa (5.1 kgf/cm²) value is without light and surge suppressor.
Note 2: Use dry air to prevent dew condensation when operating at low temperature.
Note 3: Manual override is available only for DIN terminal type.
Note 4: Vibration resistance - - - - -No malfunction from test with 8.3 to 2000Hz 1 sweep, to axis and right angle direction of main valve and armature, each one time when energised and de-energised.
Shock resistance - - - - - - -No malfunction from test using drop impact tester, to axis and right angle direction of main valve and armature, each one time when energised and de-energised.
Note 5: DIN terminal type: Dust tight, jet proof (equivalent to IP65).
Note 6: Coil rated voltage 100VAC for DIN terminal type only.

Installation

⚠ **WARNING**

Ensure all air and power supplies are ISOLATED before commencing installation.
Do not install these valves in explosive atmospheres.
If a valve is to be exposed to oil and/or water droplets ensure that they are protected.
If it is intended to energise a valve for an extended period of time please consult SMC.
Since the valve may have a slight internal air leakage, it may NOT be suitable for holding pressure/vacuum in a vessel.
This valve is NOT intended to be used as an emergency 'Dump Valve'.

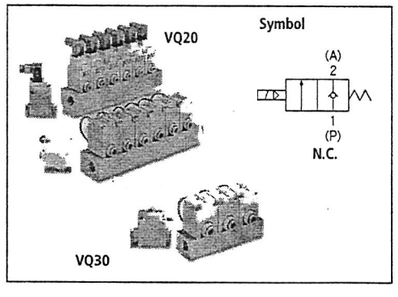
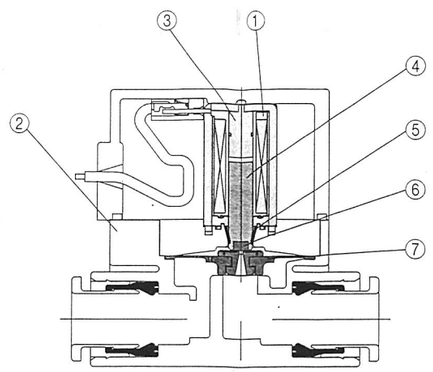


Fig 1

Construction (Fig 2)



Parts list

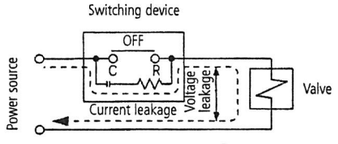
No.	Description	Material
1	Solenoid coil	-
2	Body	Resin
3	Fixed armature	Stainless steel
4	Operating armature	Stainless steel
5	Return spring	Stainless steel
6	Poppet	NBR
7	Diaphragm assembly	NBR/Resin

Fig 2

⚠ **CAUTION**

Leakage voltage (Fig 3)

Note that where a C-R device is used in parallel with a switching element, voltage leakage will increase due to the fact that current leakage passes through the C-R element.



AC coil: 10% or less of rated voltage
DC coil: 2% or less of rated voltage

Fig 3

Manual override (Fig 4)

Locking (Fig 4)

⚠ **WARNING**

Before operating any manual override button ensure ALL safety precautions are in place as connected equipment will commence operation.
Push down on the manual override button (Fig 4), with a small screwdriver until it stops. Continue to hold the button down whilst turning the button through 90° clockwise.
Remove the screwdriver.

⚠ **WARNING**

In this position the manual override is 'held' in the ON condition.

Un-Locking (Fig 4)
Replace small screwdriver into the slot in the override button.
Turn the screwdriver through 90° anti-clockwise.
Remove the screwdriver and the override will be un-locked.

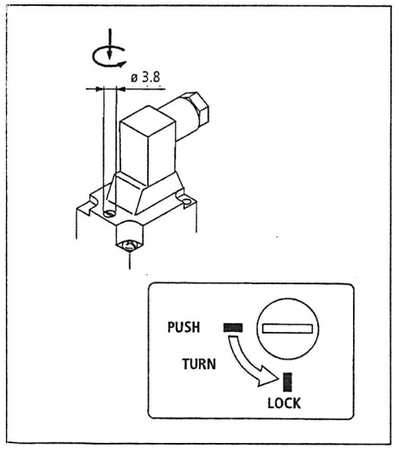


Fig 4

⚠ **CAUTION**

Electrical connection (Fig 5)

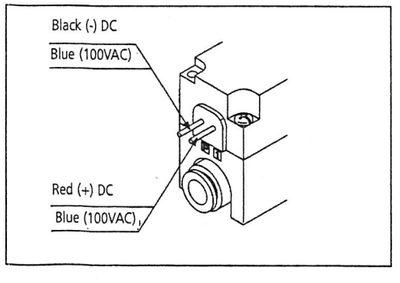


Fig 5

Wiring the DIN Connector Fig 6 (ISO 43650C 8mm pin centres)

Unscrew the top screw (Fig 6) and remove the connector housing from the spade terminals.
Remove the housing screw and insert a screwdriver into the slot area on the underside of the DIN cap and carefully separate block and housing.
Loosen the terminal screws (Fig 6) of the block and insert stripped lead wires in accordance with the wiring diagram. Secure each wire by re-tightening the terminal screws.
Tighten the housing grommet nut to secure the cable wire.

Note: Once the housing is separated from the terminal block it can be rotated in any direction through 90° increments to change the orientation of the electrical entry.

⚠ **CAUTION**

1. When using the indicator light option exercise care so as NOT to damage the light with the lead wires.
2. Ensure that the connector is pulled out from the housing in a straight line and never at an angle.

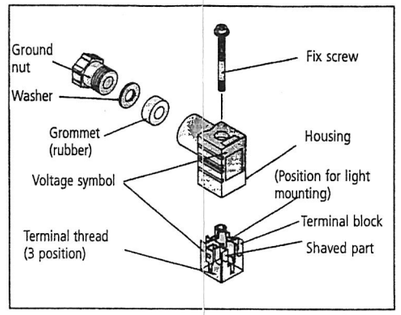


Fig 6

DIN connector circuit with LED (Fig 7)

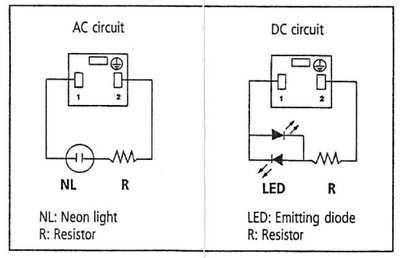


Fig 7

Lamp and surge voltage suppresser circuit (Fig 8)

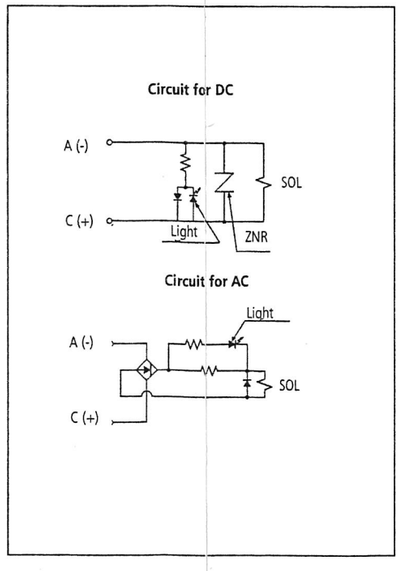


Fig 8

⚠ **CAUTION**

Manifold version

DIN rail removal/fitting (Fig 9)

To mount manifold to DIN rail place the hook of the DIN rail bracket on the 'B' side of the of the DIN rail (Fig 9).
Push side 'A' onto the DIN rail and tighten the clamp screw.
Tightening torque is 0.3 to 0.4Nm (3 to 4 kgf/cm).

Removing from a manifold (Fig 9)

Loosen the clamp screw on the 'A' side of both ends of the manifold. Lift the 'A' side of the manifold off of the DIN rail and slide in the direction of the 'B' side.

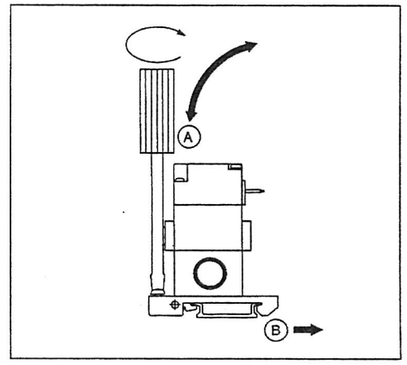


Fig 9

Valve mounting (Fig 10)

Confirm that the gasket is correctly placed under the valve.
Tighten the valve retaining screws to the appropriate torque (0.2 to 0.23Nm).

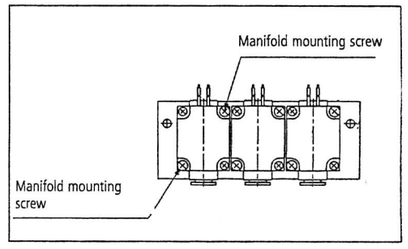


Fig 10

⚠ **CAUTION**

Maximum number of valves that can be operated simultaneously

Series	P port one side supply	P port both sides supply
VQ20	4	8
VQ30	2	4

If the max. number of valves simultaneously operated exceeds the numbers above, the effective flow rates will be reduced.

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