

Instruction Manual

QSB63P and QSB100P Pneumatically Operated Valves with Reed Switches

Description	Item Number
QSB63P Pneumatically Operated Valve with Reed Switch	B424-09-000
QSB100P Pneumatically Operated Valve with Reed Switch	B426-09-000





Declaration of Incorporation

We, Edwards,
Innovation Drive,
Burgess Hill,
West Sussex,
RH15 9TW, UK

declare under our sole responsibility, as manufacturer and person within the EU authorised to assemble the technical file, that the machine(s)

Quarter Swing Butterfly Valves:

QSB 63 Pneumatic	B42403000
QSB 63 Pneumatic with reed switches	B42409000
QSB 100 Pneumatic	B42603000
QSB 100 Pneumatic with reed switches	B42609000
QSB 160 Pneumatic	B42803000
QSB 160 Pneumatic with reed switches	B42809000
QSB 250 Pneumatic	B43003000

to which this declaration relates is intended to be incorporated into other equipment and not to function independently. The machine(s) must not be put into service until the equipment into which it is incorporated has been brought into conformity with the provisions of the Machinery Directive, 2006/42/EC.

The machine(s) is in conformity with the following standard(s) or other normative document(s)

EN50581:2012 Technical Documentation for the Assessment of Electrical and Electronic Products with respect to the Restriction of Hazardous Substances

and fulfils all the relevant provisions of

2011/65/EU Restriction of Certain Hazardous Substances (RoHS) Directive

The relevant essential requirements of the Machinery Directive 2006/42/EC Annex 1 have been applied and fulfilled so far as practicable for this partly completed machinery. The relevant technical documentation has been compiled in accordance with Annex VII Part B. In response to a reasoned request by the national authorities, Edwards Ltd undertakes to provide relevant information on the partly completed machinery (via email).

Note: This declaration covers all product serial numbers from the date this Declaration was signed onwards.



Larry Marini, Senior Technical Manager

26.04.2016, Eastbourne

Date and Place

This product has been manufactured under a quality management system certified to ISO 9001:2008

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1 INTRODUCTION

1.1 Scope and definitions

This manual provides installation, operation and maintenance instructions for the QSB63P and QSB100P Pneumatically Operated Quarter Swing Butterfly Valves. You must use the valve as specified in this manual.

Read this manual before you install and operate your valve. Important safety information is highlighted as WARNING and CAUTION instructions; you must obey these instructions. The use of WARNINGS and CAUTIONS is defined below.



WARNING

Warnings are given where failure to observe the instruction could result in injury or death to people.

CAUTION

Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment and process.

The units used throughout this manual conform to the SI international system of units of measurement.

1.2 Description

The QSB quarter swing butterfly valves are quick-acting, high conductance isolation valves designed for use in the pressure range of 3 bar absolute to 1×10^{-8} mbar (3×10^5 to 1×10^{-6} Pa). The valves will resist atmospheric pressure in either direction.

The valves have a polished stainless steel flanged body with a fluoroelastomer 'O' ring sealed butterfly type plate and shaft. The valve-plate 'O' ring groove is vented to help maintain a stable high vacuum. The valve-shaft 'O' rings and bearings are lubricated with Fomblin grease to prevent gas bursts from behind the shaft seals.

The valves are fitted with reed switches on the pneumatic cylinder which indicate when the valves are open or closed. The reed switches include LED's for local indication.

1.3 Construction

1.3.1 General

Refer to [Figure 1](#) to identify the item numbers shown in brackets in the following description.

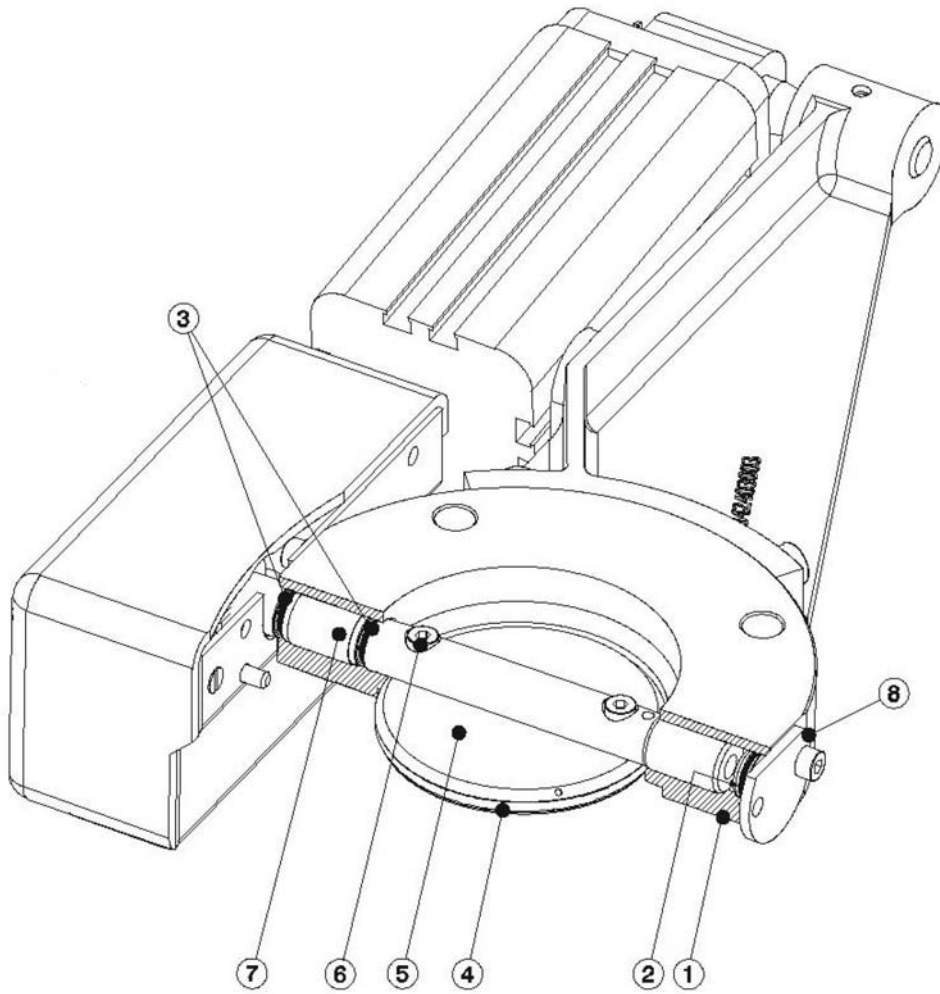
A fluoroelastomer 'O' ring (4) seals the valve plate (5) against the valve body (1) when the valve is closed.

Three fluoroelastomer 'O' rings seal the valve shaft, as follows:

- The two dynamic shaft seals (3) isolate the vacuum side of the valve mechanism from atmosphere.
- The static seal (2) on the blanking plug (8) protects the outer end of the valve shaft from atmospheric contamination.

All models of the QSB valves are secured in place by the fixing holes in the valve flange. The valve flange faces are sealed by an Edwards Co-Seal or trapped 'O' ring. The flange face dimensions are in accordance with ISO1609:1986 (Vacuum Technology - Flange Dimensions).

Figure 1 - Section of pneumatically actuated QSB63P and QSB100P



- | | |
|---------------------------|------------------|
| 1. Valve body | 5. Valve plate |
| 2. Blanking plug 'O' ring | 6. Screw |
| 3. Valve shaft 'O' ring | 7. Valve shaft |
| 4. Valve plate 'O' ring | 8. Blanking plug |

1.3.2 Pneumatic valve details

Refer to Figure 2 for items in brackets.

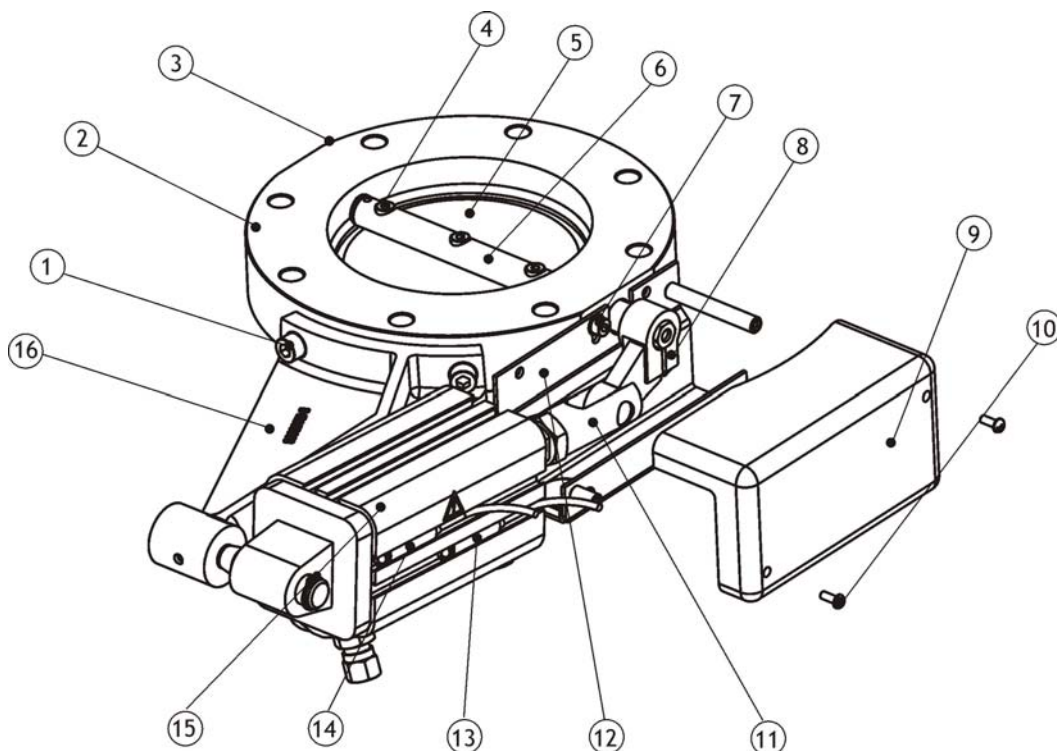
The pneumatic actuator (15) is secured to the valve-body by the bracket (16) and the screws (1). The pneumatic-actuator turns the valve plate (5) and shaft (6) through the link arm (8).

The QSB63P and QSB100P valves have double-acting pneumatic actuators to open and close the valve (see Figure 2).

The position indicator reed switches are mounted on the pneumatic actuator.

The safety cover (9) encloses the link arm.

Figure 2 - General assembly of pneumatically actuated QSB63P and QSB100P



- | | |
|------------------|--------------------------------|
| 1. Screw | 9. Safety cover |
| 2. Valve body | 10. Screw |
| 3. Blanking plug | 11. Fork |
| 4. Screw | 12. Back plate |
| 5. Valve plate | 13. Reed switch (valve open) |
| 6. Valve shaft | 14. Reed switch (valve closed) |
| 7. Screw | 15. Pneumatic actuator |
| 8. Link arm | 16. Support bracket |

2 TECHNICAL DATA

2.1 General

Table 1 - Technical data

	QSB63	QSB100
Ambient operating temperature range (°C)	5 - 40	5 - 40
Ambient storage temperature range (°C)	0 - 50	0 - 50
Pressure range	0 - 3 bar (0 - 2 x 10 ⁵ Pa)	0 - 3 bar (0 - 2 x 10 ⁵ Pa)
Maximum operations per hour: cycles	360	360
Mean time to failure (MTTF): cycles	> 1.5 x 10 ⁵	> 1.5 x 10 ⁵
Minimum air pressure	3.8 bar gauge (4.8 x 10 ⁵ Pa)	3.8 bar gauge (4.8 x 10 ⁵ Pa)
Maximum air pressure	7 bar gauge (8 x 10 ⁵ Pa)	7 bar gauge (8 x 10 ⁵ Pa)
Pneumatic connections	1/8 inch BSP	1/8 inch BSP
Molecular conductance *: ls ⁻¹	1300	4700
Flange size	ISO63	ISO100
Mass (kg)	2.7	4.8
Dimensions	See Figure 3	

* Conductance of equivalent tube length

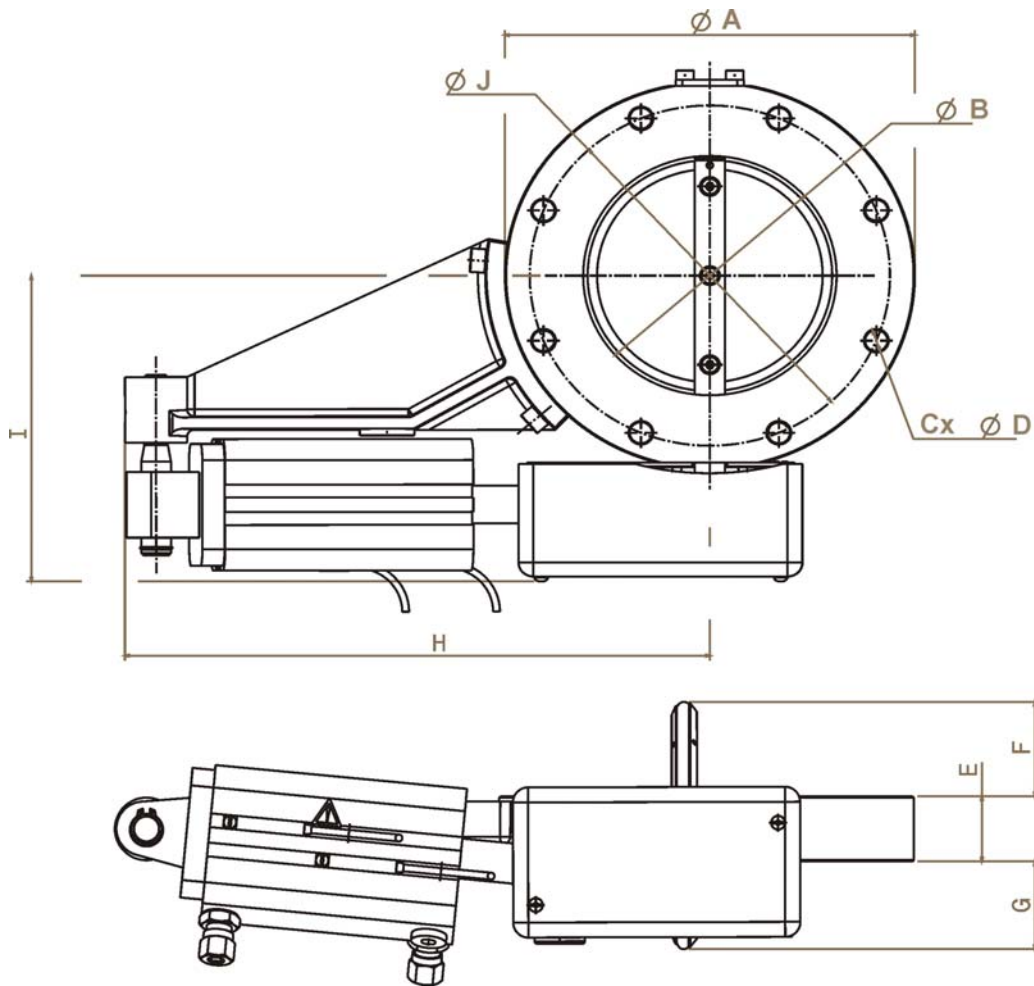
Table 2 - Position indicator reed switches

Max voltage	30 V a.c./d.c.
Max current	500 mA
Max power	6 W / 6 VA
Cable length	3 m

2.2 Item numbers

Valve	Item Number
QSB63P	B424-09-000
QSB100P	B426-09-000

Figure 3 - Dimensions (mm)



Valve Size	A	B	C	D	E	F	G	H	I	J
QSB63P	130	70	4	9	23.5	23	17.7	235.5	113	110
QSB100P	165	100	8	9	26	38	35	235.5	130.5	145

3 INSTALLATION



WARNING

Take appropriate safety precautions when you install the valve in a system in which dangerous process substances have been pumped.

3.1 Unpack and inspect

Remove all the packing materials and check the QSB valve.

If the valve is damaged, notify your supplier and the carrier in writing within three days; state the Item Number of the valve together with your order number and your suppliers invoice number. Retain the packing materials for inspection. Do not use the valve if it is damaged.

3.2 Install the valve



WARNING

Fit a cover over any exposed part of the valve actuator mechanism, so that fingers or other parts of the body cannot get trapped.

Position the valve so that the pneumatic actuator and control accessories, if fitted, are accessible but do not cause an obstruction. Allow sufficient clearance so that the valve plate does not touch any components of your vacuum system when it is open (see [Figure 3](#)).

The valve is normally supported by the pipeline it is fitted to and can be mounted in any orientation. However, we recommend that you mount the valve with the valve shaft as close to horizontal as possible to reduce particulate contamination of the valve shaft seals.

If you fit the valve with the flange in the horizontal position, support the valve so that it cannot fall before it is secured in position.

Connect the valve to your vacuum system with the Co-Seal or trapped 'O' ring (supplied) and suitable fixing bolts (not supplied). The number and size of the bolts that you will need are shown in [Table 3](#).

Table 3 - Fixing bolts required to secure the valve

Valve	Bolt size	Number
QSB63P	M8 x 65	4
QSB100P	M8 x 70	8

3.3 Pneumatic connections



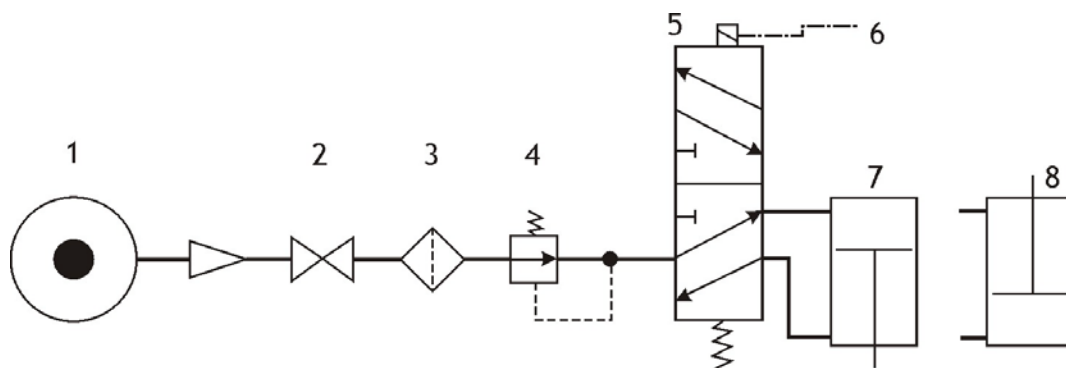
WARNING

Ensure that you control the release of compressed air when you connect or disconnect the air connections. Compressed air contains stored energy which can be dangerous.

Obey your local and national regulations when you connect the air supply and air exhaust to the pneumatic-actuator of the valve. Note that the fittings provided are designed for use with nylon pipes. Use a dry, filtered air supply to prolong the life of the pneumatic actuator.

To operate a QSB63P or QSB100P valve, we recommend that you use a 5-port control valve, as shown in Figure 4.

Figure 4 - Pneumatic circuit for QSB63P and QSB100P



1. Pneumatic supply
2. Shut-off valve
3. Filter
4. Pressure regulator
5. 5-port control valve
6. Electrical connections
7. QSB valve (electrical fail to closed position)
8. QSB valve (electrical fail to open position)

3.4 Position indicator reed switch connections

The reed switches fitted to the QSB63P and QSB100P have 3 m flying leads and built in LED indicators. To use the LED indicator, make connections as shown in Figure 5. If the LED's are not required, make connections as shown in Figure 6.

Figure 5 - Reed switch connections when LED indicator is used

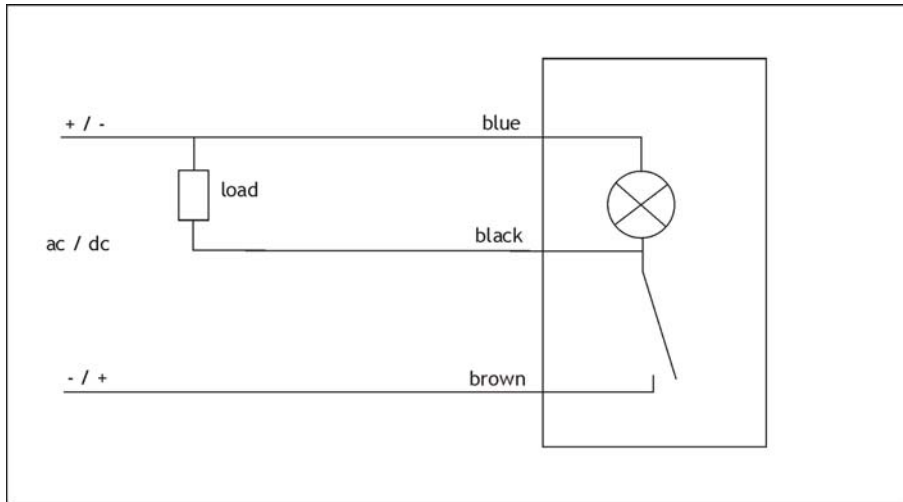
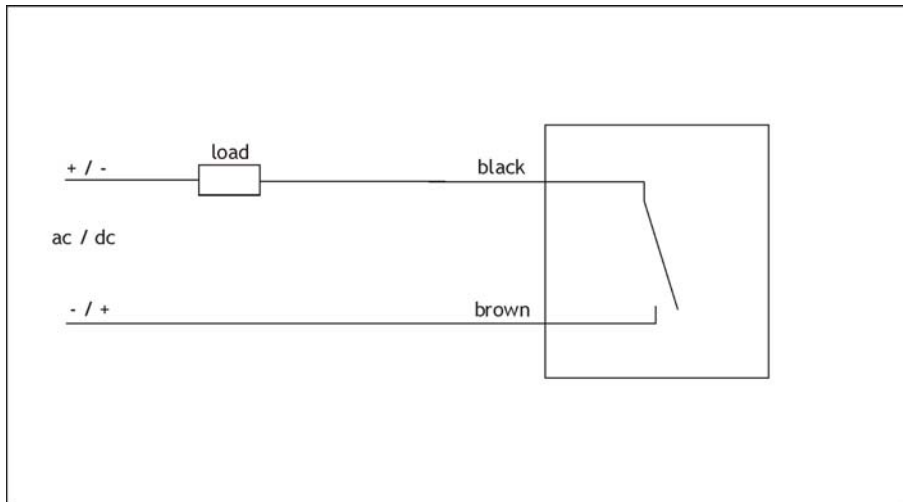


Figure 6 - Reed switch connections without LED indicator



4 OPERATION

Note: *If a pneumatically operated valve is left closed and is not operated for a long time, when you do operate the valve, an increased pressure may be required to open the valve; this is due to stiction at the valve plate 'O' ring.*

Noise may be generated when the valve is used in an air-admittance application, depending on your system design.

Operation of a QSBP pneumatically operated valve is under the control of the pneumatic circuit. Details of pneumatic control circuits are subject to local and national regulations and are outside the scope of this manual.

Note that if the pneumatic supply fails, the QSB pneumatic valves will probably stay in the same position (open or closed), though this will depend on vibration and other external influences on the valve.

5 MAINTENANCE

5.1 General information

QSB valves are designed to require little user maintenance. The only parts which you can replace are the valve shaft 'O' rings and the valve plate 'O' ring. These have been tested in excess of 1.5×10^5 operations before any increased leak rate (either across the valve or from the system to atmosphere) can be expected. Refer to Section 5.4 for the replacement procedure. Refer to Section 7 for the Item Numbers of the 'O' rings.

5.2 Safety



WARNING

Obey the safety instructions given below and take note of appropriate precautions. If you do not, you can cause injury to people and damage to equipment.

- Ensure that you do maintenance in a well ventilated area.
- Observe all appropriate safety precautions when you maintain a valve from a system in which dangerous process substances have been pumped.
- Dispose safely of all components which have been contaminated by dangerous process substances (see Section 6.2).
- Do not use abrasive or reactive chemical substances to clean the valve. Do not use solvents to clean seals or 'O' rings.
- Disconnect the pneumatic supply before you remove the valve from your vacuum system.
- Do not operate the valve when it is disconnected from your vacuum system, unless you provide protection against moving parts.
- Leak test the valve after maintenance to ensure that dangerous process substances do not leak to atmosphere.
- The dynamic seals and 'O' rings used in this valve are made from a fluoroelastomer. Fluoroelastomers can decompose into very dangerous substances if they are heated to 260 °C and above. The valve may have overheated if your vacuum system has been misused or if it has malfunctioned. If the valve has overheated, ensure that you prevent contact with the seals and 'O' rings.

5.3 Maintenance plan

The plan in Table 4 details the maintenance operations necessary to maintain the QSB valve in normal use. Instructions for each operation are given in the section shown.

Table 4 - Maintenance plan

Operation	Frequency	Refer to Section
Dismantle and inspect the valve	Every 6 months	5.4
Replace the valve-plate 'O' ring	As required (typically every 1×10^5 cycles)	5.6
Replace the valve-shaft 'O' ring	As required (typically every 1×10^5 cycles)	5.7
Adjust the position indicator	As required	5.8

5.4 Dismantle and inspect the valve

Refer to [Figure 2](#) for items in brackets.

1. Remove the screws (10) and take off the safety cover (9) and the back plate (12).
2. Remove the pin which secures the fork (11) to the link arm (8) and then remove the fork.
3. Remove the screws (4) which secure the valve plate (5) to the valve shaft (6) and then remove the valve plate.
4. Remove the blanking plug (3) and then remove the valve shaft from the valve body (2). Take care not to damage the valve shaft 'O' rings during this operation.
5. Inspect the valve plate 'O' ring, the blanking plug 'O' ring and the valve shaft seal 'O' rings. If necessary, replace the 'O' rings as described in [Sections 5.6 and 5.7](#). Reassemble the valve as described in [Section 5.5](#).

5.5 Reassemble the valve

Refer to [Figure 2](#) for items in brackets.

1. Slide the valve shaft (6) back into the valve body (2) and then refit the fork (11) onto the link arm (8) and secure it with the pin. Refit the blanking plug (3).
2. Refit the back plate (12) and the safety cover (9) and secure it with the screws (10).
3. Refit the valve plate (5) to the valve shaft (6) and secure it with the screws (4).
4. Check that the valve plate seals correctly when it is closed. If necessary, loosen the screws (4) and adjust the valve plate. Close the valve tightly to centre the valve plate and tighten the screws.

5.6 Replace the valve plate 'O' ring

1. Dismantle the valve as described in [Section 5.4](#).
2. Use a small blade screwdriver to extract the valve plate 'O' ring from the groove in the valve plate; dispose of the 'O' ring.
3. Inspect the 'O' ring groove and contact surfaces. Refinish surfaces which are scratched or damaged.
4. Lightly grease the new 'O' ring with Fomblin grease and insert the 'O' ring into the groove in the valve plate.
5. Reassemble the valve as described in [Section 5.5](#).

5.7 Replace the valve shaft 'O' rings

You must replace all of the valve shaft 'O' rings at the same time.

1. Dismantle the valve as described in [Section 5.4](#).
2. Use a small blade screwdriver to extract the valve shaft 'O' rings from the grooves in the valve shaft; dispose of the 'O' rings.
3. Inspect the 'O' ring grooves and contact surfaces. Refinish surfaces which are scratched or damaged.
4. Lightly grease the new 'O' rings with Fomblin grease and fit the 'O' rings into the grooves in the valve shaft.
5. Reassemble the valve as described in [Section 5.5](#).

5.8 Adjust the position indicators

5.8.1 Closed indicator

- Wire up the position indicators as described in [Section 3.4](#).
- Set valve to fully closed position.
- Slacken screw in reed switch (1.5 mm hex key).
- Move switch to right-hand end of slot (nearest red safety cover).
- Move switch slowly to the left until switch just closes or light comes on.
- Move switch a further 1 mm to the left.
- Tighten screw.

5.8.2 Open indicator

- Wire up the position indicators as described in [Section 3.4](#).
- Set valve to fully open position.
- Slacken screw in reed switch (1.5 mm hex key).
- Move switch to left-hand end of slot (away from red safety cover).
- Move switch slowly to the right until switch just closes or light comes on.
- Move switch a further 1 mm to the right.
- Tighten screw.

5.9 Fault finding

A list of possible fault conditions and their possible causes is provided here to assist you in basic fault finding. If you are unable to rectify a fault using this guide, call your supplier or your nearest Edwards Service Centre for help.

5.9.1 The valve fails to operate

Note: *If a pneumatically operated valve is left closed and is not operated for a long time, when you do operate the valve, an increased pressure may be required to open the valve; this is due to stiction at the valve plate 'O' ring.*

- The valve is blocked.
- The pneumatic actuator is faulty.

5.9.2 The valve leaks

- The valve plate 'O' ring or the seating groove is damaged.
- The valve shaft 'O' rings are damaged.

5.9.3 The position indicators do not operate

- Check wiring according to [Figures 5 or 6](#).
- Adjust the position of the switches as described in [Section 5.8](#).

6 STORAGE AND DISPOSAL

6.1 Storage

Place protective covers over the valve ports and store the QSB valve in cool, dry conditions until required for use. When required, install the valve as described in [Section 3](#).

6.2 Disposal

Dispose of the QSB valve and any components removed from it safely in accordance with all local and national safety and environmental requirements.

Take particular care with any components which have been contaminated with dangerous process substances.

7 SERVICE, SPARES AND ACCESSORIES

7.1 Introduction

Edwards products, spares and accessories are available from Edwards companies in Belgium, Brazil, China, France, Germany, Israel, Italy, Japan, Korea, Singapore, United Kingdom, U.S.A. and a world-wide network of distributors. The majority of these centres employ Service Engineers who have undergone comprehensive Edwards training courses.

Order spare parts and accessories from your nearest Edwards company or distributor. When you order, state for each part required:

- Model and Item Number of your equipment
- Serial number
- Item Number and description of part.

7.2 Service

Edwards products are supported by a world-wide network of Edwards Service Centres. Each Service Centre offers a wide range of options including: equipment decontamination; service exchange; repair; rebuild and testing to factory specifications. Equipment which has been serviced, repaired or rebuilt is returned with a full warranty.

Your local service centre can also provide Edwards engineers to support on-site maintenance, service or repair of your equipment.

For more information about service options, contact your nearest Service Centre or other Edwards company.

7.3 Spares

Spare	Item Number
Fomblin grease (100 g)	H113-50-003
Valve plate 'O' ring for QSB63	H021-06-161
Valve plate 'O' ring for QSB100	H021-06-055
Valve shaft 'O' ring kit for QSB63 and QSB100	H021-06-010
Reed switches	B424-09-800

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Return the equipment or components for service

Before you send your equipment to us for service or for any other reason, you must send us a completed Declaration of Contamination of Vacuum Equipment and Components - Form HS2. The HS2 form tells us if any substances found in the equipment are hazardous, which is important for the safety of our employees and all other people involved in the service of your equipment. The hazard information also lets us select the correct procedures to service your equipment.

We provide instructions for completing the form in the Declaration of Contamination of Vacuum equipment and Components - Procedure HS1.

If you are returning a vacuum pump, note the following:

- If a pump is configured to suit the application, make a record of the configuration before returning the pump. All replacement pumps will be supplied with default factory settings.
- Do not return a pump with accessories fitted. Remove all accessories and retain them for future use.
- The instruction in the returns procedure to drain all fluids does not apply to the lubricant in pump oil reservoirs.

Download the latest documents from www.edwardsvacuum.com/HSForms/, follow the procedure in HS1, fill in the electronic HS2 form, print it, sign it, and return the signed copy to Edwards.

Note: *If we do not receive a completed HS2 form, we will not accept the return of the equipment.*

