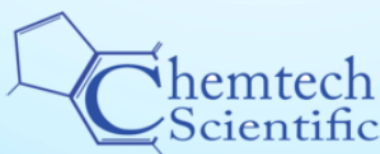


Instruction Manual

QSB63P and QSB100P Pneumatically Operated Valves with Reed Switches

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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,
Manor Royal,
Crawley,
West Sussex RH10 9LW, UK

declare under our sole responsibility that the machine(s)

QSBP Pneumatic Quarter Swing Butterfly Valves

QSB63P

B424-09-000

QSB100P

B426-09-000

to which this declaration relates is intended to be incorporated into other equipment and not to function independently. The machine(s) is in conformity with the following standard(s) or other normative document(s)

None applicable

The machine(s) must not be put into service until the equipment into which it is incorporated has been brought into conformity with the following provisions of the Machinery Directive, 2006/42/EC.

Mr L Marini
Technical Manager

Date and place

This product has been manufactured under a quality system registered to ISO9001

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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.

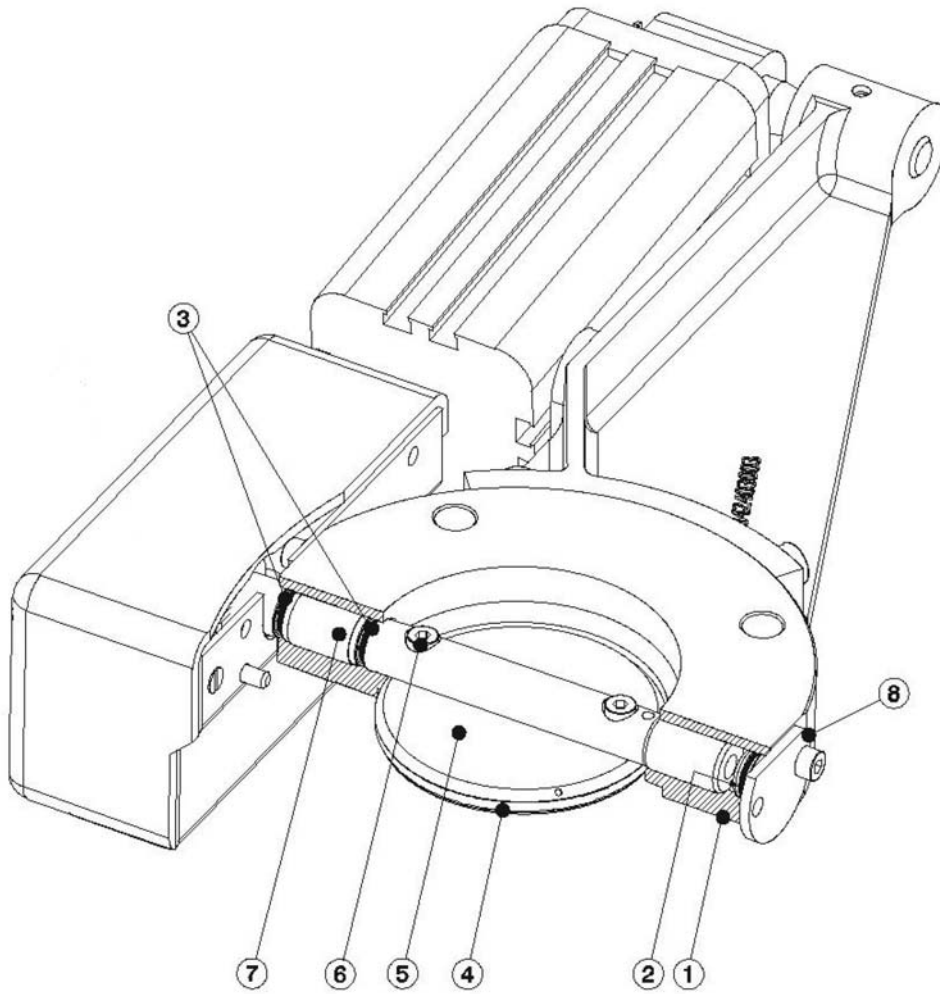
A fluoroelastomer 'O' ring (4) seals the valve plate (5) against the valve body (1) when the valve is closed.

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.

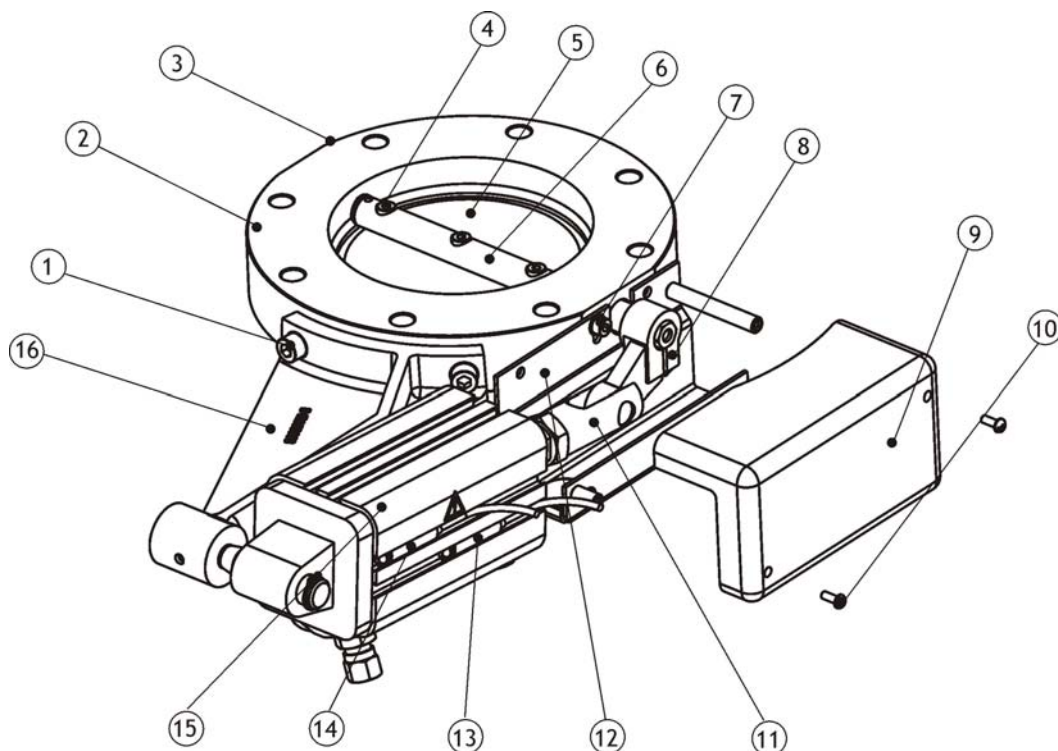
The pneumatic actuator (15) is secured to the valve-body by the bracket (16) and the screws (1). The pneumatic-actuator turns the valve plate (5) and shaft (6) through the link arm (8).

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

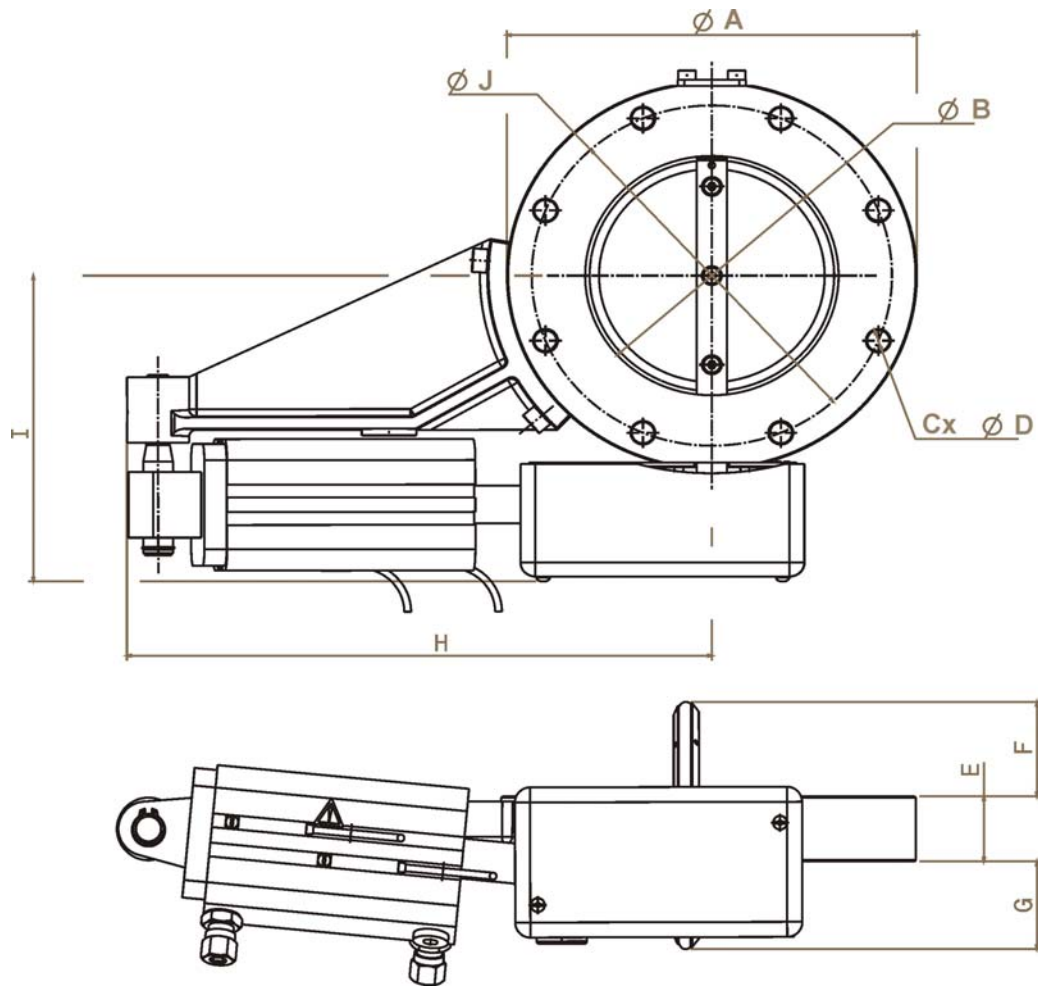
Table 2 - Position indicator reed switches

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



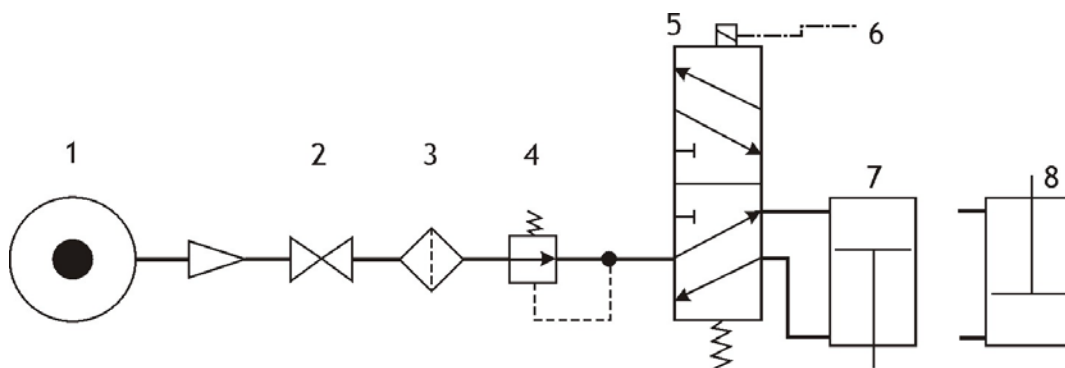
WARNING

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

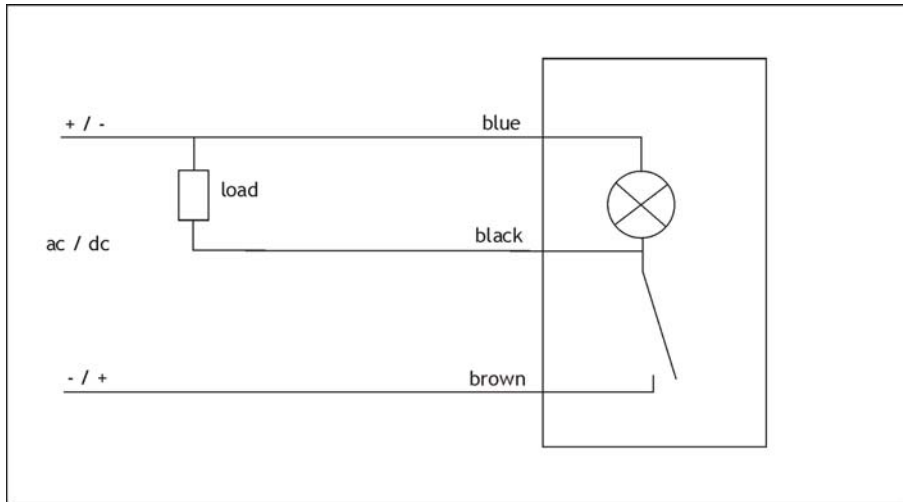
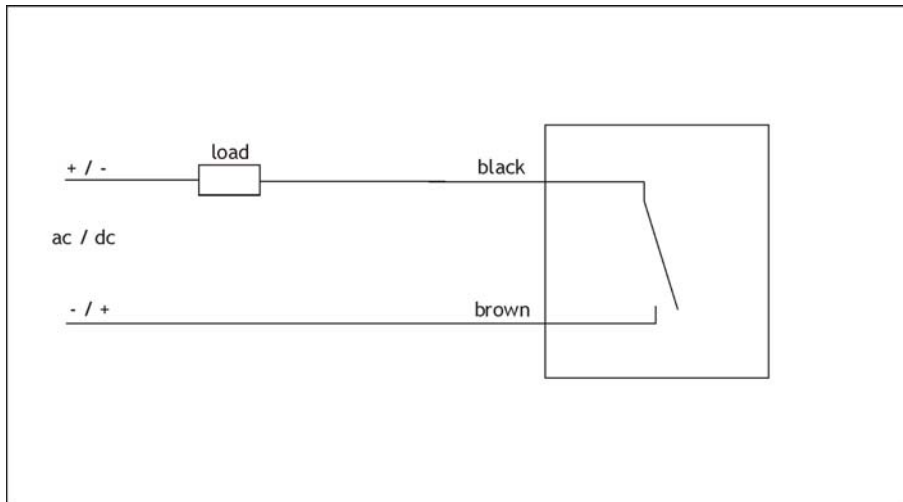


Figure 6 - Reed switch connections without LED indicator



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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Warnings 1

Return of Edwards Equipment - Procedure

INTRODUCTION

Before returning your equipment, you must warn Edwards if substances you used (and produced) in the equipment can be hazardous. This information is fundamental to the safety of our Service Centre employees and will determine the procedures employed to service your equipment.

Complete the Declaration (HS2) and send it to Edwards before you dispatch the equipment. It is important to note that this declaration is for Edwards internal use only, and has no relationship to local, national or international transportation safety or environmental requirements. As the person offering the equipment for shipment, it is your responsibility to ensure compliance with applicable laws.

GUIDELINES

- Equipment is '**uncontaminated**' if it has not been used, or if it has only been used with substances that are not hazardous. Your equipment is '**contaminated**' if it has been used with any substances classified as hazardous under EU Directive 67/548/EEC (as amended) or OSHA Occupational Safety (29 CFR 1910).
- If your equipment has been used with radioactive substances, biological or infectious agents, mercury, polychlorinated biphenyls (PCB's), dioxins or sodium azide, you must decontaminate it before you return it to Edwards. You must send independent proof of decontamination (for example a certificate of analysis) to Edwards with the Declaration (HS2). Phone Edwards for advice.
- If your equipment is contaminated, you must either:
 - Remove all traces of contamination (to the satisfaction of laws governing the transportation of dangerous/hazardous substances).
 - Or, properly classify the hazard, mark, manifest and ship the equipment in accordance with applicable laws governing the shipment of hazardous materials.

Note: Some contaminated equipment may not be suitable for airfreight.

PROCEDURE

1. Contact Edwards and obtain a Return Authorisation Number for your equipment.
2. Complete the Return of Edwards Equipment - Declaration (HS2).
3. If the equipment is contaminated, you must contact your transporter to ensure that you properly classify the hazard, mark, manifest and ship the equipment, in accordance with applicable laws governing the shipment of contaminated/hazardous materials. As the person offering the equipment for shipment, it is your responsibility to ensure compliance with applicable law. **Note: Equipment contaminated with some hazardous materials, such as semiconductor by-products, may not be suitable for airfreight - contact your transporter for advice.**
4. Remove all traces of hazardous gases: pass an inert gas through the equipment and any accessories that will be returned to Edwards. Where possible, drain all fluids and lubricants from the equipment and its accessories.
5. Seal up all of the equipment's inlets and outlets (including those where accessories were attached) with blanking flanges or, for uncontaminated product, with heavy gauge tape.
6. Seal equipment in a thick polythene/polyethylene bag or sheet.
7. If the equipment is large, strap the equipment and its accessories to a wooden pallet. If the equipment is too small to be strapped to a pallet, pack it in a suitable strong box.
8. E-mail via scan, fax or post a copy of the original with signature of the Declaration (HS2) to Edwards. The Declaration must arrive before the equipment.
9. Give a copy of the Declaration (HS2) to the transporter. You must tell your transporter if the equipment is contaminated.
10. Seal the original Declaration in a suitable envelope: attach the envelope securely to the outside of the equipment package, in a clear weatherproof bag.
WRITE YOUR RETURN AUTHORISATION NUMBER CLEARLY ON THE OUTSIDE OF THE ENVELOPE OR ON THE OUTSIDE OF THE EQUIPMENT PACKAGE.

Return of Edwards Equipment - Declaration

Return Authorisation Number: _____

You must:

- Know about all of the substances which have been used and produced in the equipment before you complete this Declaration
- Read the Return of Edwards Equipment - Procedure (HS1) before you complete this Declaration
- Contact Edwards to obtain a Return Authorisation Number and to obtain advice if you have any questions
- Send this form to Edwards before you return your equipment as per the procedure in HS1

SECTION 1: EQUIPMENT

Manufacturer's Product Name _____

Manufacturer's Part Number _____

Manufacturer's Serial Number _____

Has the equipment been used, tested or operated?

YES Go to Section 2 NO Go to Section 4

IF APPLICABLE:

Tool Reference Number _____

Process _____

Failure Date _____

Serial Number of Replacement Equipment _____

SECTION 2: SUBSTANCES IN CONTACT WITH THE EQUIPMENT

Are any substances used or produced in the equipment:

- Radioactive, biological or infectious agents, mercury, poly chlorinated biphenyls (PCBs), dioxins or sodium azide? (if YES, see Note 1) YES NO
- Hazardous to human health and safety? YES NO

Note 1: Edwards will not accept delivery of any equipment that is contaminated with radioactive substances, biological/infectious agents, mercury, PCB's, dioxins or sodium azide, unless you:

- Decontaminate the equipment
- Provide proof of decontamination

YOU MUST CONTACT EDWARDS FOR ADVICE BEFORE YOU RETURN SUCH EQUIPMENT

SECTION 3: LIST OF SUBSTANCES IN CONTACT WITH THE EQUIPMENT

Substance name	Chemical Symbol	Precautions required (for example, use protective gloves, etc.)	Action required after a spill, leak or exposure

SECTION 4: RETURN INFORMATION

Reason for return and symptoms of malfunction: _____

If you have a warranty claim: • who did you buy the equipment from? _____

• give the supplier's invoice number _____

SECTION 5: DECLARATION

Print your name: _____ Print your job title: _____

Print your organisation: _____

Print your address: _____

Telephone number: _____ Date of equipment delivery: _____

I have made reasonable enquiry and I have supplied accurate information in this Declaration. I have not withheld any information, and I have followed the Return of Edwards Equipment - Procedure (HS1).

Signed: _____ Date: _____

Note: Please print out this form, sign it and return the signed form as hard copy.