

Tyre Actuated Globe Valve Installation, Operation and Maintenance Manual

Reference Number:	IOM 040	Date:	2 August 2022	Issue:	A
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Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
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WARNING!

BEFORE ANY INSTALLATION AND MAINTENANCE WORK CAN COMMENCE ENSURE THE VALVE AND SURROUNDING SYSTEM IS DRAINED OF PRESSURE AND ISOLATED.



Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

Contents

<i>Disclaimer</i>	4
<i>Introduction</i>	5
Outline	5
Safety	5
Cleanliness	6
Service Intervals	7
Installation	7
Installation Overview	7
<i>Preparation</i>	9
<i>Hardware Description</i>	10
<i>Installation and Maintenance</i>	13
Spares Kit – Tyre Actuator	13
Spares Kit -Globe Valve	14
Torque Table	15
<i>Installation Instructions</i>	16
Refit / Refurbishment Method	18
<i>Troubleshooting</i>	25
<i>Contact Details</i>	26
<i>Service Record</i>	27



Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

Disclaimer

PLEASE NOTE:

If the valves produced by Parker Hannifin Bestobell Valves/LNG are refurbished by a third party organisation that is not approved by Parker Hannifin Bestobell Valves/LNG, then the safety and performance will not be guaranteed and the warranty may be invalid.

If unsure about the installation and operation procedures for this valve, please contact Parker Hannifin Bestobell Valves/LNG.


Bestobell Valves has produced this manual in order to provide engineering personnel with sufficient general information to enable the operation, installation and effective maintenance of the valve manufactured by Parker Hannifin Bestobell Valves.

In the interest of product development, the designs and specifications for our products are constantly under review and we therefore reserve the right to make changes and improvements without notice.

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This document has been authorised for use by:

Name:	Vinay Vallabhajosula
Title:	Engineering Manager
Signed:	
Date:	02/08/2022

Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
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Introduction

Outline

This manual is broken down into separate sections:

- **Introduction**

This section provides information about important safety requirements as well as highlighting the precautions taken at Parker Hannifin Bestobell Valves to ensure the cleanliness of our products. Details regarding servicing are also introduced.

- **Installation**

This details the method of installing the valve on site, and includes information on storage, unpacking and inspection. Preparation of the valve and site is also discussed to allow ease of installation and operation.

- **Hardware Description**

Introduces the product as well as providing a more detailed description including operating conditions and suitable media. Any further requirements for the effective operation of the valve are also discussed.

- **Maintenance**

Provides information relating to the on-site maintenance of the supplied valve, as well as discussing common problems and solutions.

Safety

Read and understand these instructions before installing the valve. Improper installation, operation or maintenance by the owner or operator of this valve can result in personal injury.

***Ensure that the Valve is always CLOSED after Fill or Decant and in particular when the Vehicle is in motion*.**

Only use genuine Parker Hannifin Bestobell Valves spares to ensure safe and optimum performance.

Prior to the installation of the valve into the system and any maintenance work, ensure the system is de-pressurised and isolated for the duration of the installation and during any subsequent maintenance.

The valve must be installed within a system that has adequate draining and venting provisions.

In cryogenic applications the area of pipe-work to receive the valve must be allowed to reach ambient temperature.

Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

It is essential that the installers and operators are conversant with all of the safety issues relating to the medium within the system and are fully trained to an adequate standard.

Wear safety glasses and gloves during any installation or operation of the valve.

Valves must only be used in a circuit protected by suitable equipment.

The valve should be inspected for wear as part of a regular system maintenance programme.

Cryogenic burns can occur if the valve is handled during or after the valve has operated.

Minor leaks from the outlet side of the valve, if allowed to build up in a confined area, can be hazardous. This can be avoided by dissipating into the atmosphere or a well ventilated area.

If valve is to be installed in hazardous climatic conditions or seismic areas, please inform Parker Hannifin Bestobell Valves.

Identify the intended flow direction and match the valve orientation with its flow direction arrow.

Ensure that all end connections to the valve are in line and that the pipe work is supported to reduce unwanted stresses, loading and vibration on the valve and system pipe work.

Ensure that all joining materials / components used during the installation of the valve are compatible, and will not cause any deterioration to the valve structure.

When using on CO₂, the internal atmosphere must be dry and moisture free as any bronze components could be affected by carbonic acid.

DO NOT check leaks with hands.

Cleanliness

Immediately after assembly in a controlled clean room, the valve is sealed in an airtight plastic bag to maintain cleanliness. As such, it is essential to maintain this cleanliness throughout all stages of installation. Particular care should be taken not to contaminate the internals of the valve with grease, moisture, grinding dust, weld/brazing spatter etc.

Clean practices will save time later with reduced 'flushing' and maintenance.

Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

Service Intervals

Parker Hannifin Bestobell Valves recommends that a major service is carried out on its valves in line with the procedures contained in this manual every 2 years.

In addition to this, a regular inspection should take place to ensure correct operational condition.

Regular inspections are suggested on a monthly basis and maintenance work should be carried out in line with this service manual.

It is recommended that the Service Record Sheet enclosed be fully completed at every service interval.

Installation

Personnel carrying out Assembly / Joining / Welding / Inspection must be adequately trained and hold the necessary approvals.

Valves should be installed in a vertical position and not less than 30° from horizontal. (for angles less than 30°, a longer extension may be required, please contact Parker Hannifin Bestobell Valves)

Ensure that environmental conditions (atmospheric pollution) are compatible with the valve materials.

(NOTE: Ensure there is enough space around the valves installed position to allow the removal and refit of the headwork / valve)

Installation Overview

The quality of performance in service is a function of the care taken to ensure good installation. A careful study of these instructions is therefore recommended, as properly installed equipment will normally operate for long periods without problems.

The most critical point in the lifetime of a valve is the time of installation, therefore, proper care at this stage and during any maintenance will increase the probability of trouble free valve service.

It is important to maintain cleanliness throughout all stages of the installation, with particular care being taken not to contaminate the internals of the valve with grease, moisture, grinding dust, weld / brazing spatter or other foreign matter.

Clean practices will save time later with reduced 'flushing' and maintenance.

Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
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STORAGE:

The equipment packing cases are **NOT** waterproof and should be stored in a weatherproof location before use.

UNPACKING:

It is recommended that before any item is unpacked, it should be moved as close as possible to its installed position. This will minimise the possibility of damage during handling.

Before unpacking, items should be checked to ensure their part number is in line with requirements and/or the purchase order.

The valve should be inspected for damage upon receipt - any problems are to be immediately reported to Parker Hannifin Bestobell. This should be done within 48 hours of receipt of goods otherwise a warranty claim may be rejected.

It is further recommended that each item should only be unpacked immediately before it is required.

Before installation the engineer should check for:

- Damaged Packaging
- Bent or Distorted Items
- Scratches, Dents or Damage

Particular attention should be paid to the sealing faces on the end connection flanges.

TOOLS REQUIRED:

No special tooling is required for the installation of this valve.

Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

Preparation

WARNING!

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Remove the headwork before installation and cover the top of the body to protect the internals of the valve from particulate contamination.

Also ensure that enough room is left above / around the valve for the headwork once this is replaced after installation.

Identify the intended flow direction and match the valve orientation with its flow direction arrow.

Ensure that all end connections to the valve are in line and that the pipe work is supported to reduce unwanted stresses, loading and vibration on the valve and system pipe work.

Ensure that all joining materials / components used during the installation of the valve are compatible, and will not cause any deterioration to the valve structure.



Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

Hardware Description

All materials used are selected for their suitability to function at cryogenic temperatures. All valves are degreased for oxygen duty, assembled in clean room conditions, and sealed in robust polythene bags prior to despatch.

Maximum Working Pressure: Refer to General Arrangement (GA) Drawing for each valve
Temperature Range: +65°C to -196°C or + 150°F to -320°F

Only suitable for operation with media: - O₂, N₂, Ar, CO₂, CH₄, He, CHF₃, Kr, Ne, He, H₂, C₂H₄, N₂O, SF₆, LPG, LNG.

When using on CO₂, the internal atmosphere must be dry and moisture free as bronze could be affected by carbonic acid.

Valve Description

Stainless steel extended globe valve with bolted bonnet and integral soft seat. Provided with socket, butt weld or flanged connections. The bolted bonnet allows for simple site maintenance, with easy access to the serviceable parts of the valve. – pneumatically actuated for inclusion into cryogenic systems.

All valves are degreased for oxygen service, assembled under clean room conditions and sealed in robust polythene bags prior to despatch before leaving the clean area.

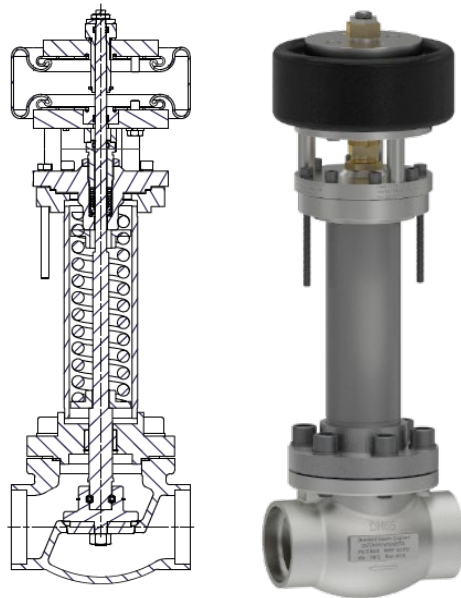
Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

Design Standards

This valve meets the requirements of BSEN 1626 (1999)

Valve Size	Test Pressures	Working Pressures
DN25	Body Test 75 Bar	50 Bar @ -196°C to +65°C
	Seat Test 55 Bar	Actuator Pressure 6 bar
DN40	Body Test 24 Bar	16 Bar @ -196°C to +65°C
	Seat Test 17.6 Bar	Actuator Pressure 6 bar
DN65	Body Test 15 Bar	10 Bar @ -196°C to +65°C
	Seat Test 11 Bar	Actuator Pressure 6 bar



Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
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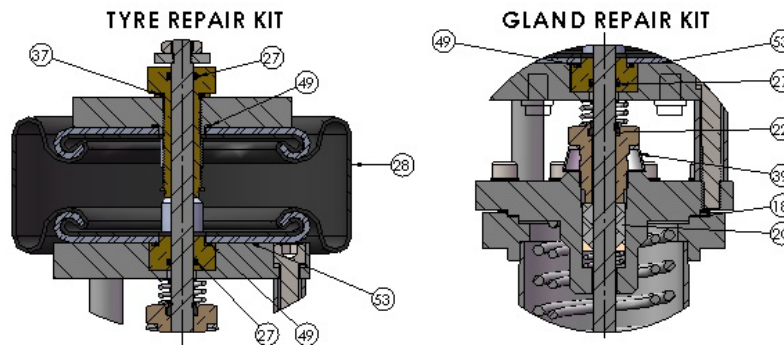


Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
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Installation and Maintenance

Spares Kit – Tyre Actuator

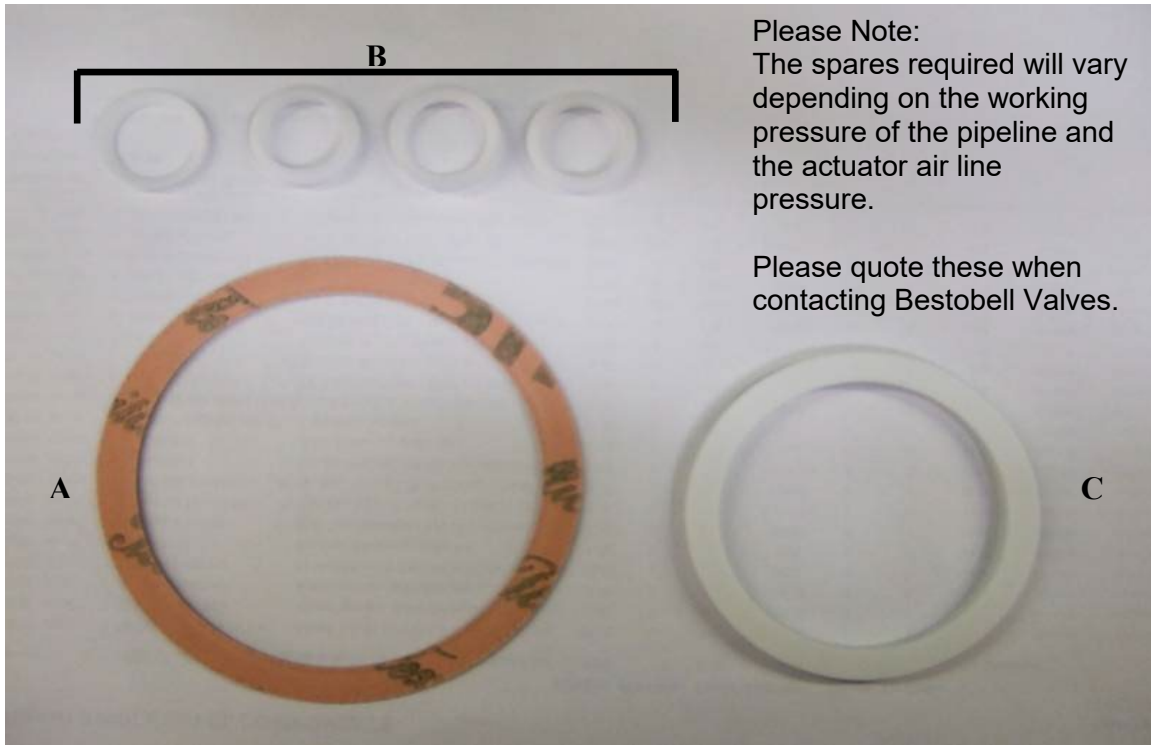


ITEM	DESCRIPTION	QTY.	REPAIR KIT NUMBER
	SPARE TYRE		
28	Air Spring Actuator (Fig Number 116-1M)	1	S-L0708F012
	TYRE SEAL REPAIR KIT		
49	O'Seal 0245-30 - (Nitrile)	2	CMDACTSEALKIT
53	O'Seal Metric Viton Number 0066-24	1	
27	O'Seal 0106-24 (Viton)	3	
37	Bonded Seal	1	
	GLAND REPAIR KIT		
49	O'Seal 0245-30 - (Nitrile)	2	CMDGLANDKIT
53	O'Seal Metric Viton Number 0066-24	1	
27	O'Seal 0106-24 (Viton)	3	
22	Wiper Seal	1	
39	Water Shield To Gland	1	
20	Gland Packing Set	1	
18	Top Range Gasket	1	

Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

Spares Kit -Globe Valve



Please Note:
The spares required will vary depending on the working pressure of the pipeline and the actuator air line pressure.

Please quote these when contacting Bestobell Valves.

REF	DESCRIPTION	PART NUMBER
A	BODY/BONNET GASKET	Dependant on valve size*
B	GLAND PACKING KIT	Dependant on valve size *
C	SEAL	Dependant on valve size*

*Contact Bestobell Valves for details

Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

Torque Table

Valve Size	Disc Retainer ¹		Bolted Bonnet ²		Gland Nut ²
DN25	Circlip Retained		M10	32 Nm (24 lb.ft)	16 Nm (12 lb.ft)
DN40			M12	57 Nm (42 lb.ft)	32 Nm (24 lb.ft)
DN65	M12	37Nm (27 lb.ft)	M16	120 Nm (90 lb.ft)	40 Nm (29 lb.ft)

- Apply torques progressively and in sequence.
- Only use PTFE based lubricants.
- On Cryogenic applications, ONLY use specified Stainless Steel fasteners.
- Torques specified for valves with PTFE body / bonnet gaskets.

¹ Disc Retainer Torque Specified for High Tensile Brass.

² For Bolted Bonnet and Gland Nut, torque specified is for lubricated Stainless Steel fasteners.

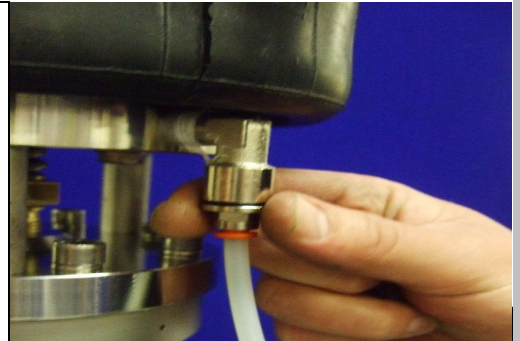
Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

Installation Instructions

STEP 1:

Inflate the tyre using a suitable air supply to lift the valve disc off the seat



STEP 2:

Ensure that the body is fitted in the line with the flow direction arrow in the same direction as the direction of pressure when the valve is closed.



STEP 3:

Weld the valve in line or for flanged connections, bolt the flanges in places and flush/clean the system

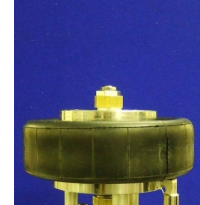


Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

STEP 4:

Release the air from the tyre to lower the valve disc onto the seat



STEP 5:

Before introducing pressure to the valve, carry out a thorough inspection of all connections: welded and/or threaded. Once pressure is introduced to the valve, a method appropriate to the medium being carried by the system should be employed to test for leaks.

Never use hands to test for leaks!



STEP 6:

Check that the valve fully opens by inflating the tyre and closes by deflating it. If difficulty is experienced, refer to the troubleshooting section of this manual.



Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
-------------------	---------	-------	-------------	--------	---

Refit / Refurbishment Method

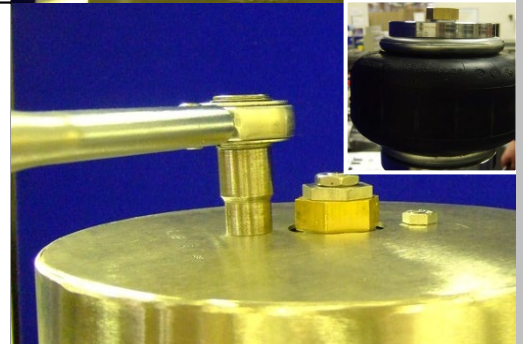
STEP 1:

Allow some air to inflate Tyre and raise the disc off from the Body Seat by approximately 25mm (1").



STEP 2:

Using the two spanners, unscrew the Cover/Body bolts in order to release the headwork, save all the Nuts and Bolts, carefully lift off the headwork, and clamp the cover flange in the vice.



STEP 3:

Release the line air from the Tyre. Remove the top retaining Nut and save, remove the lower Nut and discard.

If non-umbrella type - go to step 4.

Remove the two retaining set screws from the top of the Umbrella. Push down on the Tyre and remove the second nut - NOTE/ The Tyre will fully inflate once this has been removed. Lift the Umbrella from the Tyre - save the two retaining Cap head screws.



STEP 4:

NOTE/ If refurbishing the type WITHOUT the Umbrella then at this point remove the two Cap head screws from the Top Tyre Plate using the Allan key.

Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
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STEP 5:

Lift the Top Tyre Plate, save the two Cap head screws and Spring Washers.

Discard the O Seal from the underside.

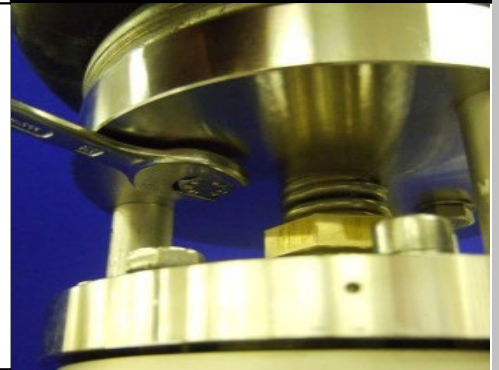


STEP 6:

Remove the two Hex head setscrews from the bottom Tyre Mounting Plate and discard them.

These will be replaced with hex head screws.

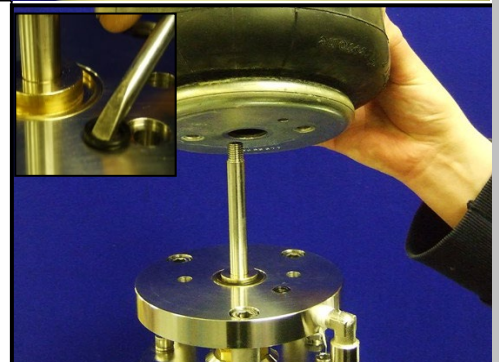
Note - if the valve is of the old design, the socket head capscrews should be removed and replaced with 2 bushes and 2 hex head setscrews.



STEP 7:

Remove the Tyre from the bottom Mounting Plate; save this unless it is damaged. If damaged, replace it.

Using a screwdriver remove the two O Ring Seals from the Mounting Plate.

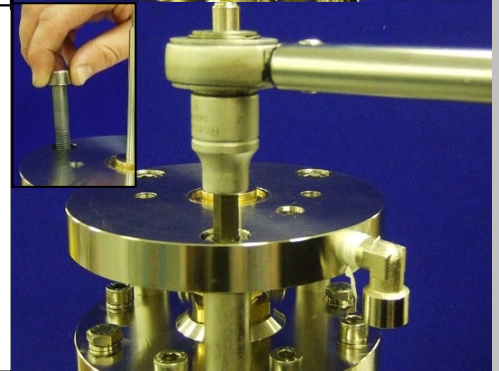


STEP 8:

Remove the three (Qty. x3) long studs.

Take care not to dislodge the Mounting Plate.

Lift out the three studs and washers (which may be left in the Mounting Plate).



Tyre Actuated Globe Valve

Reference Number:

IOM_040

Date:

8 June 2022

Issue:

A

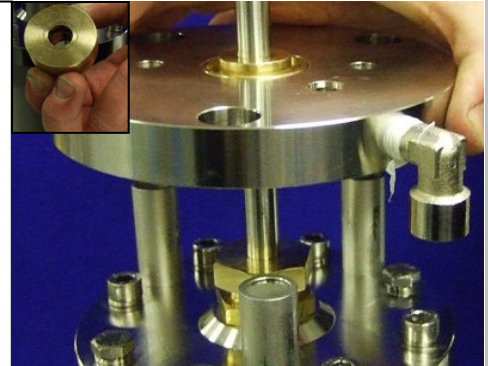
STEP 9:

Carefully lift the Mounting Plate straight up.

The supporting pillars below are not attached so be careful not to knock them off.

Remove the Guide Bush from the Mounting Plate.

Lift off the three Supporting Pillars and save.

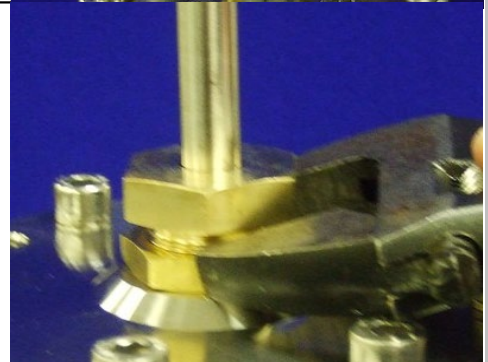


STEP 10:

Using the Spanner loosen the Gland Locknut

At this point hold the wedge and stem below as when the Packing slackens the Stem (and Wedge) will slip and fall from the headwork.

Remove the Gland Nut and Gland Locknut and discard both.



STEP 11:

Remove the Stem from the Cover and carefully pick out the Packing

Ensure that the threads and the smooth faces on the inside of the Gland are not scratched as this may create a leak path.



STEP 12:

Carefully reinsert the Stem through the headwork assembly (from the underside), this will need to be held in position until the Gland Follower is tightened.



Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
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STEP 13:

Slide the Small Spring over the Stem. Slide the Bush after the spring with the flat face down.

Follow with the two cone packings.

Finally slide the last packing down the Stem, flat face up.

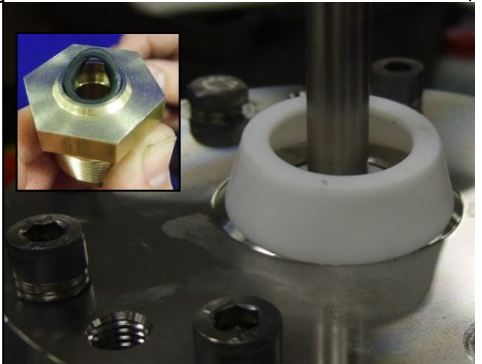


STEP 14:

Insert the Wiper Seal into the Gland Nut, ensure it is seated correctly.

Slide the Gland Nut down the Stem.

Tighten to 15NM (11 lb/ft). Stem must move freely, you can now release the bottom of it.



STEP 15:

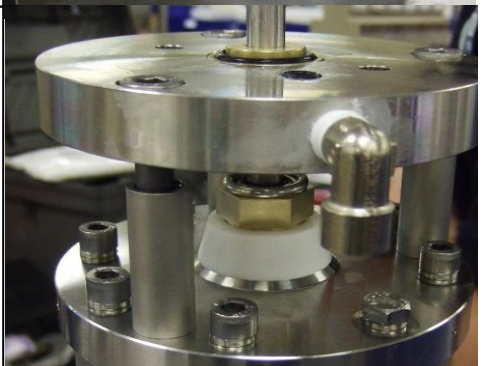
Follow the Gland Nut with the large spring.



STEP 16:

Place the three (Qty. x3) Supporting Pillars back in place & replace the bottom Tyre Mounting plate.

Insert the three (Qty. x3) long Cap head screws and Spring Washers inside the Supporting Pillars. Tighten to 30NM (22 lb/ft).



Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
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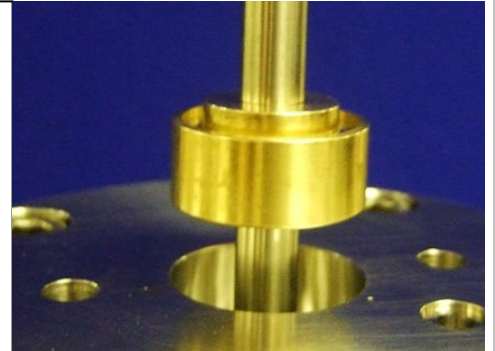
STEP 17:

Remove the inner O Seal from the Guide Bush.

Replace the O Seal & ensure the replacement is seated correctly.

Lubricate with PTFE Spray and slide the Guide Bush down the Stem.

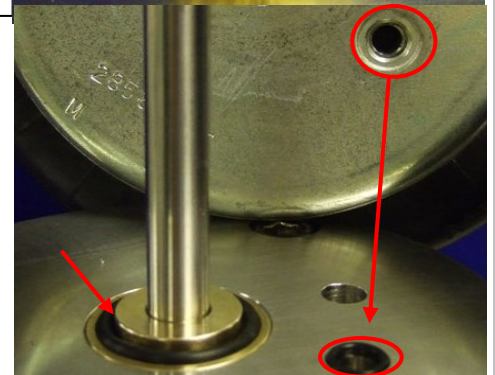
Ensure the spigot is facing up.



STEP 18:

Replace the large and small O Seals on the bottom Mounting Plate.

Replace the Tyre in such a way that the smaller O Seal will be above the hole indicated on the Tyre



STEP 19:

Insert the two (Qty. x2) bushes into the two holes on the underside of the Bottom Mounting Plate and add the lockwashers from the socket screws.

Insert the two Hex Head screws inside the two bushes, tighten with the spanner.



STEP 20:

Remove and replace the two O Seals from the Manual Override Screw, take care not to damage it.

Replace the large O Seal on the underside of the top Mounting Plate.

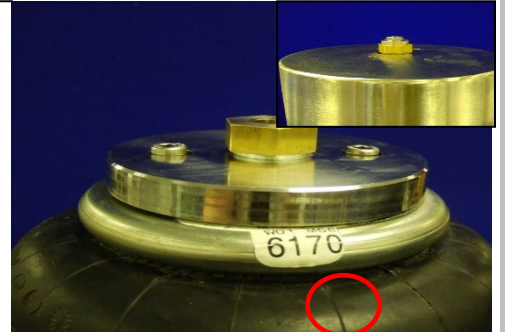


Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
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STEP 21:

Replace the top Mounting Plate and the Manual Override Screw. If there is no Umbrella with this valve then also replace the two (Qty. x2) M8 Cap head screws (16NM) with their Spring Washers. If there is an Umbrella place that over the top Mounting Plate first and then follow with the two M8 Cap head screws (16NM). Push down on the Tyre and screw on the new stainless steel Locknut, over this then screw on the old Nut saved from step 3.



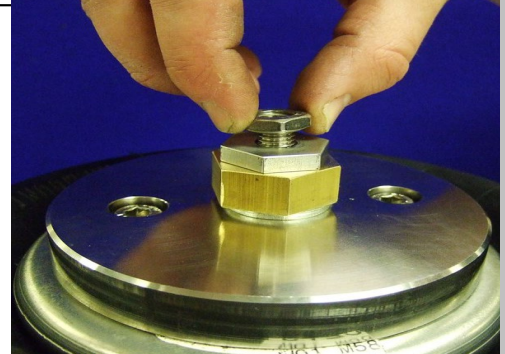
STEP 22:

Push down on the tire and screw on the new stainless steel Locknut.



STEP 23:

Replace the final Nut (saved from earlier).



STEP 24:

Hold the lower Nut in one spanner and tighten the top one using the socket spanner.

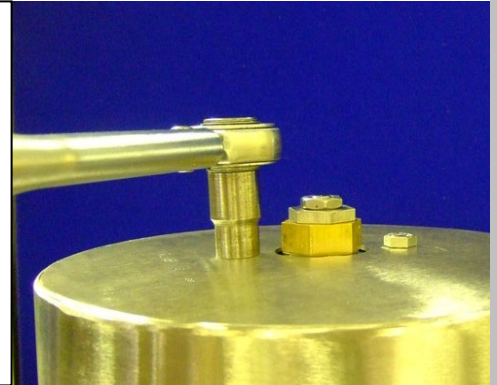


Tyre Actuated Globe Valve

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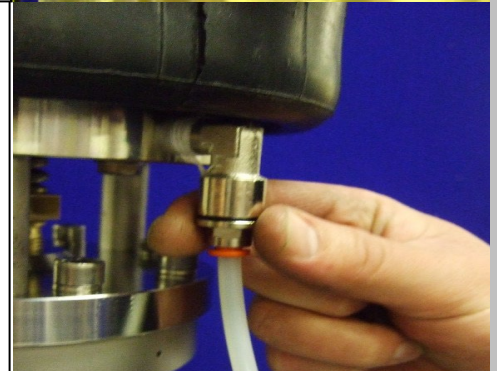
STEP 25:

If umbrella type; re-assemble with the 2 set screws to a torque of 16Nm (12 lbs/ft).



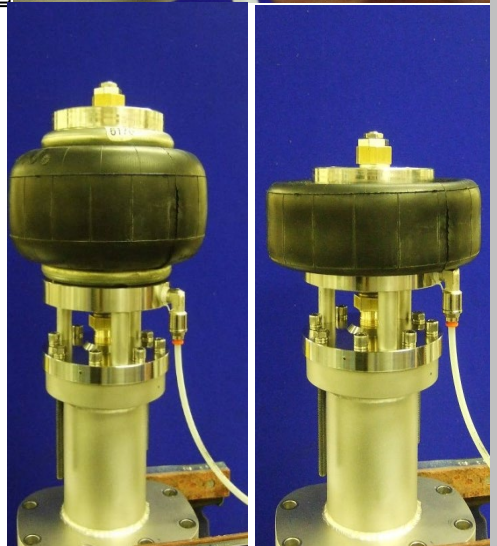
STEP 26:

Re-attach the Valve to the trailer airline.



STEP 27:

Operate the Valve.





Tyre Actuated Globe Valve

Reference Number: IOM_040 Date: 8 June 2022 Issue: A

Troubleshooting

Symptom:	Fault:	Solution:
GLAND LEAKAGE	LOOSE GLAND NUT	TIGHTEN THE GLAND NUT TO FIGURES IN TORQUE TABLE
GLAND LEAKAGE CONTINUES	PACKINGS SEALS DAMAGED	REPLACE WITH APPROPRIATE GLAND SEAL KIT
BODY/BONNET LEAKING	DAMAGED BODY GASKET	REPLACE BODY GASKET
ACTUATOR TYRE LEAKING	TYRE PUNCTURED	REPLACE TYRE. REPLACEMENT TYRE NO. FOR 50mm TO 80mm VALVES: - S - LOY08FO12
VALVE DISC LEAKING DOWNSTREAM	DAMAGED SEAL	REPLACE LOOSE DISC C/W SEAL



Tyre Actuated Globe Valve

Reference Number:	IOM_040	Date:	8 June 2022	Issue:	A
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Contact Details

For further maintenance instructions and spares contact:

Parker Hannifin Bestobell Valves/LNG
President Park,
President Way,
Sheffield,
South Yorkshire,
S4 7UR,
United Kingdom

Tel: +44(0)114 2240000
Web: www.parker.com/ipd

Parker Hannifin - Bestobell Valves
President Park, President Way,
Sheffield, South Yorkshire, S4 7UR, United Kingdom
Tel: +44 (0) 114 224 0000 www.parker.com/ipd



Tyre Actuated Globe Valve

Reference Number: IOM_040	Date: 8 June 2022	Issue: A
----------------------------------	--------------------------	-----------------

Service Record

Valve Tag Number:	Date:	Date:	Date:	Date:

Parker Hannifin - Bestobell Valves
President Park, President Way,
Sheffield, South Yorkshire, S4 7UR, United Kingdom
Tel: +44 (0) 114 224 0000 www.parker.com/ipd