MONARCH
INDUSTRIAL PRODUCTS

INSTALLATION, OPERATING
& MAINTENANCE MANUAL

OXFORD FILTRATION LIMITED

DUPLEX BASKET STRAINER/FILTER

www.monarchindustrial.com.au

OXFORD
FILTRATION
LIMITED

Unit 15, Bridgewater Way, Windsor, Berkshire. SL4 1RD. U.K.
Tel: +44 (0) 1628 440906 Fax: +44 (0) 1628 476667
e-mail: info@oxfordfiltration.com

INSTALLATION, OPERATING & MAINTENANCE MANUAL

FOR THE
OXFORD FILTRATION LIMITED

BALL DUPLEX BASKET FILTERS

Contents

Document Number: M012 Issue 21
February 2022

Important Safeguards

- Use the filter only as described in this manual.
- The filter is for use on liquids only. Always remove all air from the filter before use.
- Customers must assure themselves of suitability for the site, for access and safe handling during installation and during subsequent serving/repair.
- Operators should be suitably trained.
- A competent person should undertake installation and maintenance.
- Do not attempt to maintain, repair or adjust the filter whilst it is pressurised.
- If the fluid to be filtered is in any way hazardous, toxic or flammable, or is at a temperature extreme, the operator and environment should be suitably protected. Extreme care should be exercised if the fluid, at maximum operating temperature, but at room pressure, is above its boiling point. Unless specifically stated otherwise strainers that are sold or used within the European Union, are offered only for fluids (not gases) defined by the Pressure Equipment Directive 2014/68/EU at pressures that mean the strainer falls under a self certified conformity assessment as defined by Directive 2014/68/EU. A fluid whose vapour pressure at the maximum allowable temperature is greater than 1.5 barg must be treated as a gas and it is assumed for the purposes of the self certification of this vessel that this is not the case. Please discuss with our technical sales team if in doubt.
- The maximum operating pressure for the standard filter structure is 13.8 barg at 50º (up to and including DN100 size, for larger sizes refer to label). Other higher pressure filters are available. Please see the relevant standard for the flange pressure rating. The maximum working pressure of the assembly is the lower of the above two pressures. The maximum working pressure reduces as the temperature increases. Please consult with Oxford Filtration for further information.
- Ensure the inlet pressure and temperature is less than that shown on the filter.
- The filter body material and seal temperature limits are: -

Cast iron:	-5ºC TO +120ºC
Cast Steel:	-20ºC to 'O' seal temperature limit
Stainless Steel:	'O' seal temperature limits
Nitrile or Buna N (NBR) seals:	-35ºC to +120ºC
Viton (KPM) seals:	-20ºC to + 200ºC
EP or EPDM seals:	-50ºC to + 150ºC
FEP encapsulated seals:	-55ºC to + 200ºC

The seal temperature limits assume complete chemical compatibility with the fluid. Care should be taken with any fluid at elevated temperature, especially above 100ºC. Do not allow the fluid to freeze in the filter.

We do not recommend operating a Duplex filter above 150 ºC and we do not recommend basket cleaning above 100 ºC

Customer must ensure suitability of the use of this equipment, prior to use. It is often not possible to confirm suitability if particular industry requirements have not been stated, for example, in the food industry our standard seals are not food approved.

- The filters, when shipped from Oxford Filtration Ltd, do not contain substances specifically hazardous to health. However, the filter may have a thin coating of oil based corrosion preventative on some of its surfaces. So care should be taken should this be unacceptable in the given application.
- If a used filter is to be stored or transported, ensure that the filter is clean, suitably protected (including corrosion protection if appropriate) and does not contain substances that could be hazardous to health.
- If the filter has been subjected to overpressure, mechanical damage, corrosion or erosion, or any form of abuse that may reduce it's strength, the filter should be scrapped or returned to Oxford Filtration Ltd for examination and if practical repair and re-test.
- Use only the manufacturers recommended attachments and genuine spares.
- Retain this Manual for future reference.

1. Description of the Filter

These duplex filters remove solid material from the process fluid and provide continuous flow. This is achieved by having two chambers, each containing a perforated sheet/mesh element (basket) that collect the solid material. Only one of the chambers is in operation at any one time; the other is on standby. Flow is diverted from one chamber to the other by a pair of ball valves that are rotated by the change-over handle. The change-over handle covers the on-line chamber. The off-line (stand-by) chamber can be opened (See Routine Maintenance) to allow access to the basket for cleaning. Material collected in the basket will cause the differential pressure across the filter to increase. The differential pressure should not exceed 1 bar (14.5 lb/in^2)

2. Installation

Unpack strainer and inspect for any damage occurring during transit.

An oil may have been used on internal surfaces to prevent rusting and should it be necessary, depending on the application, this can be removed.

Support feet are located on some sizes higher than the base on the vessel chamber wall. If floor mounting and using such feet provided ensure suitable packing blocks are used so no force is put on the pressure containing casting.

Install the filter in the pipeline using appropriate seals and attachments that comply with the relevant codes. Support heavy filters as appropriate. Do not use the cover eye nuts for lifting purposes. These strainers would be usually fitted in a horizontal pipeline.

Do not fit a raised face flange to a flat face flange.

Drain and vent piping should be ported to a safe area especially if the fluid is hazardous or at a high temperature. The operator should always wear suitable protective equipment (goggles, gloves, vests, clothing etc) consistent with the service

If at any point the studs that hold the covers become loose in their engagement with the body ensure they are tightened and fully thread engaged in the tapped hole.

Contact Oxford Filtration for advise if required or unsure.

Clean basket before the differential pressure has reached 8psi (0.55 Barg)

Confirm:

- That the flow direction is correct (as shown by the markings on the inlet & outlet flanges) and that the chamber covers are uppermost
- There is enough space around the filter for maintenance and routine operation.
- That the basket assemblies are fitted and they are the correct filtration level.
- That there are no leaks. (Note: Air can be bled from the 'on-line chamber via the appropriate vent provided on the chamber cover.)
- Remove any flange or thread protectors and make sure there is no foreign or loose debris that could be carried downstream when fluid is introduced to the strainer.
- On DN150 (6") and DN200 (8") sizes ensure the equalizing piping provided is fitted so it can be used if required.
- If the strainers are to be stored, replace the flange or thread protectors and store the strainer indoors in a clean and dry environment.
- Ensure strainer is earthed as appropriate. Against an order, for example for an ATEX environment, special earth connections are included on the handle and the body and should be connected by a qualified electrician

NOTE:

1. Ideally it should be possible to isolate the filter.
2. For efficient operation, it should be possible to determine the pressure drop across the filter. The pressure drop across the basket should not exceed 1 bar.
3. For ease of operation drain valves should be considered.
4. Recheck materials are suitable for the application. Painting of cast iron is not suitable for full protection in outside exposed areas and other coatings are available on request.
5. If a differential pressure indicator adaption is fitted refer to specific operating instructions (Max temp 100ºC without special adaptation). A standard DP indicator should not be used on filtration Levels finer than 300 Mesh or on negative pressure on suction.

Oxford Filtration can supply, on request, gauges or switches to satisfy note 2 above and valves to satisfy note 3.

3. Routine Maintenance

3.1 Differential pressure - The differential pressure (pressure drop) across the filter should not exceed 1 bar (14.5 lb/in^2) Differential pressures in excess of 1 bar may cause irreparable damage to the basket and will ultimately cause the basket to burst. As the basket collects material (debris), the differential pressure will increase and before the differential pressure exceeds 1 bar, procedures 3.2 and 3.3 should be invoked.

3.2 Chamber change-over - To divert the process flow from one chamber to the other, rotate the change-over handle through 180^0, until it hits the end stop. The handle normally swings over the inlet port The on-line chamber is covered by the change-over handle as shown in figures 1 & 2.

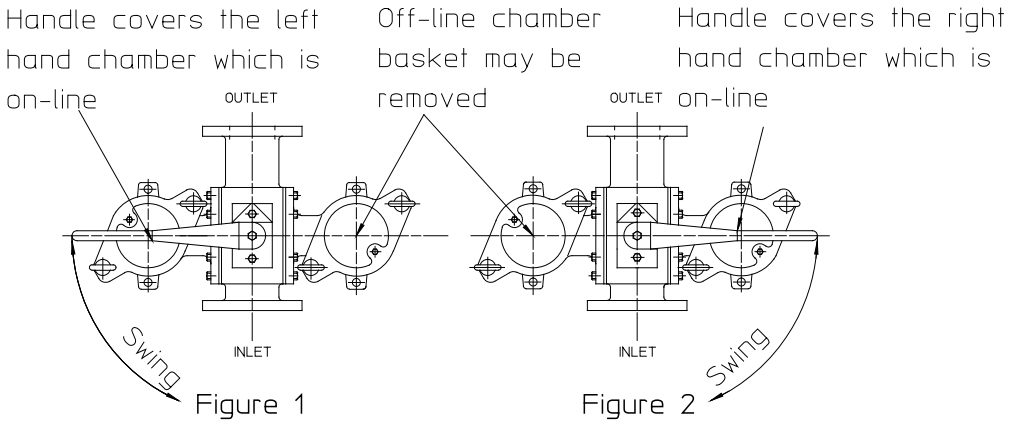


Figure 1 Left hand chamber on-line

Figure 2 Right hand chamber on-line

3.3 Basket removal and cleaning - check that the change-over handle is on its end stop. The chamber that can be worked on is the one that is NOT covered by the change-over handle. Refer to figures 1 & 2.

- With great care, vent the pressure in the chamber via the cover vent and drain the process fluid from the chamber via the drain plug. (Drain valve if fitted)
- Slacken and remove the chamber cover nuts, lift and swing the cover to expose the basket.
- The cover design varies on the 6" , 8" and 10" size units.On this open the cover by turning the tommy bar handle set and then loosening the yoke. On the 6" unit jacking screws are provided
- Lift out basket and wash thoroughly. Take care not to damage any mesh lining. Cleaning can be done by using a process compatible liquid or for course elements compressed air. A rolled supported cloth may be used inside to prevent contamination and damage if using compressed air and only from from outside to inside.
- For fine meshes do not use a compressed air line without great care as this may damage the mesh. A soft brush can be used but a trichloroethylene bath is often a good solution depending on the application/compatibility with process. Consult technical sales for details of this service. Often for fine meshes an internal support mesh welded inside the basket can be used to prevent damage during cleaning. Do not use a standard steel brush in cleaning the basket as this may lead to contamination and rust staining
- Check the basket and 'O' seal for wear or damage - replace as necessary. Check the chamber (especially the 'O' seal surface) is clean.
- Replace the basket. Note: Do not restrict the flow path by fitting the handle pillar in front of the inlet port.
- Clean the cover and inspect the 'O' ring for damage/wear - replace if necessary.
- Refit the cover and 'O' ring ensuring the basket handle is engaged with the cover and fixed. Refit and tighten the cover nuts. If at any point the studs that hold the covers become loose in their engagement with the body ensure they are tightened and fully thread engaged in the tapped hole. **Contact Oxford Filtration for advise if required or unsure.**
- The air must be removed from the filter by the use of the bleed screw.
- This chamber is now ready for use when required.
- Drain and vent piping should be installed to a safe area for all fluids and when water temperature is above 120F. Operator should wear appropriate protective clothing

3.4 Leakage: Any leakage should be cured immediately. Components should be checked for wear, corrosion or deterioration and replaced as necessary.

4. Ball seal replacement

After prolonged or arduous operation the ball seals may become worn resulting in unacceptable leakage into the standby chamber during routine basket cleaning. A smaller filter need not be removed from the pipeline to replace the ball seals (if there is sufficient room around the filter) but in most cases and with larger sizes it is easier to position the strainer on its side so the seal face is horizontal. Always support the filter appropriately.

5. Recommended Spares

The end user should consider the consequences of filter wear or failure and the level of on-site spares holding. The following is a recommended spares holding for most normal applications:

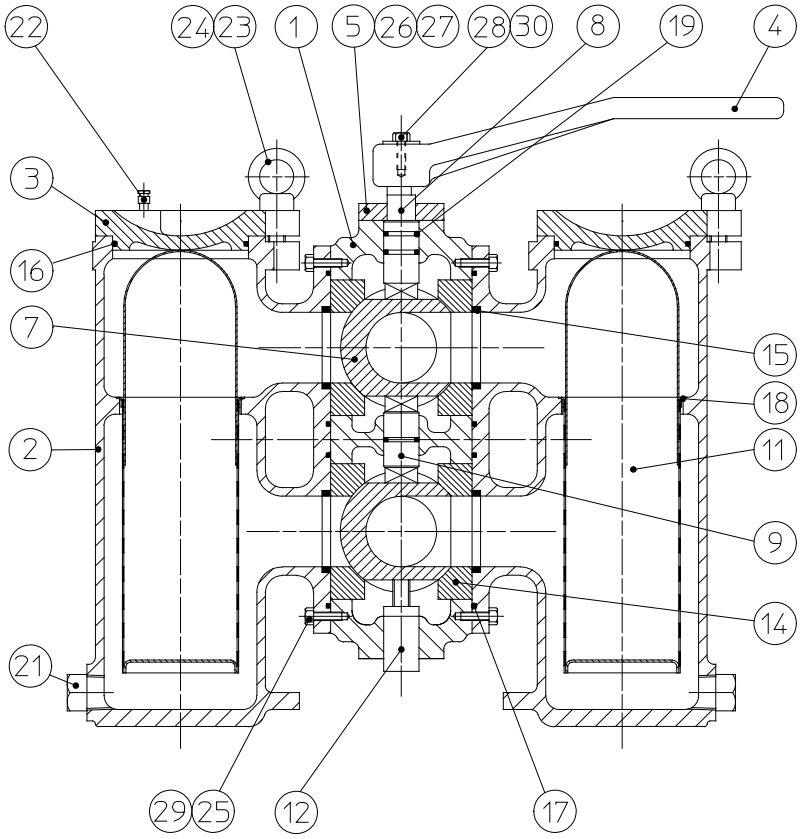
Seal kit	1 off
Basket assembly	1 off

Spare basket assemblies supplied from 1st October 2019 are supplied with a spare o ring seal. Ensure this is fitted with the new basket.

6. Fault Finding

Fault	Cause	Corrective action
6.1 Leaks		
6.1.1 body to cover leaks	(i) Dirt on seal face (ii) Cover displaced (iii) Seal missing (iv) Cover loose	(i) Clean seal face and re-fit (ii)Re-fit the cover (iii) Replace the seal (iv) Tighten cover nuts sufficient to prevent leakage
6.1.2 Bleed or drain leaks	As above (i) (iii) & (iv)	
6.2 Element not retaining debris	(i) Basket seal missing (ii) mesh damaged	(i) Re-fit seal (ii) Fit new basket
6.3 Excessive leakage from stand-by chamber during basket maintenance	(i) Worn ball seat (ii) Chamber to body bolting loose	(i) Replace seals (ii) Re-tighten to correct torque
6.4 Change-over handle difficult to move	(i) Differential pressure too high	(i) Equalise pressure
6.5 Leakage from stem	(i) Worn or damaged ‘O’ seal	(i) Re-fit seals
6.6 Leakage between basket chamber and valve body	(i) Worn or damaged ‘O’ seal	(i) Re-fit seals

7. Spares Identification



Item No	Description	No Off
1	Body	1
2	Element Chamber	2
3	Filter Cover	2
4	Changeover Handle	1
5	Stem	1
6		
7	Ball	2
8	Changeover Drive Shaft	1
9	Central Drive Shaft	1
10		
11	Element Assembly	2
12	Adjustment Nut Assembly	1
13		
14	Ball Seat	4
15	Ball seal	4
16	O Ring Cover	2
17	O Ring Body	4
18	O Ring Element	2
19	O Ring Drive Shaft	3
20		
21	Drain Plug	2
22	Vent Valve	2
23	Eye Bolt	4
24	Stud Cover	4
25	Stud Chamber	20
26	Setscrew	1
27	Setscrew	1
28	Setscrew	1
29	Plain Nut	20
30	Washer	1

PROJECTION

Item No	Ref.Number	Description	No Off	Material
1	12513	200DP Vertical	1	AL/AL
2	50051/2	1/4 BSP Straight Compression Nipple	2	Stainless Steel
3	50054/1	1/8 BSP Standpipe	2	Stainless Steel

Assembly Instructions:-

1. Remove blanking screws from body of strainer.
2. Wrap PTFE tape around exposed threads of item 2 & 3.
3. Insert Item 2 into gauge loosely, **DO NOT** tighten.
4. Insert item 3 into filter body, **DO NOT** tighten.
5. Align and push gauge (fitted with item 2) onto filter (fitted with item 3). Ensure gauge is the correct way up.
6. Tighten Item 3 into filter body firmly, **DO NOT** over-tighten.
7. Tighten item 2 into gauge firmly, **DO NOT** over-tighten.
8. Check gauge is still pushed firmly onto connecting pieces.
9. Tighten the central compression nut of item 2 onto the coupling stem of item 3, compressing the sealing olive within the joint.

NOTE:-
TO BE SUPPLIED IN COMPONENT
FORM AND PACKAGE IN CARTON
FOR CUSTOMER ASSEMBLY

MATERIAL	DESCRIPTION	
OXFORD FILTRATION LIMITED	D.P. INDICATOR KIT DUAL AND SINGLE FILTERS	
© 2015 The drawing and the design in the property of Oxford Filtration Limited and must not be copied or used for manufacture other than for which it was supplied unless expressly stated in writing	DRG NO. 12075	ISS 2

- The user must satisfy himself as to the suitability of the equipment for the intended application.
- Oxford Filtration Ltd., cannot be held responsible for any damage caused by the filter or for any consequential damages.
- The right is reserved to amend specifications without notice.

INSTALLATION & OPERATING INSTRUCTIONS FOR EQUALIZER ON 4”, 6” & 8” OXFORD DUPLEX

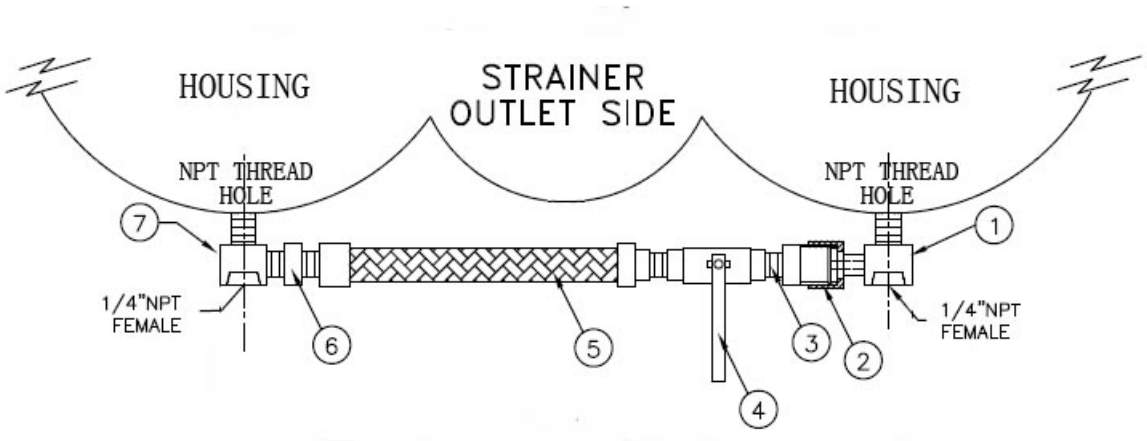
Normally the equalizer is not required on filters up to and including 4” but should always be fitted on 4” 6” & 8” duplex strainers, otherwise it may be too difficult to turn the handle to transfer flow to the off-duty chamber. The equalizer will reduce the pressure differential between the two sides of the ball valve, which will reduce the force required to turn the handle.

INSTALLING: Please see below picture.

1， Remove ‘item 2’ (connector) to separate the equalizer into two parts.
2， Remove the two drain plugs from the lower section of the two housings.
3， Fit Part 1 & 7 to these exposed NPT threaded holes in the two housings. PTFE sealing tape should be used to avoid leakage.
4， Fit the drain plugs removed at step 2 into the 1/4” NPT FEMALE thread of part 1 & 7. PTFE sealing tape should be used to avoid leakage.
5， Re-fit ‘item 2’ (connector) to join the two parts of the equalizer.

OPERATING:

1， The equalizer valve handle is normally in the middle position to isolate the two chambers from each other.
2， Turning the handle of the equalizer valve, 90 degrees, opens the pipe to both chambers equalizing the pressure between chambers.
3， Turn the main handle on top of the strainer to transfer flow to the ‘clean’ basket.
4， Turn the handle of valve on the equalizer back to the middle ‘closed’ position to isolate the chambers.
5， Bleed all air from the (now operational) chamber to allow proper functioning of the strainer system.



TOP VIEW