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**OXFORD  
FILTRATION  
LIMITED**

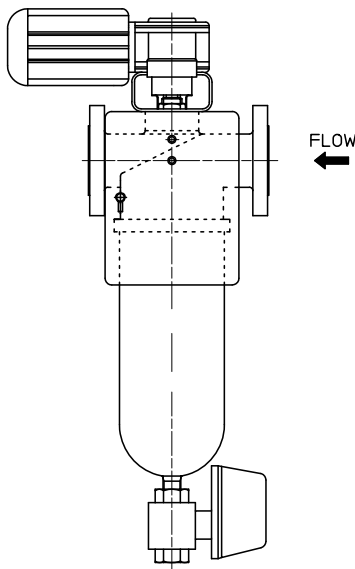
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Unit 15, Bridgewater Way, Windsor, Berkshire, SL4 1RD. U.K.

**INSTALLATION, OPERATING & MAINTENANCE  
MANUAL**

FOR THE  
OXFORD FILTRATION LIMITED

**FULLY AUTOMATED  
LP SELF CLEAN FILTER**



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## **Important Safeguards**

- Use the filter only as described in this manual.
- The filter is for use on liquids only.
- 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 97/32/EC at pressures that mean the strainer fall under a self certified conformity assessment as defined by Directive 97/32/EC. 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 14 barg at 50°C. But 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.
- The maximum operating temperature we would suggest is 100°C on our standard Self Clean Filter. If the temperature is in excess of this please discuss with our technical department.
- Ensure the inlet pressure and temperature is less than that shown on the filter identification label and that the flange drillings are suitable for the application.
- Check filter housing material and seals for the intended duty. Use depends on factors such as chemical compatibility, temperature of use etc. If in doubt at all please consult with our technical sales team. Seals used with stainless steel filter are fitted as standard in viton but available in Nitrile/Buna n or EP/EPDM on request or with high pressure adaption FEP encapsulated may be used throughout. The seal temperature limits assume complete chemical compatibility with the fluid. Care should be taken with any fluid at elevated temperature especially above 100°C. Do not allow the fluid to freeze in the filter.
- Ensure the power supply voltage is compatible with the control panel, discharge valve and cleaning motor.
- Ensure the control panel can be electrically isolated and before working on electrical equipment, isolate the supply.
- Ensure all electrical enclosure covers are correctly fitted and that the control panel cover plate is in place before applying electrical power to the filter assembly. Do not allow water or other contaminants to enter the control panel or the terminal boxes of any of the electrical equipment.
- 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 repaired and re-tested.
- Use only the manufacturers recommended attachments and genuine spares.
- Retain this Manual for future reference.

## **1. Installation**

Install the filter in the pipeline using appropriate seals and attachments that comply with the relevant codes. Pipe the waste away from the discharge valve appropriately. Wire the control panel as shown in the wiring diagram. Ensure the earth connections are good. Confirm:

- that the flow direction is correct (as shown by the arrows cast on the head of the filter).
- there is enough space around the filter for maintenance and routine operation.
- that there are no leaks.
- that the cable entry points are suitably sealed to prevent water and contaminant ingress.

The user has the option to add remote 'Healthy' and/or 'Fault' indicating devices across terminals 24/25 and/or 26/27 respectively as shown on the circuit diagram. The user also has the option to have the cleaning motor and/or discharge valve operate at fixed time intervals by linking terminals 20/21 and/or 22/23 and adjusting timers T4 (motor) and/or T3 (valve) as appropriate.

- NOTE:
1. Ideally it should be possible to hydraulically isolate the filter.
  2. Ensure the cover inside the control panel is in place before power is applied.
  3. The maximum current drawn by a single motor/single valve systems is :-
    - 400V/440V 3-phase systems: 2.3A
    - 220V/240V single phase systems: 2.6A
    - 110V/120V single phase systems: 5.9AThe current draw by remote 'healthy' and/or 'fault' indicating devices (if used) should be limited to 0.2 amps per device.
  4. The current draw when the filter is in 'stand-by' mode is less than 0.02 amps.

## **2. Commissioning**

**2.1 Mode of Operation:** As the filter collects debris, the pressure drop across the filter increases. This increase will operate the Differential Pressure (DP) switch (which is factory set at 0.35bar / 5 lb/in<sup>2</sup>). The operation of this switch causes the cleaning motor to run for a fixed time, thus removing the debris from the element. After a number of motor operations the discharge valve will open (and then close) to discharge the debris from the filter.

The motor and discharge valve can be manually operated by pressing buttons 'A' or 'B' respectively inside the control panel.

As an option, the motor and/or discharge valve can be cycled at fixed times intervals (if the appropriate links are in place in the control panel – see section 1, Installation).

The following parameters can be changed:

- The time the cleaning motor rotates (T1).
- The time the discharge valve remains fully 'open' (T2).
- The number of times the cleaning motor operates before the discharge valve operates (C1).
- The fixed time interval between repeat cleaning motor cycles, T4 (If terminal 20 is linked to 21 – customer option)
- The fixed time interval between repeat discharge valve cycles, T3 (If terminal 22 is linked to 23 – customer option)

**2.2 Commissioning Checks:** It is important to verify the overload setting and fuse are correct type for the cleaning motor and all appropriate mains wiring is complete before re-placing the cover inside the panel.

The following checks are recommended before fluid is passed through the filter:

**NOTE:** The cover inside the panel must be in place before power is applied.

- i. Confirm the green 'healthy' lamp is illuminated and the red 'fault' lamp is extinguished.
- ii. Check that the discharge valve is 'closed'.
- iii. Press button 'A' and confirm the cleaning motor rotates anti-clockwise when viewed from above.
- iv. Press button 'B' and confirm the discharge valve opens and then closes.
- v. The cleaning motor run time (T1); the discharge valve 'open' time (T2), and the ratio of motor operations to discharge valve operations (C1) are set to the desired values. (See section 2.3)
- vi. If links for the cleaning motor repeat cycle (T4) and/or discharge valve repeat cycle timer (T3) are in place, confirm the repeat cycle times are as desired.

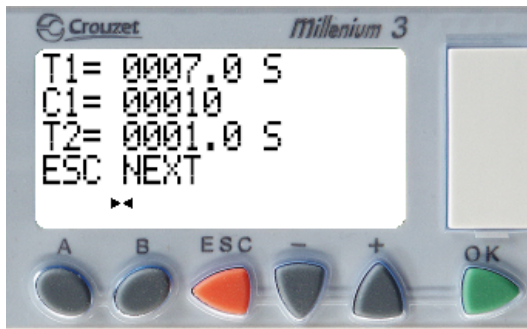
**NOTE:** See section 2.4 for suggested timer and counter values.

**2.3 Changing the timers and counters:** To change any of the timers or counters referred to in section 2.2 (v) or (vi):-

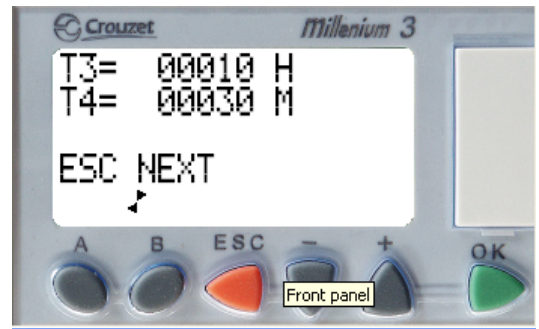
- a) Press 'ESC' to scroll through the menu pages and press the '+' and '-' keys to highlight specific timers or counters on the selected page.
- b) When the desired menu/timer is highlighted, press 'OK', then use the '+' and '-' keys to change the selected value. Press 'OK' to accept the revised value.
- c) Repeatedly press 'ESC' to return to the main menu or to select another menu page.



Control panel main menu



First menu screen showing Cleaning Motor run time timer T1 (seconds) Motor/Valve opening ratio counter C1 and Discharge valve 'open' timer T2 (seconds).



Second menu screen showing the optional Valve repeat cycle timer T3 (Hours) and the Motor repeat cycle timer T4 (Minutes)

**2.4 Suggested timer & counter Values:** The user should chose timer and counter values suitable for the application. The following are suggestions based on typical situations and should be modified by the user as a result of operational experience

Timer/Counter	Low viscosity Coarse element	Low viscosity Fine element	High viscosity Coarse element	High viscosity Fine element	Factory settings
Motor run time (T1)	5 seconds	10 seconds	15 seconds	15 seconds	7 seconds
Motor/Valve ratio (C1)	20	30	10	5	10
Valve open time (T2)	1 second	1 second	2 seconds	2 seconds	1 second

Motor and Valve repeat cycle timers (if used) should be set at the users discretion. The factory settings are:

Motor repeat cycle timer: 30 minutes

Valve repeat cycle timer: 10 hours

**2.5 Caution.:** For normal operation the differential pressure should be less than 0.5 bar. The differential pressure should not exceed 3 bar at any time. Differential pressures in excess of this value may result in permanent mechanical damage and we would recommend the re-calibration of the differential pressure switch.

**NOTE:**

1. Motor repeat cycle timer units are minutes; Valve repeat cycle timer units are hours. (These repeat cycle timers are only operational if the appropriate links are in place in the control panel – see the circuit diagram)
2. The cleaning motor repeat cycle timer resets to zero if the cleaning motor operates for any other reason. Similarly the valve repeat cycle timer resets to zero if the valve operates for any other reason.
3. It would be unusual to set the cleaning motor to discharge valve operation counter (C1) to a value greater than 100.

### **3. Operation**

**3.1 Normal operation:** The green lamp should be illuminated and the filter will clean itself and discharge the collected debris automatically. There is no need for manual intervention.

**NOTE:** The cleaning motor operates to discharge valve operation counter (C1) and (if used) the discharge valve repeat cycle timer does not re-set to zero when the power to the control panel is turned 'off'.

**3.2 Fault Conditions:** If the red lamp is flashing 'on' and 'off', there is a problem with the filtration system which should be cured immediately. The display inside the control panel will indicate the problem. Fault conditions include:

- Discharge valve failed to 'open'
- Discharge valve failed to 'close'.
- High differential pressure.
- Motor circuit fault (usually fuse F2 'blown' in single phase systems or overload tripped in 3 phase systems)

If the red lamp is flashing and the green lamp is illuminated, the panel is indicating that there was a fault that has subsequently righted itself. The display in the control panel will indicate the type of fault.

Once the fault has been cured, the flashing red lamp can be extinguished by pressing the 'OK' button in the control panel. The display will return to the menu page.

If Differential Pressure switch 1 remains 'on', the discharge valve will open (and then close) after two minutes of continuous motor operation. Differential pressure switch 2 will cause similar valve operations but the green lamp will extinguish and the red lamp will 'flash' indicating 'high differential pressure'.

**NOTE:**

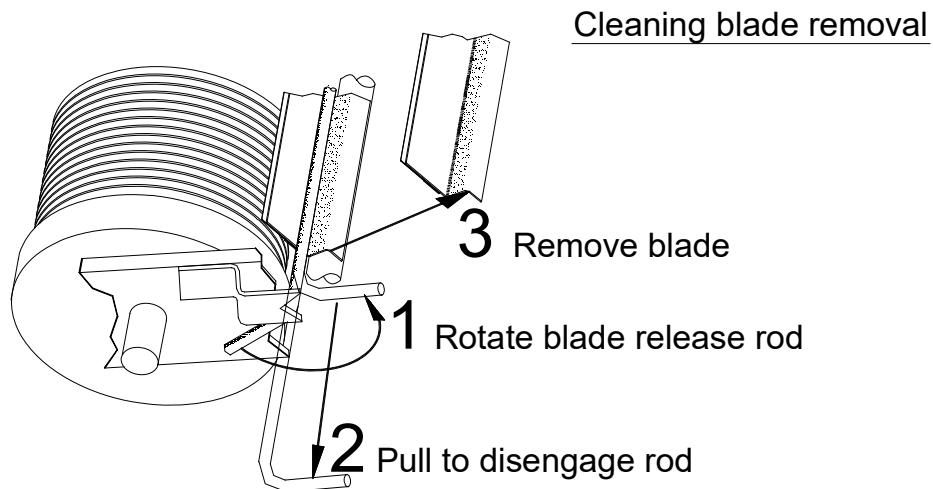
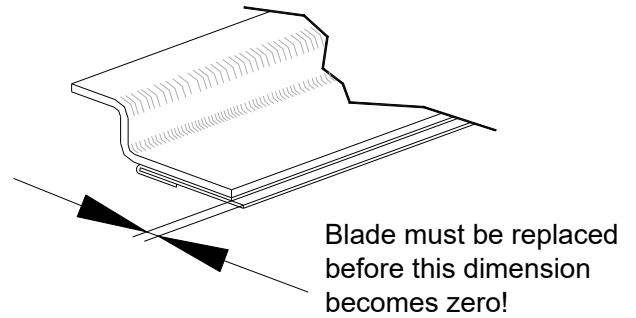
The unit is not designed to be run with the Cleaning motor or discharge valve operating continuously and appropriate advice should be sought if this occurs during commissioning or during normal operation

**4. Routine Maintenance**

**4.1 Leakage:** Any leakage should be cured immediately. See Section 5 'Trouble Shooting'.

**4.2 Blade wear:** The rate of blade wear varies from application to application. Initially the blades should be checked after 3-4 days and then monthly. As experience is gained this period may be extended. It is the users responsibility to ensure that blade wear does not exceed an unacceptable level.

**CAUTION:** The blades are sharp – handle with care



**Element wear:** Elements wear very slowly compared with the blades. However, they should be examined for wear regularly and replaced as necessary.

**4.3 Bearing wear:** The shaft bearing and element bearing should be checked for wear regularly and replaced as necessary.

4.4 Control panel & automation components: Cable entry points should be checked to ensure good seals are maintained.

4.5 Other Components: All other components should be checked for wear, corrosion or deterioration and replaced as necessary.

## 5. Trouble Shooting

Problem	Cause	Cure
<p>5.1 <u>Leaks.</u></p> <p>5.1.1 Head to bowl leak</p> <p>5.1.2 Leakage around the shaft.</p>	<p>(i) Dirt on seal face.</p> <p>(ii) Bowl displaced.</p> <p>(iii) Seal missing.</p> <p>(i) Gland packing not compressed sufficiently.</p> <p>(ii) Leaks persist after gland compression screw tightened.</p>	<p>(i) Clean seal face and re-fit the bowl.</p> <p>(ii) Re-fit the bowl.</p> <p>(iii) Replace the seal.</p> <p>(i) Tighten the gland compression screw (but do not over-tighten!)</p> <p>(ii) Re-pack the gland and if worn, replace the shaft.</p>
<p>5.2 <u>Element not clean.</u></p>	<p>(i) Blades incorrectly assembled.</p> <p>(ii) Blades worn.</p> <p>(iii) Cleaning motor not operating</p> <p>(iv) Motor to shaft drive pin broken.</p> <p>(v) Motor or wiring failed.</p> <p>(vi) Debris loading too high.</p> <p>(vii) Fibrous material present.</p> <p>(viii) Cleaning motor rotating the wrong direction.</p> <p>(ix) Red LED flashing (See 5.4)</p> <p>(i) Power supply failed</p> <p>(ii) Control panel fuse F1</p>	<p>(i) Re-fit blades.</p> <p>(ii) Fit new blades.</p> <p>(iii) Confirm panel 'green' lamp is 'on' &amp; wiring is good. Press button 'A' in control panel. If motor does not operate, suspect one of the following</p> <p>(iv) Replace drive pin.</p> <p>(v) Replace.</p> <p>(vi) Reduce flow or reduce debris load or increase element rating or fit pre-filter.</p> <p>(vii) Eliminate fibrous material.</p> <p>(viii) Re-wire motor to rotate anti-clockwise when viewed from above</p> <p>(ix) Reset overload (3 phase) or replace fuse F2 (single phase)</p> <p>(i) Re-instate power supply.</p> <p>(ii) Replace fuse after</p>



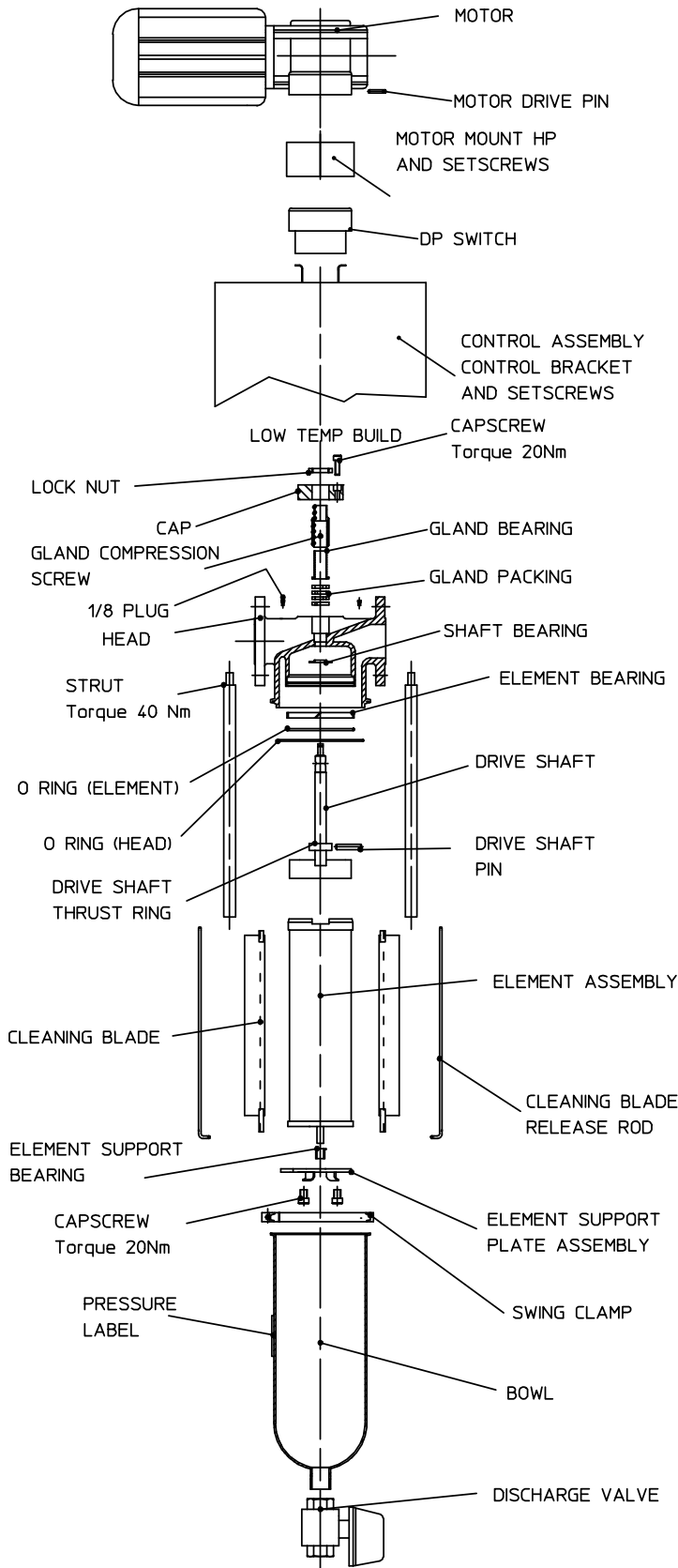
<p><u>5.3 Green and red lamps extinguished</u></p>	<p>'blown'. (iii) Corrupted Control panel logic.</p>	<p>rectifying cause. (iii) Turn the power 'off' then 'on'.</p>
<p><u>5.4 Green lamp extinguished; red lamp 'flashing'</u></p>	<p>(i) The control panel has detected a fault condition.</p>	<p>(i) The fault will be shown on the control panel display. Correct the fault as appropriate. Extinguish the red lamp by pressing 'OK'.</p>
<p><u>5.5 Green lamp illuminated; red lamp 'flashing'.</u></p>	<p>(i) The control panel has detected a fault that has subsequently cured itself.</p>	<p>(i) The fault will be shown on the control panel display. Extinguish the red lamp by pressing 'OK'.</p>
<p><u>5.6 Cleaning motor runs continuously/frequently.</u></p>	<p>(i) DP switch wiring problem. (ii) DP too high  (iii) Element not cleaning properly.</p>	<p>(i) Check DP switch wiring. Use NO contacts in switch. (ii)(a) Reduce flow rate/viscosity/dirt content. (ii)(b) Select larger filter. (iii) See 5.2.</p>
<p><u>5.7 No flow from discharge valve</u></p>	<p>(i) Valve wiring problem (ii) Valve blocked. (iii) Valve jammed (iv). Motor to valve linkage broken. (v) Actuator failed (vi) Filter at less than atmospheric pressure. (vii) Indeterminate problem.</p>	<p>(i) Check wiring. (ii) Clean valve. (iii) Un-jam valve (iv) Replace linkage.  (v) Replace actuator. (vi) Contact Oxford Filtration  (i) Turn the power 'off' and back 'on'.</p>
<p><u>5.8 Control panel malfunction</u></p>		

## **6. Recommended Spares**

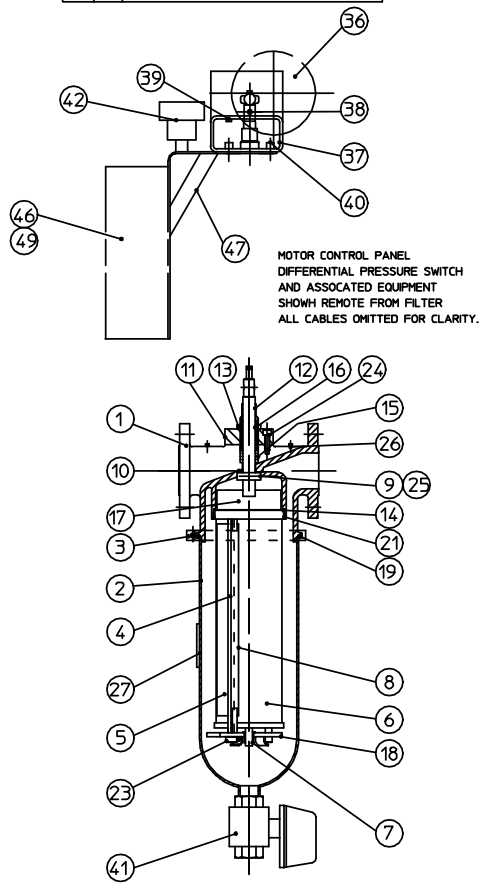
The user should consider the consequences of filter wear or failure and the level of on-site spares holding. The following is a recommended spares holding for most normal applications:

Cleaning blades	2 off
Seal kit	1 off
Element support bearing	1 off
Shaft bearing	1 off
Element	1 off

# SPARES IDENTIFICATION



Item No	No Off	Description
1	1	Head
2	1	Bowl
3	1	Band Clamp
4	2	Strut
5	2	Cleaning blade release rod
6	1	Element (see order for micron rating)
7	1	Element support bearing
8	2	Cleaning blade
9	1	Drive shaft thrust ring
10	1	Shaft bearing
11	1	Cap
12	1	Gland compression screw
13	1	Compression Screw lock
14	4	Element Bearing (St St Head Only)
15	1	Gland Packing
16	1	Gland Bearing
17	1	Drive shaft Assembly
18	1	Element End plate Assembly
19	1	O-ring cover
20		
21	1	O-ring element
22		
23	2	Socket head setscrew
24	3	Socket head setscrew
25	1	Roll pin
26	2	Male plug
27	1	Label
28		
36	1	Gear Motor
37	1	Motor mount
38	1	Motor drive pin
39	6	Set screw
40	3	Set screw
41	1	Discharge Valve
42	1	DP Switch
46	1	Control Panel
47	1	Control Panel Bracket
49	4	Fixing screws



- ❖ 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.