LAMINAR DOWNFLOW MODULE

OPERATION & MAINTENANCE MANUAL

ENVIRCO Technical Support: 800-884-0002

ENVIRCO®
Innovators in clean air technology

Table of Contents

Table of Contents

■ A. UNCRATING INSTRUCTIONS

The ENVIRCO equipment should be uncrated and inspected for shipping damage immediately upon arrival. If any external damage is observed, a claims report should be filled out and promptly sent to the responsible carrier. Otherwise, uncrate and examine for internal damage.

If shipping damage is discovered inside the crating, file claim with the responsible carrier immediately. Shipping components list and actual material received should be compared and any shortages reported to ENVIRCO immediately.

NOTE: Remove shipping blocks inside blower housing from motor/blower assembly(s).

■ 1.0 INTRODUCTION

This manual provides the necessary information for the operation and maintenance of Laminar Down Flow Modules manufactured by ENVIRCO.

The information in this manual is divided into sections to enable personnel to install, operate, maintain and trouble shoot the equipment. A recommended Spare Parts List is provided for the requisition of replaceable components.

Personnel should thoroughly acquaint themselves with the information contained in this manual before placing the equipment into operation. Proceeding within the recommended operating parameters and adhering to the maintenance requirements will ensure the proper and satisfactory operation of the equipment.

Warnings, cautions, and notes are used to emphasize information throughout the manual. Pay strict attention to all warnings, to avoid damage. Notes will call attention to work simplifications or additional information.

The ENVIRCO Laminar Downflow Module is a completely self-contained unit that provides a Class 100 (current Federal Standard 209) environment to a critical work area when used with proper enclosure. The unit keeps external contamination from entering the work area and sweeps contamination generated within the work area away using its unique laminar airflow pattern.

Air enters the module through the prefilter media contained in perforated panels on the front and bottom of the blower housing. The media removes larger particles before air is forced into the plenum by blower(s). Air is introduced to the work area via High Efficiency Particulate Air (HEPA) (Filter Framing and Pawls, U.S. Patent No. 3,280,540) filters which remove particles 0.3 microns and larger and impart a unidirectional or laminar flow pattern to the air. Air moves through the work area at a uniform velocity of 90 ± 20% feet per minute and exits below the Downflow Module.

2.0 ASSEMBLY INSTRUCTIONS

2.1 Suspended Module

2.1.1 After determining Module location, provide means for anchoring Module to structure above.

2.1.2 Lift Module slightly above desired operating height.

2.1.3 Using hanger rods with turnbuckles, install one end of rods in hangers located at corners of Module. Fasten other end of rods to structural anchorage.

2.1.4 Remove hoist and level Module using turnbuckles between upper and lower rods.

2.1.5 If units are joined, end-to-end or side-by-side, refer to page 18.

2.2 Module with Support Legs

2.2.1 Lift Module to at least operating height desired after installation.

2.2.2 Position support leg so that holes in leg and holes in leg mounts on Module are in alignment. Secure leg to leg mount channel with hardware provided. Refer to page 19.

2.2.3 Repeat Step 2.2.2 for each leg of assembly.

2.2.4 Lower Module so it is supported by legs.

2.2.5 Install fluorescent lamp tubes and plastic light diffusers in light wells.

3.0 INSTALLATION OF HEPA FILTERS

3.1 The Enviralok® System has been designed for the easy installation and removal of standard HEPA Filters with the use of a 1 /4" allen wrench while providing an air-tight mechanical seal which does not rely on additional sealants, liquids or greases. The retaining mechanism has been designed around a patented integral self-compensating locking pawl system which has no loose parts during installation or the removal procedure. Since HEPA filters are never shipped in ENVIRCO products employing the Enviralok System, in order to avoid damage during transit and installation, careful attention must be paid to the following instructions in order for the system to achieve the full benefit of its unique design:

3.2 Once the framing system has been installed and the "heavy" work is complete and the construction personnel traffic is to a minimum, only then should installation of the HEPAfilters be considered.

3.3 Carefully remove the HEPA filters from their shipping containers. Inspect for obvious shipping damage. Ideally, the filters should be stored in an area with the least personnel traffic and minimal construction activity.

3.4 Clean the flange and web areas of the frame to which the filter is to be inserted.

3.5 Turn all the pawl screws counter-clockwise so the pawl finger withdraws within the body of the frame ember until approximately 1 /4" protrudes from the frame.

3.6 Insert the filter (gasketed edge first) into the frame. A series of "clicks" will be heard as the pawl fingers engage the flange portion of the frame. While there will be a fast succession of several"clicks" it does not mean that all of the pawl fingers have engaged.

3.7 Center the filter with respect to the Enviralok frame using a 1 /8" spacer at the bottom and sides of each filter.

3.8 One-by-one, slowly turn the pawl screws until there is a slight inward movement of the filter. This will be an indication that the pawl is properly engaged on the frame of the filter. Once this movement is detected, stop and go on to the next pawl. If after turning the pawl screw clockwise there is no filter movement it is an indication that the pawl finger is beyond the filter frame and further tightening will only wedge the pawl finger between the filter frame and Enviralok frame causing a widening of the space between them. If this occurs, turn the pawl counter-clockwise until the stem is approximately 1" extended. During this time a "click" may be heard as the pawl finger engages. Turn the pawl screw clockwise once again until movement of the filter is detected.

NOTE: Special attention must be given to a pawl which locks down two adjacent filters. Both filters must show movement to assure that both fingers of the pawl are properly engaged on the filter frames. 3.9 Once it is determined that all of the pawls are engaged, uniformly tighten the pawl screws about the frame until all of the movement is gone between the filter frame and Enviralok and the filter is “snug” within the framework. DO NOT OVERTIGHTEN.

3.10 Final tightening of the filter within the frame shall be accomplished during the leak test, that is, the pawls shall be tightened until the leak test parameters are satisfied. NO MORE, NO LESS.

3.11 Once the framing system, together with the filters in-place have been leak checked and passed, the protective screens can then be installed.

3.12 To remove the filters, the pawl screws are to be turned counter-clockwise until the fingers are completely disengaged from the filter frame at which time the filter will be free from the frame.

4.0 VINYL CURTAIN INSTALLATION

4.1 Remove vinyl curtains from shipping containers.

4.2 Determine location of curtain opening and install curtain by pressing pile portion of curtain onto hook portion on lower part of the Enviralok® frame.

4.3 Repeat Step 4.2 for all curtains, noting alternate hook and pile for adjoining curtains.

4.4 Close curtain openings by pressing hook and pile together.

5.0 ELECTRICAL

5.1 If control panel is ordered with Module, mount in selected location.

5.2 Wiring from power to control panel and from control panel to Module should be done observing local electrical codes.

5.3 Wiring for motor(s) terminates at motor(s) and wiring for lights terminates at junction box inside blower housing.

NOTE: If Module is to be portable, control panel may be mounted on support leg near blower housing. Size of connecting cord and type of plug should be selected observing local electrical safety codes.

5.4 After electrical wiring is completed, turn unit on to verify proper operation of motor(s) and lights. Verify lower rotation.

6.0 ADJUSTING AIRFLOW

6.1 Testing

This Section covers testing to determine the average velocity and uniformity in feet/minute of the airflow through the work area of the equipment.

6.2 Equipment

AI nor Type 3002 Velometer; Type 1520 thermo-anemometer or equivalent.

6.3 Test Procedure

6.3.1 Calibrate instrument in accordance with manufacturer's instruction.
6.3.2 Verify that area is free of strong ambient air currents (20 fpm max.) and turn unit on.
6.3.3 Hold velometer at test position and read average needle indication.

6.4 Test Positions

6.4.1 To establish test positions, define an imaginary grid pattern across the protective screen surface.

6.4.2 Take readings on 20-24 inch grid centers, approximately 12 inches from filter face and 6 inches from enclosure sides.

6.4.3 If Module does not have a vinyl curtain enclosure, a temporary enclosure must be placed around the Module to confine the airflow.

6.5 Readings

6.5.1 Arithmetic average of readings taken should be 90 ± 20o/o feet per minute.
6.5.2 High or low average air velocity can be adjusted by resetting the pulley on the motor(s).

6.0 ADJUSTING AIRFLOW (CON'T)

6.6 Adjustments in Airflow

6.6.1 Open front prefilter screen to expose motor:

6.6.2 Loosen set screws on exterior blade of pulley.

6.6.3 Release belt tension by moving motor forward with adjustment bolt on mounting base. Remove belt.

6.6.4 Tighten exterior blade of pulley to produce higher airflow, loosen to produce less airflow.

6.6.5 Tighten pulley set screw, being certain it bears on flat portion of pulley shaft.

6.6.6 Reinstall belt.

6.6.7 Adjust belt tension by reverse of 6.6.3, to slack of 1 /2".

6.6.8. Close prefilter panel.

6. 7 Final Check

6.7.1 Readings should be retaken to verify proper velocity in work area.

7.0 FILTER LEAK TEST

7.1 Testing

This Section covers testing of the clean air device to insure that the filter contains no pinhole leaks and that the filter is installed so that no leakage occurs around the sealing gaskets. Minimum penetration values of 0.01% of a cold generated DOP aerosol are determined by this procedure.

7.2 Equipment

7.2.1 Light scattering aerosol photometer with 1 CFM sample flow rate, Sinclair-Phoenix Model JM-2000, or equal.

7.2.2 An “aersol challenge” generator with Laskin type atomizing nozzle.

7.3 Test Procedure

7.3.1 Calibrate photometer in accordance with manufacturer’s instructions.

7.3.2 Connect “aersol challenge” generator to air pressure. Place generator output tube at intake of blowers. Loosen one HEPA filter, place sampler at cellside to measure upstream concentration.

7.3.3 Adjust aersol generator to produce required upstream reading on photometer.

7.3.4 Scan the entire HEPA filter area with overlapping strokes. Scan separately the periphery of the filter along the bond between the filter pack and the frame, along all joints in the metal equipment frame and the seal joint between the frame and the sides of the equipment. Hold probe 1 inch to 2 inches from filter.

7.3.5 Identify any pinhole leaks and caulk with room temperature vulcanizing silicone as necessary to eliminate.

7.3.6 Normal upstream concentration setting is 4.0 scale reading. Allow no leaks above 0.1 scale reading to obtain a 0.01% maximum penetration level.

8.0 OPERATING TECHNIQUES

8.1 Interior of enclosure below Downflow Module should be kept clean and free from particles. Wipe daily with a cloth dampened with a normal nonabrasive cleaner.

8.2 When the module has been idle or when activities change, the work surfaces should be wiped clean as in Step 8.1 above and -blower allowed to operate for at least 5 minutes before activities commence.

8.3 If the module has been off for an extended period of time, in addition to step 8.2 above, HEPA screens should be vacuum cleaned with a soft brush attachment before performing cleaning operations as in step 8.2.

8.4 All material (instruments, containers, fixtures, etc.) should be cleaned before being transferred to the work area.

8.5 The work area should be kept free of unused items to maximize work space and cleanliness levels.

8.6 Avoid placing obstructions directly between the clean air supply and critical activities.

8.7 Paper, paper products, and other lint producing products should be avoided as much as possible inside the work area.

9.0 MAINTENANCE AND SERVICE

9.1 Prefilter Replacement
The prefilter at the front and bottom of blower housing should be replaced every 60 to 90 days, depending on dust accumulation.

9.2 Check of Blower Drive Belts
Check blower drive belts every 90 days. Adjust tension and/or replace as necessary.

9.3 Motor Lubrication
Lubricate motors equipped with non-sealed bearings every 6 months.

9.4 Check of Airflow
To maintain proper air velocity in work area, check airflow and adjust pulley on motor as required to compensate for increase in static pressure due to HEPA filter loading. When proper airflow cannot be maintained with clean prefilter media, HEPA filters should be replaced. HEPA filters will require replacement every 2 to 4 years under normal conditions.

9.5 HEPA Filter Replacement

9.5.1 Remove HEPA screen and replace after new filter is installed.

9.5.2 To change HEPA filters, use a 1 /4” allen wrench to loosen pawl screws holding filters in place. This retracts built-in pawls and allows filter to slide out of filter frame.

9.5.3 Adjust pawls on filter framing system so they extend into the filter opening approximately 1 /4”.

9.5.4 With gasket on HEPA filter toward the bearing flange of the filter frame, lift filter into opening until it slides past pawls and pawls snap into place over flanges on aluminum framed filter.

9.5.5 Repeat Step 9.5.4 for each filter

9.5.6 Insert 1 /8” spacers at each end of the filter to center the filter in the frame opening. Tighten the end pawl screws until the face of the screws are flush with the frame surface. Tighten the balance of the pawl screws in the same manner.

CAUTION: Do not overtighten.

9.5.7 Install HEPA protective screens over the HEPA filters using the hardware furnished, after Section 7 .0, “Filter Leak Test”, is completed..

10.0 TROUBLESHOOTING

10.1 Room Air Supply Inoperative

10.1.1 Check power supply to room for circuit failure

10.1.2 Place blower power supply switch in STOP position, wait 1 0 minutes for thermal overload to reset, then place switch in START position.

NOTE: When thermal overload has reset, check motor operating amperage to assure that draw does not exceed nameplate rating.

10.1.3 Check wiring for possible shorts or opens: repair or replace as necessary.

10.1.4 Check blower motor for burn out; repair or replace as necessary.

10.2 Low Air Velocity

10.2.1 Check prefilter media; replace as necessary.

10.2.2 Adjust motor pulley for higher blower output.

10.2.3 Check power supply for proper voltage, amperage, and distribution frequency (cycles per second).

10.2.4 Replace HEPA filters (Refer to Section 9.5.)

10.3 High Air Velocity

10.3.1 Adjust motor pulley for lower blower output.

10.4 Excessive Vibration or Noise

10.4.1 Check blowers and motors for bearing damage; repair or replace as necessary.

10.4.2 Check blowers for loose mounts; tighten as necessary.

10.0 TROUBLESHOOTING

10.1 Room Air Supply Inoperative

10.1.1 Check power supply to room for circuit failure
10.1.2 Place blower power supply switch in STOP position, wait 1 0 minutes for thermal overload to reset, then place switch in START position.

NOTE: When thermal overload has reset, check motor operating amperage to assure that draw does not exceed nameplate rating.

10.1.3 Check wiring for possible shorts or opens: repair or replace as necessary.
10.1.4 Check blower motor for burn out; repair or replace as necessary.

10.2 Low Air Velocity

10.2.1 Check prefilter media; replace as necessary.
10.2.2 Adjust motor pulley for higher blower output.
10.2.3 Check power supply for proper voltage, amperage, and distribution frequency (cycles per second).
10.2.4 Replace HEPA filters (Refer to Section 9.5.)

10.3 High Air Velocity

10.3.1 Adjust motor pulley for lower blower output.

10.4 Excessive Vibration or Noise

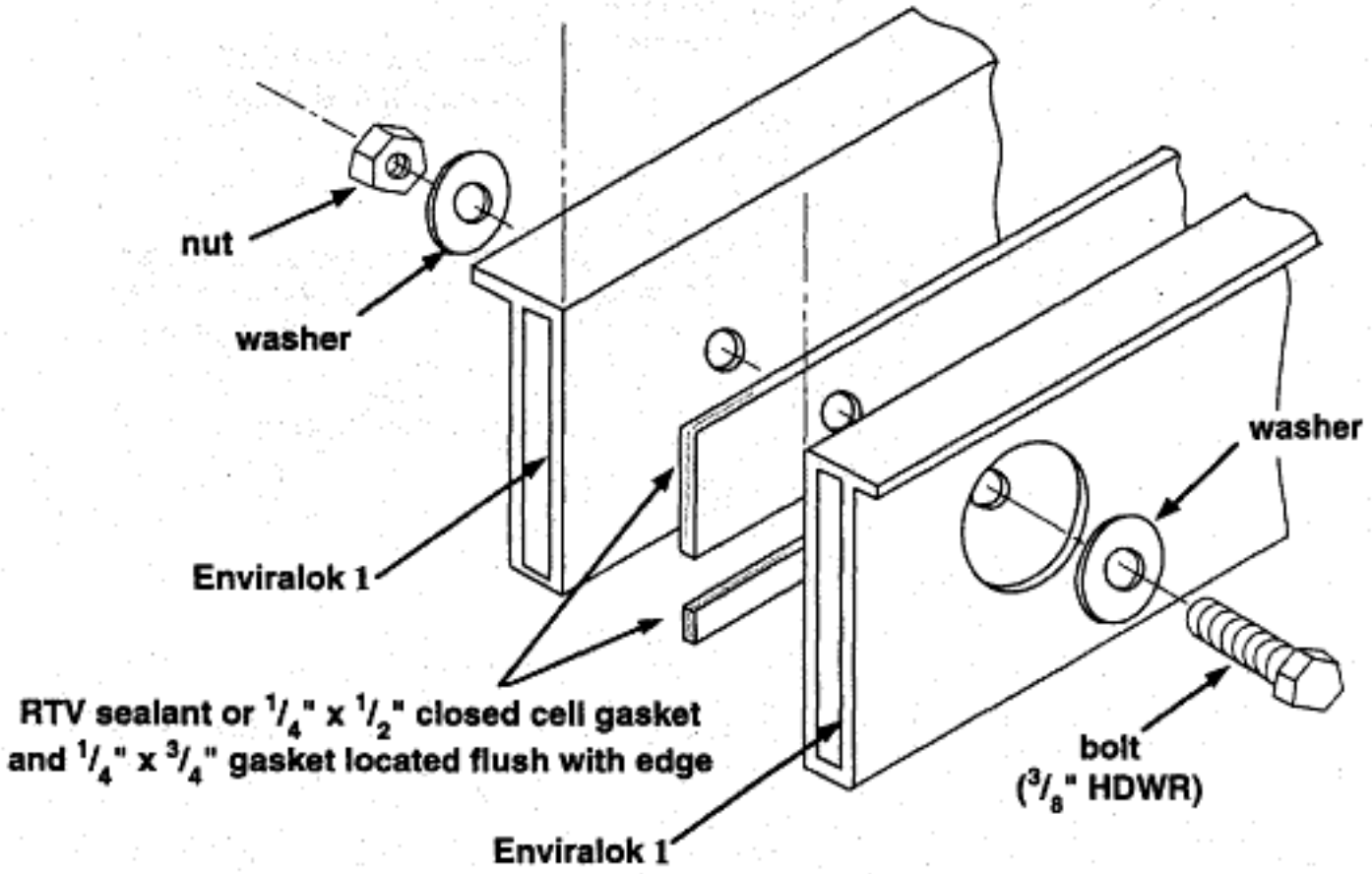
10.4.1 Check blowers and motors for bearing damage; repair or replace as necessary.
10.4.2 Check blowers for loose mounts; tighten as necessary.

10.5 Non-Laminar Flow and/or Excessive Contamination

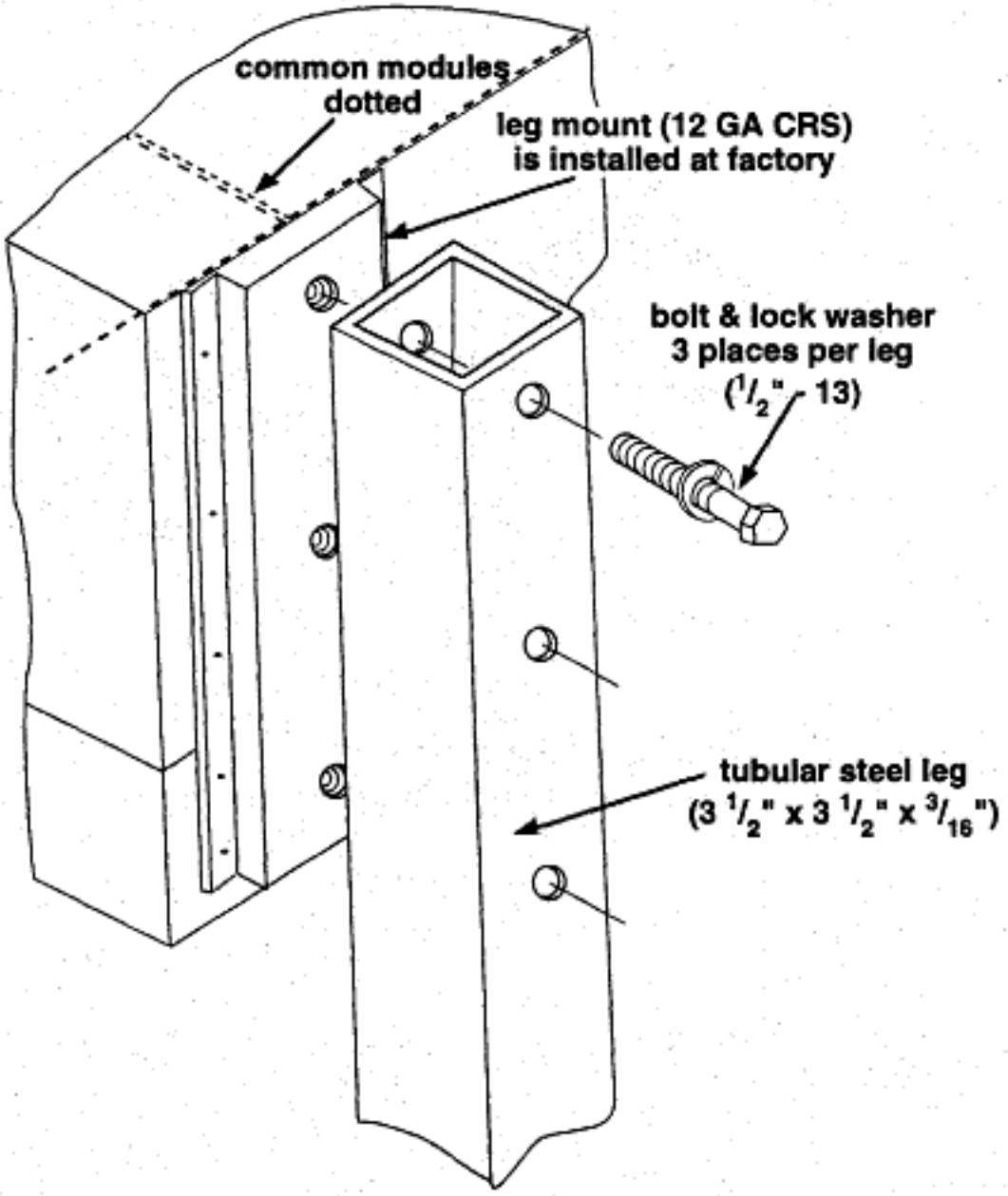
10.5.1 Insure that no large obstructions are upstream of airflow pattern.
10.5.2 Determine that no other air-moving devices are operating in or around clean room which disrupt room's airflow pattern.
10.5.3 Check air velocity and if low, conduct procedures in paragraph 1 0.2.
10.5.4 Conduct smoke and photometer test on HEPA filter bank. Seal or replace HEPA filters as required.

11.0 DRAWINGS

11.1 Module Joining Detail



11.2 Typical Leg Installation Detail



12.0 REPLACEMENT PARTS LIST

12.1 Downflow DF408, Model # 10235

Description	Part Number	Qty (ea)
BLOWER	60045	1
LAMP	60062	4
PULLEY BELT	60285	1
PULLEY ADJUSTABLE BELT	60286	1
PULLY FIXED	60287	1
MOTOR 1-1/2 HP	60288	1
PREFILTER MEDIA	31813	2
BALLAST	60069	2
LIGHT LENS	33196	2
HEPA FILTER 24” X 48”	69310	3
HEPA PROTECTIVE SCREEN	22968	3

To place a direct order, call:

ENVIRCO USA
101 McNeill Road
Sanford, NC 27330
Tel: (919) 775-2201
Tel: (800) 884-0002
Fax: (800) 458-2379
Email: info@envirco.com

ASIAN SALES
Building #1
200 Middle Suhong Road
Suzhou, Jiangsu
PRC 215021
Tel: (86) 512 6258 0031
Fax:(86) 512 6258 7180

Europe, Middle East & Africa (EMEA)
TRION Div of Ruskin Air Management Ltd
European Operations
The Cavendish Center Winnall Close
Winchester Hampshire
S023 OLB, UK
www.envirco-emea.com
Tel: +44 (0) 1962 840465
Fax: +44 (0) 1962 828619
Email: kbristow@airsysco.com

■ 12.0 REPLACEMENT PARTS LIST (con't)

12.2 Downflow DF410, Model # 10236

Description	Part Number	Qty (ea)
BLOWER	60045	1
LAMP	60062	4
PULLEY BELT	60285	1
PULLEY ADJUSTABLE BELT	60286	1
PULLY FIXED	60287	1
MOTOR 1-1/2 HP	60288	1
PREFILTER MEDIA	31813	2
BALLAST	60069	2
LIGHT LENS	33196	2
HEPA FILTER 24" X 48"	69310	4
HEPA PROTECTIVE SCREEN	22968	4

To place a direct order, call:

ENVIRCO USA
101 McNeill Road
Sanford, NC 27330
Tel: (919) 775-2201
Tel: (800) 884-0002
Fax: (800) 458-2379
Email: info@envirco.com

ASIAN SALES
Building #1
200 Middle Suhong Road
Suzhou, Jiangsu
PRC 215021
Tel: (86) 512 6258 0031
Fax:(86) 512 6258 7180

Europe, Middle East & Africa (EMEA)
TRION Div of Ruskin Air Management Ltd
European Operations
The Cavendish Center Winnall Close
Winchester Hampshire
S023 OLB, UK
www.envirco-emea.com
Tel: +44 (0) 1962 840465
Fax: +44 (0) 1962 828619
Email: kbristow@airsysco.com

12.0 REPLACEMENT PARTS LIST (con't)

12.3 Downflow DF412, Model # 10237

Description	Part Number	Qty (ea)
BLOWER	60045	1
LAMP	60062	4
PULLEY BELT	60285	1
PULLEY ADJUSTABLE BELT	60286	1
PULLY FIXED	60287	1
MOTOR 2 HP	60289	1
PREFILTER MEDIA	31813	2
BALLAST	60069	2
LIGHT LENS	33196	2
HEPA FILTER 30" X 48"	69315	4
HEPA PROTECTIVE SCREEN	22969	4

To place a direct order, call:

ENVIRCO USA
101 McNeill Road
Sanford, NC 27330
Tel: (919) 775-2201
Tel: (800) 884-0002
Fax: (800) 458-2379
Email: info@envirco.com

ASIAN SALES
Building #1
200 Middle Suhong Road
Suzhou, Jiangsu
PRC 215021
Tel: (86) 512 6258 0031
Fax:(86) 512 6258 7180

Europe, Middle East & Africa (EMEA)
TRION Div of Ruskin Air Management Ltd
European Operations
The Cavendish Center Winnall Close
Winchester Hampshire
S023 OLB, UK
www.envirco-emea.com
Tel: +44 (0) 1962 840465
Fax: +44 (0) 1962 828619
Email: kbristow@airsysco.com

■ 12.0 REPLACEMENT PARTS LIST (con't)

12.4 Downflow DF508, Model # 10238

Description	Part Number	Qty (ea)
BLOWER	60047	1
LAMP	60063	4
PULLEY BELT	60285	1
PULLEY ADJUSTABLE BELT	60286	1
PULLY FIXED	60287	1
MOTOR 1-1/2 HP	60288	1
PREFILTER MEDIA	31814	2
BALLAST	60069	2
LIGHT LENS	33197	2
HEPA FILTER 24" X 60"	69311	3
HEPA PROTECTIVE SCREEN	22970	3

To place a direct order, call:

ENVIRCO USA
101 McNeill Road
Sanford, NC 27330
Tel: (919) 775-2201
Tel: (800) 884-0002
Fax: (800) 458-2379
Email: info@envirco.com

ASIAN SALES
Building #1
200 Middle Suhong Road
Suzhou, Jiangsu
PRC 215021
Tel: (86) 512 6258 0031
Fax:(86) 512 6258 7180

Europe, Middle East & Africa (EMEA)
TRION Div of Ruskin Air Management Ltd
European Operations
The Cavendish Center Winnall Close
Winchester Hampshire
S023 OLB, UK
www.envirco-emea.com
Tel: +44 (0) 1962 840465
Fax: +44 (0) 1962 828619
Email: kbristow@airsysco.com

12.0 REPLACEMENT PARTS LIST (con't)

12.5 Downflow DF510, Model # 10239

Description	Part Number	Qty (ea)
BLOWER	60047	1
LAMP	60063	4
PULLEY BELT	60285	1
PULLEY ADJUSTABLE BELT	60286	1
PULLY FIXED	60287	1
MOTOR 2 HP	60289	1
PREFILTER MEDIA	31814	2
BALLAST	60069	2
LIGHT LENS	33197	2
HEPA FILTER 24" X 60"	69311	4
HEPA PROTECTIVE SCREEN	22970	4

To place a direct order, call:

ENVIRCO USA
101 McNeill Road
Sanford, NC 27330
Tel: (919) 775-2201
Tel: (800) 884-0002
Fax: (800) 458-2379
Email: info@envirco.com

ASIAN SALES
Building #1
200 Middle Suhong Road
Suzhou, Jiangsu
PRC 215021
Tel: (86) 512 6258 0031
Fax:(86) 512 6258 7180

Europe, Middle East & Africa (EMEA)
TRION Div of Ruskin Air Management Ltd
European Operations
The Cavendish Center Winnall Close
Winchester Hampshire
S023 OLB, UK
www.envirco-emea.com
Tel: +44 (0) 1962 840465
Fax: +44 (0) 1962 828619
Email: kbristow@airsysco.com

■ 12.0 REPLACEMENT PARTS LIST (con't)

12.6 Downflow DF512, Model # 10240

Description	Part Number	Qty (ea)
BLOWER	60045	1
LAMP	60063	4
PULLEY BELT	60285	1
PULLEY ADJUSTABLE BELT	60286	1
PULLY FIXED	60287	1
MOTOR 1-1/2 HP	60288	1
PREFILTER MEDIA	31814	2
BALLAST	60069	2
LIGHT LENS	33197	2
HEPA FILTER 30" X 60"	69316	4
HEPA PROTECTIVE SCREEN	22971	4

To place a direct order, call:

ENVIRCO USA
101 McNeill Road
Sanford, NC 27330
Tel: (919) 775-2201
Tel: (800) 884-0002
Fax: (800) 458-2379
Email: info@envirco.com

ASIAN SALES
Building #1
200 Middle Suhong Road
Suzhou, Jiangsu
PRC 215021
Tel: (86) 512 6258 0031
Fax:(86) 512 6258 7180

Europe, Middle East & Africa (EMEA)
TRION Div of Ruskin Air Management Ltd
European Operations
The Cavendish Center Winnall Close
Winchester Hampshire
S023 OLB, UK
www.envirco-emea.com
Tel: +44 (0) 1962 840465
Fax: +44 (0) 1962 828619
Email: kbristow@airsysco.com

12.0 REPLACEMENT PARTS LIST (con't)

12.7 Downflow DF608, Model # 10241

Description	Part Number	Qty (ea)
BLOWER	60047	1
LAMP	60064	4
PULLEY BELT	60285	1
PULLEY ADJUSTABLE BELT	60286	1
PULLY FIXED	60287	1
MOTOR 2 HP	60289	1
PREFILTER MEDIA	31815	2
BALLAST	60069	2
LIGHT LENS	33198	2
HEPA FILTER 24" X 72"	69312	3
HEPA PROTECTIVE SCREEN	22972	3

To place a direct order, call:

ENVIRCO USA
101 McNeill Road
Sanford, NC 27330
Tel: (919) 775-2201
Tel: (800) 884-0002
Fax: (800) 458-2379
Email: info@envirco.com

ASIAN SALES
Building #1
200 Middle Suhong Road
Suzhou, Jiangsu
PRC 215021
Tel: (86) 512 6258 0031
Fax:(86) 512 6258 7180

Europe, Middle East & Africa (EMEA)
TRION Div of Ruskin Air Management Ltd
European Operations
The Cavendish Center Winnall Close
Winchester Hampshire
S023 OLB, UK
www.envirco-emea.com
Tel: +44 (0) 1962 840465
Fax: +44 (0) 1962 828619
Email: kbristow@airsysco.com

12.0 REPLACEMENT PARTS LIST (con't)

12.8 Downflow DF610, Model # 10242

Description	Part Number	Qty (ea)
BLOWER	60045	1
LAMP	60064	4
PULLEY BELT	60285	2
PULLEY ADJUSTABLE BELT	60286	2
PULLY FIXED	60287	2
MOTOR 3 HP	60290	1
PREFILTER MEDIA	31815	2
BALLAST	60069	2
LIGHT LENS	33198	2
HEPA FILTER 24" X 72"	69312	4
HEPA PROTECTIVE SCREEN	22972	4

To place a direct order, call:

ENVIRCO USA
101 McNeill Road
Sanford, NC 27330
Tel: (919) 775-2201
Tel: (800) 884-0002
Fax: (800) 458-2379
Email: info@envirco.com

ASIAN SALES
Building #1
200 Middle Suhong Road
Suzhou, Jiangsu
PRC 215021
Tel: (86) 512 6258 0031
Fax:(86) 512 6258 7180

Europe, Middle East & Africa (EMEA)
TRION Div of Ruskin Air Management Ltd
European Operations
The Cavendish Center Winnall Close
Winchester Hampshire
S023 OLB, UK
www.envirco-emea.com
Tel: +44 (0) 1962 840465
Fax: +44 (0) 1962 828619
Email: kbristow@airsysco.com

12.0 REPLACEMENT PARTS LIST (con't)

12.9 Downflow DF612, Model # 10243

Description	Part Number	Qty (ea)
BLOWER	60043	2
LAMP	60064	4
PULLEY BELT	60285	2
PULLEY ADJUSTABLE BELT	60286	2
PULLY FIXED	60287	2
MOTOR 3 HP	60288	1
PREFILTER MEDIA	31815	2
BALLAST	60069	2
LIGHT LENS	33198	2
HEPA FILTER 30" X 72"	69317	4
HEPA PROTECTIVE SCREEN	22973	4

To place a direct order, call:

ENVIRCO USA
101 McNeill Road
Sanford, NC 27330
Tel: (919) 775-2201
Tel: (800) 884-0002
Fax: (800) 458-2379
Email: info@envirco.com

ASIAN SALES
Building #1
200 Middle Suhong Road
Suzhou, Jiangsu
PRC 215021
Tel: (86) 512 6258 0031
Fax:(86) 512 6258 7180

Europe, Middle East & Africa (EMEA)
TRION Div of Ruskin Air Management Ltd
European Operations
The Cavendish Center Winnall Close
Winchester Hampshire
S023 OLB, UK
www.envirco-emea.com
Tel: +44 (0) 1962 840465
Fax: +44 (0) 1962 828619
Email: kbristow@airsysco.com

Clean air solutions built for you.

MORE INFORMATION AVAILABLE AT WWW.ENVIRCO.COM

Industrial

Cleanroom Products

- MAC 10® Original
- MAC 10® IQ™
- MAC 10® IQ™ LAF
- MAC 10® LEAC™
- MAC 10® LEAC2™
- MAC 10® LEDC™
- Ducted Ceiling Module: DCM & RSR
- AC or DC Control Systems
- MAC-T Ceiling Grid System

Hospital & Healthcare

Hospital & Healthcare

- IsoClean® and IsoClean with Ultraviolet Light
- AirCeil®
- Hospi-Gard® Room Pressure Monitor

Enviramedic Products

- HOR Horizontal Flow Enclosure
- HCF Horizontal Flow Surgery Room
- VOR Vertical Flow Surgery Isolator

Pharmaceutical

Pharmaceutical & Medical Device

- Unimodule M2 Vertical Laminar Flow Workstation
- METD 100% Exhausted Vertical Flow Workstation
- Laminar Downflow Module

Laboratory & Research

Laboratory & Research

- 100-Plus Horizontal or Vertical Flow Clean Bench
- Unidirectional Flow Horizontal Flow Bench (LF)
- TT Table Top Horizontal Flow Clean Bench
- EnviraLab Sterility Module: ESM

ENVIRCO®

Innovators in clean air technology

ENVIRCO®
101 McNeill Road | Sanford, NC 27330, USA
tel: 919.775.2201 | toll free: 800.884.0002 | fax: 800.458.2379
www.envirco.com | email: info@envirco.com

Form P/N#: 61464 Rev. 02/17