the Bison **ASP range** of package sewage treatment plants

## Bison™ ASP 6-25

- Installation
- Operation
- Maintenance

demand special treatment

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# Table of Contents

# Regulations & Your Responsibilities

A package sewage treatment plant is an essential component of the home or workplace. It provides safe and hygienic wastewater treatment and disposal to make sure your family and colleagues have a pleasant place to live and work and that the local community and environment is protected. Hence you must treat your package sewage treatment plant with the respect it deserves and make sure it is operated and maintained properly so it can continue to provide outstanding performance.

## BUILDING REGULATIONS

1.0 It is important that your treatment and disposal system meet with the requirements of the building regulations.

2.0 Planning and building control departments may inspect same.

## WHAT RESPONSIBILITIES DO I HAVE?

3.0 Users of a packaged treatment plant have a responsibility under the terms of the Water Framework Directive (2000) and Local Government (water pollution) Regulations to ensure that the plant meets the standards set by the Environment Agency. The plant is designed to ensure that the final effluent discharged back into the water table (Ground Water) or water course meets these requirements. Once your plant is commissioned and operating efficiently, the Local Government (County Council) Environment Department may sample the discharge from the plant to check it meets the agreed standards. It is therefore essential to regularly maintain and service the plant to make sure it is running efficiently. You can do a lot to ensure you get the best out of your plant. This manual offers a simple and practical guide to help you do just that.

4.0 The plant must be emptied of sludge as required by the operating instructions, ensuring that the waste is disposed of by a tankering company that is licensed to do so. All documentation relating to the sludge disposal should be kept with the servicing records.

5.0 The plant must be serviced in accordance with the Operation and Maintenance manual. The annual service must be carried out by an approved service provider. Record of all services must be kept by the consent holder.

6.0 When a house is sold evidence that the treatment plant has been properly installed and maintained will be required.

# Introduction

This Installation, Operation and Maintenance (O&M) manual includes descriptive literature, specifications and drawings relating to the principal mechanical and electrical equipment incorporated in the unit. It is the responsibility of the installer and operator to read and fully understand these instructions before installing, commissioning or operating the plant. In the unlikely event of problems occurring with your plant you may either refer to this manual, your equipment supplier or directly to EPS Bison.

The plant comprises two treatment stages; an aerobic biological zone and a final clarification zone. The design combines the benefits of a well proven treatment process with our engineering expertise to produce a high quality system which is robust and reliable. The plant will provide long and trouble free operation providing the simple maintenance procedures laid out in this manual are regularly carried out.

**Your attention is drawn to the 'Health and Safety' section at the beginning of this manual. It is IMPERATIVE that you read these instructions BEFORE working on the plant.**

The plant has been designed to treat the volume and strength of sewage specified in the original quotation. Please note the following points:

- The maximum design loadings must not be exceeded (see original quotation and order acknowledgement for details).
- The plant is designed for gravity feed and should not be pumped to.
- Surface water, from roofs etc, must not enter the plant and or sewerage system.
- High volume discharges from swimming pools or Jacuzzi's must not enter the plant.
- Large quantities of chemicals such as water softener regenerant, disinfectants, strong acids or alkalis, oil and grease, pesticides or photographic chemicals must not enter the system.
- Do not use chemical or biological emulsifiers in grease traps.
- Do not dispose of nappies, sanitary towels and incontinence pads via the toilet
- Do not dispose of medicines down the toilet or sink
- Waste disposal units should not be used unless accounted for within the original specification

**If you have any doubt about a particular substance, please contact EPS Bison.**

# Health and Safety

(Important - Please Read This Before Staring Any Work on the Plant.)

Safety, Health and Welfare at Work Act 2005.

Section 16.1(a) of this Act requires manufacturers to advise their customers on the safety and the handling precautions to be observed when installing, operating, maintaining and servicing their products.

The user's attention is therefore drawn to the following:

1. The appropriate sections of this manual must be read before working on the equipment.
2. Installation and servicing must only be carried out by suitably trained or qualified personnel.
3. Normal safety precautions must be taken and appropriate procedures observed to avoid accidents

**Refer to EPS Bison or your local supplier for technical advice or product information.**

## HEALTH

The potential for contact with raw sewage is present when installing or maintaining wastewater treatment plants. Therefore, it is important that the correct protective clothing is worn when either installing or maintaining a wastewater treatment system.

**Leptospirosis – what is Leptospirosis and are you at risk?**

Two types of Leptospirosis infection affect people in the UK and Ireland.

1. Weil's Disease - this is a serious and sometimes fatal infection that is transmitted to humans by contact with soil, water or sewage contaminated with urine from infected rats.
2. Hardjo-type Leptospirosis - this is transmitted from cattle to humans.

**What are the symptoms?**

Both diseases start with a flu-like illness with a persistent and severe headache, muscle pains and vomiting. Jaundice appears about the fourth day of the illness.

**How might I catch it?**

The bacteria can enter the body via cuts and scratches and through the lining of the mouth and throat or through the eyes.

**How can I prevent it?**

After having worked in contact with sewage or anything contaminated with sewage, wash your hands and forearms thoroughly with soap and water. If your clothes, boots or tools are contaminated with sewage, wash thoroughly after handling them.

- **Take immediate action** to wash thoroughly any cut, scratch or abrasion of the skin as soon as possible. Apply antiseptic to the wound, cover with cotton wool or gauze, and protect with a waterproof plaster.
- **Do not** handle food, drink or smoking materials without first washing your hands.

If you contract the symptoms described above after coming into contact with sewage, report it to your doctor immediately and advise him/her of the circumstances.

Vaccinations are advisable for site personnel for the following:

Hepatitis A

Hepatitis B

Polio

Tetanus

Typhoid/Cholera

- Consultation with your GP is advised to satisfy you personal requirements.

## SAFETY

Sewage gases are potentially hazardous. **DO NOT** enter the unit or any sump.

**Before carrying out any maintenance work, the equipment must be electrically isolated by switching off the power to the plant.**

**DO NOT** leave manways open for any longer than is necessary. Temporary barriers and warning signs should be erected around any open covers or manways as appropriate.

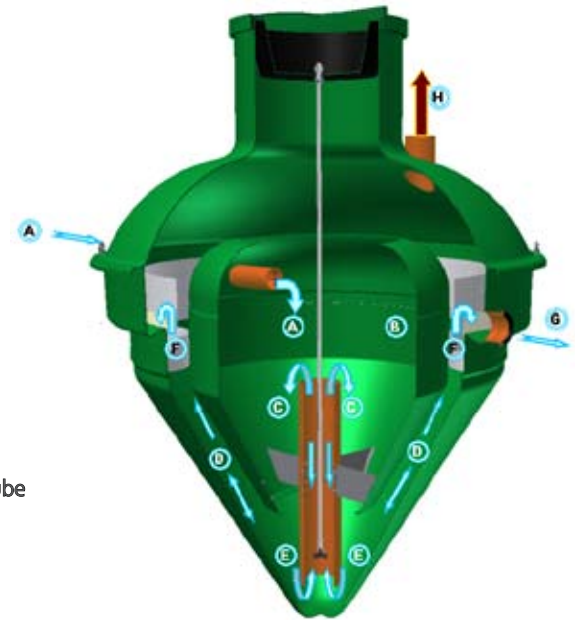
## OWNER'S RESPONSIBILITIES

**The owner of the Sewage Treatment Plant is entirely responsible for plant operation and ensuring that the effluent quality does not breach the Discharge Consent Standards.**

**The offloading of the treatment plant and the correct installation is the responsibility of the owner. We would strongly recommend that the plant should be installed by a contractor that understands sewage and drainage systems.** The chosen method of discharge remains with the client in consultation with his/her engineer and the local authority. The design, installation and maintenance of the same remains with the client. EPS Bison accepts no liability for any damage or loss, including consequential loss, caused by the failure of any pumping equipment.

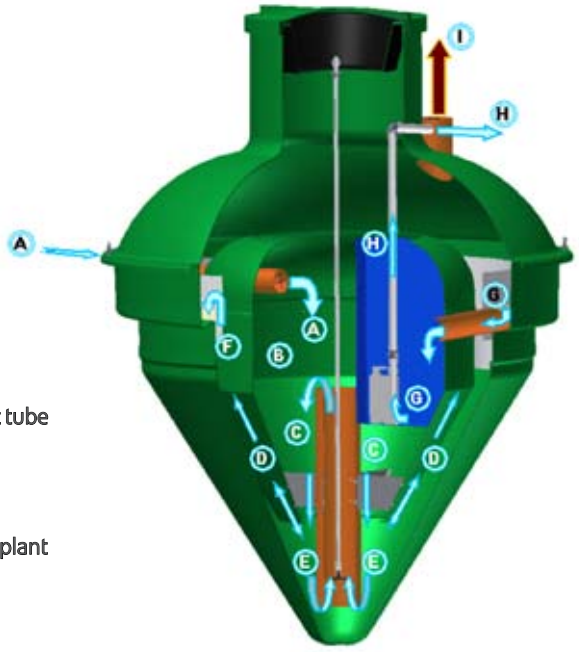
# Process and Plant Description

The EPS Bison ASP treatment plant has an inner central chamber and an outer settlement tank. The plant treats sewage using the extended aeration principle in the central bio-zone chamber. A simple course bubble diffuser, housed in a draft tube, introduces the air that provides the oxygen to the bacteria that then treats the sewage. The bio-zone retains the mixture of water, sewage and air until a level of treatment has been achieved. The treated effluent then enters the conical clarifier tank where settlement takes place and the settled solids are drawn back towards the draft tube with the diffuser in it and returned to the bio-zone. The effluent finally leaves the plant over a weir that extends around the circumference of the tank at the outlet level. The movement of fluid through the whole system is by gravity displacement. There are no moving parts in the treatment plant.



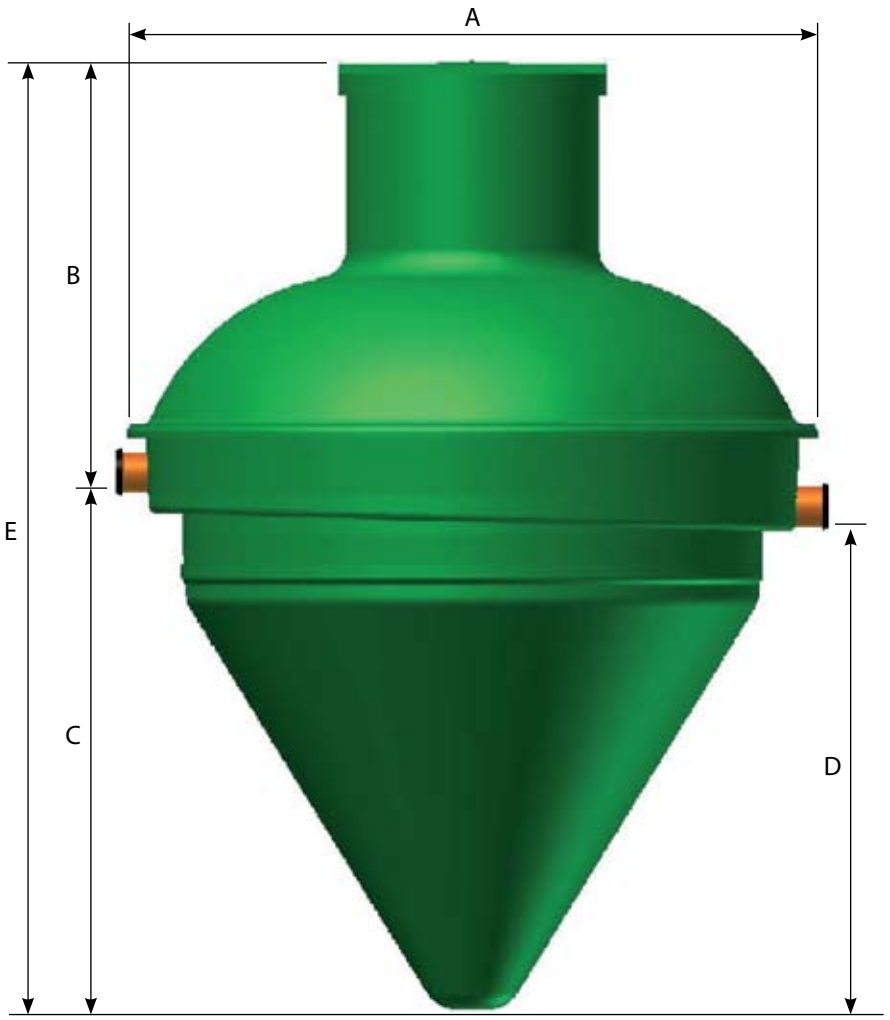

## ASP GRAVITY

A) Inlet, flow from the house (s)
B) Bio-zone chamber
C) Flow around the draft tube
D) Treated effluent being settled
E) Settled bio-solids returning to the draft tube
F) Final effluent going over the weir
G) Effluent exiting the plant
H) De-sludging access point




## ASP PUMPED

A) Inlet, flow from house(s)
B) Bio-zone chamber
C) Flow around draft chamber
D) Treated effluent being settled
E) Settled bio-solids returning to the draft tube
F) Final effluent going over the weir
G) Final effluent going into pump sump
H) Final effluent being pumped out of the plant
I) De-sludging access point




| BISON UNIT | | ASP06 | ASP12 | ASP16 | ASP20 | ASP25 |
|---|---|---|---|---|---|---|
| Population Eqiuvalent | | 6 | 12 | 16 | 20 | 25 |
| Hydraulic Load (l/day) | | 1200 | 2400 | 3200 | 4000 | 5000 |
| Organic Load (g BOD5/per day) | | 360 | 720 | 960 | 1200 | 1500 |
| NH3 (g per day) | | 48 | 96 | 128 | 160 | 200 |
| O/A Diameter (mm) A | | 2080 | 2080 | 2080 | 2080 | 2146 |
| Standard Inlet Invert (mm) | B | 1390 | 1390 | 1390 | 1390 | 742 |
| Inlet Invert to Base (mm | C | 1570 | 1870 | 1970 | 2070 | 2351 |
| Outlet Invert to Base (mm | D | 1450 | 1750 | 1850 | 1950 | 2250 |
| O/A Depth (mm) | E | 2960 | 3260 | 3360 | 3460 | 3133 |
| Pipework Fitting (mm) | | 110 | 110 | 110 | 110 | 110 |
| Max Power (Watts) | | 135 | 225 | 225 | 300 | 375 |
| Estimated Power Consumption at working pressure (Watts) Option A | | 100 | 170 | 170 | 220 | 220 |
| Estimated Power Consumption at working pressure (Watts) Option B | | 86 | 130 | 130 | 215 | 215 |
| Cover Size (mmØ) | | 800 | 800 | 800 | 800 | 750x750 SQ |
| Plant Weight (kg) | | 230 | 260 | 300 | 360 | 390 |

Option A: Charles Austin ET Blower
Option B: Nitto LA Blower
1 Deeper inverts can be accomodated with extension shafts.
2 ASP 25 - Image will differ from illustration

# Delivery

## OFFLOADING

The purchaser is responsible for offloading the tank and any accessories using the following method:

- using straps through the eyebolts (Any chains or steel ropes used in rigging **must not** be in contact with the tank)

**Do not** lift the tank if it contains any water. Maintain control over the tank when lifting by use of guide ropes. **Do not** allow the tank to impact against other objects. If the tank is stored on site prior to installation, it must be upright on a flat and level ground where it cannot be punctured or otherwise damaged.

## PAYMENT

EPS require payment in full for the system on the day of delivery, unless other credit terms have been agreed.

## SCOPE OF SUPPLY

EPS will deliver 1 No. complete Bison ASP system to the site complete with temporary cover.

Once the system is installed and has been connected to the sewers and power is available to the unit, EPS should be contacted to commission the system.

We require 10 working days notice for this.

At this stage the air blower and control box will be installed, wired and commissioned by EPS personnel or approved agents.

# Installation

## INTRODUCTION

Installation procedures must be in accordance with the Safety, Health And Welfare at Work Act 2005, and other relevant legislation. Your procedures must also align with good building practice.

This procedure is issued as a guide only. EPS Bison accept no liability for incorrectly installed units. If the customer has any concerns then a suitably qualified groundworker who has full access to all site conditions should be consulted.

**During installation it is important to check that the treatment plant remains level across all planes. The performance of a mis-aligned unit may be affected.**

**Note:**

Installing in an excavation that allows water to enter (i.e. not dry) requires special advice. High water table or flood conditions will cause problems during installation. They may also affect the desludging of the plant; again specialist advise must be taken in these conditions. Backfill around tank with 20N concrete to within 200mm of ground level.

The Bison ASP is installed at the required level so as to connect the sewer discharge from the dwelling. Where appropriate, the neck of the top section may be trimmed to suit ground topography at the commissioning stage.

Care should be taken to ensure that no large stones, etc are allowed into the excavation during back-filling.

The base of the excavation should be adequately filled with stone and sand and adequately compacted so as to ensure that no lagging or subsidence occurs once the unit is in operation.

A concrete flagstone may be used at the base as appropriate (450mm x 450mm x 35mm).

## INSTALLATION PROCEDURE

**Step 1**
Excavate a 2,500mm² hole, distance C (ref. Pg 7) below the invert of the sewer discharge from the dwelling.

**Step 2**
The base of the excavated hole must be firm, undisturbed soil.
Place some sand and stone and compact well to ensure firm bedding for the system.

**Step 3**
Lift the system into the hole utilising the lifting bolts provided.
Ensure that the tank is empty when lifting at all times.

**Step 4**
Check that the sewer connections are aligned correctly and that the tank is sitting properly in the hole.
Make the connections and level the tank utilising the marked neck as provided.

**Step 5**
Once satisfied that the tank is level, etc, backfill to a depth of 750mm with the appropriate backfill.
At this stage the tank should have stabilised. Recheck that it is still level, if not relevel the tank.

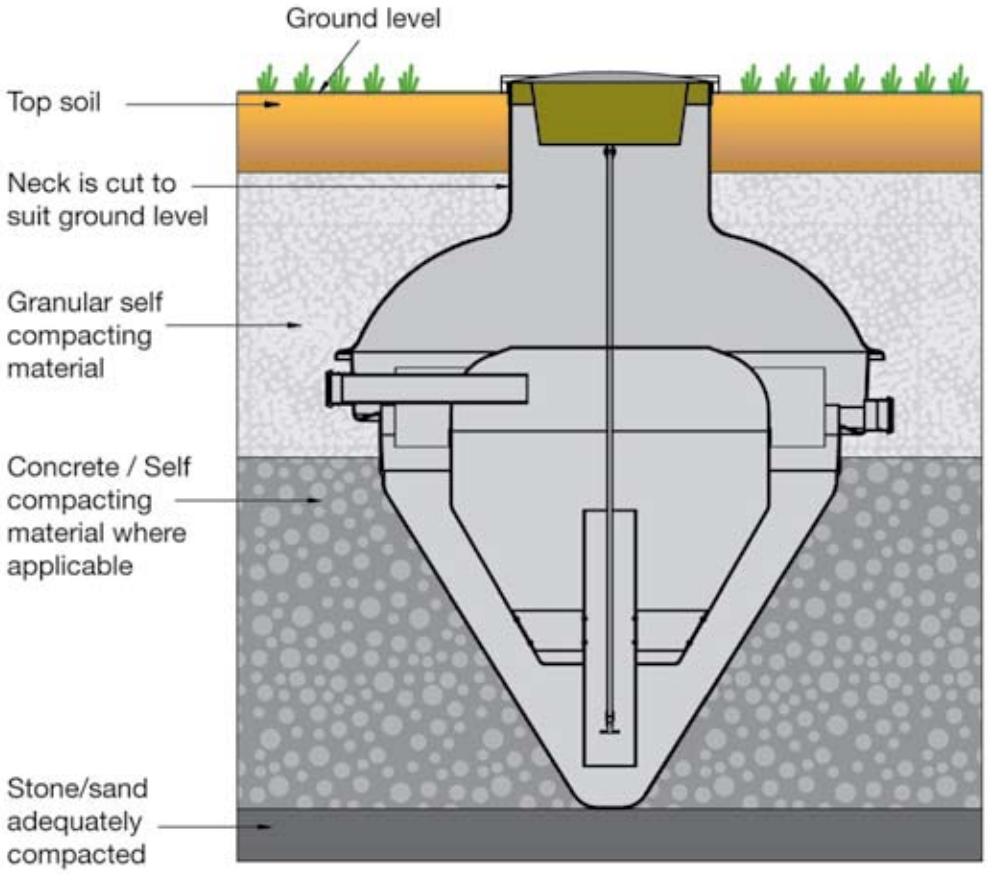
**Step 6**
At this stage start filling the tank with water up to the outlet weir provided.
At the same time continue to backfill the excavation up to ground level with the appropriate backfill.

**Step 7**
Leave the tank full of water to the TWL, i.e. at the outlet weir.
Replace the top cover on the tank and leave 2m of cable spare at the neck of the unit for commissioning the system at a later stage.

**Step 8**
It is important that the cover of the tank is above ground level and will always remain over ground level.

**Note:**

Ensure that adequate ventilation as per regulations is provided.




### INSTALLATION HINTS

- Installation of the Bison ASP should be carried out as per the Bison ASP Installation manual.
- Use concrete encasement where applicable.
- Use granular self-compacting material as backfill. Avoid sharp / large stones in backfill.
- Ensure base is adequately compacted stone / sand to avoid subsidence.
- Ensure the system is levelled accurately to enable continued operation of the system.
- Carry out all excavation, pipe connection, levelling and backfilling as per Safety, Health & Welfare at Work Act 2005.
- Install an extension pipe to the desludge pipe and bring to ground level and insert the seal cap supplied with the unit.

## Commissioning

EPS personnel will install the air blower housing complete with air blower, control box and safety cover at the commissioning stage.

EPS require 10 working days notice to commission a unit when ready.

Before we can confirm a commissioning date, we will require you to check, sign, date and return to us, the attached Declaration of Site Readiness (DSR) form.

# Declaration of Site Readiness

## Bison ASP Gravity Discharge

| | | | |
|---|---|---|---|
| **Client** | | **Date** | |
| **Address** | | **Tank No** | |
| | | **A/C Ref** | |
| | | **Phone No** | |
| **Email** | | **Warranty** | |

To avoid abortive visits, standing time and or return visits, and consequential costs, we outline below a list of requirements, which must be met before we attend site for commissioning.

| | QUESTION | YES / NO |
|---|---|---|
| 1 | Have you received and read the Operation and Maintenance Manual for your Wastewater Treatment Unit? | |
| 2 | Has the Wastewater Treatment Unit been installed according to our Bison ASP Installation procedure? See O&M Manual, page 9. | |
| 3 | Has a 3 x 2.5 SWA Power Cable been laid from the power source to the treatment plant? Note: 2 meters spare to be left at the tank. | |
| 4 | EPS provide an invert distance B (Ref. Page 7) as standard which can be reduced to suit finished ground level at the time of commissioning.<br>Is a Neck Extension required for your Wastewater Treatment Unit?<br>If so an extra charge will be incurred, €150.00 Inc Vat | |
| 5 | Have you indicated where the Wastewater Treatment Unit neck is to be cut? (if applicable) | |
| 6 | Is the Wastewater Treatment Unit and surrounding area free of debris and rubble? | |

We confirm that all the above requirements will be met by the following date: _____

We also understand that standing time or additional site visits due to lack of site readiness will involve additional charges as set out in the attached Extra Site-Work charge schedule

Signed: _____ Date: _____

This declaration form must be signed and returned before we can confirm a commissioning date.
Please Note: We require at *least 10 working days* notice for site attendance.

**Head Office:** Business & Technology Park, Mallow, Co. Cork. Tel: 022-31200; Fax: 022-31250
Ballyhaunis, Co. Mayo. Tel: 094-9630226; Fax: 094-9630761
M7 Business Park, Naas, Co. Kildare. Tel: 045-843614; Fax: 045-883296
Mountrath, Co. Laois. Tel: 057-8732279; Fax: 057-8732518

# Declaration of Site Readiness

## Bison ASP Pumped Discharge

| | | | |
|---|---|---|---|
| **Client** | | **Date** | |
| **Address** | | **Tank No** | |
| | | **A/C Ref** | |
| | | **Phone No** | |
| **Email** | | **Warranty** | |

To avoid abortive visits, standing time and or return visits, and consequential costs, we outline below a list of requirements, which must be met before we attend site for commissioning.

| | QUESTION | YES / NO |
|---|---|---|
| 1 | Have you received and read the Operation and Maintenance Manual for your Wastewater Treatment Unit? | |
| 2 | Has the Wastewater Treatment Unit been installed according to our Bison ASP Installation procedure? See O&M Manual, page 9. | |
| 3 | Has a 3 x 2.5 SWA Power Cable been laid from the power source to the treatment plant? Note: 2 meters spare to be left at the tank. | |
| 4 | EPS provide an invert distance B (Ref. Page 7) as standard which can be reduced to suit finished ground level at the time of commissioning.<br>Is a Neck Extension required for your Wastewater Treatment Unit?<br>If so an extra charge will be incurred, €150.00 Inc Vat | |
| 5 | Have you indicated where the Wastewater Treatment Unit neck is to be cut? (if applicable) | |
| 6 | Has an 1 1/4" Normal Gauge Hydrodare Pipe been laid between the Wastewater Treatment Unit and the Percolation area? | |
| 7 | Is the Wastewater Treatment Unit and surrounding area free of debris and rubble? | |

We confirm that all the above requirements will be met by the following date: _____

We also understand that standing time or additional site visits due to lack of site readiness will involve additional charges as set out in the attached Extra Site-Work charge schedule

Signed: _____ Date: _____

This declaration form must be signed and returned before we can confirm a commissioning date.
Please Note: We require at *least 10 working days* notice for site attendance.

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# De-Sludging

Bacteria and other micro-organisms present in the wastewater utilise the organic material as a food source, converting it into a non-soluble mass. This non-soluble mass or floc is compromised of living micro-organisms, sewage particles, as well as inert (non-biodegradable) material. As the process matures, the numbers of micro-organisms increase until there is an adequate biomass to metabolise or digest all of the soluble organic material in the incoming sewage. At this point, competition for food results in the dying (due to starvation) of organisms as new organisms are formed. These dying organisms in turn are metabolised, thereby reducing the overall sludge volume.

The volume of solids will gradually increase due to the accumulation of inert remains of dead organisms (ash), combined with the non-degradable material in the raw wastewater. As the solids increase, the mixed liquor (i.e. contents of the aeration chamber) becomes thicker, developing an increasing dexter brown colour. Periodically, the excess solids must be de-sludged (wasted) from the system in order to ensure continued plant efficiency.

## DE-SLUDGING FREQUENCY

The rate at which the solids (biomass) accumulates in the system, and the subsequent rate at which the excess solids must be removed, is dependent upon the total volume and strength (i.e. BOD) of the wastewater entering the plant. The typical residential system will need to be de-sludged every 2-3 years.

## DETERMINING DE-SLUDGING FREQUENCY

In order to ensure optimum treatment efficiency and effluent quality, it is necessary to maintain the level of aeration solids (MLSS) within a suitable range (refer to Appendix C). A low level of solids in the aeration chamber (i.e. during plant start up) reduces the treatment plant's ability to provide adequate treatment during peak operating periods. Excessive solids, on the other hand, may result in poor settling during periods of hydraulic surges: or, in the development of septic conditions in the plant. In order to determine when the system should be de-sludged it is necessary to perform a solid settlement test (30 minute) during each annual service check.

## PROCEDURE

1. Mark a large transparent jar into 10 equal portions.
2. While the compressor is running fill the jar with the liquid (MLSS) from the aeration chamber.
   This sample should be collected at mid depth in the tank. Do not collect sample from within the draft tube.
3. Allow the sample to sit for 30 minutes.
4. Measure the volume of the settled sludge as a percentage of the total volume of the sample. Occasionally, after the sample sits, a portion of the settled sludge may float to the top of the sample. If this occurs, add together the volume of settled sludge and the volume of floating sludge.
5. Compare the percentage of settled sludge (i.e. sludge volume) to the figures given in the "Operational Control Chart". The optimum level of solid settlement is normally between 5-50%. Whenever the sludge volume exceeds 50%, the plant should be de-sludged.

## PROCEDURE FOR DE-SLUDGING

1. Remove 6" cover from de-sludging access point.
2. Carefully lower a 3" tanker hose down through the de-sludging access point until it rests on the bottom of the outer tank (clarifier) or until the hose meets light resistance. Do not force the hose down further as this may damage the internal workings of the unit. Depending on the invert level between 2.35m – 3.3m of hose is required to reach the bottom of the tank from ground level.
3. Pump solids from the bottom of the outer tank. This will lower the liquid level in both the inner tank and outer tank simultaneously.
4. As the liquid level drops, the scum layer between the inner tank and scum baffle will normally break loose and drop to the bottom of the tank where it can be sucked out. With a garden hose, flush any remaining scum or residue to the bottom of the tank.
5. Unless the plant is septic or there is an excessive scum build-up, it is not necessary to pump the system totally dry. Leaving a small amount of sludge in the bottom (5-10 gallons) will reduce the normal start-up period.
6. In areas with a high water table, immediately re-fill the tank with clear water to prevent shifting or floatation.

## SLUDGE CHARACTERISTICS

It is important to observe the MLSS (mixed liquor suspended solids) sample, which is collected from the aeration chamber. As the sample settles you should note the following:

1. What is the colour of the sludge?
2. Do the sludge particles clump together in a dense floc, that settles rapidly?
3. Is the liquid above the settled sludge (supernatant) clear?
4. Does the sample have a noticeable odour?

A good healthy sludge should have a chocolate brown colour. It should form a dense floc that settles rapidly leaving a clear, odourless supernatant. A sludge sample that has a grey black colour, settles slowly, has a cloudy supernatant containing very fine, suspended particles, usually indicates poor treatment plant operation. Therefore, it is important to compare your observations of the plant as well as the sample of mixed liquor suspended solids to the conditions described in Appendix C and D attached to determine if the plant is operating properly or if any corrective action needs to be taken.

# Maintenance Schedule

## WEEKLY INSPECTIONS

- Check the final effluent discharging from the unit at the sample point.
  If it is cloudy or contains suspended particles contact your maintenance provider.

## 6 MONTHLY CHECK (OR AS STATED OTHERWISE)

We recommend that the unit is checked by an approved service technician at the first 6 monthly check.

As for weekly, plus

- Any signs that the compressor is overheating.
- Air Leaks and excessive heat in the air hose, and the fittings are secure.
- Is there any evidence of water or moisture entering the housing.
- Check the aeration chamber has a vigorous air supply.
- Are there any foul odours when the lid is lifted.

**If this is the first 6 month check, then carry out the annual service at the same time.**

## YEAR SERVICE

EPS Bison recommend that the yearly service be carried out by an approved service technician.

As for 6 monthly, plus

- Obtain a sample of the final effluent to check that the plant is operating correctly. This may require introducing a small flow into the treatment unit to obtain the sample. It is important that this procedure is done before anything else.
- Check that as far as possible the effluent from the plant is soaking into the ground.
- The activated sludge should be inspected to determine the settle ability of the sludge see (appendix C). The settle ability test will determine when the plant needs emptying of sludge (de-sludging).
- Inspect the top surface of the bio-zone for any grease balls, soap suds, foaming or any non biodegradable materials. These materials are best removed from the plant and correctly disposed of.
- Check that the air supply is operating in the correct pressure range of 200mb +/- 50mb.
  The compressors should be checked : see appendix B
- Remove any scum from the outer clarification chamber and place it carefully in the inner bio-zone chamber.
- Check that all the airways to the Housing are clear and the air blower has adequate ventilation.
- Clean/replace the blower air filter.
- Check that the air pipe from the air blower to the plant is not blocked, crushed or kinked.
- Ensure that all the lids and covers are correctly secured before leaving site.
- Check that the air diffuser is operating by inspecting the bio-zone turbulence. We recommend that the diffuser is removed and cleaned annually as this may block in hard water areas with scale.

## EVERY 2/3 YEARS

- De-sludge the plant as per the instructions on page 14

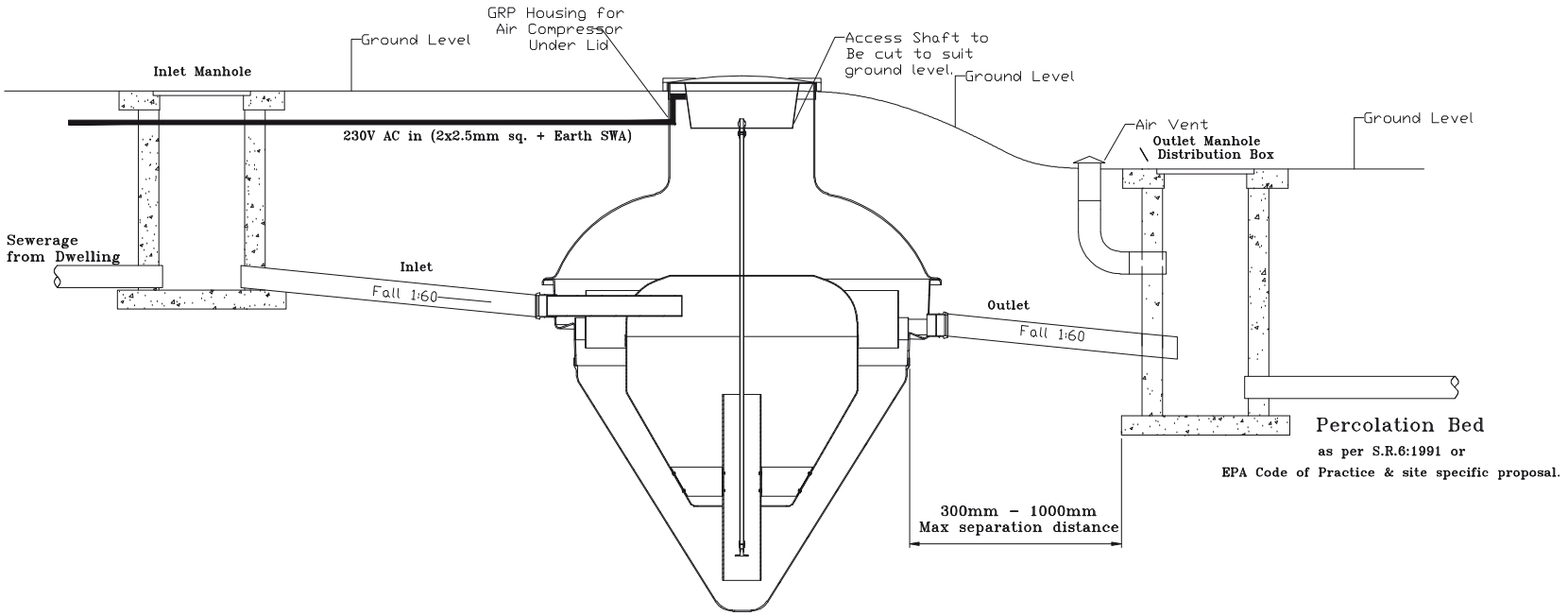
# Bison ASP Gravity - Typical Layout



**IF IN DOUBT ASK** **DO NOT SCALE OFF THIS DRAWING**

| NOTES | |
|---|---|
| 1. | ALL WELDS TO BE 6mm CONTINUOUS FILLET WELDS UNLESS OTHERWISE STATED. |
| 2. | ALL ITEMS TO BE TAGGED WITH EPS TAG STATING; EPS, WORKSHOP No, PURCHASE ORDER No. |
| 3. | FOR HANDRAIL DETAILS SEE EPS DRAWING; EPS/A-L/HANDRAILING/RAILFAB. |

All work other than commissioning Treatment Unit done by others




| | |
|---|---|
| NO REQUIRED: | NO.REQUIRED |
| MATERIAL: | MATERIAL |
| FINISH: | FINISH |
| W/SHOP No: | W/SHOP-NO. |

1st Angle Projection

Client: Bison ASP

Title: Bison ASP with Gravity Discharge

Drg No.:

Scale: NTS | 0 | 1 REV1 | 2 REV2 | 3 REV3

Drawn By: DMc | Checked By: | Date: 14.07.09

Pumping & Treatment Systems

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M7 Business park, Naas, Co. Kildare. Phone: 045-843614 Fax: 045-883296
Mountrath, Co. Laois. Ph.: 0502-32279 Fax: 0502-32518

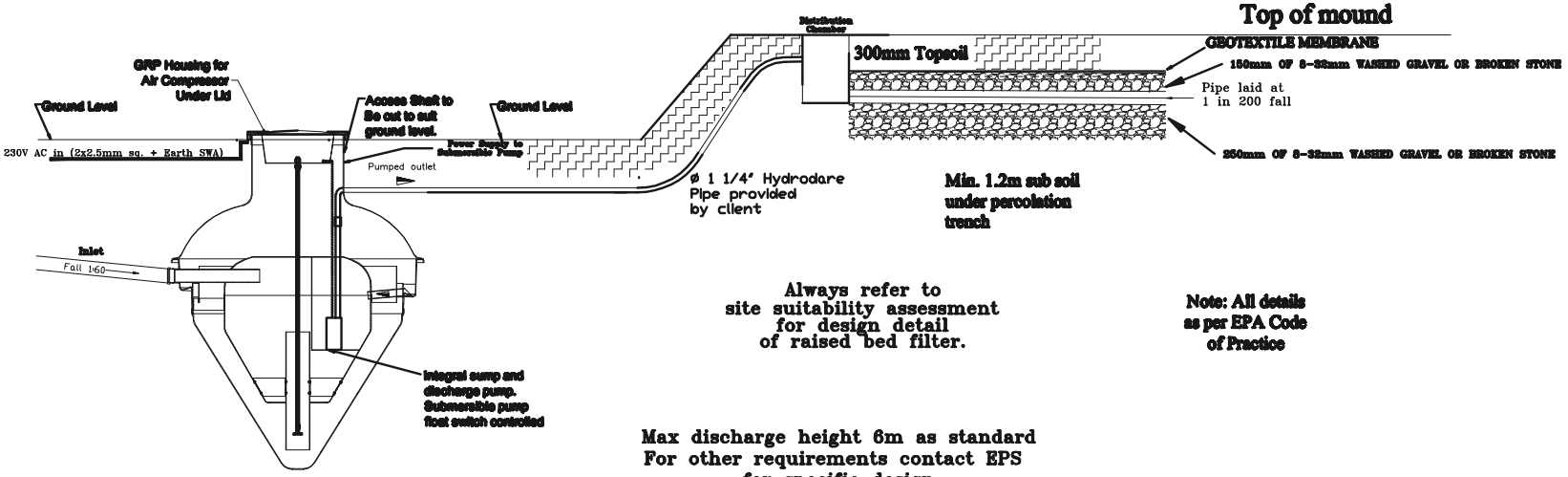
**IF IN DOUBT ASK** **DO NOT SCALE OFF THIS DRAWING**

| NOTES | |
|---|---|
| 1. | ALL WELDS TO BE 6mm CONTINUOUS FILLET WELDS UNLESS OTHERWISE STATED. |
| 2. | ALL ITEMS TO BE TAGGED WITH EPS TAG STATING; EPS, WORKSHOP No, PURCHASE ORDER No. |
| 3. | FOR HANDRAIL DETAILS SEE EPS DRAWING; EPS/A-L/HANDRAILING/RAILFAB. |

## Raised Percolation Bed

**as per S.R.6:1991 or EPA Code of Practice & site specific proposal.**

**All work other than commissioning Bio Treatment Unit done by others**




**Always refer to site suitability assessment for design detail of raised bed filter.**

**Note: All details as per EPA Code of Practice**

**Max discharge height 6m as standard**
**For other requirements contact EPS for specific design**

| | |
|---|---|
| NO REQUIRED: | NO.REQUIRED |
| MATERIAL: | MATERIAL |
| FINISH: | FINISH |
| W/SHOP No: | W/SHOP-NO. |

1st Angle Projection

| | | | |
|---|---|---|---|
| Client: Bison ASP | Drg No.: | | |
| Title: Bison ASP with Pumped Discharge | Scale: NTS | 0 1 REV1 2 REV2 3 REV3 | |
| | Drawn By: DMc | Checked By: | Date: 15/07/09 |

Pumping & Treatment Systems

Bussiness and Technology Park., Mallow, Co. Cork. Phone: 022-31200 Fax: 022-31250 Email: bison@epsireland.com

Ballyhaunis, Co. Mayo. Ph.: 094-9630226 Fax: 094-9630761

M7 Business park, Naas, Co. Kildare. Phone: 045-843614 Fax: 045-883296

Mountrath, Co. Laois. Ph.: 0502-32279 Fax: 0502-32518

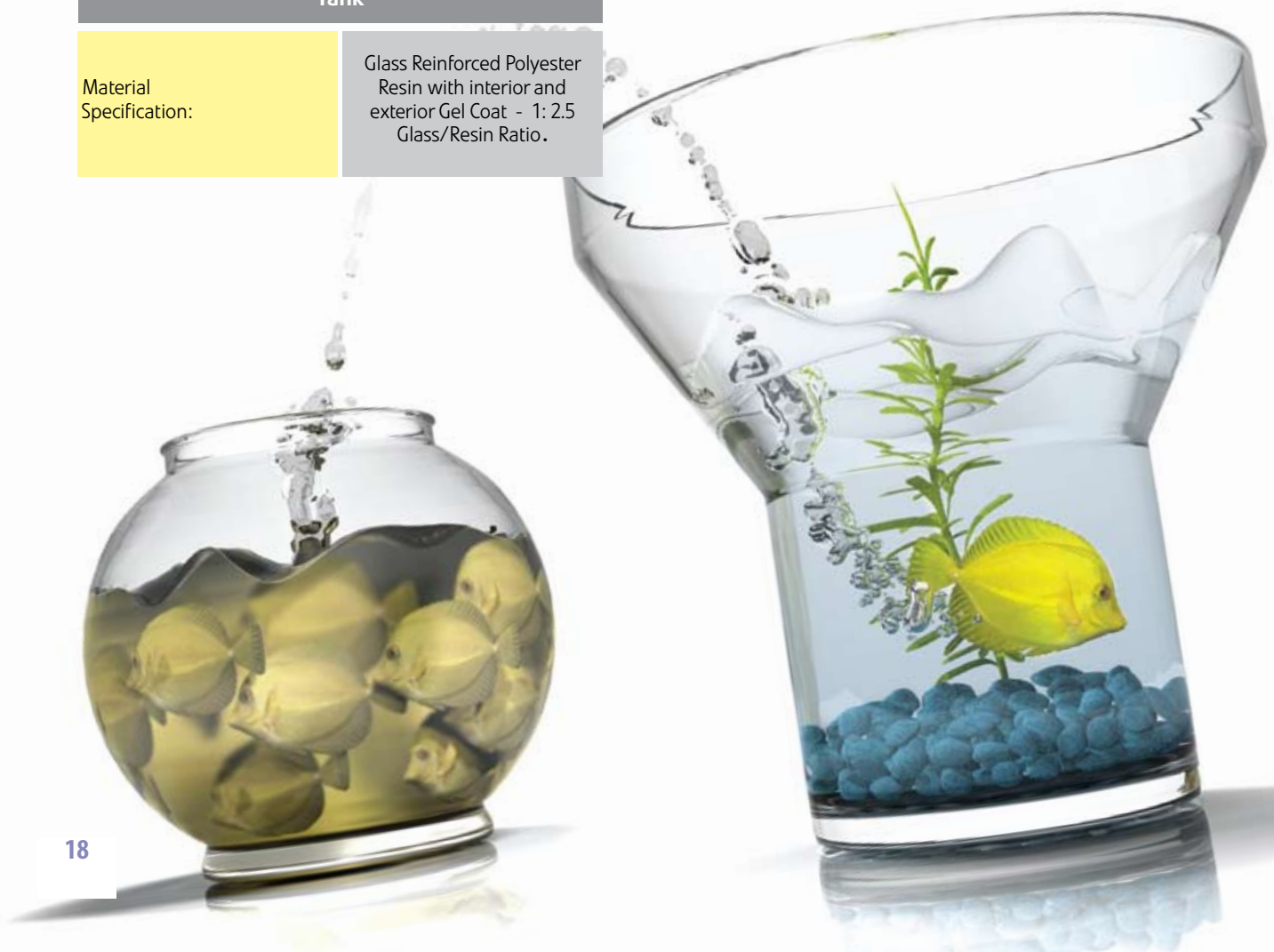
# Appendix A: ASP Specification & CE Mark - EN12566-3:2005

| EPS Bison | ASP 06 | ASP12 | ASP 16 | ASP 20 | ASP 25 |
|---|---|---|---|---|---|
| **Design Loadings (max.)** | | | | | |
| Population Equivalent [P.E.] | 6 | 12 | 16 | 20 | 25 |
| Hydraulic Load [l/day] | 1200 | 2400 | 3200 | 4000 | 5000 |
| Organic Load [gBOD/day] | 360 | 720 | 960 | 1200 | 1500 |
| Material | Glass reinforced plastic (GRP) | | | | |
| Watertightness | Pass | | | | |
| Crushing resistance | Pass | | | | |
| Treatment efficiency (nominal sequences) | COD 92.8%<br>$BOD_5$ 97.1%<br>SS 96.7%<br>$NH_4$-N 74.6% | | | | |
| Electrical consumption | 2.6 kWh/d | | | | |

**(PIA GmbH)**
**Hergenrather Weg 30**
**D-52074 Aachen**

**Certified according to ISO 9001:2000**
**Notified body number 1739**

| Tank | |
|---|---|
| Material Specification: | Glass Reinforced Polyester Resin with interior and exterior Gel Coat - 1: 2.5 Glass/Resin Ratio. |



# enviro et series

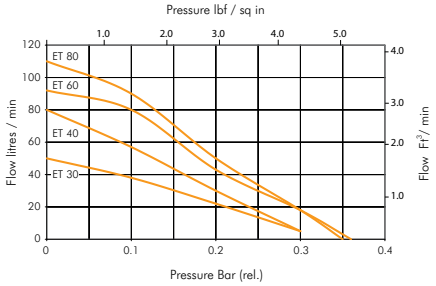
**Oil-Free - Linear Diaphragm Pump**

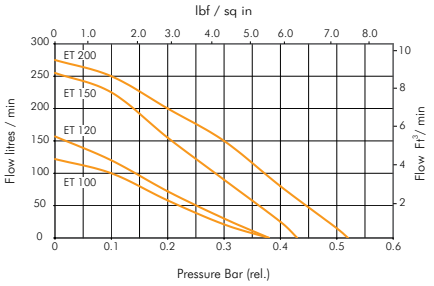
Charles Austen Pumps Ltd

## Performance

- 30 to 250 litres/min flow

- Green drive technology – energy efficient motors low power consumption
- Specially formulated diaphragm material for extended life
- Due to no wearing parts no reduction in performance
- Robust and compact construction – weatherproof
- Easy to service with competitively priced spares kit
- Suited to intermittent or continuous duty applications
- Whisper quiet operation as low as 35dB




**UK Tel: +44 (0)1932 355277**
**USA Tel: 011 44 1932 355277**
**Email: info@charlesausten.com**
**Web: www.charlesausten.com**

## Enviro options

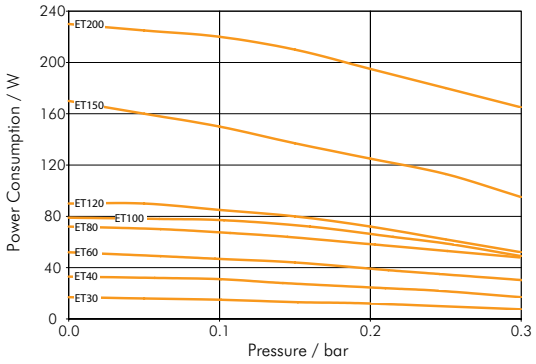
ET pump with optional straight connector

ET pump with L shape connector (supplied)

Envirosure alarm

## Application Ideas

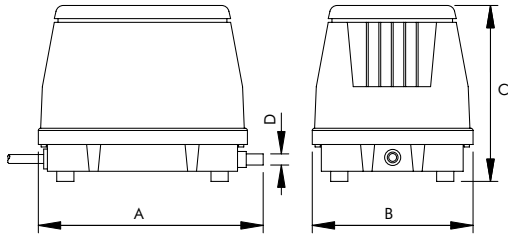
## Performance/Technical



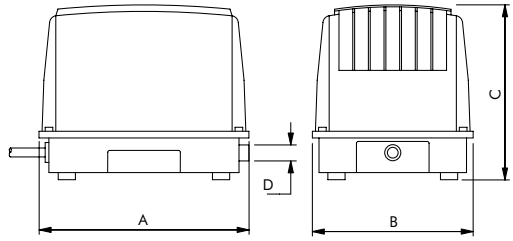

| Model no. | Performance Flow (l/min) @pressure (bar) | Noise level db | Power consumption w |
|---|---|---|---|
| ET30 | 30.0 @ 0.15 | 40.0 | 25 |
| ET40 | 40.0 @ 0.15 | 40.0 | 30 |
| ET60 | 60.0 @ 0.17 | 40.0 | 55 |
| ET80 | 80.0 @ 0.10 | 40.0 | 75 |
| ET100 | 100.0 @ 0.10 | 45.0 | 80 |
| ET120 | 120.0 @ 0.10 | 45.0 | 90 |
| ET150 | 150.0 @ 0.15 | 45.0 | 160 |
| ET200 | 200.0 @ 0.15 | 46.0 | 230 |

## Dimensions

### ET30, ET40, ET150 & ET200




### ET60, ET80, ET100 & ET120




| Model no. | Weight kg | Dimensions (mm) A | B | C | D |
|---|---|---|---|---|---|
| ET30 | 4.0 | 208 | 150 | 178 | 14 |
| ET40 | 4.3 | 220 | 155 | 190 | 14 |
| ET60 | 6.0 | 203 | 165 | 153 | 18 |
| ET80 | 7.0 | 210 | 185 | 171 | 18 |
| ET100 | 8.5 | 238 | 196 | 177 | 18 |
| ET120 | 9.5 | 265 | 215 | 198 | 18 |
| ET150 | 9.0 | 256 | 200 | 222 | 18 |
| ET200 | 9.0 | 256 | 200 | 222 | 18 |

## Connections

**ET30, ET40 -** Plain, horizontal, connection 14.0mm OD also supplied with screw in barbed connector 10mm OD

**ET60, ET80, ET100** and **ET120 -** Plain, horizontal, connection 18.0mm OD also supplied with screw in barbed connector 12.0mm OD

**ET150, ET200 -** Plain, horizontal, connection 18.0mm OD

Distributed by:

Please note - it is important that you ensure the motor specification stated and the range of materials offered in the pump are compatible with the performance, environmental limitations and chemical resistance requirements of the application.

For further information or details of our extensive range of pumps, contact our technical sales office who will be pleased to help you select the most suitable pump for your application.

S30-253/4

Royston Road, Byfleet, Surrey, KT14 7NY, England/UK
USA Tel: 011 44 1932 355277 UK Tel: +44 (0)1932 355277
Fax: +44 (0)1932 351285 Email: info@charlesausten.com
**www.charlesausten.com**

Charles Austen Pumps Ltd

# Maintenance Manual

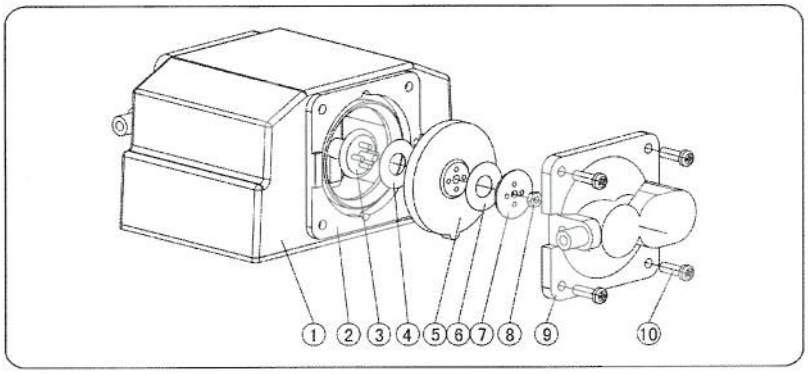
## Enviro version ET60, ET80, ET100 & ET120

### 1. To clean the air filter ( Recommended once every six months )

A. Use a screw driver to unclip the filter cover
B. Remove filter cover.
C. Take the filter out and clean it with clean water and dry it or replace with a new filter if needed.
D. Put it back and secure by push fitting the filter cover.

### 2. To change the diaphragms

**IMPORTANT : To open the upper housing, please make sure you have unplugged the power cord before opening.**




A. Loosen the four screws around the aluminum upper housing, and take the housing off. Locate the pump inside the housing as diagram above.
B. Loosen the four screws (10) and remove the air chamber cover (9)
C. Loosen the nut (8) and remove the diaphragm depressor (7), electrostatic membrane (6) and the diaphragm (5)
D. Replace the diaphragm and please note that when fixing, to make sure the diaphragm jut fits exactly to the slot of the air chamber (2)
E. Install all parts by counter steps.
F. Put on the aluminum cover and secure the four screws firmly.

## Enviro version ET150, ET200

### 1. To clean the air filter ( Recommended once every six months )

E. Loosen the screw on top. (As shown in Figure1)
F. Remove filter cover.
G. Take the filter out and clean it with clean water and dry it or replace with a new filter if needed.
H. Put it back and secure the fixing plate with the screw in.

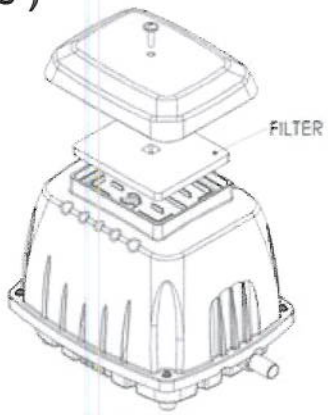



Figure 1

### 2. To change the diaphragms

**IMPORTANT : To open the upper housing, please make sure you have unplugged the power cord before opening.**

G. Loosen the four screws around the aluminum upper housing, and take the housing off. (As shown in figure 2)
H. Loosen the four screws around the coil cover, and take the cover off. (As shown in figure 3)
I. Loosen the four screws and disassemble the diaphragm housing.
J. Loosen the u-nut in the center of diaphragm.
K. Take the diaphragm off its place.
L. Replace a new one by mounting the rubber studs into their position.
M. Press the rim of the diaphragm into the ring.
N. Secure the magnet with a new u-nut and screw and put the diaphragm housing back with the four screws on.
O. Put the coil cover back with the four screws on.
P. Put on the aluminum cover and secure the four screws firmly.

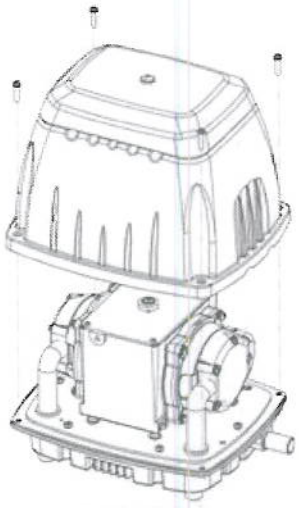


Figure 2

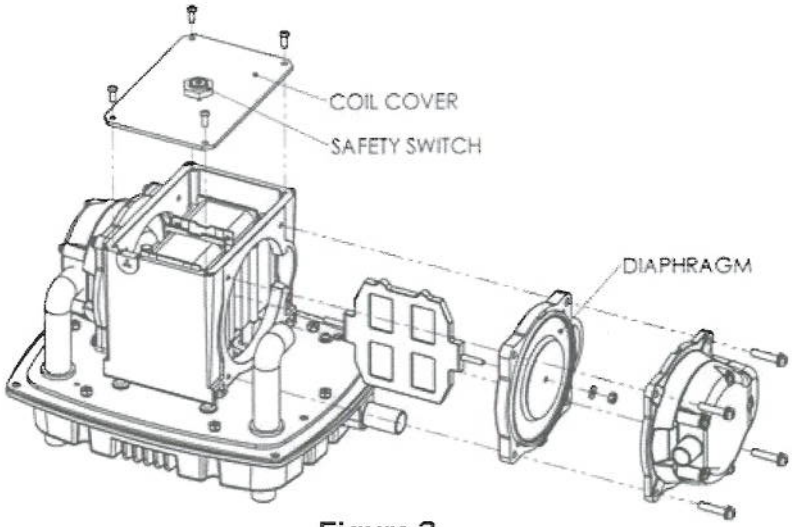



Figure 3

EPS Ireland Ltd – IDA Business & Technology Park, Mallow, Co Cork, Ireland
Tel: 00353 022 31200 Web: www.epsireland.com

Nitto Kohki's

JQA-2160
Linear Products Division
JQA-EM4057
Headquarters
Research Center

Cat.NO.Lk048e

# MEDO Brand Air Blower

For aerobic sewage treatment system and aquatics


## Model

Compact Type

**LA-28B & LA-45B**

Medium Type

**LA-60B & LA-80B**

Large Type

**LA-100 & LA-120**

Extra Large Type

**LAM-200**

## *Benefits include:*

- Low Noise
- Low Power Consumption
- Easy Maintenance
- Unrivaled Lifetime
- Weatherproof Case IP55

## Features

- **Low Power Consumption**
  Highly efficient blower saves energy.
- **Quiet Technology**
  High performance sound proofing gives quiet operation.
- **Easy Maintenance**
  Only one screwdriver is needed for filter replacement.
- **Oilless Design Offering Both Dry and Clean Air**
- **Low Running Temperature**
  Energy saving design greatly reduces heating effect.
- **Long Service Life with Linear Piston Technology**
  The rated specifications enable continuous operation for over 20,000 hours.
- **Light, Compact**
  Compact and ready-to-use design.
- **Easy Installation**
  No earthing/grounding work is required.

## Specifications

| Model | LA-28B | LA-45B | LA-60B | LA-80B | LA-100 | LA-120 | LAM-200 |
|---|---|---|---|---|---|---|---|
| Power Supply | 120 V, 220 V, 230 V, 240 V AC | | | | | | |
| Rated Frequency | 50 Hz, 60 Hz | | | | | | |
| Rated Pressure | 0.11 bar (1.56 psig) | | 0.15 bar (2.13 psig) | | 0.18 bar (2.56 psig) | | 0.20 bar (2.84 psig) |
| Operating Pressure Range | 0.05 – 0.2 bar (0.71 – 2.84 psig) | | | | 0.05 – 0.25 bar (0.71 – 3.56 psig) | | 0.05 – 0.3 bar (0.71 – 4.27 psig) |
| Rated Airflow | 28 LPM | 45 LPM | 60 LPM | 80 LPM | 100 LPM | 120 LPM | 200 LPM |
| Power Consumption | 29 W / 50 Hz | 47 W / 50 Hz | 64 W / 50 Hz | 86 W / 50 Hz | 100 W / 50 Hz | 130 W / 50 Hz | 215 W / 50 Hz |
| | 25.5 W / 60 Hz | 45 W / 60 Hz | 60 W / 60 Hz | 80 W / 60 Hz | 95 W / 60 Hz | 118 W / 60 Hz | |
| Weight | 2.8 kg | 3.0 kg | 5.0 kg | 5.3 kg | 9.4 kg | 9.4 kg | 12.3 kg |

NITTO KOHKI CO., LTD.

# MEDO Brand Air Blower

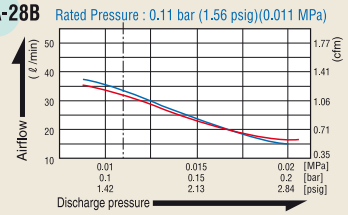
## Air Flow Characteristics

50Hz
60Hz

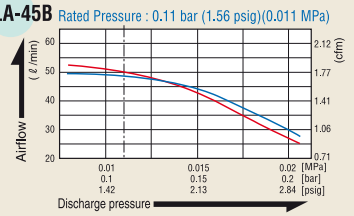
## Sketch Drawing and Dimensions Diagram (mm)

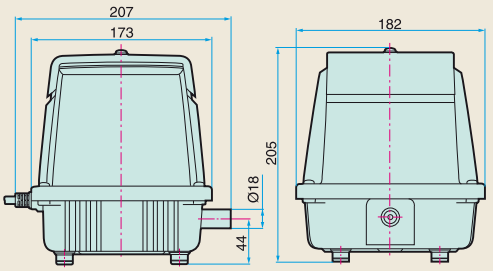
### Compact Type

**LA-28B** Rated Pressure : 0.11 bar (1.56 psig)(0.011 MPa)



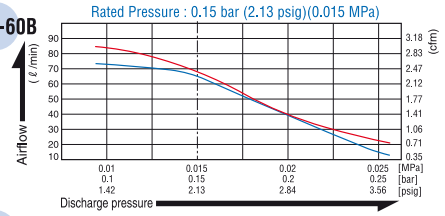

**LA-45B** Rated Pressure : 0.11 bar (1.56 psig)(0.011 MPa)

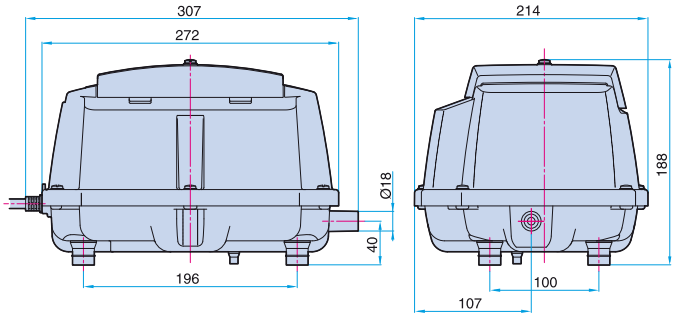


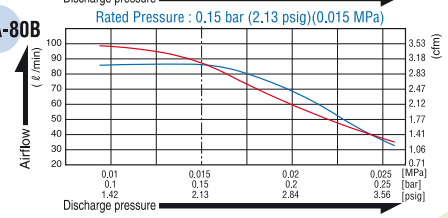

### Medium Type

**LA-60B** Rated Pressure : 0.15 bar (2.13 psig)(0.015 MPa)



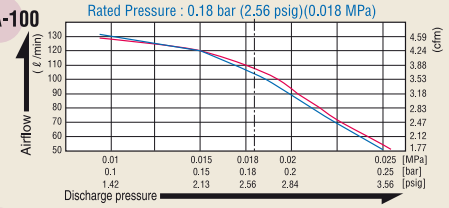



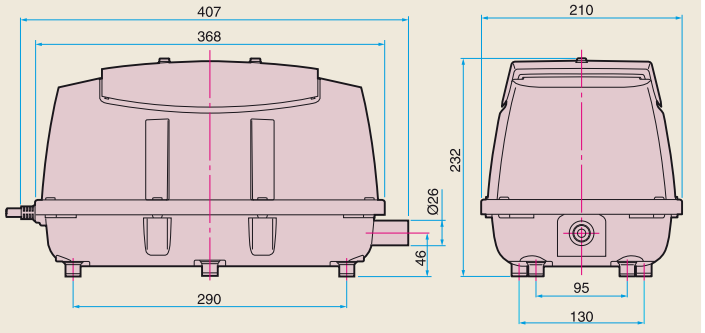

**LA-80B** Rated Pressure : 0.15 bar (2.13 psig)(0.015 MPa)



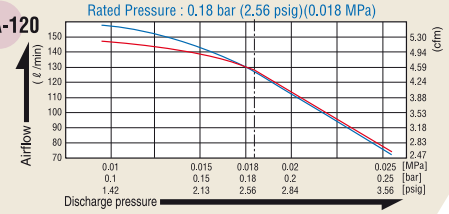

### Large Type

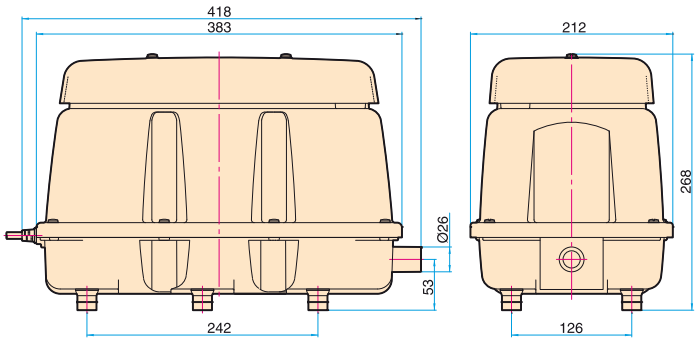
**LA-100** Rated Pressure : 0.18 bar (2.56 psig)(0.018 MPa)



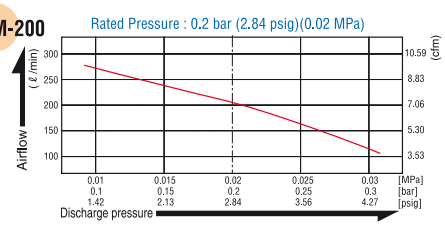

**LA-120** Rated Pressure : 0.18 bar (2.56 psig)(0.018 MPa)




### Extra Large Type

**LAM-200** Rated Pressure : 0.2 bar (2.84 psig)(0.02 MPa)




★If the unit is to be run outside the operating pressure range, consult with your supplier for advice.
★Specifications and designs are subject to change at any time without notice.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09LA03-①

# MEDO LA BLOWER

## INSTRUCTION MANUAL

### INSTALLATION & MAINTENANCE

LA-28B/LA-45B

LA-60A/LA-80A

LA-60B/LA-80B

LA-100/LA-120

This instruction manual should be read and understood thoroughly before any installation and maintenance work is executed.

After reading this instruction manual, please keep it handy for reference.

**CONTENTS**

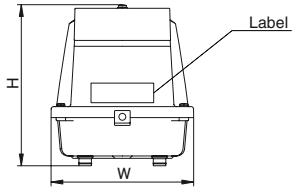
# 1. Model Specifications

| Model | LA-28B | LA-45B | LA-60A<br>LA-60B | LA-80A<br>LA-80B | LA-100 | LA-120 |
|---|---|---|---|---|---|---|
| Standard Voltage * | 120V AC OR 230V AC | | | | | |
| Rated Frequency | 50Hz/60Hz | | | | | |
| Rated Pressure | 0.011MPa(0.11kgf/cm$^2$)<br>0.11bar | | 0.015MPa(0.15kgf/cm$^2$)<br>0.15bar | | 0.018MPa(0.18kgf/cm$^2$)<br>0.18bar | |
| Operating Pressure | 0.005～0.015MPa<br>(0.05～0.15kgf/cm$^2$)<br>0.05～0.15bar | | 0.01～0.02MPa<br>(0.1～0.2kgf/cm$^2$)<br>0.1～0.2bar | | 0.013～0.023MPa<br>(0.13～0.23kgf/cm$^2$)<br>0.13～0.23bar | |
| Rated Airflow | 28ℓ/min. | 45ℓ/min. | 60ℓ/min. | 80ℓ/min. | 100ℓ/min. | 120ℓ/min. |
| Power Consumption | 29/25.5W | 47/45W | 64/60W | 86/80W | 100/95W | 130/118W |
| Weight | 2.8kg | 3.0kg | 5.0kg | 5.3kg | 9.4kg | 9.4kg |

* The unit must only be operated at the voltage as indicated on the outer casing of the blower.

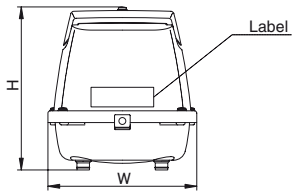
# 2. Dimensions

**LA-28B/LA-45B**



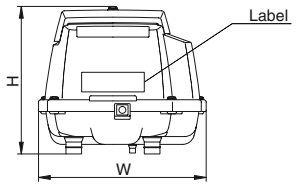

L=207mm
W=182mm
H=205mm
D=18mmOD

**LA-60A/LA-80A**



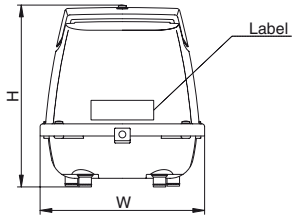

L=307mm
W=190mm
H=208mm
D=18mmOD

**LA-60B/LA-80B**




L=305mm
W=214mm
H=188mm
D=18mmOD

**LA-100/LA-120**




L=408mm
W=210mm
H=232mm
D=26mmOD

# 3. Safety Instructions

## Explanation of Diagrammatic Expressions

The term “Attention” as used in this manual is to alert you to dangers such as the following;

**Clause**

⚠ **ATTENTION**

**The degree of Danger Indicated by 'Attention' clauses**

Such clauses indicate the possibility that continuing to work while ignoring the “Attention” clause, or working with negligence, may cause personal injury or physical damage.

## The Meanings of the Symbols

**Symbols**

This symbol advises you of an item which should **BE NOTED** (including a Danger or Warning). Accompanying notes may include a picture or explanatory text inside the triangle or next to the symbol mark.

This symbol advises you of an action which must **NOT BE TAKEN** (**IS PROHIBITED**) in order to avoid danger. The general actions which must not be taken will be shown by a picture or explanatory text inside or next to the symbol mark.

This symbol advises you of an action which **must BE TAKEN** (**IS MANDATORY**) in order to avoid danger. The action which must be taken will be shown by a picture or explanatory text inside the circle or next to the symbol mark.

## Safety and Operating Instructions

The following safety precautions should always be followed to reduce the risk of breakdown and/or accidents.

### ⚠ ATTENTION • • • To Prevent Electric Shock And Fire

① Don’t install the blower where it may be flooded with water.

② Electrical work must be done by a qualified electrician.

③ The power supply should be the rated voltage shown on the label on the blower and be fitted with earth leakage and over current breakers.

④ The power outlet used should be waterproof and include an earth connected to the ground.

⑤ If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or similarly qualified person in order to avoid a hazard.

⑥ Don’t place any objects on the electric cable.

⑦ Be sure to unplug the blower before starting maintenance.

⑧ Be sure to replace the Upper Case after maintenance.

⑨ Don’t touch the metal part of the blower until it has cooled down as the blower runs very hot.

Ignoring any of the above points may cause an electric shock, fire or burn.

# 4. Installation (Septic Tank Application)

## 1. Installation site selection

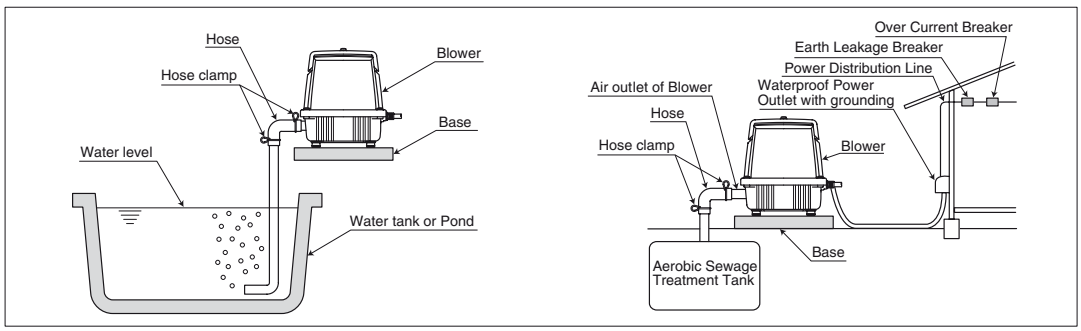
①Install near the septic tank. ⚠
If the pipeline is long, the sewage treatment may not perform well due to insufficient airflow.
②Install in a place which is convenient for maintenance. ⚠
③Don't install over a manhole or on soft ground. ⊘
④Avoid areas where wind-blown leaves and dust gathers. ⚠
⑤Install in a well ventilated place. ⚠
⑥Install at least 30cm away from the wall of the house. ⚠
⑦Installation in the shade is recommended to suppress the heat generation of the blower. ⚠
⑧Don't install the blower where it will be flooded with water. ⊘
⑨Don't install where there is excess moisture or humidity. ⊘

## 2. Method of Installation

①The base should be made of concrete strong enough to bear the weight and block vibration from the blower. ⚠
②The base should be at least 10cm above the ground level and 5cm larger than the external dimensions of the blower. ⚠
③Provide a separate power outlet to be used exclusively by the blower. ❗
④Electrical work must be done by a qualified electrician. ❗
⑤The power supply should be the rated voltage shown on the label on the blower and be fitted with earth leakage and over-current breakers. ❗
⑥The power outlet used should be waterproof and include an earth connected to the ground. ❗
⑦Place the blower horizontally on the base. ⚠
⑧A soft rubber hose must be used for connection between the air outlet of the blower and the pipe. ❗
⑨The rubber hose must be fastened with hose clamps. ❗
⑩When making the connection, make sure the air outlet and the pipe are level to ensure the hose is not kinked or blocked. ❗
⑪Before starting the operation of the blower, ensure that the water level in the septic tank is at the appropriate height and the valves on the pipeline are properly opened. ⚠

## 3. Start operation

Insert the power plug all the way into the power outlet so that the plug itself does not wobble. Incomplete connection may cause an electric shock or fire.
After starting operation ensure that there is;
No air leakage from the hose and the pipe connection.
No abnormal noise from the blower.
No vibrations being transmitted through to the ground as a result of the piping being strained.



# 5. Maintenance (Refer to the sketches on the next page)

## 1. Cautions

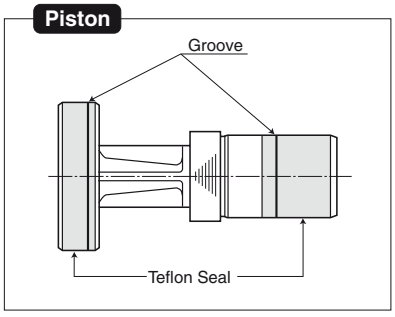
① MEDO blowers are OILLESS. Never lubricate them. ⃠
② All blowers have already been precisely adjusted. Never disassemble them. ⃠
(Do not try to loosen the Hex. Bolts on the Endcap)

## 2. Replacement of Filter Element

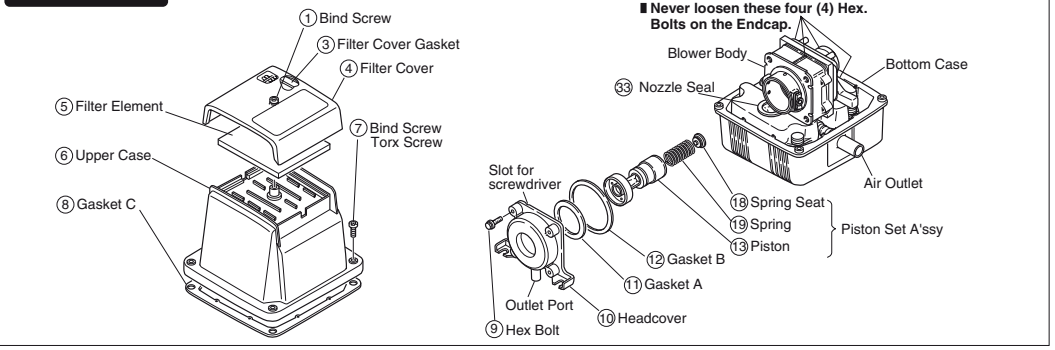
① Be sure to unplug the blower before starting the replacement work.
② Loosen the Bind Screw①and remove the Filter Cover④.
③ Remove the Filter Element(s)⑤from the Upper Case⑥and replace it with new One(s). At the same time, clean the air inlet of the Filter Cover④and the Upper Case⑥.
④ Assemble the Filter Cover④with the Filter Cover Gasket③securely positioned.
⑤ Mount the Filter Cover④ on to the Upper Case⑥, then tighten with the Bind Screw(s)①.
⑥ **Filter Element replacement Period**
It is recommended that the Filter Element(s) is cleaned or replaced with a new one(s) depending on the extent of its deterioration as determined by the atomospheric conditions around the application. The filter element(s) should be checked every three months.

## 3. Replacement of Piston Set Assembly

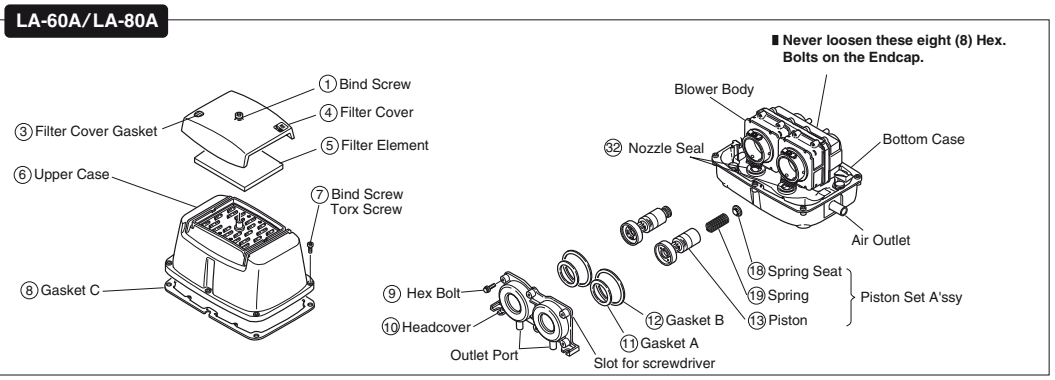
① Be sure to unplug the blower before starting the maintenance work.
② Remove the Upper Case⑥, loosen all the Hex. Bolts⑨on the Headcover ⑩and remove it. In case it is hard to remove the Headcover ⑩insert a flat head screwdriver into the slot(s) at the edge of the Headcover ⑩and twist the screwdriver gently to open.
③ Take out the Piston Set Assembly(s).
④ Replace all Piston Set Assemblies, Gasket A ⑪and Gasket B ⑫with new ones. Be sure to keep the Teflon Seal of the Piston ⑬away from any dust, swarf, water, oil or grease. Try not to touch the Teflon Seal of the Piston ⑬with your fingers.
⑤ Insert the Piston Set Assembly(s) into the Pump Body. Position Gasket A ⑪on the Headcover ⑩and Gasket B ⑫on the Pump Body, then fasten the Headcover ⑩with the Hex. Bolts⑨.Tighten the Hex. Bolts⑨ evenly and alternately then gradually tighten them fully.
⑥ Before putting the Upper Case⑥ back, start the blower and check if there is any air leakage around the Headcover ⑩or the Nozzle Seal(s)㉝by briefly blocking the air outlet. If there is an air leakage around the Headcover ⑩, re-position Gasket A ⑪and Gasket B ⑫then re-fasten the Hex Bolts⑨. If there is an air leakage around the Nozzle Seal(s)㉝check if the nozzle seal is properly positioned on the airtank and press the pump body down to allow the outlet port of the Headcover to catch the Nozzle Seal(s) correctly.
⑦ Put the Upper Case⑥back after installing GasketC⑧on the Bottom Case properly. Fasten the Bind Screws/Torx Screws⑦evenly and alternately.
⑧ **Piston Set Assembly replacement period**
It is suggested that the Piston Set Assembly is replaced every 12 to 24 months depending on the extent of the blower's pressure and airflow deterioration.
There is a groove on each Teflon Seal of the Piston indicating the degree of wear. If one or both grooves are worn away, replacement of the Piston Set Assembly is recommended.



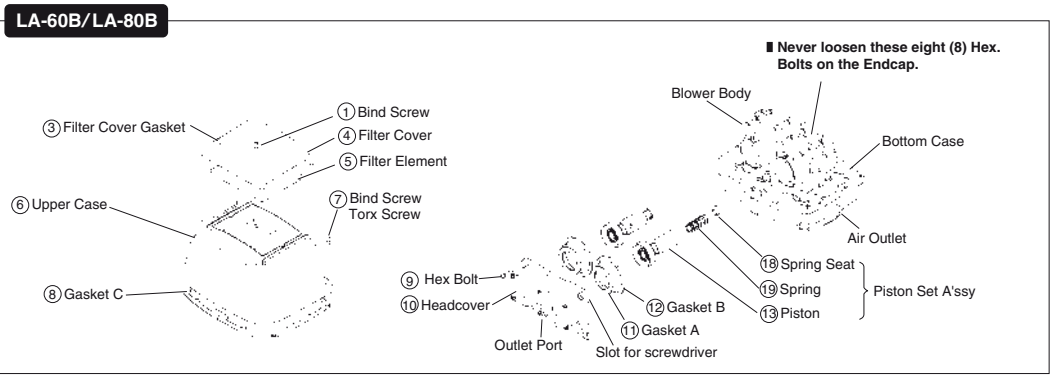
## LA-28B/LA-45B



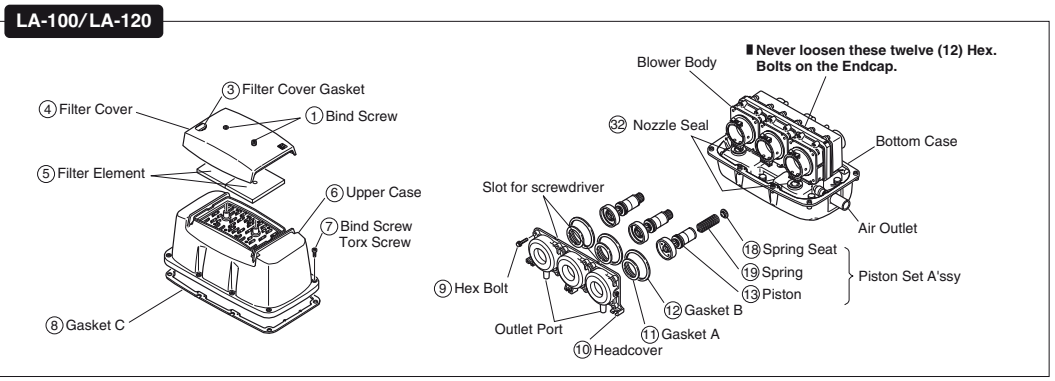

## LA-60A/LA-80A




## LA-60B/LA-80B

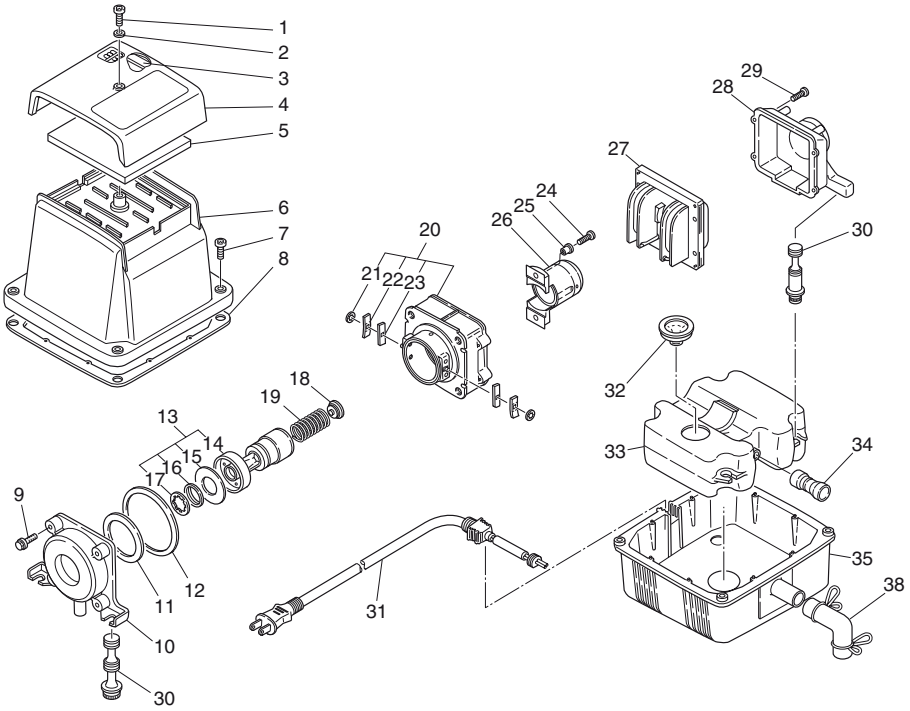



## LA-100/LA-120



## Exploded View

LA-28B/LA-45B



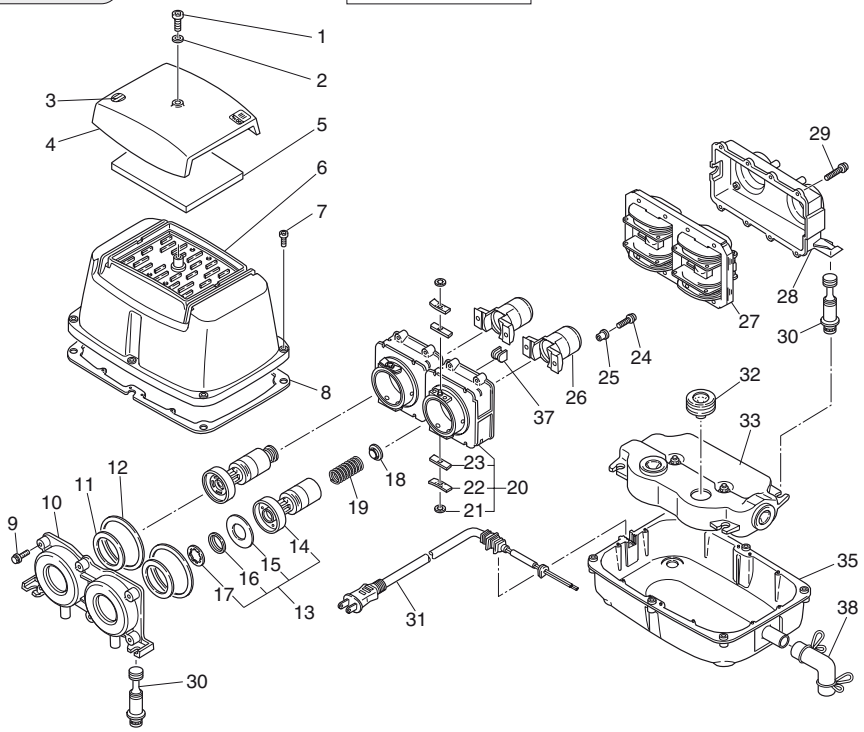

## Parts List

| No. | Part Name | LA-28B | Q'ty | LA-45B | Q'ty |
|---|---|---|---|---|---|
| 1 | Bind Screw | LP30581 | 1 | LP30581 | 1 |
| 2 | Seal Washer | LP30635 | 2 | LP30635 | 2 |
| 3 | Filter Cover Gasket | LQ02607 | 2 | LQ02607 | 2 |
| 4 | Filter Cover | LQ02575 | 1 | LQ02575 | 1 |
| 5 | Filter Element | LQ02605 | 1 | LQ02605 | 1 |
| 6 | Upper Case | LB02937 | 1 | LB02937 | 1 |
| 7 | Bind Screw UL | LP30581 | 4 | LP30581 | 4 |
| | Torx Screw CE | LQ03082 | 4 | LQ03082 | 4 |
| 8 | Gasket C | LQ02601 | 1 | LQ02601 | 1 |
| 9 | Hex Bolt | LP31316 | 4 | LP31316 | 4 |
| 10 | Headcover | LQ02567 | 1 | LQ02063 | 1 |
| 11 | Gasket A | LQ01043 | 1 | LQ01043 | 1 |
| 12 | Gasket B | LQ01042 | 1 | LQ01042 | 1 |
| 13 | Piston | LA70625 | 1 | LB03132 | 1 |
| ⑭ | Piston Sub Assy | LA70626 | 1 | LB03133 | 1 |
| ⑮ | Inlet Valve | LP30916 | 1 | LP30916 | 1 |
| ⑯ | Valve Retainer A | LP11548 | 1 | LP11548 | 1 |
| ⑰ | CS Ring | LP12948 | 1 | LP12948 | 1 |
| 18 | Spring Seat | LP12155 | 1 | LP12155 | 1 |
| 19 | Spring | LP30620 | 1 | LQ02743 | 1 |
| 20 | Housing | LB03184 | 1 | LB03184 | 1 |
| ㉑ | SE Ring | LP12475 | 2 | LP12475 | 2 |
| ㉒ | Valve Retainer B | LP13735 | 2 | LP13735 | 2 |
| ㉓ | Outlet Valve | LP10359 | 2 | LP10359 | 2 |
| 24 | Screw 5 x 20 | LP12599 | 2 | LP12599 | 2 |
| 25 | Insulation Bush | LP10355 | 2 | LP10355 | 2 |
| 26 | Rear Cylinder | LA71843 | 1 | LA71843 | 1 |

| No. | Part Name | LA-28B | Q'ty | LA-45B | Q'ty |
|---|---|---|---|---|---|
| 27 | Field Core Assy P | LB01536 | 1 | LB03466 | 1 |
| | Field Core Assy Q | | | | |
| | Field Core Assy E | LB04038 | 1 | LB04028 | 1 |
| 28 | Endcap | LQ01052 | 1 | LQ02892 | 1 |
| 29 | Hex Bolt | LP31316 | 4 | LP31316 | 4 |
| 30 | Rubber Feet | LQ04256 | 4 | LQ04256 | 4 |
| 31 | Cable Assy UK | LB05341 | 1 | LB05341 | 1 |
| | Cable Assy D | LB05307 | 1 | LB05307 | 1 |
| | Cable Assy A | | | | |
| | Cable Assy J | LQ01037 | 1 | LQ01037 | 1 |
| | Cable Assy UL | LB04770 | 1 | LB04770 | 1 |
| 32 | Nozzle Seal | LQ02598 | 1 | LQ02598 | 1 |
| 33 | Air Tank Assy | LB02987 | 1 | LB02987 | 1 |
| 34 | Joint Hose | LQ02602 | 1 | LQ02602 | 1 |
| 35 | Bottom Case | LB02938 | 1 | LB02938 | 1 |
| 36 | Cushion | | | | |
| 37 | Rubber Plug | | | | |
| OPTION | | | | | |
| 38 | Hose Assy | | | | |
| | LA97475 | | | LB03185 | |
| |  | | |  | |

## Exploded View

LA-60A/LA-80A




## Parts List

| No. | Part Name | LA-60A | Q'ty | LA-80A | Q'ty |
|---|---|---|---|---|---|
| 1 | Bind Screw | LP30581 | 1 | LP30581 | 1 |
| 2 | Seal Washer | LP30635 | 2 | LP30635 | 2 |
| 3 | Filter Cover Gasket | LQ02607 | 2 | LQ02607 | 2 |
| 4 | Filter Cover | LB03213 | 1 | LB03213 | 1 |
| 5 | Filter Element | LQ02730 | 1 | LQ02730 | 1 |
| 6 | Upper Case | LB04597 | 1 | LB04597 | 1 |
| 7 | Bind Screw UL | LP30581 | 6 | LP30581 | 6 |
| | Torx Screw CE | LQ03082 | 6 | LQ03082 | 6 |
| 8 | Gasket C | LQ03768 | 1 | LQ03768 | 1 |
| 9 | Hex Bolt | LP31316 | 6 | LP31316 | 6 |
| 10 | Headcover | LQ03766 | 1 | LQ03773 | 1 |
| 11 | Gasket A | LQ01043 | 2 | LQ01043 | 2 |
| 12 | Gasket B | LQ01042 | 2 | LQ01042 | 2 |
| 13 | Piston | LB03132 | 2 | LB03132 | 2 |
| ⑭ | Piston Sub Assy | LB03133 | 2 | LB03133 | 2 |
| ⑮ | Inlet Valve | LP30916 | 2 | LP30916 | 2 |
| ⑯ | Valve Retainer A | LP11548 | 2 | LP11548 | 2 |
| ⑰ | CS Ring | LP12948 | 2 | LP12948 | 2 |
| 18 | Spring Seat | LP12155 | 2 | LP12155 | 2 |
| 19 | Spring | LP30620 | 2 | LQ02743 | 2 |
| 20 | Housing | LB03184 | 2 | LB03184 | 2 |
| ㉑ | SE Ring | LP12475 | 4 | LP12475 | 4 |
| ㉒ | Valve Retainer B | LP13735 | 4 | LP13735 | 4 |
| ㉓ | Outlet Valve | LP10359 | 4 | LP10359 | 4 |
| 24 | Screw 5 x 20 | LP12599 | 4 | LP12599 | 4 |
| 25 | Insulation Bush | LP10355 | 4 | LP10355 | 4 |
| 26 | Rear Cylinder | LB02443 | 2 | LB02443 | 2 |

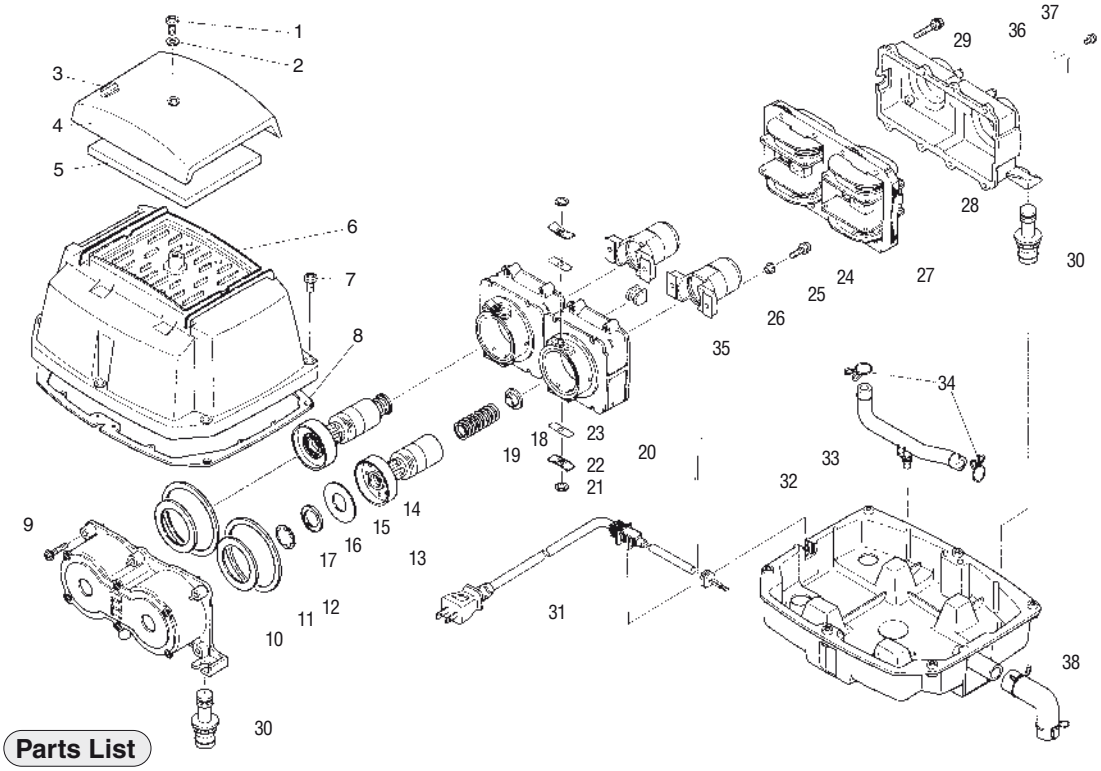
| No. | Part Name | LA-60A | Q'ty | LA-80A | Q'ty |
|---|---|---|---|---|---|
| 27 | Field Core Assy P | LB04901 | 1 | LB04905 | 1 |
| | Field Core Assy Q | LB05126 | 1 | LB05134 | 1 |
| | Field Core Assy E | LB05099 | 1 | LB05048 | 1 |
| 28 | Endcap | LQ03767 | 1 | LQ03767 | 1 |
| 29 | Hex Bolt | LP31316 | 8 | LP31316 | 8 |
| 30 | Rubber Feet | LQ04256 | 4 | LQ04256 | 4 |
| 31 | Cable Assy UK | LB05341 | 1 | LB05341 | 1 |
| | Cable Assy D | LB05307 | 1 | LB05307 | 1 |
| | Cable Assy A | LB05220 | 1 | LB05220 | 1 |
| | Cable Assy J | LQ01037 | 1 | LQ01037 | 1 |
| | Cable Assy UL | LB04770 | 1 | LB04770 | 1 |
| 32 | Nozzle Seal | LQ02598 | 3 | LQ02598 | 3 |
| 33 | Air Tank Assy | LB04600 | 1 | LB04600 | 1 |
| 34 | Joint Hose | | | | |
| 35 | Bottom Case | LB04599 | 1 | LB04599 | 1 |
| 36 | Cushion | | | | |
| 37 | Rubber Plug | LQ03775 | 1 | LQ03775 | 1 |

OPTION

| No. | Part Name | LA97475 | LB03185 |
|---|---|---|---|
| 38 | Hose Assy |  |  |

## Exploded View

LA-60B/LA-80B



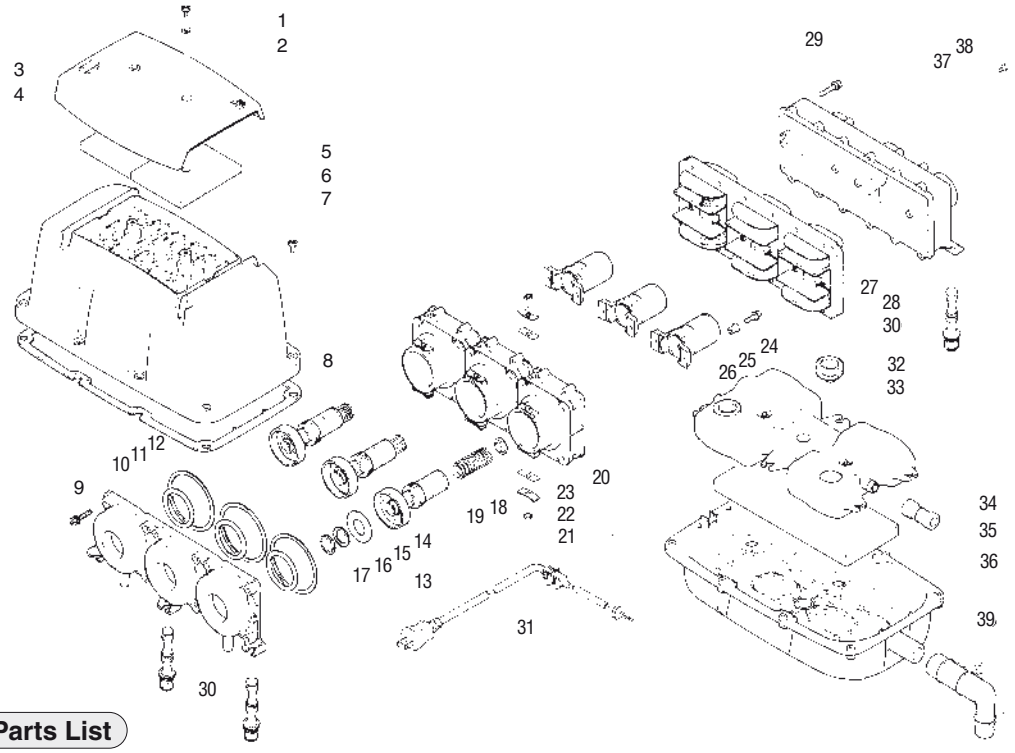

## Parts List

| No. | Part Name | LA-60B | Q'ty | LA-80B | Q'ty |
|---|---|---|---|---|---|
| 1 | Bind Screw | LP30581 | 1 | LP30581 | 1 |
| 2 | Seal Washer | LP30635 | 2 | LP30635 | 2 |
| 3 | Filter Cover Gasket | LQ02607 | 2 | LQ02607 | 2 |
| 4 | Filter Cover | LB06202 | 1 | LB06202 | 1 |
| 5 | Filter Element | LQ02730 | 1 | LQ02730 | 1 |
| 6 | Upper Case | LB06203 | 1 | LB06203 | 1 |
| 7 | Bind Screw UL | LP30581 | 6 | LP30581 | 6 |
| | Torx Screw CE | LQ03082 | 6 | LQ03082 | 6 |
| 8 | Gasket C | LQ05144 | 1 | LQ05144 | 1 |
| 9 | Hex Bolt | LP31316 | 6 | LP31316 | 6 |
| 10 | Headcover Assy | LB06207 | 1 | LB06207 | 1 |
| 11 | Gasket A | LQ01043 | 2 | LQ01043 | 2 |
| 12 | Gasket B | LQ01042 | 2 | LQ01042 | 2 |
| 13 | Piston Assy | LB03132 | 2 | LB03132 | 2 |
| ⑭ | Piston Sub Assy | LB03133 | 2 | LB03133 | 2 |
| ⑮ | Inlet Valve | LP30916 | 2 | LP30916 | 2 |
| ⑯ | Valve Retainer A | LP11548 | 2 | LP11548 | 2 |
| ⑰ | CS Ring | LP12948 | 2 | LP12948 | 2 |
| 18 | Spring Seat | LP12155 | 2 | LP12155 | 2 |
| 19 | Spring | LP30585 | 2 | LQ02743 | 2 |
| 20 | Housing | LB03184 | 2 | LB03184 | 2 |
| ㉑ | SE Ring | LP12475 | 4 | LP12475 | 4 |
| ㉒ | Valve Retainer B | LP13735 | 4 | LP13735 | 4 |
| ㉓ | Outlet Valve | LP10359 | 4 | LP10359 | 4 |
| 24 | Screw 5 x 20 | LP12599 | 4 | LP12599 | 4 |
| 25 | Insulation Bush | LP10355 | 4 | LP10355 | 4 |
| 26 | Rear Cylinder | LB02443 | 2 | LB02443 | 2 |

| No. | Part Name | LA-60B | Q'ty | LA-80B | Q'ty |
|---|---|---|---|---|---|
| 27 | Field Core Assy P | LB04901 | 1 | LB04905 | 1 |
| | Field Core Assy Q | LB05126 | 1 | LB05134 | 1 |
| | Field Core Assy E | LB05099 | 1 | LB05048 | 1 |
| 28 | Endcap | LQ03767 | 1 | LQ03767 | 1 |
| | Endcap (Thermal) | LQ05321 | 1 | LQ05321 | 1 |
| 29 | Hex Bolt | LP31316 | 8 | LP31316 | 8 |
| 30 | Rubber Feet | LQ05143 | 4 | LQ05143 | 4 |
| 31 | Cable Assy UK | LB06592 | 1 | LB06592 | 1 |
| | Cable Assy D | LB06597 | 1 | LB06597 | 1 |
| | Cable Assy A | LB06463 | 1 | LB06463 | 1 |
| | Cable Assy J | LB06640 | 1 | LB06640 | 1 |
| | Cable Assy UL | LB06691 | 1 | LB06691 | 1 |
| 32 | Bottom Case | LB06205 | 1 | LB06205 | 1 |
| 33 | Joint Hose | LQ05142 | 1 | LQ05142 | 1 |
| 34 | Clamp | LQ05398 | 2 | LQ05398 | 2 |
| 35 | Rubber Plug | LQ03775 | 1 | LQ03775 | 1 |
| 36 | Thermal Braket | LQ05320 | 1 | LQ05320 | 1 |
| 37 | Screw 4 x 8 | LQ00190 | 1 | LQ00190 | 1 |
| OPTION | | | | | |
| 38 | Hose Assy | | | | |
| | LA97475 | | | LB03185 | |
| |  | | |  | |

## Exploded View

LA-100/LA-120




## Parts List

| No. | Part Name | LA-100 | Q'ty | LA-120 | Q'ty |
|---|---|---|---|---|---|
| 1 | Bind Screw | LP30581 | 2 | LP30581 | 2 |
| 2 | Seal Washer | LP30635 | 4 | LP30635 | 4 |
| 3 | Filter Cover Gasket | LQ03101 | 2 | LQ03101 | 2 |
| 4 | Filter Cover | LB03769 | 1 | LB03769 | 1 |
| 5 | Filter Element | LQ02605 | 2 | LQ02605 | 2 |
| 6 | Upper Case | LB03763 | 1 | LB03763 | 1 |
| 7 | Bind Screw UL | LP30581 | 8 | LP30581 | 8 |
| | Torx Screw CE | LQ03082 | 8 | LQ03082 | 8 |
| 8 | Gasket C | LQ03091 | 1 | LQ03091 | 1 |
| 9 | Hex Bolt | LP31316 | 12 | LP31316 | 12 |
| 10 | Headcover | LB03834 | 1 | LB03834 | 1 |
| 11 | Gasket A | LQ01399 | 3 | LQ01399 | 3 |
| 12 | Gasket B | LQ01400 | 3 | LQ01400 | 3 |
| 13 | Piston Assy | LB03779 | 3 | LB03779 | 3 |
| ⑭ | Piston Sub Assy | LB03780 | 3 | LB03780 | 3 |
| ⑮ | Inlet Valve | LQ03230 | 3 | LQ03230 | 3 |
| ⑯ | Valve Retainer A | LP11548 | 3 | LP11548 | 3 |
| ⑰ | CS Ring | LP12948 | 3 | LP12948 | 3 |
| 18 | Spring Seat | LP10357 | 3 | LP10357 | 3 |
| 19 | Spring | LQ03117 | 3 | LQ03117 | 3 |
| 20 | Housing | LB03778 | 3 | LB03778 | 3 |
| ㉑ | SE Ring | LP12475 | 6 | LP12475 | 6 |
| ㉒ | Valve Retainer B | LP13735 | 6 | LP13735 | 6 |
| ㉓ | Outlet Valve | LP10359 | 6 | LP10359 | 6 |
| 24 | Screw 5 x 20 | LP12599 | 6 | LP12599 | 6 |
| 25 | Insulation Bush | LP10355 | 6 | LP10355 | 6 |
| 26 | Rear Cylinder | LB01415 | 3 | LB01415 | 3 |

| No. | Part Name | LA-100 | Q'ty | LA-120 | Q'ty |
|---|---|---|---|---|---|
| 27 | Field Core Assy P | LB04855 | 1 | LB04909 | 1 |
| | Field Core Assy Q | | | LB04280 | 1 |
| | Field Core Assy E | LB04180 | 1 | LB04171 | 1 |
| 28 | Endcap | LQ03108 | 1 | LQ03108 | 1 |
| | Endcap (Thermal) | LQ05390 | 1 | LQ05390 | 1 |
| 29 | Hex Bolt | LP31316 | 12 | LP31316 | 12 |
| 30 | Rubber Feet | LQ03089 | 6 | LQ03089 | 6 |
| 31 | Cable Assy UK | LB06592 | 1 | LB06592 | 1 |
| | Cable Assy D | LB06597 | 1 | LB06597 | 1 |
| | Cable Assy A | LB06463 | 1 | LB06463 | 1 |
| | Cable Assy J | LB06640 | 1 | LB06640 | 1 |
| | Cable Assy UL | LB06691 | 1 | LB06691 | 1 |
| 32 | Nozzle Seal | LQ02598 | 2 | LQ02598 | 2 |
| 33 | Air Tank Assy | LB03771 | 1 | LB03771 | 1 |
| 34 | Joint Hose | LQ03096 | 1 | LQ03096 | 1 |
| 35 | Cushion | LQ03112 | 1 | LQ03112 | 1 |
| 36 | Bottom Case | LB03762 | 1 | LB03762 | 1 |
| 37 | Thermal Braket | LQ05320 | 1 | LQ05320 | 1 |
| 38 | Screw 4 x 8 | LQ00190 | 1 | LQ00190 | 1 |
| OPTION | | | | | |
| 39 | Hose Assy | | | | |

| LB04119 | LB03965 | LB01070 |
|---|---|---|
|  |  |  |

# MEDO LAM BLOWER MAINTENANCE MANUAL

LAM–200

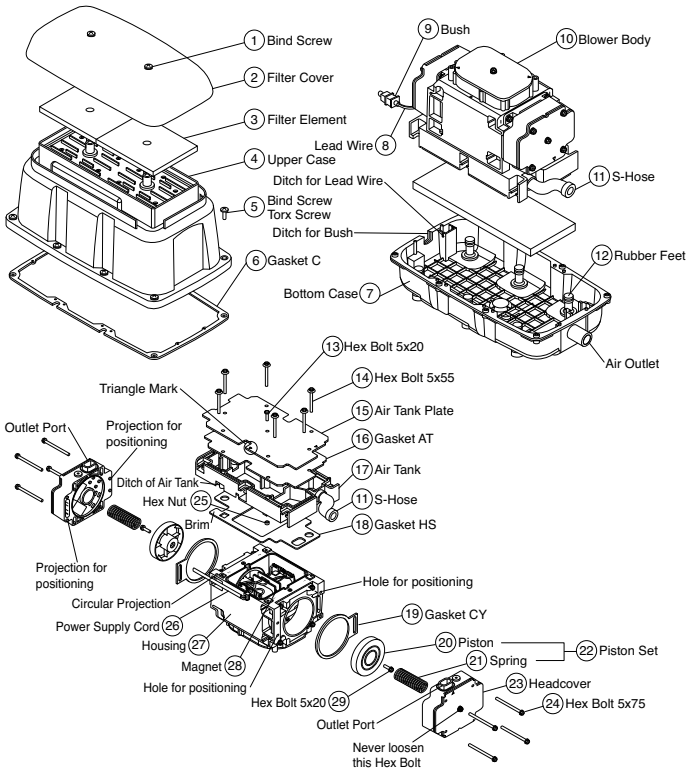
⚠ This instruction manual should be read and understood thoroughly before any maintenance work is executed.

## Contents of Repair Parts Kit

| Model | Parts Name | Q'ty | Parts Name | Q'ty | Parts Name | Q'ty |
|---|---|---|---|---|---|---|
| LAM-200 | Magnet Fixing Jig | 1* | Gasket AT | 1 | Piston Set | 2 |
| | Screw for Jig 4x35 | 1* | Gasket CY | 2 | Filter Element | 2 |
| | Screw for Jig 4x16 | 2* | Gasket HS | 1 | Instruction Manual | 1 |

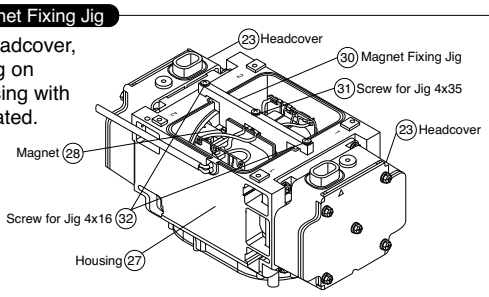
* Magnet Fixing Jig and two kinds of Screws for Jig are necessary to replace Piston Set. LB07929 Repair Parts Kit does not include the Jig and the Screws.

### Exploded View (LAM-200)




### Setting method of Magnet Fixing Jig

Before taking off ㉓Headcover, fix ㉚Magnet Fixing Jig on ㉘Magnet and ㉗Housing with ㉛㉜Screws, as illustrated.




### 1. Cautions

(1) MEDO blowers are OILLESS. Never lubricate them. ⃠
(2) All blowers have already been precisely adjusted. Never disassemble them except for maintenance of Filter Element or replacement of Piston. ⃠

### 2. Replacement of Filter Element

(1) Be sure to unplug the blower before starting the replacement work.
(2) Loosen ①Bind Screw and remove ②Filter Cover.
(3) Remove ③Filter Elements from ④Upper Case and replace it with new ones. At the same time, clean the air inlet of ②Filter Cover and ④Upper Case.
(4) Mount ②Filter Cover on to ④Upper Case, then tighten with ①Bind Screws.
**(5) Filter Element replacement period**
It is recommended that ③Filter Elements is cleaned or replaced with a new ones depending on the extent of its deterioration as determined by the atomospheric conditions around the installation point.
③Filter Elements should be checked every three months.

### 3. Replacement of Piston Set

(1) Be sure to unplug the blower before starting the replacement work.
(2) Take off ④Upper Case and ⑥Gasket C and detach ⑨Bush of ㉖Power Supply Cord and ⑪S-Hose from ⑦Bottom Case.
(3) After detaching ⑫Rubber Feet from ⑩Blower Body, pick them off ⑦Bottom Case. Be careful not to scar ⑫Rubber Feet. We recommend using a flat driver.
(4) After turning ⑩Blower Body upside down, loosen only ⑭Hex Bolt 5 x 55 (6 pcs.) and detach ⑰Air Tank. At this stage, never loosen ⑬Hex Bolt 5 x 20. If ⑱Gasket HS does not come off easily, insert a flat driver between ⑰Air Tank and ㉗Housing.
(5) Take off ⑱Gasket HS.
(6) Fix ㉚Magnet Fixing Jig on ㉘Magnet and ㉗Housing with two ㉛Screws. Use ㉛Screw to fasten ㉘Magnet and ㉜Screws to fasten ㉗Housing.
(7) Put ⑩Blower Body upright, so that ㉓Headcover lies flat. Loosen ㉔Hex Bolt 5 x 75 (4 pcs.) evenly until ㉓Headcover comes up by approx. 5 mm. (Never remove ㉔Hex Bolt 5 x 75. Just loosen them at this stage.) Never loosen the Hex Bolt in the center of ㉓Headcover. Be sure that ㉓Headcover comes off ㉗Housing. (By recoil of ㉑Spring, it will happen.) In case that ㉓Headcover does not come off, insert a flat driver between ㉓Headcover and ㉗Housing. From this condition, loose ㉔Hex Bolt 5 x 75 (4 pcs.) and take ㉓Headcover off ㉗Housing. Pick off ⑲Gasket CY.
(8) Loosen ㉙Hex Bolt 5 x 20. And pull off ㉒Piston Set.
(9) Replace ㉒Piston Set with a new one. Be sure that ㉑Spring is securely fixed on ⑳Piston. Be careful that dust or oil never adheres to the moving part (Black) of ⑳Piston. Preferably avoid touching the surface of the moving part.
(10) Replace ⑲Gasket CY with a new one. Paying attention to the direction of elliptic hole, place it securely on ㉗Housing.
(11) Fix ㉓Headcover, as if laying it on ㉑Spring. Paying attention to the direction of Outlet Port of ㉓Headcover, fit the thread part of ㉗Housing to the hole position of ㉓Headcover. Fasten ㉔Hex Bolt 5 x 75 evenly and little dividing into several times. After making sure that Projections for positioning on ㉓Headcover fit perfectly to Holes for positioning on ㉗Housing, fasten them fast towards the end.
(12) Replace another ㉒Piston Set and ⑲Gasket CY in the same ways. Replace ㉒Piston Set and ⑲Gasket CY one side by one side without fail. (Never detach both the two ㉓Headcovers at the same time.)
(13) Make sure to take out ㉚Magnet Fixing Jig after replacement of both ㉒Piston Sets.
(14) Unfasten ⑬Hex Bolt 5 x 20 in the center of ⑰Air Tank and replace ⑯Gasket AT with a new one. Hold ㉕Hex Nut in the back of ⑬Hex Bolt 5 x 20 not to drop it. After replacing ⑯Gasket AT, fasten again ⑬Hex Bolt 5 x 20 in the center.
(15) Put a new ⑱Gasket HS. Fit Brim of ⑱Gasket HS to Circular Projection of ㉗Housing.
(16) Place ⑰Air Tank on ㉗Housing with ⑭Hex Bolt 5 x 55 (6 pcs.). Set Triangle Mark on ⑮Air Tank Plate to the side of ㉖Power Supply Cord. Insert ㉖Power Supply Cord deep in Ditch of ⑰Air Tank. Fasten ⑭Hex Bolts 5 x 55 (6 pcs.) evenly and little by little dividing into several times. At the end fasten the Bolts and ⑬Hex Bolt 5 x 20 fast.
(17) Place ⑩Blower Body onto ⑫Rubber Feet on ⑦Bottom Case. Insert ⑫Rubber Feet deep and securely.
(18) Insert ⑪S-Hose deep and securely to the nipple inside ⑦Bottom Case.
(19) Insert ⑧Lead Wire of ㉖Power Supply Cord and ⑨Bush deep to ⑦Bottom Case.
(20) After finishing assembly, connect the Power Supply and make trial operation. Block up Air Outlet by your finger and make sure that no leakage of air out from area of ⑱Gasket HS and ⑲Gasket CY.
(21) After making sure of no issues, place ⑥Gasket C securely and cover ④Upper Case on ⑩Blower Body. Fasten ⑤Bind Screw (8 pcs.) evenly and little by little dividing into several times to finish up the replacement work.

## Safety Instructions

### Explanation of Diagrammatic Expressions

The term "Attention" as used in this manual is to alert you to dangers such as the following;

**Clause**

⚠ **ATTENTION**

**The degree of Danger Indicated by "Attention" clauses.**

Such clauses indicate the possibility that continuing to work while ignoring the "Attention" clause, or working with negligence, may cause personal injury or property damage.

### The Meanings of the Symbols

**Symbols**

⚠ This symbol advises you of an item which should **BE NOTED** (including Danger or Warning). Accompanying notes may include a picture or explanatory text inside the triangle or next to the symbol mark.

⃠ This symbol advises you of an action which must **NOT BE TAKEN (IS PROHIBITED)** in order to avoid danger. The general actions which must not be taken will be shown by a picture or explanatory text inside or next to the symbol mark.

❗ This symbol advises you of an action which **must BE TAKEN (IS MANDATORY)** in order to avoid danger. The action which must be taken will be shown by a picture or explanatory text inside the circle or next to the symbol mark.

### Safety and Operating Instructions

The following safety precautions should always be followed to reduce the risk of breakdown and/or accidents.

⚠ **ATTENTION** • • • **To Prevent Electric Shock And Fire**

① Don't install the blower where it may be flooded with water and buried in snow. ⃠
② Electrical work must be done by a qualified electrician. ❗
③ The power supply should be the rated voltage shown on the label on the blower and be fitted with earth leakage and over current breakers. ❗
④ The power outlet used should be waterproof and include an earth connected to the ground. ❗
⑤ If the power supply cord is damaged, it must be replaced by the manufacturer or its service agent or similarly qualified person in order to avoid a hazard. ❗
⑥ Don't place any objects on the power supply cord. ⃠
⑦ Be sure to unplug the blower before starting maintenance.
⑧ Be sure to replace the Upper Case and Filter Cover after maintenance. ❗
Ignoring any of the above ①-⑧ may cause an electric shock or a fire.
⑨ Don't touch the metal part of the blower until it has cooled down as the blower runs very hot. ⃠
Ignoring the above ⑨ may cause a burn.

LQ06332-3

# Appendix C: Settle Ability Test

## SETTLEMENT TEST TROUBLE SHOOTING GUIDE

**Colour grey:** There may be too much laundry effluent going into the plant. Ask the residents to check they are not putting in too much detergent. Check that the Laundry use is not all on one day of the week and it is spread out. Try to limit the use to 1 to 2 clothes washings per day. Another possibility is that surface water from the roof etc. is entering the plant.

**White deposits** in the activated sludge. These are probably due to grease and fat getting into the plant, which should be discouraged. The deposit may form into balls.

**Light brown:** This is due either to the plant just starting up or that it is lightly loaded. The settlement may be poor and "fluffy" in texture. Do not confuse the lack of settle ability with the need to de-sludge the plant. In a lightly loaded plant this is not the right action to take.

**Black colour:** The plant may have some septic sludge in it. In this case the best solution is to have the plant de-sludged.

**No clear supernatant:** If there is only a small amount of clear liquid above the sludge layer, 8 or 9 if the container is divided into 10 parts vertically, then the unit needs emptying of sludge.

A record of the test and the results should be kept.

# Appendix D: Fault Finding

| Symptom | Cause | Action |
|---|---|---|
| Strong odour | Excess chemicals in the plant | See appendix E |
| | Excessive laundry use | See appendix E |
| | Carry out a settlement test | See appendix C |
| | Drains inadequately venting | Check that a high level vent is fitted to the house and is working correctly |
| | Nothing obvious can be found | Carryout 12 month service and correct any faults found |
| | Lack of aeration | Check air pump |
| Air pump stopped | Switched off at the mains isolator | Switch on |
| | Power failure | Check the supply board for a trip or fuse. |
| Air pump is running but no turbulence | Air pipe has been blocked or squashed or has a problem such as the hose is split. | Inspect pipe and check all joints for any leaks or splits. |
| Poor final effluent | Check the compressor is operating and delivering air to the bio-zone. | Check and repair any faulty parts |
| | Carry out a settlement test in Appendix C | Follow the fault finding guide in appendix E |
| Bio-zone chamber has grey colour | Check there is good supply of air to the plant. (turbulent pattern in Bio-zone) | Check that the air pump is operating correctly. |
| Bio-zone has greyish to black colour and an offensive odour | Excessive laundry use. | See do's & dont's section of this manual, laundry detergents. |
| Bio-zone has a very light brown colour and has few suspended solids. White suds. | Lightly loaded. | If plant has just started or the effluent quality is OK no further action. Otherwise contact EPS Bison for advice. |
| | | Check that no surface water is entering the plant. |
| Bio-zone is black in appearance | Plant is organically over-loaded | Check load to plant or if a de-sludge is required. |
| | Not enough air is getting to the bio-zone. | Check air blower and air lines. |
| Grease balls in the bio-zone. | Too much grease in effluent. | Reduce grease in kitchen waste. |
| | Excessive laundry use. | See laundry section of Do's & Dont's. |
| Final effluent contains many Solids. | Carry out 12 month service | Only empty the plant of sludge if required. |

# Appendix E: Household Practices: Do's & Dont's

## INTRODUCTION

When we take a bath, put the washing machine on or flush the toilet few of us stop to consider what happens to the waste water and sewage. It simply goes down the drain or waste pipe and is no longer our concern. But if your drains lead to a packaged treatment plant, particularly one using a biological treatment system, then it's worth paying some attention to what happens next.

If you don't you could easily end up with a treatment plant which is not working efficiently and eventually run the risk of polluting your local environment and even facing possible prosecution as a result.

### What is sewage?

Sewage is made up of not just the organic waste from toilets but also the chemicals and waste water from everyday activities such as washing, cleaning, cooking and washing clothes and dishes. The sewage from bathrooms, kitchens and toilets collects in a series of drains that feed to a sewer. In most households or commercial premises the sewage flows away through a series of sewers and is treated at a large-scale sewage treatment works. However, for houses and premises in remote or isolated locations where no mains drainage is available, other options such as cesspools or septic tanks and treatment plants have traditionally been used.

## DO'S AND DONT'S

## DO:

### Weekly Inspections

- CHECK THAT THE AIR PUMP IS OPERATING BY LISTENING FOR A GENTLE HUM.
- Check the final effluent discharging from the unit at the sample point. If it is cloudy or contains suspended particles contact your maintenance provider.

**Think** before you put **anything** down the sink, toilet or drains.

**Tell** your guests/visitors/staff that you have a specialist sewage treatment plant and tell them how they can avoid harming it.

**Read** the label and use the manufacturers' recommended doses for all household cleaning products

**Use** cleaning products little and often so the plant isn't overloaded

**Spread** your clothes washing throughout the week

**Stick** to the same washing, dishwasher powders and other cleaning products - the bacteria in the plant will work more efficiently with products they are used to

**Use** liquid cleaners for clothes washing and for dishwashers sparingly.

## DON'T:

**Spring** clean and use large amounts of cleaners and chemicals in one day

**Have** a "washing day" - spread your washing throughout the week

**Use** household bleach and other strong chemicals indiscriminately

**Keep** changing your brands of household cleaners and washing powders

**Tip** bottles of medicine, mouth wash etc. down the toilet

**Put** sanitary towels, tampons, disposable nappies, baby wipes, cotton wool, incontinence pads etc. down the toilet

**Over flush** the toilet unnecessarily - use a water-saving flush if it's fitted

**Pour** fat or grease from cooking down the sink or drains

**Change** the oil in your chip pan and pour it down the sink

**Use** a waste disposal unit

**Pour** garden chemicals or car engine oil down the drains

## SO HOW SHOULD I USE CLEANING PRODUCTS?

### LAUNDRY DETERGENTS

Firstly you need to find out the level of hardness of your local water (see section on water softeners). Once you know how hard or soft your water is you can read the label on your laundry detergent and decide how much to use. The aim is to minimise the amount of detergent you use to limit its impact on the treatment plant whilst ensuring you get the best results from your wash.

- It is recommended that you use washing liquids in an in-machine ball dispenser, rather than powders. You get the best results from having the liquid in the heart of the wash; a liquid is already in suspension and therefore "gets to work" quicker and it reduces the amount of product left in the washing machine dispenser or lost on its journey to the drum.
- For normal "coloured" washes try to use a washing product without added bleach. For white washes add a separate bleach (such as the one produced by Ecover).
- Read the label and stick to the dosage recommended for the level of hardness of your water and to match the level of dirtiness of your washing. This is particularly important if you are using "concentrated" or "compact" liquids or powders because it is easy for your hand to slip and for you to use far too much.
- Try to ensure you have a full load each time or use an energy-saving "half load" programme if you have one. Don't be tempted to overload as this will not produce a good wash and could damage your machine in the longer term. A correctly loaded machine should have enough space for you to put your hand in to place the liquid ball on top of the washing.
- Normal wash temperatures, with the occasional very hot or "boil" wash, are not a problem for the treatment plant. However, it is not a good idea to do regular very hot washes as this could raise the plant temperature and affect the bacterial process.
- Your washing machine produces the largest quantity of waste water your treatment plant has to deal with. Don't have a "wash day" as this could produce too much water for the plant to handle in one go. Try to spread your washing throughout the week.

### DISHWASHER PRODUCTS

Your dishwasher cleaner is probably the most "aggressive" cleaning product in your household. It needs to be to make greasy plates sparkling and "squeaky" clean as the advertisers promise. It is therefore all the more important that you stick carefully to the manufacturers' recommended dosage. It is recommended that you use a liquid, rather than powder or tablet cleaner as these are understood to be more efficient.

Most dishwashers use salt as a water softener - try to ensure the salt dispenser is always topped up because soft water increases the efficiency of the cleaning product and enables you to use only the minimum dosage of cleaner.

German dishwasher manufacturers, who pride themselves on their low-water energy-saving machines, recommend that you do not rinse your washing up under the hot tap before putting it in the dishwasher. Although this is a traditionally common practice dishwashers and their cleaning products are now so effective that this is unnecessary - you are merely wasting energy and hot water.

### OTHER CLEANING PRODUCTS

It is most important that you always follow the manufacturers' recommended dosage on all household cleaning products. Read the label - don't be tempted to use guesswork. Try to avoid using large amounts of cleaning products in one go. If you follow the recommended dosage and use only small quantities on a regular basis they should not have any adverse effect on the treatment plant. However, a day's spring cleaning using massive amounts of household cleaners and disinfectants indiscriminately will affect the efficiency of the plant and destroy some of the bacteria. If the bacteria are harmed or killed they will eventually breed and come back but in the meantime your plant would not be operating for days - depending on the amount of chemicals used.

## WATER SOFTENERS

To reduce the quantity of laundry detergents you use you need to find out how hard your water is. You should contact EPS for advise on this.

The hardness of water is determined by the amount of calcium and other minerals it contains. Hard water is rich in calcium which reduces the effectiveness of soap and detergents. There is a scale of water hardness: 0 – 71.3ppm very soft, 71.3 – 142.5ppm soft, 142.5 – 213.8ppm medium hard, over 213.8ppm hard. In line with EC recommendations, all fabric washing products now carry advice on how much to use according to these levels of water hardness. Once you have identified where your water fits on the scale you can work out exactly how much detergent to use. If in doubt you could phone the manufacturer for advice - most offer a customer-care phone service.

But to help you reduce the quantity of detergent still further - and save you money - you could use a separate water softener supplied by EPS or one of our agents.

## COMMERCIAL WATER SOFTENERS

Water softeners that involve a "salt" regeneration process can be very harmful to biological treatment systems. As the softener regenerates a very concentrated salt solution is used. This will be toxic to the micro-organisms in your biological sewage treatment plant. Please contact EPS Bison if in doubt.

## WASTE DISPOSAL UNITS

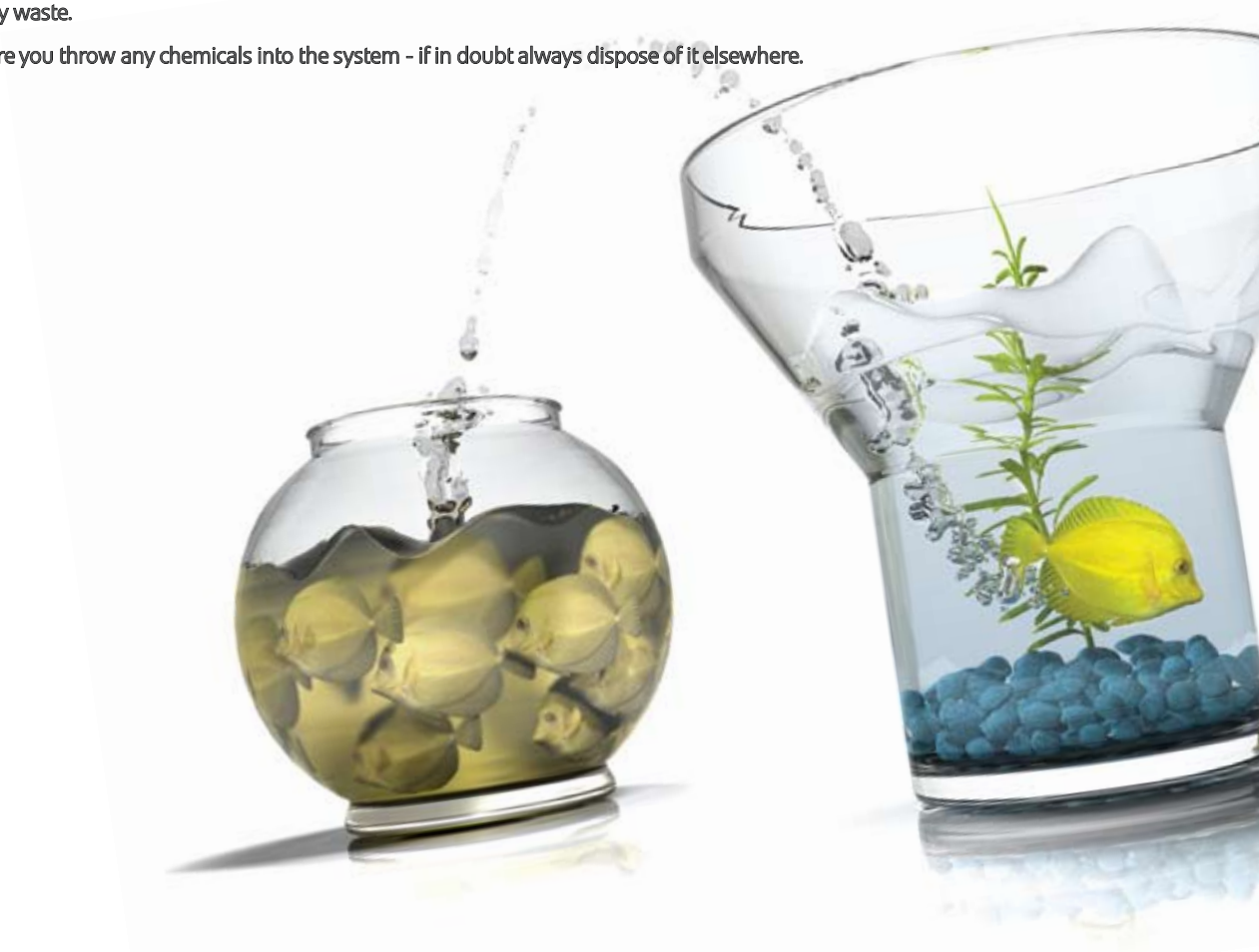
These do not inhibit the micro-organisms, but, depending on use, they can present the treatment plant with considerable extra load. Much better to compost your vegetables peelings etc.-its cheaper and more environmentally friendly. To avoid any issues EPS do not recommend the use of waste disposal units.

## HARMFUL SUBSTANCES

The following list consists of known process inhibitors, though not limited to. Under no circumstances should they enter the treatment plant:

Jeyes Fluid; medicines; cooking oil or melted fat e.g. from a grill tray or chip pan; motor oils or other car products; garden chemicals such as weed killers or fertilisers; DIY products such as paints, white spirit, paint thinners and other solvents, glue, antifreeze, engine oil dairy waste.

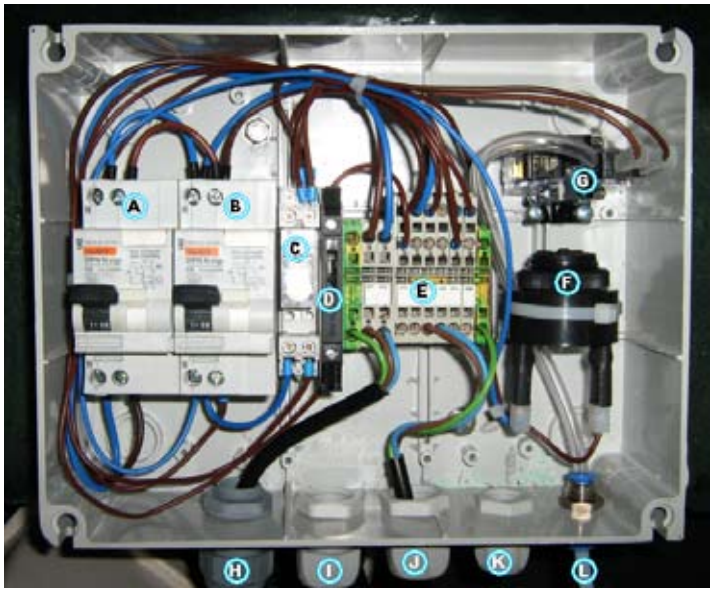
Just think before you throw any chemicals into the system - if in doubt always dispose of it elsewhere.



# Appendix F: Alarm

The Bison ASP alarm is contained in the control box of the Bison ASP. The control box sits in the blower housing of the unit. It is an audible alarm that will sound if:

- There is a high liquid level in the Bison tank.
- If there is a drop in air pressure coming from the air blower.




A. Power to Pump & Blower RCBO

B. Air Blower & Pump (only in ASP Pumped) RCBO

C. High Level Relay for Float Switch

D. Air Blower Fuse

E. Terminations

F. Buzzer

G. Pressure switch

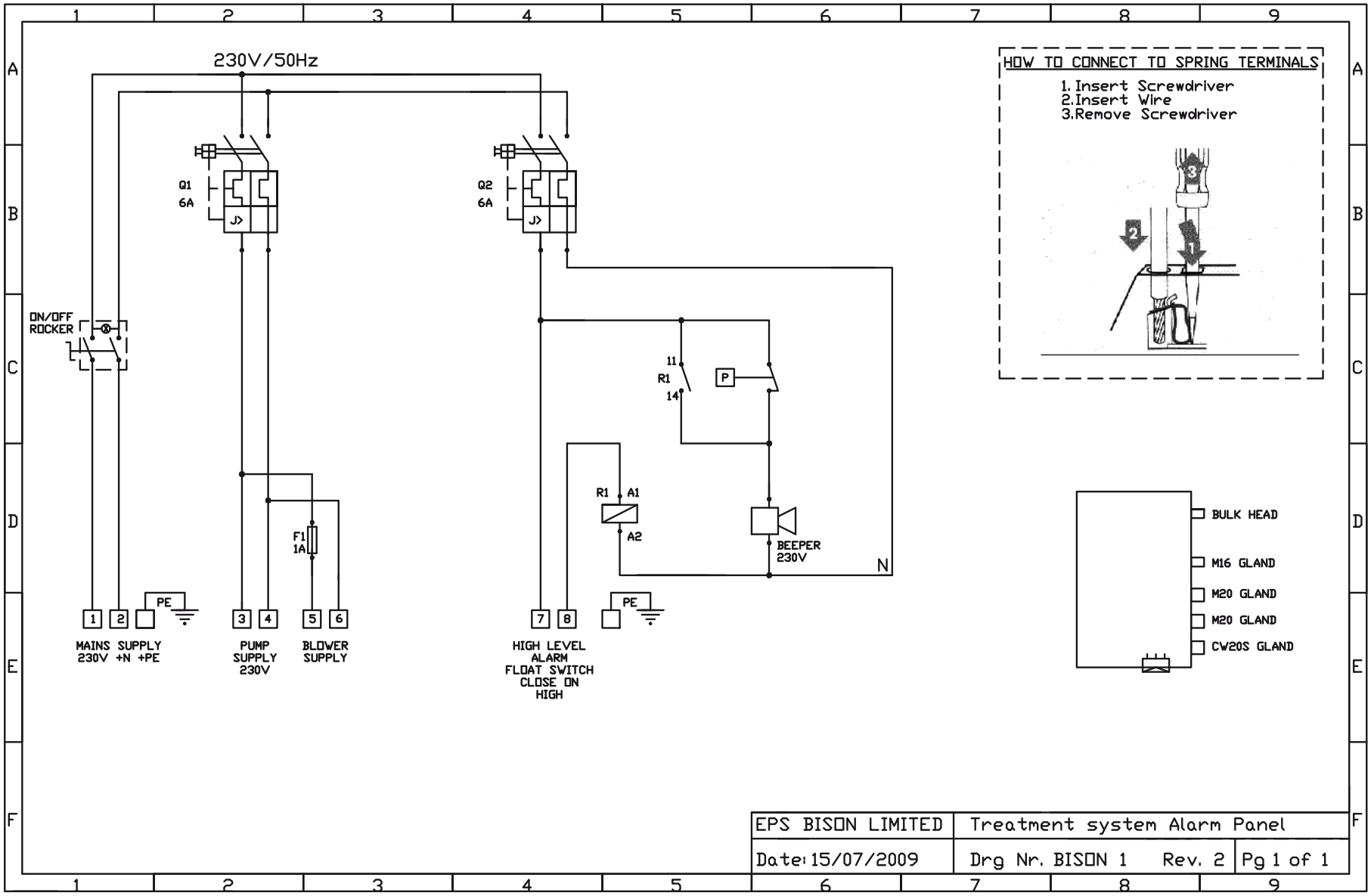
H. Mains Power in

I. Power out to pump (ASP pumped unit only)

J. Power out to air blower

K. Float Switch

L. Air line to pressure switch


230V/50Hz
Q1
6A
J>
Q2
6A
J>
ON/OFF
ROCKER
F1
1A
11
R1
14
P
R1
A1
A2
BEEPER
230V
N
PE
PE
1
2
3
4
5
6
7
8
MAINS SUPPLY
230V +N +PE
PUMP
SUPPLY
230V
BLOWER
SUPPLY
HIGH LEVEL
ALARM
FLOAT SWITCH
CLOSE ON
HIGH
HOW TO CONNECT TO SPRING TERMINALS
1. Insert Screwdriver
2. Insert Wire
3. Remove Screwdriver
3
2
1
BULK HEAD
M16 GLAND
M20 GLAND
M20 GLAND
CW20S GLAND
EPS BISON LIMITED
Treatment system Alarm Panel
Date: 15/07/2009
Drg Nr. BISON 1
Rev. 2
Pg 1 of 1

# Appendix G: Quick Installation Guide

## DO:

Read this O&M Manual including appendices for full details

Keep this manual together with any drawings that were issued and any other communication (order acknowledge, quotation, etc…)

Take care when offloading the unit – external and internal pipe work & electrical equipment could be damaged!

Ensure adequate ventilation – the treatment plant is part of the foul drainage system and requires venting (see section "Installation", p.9)

Use a suitable rated cable to connect the socket inside the Bison ASP unit to the electrical equipment.

## DON'T:

Install any Bison ASP unit deeper than the supplied access turret (i.e. do not extend the turret unless EPS Bison have advised you to do so)

Incorporate a standard household earth leakage circuit breaker (RCD) in the power supply to the unit.

let us make your environment
a better place to be...
demand special treatment

ASP 6-25pe Package Sewage Treatment Plant

NSAF 8-50pe

Clereflo Eco 6-10pe

Techflo SAF 60-600pe
single-stream and
multi-stream up to 1800pe

MBR Membrane Technology
Package Sewage Treatment
Systems (up to 5000pe)

General Underground
Storage Tanks

For product enquiries, specification advice, project assessments or further information, please contact the Bison team on:


**MALLOW, CO. CORK**
Telephone: 022 31200
Facsimile: 022 31250

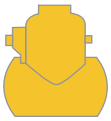
**MOUNTRATH, CO. LAOIS**
Telephone: 057 8732279
Facsimile: 057 8732518

**BALLYHAUNIS, CO. MAYO**
Telephone: 094 9630226
Facsimile: 094 9630761

**NAAS, CO. KILDARE**
Telephone: 045 843614
Facsimile: 045 883296

**E-Mail:** info@epswater.ie
**Web:** www.epswater.ie


Attenuation & Storm
Water Balancing



Class 1&2 Bypass & Full
Retention oil/water separators

Package Pump Stations

**Plus:**

Double Wall Tanks
Fuel Tanks
Cesspools & Septics
Rainwater Harvesting Systems
Grease/Oil Separators
Bucket Lift Elevators
Screenpack CSOs
Above Ground Engineered Vessels
Sprinkler Tanks

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