013531
Biotec 1 & Biotec 2
Installation & Operation Guidelines

Kingspan Environmental Service Contact Numbers:

GB: 0844 846 0500
NI: 028 3025 4077
IRL: 048 3025 4077

Enclosed Documents

		Biotec 1	Biotec 1 IPS	Biotec 2	Biotec 2 IPS
DS1023P	**Biotec 1 Gravity**	●			
DS1024P	**Biotec 1 IPS**		●		
DS1036P	**Biotec 2 Gravity**			●	
DS1037P	**Biotec 2 IPS**				●
DS0669P	**PPFDS Installation – General Layout**	●	●	●	●
DS0668P	**Desludging Procedures**	●	●	●	●
DS0735P	**Small Biotec General Installation**	●	●	●	●

HEALTH AND SAFETY

These warnings are provided in the interest of safety. You must read them carefully before installing or using the equipment.

It is important that this document is retained with the equipment for future reference. Should the equipment be transferred to a new owner, always ensure that all relevant documents are supplied in order that the new owner can become acquainted with the functioning of the equipment and the relevant warnings.

Installation should only be carried out by a suitably experienced contractor, following the guidelines supplied with the equipment.

The unit should have a Pre-Service Agreement Inspection by an approved engineer. Contact Kingspan

We recommend the use of a dust mask and gloves when cutting GRP components.

A qualified electrician should carry out electrical work.

Sewage and sewage effluent can carry micro-organisms harmful to human health. Any person carrying out maintenance on the equipment should wear suitable protective clothing, including gloves. Good hygiene practice should also be observed.

Covers must be kept locked.

Observe all hazard labels and take appropriate action to avoid exposure to the risks indicated.

The correct ongoing maintenance is essential for the proper operation of the equipment. Service contracts are available and recommended. Please contact our Sales department for details of your local service provider.

Should you wish to inspect the operation of the equipment, please observe all necessary precautions, including those listed below, which apply to maintenance procedures.

Ensure that you are familiar with the safe working areas and accesses.

Ensure that the working area is adequately lit.

The power supply to the equipment should be isolated at the main RCD before lifting the blower cover.

Take care to maintain correct posture, particularly when lifting. Use appropriate lifting equipment when necessary. Keep proper footing and balance at all times. Avoid any sharp edges.

Desludging should be carried out by a licensed waste disposal contractor holding the relevant permits to transport and dispose of sewage sludge. The contractor must refer to the desludge instructions contained in these guidelines.

1 Introduction

1.1 Engineering & Process

1.1.1 Our Packaged Sewage Treatment Plants are designed to treat domestic sewage to an average final effluent of less than 20mg/l Biochemical Oxygen Demand (BOD), 30 mg/l Suspended Solids, and 20mg/l Ammonia when the incoming flow and biological loads are within the limits for the plant as specified by us.

1.1.2 These units are exclusively for the treatment of sewage from domestic properties. Contact our sales team for other non-domestic applications.

1.1.3 As a general guide the Biotec 1 is suitable for a 3 or more bedroomed property and the Biotec 2 for a pair of 3 – 4 bedroom properties, or a single house with 5 or more bedrooms.

1.1.4 The Treatment Plant is based on an improved form of biological filtration, which is continuously recycled by airlift with a humus rich mixed sewage liquor. Process takes place in 3 distinct stages.

1.1.5 **Primary Screening & Settlement**

1.1.6 Sewage enters the primary section where the solids separate from the liquid forming a scum or a sludge. The liquid is then passed on though a dividing baffle.

1.1.7 **Biological Treatment**

1.1.8 The screened sewage liquid is mixed with treated sewage coming from the biological filter together with any humus from the final settlement tank. The liquor is recycled by an airlift pump over the filter media. This method of operation permits the unique feature of no moving parts within the treatment plant.

1.1.9 The biological filter bale consists of a composite plastic media of high specific surface area. The design is such that it promotes internal distribution of sewage liquid through the filter. This provides an evenly wetted surface on which the biomass grows. The biomass consumes the major part of the incoming biological load.

1.1.10 The air lift pump is driven by a blower mounted within a weatherproof housing which should be located in a shaded position above possible flood levels. The supply of air from the blower provides adequate ventilation to the plant. Exhaust air from the plant can be vented by either the soil vent pipe or by a separate vent.

1.1.11 **Final Settlement**

1.1.12 The treated sewage transferred from the biological filter bale to the third stage is settled, allowing humus solids to separate as the clarified liquor passes through the final up-flow zone. It is then discharged to a watercourse or soakaway.

1.2 Applications

	Biotec 1	Biotec 2
Typical Dwelling	3 bedrooms	6 bedrooms
Domestic Population Equivalent	Up to 6	Up to 12
Total BOD Loading	0.36kg/day	0.72 kg./day
Maximum Flow	1.2m³/day	2.4m³/day
Peak Flow Rate (For ½ hour in any 2 hour period)	0.15 m³/hr	0.30 m³/hr

1.3 Population Equivalent

1.3.1 Refers to normal family residents, some of whom have daytime occupations or schooling away from the house and includes overnight guests who may stay for periods of more than one night. Contact us for advice regarding non-standard situations.

1.4 Flow Balancing

1.4.1 The Biotec range was the first package plant to meaningfully deal with influent surges. The plant holds a large volume of treated effluent, which provides a significant dilution of influent surges, thereby minimizing any shock to treatment. It also has a surge control outlet arrangement.

2 Installation Guidelines

2.1 Introduction

2.1.1 These Guidelines represent Best Practice for the installation of these Kingspan Biotec Units. Many years of specialist experience has led to the successful installation of thousands of Biotec units. It must be noted, however, that these Guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, any information or advice given by employees or agents of Kingspan regarding the design of an installation must be verified by a qualified specialist (e.g. civil engineering consultant). Once installed the unit should have a Pre-Service Agreement Inspection by an approved engineer.

2.2 Handling & Storage

2.2.1 Care must be taken to ensure that the unit is not damaged during delivery and handling on site.

2.2.2 The design requirements of Kingspan products will frequently mean that the centre of gravity of the unit is “offset”. Care must therefore be taken to ensure that the unit is stable when lifting.

2.2.3 When lifting the unit, use webbing slings of a suitable specification, which must be attached to the designated lifting points.

2.2.4 Do not use chains.

2.2.5 Lifting equipment should be selected by taking into account the unit weight, length and the distance of lift required on site.

2.2.6 Kingspan Environmental accepts no responsibility for the selection of lifting equipment.

2.2.7 Whenever Kingspan Biotec units are stored or moved on site, ensure that the storage location is free of rock, debris and any sharp objects which may damage the unit. The Biotec must be placed on ground which is flat and level to evenly support the base of the unit.

2.2.8 Please read the manual completely and ensure that you are fully aware of all the instructions.

2.3 Site Planning

2.3.1 The following points should be considered before installation of the equipment:

2.3.2 The discharge from a treatment plant may require the permission of the relevant Environmental Regulator and the complete installation, including the specified irrigation system should have Planning and Building Control approval.

2.3.3 Ground conditions and water table level should be assessed. If the water table will be above the base of the unit at any time of the year, adequate concrete back-fill must be provided to avoid flotation. In poorly draining ground, consideration should also be given to the likelihood of flotation due to surface water collecting in the back-fill. It should be borne in mind that the inlet drain trench will act as a land drain, directing surface water to the back-fill around the unit.

2.3.4 In many cases, the effluent discharge is to an irrigation system. A soil porosity test should be carried out, please refer to current guidelines in place at plant’s location eg. PPG4, or Building Regulations pt H2. EN12566 part 2, BS6297;2007 or EPA Single house manual (Ireland), to assist in assessing sub-soil drainage and designing the sub-surface irrigation system.

2.3.5 There must be at least 1 metre of clear, level ground all around the unit to allow for routine servicing.

2.3.6 Wherever practicable, the unit should be installed as far as possible from any habitable building. Many Local Authorities will insist that the discharge from the wastewater treatment plant should be sited at least 10m away from watercourses and any other buildings. The EPA Manual for Southern Ireland states the recommended minimum distance from a single house treatment plant (<10PE) to a dwelling is 7m, and for a system size of 10-40Pe a distance of 28m. Further information can be obtained though your Local Authority and in the Building Regulations in the UK and though the EPA in Eire.

2.3.7 Care should be taken not to place the unit in close proximity to any openings from the building.

2.3.8 These guidelines assume no more than pedestrian duty loadings will be applied to the final installation. Traffic or other heavy superimposed loads must not be transferred through the walls of the tank.

2.3.9 Adequate access must be provided for routine de-sludging and maintenance. Usually the unit should be sited within 30 metres of a hard standing area suitable for a vacuum tanker. Vehicles should not be permitted within a distance equal to the depth of the unit, unless suitable structural protection is provided to the installation.

2.3.10 Biotec units must be installed at a level, which will allow connection to the incoming drain and a free discharge at the system outlet (excepting units with an integral discharge pump). Effluent pumping stations are available to lift the discharge to a higher level and/or pump to remote discharge points. The location should not be subject to flooding.

2.3.11 Independent pump stations or any other associated equipment should have a separate power supply.

2.3.12 On no account should the specified maximum drain invert depth be exceeded.

2.3.13 If the unit has to be recessed, measures must be taken to ensure that it cannot be flooded by surface water run-off.

2.3.14 It is essential that all surface water be segregated and excluded from entering the treatment plant.

2.3.15 Where necessary the Biotec should be fenced off or otherwise protected. Maintenance access must be maintained as above.

2.3.16 The drainage system connecting to the Biotec must be adequately vented in accordance with the Building Regulations. The head of the drainage system should be connected to a stack pipe, open at high level, so as to draw foul air from the system and sited with consideration to prevailing wind direction. Tile vents & air admittance valves should not be used as the sole drainage ventilation facility, but if this cannot be avoided, the Biotec should be independently ventilated. All inspection points within the drain system should be sealed so as to enable ventilation at high level.

2.3.17 Proximity to a mains water hose pipe connection point is recommended, for maintenance purposes. Such a supply should be connected in accordance with water bylaws and regulations. **Never leave a hose connected and immersed in sewage.**

2.3.18 We do not recommend a pumped feed to a Treatment plant without special reference to our Sales team.

2.3.19 Sink waste disposal units should **not** be used in conjunction with a Treatment plant. Please contact us for further guidance.

2.3.20 In hard water areas a softener may be required, where one is fitted, the spent regenerant must be routed to a separate small soakaway.

2.3.21 Under the Water Resources Act 1991, amended by the Environment Act of 1995, the Environment Agency has the right to review the conditions of discharge consented every 2 years. It is therefore, possible that an installation may require upgrading after several years of use. We are happy to advise and offer the means to comply on a case by case basis.

2.3.22 Installation should only be carried out by suitably qualified and experienced contractors in accordance with the Health and Safety at Work Act. Electrical work should be carried out by a qualified electrician, working to the latest edition of IEE.

2.3.23 Acceptable tolerance for installation of the Biotec is +/- 10mm.

2.3.24 The Concrete Specification given below is not a site specific installation design.

GENERAL CONCRETE SPECIFICATION IN ACCORDANCE WITH BS EN 206-1 (BS 8500-1)		
TYPE OF MIX		(DC) DESIGN
PERMITTED TYPE OF CEMENT		BS 12 (OPC): BS 12 (RHPC): BS 4027 (SRPC)
PERMITTED TYPE OF AGGREGATE (coarse & fine)		BS 882
NOMINAL MAXIMUM SIZE OF AGGREGATE		20 mm
GRADES: C25 /30 C25 /30 C16 /20		REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS REINFORCED (EG. FOR HIGH WATER TABLE) UNREINFORCED (NORMAL CONDITIONS)
MINIMUM CEMENT CONTENT	C30 C20	270 - 280 Kg/M^3 220 - 230 Kg/M^3
SLUMP CLASS		S1 (25mm)
RATE OF SAMPLING		READY MIX CONCRETE SHOULD BE SUPPLIED COMPLETE WITH APPROPRIATE DELIVERY TICKET IN ACCORDANCE WITH BS EN 12350-1
NOTE: STANDARD MIXES SHOULD NOT BE USED WHERE SULPHATES OR OTHER AGGRESSIVE CHEMICALS EXIST IN GROUND WATER		

3 Installation - General

3.1.1 When units are installed in unstable ground conditions where movement of the surrounding material and/or unit may occur, the connecting pipework should be designed to minimise the risk of damage from differential movement of the unit(s) and/or surrounding material.

3.1.2 In situations where the excavation will not maintain a vertical wall, it will be necessary to support side walls of the excavation (e.g. with suitable trench sheets and bracing systems) to maintain a vertical wall from the bottom to the top of the excavation. DO NOT completely remove the shoring system until after the back-filling is complete, but before the concrete fully hardens.

3.1.3 In areas where the water table is above the bottom of the excavation and/or the excavation is liable to flood, the excavation should be de-watered, using suitable pumping equipment, until the installation is complete. In such conditions it may be advisable to line the excavation with polythene sheeting, to prevent cement being washed out of the concrete surround/base.

3.1.4 During installation care must be taken to ensure that the body of any unit is uniformly supported so that point loads through the unit are avoided.

3.1.5 A water supply must be available on site to enable the unit to be ballasted during back-filling.

3.1.6 **A Dry Site** is defined as one where groundwater lies below the base of the excavation at all times and the subsoil is free-draining. If in any doubt, assume “Wet Site” conditions.

3.2 Biotec Installation

3.2.1 Excavate a hole of sufficient length and width to accommodate the unit and a minimum of 150mm concrete surround and to a depth which allows for the burial depth of the unit plus a minimum 150mm thick concrete bed.

3.2.2 Lay a concrete bed, of thickness appropriate to site conditions. In wet or unstable ground conditions it may be necessary to lay an additional hard-core sub-base of 200mm and line with polythene, prior to laying the level base of concrete. If necessary, make a sump hole to one corner of the excavation to accommodate a suction hose from a site pump, thereby keeping the excavation as dry as possible.

3.2.3 Lower the unit onto the concrete and bed it in, ensuring that there are no voids under the Biotec base.

3.2.4 Check that the inlet and outlet orientation is correct and that the unit is level. It is essential that the unit is installed in a level plane.

3.2.5 Haunch up concrete all round the base of the unit to at least 150mm above the base.

3.2.6 Place concrete back-fill to approximately 200mm above the unit base, ensuring good compaction to avoid voids. Never fill a freestanding tank with water or back fill an empty tank. Always fill the tank with water at the same time as the back fill material is placed. The water level inside the tank is to be maintained within 200mm of the concrete level during backfilling. It is important that these two operations are carried out simultaneously to avoid the risk of flotation and minimizes the applied loads to the tank.

3.2.7 **Do not use vibrating pokers.** Concrete backfill must be manually compacted.

3.2.8 Continue to raise the water level inside the unit and concrete around the tank, in 200mm increments.

3.2.9 Continue back-filling with concrete up to the level of the outlet.

3.2.10 Connect the inlet and outlet pipework when safe access can be gained. Short lengths of "rocker" pipe with flexible joints should be used adjacent to the unit to allow for any minor differential movement. Units with integral discharge pump have a 1¼ inch BSP threaded spigot outlet.

3.2.11 Continue to back-fill, with concrete up to 50mm below the cover flange, completing the installation to ground level with free flowing soil.

3.2.12 When concrete back filling, care should be taken not to concrete in cover fixings. A small amount of soil can be placed on the green curved top, but not on the access panel.

3.3 Options

3.3.1 Where installations involve deep inverts on wet sites, concrete back fill in excess of that required for standard depth, should be applied in gentle pours with the tank fully ballasted. This operation should only be completed when the main backfill has set.

3.3.2 These treatment plants are available with a gravity outlet including sample point or integral pump set (IPS). The installation procedure for the gravity version is the same, but the pumped outlet is suitable for MDPE pipe work at a shallower invert.

3.4 Blower Housing

3.4.1 In the course of making the air duct connection, it will be necessary to run 110mm diameter ducting from the connection at the outlet end of the plant. This ducting must connect up through an independent concrete base for blower housing location. The duct must be laid with long radius bends to enable the hose to be threaded through.

3.4.2 The blower housing base slab should be located 3 to 13 metres from the outlet end of the plant such that the 15 metres of air hose provided is sufficient. The concrete base should be 150mm thick and must be large enough to accommodate the blower enclosure.

3.4.3 Preferably the location for siting the blower should be shaded. Once the air hose is connected to the blower the duct though which it has entered should be sealed with spray foam.

3.4.4 Where pumped outlets are included, electric cable is provided with the pump. The cable may need to be extended using a junction box to reach the control panel, via the airline duct (depending on the distance the blower housing is from the treatment plant).

3.4.5 Electrical installation from the supply should be made by a competent electrician in accordance with the appropriate regulations.

3.4.6 It is essential that this treatment plants installation & set up is inspected correctly. This may be completed by the installer, however, it is recommended that the Pre-service Agreement Inspection be completed by us or an approved Service Engineers. This may be undertaken for a modest fee.

3.5 Dimensions

Model No.	Diameter mm	Depth mm
Biotec 1	1900	2200*
Biotec 2	1900	2700*

3.5.1 * Depths shown are for standard 1 metre invert unit. Additional 500mm to be added for units with 1.5 metre inverts.

3.6 Self Help

3.6.1 In order to minimize the need for dealing with emergency situations we recommend that Treatment Plants have a Pre-service Agreement Inspection, then is regularly serviced by us or an approved Service Engineers.

3.6.2 Provided that your plant is installed, operated correctly and serviced, you should not need to get into much – if any – self help.

3.6.3 However, some of the most likely question and answer situations are listed below. Firstly, any sewage treatment plant, if abused, can become a health hazard. If in any doubt ask us or an approved Service Engineer.

3.6.4 Blower Stopped:

3.6.4.a Check the unit is switched on, the incoming power supply circuit and fuse.

3.6.5 Blower works but no water distribution inside the plant: Check hose connections.

3.6.5.a Check distributor heads.

3.6.5.b If the air lift pipes are suspected to be blocked, call for service.

3.6.5.c Check regulating valve is not closed.

3.6.6 Plant Odour:

3.6.6.a Check blower working.

3.6.6.b If blower working, plant probably needs desludging.

3.6.6.c Check vent circuit is clear.

3.6.6.d Check that the air duct entering the blower housing has been sealed with foam.

3.6.7 Plant Flooding.

3.6.7.a Check for blocked outlet system.

3.6.7.b If pumped outlet, check for pump operation, check floats and pump power supply.

3.7 Do's and Don'ts

3.7.1 Do take out a service agreement and let the experts look after your plant.

3.7.2 Do contact us for advice if you have any cause for concern.

3.7.3 Don't pump feed the plant without reference to us.

3.7.4 Don't use a waste disposal unit as you will be adding to the biological load, and your system may not be large enough to cope with the waste. If you are unsure please refer to our sales team for guidance.

3.7.5 Don't throw any medicines down the toilet.

3.7.6 Don't empty large quantities of bleach or similar cleaning reagents into the system.

3.7.7 Don't empty cooking oil or similar down the sink.

3.7.8 Don't cover the plant with soil material or prevent access for service and desludging.

3.7.9 Don't apply a hose or jet wash to the biological filter unless specifically advised to.

3.7.10 Don't try to enter the plant

3.7.11 Don't put sanitary towels, incontinence pads, nappies, tampons or other non biodegradable items' down the toilet.

3.8 Blocked air lifts

3.8.1 Occasionally air lifts block. Usually this is as a result of non biodegradable products entering the unit, such as sanitary items, rags, J clothes, plastic bags, etc. These items should not be allowed to enter the unit, as they will adversely affect the liquid distribution, the build up of biomass, overall performance and effectiveness of the unit.

3.8.2 Sometimes blockages occur as a result of formation of calcium carbonate solids within the air lift pipe.

3.8.3 Calcium carbonate is a gritty white to brown solid. The solid that forms within the pipe varies in colour and consistency depending on the nature of the sewage.

3.8.4 This type of blockage usually occurs because there is too much calcium present within the unit, the solid forms when the water chemistry is altered by the air bubbled through the pipe. This is a very unusual occurrence.

3.8.5 To prevent reoccurrence, you should

3.8.5.a Ensure that no ground or surface water is allowed to enter the unit.

3.8.5.b Check that where a softener is connected to the water supply of the property, that the regenerate chemicals, (which are high in calcium and magnesium salts) are not being fed into the unit.

3.8.5.c Consider a softener to reduce the background level of calcium in the main feed supply.

3.8.6 When these blockages occur, the calcium carbonate formed is insoluble, and heavy. Within the pipe it is also sticky with other sewage solids. When wet the solids are not easily cleared from the pipe.

3.8.7 Should you have a recurring problem, please contact us and we will provide a spare air lift pipe.

3.9 Pre-service Agreement Inspection

3.9.1 We recommend that our Engineers or approved service provider should inspect the equipment. However, in situations where expediency is required for owner/installer to inspect, the following basic instructions may prove useful.

3.9.2 Check blower housing has been securely positioned and has been correctly wired to a suitable electrical supply, protected by an earth leakage circuit breaker, ensuring the equipment is correctly earthed. (refer to Installation Instructions). The electrical equipment must be inspected by a qualified Electrician and installed to the local Electricity Authority regulations.

3.9.3 Ensure the air hose has been securely connected to the hose adapter in the blower housing and the other end is connected to the manifold within the plant, ensuring that there are no sharp bends or kinks causing airflow restrictions.

3.9.4 Make sure construction debris is removed from within the plant.

3.9.5 It is essential that the Biotec is filled with clean water to the outlet level. Before switching on the unit, ensure the air filter is correctly fitted and that the air intake is completely free of any obstructions. Switch on the unit. The airflow will activate the air lift pumps distributing the water over the biological filter. Check the centralisation of the distribution cones and adjust if necessary to provide an even covering of the biological filters. Adjust the spray of distribution using the individual valves on airlines inside the unit.

3.9.6 Allow sewage to enter the plant as necessary and ensure that the blower is left running continuously. Biomass will build-up naturally over 4 -8 weeks and the plant should then treat sewage naturally.

3.9.7 To ensure the plant is functioning correctly and the final discharge is to the required standard, contact your service provider to arrange a Pre-service Agreement Inspection stating the original start-up date.

3.9.8 In order to get the best from your plant, we recommend that you contact us or one of our approved service providers to both carry out a Pre-service Agreement Inspection and service the plant. **This reduces the risk of non-compliance**. It also avoids unnecessary desludging, and minimizes the cost of emergency call out visits.

Taken from 'Kingspan's Terms & Conditions of Sale'

3.10 Warranty

3.10.1 The company will replace or, at its option, properly repair without charge any goods which are found to be defective and which cause failure in normal circumstances of use **within a period of twelve months from the date of delivery.**

3.10.2 This warranty is conditional upon:

3.10.3 (a) the Buyer notifying the Company of any claim within Seven days of the failure becoming discernible.

(b) the Company being allowed a reasonable opportunity to inspect the goods so as to confirm that they are defective.

(c) the goods not having been modified, mishandled or misused and being used strictly in accordance with any relevant instructions issued by the Company.

3.10.4 The Company's liability under this Clause is limited to the repair or replacement of the defective goods, and does not cover costs of transport, installation or associated site costs, if applicable.

3.10.5 The Company's liability to replace or repair the goods is in lieu of and excludes all other warranties and conditions, and in particular (but without limitation) the Company shall have no liability of any kind for consequential loss or damage.

3.10.6 For any further advice, please contact the Warranty department on 0844 225 2785.

3.10.7 A Warranty Form is included in this package, to register your unit for Warranty. Please complete ALL sections of the Form, and return it at your earliest convenience.

3.10.8 Also within this package is a **Notice**, describing the necessary maintenance of the plant in use. This should be fixed within the building.

4 General Electrical

4.1 General Notes on Outside Electrical Installation

4.1.1 Only qualified and competent persons should carry out any electrical installation. Outside electrical installations can present dangers that are not usually encountered in internal electrical wiring. External equipment is subjected to the elements and particular attention must be made to the suitability of the cable, glands, connection units etc. for outside use. The possibility of attack by vermin should also be considered and adequate precautions taken.

4.1.2 These notes are not intended to replace the latest I.E.E. Wiring Regulations.

4.2 Health & Safety at Work, etc. ACT 1974

4.2.1 To ensure that the equipment described is safe both for personnel and property it should be installed, inspected and maintained by or under the supervision of qualified persons. Regard should be taken of IEE Wiring Regulations, Codes of Practice, Statutory Requirements and any specific instructions issued by the supplier of these details.

4.2.2 Earthing - All equipment must be earth bonded in accordance with the latest IEE Wiring Regulations. For clarity this has not been shown.

4.2.3 We reserves the right to alter these details without prior notice.

4.3 Electrical Supply

4.3.1 The electrical feed should be dedicated to the equipment and not used for any other purpose. The supply should be via a suitable RCD unit backed up by either a motor rated fuse, or preferably a motor rated MCB of suitable rating.

Plant	Power Rating (W)
Biotec 1	51
Biotec 2	51

4.3.2 Ensure that the blower housing is protected by a suitable RCD to BS 4293 and a MCB to BS 3871. Cable installation below ground should be SWA to BS 6346, unless otherwise stipulated.

4.3.3 The RCD must be of the two-pole type rated at 25A/30mA. (If nuisance tripping is experienced then a sensitivity of 100mA should be used, but this does reduce the personnel protection capability).

4.4 Cable Installation

4.4.1 The type and size of cable depends upon site conditions and distance. If conduit/ducting is possible then providing mechanical and vermin attack protection is provided, single cables of adequate size can be used. However, the preferable method would be to use steel wire armoured (SWA) cable. This should be buried in the ground at a depth of 600mm laid on sand with warning tapes on the cable and an additional tape at a depth of 150mm. External type SWA glands should be used on all make offs.

4.4.2 For loads up to 0.75kW and runs of less than 100 metres, 2.5mm² 3 core SWA is adequate. For loads up to 1.55kW and runs of less than 100 metres, 4.0mm² 3 core SWA should be used. It is a requirement to use the unused core in the cable for the earth conductor and this should be sleeved with earth sleeving at both connection points.

4.5 General Installation

4.5.1 The control panel need not be adjacent to the plant. It can be mounted in the blower housing, wall mounted or fixed to the mounting frame (available separately). It should be positioned so it cannot be reached by someone standing in or on the unit.

4.6 Mounting Frame Installation (where applicable)

4.6.1 Set the frame legs in a concrete base, minimum 250mm thick and prop the frame to prevent movement until the concrete has set.

4.6.2 Allow 350mm minimum clearance from finished ground level to the bottom of the panel.

4.7 Installation of Control Panel

4.7.1 Remove the four screws on the front of the panel and remove the main cover.

4.7.2 Remove the four screws holding the safety cover and remove the safety cover.

4.7.3 Remove the two screws holding the isolating cover and remove the isolating cover.

4.7.4 Using a suitable M20 gland, feed the mains power supply through Gland Hole 1 (Figure 1). Wire the mains supply to the terminal blocks following the guide on the terminal blocks.

4.7.5 Replace the isolation cover and screws.

4.7.6 Using a suitable M20 gland, feed the blower power supply cable through Gland Hole 4 (Figure 1) and terminate to connections 5 & 6 (TB3) following the guide on Table 1.

Terminal Block Number	1, 3, 5 & 7	2, 4, 6 & 8	⏚
Connection	Live - Red	Neutral - Black	Earth – Green/Yellow
Terminal Block Number	11	12	
Connection	Black	Blue	
Terminal Block Number	13	14	15
Connection	Common	High	Low
Terminal Block Number	16	17	18
Connection	Red	White	Black

Table 1 : Control Panel Termination Information

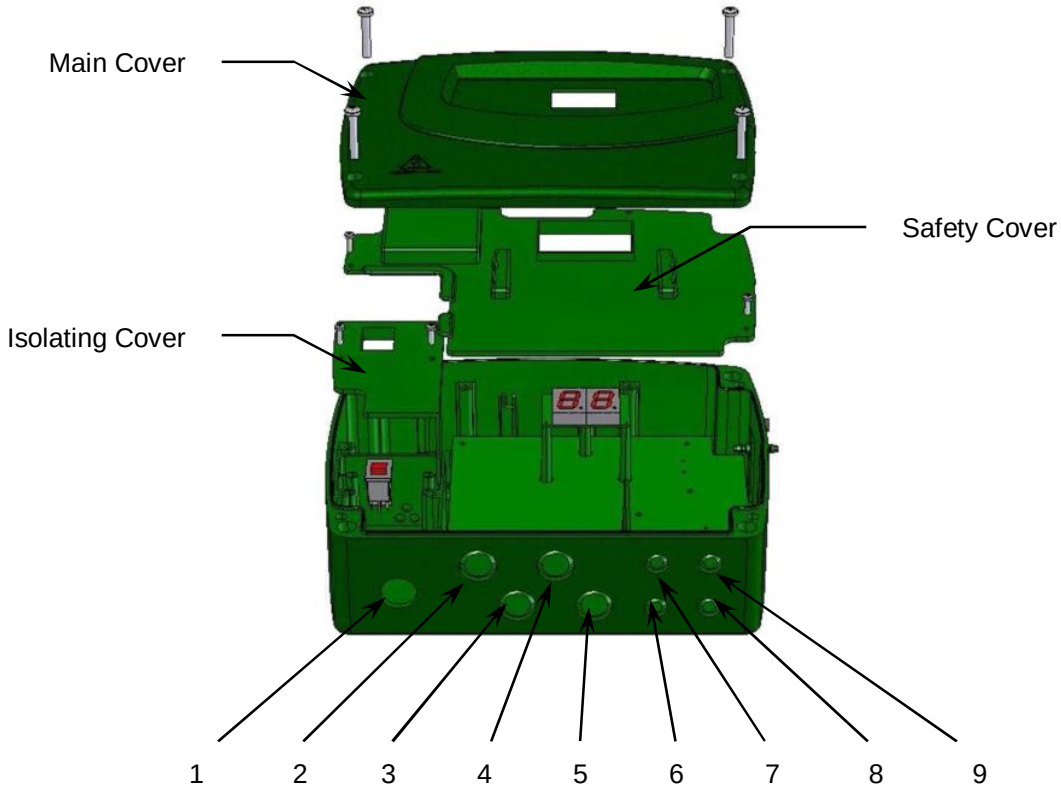

Figure 1 : Control Panel Gland Holes

4.8 Installation of Integral Discharge Pump (where applicable)

4.8.1 Using a suitable M20 gland, feed the pump power cable through Gland Hole 2 (Figure 1) and terminate to connections 1 & 2 (TB1) following the guide on Table 1.

4.9 Power & Pressure Failure Detection System (where applicable)

4.9.1 Using a small screwdriver, push switch 11 to the ON position.

4.9.2 The panel is designed to be used in conjunction with the Beacon unit to provide warning of either loss of power or air pressure failure.

4.9.3 For panels mounted outside the blower housing, additional tubing can be purchased, contact your local sales team for details. The panel can be mounted up to 30m away from the blower with no effect on the performance of the pressure failure detection system.

4.10 Installation of High Level Alarm (where applicable)

4.10.1 The High Level Alarm Float position is factory fitted. The float cable will be secured in an ABS Pipe, maclow clipped into position. With the exception of the P12 Unit where a black plastic bracket is attached to the side wall of the screen. Drawings of the factory settings can be provided if needed.

4.10.2 Pull the float cable through any installed ducting into the housing.

4.10.3 Remove the link in the terminal blocks between connections 11 & 12 (TB6) before inserting cables. Using a suitable M12 gland, feed the high level alarm float cable through Gland Hole 7 (Figure 1) and terminate to connections 11 & 12 (TB6) following the guide on Table 1.

4.11 Beacon units (where applicable)

4.11.1 These Beacons are used with optional high level alarms for pumped outlet installations.

4.11.2 They may also be included in the Power and Pressure Failure Detection System (PPFDS).

4.11.3 This unit provides an external visual indication of failure. It can be positioned up to 30m from the panel.

4.11.4 As supplied the unit is fully weatherproof to IP65 and is supplied ready to mount on a suitable surface. A 3-metre length of cable for connection to the panel terminals is provided.

4.11.5 Using a suitable M12 gland, feed the cable from the beacon through Gland Hole 9 (Figure 1) and terminate to connections 16, 17 & 18 (TB8) following the guide on Table 1.

4.11.6 This unit is designed to be simple to install and safe in operation. Any modification may adversely affect its weather resistance in operation. If in any doubt, please consult us for advice. This is a sealed unit and not serviceable.

4.12 Completing the Installation

4.12.1 Plug the lead from the battery into the small white socket in the top right corner of the PCB marked "BATTERY HEADER".

4.12.2 The display should now show "F1". This is normal and is indicating that there is no mains power to the panel. At this point the panel is running from the battery power.

4.12.3 Replace the safety cover and screws.

4.12.4 Turn the mains supply on at the source.

4.12.5 Turn on the panel using the isolation switch. It should now be illuminated red. The display should now read "- -". Press the orange reset button next to the display to clear the display.

4.12.6 Replace the main cover and screws.

4.12.7 The unit is now fully operational.

4.12.8 Blowers are to run continuously, 24 hours, 7 days a week, except when desludging and servicing.

4.12.9 Before switching on the blower, ensure the air filter is correctly fitted and that the air intake is completely free of obstructions.

5 Operations

5.1 Standard Rate Treatment Plants

Model No.	Litres	Gallons
Biotec 1	3,200	700
Biotec 2	3,200	700

5.2 General Maintenance

5.2.1 Sewage Treatment installations will only perform as well as they are maintained. The best way to achieve this is to arrange a service agreement with us or an approved Service Engineer (see below). There will always be situations when a little self-help may be sufficient to avoid call out and we describe here some basic checks, which may prove useful.

5.2.1.a Firstly, keep children and pets away from the plant and always wear rubber gloves when inspecting the unit. Never try to climb into the plant.

5.2.1.b If in doubt ask us or an approved Service Engineer for advice. One of the things that will come from routine maintenance is evaluation of the desludging interval.

5.2.2 Having confirmed that the sludge situation is under control, the following basic checks can be made.

5.2.3 Ensure that the protective mesh layer (Enkamat) on the top of the media bale is not blocked. If it is, then it can be removed, shaken, hosed off and repositioned. Alternatively, the Enkamat can be renewed and the old material disposed of safely.

5.2.4 Check that the spray is covering the rectangular bale. This can be adjusted by the plastic valve attached to the air hose inside the plant.

5.2.5 Ensure that the airlift in the centre of the bale is not blocked, as this will also affect the spray pattern.

5.2.6 Where pumped outlets are included, check the pump operation, check floats and check pump power supply to the plant.

5.3 Emptying and Desludging

5.3.1 All biological treatment plants produce a surplus of sludge's, which from time to time have to be removed as sludge in order to maintain process efficiency. Applications on purely domestic feed may only require desludging 6-12 months, whereas more heavily loaded installations may require desludging at least 6-9 months.

5.3.2 Desludging must be carried out by a reputable company who may be located by reference to Yellow Pages, your District Council or from your local Water Authority. We may be able to help you with suggesting an emptying contractor. When ordering a tanker for any desludging you will have to state the capacity of the unit to enable the correct size tanker to be scheduled (see 5.1).

5.4 Emptying and Desludging Procedure

5.4.1 Turn off the unit. First ensure that the hose is placed on the inlet side of the unit, always empty the tank ensuring equilibrium in water levels.

5.4.2 Reduce the water level by about 300mm then place the hose in the outlet side of the tank, also reducing the water level by 300mm.Continue with this process until the tank is completely empty.

5.4.3 Make sure that the hose and end fitting are, as far as practical, kept away from the baffles whilst raising and lowering.

5.4.4 The hose and end fitting must be positioned to draw from the very bottom to collect accumulated settled sledges. Make sure construction debris is removed from within the plant.

5.4.5 Take care not to blow back the wastewater into the treatment plant when lifting the hose from one compartment to another one, or removing it from the plant.

5.4.6 Whilst pumping out, check the other compartments to make sure that the water level drops at the same rate. At no time should the difference in water level either side of the screen exceed 300mm. As far as is practical, remove traces of sludge accumulation on the walls and bottom of the chamber.

5.4.7 Check for the presence of any residual solids in the bottom of the final settlement zone, i.e. the last tank compartment, and if there are any present, remove them.

5.4.8 If a clean water hose is available, hose down any residual solids from the interior of the tank. Do not hose off the biomass from the media unless it is blocked.

5.4.9 The tank should be refilled as speedily as is practical using mains supply water. Refill the tank evenly from both sides of the screen, therefore establishing a constant equilibrium. It is advisable to leave the air blowers off until normal water level has been achieved.

6 Control Panel Fault Codes & Fuses

CODE	FAULT CONDITION	FUSE	Amp
F1	No power to the unit	Customer Fuse box	N/A
F2	The blower pressure has failed (PPFDS kit required)	N/A	N/A
F3	The high level alarm has activated (where fitted)	N/A	N/A
F4	The fuse to the blower/motor has failed	F3	3.15
F5	The fuse to the discharge pump (where fitted) has failed	F1	5.0
F6	The fuse to the chemical dosing pump has failed	F4	0.25
F7	The fuse to the recirculation pump has failed	F2	5.0
F8	The loss of rotation alarm has been activated	N/A	N/A
--	The unit has had a fault which has now corrected itself	N/A	N/A

All fuses are Time Lag HBC 20mm type.

BIO*tec*

The foul drainage from this property discharges into a package treatment works.

Maintenance is required, the frequency of which depends upon the model installed, its use and application. Please consult your owners pack.

***** A Small BIOtec require annual maintenance, and Desludging at 6 – 12 month intervals.

***** Other BIOtec models require more frequent Desludging and maintenance (see individual operating manuals)

Maintenance and Desludging should be carried out by the owner in accordance with the Manufactures instructions.

THE OWNER OF THE PROPERTY IS LEGALLY RESPONSIBLE FOR ENSURING THAT THE SYSTEM DOES NOT CAUSE POLLUTION, A HEALTH HAZARD OR A NUISANCE.

We recommend that a separate log is kept of all maintenance and service visits, the log should detail the date and any action taken, e.g. Regular maintenance service, breakdown visit, desludge volume removed, parts replaced.

This notice should be fixed by the owner within the building alerting current and future owners to the maintenance requirement. (Building regulation H2 (1.57)

Please contact Service on: +44 (0) 844 846 0500, to arrange a maintenance service or to request replacement operating instructions.