



# **WPL DIAMOND EPC INSTALLATION, OPERATION AND MAINTENANCE MANUAL**

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## **1 HEALTH AND SAFETY**

### **United Kingdom Health and Safety at Work Act 1974**

Section 6a of this act requires manufacturers to advise their customers on the safety and the handling precautions to be observed when operating, maintaining and servicing their products.

#### **The user's attention is drawn to the following:**

All the sections of this manual must be read before working on the equipment.

Suitably trained and qualified personnel must carry out installation.

Normal safety precautions must be taken and appropriate procedures observed to avoid accidents.

The design factors for the lid loads and materials comply with the British Water Code of Practice, BW:COP.22.96. The lids have been tested with a load at 1.0kN/m<sup>2</sup> and will withstand accidental passage. THEY ARE NOT DESIGNED AS PEDESTRIAN WALKWAYS.

Refer to WPL Ltd for any further technical advice or product information.

### **1.1 Health**

The following is extracted from a health-warning card supplied to all WPL Ltd staff. It is the client's responsibility to ensure that all necessary protective clothing/equipment are available.

#### **Leptospirosis**

There are two types of Leptospirosis affect people in the UK:

- **Weil's disease**

This is a serious infection transmitted to humans by contact with soil, water or sewage that has been contaminated with urine from infected rats.

- **Hardjo-type Leptospirosis**

This is transmitted from cattle to humans.

#### **Typical symptoms**

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

#### **How is it caught?**

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

### **1.2 Sensible Precautions**

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

Take immediate action to wash thoroughly with clean water any cut, scratch or abrasion of the skin immediately prior to applying any protective covering.

**DO NOT HANDLE FOOD, DRINK OR SMOKING MATERIAL  
WITHOUT FIRST WASHING YOUR HANDS.**

**IF, AFTER COMING INTO CONTACT WITH SEWAGE, YOU CONTRACT THE SYMPTOMS  
DESCRIBED, REPORT TO YOUR DOCTOR IMMEDIATELY AND ADVISE HIM/HER OF THE  
CIRCUMSTANCES.**

### 1.3 Vaccinations

To avoid illness, it is recommended that site personnel have the following vaccinations. (Your doctor may recommend further).

- Hepatitis A
- Hepatitis B
- Polio
- Tetanus
- Typhoid/Cholera (probably carried out as a child).

### 1.4 Safety

Sewage gases are potentially explosive and toxic. DO NOT enter any of the below ground compartments UNLESS PROPERLY QUALIFIED AND EQUIPPED TO DO SO.

## 2 RISK ASSESSMENT NOTES

This section of the manual is intended as a guide and as such does not cater for every situation that may be experienced on site. WPL Ltd assumes that the installer/end user has ensured that all necessary permissions have been sought and granted. It is also assumed the installation procedures will be carried out observing the requirements of the Health & Safety at Work Act and will involve good building and sound civil engineering practice. Please ensure that due consideration has been given to and appropriate action taken with regard to the following:

- Planning permissions and Building Regulations and other regulating or interested parties.
- Environment Agency permit to discharge (if applicable).
- The legal responsibility for the plant as far as operation and maintenance, ongoing discharge is concerned.
- Note – failure to comply with any regulation may result in pollution, odour, nuisance and health hazards, which may lead to legal action.
- The size of the plant relevant to the number and type of people that will be using it, e.g. domestic, light industrial, etc. Consideration should be given to any unusual conditions such as B&B accommodation, special laundry requirements and frequent entertaining.
- Costs, legal implications and siting in consideration to shared systems.
- The whereabouts of wells, bore holes and springs used as sources of potable water; existing non-mains sewerage systems and soakaways; water courses, ponds and lakes and designated protected areas.
- The whereabouts of other services, pipes, cables, ducts, etc.
- Local ground conditions. Is specialist knowledge of civil engineering required to cater for unusual soil conditions such as underground rivers, running sand, chemicals in the soil, etc?
- The water table at the time of installation. Specialist knowledge is required when installing in an excavation that allows water to enter.
- The water table in winter. Special consideration should be given to installations that will be subject to high water table pressure or flood conditions. The treatment plant will need to be installed so that it cannot “float” out of the ground and provision made for continued discharge of treated effluent, should the discharge pipework/soakaway be under water.
- Note – failure to maintain the ability to discharge may result in pollution, odour, nuisance and health hazards, which may lead to legal action. WPL can not be held responsible for failure to discharge due to poorly designed, constructed or positioned soakaways and discharge pipework systems.
- Siting. The plant must be sited within 30m of heavy vehicle access for de-sludging. The plant should, where possible, be sited above the high water table mark and above or beyond the flood plain. See items above and accompanying note. The plant should be sited as far from the habitable parts of the dwelling as possible. Many local authorities recommend 10m as a minimum, but easements are possible for smaller sites.
- Gas and odour ventilation. WPL recommend that the plant be vented. This can be via the soil vent pipe, normally attached to the building, or by additional venting (high or low level) off of the inlet or outlet pipework or the sample chamber.

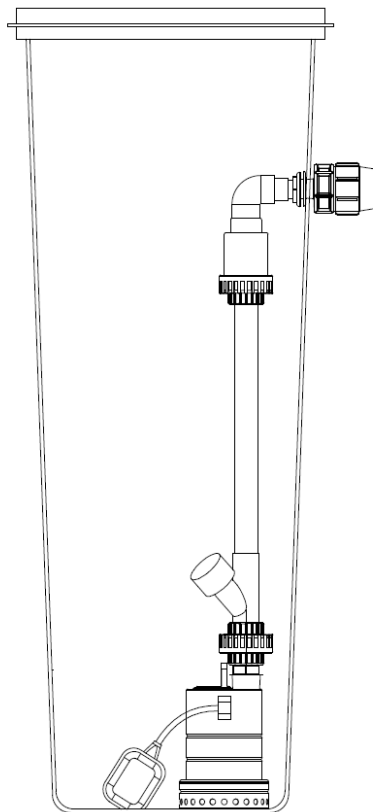
- Sample point. A safe and adequate sampling point is usually a requirement of the Environment Agency. This can be an off the shelf item or constructed using standard drainage components. Open pipe discharges to ditches, watercourses, etc, through pipework of less than 5m in length, do not require a sampling point if the effluent can be sampled from the end of the pipe.
- Electrical supply. A qualified electrician (see Electrical Installation section) should only undertake electrical installation. A safe and reliable power supply is required at all times, as the air blower is required to run continuously. Adequate means of air or power failure indication should be provided. This can be an audible or visual alarm or by regular manual checks.
- Due to the health risks associated with raw sewage, WPL recommend that the sewage treatment plant is not used until the system is complete, commissioned and handed over.
- Before carrying out any maintenance or installation work, the equipment must be electrically isolated. Do not leave covers open for any longer than necessary. Temporary barriers and warning signs should be erected around any open covers or manholes as appropriate, in particular warning of deep water in the tanks.
- Any visiting personnel must report to site office or householder on arrival and fully acquaint themselves with safety regulations applicable.

### 3 INTRODUCTION


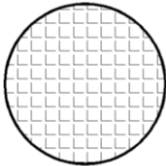

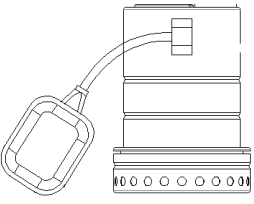
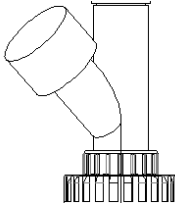
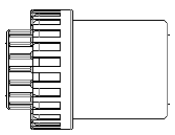
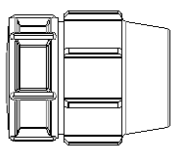
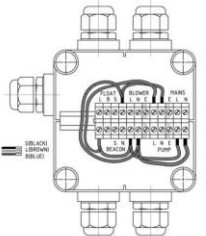
The EPC pump has been developed to provide a means of delivery for treated effluent where the existing terrain and invert levels of the pipework prevent normal gravitational discharge. The unit delivers up to 100litres/minute of effluent.

The pump operates automatically via the combined float switch and requires minimal maintenance. A high level alarm is supplied that will operate in the event of a high level within the sewage treatment plant.

The EPC also has the added benefit of being used as a sample chamber.



#### 4 ITEMS SUPPLIED

Name	Image	Quantity
<b>Pump Chamber</b>		1
<b>Manhole Cover</b>		1
<b>High Level Float Switch</b>		1
<b>Submersible Pump and Integral Float Switch</b>		1
<b>Non-return Valve</b>		1
<b>Isolation Valve</b>		1
<b>32mm MPDE Pipe Outlet</b>		1
<b>Junction Box</b>		1

## 5 EPC INSTALLATION

### 5.1 Pump Chamber Installation

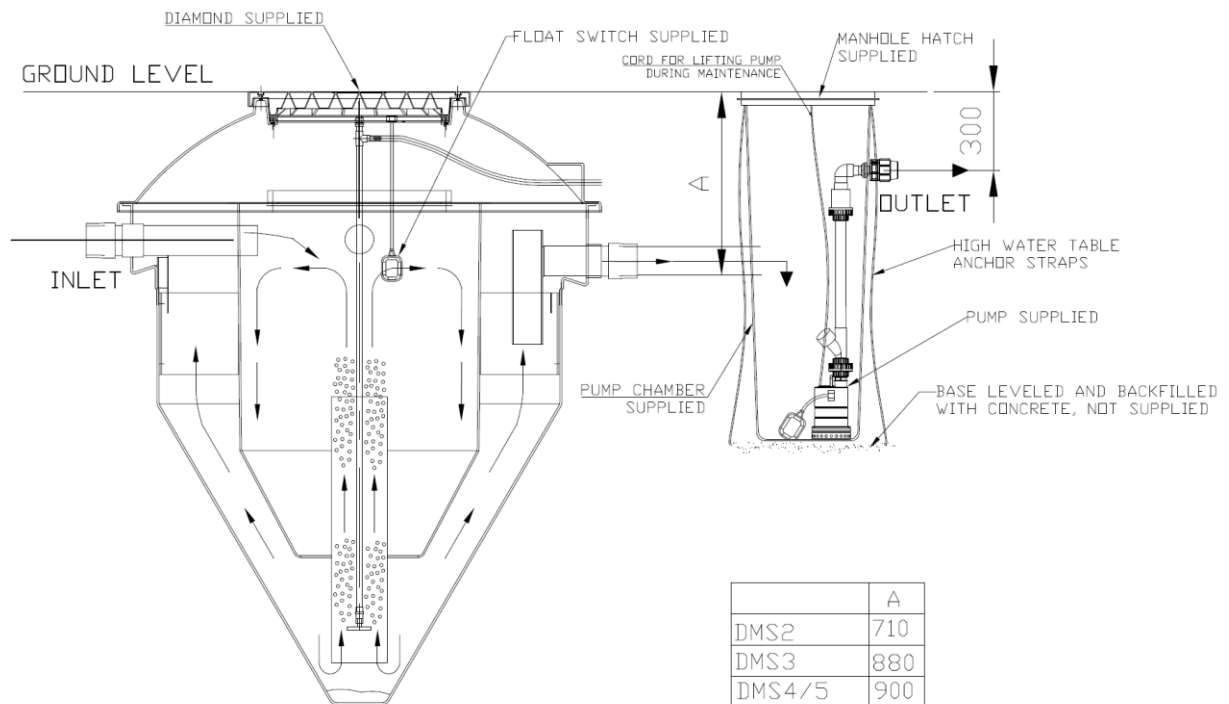


Figure 1. General Arrangement

1. Excavate a hole 600mm in diameter and to a depth of 1550mm.
2. When deeper invert levels are required, chamber extensions are available on request.
3. Level the base of the trench with concrete (not supplied), roughly 50mm deep.
4. Carefully lower the pump chamber into the hole, drop the straps on the outside of the chamber and insert the diamond outlet pipe into the chamber inlet hole.
5. Backfill around the chamber with concrete up to the lip of the chamber. Cover so no water enters the chamber and allow to set over night. (Concrete used here must be the same as the backfill for the diamond).
6. Lower pump into chamber. Adjust the float switch cable so during floatation, the float switch is 100mm below the chamber inlet.
7. Place the manhole hatch on top of the pump chamber so level with the ground, seal the edges with concrete and allow to set fully.

### 5.2 Electrical Installation (see figure 2)

1. Install a suitable conduit/pipe to carry all wires from the kiosk and high level alarm float switch.
2. Run a draw line through the conduit/pipe.
3. Tie the draw line to the cables and pull the cables through the fittings, into the conduit/pipe and through the blower kiosk.
4. Connect the float switch (for the high level alarm) to the junction box.
5. Plug the flying lead from the red beacon into the junction box.
6. Connect the mains supply from an RCD protected supply and turn on.

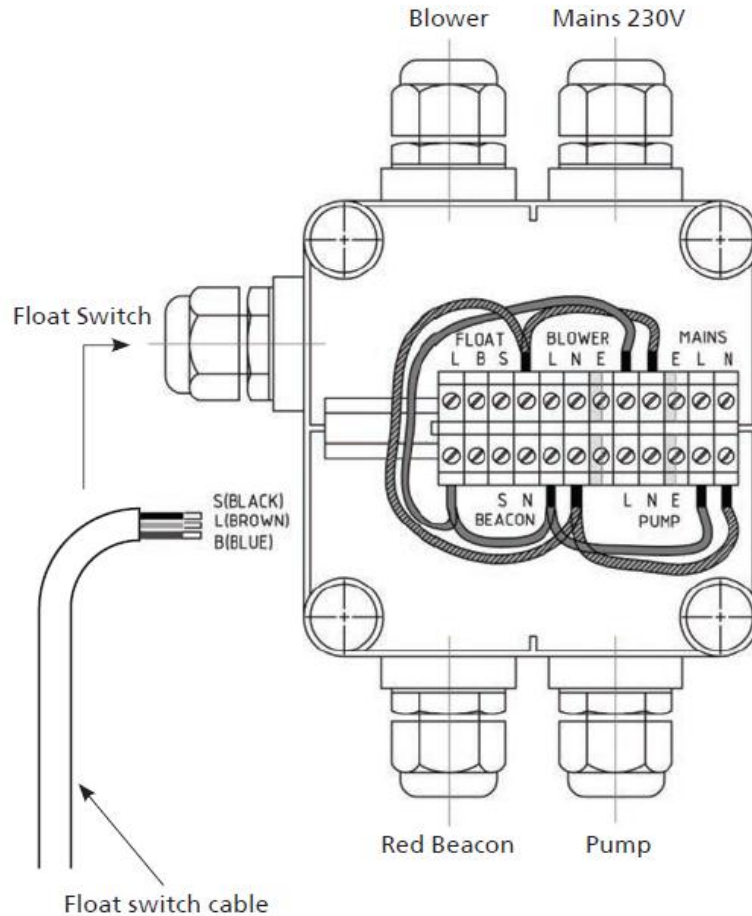


Figure 2. Wiring Layout for Junction Box

## 6 FITTING AN EPC TO A DIAMOND WITH EXTENSIONS

If the pump chamber is to be fitted to a Diamond fitted with either body or turret extensions, it will require an extension kit, obtained from your supplier.

The kit consists of:

- Chamber extension (quality to suit extension depth required)
- Pump outlet pipe extension
- Outlet pipe compression fitting

To fit the extension kit:

- Add appropriate number of chamber extensions and trim to size required
- Mark and cut hole for pumped outlet (removing fins as required)
- Cut pipe extension to length
- Assemble and fit pump outlet using compression fitting supplied

## 7 COMMISSIONING THE SYSTEM

### 7.1 Electrical

Electrical connection should be made via its own dedicated supply.

**Only a competent electrician should undertake the work.**

### 7.2 Chamber

- Ensure the chamber has been installed as per this manual.



- Check to ensure the pump and float switch have been installed as per this manual.
- Inspect all connections for leaks.
- Please see section 7 and 7.1 in this manual.

### **7.3 Float Switch**

1. Fill the chamber with clean water, until the float switch is fully covered.
2. Turn the isolator to the on position.
3. Check operation of the pump, ensuring that the level in the chamber drops until the float switch stops the pump. Allow the level to rise, and observe a second start/stop cycle.
4. Turn the isolator to the off position.

### **7.4 High Level Alarm**

1. Fill the diamond tank with clean water, until the float switch and the high level alarm are fully covered.
2. Turn the isolator to the on position and the red beacon will illuminate.
3. As the water level drops and the high level alarm float tips such that the float indicates empty, the beacon turns off.
4. The pump runs until the chamber is at low level.
5. If the alarm operates with the float hanging down, then it has been wired incorrectly.
6. See figure 2. Wiring Layout for this Junction Box.

## **8 STARTING THE PUMP**

Before starting the pump, make sure that:

- The voltage and frequency specified on the pump's nameplate are suitable for the power supply available.
- There are no signs of damage to the pump or its power cord.
- The electrical connection is made in a dry place, protected against any risk of flooding.
- Any extension cables must be suitable for the intended purpose, consult a qualified person.

### **8.1 Precautions**

- The pump must never be carried, lifted or made to operate hanging from the power cable.
- The pump should not be started more than 20 times in one hour so as not to subject the motor to excessive thermal shock.
- Pump contains no serviceable parts and all repairs should be referred back to the manufacturer.

## **9 ROUTINE MAINTENANCE**

Regular scheduled maintenance is essential to maintain the efficiency of the system.

Before undertaking any maintenance disconnect the pump from the power supply (i.e. wired in to the junction box isolator). If there is any damage to the power cable or pump, any necessary repairs or replacements must be performed by the manufacturer or its authorised customer support service, or by an equally qualified party, in order to prevent all risks.

Every 12 months these checks must be carried out for the maintenance log book and for the EPC chamber every 6 months.

### **9.1 Pump**

- Pump power supply should be checked.
- Remove pump and check connections.
- Make sure all connections are water tight.

### **9.2 Float Switch**

- Check float switch for water ingress.
- Check to make sure that the cable is not damaged in any way.
- Ensure it is operating correctly.

## 10 TROUBLE SHOOTING

Fault	Check (possible cause)	Remedy
<b>10.1 Pump does not start and makes no noise.</b>	A. Check that there is power to pump. B. Check the protection fuses. C. Check the float switch.	A. Check that there is power to pump. B. If these are burnt-out, change them. C. Ensure that the float moves freely. Ensure that the float is operating correctly. (Contact the supplier).
<b>10.2 Pump does not deliver.</b>	A. Inspect base of pump for rag and/or blockages. B. The impeller is worn or blocked. C. The check valve, if installed on the delivery pipe. D. The level of the liquid is too low. E. The required head is higher than the pump is designed for.	A. Remove the blockage. B. No serviceable parts in the pump. C. Check that the valve is operating correctly and replace if it necessary. D. Adjust the length of the float switch cable. E. Contact WPL
<b>10.3 Pump does not stop.</b>	A. The pump is not deactivated by the float switch.	A. - Ensure that the float moves freely. Check float operation (the contacts could be damaged - contact the supplier).
<b>10.4 Flow is insufficient.</b>	A. Check for blockages. B. Ensure that the impeller or the delivery pipe is not partly blocked or encrusted. C. On three-phase motors.	A. Remove any blockage. B. Remove any blockage. C. Check rotation of the motor.
<b>10.5 Thermal overload protection stops the pump.</b>	A. Check that the liquid to be pumped is not too dense as this could cause overheating of the motor. B. Check that the water temperature is not too high. C. The pump is partly blocked by impurities. D. The pump is mechanically blocked.	A. Check operation of system i.e. de-sludge air to chamber process. B. Investigate possible cause. C. Carefully clean the pump. D. Check whether there is rubbing between the moving and fixed parts; check the wear of the bearings (contact WPL). Please refer to point 8. Routine Maintenance.

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