English

Installation, Operation and Maintenance Instructions

EMS 2-80 Mono Sense

Pressure Sewer Systems

Mono®

MPA625/04

One Company, Unlimited Solutions

Index

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Warranty

Warranty Statement

1. Pressure Sewage Systems manufactured by Mono Pumps are covered by warranty for a period not exceeding twelve months from purchase.

2. Mono Pumps will make good by repair, or at Mono's option, the replacement of faulty parts under warranty, providing always that:

   (a) The equipment was correctly installed and properly used in accordance with Mono Pumps Installation, Operating & Maintenance Instruction and accepted codes of good engineering practice.

   (b) The claim for goods under warranty arises solely from faulty design, material or workmanship.

   (c) The repair is carried out in the Mono factory or by an authorised agent or distributor appointed by Mono Pumps.

   (d) All freight costs to and from the factory or repair agent are to be paid by the purchaser.

3. In the case of equipment or components which are not of Mono manufacture, but supplied by them, the warranty is limited to that extended by the suppliers or manufacturers of such equipment.

4. Mono Pumps warranty does not cover any of the following:

   (a) Claims for third party liability of damage caused by failure of any of the company's products.

   (b Damage caused by abnormal operating conditions, war, violence, storm cataclysm or any other force.

   (c) Damage caused by the equipment being used for an application for which it is not recommended.

   (d) Damage caused by sand or abrasive materials, corrosion due to salt water or electrolytic action.

5. The decision of Mono Pumps in relation to any claims or disputes over warranty is final.

6. The warranty is in lieu of all other warranties and conditions expressed or implied, written or oral, statutory or otherwise, which are hereby negated and excluded.

7. This express warranty does not exclude any conditions or warranty implied by the Trade Practices Act 1974 or separate State laws and in addition to any other right, that the original purchasers or any subsequent purchaser may have at law.

In case of claim please contact your Authorised Mono Dealer or contact Mono Pumps (Australia) Pty Ltd.

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Introduction

Introduction

This manual will provide the user with essential information on the installation, operation and maintenance of the Mono Pressure Sewer System - PSS EMS 2-80.

It is important that the instructions and recommendations presented in this manual are followed during the installation, operation and maintenance of this system.

Throughout the manual there are various safety signs associated with certain tasks. These safety signs are to be used as a guide only and should never be used in place of a job safety risk assessment.

Intended Use

The PSS EMS 2-80 is designed to transport domestic sewage from the point of generation to a sewerage treatment plant, gravity carrier or larger pump station and rising main.

The PSS EMS 2-80 system is designed to handle domestic sewage only. It is not designed to handle commercial or industrial sewage applications. For these types of applications please consult Mono Pumps (Australia) Pty Ltd.

For each property, sewage created in the household flows by gravity into the PSS EMS 2-80 tank. When the level rises to a set point, the pump is automatically started. The self priming pump draws the sewage into an integral macerator turning the solids into a slurry of small particles. This allows the sewage to be then discharged through small bore pipe (32 NB to 125 NB) into the pressurised reticulation network.

As the sewage is transported under pressure by the positive displacement pump and not by gravity, the PSS EMS 2-80 can be installed in various topography such as :

- Mountainous or hilly land.
- Flat land.
- Clay, rocky soil or areas of shallow top soil.
- Areas of significant environmental sensitivity.
- Built up areas.
- Areas of low population density.

The PSS EMS 2-80 system comprises of:

- Various tank options.
- Two pumps with inbulit macerator.
- Two PSS EMS 2-80 controllers.
- All internal tank pipework.
- Level switches.
- Check valve and ball valve on pump's discharge.
- 20m of 240V electrical cable.

Basic Tools Required For Installation

- 121mm hole saw for a 100mm DWV PVC pipe.
- Hole saw to produce a 171mm hole size for 150 mm DWV PVC pipe.
- Drill to suit hole saw.
- 13mm spanner.
- 6mm allen key.
- Pipe wrench to suit 85mm diameter barrel union.

Warnings

Warnings

The pumps are not to be operated in environments containing flammable or explosive substances.

All electrical connections must be carried out by a qualified electrician in accordance with local regulatory requirements.

All plumbing connections must be carried out by a qualified plumber in accordance with local regulatory requirements.

Never place hands into the inlet whilst pump or pumps are running as there are rotating cutters. Ensure the pumps are fully isolated prior to any maintenance.

Duty, maximum pressure and flow must be taken into account when setting up pumping system.

The G60 pumps are not designed to be operated partially or fully submerged. Ensure the drywell is kept free of water during installation, operation and maintenance.

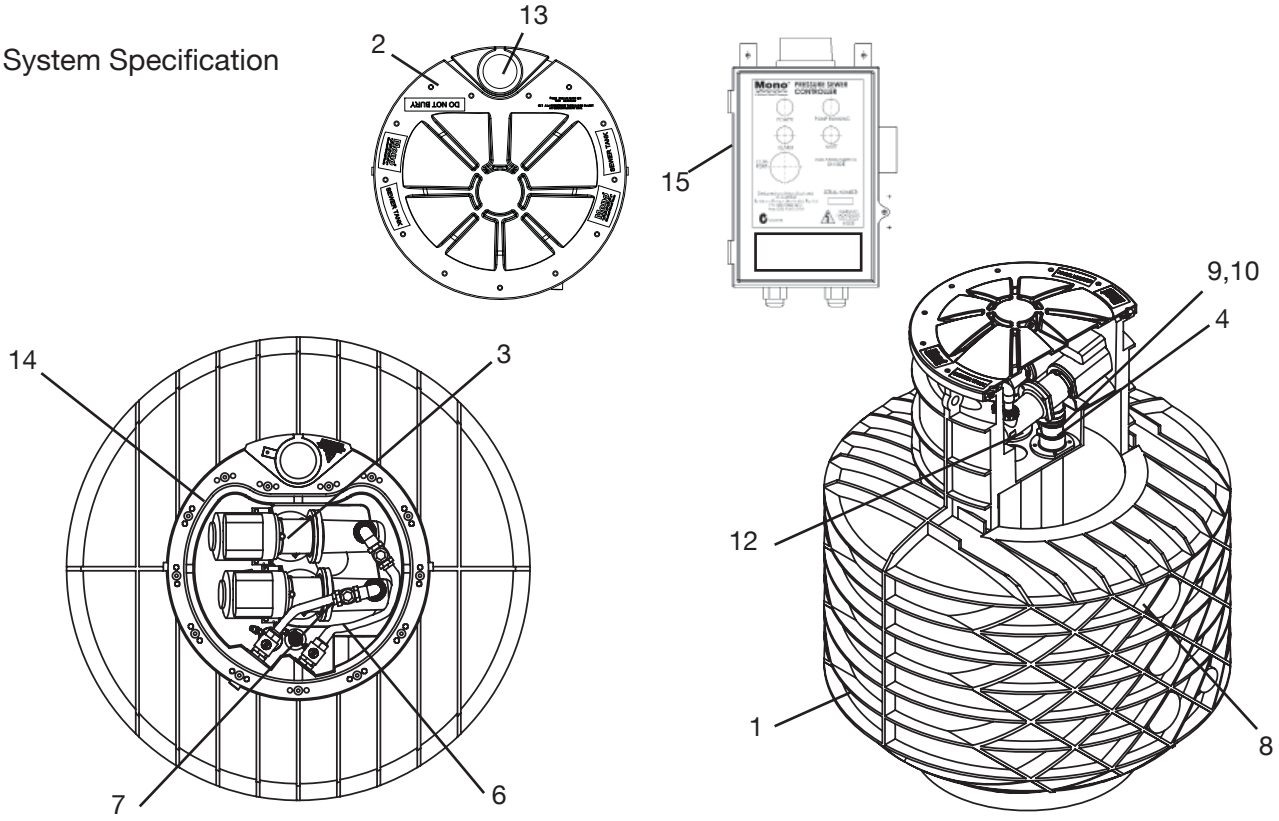
Each pump weighs 35kg. An assisted lift or multi person lift must be used when moving pumps.

High surface temperature for pump's motor. Motor may reach temperatures 80 deg C above ambient temperature.

Do not drop, roll or lay the tank on its side, as this will damage the unit.

Specification

System Specification



ITEM	DESCRIPTION	QTY	PART NUMBER
1	Tank - 2200L	1	CM9050XA
1	Drywell (Not Shown)	1	CM9028XA
2	Tank Lid	1	CM9045GC
3	Pump For PSS-EMS180	2	CG801R81PA
3	Pumps for PSS-EMS180-RTV	2	CG801R81PB/R
4	Pump Inlet Assembly	2	GRIF 310
5	Alarm Level Assembly (Not Shown)	1	GRIF 288
5	Mono Sense Assembly (Not Shown)	1	GRIF 250
6	Discharge Pump Assembly	1	GRIF 331
7	Discharge Pump Assembly	1	GRIF 330
8	100mm DWV Grommet Seal	1	AUX 6234
8	150mm DWV Grommet Seal	1	GRIF 152
9	Pump Connection Hose Clamps	2	GRIF 218
10	Pump Connection Sleave	2	GRIF 072
11	Electrical Connections (Not Shown) For PSS-EMS 2-80	1	GRIF 287
12	2” Drain Plug	1	GRIF 053
13	110mm Inspection Port	1	GRIF 104
14	Lid Gasket	1	GRIF 105
15	Pressure Sewer Controller	2	PSS-CH1MS2

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Specification

G60 Pump Specification

Inlet:	3” Cast Iron Spigot to Suit Nitrile Sleave
Outlet:	1 1/4” BSP Internal Thread
Weight:	35 Kg

Materials

Pump Body:	Cast iron
Stator and O Rings:	Nitrile rubber
Screws, Nuts & Washers:	316 stainless steel
Motor Shaft:	316 stainless steel
Cutters:	Hardened tool steel
Oil (in oil bath):	Shell Tellus Oil 100 anti wear hydraulic and circulating oil. Volume 130 mls
Gasket:	Aramid fibre and nitrile rubber binder

Environmental

Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-5 to 40 deg C
IP Rating:	IP55
Humidity:	100% Max

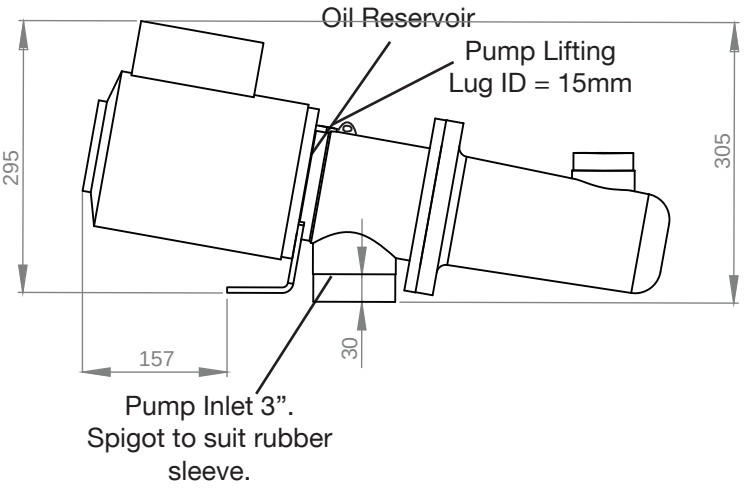
Electrical Characteristics

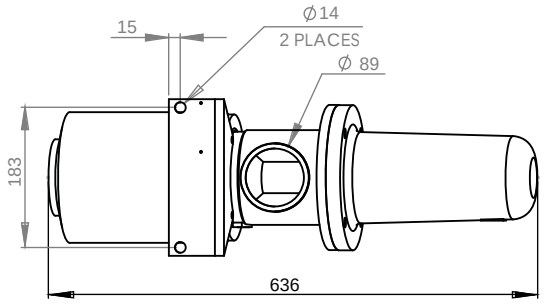
Max. Operating Voltage:	240 V +/- 5%, 50 Hz
Motor Duty:	Short time duty S2-30 minutes.
Max. Starts per hour:	10
Locked Rotor Current:	31.3 Amps
Full load Current:	7.5 Amps
Motor Power:	0.93 kW
Thermal Overload:	Automatic reset

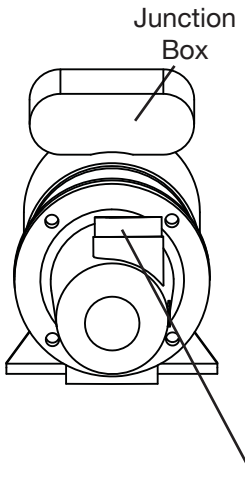
Water Quality

Water Temperature:	10 - 30 deg C.
pH range:	6 - 10

G60 Pump Dimensions







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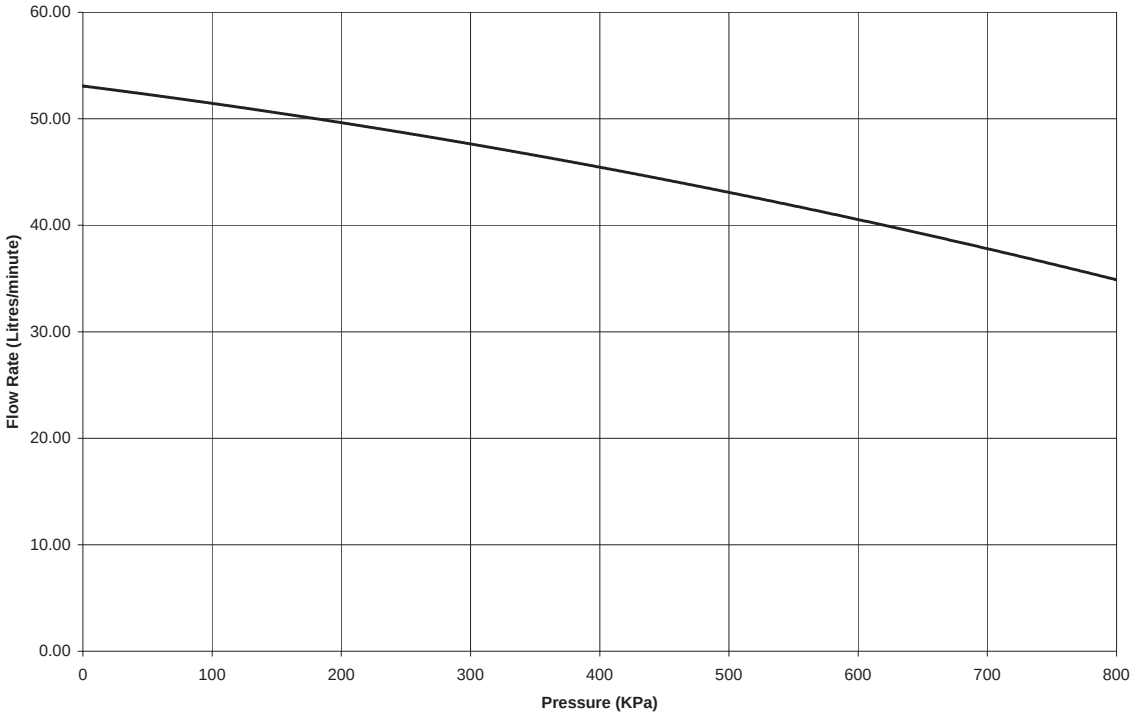
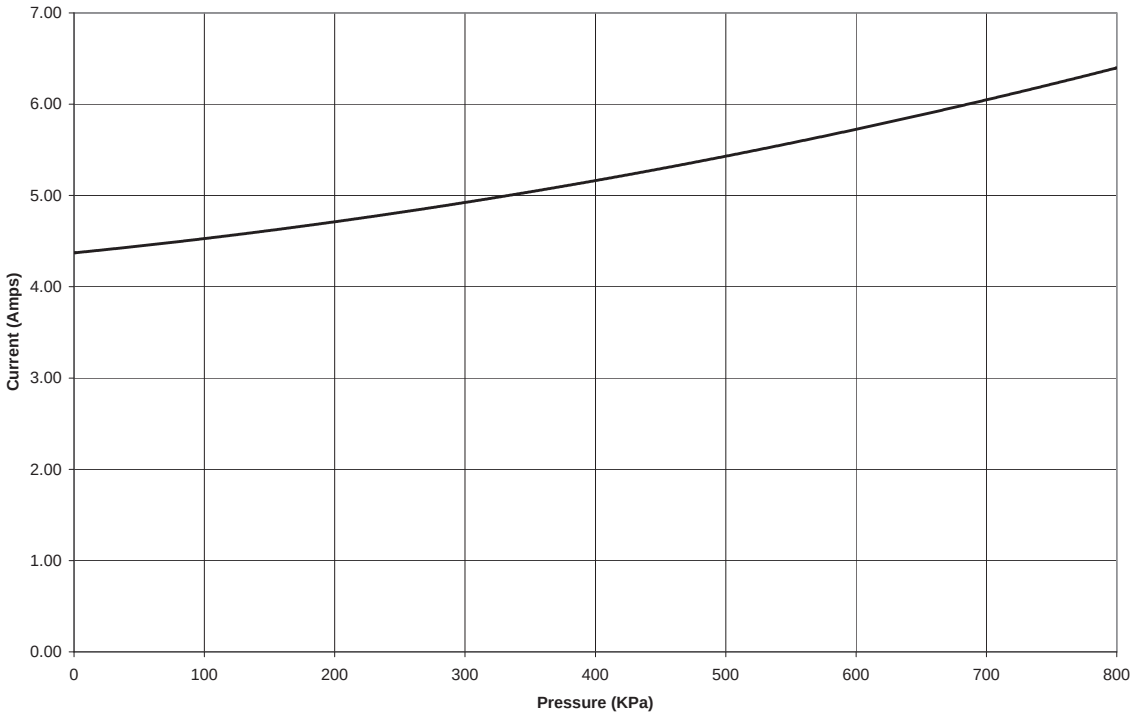
Specification

Pump Performance

The chart below indicates the performance characteristics of the pump.

Maximum Suction Lift: 2 metres with 80mm diameter suction pipe.





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Specification

Pressure Sewer Controller Single Specification

Electrical

Controller Input Voltage:	240 +6/-10 VAC
Max Current (Run) :	8 Amps
Max Current (Motor Start) :	20 Amps (Peak)
Circuit Breaker:	15 Amps
Control Circuit Fuse:	0.5 Amps

Outputs

Motor:	1.0 kW Max
	240 VAC
	Overcurrent Protection: 9 Amps
Level Probes:	RS232 (Standard Signal)
	Isolated 5 VDC
	2 Volt Trip

Com Connector

- RS232
- 9600 baud
- rts/cts

Environmental

Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-10 to 50 deg C
IP Rating:	IP66
Humidity:	95% Max.

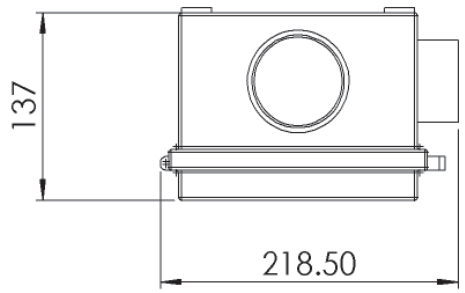
Dimensions & Weight

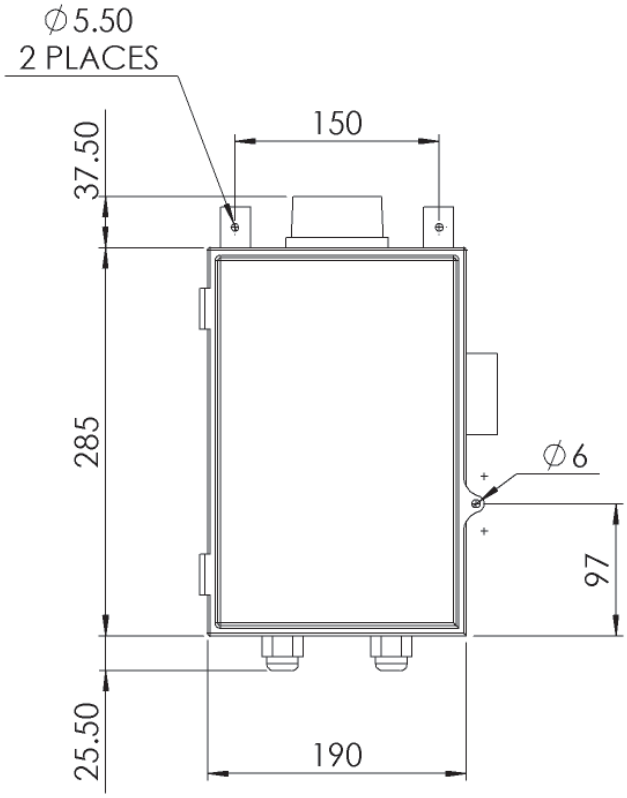
Dimensions (Carton):	390 x 275 x 290mm
Weight (in Carton):	3 Kg

Default Protection Settings

Pump Motor Current Trip (Over Pressure)	9 Amps
Pump Reset Time From Trip	5 minutes
Number of Current Trips Per Hour Till Alarm	10
Audible Alarm Run Time	5 minutes
Level Sensing Delay Time	2 seconds
Maximum Continuous Pump Run Time	15 minutes
Maximum Pump Starts Per Hour	10
Pump Cool Down Time	50 minutes

Dimensions of Pressure Sewer Controller





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Specification

Pressure Sewer Controller Enclosure Dual Specification

Materials

Body	316 Stainless Steel or Zinc Plated Steel
Body Thickness	1.5mm
Gasket	Polyurethane
Surface Finish	N4

Approvals

CE Marked
Lloyds

Protection

Earthing strap supplied with each enclosure.

Locking Mechanisms

7mm square turnbuckle lock.
Two external eyelets suitable for customer specific padlocks.

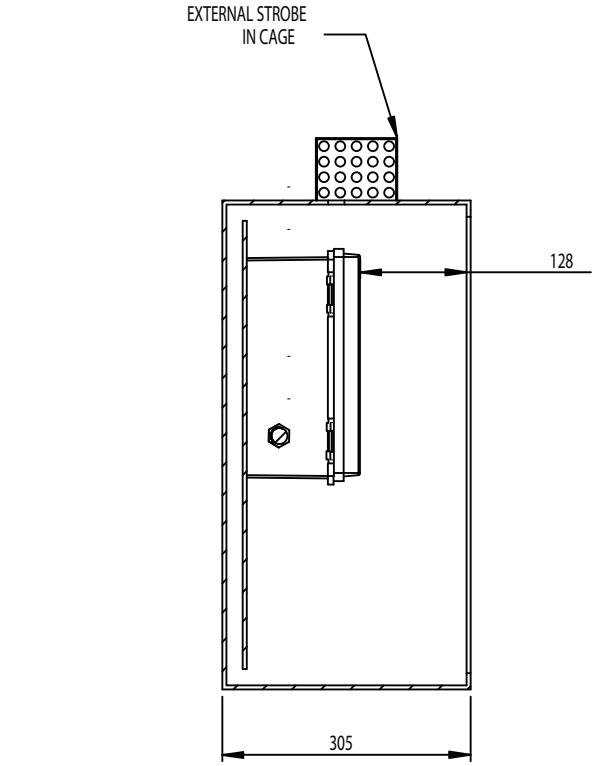
Environmental

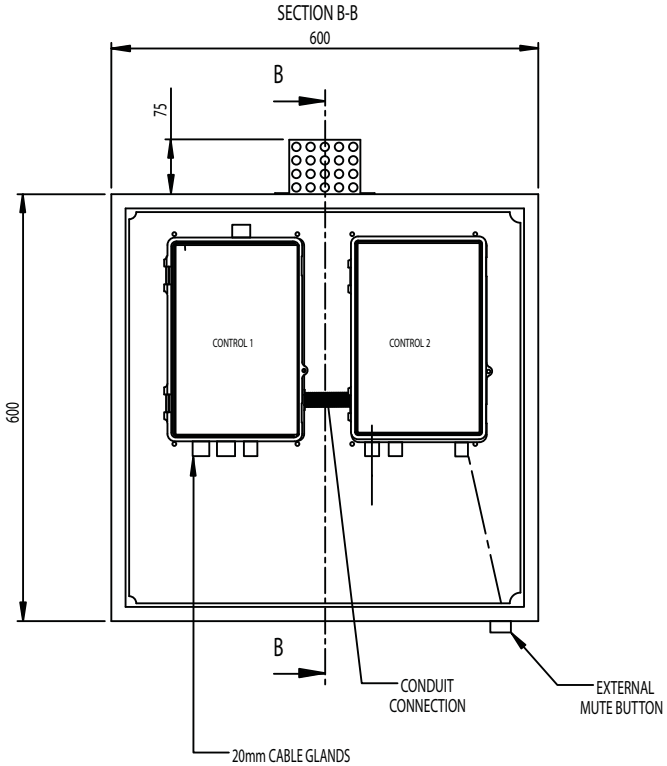
Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-10 to 50 deg C
IP Rating:	IP66
Humidity:	95% Max.

Dimensions & Weight

Dimensions:	600 x 600 x 300mm
Fully Assembled Weight:	30Kg

Dimensions of Pressure Sewer Controller Enclosure





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Specification

900L PSS Tank Specification

Materials

Tank and Lid:	LDPE	
Gasket:	Nitrile	
Pump Inlet:	PVC, Nitrile	
Pump Discharge:	Check Valve:	Stainless Steel Swing Type
	Pipe work:	Reinforced Rubber hose

Approvals

Tank tested to AS/NZS 1546.1:2008 under Licence: 20051 Viscount Rotational Moulding

Weight

Tank 900 Litre only:	120 Kg
Lid only:	8 Kg
Tank 900 Litre fully assembled:	175 Kg

Environmental

Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-10 to 50 deg C

Capacities - 900 Litre Tank

Maximum:	900 Litres
Low Level:	50 Litres
High Level:	170 Litres
Alarm Level:	330 Litres
Emergency Capacity	570 Litres

Lid Loading

Maximum Loading: 500 Kg

Tank Discharge

2 x 1 1/4" BSP Male Thread

Tank Inlet

100mm inlet to be drilled on site using a 121mm holesaw to suit either:

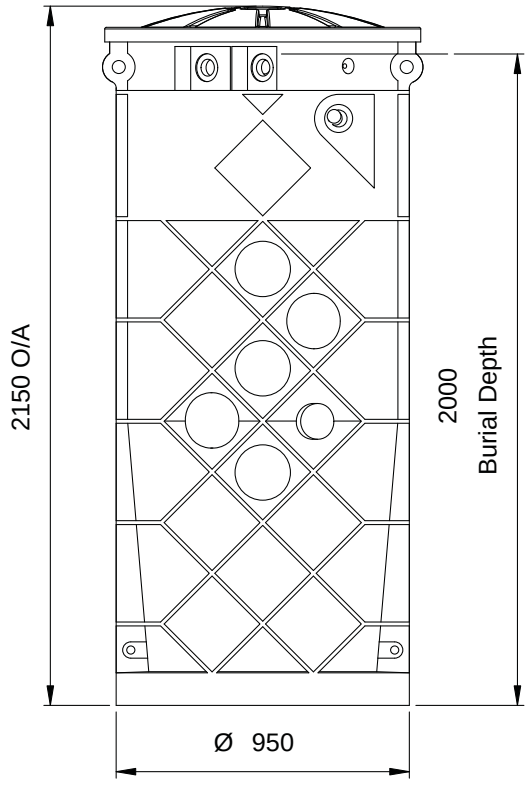
- 100mm DWV Grommet Seal

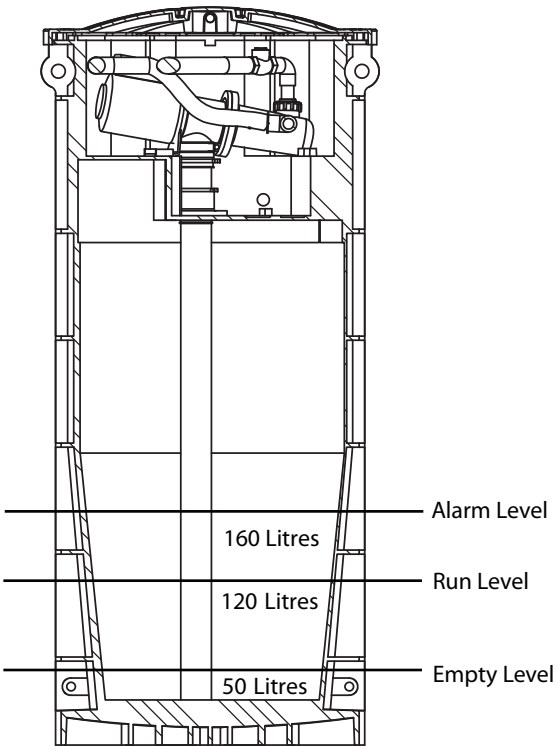
or

- 110mm Spigot

Noise Levels

48 dBA (Fast) @ 1metre, 1 pump operating Measured during operation of pump. Measurement taken 1 metre directly above tank lid.





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Specification

1100L PSS Tank Specification

Materials

Tank and Lid:	LDPE	
Gasket:	Nitrile	
Pump Inlet:	PVC, Nitrile	
Pump Discharge:	Check Valve:	Stainless Steel Swing Type
	Pipe work:	Reinforced Rubber hose

Approvals

Tank tested to AS/NZS 1546.1:2008 under Licence: 20051 Viscount Rotational Moulding

Weight

Tank 1100 Litre only:	225 Kg
Lid only:	8 Kg

Environmental

Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-10 to 50 deg C

Capacities - 1100 Litre Tank

Maximum:	1100 Litres
Low Level:	50 Litres
High Level:	170 Litres
Alarm Level:	305 Litres
Emergency Capacity	795 Litres

Lid Loading

Maximum Loading: 500 Kg

Tank Discharge

2 x 1 1/4" BSP Male Thread

Tank Inlet

100mm inlet to be drilled on site using a 121mm holesaw to suit either:

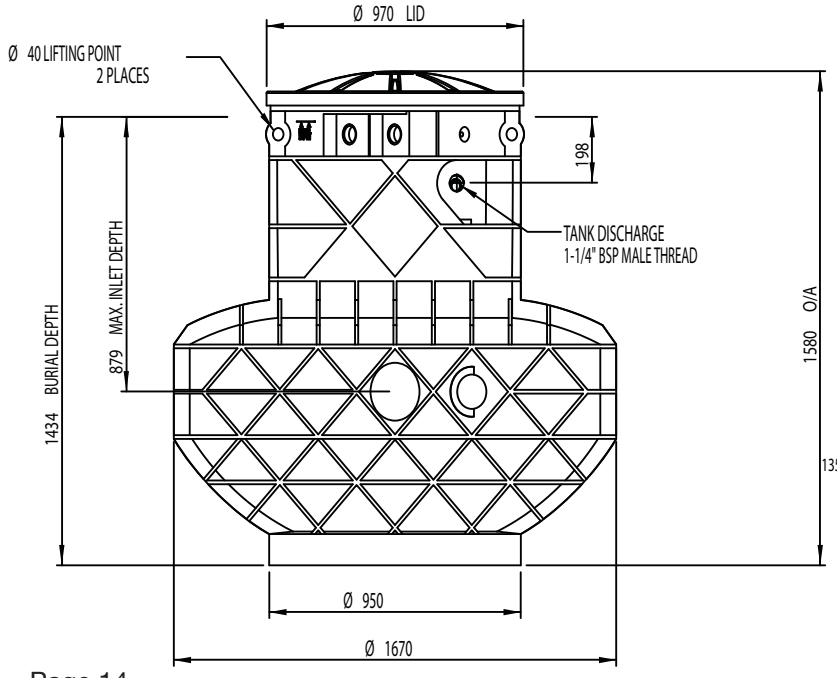
- 100mm DWV Grommet Seal

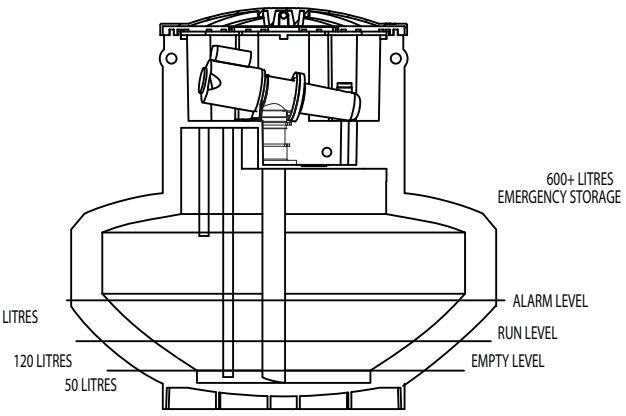
or

- 110mm Spigot

Noise Levels

48 dBA (Fast) @ 1metre, 1 pump operating Measured during operation of pump. Measurement taken 1 metre directly above tank lid.





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Specification

2200L PSS Tank Specification

Materials

Tank and Lid:	LDPE	
Gasket:	Nitrile	
Pump Inlet:	PVC, Nitrile	
Pump Discharge:	Check Valve:	Stainless Steel Swing Type
	Pipe work:	Reinforced Rubber hose

Approvals

Tank tested to AS/NZS 1546.1:2008 under Licence: 20051 Viscount Rotational Moulding

Weight

Tank 2200 Litre only:	285 Kg
Lid only:	8 Kg
Tank 2200 Litre fully assembled:	400 Kg

Environmental

Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-10 to 50 deg C

Dimensions of 2200 Litre Tank (millimetres)

Capacities - 2200 Litre Tank

Maximum:	2200 Litres
Low Level:	90 Litres
High Level:	440 Litres
Alarm Level:	820 Litres
Emergency Capacity	1380 Litres

Lid Loading

Maximum Loading: 500 Kg

Tank Discharge

2 x 1 1/4" BSP Male Thread

Tank Inlet

100mm inlet to be drilled on site using a 121mm holesaw to suit either:

- 100mm DWV Grommet Seal

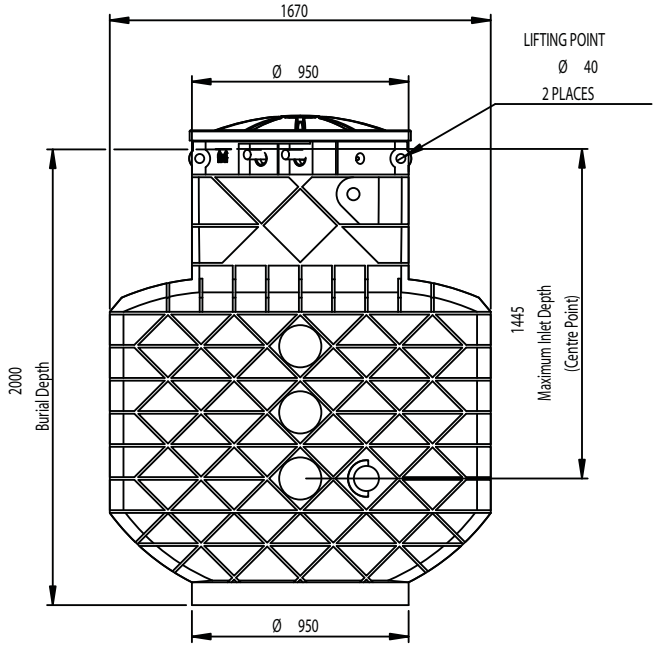
or

- 110mm Spigot

An inlet suitable for a 150mm DWV pipe is avaliable on request prior to ordering.

Noise Levels

55 dBA (Fast) @ 1metre, 1 pump operating
Measured during operation of pump. Measurement taken 1 metre directly above tank lid.



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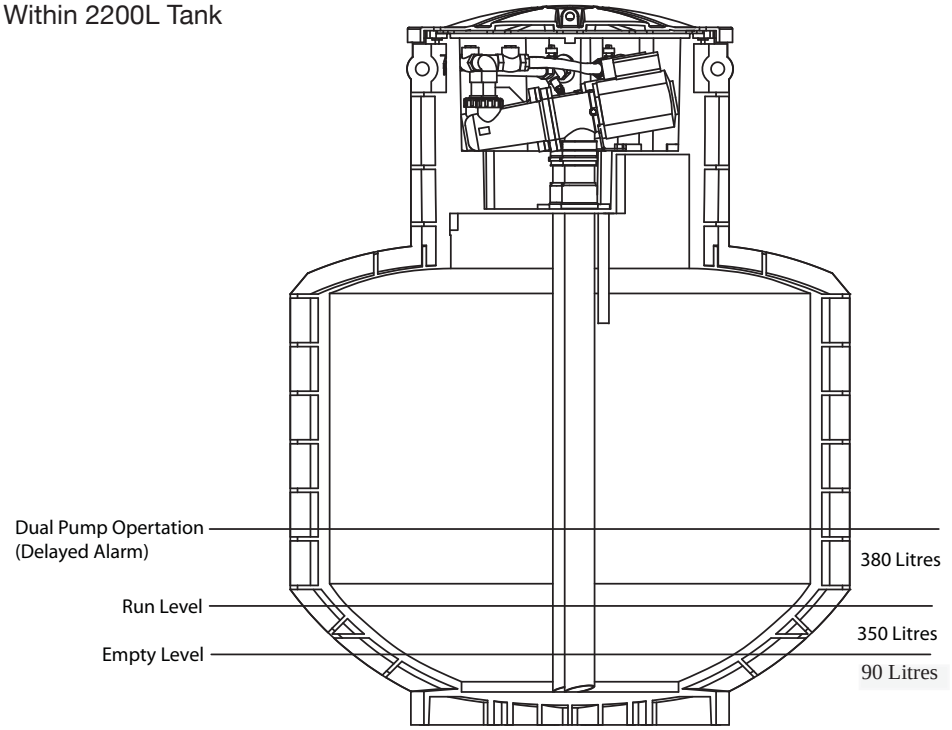
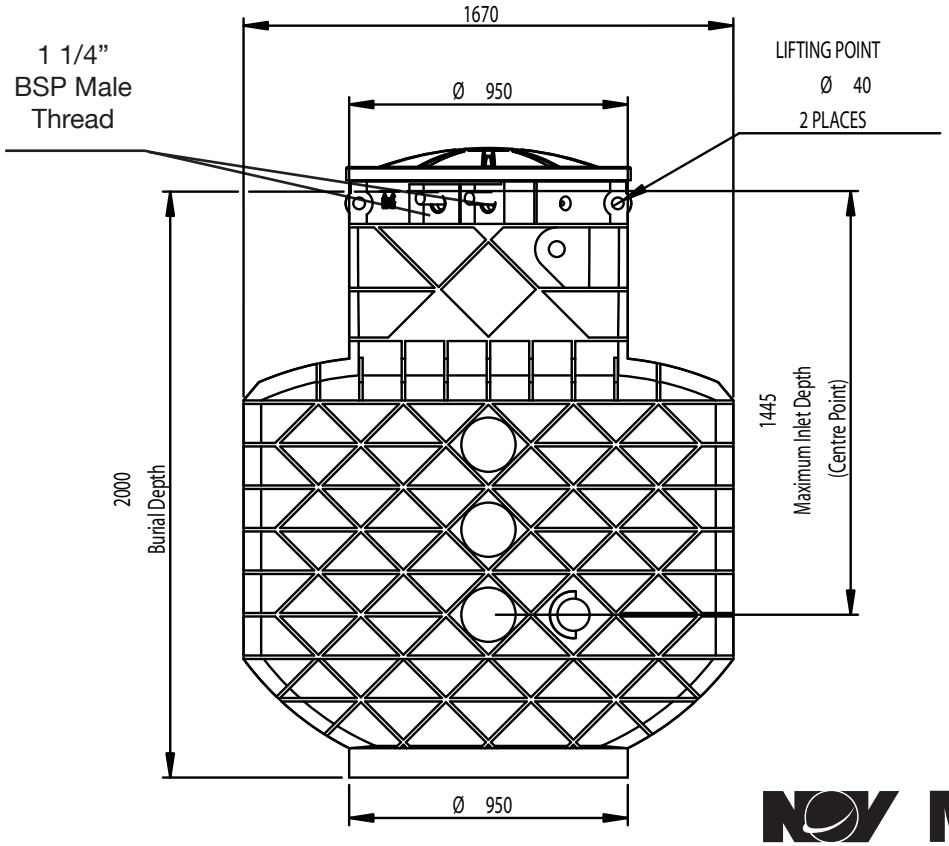
Specification

Levels Within 2200L Tank



Pipe Connection and Lifting Points on 2200L Tank



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Specification

Drywell Specification

Materials

Drywell and Lid:	LDPE	
Gasket:	Nitrile	
Pump Inlet:	PVC, Nitrile	
Pump Discharge:	Check Valve:	Stainless Steel Swing Type
	Pipe work:	Reinforced Rubber Hose

Approvals

Tank tested to AS/NZS 1546.1:2008 under Licence: 20051 Viscount Rotational Moulding

Weight

Drywell only:	48 Kg
Lid only:	8 Kg
Drywell fully assembled:	160 Kg

Environmental

Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-10 to 50 deg C

Lid Loading

Maximum Loading: 500 Kg

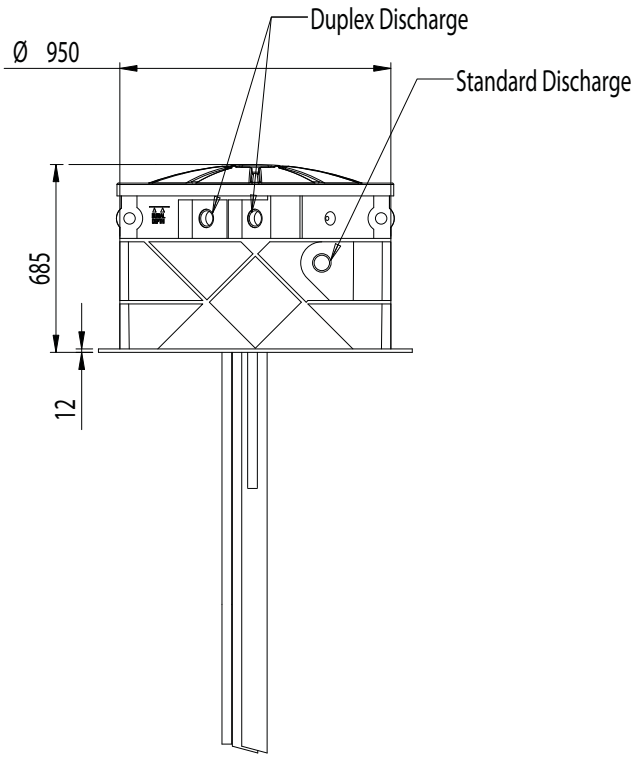
Tank Discharge

2 x 1 1/4” BSP Male Thread

Noise Levels

48 dBA (Fast) @ 1metre, 1 pump operating
Measured during operation of pump. Measurement taken 1 metre directly above tank lid.

Dimensions of Drywell (millimetres)



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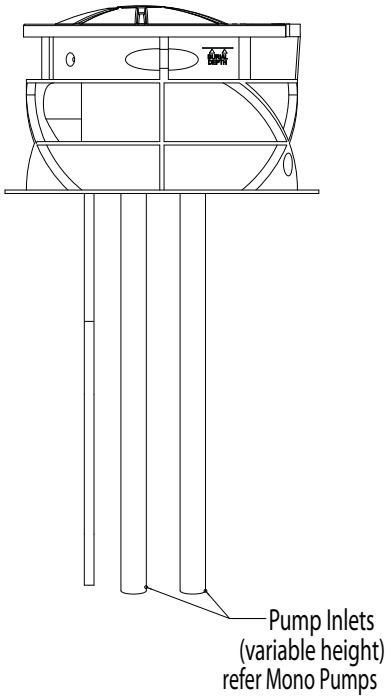
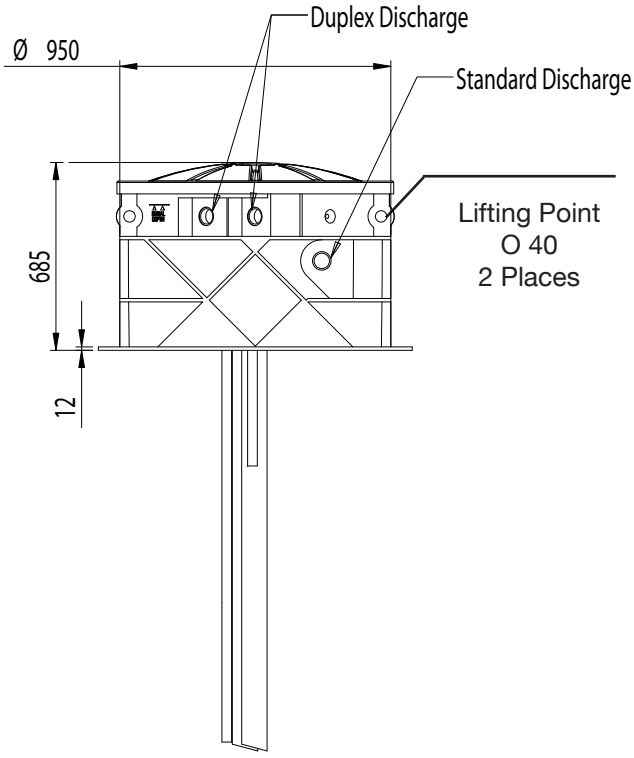
Specification

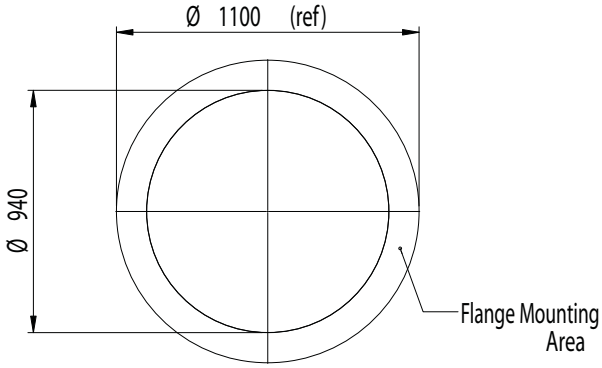
Level Switches Lengths for Drywell



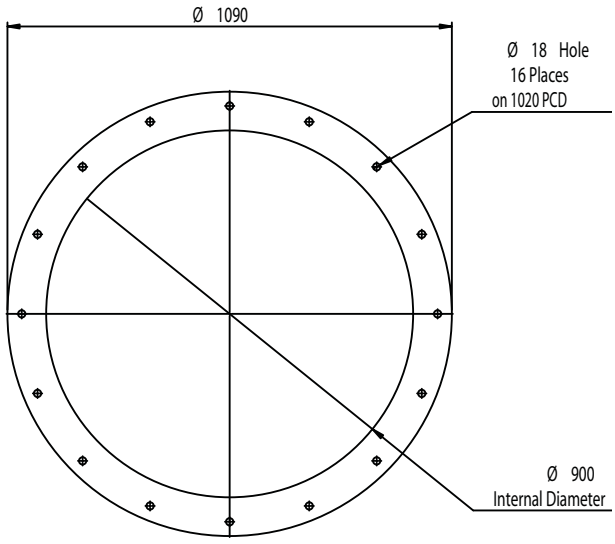
Pipe Connection and Lifting Points on Drywell



Mounting Flange Dimensions for Drywell



Mounting Anchor Points for Drywell



The drywell will need to be mounted onto a surface that:

1. Enables the unit to be securely bolted down at all points
2. Has the capability to support the load of the drywell and associate external loads.

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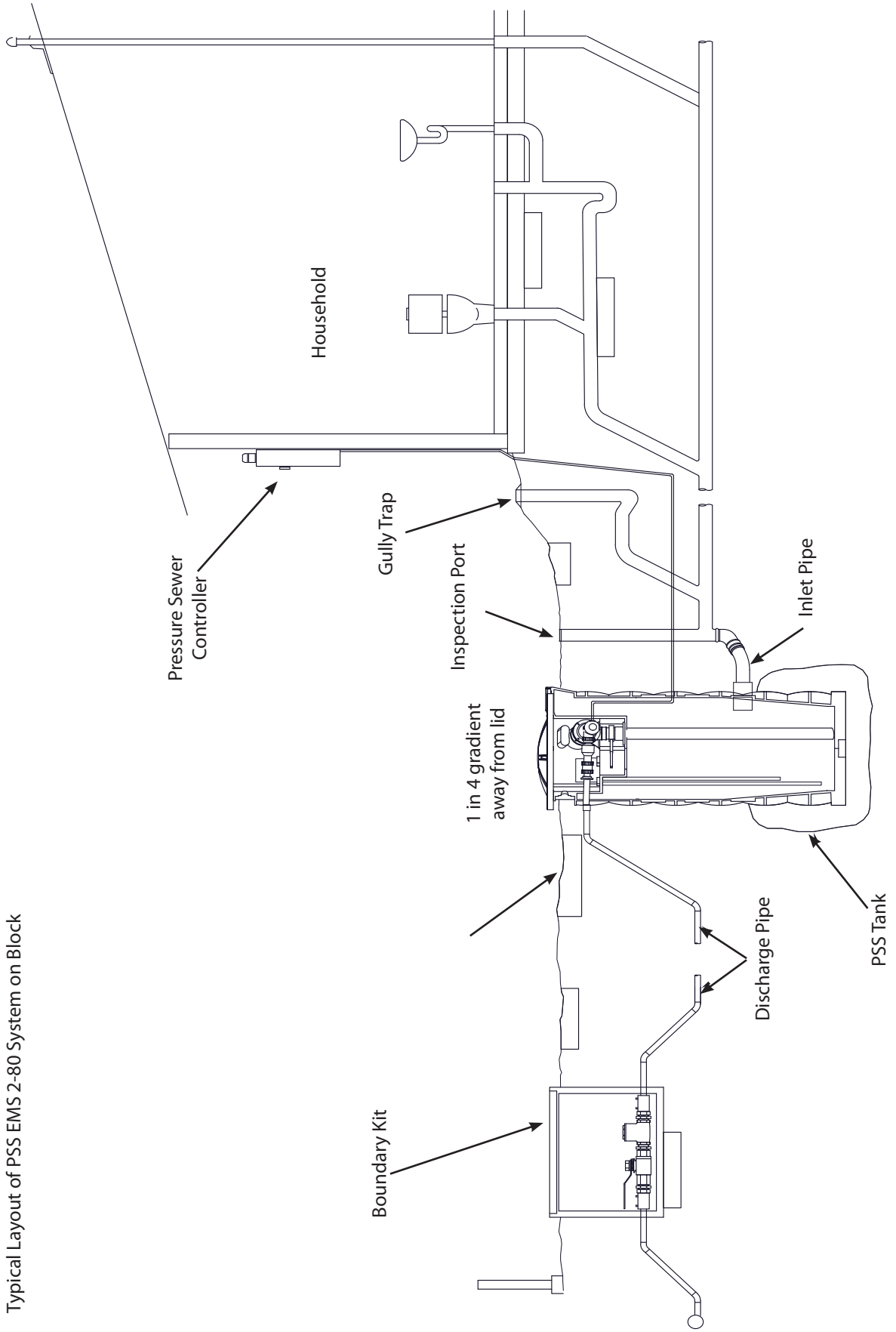
Installation



Typical Layout of PSS EMS 2-80 System on Block

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Installation

Installation Checklist

Caution: All plumbing and installation work is to be conducted by a qualified Plumber.

Caution: All electrical connections is to be conducted by a qualified Electrician.

	Action	
BEFORE TANK INSTALLATION		
1	No damage has occurred during transit to tank, lid, pumps, pipework/valves or controllers.	
2	PSS EMS 2-80 is been installed into an area where there will be no traffic within 1m around lid.	
3	PSS EMS 2-80 is been installed into an area 1.5m clear of all buildings.	
4	PSS EMS 2-80 is been installed with an 1 in 4 gradient away from the lid.	
5	Sewerage plumbing audit on property meets local regulations.	
6	Electrical audit on property meets local regulations.	
7	All installation work (except electrical work) is been conducted by a licensed plumber with drainage experience.	
8	All electrical work is been conducted by a licensed electrician.	
9	Slings, chains or shackles required to lift tank are to statutory regulations.	
10	2 x 20 amp type D circuit breaker is installed in the meter box for each controller.	
11	All trench depths for electrical cable are to local regulations.	
12	Property has been assessed for correct foundations.	
13	Hole for the PSS EMS 2-80 system is to local regulations.	
14	Inlet sewer pipe for PSS EMS 2-80 is at correct depth from ground level. Check tank dimension for maximum depth.	
DURING TANK INSTALLATION		
1	Tank is level in hole.	
2	Tank has approx. 250L of water in it, ensuring no floatation occurs during concrete pouring.	
3	Tank does not have the discharge inlet hole drilled in to it, before concrete pouring.	
4	Discharge pipe work has been installed.	
5	All pipes are supported sufficiently for backfill.	
6	Once concrete has been poured, ensure that the hole for inlet pipe has been drilled into tank.	
7	DWV grommet seal has been placed into inlet hole.	
8	Inlet and discharge pipe is connected.	
9	Backfill does not contain large particles (as these can effect tank wall loading).	
AFTER TANK INSTALLATION		
1	Pumps are primed.	
2	Pressure sewer controllers have been wired in and powered.	
3	Level sensors have been wired correctly into the pressure sewer controller.	
4	All valves are in the open position.	
5	Pumps have been tested through one complete operation cycle and are working as they should.	
6	All barrel unions have been tightened.	
7	Ensure that lid has been fully bolted down evenly.	

Installation

Foundations - PSS EMS 2-80

Caution: All plumbing and installation work is to be conducted by a qualified Plumber.

Caution: As sites vary and there are many potential site hazards, it is recommended that a Job Safety Analysis of each site is done prior to installation or any works.

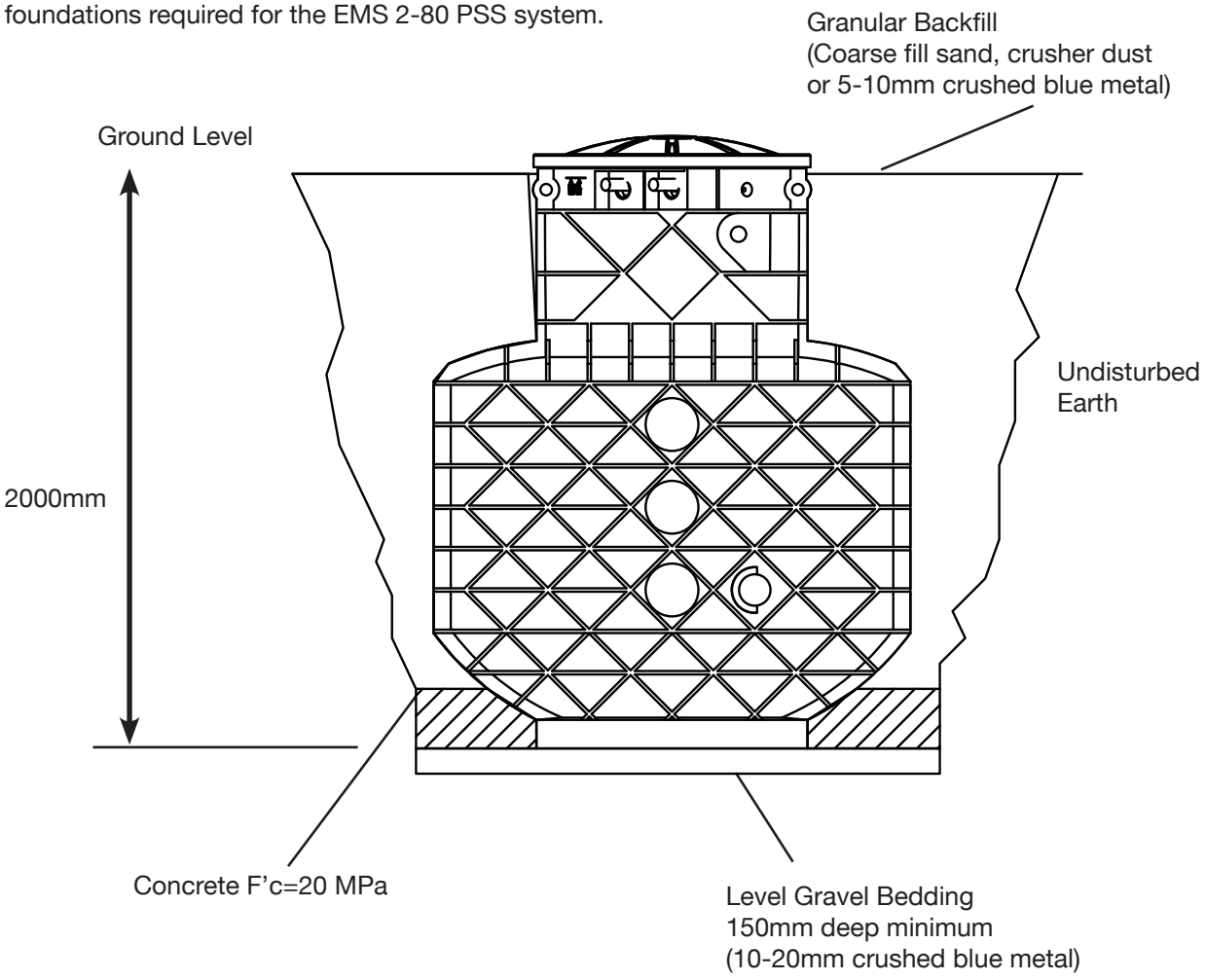
Caution: Installation holes may require protection and supports to prevent accidents. Refer to site engineer for recommendations.

The illustration below provides a guide to the foundations required for the EMS 2-80 PSS system.

This is to be used a guide only, as installation is dependent on ground conditions and should be in accordance with the directions of the site engineer.

The EMS 2-80 Tank should be located in an area where there is good drainage of surface water away from the tank. There should be a 1 in 4 gradient away from the lid to help with drainage. It should be as close to the household as possible and in a non trafficable area.

Tank Size	Weight of Concrete	Volume of Concrete
900L	700Kg	0.35 Cubic Metre
1100L	1250Kg	0.55 Cubic Metre
2200L	1250Kg	0.55 Cubic Metre



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Installation

Pipework Connections - Inlet

The connection to the tank from the household is made using 100mm DWV PVC pipe and the grommet seal provided (loose).

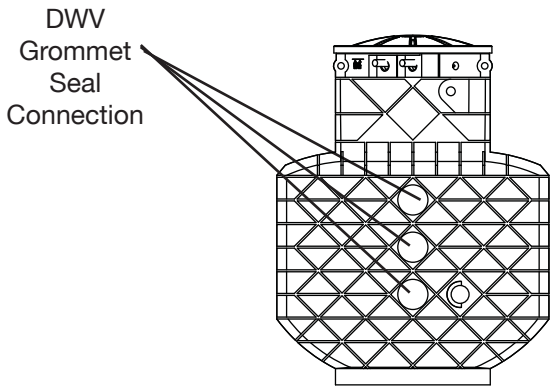
Drill a hole using an 121mm size hole saw (for 100mm grommet), at the correct depth using the flats provided.

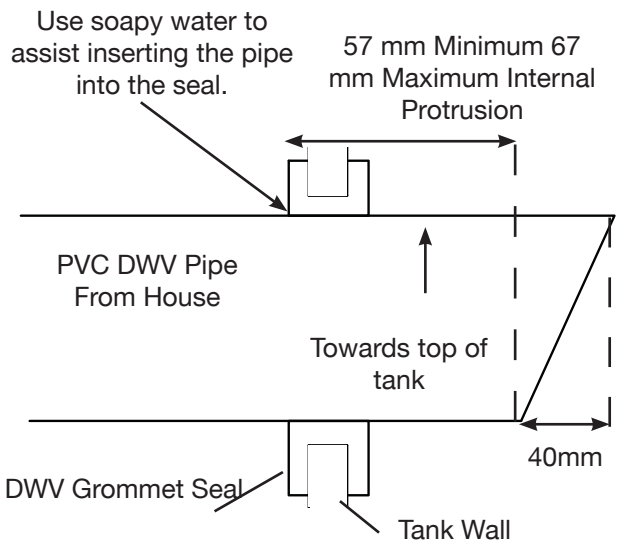
An option is provided for a 150mm DWV inlet, but this must be advised to Mono prior to ordering.

Ensure that hole is central to the flat. Place the DWV grommet seal in the hole with the label facing out. Push the pipe through. Soapy water may assist this process.

Alternatively, a rubber spigot connection can be used. The rubber spigot should have an internal diameter of 110mm.

The minimum depth of inlet from ground level is 450mm.



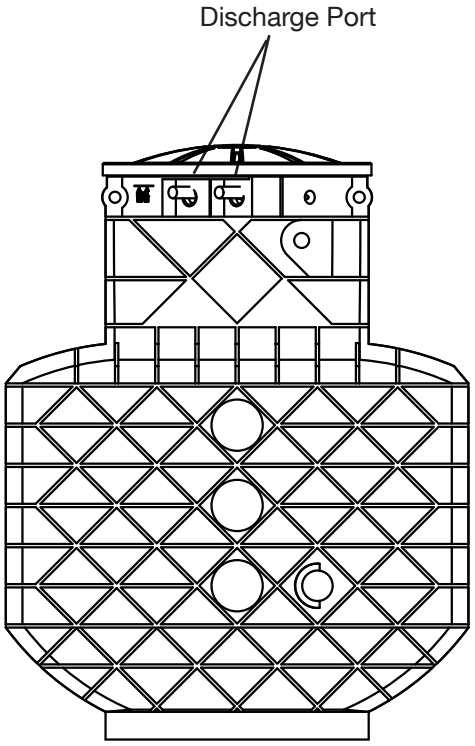


Pipework Connections - Outlet

2 x 1 1/4" BSP Stainless Steel with external thread is supplied for the outlet.

Ensure that discharge pipework leading away from the PSS EMS 2-80 tank, is in a pattern as per Typical Installation of this manual.

Ensure that the discharge pipework leading from the tank is well supported for backfilling.



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Installation

Electrical Connections

Warning: All electrical connections is to be conducted by a qualified Electrician.

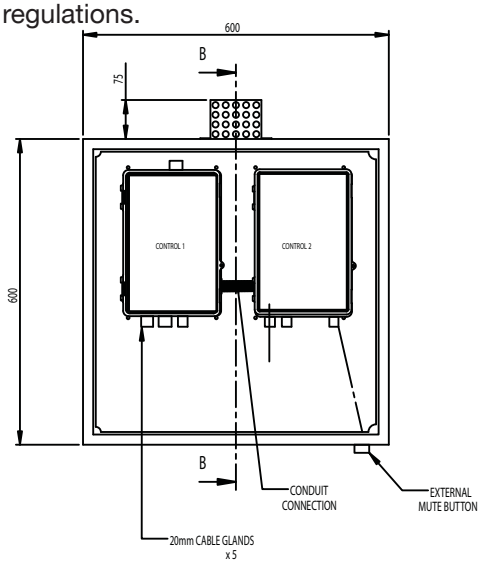
Prior to installation, an electrical audit must be conducted on the property to ensure the installation will meet local regulations.

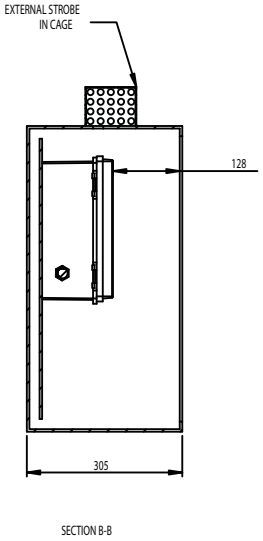
Electrical Installation Diagram.

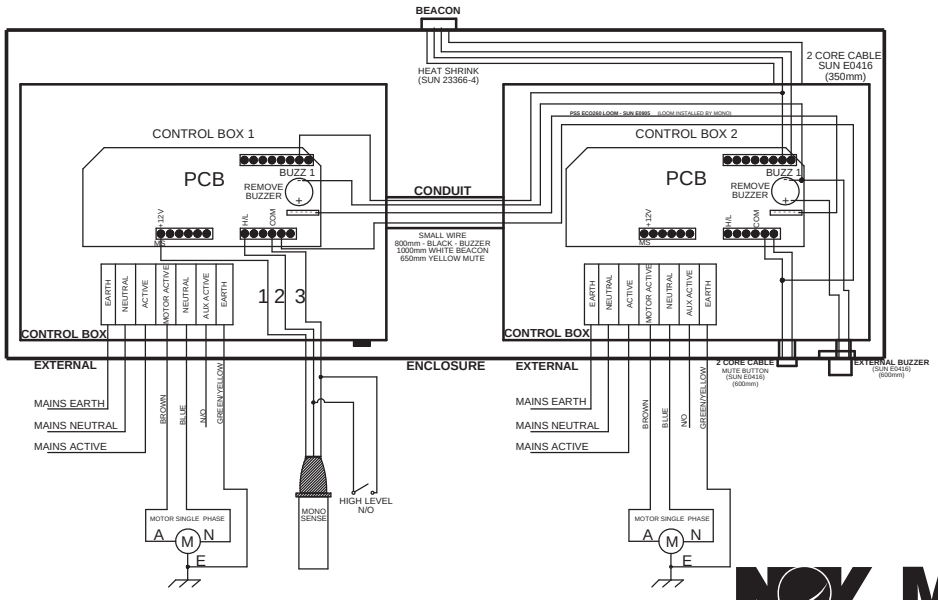
Ensure all electrical connections are made in accordance with local regulations.

Connections at the Meter Box.

The power to each PSS Control box must come from the meter box and be wired in, on its own circuit breaker. Each controller requires a 20 Amp Type D circuit breaker.







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Installation

Electrical Connections - At Tank

Run both the motor cable and the level sensing cable through sealed conduit. At the tank wall connect the conduit to the socket connection that is provided.

Ensure that the conduit is buried in accordance with local regulations.

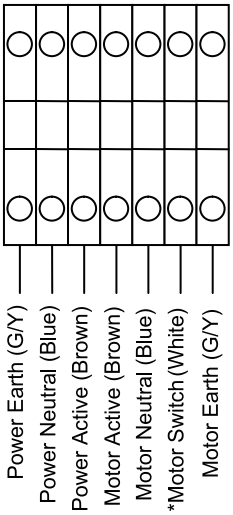
Electrical Connections - Within Pressure Sewer Controller

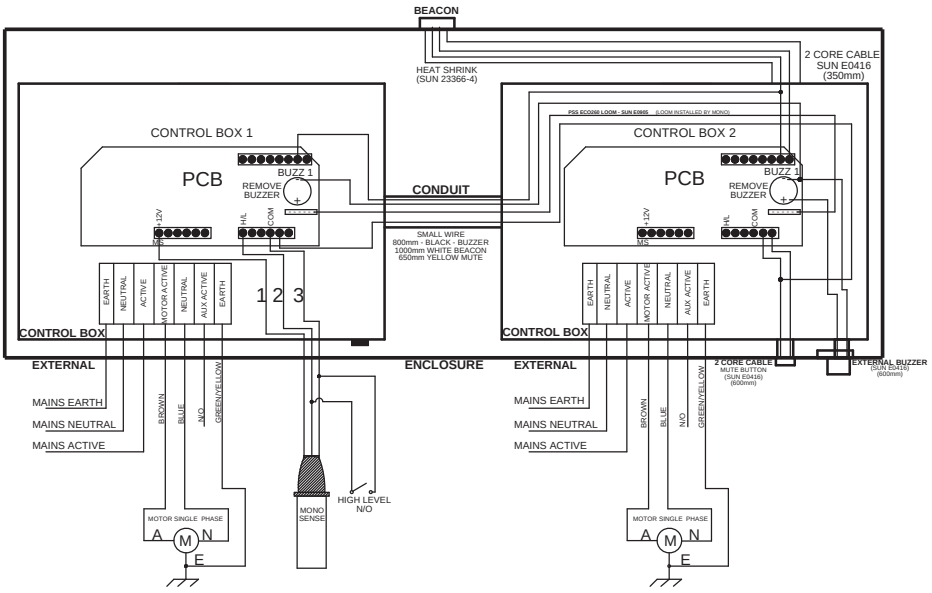
Ensure all cables are sealed through the cable glands/ conduit at the base of the controller.

Connect the mains power and the pump leads to the Terminal block mounted on the DIN Rail.

* Motor Switch (White) is required for PSS-EMS180-RTRV system only. Do not connect this terminal block if the system is not a PSS-EMS180-RTRV.

Refer to the diagram below.





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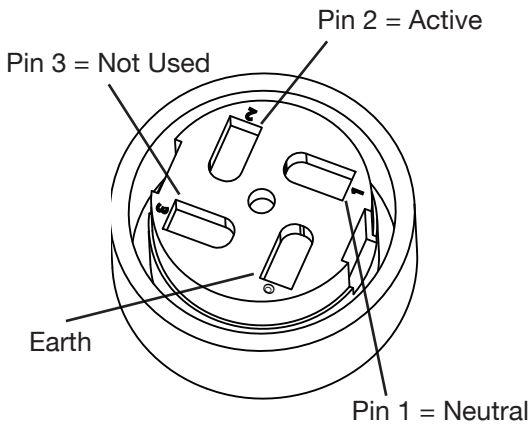
Installation

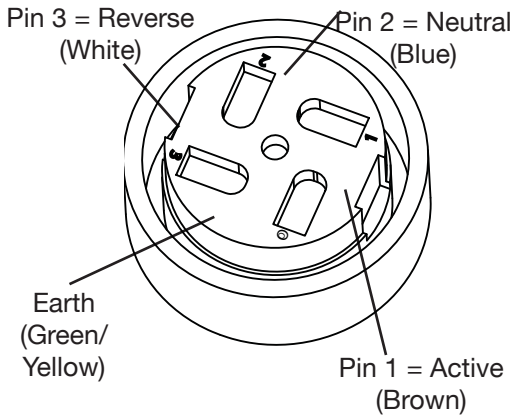
Electrical Connections - Motor Plug

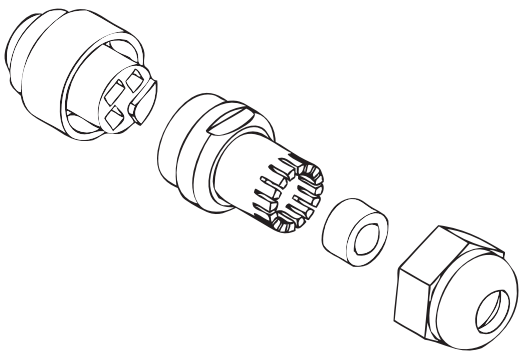
The motor connection plug for the system is to be wired as below.

The motor connection plug for system is to be wired as below.

Assemble the remainder of the plug as shown below.

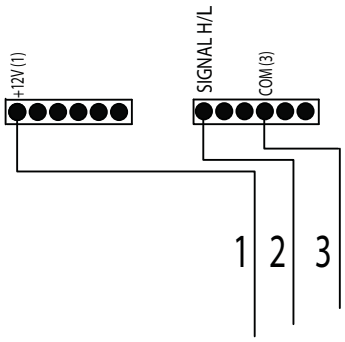




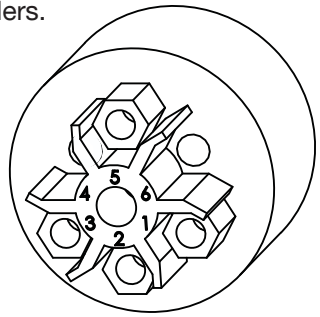


Electrical Connections - Level Sensors

The level sensors are connected directly into the terminal block on the PCB in the Pressure Sewer Controller. The connection ports are labelled.



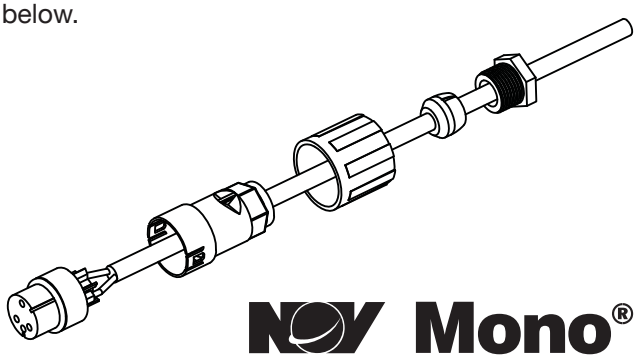
The above numbers corresponds to the connections numbers on the plug for the level box inside the tank. The wires in this cable are also referenced with the corresponding connection numbers. The plug is wired as below. Refer page 21. Only wire one of the 2 controllers.



Level Switch Pin Connections

Pin 1 is the +12 Volt connection
Pin 2 is the Signal connection.
Pin 3 is the common connection
Earth Pin is not used.

Assemble the remainder of the plug as shown below.



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Installation

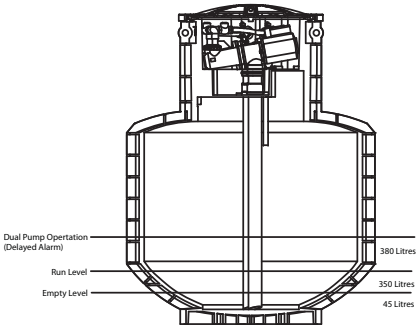
Installation of the Pumps

Warning: Check that the main power for the Pressure Sewer Controllers is switched off prior to working on either pump.

Caution: Depending of the amount of water in the tank, if the controllers are on the pumps may start automatically.

Warning: Each pump weighs 35kg. An assisted lift or multi person lift must be used when moving pumps.

1. Remove cardboard or foam inserts from the drywell. These are required for support during transport only.
2. Remove both pumps from drywell.
3. Ensure discharge chambers are full of water and rotor and stator are wet.
4. Place both pumps back into the dry well. Ensure that there is a good seal on the 2” suction port by tightening up the hose clamps.
5. Hand tighten the unions on the flexible discharges (do not use a pipe wrench).
6. Ensure that the check valve inspection caps are facing up.
7. Connect both IP68 plugs for the pumps.
8. Fill the tank with approx. 250 litres of water, through the inspection port.
9. Turn the mains power back on.
10. Check that there are no leaks in the system.



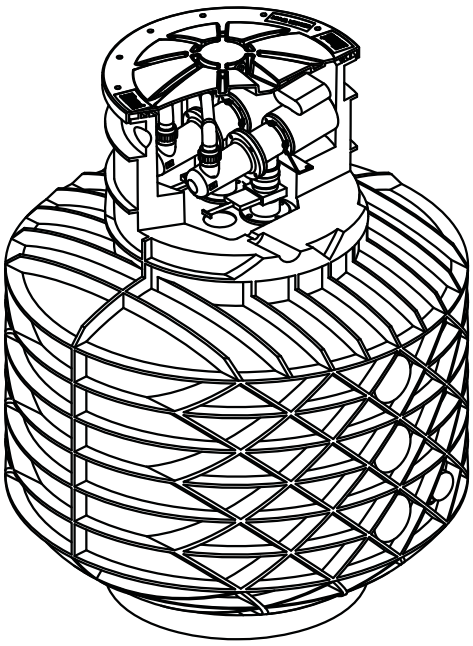
Installation of Level Sensors

Caution: Ensure that you keep a watch on the water level in the tank as you perform this operation, so that the pumps are not dry run.

1. Switch on the Pressure Sewer Controllers. Pumps should be acitvated.
2. Allow pump to pump out water to below the low level sensor. Once the water has fallen to below the low level sensor the pump will turn off.
3. If pump does not turn off, check level sensor wiring.
4. Refill the tank through the inspection port.
5. When the water level is high enough to cover the low level sensor the pump will turn on.
6. If pump does not turn on, check level sensor wiring.
7. Keep filling the tank up.
8. Once the tank reaches the high level sensor, the second pump will turn on.
9. Keep filling the tank, until the alarm sounds.
10. If the alarm does not sound, stop filling tank, turn off pump and check high level sensor wiring.
11. If level sensors are working as they should, turn off the water and pump the water out until the alarm turns off.
12. Once the alarm has stopped, Turn off both pumps.
13. If level sensors have been wired correctly, leave water in the tank as this will help with stabilsing the tank during backfilling. This will also help prevent the pump from dry running.
14. Firmly secure the lid. To secure the lid, place the lid on top of the tank and align the fasteners in the slots. Compress the lid at the fastener you are tightening until bolt touches lid, by standing on the lids edge. The fasteners only require a 1/4 turn in either direction to tighten. The closed position is indicated by the line on the hex head pointing out from the tank, as shown below.

Operation

Duty Standby Assist

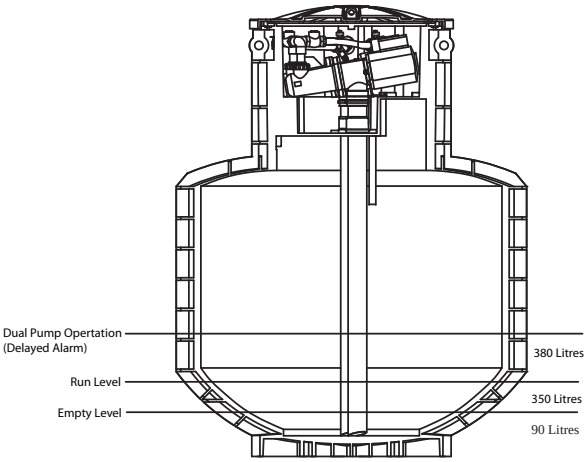


The PSS EMS 2-80 system is used when the expected intake of the system will exceed the output flowrate of the PSS EMS 2-80 system. The PSS EMS 2-80 system consists of two pumps that are controlled via two controllers.

The controllers for the PSS EMS 2-80 system are programmed so that the run time between the two pumps is alternated. By alternating between the two pumps:

- It ensures that one pump is not constantly been used, which prevents one pump from wearing out sooner than the other pump.
- It also ensures that both pumps will start when required.

How the Level Switches Operate



Sewage enters into the tank via the tank inlet. When the level rises to 140 litres, one pump is activated. If the level continues to rise, this indicates that the flow into the tank is faster than the output of one pump. When the sewage level in the tank reaches 170 litres, the second pump is activated.

Both pumps will run until the sewage level in the tank drops down under 140L. At this point one pump will turn off while the second pump will continue to pump, until the sewage level has dropped to below 90 litres.

Next time that sewage activates the run level switch, the alternative pump will be activated.

Operation

Operation of Pressure Sewer Controller

System Indicators

The Pressure Sewer Controller features various indicators which signify how the system is functioning. The functions of the indicators are as follows:

Power On

This indicates that mains power is connected to the unit.

Pump Running Indicator

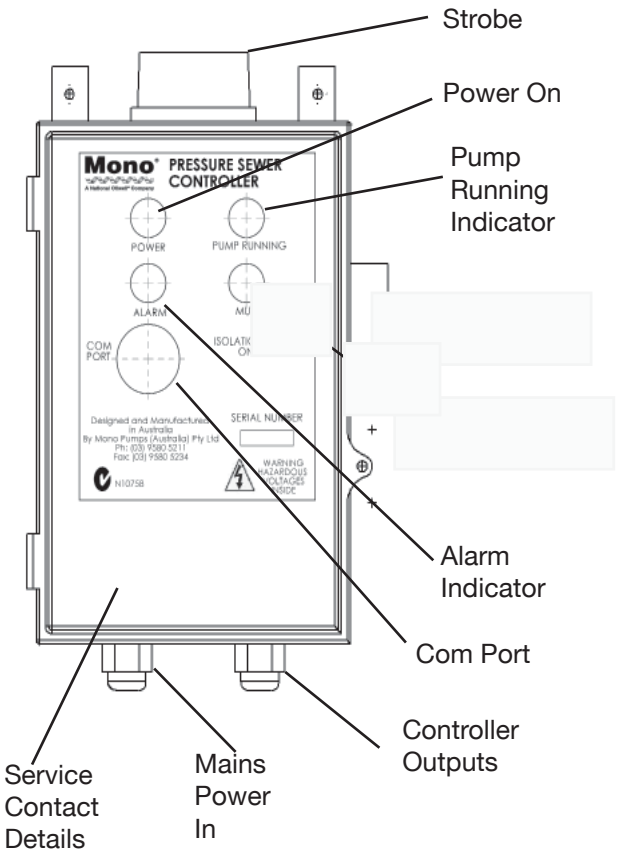
This indicates when the pump is running.

Alarm Indicator/ Strobe/ Siren

This indicates operational problems with the PSS EMS 2-80 system. When the alarm begins, limit the use of water (there is 1380L emergency storage in tank). If the strobe light does not stop flashing after ten minutes, contact your service provider.
The table at the bottom of the page indicates the functions that the alarms will operate.

Mute Button

By pressing this button, the end user can switch off the audible alarm. This will not switch off the visual alarm.



Operation of Protection Features

Function	Description	Reset	Pump Shutdown	Warning Light	Siren	Strobe
Over Current	Trips when current exceeds programmed maximum current level.	Via Trip Reset Timer	YES	YES	NO	NO
Max Current Trips	Trips when number of current trips exceed programmed value.	Automatic - if fault clears	NO	YES	YES	YES
Exceed max. run time	Trips when pump/motor has continuously run greater than the programmed maximum time	Via Motor Cool-Down Time	YES	YES	YES	YES
Exceed max. Starts/ Hour	Trips when maximum starts per hour has been exceeded	Via Motor Cool-Down Time	YES	YES	NO	NO
High Level	Trip when high level probe is active	Via Low Level Probe	NO	YES	YES	YES
Sensor Fault	Triggered when Mono-Sense level sensor is not detected	Automatic when sensor detected	YES	YES*	NO	NO

*Warning light only activated if sensor has previously been detected.

Maintenance

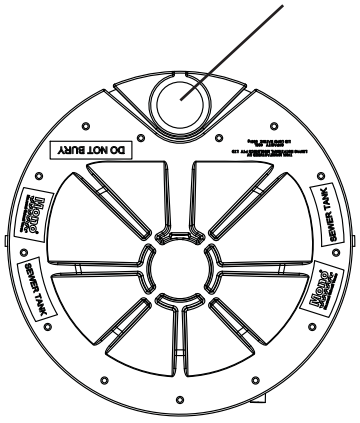
Desludging The PSS EMS 2-80 Tank

Over time, sewage sludge can build up in the bottom of the tank. The PSS EMS 2-80 tank has been designed so that desludging can occur without having to remove the lid of the tank.

Access to the wet well can be gained by the 110mm inspection port on top of the tank

This port enables a 100mm diameter suction pipe into the tank.

Inspection Port



If additional access is required, there are an extra two access points in the dry well. The first access point is the 100mm port under either pump's inlet assembly. The pump/s would need to be removed to access this port. The second access point is the 50mm drainage point for the dry well.

Reversing pump: Over current event pump will do a back pulse.

Removal of Sludge via Inspection Port

1. Isolate PSS system. Ensure that the pump can not be turned on.
2. Unscrew the lid of the inspection port.
3. Place suction pipe down the hole and into the tank until it hits the bottom of the tank (approx. 2.2m).
4. Remove sludge from the bottom of tank.
5. Once completed, remove suction pipe from inspection port.
6. Fill tank with approximately 250 litres via the inspection port.
7. Reprime both pumps as per Installation of Pump.
8. Replace lid of inspection port.

Maintenance

Removal of Sludge via the Additional Access Points.

Caution: Each pump weighs 35kg. An assisted lift or multi person lift must be used when moving pumps.

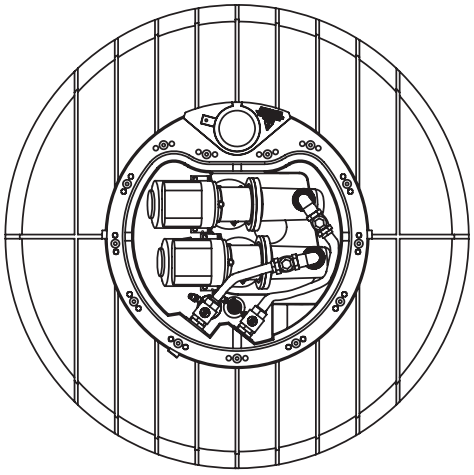
The first access point is the 100mm port under each pump inlet assembly. The pump will need to be removed to access this port.

The second access point is the 50mm drainage point for the dry well. Both pumps will need to be removed to access this point.

1. Isolate the pressure sewer controllers and ensure that either pump can not be turned on.
2. Isolate the PSS system at the boundary kit.
3. Unscrew bolts in lid and place underside up and away from dirt etc.
4. Either pump can be removed to reach the first access point.
5. Unscrew the hose clamps around the rubber sleeve and remove the four bolts from the suction pipe flange. Remove pump and inlet assembly.
6. To access the 50mm plug if access via the drywell drainage port is required, remove the second pump.
7. Place a suction pipe down either or both access points and into the tank until the hose hits the bottom of the tank (approx. 2.0m).
8. Remove sludge from the bottom of tank.
9. Once completed, remove suction pipe.
10. For the first access point, replace pumps and inlet assemblies.
11. Tighten up the four bolts in the suction pipe flance and the hose clamps around the rubber sleeve.
12. Fill tank with approx. 250 litres of water via the inspection port.
13. Reprime the pumps as per Installation of Pump.
14. If second access point has been used, replace the plug.
15. Clean up the dry well ensuring that it contains no liquids.
16. Check that the 50mm lip around the top of the tank and that the lip on th underside of the lid is clean. This will ensure a good seal has occurred so that the drywell remains sealed.
17. Place the lid and bolts back onto the PSS tank. The lid is keyed, so that it can be only fitted one way.
18. Screw the bolts down in place, ensuring that a good seal of the drywell has occurred.
19. Turn PSS system at boundary kit back on.
20. Turn the pressure sewer controllers back on.

Cleaning the Level Sensors

It is recommended when desludging the PSS EMS 2-80 tank, that the level sensors are cleaned.



1. Unscrew the level sensors from the barrel union. when replacing the level sensor in the barrel union add threaded tape. There is no need to open the pressure sensor.
2. Lift up and out the level sensors and assembly.
3. Clean off any build up around the end of the tube, best using a bucket of clean water
4. Replace the level sensors back into the tank
5. THE MONO-SENSE LEVEL SENSOR IS VERY FRAGILE! Never touch the sensor diaphragm with any object. Never direct high pressure water into the sensor.

Maintenance

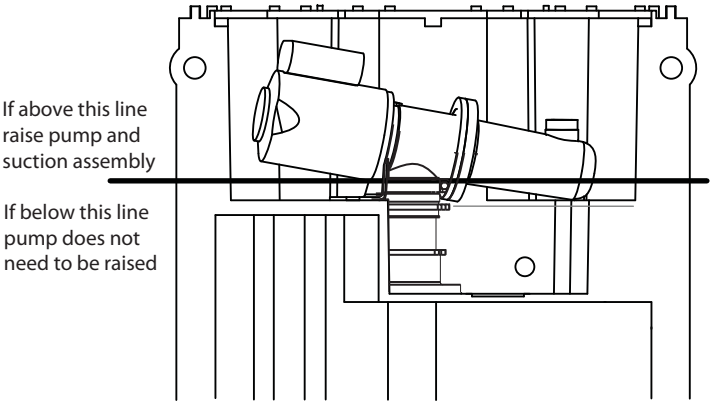
Removing The PSS EMS 2-60 Pump.

Ensure the PSS System has been isolated, and ensure that the pump cannot be turned on.

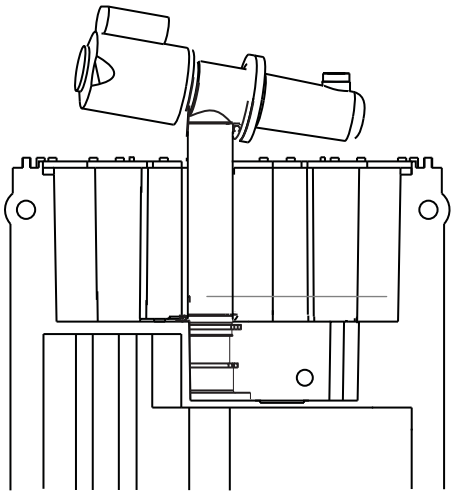
Removing of the pump will require the removal of the lid first. Please ensure the lid is removed in a similar way as per the instructions under installation on page 24.

After removing lid please follow the below instructions.

1. Check the level of sludge inside of the tank via the inspection port (as shown on page 29) by unscrewing the lid.
2. If level of the Sludge is below the line as per the drawing the pump does not need to be lifted, if the sludge is level with this line the pump will need to be lifted as per the drawing before any part of the pipework is removed to ensure spillage does not occur.
3. Once the pump is secure via the lifting lug, close the valve on the discharge pipework.
4. If raising the pump do now, if not proceed to the next step.
5. Unscrew the end of the discharge pipework that is attached to the pump.
6. Unplug the IP68 Plug that is connected to the pump.
7. Loosen clamps that attached pump to suction pipe.
8. Pump can now be removed.



Secure lifting device or PSS lifiting Tripod (GRIF 340) to tank and attach to pump. Pump should be raised to about this height and secure before any further steps can be followed.



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Maintenance

Maintenance Checklist

Caution: Isolate mains power before commencing any work on the PSS EMS 2-80 system.

Caution: High surface temperture for pump motor. Motor may be reach temperatures 80 deg C above ambient temperature.

	Action	Checked
1.	Ensure that household has discontinued use of water.	
2.	Pressure sewer controllers are off.	
3.	Isolate the mains power (follow standard electrical lockout procedures).	
4.	Ensure that discharge valve in boundry kit is turned off.	
5.	Remove lid and ensure that underside of lid is not in dirt.	
6.	Disconnect pump plugs from internal power supply.	
7.	Disconnect level sensor power plug from internal power supply	
8.	Ensure that the valves on both discharges in the tank are closed.	
9.	Attach lifting device to pump.	
10.	Unscrew clamps on both rubber sleeve closet to suction side of pumps.	
11.	Remove pump by lifting straight up.	
12.	Clean up any liquid in the dry well.	
13.	Ensure that lid has been replaced on tank and tightened to prevent water from entering into the drywell.	

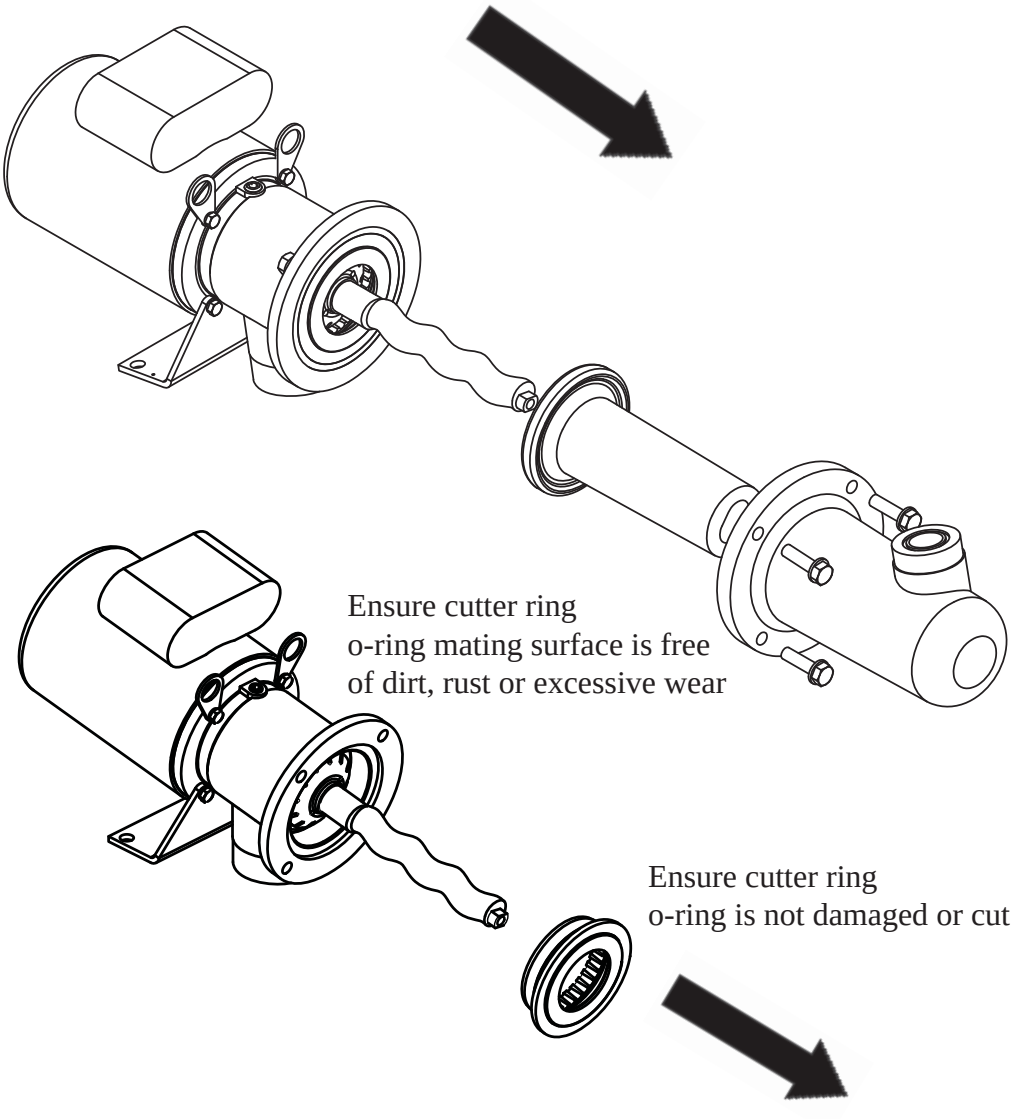
Maintenance

Pump Disassembly

Caution: Ensure that motor has been disconnected from any power supply before commencing any work.

Caution: Pump may contain sharps ie needles. Ensure that suitable protective gloves for sharps are worn while working on pump.

Caution: Pump may contain human effluent. Ensure that suitable protection is worn during maintenance.



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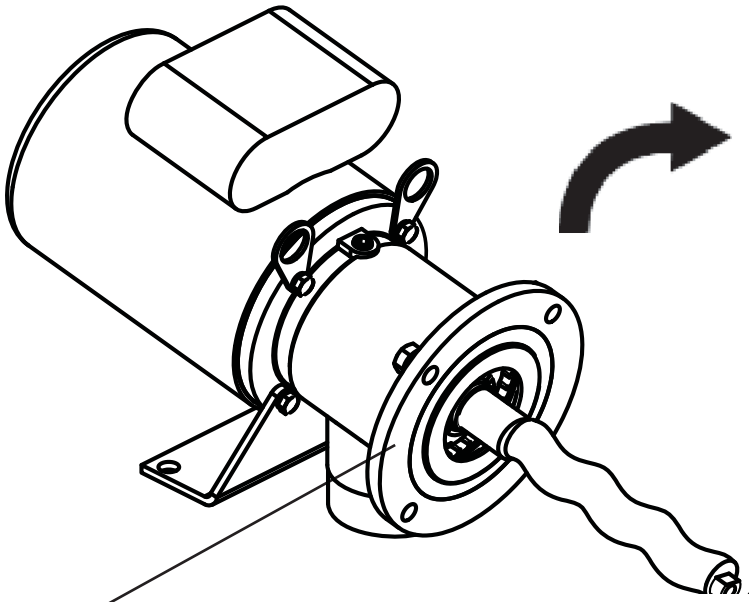
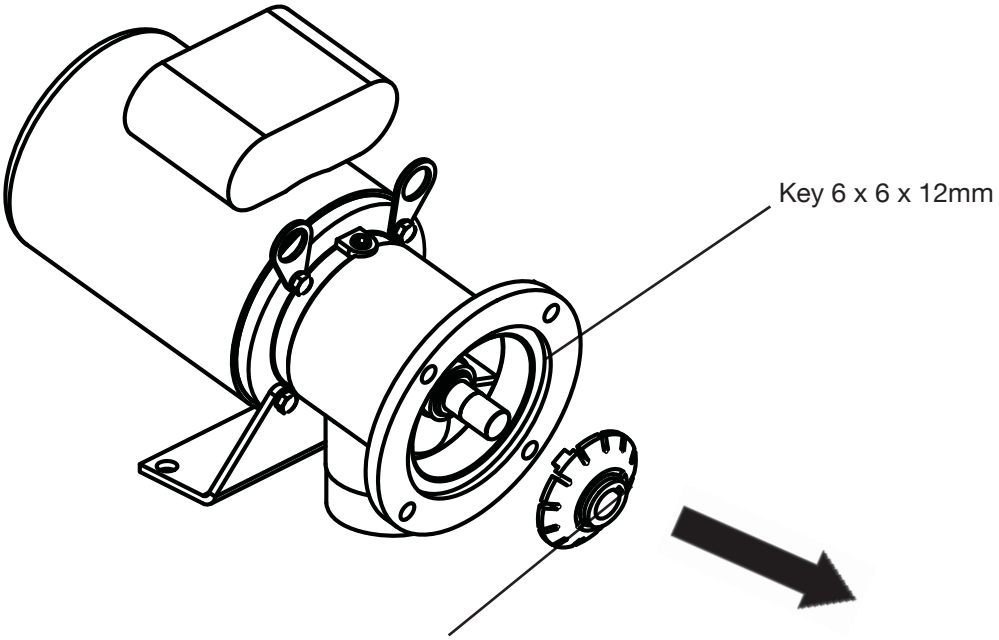


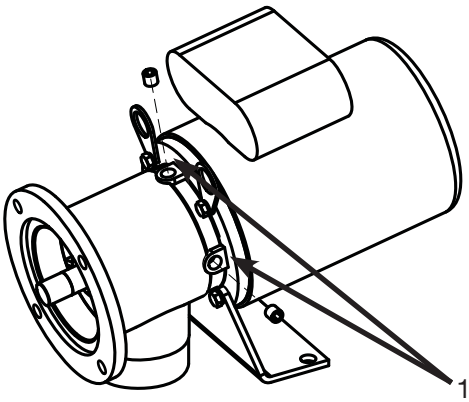
Hold cutter to remove rotor.
Cutter can be held with screw driver against the internal shroud.
Note: Left hand thread on rotor.



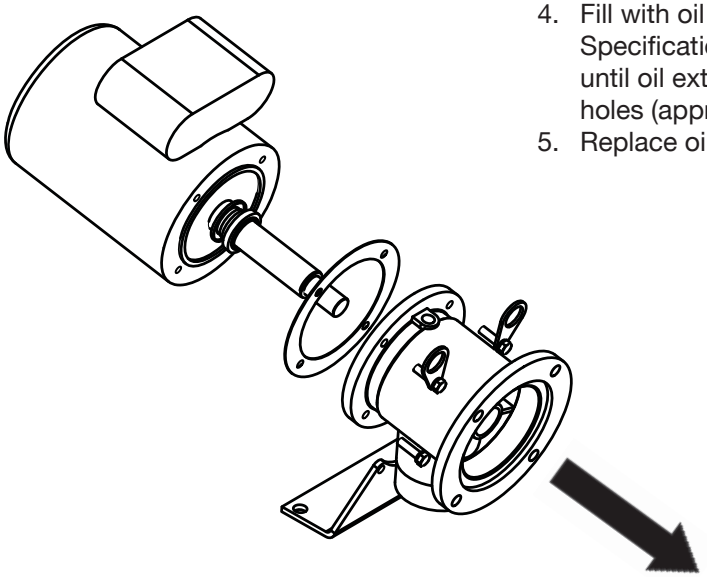
Use extraction bolts to remove cutter impeller.

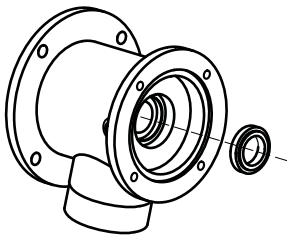
Maintenance

Caution: Mechanical seal is contained in an oil filled bath. Before suction chamber can be removed, the oil needs to be drained.



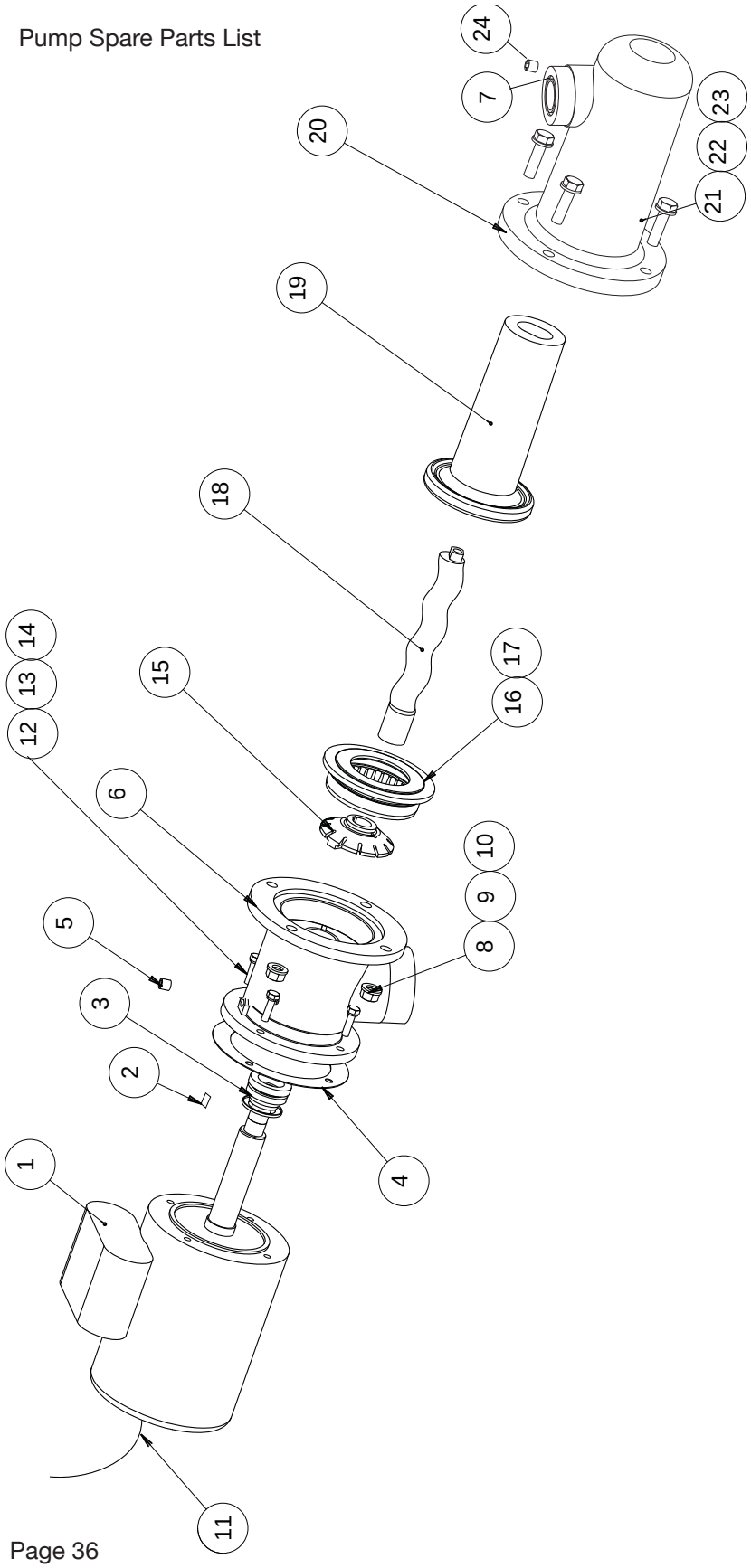
1. Remove oil fill plugs.
2. Turn pump on to its side to drain oil.
3. To refill, place pump upright.
4. Fill with oil (see Pump Specification for which type) until oil extrudes from the side holes (approx. 130mL).
5. Replace oil fill plugs.





Maintenance

Pump Spare Parts List



ITEM	DESCRIPTION	QTY	PART NUMBER
1	Motor 240V 1 Phase	1	GRIF-09301MTR
2	SQ KEY 6x5x14	1	K150614P
3	Mechanical Seal	1	OO CP800 1060
4	Gasket	1	GRIF 021
5	Plug 1/4”	2	P130210S
6	Suction Chamber	1	CD GRIF 071M
7	O-ring	1	AUX 6252
8	Washer M12 S/S	4	W115050F
9	Nut M12 S/S	4	N115100F
10	Spring Washer M12	4	W115251F
11	Electrical wire	1	SUN 23565-3
12	Washer M8 S/S	4	W113051F

ITEM	DESCRIPTION	QTY	PART NUMBER
13	M8 S/S Bolt	4	K113260F
14	Spring Washer	4	W113251F
15	Cutter Impeller	1	LE GRIF 024
16	Cutter Ring	1	TC GRIF 025
17	O Ring	1	GRIF 029
18	Rotor HCP	1	SF G90 2530
19	Stator	1	RR G90 2200
20	Discharge Chamber	1	CD GRIF 075M
21	M12 Bolt	4	F115300F
22	Washer M12 S/S	4	W115050F
23	Spring Washer M12	4	W115251F
24	Plug 1/4”	1	P130210S

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Fault Finding

Fault Finding

Warning: Failure to respond to a flashing strobe/audible alarm, will result in damage to the PSS EMS 2-80 system.

It is recommended that a PSS handheld display unit is used to help the operator determine and repair settings for the PSS EMS 2-80 system.

SYMPTOM	CAUSE OF TROUBLE	CHECKING PROCEDURE	CORRECTIVE ACTION
Flashing strobe/ audible alarm	High level probe has been activated.	Check the sewage level in the tank to ensure that the tank is not full. Check that the pump/s are able to handle the flow coming into the tank. If water level is not past the high level probe, check that the level sensors are working as per this manual.	If tank is full, stop all water use. If tank is above high level sensor but is not full, minimise water usage as there is 1380L emergency storage in tank. Rewire the level sensors as per this manual.
		Check that the pump/s are working.	Pull out the pump and replace or repair.
	Pump/s have exceeded maximum current trips. This is most likely due to over pressure in the discharge line.	Check to ensure that there is no closed valves on the pump's discharge lines. Check to ensure that there is no closed valves in the network.	Open all closed valves.
		Check discharge line or network for blockages.	Clear any blockages in the discharge line or network.
		Check that the cutters the pump are not jammed or blocked.	Pull out the pump and remove blockage.
		Check that the stator has not been run dry.	Pull out the pump and replace or repair.
		Check the setting in the controller for maximum number of current trip levels.	Return maximum number of current trip levels back to default factory settings.
	Pump/s have been running for too long.	Check that there is not too much water flowing into the tank.	If a large amount of water has been dumped into the sewer system, this can cause the pumps to run too long. Install a flow restrictor.
		Check that the pump is turning and producing flow.	Pull out the pump and replace or repair.
	Failing to respond to the flashing strobe or audible alarm.	Check the complete system (all pipework, level sensors, pump etc) for any damage.	Replace or repair system.
Increased pump running time/pump runs at reduced capacity.	Partial blockage of inlet.	Check discharge line or network for blockages.	Clear any blockages in the discharge line or network.
	Stator has been damaged.	Check the condition of the stator.	Pull out the pump and replace or repair.
Pump run light is flashing.	Motor not connected, motor faulty OR faulty wiring.	Check to ensure motor is wired to controller correctly as per installation instructions and check for lose wiring in the controller.	If motor is wired to controller correctly and no lose wires re found and the PUMP RUN light continues to "flash" replace the motor.

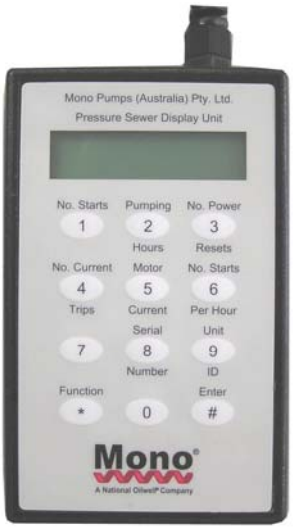
Fault Finding

SYMPTOM	CAUSE OF TROUBLE	CHECKING PROCEDURE	CORRECTIVE ACTION
Warning light on controller is “ON”.	Current exceeds maximum number of current trips setting.	Check to ensure that there is no closed valves on the pump’s discharge line. Check to ensure that there is no closed valves in the network.	Open all closed valves.
		Check discharge line or network for blockages.	Clear any blockages in the discharge line or network.
		Check that the cutters in the pump are not jammed or blocked.	Pull out the pump and remove blockage.
		Check that the stator has not been run dry.	Pull out the pump and replace or repair.
		Check the setting in the controller for maximum number of current trip levels.	Return maximum number of current trip levels back to default factory settings.
		Check that there is not too much water flowing into the tank.	If a large amount of water is been dumped into the sewer system, then this can cause the pump to run too long. Install a flow restrictor.
		Check that the pump is turning and producing flow.	Pull out the pump and replace or repair.
	Maximum number of starts per hour has been exceeded.	Check the setting in the controller for maximum number of starts per hour.	Return maximum number of starts per hour back to default factory settings.
	Mono-Sense level sensor communication problems	Check level sensor wiring	Rewire level sensors, replace if fault persists.
Tank is full but pump does not turn on.	Level sensors are wired incorrectly.	Check the electrical connections of the level sensors as per this manual.	Rewire the level sensors as per this manual.
		Check that the level sensors are working as per this manual.	Rewire the level sensors as per this manual.
	Blocked level sensors.	Check sludge level in bottom of tank. Check the level sensor tube, nipple and line for any blockages.	Desluge the tank as per this manual. Clear level sensors of blockage.
	Air leaks in level sensor assembly.	Check the level sensor assembly for air leaks.	Replace level sensor assembly.
	Controller is not turned on.	Check that there is power to the controller.	Contact supply authority for correction.
	No power or incorrect voltage.	Voltage must be +/- 10% rated voltage.	Contact supply authority for correction and voltage symmetry.
	Defective wiring.	Check for loose or corroded connections.	Correct faulty wiring or connections.
Controller states that pump is running, but there is no discharge	Circuit breaker is in the “off” position.	Open controller and check circuit breaker.	Turn circuit breaker to the “on” position.
	Wiring of the motor plug or wiring of the motor is incorrect.	Check wiring of the motor plug as per this manual.	Correct faulty wiring or connections. If fault appears to be with the motor, contact your supply authority.
	Pump has dry run.	Pull the pump out and check the stator.	Replace the stator and clean up the rotor.
	Pump motor is turning but there is no discharge.	Pull the pump out and check the internal parts of the pump.	Pull out the pump and replace or repair.
	Air leaks are present in the suction pipework.	Check for water noise running back down the suction pipework when the pump is stopped.	Tighten hose clamps ensuring that there are no air leaks at this point.

Optional Accessories

PSS Handheld Display Unit

Part No.: PSS DISP UNIT



The PSS handheld display unit is an optional accessory that allows the operator to extract data and change software settings within the Pressure Sewer Controller.

The PSS handheld display unit is powered either from the Pressure Sewer Controller or a 9 volt battery. If the Pressure Sewer Controller is running the display unit takes power from the controller. If the Pressure Sewer Controller is not connected to power, the PSS handheld display unit will run off the internal battery, provided that the battery is not flat. Provided that there is battery power, the PSS handheld display unit will also power up the microprocessor on the Pressure Sewer Controller so that settings can be changed without the controller being connected to mains power.

The PSS handheld display unit has two sets of functions, primary and secondary. The primary functions will give actual information on the PSS EMS 2-60 system. The secondary functions allows the operator to change certain functions of the Pressure Sewer Controller software.

Primary Functions

To access the primary functions, press the number key then enter.

Number Key	Primary Function
1	Number of Starts
2	Hours Run (Pump)
3	Number of Power Resets
4	Number of Current Trips
5	Motor Amps
6	Number of Starts per Hour
7	Number of High Levels
8	Serial Number and Date of Manufacture of the Pressure Sewer Controller
9	Unit ID of the Pump Display Unit
20	Read tank level, measured from bottom of Mono-Sense level sensor (if installed)
21	Number of Mono-Sense Level Sensor failures detected

Secondary Functions

Caution: Secondary functions should only be changed by an experienced operator, as changing the settings from the factory defaults could cause damage to the PSS EMS 2-80 system.

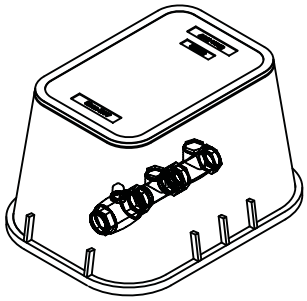
To access the secondary functions, press:

- * key
- Number key for the function to be changed.
- Enter
- New Value (that this function is to be changed too)
- Enter

Number Key	Secondary Function
1	Motor Trip Amps
2	Motor Trip Reset Time (minutes)
3	Motor Trip Maximum (No. of current trips allowed before alarm)
4	Audible Alarm Time (minutes)
5	Level Delay Time (seconds)
6	Maximum Run Time
7	Maximum Starts/Hour
8	Motor Cool Down Time
9	Set Defaults (1 = Return back to factory settings)

Optional Accessories

Boundary Kit



The boundary kit is an optional accessory, that allows an operator to isolate an individual property from the common sewerage network. The boundary kit contains a boundary kit box with a stainless steel lockable ball valve and check valve.

The boundary kit is installed between the main pressure network and the PSS EMS 2-80 system. When work is required on the PSS EMS 2-80 system and/or property, the lockable ball valve in the boundary kit can be turned into the off position preventing sewage from the common network flowing back into the PSS Eco 2-80 tank.

Materials

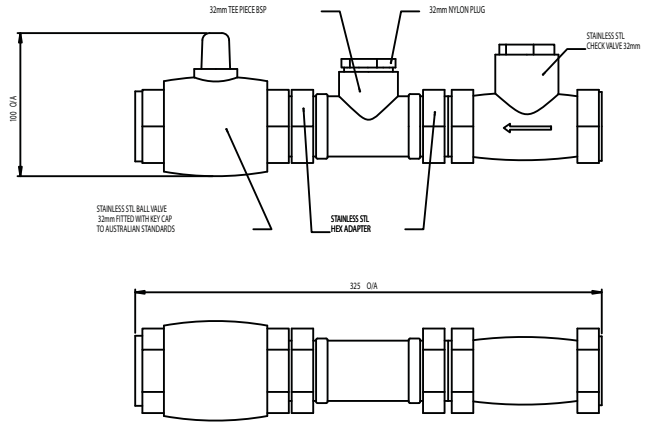
Boundary Kit Box:	Black LDPE
Lockable Ball Valve:	316 stainless steel
Hex Nipple:	316 stainless steel
Check Valve:	316 stainless steel

Environmental

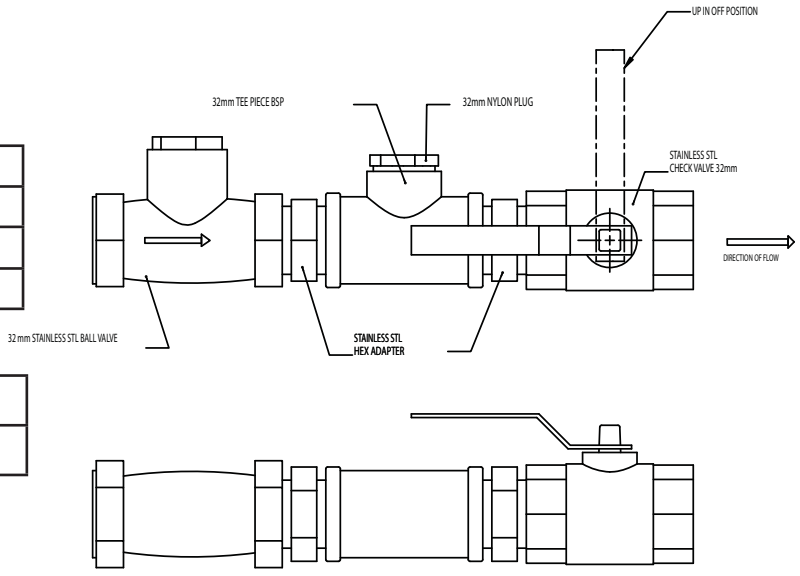
Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-10 to 50 deg C

Boundary Kit Dimensions

PSS-BK4



PSS-BK5



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Optional Accessories

Telemetry Options

Mono Pumps has an extensive range of telemetry options that can be added to the standard PSS EMS 2-80 system. These telemetry options can be individually tailored to your requirements.

For all inquiries with regards to this option, please contact Mono Pumps.

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