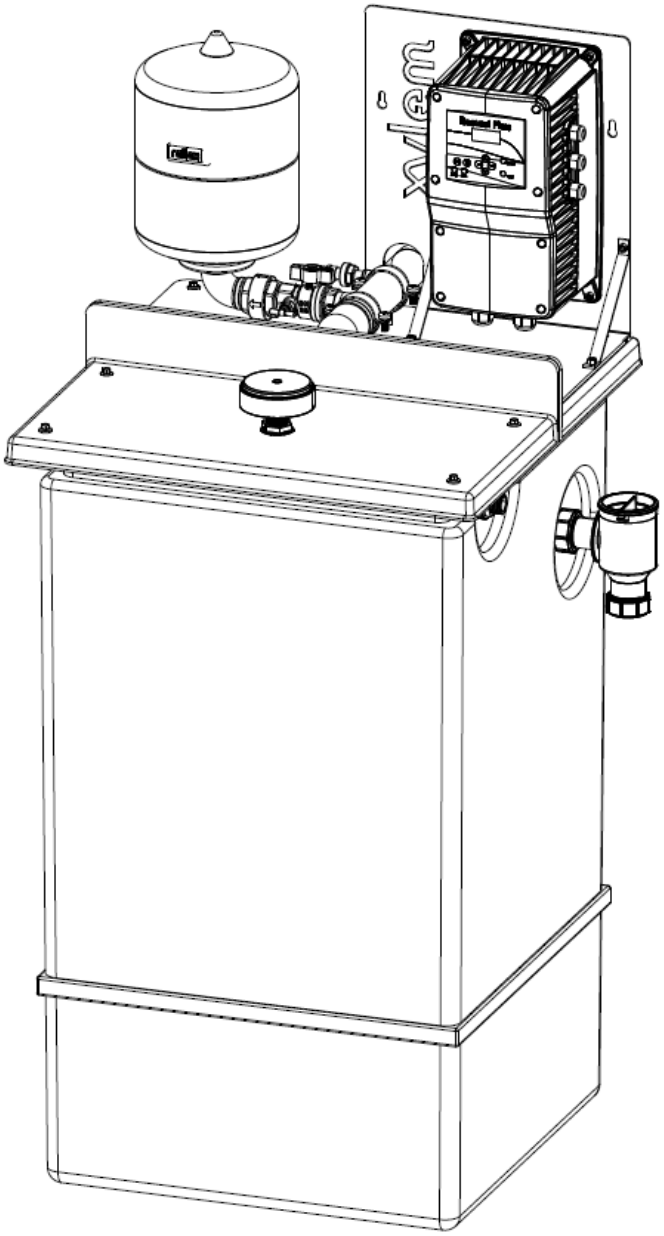
# Resvari Plus Break Tank Booster Set

Instructions Date: Dec 2021

## Operating and Maintenance Instructions



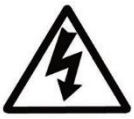
# 0. Table of Contents

# 1. Introduction & Safety

**1.1 Introduction**
This manual contains information to enable the safe installation and operation of the products mentioned above. The following instructions must be read and understood by all persons responsible for the installation, operation and maintenance of this product. Safety instruction where noncompliance would affect safety.

**1.2 Warning Symbols**

Safety instruction where noncompliance would affect safety.



Safety instruction where electrical hazard is involved.

Safety instruction where noncompliance could cause damage to the equipment.

**1.3 Instruction for safe use**

This product has been designed for boosting cold water in potable water installations to the operating conditions shown. This product should not be installed until this leaflet has been studied carefully. Handling, transportation and installation of this equipment should only take place with the proper use of lifting equipment. This product must be stored in a dry frost-free, environment.

**1.4 Warning to Inexperienced users**

This product must be operated by qualified personnel only. Be aware of the following precautions:

This product is not to be used by anyone impaired by physical or mental disabilities, or anyone without the relevant experience and knowledge, unless they have received instructions on using the equipment and on the associated risks or are supervised by a responsible person.

Children must be supervised to ensure that they do not play on or around the product.

**1.5 Protection of the environment**

Disposal of packing and product
Comply with the current regulations on sorted waste disposal

Leaking of Fluid

The unit contains a small quantity of lubricant oil: Always put in place the necessary measures to ensure that any spilled lubricant doesn't not disperse in the environment

***WARNING***

It is prohibited to dispose of lubricating fluids and other hazardous substances in the environment

# 2. Handling and Storage

**2.1 Packaging**

The domestic booster set is dispatched mounted on a wooden pallet and covered in a protective film; it is recommended that the unit be retained in the protective packaging until the product is to be installed. The unit will arrive pre-packaged and wired ready for installation.

**2.2 Unit inspection Upon Delivery**

This product has been fully run tested at our works under simulated site conditions. The unit should be thoroughly checked for physical damage that may have been caused during transit. If the unit is found to have damage it must be reported immediately and should not be installed

**2.3 Unit Handling**

Handling, transportation and installation of this equipment should only take place with the proper use of lifting equipment.

Use crane, ropes, lifting straps, hooks and claps that comply with the current regulations and that are suitable for the specific use. Due to the size of the unit, it is recommended that two engineers maneuver the Resvari Plus into place. Make sure that the harnessing does not hit and / or damage the unit

During handling, make sure to avoid injury to people or animals, and/or damage to property

**2.4 Storage**

The unit must be stored:

- In a covered and dry place
- Away from heat sources
- Protected from dirt
- Protected from vibrations
- At and ambient temperature between -5°c and +50°c and relative humidity between 5% and 95%

Do not place heavy loads on top of the unit
Protection the unit from collisions

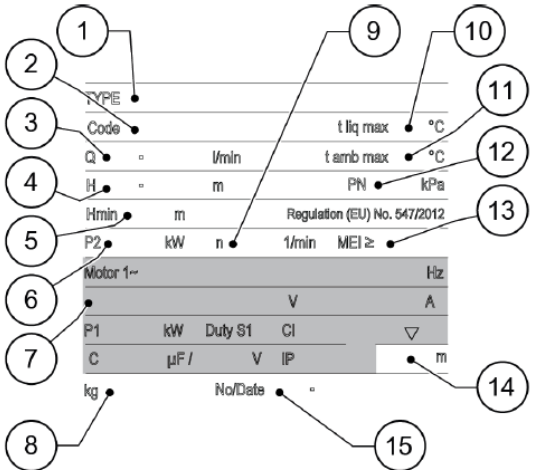
# 3. Technical Description

### 3.1 Designation
The Resvari plus is a cold water, variable speed break tank booster set

### 3.2 Data plate
On the Resvari Plus, there will be two Name plates on the unit. One supplying information for the Scuba pump installed inside the tank and the other is the Model data for the Resvari Plus booster set. The labels will be located on the “Bottom Plate”, in the bottom right position. Please see exploded parts diagram for indication of each component

#### 3.2.1 Scuba Pump Data Plate

Warning:
Information stated on the pump data plate is only relevant for the pump. For installation conditions such as maximum operating temperature, please refer to the Resvari Plus data plate




| Position Number | Description | Position Number | Description |
|---|---|---|---|
| 1 | Pump unit type | 9 | Rated speed |
| 2 | Pump unit Code | 10 | Maximum liquid temp |
| 3 | Flow rate | 11 | Maximum ambient |
| 4 | Pressure produced | 12 | Maximum operating pressure |
| 5 | Minimum head | 13 | Minimum efficiency index MEI |
| 6 | Rated output | 14 | Maximum immersion depth |
| 7 | Motor characteristics | 15 | Serial number + manufacturing date |
| 8 | Weight | | |

### 3.2.2 Resvari Plus Data Plate

| | |
|---|---|
| Part number | UKRESVARI250330 |
| Model: | RESVARI PLUS 250 3-3 |
| Power Rating: | 0.55kw |
| Supply Voltage | 240V-1PH-50HZ |
| Full Load Current | 12 A |
| IP Rating | IP54 |
| Max Ambient Temp: | 50°c |
| Lot Number: | |
| Shop Order Number: | |

| Label | Description | Label | Description |
|---|---|---|---|
| Part number | Set part number | IP Rating | IP Rating of the set – including the drive |
| Model | Set model reference | Max Ambient temp | IP Rating of the set – including the drive |
| Power Rating | Set power rating (total) | Lot Number | Internal use only |
| Supply Voltage | Set supply voltage, (Voltage, phase and speed hzs) | Shop order number | Internal use only |
| Full Load Current | Full load current of the unit – this may differ from the pump FLC | | |

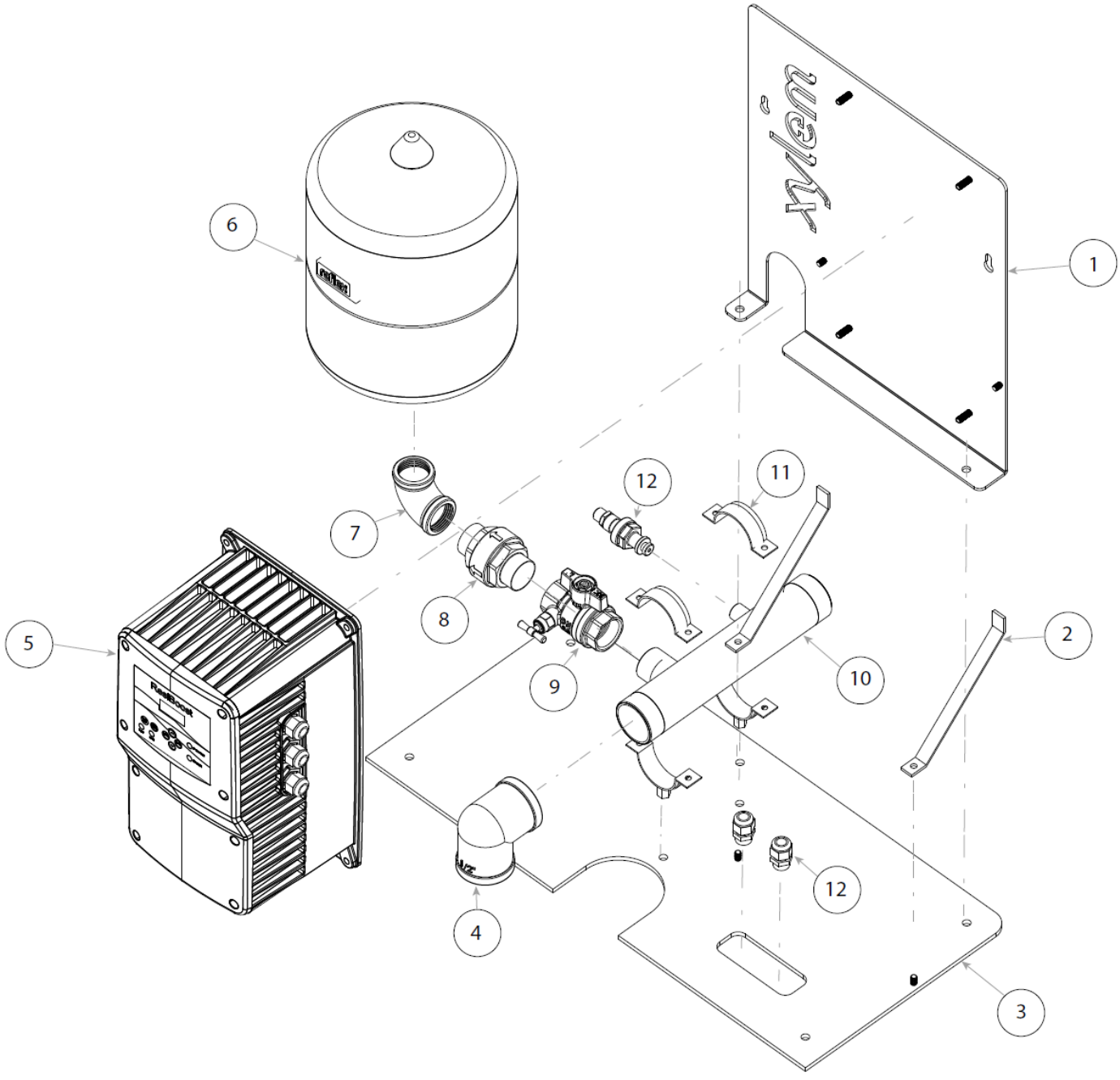
### 3.3 Identification Code / Nomenclature

Example:
Resvari Plus 250 5-3

| Reference | Description |
|---|---|
| Resvari Plus | Product range name |
| 250 | Nominal Size of the Break tank in litres |
| 5 | Flow rate at BEP (Best Efficiency Point) produced by the pump |
| 3 | Pressure at BEP (Best Efficiency Point) produced by the pump |

**3.4 Names of the Main Components / Exploded parts**
For procurement of spare parts or exploded parts diagram, please contact the sales office

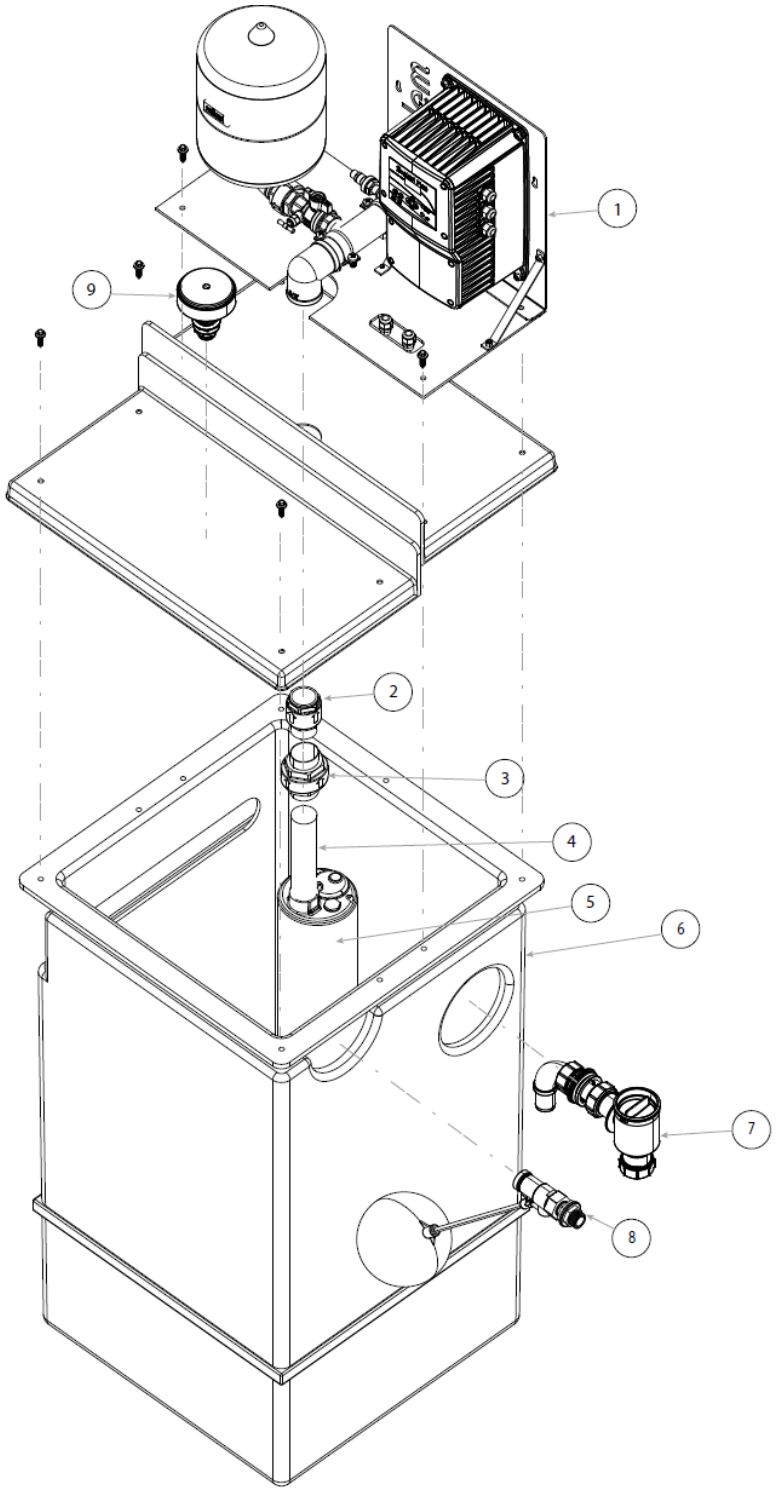
**3.4.1 Resvari Plus Head:**




| Position | Description |
|---|---|
| 1 | Back Bracket |
| 2 | Side Bracket |
| 3 | Bottom Plate |
| 4 | Delivery elbow |
| 5 | Resvari Plus Drive |
| 6 | Pressure vessel – 10 bar, 8 litre |
| 7 | Vessel Elbow |
| 8 | Union 1” |

| | |
|---|---|
| 9 | Pressure vessel Isolation and drain valve |
| 10 | 1 1/4” Stainless Steel manifold |
| 11 | Pipe bracket |
| 12 | Pressure Transducer |
| 13 | Cable glands |

### 3.4.2 Resvari Plus 250 Complete



| Position | Description |
|---|---|
| 1 | Resvari Plus Head |
| 2 | Non return valve |
| 3 | 1 ¼" Union |
| 4 | Copper Riser |
| 5 | Scuba Pump |
| 6 | Break tank |
| 7 | Tank overflow |
| 8 | Float valve |
| 9 | Tank Breather |

**3.5 Intended use**

Typical applications include:

- Boosted cold water supply for use in domestic and light commercial environments
- Boosting cold water for tap outlets in Schools, science labs, nurseries
- Use as a washdown set, for example for vehicles, bin stores, milking parlors etc
- Boosting cold water for agriculture and irrigation applications for example supply water for water troughs

Pump liquids

- Clean
- Cold to medium temperature (Not exceeding 40c)
- Free of solids particle or fibers
- Chemically and mechanically nonaggressive
- Non-flammable

**3.6 Improper use**

WARNING:
The unit was designed and built for the use described in the Intended Use Section. Any other uses are prohibited, as they could compromise the safety of the user and the efficiency of the unit itself. For more information, please contact the sales office

DANGER
It is prohibited to use this unit to pump flammable and/or explosive liquids

***DANGER***: Potentially explosive atmosphere hazard
It is prohibited to start and run the unit in environments with potentially explosive atmospheres or with combustible dust.

Examples of improper use:

- Pumping Liquids not compatible with construction materials of the unit
- Pumping hazardous, toxic, explosive, flammable or corrosive liquids
- Pumping drinking liquids other than water, for example wine or milk
- Pumping liquids containing abrasive, solid or fibrous substances
- Using the unit for flow rates exceeding the flow rate indicated in the date plate

Examples of improper installation

- Explosive and corrosive atmospheres
- Areas which exceeded the ambient temperature rated for the product
- Areas that are exposed to the elements and direct sunlight. For information of installation environments please see section 4

# 4. Installation

**4.1 Precautions**

Before starting, make sure the safety instructions shown in the Introduction and Safety on page 4 have been fully read and understood

DANGER:
All the Hydraulic and electrical connections must be completed by a technician or engineer possessing the technical- professional requirements outlined in the current regulations

***DANGER***: Potentially explosive atmosphere Hazard
It is prohibited to start and run the unit in environments with potentially explosive atmospheres or with combustible dust.

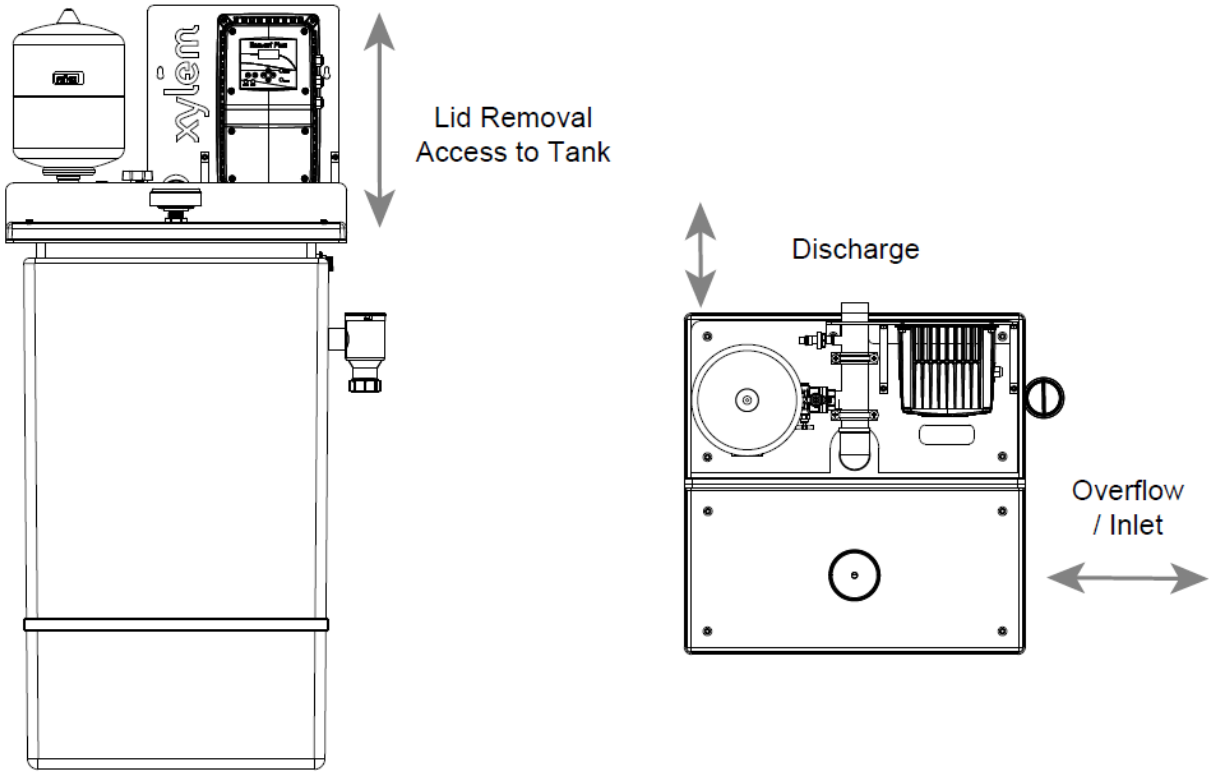
WARNING:
Always wear personal protective equipment

WARNING:
Always use suitable working tools

WARNING:
When selecting the place of installation and connecting the unit to the hydraulic and electric power supplies, strictly comply with current regulations

**4.2 Installation Considerations**

When installing the Resvari Plus. Please ensure that there is enough room above the tank to allow for the removal of the split lid and to access inside the tank for maintained of the pump, float switch or float valve. It is also recommended to allow for enough room behind and to the right of the tank for the pipework connections into and from the Resvari Plus unit.



**4.3 Installation area**

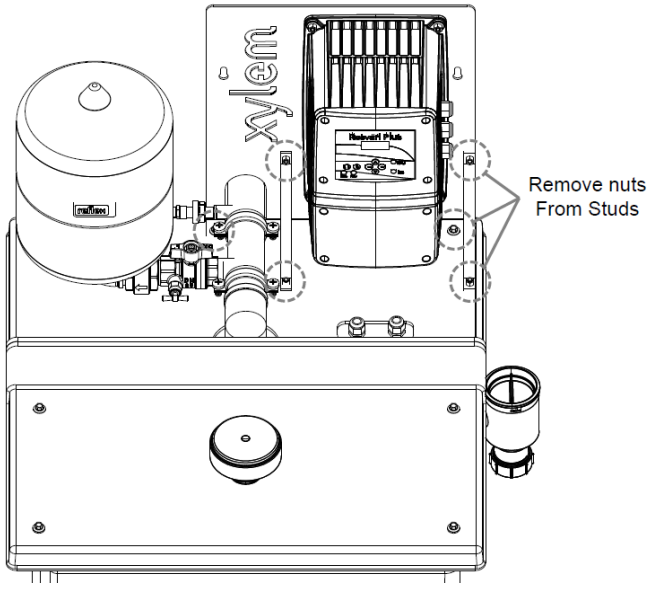
- Follow the provision in Operating environment see section 8.1
- Check that the area you chosen to install the Resvari plus is level, flat surface that is structurally sound
- It is recommended to position the Resvari Plus unit away from any walkways to avoid obscuring access
- Please take into account space around and above the unit for maintenance.
- In the extremely unusual circumstances where the float valve and plumbed overflow was to fail / block, water may overflow from the weir on the left-hand side of the tank. Please ensure provisions are made to ensure water can be drained or pumped away from the area to avoid flooding
- The unit should be sited in a dry frost-free environment

**4.4 Alternative Installation Set ups**

Please note:
This alternative installation method is not compulsory and gives the installer another option to the traditional installation method

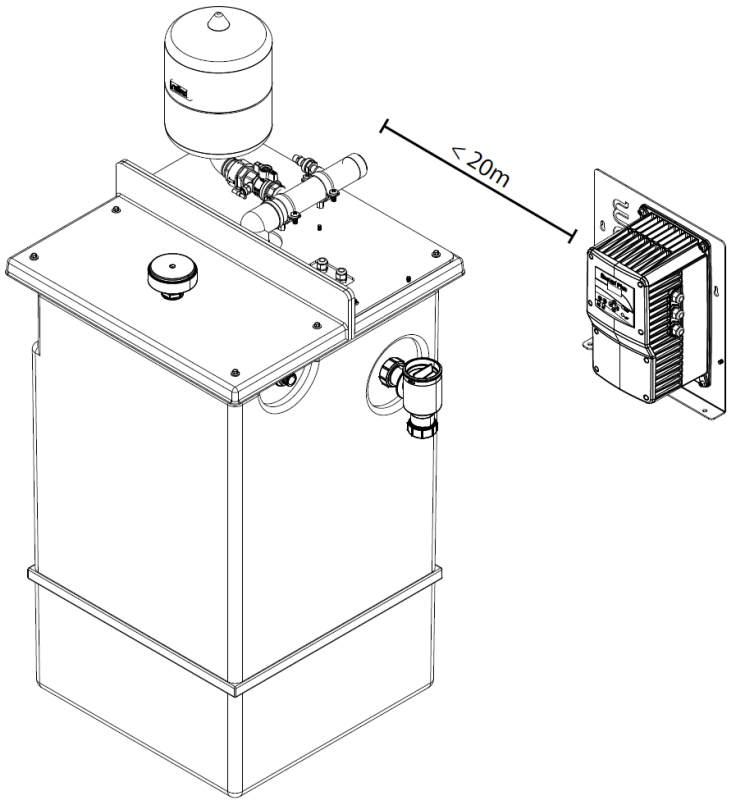
The Resvari Plus is designed for Flexible Installations enabling the installer to remove the back bracket (which holds the variable speed drive) and fit to a wall away from the tank. This is beneficial for applications where the Resvari Plus is installed in a space which has limited access for monitoring and modified the parameters of the drive.

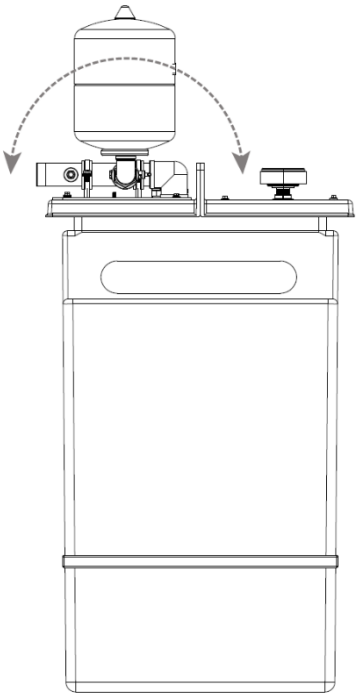
The back bracket can be detached from the bottom plate by removing the side brackets (2 nuts on the back bracket and a further 2 on bottom plate) and the 2 bolts which attach the back bracket to the bottom plate using the tabs. Please see the below diagram for the nut locations




Once the bracket is removed from the bottom plate, you will need to ensure that the cables for the float switch, transducer and power to Scuba pump are long enough. The Scuba pump will come with 20 meters of cable already attached.

Please note:
It is not advised to exceed the distance greater than 20m between the pump and drive. A longer distance may affect the longevity and performance of the variable speed drive and pump. Please see below diagram

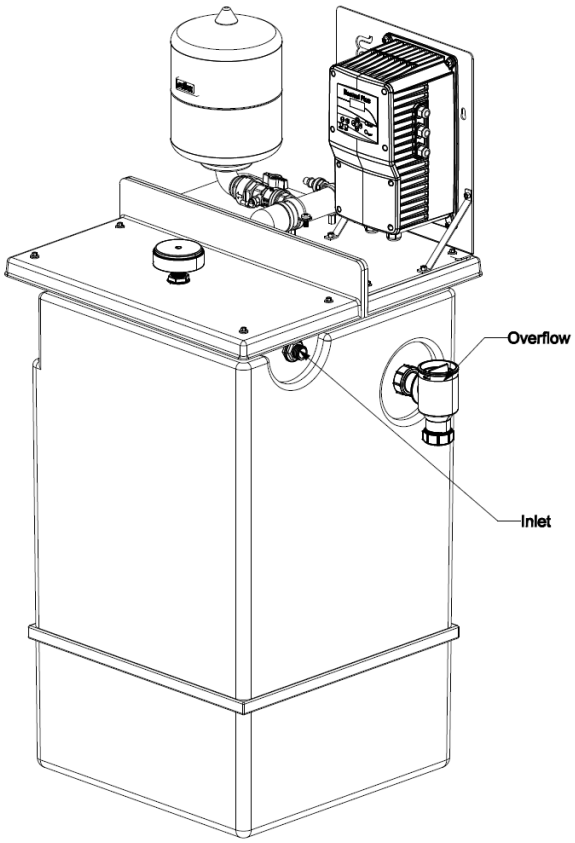


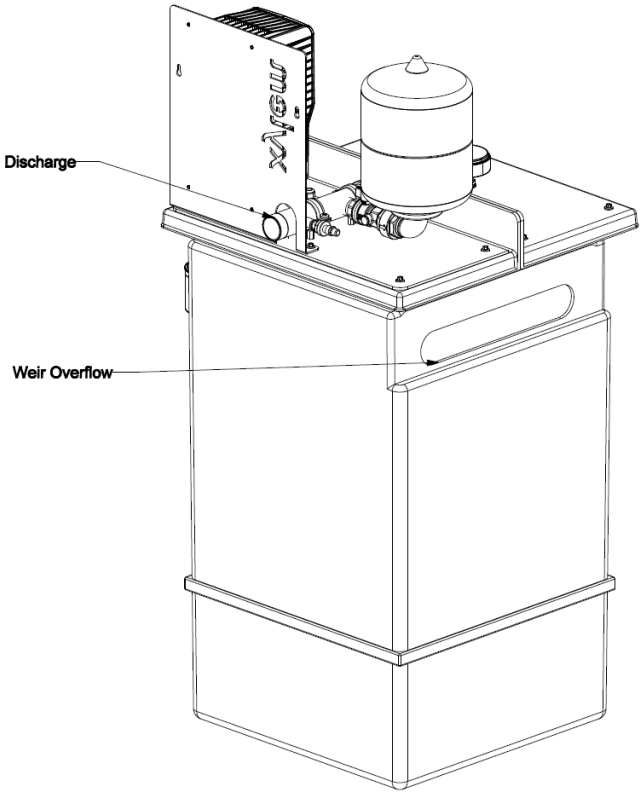



If the installer wishes to reduce the height of the Resvari Plus further, the union between the pressure vessel and stainless manifold can be adjusted to position the vessel at a slight angle reducing the total height of the Resvari Plus

Please note:
If the union is to be readjusted, please ensure the union halves are reconnected correct to avoid any leaks from the pipework

**4.5 Hydraulic connection**




DANGER
All the Hydraulic and electrical connections must be completed by a technician or engineer possessing the technical-professional requirements outlined in the current regulations.

**4.5.1 Tank inlet**

Connect the domestic booster water inlet 22mm compression (right side of tank) to a suitable water supply. It is advisable to fit an external isolation valve for added ease of maintenance. If the pressure available at the ball valve is below 0.3 bar, a low-pressure orifice must be obtained and fitted. Ensure that the water flowing into the tank has be filtered correctly to avoid fine solids from entering the break tank.

**4.5.2 Overflow**

It is the responsibility of the installer to ensure that the overflow is able to keep up with the incoming water volume, if this is not the case then a pressure reducing valve should be fitted to reduce the incoming mains water volume.
Extend the 22mm plastic overflow pipe from the side of the unit to a position where an overflow will be noticed and rectified.

**4.5.3 Weir overflow**

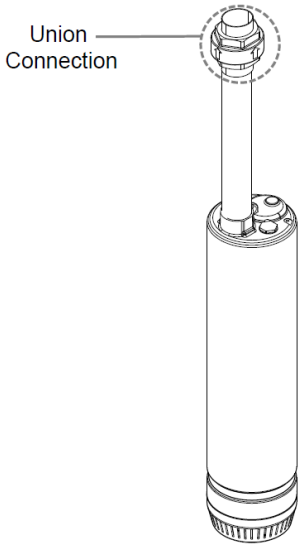
The Break tank is constructed to have a weir slot as required by the water bylaws to prevent back flow contamination, if the inlet float valve or NRV suffered a catastrophic failure the overflow may not be able to keep up with the inflow in which case excess water will be ejected through the weir slot and onto the plant room floor, if this is not acceptable then consideration should be given to fitting the Resvari Plus onto a tray with overflow to drain.

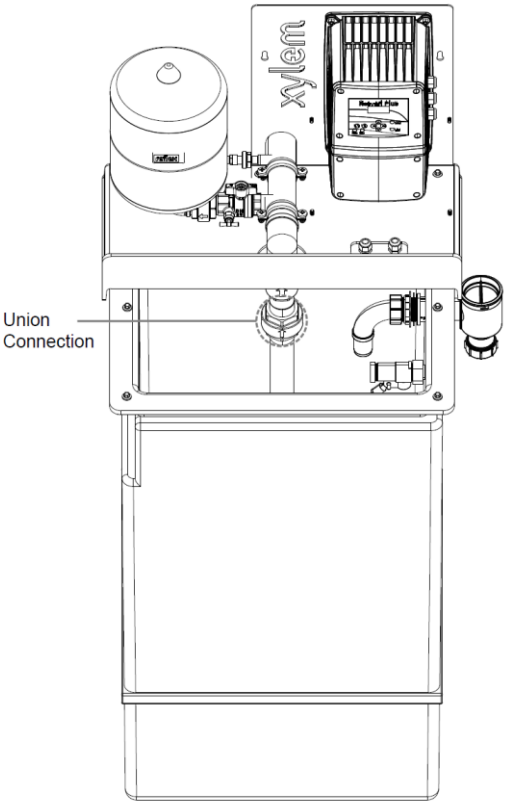
### 4.5.4 Outlet / Discharge connection

Connect the Resvari plus booster set discharge connection located at the rear of the unit. The connection is 28mm (11/4") male threaded. It is advised to fit an external isolation valve after the set for added ease of maintenance

***DANGER***: Electrical Hazard
Holding and lowering the Scuba Pump by the power supply cord is strictly forbidden

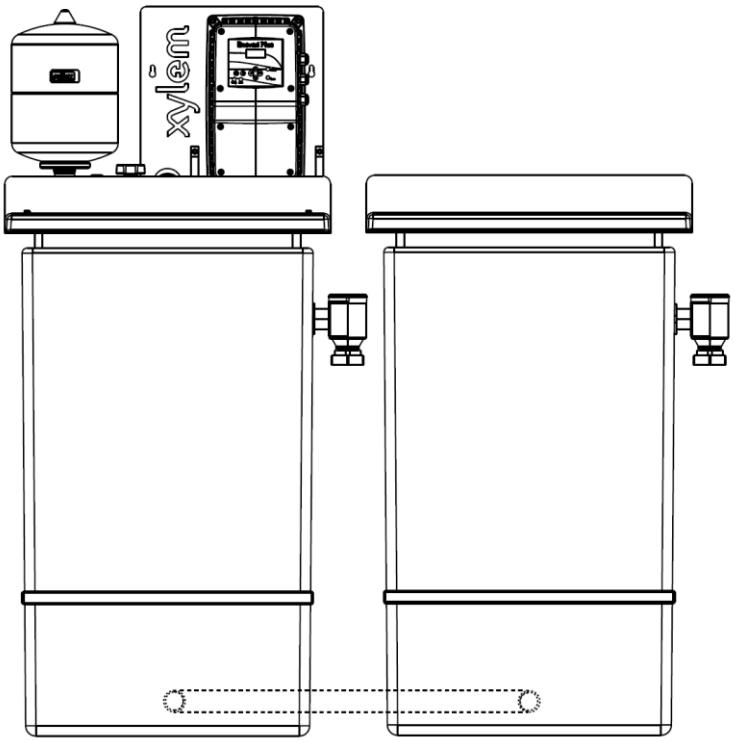
### 4.5.5 Connecting the Scuba pump the discharge pipework




To avoid damage both the internal of the tank and the Scuba pump while in transport, the pump will come separately along with a length of pipework with union connection on the end. Once the unit is securely in place, open the top access hatch and lower the pump with the pipework into the bottom of the tank. Place the bottom of the pump on the floor on tank and position the unit so that the both halves of the union (Union half on the Resvari Head and union on the pump discharge pipe). The pump should be position in that the back of the pump (with the cables exiting the unit) is facing the back of the tank). Tighten the two halves of the union and ensure that there is secure connection.

### 4.5.6 Connecting a Resvari Plus Assist tank




For applications that required additional storage, it is possible to connect an additional 250 litre (nominal volume) break tank to the Resvari Plus Unit. The Resvari Plus Assist unit can be purchased from Lowara UK as a kit which includes a 250 litre break tank, ball float valve on the inlet, and overflow, two elbows, two tank connectors and a 2-meter length of 35mm copper pipework. The pipework and accessories come loose alongside the tank for the installer to fit to suit the application.

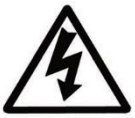
Although you can cut a hole out of the tank in any position, we recommend drilling the connection hole from the bottom back of the tank where there is a section of tank without any insulation, referred to as a pad. Drill a hole in the tank, fit the tank connector and elbow to the back of each unit and position the two tanks so that they are parallel to each other. Cut the pipework to suit the length between the unit and install the pipework using the compression connection on the elbow.

As the ball valve is supplied with assist tank, the installer has the option to plumb in an inlet to each tank. We recommend this to encourage the usage of water from both tanks. If in doubt, please refer to your local water quality guidance.

It is also advised to fit the piped overflow for each tank to ensure it meets backflow prevention recommendations

### 4.6 Electrical connections

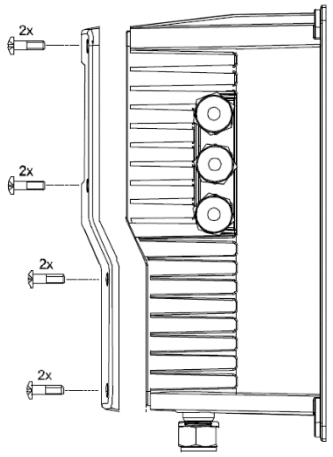
DANGER
All the Hydraulic and electrical connections must be completed by a technician or engineer possessing the technical-professional requirements outlined in the current regulations



DANGER
Before starting work, check that the unit is unplugged and that Resvari Plus unit cannot restart, even unintentionally
Never operate this product with the inverter front panel removed. Wait at least 5 minutes before removing front panel after operation.
It is essential that this equipment is earthed to the building earth system. Pump operates at 230v 50Hz.

### 4.6.1 Removing the front cover

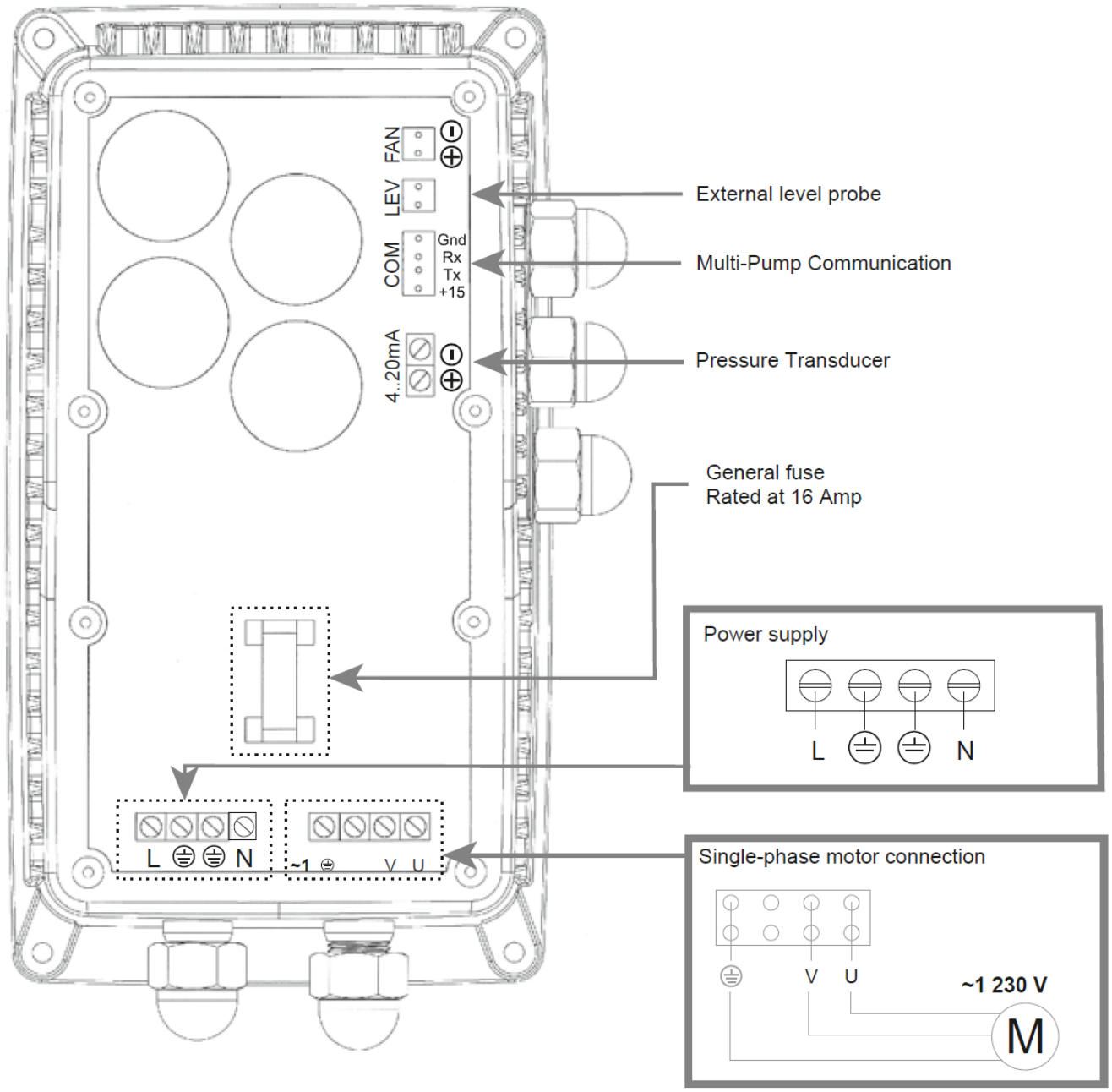
Remove the front panel from the drive, loosening and remove the 8 screws holding the blue front panel to the black plastic housing. This is shown on the below diagram.




### 4.6.2 Terminals connections

Below is the diagram showing the different available within the drive. To access these terminals, the blue front cover will need to be removed

**See Next Page**




| Label | Pre-Wired | Description |
|---|---|---|
| External Level Control | Yes | This is the connection to the Float switch present inside the tank |
| Multi-Pump Communication | No | Terminals used for Mutli-Pump control between two Resvari Plus units |
| Pressure Transducer | Yes | Terminals used to supply the signal from the Pressure transducer |
| Power Supply | Yes, Cable is provided | 240-volt power supply to the drive |
| Single phase motor connection | Yes, with 20 meters of cable | Single phase connection to the Scuba pump located inside the tank |
| Fan | Yes | Power supply to the cooling fan located on the back of the drive, underneath the heat sink |

### 4.6.3 Supplying the Drive with Power

Once the panel is removed, feed the supply cable through the bottom Left entry (Shown as entry 1 in the below diagram). You may need to loosen off the cable gland nut. Make sure the supply cable is also threaded through metallic ring. Carry out any necessary preparation to the wired and screw them into the below marked terminals.

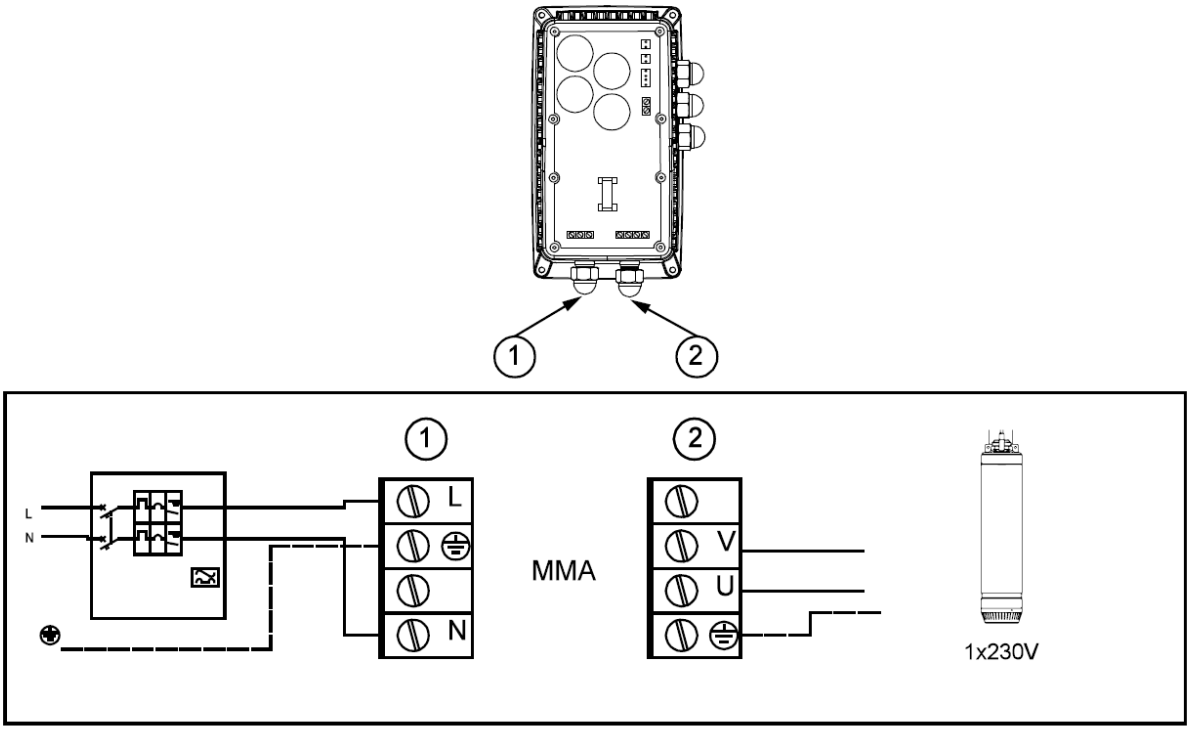
Once the connections are made, fix the front panel back into place. Make sure the front panel is secure before applying any power to the unit.

The cable used for the incoming supply must be of adequate size to carry the motor full load current. This is shown on the duty plate. The supply must provide thermal/short circuit protection, a high sensitivity differential switch (0.15 to 0.3A) is also recommended.
All connections must be made using the appropriate wiring drawings for the equipment being installed, with particular attention being paid to the supply voltages, shown on duty plate.

### 4.6.4 Shortening the cable to the Scuba Pump

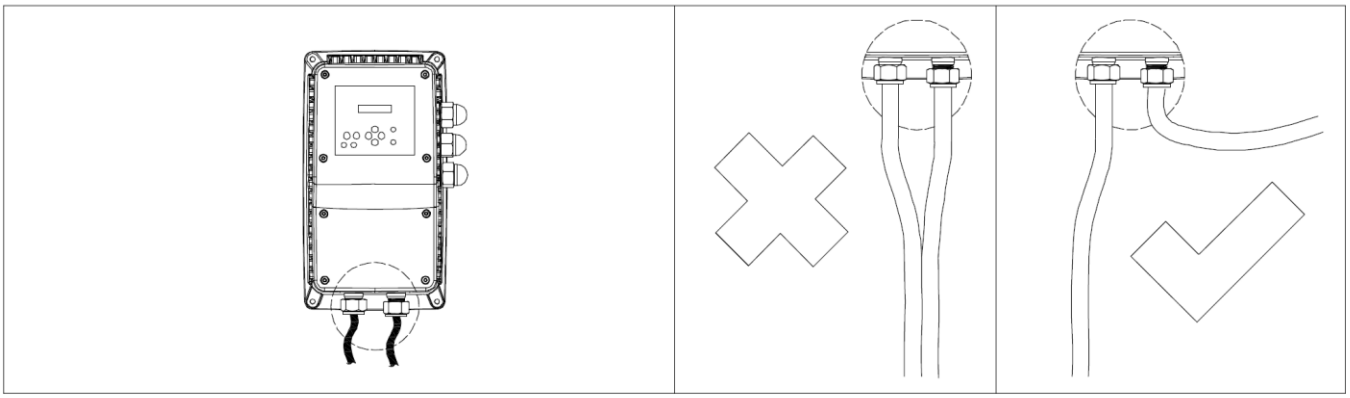
As standard, the unit will come with 20 meters of cable between the pump and drive. You may wish to reduce the length of cable to improve the practically and the athletics of the installation. As with the wiring of the supply to the unit: Remove the front panel from the drive, loosening and remove the 8 screws holding the blue front panel to the black plastic housing. This is shown on the above diagram.

The supply between the pump and drive can be found being feed through the entry on the bottom right of the drive (Shown as entry 2 in the below diagram). Remove the existing cable from the terminals, cut the cable to length, prepare the wired and rewire into the correct terminals



**4.6.5 Cabling recommendation**

You are advised not to tie the electrical supply cable (Shown as 1 above) and the pump supply cable (Shown as 2 above) together. The cables should be apart from each other to prevent electrical interference. Please see below diagram



DANGER:
Make sure the correct line protection is sized correctly for the Resvari Plus

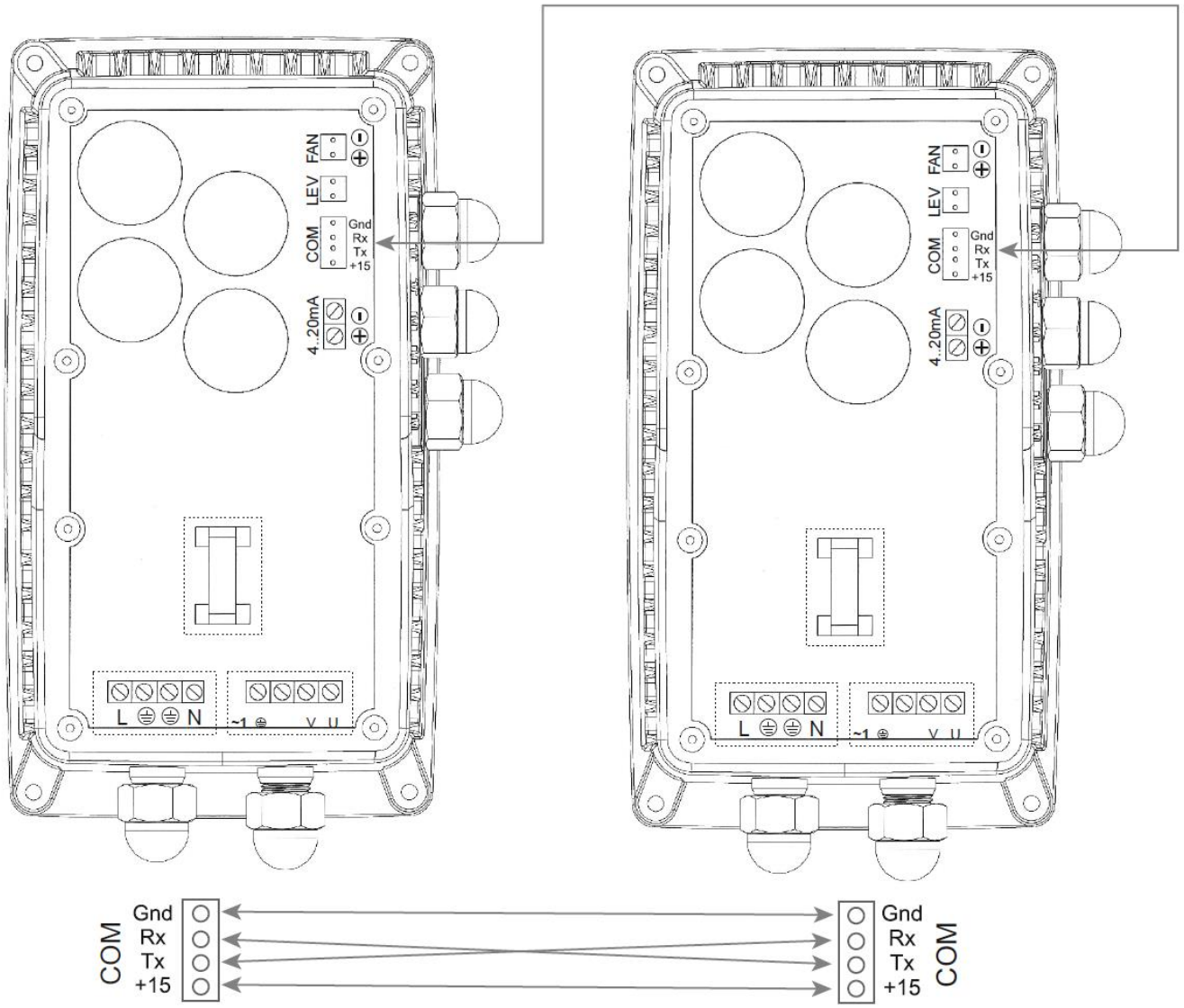
**4.6.6 Line Protection**

It is not recommended to wire a 3-pin plug to the Resvari Plus directly into a domestic electrical wall outlet. Please refer to your local electrical guidelines on supply protection. The Full Load Current of the Resvari Plus, must be taken into account when sizing the correct line protection. Any electrical work must be carried out by an experienced engineer / technician

**4.7 Multi Pump Use**

If a twin Resvari Plus configuration is used, a shielded cable needed to be wired between the two drives using the "Mutli-Pump Communication port". We recommend using the "RS485 Link Cable" (P/N UK0034190) available for sale from the Axminster sales office. If you wish to source your own cable, 4x0.25mm² Screened cable can be used

Please see below for the wiring diagram.




**Please note:** The Receive (Rx) and Transmit (Tx) wires need to be crossed, So that:

Rx on Drive 1 and Tx on Drive 2 are connected.
Tx on Drive 1 and Rx on Drive 2 are connected.

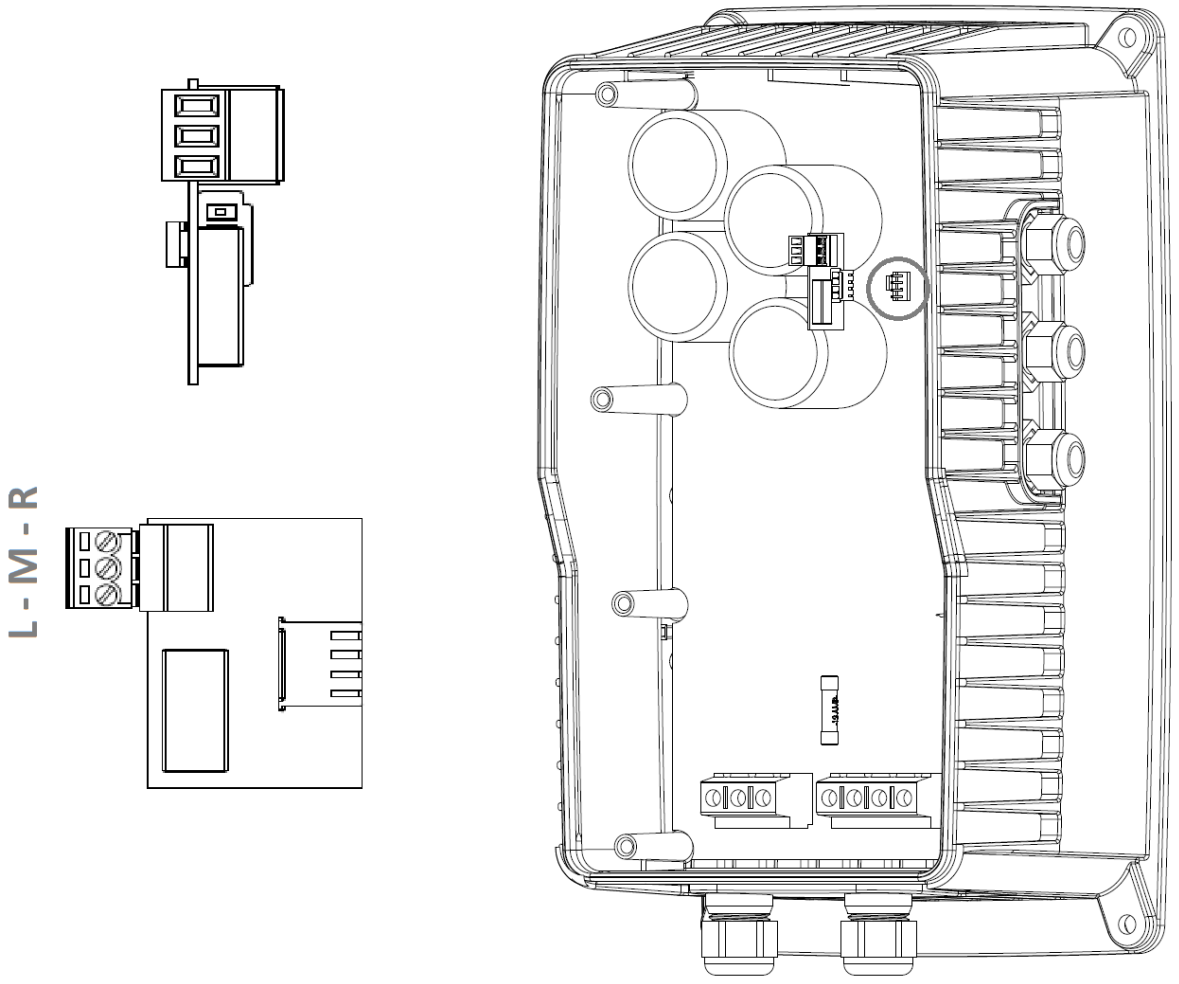
Once the there a link between the two drives, please refer to section 5.7 for information on how to commission the two drives for Master / Slave control

### 4.8 Optional Volt Free Relay

An additional plug in module to provide a volt free contact on fault is available for the Resvari Plus. The Module plugs into a free socket on the Resvari Plus drive PCB board (as seen in the below diagram). This module will close a contact in the event of with the option of Normally Open (NO) or Normally Closed (NC) circuits. This benefits the user as it allows the drive to send out a signal to a local BMS system or turn on a lamp / buzzer in the event of a fault. The Module is not fitted as standard and can be purchased using the following part number: UKRECH087

The Relay module plugs into a while 5 pin connection in-between the two capacitors on the right side of the control board. When connecting the relay board to the volt free circuit

Left screwed connection is Normally Closed
Middle screwed connection is common
Right screwed connection is Normally Open



# 5. Use and Operation

**5.1 Operation**

When a draw off point connected to the system is opened water will be discharged from the vessel, if the demand continues the system pressure will start to fall until the pump cut in pressure is reached.
The pump will now start and ramp up maintaining the system pressure.
The pump will modulate the speed until demand cesses and the pump will then slow down and stop.

**5.2 Commissioning**

DANGER
Commissioning of the Resvari Plus must be carried out by a technician or engineer possessing the technical-professional requirements outlined in the current regulations

DANGER
Before commission the product, please familiarize yourself with the contents of the manual

**5.2.1 Pre commission checks:**

- Ensure that the unit is installed on a level and secure floor
- That all pipework connections (inlet, overflow and discharge) are in place and secure
- All pipe joints are sealed correctly to avoid leakages
- Check that the cabling to the pump and Resvari Plus drive is complete and that the unit is electrically sound. Please see section 4.6
- That there is no damage to the tank or components
- Make sure that the pump is lowered into the bottom of the tank and that there is a tight connection on the union between the copper riser and connection to the Resvari Plus head

**5.2.2 Drive Pre commissioned during manufacturing**

To make the process of commissioning easier for the first time, several parameters have been set during the manufacturing and testing process. As a result, the drive only requires power for the unit to start.

Please note:
To avoid dry running of the pump, which could lead to premature failure of the unit, please make sure that the water level is above the pump discharge port before applying power to the drive.

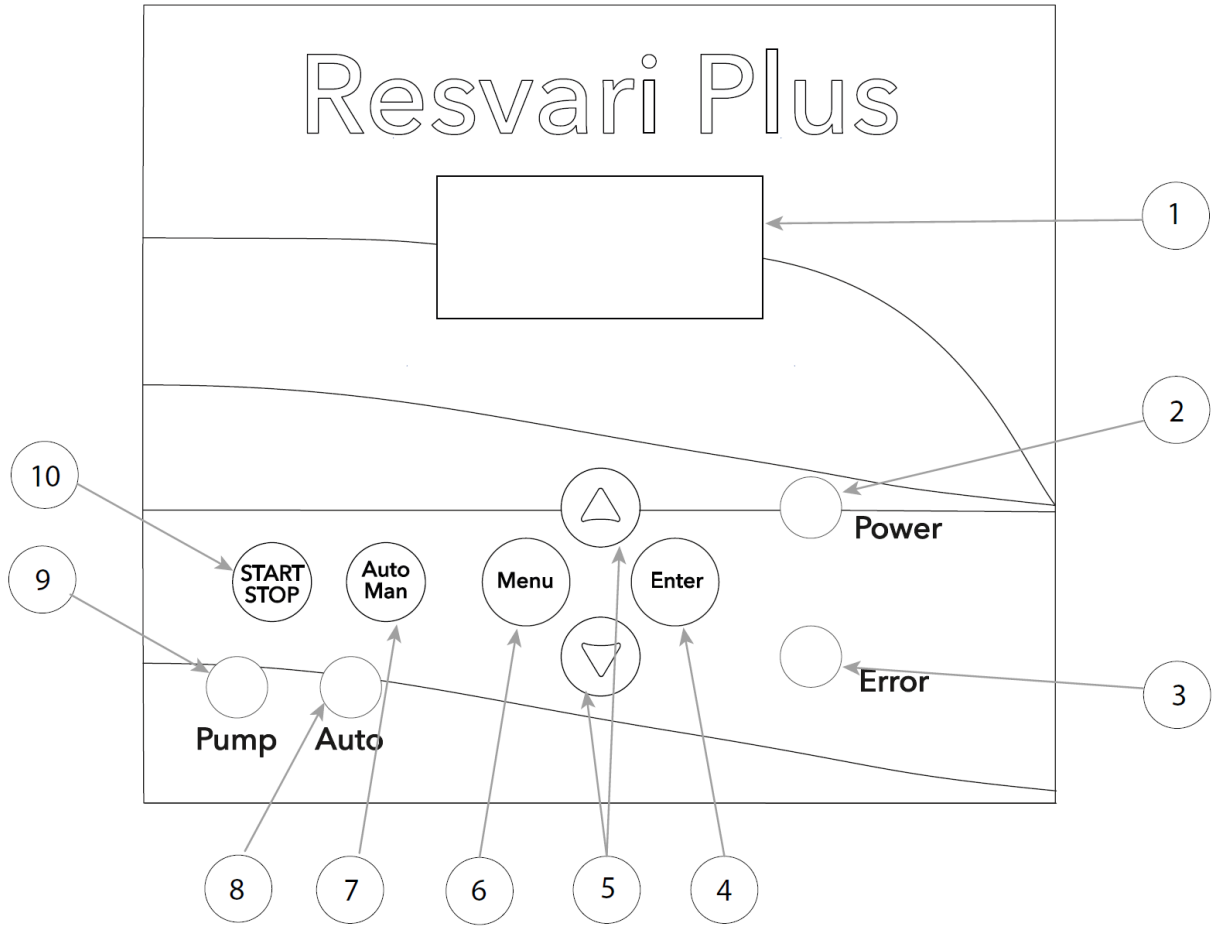
**5.2.3 First time Commissioning**

It is recommended that the below steps are carried out in order from 1 to 12

1. Ensure the bottom and side walls of the tank is clean.
2. Check the vessel pre-charge, this should be set to 0.2 bar below the system pressure, Re-charge with Nitrogen or dry air if required. Open vessel isolation valve.
3. Open the water supply to the unit set and let the water tank fill with water until the float valve rises, thus closing the inlet valve and stops further filling.
4. Make sure that the float switch inside the tank is free and not tangled up. The square float will need to be flat and floating on the surface of the water
5. Once the tank is full and the float valve has closed stopping water from entering the tank, Turn on the power to the unit.
6. The Resvari Plus drive will now start to boot up. All the LEDs Indicators (Pump On, Auto On, Power and Error) turn on and, if there are no faults, turn off again within 10 seconds.
7. The Drive performs an auto test and the Power indicator LED turns on.
8. The display shows the software version.
9. If needed change the set point of the unit to match the requirement of your application. For information on how to change the Required value see section 5.4
10. The pump will run to until the pressure in the discharge line reaches the set point (Pressure setting in the “Required Value” parameter)
11. Open the discharge valve unit slowly until fully open.
12. The initial commissioning is now complete. The pump will now run when its sense’s a drop in pressure and is set to maintain the “Required Value”

### 5.3 Resvari Plus Drive

#### 5.3.1 HMI / Interacting with the drive




| Position | Label | Description |
|---|---|---|
| 1 | Screen | LCD with 2 lines of 8 characters |
| 2 | Power LED Indicator | Steady yellow LED, indicating the pump is running. |
| 3 | Error LED Indicator | Steady red LED, indicating a fault. The LED is illuminated when there is an alarm. |
| 4 | Enter Button | Button for selecting parameters in AUTOMATIC mode. In MANUAL mode, this is an alarm reset button. |
| 5 | Navigation (Up & Down) | Decreasing or increasing the value of a parameter selected in MANUAL mode.<br>Viewing the operating parameters in AUTOMATIC mode, Operating parameters |
| 6 | Menu Button | Counter / Button for accessing the Standard Menu parameters in MANUAL mode |
| 7 | Auto On / Off toggle button | Button for switching between AUTOMATIC and MANUAL mode. |
| 8 | Auto On LED Indicator | Illuminated and steady in automatic mode.<br>Flashing in manual parameter configure ration mode (Standard menu, Advanced menu) |
| 9 | Pump Run LED Indicator | Steady yellow LED, indicating the pump is running. |
| 10 | Start / Stop toggle button | Button for running the electric pump in MANUAL mode. Press and hold the button to run the electric pump. |

### 5.3.2 Automatic and Manual Mode

Please note:
A number of parameters cannot be accessed or changed if the unit is in Automatic Mode. Press AUTO ON / OFF Toggle button to switch between AUTOMATIC and MANUAL mode. The Auto On LED indicates if Auto mode is on or off

### 5.3.3 Status Screen

To access the status screen: In AUTOMATIC mode, press the navigation buttons (UP & DOWN) to view the following operating data of the Drive:

| Parameter | Description | Unit | Range |
|---|---|---|---|
| Pset | Set point pressure | bar | 0.0 – Full Scale of sensor (either 10 or 16 bar) |
| Pbar | Instantaneous pressure of the system | bar | 0.0 –Full Scale of sensor (either 10 or 16 bar) |
| Hz | Instantaneous operating frequency of the motor | Hz | 30-60 |
| A | Instantaneous current absorbed by the motor | Ampere | 0 - 10 |
| °C | Temperature of the power module | Degrees Celsius | 0 - 95 |
| STATE | Drive diagnostics for technical assistance | — | — |

## 5.4 Parameters

**Navigating the Parameters menu**

The parameters in the basic menu can be edited ONLY in MANUAL mode. Press AUTO ON / OFF Toggle button to switch between AUTOMATIC and MANUAL mode. The Auto On LED indicates if Auto mode is on or off

- In MANUAL mode, press and hold MENU for a few seconds until the first parameter to be edited appears on the display and Auto On LED indicates flashes.
- Press UP & DOWN to edit the value of the parameter or ENTER to confirm and select the next parameter.
- Press MENU to exit the list of parameters to be edited and the Auto On LED Indicator turns off.
- Press AUTO ON / OFF Toggle to set AUTOMATIC mode and Auto On LED indicates is illuminated and remains solid.

Please note:
In automatic mode, the electric pump runs if the pressure of the system is below the set point. The standard Menu can be accessed by pressing and holding the MENU button for three seconds.

**Standard Menu**

The standard Menu can be accessed by pressing and holding the MENU button for three seconds.

| Name / Code | Description | Default Value | Description |
|---|---|---|---|
| REQ VAL | Required Value | Unique to the model of Resvari Plus Best Efficiency point e.g. Resvari Plus 5-3 = 3 bar | This value is the pressure the pump will look to maintain when a demand is sensed but eh pressure transducer. The default value will match the BEP (best efficiency point) of the pump fitted to the Resvari Plus. Change this parameter to meet the requirements of the application |
| MIN.FREQ | Minimum Frequency | 30hzs | Minimum start-up and stop frequency of the motor. Frequency at which the Drive begins to run (upon start-upand shut- down) withoutusing the ramps. |
| STRT VAL | Start Value | 10% | This parameter is the value for starting the pump after a stop, calculated as a percentage of the required set point value.<br><br>Example:<br>SET PRESS= 4.0bar<br>**START VALUE**=10% (3.6 bar)<br><br>If the pressure in the system reaches the required pressure of 4.0 bar and there is no additional consumption, the Resvari Plus drive disables the pump. As consumption increases and the pressure decreases, the drive turns on the pump when the pressure falls below the**START VALUE** of 3.6 bar |
| MIN THRS | Minimum Threshold | 0.00 | Pressure value of the system below which the **A4** "minimum pressure" alarm is triggered. When the alarm is triggered, the pump stops, and the ART function is enabled. Triggering of the |

| | | | |
|---|---|---|---|
| | | | alarm is delayed by the length of timeset in the MINT DLY parameter. |
| MINT DLY | Minimum Threshold Delay | 20 Secs | Delay for activating the **MINTHRS** alarm condition.<br><br>Please note:<br>This parameter will only appear if the MIN THRS (Minimum Threshold) has a value other than 0.0 bar |

**Advanced Menu**

To access the Advanced menu of parameters: In MANUAL mode and with the Auto On LED Indicator off:

- Press and hold MENU and ENTER at the same time for a few seconds. The Auto On LED Indicator flashes.
- Press UP & DOWN to edit the value of the parameter.
- Press ENTER to confirm and move on to the next parameter.
- Press MENU and ENTER in sequence to exit the menu. The Auto On LED Indicator turns off.

| Name / Code | Description | Default Value | Description |
|---|---|---|---|
| LANGUAGE | Language Select | English | This parameter allows you to change the language of the text on the drive is set to. |
| NOM CURR | Nominal Current | N/A | This Parameter allows you to change the current protection the drive provides the pump. This value (In Amps) should match the Full Load Current of the pump to ensure adequate protection |
| EXLOWWTR | External Low water enabled | YES | This parameter Enables or Disables the low water protection via the float switch. We strongly recommend enabling this parameter at all times and use the supplied Float switch to protect the pump from dry running |
| P SENSOR | Pressure Sensor Rating | 10 Bar | The value shown on this parameter needs to match the maximum pressure rating stated on the pressure transducer. As standard the pressure transducer fitted is 10 Bar |
| MULT PMP | Multiple Pump operation | SING? | This parameter is set when using the Resvari Plus in a Mutli-Pump application. Please see details on wiring the drive ready for Multi-Pump operation 4.7<br>Then follow guidance 5.7 for setting this parameter |
| ACCELER | Acceleration ramp timing | 10 Seconds | Acceleration time. Minimum time required for the frequency of the motor to go from minimum to maxi- mum frequency |
| DECELER | Deceleration ramp timing | 10 Seconds | Deceleration time. Minimumtime required for the frequency of the motor to go from minimumto maximum frequency |
| FREQ SW | Frequency Switching | 4kHzs | Selection of the switching frequency of the power module |
| DEFAULT PAR | Reset the parameters to Default | NO | Select YES to set the default values |
| RESET CONT | Reset Counter / Alarm log | NO | Select YES to reset the operation counters and the alarm log. |

### 5.4.1 Counter / Alarm Logs

To access the Logs screen: In MANUAL mode, in addition to the parameters indicated in Status Menu, it is possible to view information on the counter log and the alarm log.

- To access the menu, press and hold MENU and UP at the same time for a few seconds.
- Press ENTER to select the next parameter.
- Press ENTER several times to return to the initial parameter, or MENU to exit the function and alarm log.

To view the list of alarms displayed on the Resvari Plus, please see section 6.2

| Relating to Alarm Ref: | Label | Description |
|---|---|---|
| n/a | HOURS | Number of hours the drive has been running (power on). |
| n/a | CYCLES | Number of times the electric pump has been turned on and off. |
| n/a | SWITCH ON | Number of times the drive has been turned on |
| A1 | DRYRUN | Total number of times the digital input has triggered the no water alarm |
| A6 | OVER TEMP | Total number of times the power module overtemperature alarm has been triggered |
| A2 | OVER CURR | Total number of times the overcurrent alarm has been triggered. |
| A7 | SHORT CIRCUIT | Total number of times the Short Circuit alarm has been triggered. |
| A8 | HIGH VOLTAGE | Total number of times the High Voltage alarm has been triggered. |
| A9 | LOW VOLTAGE | Total number of times the Low Voltage alarm has been triggered. |
| A13 | MINIMUM THRESHOLD | Total number of times the Minimum Threshold alarm has been triggered. |
| A14 | LEVEL | Total number of times the lack of water alarm has been triggered |

**5.4.2 Installation Environment**
The Resvari Plus drive has an IP rating of IP54 and should not be installed in an environment where the drive exposed to direct sunlight and/or near heat sources.

**5.7 Multi-Pump Control**
The Resvari Plus drive has the capability to communicate with another Resvari Plus unit to work in Master / Slave operation. First ensure that the two drives have been correctly wired, please see section 4.7 for more details.

Please note:
Before setting up the Multi Pump communication ensure that both units have been commissioned correctly following the steps described in 5.2

Nominate which drive will first become the Master and the other to be the Slave device.

1. On the Master drive, navigate to the "MULT PMP" parameter in the Advanced menu and change the value from SING to MASTER
2. On the Slave drive, navigate to the "MULT PMP" parameter in the Advanced menu and change the value from SING to SLAVE

When linking two Resvari Plus units together in Mutli-Pump Communication, after enabling the automatic mode in the Master drive, the Auto On LED Indicator will flash intermittently on the Slave device. This is to indicate that the connection between the two drives is ready. If the LED light does not flash on the Slave device as described, please check the wiring connection between the two drives

When operating two Resvari Plus units in Multi Pump configuration, the alarms may behave differently compared to single unit arrangement. Please see section 5.7 for more information

**5.8 ART function (Automatic Reset Test)**
When alarm A4 PRESS MIN is triggered with the Error LED indicator illuminated, the drive performs automatic reset tests on the electric pump.

The system does the following:
The drive enters A4 PRESS MIN fault mode with the Error LED indicator illuminated. Approximately 5 minutes after the alarm, the system attempts to start the electric pump to try to increase the pressure up to the value set in the MIN THRS value. See Standard Menu parameters on 5.4.2 If the pressure in the system exceeds the value, the alarm disappears, and the electric pump is ready without any faults and with the Error LED indicator off. If the A4 alarm is still active with the Error LED indicator illuminated, the system runs the automatic reset procedure described above once every 30 minutes over the next 24 hours. If the A4 alarm perseveres after these attempts, the system remains in this disabled condition with the Error LED indicator illuminated until an operator resolves the problem.

During the ART attempts, it is possible to reset the A4 alarm as follows:
Press Auto On / Off toggle button to enter MANUAL mode.
Press ENTER to reset the alarm and turn off the Error LED indicator
Start up the pump, press Start / Stop toggle button and check that the pressure reaches or exceeds the set MINIMUM PRESSURE value. If this does not happen, stop the pump and resolve the problem.
Enter AUTOMATIC mode and press Auto On / Off toggle button

# 6. Troubleshooting

### 6.1 General fault-finding guide

| Fault | Possible Cause | Remedy |
|---|---|---|
| Automatic Mode is activated, but the pump doesn't switch off | "Start Value" Parameter not at correct value | Change the value in parameter "Start Value" further away to the required value. E.g. Increase the % value so that the differential between the Start Value and Require Value is greater |
| Automatic Mode is activated, but the pump doesn't turn on | "Start Value" Parameter not at correct value | Change the value in parameter "Start Value" closer to the required value. E.g. Reduce the % value so that the differential between the Start Value and Require Value is smaller |
| Pump fails to start / No power to Drive | Power supply failure | Reinstate incoming power supply |
| | Isolator fuse blown/MCB tripped | Replace fuse/reset MCB |
| Pump fails to stop | Set point set too high | Lower set point |
| | System pressure low due to large leak in system | Switch unit off until leak is repaired |
| Pump switches on and off quickly | Air in system | Purge air from pumps and pipework |
| | Vessel pre-charge incorrect | Check vessel pre-charge and Charge as necessary with Nitrogen or dry air |
| | Pump air locked | Vent pump |
| Pump runs but will not make pressure | Passing too much water | Check system for leaks |
| Pump overheating | Pump partially seized | Remove pump and check for sediment build up or foreign objects |
| Break tank overflowing | Leaking ball valve | Replace ball valve seal |
| | Non-return valve letting by | Replace/clean non-return valve |
| Pump stops and pressure drops immediately | Non-return valve letting by | Replace non-return valve |
| | Vessel pre-charge incorrect | Check vessel pre-charge and Charge as necessary with Nitrogen or dry air |
| The pump runs but starts and stops frequently | There could be a problem with the level float in the in- take tank. | Check the float and the tank. |
| The pump always runs at maximum speed | There could be a problem with the pressure transmitter. | Check the hydraulic connection between the transmitter and the system.<br>Check the working order of the sensor.<br>There is air in the sensor or the hydraulic circuit concerned. |
| | The set point is too high, and the pump doesn't achieve the pressure desired. | Reduce the set point. |
| | The pump is not primed. | Control the suction condition of pump. |

### 6.2 Resvari Plus Drive Alarms

| Error Codes: | | | |
|---|---|---|---|
| **Name / Code** | **Description** | **System Reaction** | **Solution** |
| A1 Dry Running | No flow of water to the pump.<br><br>Causes:<br>1. No flow of water on the intake side of the pump. The pump must not run dry because this causes severe damages. | Automatic, when the alarm stops | AUTOMATIC mode: Alarm triggered, and pump locked. It is possible to run the pump in manual mode when the alarm is triggered. The pump can be run and primed in this way, but it is important not to run it on dry for more than 5 seconds<br><br>Solutions:<br>• Check for the presence (level) of water in the tank |
| A2 Over Current | Overcurrent on the motor side of the electric pump | Automatic. Maximum of 4 attempts to start are made at 2 second intervals. Permanent locking of the electric pump if the alarm continues to be active after these attempts | The drive supplies current to the electric motor above the set rated value. The drive protects the motor against current over- load.<br>Solutions:<br>• Check the condition of the windings of the electric motor.<br>• Check the power consumption of the electric motor.<br>• Check the cross-section of the motor's power cable: this must be suited to the length of the cable and to the power of the motor.<br>• Check configuration of the rated current parameter . Please see section 5.4.3<br>• The value of the drives rated current must be at least equal to the current value on the data plate. If the power cable for the motor is longer than 30 meters, it is advisable to increase the value by a minimum of 10%. |
| A3 Disconnected Power | An automatic function of the drive that detects current consumption while the motor is running. The drive cuts out the power supply to the motor and remains locked. | Manual. | •In the case of single-phase motors, the thermal circuit breaker (motor protector) trips automatically.<br>• Breaking or failure of a phase of the motor.<br>• Failure/disconnection/deterioration of a phase of the motor's power cable.<br>• Breaking of the Resvari Plus Drive fuse |
| A5 Transducer Error | Fault with the pressuresensor. The alarm is triggered if the pressure transducer sends a signal of < 3.2 mA or > 22 mA signal. | Automatic Reset | The pressure sensor is faulty.<br>• Check that the sensor and connector are connected.<br>• Open the cover and check that the power cord of the sensor is connected and secured to the terminals. See section 4.6.1<br>• Check the cable of the sensor is connected correctly. Please see 4.61<br>•The power cable of the sensor has deteriorated: replace the cable.<br>• If the above action(s) do not resolve the issue, the sensor may have failed and you may need to replace the faulty sensor |
| A6 Excessive Temp | Alarm indicating that the power module of the drive has overheated<br><br>The cooling fan turns on at 60°C and turns off at 50°C (The Resvari Plus Drive has a built in Fan). If the temperature reaches 85°C, the output frequency of the motor is automatically reduced by 3Hz down to 75°C. At 95°C, and in AUTOMATIC mode, the drive stops the pump and does not restart it until the temperature falls below 80°C. | Automatic Reset. | •The ambient temperature exceeds the limits for use of the drive. See Technical data on page 27.<br>•The cooling fan does not work. Open the cover and check the power cable of the fan is connected and secured to the relative terminals. Please see 4.61<br>•The cooling fan is faulty. Contact the assistance service.<br>•The power module is faulty: contact the assistance service. |
| A7 Short-circuit | Alarm indicating a short circuit on the power supply side of the motor<br><br>An automatic function of the drive that detects current consumption while the motor is running. The drive cuts out the power supply to the motor and remains locked. | Automatic. A max of 4 at- tempts to start are made at 2 second intervals. The pump is permanently locked if the alarm perseveres after the reset tests. | •The motor is damaged and must be replaced.<br>•The power cable of the motor is faulty or worn: replace the cable. |
| A8 Over Voltage | Alarm indicating the voltage supply of the drive is high | Automatic Reset. | Troubleshooting:<br>• Problems with the power line: contact the utility provider.<br>• For systems with more than one pump, the electric pump with |

| | | | |
|---|---|---|---|
| | An automatic function of the drive that detects the voltage value of the power line. The drive stops the electric pump when the voltage value exceeds the permitted limit (254 V). The pump automatically starts up when the voltage drops below the limit (chapter 2.5). | | drive acts as a current generator when the non-return valve of the hydraulic system is faulty. The water flows through the non-return valve in the opposite direction.<br>•The DC Bus power circuit of the drive is faulty. |
| A9 Under Voltage | Alarm indicating that the voltage supply of the drive is too low<br><br>An automatic function of the drive that detects the voltage value of the power line. The Drive stops the electric pump when the voltage value is below the permitted limit (184 V). The pump automatically starts when the voltage exceeds the limit. | Automatic Reset | • The cross-section of the power cable, to the Resvari Plus Drive, is too small. Replace the cable with one of a suitable cross-section taking into account the voltage drop at the supply point of the drive.<br>• The power cable for the drive is too long. Replace the cable with one of a wider cross-section taking into account the voltage drop at the supply point of the drive<br>• Check and make sure the voltage of the electrical supply is stable<br>• This error will also show when the power is cut to the drive before shutting off completely |
| A13 Minimum Pressure | Minimum pressure alarm | | Troubleshooting:<br>• No water on the intake side of the pump: check the level or pressure of the water.<br>• Pump not primed. Prime the pump.<br>• The pipe on the delivery side of the pump is broken. The flow of water is too high.<br>• The pump (impeller or diffuser) is damaged. Contact the technical assistance service.<br>• The motor is damaged and must be replaced. |
| A14 Low Water | When the EXLOWWTR parameter is enabled, and the digital input is open. E.g The Float switch inside the tank has detected no water inside the tank | | Solutions:<br>• Check the working order of the level sensor. |
| **A10 Communication** | Alarm indicating the connection between the two drives (When configuring the Resvari Plus unit in Multi-Pump operation) is disconnected or there is a bad connection | The Multi-Pump Operation will stop and both Resvari Plus units will operate individually | Troubleshooting:<br>• Check the cable connection on both units and ensure the Rx and Tx wires are crossed (as described in section 4.7)<br>• Check that there is on drive set as Master and the other slave in Parameter MULT PMP (Please see section 5.7 for more information) |

***A10 communication error is only present when Mutli-Pump operation is enabled / active.***

**6.3 Alarms in Multi-Pump Configuration**

When two Resvari Plus units are being used in Multi-Pump operation, the following alarms may differ to the standard behavior in single pump operation:

Alarm that differ are as follows:

**Communication Failure A10:** Alarm indicating the connection between the two drives (When configuring the Resvari Plus unit in Multi-Pump operation) is disconnected or there is a bad connection. The Multi-Pump Operation will stop and both Resvari Plus units will operate individually

**Dry Run Alarm A1**: If there is a lack of water alarm in one of the units, the other pump assumes the role of “Main Device”. If the demand exceeds the performance of one unit the system will try and restore the device which has failed due to the dry run error. If the device status is restored in the unit encountering the alarm, then the two units will restore alternated operating mode. If there is a lack of water on both units, the system will activate the ART system in the MASTER unit

**All other Alarms:** If the alarm has occurred in one single device, the other unit in the Multi-Pump operation will act as the “Main Device”. If the demand exceeds the performance of one unit, the system will try and restore the device which has failed due to the error After 4 consecutive attempts without success restoring the device in question is turned off and will need to be restored manually. (This involved switching the unit on / off once the issue has been resolved).

In the case of both devices encoring alarms / errors the system will attempt to restore the device. After 4 consecutive attempts without success restoring the two devices, the two drives are disabled and will need to be restored manually

# 7. Maintenance

### 7.1 Routine check (6 monthly intervals)

1. Check the pump produces the correct pressure.
2. Check that the pump operates without undue noise or vibration.
3. Check the break tank is clean and that the correct water level has been maintained.
4. Check that all screws are tight on electrical components.
5. Check that the earth connections are tight and making good contact.
6. Check that the gas pre charge is at the correct pressure, this should be done by isolating the vessel fromthe system and draining water out of the vessel via the isolation valve drain point.

once the water has been discharged, a tyre gauge can be connected to the pre charge valve to display thevessel pre charge pressure. Recharge as necessary with Nitrogen or dry air.
Any other expansion vessels connected to the system can be checked in the same manner.

### 7.2 Long periods of inactivity

1. Pump must be rinsed with fresh water
2. Disconnect the tank from the inlet
3. Empty the unit and pipework of water
4. Ensure that the is no sitting water at the bottom of the tank
5. Put the unit out of service

Before starting the unit
1. Remove the bottom filter of the pump and check that the shaft is rotating freely, without mechanical impediment
2. Ensure the inside of the tank is clean
3. Reconnect the inlet and fill the tank with fresh clean water

### 7.3 Spare parts

Spare parts for the Resvari Plus are available to purchase from Lowara UK. Please contact the sales office for more information or visit the Lowara Spark website for Exploded parts diagrams. (**https://rcwemea.xyleminc.com/Spark/**)

# 8. Technical Information

### 8.1 Operating Environment

The Resvari Plus unit has an IP rating of IP54 due to the electrical components situated on the Resvari Plus head Please ensure that if the Head is attached to the Resvari Plus unit, that the drive is protected against weather, extreme heat and water.

| | |
|---|---|
| IP protection | 54 |
| Ambient temperature | 0–40°C (32–104°F) |
| Ambient humidity | < 50%, non-condensing |
| Elevation | ≤2000m asl |
| Cooling | Forced Air |

### 8.2 Materials in contact with the water

#### 8.2.1 Resvari Plus head

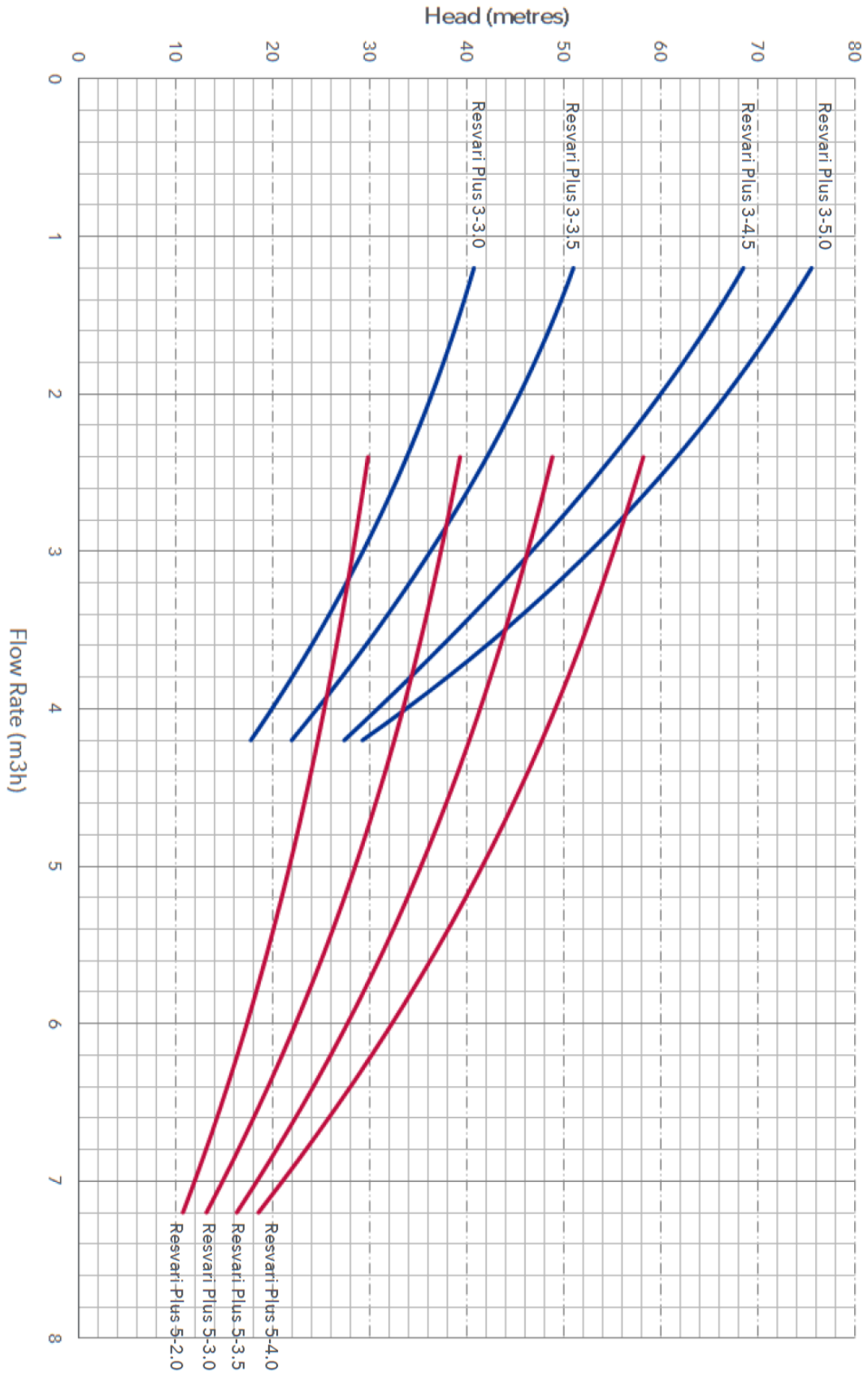
| Description | Material | WRAS Approved |
|---|---|---|
| Delivery elbow | Brass | n/a |
| Pressure vessel – 10 bar, 8 litre | Outer Shell: Carbon Steel<br>Flange: Galvanized steel | Yes |

| | | |
|---|---|---|
| | Diaphragm: Butyl Rubber | |
| Vessel Elbow | Brass | n/a |
| Union 1” | Stainless steel | n/a |
| Pressure vessel Isolation and drain valve | Stainless steel | n/a |
| 1 1/4” Stainless Steel manifold | Stainless steel | n/a |
| Pressure Transducer | Stainless steel | n/a |

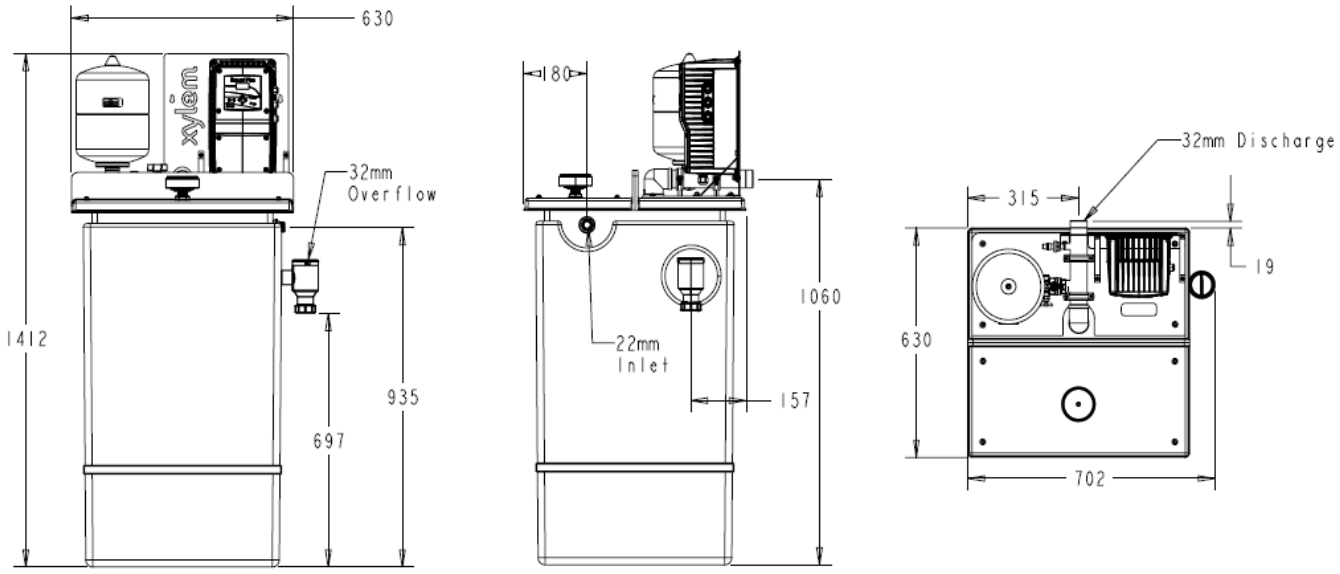
### 8.2.2 Resvari Plus 250 Complete

| Description | Material | WRAS Approved |
|---|---|---|
| Non return valve | Brass | n/a |
| 1 ¼” Union | Stainless steel | n/a |
| Copper Riser | Copper | n/a |
| Scuba Pump | Casing: Stainless steel,<br>Impeller: Technopolymer (Plastic) | No |
| Break tank | GRP (Glass Reinforced Plastic) | Yes |
| Tank overflow | Plastic | Yes |
| Float valve | Float: Copper<br>Valve: Brass | Yes |
| Tank Breather | Plastic | Yes |

**8.3 Performance / Pump Curves**



### 8.4 Dimensions of the Resvari Plus




Front View  Side View  Top View

### 8.5 Inflow Rate / Minimum pressure

| Incoming pressure | | Flow: Gallons per min |
|---|---|---|
| Bar | PSI | |
| 0.5 | 7.2 | 12.5 |
| 1 | 14.5 | 17.7 |
| 1.5 | 21.7 | 21.7 |
| 2 | 29 | 25 |
| 2.5 | 36.2 | 28 |
| 3 | 43.5 | 31 |
| 4 | 58 | 35 |
| 5 | 72 | 39 |
| 6 | 87 | 43 |
| 7 | 101 | 46 |
| 8 | 116 | 50 |
| 9 | 130 | 53 |
| 10 | 145 | 56 |
| 11 | 159 | 59 |
| 12 | 174 | 61 |
| 13 | 188 | 64 |
| 14 | 203 | 66 |

Flow Rate and Size Selection Chart general notes:
The discharge through a floatvalve is governed by the running pressure maintained at its inlet. In practice this is difficult to measure and so the tables shown indicate the ‘estimated’ flow rate in gallons per minute that will occur at various static heads for each size of floatvalve or for each size of seat in floatvalve that accept a variety of seat sizes. The flowrates quoted will only occur when the floatvalve is fully open and will reduce as the water level in the tank rises. Excessive pipe runs to the floatvalve will result in lower running pressures and thus reduced flowrates.

### 8.6 Electrical specification

| Model | Pump Used | Part Number | Electrical Supply | Motor size (kW) | Full Load Current (amps) |
|---|---|---|---|---|---|
| Resvari Plus 250 3-3 | 3SC4/05/5 C L05 | UKRESVARI250330 | 240/1/50 | 0.55kw | 4.06 |
| Resvari Plus 250 3-3.5 | 3SC5/07/5 C L05 | UKRESVARI250335 | 240/1/50 | 0.7kw | 4.80 |
| Resvari Plus 250 3-4.5 | 3SC7/09/5 C L05 | UKRESVARI250345 | 240/1/50 | 0.9kw | 5.88 |
| Resvari Plus 250 3-5 | 3SC8/11/5 C L05 | UKRESVARI250350 | 240/1/50 | 1.1kw | 6.85 |
| Resvari Plus 250 5-2 | 5SC3/05/5 C L05 | UKRESVARI2503520 | 240/1/50 | 0.55kw | 4.08 |
| Resvari Plus 250 5-3 | 5SC4/07/5 C L05 | UKRESVARI2503530 | 240/1/50 | 0.7kw | 4.98 |
| Resvari Plus 250 5-3.5 | 5SC5/09/5 C L05 | UKRESVARI2503535 | 240/1/50 | 0.9kw | 5.72 |
| Resvari Plus 250 5-4 | 5SC6/11/5 C L05 | UKRESVARI2503540 | 240/1/50 | 1.1kw | 6.90 |
| Resvari Plus 250 3-3 | 3SC4/05/5 C L05 | UKRESVARI250330 | 240/1/50 | 0.55kw | 4.06 |

| | |
|---|---|
| Digital input for float switch con-tact | 24Vdc, 23,9mA |
| Maximum power cable section | 2,5mm2 |
| Maximum motor power cable section | 2,5mm2 |
| Consumption in standby | 4W |
| Rated voltage input (Uin) | 1x230V (-20% – +10%) |
| Overcurrent | 20%, 10 second maximum |

### 8.7 Sound output

**Noise Emissions** Less than 70dBA.

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