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# LQS180 OPERATORS MANUAL

Version 2.3



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PLB Australasia Pty Ltd trading as Liquid Systems (SA)

[www.liquidsystems.com.au](http://www.liquidsystems.com.au)



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## SAFETY AND DAMAGE WARNINGS

WARNING, CAUTION and NOTE symbols are used throughout this manual to stress the importance of personal safety, potential machinery damage and useful operating information.

Symbol Descriptions shown below:



**WARNING:** Indicates the strong possibility of severe personal injury or damage to machinery if instructions are not followed.



**CAUTION:** Highlights hazards, unsafe or unwise practices which could cause personal injury, property damage, damage to your machinery or loss of potential crop yield if instructions are not followed



**NOTE:** Refers to important and useful information which should not be overlooked.

## IMPORTANT SAFETY INSTRUCTIONS



### WARNING:

Always wear protective gloves, eyewear and clothing when dealing with liquid fertilizers and other liquid agricultural products.

Do not disconnect any hose lines while the pump is running.

Ensure power is switched off or disconnected when connecting or disconnecting any electrical components of the system.

Always ensure the tank lid or a vent/overflow valve is open to allow air to escape when filling product tank.



**WARNING:** Use of phosphoric acid with this equipment will void the warranty.

## ABOUT THE SYSTEM

The Pump & Control Module is designed to provide accurate, rate controlled variable application of liquid fertilizers & other crop care products.

## HYDRAULICS

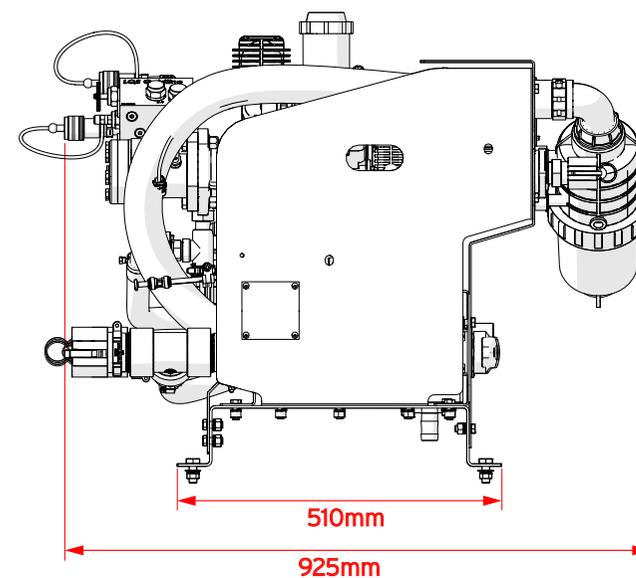
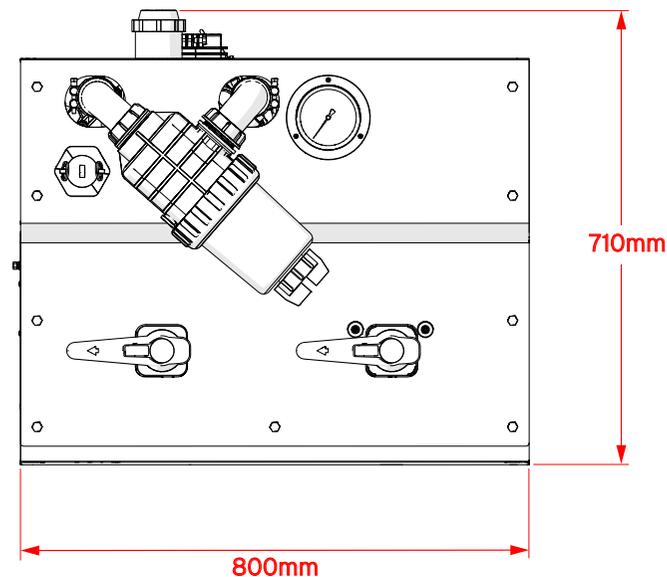
Displacement per Revolution	50cc
Max Operating Speed	550 rpm
Max Hydraulic Pressure	1500 psi
Max Hydraulic Flowrate	30 L/min, 7.9 US Ga/min, 6.6 Imp. Ga/min

## ELECTRICAL

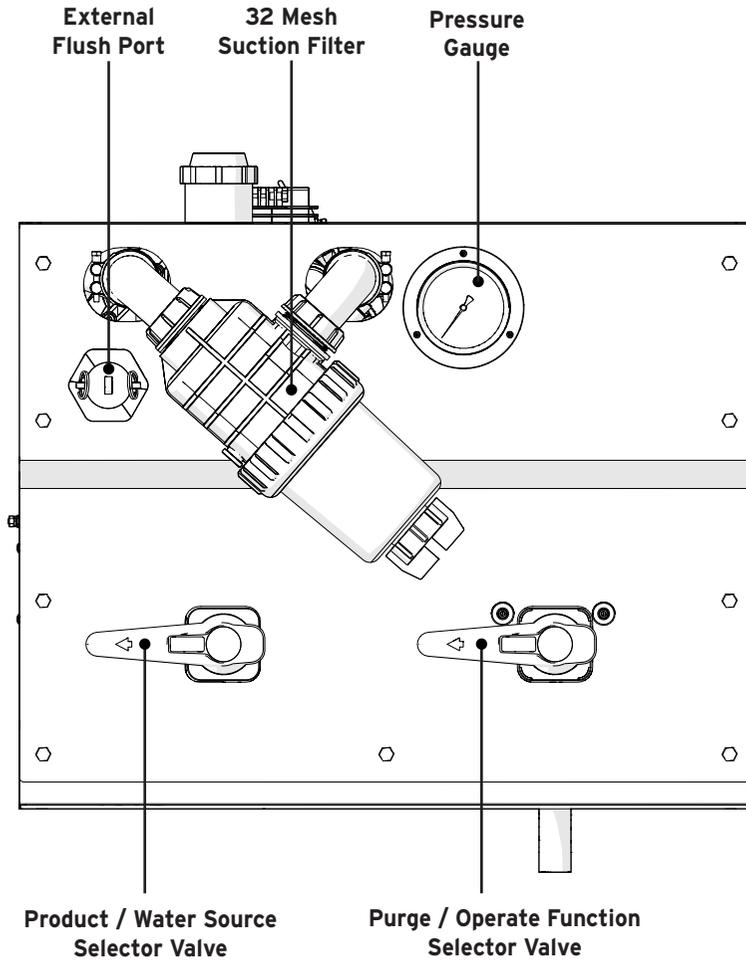
Nominal Voltage	12V DC
Maximum Current	1.3A
Flowmeter Calibration	82 Pulses/L 310 Pulses/US gal 373 Pulses/imp gal
Pump Speed Sensor	36 pulses/revolution
Pressure Sensor	5mV/kPa 34.5mV/psi

## MODULE INFORMATION

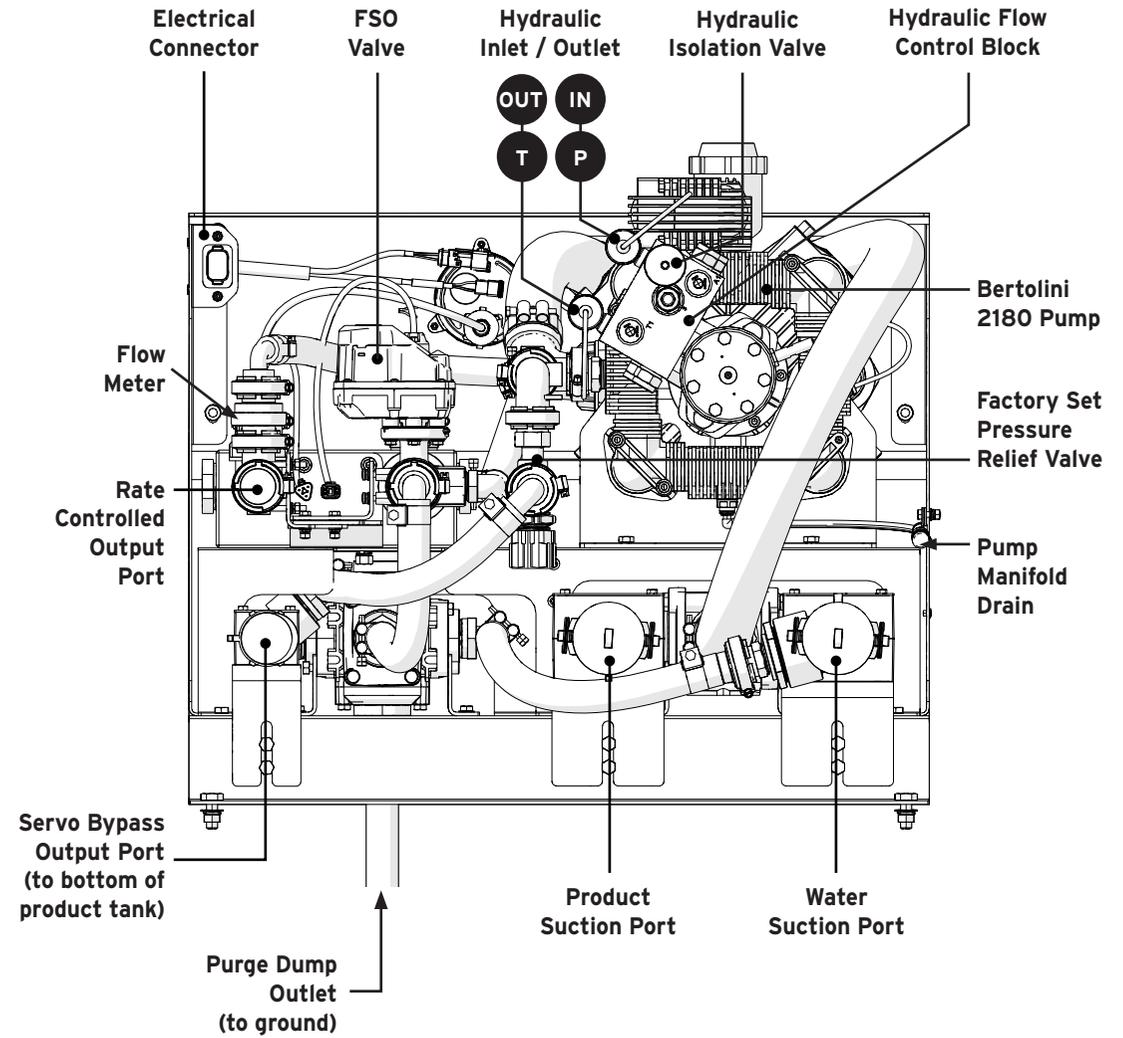
Unit Weight	121Kg
Safe Operating Range	1.5-4bar 22-58psi
Flow Control Range	7- 170 L/min 2- 44 Gal/min



## MODULE COMPONENTS

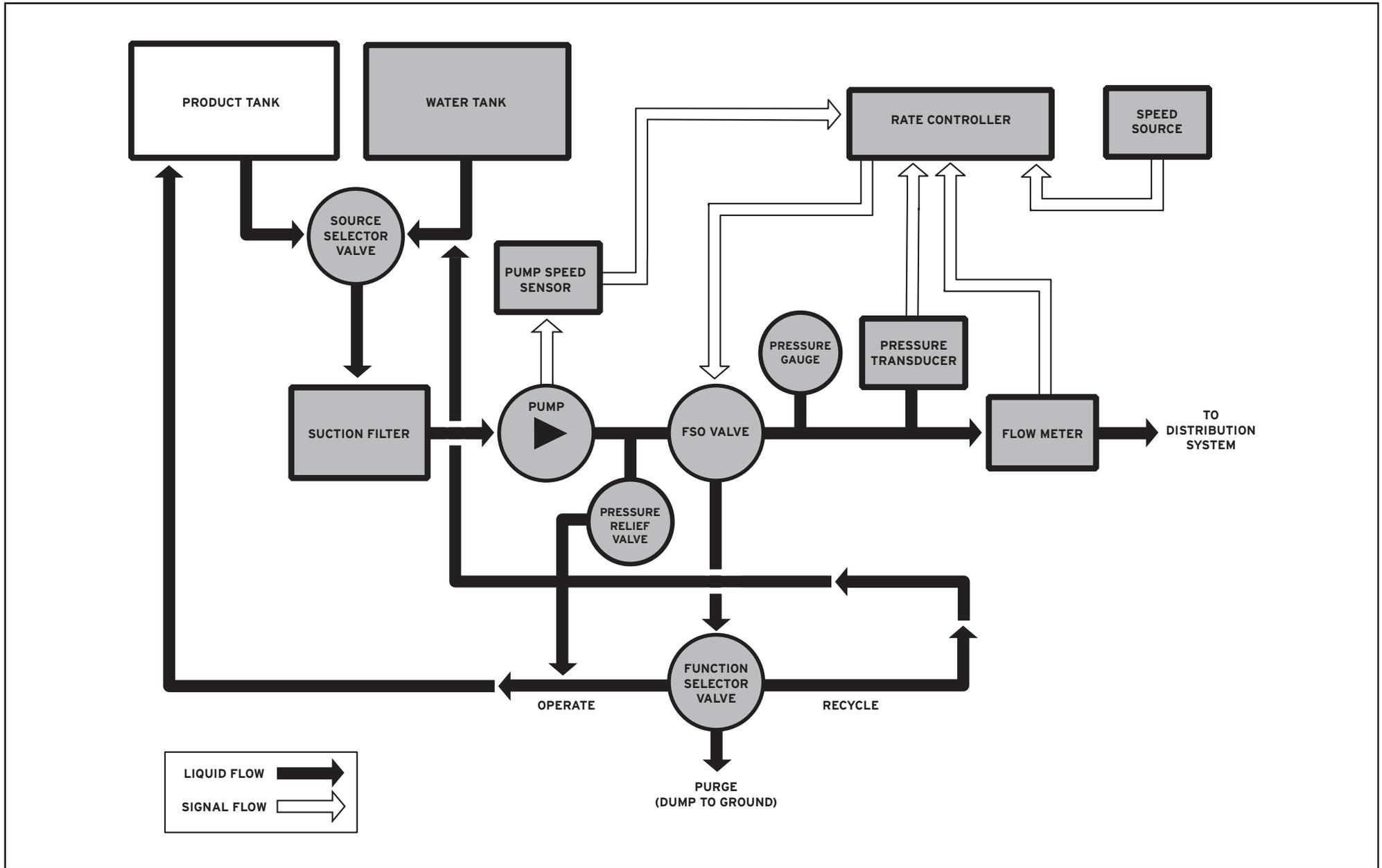


**FRONT VIEW**



**BACK VIEW**

LQS180 SYSTEM LAYOUT

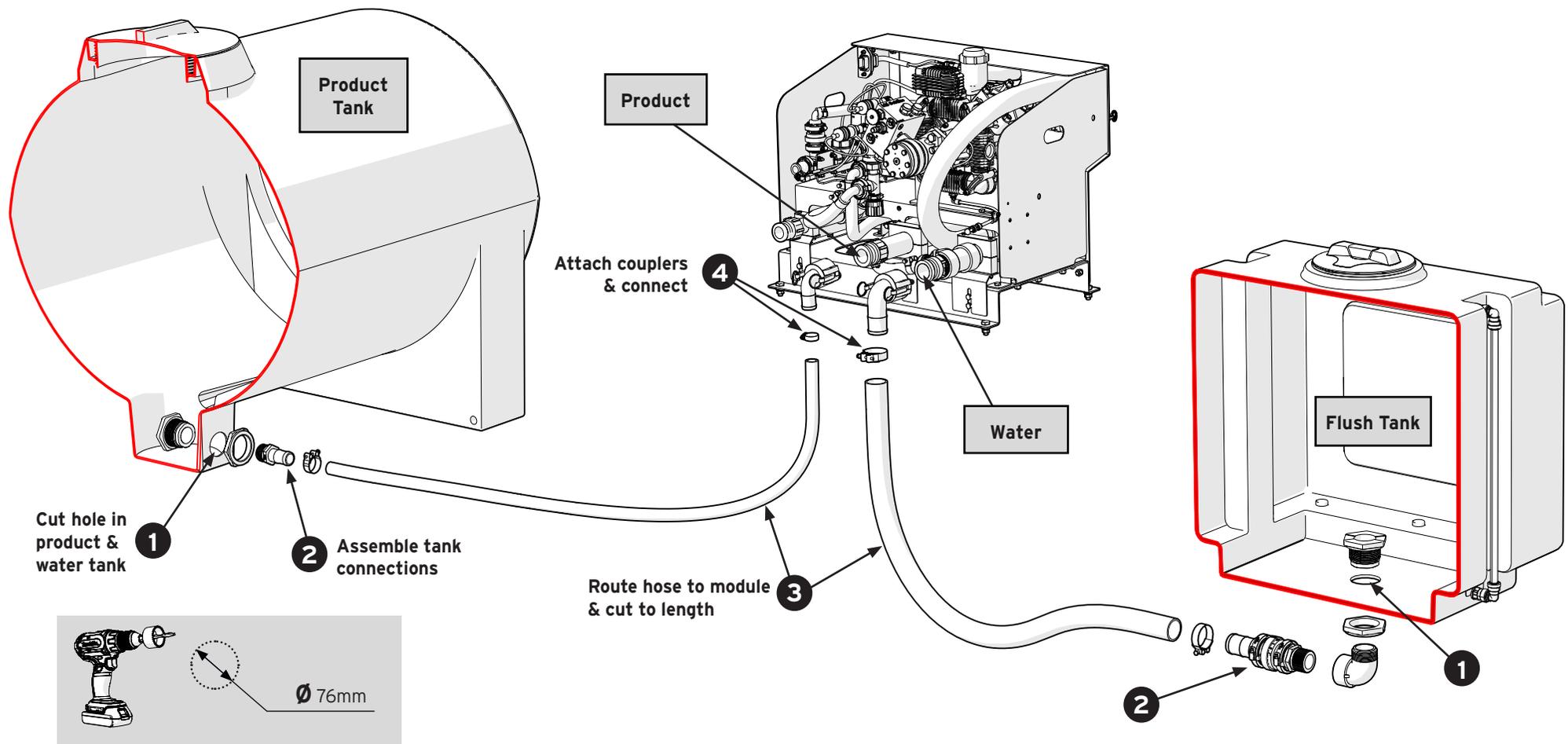


## MOUNT MODULE

- Build framework for mounting of module. Refer to page 2.1 for dimensions.
- Ensure the mounting of the module does not interfere with functionality of implement. E.g. Steering, Augers, fans.
- Ensure hardware used for mounting will support the weight of the module.

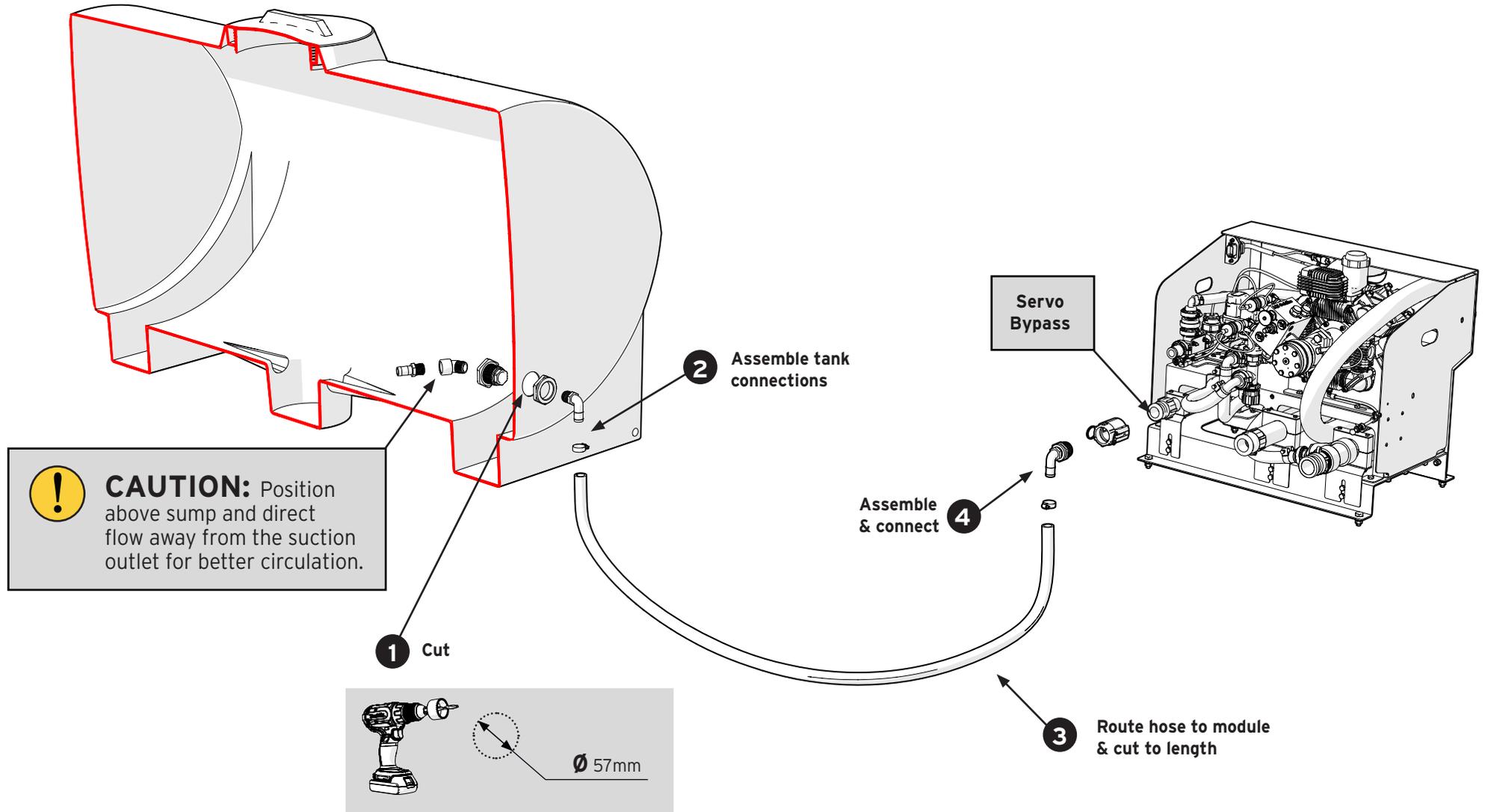
## INSTALL SUCTION LINES X2

- Connect **product** suction line to product tank.
- Connect **water** suction line to flush tank. This enables convenient flushing for regular hygiene.

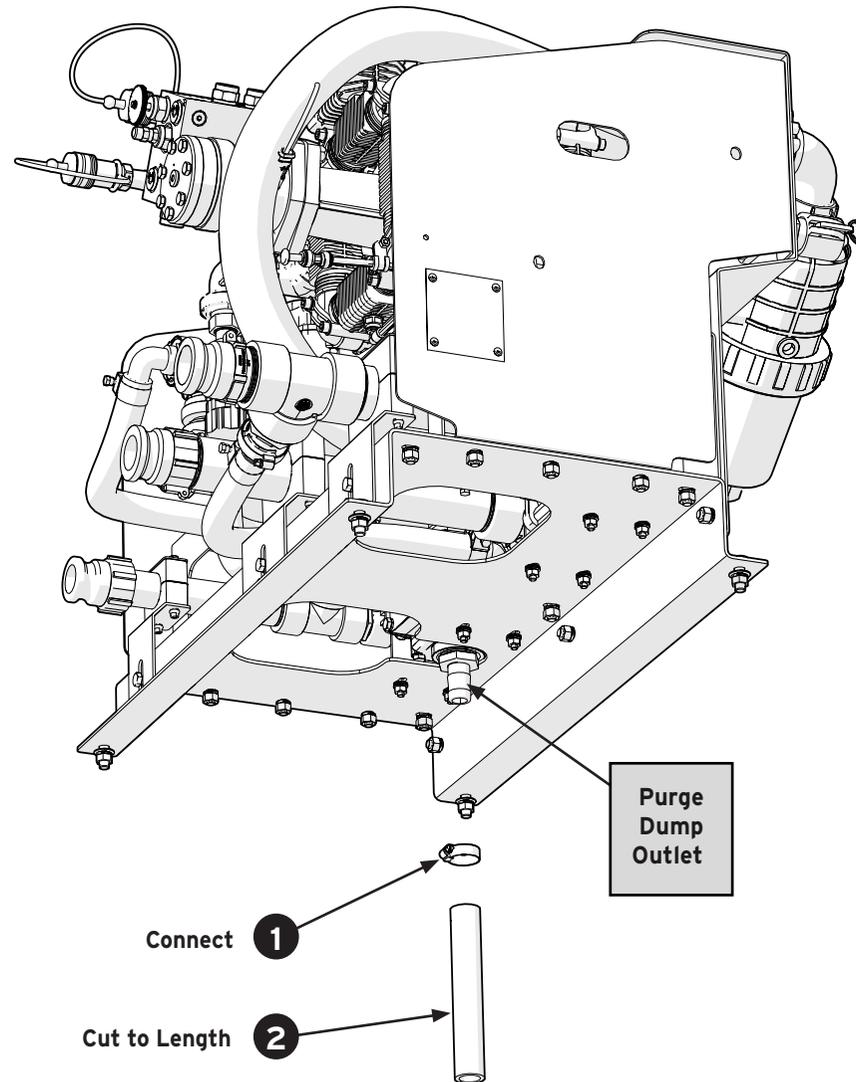


## INSTALL SERVO BYPASS RETURN LINE

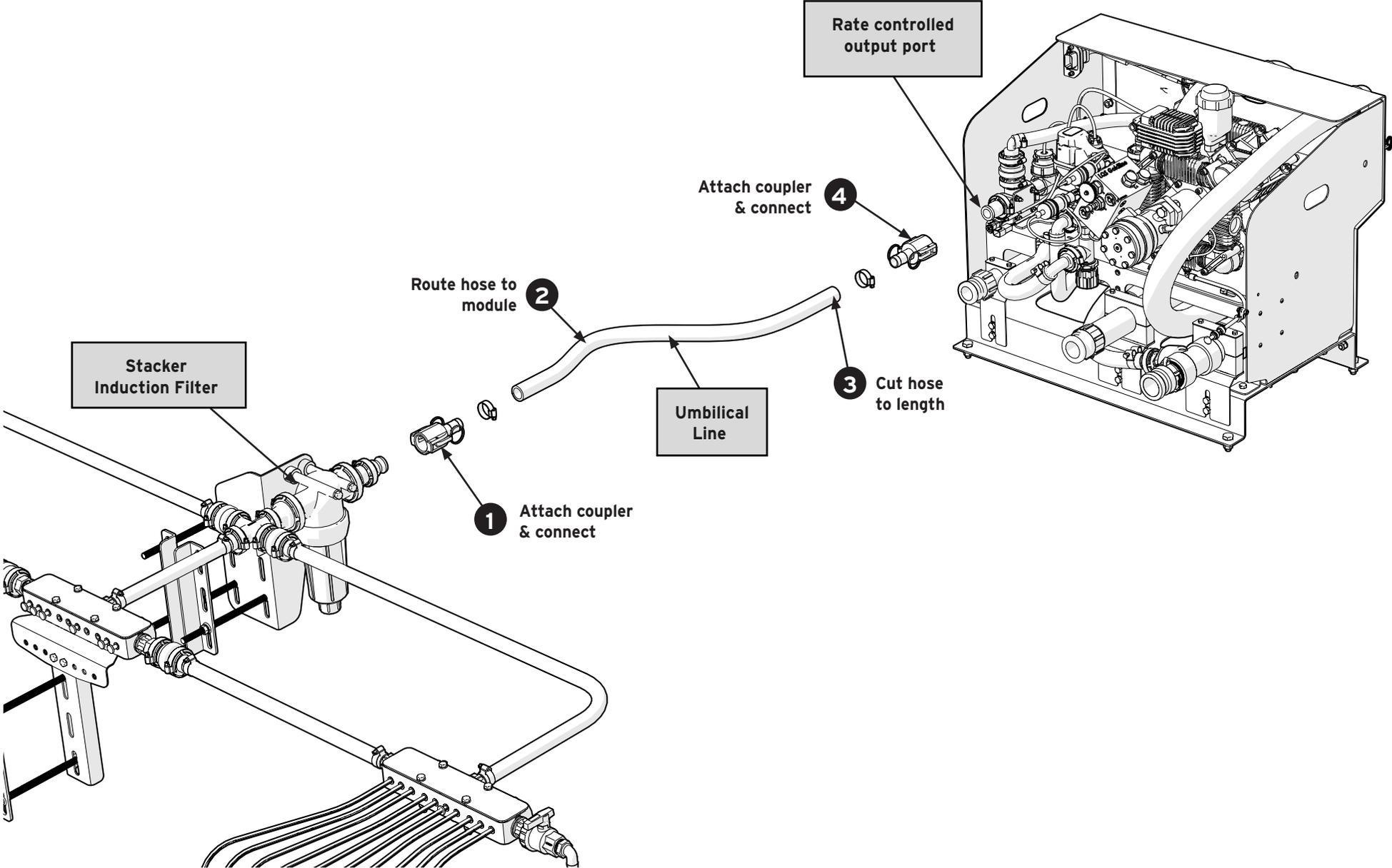
Connect to Product Tank



## INSTALL PURGE DUMP LINE



INSTALL UMBILICAL LINE



## CONNECT ELECTRONICS

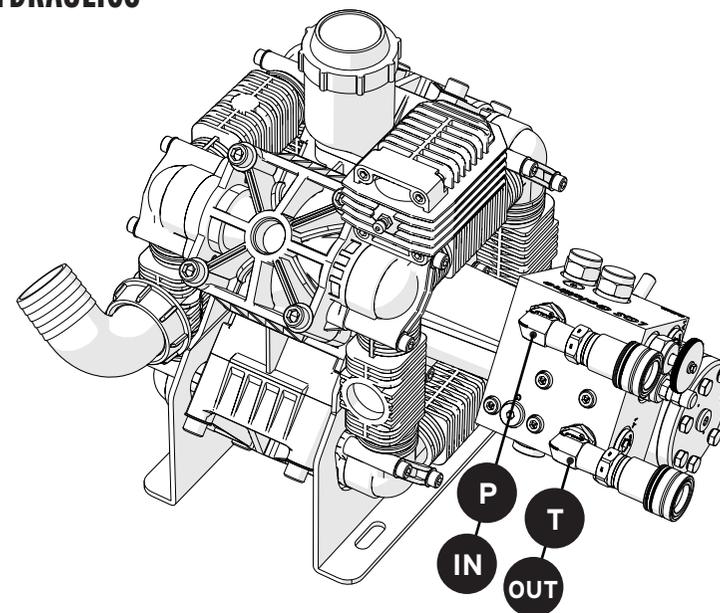
Refer to LQS Controller Setup Guide and manufacturer's controller and display manuals.

1. Plug individual device connectors on the module to matching connectors on generic module loom.
2. Connect generic module loom to controller specific adaptor loom.
3. Connect adaptor loom to controller.
4. Configure Control System.



**WARNING:** Ensure electrical power is disconnected from Controller before connecting the adaptor harness.

## CONNECT HYDRAULICS



Connect 1/2" hydraulic lines to couplings on hydraulic flow control block with male fittings supplied. Use a dedicated pair of remotes on tractor.



**NOTE:** Hydraulic inlet is marked **P (Pressure)** and outlet is marked **T (Tank)** on the flow control block. Ensure hydraulic input and output lines are fitted to the correct couplings otherwise pump will not run.



**WARNING:** Do not connect hydraulics in series with any other equipment unless specifically instructed to by Liquid Systems (SA).

## CONNECT HYDRAULICS - ADD MODULE IN SERIES

A second module can be added for application of two liquids with independent auto-rate control. Follow below steps to connect 2 modules in series.

1. Remove Plug from port **5** on the Flow Control Block (FCB) of primary pump and replace with Cavity Plug (P/No. SO-CPLG-10-N-20-000).
2. Remove Plugs from ports **T1** and **A1** on the FCB of primary pump and replace with Male Nipples (P/No. SO-CP2-0814).
3. Connect first hose from port **A1** on the FCB of primary pump to port **P** on the FCB of secondary pump.
4. Connect second hose from port **T1** on the FCB of primary pump to port **T** on the FCB of secondary pump.

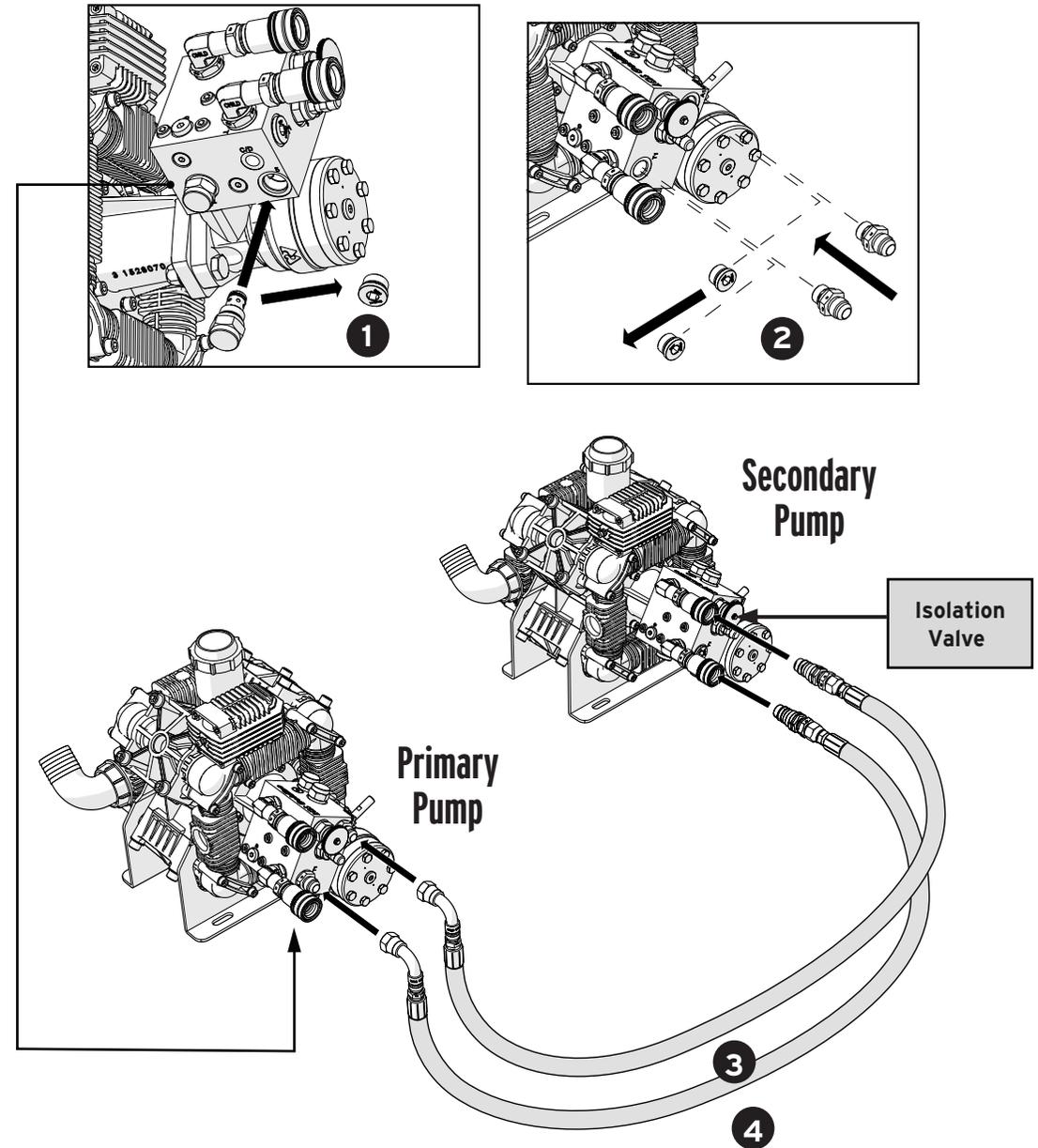
Apply steps 1 to 4 to the FCB of the second pump if there are 3 pumps in series.

Any pump can be disengaged by turning the Isolation Valve fully anti-clockwise.



**NOTE:** Turning off 1 pump may result in the other pump(s) running faster.

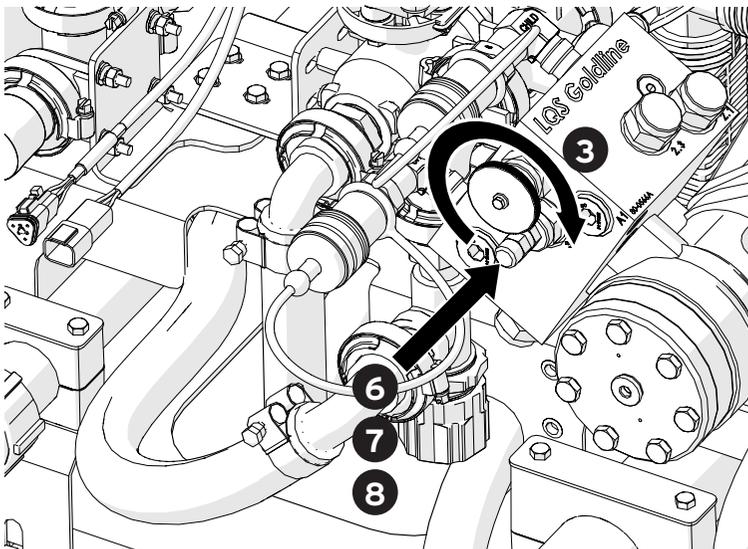
Increasing load on 1 pump (i.e. higher pressure application) may impact speed of other pump(s).



## CHECK AND ADJUST PUMP SPEED

**Pumps are factory set to 420 RPM. If lower or higher flow is required, control block can be adjusted to set maximum pump speed.**

1. Configure controller to show pump speed on screen. Sensor generates 36 pulses/revolution.
2. Ensure selected source tank contains water or liquid product.
3. Ensure isolation valve is rotated fully clockwise.
4. Apply hydraulic power to pump.
5. Check pump speed on the display screen.
6. Remove 1/2" cap from control block.
7. Loosen 9/16" lock nut.
8. Use 3/16" Allen key to adjust speed - anti-clockwise to increase
9. Set speed within range MIN 300 RPM - MAX 550 RPM
10. If hydraulic oil is cold MAX RPM is 500.
11. Tighten lock nut. Replace and tighten cap



## TEST OPERATION

- Run system with clean water to verify rate control for target application range.
- Check all distribution system outlets are working. Clear any blockages.
- Refer to next section of this document for instructions.

## CALIBRATE FLOWMETER

- To calibrate flow meter, apply a known amount of liquid and compare actual volume applied with control system.
- You can use a full tank or an amount between marked levels on the tank. Alternatively, measure amount delivered out of a number of outlets for 1 minute and calculate equivalent for all outlets.
- Calculate the new calibration factor with the following:

$$\text{New Cal Factor} = \frac{\text{Current Cal Factor} \times \text{Volume Applied (controller display)}}{\text{Volume Applied (measured)}}$$



**NOTE:** Pump will not run at full speed unless isolation valve is rotated fully clockwise.



**NOTE:** Liquid product & water calibrations will normally be different.



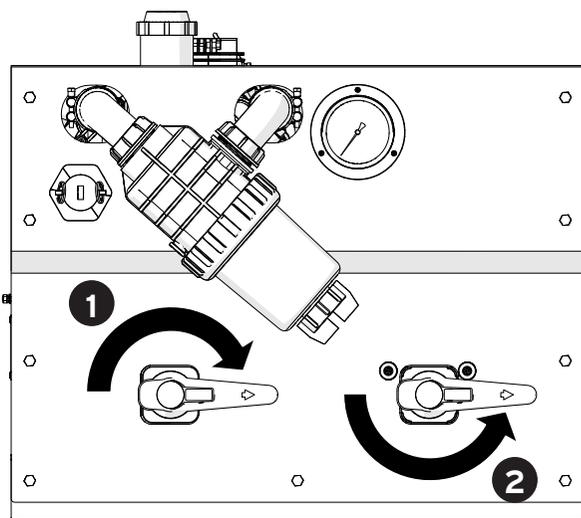
**CAUTION:** Pump may run up to 50 RPM faster when hydraulic oil temperature increases with use so allow for this when setting up with cold oil.



**CAUTION:** Higher pump speed will deliver greater liquid flow for application and tank agitation but do not exceed the maximum specified speed.

## OPERATE SYSTEM

1. Turn Source Selector Valve to **PRODUCT**
2. Turn Function Selector Valve to **OPERATE**
3. Setup application rates via the Display
4. Start hydraulic flow to pump
5. Enable product application via the Display



**NOTE:** System Operating Pressure  
We recommend, aim for the optimal working pressure of **2 to 2.5 Bar**. However, the systems working range of **1.5 to 4 Bar** is acceptable when a broader range of flow rate is needed.



**CAUTION:** When working with *live* biologicals, it is recommended to maintain operating pressure **below 2 Bar** and reduce pump speed to **360rpm** (at operating oil temperature) to preserve microbial viability.

Normal operating conditions are suitable for freeze-dried inoculant.

## MONITORING

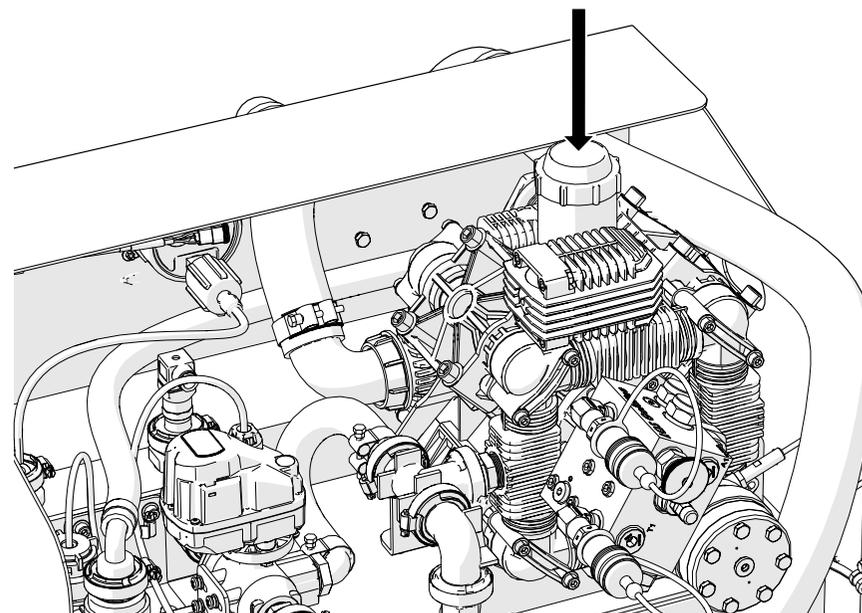
Monitor via Display

- Tank Level
- Changes in operating pressure
- Stability of Application Rate

## CHECK PUMP OIL LEVEL

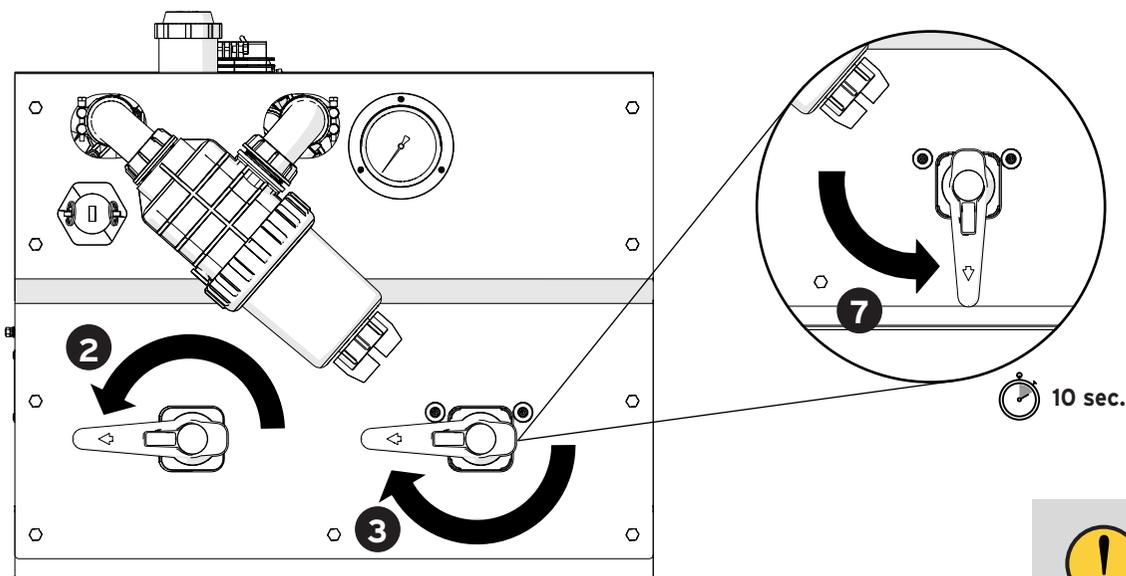
- Top up with SAE30 oil.
- If oil is discoloured, replace broken diaphragms.
- If reservoir is empty, replace worn shaft seal.

Refer to Bertolini pump manual for instructions.



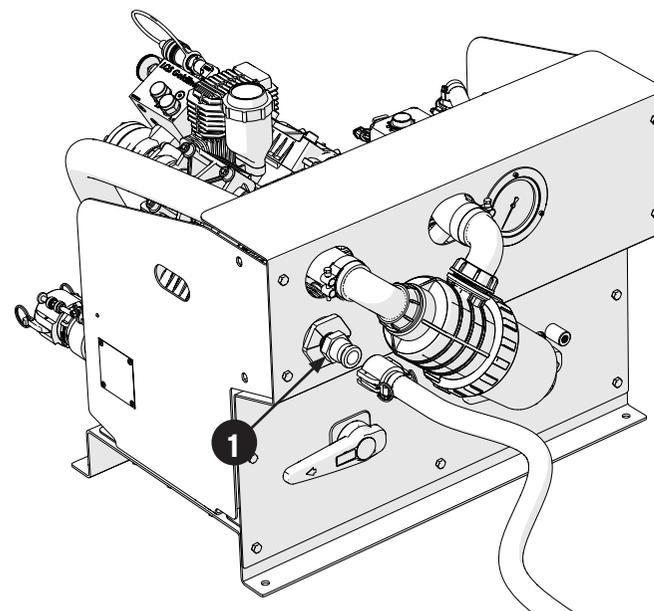
## FLUSH SYSTEM (STATIC)

1. Connect clean water to water suction port
2. Turn Source Selector Valve to **WATER**
3. Turn Function Selector Valve to **PURGE**
4. **Switch on all Sections in Controller**
5. Start Pump
6. Run System in Controller Test Mode < 550kPa, 80psi
7. To quickly dump product circulating in module: Turn Function Selector to **PURGE TO GROUND** for 10 seconds. Then return to **PURGE**
8. Check **ALL** outlets are flowing. Clear blockages.



## FLUSH DISTRIBUTION SYSTEM (MANUAL)

1. Connect to clean water
2. **Switch on all Sections in Controller**
3. Pump water < 550kPa, 80psi
4. Check **ALL** outlets are flowing. Clear blockages.



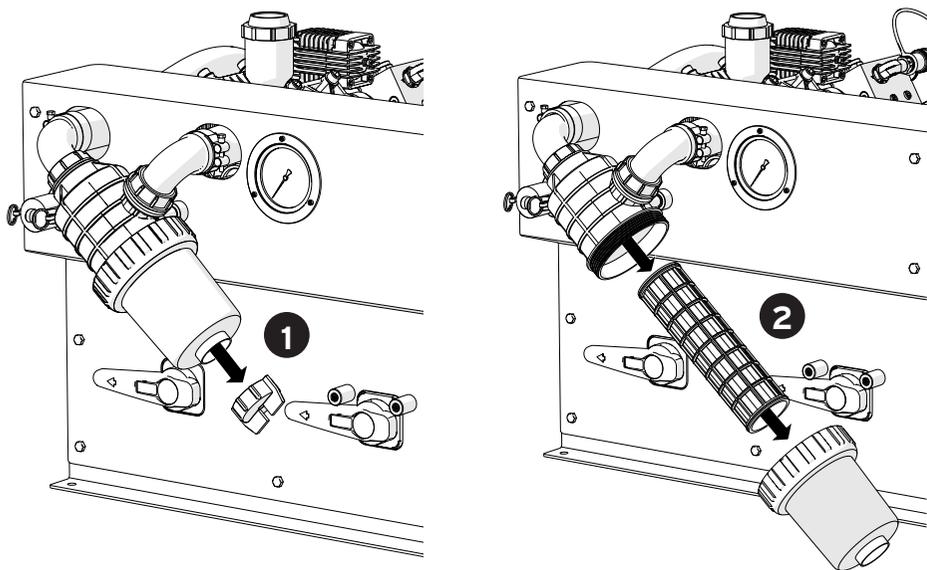
**NOTE:** A daily System Flush is good practice to keep system in optimal condition.



**CAUTION:** Flushing System at pressure above 5.5 bar (80 psi) may dilute product tank with water. With a Section Control system, ensure all sections are switched on before flushing. Otherwise water will flow back into product tank. Liquid will flow from the purge dump line when moving function selector valve from "Operate" to "Purge". Keep feet clear.

## CHECK &amp; CLEAN SUCTION FILTER

1. Unscrew plug to drain liquid from bowl
2. Unscrew fly nut to remove bowl
3. Clean screen. Replace if damaged
4. Check O-rings. Replace if damaged



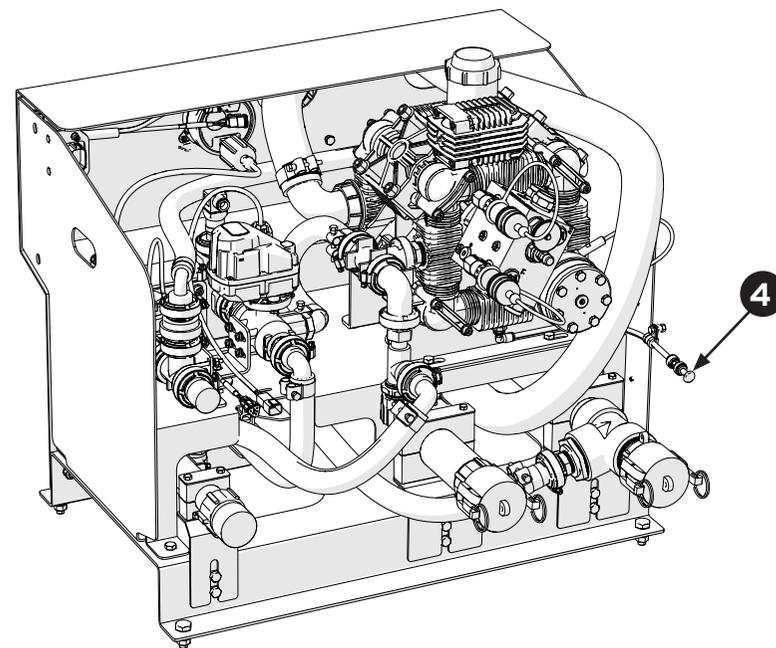
**WARNING:** Liquid will escape from the filter during this process. Ensure suitable protective gloves and clothing are worn when performing this task.



**CAUTION:** It is important when reassembling the suction filter that the screen bowl assembly be re-located correctly to the filter body. The pin location is crucial to operation of the filter. The pin activates a valve that will prevent the pump from sucking liquid if it is not seated correctly.

## SHUTDOWN

1. Empty & Rinse Product Tank
2. Flush System
3. In freezing climates Flush System with Antifreeze
4. Remove Pump Manifold Drain Plug
5. Turn Function Selector Valve to PURGE TO GROUND



## PUMP COMPONENTS

**BE-62.0040.00.ADS**  
Duramax Diaphragm for 2180 pump



**BE-28.9884.97.3**  
Set of 8 valves + 4 'O rings' for Bertolini 2180 pump



**LQS-2180-EH PUMP**  
LQS Enhanced 2180 Pump



## SELECTOR VALVES

**AG-453426A77**  
2" 3-Way Ball Valve



**AG-453055A55**  
1-1/4" 5-Way Ball Valve



## SUCTION FILTER

**AG-3172472**  
2" 32 Mesh 317 Series Suction Filter



**AG-3172002.030**  
2" 32 Mesh Suction Filter Screen



## VALVE SET COMPONENTS

**WK-531.0.13066880**  
Pressure Sensor



**TJ-57-10100**  
TeeJet 801 Flowmeter



**L03085**  
FSO Valve - 3-Way Flow 1" Valve



**LL03003**  
Module Dual Scale Pressure Gauge Assembly (Kit includes fixings)



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