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How does the Overwatch work?

The Overwatch control utilizes the Deragger Pro, Variable Frequency Drives, & a Pressure Sensor on the pump suction, to dynamically measure flow into the pump, and adjust its output flow to match. The Deragger Pro can also monitor the electrical behavior of the pump's motors, to detect potential issues and take a corrective action to protect itself.

Unlike a fixed-speed Pump curve, which operates at the line frequency (50Hz EU or 60Hz US) at a fixed voltage, the VFD's power output is variable and can dynamically change when needed.

The VFD takes the 3-phase AC line power input & converts it into a synthetic 3-phase signal to the motors. This allows it to change the Frequency, Voltage, & Amperage being applied, to whatever the motor needs for its operation. Pumps powered by VFD's can therefore provide a much wider operational range with the same Impeller.

The Overwatch's Pressure Sensor measures the Suction head at the pump's inlet, to monitor the liquid level in the upstream pipes. The Overwatch's control logic & PID loop attempts to maintain a constant liquid level in the upstream pipes, called the Level Setpoint. If flow increases into the pump, the liquid level rises, and the Overwatch measures a higher pressure on the suction. The VFD then increases the speed (frequency) of the motors to increase its pumping flowrate, until that liquid level begins to drop back down towards the Level Setpoint. The same is true in reverse; if the liquid level begins to decrease, the motors will decrease in speed to reduce the pumping flowrate until the level returns to the Level Setpoint.

If the liquid level falls too low, the pump will shut off to stop pumping entirely, and wait until the liquid level builds up enough volume for the primary pump to activate again and resume pumping.

This makes the Overwatch quite different from the Fixed-speed Submersible Pumps it is often replacing. Rather than managing a fixed Volume of liquid in a well or basin, pumping in short "batches" throughout the day, the Overwatch is dynamically adjusting its continuous pumping to match whatever flowrate is coming through the inlet. It can handle peak-flow conditions as well as times of low demand, or adjust to gradual seasonal changes dynamically.

On a Multi-Pump Overwatch system (Duplex, Triplex, or Quadraplex), the system will periodically switch which pump is currently active, to allow each motor an interval of activity & rest. This improves the overall Lifespan of the pump system, by distributing the load evenly between all pumps, and preventing any negative effects from the Auxiliary pumps sitting stagnant for too long.

Additionally, in the event of anomalously high flow, such as during a flooding event, a multi-pump Overwatch system can activate the other Lag pumps to run in parallel with the Lead pump. This can temporarily increase flow beyond the maximum operational range a single pump will produce. The lag pump(s) will activate when a very high liquid level is detected, and then deactivate once the liquid level returns to the normal operational range for a single pump.

Overwatch PID Behavior

When the overwatch activates in Automatic mode, it goes through 3 phases of operation.

Initial Purge clean

Upon reaching it's high level, the pump will activate, and start with an initial 'clean' or purge. The Pump accelerates to it's maximum frequency (or user defined alternative) for a default of 2 seconds (adjustable). This is to clear out any bubbles, fats/grease, or solids which may be present in the pump's volute. This also serves to actuate any swing-check valves which may be on the pump's discharge, so it can overcome a "Dead-Head" condition.

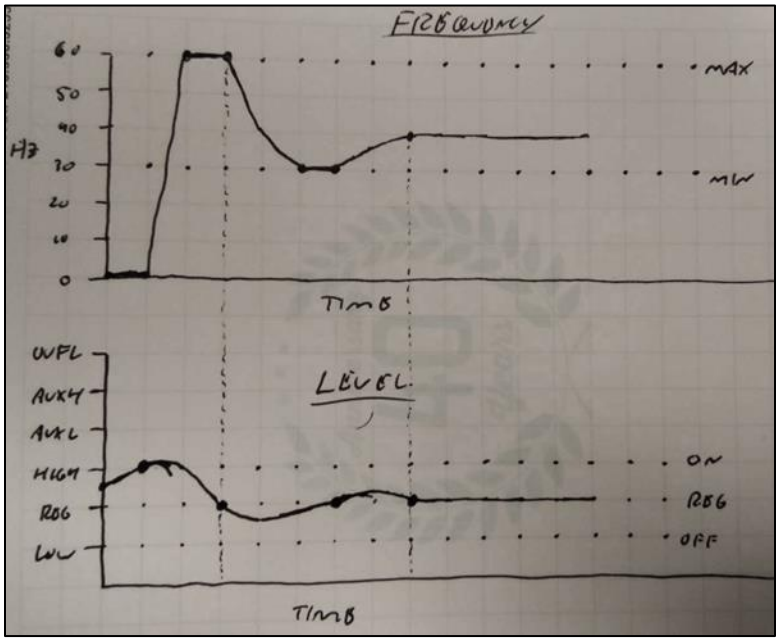
Transient PID

After the Initial Purge Clean, the pump's speed will drop, and the PID algorithm will then begin hunting to match the inlet flow and maintain its Level Setpoint. The pump will gradually speed up and slow down, as it attempts to bring the liquid level up or down towards the level setpoint.

Steady-State Pumping

Ideally, the pump should converge onto the level setpoint, and pump at a uniform speed.

If the inlet flow is not high enough (during low-demand times), the pump will slow to the minimum speed (30Hz default) and stay there. If the liquid level falls below the Lead Stop setpoint, the pump will decelerate off, and remain in stand-by until the liquid level increases to the Lead Start setpoint.



Home Screen

The Home screen shows an overview of the wet wells and pumps on site.

Back

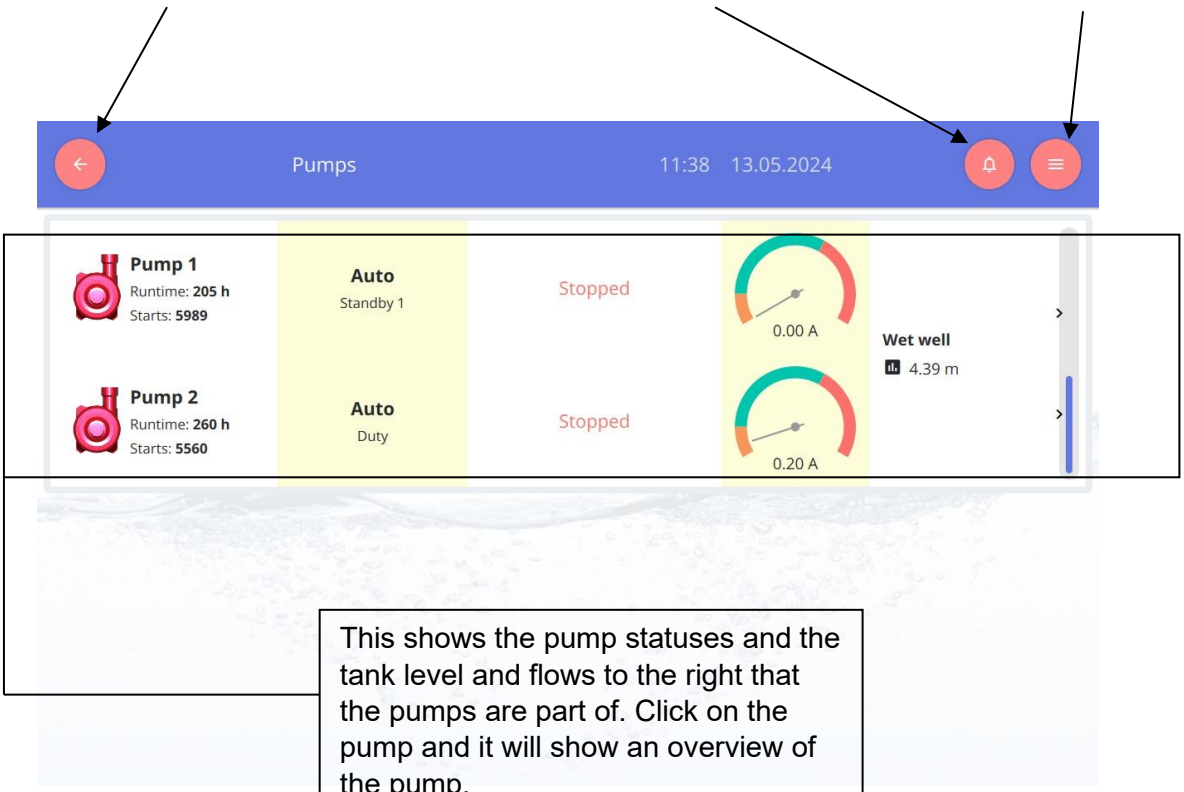
Use this button to navigate back a menu level

Alarms

Press this button to get access to the Alarms/Events

Menu

Press this button to get access to the Pro menu

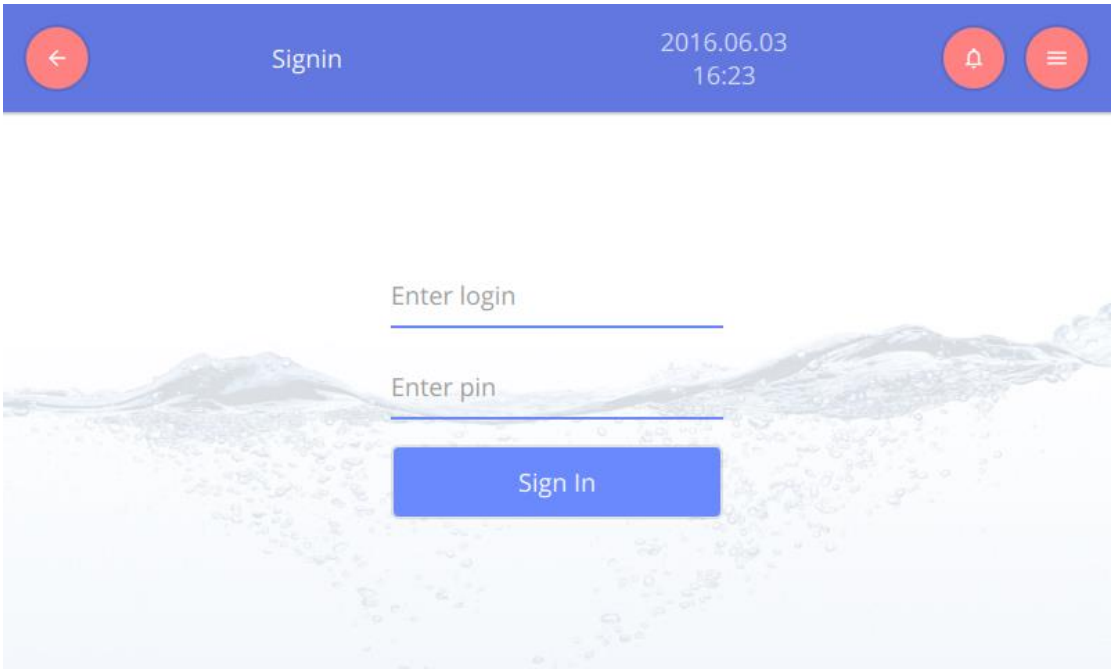


This shows the pump statuses and the tank level and flows to the right that the pumps are part of. Click on the pump and it will show an overview of the pump.

Sign in

To access the advanced menu the user should sign in by clicking on the sign in in the menu.

The user should then enter their username and passcode then Sign In.



How to Sign In:

1. Press the Menu button
2. Press Sign In
3. Enter Login – admin
4. Enter PIN – 0000

Overwatch Level Setpoints

The Overwatch uses 5 Level setpoints to manage its behavior.

TABLE	
Lead Start	Lead pump Activation point.
Level Setpoint	Liquid level that the Pump will try to maintain at the suction
Lead Stop	Lead Pump Deactivation Point. Typically, the minimum water level for the pump to remain primed with liquid.
Lag 1 Start	Lag Pump 1 Activation Point. While Lead pump is operating.
Lag 1 Stop	Lag Pump 1 Deactivation Point. Typically the same as the Lead Pump Activation Point (High Level)

These level setpoints are expressed as a physical Height in Meters, measured vertically from the Pressure Sensor on the pump's suction. They can be changed in the Deragger Pro (see instructions below)

Every Overwatch leaves the factory with a set of default level setpoints as a baseline for its Automatic regulation. These can allow a newly installed system, to begin automatic operation right away, in most standard applications with either a Horizontal or Vertical Inlet.

CAUTION: *Every Customer's plumbing layout is unique, and these setpoints will likely need to be adjusted during commissioning, to ensure the Overwatch properly operates in the customer's system. Proper Regulation & smooth operation must still be observed, and signed-off to accept the factory defaults as valid during the pump's commissioning.*

IFS Overwatch Pump	Min Suction Pipe Diameter	Lead Stop	Level SP	Lead Start	Lag1 Stop	Lag1 Start	Overflow
OW11-11H, 21	0.125	0.20	0.27	0.31	0.31	0.56	0.83
OW31-31R, 61-61R, 101-101R	0.150	0.30	0.38	0.42	0.42	0.72	1.05
OW61H-61HR, OW101-101HR	0.150	0.70	0.78	0.82	0.82	0.9	1.45
OW131R, 151-151B	0.300	0.50	0.80	0.95	0.95	1.25	1.50
OW201-201B-201BB	0.400	0.50	0.90	1.10	1.10	1.50	2.00
OW301-301B	0.500	0.65	1.15	1.40	1.40	1.90	2.50

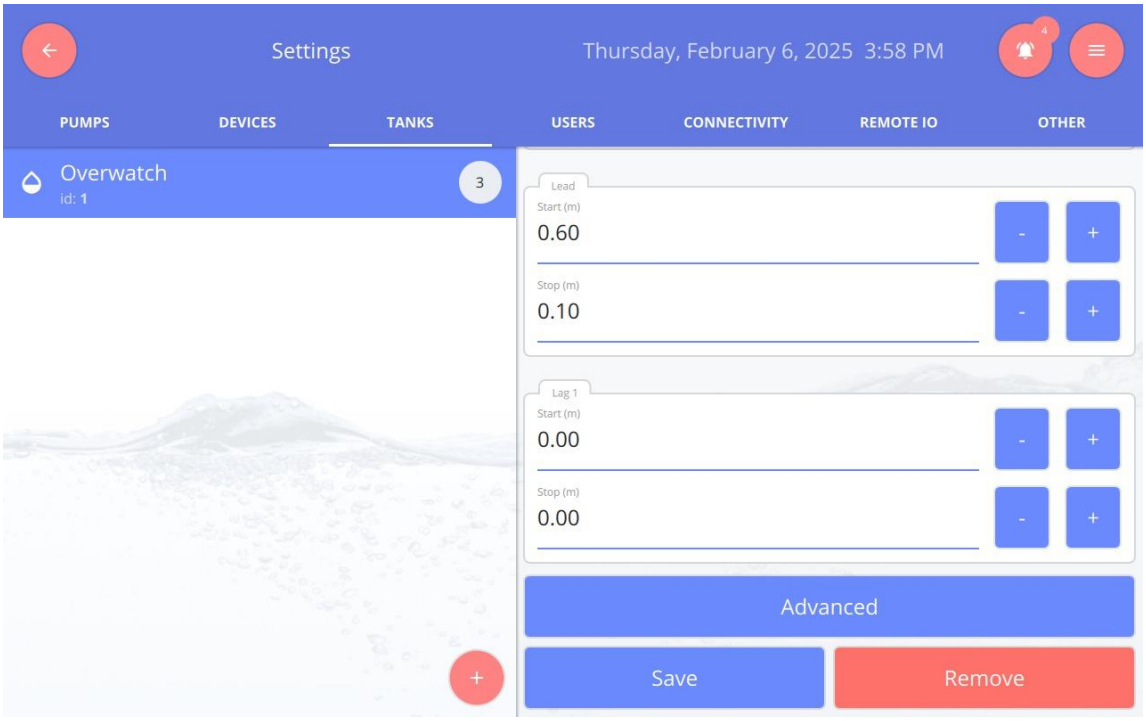
IFS Overwatch Pump - 'V'	Min Suction Pipe Diameter	Lead Stop	Level SP	Lead Start	Lag1 Stop	Lag1 Start	Overflow
OW11-11H, 21	0.125	1.25	1.63	1.76	1.76	2.39	2.5
OW31-31R, 61-61R, 101-101R	0.150	1.50	1.95	2.1	2.1	2.85	3
OW61H-61HR, OW101-101HR	0.150	3.00	3.45	3.6	3.6	4.35	4.5
OW131R, 151-151B	0.300	3.00	3.9	4.2	4.20	5.7	6
OW201-201B-201BB	0.400	4.00	5.2	5.6	5.60	7.6	8
OW301-301B	0.500	5.00	6.5	7	7.00	9.5	10

Start/Stop Setpoints

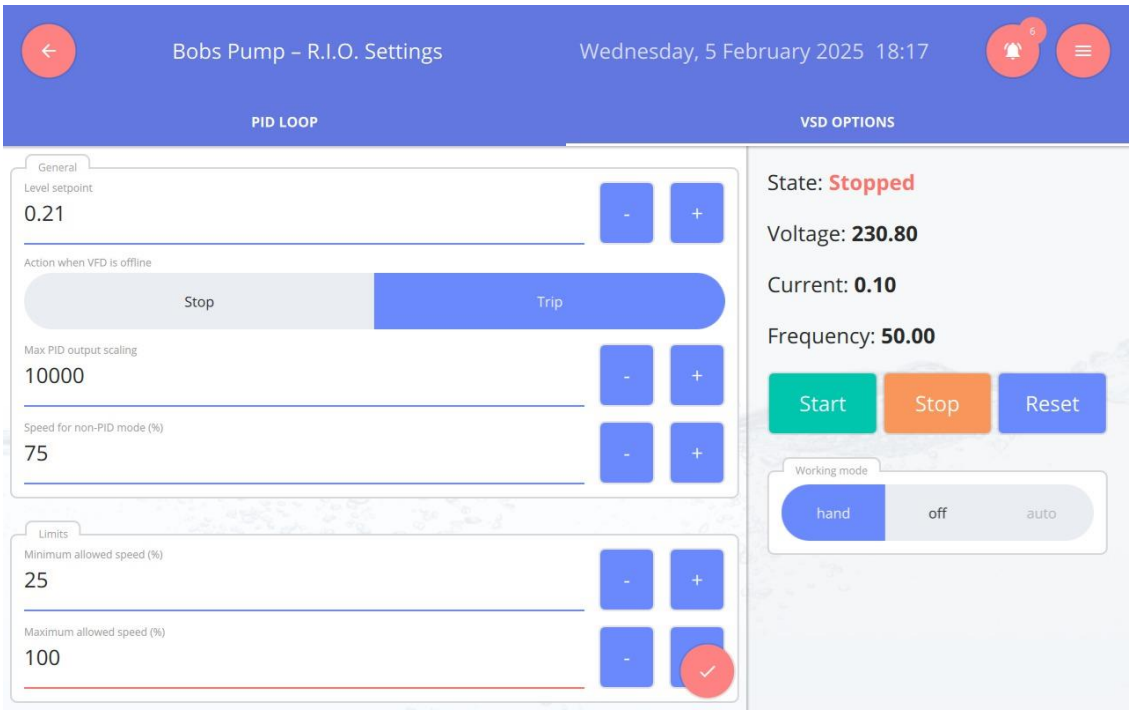
Note: A level device must be configured and assigned to the ‘Overwatch’ under Tanks. This should already be configured at the factory prior to shipment.

How to set the Lead/Lag, Start/Stop Setpoints:

1. Press the Menu button
2. Press Settings
3. Press Tanks
4. Tap on the name of the tank you are working on (OverWatch)
5. When the settings pop up on the right side, scroll down to Lead and set the Start and Stop settings in meters.
6. Then scroll down to Lag1 and set the Start and Stop settings in meters.



To set up duty standby enter 0 in the start and stop levels of the assist/lag pump.



While the Start & Stop points are configured in the tank, the Regulating Level Setpoint is configured separately for each pump.

How to set the Level Setpoint:

1. Press the Menu button
2. Press Settings
3. Press Pump 1 or Pump 2
4. Press R.I.O. Settings
5. Press VSD Options Tab
6. Level Setpoint is the first option
7. This needs to be completed on both pumps

Commissioning Adjustments

CAUTION: *Refer to commissioning documents & IOM for complete commissioning process. The writing below is to communicate how different parameters in the DIP System firmware affect the pump's functionality, and how to set them for a properly operating Overwatch system.*

To properly commission and set up your overwatch system, you will need to ensure that you have enough fluid to operate the system's continuous pumping for the duration. If you do not have sufficient flow to operate the pump for at least 5 minutes, it will not be possible to verify that level setpoints are adequate or diagnose system misbehaviors.

Minimum & Maximum Frequency:

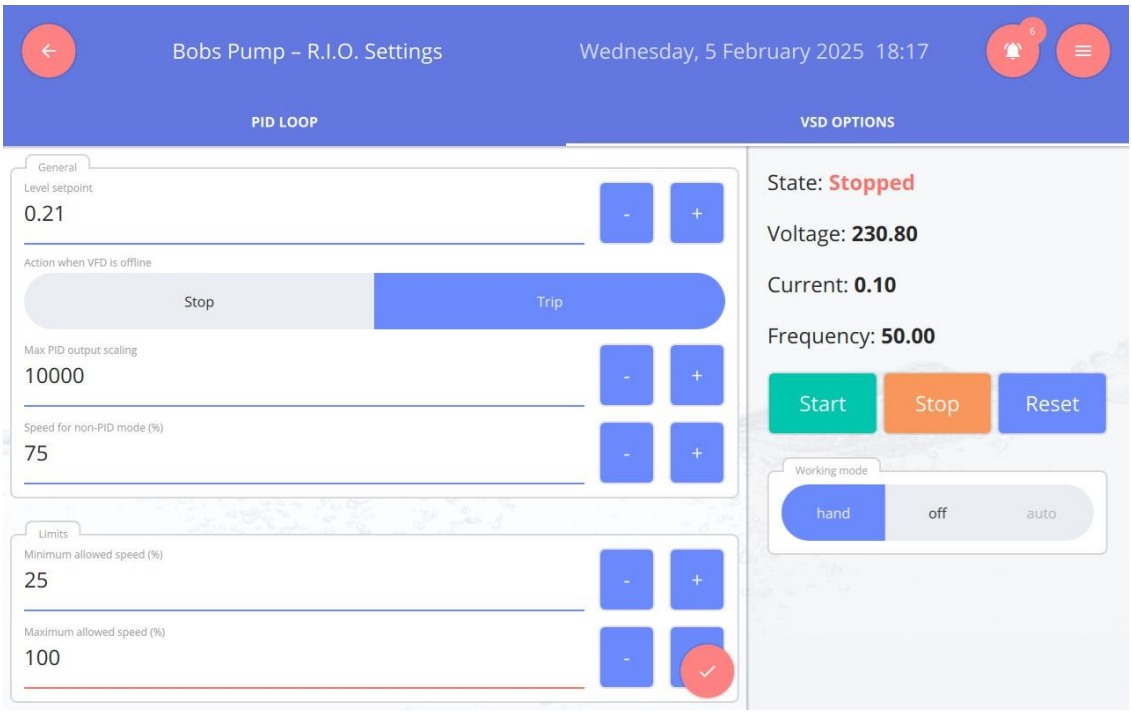
The First thing to check is whether minimum & maximum frequencies are sufficient for pump operation. All pumps ship with a default of 30hz minimum, and 60hz maximum.

Test to confirm liquid pumps at 30hz (minimum frequency) at steady-state operation. If not, raise minimum frequency by 2-5 hz. Re-test to confirm liquid pumping.

So long as the pump can operate at 30hz after the initial purge-clean

Limits

Minimum and maximum allowed speed sets the maximum and minimum output in % of the PID loop

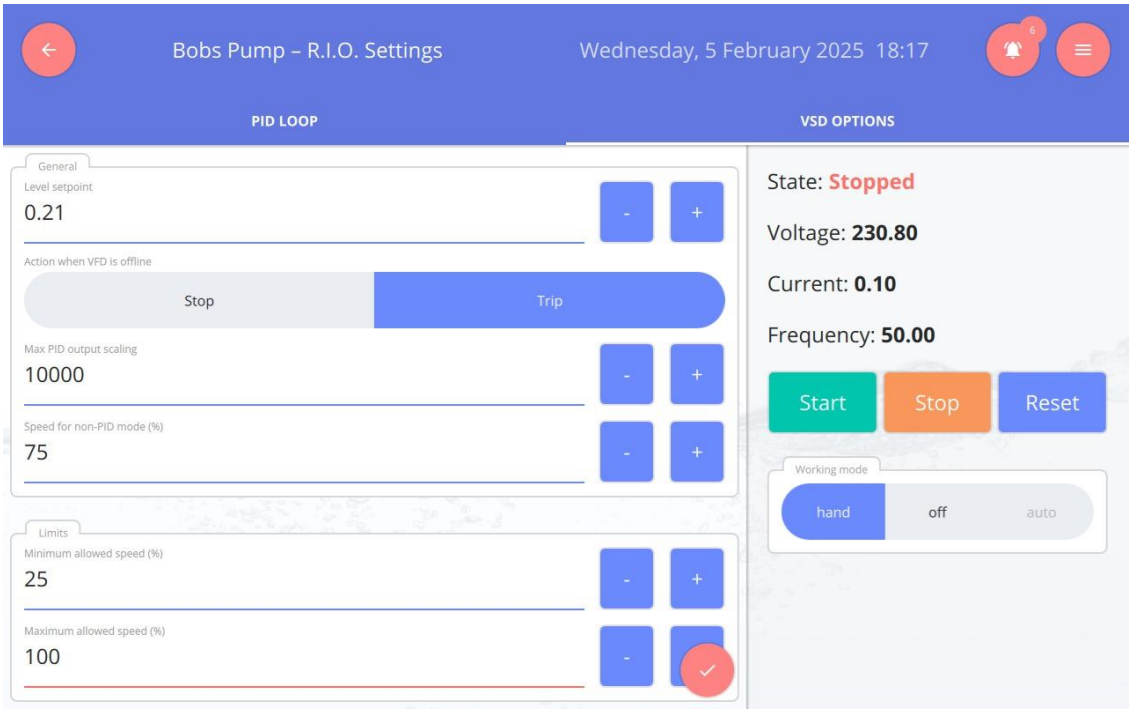


How to set the Minimum and Maximum Allowed Speed %:

1. Press the Menu button
2. Press Settings
3. Press Pump 1 or Pump 2
4. Press R.I.O. Settings
5. Press VSD Options Tab
6. Minimum Allowed Speed is in the Limits box
7. Maximum Allowed Speed is in the Limits box
8. This needs to be completed on both pumps

Speed for non PID mode

The speed reference sent to the VFD when the PRO is not in PID mode. This could be in Hand mode or if the level transmitter fails

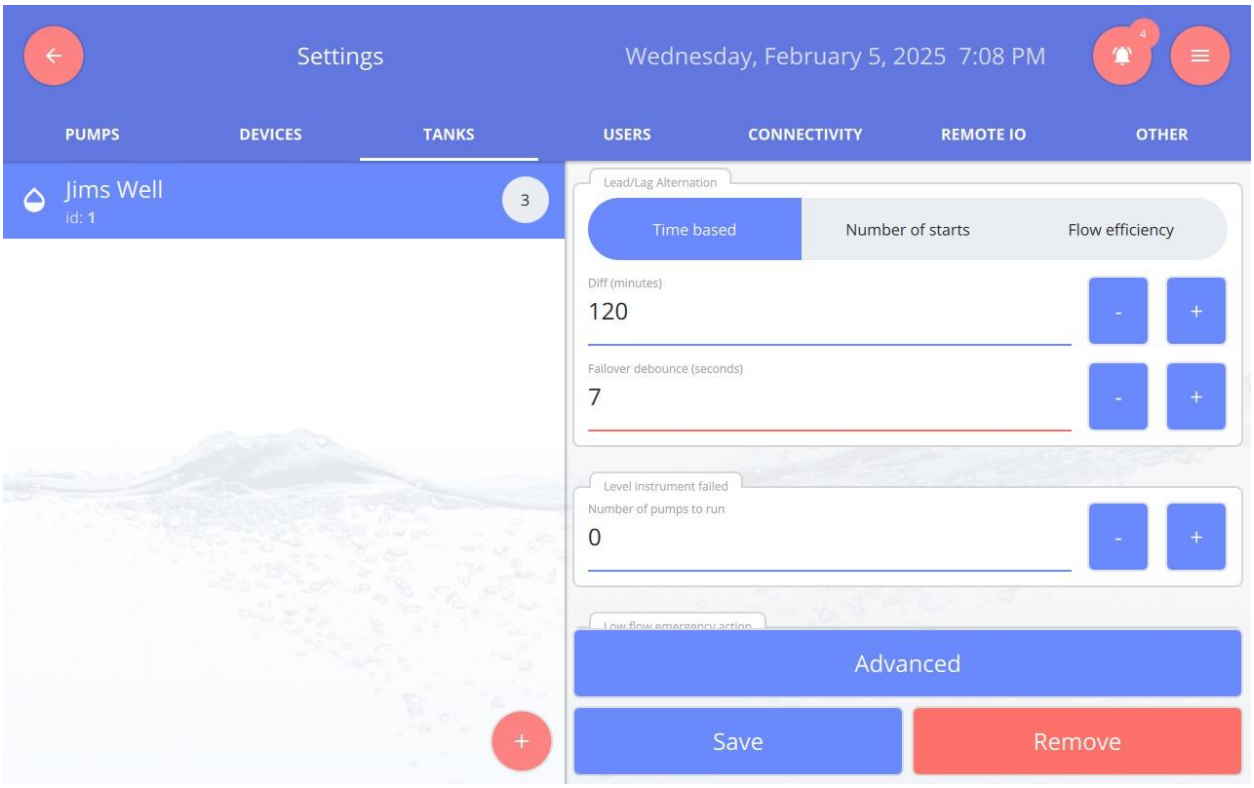


How to set the Hand Speed “non PID Mode” setting:

1. Press the Menu button
2. Press Settings
3. Press Pump 1 or Pump 2
4. Press R.I.O. Settings
5. Press VSD Options Tab
6. Look for the Speed for non-PID mode setting
7. This needs to be completed on both pumps

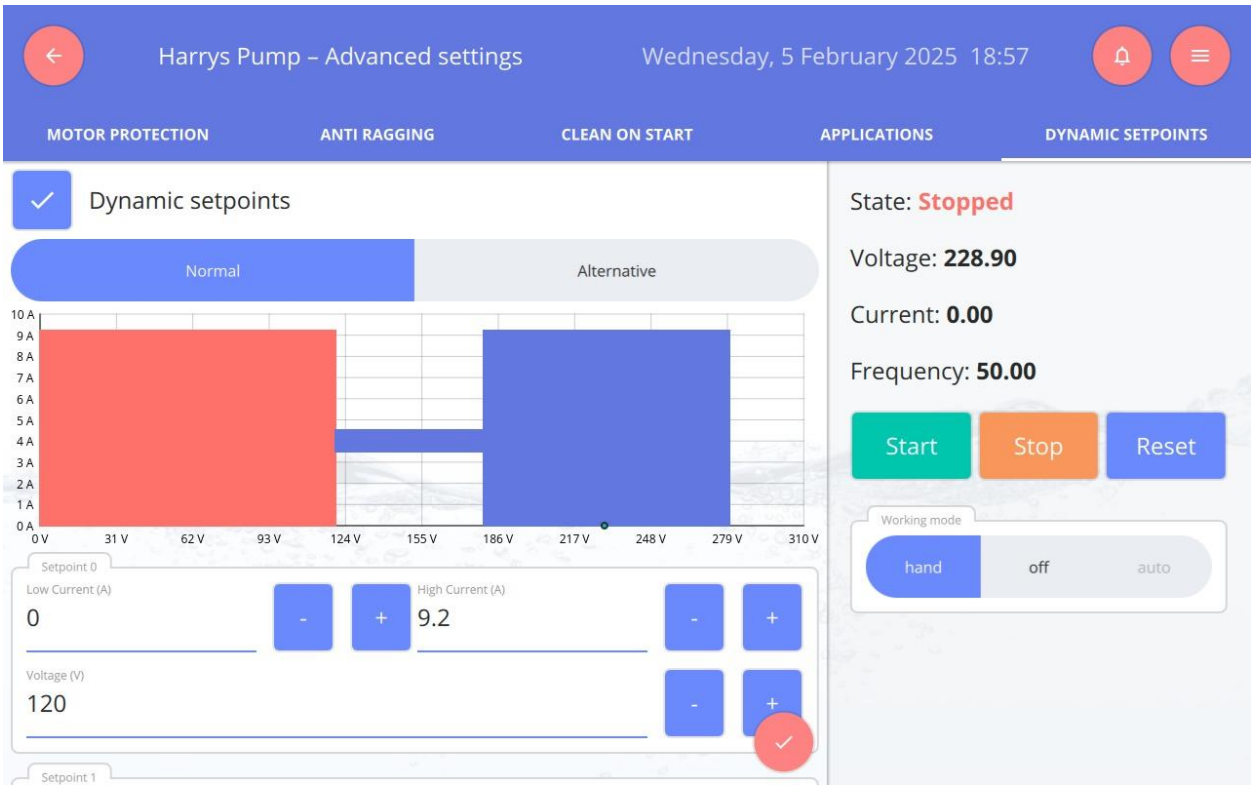
Lead/Lag Interval Time

Here the lead lag alternation can be selected either time based, number of starts, or flow efficiency.



How to set the Lead/Lag Alternation settings:

1. Press the Menu button
2. Press Settings
3. Press Tanks
4. Tap on the name of the tank you are working on (OverWatch)
5. When the settings pop up on the right side, scroll down to Set Lead/Lag Alternation (we recommend Time Based)
6. Tap on Diff. and put the amount of minutes you want in there based on run time. If you put 120 minutes in the slot, then after 120 minutes of runtime, it will change to the other pump. Also, the Failover debounce is set to 7 seconds from the factory.



How to set the Dynamic Setpoints for Anti-Ragging:

1. Press the Menu button
2. Press Settings
3. Press Pump 1
4. Press Advanced button
5. Press Dynamics Setpoints Tab
6. You'll see 3 boxes

Setpoint 0 – (Low – 0) (High – 200% FLA) (Voltage – 120)

Setpoint 1 – (Low – FLA minus 20%) (High - FLA) (Voltage – 180)

Setpoint 2 – (Low 0) (High – 200% FLA) (Voltage – 280)

OverWatch Field Commissioning Checklist

DERAGGER Pro Controls on Duplex Pump Systems

Location Name	
Project Name	
Address	
Date	
Serial Number	
Pump Model	

Ensure mechanical and electrical installation has been completed by authorized personnel according to the OverWatch Instruction Manual, Engineering drawings, and supplemental materials. Completed installation includes: unit fully assembled, all fasteners tightened, all electrical connections completed, all cable gland seals tightened.

☐ Does the equipment that is installed match the sales order?

☐ Open all valves. Check for any leaks.

When mechanical checks are complete the following field commissioning checklist is specific to the controls.

☐ Does the power supply match requirements for pumping system?

☐ Check the incoming voltage with a voltmeter.

L1-L2_____V L1-L3_____V L2-L3_____V

☐ Confirm that all pump switches are in the OFF position on the control panel. Turn on the main power.

☐ Bump all motors individually and confirm rotation as indicated with the arrows on the pump volutes.

☐ Check amperage on all three legs with each pump running individually. The discharge valve(s) should still be open and the amperage quite low but balanced.

P#1 L1_____A L2_____A L3_____A

P#2 L1_____A L2_____A L3_____A

P#3 L1_____A L2_____A L3_____A

P#4 L1_____A L2_____A L3_____A

☐ Check to see if transducer is wired correctly, refer to Electrical Drawings.

☐ Check to see if [optional] flow meter is wired correctly, refer to Electrical Drawings.

☐ Check to see if [optional] sump pump is wired up correctly and that the sump pump overload is set to the motor FLA, refer to Electrical Drawings and Motor Nameplate. Test the sump pump.

☐ Set up thermostat to avoid condensation and overheating. Use local guidance and VFD and component manuals for appropriate settings.

☐ Ensure (optional) A/C unit is operational.

☐ Set Minimum Frequency & Maximum Frequency speeds, may require some iteration from factory settings during commissioning to determine specific values. In most cases, the maximum frequency does not need to change. Note that the Drives min and max frequencies are set at the factory and should not be adjusted, any adjustments will be done in the Pro.

- In RIO Settings VSD Options Minimum Frequency (%) Pump 1 Factory Default: 1 %; As left: _____
- In RIO Settings VSD Options Maximum Frequency (%) Pump 1 Factory Default: 100 %; As left: _____
- In RIO Settings VSD Options Minimum Frequency (%) Pump 2 Factory Default: 1 %; As left: _____
- In RIO Settings VSD Options Maximum Frequency (%) Pump 2 Factory Default: 100 %; As left: _____
- In RIO Settings VSD Options Minimum Frequency (%) Pump 3 Factory Default: 1 %; As left: _____
- In RIO Settings VSD Options Maximum Frequency (%) Pump 3 Factory Default: 100 %; As left: _____
- In RIO Settings VSD Options Minimum Frequency (%) Pump 4 Factory Default: 1 %; As left: _____
- In RIO Settings VSD Options Maximum Frequency (%) Pump 4 Factory Default: 100 %; As left: _____

☐ Set Operating Set Points, based on installation. Will require some iteration during commissioning to determine specific values.

- Tanks tab Lead Stop: Low Level where lead pump shuts off. As left:_____
- RIO Settings then VSD Options: Level Setpoint (Regulating). As left:_____
- Tanks tab Lead Start: Lead pump turns on. As left:_____
- Tanks tab Lag 1 Stop: Low level where lag pump shuts off. As left:_____
- Tanks tab Lag 1 Start: High level where lag pump turns on (both pumps running in parallel). As left:_____
- Devices Level Source Alarm Levels:
  - Low Low As left:_____
  - Low As left:_____
  - High As left:_____
  - High High As left:_____

☐ After completing settings, leave panel in “auto” and observe multiple cycles to determine if parameters allow for stable operation.

☐ Set Sensor Loss Frequency, the speed at which the pump will run in the event the pressure transducer fails, in RIO Settings VSD Options.

- Speed for Non PID Mode (%) Factory default varies. As left:_____

☐ Set Pre-Set speed to output frequency desired when pump is in Hand mode.

- Starting Speed (%) Factory default 100%. As left:_____

☐ Set Pre-Set speed to output frequency desired when pump is in Clean.

- Reverse Speed (%) Factory default 100%. As left:_____

☐ Enable and set the following if applicable:

- Motor Protection
- Anti Ragging
- Clean on Start
- Applications
- Dynamic Setpoints
- Dry Well protection

☐ Save Pro backup file

☐ Generate Pro Settings Report

- Launch ProSettingsReport (Pro Settings PDF Report Generator).
- Drag and drop backup file and fill in: Commissioned by, Pro Software Version, Deragger Software Version, RIO Firmware Version, Site Notes.

☐ Note changes, if any, made to RIO or Power Monitor settings or PLC program (optional) and backup applications if needed.

_____

_____

_____

_____

☐ If applicable, confirm that the controller is communicating via SCADA or other telemetry.

Additional Comments:

_____

_____

_____

_____

Final Signoff

☐ Equipment is ready for operation

☐ Operating personnel trained

Operating personnel sign off

Name (printed)	Title/Company	Signature	Date
Name (printed)	Title/Company	Signature	Date

Industrial Flow Solutions or designated field representative sign off

Name (printed)	Title/Company	Signature	Date
Name (printed)	Title/Company	Signature	Date

Revisions

ECN	Rev	Description	Date	Created By	Reviewed By	Approved By
-	01	Initial Draft		JB	BH	
-	02	Formalized into EI Doc	08/05/25	RMc	GM	GM