ECOMIZER-PRO
USER MANUAL

HIGH QUALITY MOBILE PUMP CONTROLLERS

Introduction

Congratulations on your purchase of an Impulse Pump unit with ECOMIZER-PRO control technology.

The ECOMIZER-PRO is an emissions-reducing and fuel-saving mobile pump and engine controller that can automatically handle the unit's performance based on the changing conditions in a pump pit. Adjusting the revolution cycles depends directly on the amount of supplied medium that needs to be pumped.

Pump units equipped with the ECOMIZER-PRO offer the best of both worlds - the mobility of a self-operating diesel pump set with the full flexibility of a frequency-controlled electric fixed installation. With the ECOMIZER-PRO control technology, both diesel and electric driven mobile pumps can achieve significant emissions reductions and fuel savings of up to 55% when compared to similar equipment without this technology.

The ECOMIZER-PRO achieves full automation with comprehensive log data on the pump's use, such as operating hours, production days, hours until the next service, and/or time-related warnings or alarms when exceeding adjustable limits. The user can choose some limits and/or parameters attuned to their own operations.

The ECOMIZER-PRO, with optional internet connection, allows you to remotely monitor and even operate the pump set from any computer with internet connection.
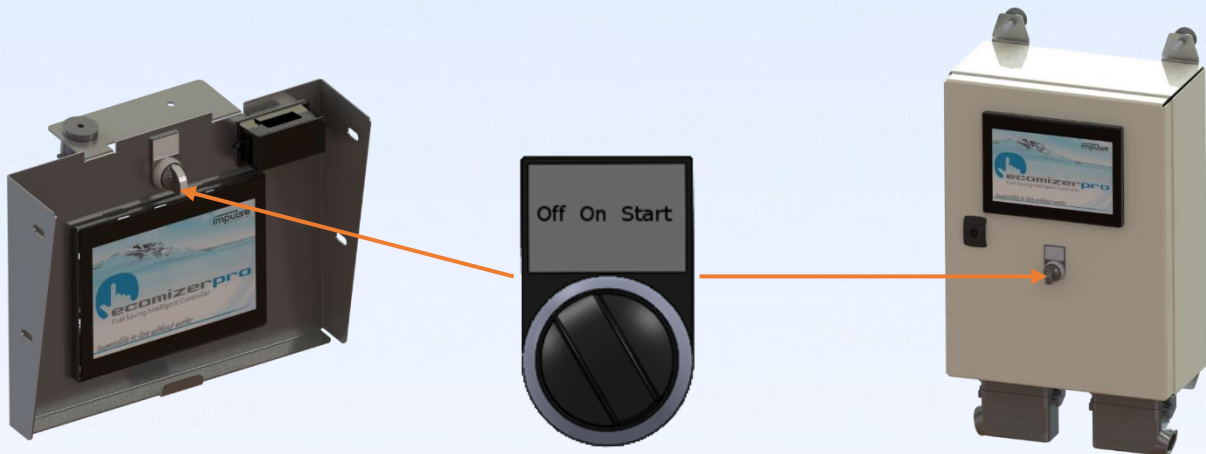
Impossible to live without water

1. Screen Activation

All Impulse Pumps equipped with ECOMIZER-PRO are operated using only a single switch. To activate the display, keep the switch in the "Start" position until the display lights up (approximately 5 seconds). Once it has lit up, you can release the switch, which will return to the "On" position. In the "On" position, the unit is active for remote operation.

Please be aware that the pump is in Stand-By mode as soon as the switch is in "On" position. Maintenance, repair, and/or transportation should never be done with the switch in "On" position.

1. To start the ECOMIZER-PRO: Hold the "Off-On-Start" switch on the control box in the "Start" position, and wait until the Touch Screen display appears.

2. After these 3 seconds the switch can be released, and it return to its "on" position. When no further actions are made during the shutdown delay (standard on 2 minutes) the ECOMIZER-PRO will switch itself into Stand-By. To reactivate the ECOMIZER-PRO the user has to turn the switch on "start" again, or when applied (optional), the pump can be started by Remote Control.

3. The "Off" position will shut down the Pump Unit completely. This position can be used as emergency stop. Make sure the ECOMIZER-PRO is on "Off" while maintaining, repairing, transporting or being stored.

Switching to "Off" Position has the same working as an emergency stop

2. Starting Screen

Depending on the purchased software version there are three possible starting screens available:

Manual Control (Only)

The pump will automatically shut down in Stand-By mode as soon as there are no further interactions with the display for more than 120 seconds.
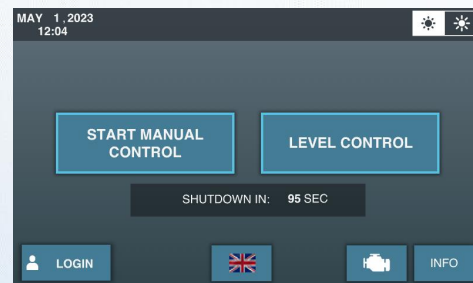
The **Manual Control (Only)** software option is mostly used on smaller pump sets which are generally operated on site. See Manual Control section to discover all advantages.

Level Control (Only)
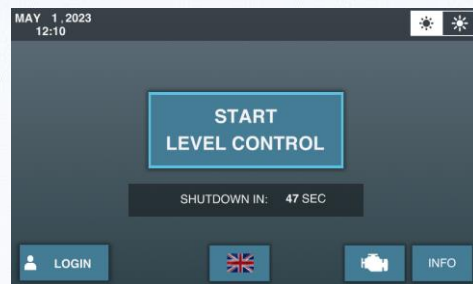
The **Level Control (Only)** software option is mostly used for larger pump sets for which Ecomizer-Pro can help reduce mistakes caused by human error.
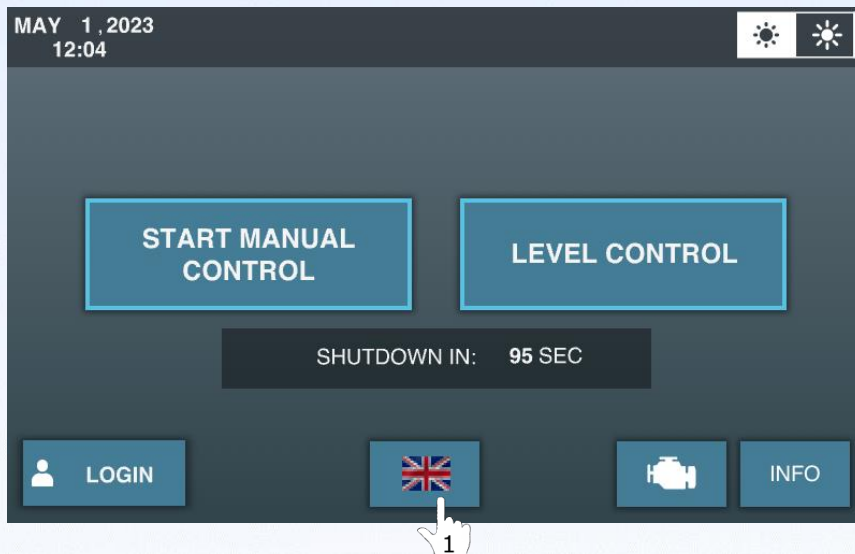
Ecomizer-Pro

The **Ecomizer-Pro** software option gives the user the choice of using either manual control or level control.

3. Ecomizer-Pro Explanation

From this point on the manual is based on the Ecomizer-Pro software version. The **Manual Control Only** and **Level Control Only** are both explained separately.

1 To change the Touch Screen language, press the [Language] button.

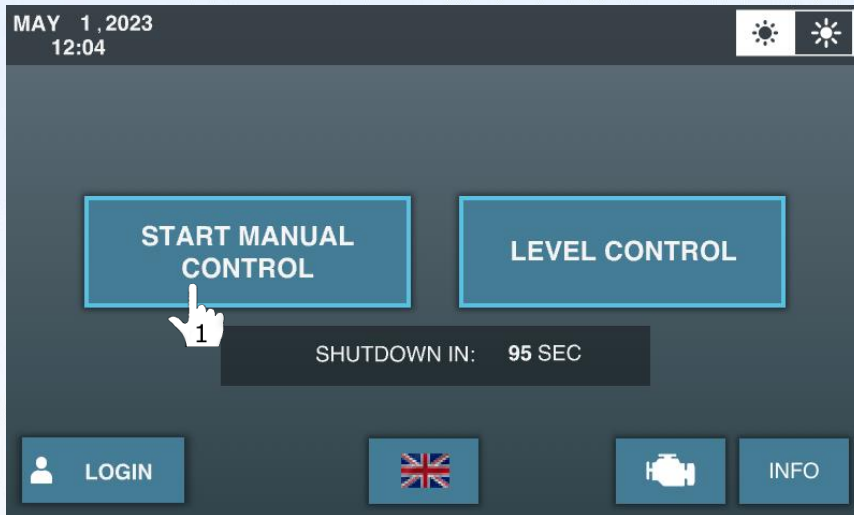2 Select the preferred language by pressing the flag on the pop-up.

Note:

USA flag uses the Imperial system (PSI, Inch, Ft, and Gallons/h).
All other flags use the Metric system (Bar, Metre, Litre, m3/h).

4. Manual Control

In manual control you can activate the pump unit and set the RPM value according to your preferences.

1 Activate Manual Control by pressing START MANUAL CONTROL

Be aware that RPM adjustment is only possible as soon as the system has been primed (full of water). As long as there is no water present, the REV UP and REV DOWN buttons are not being displayed on the screen.

As soon as "START MANUAL CONTROL" has been selected the following screen appears:
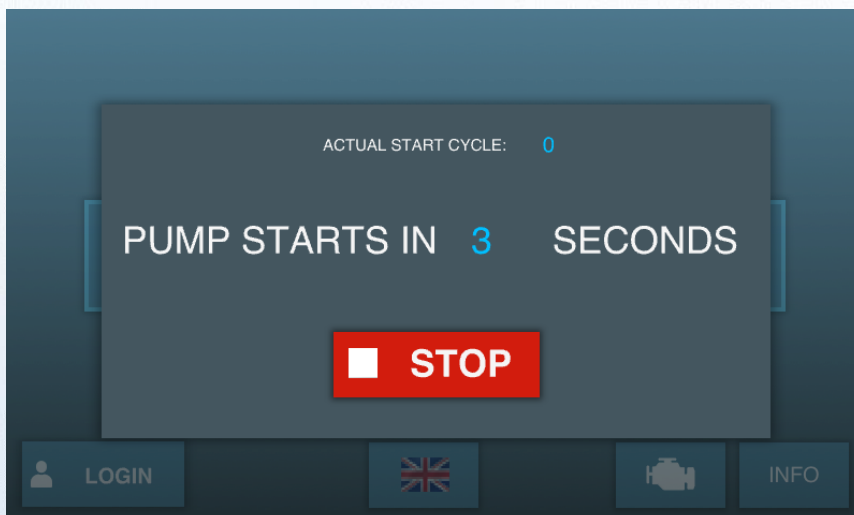
The pump starts up after 5 seconds and a warning beep is given. You can stop the start-up procedure at any time by pressing the red "STOP" button.

As soon as the pump has started the following screen appears:

General Data

MAY 2, 2023
11:18

MANUAL CONTROL

19 %
1010 rpm
1.6 L/hr
0 M³/hr
CAPACITY FROM PUMP GRAPH

AIR DETECTED
**Vacuumpump
Active**

Manual Control Active

ACTUAL SETPOINT: 1000 rpm

■ **STOP**

INFO

Air in system

Vacuum pump is active.

Air in suction hose is displayed by "AIR DETECTED" and a blue dot.

As soon as the pump has been primed "REV UP" and "REV DOWN" buttons appear.

MAY 2, 2023
08:12

MANUAL CONTROL

21 %
1000 rpm
1.9 L/hr
-0.1 bar
PRESSURE

Manual Control Active

**Vacuumpump
Active**

ACTUAL SETPOINT: 1000 rpm

REV DOWN   **REV UP**

■ **STOP**

INFO

Slide show:
• Flow rate
• Pressure
• Vacuum

System primed

Vacuum pump is active and will turn off when the pump is primed (full of fluid) for more than 20s.

REV UP and REV DOWN buttons together with setpoint.

4.1 Main screen during operation (Manual Control)
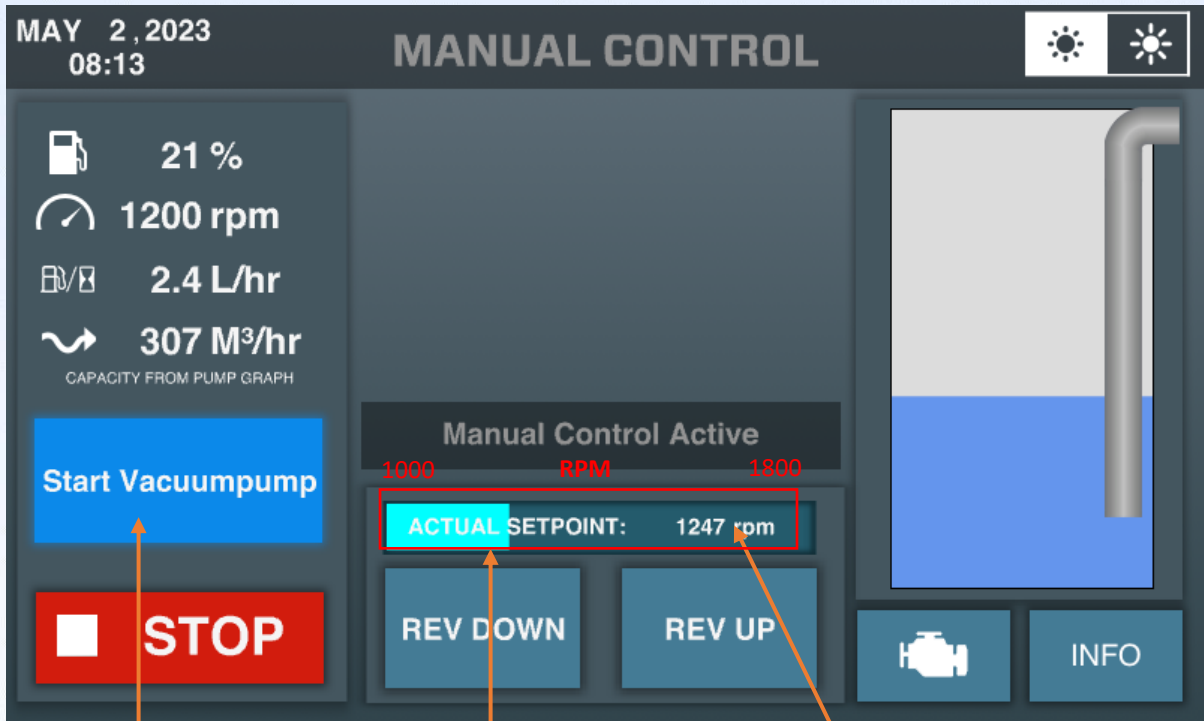
Vacuum pump
is not active
(system is fully
primed)

RPM bar. In this unit from
1000 RPM to 1800 RPM.

Manual set
setpoint (RPM)

4.2 Air Snoring in Manual Control

In manual control the pump will keep on running even when air is detected.
The automatic shut-down of the unit after 900s of priming air is ONLY in this
mode not activated. As air is detected the unit will rev down to 1000 RPM,
vacuum pump will be activated, and the pump will keep on priming/snoring.

4.3 Intelligent Manual Control by ECOMIZER-PRO

If air is detected and the pump starts snoring/slobbering the RPM will automatically fall
down to idle RPM (in this case 1000 RPM). The setpoint is still in memory and as soon as
the system is fully primed again, the unit will automatically rev up to its setpoint.

Remarkable Advantages:
- Fuel Reduction
- Emission Reduction
- Noise Reduction
- Wear Reduction
- Extended Lifetime

5. Level Control

Level Control provides the advantage that the pump performance is automatically adjusted to the available amount of medium (flow). The units come equipped with a hydrostatic pressure sensor and/or a ball float switch. The two connectors for the sensors have different connection points (4 pins or 5 pins), eliminating the possibility of connection mistakes. This needs to be connected in the pump set.

Activate Level Control
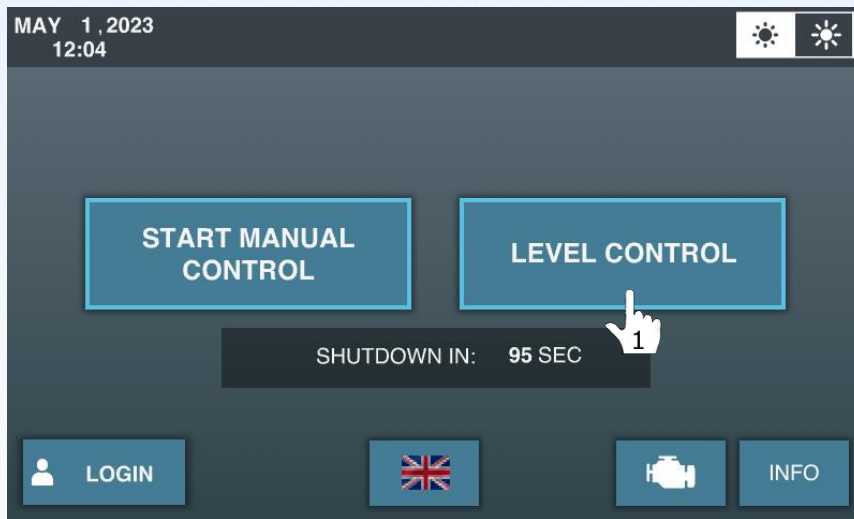
If there are no sensors connected the following screen appears indicating that the level sensor needs to be connected.
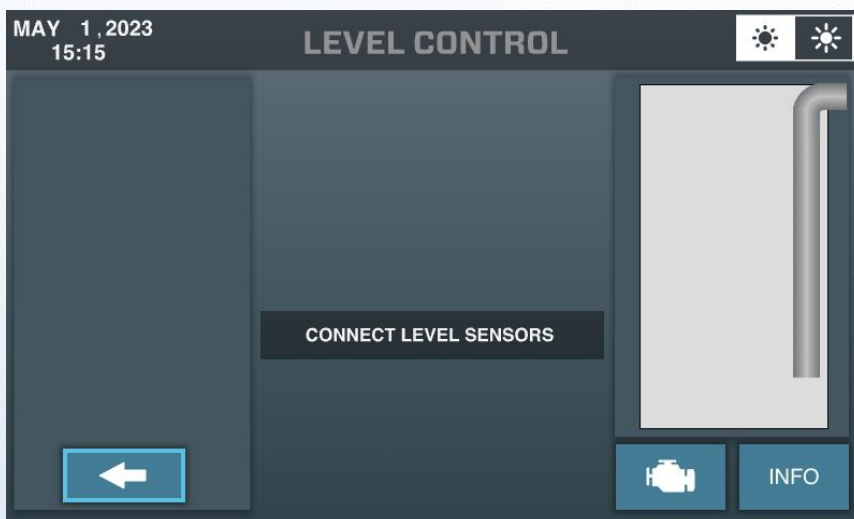
There are three possible ways of connecting the level sensors. Every sensor is creating its own distinct display.

5.1 Installing/positioning of the Ball Float Switch

1. Put a tube (longer than total pit depth) inside the well. Now mark the level at which the pump needs to start pumping. This is the position at which the ball float should be mounted.

The ball float switch will float (up) as soon as the water level rises above this point. As soon as the float stays up the pump will be activated.

> Please make sure the Ball Float Switch is secured in such a way that the float can not interfere anywhere.

2. Secure the Ball Float Switch using a tie-wrap or tape on a (sinking) tube as shown below.

Keep distance between float and tie-wrap small to avoid getting tangled.

Ball Float Down. On screen:

Ball Float Up (activated). On screen:

5.2 Connecting Ball Float Switch Only
The following screen appears:


Ball Float Switch Connected (Down)

In this mode ensure that the ball float is positioned (floating) at the desired level at which you want the pump to start. After installing the ball float, activate the pump by pressing the START button.
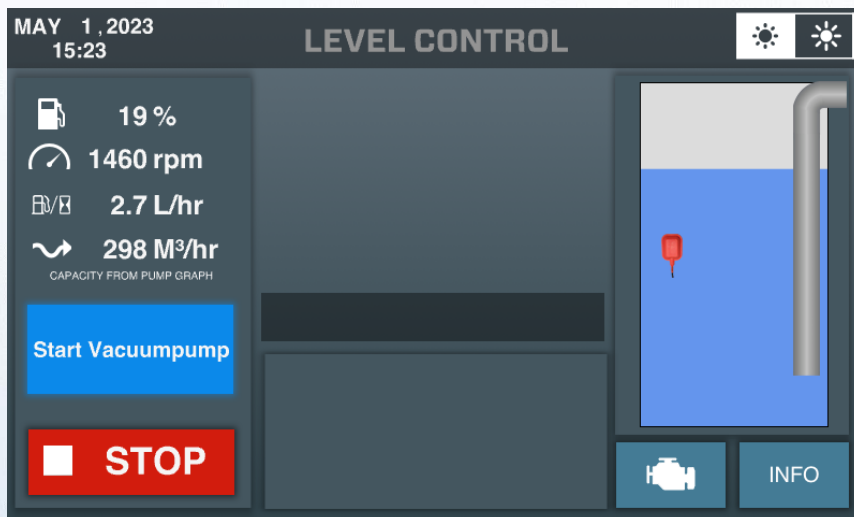
Active pump unit on ball float switch waiting for fluid (ball float switch down).
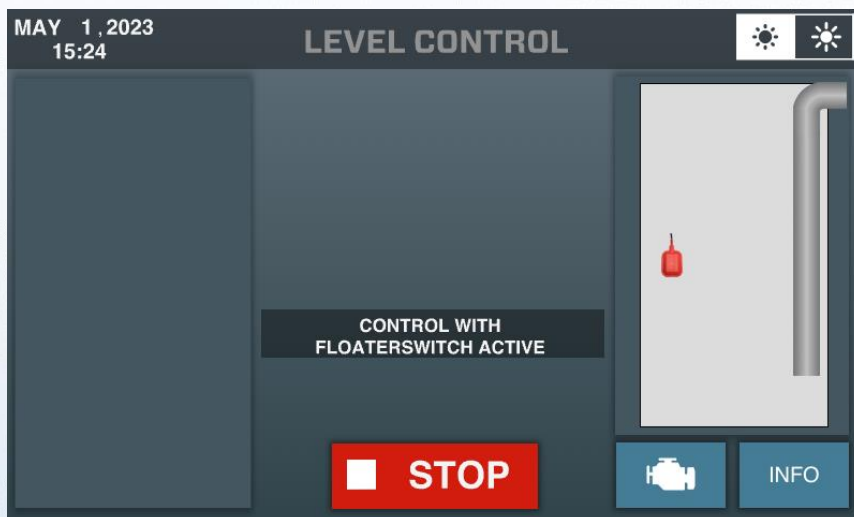
As soon as the water level will activate the pump by lifting the float switch up, the following screen appears:

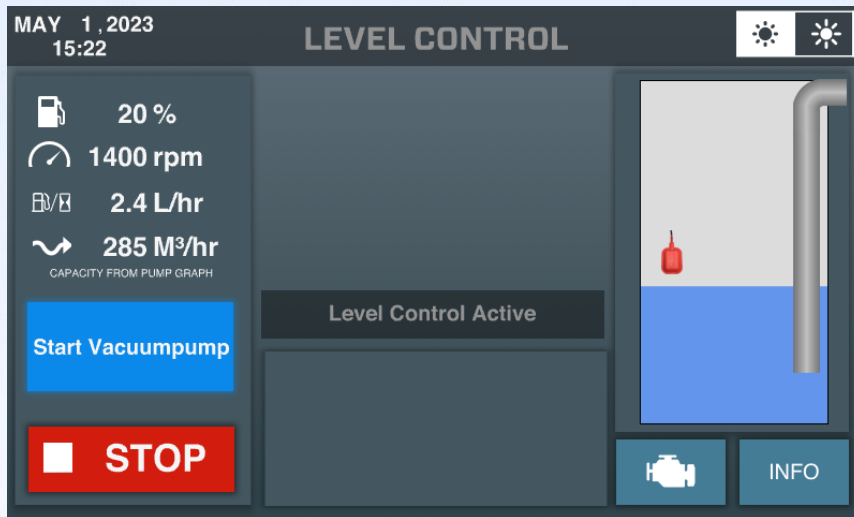Ball Float Switch Connected (Up)
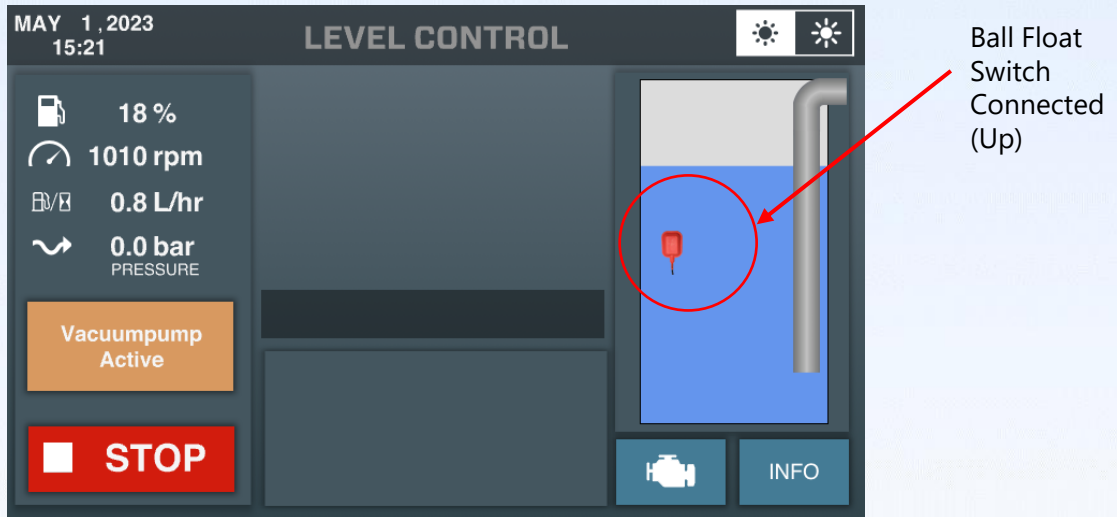
The vacuum pump is active and will prime the system. After full activation the following screen appears:
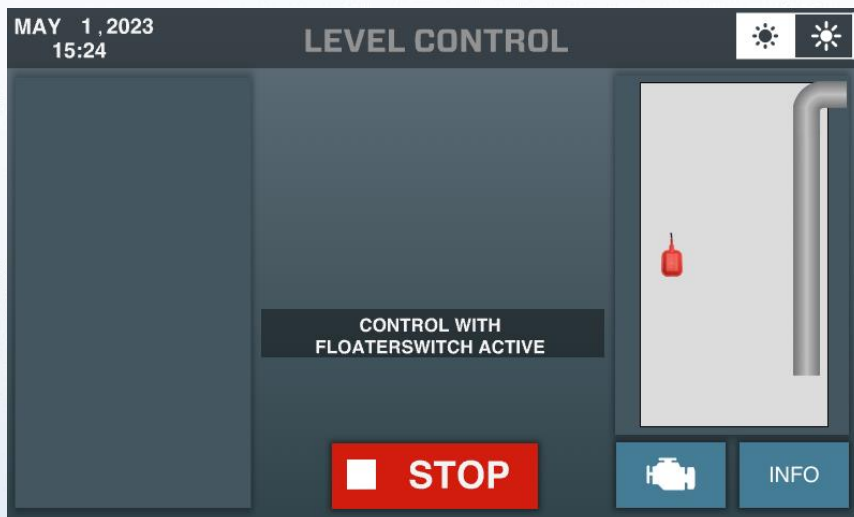

As long as the float switch is up the engine will slowly rev up to maximum RPM.

If the water level comes down and the float switch will be down the unit will slowly rev down to a minimum of 1400 RPM.

As soon as the water level comes up to a level that the float switch will come up again the pump will rev up again.

As soon as air enters the suction line the pump will shut itself off (stops) and will be waiting until the time the float switch will be up again.

5.3 Installing/positioning of the Hydrostatic Pressure Sensor (HPS)

1. Put a filter/well point tube with end cap (longer than total pit depth) inside the well.
2. Place the HPS inside the filter well point tube and sink it completely to the bottom.

Hydrostatic Pressure Sensor (HPS)

Filter/well-point tube. Placed at the bottom of the pit.

TIP:

If you expect a lot of sludge at the bottom of the pit then place the HPS a little bit higher to avoid clogging of the holes of the sensor. The HPS cable has a small air line inside and **may never kink**. However, it is important to check and maintain the HPS regularly and put it back at the same position after maintenance.

Do not over-clamp the tie-wrap in a way that the inside air tube could be blocked.

Inspect the camp for clogged holes on a regular basis.
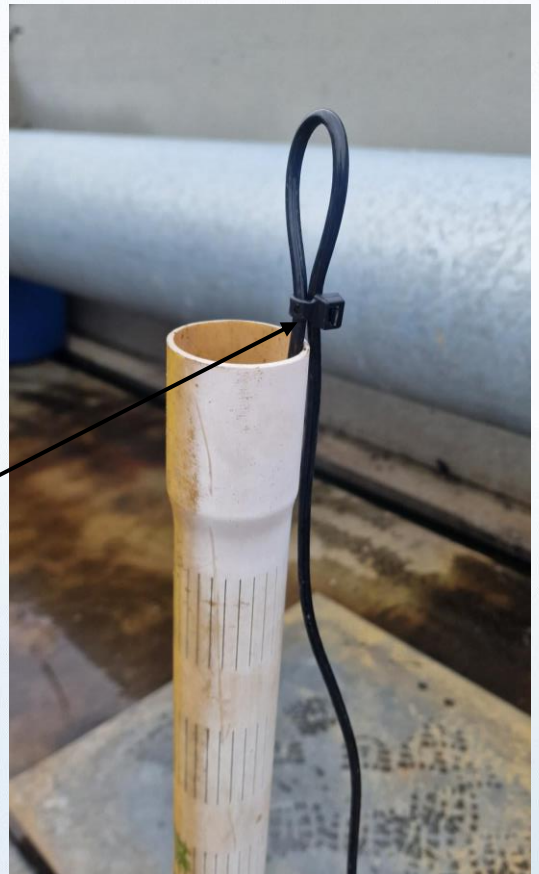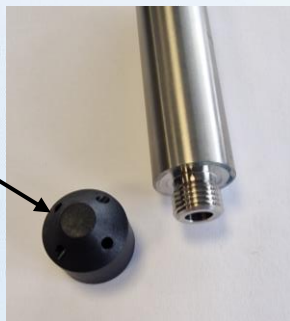
5.4 Connecting Hydrostatic Pressure Sensor Only
The following screen appears:

Hydrostatic Pressure Sensor Connected

The HPS sensor should be positioned at the bottom or just above the bottom (to avoid sludge) of the pump pit. Make sure that the sensor is always leveled below the suction hose/strainer of the pump. The best way is to install the HSP inside a well point (filter tube) and as far away as possible from suction inlet/strainer.

After the HPS has been installed in the pit, the column of fluid above the sensor is given on the screen in the green highlighted "Actual level" bar. This value given is the vertical distance from the bottom of sensor up till the water surface level above the sensor.

Knowing this value already, all parameters needed to let the pump unit work fully automatically and independently have to be set.
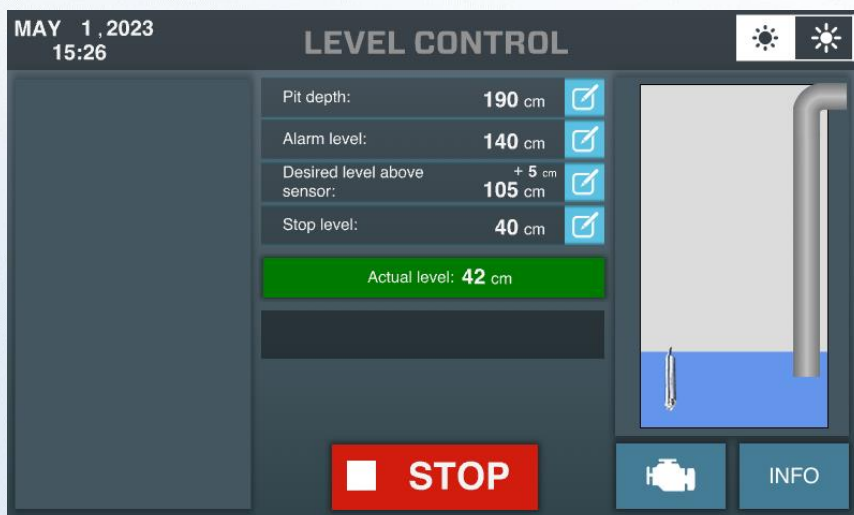
5.5 Level Control Settings (HPS Connected):

1. Pit depth:
The pit depth value is only needed to obtain a properly scaled view of the pit on the right side of the screen. You need to measure the distance from the fluid level in the pit to the upper surface of the pit (ground level) or estimate it. The pit depth is the sum of the distance from the fluid level to the ground level and the actual level, which is shown in the green bar.

2. Alarm Level:
The alarm level is the level at which a time-stamped fault code will be registered in the controller's list. When the alarm level is reached, the blue color of the fluid in the schematic pit view on the screen will change to red.

3. Desired level above sensor:
The desired level above the sensor is the level that needs to be maintained in the pit. It's important to use as much of the (sewer) pipelines' volume as possible for optimal efficiency in over pumping. Always try to set a significant distance between the desired level above the sensor and the set stop level.

4. Stop Level: **(READ THIS SECTION CAREFULLY, MOST ISSUES ARISE HERE!!!)**

• The stop level should preferably be 5 times the inner diameter (ID) of the suction hose/pipe **above the inlet of the suction hose/strainer**.
• If the stop level is set too low, it can create a "Suction Vortex," causing air to be sucked into the system, and the vacuum pump to activate continuously.
• If the vacuum pump operates continuously **in level mode for more than 900 seconds** because it cannot reach the stop level due to air, it will activate an alarm and directly shut off the pump unit (hard stop).
• Even if the fluid level rises above the desired level above the sensor later on, the pump **will not start** automatically anymore but remain in an alarm state until a complete reset is performed (set switch to "0" and restart the pump unit).

The parameters for level control can be set by pressing the blue activation box for the level that needs to be changed/adjusted.

After the activation box for a required level has been selected the screen below appears. The required level can be set in the range as given.
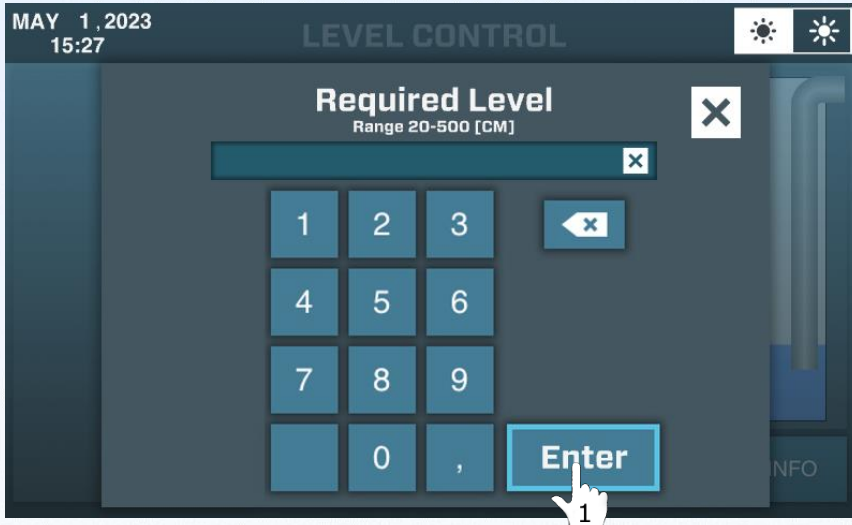
Every time the level is adjusted, activate this new level by pressing the enter button. When all levels have been set, the next screen appears showing the green start button:
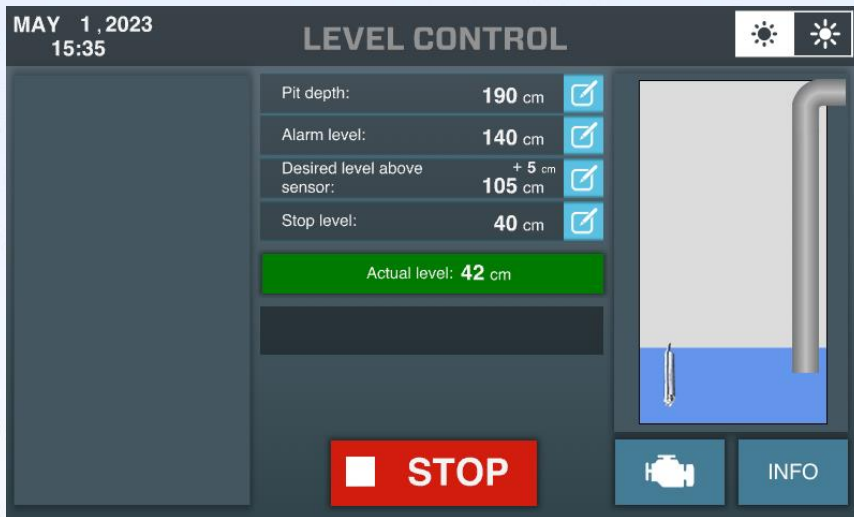

PLEASE BE AWARE THAT LEVEL CONTROL IS ONLY ACTIVATED AFTER PRESSING THE START BUTTON

5.6 Screen of fully activated Level Control (waiting mode)

After pressing the START button the STOP button appears, indicating that the pump is active. Depending on the Desired Level Above Sensor in combination with the actual level the pump may not start directly. The Desired Level above Sensor is above the actual level.
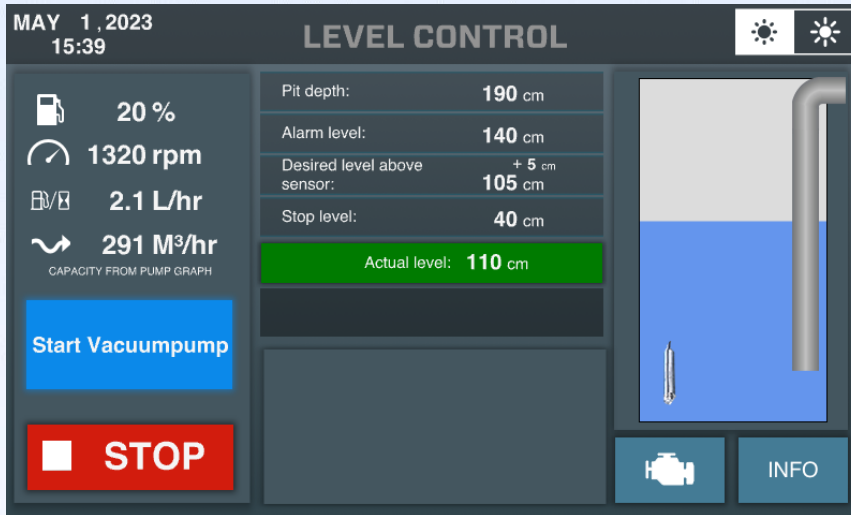

5.7 Screen of fully activated Level Control (start mode)

After pressing the START button the pump will start directly if the actual level is above the desired level. The following screen pops up:
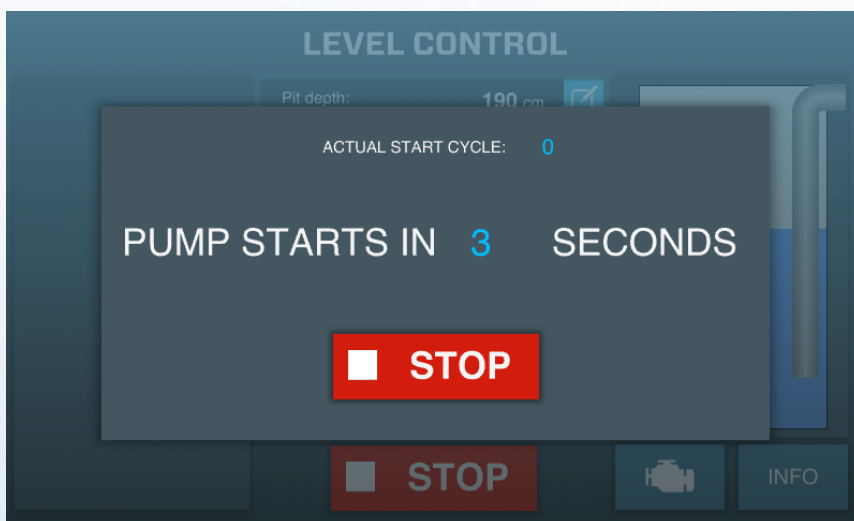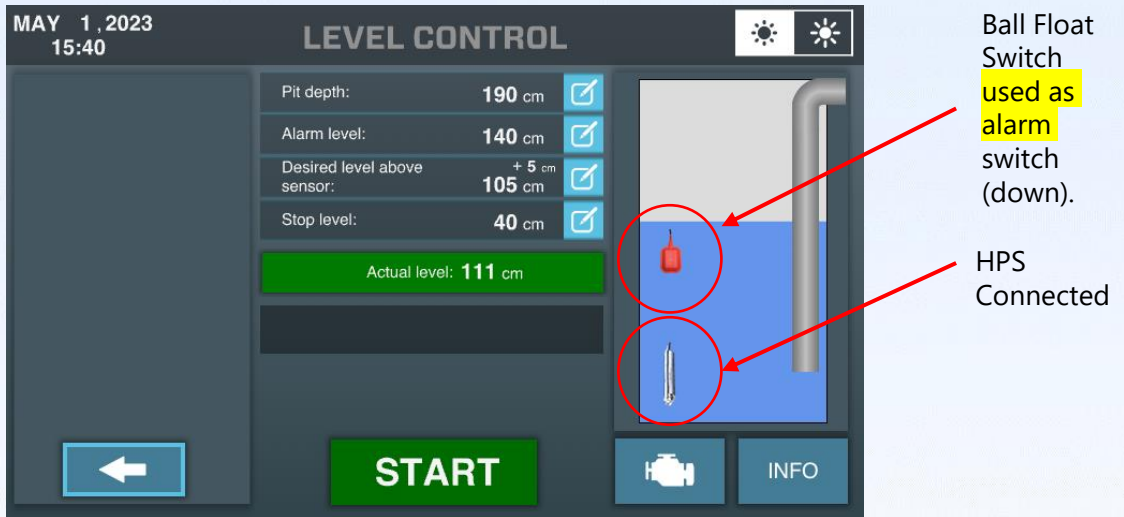
5.8 Main screen of Level Control <mark>(pumping mode)</mark>

5.9 Connecting Hydrostatic Pressure Sensor (HPS) & Ball Float Switch Both
The following screen appears:

Ball Float Switch used as alarm switch (down).

HPS Connected

Installing both the HPS and all float switch together gives some extra security.

The HPS is an electronic and more sensitive sensor compared to the simpler ball float switch. The HPS needs to be inspected periodically to ensure reliable functioning.

If the maintenance of the HPS cannot be assured, the ECOMIZER-PRO controller can be executed by using two sensors at the same time. If the ball float switch will finally go "up", and pump unit is NOT running, the pump will start and go directly to Full Power Mode.

The ball float will at the same time create an alarm stamp in the faulty code list.
After activation by the ball float switch the pump will perform as per ball float switch operation.

6. Battery Recharge

An activated Ecomizer-Pro pump controller will always consume some power. To avoid empty batteries and failure of the system an automatic battery recharge procedure is built in. As soon as the battery voltage drops down below the set value (settings button after login) the unit will start recharging the battery. This can be seen on the screen displaying BATTERY CHARGING MODE with a battery charging timer.
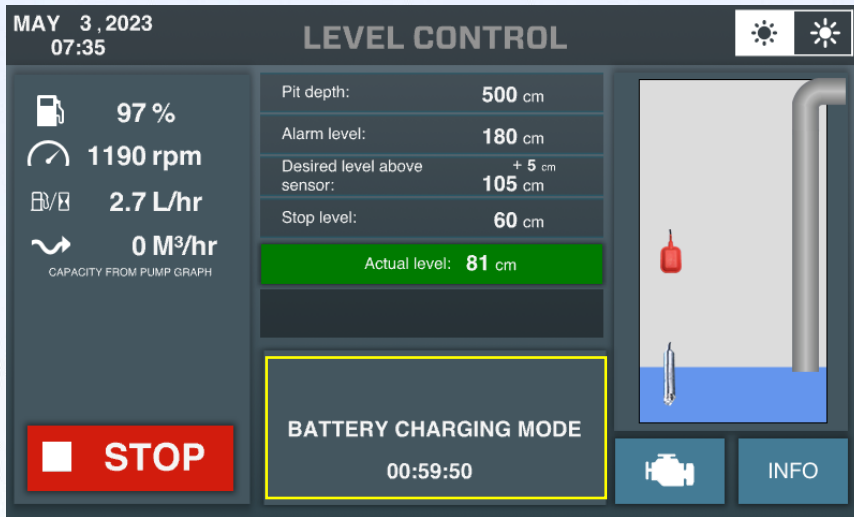
The Min. Battery Voltage can be adjusted in the settings menu which is visible after logging in. Login is explained in chapter 9 (Login User).

Battery voltage at which battery rechar will be activated.

User Login Screen
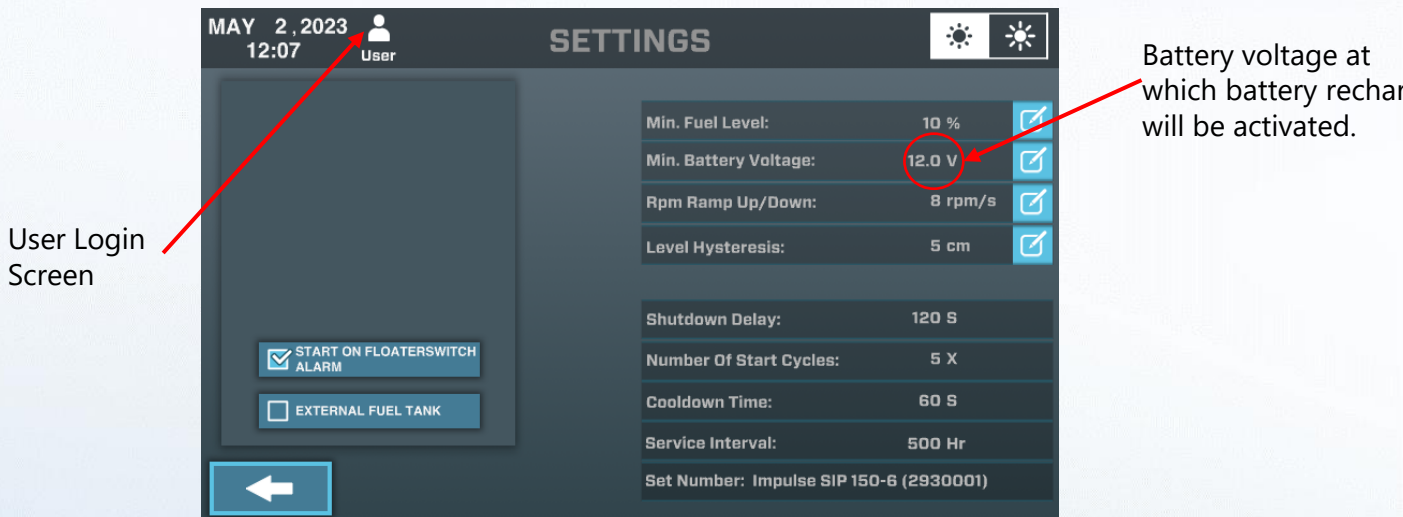
It is highly recommended that no external equipment is connected to the main battery of the unit (this drains the battery faster).

Battery recharging mode needs to be avoided as much as possible by proper installation of level control such that the unit will run as long as possible after each activation.

7. Fault Code List

Ecomizer-Pro pump controllers are unique in the way the fault codes are being displayed directly on the screen. The user of the pump can see the fault codes (mostly generated by the ECU of the engine) and in the same platform the fault codes of the pump, like fuel level low, alarm level reached or maximum time of priming reached.

As soon as a faulty code comes up, it will be highlighted by a red pop-up bar at the top-center of the screen.
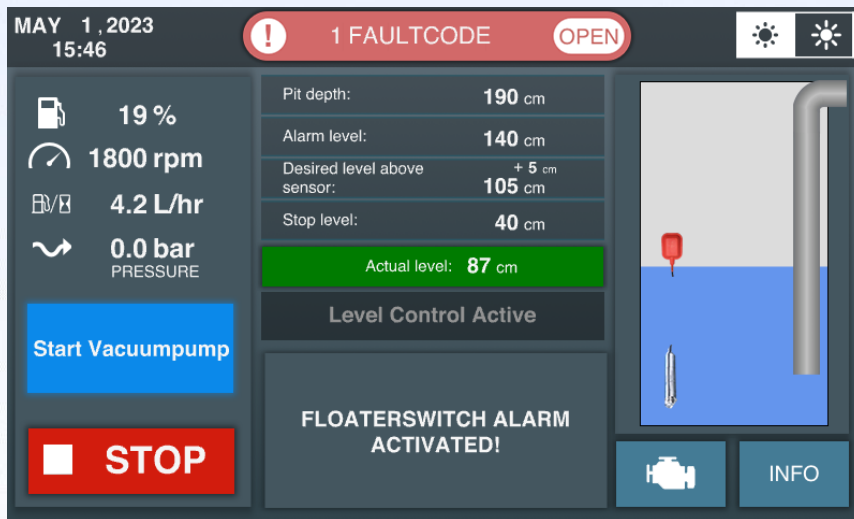
Only by pressing the red bar, the faulty code list will appear.
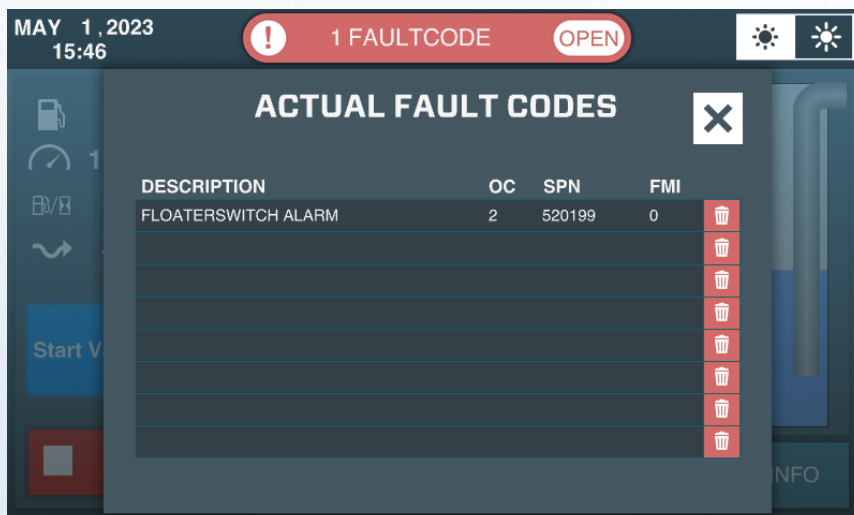
All fault codes are displayed with the following details:

1. **Description**:   Short description of main reason of this fault

2. **OC**:   Occur Counter, gives the total numbers of generation of this fault code

3. **SPN**:   Suspect Parameter Number registered in J1939 Canbus Protocol

4. **FMI**:   Failure Mode Identifier

For example, in the fault code SPN 3226 FMI 13, the SPN number 3226 tells you the problem is with the SCR outlet NOx sensor and FMI 13 tells you that the signal from the part is unavailable.

All SPN codes used in ECOMIZER-PRO Pump controllers are registered in the ECOMIZER-PRO Fault Code list.

This list is available at Impulse Pumps. Please send email to parts@impulsebv.com if you would like a copy of this list.

8. Info Screens

There are two info screens available in ECOMIZER-PRO which can always be opened on all screens. The INFO button ⟨2⟩ gives general data of the unit software version, etc. The engine button ⟨1⟩ gives real-time data of the unit. In this manual we show the info screens of a running unit.
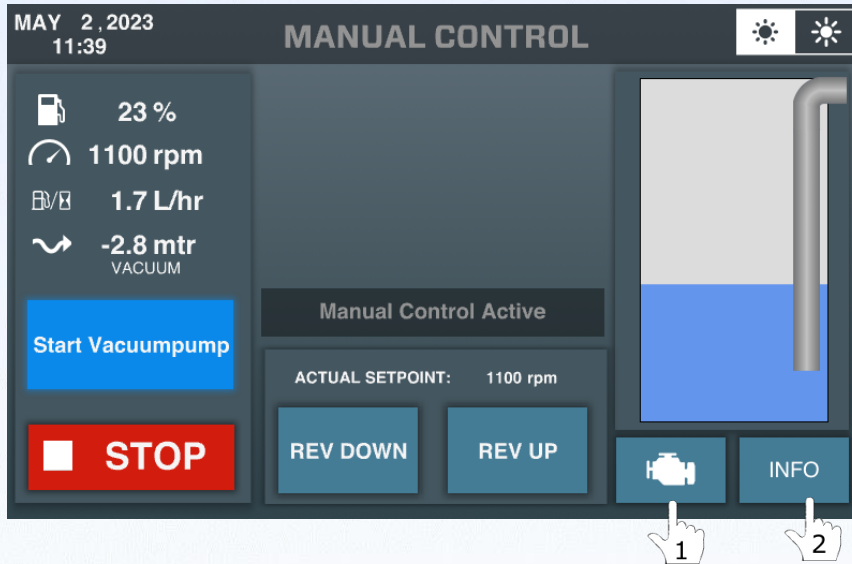
By clicking on INFO ⟨2⟩ the following screen appears:

Back to previous screen

By clicking on engine button 1 the following screen with information appears:

MAY 3, 2023 07:37	PARAMETERS	
Engine Running Hours:		441:15 Hr
Engine Running Hours in Manual Control:		1:47 Hr
Hours To Next Service Interval:		65:02 Hr
Tripcounter Hours:		434:57 Hr
Running Hours Vacuumpump:		12:26 Hr
Clutch Activation Counter:		739 X
Battery Voltage:		14.1 V
Fuel Level:		97 %
Fuel Consumption:		1.5 L/hr
←	PAGE 1 PAGE 2 PAGE 3	

Not always given

By clicking on PAGE 2, the next screen with engine information appears.

MAY 3, 2023 07:37	PARAMETERS	
Oil Temperature:		27.2 C
Oil Pressure:		3.5 bar
Coolant Liquid Temperature:		33 C
Engine Torque At Current Speed:		26.1 %
Actual Engine Power:		13.2 kW
Engine Speed:		1200 rpm
Setpoint Engine Speed:		1200 rpm
Fuel Low Pressure:		4.0 bar
←	PAGE 1 PAGE 2 PAGE 3	

Depending on the engine, there might also be a third page (PAGE 3) with emission and regeneration data (FASE V Engines with AdBlue).

MAY 3, 2023 07:38	PARAMETERS	
DPF Differential Pressure:	6 mBar	
DOC Intake Temperature:	104 C	
DPF Intake Temperature:	94 C	
Physical Torque:	9 Nm	REGEN INFORMATION
SOOT Load:	8 %	
Exhaust Gas Temperature:	94 C	
Remaining Time till Torque Reduction Level 1:	0 min	
Remaining Time till Torque Reduction Level 1:	0 min	
←	PAGE 1 PAGE 2 PAGE 3	

By pressing on the REGEN INFORMATION button the following screen can appear depending if manual regeneration is allowed by the engine manufacturer:
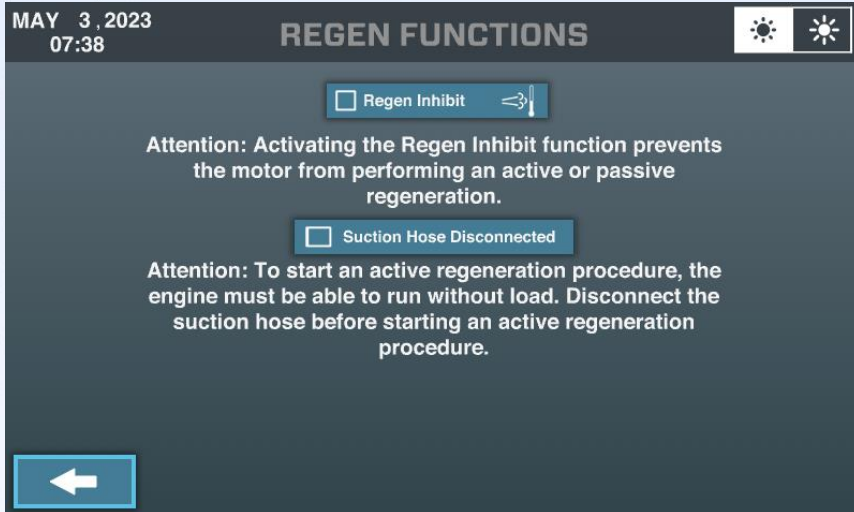

Select "Regen Inhibit" to start the manual regeneration procedure. Confirm that suction hose is disconnected to run without load. After both selections have been made the engine will start manual regeneration and the following screen appears:
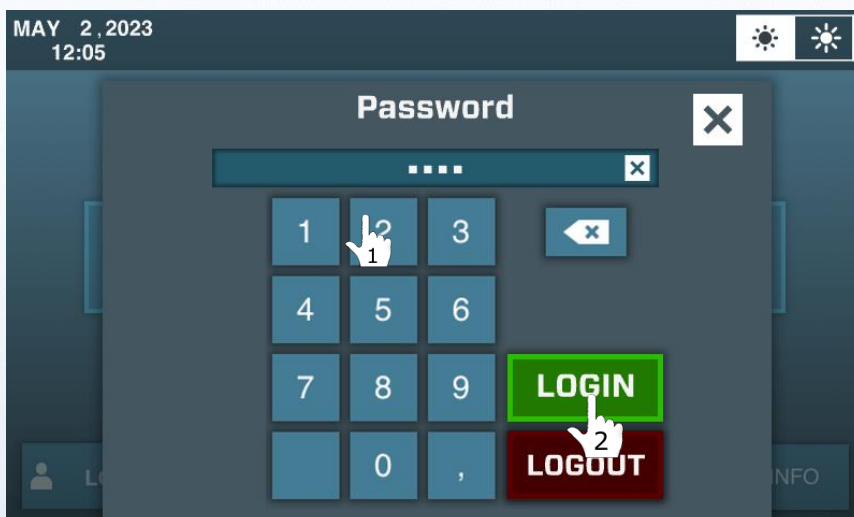
9. Login Screen

The login option in ECOMIZER-PRO enables different users to have various access levels.
Only User and Owner logins are explained.

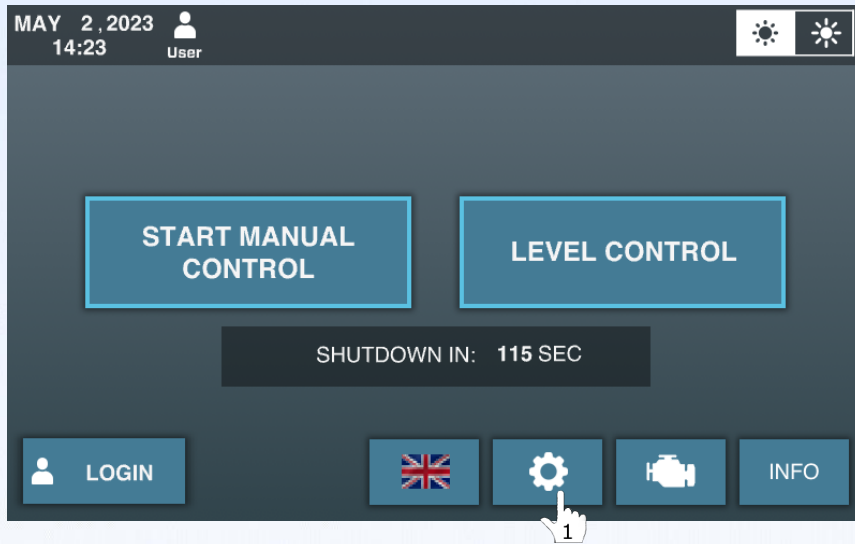Click on the LOGIN button in order to log-in.
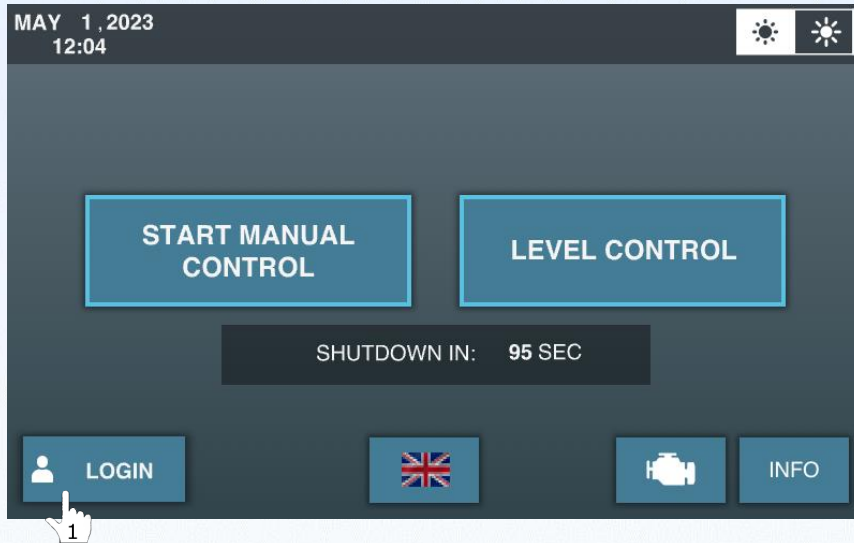
The following screen will pop-up:

To login as User press 1234 and then LOGIN.

After logging in, a new settings button (gear wheel) appears on the home screen:

Click on the settings button (gear wheel) to open the login settings page.

When logged in as User the following screen appears:

Login Level
(User)

As User possibilities are given to shut down fuel tank levels (by running on an external fuel tank) and start on Ball Float Alarm Level (both sensors connected at the same time).

The User can also finetune the data on the right side of the screen (4 settings).

Min. Fuel Level: Percentage of fuel left at which a fault code will be generated.

Min. Battery Voltage: The value at which the pump starts battery recharge by engine.

RPM Ramp Up/Down: The rate of ramping RPM up or down (in this case 8 rpm/s).

Level Hysteresis: Distance above the required level before the pump starts. (Hysteresis Level is important to avoid continuous adjustment.)

To login as Owner use the password given to the owner (buyer) of this unit. With this password timer settings can be changed and it is recommended that this password will not be shared with all common users.

When logged in as **Owner** the following screen appears:

Login Level
(Owner)
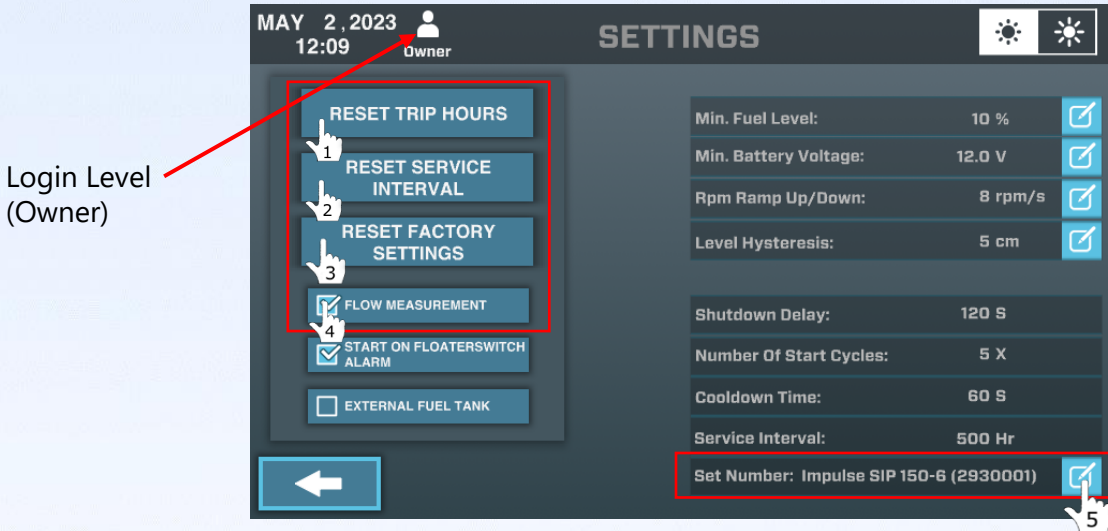
As Owner there are a couple of extra settings visible to be adjusted.

1. By pressing on RESET TRIP HOURS the hour counter can be adjusted to 000. For Owner of the pump unit, the total running hours on a project can be logged. Every new project requires a reset of the trip hours.

2. By pressing on RESET SERVICE INTERVAL the hours until service will be set back to 500 hours (default). After each and every oil change this counter needs to be reset.

3. By pressing on RESET FACTORY SETTINGS the complete system return to default settings. Engine running hours, vacuum pump running hours, clutch activations, etc. will not be changed.

4. By selecting FLOW MEASUREMENT the Owner can decide if he/she likes to supply vacuum pressure and flow data on the screen.

5. By pressing the blue activation box, a keyboard pops-up to give the unit a name.
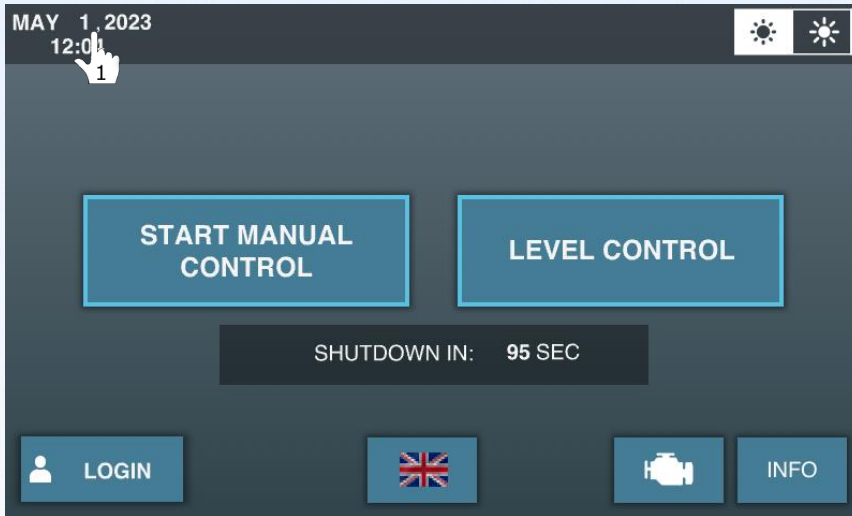
Every counter reset will always ask for a second confirmation whether you are sure to reset the counter. The following screen appears:
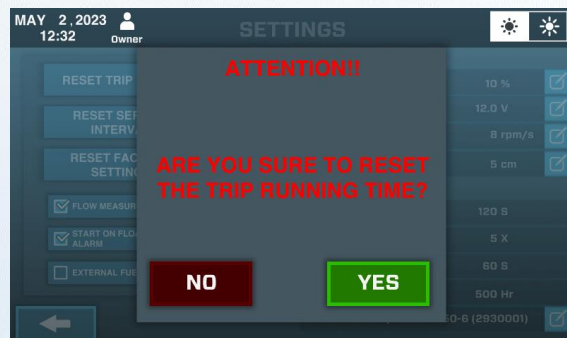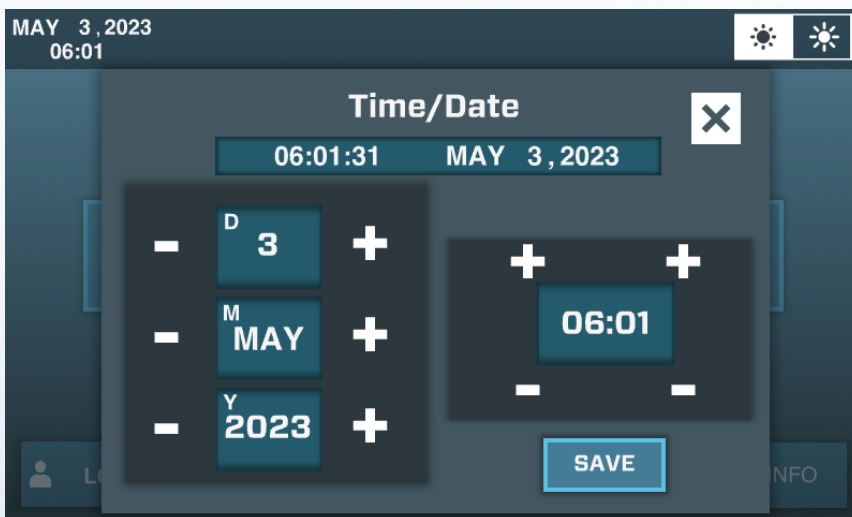
10. Time Settings

Time adjustments can be made on all screens.

[1] Click on the TIME-DATE block on the upper-left side of the screen.

The following screen will pop-up to adjust the time (login not needed):

By pressing on – and + the correct date and time can be set. Ecomizer-Pro does not account for summer and winter timings. This needs to be set manually.

Notes

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Dewatering Technologies

ECOMIZER-PRO pump technologies are designed for a better and greener planet

Impossible to live without water

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