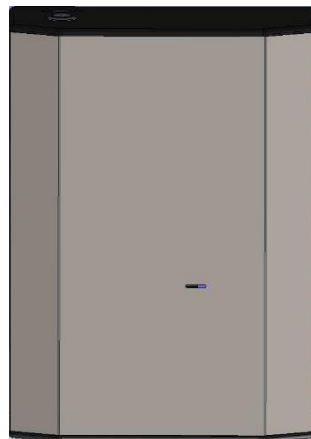


Active Meniscus Pressure Control (AMPC)

V6



1.0 Warnings/ Limitation of liabilities

This document:

Details contained in this document, although accurate at the time of publication maybe subject to change without prior notice.

Integration:

Sellenis accepts no liability for any damages resulting from integration into customer equipment. No warranties or support will be given outside the support and return to base policy as detailed in the Sellenis terms and conditions of sale.

Fluids and associated gases:

If the Sellenis Active Meniscus Pressure Control (AMPC) is used with ink/fluids which have not been supplied by Sellenis which must be part of the purchase order, Sellenis Ltd will not be liable for any warranty or damage, including without limitation, damages for loss of business profits, business interruptions, failures or loss of parts and equipment that are a direct result of contact with the ink/fluid or associated fumes. Standard guarantee for other parts that are not in direct contact with ink/fluid or associated fumes will apply as per Sellenis' warranty policy.

2.0 Health and safety

When working with any kind of machinery, health and safety is critical.

Safety goggles and nitrile gloves must be worn at all times whilst working on and with this equipment and users must ensure that they are suitably decontaminated prior to eating and/or drinking.

○ **Exposure to rotating machinery**

The Sellenis AMPC ink supply does not contain any rotating machinery that could exhibit a hazard. The equipment may potentially be mounted on larger rotating machinery, for example a roll-to-roll machine. This type of equipment is classified under the EU safety regulations as Category 4. As such **suitable safety precautions** must be taken in accordance with the machine manufacturer's safety policy and recommendations to remove exposure to hazards associated with rotating machines. These may include isolation and lock off procedures of drive motors during invasive maintenance operations on the equipment.

○ **Exposure to impact or trap hazards**

The Sellenis equipment does not contain any trap or impact hazards. The equipment may potentially be mounted on to larger machinery containing linear drive systems. These drive systems have the capacity to move extremely quickly and with substantial force. This type of equipment is classified under the EU safety regulations as Category 4 and therefore **suitable safety precautions** must be taken in accordance with the machine manufacturer's safety policy and recommendations to remove exposure to hazards associated with linear drive systems. These may include isolation and lock off procedures of drive motors during invasive maintenance operations on the equipment.

○ **Exposure to chemicals during operation/maintenance**

This equipment is for integration in systems for the jetting of inks and other functional chemicals. Exposure to these chemicals cannot be avoided. **Safety goggles and nitrile gloves must be worn at all times.** Due to the diversity of chemicals that may be used, integrators must generate a health and safety policy themselves specific to the fluid used. **Additional safety precautions** must be taken in accordance with chemical manufacturer's guidelines for the relevant solution.

- **Exposure to high voltage**

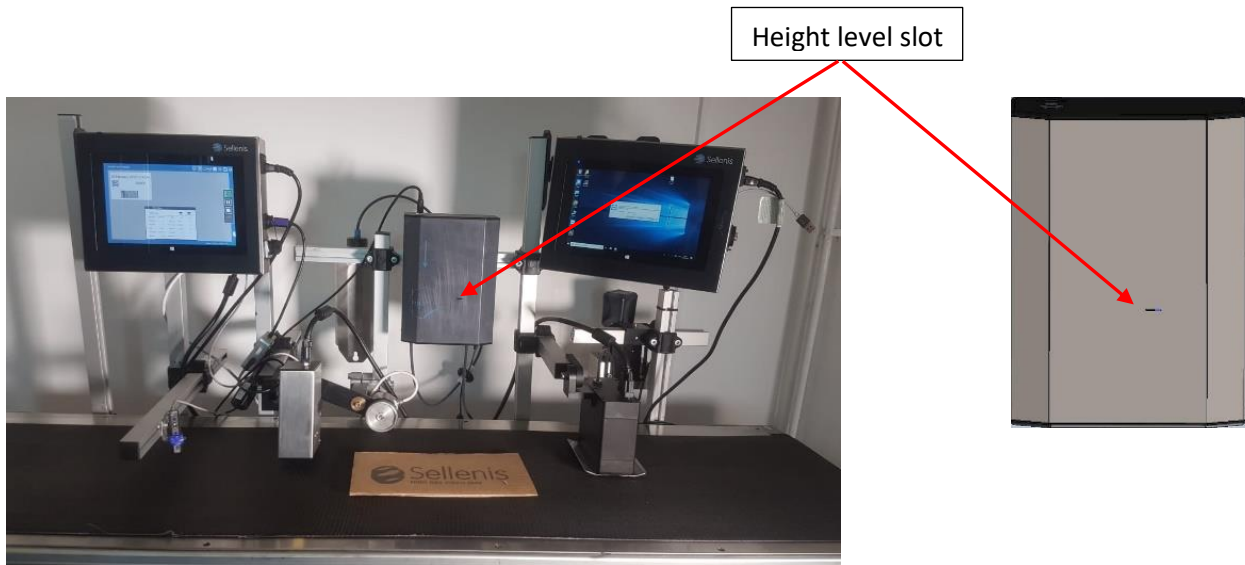
The Sellenis equipment is manufactured in accordance with the low voltage working directive meaning it is designed to be operated from a 24vdc 5a supply. Other than the use of common sense, no specific risks are associated with the unit. The installation maybe mounted on larger machinery containing potentially much higher voltages from site power supply or additional power supplies integrated in the equipment, with specific note to cure lamp systems which can contain HV to >10,000 volts typically. As such **suitable safety precautions** must be taken in accordance with the machine manufacturer's safety policy to reduce the exposure to dangerous voltages such as shielding or isolation of equipment during maintenance.

3.0 Integrating the system

3.1 Physical mounting of the system

The system must be hung/mounted vertically from a rear mounting. Failure to mount the system level may impact performance.

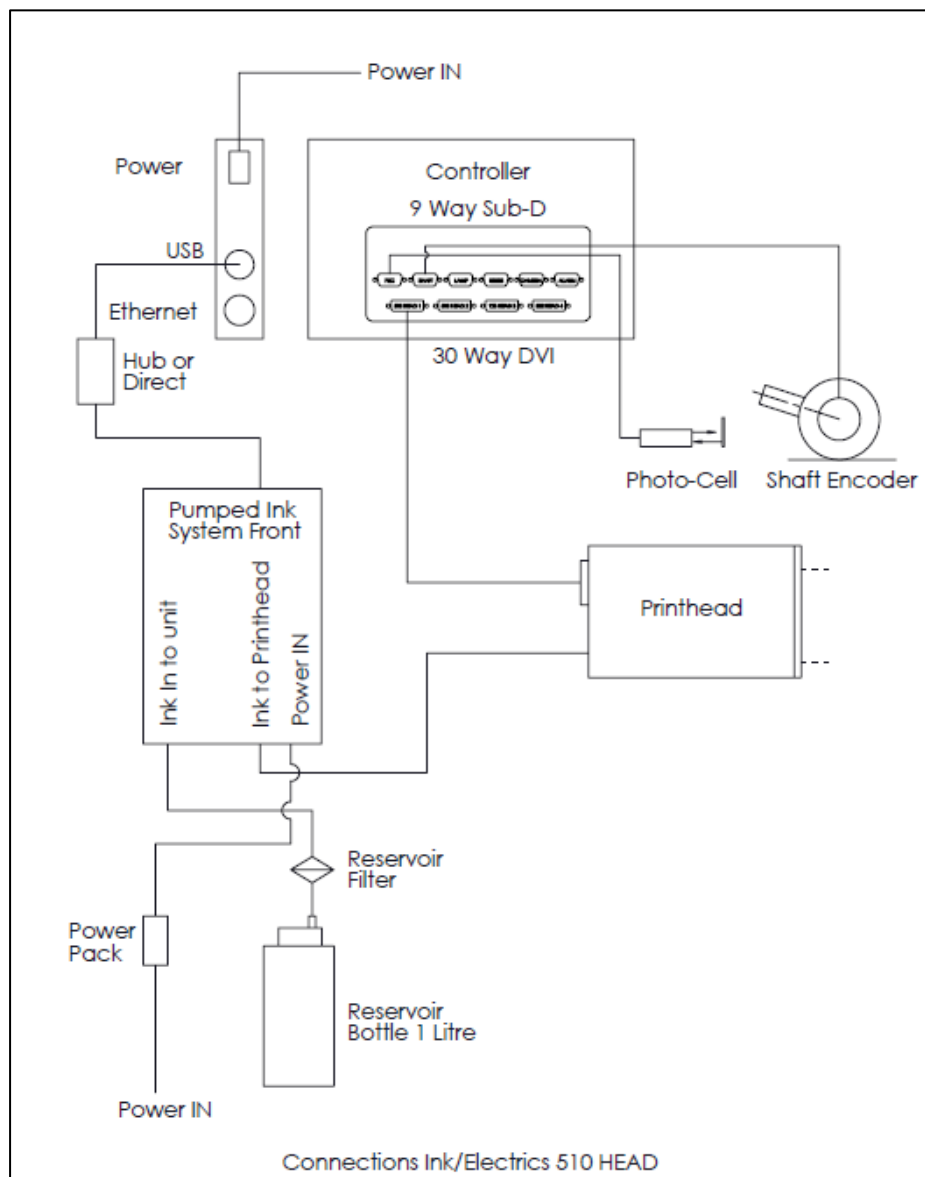
When mounting the ink supply enclosure, ensure that the small height level slot on the front cover is located at the bottom right-hand side as shown in the pictures below



In systems where inertia is applied to the system, the system should be mounted in the direction of travel (mounting plate in the direction of travel) to reduce the inertial effects on the system and its contents)

3.2 Connecting the ink system pipes & cables

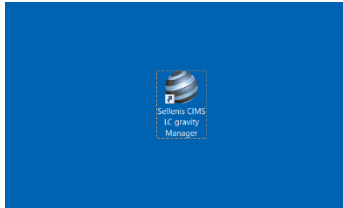
1. A pipe with a 5-um filter coming out of the bottom of the ink enclosure connects to and picks up ink from the ink feed bottle
2. A pipe at the bottom right-hand side of the enclosure connecting and feeding the printhead with ink
3. A power cable coming out of from the bottom of the enclosure going to an adapter then to the power plug
4. A comms port connection cable coming out at the top and connecting to the controller USB port or to a USB hub connected to the controller USB port



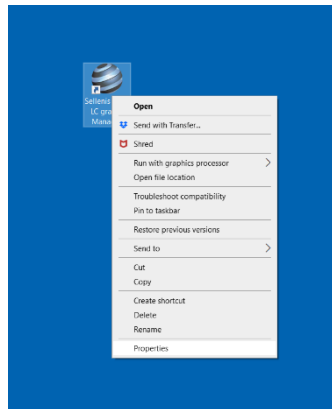
4.0 Starting and Configuring the Software

To ensure that the users' settings such as the comms port is stored/saved correctly, please run the ink system software under administrator privileges. To do this, carry out the following steps: This need doing only once.

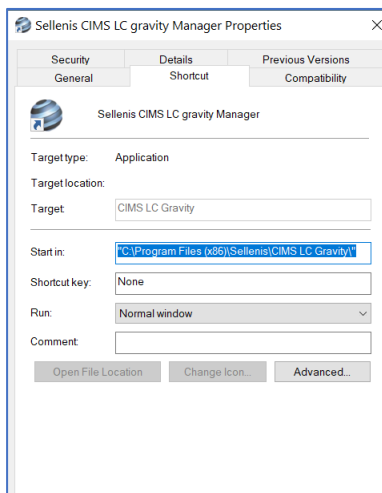
- a. Before running the software, right click on the ink system software app shortcut on the desktop



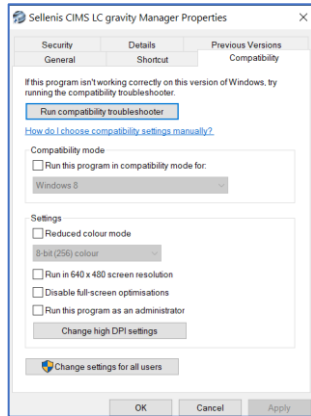
- b. The below screen appears. Click on properties



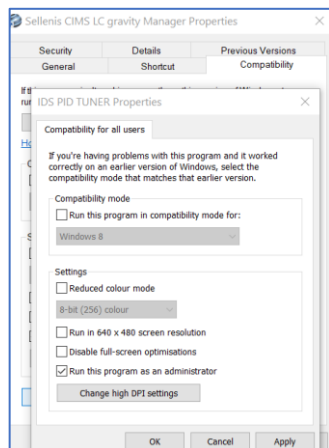
- c. The below screen appears. Click on **Compatibility**



- d. The below screen is displayed. Check the box for **“Run this program as an administrator”** if it is not checked already. If it is already checked go to next step



- e. Then click on **“change settings for all users”** and check **“Run this program as administrator”**



- f. Click **Apply** then **OK**

4.1 Setting up the communications port

4.1.1 Accessing Advanced Setup

Press the “**Advanced**” button on the welcome screen then the “**Advanced Setup**” button on the main screen.

You will be asked for a password.

For normal operations the password is “password”

If the calibration functions are required the password is “calibration”

4.1.2 Setup of the communications port

Go to the communications setup tab of the application and then click on port name drop down menu. Select the port name that represents the port your AMPC is connected to.

Note: The dropdown menu populates on application start up so if you have installed your com port after you have started the application, your port will not be shown until you restart the software.

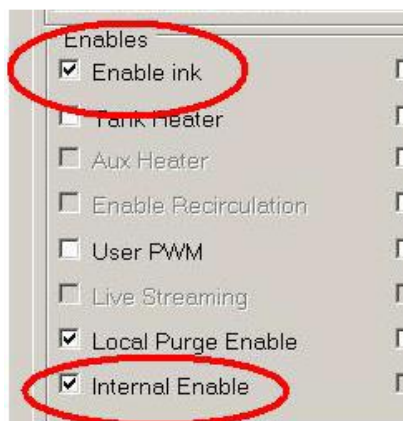
- Log in to the software as an advanced user
- Either select Comms Settings from the Advanced Setup drop down menu or select the **Comms** tab from the Advanced Setup page.
- Click on the **Port Name** drop down menu.
- Select the port name that represents the port your ink system is connected to.
- If the Enable Polling box is checked the data monitor area will display live data being sent to and from the ink system.

4.2 Enabling the system

Note: Remove the nozzle protective cover before the prime the system. This cover is to protect the nozzle face during shipping.

Before the system will start up, please set up the following:

- Click on “Advanced” on the opening screen
- Click on “Advanced Setup”
- The required password to be entered is “password” then click ok
- Now click “Parameter Setup” tab
- At the bottom left of the screen the following can be seen.
 - Check “Enable Ink”
 - Check “Internal Enable”



4.3 Priming the system

Note: Remove the nozzle protective cover before the prime the system. This cover is to protect the nozzle face during shipping. Put a beaker under the nozzle to catch any ink.

To prime the system, the unit must be powered up and the “Enable ink” and “Internal Enable” boxes are ticked (see section 4.2). This will start the ink fill pump. The ink fill pump has a timeout feature on it so it will automatically raise an alarm after 30 seconds of continuous filling and shut down the pump, to reset it press the rolling warning message bar then accept errors (see section 4.5)

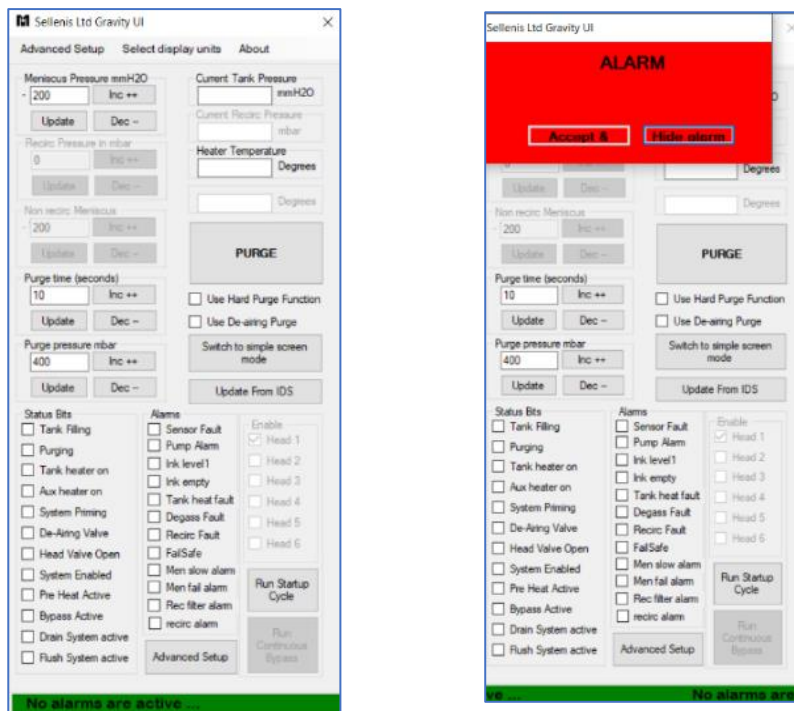
Note: when using fluids with Specific Gravity lower than 1 (flushes and solvents) caution must be taken that the float switch has not sunk as this would result in an overflow situation and fluid would pass into the failsafe container

4.4 Flushing the system prior to use

To fill the system with flush, follow the same procedure as for priming the system (detailed in section 4.3) then simply do a short de-airing purge see picture below:

4.5 Checking /resetting alarms

Current alarms and status of the system are shown in the relevant checkbox list and, should an alarm occur due to pump timeout etc., these can easily be reset by clicking the reset alarm button.



4.6 calculating the meniscus pressure required

The AMPC use hydrostatic meniscus pressure measurement to maintain a static meniscus pressure at the ink jet printhead. The ink system takes its “Meniscus Pressure” from the point where the small level slot on the cover is situated. This position is the pressure sense point. The offset in mm that needs to be entered in the “Meniscus Pressure” box is based on the height from the nozzle plate of the ink jet printhead, to the level slot times the specific gravity of the fluid (see figure below). For most fluids, the Specific Gravity (SG) can be taken as about 1 so the system height in mm should be fine.

Meniscus pressure setup

All Piezo DOD printheads require a meniscus to stop the ink dropping out of them. The active ink supply pressure control range allows this pressure to be altered according to system setup. The pressures vary from printhead-to-printhead head, but are usually between -20 to -60 mm/H₂O at the nozzle plate. Therefore, if the ink system is mounted higher than the nozzle plate. The set meniscus pressure value is higher than that at the nozzle plate.

The meniscus pressure is set in 1mm H₂O increments from the main screen by entering the required value into the text box and pressing update or by using the inc/Dec buttons which update automatically. The current meniscus pressure is displayed to the right of the setpoint on the user interface screen.

To set theoretical initial meniscus pressure

Measure the distance from nozzle plate to cross tube on the ink system (slot on the front cover) add the head suppliers recommended nozzle plate meniscus pressure. For example:

- Measure height from nozzle plate to slot of the front cover= 220mm
- Recommended nozzle plate meniscus pressure for Seiko head=- 70 mm H₂O

Then in this case the value to enter in the set meniscus pressure box= 220 + 70= 290mm H₂O

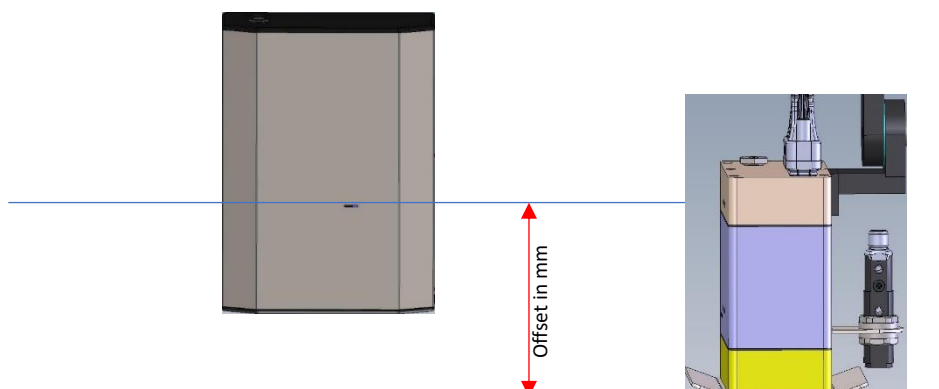
This should be about correct

To tune further (once you have established a base value using the above)

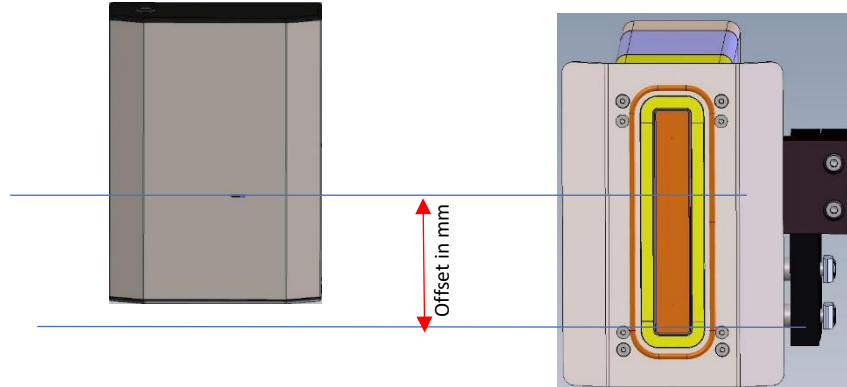
- ensure the head is fully primed by setting a meniscus pressure of 0 and purging (so the nozzles are dripping)
- set the meniscus calculated above and wipe the nozzle plate
- Do a 0.5 second purge so the nozzles bead
- Now watch the beads, they should suck back in about 6 seconds, if too fast your meniscus is too high drop it by 5mm, if too slow increase the meniscus by 5mm and repeat

Initial setup is key to the ongoing reliability so hopefully this sorts the problem

4.6.1 Printhead printing vertically down

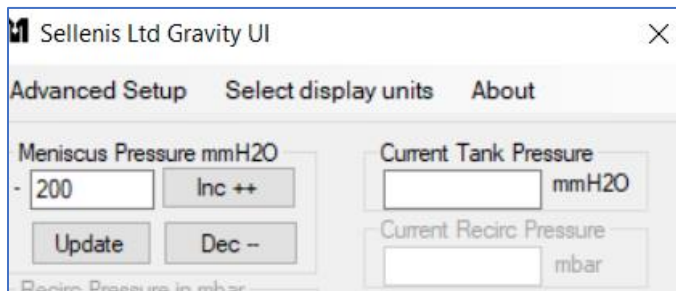


4.6.2 Printhead printing horizontally (sideways)



The meniscus pressure is set in 1mm H₂O increments from the main screen by entering the required value into the text box and pressing update or by using the inc/Dec buttons which update automatically.

Note: the text box is input protected so it will only accept numeric values. The limitation on the box is 0 – 2000mm H₂O.



After entering the “Meniscus Pressure”, press “Update” so the system starts measuring the current meniscus pressure then starts controlling to the set meniscus pressure.

Optimise the offset setting by carefully checking that there is no ink seeping from the nozzle and no suction of air through the nozzle. Use a lint free tissue to Passover the face of the nozzle to check for ink seepage.