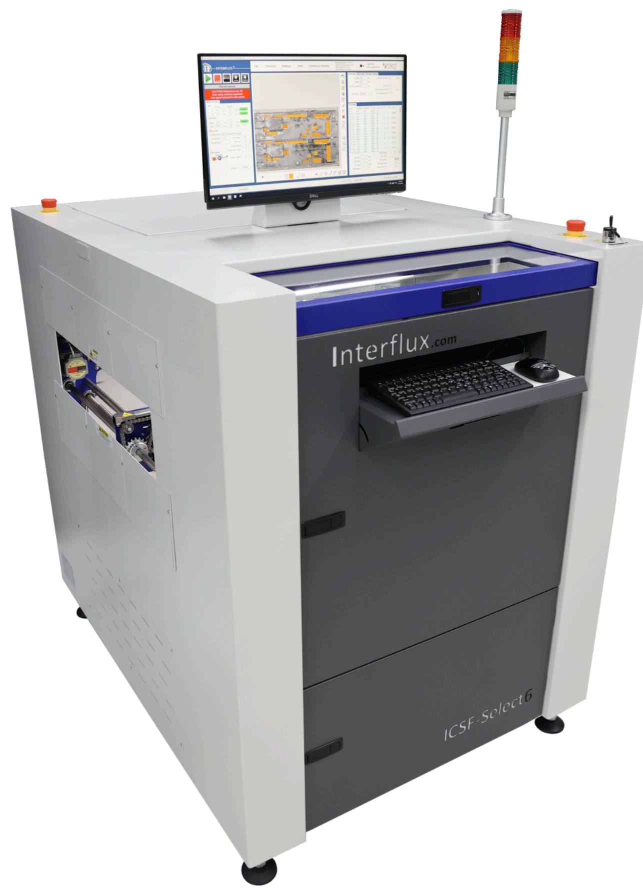
ICSF Select6

Jet Fluxer

M23 Instructions Manual 2024Rev1.3

Instruction Manual

Version : M23



ICSF-Select6

Selective Jet Flux System

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Preface

Please ensure you have read this manual before operation

TRANSLATION OF THE ORIGINAL INSTRUCTIONS

It is compulsory to read this instruction manual before starting operation. The guarantee of smooth operation and full performance of the machine is highly dependent on the application of all the instructions contained in this manual.

Operator qualifications

The workers responsible for the use of this machine must have all the necessary information and instruction and should be given adequate training in relation to safety regarding:

Conditions of use for the equipment.

We guarantee the Machine complies with the specifications and technical instructions described in the Manual on the date of issuance and listed herein; On the other hand, the machine may also be subject to important technical changes in the future, without the manual being updated.
Therefore, contact Interflux for information about modifications that may have been implemented.

Version	*Date*	*Designation*	*Modified by*
1	11/10/22	Creation	Farrah

Contents

SECTION 1 : General Information

The operating manual is an integral part of the machine. It is designed to provide the operator with complete information regarding the product; installation, maintenance, machine functions, programming and troubleshooting.

This manual is designed to provide the knowledge of possibilities and limitations required for the use and maintenance of **ICSF-Select6 (M23)**.

Operators must have carefully read and understood the manual, consulted the staff responsible for the commissioning, operation and maintenance of the machine.For safe and satisfactory operations of the **ICSF-Select6 (M23)**, it is imperative that the requirements laid out in this manual are strictly complied with.

Our service department is available to respond to any queries and problems encountered during operations with the machine.

The buyer is responsible to ensure that the users are properly trained, that they are made aware of this manual and the potential risks involved with operation of the machine.

SECTION 2 : Proper Use

The **ICSF-Select6 (M23)** has been designed and manufactured in accordance with the Directive(s) 2006/42/EC, 2014/35/EU.

It is strictly forbidden to modify or remove guards, safety devices and caution labels. If you do so temporarily (i.e. for the purpose(s) of cleaning or repair) , ensure that no personnel are able to operate the machine for the duration.

The selective jet fluxing machine is designed exclusively for the purpose of applying flux selectively for soldering electronic modules that are suitable for this process. Any other use, or use exceeding the specifications is improper. The manufacturer/supplier assumes no liability for damages resulting from improper use. Proper use also involves complying with the instructions in the operating manual, including the safety instructions.

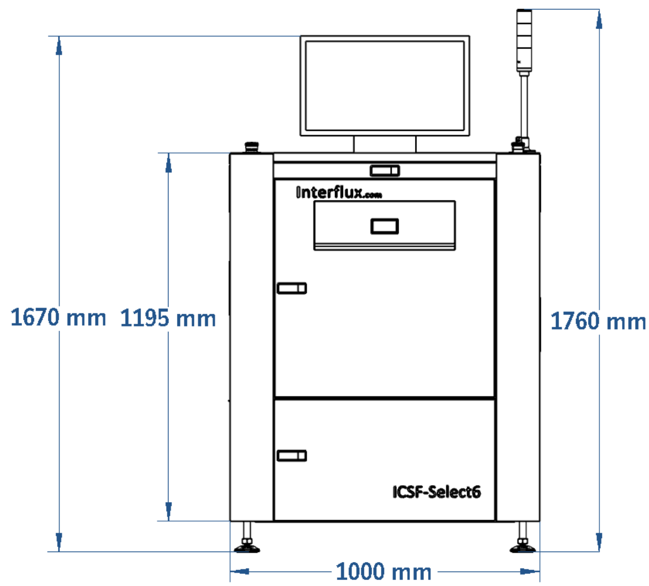
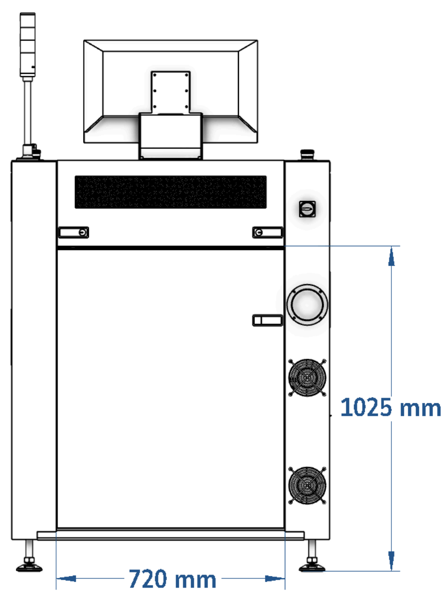
The manufacturer/supplier will not be held responsible for any damage to people and/or property caused by non-compliance with any instructions listed in this manual.

Operators will be held fully responsible for any changes they have made to the machine; the manufacturer will not be held responsible for any damage to persons and/or property resulting from maintenance performed by unqualified personnel and in manner(s) differing from the operation procedures as stated below.

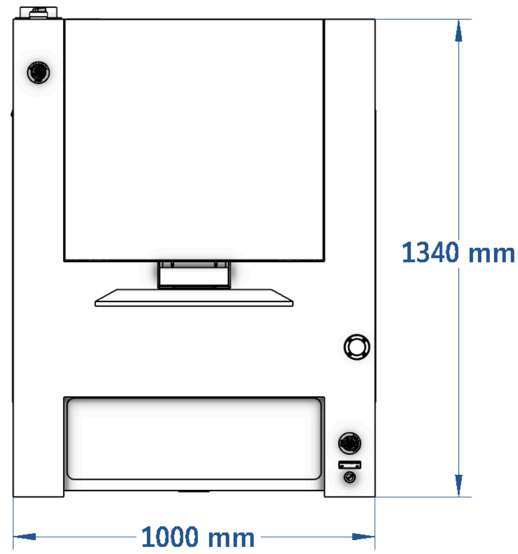
The machine is designed exclusively for commercial use. Private use is excluded.

SECTION 3 : Technical Data

3.1 Drawing ICSF-Select6 (M23)

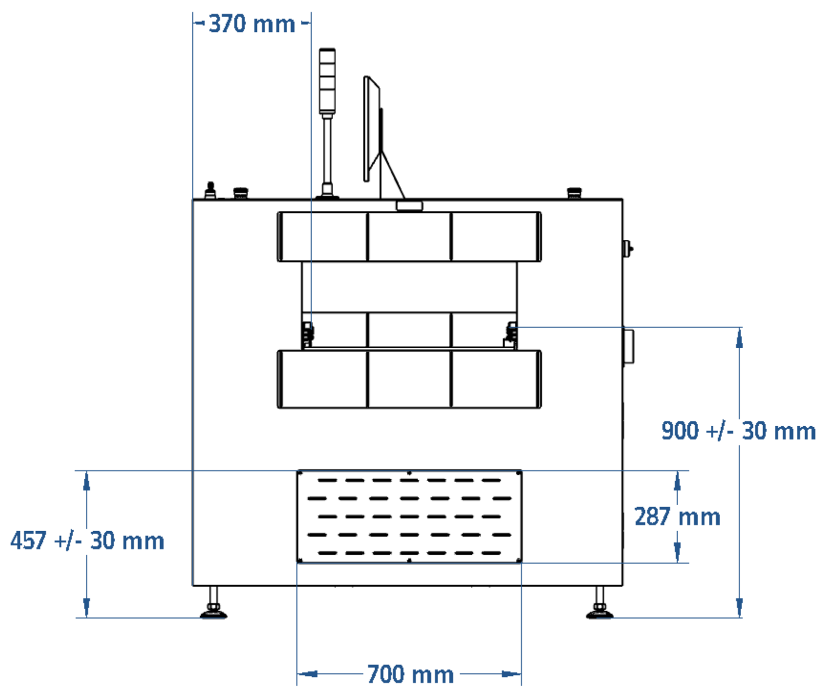
Front View	
Rear View	

Top View



Horizontal Configuration

Side View



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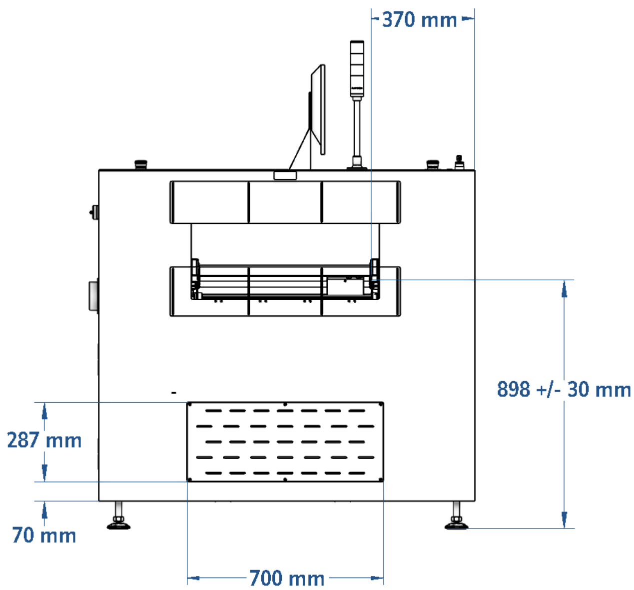
<tr><th colspan="2">Angled Configuration*</th></tr>
<tr><td>Incoming View</td><td>
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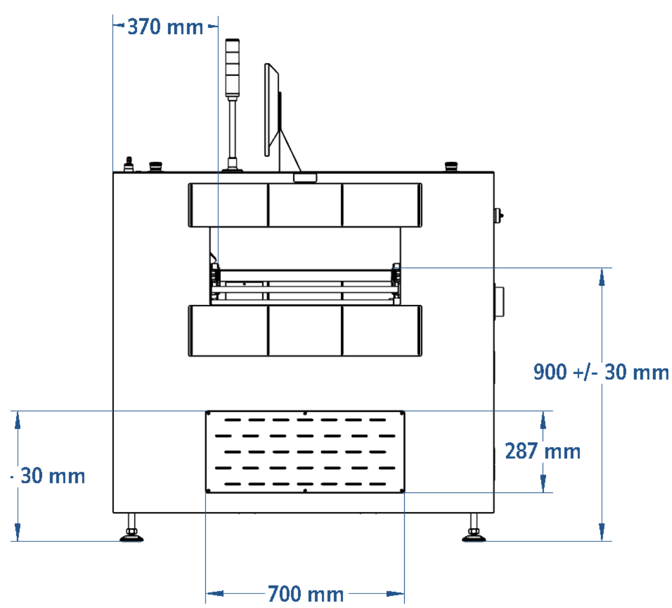
<tr><td>Outgoing View</td><td>
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*Note: Conveyor angle, incoming and outgoing sides can be switched to suit operational needs.

3.2 Technical Specification ICSF-Select6 (M23)

ICSF-Select6 (M23)+	
Product Size, L x W	610 x 610 or 920 x 610mm (with oversized boards software option)
Dimensions, W x D x H	1,000 x 1,340 x 1,670mm
Weight	600kg
Machine Frame	Welded
Conveyor Type	Horizontal or slanted (option) SS316 5mm pin chain conveyor
Conveyor Length	1,000mm
Conveyor Height	SMEMA height 930 ±30mm
Conveyor Width	Automatic adjustment by software: Max 610mm
Conveyor Speed	Incoming/outgoing: 10 to 300mm/s (separate software setting)
Pass Through Direction	Left to Right OR Right to Left/ (selectable by software) No mechanical change over
Product Positioning	Soft stop with 2 detection by Laser Sensor. No mechanical stopper, accuracy 0.1mm
Safety	Safety circuit with front and back emergency stop buttons, front and top doors with individual contacts and feedback to software. Internal rear panel with individual contacts and feedback to software. CE certified
Power Supply	1-Phase, 200-240V AC, 50/60Hz, 13A
Compressed Air Supply	No Compressed Air required.
Exhaust Requirement	Exhaust not required. 100mm, diameter exhaust connection available.
X-Y Linear Axis System	Servo-controlled belt drive
Speed	Max. 1,500mm/s
Accuracy	±0.25mm
Repeatability	±50µm
Flux types	Water based, Water soluble, Alcohol based, Rosin based
Maximum Solid Content	40%
Flux Supply	Variable flow, volume and pressure system with supply pump and high speed control valve
Flux Flow	Variable for each programmed location on the board. Controlled by software setting and flux supply pump.
Flux Volume	Variable for each programmed location on the board. Controlled by software settings,

	valve controller and high-speed flux valve.
Flux Pressure	Manually adjustable pressure setting.
Nozzle Type	Jet nozzle, 186µm hole size.
Nozzle Quantity	Single or Double (option, for 2 different fluxes) jet nozzle.
Nozzle Material	SS316,, sapphire orifice with Butyl/ FFKM (model dependent) seal material, POM-C.
Flux Quantity Control	0.0001ml - 0.005ml per droplet (dependent on flux type, valve model and settings)
Flux Nozzle Cleaning	Automatic, programmable flux nozzle purging to prevent nozzle clogging.
Flux Jet Control	Flux drop check by laser with auto-purge during flux cycle. (Optional).
Flux Quantity Measurement	Software function for accurate flux quantity measurement. A separate precision weighing scale is required.
Flux Tank	SS316, 10 or 3 litre (or optional external drum).
Tank Quantity	1 or 2 (optional), additional tanks with or without couplings for quick tank exchange are available.
Flux Level Detection	Contactless low-level sensor and alarm for each tank.
Flux Tank Drain	Automatic drain of supply system by software function with operator prompts. Manual tank draining via ball valve in base.
Machine Software	PLC controlled, can run independently from the PC software in case PC breaks down.
Programming Software	Flux Designer software package, with online/offline programming, picture editing and machine control.
Programming Device	PC with Microsoft Windows 10 operating system.
Programming Base	Point and click programming, JPEG, BMP, GIF, DXF picture import. For CAD and GERBER files a screen print is recommended.
User Security	4 user levels, each with defined access level and a programmable user list.
Picture Editing	Editing software integrated in main software; four-point stretch, rotation, mirroring, brightness & contrast control.
Flux Library	User-editable database with default programming values for each type of flux.
Flux Programming Options	Dots, lines, Multi-lines and Areas. Parameters can be set for each individual dot, line or area.
Flux Programming Functions	Copy, paste, copy with base point, rotation, alignment vertically/horizontally, zoom, etc.
Program Optimization	Software function to optimise flux application routing.
Flux Mode	Standard (highest precision) and continuous (highest throughput) fluxing modes.

Alarms and Events Reporting	Current alarms, alarm history, software events, machine events and security events.
Barcode Options	Different barcode options are available for automatic program selection, program verification and traceability applications. (Optional).
Traceability Option	Industry 4.0 ready. All process values are available in text file reports and an SQL database. Optional.
MES Interfacing	Customer specific modules interfacing the traceability software (SQL dB) with Manufacturing Execution System software can be developed (Optional).
Remote Support	Remote support for PLC and programming software available worldwide via TeamViewer.

SECTION 4 : General Safety Warnings

4.1 Safety fixtures and machine interfaces

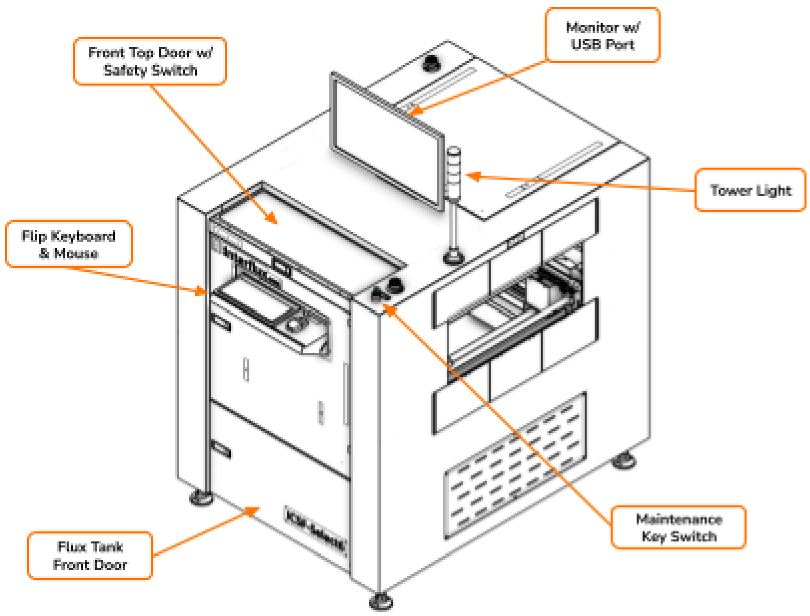


Figure 1.

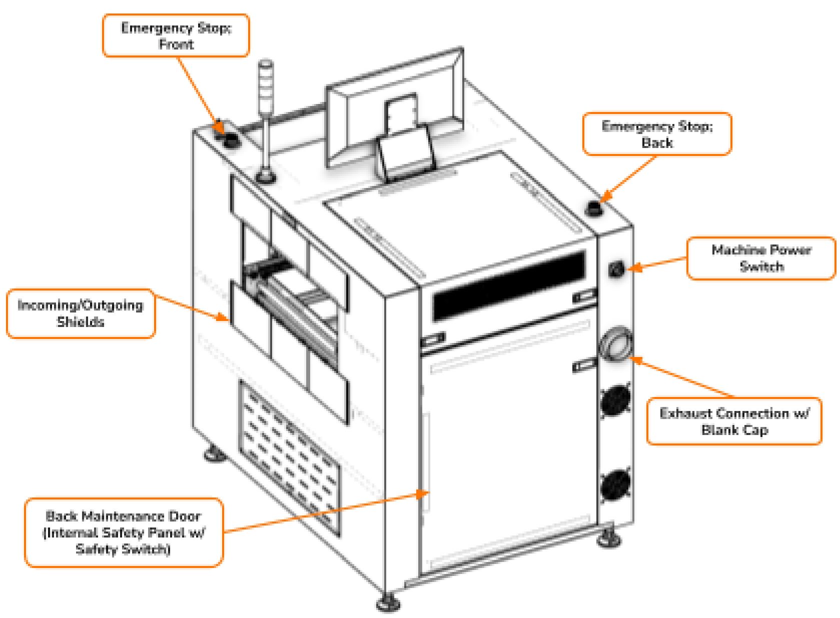


Figure 2.

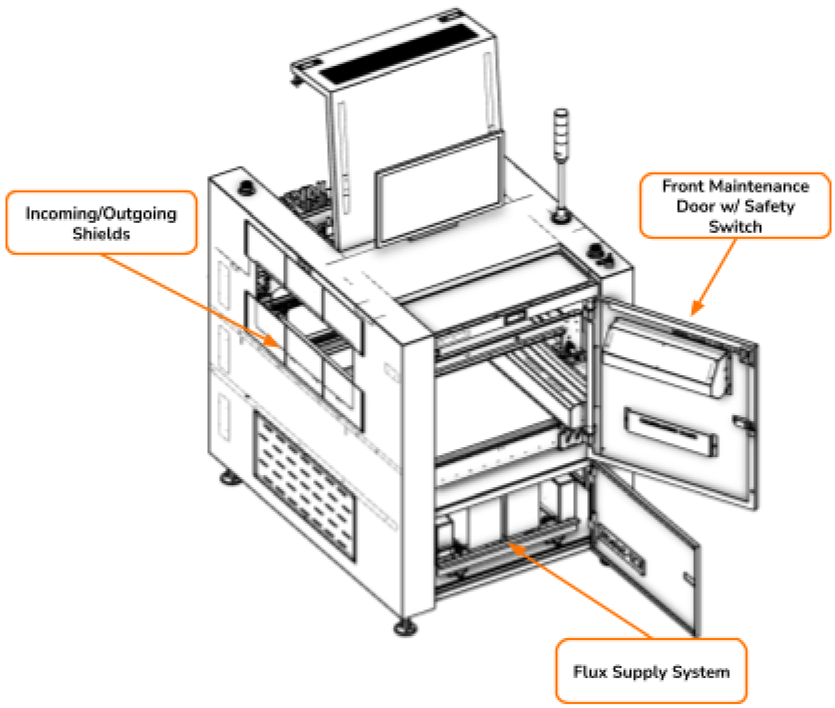


Figure 3.

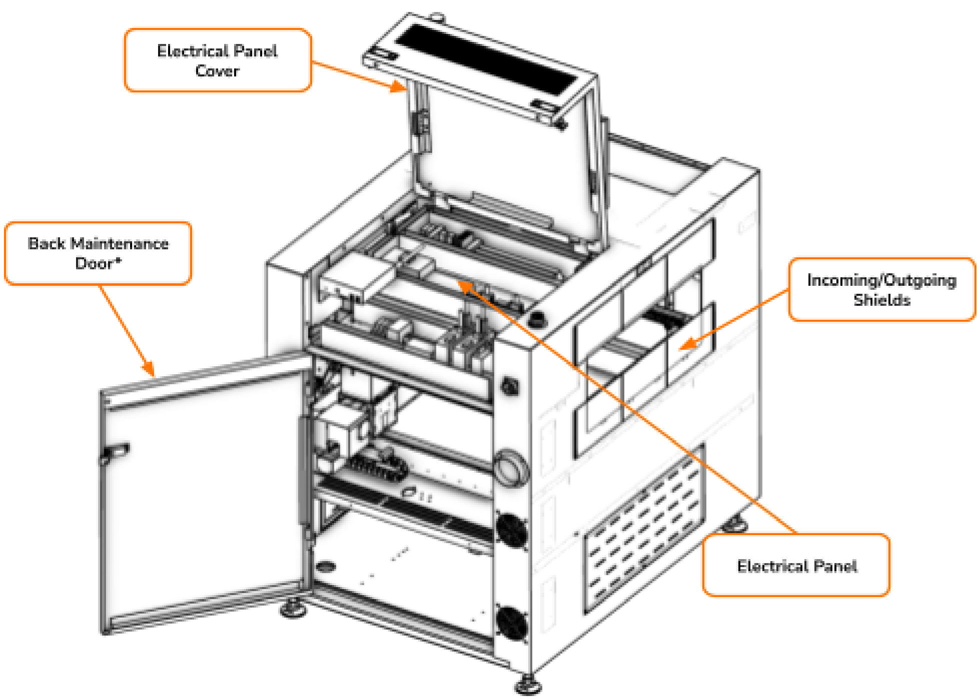


Figure 4.

*Internal panel removed for clarity

4.2 List of safety fixtures/machine interfaces/control descriptions

Item	Description
Machine Power Switch	This master power switch supplies power to the machine's electrical panel. The switch must be turned off and locked when any electrical maintenance has to be performed. To power the machine, it is necessary to: • Remove the lock (if used), turn the main switch to "I", by turning it clockwise. Confirm the power has turned on by internal light activating.
Maintenance Key Switch	When switched ON, the maintenance key will bypass all the door's safety switches of the machine. Emergency stop buttons will NOT be bypassed. All manual functions can be operated but axis speeds are limited to 50mm/s. The following message will be shown on the screen. "Caution! Maintenance key ON Door safety switches bypass Axis speed reduced to safe speed." **This maintenance mode should only be used by qualified personnel who have received training and certification from Interflux! Proceed with extreme caution and wear safety goggles.**
Emergency Stop Front Side	Activating the palm button immediately stops the operation of the machine and disconnects power to all motors, drivers and valves. CAUTION: It will not de-energize the electrical panel. An alarm will be displayed on the screen describing the location of the pressed emergency stop button. To resume operation, release the button and press the acknowledge button on the Flux Designer software.
Emergency Stop Rear Side	Activating the palm button immediately stops the operation of the machine and disconnects power to all motors, drivers and valves. CAUTION: It will not de-energize the electrical panel. An alarm will be displayed on the screen describing the location of the pressed emergency stop button. To resume operation, release the button and press the acknowledge button on the Flux Designer software.

Tower Light	The tower light will display the different statuses of the machine: GREEN Light Solid: Machine is switched ON, machine automatic cycle is running. YELLOW Light Flashing: Warning active, machine automatic cycle NOT stopped (for example flux tank low level) RED Light Flashing: Alarm active, machine automatic cycle stopped
Front Top Door with Safety Switch	Opening the door when the maintenance key is turned OFF immediately stops the operation of the machine and disconnects power to all motors, drivers and valves. **CAUTION: It will NOT de-energize the electrical panel.** An alarm will be displayed on the screen describing the location of the opened door. To resume operation, close the door and press the acknowledge button on the Flux Designer software.
Front Maintenance Door with Safety Switch	Opening the door when the maintenance key is turned OFF immediately stops the operation of the machine and disconnects power to all motors, drivers and valves. **CAUTION: It will NOT de-energize the electrical panel.** An alarm will be displayed on the screen describing the location of the opened door. To resume operation, close the door and press the acknowledge button on the Flux Designer software.

Rear Internal Panel with Safety Switch	Removing the internal panel when the maintenance key is turned OFF immediately stops the operation of the machine and disconnects power to all motors, drivers and valves. **CAUTION: It will NOT de-energize the electrical panel.** An alarm will be displayed on the screen describing the location of the opened door. To resume operation, close the door and press the acknowledge button on the Flux Designer software.
Flux Tank Drawer	This drawer is separated from the moving machine elements, it can be opened when the machine cycle is running. This will allow for easy refilling of the flux tank at any time. This drawer also contains the flux supply system. **CAUTION: Flammable flux liquid may be present inside the drawer in case of any leaks. Please make sure to be properly grounded when performing any tasks inside the flux tank drawer. Do NOT use any heat source nearby. Wear safety goggles and gloves when handling.**
Flux Tank	The flux tank is an open air tank that contains the chemicals used in the machine. **CAUTION: Flammable flux liquid is present inside the tank. Please make sure to be properly grounded when performing any tasks on the flux tank. Do NOT use any heat source nearby. Wear safety goggles and gloves when handling.**
Flux Supply System	The flux supply system takes care of supplying the flux to the valve head at variable flows and pressure. **CAUTION: Flammable flux liquid is present inside the tank. Please make sure to be properly grounded when performing any tasks on the flux tank. Do NOT use any heat source nearby. Wear safety goggles and gloves when handling.**
SMEMA Connections Access Hole	This is the access hole where the SMEMA cables for upstream and downstream machinery can be routed through and connected.
Electrical Connection Access Grommet	This is the location where the main power cable of the machine is located. The cable must be secured via the grommet and the panel secured to the frame with the screws provided.

Electrical Panel	This area contains all of the electrical equipment and wiring for the machine, as well as the machine controller and PC. **This area should only be accessed by qualified personnel who have received training and certification from Interflux!**
Incoming/Outgoing Shields	These shields protect the users from accessing the main machine area through the conveyor infeed and outfeed openings. These shields are fixed during shipment and have to remain in place when the machine is tested offline. They can be removed or recut by the customer according to their specifications when the machine is put in the production line. **Note that Interflux will NOT be liable for any accidents when this cover is removed prematurely during testing!**
Exhaust connection with blank cap	This is optional as the machine does not require an exhaust connection since the amount of chemicals used is very little. Two fans are fitted for cabinet ventilation with monitoring for fan failure. Alarm is generated if either fan fails.
Flip Keyboard and Mouse	This flip assembly contains the mouse and keyboard and can be closed or opened at any time.
USB Connection(s) (Monitor)	This standard type-A USB 2.0 connection is located on the side/bottom edge of the monitor.
Monitor	The monitor is fixed to the top of the machine.

4.3 General safety rules for machine equipment

Follow the instructions contained herein, in addition to the general precautions to be observed while working. Even if the operator is already familiar with the use of jet fluxing machines, it is necessary to: In particular:

Acquire full knowledge of the machine.

For safe operation, this manual must be read carefully by every person who is involved with the assembly, commissioning, operation and/or maintenance of the jet fluxing machine, in order to acquire the necessary knowledge of the machine and to understand: operation, safety devices and all necessary precautions.

Acknowledgement of responsibility.

It is recommended that the owner of the machine have every person who is involved with the assembly, commissioning, operation and/or maintenance of the jet fluxing machine, confirm in writing that they have fully read and understood the safety instruction section as well as other sections relevant for operator's activity.

Wear appropriate attire for the job.

Operators must wear appropriate attire to prevent accidents, i.e. snag in moving mechanical parts. Accessories that hang from the body should be removed to prevent accidental entrapment.

Maintain machine with care.

Periodic maintenance of the machine must be conducted to prevent malfunction. It is recommended that this operating manual is on hand at all times.

4.4 Hazard Symbols

This symbol warns of electric shock hazard. Touching voltage-conducting parts can result in serious , possibly fatal, physical injury.

This symbol warns of hazards of any type that can result in possibly fatal physical injury.

This symbol warns of hazards of flammable substances that are prone to combustion if exposed to sources of ignition.

This symbol warns of hazards of pinching due to mechanical motion.

ATTENTION! Attention indicates instruction, which if not complied with, results in damage to the fluxing machine or other material damages.

Risks associated with using the machine.

- Machine should only be used by personnel who have been specially trained by the authorised personnel.
- NEVER under any circumstances underestimate the risks associated with using the machine and concentrate on the operations in progress.
- Despite the implementation of safety devices for accident prevention. It is necessary for operators to take note of all the proper procedures for operations to prevent accidents as detailed in various sections within this manual.

4.5 Personal Protective Equipment (PPE)

ALWAYS use appropriate personal protective equipment (PPE) such as;

- Gloves
- Safety Goggles
- Overalls/Apron
- Safety Shoes

Safety instructions for electrical machine equipment

Do not modify the machine's electrical system in any way. Any attempt to do so may impair the operation of the electrical devices causing a malfunction or accident.

- Only use original fuses/circuit breakers with **prescribed** amperage.

If the machine produces unusual noise or displays unusual behaviour, stop the machine immediately. Immediately carry out an inspection and, if necessary, perform any repairs as needed.

Only a certified electrician or personnel who have been instructed in electrical engineering under the direction and supervision of a certified electrician in accordance with standard electrical engineering practice can perform work on electrical components/equipment.

Machine and/or components must be de-energized before proceeding with inspection, service and repair work, if prescribed; adjacent energised components must be insulated.

Immediately switch off the jet fluxing machine and/or its components when malfunctions appear with the power supply.

For works on voltage-conducting components, a second personnel is required to be present to activate the **EMERGENCY-STOP** button or the master switch for shunt tripping. The work area around the machine must be cordoned off with a red/white safety guard along with affixation of a warning sign.

Use **ONLY** insulated tools.

4.6 Safety instructions for handling auxiliary equipment and operating materials

Compliance is required for handling flux, oils, greases and other chemical substances as stated by the applicable safety guidelines for the respective product(s).

Exercise caution when handling hot operating materials and auxiliary material(s) with the hazard of burning or scalding.

Fluxing process ejects small but high speed flux drops. Flux drops are harmful to the health if ingested or exposed to sensitive areas such as the eyes.

Appropriate Personal Protective Equipment (PPE) must be worn, i.e. gloves and safety goggles, when handling flux or operating the machine while in maintenance mode.

Eating, drinking and smoking are prohibited in the vicinity where fluxing occurs.

Cleaning media, tools and or any objects that are not part of the machine operations should **NEVER** be stored in the machine.

4.7 Safety instructions for certain operation phases

4.7.1 Normal Operations

Refrain from any working method not suggested, especially where safety is a concern.

Take measures to ensure that the component/jet fluxing is only operated in a safe and fully functional condition. Only operate the machine if all safety fixtures and safety-related fixtures are functional and in place, i.e. removable protective fixtures, EMERGENCY-STOP devices, noise insulation, and exhaust devices.

Prior to start-up ensure the working area around the machine is clear of obstructions and the machine operations would not endanger personnel.

4.7.2 During maintenance, service and troubleshooting

Comply with the adjustment activities, service activities, inspection activities and periodicity, including the information concerning replacement of parts/spare equipment, as prescribed in the manual. These activities should only be performed by qualified personnel trained and certified by Interflux.

Inform regular operating personnel that special tasks and maintenance work will be performed prior to starting such work. Designate supervisory personnel.
If the component/fluxing machine is completely switched off for maintenance and repair work, then it must be safeguarded from being turned on unexpectedly.

- Lock the main control devices, remove the key and
- Lock the master switch with a padlock.
- Proper to starting the service/repair work, clean the machine, and particularly clean oil, fuel, or flux from connections and threaded fastenings.
- Do **NOT** use aggressive cleaning agents! Use lint-free cleaning cloths.
- Always tighten threaded fastenings that have been loosened for maintenance and repair work.
- If service and repairs require that safety fixtures be dismantled, these must be remounted and inspected immediately upon conclusion of the service and repair work.

4.8 Safety Instructions specific to the jet fluxing system

Ensure that the machine controller is switched-off for all service, maintenance, and repair work.

Refilling flammable operating material (i.e. alcohol-based flux) into the flux tank is permitted when the machine is switched on but maintain caution regarding nearby ignition sources.

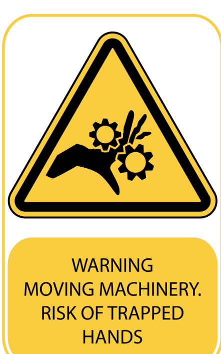
Any spillages should be immediately cleaned up before proceeding.

Any leaks found in the flux system should be noted and immediately reported and fixed.

ESD Protection

Ensure that neither personnel nor objects, i.e flux refill containers are able to transfer an electric charge TO the machine.

4.9 Safety instructions specific to the conveyor system and positioning system



Pinching/Crushing/Draw-In/Take-Up Hazards

Do not bend over the conveyor/positioning system with loose clothing, dangling jewellery or long hair that hangs down.

4.9.1 Forbidden Uses and Hazards

The modes of use specified in this section are outside of machine specifications and should **NEVER** be permitted, under any circumstances.

Using the machine to jet materials other than fluxes, for unauthorised manoeuvres, its misuse and lack of maintenance can endanger the safety of the staff, especially to the operator, as well as affecting the functionality and the intrinsic safety of the machine itself.

The following actions listed, while not possible to cover the entire range of potential possibilities of “misuse” of the machine, are those which are reasonably foreseeable and should be strictly prohibited.

The following is strictly prohibited:

- Supplying the machine with voltage from the mains that is different from that shown on the identification plate (200-240V AC, 50/60Hz).
- Using the machine for services other than those for which it is intended.
- Using the machine without having read the operating instructions and without due care.
- Using the machine, and in particular carrying out manual loading without the use of appropriate personal protective equipment (PPE) according to the instructions given in this manual.
- Using the machine and particularly, the jetting assembly improperly.
- Picking up the machine while operation is in progress.
- Reaching into the machine while operation is in progress.
- Modifying and/or tampering with the safety devices installed on the machine.
- Using the machine as a support and/or work surface.
- Climbing on to the machine.
- Touching the machine with wet/damp hands.
- Exposing the machine to the elements.
- Using the machine when it is not secured on a stable platform.
- Installing and using the machine without properly ensuring the machine is level.
- Installing and using the machine on surfaces that do not possess the mechanical strength to support its weight.
- Installing and using the machine outdoors.

- Allowing the machine to be used by untrained personnel.
- Operating the machine without being psychophysically fit.
- Operating the machine while under the influence of drugs/alcohol.
- Allowing untrained/unqualified personnel to perform maintenance on the machine, and without compliance to the procedures listed/specified in this manual.
- Performing maintenance operations under insufficient lighting conditions.
- Performing cleaning and/or maintenance without ensuring maintenance mode is ON/disconnecting the main power.
- Modifying the electrical system of the machine.
- Moving the machine without suitable lifting equipment.

SECTION 5 : Technical Assistance

For any problems or concerns, please do not hesitate to contact Interflux for queries & support.

5.1 Other Provisions

Tampering with any safety device is **FORBIDDEN**.
ALWAYS check for the presence and integrity of protective devices and functionality of said devices before starting operations.

SECTION 6 : Description of the Machine

The ICSF-Select6 (M23) is a stand-alone high speed selective jet fluxer, the nozzle assembly operates on the XY axis by means of a gantry and transport of PCBs/pallets through a conveyor system, for the selective application of flux to optimise the amount needed per solder joint.

The application of flux is controlled by a High Speed Valve (HSV) configured to allow pressurised flow of liquid flux from a flux supply tank; a controller is coupled to both the High Speed Valve and Flux Supply System.

The controller is configured to generate HSV signals to control the valve, and pump speed signals to control the variable speed of the pump. ICSF-Select6 (M23) is able to selectively control volume of individual flux drops along with the flow of the liquid flux.

ICSF-Select6 (M23) is PLC-controlled, it is capable of running independently without the Flux Designer Software in the event of PC breakdown.

6.1 Intended use and field of application

ICSF-Select 6 (M23) is designed and built to perform the following operations using all types of flux.

- Dot Fluxing
- Line Fluxing
- Multi-line Fluxing
- Area Fluxing

The machine has been designed and manufactured for the use specified above. Operation of the machine in manners other than intended and stated may be dangerous for operators and upkeep of the machine. Manufacturer/supplier therefore cannot accept any responsibility for resulting damage to operators and/or machine.

ICSF-Select6 (M23) is equipped with adjustable feet and is preferably installed and used on flat surfaces, with ergonomic features.

ICSF-Select 6 (M23) is capable of operating in closed work environments, i.e. protected from exposure to the weather and away from hazards of fire or explosion.

It is recommended that the ICSF-Select6 (M23) operates between the temperature range of 10-70°C.

It is recommended that the ICSF-Select6 (M23) operates below the altitude of 3000m.

Environment should be sufficiently illuminated (at least 200 lux is recommended) for operations to be observable and safely carried out.

There are three main groups within the ICSF-Select6 (M23):

- The valve/pump assembly
- The gantry/conveyor system
- The electronic panel

The valve/pump assembly comprises the High Speed Valve, controller, pump, pressure gauge, regulator, buffer and flux tanks.

The gantry/conveyor system comprises the components that enable motion to the PCB/pallets and the nozzle.

The electronic panel comprises the components that enable the programmable functions of the ICSF-Select6 (M23).

6.2 Description of the main parts

Jetter Assembly

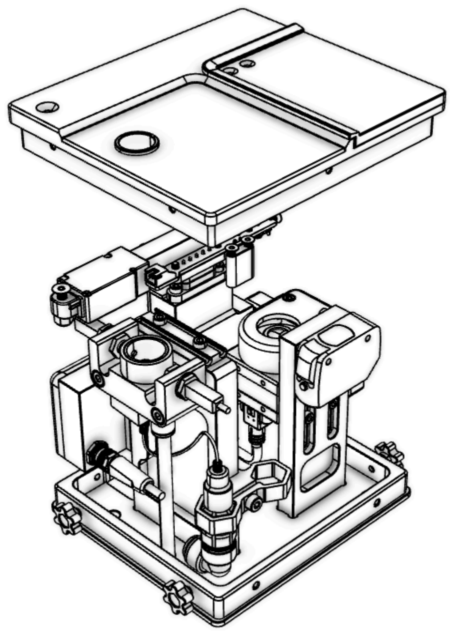


Figure 5. Jetter Assembly

Jetter Assembly Cover

The cover is made to protect the assembly from Flux contamination during the fluxing process.

Glass Tube Protector

The glass tube is made to protect the Laser Droplet Sensors from Flux contamination during the fluxing process. This must always be in place during operation.

High Speed Valve(s)

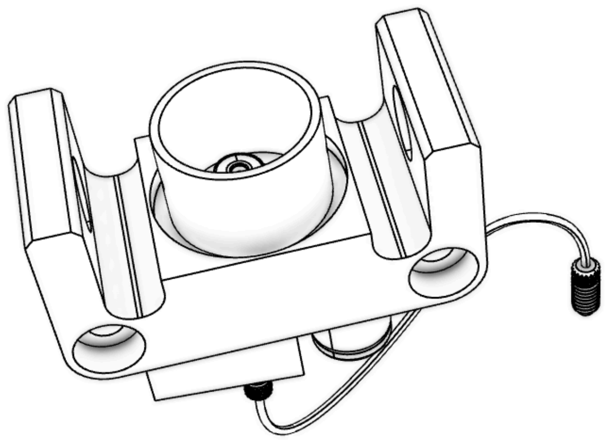


Figure 6: High Speed Valve

Precision Type (HSV-P)

The valve serves to jet a highly precise droplet size with minimal resistance at a 5° angle. The valve allows for direction of flux from the pump system and an accurate metering of the flux through opening and closing in milliseconds.

Volume Type (HSV-V)

The valve serves to jet a consistent droplet size of considerable volume with minimal resistance at a 5° angle. The valve allows for direction of flux from the pump system and an accurate metering of the flux through opening and closing in milliseconds.

Laser Droplet Sensor (Optional)

The laser sensor serves to detect the flux droplets. When the option of droplet detection is activated the Laser sensor detects each droplet ejected from the High Speed Valve(s). It is an essential component for flux detection traceability.

PCB Laser Sensor

The laser sensor serves to detect the positioning of the incoming PCB board for fluxing. It is essential for precisely locating the areas programmed for fluxing and eliminating positioning errors.

Conveyor Assembly

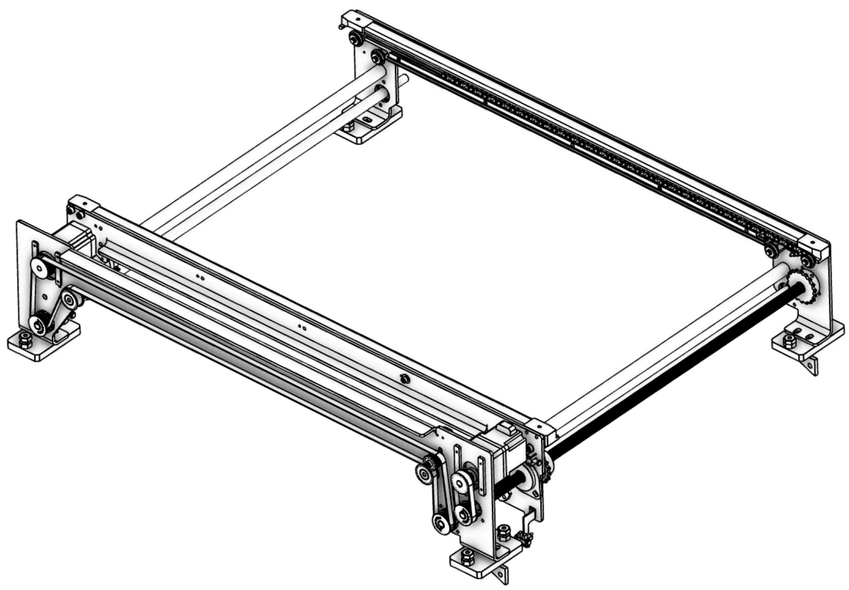


Figure 7. Conveyor System

Conveyor assembly allows the conveyor chain to slide along the length of the assembly to hold, position and feed the pallet/PCB to the system. The conveyor assembly is made of a combination of pressed steel, stainless steel, POM-C and aluminium. The conveyor assembly can be controlled through the Flux Designer software for calibration, manual positioning and pallet/PCB transportation speed.

Purging/Measurement Station

The station is made of Carbon-Fibre Reinforced PETG. The station is able to hold the flux measurement jar in place for measurements to be taken, along with an orifice to enable the purging sequence.

X-Y Assembly

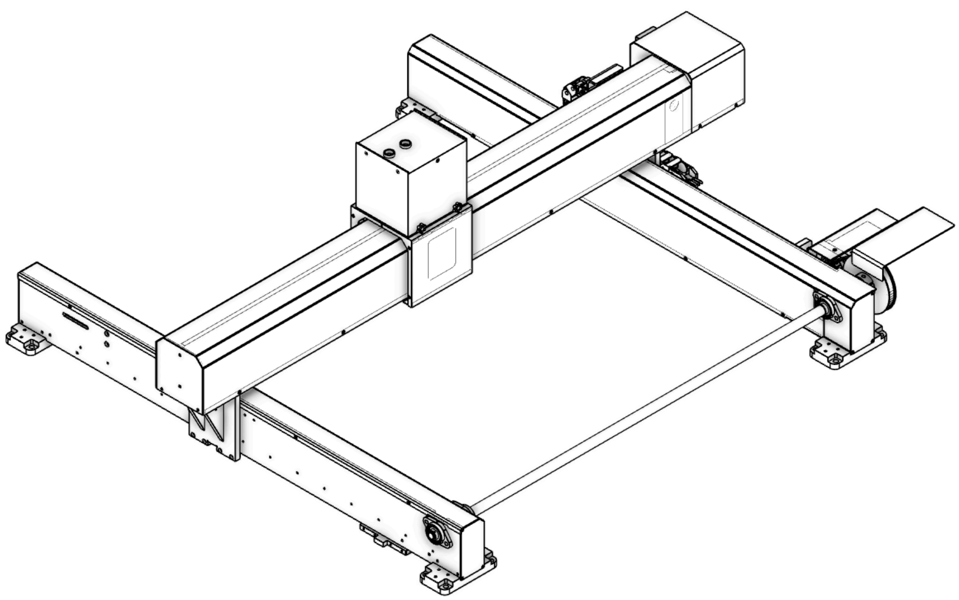


Figure 8. XY Gantry Movement

The X-Y assembly holds the Fluxer Assembly and enables it to reach required positions as demanded by the programme. The assembly frame is made of aluminium with stainless steel covers. The X-Y Assembly can be controlled through the Flux Designer software for calibration and manual positioning.

Electronic Panel

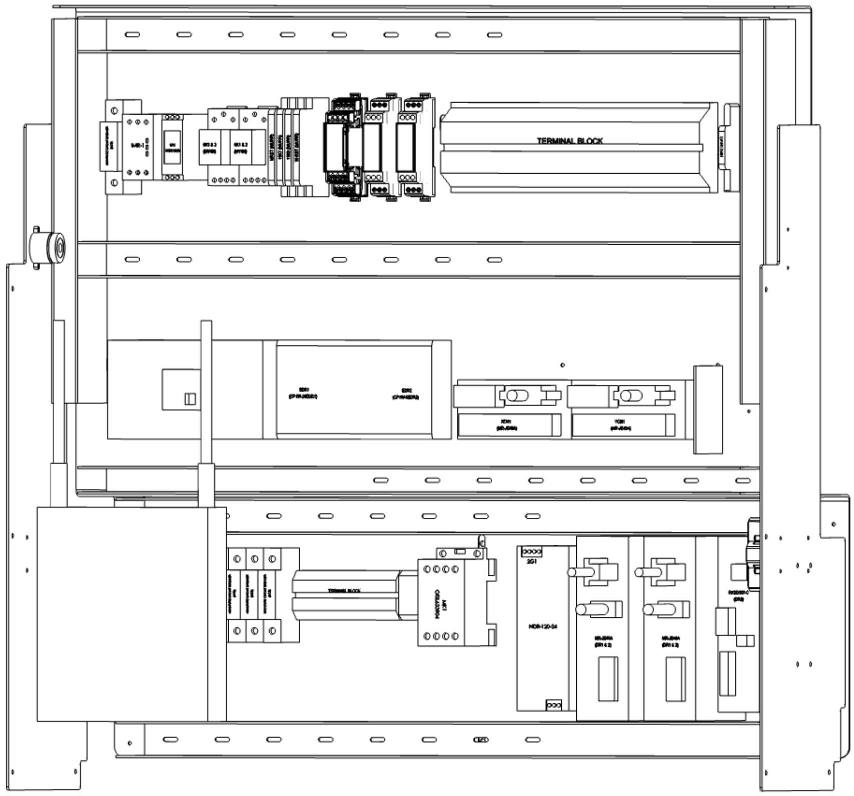


Figure 9. Electronic Panel

Contains all electrical components for the operation of the ICSF-Select 6 (M23).

6.3 Identification Plate

Figure 10. Identification Plate

SECTION 7: Installation, Lifting, Transportation & Storage in Warehouse

7.1 Site Requirements

Before installation of the machine, identify an area that is sufficiently well lit, flat and level, away from wet areas and has no ignition/vibration source nearby.

The jet fluxer should be placed in a location where the operator(s) have adequate space to perform their duties. It should allow the machine to be used to its maximum potential, giving allowance to safely adjust, maintain and clean the jet fluxer. It is recommended that at least 2 square metres in the front and back of the machine is kept free for easy access to maintenance doors.

7.2 Moving the machine into positions

When moving the machine into place, please take note of the highlighted areas for lifting. Ensure that the locking brackets have been installed prior to moving the machine. Check Chapter 7.3 on location to install/remove the locking brackets.

CAUTION: Take immense care not to damage the machine while moving it. The machine contains sensitive equipment which can be easily damaged with improper/rough handling of the machine.

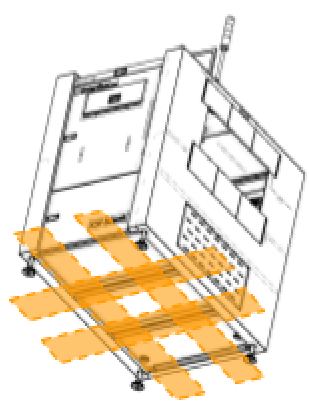


Figure 11.

7.3 Removing the locking brackets

The machine has a locking bracket which must be placed in the allocated position prior to moving/shipping. This bracket **MUST** be removed before switching on the machine.

CAUTION: Failure to remove the locking bracket before switching on the machine might result in damage to the locked components.

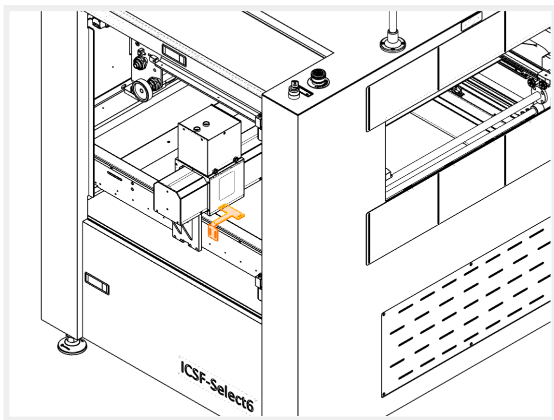


Figure 12.

7.4 Levelling the machine

Use a spirit level to level the machine by changing the height of the adjustable feet. Make sure the machine is level in both X and Y direction. See below on how to use the inside conveyor as reference to level the machine.

CAUTION: Failure to properly level the machine may result in damage to the high-speed axis.

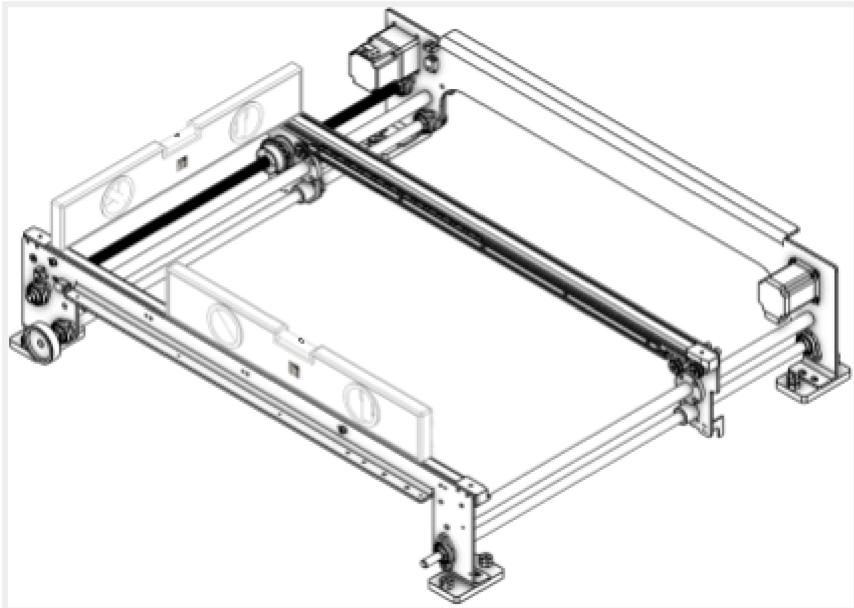


Figure 13.

Use a wrench to adjust the feet to the correct height by rotating the hexagonal head closest to the foot. After finalising the adjustment, lock it in place with the locking nut provided.

CAUTION: Failure to properly lock the locking nut might result in excess vibration of the machine.

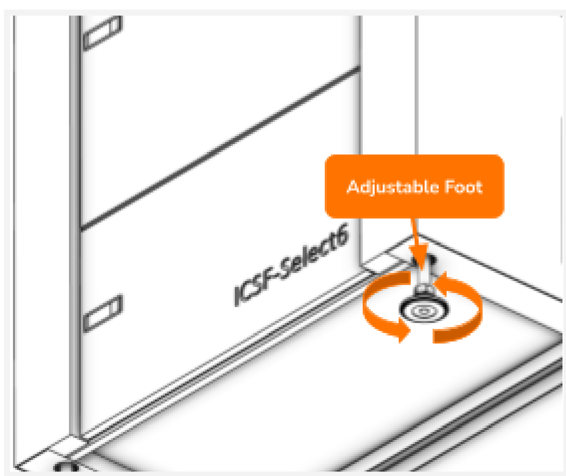


Figure 14.

7.5 Connecting the fluxing machine

7.5.1 Connection to the electrical power supply

Interflux reserves the right to make technical changes. Only use/refer to the electrical circuit diagrams that are included in the scope of supply.

Prior to connecting, the energy supply terminals of the master power switch must be confirmed for tightness.

Ensure that your power supply readings agree with the information on the nameplate of the jet fluxing machine.

Only a **CERTIFIED** electrician may connect the fluxing machine to the electrical power supply.

To connect the machine, take the power cable from the back of the machine. Then either plug into the power socket or connect the cable to the power supply.

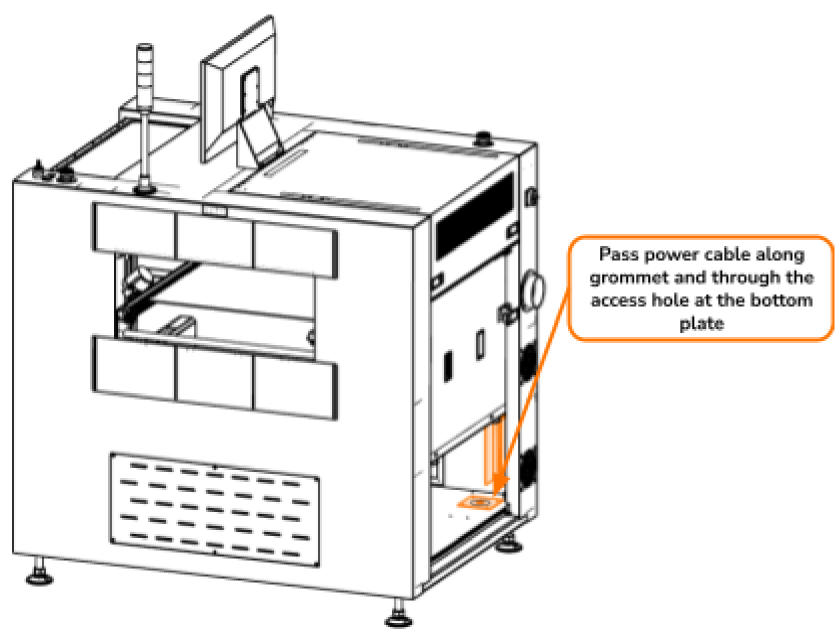


Figure 15.

7.5.2 Connection to upstream or downstream conveyors via SMEMA

The SMEMA cable and connections can be found in the back, below the main assembly. Connect the cables to the proper connectors and route the cables through the access hole in the bottom plate. Proceed to connect to the upstream and downstream machine conveyor.

Upstream = Incoming, Downstream = Outgoing.

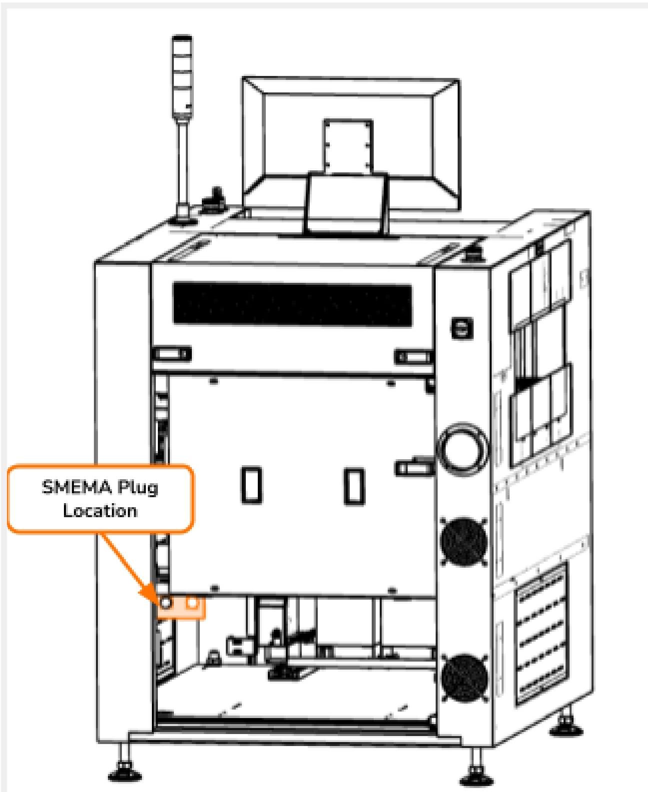
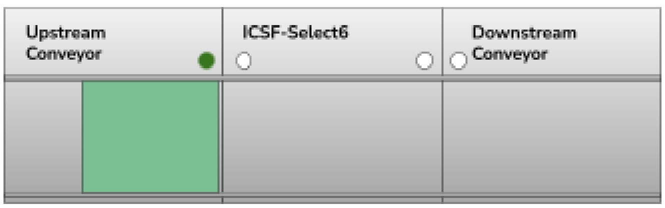
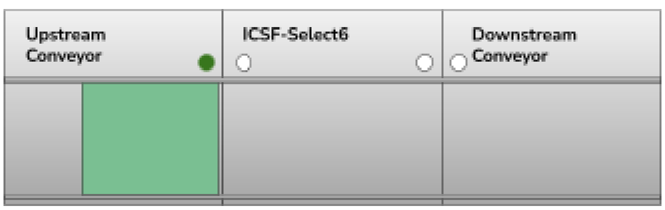
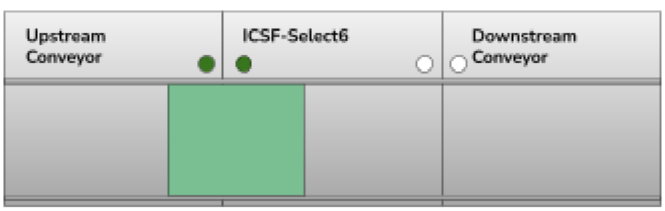
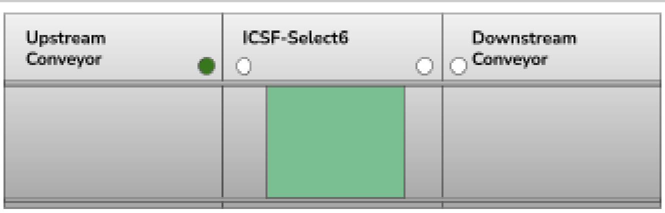


Figure 16.

	SMEMA communication signals			
	Upstream conveyor ready to send board	Fluxer ready to receive board	Fluxer ready to send board	Downstream conveyor ready to receive board
	→	←	→	←
	→	←	→	←
	→	←	→	←
	→	←	→	←
	→	←	→	←


Upstream Conveyor
ICSF-Select6
Downstream Conveyor

7.5.3 Connection and usage of the flux storage tank

The ICSF-Select6 (M23) has (a) flux storage tank(s) that is/are located in the flux tank drawer which is located at the bottom front of the machine. The flux tank(s) is/are not pressurised, operators are able to refill the flux at any point in time.

Only use the specific flux recommended to fill the container, to ensure that the flux system's service lifespan is prolonged.

CAUTION: NO smoking is allowed when working with flux. All ignition sources are to be removed from the work area. Flux is highly combustible and can easily ignite, threatening the safety of the surroundings. Any leaks should be noted, reported and fixed immediately. Any spillages should be cleaned up immediately.

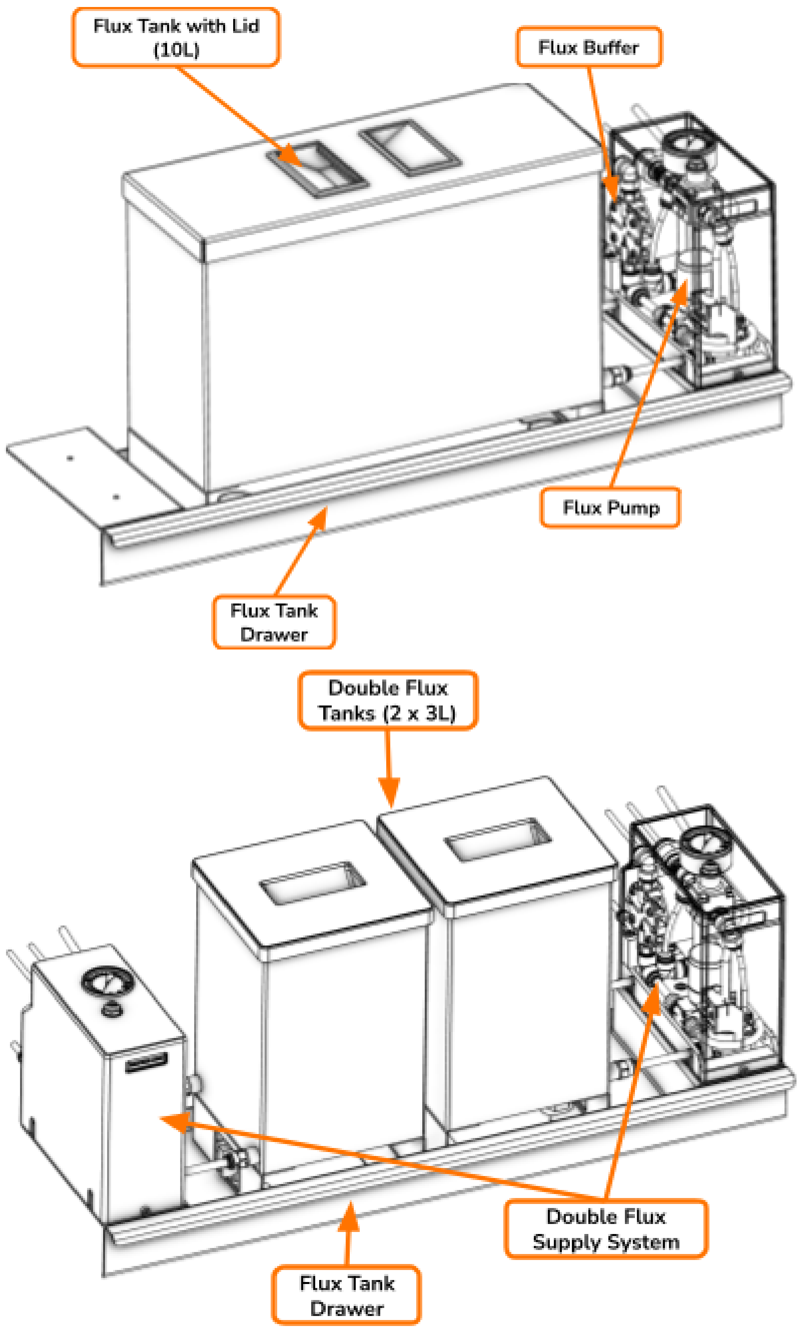

Flux Tank with Lid (10L)
Flux Buffer
Flux Pump
Flux Tank Drawer
Double Flux Tanks (2 x 3L)
Double Flux Supply System
Flux Tank Drawer

Figure 17.

SECTION 8 : Basic Operation Guide

8.1 Outline

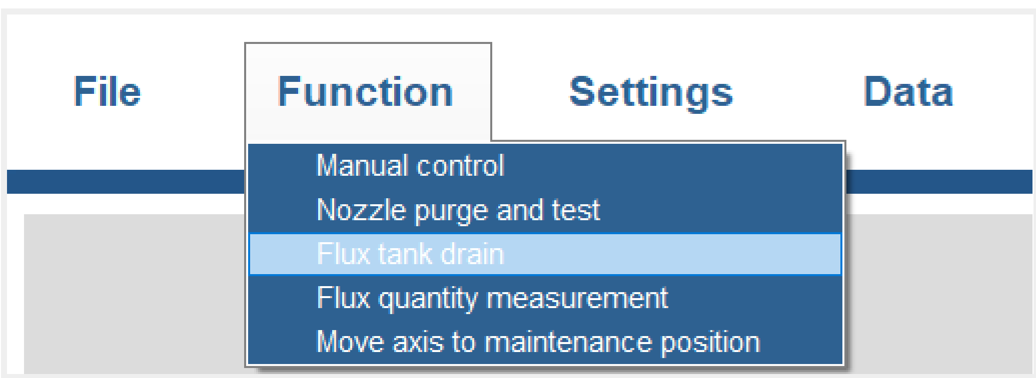
This section will only describe how to operate the machine on a basic level, for more advanced functions, please refer to Chapter 18. The software referenced in this manual is **Flux Designer V10.5**.

8.2 Starting the software

Flux Designer boots on startup with the operating system when the machine is first initialised.

8.2.1 Drain the flux tank to change flux

To drain the flux tank, select **Function → Flux Tank Drain** then follow the instructions on the screen.

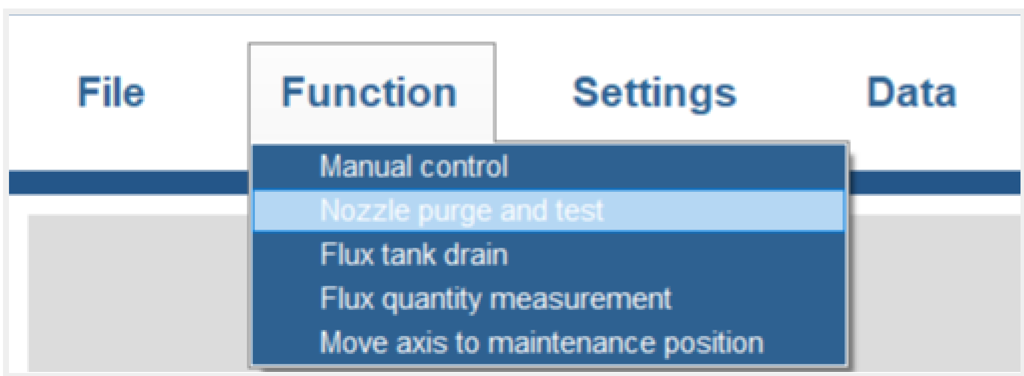


1. Nozzle will drain during a set time back to the tank by gravity.
2. Place a container under the flux tank drawer, align the container to the manual drain valve, open the manual drain valve for the flux to drain.
3. Flux pump will circulate into the empty tank to empty the recirculation line of the remaining flux.
4. Once all flux is drained close the manual drain valve.

5. Using an absorbent cloth and wearing the required personal protective equipment, wipe out the inside of the flux tank followed by the manual drain valve to remove any remaining fluid and dirt. Dispose of the cloth accordingly.

8.2.2 Purge the flux supply system after loading flux

After every operation of emptying/loading flux, it is necessary to purge the supply system. Purging procedure is not necessary if the flux was "topped-up" in the tank.
Start the nozzle pump by selecting **Function → Nozzle Purge and Test**. Operation may have to be performed up to 3 times for a clear stream is present.



System will:

1. Prime the flux pump and buffer before circulating contents in the tubing until all air bubbles are gone.
2. Nozzle is moved to the purging station.
3. Open the valve to prime the nozzle until all air bubbles are removed.
4. Move the nozzle back to home position.

AND

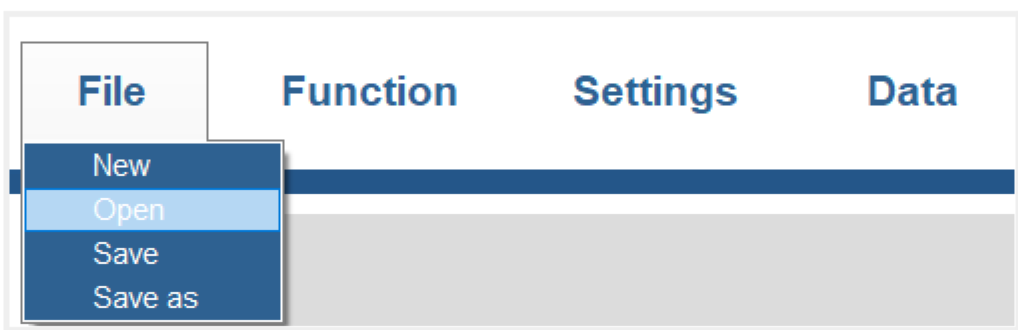
System will:

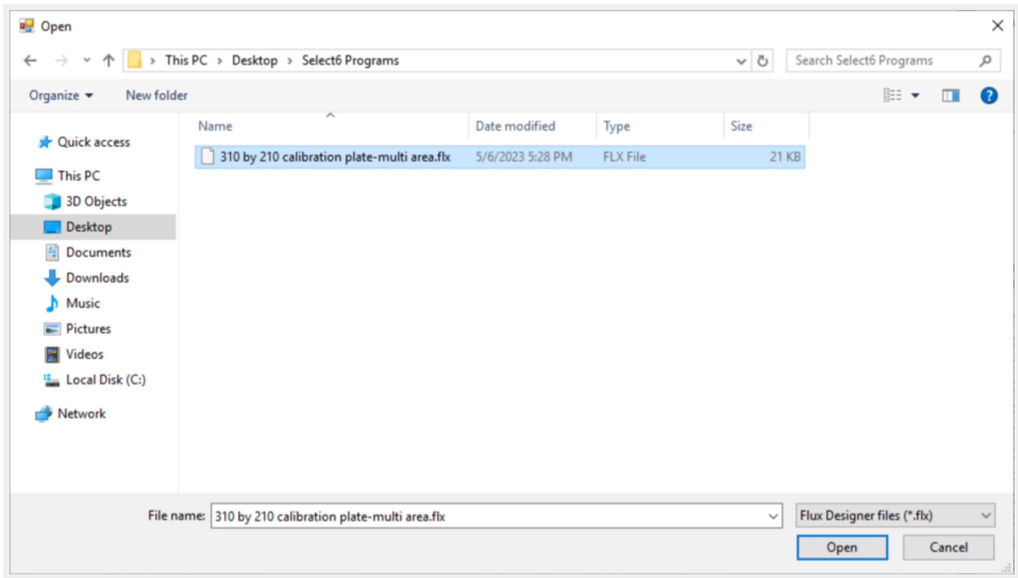
1. Move the nozzle to the purging station.
2. Attempt to jet a line of flux/IPA
   a. In the event of failure, the machine will attempt to clean the nozzle by means of a high pressure purge.
3. Attempt to jet a line of flux/IPA a second time
   a. In the event of failure, the machine will attempt to recalibrate the flux detection sensor to make sure the sensor is not faulty or dirty.
4. Attempt to jet a line of flux/IPA a third time.
5. If successful, the flux jet system works, else;
   a. Error message as shown will appear.

6. Move the nozzle back to home position.

8.2.3 Opening a project file

To open a project file, select **File → Open**





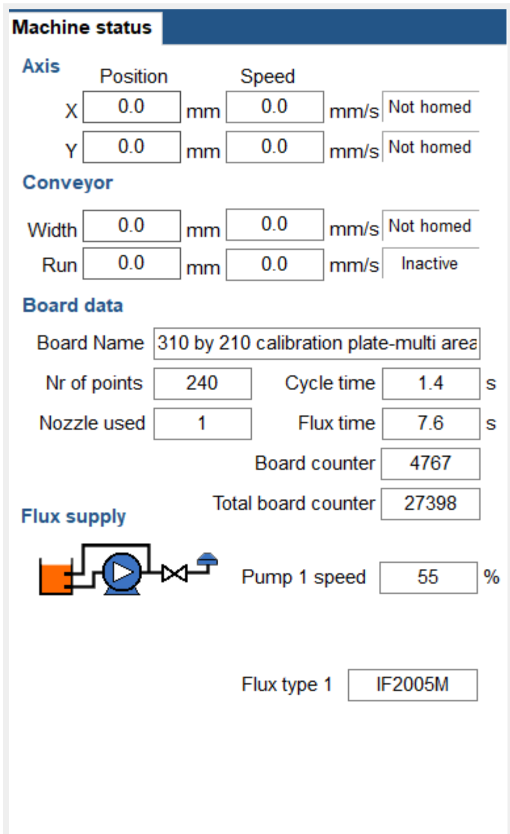
From the open file dialog, select the folder that contains the relevant project files and pick a *.flx file.

8.2.3.1 Downloading the project file to the machine

Downloading : " Transferring the file from the programming panel to the PLC panel"

To download the file, click the **"Download"** button as shown.

When the download is completed, the filename and the number of points of the current board data would appear in the panel.



8.2.4 Starting the machine cycle

To start the main cycle, press the **"Start"** button.

System will:

- Home X and Y axis for the first cycle after machine intialisation.
- Test the PCB sensor to make sure it is working properly.
- Move the X and Y axis to the waiting position to detect the board.
- Home the conveyor width if necessary.
- Move the conveyor width to the board width setpoint.
- Prepare the machine for receiving the boards.

When the checklist is completed, the ISCF-Select6 (M23) will indicate its status as **"Waiting for Board"** as shown.

Waiting for new board

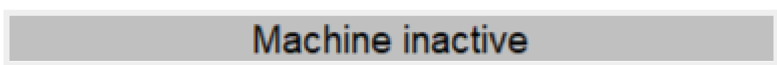
The ICSF-Select6 (M23) is now ready to receive boards from the Upstream Conveyor (if available)
Fluxing cycle begins when the machine receives the board.

After completion of the fluxing cycle, the machine releases the board to the Downstream Conveyor (if ready) and prepares to receive the next board from the Upstream Conveyor.

8.2.5 Stopping the machine cycle

To stop the main cycle at any time, press the **“Stop”** button as shown.

The machine will cease all activities along with displaying the status message **“Machine inactive”** as shown.



SECTION 9 : Electrical Safety Devices

The electrical circuit of the ICSF-Select6 (M23) is equipped with a rotary main switch. This prevents the danger of unwanted/accidental starts of the machine. The switch can only be activated through a voluntary, intentional action.

The maintenance doors and back internal panel are equipped with individual contacts which feedback to the software for safety.

ICSF-Select6 (M23) also comes equipped with two emergency stop buttons (mushroom type), located at the **top front right** and **top back left** of the machine respectively. In any event of emergency, when pressure is applied to the button, all operations on the machine cease immediately.

ICSF-Select6 (M23) power supply connection must be equipped with a grounding conductor according to regulations.

CAUTION: Improper connection of the ICSF-Select6 (M23) and/or the grounding conductor can result in the risk of electric shock.

Check with a qualified electrician if you do not understand the grounding instructions or if you have any doubts about grounding the machine.

SECTION 10 : Mechanical Safety Devices

10.1 Maintenance Key Switch

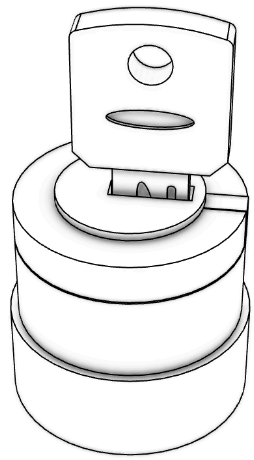
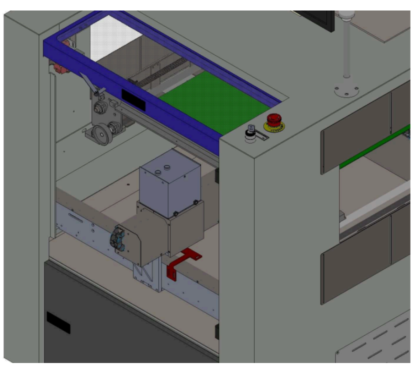


Figure 18. Maintenance Key Switch

The switch allows the certified/qualified personnel to bypass all safety switches to perform maintenance on the machine, the emergency stop switches are **NOT** bypassed. The key switch will limit the speed of the assembly to **50mm/s**.

Maintenance mode should only be activated by qualified personnel who have received training and certification from Interflux.

SECTION 11 : Installation Checklist

ICSF-Select6 Installation Checklist		
Machine Serial No. :		
Hardware ID :		
HMI Software Version :		
PLC Software Version :		
Software Database Version :		
Flux Designer Key No. :		
Barcode Key No. :		
Traceability Key No. :		
Oversized Board Key No. :		
Task	**Tick to indicate task finished or NA if not applicable**	**Comments**
Unpack machine		
Move machine into position		
Remove the locking brackets 		
Check no debris inside the machine		
Tighten bolts and screws that might have come loose during transport		
Adjust height of machine as required		
Level the machine		
Install monitor and bracket		

Connect all cables to monitor and check USB operation		
Install and connect tower light		
Adjust position of conveyor panels as required		
Ensure no rust on the conveyor and X-Y gantry, a thin layer of grease is applied on the lead screws		
Ensure that all conveyor pins are in place		
Ensure conveyor cables are properly looped, arranged and covered		
Ensure X-Y gantry cables are properly looped, arranged and covered		
Check that the Board Detection Sensor is present for both conveyor entrance and exit		
Check the flux tank for any dirt or debris		
Connect the flux tank		
Check the electrical panel for any debris like washers, screws, etc		
Ensure that all terminals in the electrical supply are tightened		
Connect the power supply		
Check that the ICSF-Select6 is able to power up properly		
Check that the Windows OS is activated		
Flux Designer boots upon startup		
Load and run Cal.flx, check to see if conveyor clamps as intended and movement is correct		
Load and run Cal.flx, check that X-Y gantry movement is smooth and aligned to the programme		
Load and run Cal.flx, check if Board Detection Sensor works as intended		

Fill the Tank with Flux, turn on Pump, ensure no leaks/blockage in any of the connections in the system		
Load and run Cal.flx, check that Valve(s) are electrically and flux connected properly and working as intended		
Load and run Cal.flx, check that Flux Laser Sensor (if available) is properly connected and working as intended		
Load and run Cal.flx, check that Shutter is properly connected and working as intended		
Load and run Cal.flx, check that Barcode Sensor (if available) is properly connected and working as intended		
Load and run Cal.flx, check that Flux Level Sensor and Filter is properly connected and working as intended		
Connect upstream SMEMA (if available) and test signals		
Connect downstream SMEMA (if available) and test signals		
Purge the flux supply system		
Perform a flux nozzle test (manual or automatic)		

Comments/Open Points

Name of Interflux representative name, signature and date to indicate installation complete.

Name: ____________ Signed: ____________ Date: ____________

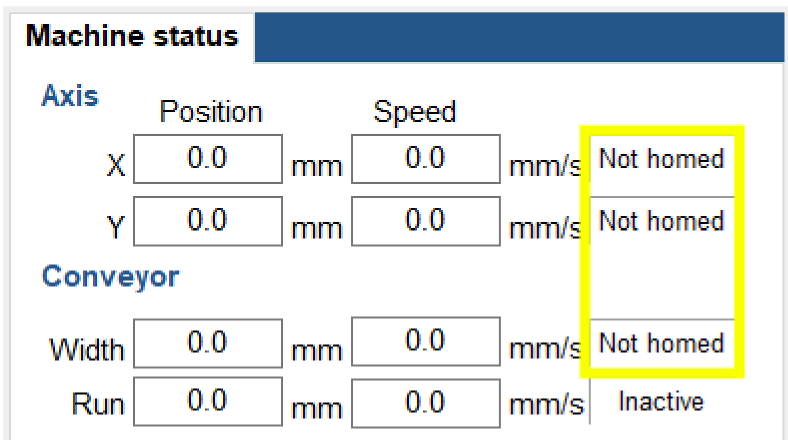
SECTION 12 : Calibration

12.1 Outline

This section will detail how to calibrate the following systems:

- Conveyor width
- X,Y axis positioning

Before any Calibration sequence is performed make sure that X and Y axis status shows **"Homed"**.

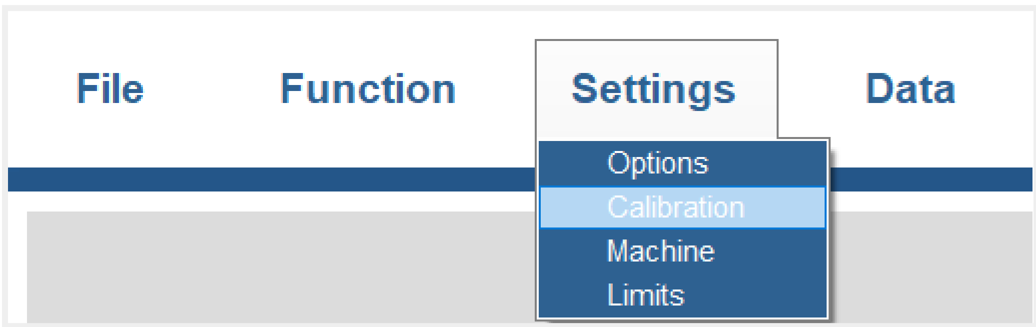


In the event that the status panel does not show **"Homed"** for the X & Y axis .

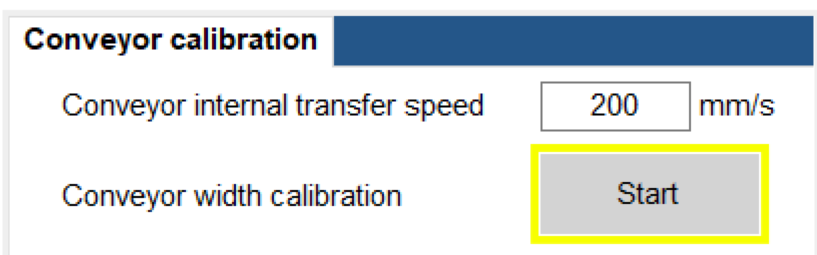
Select the **"X & Y homing"** button on the panel as shown.

12.2 Conveyor width calibration

Log in as administrator if user security is activated.
Open the calibration dialog by going to **Settings → Calibration**

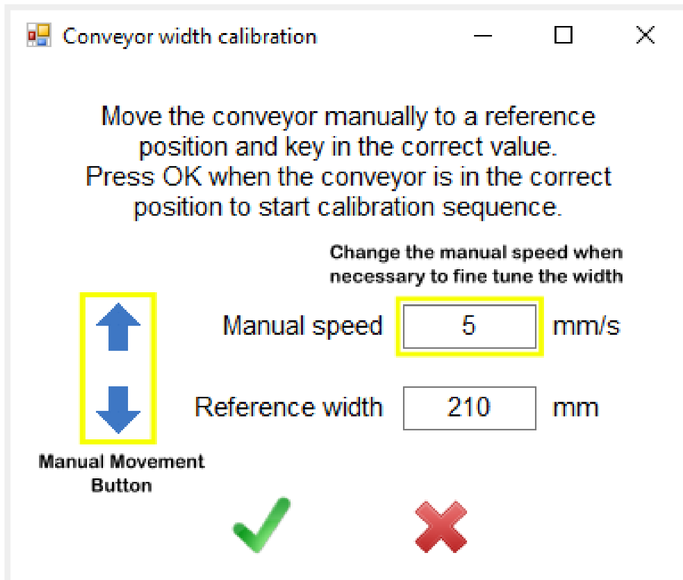


Select **"Start"** for **"Conveyor width calibration"** in the Conveyor Calibration section.



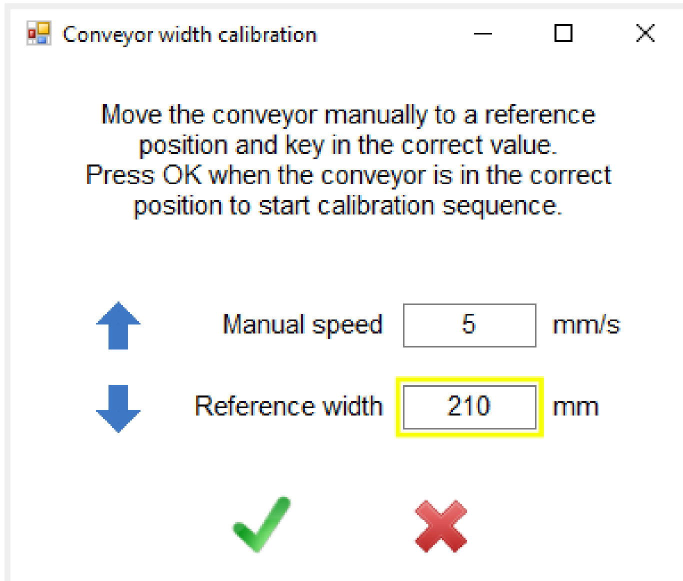
Follow the instructions shown on the screen.

Determine the exact width of the reference board or use ICSFJ-034 . Manually move the conveyor width to that of the reference board by the **"Manual Movement Buttons"**.

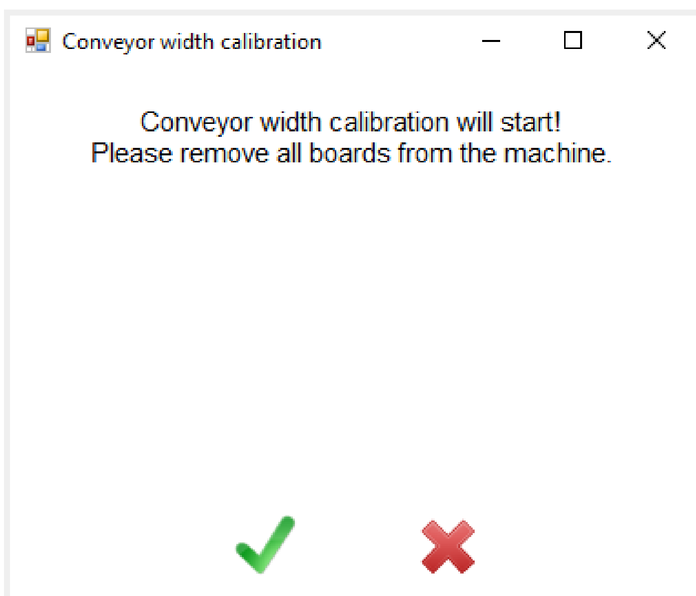


Place the reference board on the conveyor (ensure the board is sitting on the conveyor pins), make adjustments to the conveyor by means of the buttons. Ensure that the conveyor is not too tight or too loose against the edges of the reference board.

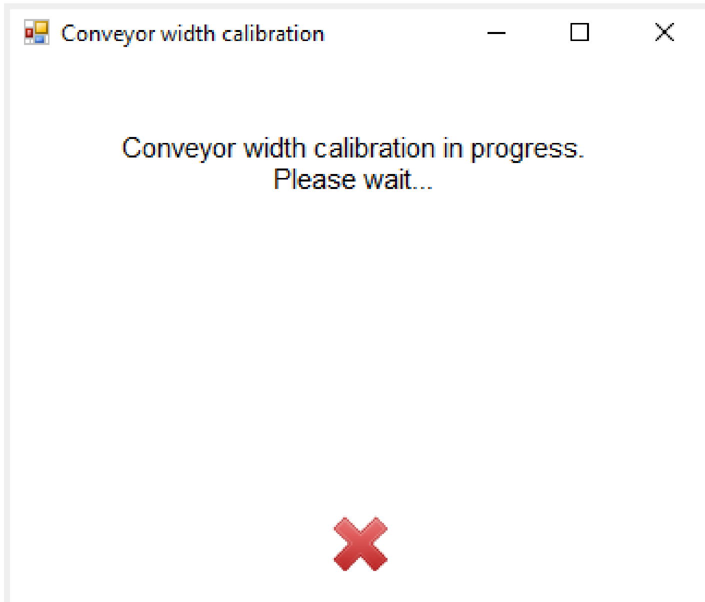
Input the exact width of the board into the **"Reference Width"** input window. Select the **Green Check**. Conveyor width calibration begins automatically, follow all on screen instructions.



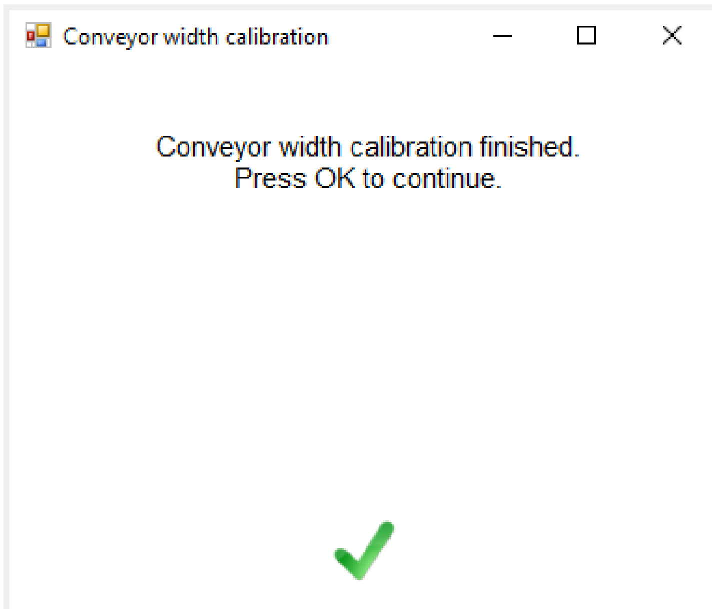
. Select the **Green Check**.



The calibration is in progress when this message is displayed.


Conveyor width calibration
Conveyor width calibration in progress.
Please wait...

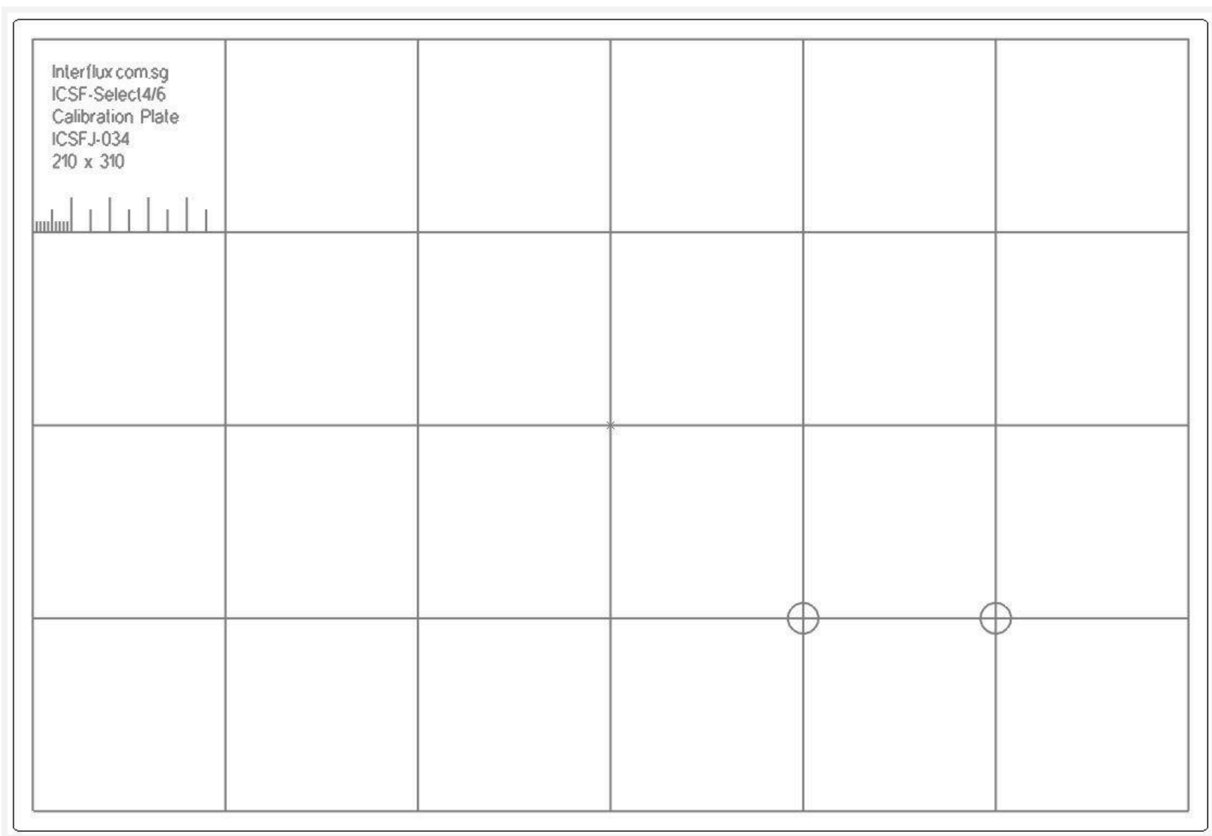
After the calibration is successfully finished the following message will appear. Select the Green Check to continue.



12.3 X,Y axis positioning

12.3.1 Calibration tools

Use the following polycarbonate calibration plate (Part #ICSFJ-034) to complete the X-Y axis calibration.



Use a metal rule with 0.5mm graduations to measure for accurate positioning and verification of the correct position.

12.4 Calibration method Jet Nozzle 1

Jet Nozzle 1:

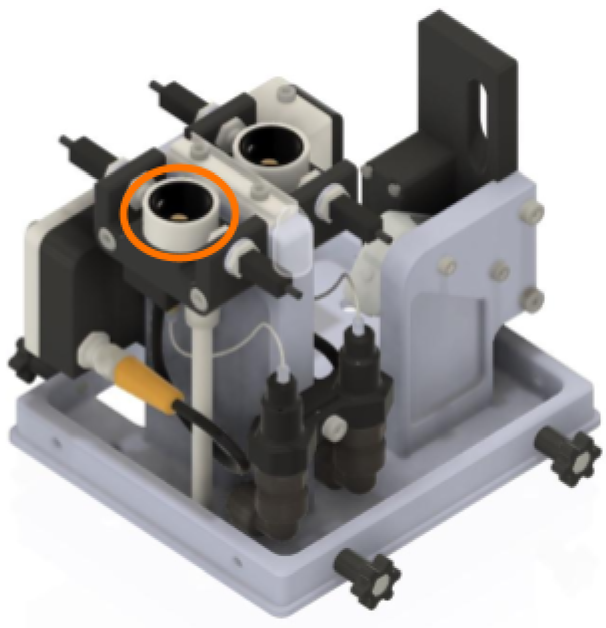
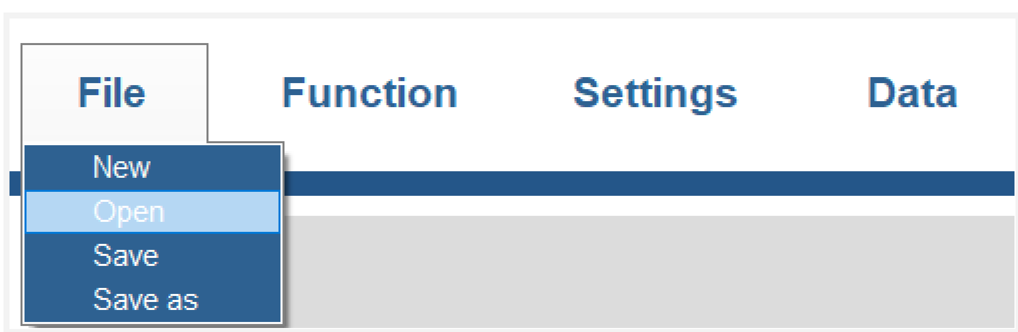
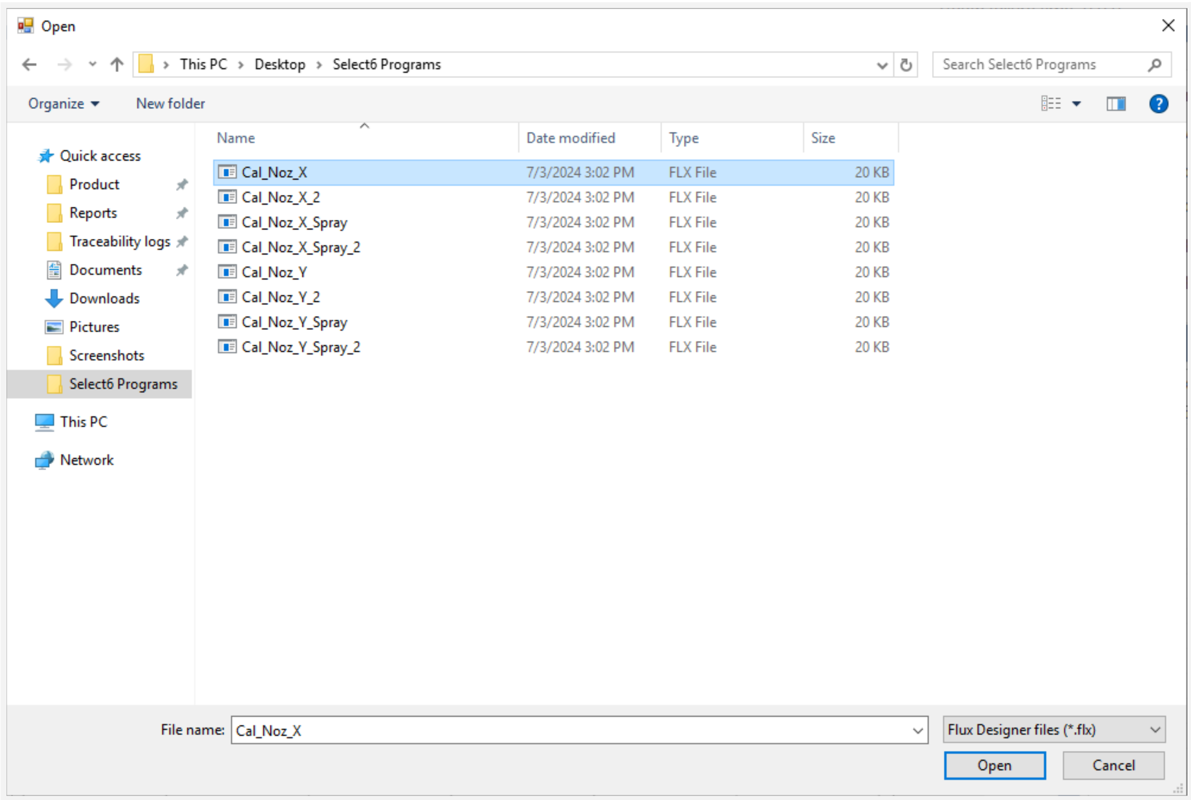


Figure 19. Jet Nozzle 1 Position

For X-Axis, Select **File → Open**

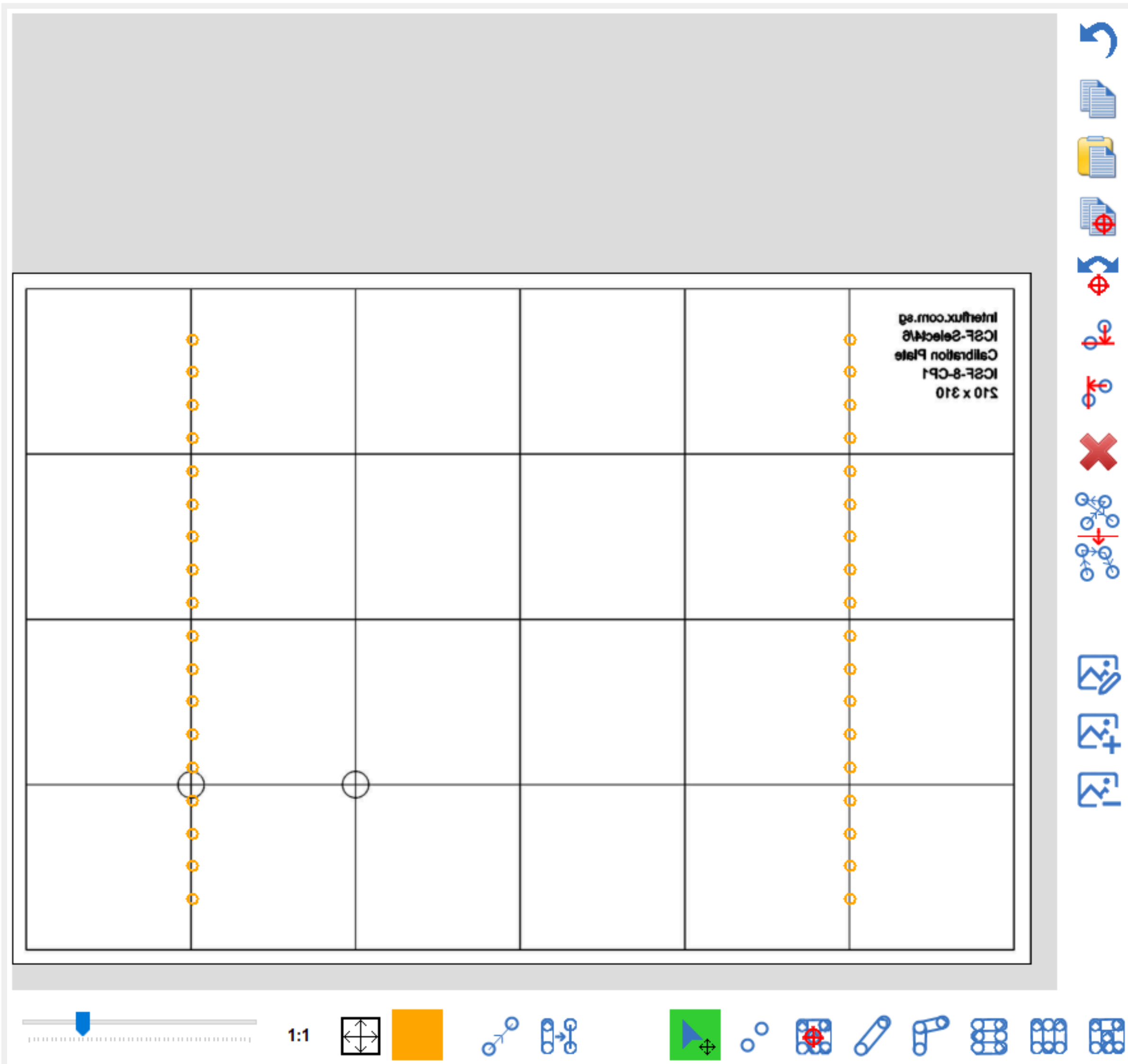


In the relevant folder, select project **"Cal_Noz_X.flx"**.

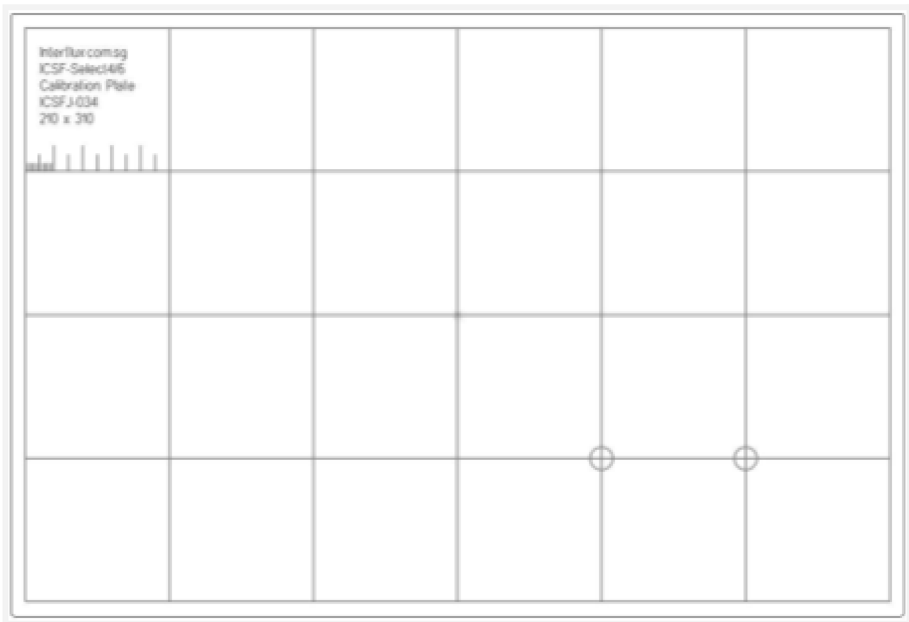


Select **"Download"** to load the program from the programming panel into the PLC panel.

Check that the program is the same as the one shown below:

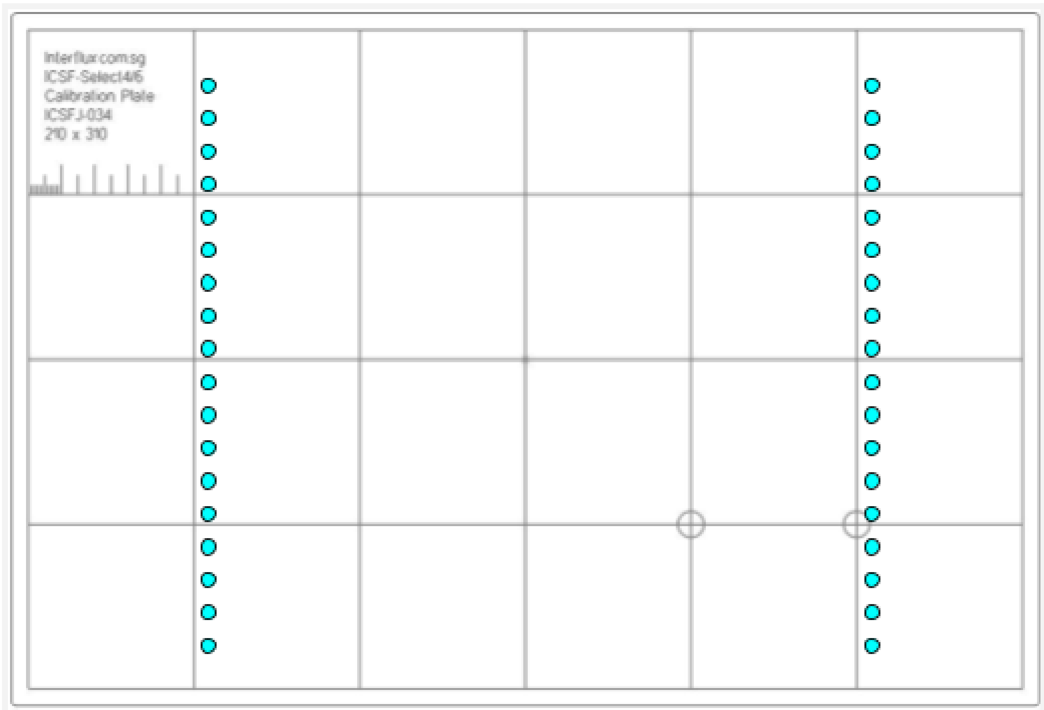


Place calibration plate according to below configuration on the conveyor:



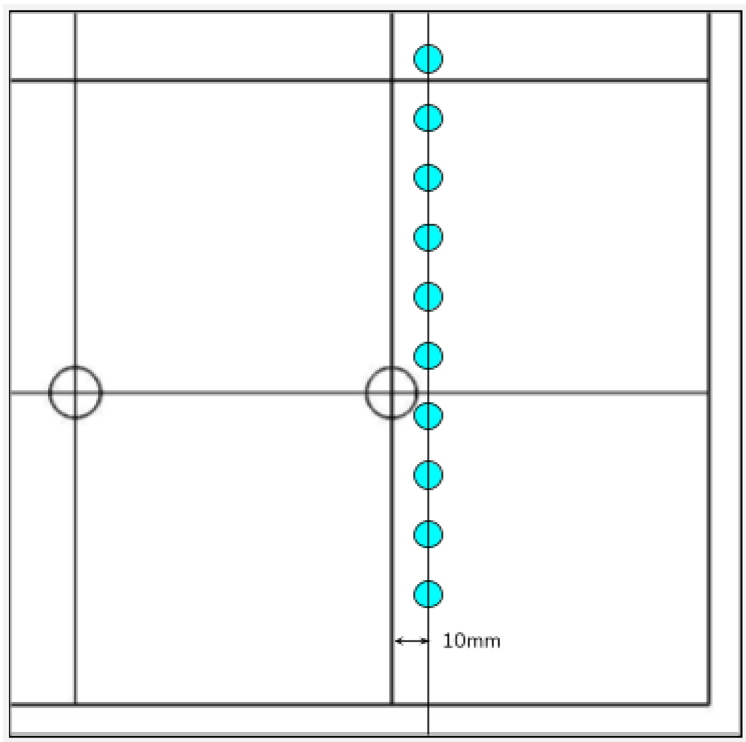
Select the **"Start"** button and run the cycle for the board.

Similar result as shown may follow:

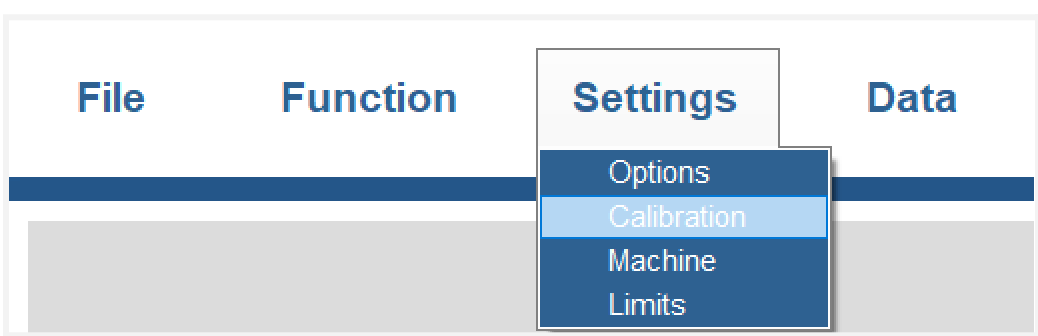


Measure the positioning X-offset with a correct ruler. The following values shown are examples.

Take reference to the right grid line on the calibration board. As seen below, the row of flux points is 10mm to the right. Hence, the offset needs to be reduced by 10mm.



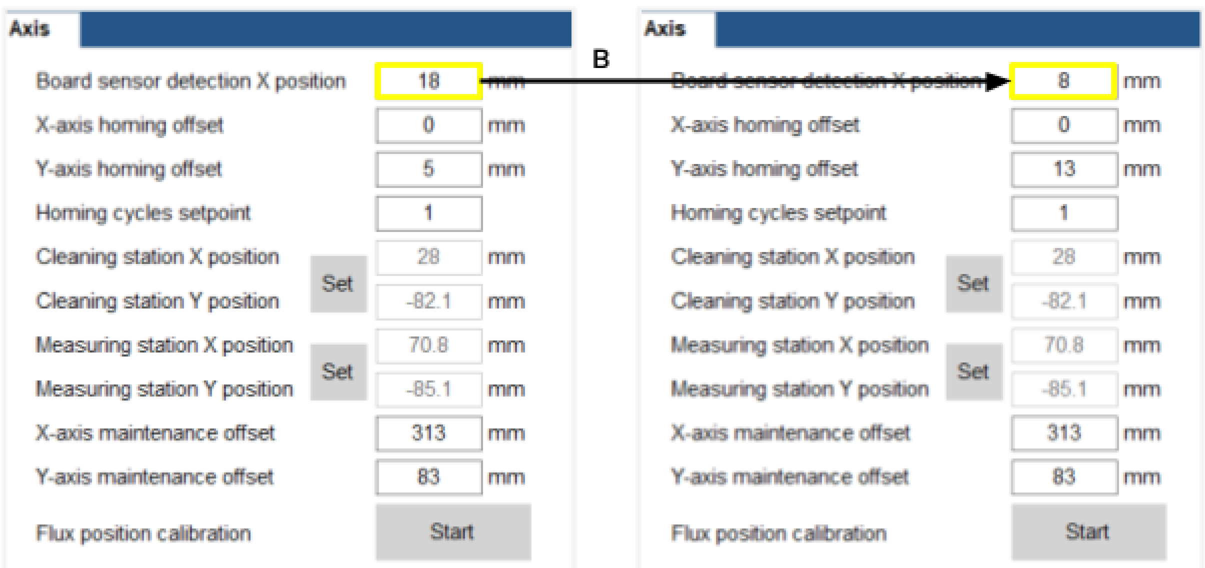
Open the calibration dialog by going to **Settings → Calibration**



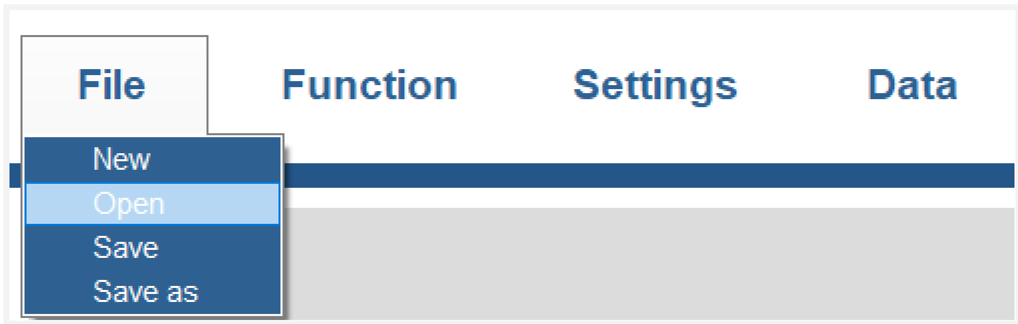
Adjust the following values according to the measured X-position offset.

- For X: Board sensor detection X position:

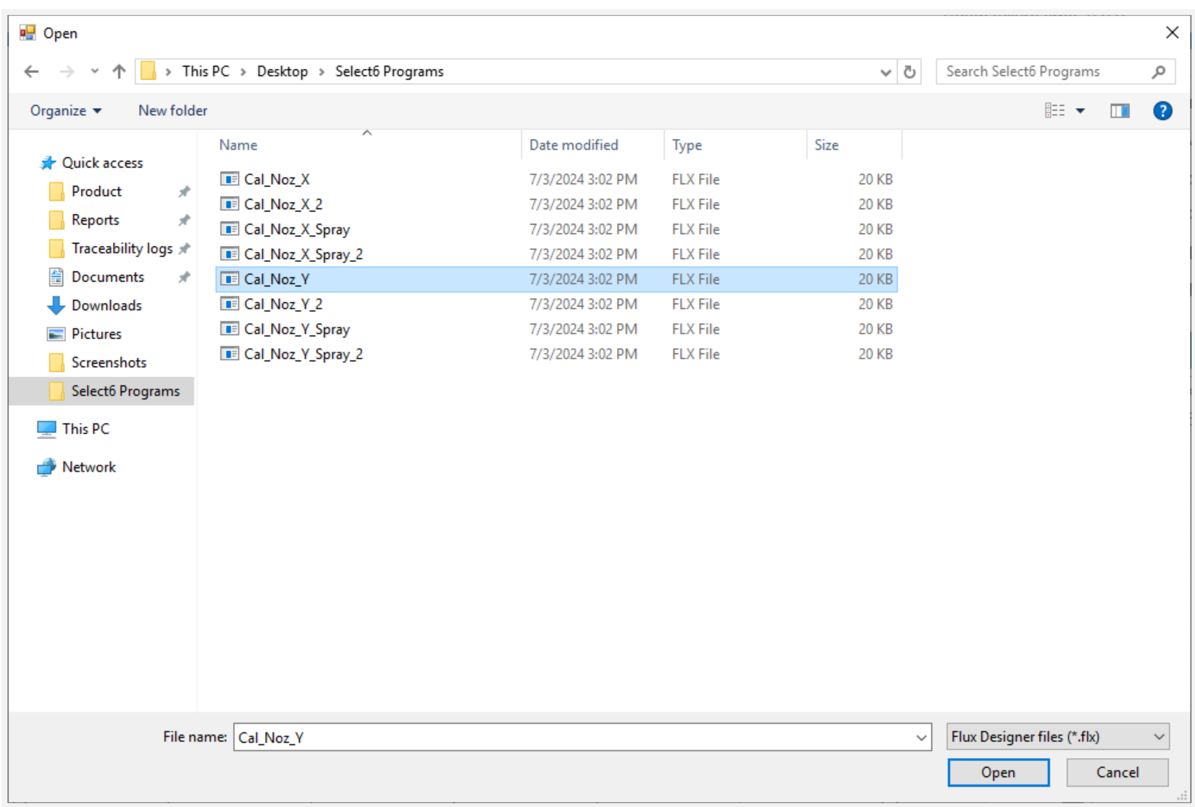
  REDUCE offset by measured value if the row is to the **RIGHT** of the reference grid line.
  INCREASE offset by measured value if the row is to the **LEFT** of the reference grid line.



For Y-Axis, Select **File → Open**

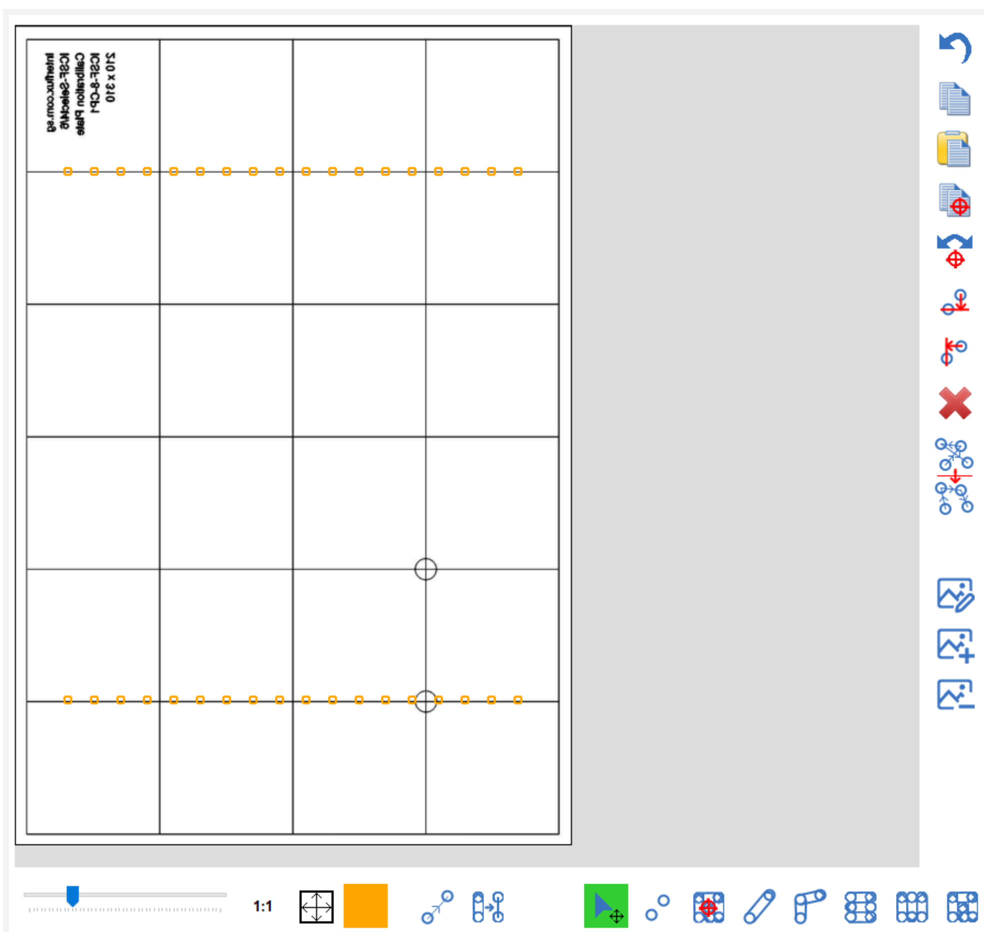


In the relevant folder, select project **"Cal_Noz_Y.flx"**.

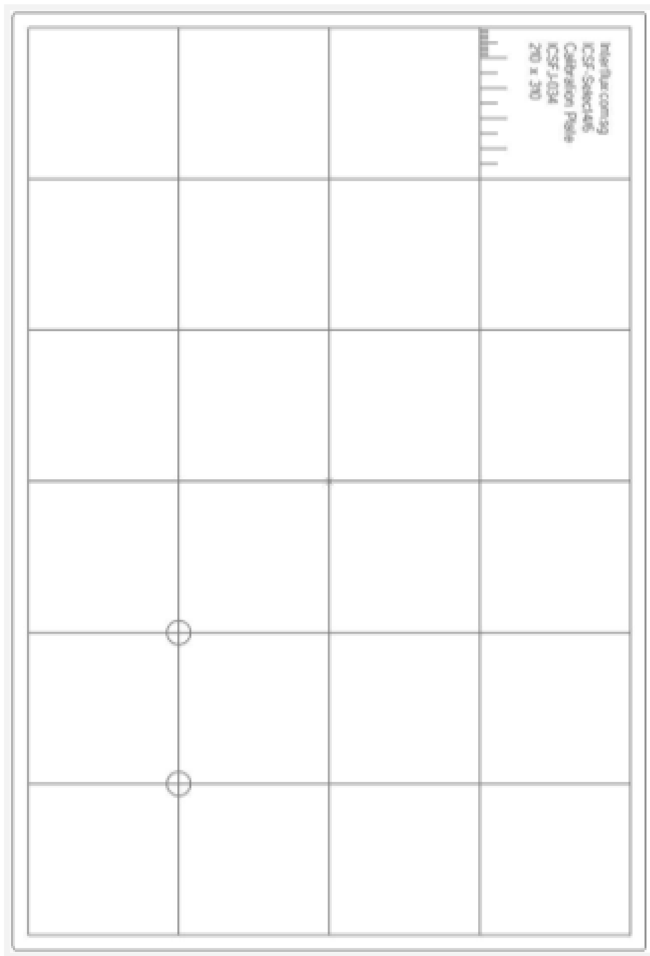


Select **"Download"** to load the program from the programming panel into the PLC panel.

Check that the program is the same as the one shown below:

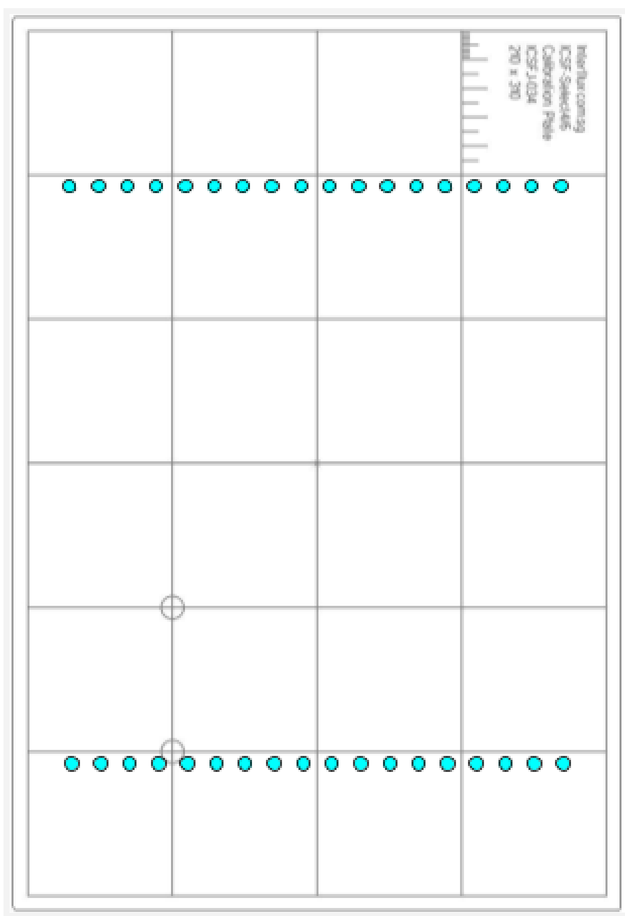


Place calibration plate according to below configuration on the conveyor:



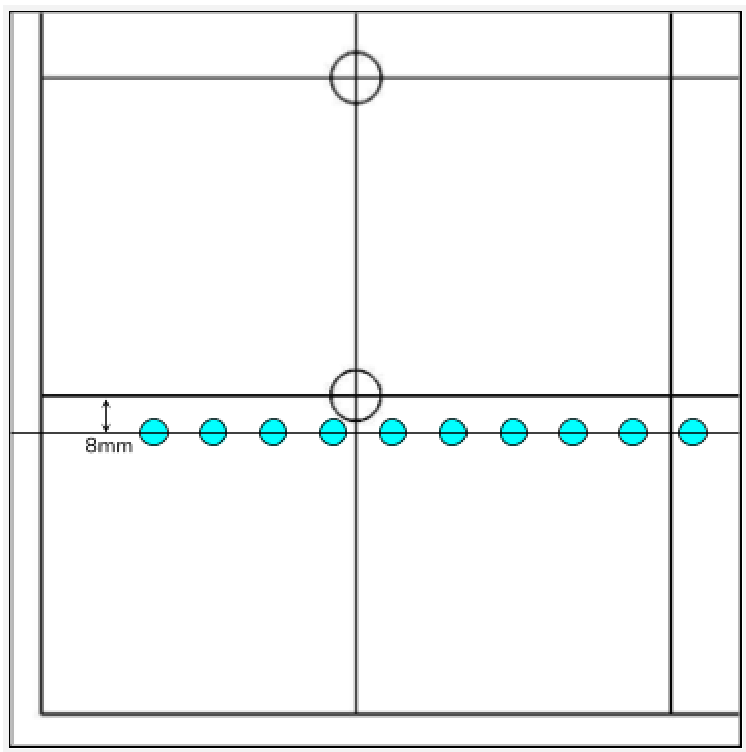
Select the **"Start"** button and run the cycle for the board.

A similar result as shown may follow:

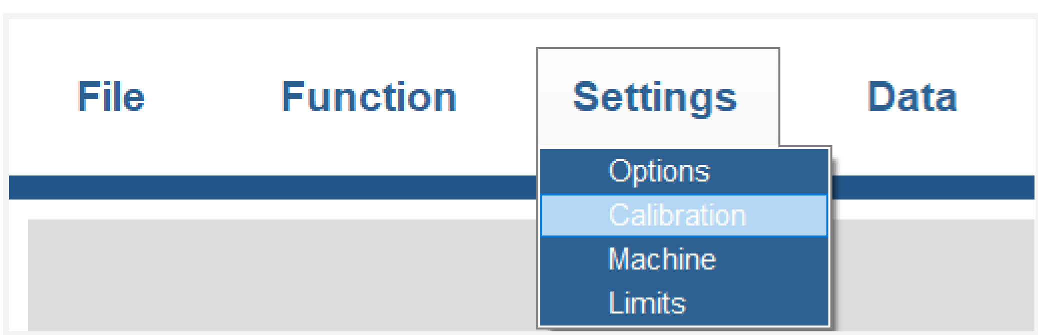


Measure the positioning Y-offset with a correct ruler. The following values shown are examples.

Take reference to the bottom grid line on the calibration board. As seen below, the row of flux points is 8mm to the bottom. Hence, the offset needs to be increased by 8mm.



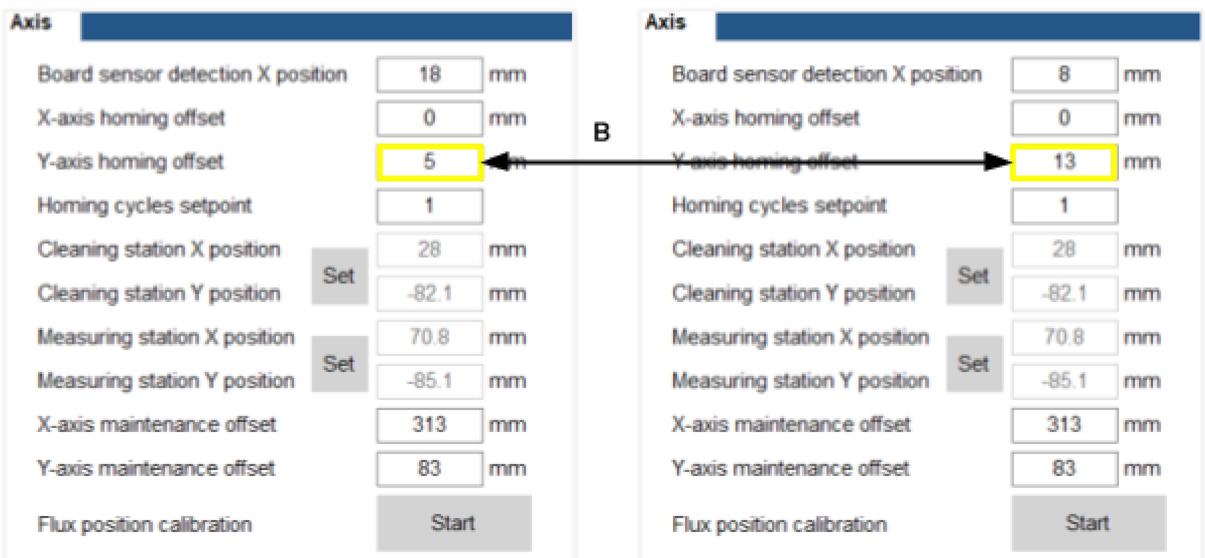
Open the calibration dialog by going to **Settings → Calibration**



Adjust the following values according to the measured Y-position offset.

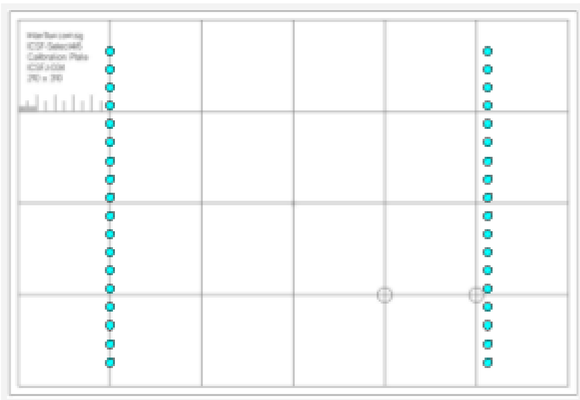
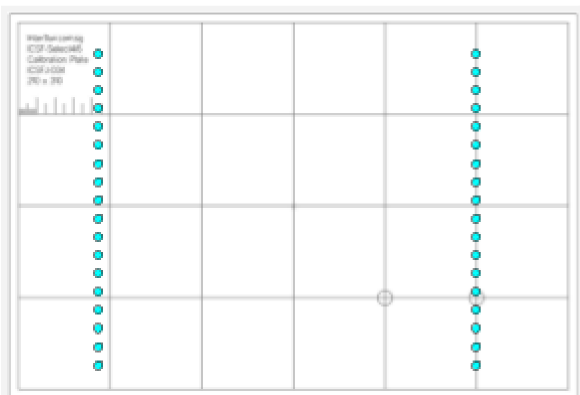
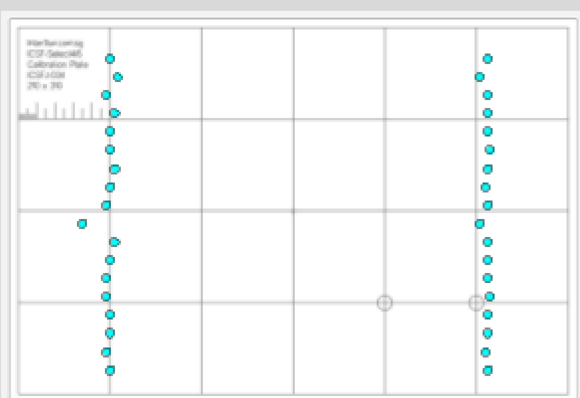
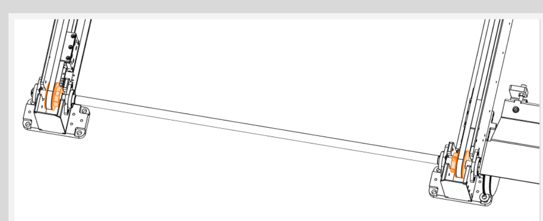
- For Y: Y-Axis homing offset:

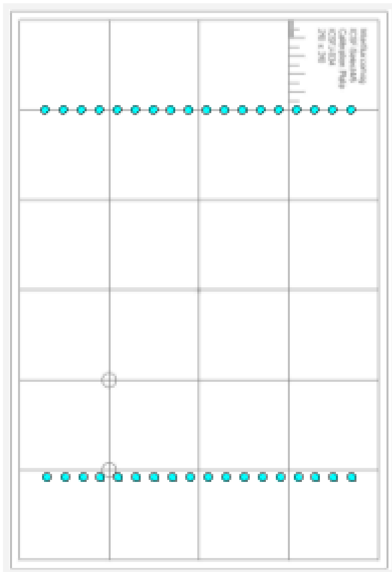
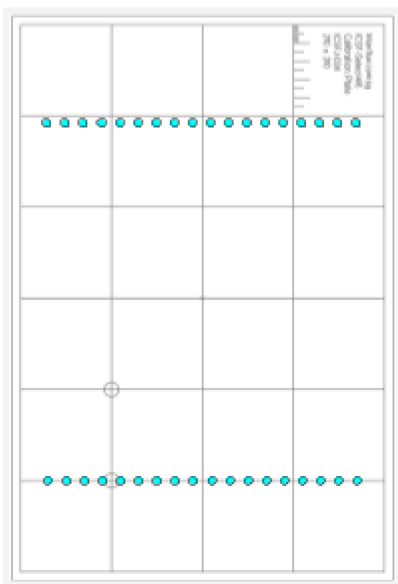
  REDUCE offset by measured value if the row is **ABOVE** the reference grid line.
  INCREASE offset by measured value if the row is **BELOW** the reference grid line.

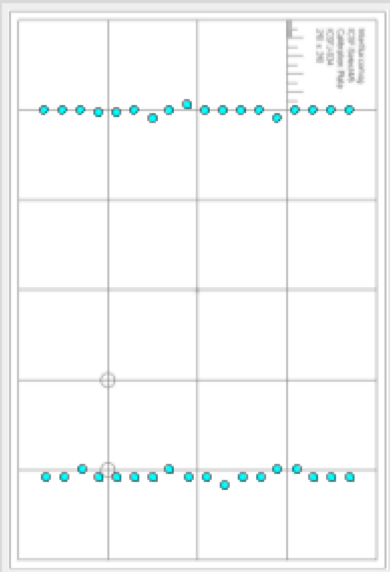
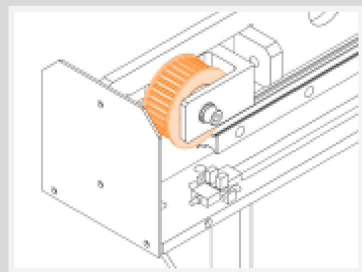


NOTE: Do not change the value "X-axis homing offset" because this will only shift the whole board flux area to the left and would not change any positioning offset. This value is used by the PLC to calculate auto-offsets during right to left operation of the machine.

In the event that after changing the offset value, the fluxing results appear as below.

Fluxing Result	Corrective Action
  Either row is not accurate to the intended position.	To mitigate the X-axis drift, adjust the X-axis belt tension.
 Flux rows not aligned on the intended line.	To prevent X-Axis inconsistency, check pulley grub screws are intact and tightened sufficiently, and adjust the belt tension. 

  Either row is not accurate to the intended position.	To mitigate the Y-axis drift, adjust the Y-axis belt tension.

 Flux rows not aligned on the intended reference line.	To prevent Y-Axis inconsistency, check pulley grub screws are intact and tightened sufficiently, and adjust the belt tension. 

To adjust the belt tension of the respective axis, refer to Chapter 14.

12.5 Calibration method Jet Nozzle 2

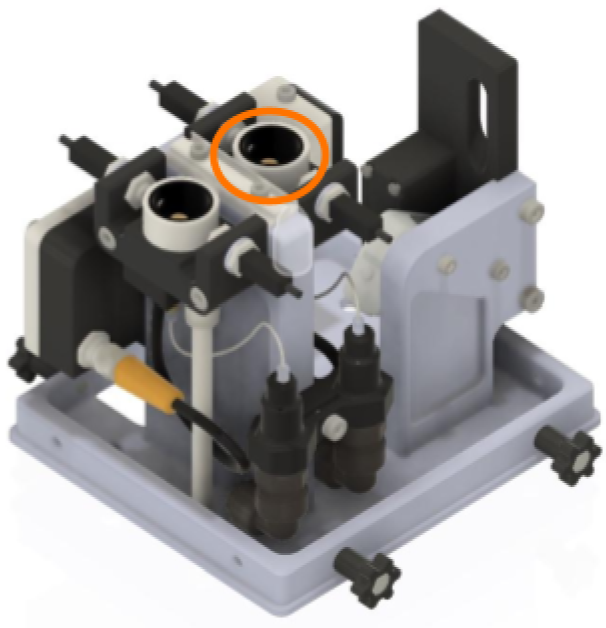


Figure 20. Jet Nozzle 2 Position

This function can only be performed if the machine has this option available and turned on.

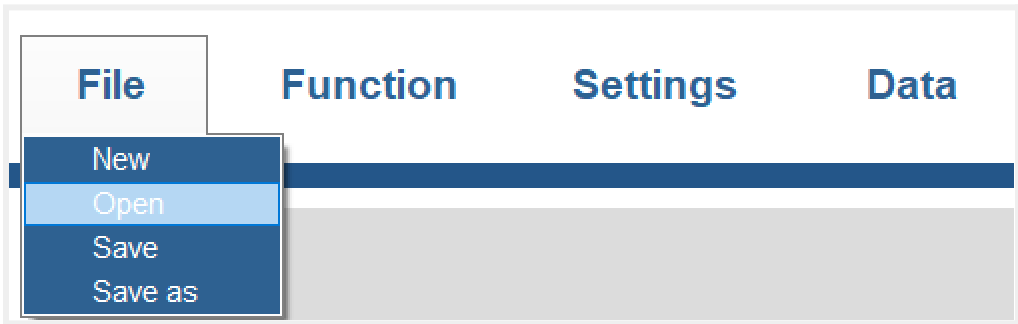
Nozzle 2 will be calibrated relative to Nozzle 1.

Confirm in the calibration dialog that the Nozzle 2 offsets are both 0,0 else, make a note of the offset numbers in the Nozzle 2, X & Y Offsets cell.

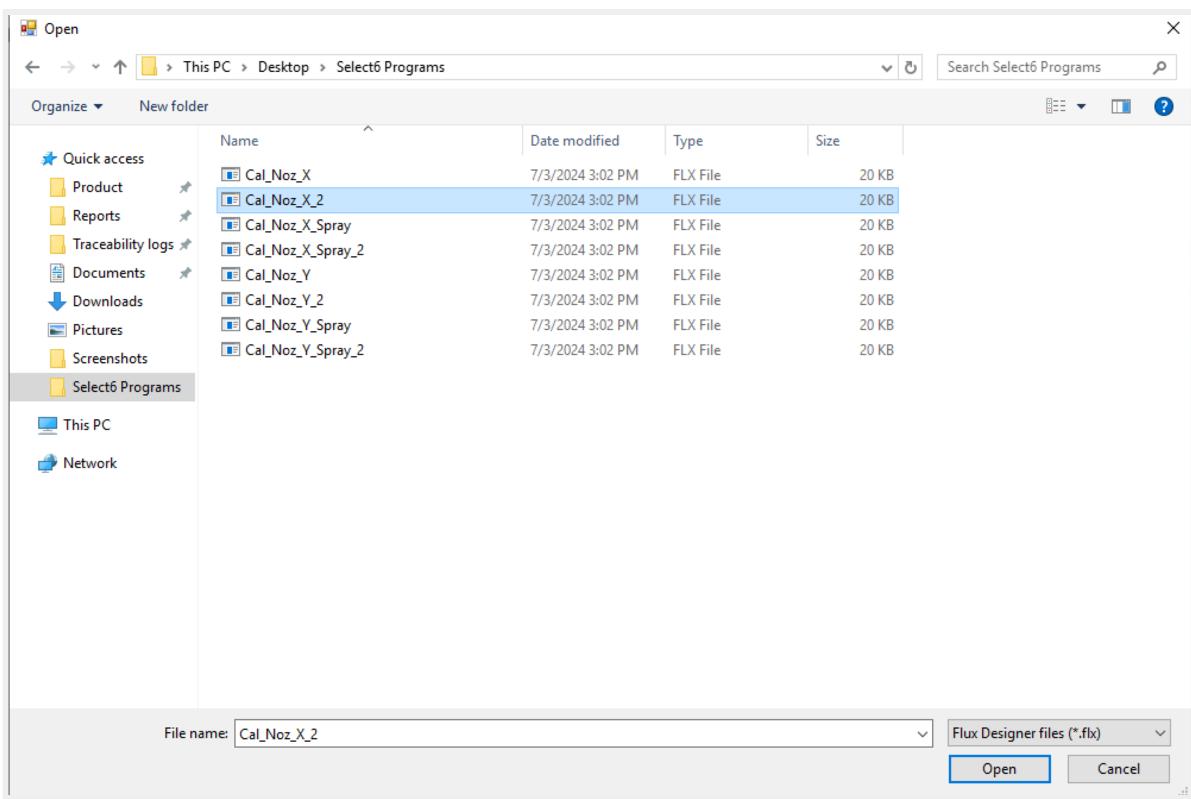
Ensure that the calibration of Nozzle 1 is complete before proceeding.

Use the following polycarbonate calibration plate (Part #ICSFJ-034) to complete the Nozzle 2 calibration.

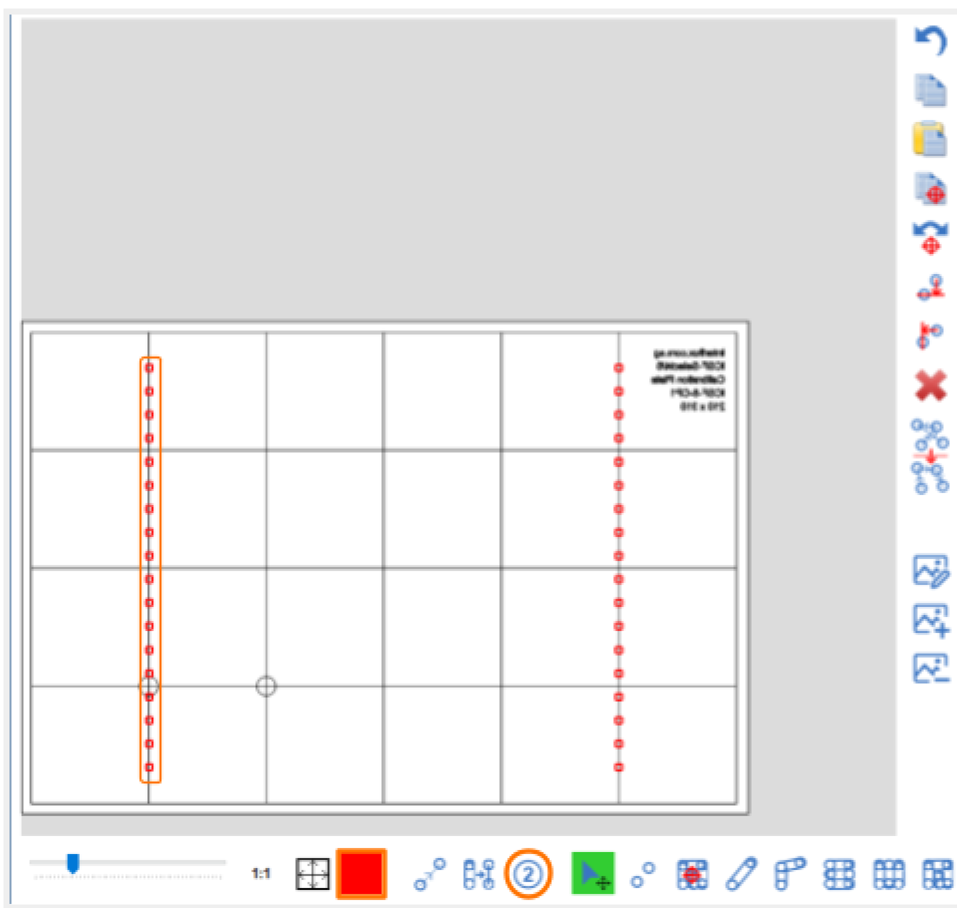
For X-Axis, Select **File → Open**



In the relevant folder, select project **“CAL_Noz_X_2.flx”**.



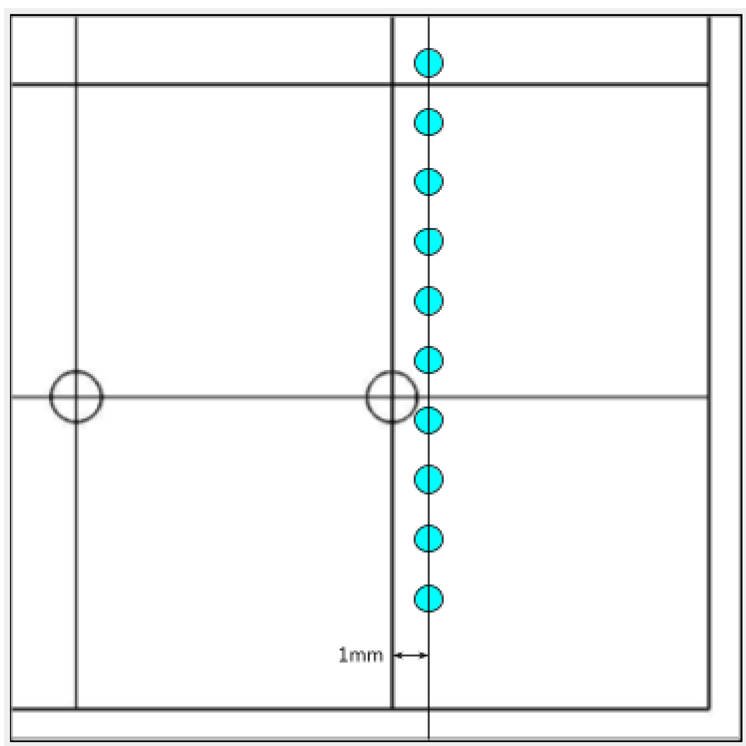
Select **"Download"** to load the program from the programming panel into the PLC panel.



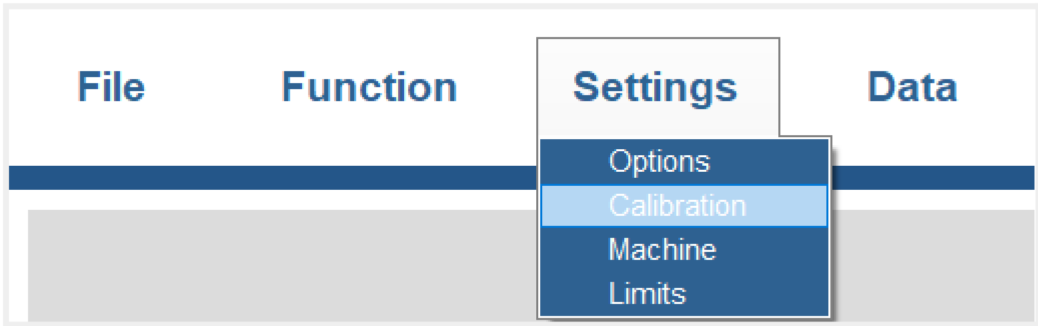
NOTE: Nozzle 2 is selected in dot parameters and the colour of point has changed for Nozzle 2.

Select the **"Start"** button and run the cycle for the board.

Measure the positioning offset with a correct ruler. The following values shown are examples.



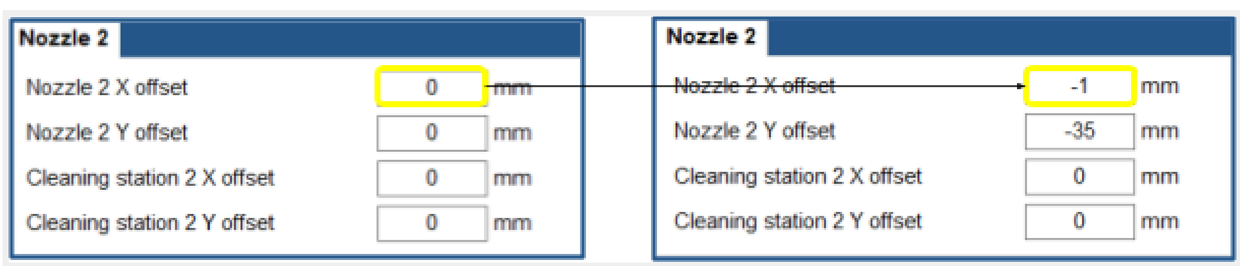
Open the calibration dialog by going to **Settings → Calibration**



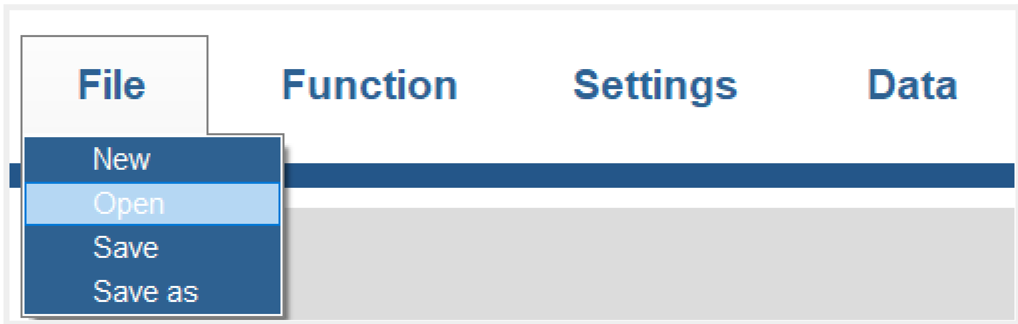
Adjust the following values according to the measured X-position offset.

- For X: Nozzle 2 X offset:

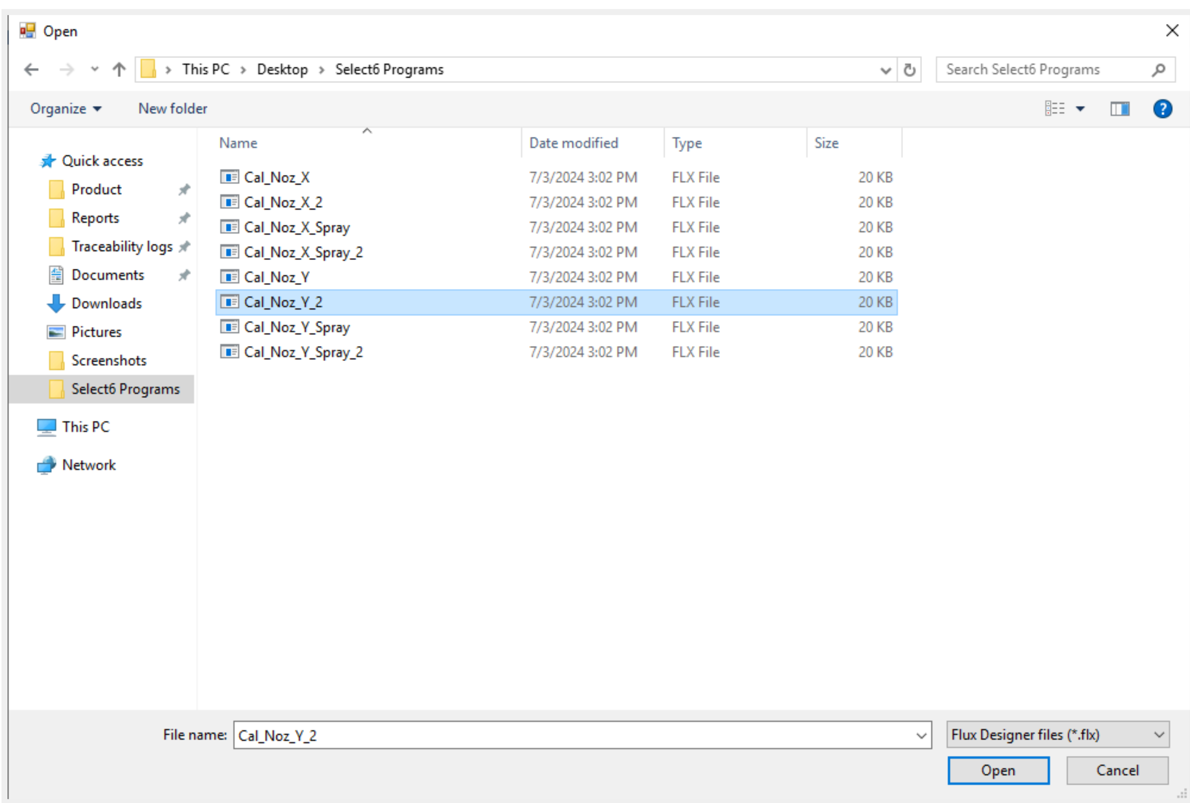
  REDUCE offset by measured value if the row is to the **RIGHT** of the reference grid line.
  INCREASE offset by measured value if the row is to the **LEFT** of the reference grid line.



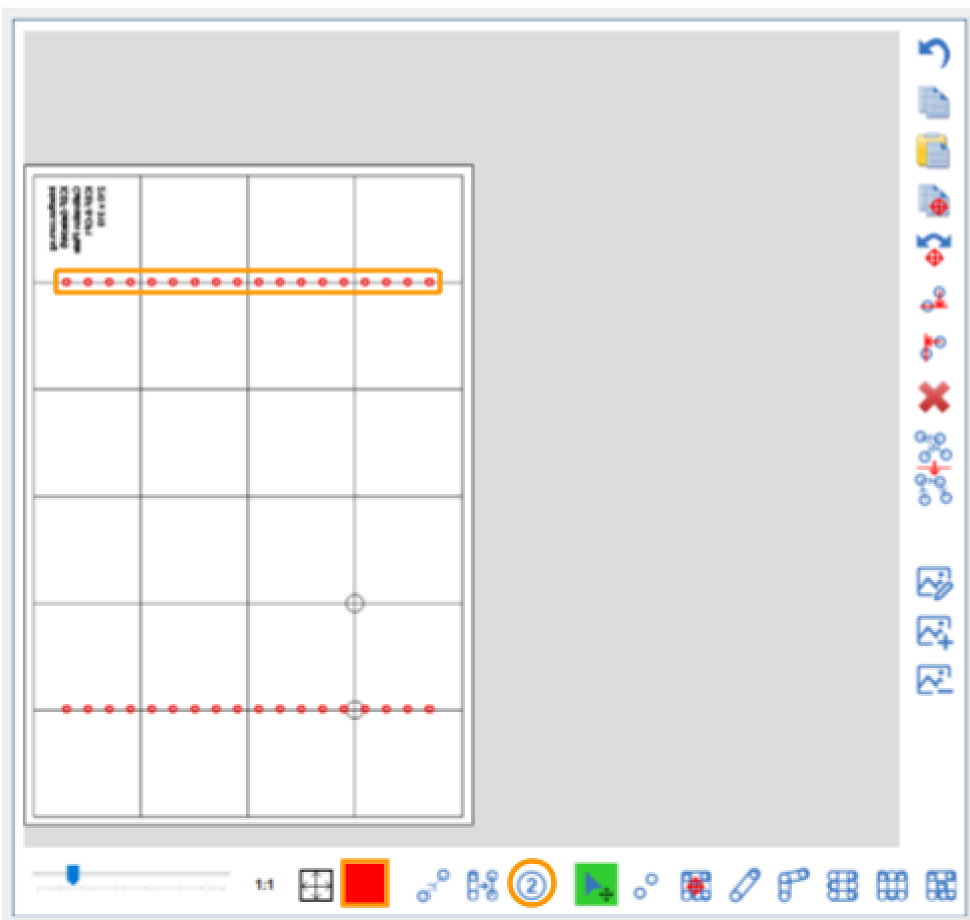
Next for Y-Axis, Select **File → Open**



In the relevant folder, select project **"CAL_Noz_Y_2.flx"**.



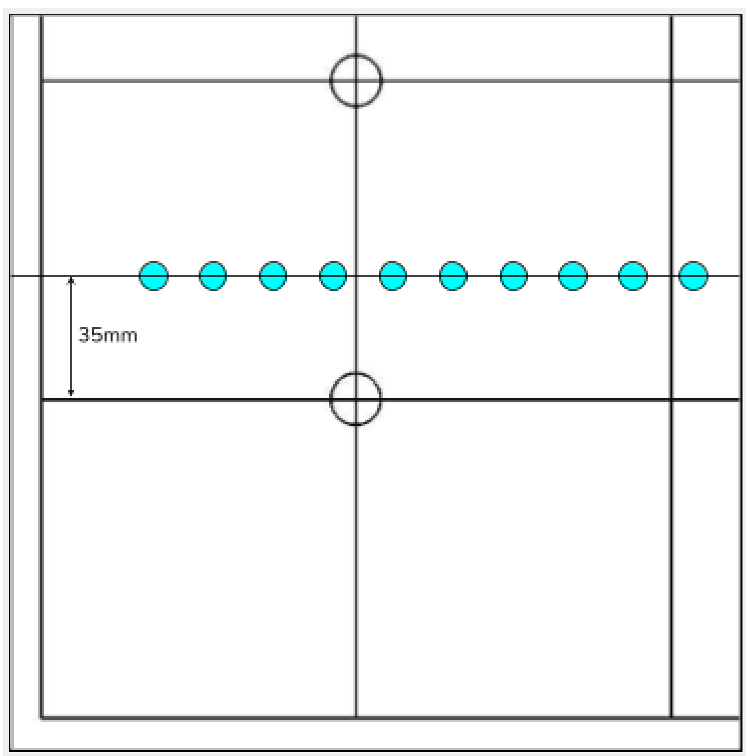
Select **"Download"** to load the program from the programming panel into the PLC panel.



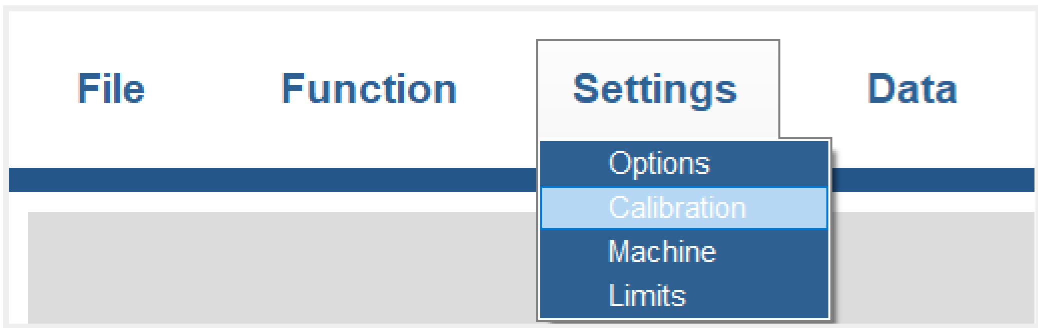
NOTE: Nozzle 2 is selected in dot parameters and the colour of point has changed for Nozzle 2.

Select the **"Start"** button and run the cycle for the board.

Measure the positioning offset with a correct ruler. The following values shown are examples. Record the value measured.



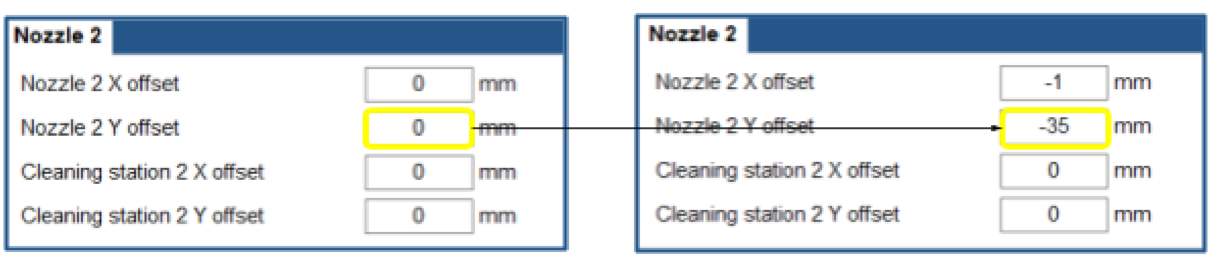
Open the calibration dialog by going to **Settings → Calibration**



Adjust the following values according to the measured Y-position offset.

- For Y: Nozzle 2 X offset:

  REDUCE offset by measured value if the row is **ABOVE** the reference grid line.
  INCREASE offset by measured value if the row is **BELOW** the reference grid line.



If there were already values in the Nozzle 2 X and Y offset cells, then the measured distance will need to be added to these current values to adjust the offset to the corrected value.

12.6 Calibration method Spray Nozzle 1

Spray Nozzle 1:

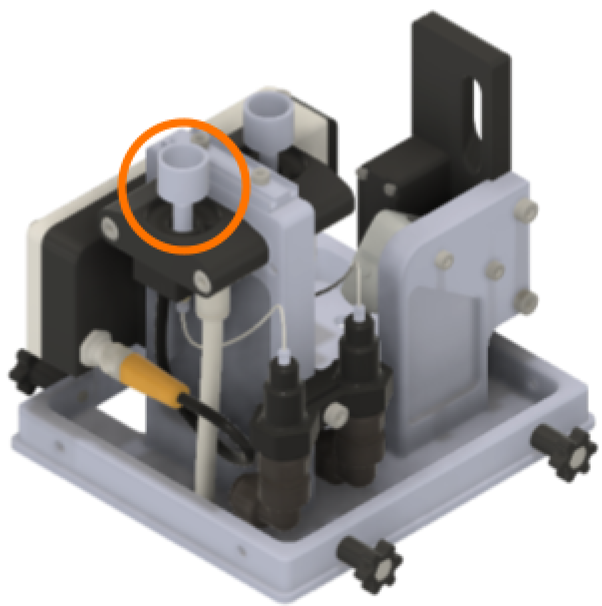
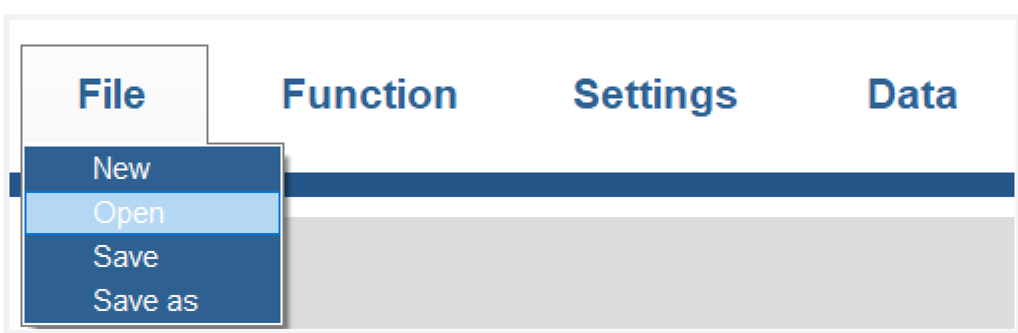
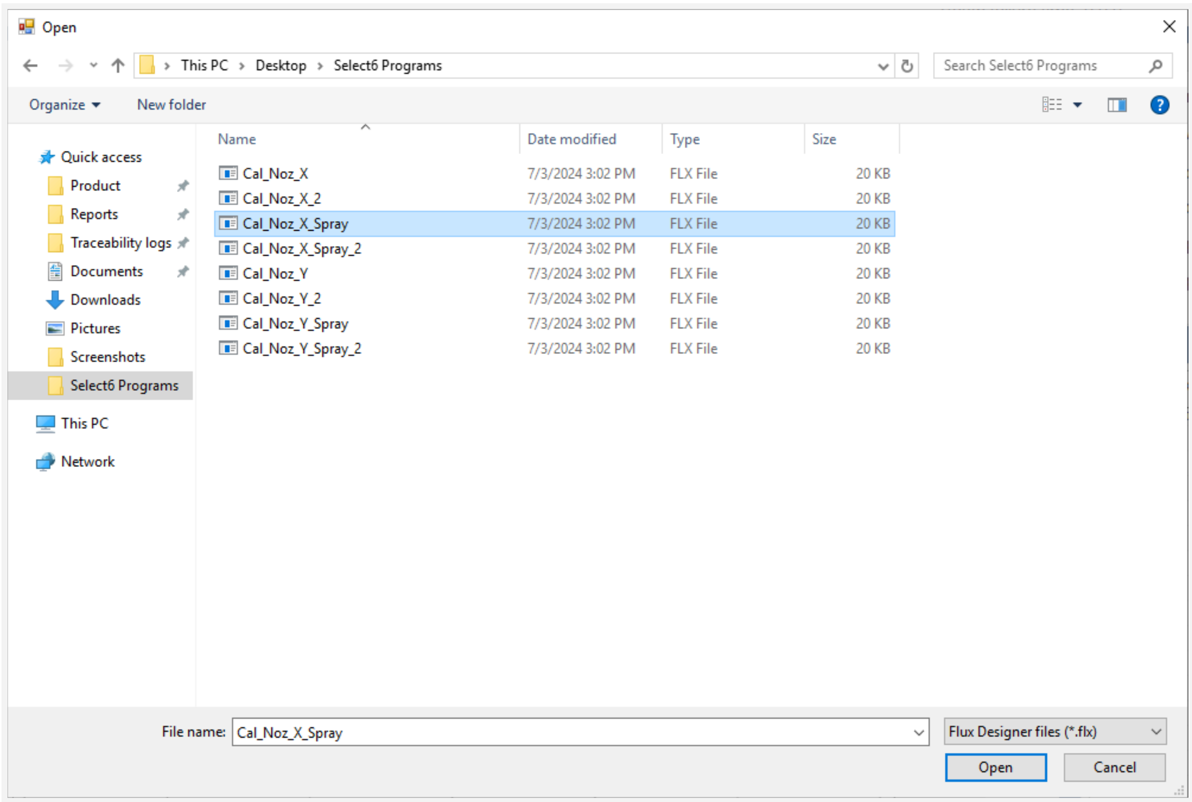


Figure 19. Spray Nozzle 1 Position

For X-Axis, Select **File → Open**

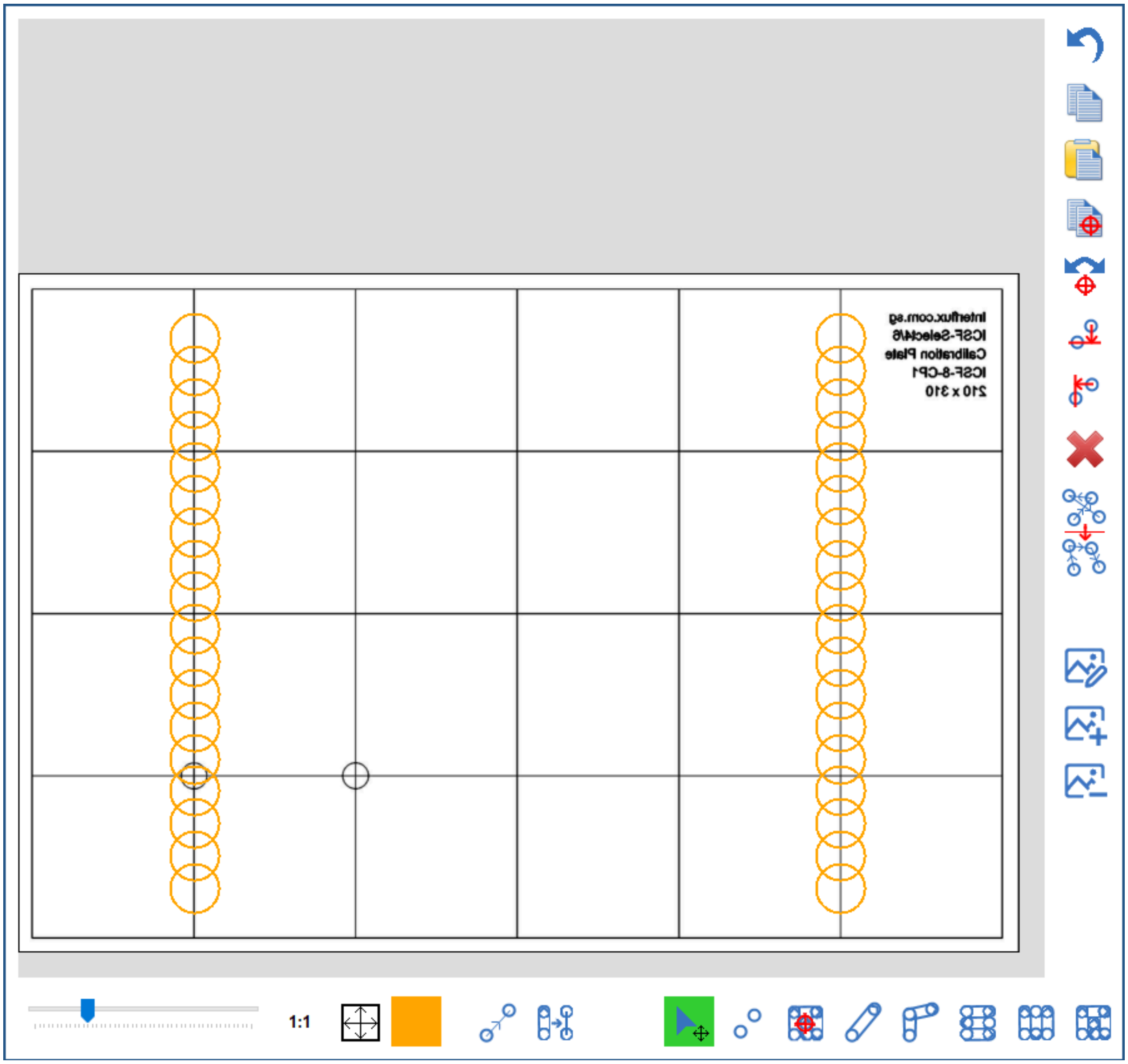


In the relevant folder, select project **"Cal_Noz_X_Spray.flx"**.

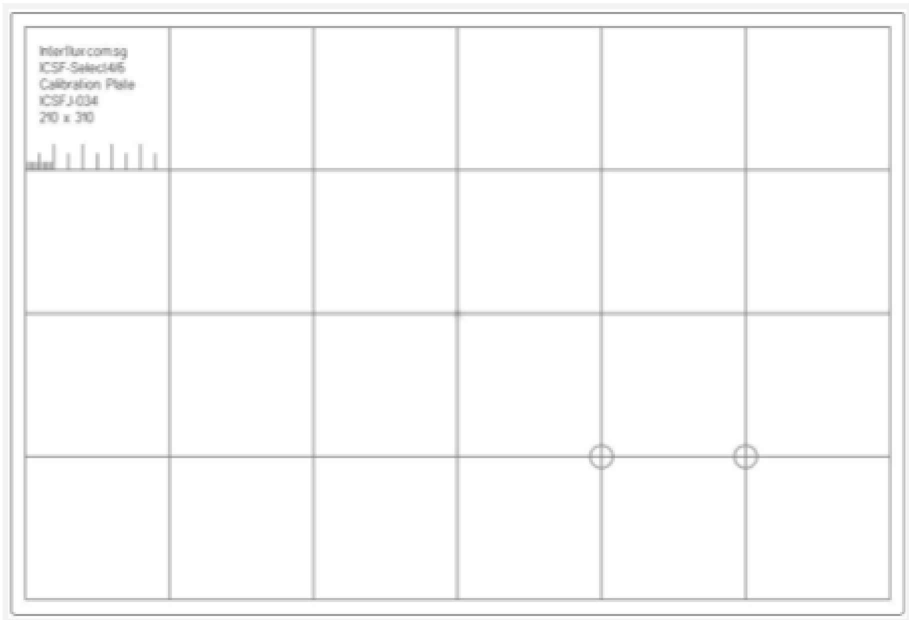


Select **"Download"** to load the program from the programming panel into the PLC panel.

Check that the program is the same as the one shown below:

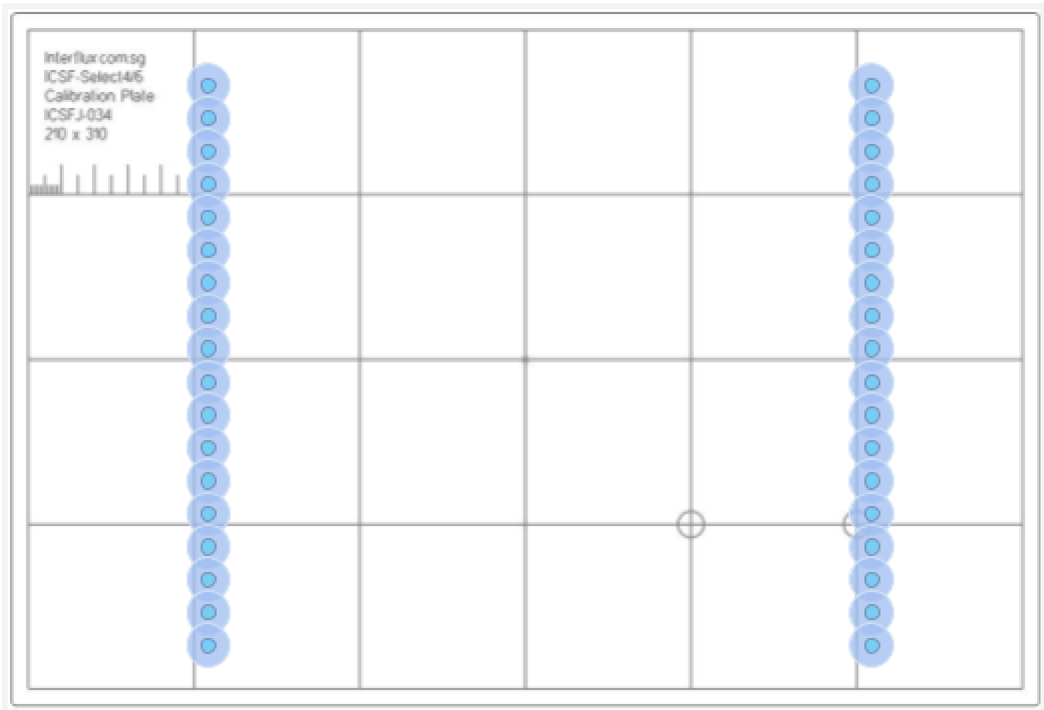


Place calibration plate according to below configuration on the conveyor:



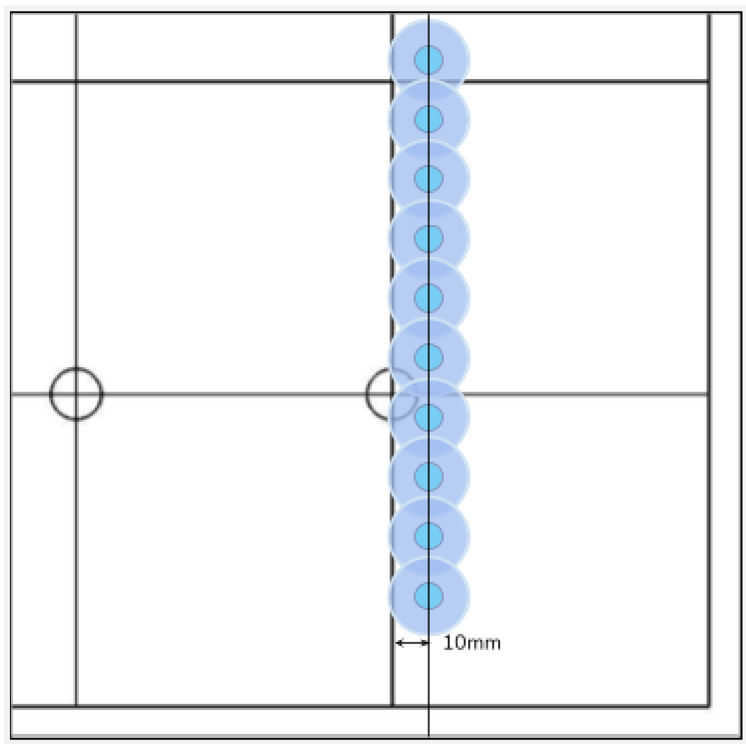
Select the **"Start"** button and run the cycle for the board.

Similar result as shown may follow:

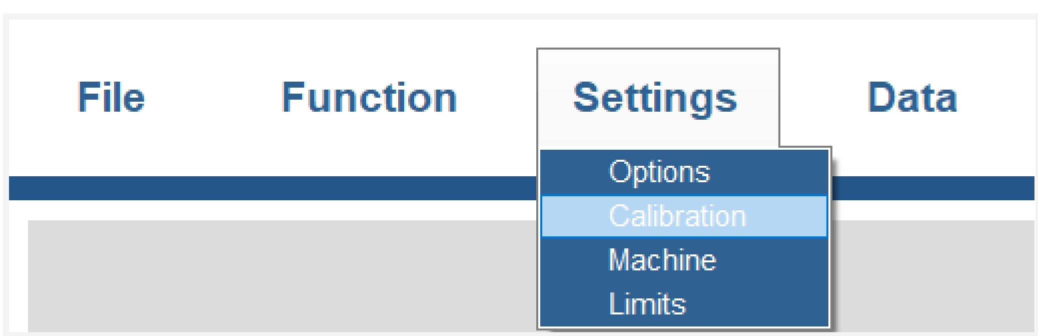


Measure the positioning X-offset with a correct ruler. The following values shown are examples.

Take reference to the right grid line on the calibration board. As seen below, the row of flux points is 10mm to the right. Hence, the offset needs to be reduced by 10mm.



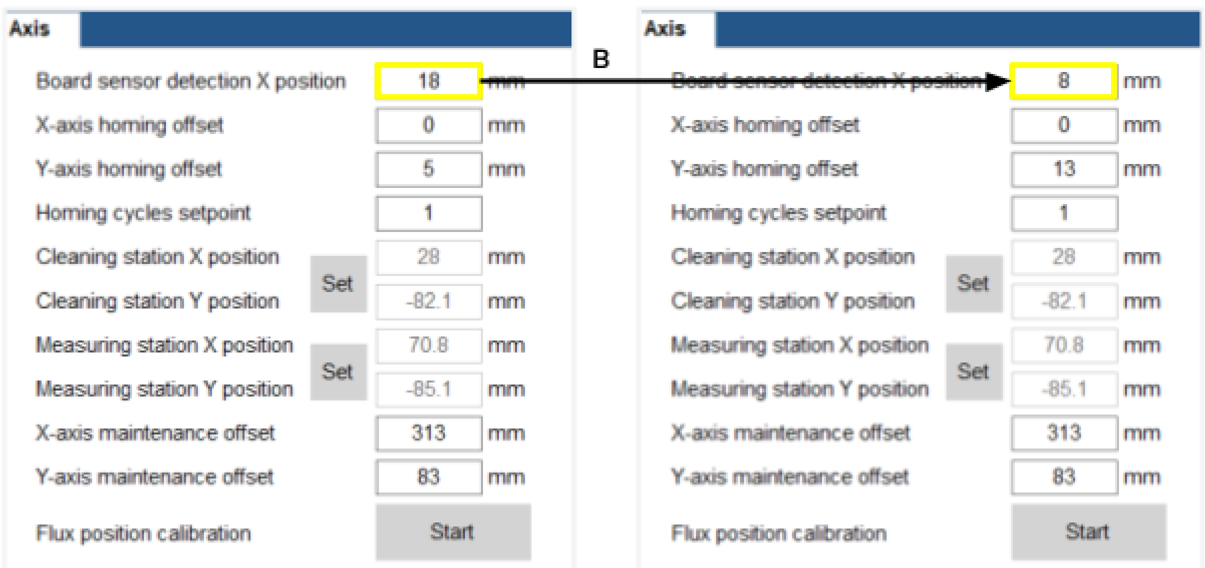
Open the calibration dialog by going to **Settings → Calibration**



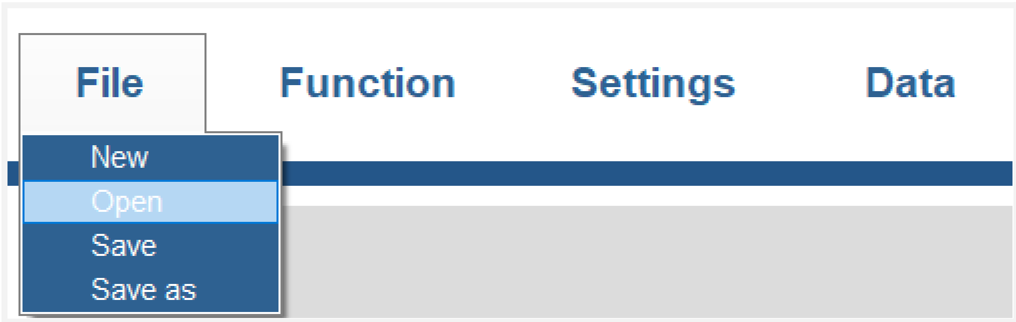
Adjust the following values according to the measured X-position offset.

- For X: Board sensor detection X position:

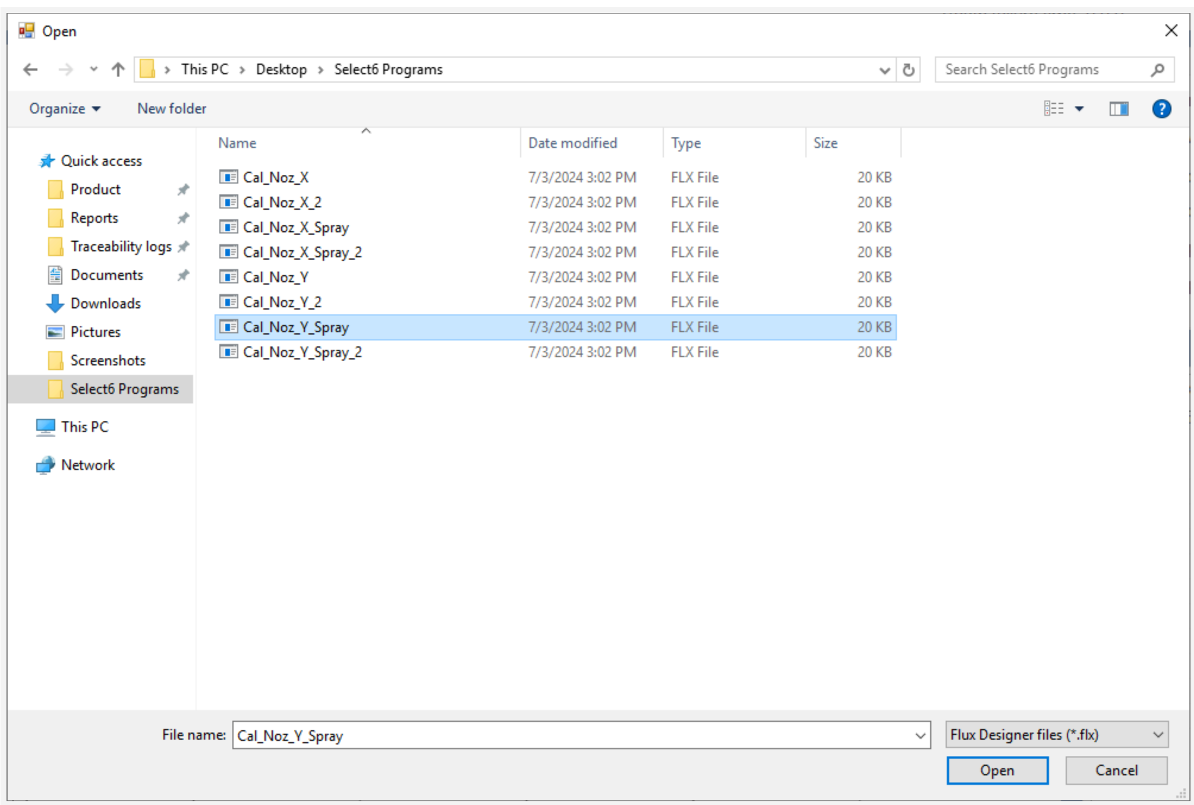
  REDUCE offset by measured value if the row is to the **RIGHT** of the reference grid line.
  INCREASE offset by measured value if the row is to the **LEFT** of the reference grid line.



For Y-Axis, Select **File → Open**

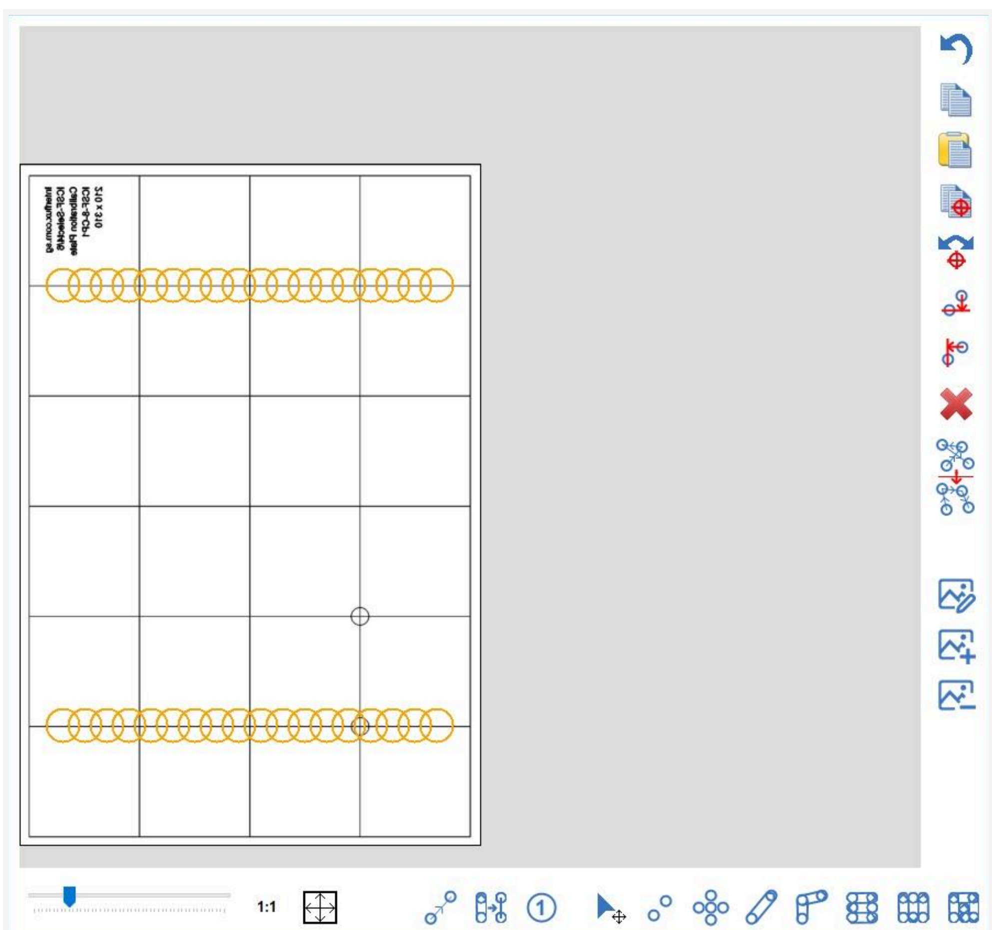


In the relevant folder, select project **"Cal_Noz_Y_Spray.flx"**.

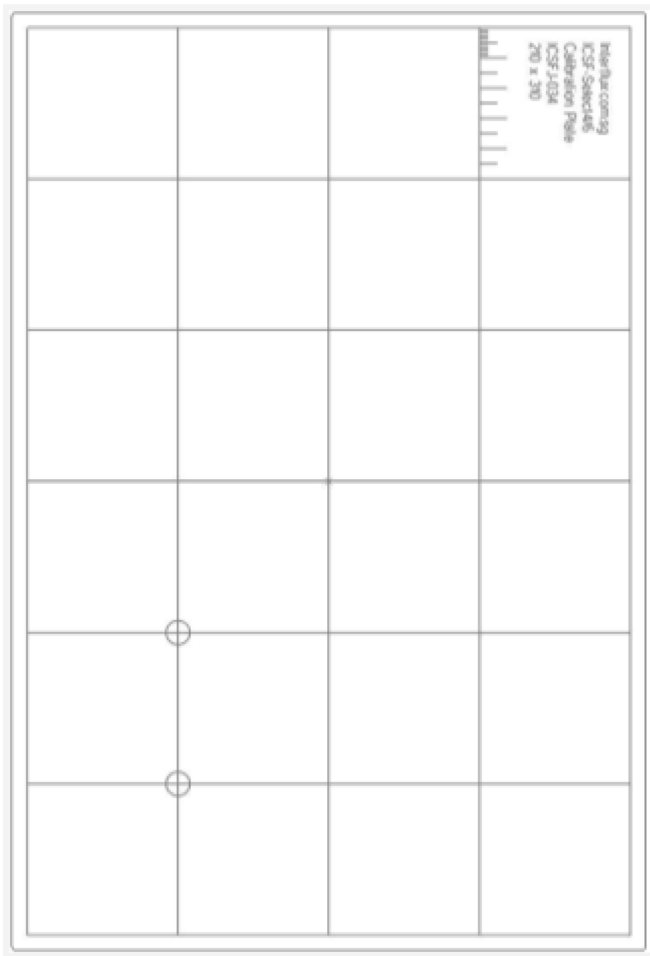


Select **"Download"** to load the program from the programming panel into the PLC panel.

Check that the program is the same as the one shown below:

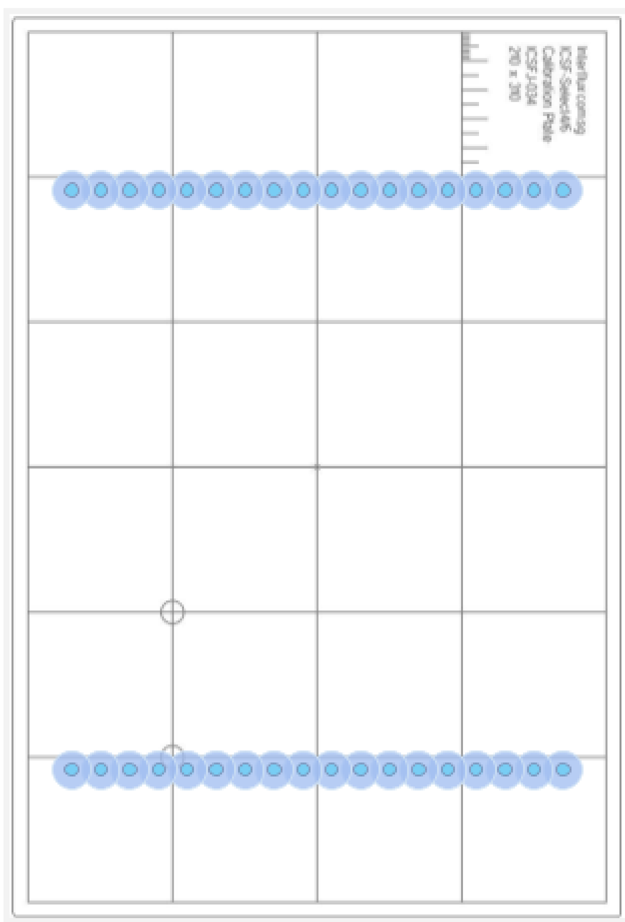


Place calibration plate according to below configuration on the conveyor:



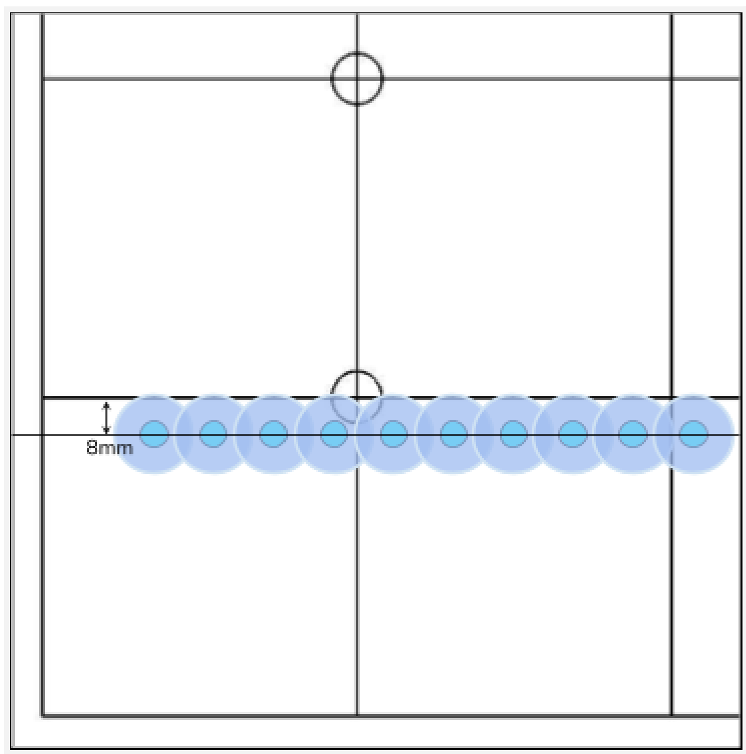
Select the **"Start"** button and run the cycle for the board.

A similar result as shown may follow:

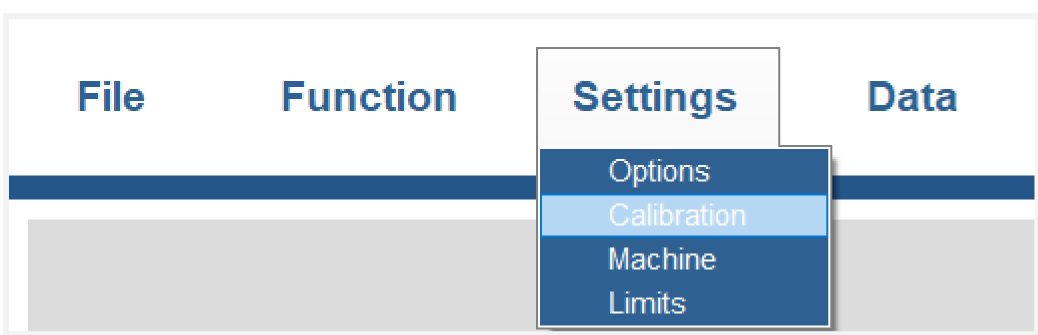


Measure the positioning Y-offset with a correct ruler. The following values shown are examples.

Take reference to the bottom grid line on the calibration board. As seen below, the row of flux points is 8mm to the bottom. Hence, the offset needs to be increased by 8mm.



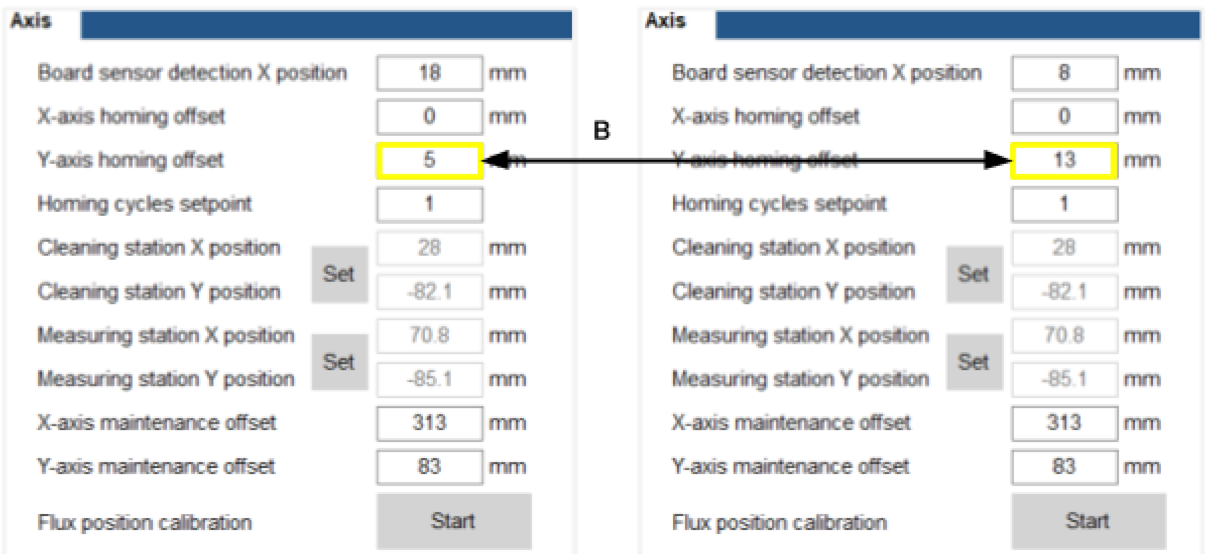
Open the calibration dialog by going to **Settings → Calibration**



Adjust the following values according to the measured Y-position offset.

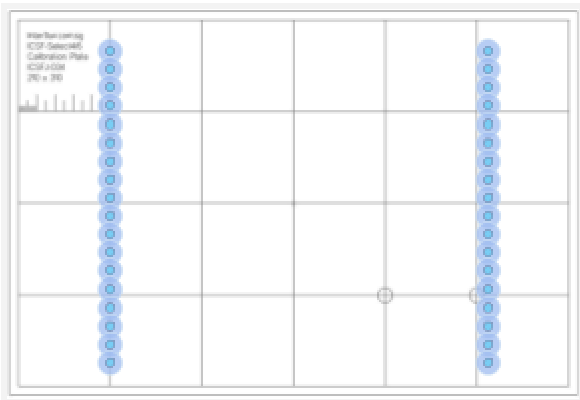
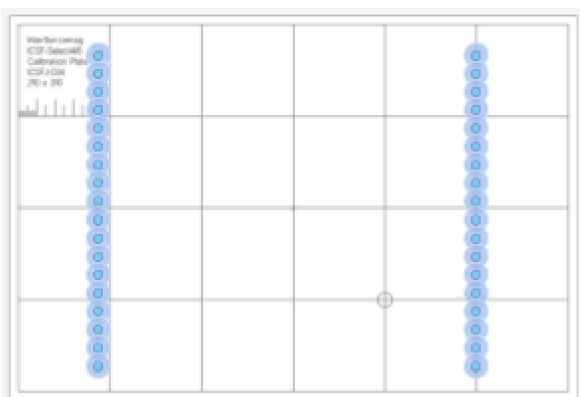
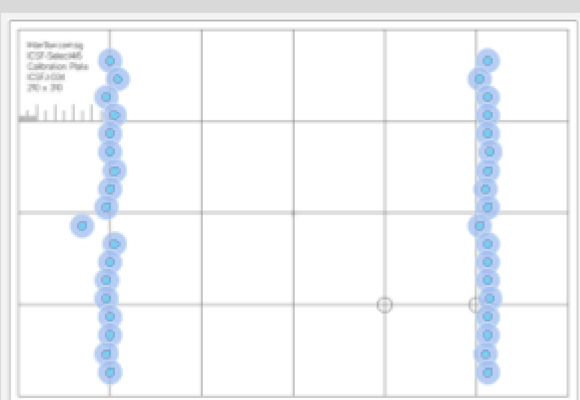
- For Y: Y-Axis homing offset:

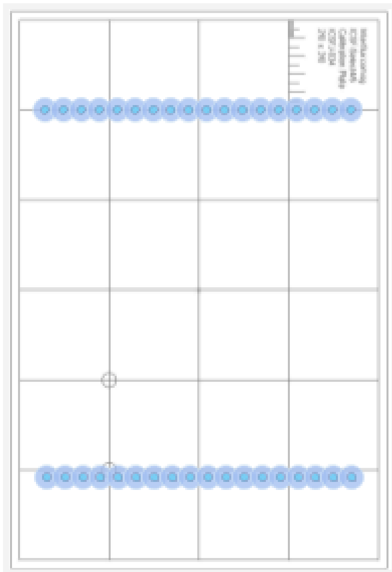
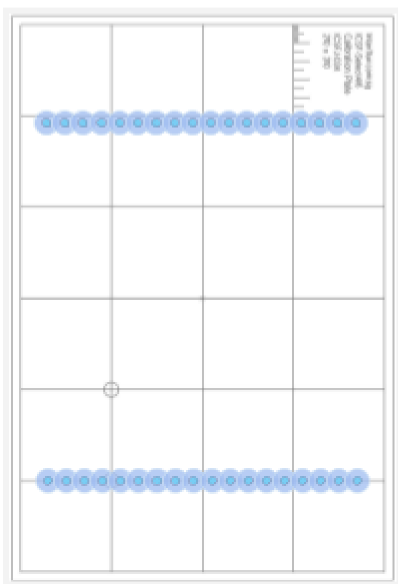
  REDUCE offset by measured value if the row is **ABOVE** the reference grid line.
  INCREASE offset by measured value if the row is **BELOW** the reference grid line.

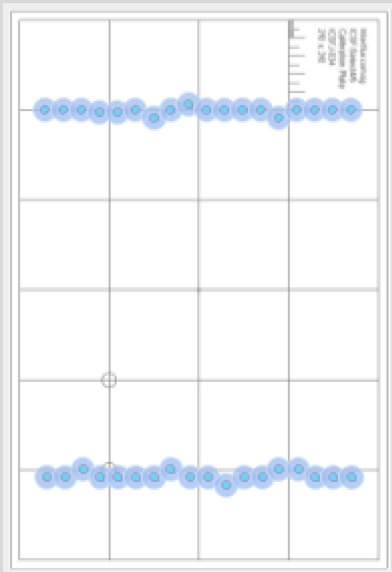


NOTE: Do not change the value “X-axis homing offset” because this will only shift the whole board flux area to the left and would not change any positioning offset. This value is used by the PLC to calculate auto-offsets during right to left operation of the machine.

In the event that after changing the offset value, the fluxing results appear as below.

Fluxing Result	Corrective Action
  Either row is not accurate to the intended position.	To mitigate the X-axis drift, adjust the X-axis belt tension.
 Flux rows not aligned on the intended line.	To prevent X-Axis inconsistency, check pulley grub screws are intact and tightened sufficiently, and adjust the belt tension.

  Either row is not accurate to the intended position.	To mitigate the Y-axis drift, adjust the Y-axis belt tension.

 Flux rows not aligned on the intended reference line.	To prevent Y-Axis inconsistency, check pulley grub screws are intact and tightened sufficiently, and adjust the belt tension.

To adjust the belt tension of the respective axis, refer to Chapter 14.

12.7 Calibration method Spray Nozzle 2

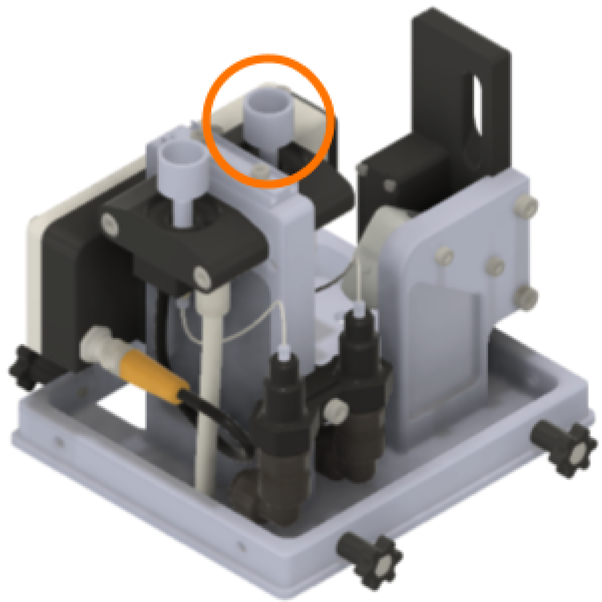


Figure 20. Spray Nozzle 2 Position

This function can only be performed if the machine has this option available and turned on.

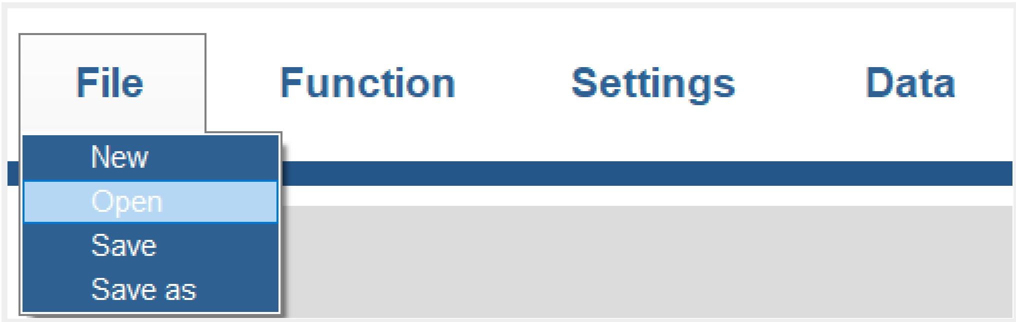
Nozzle 2 will be calibrated relative to Nozzle 1.

Confirm in the calibration dialog that the Nozzle 2 offsets are both 0,0 else, make a note of the offset numbers in the Nozzle 2, X & Y Offsets cell.

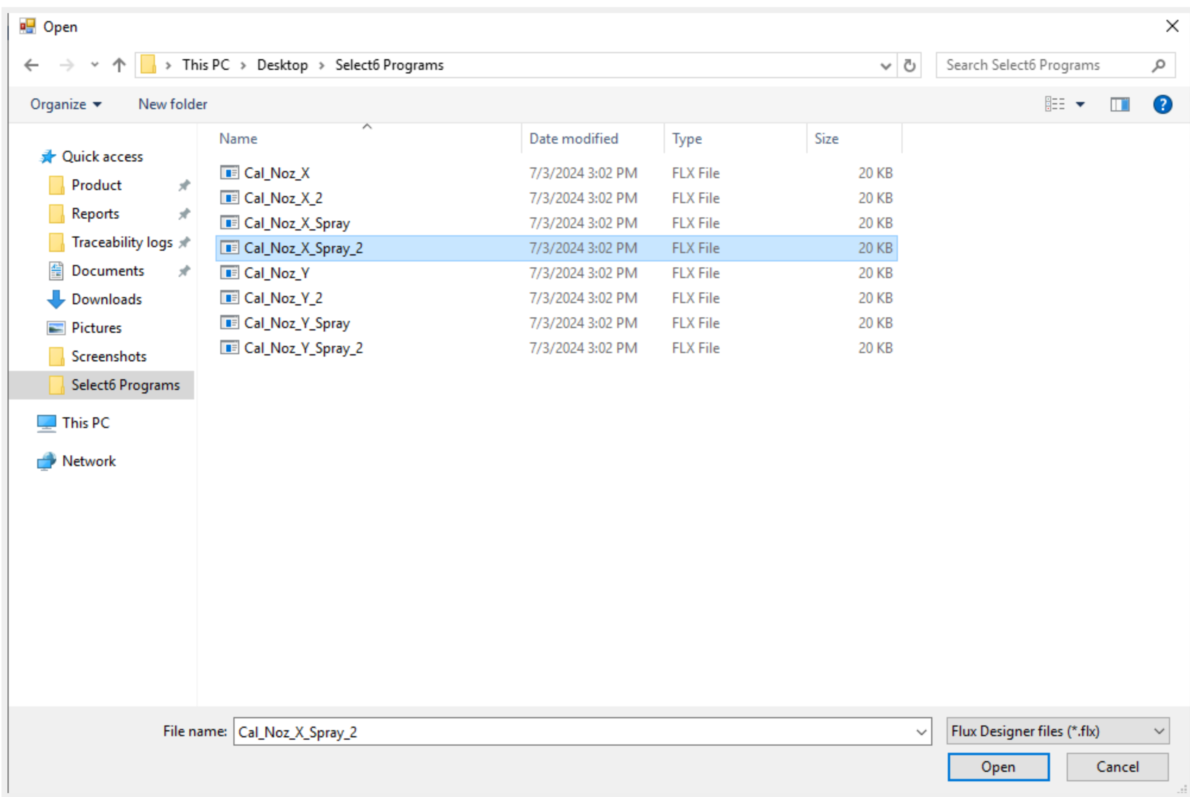
Ensure that the calibration of Nozzle 1 is complete before proceeding.

Use the following polycarbonate calibration plate (Part #ICSFJ-034) to complete the Nozzle 2 calibration.

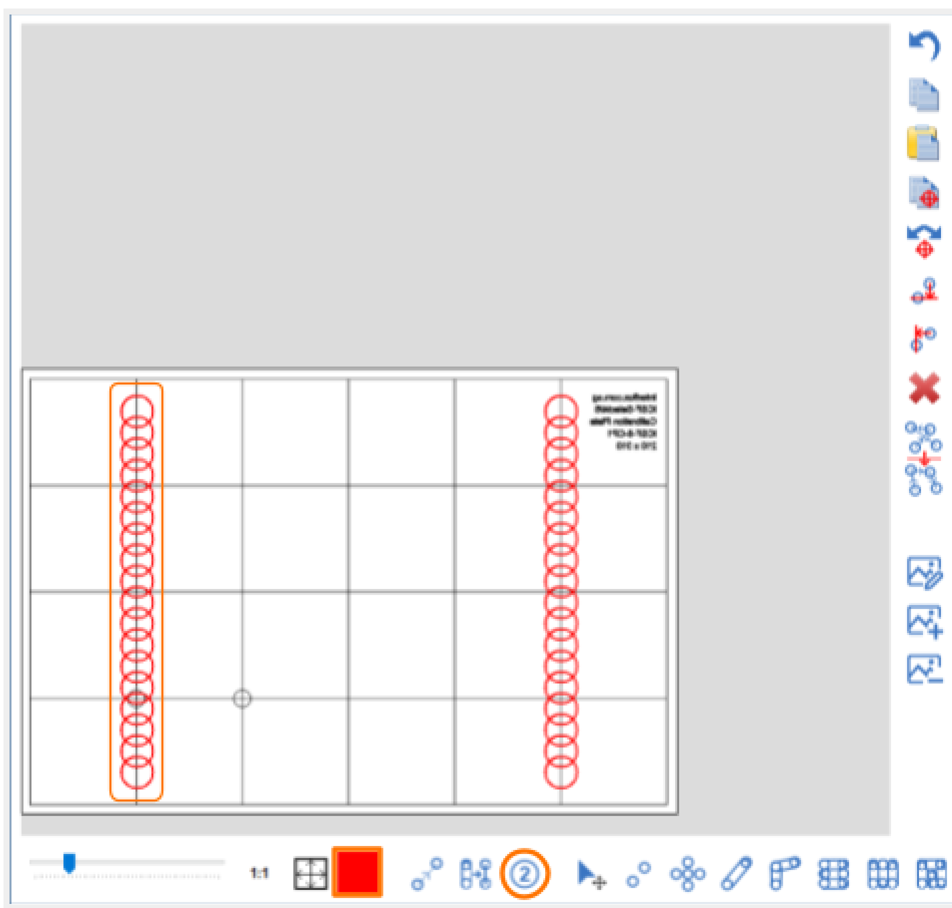
For X-Axis, Select **File → Open**



In the relevant folder, select project **"CAL_Noz_X_Spray_2.flx"**.



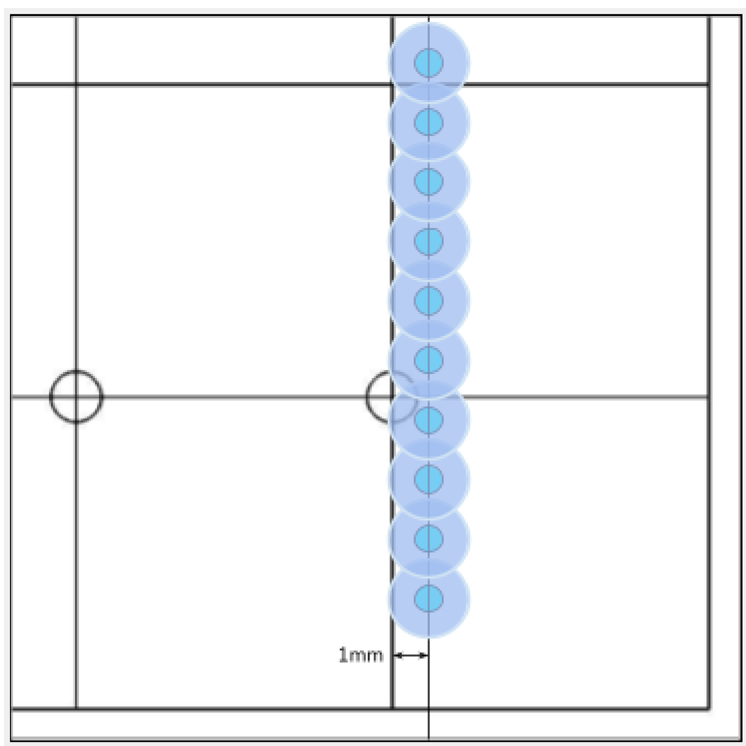
Select **“Download”** to load the program from the programming panel into the PLC panel.



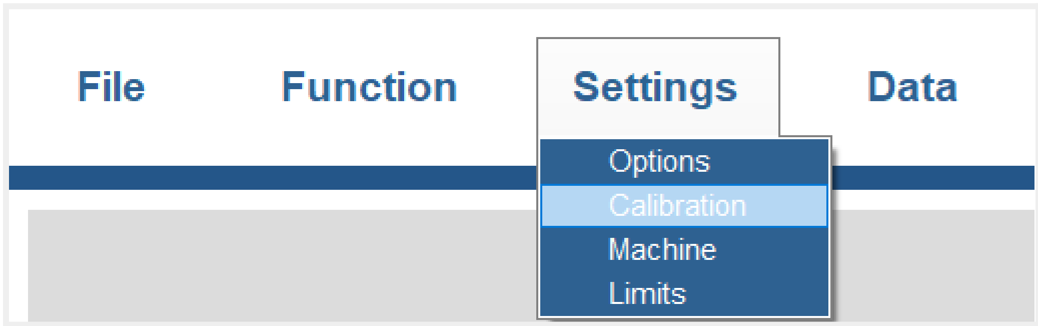
NOTE: Nozzle 2 is selected in dot parameters and the colour of point has changed for Nozzle 2.

Select the **"Start"** button and run the cycle for the board.

Measure the positioning offset with a correct ruler. The following values shown are examples.



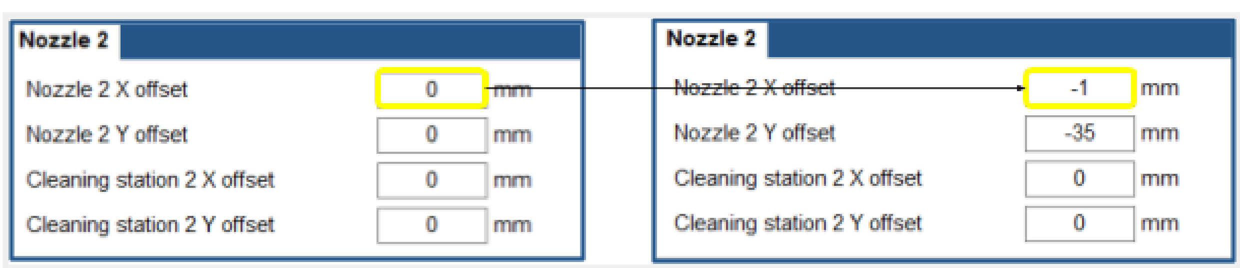
Open the calibration dialog by going to **Settings → Calibration**



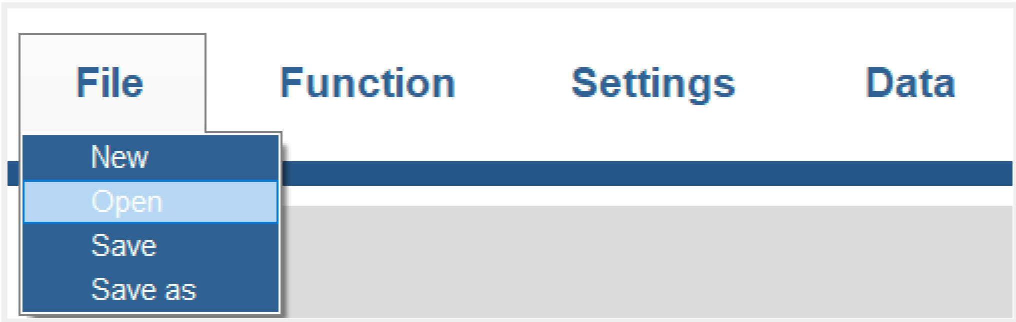
Adjust the following values according to the measured X-position offset.

- For X: Nozzle 2 X offset:

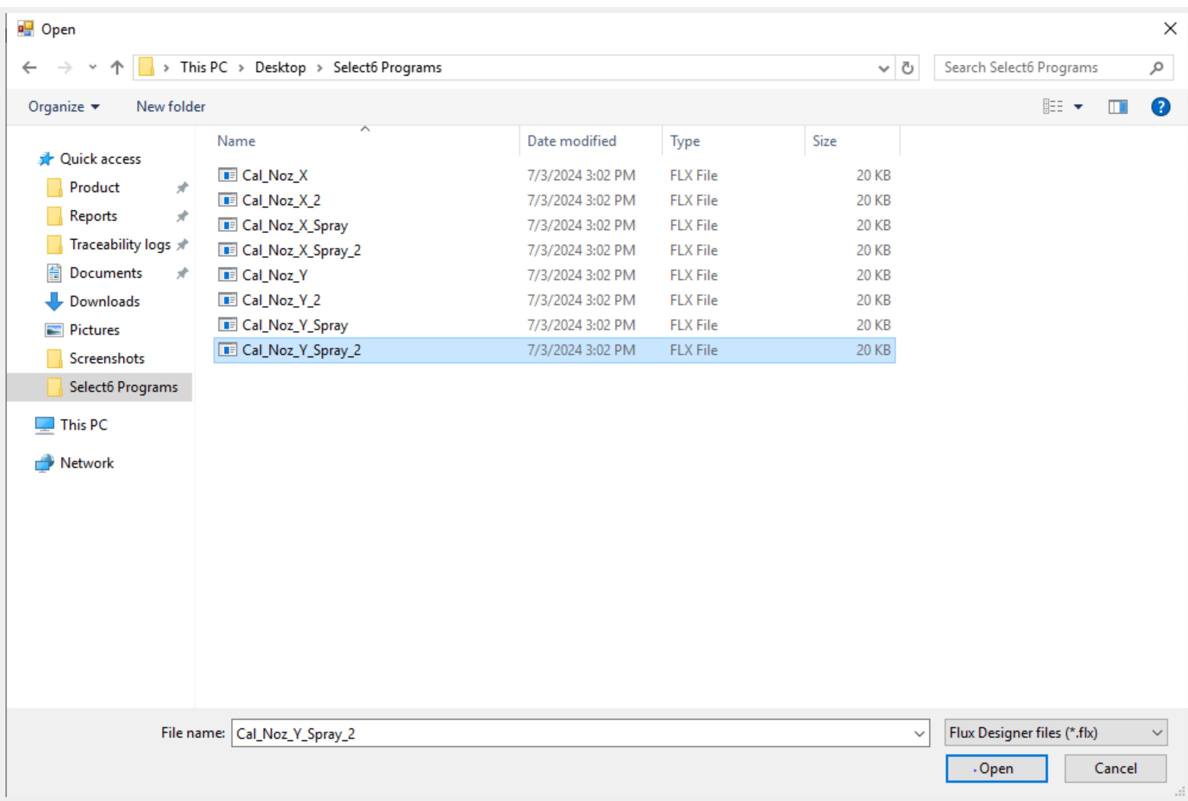
  REDUCE offset by measured value if the row is to the **RIGHT** of the reference grid line.
  INCREASE offset by measured value if the row is to the **LEFT** of the reference grid line.



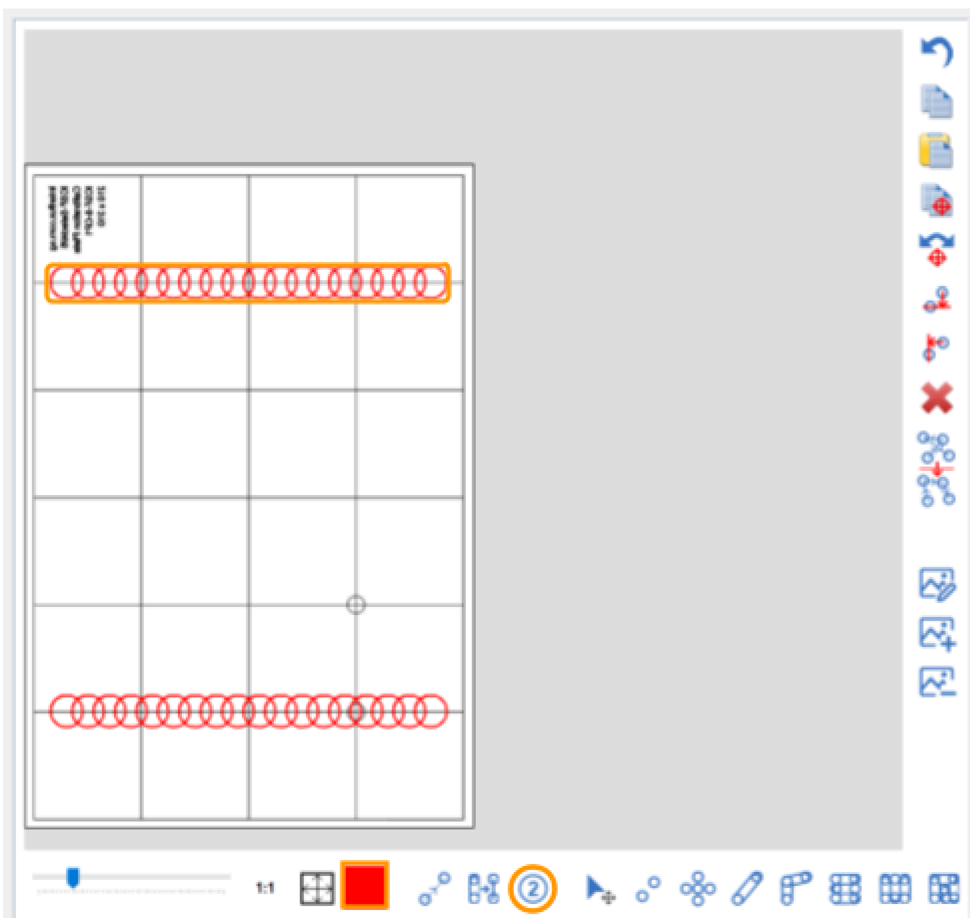
Next for Y-Axis, Select **File → Open**



In the relevant folder, select project **"CAL_Noz_Y_Spray_2.flx"**.



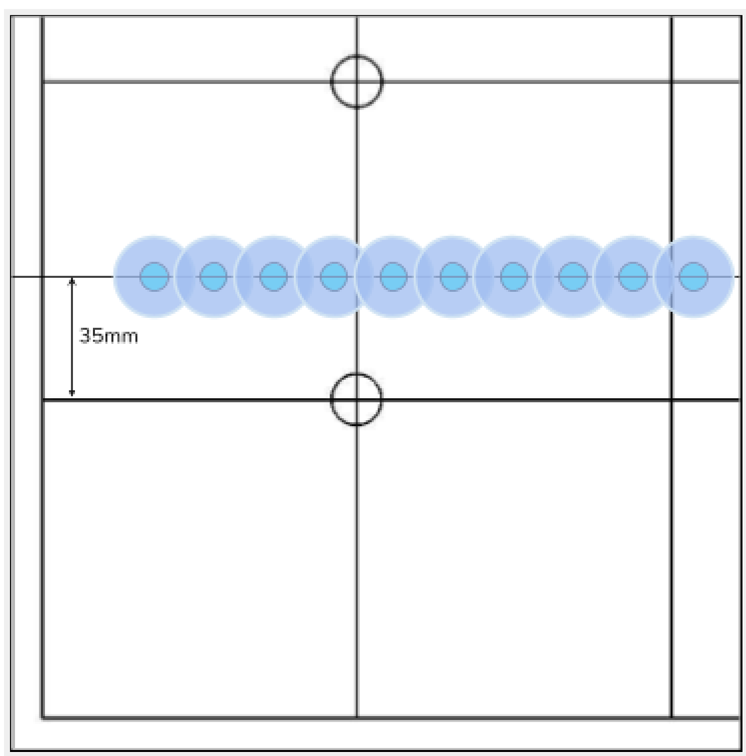
Select **"Download"** to load the program from the programming panel into the PLC panel.



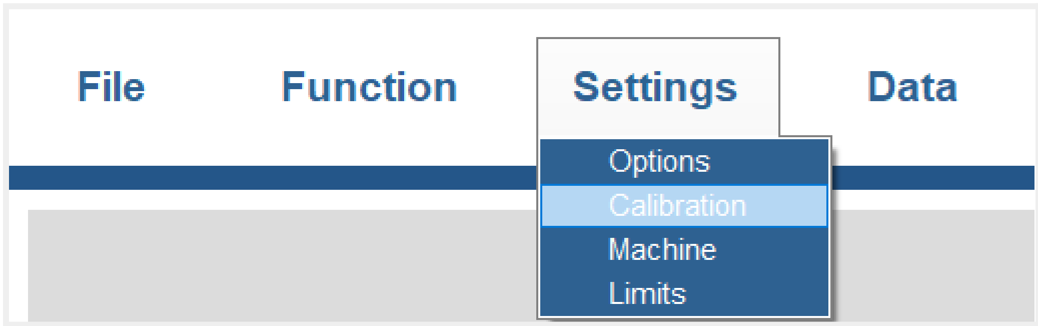
NOTE: Nozzle 2 is selected in dot parameters and the colour of point has changed for Nozzle 2.

Select the **"Start"** button and run the cycle for the board.

Measure the positioning offset with a correct ruler. The following values shown are examples. Record the value measured.



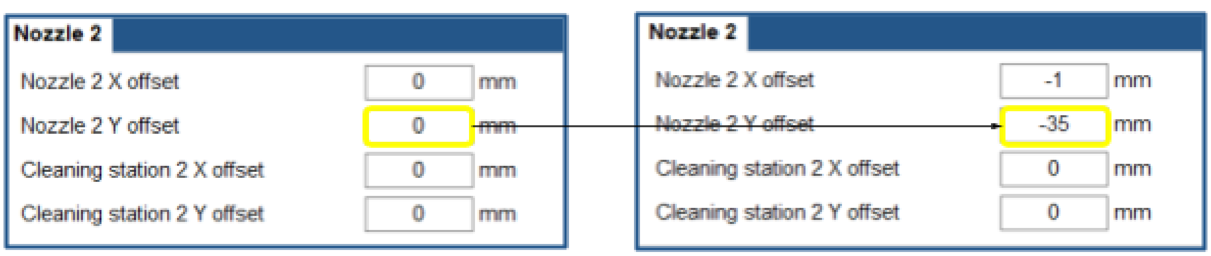
Open the calibration dialog by going to **Settings → Calibration**



Adjust the following values according to the measured Y-position offset.

- For Y: Nozzle 2 X offset:

  REDUCE offset by measured value if the row is **ABOVE** the reference grid line.
  INCREASE offset by measured value if the row is **BELOW** the reference grid line.

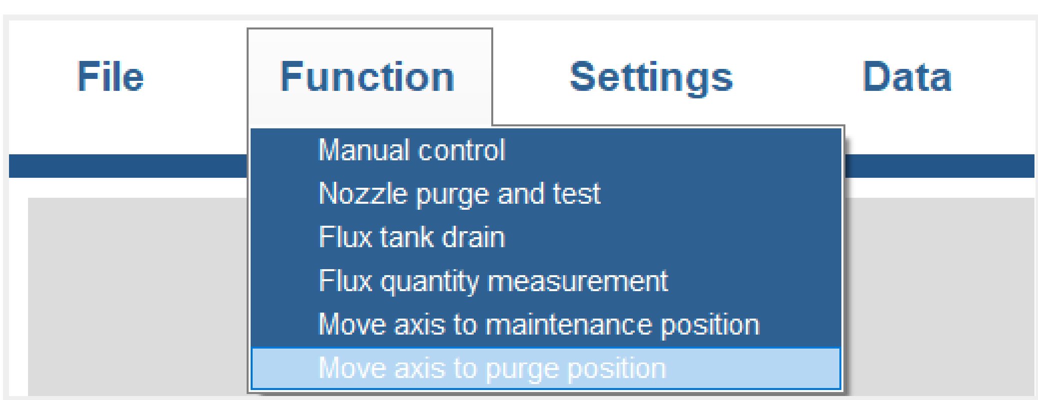


If there were already values in the Nozzle 2 X and Y offset cells, then the measured distance will need to be added to these current values to adjust the offset to the corrected value.

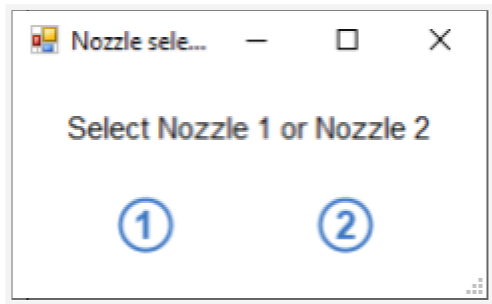
12.8 Purging unit position calibration

Before proceeding to measure the flux usage for each programme. Firstly, determine the type of valve installed for each nozzle position. Calibrate the position of the nozzle(s) relative to the Purging Station's purging orifice. Remove the Purging Station Nozzle Cover(s) off the Purging Station before proceeding with calibration.

Select **Function** → **Move to purging position**

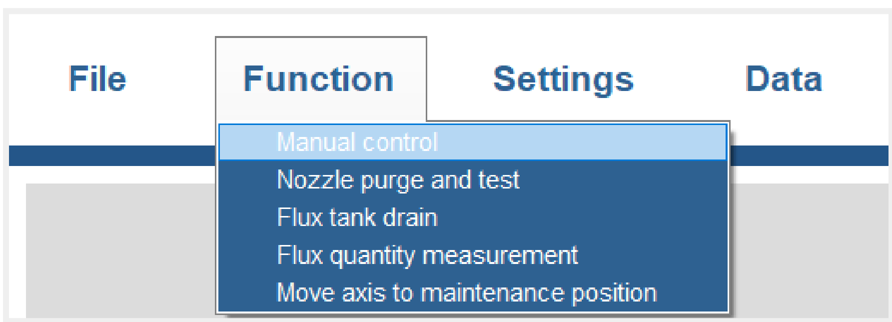


Select Nozzle 1.

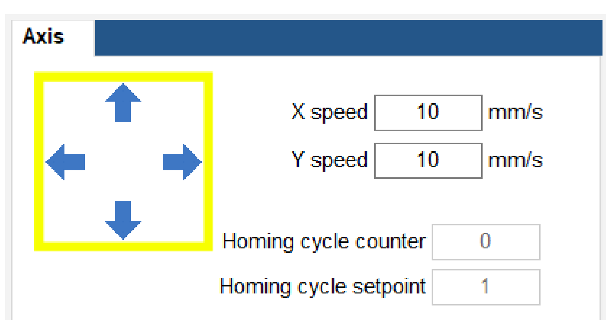


Nozzle 1 will move towards the Purging Unit and stop in position.

Open the manual control dialog by selecting **Function → Manual Control**

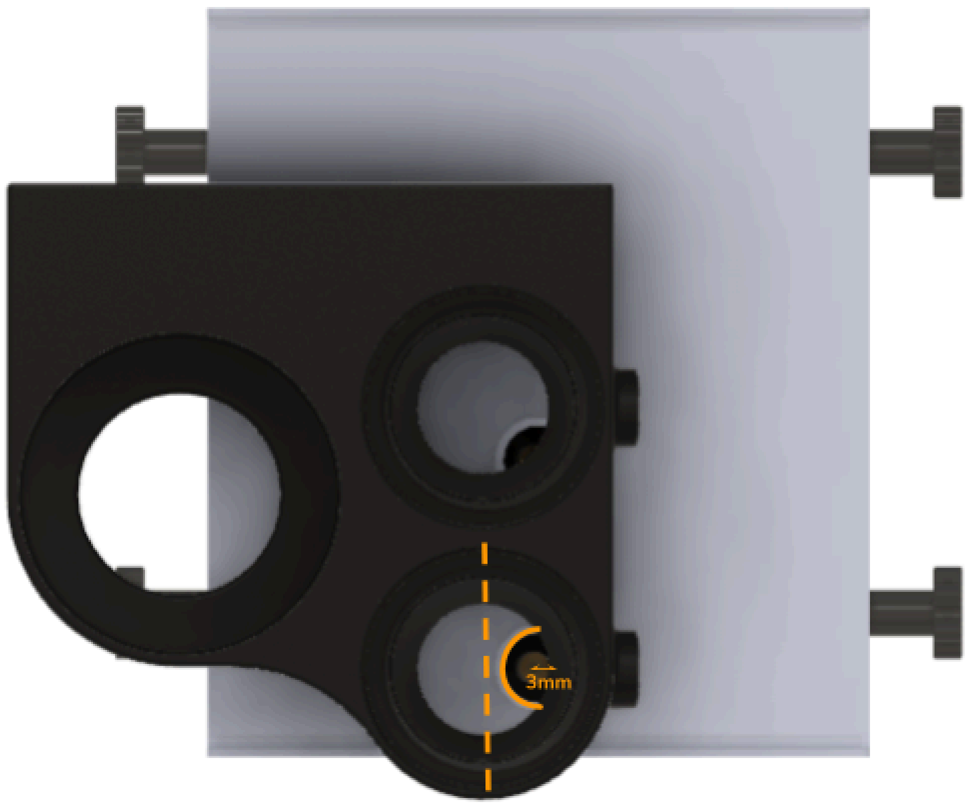


Using the Manual Axis Control, move the nozzle for testing to the position required to align the Purging Unit orifice with the nozzle head. (This operation may require a few attempts until an accurate position is attained). See following sections to determine ideal position for nozzle head according to valve type.

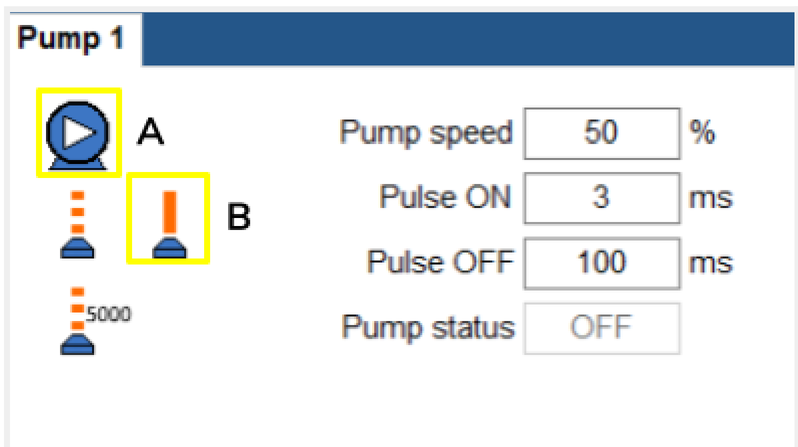


12.8.1 HSV-V/HSV-P Nozzle Head Alignment

If the valve installed in the machine belongs to HSV-V or HSV-P. Align the nozzle head as shown below. Where the nozzle head orifice is slightly offset 3mm from the right edge of the purging station orifice.

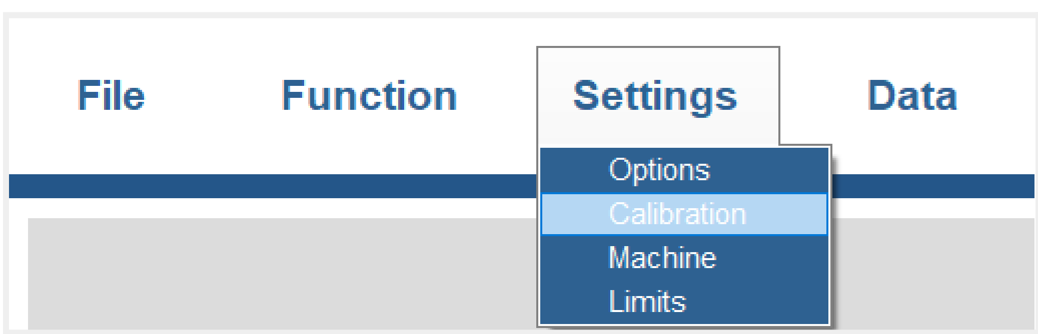


Turn on the Pump (A) then turn on the Nozzle (B) to check the alignment. If alignment is off and flux stream hits the bottom of the purging station, turn off the Nozzle (B). Adjust the position with the Manual Axis Controls. Repeat until the jet manages to enter the Purging Station orifice without spillage.

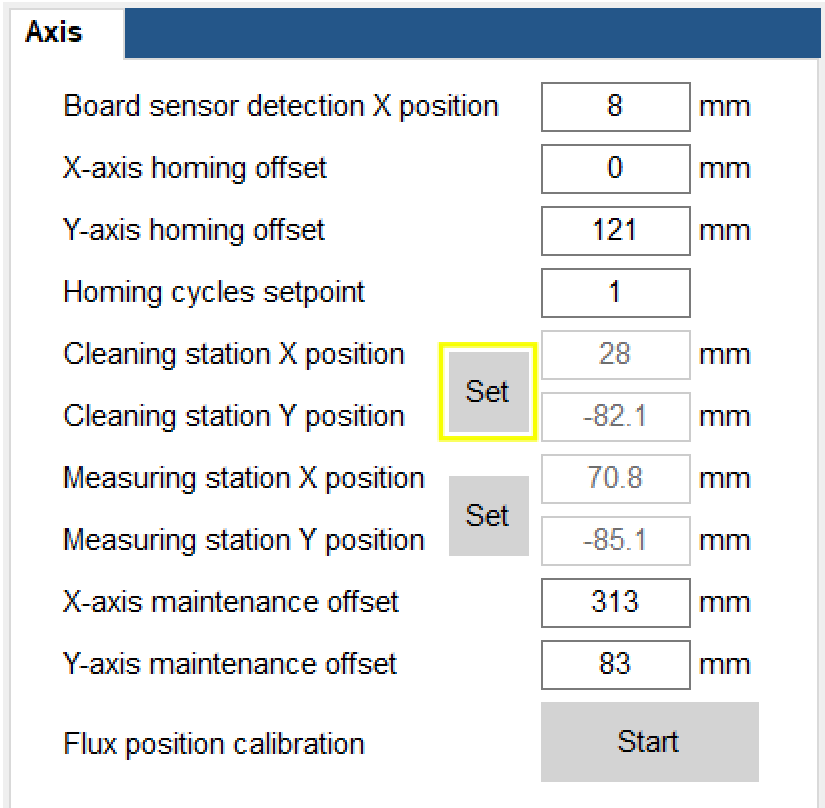


Once the Nozzle and Purging Station orifice is aligned. Turn off the Nozzle and Pump. Replace the Purging Station Nozzle Cover.

Open the calibration dialog by selecting **Settings → Calibration**.



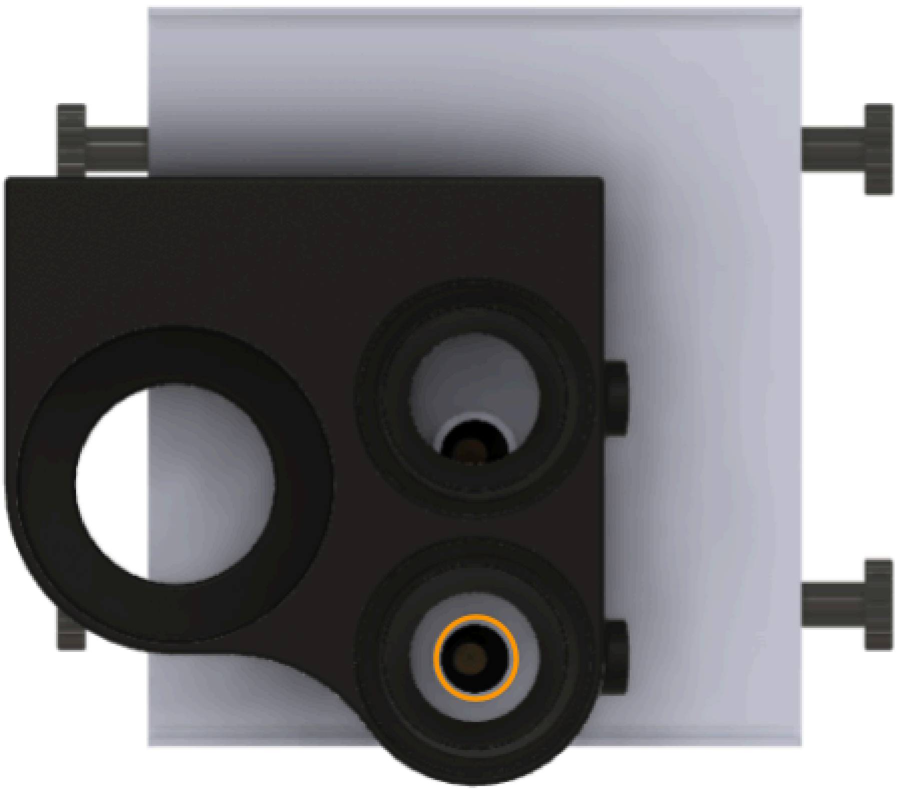
When the calibration dialog opens. Press the “Set” button next to the “Cleaning Station X” and “Cleaning Station Y”. Position and follow the onscreen prompts.



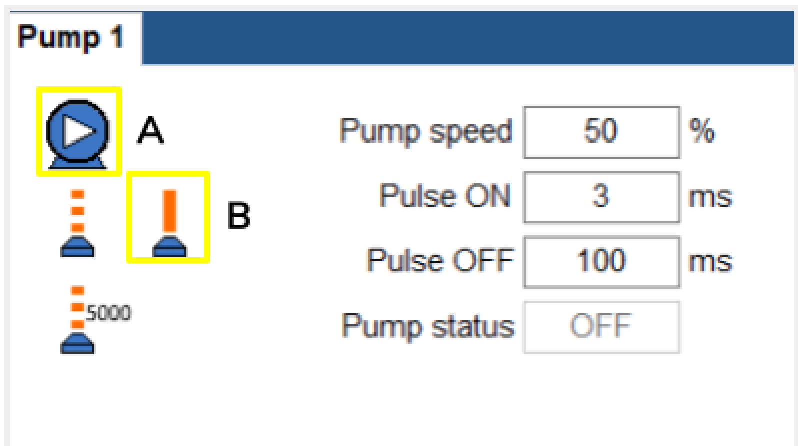
The new purging position is now stored. Close the calibration table and return back to the Start position by pressing the **"X Y Homing Button"**.

12.8.2 SSV Nozzle Head Alignment

If the valve installed in the machine belongs to SSV. Align the nozzle head as shown below. Where the nozzle head orifice is to the centre of the purging station orifice.

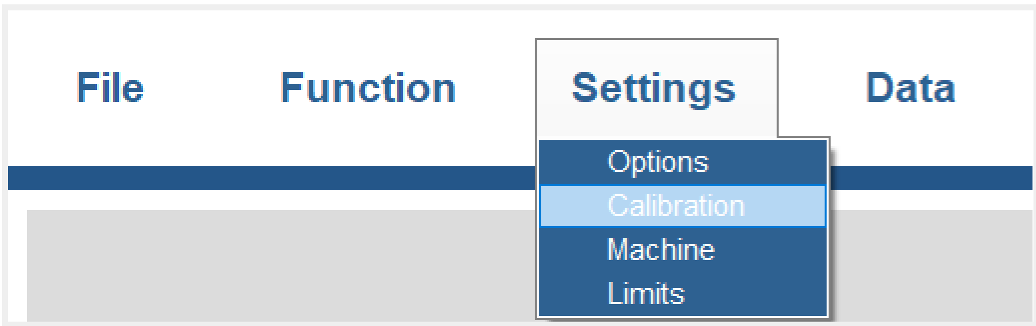


Turn on the Pump (A) then turn on the Nozzle (B) to check the alignment. If alignment is off and flux stream hits the bottom of the purging station, turn off the Nozzle (B). Adjust the position with the Manual Axis Controls. Repeat until the jet manages to enter the Purging Station orifice without spillage.

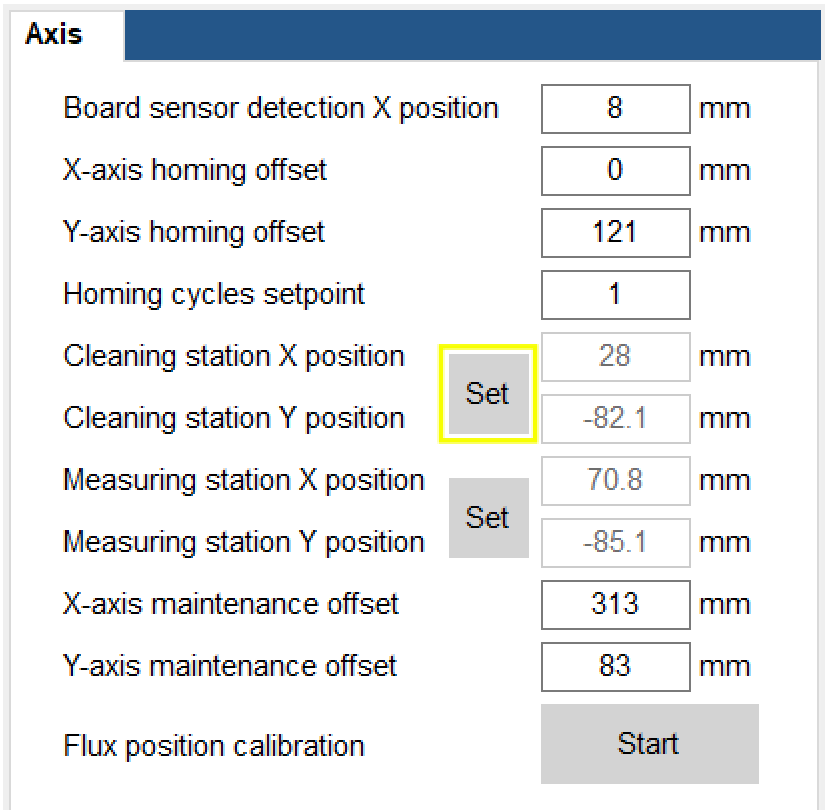


Once the Nozzle and Purging Station orifice is aligned. Turn off the Nozzle and Pump. Replace the Purging Station Nozzle Cover.

Open the calibration dialog by selecting **Settings → Calibration**.



When the calibration dialog opens. Press the “Set” button next to the “Cleaning Station X” and “Cleaning Station Y”. Position and follow the onscreen prompts.

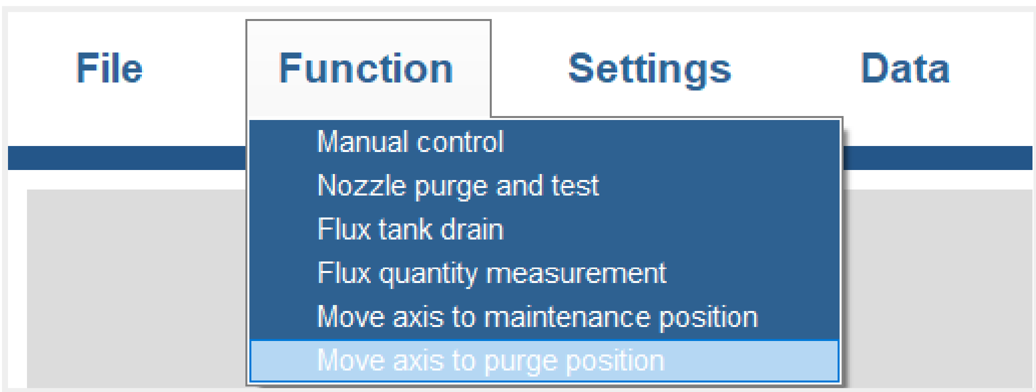


The new purging position is now stored. Close the calibration table and return back to the Start position by pressing the **"X Y Homing Button"**.

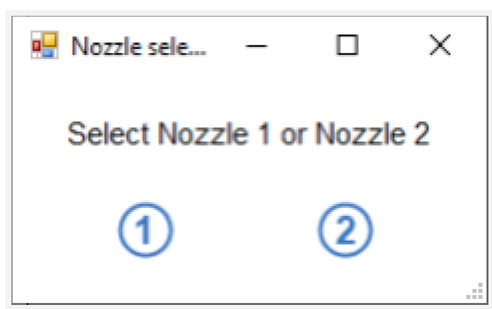
12.9 Second Nozzle Alignment

For Nozzle 2,

Select **Function → Move to purging position**



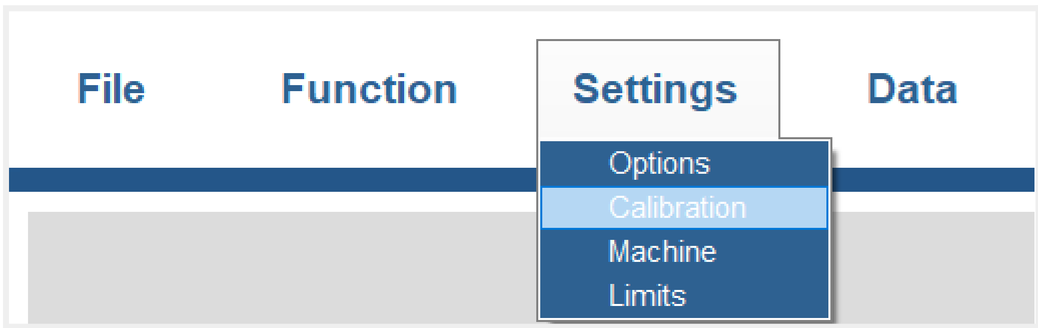
Select Nozzle 2.



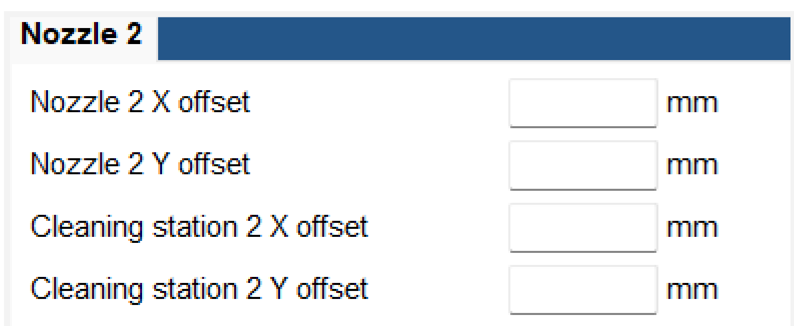
Nozzle 2 will move towards the Purging Unit and stop in position.

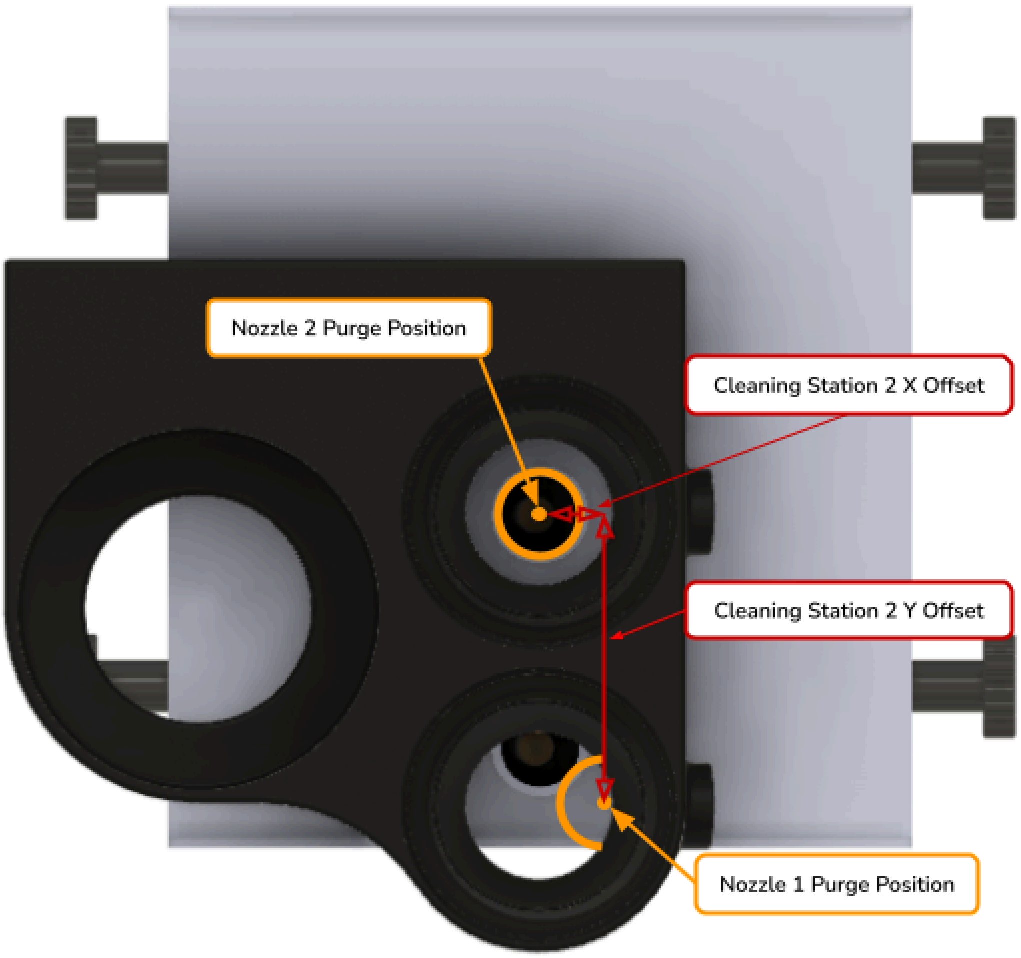
Check if Nozzle 2 is aligned to the second Purging Station Orifice as according to the type of valve installed.

Open the calibration dialog by selecting **Settings → Calibration**.



When the calibration dialog opens. Adjust the “Cleaning Station 2 X Offset” and “Cleaning Station 2 Y Offset”.

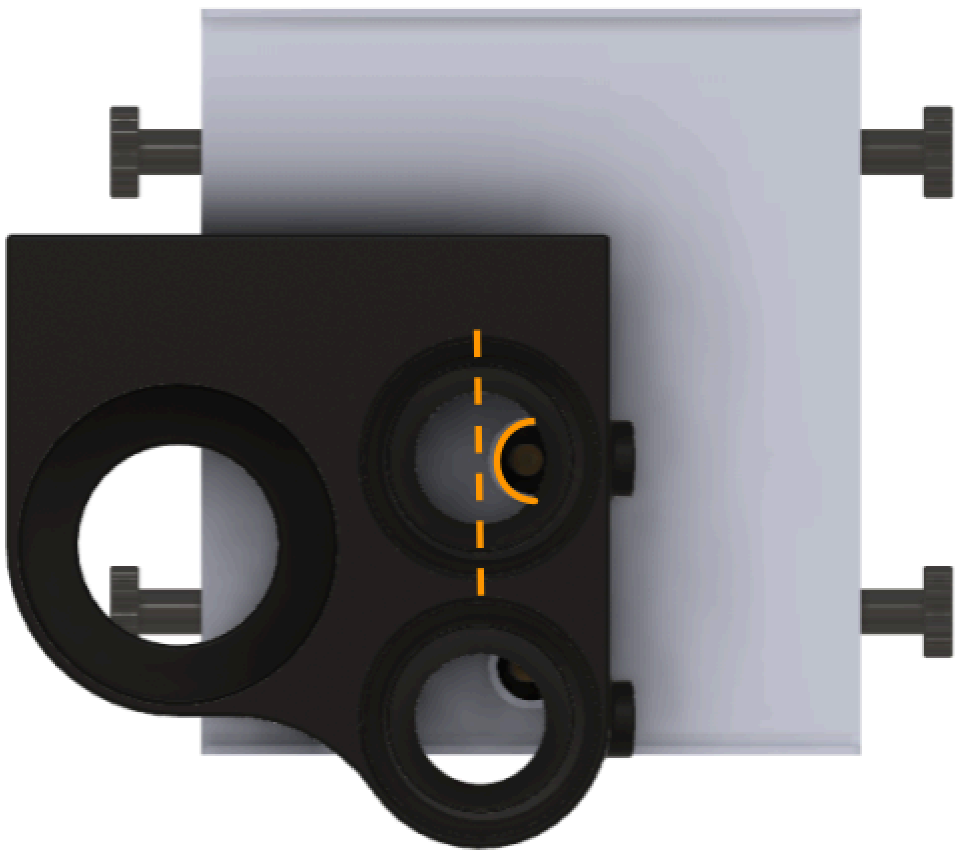



Nozzle 2 Purge Position
Cleaning Station 2 X Offset
Cleaning Station 2 Y Offset
Nozzle 1 Purge Position

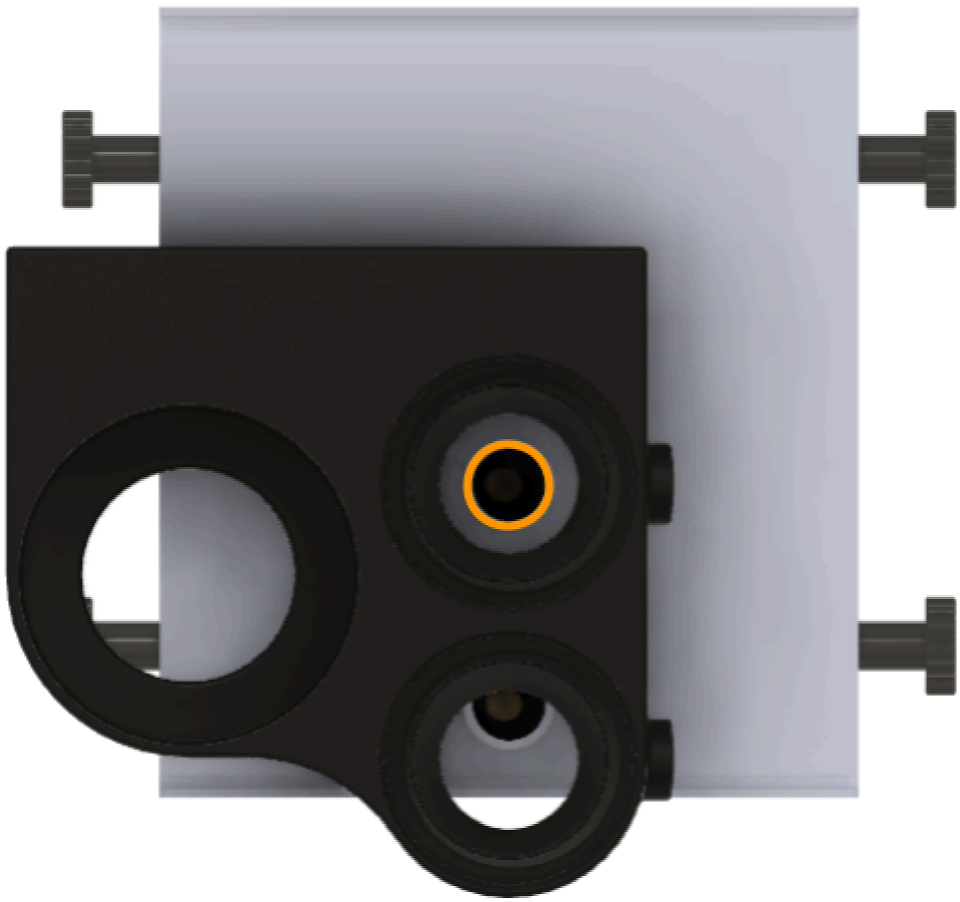
Increasing “Cleaning Station 2 X Offset” moves it to the left and decreasing moves nozzle head to the right.

Increasing ‘Cleaning Station 2 Y Offset” moves it up and decreasing moves nozzle head down.

For Nozzle 2 HSV alignment. If Nozzle 1 has HSV installed, “Cleaning Station 2 Y Offset” should be 46mm.



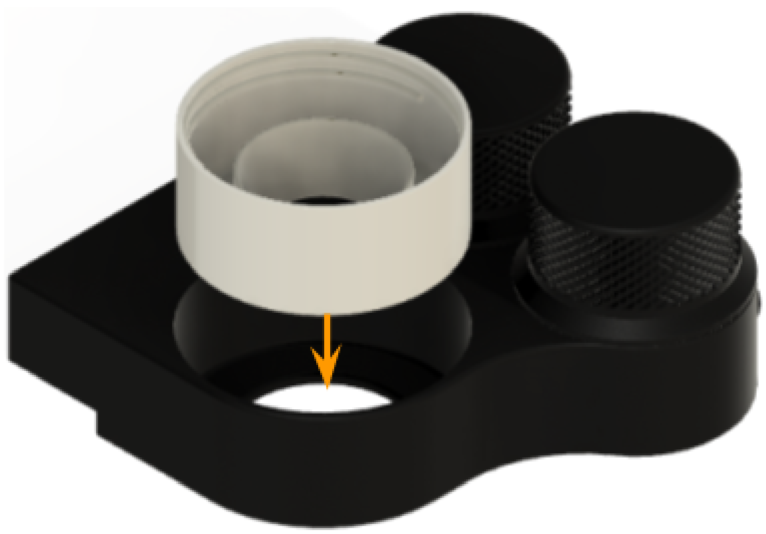
For Nozzle 2 SSV alignment. If Nozzle 1 has HSV installed, “Cleaning Station Y Offset” should be 46+/-1mm and “Cleaning Station X Offset” should be 10+/1mm. Else if Nozzle 1 has SSV installed, “Cleaning Station Y Offset” should be adjusted to 46+/-1mm and no changes to “Cleaning Station X Offset”.



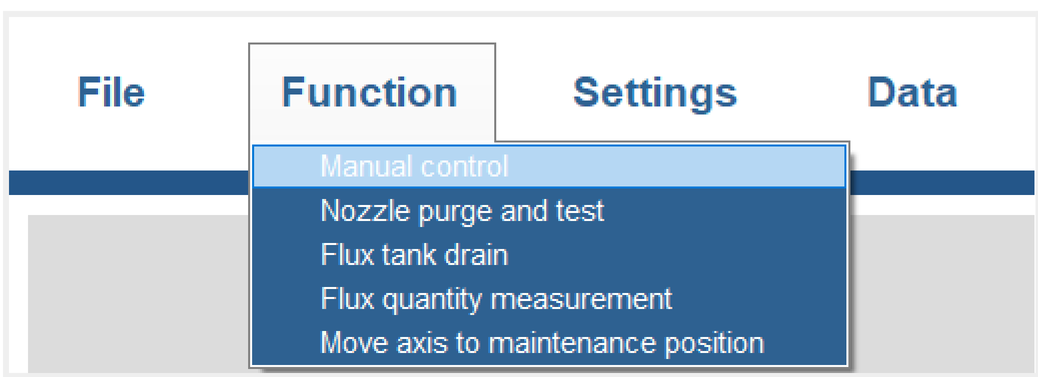
Once Nozzle 2 position is fixed, replace the Purging Station Nozzle Cover.

12.10 Measuring Unit Position Calibration

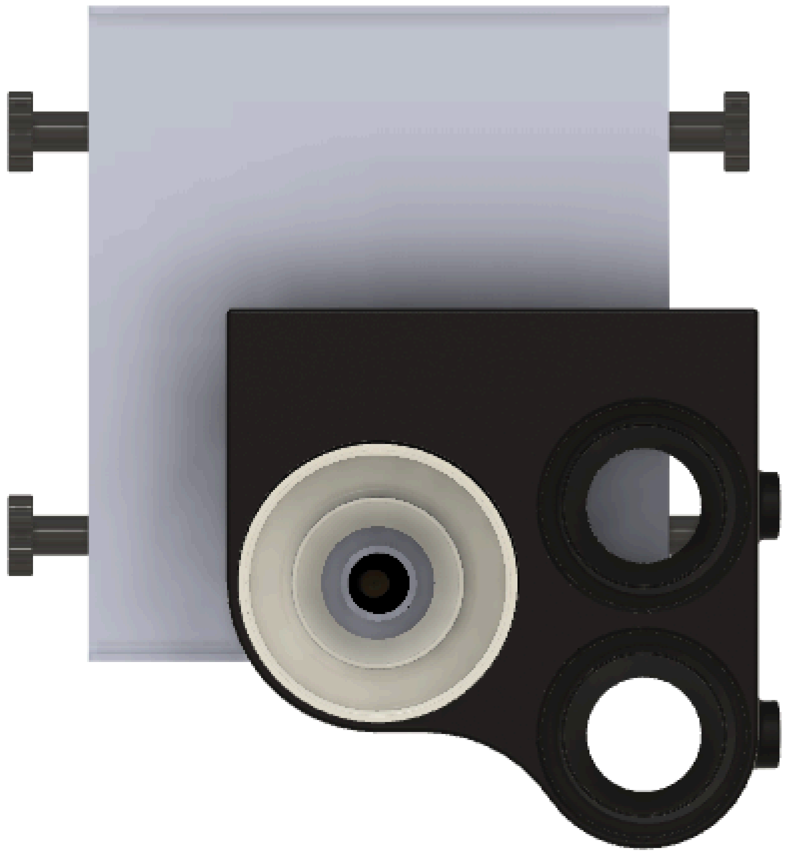
Place the Measuring Jar Lid Into the Measuring Station Jar Holder.



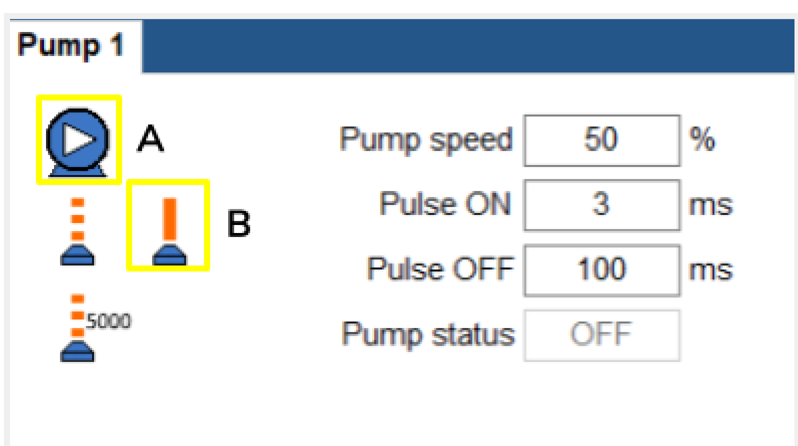
Open the manual control dialog by selecting **Function → Manual Control**



Using the Manual Axis Control, move the nozzle for testing to the position required to align the Measuring Station orifice with the nozzle head. (This operation may require a few attempts until an accurate position is attained). See below for recommended alignment.

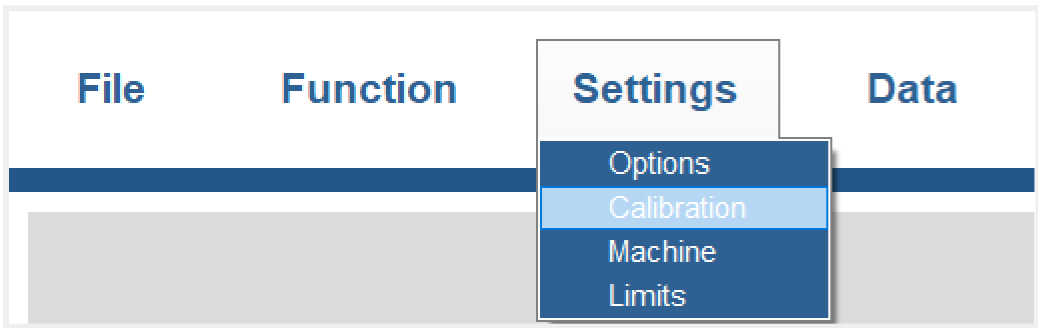


Turn on the Pump (A) then turn on the Nozzle (B) to check the alignment. If alignment is off and hits the bottom of the purging station, turn off the Nozzle (B). Adjust the position with the Manual Axis Controls. Repeat until the jet manages to enter the Purging Station orifice without spillage.

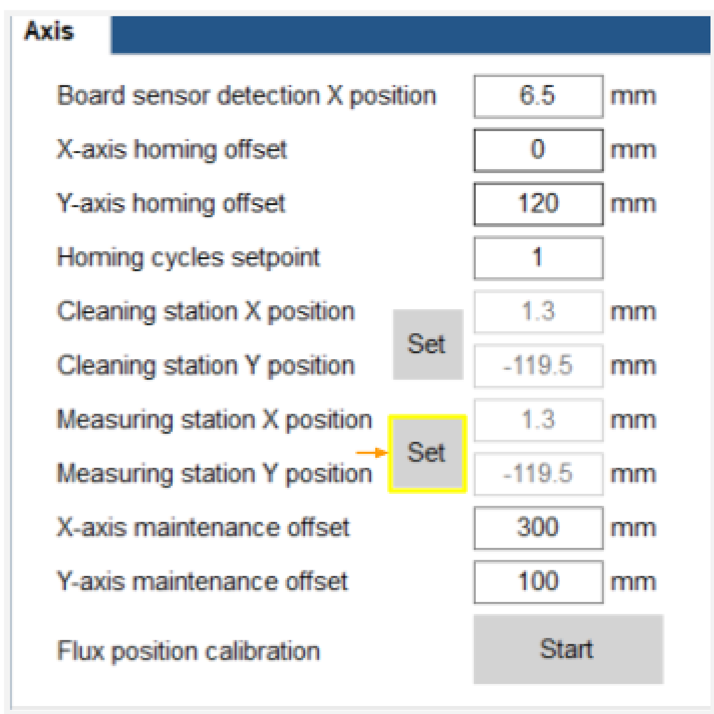


Once the Nozzle and Purging Station orifice is aligned. Turn off the Nozzle and Pump.

Open the calibration dialog by selecting **Settings → Calibration**.



When the calibration dialog opens. Press the "Set" button next to the "Measuring Station X" and "Measuring Station Y". Position and follow the onscreen prompts.

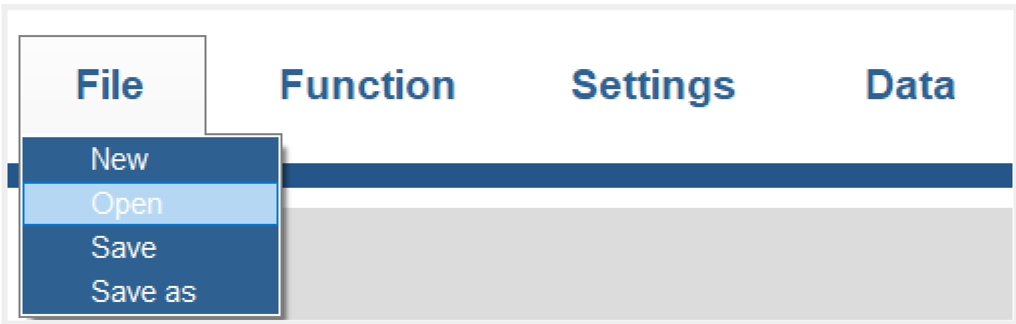


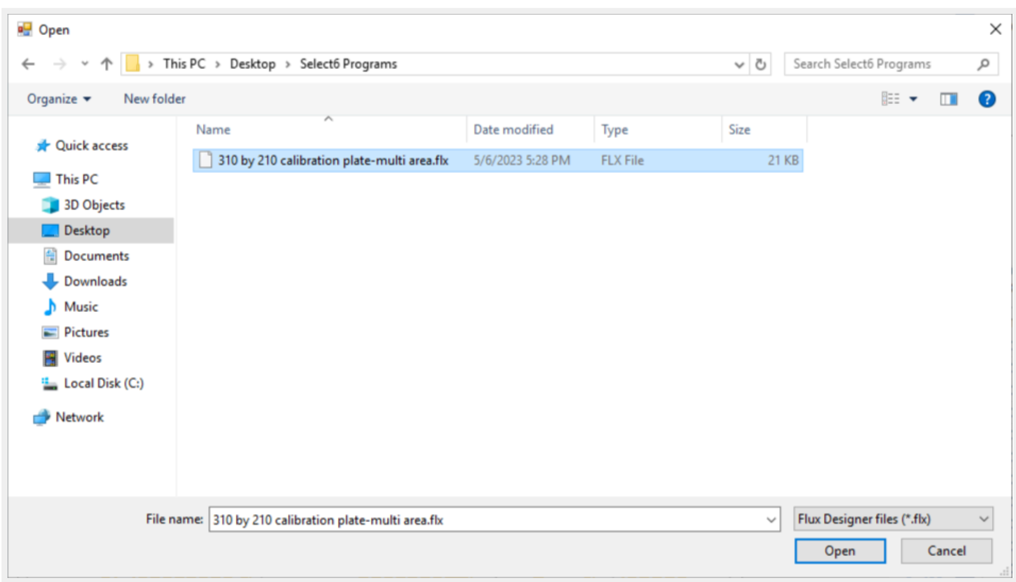
The new measuring position is now stored. Close the calibration table and return back to the Start position by pressing the **"X Y Homing Button"**.

12.11 Standard Programme Flux Measurement Programme

To measure the flux usage on any programme follow the listed procedure.

Opening a project file : Select **File → Open**



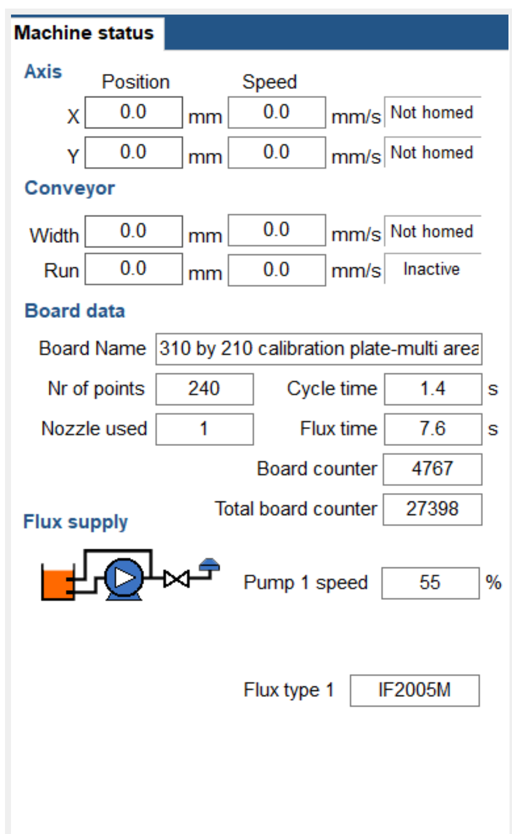


From the open file dialog, select the folder that contains the relevant project files and pick a *.flx file.

Downloading : " Transferring the file from the programming panel to the PLC panel"

To download the file, click the **"Download"** button as shown.

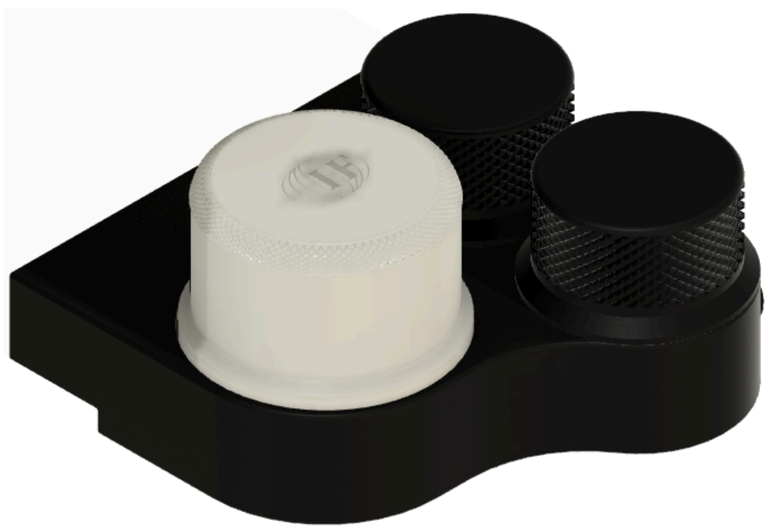
When the download is completed, the filename and the number of points of the current board data would appear in the panel.



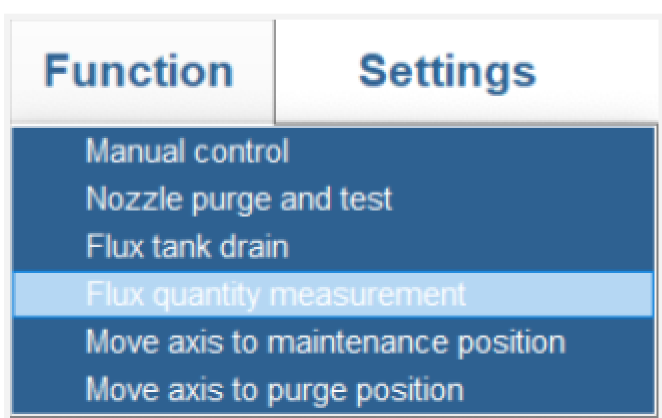
Measuring : Before measuring, verify that the balance is level. If the balance has a bubble level, the bubble should be in the centre of the circle for measurement to be accurate. It may not apply for all models.

Turn on the balance. Tare the balance with the Measuring Jar. The balance should show a value of 0.000 grams.

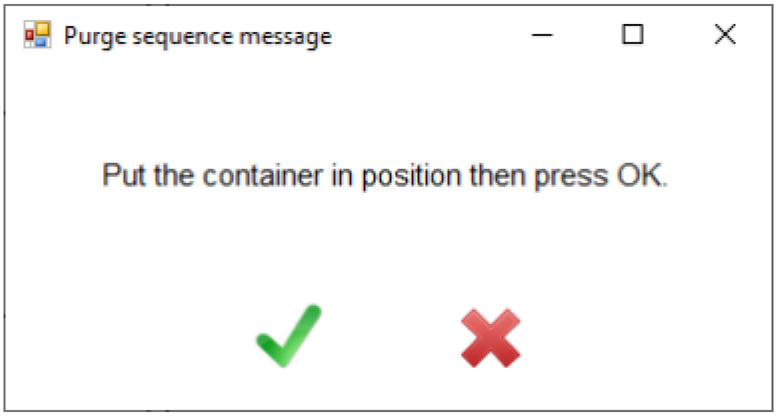
Place the Measuring Jar into the Measuring Station Holder.



Select **Function → Flux Quantity Measurement**



The following window will appear



Select the **Green Tick** when ready.

When the flux deposition procedure is completed, remove the Measuring Jar from the Measuring Jar Station.

Weigh the Measuring Jar and record the value. This is the weight of the flux applied during the programme.

Calculation : To calculate the volume of the flux applied during the programme.

In this example, the flux used is **IF2005C** and weighs 0.144g

Obtain the density of the flux from the TDS. For example; **0.814g/ml**

The calculation formula for the volume of flux applied is :

Volume of flux applied *= (Flux weighed in grams) / (Density of Flux in g/ml)*

= (0.144g)/(0.814g/ml)

= 0.176ml

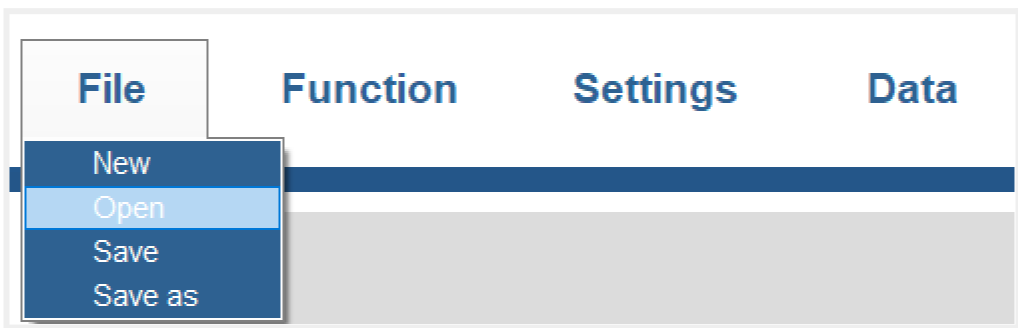
Record down the volume of flux applied.

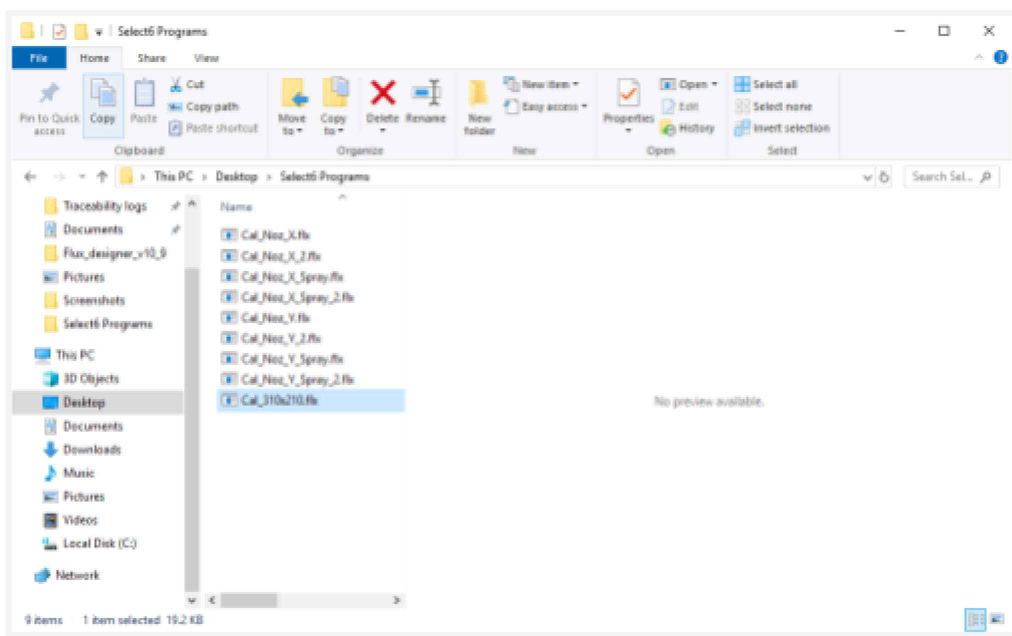
12.11 Flux Applied per Area Measurement Procedure

With changes to Flux Type Settings and the type of Flux loaded into the machine. Changes to the Flux Applied per Area is expected.

To measure the Flux Applied per Area.

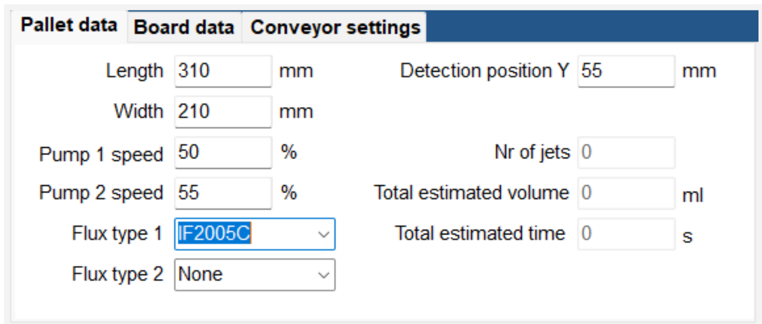
Opening a project file : Select **File → Open**





From the open file dialog, select the folder that contains the Cal_310x210.flx project files and select it.

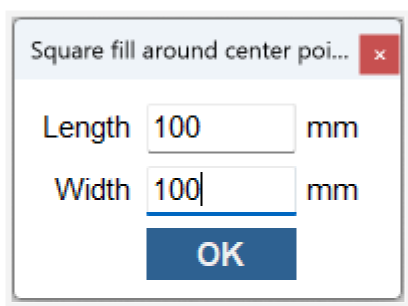
Select the flux type that is meant to be measured from the pallet data column.



In this case, the flux type chosen is **IF2005C.**

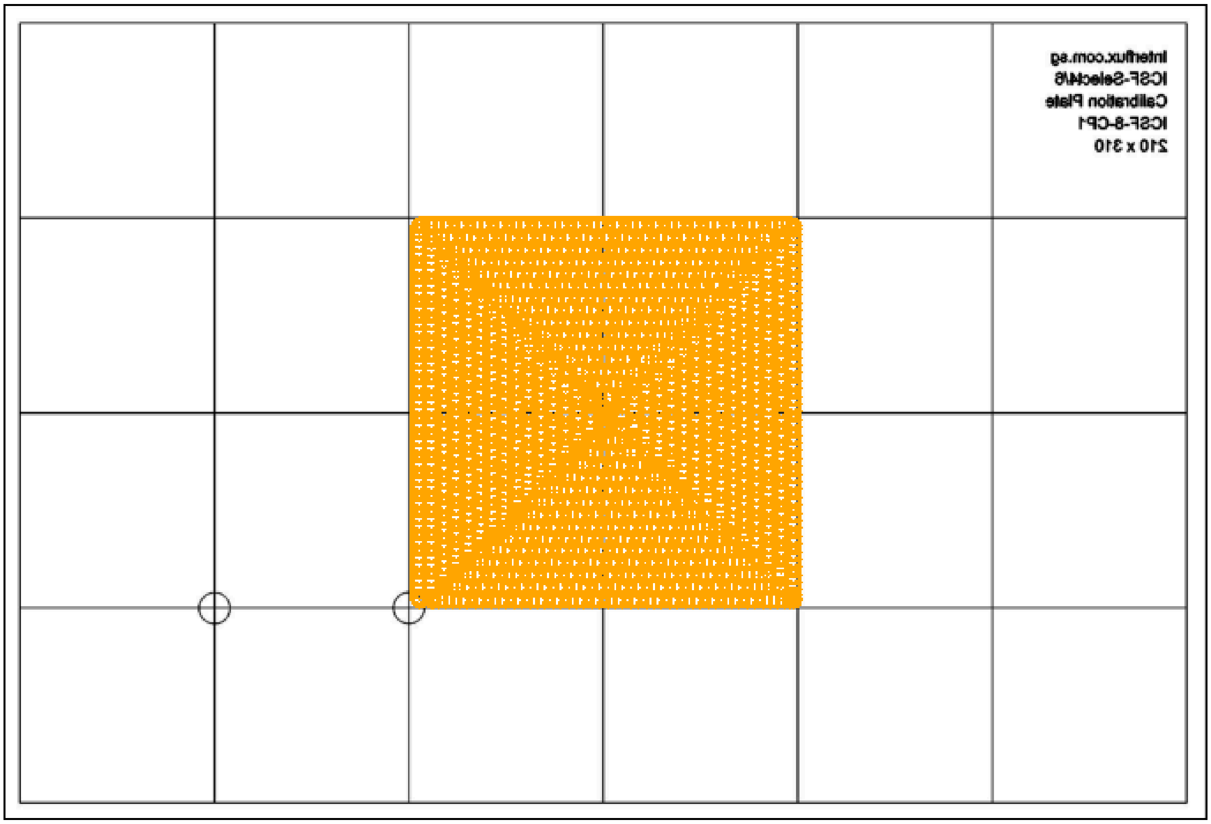
Select the multiline area tool

When the size dialog box appears,



Set both Length and Width to 100mm.

Place the multiline area in the centre of the Calibration Plate as seen below



Downloading : “ Transferring the file from the programming panel to the PLC panel”

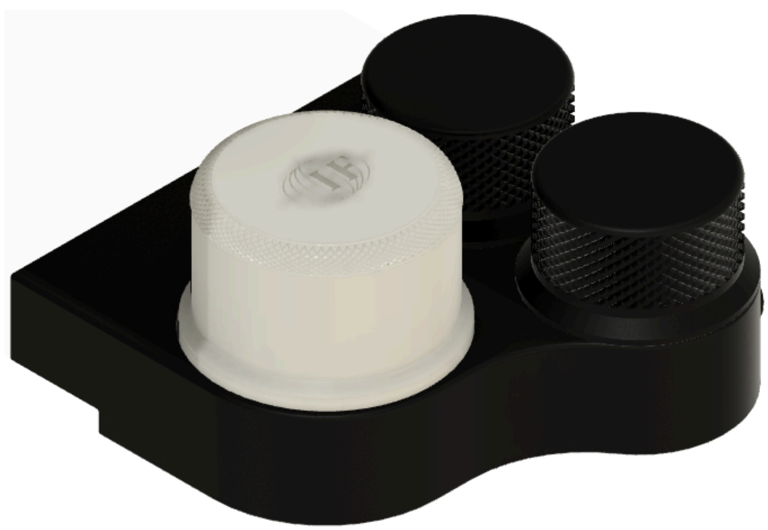
To download the file, click the **“Download”** button as shown.

When the download is completed, the filename and the number of points of the current board data would appear in the panel.

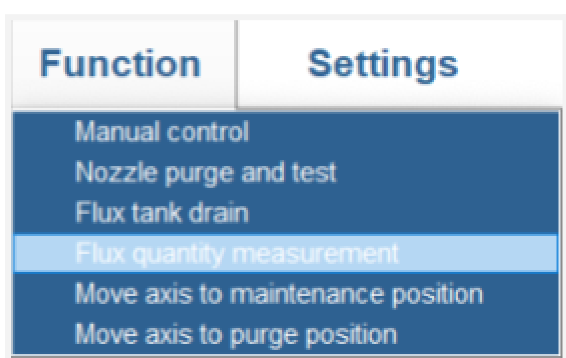
Measuring : Before measuring, verify that the balance is level. If the balance has a bubble level, the bubble should be in the centre of the circle for measurement to be accurate. It may not apply for all models.

Turn on the balance. Tare the balance with the Measuring Jar. The balance should show a value of 0.000 grams.

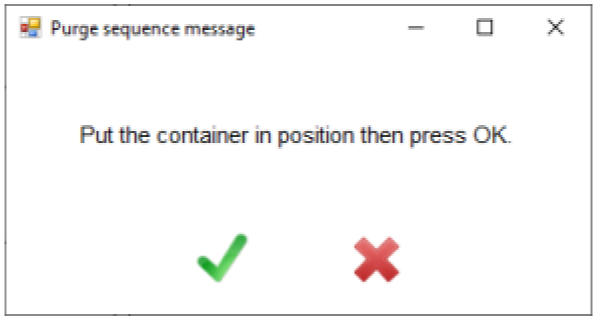
Place the Measuring Jar into the Measuring Station Holder.



Select **Function → Flux Quantity Measurement**



The following window will appear



Select the **Green Tick** when ready.

When the flux deposition procedure is completed, remove the Measuring Jar from the Measuring Jar Station.

Weigh the Measuring Jar and record the value. This is the weight of the flux applied over 100x100mm.

Calculation 1 : To calculate the volume of flux applied per area.

In this example, the flux used is **IF2005C** and weighs 0.651g

Obtain the density of the flux from the TDS. For example; **0.814g/ml**

The calculation formula for the volume of flux applied per area (ml/cm^2) is :

Quantity of flux applied per area = *(Flux weighed in grams) /(Density in g/ml) (Total Area in cm^2)*

= *(0.651g)/(0.814g/ml)(100)*

=*8.00×10^{-3}ml/cm^2*

Record down the volume of flux applied per area.

Calculation 2 : To calculate the flux solids applied per area in **(μg/cm²)**

In this example, the flux used is IF2005C and weighs 0.651g = **0.651x10⁶μg**.

The fluxing area is 10000mm² = **100cm²**.

Obtain the solid content % from the TDS. For example; **3.3%**

The calculation formula for the flux solids applied per area (μg/cm²) is :

Flux solids applied per area	*= (Flux weighed in micrograms)(Solid Content%) / (Total Area in cm²)(Total Volume%)*
	*= [(0.651 **x10⁶** μg)(3.3%)] / [(100cm²)(100%)]*
	= 214.83 μg/cm²

Record down the flux solids applied per area.

Calculation 3 : To calculate the flux solids applied per area in **(μg/in²)**

In this example, the flux used is IF2005C and weighs 0.651g = **0.651x10⁶μg**.

The fluxing area is 10000mm² = **15.5in²**.

Obtain the solid content % from the TDS. For example; **3.3%**

The calculation formula for the flux solids applied per area (μg/in²) is :

Flux solids applied per area	*= (Flux weighed in micrograms)(Solid Content%) / (Total Area in in²)(Total Volume%)*
	*= [(0.651 **x10⁶** μg)(3.3%)] / [(15.5in²)(100%)]*
	= 1386 μg/in²

Record down the flux solids applied per area.

SECTION 13 : Service and maintenance

The ICSF-Select6 (M23) is subject to specified service intervals.

13.1 Service overview

Service Interval	Area	Execution
Daily, prior to starting the shift	Covers	Clean all covers with IPA
Daily, prior to starting the shift	PCB Sensor	Clean the PCB sensor glass by flushing with glass cleaner
Daily, prior to starting the shift	Nozzle/Valve	Perform a purge to make sure no air has collected in the tubes and the valve is functioning. See Chapter 8.2.2 to perform.
Daily, prior to starting the shift	Flux Tank	Visually inspect the flux tank container and its tubing. If you find any leaking connections, they must be repaired immediately. Check that the tank has sufficient level of flux for operation.
Monthly	Flux Tank	Clean the flux filter See Chapter 13.5 to perform.
Monthly	Flux Tank	Clean the flux tank See Chapter 13.5 to perform.
6 Monthly	X & Y Axis	Check the belt tension, adjust when necessary. See Chapter 14.1 to perform. Check if all pulleys are rotating properly.
6 Monthly	Conveyor Width	Check the belt tension, adjust when necessary. See Chapter 14.2 to perform. Grease the leadscrews and runner blocks.
6 Monthly	Conveyor Drive	Check smoothness of chains running, adjust when necessary. Grease the spline shaft. Check the motor timing belt tension. See Chapter 14.2.5 to perform.
Yearly	X & Y Axis	Check belts for wear, misalignment and deterioration. If belts have any damage or deterioration they should be replaced immediately as further machine damage could result from failure.

13.2 Service overview of the safety related fixtures

Service Interval	Area	Execution
Monthly	EMERGENCY-STOP button	Activate the EMERGENCY-STOP button in automatic mode. All axis movements **MUST** stop immediately. The message will then be displayed in the software.
Monthly	Door-Safety Switch	Open the doors of the ICSF-Select6. All axis movements **MUST** stop immediately. The message will then be displayed in the software.
Yearly	Electrical Connections	Check the terminal of the machine, by tightening the screws of the connection terminals in a de-energized state. ***This activity may only be performed by a certified electrician.***

13.3 Maintenance Parts and Replacement Intervals

Item	Area	Maintenance Replacement Interval (Recommended Maximum)
High Speed Valve	Jetter Head	24 Months
X-Axis Motor to Transfer Shaft Belt	X-Axis	36 Months
X-Axis Main Linear Belts	X-Axis	36 Months
Y-Axis Motor to Transfer Pulley Belt	Y-Axis	36 Months
Y-Axis Main Linear Belt	Y-Axis	36 Months
Conveyor Motor Belt	Conveyor	36 Months
Conveyor Main Drive Belt	Conveyor	36 Months
X-Axis Linear Bearing Block	X-Axis	48 Months
Y-Axis Linear Bearing Block	Y-Axis	48 Months
Conveyor Chain	Conveyor	48 Months
Conveyor Drive Shaft Bearings	Conveyor	48 Months
Conveyor Chain Sprockets	Conveyor	48 Months
Conveyor Chain Guides	Conveyor	48 Months
Flux Pump	Flux Drawer	48 Months

13.4 Recommended Consumables and Spare Parts

Category	Item
Consumable	ICSFJ-130- Flux Tank Filter
	ICSFJ-025 - Glass Tube Protector
	ICSFJ-015 - Flux Tubing OD6mm, 1M
	ICSFJ-A619894 - Flux Tubing OD4mm, 5M
	ICSFJ-140 - Micro Filter (Straight)
	ICSFJ-142 - Micro Filter (Elbow)
	ICSFJ-120-P03 - Micro Tubing w/ Double 100mm Fitting
Spare Parts	ICSF-120 - High Speed Valve (HSV-P)
	ICSF-157 - High Speed Valve (HSV-V)
	ICSFJ-I020-P-22 - PCB Sensor Linear Actuator
	ICSFJ-I019-P-08 - PCB Sensor Rotary Shutter
	ICSFJ-072 - PCB Sensor Actuator Module
	ICSFJ-001 - Flux Pump
	ICSFJ-END-764222 - Flux Detection Laser Sensor Head

All parts in this list are classed as wear and tear items.

13.5 Cleaning the flux system

13.5.1 Cleaning the flux tank

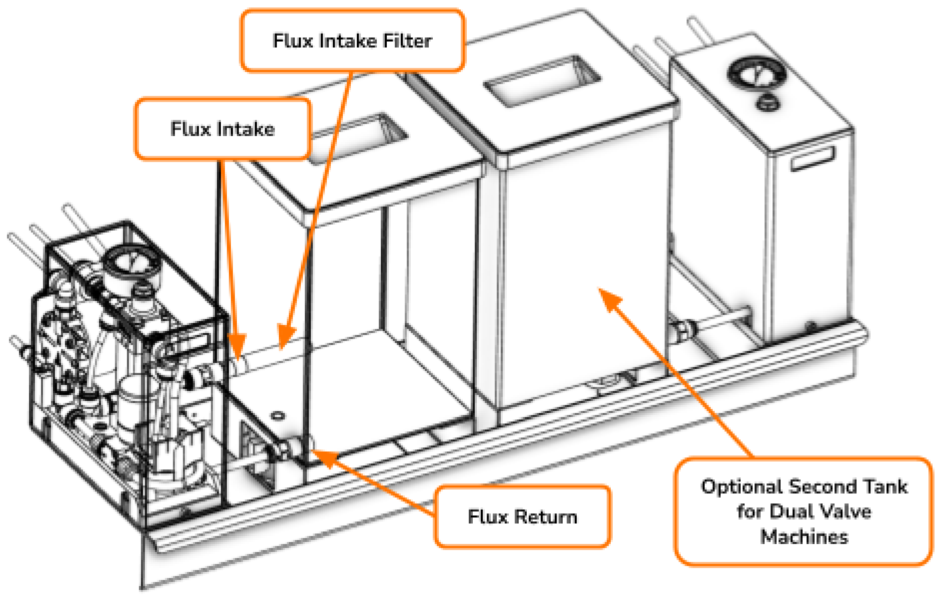


Figure 22.

1. Drain the tank as described in Chapter 8.2.1
2. Clean out the tank to remove residue
3. Clean the intake filter by removing it and using compressed air to blow it out in the opposite direction. If the filter is too dirty, see the section below to replace the internal filter element.
4. If necessary replace the pump

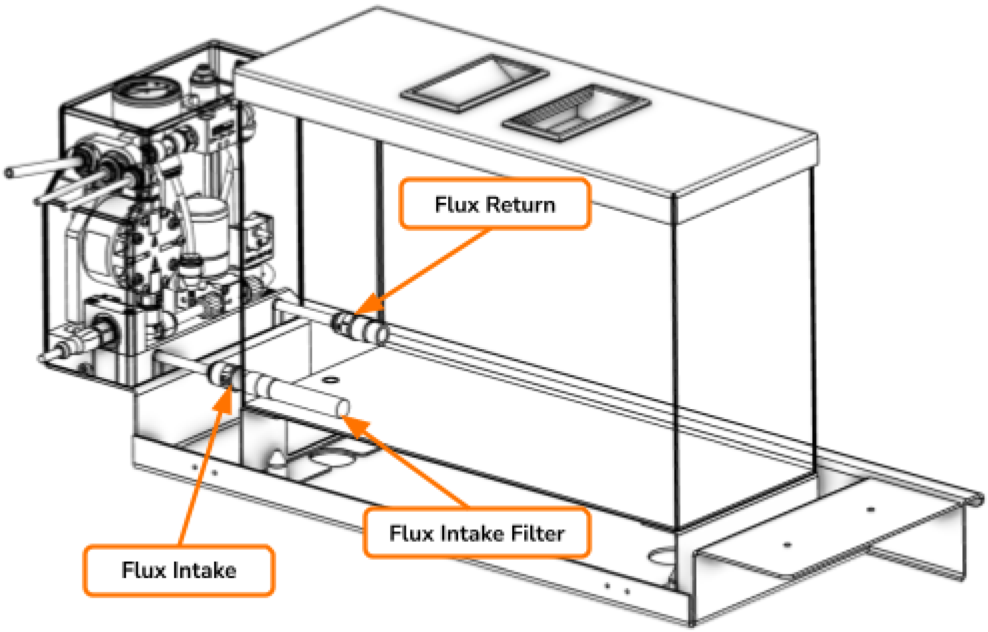


Figure 23.

1. Drain the tank as described in Chapter 8.2.1
2. Clean out the tank to remove residue.
3. Clean the intake filter by removing it and using compressed air to blow it out in the opposite direction. If the filter is too dirty, see the section below to replace the internal filter element.
4. If necessary replace the pump.

13.6 Cleaning the High Speed Valve

13.6.1 No Clean Fluxes (General Maintenance)

Cleaning of the nozzle should be carried out in the manner listed below.

Using an ESD swab as shown (Figure 24), soak the swab in Isopropyl Alcohol (IPA) before proceeding to approach the nozzle from above the cover to perform a wipedown of the nozzle face.

Figure 24.

13.6.2 For No Clean Fluxes (Syringe Method)

For more persistent debris in the nozzle, perform the following procedure:

For M23 Basic Cover

Remove the cover by releasing the 4 thumb screws from the base. Carefully slide the cover up and away from the nozzle mount (Refer to Figure 25).

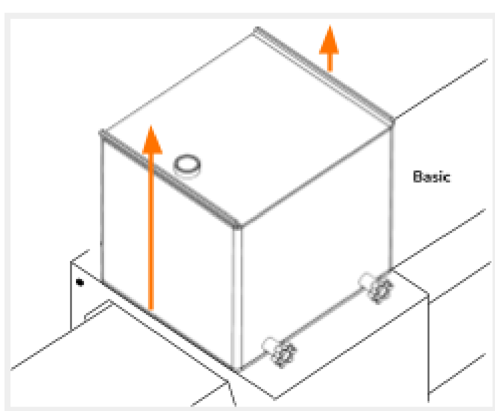


Figure 25.

For M23 Advanced Cover*

Remove the cover by releasing the 4 thumb screws from the side. Carefully slide the cover up and away from the nozzle mount (Refer to Figure 26).

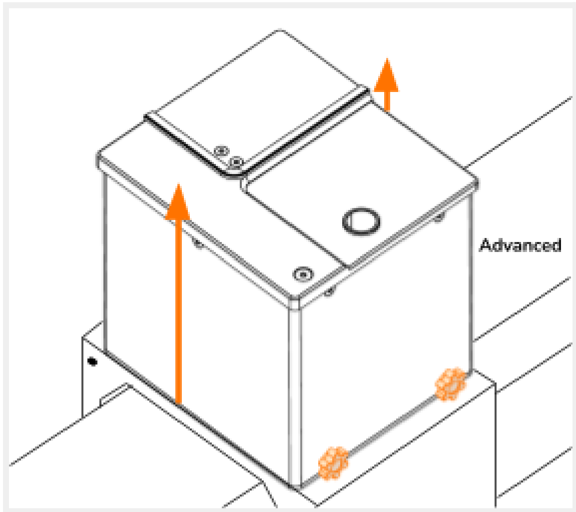


Figure 26.

Grip the glass tube with a tissue or clean lint free cloth. Gently lift upwards and place on a stable surface where it cannot be damaged. (Refer to Figure 27.)

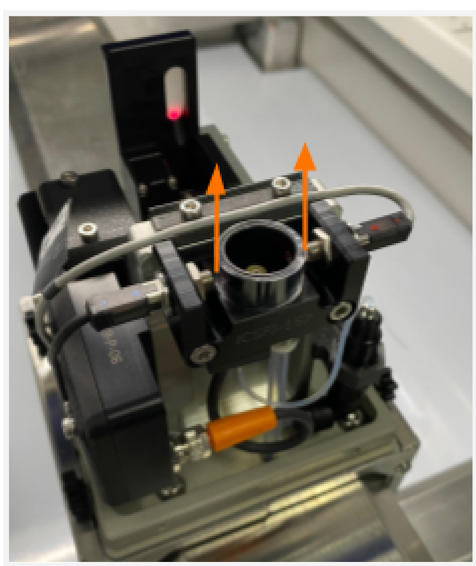


Figure 27.

Unscrew the valve from the assembly as shown below (Refer to Figure 28.) and remove the tubing (Refer to Figure 29.) Keep the valve connected to power.

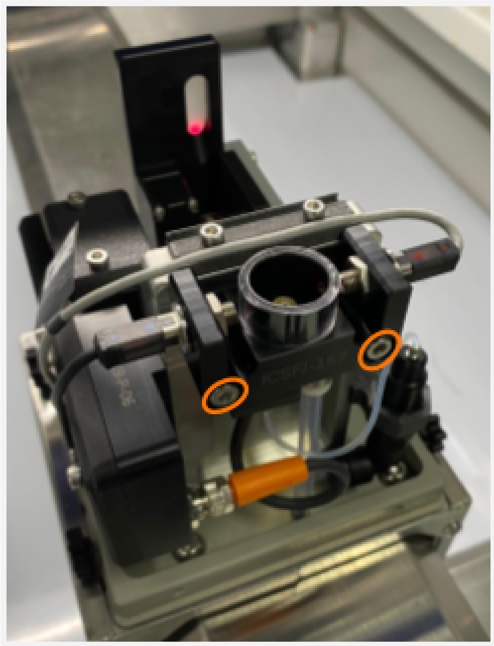


Figure 28.

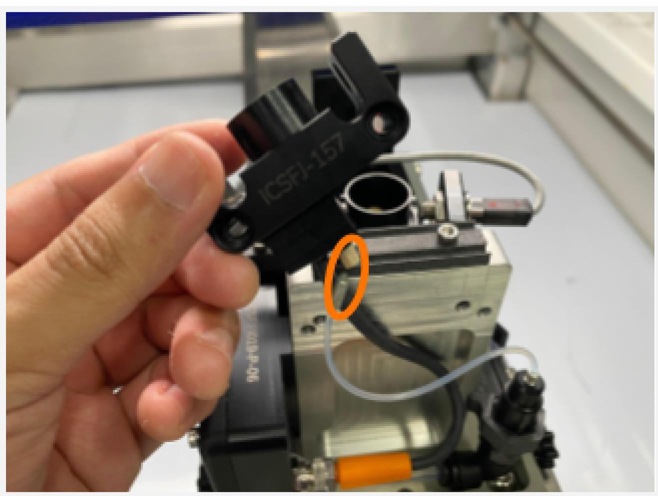


Figure 29.

Switch on the valve to be on “Open”, as shown below in Figure 30.

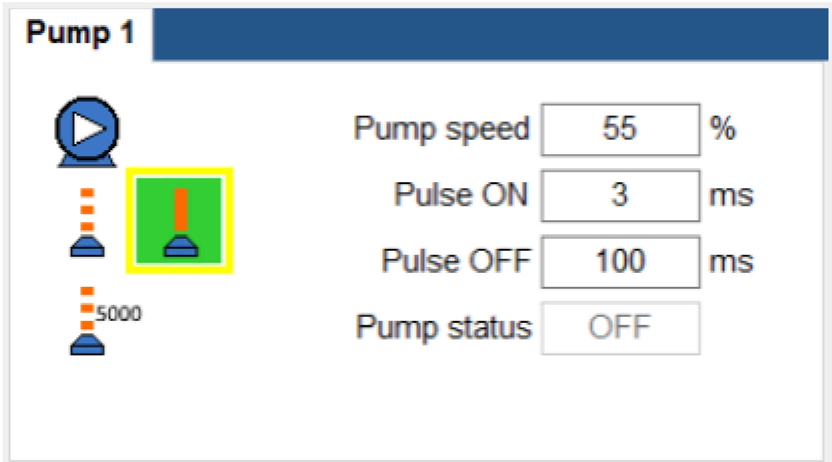


Figure 30.

With a 10 cc syringe filled with IPA and a needle of size 22 Gauge (available for purchase from Interflux).

Insert the needle fully into the valve flux input as shown in Figure 31&32.

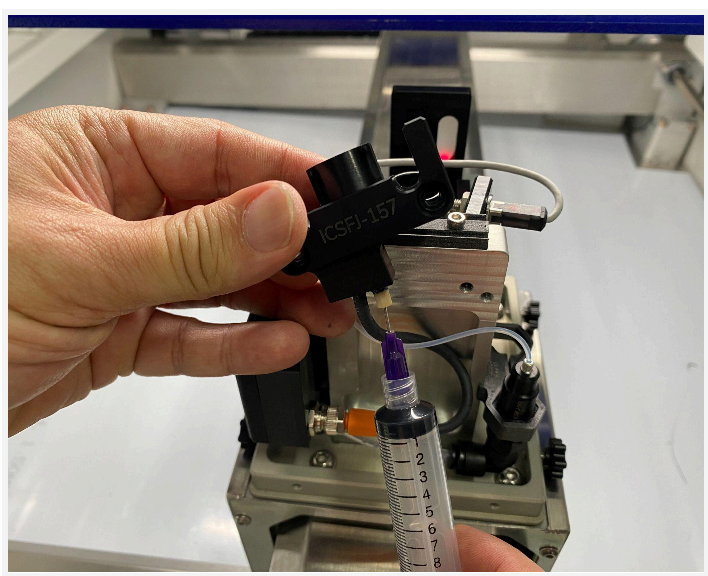


Figure 32.

Press down on the syringe plunger until a steady stream appears as shown below in Figure 33.

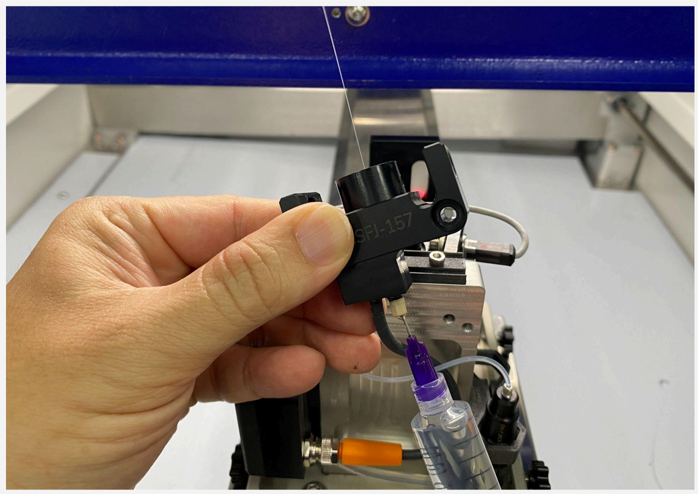


Figure 33.

Once complete, switch the valve to be “Closed” by clicking the icon as shown in Figure 30.

Dry the Valve with a lint free cloth to remove excess cleaning fluid. Allow to dry before reinstalling onto the assembly.

The assembly screws should be carefully tightened to finger-tight only so as not to deform the manifold from excessive pressure.

After any cleaning procedure, carry out a Flux Sensor Calibration. (See 13.9)

Prior to use in regular operations, carry out Valve Priming (See 13.10).

In the event that cleaning does not resolve issues related to the Valve, proceed to the Ultrasonic Method.

13.6.3 For Water Soluble Fluxes (General Maintenance)

Cleaning of the nozzle should be carried out in the manner listed below.

Using an ESD swab as shown (Figure 34), soak the swab in Deionised Water (DI Water) before proceeding to approach the nozzle from above the cover to perform a wipedown of the nozzle face.

Figure 34.

13.6.4 For Water Soluble Fluxes (Syringe Method)

For more persistent debris in the nozzle, perform the following procedure:

For M23 Basic Cover
Remove the cover by releasing the 2 thumb screws from the side and the 2 thumb screws from the base. Carefully slide the cover up and away from the nozzle mount (Refer to Figure 35).

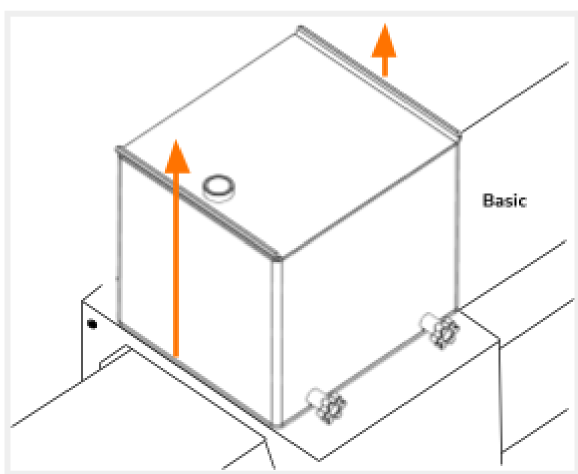


Figure 35.

For M23 Advanced Cover*

Remove the cover by releasing the 4 thumb screws from the side. Carefully slide the cover up and away from the nozzle mount (Refer to Figure 36).

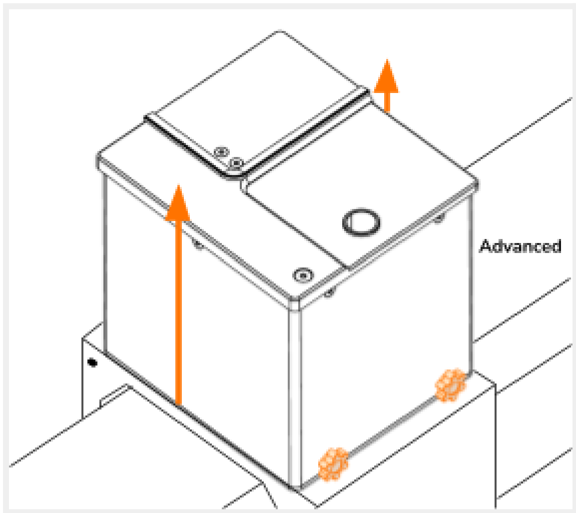


Figure 36.

Grip the glass tube with a tissue of clean lint free cloth. Gently lift upwards and place on a stable surface where it cannot be damaged. (Refer to Figure 37.)

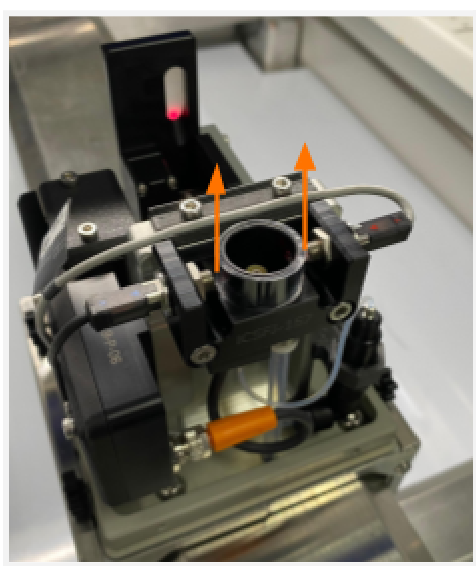


Figure 37.

Unscrew the valve from the assembly as shown below (Refer to Figure 38.) and remove the tubing (Refer to Figure 39.) Keep the valve connected to power.

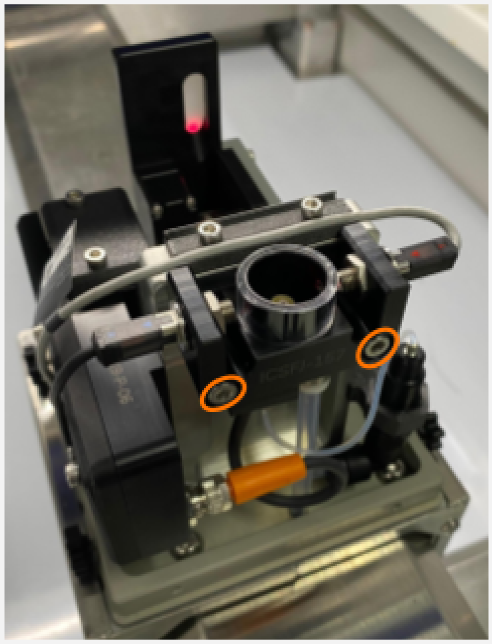


Figure 38.

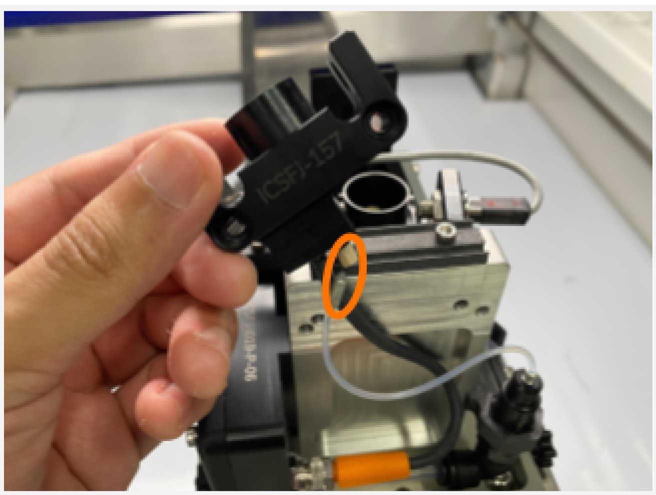


Figure 39.

Switch on the valve to be on “Open”, as shown below in Figure 40.

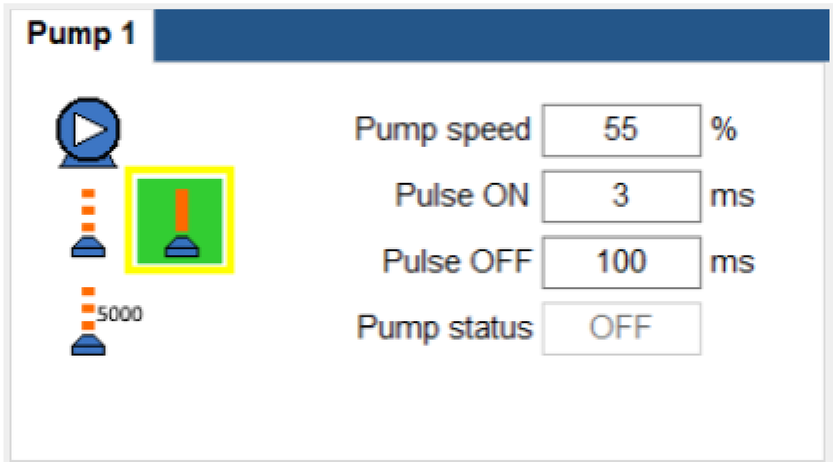


Figure 40.

With a 10 cc syringe filled with Deionised Water and a needle of size 22 Gauge.

Insert the needle fully at the valve flux input as shown in Figure 41&42.

Figure 41.

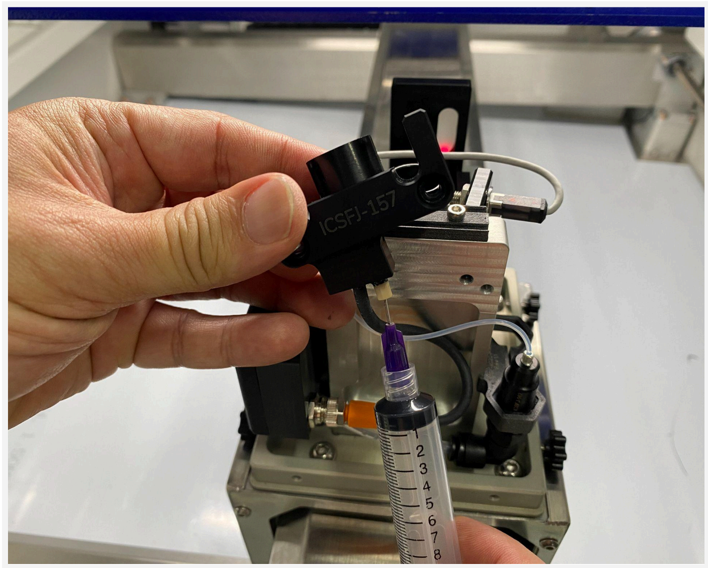


Figure 42.

Press down on the syringe plunger until a steady stream appears as shown below in Figure 43.

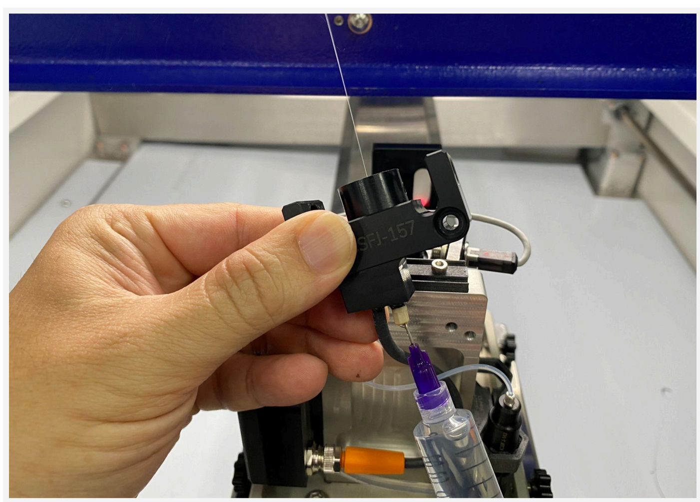


Figure 43.

Once complete, switch the valve to be "Closed" by clicking the icon as shown in Figure 40.

Dry the Valve with a lint free cloth to remove excess cleaning fluid. Allow to dry before reinstalling onto the assembly.

The assembly screws should be carefully tightened to finger-tight only so as not to deform the manifold from excessive pressure.

After any cleaning procedure, carry out a Flux Sensor Calibration. (See 13.9).

Prior to use in regular operations, carry out Valve Priming (See 13.10).

In the event that cleaning does not resolve issues related to the Valve, proceed to the Ultrasonic Method.

13.7 Ultrasonic Cleaning

If Flushing fails to remove the debris for both No-Clean Fluxes and Water-soluble Fluxes, the Valve can be cleaned by way of sonication.

Gently lift the glass tube upwards and place it on a stable surface where it cannot be damaged as shown in Figure 44.

Remove the Valve from the assembly and place in an Ultrasonic Cleaner filled with Isopropyl Alcohol (IPA).

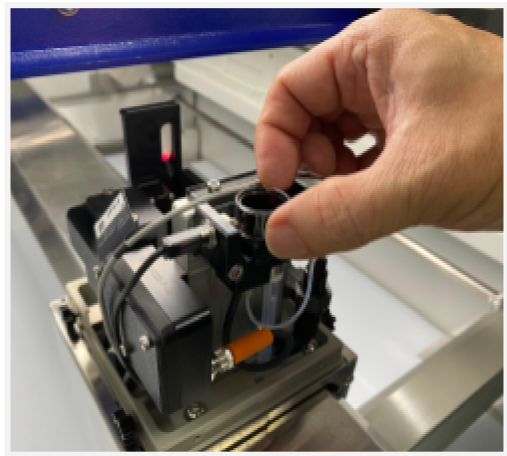


Figure 44.

Let the Valve be sonicated for a minimum of 20 mins at 55°C.

Dry the Valve with a lint free cloth to remove excess cleaning fluid and rinse under hot water. Allow to dry before reinstalling onto the assembly.

The assembly screws should be carefully tightened to finger-tight only so as not to deform the manifold from excessive pressure.

In the event that both syringe cleaning and Ultrasonic Method does not resolve the issues related to the Valve, contact your Interflux representative for more information.

13.8 Cleaning the Flux Laser Sensor Glass Tube

13.8.1 If Removed

The Glass Tube (refer to Figure 45.) can be cleaned while removed from the nozzle by using a readily available Glass Cleaner (refer to Figure 46.)

Figure 45.

Figure 46.

Place the Glass Tube on a Lint Free cloth and spray inside and outside with the Glass Cleaner. Clean the inside surface first while holding the tube outer, then by holding the Glass Tube between the open ends, clean the outer surface with the lint free cloth. Now that this surface is clean make sure not to touch it with your fingers, as oils from your hands will reduce the measurements of the laser sensors.

Once cleaned and refitted perform a Flux Sensor calibration (See 13.9).

13.9 Sensor Calibration

Select the calibration dialog form **Settings → Calibration**. (Refer to Figure 47.)

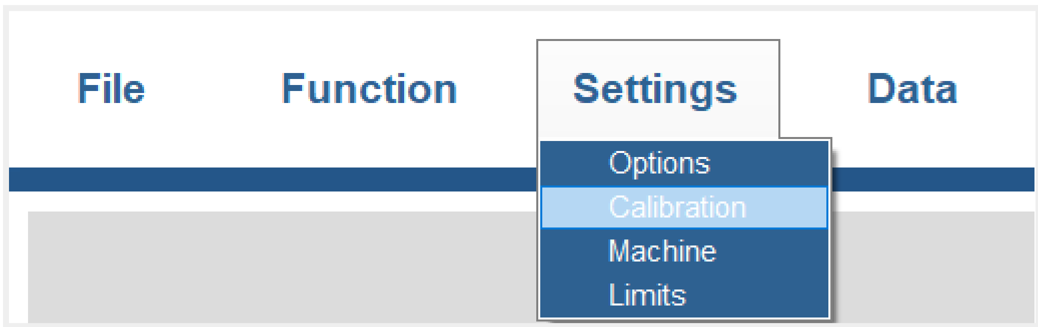


Figure 47.

Select **"Start"** Under Flux Sensor section. (Refer to Figure 48.)

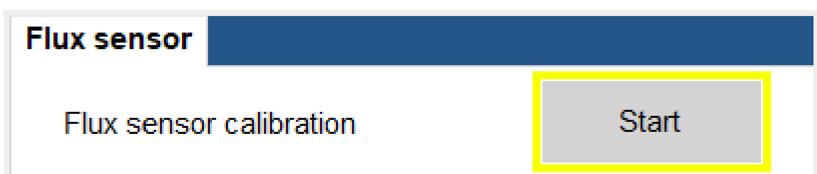


Figure 48.

Follow the on screen prompts.

13.10 Valve Priming

After installation of Valve onto the assembly, prime the valve by the following method:

Select **Function → Move axis to purge position**.

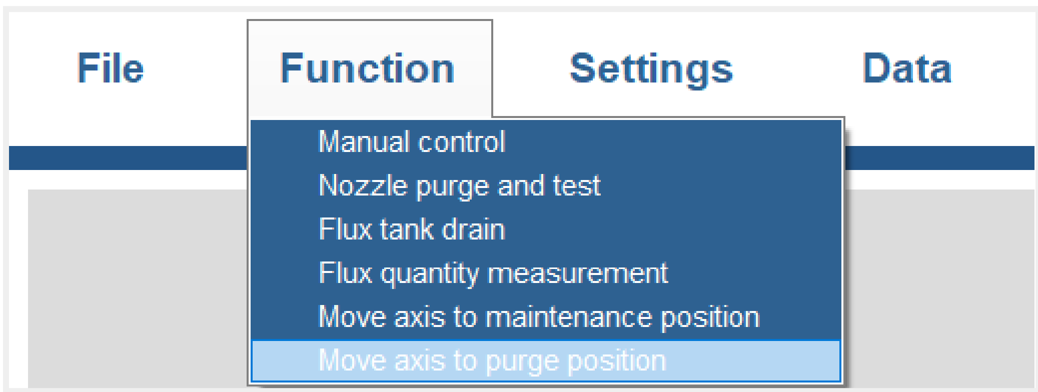


Figure 49.

Select the manual control dialog from **Function → Manual Control**. (Refer to Figure 50.)

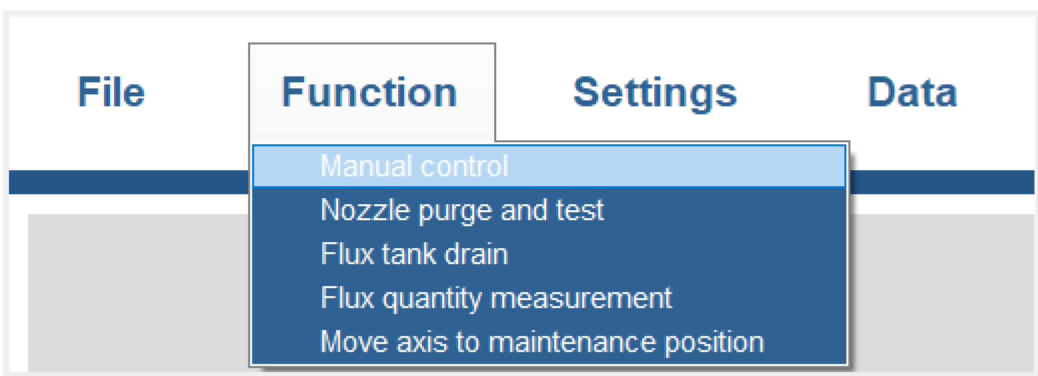


Figure 50.

Turn on the Pump (A) and then Priming Function* (B) (Refer to Figure 51). Valve Priming is complete.

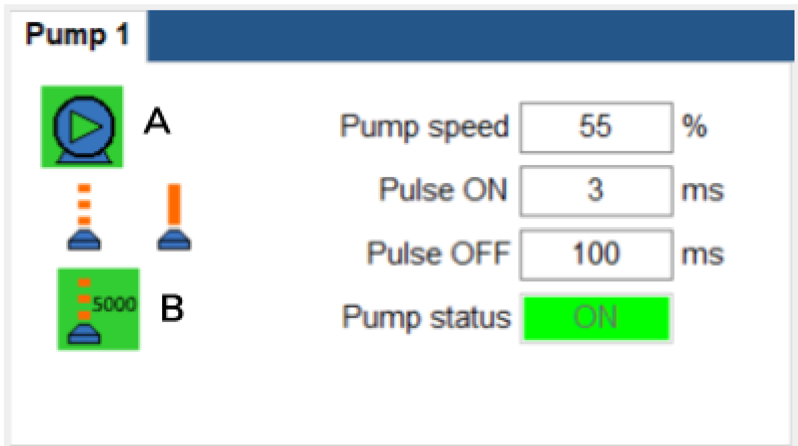


Figure 51.

*Only available in Flux Designer v10.5 onwards. Speak to your Interflux representative to upgrade.

If the feature is unavailable, set the Pump Speed to 50%, Pulse ON to 2ms, Pulse OFF to 2ms. Turn on Pump (A) and Pulse (B), (Refer to Figure 52). Repeat the sequence 5 times to complete Valve Priming.

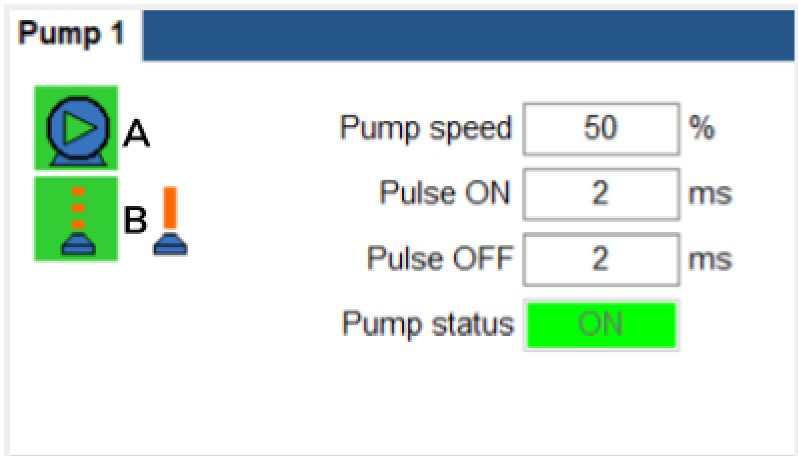


Figure 52.

13.11 Cleaning the Purge and measurement container

- Purging unit drains directly back into the tank.
- Unit is mounted to the front of the conveyor.
- Remove the container from its holder and empty any residual fluid into an appropriate waste liquids container.
- Wipe out the interior of the measuring container before returning to the holder.

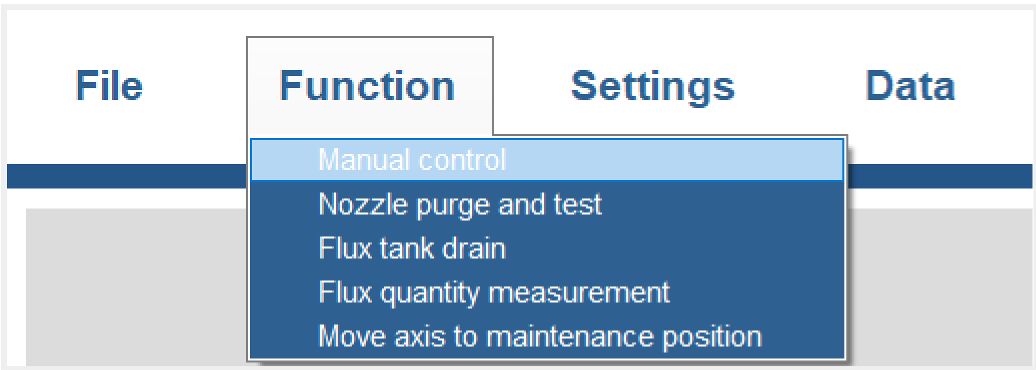
13.12 Drain the Flux Tank

Refer to Chapter 8.2.1

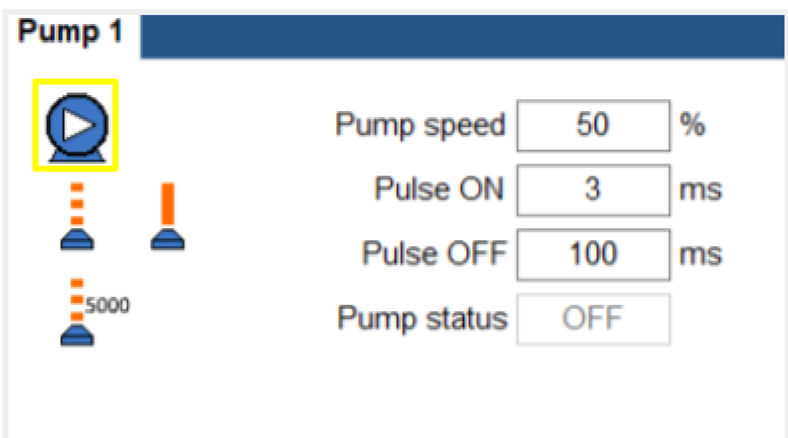
13.13 Loading up the flux tank

Pour in the Flux to a level that is required, which is higher than the filter and the level sensor.

Select the manual control dialog from Function → Manual Control

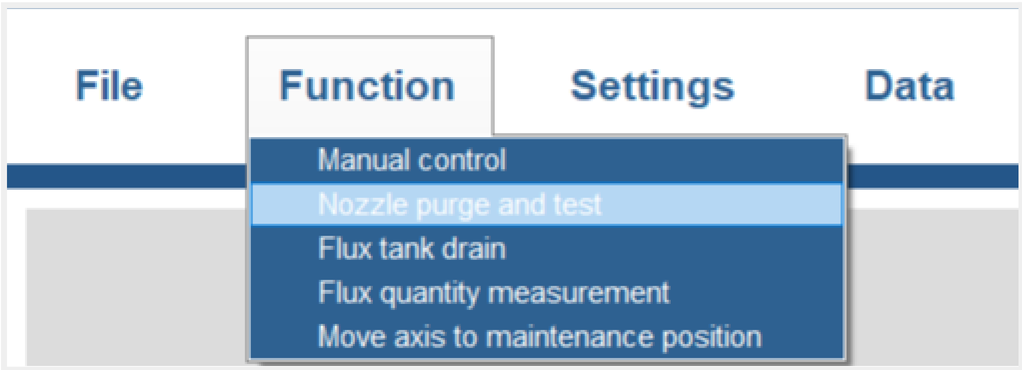


Start the pump by clicking the flux pump manual control button.



Wait until all air bubbles are removed from the Flux pump recirculation line.

Start a purging cycle by going to **Function → Nozzle Purge and Test**



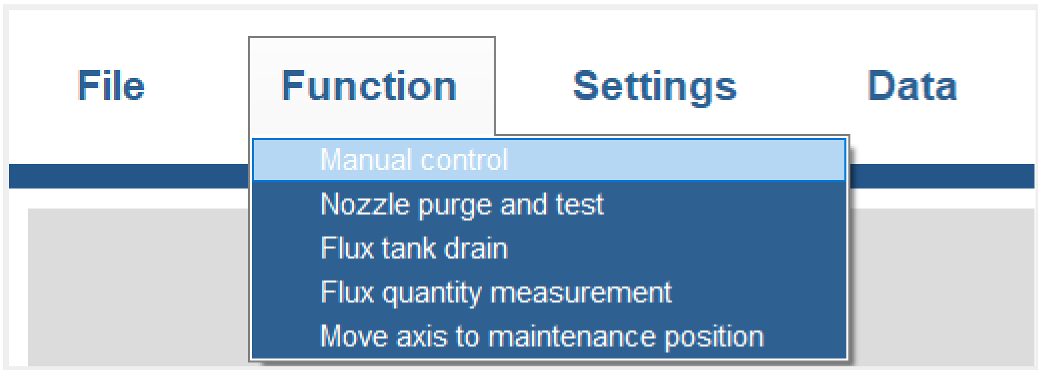
System will perform automatic purging of the nozzle.

NOTE: 2-3 purge cycles might be necessary if the lines were fully empty after a drain cycle

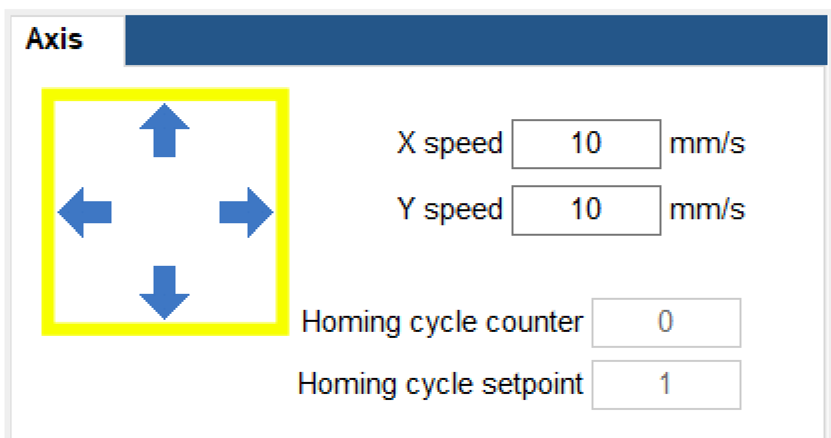
NOTE: If ICSF-Select6 (M23) was not calibrated properly such that the purging unit orifice is not aligned correctly to the nozzle. This will result in the nozzle jet missing the purging unit orifice. In the event this situation happens, take note of the following steps.

1. Press the stop button while the nozzle is in the middle of the purging sequence.

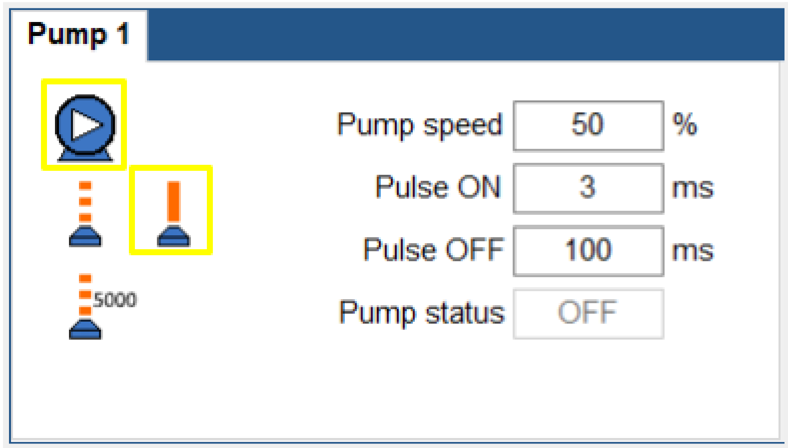
2. Select the manual control dialog from **Function → Manual Control**



3. Use the **Manual Axis Control Buttons** to re-align the nozzle to the purging unit orifice at the set-speed.



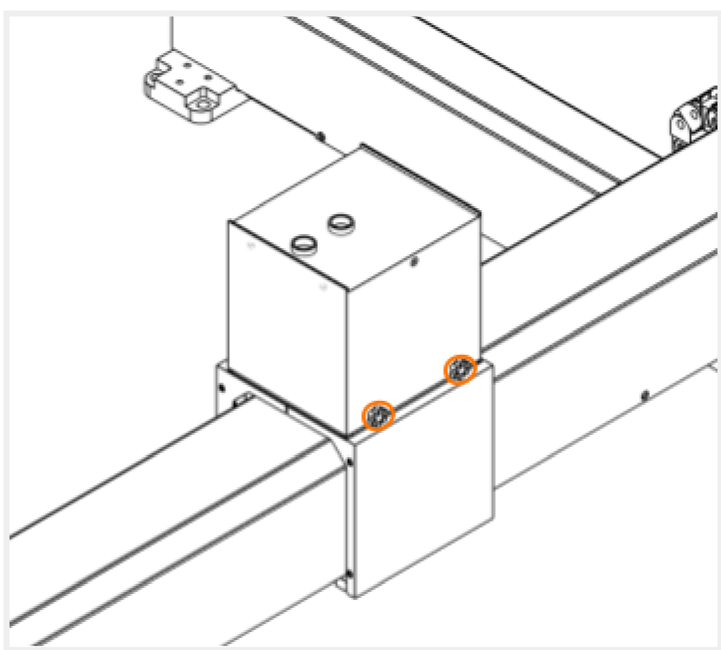
4. Turn on the pump and open the valve to clear any remaining bubbles. Close the valve again when the stream appears straight and stable. Turn off the pump.



5. After purging is complete, proceed with position calibration. Refer to Chapter 12.

13.14 Replacing the valve

For valve replacement, unscrew thumbscrews from the assembly cover, lift the cover and set aside.



Remove the glass tube above the valve and set aside on a soft and stable surface.
Remove the nuts holding the laser sensors in place, remove the laser sensor from the hole.
Disconnect the orange power connector from the valve.

Unscrew the valve from the assembly stand before disconnecting the flux tube connector from the valve.

Take a new valve, ensure the connector cable is positioned on the left side. Connect the flux tube connector to the valve. Screw the valve to the assembly stand.

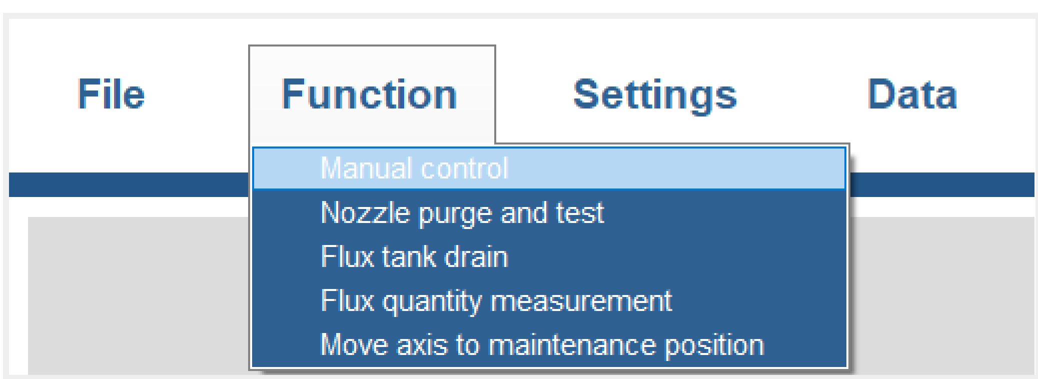
Connect the connector cable to the mating socket. Insert the laser sensors into the holes on the sides of the valve. Orient the laser sensor such that the red light faces upwards. Use the nuts to hold the laser sensors in place. Ensure the flat side of the nut is against the valve mount wall. Turn the nuts till hand-tight and avoid touching the laser.

Replace the glass tube.

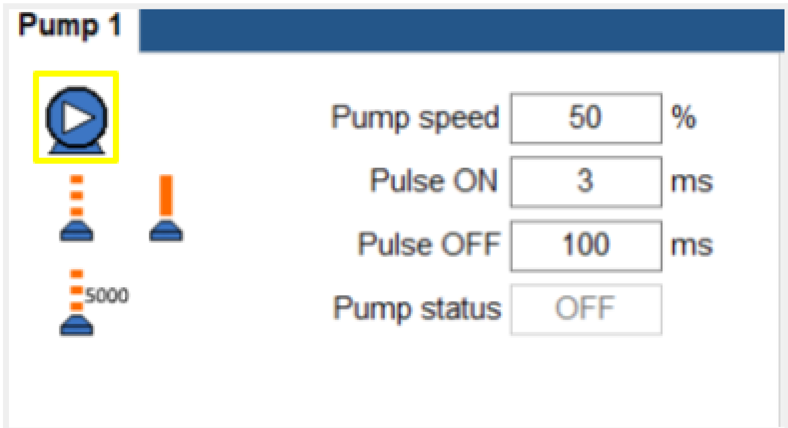
Replace the assembly cover. Screw thumbscrews hand-tight to hold the assembly cover in place.

13.15 Setting the Flux Pressure

To set the pressure, first start the pump by going to **Function → Manual Control**



Click on the Pump Icon



Loosen the lock nut (highlighted in orange) on the Regulator (See Figure 53.)

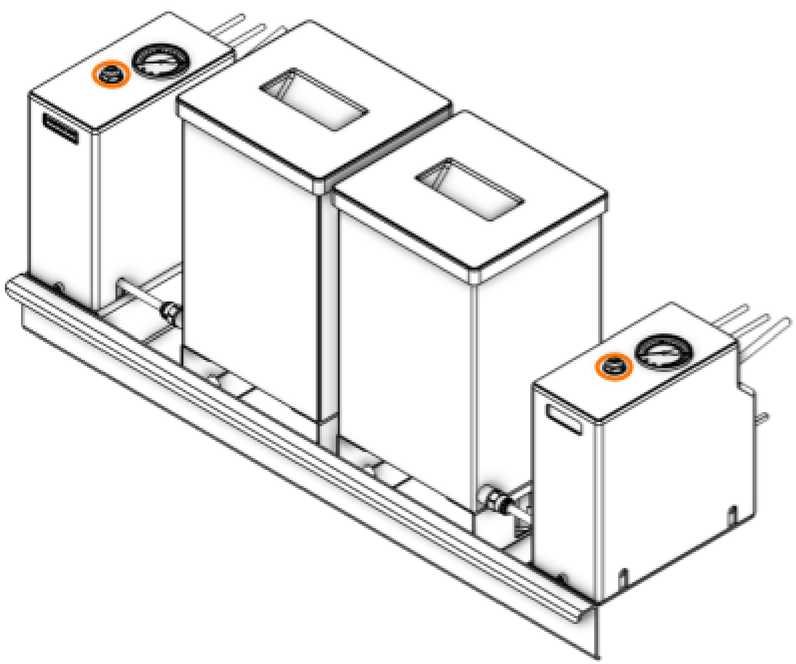


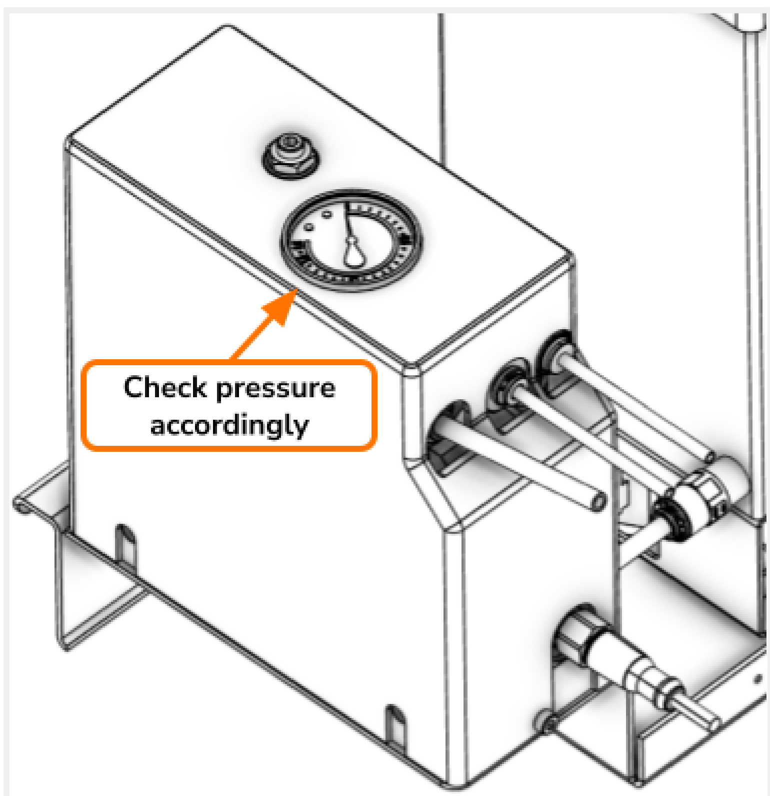
Figure 53.

Using a suitable Allen Key, slowly rotate the screw to increase or decrease the pressure. Clockwise to increase.

Counterclockwise to decrease.

Watch carefully as the screw is rotated, that the pressure gauge shows the desired pressure is reached as per recommended settings for each valve type below:

High Speed Valve - Precision (HSV-P): 1 to 1.2 Bar
High Speed Valve - Volume (HSV-V): 1.2 to 1.5 Bar



13.16 Setting Valve Open/Close Time

Changes in the Valve Open/Close Time affects the flux volume jetted.

It is recommended to adjust Valve Open/Close time according to type of valve available as listed below:

High Speed Valve - Precision (HSV-P):
Flux Valve Open: 0.4 to 20ms
Flux Valve Closed: 2 to 200ms

High Speed Valve - Volume (HSV-V):
Flux Valve Open: 1.5 to 20ms
Flux Valve Close: 2 to 200ms

SECTION 14 : Maintaining the mechanical components

14.1 Axis System

14.1.1 Overview

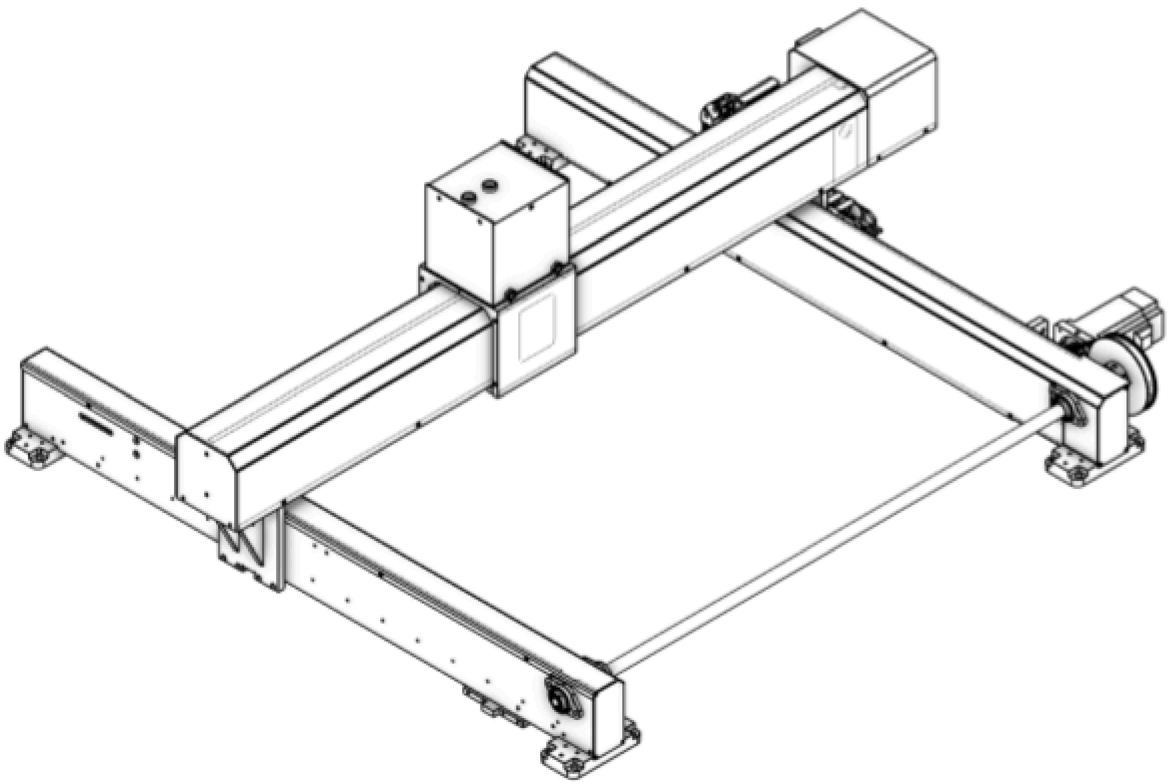


Figure 54.

14.1.2 X-axis Motor to Transfer Shaft timing belt tensioning

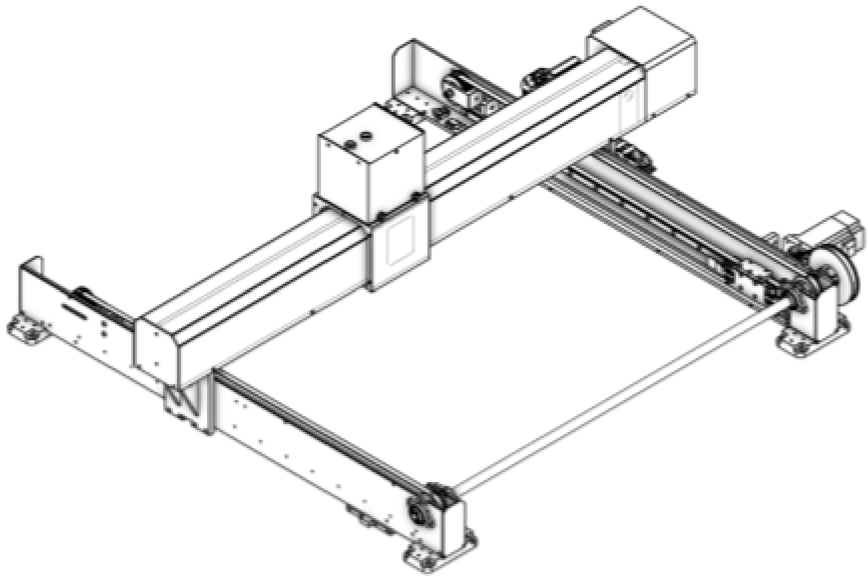


Figure 55.

Visually check the motor timing belt. If necessary, perform the following steps to tension the belt.

Using a 4mm Allen Key, loosen and release the 4 bolts of the motor bracket (as shown in Figure 56.)

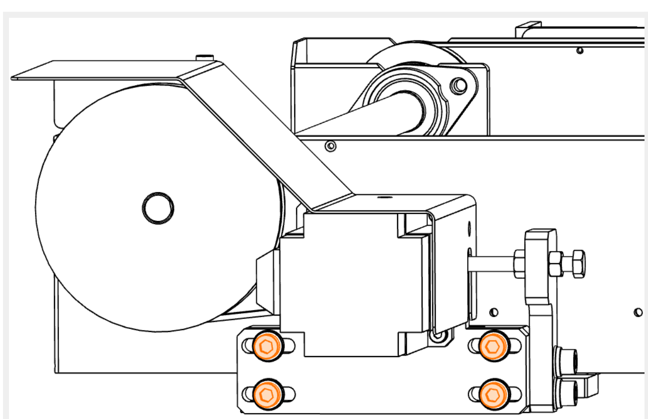


Figure 56.

Loosen the locking nuts (as shown in Figure 57.) of the tensioning bolt using a 10mm Open End Spanner.

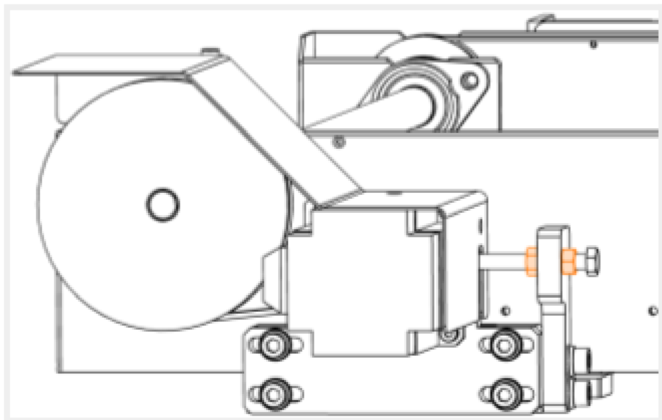


Figure 57.

Using a 4mm Allen Key. Increase the belt tension by turning Bolt A in the Clockwise direction (as shown in Figure 58.)

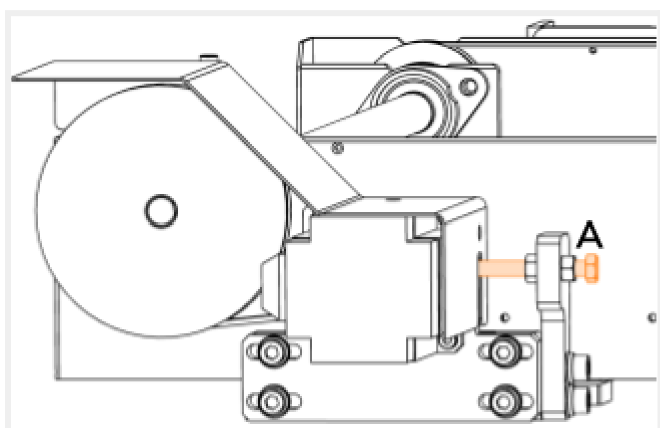


Figure 58.

Belt tension should be carried out to achieve a suitable measurement as per below Figure 59. Alternatively, if using a belt frequency tuner, the tension should be adjusted such that the frequency is in the range of 340-360 Hz.

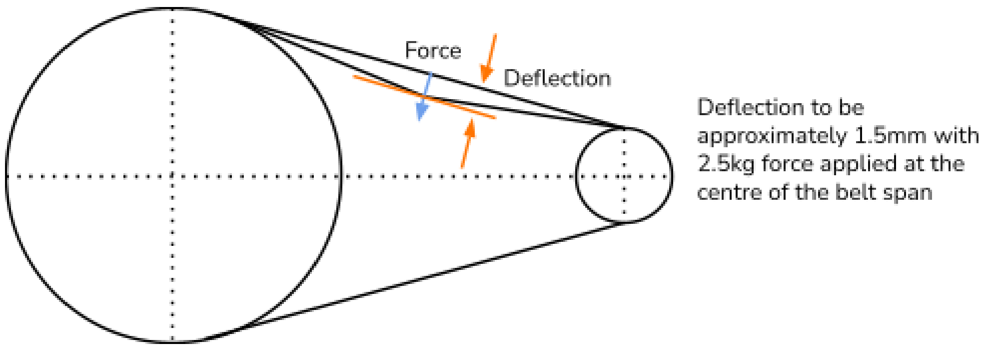


Figure 59.

Tighten the 4 bolts of the motor bracket (as shown in Figure 60.) and tighten the locking nut of the tensioning bolt.

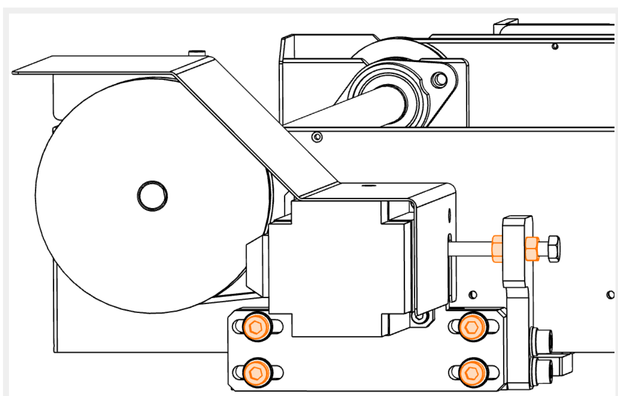


Figure 60.

14.1.3 X-axis Main Linear timing belt tensioning

Visually inspect the left and right main timing belt, if necessary perform the following instructions to tension the belt.

Undo the locking nut on the side to tension.

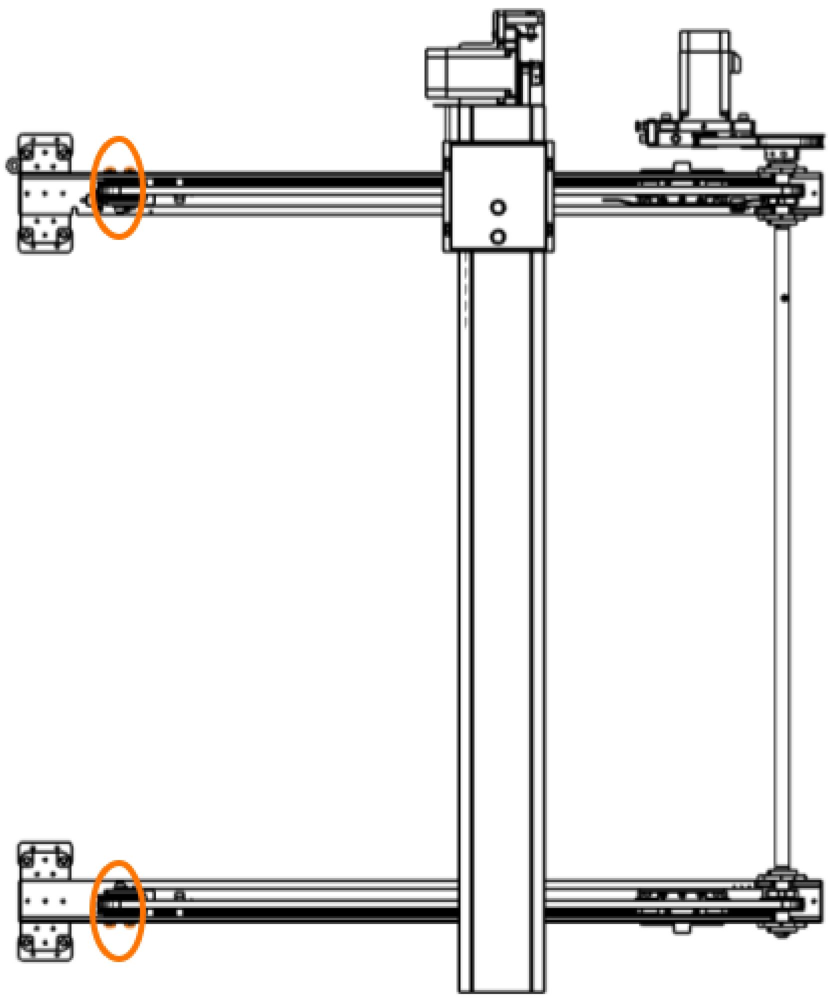


Figure 61.

Use the tensioning bolt/nut (as shown in Figure 62.) to tension the belt.

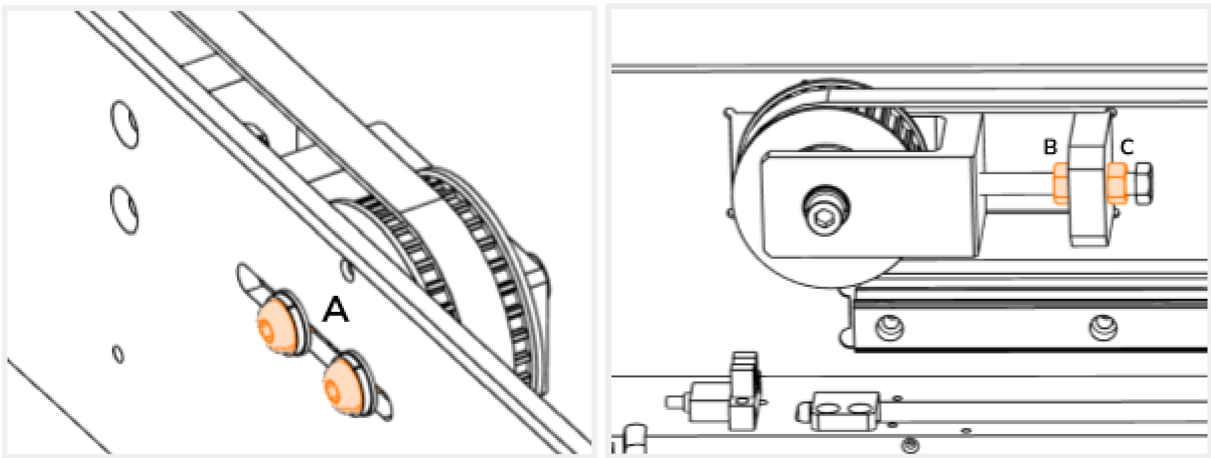


Figure 62 & 63.

To tighten the belt:

1. Loosen the two socket screws (A) on the rear of the pulley mount.
2. Loosen nut C by a few turns
3. Turn nut B in a Clockwise direction until the desired tension has been reached.
4. Retighten the nut C to be secure.
5. Retighten the two socket screws (A) on the rear of the pulley mount.

Belt tension should be carried out to achieve a suitable measurement as per below example. Alternatively, if using a belt frequency tuner, the tension should be adjusted such that the frequency is in the range between 30-40 Hz.

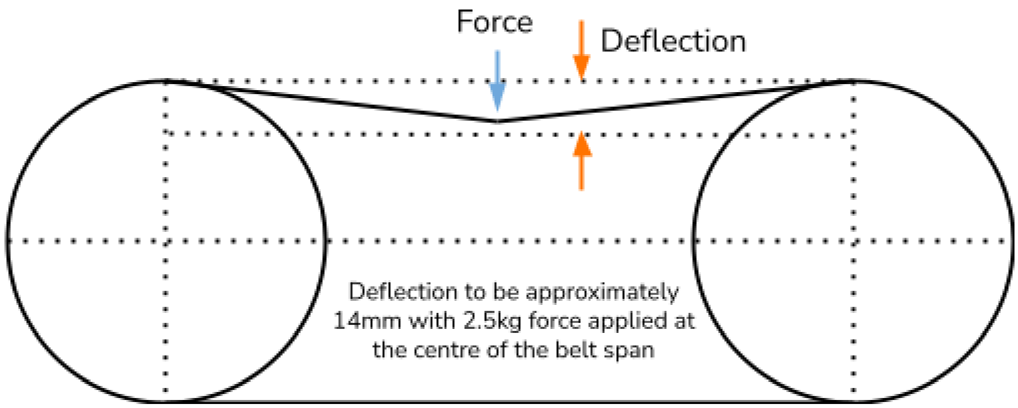


Figure 64.

14.1.4 Y-axis timing belt tensioning

Move the nozzle head to the rear of the gantry before removing the Y-axis Gantry cover and the Rear Motor Covers.

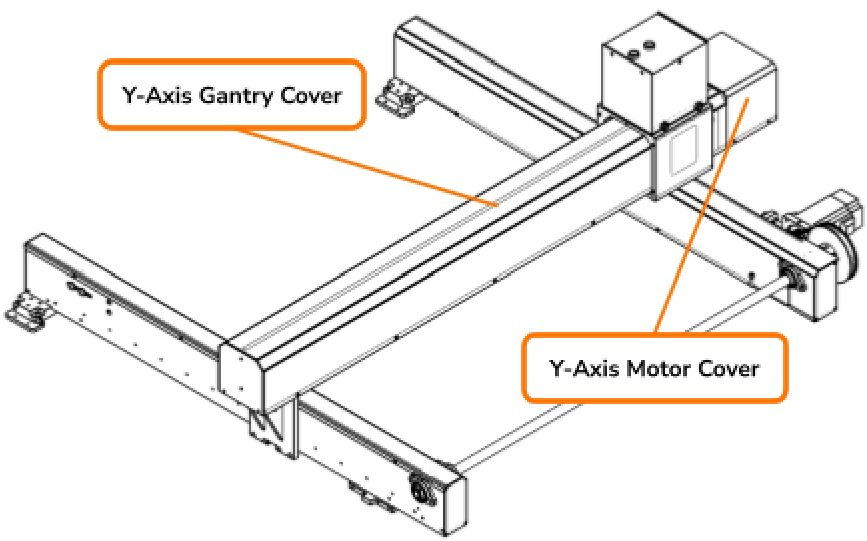


Figure 65.

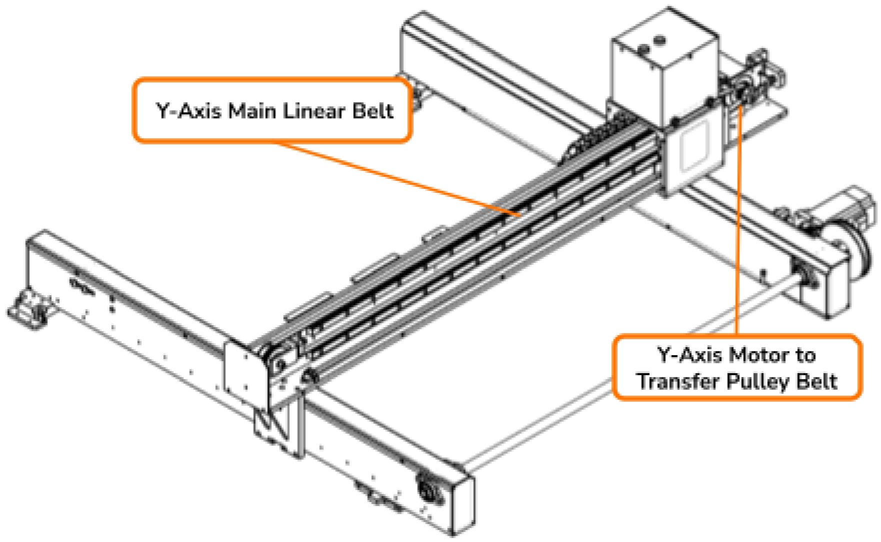


Figure 66.

14.1.5 Y-axis Motor to Transfer Pulley timing belt tensioning

Visually inspect the motor timing belt. If necessary, perform the following instructions to tension the belt.

Using a 4mm Allen Key, release the four bolts of the motor bracket (as shown in Figure 67.)

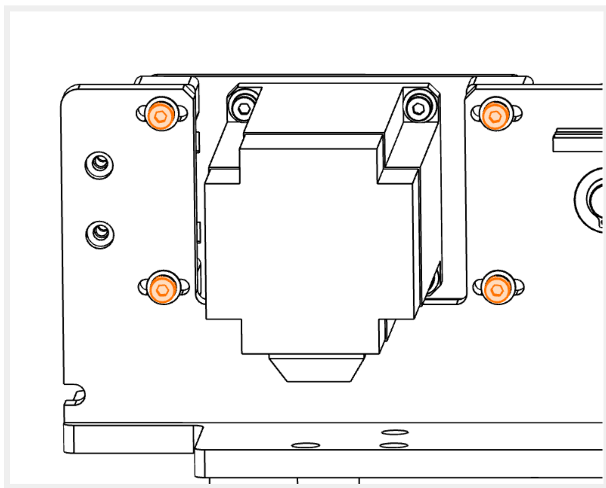


Figure 67.

Loosen the lock nut of the tensioning bolt. Rotate the bolt in a Clockwise direction to tighten the belt (as shown in Figure 68.)

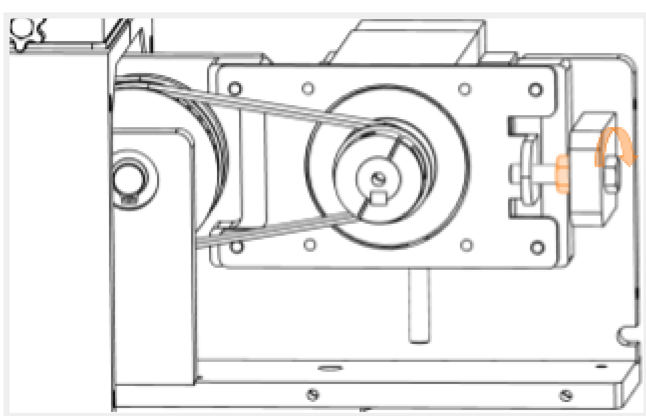


Figure 68.

Belt tension should be carried out to achieve a suitable measurement as per below example. Alternatively, if using a belt frequency tuner, the tension should be adjusted such that the frequency is in the range between 350-370 Hz.

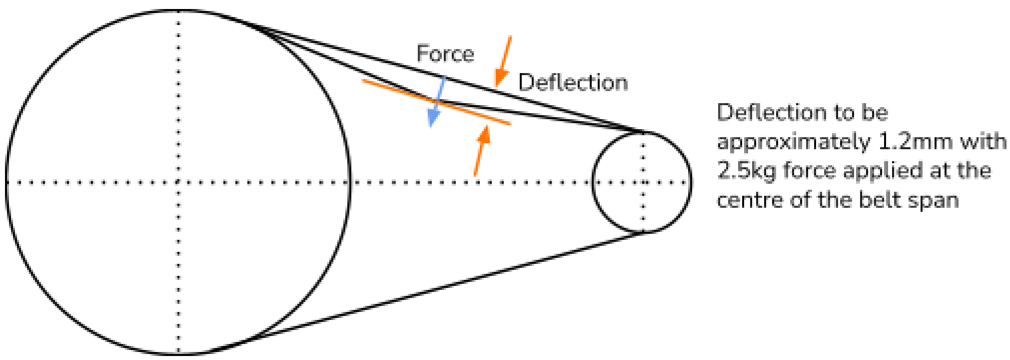


Figure 69.

Once the correct tension has been achieved, retighten the adjuster lock nut and then the four motor bracket screws (as shown in Figure 70 & 71.)

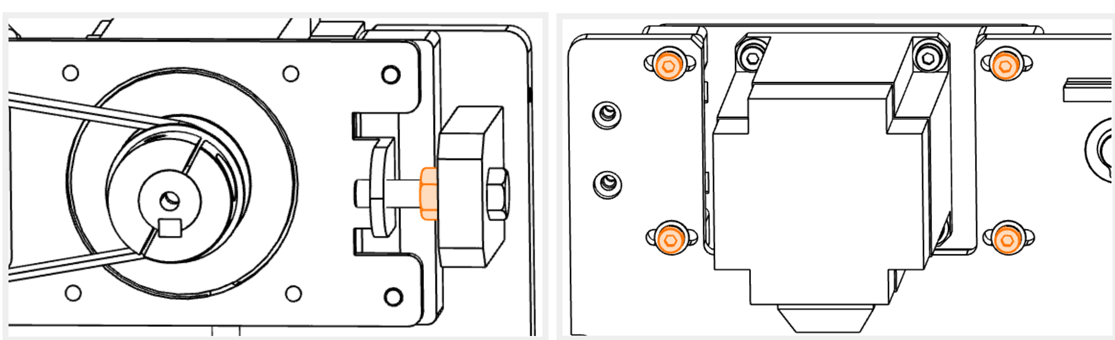


Figure 70 & 71.

14.1.6 Y-axis Main Linear timing belt tensioning

Visually inspect the main timing belt. If necessary, perform the following steps to tension the belt.

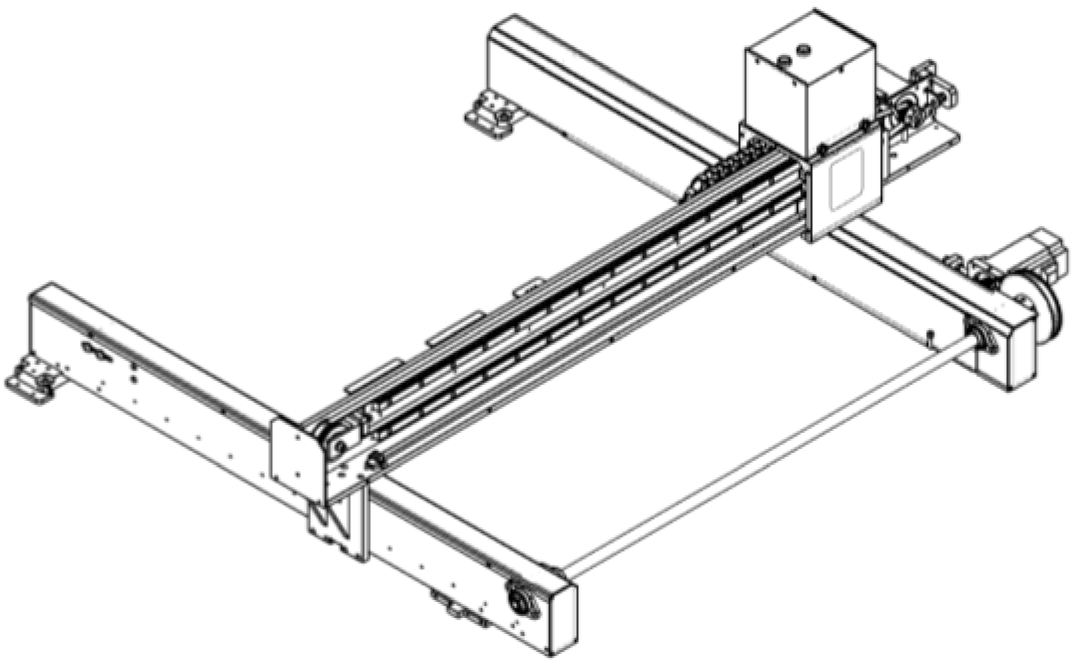


Figure 72.

To tighten the belt:

1. Loosen the two socket screws (A) on the rear of the pulley mount.
2. Loosen nut C by a few turns.
3. Turn nut B in a Clockwise direction until the desired tension has been reached.
4. Retighten the nut C to be secure.
5. Retighten the two socket screws (A) on the rear of the pulley mount.

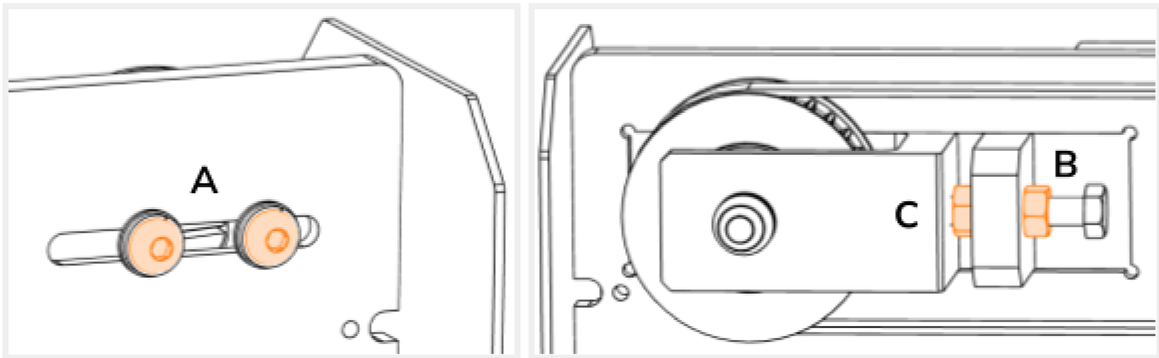


Figure 73 & 74.

Belt tension should be carried out to achieve a suitable measurement as per below Figure 75. Alternatively, if using a belt frequency tuner, the tension should be adjusted such that the frequency is in the range between 20-30 Hz.

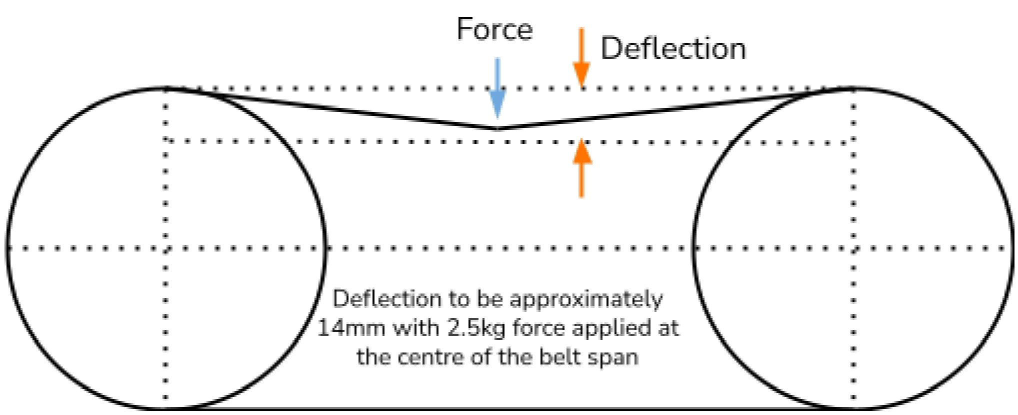


Figure 75.

Replace all the covers after tensioning is complete.

14.1.7 X,Y axis runner block greasing

Following tools are needed:

- Grease pump with circular adapter

Following grease is recommended for use:

- CASTROL LM grease

Locate the axis runner blocks (as shown in Figure 76.) and attach the Grease Pump Adapter to the Lubrication nipple on the Bearing Block. Pump the Grease into the Bearing Block until Grease begins to appear around the seal on the rail.

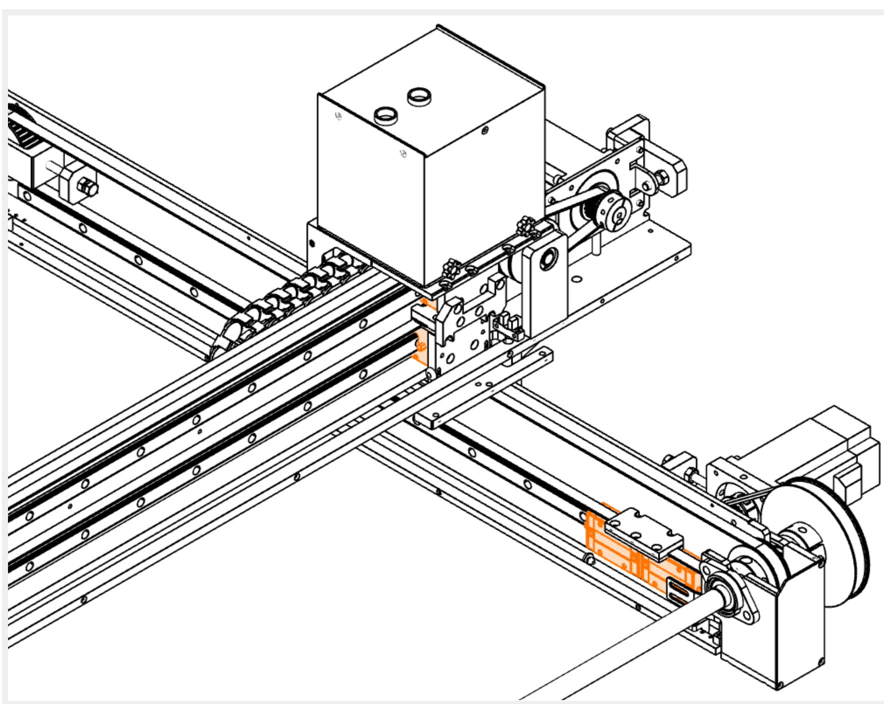


Figure 76.

14.2 Conveyor system

14.2.1 Overview

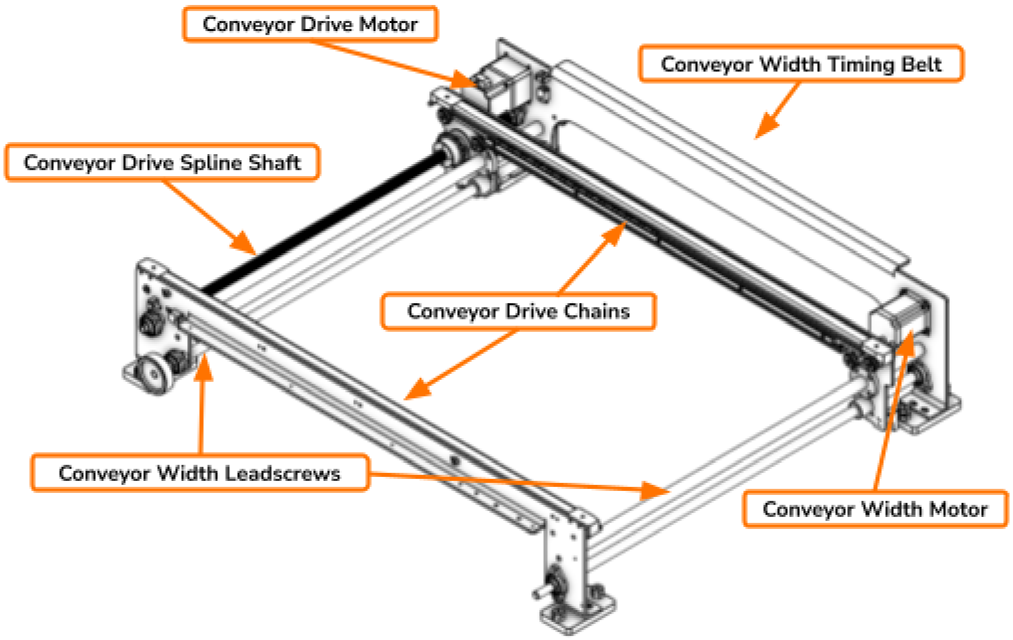


Figure 77.

14.2.2 Conveyor drive chaining tensioning

Visually inspect the conveyor chains. If necessary, perform the following instructions to tension the belt.

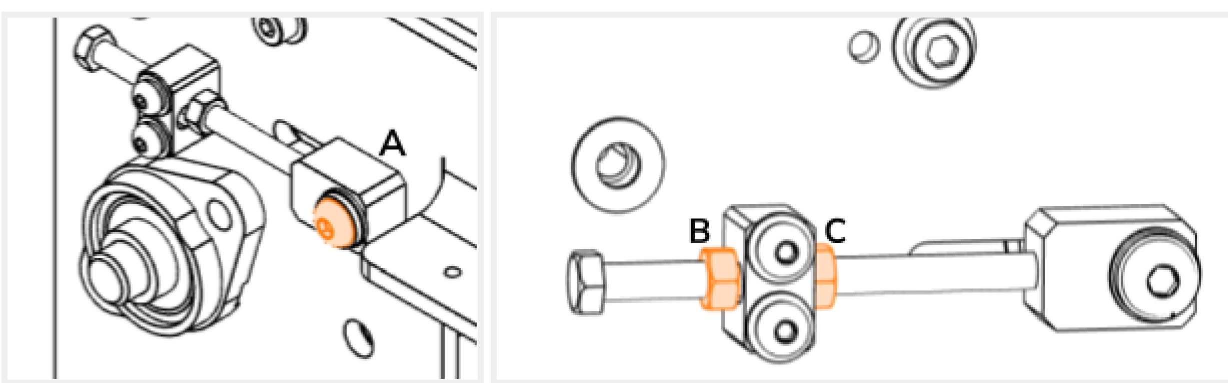


Figure 78 & 79.

To tighten the chain:

6. Loosen the socket screws (A) on the rear of the pulley mount.
7. Loosen nut C by a few turns.
8. Turn nut B in a Clockwise direction until the desired tension has been reached.
9. Retighten nut C to be secure.
10. Retighten the socket screws (A) on the rear of the pulley mount.

14.2.3 Conveyor drive motor timing belt tensioning

Visually inspect the motor timing belt. If necessary, perform the following instructions to tension the belt.
Loosen the bolts of the conveyor drive motor (as shown in Figure 80.)

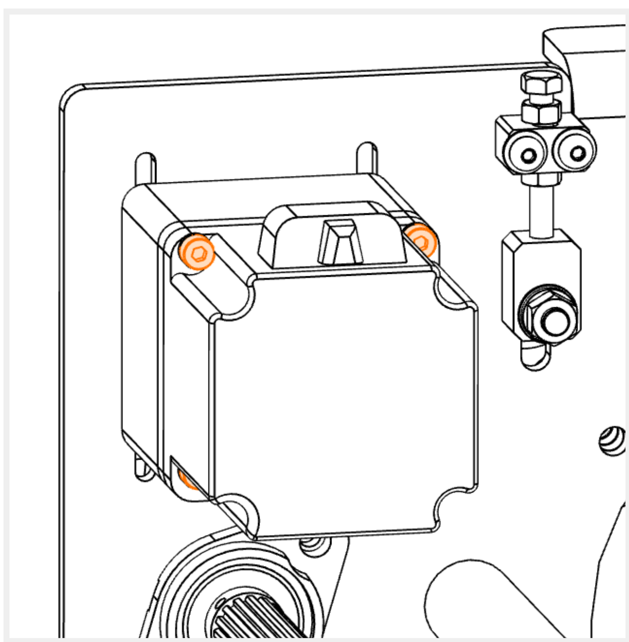


Figure 80.

Lift up the motor to tension the belt (as shown in Figure 81.) Additional personnel may be required to appropriately increase the tension.

Belt tension should be carried out to achieve a suitable measurement as per below example. Alternatively, if using a belt frequency tuner, the tension should be adjusted such that the frequency is in the range between 320-340 Hz.

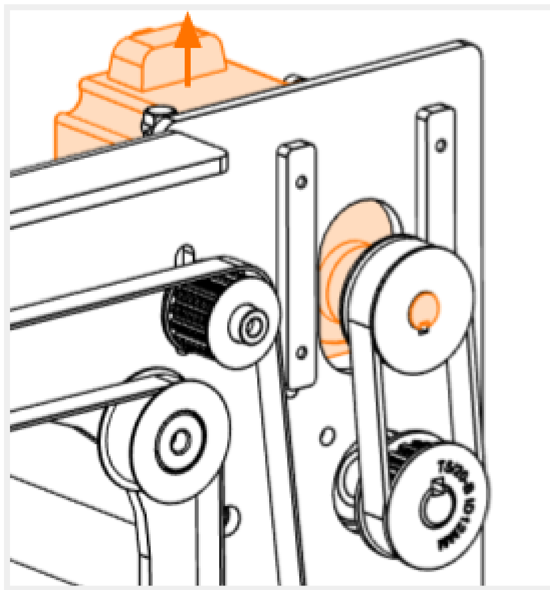


Figure 81.

Retighten the conveyor drive motor bolts again.

14.2.4 Conveyor width timing belt tensioning

Visually inspect the motor timing belt. If necessary, perform the following instructions to tension the belt.

Release the nut of the tensioning pulley (as shown in Figure 82.)

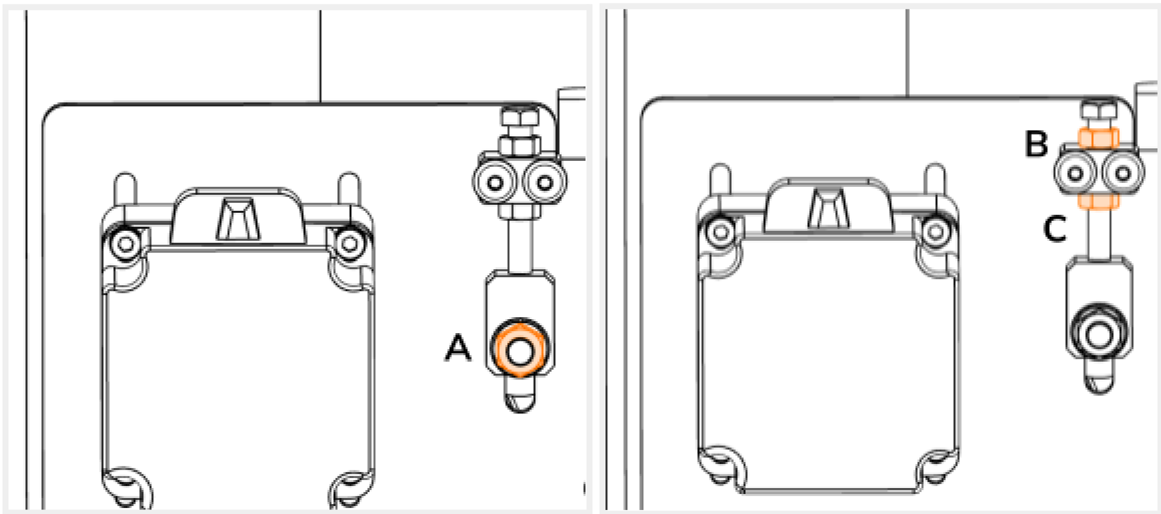


Figure 82.

To tighten the pulley (as shown in Figure 83):

11. Loosen the socket screws (A) on the rear of the pulley mount.
12. Loosen nut C by a few turns.
13. Turn nut B in a Clockwise direction until the desired tension has been reached.
14. Retighten nut C to be secure.
15. Retighten the socket screws (A) on the rear of the pulley mount.

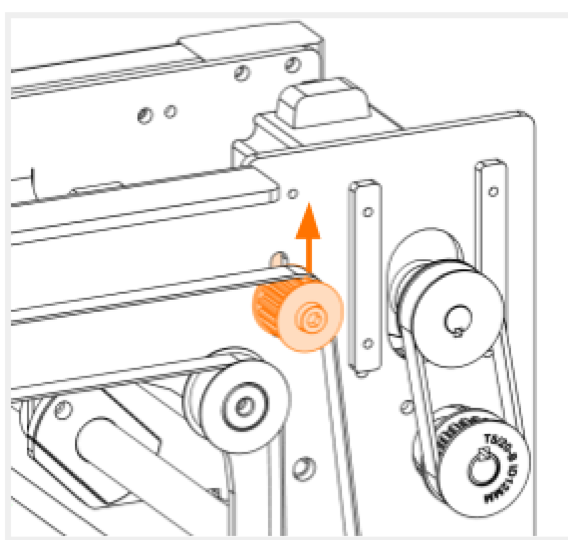


Figure 83.

Belt tension should be carried out to achieve a suitable measurement as per below example. Alternatively, if using a belt frequency tuner, the tension should be adjusted such that the frequency is in the range between 250-270 Hz.

14.2.5 Conveyor drive spline, conveyor width leadscrew and runner blocks greasing

Following tools will be used:
- Brush (Acid Brush is Recommended)

- Grease Pump with circular adapter

Following grease is recommended for use:
- CASTROL LM grease

Use the brush to apply grease over the entire length of the following items:
- Conveyor drive spline shaft
- Conveyor width left leadscrew
- Conveyor drive right leadscrew

Use the grease pump to apply a correct amount of grease to the following items:
- Conveyor width left runner block
- Conveyor width right runner block

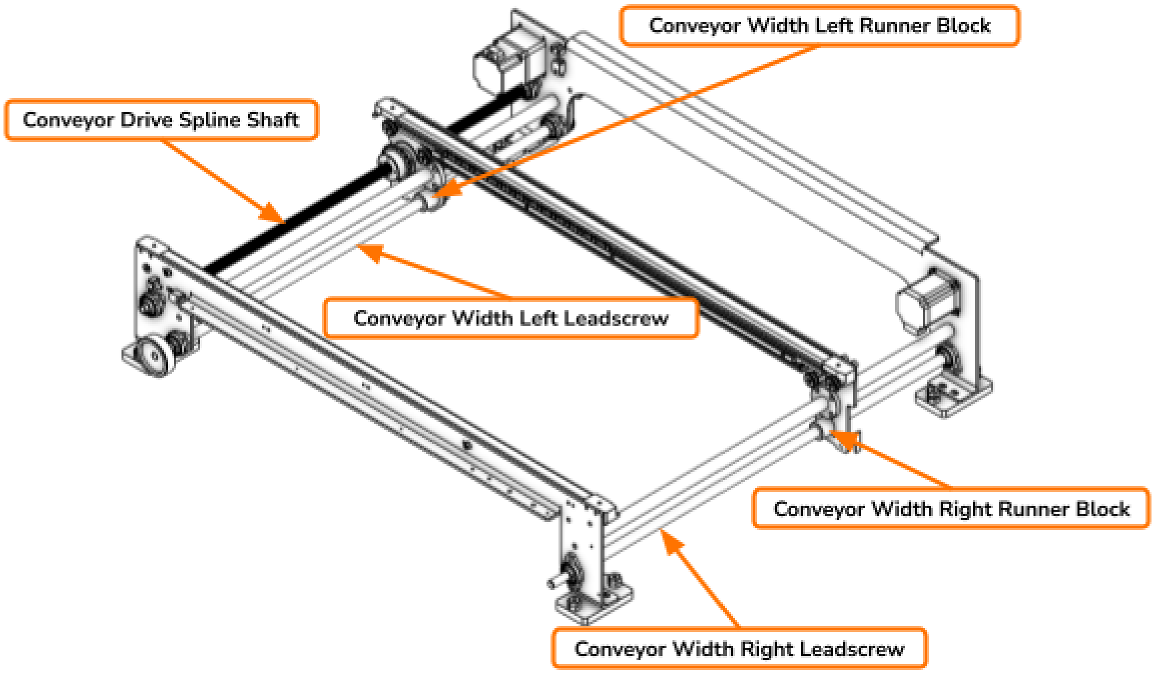

Conveyor Width Left Runner Block
Conveyor Drive Spline Shaft
Conveyor Width Left Leadscrew
Conveyor Width Right Runner Block
Conveyor Width Right Leadscrew

Figure 84.

14.3 Disposal of Parts and Materials, Environment

Ensure safe and environmentally-responsible disposal of operating materials and auxiliary materials, as well as replaced parts.

Flux wastes are hazardous waste and they may not be disposed of as household trash.

If the machine is to be scrapped, its parts must be disposed of differently.
The ICSF-Select6 (M23) is composed of the following materials:

- The covers, gears, shafts, bearings, tanks, are made of steel.
- The belts are made of rubber.
- The nozzle, tubes and purging units are made of plastic.

SECTION 15 : Troubleshooting

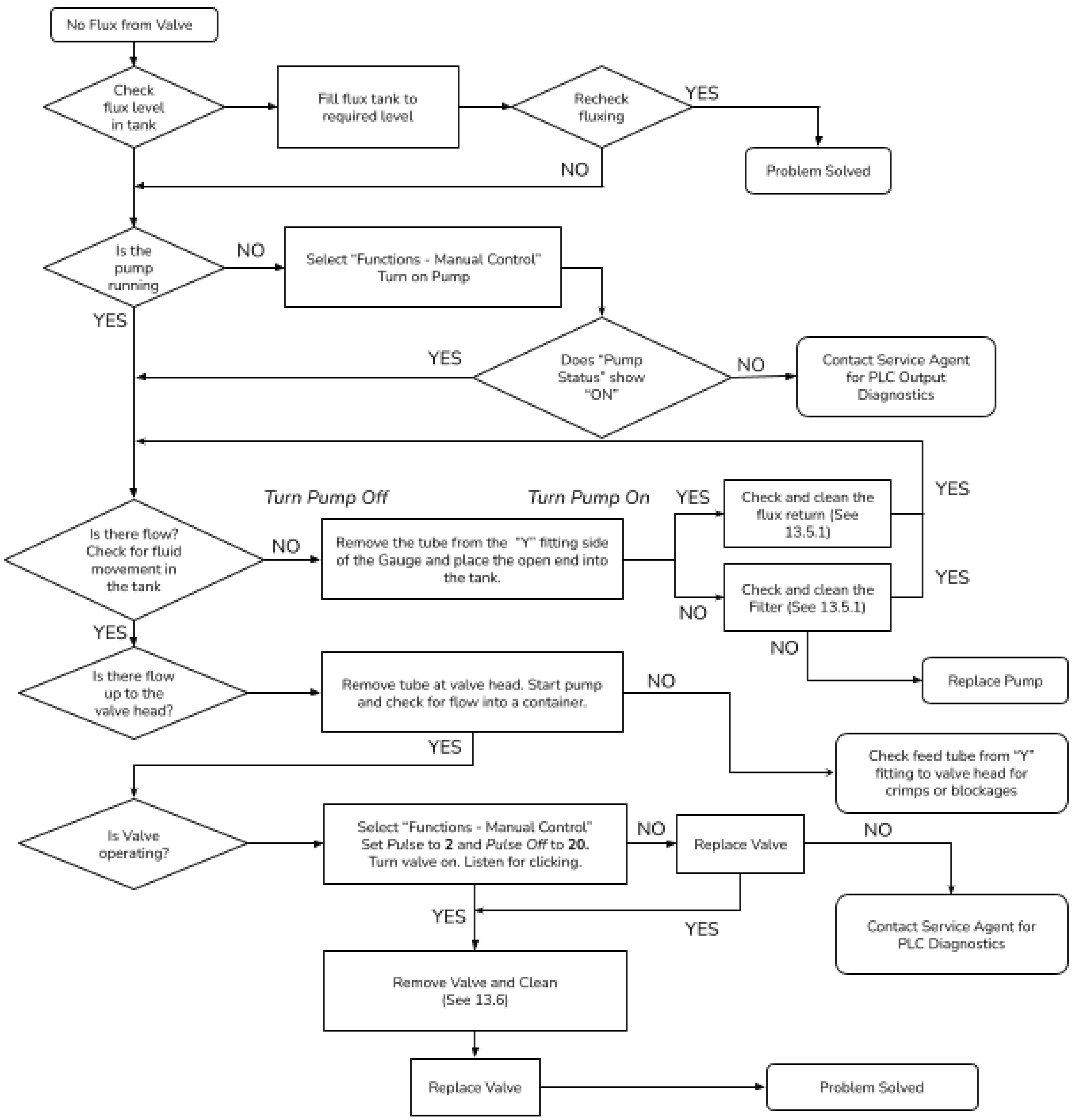
15.1 Basic Troubleshooting Fault Table

Problem	Area	Solution
If flux result decreases	Nozzle body	Perform "Nozzle and Test" Refer to Chapter 8.2.2
If pump performance decreases	Flux tank	Clean out the filter, refer to Chapter 13.5 If no improvement still, replace the pump
If flux valve performance decreases	Nozzle body	Carry out tests for "Flux result decreases" (see above) Replace the Flux Valve
If flux sensor errors occur	Nozzle body	Flush the nozzle glass with IPA Open up the nozzle cover and clean the Glass Tube with ESD swab drenched in IPA Carry out a Flux Sensor Calibration once cleaned ***Be careful not to touch the outer surface with bare fingers as body oils will impair the sensor signal. If not resolved it is possible to switch off the flux sensor in the software and resume production. In this case, please contact an Interflux representative.***
No flux jetting	Nozzle body	Check flux level in tank Check pump is running See below flow chart for diagnosing
Flux coming out when valve is off	Nozzle body	See below flow chart for diagnosing
Position of flux application not consistent		See below flow chart for diagnosing
Conveyor not running when board enters		See below flow chart for diagnosing

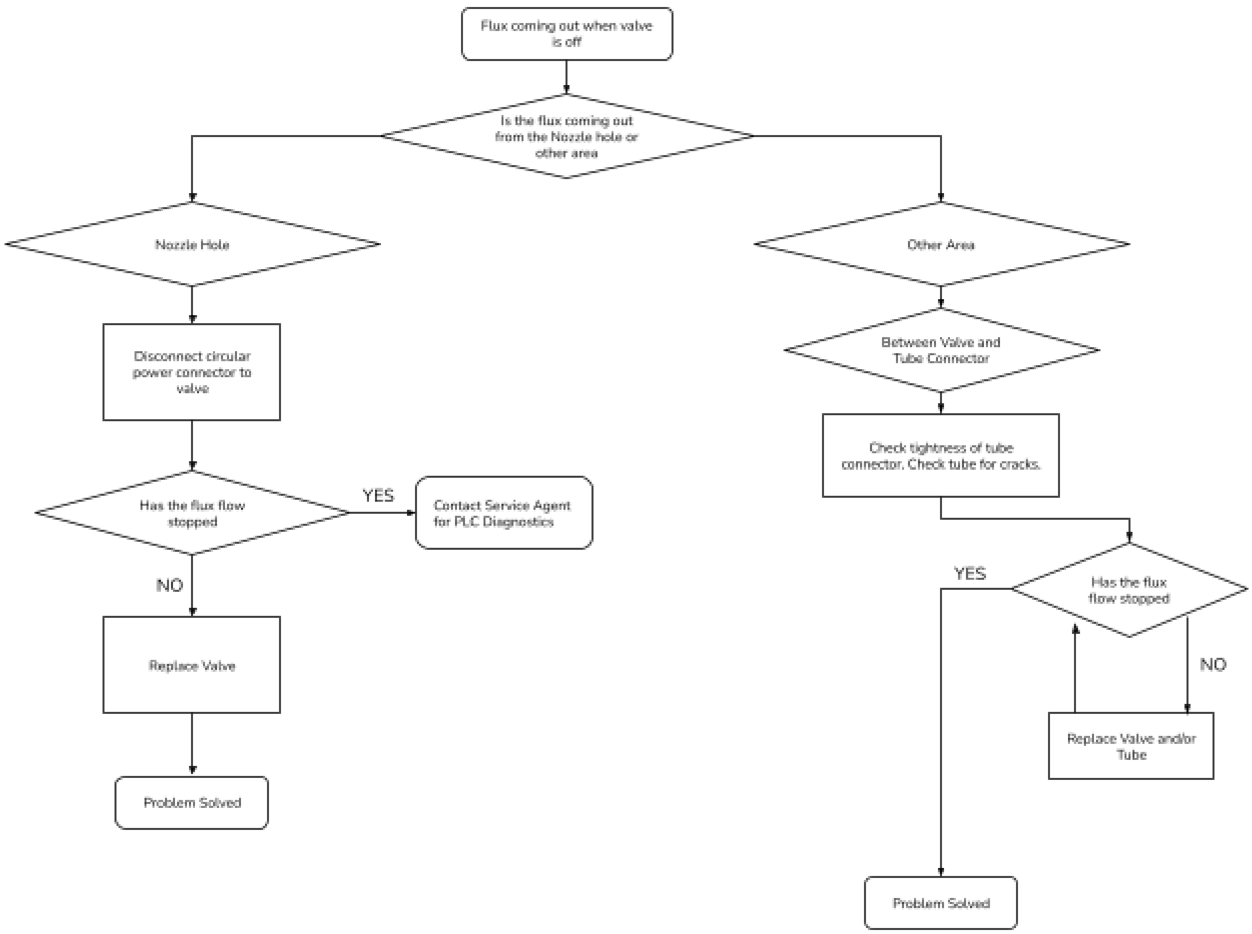
15.2 Complex Fault Diagnostic Flow Charts

15.2.1 No Flux Jetting

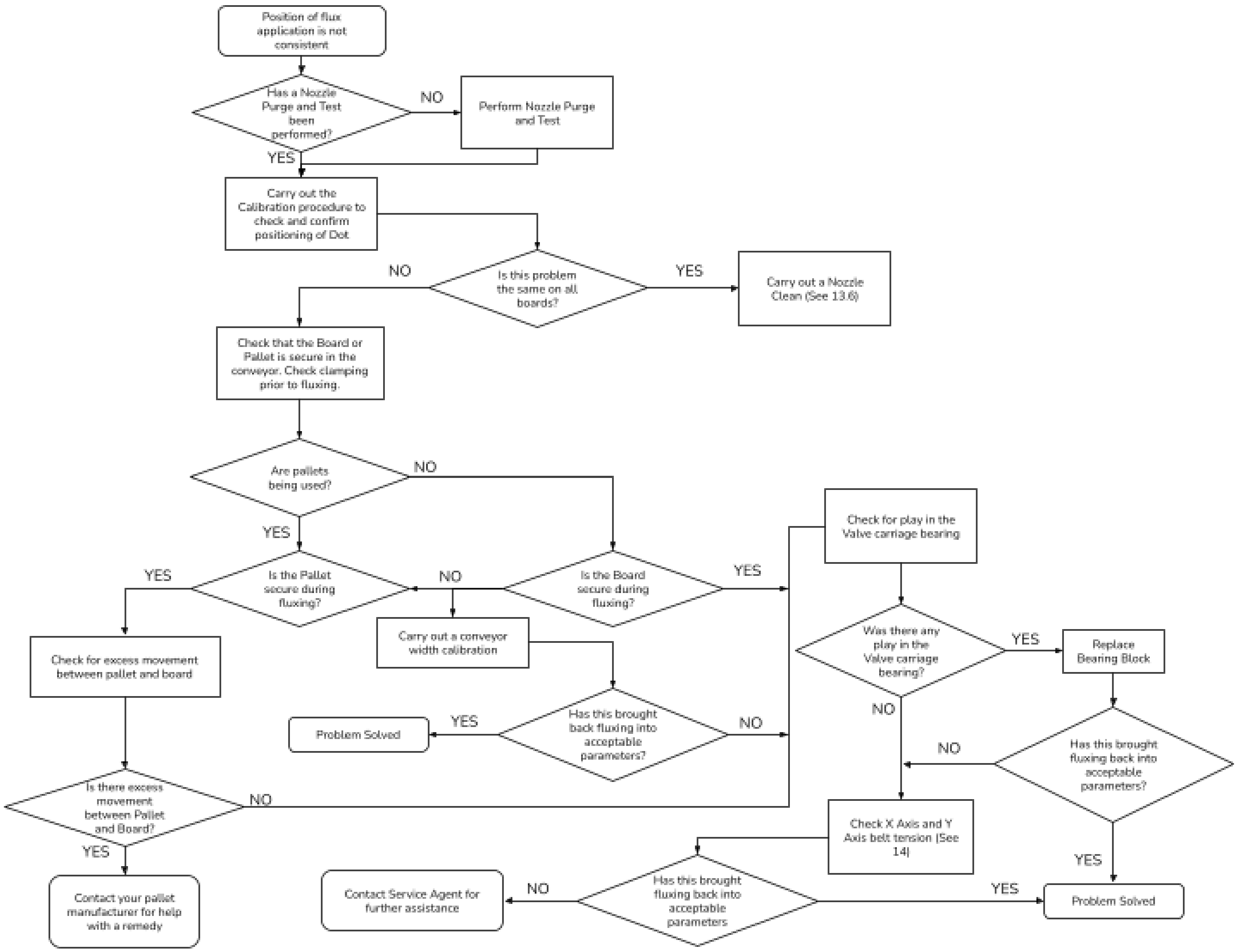
For Flux Designer version 10.2 or Greater. For Flux systems with Gauge and Regulator.



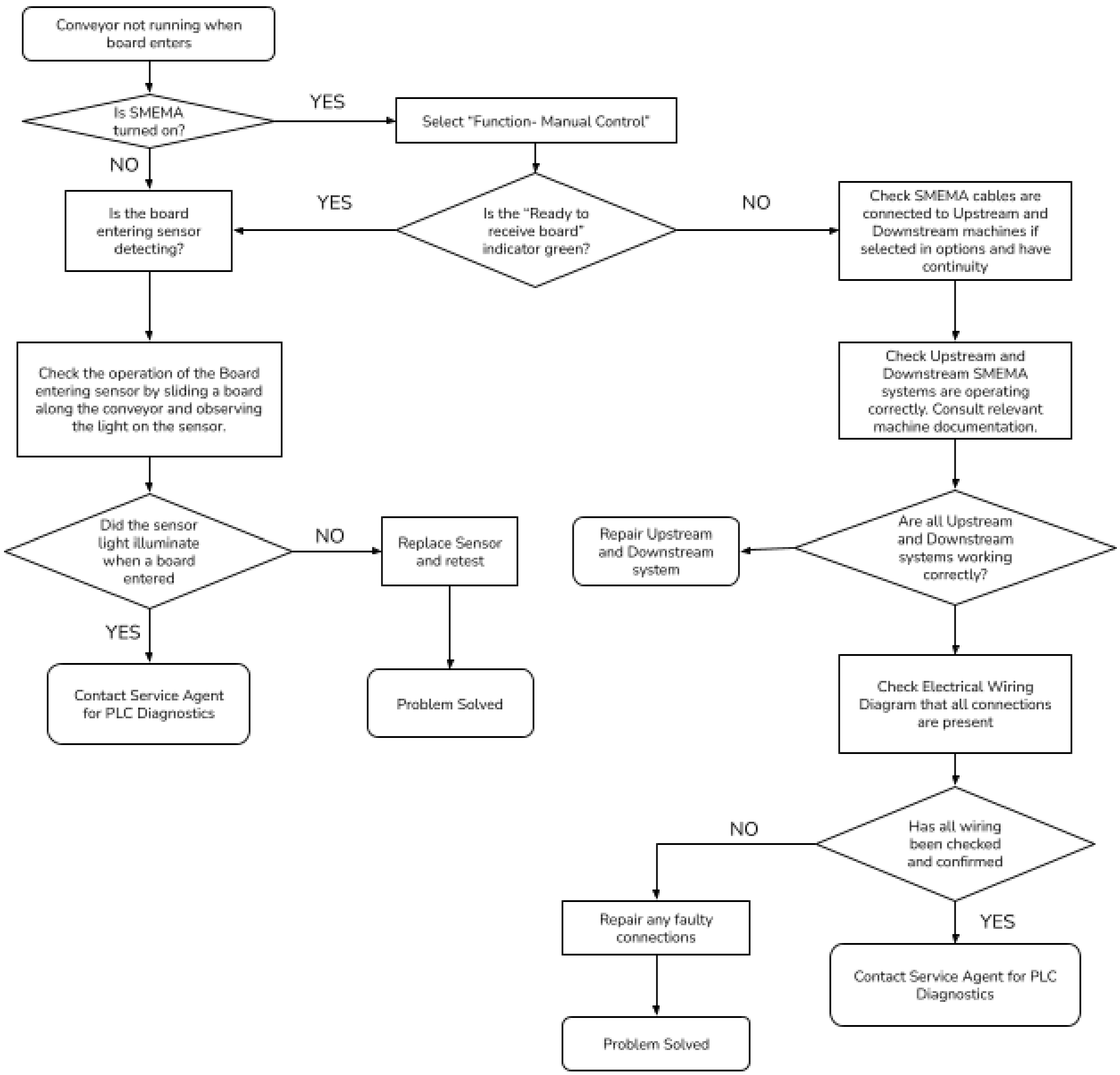
15.2.2 Flux coming out when valve is off



15.2.3 Position of Flux application is not consistent



15.2.4 Conveyor not running when board enters



SECTION 16 : Table of Alarms

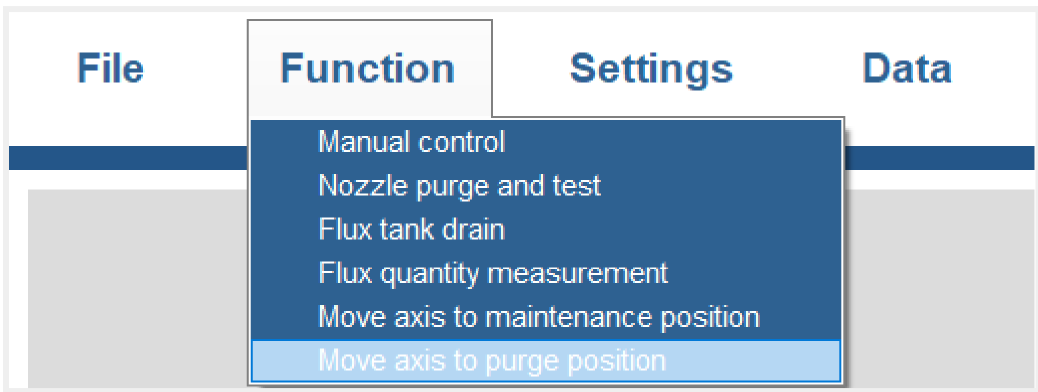
Alarm	Area	Action
Barcode read error	PC	Check File name in Flux Designer matches barcode on incoming pallet
CV-Axis driver fault	Conveyor	Check Conveyor chain is free and motor turns. Reset drive
Door back open	Rear Internal Panel	Check Rear Internal Panel is fitted. Check switch operation
Door front maintenance door open	Front Doors	Check Front Maintenance door is closed. Check door switch operation
Door front top open	Front Doors	Check Front Top door is closed. Check door switch operation
Emergency stop back pressed	Rear E Stop	Release Back Emergency stop. Reset alarm
Emergency stop front pressed	Front E Stop	Release Front Emergency stop. Reset alarm
Exhaust pressure too low (if exhaust sensor is fitted)	Exhaust Port	Check for blockage in the exhaust system or exhaust system is active.
Flux sensor 1 blocked	Valve Head	Check for an obstruction in the valve glass tube
Flux sensor 1 dirty	Valve Head	Glass tube has become too dirty. Clean and recalibrate sensor (See 13.8)
Flux sensor 1 error	Valve Head	The flux stream is not consistent. Carry out a cleaning cycle. If still faulty, check as per "No Flux Jetting" (See 15.2) If still alarming (See 15.2) Sensor failure possible.
Flux sensor 2 blocked	Valve Head	Check for an obstruction in the valve glass tube
Flux sensor 2 dirty	Valve Head	Glass tube has become too dirty. Clean and calibrate sensor (See 13.8)
Flux sensor 2 error	Valve Head	The flux stream is not consistent. Carry out a cleaning cycle. If still faulty, check as per "No Flux Jetting" (See 15.2) If still alarming (See 15.2) Sensor failure possible.
Flux stream not correct or not straight	Valve Head	The flux stream is not centred with the laser. Clean the nozzle (See 15.2) If still alarming (See 15.2) Note 1
Flux tank 1 level low	Flux Tank	Check and refill flux tank 1
Flux tank 2 level low	Flux Tank	Check and refill flux tank 2

Flux valve 1 error	Valve Head	Check PLC output according to the wiring diagram.
Flux valve 2 error	Valve Head	Check PLC output according to the wiring diagram,
Incoming PCB detected during cycle	Conveyor	Check incoming conveyor that a board stops before the sensor
Incoming PCB stuck	Conveyor	A Board has taken too long to enter the machine. Check the incoming PCB timer buffer. (Interflux can increase)
Outgoing PCB stuck	Conveyor	A Board has taken too long to exit the machine. Check the outgoing PCB timer buffer. (Interflux can increase)
PCB sensor error	Valve Head	The PCB sensor has failed to detect during the PCB check. Check that the shutter door is working correctly. If the shutter door is working correctly (See 16.1) Note 2.
PCB sensor not reached within time	Valve Head	PCB may have jammed and has taken too long to reach the second detection position. Check conveyor
PCB sensor shutter blocked	Valve Head	Shutter door may be jammed, check and clean if required.
Purge timeout	Valve Head	Purge has taken too long to get a viable stream of flux. Acknowledge and retry.
Safety relay tripped	Electrical Draw	Safety related errors will trip this relay. Check for other errors before acknowledging.
W-Axis driver fault	Electrical Draw	W-Axis (Conveyor) may have jammed or crashed and caused the axis to fault. Check axis is free and all obstructions are removed.
X-Axis driver fault	Electrical Draw	X-Axis may have jammed or crashed and caused the axis to fault. Check axis is free and all obstructions are removed.
Y-Axis driver fault	Electrical Draw	Y-Axis may have jammed or crashed and caused the axis to fault. Check axis is free and all obstructions are removed.

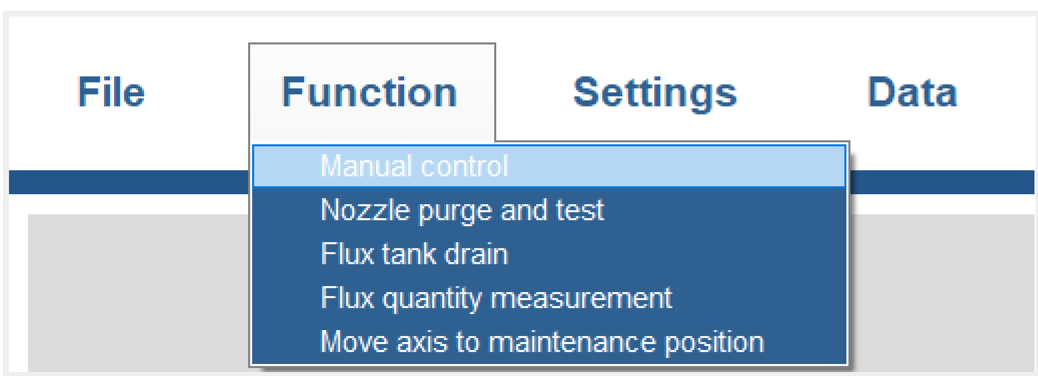
16.1 Additional Alarm Clearing Procedures

1. Flux Sensor Testing

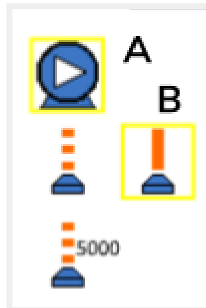
Select **Function → Move to purging position**



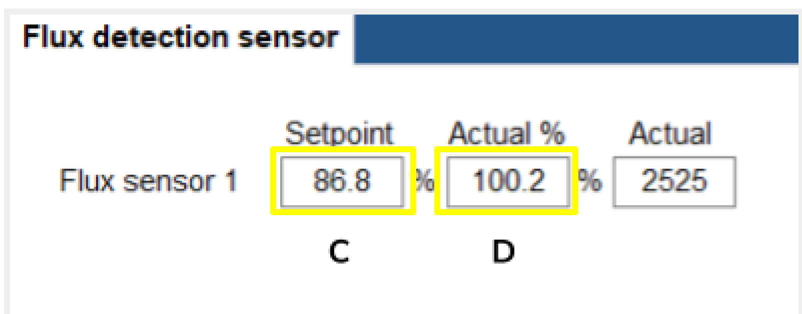
Select the manual control dialog from **Function → Manual Control**.



Select the pump button (A) followed by the constant stream button (B).

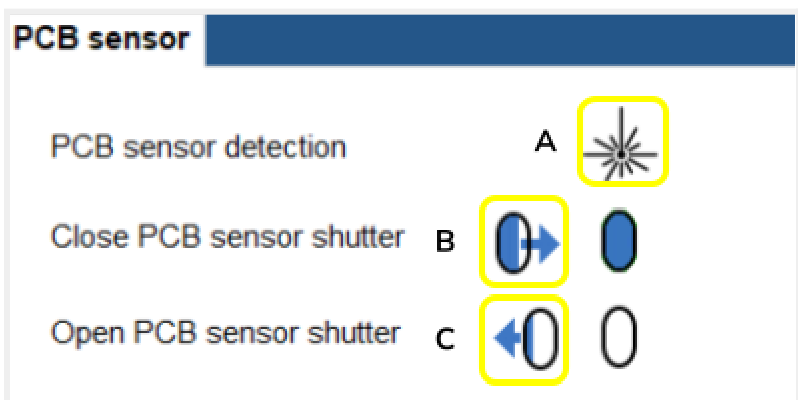


Check the Sensor AV compared to the setpoint. If Sensor AV (D) is higher than the setpoint (C) a recalibration of the sensor is required. Clean the glass and then recalibrate the sensor.



2. PCB Sensor Testing

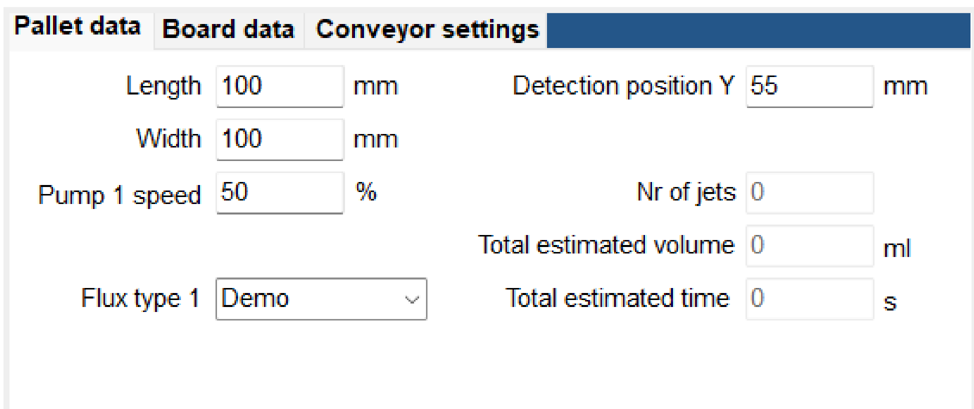
If the shutter door is working correctly. Move the nozzle head to a position where you can test the sensor. Open the shutter door manually by selecting **Function → Manual Control** then pressing the Open PCB sensor shutter button (C) . Place a PCB or pallet on the conveyor and slowly slide it above the nozzle head until it is over the sensor. The PCB sensor detection icon (A) should turn green if the sensor is detecting the board correctly. If it does not change to green, clean the sensor surface with a damp cloth only. **NOTE: Do not use any solvents as this will damage the sensor lens.** Once cleaned and rested, close the shutter door by pressing the close PCB sensor shutter button. (B).

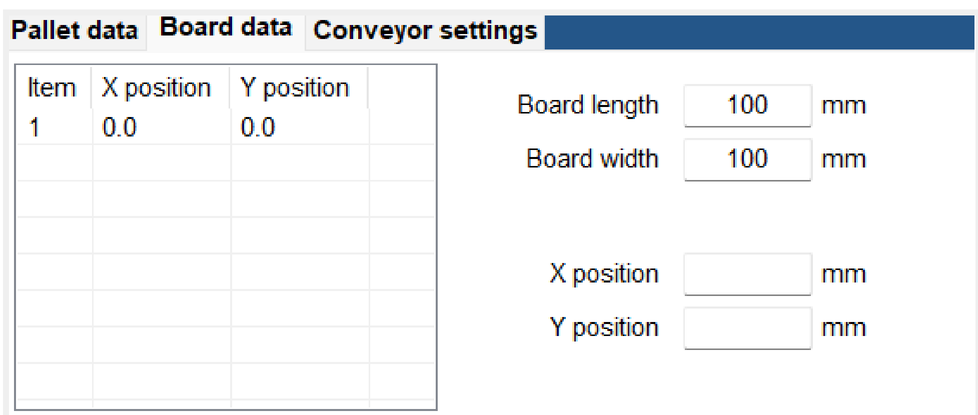


SECTION 17 : Getting Started with Programming

17.1 Starting a new programme

Set Pallet/Board Height and Width in the Data Area.

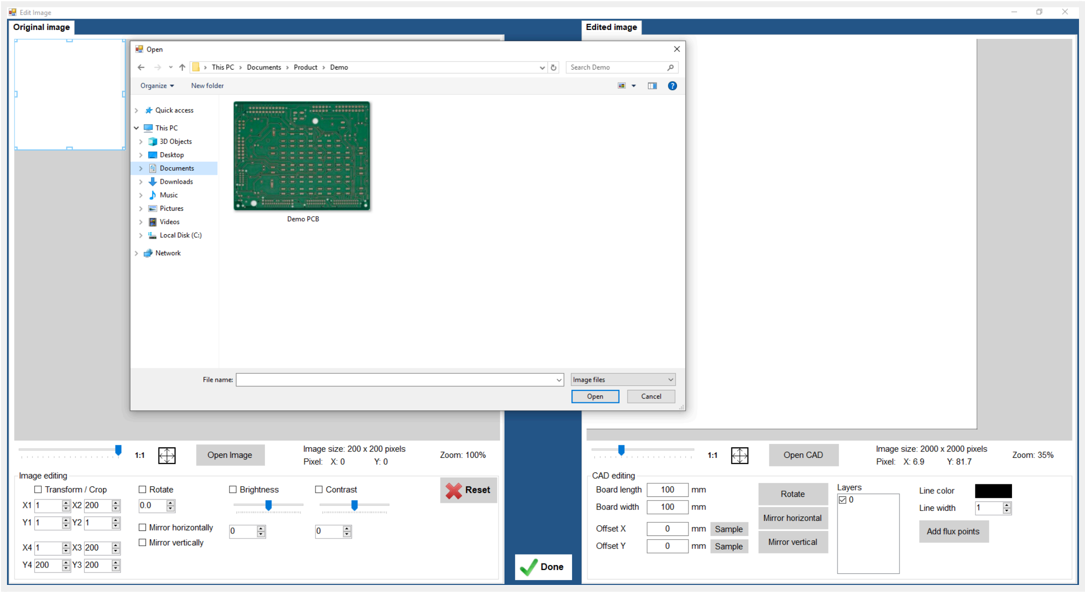




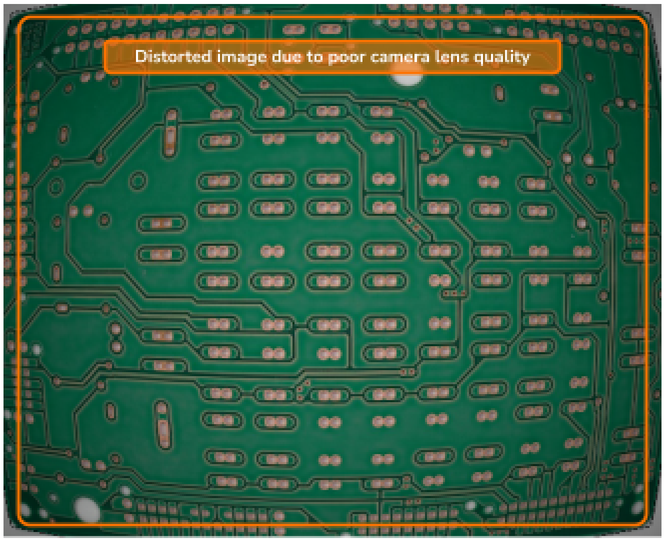
Select 

Select “Open Image”

Choose a BMP or JPG file of the selected board.

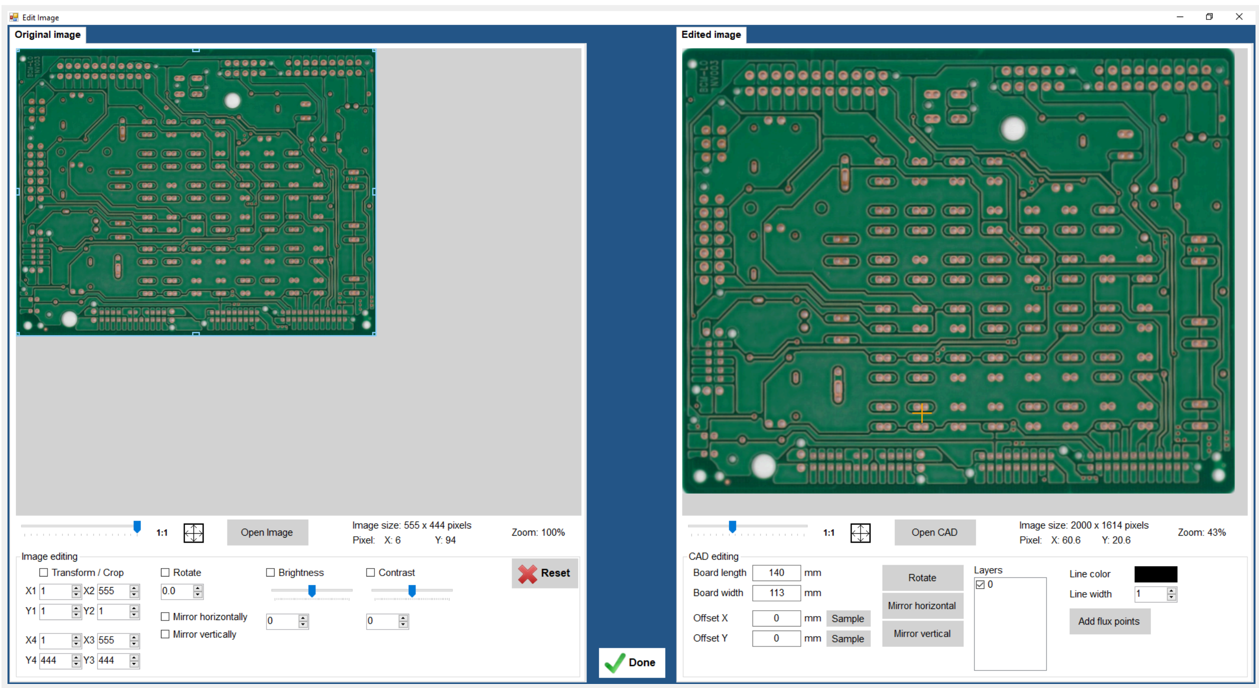


NOTE: Choose a good quality picture of the pallet with PCBs or a high resolution screenshot of a CAD file. When using a picture, make sure it is not taken by a small camera lens (like on a cellphone) as this will distort the image's straight lines. Following is an example of a bad picture. Compared to the orange lines that the board picture is warped beyond usage.



17.2 Edit Board Image

After a proper picture is selected. Edit the chosen image in the window.



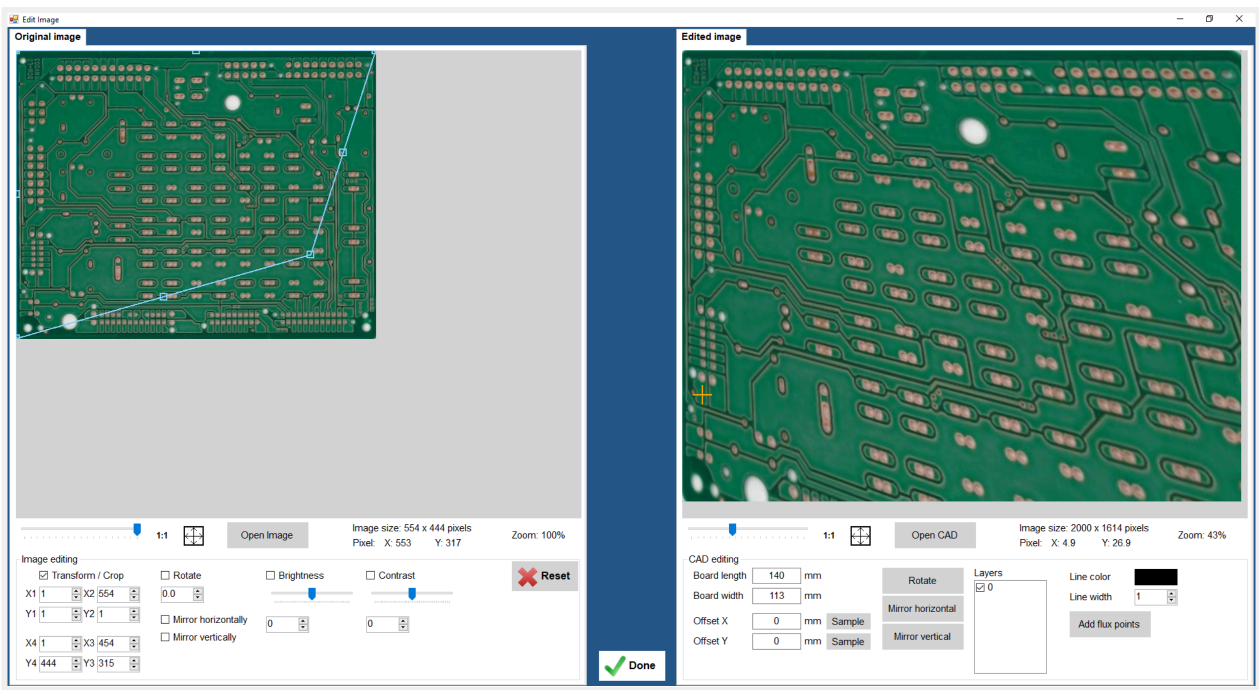
Select any of the following filters to adjust the image.

Press **Done** once all adjustments have been made. This will transfer the filtered image back to the project area.

17.3 Transform/Crop board Image

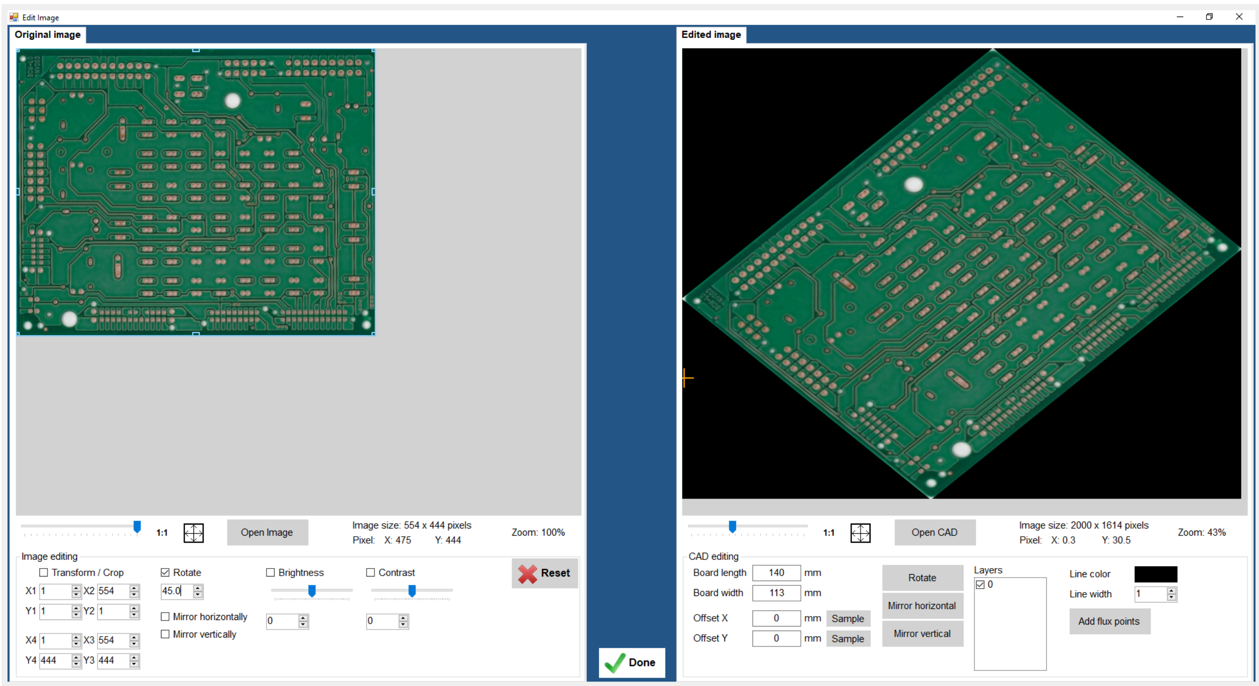
To straighten the image, activate the **Transform/Crop** image and adjust the image by:

- Fitting the blue rectangle around the board and pallet (be sure to include the part of the pallet that sits on top of the conveyor pins!)
- Zooming to see the corners up close.
- Clicking the arrow on the manual adjustment values to fine tune the corner positions.



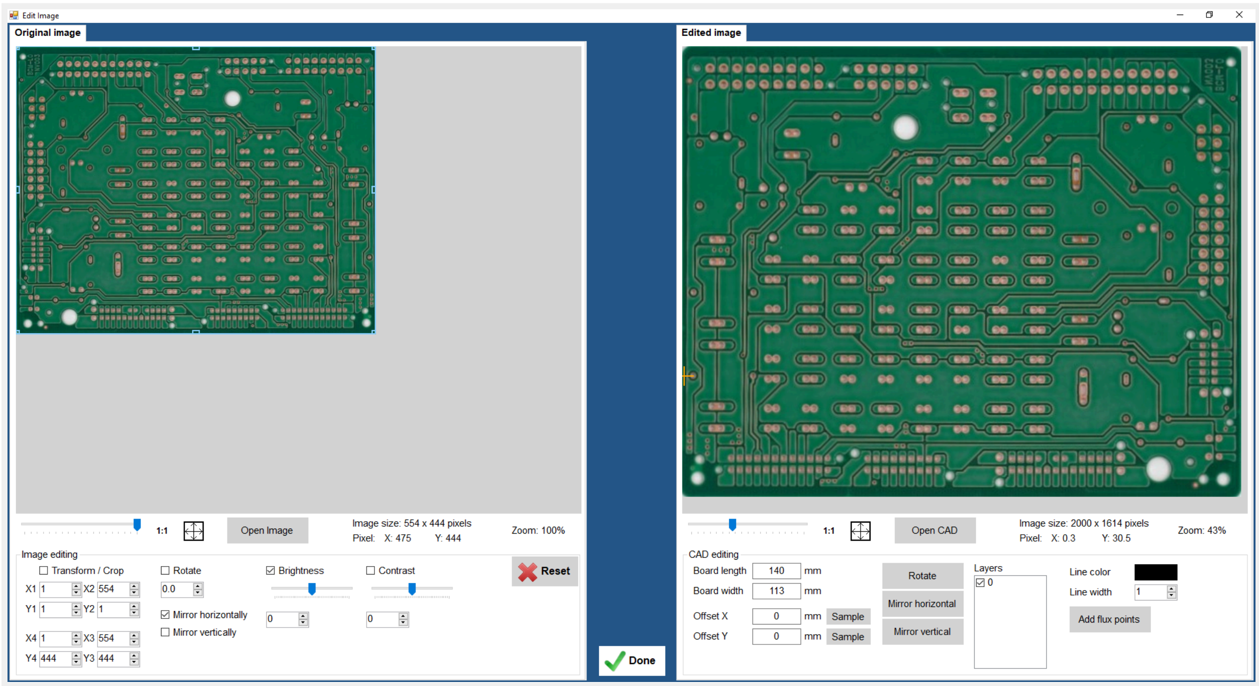
17.4 Rotate Board Image

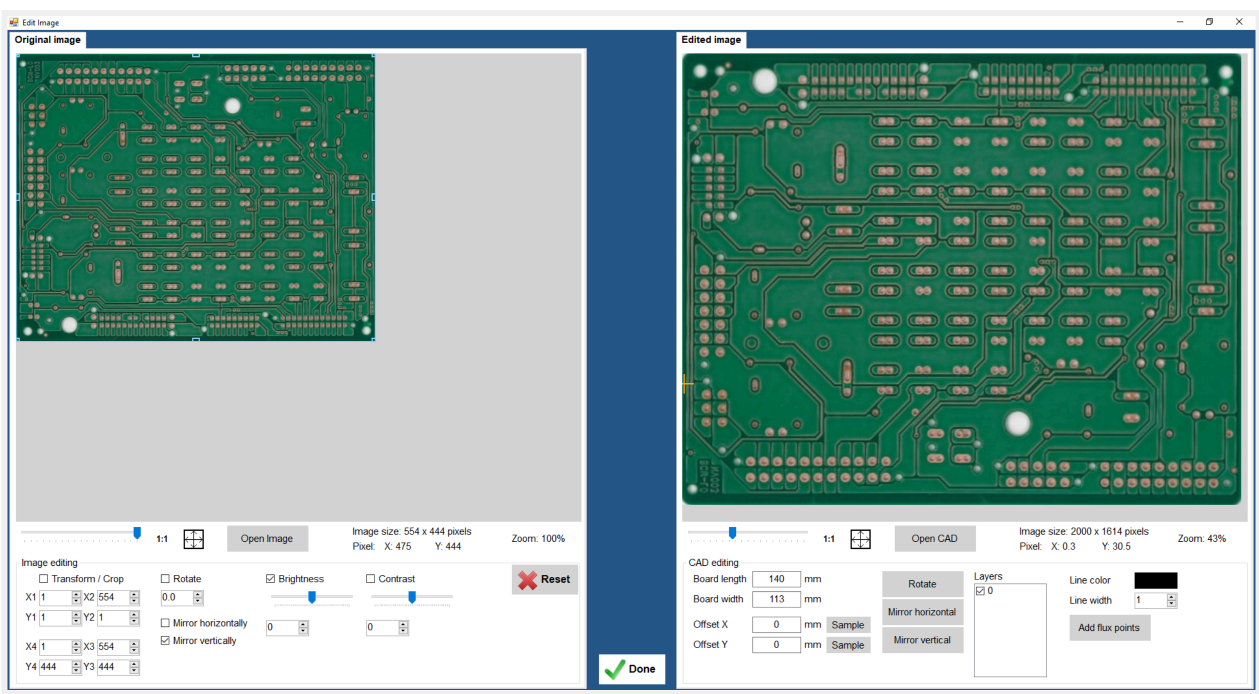
Select **Rotate** and key in a value for the angle to rotate the image accordingly.



17.5 Mirror Board Image

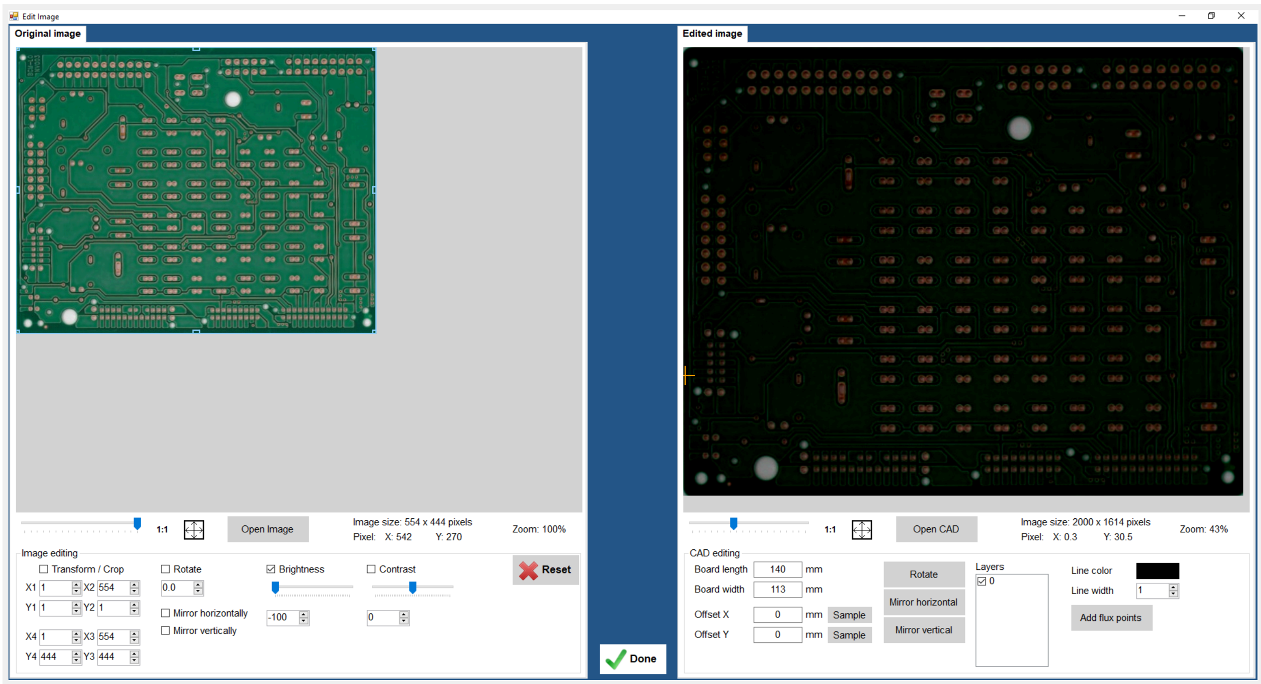
Select **Mirror horizontally/vertically** to mirror the image accordingly.

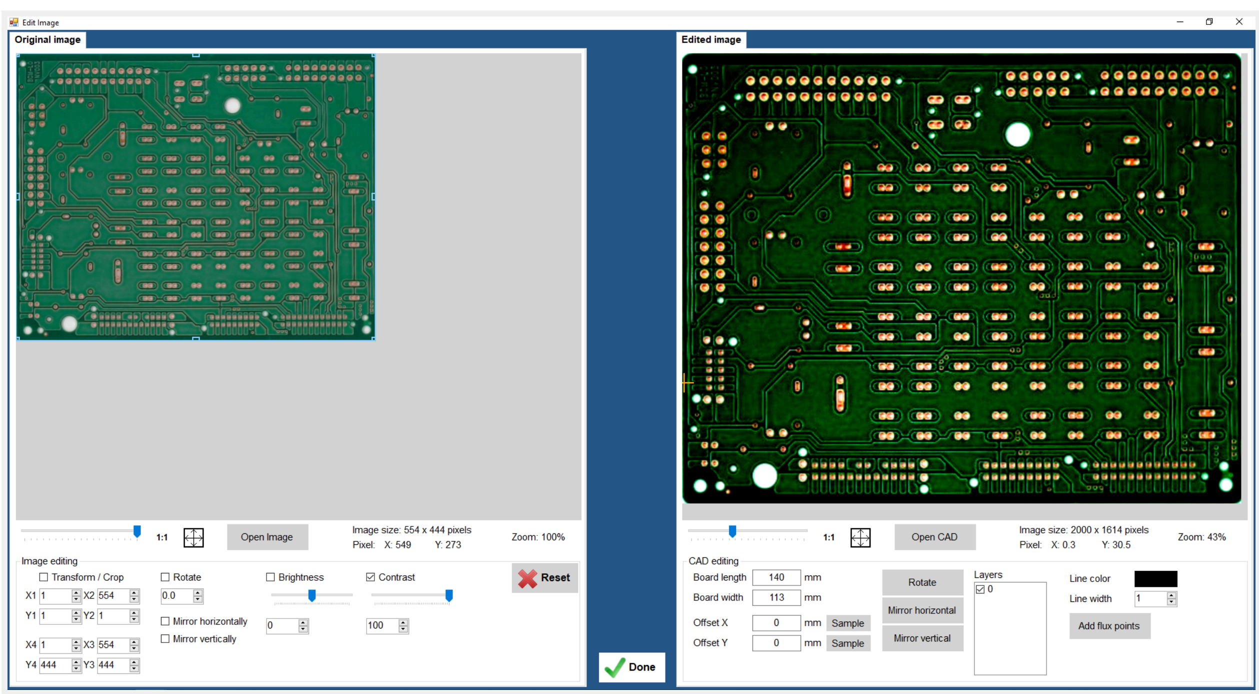

Edit Image
Original image
Edited image
1:1
Open Image
Image size: 554 x 444 pixels
Pixel: X: 475 Y: 444
Zoom: 100%
Image editing
Transform / Crop
Rotate
Brightness
Contrast
Reset
X1 1 X2 554
Y1 1 Y2 1
X4 1 X3 554
Y4 444 Y3 444
0.0
Mirror horizontally
Mirror vertically
0
0
Done
1:1
Open CAD
Image size: 2000 x 1614 pixels
Pixel: X: 0.3 Y: 30.5
Zoom: 43%
CAD editing
Board length 140 mm
Board width 113 mm
Offset X 0 mm Sample
Offset Y 0 mm Sample
Rotate
Mirror horizontal
Mirror vertical
Layers
0
Line color
Line width 1
Add flux points


Edit Image
Original image
Edited image
1:1
Open Image
Image size: 554 x 444 pixels
Pixel: X: 475 Y: 444
Zoom: 100%
Image editing
Transform / Crop
Rotate
Brightness
Contrast
Reset
X1 1 X2 554
Y1 1 Y2 1
X4 1 X3 554
Y4 444 Y3 444
0.0
Mirror horizontally
Mirror vertically
0
0
Done
1:1
Open CAD
Image size: 2000 x 1614 pixels
Pixel: X: 0.3 Y: 30.5
Zoom: 43%
CAD editing
Board length 140 mm
Board width 113 mm
Offset X 0 mm Sample
Offset Y 0 mm Sample
Rotate
Mirror horizontal
Mirror vertical
Layers
0
Line color
Line width 1
Add flux points

17.6 Brightness/Contrast Board Image

Select **Brightness/Contrast** to adjust the brightness or contrast of the image accordingly.

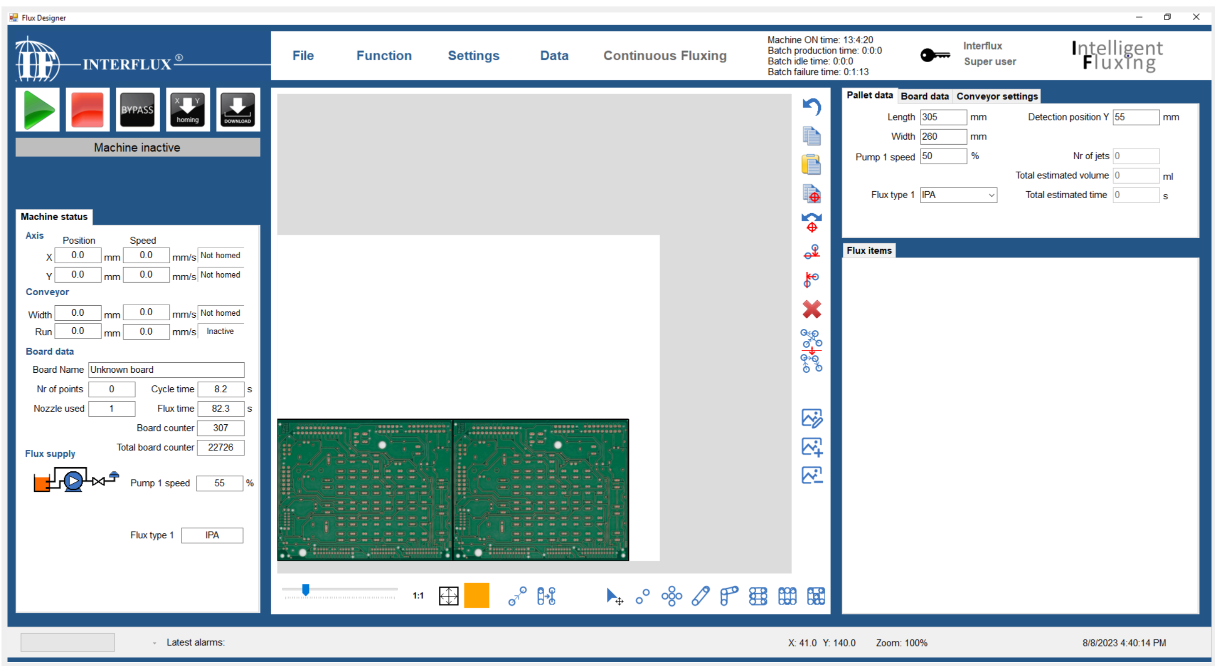




17.7 Duplicate/Delete Board

Select 

Duplicate of the existing image would appear next to it.



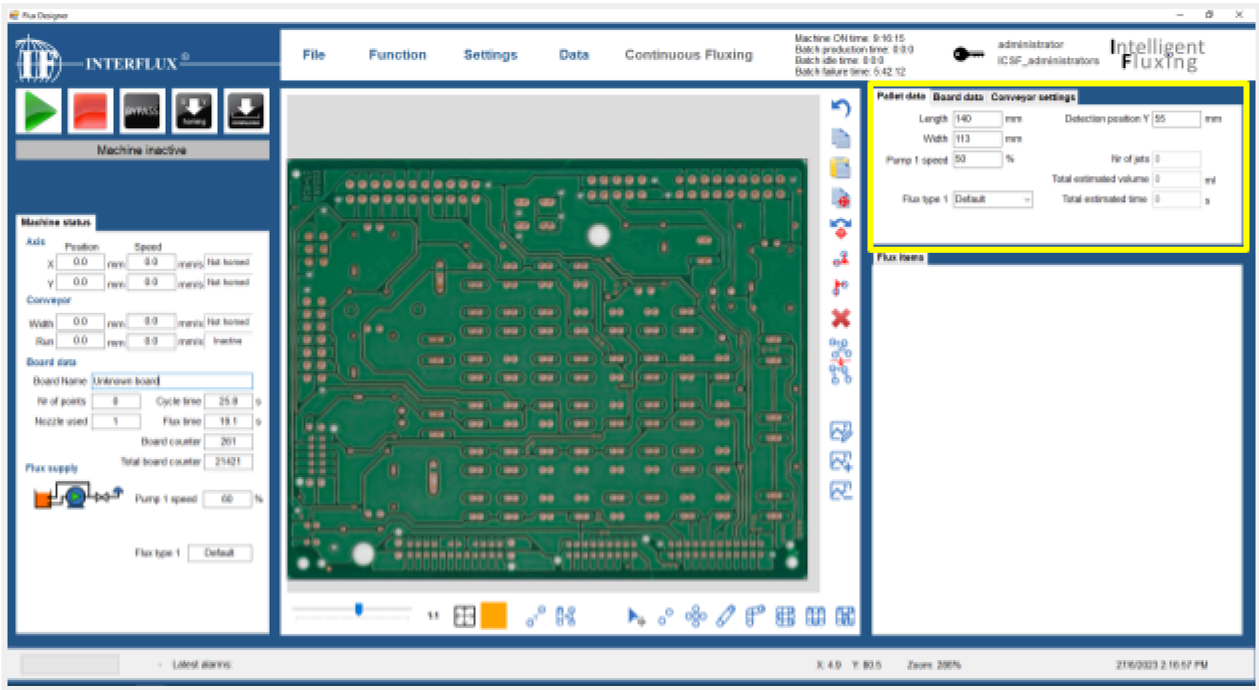
If any image is unwanted, select the board within the **Board Data** table.

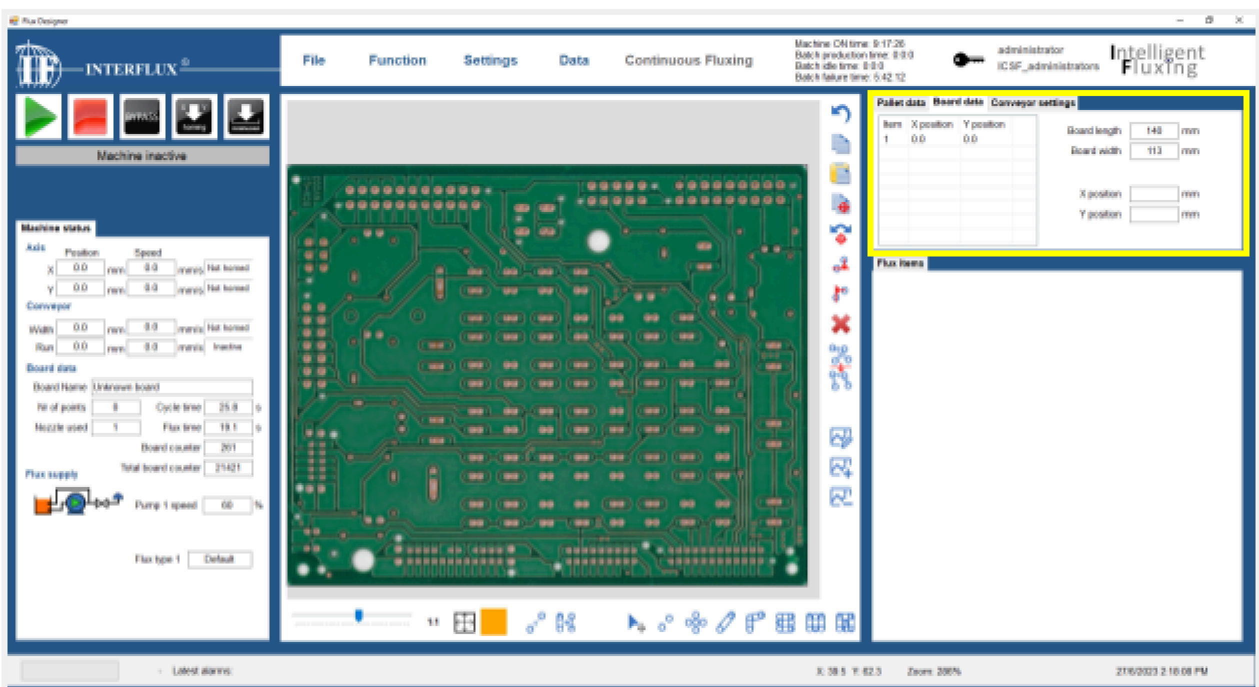
Select 

Chosen image will be removed.

17.8 Board/Pallet Data

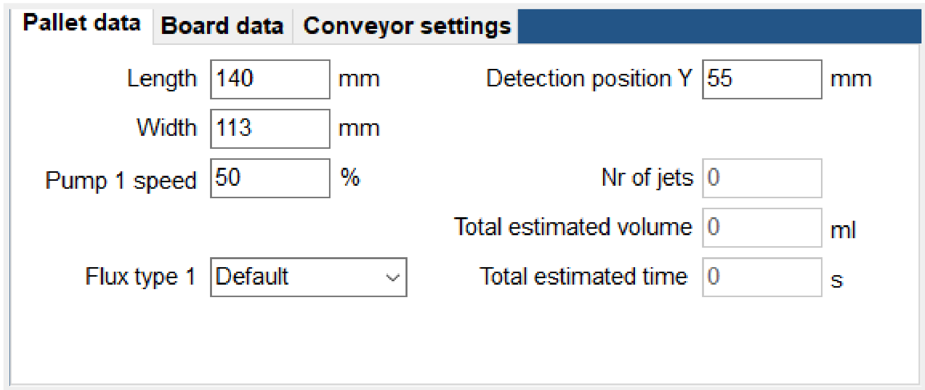
After the board image is ready, key in the board information in the **Board/Pallet Data** area.

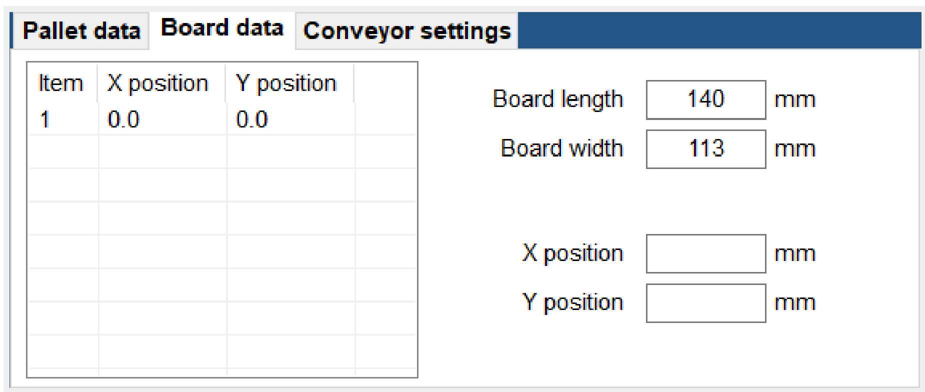




Key in the following values:

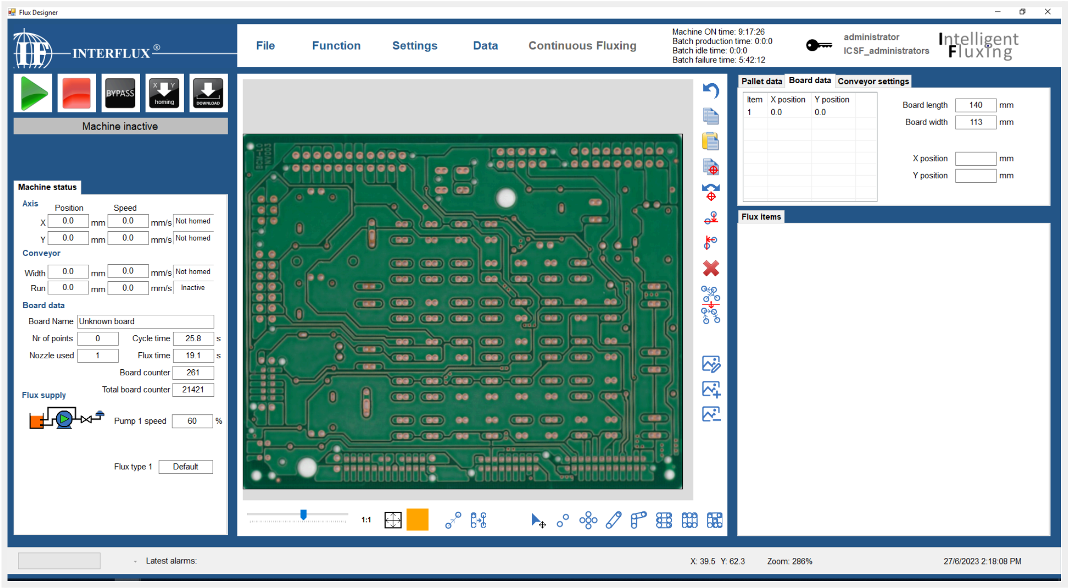
- **Length**: Actual length of the board
- **Width**: Actual width of the board (include the part of the pallet that sits on top of the conveyor pins)
- **Pump 1 Speed**: Default standby speed (can be kept at a standard 50%)
- **Flux type 1**: Select the flux you are using for this board (The flux should have been entered in the flux database before with the correct default values).
- **Board detect Y position**: This is the location in Y coordinate where the PCB sensor will detect the board/pallet.
- **Conveyor speed in**: This is the transfer speed from upstream conveyor to ICSF-Select6 (M23)
- **Conveyor speed out** : This is the transfer speed from ICSF-Select6 (M23) to downstream conveyor.
- **Conveyor clamp open**: This is the amount the conveyor opens greater than the pallet/board width to allow it to travel through the conveyor.
- **Conveyor clamp close**: This is the amount the conveyor will move to less than the board/pallet width, to clamp once the board/pallet has stopped in position.



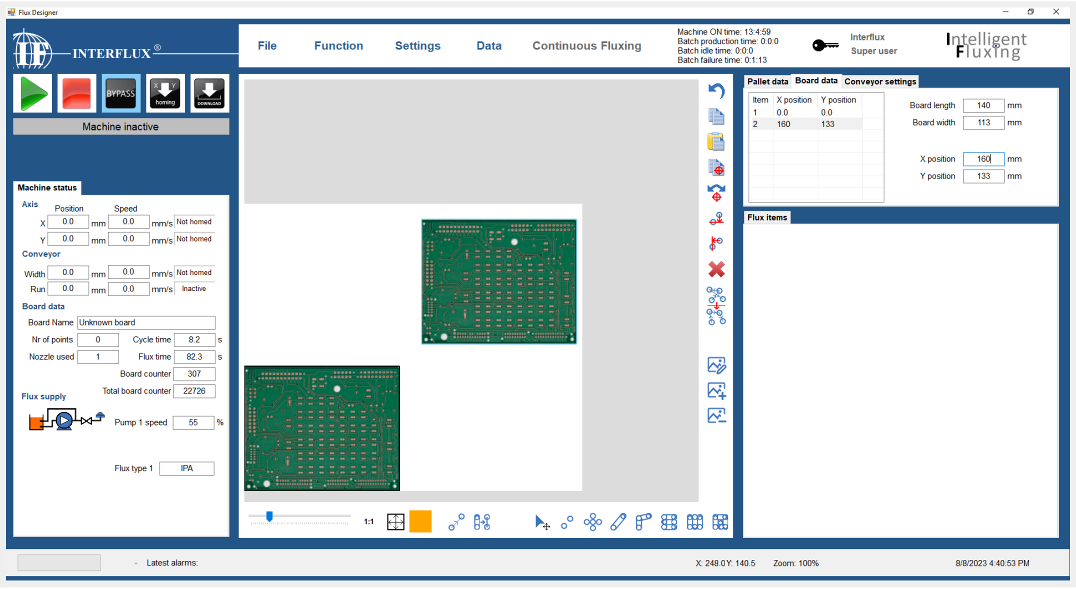


- **X position**: For the board chosen in the board data table, this is the distance that the board placement is changed in the X-axis.
- **Y position**: For the board chosen in the board data table, this is the distance that the board placement is changed in the Y-axis.
-

After completion, the image should accurately represent the board (or pallet with PCBs.)

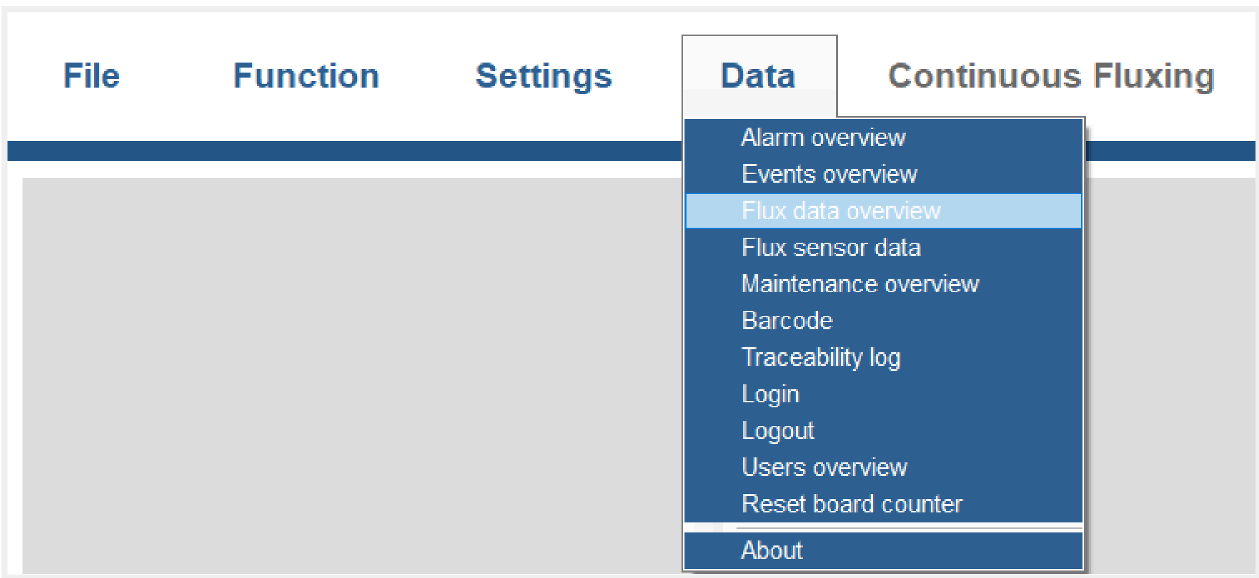


OR

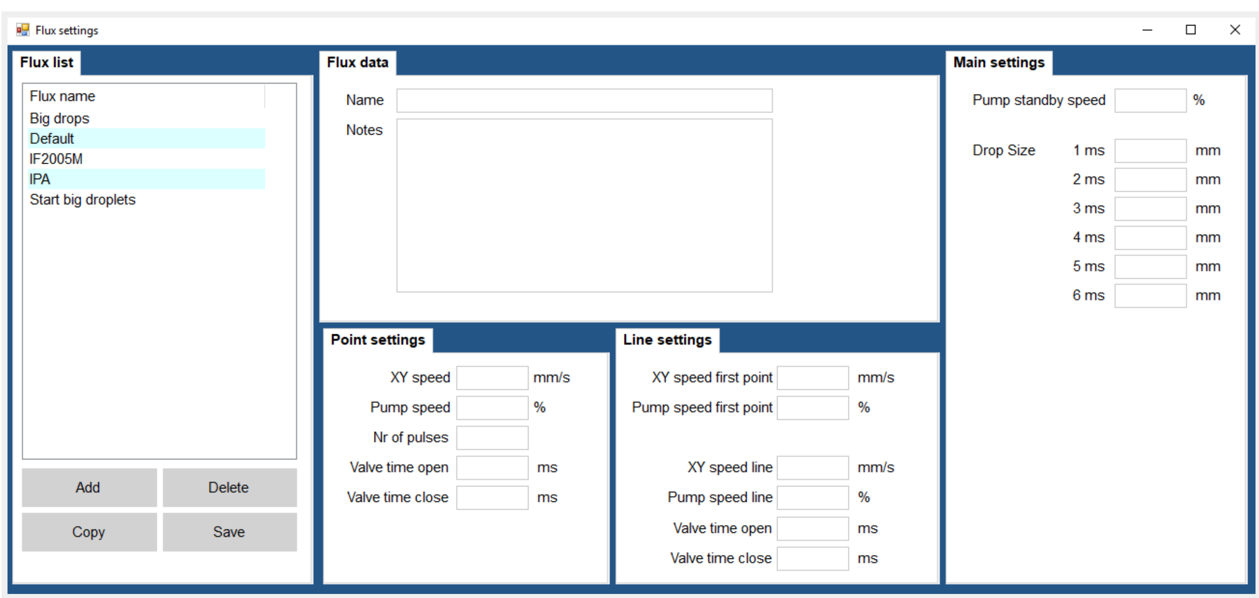


17.9 Flux Data

To add or remove a Flux type in the Flux Database, open Flux settings by selecting **Data → Flux data overview**.

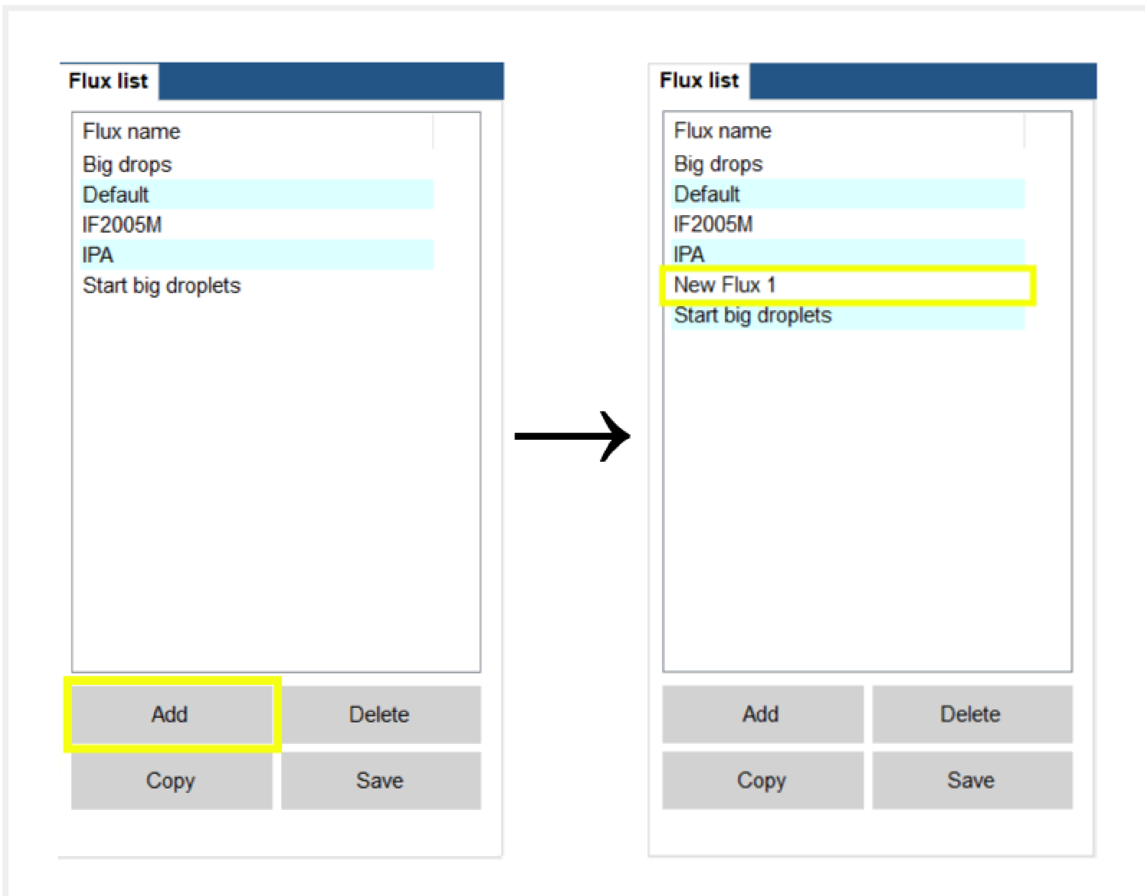


This will open a database window where all Flux data is stored.

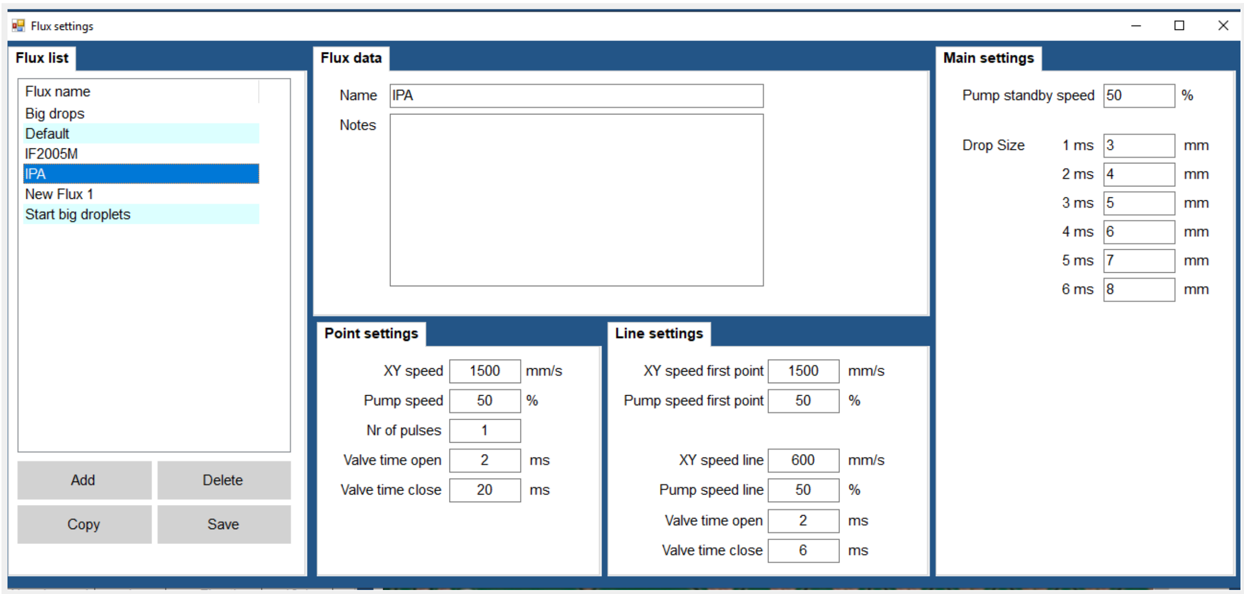


17.10 Add a new Flux type

Select Add to add a new flux type.



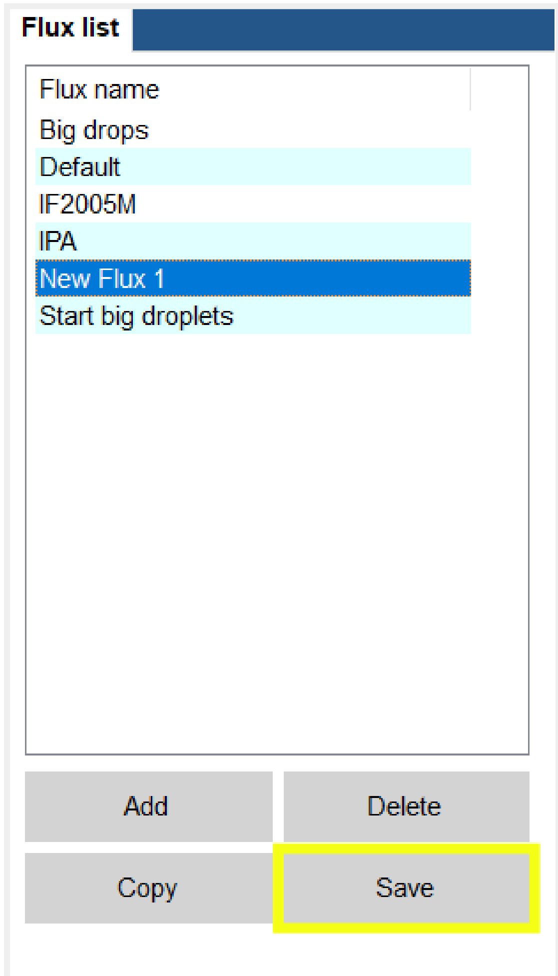
This will create a new entry into the database. Now it can be edited by selecting the new entry and changing any of the parameters. These will become the default values when placing dots and lines into a program.



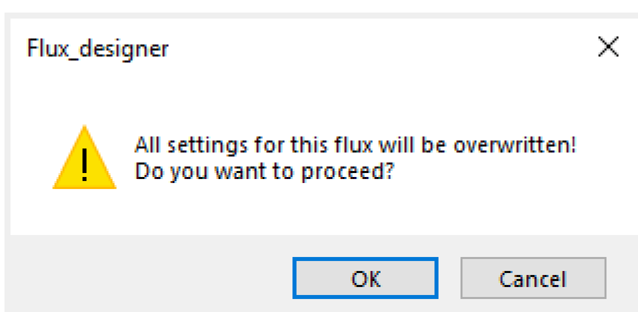
17.11 Save a new Flux type

Once the new Flux data has been edited it needs to be saved.

Select the **"Save"** button.



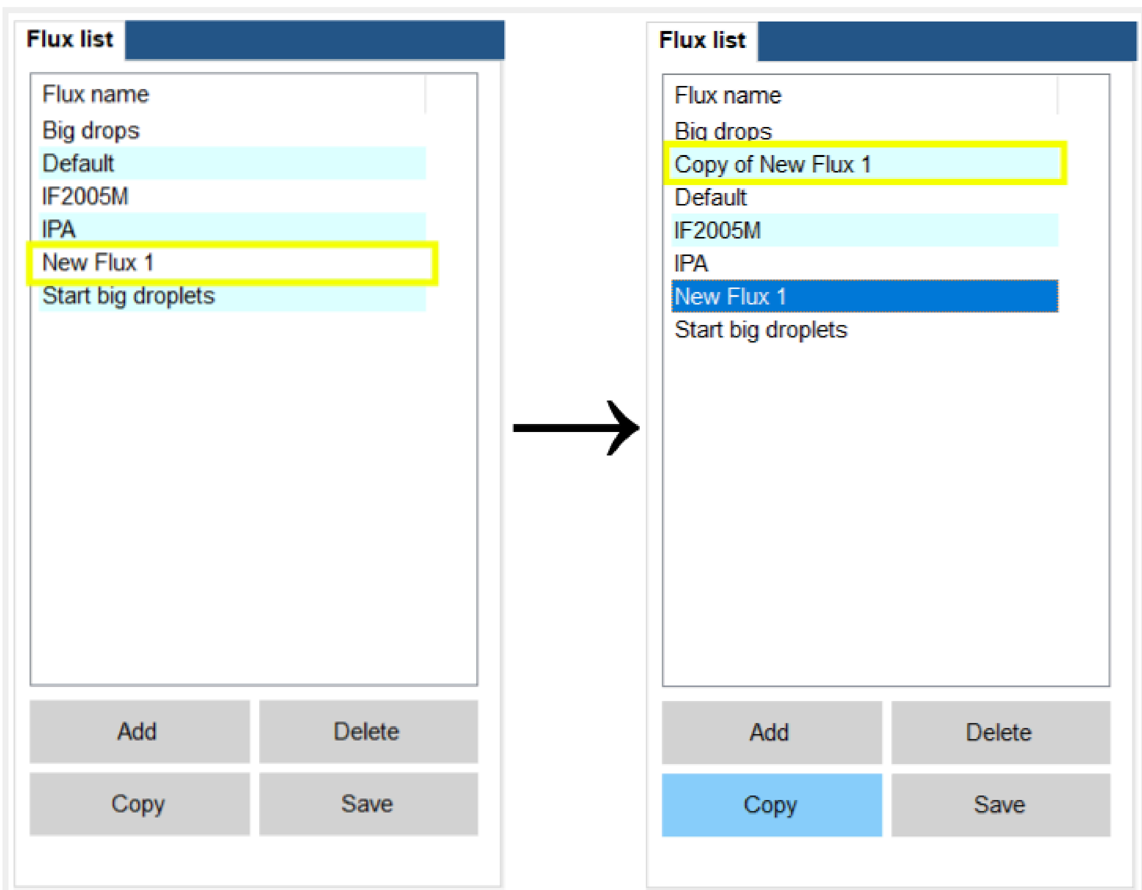
A confirmation screen will pop up. Select OK to save the data or cancel to return back to the database page to make further changes.



17.12 Copy a Flux type

If a flux with matching parameters is needed but with a different product name, a copy of an existing flux type can be made and then renamed.

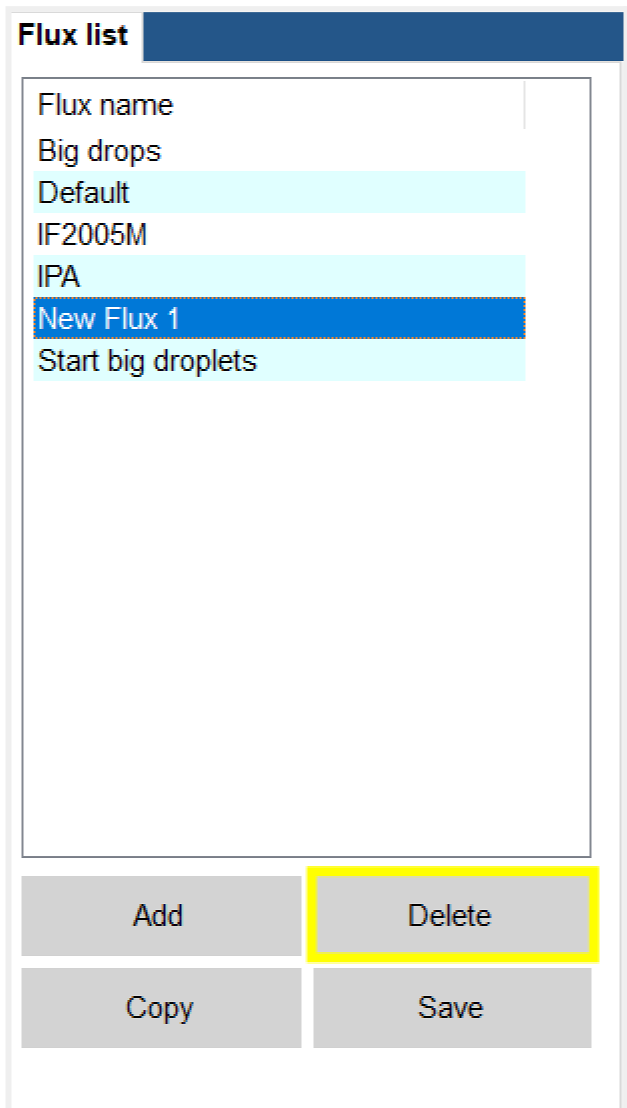
First select the Flux that is to be copied.
Click the **"Copy"** button, this will make a copy of the original Flux.



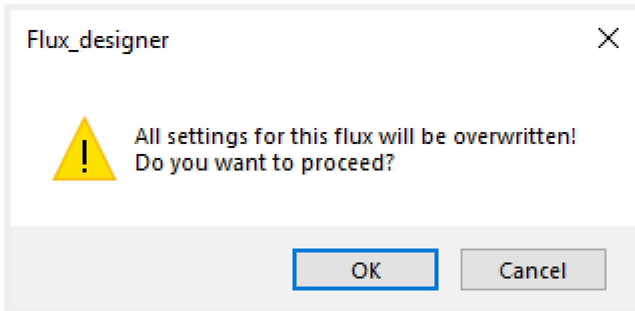
Select the Copy and edit the name as per Save a new Flux type.

17.13 Delete a Flux type

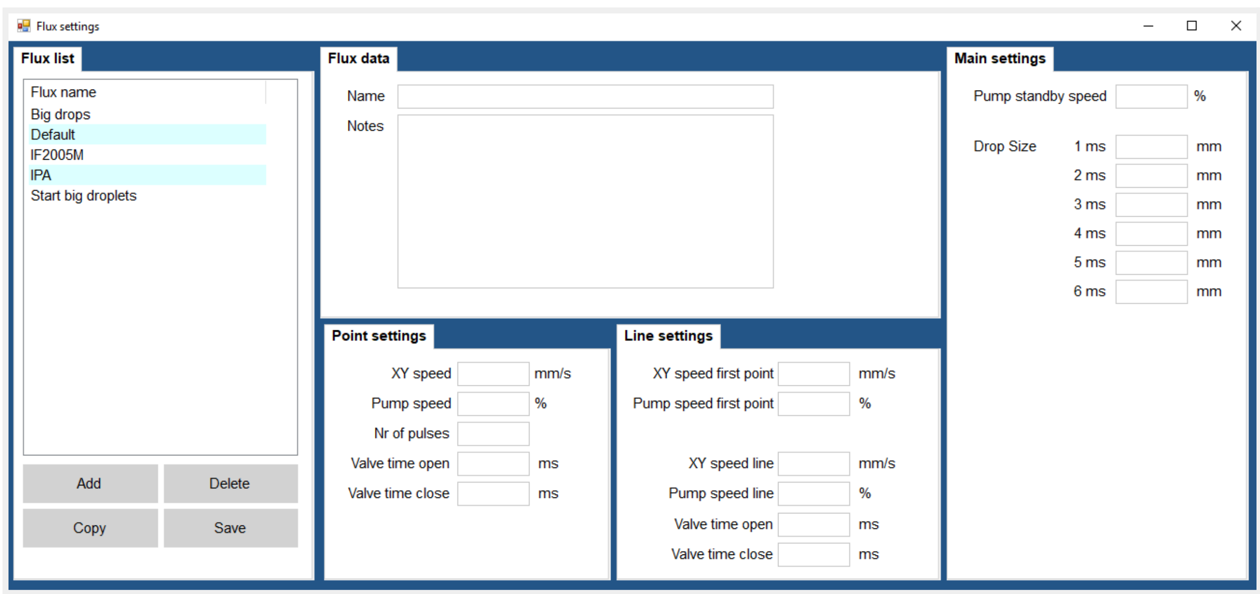
To Delete a Flux type from the database, select the Flux Type then click **"Delete"**.



A confirmation screen will pop up. Select **"OK"** to delete the data or cancel to return back to the database.



17.14 Flux Data Parameters



Listed by Parameter Box

Flux Data

Name: The Name of the Flux to be used
Notes: This is a free area where notes and references can be placed. When barcode flux type verification is available, the free area needs to contain the barcode's reference text on separate lines.

Main Settings

Pump standby speed: This is the speed that the pump runs at when it is not fluxing. I.E. While moving between points

Point settings

XY speed: This is the speed that the Fluxer moves between points (Dots)
Pump speed: The speed at which the pump runs while it is jetting (Dots)
Nr of pulses: How many pulses the Fluxer does for each point
Valve time open: The time that the valve is open when Fluxing points (Dots)
Valve time close: The time the valve is closed between pulses (Dots)

Line Settings

XY speed first point: This is the speed that the Fluxer moves between the previous point and the first point of the line.
Pump speed first point: The speed at which the pump runs when it jets the first point of a line.
XY speed line: This is the speed that the Fluxer moves for different line lengths
Pump speed line: The speed at which the pump runs while it is jetting different line lengths
Valve time open: The time that the valve is open for each point along different line lengths
Valve time close: The time the valve is closed between each pulse for different line lengths

SECTION 18 : Programming

18.1 Disclaimer

The ICSF-Select jet fluxer is a highly flexible and sophisticated selective jet fluxer so there are many ways to program a board. There are many solutions to add more or less flux in different areas. So there are many ways to solve solderability issues or reduce residue etc.
There are many different fluxes as well (Solvent based, water based, rosin based, etc ...) Each flux will require different settings and possibly a different way of programming the product.

The operator is encouraged to build up experience by using the tools of the software to try and get to the best quality on his own products and with his own flux.

This guide is a basic guide for basic programming only. It is impossible to produce a complete guide due to the flexibility/versatility of the ICSF-Select6 (M23) jet fluxer.

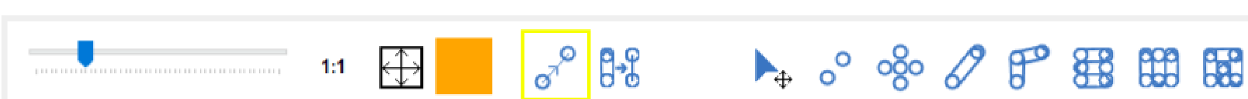
Interflux is NOT responsible for bad quality due to poor programming.

18.2 Choose flux drop colour and display options

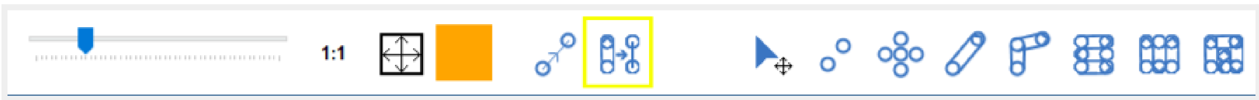
Select flux drop image colour to start

NOTE: This does not actually affect the REAL colour of the flux on the board. This is solely for the purpose of visualisation on the screen.

Select the following mode to display the path of the programmed items.

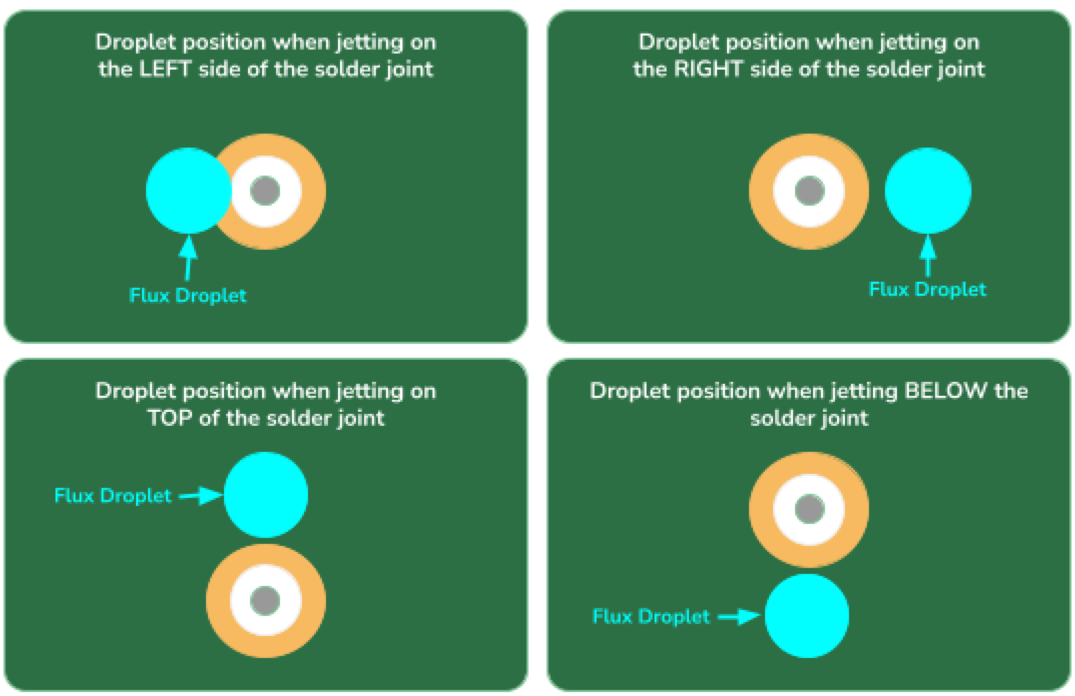


Select the following mode to display centre lines of flux items instead of the circular look.



18.3 Flux placement recommendations

Interflux strongly recommends particular placement of the flux points with respect to the via hole due to the 5° fluxing angle. See below diagram for approximate positioning relative to via hole.



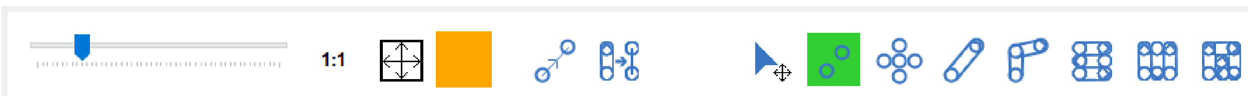
Exact distance can only be determined with testing on a small area with fax paper for indication of landing zone.

18.4 Use single points to program

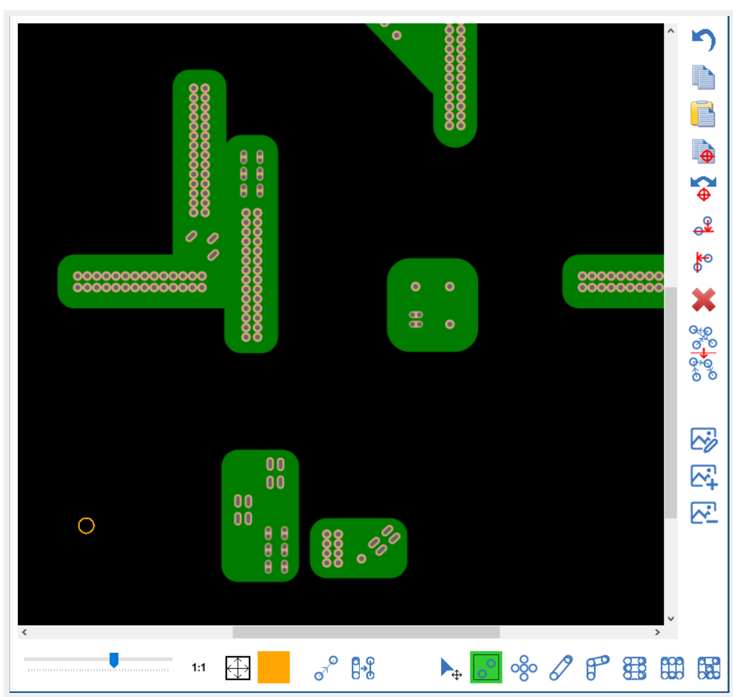
In the case of only having single pins to be soldered, the flux point tool is available to place single dots. This tool can also put multiple dots in a single location by adjusting settings.

18.4.1 Adding flux points

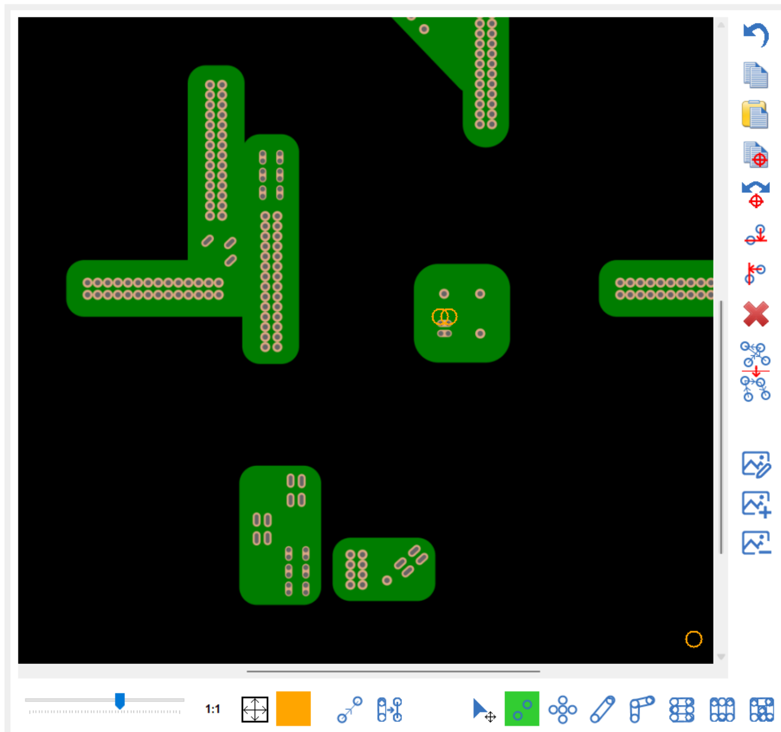
Select the flux point tool at the bottom of the programming area



Click on the spot where the flux point needs to be

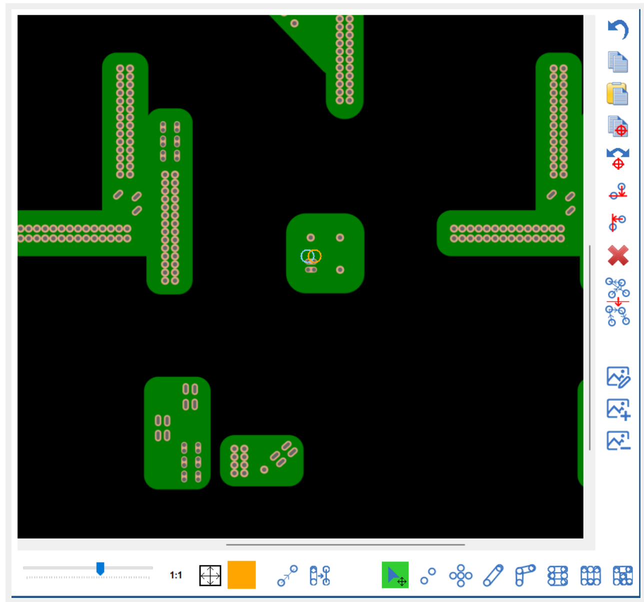


Click on the next spot where the next flux point needs to be
Hold the ALT key to put the next point on the same horizontal or vertical coordinate



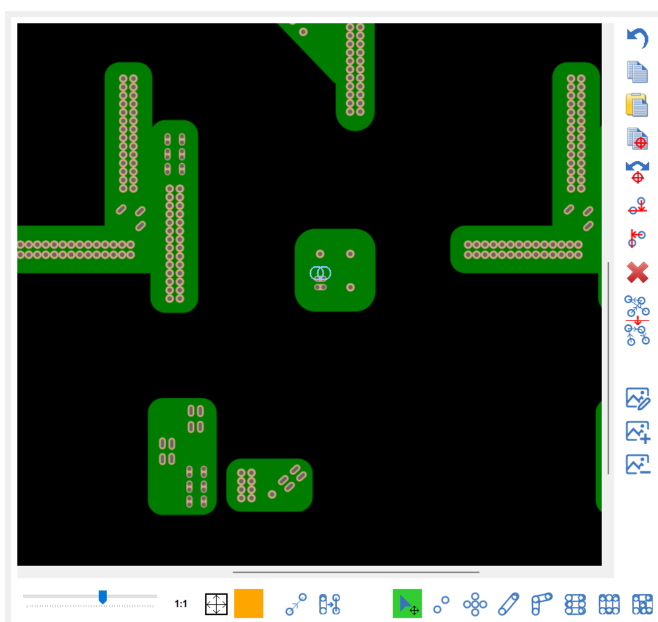
18.4.2 Selecting and moving flux points

Select flux points by a single click inside the point or by clicking on the point in the item list on the right. Selected points will show as a **Blue** colour on the image.



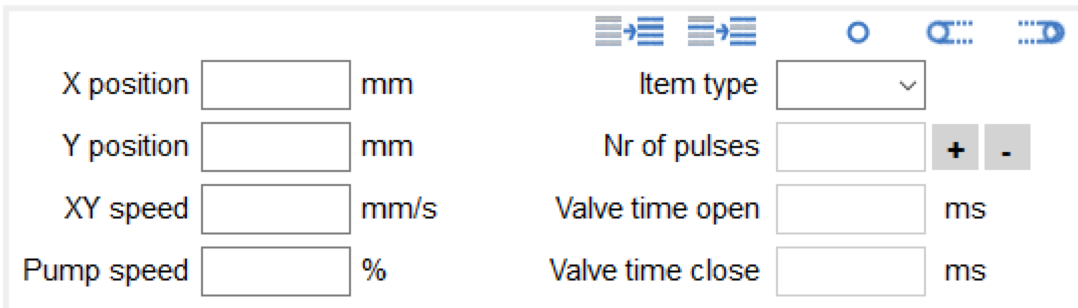
Select or deselect multiple points by either

- Holding CTRL and single clicking in the points that need to be selected
- Holding CTRL and single clicking on the points in the item list that need to be selected
- Click and drag a box around the points that need to be selected



18.4.3 Adjusting flux point settings

When selecting a point the settings of this point will be accessible in the Item Data Area.



Item data consists of the following data:

- **X position:** The actual horizontal position of the item in mm
- **Y position:** The actual vertical position of the item in mm
- **XY speed:** The speed at which the nozzle moves to this item in mm/s
- **Pump speed:** The speed of the flux pump from 35-60%. Adjust flux flow.
- **Item type:** The type of item: either Point or Line
- **No. of pulses:** The amount of shots that will be executed in this position
- **Valve time open:** The length of the shot pulse (The opening of the valve). This adjusts volume of the flux
- **Valve time close:** The length of time between two shot pulses (The closing of the valve)

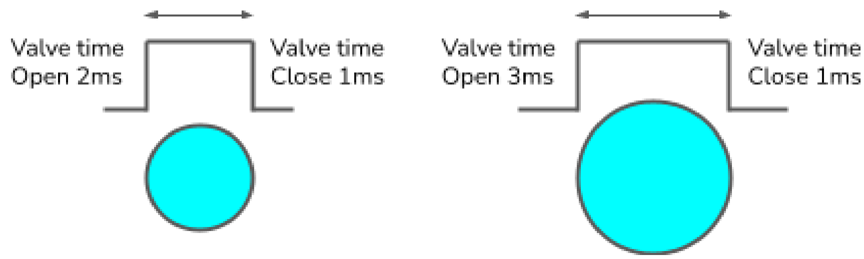
Following are the flux point variables we can influence with these settings in order of importance:

- Flux volume (Valve time open, Valve time close, No. of pulses)
- Flux flow (Pump speed)

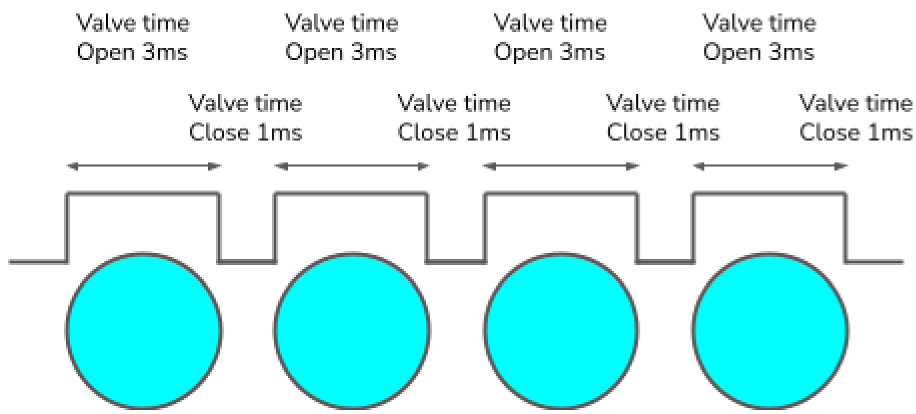
NOTE: These settings all influence each other. The key is to find the right balance experimentally.

18.4.4 Adjusting flux volume for flux points

Flux volume is adjusted by increasing or decreasing Valve time open.
Increasing the **Valve time open** will open the flux valve longer and jet a bigger drop of flux.



For single shots, the **Valve time closed** time can be left to default value.



(These four drops will be shot in the exact same location)

Certain solderability issues can only be solved by a larger volume and penetration of the flux. This can be achieved by shooting multiple drops per location by adjusting the No. of pulses.

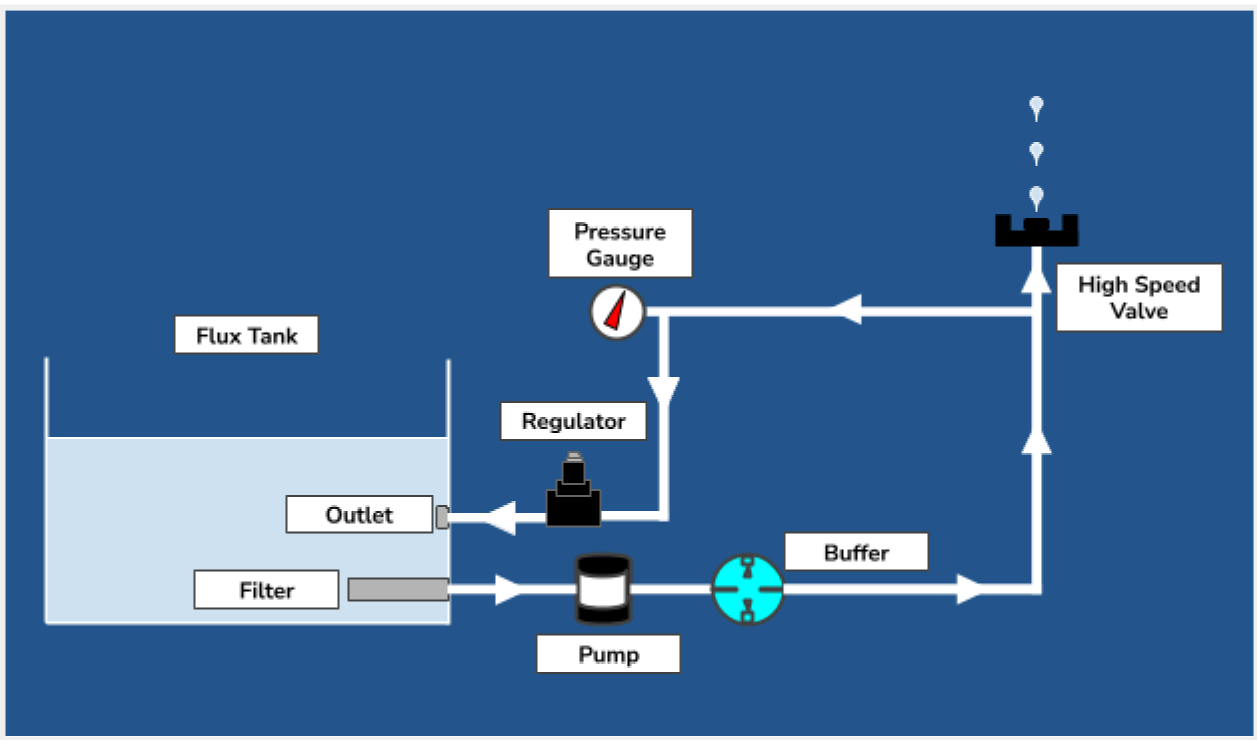
The **Valve time close** indicates the flux valve closing time between two shots.

NOTE: When the volume dispensed by each drop gets too high, it might be necessary to increase the pump speed to increase the flow of flux to the nozzle. This has to be determined experimentally. When penetration is insufficient, a higher Pump speed will give

a higher flow rate to be able to shoot deep in the holes of the PCBs. Adjustment of the regulator may also be required to increase the pressure.

18.3.5 Flux System Overview

The flux flow rate is realised by adjusting the **Pump speed**.
The flux pressure is realised by adjusting the **Regulator**.



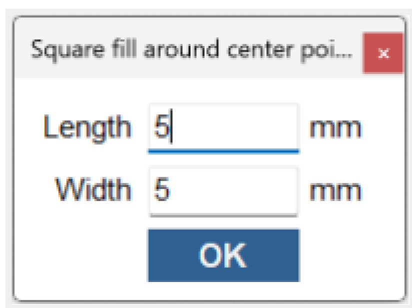
18.5 Use Array to program

In cases where there are large pads around a pin to be soldered you can use the flux array tool to put multiple dots over the area.

18.5.1 Adding Dimensioned Areas

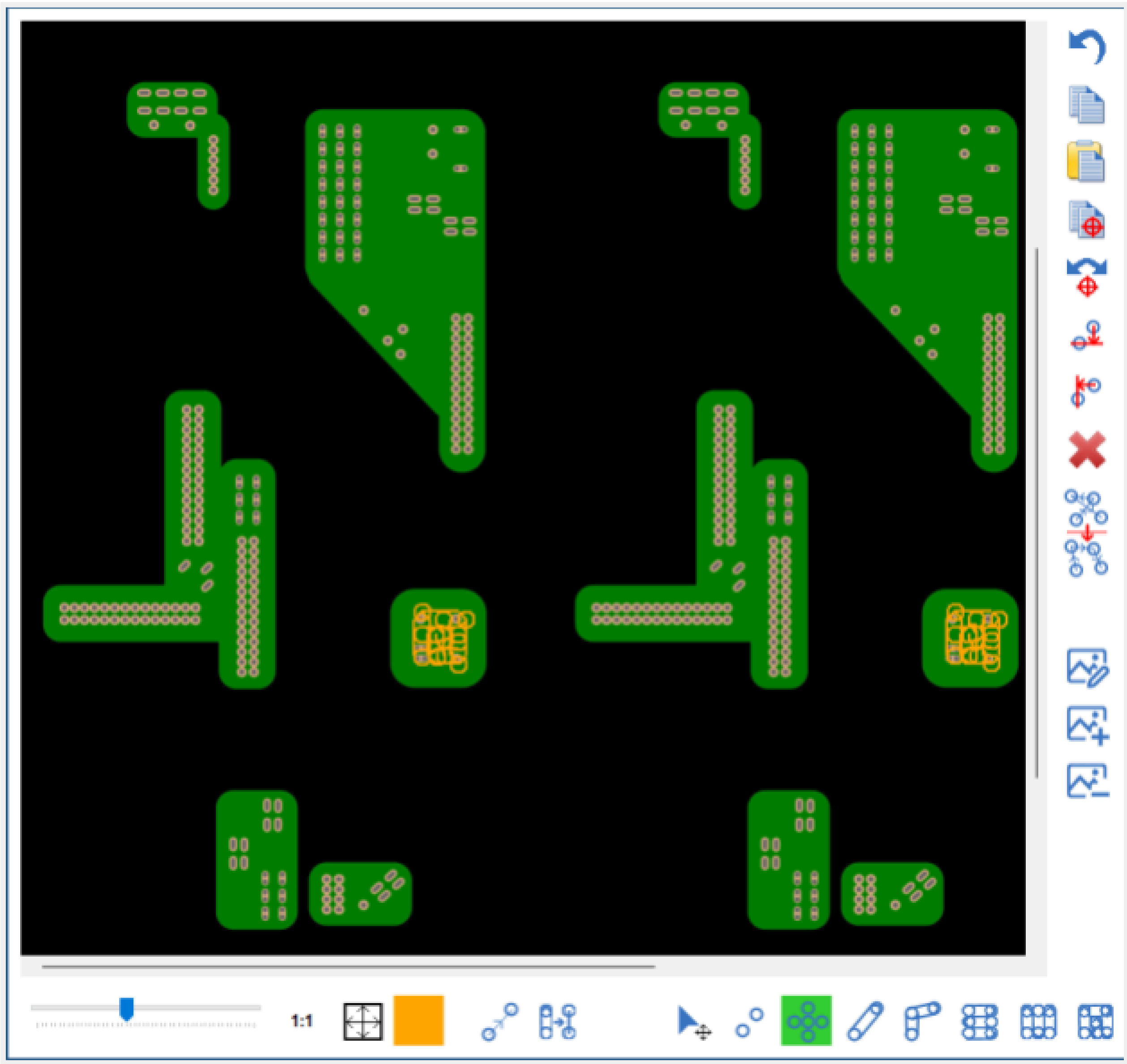
Select the Dimensioned Area tool at the bottom of the programming area.

A dimensional input window will open.



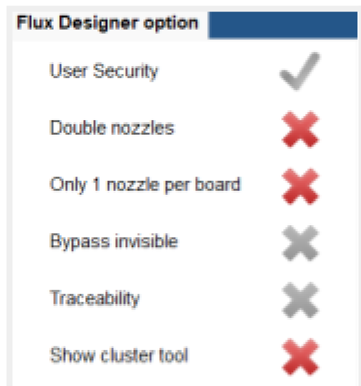
Enter the dimensions of the area to create a rectangle that will cover the area.
Click OK once ready to place down the area.

Click on the spot where the centre point of the area will be.

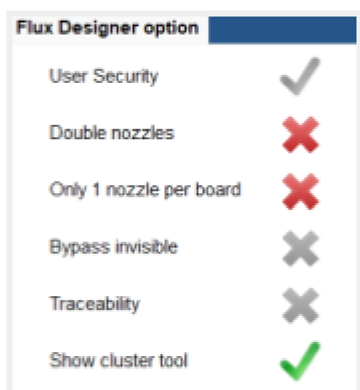


18.4.2 Adding Array points

To enable the switch to use the Array Point programming instead of Dimensioned Area. Go to **Settings → Options**. (Requires Administrator Access).

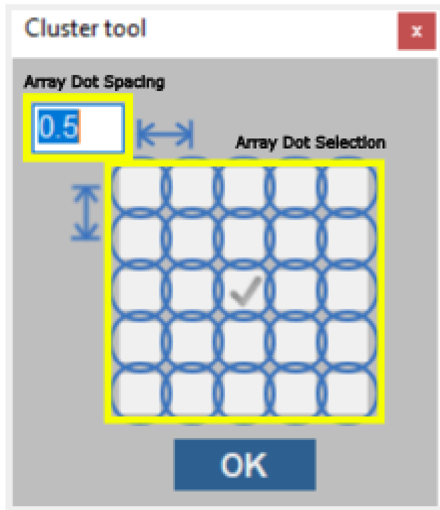


Select **Show cluster tool** to **YES.**

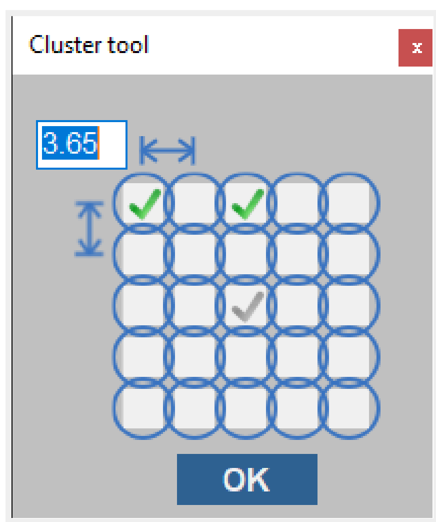


Select the flux array tool at the bottom of the programming area.

An array selection window will open.

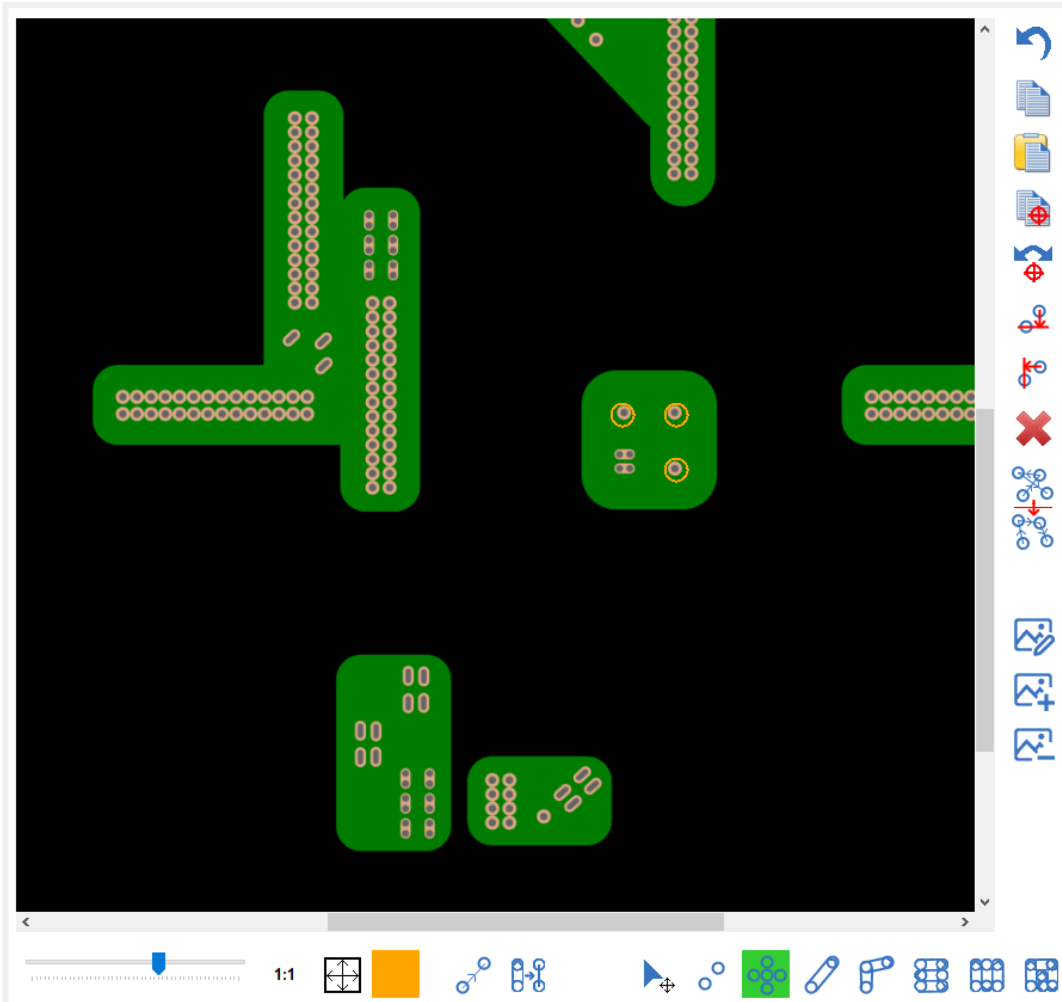


Select the points around the central dot to create an array shape that will cover the area.
Set the spacing to space the dots further apart or closer together for more or less cover.



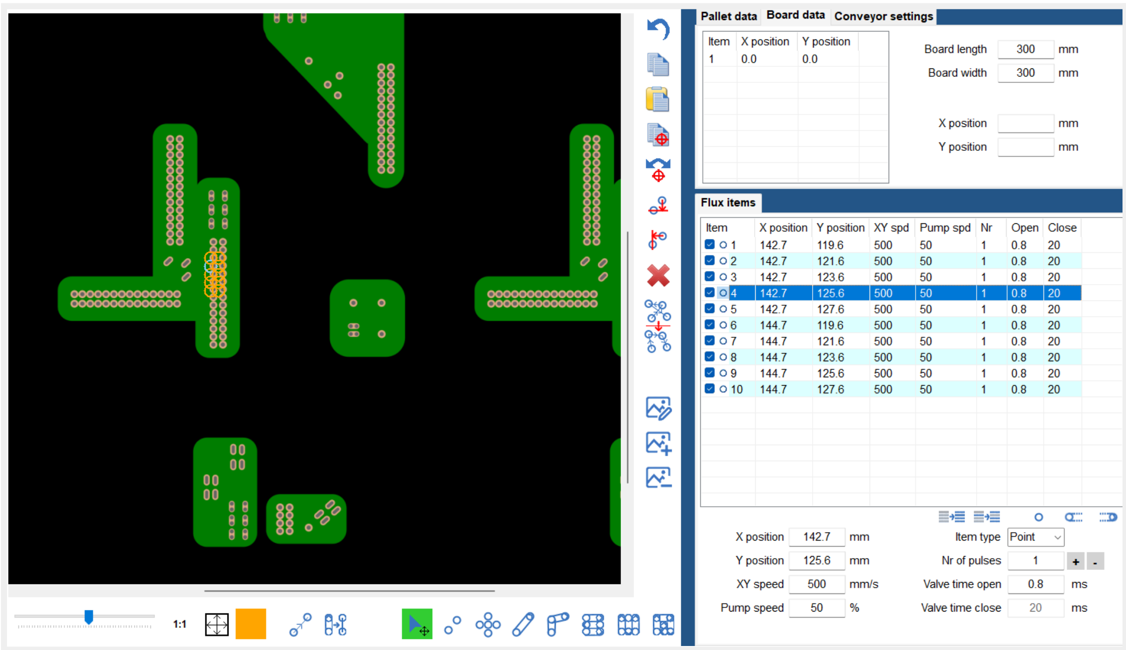
Click OK once ready to place the array.

Click on the spot where the first point (Default grey dot in selector of the flux array needs to be.



18.4.3 Selecting and changing Array points

Select the line in the time list to select the dot to change.
Pressing delete on the keyboard will remove that dot from the array or the position can be adjusted as per a single dot in the item data.



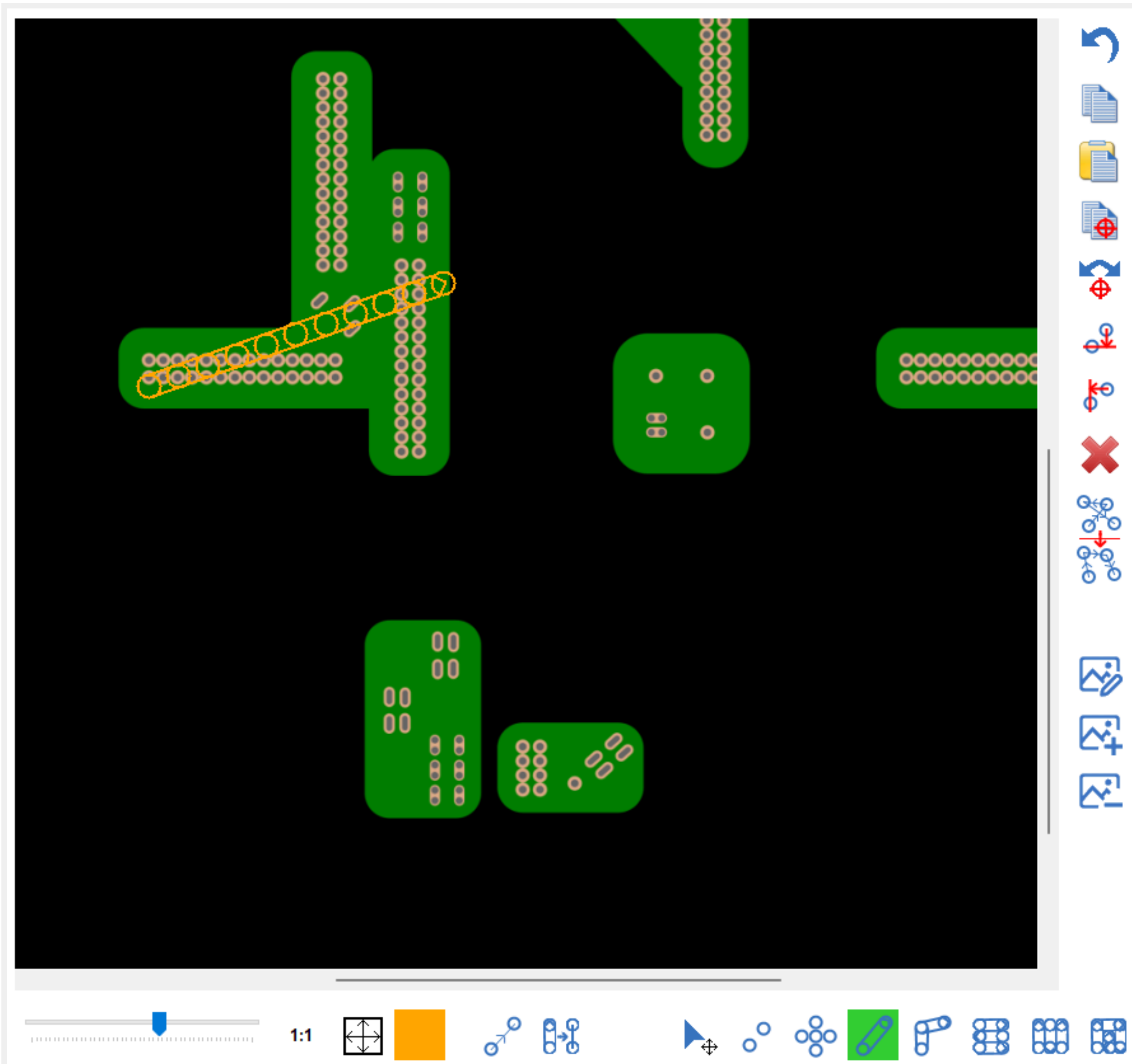
18.5 Use lines to program

In cases where there are single rows or pins to be soldered you can use the flux line tool to put single lines.

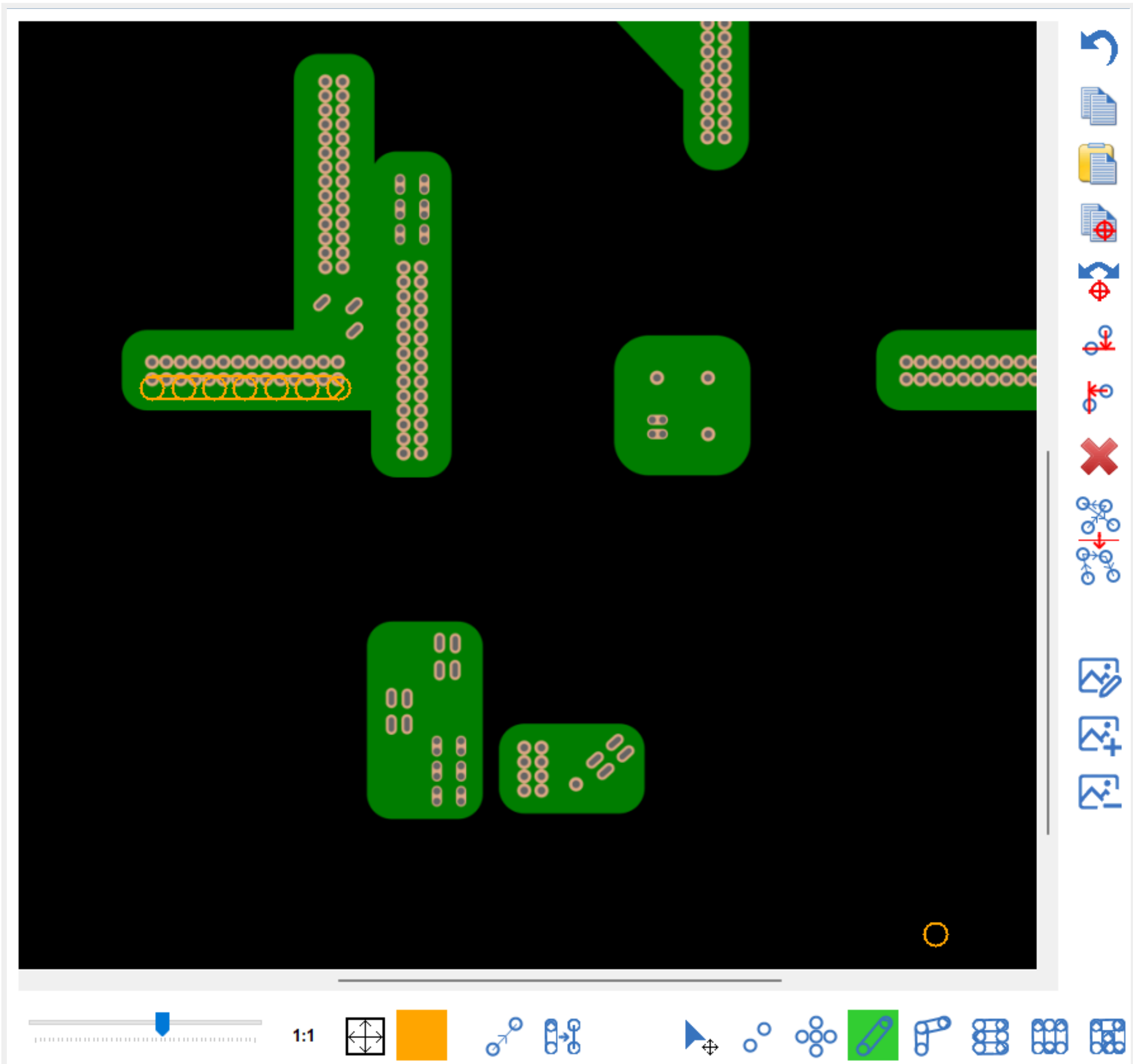
18.5.1 Adding flux lines

Select the flux line tool at the bottom of the programming area

Click and release on the spot where the first point of the flux line needs to be.

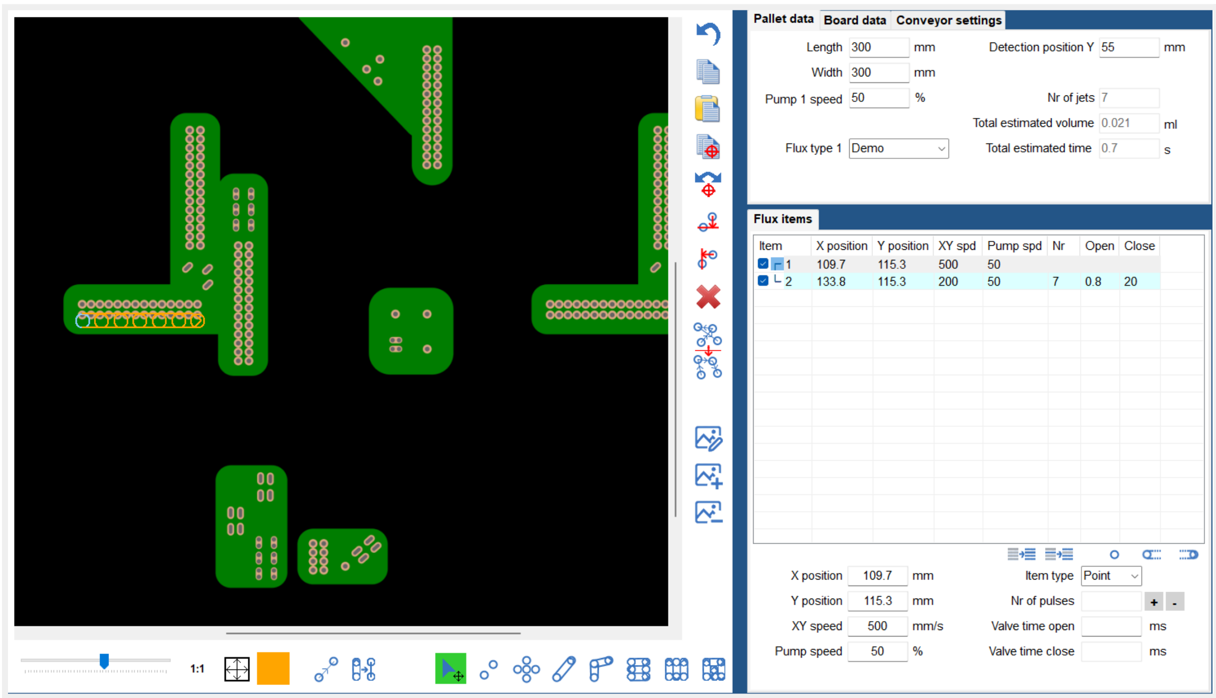


Click and release on the spot where the endpoint of the line needs to be.
Hold the ALT key to put the endpoint of the line on the same horizontal or vertical coordinate as the starting point.

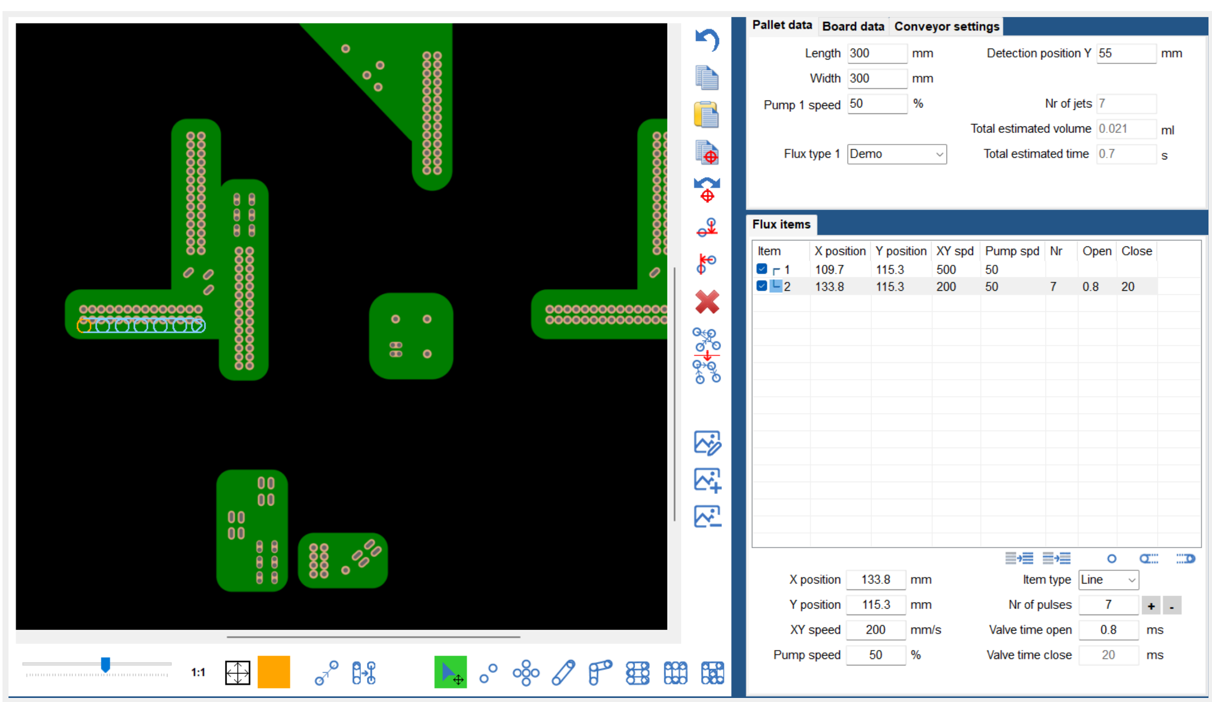


18.5.2 Selecting and moving flux lines

Select flux line starting point by a single click inside the starting point or by clicking on the starting point in the item list on the right.

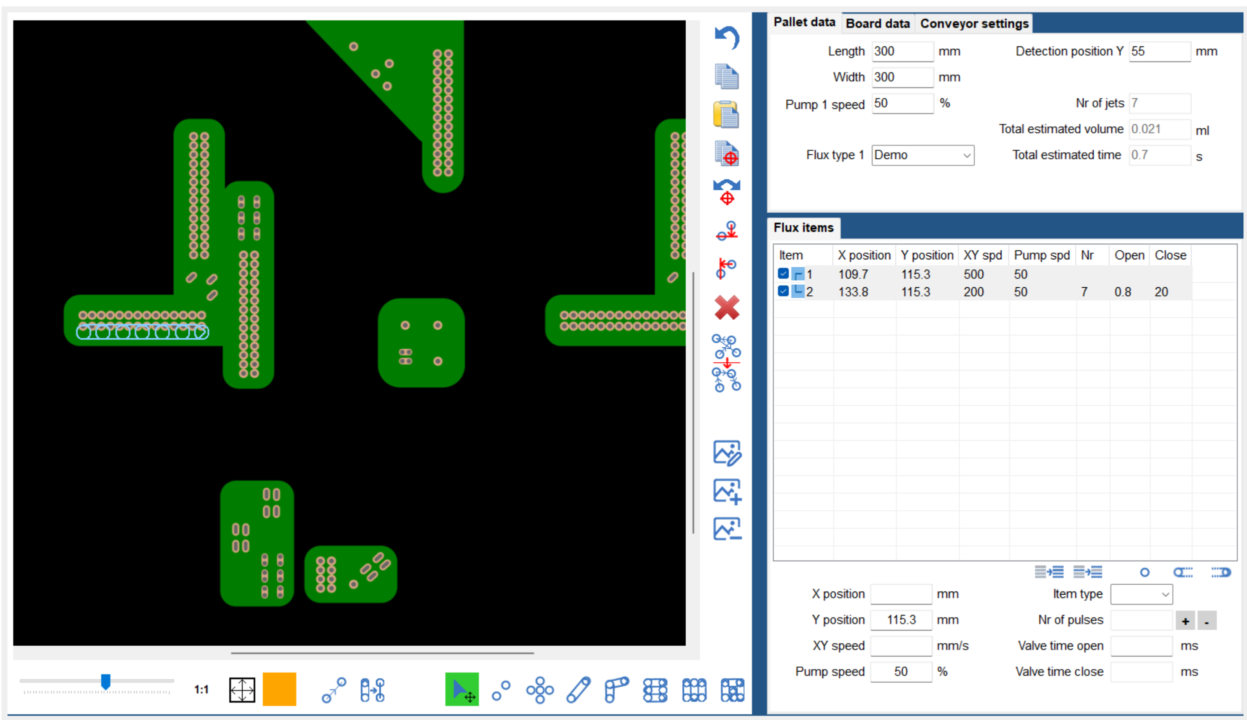


Select flux line by a single click inside the line endpoint or by clicking on the endpoint in the item list on the right. This excludes the starting point.



Select or deselect multiple points and/or line by either

- Holding CTRL and single clicking in the points that need to be selected
- Holding CTRL and single clicking on the points in the item list that need to be selected
- Click and drag a box around the points that need to be selected



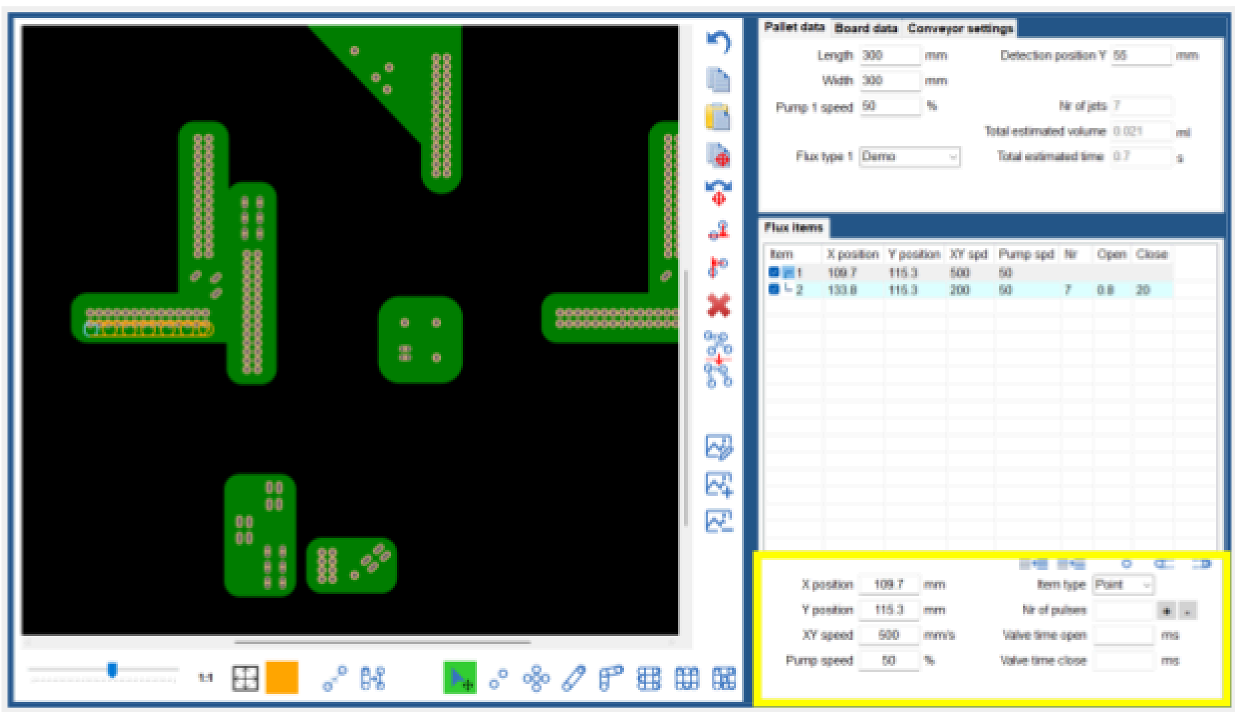
To move the selected points either:

- Click inside one of the selected points and drag them to the desired location
- Hold the ALT key while dragging to move the selected points vertically or horizontally
- Use the ARROW keys to move the selected points in fine increments

NOTE: Lines can be made longer and shorter by; selecting the start or endpoint of the line, using the ARROW keys or clicking and dragging the start or endpoint of the line, holding the ALT key while dragging to move the selected points vertically or horizontally.

18.5.3 Adjusting flux line settings

When selecting a start point the settings of this point will be accessible in the Item data area

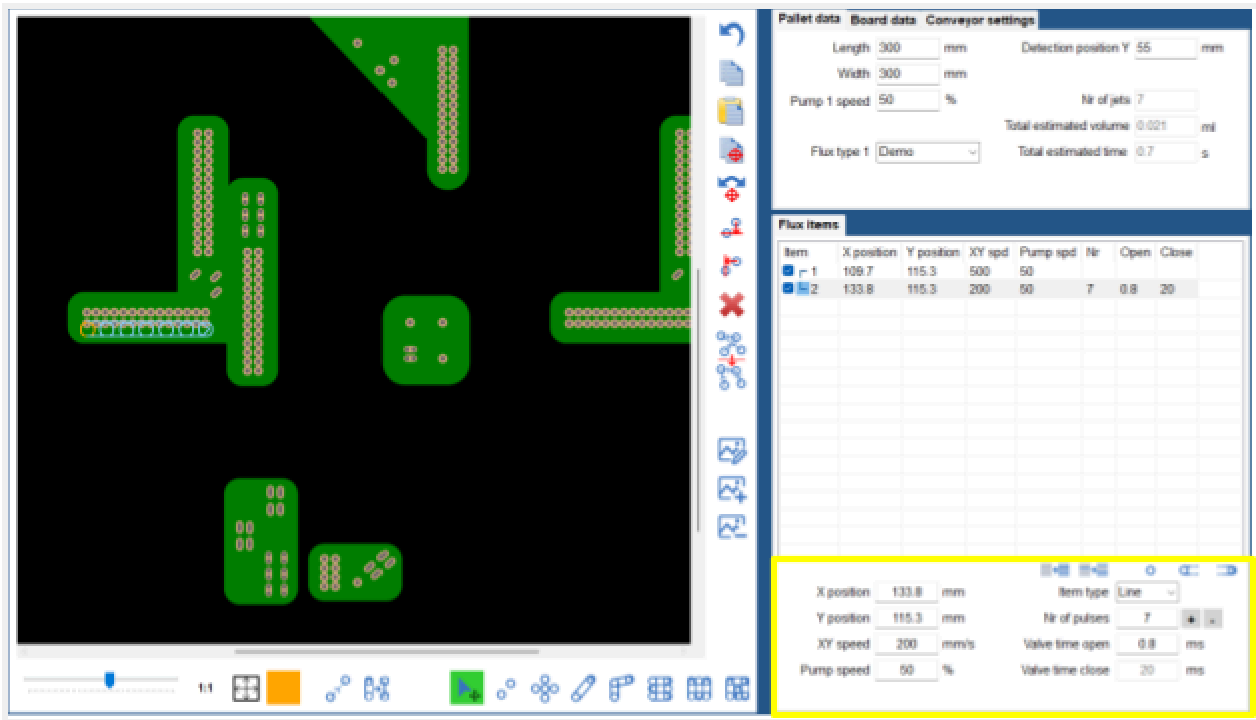


Item data for the line starting point consists of the following data:

- X-position: The actual horizontal position of the item in mm
- Y-position: The actual vertical position of the item in mm
- XY speed: The speed at which the nozzle moves to the starting point of the line in mm/s
- Pump speed: The speed of the flux pump in 35-60% at the start of the line
- Item type: A line starting point is always of the type: Point

NOTE: The starting point of the line does not contain any flux related settings. All flux related settings are done on the endpoint of the line.

When selecting the endpoint of a line the settings of this line will be accessible in the item data area



Item data for the line end point consists of the following data:

- **X-position:** The actual horizontal position of the item in mm
- **Y -position:** The actual vertical position of the item in mm
- **XY speed:** The speed at which the nozzle moves to the endpoint of the line while fluxing in mm/s
- **Pump speed:** The speed of the flux pump is 35-60%.
- **Item type:** The type of the endpoint of the line will always be: Line
- **No. of pulses:** Adjusts the spacing between drops along the line.
- **Valve time open:** The length of the shot pulse (the opening of the valve). This adjusts volume of the flux
- **Valve time close:** the length of time between two shot pulses (The closing of the valve)

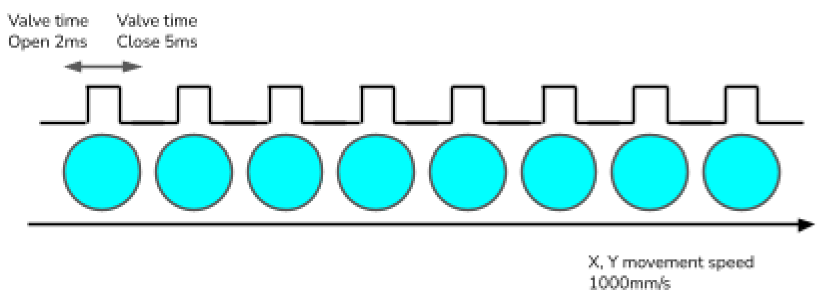
The following are the flux point variables we can influence with these settings in order of importance:

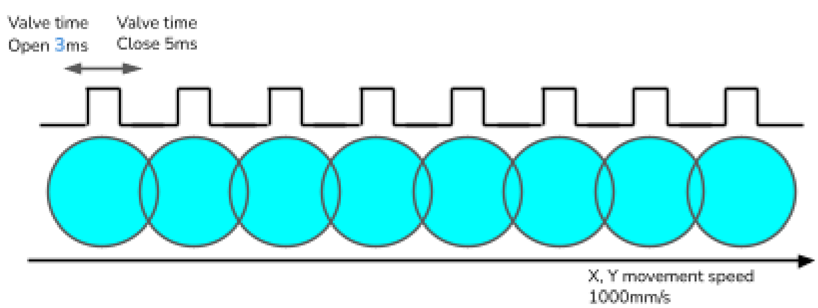
- **Flux volume** (Valve, time open, Valve time close, XY speed)
- **Flux flow rate** (Pump speed)

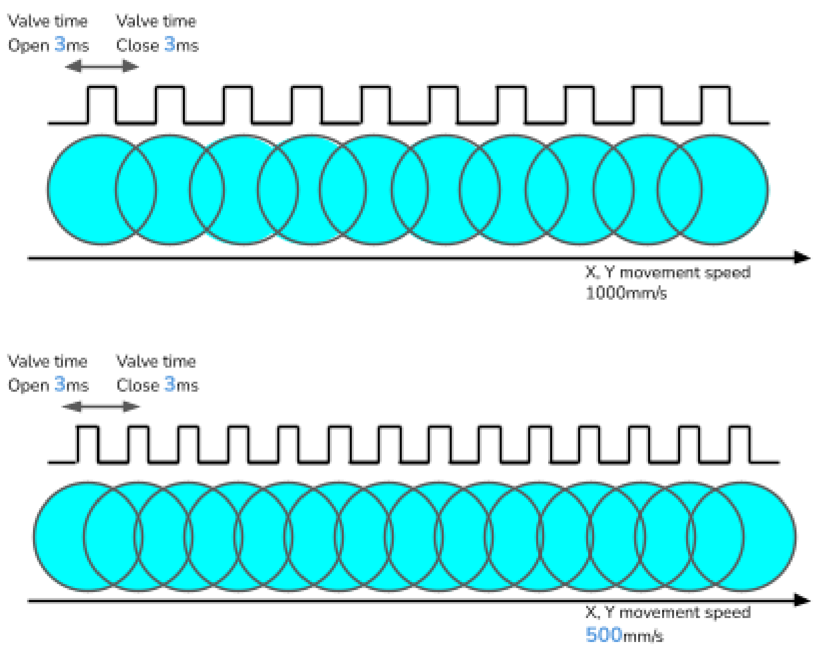
NOTE: These settings will all have influence on each other. The key is to find the right balance experimentally.

18.5.4 Adjusting flux volume for flux lines

Flux volume is adjusted by increasing or decreasing **Valve time open and Nr. of pulses per line.**







Increasing the **Valve time open** will open the flux valve longer and jet a bigger drop of flux.
Changing the **Valve time close** will make the drops overlap more or less.
On top of this, the **XY speed** can be adjusted as well to make the drops overlap more or less.

Adjusting **Nr. of drops per line** automatically adjusts **Valve time close**.

NOTE:

- **When the volume dispensed during a line gets too high, it might be necessary to increase the Pump speed to increase the flow of flux to the nozzle. This has to be determined experimentally.**

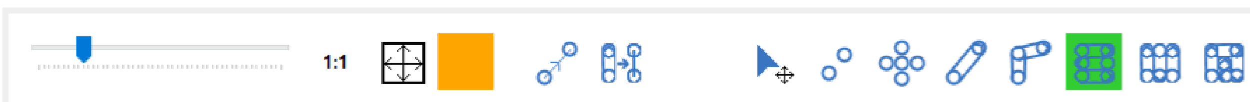
18.6 Use Area to program

In cases where there are areas to be completely covered, the flux area tools can be used. There is a tool for horizontal lines and one for vertical lines.

18.6.1 Adding flux areas

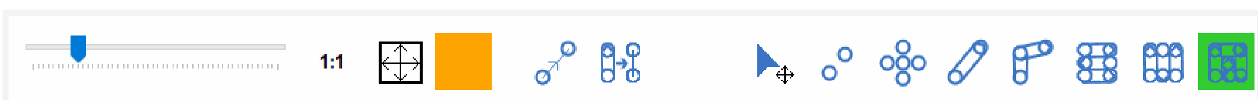
Select the flux area tool at the bottom of the programming area.

Horizontal Area

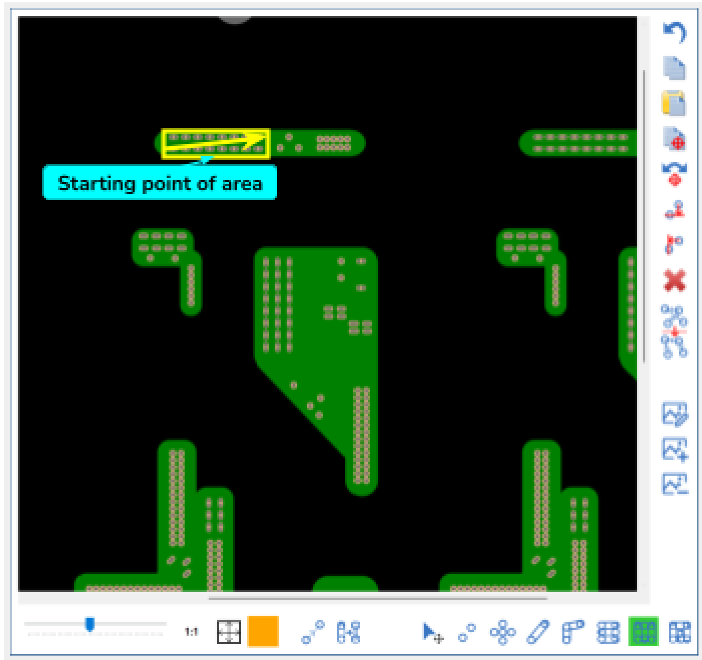


Vertical Area

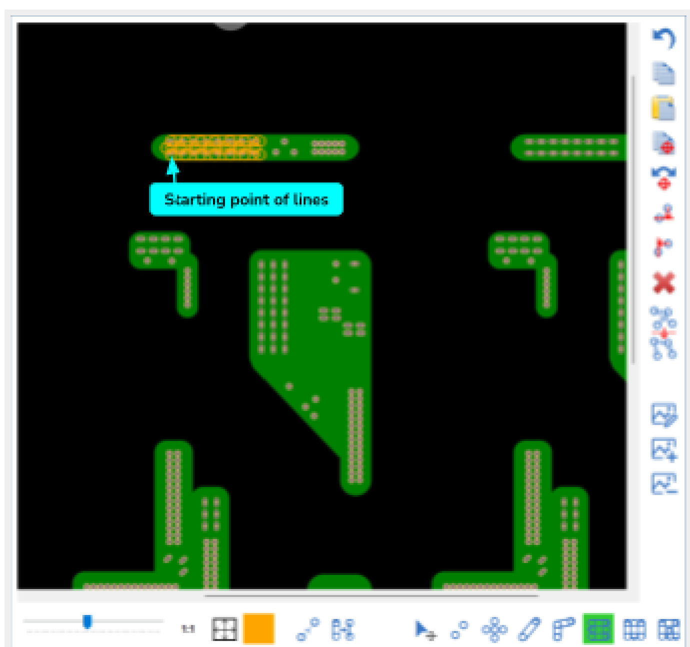
Inward Area



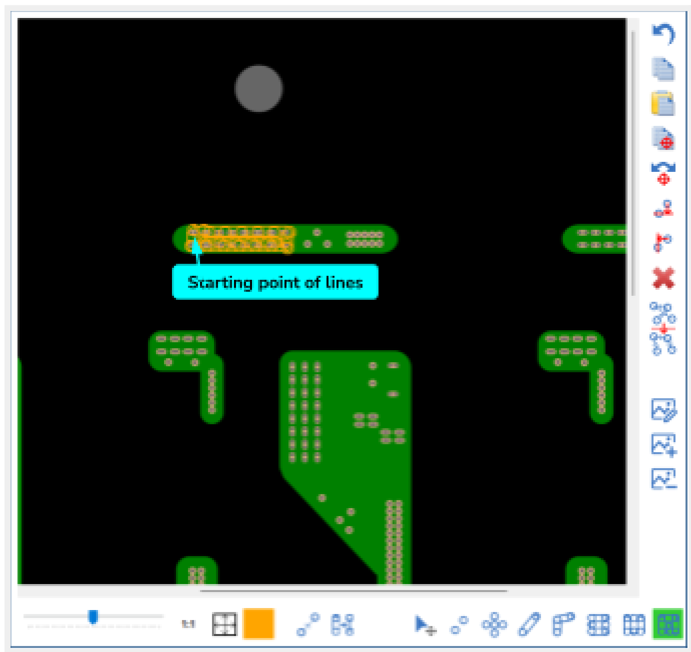
Click and hold then drag a square over the area that has to be covered. Make sure to cover the entire area.
The starting corner of the square will be where the starting point of the lines will be, except for the Flux Inwards tool, where the bottom right of the square will be the starting point.



Release the click to fill up the square area with lines.



For Flux Inwards Tool,

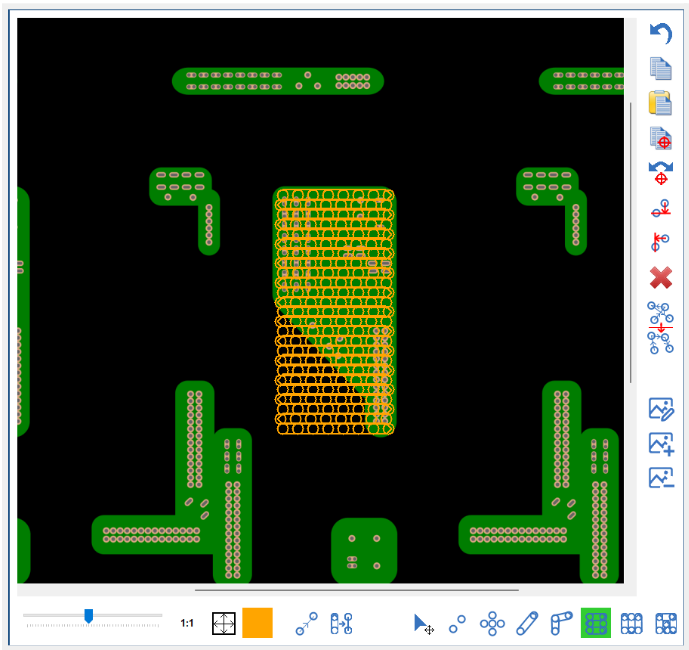


Depending on the Valve time open in the Flux Data Settings, the lines filling up the area will be wider or narrower.
This is a way to adjust flux quantity in an area

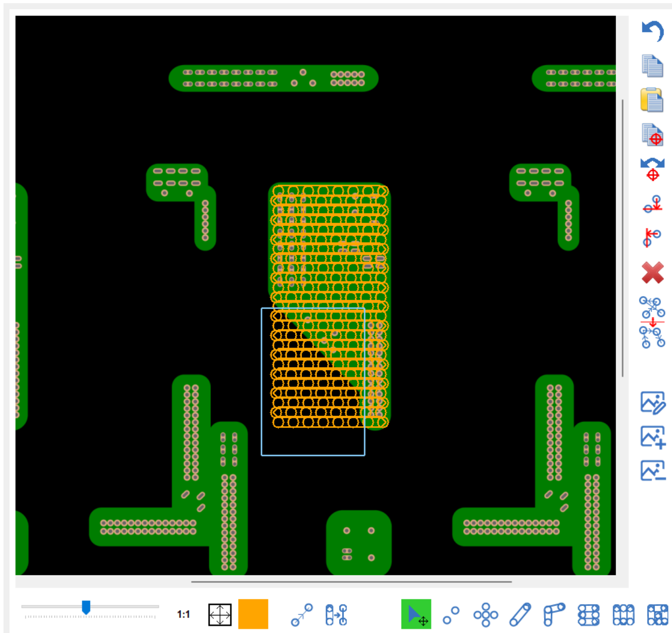
NOTE: Valve time open in Flux data settings needs to be changed before creating the area.

18.6.2 Selecting and moving flux lines to fit an area

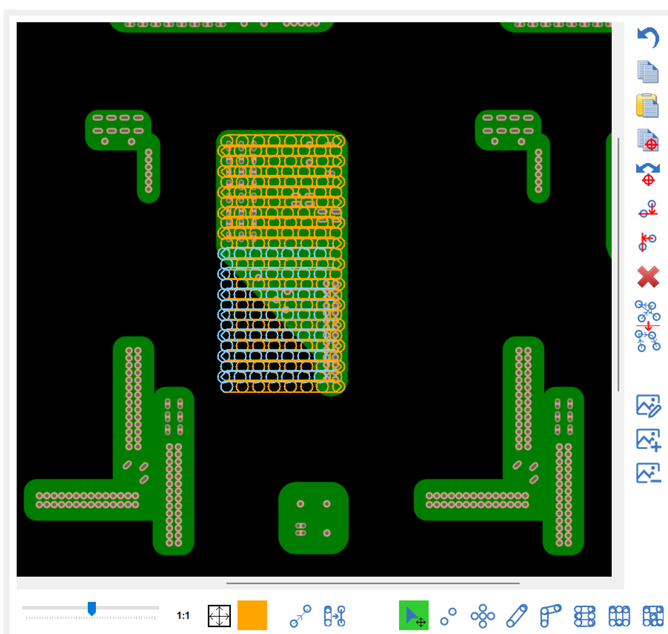
Start by covering an area as described in “Adding flux areas”.

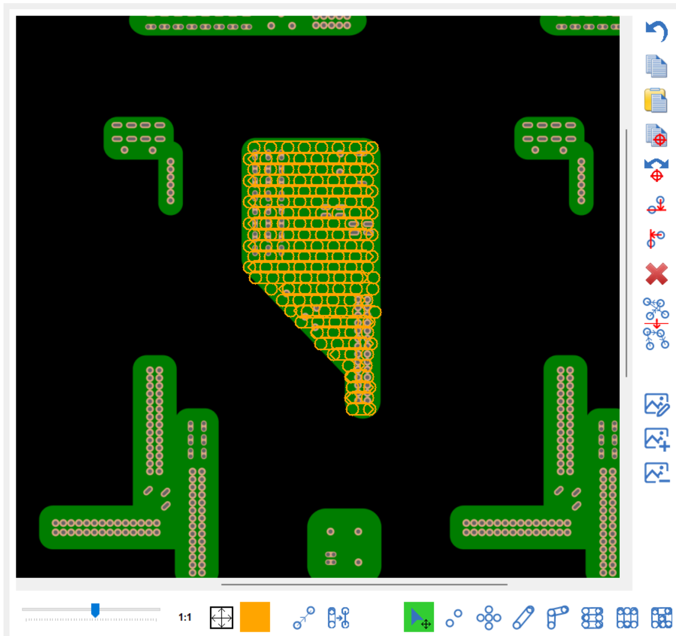


Select and move flux line points as described in “Selecting and moving flux lines”
Multiple points can be adjusted at the same time.

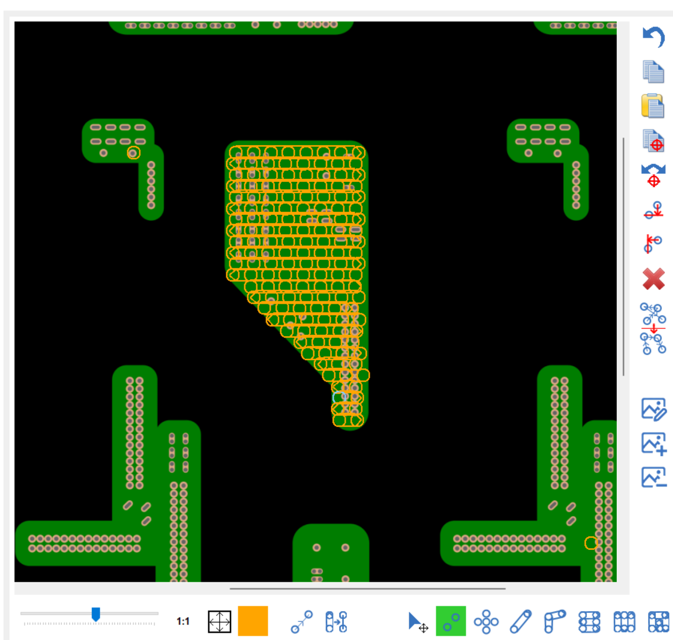


- Drag a selection box around the end points that need to be adjusted.
- Select the lines by clicking in the Item list. Hold CTRL to select multiple lines.



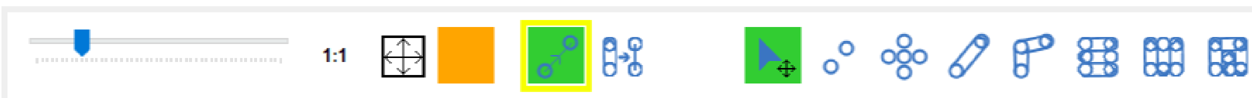


Adjust all the lines to fit the area as well as possible
Extra single lines and/or points can be added to fill up the area better
See “Adding flux points” and “Adding flux lines”

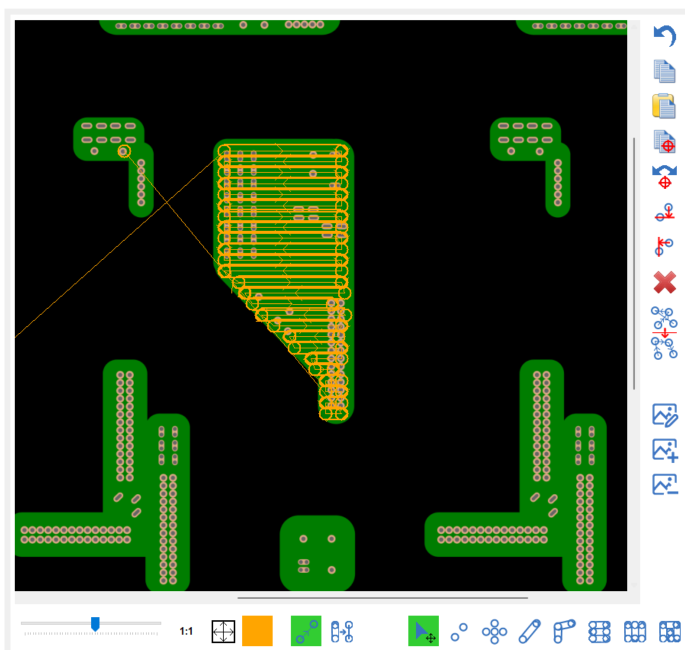


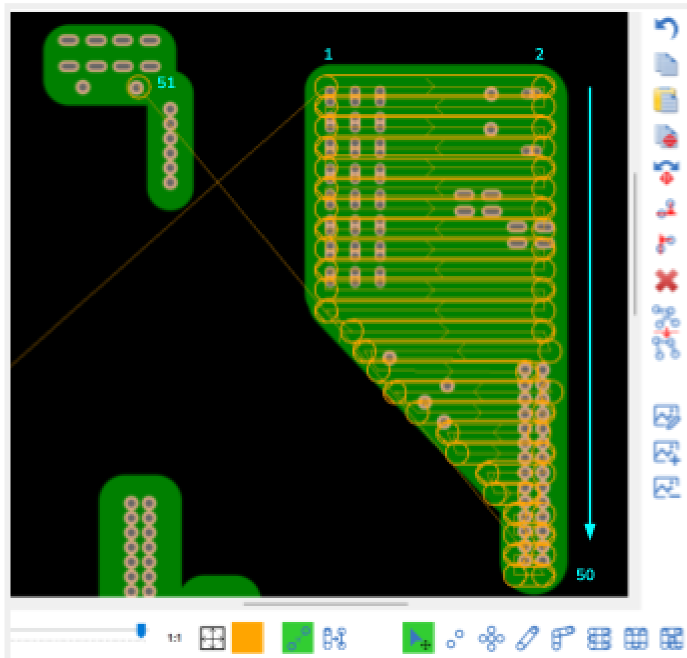
It is possible that by adding extra single lines and points the sequence of the items becomes less than ideal.

Select the path direction button to show the nozzle path.



The display will change to show the nozzle path.





The order of the items can be improved. In this case it would be better for cycle time to go from item 51 to 1 then go to item 50.
This can be achieved as follows:

Select item 51 by using CTRL and select each item. Or by using SHIFT and selecting all items (in cases where there are multiple items to be moved)

Flux items

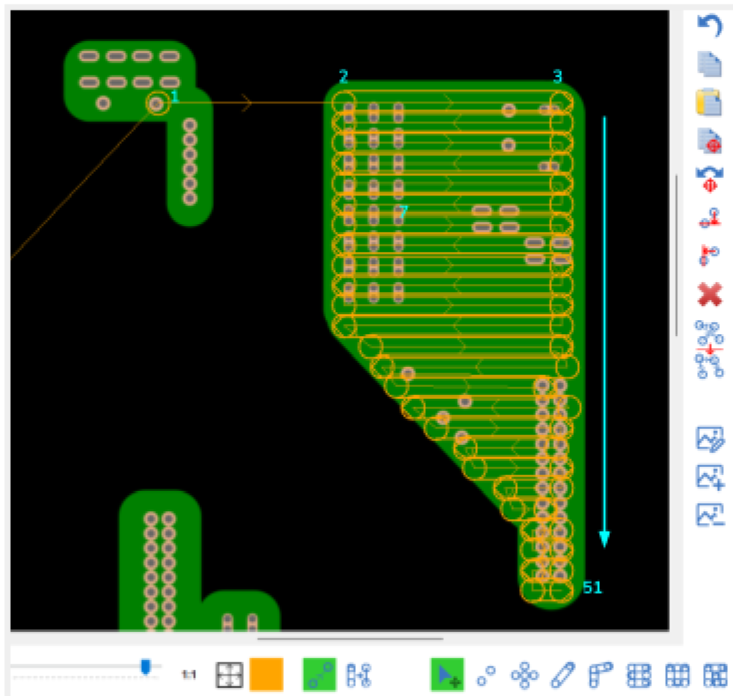
Item	X position	Y position	XY spd	Pump spd	Nr	Open	Close
└ 36	174.0	165.7	200	50	4	0.8	20
┌ 37	175.2	163.0	500	50			
└ 38	186.6	163.0	200	50	4	0.8	20
┌ 39	186.6	160.4	500	50			
└ 40	179.2	160.4	200	50	3	0.8	20
┌ 41	180.2	157.7	500	50			
└ 42	184.6	157.7	200	50	3	0.8	20
┌ 43	186.6	155.0	500	50			
└ 44	182.8	155.0	200	50	2	0.8	20
┌ 45	182.8	152.4	500	50			
└ 46	186.6	152.4	200	50	2	0.8	20
┌ 47	186.6	149.7	500	50			
└ 48	182.8	149.7	200	50	2	0.8	20
┌ 49	182.8	147.1	500	50			
└ 50	186.6	147.1	200	50	2	0.8	20
O 51	133.8	210.8	500	50	1	0.8	20

Click on the selected item(s) and drag them to position between item 6 and 7. The small arrow on the left will show where the lines will be inserted.

Flux items

Item	X position	Y position	XY spd	Pump spd	Nr	Open	Close
┌ 1	158.2	210.8	500	50			
└ 2	186.6	210.8	200	50	8	0.8	20
┌ 3	186.6	208.2	500	50			
└ 4	158.2	208.2	200	50	8	0.8	20
┌ 5	158.2	205.5	500	50			
└ 6	186.6	205.5	200	50	8	0.8	20
┌ 7	186.6	202.8	500	50			
└ 8	158.2	202.8	200	50	8	0.8	20
┌ 9	158.2	200.2	500	50			
└ 10	186.6	200.2	200	50	8	0.8	20
┌ 11	186.6	197.5	500	50			
└ 12	158.2	197.5	200	50	8	0.8	20
┌ 13	158.2	194.9	500	50			
└ 14	186.6	194.9	200	50	8	0.8	20
┌ 15	186.6	192.2	500	50			
└ 16	158.2	192.2	200	50	8	0.8	20
┌ 17	158.2	189.6	500	50			

The result shows a new sequence now as follows:



Flux items

Item	X position	Y position	XY spd	Pump spd	Nr	Open	Close
○ 1	133.8	210.8	500	50	1	0.8	20
┌ 2	158.2	210.8	500	50			
└ 3	186.6	210.8	200	50	8	0.8	20
┌ 4	186.6	208.2	500	50			
└ 5	158.2	208.2	200	50	8	0.8	20
┌ 6	158.2	205.5	500	50			
└ 7	186.6	205.5	200	50	8	0.8	20
┌ 8	186.6	202.8	500	50			
└ 9	158.2	202.8	200	50	8	0.8	20
┌ 10	158.2	200.2	500	50			
└ 11	186.6	200.2	200	50	8	0.8	20
┌ 12	186.6	197.5	500	50			
└ 13	158.2	197.5	200	50	8	0.8	20
┌ 14	158.2	194.9	500	50			
└ 15	186.6	194.9	200	50	8	0.8	20
┌ 16	186.6	192.2	500	50			
└ 17	158.2	192.2	200	50	8	0.8	20

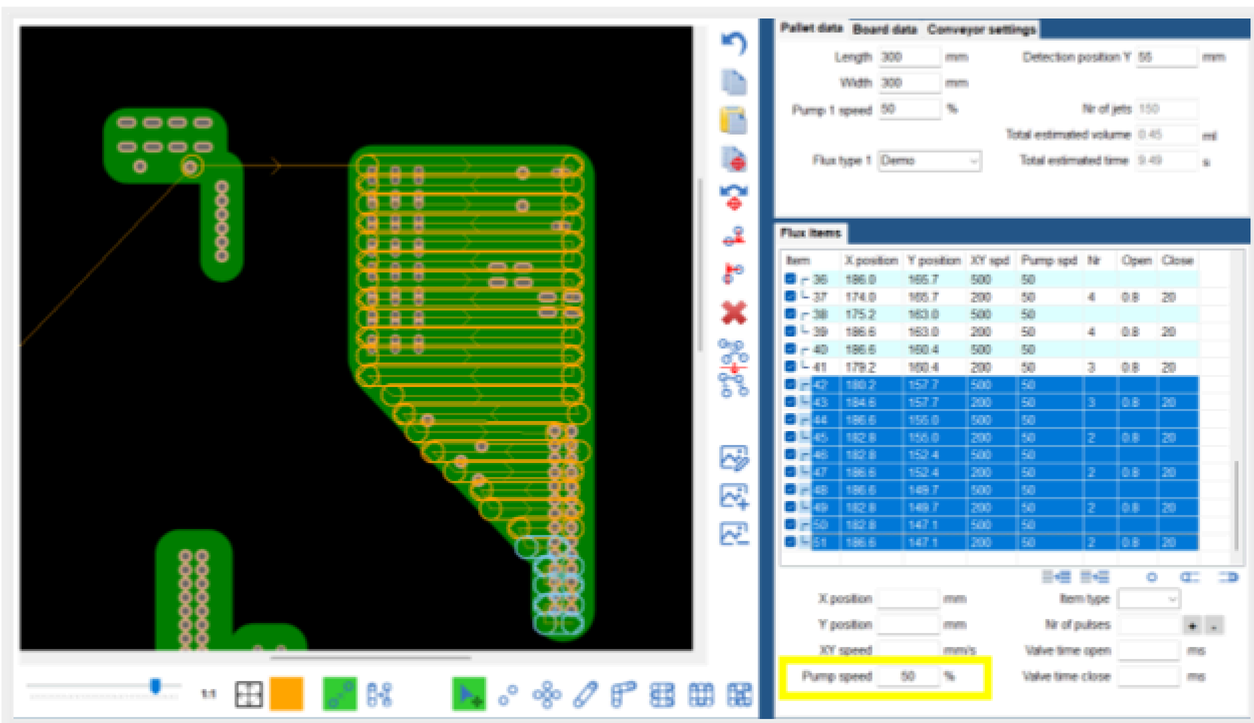
18.6.3 Adjusting flux area settings

Each area consists of individual flux lines that can be individually adjusted or together.

In order to change individual line settings the following can be done:

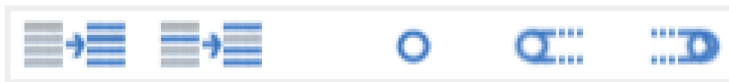
Select the items of which the settings need to be adjusted according to “Selecting and moving flux ponts” or “Selecting and moving flux lines”

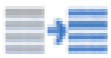
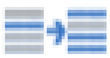
Any settings that are identical for all selected lines will display in its respective item data field.



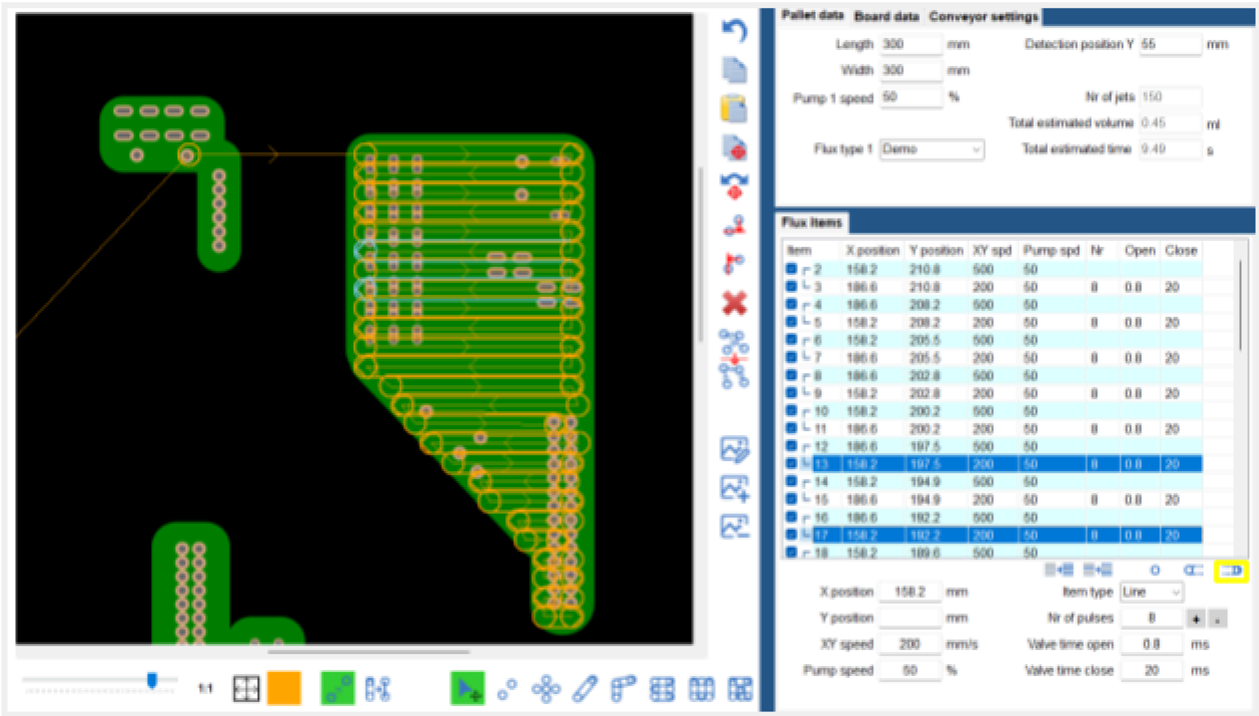
NOTE: Any setting that is changed will be applied to all selected items

The following buttons will adjust your selection:



	This will select all items in the list
	This will select the inverse of the selection
	This will filter out the points from the selection
	This will filter out the starting points of the flux lines from the selection
	This will filter out the end points/body of the flux lines from the selection

For example in order to only select endpoints of the lines that are selected press the “Select all lines” button.

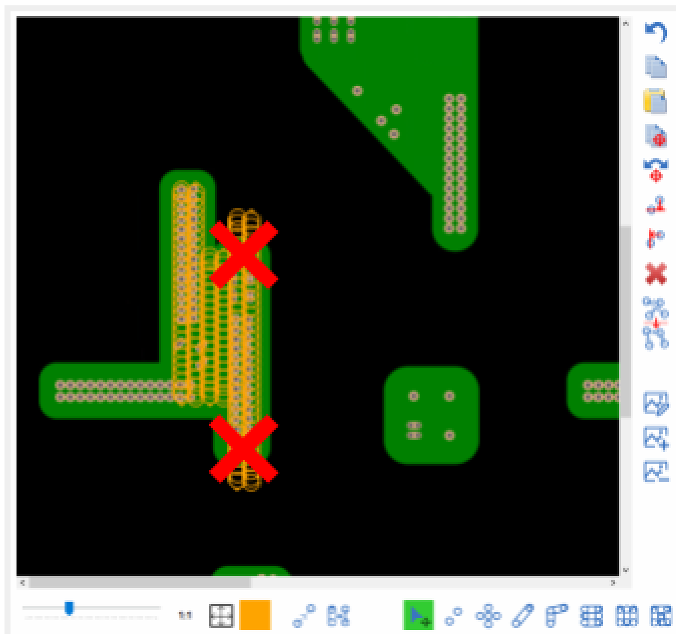


Changing XY speed, Pump speed, Valve time open and Valve time close will now change it for all lines selected.

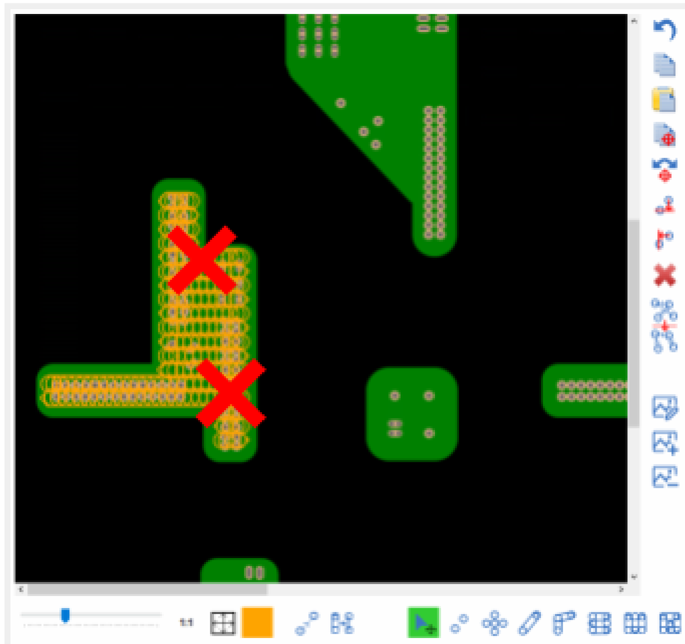
NOTE: It is advised to make Pump speed the same for flux line starting points and lines.

18.6.4 Examples of things to avoid

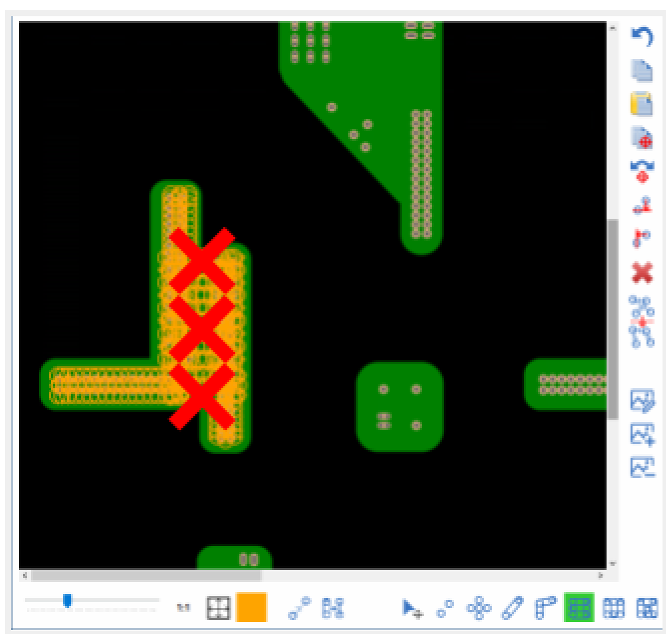
Do not have lines extending onto the pallet. This will make the pallet dirty.



Use the correct horizontal or vertical tools for areas. Do not use the horizontal tool for example for an area which is higher than it is wide.



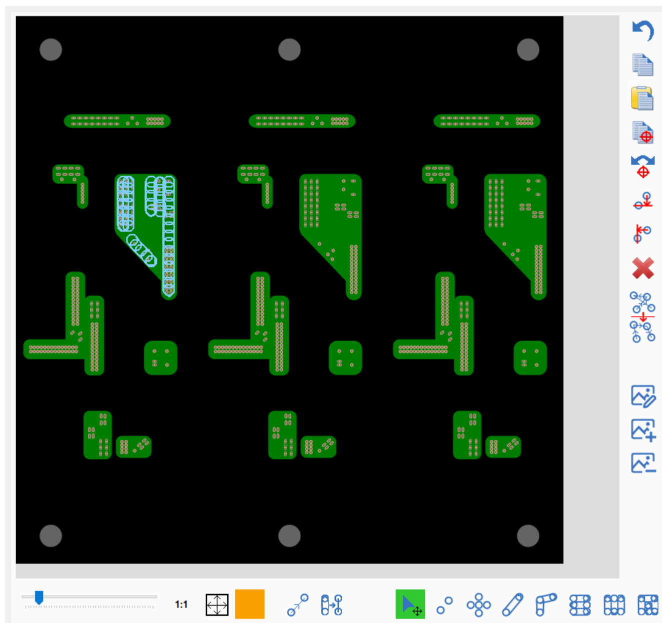
Avoid crossing over lines of different directions to create more flux volume. Change flux settings to create more flux quantity.



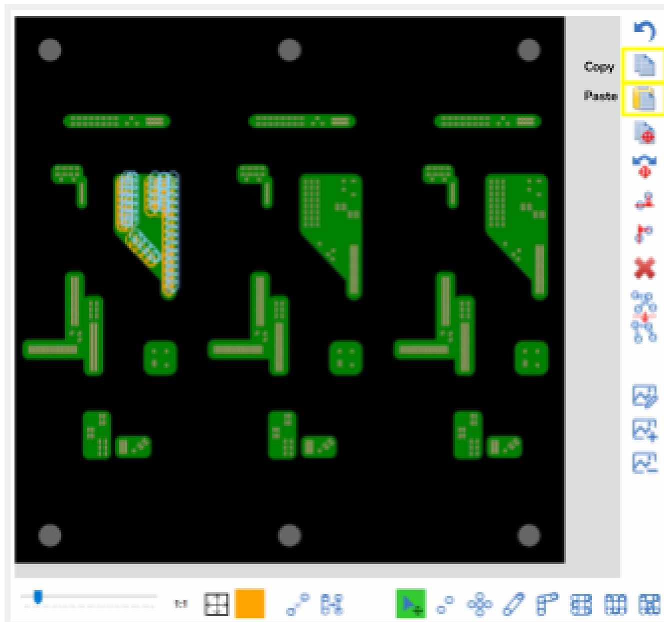
18.7 Additional programming functions for pallets with multiple PCBs

18.7.1 Copy/Paste

Select all items to be copied

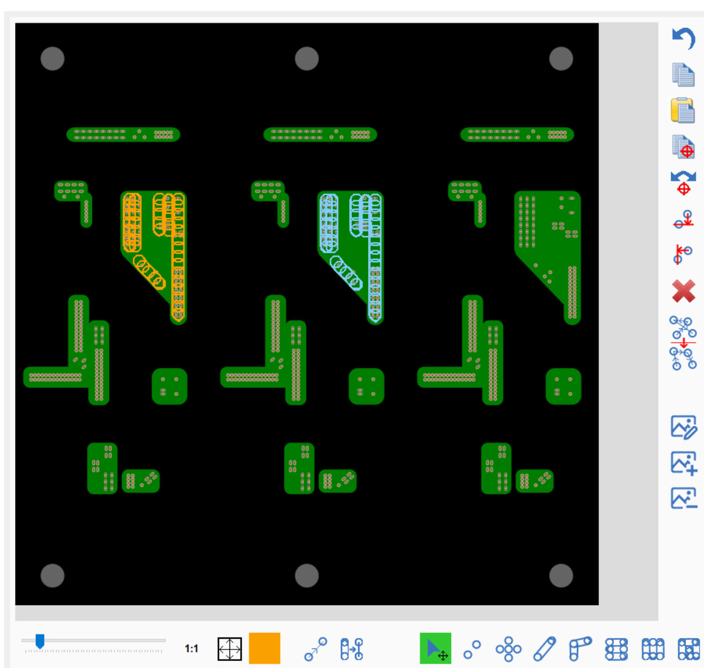


Click on the Copy button to copy the items.



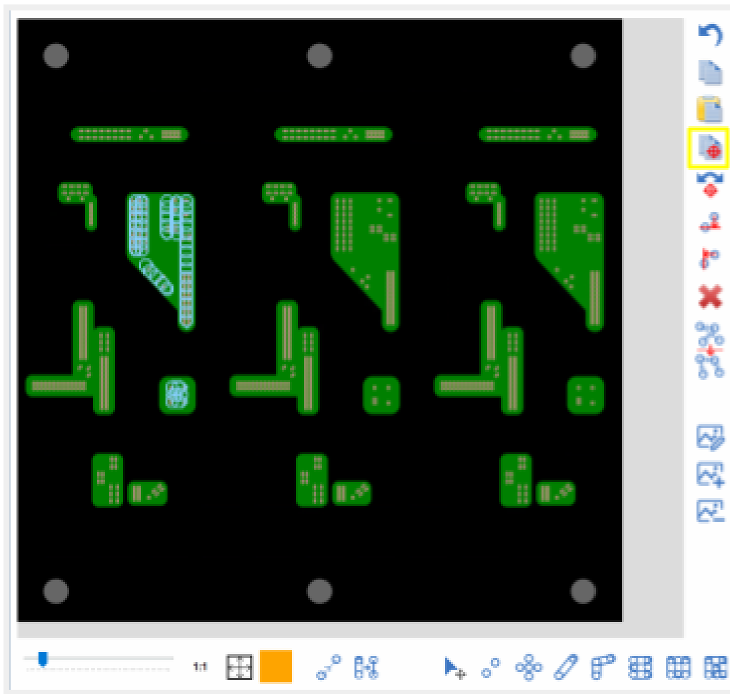
Click on the Paste button to paste the items.

Drag the items to the correct position

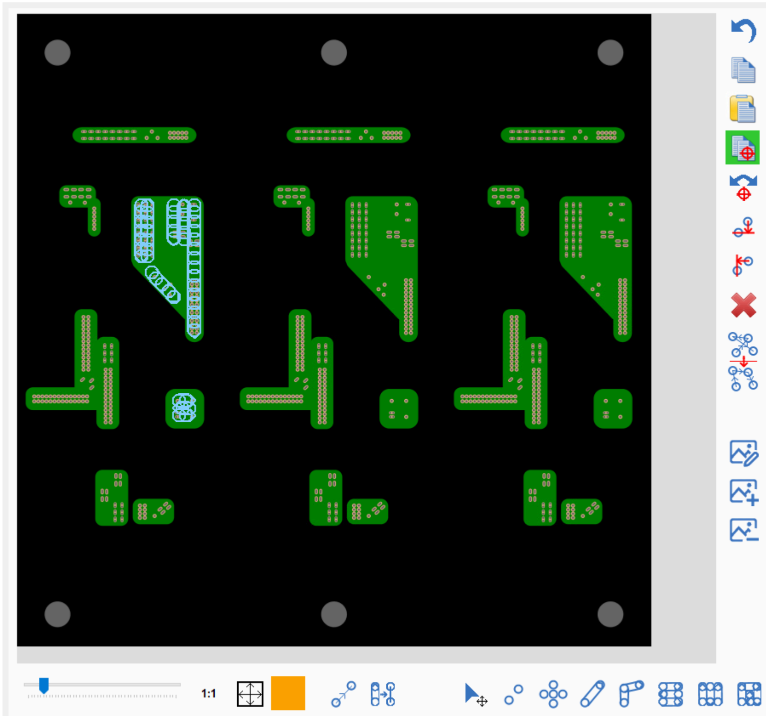


18.7.2 Copy/Paste with basepoint

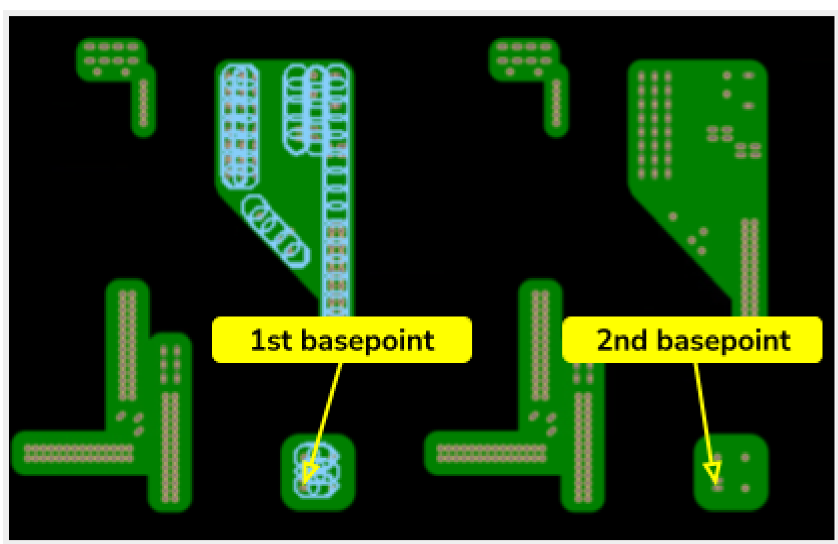
Select all items to be copied



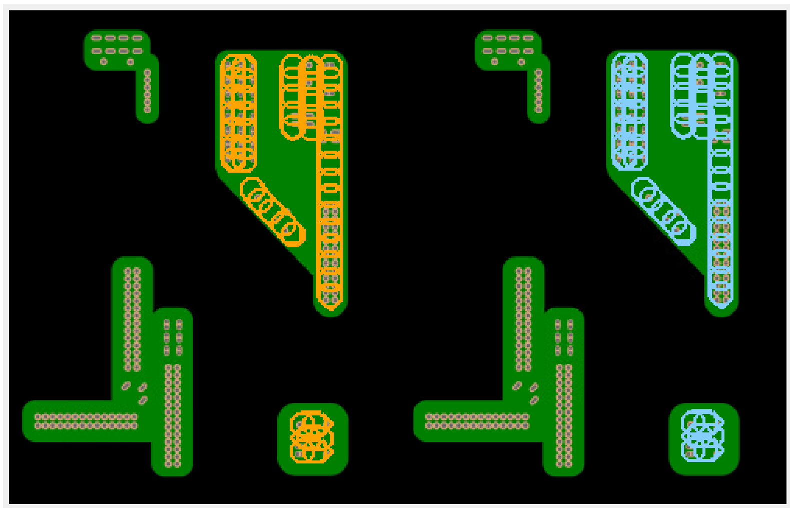
Click on the Copy with basepoint button



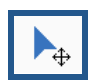
Find a point that is identical for the PCBs
This could be a corner point of an area, a pin, a hole etc.



Click on the basepoint of the first PCB, then click on the identical point on the second PCB to paste the items.



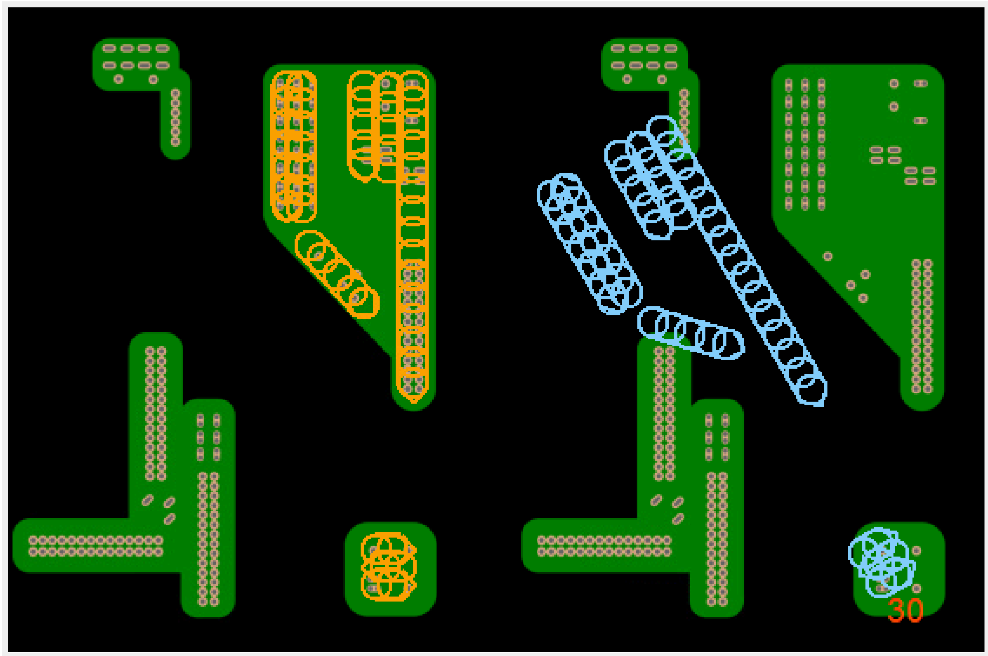
Clicking again will paste another instance of the copied items.

To deactivate the function, click the select button  or activate any other function

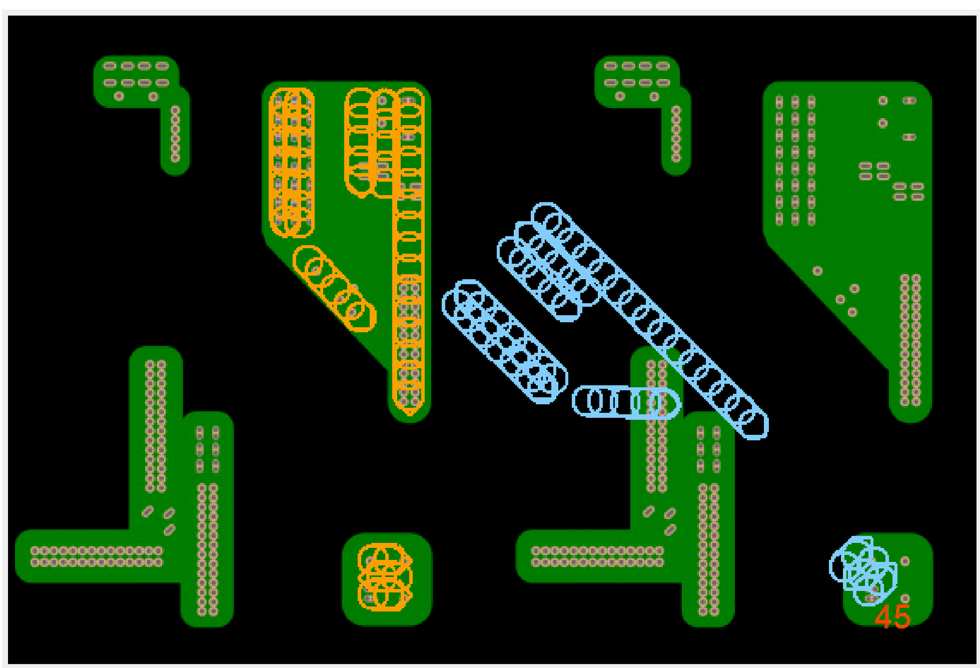
18.7.3 Rotate

Select the items to be rotated
Activate the **Rotate** button by clicking it
Then click on a spot on the PCB to select it as the rotation centre

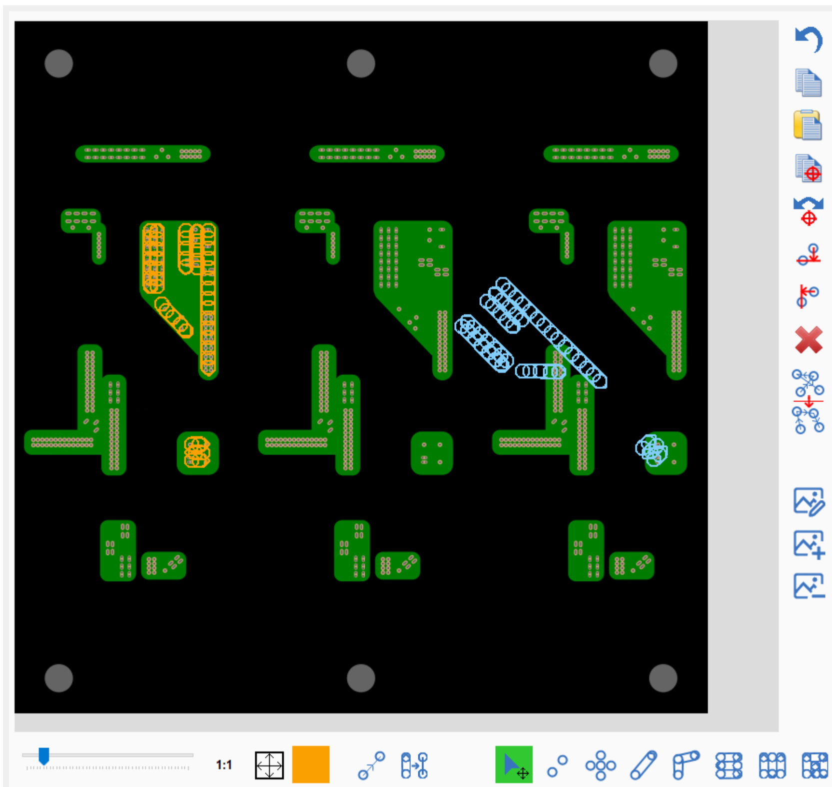
Click and hold on any position next to the selected items and drag in a circular motion to rotate the selected items. The angle will be displayed in red. Release the click to stop the rotation.



Keep the ALT key pressed to rotate through fixed increments of 45°
Release the click to stop the rotation.

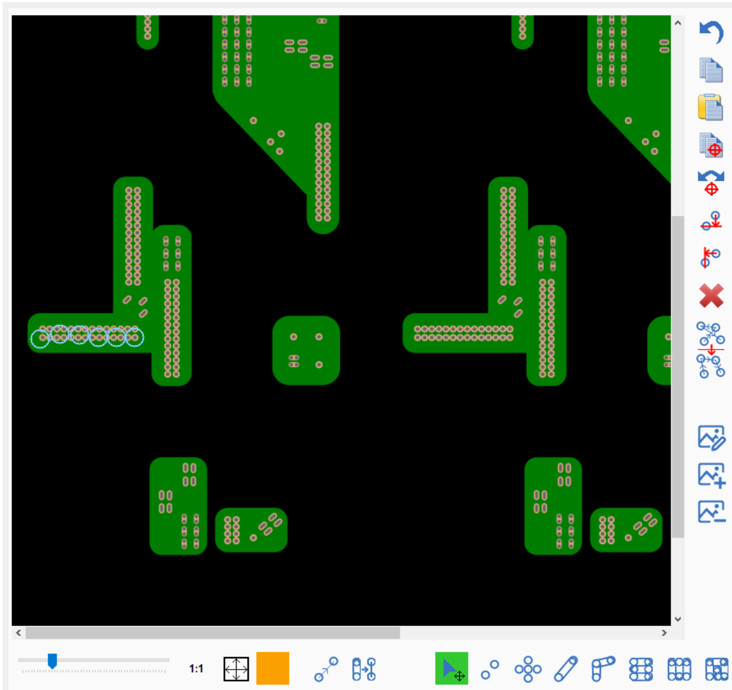


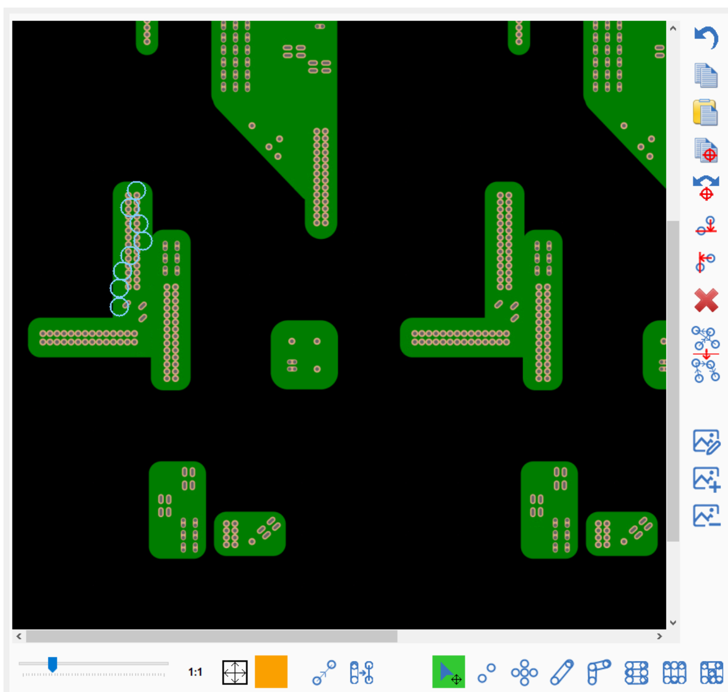
NOTE: After rotating items, they can be moved in the right position by following "Selecting and moving flux points" or "Selecting and moving flux lines".



18.7.4 Align

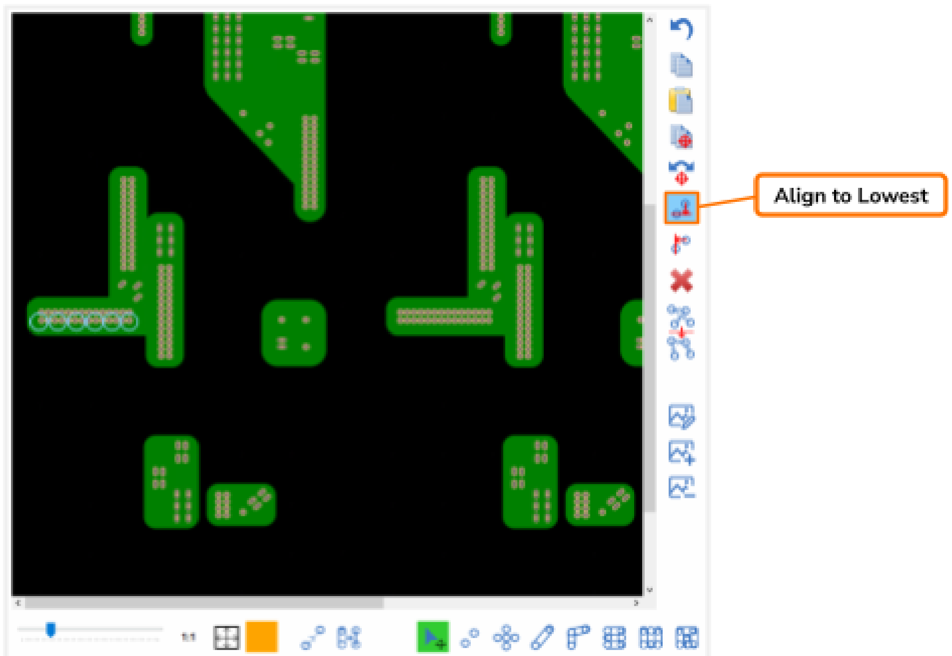
Select the items to be aligned

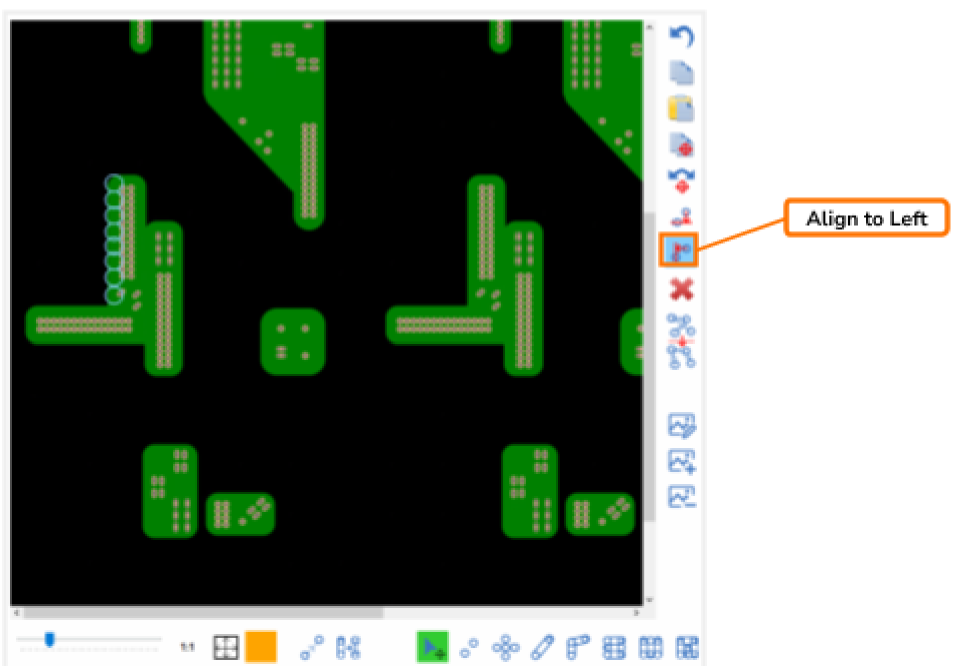




NOTE: If aligning points vertically, all points will be aligned to the left most point, If aligning horizontally, all points will be aligned to the lowest point

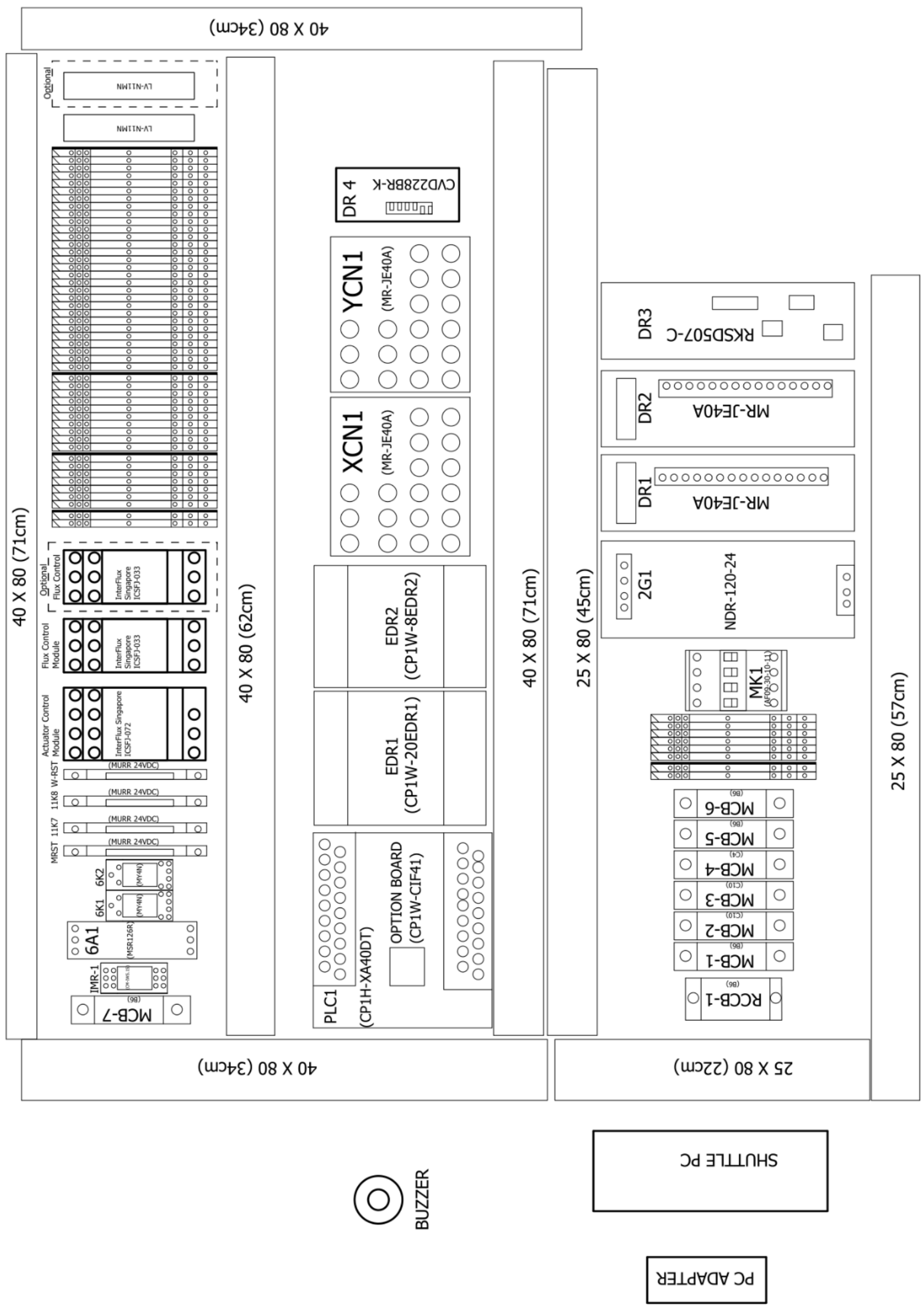
Click the “Align to lowest” button or “Align to left” button





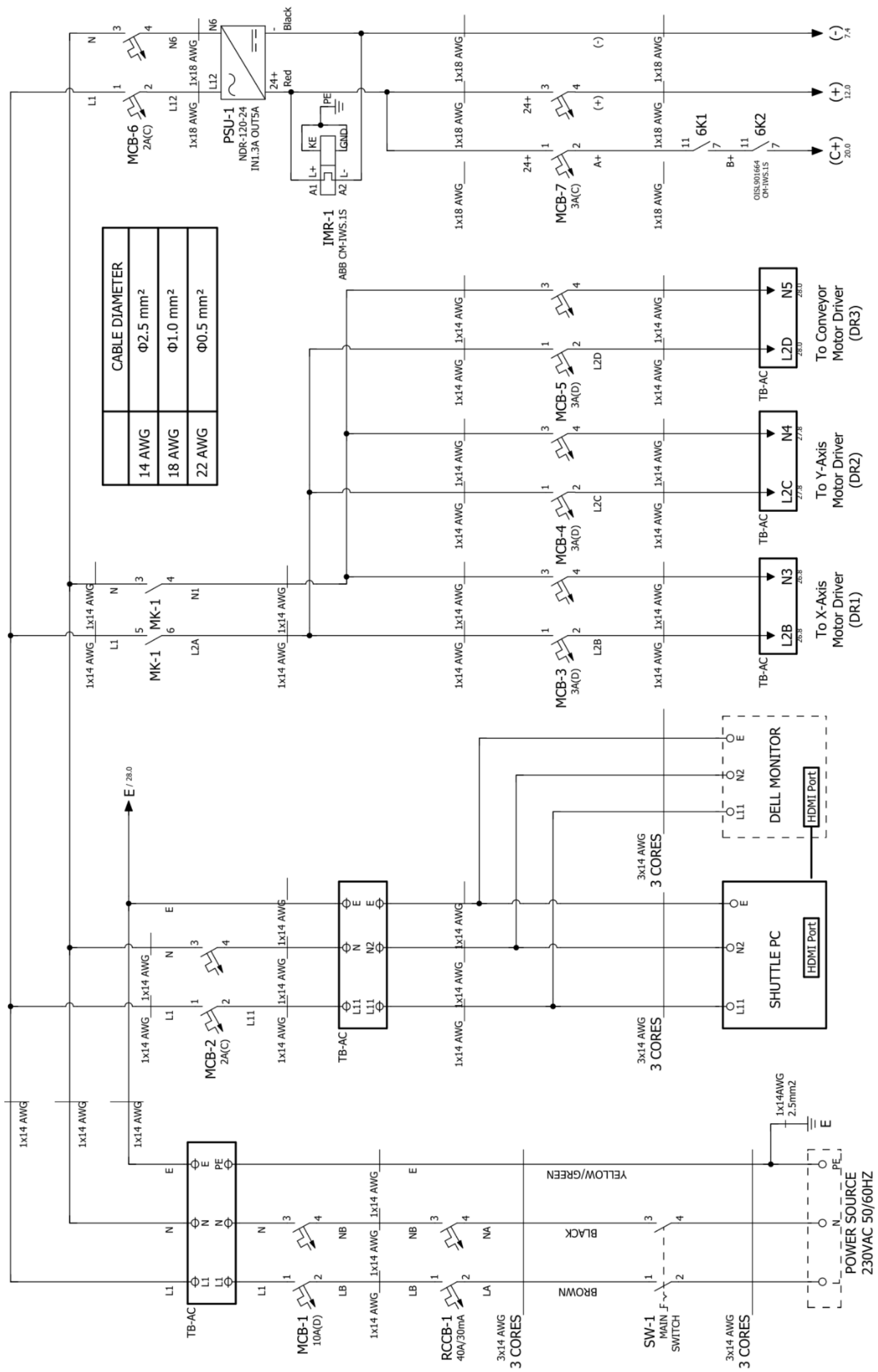
SECTION 19 : Electrical Circuit Diagrams

19.1 Electrical Panel Layout

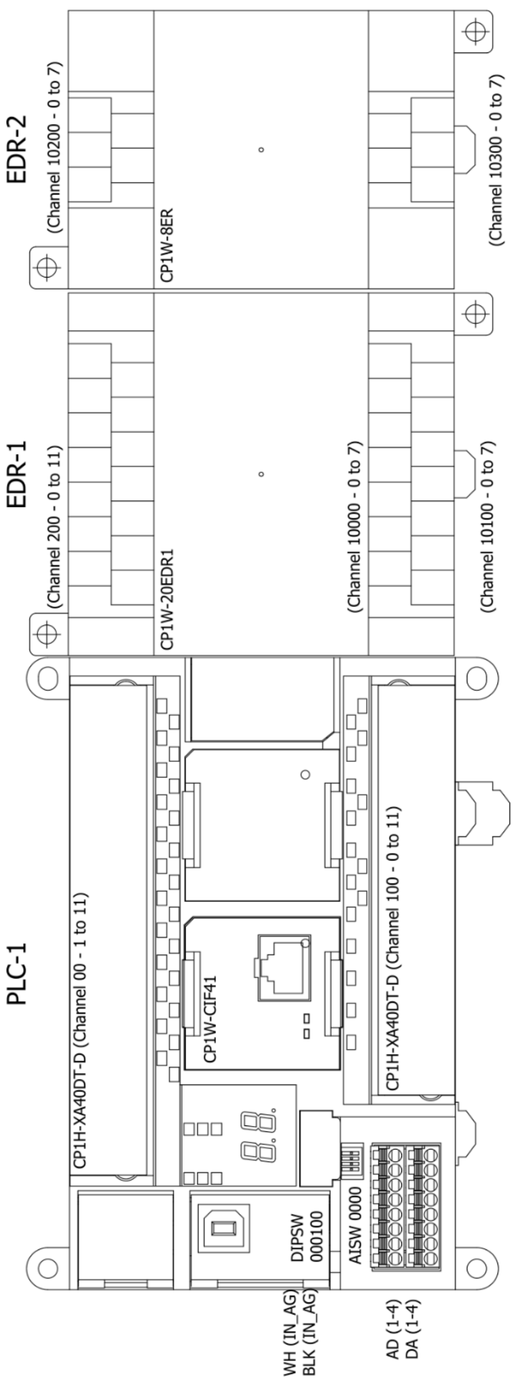


pump

19.2 Main Circuit Diagram



19.3 PLC Configuration

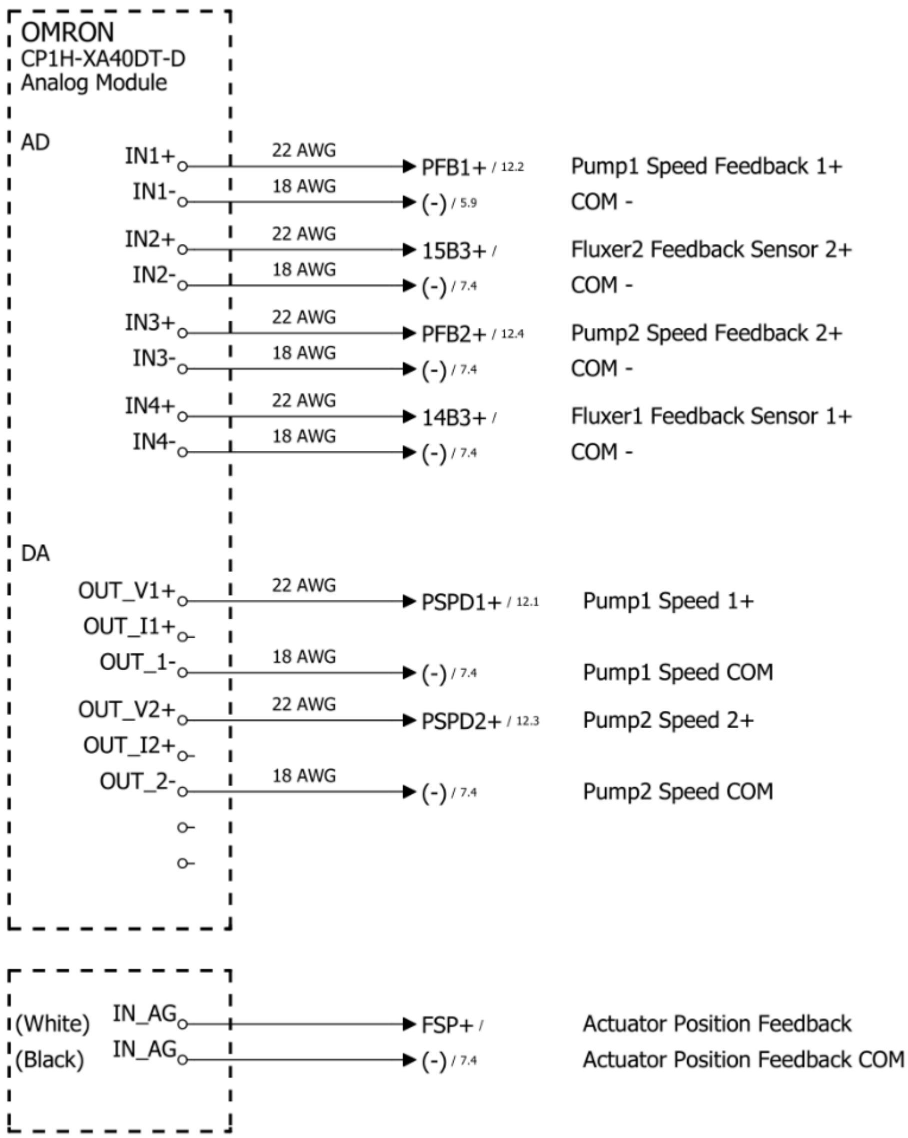


OPTION BOARD SLOT 1 = CP1W-CIF41 ETHERNET OPTION BOARD

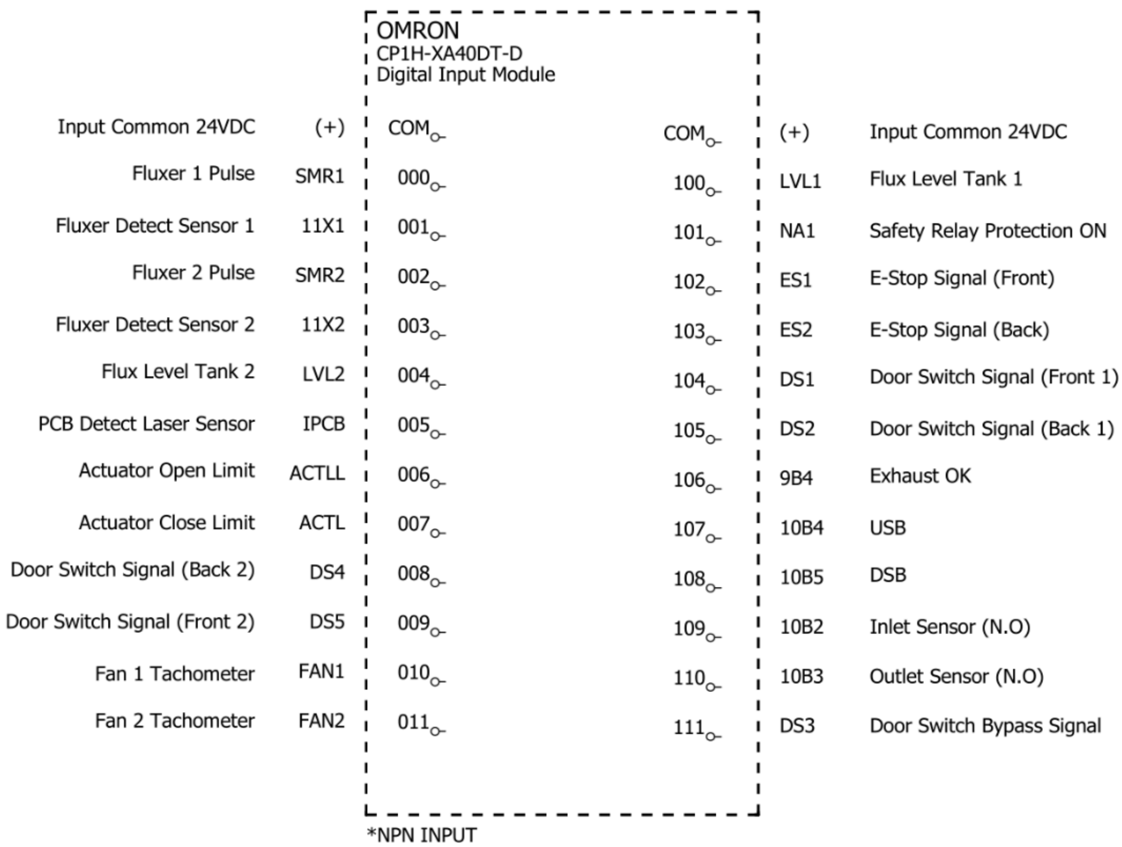
DIPSW = 000100

ANALOG INPUT SW = 0000

19.4 CP1H PLC Analog Input/Output



19.5 CP1H PLC Input

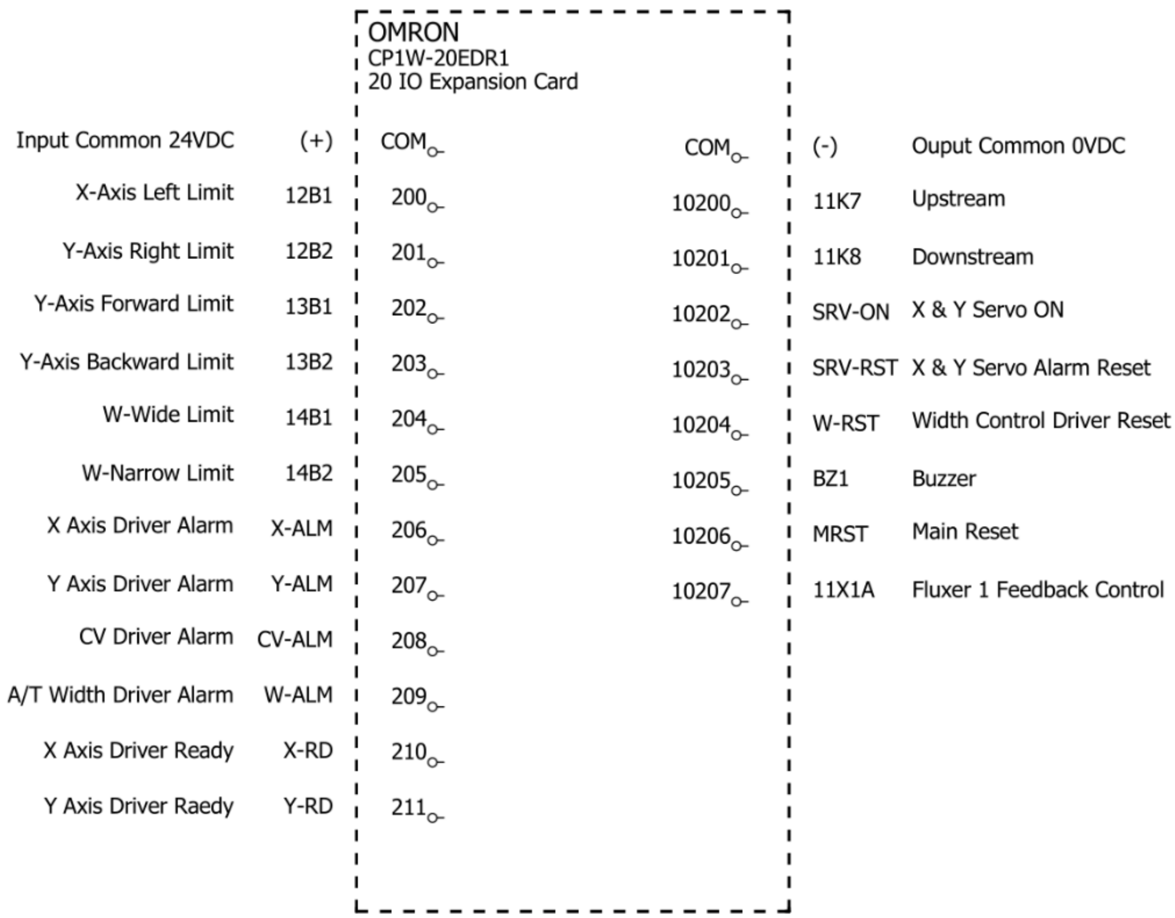


19.6 CP2H PLC Output

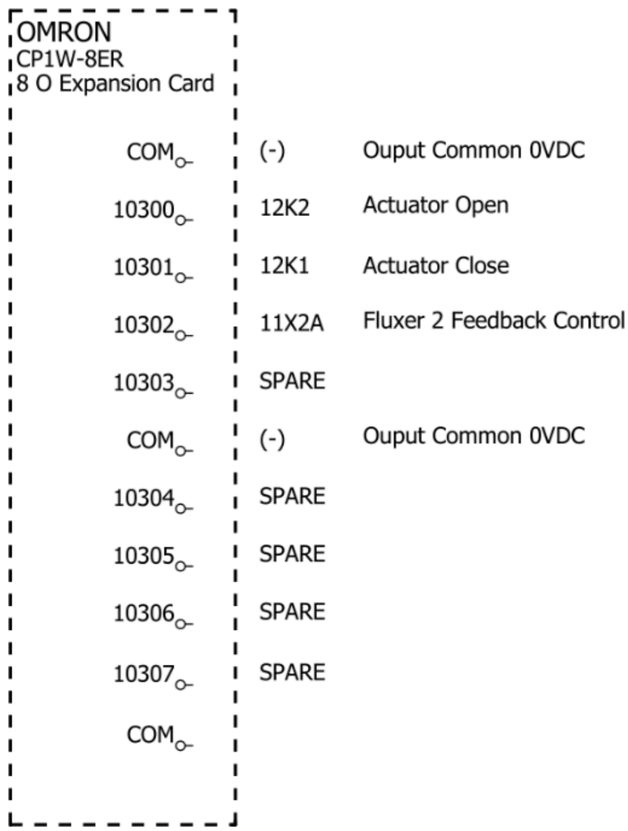
OMRON
CP1H-XA40DT-D
Digital Ouput Module

COM	(-)	Ouput Common 24VDC
10000	W-A-	W-Axis CW Pulse (-)
10001	W-B-	W-Axis CCW Pulse(-)
10002	X-A-	X-Axis CW Pulse (-)
10003	X-B-	X-Axis CCW Pulse(-)
10004	Y-A-	Y-Axis CW Pulse (-)
10005	Y-B-	Y-Axis CCW Pulse(-)
10006	CV-A-	Conveyor CCW Pulse (-)
10007	CV-B-	Conveyor CW Pulse(-)
10100	SMR1	Fluxer Pulse 1
10101	SMR2	Fluxer Pulse 2
10102	OPCB	PCB laser Sensor Active
10103	CV-AWO	Conveyor Driver ON
10104	CV-ALRST	Conveyor Driver Reset
10105	9H1	Tower Light Red
10106	9H2	Tower Light Yellow
10107	9H3	Tower Light Green

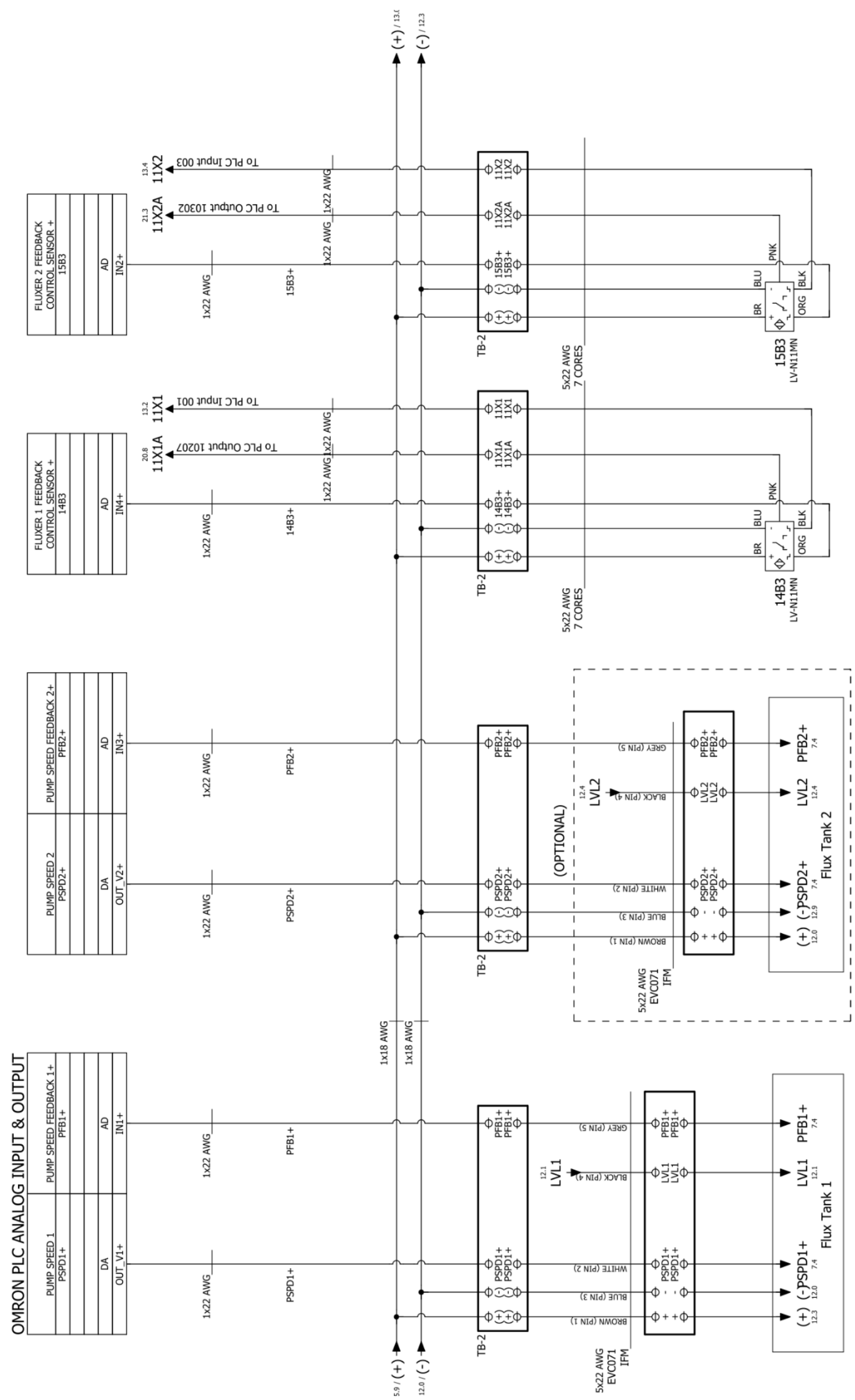
19.7 CP1W I/O Expansion-1



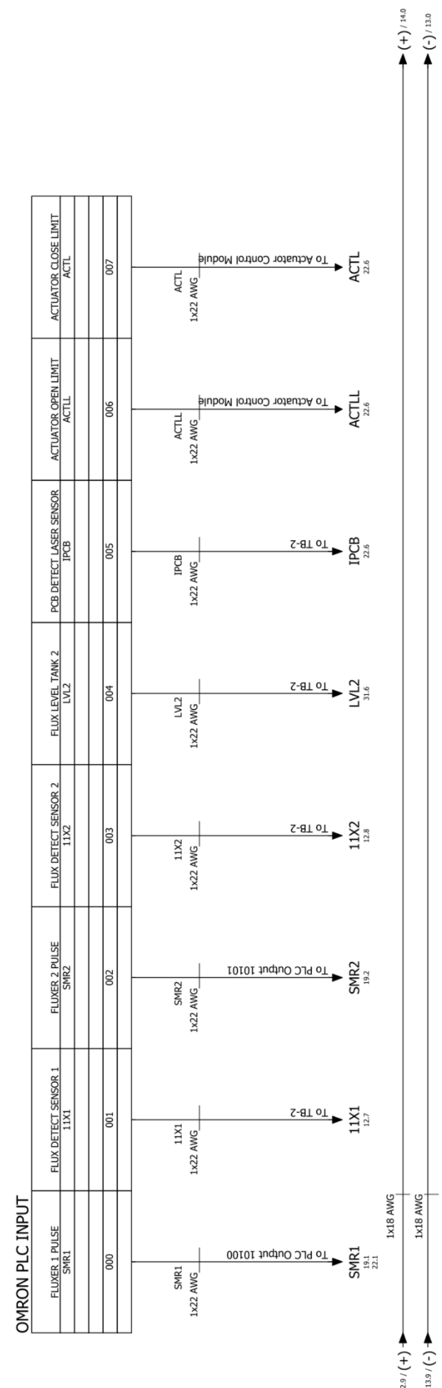
19.8 CP1W Output Expansion-2



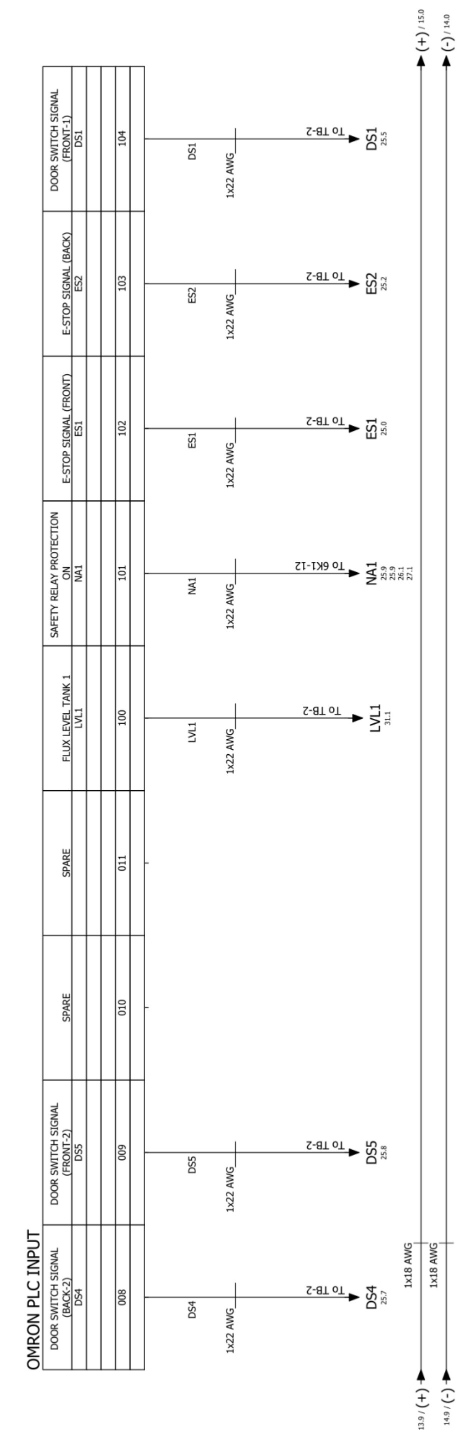
19.9 CP1H PLC Analog Input/Output & Device



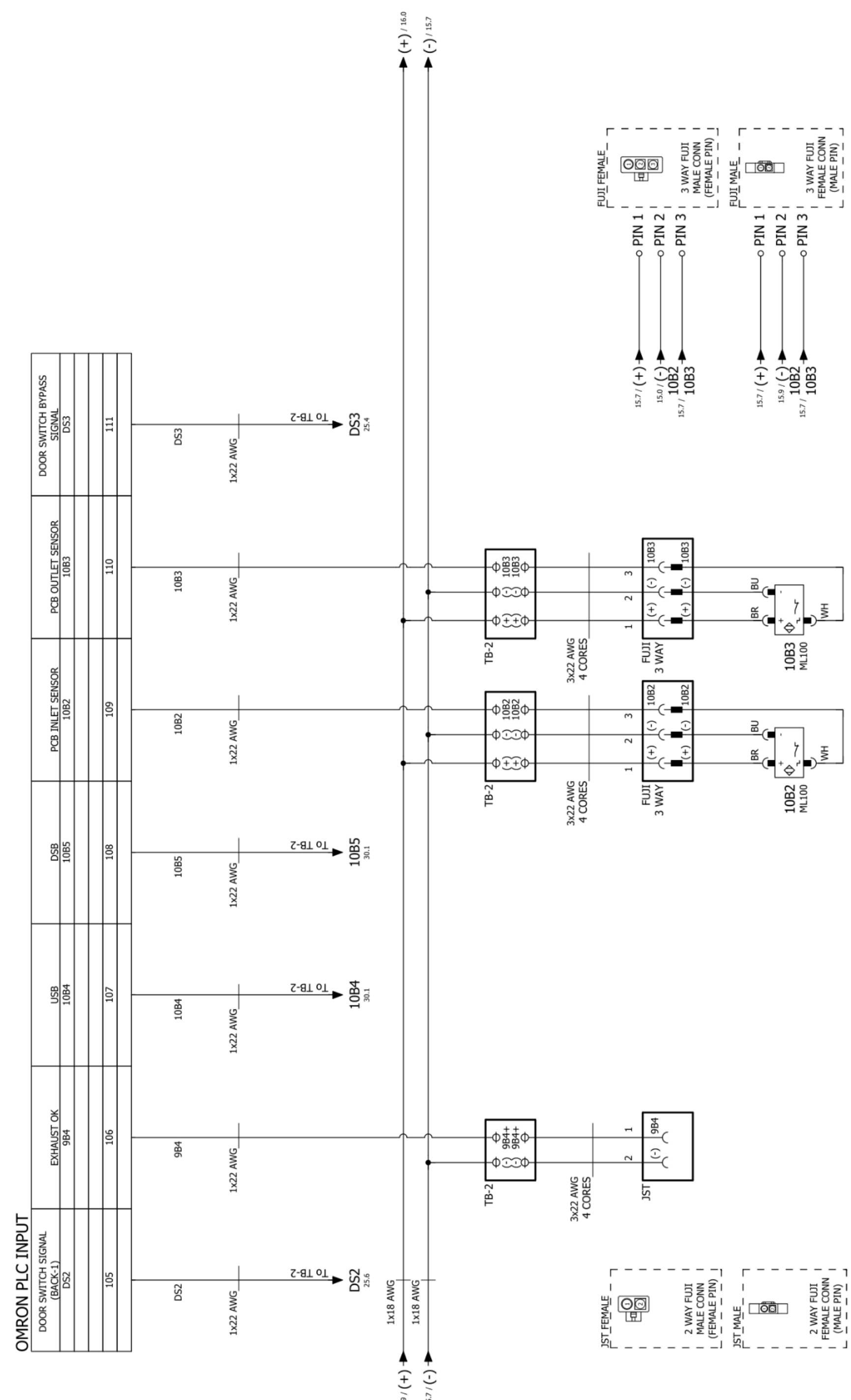
19.10 CP1H PLC Input & Device (Channel 00 - 1 to 7)



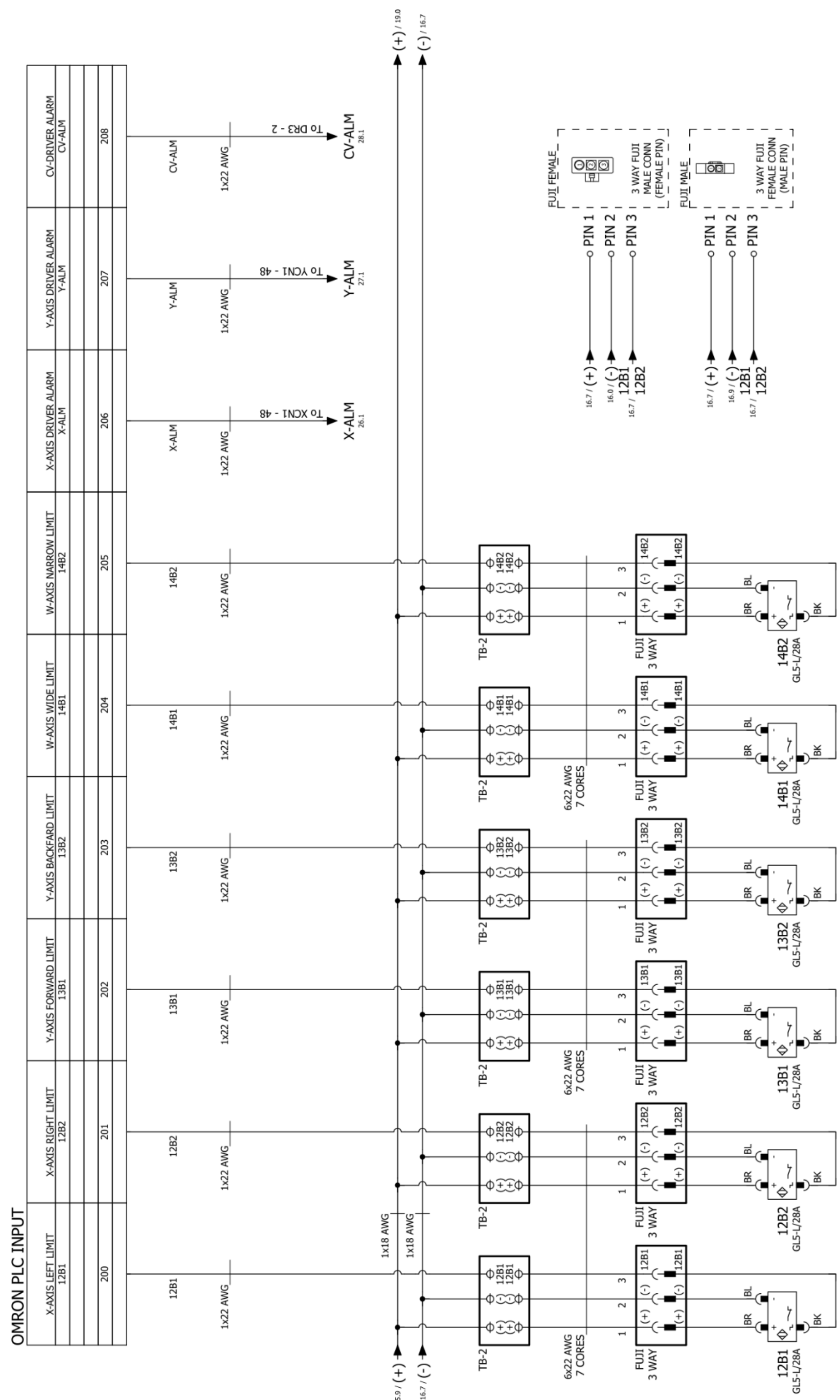
19.11 CP1H PLC Input & Device (Channel 00 - 8 to 11)/(Channel 100 - 0 to 4)



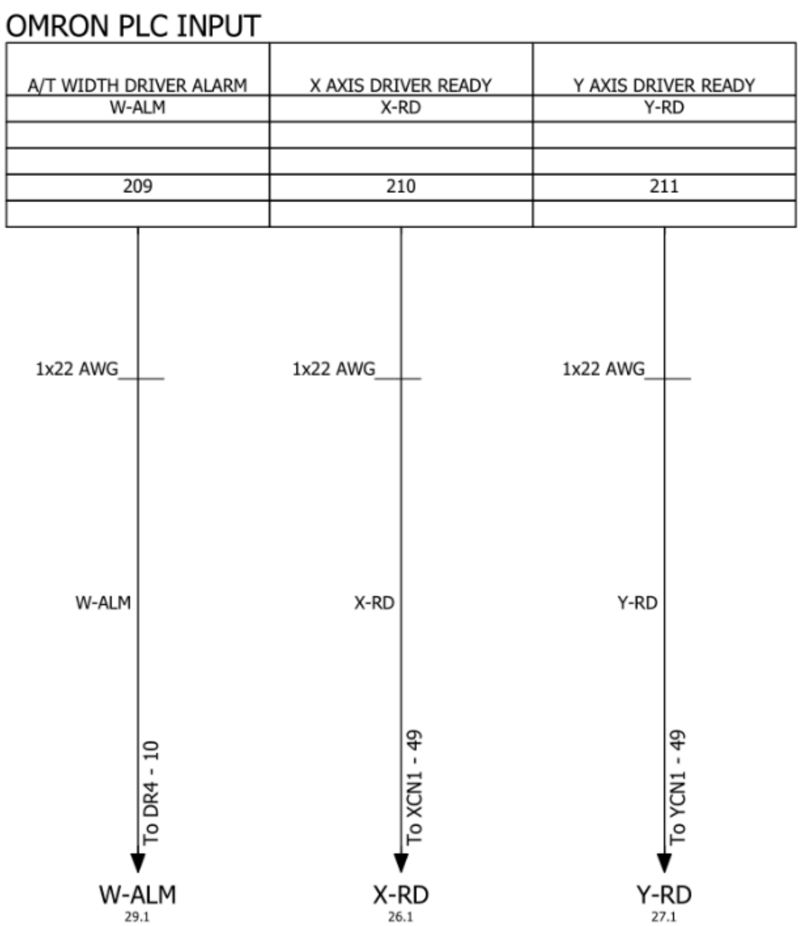
19.12 CP1H Input & Device (Channel 100 - 5 to 11)



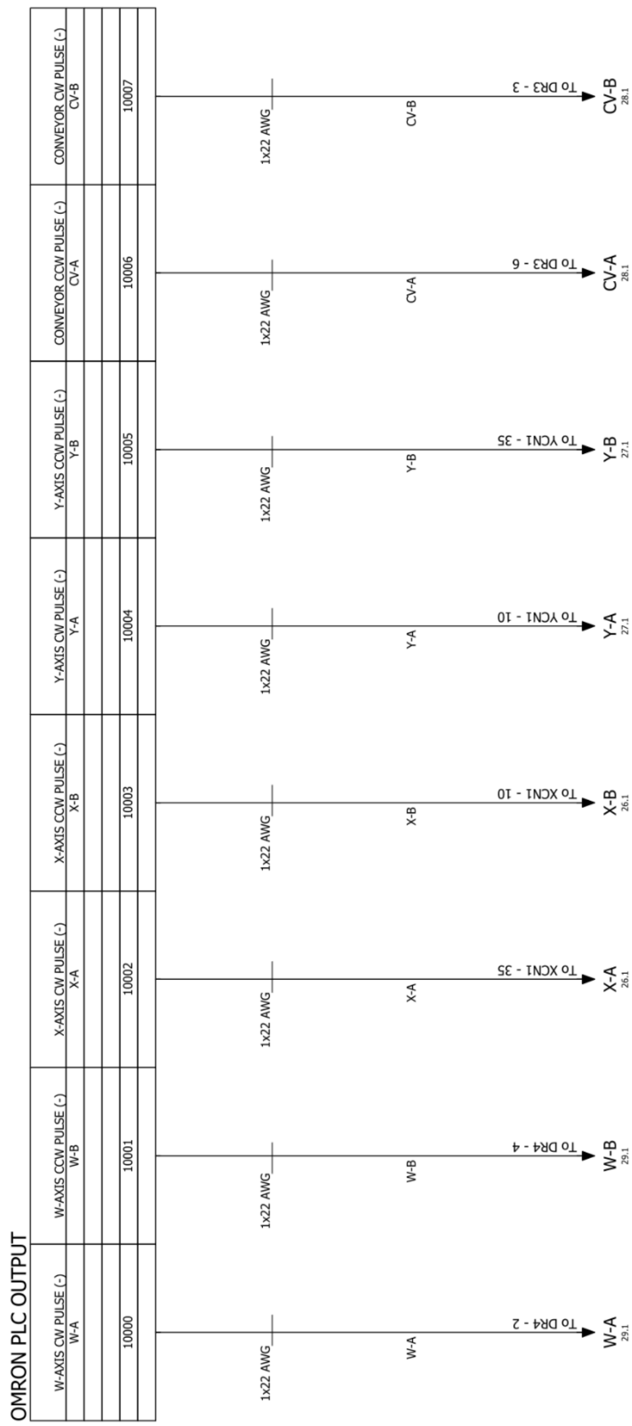
19.12 CP1H Input & Device (Channel 200 - 0 to 8)



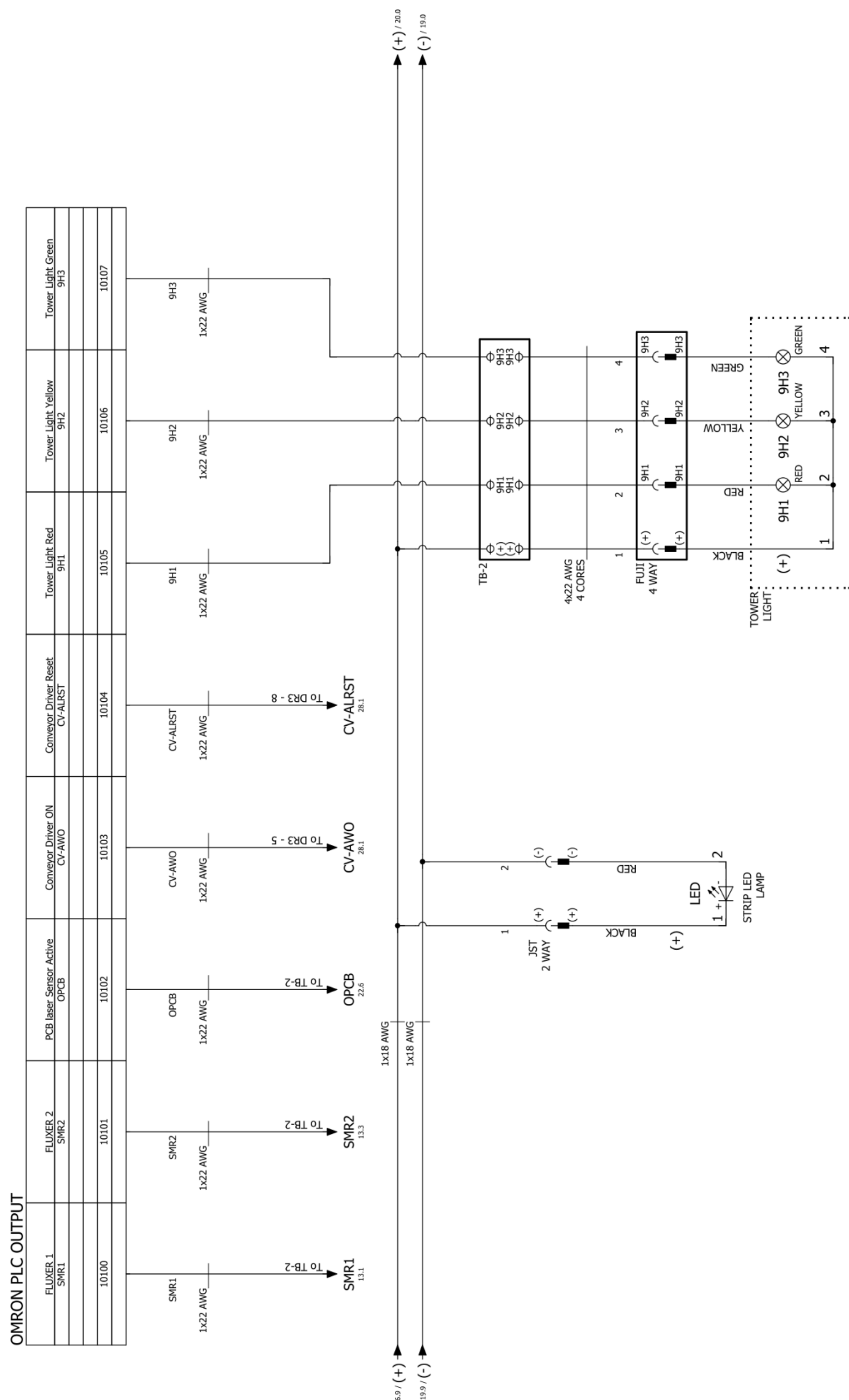
19.13 CP1W PLC Input & Device (Channel 200 - 9 to 11)



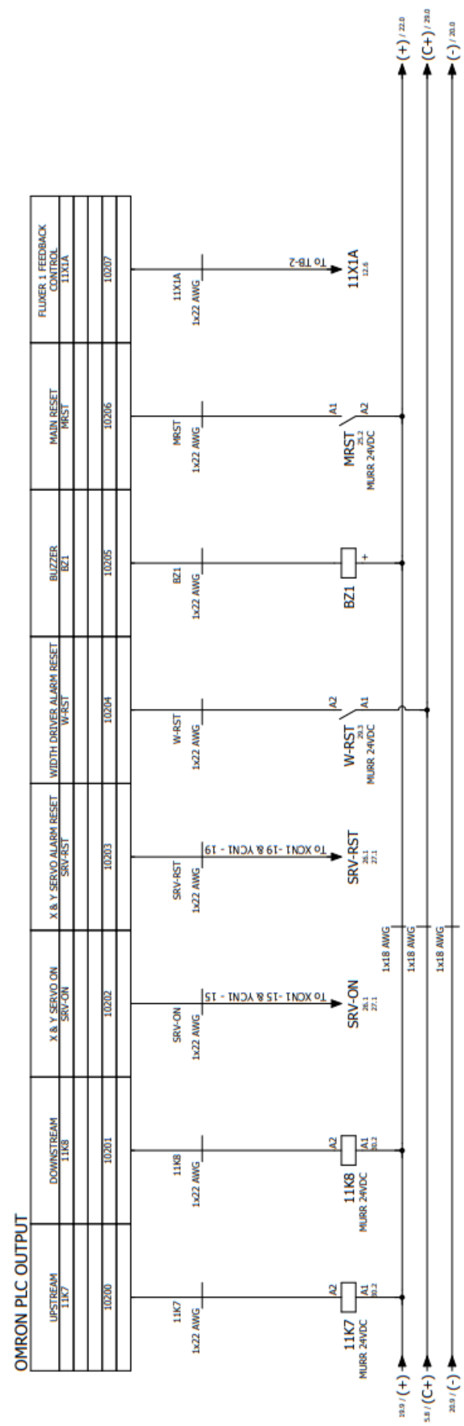
19.14 CP1H PLC Output & Device (Channel 1000 - 0 to 7)



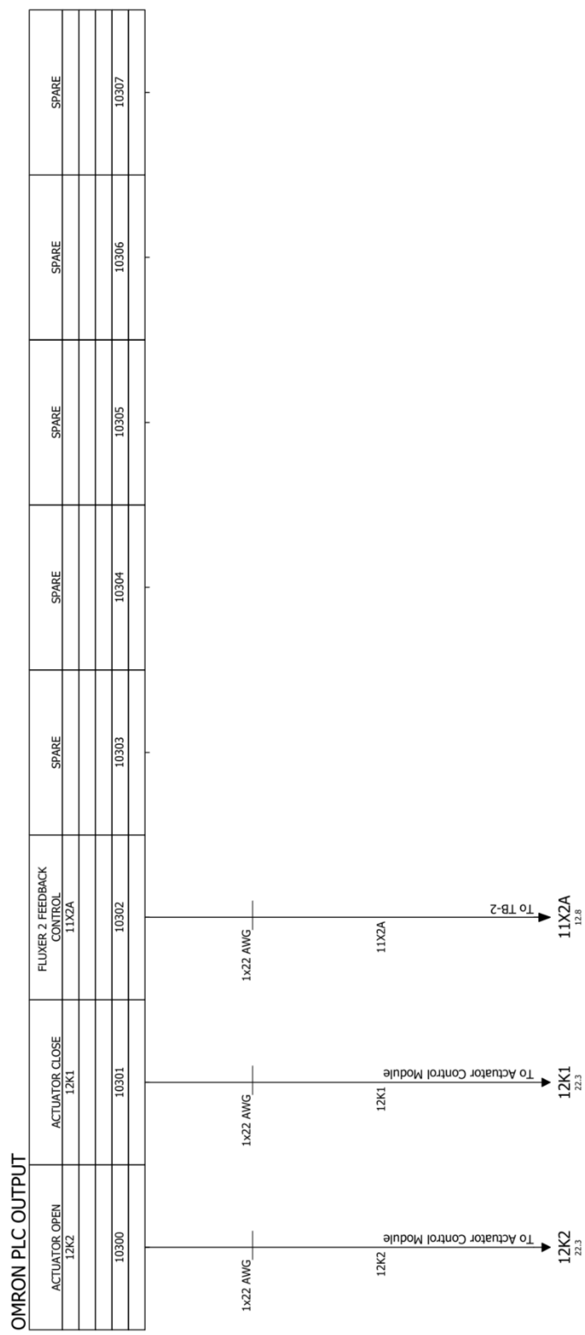
19.15 CP1H PLC Output & Device (Channel 10100 - 0 to 7)



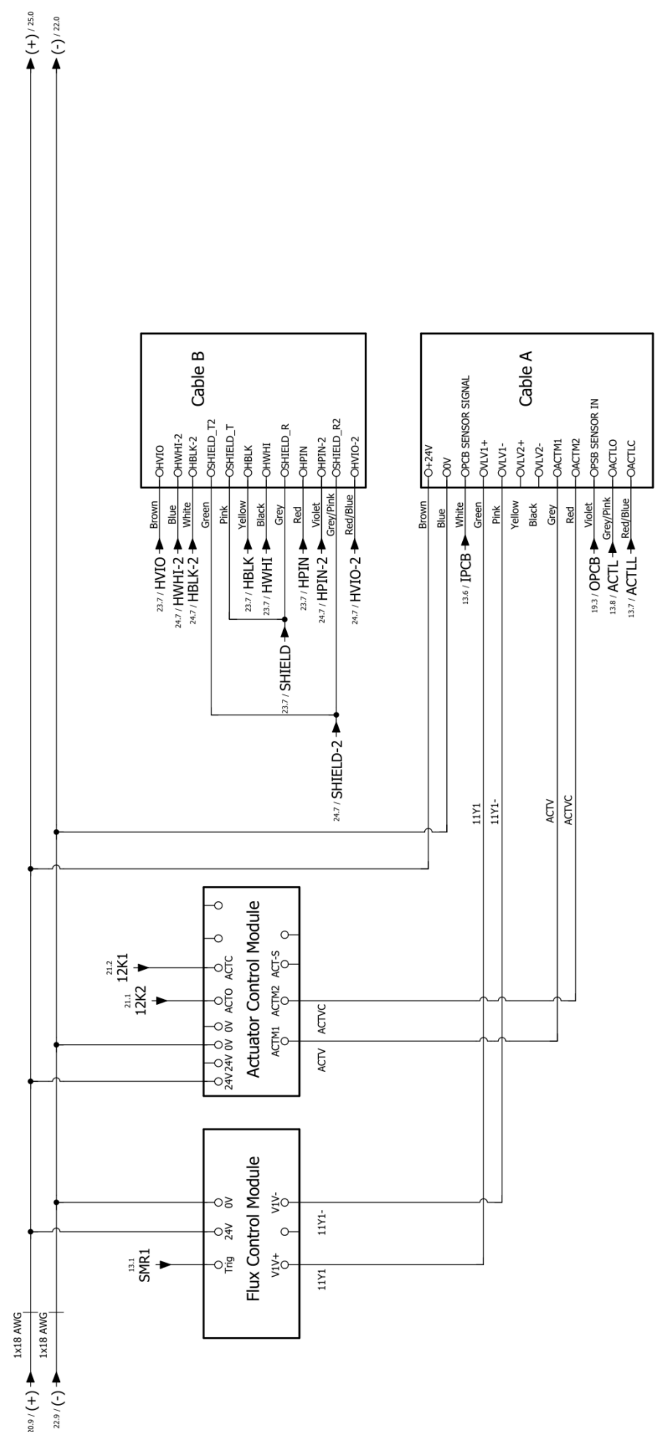
19.16 CP1W Expansion-1 Output & Device (Channel 10200 - 0 to 7)



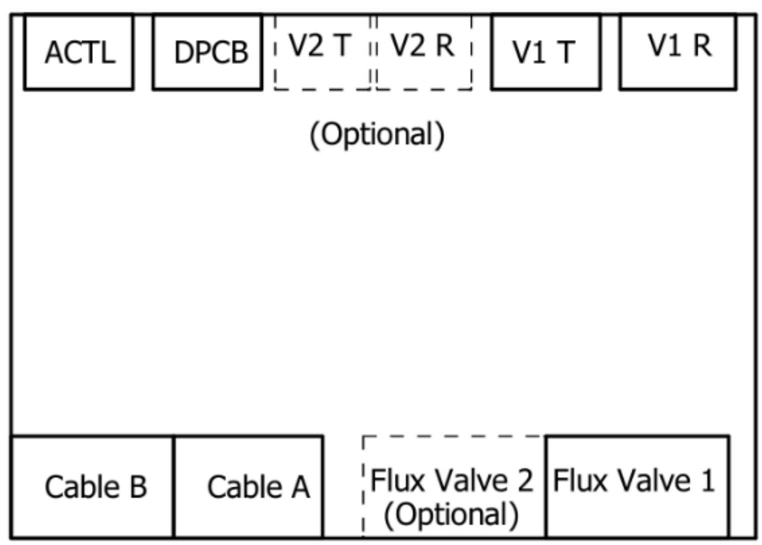
19.17 CP1W Expansion-2 Output & Device (Channel 10300 - 0 to 7)



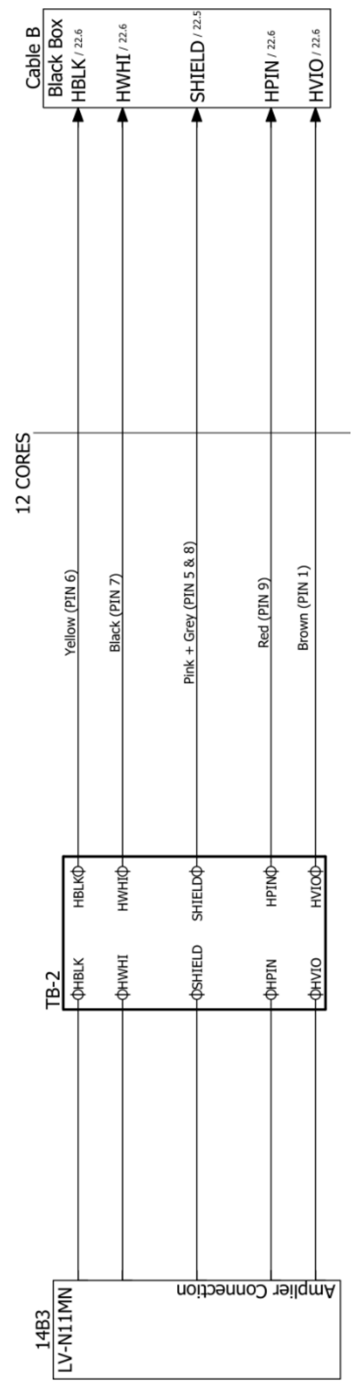
19.18 Fluxer Valve and Shuttle Control



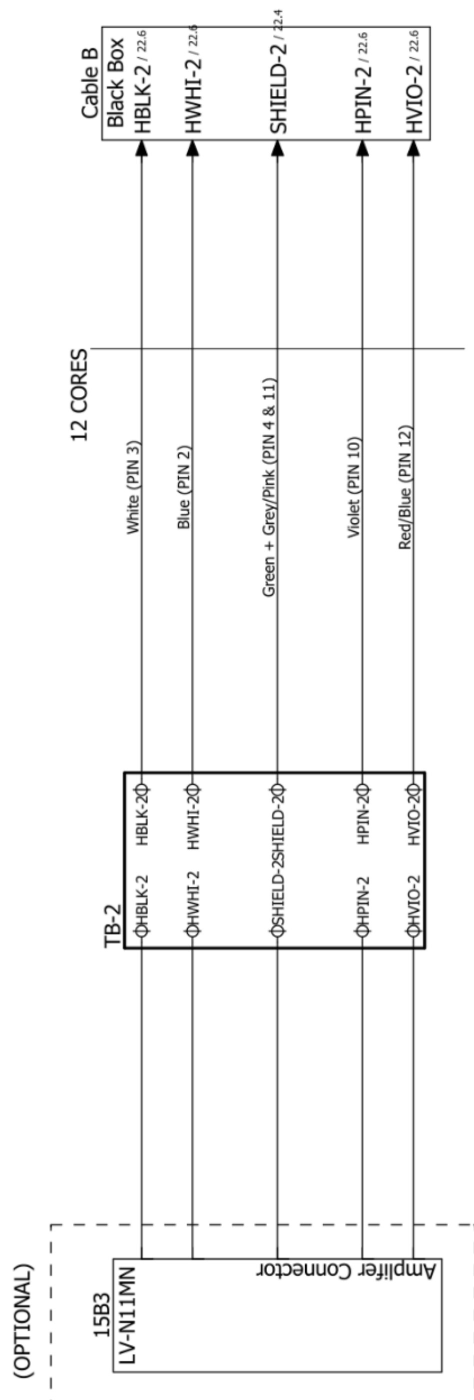
19.19 Fluxer - PCB Connection



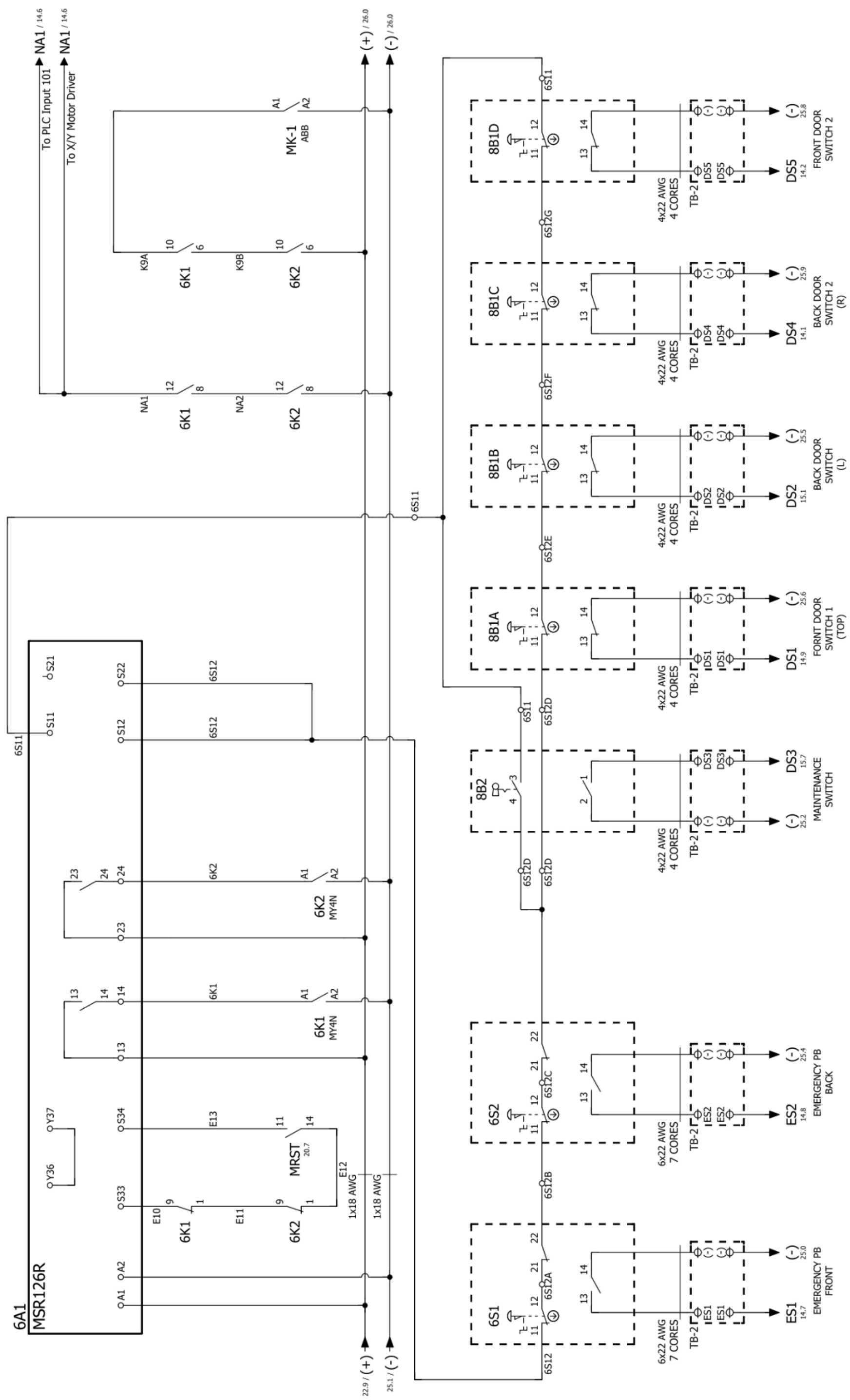
19.20 Flux 1 Amplifier to Module Connection



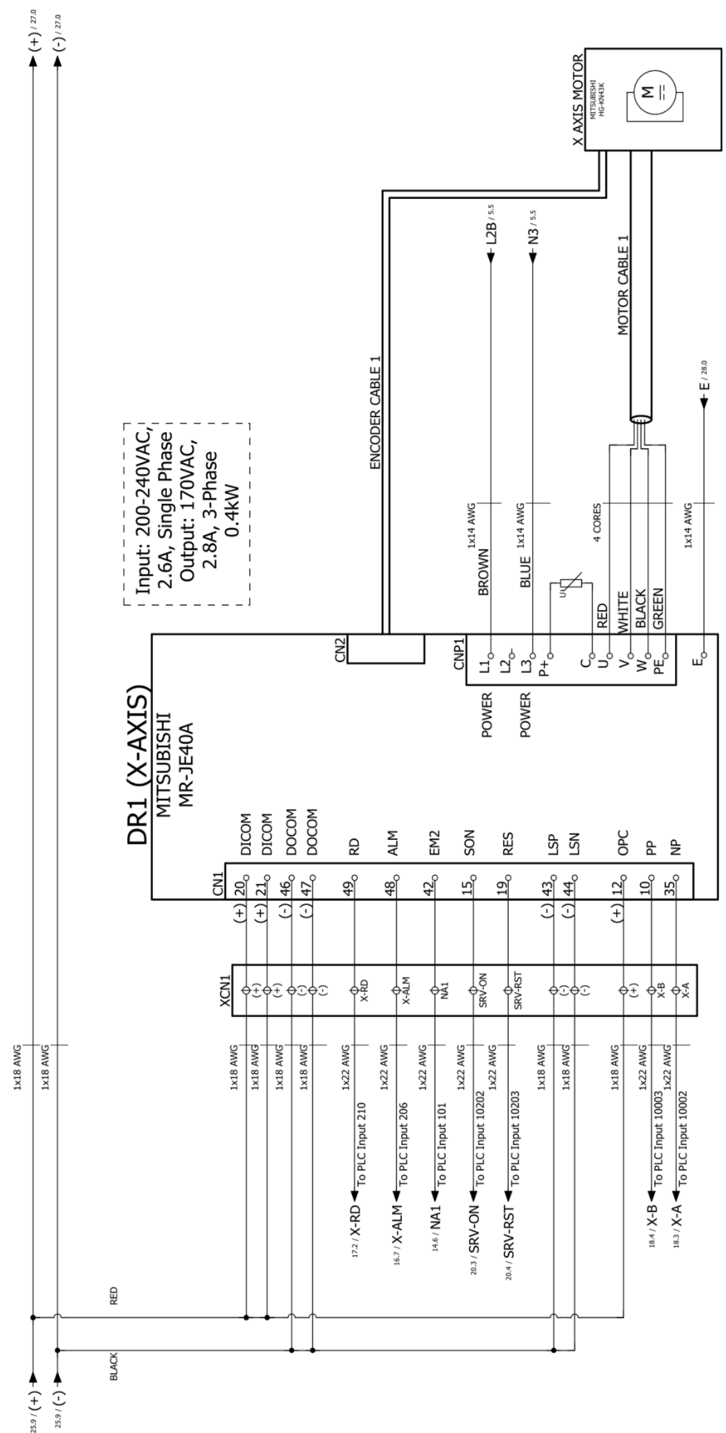
19.21 Flux 2 Amplifier to Module Connection



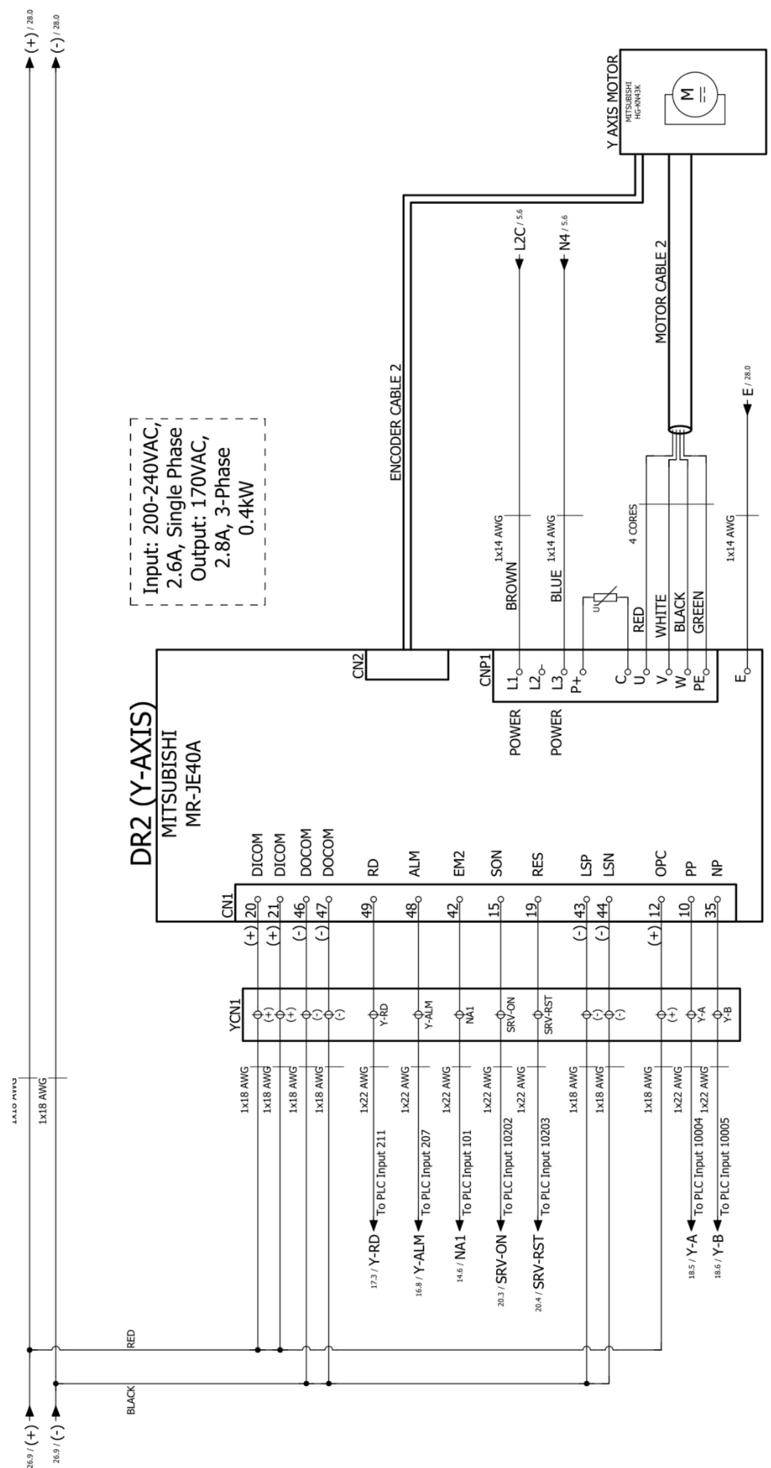
19.22 Emergency Control Circuit



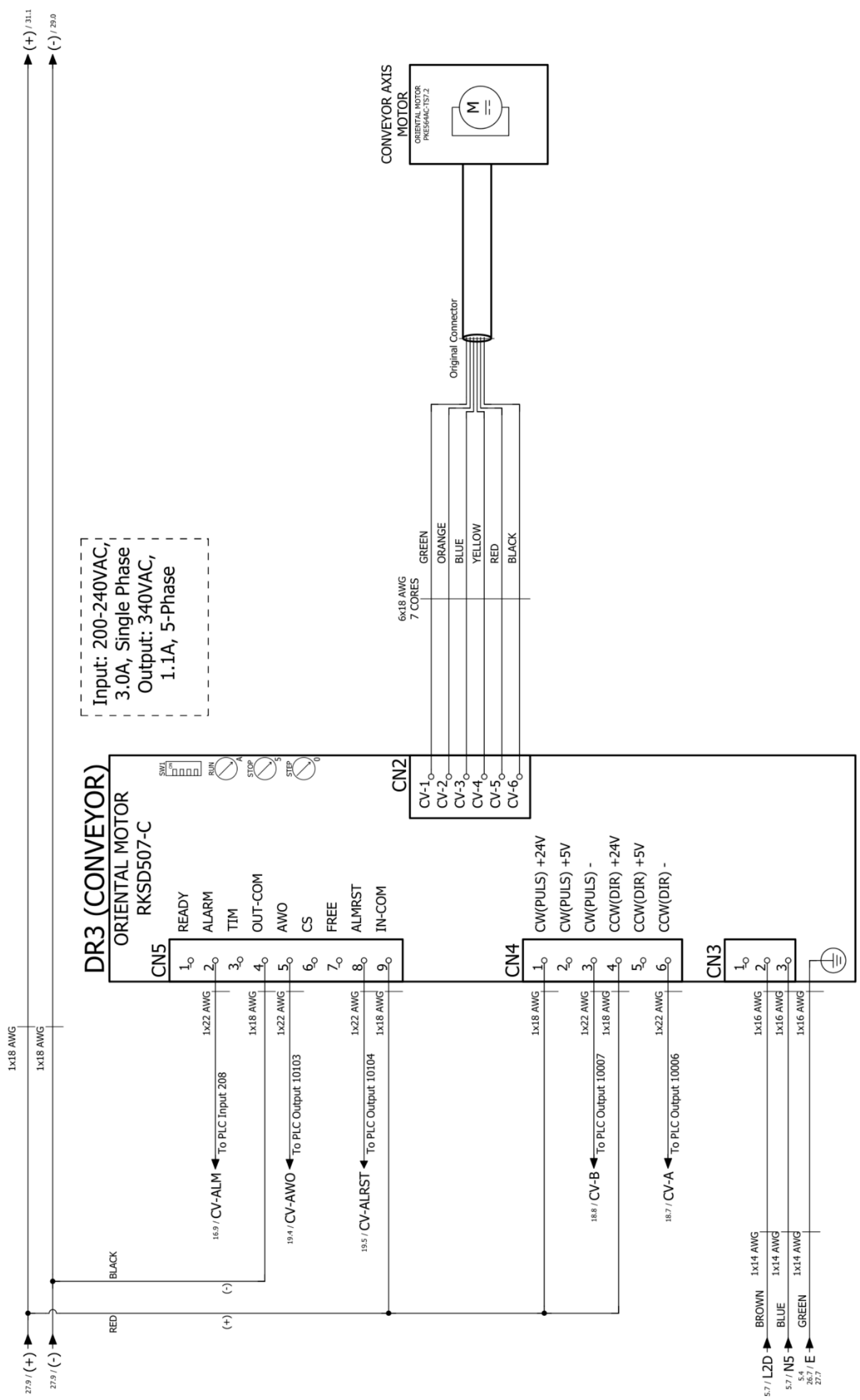
19.23 Flux X-Axis Motor Control



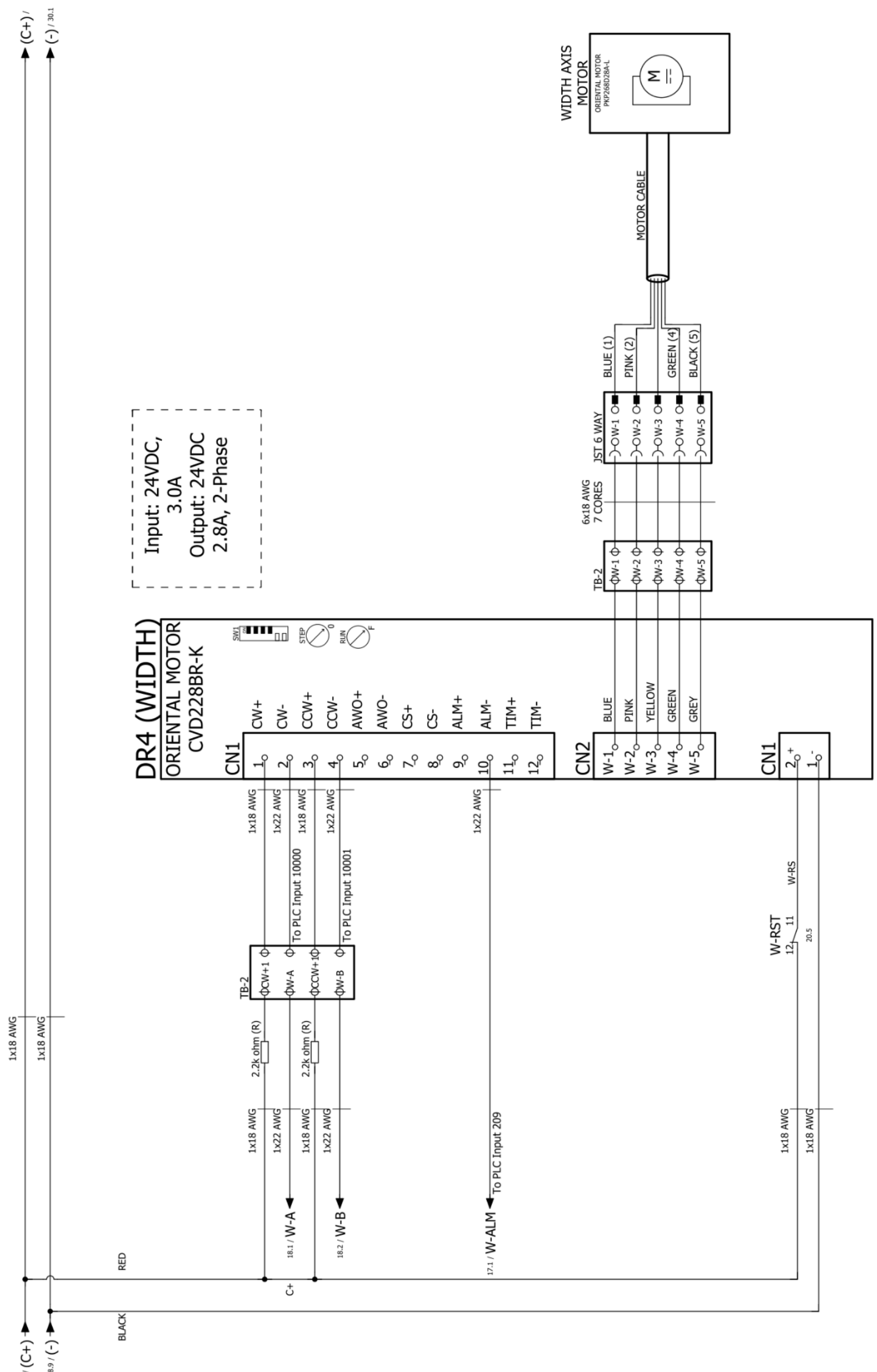
19.24 Flux Y-Axis Motor Control



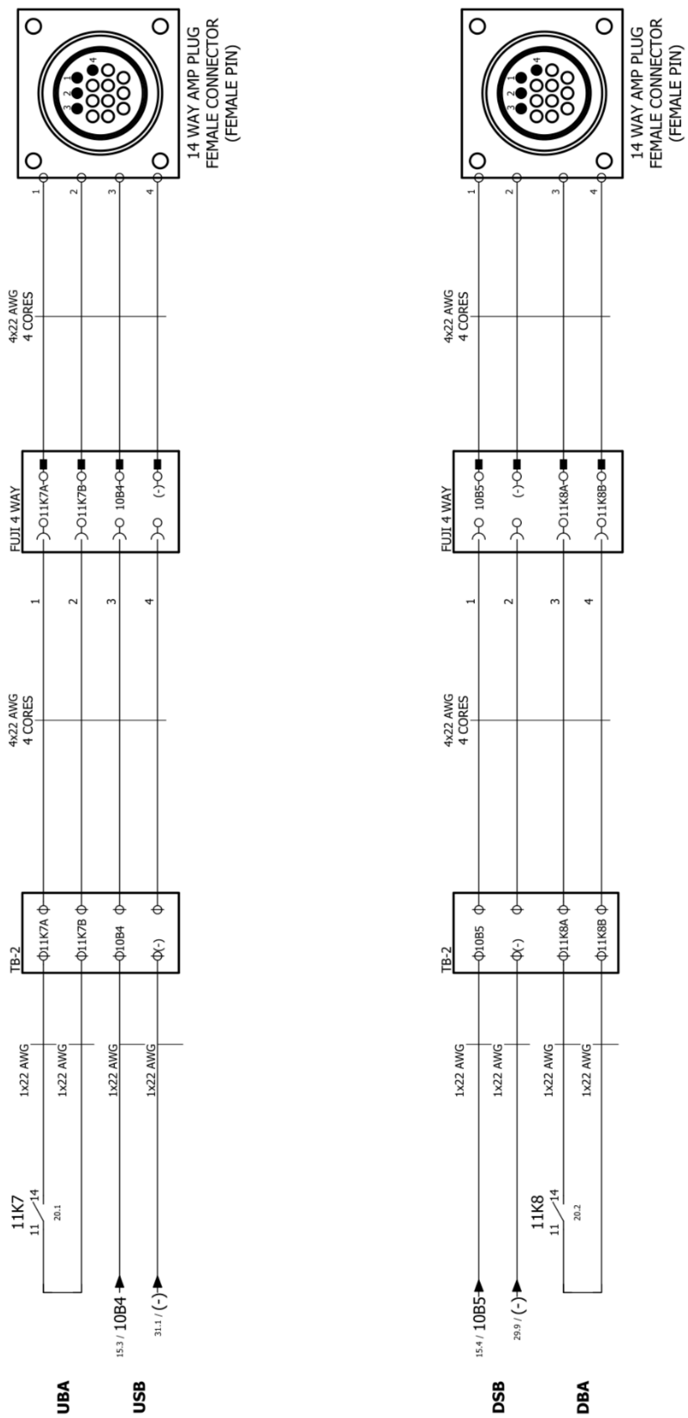
19.25 Flux-Conveyor Motor Control



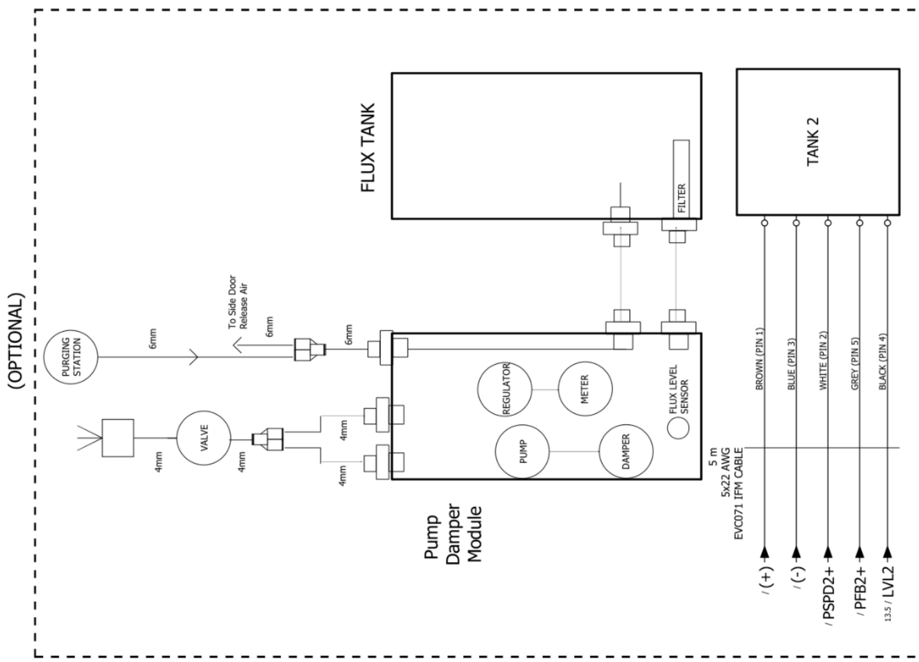
19.26 Flux Conveyor Width Motor Control

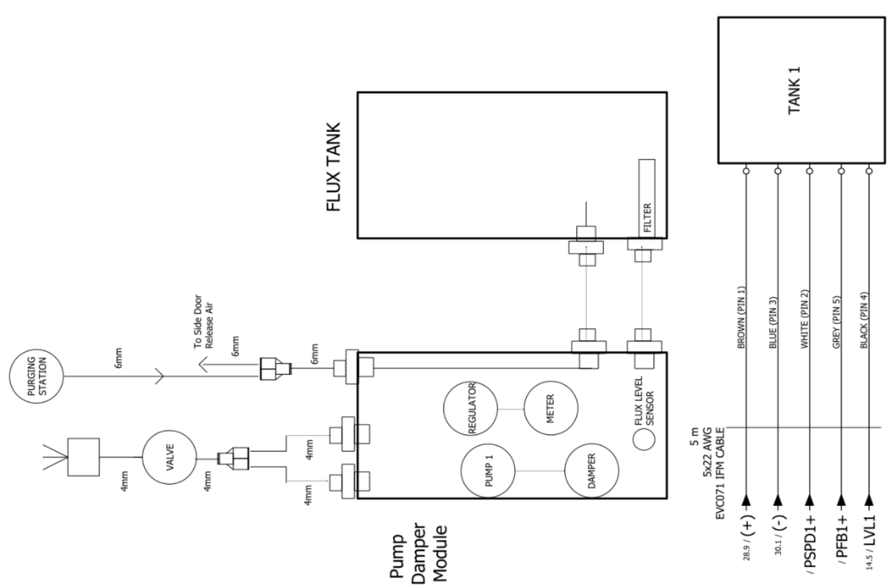


19.27 SMEMA Circuit



19.28 Fluxing System Circuit





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