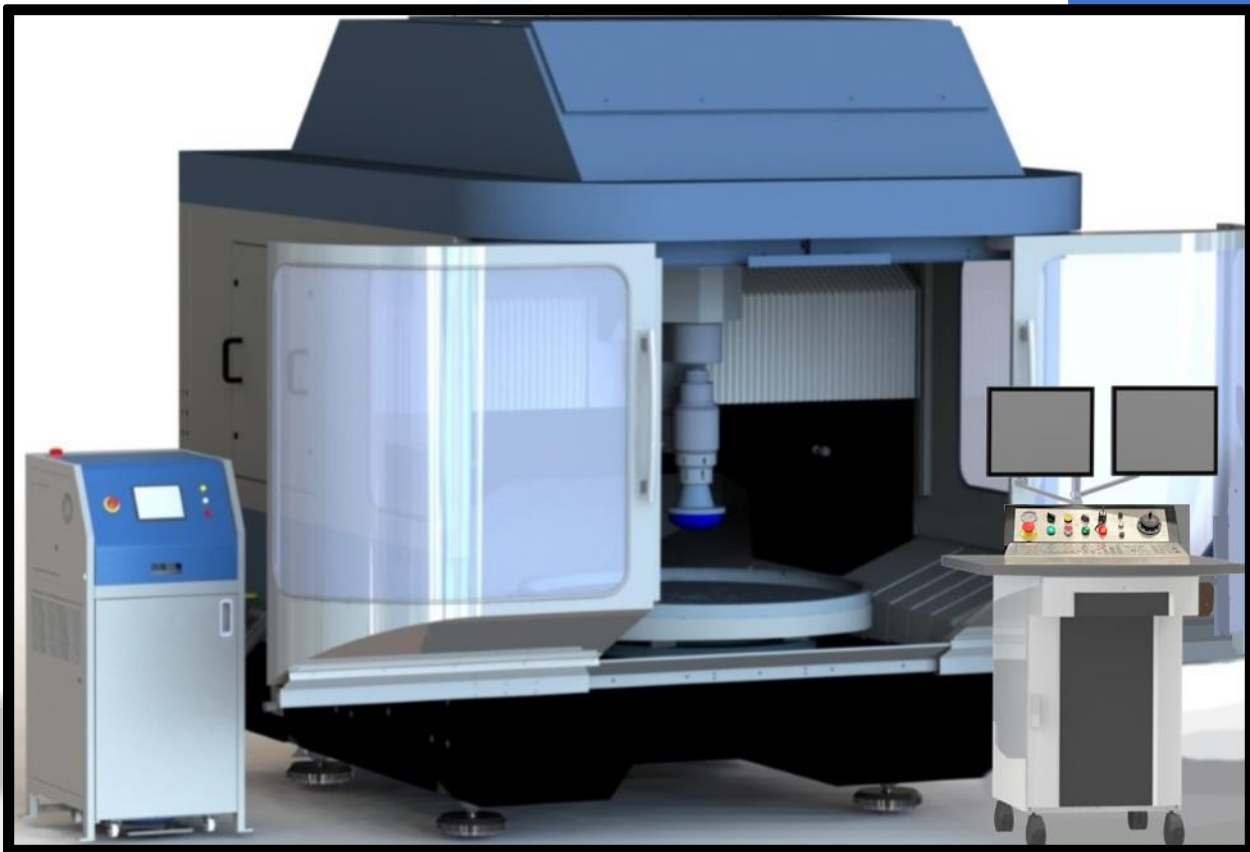


Maintenance Manual



IRP1200 MK1 – Fanuc
Ballscrew

Version 2, Rev b

Sept 2024

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Preface

Dear Customer,

This Maintenance Manual details the procedures required for the regular maintenance of your IRP1200 machine.

Please take the time to read this manual carefully and pay attention to the safety considerations and safety instructions in this manual.

The maintenance manual is structured such that the jobs are grouped according to their maintenance intervals:

- Maintenance jobs to be completed daily.
- Maintenance jobs to be completed weekly.
- Maintenance jobs to be completed monthly.
- Maintenance jobs to be completed every 6 months.
- General Maintenance jobs to be completed as necessary.

The maintenance manual is also structured in a way that depicts the skill level required to carry out the different maintenance tasks.

Always keep this manual in the immediate vicinity of the machine so that it is always available for consultation.

We wish you success and great results with your IRP1200.

Zeeko LTD

Safety considerations

The following signs are used throughout the manual to depict areas of safety or general instruction. Please make yourself aware of these signs and take careful consideration when carrying out the specified maintenance tasks.



WARNING: Identifies a potentially dangerous situation which may cause loss of life, serious.



ATTENTION: Signifies a potentially dangerous situation which may cause injury or serious.



NOTE: Identifies application instructions and other useful and important information.



TIP: Specifies information that could be useful and save you unnecessary time and effort.



Skill Level: Specifies information relating to the various skill levels required to perform certain operations.



Prohibition: Do not spray with water from a pressure washer or high-pressure hose

Safety instructions



ATTENTION: Press the “EMERGENCY STOP” button before carrying out any maintenance work in the work chamber.

The EMERGENCY STOP button (E-STOP) is located on the left-hand side of the console as shown in Figure 1.



Figure 1 - IRP1200 E-STOP



ATTENTION: Read the Manual carefully and always perform maintenance work at the required maintenance intervals. Observe all safety instructions for each task and comply with all local health and safety regulations.

Maintenance work (except cleaning) should only be performed by qualified maintenance personnel or will be carried out by a Zeeko approved service agents.

- Read all instructions for working with electrical equipment when cleaning and maintenance jobs are performed.
- The machine must be switched off when carrying out certain maintenance jobs.
- Read the instructions for each maintenance job and ensure instructions are fully adhered to.
- Use lint-free cloths when cleaning inside the work chamber and guard windows.
- After cleaning check all screwed connections for signs of leaks and ensure that they are tight. Rectify all issues immediately.
- Always correctly tighten any screwed connections which may have been loosened for maintenance or repair purposes.

- If safety devices/guards are removed for any set-up, maintenance or repair procedure, they must be remounted immediately after completion of the work. Ensure that all such devices are functioning properly.
- Always dispose of consumables and any other auxiliary substances or parts in a safe and environmentally sound manner, in line with local regulations.

Skill level guidelines

The following table shows the skill levels required for operating and maintaining the machine: *See Table 1.*

Skill Level	Operation and Function
Unskilled (U)	Basic cleaning and supervised set-up. Press the Emergency Stop (E-Stop), Access enclosed area in emergency. MUST NOT operate the machine.
Semi-Skilled (SS)	Operator. Everything included in unskilled plus daily inspection, Jogging for polish operation set-ups, push-button and auto mode operations.
Skilled (S)	Maintenance engineer. Everything included in semi-skilled plus electrical and pneumatic cabinet inspection, mechanical system calibration and setup. Zeeko should be informed before doing any maintenance.
Fully Skilled (FS)	Program engineer. Only Zeeko Engineers are allowed.

Table 1 - The skill levels required for operating and maintaining the machine



NOTE: The above table displays the skill levels required for operating and maintaining the machine. These will be used throughout the manual to ensure the correct personnel are assigned to the correct procedure.

Daily maintenance

Cleaning the work chamber



SKILL LEVEL: *Semi-Skilled (SS)*



Prohibition: *Avoid the use of excessive water pressure and avoid spraying at any joint faces between the work chamber and the enclosure.*

To clean the work chamber, proceed as follows:

1. Press the Red 'EMERGENCY STOP' button.
2. Ensure the air supply is ON, and the H & C Axis purges are operating.
3. Connect the polishing fluid drainpipe to a separate container.
4. Clean the Work Chamber, the Virtual Pivot assembly and the C-axis with water and a clean sponge or soft brush.
5. Wipe all parts dry with a clean lint-free cloth.

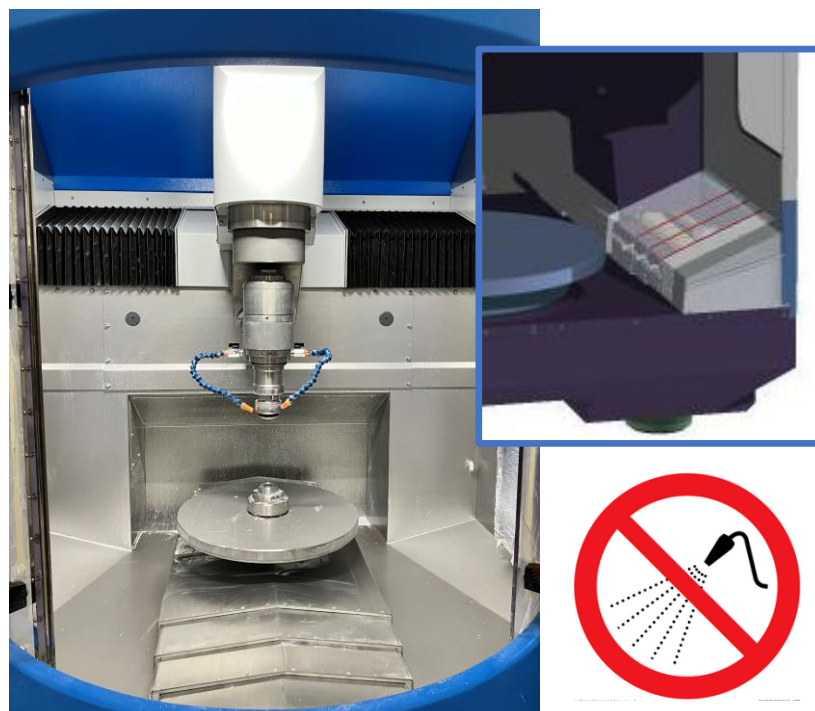


Figure 2 - Work chamber

Cleaning the guard windows



SKILL LEVEL: *Semi-Skilled (SS)*



NOTE: *Do not use harsh cleansers on the guard windows, as this may cause damage to the plastic or may cause the plastic surface to discolour.*

To clean the Guard Windows, proceed as follows: *See Figure 3.*

1. Press the “EMERGENCY STOP” button.
2. Clean the guard windows with water.
3. Wipe the guard windows dry with a clean cloth.

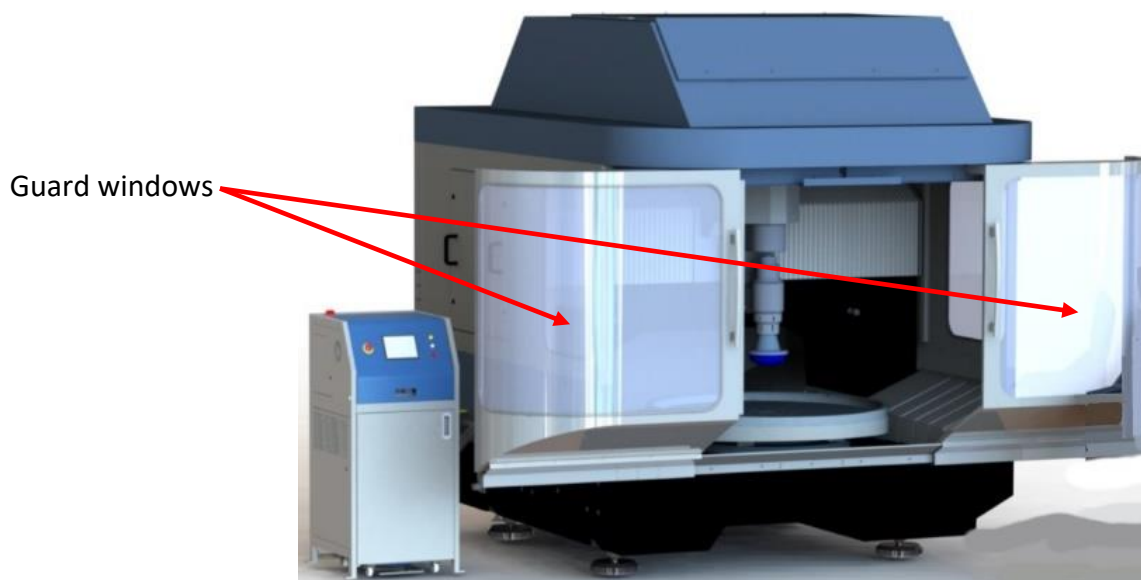


Figure 3 - Guard windows



NOTE: *When the “EMERGENCY STOP” is pressed, the machine is powered down. If the guard windows are moved, they must be returned to their original home positions before resetting the machine.*

Check polishing fluid pipes and pneumatic pipes for leaks



SKILL LEVEL: Semi-Skilled (SS)

1. Press the “EMERGENCY STOP” button.
2. The pneumatics/hydraulics cabinet is located at the rear of the machine. See Figure 4.
3. Visually inspect the polishing fluid pipes for leaks.
4. Visually inspect the pneumatic pipes for leaks.



Figure 4 - Pneumatics / hydraulics cabinet



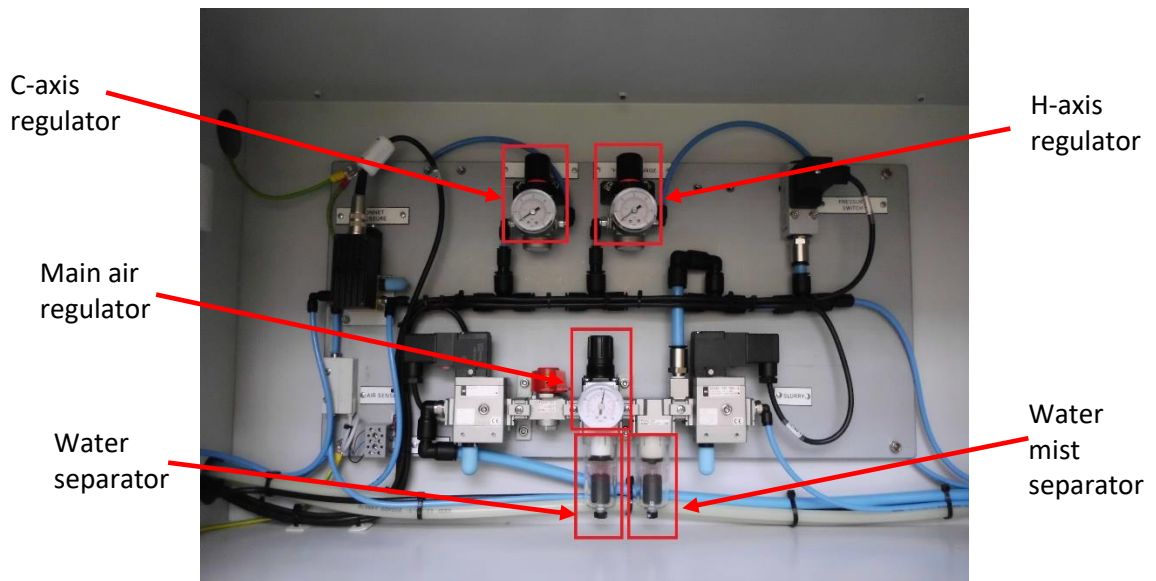
NOTE: If there are polishing fluid or pneumatic leaks, please refer to trained maintenance staff.

Servicing the air service unit



SKILL LEVEL: Semi-Skilled (SS)

The Air Service Unit is located in the pneumatics/hydraulics cabinet.
See



Checking the water and water mist separator



SKILL LEVEL: *Semi-Skilled (SS)*

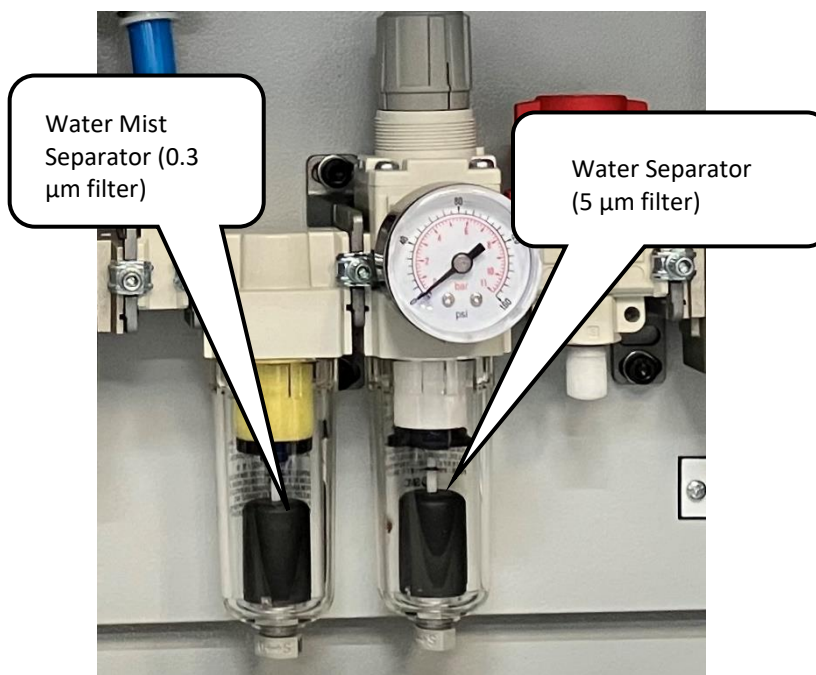


Figure 5 - Air service unit

The water separator is located on the pneumatic panel in the pneumatics/hydraulics cabinet.

1. Press the “EMERGENCY STOP” button.

2. Open the pneumatics/hydraulics cabinet, located at the rear of the machine.
3. Visually inspect the level of condensate in the Water and Mist Separator.
4. Manually empty the condensate in the Separator by releasing the valve at the bottom of the Separators.



NOTE: The residue container underneath the Water and Water Mist Separator must be checked and emptied each day.

Checking the pneumatic settings

1. Press the 'EMERGENCY STOP' button.
2. Open the pneumatics/hydraulics cabinet.
3. Check the pressure gauges to confirm the settings are correct for the process.

Check the regulator settings

1. Press the 'EMERGENCY STOP' button.
2. Open the pneumatics cabinet.
3. The C- and H-axis purge regulators and the main air regulator are shown in Figure 4. The linear encoder purge is located on the left-hand side of the pneumatic cabinet enclosure interior.
4. Check the pressure regulators to confirm the settings are correct for the process.
5. C-axis and H-axis purge - 10 psi
6. Main air – 84 psi
7. Linear encoder purge – 10 psi

Daily visual checks

- Ensure drainage is free from blockage and connections are secure.
- Ensure the air pressure is connected and working correctly.
- Ensure the SMU/Centrifuge system is in working order and is connected securely.
- Ensure the chiller unit is connected and good working order.

Weekly maintenance

Cleaning the outer surfaces and hydraulic chucks



SKILL LEVEL: *Semi-Skilled (SS)*

Clean the processing residue and any other dirt from all painted surfaces using a damp cloth.

Remove the grub screw from both H-axis and C-axis hydraulic chucks.

Clean the grub screw thoroughly and re-grease.



TIP: *Do not use any alcohol-based cleaning fluids on the painted surfaces of the machine as these may damage the paintwork.*

Monthly maintenance

Check the work chamber interlocks



SKILL LEVEL: Semi-Skilled (SS)

1. Put the machine into "Manual" mode.
2. Open the enclosure doors.
3. Observe that the "DOOR" status display on the GUI is RED. See *Figure 6 - 'DOOR' status display*.

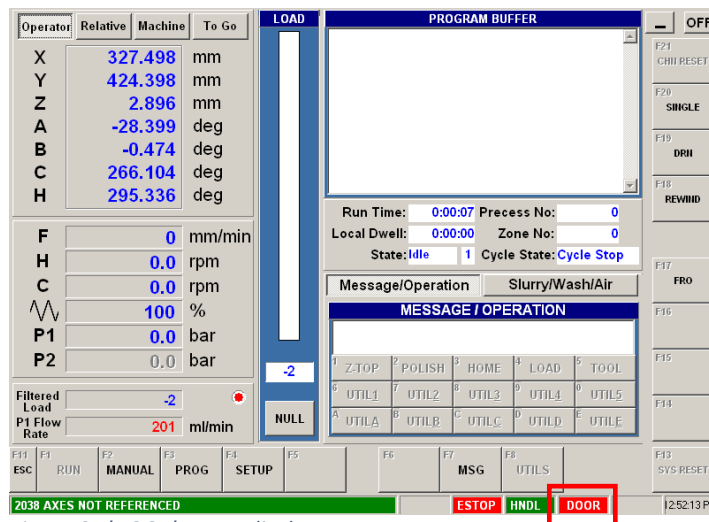


Figure 6 - 'DOOR' status display

4. Put the machine into "Auto" mode.
5. Close ALL work chamber guards.
6. Check that ALL guards are locked.
7. Observe that both guard LEDs are extinguished.



ATTENTION: If either of the LEDs are not extinguished, please refer to trained maintenance staff. The machine must not be operated with defective work chamber interlocks!

8. Put the machine into "Manual" mode to open the chamber doors.
9. Put the machine back into "Auto" mode.
10. Select the "MDI" tab on the "GUI MAIN" menu.
11. Type "M03 S2=100" at the "MDI" command line and then press "Enter". See *Figure 7 - MDI command line*.
12. Press the "CYCLE START" button situated on the side of the console.

13. The GUI should report the error “Guard not locked and closed \ Cycle start inhibited”.
14. Observe that both guard LEDs are illuminated.

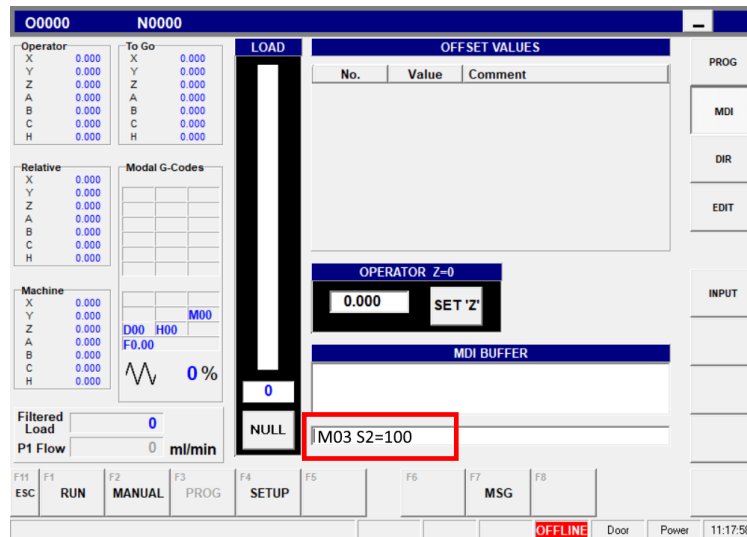


Figure 7 - MDI command line

Monthly visual checks

Visual inspection of the following items should be done on a monthly basis.

- Bellows – Ensure no tears or rips have occurred in the bellows.
- Window guards – Check for scratches, cracks or chips to the guards.
- Check locks are all in working order.
- Check panels are secure and not damaged.
- Check the bonnets for wear and tear or damage.
- Check electrical cables are not damaged and electrical test dates are in date.



ATTENTION: Any damages should be immediately reported to ZEEKO direct or to a ZEEKO approved agent.

Six-monthly maintenance

Grease the ball screws and re-grease the linear guideways of the axes.

- This work should only be carried out by authorized Zeeko maintenance personnel.

General maintenance

Adjusting and setting the virtual pivot



SKILL LEVEL: Skilled (S)

The virtual pivot is set by Zeeko personnel at the factory and will not need resetting under normal working conditions. In the event of a collision taking place the virtual pivot has adjustments available both mechanically and by the software correction facility. The virtual pivot can be checked in the following way:



NOTE: Only trained personnel can check the virtual pivot.

1. Clamp the virtual pivot setting tool into the H-axis.
2. Position the probe of a clock on the centerline of the VP ball with the magnetic base fitted to the C axis.
3. A variation of 20 μm or less is acceptable when rotating the B axis through $\pm 90^\circ$ from the "Home" position.
4. A variation of 20 μm or less is acceptable when rotating the A axis through $\pm 120^\circ$ from the "Home" position.

Greasing the ball screws and linear guideways of the axes

- Zeeko recommends that the ball screws and linear guideways of the machine be re-greased every 6-12 months dependent upon usage.



NOTE: Only Zeeko trained personnel should grease the ball screws and linear guideways of the machine.

- If required, a service contract can be set up with Zeeko to have us perform this maintenance for you. Please contact Zeeko if you wish to discuss this.

External units

1. Clean the external Units in line with the applicable manuals.
2. Wipe over units to remove, dust grease etc.

Changing the fuses



WARNING: Identifies a potentially dangerous situation which may cause loss of life, serious injury or serious damage.

1. Switch the machine completely off at the “MAIN ISOLATOR” Switch.
2. Completely isolate the machine electrically by unplugging from the main supply.

The electrical cabinet is located at the lower rear of the machine.

3. Open the electrical cabinet.
4. Locate the 3-phase fuse holder labelled “3F1”. See *Figure 8 - 3F1 fuse holder*.

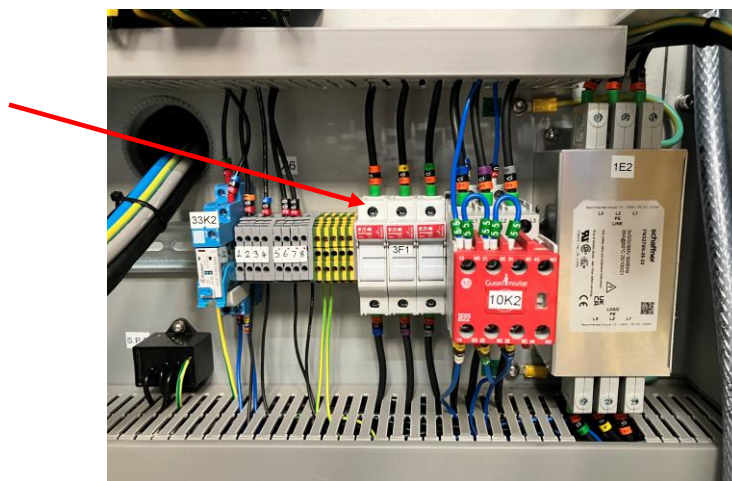


Figure 8 - 3F1 fuse holder

5. Replace the fuses with 10 x 38 mm gG S/I 16 A 500 v cartridge fuses.