

# *Maintenance Manual*



IRP100 7-axis ballscrew

*Version 2, Rev a*

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## 1. Preface

Dear Customer,

This Maintenance Manual details the procedures required for the maintenance of your IRP100 7-axis ballscrew machine.

Please take time to read the manual carefully and pay particular attention to the warning instructions for this manual which are detailed in Section – [Safety Instructions](#).

Please also note the skill sets required to carry out certain operations, detailed in Section – [Skill Level Guidelines](#). If incorrect personnel carry out skilled personnel requirements this will invalidate the warranty.

The manual is structured to guide the user through the maintenance of the machine. It is therefore advised that you always keep this manual in the immediate vicinity of the machine, readily available for consultation.

- Daily maintenance
- Weekly maintenance
- Monthly maintenance
- Maintenance as necessary

We wish you success and great results with the maintenance of your IRP100.

**Zeeko LTD**



## 2. Instructions for this manual

The following signs may be 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 assembly, installation or maintenance tasks.



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

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

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**NOTE:** Identifies application or assembly instructions and other useful and important information.

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

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

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

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**Danger:** Danger of electric shock!

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### 3. Skill level guidelines

Skill Level	Operation and Function
<b>U = Unskilled</b>	Basic cleaning, supervised set-up and maintenance. Must not operate the machine.
<b>SS = Semi-Skilled</b>	Basic daily inspection and cleaning of machine, machine set-up for operations, operating machine (push-button operations only)
<b>S = Skilled</b>	Machine set-up for operations, operating machine, maintenance and basic programming
<b>FS = Fully Skilled</b>	As skilled and fully trained in programming



## 4. Safety instructions



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**WARNING:** Press the “EMERGENCY STOP” button before any maintenance work in the work chamber!

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**ATTENTION:** Read the manual carefully and always perform the individual maintenance work on time. Observe all safety instructions listed in the related section which describes a particular maintenance task.

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**ATTENTION:** Maintenance work (except cleaning) should only be performed by qualified maintenance personnel or by a Zeeko approved service agent.

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- Read all instructions for working on electrical equipment when you do any cleaning and maintenance jobs.
- The machine must be switched off when carrying out certain maintenance jobs. Heed the instructions given for each individual maintenance job.
- Use lint-free cloths for cleaning inside the work chamber.
- After cleaning, check all screwed connections for signs of leaks, chafing and ensure that they are tight. Rectify any shortcomings immediately.
- Always correctly tighten any screwed connections which you may have loosened for maintenance or repair purposes.
- If safety devices/guards must be removed for set-up, maintenance or repair purposes, they must be remounted immediately after completion of the work, and you must ensure that such safety devices are then working properly.
- Always dispose of consumables and other auxiliary substances and any exchanged parts in a safe and environmentally friendly manner.

## 5. Maintenance jobs to be completed daily



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**SKILL LEVEL:** *Unskilled (U)*

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- 5.1 Cleaning the work chamber.
- 5.2 Cleaning the guard windows.
- 5.3 Checking the polishing fluid and pneumatic pipes for leaks.
- 5.4 Servicing the air service unit.

### 5.1 Cleaning the work chamber

To clean the work chamber, proceed as follows:

1. Press the “EMERGENCY STOP” button.
2. Slide out the SMU assembly and place a wastewater container under the fluid return pipe.
3. Clean the work chamber, the Virtual Pivot (VP) assembly and the C-axis with water and a clean sponge or soft brush.
4. Wipe all parts dry with a clean lint-free cloth.



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**Prohibition:** *Avoid the use of excessive water pressure and avoid spraying at any joint faces between the work chamber and the enclosure. DO NOT use a pressure washer or high-pressure hose, this could cause slurry to penetrate the seals.*

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### 5.2 Cleaning the guard windows

1. Press the “EMERGENCY STOP” button so that the machine is powered down.
2. Before resetting the machine, you must return the guard windows to their original home positions.



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**Prohibition:** *Do not use harsh cleansers to clean the guard panes, as they could attack and therefor damage the plastic surface.*

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### 5.3 Checking the polishing fluid and pneumatic pipes for leaks.

- Press the “EMERGENCY STOP” button.

- The pneumatics/hydraulics cabinet is located at the top rear of the machine.
- Check the polishing fluid pipes visually for leaks.
- Check the pneumatic pipes for leaks.



**NOTE:** If the polishing fluid or pneumatic pipes have any leaks, please refer to trained maintenance staff.

## 5.4 Servicing the air service unit

- 5.4.1 Checking the water separator.
- 5.4.2 Checking the water mist separator.
- 5.4.3 Checking the pneumatic settings.

The air service unit is located in the pneumatics / hydraulics cabinet.



Figure 1 - Air service unit

### 5.4.1 Checking the water separator

The water separator is located on the pneumatic panel (see Figure 1).

- Press the “EMERGENCY STOP” button.
- Open the pneumatics/hydraulics cabinet.
- Check the level of condensate in the water separator through the inspection window.

The water separator is automatically exhausted via the controller.





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**NOTE:** The residue container underneath the water separator needs to be emptied every day.

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**NOTE:** If the water mist separator has not been exhausted automatically, it has to be manually emptied by lifting the valve at the bottom.

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#### 5.4.2 Checking the water mist separator

The water mist separator is located on the pneumatic panel (see Figure 1).

1. Press the “EMERGENCY STOP” button.
2. Open the pneumatics/hydraulics cabinet.
3. Check the level of condensate in the water mist separator through the inspection window.

The water mist separator is automatically exhausted.



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**NOTE:** The residue container underneath the water separator needs to be emptied every day.

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**NOTE:** If the water mist separator has not been exhausted automatically, it must be manually emptied by lifting the valve at the bottom of the water mist separator.

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#### 5.4.3 Checking the pneumatics settings

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

## 6. Maintenance jobs to be completed weekly



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**SKILL LEVEL:** *Semi-skilled (SS)*

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- 6.1 Cleaning the outer surfaces.
- 6.2 Cleaning the hydraulic chucks

### 6.1 Cleaning the outer surfaces

1. Clean the processing residue and other dirt from all painted outer surfaces.

### 6.2 Cleaning the hydraulic chucks

1. Remove the grub screw from both H-axis and C-axis hydraulic chucks.
2. Clean the grub screw thoroughly and re-grease.

## 7. Maintenance jobs to be completed monthly



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**SKILL LEVEL:** Semi-skilled (SS)

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### ■ 7.1 Checking the work chamber interlocks

#### 7.1 Checking the work chamber interlocks

1. Put the machine into manual mode.
2. Observe that the GUI indicates the guard is closed.



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**ATTENTION:** If the GUI doesn't show the guard is closed, please refer to trained maintenance staff. The machine must not be operated with defective work chamber interlocks.

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3. Put the machine into auto mode.
4. Close ALL work chamber guards.
5. Check that ALL guards are locked.
6. Observe that the GUI indicates that the door is open.



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**ATTENTION:** If the GUI doesn't show the door open, please refer to trained maintenance staff. The machine must not be operated with defective work chamber interlocks.

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7. Put the machine into manual mode to open the chamber doors.
8. Put the machine back into auto mode.
9. Select the "MDI" tab on the GUI main menu.
10. Type "M203 S2=100" at the MDI command line and then press "Enter".
11. Press the "CYCLE START" button.



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**NOTE:** The GUI should report the error "Guard closed \ Cycle start inhibited".

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12. Observe that both guard LEDs are illuminated.



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**ATTENTION:** If the GUI doesn't show the guard is closed, please refer to trained maintenance staff. The machine must not be operated with defective work chamber interlocks!

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## 8. Ball screws and linear guideways



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**SKILL LEVEL:** *Skilled (S)*

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- 8.1 Greasing the ball screws and linear guideways of the axes.

### 8.1 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.

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



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**NOTE:** *It is recommended that greasing the ball screws and oiling the linear guideways is completed every 3 years.*

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## 9. Maintenance jobs to be completed as necessary



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**SKILL LEVEL:** Skilled (S)

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- 9.1 Adjusting and setting the Virtual Pivot (VP).
- 9.2 Changing the fuses.

### 9.1 Adjusting and setting the virtual pivot

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:

1. Clamp the virtual pivot setting tool into the H-axis.
2. Position the probe of a clock on the centre line of the X and Y axes with the base magnetised adjacent to the C-axis.
3. A variation of 15  $\mu\text{m}$  or less is acceptable when rotating the B-axis through + 90 °, - 45 ° from the “Home” position.
4. A variation of 15  $\mu\text{m}$  or less is acceptable when rotating the A-Axis through  $\pm$  120 ° from the “Home” position.



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**ATTENTION:** *If the virtual pivot needs to be reset, this can only be done by Zeeko personnel.*

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### 9.2 Changing the fuses



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**WARNING:** *Work on electrical parts and equipment must only be carried out by a qualified electrician or by duly trained personnel under the instruction and supervision of a qualified electrician, in accordance with electro-technical rules and regulations.*

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1. Switch the machine completely off at the “MAIN SWITCH”
2. Completely isolate the machine electrically by unplugging it 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 (See *Figure 2 - 3-phase fuse holder*), labelled 3F2.



*Figure 2 - 3-phase fuse holder*

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