This procedure tells you how to install the I/O PCB revision R. Version R replaces versions K, L, M, and P.
Caution: When you do maintenance or repair on CNC machines and their components, you must always follow basic safety precautions. This decreases the risk of injury and mechanical damage.

Do these steps before you do work in the machine or in the control cabinet:

- Set the main circuit breaker to the [OFF] position.
- Use an approved lock with an approved safety tag. Always follow lock-out procedures in accordance to local government rules.
- After turning off the machine, wait at least 5 minutes before working in the control cabinet, to allow power to dissipate. Wait for the voltage indicator LED on the vector drive to go off completely.
- Always turn off the main air supply when you work on any part of the pneumatic system.
- Make sure to rest the spindle head on a block of wood when work is done on a vertical axis. This will prevent any unintended movement that could result in the axis falling.
- Never alter any safety circuits on the machine.

You should not do machine repair or service procedures unless you are qualified and knowledgeable about the processes. Serious damage to the machine components can result in costly repairs. The service technicians at your Haas Factory Outlet (HFO) have the training and experience, and are certified to do these tasks safely and correctly. The repair and service work performed by your HFO is protected with a limited warranty.

Danger: Some service procedures can be dangerous or life-threatening. DO NOT attempt a procedure that you do not fully understand. If you have any doubts about doing a procedure contact your Haas Factory Outlet (HFO) and schedule a service visit.

### Parts Included

<table>
<thead>
<tr>
<th>KIT PN: 93-0113A, I/O PCB R VF/HL/HS. QTY: 1</th>
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</thead>
<tbody>
<tr>
<td><strong>[A]</strong> 34-3081R QTY: 1 I/O PCB, REV R</td>
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<tr>
<td><strong>[B]</strong> 33-0814 QTY: 1 CABLE, TOOL CHANGER</td>
</tr>
<tr>
<td><strong>[C]</strong> 33-0825 QTY: 1 CABLE, JUMPER COOLANT PUMP</td>
</tr>
<tr>
<td><strong>[D]</strong> 33-8609 QTY: 1 CABLE, DRAWBAR RESISTOR IO REV R (HMC)</td>
</tr>
<tr>
<td><strong>[E]</strong> 86-1600 QTY: 1 FUSE, VERY FAST 10A / 250V</td>
</tr>
<tr>
<td><strong>[F]</strong> 86-1703 QTY: 1 FUSE, FAST BLOW 5A / 250V</td>
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</table>

### Tools Required

| ESD Strap | Digital Multimeter |
Electrical Cabinet - I/O PCB-R - Replacement

Prerequisites

Resolve the issue that caused the original I/O PCB to fail before you install a new I/O PCB. If the original I/O PCB had a short, and the cause of the short was not fixed, the new I/O PCB can also short out.

Determine if the machine is brush or brushless:

- For HMC/VMC: If you have 8.xx software version of software and lower, you have a brush machine. 9.xx version of software and higher is a brushless machine.
- For lathes: If you have 1.xx software version of software and lower, you have a brush machine. 2.xx version of software and higher is a brushless machine.

Determine if the chip auger/conveyor of your machine is single-phase or 3-phase:

- Method 1: Look at the cover plate of the chip auger/conveyor motor. The cover plate should specify the phase.
- Method 2: Look at the removed I/O PCB. If a fuse is connected to FU4, the machine uses a 3-phase chip auger/conveyor.

Note: Find the location of FU4 in the step 2 illustration.

STEP 1

Push [POWER OFF]. Set the main circuit breaker to the OFF position. Lock the main circuit breaker. Use an approved lock with an approved safety tag.

Danger: When the machine is off, wait at least 5 minutes before you work in the electrical cabinet. This lets power dissipate from the machine. When the voltage indicator LED on the vector drive to goes off completely, it is safe to work in the electrical cabinet.

Caution: When you touch a PCB that is not grounded, you must put on an Electrostatic Discharge (ESD) strap.

Record the I/O PCB version letter from the PCB.

Make sure all cable connections have the correct labels. Record the position of the push-on jumpers on the board. Disconnect all cables.

Remove the I/O PCB. Put the removed I/O PCB in the bag from the replacement I/O PCB.

Install the new I/O PCB. Connect the cables and push-on jumpers that you removed from the removed I/O PCB.
### Do each set of instructions that is applicable to your machine:

<table>
<thead>
<tr>
<th>All machines:</th>
<th>Make sure a jumper is across pins 1 and 2 all of the Emergency Stop input connectors that are not used (P16, P40, or P61) [2]. Look at connectors [8] P6 and P60. If no cable is connected to P60, connect the JUMPER [C] at P63.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brush machines:</td>
<td>Remove the jumpers from J1, J2, and J7 [1].</td>
</tr>
</tbody>
</table>
| Chip augers and conveyors: | Remove the fuse and cap from FU4 [4] for single-phase chip augers and conveyors. Set your meter to Ohm. Measure test points between TP6 and TP7 at position R119 and R122 [3]. Turn the small screw on the potentiometer to adjust the current for the auger or conveyor:  
  - Single-phase chip augers and conveyors: 3-4 kOhm  
  - 3-phase chip augers and conveyors: 1 kOhm  
  - Single-phase, lathe chip conveyors: 500 Ohm |
| VMC and lathe: | Connect JUMPER [B] to P32 [5]  
The location labeled J10 [7] has (2) positions available for a jumper. The positions are labeled. Put the jumper on the J10 [7] 5A position. |
| HMC: | See if a resistor or connector was installed at R3 [6] on the removed board:  
  - If the removed board had a resistor at R3 [6], connect JUMPER [B] to P32 [5]  
  - If the removed board had a connector at R3 [6], remove the old cable. Connect CABLE [D] to P32 [5] on the I/O PCB. Connect the other end of the cable to P3 on the horizontal option (HOPT) PCB in the electrical cabinet. The HOPT PCB is installed only on HS-1/2-RP machines for the pallet changer.  
The location labeled J10 [7] has (2) positions available for a jumper. The positions are labeled. Put the jumper on the J10 [7] 10A position. |
STEP 3

Do this step to make sure the I/O-PCB operates correctly.

Set the main circuit breaker to the **ON** position. Push **[POWER ON]**.

Push **[POWER UP/RESTART]**.

Adjust the ground fault value R86 **[11]** to 0.075V. Use a multimeter on TP2 and a ground source. TP2 is located next to R86 **[11]**. Turn the small screw on the potentiometer to adjust the current for the ground fault value.

Do a tool change for each tool. If a ground fault alarm occurs, increase the ground fault value to 0.150V. Do the test again.

STEP 4

Do this step if you have an auger or chip conveyor.

Operate the auger or chip conveyor. If the motor will not turn forward continuously, do these steps:

1. Increase the overcurrent value (R119 and R122) **[3]** to 2 kOhm on 3-phase motors or 5 kOhm on single-phase motors.
2. Block the auger or belt with a piece of wood. Make sure that the motor pauses before it changes direction.

   **Note:** The belt-style conveyor possibly will not change direction, but it will pause.

3. If the auger or belt will not pause, increase the resistance a maximum of 1 kOhm.

Conclusion

Operate the spindle, tool changer, coolant, TSC, P-cool spigot, Emergency Stop, beacon, operator door, and all optional equipment. Make sure that all machine parts and optional systems operate correctly.