

## X-03: Troubleshoot Hydraulic System (Induction Melt)

### SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- No lockout and tagout is required because problems cannot be diagnosed without electrical and other energy sources operating.
- Explosive and ventilation hazards come from the combustion gases.
- Moving equipment hazards stem from motors and actuators on the furnace.

### EQUIPMENT

- Electrician hand tools
- DVM
- radio

### RESOURCES

- manufacturer's specifications
- design specifications for the furnace



## Troubleshoot Hydraulic System (Induction Melt)

Symptom: The cover will not open.

1. Use the decision table shown below to troubleshoot the cover system.



If:	Recommended Action:
The hydraulic system is not running.	<ol style="list-style-type: none"> <li>1. Activate the Hydraulic Start button.</li> <li>2. Activate the Cover Open switch to the open position.</li> <li>3. Observe the cover.</li> </ol>
The cover did not open.	<ol style="list-style-type: none"> <li>1. Open the control panel door.</li> <li>2. Activate the Cover Open switch to the open position, to check that the input light on the MODICON illuminates.</li> </ol>
The input light illuminates.	<ol style="list-style-type: none"> <li>1. Check for the output light.</li> <li>2. Activate the switch to check that the output light on the MODICON illuminates.</li> </ol>
The input light does not illuminate.	<ol style="list-style-type: none"> <li>1. Follow the procedures for troubleshooting the MODICON logic.</li> <li>2. Check the button/switch.</li> <li>3. Check for active light.</li> </ol>
The active light is not illuminated on the input board, communication is okay, and the power is on.	<ol style="list-style-type: none"> <li>1. Reset the input board.</li> <li>2. Check the active light.</li> </ol>
The active light is still not illuminated.	Change the input board.
The output light illuminates.	Check the output fuse.
The output light does not illuminate.	Check the logic on the MODICON.
The fuse is okay.	Check the directional lights on the solenoid valve.
The solenoid directional lights fail to illuminate.	Listen for the solenoid to click.

2. Use the decision table shown below to continue troubleshooting the cover system.

If:	Recommended Action:
The solenoid does not click. No power to solenoid when operated.	Check for damaged conduit or junction box.
No apparent damage to the conduit or junction box.	Manually operate the valve (Valve In).
The valve operates manually.	<ol style="list-style-type: none"> <li>1. Remove the cover from the valve.</li> <li>2. Check for loose or open wire connections.</li> </ol>
The wire connections are okay.	Disconnect the wires and check for voltage with a DVM.
Voltage is present at the solenoid valve.	Replace the solenoid valve.
The fuse is blown.	Replace the fuse and try the procedure again.
The fuse is okay.	Check the solenoid for "open."
The coil on the solenoid is open.	Replace the solenoid.
The new fuse blows.	<ol style="list-style-type: none"> <li>1. Unplug the power to the solenoid.</li> <li>2. Using a new fuse, perform the procedure again.</li> </ol>
The fuse blows.	<ol style="list-style-type: none"> <li>1. Check the electrical components between the fuse and the solenoid.</li> <li>2. Check the junction box for signs of dirt or oil.</li> <li>3. Change the solenoid.</li> </ol>
Dirt and/or oil is in the junction box.	Clean the junction box thoroughly.



Symptom: The furnace will not tilt.

1. Use the decision table below to troubleshoot the tilt system.

If:	Recommended Action:
The hydraulic system is not running.	<ol style="list-style-type: none"> <li>1. Activate the Hydraulic Start button.</li> <li>2. Activate the Tilt switch to the tilt position.</li> <li>3. Observe the Furnace.</li> </ol>
The furnace did not tilt.	<ol style="list-style-type: none"> <li>1. Open the control panel door.</li> <li>2. Activate the tilt switch to the tilt position, to check that the input light on the MODICON illuminates.</li> </ol>
The input light illuminates.	<ol style="list-style-type: none"> <li>1. Check for the output light.</li> <li>2. Activate the switch to check that the output light on the MODICON illuminates.</li> </ol>
The input light does not illuminate.	<ol style="list-style-type: none"> <li>1. Follow the procedures for troubleshooting the MODICON logic.</li> <li>2. Check the button/switch.</li> <li>3. Check for active light.</li> </ol>
The active light is not illuminated on the input board, communication is okay, and the power is on.	<ol style="list-style-type: none"> <li>1. Reset the input board.</li> <li>2. Check the active light.</li> </ol>
The active light is still not illuminated.	Change the input board.
The output light illuminates.	Check the output fuse.
The output light does not illuminate.	Check the logic on the MODICON.
The fuse is okay.	Check the directional lights on the solenoid valve.
The solenoid directional lights fail to illuminate.	Listen for the solenoid to click.



2. Use the decision table shown below to continue troubleshooting the tilt system.

If:	Recommended Action:
The solenoid does not click. No power to solenoid when operated.	Check for damaged conduit or junction box.
No apparent damage to the conduit or junction box.	Manually operate the valve (Valve In).
The valve operates manually.	<ol style="list-style-type: none"> <li>1. Remove the cover from the valve.</li> <li>2. Check for loose or open wire connections.</li> </ol>
The wire connections are okay.	Disconnect the wires and check for voltage with a DVM.
Voltage is present at the solenoid valve.	Replace the solenoid valve.
The fuse is blown.	Replace the fuse and try the procedure again.
The fuse is okay.	Check the solenoid for "open."
The coil on the solenoid is open.	Replace the solenoid.
The new fuse blows.	<ol style="list-style-type: none"> <li>1. Unplug the power to the solenoid.</li> <li>2. Using a new fuse, perform the procedure again.</li> </ol>
The fuse blows.	<ol style="list-style-type: none"> <li>1. Check the electrical components between the fuse and the solenoid.</li> <li>2. Check the junction box for signs of dirt or oil.</li> <li>3. Change the solenoid.</li> </ol>
Dirt and/or oil is in the junction box.	Clean the junction box thoroughly.



Symptom: The back plate will not raise.

1. Use the decision table below to troubleshoot the back plate system.



If:	Recommended Action:
The hydraulic system is not running.	<ol style="list-style-type: none"> <li>1. Activate the Hydraulic Start button.</li> <li>2. Activate the Back Plate Raise switch to the raise position.</li> <li>3. Observe the cover.</li> </ol>
The back plate did not rise.	<ol style="list-style-type: none"> <li>1. Open the control panel door.</li> <li>2. Activate the Back Plate Raise switch to the raise position, to check that the input light on the MODICON illuminates.</li> </ol>
The input light illuminates.	<ol style="list-style-type: none"> <li>1. Check for the output light.</li> <li>2. Activate the switch to check that the output light on the MODICON illuminates.</li> </ol>
The input light does not illuminate.	<ol style="list-style-type: none"> <li>1. Follow the procedures for troubleshooting the MODICON logic.</li> <li>2. Check the button/switch.</li> <li>3. Check for active light.</li> </ol>
The active light is not illuminated on the input board, communication is okay, and the power is on.	<ol style="list-style-type: none"> <li>1. Reset the input board.</li> <li>2. Check the active light.</li> </ol>
The active light is still not illuminated.	Change the input board.
The output light illuminates.	Check the output fuse.
The output light does not illuminate.	Check the logic on the MODICON.
The fuse is okay.	Check the directional lights on the solenoid valve.
The solenoid directional lights fail to illuminate.	Listen for the solenoid to click.

2. Use the decision table shown below to continue troubleshooting the back plate system.

If:	Recommended Action:
The solenoid does not click. No power to solenoid when operated.	Check for damaged conduit or junction box.
No apparent damage to the conduit or junction box.	Manually operate the valve (Valve In).
The valve operates manually.	<ol style="list-style-type: none"> <li>1. Remove the cover from the valve.</li> <li>2. Check for loose or open wire connections.</li> </ol>
The wire connections are okay.	Disconnect the wires and check for voltage with a DVM.
Voltage is present at the solenoid valve.	Replace the solenoid valve.
The fuse is blown.	Replace the fuse and try the procedure again.
The fuse is okay.	Check the solenoid for "open."
The coil on the solenoid is open.	Replace the solenoid.
The new fuse blows.	<ol style="list-style-type: none"> <li>1. Unplug the power to the solenoid.</li> <li>2. Using a new fuse, perform the procedure again.</li> </ol>
The fuse blows.	<ol style="list-style-type: none"> <li>1. Check the electrical components between the fuse and the solenoid.</li> <li>2. Check the junction box for signs of dirt or oil.</li> <li>3. Change the solenoid.</li> </ol>
Dirt and/or oil is in the junction box.	Clean the junction box thoroughly.

