

Section 12.1



Troubleshooting Guide - Introduction

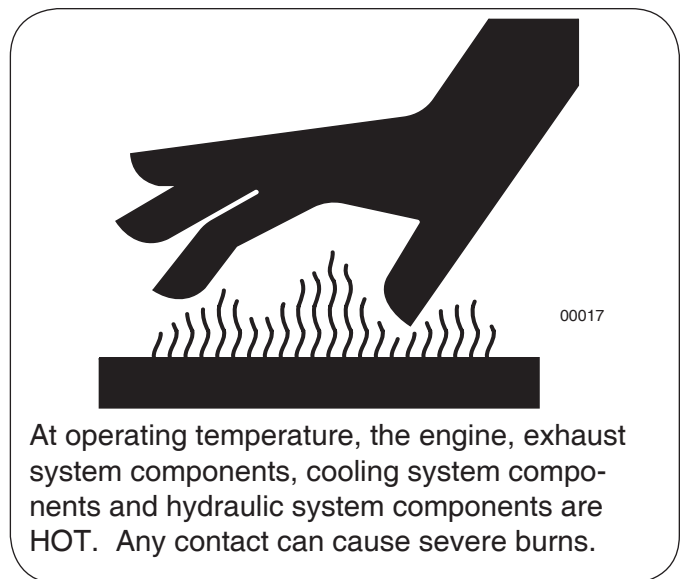
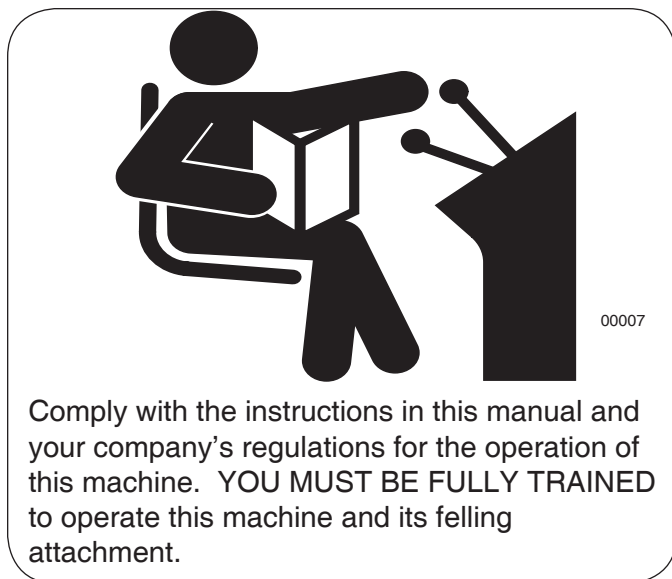
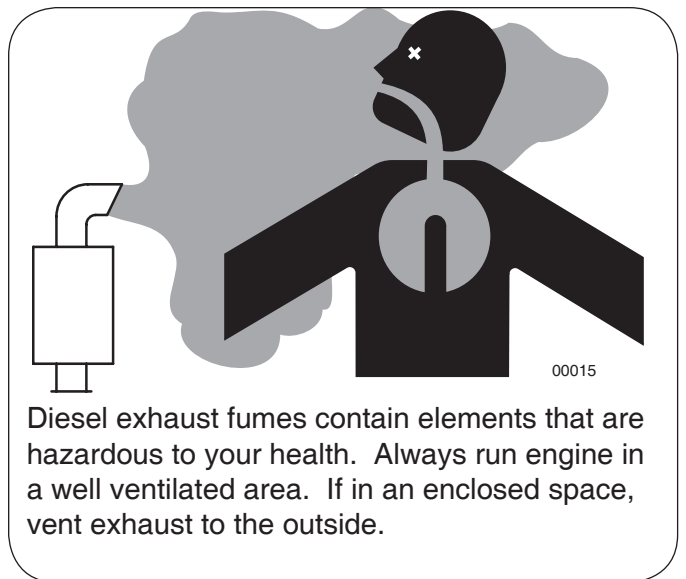
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Troubleshooting Safety

Notice

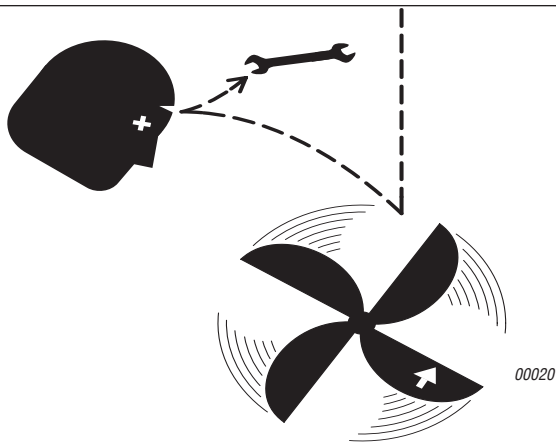
You must read and understand the warnings and basic safety rules found in Group 1 of this manual, before performing any troubleshooting procedures.

For additional troubleshooting guidelines, see the manufacturer's manuals provided with the machine for the engine and any felling attachment when installed.

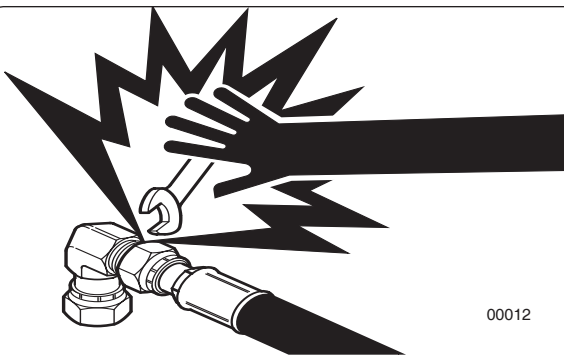




Keep your head, hands, and feet clear of all moving parts.



Keep yourself, all objects and tools away from moving fan blades. Fan blades will cut or throw any object dropped or pushed into them.



Pressure can be maintained in system circuits long after the engine and pumps have been shut down. Release trapped pressure in hydraulic, fuel, and cooling system lines before performing any maintenance or repair procedures.

Simplified Trouble Shooting

There are two ways to tackle and find the cause of problems. The first is by guessing and replacing parts until the problem is corrected (expensive and time consuming). The second is by troubleshooting (cheap and consistent). With the increasing cost of parts and machine downtime, replacing parts until the problem is corrected is prohibitive and extremely inefficient. This has made troubleshooting a very valuable skill.

Troubleshooting is done by stepping back, examining the facts and symptoms, isolating the cause of the problem by testing. Parts are only ordered after confirming the problem. This reduces costs by only replacing parts that require replacing and reducing downtime by getting machines up and running quickly. Troubleshooting may sound slow and complicated, but it isn't. Once a person has learned the basic steps of troubleshooting and has used them a few times, it is a quick and easy way to solve problems.

With this in mind you decide which way you want to solve problems you encounter. If you want to do it by being a parts replacer... read no further and accept the higher costs of repair problems. If you want to troubleshoot and repair problems economically... read on.

The 7-Step Troubleshooting Method

There are several methods of troubleshooting that can be used to solve problems. The method we are going to explain is called the *Seven Step Method*. This method is simple to learn and easy to use. As with all methodical troubleshooting methods, if used correctly, it will produce accurate and consistent results. The seven steps of troubleshooting are:

- 1) Know the System
- 2) Ask the Operator
- 3) Operate the Machine
- 4) Inspect the Machine
- 5) List the Possible Causes
- 6) Reach a Conclusion
- 7) Test Your Conclusion

The only time parts should be replaced is after the seventh step. Let us now examine the seven steps and how each is used.

1) Know The System

To be able to troubleshoot, one must be familiar with and understand the systems on the machine by doing their homework. What we mean is getting to know about the machine through the product manuals, bulletins, technical schools and courses available on the machine, and from other knowledgeable personnel. This may seem overwhelming, but it is not. Much of it can be learned over a period of time and the rest is generally available if need immediately. With this knowledge a person is prepared to tackle step #2.

2) Ask The Operator

This is an important step that many people skip. Operators are a valuable part of troubleshooting. Only they can tell you how the machine acted when the problem first started to occur and if any other unusual things happened also. They can also tell you if any adjustments were tried, plumbing moved around, or various other little bits of valuable information. Once you have thoroughly interviewed the operator, you are ready to move on to step #3.

3) Operate The Machine

It is important that you operate the machine yourself and experience the problem. You know what a proper machine feels and operates like. Find out what feels different now. This will also allow you to verify the operator's story about the machine and its problem.

When you operate the machine you should see if it feels different. Is it sluggish, do the controls feel stiff, unresponsive, overly aggressive, spongy, etc.

How do the gauges read, are they normal? How is the performance? Is it slow, erratic, or does not respond at all?

Are there any unusual smells or do you see anything abnormal like smoke?

Are there any strange or unusual noises? If so, where do they seem to come from? What do they sound like? What functions cause the noises? You should experience and investigate the problem

with all the senses you possess (*Look, Listen, Feel, Smell, and Taste*).

Your senses are very sensitive, can accumulate and analyze a huge amount of information, and are an integral part of troubleshooting. Don't ignore them, use them, then move on to step #4.

4) Inspect The Machine

Now that you know what the machine is acting like, it is time to visually inspect the machine using all five senses again (*Look, Listen, Feel, Smell, and Taste*).

How are the filters, are they plugged?

Feel the reservoir and other components. Are they overly hot? Is the oil cooler plugged with debris? Any collapsed lines?

These are just examples. When you inspect the machine, specifically the affected system, it will give you many excellent clues to the root of the problem. Now move on to step #5.

5) List The Possible Causes

You are now ready to list the possible causes of the problem based on what the operator has told you and the information you have gained from operating and inspecting the machine. All your information will provide clues that will point to a problem or a series of problems. Analyze these clues and combine them with your knowledge of the machine. Write down each possible cause of the problem, even if it seems very remote or unlikely. After making your list move on to step #6

6) Reach Your Conclusion

Look over your list of possible causes and mark down which is the most likely and easiest to confirm. The troubleshooting guides in this section can help you with this. Reach a conclusion on the most reasonable causes of the problem and plan to check or confirm these possibilities first. Now move on to step #7.

7) Test Your Conclusions

This is another step that many people skip and go to replacing parts, hoping that it corrects the problem.

You need to test your conclusions to verify what has actually caused the problem. Only after testing your conclusions should parts be ordered and replaced.

Many of the conclusions can be verified without further testing by logically analyzing the information you already have.

Were all functions bad? If so, then the components that are only common to all parts of the system could cause the problem. These may include pumps, filters, coolers, tank, etc.

Was only one circuit or function bad? If so, then you can eliminate any component that is common to all functions. Doing this will narrow your list of conclusions down to just a few items.

The remaining conclusion can now be tested by using the test & adjustment procedure found in this manual to confirm which item or component caused the problem. Once testing has been completed, you will know what caused the problem and be able to only replace the part(s) required. This simplifies the repair and reduces the total cost by eliminating additional unneeded parts.

Congratulations on entering the world of troubleshooting!

Other Helpful Troubleshooting Hints

When troubleshooting problems arise, always try to isolate the problem by starting with a simple procedure first.

Depending on the problem, it will usually involve a pressure check for either system pilot pressures such as charge pressure standby pressure, or POR pressure. There are quick-coupling gauge port adapters provided for each of these pressure checks.

In case of an implement or travel problem, it is a good idea to check the return filters first. Bronze or brass flakes in the filters would indicate a pump failure. DO NOT allow unfiltered oil to flow into the main tank. See "Changing Return Filters" in Section 2.1.

Section 12.2



Troubleshooting Guide - General Machine Performance

Troubleshooting Guide - General Hydraulic Problems:	
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Troubleshooting Guide - General Hydraulic Problems

PROBLEM	PROBABLE CAUSE	ACTION
1) Engine Runs, No Functions Work	a) No Power To Controls. Cab door open	- Close cab door
	b) No Power To Controls. IQAN system not armed.	- Arm IQAN system. See Section 4.3
	c) No Power To IQAN System. Optional charge oil heater ON.	- Turn charge oil heater switch OFF. See Section 4.3
	d) No Power To IQAN System. Blown IQAN circuit fuse.	- Check appropriate circuit fuses. See Section 5.2.
	e) No Power To IQAN System. Safety interrupt door switch malfunction.	- Replace safety interrupt door switch.
	f) No Power To IQAN System. IQAN system error.	- See "Basic IQAN Training Manual" shipped with machine.
	g) No Pump Pressure Output. Damaged flexplate in pump drive transmission. <i>Note: Broken pump drive transmission flexplate failures are rare. Be sure all other possible causes have been explored before removing these components.</i>	- If there is no evidence of a pump failure, the pump drive transmission flexplate may be damaged which would prevent any pump operation. Remove and inspect the pump drive transmission flexplate. Replace the flexplate if damaged.
PROBLEM	PROBABLE CAUSE	ACTION
2) All functions Slow Or Sluggish	a) Hydraulic Oil Temperature Too Cold For Proper Operation.	- Allow hydraulics to warm-up properly. Change oil to an ISO grade that matches your ambient conditions if required. See Section 2.1.
	b) Hydraulic Oil Temperature Too Hot For Proper Operation.	- Allow hydraulics to cool down. Change oil to an ISO grade that matches your ambient conditions if required. See Section 2.1.
	c) Poor Engine Performance.	- See "Engine Troubleshooting Guide", Section 12.5.

PROBLEM	PROBABLE CAUSE	ACTION
3) Excessive Noise From Pump Area.	a) Hydraulic Tank Not Pressurized.	- See Problem #4, "Hydraulic Tank Turbo Boost Not Building Pressure." in this Section.
	b) Air In Pump Suction Line(s). Pump suction line shut-off valve partially closed causing pump cavitation.	- Ensure all pump suction line shut-off valves are fully open and retained tie straps.
	c) Air In Pump Suction Line(s). Loose connections in pump suction lines.	- Tighten all suction line connections.
	d) Air In Pump Suction Line(s). Collapsed pump suction lines.	- Check all pump suction lines. Replace any collapsed lines.
	e) Air In Pump Suction Line(s). Low hydraulic oil level in tank.	- Low oil level can allow the suction strainers to be exposed to air when traveling up a slope. Check Oil level at sight gauge. Oil should be in the "green" zone at operating temperature. Add oil if required. See Section 2.1.
	f) Air In A Pump Suction Line. Air entering hydraulic tank from cylinders and motors.	- Trapped Air can enter the hydraulic tank during initial start up or after replacing a major hydraulic tank access cover and check for trapped air bubbles in the oil with a flashlight. If there are air bubbles, or the oil has a foamy appearance, de-aerate the machine. See Section 2.1.
	g) Failing Hydraulic Pump.	- Check all pump case drains for shavings or flakes. Also check the case drain return filter for metal shavings and flakes. If found, replace pump. If no metal shavings or flakes are found, perform case drain flow test for the component. If case drain flow is excessive, the component may be near failure. Replace component if required. See Sections 6.2 & 7.2.

PROBLEM	PROBABLE CAUSE	ACTION
3) Excessive Noise from Pump Area. (Cont'd)	h) Plugged Pump Suction Line. Strainer.	<ul style="list-style-type: none"> - Check all pump suction line strainers. for debris. Remove and clean plugged strainer. <p>Note: <i>The hydraulic tank will need to be drained to remove and clean a strainer.</i></p>
	i) Rear engine mounts worn.	<ul style="list-style-type: none"> - Check and inspect for worn or damaged rubber isolators on the rear engine mounts. Replace isolators if required.

PROBLEM	PROBABLE CAUSE	ACTION
4) Hydraulic Tank Turbo Boost Not Building Pressure.	a) Turbo Boost Release Valve Open.	<ul style="list-style-type: none"> - Close the turbo boost release valve located in the upper left corner of the hydraulic tank near the air cleaner.
	b) Hydraulic Tank Safety Relief Cap Loose Or Seal Is Worn.	<ul style="list-style-type: none"> - Tighten relief cap. If turbo boost will still not build pressure, replace the relief cap, TimberPro PN# 18135. Damage to hydraulic components may result if incorrect relief cap is used.
	c) Turbo Boost Regulator. Malfunction.	<ul style="list-style-type: none"> - Perform "Hydraulic Tank Turbo Boost Regulator" test.

PROBLEM	PROBABLE CAUSE	ACTION
5) Hydraulic Oil Coming From Tank Overflow Hose.	a) Machine Not Level During Operation.	- If the machine is operated on a steep slope and facing downhill, the oil level can reach the bottom of the relief stem inside the tank. If the pressure in the tank exceeds the relief cap setting while the stem is submerged in oil, the oil will be purged instead of air. Since the machine does not have a leveling capability, little can be done to prevent this from occurring other than avoiding operation on a steep slope facing downhill.
	b) Hydraulic Oil Tank Overfilled. oil if required. See Section 2.1.	- Check oil level at sight gauge. Oil should be in the "green" zone at operating temperature. Drain some
	c) Hydraulic Tank Safety Relief Cap With Too Low Of A Setting.	- Replace relief cap with correct relief cap, TimberPro PN# 18135. Damage to hydraulic components may result if incorrect relief cap is used.
	d) Turbo Boost Pressure Too High.	- Perform "Hydraulic Tank Turbo Boost Regulator" test.

PROBLEM	PROBABLE CAUSE	ACTION
6) Low Hydraulic Oil Warning Sounds, But Oil Level OK.	a) Hydraulic Oil Level Sensor Malfunction.	- Remove and replace the hydraulic oil level sensor.
	b) Electrical Ground Or Short Between Sensor And Indicator In Dash.	- Inspect for a worn or damaged wire harness. Repair or replace wires or harness if required.

PROBLEM	PROBABLE CAUSE	ACTION
7) Low Hydraulic Oil Warning Does Not Work.	a) No Power To Low Hydraulic Oil Level Warning Indicator.	- Check for power at the low hydraulic oil level warning indicator. Repair wiring if required.
	b) Burnt Out Indicator Bulb.	- Replace Bulb.
	c) Open Circuit Between Sensor And indicator in Dash.	- Inspect for a loose connection or broken wire. Tighten connections or replace wire if required.
	d) Hydraulic Oil Level Sensor Malfunction.	- Remove and replace the hydraulic oil level sensor.

Notice

Overheating of both the engine and hydraulics will most likely be the result of not enough cooling air owing past the radiator and oil cooler.

Troubleshooting Guide - Machine Overheat Problems

PROBLEM	PROBABLE CAUSE	ACTION
1) Engine & Hydraulics Overheating	a) Blocked Airflow Across Radiator/Oil Cooler Fins: Forest debris plugging debris screen and radiator/oil cooler fins.	- Keep radiator/oil cooler fins clean
	b) Blocked Airflow Across Radiator/Oil Cooler Fins: Damaged radiator/oil cooler fins, debris screen or louvered radiator guard preventing proper cooling air flow.	- Check and repair or replace damaged components.
	c) Re-circulation Of Hot Engine Air Across Radiator/Oil Cooler.	- Be sure rubber baffle is in place assembly to prevent hot air bypass around the entire radiator/oil cooler.
	d) Not Enough Cooling Air Flow Across The Radiator/Oil Cooler Fins. Damaged engine fan or missing/damaged fan shroud.	- Check engine fan and fan shroud. Replace damaged or missing components.
	e) Not Enough Cooling Air Flow Across The Radiator/Oil Cooler Fins. Incorrect fan belt or fan belt worn or slipping.	- Ensure fan belt is correct for engine installed. Inspect fan belt and pulleys for wear and correct tension. See Section 3.1.
	f) Not Enough Cooling Air Flow Across The Radiator/Oil Cooler Fins. Incorrect engine fan installed.	- Ensure proper engine fan is installed for the application. Engine fans are available in sucker and blower types (sucker fan installed at factory). See your OEM Replacement Parts Manual for part numbers and ordering information.
	g) Not Enough Cooling Air Flow Across The Radiator/Oil Cooler Fins. Incorrect engine fan spacer installed.	- Ensure proper engine fan spacer is installed for the fan type being used. See your OEM Replacement Parts Manual for part numbers and ordering information.

PROBLEM	PROBABLE CAUSE	ACTION
1) Engine & Hydraulics Overheating. (Cont'd)	h) Not Enough Cooling Air Flow Across The Radiator/Oil Cooler Fins. Engine fan installed backwards.	- Ensure engine fan is installed correctly. Normally, any information tampered on the fan hub will face the the radiator/oil cooler when installed correctly.
	i) Not Enough Cooling Air Flow	- Check and adjust engine rpm.

PROBLEM	PROBABLE CAUSE	ACTION
2) Only Engine Overheating.	a) Thermostat Stuck Closed.	- Check and correct or replace See engine manuals supplied with the machine for procedure.
	b) Incorrect thermostat installed For Ambient Conditions.	- Replace thermostat with one that has a lower opening temperature. See engine manuals supplied the machine for procedure.
	c) Excessive Coolant Anti-Freeze Ratio Causing Gelling.	- Check coolant for correct anti-freeze ratio and adjust as required. See Section 3.1.
	d) Failed Water Pump.	- Check water pump and replace if required. See engine manuals supplied the machine for procedure.
	e) Engine Water Temperature Gauge Malfunctioning.	- Check engine water temperature with a master gauge known to be good Replace gauge if required.
	f) Failed Head Gasket Allowing. Combustion Gases Into The Engine Coolant.	- Open the radiator cap and inspect engine coolant for gas bubbles while the machine is running. If combustion gas bubbles are present, contact your TimberPro dealer for further instructions.
	g) Engine Is Over fuelled.	- Contact your TimberPro dealer for further instructions.

PROBLEM	PROBABLE CAUSE	ACTION
3) Wheel Drive Hydraulics Overheat.	a) Wheel Drive Pump POR Relief Out Of Adjustment	- Perform "Wheel Drive Pump POR Pressure" test. Adjust or replace the POR relief.
	b) Wheel Drive Pump Directional Relief Out Of Adjustment.	- Perform "Wheel Drive Pump Directional Relief Pressure test. Adjust or replace the reliefs if required. See Section 7.2.
	c) Running Wheel Drives Hard And Excessively Lugging Engine Down.	- Running the wheel drive functions hard or rough forces oil over reliefs causing heat. Use correct operating technique.
	d) Wheel Drive Motor Case Drain Orifice(s) Plugged.	- Remove each wheel drive motor case drain (flush) orifice plug in the motor head bottom end cap. Clear any debris plugging the orifice spool end.
	e) Leakage In Rotary Manifold Between Wheel Drive Galleries.	- Contact your TimberPro dealer.

PROBLEM	PROBABLE CAUSE	ACTION
4) Implement Hydraulics Overheating.	a) Loader Or Arch Grapple Valve Port Relief Out Of Adjustment.	- Perform "Implement Valve Port Relief" test. Adjust or replace the relief. See Section 6.2.
	b) Clam Bunk Valve Port Relief Incorrect or Malfunctioning.	- Test Clam Bunk Valve Port Relief. Replace the relief if required.
	c) Implement Pump POR Set Too Low.	- Perform "Implement Pump POR Pressure" test, Section 6.2.
	d) Internal Leakage In Implement Valve.	- Contact your TimberPro dealer.
	e) Internal Leakage In Clam Bunk Valve.	- Contact your TimberPro dealer.
	f) Excessive Volume Of Oil Flow Down Too Small Of Lines To Grapple or Cutting Attachment.	- Ensure hoses and/or tubelines are the correct size for the oil flow required.

PROBLEM	PROBABLE CAUSE	ACTION
10) All Hydraulics Overheating.	a) Excessive Pump Or Motor Case Leakage That is Not Routed To The Oil Cooler Before Going To Tank.	- Perform wheel drive pump, wheel drive motor, loader implement pump, and swing motor case drain leakage test. See Sections 6.2 and 7.3.
	b) Oil Cooler Thermal Bypass Valve Malfunction.	- Test the oil cooler thermal bypass valve for proper operation. Replace oil cooler thermal bypass valve if required.
	c) Oil Cooler Plugged Internally	- Test oil cooler performance
	d) Wrong Hydraulic Oil Viscosity.	- Charge hydraulic oil viscosity to match ambient conditions. See "Appendix A" or hydraulic oil viscosity decal inside the swing-out pump access guard.

Section 12.3



Troubleshooting Guide - Implement Functions

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All Implement Functions Slow Or Sluggish	12.3.3
Single Function Slow Or Sluggish In Both Directions	12.3.4
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All Functions Feel Jerky	12.3.7
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Load Drift, Cylinder	12.3.8
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Swing Does Not Work, Other Functions OK	12.3.9
Weak Swing Function In Both Directions	12.3.10
Jerky Swing Control	12.3.11
Reverse Steer Does Not Work	12.3.11

Troubleshooting Guide - Implement Function Problems

PROBLEM	PROBABLE CAUSE	ACTION
<p>1) No Implement Functions Work, Wheel Drive OK.</p>	<p>a) Pump Destroke Activated: Pump destroke circuit remains activated after starting engine.</p> <p>NOTE: This condition generally exists immediately after using the pump destroke during engine start.</p>	<ul style="list-style-type: none"> - Disconnect the harness (green wire) from the load sense signal dump valve coil in port “SV2” of the upper solenoid manifold. See Section 10.1. <p>If the implement functions work with the wire lead removed, the pump destroke switch is sticking or failed.</p> <p>If the implement functions still do not work, remove the load sense dump valve cartridge and check for debris or damaged seals that are allowing signal oil to bypass. Replace seals or valve cartridge if required.</p>
	<p>b) Load Sense Orifice Or Shuttle Blocked.</p>	<ul style="list-style-type: none"> - Locate the load sense shuttle above the implement pump. Remove the shuttle and the orifice fitting between the shuttle and pump compensator. Check for debris blocking the orifice or causing the shuttle to stick.
	<p>c) No Implement Pump Output</p>	<ul style="list-style-type: none"> - Perform “Implement Pump Stand-by Pressure” test, Section 6.2. <p>If no standby pressure, the problem is at the implement pump, go to 1d.</p> <p>If standby pressure is ok, but no implement functions will work, the problem is the load sense signal bypassing internally in the main control valve and not reaching the pump. Contact your TimberPro dealer.</p>
	<p>d) No implement Pump Output: Worn pump or internal failure.</p> <p>NOTE: If an internal pump/motor failure is suspected, always check the component’s case drain line and the case drain return filter for metal particle contamination first.</p>	<ul style="list-style-type: none"> - Check the case drain filter for metal flakes and perform “Implement Pump Case Drain Flow” test, Section 6.2. If metal flakes are found in the case drain filter or case drain flow is excessive, the implement pump is worn or failed. Replace the implement pump.

PROBLEM	PROBABLE CAUSE	ACTION
2) Only Functions On Single Hand Control Do Not Work.	a) Control Malfunction.	- Check the MDM display for an error signal indicating a problem with the control or wire harness. See the "Basic IQAN Training Manual" shipped with the machine.

PROBLEM	PROBABLE CAUSE	ACTION
3) All Implement Functions Slow Or Sluggish.	a) Hydraulic Oil Temperature Too Cold For Proper Operation. NOTE: Wheel drive functions will also be slow and sluggish.	- Allow hydraulics to warm-up properly. Change oil to an ISO grade that matches your ambient conditions if required. See Section 2.1.
	b) Hydraulic Oil Temperature Too Hot For Proper Operation. NOTE: Wheel drive functions will also be slow and sluggish.	- Allow hydraulics to cool down. Change oil to an ISO grade that matches your ambient conditions if required. See Section 2.1.
	c) Poor Engine Performance.	- See "Engine Troubleshooting Guide", Section 12.5.
	d) Load Sense Orifice Blocked.	- Locate the load sense orifice fitting between the shuttle and implement pump compensator. Check for debris blocking the orifice.
	e) Incorrect Implement Pump Standby and/or POR Pressures.	- Perform "Implement Pump Stand-By" and "Implement Pump POR Pressure" tests, Section 6.2. If pump pressures are ok, but loader implement functions are still slow and sluggish, the problem is the load sense signal not reaching the implement pump, go to "3f". If correct pump pressures cannot be reached, the problem is in the implement pump, go to "3g".

PROBLEM	PROBABLE CAUSE	ACTION
3) All Implement Functions Slow Or Sluggish. (Cont'd)	f) Load Sense Signal Not Reaching Pump: Load sense shuttle valve leaking signal.	<ul style="list-style-type: none"> - Remove all lines from the load sense shuttle valve except the #6 line going to the control valve. Cap all fittings. If implement functions work properly with lines disconnected, replace the shuttle valve. <p>NOTE: If there is more than one shuttle valve, reconnect each line separately until the leak is found.</p> <p>If implement functions are still slow or sluggish, the problem is the load sense signal bypassing internally in the main control valve. Contact your TimberPro dealer.</p>
	g) Implement Pump Malfunction: Compensator spools sticking or control spring broken.	<ul style="list-style-type: none"> - Remove and clean spools. Be sure the spools move freely. Check for a broken control spring and replace if required.

PROBLEM	PROBABLE CAUSE	ACTION
4) Single Function Slow Or Sluggish In Both Directions.	a) Function Control Problem.	<ul style="list-style-type: none"> - Check the MDM display for an error signal indicating a problem with the control or wire harness. See the "Basic IQAN Training Manual" shipped with the machine.
	b) Internal leakage In Cylinder Or Motor. NOTE: If the swing function is slow or sluggish in both directions, first check to be sure that the swing detent feature is not activated. It is possible to operate the swing function with the swing detent activated but oil flow is very restricted.	<ul style="list-style-type: none"> - Check for cylinder or motor leakage.

PROBLEM	PROBABLE CAUSE	ACTION
<p>4) Single Function Slow Or Sluggish In Both Directions. (Cont'd)</p>	<p>c) Compensator Dampening Orifice In Function Control Valve Section Plugged. (LS90 Sections Only)</p>	<ul style="list-style-type: none"> - Remove the compensator dampening orifice from the function's control LS90 valve section. Clean debris from the orifice and re-install. See in Section 6.1.
	<p>d) Function Valve Section Compensator Spool Malfunction.</p>	<ul style="list-style-type: none"> - Remove the compensator spool from the function's control valve section. - Be sure spool does not stick or bind. Clean and inspect for nicks or scoring. Replace spool if required. - Check for a broken compensator spool control spring. Replace control spring if broken. Be sure to remove all pieces of broken spring.
	<p>e) Proportional Solenoid Orifice Plugged.</p>	<ul style="list-style-type: none"> - Remove the proportional solenoid orifices from the function's control valve section. See Section 6.1. Clean and check for debris. Reinstall orifice.

PROBLEM	PROBABLE CAUSE	ACTION
5) Single Function Slow Or Sluggish In One Direction.	a) Function Control Problem.	<ul style="list-style-type: none"> - Check the MDM display for an error signal indicating a problem with the control or wire harness. See the “Basic IQAN Training Manual” shipped with the machine.
	b) Proportional Solenoid Malfunction.	<ul style="list-style-type: none"> - Swap the harness leads between the proportional solenoids of the problem function’s control valve section. - If the problem does not change direction with the harness swap, a proportional solenoid may have failed. Replace the solenoid. - If the problem does not change direction with the harness swap, the problem is in the main control valve, go to “5c”.
	c) Function Port Relief Out Of Adjustment.	<ul style="list-style-type: none"> - Perform “Implement Valve Port Relief” test, Section 6.2. Adjust or replace the relief, if required.
	d) Proportional Solenoid Orifice Plugged.	<ul style="list-style-type: none"> - Remove the proportional solenoid orifices from the function’s control valve section. See Section 6.1. Clean and check for debris. Reinstall orifice.
	e) Internal leakage In Cylinder Or Motor.	<ul style="list-style-type: none"> - Check for leakage. Repair or replace component as required.
	f) Plugged Load Sense Orifice In Function Valve Section Main Spool.	<ul style="list-style-type: none"> - Contact your TimberPro dealer.

PROBLEM	PROBABLE CAUSE	ACTION
6) All Functions Feel Jerky.	a) Hydraulic Tank Not Pressurized.	- See Problem #4, "Hydraulic Tank Turbo Boost Not Building Pressure", Section 12.2.
	b) Incorrect Implement Pump Stand-by Pressure.	- Perform "Implement Pump Stand-by Pressure" test, Section 6.2. If standby pressure is ok, but functions are still jerky, go to "6c". If correct pump pressures cannot be reached, the problem is likely in the implement pump compensator, go to "6d".
	c) Control Valve Return Oil 150 PSI Check Valve Stuck Open.	- Remove 150 PSI and inspect for damage or debris. Clean or replace check valve.
	d) Implement Pump Malfunction: Compensator spools sticking or control spring broken.	- Remove and clean spools. Be sure the spools move freely. Check for a broken control spring and replace if required.

PROBLEM	PROBABLE CAUSE	ACTION
7) Single Function Feels Jerky.	a) Function Control Problem.	- Check the MDM display for an error signal indicating a problem with the control or wire harness. See the "Basic IQAN Training Manual" shipped with the machine.
	b) Proportional Solenoid Orifice Plugged.	- Remove the proportional solenoid orifices from the function's control valve section. See Section 6.1. Clean and check for debris. Reinstall orifice.
	c) Function Valve Section Compensator Spool Sticking Full Open.	- Remove the compensator spool from the function's control valve section. Be sure spool does not stick or bind. Clean and inspect for nicks or scoring. Replace spool if required.

PROBLEM	PROBABLE CAUSE	ACTION
8) Load Drift, Cylinder.	a) Function Port Relief Malfunction.	- Perform "Implement Valve Port Relief" test, Section 6.2. Adjust or replace the relief, if required.
	b) Internal leakage In Cylinder.	- Check for leakage. Repair or replace component as required. NOTE: If working with the grapple cylinder, also check for leakage in the rotator seals.
	c) Function Valve Section Main Spool Centering Spring.	- Remove the valve section main spool centering spring. Inspect the centering spring and main spool for damage. Replace if required.

PROBLEM	PROBABLE CAUSE	ACTION
9) Load Drift, Motor.	a) Function Port Relief Malfunction.	- Perform "Implement Valve Port Relief" test, Section 6.2. Adjust or replace the relief, if required.
	b) Internal leakage In Motor.	- Check for leakage. Repair or replace component as required..
	c) Function Valve Section Main Spool Centering Spring.	- Remove the valve section main spool centering spring. Inspect the centering spring and main spool for damage. Replace if required.
	d) Anti-Cav Valve Cross Over Relief Leakage (Swing Function Only)	- Remove the anti-cav cross over reliefs and inspect for damaged seals. Replace seals or cartridge, if required.

PROBLEM	PROBABLE CAUSE	ACTION
10) Swing Does Not Work, Other Functions OK.	a) Function Control Problem.	<ul style="list-style-type: none"> - Check the MDM display for an error signal indicating a problem with the control or wire harness. See the “Basic IQAN Training Manual” shipped with the machine.
	b) Swing Brake Not Released. (Charge pressure too low)	<ul style="list-style-type: none"> - Charge pressure too low to release swing brake. Check for proper charge pressure. See Section 7.2.
	c) Swing Brake Not Released. (Swing Brake Malfunction)	<ul style="list-style-type: none"> - Swing brake spring pack sticking. Contact your TimberPro dealer.
	d) Function Valve Section Work Or Compensator Spool Malfunction.	<ul style="list-style-type: none"> - Remove spools from the swing function control valve section. <ul style="list-style-type: none"> - Be sure spools do not stick or bind. Clean and inspect for nicks or scoring. Replace spool if required. - Check for a broken compensator spool control spring. Replace control spring if broken. Be sure to remove all pieces of broken spring.
	e) Internal leakage In Swing Motor.	<ul style="list-style-type: none"> - Check for leakage. Repair or replace motor if required.
	f) Swing Gearbox Malfunction.	<ul style="list-style-type: none"> - Contact your TimberPro dealer.

PROBLEM	PROBABLE CAUSE	ACTION
11) Weak Swing Function In Both Directions.	a) Function Control Problem.	- Check the MDM display for an error signal indicating a problem with the control or wire harness. See the “Basic IQAN Training Manual” shipped with the machine.
	b) Swing Detent Switch ON.	- Turn switch OFF. See Section 4.2.
	c) Swing Detent Solenoid Valve SV2 Malfunction.	- Remove cartridge. See Section 9.1. Check for contamination or damaged seals. Replace seals or cartridge if required..
	d) Swing Brake Not Fully Released. (Charge pressure too low)	- Charge pressure too low to fully release swing brake. Check for proper charge pressure. See Section 7.2.
	e) Swing Brake Not Fully Released. (Swing Brake Malfunction)	- Swing brake spring pack sticking. Contact your TimberPro dealer.
	f) Function Valve Section Work Or Compensator Spool Malfunction.	<ul style="list-style-type: none"> - Remove spools from the swing function control valve section. - Be sure spools do not stick or bind. Clean and inspect for nicks or scoring. Replace spool if required. - Check for a broken compensator spool control spring. Replace control spring if broken. Be sure to remove all pieces of broken spring.
	g) Internal leakage In Swing Motor.	- Check for leakage. Repair or replace motor if required.

PROBLEM	PROBABLE CAUSE	ACTION
12) Jerky Swing Control	a) Brake Circuit Regen Causing Pump To Cycle HI/LOW Flow Output.	- Look for leakage in the brake circuit, or any other circuits served by the lower solenoid manifold, that is making the brake accumulator regen circuit cycle ON and OFF continuously. See Sections 9.1 and 10.1.
	b) 150 PSI Check in Return Line To The Oil Cooler Not Maintaining. Required Backpressure.	- Remove 150 PSI check and check for contamination holding the check valve open. Replace if required.

PROBLEM	PROBABLE CAUSE	ACTION
13) Reverse Steer Does Not Work.	a) Reverse Steer Switch Malfunction.	- Reverse steer is done entirely by crossing signal wires at the reverse steer switch in the dash. See Section 4.2. Check switch for loose wires. Replace switch if required.

Section 12.4



Troubleshooting Guide - Wheel Drive Functions

Troubleshooting Guide - Wheel Drive Problems:	
Wheel Drive Will Not Work, Implement Functions OK	12.4.2
Wheel Drive Slow Or Sluggish In Both Directions	12.4.3
Wheel Drive Slow Or Sluggish In One Direction	12.4.4
Machine Creeps In Neutral	12.4.4
Wheel Drive Maximum Displacement Lock Will Not Engage (Dual wheel drive motors)	12.4.5
2-Speed Motor Shift Will Not Work (Single wheel drive motor)	12.4.6
2-Speed Motor Shift Slow Or Sluggish (single wheel drive motor)	12.4.6

Troubleshooting Guide - Wheel Drive Problems

PROBLEM	PROBABLE CAUSE	ACTION
<p>1) Wheel Drive Will Not Work, Implement Functions OK.</p>	<p>a) Low Hydrostatic Charge Pressure. Charge pressure set too low.</p>	<p>- Check hydrostatic charge pressure and adjust as required. See Section 7.2.</p> <p>If charge pressure cannot be set to specification, remove charge pressure relief cartridge and check for damaged or missing seals. Replace seals or relief cartridge if required.</p>
	<p>b) Low Hydrostatic Charge Pressure. Charge oil filter dirty or element has collapsed.</p>	<p>- Check hydrostatic charge oil filter. See Section 7.2. Replace if required.</p>
	<p>c) Oil Too Cold To Flow Poperly Through The Hydrostatic Charge Oil FIlter.</p>	<p>- Warm machine up properly before starting to work.</p>
	<p>d) Charge Pump Failure.</p>	<p>- Replace charge pump.</p>
	<p>e) Wheel Drive Pump Or Motor Failure.</p>	<p>- Check case drain return filters for metal flakes. Perform case drain pressure and flow tests. See Section 7.2 Replace wheel drive pump or motor if required.</p>
	<p>f) Drivetrain Failure.</p>	<p>- Check driveshafts and gearbox. Replace components if required.</p>

PROBLEM	PROBABLE CAUSE	ACTION
2) Wheel Drive Slow Or Sluggish In Both Directions.	a) Low Hydrostatic Charge Pressure. Charge pressure set too low.	<ul style="list-style-type: none"> - Check hydrostatic charge pressure and adjust as required. See Section 7.2. <p>If charge pressure cannot be set to specification, remove charge pressure relief cartridge and check for damaged or missing seals. Replace seals or relief cartridge if required.</p>
	b) Low Hydrostatic Charge Pressure. Charge oil filter dirty or element has collapsed.	<ul style="list-style-type: none"> - Check hydrostatic charge oil filter. See Section 7.2. Replace if required.
	c) Oil Too Cold To Flow Properly Through The Hydrostatic Charge Oil Filter.	<ul style="list-style-type: none"> - Warm machine up properly before starting to work.
	d) POR Relief Out Of Adjustment.	<ul style="list-style-type: none"> - Perform "Wheel Drive Pump POR Pressure" test, Section 7.2. <p>If correct pressure setting cannot be made, remove the relief cartridge and inspect the seals. Replace the seals or the relief cartridge if required.</p>
	e) POR Relief Sticking.	<ul style="list-style-type: none"> - Remove the POR relief cartridge and check for a sticking spool. Replace cartridge if necessary.
	f) Wheel Drive Motor Begin Of Stroke out of adjustment.	<ul style="list-style-type: none"> - Adjust wheel drive motor Begin Of Stroke pressure. See Section 7.2.
	g) Wheel Drive Pump Or Motor Failure.	<ul style="list-style-type: none"> - Check case drain return filters for metal flakes. Perform case drain pressure and flow tests. See Section 7.2 Replace wheel drive pump or motor if required.
	h) Drivetrain Failure.	<ul style="list-style-type: none"> - Check driveshafts and gearbox. Replace components if required
	i) Leakage In Rotary Manifold Between Wheel Drive Galleries.	<ul style="list-style-type: none"> - Contact your TimberPro dealer.

PROBLEM	PROBABLE CAUSE	ACTION
3) Wheel Drive Slow Or Sluggish In One Direction.	a) Function Control Problem.	- Check the MDM display for an error signal indicating a problem with the control or wire harness. See the "Basic IQAN Training Manual" shipped with the machine.
	b) Wheel Drive Pump Directional Relief Out Of Adjustment.	- Perform "Wheel Drive Pump Directional Relief Pressure" test, Section 7.2. If correct pressure setting cannot be made, remove the relief cartridge and inspect the seals. Replace the seals or the relief cartridge if required.
	c) EP Solenoid Coil Malfunction.	- Swap suspect coil with the other EP solenoid coil and try function again. Replace suspect EP solenoid coil if required.
	d) Wheel Drive Pump Or Motor Failure.	- Check case drain return filters for metal flakes. Perform case drain pressure and flow tests. See Section 7.2 Replace wheel drive pump or motor if required.
	e) Leakage In Rotary Manifold Between Wheel Drive Galleries.	- Contact your TimberPro dealer.
	f) Loop Flushing Orifice Plugged In Wheel Drive Pump Or Motor.	- Contact your TimberPro dealer.

PROBLEM	PROBABLE CAUSE	ACTION
4) Machine Creeps In Neutral.	a) Function Control Problem.	- Check the MDM display for an error signal indicating a problem with the control or wire harness. See the "Basic IQAN Training Manual" shipped with the machine.
	b) Wheel Drive Pump Stroke Control Valve Worn.	- The stroke control valve may be worn and not holding the pump in a neutral condition. Perform "Wheel Drive Pump Null" adjustment, Section 7.2.

PROBLEM	PROBABLE CAUSE	ACTION
5) Wheel Drive Maximum Displacement Lock Will Not Engage. (Dual wheel drive motors) spool	a) No Power At Max Displacement Lock Solenoid Coil.	- Check for power at solenoid coil. See Section 8.1. If no power, replace max displacement lock rocker switch in dash panel.
	b) Max Displacement Lock Solenoid Valve Malfunction	- Check continuity of coil with ohm meter. See Section 9.1. Replace coil if required. - Remove cartridge. Check for contamination or damaged seals. Replace seals or cartridge if required.
	c) Stuck Or Damaged Shift Spool.	- Remove shift control end cap on motor shift spool housing, and shift spool. Check for damage to the housing and spool. Be sure spool moves freely in the housing. Replace the spool or spool housing if required. NOTE: Shift control end cap is under spring pressure. Remove cap slowly.
	d) Internal Damage to Wheel Drive Motor.	- Contact your TimberPro dealer.

PROBLEM	PROBABLE CAUSE	ACTION
6) 2-Speed Motor Shift Will Not Work. (Single wheel drive motor)	a) No Power At Max Displacement Lock Solenoid Coil.	- Check for power at solenoid coil. See Section 8.1. If no power, replace max displacement lock rocker switch in dash panel.
	b) 2-Speed Shift Solenoid Valve Malfunction	- Check continuity of coil with ohm meter. See Section 9.1. Replace coil if required. - Remove cartridge. Check for contamination or damaged seals. Replace seals or cartridge if required.
	c) Stuck Or Damaged Shift Spool.	- Remove shift control end cap on motor shift spool housing, and shift spool. Check for damage to the housing and spool. Be sure spool moves freely in the housing. Replace the spool or spool housing if required. NOTE: Shift control end cap is under spring pressure. Remove cap slowly.
	d) Internal Damage to Wheel Drive Motor.	- Contact your TimberPro dealer.

PROBLEM	PROBABLE CAUSE	ACTION
7) 2-Speed Motor Shift Slow Or Sluggish. (Single wheel drive motor)	a) Sticking Shift Spool Or Plugged Spool Housing Orifice.	- Remove shift control end cap, shift spool housing, and shift spool. Check for debris plugging the spool housing and be sure spool moves freely in the housing. Clean or replace the spool or spool housing if required. NOTE: The shift control end cap is under spring pressure. Remove cap slowly.

Section 12.5



Troubleshooting Guide - Engine Problems

Troubleshooting Guide - Engine Problems:	
Engine Will not Start (Crank over OK)	12.4.2
Engine Will not Start (Doesn't crank over)	12.4.2
Engine Sluggish or Stalls Easily	12.4.3

Troubleshooting Guide - Engine Problems

PROBLEM	PROBABLE CAUSE	ACTION
1) Engine Doesn't Start (cranks over ok)	a) Bad Diesel fuel	<ul style="list-style-type: none"> - Check Fuel to make shure it is free of contamintion and water - Check Fuel to see if it is proper Blend for weather conditions.
	b) Plugged Fuel Filters	<ul style="list-style-type: none"> - Replace All fuel filters and drain water from engine fuel filter.
	c) Bad Fuel Lift Pump	<ul style="list-style-type: none"> - Check Fuel Lift Pump in the lower frame to make shure it is working properly.
	d) Bad Fuel Pump Shut-off Solenoid (NON-Electronic Engines)	<ul style="list-style-type: none"> - Check to see that Shut-off solenoid is working properly.
	e) Loss of power to engine ECU (Electronic Engines)	<ul style="list-style-type: none"> - Check fuses in engine control panel to make shure it is sending power to engine ECU.
	f) Not allowing Grid Heater on Electronic Engines to activate.	<ul style="list-style-type: none"> - When tempatures are below 30 degrees feienheit alow wait to start light to turn on an go off twice before starting.

PROBLEM	PROBABLE CAUSE	ACTION
2) Engine Doesn't Start (Doesn't crank over)	a) Bad Batteries	<ul style="list-style-type: none"> - Check batteries for proper charge.
	b) Pump Destroke not depressed	<ul style="list-style-type: none"> - Push and hold Pump Destroke while cranking engine.
	c) Implement or Hydro Pump stuck on stroke.	<ul style="list-style-type: none"> - Check pump pressure while cranking to determine if pump is trying to stroke.
	d) Tempatures are to cold.	<ul style="list-style-type: none"> - Use engine heaters to warm engine block before cranking.

PROBLEM	PROBABLE CAUSE	ACTION
3) Engine Sluggish or Stalls Easily.	a) Bad Diesel fuel	<ul style="list-style-type: none"> - Check Fuel to make shure it is free of contamintion and water - Check Fuel to see if it is proper Blend for weather conditions.
	b) Plugged Fuel Filters	<ul style="list-style-type: none"> - Replace All fuel filters and drain water from engine fuel filter.
	c) Bad Fuel Lift Pump	<ul style="list-style-type: none"> - Check Fuel Lift Pump in the lower frame to make shure it is working properly.
	d) Turbo Boost not working Properly.	<ul style="list-style-type: none"> - Check Turbo lines for loose lines or cracked hoses. - Contact your TimberPro Dealer.
	e) Sensor Problems on Electronic Engine.	<ul style="list-style-type: none"> - Check for Error Blink Codes using Warning and Stop Lights. - Contact your TimberPro Dealer.
	f) Excessive Engine Wear	<ul style="list-style-type: none"> - Contact your TimberPro Dealer.