

SERVICE MANUAL

Tigercat H860C/H870C/LH870C HARVESTER

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ISSUE 1.1 FEBRUARY 2007

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H860C H870C LH870C-SM00

H860C/H870C/LH870C HARVESTER Available Literature
 Operator's Manual, English Part No. 25198A
 Operator's Manual, Russian Part No. 30225A
 Service Manual English (this manual) Part No. 25199A
 Service Manual, Russian Part No. 30226A
 Parts Catalog Part No. 25197A

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OPERATING SAFETY PRECAUTIONS

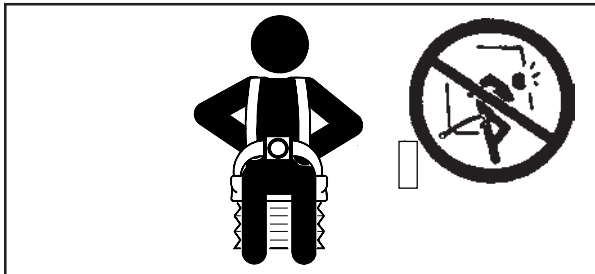


Shut off engine when refuelling - DO NOT refuel the engine while smoking or near open flame or sparks.

Check that no other personnel have moved into a hazardous area before starting the machine.

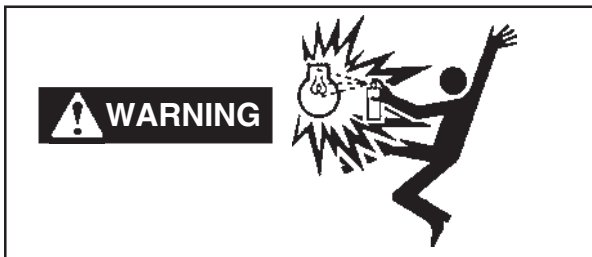
Sound the machine horn before starting the machine.

The operator's seat is equipped with lap and shoulder harness belts. Use both of these restraint systems at all times when operating the machine.



Start the engine according to the instructions in this manual. Refer to OPERATING MACHINE in SECTION 2 of the OPERATOR'S MANUAL.

Never use a liquid starting aid to start an engine.



THIS MACHINE IS EQUIPPED WITH A COMPUTER CONTROLLED HEATING ELEMENT IN THE ENGINE INTAKE SYSTEM. STARTING FLUIDS WILL EXPLODE ON CONTACT WITH THE HEATING ELEMENT.

Before moving the machine to the work site, check to ensure that all doors, panels, and access covers are installed properly and secured.

CAB EXITS

There are three ways to exit the cab in case of an emergency.

1. **Front door**, this is also the main point of entry and is the **only** door that should be used under normal operating conditions to enter or leave the cab. This door is also equipped with a SAFETY INTERLOCK SWITCH. See SAFETY INTERLOCK SWITCH ON FRONT DOOR in THIS SECTION.
2. **Side door**, should be used for emergency exits only. **Do not use this door** to routinely enter or leave the cab. This door is **not** equipped with a safety interlock switch and therefore when left open will not deactivate the pilot controls in the cab. ALWAYS shut OFF engine before using the side door exit.
3. **Escape hatch**, this is a third cab exit for use if the side exit or front door exit become blocked.

This hatch is **not** equipped with a safety interlock switch and therefore when left open will not deactivate the pilot controls in the cab. ALWAYS shut OFF engine before using the escape hatch exit.

It is important that the operator of the machine be familiar with these emergency exits and how to use them.

All three exits should be checked to make sure that they are operational and will function in an emergency. The safety interlock mechanism on the front door or the side door and escape hatch retaining mechanisms must not be tampered with or defeated.

IMPORTANT

Unlock both doors before operating machine to allow opening from the outside in case of an emergency. Make sure that the doors are operational, open the doors twice, once using the exterior latch handle and once using the interior handle.

For additional information, refer to EMERGENCY EXITS in SECTION 2 of the OPERATOR'S MANUAL.

SERVICING SAFETY PRECAUTIONS
continued



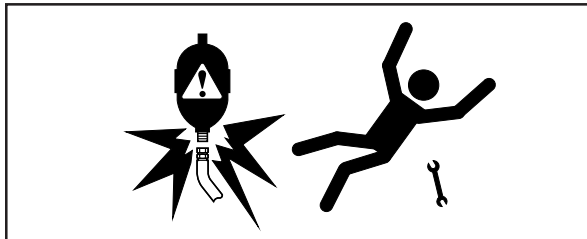
WARNING

Diesel fuel or hydraulic fluid under pressure can penetrate the skin and cause serious personal injury, blindness, or death. If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with treating this type of injury.

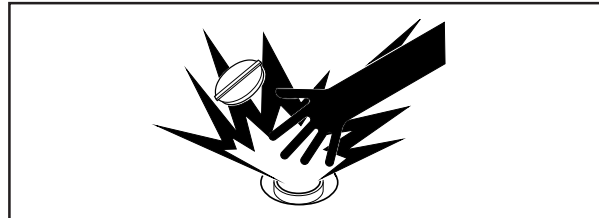
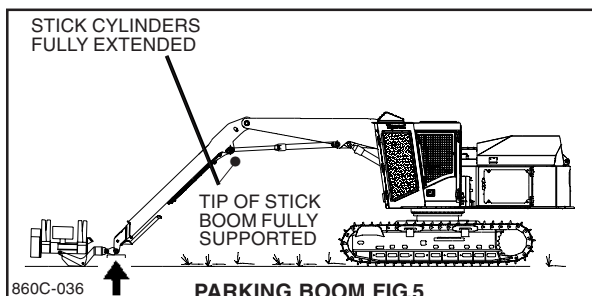
Never use your bare hand to check for fluid leaks.



Fluid leaks under pressure may not be visible. When searching for leaks, wear work gloves and use a wrench or piece of wood to move hydraulic hoses. Do not grab hold of hydraulic hoses. Wear safety goggles for eye protection.



Pressure can be maintained in a hydraulic system long after the power source and pump have been shut down. Lower the attachment to the ground, stop engine and relieve trapped pressure before performing work on components, or disconnecting any hoses. Refer to PARKING BOOM diagram (fig.5). Accumulators will self drain within 2 minutes of stopping the engine.



Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove coolant filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.



Do not change any pressure or relief setting unless Tigercat authorized instruction has been obtained.

Use the proper tool for the job. Repair or replace worn or damaged tools including lifting equipment immediately.



Keep your hands, feet, head, and loose clothing away from power driven parts. Tie long hair behind your head. Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.

Always be aware of machine pinch points that could cause injury. Never place body parts within the range of motion of the working parts of the machine.

Never stand under an object supported with hydraulics. Always use safety stands or a locking device.

GENERAL



ALL HANDLES, STEPS AND PLATFORMS MUST BE KEPT FREE OF GREASE, OIL, FUEL, MUD, SNOW, ICE AND FOREST DEBRIS.

- ☑ Clean around filler caps before checking or adding fluids.
- ☑ Clean around hydraulic fittings before breaking connection. Plug or cap immediately.
- ☑ Clean up all spills immediately.
- ☑ Always use clean oil and containers.
- ☑ Drain dirty oil while still warm.
- ☑ Do not exceed recommended fluid levels.
- ☑ Service all hydraulic filters after the failure of a pump, motor, cylinder or valve. Failures of this nature could contaminate the entire hydraulic system.
- ☑ Top up diesel fuel at each shift to reduce contamination by condensation.
- ☑ Before welding on machine, be sure to disconnect all electrical connections and follow all servicing safety precautions as outlined in the WELDING, PRIOR TO of SECTION 1 in THIS MANUAL.
- ☑ When welding, secure ground connection as close to working position as possible to prevent arcing across machined surfaces or through bearings.
- ☑ Clean away all branches, bark and chips. Clean up all traces of oil to avoid fires.
- ☑ Inspect the EXHAUST SYSTEM DAILY for any signs of LEAKAGE. Check for worn, cracked, broken, or damaged pipes or muffler. Also check for missing or damaged bolts or clamps. Should any exhaust leaks or defective parts be found, repairs must be made immediately. Engine exhaust leaks can cause fires, DO NOT OPERATE the machine until the exhaust leak is repaired.
- ☑ During daily operation of the machine, the occurrence of exhaust leaks are usually accompanied by a change or increase in engine exhaust noise levels. These audible warnings cannot be ignored. Should any exhaust leaks occur during operation, the machine must be shut down immediately and not put back to work until the necessary repairs have been completed.

- ☑ Always have a fire extinguisher at hand.
- ☑ For safety, always lower boom assembly to the ground when leaving cab, leaving machine unattended or during service.
- ☑ Always install door safety struts when working on machine.
- ☑ Clean fire suppression system sensors.

CHECK EMERGENCY EXITS, MONTHLY:~

Two alternate exit routes are provided: side door emergency exit and escape hatch/emergency exit. These are only to be used if the front door cannot be opened.

It is therefore essential that these emergency exits be checked at least once per month to ensure they are fully operational.

Refer to EMERGENCY EXIT MAINTENANCE GUIDE in SECTION 2 of the OPERATOR'S MANUAL for checking procedure.

FIRE PREVENTION

Maintaining your machine properly will greatly extend its life and reduce your operating costs.

Fire can result in a machine loss which can be financially devastating.

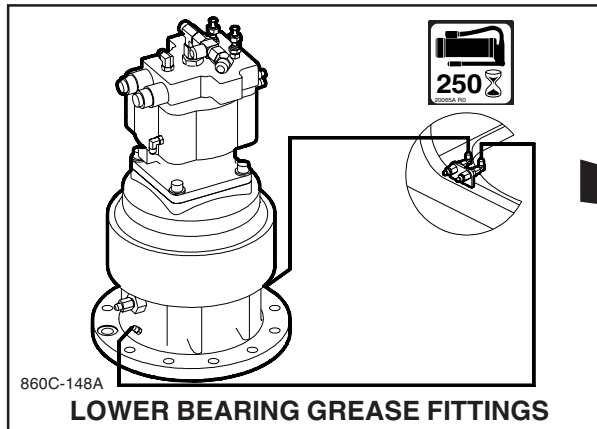


AFTER transporting (trucking) a machine from one job sight to the next, open all doors and access panels and blow off any debris that could have re-positioned itself onto the engine and exhaust parts due to wind turbulence caused by the journey.

1. Pine needles and bark when allowed to accumulate, form a fuel source that when ignited is extremely difficult to extinguish. A thorough program of regular cleaning and washing will reduce the possibility of a fire starting. In the event a fire does start, the regular cleaning program will improve the chances of successfully extinguishing a fire.
2. Pay close attention to wiring and plumbing routings during maintenance, ensure that ALL wiring harnesses or hydraulic hoses are properly restrained and clamped to prevent damage from chaffing.

Continued on page 4

SWING DRIVE LUBRICATION

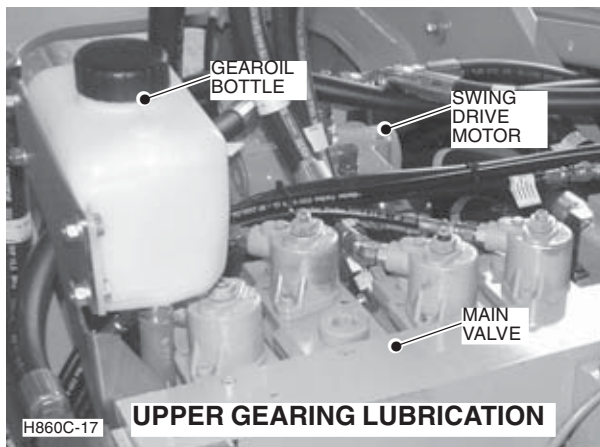


LUBRICATION OF SWING DRIVE GEARBOX LOWER BEARINGS

The cavity in the lower portion of the gearbox where the two lower bearings are housed is completely filled with grease.

Open the hydraulic pump compartment and locate the lube fittings. Using a hand grease gun, pump 5 shots of grease into each grease fitting. **DO NOT OVERGREASE**, make sure machine is warmed up in winter or lower seal can be damaged. Follow the lubricating procedure on the label located beside the grease fittings and also refer to SCHEDULED MAINTENANCE - 250 HOURS in THIS SECTION.

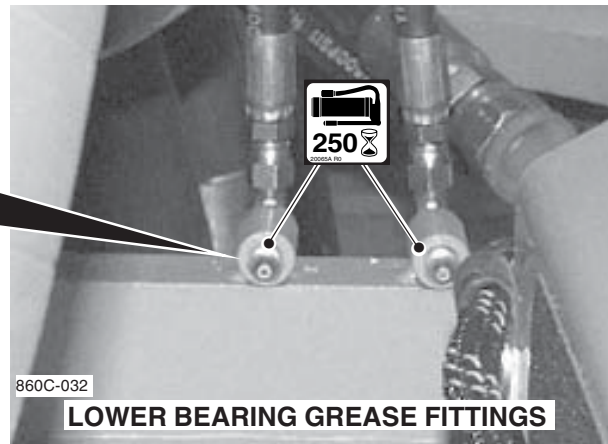
For additional information refer to SECTION 15 in the SERVICE MANUAL.



LUBRICATION OF SWING DRIVE GEARBOX UPPER GEARING

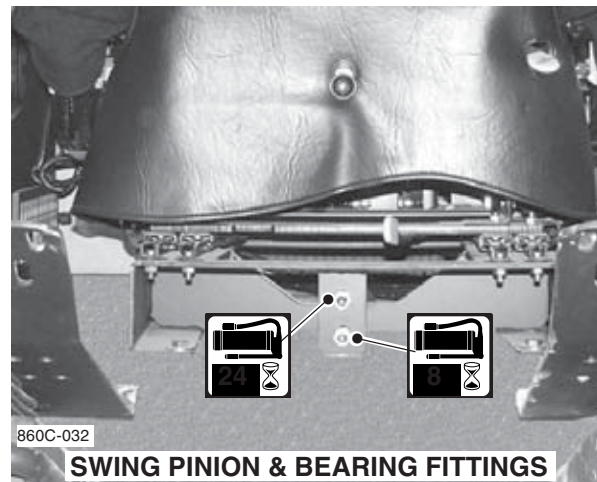
The swing gearbox upper gearing is filled with gear oil. Use 75W-90 or 80W-140 synthetic gear oil. Follow the lubricating procedure on the label located beside the gear oil bottle and also refer to SCHEDULED MAINTENANCE - 250 HOURS in SECTION 3 of THIS MANUAL.

For additional information refer to SECTION 15 in the SERVICE MANUAL.



CAUTION

Do Not use a power grease gun to lubricate this machine. Use a hand grease gun only.

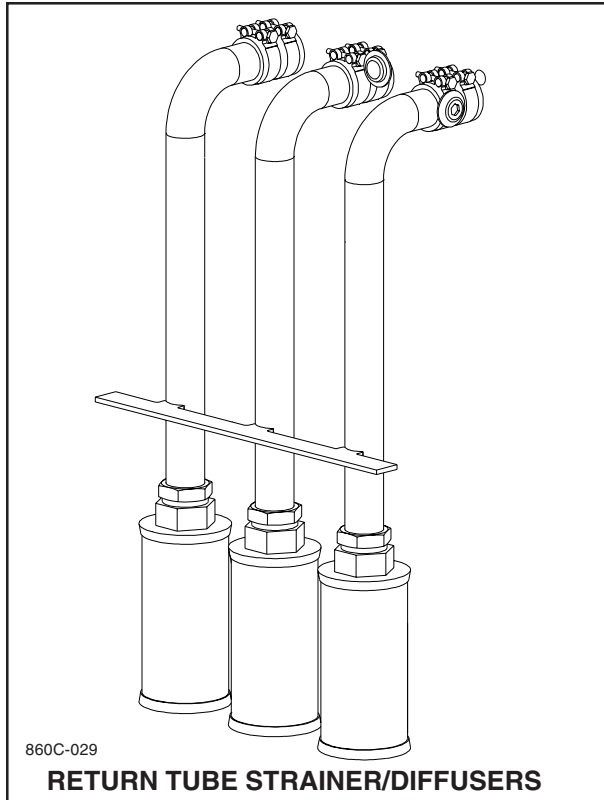


LUBRICATION OF SWING PINION AND SWING BEARING

To lubricate the **swing bearing**, apply **10 shots** grease while swinging every **24 hours** to one of the two grease fittings located on the seat pedestal in the operator's cab. To lubricate the swing pinion (or teeth) apply **10 shots** grease every **8 hours** while swinging to the other grease fitting located on the seat pedestal. The grease fittings are clearly labelled.

For lubrication schedule, refer to SCHEDULED MAINTENANCE in THIS SECTION.

For additional information refer to SECTION 15 in the SERVICE MANUAL.

**HYDRAULIC OIL RETURN
STRAINERS/DIFFUSERS**

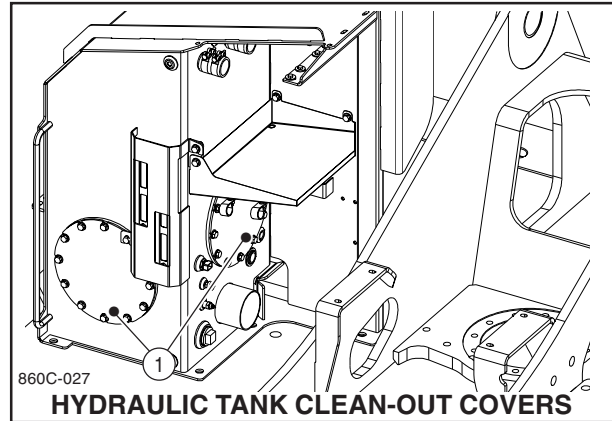
There are three reusable strainers/diffusers on the return tubes. The strainers should be inspected whenever the hydraulic tank is drained. See **SCHEDULED MAINTENANCE** in THIS SECTION.

For service and replacement intervals see **SERVICE AND LUBRICATION CHART** in THIS SECTION.

CHANGING OR CLEANING THE STRAINER:

This should be performed in the event of a pump failure or hydraulic oil contamination.

1. Park machine on level ground with attachment resting on the ground.
2. Position upper frame to allow access to the drain plug in the bottom of hydraulic reservoir.
3. Stop engine.
4. Open service enclosure doors and install safety strut.
5. Turn BATTERY DISCONNECT SWITCH to the 'OFF' position.
6. Drain the hydraulic tank via a drain plug in the bottom of the tank.
7. Remove the round access cover plates (1) and 'O' rings.



8. Before removing the strainers, clean any debris from the bottom of the tank and wipe it clean.
9. Remove the three hydraulic oil return strainers using the hex on the end of strainer. Carefully clean the strainers (they may be damaged by rough handling).
10. Check for a **buildup of foreign materials** where the strainers screw onto the pipes and cover plate.
11. Reinstall the strainers using the hex on end.
12. Reinstall access cover plates with NEW "O" rings.
13. Add hydraulic oil to tank using fill pump.
14. Bleed air from the main pump, attachment pump and fan valve by removing the case drain hoses at each pump connection. Install plugs in hose ends.
15. Continue filling hydraulic tank using fill pump. Reconnect case drain hoses to pumps when oil is seen coming from the pump case drain ports. It is important that all air is evacuated from the pumps.
16. Fill hydraulic tank up to FULL mark on sight gauge using fill pump.
17. Recheck oil level and add hydraulic oil up to FULL mark using fill pump.

NOTE: Changing strainers and filters and replacing the hydraulic oil tends to aerate the oil. For maximum pump life, the machine should sit for 1 hour after servicing to allow entrained air to escape from the oil prior to applying working pressures to the pumps.

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SECTION 4 - HYDRAULIC SYSTEM

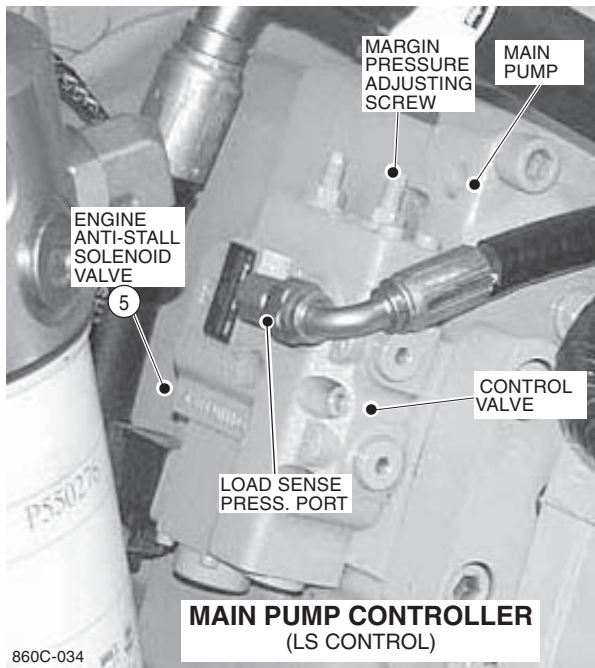
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- 4 With the engine at high idle, simultaneously hold the boom OUT control and hold the SWING CONTROL fully over relief.
- 5 Record the flow coming out of the main pump case drain.

Normal/acceptable case drain leakage rates for the main pump under the above conditions is **5 GPM to 8 GPM**. With case drain leakage rates greater than **9 GPM**, the pump will still operate properly but should be considered for replacement.



860C-034

MARGIN PRESSURE

When a function control lever is moved, i.e. joystick, to activate a boom or swing function, Load Sense (LS) pressure increases to the point where it is equal to the work port pressure and it shifts the LS control valve spool in the main pump controller.

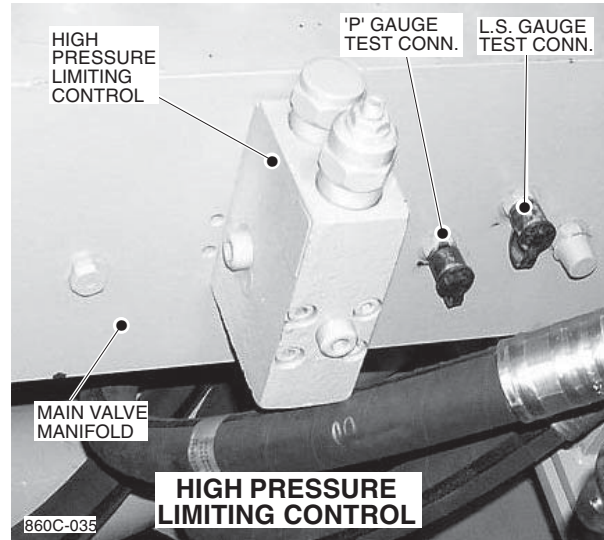
The pump then adjusts its output volume until the pump output pressure exceeds the LS pressure by a small amount. This difference is known as *margin pressure* (differential pressure or Delta P).

Refer to SET MARGIN PRESSURE in THIS SECTION.

At this point the LS control valve spool shifts back to its previous condition and the swashplate control piston will be balanced with the pump output remaining constant until the pressure at the LS port changes. This is a dynamic condition with the swashplate angle changing constantly in response to the load fluctuations. The LS pressure is always equal to the highest work port pressure.

NOTE: If the machine controls are not responding as they should, i.e. boom is jerky or sluggish, the margin pressure setting may be out of adjustment.

Also refer to ENGINE ANTI-STALL in SECTION 9 of THIS MANUAL.



The pump is protected by a high pressure limiting control which is attached to the rear side of the main control valve manifold. Refer to HIGH PRESSURE LIMITING CONTROL in THIS SECTION.

ATTACHMENT PUMP

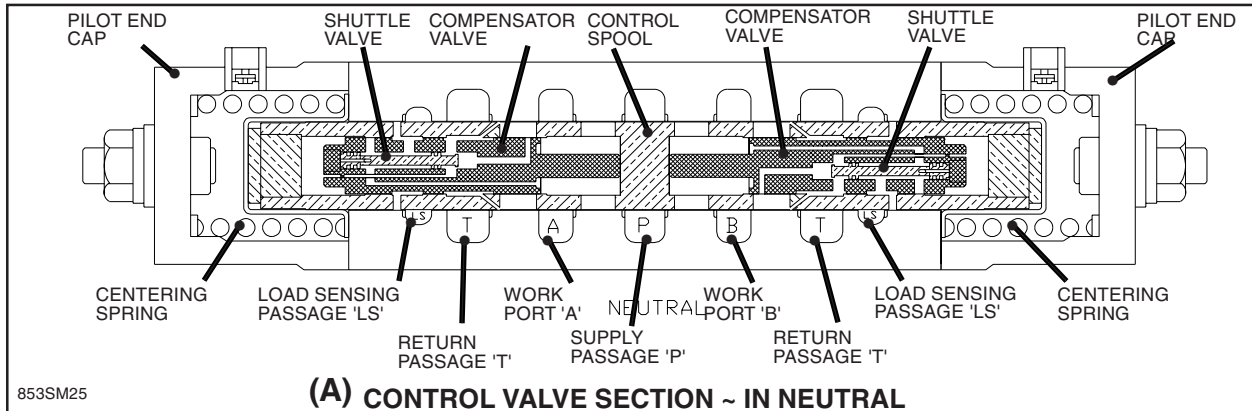
The attachment pump is a variable displacement piston pump driven off the back of the main pump. For detailed information on this pump, refer to SECTION 18 of THIS MANUAL.

FAN PUMP

For the operation and adjustments of this pump refer to SECTION 10 of THIS MANUAL.

CONTROL VALVE SPOOL OPERATION

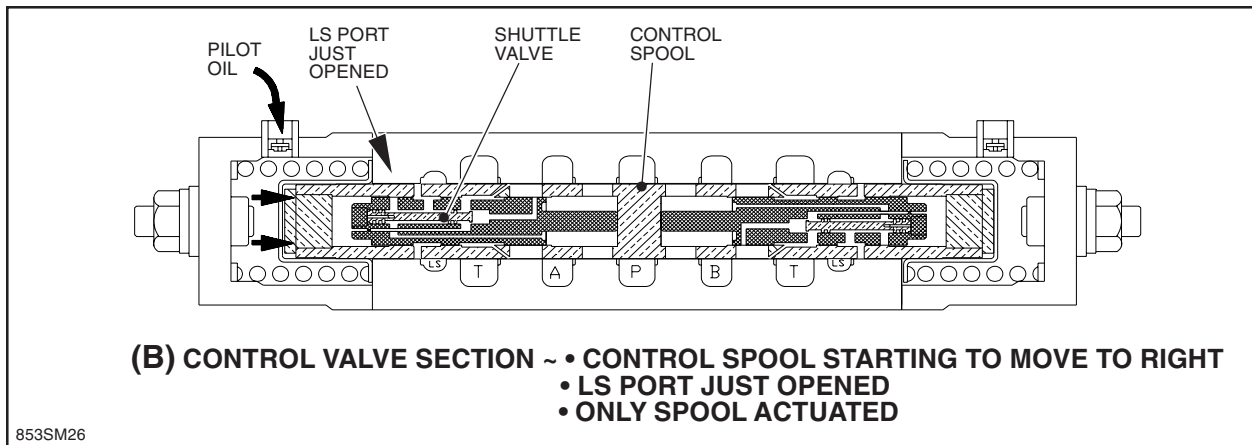
To achieve load sensing compensation, each control spool has two compensator valves and two L.S. check valves. These compensator valves can be either in the form of a shuttle valve or a ball, depending on the function being controlled.



(A) Each work port (A & B) has a compensator valve and shuttle valve. Each valve section also has two return passages (T) and two load sensing passages (LS). Each valve section has only one supply passage (P).

With the control valve spool held in neutral by the centering springs in both pilot caps, the pump discharge is blocked. Therefore, the control valves are **closed centre**. Pump discharge, work port, return, and load sensing passages are all blocked by the spool. Oil in the work ports is trapped.

With all control valve spools in neutral, pump discharge or "standby" oil pressure is approximately 400-600 psi.



(B) Whenever a single function is operated, pilot oil flows to a control valve end cap. Pilot oil will start to move the spool against the centering spring on the opposite end of the spool. The load sensing port (LS) is the first port to open. When the LS port is opened, the shuttle cavity is at LS pressure. Since this is the first function being operated, there is no LS pressure in the manifold and the shuttle does not move.

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SECTION 5 - PILOT SYSTEM

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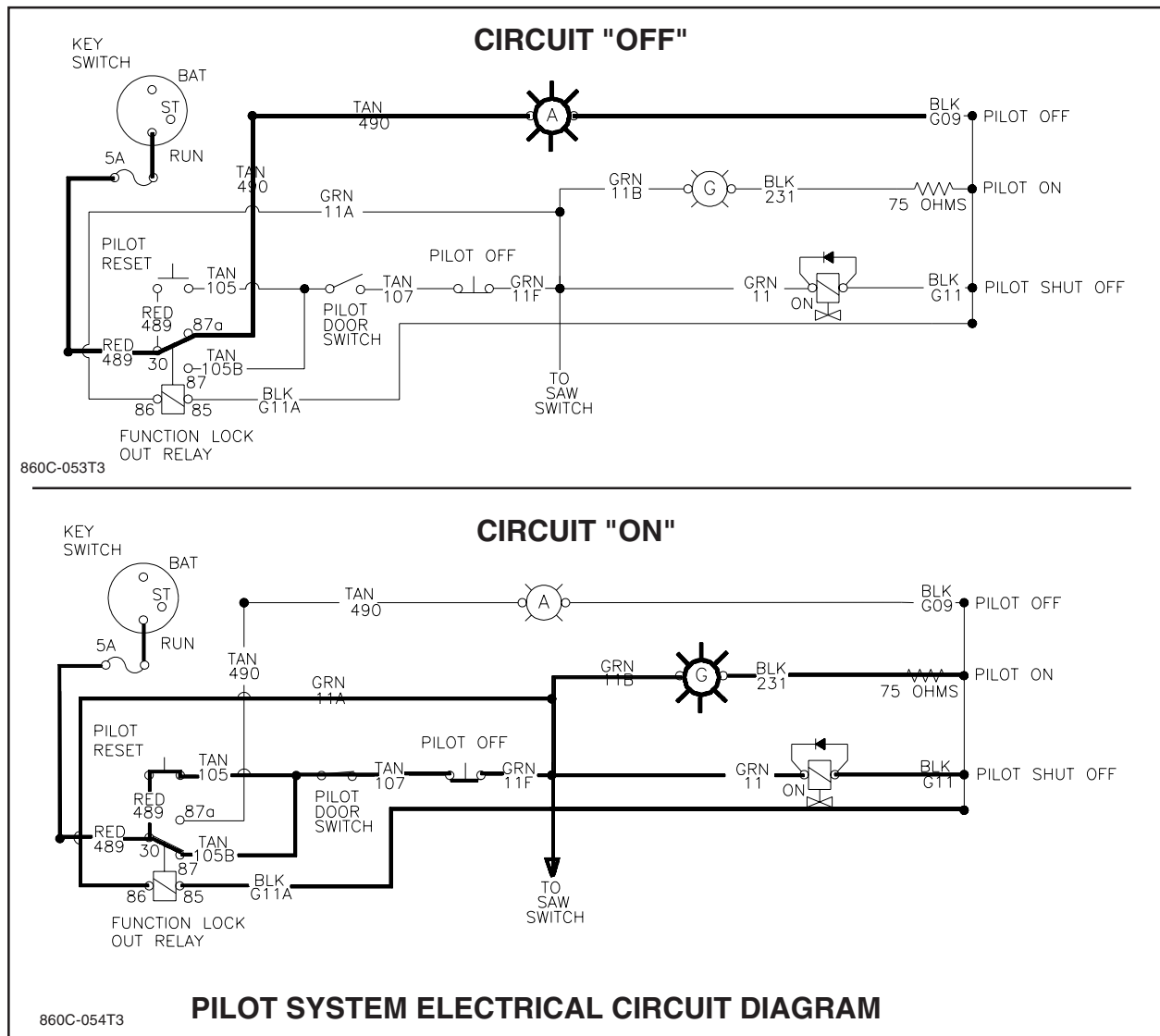
PILOT SYSTEM ELECTRICAL CIRCUIT (860*1700 AND UP, 870*1700 AND UP)

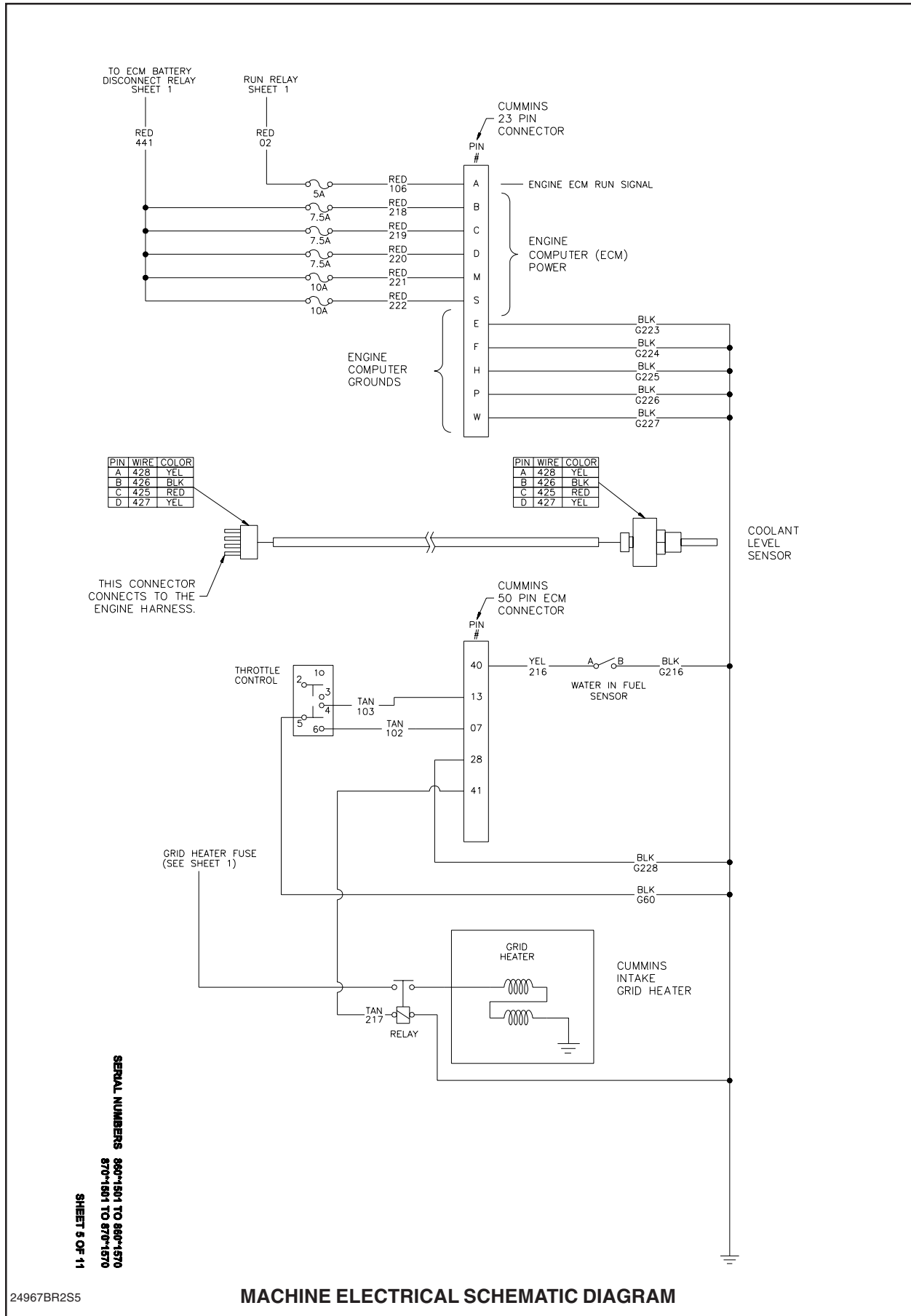
With the engine running, the pilot shut off valve solenoid is not energized until the front door is closed and latched and the pilot reset switch is momentarily pressed.

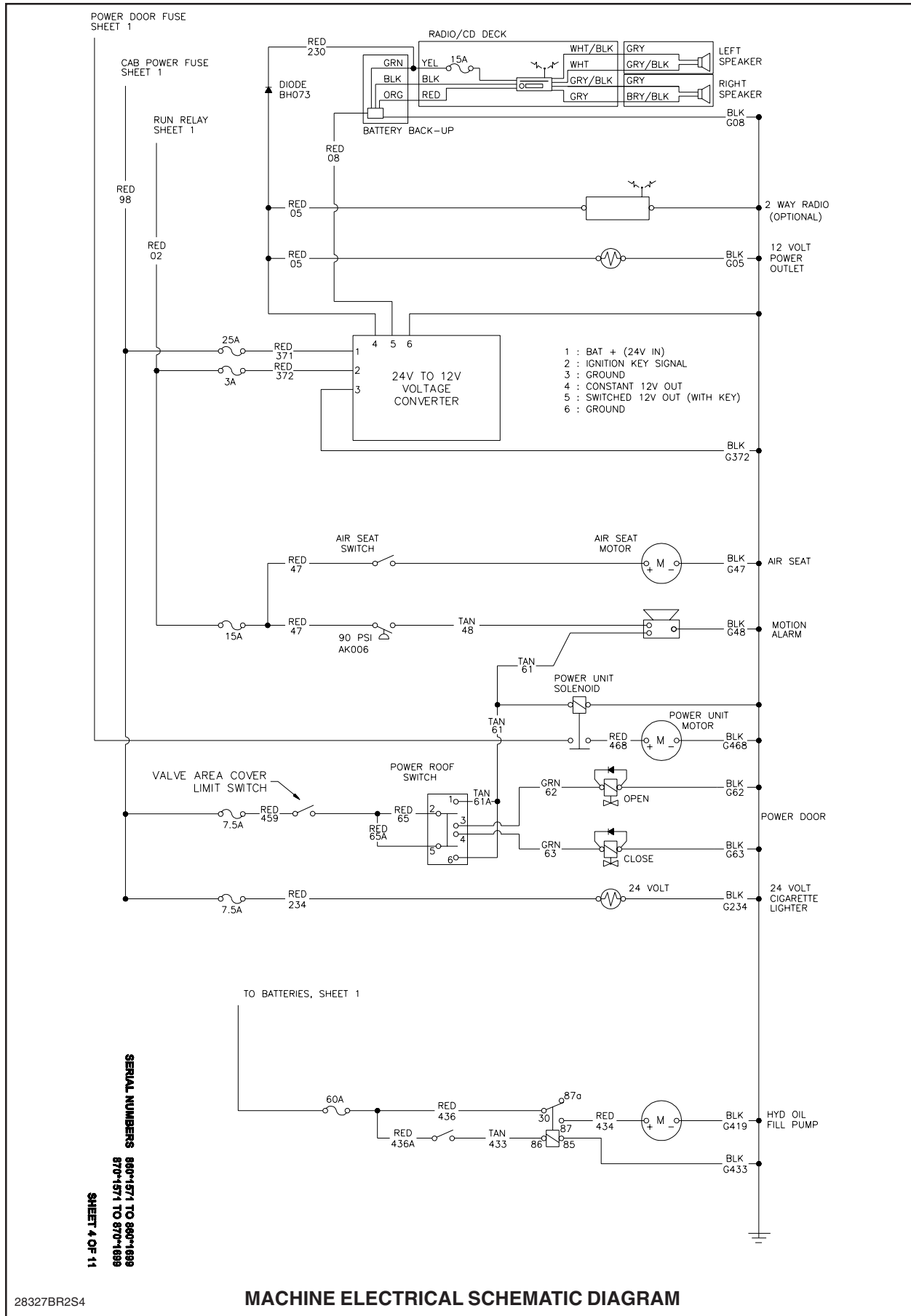
When this switch is pressed, the coil on the function lock-out relay is energized closing the circuit between wires RED 489 and TAN 105B. Wire TAN 105B connects to the front door switch. When this switch is closed (door closed) current flows through wires TAN 107 and GRN 11 to energize the coil on the pilot shut off valve to shift the valve spool and supply oil to the pilot circuit via the pilot manifold. The green pilot on light will also be turned ON. At the same time current flows through wire GRN 11A back to the function lock-out relay coil and latches the function lock out relay in the energized position after the pilot reset switch has been released.

Whenever the front door is opened the door limit switch opens interrupting the voltage to the function lockout relay coil, this opens the contacts of the function lockout relay and de-energizes the pilot shut off valve and shuts down the pilot system. This prevents pilot oil from reaching the controls. The amber pilot off light will be turned ON.

A second pilot shut off switch is in the same circuit as the front door switch. If an emergency situation should arise, pressing the pilot shut-off switch (Red button) located in the cab will have the same effect as opening the front door.

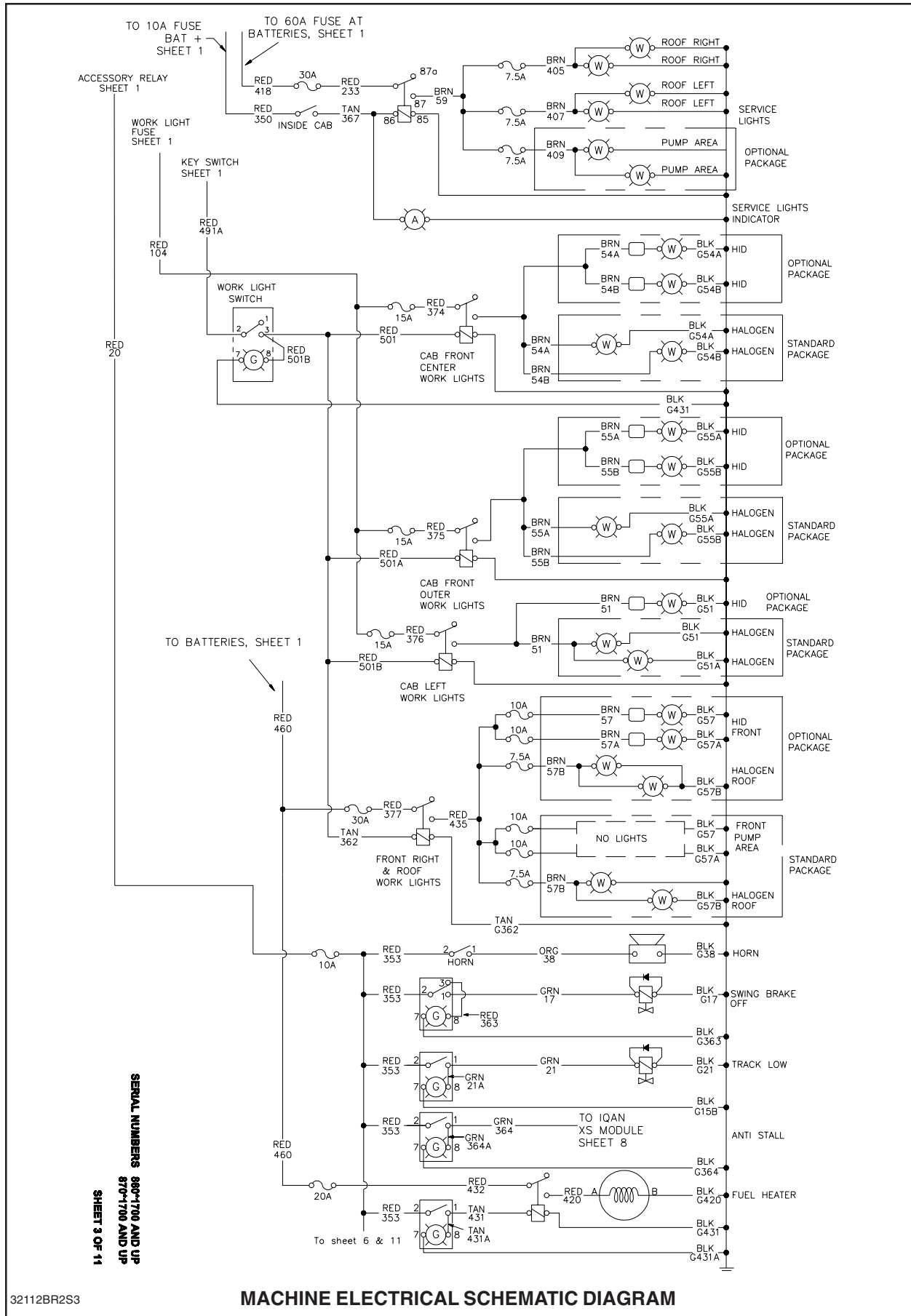






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MACHINE ELECTRICAL SCHEMATIC DIAGRAM



SERIAL NUMBERS
860-1700 AND UP
870-1700 AND UP
SHEET 3 OF 11

Tigercat wire colour code chart applicable to all products manufactured by Tigercat Industries Inc.		
<u>COLOUR</u>	<u>FUNCTION</u>	<u>EXAMPLE</u>
Red	Power	(protected and unprotected)
Black	Ground	
White	Engine control	(fuel shut-off, start aid)
Blue	Propulsion Control	(transmission/reverser solenoids)
Purple	Monitor, electrical and mechanical systems	(air cleaner, alternator, wheel speed, engine speed)
Tan	Electrical and electromechanical control	(park brake, alternator excitation) (power door motor, backup alarm)
Yellow	Monitors	(flow, pressure, temperature, level)
Grey	Standard monitor system	(logic module to monitor)
Brown	Lights	
Green	Electro-hydraulic control	(pilot solenoids)
Orange	Accessories	(horn, A/C, heater)

Two **125 amp** and three **60 amp** fuses are installed in the **Fuse and Relay Panel Rear Compartment** ahead of the system circuit fuses and are there to prevent major damage to the electrical systems of the machine in the event of a short circuit in any of the main battery feed lines.

Each circuit on the machine is further protected against current overload by individual circuit fuses. The circuit fuses on the **Fuse, Relay and Electrical Panel in Cab** protect the cab electrical components.

The fuses in the **Fuse and Relay Panel Rear Compartment** protect the circuits for the work lights , engine ECM, engine enclosure power door and many other machine operating circuits. Refer to the label on the previous page for specific fuse designation and location.

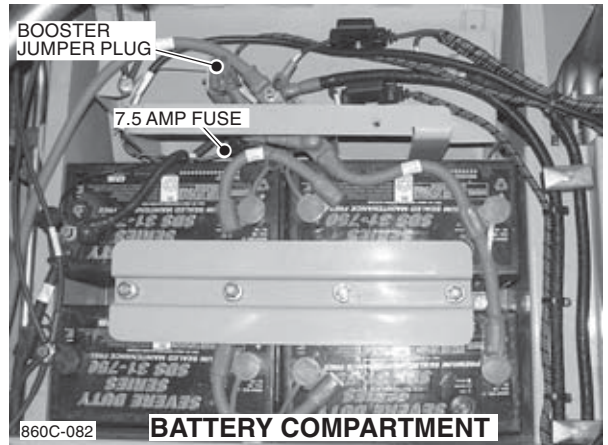
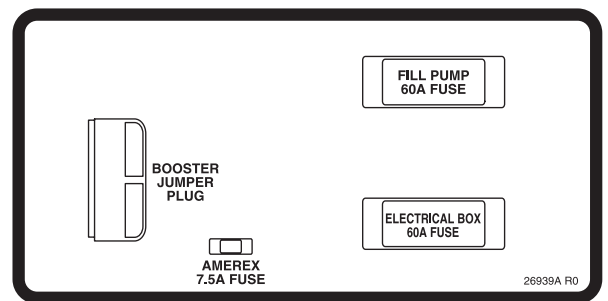
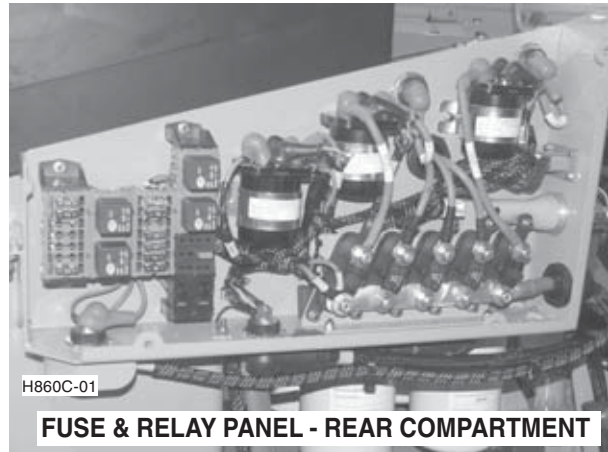
A **60 amp** fuse located in the battery compartment provides unswitched power for cab lights and service lights.

A second **60 amp** fuse located in the battery compartment provides unswitched power for the hydraulic fill pump electrical circuit.

A **7.5 amp** in-line fuse protects the fire suppression system when an AMEREX fire suppression system is installed. This fuse is located in the fire suppression power lead from the battery.

A battery booster jumper plug is located in the battery compartment. This special JUMPER CONNECTOR is used in conjunction with jumper cables with matching ends. If standard jumper cables are used the NEGATIVE connection can be made anywhere on the upper frame, as close to the batteries as possible on bare metal.

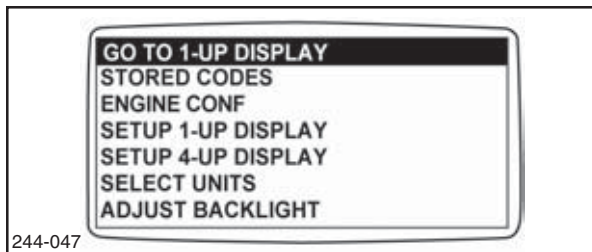
If a fuse “blows” it should be replaced with a fuse of the same amperage rating. If the fuse “blows” again, the circuit in question must be inspected for possible short circuit.





MAIN MENU NAVIGATION

1. Starting at the single or four engine parameter display, depress the "Menu Button".



2. The first seven items of the "Main Menu" will be displayed.
3. Depressing the "Arrow Buttons" will scroll through the menu selections.
4. Pressing the right arrow button will scroll down to reveal the last items of "Main Menu" screen highlighting the next item down.
5. Use the arrow buttons to scroll to the desired menu item or press the "Menu Button" to exit the Main menu and return to the engine parameter display.

FAULTS AND WARNINGS

During normal operation the single or four parameter screen will be displayed. When the PowerView receives a fault code from the engine control unit the single or four parameter screen will be replaced with the "Active Fault Codes" message.

To acknowledge and "Hide" the fault and return to the single or four parameter display press the "Enter Button". The display will return to the single or four parameter screen.

Pressing the "Enter Button" will redisplay the hidden fault. Pressing the "Enter Button" once again will hide the fault and return the screen to the single or four parameter display.

NOTE: The fault can only be cleared by correcting the cause of the fault condition.

Some of the display and warning functions are:

LOW ENGINE OIL PRESSURE - RED LED

This light will come ON when the engine oil pressure falls below 7 psi. If this light comes ON stop the engine and determine cause.

ENGINE COOLANT TEMP. - RED LED

This light will come ON when the engine coolant temperature rises above 215°F. If this light comes ON stop engine and determine cause. Do not continue to operate machine.

TACHOMETER

This display indicates the RPM. of the engine.

HOURLY METER

There are two options available for displaying hours:

TOTAL ENGINE HOURS - displays total hours the engine has run as provided by the engine computer.

MACHINE HOURS - displays the total hours the engine has run as calculated by the display module.

ENGINE OIL PRESSURE

Oil pressure at low idle and high idle will display 54 psi (372 kPa). If oil pressure drops below 7 psi (48 kPa) the display will read 0 and the **LOW ENGINE OIL PRESSURE - RED LED** will turn ON, stop engine and determine cause. Check engine oil pressure every time the engine is started.

ENGINE COOLANT TEMP.

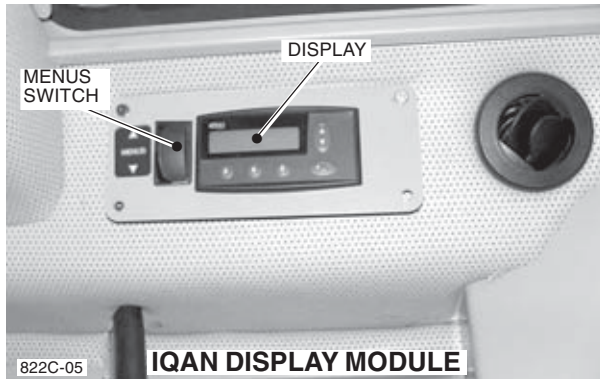
Normal operating range is between 181°F and 203°F. If the temperature rises beyond 210°F, reduce the load on the engine and check for a plugged radiator. If the temperature does not drop, remove load completely. If the temperature still does not drop, stop engine and determine cause. Do not continue to operate machine.

VOLTAGE DISPLAY

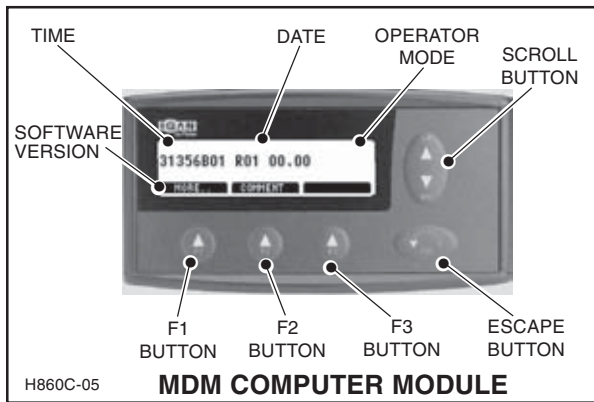
Normal operating range is between 26-28 volts. A reading in excess of 29 volts indicates a possible faulty voltage regulator. A reading of less than 24 Volts indicates a possible faulty battery or alternator.

Refer to manufactures Operations Manual (supplied with the machine) for detailed information.

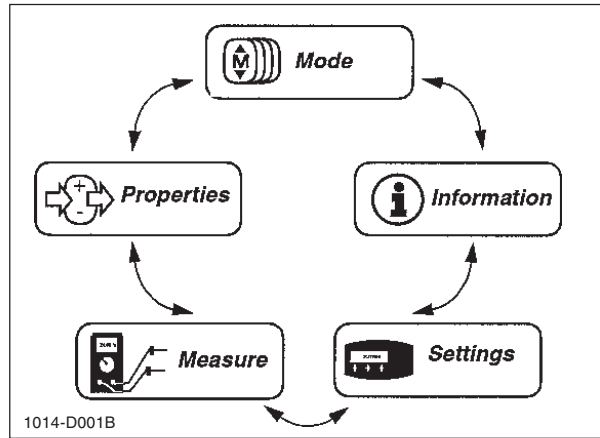
SYSTEM DIAGNOSTICS AND FUNCTION ADJUSTMENT MENUS



Press the bottom of the MENU switch to display the IQAN-MDM system diagnostics and function adjustment menus.



The display should show the current date, time, operator mode, machine model number and software version identification.



Press the ESCAPE button to display one of 5 menus (MODE, INFORMATION, SETTINGS, MEASURE AND PROPERTIES) that access system diagnostics and function adjustment menus.

Use the SCROLL UP/DOWN buttons to scroll through the menus.

Use the F1, F2, and F3 buttons to select the highlighted menu options located above each button in the LCD menu display.

Use the ESCAPE button to move back to the previous menu display.



5. PROPERTIES MENU OPERATION

Changes can be made to the settings for adjustable machine functions. Adjustments will only affect the settings in the current operator mode.

A. ADJUST FUNCTION PARAMETERS

Adjustable functions include:

- Forward Level Speed - Adjusts forward levelling speed
- Rear Level Speed - Adjusts rearward levelling speed.
- Pump 2 Start Ramp - Adjusts the rate at which pump 2 starts.
- Pump 2 Stop Ramp - Adjusts the rate at which pump 2 stops.
- Timed Purge Interval - Adjusts the time interval between automatic cooling fan clean cycles.
- Proportional Telescopic - Turns proportional control of telescopic boom OFF or ON as required by the type of joystick in use (0=OFF, 1=ON).

Adjustable Function Parameters

Function Parameter	Minimum	Maximum	Factory Default (Reset)
For Level Speed	0%	100%	80%
Rear Level Speed	0%	100%	80%
Pump 2 Start Ramp	0 ms	2000 ms	250 ms
Pump 2 Stop Ramp	0 ms	2000 ms	0 ms
Timed Purge Interval	0.25 hrs	4 hrs	2 hrs
Proportional Telescopic	0	1	0

For more detailed instructions and information about electronic adjustment of the levelling system refer also to LEVELLING ELECTRONIC ADJUSTMENT PROCEDURE in SECTION 13 of THIS MANUAL.

For more detailed instructions about pump 2 start and stop ramp adjustments refer to PUMP 2 ELECTRONIC ADJUSTMENT PROCEDURE IN SECTION 18 of THIS MANUAL.

EXAMPLE:



Press OTHER(F3) to select other properties for adjustment.

Use UP/DOWN scroll buttons to select type of output you wish to adjust.



Press SELECT (F1) to select.

Use UP/DOWN scroll buttons to select the output you wish to adjust.



Press SELECT(F1) to select a function parameter for adjustment.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

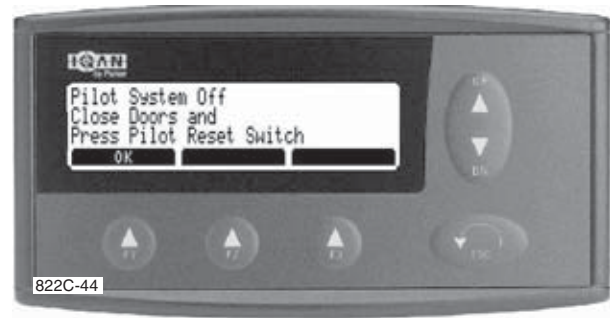
CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

SYSTEM WARNING MESSAGES

When system warning messages are displayed the master alarm may sound, see specific warning message descriptions for details. All system warning messages are logged and recorded by the IQAN system for use by Tigercat service technicians. Operator's should respond to all warning messages immediately by bringing the machine to a safe stop and investigating the cause of the alarm.

The alarm can be acknowledged by pressing OK (F1), if applicable. Note that acknowledging the warning message does not address the cause of the alarm. Ignoring system warning messages may result in component damage and/or subsequent malfunction. In addition ignoring system warning messages may also affect warranty claims. All warning messages should be addressed immediately to help ensure the efficient long term operation of the machine and avoid costly repairs.

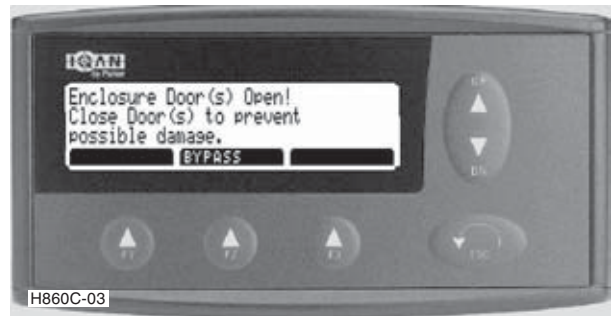
WARNING MESSAGES



1. PILOT SYSTEM OFF

This warning will be displayed and PILOT OFF warning light will come on when the pilot system has been de-activated. To reset the pilot system close the doors and press the PILOT ON (RESET) switch.

For more information on the pilot shut off system refer to PILOT SYSTEM OFF SWITCH, PILOT SYSTEM ON SWITCH, PILOT SYSTEM INTERLOCK SWITCH, PILOT ON LIGHT and PILOT OFF LIGHT in SECTION 2 of the OPERATOR'S MANUAL.



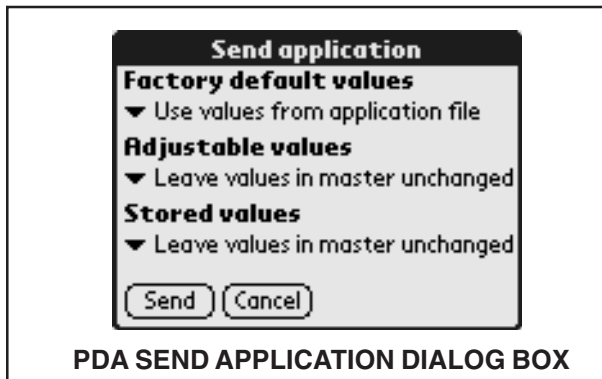
2. ENCLOSURE DOOR(S) OPEN (860*1700 AND UP, 870*1700 AND UP)

This warning will be displayed, master alarm will sound and ROOF/DOOR warning light will come on when pilot system is ON and any of the doors equipped with sensors is open for more than 2 seconds. The warning can be acknowledged on the IQAN MDM to silence the alarm but the warning light will stay on until the open door(s) is(are) closed.

The left hand access door, right hand access door, pump compartment door and radiator cleanout doors are equipped with proximity sensors.

Refer also to ROOF OPEN warning message in THIS SECTION. Refer also to ROOF/DOOR OPEN LIGHT, MASTER ALARM and SERVICE ACCESS DOORS in SECTION 2 of the OPERATOR'S MANUAL.

8. From the 'System' menu, select '**Update application...**'. Note: it will take a moment for the PDA to display available application programs.
9. All IQAN application programs available for upload will be displayed.
10. Highlight the appropriate application program by selecting it on the PDA screen.



11. Select the '**SEND**' box. This will display a dialog box titled 'Send application'.
12. Set the '**Factory default values**' to 'Use values from application file'.
13. Set the '**Adjustable values**' to 'Use values from application file'.
14. Set the '**Stored values**' to:
 - For an MDM previously installed:**
'Leave values in master unchanged'.
 - For a new MDM (field replacement):**
'Reset all values to zero'.
15. Select the '**SEND**' box. The MDM will display '**! RECEIVING APPLICATION !**'.

Important: The upload process should take less than one minute to complete. During this time, do not perform any other functions on the PDA, or turn off power to the MDM. **DO NOT START THE MACHINE.** Should this occur, the upload will be halted and incomplete; starting from the beginning will be required.
16. Once the application is sent, turn off power to the MDM.
17. Select the '**DONE**' box on the PDA. This will return the PDA display to the IQANdevelop G3 main screen.
18. Start the machine and verify correct operation of the new application.
19. Turn the key switch to 'OFF'.
20. Turn off power on the PDA.
21. Disconnect the IQAN data cable for PDA from both the MDM and the PDA serial port adapter cable.
22. Reinstall the rubber dust seal on the MDM RS232 port. Reinstall the MDM into the mounting panel (4 screws).

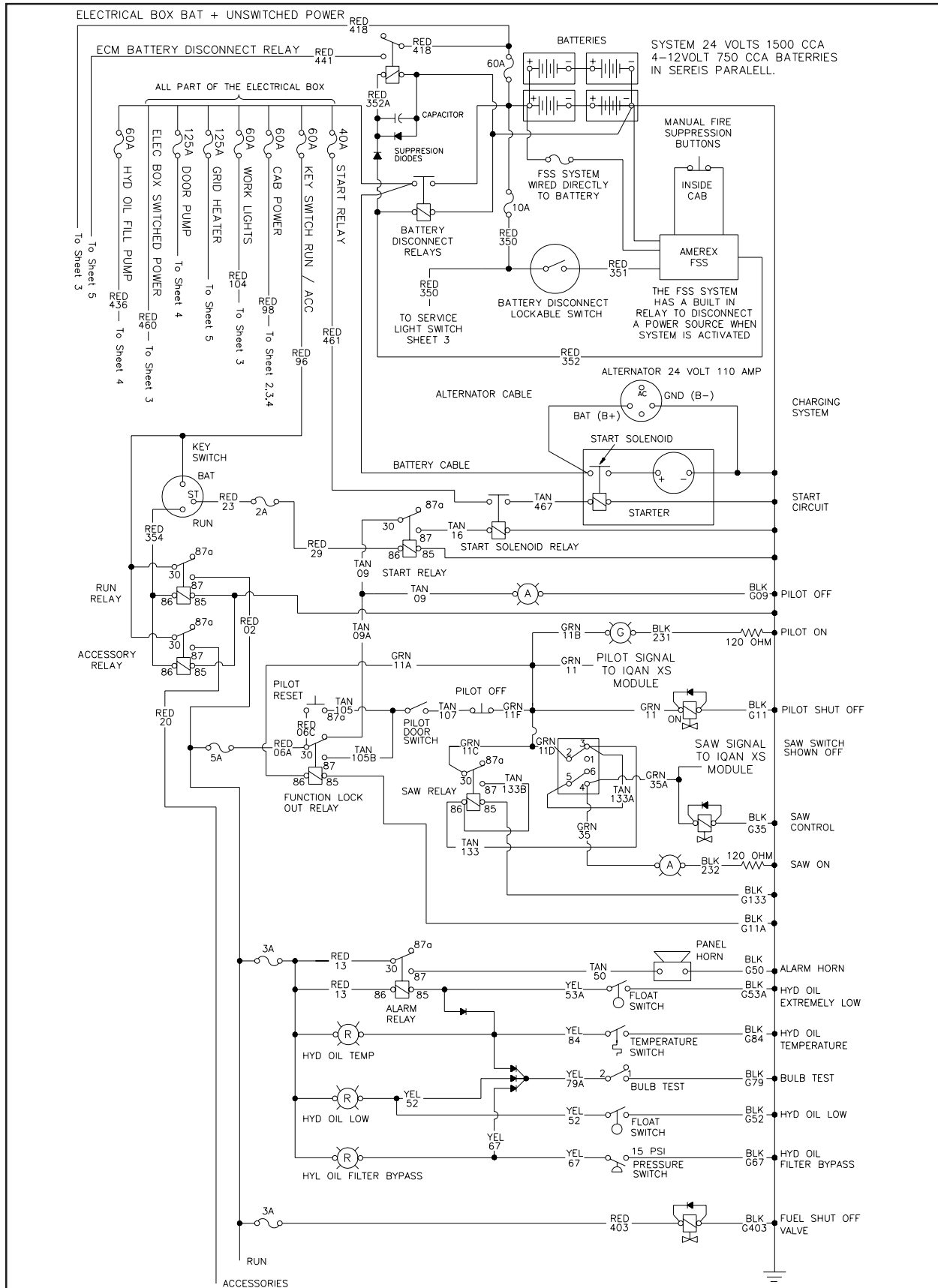
Tigercat H860C/H870C/LH870C Harvester

SECTION 7 - ENGINE START AND STOP

OCTOBER 2006

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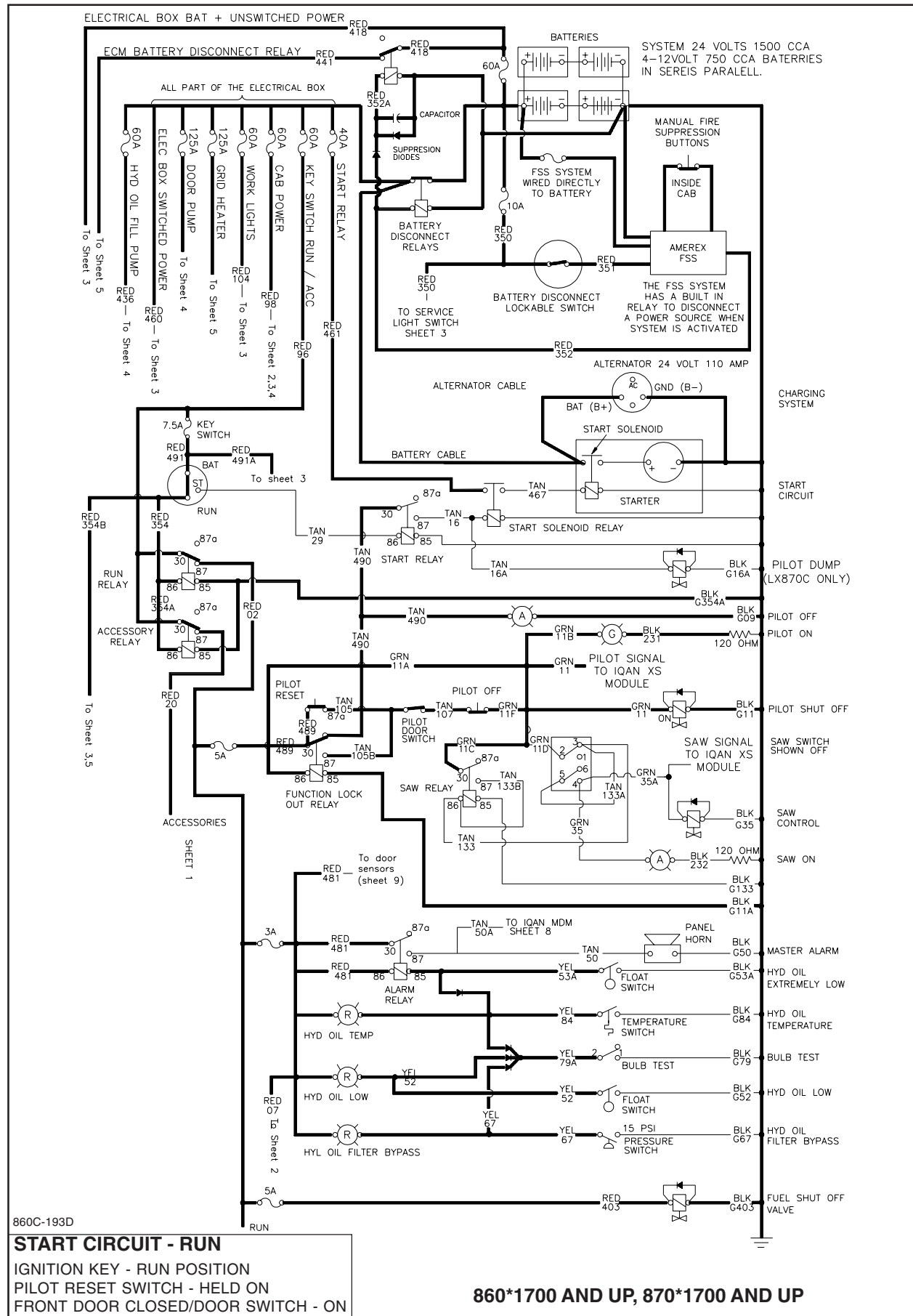
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860C-195

START CIRCUIT - AT REST

860*1571 TO 860*1699, 870*1571 TO 860*1699



H. SPEED SENSOR OUTPUT

1. Remove 25 pin connector from anti-stall control module.
2. Start engine and place *throttle switch* in FULL position.
3. Measure the AC voltage across 12 and 14 on connector.
 - The speed sensor output should be greater than 0.5 VAC.

The speed sensor on the engine should be a fixed distance from the flywheel. Do not use the voltage to adjust this distance. Refer to ADJUST SPEED SENSOR in THIS SECTION.

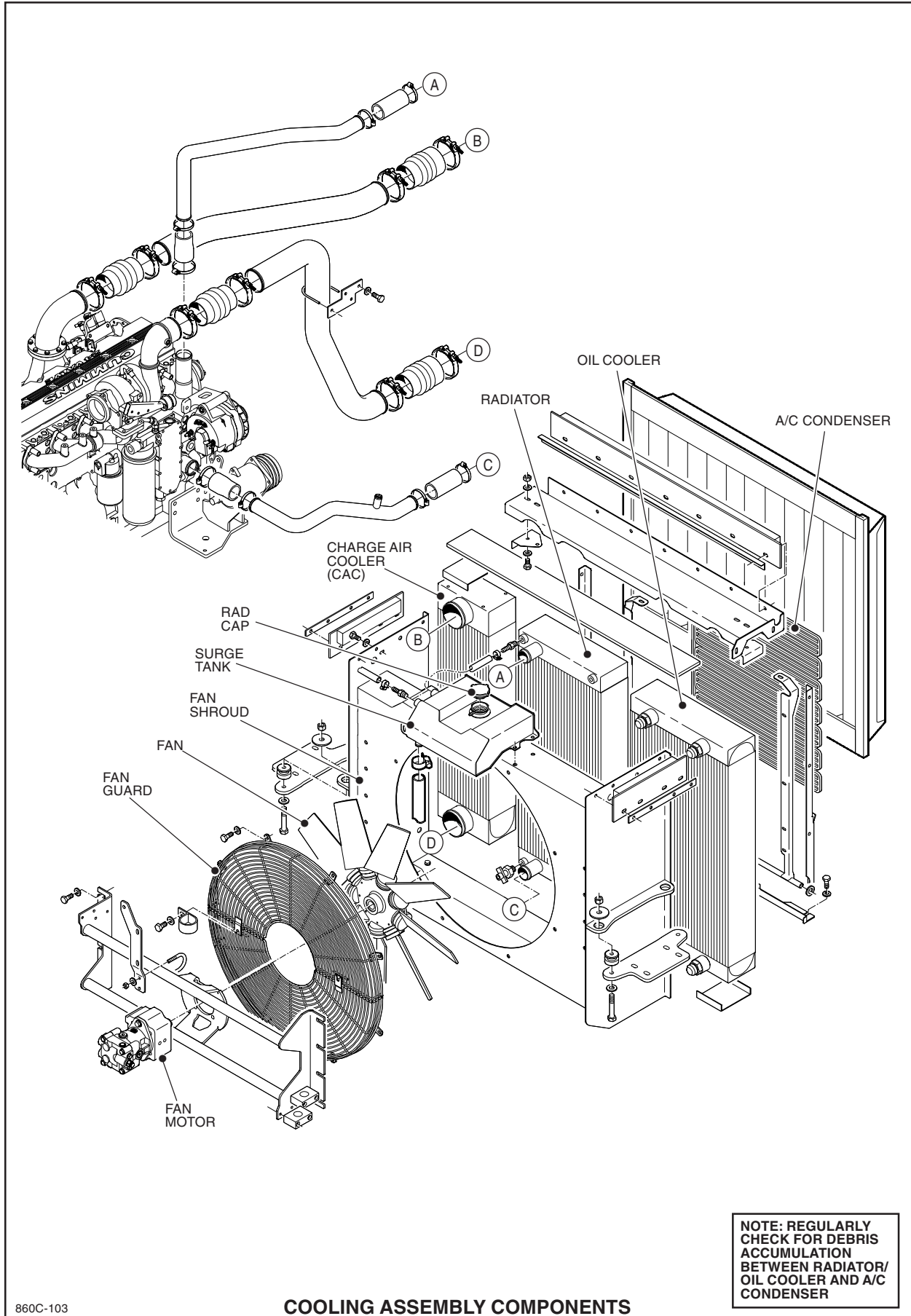
I. SPEED SENSOR WIRES

1. Remove 25 pin connector from anti-stall control module.
2. Measure resistance between pins 12 and 14 on connector
 - The resistance should be: 130 to 140 ohms at 72°F (22°C)
3. Check for continuity from pin 14 to 13 and 12 to 13. (Pin 13 is connected to ground)

J. SPEED SENSOR COIL

1. Remove connector from anti-stall speed sensor.
 2. Measure resistance of speed sensor coil between terminals on sensor.
 - The resistance should be: 130 to 140 ohms at 72°F (22°C)
-

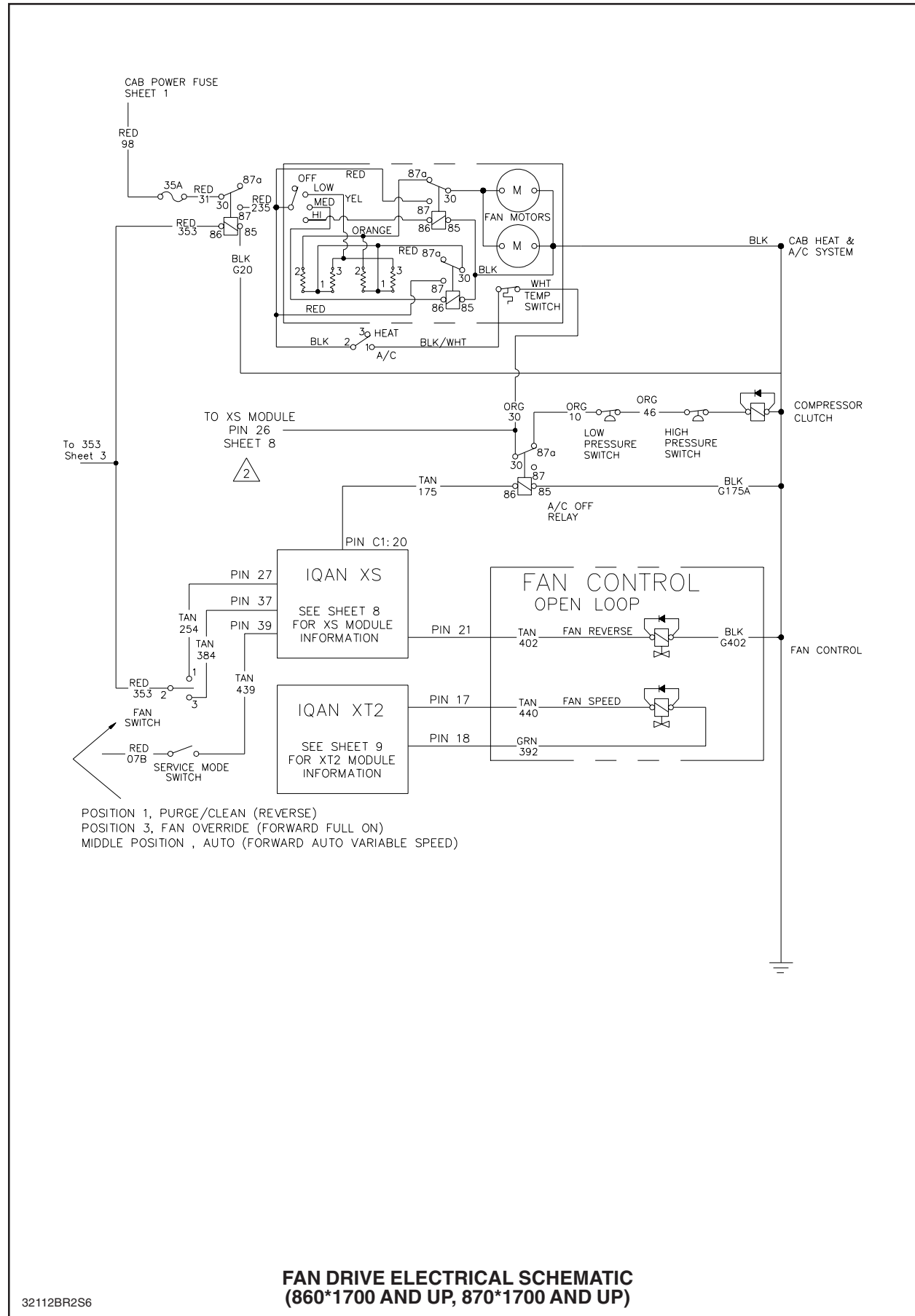
Tigercat H860C/H870C/LH870C Harvester Oil Cooler, Radiator, Charge Air Cooler and Fan



860C-103

COOLING ASSEMBLY COMPONENTS

Tigercat H860C/H870C/LH870C Harvester Oil Cooler, Radiator, Charge Air Cooler and Fan



**FAN DRIVE ELECTRICAL SCHEMATIC
 (860*1700 AND UP, 870*1700 AND UP)**

32112BR2S6

piston bores in the cylinder block (1). This forces the pistons against an angled swashplate (5). Piston sliding action causes the rotating group to turn. The cylinder block is splined to the output shaft (3) which causes the output shaft to turn. During the second half of the motor rotation, low pressure is discharged as the pistons ride up to a higher position on the swashplate. To reverse rotation, oil flow is reversed. During operation a small amount of supply oil flows through the centre of each piston. This oil lubricates the piston to slipper (6) joint and the slipper to swashplate area.

High pressure supply oil also flows through a tube to lubricate the swashplate to bearing shell area. Normal leakage and lubrication oil aid in flushing and cooling the motor during drive operation.

The swashplate (5) angle is changed by the **minimum** displacement piston (7) and **maximum** displacement piston (8). When supply oil acts on the **minimum** displacement piston (7), the motor runs at its highest speed. When supply oil acts on the **maximum** displacement piston (8), the motor runs at its slowest speed. The **maximum** displacement piston is larger than the **minimum** piston and will hold the motor in **maximum** displacement when equal pressure acts on both pistons.

NOTE: Swashplate angle (motor displacement) is limited by the minimum and maximum displacement pistons contacting the minimum (9) and maximum (10) displacement adjustment stops. For minimum displacement, the maximum displacement piston contacts the minimum displacement adjustment stop. For maximum displacement, the minimum displacement piston contacts the maximum displacement adjustment stop.

Refer to front cover illustration;

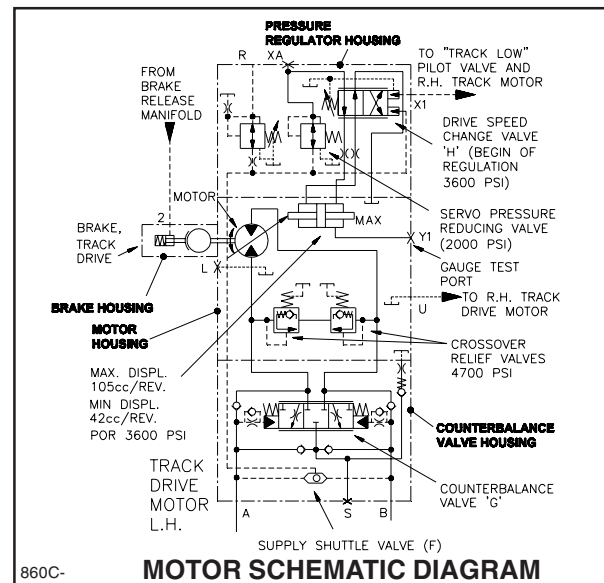
The drive motor cover (4) consists of several components to operate the drive functions.

The minimum displacement adjustment stop (9) limits the minimum angle the swashplate can move. The maximum displacement adjustment stop (10) limits the maximum angle the swashplate can move. The crossover relief valve(s) (11) protects the motor circuit from pressure spikes.

BRAKE CIRCUIT DESCRIPTION

Refer to motor schematic diagram

When the foot pedals are activated, pilot oil from the foot pedal valves is directed to the brake release manifold. This oil pressure acts on the brake release valve and causes it to shift, redirecting pilot oil from the pilot manifold through the valve to the track drive brake cylinders. Pilot oil is limited to **500 psi.**, the brake is fully released by **250 psi.** and the maximum pressure the brake can stand without failure is **725 psi.**



A drive speed change valve (H) routes supply oil to the maximum displacement piston to keep the drive motor in the lowest speed. A servo pressure reducing valve controls the pressure of the supply oil entering the drive speed change valve at **2000 psi.** maximum.

A flushing orifice (I) is located in the flushing circuit to motor case passage. The orifice provides a passage for oil flow from the flushing circuit to the motor case for cooling and flushing during drive operation. When the oil is cold the flow of oil is restricted by the orifice to prevent an excessive build up of pressure in the drive motor case. The orifice also provides a passage to release any residual pressure to the motor case when not driving.

TRACK COMPONENTS

IMPORTANT:

New machine: Before driving a new machine ensure that track sag is set correctly. Track sag may be set less than specified for shipping purposes.

The correct track sag must be adjusted once a machine has been delivered to the job sight and operating in the accumulated soil build-up in the undercarriage.

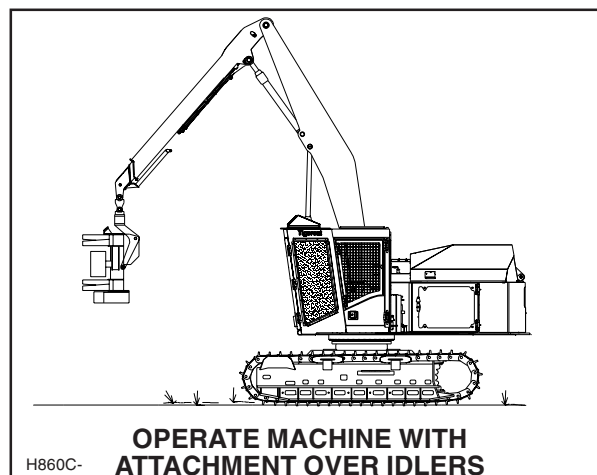
TRACK SAG NOTE:

The track sag dimension is very important and should be checked regularly, 50% increase in the life of the track assembly can be realized, particularly bushing O/D wear and track pitch by maintaining the correct amount of track sag. A track that is too tight will wear out significantly faster due to increased tension in the chain.

Track components operate under varying terrain conditions, most of which cause excessive wear. Wear to one component can quickly spread to the rest of the track assembly.

To ensure that the track components are always in good running order, a periodic inspection should be made to ensure that components have not come loose, that bolts are at the correct torque, that components are within the specified wear limits (discussed further in this section) and where applicable, check lubrication points.

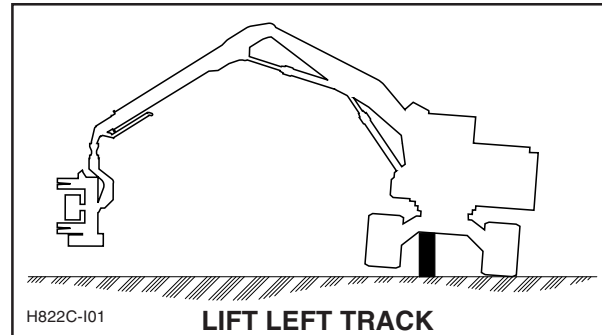
For a guide on inspection, refer to the PERIODIC MAINTENANCE SCHEDULE in SECTION 3 OF THIS MANUAL.



OPERATING THE MACHINE

Whenever possible the machine should always be operated with the attachment head over the IDLERS and not over the SPROCKETS.

Operating over the sprockets will result in overloading of the contact surfaces between the sprocket and the track bushings. Bushings could crack during sprocket impact.



MEASURING TRACK SAG

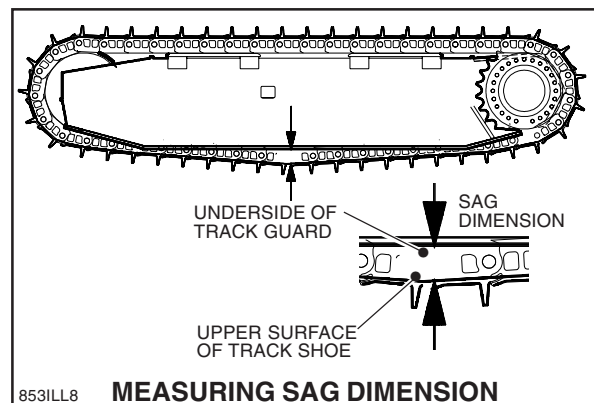
1. Position attachment head in vertical position and swing boom to side of machine.
2. Use a jack of suitable design and capacity to safely lift the left track clear of the ground.

Machine weight (less attachment):

H860C	60200 lbs (27330 kg)
H870C	66870 lbs (30360 kg)
LH870C	78490 lbs (35640 kg)

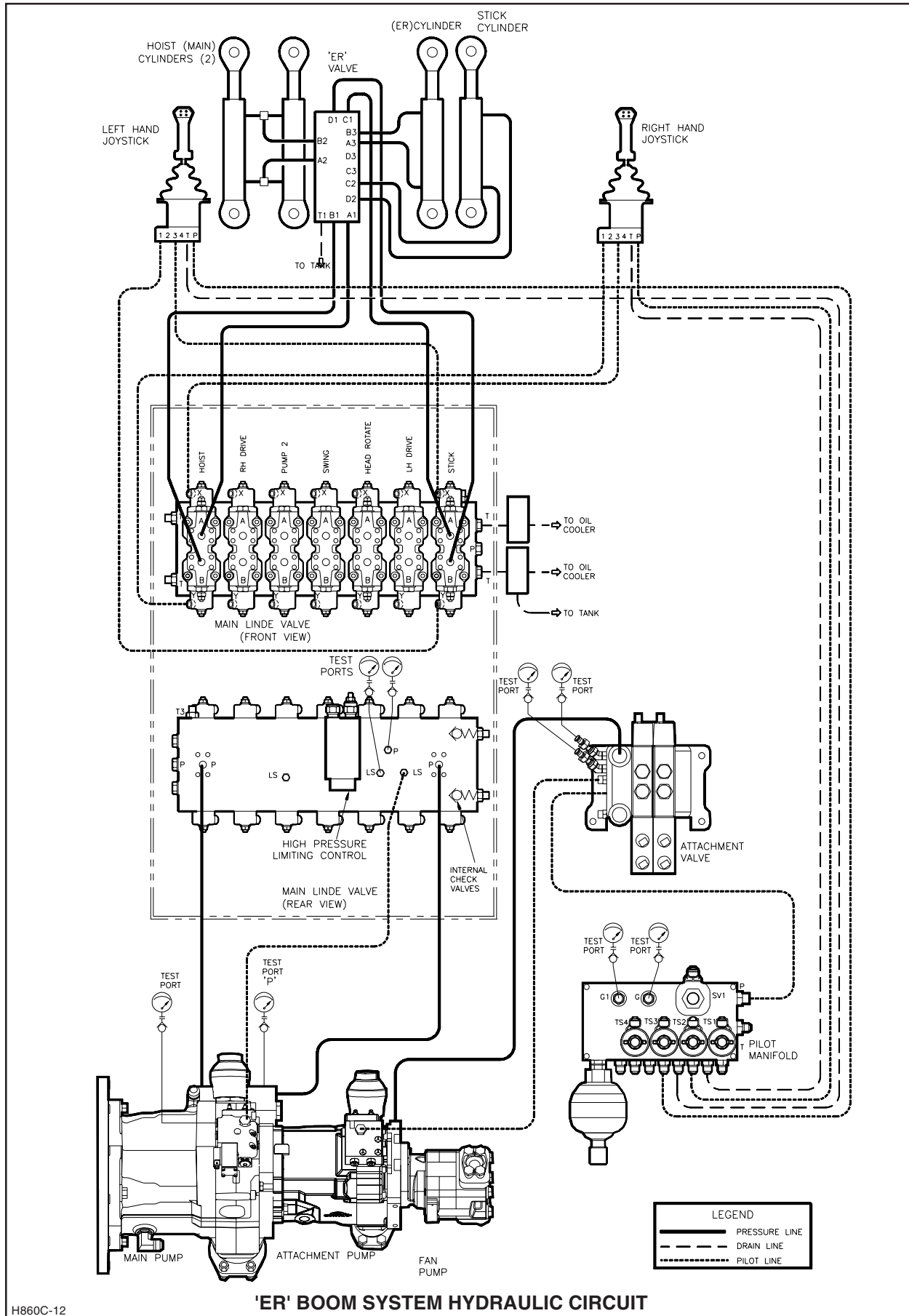
Refer to attachment manufacturer's manual for correct attachment weight information.

3. Rotate track in forward and reverse several times. Stop the track while in reverse. Do not clean the track.
4. Stop engine.
5. Measure distance between top surface of track shoe at centre of lower surface of track frame.



6. This dimension should be between 4" and 6" for normal operations.

NOTE: If track sag is less than specified, track chain wear will be accelerated. If track sag is excessive, it is possible for the track to jump off the sprocket.

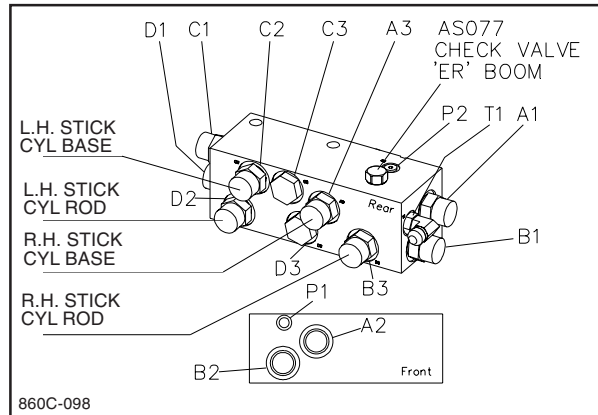


H860C-12

'ER' BOOM SYSTEM HYDRAULIC CIRCUIT

4. Install a drain pan and wiper cloths under boom manifold to catch any spilled oil.
5. Disconnect the R.H. stick cylinder hoses from the C3 and D3 ports on the boom manifold.
6. Remove the fittings from the C3 and D3 ports on the boom manifold.
7. Remove the Plugs from the A3 and B3 ports and install them in the C3 and D3 ports on the boom manifold.
8. Install the fittings removed from C3 and D3 ports in A3 and B3 ports on the boom manifold.
9. Install the R.H. stick cylinder (rod end) hose (removed from the D3 port) on the B3 port. Install the R.H. stick cylinder (base end) hose (removed from the C3 port) on the A3 port.
10. Remove the AX319 plug from the top of the boom valve and install an AS077 check valve in the port. Tighten check valve to 30-35 lbf-ft.
11. Tighten fittings and plugs in manifold to 105-115 lbf.ft (142-156 Nm), and hose connections to fittings to 85-90 lbf.ft (115-122 Nm).
12. Turn off vacuum pump, remove hose and reinstall hydraulic tank breather filter.
13. Remove drain pan and wiper cloths, and wipe up any spilled oil.
14. Reinstall the belting, retainer plate, washers and capscrews over the access hole below the main boom.
15. Start the engine, engage the pilot switch and operate the joysticks. Refer to SECTION 2 of the Operators' Manual to ensure that the main and stick boom functions are correct.

Refer to CONVERTING 'ER' TO NON-'ER BOOM to revert back to NON-'ER' boom configuration.



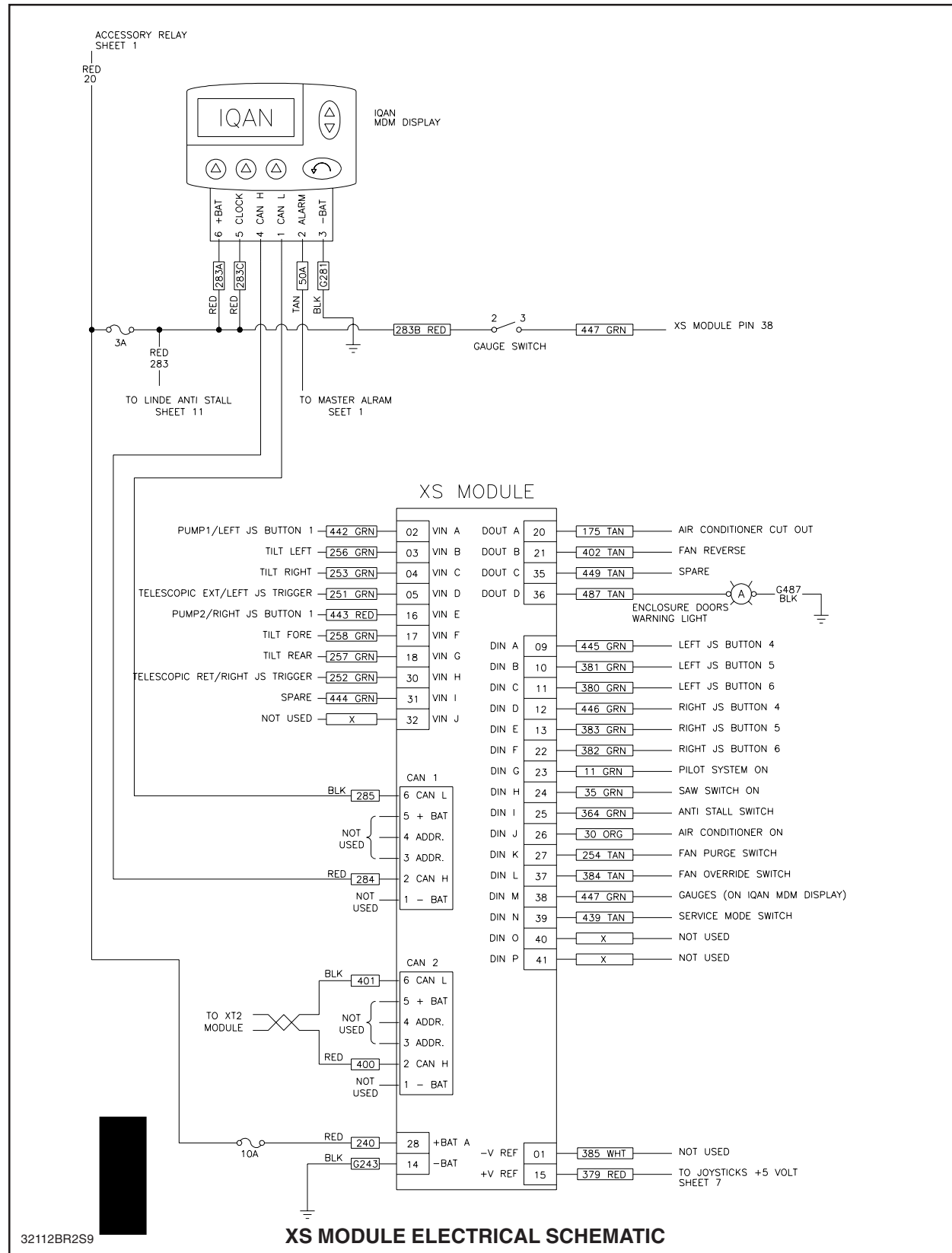
'ER' BOOM MANIFOLD CONNECTIONS

The Boom Manifold connections for 'ER' boom systems are as follows:

- A1 Hoist Valve 'A' Port
- A2 Hoist Cylinders Base End
- A3 R.H. Stick 'ER' Cylinder Base End
- B1 Hoist Valve 'B' Port
- B2 Hoist Cylinders Rod End
- B3 R.H. Stick 'ER' Cylinder Rod End
- C1 From Stick Valve 'B' Port
- C2 L.H. Stick Cylinder Base End
- C3 Plugged
- D1 From Stick Valve 'A' Port
- D2 L.H. Stick Cylinder Rod End
- D3 Plugged
- ER AS077 Check Valve
- P1 Plugged
- P2 Plugged
- T1 Return to Tank

IMPORTANT

This manual is applicable to factory installed machine functions and controls. It does not take into account any changes or modifications made after shipment. Verify all functions before operating this machine.



32112BR2S9

ADJUSTING FORWARD/REAR LEVELLING SPEED (CYLINDER OPERATING SPEED)



1. Press the bottom of the MENUS SWITCH to display the IQAN-MDM diagnostic and function adjustment menus.

Press Escape button then scroll UP/DOWN to display PROPERTIES. Press F3 OTHER to choose FUNCTION PARAMETERS menu.



2. Press SELECT (F1) to display SELECT FUNCTION menu.
3. Use UP/DOWN buttons to scroll to desired function.

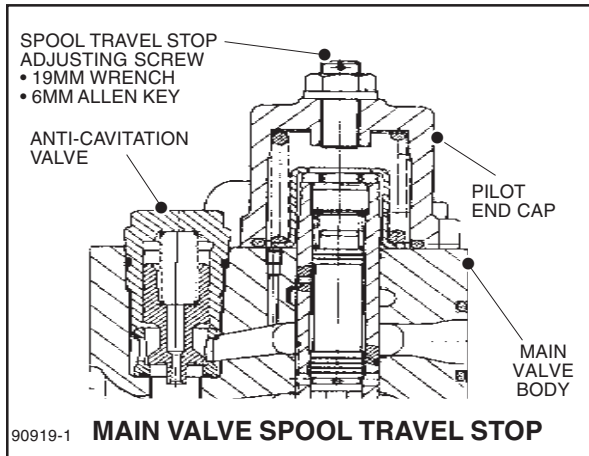


4. Press SELECT (F1) for For Level Speed.



5. Use UP/DOWN scroll buttons to change speed between 0% and 100% to obtain 8 seconds (Forward Level Speed) Cylinder Cycle Time then press OK (F1).
6. Repeat steps 3 to 5 for the Rear Level Speed.

**ADJUST OIL FLOW TO SWING MOTOR
(SWING MOTOR SPEED)**



⚠ CAUTION

Be aware of other personnel in the area. Operator is responsible for the safe operation of the machine.

⚠ WARNING

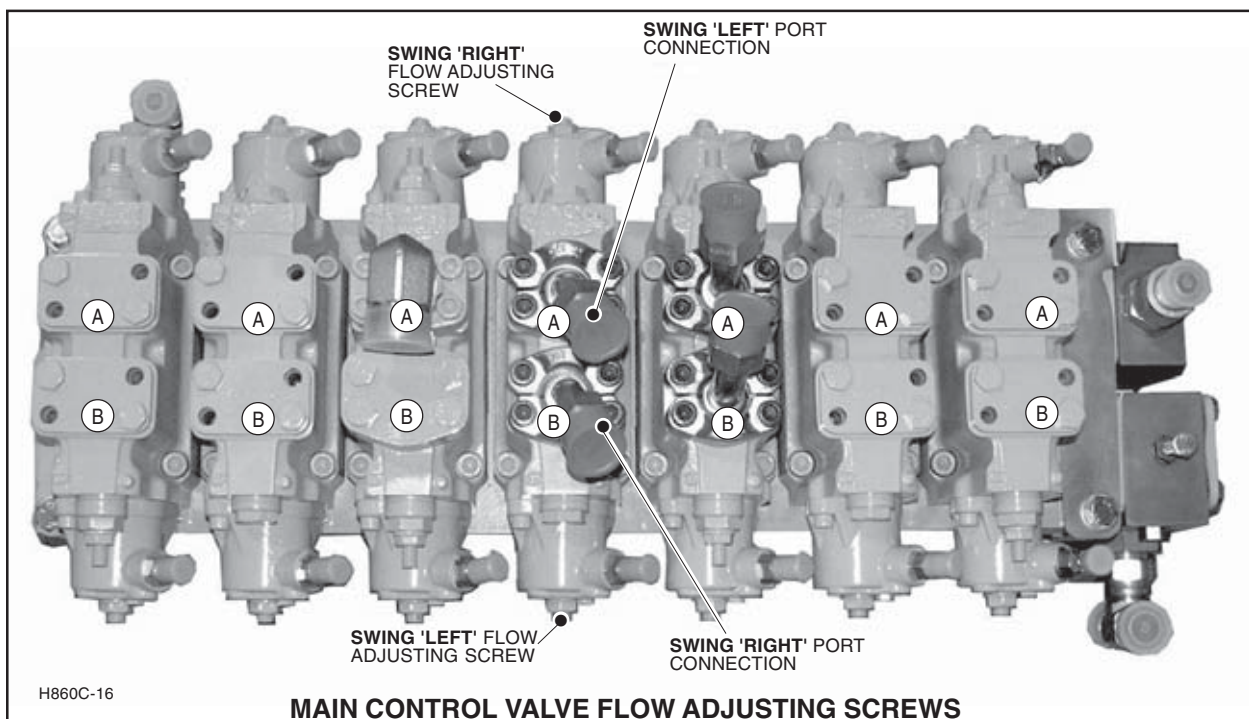
Ensure that no one is standing near the attachment during this procedure.

NOTE: Constant loosening and tightening of the locknut (sealnut) on the adjusting screws will eventually cause the seal in the nut to break down and leak. Because of this it is best to keep the adjusting procedure brief.

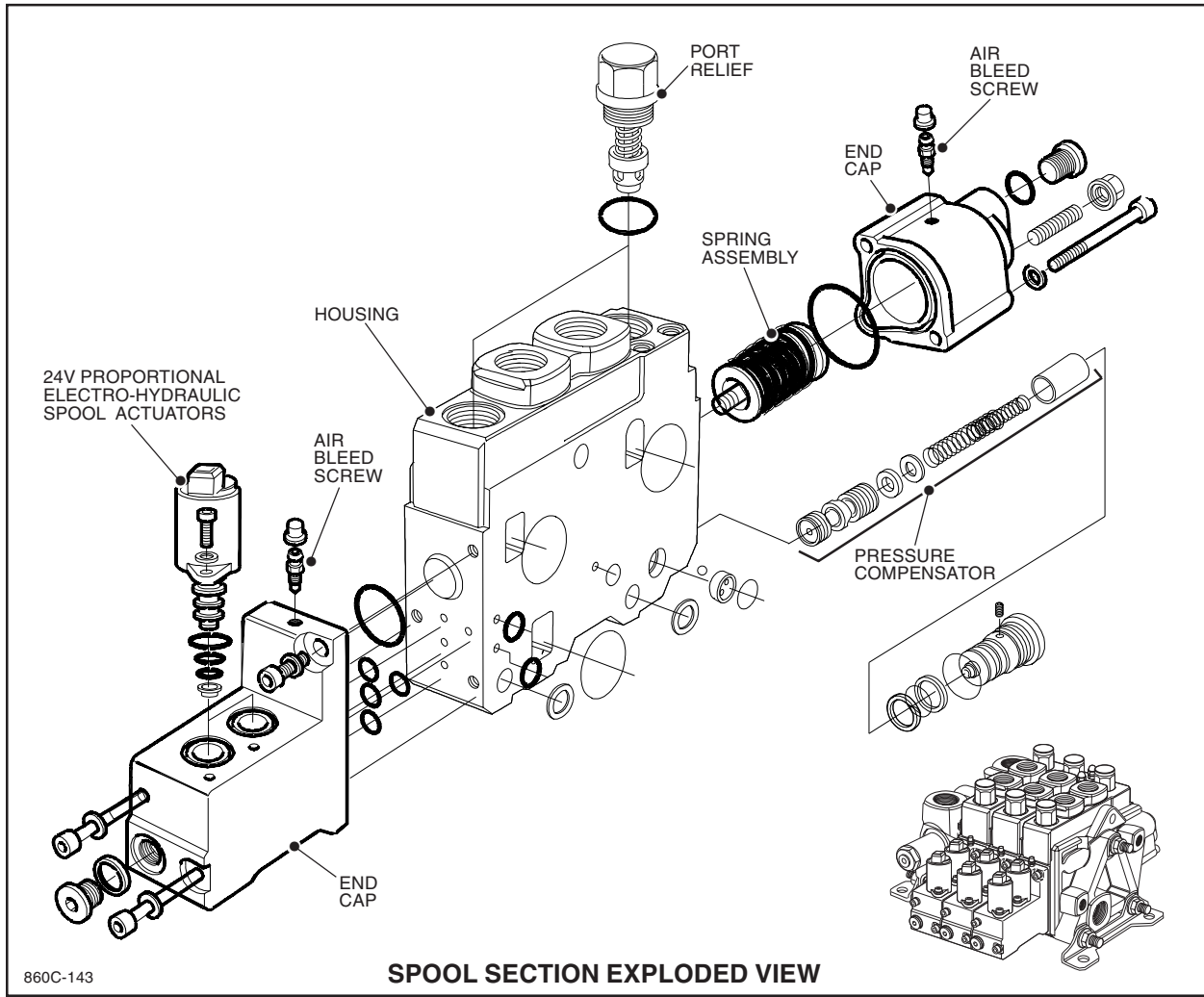
1. Ensure that the hydraulic oil is at **operating temperature**.
2. Start engine and set engine speed to **HI IDLE**.
3. Close cab door and press **PILOT RESET** switch to activate the pilot system.
4. Place the service mode (fan service) switch in the **ON (REVERSE)** position.
5. Raise attachment off ground and place L.H. joystick lever in 'FULL LEFT' position and rotate the upper. Record time for one complete revolution.
6. Repeat step (4) with L.H. joystick lever in 'FULL RIGHT' position.

The recommended factory setting is between **6 and 7 RPM**. It should be noted that over adjusting to provide a faster swing speed could increase the stress on boom components and increase the heat load in the hydraulic system.

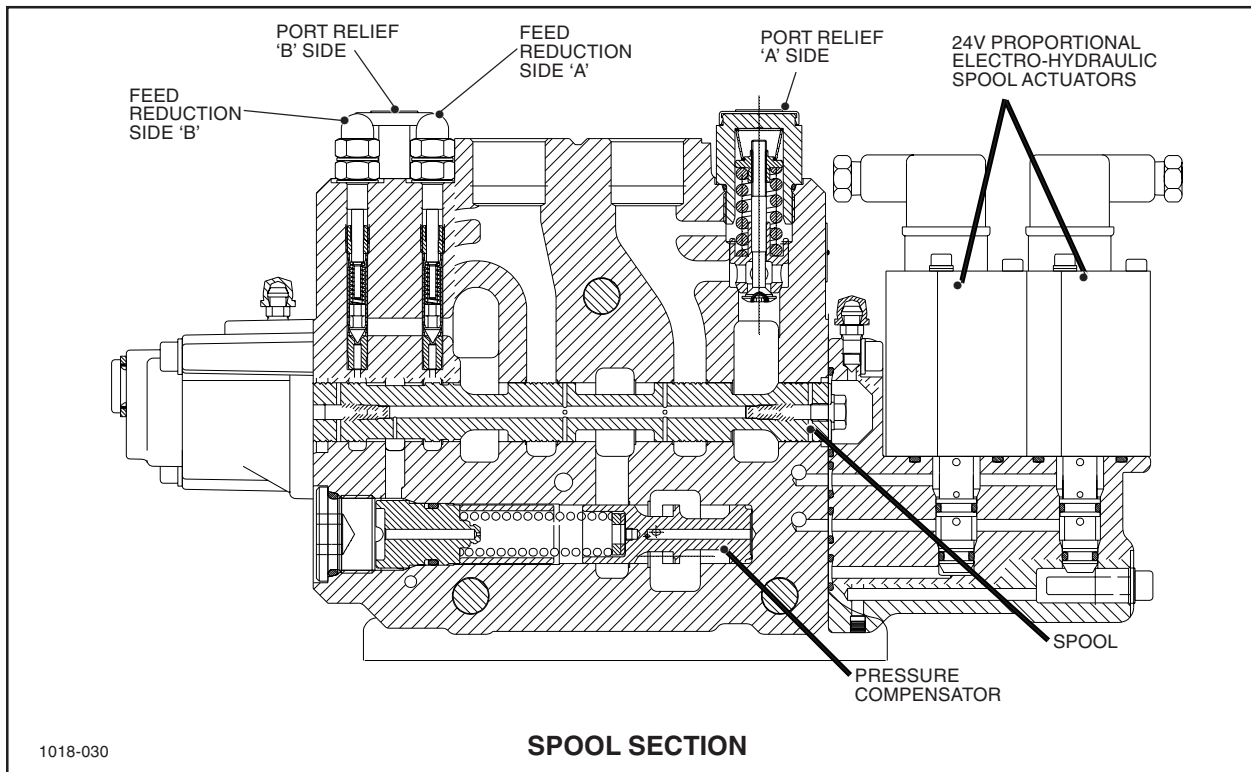
7. To adjust swing speed;
(Refer to main valve photo and fig. 90919-1) Loosen locknut on spool travel stop adjusting screw and turn adjusting screw **IN** (clockwise) to slow down and **OUT** (counterclockwise) speed up. Tighten locknut on adjusting screw and re-check times.
8. Place the service mode (fan service) switch in the **OFF (RUN)** position.



MAIN CONTROL VALVE FLOW ADJUSTING SCREWS



SPOOL SECTION EXPLODED VIEW

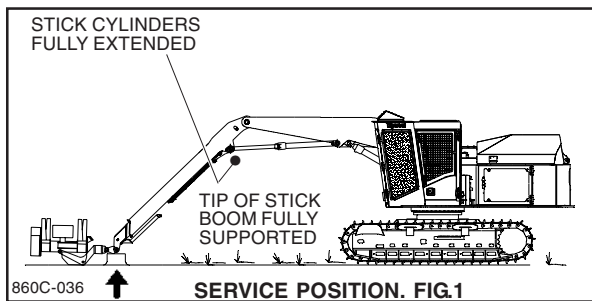


SPOOL SECTION

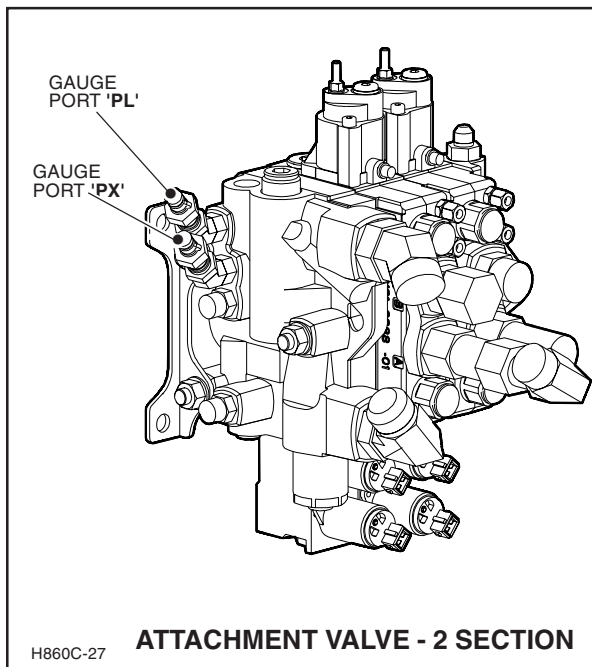
CHECKING PUMP 1 PRESSURES

WARNING: Position attachment head on the ground during this procedure except when operating the pump 1 or telescopic boom functions. The swing brake should be applied at all times during this procedure. Refer to attachment manufacturer's information for recommended pressure settings and safe procedures for adjusting pressures.

NOTE: The relief valves are cartridge type reliefs and are not adjustable. If the observed pressures are not within 50 psi of the specified pressure replace the cartridge. See replacing procedure later in this section.



1. Park machine on level ground, lower the attachment to the ground, engage the swing brake and stop engine.
2. Ensure that hydraulic oil is at **operating temperature**.



3. Connect a 0 - 5,000 psi. pressure gauge to the attachment control valve 'PX' test port.

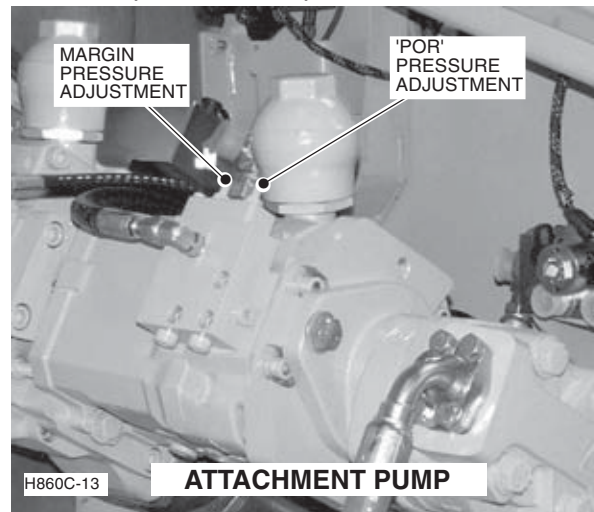
4. From inside the cab, close and latch the cab door.
5. Start the engine and set throttle to **HIGH IDLE**.

! WARNING

The attachment will be operating during this procedure. Operator must ensure that no one is near the attachment during this procedure.

The swing brake should be applied at all times during this procedure.

6. If the machine is not equipped with a telescopic boom proceed to step 7
If the machine is equipped with telescopic boom proceed to step 10.



7. **NON -TELESCOPIC BOOM**
With aid of an assistant operate the Pump 1 function, loosen the locknut on the 'POR' adjustment screw on the attachment pump and turn the screw **IN** until gauge reading is **4160 psi** (Main Pressure Relief Valve Setting).

If pressure will not go past **4010 psi** replace the port relief valve cartridge. If pressure still will not go past **4010 psi** replace the main relief cartridge.

If greater than **4110 psi**, the port relief and main relief cartridges should be replaced.

8. Reset pump 'POR' to **3625 psi** for standard operation.
9. Proceed to step 12.

**ADJUSTING FUNCTION PARAMETER
PUMP 2 START RAMP & PUMP 2 STOP RAMP**



1. Press the bottom of the MENUS SWITCH to display the IQAN-MDM diagnostic and function adjustment menus.

Press Escape button then scroll UP/DOWN to display PROPERTIES. Press F3 OTHER to choose FUNCTION PARAMETERS menu.



2. Press SELECT (F1) to display SELECT FUNCTION menu.



3. Use UP/DOWN buttons to scroll to desired function.
4. Press SELECT (F1) for Pump 2 Start Ramp.



5. Use UP/DOWN scroll buttons to change speed between 0 ms and 2000 ms then press OK (F1). Pressing reset will return the setting to the factory default value, 250 ms.

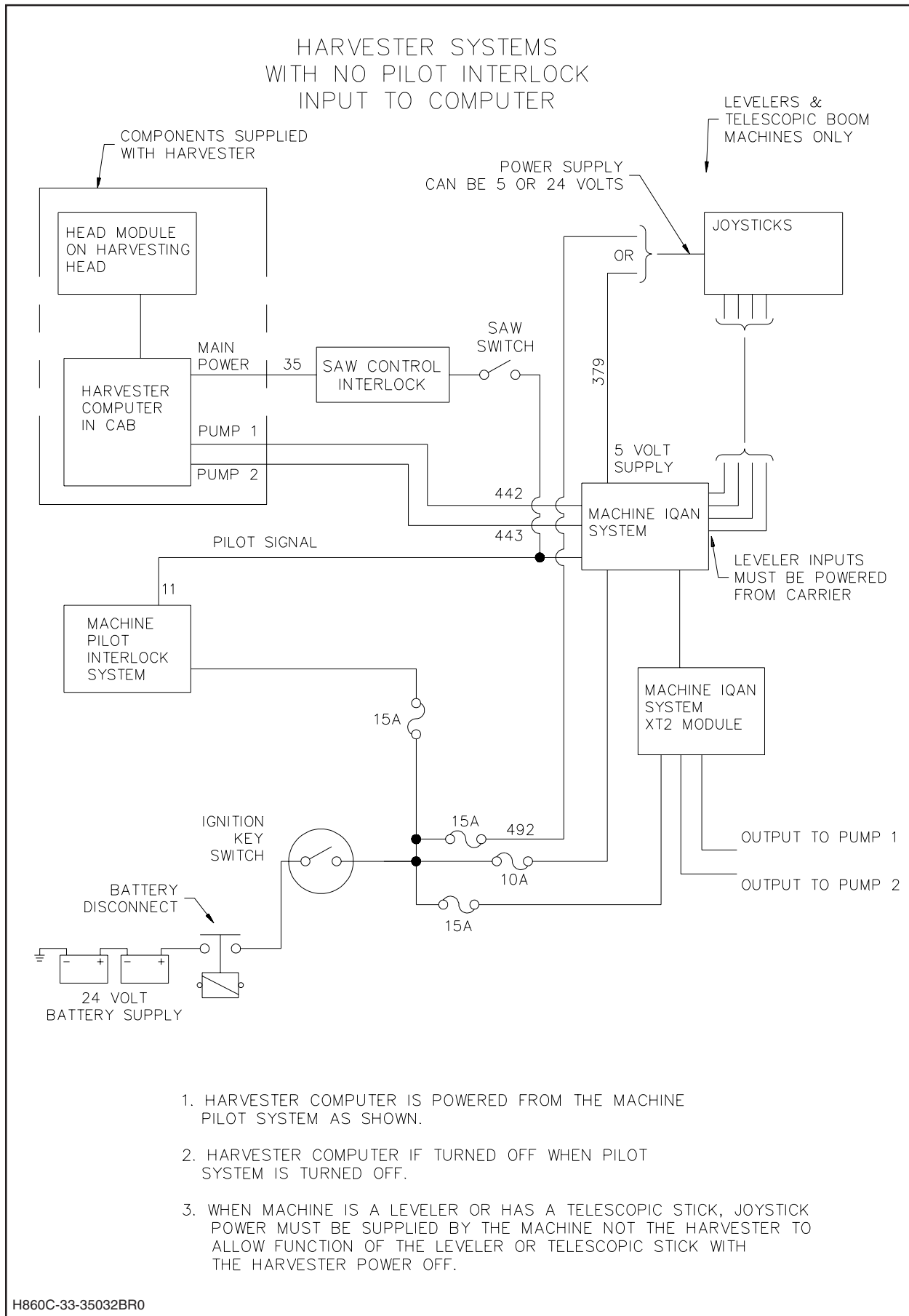
The correct setting will depend on a combination of the type of attachment in use, operating conditions and operator preference.



6. Repeat steps 3 to 5 for the Pump 2 Stop Ramp if adjustment is required.

Pump 2 Stop ramp is adjustable between 0 ms and 2000 ms, factory default 0 ms.

The correct setting will depend on a combination of the type of attachment in use, operating conditions and operator preference.



Tigercat H860C/H870C/LH870C Harvester

SECTION 21 - TELESCOPIC BOOM

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