Tigercat®

X822C/LX822C/X830C/LX830C
FELLER BUNCHER

SERVICE MANUAL

SERIAL NUMBER 822*2001 TO 822*3000
SERIAL NUMBER 830*2001 TO 830*3000

ISSUE 1.0, DECEMBER 2015

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VIBRATION AND NOISE LEVEL INSIDE CAB

Noise Level Inside Cab dB(A) As per Tigercat test ETR00047				
	Microphone direction:			
	Forward	Rear	Left	Right
Driving max speed (High)	77	76	77	76
Driving max speed (Low)	73	72	72	73
Boom opertation	72	73	72	73

NOISELEVELS.PDF

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against noise. Prolonged exposure to loud noise can cause impairment or loss of hearing. This machine exceeds 70 dB(A) in the cab and exceeds 85 dB(A) when servicing machine engine.

Check with your local Safety Commission to determine if hearing protection is required at these levels.

Vibration Level - Whole-body As per Tigercat test ETR007 & ISO 2631-1 Weighted rms acceleration (m/s^2)				
	Seat		Seat-back	Feet
	Health	Comfort		
Driving max speed (High)				
x-axis (back-to-chest)	0.2370		0.5630	0.4020
y-axis (right-to-left)	0.2310		0.3200	0.4200
z-axis (buttocks-to-head)	0.4660		0.2110	0.6140
S	0.6571	0.5700	0.4850	0.2850
Driving max speed (Low)				
x-axis (back-to-chest)	0.1140		0.2150	0.1200
y-axis (right-to-left)	0.0764		0.0977	0.1440
z-axis (buttocks-to-head)	0.2170		0.0669	0.2230
S	0.2890	0.2568	0.1800	0.1000
Boom opertation				
x-axis (back-to-chest)	0.4510		0.6140	0.1830
y-axis (right-to-left)	0.3710		0.2470	0.3300
z-axis (buttocks-to-head)	0.4440		0.0838	0.3670
S	0.9304	0.7310	0.5070	0.1740

Vibration Level - Hand/Arm As per Tigercat test ETR007 Weighted rms acceleration (m/s^2)	
Driving max speed (High)	
S	1.770
Driving max speed (Low)	
S	1.170
Boom opertation	
S	0.770

**Note for hand/arm, all weighted RMS acceleration values are below 2.5 m/s^2 as per clause 3.6.3 Machinery Directive 98/37/EC Annex 1.*

VIBRATION LEVEL.PDF

- NEVER travel across a STEEP slope or side hill.
- Always carry any load on the uphill side of the machine.
- Do not lift or move objects that exceed machine stability.
- Always be prepared to release the load in case it causes the machine to tip.
- Always position the cab so that you have a clear view in the direction of travel. Be aware of ground conditions and obstacles in the machine's path before moving the machine.
- When crossing obstacles (boulders, stumps, ditches etc.) the machine can shift rapidly, greatly affecting the stability of the machine. Move slowly over obstacles, and position the boom against the ground to reduce the risk of the machine shifting rapidly.
- Backing over obstacles unexpectedly while travelling down a slope poses a tipping risk. Know the path of the tracks whenever the machine is moved.
- When climbing a slope the boom should face uphill and the attachment should be kept close to the ground (FIG. 3). When descending a slope the boom should face down hill and the attachment should be kept close to the ground (FIG. 4). Be aware that the machine is in its least stable position on a slope with the boom to the rear. Be particularly aware of machine stability when changing directions on, or travelling back down a slope.
- As you gain experience, recognize that the maximum slope on which the machine can operate cannot be defined simply by an angle value. Variables in surface terrain, soil types, rocks, boulders, stumps, and fallen trees, changing weather conditions, and first and foremost the operator's experience and skill levels greatly affect the maximum slope limitations. Be aware that these factors can result in a shallow slope posing greater risk than a relatively steeper slope. **DO NOT attempt to work on slopes beyond your personal capability level**.

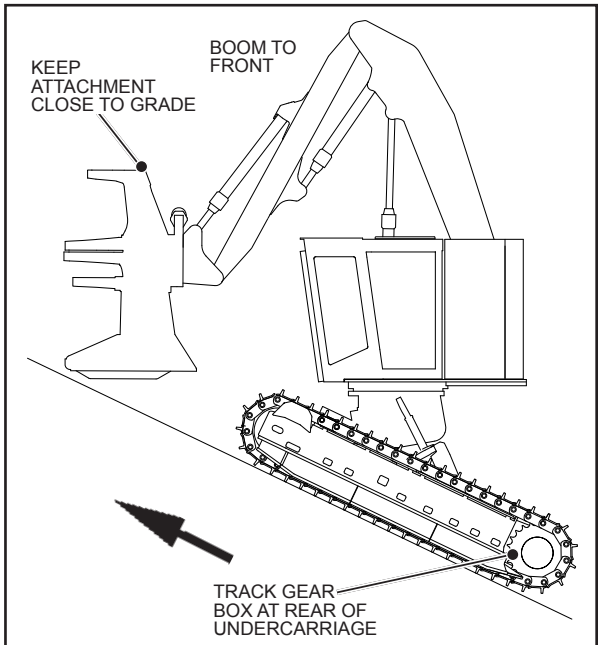


FIG. 3 - CLIMBING SLOPE

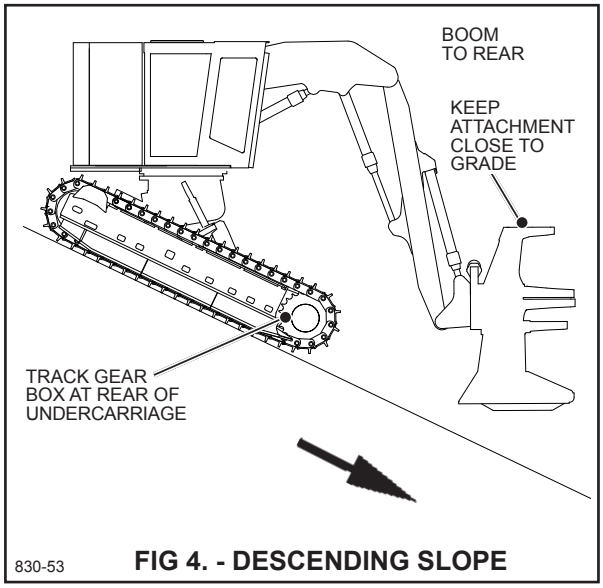


FIG 4. - DESCENDING SLOPE

LIGHTNING SAFETY AWARENESS

WHAT IS A LIGHTNING STRIKE?

Lightning is a discharge of the electricity produced by a thunderstorm. As the thunderstorm develops, many small particles of ice within the storm clouds bump together. These collisions create a positive charge at the top of a cloud and a negative charge at the bottom. As this continues a second positive charge builds up on the ground beneath the cloud, concentrated around high objects such as hills, trees, buildings, equipment and even people.

When the difference between the electrical charge in the cloud and on the ground becomes great enough to overcome the resistance of the insulating air between them, an electrical current flows instantly. This is a lightning strike.

The electrical potential in a lightning strike can be as much as 100 million volts. Lightning strikes can occur over very large distances, even as much as 60 km (37 mi). Lightning travels both in front of and behind a thunderstorm and so strikes happen even when rain has not started or has stopped. Lightning can hit in the same place, many times and often spreads out over 18 m (60 ft) within the soil around the strike point.

Thunder always accompanies lightning. When lightning occurs, the air through which it travels is instantaneously heated to a temperature more than 28,000°C (50,000°F). The air expands rapidly due to this heating, then quickly contracts as it cools. It is this contracting shock wave that we hear as thunder.

In many areas of the world, lightning strikes are second only to flooding as the greatest cause of storm related deaths and injuries. Although only 10% of lightning strike victims are killed, virtually all from cardiac or respiratory arrest, over 70% of those that survive suffer severe, life-long injury and disability. The symptoms of a lightning strike include memory loss, fatigue, chronic pain, dizziness, sleeping difficulty and the inability to complete several tasks at one time.

LIGHTNING SAFETY

In spite of the popular myth that being struck by lightning is an unlikely event, the facts show that lightning strikes occur frequently. As a result loggers are at high risk because their work is outdoors and close to known strike points such as tall trees and heavy equipment.

Loggers can increase their chances of avoiding a lightning strike by following a few simple safety practices.

1. Designate a member of your crew to
   - Monitor daily weather forecasts
   - Observe local weather conditions
   - Alert all other members of the crew when a possible lightning threat develops.
2. Don’t start or continue any work that cannot be stopped immediately, when a storm moves nearby.
3. Anticipate a high-risk situation and take action early by moving to a low-risk location. Do not hesitate. If there is lightning, you are in danger.
4. Obey the rule - **If you see lightning, Flee. If you hear thunder, Clear**.
5. Do not follow the now obsolete guideline to take shelter when the time between seeing lightning and hearing thunder is 30 seconds or less. This does not provide sufficient time to ensure safety. Always follow step 4.
6. Remain in your safe location for 30 minutes after the last sight of lightning or the last sound of thunder.

The safest location during lightning activity is inside a fully enclosed, substantially constructed building, a house, office, school, shopping area, etc. These are the safest because of the electrical wiring and plumbing that they contain. Should lightning strike, the electrical current will travel through the wiring or plumbing into the ground. When such a building is nearby, always seek shelter there first.

CRUSH HAZARD

This label warns of the **CRUSH HAZARD** caused by the cab tilting.

Be sure that all personnel are clear when tilting the cab. Operating the cab tilt function with personnel in the crush zone **COULD RESULT IN DEATH OR SERIOUS INJURY**!

Keep all personnel clear of the machine before operating the cab tilt function.

CRUSH HAZARD

This label warns of the **CRUSH HAZARD** caused by the engine enclosure door.

Be sure that all personnel are clear when opening and closing the engine enclosure door. Operating the engine enclosure door with personnel in the crush zone **COULD RESULT IN DEATH OR SERIOUS INJURY**!

Keep all personnel clear of the machine before operating the engine enclosure door.

CRUSH HAZARD, LEVELER

:This label warns of the **CRUSH HAZARD** caused by movement of the leveling frames and cylinders when not properly supported.

Never work under the machine or near the leveler area when it is unsupported. Contact with moving frames and cylinders **COULD RESULT IN DEATH OR SERIOUS INJURY**!

Properly support and brace the leveler cylinders and shut off engine before performing service work in this area.

USING HIGH-SPEED DISC SAWS SAFELY

⚠ DANGER

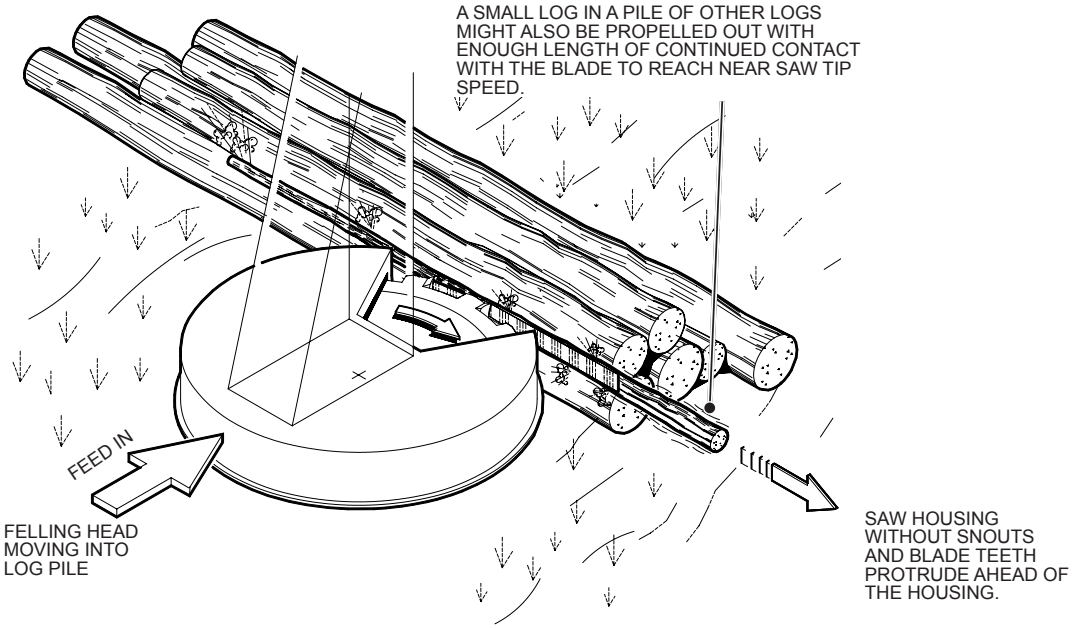
This information is intended to encourage logging organizations and operators to develop and practice additional rules that suit particular terrain conditions and job requirements. It is also intended to assist towards a quicker understanding of how and why things can happen when a high speed disc saw is in use; and hence to assist in development of safe operating practices.

The following information is in addition to any safety instructions or recommended safe operating practices that may already be in circulation.

⚠ DANGER

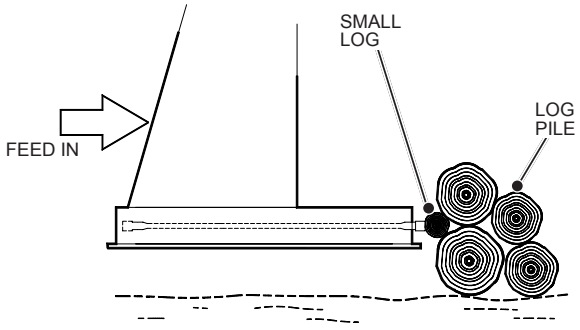
CONTENTS - APPENDIX TO SECTION 1

Figures 8 and 9 show two ways that this might happen in the woods if using the saw head of figure 4 (where the throw contact can be long). A slab, still partly attached to a well backed-up tree bole and wet with sap, makes an ideally bad throw situation which could unintentionally occur in woods work. A small log in a pile of other logs might also be propelled out with enough length of continued contact to reach near saw tip speed.



SAW3

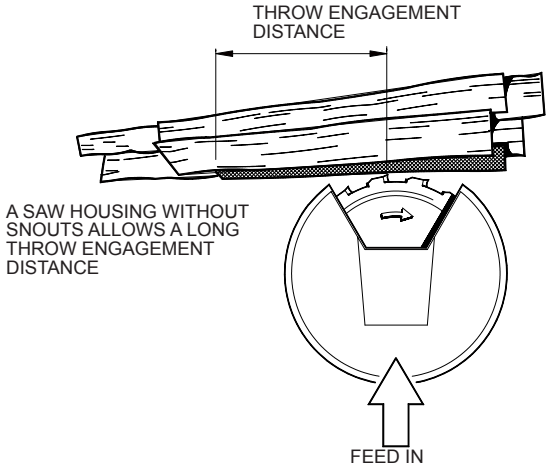
FIGURE 9a: HOW A LOG CAN BE THROWN LIKE A SPEAR



IF THE SIDE OF A LOG CAN CONTACT THE SAW, THE THROW ENGAGEMENT DISTANCE CAN BE LONG

SAW8

FIGURE 9b SIDE VIEW



SAW8

FIGURE 9c TOP VIEW

TIGERCAT OIL SAMPLING PROGRAM

OIL SAMPLE COLLECTION PROCEDURES

Fill out the Sample Information Form (SIF) completely and accurately. When taking multiple oil samples, fill out all of the required SIF`s in their entirety, prior to taking any oil samples. Then, immediately package each completed SIF together with the matching oil sample in the black outer shipping container as each individual sample is taken. This will reduce the possibility of mixing up or incorrectly identifying the SIF`s and oil samples. Incorrectly identified samples could result in a false warning alarm.

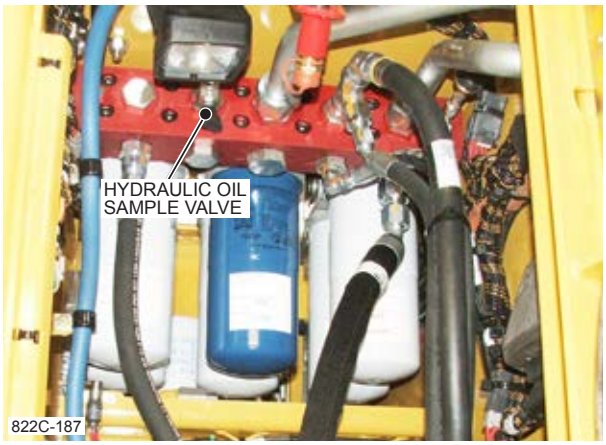
The accuracy of the lab analysis results is very dependent on the quality of the oil sample taken. Collection of clean oil samples that are representative of the main body of oil are essential if meaningful lab results are to be obtained. Erroneous readings may result if proper collection, handling, packaging and shipping practices are not followed prior to the sample being tested by the lab. To be able to accurately compare and trend the lab results over time, all follow-up samples should be consistently taken from the same location using the same techniques as all previous samples.

- Ensure that all sample valves and drain plugs are clean and free of debris.
- Remove the sample bottle cap only when ready to take the sample. Keep the cap clean – **DO NOT** put it in your pocket or let it get contaminated in any way.
- **DO NOT** allow any airborne dirt, etc. to enter the sample bottle.
- Avoid contamination of the sample – replace the sample bottle cap immediately after filling the bottle to approximately ¾ full.

All samples taken should be immediately forwarded to the lab for processing.

Contact your Tigercat dealer to purchase additional or replacement hydraulic sample valves or drain plugs.

In cases where oil samples must be pumped or otherwise drawn out of a reservoir or housing, a hand operated oil suction pump is also available from your Tigercat dealer.



Hydraulic Oil Samples:

- Hydraulic oil samples should be taken from the circulating oil flow at operating temperature, with no functions actuated, using sample valves that are permanently located on the machine whenever possible.
- Purge the sample valve before taking a representative oil sample. Drain a minimum of 90 to 120 ml (3-4 ounces) of oil into a separate container and discard this oil using approved recycling methods.
- Replace the dust cover on the sample valve immediately after taking the oil sample and sealing the sample bottle.

Gearbox Samples:

- These samples can be taken during the oil change process.
- To obtain a representative oil sample, ensure the oil is warm and has not settled very long (within 30 minutes of shutdown).
- Place the required drain container under the machine to capture the used oil to be discarded using approved recycling methods.
- Remove the drain plug and allow approximately 50% of the oil to drain, then place the sample bottle in the stream of draining oil to obtain a representative sample.

APPROVED HYDRAULIC OILS

In addition to providing the vehicle with its normal operational functions, hydraulic oil is also used to fill the swing gearbox and brake.

Use one of the following oils to fill or replenish the hydraulic system.

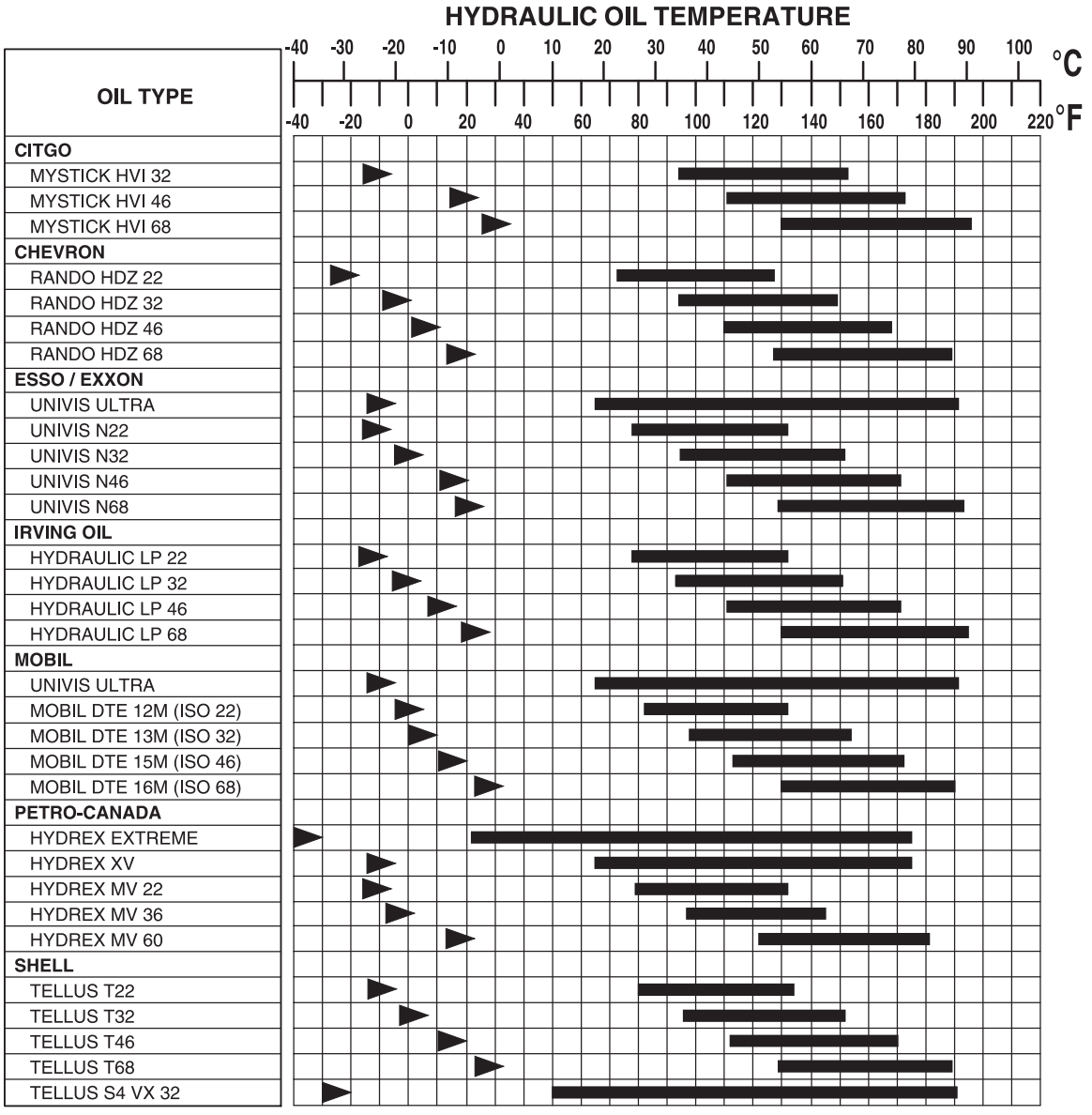
HYDRAULIC OIL OPERATING RANGE

(Not suitable for axle applications)

Tigercat

OPERATING TEMP. RANGE

LOWEST START-UP TEMP.



NOTICE OPERATING MACHINE OUTSIDE LIMITS SHOWN WILL RESULT IN FAILURE OF HYDRAULIC COMPONENTS.

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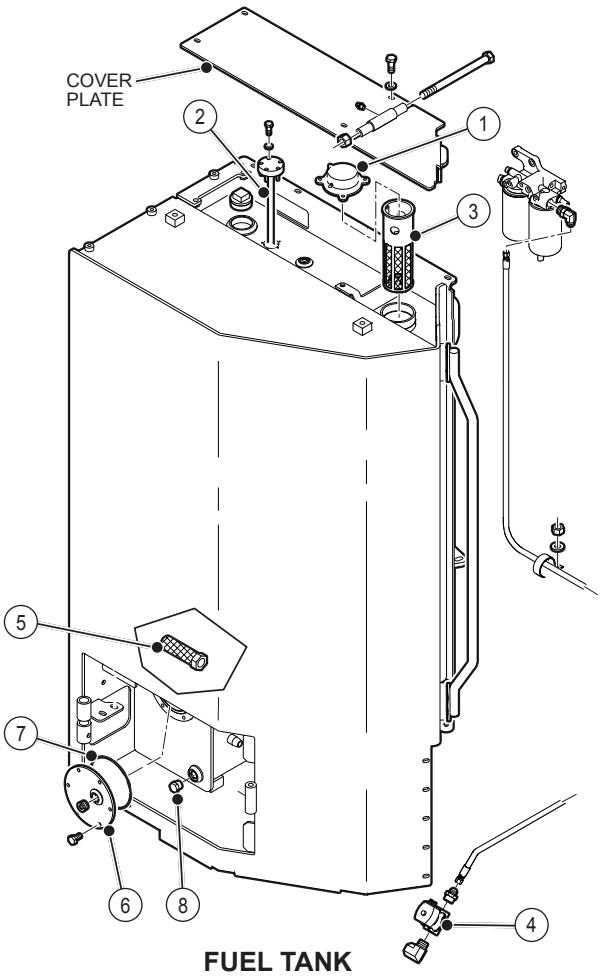

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FUEL TANK

FUEL TANK STRAINER

A 150 micron stainless steel fuel strainer (5) is screwed onto the end of the fuel supply pipe located inside the fuel tank. The strainer is accessible by removing the clean-out cover (6).

CHANGING/CLEANING THE STRAINER

NOTE: This should only be required if excessive quantities of foreign material has built up inside the tank.

1. Park machine on level ground with attachment resting on the ground.
2. Stop engine. Turn battery disconnect switch to the OFF position. Always install a **"DO NOT START ENGINE"** sign on the operator's cab door and in the engine compartment when making repairs to the machine.
3. Remove the drain plug (8) and drain the fuel tank.
4. Disconnect the fuel supply and return hoses at the fuel tank. Remove the clean-out cover (6) and O-ring (7).
5. Before removing strainer (5), clean any debris from inside bottom of tank and wipe clean.
6. Remove the fuel strainer (5) using the hex on the end of strainer. Carefully clean the strainer. **NOTE:** rough handling can cause damage.
7. Check for a buildup of foreign material where the strainer screws onto the pipe.
8. Reinstall the strainer (5) using the hex on end.
9. Reinstall fuel tank clean-out cover (6) with a NEW O-ring (7) and reinstall fuel supply and return hoses.
10. Replace drain plug (8), refuel and check for leaks.
11. Turn battery disconnect switch ON and start engine, check for leaks again.
12. Clean up any spilled fuel before returning machine to operation.

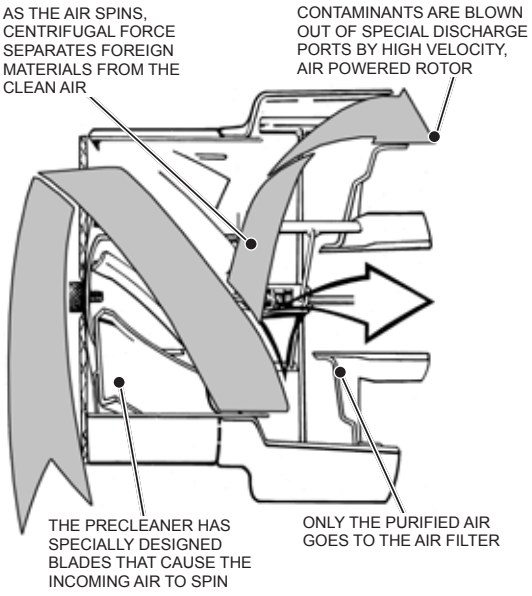
⚠ WARNING

To lower the risk of causing accidental fires, DO NOT leave fuel or oil soaked rags laying around.

AIR INTAKE MAINTENANCE

ENGINE AIR PRECLEANER

The engine air precleaner cleans engine air before it reaches the air cleaner filter elements. It removes contaminants such as dust, powder, insects, rain and snow. This precleaner is self powered and self cleaning requiring virtually no maintenance. However, it should be checked periodically to make sure that foreign materials have not plugged the intake area or the discharge port area and that the rotor spins freely.



PRECLEANER OPERATION

PRECLEANER

AIR INTAKE SEAL

Periodically check to ensure seal on top of precleaner is making proper contact with the sealing surface of the inside top of the power door. Hot air leakage at this seal will reduce engine power.

EATON Aeroquip

Assembly Torque

Recommended Parallel Connection Assembly torque

Eaton recommends that a Torque wrench be used to assure proper fitting assembly of these connections.

The values listed are for steel connections. Contact Teaton for torque values for other materials.

Straight Thread O-Ring Boss Low Pressure with 37º (SAEJ514)

Dash Size	Thread Size (inches)	Jam Nut or Straight Fitting Torque lb.-ft.	Jam Nut or Straight Fitting Torque Newton Meters
-03	3/8-24	8-9	12-13
-04	7/16-20	13-15	18-20
-05	1/2-20	14-15	19-21
-06	9/16-18	23-24	32-33
-08	3/4-16	40-43	55-57
-10	7/8-14	43-48	59-64
-12	1 1/16-12	68-75	93-101
-14	1 3/16-12	83-90	113-122
-16	1 5/16-12	112-123	152-166
-20	1 5/8-12	146-161	198-218
-24	1 7/8-12	154-170	209-230
-32	2 1/2-12	218-240	296-325

Straight Thread O-Ring Boss High Pressure with ORS (J1453)

Dash Size	Thread Size (inches)	Jam Nut or Straight Fitting Torque lb.-ft.	Jam Nut or Straight Fitting Torque Newton Meters
-03	3/8-24	8-10	11-16
-04	7/16-20	14-16	20-22
-05	1/2-20	18-20	24-27
-06	9/16-18	24-26	33-35
-08	3/4-16	50-60	68-78
-10	7/8-14	72-80	98-110
-12	1 1/16-12	125-135	170-183
-14	1 3/16-12	160-180	215-245
-16	1 5/16-12	200-220	270-300
-20	1 5/8-12	210-280	285-380
-24	1 7/8-12	270-360	370-490

ORS

Dash Size	Thread Size (inches)	Swivel Nut Torque lb.-ft.	Swivel Nut Torque Newton Meters
-04	9/16-18	10-12	14-16
-06	11/16-20	18-20	24-27
-08	13/16-16	32-35	43-47
-10	1-14	46-50	62-68
-12	1 3/16-12	65-70	88-95
-16	1 7/16-12	92-100	125-136
-20	1 11/16-12	125-140	170-190
-24	2-12	150-165	204-224

SAE 37º (JIC)

Dash Size	Thread Size (inches)	Swivel Nut Torque lb.-ft.	Swivel Nut Torque Newton Meters
-04	7/16-20	11-12	15-16
-05	1/2-20	15-16	20-22
-06	9/16-18	18-20	24-28
-08	3/4-16	38-42	52-58
-10	7/8-14	57-62	77-85
-12	1 1/16-12	79-87	108-119
-16	1 5/16-12	108-113	148-154
-20	1 5/8-12	127-133	173-182
-24	1 7/8-12	158-167	216-227
-32	2 1/2-12	245-258	334-352

Metric

Thread Size		Straight Adapter or Locknut Torque
mm	lb.-ft.	Newton Meters
M10x1	13-15	18-20
M12x1.5	15-19	20-25
M14x1.5	19-23	25-30
M16x1.5	33-40	45-55
M18x1.5	37-44	50-60
M20x1.5	52-66	70-90
M22x1.5	55-70	75-95
M26x1.5	81-96	110-130
M27x2	96-111	130-150
M33x2	162-184	220-250
M42x2	170-192	230-260
M48x2	258-347	350-470

BSPP

Nominal Thread Size		Straight Adapter or Locknut Torque
inches**	lb.-ft.	Newton Meters
G1/8-28	13-15	18-20
G1/4-19	19-23	25-30
G3/8-19	33-40	45-55
G1/2-14	55-70	75-95
G3/4-14	103-118	140-160
G1-11	162-184	220-250
G1 1/4-11	170-192	230-260
G1 1/2-11	258-347	350-470

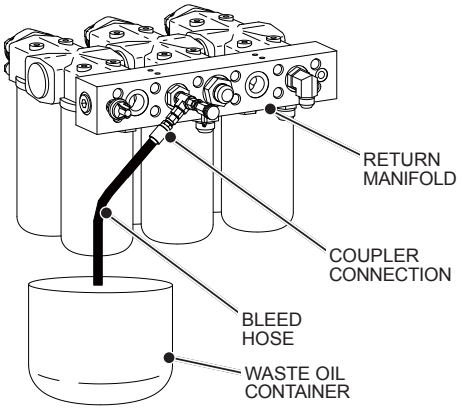
** "G" denotes parallel threads, other than ISO 6149 (Port connection only)

Eaton Aeroquip Fluid Conveyance Products A-HOOV-MC001-E January 2005

Tigercat X822C/LX822C/X830C/LX830C Feller Buncher
SECTION 4 - HYDRAULIC SYSTEM

CONTENTS - SECTION 4

ISSUE 1.0, DECEMBER 2015



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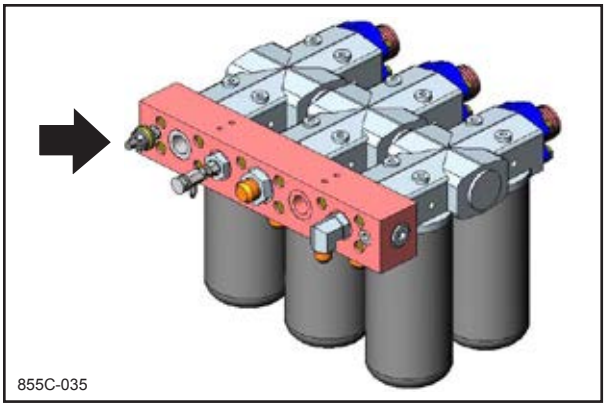
BLEEDING AIR FROM HYDRAULIC RETURN CIRCUIT

13. Attach bleed hose (located in the compartment behind cab above hydraulic tank) to the coupler on the return manifold.
14. Route hose to a waste oil container.
15. Use fill pump to raise hydraulic oil level up to the FULL line, replacing oil lost during filter change.
16. As oil is being pumped into the tank, purge air out the bleed hose from the return manifold until a steady stream of oil is coming from the bleed hose.
17. Disconnect bleed hose from the coupling at the return manifold.
18. Clean up any spilled oil.
19. Start the engine and check for leaks.
20. Run engine at IDLE speed for at least five minutes to purge any remaining air from the filter system. Then STOP the engine for 15 minutes to allow air bubbles in the hydraulic tank to rise.
21. Re-check hydraulic oil level – top-up as needed.



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FILTER RESTRICTION PRESSURE SWITCH

The bypass valves built into each filter head, preset at 1.7 bar (25 psi) will open in the event the elements become restricted. Before these valves are activated, a 1.4 bar (20 psi) filter restriction pressure switch installed in the return manifold, will send a signal to the computer control system when an oil flow in excess of 1.4 bar (20 psi) is encountered at the return filters. This pressure switch closes and the hydraulic oil filter bypass icon displays RED on the MD3 computer. The master alarm and alarm light will sound and flash.

IMPORTANT!

Do not use these warnings as a substitute for checking the oil level at regular intervals. Refer to SCHEDULED MAINTENANCE in SECTION 3 of THIS MANUAL.

This information is assuming that operating conditions and running temperatures are NORMAL.

LOAD SENSING

BASIC PRINCIPLES

Figs. 1 & 2 Early hydraulic systems used a fixed displacement pump, with valves to control or adjust flow rates or speeds. This throttling or restricting pump flow to achieve control over the functions causes excess oil to flow over the relief valve. This results in wasting power and at the same time creates heat. SEE FIGS. 1 & 2.

Figs. 3 & 4 In an attempt to recover some of the wasted energy, variable volume pumps evolved. These pumps are power regulated or horsepower controlled and since they reduce the pumps output to maintain a constant system hp, oil flow over the relief valve is less, therefore reducing the wasted power losses and heat generation. SEE FIGS. 3 & 4.

The power wasted in the horsepower control system is still considerable and still requires constant "throttling" by the operator if he wants the speeds to remain as selected.

Figs. 5 & 6 The load control system was developed to address the problems outlined above.

This system combines the energy saving benefits of flow on demand with load compensation at each work port. The compensator eliminates the need for operator flow adjustments (throttling). SEE FIGS. 5 & 6.

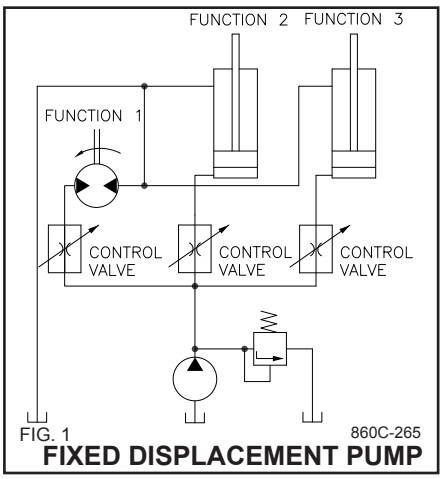


FIG. 1 **FIXED DISPLACEMENT PUMP**

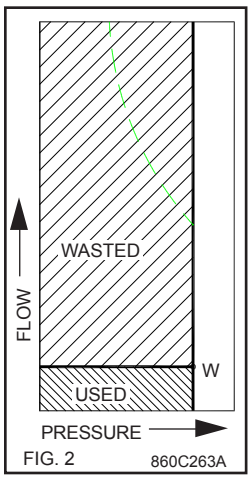


FIG. 2

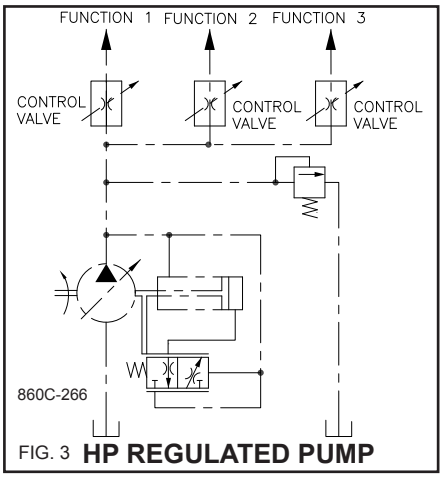


FIG. 3 **HP REGULATED PUMP**

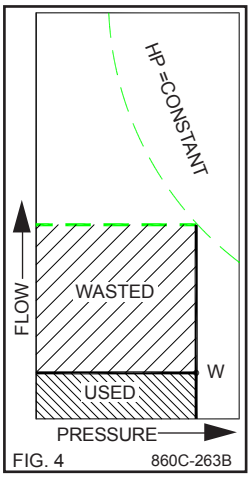


FIG. 4

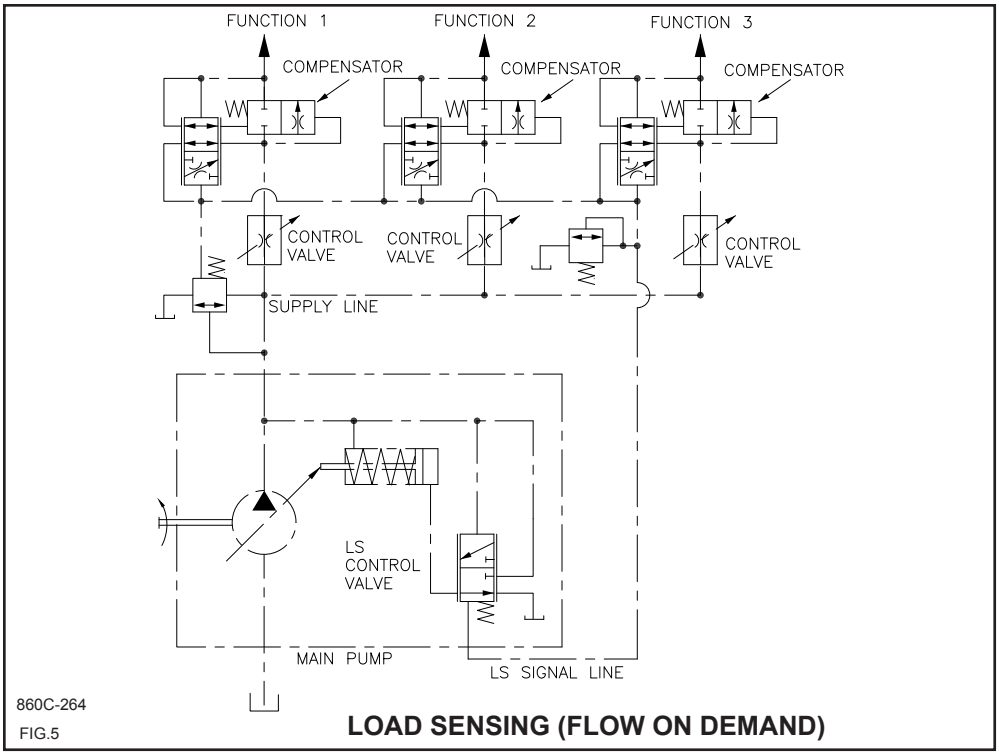


FIG.5 **LOAD SENSING (FLOW ON DEMAND)**

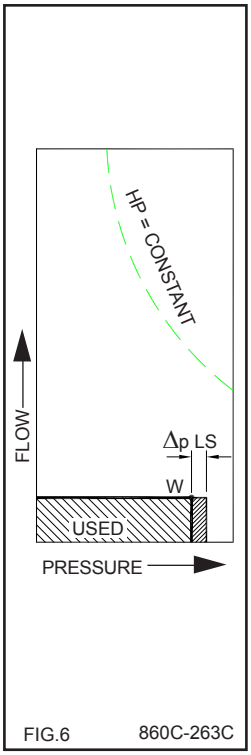
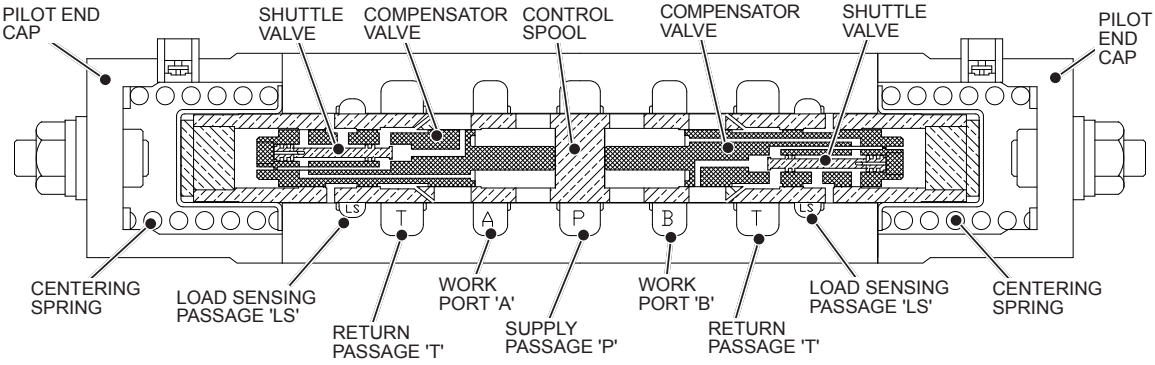


FIG.6

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.

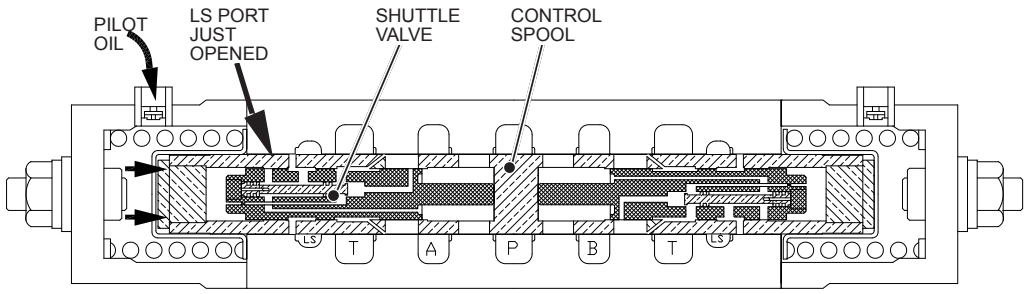


(A) CONTROL VALVE SECTION ~ IN NEUTRAL

(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).

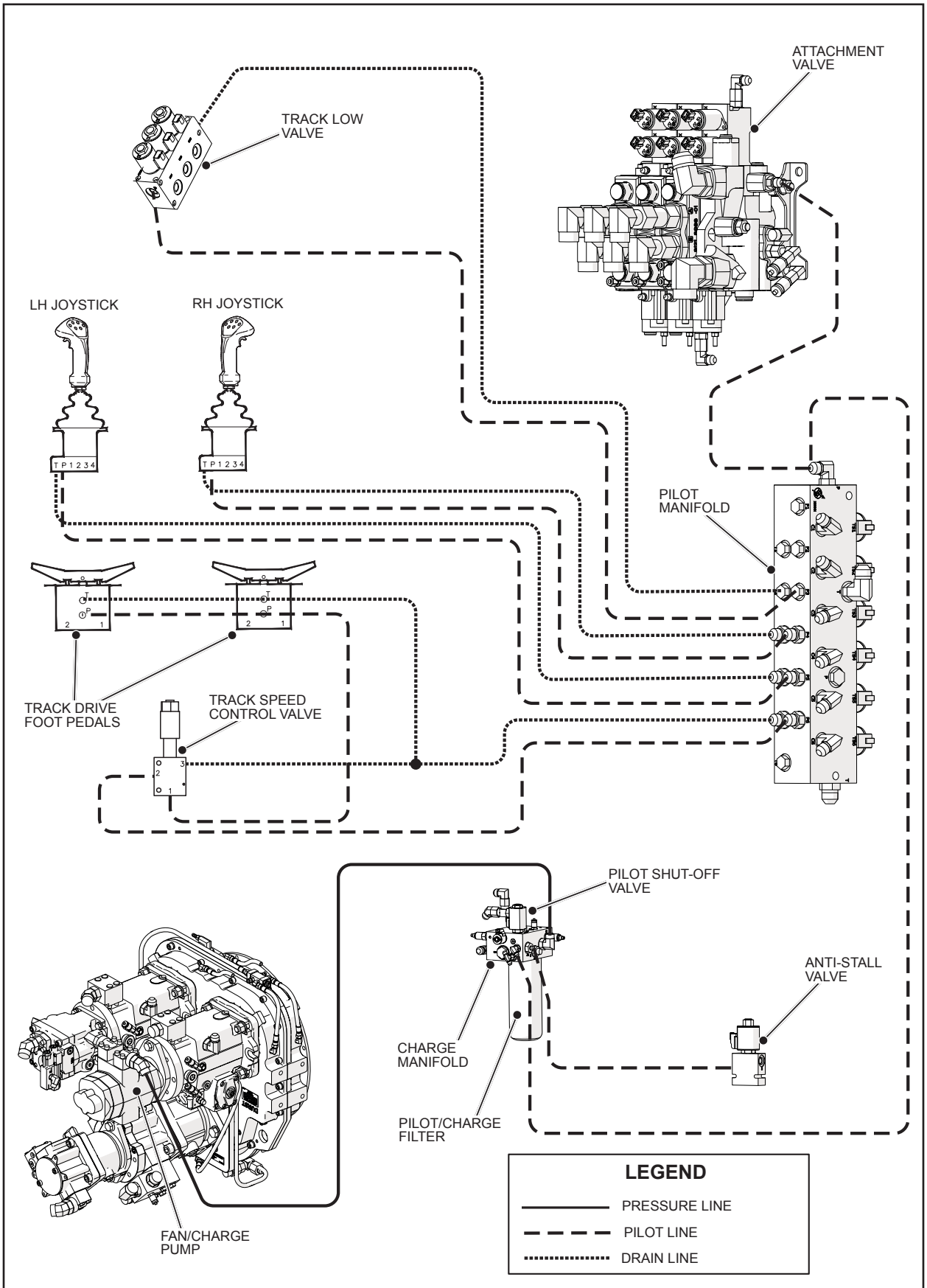
With the control valve spool held in neutral by the centering springs in both pilot caps, the pump discharge is blocked. Therefore, the control valves are closed centre. Pump discharge, work port, return, and load sensing passages are all blocked by the spool. Oil in the work ports is trapped.

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



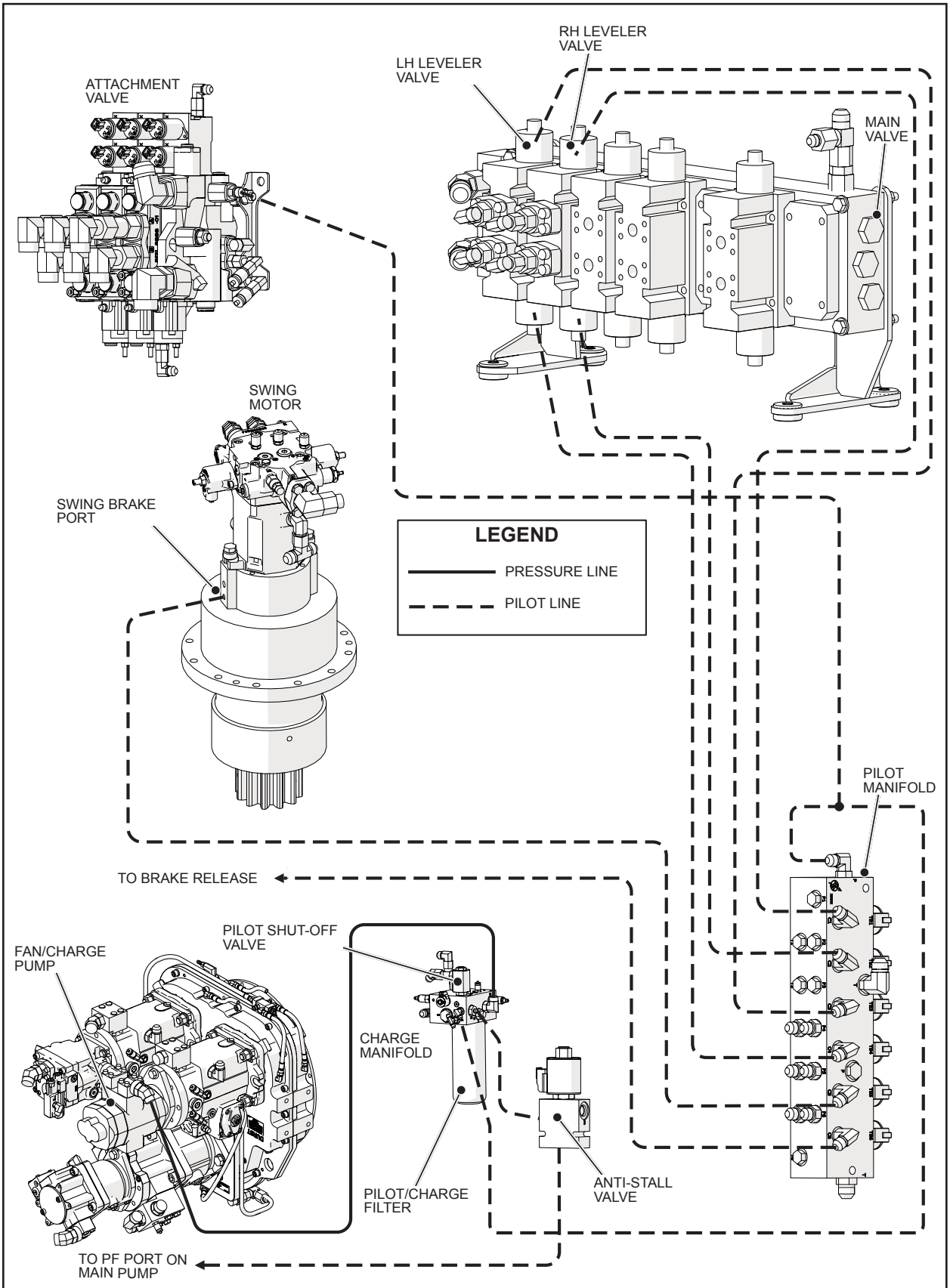
(B) CONTROL VALVE SECTION ~ • CONTROL SPOOL STARTING TO MOVE TO RIGHT
• LS PORT JUST OPENED
• ONLY SPOOL ACTUATED

(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.



LX830C-021

PILOT SUPPLY CIRCUIT

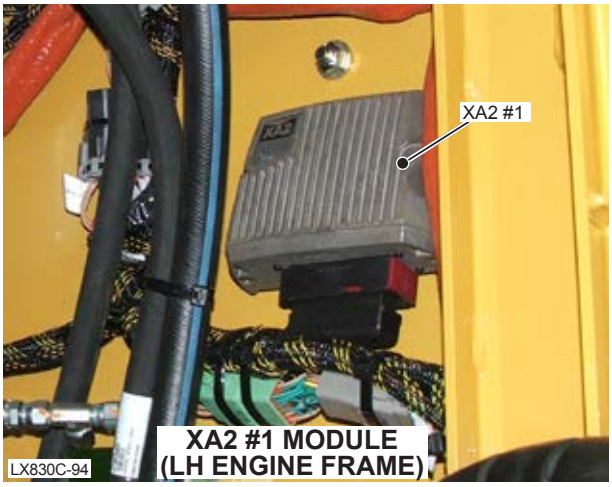


LX830C-027 **PILOT SYSTEM CIRCUIT DIAGRAM (C PORTS), ANTI-STALL AND ATTACHMENT VALVE**

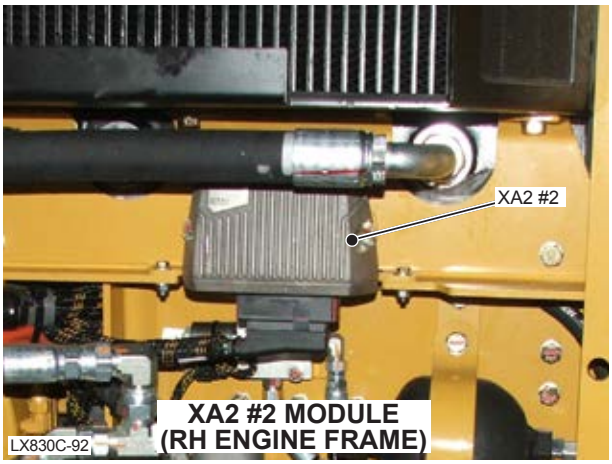
MD3 COMPUTER AND DISPLAY MODULE

MD3 USB PORT

XS2-A0 CAB MODULE



XA2 #1 MODULE (LH ENGINE FRAME)



XA2 #2 MODULE (RH ENGINE FRAME)

ADJUSTMENT MENU

From the Main Display press the F2 button to select the ADJUSTMENT MENU.

The adjustment menu icon is on display along with the following adjustment selections:

- Oil Grade Adjustments - Press the F2 button.
- Auto Accumulation Mode Status - Press the F3 button.
- Press the button to return to the Main Display.

OIL GRADE SELECTION

Press the F2 button to select the OIL GRADE Menu from the ADJUSTMENT MENU.

The oil grade menu lists the following:

- ISO22
- ISO32
- MULTI (UNIVIS ULTRA)
- ISO46
- ISO68

Press the or button to scroll to the desired oil grade and press OK.

The information is used by the machine program to adapt hydraulic oil temperature messages for the operating range of each Hydraulic Oil Grade.

Hydraulic oil grade information is shown on the Main Display below the hydraulic oil temperature gauge.

Refer also to APPROVED HYDRAULIC OILS in SECTION 3 of this manual for hydraulic oil operating range information.

Refer also to COMPUTER - MESSAGES -CRITICAL - HYDRAULIC OIL TEMPERATURE HIGH in this section for more information about the hydraulic oil temperature message.

Press the button to return to the Adjustment menu.

Press the button again to return to the Main Display.

DM1 INFORMATION

This menu provides a status of fault detection related to the MD3 Computer.

ANTI-STALL

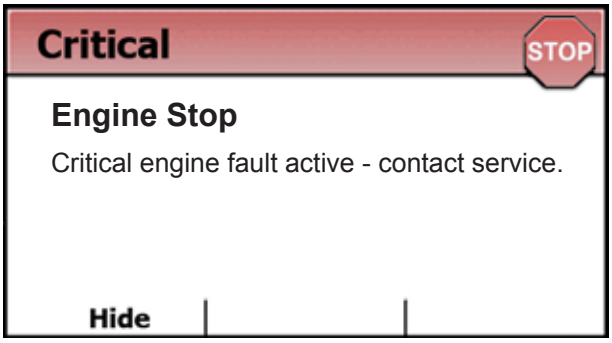
This menu provides information related to the Anti-Stall system.

SENSORS

This menu provides information from the various sensors on the machine.
Use the up or down arrow buttons to highlight the input to be viewed. Once highlighted the bottom line of this menu will show which module this input is connected to and the corresponding pin # at that module.

In the example above the LS Pressure sensor is highlighted. The bottom line of the menu shows that this is connected to the XA2-A0 module at Pin 13 of the C1 connector plug.

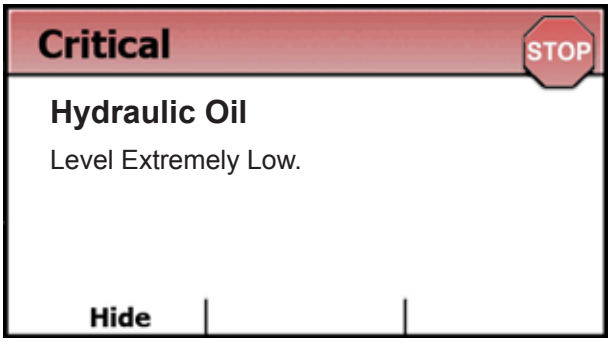
CRITICAL MESSAGES



ENGINE STOP

This message is displayed, the alarm light flashes and the alarm sounds when the engine stops while the ignition switch is in the RUN position and/or when critical engine alarms are triggered.

Refer to engine manufacturer's manual for specific information regarding the engine.



HYDRAULIC OIL LEVEL EXTREMELY LOW

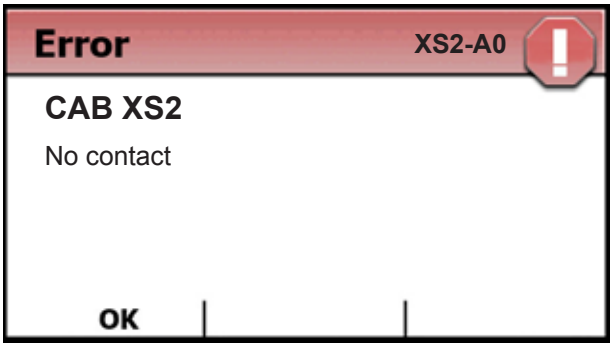
This message is displayed, the alarm light flashes and the alarm sounds when the main hydraulic tank oil level is extremely low.

Turn OFF the engine immediately when this alarm is activated. Operating the machine with a low hydraulic oil level can cause hydraulic pumps to fail.

Look for signs of broken hoses or other leaks. Repair leaks and refill the main hydraulic tank to FULL mark on the sight gauge. Restart engine and inspect for leaks.

NOTE: The hydraulic oil level icon illuminates RED when a hydraulic oil level extremely low critical message is activated.

XS2 MODULE NO CONTACT ERROR



Expect all machine functions controlled by this module to cease and all alarms associated with this module to be triggered.

1. CHECK FOR OTHER ERROR/ALARM MESSAGES ON SCREEN

Press OK to acknowledge each error message. Note that module no contact errors are followed by other alarm messages associated with the module(s) which is(are) out of contact.

If XS2-A0 MODULE NO CONTACT is the only module in the NO CONTACT error message, the likely causes are:

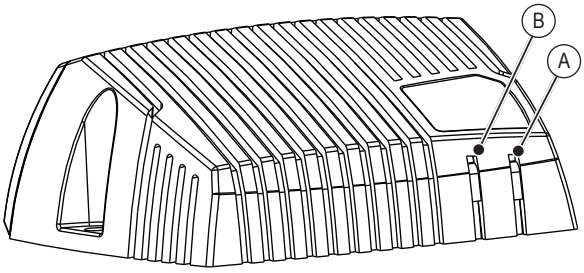
- Power - Fuse (XS2 MODULE)
- Ground
- Address (ID-Tag)

If the XS2-A0 MODULE NO CONTACT is followed by an XA2-A0 and XA2-A1 NO CONTACT error the likely cause is the CAN wire connection

LED indicator showing different XS2 and XA2 modes

Status		Flash	
Normal operation (yel.)			
Error code	**Error**	**Primary Flash (red) Error category**	**Secondary Flash (yellow) Error description**
1:n	See note [a]		
2:n	See note [a]		
3:1	CAN error		
3:2	Address error		
4:1	Memory error[b]		
FE	Fatal error		

a. Error groups 1:n and 2:n are controlled by the master.
b. FRAM memory error.



XS2 MODULE LED INDICATORS

2. CHECK MODULE STATUS INDICATORS

The XS2 module also indicates error status through the yellow/red blinking LED. This gives an immediate diagnosis as to the nature of the error that has occurred.

(A) Supply Voltage LED (green).

LED with green light ON indicates supply voltage is ON.

LED OFF indicates supply voltage is OFF.

(B) Status indicator LED (yellow/red).

LED yellow flashing light indicates status is correct.

LED flashing red light indicates error status as follows:

- One red primary flash and one secondary yellow flash indicates an error controlled by the master (MD3).
- Two red primary flashes in a row and one yellow secondary flash indicates an error controlled by the master (MD3).
- Three red primary flashes in a row and one yellow secondary flash indicates that the fault is related to the CAN-bus.
- Three red primary flashes in a row and two yellow secondary flashes in a row indicates that the fault is related to the address.
- Four red primary flashes in a row and one yellow secondary flash indicates a memory error.
- Continuous red primary flashing indicates a fatal error.

Internal diagnostics in the master (MD3) can be used to get more information about the XS2 module. The following values are supervised:

- Internal temperature (°C)
- Power supply (V)
- Reference voltage (V)
- CAN address voltage (V)

ADJUST

Allows access to adjustment groups. In addition to adjust groups normally accessible on screen additional adjust groups that require sufficient rights restricted by username and password login. Refer to IQANRUN 2 - ADJUST in this section for details.

MEASURE (GRAPH)

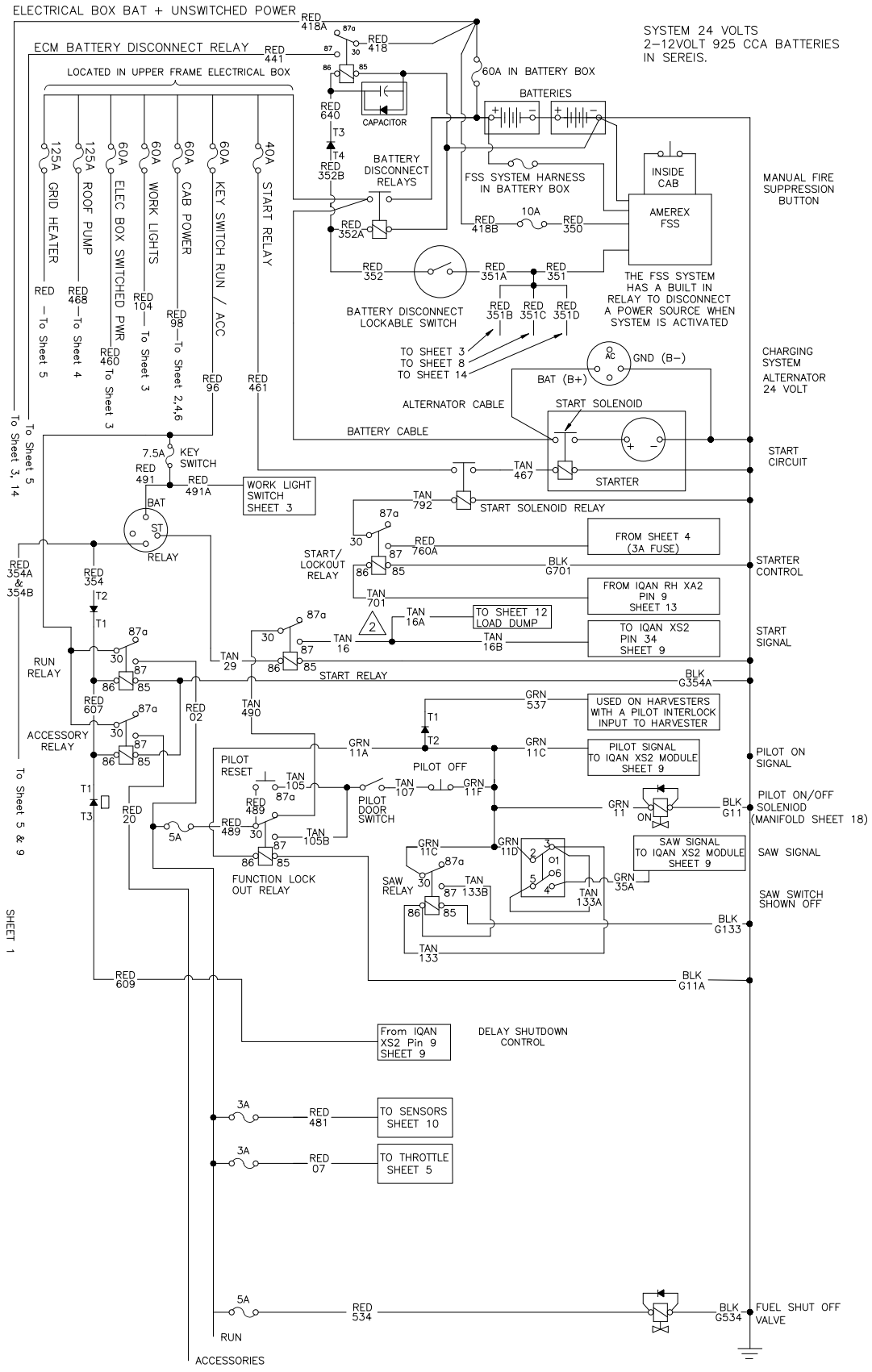
Allows the user record, graph and measure group channel readings during machine operation, testing or setup procedures. These recordings can be saved or printed. Refer to IQANRUN 2 - MEASURE (GRAPH) in this section for details.

LOGS

Allows the user to access to logs for service troubleshooting, maintenance documentation or clearing. Some log operations require sufficient rights to perform. Refer to IQANRUN 2 - LOGS in this section for details.

SYSTEM

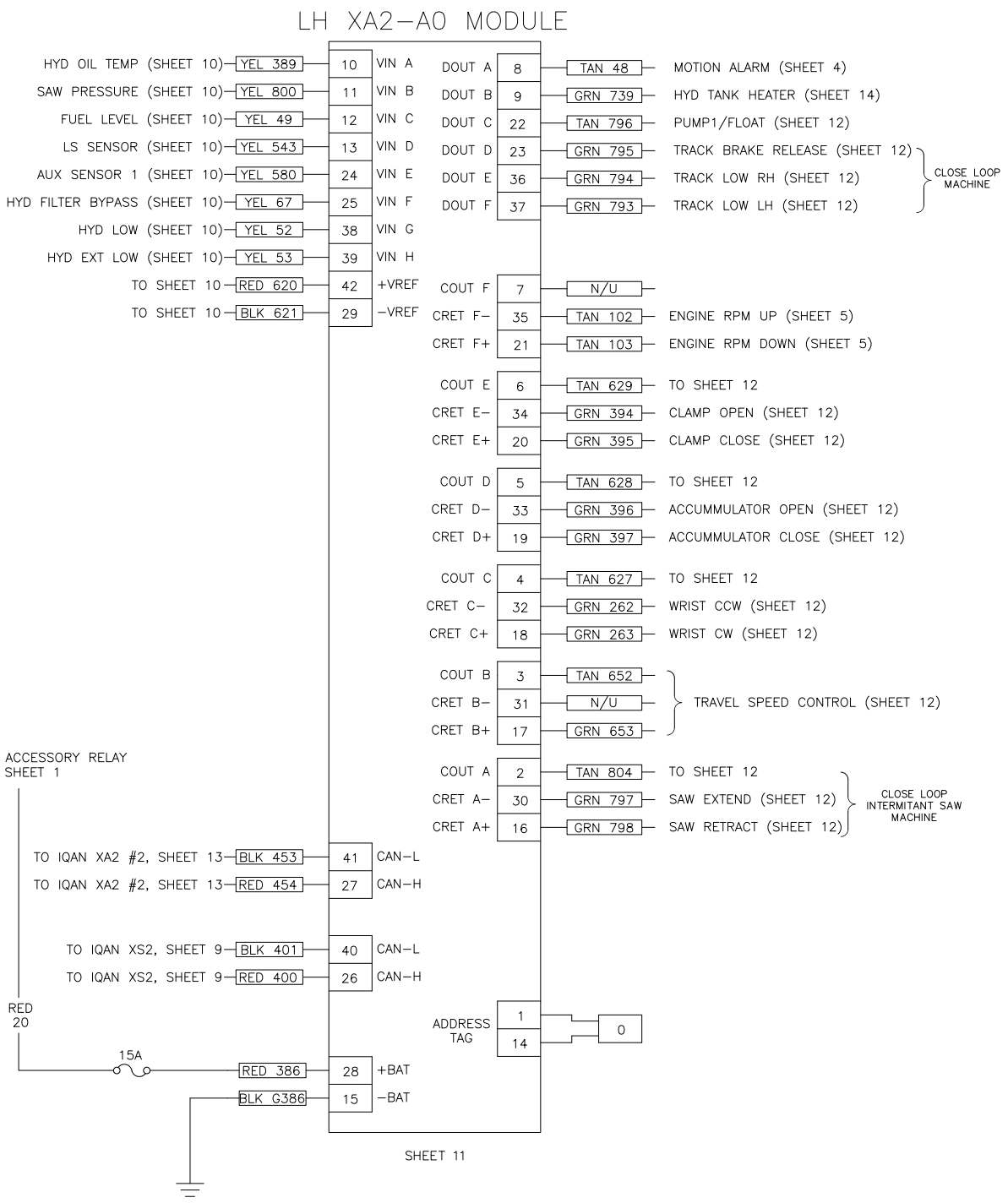
Allows the user to access system information including machine serial number information. Refer to IQANRUN 2 - SYSTEM in this section for details.



SHEET 1 OF 14

56600B S1

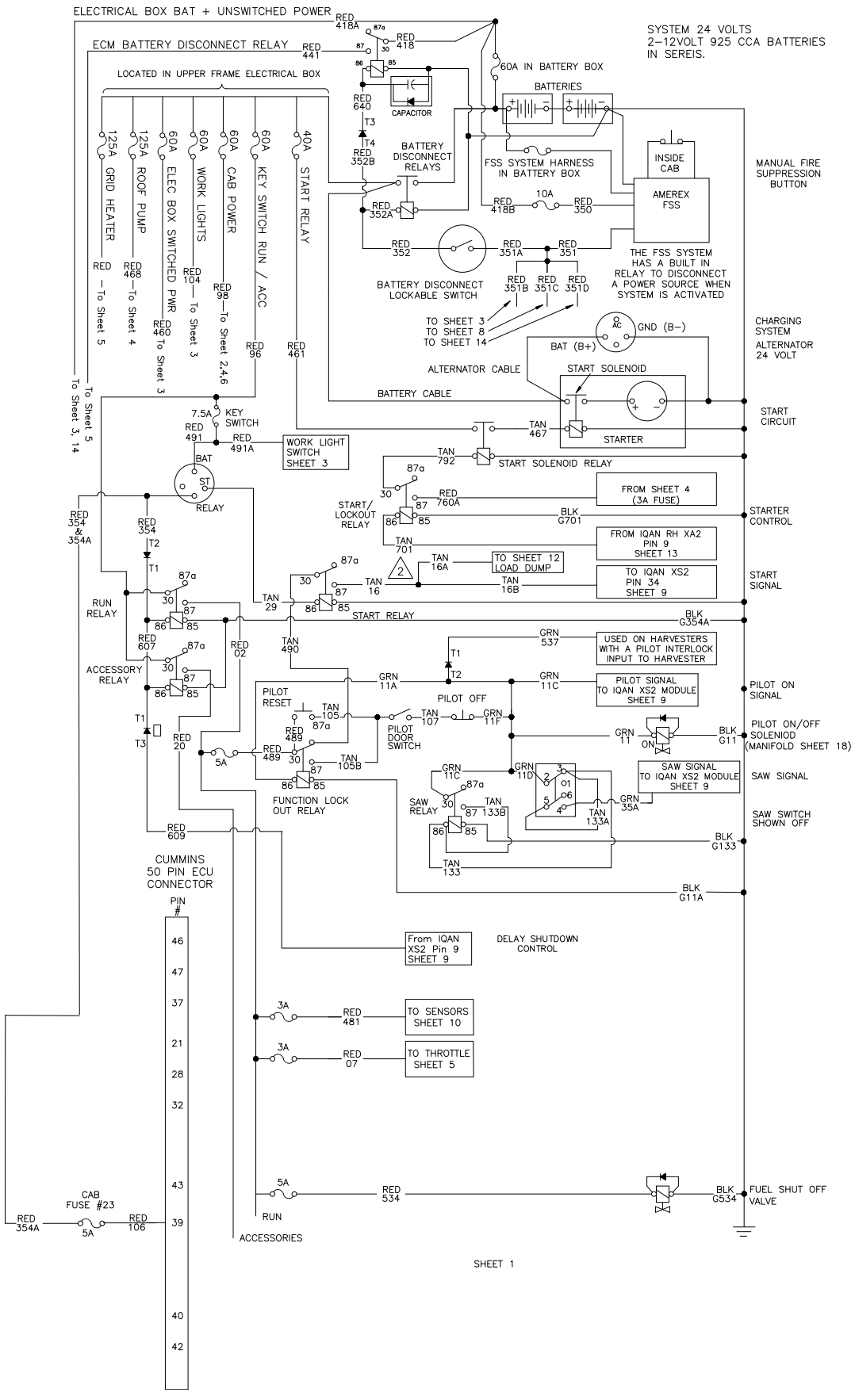
IGNITION SWITCH/START AND PILOT SCHEMATIC



SHEET 11 OF 14

56600B S11

LH XA2-A0 MODULE SCHEMATIC

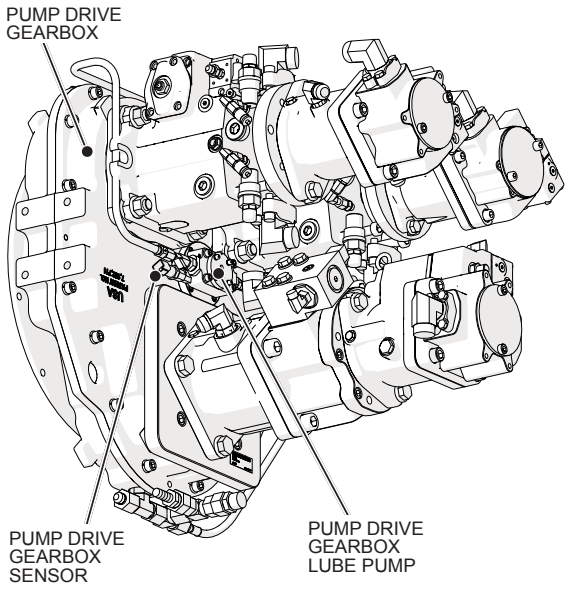


56600B S1A

IGNITION AND START CIRCUIT

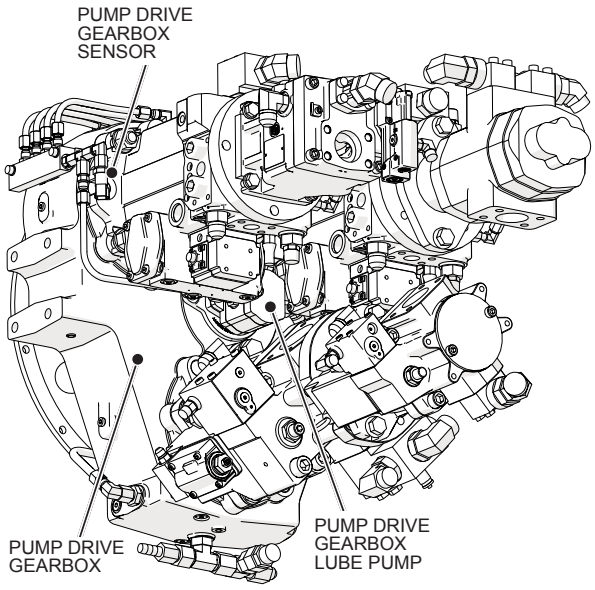
PUMP DRIVE GEARBOX

The pump drive gearbox mounted on the back of the engine drives the 6 hydraulic pumps. The internal components of the pump drive gearbox are lubricated via a lube pump that draws oil from the bottom of the gearbox and injects it back in, at the top of the gearbox. Mounted adjacent to the gearbox is the Pump Drive Gearbox Oil Reservoir and Oil Level Gauge.



PUMP DRIVE GEARBOX 8XX*2001 TO 8XX*2202

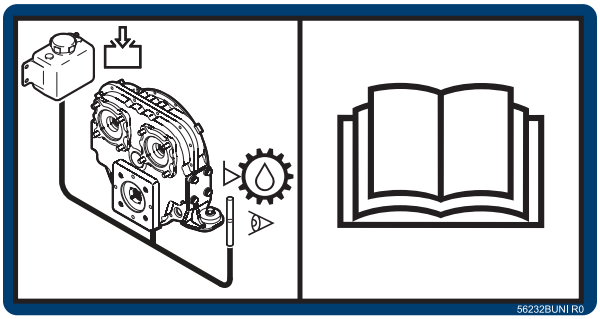
LX860C-148



PUMP DRIVE GEARBOX 8XX*2203 TO 8XX*3000

LX830C-071

PUMP DRIVE GEARBOX MAINTENANCE GUIDE



PUMP DRIVE GEARBOX OIL LEVEL GAUGE

It is very important to maintain the correct level of oil in the gearbox at all times. An oil level sight gauge is remote mounted to the side of the upper frame just below the accumulator. The oil level must be checked ONLY when the machine is on level ground and the oil is HOT. Always wait at least 5 minutes after stopping the engine before checking the oil level. Do not overfill as this can cause the gearbox to overheat.

If adding oil to the reservoir ensure that the oil level in the gauge moves up as the oil is added. If the level fails to move check the vent at the top of the tube for blockage.

MAIN PUMP

For operation and adjustment of this pump refer to SECTION 4 of this manual.

MAIN CONTROL VALVE

For operation and description of this valve refer to SECTION 4 of this manual

OIL COOLER CIRCUIT DESCRIPTION

The oil cooler circuit operates as a part of the main hydraulic circuit.

The main pump draws oil from the hydraulic tank and sends it to the main control valve. Return oil from the main control valve sections exits the base manifold at two 'T' ports and 5.1 bar (75 psi) internal check valves. From the bottom port, the oil passes through the oil cooler via the oil cooler bypass return manifold, which includes a 100 psi bypass valve for the oil cooler. From the top port the oil returns directly to the return manifold via a 120 psi check valve.

The cooler bypass ensures that the differential pressure between the oil cooler inlet and outlet does not exceed set limits. Increases in pressure within the oil cooler can occur in cold weather when oil temperatures at start-up are very low.

Cooling of the oil occurs as air is drawn over the oil cooler cooling fins by the cooling fan. Cooled oil then passes back through the cooler bypass valve and on to the return manifold and return filters and then to the hydraulic tank. A (1.7 bar) 25 psi bypass valve is incorporated into each pair of return filter heads.

Oil entering the hydraulic tank from the return manifold and filters passes through 3 strainers situated inside the tank below the oil surface.

Refer to HYDRAULIC OIL TANK in SECTION 4 of this MANUAL. Refer also to SECTION 2 and SECTION 3 of the OPERATOR'S MANUAL.

Refer to HYDRAULIC SYSTEM OPERATION - MAIN HYDRAULIC SYSTEM in SECTION 4 of this manual.

ELECTRONIC ADJUSTMENT PROCEDURE

When the fan switch is in the Auto position the fan will reverse direction automatically to purge the radiator and screens. The frequency of the direction change or purge interval is adjustable on the MD3 controller.

TIME PURGE INTERVAL ADJUSTMENT

Press the menu button to go to the MAIN MENU.

Press F1 to access the Adjust menu.

Using the up or down arrow buttons scroll to the Machine Parameters menu and press OK.

Use the up arrow or down arrow buttons to scroll to Time Purge Interval and press OK.

HYDROSTATIC DRIVE MOTOR

The hydrostatic drive motor is a variable displacement, bent-axis, axial piston type motor.

High pressure oil, from the hydrostatic pump, enters the motor via port A or port B, depending on the direction of travel required. This oil is then directed to a set of pistons inside the motor rotating group cylinder housing. These pistons push against the back of the output shaft at an angle, causing the shaft to rotate.

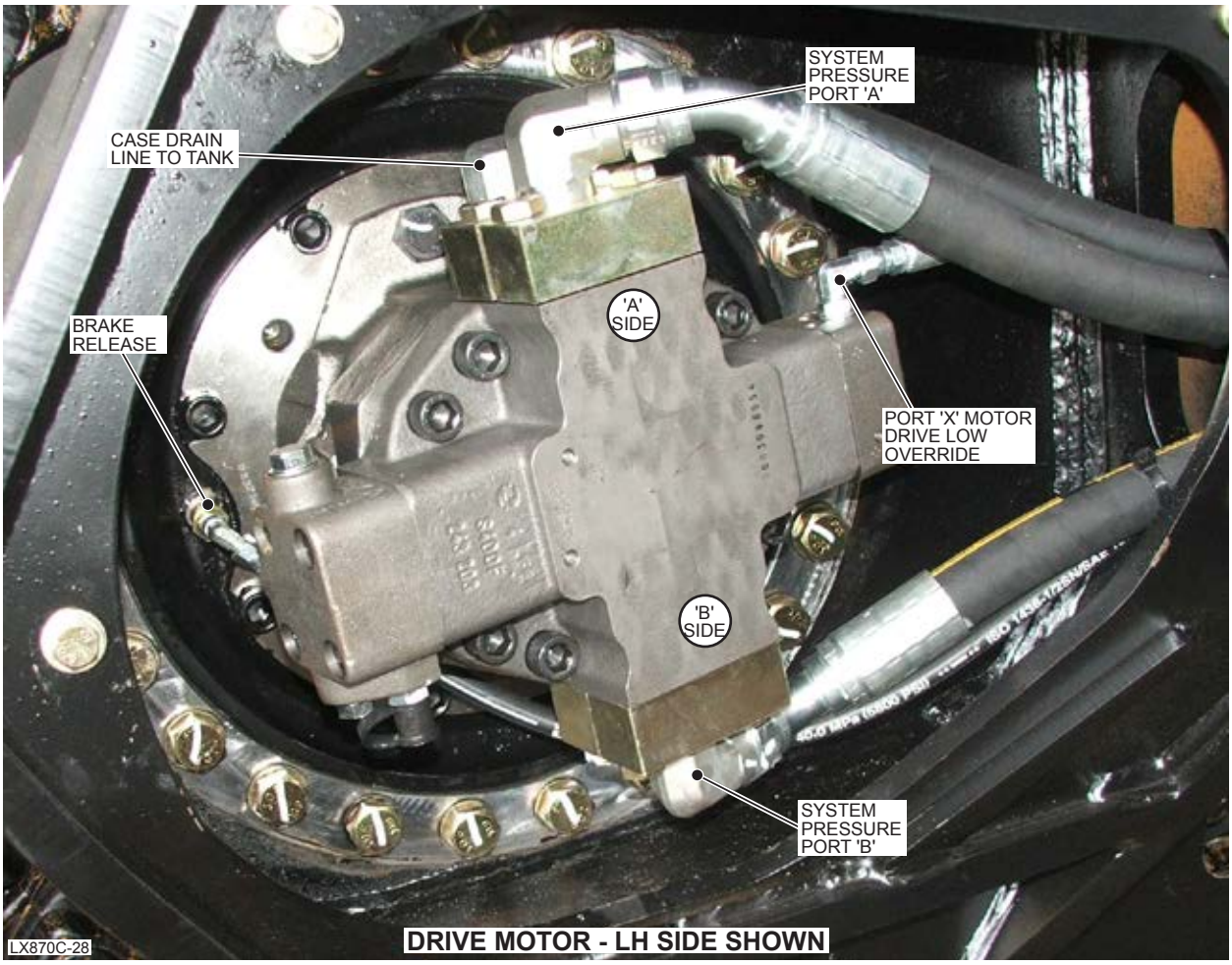
The piston motor is made variable by changing the angle of the motor rotating group cylinder housing relative to the end of the output shaft. This angle determines the size or displacement of the motor. The displacement determines the output speed and torque of the motor. Increasing the displacement, increases the torque output while reducing the output speed of the motor. Reducing the displacement reduces the torque and increases the speed.

The displacement of the motor is changed by an internal control cylinder which receives high pressure oil from the *begin of stroke* valve. The hydrostatic drive motor normally stays at the smallest displacement in order to drive the machine as fast as possible.

Only when the pressure in the high pressure side of the closed loop exceeds the *begin of stroke* preset level does the displacement of the motor begin to increase.

As the motor displacement automatically increases, the machine speed automatically slows but the motor is able to drive the machine up steeper slopes and to travel on rougher or wetter terrain. As the pressure in the high pressure side of the closed loop falls below the *begin of stroke* pressure, the motor displacement automatically returns to the smallest displacement and the machine speeds up.

A flushing valve is incorporated into the hydrostatic drive motor to provide a regulated flow of oil from the low pressure side of the closed loop into the motor case. This flow reduces the possibility of the buildup of contamination particles within the closed loop by providing a continuous change of oil. The flushing valve oil also assists in cooling of the hydrostatic drive motor. The flushing valve flow is fixed and no adjustment is required.



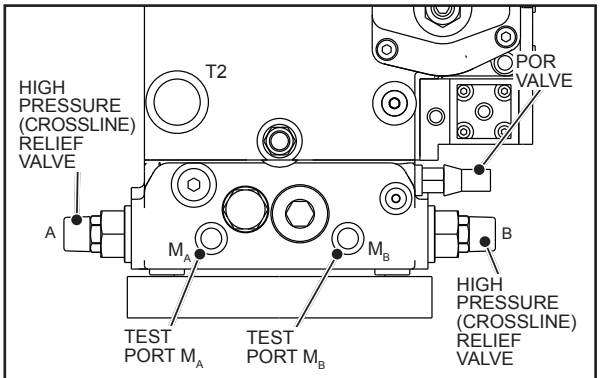
DRIVE MOTOR - LH SIDE SHOWN

TRACK DRIVE PRESSURE AND SPEED SETTINGS

DRIVE PUMP HIGH PRESSURE RELIEF VALVES

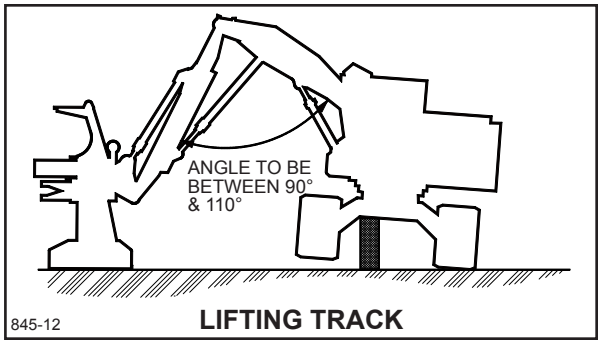
IMPORTANT!
Park the machine on flat solid ground and place the felling head securely on the ground before performing any service work.

1. Raise the hydraulic oil temperature to no higher than **40°C (100°F).**
   NOTE: DO NOT heat to operating temperature prior to starting this procedure, significant heating will occur during this test. Constantly monitor hydraulic oil temperature during this test procedure.



DRIVE PUMP

2. Connect two 0-700 Bar (0-10000 psi) pressure gauges to test ports **Mb and Ma** on the left track drive pump.
3. Start engine and set throttle to IDLE.
4. Position the felling head in the vertical position and swing the boom to the LEFT side of the machine.
5. Place the felling head on the ground and lift the track clear of ground by forcing down with the boom controls (hoist down and stick out).

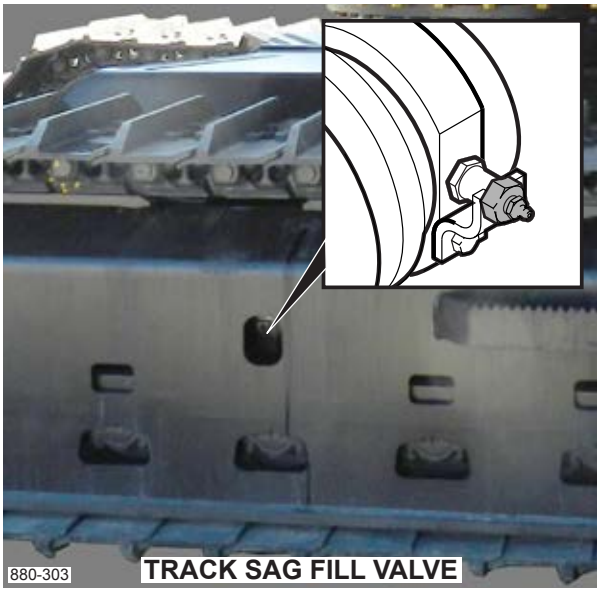


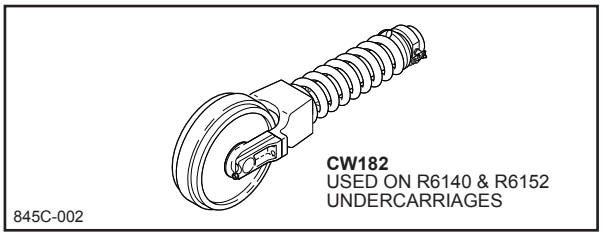
LIFTING TRACK

6. Use blocks to firmly support the track frame in the raised position. DO NOT place your arms, legs or body under the track while in the raised position.
7. From inside the cab close and latch the front door and press the PILOT RESET switch to activate pilot system.

8. Fully depress the left track foot pedal and at the same time use the down arrow on the MD3 screen to adjust the track speed so the track is just moving.

NOTE: Do not turn the key off until instructed. If the key is turned off the track speed control automatically reverts back to maximum. If for any reason the key is turned off prior to completing the tests this step will need to be repeated.





TRACK SAG ADJUSTMENT

To tighten the track, use a grease gun and add grease at the fill valve. Add grease until the track sag dimension is within recommended limits. Refer to MEASURING TRACK SAG in THIS SECTION for recommended limits.

To loosen the track, slowly loosen the fill valve until grease begins to escape through the vent passage in the valve body housing. Grease will vent around the valve body threads. Remove grease until the track sag dimension is within recommended limits. Refer to MEASURING TRACK SAG in THIS SECTION for recommended limits.

NOTE: The track sag fill valve is mechanically restricted from being removed completely.

Tigercat X822C/LX822C/X830C/LX830C Feller Buncher

SECTION 12 - BOOM FUNCTIONS

CONTENTS - SECTION 12

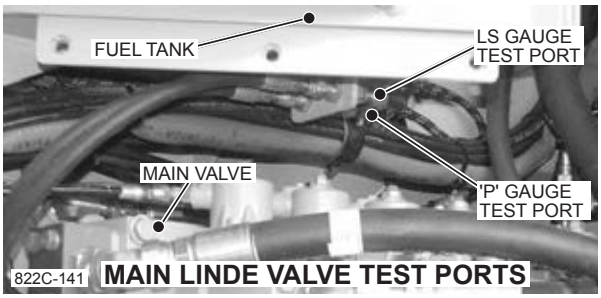
ISSUE 1.0, DECEMBER 2015

TILT CYLINDER (ROD END) FLOW AND SPEED ADJUSTMENT

This adjusting screw restricts the flow of oil leaving the rod end of the TILT cylinder when tilting FORWARD.

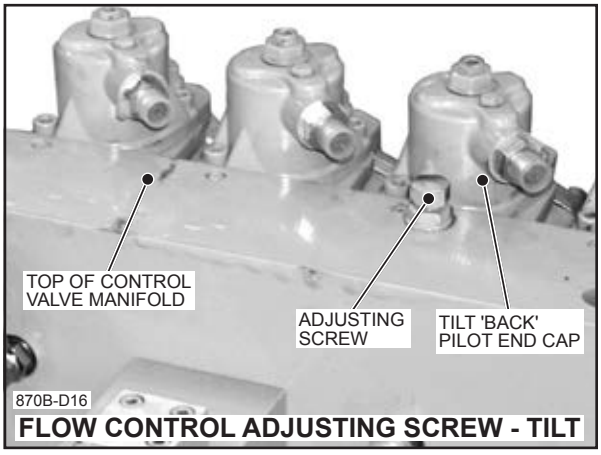
When correctly set, this restriction will prevent cylinder damage.

1. Ensure the hydraulic oil is at operating temperature.



MAIN LINDE VALVE TEST PORTS

2. Connect a 0-345 Bar (0-5000 psi) pressure gauge on the main valve manifold 'P' test port.
3. Start the engine and place the throttle control in the FULL position.
4. From inside the cab, close and latch the front door and press the PILOT RESET switch to activate the pilot system.
5. Place the ANTI-STALL switch in the OFF position.
6. Raise the boom and place the felling head in the fully TILT BACK position (cylinder fully retracted).



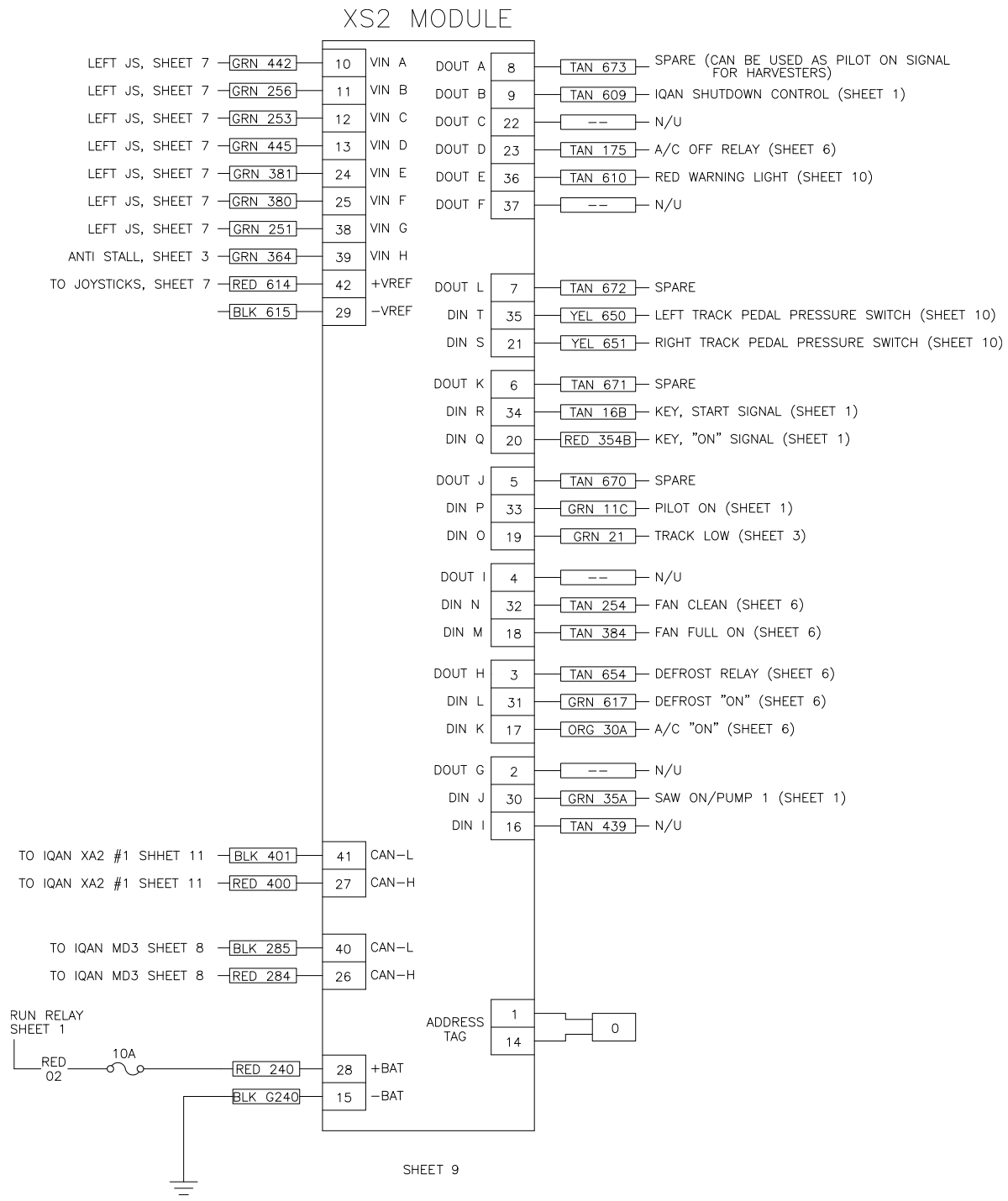
FLOW CONTROL ADJUSTING SCREW - TILT

7. Loosen the locknut on the restriction adjustment screw. While holding the joystick in the fully TILT FORWARD position, observe the pressure gauge and record the TILT travel speed from stop to stop**. Turn the restriction adjustment screw to adjust the speed and turn the spool travel stop adjustment screw on the main control valve to maintain 55-70 bar (800-1000 psi) pump pressure.

   If the TILT speed is too fast, turn the restriction adjustment screw IN. If the TILT speed is too slow, turn the restriction adjustment screw OUT.

   If the pump pressure reading is too low, increase the flow by turning the TILT spool travel stop adjusting screw (bottom adjuster) OUT. If the pump pressure is too high, decrease the flow by turning the adjusting screw IN.

   NOTE: The Tilt restriction and (to a lesser extent) the spool travel stop adjustment both affect the TILT forward speed. Similarly, the TILT restrictor has a small affect on the pump pressure. Alternate between adjustments making moderate changes until the desired speed and pressure ranges are achieved.
8. Tighten the locknut on the restriction adjustment screw taking care NOT to turn the adjusting screw at the same time.
9. Check the pressures again after tightening the locknut.
10. Turn OFF the engine and remove the gauge.



56600B S9

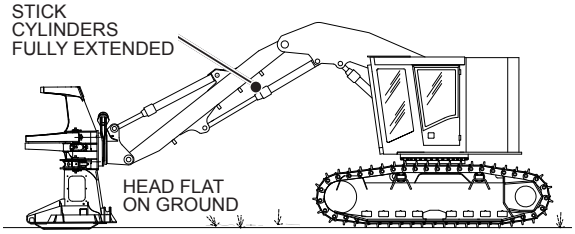
XS2 CAB MODULE ELECTRICAL SCHEMATIC

CHECK PORT RELIEF VALVES

DANGER

Extreme care and attention must be exercised when making adjustments to the leveling hydraulic and electrical circuits. Ensure that all personnel not directly associated with the servicing are well clear of the machine.
The whole upper frame/cab/engine compartment, boom and attachment can tilt unexpectedly from side to side or forward and backwards during servicing, creating *pinch points* between the upper frame and track and the ground.

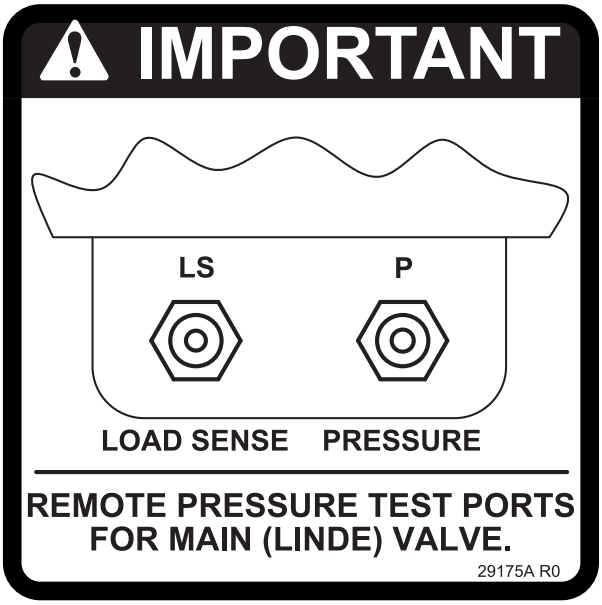
1. Ensure hydraulic oil is at operating temperature.



SERVICE POSITION

2. Park the machine on level ground. Lower the attachment to the ground.
3. Engage the swing brake.
4. Turn the engine OFF.

5. Turn the battery disconnect switch OFF.
6. Install the leveling cylinder support brace to prevent tilting of the upper frame during this procedure.
7. Remove the access plate under the main valve to access the LS relief valve adjustment.
8. Turn the battery disconnect switch on.



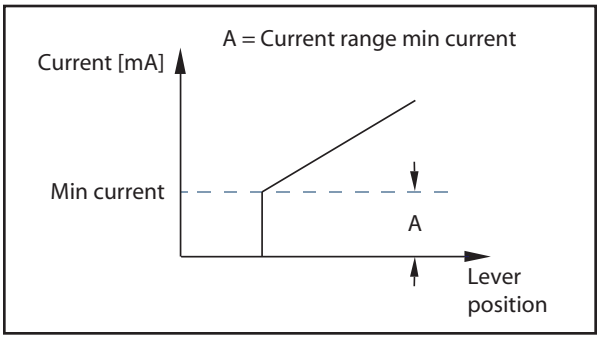
9. Connect a 0-350 Bar/0-5000 psi pressure gauge to the remote 'P' test port located under the track low valve in the hydraulic tank compartment.
10. Start the engine and set the throttle speed to the IDLE position.

    NOTE: It may be necessary to increase the engine RPM sufficiently to prevent the engine from stalling.
11. Close the cab door.
12. Press the PILOT RESET switch to activate the pilot system.
13. Place the anti-stall switch in the OFF position.

LEVELER ADJUSTMENT SETTINGS

These settings (defined below) fine tune the operating speeds, start/stop ramps and cylinder tracking for the leveler functions.

MIN = MINIMUM CURRENT (mA)

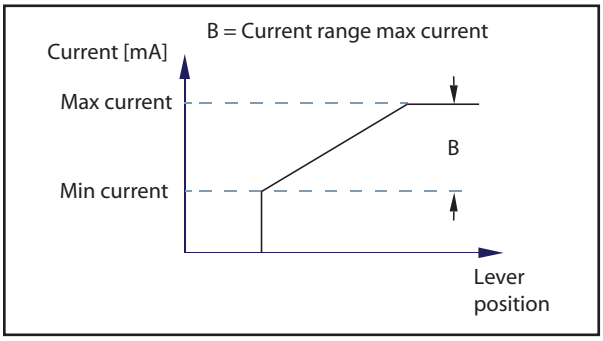


Minimum current settings control function start speed. Coils on hydraulic valves require a certain amount of current before they begin to operate the valve. The Min current value is the current that will be sent to the hydraulic valve coil when the function switch is activated.

The Min current is adjusted to a value that causes the function to just begin to creep.

NOTE: Use the default setting of 300 mA when setting the Min Current.

MAX = MAXIMUM CURRENT (mA)



Maximum current settings control the maximum speed the function will operate at. Increasing this value will increase the travel speed of the cylinder.

NOTE: The mA +(extend) and mA- (retract) settings for the left and right cylinders need to be set separately to avoid tracking (one cylinder extending or retracting faster then the other).

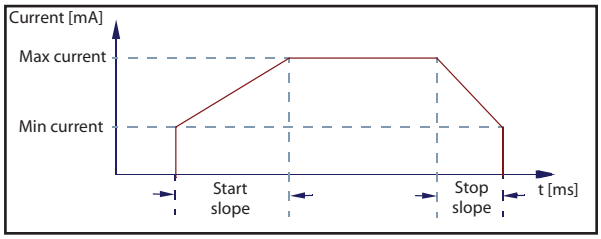
START RAMP

This is the amount of time in mS that it takes for the current to get from the Min Current value to the Max Current when turning on a function. A higher setting will cause a delay in the time that it takes the function to reach top speed. Note that if the mS setting is set to 0ms then the min current setting is negated as the function will start at max current as soon as it is turned on.

STOP RAMP

This is the amount of time in mS that it takes for the current to get from the Max Current to the Min current when turning off a function. A higher setting will cause a delay in the time that it takes for the function to come to a stop from top speed. Note that if the mS setting is set at 0mS then the min current setting is negated and the function would stop as soon as it is turned off.

Below is a typical graph showing the four settings.



NOTE: The start and stop ramps adjust both the left and right cylinders to the same value.

FORWARD LEVELING SPEED

This adjusts both the left and right cylinder speeds proportionally to their respective Max mA+(cylinder extend) settings.

REAR LEVELING SPEED

This adjusts the left and right cylinder speeds proportionally to their respective Max mA-(cylinder retract) settings.

Tigercat X822C/LX822C/X830C/LX830C Feller Buncher
SECTION 15 – SWING

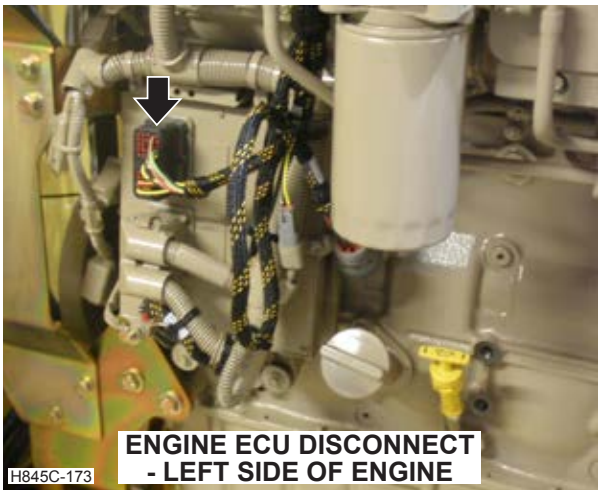
CONTENTS - SECTION 15

ISSUE 1.0, DECEMBER 2015

PREFILLING SWING MOTOR

When the swing motor has been removed and replaced for service, it is important to prefill it with hydraulic oil prior to starting the engine.

1. After replacing the motor and the hose is reconnected, refill the hydraulic tank.



2. Disconnect the multi-pin plug from the engine ECU to prevent engine starting.

3. To help purge air from the system, loosen the hose connection for the swing motor case drain return on the motor.
4. Crank the engine over for 5 to 10 seconds, stop cranking, wait 20 seconds then crank engine over again for 5 to 10 seconds.
5. Have an assistant watch for oil to flow from the case drain return hose. Once oil free of air is seen, stop cranking engine and tighten hose connection.
6. Install the multi-pin plug on the engine ECU.
7. Clean up any spilled oil.
8. Start engine and set engine speed to **IDLE.** Very gently operate swing system five times in each direction.

Tigercat X822C/LX822C/X830C/LX830C Feller Buncher
SECTION 17 - SAW DRIVE

CONTENTS - SECTION 18

ISSUE 1.0, DECEMBER 2015

SET MOTOR BEGIN OF REGULATION TO 221 BAR (3200 PSI)

Refer to the felling attachment manufacturer's service literature for this procedure.

IMPORTANT!
The motor begin of regulation setting must be at least 27.6 Bar/400 psi. lower than the pump P.O.R. setting.

SET MOTOR MINIMUM DISPLACEMENT

Refer to the felling attachment manufacturer's service literature for this procedure.

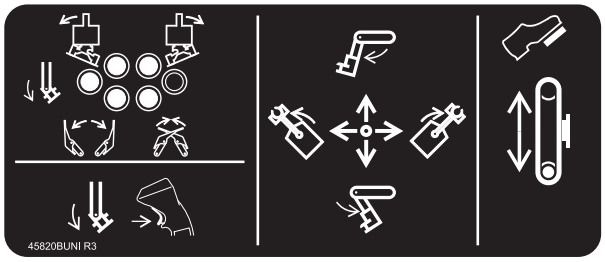
Tigercat X822C/LX822C/X830C/LX830C Feller Buncher
SECTION 18 - WRIST AND CLAMPS

CONTENTS - SECTION 18

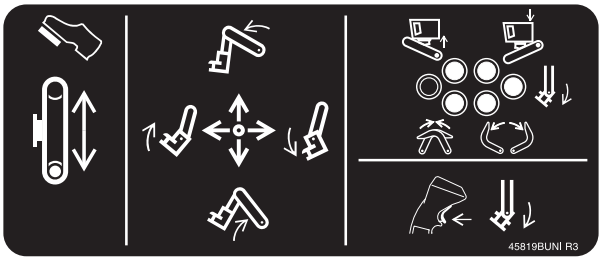
ISSUE 1.0, DECEMBER 2015

JOYSTICK CONTROLS

The factory installed left (1) and right (2) joysticks are equipped with thumb switches and finger buttons that are used as an operator interface with the electronic control system to activate the clamp arm, accumulator arm and wrist functions. Refer also to JOYSTICK in SECTION 2 of the OPERATOR'S MANUAL for a complete description of factory equipped joystick control function.

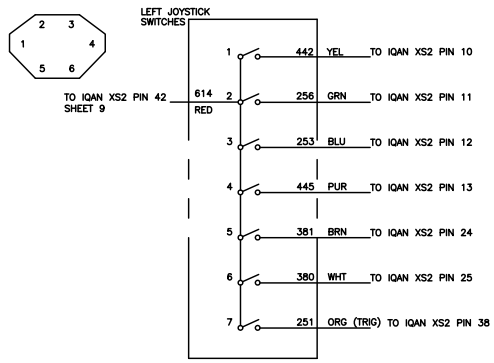


LEFT JOYSTICK

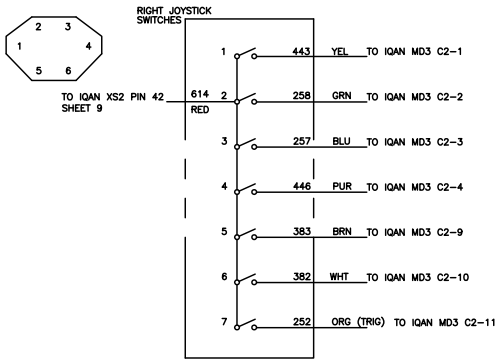


RIGHT JOYSTICK

STANDARD TIGERCAT 6 BUTTON JOYSTICKS : NOT APPLICABLE FOR ALL MACHINES



1. Wrist CCW
2. Level Left (if equipped)
3. Level Right (if equipped)
4. Not Used
5. Accumulator Arm Open
6. Accumulator Arm Close
7. Wrist CCW



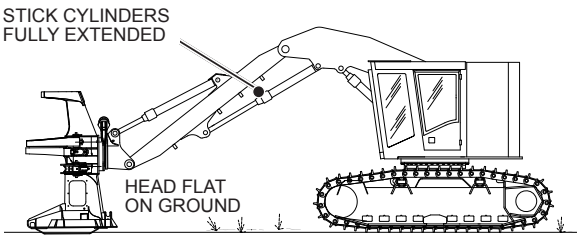
1. Not Used
2. Level Forward (if equipped)
3. Level Back (if equipped)
4. Wrist CW
5. Clamp Arm Close
6. Clamp Arm Open
7. Wrist CW

860C-483 **JOYSTICK ELECTRICAL SCHEMATIC (FACTORY INSTALLATION SHOWN)**

CHECKING CLAMPS/WRIST PRESSURES

WARNING

Accumulator and clamp arms open and close very rapidly. The felling head will also be rotated side to side during this procedure. Operator must ensure that no one is near the felling head during these procedures.



830-07 **SERVICE POSITION**

WARNING

Position the felling head on the ground during this procedure except when checking the wrist port relief valves. The swing brake should be applied at all times during this procedure.

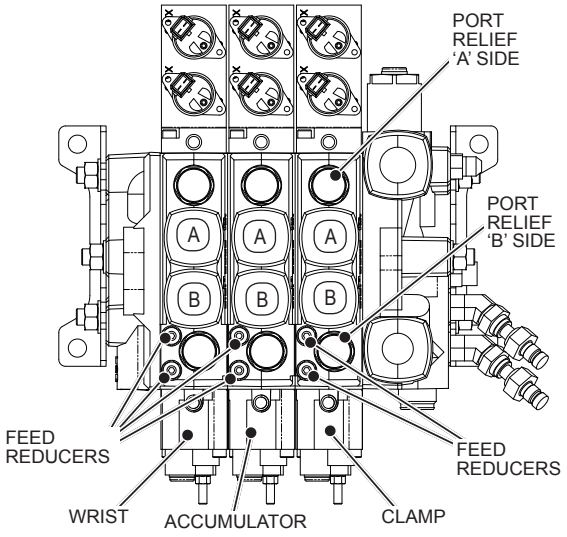
NOTE: The relief valves are cartridge type reliefs and are not adjustable. If the observed pressures are not within 3.5 bar (50 psi) of the specified pressure the cartridge will require replacement.

1. Ensure the hydraulic oil is at operating temperature.
2. Park the machine on level ground with the attachment resting firmly on the ground.
3. Apply the swing brake.
4. Turn OFF the engine.
5. Remove the ignition key.
6. Turn OFF the battery disconnect switch.
7. Connect a 0-350 bar (0 - 5,000 psi) pressure gauge to the attachment control valve 'PX' test port.
8. Turn ON the battery disconnect switch.
9. Check that all personnel are clear of the machine before starting the engine.
10. Insert the ignition key and turn to the ON position.
11. Sound horn to warn personnel of machine start up.
12. From inside the cab, close and latch the cab door.
13. Turn the engine ON and set throttle to HIGH IDLE.

CLAMP ARM

WARNING

The following adjustments are made with the engine running. Take extreme care to keep away from moving parts and hot surfaces.



860C-408 **ATTACHMENT VALVE**

1. Loosen the lock nuts on the clamp feed reducer screws.
2. Turn the feed reducer screws clockwise (IN) all the way.
3. Tighten the lock nuts.

Using the up or down arrow buttons adjust the -(CCW) Wrist Start setting. Adjustment of this setting (along with the - CCW Min setting) will determine how the Wrist will start in the CCW direction. Increasing this setting will result in a less aggressive start while decreasing the setting will result in a more aggressive start. Once the setting has been adjusted press OK.

Using the up arrow or down arrow buttons adjust the -(CCW) Wrist Stop setting. Adjustment of this setting (along with the - CCW Min setting) will determine how the wrist stops in the CCW direction. Increasing this setting will result in a less aggressive stop while decreasing the setting will result in a more aggressive stop. Once the setting has been adjusted press OK. The CCW wrist adjustment is now complete.