Tigercat®

X870C/LX870C FELLER BUNCHER

SERVICE MANUAL

SERIAL NUMBER 87062101 TO 87062499
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Tigercat Industries Inc.
P.O. Box 637
Brantford, Ontario
Canada N3T 5P9
Tel: (519) 753-2000
Fax: (519) 753-8272

SAFETY SYMBOLS

This safety alert symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

The safety alert symbol identifies important safety messages on machines, safety signs, in manuals, or elsewhere. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Understanding Signal Words

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.+

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

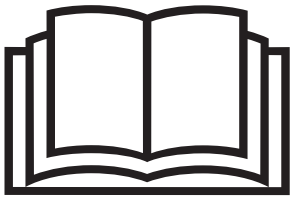
GENERAL SAFETY PRECAUTIONS

IMPORTANT
24 VOLT ELECTRICAL SYSTEM

Remember that safety is a prime responsibility of all.

To minimize the risks and promote safety at all times, this section of the Operator's manual details a number of safety rules which should always be followed and obeyed.

Always read the Operator's manual before operating the machine. Pay close attention to WARNINGS and HAZARD identifications.

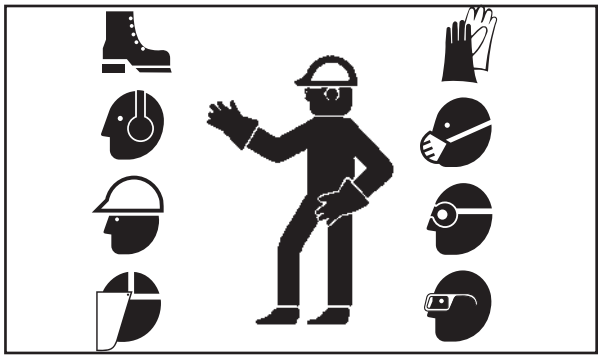


Follow all instructions from safety inspector and supervisors.

You must be fully trained to operate this piece of equipment. Know the capabilities and the limitations of the equipment. Learn the most efficient operating techniques.

Do not let untrained persons operate the machine.

Use recommended protective clothing and safety devices such as gloves, safety boots, safety hat, goggles, and ear protection when necessary.



These safety rules highlight both general and specific measures that the operator should be familiar with and adhere to. More specific measures are illustrated with pictograms which may also be attached to the machine in locations pertinent to their respective message. Keep safety labels in good condition. Repair or replace damaged labels.

OPERATING SAFETY PRECAUTIONS continued

FELLING TREES

Pieces of wood, debris from the ground and even teeth separating from the saw blade become potentially dangerous missiles when thrown from these machines.

Inspect the saw teeth, the tooth retaining bolts, the saw disc and the felling head assembly.

Ensure that all the saw tooth retaining bolts are at the correct torque value. Refer to the Attachment manual for correct values.

Replace all worn saw teeth or rotate worn teeth to align unused cutting tips.

Always replace the retaining bolts when replacing saw teeth.

Inspect the saw disc for stress cracks and that the saw disc does not wobble due to worn saw shaft bearings.

Never start the machine if the saw blade has missing teeth, teeth retaining bolts or a bent saw disc.

Shut down the machine immediately if vibration occurs during cutting.

Check that the saw discharge area is clear and undamaged.

When moving from tree to tree with the saw blade turning, take care not to make contact with other vegetation or debris.

Do not overload the felling head.

Work within your operating skills and do not attempt to cut down a tree that is too large for the felling head.

Make sure the chip discharge area of the felling head (where applicable) is not directed at people, livestock, buildings or other machines.

Properly position the felling head in front of the tree and make sure the saw blade is running at full rpm when cutting.

Always know and control the direction the tree will fall to prevent injury to co-workers or damage other vehicles.

Watch out for obstacles in your path when backing away from a cut.

Always travel with the felling head as close to the ground as possible. Never elevate the felling head unless necessary.

⚠ WARNING

DO NOT operate this machine to lift or move any objects other than what it is designed to lift or move.

The boom system is intended for use in tree felling applications only.

- **Do not use the boom to service other equipment.**
- **Do not use the boom to lift items such as tires, engines, cylinders, boom components, etc.**
- **Do not modify the boom system.**
- **Do not add hooks or lugs to the boom for the purpose of attaching lifting rigging.**
- **Do not use the attachment for any purpose other than the intended felling function.**

Maintain a safe operating distance between the machine, the workers and all other personnel. It is the duty of the operator to ensure that no person approach the machine while in use.

Failure to follow the above instructions could result in serious injury or death.

Never use this machine to clear a logging deck on a new tract of timber when the rest of the equipment and operators are also moving in. Pre-plan to clear decks in advance before other equipment arrives.

Never work alone. Regularly inform other crew members of your intentions, location and length of time to perform duties.

Stop the saw blade before leaving the cutting area.

NOTE: The saw blade will continue to free wheel for several minutes after the saw switch has been turned OFF.

To stop the blade from rotating, CAREFULLY and gently lower the saw blade onto a stump to prevent unnecessary loading of the saw blade, saw housing and bearings.

LIGHTNING SAFETY AWARENESS continued

Unfortunately loggers do not often work close to buildings and therefore other alternatives need to be considered.

Sheds, weather shelters, hunting blinds, tents and other partially open or small structures are not safe against lightning strikes as they lack the electrically grounded components of larger buildings. They are intended for sun or rain protection only. Do not seek shelter from lightning strikes inside these structures.

The second safest location during lightning activity is inside a fully enclosed car, van, truck or bus with a metal roof and metal sides. The electrical energy of a lightning strike to these vehicles is carried to ground by the conducting outer metal surfaces. This is called the skin effect.

Do not seek safety from lightning strikes in vehicles with fiberglass or plastic body shells or in convertible top vehicles. None of these are safe, as they do not offer skin effect lightning protection.

Heavy forestry equipment such as a skidder, loader, feller buncher, forwarder, etc., with a fully enclosed rollover protective structure (ROPS) cab take advantage of the skin effect and are therefore safe in electrical storms.

However, machines with a rollover canopy only, are not safe against lightning strikes as they are open to electrically conductive rainwater and do not benefit from the skin effect. Operators of this equipment must abandon their machines and get to a safer location before lightning strikes.

Note that the rubber tires on motor vehicles and heavy equipment do not increase safety from lightning strikes. Lightning has already travelled a great distance through the air to strike the vehicle. In comparison a few inches of rubber in a tire offers absolutely no additional insulation.

WHAT TO DO IF YOU ARE OUTSIDE AND SEE LIGHTNING OR HEAR THUNDER.

If you can, get inside.

1. Run to the nearest building, motor vehicle or fully enclosed ROPS equipment cab immediately. Being anywhere outside is not safe.
2. If inside a building:
   - Don’t watch the lightning storm from open windows or doorways. Stay in inner rooms.
   - Stay well away from corded telephones, electrical appliances, lighting fixtures, radio microphones, electrical sockets and plumbing pipes and fixtures.
3. If inside a motor vehicle or fully enclosed ROPS equipment cab:
   - Under no circumstances whatsoever step outside of the vehicle or off the equipment to move to another shelter. Very dangerous electrical pathways to ground may go through you.
   - Shut down all operation, turn off the engine, close all doors and raise all windows.
   - Sit squarely in the seat with your hands in your lap and your feet flat on the floor mat.
   - Do not touch any metallic objects referenced to the outside of the vehicle. Do not touch any door and window handles, control levers, foot pedals, steering wheels, cab interior walls and any other inside to outside metal objects.
   - Do not touch any radio or telephone connected to an outside antenna.

DANGER

USING HIGH-SPEED DISC SAWS SAFELY

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.

CONTENTS

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Comments and Instructions cont.

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.

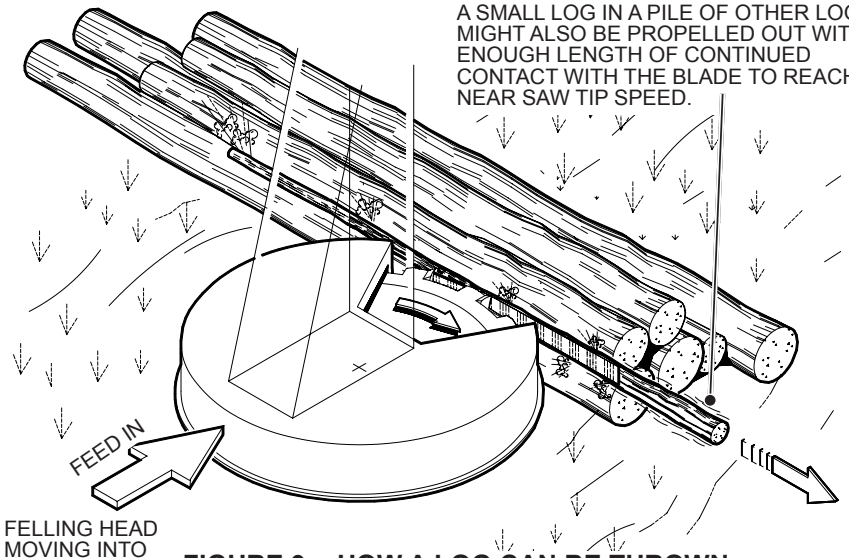


FIGURE 9a: HOW A LOG CAN BE THROWN LIKE A SPEAR

SAW HOUSING WITHOUT SNOUTS AND BLADE TEETH PROTRUDE AHEAD OF THE HOUSING.

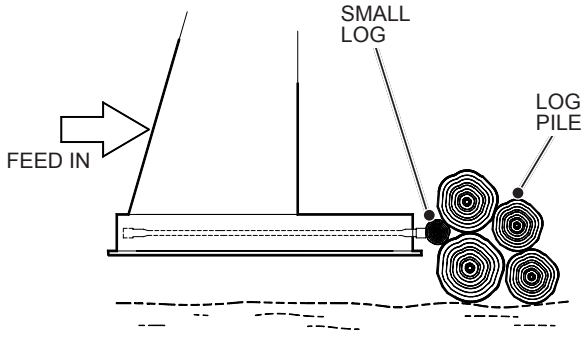


FIGURE 9b SIDE VIEW

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

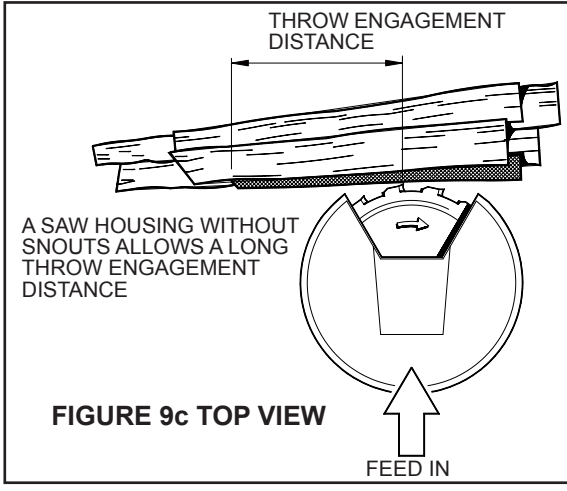


FIGURE 9c TOP VIEW

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 forms in their entirety, prior to taking any oil samples. Then, immediately package each completed SIF form 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 forms and oil samples. Incorrectly identified samples could result in a false warning alarm.

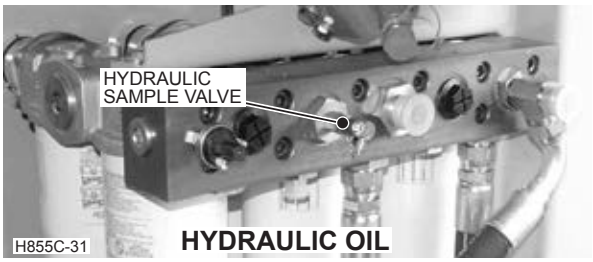
The accuracy of the lab analysis results is very dependent on the quality of the oil sample taken. Collection of clean oil samples that are representative of the main body of oil are essential if meaningful lab results are to be obtained. Erroneous readings may result if proper collection, handling, 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:

- Whenever possible, 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.
- To obtain a representative oil sample, sample valves must be purged before the actual oil sample is taken. Drain a minimum of 3 or 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.

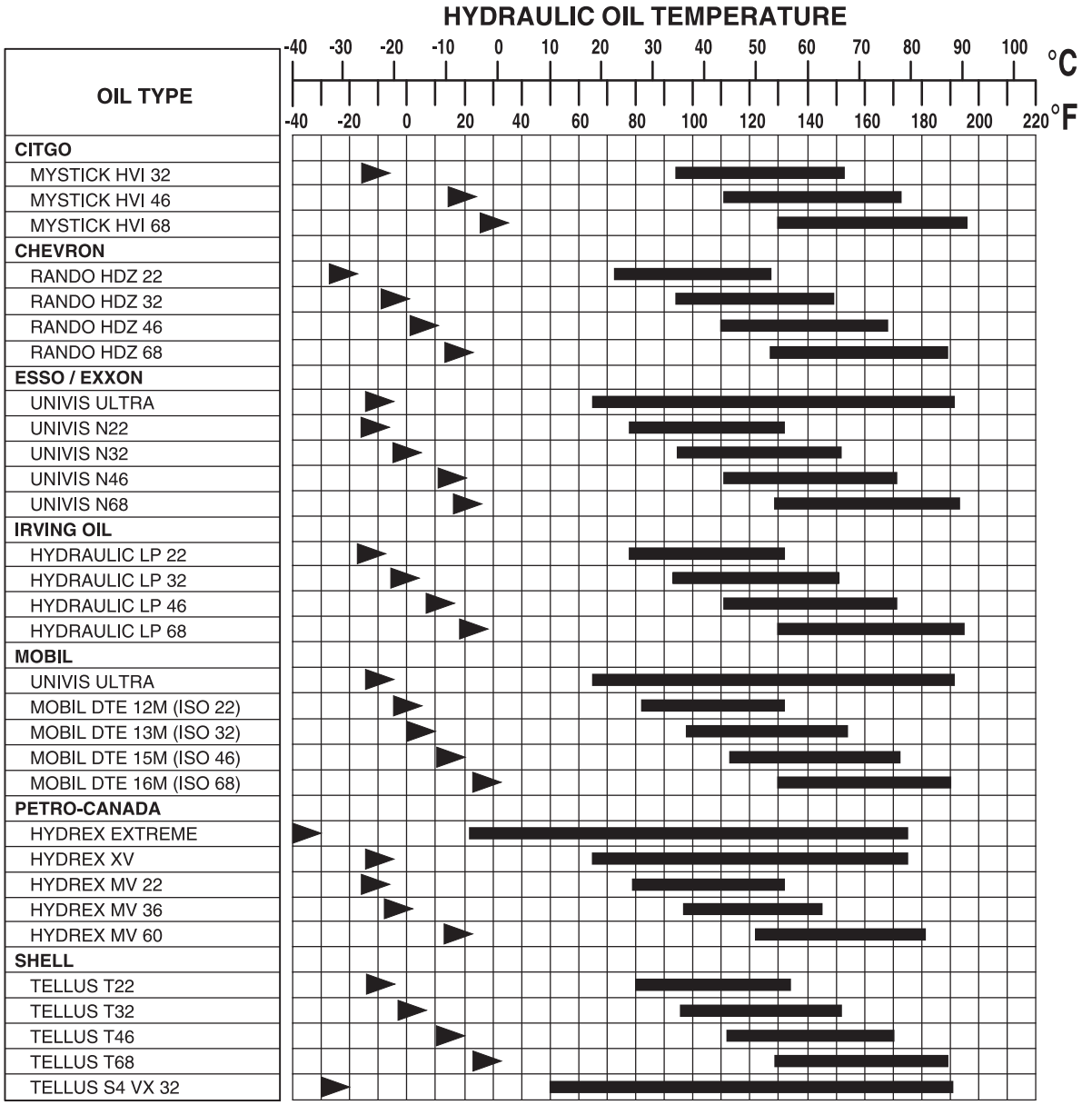
HYDRAULIC OIL OPERATING RANGE

(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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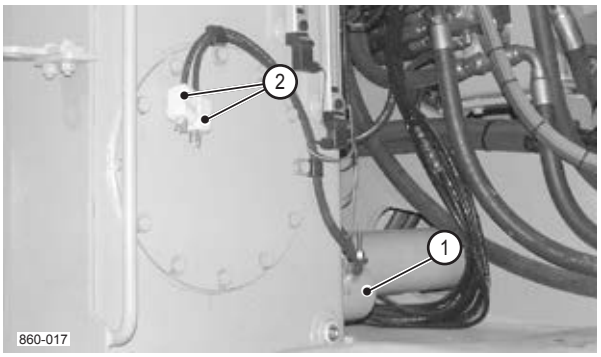
HYDRAULIC OIL HEATER (OPTIONAL)



This is a **120 volt, 2000 watt** immersion heater (1) with two outlet plugs (2). To obtain full output, both plugs must be used, connected to separate power outlets.

IMPORTANT!
Do not leave the heater plugged in for a prolonged period of time without the oil circulating. Localized high temperatures can damage hydraulic oil.

HYDRAULIC FILTER SERVICING GUIDELINES

IMPORTANT!
Tigercat generally does not recommend the pre-filling of spin-on filters due to the risk of damage to the hydraulic system caused by unfiltered oil. Unfiltered oil used to pre-fill filters enters directly into the hydraulic circuit. Contaminants in unfiltered oil can cause significant and costly damage to hydraulic valves, pumps and motors. The cleanliness of hydraulic oil cannot be guaranteed unless it is always prefiltered before use.

Contaminated hydraulic fluid can lead to premature failure of hydraulic components and costly repairs. Filters must be replaced at the recommended time intervals. Refer to SCHEDULED MAINTENANCE in THIS SECTION.

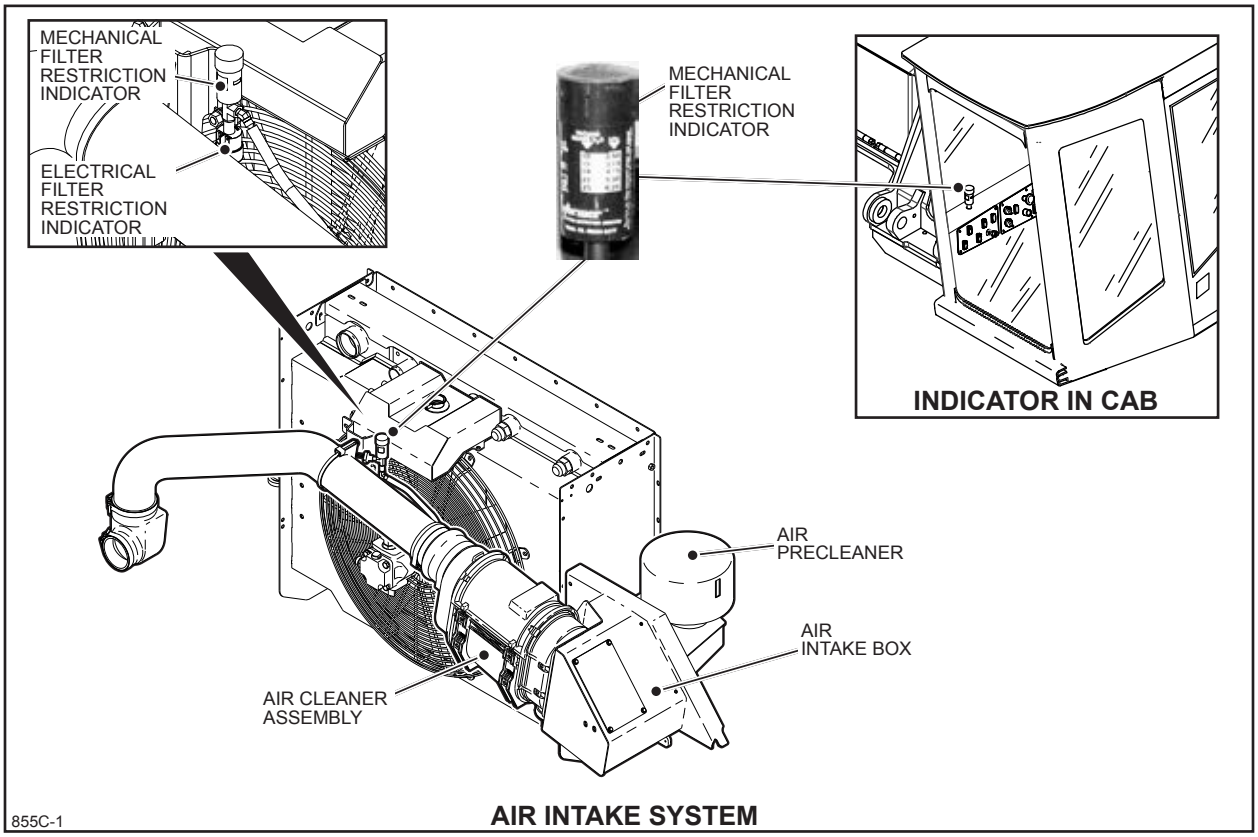
Use of hydraulic oil filters other than the Tigercat brand could lead to severe wear and rapid failure of hydraulic system components.

⚠ WARNING

WARNING, HOT HYDRAULIC OIL AND HOT MACHINE SURFACES CAN CAUSE SERIOUS BURNS!

- Before servicing the machine, allow the hydraulic system and machine surfaces to cool down.
- Use a thermometer to check surface and system temperatures to ensure it is safe to begin service work.
- DO NOT begin service work until the surface or system temperature has cooled down to below 38°C (100°F)!

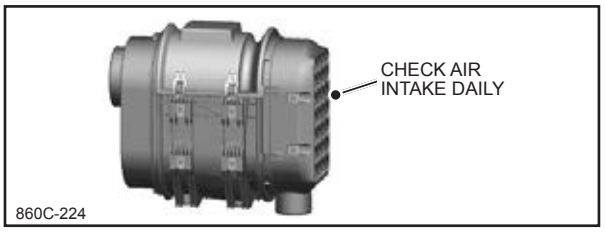
AIR INTAKE SYSTEM MAINTENANCE



AIR INTAKE SYSTEM

AIR CLEANER

The air cleaner on this machine uses two filters: a **primary** filter and a **safety** filter.



The air intake should be **checked daily** to make sure that foreign materials have not plugged the air intake area.

To ensure maximum engine protection, it is important that the filters be serviced correctly and at proper servicing intervals.

Refer to the CLEANING THE AIR INTAKE PRE-CLEANER SECTION OF THE AIR CLEANER in THIS SECTION.

In addition to the LUBRICATION AND MAINTENANCE SCHEDULE outlined in THIS SECTION, the following should also be noted.

The most common and most damaging air intake servicing problems are:

OVER SERVICING

Filters increase in dust cleaning efficiency as dust builds up on the media. Looks can be deceiving. A filter that looks dirty is actually more efficient than one that is clean. A filter with dust build up on the media reaches nearly 100% dust cleaning efficiency. Only when a filter is so clogged with dirt that air restriction goes beyond engine manufacturer's guidelines, should a filter be replaced.

NOTE: This does not apply to hydraulic oil or diesel engine filters.

IMPROPER SERVICING

Engine exposure to dust during servicing is the largest single reason for engine damage due to dust.

Abrasive dust can easily enter the intake system once the air cleaner cover and safety filter are removed for replacement. The safety filter does reduce this risk but it should also be replaced at every third primary element change.

GENERAL TORQUE SPECIFICATIONS

IMPERIAL

The torque values listed below are for general use only. DO NOT use these values if a different torque value or tightening procedure is shown for a specific application.


GRADE 8 BOLTS


GRADE 5 BOLTS

IMPERIAL BOLT TORQUE SPECIFICATIONS

GRADE 8 BOLTS

COARSE THREAD	DRY lbf-ft	DRY Nm	LUBRICATED lbf-ft	LUBRICATED Nm
1/4" - 20	11 - 12	15 - 16	8 - 10	11 - 13
5/16" - 18	26 - 30	35 - 40	20 - 28	27 - 38
3/8" - 16	44 -48	60 - 65	33 - 36	45 - 49
7/16" - 14	70 - 77	95 - 104	52 - 57	71 - 77
1/2" - 13	106 - 117	144 - 158	80 - 88	109 - 119
9/16" - 12	153 - 168	208 - 228	115 - 127	156 - 172
5/8" - 11	212 - 233	288 - 316	159 - 175	216 - 237
3/4" - 10	376 - 414	510 - 561	282 - 310	393 - 420
7/8" - 9	606 - 667	822 - 904	455 - 501	617 - 679
1" - 8	909 - 1000	1233 - 1355	682 - 750	925 - 1016
1 1/8" - 7	1288 - 1417	1746 - 1921	966 - 1062	1310 - 1441
1 1/4" - 7	1817 - 1999	2464 - 2710	1360 - 1496	1844 - 2027

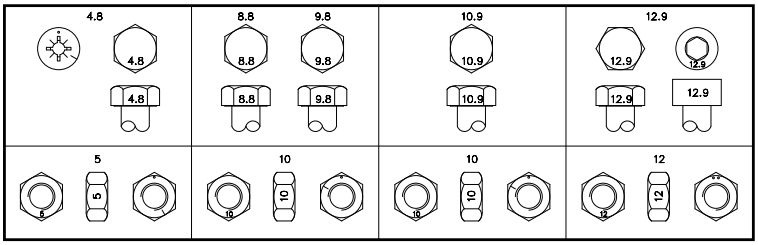
FINE THREAD	DRY lbf-ft	DRY Nm	LUBRICATED lbf-ft	LUBRICATED Nm
1/4" - 28	13 - 14	18 - 19	10 - 13	14 - 17
5/16" - 24	23 - 28	31 - 38	18 - 25	25 - 33
3/8" - 24	49 - 54	67 - 73	37 - 41	50 - 55
7/16" - 20	78 - 86	106 - 116	58 - 64	79 - 86
1/2" - 20	120 - 132	163 - 179	90 - 99	122 - 134
9/16" - 18	171 - 188	232 - 255	128 - 141	174 - 191
5/8" - 18	240 - 264	326 - 358	180 - 198	244 - 268
3/4" - 16	420 - 462	570 - 626	315 - 347	427 - 470
7/8" - 14	668 - 735	906 - 996	501 - 550	679 - 745
1" - 14	995 - 1096	1359 - 1486	746 - 821	1012 - 1113
1 1/8" - 12	1445 - 1590	1960 - 2155	1083 - 1191	1469 - 1613
1 1/4" - 12	2012 - 2213	2728 - 2997	1509 - 1660	2046 - 2250

GRADE 5 BOLTS

COARSE THREAD	DRY lbf-ft	DRY Nm	LUBRICATED lbf-ft	LUBRICATED Nm
1/4" - 20	7- 8	10 - 11	8 - 10	11 - 13
5/16" - 18	14 - 18	19 - 24	10 - 15	13 - 20
3/8" - 16	31 - 34	42 - 46	23 - 25	31 - 34
7/16" - 14	49 - 54	66 - 73	37 - 41	50 - 55
1/2" - 13	75 - 83	102 - 112	57 - 63	77 - 85
9/16" - 12	109 - 120	148 - 162	82 - 90	111 - 122
5/8" - 11	150 - 165	204 - 223	113 - 124	152 - 168
3/4" - 10	266 - 293	360 - 397	200 - 220	271 - 298
7/8" - 9	394 - 433	535 - 586	296 - 326	402 - 441
1" - 8	591 - 649	802 - 879	443 - 489	601 - 663
1 1/8" - 7	794 - 873	1077 - 1183	596 - 656	808 - 889
1 1/4" - 7	1120 - 1232	1519 - 1670	840 - 924	1139 - 1252

FINE THREAD	DRY lbf-ft	DRY Nm	LUBRICATED lbf-ft	LUBRICATED Nm
1/4" - 28	9 - 10	12 - 13	9 - 10	12 - 13
5/16" - 24	17 - 22	23 - 29	16 - 20	21 - 27
3/8" - 24	35 - 39	48 - 53	26 - 29	35 - 39
7/16" - 20	55 - 61	75 - 83	41 - 45	56 - 61
1/2" - 20	85 - 94	116 - 127	64 - 70	87 - 95
9/16" - 18	121 - 133	164 - 180	91 - 100	124 - 135
5/8" - 18	170 - 187	231 - 253	128 - 141	174 - 191
3/4" - 16	297 - 327	403 - 443	223 - 245	303 - 332
7/8" - 14	434 - 477	589 - 646	326 - 359	442 - 486
1" - 12	646 - 711	876 - 965	484 - 534	657 - 724
1 1/8" - 12	891 - 980	1208 - 1328	668 - 735	906 - 996
1 1/4" - 12	1240 - 1364	1682 - 1849	931 - 1024	1262 - 1387

METRIC



METRIC BOLT TORQUE SPECIFICATIONS

SIZE	CLASS 4.8 LUBRICATED Nm	CLASS 4.8 LUBRICATED lbf-ft	CLASS 4.8 DRY Nm	CLASS 4.8 DRY lbf-ft	CLASS 8.8 OR 9.9 LUBRICATED Nm	CLASS 8.8 OR 9.9 LUBRICATED lbf-ft	CLASS 8.8 OR 9.9 DRY Nm	CLASS 8.8 OR 9.9 DRY lbf-ft	CLASS 10.9 LUBRICATED Nm	CLASS 10.9 LUBRICATED lbf-ft	CLASS 10.9 DRY Nm	CLASS 10.9 DRY lbf-ft	CLASS 12.9 LUBRICATED Nm	CLASS 12.9 LUBRICATED lbf-ft	CLASS 12.9 DRY Nm	CLASS 12.9 DRY lbf-ft
M6	4.8	3.5	6.0	4.5	9.0	6.5	11.0	8.5	13.0	9.5	17.0	12.0	15.0	11.5	19.0	14.5
M8	12.0	8.5	15.0	11.0	22.0	16.0	28.0	20.0	32.0	24.0	40.0	30.0	37.0	28.0	47.0	35.0
M10	23.0	17.0	29.0	21.0	43.0	32.0	55.0	40.0	63.0	47.0	80.0	60.0	75.0	55.0	95.0	70.0
M12	40.0	29.0	50.0	37.0	75.0	55.0	95.0	70.0	110.0	80.0	140.0	105.0	130.0	95.0	165.0	120.0
M14	63.0	47.0	80.0	60.0	120.0	88.0	150.0	110.0	175.0	130.0	225.0	165.0	205.0	150.0	260.0	190.0
M16	100.0	73.0	125.0	92.0	190.0	140.0	240.0	175.0	275.0	200.0	350.0	225.0	320.0	240.0	400.0	300.0
M18	135.0	100.0	175.0	125.0	260.0	195.0	330.0	250.0	375.0	275.0	475.0	350.0	440.0	325.0	560.0	410.0
M20	190.0	140.0	240.0	180.0	375.0	275.0	475.0	350.0	530.0	400.0	675.0	500.0	625.0	460.0	800.0	580.0
M22	260.0	190.0	330.0	250.0	510.0	375.0	650.0	475.0	725.0	540.0	925.0	675.0	850.0	625.0	1,075.0	800.0
M24	330.0	250.0	425.0	310.0	650.0	475.0	825.0	600.0	925.0	675.0	1,150.0	850.0	1,075.0	800.0	1,350.0	1,000.0
M27	490.0	360.0	625.0	450.0	950.0	700.0	1,200.0	875.0	1,350.0	1,000.0	1,700.0	1,250.0	1,600.0	1,150.0	2,000.0	1,500.0
M30	675.0	490.0	850.0	625.0	1,300.0	950.0	1,650.0	1,200.0	1,850.0	1,350.0	2,300.0	1,700.0	2,150.0	1,600.0	2,700.0	2,000.0
M33	900.0	675.0	1,150.0	850.0	1,750.0	1,300.0	2,200.0	1,650.0	2,500.0	1,850.0	3,150.0	2,350.0	2,900.0	2,150.0	3,700.0	2,750.0
M36	1,150.0	850.0	1,450.0	1,075.0	2,250.0	1,650.0	2,850.0	2,100.0	3,200.0	2,350.0	4,050.0	3,000.0	3,750.0	2,750.0	4,750.0	3,500.0

TORQUECHARTGENERAL.XLS

Tigercat X870C/LX870C FELLER BUNCHER
SECTION 4 - HYDRAULIC SYSTEM

ISSUE 1.0, MAY, 2015

CONTENTS - SECTION 4

FILTER - HYDRAULIC TANK PRE-FILL

There is a hydraulic oil pre-fill filter installed in the fill line to filter oil prior to entering the hydraulic tank. For service and replacement intervals see SERVICE AND LUBRICATION CHART in THIS SECTION 3 of this manual.

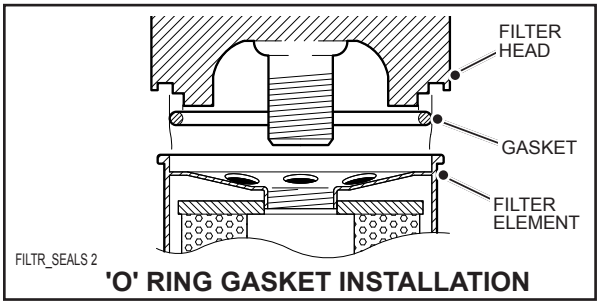
860-130 **HYDRAULIC FILL COMPARTMENT**

Changing the filter:

1. Park the machine on level ground with the felling head resting on the ground and turn OFF the engine.

   The pre-fill filter is accessed through the left hand access door inside the hydraulic fill pump compartment.

2. Wipe clean the area around the filter and head.
3. Place rags below to catch the spillage of oil.
4. Wearing face protection (in case of an oil spray), unscrew the old filter. Dispose of old filter and any oil properly.
5. The Tigercat spin-on filter element is supplied with two gaskets. The **round** ('O' ring style) section gasket is used for all return filters. Discard the **square** section gasket.



'O' RING GASKET INSTALLATION

   Remove the used gasket and clean the gasket seat in the head.

   Apply clean oil to the new gasket surfaces.

   Install the new gasket on the inside lip of the filter.

   DO NOT PRE-FILL FILTER. Screw on the new filter until the gasket makes contact with the filter head.

   Tighten the filter an additional 3/4 of a turn.

   Tighten the filter until the top edge makes metal to metal contact with the filter head (approximately 1 1/2 additional turns after gasket contact).

6. Start the engine and check for leaks.

⚠ WARNING

WARNING, HOT HYDRAULIC OIL AND HOT MACHINE SURFACES CAN CAUSE SERIOUS BURNS!

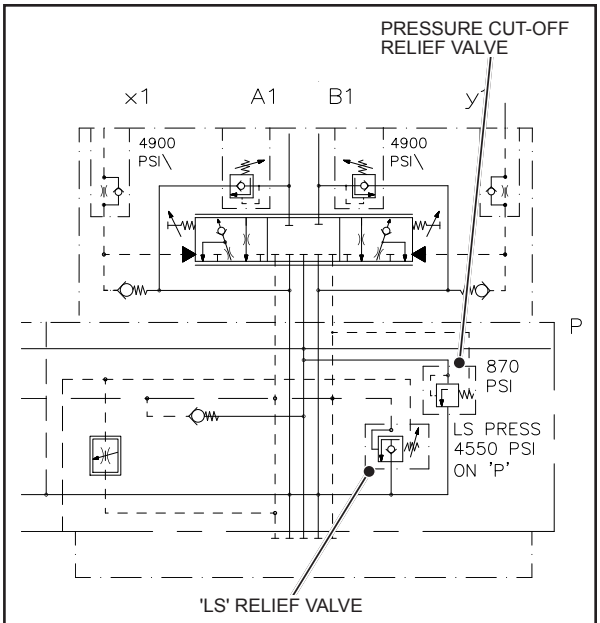
- Before servicing the machine, allow the hydraulic system and machine surfaces to cool down.
- Use a thermometer to check surface and system temperatures to ensure it is safe to begin service work.
- DO NOT begin service work until the surface or system temperature has cooled down to below 38°C (100°F)!

PRESSURE CUT-OFF (PCO)

The single stage PCO, or Pressure Cut Off, limits the control pressure in the main valve control system. It contains one load sense relief valve and a safety relief valve. The load sense relief valve limits the load sense pressure to a set level and signals the pump to compensate and to maintain the predetermined pressure. The safety relief valve operates at a fixed differential between pump outlet and load sense pressure. By doing this it serves two functions.

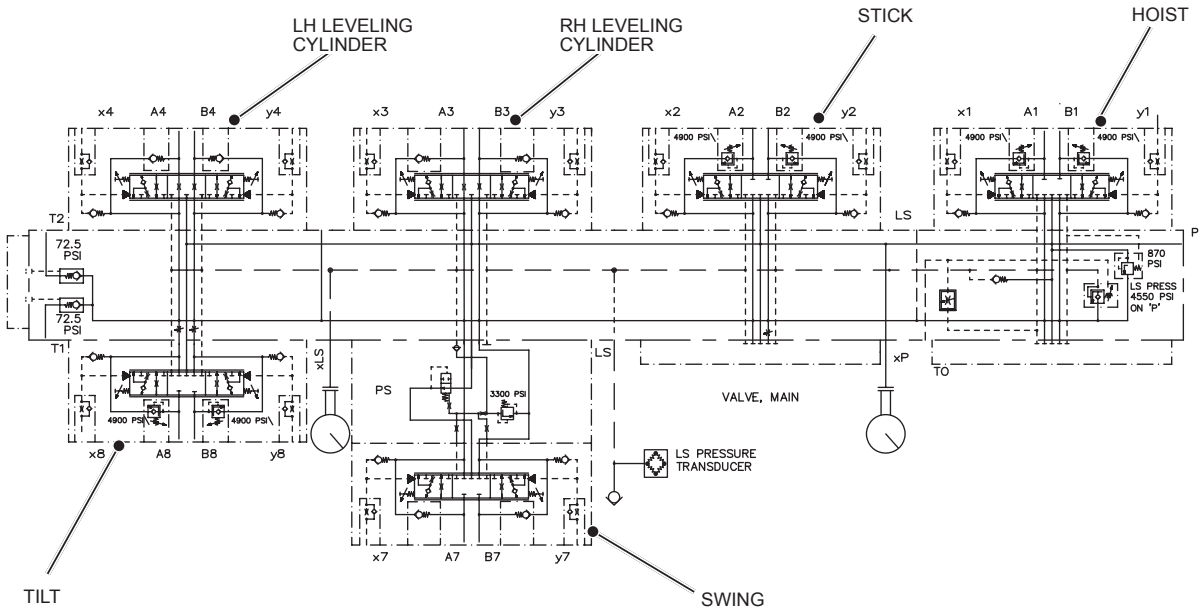
The primary function of a system relief valve is to eliminate pressure spikes within the work line. If the pump outlet pressure rises above the load sense relief setting by more than 60 bar (870 psi) the safety relief will redirect the pump outlet flow to tank until the surge has passed.

The second function of the safety relief is to reduce the load on the engine starter. During start-up, the main valves are all in their neutral position, so the pump outlet path is blocked. Since the pump starts at maximum displacement, pressure rises in the pump outlet until the pump can react to its internal control signal and destroke to its standby pressure. This pressure could reach nearly 400 bar (5800 psi) except for the safety relief. In this condition the load sense pressure is 0 bar (0 psi), so the safety relief works like a 60 bar (870 psi) fixed system relief. Even with overshoot, the pump outlet pressure is limited to about 100 bar (1450 psi).



860C-283A

PRESSURE CUT-OFF RELIEF VALVE



860C-283

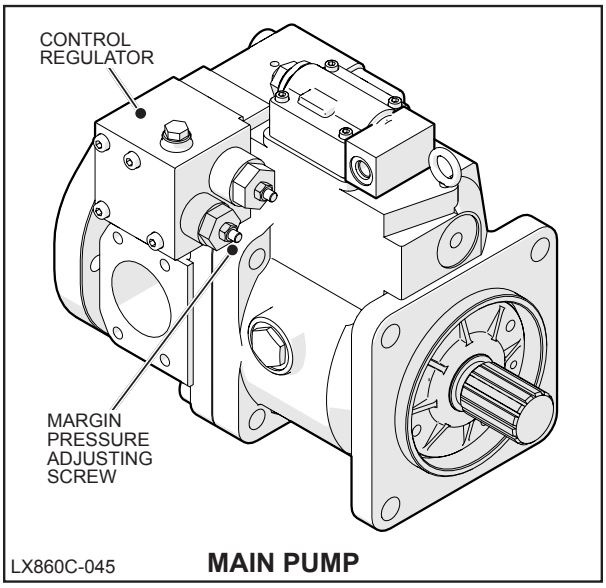
MAIN CONTROL VALVE - SCHEMATIC

SET MARGIN PRESSURE

Margin pressure is the difference between the load sense pressure and the pump output pressure while a function (boom, swing or travel) is being operated. For the load sensing system to operate correctly the differential pressure between 'LS and 'P' should be 20.7 bar (300 psi). 'P' being higher than 'LS'.

NOTE: If the margin pressure is not set correctly, the machine controls may not respond as they should, i.e., boom is jerky or sluggish.

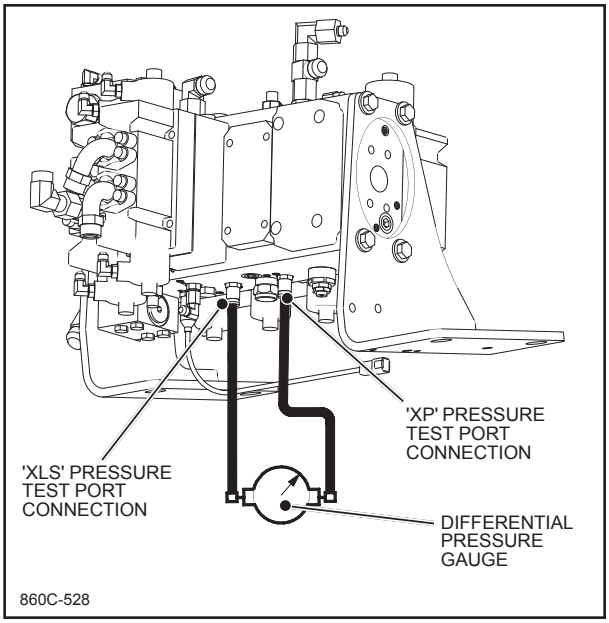
The margin pressure adjustment is made at the main pump controller attached to the main pump.



MAIN PUMP

PRESSURE GAUGE CONNECTIONS

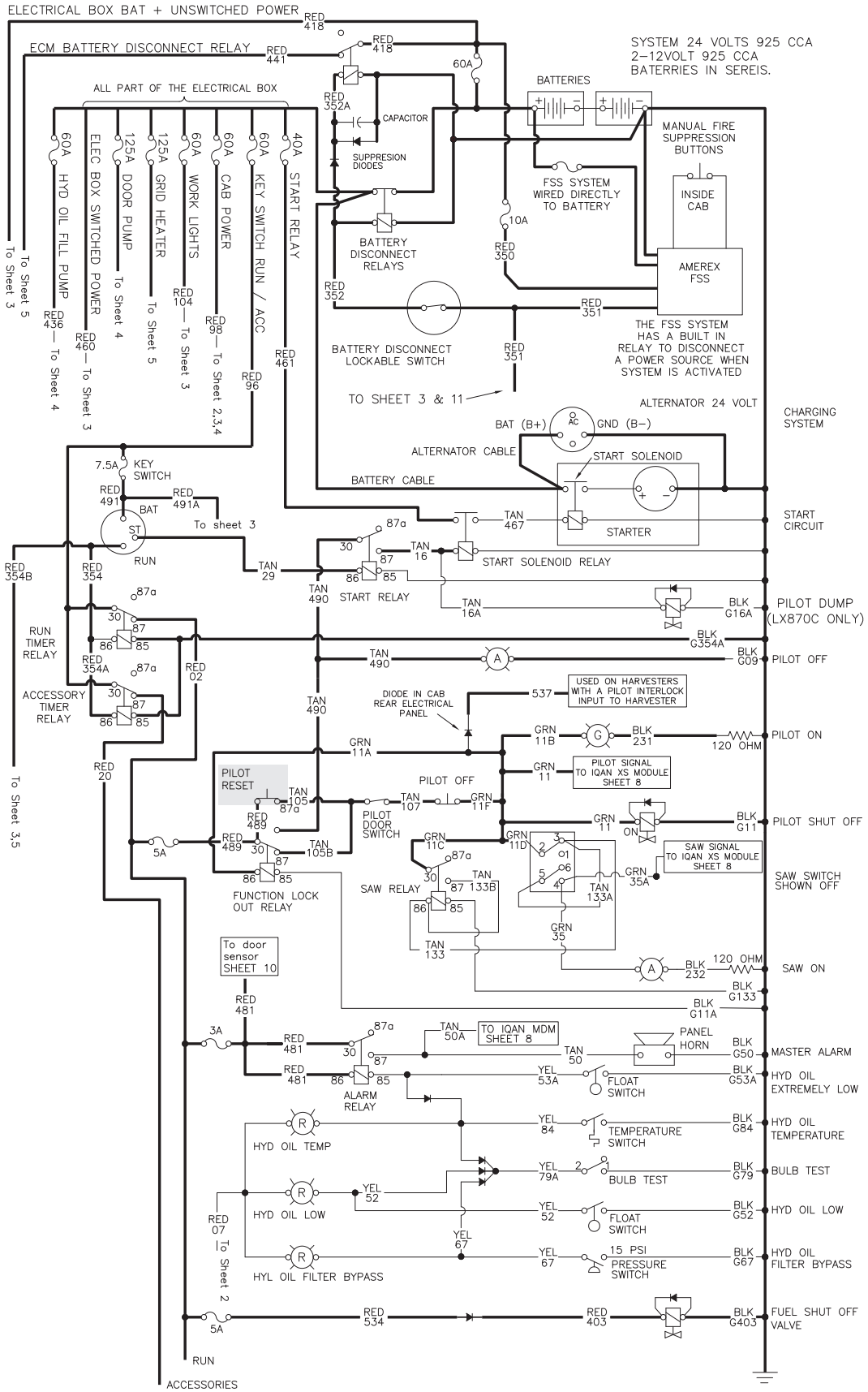
The pressure gauge connections are the 'XP' and 'XLS' gauge tests port on the main valve manifold.



The margin pressure is set at the factory to 20 bar (290 psi). The margin pressure can be adjusted from 17.2 - 20.7 bar (250 - 300 psi), however the flow stops on the valves must be reset in order to maintain the same speed of the functions.

1. Use a differential pressure gauge (preferably a differential gauge with ten psi increments).
2. With hydraulic oil at operating temperature, Connect one side of the differential pressure gauge to the 'XLS' gauge port and the other side of the gauge to the pressure 'XP' gauge test port.
3. Close and latch the cab front door.
4. Start the engine set anti-stall off, place fan in service mode via the computer (see SECTION 6 for this procedure), and place throttle control in full position.
5. Press pilot reset button to activate pilot system and turn anti-stall switch off.
6. Use Flow Stop to set the head forward speed to 25 seconds.
7. Use port relief to set the head tilt forward to 138 bar (2,000 psi).
8. Loosen locknut on margin pressure adjusting screw on main pump controller and turn adjusting screw until the differential reading on gauge is 20.6 bar (300 psi). Turn out to decrease margin pressure.

   NOTE: This is a sensitive adjustment, significant changes in pressure will be noticed with only a small movement of the adjusting screw.
9. Allow a short time for pressure reading to stabilize then tighten locknut on adjusting screw. Repeat above procedure to verify the differential pressure setting is still correct.
10. Place fan in run mode via the computer (see section 6 for this procedure).
11. Shut engine off and remove gauges.



PILOT SYSTEM ELECTRICAL CIRCUIT DIAGRAM

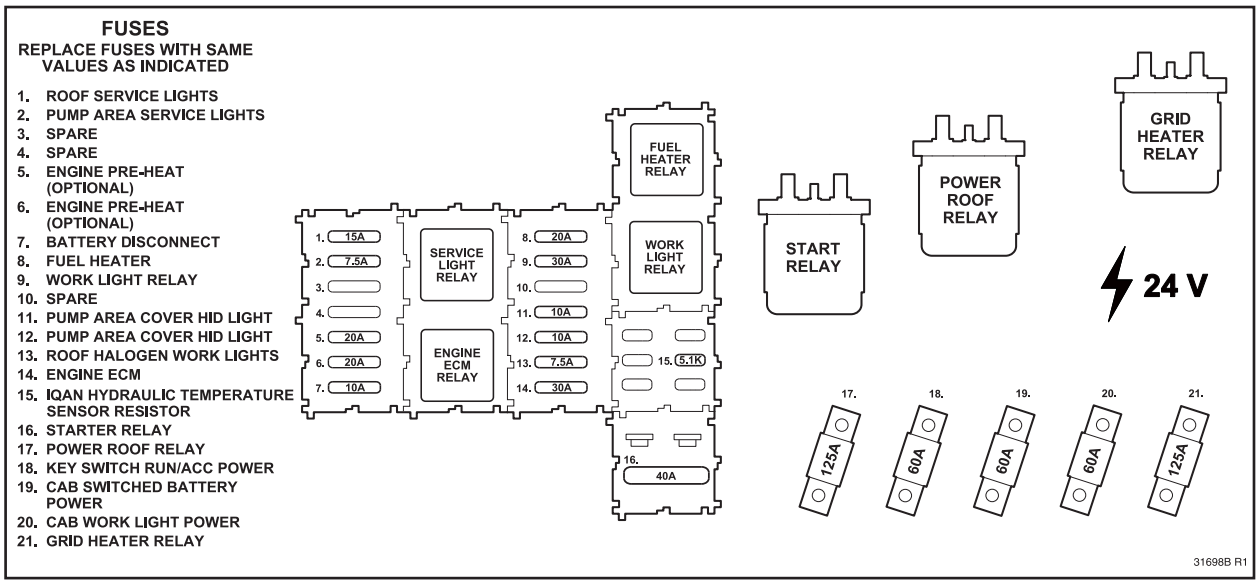
PILOT RESET SWITCH - HELD ON

LX870C-075

SYSTEM FUSES AND RELAYS - CONTINUED

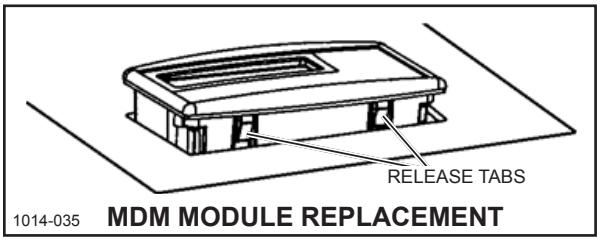
- **Electrical Controls, Fuse and Relay Rear Panel** located in the rear compartment behind the cab.

FUSE & RELAY PANEL - REAR COMPARTMENT



COMPONENT REPLACEMENT

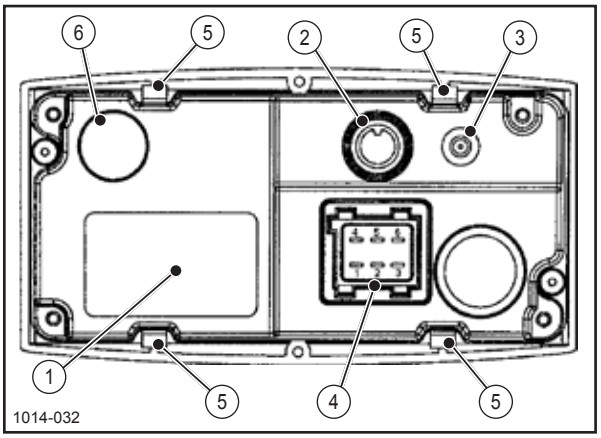
MDM DISPLAY MODULE



MDM MODULE REPLACEMENT

1. Turn battery disconnect switch OFF.
2. Remove the four screws and lift the cover panel to access the wiring and back of the MDM module.
3. Disconnect the wiring harness at the module.
4. Press the four tabs on the module (snap on attachment) and lift the module out of the panel.
5. Install new module in reverse order as removed.

NOTE: Refer to Update the Application in THIS SECTION.

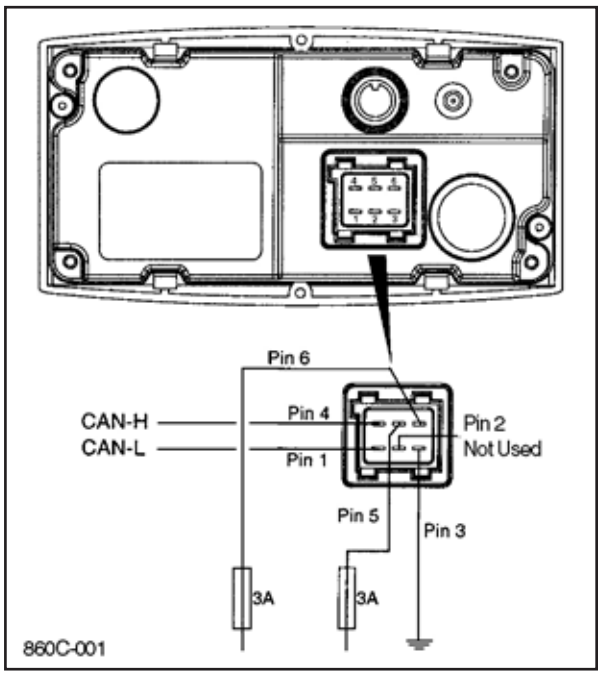


REAR OF MDM MODULE

The back of the MDM Module consists of the following:

1. Tag with serial number and part number.
2. RS-232 serial port, 8 pin for PC connection.
3. Voltage supply indicator. green LED light ON indicates supply voltage is activated. LED light OUT indicates supply voltage is OFF.
4. Main connector for voltage supply, CAN communication and alarm output.
5. Snap on attachment for mounting in panel.
6. Membrane valve for condensation prevention inside unit.

MDM MODULE WIRING PIN ASSIGNMENT



1. Can Low
2. Alarm Out
3. Battery Ground
4. Can High
5. Power Supply - Real Time Clock
6. Power Supply

NOTE: Refer to the Electrical schematics in this section for detailed pin and wiring assignment.

1014-D096

3. SETTINGS MENU OPERATION

The computer sound volume, display contrast, light, date, time and language can be adjusted in this menu.

A. LCD

Press LCD (F1) to select LCD SETTINGS.

CHANGE CONTRAST

630C-27

Press CONTRAST (F1) to select the function LCD CONTRAST.

630C-74

Change to desired CONTRAST using UP/DOWN scroll buttons and press OK (F1) to save setting and return to previous menu.

CANCEL (F2) or ESC returns the character display to the previous display without saving any new setting.

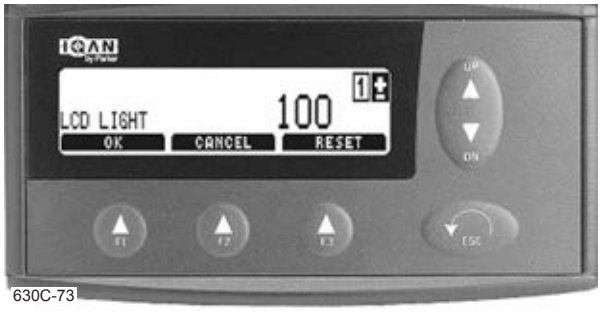
Reset Contrast

RESET (F3) resets the character display contrast to the preset factory value which corresponds to 100.

CHANGE LIGHT (DISPLAY BRIGHTNESS)

630C-27

Press LIGHT (F2) to select the function LCD LIGHT.



630C-73

Change to desired BRIGHTNESS using UP/DOWN scroll buttons and press OK (F1) to save setting and return to previous menu.

CANCEL (F2) or ESC returns the character display to the previous display without saving any new setting.

Reset Light

RESET (F3) resets the character display's light to the preset factory value which corresponds to 100.

EXAMPLE:

Press OUTPUTS (F2) to select ouputs 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) or SELECT(-) (F2) to select a function and direction for adjustment.

Use UP/DOWN scroll buttons to select the setting to be adjusted.

Press SELECT (F1) to select.

Use UP/DOWN scroll buttons adjust setting.

Select OK (F1) to confirm new setting.

11. FAN AND ALARM TEMPERATURES
(Refer to the chart at the bottom of this page for temperatures)

Warm-Up Mode Off - This is the minimum hydraulic oil temperature that must be reached before the warm-up mode is de-activated which allows the hydraulics to operate at full capacity and the engine to go to full speed. Note that the temperature is dependent on the oil grade selected in IQAN.

Fan Start Temperature - This is the temperature of the monitored function that the computer uses to start increasing the fan speed to increase the cooling of that function to prevent the function from increasing to the alarm temperature. Note that the hydraulic oil temperature is dependent on the oil grade selected in IQAN. The computer monitors all of the function and the fan speed is determined by the function that exceeds the fan start temperature the most or for the longest time period. It is normal for the fan to cycle from low to high speed and back to low until all function temperatures stabilize for the operating conditions.

Alarm Temperature - This is the temperature of the monitored function that the computer uses to activate an alarm and display a message on the IQAN screen. Note that the temperature is dependent on the oil grade selected in IQAN.

H855C-30

12. WARM UP MODE

This message will be displayed whenever the machine is in warm up mode. The warm up mode limits engine rpm and applies anti-stall so that the system can be warmed up gradually from a cold start. As hydraulic oil temperature increases the system will automatically allow the engine rpm to increase. The warmup mode operates automatically on cold start ups within a hydraulic oil temperature range. The temperature range will vary based on computer control system hydraulic oil settings.

NOTE: See item 1. 'OK'/BYPASS - MESSAGE INTERACTION item 1A.

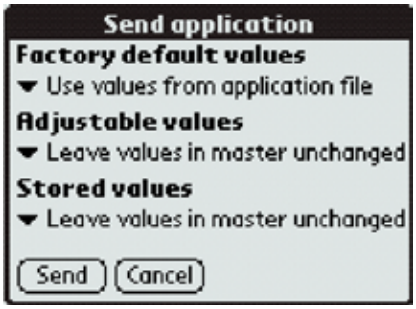
(Refer to the chart at the bottom of this page for WARM-UP mode OFF temperatures)

For more information about hydraulic oil settings refer to COMPUTER CONTROL SYSTEM - ALTERNATE MENUS - MACHINE SERVICE - HYDRAULIC OIL. For proper operation the computer control system hydraulic oil settings should match the type of hydraulic oil in use.

FAN AND ALARM TEMPERATURES

Monitored Function	Warm-Up Mode Off Temperature	Fan Start Temperature	Alarm Temperature
Engine Intake Air	NA	140°F - 60°C	200°F - 93°C
Engine Coolant	NA	193°F - 89°C	220°F - 104°C
Hydraulic Oil (ISO22)	80°F - 27°C	110°F - 43°C	130°F - 54°C
Hydraulic Oil (ISO32)	95°F - 35°C	120°F - 49°C	150°F - 66°C
Hydraulic Oil (ISO36)	100°F - 38°C	120°F - 49°C	145°F - 60°C
Hydraulic Oil (ISO46)	110°F - 43°C	140°F - 60°C	185°F - 85°C
Hydraulic Oil (ISO68)	120°F - 49°C	150°F - 66°C	199°F - 93°C

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.



PDA SEND APPLICATION DIALOG BOX

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:

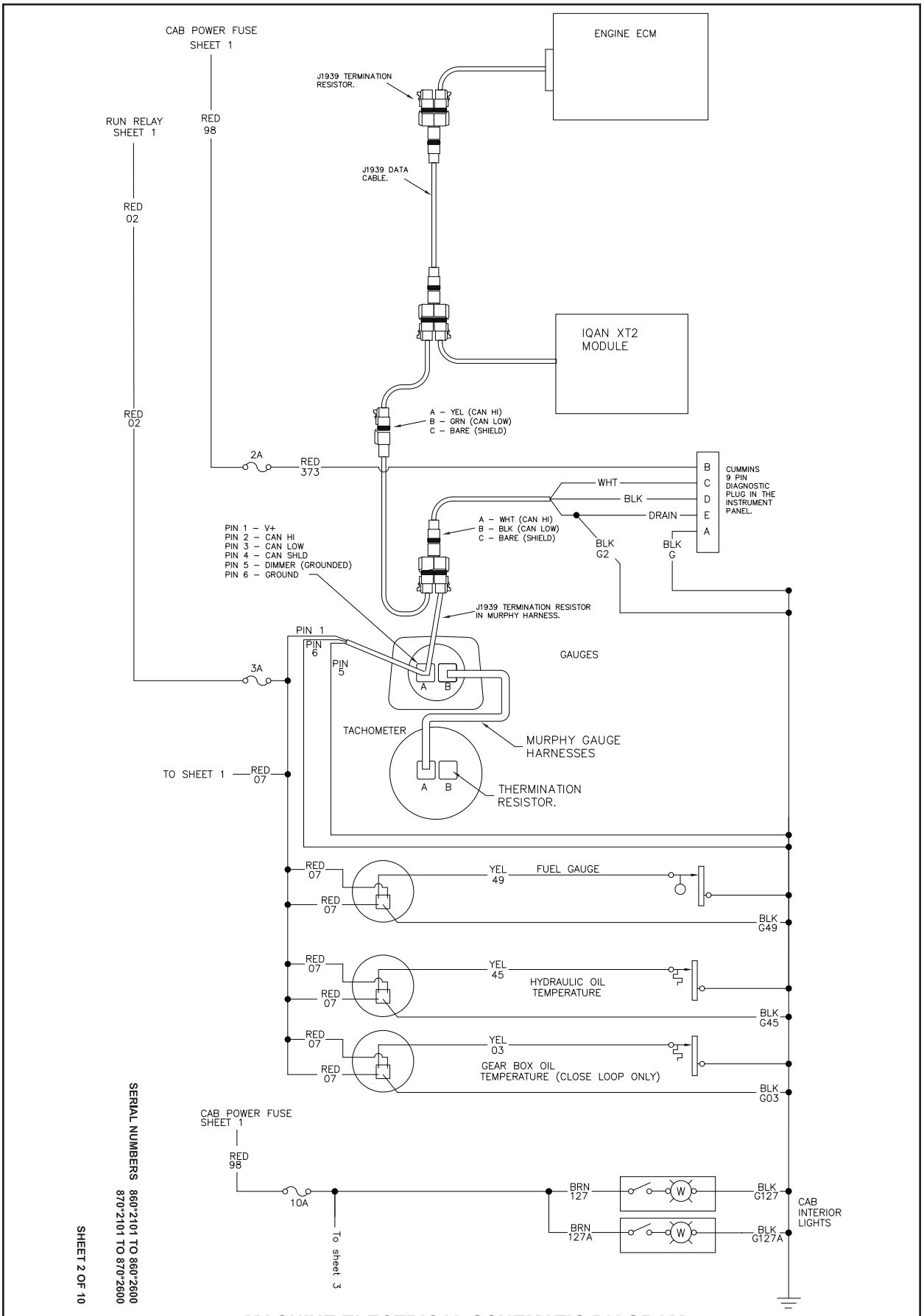
    For an MDM previously installed:
    'Leave values in master unchanged'.

    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 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).

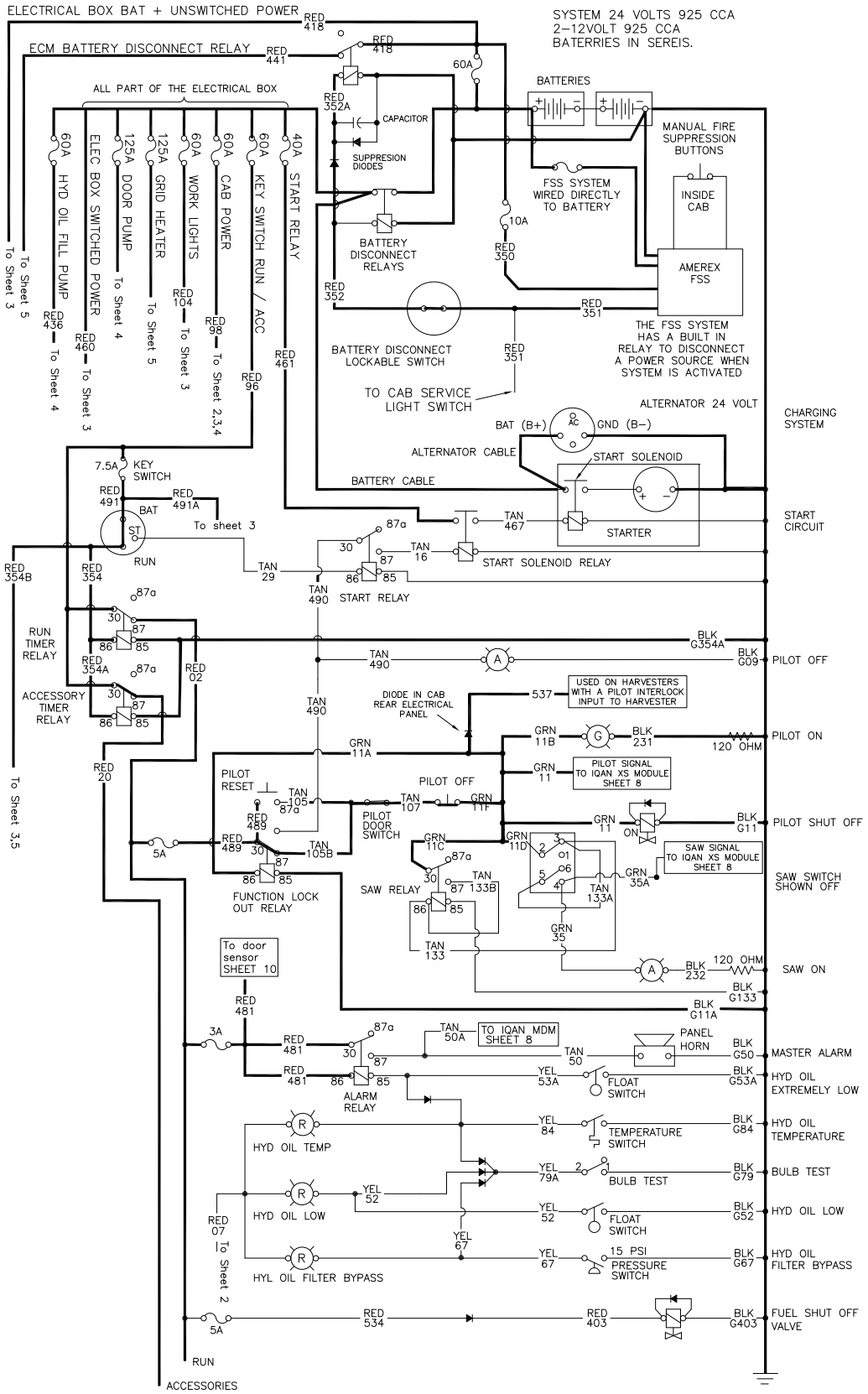


MACHINE ELECTRICAL SCHEMATIC DIAGRAM

Tigercat X870C/LX870C FELLER BUNCHER
SECTION 7 - ENGINE AND ANTI-STALL

ISSUE 1.0, MAY 2015

CONTENTS - SECTION 7

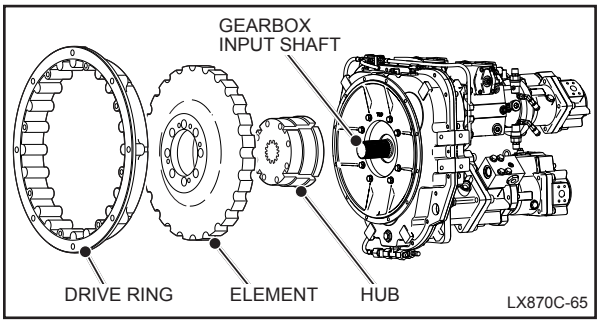


860C-311

START CIRCUIT - RUN

IGNITION KEY - RUN POSITION
PILOT RESET SWITCH - RELEASED
FRONT DOOR CLOSED/DOOR SWITCH - ON

FLEX DRIVE HUB, ELEMENT AND DRIVE RING INSTALLATION



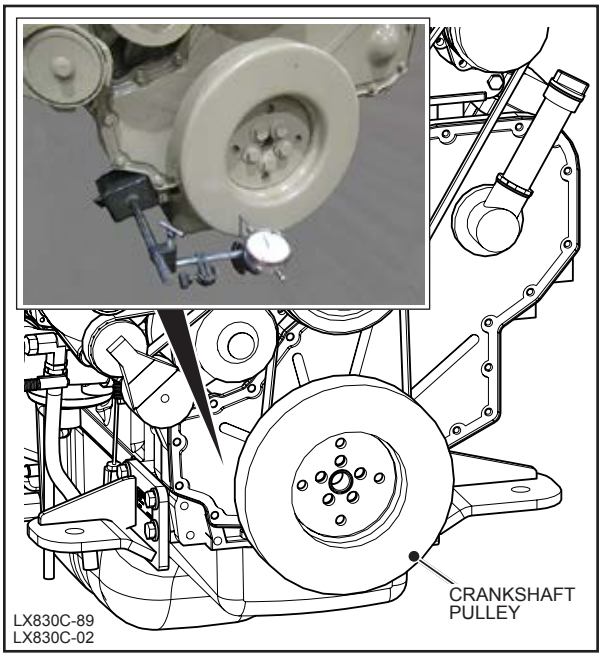
It is important to correctly position the flex drive hub on the gearbox input shaft.

Installing the hub too far onto the shaft will result in insufficient contact between the flex drive element and drive ring resulting in component failure.

If the hub is not installed far enough on the shaft, interference will occur between the element and the engine flywheel resulting in component failure.

INSTALLATION PROCEDURE

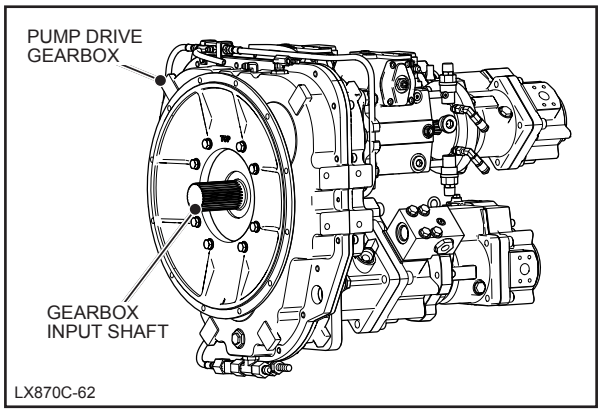
1. The engine crankshaft end play must be checked before and after the pump assembly is installed on the engine.
2. Measure crankshaft end play at the engine crankshaft pulley. Gently pry the crankshaft as far as it will go towards the engine.



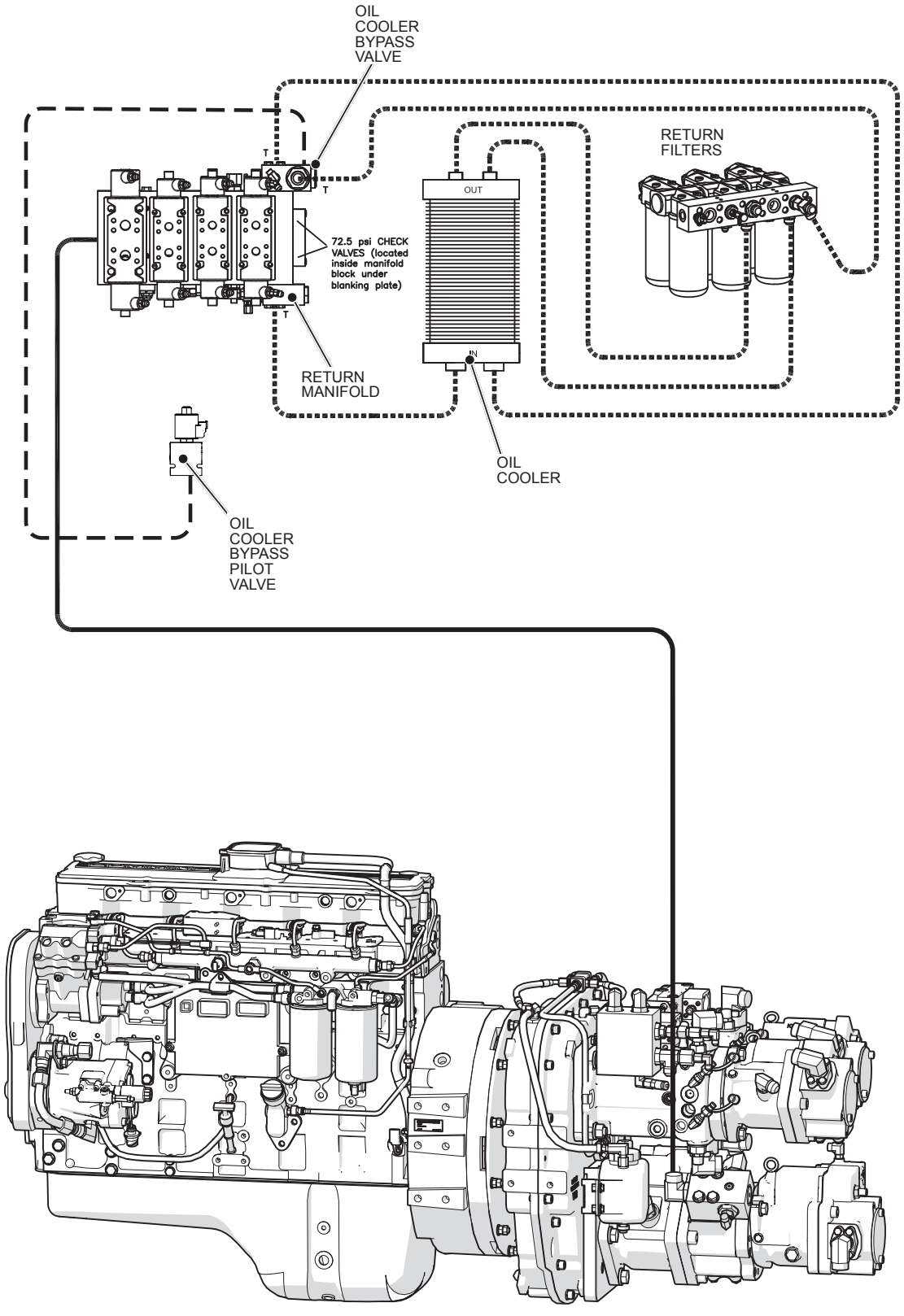
3. Install a dial indicator and magnetic base at a suitable location on the engine. Position the indicator extension on the outer face of the pulley.
4. Zero the dial indicator.
5. Gently pry the crankshaft pulley away from the engine noting the amount of end play.

IMPORTANT!
Do not pry using the engine speed ring. Severe component damage could occur.

6. Repeat steps 2, 4 and 5 several times and average the readings. Record the average crankshaft end play.



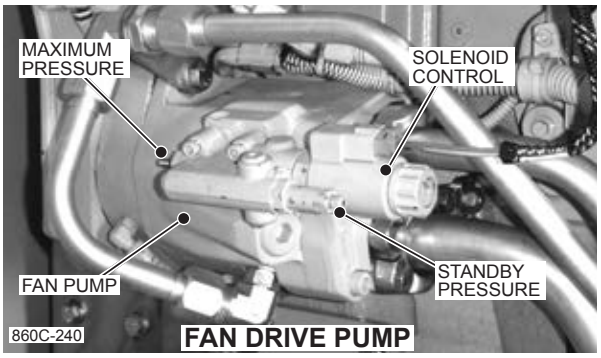
7. Apply with a brush lithium based EP2 grease containing molybdenum disulfide to the gearbox input shaft.
8. Fit the flex drive hub to the gearbox input shaft.



LX870C-108

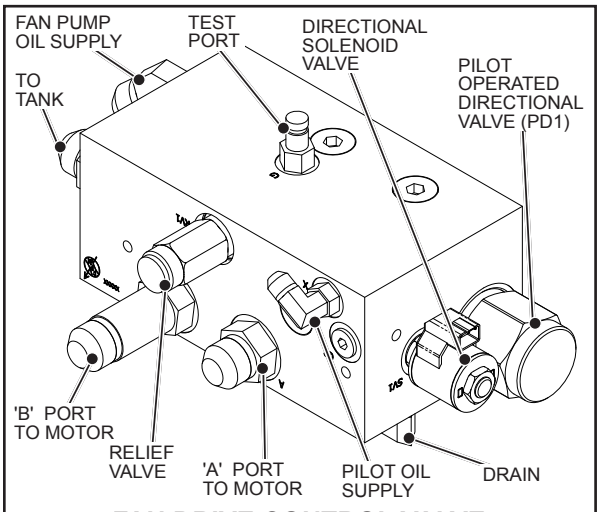
OIL COOLER CIRCUIT

SET STANDBY PRESSURE:



FAN DRIVE PUMP

The standby pressure adjustment is made at the fan pump controller attached to the pump. The pressure gauge connection is made to test port G on the Fan Control Valve Manifold.



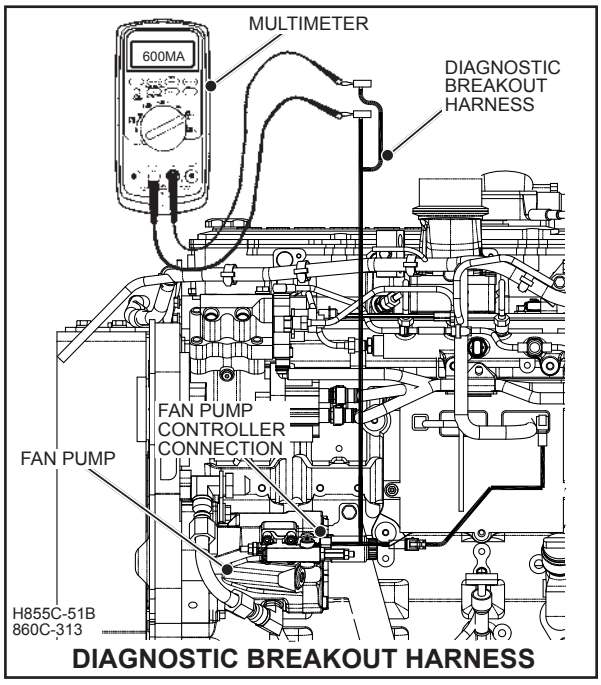
FAN DRIVE CONTROL VALVE

1. Connect a 0-70 bar (0-1000 psi) gauge to test port G on the Fan Control Valve Manifold, located in the main service compartment.

   Ensure that the engine coolant and hydraulic oil temperatures are **below** the normal operating temperatures of **91°C/195°F coolant**, **54°C/130°F hydraulic oil and 44°C/111°F charge air cooler** during the test or the computer will activate the fan pump and the fan will rotate resulting in a pressure rise above the recommended standby pressure and the test will be invalid.

2. Turn the engine ON, place the A/C in the off position, set the fan control switch to AUTO and set the engine speed to **HIGH IDLE**.

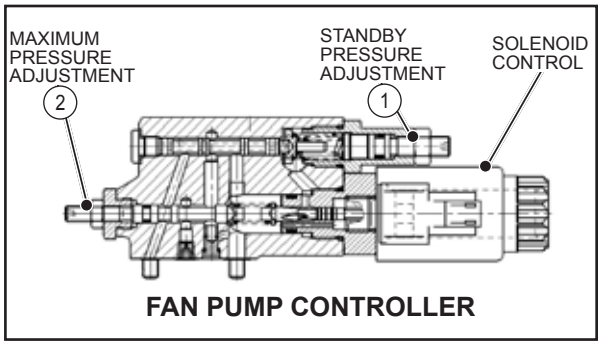
3. Read the pressure on the gauge. The pressure at test port G should meet **specifications**. Refer to the PRESSURE AND SPEED SPECIFICATION chart in SECTION 3 of this MANUAL for standby pressure specifications.



DIAGNOSTIC BREAKOUT HARNESS

4. Use a multimeter and a diagnostic breakout harness to verify that the current output signal to the solenoid control on the fan pump controller is 600 mA or, refer to SECTION 6 of THIS MANUAL, MENU DESCRIPTIONS, MEASURE MENU, OUTPUTS, CURRENT OUT, and select fan prop relief.

If the standby pressure requires adjustment:



FAN PUMP CONTROLLER

Loosen the locknut on standby pressure adjusting screw (1) (located on the fan pump controller).

1. Turn the adjusting screw (1) until the reading on the gauge meets **specifications**. Turning the adjusting screw IN (clockwise) increases pressure, turning the screw OUT (counter-clockwise) decreases the pressure.

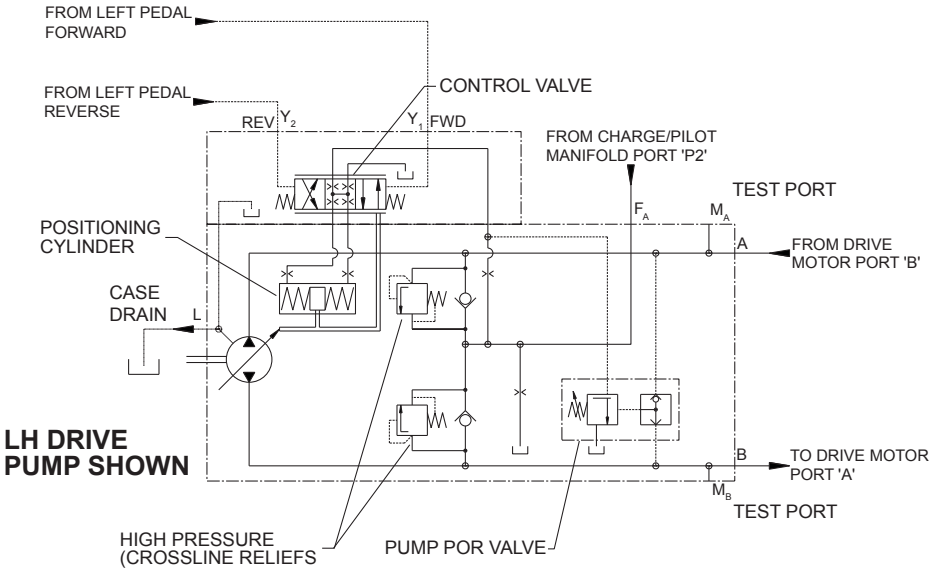
2. Tighten the locknut on the adjusting screw. Observe the gauge to verify the pressure setting is still correct.

3. When the adjustment is complete, turn the engine OFF and remove the gauge.

Each hydrostatic piston pump is equipped with a pressure override (POR) control to protect the closed loop hydrostatic drive components from excessive pressure. There are two valves involved. One is a shuttle valve to select the higher pressure line in the closed loop and the other is a relief valve. When the tractive effort requirements of the vehicle become excessive, the pressure on the high side of the closed loop can reach maximum. At this point the POR relief valve shifts bleeding off charge pressure to the displacement control valve. This reduces the pressure to the positioning cylinder, causing the swashplate to reduce pump displacement and pump flow.

Two high pressure crossline relief valves, on each pump, control the high pressure side of the loop by *dumping* oil into the low pressure side of the loop when the pressure rises above the preset valve value. These valves are adjustable and they always dump oil from the high pressure to the low pressure side of the closed loop in order to keep the hydraulic oil within the closed loop system.

Refer to PRESSURE SETTINGS in SECTION 4 of THIS SERVICE MANUAL for a complete list of pressure set points discussed above.



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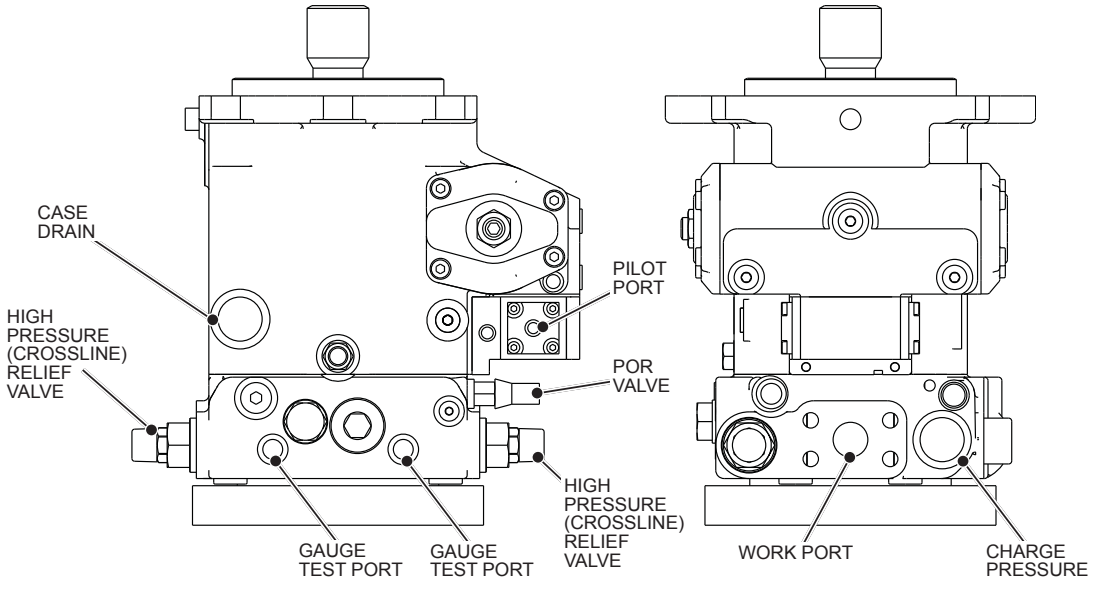
TRACK DRIVE PUMP SCHEMATIC

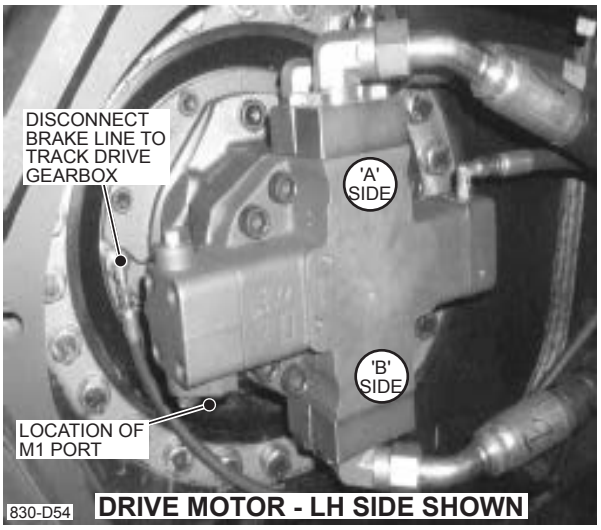


860-75

DRIVE PUMP

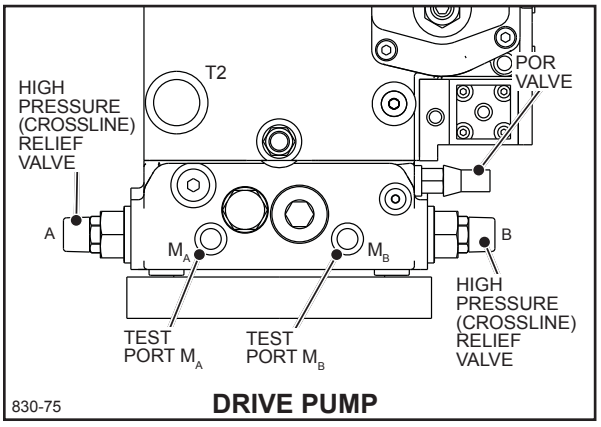
DRIVE MOTOR BEGIN OF REGULATION

1. Raise the hydraulic oil temperature to no higher than **40°C (100°F).**
2. Remove both left and right drive motor inspection covers.



DRIVE MOTOR - LH SIDE SHOWN

3. Disconnect the left and right brake release hoses.
4. Plug the hoses with size 04 JIC plugs and cap the port adapter but **do not** completely seal.



DRIVE PUMP

5. Connect a 0-700 Bar (0-10000 psi) pressure gauge to port **Mb** on the left track drive pump.
6. Fit a test port to the M1 port on the left drive motor and connect a 0-345 bar (0-5000 psi) gauge on the **M1** test port with a long test hose to enable this gauge to be viewed at the pump.
7. Start the engine and set the throttle to IDLE.
8. From inside the cab close and latch the front door and press the PILOT RESET switch to activate pilot system.
9. Adjust the speed control lever to FULL .
10. Place the Drive/Low switch in the Drive position.
11. **TEST** - Activate the left track drive foot pedal in both the forward and reverse directions to ensure that the track does not move.

⚠ WARNING

Exercise extreme care when performing this set-up procedure as the machine may move. Ensure that there is no personnel either in front of, or behind the machine.

12. Ask an assistant to fully depress and hold the left track drive foot pedal in the forward position.

⚠ CAUTION

While the foot pedal is pressed, oil will flow over the pump crossline relief valves causing the drive circuit to heat up. Monitor hydraulic oil temperature during this procedure.

13. Turn the drive pump POR adjusting screw OUT until the pressure gauge on the **Mb** port is reduced to a reading of 140 Bar (2000 psi).
14. Begin turning the pump POR adjusting screw IN, raising the pump POR setting while observing the reading on the **M1** test port gauge. Stop adjusting when the **M1** test port starts to move. The pump POR (**Mb** port) reading at which this happens is called the Begin of Regulation setting.

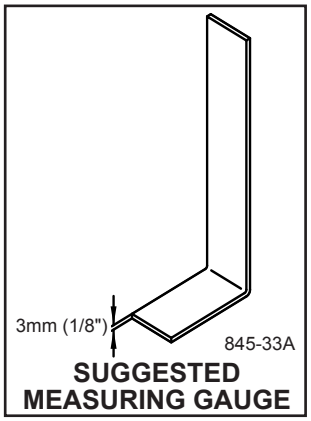
    The pump POR reading at this point should be 280 Bar (4000 psi) (**Mb** port) .

    If set correctly, go to step 17.

    If not set correctly, continue with the next step.

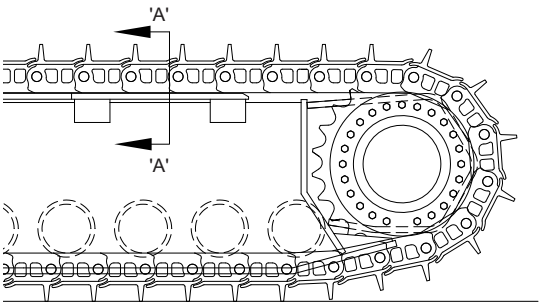
TRACK SLIDE WEAR

Track slide wear should be checked periodically to ensure that it does not go over the limit and cause damage to the chain link bushings.

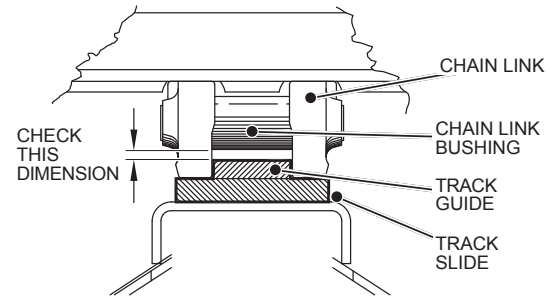


SUGGESTED MEASURING GAUGE

Since the area to check is not immediately visible, the measuring may be done using a 'go/no go' gauge made from a piece of 3 mm (1/8") flat bar. The gauge is inserted down through the holes in the track and placed between the track guide and the track bushing. Make sure that dirt build-up does not interfere with the reading. Check at several locations. The ends of the track slides tend to wear first. The slides should be replaced if excessive wear is found.

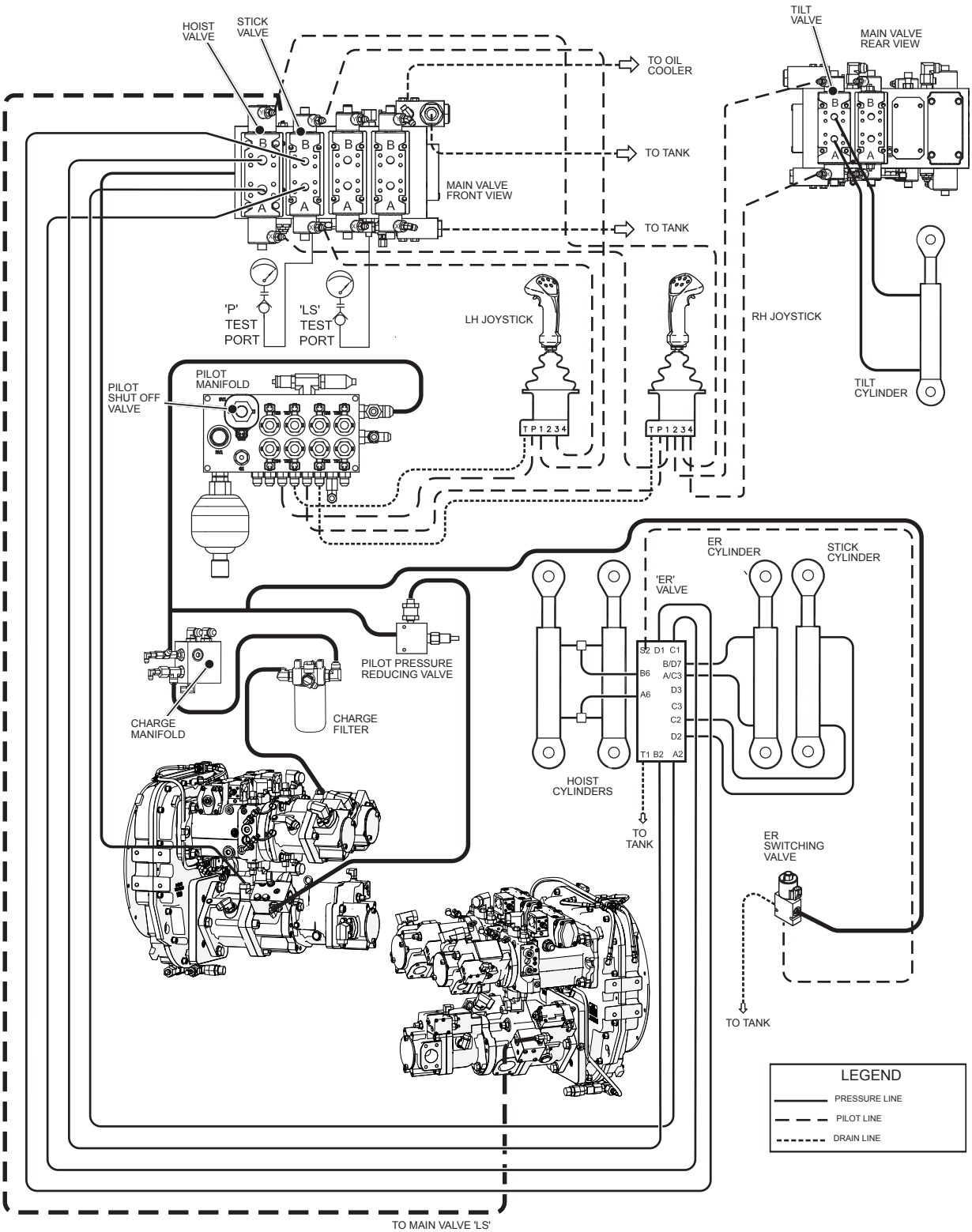


845-32 **TRACK SLIDE WEAR**



845-33 **SECTION A - A**

The wear occurs on the top of the track slide as the chain links slide along and this wear will reduce the clearance between the track guide and the chain link bushings. When this clearance disappears the chain link bushings will start to wear.



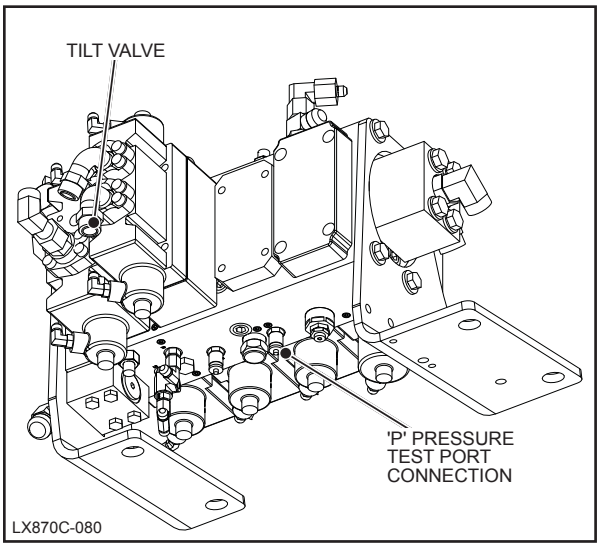
LX870C-084

ER BOOM SYSTEM AND TILT HYDRAULIC CIRCUIT

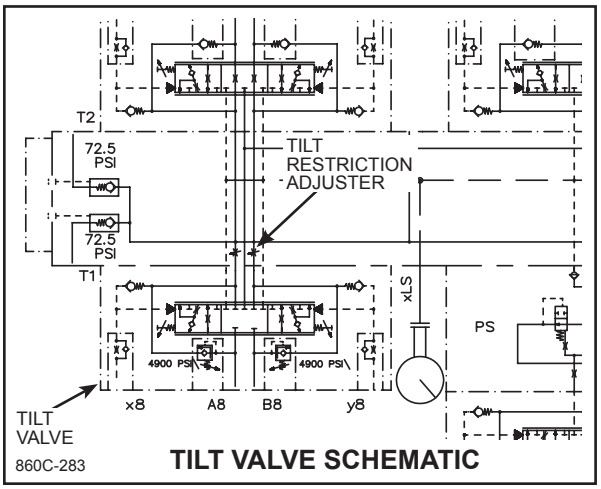
TILT CYLINDER FLOW AND SPEED ADJUST

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.

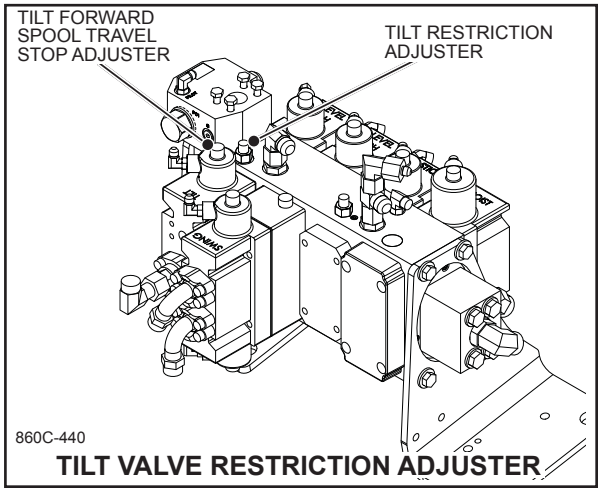
1. Ensure the hydraulic oil is at operating temperature.
2. Connect a 0-5000 psi pressure gauge on 'P' test port of the main valve manifold.



3. Start the engine and set the throttle speed to the FULL position.
4. Close the cab door and press the PILOT RESET switch to activate the pilot system.
5. Place the anti-stall switch in OFF position and place the fan in SERVICE mode via the computer.
6. Raise the boom and place the felling head in the fully TILT BACK position (cylinder fully retracted).



TILT VALVE SCHEMATIC



TILT VALVE RESTRICTION ADJUSTER

7. Have an assistant hold the joystick in the fully TILT FORWARD position.
8. Loosen the locknut on the restriction adjustment screw.
9. Observe the pressure gauge and record the TILT travel speed from stop to stop**.
10. Use the restriction adjustment screw to adjust the speed and use the spool travel stop adjustment on the main control valve to maintain **800-1000 psi** pump pressure.

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

    If the pump pressure reading is too low, turn the TILT spool travel stop adjusting screw counterclockwise (OUT) [top adjuster] to increase flow. If the pressure is too high, turn the adjusting screw clockwise (IN) to decrease flow.

    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.
11. Tighten the locknut on the restriction adjustment screw taking care NOT to turn the adjusting screw at the same time.
12. Check the pressures again after tightening the locknut.

LEVELING CIRCUIT DESCRIPTION

Hydraulic oil for the leveling function is supplied by the main pump.

The leveling hydraulic system is integrated into the load sensing system or the main hydraulic system. Two valve sections on the main control valve supply oil to the rod and base ends of the two leveling cylinders.

The pilot manifold supplies lower pressure pilot oil to the pilot end caps of the two valve sections on the main control valve.

Two switches on the left joystick and two switches on the right hand joystick operate the leveling functions.

NOTE: The joystick switch positions shown in this manual are factory installed and do not reflect changes or modifications made after shipment. Verify all functions before operating this machine.

When the operator presses the level left, level right, level forward or level back switch, a signal (VOLTAGE IN - Level Left, Level Right, Level For or Level Rear) is sent to the IQAN computer control system. The computer control system generates two signals (CURRENT OUT - Right Level Cylinder and CURRENT OUT - Left Level Cylinder) which are sent out to the corresponding solenoids on the main control valve activating the LEVEL LEFT, LEVEL RIGHT, LEVEL FORWARD or LEVEL BACK function.

During leveling, the two leveling cylinders are in operation at the same time and in synchronization with each other in order to provide a level platform. They oppose each other when tilting LEFT/RIGHT and work together when tilting FORWARD/BACK.

The left leveling cylinder retracts while the right cylinder extends to tilt LEFT. To tilt RIGHT, the right leveling cylinder retracts while the left cylinder extends. Both cylinders extend at the same time to tilt FORWARD or retract at the same time to tilt BACK.

Each cylinder is equipped with a counterbalance valve for pressure relief and load holding.

Refer also to SECTION 18 of THIS MANUAL for wrist and clamps circuit information.

LEVELER COMPONENT LUBRICATION

SIDE PIVOT AXIS BEARINGS

Shown below are the lubrication points on the 2 Cylinder Leveler.

The grease points for the side to side pivot pin tapered roller bearings are located under a ¾ NPT plug on either side of the bearing housing lug (2 grease points per bearing). The greasing interval for the roller bearings is about 10 shots every 250 hours.

A bronze thrust washer exists in the rear lug arrangement and receives grease from two grease lines connected to the underside of the Leveler cylinder covers. The grease interval is about 5 shots every 8 hours. Grease will normally exit the bronze bearing face but occasionally it will travel from this zone through the tapered roller bearing and exit at the extreme rear lug connection.

The other grease point on the leveler cylinder cover directs grease to the lower ball bushing of the leveler cylinder. The grease interval for the leveler cylinders is about 5 shots every 8 hours.

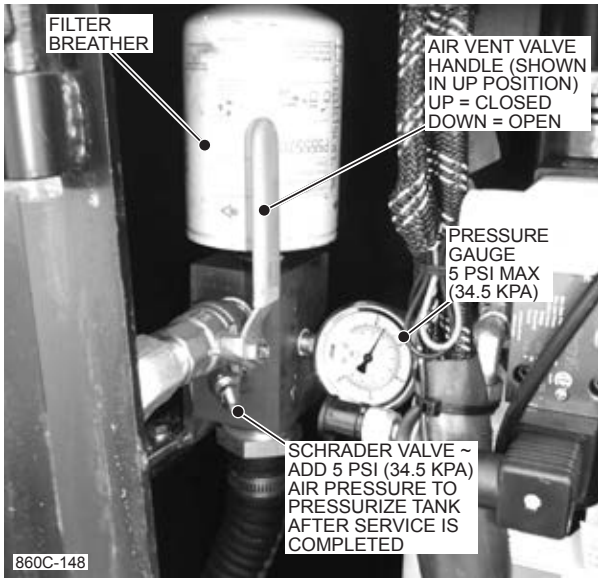
FORE/AFT PIVOT BEARING

The fore/aft pivot axis bearing is shown above. The grease point for the roller bearing is located under a ¾ NPT plug on the stub shaft flange (1 grease point per bearing). The greasing interval for the roller bearings is about 10 shots every 250 hours. If the bearing housing is frequently submerged the greasing interval should be increased to 8 hours.

There is no adjustment required in the fore/aft pivot arrangement and if more than .030” movement is detected in either the axial or radial direction contact Tigercat Engineering for service recommendations.

HYDRAULIC TANK PRESSURIZATION INSTRUCTIONS

IMPORTANT! PRESSURIZED HYDRAULIC TANK. 34.5 kPa (5 psi) MAXIMUM.
Before servicing the hydraulic system, release air pressure from tank using air vent valve.



To release pressure from the hydraulic tank:

Wearing eye protection, release air from the hydraulic tank by opening the AIR VENT VALVE. pull the valve handle down 90° to open. Push the valve handle up to close.

NOTE: Expelled air from the vent valve will blow accumulated loose debris in the enclosure.

Releasing hydraulic tank pressure in the event of a hose breakage may reduce oil loss.

IMPORTANT!

The air vent valve must be opened before changing hydraulic filters and strainers or performing any other service on hydraulic circuits. Do not operate machine with the air vent valve in the open position.

During a filter change or return hose replacement, air is able to enter the return hydraulic circuit. It is important to bleed as much of this air out as possible prior to restarting the machine. See **HYDRAULIC OIL RETURN FILTERS *filter change procedure*** for instructions on bleeding air from return circuit. AIR BUBBLES IN THE HYDRAULIC SYSTEM WILL DAMAGE THE PUMPS.

After the service is completed, close the air vent valve and add air pressure from a clean air source to the hydraulic tank via the schrader valve. **Do not exceed 34.5 kPa (5 psi)**.

Tigercat X870C/LX870C FELLER BUNCHER
SECTION 15 - SWING

ISSUE 1.0, MAY 2015

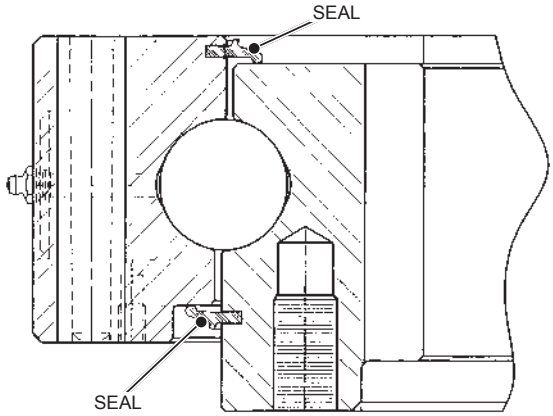
CONTENTS - SECTION 15

SWING BEARING SEAL REPLACEMENT

INSTALLATION INSTRUCTIONS

1. Remove all traces of the former seal and glue from the seal groove.
2. The groove must be cleaned with a non-residue commercial solvent.
3. Wipe the new seal with the same solvent.
4. Apply a bead of adhesive (BN157) to the seal groove (avoid extrusion of the adhesive into the bearing cavity as the seal is installed.)
5. Insert the seal into the groove and trim the excess with a sharp knife or pruning shears to allow adjoining end to mmet smoothly (the length of the seal provided is longer than required).
6. Place a drop of adhesive (BN158) on one end and immediately butt the two ends together, aligning them as quickly as possible.
7. Hold the ends together, without movement (motion weakens and may destroy the bond). After 2 minutes the joint will be strong enough.

   NOTE: Read the precautions on the adhesive container. Avoid skin contact; it will bond them together.
8. Coat the joint with grease from the bearing (moisture or high humidity may weaken the bond unless protected with grease).
9. Examine the seal for contact with the seal surface on the race ring.
10. To remove any foreign matter, re-grease the bearing until the grease extrudes from under the seal.



SWING BEARING SEAL

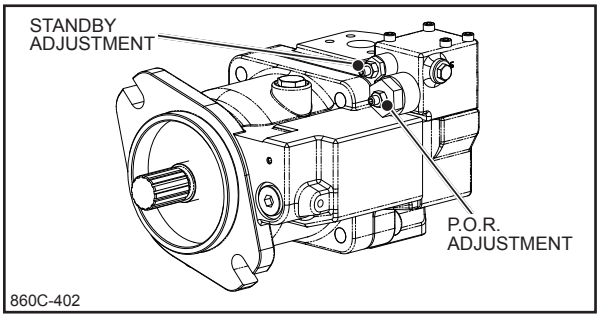
SWING MOTOR INSTALLATION

1. Install a new O-Ring into the groove on the top of the swing drive gearbox.
2. Place the swing motor on the swing gearbox.
3. Apply Blue LocTite #242 to the 4 bolts (removed in Step 6 - Removal of Swing Drive Gearbox) and insert them into the holes, with washers, to attach the swing motor to the swing gearbox. Torque to specification. See Torque Chart in SECTION 3 of the OPERATOR'S MANUAL.
4. Re-connect all hydraulic hoses and grease lines.

PRESSURE SETTINGS:

PUMP AND SAW CONTROL VALVE

1. Park the machine on flat level ground.
2. Ensure that the attachment is resting squarely on a solid footing.
3. Turn the engine OFF.
4. Block the saw blade from rotating. Refer to methods outlined in the saw head manufacturer's manual.
5. Ensure that the hydraulic oil is at operating temperature.
6. Install a 0-350 Bar/0-5000 psi pressure gauge on the saw valve G2 gauge test port.
5. On the pump compensator valve:



   - Loosen the jam nut on the POR adjusting screw, and turn the adjusting screw all the way in. Tighten the jam nut.

     NOTE: Do not use excessive force; stop when the resistance increases sharply.

   - Do not adjust the stand-by adjusting screw at this time.

6. On saw control valve, slacken the jam nut and turn the adjusting nut on the saw control relief valve counterclockwise (OUT) until spring pressure is relieved.
7. Turn the engine ON and set the throttle control to the idle position.

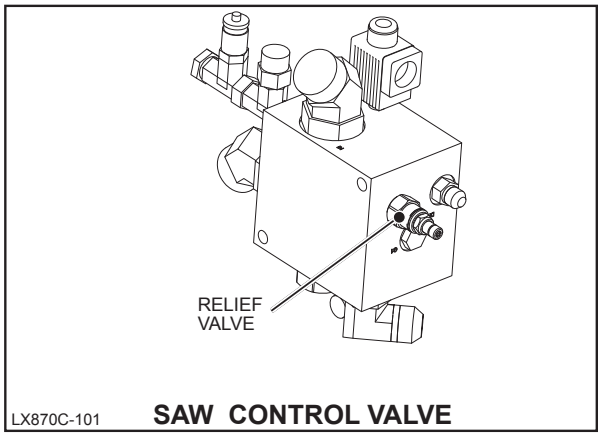
IMPORTANT!
Before turning the engine ON, ensure the saw relief valve is unscrewed as stated in step 6, otherwise damage could occur to the piston pump.

8. Close the front door and press the pilot reset switch to activate the pilot system.
9. Turn the saw switch ON.

   NOTE: The saw will not operate with the pilot system OFF. Interruption of the pilot system electrical signal disables the saw relay switch and disconnects the saw electrical circuit.

   NOTE: If the engine is turned OFF or, the pilot shut off system is tripped (Front Door Opened), with the saw switch left in the ON position, the saw will not start up when the engine is restarted or the front door is closed. In this case, press the pilot reset button and turn the saw switch OFF and then ON.

IMPORTANT!
The saw relief valve must be set to at least 27.6 Bar/400 psi above the pump POR to avoid generating excessive heat.



SAW CONTROL VALVE

10. Set the saw control valve relief pressure to 296 bar (4300 psi) by slowly screwing the relief valve adjusting screw clockwise (IN) until the required pressure reading is obtained.
11. Tighten the jam nut, making sure the adjusting screw does not turn.
12. Set the POR on the pump compensator to 248 bar (3600 psi) [or to saw head manufacturer's recommended value, whichever is lower] by slowly screwing the relief valve adjusting screw counterclockwise (OUT) until the required pressure reading is obtained.
13. Tighten jam nut, making sure adjusting screw does not turn.
14. Turn the saw OFF and observe the gauge. If required, adjust the screw on the stand-by valve to obtain a reading of 21 bar (300 psi) on the gauge.
15. Turn the engine OFF and remove the pressure gauge.

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.

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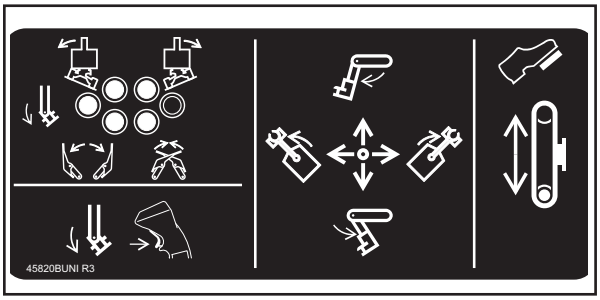
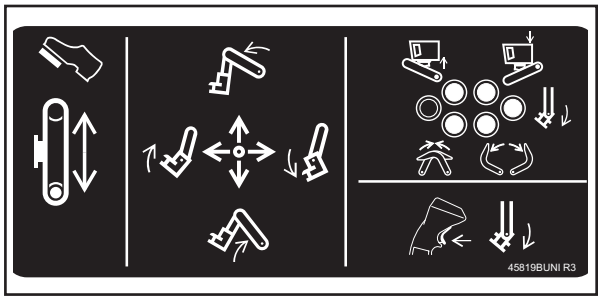
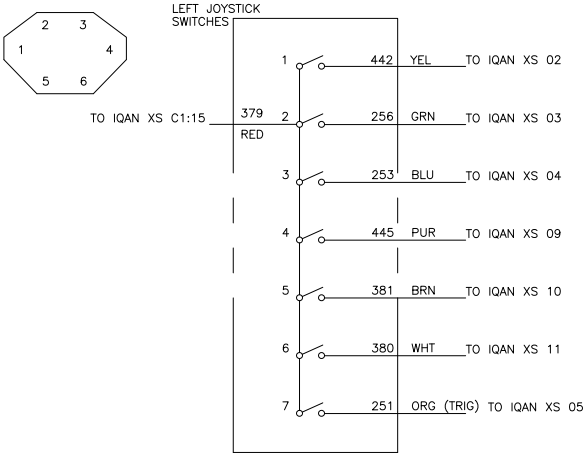
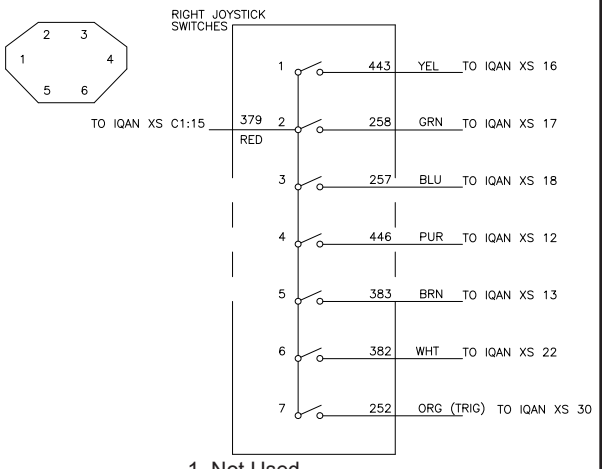
860C-310







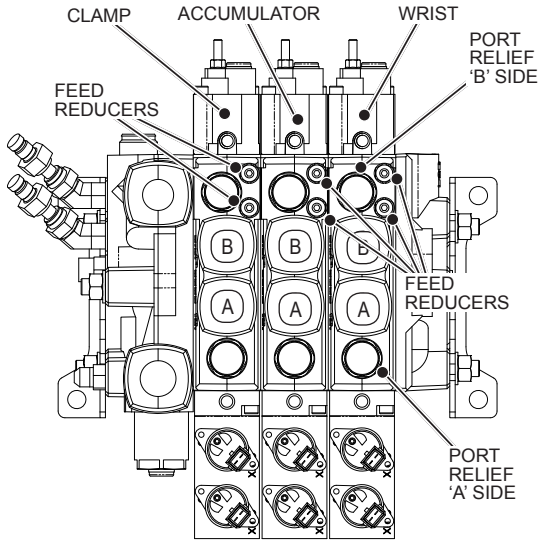
1. Not Used
2. Level Left (if equipped)
3. Level Right (if equipped)
4. Not Used
5. Accumulator Arm Open
6. Accumulator Arm Close
7. Not Used



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

860C-374
860C-375

JOYSTICK ELECTRICAL CIRCUIT (FACTORY INSTALLATION SHOWN)



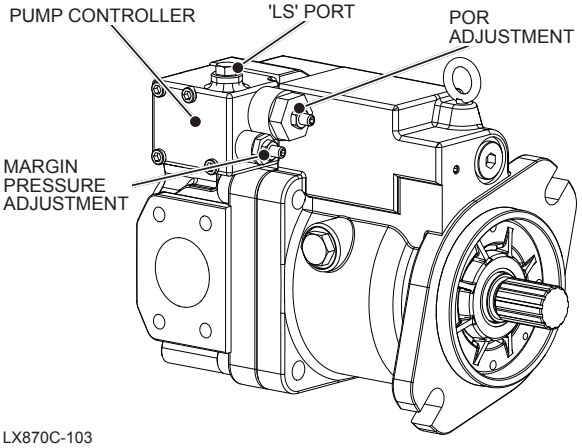
ATTACHMENT VALVE

ACCUMULATOR ARM

1. Loosen the lock nuts.
2. Turn the feed reducer screws clockwise (IN) all the way.
3. Tighten the lock nuts.
4. Ask an assistant to operate the CLAMP ARM CLOSE function (cylinder fully extended) as you loosen the locknut on the POR adjustment screw on the attachment pump and turn the screw clockwise (IN) until the gauge reading is 280 bar (4060 psi) [Main Pressure Relief Valve Setting].

   If the pressure will not go past 276 bar (4010 psi), replace the port relief valve cartridge. If the pressure still will not go past 276 bar (4010 psi), replace the main relief cartridge.

   If the pressure is greater than 283 bar (4110 psi), replace the port relief valve cartridge. If the pressure is still greater than 283 bar (4110 psi), replace the main relief cartridge.
5. Loosen the lock nuts.
6. Set the feed reducer screw so the pressure gauge reading is 221 bar (3200 psi).
7. Tighten the lock nuts.
8. Repeat steps 4 through 7 for the ACCUMULATOR ARM OPEN function (cylinder fully retracted).



ATTACHMENT PUMP COMPONENTS

WRIST

1. Loosen lock nuts and turn feed reducer screws in all the way and tighten lock nuts.
2. With the aid of an assistant raise the boom and rotate the felling head fully to one side. While holding the joystick wrist trigger switch depressed, check gauge pressure reading.

   If less than 276 bar (4010 psi) or greater than 283 bar (4110 psi) replace the port relief valve cartridge.
3. With the boom raised, rotate the felling head fully to the other side. While holding the joystick wrist trigger switch depressed, check gauge pressure reading.

   If less than 276 bar (4010 psi) or greater than 283 bar (4110 psi) replace the port relief valve cartridge.
4. Loosen lock nut.
5. Set feed reducer screws so pressure gauge reading is 221 bar (3200 psi) in both directions.
6. Tighten the lock nuts.
7. Reset pump POR to 207 bar (3000 psi).
8. Set throttle to LOW IDLE, shut engine off and remove gauges.