Tigercat®

X822D/LX822D/X830D/LX830D FELLER BUNCHER

OPERATOR'S MANUAL

SERIAL NUMBER 82263001 TO 82264000
SERIAL NUMBER 82273001 TO 82274000
SERIAL NUMBER 83063001 TO 83064000
SERIAL NUMBER 83073001 TO 83074000

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US Environmental Protection Agency (EPA) Warranty Certificate

Tigercat Industries Inc. (Tigercat) warrants to the ultimate purchaser and each subsequent purchaser that the engine is designed, built and equipped so as to conform with US Environmental Protection Agency (EPA) regulations applicable at the time of manufacture and that it is free from defects in workmanship or material which would cause it not to meet these regulations for a period of:

- 2 years or 1,500 hours of operation, whichever occurs first, for engines less than 19 kW (25 Hp)
- 5 years or 3,000 hours of operation, whichever occurs first, for engines greater than or equal to 19 kW (25 Hp)

NOTE: *This warranty applies to all units operated in the United States or Canada.*

Coverage

The model year, class of diesel engine, and emission application determination for your engine are identified on the Emission Control Information Label. This label is affixed to one of the following areas of the engine: the top of engine's rocker arm cover, the right-hand side of the oil pan, and the right-hand side of the engine front gear cover. The warranty period begins on the date the new equipment is sold to the first retail purchaser. The presence of the emission control label is the indication that the engine conforms to the applicable standards. Any emission control system parts which are proven defective during normal use will be repaired or replaced during the warranty period.

The engine owner has responsibility to perform all the required maintenance listed in the Operation and Maintenance Manual. Tigercat will not deny an emission warranty claim solely because no record of maintenance exists; however, a claim may be denied if failure to perform maintenance resulted in the failure of a warranted part.

It is recommended that replacement parts used for maintenance or repairs be Tigercat Service Parts to maintain the quality originally designed into your emission certified engine. The use of non- Tigercat parts does not invalidate the warranty on other components unless the use of such parts causes damage to warranted parts.

The manufacturer is liable for damages to other engine components caused by the failure of any warranted emission control system part. Tigercat is not responsible for failures resulting from improper repair or the use of parts that are not genuine Tigercat or Tigercat approved parts.

Component coverage

New engines certified for sale and registered will have the following items covered by the emission warranty, depending on the emission level of the engine, if the items were first installed on the new engine as original equipment:

Fuel injection system

- Fuel injection pump
- Fuel injectors
- Fuel injection lines

Air induction system

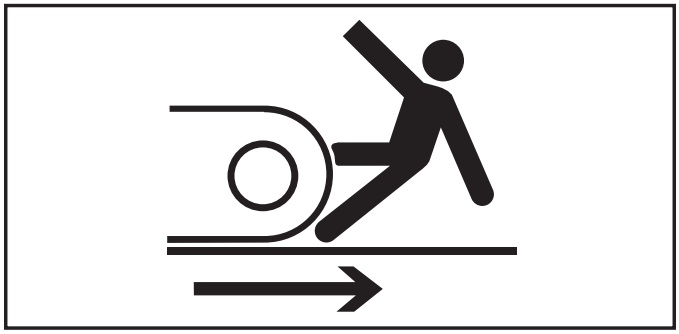
- Intake manifold
- Turbocharger system (includes exhaust manifold)
- Charge air cooler

Positive Crankcase Ventilation (PCV) system (if applicable)

- PCV valve
- Oil fill cap

AVOID INJURY FROM BACKOVER ACCIDENTS

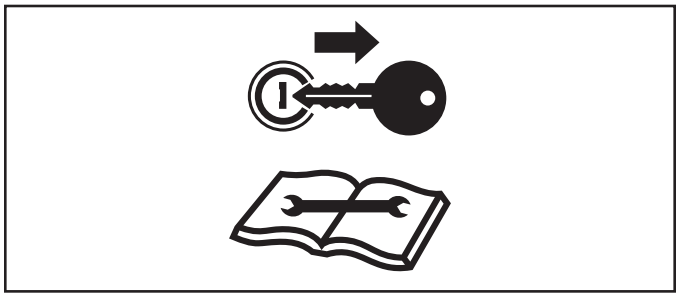
- Before moving the machine, be sure all persons are clear of the area.
- Be alert for bystanders moving into the work area. Use the horn to warn bystanders before moving the machine.
- When using a signal person, keep the person in view at all times. Be sure the signal person is clear before backing up.



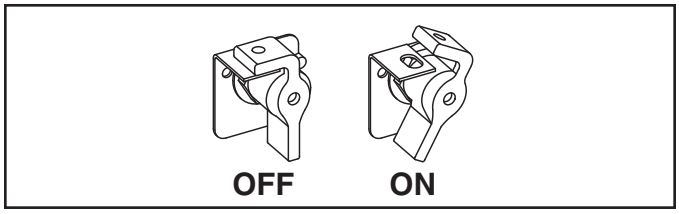
- To avoid backover accidents:
  - Look around before you back up. Be sure everyone is clear.
  - Keep the machine motion alarm in working condition. The motion alarm must sound when the machine is moving forward or in reverse.
  - Use a signal person when backing up if the view is obstructed. Keep the signal person in view.
  - Learn the meaning of all flags, signs and markings on the job site and who is responsible for signalling.
  - Keep all windows, mirrors and lights in good condition.
  - Dust, heavy rain, fog, snow, etc., can reduce visibility. As visibility decreases, reduce speed and use proper lighting.

SERVICING SAFETY PRECAUTIONS

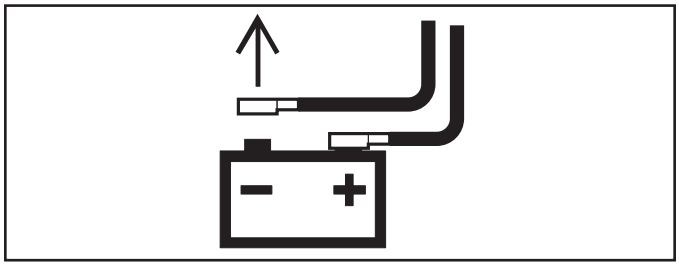
- Conduct maintenance inspections at least as frequently as recommended in SECTION 3.



- Read, understand and follow all operating safety precautions specified by the harvesting attachment manufacturer.

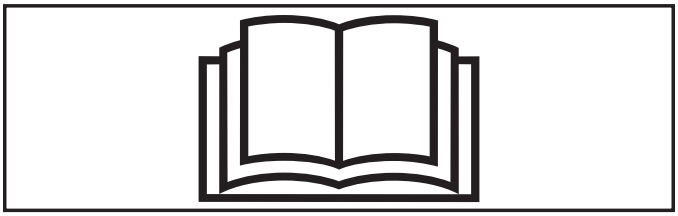


- When servicing or repairing equipment, turn OFF the engine, turn OFF the battery disconnect switch and lock out the switch in accordance with local regulations.



This machine is equipped with a remotely operated battery disconnect relay. Some wiring on the machine is live even when the battery disconnect switch is OFF. When servicing the electrical system, disconnect the negative (-) battery cable from the battery.

- Install a 'DO NOT START ENGINE' sign on the operator cab door and in the engine compartment when making repairs to the machine.



- Before performing maintenance or repair work on any equipment, consult the instruction manual provided by the manufacturer and follow the recommended procedures.

  The cooler package should be cleaned and serviced at least daily to maintain moderate engine temperatures.

⚠ WARNING

- **Before servicing the machine, allow the engine cooling system, fuel system, exhaust system, 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).**

⚠ WARNING

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

- Never use your bare hand to check for fluid leaks.

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 fibreglass 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, takes advantage of the skin effect and are therefore safe in electrical storms.

However, machines with only a rollover canopy, 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: 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:

Run to the nearest building, motor vehicle or fully enclosed ROPS equipment cab immediately. Being anywhere outside is not safe.

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.

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.

IF YOU ARE CAUGHT OUTSIDE AND HAVE NOWHERE TO GO:

- Avoid wide-open areas where you project above the surrounding landscape.
- Seek shelter in a low place, such as a ditch, ravine, valley, canyon or cave.
- Get away from open water such as ponds or streams.
- Do not take shelter under any isolated tall trees or small groups of trees.
- Seek shelter amongst the dense, thick growth of the shortest trees.
- Avoid entering any small enclosures or shelters.
- Do not seek shelter under any motor vehicle or heavy equipment.
- Keep clear of any materials that can conduct electricity such as wire fences and gates, metal pipes, poles, rails and tools.
- Stay at least 15 m (50 ft) away from metal objects such as a fuel tank, a vehicle or machinery without a cab, motorcycle, ATV, etc.
- Stay at least 5 m (16 ft) apart from any other members of a group so lightning won’t travel between you.
- Do not use the telephone except for emergencies.

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.

CUTTING HAZARD

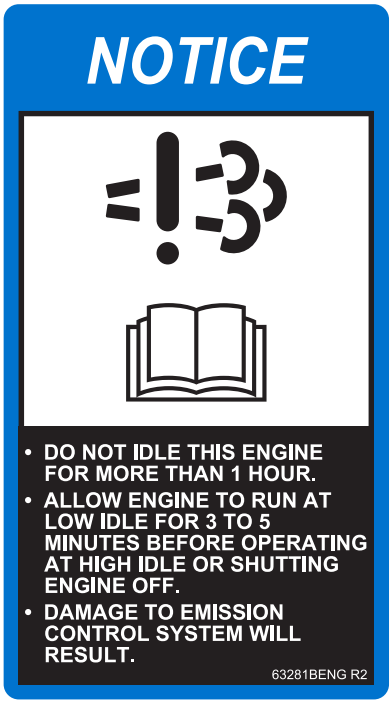
This label informs you of the cutting hazards of the cooling fan blade when the engine is running.

Keep clear of cutting hazards caused by rotating components.

Do not place hands or fingers in this area. Rotating parts such as cooling fan blades can cause entanglement of body parts resulting in serious injury.

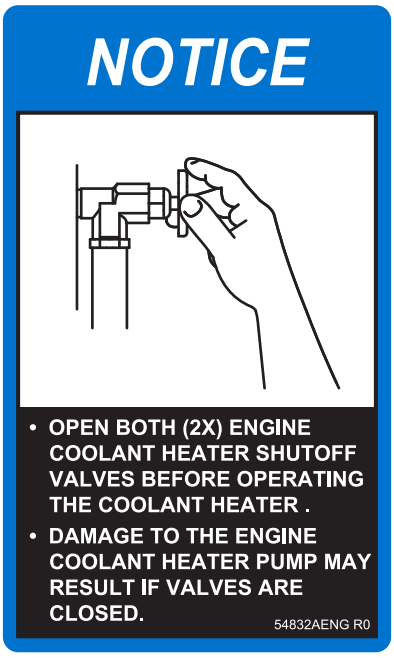
Keep hands and fingers clear of rotating fan blades! Before performing any service work on these parts or in this area, turn off the engine and wait for rotating parts to come to a complete stop.

ENGINE IDLE (T4F ENGINES)

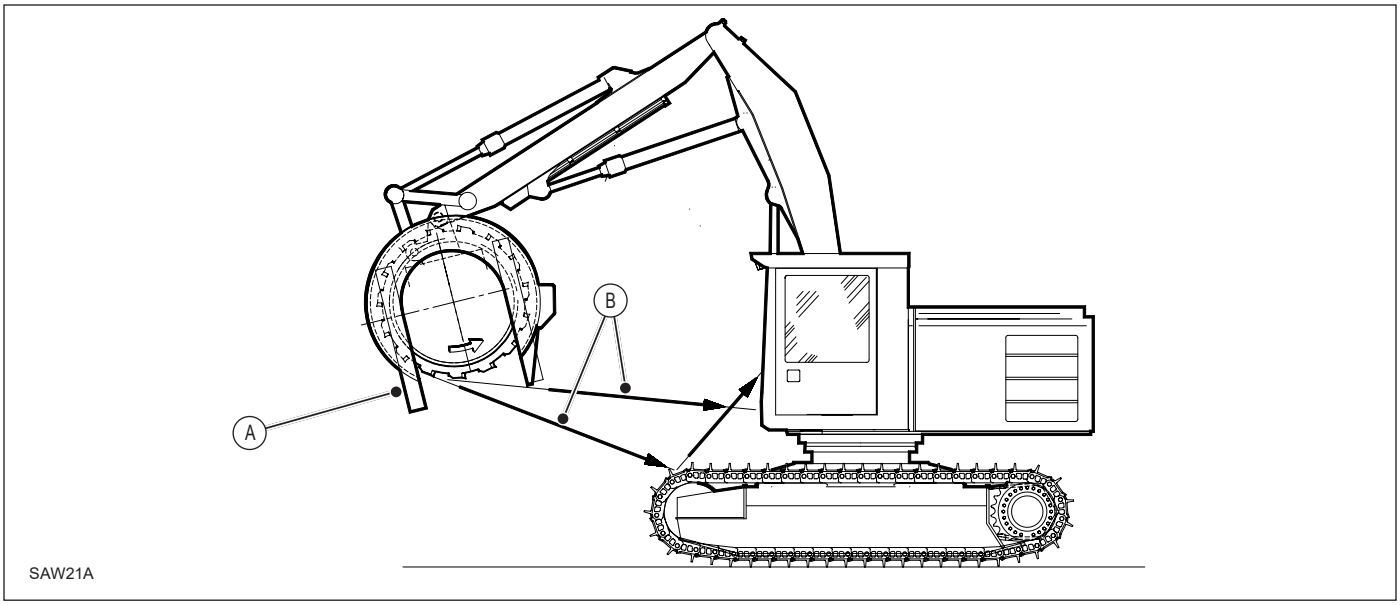


This label reminds operators to idle the engine for no longer than one hour at a time, to prevent damage to the emission control system.

ENGINE COOLANT SHUT-OFF VALVE (MACHINES EQUIPPED WITH ENGINE COOLANT HEATER)



This label indicates that damage to the engine coolant heater pump may result if the engine coolant heater is operated with the engine coolant shut-off valve(s) closed.



Disc Saw Felling Head with High Angle Wrist Rotation Capability

A Long Snout on Outgoing Side
B Discharge Paths

It is essential that the housing have a long snout on the ingoing side and, if equipped with a chip escape port, it should be guarded.

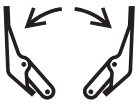
With these high mechanical freedom arrangements, there is a chance that an unforeseeable operator misadventure or equipment failure could result in an accidental direct or deflected throw at the operators cab. The cab should be capable of resisting such accidental and ricochet throws. The velocity energy of metal or rock pieces leaving the blade is extremely high. The operators cab cannot be considered safe to routinely operate in the chip throw area, even if it has been constructed to prevent penetration by accidentally thrown objects.

PICTOGRAM DESCRIPTIONS

Diagrams in pictorial form are used to represent machine function operation. They are a simple universal language of symbols or pictograms that illustrate a function or component without the use of words.

Examples of these pictograms are the turtle and the rabbit , often used to describe speed such as SLOW = or FAST = .

Accumulator Arms AUTO



Accumulator Arms OPEN

Accumulator Arms CLOSE

Adjustment Menu

Air Conditioner ON

Air Conditioner OFF

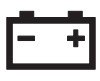
Air Source–FRESH AIR

Air Source–RECIRCULATE

Alert Message

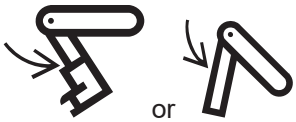
Auxiliary Power Outlet 12 V

Auxiliary Power Outlet 24 V

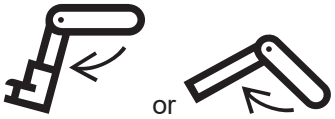


Battery Connect

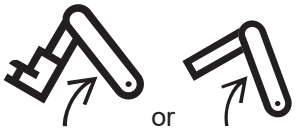
Battery Disconnect



Boom IN



Boom OUT



Boom UP

Boom DOWN

Boom IN–TELESCOPIC

Boom OUT–TELESCOPIC

Clamp Arms CLOSE

Clamp Arms OPEN

Control Lever Multiple Direction

Critical Error Message Saved

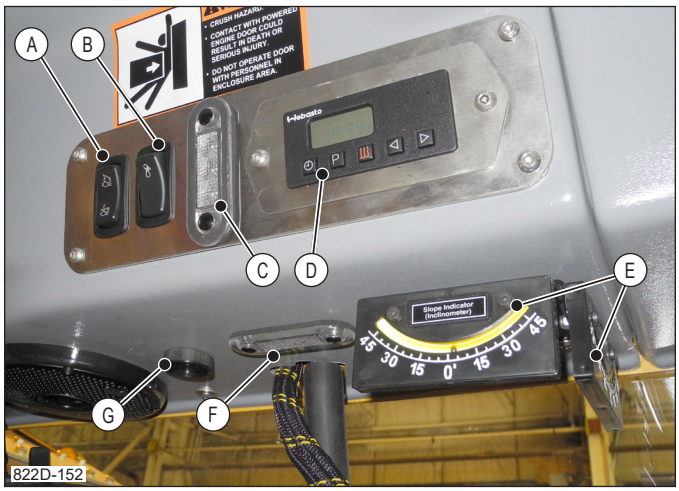
Critical Message

Diesel Exhaust Fluid (DEF)

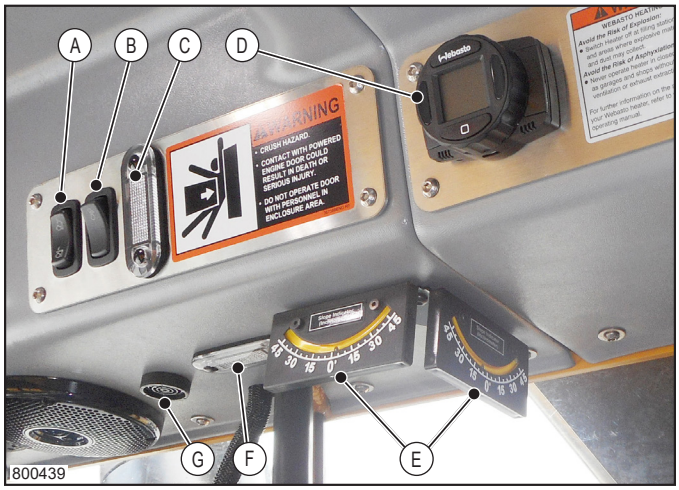
Defrost, Front Window

Disc Saw

CONTROL PANEL (UPPER-RIGHT)



8***3001–8***3053	
A	Engine Compartment Power Roof Switch
B	Service Work Light Switch
C	Service work Light Indicator Light
D	Engine Coolant Heater Control Panel
E	Slope Indicators
F	Alarm Light
G	Alarm



8***3054–8***4000	
A	Engine Compartment Power Roof Switch
B	Service Work Light Switch
C	Service work Light Indicator Light
D	Engine Coolant Heater Control Panel
E	Slope Indicators
F	Alarm Light
G	Alarm

ENGINE COMPARTMENT POWER ROOF SWITCH

This is a three-position momentary switch labeled (open)– (close), with a spring return to the centre OFF position. Push and hold the switch in the OPEN position to OPEN the roof and side engine door. Push and hold the switch in the CLOSE position to CLOSE the roof and side engine door.

CAUTION

Watch for personnel in the area of the power door before opening the door.

NOTE: The power door is equipped with a motion alarm that sounds when it is moved.

The power door is operated by a dedicated Electric Pump Hydraulic System located at the front of the pump compartment on the right side of the machine next to the boom. This system is self-contained with its own oil tank.

For more information, refer to SERVICE AND MAINTENANCE ACCESS DOORS AND COVERS in SECTION 3.

SERVICE WORK LIGHT SWITCH AND INDICATOR LIGHT

This is a two-position switch. Place the switch in the position to turn ON the service work lights. The amber indicator light will turn ON to notify the operator the service work lights are ON. Place the switch in the alternate position to turn OFF the service work lights.

The service lights are located in the following areas:

- Pump compartment
- Engine compartment
- Cooling compartment
- Hydraulic tank compartment

ALARM AND ALARM LIGHT

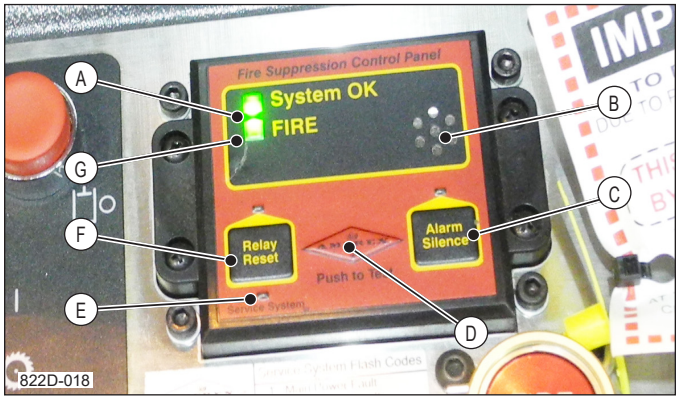
The computer displays messages and activates the alarm and alarm light whenever a system fault occurs.

NOTE: The computer will automatically perform a test at engine start up to ensure the alarm and alarm light are functioning. Refer to COMPUTER DISPLAY MESSAGES in THIS SECTION.

SLOPE INDICATORS

Two slope indicators are provided. One indicates forward and backward slope angle and the other indicates side-to-side slope angle.

USING THE FIRE SUPPRESSION SYSTEM



Fire Suppression System Control Panel	
A	System OK LED
B	Audible Alarm
C	Alarm Silence Button and LED
D	'Push to Test' Button
E	Service System LED
F	Relay Reset Button and LED
G	Fire Alarm LED

The machine leaves the factory with the fire suppression system fully activated.

NOTE: Machines shipped to international destinations have the fire suppression system deactivated to prevent accidental discharge. The in-line fuse for the power lead wire to the battery (in the battery compartment) is removed and wire tied to the fuse holder.

The system is not certified for use, certification must be performed by an approved local dealer.

NOTE: A pre-delivery inspection of the fire suppression system must be carried out to ensure the system is fully operational. This involves performing all daily and weekly inspection steps. Refer to INSPECTION OF THE FIRE SUPPRESSION SYSTEM AND PORTABLE EXTINGUISHERS in THIS SECTION.

Read the owners manual applicable to the system installed on this machine for additional information on operation, service and warranty requirements.

Refer to FIRE SUPPRESSION SYSTEM (OPTIONAL) in THIS SECTION for complete details.

The discharge is activated either automatically by the fire detection thermostats or manually by the operator.

The control panel mounted in the cab provides continuous monitoring of the system. It also automatically actuates the suppression system when signalled by the thermostats.

When the panel is connected to an operational configuration, the system will illuminate the green 'System OK' LED.

SYSTEM ALARM

When either the heat detection circuit has detected fire or the Manual Actuation Switch has been pressed, the following sequence will occur:

1. System OK LED will turn OFF.
2. The alarm buzzer will sound continuously.
3. The FIRE LED will illuminate.
4. The relay will engage at the expiry of the programmed delay (default is zero seconds).
5. The Relay Reset LED will illuminate.
6. The Service System LED will illuminate.
7. The Service System LED will flash four times to indicate actuator trouble.

When the FIRE LED first comes on, it will flash a number of times to indicate which hazard zone is in alarm.

The heat detection circuit corresponds to one zone and the manual actuation switch correspond to another zone.

The alarm flash codes are as follows:

- Heat Zone 1 Alarm 1 Flash
- Heat Zone 2 Alarm 2 Flashes
- Both Zones in Alarm 3 Flashes

The system will remain in alarm until the system has been serviced and the actuator has been replaced.

SERVICE SYSTEM

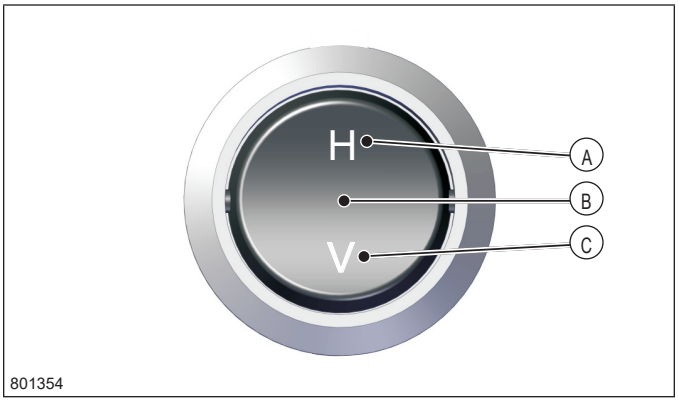
In the event of a system fault:

- The Service System LED will illuminate.
- The alarm will pulse.
- The Service System LED will flash to signify the fault source. The source of the fault can be determined as follows:
- Main Power Trouble 1 Flash
- Heat Zone 1 Trouble 2 Flashes
- Heat Zone 2 Trouble 3 Flashes
- Actuator Trouble 4 Flashes
- Backup Battery Trouble 5 Flashes
- Pressure Switch Trouble 7 Flashes

When a system fault is detected there is a five second delay before notification. For main power trouble, the delay for notification is 20 seconds.

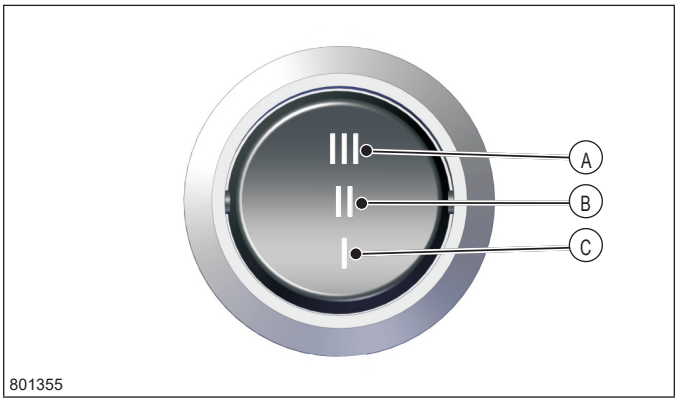
CLIMATE CONTROL SEAT SWITCHES

The climate controlled seat warms the seat using a integral heater or cools the seat by blowing cool air from inside the seat. The climate control switches are located at the front of the seat. The seat heater operates when the ignition switch is in the ON position.



Heater/Ventilation Switch	
A	Heated Seat
B	Seat Ventilation
C	Climate Control Off

The heater/ventilation switch has three positions. The H position activates the heated seat. The V position activates seat ventilation. The middle position turns OFF seat climate control.



Low-Medium-High Switch	
A	High
B	Medium
C	Low

The low-medium-high switch has three positions. It adjusts either the heat level of ventilation fan speed, depending upon the position of the heater/ventilation switch.

To operate the heated seat function:

1. Turn the ignition key to the on position.
2. Place the heater/ventilation switch in the H position.
3. Select heat level at the low-medium-high switch.

To operate the seat ventilation function:

4. Turn the ignition key to the on position.
5. Place the heater/ventilation switch in the V position.
6. Selection the fan speed at the low-medium-high switch.

HEIGHT ADJUSTMENT

To raise the seat, lift up on the control bar while partially lifting body weight from the seat. When the seat is at the desired height, release the lever and sit down.

To lower the height of the seat, lift up on the control bar while applying body weight to the seat. When the seat is at the desired height, release the lever and sit normally.

FORWARD AND BACKWARD ADJUSTMENT

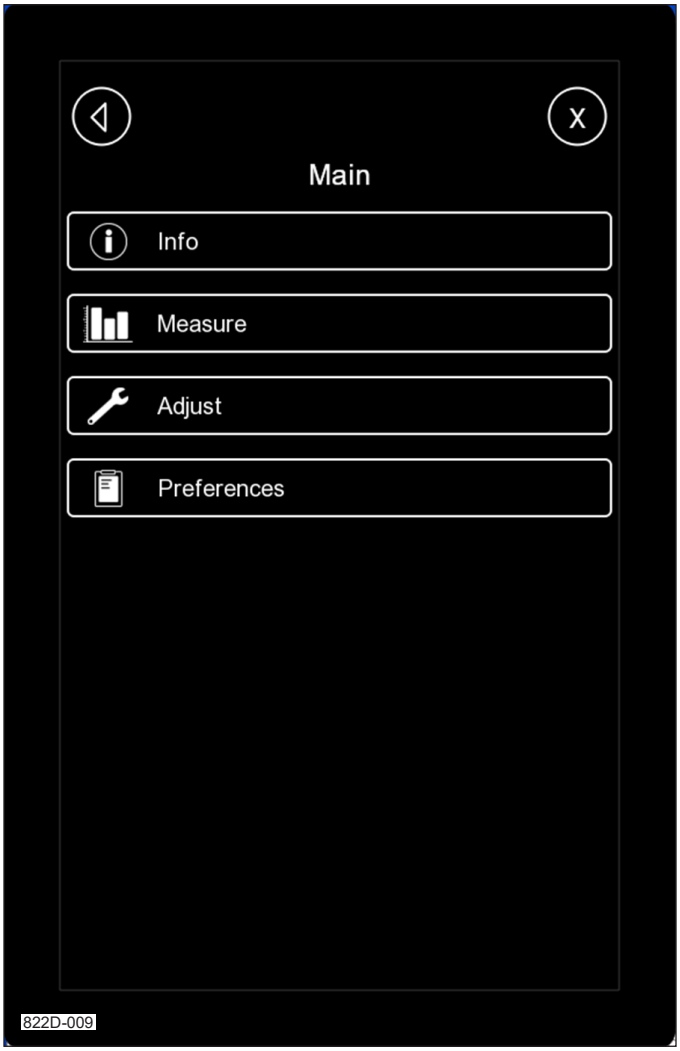
Move the lever to the side and slide the seat to the desired position. Release the lever and try to move the seat back and forth to ensure that it is securely locked into place.

SEAT BELT

Fasten the seatbelt before operating the machine. The belt should fit snugly to provide proper restraint. Do not permit the belt to become twisted or reversed.

MAIN MENU SCREEN

From the Home screen, tap the Main menu icon.



The Main menu displays the following selections:

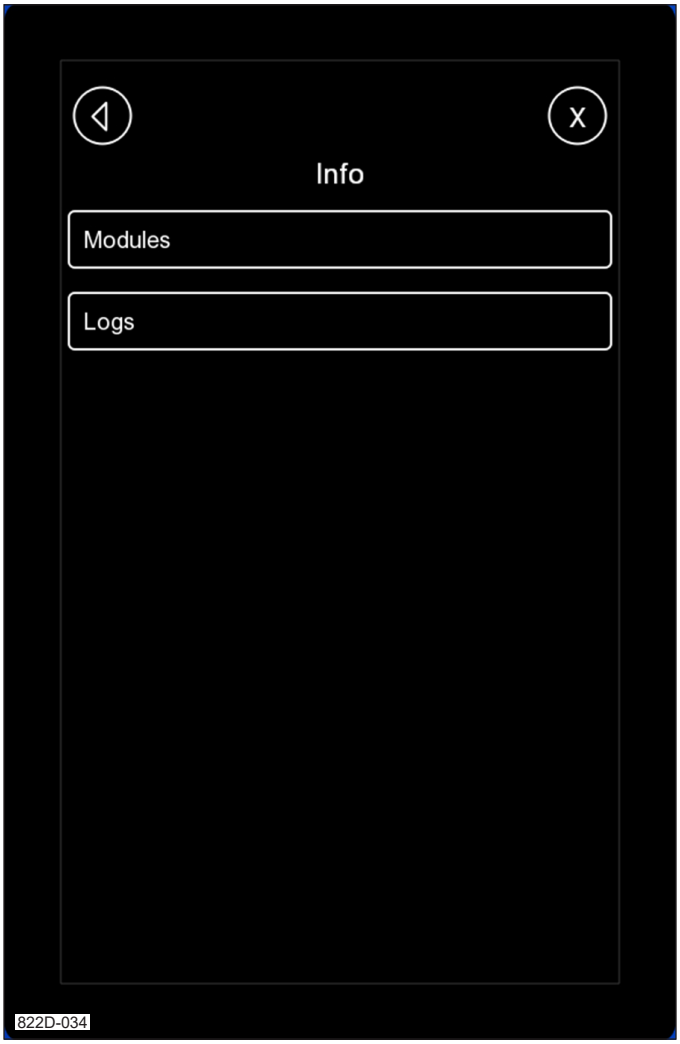
- Info
- Measure
- Adjust
- Preferences

The Back button will return you to the previous screen.

The Home button will return you to the Home screen.

INFO MENU

From the Main menu, tap the Info bar.



The Info menu displays the following selections:

- Modules
- Logs

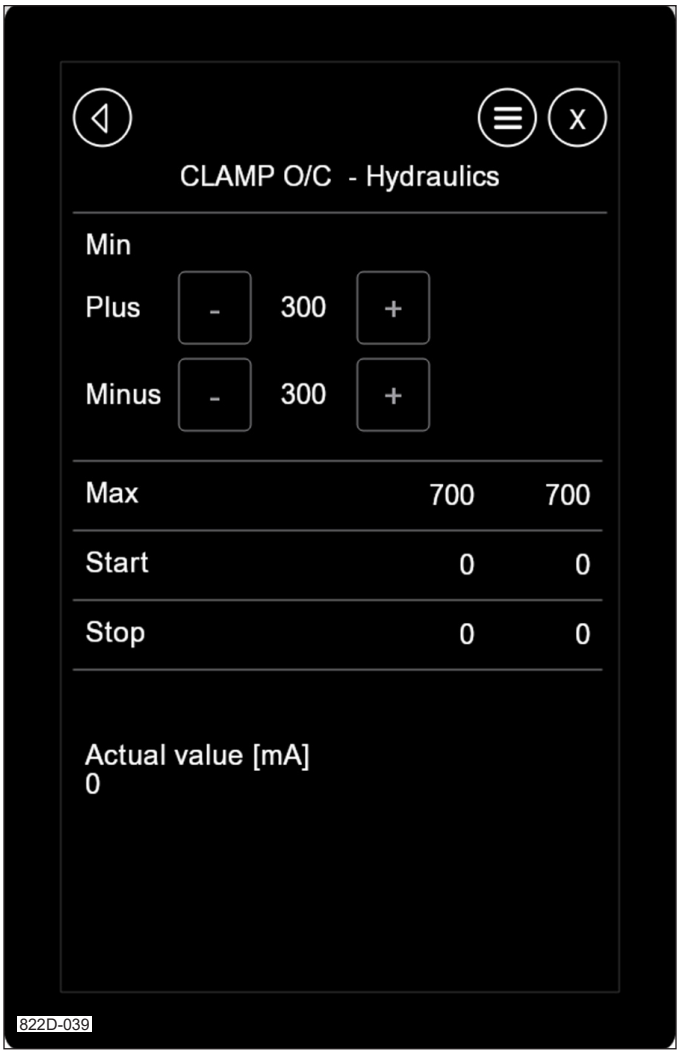
CLAMP DEFAULT SETTINGS

At any time during the adjustment procedures, you can reset to the factory default settings. Tap the Cancel/ Reset button, tap 'Reset' and then tap the button.

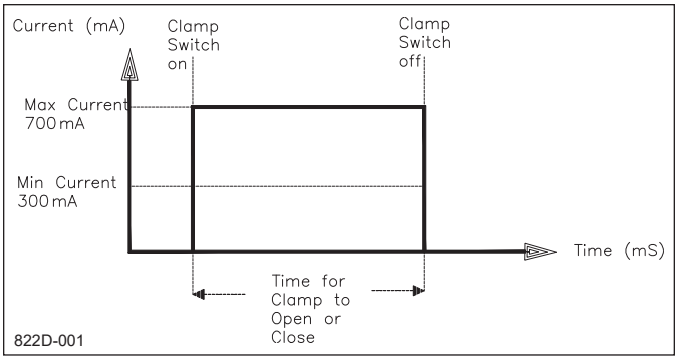
NOTE: This action will reset all values within the current menu.

CLAMP EXAMPLE (DEFAULT SETTINGS)

- Min mA =300
- Max mA =700
- Start Slope =0 ms
- Stop Slope =0 ms

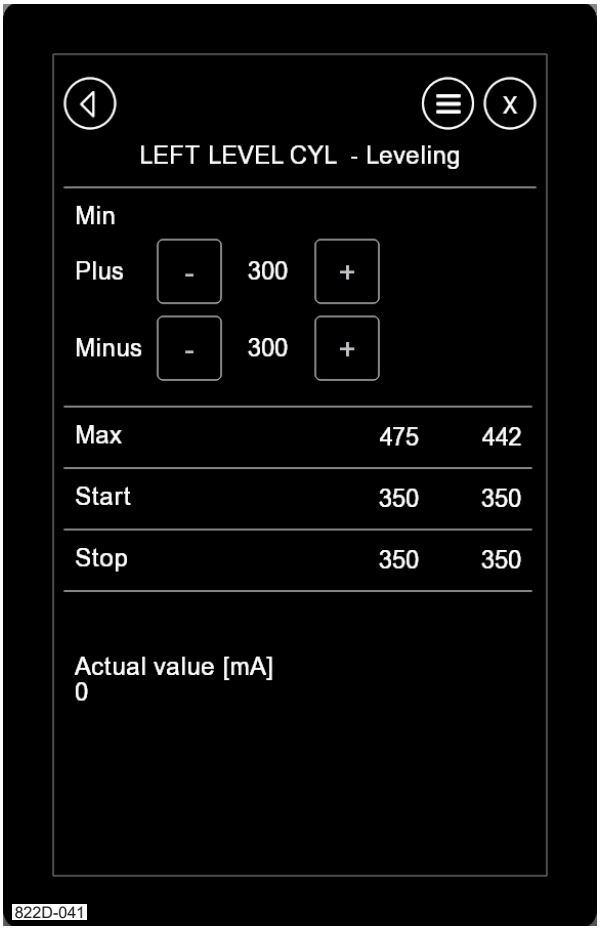


NOTE: The graph reflects the default settings and as the Start and Stop Slopes are set to 0 ms there is no ramp up or down showing the clamp will travel immediately at max speed once the button is activated.



LEFT LEVEL CYLINDER

From the Leveling menu, tap the LEFT LEVEL CYL button.



The Min Plus (cylinder extend) and Min Minus (cylinder retract) default setting is 300 mA and this should be used.

Tap the - / + buttons to adjust the value, if required. Once the setting has been adjusted tap the Max area.

To adjust the Max Plus (cylinder extend), activate and hold the Tilt Left function on the joystick and then tap the - / + buttons to adjust to the desired value.

To adjust the Max Minus (cylinder retract), activate and hold the Tilt Right function on the joystick and then tap the - / + buttons to adjust to the desired value.

Increasing or decreasing this value will speed up or slow down the cylinder speed. For the level cylinder function this value is typically about 600 mA, however it will vary slightly from machine to machine due to slight differences in the coils ,spool cut on the valve, various attachment manufacturers and also due to operator preference.

The Left Level Cylinder Min and Max settings have now been set. Tap the button to return to the Leveling menu.

The left and right (Plus – extend and Minus – retract) cylinder speeds have been set and now need to be checked to ensure Refer to cylinders extend and retract at the same rate.

Activate the Tilt Forward and Tilt Back functions on the joystick and make sure the cab tilts forward and back evenly without tracking to one side.

If the right cylinder extends faster than the left cylinder it bottoms out first. Reducing the Right (Max Plus – Extend) current reduces the speed at which the right cylinder extends to match the left cylinder speed and vice versa. Continue making the required adjustments until the cab tilts forward and back evenly without tracking to one side.

CRITICAL MESSAGES

Critical messages advise the operator a critical machine fault is about to occur or a system fault has occurred.

Critical messages have the highest level of priority and are used to alert the operator that immediate action must be taken to prevent damage to machine or to ensure operator safety.

When a critical message is displayed, the alarm and alarm light sounds and flashes continuously. The message remains on the screen until it is hidden by the operator.

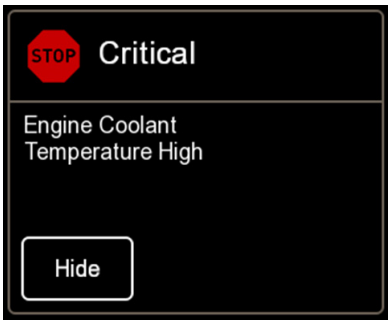
The message will give brief details of the fault and advise what action is necessary.

In some instances the machine requires immediate action to correct the problem which requires the operator to stop machine operation, turn OFF the engine and service the machine to correct the problem.

However, if the machine cannot be stopped immediately for safety reasons, the operator can hide the message. In this instance the machine should only be operated long enough to make the machine safe, then stop machine operation and turn OFF the engine before serious machine damage can occur.

Messages can be hidden by tapping the Hide button.

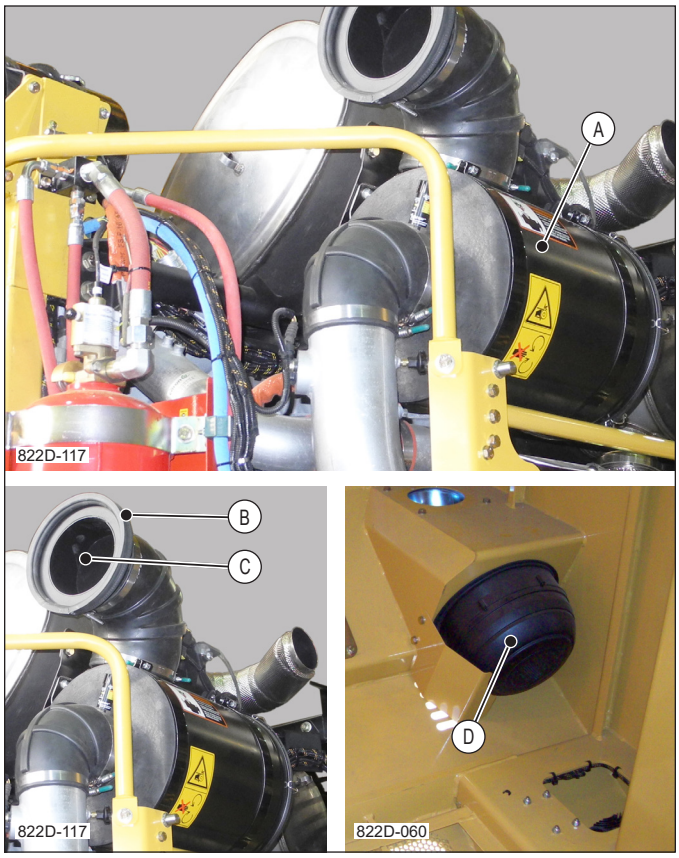
Critical messages flash the critical symbol in the top icon bar at the top of the display when active messages are hidden. The symbol continues to flash until the problem is resolved and the fault becomes inactive.



Hidden active messages, can be reviewed by tapping the critical symbol button in the top icon bar at the top of the display.

Critical messages:

- Hydraulic Oil Level Low
- Hydraulic Oil Temperature High
- Engine Stop
- Hardware Fault–Computer Display
- Hardware Fault–Engine
- Hardware Fault–XA2
- Engine Coolant Temperature High
- Engine Coolant Level low
- Engine CAC Temperature High
- Engine Oil Pressure Low
- Engine Fault Code Messages

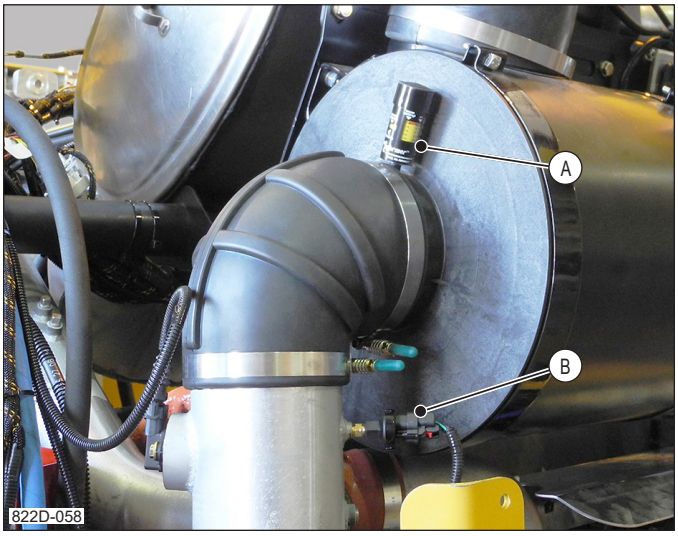


A	Air Cleaner
B	Air Intake Seal
C	Air Intake Area
D	Air Intake Precleaner

6. Check the air intake precleaner. Remove any blockages or obstructions. Refer to ENGINE AIR PRECLEANER in SECTION 3.

A	Fuel Filter/Water Separator

7. Check the fuel/water separator and drain any accumulated water into a bowl and clean up any spills. Refer to FILTER/WATER SEPARATOR DRAINING PROCEDURE in SECTION 3.



A	Filter Restriction Indicator
B	Filter Restriction Sensor

8. Check the air filter restriction indicator. Refer to FILTER RESTRICTION INDICATOR in SECTION 3.

TRAVELLING (BOOM RAISED)

1. Select the appropriate drive range.

   Place the track switch in the LOW or DRIVE position.

   When in LOW, the machine moves slower but with increased drive force. LOW should be selected when operating on sloped terrain.

   When in DRIVE the machine moves faster but with less drive force. Travelling over longer distances (and not harvesting) should be done in DRIVE to allow for faster travel speeds when the terrain permits. Also, do not travel continuously for longer than 10 minutes, take five minute breaks, this will help prevent the track drive gearboxes from overheating.

   For a more detailed description of drive range refer to TRACK DRIVE SWITCH in THIS SECTION.

2. Place the swing brake switch in the OFF position.
3. Move the speed control switch to HIGH IDLE.
4. Operate the drive foot pedals to manoeuvre the machine.

OPERATING TIPS WITH LOAD SENSING

When using the controls on a load sensing system, be aware of what the load sensing system is trying to do for you. If you move the lever or pedal 20% of its total angle, the system will provide whatever pressure it takes (up to its maximum capacity if needed) to meet this speed requirement. If you move the lever past the point needed in an attempt to speed up the boom movement, you will only overshoot the speed you wanted. Relax and try to use the least amount of lever action you can.

Load sensing systems respond to rough operation by amplifying these movements. If you find the boom is jerky or giving feedback, you're probably too active on the controls. If slowing down doesn't eliminate the roughness, the margin pressure setting may be too high and can be reduced to calm down the machine's response.

Refer to SET MARGIN PRESSURE in SECTION 4.

Refer to SET FLOW (FUNCTION SPEED) RATE in the appropriate BOOM, SWING or TRACK DRIVE sections.

ATTACHMENTOPERATINGINSTRUCTIONS AND SAFETY PRECAUTIONS

1. Tree harvesting on sloped terrain should be carried out in LOW driving range. Refer to TRACK DRIVE SWITCH in THIS SECTION.
2. Refer to GENERAL SAFETY PROCEDURES and the OPERATING SAFETY PROCEDURES in SECTION 1.
3. Read and understand the operating and safety instructions found in the ATTACHMENT MANUFACTURER'S DOCUMENTATION for the attachment installed on this machine.

GENERAL

⚠ CAUTION

All handles, steps and platforms must be kept free of grease, oil, fuel, mud, snow, ice and forest debris.

- Clean around fill caps before checking or adding fluids.
- Release pressure in hydraulic tank before breaking a connection. For machines with pressurized tanks.
- Clean around hydraulic fittings before breaking connection. Plug or cap immediately.
- Clean up spills as soon as possible.
- Use clean oil and containers.
- Drain dirty oil while still warm.
- Do not exceed recommended fluid levels.
- Service all hydraulic filters after the failure of a pump, motor, cylinder or valve. Failures of this nature could contaminate the entire hydraulic system.
- Top up diesel fuel at each shift to reduce contamination by condensation.
- Clean up oil spills on walking surfaces in the engine enclosure immediately.
- Before welding on the machine, be sure to disconnect all electrical connections and follow all servicing safety precautions as outlined in the WELDING, PRIOR TO in SECTION 1.
- When welding, secure the ground connection as close to the working position as possible to prevent arcing across machined surfaces or through bearings.
- Clean away all branches, bark and chips. Clean up all traces of oil to avoid fires.
- Inspect the exhaust system daily for any signs of leakage. Check for worn, cracked, broken, or damaged pipes or muffler. Also check for missing or damaged bolts or clamps. Should any exhaust leaks or defective parts be found, repairs must be made immediately. Engine exhaust leaks can cause fires; do not operate the machine until the exhaust leak is repaired.
- During daily operation of the machine, the occurrence of exhaust leaks are usually accompanied by a change or increase in engine exhaust noise levels. These audible warnings cannot be ignored. Should any exhaust leaks occur during operation, the machine must be turned OFF immediately and not put back to work until the necessary repairs have been completed.
- Have a fire extinguisher at hand.
- For safety, lower the boom to the ground when leaving the cab, leaving the machine unattended or during service.
- Install the door safety struts when working on the machine.
- Clean the fire suppression system sensors.

CHECK EMERGENCY EXITS MONTHLY

- Two alternate exit routes are provided: side door emergency exit and roof escape hatch/emergency exit. These are ONLY to be used if the front door cannot be opened.
- It is essential these emergency exits be checked at least once per month to ensure they are fully operational.
- Refer to EMERGENCY EXIT–MAINTENANCE GUIDE in THIS SECTION for the procedure.

*OIL LOST FROM LEAKAGE						
	LOST OIL (LITRES)			LOST OIL (US GALLONS)		
LEAKAGE RATE	PER DAY	PER MONTH	PER YEAR	PER DAY	PER MONTH	PER YEAR
ONE DROP IN TEN SECONDS	0.424	12.72	152.0	0.112	3.36	40.0
ONE DROP IN FIVE SECONDS	0.852	25.6	306.6	0.225	6.75	81.0
ONE DROP PER SECOND	4.26	127.76	1533.1	1.125	33.75	405.0
THREE DROPS PER SECOND	14.2	425.86	5110.31	3.75	112.5	1350.0
DROPS BREAK INTO STREAM	90.83	2725.5	32706.0	24.0	720.0	8640.0

Tigercat Model X822D/X830D/LX830D FELLER BUNCHER
SERVICE AND LUBRICATION SCHEDULE

REFER TO **Tigercat** OPERATOR'S MANUAL FOR FURTHER INFORMATION

SERVICE POINT NO.	DESCRIPTION	SERVICE EVERY								CAPACITY			REMARKS/LUBRICANT
		8 ⧖	125 ⧖	250 ⧖	500 ⧖	1000 ⧖	2000 ⧖	3000 ⧖	5000 ⧖	LITRE	USG	QTY	
1	COOLING SYSTEM	CHK	CHANGE COOLANT EVERY 2 YEARS							50	13.2		SEE ENGINE MANUFACTURER'S OPERATIONS AND MAINTENANCE MANUAL FOR REQUIRED ANTIFREEZE SOLUTION AND MIXTURE.
2	ENGINE OIL/FILTER	CHK •		REP •						•	•		• SEE ENGINE MANUFACTURER'S OPRATION AND MAINTENANCE MANUAL FOR PROCEDURES AND CAPACITIES.
3	CRANKCASE VENTILATION FILTER - T4F ONLY				REP •							1	
4	FUEL FILTER (ENGINE)			REP •								1	
5	FUEL/WATER SEPARATOR	DRN		REP								1	REFER TO SECTION 3 OF THE OPERATOR'S OR SERVICE MANUAL FOR DETAILS.
6	DEF DOSING MODULE FILTER - T4F ONLY			REP								1	
7	IN-TANK FUEL STRAINER					CHK						1	DRAIN TANK, CLEAN OR REPLACE AS NECESSARY.
8	AIR INTAKE PRECLEANER	CHK										1	CLEAN INTAKE & DISCHARGE AREAS AS REQUIRED.
9	AIR INTAKE PRIMARY ELEMENT	CHK										1	CHECK FILTER RESTRICTION INDICATOR. REFER TO 8 HOUR SCHEDULED MAINT. FOR DETAILS.
10	AIR INTAKE SAFETY ELEMENT	CHK										1	
11	AIR INTAKE CONNECTIONS	CHK					REP						CHECK FOR LOOSE CLAMPS AND DAMAGED RUBBER COMPONENTS. REPLACE RUBBER COMPONENTS.
12	HYDRAULIC TANK BREATHER						REP					1	
13	HYDRAULIC TANK - DRY FILL CAPACITY (INCLUDES SUCTION ELBOW, MANIFOLD AND HOSES)	CHK					D/R			231	61	1	DRAIN AND REFILL AT SEASONAL OIL CHANGE SEE APPROVED HYDRAULIC OILS IN THE MANUAL* *Tigercat RECOMMENDS REGULAR USE OF AN OIL TESTING PROGRAM.
14	HYDRAULIC OIL RETURN FILTERS, 1 BLUE WATER ABSORBING ELEMENT 5 WHITE HIGH PERFORMANCE FILTERS		CHK		REP †							6	IF THE FILTER BYPASS ICON ON THE COMPUTER DISPLAY TURNS RED BETWEEN SCHEDULED MAINTENANCE INTERVALS, CHANGE THE ELEMENTS.
15	PILOT/CHARGE PRESSURE FILTER				REP							2	
16	PUMP CASE DRAIN FILTER				REP							1	
17	PUMP DRIVE GEARBOX FILTER				REP							1	
18	PUMP DRIVE GEARBOX	CHK			D/R					8	2.1	1	CHECK OIL LEVEL WITH DIPSTICK. FILL WITH MIL-L-2105C OR API-GL-5 BELOW -23°C (-10°F) USE 75W-90 UP TO 38°C (100°F) USE 80W-90 ABOVE 38°C (100°F) USE 85W-140
19	SWING BEARING	LUB 24 ⧖								10 SHOTS		1	GREASE EVERY 24 HOURS WHILE SWINGING LITHIUM BASE EP2 GREASE ◆
20	SWING PINION	LUB								10 SHOTS		1	GREASE WHILE SWINGING LITHIUM BASE EP2 GREASE ◆
21	SWING GEARBOX LOWER BEARING			LUB						5 SHOTS EACH FITTING		2	REFER TO 250 HOURS SCHEDULED MAINTENANCE FOR DETAILS LITHIUM BASE EP2 GREASE ◆
22	SWING GEARBOX UPPER GEARING (EARLIER MACHINES ONLY)	CHK		D/R						17	4.5	1	FILL WITH 75W-90 OR 80W-140 SYNTHETIC GEAROIL TO BOTTLE FILL LINE.
23	ROTARY MANIFOLD SEAL			LUB						2 SHOTS		1	THE LUBRICATION FITTING ON NON-LEVELING MACHINES IS ACCESSED EITHER THROUGH THE MAIN BOOM MOUNTING AREA OR INSIDE THE UNDERCARRIAGE TOOLBOX LID. REFER TO 250 HOURS SCHEDULED MAINTENANCE FOR DETAILS. LITHIUM BASE EP2 GREASE ◆
24	TRACK DRIVE GEARBOX		CHK ‡	D/R						6	1.5	2	FILL WITH SAE 75W-90 (SPEC) RECOMMENDED SYNTHETIC GEAR OIL FOR SEVERE DUTY APPLICATION ‡ CHECK OIL WITH LEVEL PLUG AT 6 O'CLOCK AND OTHER PLUG 9 O'CLOCK POSITIONS.
								REP				2	**FOR LEVELING MACHINES ONLY.** PARKING BRAKE DISC REPLACEMENT. REFER TO SECTION 11 IN THE SERVICE MANUAL FOR DETAILS.
									PER			2	**FOR LEVELING MACHINES ONLY.** PERFORM THE TRACK DRIVE MOTOR CASE DRAIN LEAKAGE TEST. REFER TO SECTION 11 IN THE SERVICE MANUAL FOR DETAILS.
	TIGERCAT TRACK DRIVE GEARBOX ONLY, GREASE SEAL			PURGE								2	LITHIUM BASE EP2 GREASE ◆
25	TRACK ROLLERS AND IDLERS CHECK FOR OIL LEAKAGE				CHK								IF LEAKING, REFER TO TO 500 HOURS SCHEDULED MAINTENANCE IN THE MANUAL FOR DETAILS.
26	HOIST, STICK AND TILT JOINTS: - ER BOOM SYSTEM	LUB								PURGE		13	LITHIUM BASE EP2 GREASE ◆
27	HOIST, STICK AND TILT CYLINDERS: - ER BOOM SYSTEM	LUB								PURGE		8	LITHIUM BASE EP2 GREASE ◆
28	DOOR & COVER HINGES				LUB					1 SHOT		10	LITHIUM BASE EP2 GREASE ◆
29	ENGINE ROOF CYLINDER PINS				LUB					LUB		4	APPLY OIL LIBERALLY
30	CASE RETURN FILTER, ATTACHMENT	CHK			REP							1	SERVICE EVERY 500 HOURS OR WHENEVER THE BACKPRESSURE INDICATOR IS IN THE RED.
31	ATTACHMENT	SEE MANUFACTURER'S MAINTENANCE SCHEDULE.											
32	LEVELING SYSTEM (LX830D ONLY)	SEE SEPARATE LABEL.											

LEGEND

2 FTG/125 ⧖ — LUBRICATION POINT WITH A DESIGNATED NUMBER OF FITTINGS (2FTG) AND HOURS BETWEEN SERVICING (125 ⧖). JOINT TO BE PURGED.

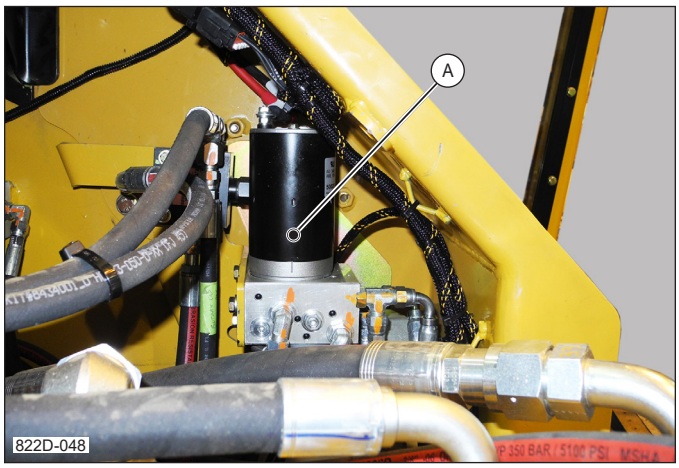
♦ USE LITHIUM BASED GREASE CONTAINING MOLYBDENUM DISULFIDE.

† USE OF FILTERS OTHER THAN GENUINE TIGERCAT REPLACEMENT FILTERS IS NOT RECOMMENDED.

⧖	HOURS
CHK	CHECK
D/R	DRAIN AND REFILL
DRN	DRAIN
LUB	LUBRICATE
PER	PERFORM
REP	REPLACE

78677BENG R4

ENGINE COMPARTMENT ROOF AND DOOR



A Electric Pump–Roof

The engine compartment roof and door are opened hydraulically using an electric pump and hydraulic cylinders.

A Roof Switch

⚠ CAUTION

Be sure all personnel are clear of the power engine-door before opening the door.

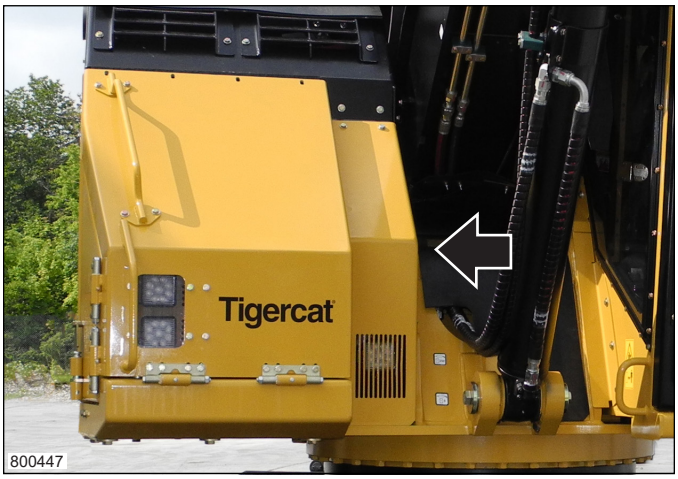
The switch (A), located in the cab, on the upper-right control panel, is used to open and close the roof and side engine/pump compartment door.

The roof and side compartment door circuit does not normally require scheduled maintenance other than lubrication of cylinder and pivot points. Tigercat recommends the use of DEXRON III TYPE transmission fluid in this circuit. Total circuit capacity is approximately 2 L (0.53 US gal). The fill port is located on the pump.

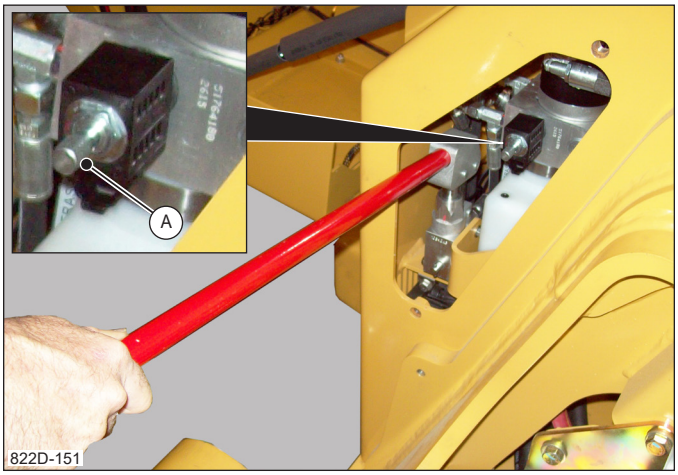
This machine is equipped with a manual back-up roof and side compartment door hand pump mounted behind a cover plate on the left side of the pump access door. Refer to HYDRAULIC OIL FILL PUMP in SECTION 3.

MANUAL HAND PUMP OPERATION

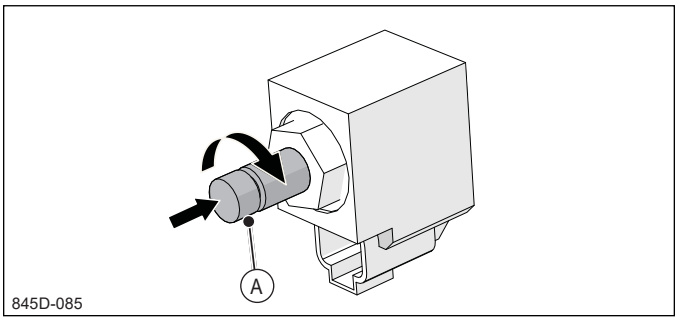
This machine is equipped with a manual back-up engine compartment roof and side door hand pump mounted behind a cover plate on the left side of the pump compartment front access door.



The hand pump can be used to hydraulically open and close the roof and side door (if required).



A Solenoid Valve Metal Pin

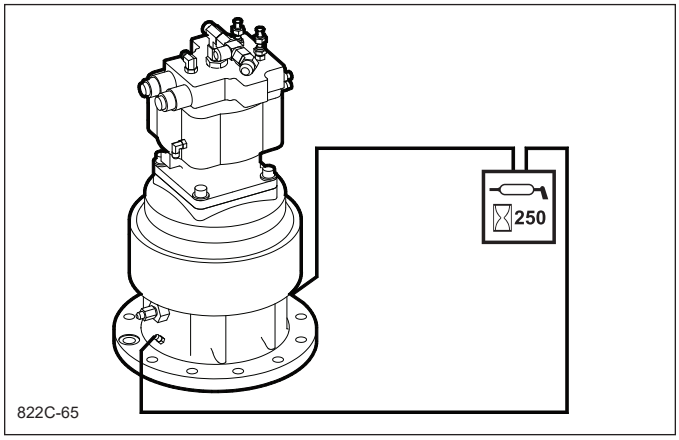


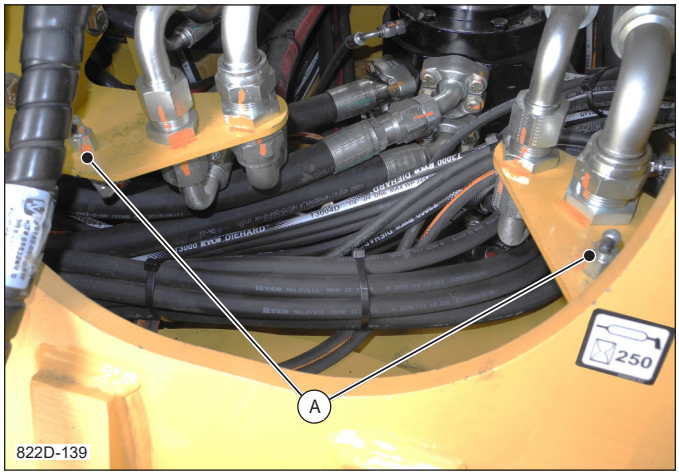
A Metal Pin

The default operating position of the upper enclosure power roof pump solenoid is when the metal pin is turned fully CW.

SWING DRIVE LUBRICATION

LUBRICATION OF SWING DRIVE GEARBOX LOWER BEARINGS





A Gearbox Lower Bearing Lubrication Points

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

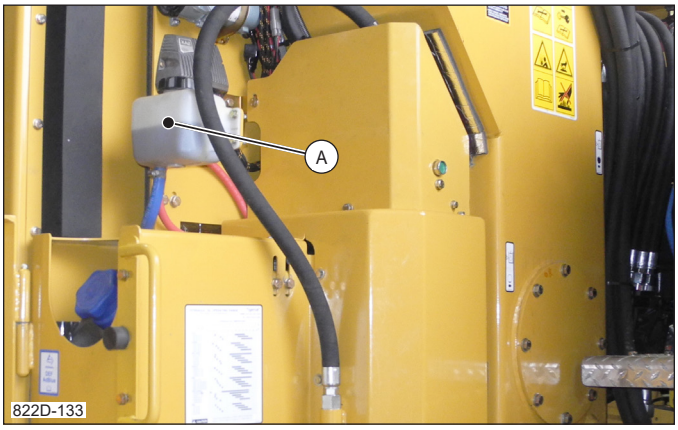
The grease fittings are located in the hoist boom saddle area under the rubber belting. Using a hand grease gun and with the gearbox at operating temperature slowly add five shots of lithium based EP2 grease to each side of gearbox every 250 hours. Do not over grease.

NOTE: During cold weather applications the swing function must operate for several hours to achieve operating temperature. If machine is not warmed up, the lower seal can be damaged.

IMPORTANT!
Do not force grease, gearbox failure may result. Do not use a power grease gun to lubricate this machine. Use a hand grease gun only.

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

LUBRICATION OF SWING DRIVE GEARBOX UPPER GEARING



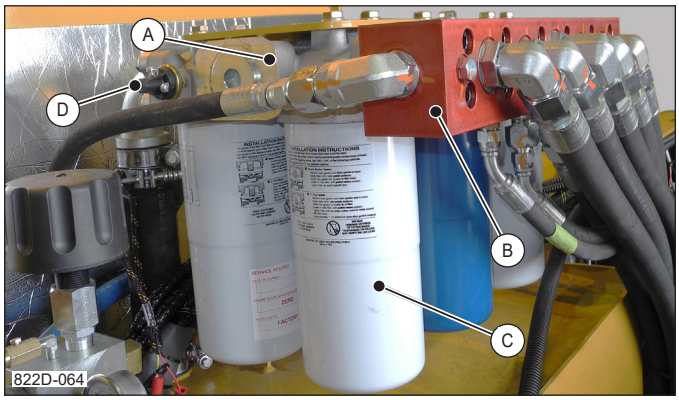
A Gear Oil Bottle

The swing drive gearbox upper gearing is filled with gear oil. Check oil level in the bottle every eight hours. Oil level in the bottle must be kept at the half full mark at all times. Drain and replace the swing drive gearbox upper bearing gear oil according to SCHEDULED MAINTENANCE–250 HOURS in SECTION 3. Use 75W-90 or 80W-140 gear oil.

Before draining any fluids, know the proper way to dispose of them. Do not pour fluids into the ground, stream, pond or lake.

The gear oil bottle is located directly above the DEF tank in the back-left corner of the hydraulic compartment.

RETURN FILTERS–HYDRAULIC OIL



A	Filter Head
B	Filter Manifold
C	Filter
D	Filter Restriction Pressure Switch

The majority of return oil entering the tank passes through six spin-on hydraulic oil filters. One of the filters is a water absorbing filter (blue filter) which is in place to assist with removing unwanted moisture from the hydraulic oil. The filters are connected in parallel to three separate return filter heads.

The filters should be checked/changed at the intervals specified in the SERVICE AND LUBRICATION SCHEDULE in THIS SECTION.

There is a bypass valve, preset at 1.7 bar (25 psi), built into each filter head, which will open in the event the elements become restricted. Before this valve is activated, a filter restriction pressure switch, will cause the hydraulic oil filter bypass icon on the computer display to illuminate YELLOW. Stop the machine and change the filters immediately.

If the icon continues to display YELLOW after the filters have been changed, the return diffusers attached to the base of the return tubes in the hydraulic tank should be examined for possible obstruction.

Refer to DIFFUSERS, CHANGING OR CLEANING in THIS SECTION.

If the filter bypass icon displays YELLOW between scheduled maintenance intervals, stop the machine and change these filter elements immediately.

NOTE: The filter bypass icon will illuminate RED when the hydraulic oil temperature is low and the filter restriction switch is activated. Allow the oil to warm to operating temperature and the icon should change to GREY. Refer to MACHINE PREPARATION in SECTION 2.

FILTER RESTRICTION PRESSURE SWITCH

A 1.4 bar (20 psi) filter restriction pressure switch is installed in the return manifold. When an oil pressure differential in excess of 1.4 bar (20 psi) is encountered at the return filters in the hydraulic tank, this pressure switch closes and the hydraulic oil filter bypass icon displays YELLOW on the computer display. The alarm will sound and the alarm light flash continuously.

FILTER/DIFFUSER SERVICE NOTE: The filters should be checked/changed when the oil filter bypass icon displays YELLOW on the computer display. If the icon continues to display YELLOW after the filters have been changed, the diffusers attached to the base of the return tubes in the hydraulic tank should be examined for possible obstruction.

IMPORTANT!
Do not use these warnings as a substitute for changing the oil filters at regular intervals as per the SCHEDULED MAINTENANCE in SECTION 3.

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

HYDRAULIC FILTER SERVICING GUIDELINES

NOTICE

Never pre-fill hydraulic filters.

Tigercat 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 pre-filtered before use.

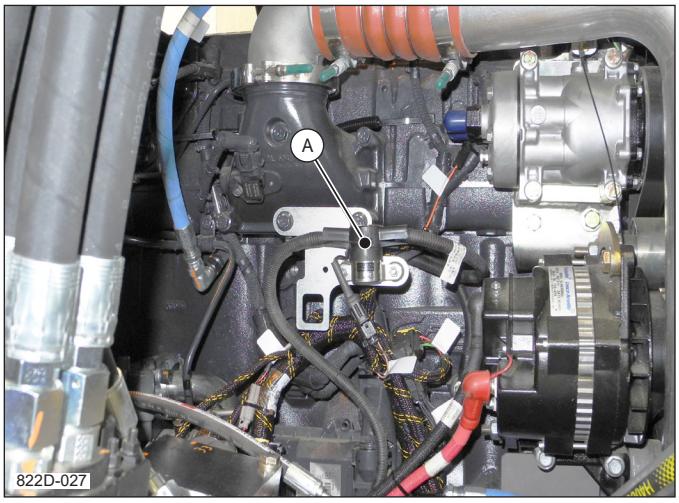
Contaminated hydraulic oil can lead to premature failure of hydraulic components and costly repairs. Filters must be replaced at the recommended time intervals. Refer to SCHEDULED MAINTENANCE in THIS SECTION.

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

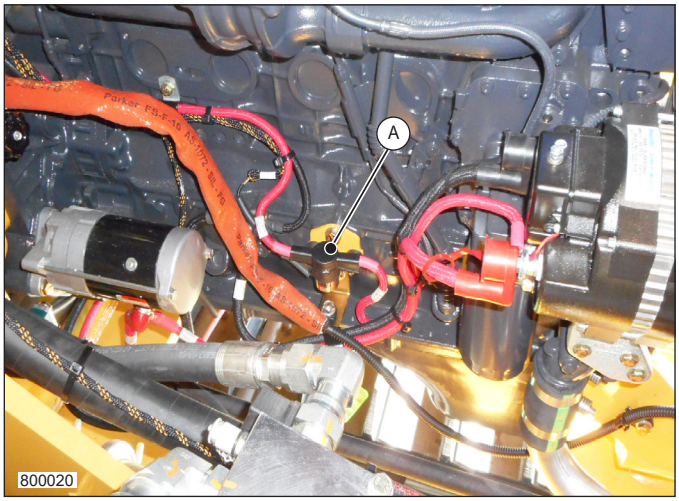
7. Press the selection button to enter the LVD threshold page.

8. Turn the rotary knob to adjust the LVD threshold to 22 V.
9. Press the selection button three times to return to the main page and confirm the change.

RELAY–GRID HEATER



822*3001–822*3250 and 830*3001–830*4000



822*3251–822*4000
A Grid Heater Relay

This relay is energized by a voltage controlled by the ECU when the key is turned to the RUN position. This activates the heating elements (grid heater elements) located in the engine air intake manifold to heat the intake air when starting the engine. This activity works in conjunction with the WAIT TO START function. Refer to STARTING ENGINE and COLD WEATHER STARTING in SECTION 2.

BATTERY CARE

Tigercat uses two types of batteries dependant on the machine application, model and design.

- Absorbed Glass Mat (AGM)
- Flooded Lead Acid (FLA).

NOTICE

Before charging the battery, it is important to identify which type of battery you have. Read and follow the battery and charger manufacturer's instructions prior to connecting or charging a battery.

All batteries are sensitive to overcharging. Charging or maintaining AGM batteries requires the use of a smart charger with an AGM setting. The peak charging voltage for AGM batteries varies slightly between battery manufacturer's. Exceeding this voltage can cause permanent battery damage. Refer to BATTERY MANUFACTURER'S charging instructions for more information.

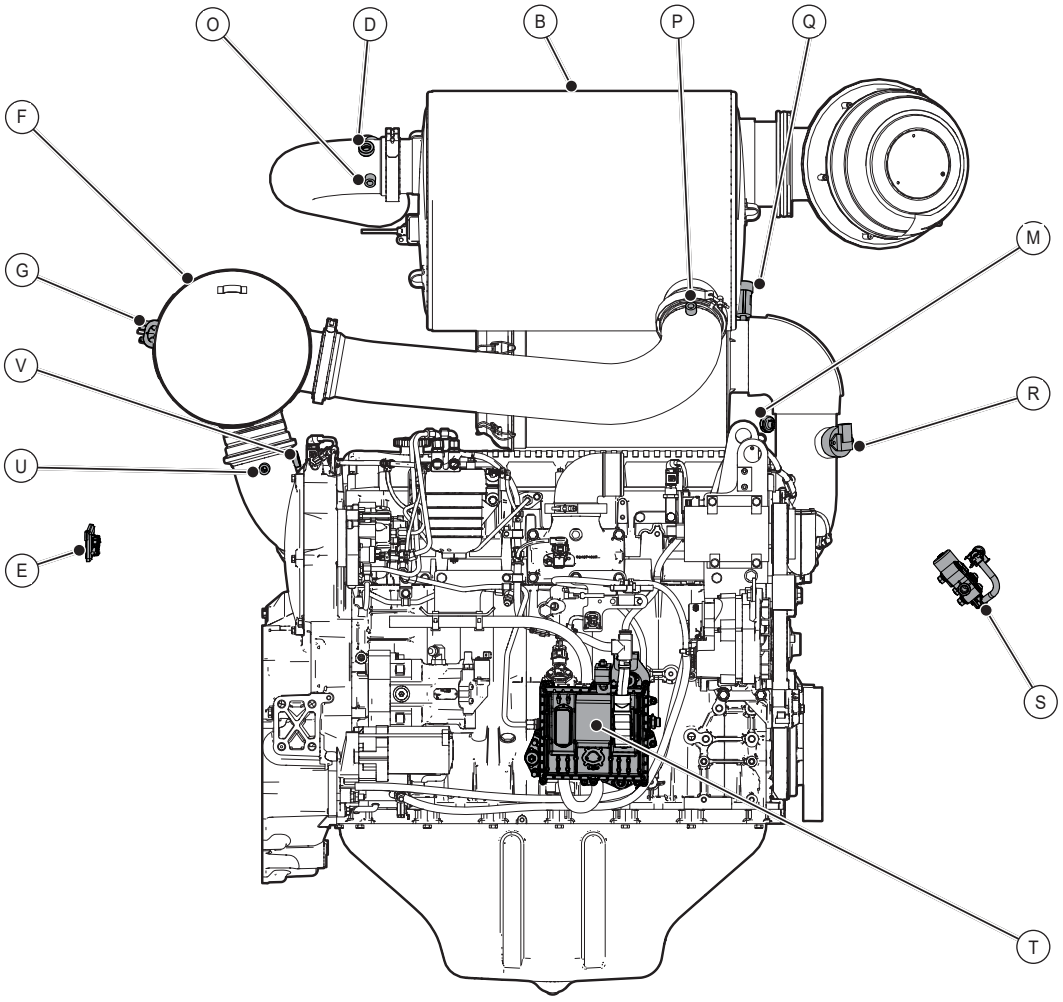
Refer to BATTERY MANUFACTURER'S instructions for charging or maintaining FLA batteries.

The bottom refuelling system includes:

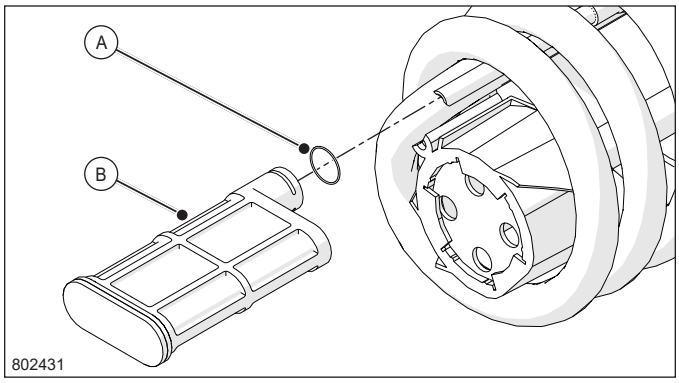
- A dry break quick connect
- A solenoid operated fuel filling shut-off valve
- An interior mounted fuel switch to activate the shut-off valve when the tank is full
- An ON/OFF switch box with an indicator light

NOTE: This method can be reached from ground level and does not require the engine compartment roof to be opened.

NOTE: This method relies on a remote fuel transfer pump mounted on the fuel supply truck or tank. There is no fuel transfer pump mounted on this machine. Park the machine with the upper structure level.



822*3001–822*3250 and 830*3001–830*4000	
DOC/SCR Aftertreatment Components	
A ECU, NH_3 Sensor	M Air Filter Restriction Sensor
B Catalytic Converter (SCR, CUC)	N Air Filter
C Outlet NH_3 Sensor (3)	O SCR Outlet Temperature
D Outlet NOx Sensor	P SRC Inlet Temperature Sensor
E ECU, NOx Sensors	Q Air Filter Restriction Indicator
F Diesel Oxidation Catalyst (DOC)	R Humidity and Temperature Sensor
G Dosing Module (DEF Injector)	S Heater Valve (DEF Supply Lines)
H Supply Module	T DENOX 2.2 Control System (incorporated into the engine ECU)
I DEF Heater Unit	U DOC Inlet Temperature Sensor
J DEF Tank Fill Cap	V DOC Inlet NO_x Sensor
K DEF Tank	Mixer Tube (DOC outlet) (not shown)
L Exhaust Flap on outlet of Turbocharger	



A O-ring
B DEF Tank Strainer

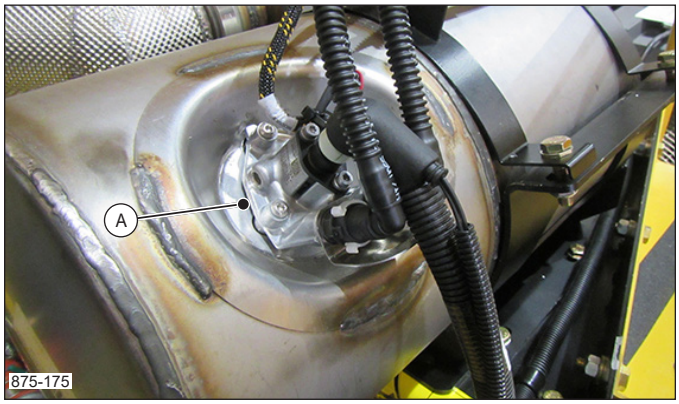
14. Remove and clean the DEF tank strainer. Inspect the O-ring, replace if required.
15. Clean the strainer with clean DEF, distilled or demineralized water.
16. Install the tank strainer.
17. Remove the DEF fill strainer and clean it with clean DEF, distilled or demineralized water.

    Refer to DEF, TANK, CLEANING THE DEF FILL STRAINER in THIS SECTION.
18. Install the drain plug.
19. Replace the cover from the bottom of the upper structure.
20. Install the sending unit and the fill strainer.
21. Reconnect the hoses and electrical connector to the sending unit.

Do not reuse the DEF that has been drained from the tank. Use a licensed waste disposal contractor or as otherwise required by local laws to dispose of DEF.

If any DEF has spilled, rinse well with water.

DOSING MODULE (DEF INJECTOR)



A Dosing Module

The dosing module is mounted on the DOC outlet upstream of the catalytic converter. The dosing module injects DEF into the exhaust stream.

The dosing module is cooled by a constant flow of engine coolant supplied by the heater valve to maintain optimum temperature for the aftertreatment process.

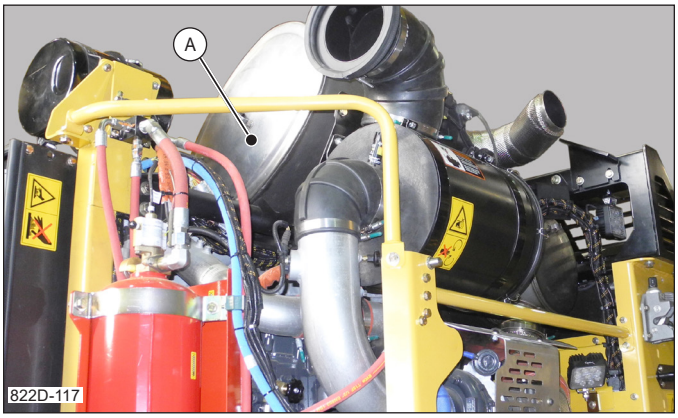
MIXER TUBE

A Mixer Tube

The mixer tube is incorporated into the outlet of the DOC upstream from the catalytic converter.

The high-turbulence mixer tube is used to mix the DEF solution and exhaust gases together before they enter the catalytic converter.

CATALYTIC CONVERTER



A Catalytic Converter

The catalytic converter is located above the engine. Chemical reactions inside the catalytic converter reduce nitrogen oxides (NO_X) in the exhaust gas.

The catalytic converter is equipped with sound-proofing material and replaces the exhaust silencer. It incorporates both the selective catalytic reduction (SCR) and the cleanup catalyst (CUC) components of the aftertreatment system.

The first phase of the SCR process takes place between the DOC and the SCR. High temperature exhaust gas evaporates the DEF solution instantly and, by hydrolysis, converts it into ammonia ($2NH_3$) and carbon dioxide (CO_2).

Evaporation of the solution lowers exhaust gas temperature, bringing it closer to the optimum temperature required by the process.

The exhaust gases and ammonia, at the proper reaction temperature, are introduced into the SCR, where the second phase of the process takes place. By reacting with the oxygen in the exhaust gases, the ammonia is converted into free nitrogen (N_2) and water vapour (H_2O).

Finally the high-efficiency catalytic converter incorporates a clean up catalyst (CUC) which reduces any excess ammonia (NH_3) which may result from the SCR process.

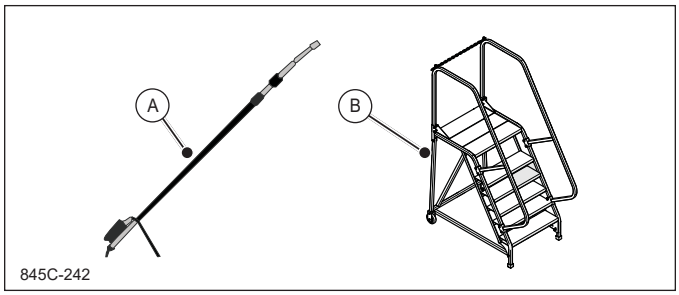
PRESSURE WASHING

Pressure washing is one of the easiest and most economical ways to preserve your investment. Accumulated mud can damage track rollers, sand will grind down pins and bearings and wood debris buildup in machine enclosures is a serious fire hazard. Pressure washing is also good practice before and after servicing equipment.

⚠ CAUTION

To avoid slips, trips or falls, all handles, steps and platforms must be kept free of grease, oil, fuel, mud, snow, ice, and forest debris.

IMPORTANT!
Use a high volume, low pressure fan nozzle or nozzle setting for all equipment cleaning. High pressure spray can damage paint, penetrate electrical connections and remove labels. Use a mild detergent and make sure pressure settings are below 83 bar (1200 psi).

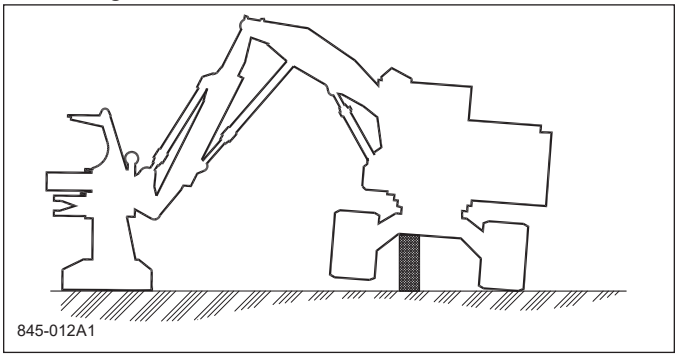


A Pressure Washer Extension
B Platform Ladder

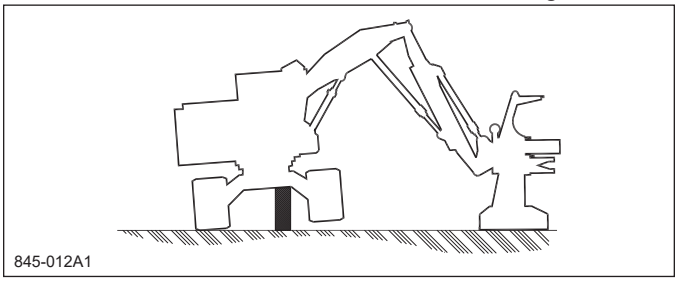
To clean hard-to-reach areas, use a platform ladder or attach an extension wand to your pressure washer, extend it to the desired height and lock it in place.

PRESSURE WASHING PROCEDURE– UNDERCARRIAGE

1. START the engine and leave at LOW.
2. Swing the boom to the side of the machine.



3. Place the felling head on the ground and by forcing down with boom controls, lift the track clear off the ground.
4. Use blocks to firmly support the undercarriage frame in the raised position.
5. Rotate the track to shake off mud and dirt.
6. Clean the undercarriage and tracks with a shovel and a broom to remove all debris before pressure washing.
7. Pressure wash the tracks and undercarriage.



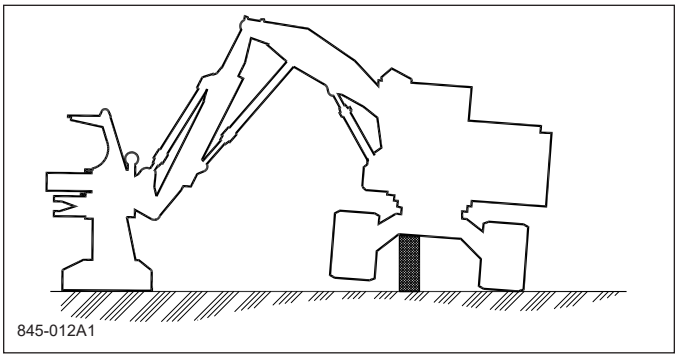
8. Repeat steps 2–7 for the other track.

TRACK CHAIN

TRACK CHAIN SAG

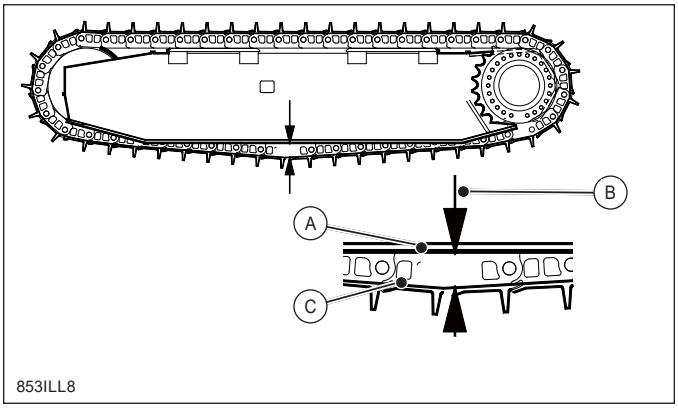
Track chains that are too tight significantly shorten the bushing OD wear life.

MEASURING TRACK SAG



A	Lift Left Track

1. Position the attachment head in a vertical position and swing the boom to the side of the machine.
2. Place the attachment on the ground and force down with boom controls, lift the track clear of the ground.
3. Rotate the track in forward and reverse several times. Stop the track while in reverse. Do not clean the track.

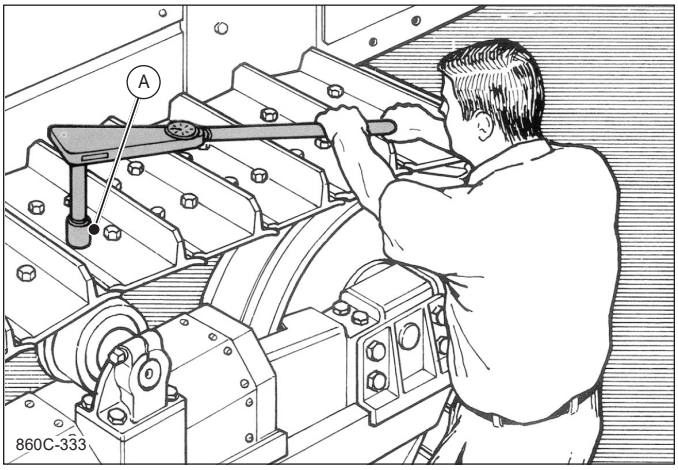


A	Underside of Track Guard
B	Sag Dimension
C	Upper Surface of Track Shoe

4. Turn OFF the engine.
5. Measure the distance between the upper surface of the track shoe at the centre of the lower surface of the track guard.
6. This dimension should be between 102–152 mm (4–6 in) for normal operations.

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

TORQUE PROCEDURE, TRACK SHOE



A	Torque Procedure

- Incorrect bolt torque is the leading cause of shoe loosening.
- Torque + turn is the shoe bolts assembly method.
  - Provides a controlled stretch of the bolt of about 0.3 mm (0.012 in). It is the stretch that prevents the bolt from coming loose.
  - Provides up to 25% more clamp load than straight torque.
  - It is not influenced by friction/condition of mating components.
- The method is also used on other critical joints, such as sprockets, master sections, final drives. Refer to TORQUE SPECIFICATIONS in SECTION 11 of the SERVICE MANUAL.

Parker Assembly Torque

JIC 37 Degree Flare			
SAE Dash Size	Thread Size	Tube Connection FFWR	Swivel or Hose Connection FFWR
-2	5/16-24	NA	NA
-3	3/8-24	NA	NA
-4	7/16-20	2	2
-5	1/2-20	2	2
-6	9/16-18	1 1/2	1 1/4
-8	3/4-16	1 1/2	1
-10	7/8-14	1 1/2	1
-12	1 1/16-12	1 1/4	1
-14	1 3/16-12	1	1
-16	1 5/16-12	1	1
-20	1 5/8-12	1	1
-24	1 7/8-12	1	1
-32	2 1/2-12	1	1
-40	3-12	1	1

F.F.W.R : Flats From Wrench Resistance
All values are for Steel, Stainless Steel and Brass

NPTF			
SAE Dash Size	Thread Size	Tube Connection TFFT	Swivel or Hose Connection TFFT
-2	1/8-27	2-3	2-3
-3	NA	NA	NA
-4	1/4-18	2-3	2-3
-5	NA	NA	NA
-6	3/8-18	2-3	2-3
-8	1/2-14	2-3	2-3
-10	7/8-14	NA	NA
-12	3/4-14	2-3	2-3
-14	NA	NA	NA
-16	1-11 1/2	1.5-2.5	1.5-2.5
-20	1 1/4-11 1/2	1.5-2.5	1.5-2.5
-24	1 1/2-11 1/2	1.5-2.5	1.5-2.5
-32	2-11 1/2	1.5-2.5	1.5-2.5
-40	NA	NA	NA

T.F.F.T. : Turns from finger tight
All pipe values are for Steel, Stainless Steel and Brass

O'ring Face Seal / Seal-Lok			
SAE Dash Size	Thread Size	Tube Connection FFWR	Swivel or Hose Connection FFWR
-2	NA	NA	NA
-3	NA	NA	NA
-4	9/16-18	1/4 TO 1/2	1/2 TO 3/4
-5	NA	NA	NA
-6	11/16-16	1/4 TO 1/2	1/2 TO 3/4
-8	13/16-16	1/4 TO 1/2	1/2 TO 3/4
-10	1-14	1/4 TO 1/2	1/2 TO 3/4
-12	1 3/16-12	1/4 TO 1/2	1/3 TO 1/2
-14	NA	NA	NA
-16	1 7/16-12	1/4 TO 1/2	1/3 TO 1/2
-20	1 11/16-12	1/4 TO 1/2	1/3 TO 1/2
-24	2-12	1/4 TO 1/2	1/3 TO 1/2
-32	NA	NA	NA
-40	NA	NA	NA

F.F.W.R : Flats From Wrench Resistance
All values are for Steel, Stainless Steel and Brass

BSPT			
SAE Dash Size	Thread Size	Tube Connection TFFT	Swivel or Hose Connection TFFT
-2	1/8-28	2-3	2-3
-3	NA	NA	NA
-4	1/4-19	2-3	2-3
-5	NA	NA	NA
-6	3/8-19	2-3	2-3
-8	1/2-14	2-3	2-3
-10	NA	NA	NA
-12	3/4-14	2-3	2-3
-14	NA	NA	NA
-16	1-11	1.5-2.5	1.5-2.5
-20	1 1/4-11	1.5-2.5	1.5-2.5
-24	1 1/2-11	1.5-2.5	1.5-2.5
-32	2-11	1.5-2.5	1.5-2.5
-40	NA	NA	NA

T.F.F.T. : Turns from finger tight
All pipe values are for Steel, Stainless Steel and Brass

SAE J1926 Straight Thread Port Assembly Torques

SAE DASH SIZE	THREAD SIZE	ASSEMBLY TORQUE = 10 % -0											
		NON-ADJUSTABLE				ADJUSTABLE				PLUGS			
		SEAL-LOK		TRIPLE-LOK FERULOK PIPE FITTINGS		SEAL-LOK		TRIPLE-LOK FERULOK PIPE FITTINGS		HOLLOW HEX HP5ON-S		HEX HEAD P5ON-S	
		lbf.ft (lbf.in)	Nm	lbf.ft (lbf.in)	Nm	lbf.ft (lbf.in)	Nm	lbf.ft (lbf.in)	Nm	lbf.ft (lbf.in)	Nm	lbf.ft (lbf.in)	Nm
2	5/16-24	(310)	20	(85)	10	(310)	20	(60)	7	(30)	3.5	(85)	10
3	3/8-24	(310)	20	(155)	18	(310)	20	(100)	11	(55)	6	(155)	18
4	7/16-20	(310)	20	(260)	29	(310)	20	(180)	20	(120)	13.5	(260)	29
5	1/2-20	(360)	40	(280)	32	(360)	40	(250)	28	(170)	19	(280)	32
6	9/16-18	(420)	46	(350)	40	(420)	46	(350)	40	(410)	46	(350)	40
8	3/4-16	60	80	(620)	70	60	80	(620)	70	60	80	(620)	70
10	7/8-14	100	135	85	115	100	135	85	115	100	135	85	115
12	1 1/16-12	135	185	135	183	135	185	135	183	135	185	135	183
14	1 3/16-12	175	235	175	237	175	235	175	237	175	235	175	237
16	1 5/16-12	200	270	200	271	200	270	200	271	200	270	200	271
20	1 5/8-12	250	340	250	339	250	340	250	339	250	340	250	339
24	1 7/8-12	305	415	305	414	305	415	305	414	305	415	305	414
32	2 1/2-12	375	510	375	509	375	510	375	509	375	510	375	509