Tigercat®

470 MULCHER

OPERATOR'S MANUAL

SERIAL NUMBER 4701001 TO 4702000

ISSUE 1.0 FEBRUARY 2015

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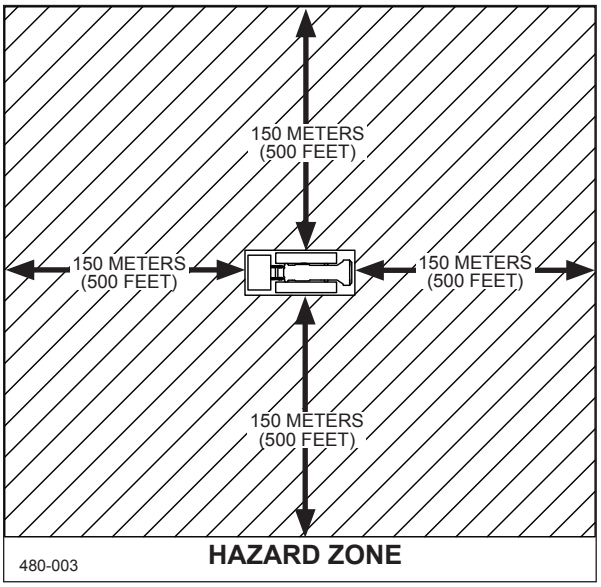
KEEP BACK
150 m (500 ft)

DANGER

Thrown debris keep back 150 m (500 ft).

The following diagram illustrates the HAZARD ZONE. All personnel should be kept clear of this zone while the attachment is operating.

The HAZARD ZONE should be considered off limits to all individuals.



DANGER

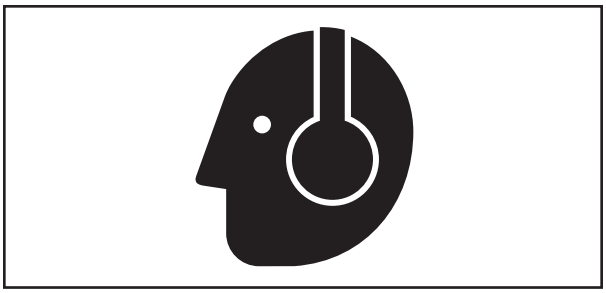
Danger caused by flying debris.
Improper operation of the attachment and failure to follow safety precautions can result in personal injury.

When approaching an operating machine on foot, stay at least 150 m (500 ft) away until the operator recognizes your presence. Make sure that all equipment has been shut down before advancing to the machine.

DANGER

ROTATING CUTTER

The safety of persons outside the cab is the responsibility of the machine operator



Wear a suitable hearing protective device such as earmuffs or earplugs to protect against noise. Prolonged exposure to loud noise can cause impairment or loss of hearing.

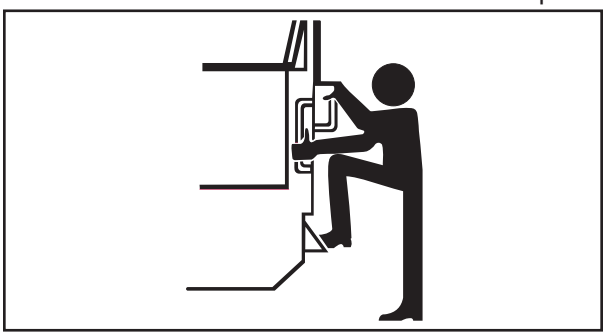
Always use the handrails and steps provided when mounting and dismounting from the machine.

Do not jump off the machine at any time.

Do not try to climb onto or off a moving machine.

Do not use the seat armrest or joystick as handles when entering or leaving the cab.

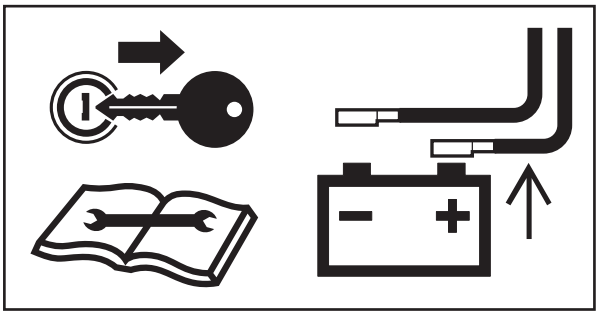
Do not use the machine foot controls as a step.



When mounting or dismounting the machine always use the three point technique; Use one hand with two feet or two hands with one foot.

Avoid mounting or dismounting the machine in areas with slippery surfaces. If this is not possible clean up or cover slippery surfaces with a nonslip material.

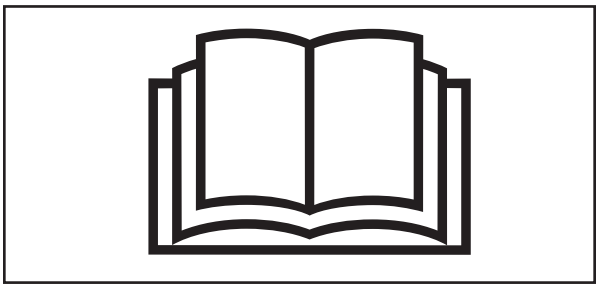
SERVICING SAFETY PRECAUTIONS



Conduct maintenance inspections at least as frequently as recommended in SECTION 3 of THIS MANUAL.

When servicing or repairing equipment, shut the engine down. Turn Battery Disconnect switch OFF 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, remove the battery cables from the batteries disconnecting the negative cables first.

Install a “DO NOT START ENGINE” sign on the operator’s cab door and in the engine compartment when making repairs to the machine.



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

470-070 COOLER PACKAGE

The charge air cooler, radiator and the engine cooling system should be cleaned and serviced at least daily to maintain moderate engine temperatures.

⚠ WARNING

This machine is equipped with a reversible cooling fan. Exercise care when working in this area with the engine running.

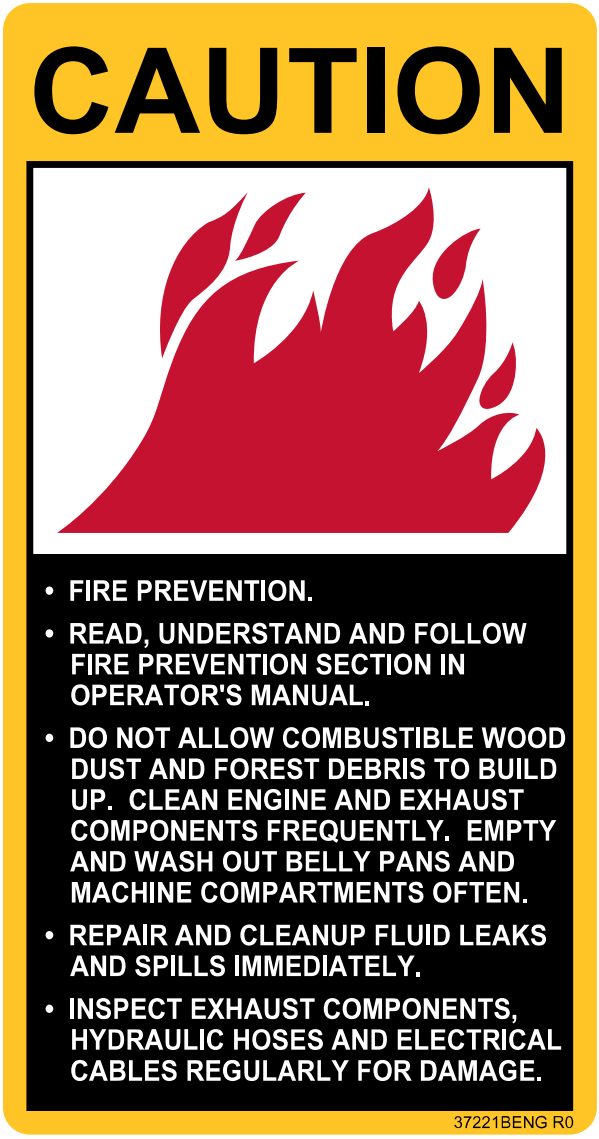
This machine is equipped with a reversible cooling fan to facilitate cleaning of the charge air cooler, radiator and oil cooler assembly. Exercise care when working in this area with the engine running. If the fan switch in the cab is in the AUTO position, the fan could turn ON and/or go into REVERSE mode without warning.

⚠ WARNING

WARNING, HOT FLUIDS AND HOT MACHINE SURFACES CAN CAUSE SERIOUS BURNS!

- 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 to below 38°C (100°F).

13. **Turn the battery disconnect switch to OFF** at shut down to de-energize all electrical circuits.
14. **Remain with the machine** for at least 45 minutes at the end of operations while the machine cools.



15. **Remove all keys,** lock equipment and fuel cap at the end of operations to reduce the risk of vandalism.
16. **Be cautious when smoking.** An open flame, a lighted cigarette, etc., should not be permitted around any vehicle, especially during fuelling operations or when the fuel system is open to the atmosphere or when servicing batteries.
17. **AFTER transporting (trucking) a machine** from one job site to the next, open all doors and access panels and blow off any debris that may have repositioned itself onto the engine and exhaust parts due to wind turbulence caused by the journey.
18. **Before starting repair work,** such as welding, the surrounding area should be cleaned and a fire extinguisher should be close by.
19. **Store rags and other combustible materials** in a safe, fireproof location.
20. **Do not use the machine** on top of or to push piles of burning timber. A machine fire will most probably result.

EQUIPMENT FIRES ADVERSELY EFFECT YOUR ABILITY TO LOG, MAY INCREASE YOUR INSURANCE PREMIUMS DRAMATICALLY OR PREVENT YOU FROM OBTAINING INSURANCE COVERAGE AT ALL.

WHAT TO DO TO PREPARE FOR A MACHINE FIRE

- Prevent the fire from happening in the first place by ensuring that all machine systems are frequently inspected and always well maintained.
- Ensure that any hand held fire extinguishers are charged and in working order. Fire extinguishers require routine care. Follow the manufacturer's instructions for inspection and maintenance shown on the label of the fire extinguisher and in the extinguisher manufacturer's manual.
- Ensure that any pressurized water systems on the machine (if applicable) are charged and in working order. Refer to PRESSURIZED WATER SYSTEM MAINTENANCE in SECTION 3 of the OPERATOR'S MANUAL.
- Ensure that you have the proper fire extinguishers on site. Most fires involving mobile forestry equipment will be Class **A** or **B**.

  Dry chemical extinguishers should be rated **ABC** and pressurized water extinguishers should be rated **A**.

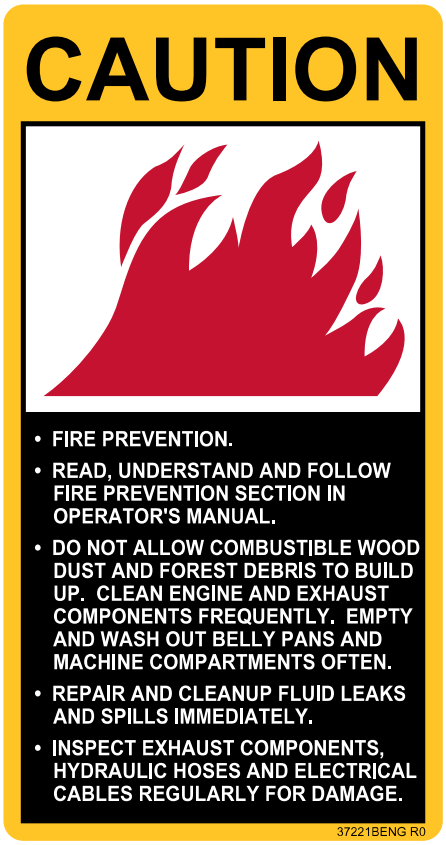
  Class **A** fires involve ordinary combustibles such as wood, cloth, paper, rubber and many plastics, Class **B** fires occur with flammable liquids such as diesel fuel, oil and grease and Class **C** fires apply to energized electrical equipment.

EXPLOSION HAZARD

This label warns of an **EXPLOSION HAZARD**. It is located near the engine air intake precleaner. The engine is equipped with a heater starting aid, **DO NOT USE ETHER** to assist in starting the engine.

USING ETHER COULD CAUSE AN EXPLOSION WHICH COULD RESULT IN DEATH OR SERIOUS INJURY.

FIRE PREVENTION!



This label advises the operator of the following:

READ UNDERSTAND AND FOLLOW THE FIRE PREVENTION GUIDELINES IN THIS MANUAL. These guidelines provide all the necessary action required to preventing fires on this machine. DO NOT OPERATE THIS MACHINE until you have read these instructions and have performed any necessary maintenance required that will prevent the potential of a fire from starting on this machine.

It is also important to note that fire prevention inspections and maintenance MUST BE PERFORMED FREQUENTLY (several times per day). A clean combustible free machine as well as frequent inspections of the exhaust components, hydraulic hoses and electrical cables and performing any necessary repairs immediately will help prevent fires.

Maintain a CHARGED fire extinguisher on the machine at all times, know where it is and **KNOW HOW TO USE IT**!


= Information Message Symbol


= Instrument Bulb Test


= Interlock Reset ON


= Interlock Reset OFF


= Lights, Work


= Lights, Engine Service


= Machine Hours


= Mulching Head FLOAT


= Mulching Head ON


= Mulching Head Off


= Mulching Head Debris Door Closed


= Mulching Head Debris Door Open

= Mulching Head Drum Speed %


= Mulching Head Push Bar IN


= Mulching Head Push Bar OUT


= Mulching Head (Cutter) Pressure

= Serial Number


= Speed FAST or Hi


= Speed SLOW or LOW

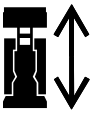

= Steer Left


= Steer Right

= Switch ON


= Switch OFF


= Temperature


= Travel Direction


= Travel FORWARD


= Travel REVERSE

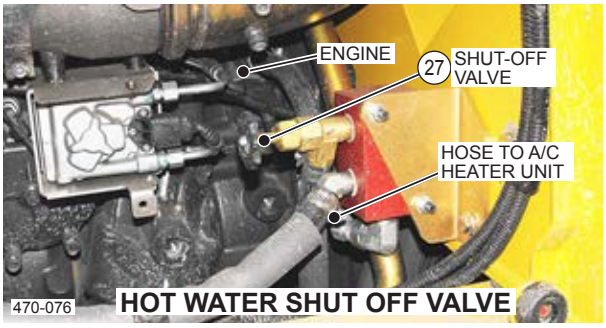

= Ventilation Blower Fan


= Windshield Washer


= Winch ON

26. FILTER - CAB FRESH AIR

When the AIR SOURCE control switch (13) on the instrument panel is in the FRESH AIR position, outside air is drawn into the cab A/C Heater unit through this filter and mixed with interior air from the cab. The filter is located in the rear of the cab roof and accessible from outside the cab. It should be checked every 125 hours. This is done by removing 6 bolts and removing the air inlet cover. Next remove 2 bolts and remove the filter retainer. This will allow access to the filter.



27. HOT WATER SHUT OFF VALVE (ENGINE)

To maximize the efficiency of the air conditioning system, the HEATER control (18) on the instrument panel must be rotated to the "OFF" position. During times when cab heating is not required the HOT WATER SHUT OFF VALVE, on the heater hose from the engine, should also be closed to prevent hot water from seeping through the A/C unit, thereby reducing the efficiency of the cooling system.

28. FUSE PANEL - CAB

The fuses, diodes, resistors and relays are located behind a panel below the instrument panel. Press the latch button to open the door to access the fuses, diodes, resistors and relays. See FUSE AND RELAY PANEL - CAB in THIS SECTION for more detail.

29. USB PORT - MD3 COMPUTER

This USB port is used to access the MD3 computer. A laptop with appropriate IQAN software can be plugged into this port for software updates, diagnostics and some adjustments.

NOTE: This USB connection should only be used by a trained service technician.

Refer to COMPUTER in SECTION 6 of the SERVICE MANUAL for more information and safeguards related to the use of this port.

30. ENGINE DIAGNOSTICS CONNECTION

Plug a remote electronic diagnostic device into this connection such as a laptop computer with appropriate engine manufacturer's programming to perform engine performance analysis and tuning.

NOTE: This operation can only be performed by a trained service technician.

illuminate all LEDs, sound the alarm and engage the relay. The “Push to Test” function will not cause a system discharge.

- Check the manual actuation switches to ensure that all tamper indicators are in place, operating instructions are visible and access is unobstructed.

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

BI-YEARLY

- Check the system owners manual for correct re-certification intervals. These are required for insurance policy.

AVOIDING DAMAGE AND FALSE DISCHARGES DURING MACHINE SERVICE:

Pay attention to the location of the components of the fire suppression system. Take care not to damage heat sensors or wiring, this includes hitting, cutting, bending, denting, etc. Damage to heat sensors due to shock could cause an accidental discharge of the system. Cut, pinched, or kinked wiring could cause false signals and an accidental discharge of the system.

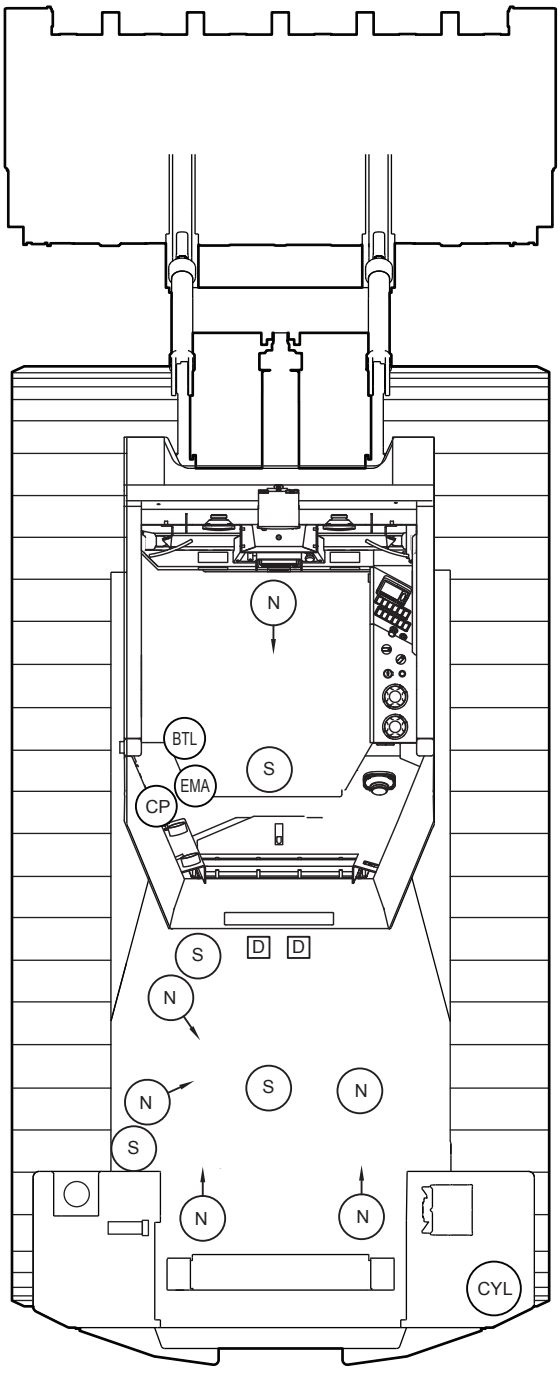
In addition thermostats are sensitive to heat from welding torches, steam cleaning or other outside sources which may create a false discharge of the system.

If any of the components are damaged, replace them immediately before operating the machine.

It is also important to take care around the chemical cylinder. The chemical cylinder is pressurized and can explode if struck with sufficient force. Pressurized cylinders are extremely hazardous.

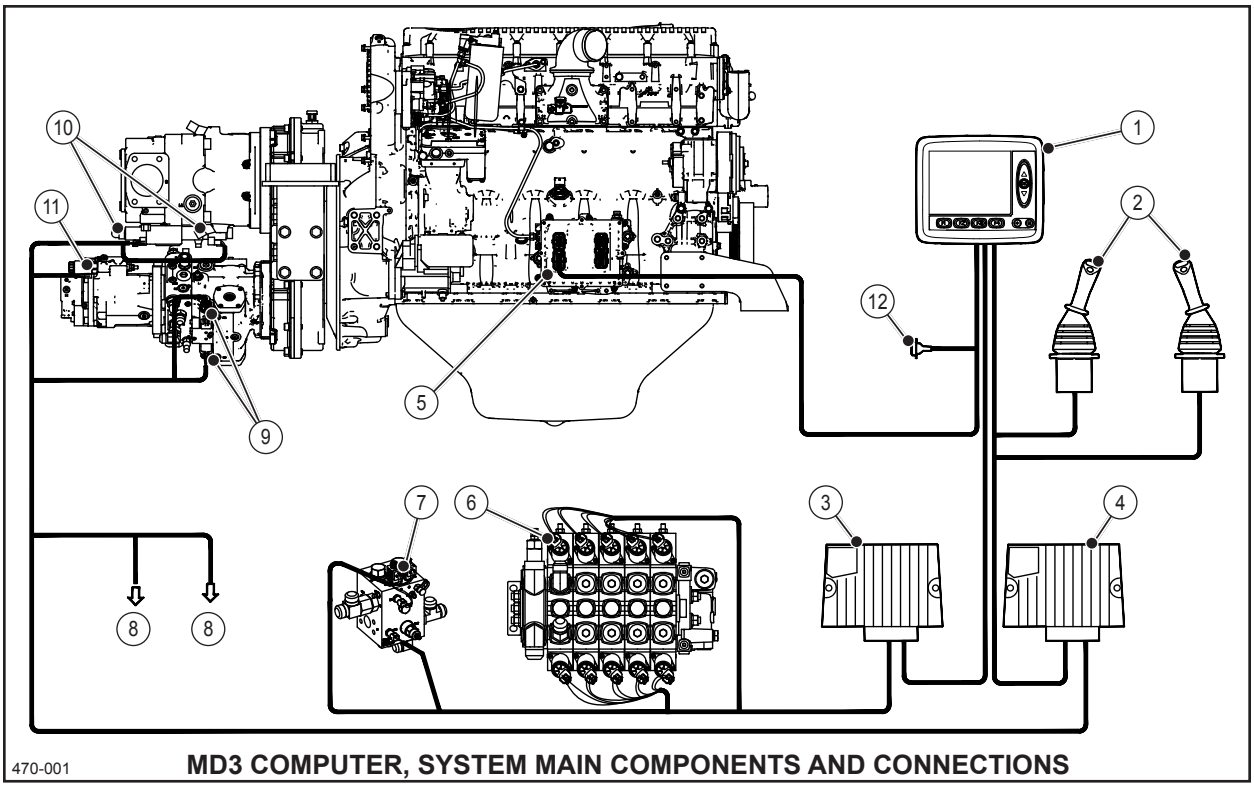
⚠ CAUTION

Failure to follow the system manufacturers instructions and guidelines may result in serious bodily injury, death, and property damage.



CYL - CHEMICAL CYLINDER
CP - CONTROL PANEL
BTL - NITROGEN ACTUATOR
EMA - ELECTRICAL MANUAL SWITCH
D - DISTRIBUTOR
N - NOZZLE
S - SENSOR (THERMOSTAT)

470-003 **COMPONENT LOCATIONS**

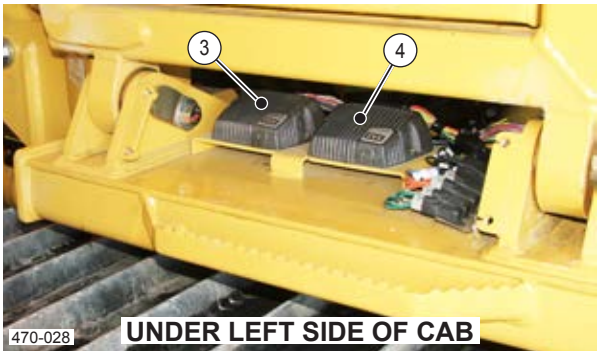


470-001 **MD3 COMPUTER, SYSTEM MAIN COMPONENTS AND CONNECTIONS**

MD3 COMPUTER CONTROL SYSTEM

The MD3 computer control system is part of a network of components (shown above). The system is made up of the following components:

1. MD3 Computer and Display Module
2. Electronic Joysticks
3. XA2 A1 Chassis Expansion Module 1
4. XA2 A2 Chassis Expansion Module 2
5. Engine Electronic Control Module
6. Boom Control Valve Electronic Solenoids
7. Cutter Control Valve Electronic Solenoids
8. Drive Motors Electronic Solenoids
9. Drive Pump Electronic Solenoids
10. Attachment Pump Electronic Solenoids
11. Fan Pump Electronic Solenoid
12. Engine Diagnostic Connector
13. Various controls, switches, and sensors not shown.



470-028 **UNDER LEFT SIDE OF CAB**

The MD3 computer is the main controller in the system. The MD3 computer program is the operating system for the computer display as well as the control system for the machine operating parameters.

As an example, the joystick movement/ position is transmitted to the MD3 controller electronically. This signal is then transmitted to the corresponding XA2 expansion module from the MD3 control and on to the corresponding control valve solenoid controls. The applicable hydraulic control valves will be activated allowing hydraulic oil to flow to the functions activated by the joystick movement.

The engine electronic control module provides electronic information to the MD3 computer via the J1939 CAN BUS link. This information is displayed on the computer display.

NOTE: The computer control system is software-based. This software may be updated after the machine is in service as a part of on-going product improvement programs and service newsletters. The information contained in this manual is accurate at the time of printing. Improvements to the machine and/or software are on-going and may not be covered. In these cases contact your Tigercat dealer for appropriate information.

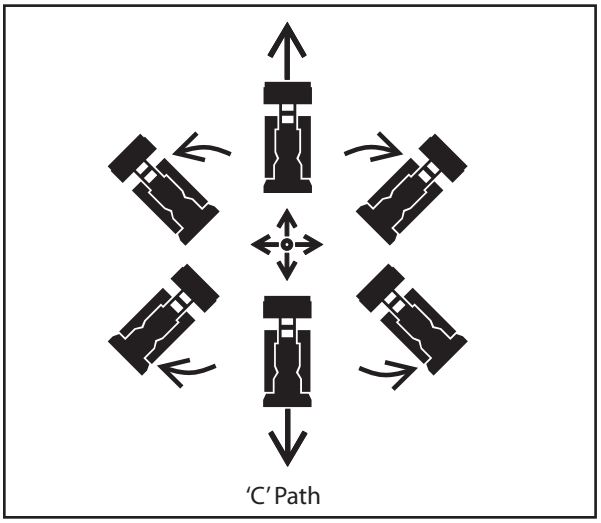
STEERING CONFIGURATION

Scroll to the Steering Configuration selection in the drive settings menu. Press the OK button to make adjustments.

The Steering Configuration menu will appear. Two choices are given, C Path or S Path.
Use the arrow up/down buttons to select C Path or S Path. Press the OK button when selection has been chosen.

Press the back button to return to the drive settings menu or back button twice to return to the adjustment menu. Press the Back button again to return to the main menu.

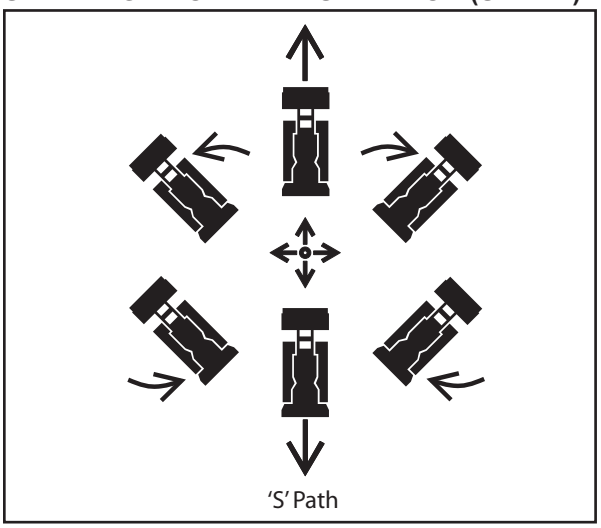
STEERING CHOICE 1 DESCRIPTION (C PATH)



If 'C' Path is chosen, the direction the machine will steer when driving forward is shown above. Push joystick forward to drive forward then push joystick left to steer left or push joystick right to steer right.

The direction the machine will steer when driving in reverse is also shown above. Pull joystick back to drive in reverse then pull joystick left to steer left or pull joystick right to steer right.

STEERING CHOICE 2 DESCRIPTION (S PATH)



If 'S' Path is chosen, the direction the machine will steer when driving forward is shown above. Push joystick forward to drive forward then push joystick left to steer left or push joystick right to steer right.

The direction the machine will steer when driving in reverse is also shown above. Pull joystick back to drive in reverse then pull joystick left to steer right or pull joystick right to steer left.

MEASURE MENU

From the Main Menu press the F2 button to access the MEASURE MENU.

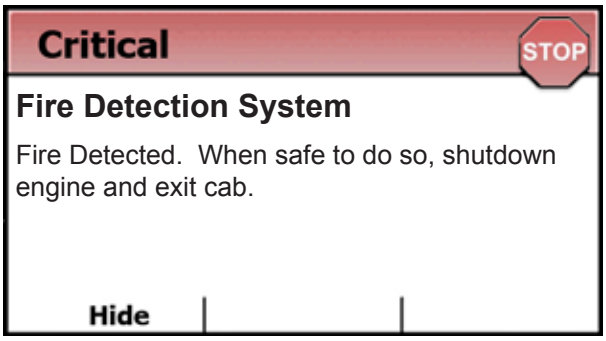
The following menu items can be selected.

- Inputs
- Outputs
- J1939 Parameter Inputs
- Module Diagnostics
- Drive Control
- Cutter Control
- LH Joystick CAN Inputs
- LH Joystick Digital Inputs
- LH Joystick Analog Inputs
- RH Joystick CAN Inputs
- RH Joystick Digital Inputs
- RH Joystick Analog Inputs
- Boom Float
- Fan Control
- Fault Management
- Options

Use the up arrow or down arrow button to select the menu item. Press OK to confirm the selection.

This menu is used by Tigercat service technicians. Refer to SECTION 6 of the SERVICE MANUAL for more information.

Press the back button (or F1) to return to the Main Menu page.

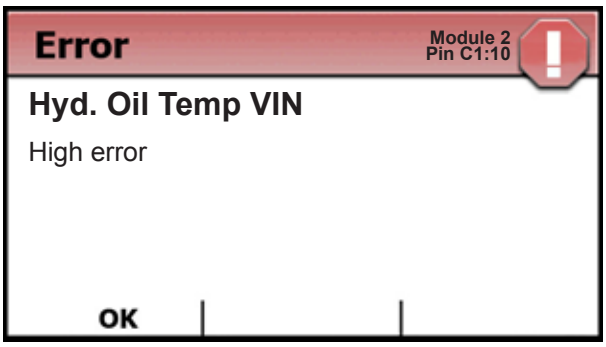


FIRE DETECTED

This message is displayed, alarm light flashes and alarm sounds to inform the operator that the fire detection system has detected a fire.

Refer to FIRE DETECTION SYSTEM in THIS SECTION for more information.

Refer also to WHAT TO DO IN CASE OF A MACHINE FIRE and WHAT TO DO AFTER A FIRE in SECTION 1 of THIS MANUAL.



VOLTAGE INPUT ERROR (VIN)

Voltage input error messages will be displayed to indicate a problem with a voltage input signal to a computer system module.

The module and pin number are identified on the display screen.

The heading identifies the signal source and the text indicates the type of error.

An example of a voltage input error message is shown above.

DIGITAL INPUT ERROR (DIN)

Digital input error messages will be displayed to indicate a problem with a digital input signal to a computer system module.

The module and pin number are identified on the display screen.

The heading identifies the signal source and the text indicates the type of error.

The display is similar to the voltage input error message shown above.

DIGITAL OUTPUT ERROR (DOUT)

Digital output error messages will be displayed to indicate a problem with a digital output signal from a computer system module.

The module and pin number are identified on the display screen.

The heading identifies the signal destination and the text indicates the type of error.

The display is similar to the voltage input error message shown above.

CURRENT OUTPUT ERROR (COUT)

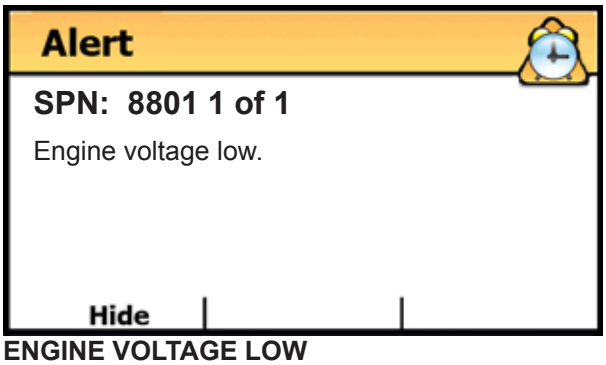
Current output error messages will be displayed to indicate a problem with a current output signal from a computer system module.

The module and pin number are identified on the display screen.

The heading identifies the signal destination and the text indicates the type of error.

The display is similar to the voltage input error message shown above.

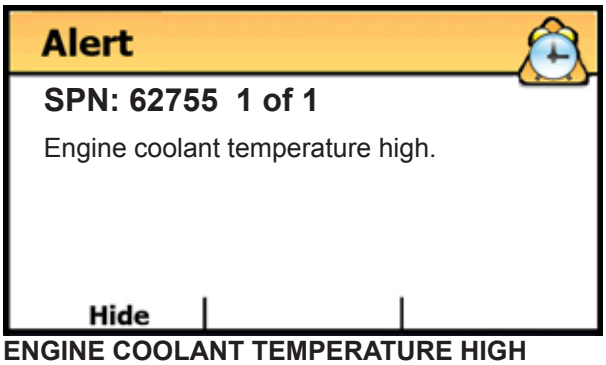
Once acknowledged these message will be replaced with a hardware failure message for the corresponding module when active faults recalled to the screen. Refer to COMPUTER – MESSAGES - ALERT – HARDWARE FAILURE in THIS SECTION.



ENGINE VOLTAGE LOW

This warning will be displayed when engine voltage readings of less than 20 volts are detected.

When this alarm is activated investigate the cause immediately.



ENGINE COOLANT TEMPERATURE HIGH

This warning will be displayed, alarm warning light will flash and alarm will sound when engine temperature exceeds recommended engine temperature.

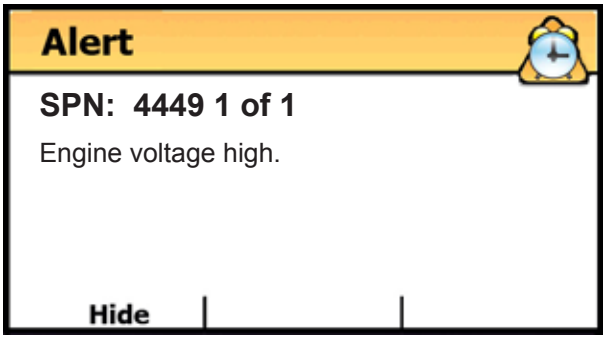
Investigate cause as soon as possible.

When this alarm is activated check for:

- Plugged air intake access panel screens
- Plugged radiator.

Refer to CLEANING A/C CONDENSER AND COOLING ASSEMBLY in THIS SECTION.

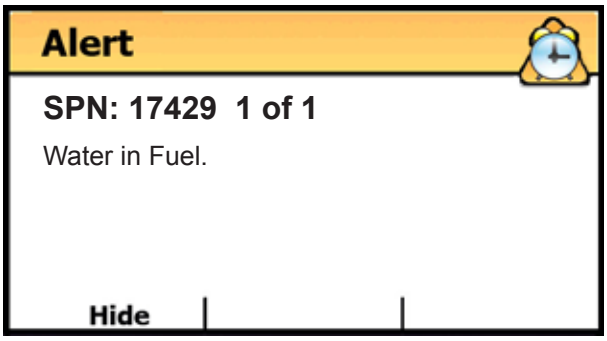
Refer to COMPUTER – MESSAGES - CRITICAL – ENGINE COOLANT TEMPERATURE HIGH.



ENGINE VOLTAGE HIGH

This warning will be displayed when engine voltage readings of greater than 30 volts are detected.

When this alarm is activated investigate the cause immediately.

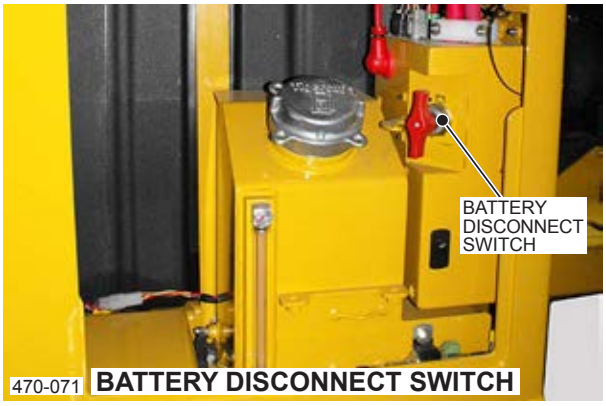


FUEL - WATER IN FUEL

This warning will be displayed when water is detected in the fuel by the engine computer system.

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

BATTERY DISCONNECT - SWITCH



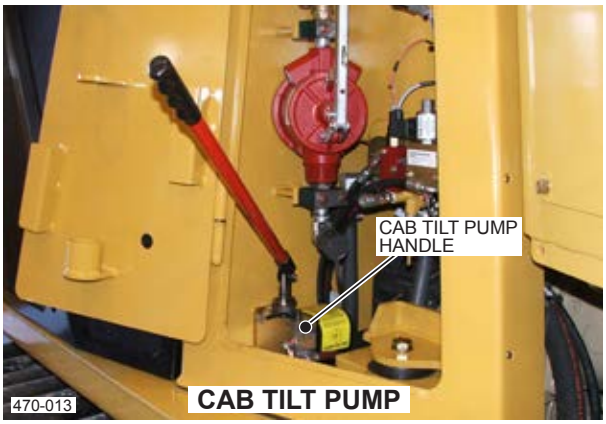
This manually operated battery disconnect switch completely disconnects most electrical circuits on the machine from the battery.

Turn the battery disconnect switch off if the vehicle is to be parked for an extended period of time (Example - overnight).

Note: This machine is equipped with an After Run/ Accessory Relay which delays by 90 seconds the power disconnect to engine related fuses and relays. Whenever the engine is stopped all DEF solution is pumped back to tank before the engine power system is turned off. This process takes approximately 90 seconds. Refer to AFTER TREATMENT SYSTEM in SECTION 3 for more information.

IMPORTANT!
Only use the battery disconnect switch to shut off a running machine in an emergency. A fault code is logged by the ECU on the engine for improper shut down and power down.

CAB TILT PUMP



Located in the hydraulic compartment on the right side of the machine, the cab tilt pump consists of a hydraulic pump with an independent reservoir, and valve.

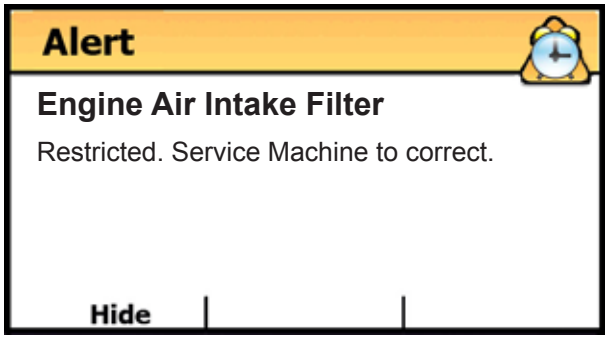
Insert the handle (stored in the hydraulic compartment) in the pump lever to operate the pump to tilt the cab. See TILTING THE CAB procedure later in this section.

AIR CLEANER

The air cleaner on this machine uses two filter elements; a primary element and a safety element. It is accessible through a hinged access panel on the left side of the engine compartment.

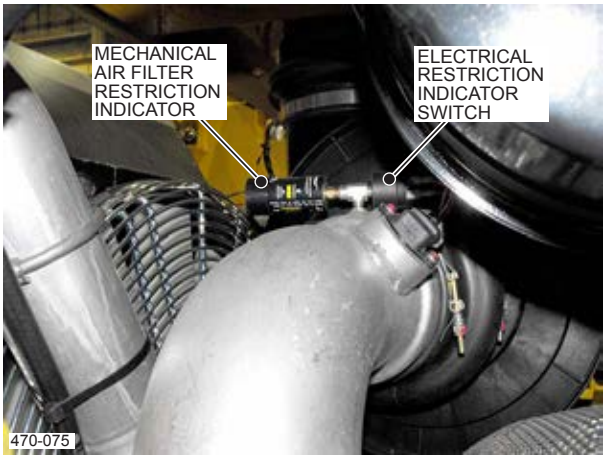
To ensure maximum engine protection, it is important that the elements be serviced correctly and at proper servicing intervals.

A filter restriction switch is installed on the air cleaner, the switch is used to signal the MD3 computer when the filter is restricted.



An alert message will appear on the MD3 display to indicate the engine air intake filter is restricted. Replace the primary air filter element if the alert message is displayed. Replace the secondary (safety) filter every third primary filter change to guarantee maximum performance and reliability.

AIR FILTER RESTRICTION INDICATOR



A mechanical filter restriction indicator is connected to the outlet side of the air filter. Replace the primary air filter when the indicator shows RED. This indicator provides a continuous reading whether the engine is running or is shut down. After replacing the filter, reset the indicator by pressing the reset button.

NOTE: Replace the safety element every third primary filter change.

6. When the units have been cleaned return all cooling components to their operating position.

NOTE: The cooler package must be checked daily and may have to be thoroughly cleaned on a daily, weekly or monthly basis, depending on operating conditions. **Use personal protective equipment (eye wear) to guard against flying debris.** Use compressed air for cleaning only when the machine is cold to avoid the risk of fire caused by debris contacting hot surfaces. **Care must be taken** not to set the pressure too high otherwise damage to the components could result.

Thoroughly clean the debris screen and pay particular attention to cleaning in the corners of the cooler as these areas usually plug deeply. Reversing the fan at least once per hour will help reduce the dust accumulation in the cooler cores.

Avoid the risk of fire caused by debris accumulating on surfaces that may become hot during machine operation. Always use care when cleaning to ensure that debris removed from one area of the machine does not accumulate on other areas of the machine. For more information on fire prevention refer to FIRE PREVENTION in SECTION 1 of THIS MANUAL.

If an oil leak occurs in this area it should be thoroughly power-washed with a mild soap to ensure that all of the oil is removed. The presence of oil causes dust and dirt to cling to surfaces which will impair the fan's ability to remove dust and dirt particles when the air flow is reversed.

⚠ CAUTION

Use compressed air for cleaning only when the machine is cold to avoid the risk of fire caused by debris being blown into contact with hot surfaces.
If using compressed air for cleaning, use at 2 bar (30 psi) or less.

Always use personal protective equipment (eye wear) to guard against flying debris.

CARE OF THE MACHINE

1. Ensure that all fluid levels are always at the proper level. Use the preventative maintenance schedule in SECTION 3 of this manual .
2. Apply grease to all lubrication points at required intervals.
3. Do not apply load to a cold engine.
4. Close and secure all doors and access covers.
5. Do not allow branches, twigs, leaves or other obstructions to build up around radiator intake doors or anywhere else on the machine. Clean frequently.
6. Be sure that the attachment is resting on the ground before servicing or parking the machine.
7. Follow proper procedure for cleaning windows described in this section.

IMPORTANT !
When cleaning the machine with pressurized water it is important to avoid getting water directly or indirectly into the exhaust tube. Water in the exhaust tube will damage sensors and SCR system components and affect the proper operation of the after treatment system and the engine.

GENERAL

CHECK EMERGENCY EXITS, DAILY:~

An alternate exit route is provided:

- Right hand cab door.
- Roof Hatch.

CHECK FIRE EXTINGUISHER, DAILY:~

A portable fire extinguisher is located in operator's cab. The extinguisher should be **checked daily to ensure that it is charged**. The pointer on the charge gauge should point to the green region. If the indicator falls out of this green area, the extinguisher should be serviced immediately.

Maintain a CHARGED fire extinguisher on the machine at all times and KNOW HOW TO USE IT.

Refer to the manufacture's Use and Information manual for proper usage, additional information and recommended inspection and maintenance intervals.

FIRE PREVENTION

Maintaining your machine properly will greatly extend its life and reduce your operating costs. Fire can result in a machine loss which can be financially devastating.

CAUTION

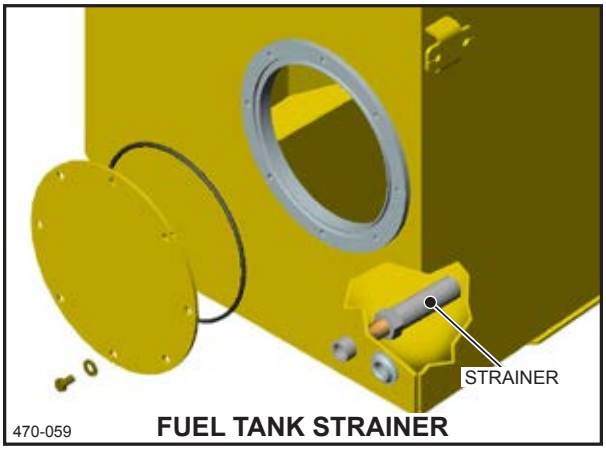
AFTER transporting (trucking) a machine from one job sight to the next, open all doors and access panels and blow off any debris that could have re-positioned itself onto the engine and exhaust parts due to wind turbulence caused by the journey.

1. Pine needles and bark when allowed to accumulate, form a fuel source that when ignited is extremely difficult to extinguish. A thorough program of regular cleaning and washing will reduce the possibility of a fire starting. In the event a fire does start, the regular cleaning program will improve the chances of successfully extinguishing a fire.
2. Pay close attention to wiring and plumbing routings during maintenance, ensure that ALL wiring harnesses or hydraulic hoses are properly restrained and clamped to prevent damage from chaffing.
3. If equipped, read the fire suppression system manual and have the system serviced regularly by qualified personnel.
4. In case of fire lower the boom system to the ground and shut off the engine before discharging the fire suppression system.

Also refer to FIRE PREVENTION in SECTION 1 of THIS MANUAL for additional information.

FUEL TANK STRAINER

This is a stainless steel fuel strainer, screwed on to the inlet pipe of the engine fuel feed line inside at the bottom of the fuel tank.

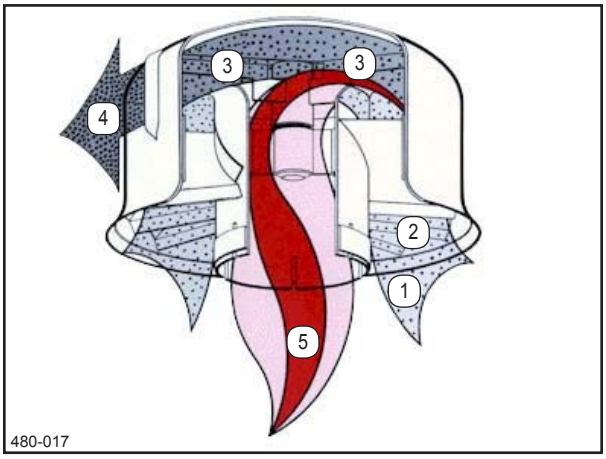


FUEL TANK STRAINER

Changing or cleaning the strainer:

1. Park machine on level ground, lower attachment to ground, stop engine.
2. Drain the fuel tank. (plug in bottom)
3. Remove the round fuel tank clean out cover plate and O-ring from the access hole on the fuel tank.
4. Before removing the strainer, clean any debris from the bottom of the tank and wipe it clean.
5. Remove the fuel strainer using the hex on the end of strainer. Carefully clean the strainer (it may be damaged by rough handling).
6. Check for a **buildup of foreign materials** where the strainer threads on to the pipe and elbow.
7. Reinstall the strainer using the hex on end.
8. Reinstall fuel tank cover plate and O-ring.
9. Refuel with pre-filtered fuel and check for leaks. Start the engine and check for leaks again.

ENGINE AIR PRECLEANER



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

HOW IT WORKS

1. Dirty air (1) enters the Precleaner, which is clamped onto the engine air intake.
2. Specially-designed vanes (2) , curved and angled to precisely direct air flow, move the dirty air toward the stainless steel impeller (3).
3. The **dynamically balanced**, one piece impeller (3) (only moving part) creates a tornado inside the housing.
4. The centrifugal force of the tornado expels the heavier than air dirt particles (4), chaff, dust, snow, rain, etc., out the discharge louver
5. Cleaned air (5) enters the engine air cleaner intake pipe, and the filter element has only the very light particles to remove.

RESULTS

- Cleaner Air for The Engine!
- Longer Filter Element Life!
- Increased Engine Life!
- Increased Engine Performance!
- Reduced Operating Costs!

DIESEL EXHAUST FLUID (DEF) HANDLING

Diesel exhaust fluid (DEF) is an aqueous urea solution with 32.5% high purity urea and 67.5% deionized water. Note that DEF may also be referred to as AUS32 or AdBlue and should meet ISO 22241 specifications. Use only DEF meeting this standard.

It is important to avoid contamination of DEF as this may cause costly damage to SCR system components and affect the proper operation of the SCR system and the engine.

When a problem with DEF quality is detected information messages and warnings will be shown on the computer display. Note that DEF quality problems may result in derating of engine performance to meet emission standard requirements. Action to correct DEF quality problems should be taken immediately to avoid affecting engine performance and damage to SCR after treatment system components. Refer also to COMPUTER – MESSAGES AND WARNINGS in Section 2, or Section 6 of the Service Manual.

For safety information refer to DIESEL EXHAUST FLUID (DEF) in Section 1.

AVOID DEF QUALITY PROBLEMS WITH PROPER HANDLING PRACTICES

Most DEF quality problems can be avoided entirely with a little care and proper handling of DEF fluid.

⚠ WARNING

Use only diesel exhaust fluid (DEF) which meets ISO 22241 specifications. NEVER fill the DEF tank with any other fluid.
DEF fluid is injected into the exhaust gas stream during normal operation of the Selective Catalytic Reduction (SCR) after treatment system.
Use of other fluids may cause component damage, or a fire risk which could result in death or serious injury.

FILLING THE DEF TANK

- Always clean the area around the fill cap and avoid introducing contaminants into the DEF tank when filling.
- Always use only diesel exhaust fluid (DEF) which meets ISO 22241 specifications. Use of any other fluid will contaminate the after treatment system and may pose a safety hazard.

USE OF PROPER STORAGE CONTAINERS

- To prevent contaminants from affecting DEF quality it should be handled only in storage, transport and filling containers intended exclusively for that purpose.
- Polyethylene or stainless steel containers are recommended. Refer also to DEF manufacturer's recommendations.
- DEF is corrosive to metals other than stainless steel. Transport in metal containers other than stainless steel will result in contamination.

PROPER STORAGE CONDITIONS TO MAXIMIZE SHELF LIFE

- DEF should be stored between -11°C (12°F) and 30°C (86°F) and out of direct sunlight to maximize shelf life and to avoid DEF quality problems caused by improper storage.
- DEF quality problems can often be avoided with proper storage and handling practices to maximize shelf life.
- DEF storage areas should always be out of direct sunlight and away from heat sources to avoid reducing shelf life.
- DEF shelf life is limited. It should be consumed on a first in first out basis, within manufacturer's recommended shelf life limits. DEF beyond manufacturer's recommended shelf life limits may not meet ISO 22241 specifications.