BI643619

Reliability at work

BUCYRUS

Operator's Manual

BUCYRUS®

FBL-10 LHD/Utility

Serial No: 5000112

Section **2**

General Safety and Precautions

This section contains specific safety precautions that shall be followed whilst the machine is being used by suitably qualified operators. This list is *NOT* all inclusive and a measure of commonsense should always be applied together with established and ongoing site specific risk assessment and safety procedures.

ONLY TRAINED AND AUTHORISED OPERATORS SHALL OPERATE THIS MACHINE

DO NOT use the machine for any purpose other than its intended use.

DO NOT for any reason exceed the indicated capacity of the machine.

DO NOT operate the machine unless all operator checks and scheduled servicing have been performed. Report any damage or faulty operation immediately and do not operate the machine until the fault has been corrected.

DO NOT tie down or tow equipment such that the chains or slings are not rated for the capacity of the machine and equipment.

DO NOT operate the machine unless:

- There are no tags attached stating otherwise.
- All covers and guards are correctly installed.
- Personal protective equipment is worn.

DO NOT start the machine unless:

- There are no tags attached stating otherwise.
- The area around the machine is clear.
- The park brake is applied.
- Transmission is in *neutral*.
- All water and oil levels are checked.
- All site specific checks are completed.

DO NOT leave the machine unless:

- The machine is parked in a safe place.
- The transmission is in *neutral*.
- The park brake is applied and brake head pressure is *zero*.
- The lift arms are lowered or any attachment is flat on the ground or supported.
- The engine is stopped.

DO NOT work on the machine in low ventilated areas while the engine is running.

ALWAYS sound the horn before starting the engine to alert anyone who may be around the machine.

ALWAYS ensure that the operator's compartment door is closed and made secure before operating the machine.

TRANSMISSION GEAR CONTROL LEVER

The transmission gear control lever has four positions, *first, second, third* and *fourth*. Shifting to a higher or lower speed may be made at full engine RPM.

NOTICE

The transmission in the machine is modulated. This prevents severe shocks being transmitted through the drive train when the transmission is shifted between gears.

TRANSMISSION DIRECTIONAL CONTROL LEVER

A directional control lever controls the transmission and direction of travel. This lever has three positions, *forward, neutral* and *reverse*. The engine should be at low idle when the transmission is shifted from the *neutral* position to either *forward* or *reverse* direction.

NOTICE

The transmission must be placed in the *neutral* position for the starter motor to engage when starting the engine.

WARNING

If the engine starts when the transmission is not in neutral, the machine should be tagged out of service until the problem is rectified.

TRANSMISSION CONTROLS

EXHAUST GAS TEMPERATURE GAUGE

This shows the exhaust gas temperature entering the mine atmosphere from the exhaust outlet. Machine will shutdown if this temperature exceeds 140 °C.

ENGINE OIL PRESSURE GAUGE

This gauge indicates the engine lubricating oil pressure. Normal pressure is between 210 kPa-550 kPa (30 psi-80 psi).

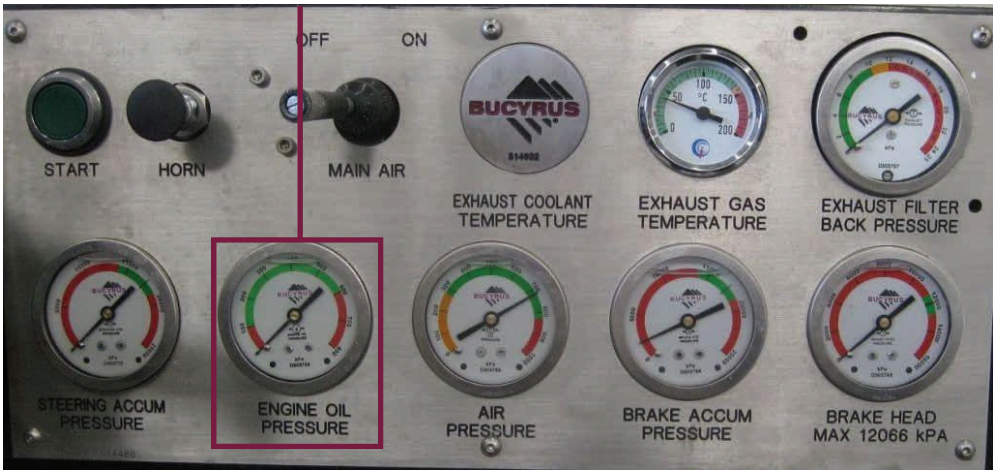
CAUTION

Shut off the engine if the oil pressure drops and stays below 70 kPa (10 psi). The electronic shutdown system should shutdown the engine at 70 kPa (10 psi).

CAUTION

Do not run the engine with low oil pressure, as engine damage will result. Immediately report the problem to service personnel.

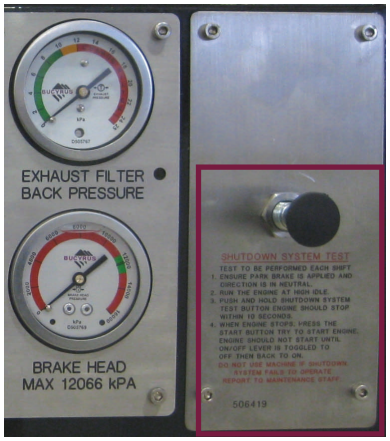
Engine Oil Pressure Gauge



RIGHT HAND SIDE OPERATOR'S PANEL

SHUTDOWN SYSTEM TEST VALVE

The test valve is used to check the integrity of the Fail-Safe Shutdown System. This test should be carried out on a daily basis as part of the *10 Hour Daily Off Line Mechanical Inspection.* (Refer to Section 8 - Post Start Checks).



LIFT ARM ISOLATION

To install the lift arm lock:

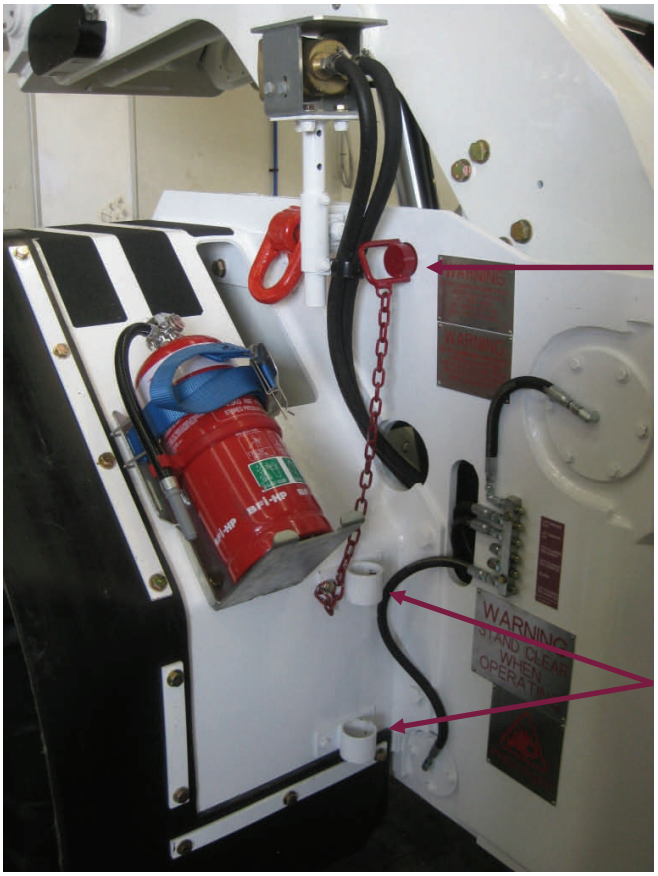
1. Ensure the area is clear of any obstructions and area is fit for carrying out safe operation and maintenance.
2. Remove any attachments from the QDS back plate.
3. Chock the wheels.
4. Fit the articulation lock (see Articulation Isolation).
5. Raise the lift arms until the locking pin holes are in line with holes in the front frame and the locking pins can be placed through the lift arms on both sides in the location points shown below.
6. Remove the locking pins from storage locations and install in the aligned holes on the lift arms.
7. Note that the locking pins are to be fully inserted into the holes.
8. It is now safe to work under the lift arms.

To remove the lift arm lock:

1. Remove the locking pines from the locating holes and secure in the respective storage locations.
2. Lower the lift arms to the ground.

WARNING

The lift arms on this machine can cause fatal crush injuries if extreme caution is not observed. Never access or perform work under the lift arms unless the engine has been shutdown, the articulation lock fitted, the park brake applied, the attachment has been removed and the lift arms have been supported in the raised position.



Lift Arm Locking Pin Installed

Storage Position on Both Front Guards

The float chamber inlet valve should be in the open position as shown in the picture below.

INLET VALVE

WARNING

Wear suitable eye protection, gloves and dust mask when performing maintenance tasks as particulate may be harmful to the respiratory system. Immediately wash any particulate matter from skin with warm, soapy water.

Emergency Intake Shut Off Valve:

The emergency intake shutoff valve (strangler valve) should be inspected before attempting to start the engine. The stop button should be pulled out and the reset lever latch into the operating position (see Section 4).

CAUTION

The engine will not start if the emergency shut off valve is activated, continued attempts to start the engine may result in damaged components.

WARNING

If the emergency intake shut off valve has been activated, the restarting of the engine should be done in compliance with the relevant regulations and Manager's Rules.

EMERGENCY INTAKE SHUT OFF VALVE ACTIVATION BUTTON

Section **9**

Stopping the Engine

1. Ensure the area is clear of any obstructions and area is fit for carrying out safe operation and maintenance.
2. Lower the lift arms and any attachment completely to the ground and remove any load from the engine.
3. Put the transmission directional control lever into the *neutral* position.
4. Remove any hydraulic load from the engine.
5. Apply the park brake. Observe that the brake head pressure gauge is on *zero*.
6. Allow the engine to run at idle speed for five minutes. This will allow internal temperatures to reduce gradually.

NOTICE

As the engine is turbocharged, shutting down the engine when the engine's operating temperature is high may cause damage to the turbocharger and the lubrication system.

7. Turn the on/off toggle switch to the *off* position and the engine will shutdown.
8. Open the door, check floor, hold on and step down using three points of contact at all times.

WARNING

Any problems with the normal engine shut off mechanism must be corrected before the engine is restarted.

NOTICE

If the engine fails to shutdown under the normal procedure the Emergency Intake Shut Off Valve should be used (see Section 4).

9. Close the main air isolation valve on the air manifold after the engine has stopped.

WARNING

Ensure the lift arms or any attachment are flat on the ground before leaving the operator's compartment.

WARNING

Ensure the machine is parked in an area that will not block traffic or in a blind intersection that may result in a collision.

Section 14
Loading

The LHD method of loading is called *crowd loading* which combines the tractive effort of the machine with the breakout force of the bucket. With the 172 kW of power from the machine and the torque multiplication of the converter and axles, this machine produces tremendous crowding power. Aggressive tyres, Posi-Torque differentials and an oscillating rear axle make sure the power is kept on the ground for loading.

Clark Posi-Torque differentials are fitted to the front and rear axles of the machine to ensure positive traction. These differentials are similar to a limited *no spin* arrangement. At the bucket lip there is maximum breakout force in excess of 15000 kg. Maximum loading efficiency is obtained by adjusting the loading cycle to the operating conditions. The proper use of traction and breakout force makes it possible for a single pass load without spinning the tyres or ramming the muck pile. The following cycle includes operations common to all *load-haul-dump* situations, it should be modified to suit other operating conditions.

Always when mucking from a pile, work from both sides towards the centre. Keep it trimmed at all times.

Do not ram the muck pile or spin the tyres.

Do not go under a hung up draw point or under any unsupported roof.

Do not use the machine to bar down a hang up.

Always keep all four wheels on the ground during mucking. If you should accidentally raise the rear of the machine off the ground, lower it slowly - not with a sudden jerk.

Section 19
Air Venting the Engine Cooling System

To prevent an air lock in the engine coolant system, the cooling system automatically bleeds back to the expansion tank. Fill the coolant system expansion tank only with the correct mix of *potable* water and inhibitor as required in Section 23 - Fluid Specification Table.

Add water conditioner as necessary.

Refer to Section 5 for isolation of the cooling system and Section 6 for checking and filling of the cooling system.