1648 PLUS
POWERBOX PAVER

Operation and Maintenance Manual

Discount Equipment

February, 2015
S/N 1001 – UP
Part # 30954

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Weiler cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all-inclusive. If a tool, procedure, work method, or operating technique that is not specifically recommended by Weiler is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that the product will not be damaged or be made unsafe by the operation, lubrication, maintenance or repair procedures that you choose.

PRODUCT AND DEALER INFORMATION

Delivery Date: _____

Dealer Information

Dealer Name _____

Address _____

City _____

State _____ Zip / Postal Code _____

Country _____ Phone _____

Customer Information

Customer Name _____

Address _____

City _____

State _____ Zip / Postal Code _____

Country _____ Phone _____

Machine Identification Numbers

Machine Manufacturing Date _____

Machine Model Number _____

Machine Serial Number _____

TABLE OF CONTENTS

Chapter 1
INTRODUCTION

The information in this Operator's Manual was written to give the owner/operator assistance in preparing, adjusting, maintaining and servicing of the paver. More important, this manual provides an operating plan for safe and proper use of the machine. Major points of safe operation are detailed in the **SAFETY** chapter of this manual.

POWERBOX is manufactured by Weiler Inc. in Knoxville, Iowa.

POWERBOX asks that you read and understand the contents of this manual COMPLETELY and become familiar with the machine, before operating it.

The use of this asphalt paver (referred to as paver throughout the rest of the manual) is subject to certain hazards that cannot be eliminated by mechanical means, but only by the exercise of intelligence, care and common sense. It is therefore essential to have competent and careful operators, who are not physically or mentally impaired, and who are thoroughly trained in the safe operation of the equipment.

Throughout this manual information is provided that is set in *italic* type and introduced by the word **NOTICE** or **NOTE**. Be sure to read carefully and comply with the message or directive given. Following this information will improve operating and maintenance efficiency, help to avoid breakdowns and damage, and extend the machine's life. A chart of standard hardware torques is located in the back of this manual. "Right" and "left" are determined from a position standing on the screed and facing forward.

A storage compartment is provided on the unit for storing the Operator's Manual. After using the manual, please return it to the storage compartment and keep it with the unit at all times! If the machine is resold, POWERBOX recommends that this manual be given to the new owner.

If this machine was purchased "used," or if the owner's address has changed, please provide your POWERBOX dealer or Weiler Company Service Department with the owner's name and current address, along with the machine model and serial number. This will allow the registered owner information to be updated, so that the owner can be notified directly in case of an important product issue, such as a safety update program.

The wide POWERBOX dealership network stands ready to provide any assistance that may be required, including genuine POWERBOX service parts. All parts should be obtained from or ordered through your POWERBOX dealer. Give complete information about the part and include the model and serial number of the machine. Record the serial number in the space provided in "Model/Serial Number Information" on page 6, as a handy record for quick reference.

POWERBOX reserves the right to make changes or improvements in the design or construction of any part without incurring the obligation to install such changes on any unit previously delivered.

POWERBOX, in cooperation with the Society of Automotive Engineers, has adopted this

Safety Alert Symbol

to identify potential safety hazards, which, if not properly avoided, could result in injury. When you see this symbol in this manual or on the machine itself, you are reminded to BE ALERT! Your personal safety is involved!

Model/Serial Number Information

As a handy reference, record the purchase information, and the model and serial numbers in the following spaces.

Purchased from: _____

Date of Purchase: _____

Model No.: _____

Serial No.: _____

Controls/Components Identification

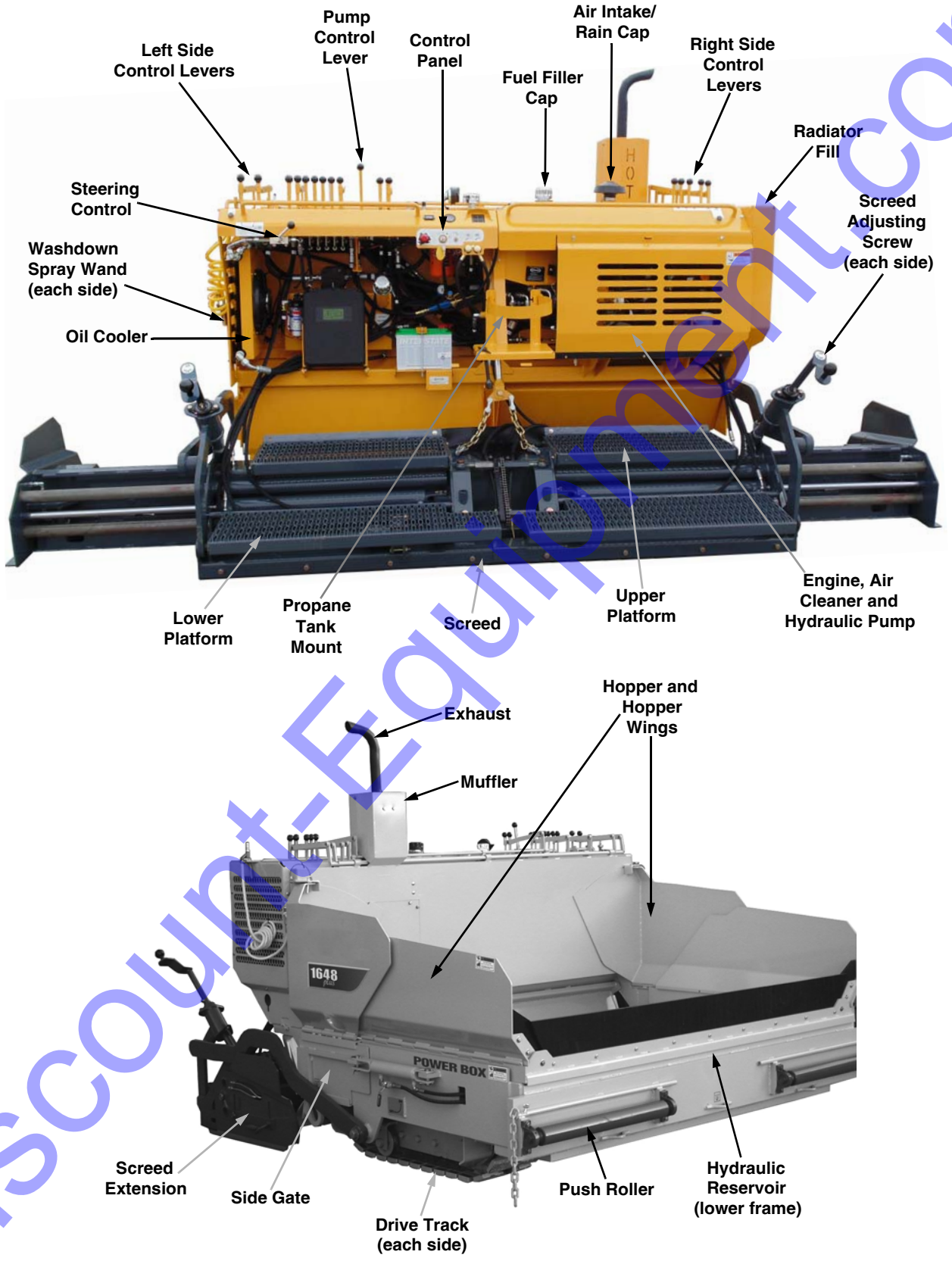


Fig. 1 - Paver Controls/Components

Chapter 2
SPECIFICATIONS

DIMENSIONS, MEASURES AND WEIGHTS	
Overall Height (top of exhaust pipe)	7’1” (2172 mm)
Minimum Width (transport)	8’6” (2591 mm)
Maximum Width (operating) (hopper wings down)	10’5” (3200 mm)
Length (augers on screed)	9’7” (2921 mm)
Length (augers on gates)	9’2” (2794 mm)
Truck Clearance (height from ground to asphalt hopper floor)	23” (584 mm)
Weight (approximate)	10,600 lbs. (4808 kg)
ENGINE	
Engine Model	Yanmar 4TNV88-BDGP
Type	Vertical In-line 4-cylinder Water-cooled Diesel
Horsepower (net) @ Engine Speed	48 (35.8 kW) @ 3000 rpm
Displacement	134 cu. in. (2.19 L)
Aspiration	Natural
Bore and Stroke	3.46” x 3.54” (88 x 90 mm)
Weight	375 lbs. (170 kg)
Power Take Off Location	Flywheel side
Direction of Rotation	Counter-clockwise (viewed from flywheel side)
Dimensions (L x W x H)	25.9 x 19.6 x 24.3” (658 x 498.5 x 618 mm)
Max. Torque @ Engine Speed	103 lb.-ft. (140 Nm) @ 1200 rpm
Max. Engine Speed (with no load)	3210±25 rpm
Lubricating System	Forced lubrication with trochoid pump
Fuel Injection System	Direct Injection
Engine Cooling System	5.7 qts. (5.4 L)
Engine Oil Capacity	7.8 qts. (7.4 L)
Cooling Fan	17” (432 mm) dia., 8-blade, pusher type
Starting Aid	Intake Air Heater (preheating time: 15 seconds)
SCREED	
Main Width	8”-13” (2438-3962 mm)
Hydraulic Vibrator	3000 vpm - maximum
Heat Medium	Propane
Variable Hydraulic Screed Extension - Max. Extension Length	30” (762 mm) w/ 6” (152 mm) wear plate
Maximum Variable Crown/Invert	0”-3” (0-76 mm)
Extension Width	30” (762 mm)
Dual-Span Operator Platform Type	Isolated
Top Operator Platform Type	Stationary

MATERIAL FLOW	
Independent Hyraulic Operated Gates	Standard
Gate Cut-Off Plates	Option, 6”-36” (152-915 mm)
Gravity-Flow Asphalt Hopper Capacity	6 Tons (5443 Kg)
Independent Hydraulic Operating Augers	Located on Gate or Screed Extension
DRIVE CONFIGURATION	
Type	Hydrostatic
Track Type	Self-adjusting, Steel
Track Link Dimensions	12” x 3” (305 mm x 76 mm)
Counter-Rotating	Standard
Steering Valve	Fine-tune
Track Length	48” (1219 mm)
OPERATOR STATION	
Platform	Isolated Dual-Span
Controls	Left and Right Sides
Wash-Down Stations	Dual, 5.5 gal. (21 L) Total
HYDRAULIC SYSTEM	
Variable Hydrostatic Drive Pump - Maximum Flow	37 gpm (140 L/min)
Variable Hydrostatic Drive Pump - Maximum Relief Pressure	3500 psi (241 bar)
Hydraulic Auger Drive Pump - Maximum Flow	10.9 gpm (41.3 L/min)
Hydraulic Auger Drive Pump - Maximum Relief Pressure	2000 psi (138 bar)
Hydraulic Cylinder Pump - Maximum Flow	10.9 gpm (41.3 L/min)
Hydraulic Cylinder Pump - Maximum Relief Pressure	1800 psi (124 bar)
Track Relief Pressure	300-350 psi (21-24 bar)
Return Filter	5 Micron
Suction Strainer	100 Mesh
Hydraulic Oil Cooler Capacity	32.0 gpm (121.1 L/min)
Drive Loop Oil Cooler Capacity	20 gpm (76 L/min)
ELECTRICAL SYSTEM	
Alternator	12-V, 40-A
Starter	12-V, 1.4-kW

Battery	12-V, Group Size 24, 675 CCA
PERFORMANCE	
Minimum Paving Width	4’ (1219 mm)
Standard Paving Width	8’ (2438 mm)
Maximum Paving Width	13’ (3962 mm)
Paving Depth	0-6” (0-152 mm)
Gravity Feed Hopper Capacity	6 Tons (5443 kg)
Hydraulic Feed Auger	2
Hydraulic Material Flow Gates	2
Operating Speed	0-130 fpm (0-40 m/min)
Left and Right Side Operator Controls	Standard
SERVICE CAPACITIES	
Engine Cooling System	5.7 qts. (5.4 L)
Engine Oil Capacity (dipstick upper limit/lower limit)	7.8/4.2 qts. (7.4/4.0 L)
Hydraulic Reservoir	20 gal. (75.7 L)
Fuel Tank	12.5 gal. (47.3 L)
Washdown Tank w/Electric Pump	5.5 gal. (20.8 L)

Chapter 4
SAFETY

SAFETY MESSAGES

General safety messages appear in this Safety Messages section. Specific safety messages are located in appropriate sections of the manual where a potential hazard may occur if the instructions or procedures are not followed.

Personal Safety

A signal word “DANGER”, “WARNING”, or “CAUTION” is used with the safety alert symbol.

Safety signs with signal word “DANGER”, “WARNING”, or “CAUTION” are located near specific hazards.

DANGER	Indicates a hazardous situation that, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

Machine Safety

NOTICE: The word ***“NOTICE”*** is used to inform the reader of something that needs to be known to prevent minor machine damage and/or property damage if a certain procedure is not followed.

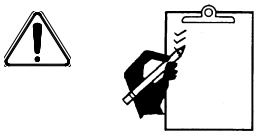
SAFETY

(Continued)

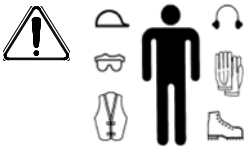
SAFETY SYMBOL EXPLANATION

This is the safety alert symbol. This symbol is used in combination with an exclamation mark or other symbols to alert you to the potential for bodily injury or death.

WARNING: Read Operator's Manual and safety signs before operating machine.

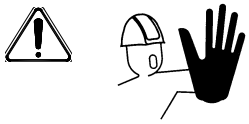


WARNING: Check machine before operating. Machine must be in good operating condition and all safety equipment installed and functioning properly.



WARNING: Wear personal protective equipment. Dress properly. Wear close-fitting clothing and confine long hair. Avoid wearing jewelry such as rings, wrist watches, necklaces or bracelets. Always wear:

- a hard hat
- safety glasses
- work shoes
- reflective clothing
- hearing protection



WARNING: Keep spectators away.

WARNING: Use Machine Shutdown Procedure, page 3-3 before servicing, cleaning, repairing, or transporting machine.

SAFETY

(Continued)

WARNING: Pressurized fluid can penetrate body tissue and result in serious injury or death. Leaks can be invisible. Keep away from any suspected leak. Relieve pressure in the hydraulic system before searching for leaks, disconnecting hoses, or performing any other work on the system. If you must pressurize the system to find a suspected leak, use an object such as a piece of wood or cardboard rather than your hands. When loosening a fitting where some residual pressure may exist, slowly loosen the fitting until oil begins to leak. Wait for leaking to stop before disconnecting the fitting. Fluid injected under the skin must be removed immediately by a surgeon familiar with this type of injury.

WARNING: Contact with moving parts can cause death or serious injury.

- Keep hands, feet, and clothing away from power-driven parts.
- Wear close-fitting clothing and confine long hair. Avoid wearing jewelry, such as rings, wristwatches, necklaces, or bracelets.
- Keep all shields and guards in place and properly secured.

Check Laws and Regulations

Know and obey all federal, state, and local laws and regulations to apply to your work situation.

Fire Extinguisher

Mount a fire extinguisher (not supplied with machine) on the screed attachment, readily accessible from the ground.

SAFETY

(Continued)

PAVER SAFETY

The following safety rules are some of the most important for safe operation of the machine. Remember that no amount of safety rules or safety equipment can make the operation of any machine safe, unless operator follows the rules and uses the safety equipment. An alert, properly trained and safety-conscious operator is key to the safe operation of any machine. Safety decals located on your machine contain important and useful information that will help you operate your equipment safely.

- Only responsible persons, delegated to do so, should operate any machine.
- Be sure safety shields and guards are in place and in good condition before starting the machine.
- Check to see that all personnel are clear of the machine before starting.
- Place all control levers and switches in NEUTRAL or OFF position when shutting the machine down. Be sure all control levers and switches are in NEUTRAL or OFF position before starting the engine.
- When parking the machine for the night, provide the appropriate lighting and marking if the machine is adjacent to a roadway or a construction area where work is in progress.
- The operator should not leave the operator's platform when the engine is running.
- Stay clear of the tracks, conveyors, augers, and stay out of hopper when the engine is running.
- Keep the machine clean. The process of cleaning will reveal loose bolts, hydraulic lines, fittings and other trouble spots.
- Always keep the operator's platform clean and free from asphalt, grease, oil, rags, and loose tools to help prevent slipping and falling.
- Before cleaning, adjusting or servicing the machine, shut engine down and place all controls and switches in neutral or off position. Lower all attachments, or securely support raised components. A variation of the above procedure may be used if instructed within this manual.
- Refuel the machine only with the engine OFF. Never smoke or have an open flame in area when refueling.
- Refill or check the radiator only when the engine is OFF and the radiator is not hot. Turn cap slowly to the first stop to relieve the pressure before removing the cap.
- Before starting or continuing operation, correct or report any mechanical deficiency that may cause further damage.
- Securely support with suitable blocking the mainframe, screed, or other components that are suspended or held aloft by slings, hoists, jacks or hydraulic cylinders before working under or between them.
- Make no modifications to your equipment unless specifically requested by Weiler.

SAFETY

(Continued)

WARNING

Failure to follow any of the preceding safety instructions or those that follow within this manual, could result in serious injury or death. This machine is to be used only for those purposes for which it was intended as explained in this manual.

MACHINE SHUTDOWN PROCEDURE

1. **Bring paver to full stop on a level surface. NEVER park on a slope or hillside, but if it is not possible to avoid, park across the slope and block the tracks at both ends.**
2. **Place all controls in neutral.**
3. **Move the throttle to low idle.**
4. **Shut off the engine and remove the key.**
5. **Lower the hopper and screed assembly to the "full down" position. Allow the screed to cool before lowering for transport.**

Failure to follow the above procedure could lead to death or serious injury.

For your safety and the safety of others, use shutdown procedure before working on the machine for any reason, including servicing, cleaning, unplugging, or inspecting.

A variation of the above procedure may be used if instructed within this manual or if an emergency requires it.

Screed Propane Heater Safety Reminders

WARNING

Do not smoke in the area around a paver equipped with propane burners.

ALWAYS be sure a suitable fire extinguisher is readily available.

ALWAYS light ignitor with a striker. NEVER use a cigarette lighter or a match.

Ignitor flame may be invisible in sunlight. Do not place ignitor near your skin or clothing. Severe burns will result.

ALWAYS allow the screed to cool before lowering it for transport. Fires could result.

- Only use propane gas with the screed propane heater.
- Wrench-tighten all fittings.
- Never use oil or grease for lubrication.
- Keep the propane supply cylinder upright at all times.
- Keep the paver free of dirt and oil.
- Use a regulator valve on the propane supply cylinder.
- Check the screed propane heater equipment carefully each time before lighting.
- Do not operate the screed propane heater in an enclosed area or near flammable material.
- Close all valves when not in use.
- Comply with all federal, state and local regulations during operation.

SAFETY

(Continued)

Modifications

Modifications and additions that affect capacity or safe operation of the paver must not be performed without the prior written approval of the POWERBOX.

Guards and Warning Devices

The paver is fitted with protective covers over the engine area in accordance with industry standards. They are intended to offer protection to the operator from physical injury.

A horn is provided, which can be activated from either side of the paver.

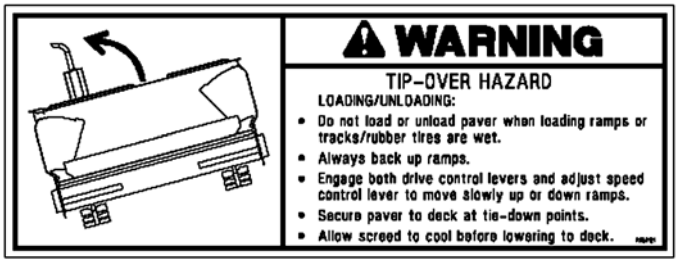
Replacement Parts

To ensure continued safe operation, replace damaged or worn parts with genuine POWERBOX service parts before operating the paver. If there is a decal on a part that is to be replaced, be sure that the replacement part has the decal applied to it.

SAFETY

(Continued)

Safety Decals



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SAFETY

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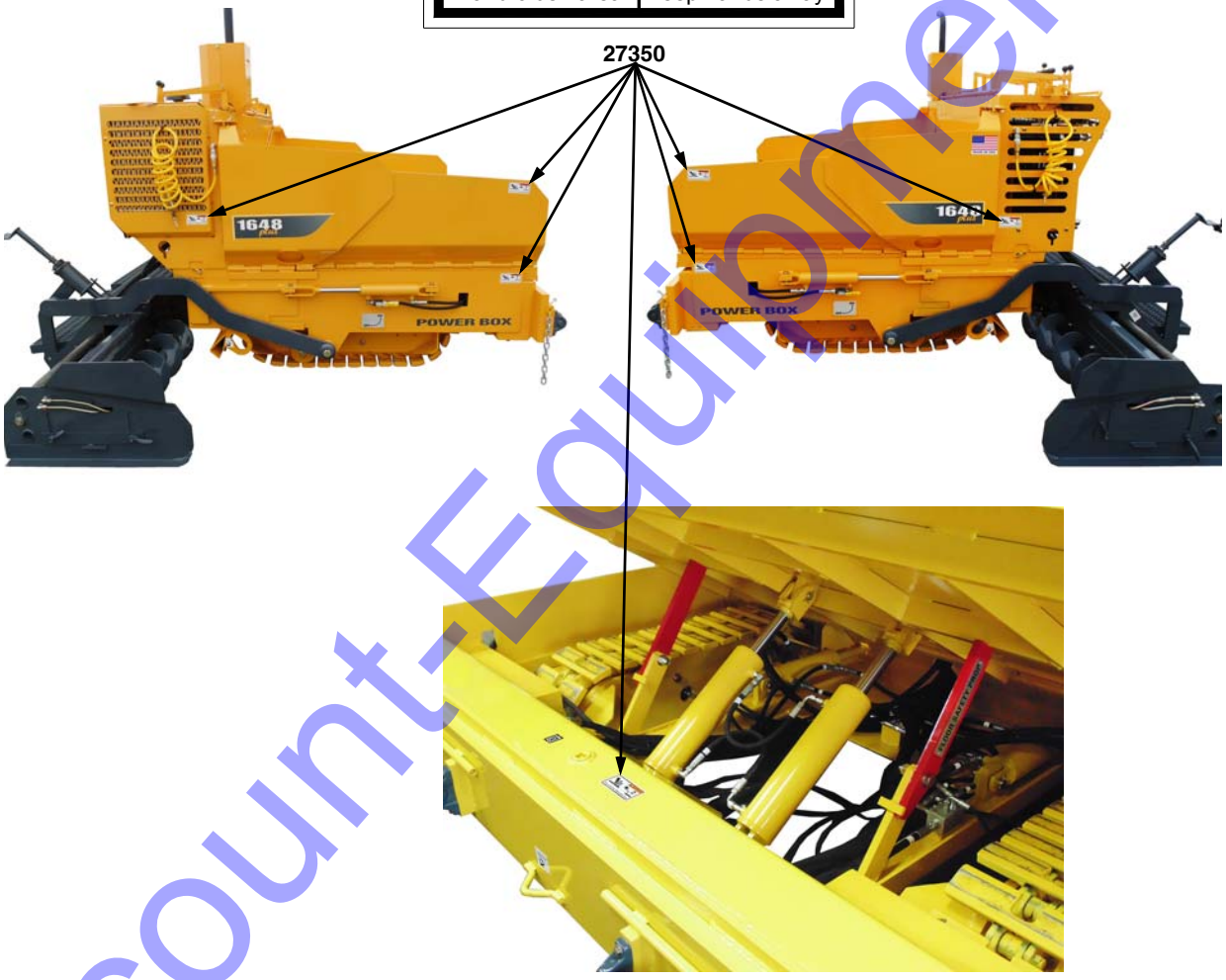

SAFETY

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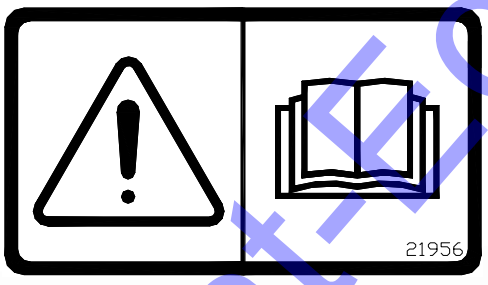

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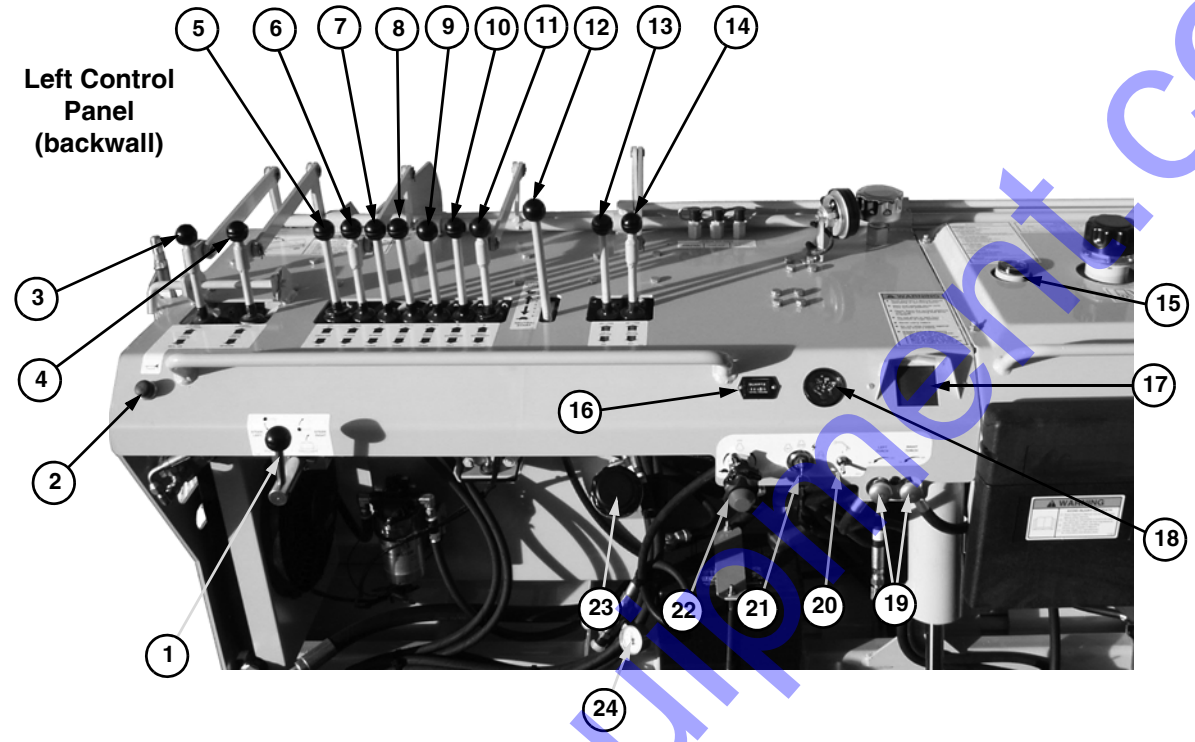
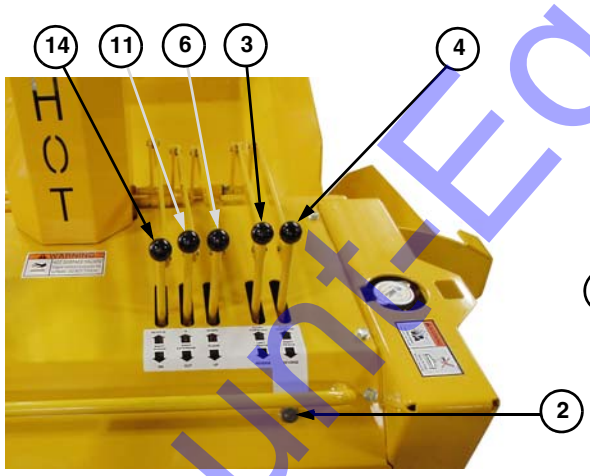
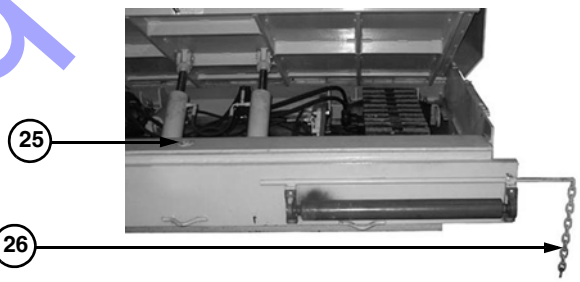
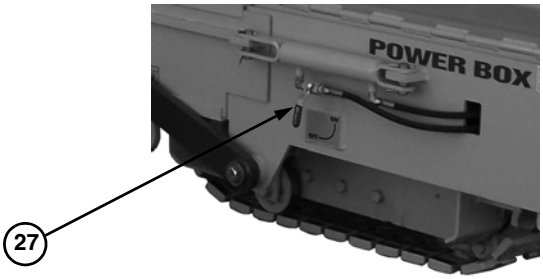
Chapter 5
INDICATORS AND CONTROLS





Right Control Panel (backwall)





1 Steering Control
2 Horn
3 Left Travel Control
4 Right Travel Control
5 Screed Vibrator Control
6 Hopper Floor Control
7 Screed Lift Control
8 Left Flow Gate Control
9 Right Flow Gate Control
10 Left Screed Extension
11 Right Screed Extension
12 Variable Speed Control
13 Left Feed Auger Control
14 Right Feed Auger Control
15 Fuel Level Indicator
16 Hourmeter
17 Instrument Module
18 Engine Coolant Temperature
19 Screed Burner Valves
20 Washdown Sprayer Switch
21 Ignition Switch
22 Engine Throttle
23 Releasing Agent Reservoir Fill
24 Propane Tank Regulator
25 Hydraulic Fluid Reservoir Fill
26 Paving Alignment Guide
27 Flow Gate Control

Fig. 2 - Indicators and Controls

⚠ CAUTION

Before operating the paver, become familiar with, and know how to use, all safety devices and controls. Know how to stop the paver before starting it — refer to "MACHINE Shutdown Procedure" on page 21.

Guards and Shields

Whenever possible and without affecting paver operation, guards and shields are used to protect potentially hazardous areas. In many places, decals are also used to warn of potential dangers and to communicate special operating procedures.

⚠ WARNING

Read and thoroughly understand all safety decals on the paver before operation. Do not operate the paver unless all factory-installed guards and shields are properly secured in place.

Indicator and Control Descriptions

(Refer to Fig. 2, page 27 for locations)

Ignition Keyswitch

(Item 21, Fig. 2)

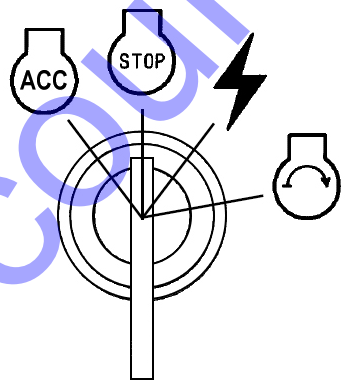


Fig. 3 - Keyswitch

STOP Position (STOP): When the key is vertical in the keyswitch, power from the battery is disconnected from the paver electrical circuits (except the horn).

NOTE: *This is the only position the ignition key can be inserted or removed from the keyswitch.*

RUN Position ( ): When the key is rotated clockwise one position from vertical, power from the battery is connected to the paver electrical circuits.

NOTE: *The battery charge and engine oil pressure indicators activate when the key is in the RUN position. If the engine is below 40° F (5° C), engine pre-heating is activated (see item D in "Instrument Module" on page 29).*

START Position ( ): Rotating the key clockwise two positions from vertical activates the engine starter. The key automatically returns to the RUN position after the key is released.

NOTE: *If ambient temperature is below 40° F (5° C) or cold engine does not start, turn key to RUN position and wait 15 seconds or until preheat indicator light is off. Then start engine. See item D in "Instrument Module" on page 29.*

ACC (Accessory) Position (ACC): When the key is rotated counter-clockwise one position from vertical, the paver accessory electrical circut activates.

Instrument Module

(Item 17, Fig. 2)

The instrument module is a multi-function indicator monitoring four engine/system functions. During power-up, the instrument module performs a diagnostic self-test. During the self-test, the module beeps for 3 seconds and the indicator lights activate. When the self-test is complete, the lights deactivate unless an error condition is detected.

NOTE: *If the engine temperature is below 40° F (5° C), the engine preheat indicator may stay on for 15 seconds.*

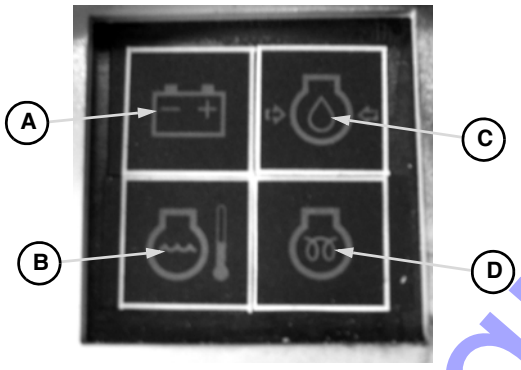


Fig. 4 - Instrument Module

Indicator	Description
A - Battery Charge	Indicator is activated if a charge system fault is detected. Activates if system voltage is below 12V or over 15V.
B - Engine Coolant Temperature	Indicator is activated if engine coolant temperature exceeds 220° F (104° C). Once activated, indicator deactivates when coolant temperature falls below 210° F (99° C).
C - Engine Oil Pressure	Indicator is activated if a significant loss in engine oil pressure is detected.
D - Engine Pre-Heat	Indicator is activated during pre-heat. Pre-heating is required under cold starting conditions.

NOTICE: If the engine oil pressure indicator activates during normal operation, STOP the engine immediately. Loss of engine oil pressure could be an indication of insufficient engine oil. See “Check Engine Oil Level” on page 64.

Engine Throttle

(Item 22, Fig. 2)

Fig. 5 - Engine Throttle

The throttle controls engine speed.

To place the throttle into idle position, loosen the throttle lock ring (G) by rotating it counter-clockwise, push the red throttle release button (E) and move the throttle control knob (F) all the way in against the lock ring (G).

To increase engine speed, loosen the throttle lock ring (G), press the red throttle release button (E) and pull the throttle control knob (F) out.

For fine adjustment of the throttle, rotate the throttle control knob (F) counter-clockwise to increase engine speed; clockwise to decrease engine speed.

To lock the throttle in position, rotate the throttle lock ring (G) clockwise until it is tightened/engaged.

NOTE: *The throttle can be quickly placed into the idle position by firmly pushing against the throttle release button.*

For normal operation, move the throttle release button (E) and the throttle control knob (F) as a unit to prevent undue wear on the throttle mechanism.

Horn

(Item 2, Fig. 2)

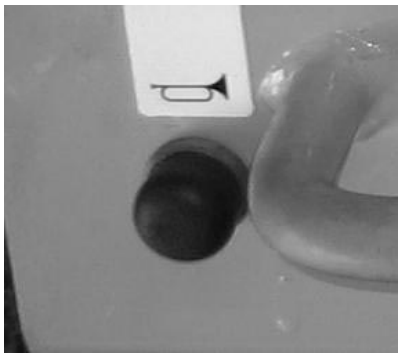


Fig. 6 - Horn (Either Side of Control Panel)

The horn is activated by pressing the button on either side of the control panel.

Fuel Level Indicator

(Item 15, Fig. 2)

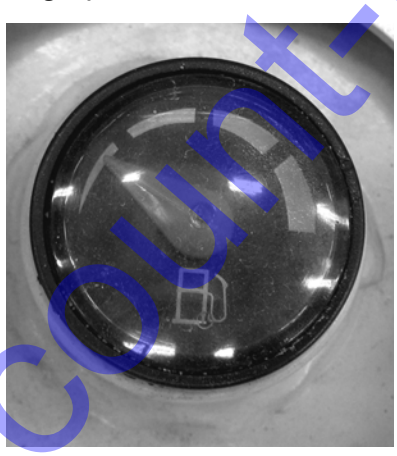


Fig. 7 - Fuel Level Indicator

The fuel level gauge shows the amount of fuel remaining in the fuel tank.

Engine Coolant Temperature Indicator

(Item 18, Fig. 2)

Fig. 8 - Engine Coolant Temperature Indicator

The engine coolant temperature indicator shows engine coolant temperature. Normal operating temperature is 180-200° F (82-93° C).

NOTE: *An engine coolant temperature warning is also included on the instrument module display. See “Instrument Module” on page 29.*

Hourmeter

(Item 16, Fig. 2)

Fig. 9 - Hourmeter

The hourmeter indicates total paver operating time and is activated when the paver is running. Use the hourmeter to determine paver maintenance intervals. See “Maintenance” on page 39.

Washdown Sprayer System

(Items 20 & 23, Fig. 2)

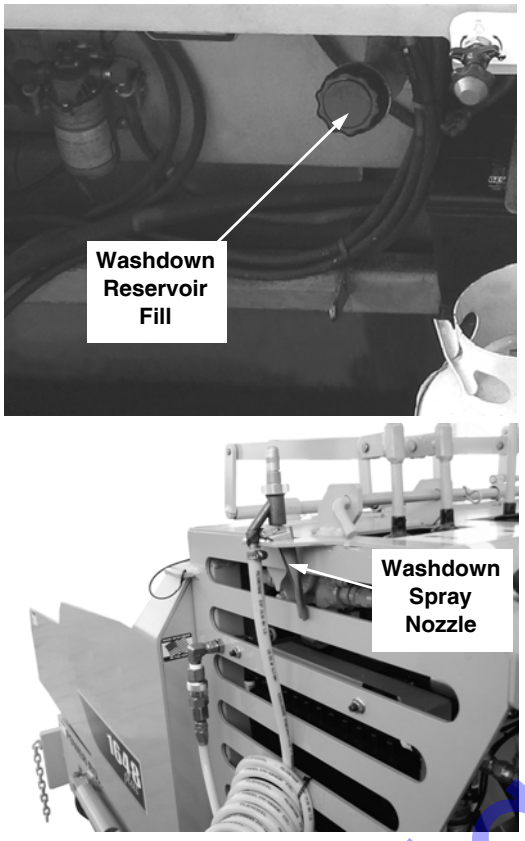


Fig. 10

The washdown sprayer system (a spray nozzle is located on each side of the paver, only the left side is shown) is used periodically each day to wash down parts of the paver with an asphalt releasing agent.

NOTICE: Only use releasing agents approved for use according to environmental laws and local regulations applicable to the area of paver operation.

Hydraulic Fluid Reservoir Fill

(Item 25, Fig. 2)

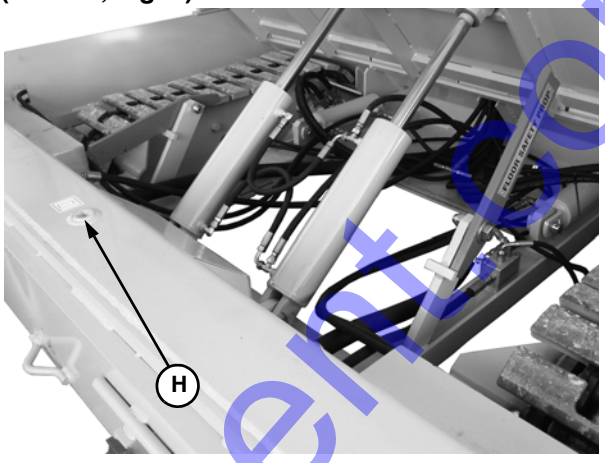


Fig. 11 - Hydraulic Fluid Fill

Remove the hydraulic reservoir fill plug to check the hydraulic fluid level or to add hydraulic fluid.

NOTE: *Before removing the hydraulic reservoir fill cap, allow the fluid to cool for 10-15 minutes. Slowly loosen the breather cap on the backwall top console to release system pressure.*

Paving Alignment Guide

(Item 26, Fig. 2)

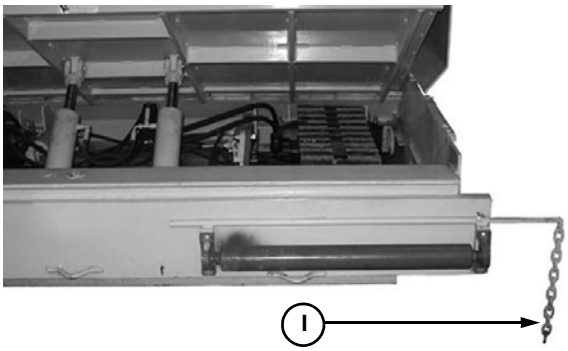


Fig. 12 - Paving Alignment Guide

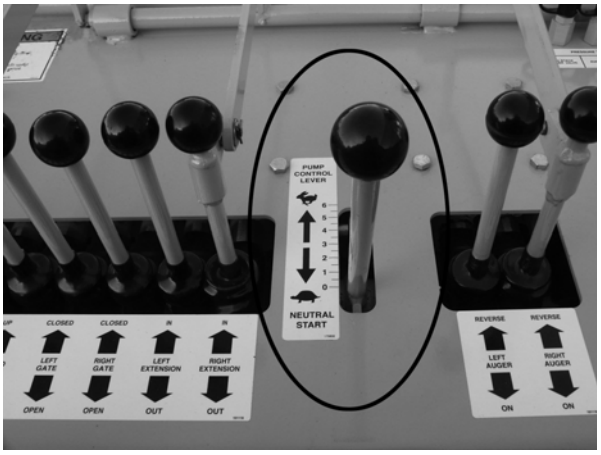
The adjustable paving alignment guide is used to align the paver with a curb or the edge of a previously laid mat of asphalt.

Travel Controls

The travel controls are used to maneuver the paver around at the jobsite and for road travel. Decals on the backwall top console area provide graphic representation of the various control actions.

Hydraulic Pump Variable Speed Control Lever

(Item 12, Fig. 2)



NOTE: Variable Speed Control Lever Shown in Neutral Position

Fig. 13 - Variable Speed Control Lever

This lever increases or decreases oil flow to the drive motors. Push the lever forward to increase speed; pull rearward to decrease speed. Place the lever in neutral when not operating to prevent creating excess heat in the hydraulic system.

NOTE: *Lever must be all the way back (neutral position) to start the engine.*

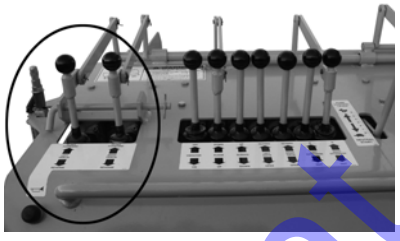
After placing the speed control lever into neutral, the paver should stop traveling when both travel control levers (Fig. 14) are in forward or reverse position.

If the paver does not completely stop traveling when the variable speed control lever is placed into the neutral position, adjustment is required. See “Adjusting Variable Speed Control” on page 72.

Travel Control Levers

(Items 3 & 4, Fig. 2)

TRAVEL CONTROLS — LEFT SIDE



TRAVEL CONTROLS — RIGHT SIDE

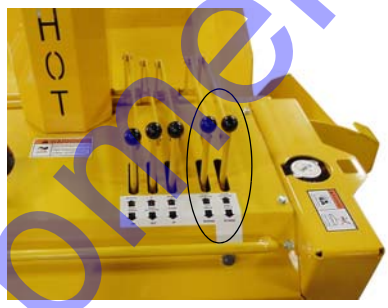


Fig. 14 - Travel Control Levers

These two levers control forward, rearward and turning travel. The travel levers are mechanically linked together on both sides of the paver to provide control from either side.

Travel Type	Lever Position
Forward	Both levers forward
Reverse	Both levers back
Stop	Both levers returned to neutral
Left Turn	Right lever forward
Right Turn	Left lever forward
Spin (paver spins around its center)	Right/left levers in opposite directions

NOTE: *Turn and/or spin the paver at slow speeds only.*

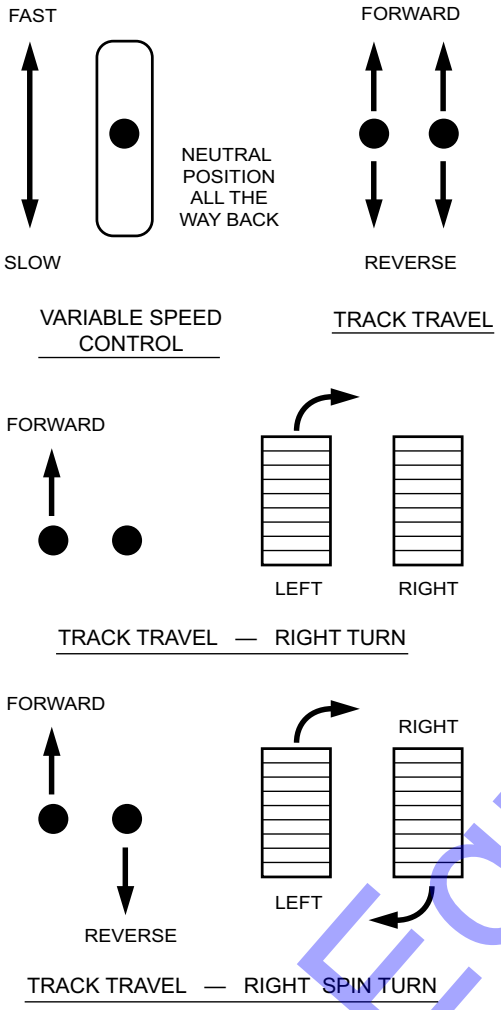


Fig. 15 - Travel Controls

Steering Control

(Item 1, Fig. 2)

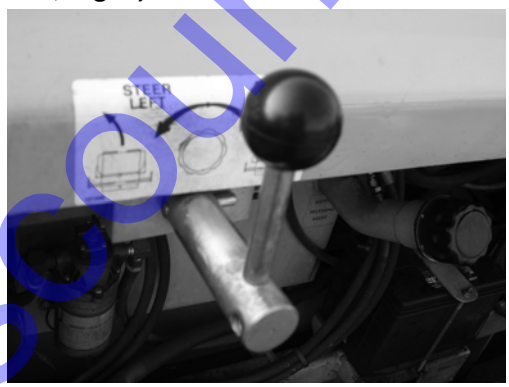


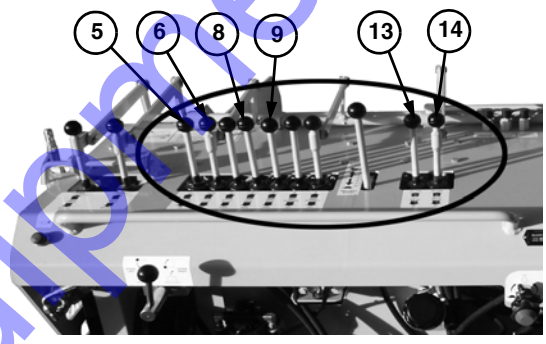
Fig. 16 - Steering Control Lever

The steering control lever is used for making fine steering adjustments. With the travel control levers both either forward or rearward, set the pump speed lever to the desired position. Rotate the steering control counter-clockwise to turn left and clockwise to turn right. The paver travels in a straight line when the steering control lever is centered.

NOTE: *It may be necessary to move the steering control lever as paving conditions vary to adjust for straight-line travel.*

Hopper Controls

HOPPER CONTROLS — LEFT SIDE



HOPPER CONTROLS — RIGHT SIDE

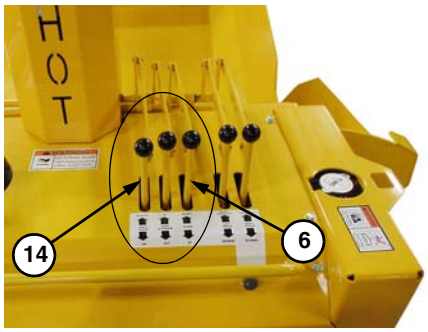


Fig. 17 - Hopper Controls

Hopper Floor Control Lever

(Item 6, Fig. 2 and Fig. 17)

Move the hopper control lever rearward to raise hopper, forward to lower the hopper. These hopper control levers are mechanically linked together on both sides of the paver.

Flow Gate Control Levers

(Items 8 and 9, Fig. 2 and Fig. 17)

The right and left flow gate control levers control flow of asphalt out of the hopper. One lever controls each gate.

Move the levers rearward to open the gates, forward to close the gates.

Side Gate Control Levers

(Item 27, Fig. 2)

Fig. 18 - Side Gate Control Lever

The flow gate control levers open and close the side gates. Move the flow gate control levers to ON to open or close the side gates. Move the flow gate control levers to OFF after the side gates are in the preferred position.

NOTE: *The side gates should be closed unless paving an area wider than eight feet.*

Feed Auger Control Levers

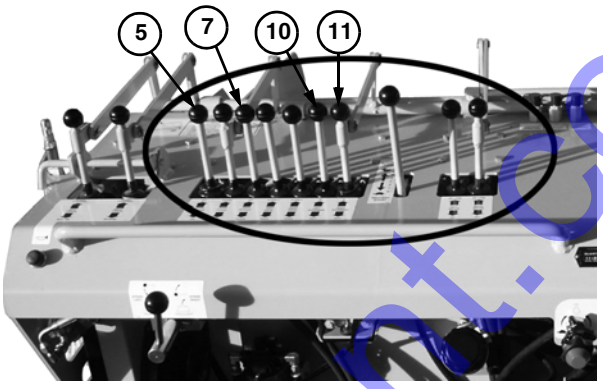
(Items 13 and 14, Fig. 2 and Fig. 17)

The feed auger controls are used only with screed extensions "out." On the left side of the paver, one lever controls either the right or left auger with the right feed auger control lever mechanically linked to another lever on the right side of the paver. Move the levers rearward to activate the augers. Move the levers to "neutral" to deactivate the augers.

The right feed auger control levers are mechanically linked together on both sides of the paver.

Screed Platform Controls

SCREED CONTROLS — LEFT SIDE



SCREED CONTROLS — RIGHT SIDE

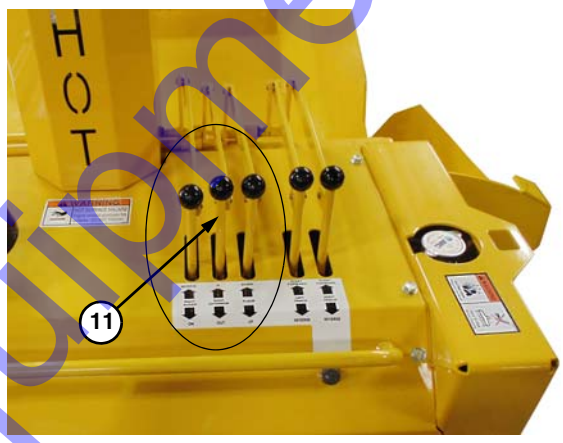


Fig. 19 - Screed Platform Controls

Screed Lift Control Lever

(Item 7, Fig. 2 and Fig. 19)

Move the screed lift control lever rearward to lower the screed into the paving position. Make sure the cylinder is fully extended. Move the lever forward to raise the screed.

Vibrator Control Lever

(Item 5, Fig. 2 and Fig. 19)

The screed vibrator assists in compacting the asphalt mat passing under the screed. Move the vibrator control lever rearward to turn the vibrator on, forward to turn the vibrator off.

Screed Extension Control Levers

(Items 10 and 11, Fig. 2 and Fig. 19)

The screed extensions allow paving an area wider than eight feet.

On the left side of the paver, one lever controls either the right or left screed extension with the right screed extension control lever mechanically linked to another lever on the right side of the paver.

Move the levers forward to move the extensions inward, rearward to move the extensions outward.

Screed Depth Adjustment

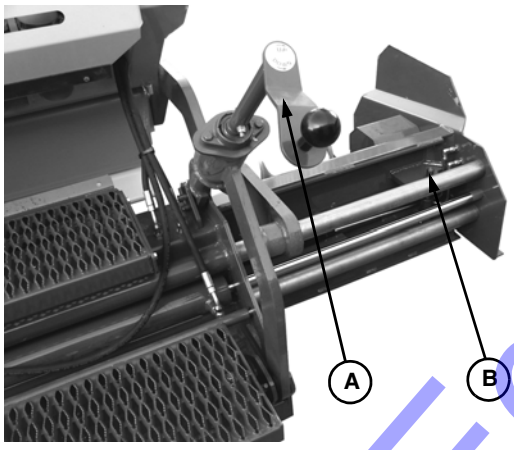


Fig. 20 - Screed Depth Adjustment

Screed depth adjustment is controlled with manually operated adjustment screws (A, Fig. 20) on both sides of the screed. The adjustment screws set the thickness of the asphalt mat. Rotate the screws clockwise to increase the depth, counter-clockwise to decrease the depth.

NOTE: *Indicators on the adjustment screws provide a reference for mat thickness, but actual mat thickness must be measured with a depth gauge.*

Screed Extension Adjustment

In order to maintain a smooth mat transition from the main screed through the extension, the rear edge of the extension has to have the same amount of compaction as the main screed.

Adjust the compaction of the rear edge of the extension using the screed extension adjustment screw (B, Fig. 20). Rotating the adjustment screw counter-clockwise will move the rear edge of the extension down and increase compaction.

Side Shoe Plate Adjustment

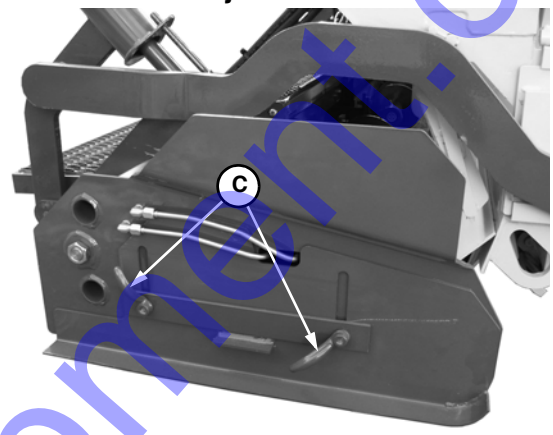


Fig. 21 - Side Shoe Plate

Wing nuts (C, Fig. 21) are used to adjust the side shoe plates on both sides of the screed. Loosen the wing nuts to adjust the side shoe plates and re-tighten when the adjustment is complete.

Mat Crown Adjustment

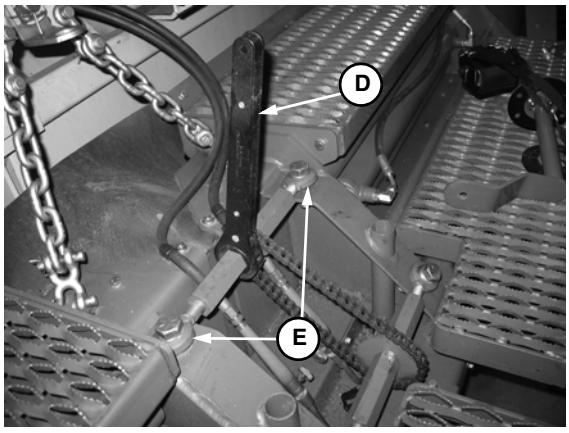


Fig. 22 - Mat Crown Adjustment

Mat crown adjustment is controlled by moving the rod ends (E, Fig. 22) inward or outward using ratchet handle (D). Mat crown is increased when the rod ends move outward. Mat crown is decreased when the rod ends move inward.

Screed Propane Heater Controls

(Items 19 and 24, Fig. 2 and Fig. 23)

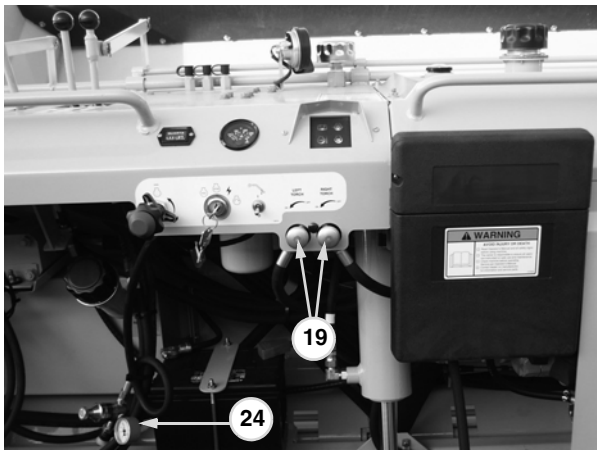


Fig. 23 - Propane Heater Controls

Two propane heaters are located one each in the left and right sides of the screed. They provide even heating across the bottom of the screed and the screed extensions.

The propane tank regulator (24, Fig. 23) controls and indicates the pressure of the propane gas flowing out of the propane tank. The screed burner valves (19) control the flow of propane gas to the right and left screed heaters.

For information about using the propane screed heating system, see “Using the Screed Propane Heater” on page 45.

Accessories

POWERBOX offers special accessories such as hopper cut-off and block-off plates, and bolt-on screed extensions. Contact your area POWERBOX dealer for specifications and ordering information.

NOTE: *All accessories are field-installed unless otherwise noted. Information and parts for field installation of all accessories are provided by the factory or POWERBOX paver dealers.*

CHAPTER 6
MAINTENANCE

The Maintenance Interval Chart contains the maintenance intervals for the service procedures located in "Service and Storage" on page 59. The "Maintenance Log" on page 40 is for recording the service procedures performed.

NOTICE: *Under extreme operating conditions, more frequent maintenance than the recommended intervals may be required.*

MAINTENANCE INTERVAL CHART

SERVICE PROCEDURE	Every 10 Hours (or Daily)	Every 50 Hours (or Weekly)	First 50 Hours	Every 250 Hours	Every 500 Hours	Every 1000 Hours (or Yearly)
Check Fuel Tank Level	●					
Check Engine Oil	●					
Check Radiator Coolant Level	●					
Check Instruments Operation	●					
Clean Areas Contacting Asphalt	●					
Check General Machine Operation and Condition	●					
Check Air Cleaner Element		●				
Drain Fuel Water Separator		●				
Check Fan Belt Tension and Condition		●				
Check Battery and Connections		●				
Check Hydraulic Oil Level		●				
Lubricate Grease Points		●				
Change Hydraulic Filter Elements			●	●		
Change Engine Oil and Filter			●	●		

SERVICE PROCEDURE	Every 10 Hours (or Daily)	Every 50 Hours (or Weekly)	First 50 Hours	Every 250 Hours	Every 500 Hours	Every 1000 Hours (or Yearly)
Check Torque Hubs Oil Level				●		
Check Track Adjustment				●		
Check Screed Bottom Plate Wear				●		
Change Engine Oil Filter				●		
Change Fuel Filter					●	
Change Radiator Coolant						●
Change Hydraulic Reservoir Oil and Strainer						●
Check Exhaust System						●
Refer to Engine manual for recommended checks						●
Change Air Cleaner Element						●

NOTE: *Recording the 10-hour (or daily) service intervals in the Maintenance Log is not recommended.*

MAINTENANCE LOG

Date	Hours	Service Procedure

Date	Hours	Service Procedure

Date	Hours	Service Procedure

Chapter 7
OPERATION

GENERAL INFORMATION

⚠ CAUTION

BEFORE starting the engine and operating the paver, review and comply with all safety recommendations in the SAFETY chapter of this manual. Know how to stop the paver before starting it.

ENGINE BREAK-IN

NOTICE: Do not suddenly change engine speed or carry heavy loads during the first 50 hours of operation because this may damage the engine and/or shorten engine life.

The paver does not use a special engine "break-in" oil. Do not add special additives or "break-in" components to the crankcase. The oil in the engine crankcase is the same used for regular oil changes. Check the oil level frequently and refill as necessary. See “Check Engine Oil Level” on page 64. Change the oil and replace the oil filter. See “Service Every 250 Hours” on page 68.

BEFORE STARTING ENGINE

Before starting the engine and running the paver, see “Indicators and Controls” on page 27.

STARTING THE ENGINE

Before mounting the screed platform, walk completely around the paver to make sure no one is on or close to it. Let others near the paver know you are going to start the engine and do not start the engine until everyone has moved away from the paver.

Place all hydraulic function controls and the hydraulic pump speed control lever in the "neutral" positions.

Complete the following steps to start the engine:

1. Be sure that the keyswitch is in the STOP position.
2. Set the throttle control to 1/3 open.

NOTE: *If starting a cold engine and the outside temperature is below 40° F (4° C), turn the keyswitch to the RUN position and leave it there for 15 seconds before starting the engine. See item D in “Instrument Module” on page 29.*

3. Turn the keyswitch to the START position. If the engine does not start, turn the keyswitch to the STOP position. Wait 30 seconds to allow battery voltage to recover and follow the cold start procedure noted above.

NOTICE: Do not crank the starter for longer than 15 seconds or the starter motor may overheat. Do not crank the starter if the engine is either not completely stopped or in operation because the starter motor pinion or ring gear will be damaged.

4. After the engine starts, release the keyswitch. The keyswitch moves to the RUN position.
5. Run the engine at a low, consistent speed for five minutes before operating any controls. Listen for any abnormal sounds during this time.

NOTICE: Do not run the engine with a load while the engine is cold/while black smoke emits from the exhaust because the life of the engine may be shortened.

6. Check that indicators are in normal condition.
7. Check the color of the exhaust gas. It should be light blue or colorless.
8. Check that there are no fuel, oil, or engine coolant leaks.
9. Check that there are no abnormal noises or vibrations.

If the battery is discharged and cannot start the engine, either charge the battery or use jump-start the paver. See “Jump-starting” on page 66.

⚠ CAUTION

BEFORE starting the engine and operating the paver, review and comply with all safety recommendations in the SAFETY chapter of this manual. Know how to stop the paver before starting it.

FIRST TIME OPERATION

Complete the following steps if you are operating the paver for the first time:

1. Be sure the engine is warm.
2. Learn the control levers.
3. Raise the screed.
4. Move the paver travel control levers forward and rearward.
5. Make left and right turns using the travel control levers and modular steering control.
6. Stop the paver, lower the screed, and activate the vibrator.
7. Position the side gates and extensions in and out.
8. Raise and lower the hopper.
9. Turn the auger motors on and off.

STOPPING THE PAVER

1. Bring paver to full stop on a level surface. NEVER park on a slope or hillside, but if it is not possible to avoid, park across the slope and block the tracks at both ends.
2. Place all controls in neutral.
3. Move the throttle to low idle.
4. Lower the hopper and screed assembly to the “full down” position. Allow the screed to cool before lowering for transport.
5. Run the engine at a low, consistent speed for five minutes. Listen for any abnormal sounds during this time.
6. Shut off the engine and remove the key. Refer to the “MACHINE Shutdown Procedure” on page 21.

⚠ WARNING

Do not turn the keyswitch to “STOP” position before completing step 5. Turning the keyswitch to “STOP” position before completing step 5 causes the engine temperature to rise rapidly and this may cause fire, damage to the engine, and injury.

NOTICE: Do not stop the engine immediately after removing the load because the temperature of the engine rises suddenly when this occurs. If the coolant system is not allowed to cool the engine before it is shut down, the engine may be damaged.

GENERAL PAVER OPERATION

WALK-AROUND INSPECTION

1. Inspect hydraulic suction hose to be sure it is firm and not soft.
2. Check for hydraulic leaks.
3. Check hopper sides and floor clearance.
4. Inspect the screed.
5. Check that safety guards and covers are in place.

HANDS-ON CHECK

1. Check the fuel gauge. Fill the tank before paving and when necessary.
2. Check the engine oil level and add oil if necessary.

NOTICE: Follow the manufacturer's recommendations regarding the use of fuel, lubricants and oil.

WARNING

To prevent a fire or explosion, allow the engine to cool down before refilling the fuel tank. A hot engine could ignite spilled fuel and burn you. Also, do not smoke while refilling the fuel tank.

3. Check the cooling air intake on the radiator.
4. Check the air cleaner for cleanliness and make sure that components are tight to prevent intake of unfiltered air.
5. Check the pump speed control lever for full travel movement.

WARNING

Do not spray releasing agent into tracks immediately before loading or unloading. Wet tracks can slip and lose traction.

6. Clean the external area of both tracks, and clean them three to four times during the work day.
7. Clean all asphalt buildup in the screed platform propane burner area and in the exhaust ports located on each end of the screed.
8. Clean all asphalt buildup inside the tracks.
9. Inspect the paver for loose hardware and components.
10. Be sure safety guards and covers are in place.

WARNING

NEVER operate the paver with safety guards or covers removed.

If the paver needs repair, is unsafe, or contributes to an unsafe condition, inform the appropriate person immediately. Do not operate the machine until it is repaired or the unsafe condition is corrected.

Using the Screed Propane Heater

1. Check the propane heating equipment carefully each time before lighting.
2. Do NOT operate the propane heater in enclosed areas or near flammable materials.

WARNING

Do NOT smoke in the area around the paver when it is equipped with propane burners.

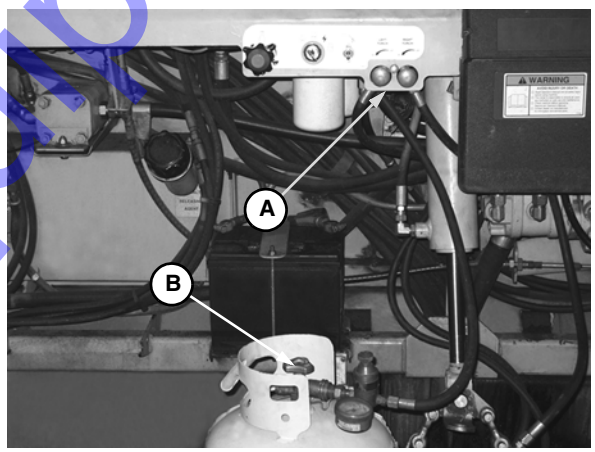


Fig. 24 - Screed Propane Heater

3. Close the tank valve (B, Fig. 24), the valves on the screed burner valves (A, Fig. 24), and the valve on the lighting torch (C, Fig. 25).
4. Slowly open the tank valve.
5. Adjust regulator to 15-20 psi (103-138 kPa).

WARNING

Always light the burners with a striker. NEVER use a match.

6. Direct the lighting torch (C, Fig. 25) away from the battery, propane tank, fuel tank, and other people. Open the needle valve and light with a striker.

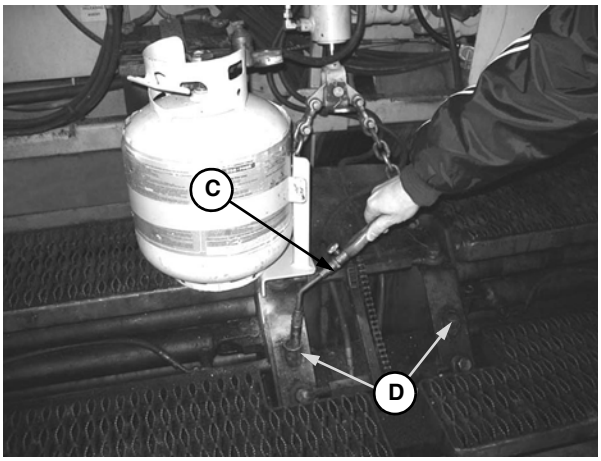


Fig. 25 - Light Screed Torch Lighting Tubes

7. Light the left and right screed torches with the lighting torch (C, Fig. 25) by directing the flame into the lighting tubes (D, Fig. 25) and opening the left and right screed burner valves (A, Fig. 24).
8. Re-adjust the regulator to 15-20 psi (103-138 kPa).

⚠ WARNING

The burner flame may be invisible in sunlight. Do NOT place the burner near your skin or clothing. Severe burns may result.

Screed surfaces will be HOT. Do NOT touch. Severe burns will result.

9. Do NOT leave the paver unattended with the burners on. If the flame is extinguished, quickly close the valves. Wait five minutes before re-lighting the burners to allow fumes to dissipate.
10. When the burners are not in use, close valve on the tank, crack and close valves on the “Y” valve to release gas pressure in the hoses. Close the valve on the lighting torch.

PAVING AT THE JOBSITE

The following areas should be "sprayed down" with asphalt releasing agent using the washdown hose before paving and four times or more during the work day. The following areas should also be cleaned thoroughly after every use of the paver:

- Hopper, augers, and underside of the screed
- Push rollers
- Hydraulic fluid reservoir
- External track and sprockets
- Any part of the paver that contacts asphalt

Positioning the Paver

1. Warm-up the engine.
2. Use the propane burners to heat the screed. See “Using the Screed Propane Heater” on page 45.
3. Use the travel control levers to move the paver into position for laying asphalt.
4. Move the screed control lever to "down" and hold it until the screed lift cylinder fully extends (this allows the screed to float freely).
5. Lower the screed onto a starting pad of asphalt or blocks that are equal in height to the desired paving thickness.
6. Manually adjust the screed depth control screws to a neutral position.
7. Slowly turn the screws toward the "up" position until a slight amount of tension is felt. After the tension is felt, the screed is ready to lay asphalt that measures the approximate thickness of the starting pad or blocks.
8. Move the right and left flow gate control levers to the "closed" position and hold until both gates are fully closed.
9. Set the alignment guide on the left side of the lower front frame.

Filling the Hopper

1. Have the dump truck back up to the front of the paver until the truck tires are one to two inches from the push rollers.
2. Move the paver forward until the push rollers contact the rear tires of the truck. Do not raise the screed.
3. Move the hopper control lever to the "up" position and hold it in this position until the hopper almost touches the dump body of the truck.
4. Have the dump truck driver slowly raise the dump body so that asphalt flows from the dump body into the hopper.

NOTICE: Be prepared to lower the hopper to prevent the dump body from striking the hopper.

5. Fill the hopper with asphalt.
6. Move the flow gate control levers to the "open" position and hold them in this position until the flow gates are completely open. Asphalt will then gravity feed and form a head of asphalt at the leading edge of the screed.

   If the area to be paved is level and pushing the truck is desired, move the travel control levers forward. The engine throttle should be set at full power.

   If using the paver by itself, without a dump truck, skip step 7 in “Filling the Hopper.”
7. Have the dump truck driver leave the truck in neutral with the dump body raised to a sufficient height to allow asphalt to flow slowly but continuously into the hopper.

NOTICE: Do not lift the hopper if pushing a dump truck with the paver. Damage to the paver/truck may result.

Laying the Asphalt

1. If the paving width is wider than eight feet, adjust the paving width by using the extension control levers.
2. Move the hydraulic pump speed control lever forward to the desired travel speed. Lay asphalt/push the truck approximately 36 to 48” (914 to 1219 mm).
3. Make the screed vibrate by moving the vibrator control lever to the "on" position while moving the hydraulic pump speed control lever "forward" to the desired travel speed.
4. Move the hydraulic pump speed control lever to the "neutral" position to stop the paver.

   Move the vibrator control lever to the "off" position when stopping forward motion of the paver. If a truck is being pushed and is moving, have the dump truck driver stop.

NOTE: *When pushing a truck, the dump truck should not be in gear and the dump truck driver should not "ride" the brakes. Tell the dump truck driver about the procedure for pushing the truck with the paver.*

5. Check the thickness/depth of asphalt in the 36 to 48” (914 to 1219 mm) mat and make any necessary adjustments using the manual depth adjustment screws.

   Slowly make adjustments up or down to avoid porpoising effect or ripples in the mat because of adjusting too much in either direction.

   If the base that the asphalt is being laid on is graded and level, only make infrequent adjustments after setting the asphalt thickness/depth.

NOTE: *See “Troubleshooting” on page 75 for paver-related and/or material delivery and compaction-related paving mat application problems.*

6. Move the hydraulic pump speed control lever to "forward" and continue to pave until the truck is empty and the hopper is approximately 50% full.

NOTE: *Leave a small head of asphalt at the leading edge of the screed while waiting for the next load of asphalt. If the wait is longer than 10 to 15 minutes, pave 12 to 18" (305 to 457 mm) and leave a small head of asphalt at the leading edge of the screed. Repeat this every 10 to 15 minutes using asphalt remaining in the hopper until the next load arrives.*

7. After the hopper is fully loaded, have the truck driver lower the dump body to stop the flow of asphalt to the paver. At the same time, move the hopper control lever to the "up" position. This raises the hopper and avoids asphalt spills from the front of the hopper.

8. Have the truck driver move forward to the next reloading place to reload the paver. The next reloading place may be in front of the paver at a location where the paver operator expects the hopper to be emptied, or another location on the jobsite.

PRECAUTIONS WHILE PAVING

The right side control levers for auger, extension, travel and hopper modes require a two-person operation. The two-person operation helps avoid making "blind" joints and reduces cycle time when paving in two directions.

Only operate the screed vibrator when the paver is moving to avoid compaction in the mat when the paver is stopped.

Do not raise the hopper against the truck frame or dump body.

When pushing a truck on level ground, the truck should not be in gear and the truck brakes should not be held. The paver cannot push a truck with the brakes on.

Only use the two independently-operated augers when the extensions are out, and then only occasionally. The augers are only used for keeping the extended area fully charged with asphalt.

NOTE: *DO NOT leave the augers operating continuously unless required!*

If the hopper is loaded and the operator wants to close the flow gates (to transport material to an area inaccessible to the truck, reposition the paver for the next pass, etc.), complete the following steps:

1. Lower the hopper as low as possible without spilling asphalt. This decreases the weight being lifted by each flow gate.
2. Close both flow gates.
3. Close the screed extensions.

When paving uphill, lower the hopper as needed. This places more weight directly over the tracks to increase traction.

Handling Asphalt Spills

NOTICE: Remove all asphalt spills from the path of the paver tracks to prevent loose asphalt from getting into the tracks or building up on the sprockets.

⚠ WARNING

Do not attempt to move hot asphalt mix with your hands or feet. Contact can cause serious skin burns! Hot asphalt can exceed 350° F (177° C).

Complete the following steps if the asphalt truck moves away from the paver and spills asphalt in front of the paver:

1. Stop the paver.
2. Lower the hopper as low as possible without spilling asphalt. This decreases the weight being lifted by the flow gates.
3. Close both flow gates.
4. Windrow spilled asphalt to the center and in front of the paver. Be sure that the asphalt is removed from the path of the paver tracks.

5. Move the hydraulic pump speed control lever to "forward," and continue to pave with asphalt gravity fed from the hopper. As the asphalt head from the hopper begins to run thin, the windrow asphalt should be at the leading edge of the screed.

   If this is the case, continue to pave using the windrow asphalt and open both flow gates when the windrow asphalt begins to run thin. If this is not the case, open both flow gates about 1/3 and maintain a full head of asphalt at the leading edge of the screed until it strikes the windrow asphalt. Continue to pave.

NOTICE: Failure to follow this procedure results in asphalt build-up and eventual damage to the flow gate cylinders and tracks.

HIGHWAY TRAVEL

For short distance highway travel, attach a Slow-Moving Vehicle (SMV) emblem (purchased locally) to the back of the paver.

NOTE: *Always follow all state and local regulations for operating equipment on or across public roads! If there is a long distance between jobsites or if operating on public roads is prohibited, transport the paver by using a vehicle.*

TRANSPORTING BETWEEN JOBSITES

When transporting the paver, know the overall height to allow clearance of obstructions. Remove or tape over the Slow-Moving Vehicle (SMV) emblem if it is visible to traffic.

⚠ WARNING

Always follow the recommended procedures and guidelines when using ramps to load the paver onto (or unload it from) a truck or trailer. Failure to heed can result in damage to equipment and serious personal injury or death!

1. Use a pair of matching ramps that can support the weight of the paver. The ramp width must be at least 1-1/2 times the track width, and the ramp length must be at least four times the ramp height. It is best to use strong wood-covered steel ramps and center supporting blocks (Fig. 26).

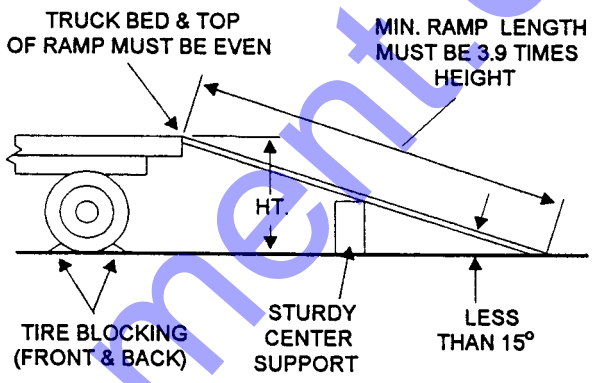


Fig. 26 - Ramps and Center Supporting Blocks

2. Firmly attach the ramps to the truck or trailer bed with no step between the truck or trailer bed and the ramps.
3. Position the incline of the ramps to be less than 15°.
4. Block the front and rear of the tires on the truck or trailer, and if equipped, engage the parking brake.

⚠ WARNING

NEVER attempt to adjust travel direction (even slightly) while traveling on the ramps. Instead, back off of the ramps, and re-align the paver with the ramps.

Do not walk beside, behind or in front of the paver during loading and unloading procedures.

ALWAYS place the pump speed control lever in "slow" position when operating the paver on the truck or trailer bed. ALWAYS load the paver in "reverse" and unload in "forward" direction.

Check for and remove oil, grease, fuel or other substance on the ramps that may cause the tracks to lose traction or slip.

Do not wash down the paver with asphalt releasing agent just before loading or unloading on the vehicle. The paver tracks may become wet and may slip on the ramps.

Tie-down points are located at the front of the hydraulic reservoir section of the frame and at the lower rear corners of the main frame. Chains can be inserted through these brackets and slots while securing the paver for transporting.

Loading with Ramps

1. Align the paver with the ramps so that the paver can load in reverse.
2. Stop the paver.
3. Place the throttle control at “full open” position.
4. Use the screed control lever to raise the screed to the "full up" position.
5. Turn the depth adjustment screws counterclockwise seven or eight turns to avoid bumping the rear edge of the screed on the ramps (Fig. 28).
6. Move the travel control levers rearward.
7. Move the pump speed control lever forward so that the paver moves slowly up the ramps.

NOTE: *The operator should ride on the paver with both hands on the travel control levers to stop the paver if it is not traveling straight.*

8. Stop the paver immediately after it is on the vehicle bed.
9. Move the pump speed control lever to "slow" position and reduce the throttle to "idle" position.
10. Using the travel control levers, maneuver the paver while it is on the vehicle bed to obtain the best transporting and most balanced position.
11. If not rear loading, proceed to step 12. If rear loading, after the paver is on the vehicle bed, place one travel lever in "forward" and the other in "reverse." This rotates the paver to legal width for transporting.
12. Return the screed to flat position by turning the depth adjustment screws clockwise seven or eight turns.

⚠ WARNING

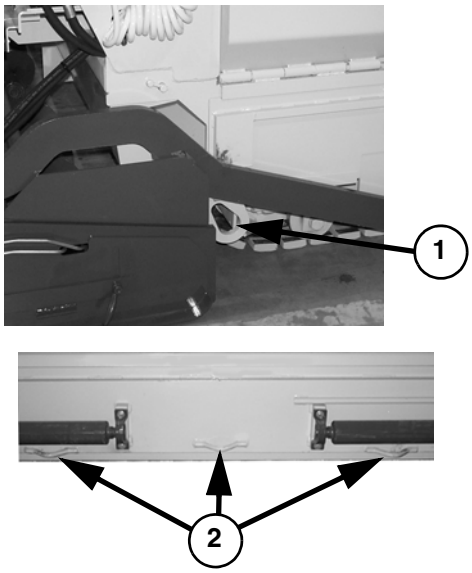
Allow the screed to cool before lowering for transport.

13. Lower the screed and place chains through the two tie-down points at the rear of the paver. Drive the paver forward, allowing the chains to tighten slightly (Fig. 27).

NOTE: *Be sure that the chains do not damage the screed.*

14. Place a tie-down chain through the tie-down point(s) on the front of the paver and bind it to the vehicle bed (Fig. 27).

15. Turn the keyswitch to the "off" position and remove the key.



1 Rear tie-down points (each side)
2 Front tie-down points

Fig. 27 - Front and Rear Tie-down Points

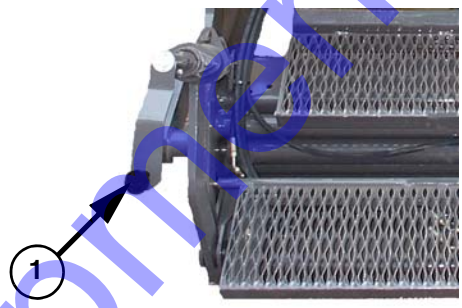
Unloading with Ramps

WARNING

ALWAYS place the pump speed control lever in "slow" position when operating the paver on the truck bed. ALWAYS unload the paver in "forward."

Do not walk beside, behind or in front of the paver during unloading procedures.

1. Remove the chain binders from tie-down points on the front of the paver (Fig. 27).
2. Start the engine. See “Starting the Engine” on page 43.
3. Move the travel control levers to "reverse" and open the throttle approximately 1/4.
4. Move the pump speed control lever to "slow." The paver moves rearward, releasing tension from the two tie-down chains on the rear of the paver.
5. Stop the paver.
6. Remove the chains from both tie-down points on the rear of the paver (Fig. 27).
7. Move the screed control lever to "up" position and hold until screed is completely raised.
8. Turn the depth adjustment screws seven or eight turns counter-clockwise to avoid bumping the rear edge of the screed on the bottom of the ramps. This raises the rear edge of the screed approximately 1 inch (Fig. 28).



1. Adjustment screw

Fig. 28 - Rear Edge of the Screed

9. Align the paver with the ramps by using the travel control levers. If unloading from the rear, rotate and align the paver tracks. Rotate by placing one travel control lever in "forward" and the other in "reverse."
10. Move the paver forward to the ramps. Stop the paver by placing both travel control levers in "neutral."
11. Make sure the pump speed control lever is in the "slow" position. This prevents the machine from "freewheeling" down the ramps.
12. The throttle should be set between 1/2 and full open.
13. Clear the area at the bottom of the ramps of all personnel and obstructions.
14. Place both travel control levers in "forward." Move the pump speed control lever forward so that the paver travels to the ground.

NOTE: *The operator should ride on the paver with one hand on the travel control levers and the other on the bar. Place both travel control levers in "neutral" to stop.*

Towing for More Than One Block

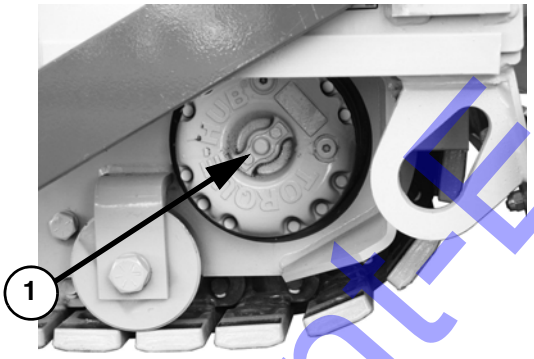
⚠ CAUTION

Completing the steps in "Towing for More Than One Block" de-activates the drive system and places the paver into "neutral." Be sure to keep the power attached to the towing vehicle to prevent free-wheeling when the torque hub is in "neutral."

If towing the paver onto a truck, move the travel control levers to "forward" and lock them with a pin.

If towing the paver for more than one block:

1. Remove the cover plate and bolts (two bolts) (Fig. 29).



1. Cover Plate

Fig. 29 - Torque Hub

2. Turn the cover plate over.
3. Re-install the cover plate and bolts.

NOTE: *The "bulb" in the center of the cover plate pushes in a pin inside the torque hub, placing it in neutral.*

⚠ CAUTION

Complete step 4 before operating the paver.

4. Repeat steps 1 through 3 after towing the paver to place the torque hub in the "drive" position.

NOTICE: Do not tow the paver unless it is an emergency, such as loss of hydraulic power or engine failure. The travel control levers must be locked into the "float" position. Remove the lock lever, move the control levers all the way forward, and then replace the lock lever. Do not tow the paver rearward or at high speeds!

Transporting for More Than One Day

If transporting the paver for more than one day:

1. Disconnect the battery.
2. Clean all bright surfaces and coat them with heavy, very high flash-point grease to prevent rusting.

THEFT DETERRENTS

POWERBOX has records of component and serial numbers. Complete the following to discourage vandalism, theft, and to help recovery if theft occurs:

1. Remove keys from unattended machines.
2. Attach, secure, and lock all anti-vandalism and anti-theft devices on the paver.
3. Inspect the gates and fences of the vehicle storage yard. If possible, keep machines in well-lighted areas. Ask local law enforcement to frequently inspect storage and work sites, especially at night, during weekends, and on holidays.
4. Report any theft to your dealer and insurance company. Provide the model and all serial numbers. Request that your dealer forward this information to POWERBOX.

Chapter 8
LUBRICATION

GENERAL INFORMATION

⚠ WARNING

NEVER lubricate or service the paver when any part of the machine is in motion. ALWAYS exercise the MACHINE SHUTDOWN PROCEDURE before lubricating or servicing this equipment. See "MACHINE Shutdown Procedure" on page 21.

NOTE: *See "Maintenance" on page 39 to record the dates and hourmeter readings after lubricating or other servicing. Lubrication prevents excessive part wear and early failure.*

LUBRICANTS

The "Greasing and Lubrication" chart on this page lists the locations, temperature ranges, and types of recommended lubricants. Refer to the engine manual for additional information about recommended engine lubricants, quantities required, and grades.

NOTE: *See "Service and Storage" on page 59 for lubricant checking and refilling information.*

GREASING AND LUBRICATION

This section contains greasing location and frequency information. Wipe dirt from the grease fittings before greasing them to prevent contamination. Avoid excessive greasing to minimize dirt buildup. Replace any missing or damaged fittings.

Hydraulic Fluid Reservoir

Use SUNVIS 846, or equivalent that contains anti-rust, anti-foam and antioxidation additives and conforms to ISO VG46.

Capacity:
20 Gallons (75.7 Liters)

All Grease Fittings

Use No. 2 Lithium-based Grease

Engine Crankcase Oil

Grade*

SAE 10W-30 or 15W-40

*Service Classification: API - CD or Higher

Capacity:
7.8 Quarts (7.4 Liters) - Diesel En

Torque Hubs Gear Oil

Use API-GL-5 80W-90
Capacity (each hub):
17 ounces (500 cc)

Fig. 30 - Greasing and Lubrication Chart

NOTICE: Always dispose of waste lubricating oils, anti-freeze, and hydraulic fluids according to environmental laws or take them to a recycling center for disposal. DO NOT pour them onto the ground or into a drain.

GREASE FITTING LOCATIONS

NOTE: *See "Service and Storage" on page 59 for more information.*

Every 50 Hours (or weekly):

1. Grease depth adjustment screws (1 per screw)
2. Grease track adjuster yokes (8 per track)

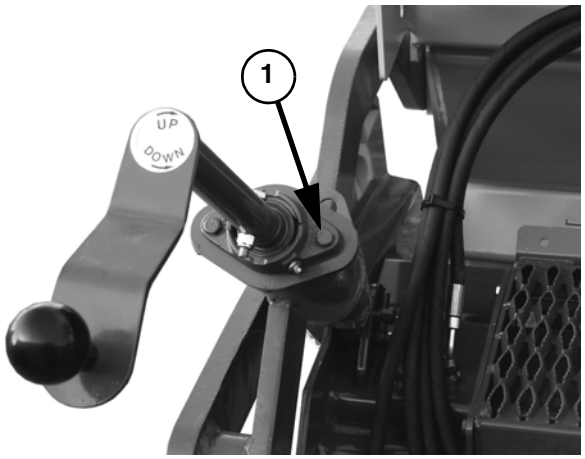


Fig. 31 - Grease Depth Adjustment Screws

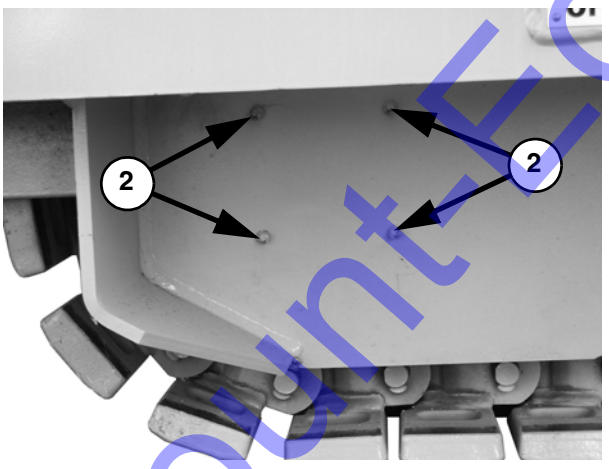


Fig. 32 - Grease Track Adjuster Yokes

Engine	
Oil Filter Element	P/N P137500
Fuel Filter Element	P/N P182130
Hydraulic System Filters	
Screw-On Filter Element	P/N P074830
Reservoir Sump Strainer	P/N P128299
Air Cleaner	
Dry Element	P/N P420-36075

Fig. 33 - Replacement Filters Chart

Chapter 9
SCHEMATICS

The Schematics chapter contains hydraulic and electrical schematics.

HYDRAULIC SCHEMATIC

Use the hydraulic schematic for valves, pumps, motors, cylinders, and as a guide for troubleshooting and service reference. See “Hydraulic Schematic” on page 56.

ELECTRICAL SCHEMATIC

Use the electrical schematic for instrumentation, components, switch connections, and as a guide for troubleshooting and service reference. See “Electrical Schematic” on page 57.

Hydraulic Schematic

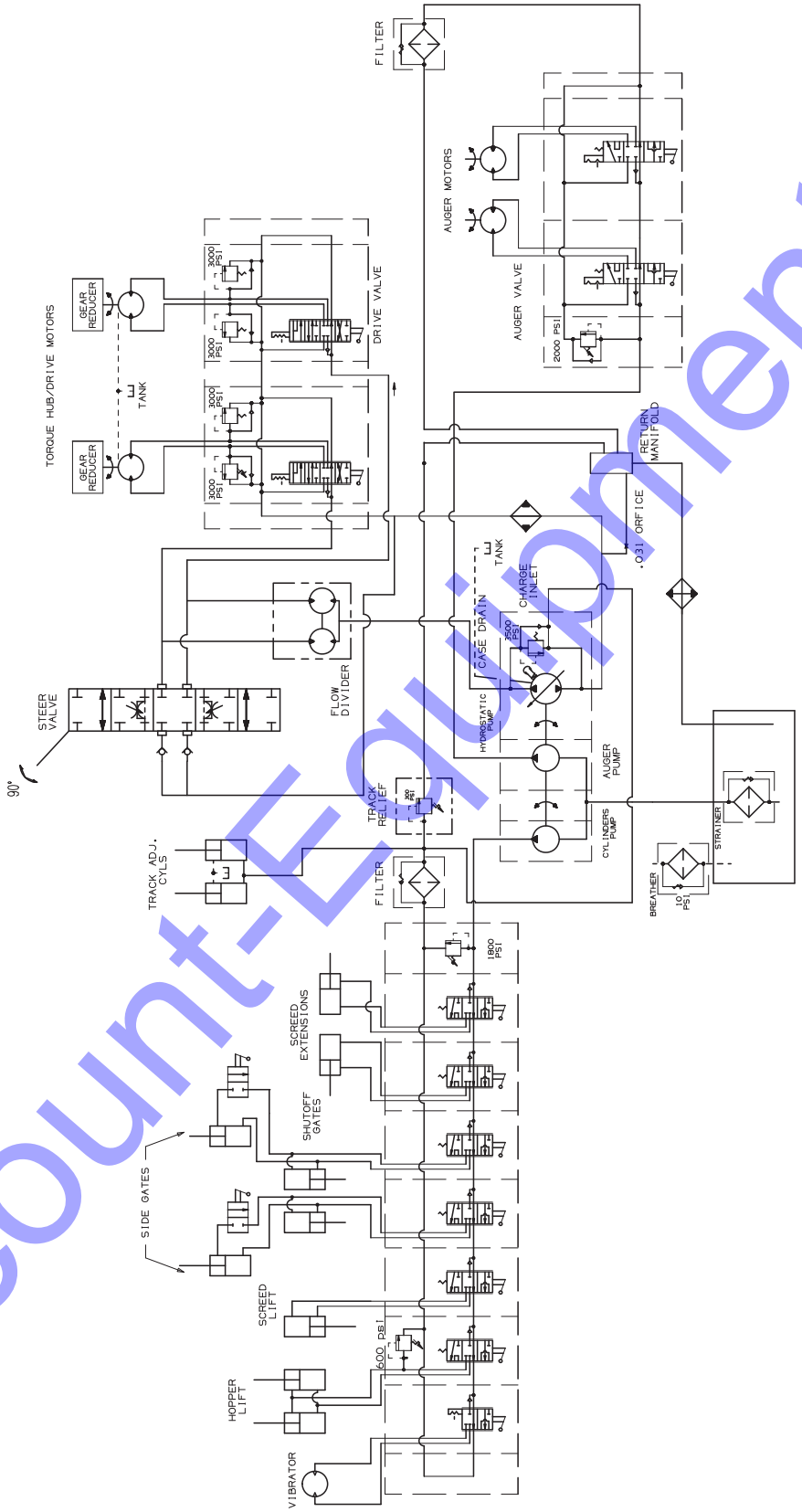


Fig. 34 - Hydraulic Schematic

Electrical Schematic

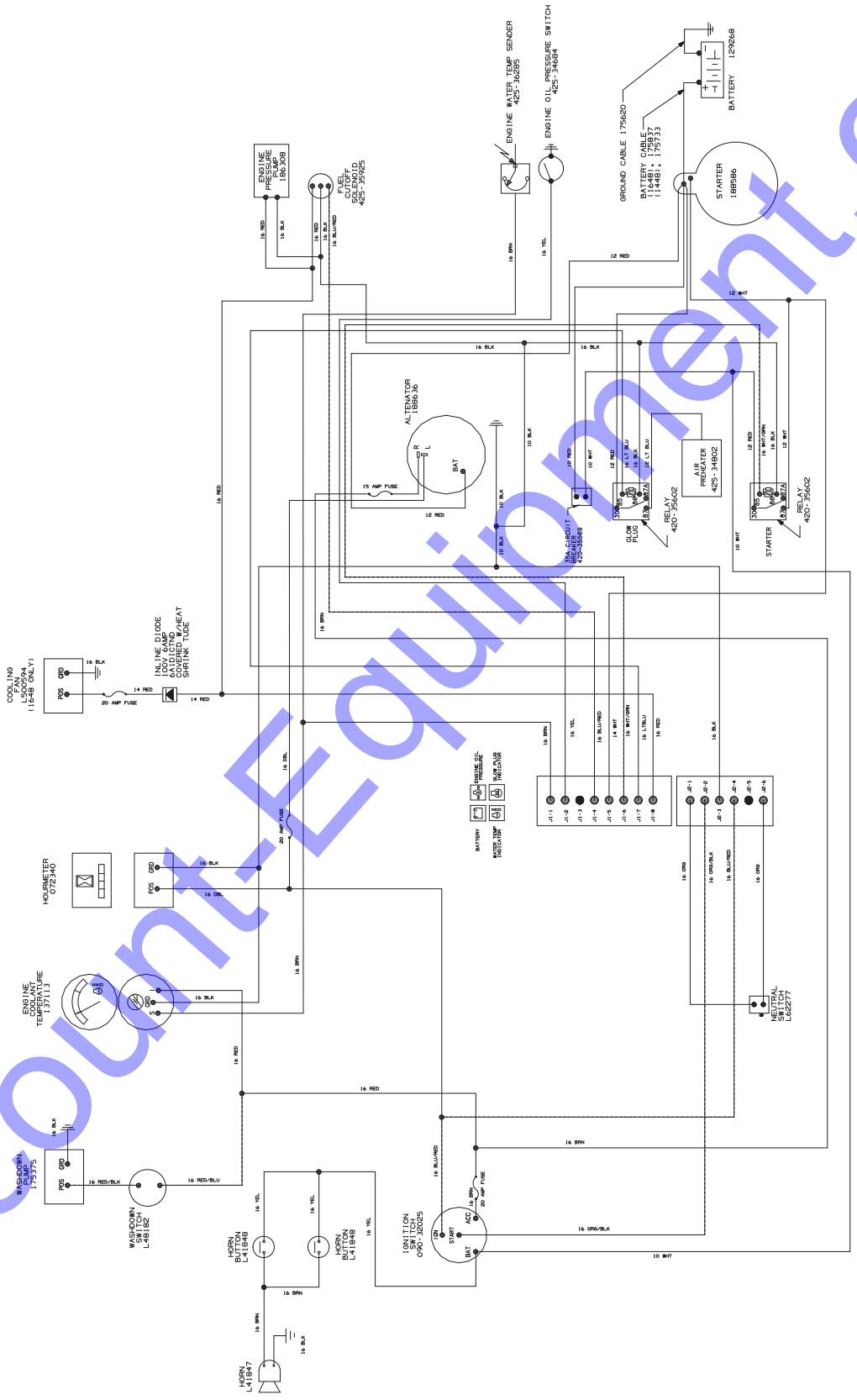
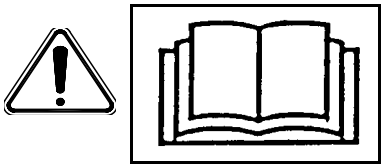


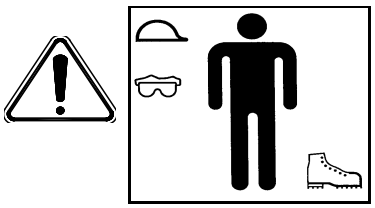
Fig. 35 - Electrical Schematic

Chapter 10
SERVICE AND STORAGE

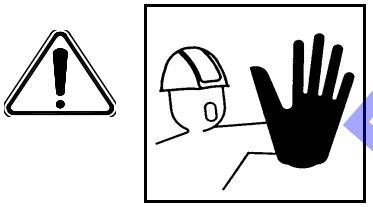
SAFETY MESSAGES



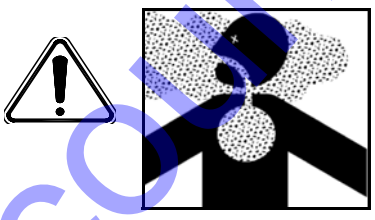
WARNING: Read this Operation and Maintenance Manual and safety signs before performing maintenance on the machine.



WARNING: Wear personal protective equipment. Wear close-fitting clothing and confine long hair. Always wear a hard hat, safety glasses, and safety shoes.

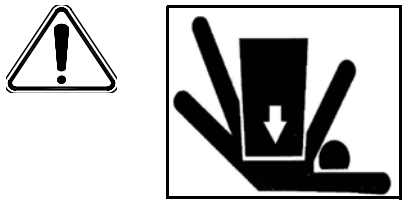


WARNING: Keep spectators away.



WARNING: Exhaust fumes can be fatal.

If operating in an enclosed area, remove exhaust fumes with an exhaust pipe extension to the outside.



WARNING: Raised attachment can fall and crush you.

Never work under a raised attachment unless attachment is securely supported.

WARNING: Hot fluid under pressure can scald.

Allow engine to cool before opening radiator cap.

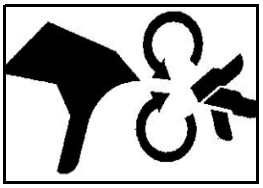
WARNING: Fuel and fumes can explode and burn.

Shut off engine before refueling. No flame. No smoking.

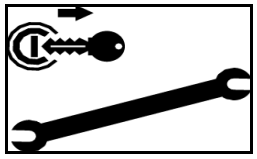
WARNING: Battery fumes are flammable and can explode. Keep all burning materials away from battery. Battery explosion can blind. Acid can blind and burn. Tools and cable clamps can make sparks.

Do not smoke. Shield eyes and face. Read instructions.

WARNING: Pressurized fluid can penetrate body tissue and result in serious injury or death. Leaks can be invisible. Keep away from any suspected leak. Relieve pressure in the hydraulic system before searching for leaks, disconnecting hoses, or performing any other work on the system. If you must pressurize the system to find a suspected leak, use an object such as a piece of wood or cardboard rather than your hands. When loosening a fitting where some residual pressure may exist, slowly loosen the fitting until oil begins to leak. Wait for leaking to stop before disconnecting the fitting. Fluid injected under the skin must be removed immediately by a surgeon familiar with this type of injury.



WARNING: Keep hands, feet, and clothing away from power-driven parts. Keep shields in place and properly secured.



WARNING: Use Shutdown Procedure before servicing, cleaning, repairing or transporting machine. Refer to Shutdown Procedure for instructions.

WARNING: Make no modifications to this equipment unless specifically recommended by Weiler.

WARNING: Be sure that all safety devices, including shields, are installed and functioning properly after servicing the machine.

⚠ WARNING

Failure to follow any of the preceding safety instructions or those that follow within this manual, could result in serious injury or death. This machine is to be used only for those purposes for which it was intended as explained in the Operation section of this manual.

GENERAL INFORMATION

This chapter contains procedures to follow when performing routine maintenance checks, adjustments, and replacements. Many procedures are also referred to in “Troubleshooting” on page 75 and in “Maintenance” on page 39. For engine-related adjustments and servicing procedures, refer to the engine manual.

⚠ WARNING

BEFORE performing any service on the paver, exercise the MANDATORY SAFETY SHUTDOWN PROCEDURE (SAFETY chapter). See “MACHINE Shutdown Procedure” on page 21.

After service has been performed, BE SURE to replace all guards, shields and covers to their original positions BEFORE resuming paver operation.

NOTE: *All service routines, except those described under "Dealer Services," are owner-operator responsibilities. Refer to “Lubrication” on page 53 of this manual for lubrication information.*

Precautions

Do not perform any maintenance or repair without the owner's prior authorization. Allow only trained personnel to service the paver.

Only POWERBOX dealers are authorized to perform warranty repairs. Dealers know the components covered under the terms of the POWERBOX Warranty and the components covered under the terms of vendor warranties.

NOTICE: Always dispose of waste lubricating oils, anti-freeze, and hydraulic fluids according to environmental laws or take them to a recycling center for disposal. DO NOT pour them onto the ground or into a drain.

DEALER SERVICES

The following areas of internal components service replacement and operating adjustments should only be performed by (or under the direction of) an authorized POWERBOX dealer.

Engine Components

All service procedures related to the internal components are precise and critical for proper engine operation. Special training and tools are required for servicing.

NOTE: *If the engine is not operating properly, contact your POWERBOX dealer.*

Hydraulic System Components

Valves, pumps, motors and cylinders are assemblies that require special training and tools for servicing. All cylinders are designed with strokes, diameters, checks, and hose connections specifically for paver application requirements. Use the hydraulic schematic as a guide for troubleshooting and service reference. See “Hydraulic Schematic” on page 56.

Internal service on any of these components should only be performed by (or under the direction of) an authorized POWERBOX dealer.

Electrical Components

Use the electrical schematic for instrumentation, components, switch connections, and as a guide for troubleshooting and service reference. See “Electrical Schematic” on page 57.

OPERATOR SERVICES

Some of the operator services require access to components located underneath shields, hoods, covers, and other areas inside of the paver chassis.

Choose a clean, level work area. Make sure you have sufficient room, clearances, and ventilation.

Clean the walking and working surfaces. Remove oil, grease, and water to eliminate slippery areas. If necessary, use sand or oil-absorbing compounds while servicing the paver.

Before inspecting and repairing the paver, move it onto a level surface, shut down the engine, and release all hydraulic pressure. Refer to the MACHINE SHUTDOWN PROCEDURE on page 21. Always lower the hopper to the "full down" position. If the area under the hopper requires service, raise the hopper to "full up" and swing up the two safety props. Place all controls in "neutral."

Disconnect the battery and then remove the ignition key and take it with you. Only remove guards or covers that prevent needed access to components located inside of the superstructure. Wipe away excess grease and oil. Replace any worn, cracked, or damaged parts, these parts can cause injury or death.

Use only genuine POWERBOX replacement service parts.

Be sure not to damage polished surfaces. Clean or replace all damaged or painted over plates and decals that cannot be read.

NOTE: *Never leave guards or access covers removed when the paver is unattended. Keep bystanders away if access covers are removed.*

Check the work performed after servicing. Re-install all guards, covers and reconnect the battery.

⚠ WARNING

Do not smoke or allow any open flames in the area while checking or servicing hydraulic, battery, fuel or propane systems; all contain highly flammable liquids or explosive gases, which can cause an explosion or fire if ignited.

Wear a face shield when disassembling spring-loaded components or work with battery acid. Wear a helmet or goggles with special lenses when welding or cutting with a torch.

When working beneath a raised machine, always use blocks, jack-stands or other rigid and stable supports. Wear appropriate protective clothing, gloves and shoes. Keep feet, clothing, hands and hair away from moving parts.

Always wear safety glasses or goggles for eye protection from electric arcs from shorts, fluids under pressure, and flying debris or loose material when the engine is running or tools are used for grinding or pounding.

NEVER weld on hopper, screed or frame without the consent of the manufacturer. Special metals may be used, which require special welding techniques or have a design that should not have weld repairs. NEVER cut or weld on fuel lines or tanks.

If repair welding is ever required, be sure to attach the ground (-) cable from the welder as close as possible to the area to be repaired.

Remove positive (+) battery terminal connection before proceeding to weld.

SERVICE EVERY 10 HOURS OR DAILY

Spraying Asphalt Contact Areas

Spray the following areas with asphalt releasing agent before paving, at least four times while paving, and after each use of the paver.

- Hopper and augers
- Screed (bottom)
- Push roller assembly
- Hydraulic fluid reservoir
- Drive tracks
- Any other part of the machine that contacts asphalt

⚠ WARNING

Do not spray releasing agent into tracks before loading or unloading the paver on a truck or trailer, because this could cause loss of traction.

Do not spray releasing agent on a hot engine.

Do not spray releasing agent while the screed propane heaters are in use.

Check Fuel Tank Level

After daily operation, fill the fuel tank to prevent water from condensing in the tank. Remove the filler cap and add fuel.

NOTICE: DO NOT discharge fuel onto the ground. Contain and dispose of fuel according to environmental laws and waste regulations.

Check Engine Oil Level

Complete the following steps to check the engine oil level:

1. Move the paver to level ground and stop the engine for at least ten minutes.
2. Remove the engine dipstick (1, Fig. 36), wipe it clean, re-insert it, and then remove it again. Read the oil level on the dipstick.

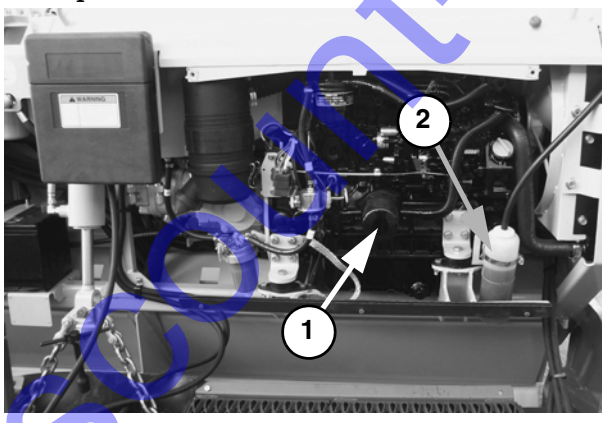


Fig. 36 - Crankcase Dipstick/Coolant Overflow

3. If the oil level is below the ADD mark, add oil until the level has reached the FULL mark. Refer to the engine operator's manual for engine oil type requirements.

Check Radiator Coolant Level

⚠ WARNING

DO NOT remove the radiator cap when the engine is running hot or overheated. Coolant is extremely hot and under pressure and it can burn your skin. Allow sufficient time for the radiator to cool before relieving the pressure and removing the radiator cap.

1. Check the radiator coolant level by viewing the coolant level in the overflow bottle (2, Fig. 36). If there is no coolant in the overflow bottle, proceed to step 2.
2. Move the paver to level ground and remove the radiator cap.
3. Add clean engine coolant as required. Refer to the engine operator's manual for coolant type requirements.
4. Re-install the radiator cap.

NOTICE: Operating the engine with a loose or damaged radiator cap will defeat the pressure bypass and may damage the engine.

Check Instrument Operation

Allow the engine to warm up for about five minutes before beginning operation. Indicator lamps should not be lit and gauges should register normal readings.

Check Paver Operation and Condition

Check the following:

- Are any decals missing or damaged?
- Are all guards, shields and covers in place?
- Do all controls function smoothly and properly?
- Are there any abnormal vibrations or noises?
- Are any hoses or fitting connections leaking?
- Is the engine exhaust color normal (normal color is light blue or colorless)?

SERVICE EVERY 50 HOURS OR WEEKLY

Also complete the service checks in “Service Every 10 Hours or Daily” on page 63.

Check Fan Belt

If the belt is worn, cut, cracked, or damaged, it should be replaced. Order a replacement belt from your POWERBOX dealer. Refer to the engine manual to learn proper belt replacement and tension adjustment procedures.

Check Hydraulic Oil Level

The fluid must be cool when checking the reservoir level (Fig. 37) or changing the filter. This reduces the possibility of overfilling the hydraulic system and potential injury due to hot fluid.

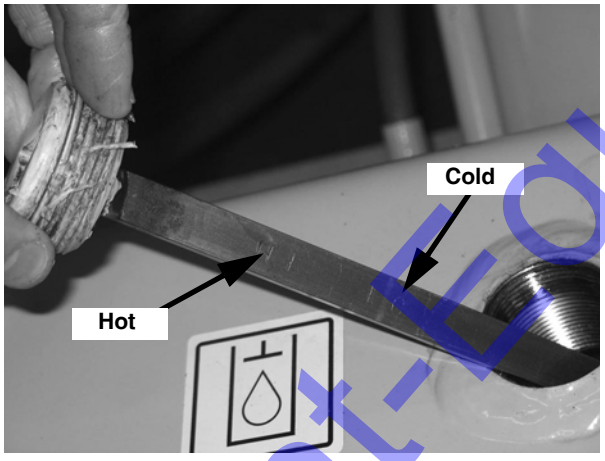


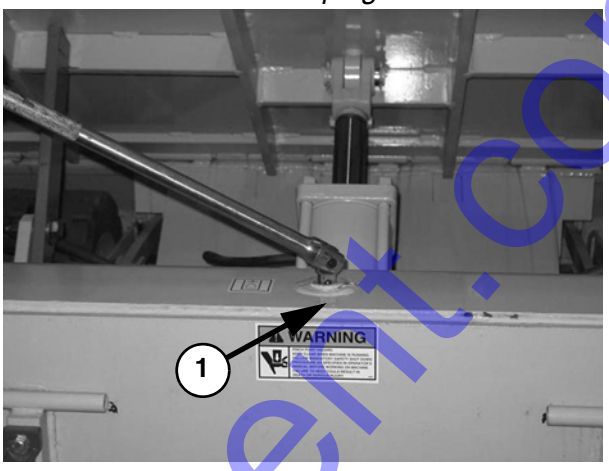
Fig. 37 - Checking Hydraulic Oil Level

WARNING

ALWAYS protect face and eyes whenever a pressure plug or cap is removed. NEVER assume that no pressure exists in a pressure vessel or system.

Before removing the fill plug (Fig. 38), release hydraulic system pressure by loosening the fill plug or the breather cap on the top of the backwall console (shown in “Change Hydraulic Filters” on page 68).

NOTE: *Use a 3/4” drive socket wrench handle to remove the fill plug.*



1. Fill plug

Fig. 38 - Removing Fill Plug

NOTICE: Be sure that no dirt or other foreign matter enters the hydraulic system while the cap is removed. DO NOT OVERFILL.

See “Lubricants” on page 53 for recommended hydraulic oils.

Check Battery Connections/Cables

Check cables for corrosion or loose connection.

NOTE: *The battery on the paver is warranted by the supplier. See the label on the top of the battery for warranty information.*

Cleaning the Battery

Always keep the top of the battery clean. Clean the battery with a brush dipped in an alkaline solution (ammonia or baking soda and water). After the foaming has stopped, flush the top of the battery with clean water. If the terminals and cable connection clamps are corroded or dirty, disconnect the cables and clean the terminals and clamps with the same alkaline solution.

⚠ WARNING

Explosive gas is produced while a battery is in use or being charged. Keep flames or sparks away from the battery area. Be sure battery is charged in a well-ventilated area.

NEVER lay a metal object on top of a battery as a short circuit can result.

Battery acid is harmful on contact with skin or fabrics. If acid spills, follow these first aid tips:

1. IMMEDIATELY remove any clothing on touched by acid spills.

2. If acid contacts the skin, rinse the affected area with running water for 10 to 15 minutes.

3. If acid comes in contact with the eyes, flood the eyes with running water for 10 to 15 minutes. See a doctor at once. NEVER use any medication or eye drops unless prescribed by the doctor.

4. To neutralize acid spilled on the floor, use one of the following mixtures:

- **1 pound (0.5 kg) of baking soda in 1 U.S. gallon (4 liters) of water.**
- **1 pint (0.5 liters) of household ammonia in 1 U.S. gallon (4 liters) of water.**

Whenever the battery is removed from the paver, BE SURE to disconnect the negative (-) battery terminal connection cable first.

Jump-starting

If the battery becomes discharged or does not have enough power to start the engine, the paver can be jump-started. Complete the following steps to jump-start the engine.

NOTICE: BE SURE that the jumper battery is 12-volt D.C. and that the vehicle used for jump starting has a negative-ground electrical system.

⚠ WARNING

The ONLY safe method for jump-starting a discharged battery is for TWO PEOPLE to perform the following procedure. The second person is needed for removing the jumper cables so that the operator does not have to leave the operator's position while the engine is running. NEVER make the jumper cable connections directly to the starter solenoid of either engine. DO NOT start the engine from any position other than the operator's position, and then ONLY after being sure all controls are in "neutral."

Closely follow the jump-start procedures, in the order listed, to avoid personal injury. In addition, wear safety glasses to protect your eyes and avoid leaning over the battery while jump-starting.

DO NOT attempt to jump-start the paver if the battery is frozen, because this may cause it to rupture or explode.

1. Turn the key switches on both vehicles to "OFF." Be sure that both vehicles are in "neutral" and are not touching.
2. Connect one end of the positive (+) jumper cable to the positive (+) battery terminal on the disabled vehicle.

NOTICE: Do NOT allow the positive (+) cable clamps to touch any metal other than the positive (+) battery terminal.

3. Connect the other end of the positive (+) jumper cable to the jumper battery positive (+) terminal.
4. Connect one end of the negative (-) jumper cable to the jumper battery negative (-) terminal.
5. Connect the other end of the negative (-) jumper cable to the disabled paver's engine block or frame (ground), and not to the disabled battery negative post. If making the connection to the engine, keep the jumper clamp away from the battery, fuel lines, and moving parts.

NOTE: *Twist the jumper cable clamps on the battery terminals to ensure a good electrical connection.*

6. Start the paver. If it does not start immediately, start the jumper vehicle to avoid excessive drain on the booster battery.
7. After the paver is started and running smoothly, the second person should remove the jumper cables, negative (-) jumper cable first, from the jumper vehicle battery.
8. Remove the jumper cables from the paver, Do not short the cables by allowing them to come together.

Allow time for the paver alternator to build up a charge in the battery before operating the paver or shutting off the engine.

NOTE: *If the battery frequently becomes discharged, check the battery for dead cell(s) and troubleshoot the electrical system for possible short circuits or damaged wire insulation.*

Air Cleaner Element Maintenance

NOTICE: NEVER use an air cleaner element that is damaged. Engine wear and failure can result if dirt enters the engine through a hole in the element.

1. Open the latches (1, Fig. 39) securing the air cleaner cover (2).
2. Remove the cover and the air cleaner element (3).
3. Refer to the engine manual for air cleaner element servicing information, or replace the element with a new one.
4. Clean the inside of the air cleaner cover (2).
5. Re-install the air cleaner element (3) into the air cleaner housing.
6. Re-install the air cleaner cover (2) on the housing and secure with latches (1).

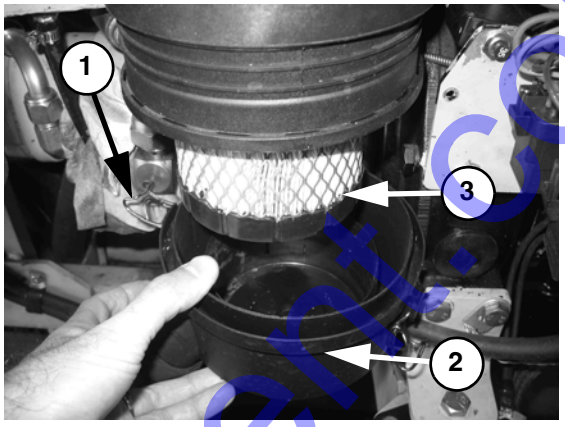


Fig. 39 - Air Cleaner

Lubricate Grease Points

See “Grease Fitting Locations” on page 54 for fitting locations and details.

SERVICE AT 50 HOURS (NEW PAVER ONLY)

The following oil and filter changes should be performed after 50 hours on a new paver.

- Engine oil and filter
- Hydraulic filter elements

After performing these changes for the first time, thereafter, perform them according to the regular maintenance schedule. Refer to “Service Every 250 Hours” on page 68.

SERVICE EVERY 250 HOURS

Also complete the service checks in “Service Every 10 Hours or Daily” on page 63 and in “Service Every 50 Hours or Weekly” on page 65.

Check Screed Bottom Plate

Inspect the bottom plate of the screed for wear.

Change Hydraulic Filters

1. Perform the MACHINE SHUTDOWN PROCEDURE on page 21.

⚠ WARNING

Hydraulic fluid is hot during operation. Allow the hydraulic system to cool before relieving system pressure by loosening breather cap on top of the backwall.

2. Loosen the hydraulic breather cap (1, Fig. 40) to relieve hydraulic system pressure.

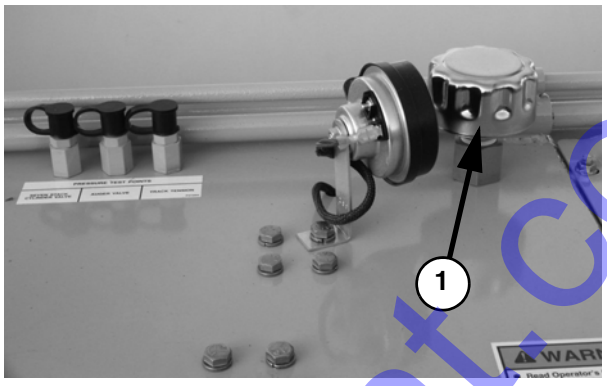


Fig. 40 - Hydraulic System Breather Cap

3. Unscrew and remove the two hydraulic filter elements (2, Fig. 41) and discard.

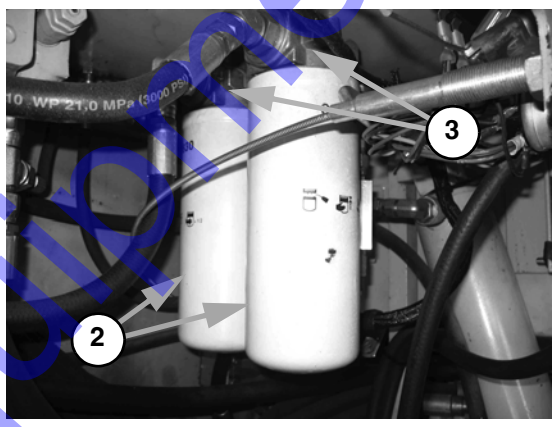


Fig. 41 - Hydraulic Filter Components

4. Wipe the sealing surface on the mounting heads (3) with a clean cloth.
5. Apply a thin coat of clean oil to the new oil filter gaskets.
6. Install the new hydraulic filter elements (2) on the filter heads and hand-tighten.

Change Engine Oil and Filter

Replace the engine oil filter when changing the engine oil.

1. Run the engine until it reaches operating temperature.
2. Perform the MACHINE SHUTDOWN PROCEDURE on page 21.
3. Prepare a waste oil container to collect the engine oil as it drains.

4. Remove the engine crankcase drain plug. Allow the oil to drain into the waste oil container.

NOTICE: DO NOT discharge engine oil onto the ground. Contain and dispose of engine oil according to environmental laws and waste regulations.

5. Remove all metallic filings from the drain plug. Re-install and tighten the drain plug.

6. Remove and discard the engine oil filter (1, Fig. 42).

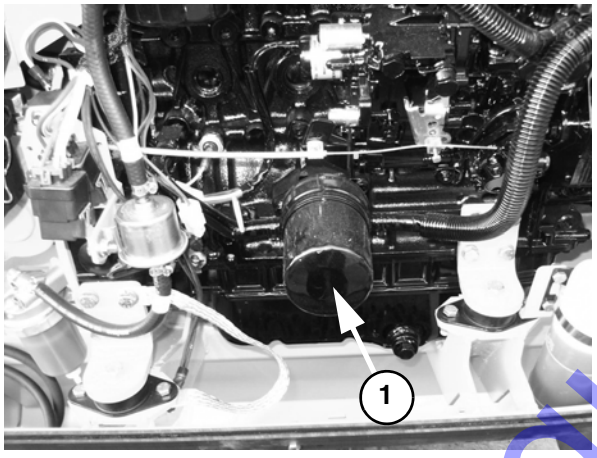


Fig. 42 - Engine Oil Filter

7. Wipe the oil filter gasket sealing area on the block with a clean cloth.

NOTE: *Use only genuine OEM engine replacement filters.*

8. Apply a thin coat of clean oil to the gasket on the new oil filter.

9. Install and tighten the new filter on until its gasket contacts the engine sealing surface.

10. Use a filter wrench to tighten the filter another 3/4 turn.

11. Refill the crankcase with new oil. Follow specifications in “Lubrication” on page 53 for type and viscosity of new oil.

12. Test run the engine at idle speed until the oil pressure lamp on the instrument module is OFF. Check the drain plug for leakage. If it is leaking, tighten the drain plug.

CHECK TORQUE HUB OIL LEVEL

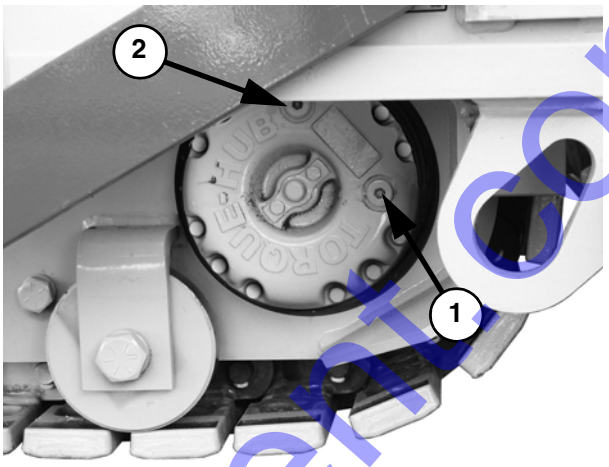


Fig. 43 - Fill and Check Plugs

1. After raising the hopper, position the track so that one plug is in the 3 or 9 o'clock position and the other plug is in the 12 o'clock position.

2. Remove the check plug (1, Fig. 43) at the 3 or 9 o’clock position. If oil appears, replace the plug. If oil does not appear, remove the fill plug (2) and add oil until it flows from the check plug.

3. Replace both plugs. Repeat for the other torque hub.

SERVICE EVERY 500 HOURS

Along with all the service checks in this section, also complete the service checks in "Service Every 10 Hours or Daily" on page 63; in "Service Every 50 Hours or Weekly" on page 65; and in "Service Every 250 Hours" on page 68.

Change Fuel Filter

The cleanliness of available fuel, the care used in storing fuel supplies, and the operating conditions in which the paver is used may require more frequent fuel filter changing intervals.

1. Perform the MACHINE SHUTDOWN PROCEDURE on page 21. Allow the engine to cool completely.

⚠ WARNING

NEVER service the fuel system while smoking, while near an open flame, or when the engine is hot.

2. Close the fuel shut-off valve (1, Fig. 44) on the oil/water separator.

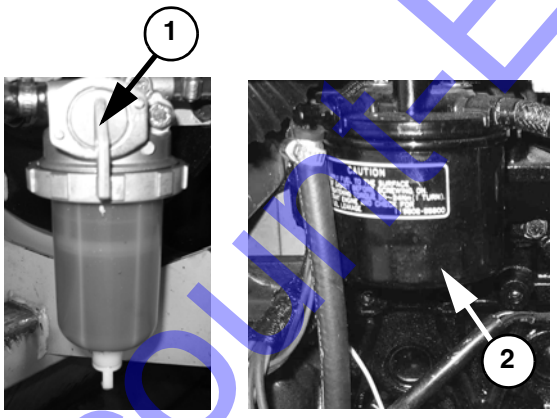


Fig. 44 - Fuel Shut-Off and Fuel Filter

3. Using a filter wrench, unscrew the fuel filter (2). Hold the bottom of the fuel filter with a piece of rag to prevent the fuel from dripping. Wipe up any fuel spills completely.

NOTE: *Fuel will flow from the filter head after the filter is removed. Contain and dispose of spilled fuel according to environmental laws and local waste disposal regulations.*

4. Wipe the fuel filter gasket sealing area on filter mount with a clean cloth.
5. Apply a thin coat of oil to the gasket on a new fuel filter.
6. Install and tighten the new filter until its gasket contacts the mount sealing surface.
7. Use a filter wrench to tighten the filter another 3/4 turn.
8. Bleed the fuel system according to the engine manual.

SERVICE EVERY 1000 HOURS OR SEASON

Along with all the service checks in this section, also complete the service checks in "Service Every 10 Hours or Daily" on page 63; in "Service Every 50 Hours or Weekly" on page 65; in "Service Every 250 Hours" on page 68; and in "Service Every 500 Hours" on page 70.

Change Radiator Coolant

Drain, flush, and refill the cooling system as follows:

1. Perform the Mandatory Safety Shutdown Procedure on page 21. Allow the engine to cool completely.
2. Loosen the radiator cap to release any system pressure. Remove the cap after all pressure is bled off.

⚠ WARNING

Remove the radiator cap only when the engine is cool, or painful burns could result.

3. Attach a hose to the radiator drain valve (1, Fig. 45), and run the hose out of the paver into a suitable collection container for the draining coolant.

NOTICE: DO NOT discharge coolant onto the ground. Contain and dispose of coolant according to environmental laws and waste regulations.

4. Remove the radiator drain plug. After all coolant is drained, flush the system with clean, fresh water.

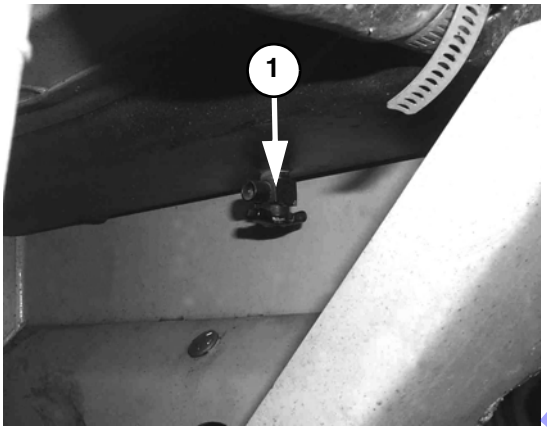


Fig. 45 - Radiator Drain Valve

5. After the coolant is drained, replace and tighten the radiator drain plug. Clean the cooling fins in the radiator with water pressure or steam.

NOTICE: When cold weather is expected, fill the cooling system with the proper coolant as directed in the engine manual.

6. Inspect the radiator cap seal before installing it and replace it if it appears defective. The pressure cap and engine thermostat work in conjunction with each other to maintain proper engine cooling.

NOTE: *Check the coolant temperature indicator every minute or two after changing the coolant because air pockets may form. It may be necessary to add coolant after a short period of use due to air bleeding out of the system.*

Replace Hydraulic Oil and Strainer

Clean all dirt and debris off of the area where the hydraulic system suction (large) hose connects to the inside wall of the hydraulic reservoir.

1. Remove the drain plug from the bottom of the reservoir. Allow all of the oil to drain out into a suitable container.

NOTICE: DO NOT discharge hydraulic oil onto the ground. Contain and dispose of hydraulic oil according to environmental laws and waste regulations.

2. Disconnect the suction hose and remove the sump strainer from inside of the reservoir. Inspect the sump strainer.
3. If the sump strainer shows any damage, holes, etc. it should be replaced. If it does not need to be replaced, wash it clean with an industrial solvent, dry with a towel, and coat it with fresh hydraulic oil.
4. Flush out the bottom of the reservoir with clean hydraulic oil. Install the sump strainer and drain plug and connect the suction hose.
5. Fill the reservoir with fresh hydraulic oil. Follow specifications in “Lubrication” on page 53.

NOTICE: Hydraulic fluid and filters should be replaced any time contamination is detected.

Check Exhaust System

Check the muffler and pipes for leaks, holes, and loose clamps. Tighten all loose clamps and replace the pipes or muffler if they are leaking or have holes.

ADJUSTING VARIABLE SPEED CONTROL

NOTICE: Perform the following steps only if the paver does not completely stop traveling after the variable speed control lever is placed into neutral.

⚠ WARNING

Make all adjustments after placing the travel control levers into neutral and turning off the engine.

Closely follow the procedure in the order listed to avoid personal injury. In addition, wear safety glasses to protect your eyes and avoid leaning over the battery.

1. Place the travel and speed control levers into neutral and turn off the engine.
2. Locate cable connection (A) or (B) (Fig. 46).

NOTICE: Only perform step 4 at ONE cable connection (A) or (B). DO NOT perform step 4 at BOTH cable connections (A) and (B).

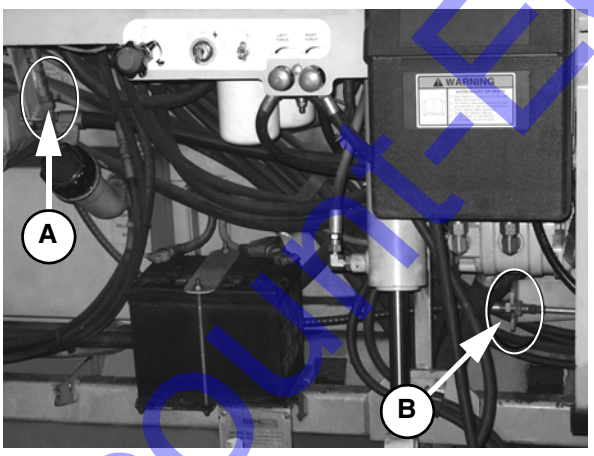


Fig. 46 - Cable Connections

3. Locate two nuts, one on each side of a bracket, as shown (Fig. 46).
4. Slightly loosen one of the nuts and tighten the other one.
5. Start the engine and run it at full throttle.
6. Place the travel control levers into forward and the variable speed control lever into neutral.
7. If the paver still moves, stop the engine and repeat steps 3 through 7 as required.

STORAGE

If the paver will not be operated for a long period of time, put it into storage by following the procedures below:

Before Storage

1. Wash off the entire paver.
2. Lubricate all grease points as described in “Lubrication” on page 53.
3. Change engine oil. See “Check Engine Oil Level” on page 64.
4. Apply grease to all exposed hydraulic cylinder rod areas.
5. Add stabilizer to fuel per fuel supplier's recommendation.
6. Disconnect the battery cable clamps and cover or remove the battery from the paver and store it separately.
7. If the ambient temperature (at any time during the storage period) is expected to drop below freezing, make sure that the engine coolant is either completely drained from the radiator and engine block or that the amount of anti-freeze in it is adequate to keep the coolant from freezing. Refer to the engine manual for anti-freeze recommendations and quantities.

During Storage

1. Once each month, connect the battery and check all fluid levels to make sure that they are at the proper level before starting the engine.
2. Start the engine, run it until it warms up, and then move the machine a short distance to help lubricate the internal parts.

3. Run the engine until the battery charges and then shut it off.

NOTICE: If operating the hydraulic cylinders, wipe the protective grease and any dirt from the hydraulic cylinder rods before starting the engine.

After Storage

After removing the paver from storage and before operating it, perform the following:

1. Refer to the engine manual for proper engine operation procedures following storage.
2. Change the engine oil and filter to remove condensation and any other contamination.
3. Wipe grease off the hydraulic cylinder rods.
4. Lubricate all grease fittings.
5. Read the Safety chapter on page 17.
6. Follow starting and warm-up procedures as directed in “First Time Operation” on page 44.

Chapter 11
TROUBLESHOOTING

This troubleshooting guide lists possible causes of problems and the corrective actions required to solve the problems.

If a problem occurs, do not overlook simple causes. For example, an engine failing to start could be caused by an empty fuel tank. After a mechanical failure has been corrected, be sure to locate the root cause of the problem.

NOTICE: Do not attempt to service or repair major components unless authorized to do so by your POWERBOX dealer. Unauthorized repairs may void the Warranty.

ENGINE

Problem	Possible Cause	Corrective Action
Engine will not turn over	Fuse in control module is blown	Replace fuse
	Faulty relay	Replace relay
	Circuit breaker is tripped	Reset circuit breaker
	Starter motor defective	Repair/replace starter
	Faulty wiring connections	Repair wiring connections
Starter motor does not have enough power to turn the engine over	Battery defective	Charge battery
	Starter motor defective	Repair/replace starter
	Wiring connections are broken or loose	Repair/replace and/or tighten connections
Engine cranks over but will not start	Fuel tank is empty	Add fuel
	Engine crankcase oil is too heavy	Drain and replace crankcase oil with proper viscosity oil
	Engine is cold	Preheat engine
Engine cuts out abruptly	Fuel tank is empty	Add fuel
	Fuel filter is clogged	Clean/replace fuel filter
	Air is trapped in the fuel system	Bleed the fuel system. Refer to the engine manual
Engine runs rough	Fuel filter is clogged	Clean/replace fuel filter
	Air is trapped in the fuel system	Bleed the fuel system. Refer to the engine manual.
	Air cleaner is clogged	Clean/replace air cleaner
Engine overheats	Low radiator coolant	Add coolant
	Radiator clogged	Clean radiator
	Low crankcase oil level	Add oil as required
	Exhaust is restricted	After engine cools, remove restriction

GENERAL OPERATION PROBLEM

Problem	Possible Cause	Corrective Action
Engine operation erratic	See “Engine” on page 75	
Paver difficult to steer (normal lead off to one side may be as much as 1 to 2 ft. in 100 ft. of travel under low or no load conditions)	One forward/reverse lever not fully engaged	Engage lever
	Linkage for dual controls binding	Free up linkage
	Tracks not properly aligned	Align tracks
Soft or uneven terrain may cause lead off, which may indicate a steering problem (operating conditions cause the lead off to change)	Internal leakage in modular steer valve	Replace seals
Paver slowing down or excessive power loss (travel speed is 0-130 FPM)	Engine not running at rated speed	Disassemble drive valve and clean load checks
		Check fuel filter
	Failure of hydraulic system component (filter, motor, pump, etc.)	See “Hydraulic Pump and Motors System” on page 79
Hydraulic controls stall too freely or do not operate under a load	Hydraulic system leaks	Locate leaks and repair
		Repair faulty component
		See “Hydraulic Pump and Motors System” on page 79
Screed not hot enough	Ports at end of screed plugged	Clear ports
	Outside air too cold and/or windy	Use propane heater while paving

PAVER-RELATED MAT PROBLEMS

Problem	Possible Cause	Corrective Action
Wavy surface (ripples)	1. Fluctuating head of materials	Maintain full head of material
	2. Finisher speed too fast	Reduce speed with the fast-slow lever
	3. Excessive play in screed mechanical connection	Replace attaching bolts
	4. Screed riding on lift cylinder	Lower lift cylinder completely
Wavy surface (long waves)	See Causes 1, 3, 4	
	5. Overcorrecting thickness control screws	Make moderate corrections as seldom as possible
	6. Running hopper empty between loads	Stop paver before head of material reaches screed area
	7. Sitting long period between loads	Empty hopper completely if waiting period lets asphalt cool
Tearing of mat (full width)	See Causes 2	
	8. Screed plates worn or warped	Replace wear plate
	9. Cold screed	Check ports in screed
Tearing of mat (center streak)	See Causes 8, 9	
	10. Too little lead crown in screed	Increase lead crown

Problem	Possible Cause	Corrective Action
Tearing of mat (outside streak)	See Causes 8, 9	
	11. Too much lead crown in screed	Decrease lead crown
	12. Screed extensions adjusted incorrectly	Raise extension leading edge
Mat texture not uniform	See Causes 1, 2, 4, 7-9, 12	
Screed marks	See Causes 3	
Screed not responding to correction	See Causes 2-4	
Poor pre-compaction	See Causes 2, 4	
Poor longitudinal joint	13. Improper joint overlap	Limit overlap to 2” maximum
Poor transverse joint	See Causes 3, 4	
	14. Incorrect nulling of screed	Increase “pitch” of screed before starting

MATERIAL-DELIVERY, COMPACTION-RELATED MAT PROBLEMS

Problem	Possible Cause	Corrective Action
Wavy surface (short waves - ripples)	1. Improper base preparation	Review base installation
	2. Improper rolling operation	Decrease speed
	3. Improper mix design (aggregate)	
	4. Improper mix design (asphalt)	
	5. Mix segregation	Asphalt plant mixing too long
	6. Variation of mix temperature	Asphalt plant burners not heating consistently
Wavy surface (long waves)	See Causes 1, 5, 6	
	7. Trucks bumping finisher	Stop truck short of paver and drive paver to truck
	8. Truck holding brakes	Driver must apply brakes only as required for the truck to stay “in Paver”
	9. Reversing or turning rollers too quickly	Cycle must be slow but deliberate
	10. Parking roller on hot mat	Move to cooler surface before parking Park at 45^{o} angle
Tearing of mat (full width)	See Causes 3-7	
	11. Improper mat thickness	Check that the mat thickness is twice the size of the largest aggregate
	12. Cold mix temperature	Check with asphalt facility for hotter asphalt mix
Mat texture (center or outside streaks)	See Causes 12	
Mat texture (non uniform)	See Causes 1, 3-6, 11, 12	
Screed marks	See Causes 7, 8	
Screed not responding to correction	See Causes 6, 11, 12	
Auger shadows	See Causes 3, 4, 5	

Problem	Possible Cause	Corrective Action
Poor pre-compaction	See Causes 1, 11, 12	
Poor longitudinal or transverse joint	See Causes 2, 12	
Transverse cracking (checking)	See Causes 1-4, 6	
Mat shoving under roller	See Causes 1-4, 6, 9, 13	
Bleeding or fat spots in mat	See Cause 3, 4, 6, 13	
Roller marks	See Causes 1, 2, 6, 9, 10	
Poor mix compaction	See Causes 1-4, 6, 9, 10, 12, 13	

DRIVE AND MAIN CONTROL VALVES

Problem	Possible Cause	Corrective Action
Incapable of maintaining the load	Internal oil leak at the spool	Replace entire valve housing and spool
	Oil leaking at relief valve port	Disassemble and clean or replace relief valve
	Load check poppet or seat damaged (located inside sections)	Replace poppet and seat assembly
Spool sticking or does not move	Hydraulic oil contaminated	Drain oil, replace with fresh oil
		Replace filters
	Valve clogged with dirt	Remove dirt and clean assembly
	Inside of plunger cap filled with oil	Replace seal on end of cap
	Restriction at spool internal stop	Remove restriction
		Replace entire valve section and spool assembly
	Pressure too high	Using pressure gauge, adjust pressure
	Lever or link bent	Remove and replace lever or link
	Spool bent	Replace entire valve assembly
	Return spring failing	Replace spring
	Return spring or cap misaligned	Loosen, align and tighten spring or cap
	System oil temperature distribution not uniform	Allow sufficient warm-up for entire system
Oil leaking at seals	Paint sticking at seal	Remove and clean the seal
	Back-pressure in valve	Replace hydraulic oil filter
	Dirt in seal	Remove and clean the seal
	Seal plate has loosened	Replace valve housing as assembly
	Seal broken or damaged	Remove and replace seal
Controls feel heavy	Foreign matter in control valve spool	Clean control valve
	Valve spool sticking	Replace entire valve housing
	Control linkage lacking lubrication	Properly lubricate linkage

HYDRAULIC PUMP AND MOTORS SYSTEM

Problem	Possible Cause	Corrective Action
System will not operate in either direction	1. Oil supply low	Check oil level and fill
	2. Oil filters clogged	Replace filter
	3. Oil too heavy	Use proper viscosity oil
	4. Control linkage mis-adjusted	Check to see if control linkage is binding or unfastened
	5. Low charge pressure	See corrective action for Causes 6-9.
	6. Relief valve stuck open	Remove, clean or replace
	7. Damaged check valve	Disassemble and check if valve is faulty or damaged
System is loud	8. Air in system	Low oil level in reservoir
	9. Loose suction line	Tighten fittings and/or hose
	10. Clogged suction filter	Replace suction filter
	11. Internal pump or motor damage	Disassemble, inspect, repair, or replace
Slow response to acceleration or deceleration	See cause 8	See corrective action for Causes 1-3, 8, and 9
	See cause 11	See corrective action for Causes 1-3, 9, and 11
	12. Low charge pressure	See corrective action for Causes 6, 7, and 9
	13. Relief valve dirty or damaged	Remove, clean, or replace
Oil leaking from pump or motor	14. Defective seal	Replace seal and/or complete assembly

HYDRAULIC CYLINDERS

Problem	Possible Cause	Corrective Action
Insufficient hydraulic cylinder power	Relief valve pressure setting decreased	Readjust valve pressure setting
	Cylinder internal oil leakage	Replace seals
	Cylinder piston or seals defective	Replace piston or seals
	Control valve internal oil leakage	Replace entire valve housing
Hydraulic cylinder external oil leakage	Cylinder seals defective	Replace seals
	Cylinder rod damaged	Replace rod
Piston does not move smoothly	Oil temperature is abnormally high	Lower the oil temperature
	Air being taken into system	Replenish oil and tighten suction connections
	Seals defective	Replace seals

ELECTRICAL SYSTEM

Problem	Possible Cause	Corrective Action
Starter will not turn	Ignition is in OFF or RUN position	Turn ignition to START position
	Speed control not in OFF position	Move speed control to NEUTRAL position
	Faulty wiring	Troubleshoot circuit and repair
	Faulty terminations	
	Fuse open	
	Circuit breaker tripped	Reset circuit breaker
	Faulty starter switch	Replace switch
	Battery not charged	Recharge battery
Battery discharges and/or will not recharge	Terminals and/or cables are loose or corroded	Clean terminals and/or cables
	Battery defective	Re-tighten or replace battery
	Alternator defective	Contact authorized service center and have them check alternator
Horn does not function	Fuse blown	Replace fuse
Charge indicator does not activate before engine starts	Alternator defective	Replace alternator
	Battery not charged	Recharge battery

Chapter 12
DECAL LOCATIONS

GENERAL INFORMATION

Decal location information is provided to assist in the proper selection and application of new decals, in the event the original decals become damaged or the machine is repainted. Refer to the listing for the illustration reference number, part number, description and quantity of each decal provided in the kit. Refer to the illustrations for appropriate replacement locations.

To ensure proper selection of the correct replacement decals, compare all of the various close-up location drawings to the machine before starting to refinish the unit. Then circle each decal shown (applicable to the machine) while checking off its part number in the listing. After verifying all the decals needed for replacement, place any extra unnecessary decals aside for disposal. If there is a decal on a part that is to be replaced, be sure that the replacement part has the decal applied to it.

NOTE: *Refer to the SAFETY chapter of this Operator's Manual for the specific information provided on the various safety decals furnished in the decal kit.*

NEW DECAL APPLICATION

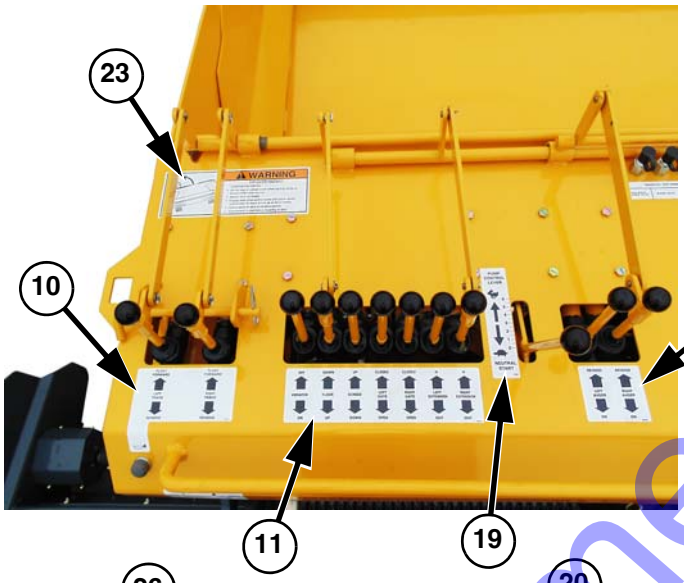
Surfaces MUST be free from dirt, dust, grease and other foreign material before applying the new decal. To apply, remove the smaller portion of the decal backing paper and apply this part of the exposed adhesive backing to the clean surface while maintaining proper position and alignment. Slowly peel off the other portion of the backing paper while applying hand pressure to smooth out the decal surface.

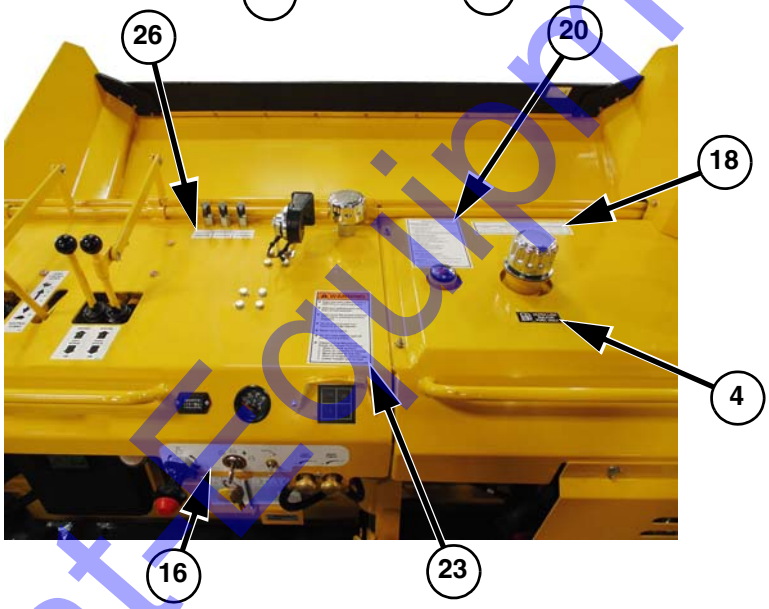
⚠ CAUTION

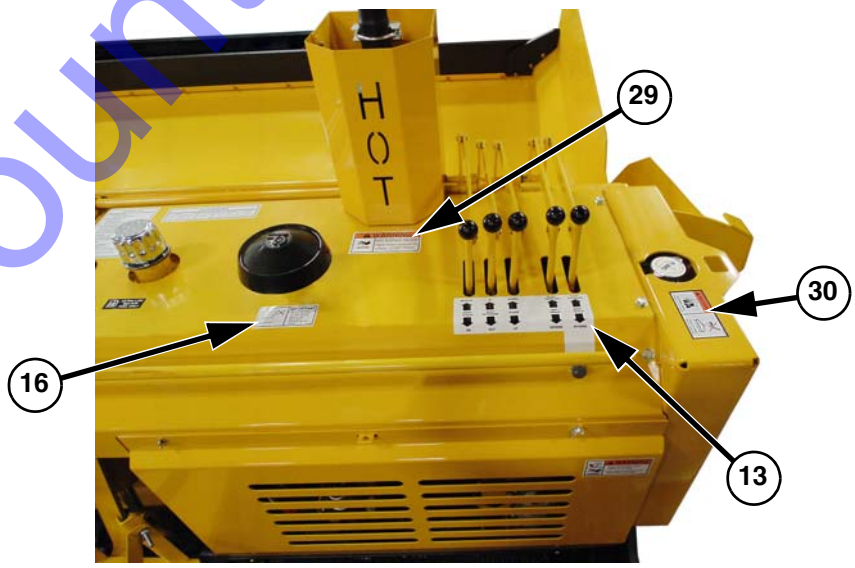
ALWAYS follow safety precautions on decals. Replace the decals if they are damaged, or if the unit is repainted. If repainting, BE SURE all applicable decals are affixed to the unit.

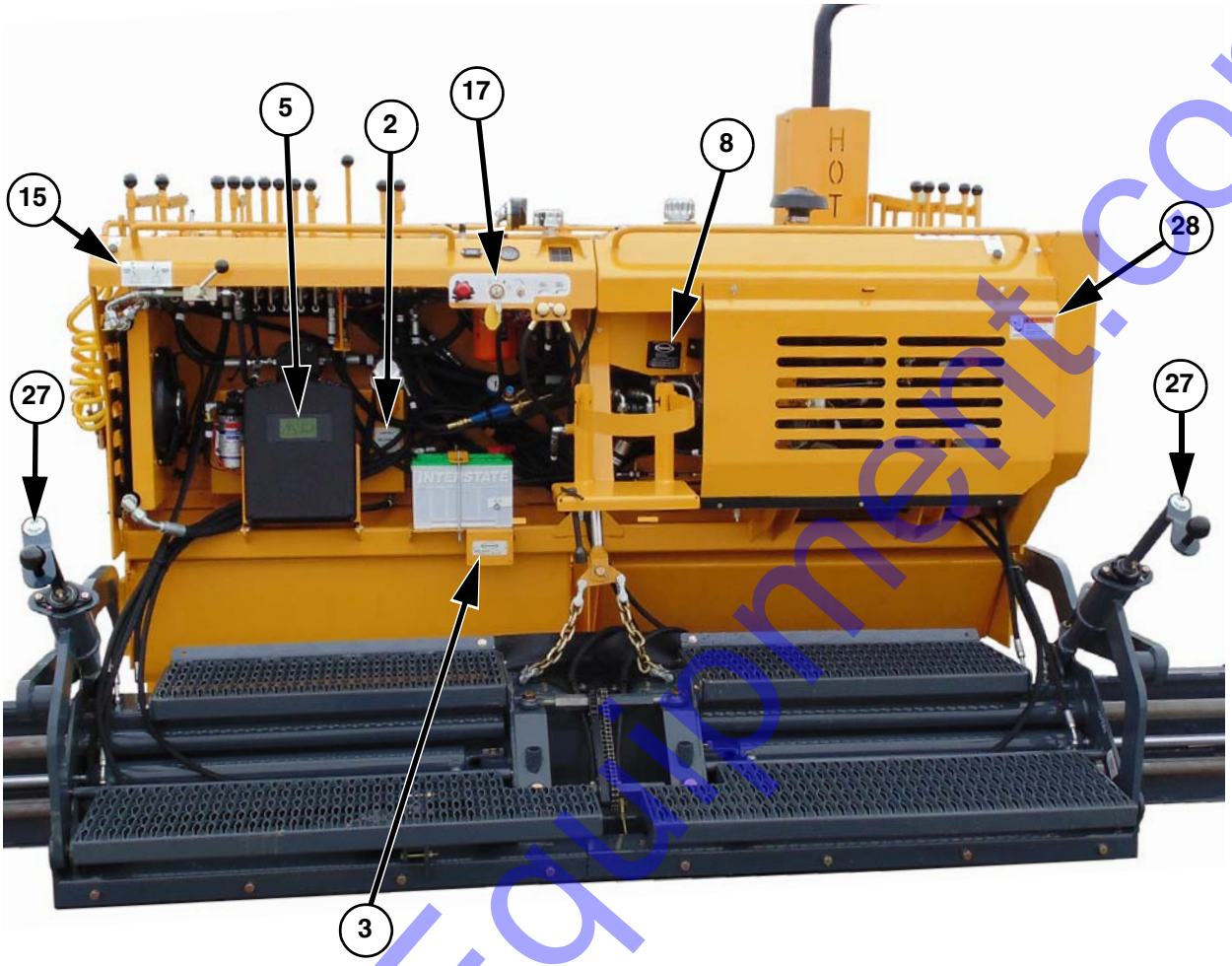
The decal kit for the model 1648 Plus Paver is listed below:

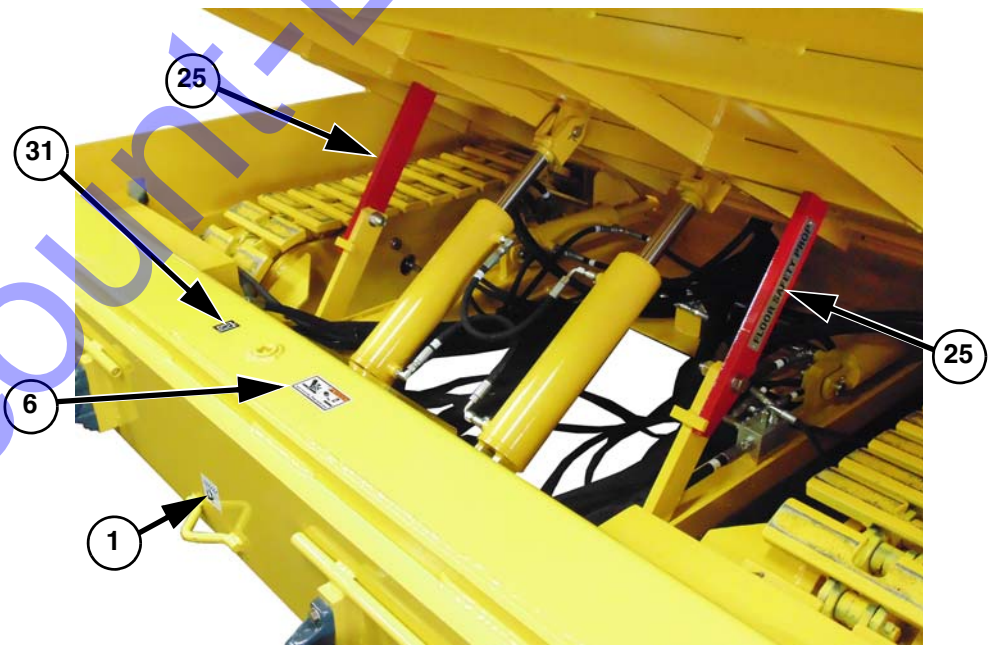
Ref. No.	Part No.	Description & Quantity
	P176063	Decal Kit - 1648 Plus
1	6937	DECAL - TIE DOWN POINT
2	9794	DECAL - WASHDOWN SOLUTION
3	11329	WEILER SERIAL NUMBER PLATE
4	21226	DECAL - ULTRA LOW SULFUR FUEL
5	21956	INT'L DECAL - READ OPERATORS MANUAL
6	27350	DECAL - HAND CRUSH, 4 X 2
7	29975	DECAL - ENGINE EMISSION CONTROL INFO 2015
8	73162772	DECAL - USA
9	P101115	DECAL / DRIVE CONTROL
10	P101116	DECAL / 7 STACK VALVE
11	P101118	DECAL / AUGER CONTROL
12	P101119	DECAL / 5 POSITION RT
13	P101481	DECAL / "POWERBOX" CORP GRAY
14	P101986	DECAL / STEER VALUE
15	P137660	DECAL / ETHER
16	P175774	DECAL / GAUGE PANEL
17	P175805	DECAL / FILTER REFERENCE
18	P175806	DECAL / PUMP CONTROL
19	P175862	DECAL / 1648 MAINTENANCE
20	P175900	DECAL / 1648 RIGHT
21	P175932	DECAL / 1648 LEFT
22	P204100	DECAL WARNING
23	P204101	DECAL WARNING
24	P207300	DECAL / ON/OFF
25	P210200	DECAL SAFETY PROP
26	P473204	DECAL / 1648 PRESSURE TEST
27	P480087	DECAL / DEPTH ADJ
28	PL65924	DECAL / DANGER ROTATING
29	PL65942	DECAL / HOT SURFACE WARNING
30	V2326315	DECAL - FLUID UNDER PRESSURE
31	V2326I756	DECAL - HYDRAULIC OIL SYMBOL











INDEX

NOTES

TORQUE SPECIFICATIONS

Use these torque values when tightening hardware (excluding locknuts, and self-tapping, thread-forming, and sheet metal screws) unless otherwise specified.

UNIFIED NATIONAL THREAD	GRADE 2		GRADE 5		GRADE 8	
	DRY	LUBED	DRY	LUBED	DRY	LUBED
8-32	19*	14*	30*	22*	41*	31*
8-36	20*	15*	31*	23*	43*	32*
10-24	27*	21*	43*	32*	60*	45*
10-32	31*	23*	49*	36*	68*	51*
1/4-20	66*	50*	9	75*	12	9
1/4-28	76*	56*	10	86*	14	10
5/16-18	11	9	17	13	25	18
5/16-24	12	9	19	14	25	20
3/8-16	20	15	30	23	45	35
3/8-24	23	17	35	25	50	35
7/16-14	32	24	50	35	70	55
7/16-20	36	27	55	40	80	60
1/2-13	50	35	75	55	110	80
1/2-20	55	40	90	65	120	90
9/16-12	70	55	110	80	150	110
9/16-18	80	60	120	90	170	130
5/8-11	100	75	150	110	220	170
5/8-18	110	85	180	130	240	180
3/4-10	175	130	260	200	380	280
3/4-16	200	150	300	220	420	320
7/8-9	170	125	430	320	600	460
7/8-14	180	140	470	360	660	500
1-8	250	190	640	480	900	680
1-12	270	210	710	530	1000	740

METRIC COARSE THREAD	GRADE 8.8		GRADE 10.9		GRADE 12.9	
	DRY	LUBED	DRY	LUBED	DRY	LUBED
M6-1	8	6	11	8	13.5	10
M8-1.25	19	14	27	20	32.5	24
M10-1.5	37.5	28	53	39	64	47
M12-1.75	65	48	91.5	67.5	111.5	82
M14-2	103.5	76.5	145.5	108	176.5	131
M16-2	158.5	117.5	223.5	165.5	271	200

*All torque values are in ft.-lbs. except those marked with an *, which are in lbs.
For metric torque value (N·m), multiply ft.-lbs. value by 1.355, or the in.-lbs. value by 0.113.

WARNING

THIS OPERATOR'S MANUAL IS PROVIDED FOR OPERATOR USE

DO NOT REMOVE FROM THIS MACHINE

Do not start, operate or work on the machine until you carefully read and thoroughly understand the contents of this Operator's Manual.

Failure to follow safety, operating and maintenance instructions can result in serious injury to the operator or bystanders, poor operation, and costly breakdowns.

If you have any questions on proper operation, adjustment or maintenance of the machine, contact your dealer or the POWERBOX Company Service Department before starting or continuing operation.

California Proposition 65 Warnings:

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer and birth defects and other reproductive harm.

Battery post, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects and other reproductive harm. **Wash hands after handling battery**.

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