

# Rubber Tire Asphalt Paver

## Operation and Service Manual



# RP-170e Rubber Tire Asphalt Paver

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## OPERATION AND SERVICE MANUAL

MODEL

RP-170e

SERIAL NUMBER

DATE PURCHASED







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# 1.0 Contents

<b>RP-170e Rubber Tire Asphalt Paver.....</b>	<b>11</b>
<b>STANDARD WARRANTY .....</b>	<b>13</b>
<b>Proposition 65 Warning.....</b>	<b>15</b>
<b>1.0 Introduction .....</b>	<b>17</b>
1.01 Preface .....	19
1.02 Description .....	21
1.03 Inspect a New Machine.....	23
1.04 Unit Nomenclature.....	25
1.05 Machine Dimensions .....	27
1.06 Machine Specifications .....	29
1.07 Engine Systems .....	31
1.08 Drive System .....	33
1.09 Material Feed System.....	35
1.10 Electrical System.....	37
1.11 Optional Equipment .....	39
<b>2.0 Safety.....</b>	<b>41</b>
2.01 Safety Features.....	43
2.01.01 Machine Danger Zones .....	45
2.02 Safety Requirements.....	47
2.03 Wear Personal Protective Equipment (PPE).....	48
2.04 Commit to 100% Safety .....	48
2.05 Learn Safety .....	49
2.06 Know the Rules .....	49
2.07 Perform Quality Inspections .....	50
2.08 Know the Machine .....	50
2.09 Prevent Fires .....	51
2.10 Know the Job Site.....	51
2.11 Load/Unload Safely.....	52
2.12 Mount and Start Safely.....	52
2.13 Focus on Safety.....	53
2.14 Practice Ground Operation Safety .....	53
2.15 Be Safe Around Fumes .....	54
2.16 Work Safely .....	54

2.17	Work Safely At Night.....	55
2.18	Park Safely .....	55
2.19	Maintenance Safely.....	56
2.20	Take Precautions .....	56
2.21	Service Battery Safely.....	57
2.22	Safely Service Electric Systems .....	57
2.23	Safely Service Hydraulic Systems .....	58
2.24	Material Safety Data Sheets (MSDS) .....	58
2.25	Safety First.....	58
2.26	Hazard Decals.....	59
<b>3.0</b>	<b>Operation .....</b>	<b>63</b>
3.01	Principles of Operation .....	65
3.02	Operator Station .....	69
3.03	Left Seat/Left Side, Right Seat/Right Side Operator Console.....	70
3.04	Left Seat/Right Side, Right Seat/Left Side Operator Console.....	74
3.05	Machine Control Screen.....	77
3.05.01	Main Screen .....	78
3.05.02	Configure Main Display 1 and Display 2 Screens.....	79
3.05.03	Menu Options .....	80
3.05.04	Set Up Screed Boost .....	81
3.05.05	Set Units of Measure .....	82
3.05.06	SCR Exhaust System Cleaning (Regen) Modes .....	83
3.05.06.01	SCR Engine Exhaust System Cleaning (Regen) .....	84
3.05.06.02	Perform Forced Regen.....	87
3.05.06.03	Diesel Exhaust Fluid Indication Lamp .....	88
3.05.06.04	SCR System Tampering / Malfunction Inducements .....	90
3.06	Left Screed Control Box.....	92
3.07	Right Screed Control Box.....	93
3.08	Screed Digital Display - Main Screen .....	94
3.09	Screed Digital Display - Auger Raise Screen .....	95
3.10	Screed Digital Display - Flow Gate Height Screen .....	96
3.11	Screed Digital Display - Screed Settings Screen.....	97
3.12	Screed Digital Display -Screed Offset and Min. Generator.....	98
3.13	Remote Screed Box .....	99

3.14	Pre-Start Conditions .....	101
3.15	Pre-Start Check List.....	103
3.16	Pre-Start Communication .....	105
3.17	Screed Operations .....	106
3.18	Prepare the Screed .....	107
3.19	Screed Set Up.....	108
3.20	Feed System Set Up .....	112
3.21	Paving Techniques .....	115
3.22	Create Quality Transverse Joints .....	119
3.23	Auger Extensions.....	124
3.24	Paving for Smoothness Tips .....	127
3.25	Drive-Off Procedure .....	129
3.26	Operate .....	131
3.27	Park and Shut Down .....	137
<b>4.0</b>	<b>Lubrication &amp; Maintenance .....</b>	<b>139</b>
4.01	Service Summary .....	141
4.01.01	Service Safely .....	142
4.02	Fluid Requirements.....	143
4.03	Daily Maintenance .....	145
4.03.01	Refill Diesel Fuel .....	147
4.03.02	Refill Diesel Exhaust Fluid .....	148
4.03.03	Check Engine Crankcase .....	149
4.03.04	Check Engine Oil Level.....	150
4.03.05	Check Engine Coolant Level.....	151
4.03.06	Lubricate Conveyor Idler and Headshaft Bearings.....	152
4.03.07	Lubricate Screed Vibrator Bearings.....	153
4.03.08	Lubricate Auger Hanger and Chain Case Bearings.....	154
4.03.09	Check Hydraulic Tank Oil Levels .....	155
4.04	50 Hours Maintenance.....	157
4.04.01	Check/Replace Engine Air Intake Filter.....	159
4.04.02	Change Hydraulic Filters .....	160
4.04.03	Check/Refill Battery Electrolyte Levels .....	161
4.04.04	Lubricate Screed Endgate Jacks .....	162
4.04.05	Lubricate Angle of Attack Mechanisms .....	163

4.04.06	Lubricate Angle of Attack Threads .....	164
4.04.07	Lubricate Screed Crown Threads .....	165
4.04.08	Lubricate Strike-off Tube .....	166
4.04.09	Check Tire Pressure .....	167
4.04.10	Lubricate Crown Control .....	168
4.05	100 Hours Maintenance .....	169
4.05.01	Change Engine Oil and Oil Filter .....	171
4.06	250 Hours Maintenance .....	173
4.06.01	Check/Replace Engine Air Intake Filter .....	175
4.06.02	Change Engine Oil and Oil Filter .....	176
4.06.03	Change Engine Fuel Filter .....	178
4.06.04	Change Hydraulic Filters .....	179
4.06.05	Change Wheel Planetary Oil .....	180
4.06.06	Change Pump Drive Gearbox Oil .....	181
4.06.07	Change Auger and Conveyor Planetary Oil .....	182
4.06.08	Lubricate Seat Pivot Bearing .....	183
4.07	1000 Hours Maintenance .....	185
4.07.01	Flush and Clean Radiator .....	187
4.07.02	Replace Engine Breather .....	188
4.07.03	Flush Hydraulic Tank and Replace Strainer .....	189
4.07.04	Flush and Refill Wheel Planetary Oil .....	191
4.07.05	Flush and Refill Pump Drive Gearbox Oil .....	192
4.07.06	Flush and Refill Auger and Conveyor Planetary Oil .....	193
4.07.07	Check and Refill Bogie Wheel Bearings .....	194
4.08	2000 Hours Maintenance .....	195
4.08.01	Diesel Emissions Fluid Filters .....	197
4.09	Maintenance Procedures .....	199
4.09.01	Machine Lifting Points .....	201
4.09.02	Machine Tie Down Points .....	202
4.09.03	Adjust Auger Drive Chain .....	203
4.09.04	Adjust Conveyor Drive Chain .....	206
4.09.05	Adjust Conveyor Drag Chain .....	207
4.09.06	Wash Down Machine .....	208
4.09.07	Manual Hood Raise and Brake Release .....	210

4.09.08 Engage / Disengage Propel Pump Bypass .....	212
4.09.09 Pivot Seats with Manual Hand Pump .....	213
4.10 Wear Parts Guide.....	214
4.11 Chain Wear Guide.....	215
<b>5.0 Hydraulic Systems .....</b>	<b>217</b>
5.01 Hydraulic Pump Drive System .....	219
5.01.01 Auxiliary Pump .....	221
5.01.02 Propel Pumps .....	222
5.01.03 Conveyor Pumps.....	223
5.01.04 Screed Generator Pump.....	224
5.01.05 Radiator Fan Pump.....	225
5.02 Motors .....	227
5.02.01 Auger and Conveyor Motors .....	229
5.02.02 Propel Drive Motors.....	230
5.02.03 Fume Extraction Motors .....	231
5.02.04 Radiator Fan Motor.....	232
5.03 Valves.....	233
5.03.01 Brake Shift, Hood Valve Stack.....	235
5.03.02 Rear Valve Stack.....	236
5.03.03 Tow Point Valves .....	237
5.03.04 Differential Lock Valve .....	238
5.03.05 Screed Assist/Screed Boost Valve.....	239
5.03.06 Hydraulic Tunnel Extension Valve .....	240
<b>6.0 Maintenance Charts .....</b>	<b>241</b>
6.01 Daily Maintenance Chart.....	243
6.02 50 Hour Maintenance .....	244
6.03 100 Hour Maintenance .....	245
6.04 250 Hour Maintenance .....	246
6.05 1000 Hour Maintenance.....	247
6.06 2000 Hour Maintenance.....	248
<b>7.0 Troubleshooting .....</b>	<b>249</b>
7.01 Engine Diagnostic Screen .....	251
7.01.01 Engine Fault Codes.....	253
7.02 Troubleshoot Engine Malfunctions .....	257



7.03	Troubleshoot Operations .....	261
7.04	Troubleshoot Hydraulic Systems .....	263
7.05	Troubleshoot Batteries .....	267
7.06	Troubleshoot Fluid Motors .....	269
7.07	Troubleshoot Electrical Systems.....	271
<b>8.0</b>	<b>Schematics .....</b>	<b>273</b>
8.01	Lubrication Chart.....	275
8.02	Hydraulic Schematics .....	277
8.03	Electrical Schematics .....	279
	<b>STANDARD WARRANTY .....</b>	<b>281</b>
	<b>Order Parts.....</b>	<b>283</b>
	<b>INDEX .....</b>	<b>285</b>
	<b>NOTES .....</b>	<b>287</b>

# RP-170e Rubber Tire Asphalt Paver

- Serial number is needed for machine information including specific operating and maintenance instructions, hydraulic and electrical schematics, parts assembly manuals and technical assistance from your dealer or Roadtec Service Department.



FOR REPAIRS REFER TO MACHINE NUMBER

ENG SN

*In Pursuit of Excellence*

Roadtec, Incorporated • Chattanooga, Tennessee U.S.A. 37405  
(423)265-0600, (800)272-7100

DELIVERY DATE	
SERIAL NUMBER	
ENGINE NUMBER	
DEALER	
DEALER ADDRESS	
PHONE	
EQUIPMENT HOURS	
SERVICE MANAGER	



## STANDARD WARRANTY

Roadtec, Inc. ("Manufacturer") warrants to the first end-user all new machinery and parts manufactured by it ("Products") to be free from defects in workmanship and material, commencing with the date of initial startup and for a period of twelve months thereafter or 1,000 hours of operation, whichever occurs first.\* **This limited warranty remains in force for the above time period only if all Manufacturer's operational and warranty procedures are followed and recommended maintenance is performed.** Manufacturer's liability hereunder is conditioned on the first end-user giving written notice to Manufacturer of any alleged defect no later than thirty days after the discovery of such alleged defect.

If, within such warranty period, any Product shall be proven to Manufacturer's satisfaction to be defective, it shall be repaired or replaced, at Manufacturer's option. All defective parts or components must be returned to Manufacturer freight prepaid, at a location specified by Manufacturer, for inspection before credit will be issued for new parts or components. The right to have a defective Product repaired or replaced shall constitute the first end-user's sole and exclusive remedy for breach of this limited warranty. Manufacturer may, at its sole discretion, refund the purchase price of the defective Product in lieu of repairing or replacing it, provided the defective Product is returned to Manufacturer freight prepaid at a location specified by Manufacturer, and such return is authorized by Manufacturer. Labor for warranty repair will be paid under a formula determined by Manufacturer.

Wear parts including, but not limited to, conveyor lines, screed plates, cutter teeth, tooth holders, scraper blades, track pads, tires and conveyor belts are warranted only if found to be defective at time of shipment, but are not warranted for the warranty period against wear or abuse.

No warranty shall apply to Products which have been repaired or altered by others so as, in Manufacturer's judgment, to adversely affect the same or which shall have been subject to negligence, accident, abuse or improper care, installation, maintenance, storage or other than normal use or service, during or after shipment. No warranty shall apply to any used Product. No warranty shall apply to any Product adversely affected by being used with any machinery, part or accessory not manufactured or authorized by Manufacturer. With respect to machinery, parts or accessories which are furnished but not manufactured by Manufacturer, the warranty obligation of the original equipment manufacturer shall be passed through to the first end user, but Manufacturer does not provide any warranty as to such items.

Manufacturer does not warrant or represent that any Product furnished by it meets any federal, state or local safety, environmental or electrical regulations. Manufacturer is wholly discharged from all liability under this warranty in the event that the purchaser of the Product fails to pay for it in accordance with the applicable purchase terms. This warranty extends only to the first end-user and is not transferable. This warranty may not be modified except pursuant to a written agreement signed by Manufacturer.

**THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED (EXCEPT WARRANTY OF TITLE), INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND ANY IMPLIED WARRANTY FROM COURSE OF DEALING OR USAGE OF TRADE, EACH OF WHICH IS EXPRESSLY DISCLAIMED. MANUFACTURER SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES WHATSOEVER WITH RESPECT TO MACHINERY, PARTS OR ACCESSORIES MANUFACTURED OR FURNISHED BY IT OR ANY SERVICES, UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO. IN NO EVENT SHALL MANUFACTURER BE LIABLE TO ANY PARTY FOR ANY LOSS OF USE, REVENUE OR PROFIT, OR FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR PUNITIVE DAMAGES WHETHER ARISING OUT OF BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHERWISE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.**



**ROADTEC, INC.**


**Chattanooga, Tennessee**

\* The warranty period for the Front Mounted Broom: FB-100e SN 4001 is six months or 500 hours of operation, whichever occurs first.




# Proposition 65 Warning

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 **WARNING:** Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information, go to [www.P65warnings.ca.gov/diesel](http://www.P65warnings.ca.gov/diesel).

 **ADVERTENCIA:** Respirar los gases del escape de motores a diésel le expone a químicos conocidos por el Estado de California como causantes de cáncer y defectos de nacimiento u otros daños reproductivos.

- Siempre encienda y opere el motor en un área bien ventilada.
- Si es en un área cerrada, ventile el orificio del escape hacia el exterior.
- No modifique ni altere el sistema de escape.
- No encienda el motor, excepto cuando sea necesario.

Para mayor información visite [www.P65warnings.ca.gov/diesel](http://www.P65warnings.ca.gov/diesel).



## 2.0 Introduction

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## 2.01 Preface

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The Roadtec brand is synonymous with innovation, durability, top performance and customer support. For more than 34 years, Roadtec has been a market leader for mobile road building equipment technologies. Asphalt Pavers are designed for durability, maneuverability and traction.

### **This Manual**

This manual serves as part of a set of manuals intended for the use of owners and operators. This Manual provides information for the operation and maintenance of the RP-170e Rubber Tire Asphalt Paver. Never remove the manuals from the machine. Refer to the table of contents at the front of this manual for a list of chapters and sub-chapters. Locate the index at the back of this manual for a list of alphabetical common words and phrases.

Roadtec recommends that all owners and operators become familiar with the manuals to maximize safe operations and long machine life. Follow all safety warnings written in this Manual and all safety decals posted on machine. Read this manual in its entirety before attempting any operation or maintenance. This information is based on established procedures to date. Refer to the most recent version of this Manual as technical data and methods are subject to change.

The set consists of the **Operation and Service Manual** and the **Parts Manual**. The set is provided free of charge with the initial purchase of the machine. Replacements are available for a fee to cover printing and handling. The Parts Manual is shipped as part of the technical CD- ROM or USB located in the Operation and Service Manual. The Operation and Service Manual is stored on the CD/ USB and is printed and shipped with the machine.

Roadtec, Inc. and Astec Industries accepts no liabilities for losses, consequential losses, disturbances, breakdowns, damages or claims caused by the use of this Manual.

### **Units of Measures**

Standard units for weight and measurements used in this manual are listed as U.S. customary units followed by their SI (metric) equivalents in parenthesis. For example, 12.67 ft. (3.86 m). Units can be stated in words, such as quarts and inches. Measures may be stated using abbreviations, such as lbs. for pounds, or psi for pounds-per-square-inch.

### **Reference Standards**

Reference standards are maintained for hazard messages and other safety communications established by the American National Standards Institute (ANSI), the Occupational Safety and Health Administration (OSHA) and the American Society of Mechanical Engineers (ASME).

### **Copyright and Trademark**

#### **Acknowledgments**

Copyright and Trademark acknowledgments include: Sauer Danfoss is a trademark of Danfoss Power Solutions, Inc. MOBA is a trademark of Mobile Automation GmbH. Shell is a trademark of Shell Oil Company. Roadtec is a trademark of Astec Industries, Inc.

### **Inspect the Machine**

Inspect machine loss or damage incurred during transit. Check shipment against freight bill or packing list. Notify transportation agent immediately if damage is found. Contact Roadtec service department a week prior to the first day of operation for assistance with start-up, safe operation and maintenance.

### **Order parts and direct questions to:**

**Roadtec, Inc.**  
**800 Manufacturers Road**  
**PO Box 180515**  
**Chattanooga, TN 37405-0600**  
**USA**

**1.800.272.7100**  
**1.423.265.0600**  
**Fax 1.423.267.7104**

[www.roadtec.com](http://www.roadtec.com)



## 2.02 Description

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The RP-170e Rubber Tire Asphalt Paver is an 8 ft. wide rubber-tire asphalt paver with a compact wheelbase for greater maneuverability without sacrificed performance. The RP-170e is suitable for paving operations using windrow pickup machines even on sharply inclined hills and wider paving widths. Asphalt Pavers are useful for new road and highway rehabilitation projects. **The RP-170e offers an unmatched combination of power, traction, maneuverability and performance in the highway class of pavers.**

**The RP-170e is simple to operate.** Crew members control operations from dual operator stations. Control panels are conveniently located on arm rests to allow full focus on the job at hand. Operator seats hydraulically swing outward past the machine for greater visibility, offering a clear view back to augers, hoppers and the matching line. Control screens are easily navigated using one control switch. Flow gate settings are visually displayed on screen for easy adjustments. A tilting steering wheel and a single joystick control all propel functions with ease.

**The RP-170e saves time and money.** The robust drive system is powered by a low emissions, Cummins QSB 6.7 T4f 174 HP @ 2200 RPM. Hoppers are engineered to optimize material flow and prevent segregation. The narrow front apron allows trucks to directly engage the hopper and prevent material buildup. Tilting augers allow for better material flow and are useful for supers, partial passes and correcting mat defects. The 13" conveyor opening height permits high levels of material throughput. Chromium carbide floor plates mean longer life and fewer replacement parts. The

specially-designed delta plate minimizes the gap against the conveyor and stops material from falling forward and underneath the machine, preventing centerline segregation. Dual 12"x22" fabricated, offset front bogie wheels work to pre-compact soft grade material for faster, smoother mat development.

**The RP-170e is easy to maintain.** Dual fuel fills are easy to reach. Electrical systems are lighted and accessible with clearly labeled systems that are easy to troubleshoot. The full-size hydraulic engine hood opens widely to allow easy access into the engine compartment. A manual hood lift feature is included for back-up. Hydraulic systems are displayed on screen for easy diagnostics. Large hydraulic pumps are easily serviced and allow the entire circuit to run cool, prolonging pump life and helping lower overall maintenance costs. Quick connect test ports on pumps can be connected while pressurized. Hydraulic filters are conveniently located on top of the tank.

**The RP-170e is built to last.** The frame is manufactured with the strength of A656 grade 80 steel, yielding twice the strength as mid-strength steel frames used on similar machines in the market. The side plates are 3/4" thick with a 2"+ front cross frame.

**The RP-170e is a heavy-duty machine especially designed for durability, efficiency and high production.** Roadtec Asphalt Pavers have become an essential tool for road builders all over the world who achieve smoothness specs and long lasting roadways.



## 2.03 Inspect a New Machine

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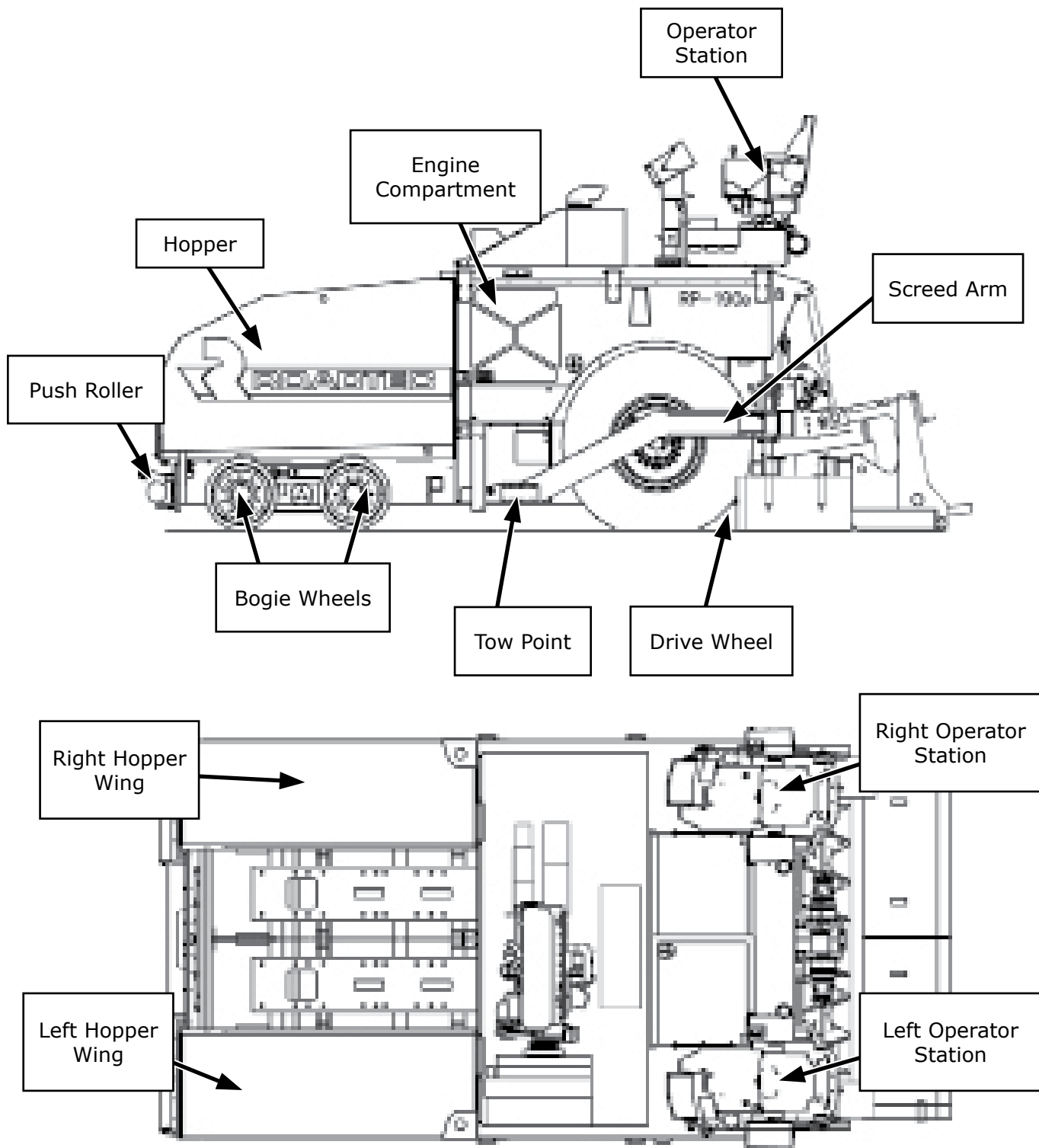
Always inspect this equipment for evidence of damage or missing parts before accepting and unloading the machine. Never move equipment from the original receiving location until the official inspection has been made. After the freight receipt has been signed, it is confirmed that the equipment was received in good condition. Therefore, a thorough inspection is required using the check list provided. Any and all damage that occurs to the equipment and the components in transit is the responsibility of the carrier and not Roadtec. Make clear photos of the damage and ask the driver to make a notation on both the carrier and the

consignee's copies of the freight bill. The consignee should file a written damage claim with the carrier's office and report this action to Roadtec. Submit claims for damage that occurred during transit to the carrier for settlement.

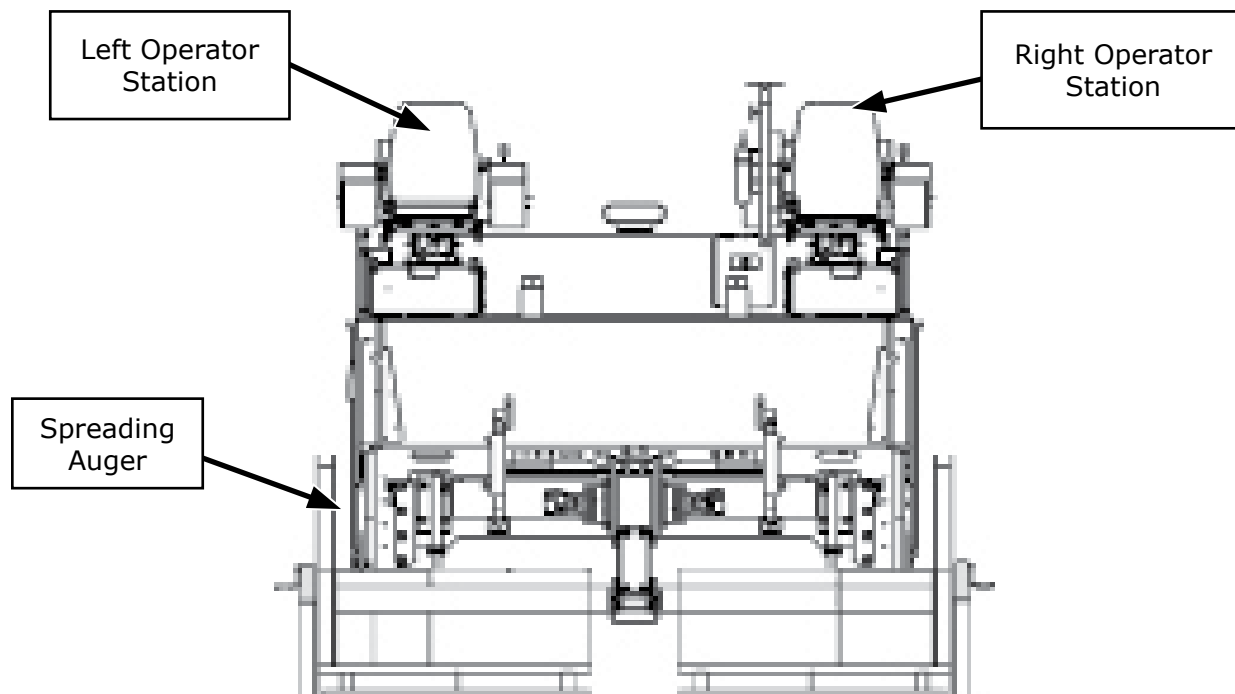
Stop unpacking or moving the equipment if hidden damage is discovered after the carrier's representative has gone. Contact the carrier's local office and ask for the authorized representative to make an immediate inspection. Obtain a written description and photos signed by the representative for proof of claim.



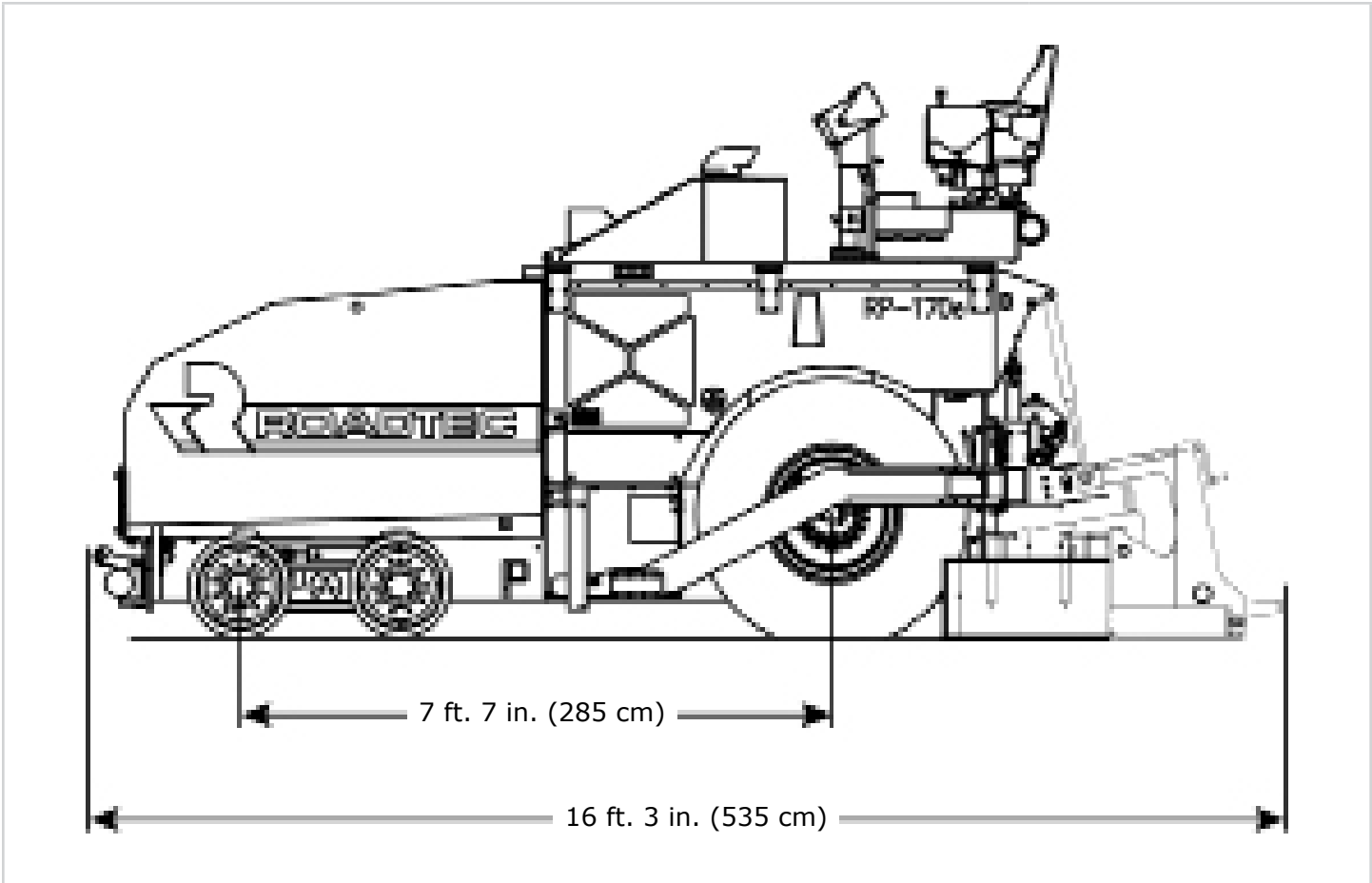
## 2.04 Unit Nomenclature



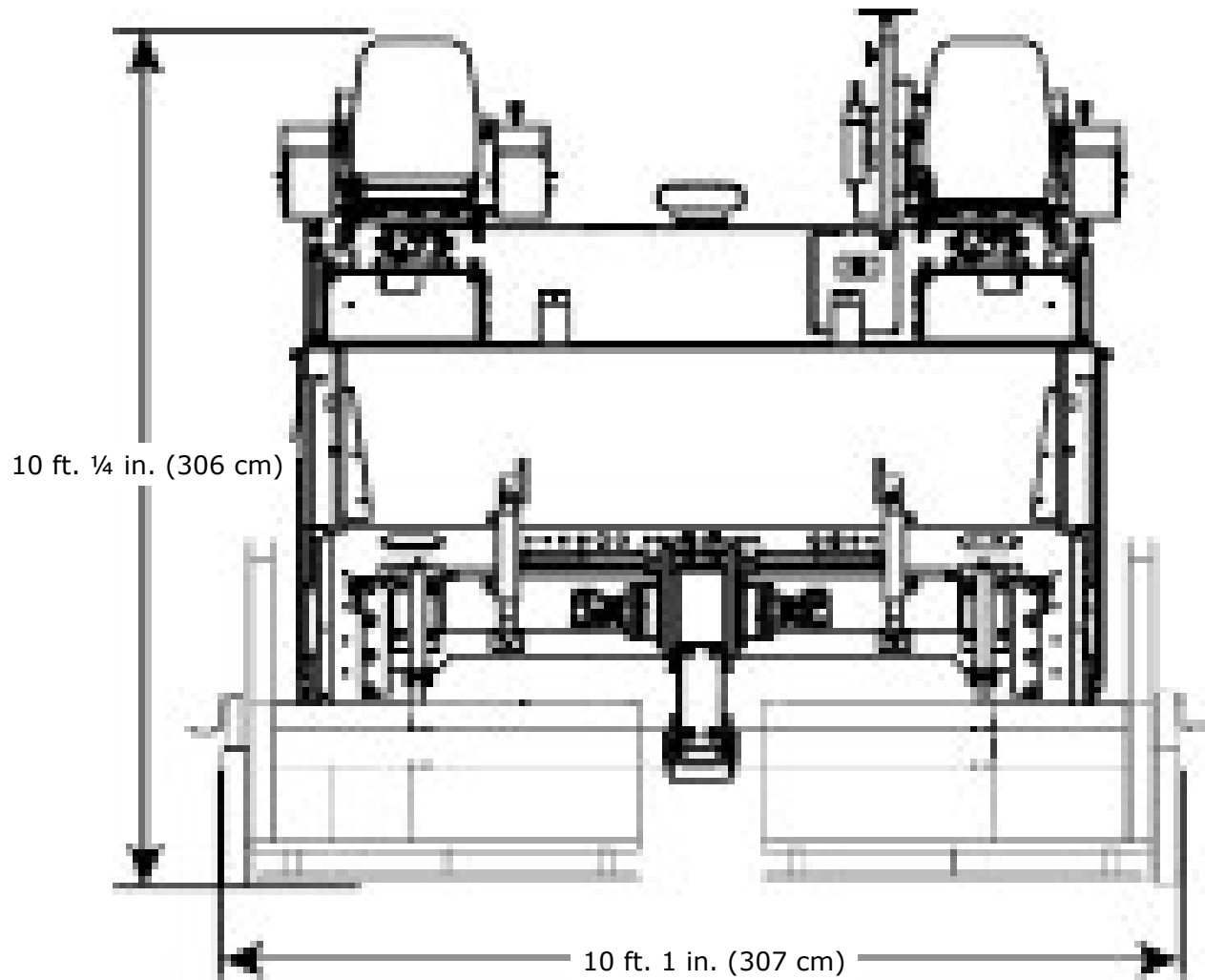




## 2.05 Machine Dimensions



Dimension	English	Metric
Shipping Length (Tractor Only)	16 ft. 3 in.	535 cm
Shipping Height	11 ft. 5 in.	348 cm
Wheel Base	7 ft. 7 in.	285 cm
Shipping Width	8 ft. 2 in.	250 cm
Operating Width	10 ft. 6 in.	320 cm
Ground Clearance	6 in.	15.24 cm
Tractor Weight	29,280 lbs.	13, 344 kg



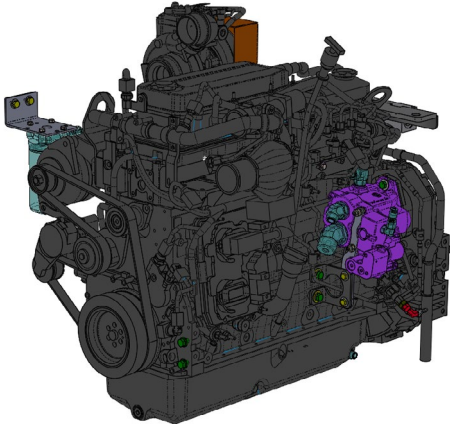
## 2.06 Machine Specifications

Operational Specs	English	Metric
<b>Working Speed Range</b>	0-300 fpm	0-91 mpm
<b>Travel Speed Range</b>	0-10 mph	0-16 kph
<b>Inside Turning Radius</b>	30 in.	76 cm
<b>Fluid Capacities</b>		
Fuel	81 gal.	306 L
Hydraulic Tank	66 gal.	250 L
DEF Tank	5 gal.	19 L
Engine Coolant	8.75 gal.	33 L
Engine Oil	18.5 qt.	17.5 L
<b>Dimensions</b>		
Shipping Height	11 ft. 5 in.	348 cm
Shipping Width	8 ft. 10 in.	270 cm
Tractor Weight	29,280 lbs.	13, 344 kg
Truck Dumping Clearance	2 ft. 1 in.	63.5 cm
Hopper Length	6 ft. 6 in.	198 cm
Hopper Capacity	11.5 ton	10.4 mt
Standard Machine Weight	29,280 lbs.	13,344 kg
S-8 Screed	34,580 lbs.	15,685 kg
Carlson EZIV-8	35,630 lbs.	16,161 kg
Eagle 8	36,780 lbs.	16,683 kg



## 2.07 Engine Systems

- ▀ Cummins QSB 6.7 T4f 174 HP @ 2200 RPM drives hydraulic propel pumps and auxiliary pumps. Mounted behind operator station, accessible under machine. Fuel pump withdraws fuel from fuel tank. Air cleaner on top engine filters air before engine uses and removes fine particles, dust, sand and lint.
- ▀ Primary and secondary fuel filters remove contaminants from diesel fuel before fuel flows to injection pump. Automatic safety shut down for emergency situations. Electronic diagnostic gauge provides instrumentation for tach/hour meter, oil pressure gauge, travel speed, voltage meter and engine fault codes.
- ▀ Turbo charger uses exhaust energy to pack more air into cylinders, resulting in highly efficient combustion, fuel consumption and heat reduction; compensates to maintain combustion air density for operating in higher altitudes. After-cooler cools pressurized intake air from turbo charger, allowing greater air density for more complete fuel combustion. The engine will deliver full-rated power up to 8500 ft. (2590 m) altitude.
- ▀ Refer to engine manual for more detailed information.

Engine Item	Specification
<b>Cummins QSB 6.7 T4f 173 HP @ 2200 RPM</b>	
<b>Type</b>	In-Line
<b>Stroke</b>	4.21 x 4.88 in. (107 x 124 mm)
<b>Displacement</b>	408 cu. in. (6.7 L)
<b>Power</b>	174 HP (130 kW)
<b>Idle Speed</b>	2200 RPM
<b>Engine Oil Type/Capacity</b>	SAE 15W40 API-CJ4/18.5 qt. (17.5 L)
<b>Ambient Oil Temperature</b>	0°F(-18°C) - 104°F(40°C)
<b>Engine Cooling System</b>	
Capacity	8.75 gal. (33.1 L)
<b>Engine Fuel</b>	
Type/Capacity	Low Sulfur Diesel, 81 gal. (306 L)



## 2.08 Drive System





- Propel system consists of two (2) industrial hydrostatic drive systems - one for each wheel drive. Each system consists of a heavy-duty pump that drives a 2-speed hydraulic motor and gearbox assembly.
- The hydraulic system powers left travel and right travel pumps.
- A hydraulic tank reservoir provides filtered hydraulic fluid to circuits.
- Dual operator station controls allow for machine control from either side of machine.
- Travel direction is controlled using a travel joystick. Machine steering is controlled by a steering wheel.




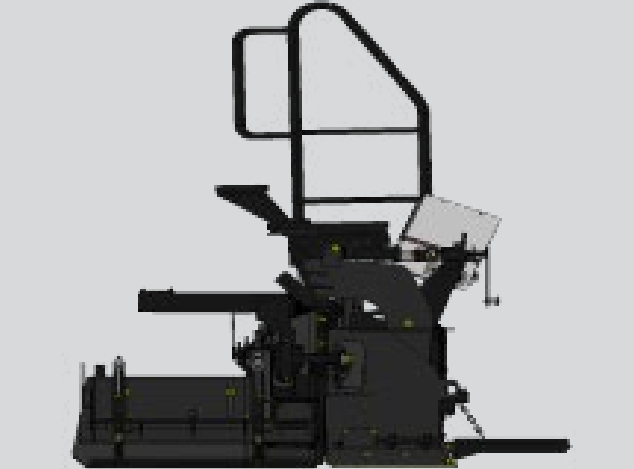
Drive Item	Specification
<b>MAIN DRIVE</b>	2 speed
<b>STEERING</b>	Steering Wheel, hydraulic swing
<b>BRAKES</b>	Hydrodynamic, service & parking
<b>SUSPENSION</b>	Rubber Tire
<b>FRONT BOGIES</b>	dual 12 in. (356 mm) x 22 in. (559 mm)
<b>TIRES</b>	
<b>Front Tire Size</b>	(2) hydroflated high flotation 16x24 sand rib drive tires
<b>Rear Tire Size</b>	(2) 16 in. x 24 in. (406 mm x 610 mm) Sand Rib Drive Tires
<b>SPEED</b>	
<b>Traveling</b>	0-10 MPH (16 KPH)
<b>Paving</b>	0-300 FPM (91 MPM)
<b>HYDROSTATIC DRIVE</b>	
<b>Drive Motors</b>	2
<b>Drive Pumps</b>	(2) variable displacement hydraulic pumps
<b>Hydraulic Fluid</b>	76 gal. (288 l)
<b>Hydraulic Fluid Type</b>	Grade 46 Anti Wear Hydraulic Oil
<b>Hydraulic Filters</b>	(5) canister, (2) 10-micron






## 2.09 Material Feed System

Flow Item	Specification	
<b>Hopper</b>	11.5-ton (10.4 mt) capacity, equipped with hydraulically-folding wings; Electrically-operated tunnel gates provide rapid and convenient control of material flow to screed.	
<b>Push Rollers</b>	Oscillating front push rollers control truck position during material unloading.	
<b>Auger</b>	Heavy-duty, ni-hard, 16 in. (406 mm) diameter, abrasion-resistant lines.	
<b>Flow Gates</b>	Electronically-controlled flow gates are controlled from operator console and screed console; control flow of material to screed for consistent and even flow.	

<b>Tow Points</b>	<p>Indicator scales on right and left side of paver indicate position of right and left tow points; Screed console switches or automatic grade control system can be used to adjust tow points. Always position at zero reference before paving operation begins.</p>	
<b>Conveyor System</b>	<p>Variable speed, hydraulically-driven, 55 in. (1.4 m) width, controllable from the operator's console and screed console, or can be automatically controlled through use of ultrasonic sensors.</p>	
<b>Fume Extraction System</b>	<p>Standard equipment for all Roadtec pavers; designed to direct fumes and hot air away from the asphalt tunnel and auger area and redirect away from operators.</p>	
<b>Screed</b>	<p>Standard screeds for 8' pavers are vibratory, electrically-heated screeds. Roadtec S-8, Carlson EZIV-8, or the Roadtec Eagle 8. Refer to screed operation and service manual included in the literature package for details.</p>	






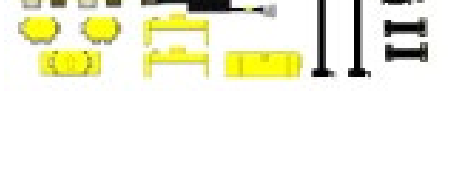
## 2.10 Electrical System

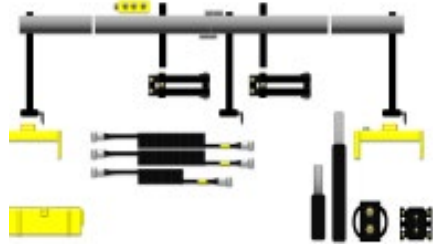




- Comprised of two (2) 12-volt batteries connected at parallel locations and power the 24-volt CAN-bus system. Electrical power can be shut off via battery quick disconnect switch.
- The electronically-controlled engine on this machine provides the operator with the ability to accurately monitor and control engine operation. The CPU will help safeguard against potential circumstances that could result in damage to the engine by automatically shutting the engine down. The CPU will generate fault codes to aid in the diagnosis of engine malfunctions and errors. Electrical circuits are fuse-protected to help prevent damage. Fuses are located in the main electrical junction box mounted inside the engine compartment.

Electrical Item Specification	
	
<b>BATTERY</b>	
<b>Rating</b>	Heavy-duty
<b>Volts</b>	24-volt
	Circuit breaker protection
<b>ALTERNATOR</b>	
<b>Rating</b>	90-amp



## 2.11 Optional Equipment

Optional Equipment	Specification	
<b>Screed Extensions</b>	Standard 8 ft. (2 m) electric heat screed may be extended up to 24 ft. (7.32 m) using optional 6" (15 cm), 12" (30 cm), 24" (60 cm) crownable and 26" (91 cm) extensions. All extensions have replaceable wear surfaces and are heated electrically by internal heating elements.	
<b>Tunnel and Auger Extensions</b>	Tunnel and ni-hard auger extensions are available from 1 ft. to 8 ft. with the use of outboard auger hanger bearing assemblies. These extensions evenly distribute material feed across the screed when using screed extensions.	
<b>Hydraulic Strike-off Extensions</b>	Left and right 4 ft. hydraulic strike-offs permit rapid changes in paving width. Either side may be articulated from positive 6.6% to negative 3.3% crown or wedge courses by using electric jack screws.	
<b>Electric Strike-Off Articulation</b>	Electric articulation provides for rapid changes in slope of the right or left hydraulic strike-off allowing changes to crown or wedge courses by use of electric jack screws.	
<b>Automatic Grade Control</b>	The screed elevation may be automatically maintained with respect to a reference point on one side of the screed with the use of an automatic control system. The opposite side of the screed can be independently controlled to a second reference grade using a grade control.	
<b>Automatic Slope Control</b>	Slope may be automatically maintained with respect to either the right or the left reference grade of the screed when an automatic slope control is used with an automatic grade control.	

Optional Equipment	Specification	
<b>Averaging Ski</b>	30 ft. (9.14 m) and 40 ft. (12.19 m) over the screed tubular or multi-foot skis provide improved leveling of existing surfaces by providing an average reference grade for automatic grade controls.	
<b>Truck Hitch</b>	Forward control of an unloading truck can be obtained with the use of a truck hitch. The truck hitch utilizes hydraulically extending rollers that engage the truck's wheels to assist in the forward movement of the truck while paving.	
<b>Cut-Off Shoes</b>	1 ft, 2 ft, 4 ft cut-off shoes are available to reduce paving width.	
<b>Front Wheel Assist</b>	Add up to 36% additional draw bar pull with the front wheel assist. Four (4) 14"x22" (35.66 cm x 55.88 cm) solid rubber steering tires provide maximum front-end flotation.	
<b>Paver Hopper Insert (for use with a material transfer vehicle)</b>	A paver hopper insert can be added for use with a material transfer vehicle and holds 15-20 tons. The hopper insert is designed to provide a mass flow of material directly to the paver's slat conveyors.	
<b>Automatic Lubrication System</b>	The automatic lubrications system will automatically lubricate various components of the machine through a series of grease lines.	

## 3.0 Safety

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## 3.01 Safety Features

### EMERGENCY STOP BUTTONS

Locate red E-Stop Buttons on operator consoles and ground control boxes.

Push Emergency Stop Buttons to immediately shut down machine.

#### **IMPORTANT!**

*Engine will not start until all E-Stop buttons are reset to RUN. Turn E-Stop Button clockwise to reset to RUN.*



### BEACON LIGHTS

Mounted on top of machine to warn personnel that machine is in operation.

Activate beacon light when machine is started and leave on until machine is shut down.

Locate Beacon Light Switch on operator console.



### FUME EXTRACTION SYSTEM

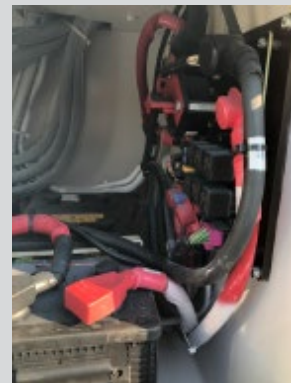
Directs fumes and hot air away from the head of material while paving. The Fume Extraction system helps provide a cleaner work environment for machine operators. Two blower unit inside the engine compartment suction and then blow away fumes from the head of material and out through a specially designed exhaust.



### BATTERY DISCONNECT SWITCH

Locate the battery disconnect switches in the battery compartment.

Use the battery disconnect switches to shut off power and prevent accidental engagement of machine or components during maintenance or service.



## FIRE EXTINGUISHER

Located on the operator's station.

Fire rating 2-A:10-B:C

Extinguishant - Ammonium phosphate base



## REVERSE ALARM

Sounds an alarm when machine is moving in a reverse direction.



## HORN

Locate the horn on the operator console. Push up to sound.



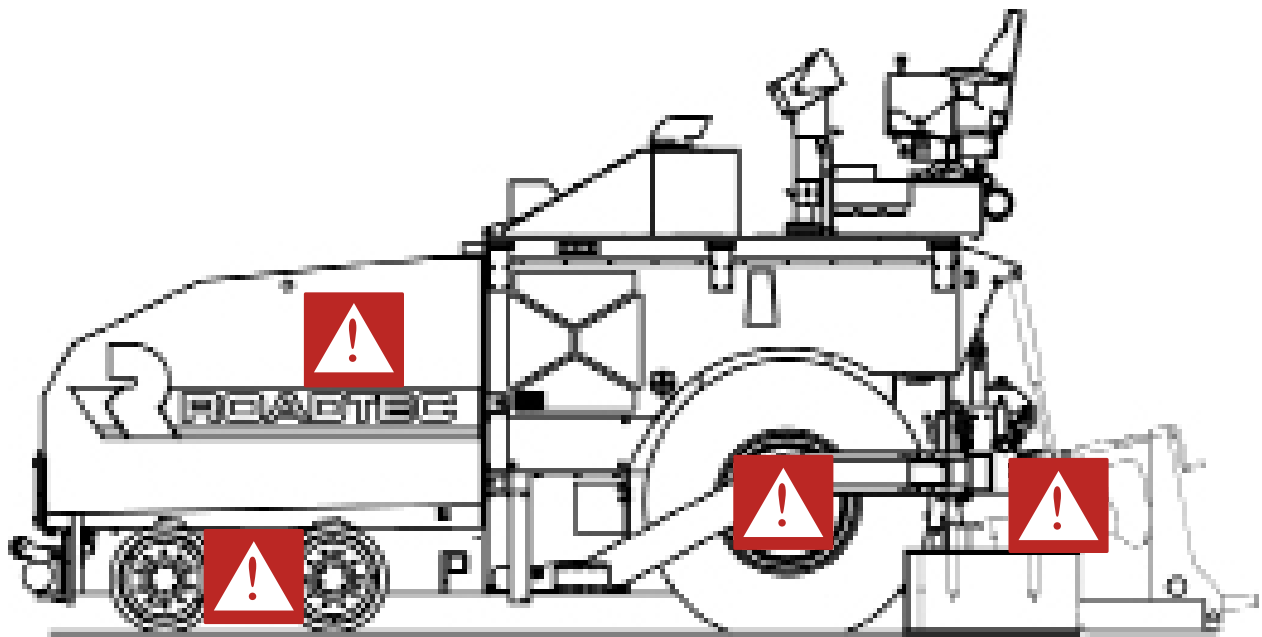
## HAZARD ALERT SIGNS

Locate all hazard alert and warning decals and signs on the machine. Follow all instructions. Replace any missing or damaged decals immediately.







### 3.01.01 Machine Danger Zones




- Keep away from danger zones during operation and transport of machine.
- Stay clear of tires, rear of machine, front of machine, hopper and auger area. Stay behind rails on operator station. Stay clear of screed.
- Only authorized personnel who perform maintenance and service are allowed to enter danger zones. Ensure machine is shut down and locked down before entering danger zones.




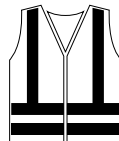






## 3.02 Safety Requirements

-  Most operation and maintenance-related accidents are caused by failure to follow safety rules. Accidents can be prevented by recognizing hazardous situations before they occur.
-  Safety is a **FIRST** priority when operating heavy equipment and its componentry. Practice established safety procedures when installing, operating or servicing this equipment. These safety warnings are not meant to cover every possible situation that may occur. The manufacturer has no direct control over application, operation, inspection or maintenance. **It is the machine operator's responsibility to practice safety.** Qualified operators will possess the training, skills and tools to perform these safety practices. Study the most recently updated version of the machine Manual **before** operating or servicing any equipment.
-  Safety features include emergency stop buttons. All E-stop buttons must be disengaged, or pulled out before engine will start. Battery Disconnect Switches must be on and parking brakes set to ON in order for engine to start.
-  Symbols, signal words, hazard alert decals and pictograms are used throughout this Manual to emphasize potential hazards and indicate the relative level of severity.

 <b>DANGER</b>	Death or serious injury <b>WILL</b> result if situation is not avoided
 <b>WARNING</b>	Death or serious injury <b>COULD</b> result if situation is not avoided
 <b>CAUTION</b>	<b>MINOR OR MODERATE</b> injury could result if situation is not avoided
<b>NOTICE</b>	Alert for practices not related to physical injury

## 3.03 Wear Personal Protective Equipment (PPE)

▶ Hard Hat		▶ Reflective clothing	
▶ Hearing protection		▶ Safety glasses or goggles	
▶ Safety Shoes		▶ Face shield	
▶ Heavy gloves		▶ Wet weather gear	

### ⚠ WARNING

Protect your body!  
Wear ALL required personal protective equipment.

W-1001

## 3.04 Commit to 100% Safety

### ALWAYS!

- ▶ Permit only qualified and trained personnel to operate machine.
- ▶ Use safety checklists.
- ▶ Take safety training programs.
- ▶ Know how to find and use first aid kits and fire extinguishers.
- ▶ Understand how fatigue, carelessness, drugs, alcohol, lack of training and overload can cause accidents.
- ▶ Encourage others to follow safety practices.

### NOTICE



Safety is up to you!  
Study this safety section and the manufacturer's manuals before operating or servicing this machine.

N-1001

## 3.05 Learn Safety

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1. **Study** manufacturer's operation and service manual. Learn machine capabilities and limitations.
2. **Learn** controls, indicators and safety features. The machine will alert you to dangerous conditions such as high temperature or low pressure.
3. **Understand** machine safety devices and instructions. Keep safety signs and decals in good condition.

### **DANGER**

Avoid occupational hazards!

**NEVER** operate machines with missing or broken guards, rails or safety devices.

**NEVER** remove or disable safety devices.

D-1001

## 3.06 Know the Rules

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- ▶ Check with supervisors or safety coordinators before operating this machine. Learn all the rules you will be expected to follow.
- ▶ Check for local, state/provincial laws that apply to this machine. The Occupational Safety and Health Administration (OSHA) enforces federal laws within the U.S. that apply to safe operation, application and maintenance of equipment on a work site.

### **CAUTION**

Avoid occupational hazards!

**NEVER** use drugs or alcohol while operating machine.

**NEVER** allow anyone with impaired coordination or decreased alertness to operate machine.

C-1002



## 3.07 Perform Quality Inspections

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### ALWAYS!

- ▶ Conduct equipment inspections before operating machine.
- ▶ Check fluid levels, brakes, horns, tires, steering, lights and safety devices.
- ▶ Keep all parts properly installed and in good working condition.
- ▶ Follow daily maintenance schedules.

## 3.08 Know the Machine

---

- |                     |                 |
|---------------------|-----------------|
| ▶ Alarms            | ▶ Decals        |
| ▶ Guards            | ▶ Covers        |
| ▶ Fire Extinguisher | ▶ Lights        |
| ▶ Shields           | ▶ Hand Rails    |
| ▶ Horn              | ▶ First Aid Kit |

### CAUTION

Avoid occupational hazards!

**NEVER** allow unqualified personnel to operate machine.

**NEVER** operate machinery known or suspected to be malfunctioning.

C-1003

### ALWAYS!

- ▶ Understand hazard zones created by heavy equipment in operation.
- ▶ Stay out of machine danger zones.
- ▶ Be familiar with all pedals, controls, mirror ranges and safety devices.
- ▶ Know blind spots and machine height clearances.
- ▶ Read and understand all machine operations, decals and safety signs.
- ▶ Know what to do if machine becomes disabled.

## 3.09 Prevent Fires

### ALWAYS!

- ▶ Refuel in ventilated areas.
- ▶ Replace fuel cap after refueling.
- ▶ Wipe rails, walkways, controls, foot pedals and hand levers clean of oil and grease.
- ▶ Keep flammable materials, open flames and sparks away from engine and batteries.
- ▶ Check for fuel, oil and hydraulic fluid leaks.
- ▶ Replace worn hoses, frayed wires and broken cables.

### ⚠ WARNING

Avoid occupational hazards!

**NEVER** use starting fluids in engine.

**NEVER** dispose of cigarettes, cigars or matches near machines.

**NEVER** overfill fuel tank or reservoirs.

W-1012

## 3.10 Know the Job Site

### ALWAYS!

- ▶ Know ground surface load limits.
- ▶ Watch for overhead obstacles, passing traffic and side clearances.
- ▶ Check bridge and road conditions.
- ▶ Look for pipes, gas lines, manholes and hidden rails.
- ▶ Understand flags and sign meanings at first glance. Identify crew members responsible for signaling.
- ▶ Avoid curbs, sidewalks and driveways.
- ▶ Learn emergency stop procedures.

### ⚠ WARNING



Avoid occupational hazards!

**NEVER** operate this machine on sloped, muddy or soft surfaces.

**NEVER** exceed safe travel speeds.

W-1013

## 3.11 Load/Unload Safely

### ALWAYS!

- ▶ Use extreme caution when loading or unloading machinery.
- ▶ Ensure ramp capacity exceeds machine weight.
- ▶ Load and unload on level surfaces.
- ▶ Keep personnel back at least 16 ft. (5 m) from machine.

### ⚠ CAUTION



Avoid crushing hazards!

**NEVER** load or unload a machine alone.

**NEVER** use tie downs for towing, pulling or any other purpose. This machine was not designed for towing vehicles.

C-1004

## 3.12 Mount and Start Safely

### ALWAYS!

- ▶ Follow manufacturer's start-up procedures.
- ▶ Allow only qualified personnel onto operator platform.
- ▶ Wipe boots clean before mounting.
- ▶ Maintain three-point contact with ladders.
- ▶ Start machine only from operator's station.
- ▶ Check emergency stop buttons.
- ▶ Clear work areas and walkways of trash, ice, debris, oil, grease, supplies and tools.

## 3.13 Focus on Safety

### ALWAYS!

- ▶ Ensure engine is working properly. Test steering and listen for unusual noises.
- ▶ Use caution when operating machine near ditches or ruts.
- ▶ Stay in designated areas and behind safety rails when operating machine.
- ▶ Understand gauge, instruments and warning lights.
- ▶ Keep back from running machine and all its rotating components.
- ▶ Beep horn to warn bystanders before moving machine.

### ⚠ WARNING



Avoid sudden machine movement hazards!

**NEVER** apply parking brake when machine is in motion.

**NEVER** climb on or off a machine during operation.

W-1014

## 3.14 Practice Ground Operation Safety

### ALWAYS!

- ▶ Stay behind guard rails, safety rails and barriers.
- ▶ Use extreme caution when working near moving machinery.
- ▶ Stay clear of areas between machines.
- ▶ Keep personnel clear of machine and screed about to be started or in operation.
- ▶ Stay clear of automatic system components and sensors.

### ⚠ WARNING



Avoid crushing and entanglement hazards!

**NEVER** remove material from moving parts while machine is in operation.

**NEVER** stand in between moving machines or near moving machine parts.

**NEVER** wear loose clothing, long hair or accessories when operating this machine.

W-1015

## 3.15 Be Safe Around Fumes




### ALWAYS!

- ▶ Confirm work zone has proper ventilation.
- ▶ Read all Material Safety Data Sheets (MSDS) listed with product manufacturers for a list of substances and fluids that may pose a health hazard.

## 3.16 Work Safely

### ALWAYS!

- ▶ Keep all body parts clear of moving components.
- ▶ Ensure machine has full clearance. Stay clear of tires and screed.
- ▶ Maintain safe speeds. Slow down when making sharp turns.
- ▶ Monitor machine-to-machine speed/distance to prevent collision.
- ▶ Set brake switch safety cover when leaving operator's station to prevent accidental application.
- ▶ Use E-stops to shut machine down immediately. Locate red pull stops at operator console and ground boxes. Engine will start when E-stop buttons are reset to RUN.

 <b>DANGER</b>	
	<p>Avoid serious injuries or death!</p> <p><b>NEVER</b> service machine while engine is running.</p> <p><b>NEVER</b> stand near or beneath machine, screed or any moving machine component.</p>
	<p>Avoid falling hazards!</p> <p><b>NEVER</b> climb on or off a moving machine.</p> <p><b>NEVER</b> allow riders or tolerate horseplay.</p>

D-1021

## 3.17 Work Safely At Night

### ALWAYS!

- ▶ Understand and communicate plans for the hazards of nighttime operation.
- ▶ Mark obstacles with reflective material. Wear appropriate reflective clothing.
- ▶ Check visibility of gauges and controls.
- ▶ Ensure machine is equipped with working hazard lights.
- ▶ Pay special attention to work zones and personnel at all times.
- ▶ Stay alert to passing traffic.
- ▶ Be aware of fatigue during nighttime operations.

### ⚠ CAUTION

Avoid nighttime hazards!

**NEVER** leave assigned work zones.

**NEVER** rely on mirrors for visibility when working at night - use direct line of sight.

C-1005

## 3.18 Park Safely

### ALWAYS!

- ▶ Follow manufacturer's shutdown procedure.
- ▶ Park vehicles out of traffic on level, stable ground.
- ▶ Leave parking clearance between vehicles and machines.
- ▶ Remove keys and lock battery switches.
- ▶ Dismount using 3-point contact with steps and rails.
- ▶ Post approved safety cones, barrels, flashing lights or flags around machine.

### NOTICE



Avoid accidental engine application!

**NEVER** leave machine overnight until parking brakes are set, battery disconnects are locked, master switches are off and tires are blocked.

N-1028

## 3.19 Maintenance Safely

### ALWAYS!

- ▶ Follow manufacturer's service manual.
- ▶ Permit only qualified personnel to perform service or repairs.
- ▶ Stop engine and disconnect batteries.
- ▶ Use proper tools in good working condition.
- ▶ Support equipment properly when working beneath.
- ▶ Allow machine to cool before performing maintenance or repair.

### ⚠ WARNING



Avoid serious injuries and death!

**NEVER** perform service or repair until completing machine shut down and lockout/tag-out procedures.

W-1016

## 3.20 Take Precautions

### ALWAYS!

- ▶ Disconnect battery and engine electronics before servicing machine.
- ▶ Stand to side of radiator when removing cap. Ensure radiator is cooled.
- ▶ Turn off machine before servicing conveyor.
- ▶ Follow manufacturer's lube charts.
- ▶ Turn off engine before using the manual hand pump to lower and raise hood.
- ▶ Secure machine to the towing vehicle or chock wheels before releasing brakes and opening HPRV valves.
- ▶ Use extreme caution when working beneath machine.

## 3.21 Service Battery Safely

### ALWAYS!

- ▶ Disconnect batteries using battery isolation switch before performing maintenance or repairs.
- ▶ Keep open flames and sparks away from batteries that emit flammable fumes.
- ▶ Check battery electrolyte levels using flashlight.
- ▶ Avoid touching battery acid or electrolyte.
- ▶ Wear protective clothing and safety goggles when servicing batteries.

### DANGER



Avoid explosion hazards!

**NEVER** attempt to jump start or charge a frozen battery.

**NEVER** weld on machine without disconnecting batteries.

D-1014

## 3.22 Safely Service Electric Systems

### ALWAYS!

- ▶ Follow manufacturer's operation and service procedures for servicing electric systems.
- ▶ Allow only qualified personnel to service electrical systems.
- ▶ Verify voltage with testing tool.
- ▶ Never open electrical enclosures while generator is running.
- ▶ Replace covers before operating machine.
- ▶ Always disconnect engine electronics with the engine electronics disconnect switch before servicing or welding on this machine.
- ▶ Always ensure battery disconnect switches are disconnected before performing service or maintenance or welding on the machine.
- ▶ Ensure welder is grounded close to the location of welding. Never ground the welder to an electric box or to the engine. Disconnect the electrical box or controller before welding when the welding to be performed is near an electrical box or remote-mounted controller.

### DANGER



Avoid electric shock hazards!

**NEVER** perform maintenance or repairs to electric system until engine is turned off and batteries are disconnected using the battery isolation switch.

D-1015



## 3.23 Safely Service Hydraulic Systems

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### ALWAYS!

- ▶ Allow hot fluids to cool before servicing.
- ▶ Keep open flames away from pressurized hydraulic systems.
- ▶ Use only approved fluids and filters as indicated on hydraulic tank decal.
- ▶ Ensure pressure is at zero before opening hydraulic lines or fittings.
- ▶ Use replacement hoses, tubes and fittings of same pressure rating.
- ▶ Dispose of hydraulic fluids immediately and properly.

### WARNING



Avoid pressure explosion and burn hazards!

**NEVER** weld or cut on fuel tank or hydraulic tank.

**NEVER** allow oil level to fall below indicator line.

**NEVER** use hands to locate leaks. Use cardboard.

W-1017

## 3.24 Material Safety Data Sheets (MSDS)

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- ▶ Request MSDS sheets from manufacturers to understand potential health hazards associated with substances used on this machine, including gear oil, diesel engine oil, antifreeze, coolant, hydraulic oil and diesel fuel.

## 3.25 Safety First

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- ▶ Safety is up to you!
- ▶ You can prevent serious injury and death.
- ▶ Give 100% focus to safety at all times.

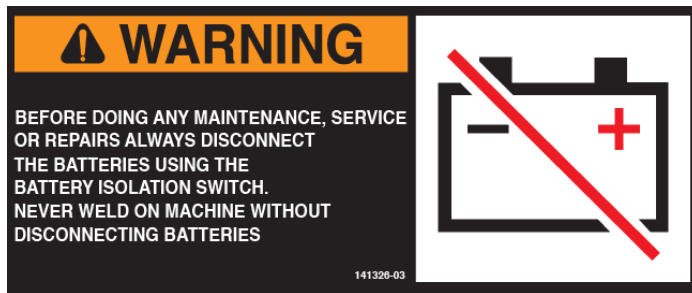
## 3.26 Hazard Decals

- ▀ Following decal warning is critical for safe operations.
- ▀ Decals are specifically designed and placed on machine to help prevent hazards, serious injury and death.
- ▀ Replace worn or missing hazard alert decals immediately.
- ▀ Ensure anyone working on or around this machine is familiar with these warnings.
- ▀ Safety is up to operators and crew members.
- ▀ Locate, understand and follow every safety decal on machine.

	<p>Caution - Pinch point area. Keep clear when machine is in operation.</p>
	<p>Do not step here.</p>
	<p>Warning - Pinch point area. Keep clear when machine is in operation.</p>



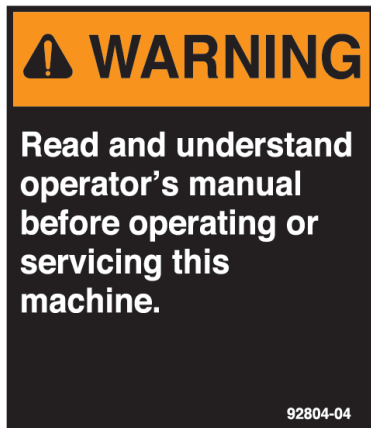
Warning - Explosion hazard. Never use starting fluids to start this machine.



Warning - Always disconnect batteries using battery isolation/disconnect switches before performing maintenance or welding on machine.



Caution- Clean fuel, lubricant and hydraulic oil from walkways.



Warning - Read and understand the operator's manual before operating or servicing this machine.



Caution - No smoking within 50 feet during machine fueling or wash-down.



Caution - Never get on or off of a moving machine.



Danger - Never stand in hopper when engine is running.



Caution - Stand clear of material discharge area.

## 4.0 Operation

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## 4.01 Principles of Operation

Roadtec Pavers are used to create and lay a high-density, smooth asphalt roadway for interstates, highway, runways, roads and parking lots.

The **paver tractor** receives material, then delivers the material in front of a **screed attachment**, which the tractor tows forward. The material is leveled and smoothed by the screed.

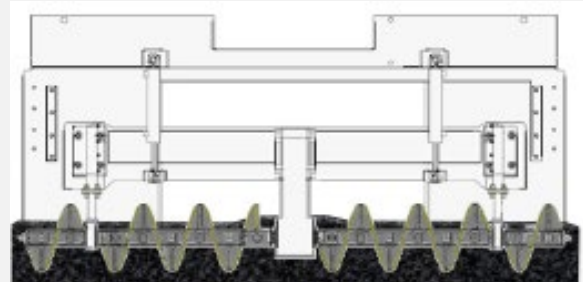
Hot asphalt mix is delivered to the paver hopper via dump trucks or haul trucks. A windrow machine can also be used to suction material from the roadway and deliver material to the paver.

The haul truck is pushed forward by the forward-moving paver via push rollers that contact the haul truck rear tires as it delivers the load in order to maintain continuous paving. Pavers can be designed as rubber tire or rubber tracks. Steel track pavers and gravity-fed pavers are two other types of asphalt road pavers offered by Roadtec.



The RP-170e Rubber Tire Asphalt Paver is capable of laying a mat with widths ranging from 6 ft. to 24 ft. The paver can be pre-programmed for control specifications for production. The road width and depth are controlled with **feed control dials and screed adjustments**.

**Augers** in the paver hopper keep material mixed as two separately-controlled slat conveyors transfer hot mix asphalt to spreading augers at the end of the tractor where the tractor meets the screed attachment. The spreading auger delivers material to the road surface.





Pavers utilize a **screed attachment** to lay the asphalt to a specific grade and slope. Screeds utilize heated elements to smoothly iron the surface of the mat.

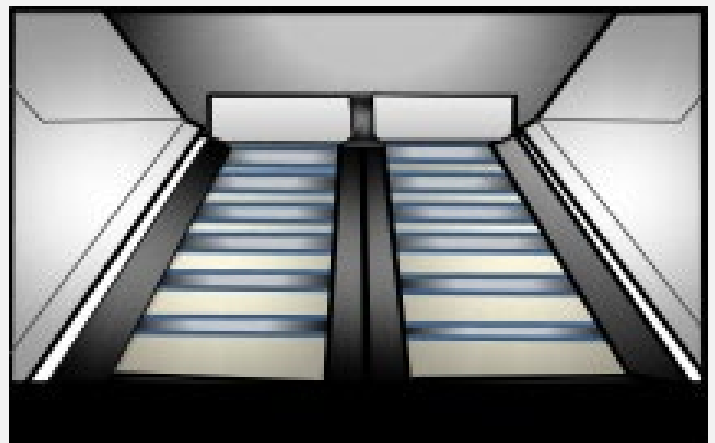
Right and left side arms connect to the screed at the **pivot points** and to the tractor at the **tow points** enabling the screed to self-level as it is pulled along the mat surface, independent of the tractor.

The **free-floating principle** describes the displacement of the screed vertically as it rises and falls on the material surface. Eventually, the screed travels on a plan that is parallel to the **line of pull**. **Mat thickness** is controlled by the rise and fall of the screed.



The material **flow rate** can be controlled using conveyor speed dials and flow gate height adjustments. Two independently controlled conveyors (left and right side) each contain a slat conveyor and auger to move material through the conveyor tunnel.

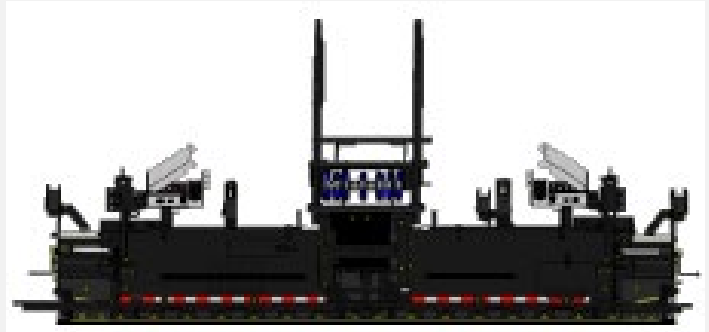
Material flow is an important skill to learn since the **“head of material”** in front of the screed must be maintained consistently and evenly in order to produce a uniform mat.



Screeds are designed to float on top of the mix in order to smooth out the mat surface. The screed bottom is designed with a flexible V-shape, or **negative crown**. The screed crown can be adjusted to have a **positive crown**, which is a slightly inverted V-shape. Both crown adjustments work to lay a mat for water drainage requirements.

Burners on the bottom of the screed are heated during the pre-operational stages to be the same temperature as the hot mix in order to prevent material from sticking to the screed. The screed bottom must be kept clean in order to prevent a low quality mat surface.

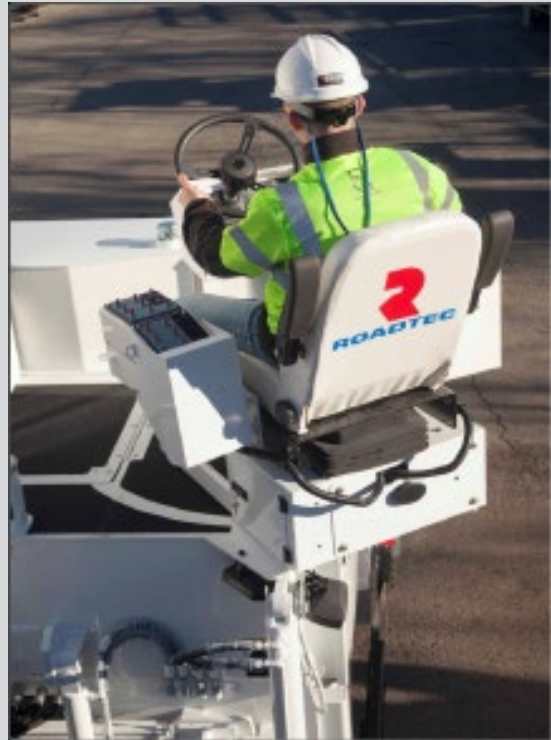
Screeds can employ a **strike-off plate**, which mounts in the bottom front of the screed and cuts material off as the screed passes over. In order to lay wider mats, screed extensions or strike-off extensions can be installed. **Cut-off shoes** can be installed on the screed to reduce paving width for narrowing roadways. **Vibrators** employ slight movement to the compaction of the mix as the screed bottom irons over it, keeping the mix distributed instead of sticking together or adhering to the screed bottom. Material is then smoothed and compacted by the **screed rollers**.





## 4.02 Operator Station

**Dual operator stations** enable greater visibility during the paving operation. Control machine with Left and Right Hand Controls, steering wheel and center control box.



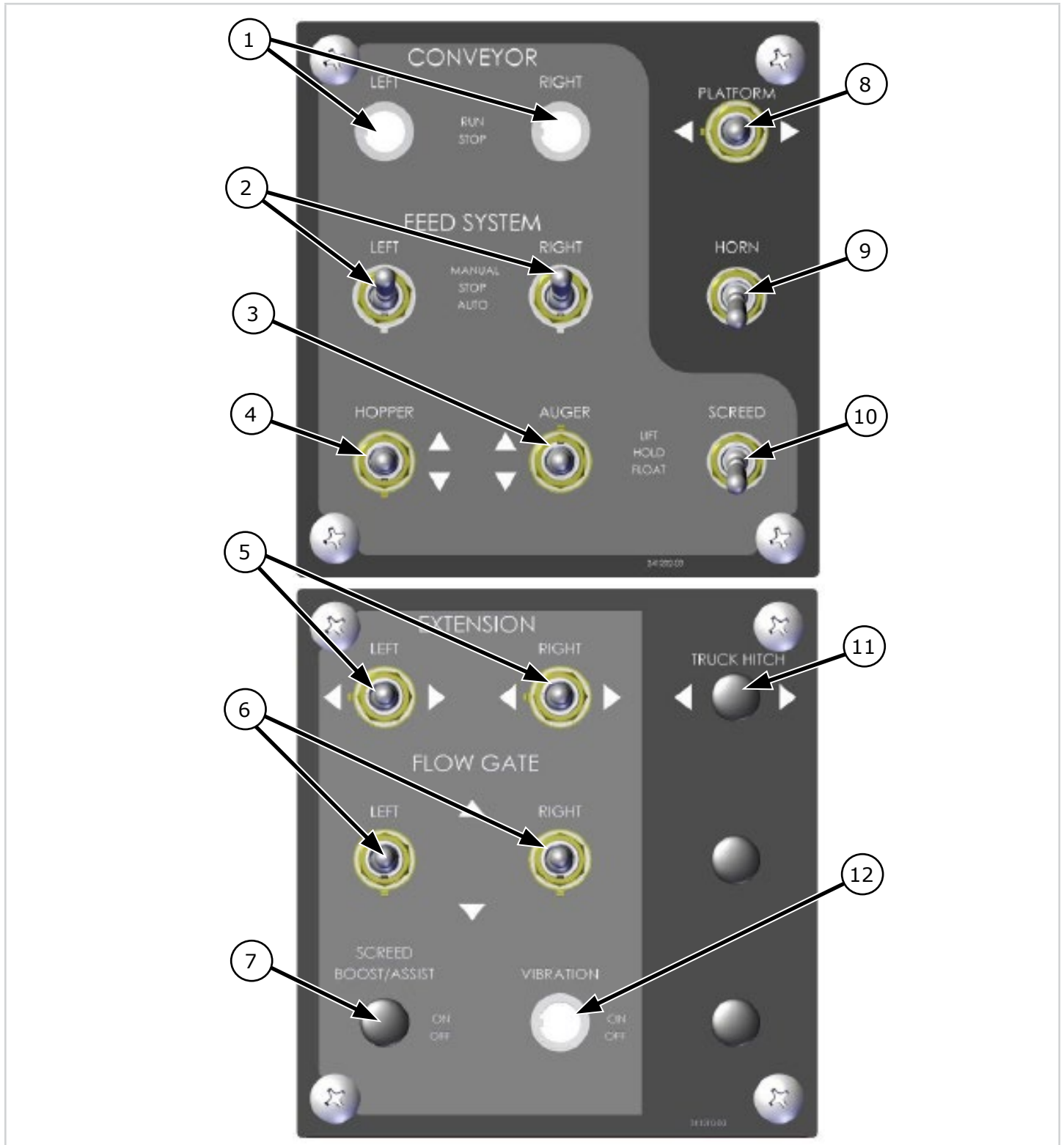
**Digital Control Screen** displays gauges, engine information and system fault codes.



**Ground Control Panels** on either side of the screed control cutter system, drum, and end slides.



## 4.03 Left Seat/Left Side, Right Seat/Right Side Operator Console



**1. Conveyor Switches**

Activates or deactivates left and right side slat conveyors.

Activate - Push up

Deactivate - Push down

**2. Feed System Switches**

Activates left and right side material feed system.

MANUAL - Feed system runs continuously.

AUTO - Feed System automatically stops when sonic sensors detect that the head of material is too thick.

STOP - Feed System will deactivate the feed system

**3. Auger Switch**

Raises or lowers the augers.

*NOTE: Always completely raise the augers when loading or traveling the machine to ensure clearance height.*

RAISE - Push up

LOWER - Push down

**4. Hopper Switch**

Raises or lowers hopper wings for material height

RAISE - Push up

LOWER - Push down

**5. Screed Extensions Switches**

Extends or retracts left and right side screed extensions.

EXTEND LEFT SIDE - Push left

RETRACT LEFT SIDE - Push right

EXTEND RIGHT SIDE - Push right

RETRACT RIGHT SIDE - Push left

**6. Flow Gate Switches**

Raises or lowers left and right side flow gates to control material flow from the hopper to the spreading augers.

RAISE - Push up

LOWER - Push down

**7. Screed Assist Switch or Screed Boost Switch (OPTIONAL)**

Screed Assist - designed for rear-mounted extension and provides a means to offset the weight of an extendible screed when paving narrow lanes.

Screed Assist is turned on during paver operations.

*NOTE: Never turn Screed Assist off during paving operation to prevent bumps in the mat.*

Screed Boost - designed for front-mounted extension screeds. Screed Boost will cause the screed to float freely while the paver is in motion. Screed Boost will pressurize the bottom of the screed lift cylinders and prevent the screed from dropping when the paver stops.

ACTIVATE - Push up

DEACTIVATE - Push down

**8. Platform Slide Switch**

Activates the slide platform feature to the left or right to provide operator visibility.

SLIDE LEFT - Push left

SLIDE RIGHT - Push right

**9. Horn Switch**

Sounds the horn.

ACTIVATE - Push up

DEACTIVATE - Push down

**10. Screed Lift Switch**

Raises or lowers screed. Float allows screed to be automatically adjusted by automatic grade controls. Hold will maintain screed in a rigid position. Lift will raise screed.

NOTE: Always raise the screed and install screed support cables when traveling or loading paver.

LIFT - Press up

HOLD - Press center

FLOAT - Press down

**11. Truck Hitch Switch (OPTIONAL)**

Connects or disconnect dump truck and paver.

CONNECT - Press left

DISCONNECT - Press right

**12. Vibration**

Activates or deactivates screed vibrators.

ACTIVATE - Press up

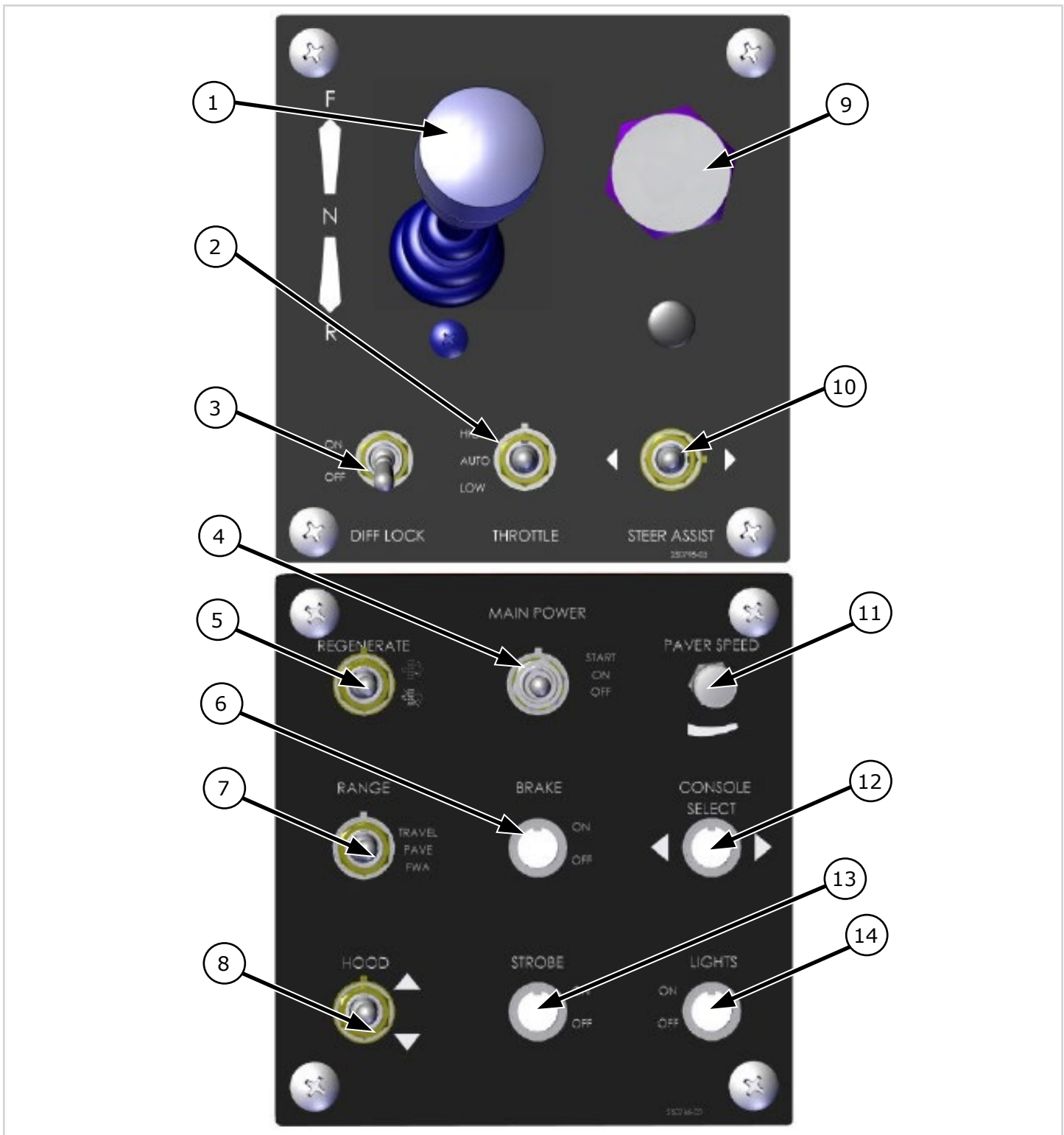
DEACTIVATE - Press down







## 4.04 Left Seat/Right Side, Right Seat/Left Side Operator Console



**1. Travel Joystick**

Engages forward or reverse machine movement.  
FORWARD - Push up  
NEUTRAL - Push center  
REVERSE - Push down

**2. Throttle Switch**

Increases and decreases engine speed (rpm). Automatic mode will automatically invoke full throttle when machine is in forward paving mode and low throttle when in neutral.  
HIGH - Push up  
AUTO - Push center  
LOW - Push down

**3. Differential Lock Switch**

Activates the differential lock circuit when positive traction is required. Useful when road conditions are wet and one wheel loses traction. Both rear wheels rotate at the same speed regardless of traction.

*NOTE: Never activate differential lock switch when turning machine sharply.*

ACTIVATE - Push up  
DEACTIVATE - Push down

**4. Main Power Switch**

Engage the engine. Push engine ON button for 3-5 seconds, then push switch to start position.

*NOTE: All E-stop buttons must be in the run position before engine will start.*

ACTIVATE IGNITION - Push center  
START ENGINE - Push up  
STOP ENGINE - Push down

**5. Regenerate Switch**

Controls the Diesel Particulate Filter (DPF) regeneration system. Spring-loaded switch remains in center position until pressed up or down. Center position will automatically regenerate engine DPF system when necessary.

*NOTE: Never stop DPF regeneration unless machine is located in an area that would result in unsafe conditions. Regenerate immediately when possible if regen is forcibly stopped.*

REGENERATE IMMEDIATELY - Push up  
AUTOMATICALLY REGENERATE - Center position  
MOMENTARILY STOP REGENERATION - Push down

**6. Brake Switch**

Stops machine motion.  
ACTIVATE - Push up  
DEACTIVATE - Push down

**7. Range Switch**

Travel range is used when moving machine from one location to another. Pave is selected for paving operation. FWA if selected for front wheel assist.

*NOTE: Never travel paver in high speed with hopper loaded. Never travel or pave on grades of 6% or greater. Never change speeds when paver is in motion.*

TRAVEL - Push up  
PAVE - Push center  
FORWARD WHEEL ASSIST - Push down

**8. Hood Switch**

Raises or lowers engine compartment hood for service procedures.

*NOTE: Always use support pin when hood is raised before working under hood.*

RAISE - Push up

LOWER - Push down

**9. Emergency Stop Button**

Press to immediately shut down the engine in case of emergency.

*NOTE: Engine will not restart until all E-stop buttons have been disengaged.*

ACTIVATE - Push down

DEACTIVATE - Pull up

**10. Steer Assist Switch**

Activates steering assist feature that will create tighter turning radius when steering paver to the left or right. As paver makes a left turn and steer assist is pushed left, the right drive motor de-rates allowing the motor to push the paver through the turn with a tighter radius. The same is true for a right turn/right steer assist switch.

LEFT TURN - Push left

RIGHT TURN - Push right

**11. Paver Speed Dial**

Increases or decreases forward speed while paver is in travel mode.

INCREASE SPEED - Turn left

DECREASE SPEED - Turn right

**12. Console Select Switch**

Used to alternate between right and left hand operator's console.

*NOTE: Only one console at a time can be used for machine control.*

LEFT CONSOLE - Push left

RIGHT CONSOLE - Push right

**13. Strobe Switch**

Activates the strobe light to alert persons in and around the work zone of machine operations.

*NOTE: Always activate strobe when operating or transporting machine.*

ACTIVATE - Push up

DEACTIVATE - Push down

**14. Lights Switch**

Activates work lights for nighttime operations.

*NOTE: Always activate work lights when operating or transporting machine.*

ACTIVATE - Push up

DEACTIVATE - Push down

## 4.05 Machine Control Screen

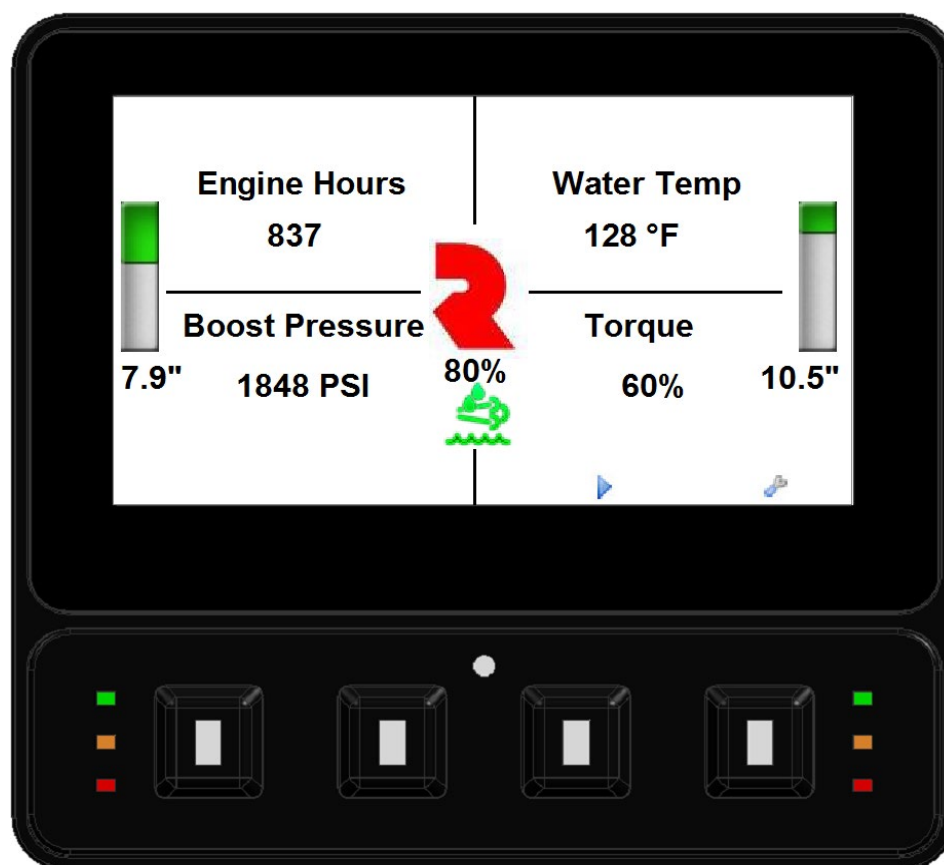
- ▀ Located on the operators station near right and left side steering wheels
- ▀ Displays service screens, operator screens, calibration screens and engine diagnostic screens.
- ▀ Access Input/Output Monitoring Screens from Left Operator's Display. Calibrate Wheels from Right Operator's Display.

### Digital Display Screen



## 4.05.01 Main Screen

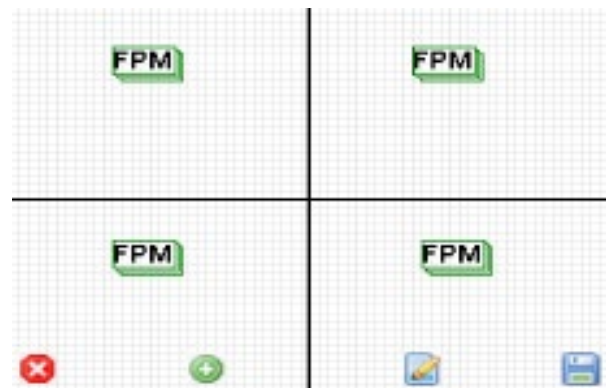
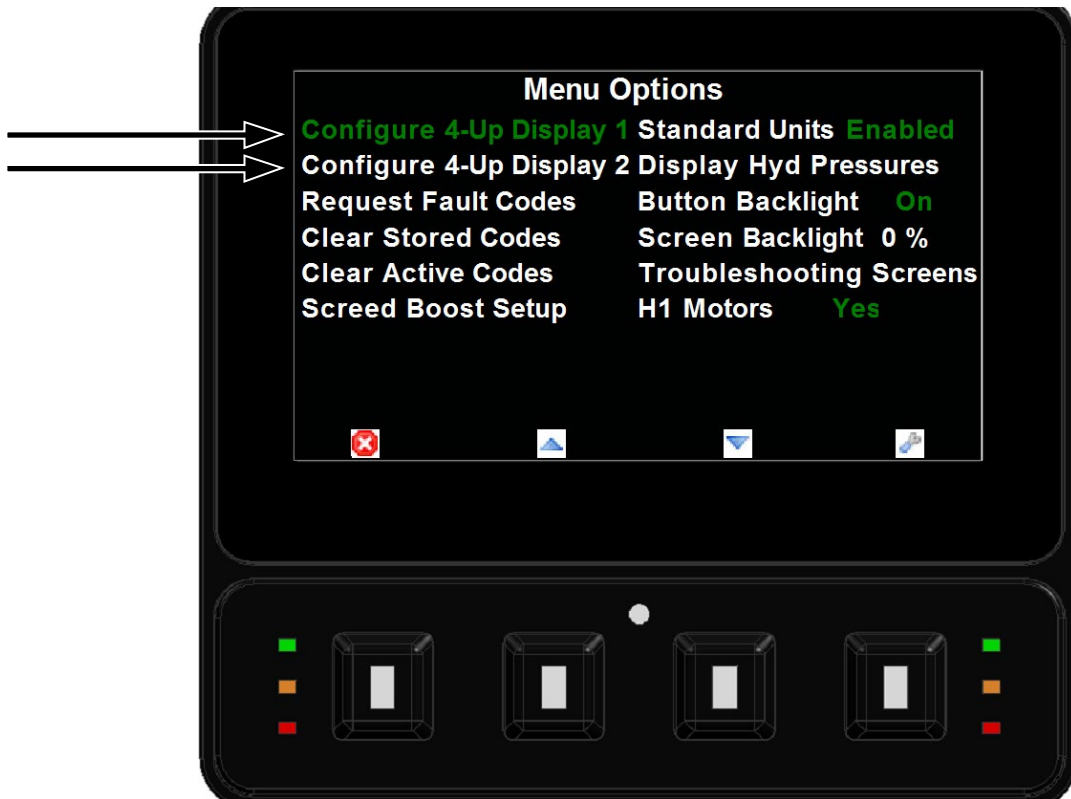
### Main Screen



- The Main Screen Display 1 shows a quadrant of customizable monitors. Shown here are Engine Hours, Water Temp, Boost Pressure, and Torque.
- Press 3 (right arrow) to advance to Main Screen Display 2 to view the second quadrant of customizable monitors.
- Engine Regeneration Status will display on center of Roadtec icon. **See Engine Regen screens at the end of this section.**
- To customize Display 1 and Display 2 screens, press button 4 (wrench), then choose Configure 4-up Display 1 or Configure 4-up Display 2.

## 4.05.02 Configure Main Display 1 and Display 2 Screens

### Configure Main Screen Displays



- Press button 4 (wrench icon) to advance to the Menu Options Screen.
- Choose Configure 4-up Display 1 or Configure 4-Up Display 2, then press button 4 (check mark) to advance to the options.
- Press 2 (green plus) to toggle through the quadrants.
- Press button 3 (paper and pencil) to select quadrant, then press button 2 to toggle options for that quadrant.
- Press 4 (disk) to save the options.
- Press EXIT to return to the Main Screen

### 4.05.03 Menu Options

#### Menu Options

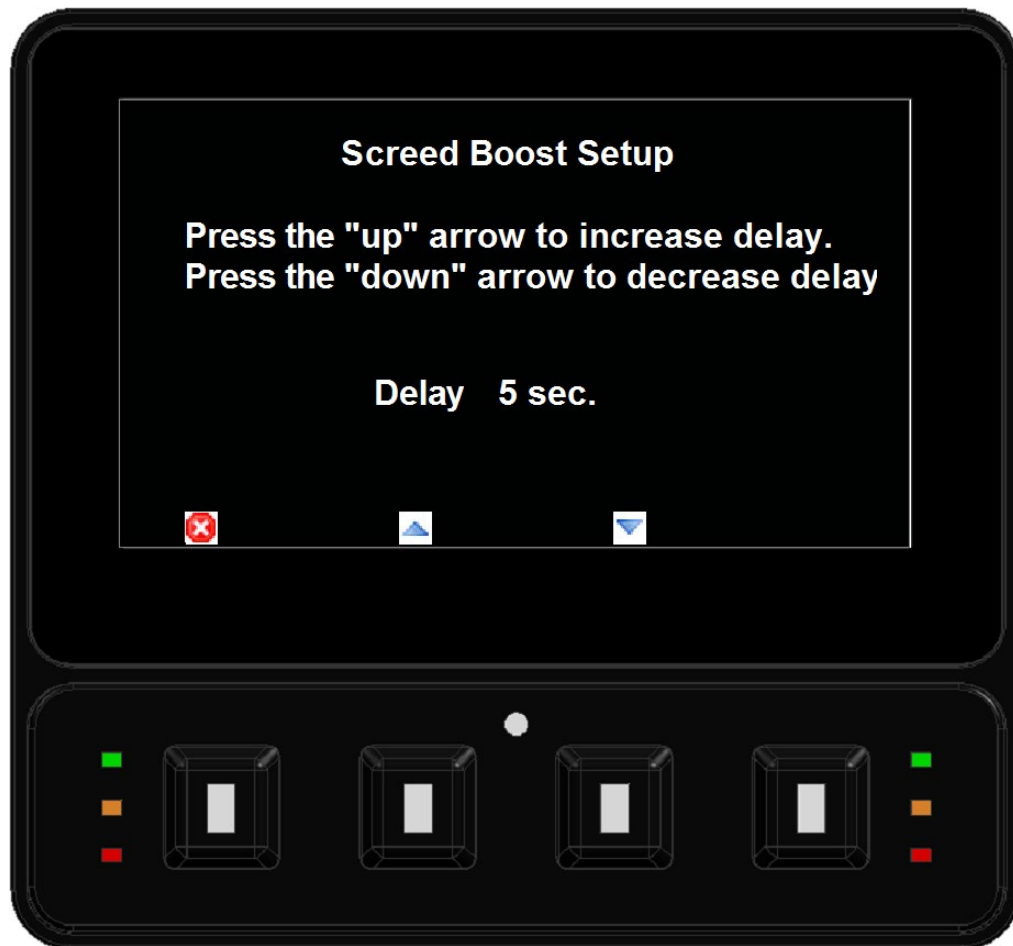


- Press 4 (wrench icon) to advance to the Menu Options Screen.
- Press 2 or 3 to scroll up and down through the options. Option selections will highlight green.
- Press 4 to select option.
- See Section for Configure 4-Up Displays 1 and 2.
- See Section 8.01 for Request Fault Codes, Clear Stored Codes and Clear Active Codes.
- Press EXIT to return to the Main Screen.



## 4.05.04 Set Up Screed Boost

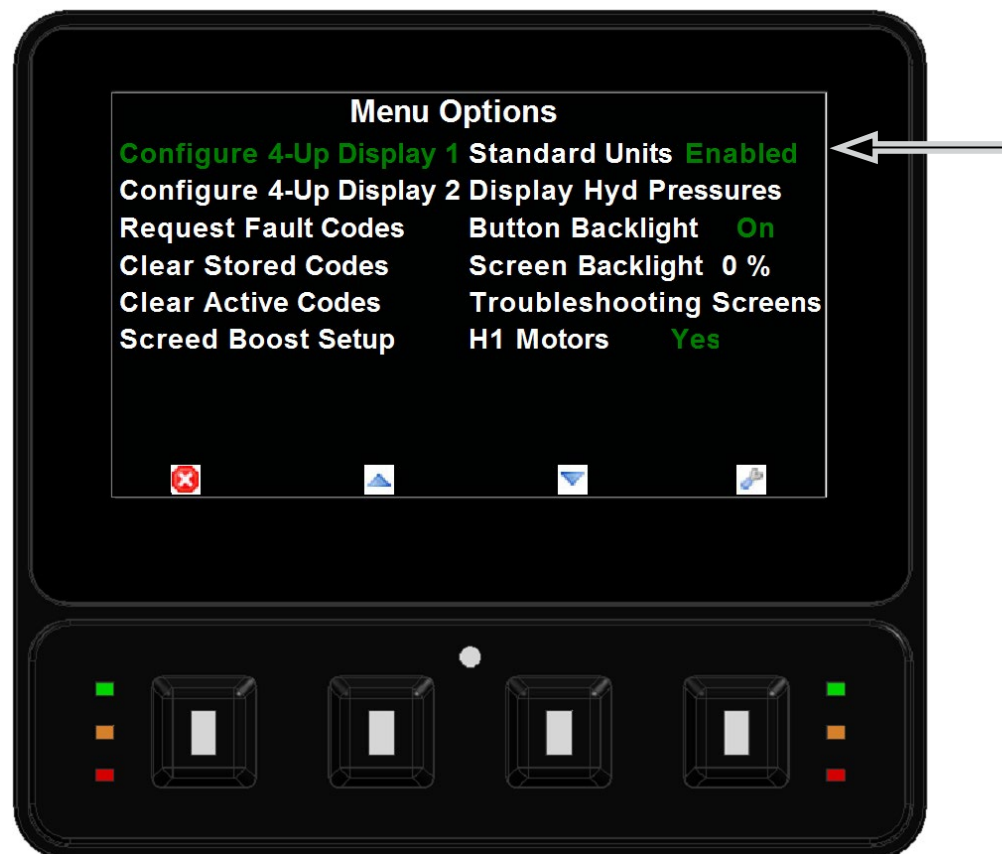
### Set Up Screed Boost



- Choose Screed Boost Set Up from Menu Options Screen, and press 4 (wrench).
- Press 2 (up arrow) to increase delay in seconds.
- Press 3 (down arrow) to decrease delay in seconds.
- Press EXIT to return to the Main Screen.

## 4.05.05 Set Units of Measure

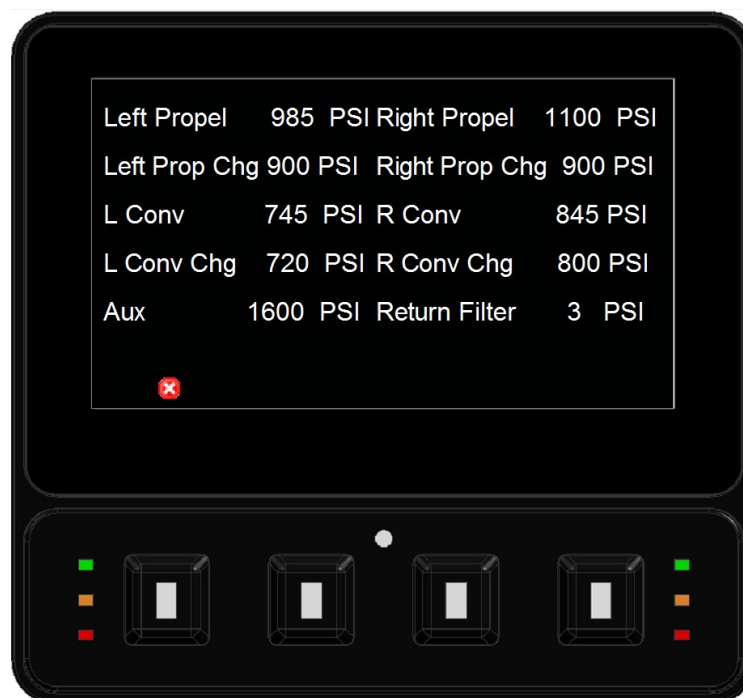
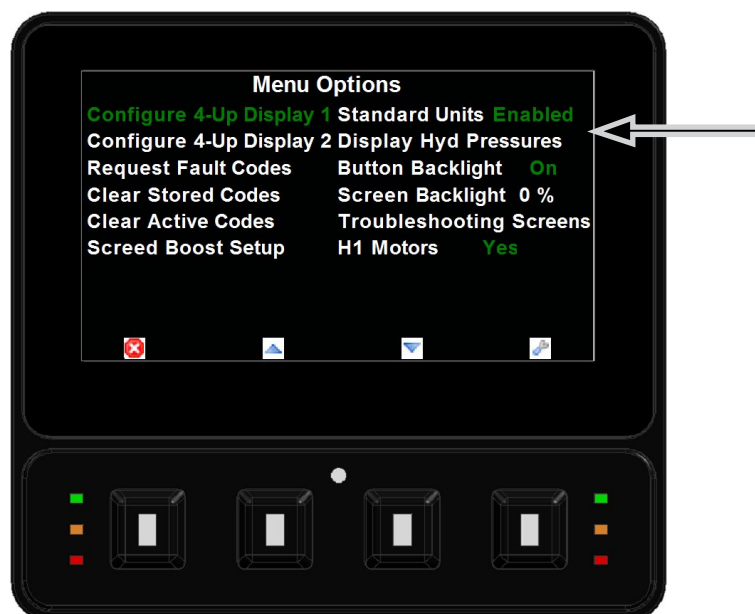
### Set Units of Measure



- Choose Imperial or Metric form Menu Options Screen, and press 4 (green check) to change units of measure displayed on machine controls. Both Standard Units and H1 Motors can only be accessed from the Right Operator Control display.
- Press EXIT to return to the Main Screen.

## 4.05.06 Display Hydraulic Pressures

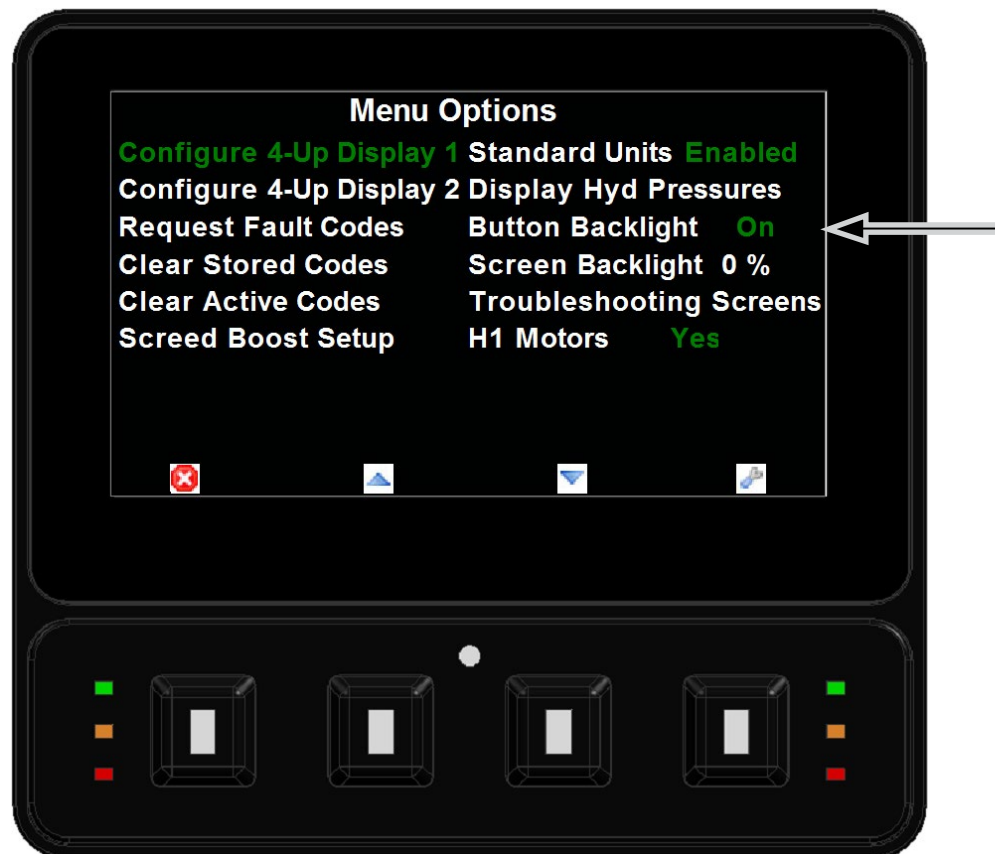
### Display Hydraulic Pressures



- Choose Display Hydraulic Pressures to navigate to the screen that displays the pressures for all pumps, including left propel, left propel charge, left conveyor, left conveyor charge, auxiliary, right propel, right propel charge, right conveyor, right conveyor charge, and return filter.
- Press EXIT to return to the Main Screen.

## 4.05.07 Set Button Backlight

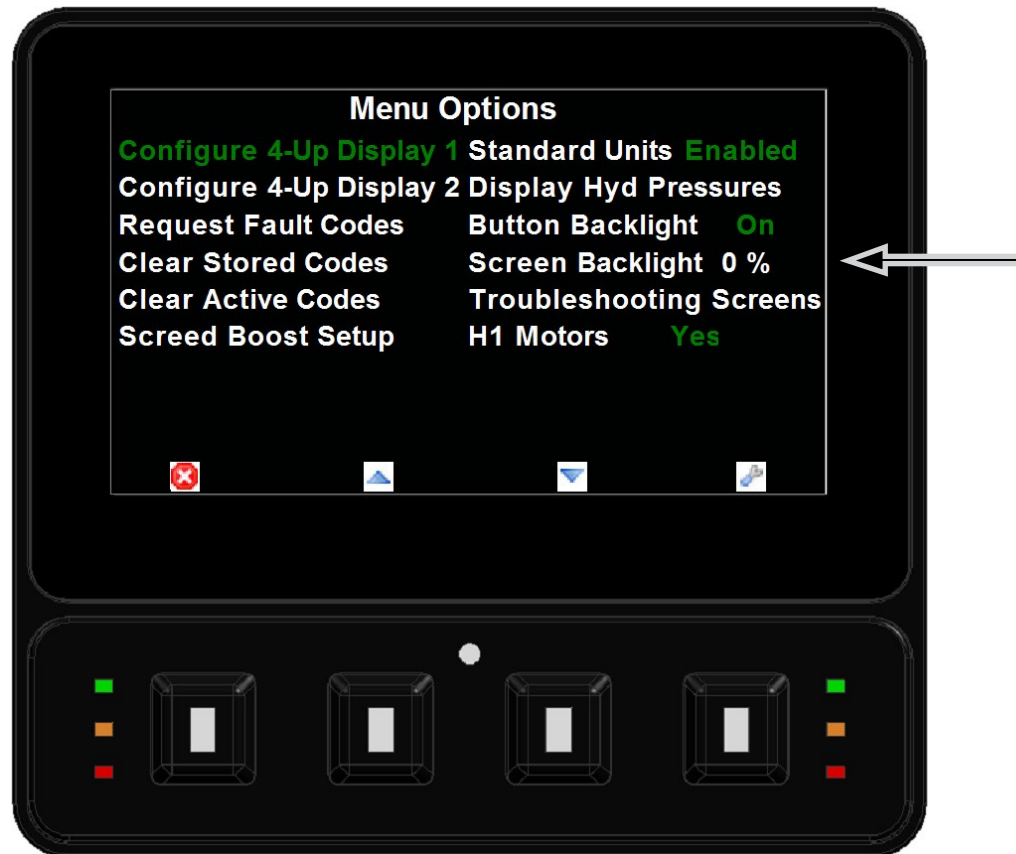
### Set Button Backlight



- Choose Button Backlight from the Menu Options, and press button 4 (wrench) to turn the Button Backlights ON or OFF.
- Press EXIT to return to the Main Screen.

## 4.05.08 Set Screen Backlight

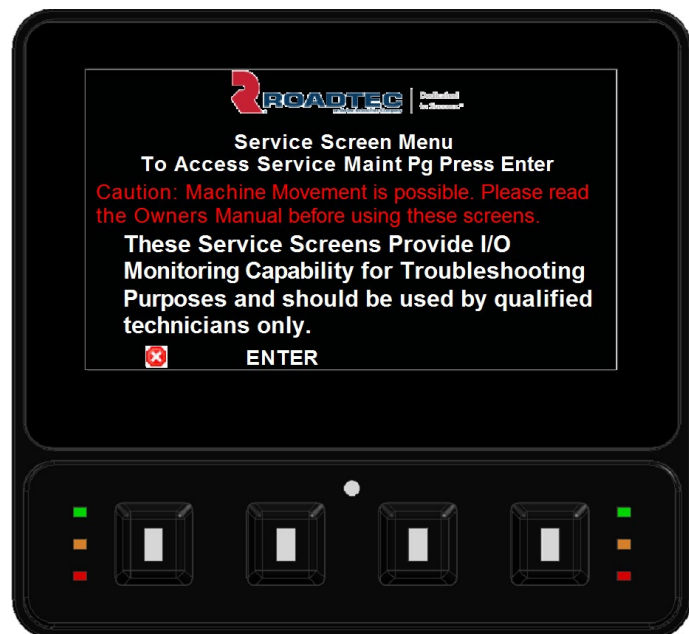
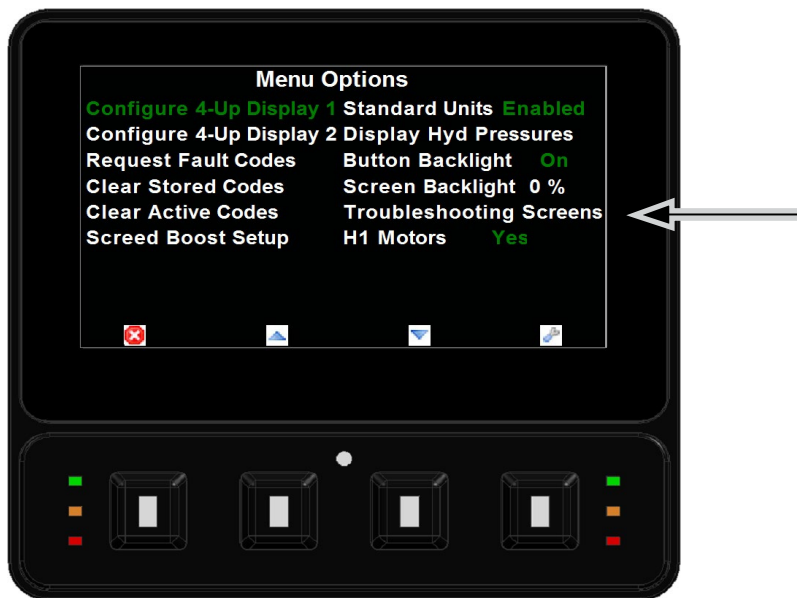
### Set Screen Backlight



- Choose Screen Backlight from the Menu Options, and press button 4 (wrench) to turn the Screen Backlights ON or OFF.
- Adjust the dimness or brightness in increments of 10% with the down or up arrow.
- Press EXIT twice to return to the Main Screen.

## 4.05.09 Troubleshooting Screens

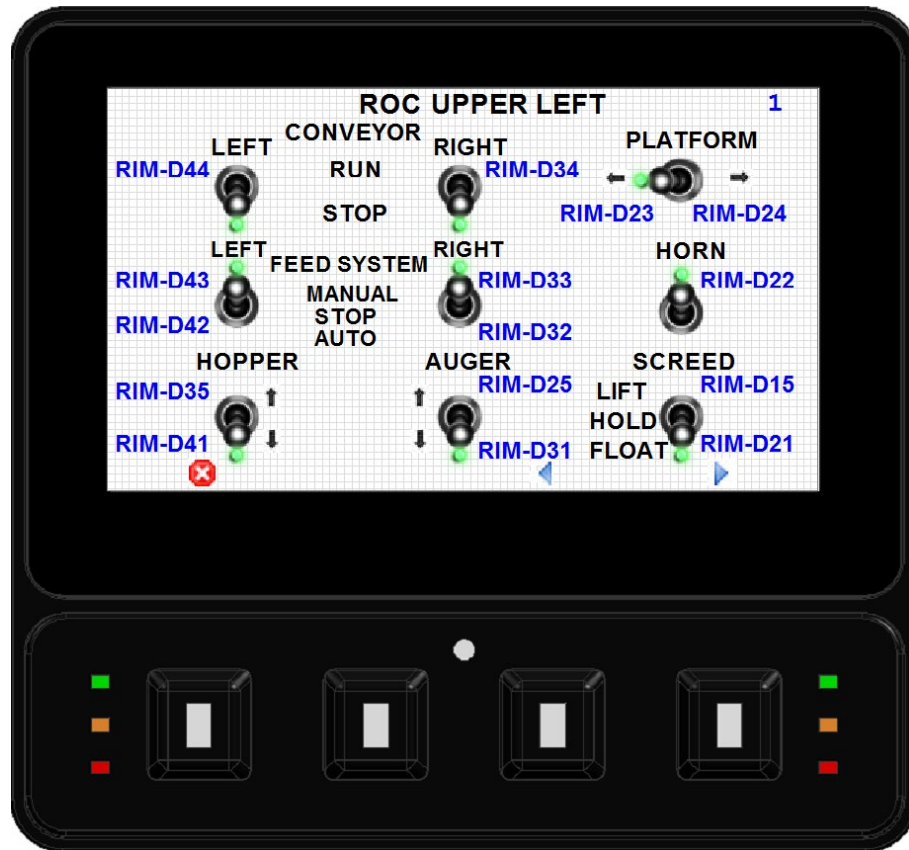
### Troubleshooting Screens



- Choose Troubleshooting Screens to access the Troubleshooting Screens, and press button 4 (wrench).
- The warning page appears to caution that machine movement is possible. Please read the Operation and Service Manual before using the screens to perform maintenance or repair. Only qualified technicians should perform maintenance or repair on this machine. Press button 2 (ENTER) to enter the Troubleshooting Screens.
- Press EXIT to return to the Main Screen.

#### 4.05.10 Troubleshooting Screens - ROC Upper Left Screen

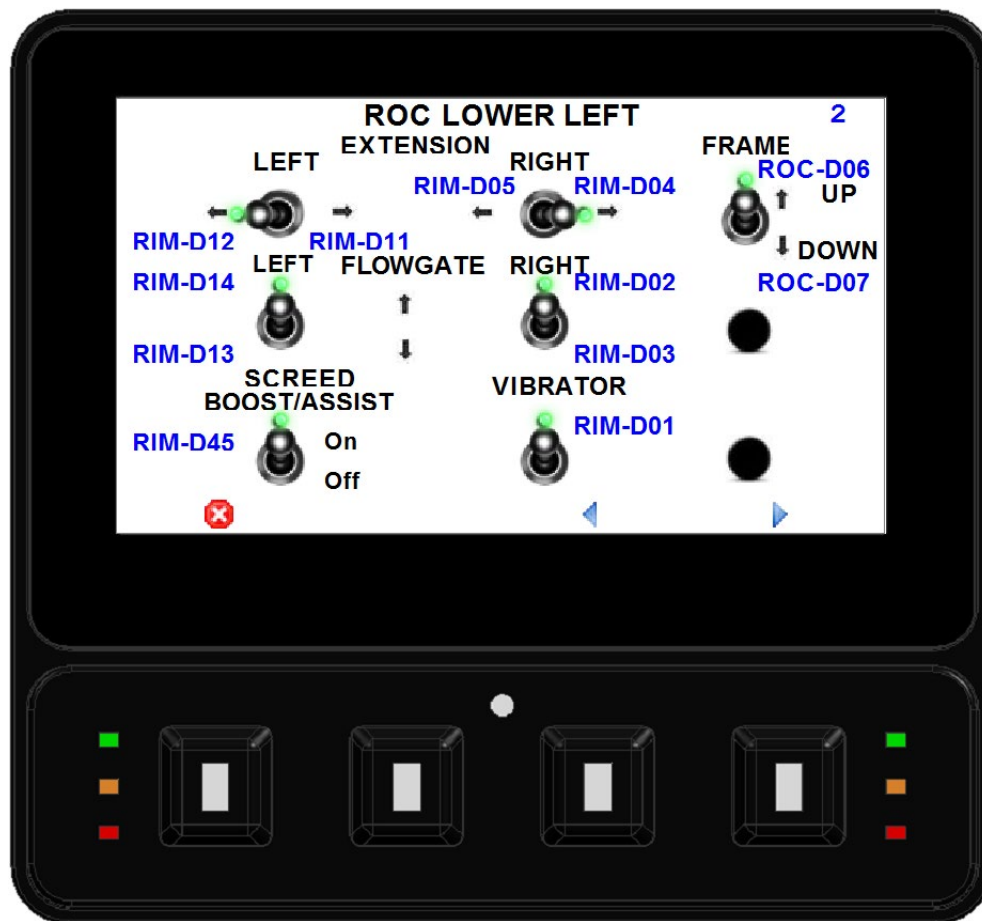
## Troubleshooting Screens - ROC Upper Left Screen



- Press the ENTER button from the Troubleshooting Screens Warning screen to access the ROC Upper Left Screen.
- Monitor the switches for Left and Right Conveyor, Left and Right Feed System, Hopper, Platform, Horn, Auger, and Screed.
- Press EXIT to return to the Main Screen.

## 4.05.11 Troubleshooting Screens - ROC Lower Left Screen

### Troubleshooting Screens - ROC Lower Left Screen



- Press button 4 (right arrow) from the ROC Upper Left screen to access the ROC Lower Left Screen.
- Monitor the switches for Left and Right Screed extensions, Left and Right Flowgate, Screed Boost/Assist, and Vibrator.
- Press EXIT to return to the Main Screen.



## 4.05.12 Troubleshooting Screens - ROC Upper Right Screen

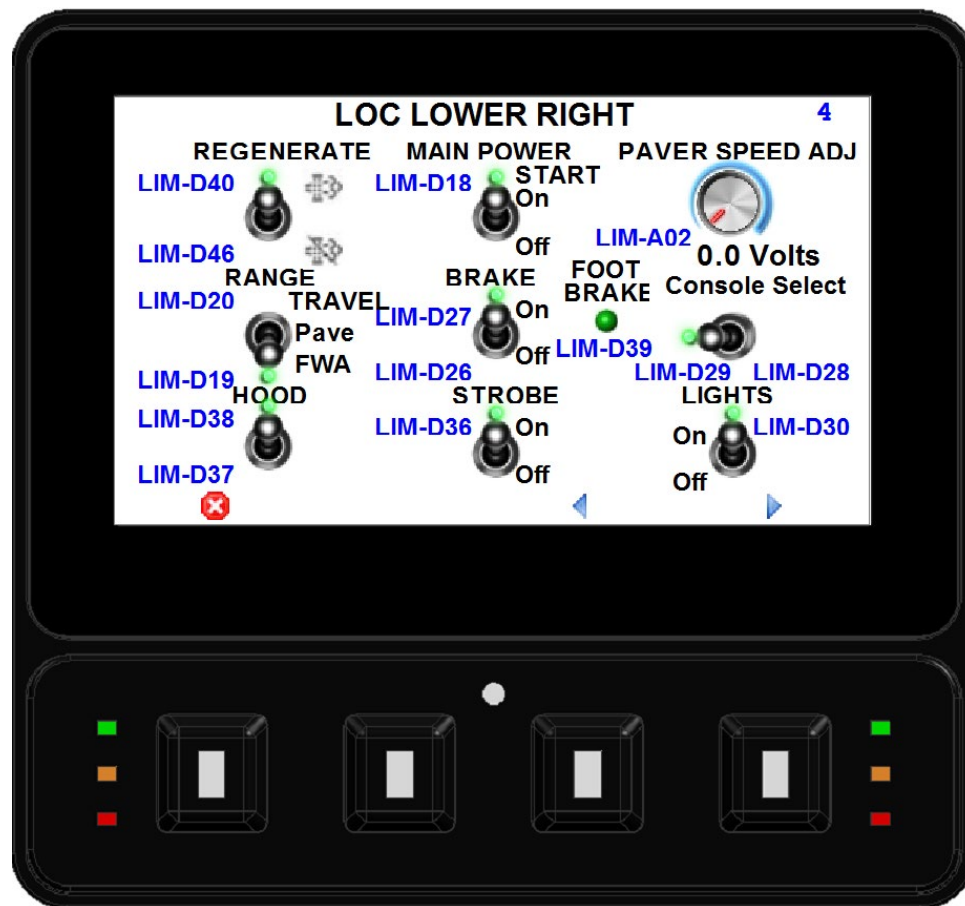
### Troubleshooting Screens - ROC Upper Right Screen



- ▶ Press button 4 (right arrow) from the ROC Lower Left screen to access the ROC Upper Right Screen.
- ▶ Monitor the switches for the Joystick, E-Stop, Differential Lock, Throttle, and Steer Assist.
- ▶ Press EXIT to return to the Main Screen.

### 4.05.13 Troubleshooting Screens - ROC Lower Right Screen

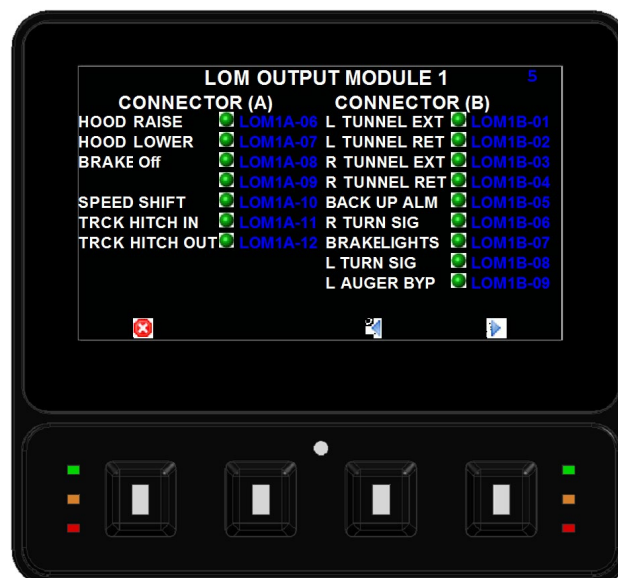
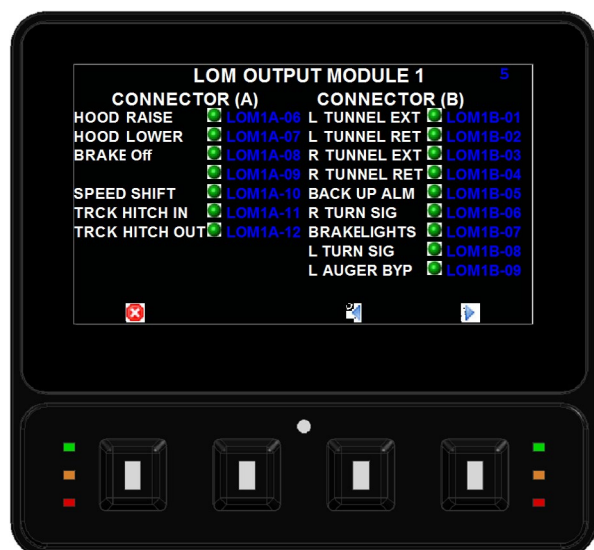
#### Troubleshooting Screens - ROC Lower Right Screen



- Press button 4 (right arrow) from the ROC Upper Right screen to access the ROC Lower Right Screen.
- Monitor the switches for the Regenerate, Range, Front Wheel Assist, Hood, Main Power, Paver Speed, Brake, and Foot Brake, Strobe Lights, and Lights.
- Press EXIT to return to the Main Screen.

## 4.05.14 Troubleshooting Screens - ROM and LOM Output Module 1

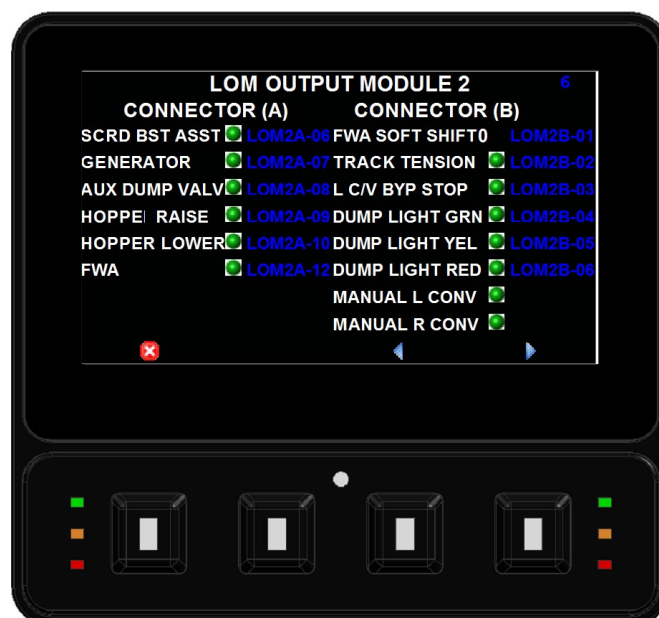
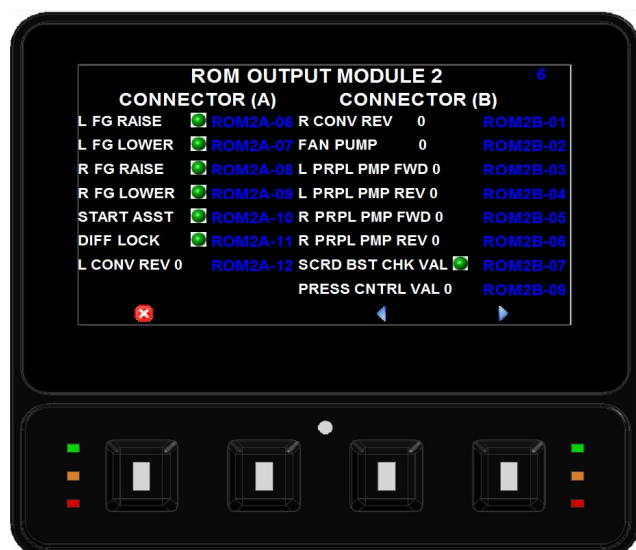
### Troubleshooting Screens - ROM and LOM Output Module 1



- Press button 4 (right arrow) from the ROC Lower Right Screen to access ROM Output Module 1 and LOM Output Module 1.
- Monitor the output for ROM Output Module 1: Connector A (Fumex, Frame Raise, Frame Lower, Screed Float, Screed Lift, Screed Lower, Right Auger Raise, Manual Left Conveyor, and Manual Right Conveyor) and Connector B (Right Auger Lower, Left Auger Raise, Left Auger Lower, Left Cons Pivot In, Left Cons Pivot Out, Right Cons Pivot In, Right Cons Pivot Out, Right Conveyor Bypass, and Right Auger Bypass).
- Monitor the output for LOM Output Module 1: Connector A (Hood Raise, Hood Lower, Brake OFF, Speed Shift, Truck Hitch In, Truck Hitch Out), and Connector B (Left Tunnel Extension, Left Tunnel Retract, Right Tunnel Extension, Right Tunnel Retract, BackUp Alarm, Right Turn Signal, Brakelights, Left Turn Signal, Left Auger Bypass).
- Press EXIT to return to the Main Screen.

## 4.05.15 Troubleshooting Screens - ROM and LOM Output Module 2

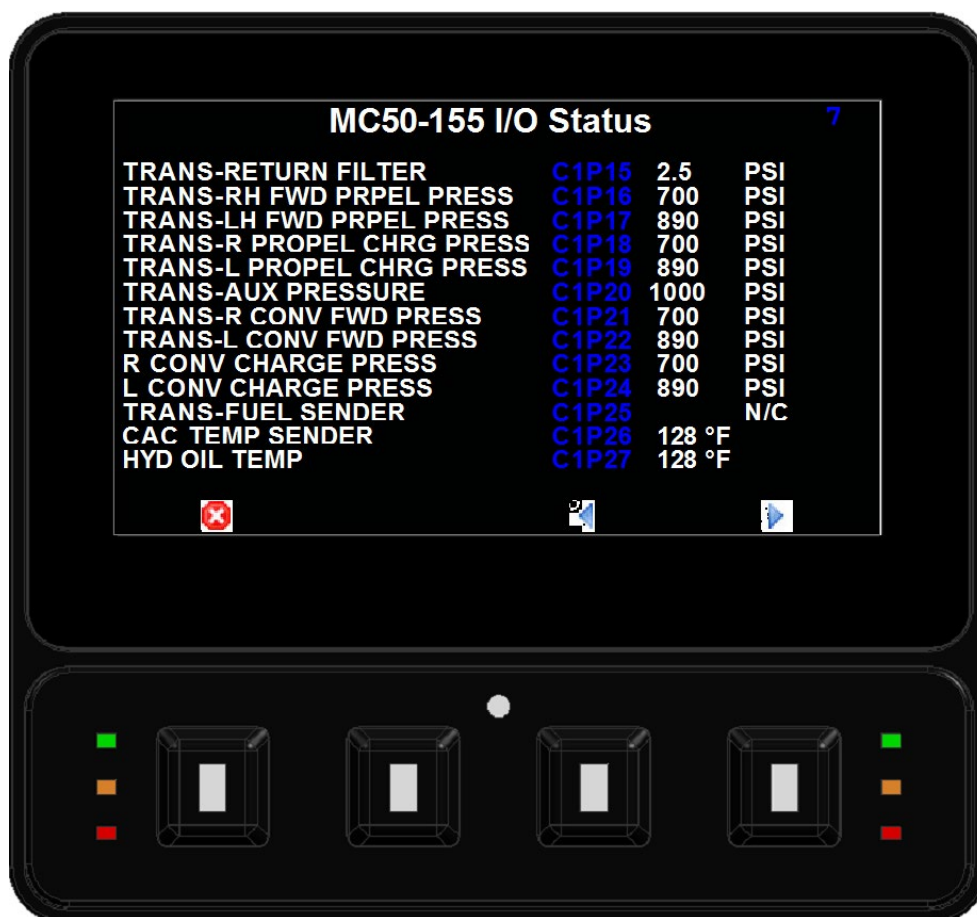
### Troubleshooting Screens - ROM and LOM Output Module 2



- Press button 3 (right arrow) from the ROM Output Module 1 to access ROM Output Module 2.
- Monitor the ROM Output Module 2 for Connector A (Left FG Raise, Left FG Lower, Right FG Raise, Right FG Lower, Start Assist, Differential Lock, Left Conveyor Rev. 0) and Connector B (Right Conveyor Rev. 0, Fan Pump 0, Left Propel Pump Forward 0, Left Propel Pump Rev. 0, Right Propel Pump Forward 0, Right Propel Pump Rev. 0, Screed Boost Check Valve).
- Monitor the LOM Output Module 2 for Connector A (Screed Boost Assist, Generator, Auxiliary Dump Valve, Hopper Raise, Hopper Lower, Front Wheel Assist), and Connector B (Front Wheel Assist Soft Shift, Track Tension, L C/V Bypass Stop, Dump Light Green, Dump Light Yellow, Dump Light Red, Manual Left Conveyor and Manual Right Conveyor).
- Press EXIT to return to the Main Screen.

## 4.05.16 Troubleshooting Screens - MC50-155 Input/Output 1 Status

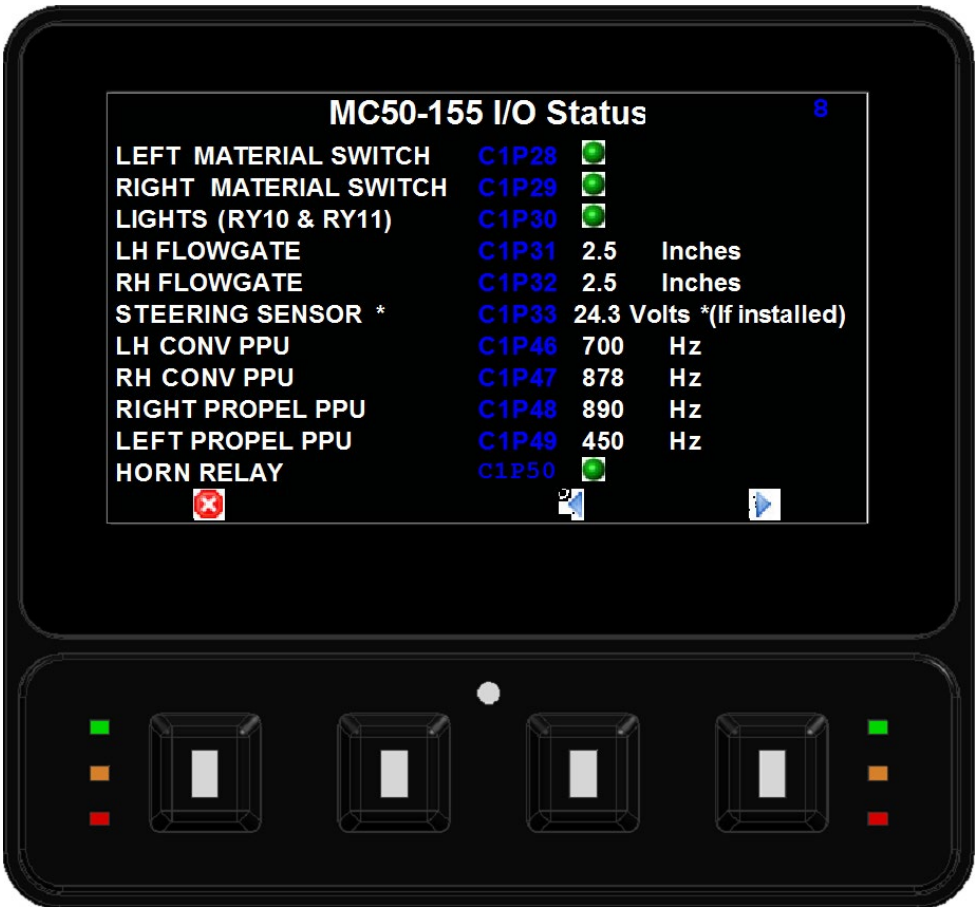
### Troubleshooting Screens - MC50-155 Input/Output 1 Status



- Press button 3 (right arrow) from the ROM Output Module 2 screen to access the MC50-155 Input/Output 1 Status screen.
- Monitor the input/output for the trans-return filter, trans-RH forward propel pressure, trans LH forward propel pressure, trans right propel charge pressure, trans left propel charge pressure, trans auxiliary pressure, trans right conveyor forward pressure, trans left conveyor forward pressure, right conveyor charge pressure, left conveyor charge pressure, trans fuel sender, CAC temp sender, and hydraulic oil temp.
- Press EXIT to return to the Main Screen.

4.05.17 Troubleshooting Screens - MC50-155 Input/Output 2 Status

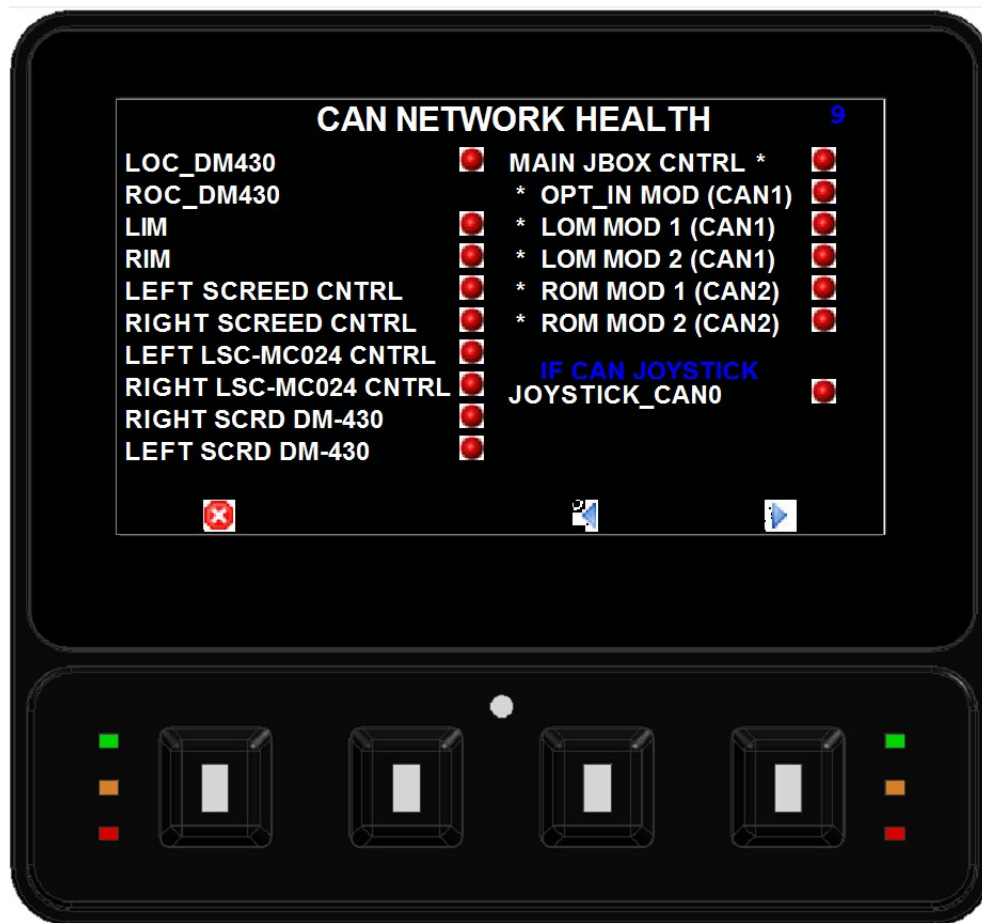
Troubleshooting Screens - MC50-155 Input/Output 2 Status



- Press button 3 (right arrow) from the MC50-155 Input/Output 1 screen to access the MC50-155 Input/Output 2 Status screen.
- Monitor the input/output for the left material switch, right material switch, lights, left hand flowgate, right hand flowgate, steering sensor, left hand conveyor PPU, right hand conveyor PPU, right propel PPU, left propel PPU, and horn relay.
- Press EXIT to return to the Main Screen.

## 4.05.18 Troubleshooting Screens - CAN Network Health

### Troubleshooting Screens - CAN Network Health

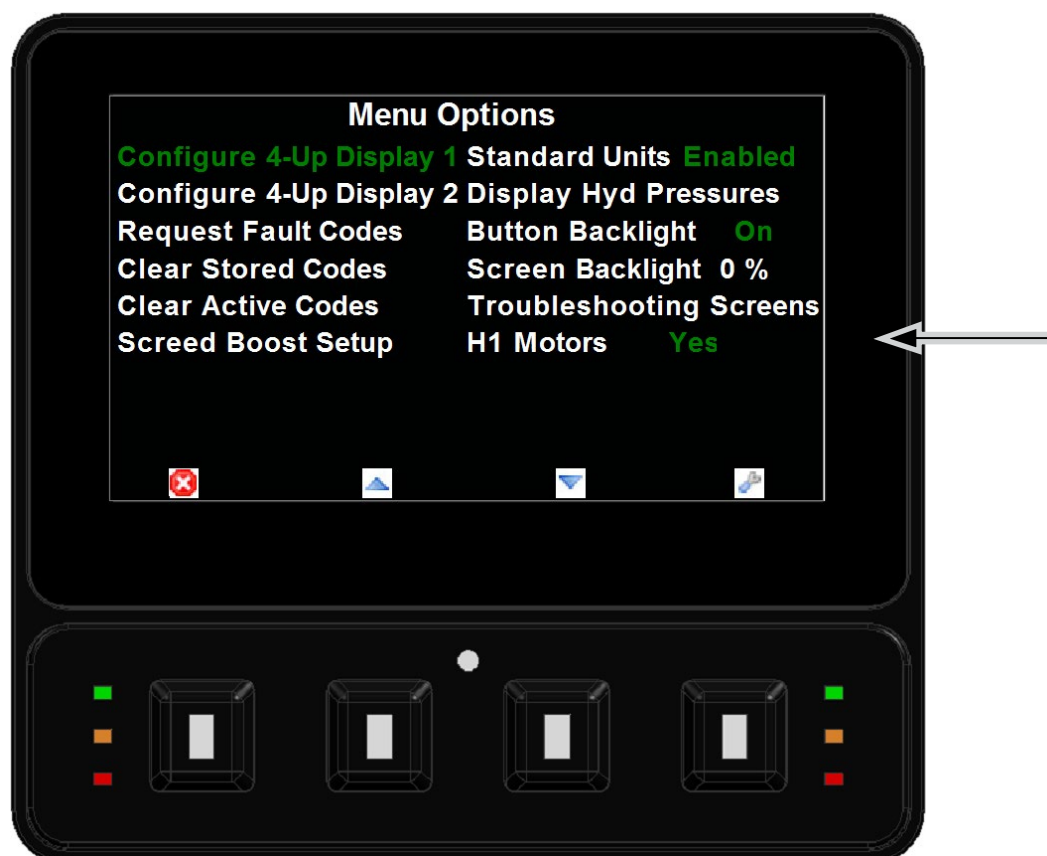


- Press button 3 (right arrow) from the MC50-155 Input/Output 2 screen to access the CAN Network Health screen.
- Monitor LOC\_DM430 (left operator digital screen), ROC\_DM340 (right operator digital screen), left input module, right input module, left screen control, right screed control, Left LSC-MC024 control, right LSC-MC024 control, right screed DM-430 (digital display), left screed DM-430 (digital display), Main junction box, option-in module (CAN1), LOM Module 1 (CAN1), LOM Module 2 (Can 1), ROM Module 1 (CAN2), ROM Module 2 (Can2), and Joystick CAN0.
- Press EXIT to return to the Main Screen.



## 4.05.19 Troubleshooting Screens - H1 Motors

### Troubleshooting Screens - H1 Motors



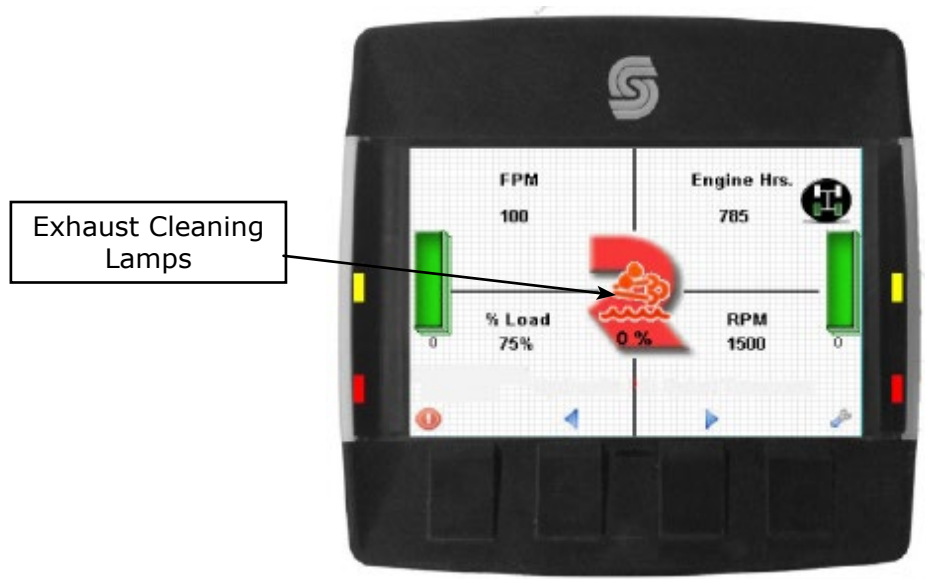
- Choose H1 Motors from the Menu Options Screen (if machine is so equipped) and press button 4 (wrench) to toggle H1 Motor to YES.
- The processor uses different calculations based this motor type.
- If H1 is not selected, then the feet-per-minute calculations for example will not display accurately.



## 4.05.20 SCR Exhaust System Cleaning (Regen) Modes

- ✓ SCR Exhaust Cleaning System (Regen) automatically initiates during operations.
- ✓ Inhibit or Force (Non-Mission) Regen — for use only when inhibiting cleaning would prevent safety risks.

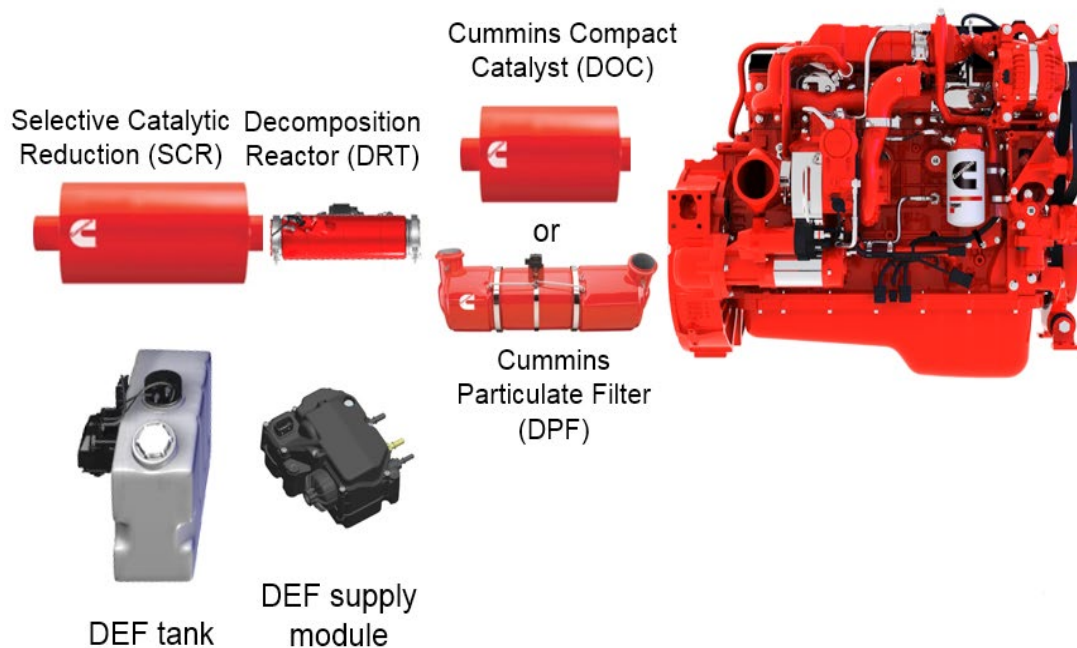
### Control Display - Main Screen



## 4.05.20.01 SCR Engine Exhaust System Cleaning (Regen)

- ✓ Tier IV Final engines oxidize soot collected in after-treatment systems to maintain efficient engine operations and cleaner air quality.
- ✓ Elevated temperatures clean Diesel Exhaust Fluid (DEF) deposits from the Decomposition Reactor Tube (DRT) and the Selective Catalyst Reduction (SCR).
- ✓ Refer to Engine Manufacturer's Manual for more information.

### After-Treatment System

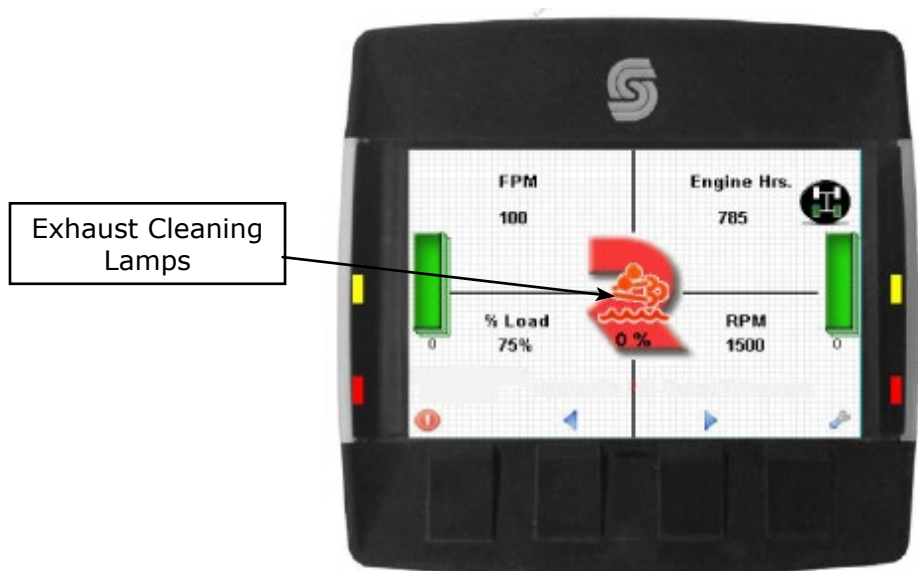


SCR Cleaning Modes include:

1. Automatic
2. Non-Mission
3. Inhibited

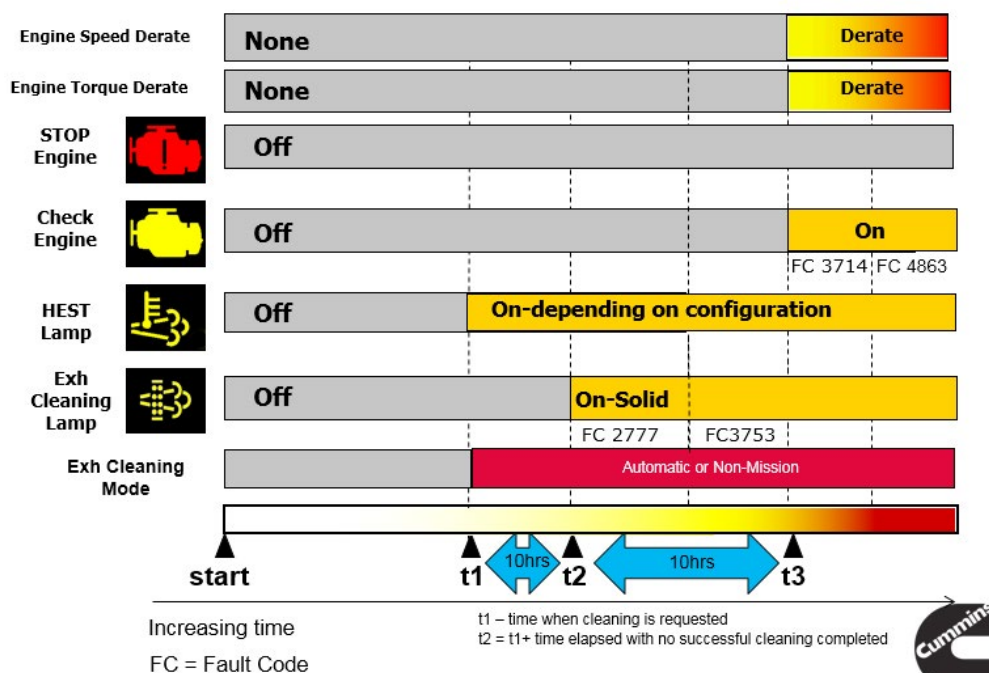
Minimal operator interaction is needed when a Non-Mission Cleaning Event is required.








## Control Display - Main Screen



## Exhaust System Lamp Behavior

### Tier 4 FINAL – Exhaust Cleaning



Lamp Functions	Description	Machine Behavior	Operator Action
 <b>High Exhaust System Temperature (HEST) Lamp ON</b>  <b>NORMAL</b>  <b>T1 Level (60- 80 hrs. since last cleaning event)</b>	<b>Automatic</b> - Indicates exhaust system temperature is elevated. Cleaning automatically initiated at preset time increments during machine operation every 60-80 hours. Cycles take 15-30 minutes to complete. Engine speed must be > 1500 rpm. Engine exhaust temp must be > 572° F.	Exhaust temperatures during cleaning event may reach 1000 – 1100° F. No engine speed or torque decrease. Any throttle change stops automatic cleaning event.	<b>No operator action required. Continue operations as normal.</b>  <b>DANGER!</b> <i>Keep engine exhaust pipe outlet away from persons and any flammable or combustible materials during high temperature cycles.</i>
 <b>Exhaust System Cleaning Lamp ON</b>   <b>HEST Lamp ON</b>  <b>INFREQUENT</b> <b>Automatic ON</b> <b>T2 Level (T1 + 10 hours)</b>  <b>Non-Mission required ON - T2 Level + 5 hours;</b> <b>Non-Mission in progress FLASH</b>	Indicates Automatic or Non-Mission cleaning. <b>Automatic</b> - Cleaning initiated during machine operation at T2+10 hours when prior automatic cleaning event did not complete. <b>Non-Mission</b> - Illuminates at T2 + 5 hours. Cleaning should be initiated by operator as soon as possible.  Engine speed is > 1500 rpm. Exhaust temp > 572° F.	<b>Automatic FC 2777</b> No engine speed or torque decrease. <b>Non-Mission FC 3753</b> Machine is stationary during cleaning. Engine speed decreases by 25%. Throttle to 1000 rpm. Maintains speed for 30-45 minutes. Any throttle change will stop auto cleaning event. Automatic cleaning resumes when conditions are met.	<b>FC 2777 Automated Cleaning: No operator action required.</b>  <b>FC 3753 Non-Mission Cleaning Required: Stop machine and initiate SCR Cleaning. See Section 3.07.08.02</b>  <b>DANGER!</b> <i>Keep engine exhaust pipe outlet away from persons and any flammable or combustible materials during high temperature cycles.</i>
 <b>Exhaust System Cleaning Lamp ON</b>   <b>Check Engine Lamp ON</b>  <b>VERY INFREQUENT</b> <b>Near Critical</b> <b>T3 Level (T2 + 10 hours)</b>  <b>Critical</b> <b>T3 Level + 5 hours</b>	<b>Near Critical System Status</b> – Indicates T2 + 10 hours since last cleaning event. <b>Critical System Status</b> – Indicates T3+ 5 hours since last cleaning event.	<b>Near Critical Status FC 3714</b> Engine speed and torque start to significantly reduce.  <b>Critical Status FC 4863</b> Engine speed significantly reduced and torque rate decreased by 25%.	<b>Stop machine and perform Non-Mission Exhaust Cleaning. See Section 3.07.08.02</b>  <b>DANGER!</b> <i>Park machine with exhaust pipe outlet away from all persons and any flammable or combustible surfaces during high temperature cycles.</i>
 <b>Stop Engine Lamp ON</b>  <b>AVOIDABLE</b> <b>T3 Level + 10 hours</b>	<b>Stop Engine</b> - Indicates red level warning. Further machine operation can result in damage to exhaust system.	Engine power limited to idle.	<b>Shut down engine as soon as possible. Contact Cummins.</b> <b>CAUTION! Failure to shut down engine will damage exhaust system.</b>
 <b>Exhaust System Cleaning Inhibit Lamp ON</b>  <b>EXCEPTIONAL</b> <b>Use Only When Necessary</b>	<b>Inhibited</b> - Indicates exhaust cleaning system is OFF, preventing automatic cleaning events. Only inhibit cleaning for safety reasons.  Non-Mission Cleaning Event will soon be required unless Automatic cleaning is restored.	No engine or torque decrease. Inhibit will result in loss of fuel efficiency and increased chances of service or repair to DPF system.	<b>CAUTION!</b> <b>ONLY stop exhaust system cleaning when high exhaust temperatures presents hazard. Excessive use of the STOP position will result in the need for more frequent stationary exhaust cleaning events.</b>

## 4.05.20.02 Perform Forced Regen

### Warnings

#### ⚠ WARNING

Avoid fire and explosion hazards!

**NEVER** perform Non-Mission exhaust cleaning near combustible materials.

**NEVER** allow people or materials near exhaust pipe when High Exhaust System Temperature Lamp is illuminated. Exhaust gas temperatures can reach 1100° F (800° C) which is hot enough to burn, ignite or melt materials and harm persons.

W-1018

### Perform Forced Regen Exhaust System Cleaning

1. **Park** machine in appropriate location with exhaust tail pipe away from people or combustible materials.



2. **Set** Parking Brake.

3. **Lower** Engine Speed.

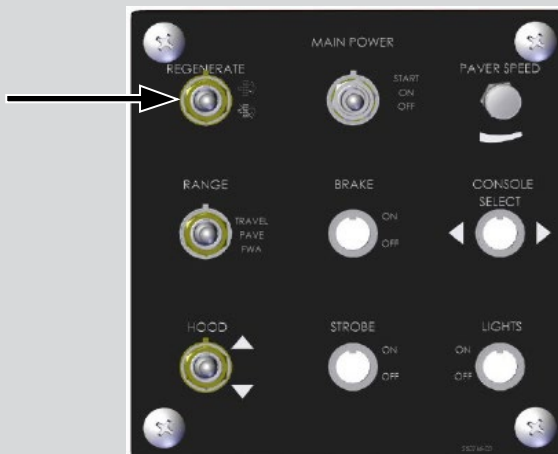


4. **Set** Travel Joystick to NEUTRAL.



5. **Press** 4 for Forced Regen on Exhaust Cleaning Menu Screen. Exhaust System Cleaning Lamp will flash and the HEST Lamp will illuminate. Monitor machine and surrounding area for safety during cleaning event.

Engine speed and throttle will return to normal and Exhaust Cleaning Event Lamp and HEST Lamp will turn OFF when cleaning is complete.

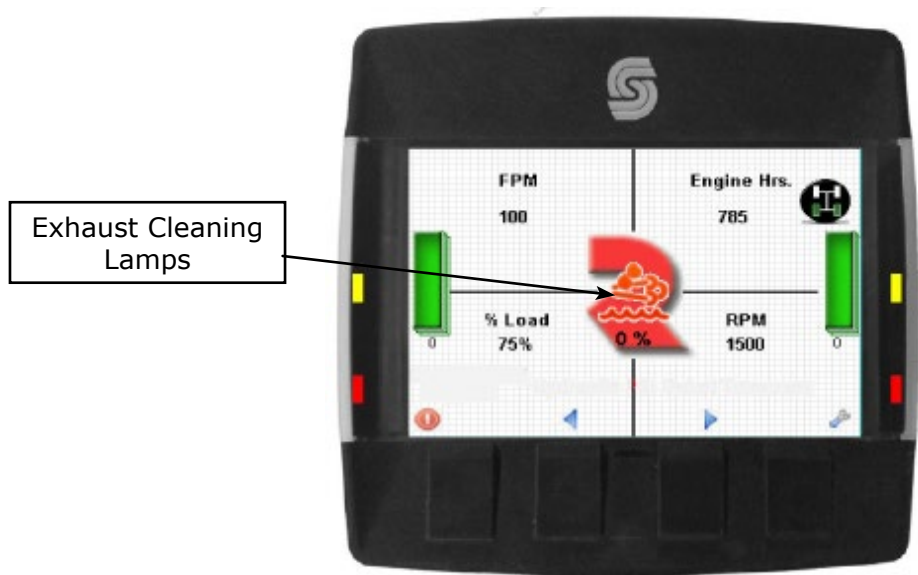


6. **Press** ◀ to return to Main Menu.

### 4.05.20.03 Diesel Exhaust Fluid Indication Lamp

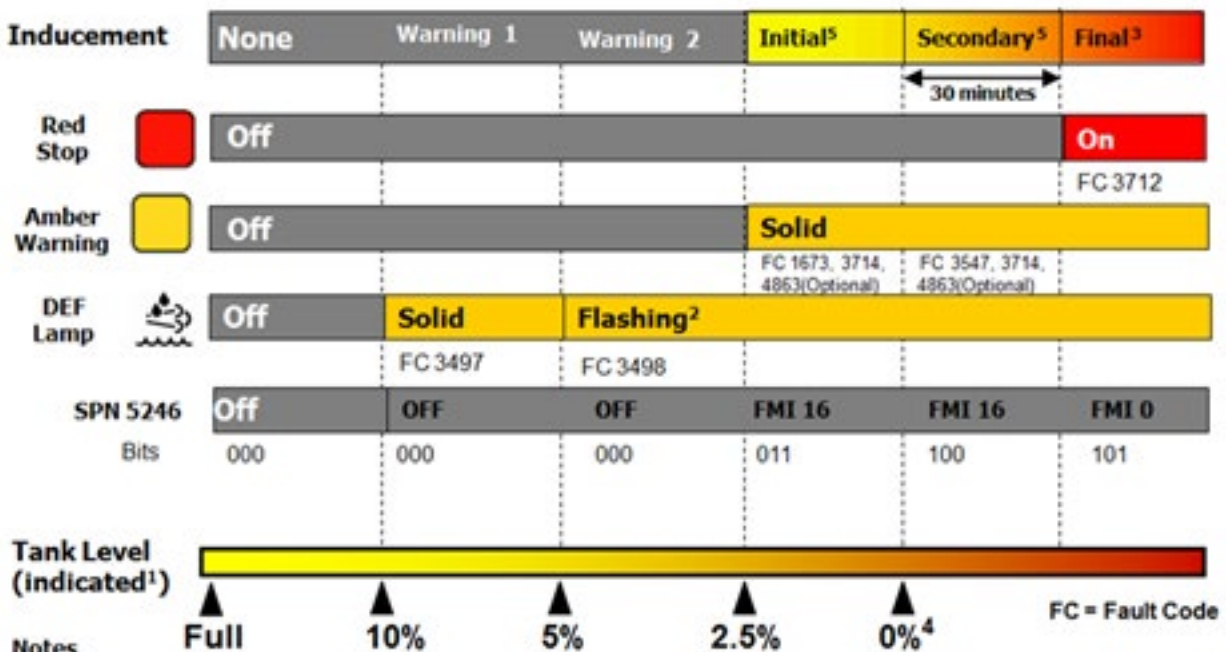
- Maintain DEF tank level above 10% to prevent DEF tank low level inducements from being activated.
- Diesel Exhaust Fluid (DEF) Lamps indicate when DEF tank should be filled.

#### Control Display – Main Screen



#### DEF Tank Level

##### DEF Tank Level



#### Notes

<sup>1</sup> Indicated tank level is calibrated.







<sup>2</sup> The flashing signal can be used for audible alarm signal by OEM

<sup>3</sup> Warning/FC will be turned on at least 2 minutes before the inducement

<sup>4</sup> DEF Tank must have minimum of 10% useable volume when gage reads zero

<sup>5</sup> Derate Ramps in over a period of 5 minutes



Lamp Functions	Description	Machine Behavior	Operator Action
 <b>DEF Lamp ON</b>	DEF level at 10%.	Engine speed and torque normal. <b>FC 3497</b>	Fill DEF tank with DEF at earliest convenience.  Section 4.03.02
 <b>DEF Lamp FLASH</b>	Low DEF level at 5%.	Engine speed and torque reduced. Engine power will be restored when tank fill level is acceptable. <b>FC 3498</b>	Fill DEF tank with DEF as soon as possible.  Section 4.03.02.
 <b>DEF Lamp FLASH</b>  <b>Engine Lamp ON</b>	Initial Stage – Approaching critical DEF levels at 2.5%.  Secondary Stage- Critical DEF levels near 0%.	Initial Stage - Engine speed and torque reduced. <b>FC 1673, 3714</b> Secondary Stage – Engine power limited. 30 minutes until Stop Engine warning. <b>FC 3547, 3714</b> Engine power will be restored when tank fill level is in acceptable ranges.	Fill DEF tank with DEF immediately.  Section 4.03.02.
 <b>DEF Lamp FLASH</b>  <b>Stop Engine Lamp ON</b>	0% DEF level for 30 minutes.	Engine power severely limited. <b>FC 3712</b>  Warning displays 2 minutes before Inducement.	Stop machine and fill DEF tank with DEF immediately.  Section 4.03.02.

## Find DEF Fluid

Use only DEF meeting ISO 2224101 standards identifiable by blue filler cap.



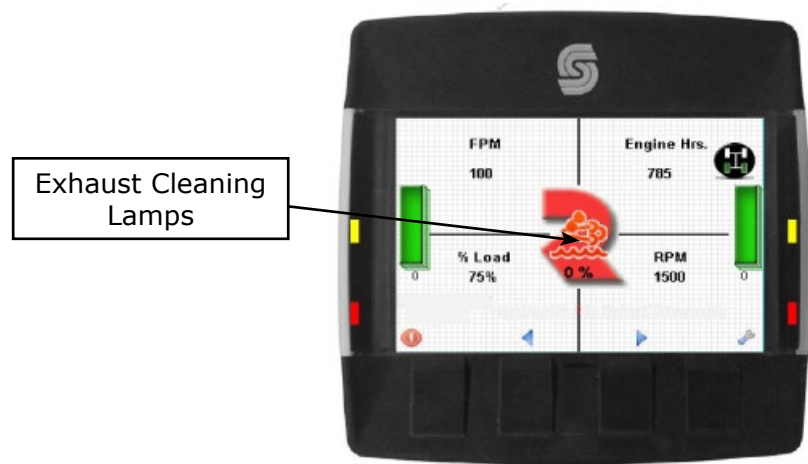
<http://www.discoverdef.com>

<http://finddef.com>

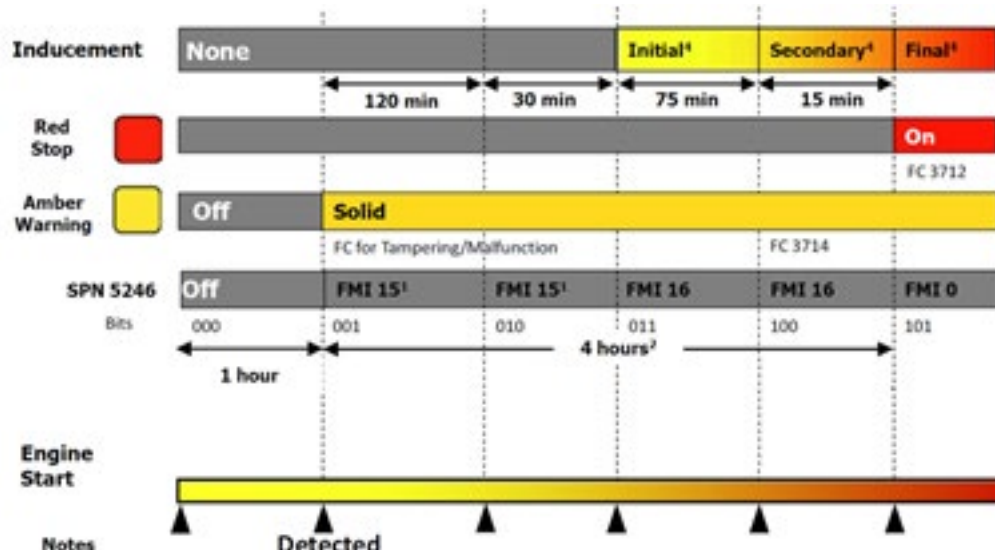
## 4.05.20.04 SCR System Tampering / Malfunction Inducements

- Operator is warned when tampering or malfunction has caused emission levels to increase.
- Tampering / Malfunction Events include, but are not limited to:
  - Disconnected tank level sensor or quality sensor
  - Blocked DEF line or dosing unit
  - Disconnected DEF or dosing unit
  - Disconnected DEF pump
  - Disconnected SCR Wiring Harness
  - Disconnected NOx Sensor
  - EGR Valve Malfunction
  - Any hardware or performance issues that will the NOx emission exceeding a legislated threshold











### Control Display – Main Screen



### SCR Tampering / Malfunction Inducement Indicators



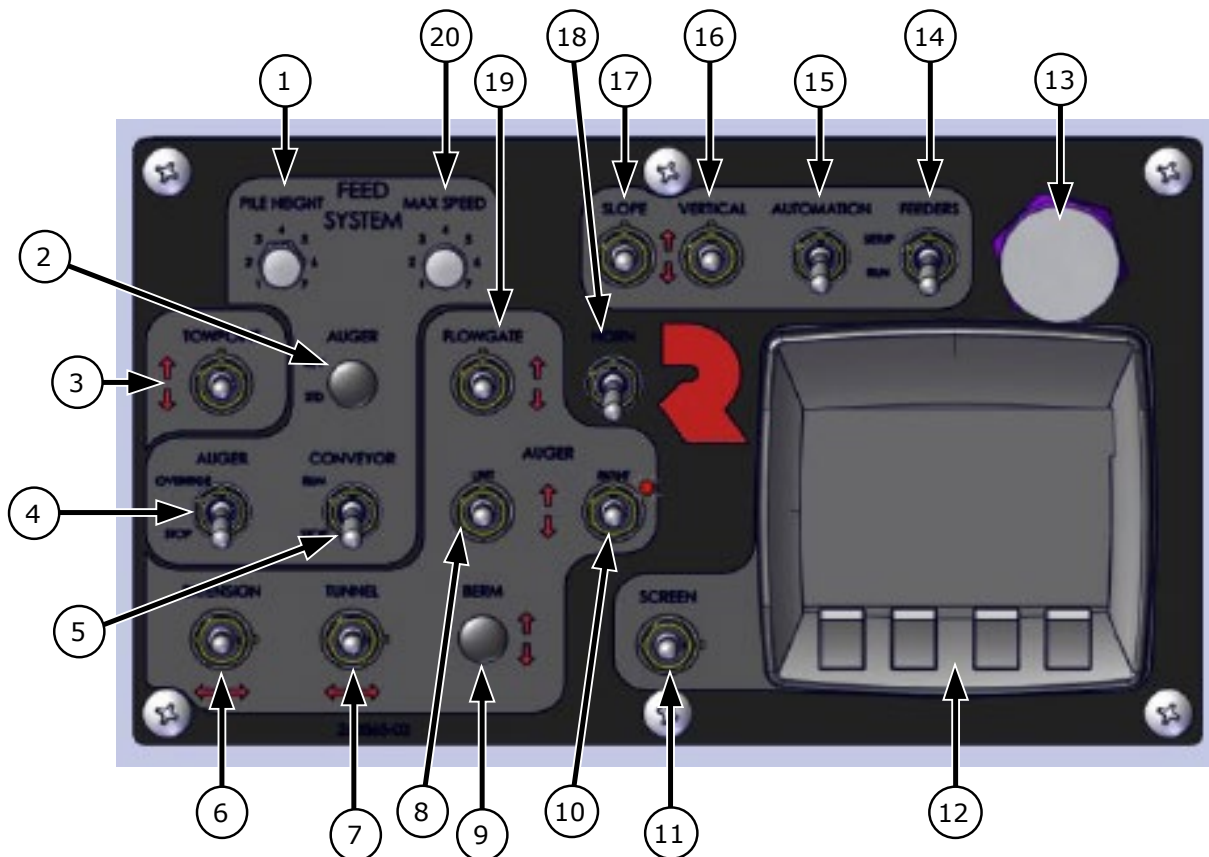


Lamp Functions	Description	Machine Behavior	Operator Action
 <b>DEF Lamp</b>  <b>Check Engine Lamp ON</b>	SCR System detects tampering or malfunction Equivalent of T3 Level on Exhaust Cleaning Chart	<b>PGN 65110</b> <b>SPN 5246</b>	Check for possible tampering/malfunctions or contact Cummins.
 <b>DEF Lamp</b>  <b>Check Engine Lamp ON + 2 hrs.</b>	SCR System detects tampering or malfunction	FC for Tampering/ Malfunction	Check for possible tampering/malfunctions or contact Cummins.
 <b>DEF Lamp</b>  <b>Check Engine Lamp ON + 2.5 hrs.</b>	SCR System detects tampering or malfunction  <b>Initial Inducement</b>	Initial engine de-rate induced  <b>FC 4863</b>	Check for possible tampering/malfunctions or contact Cummins.
 <b>DEF Lamp FLASH</b>  <b>Check Engine Lamp ON + 3 hrs. 45 min.</b>	SCR System detects tampering or malfunction  <b>Secondary Inducement</b>	Secondary engine de-rate induced  <b>FC 3714</b>	Check for possible tampering/malfunctions or contact Cummins.
 <b>DEF Lamp FLASH</b>  <b>Stop Engine Lamp ON + 4 hrs.</b>	SCR System detects tampering or malfunction  <b>Final Inducement</b>	Final Inducement initiated  Engine at idle speed  <b>FC 3712</b>	Contact Cummins.

## 4.06 Left Screed Control Box

- ▀ Located on the left hand side of the screed.
- ▀ Displays operator controls and digital display screens.

### Left Screed Control Box

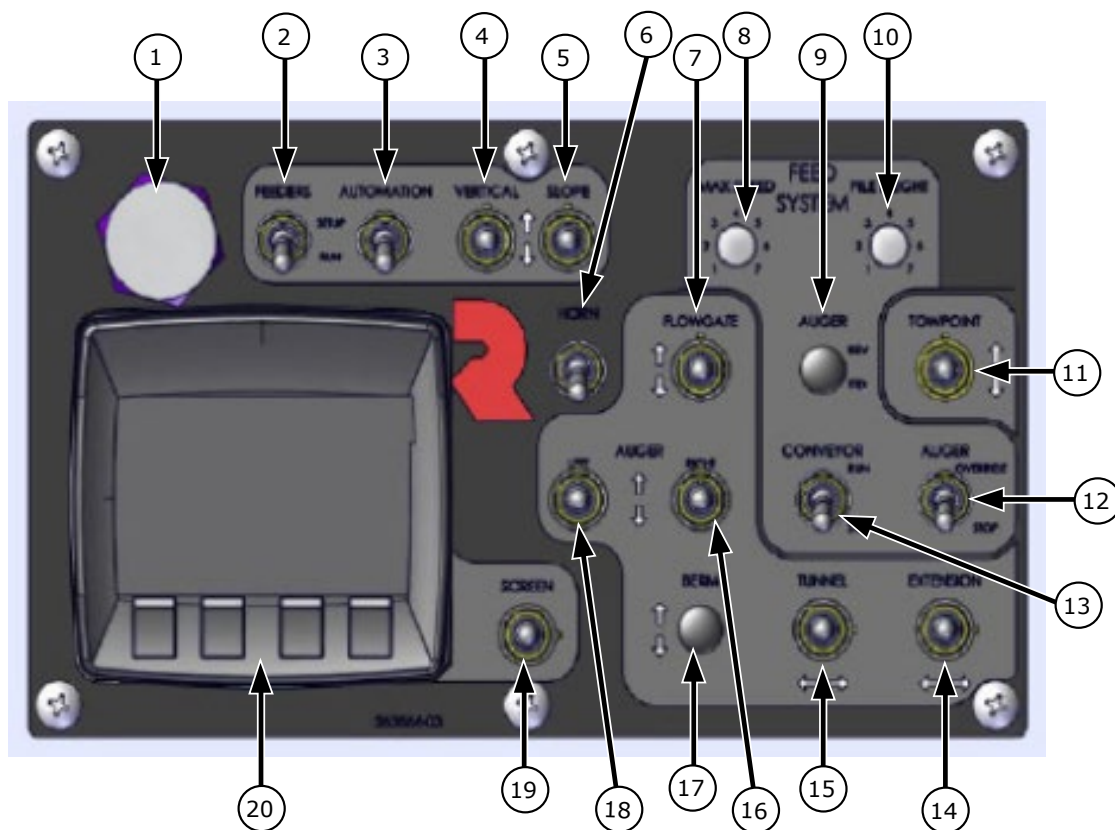


<b>1. Pile Height</b> - Adjust dial to control the amount of material at the head of the screed.	<b>11. Screen</b> - Push UP to power on display. Push DOWN to power off.
<b>2. Auger Direction</b> - Push UP to reverse direction of rotation. Push DOWN for standard forward direction.	<b>12. Digital Display Screen</b> - See Screed Digital Screen section for details.
<b>3. Tow Point</b> - Push UP to raise tow point. Push DOWN to lower tow point.	<b>13. E-Stop</b> - Push IN to shut down engine in case of emergency. Engine will not restart until all E-stop buttons have been disengaged. Pull OUT to disengage.
<b>4. Auger Override</b> - Push UP to override auger function. Push DOWN to stop auger.	<b>14. Feeders</b> - Press UP to set up feeder system. Push DOWN to run.
<b>5. Conveyor</b> - Push UP to run. Push DOWN to stop.	<b>15. Automation</b> - Press UP for screed to automatically adjust to slope settings during operation.
<b>6. Extension</b> - Push LEFT to extend screed extension left. Push RIGHT to extend right.	<b>16. Vertical</b> - Push UP to raise vertical screed height. Push DOWN to lower.
<b>7. Tunnel</b> - Push LEFT to extend tunnel extension left. Push RIGHT to extend right.	<b>17. Slope</b> - Press UP to angle screed left. Press down to angle screed right.
<b>8. Left Auger</b> - Push UP to raise. Push DOWN to lower.	<b>18. Horn</b> - Press UP to sound horn.
<b>9. Berm</b> - Push UP to raise berm. Push DOWN to lower.	<b>19. Flow Gate</b> - Press UP to raise flow gates. Press DOWN to lower.
<b>10. Right Auger</b> - Push UP to raise. Push DOWN to lower.	<b>20. Max Speed</b> - Adjust dial to control the feed system speed.

## 4.07 Right Screed Control Box

- ▀ Located on the right hand side of the screed.
- ▀ Displays operator controls and digital display screens.

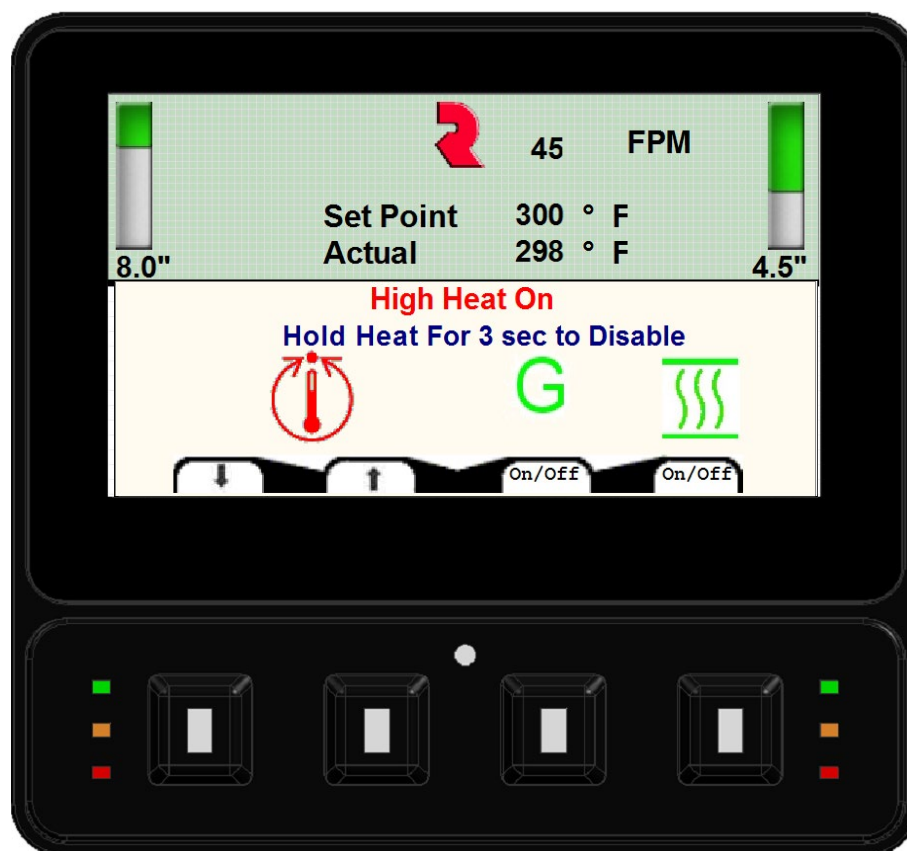
### Right Screed Control Box



- |   |  |
|---|--|
| <p>1. <b>E-Stop</b> - Push IN to shut down engine in case of emergency. Engine will not restart until all E-stop buttons have been disengaged. Pull OUT to disengage.</p> | <p>11. <b>Tow Point</b> - Push UP to raise tow point. Push DOWN to lower tow point.</p>              |
| <p>2. <b>Feeders</b> - Press UP to set up feeder system. Push DOWN to run.</p>  | <p>12. <b>Auger Override</b> - Push UP to override auger function. Push DOWN to stop auger.</p>      |
| <p>3. <b>Automation</b> - Press UP for screed to automatically adjust to slope settings during operation.</p>   | <p>13. <b>Conveyor</b> - Push UP to run. Push DOWN to stop.</p>                                      |
| <p>4. <b>Vertical</b> - Push UP to raise vertical screed height. Push DOWN to lower.</p>  | <p>14. <b>Extension</b> - Push LEFT to extend screed extension left. Push RIGHT to extend right.</p> |
| <p>5. <b>Slope</b> - Press UP to angle screed left. Press down to angle screed right.</p>   | <p>15. <b>Tunnel</b> - Push LEFT to extend tunnel extension left. Push RIGHT to extend right.</p>    |
| <p>6. <b>Horn</b> - Press UP to sound horn.</p>   | <p>16. <b>Right Auger</b> - Push UP to raise. Push DOWN to lower.</p>                                |
| <p>7. <b>Flow Gate</b> - Press UP to raise flow gates. Press DOWN to lower.</p>   | <p>17. <b>Berm</b> - Push UP to raise berm. Push DOWN to lower.</p>                                  |
| <p>8. <b>Max Speed</b> - Adjust dial to control the feed system speed.</p>  | <p>18. <b>Left Auger</b> - Push UP to raise. Push DOWN to lower.</p>                                 |
| <p>9. <b>Auger Direction</b> - Push UP to reverse direction of rotation. Push DOWN for standard forward direction.</p>  | <p>19. <b>Screen</b> - Push UP to power on display. Push DOWN to power off.</p>                      |
| <p>10. <b>Pile Height</b> - Adjust dial to control the amount of material at the head of the screed.</p>  | <p>20. <b>Digital Display Screen</b> - See Screed Digital Screen section for details.</p>            |

## 4.08 Screed Digital Display - Main Screen

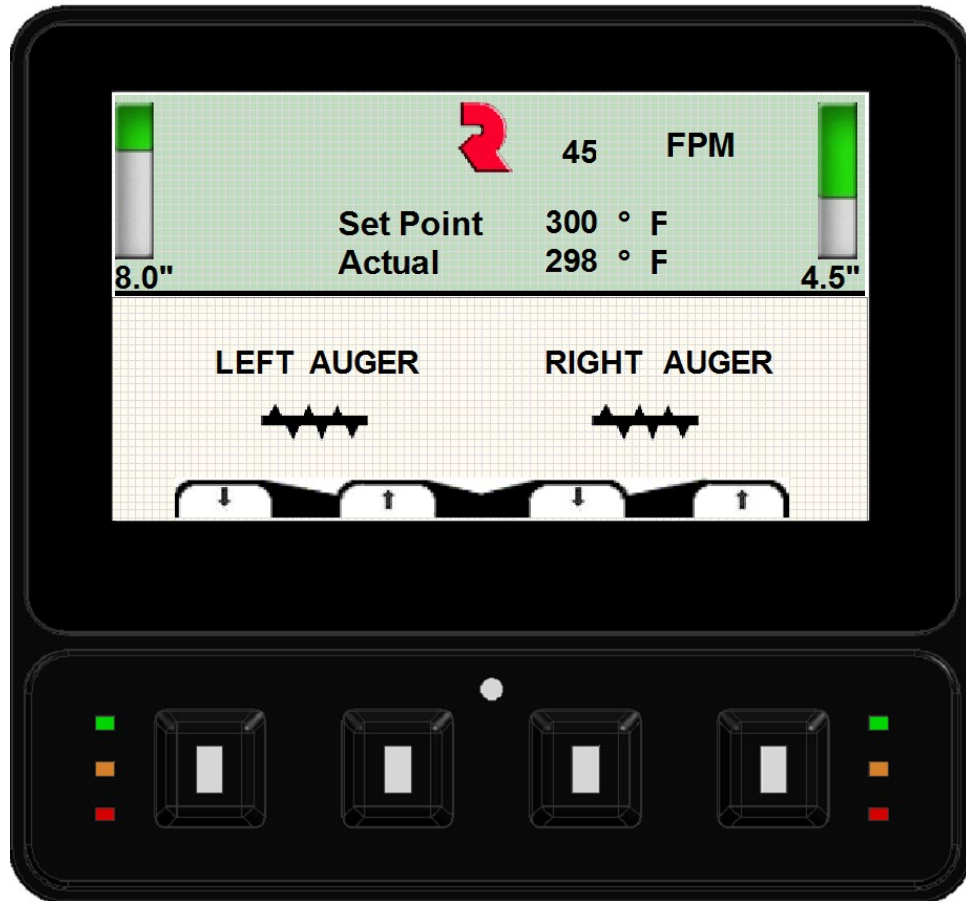
### Main Display Screen



- Push UP on the Screen toggle switch to power on the digital display screen.
- Monitor output values for: Left/Right Flow Gates, Set Point Temperature, Actual Temperature, Feet-per-minute (FPM).
- Adjust temperature with buttons 1 and 2 (up and down arrows).
- Press 3 for Generator ON/OFF.
- Press 4 for Heat ON/OFF.

## 4.09 Screed Digital Display - Auger Raise Screen

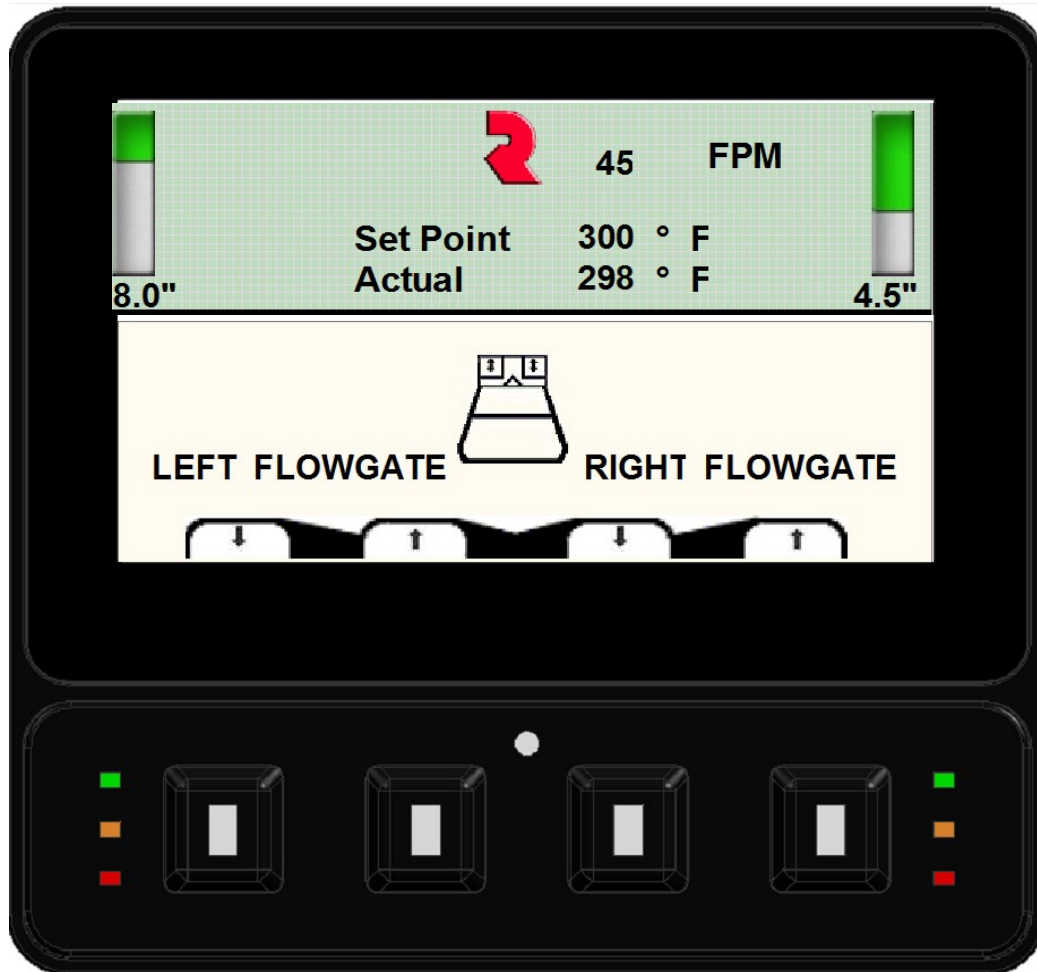
### Auger Raise Screen



- Push UP on the Screen toggle from the Main Screen to enter the Left/Right Auger Screen.
- Flow gate height monitors are visible on upper section of page.
- Left and Right Auger depictions are shown with corresponding arrows. Press UP/DOWN arrows to raise or lower Augers in inches.

## 4.10 Screed Digital Display - Flow Gate Height Screen

### Flow Gate Height Screen

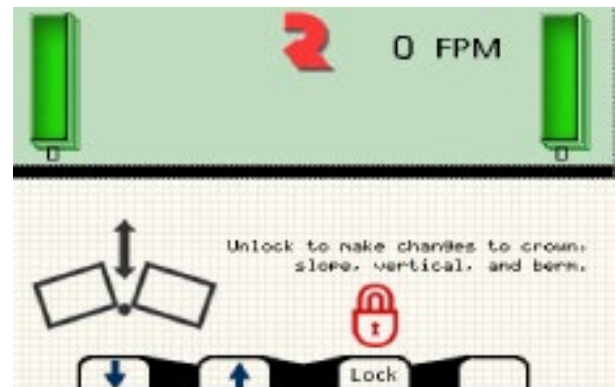
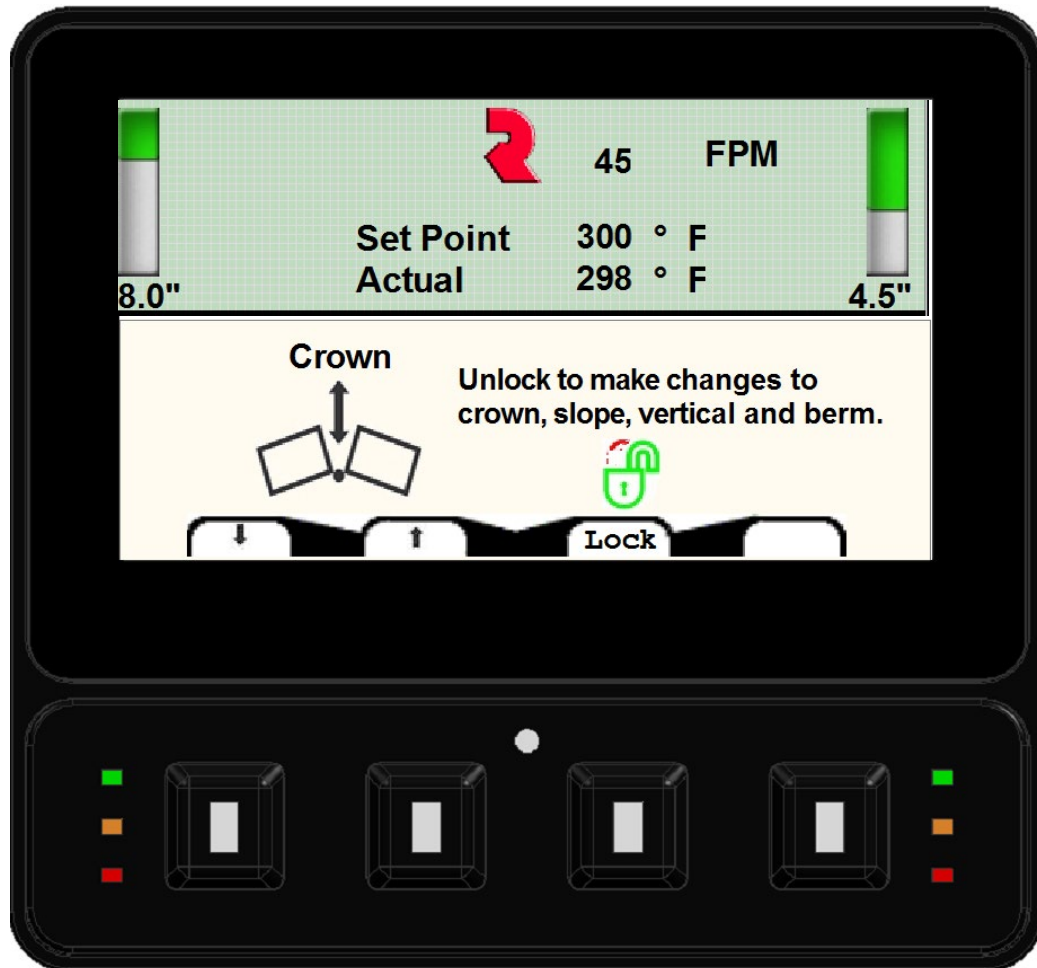


- Push UP on the Screen toggle from the Auger Raise Screen to enter the Flow Gate Height Screen.
- Flow gate height monitors are visible on upper section of page.
- Left and Right Flow Gate depiction is shown with corresponding arrows. Press UP/DOWN arrows to raise or lower Flow Gates in inches.



## 4.11 Screed Digital Display - Screed Settings Screen

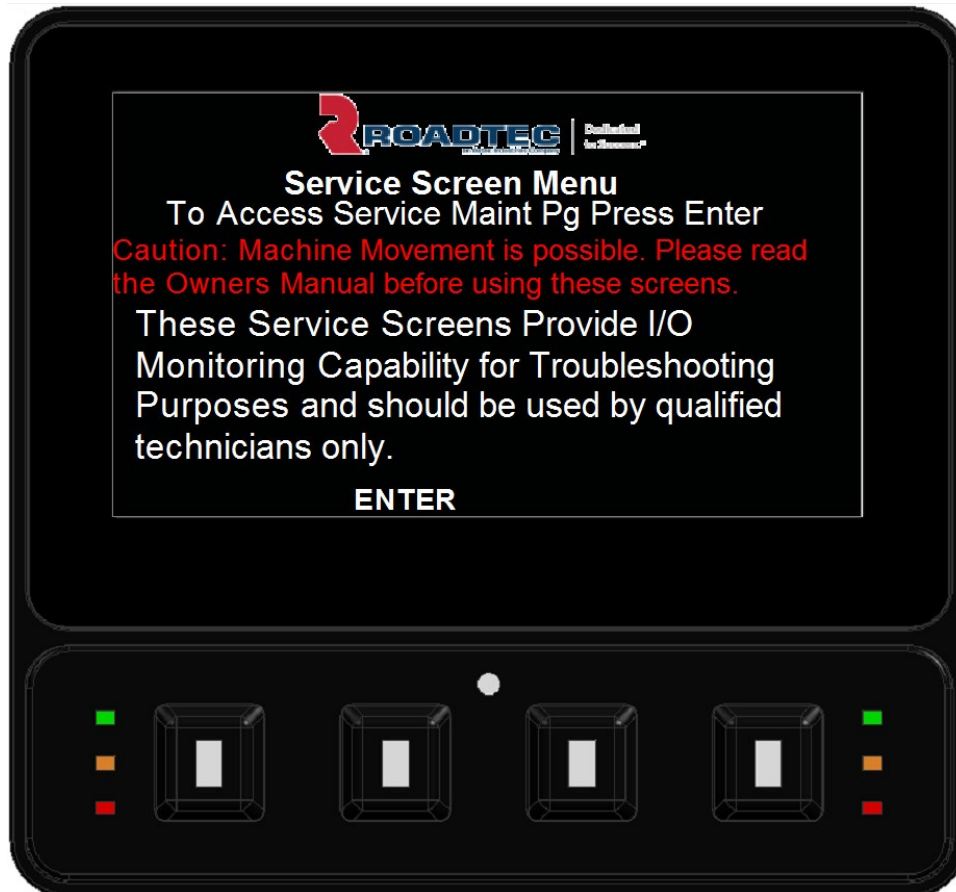
### Screen Settings Screen



- Push UP on the Screen toggle from the Flow Gate Height Screen to enter the Screed Settings Screen.
- Flow gate height monitors are visible on upper section of page.
- Press 3 to unlock settings feature. Settings can be locked by pressing 3 again.
- Press UP/DOWN arrows to raise or lower Crown/Slope/Vertical/Berm.

## 4.12 Screed Digital Display -Service Screen Menu

### Service Screen Menu



- ▶ Press button 2 (ENTER) to enter the service menu.
- ▶ NOTE: These service screens provide input/output monitoring capability for troubleshooting purposes and should only be used by qualified technicians.



## 4.13 Screed Digital Display -Screed Control Screen 1

### Screed Control Screen 1



- Monitor the status for slope, vertical height, automation, feeders, and setup/run. The green light means the switch is active.
- Press button 4 (right arrow to advance to the next screen) Button 3 (left arrow) returns to the previous screen.
- Press button 1 (X) to exit the menu.

## 4.14 Screed Digital Display -Screed Control Screen 2

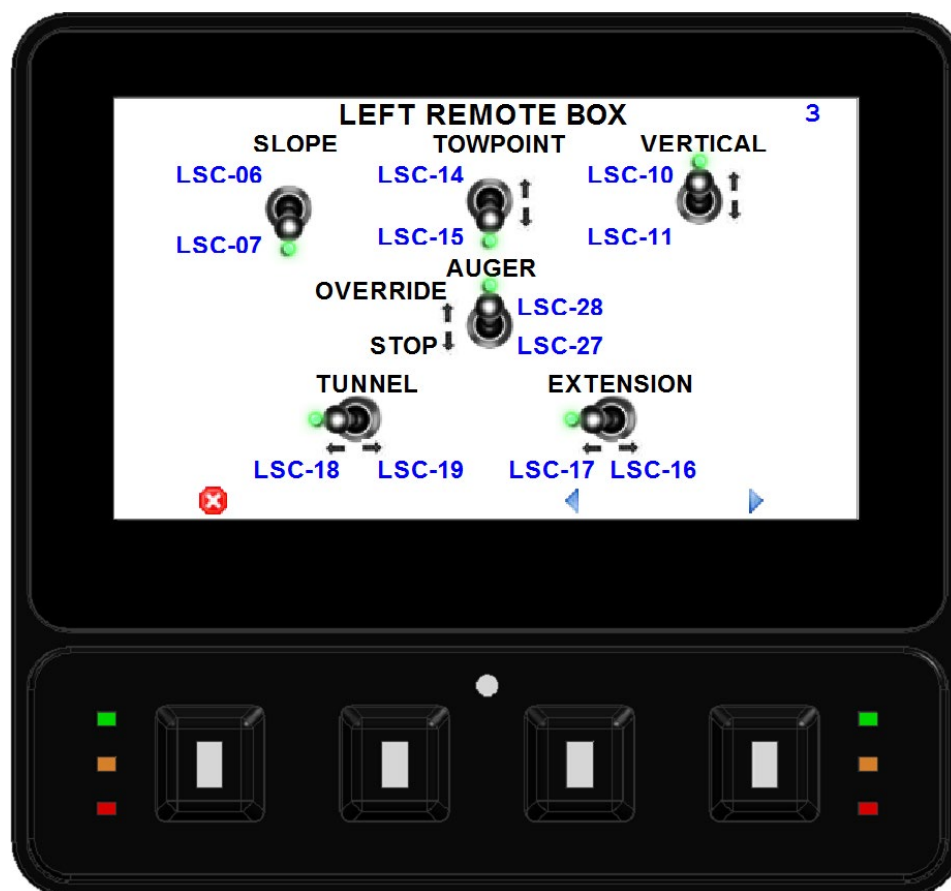
### Screed Control Screen 2



- Monitor the status for towpoint, auger power, flowgate, horn, auger override, conveyor, left and right auger, extension, tunnel, and berm.
- Press button 4 (right arrow) to advance to the next screen; Button 3 (left arrow) returns to the previous screen.
- Press button 1 (x) to exit the menu.

## 4.15 Screed Digital Display -Remote Box Screen

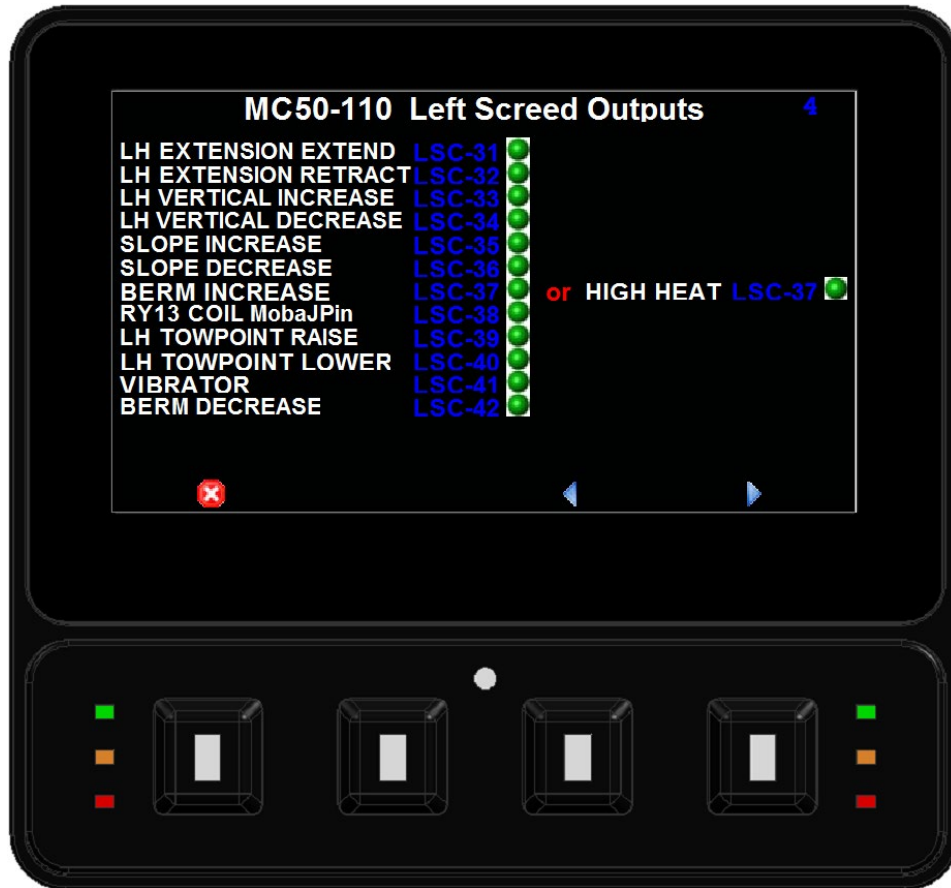
### Remote Box Screen



- ▶ Monitor the status for slope, towpoint, vertical, auger override, tunnel and extension.
- ▶ Press button 4 (right arrow) to advance to the next screen; Button 3 (left arrow) returns to the previous screen.
- ▶ Press button 1 (x) to exit the menu.

## 4.16 Screed Digital Display -MC50-110 Screed Controls

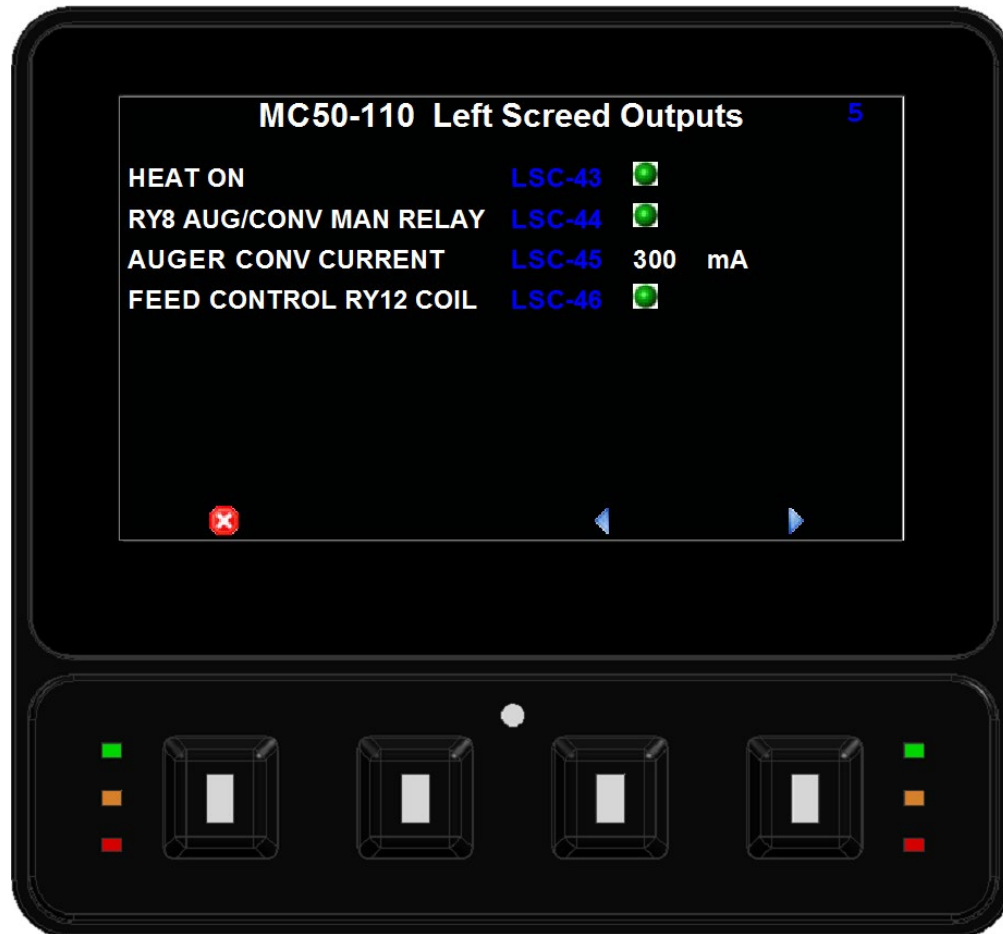
### MC50-110 Screed Controls



- Monitor the status for LH extension extend, LH extension retract, LH vertical increase LH vertical decrease, slope increase, slope decrease, berm increase, RY13 Coil MOBAjpin, LH towpoint raise, LH towpoint lower, vibrator, berm of decrease. Right hand screen will show crown increase and the RY15 coil MOBAjpin.
- Press button 4 (right arrow) to advance to the next screen; Button 3 (left arrow) returns to the previous screen.
- Press button 1 (x) to exit the menu.

## 4.17 Screed Digital Display -MC50-110 Screed Outputs

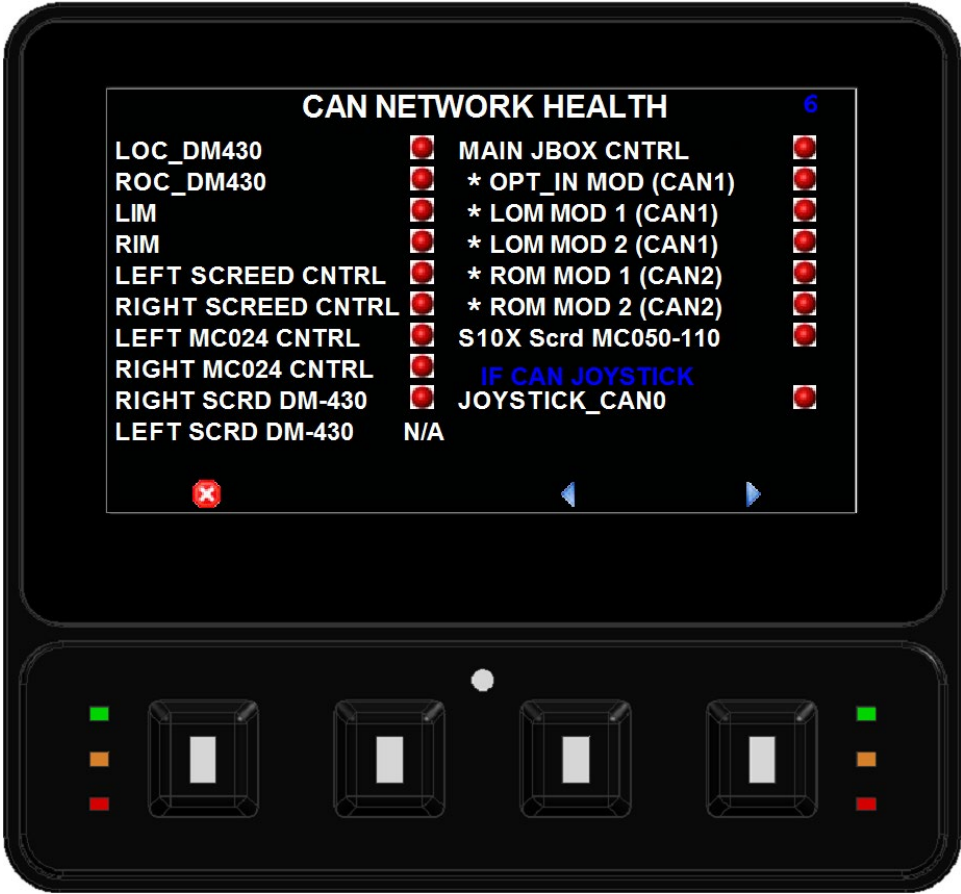
### MC50-110 Screed Outputs



- Monitor the outputs for heat on, RY8 aug/conv manual relay, auger conveyor current, feed control RY12 coil. Heat on only show on Left hand screen. Right hand screen will berm decrease and crown decrease, and RY9 aug/conv manual relay.
- Press button 4 (right arrow) to advance to the next screen; Button 3 (left arrow) returns to the previous screen.
- Press button 1 (x) to exit the menu.

# 4.18    Screed Digital Display -CAN Network Health Screen

CAN Network Health Screen



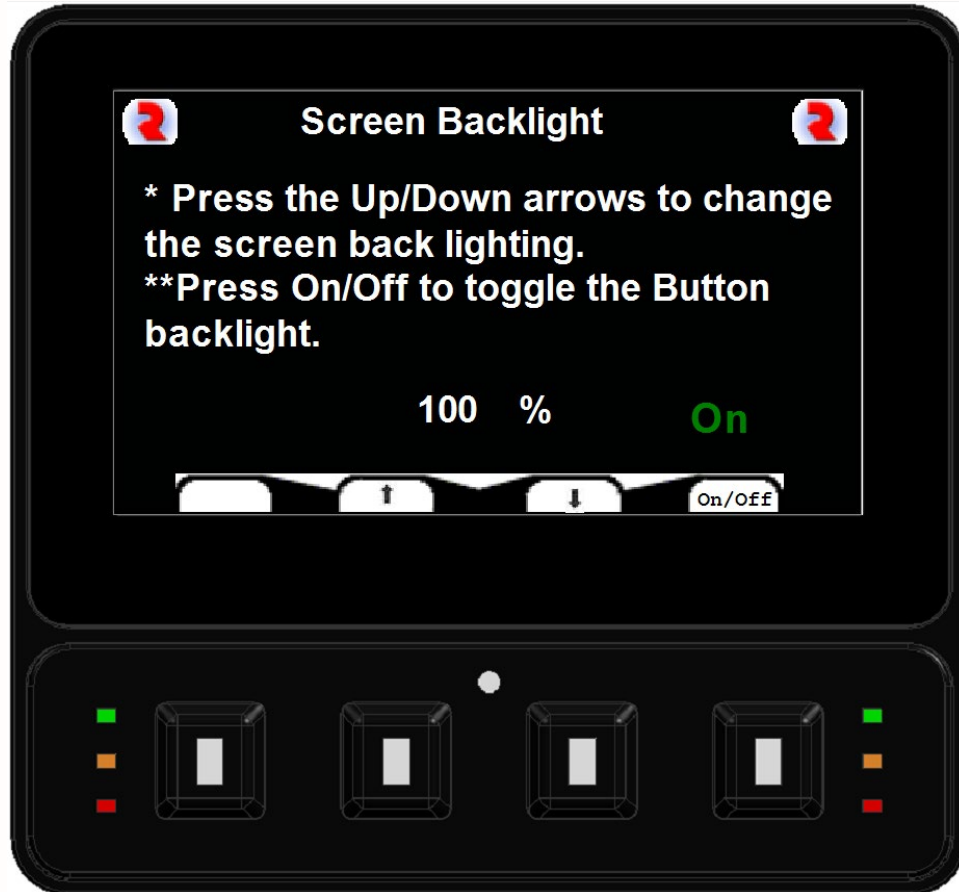
The image shows a digital display titled "CAN NETWORK HEALTH" with a blue number "6" in the top right corner. The display lists various components and their status, each with a red square icon. The components are arranged in two columns. The left column includes: LOC\_DM430, ROC\_DM430, LIM, RIM, LEFT SCREED CNTRL, RIGHT SCREED CNTRL, LEFT MC024 CNTRL, RIGHT MC024 CNTRL, RIGHT SCRDM-430, and LEFT SCRDM-430. The right column includes: MAIN JBOX CNTRL, \* OPT\_IN MOD (CAN1), \* LOM MOD 1 (CAN1), \* LOM MOD 2 (CAN1), \* ROM MOD 1 (CAN2), \* ROM MOD 2 (CAN2), S10X Scrd MC050-110, IF CAN JOYSTICK, and JOYSTICK\_CAN0. Below the list, there is a red square icon with a white 'x' on the left, and two blue arrow icons (left and right) in the center. Below the display, there are four square buttons with a white 'x' in the center, and two green square icons on the far left and right.

Component	Status
LOC_DM430	Red square icon
ROC_DM430	Red square icon
LIM	Red square icon
RIM	Red square icon
LEFT SCREED CNTRL	Red square icon
RIGHT SCREED CNTRL	Red square icon
LEFT MC024 CNTRL	Red square icon
RIGHT MC024 CNTRL	Red square icon
RIGHT SCRDM-430	Red square icon
LEFT SCRDM-430	N/A
MAIN JBOX CNTRL	Red square icon
* OPT_IN MOD (CAN1)	Red square icon
* LOM MOD 1 (CAN1)	Red square icon
* LOM MOD 2 (CAN1)	Red square icon
* ROM MOD 1 (CAN2)	Red square icon
* ROM MOD 2 (CAN2)	Red square icon
S10X Scrd MC050-110	Red square icon
IF CAN JOYSTICK	Red square icon
JOYSTICK_CAN0	Red square icon

- Monitor the CAN network health for LOC\_DM430, ROM\_DM430, LIM, RIM, left screed control, right screed control, left MC024 control, right MC024 control, right screed DM-430, left screed DM-430, main J box control, opt in mod (CAN1), LOM Mod 1 (CAN1), LOM Mod 2 (CAN2), ROM Mod 1 (CAN2), ROM Mod 2 (CAN2), S10X Screed MC050-110, and Joystick CAN0.
- Press button 4 (right arrow) to begin the rotation of service screen again.
- Button 3 (left arrow) returns to the previous screen.
- Press button 1 (x) to exit the menu.

## 4.19 Screed Digital Display -Screen Backlight

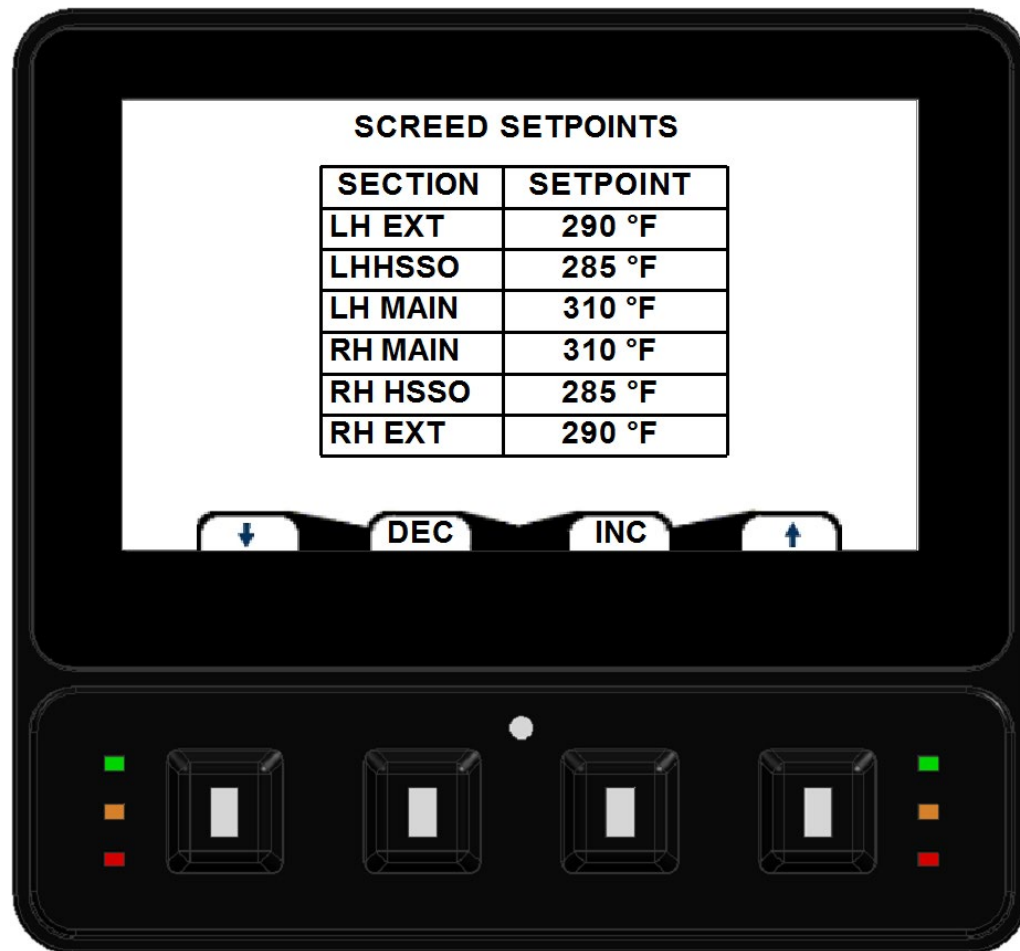
### Screen Backlight



- ▶ Press button 2 (up arrow) to increase light by 10%
- ▶ Press button 3 (down arrow) to decrease light by 10%
- ▶ Press 4 to EXIT to Main Screen.

## 4.20 Screed Digital Display -Screed Setpoints Screen

### Screen Setpoint Screen

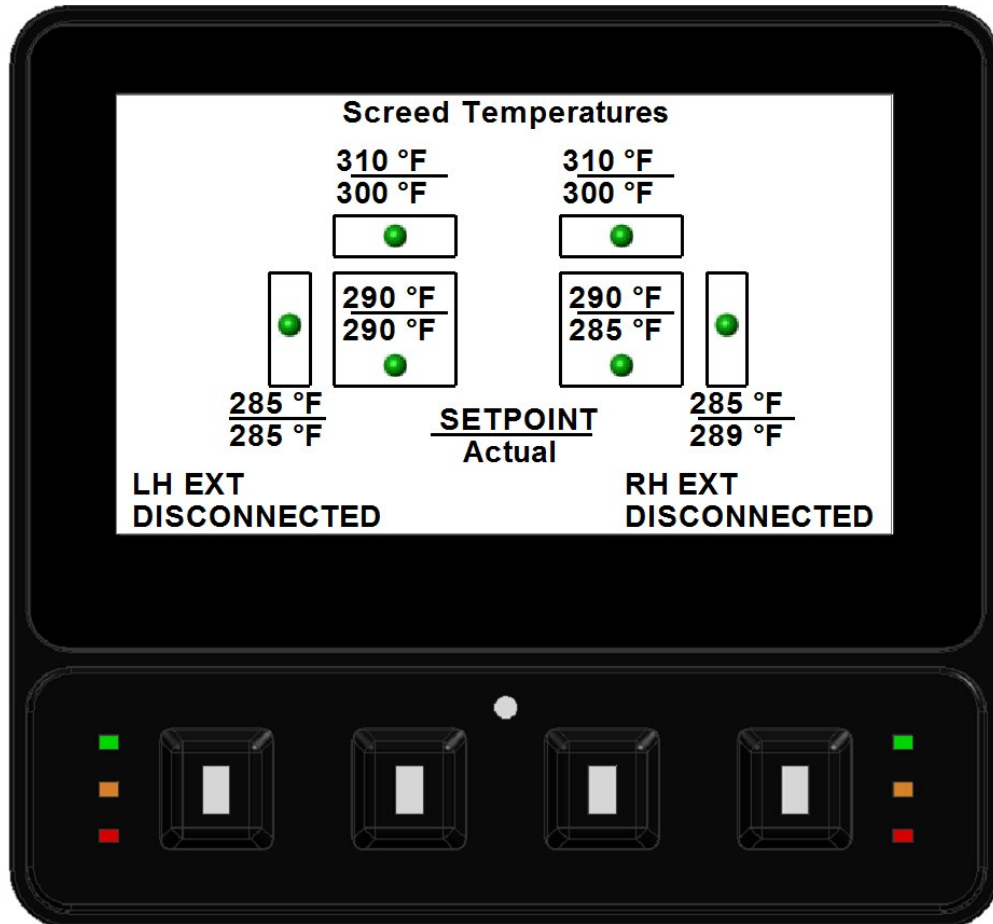


- ONLY available when the S-10X screed is installed.
- Press button 1 (down arrow) to toggle through menu items for LH EXT, LH HSSO, LH Main, RH Main, RH HSSO, and RH EXT.
- Press buttons 2 and 3 (DEC and INC) to decrease or increase values.
- Press 4 to EXIT to Main Screen.



## 4.21 Screed Digital Display -Screed Temperatures

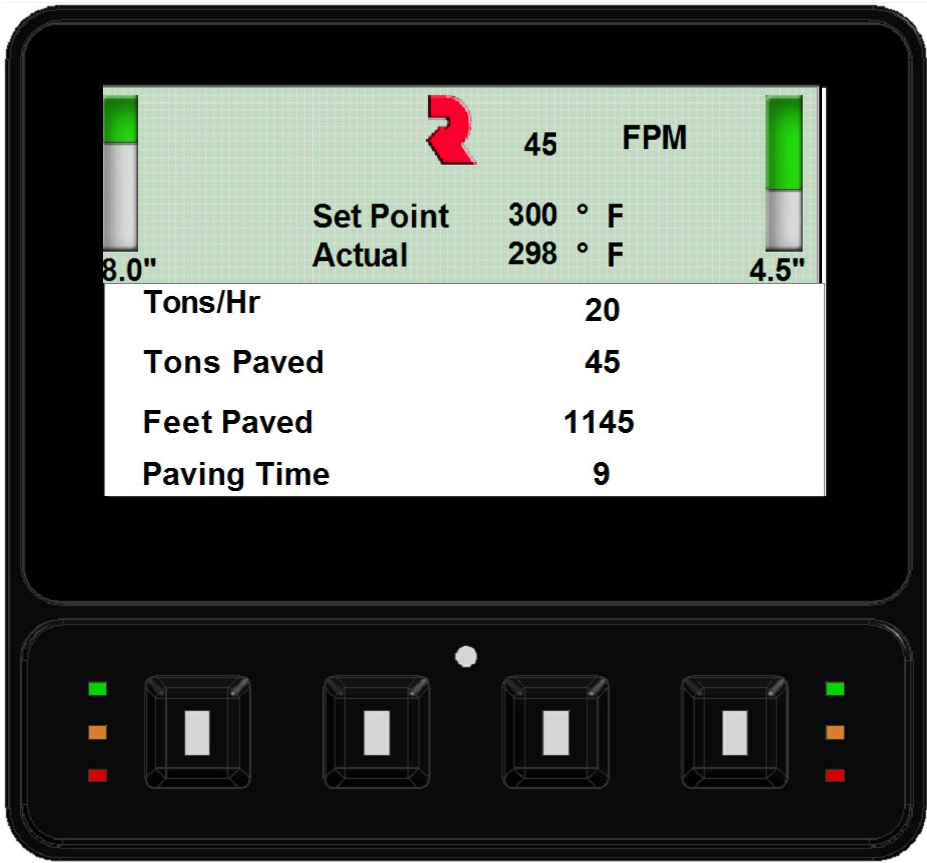
### Screed Temperatures



- ▶ ONLY available when the S-10X screed is installed.
- ▶ Monitor screed and heating element temperatures. The top value in each set represents the setpoint value. The bottom number represents the actual temperature reading.
- ▶ Press 4 to EXIT to Main Screen.

## 4.22    Screed Digital Display -Paver Production Screens-Guardian

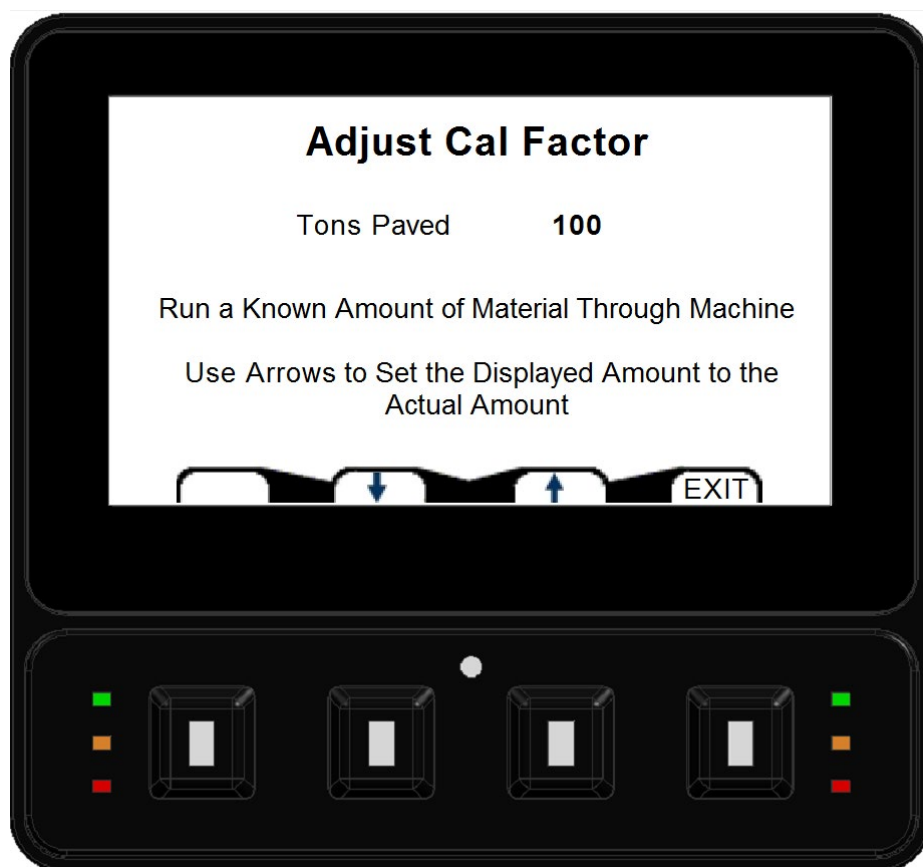
### Paver Production Screens for Guardian - Tons and Feet Paved Totals Screen



- Monitor tons per hour, total tons paved, total feet paved, and total paving time. **This screen is found on Left Screed Digital Display ONLY and only if machine option is available.**
- Press 4 to EXIT to Main Screen.

## 4.23 Screed Digital Display - Paver Production Screens-Guardian

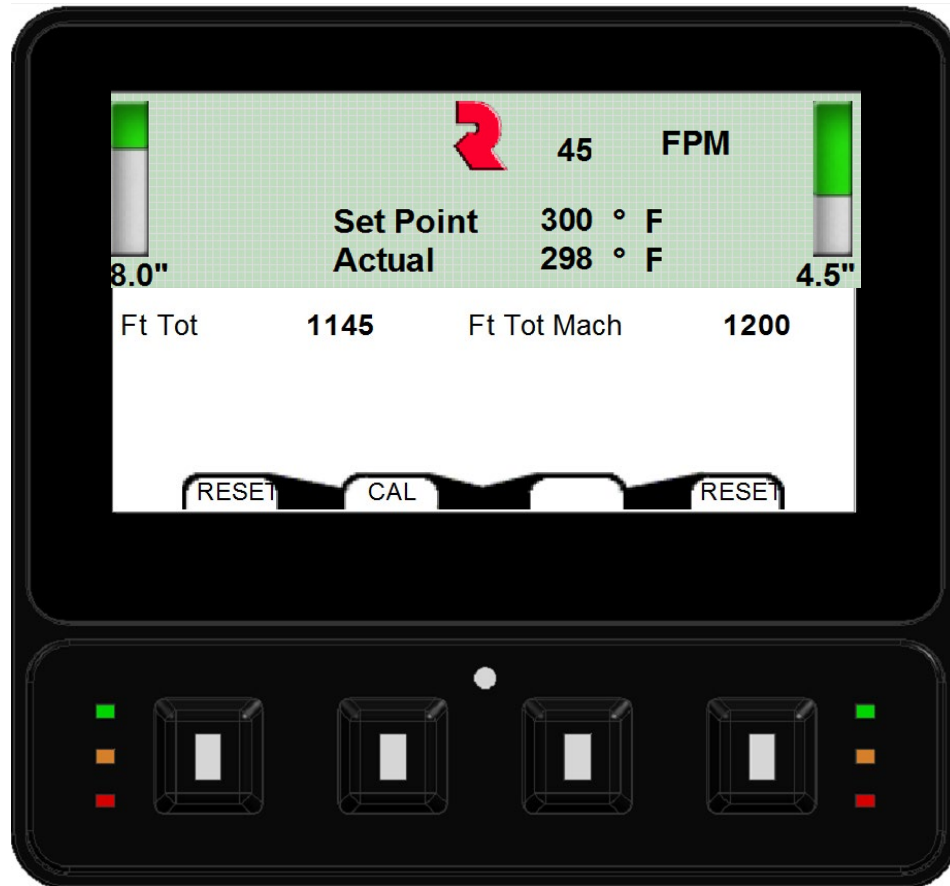
### Paver Production Screens for Guardian - Adjust Calibration Factor



- ▶ Run a known amount of material through the machine.
- ▶ Press button 2 (down) or button 3 (up) to adjust the displayed amount to the actual amount of material run the machine. This will provide matching totals going forward. **Paver production screens found only on Left Screed Digital Display and only if option is available.**
- ▶ Press 4 to EXIT to Main Screen.

## 4.24 Screed Digital Display -Total Feet Screen

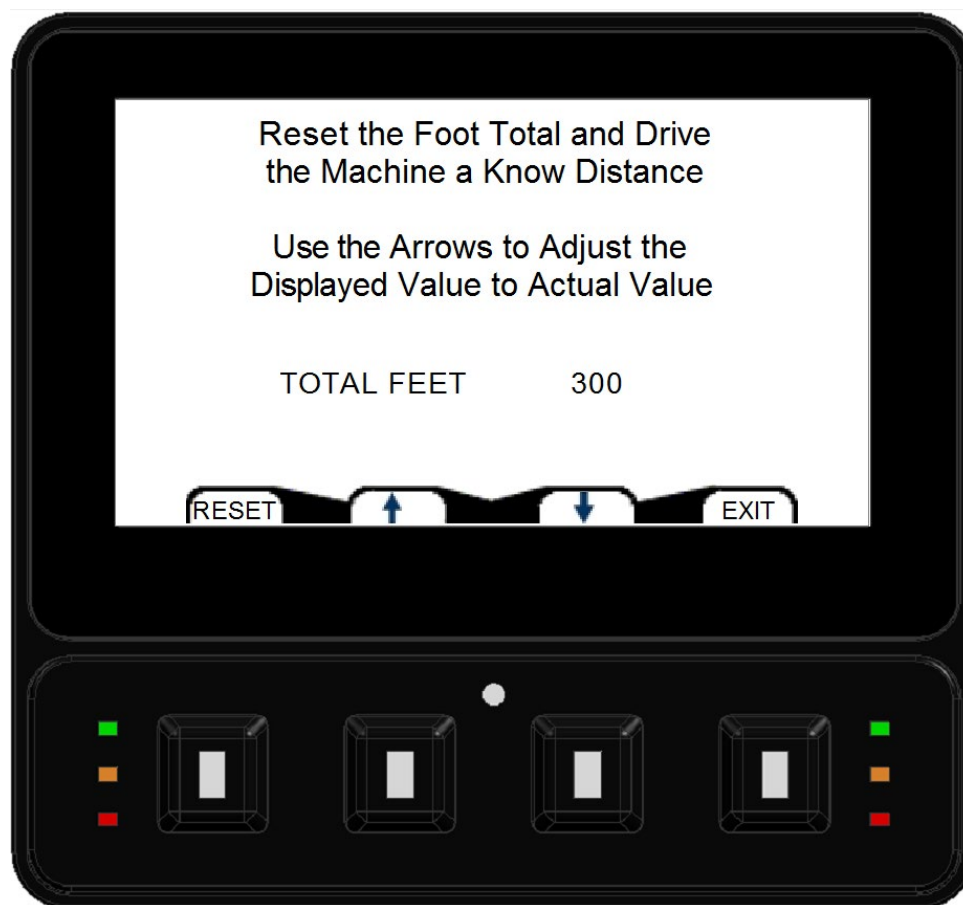
### Total Feet Screen



- Reset the Foot Total Values, then drive the machine to a known distance.
- Press button 1 (reset) to reset values for total feet traveled.
- Press button 4 (reset) to reset the total feet for machine.
- Press button 2 (CAL) to calibrate.

## 4.25 Screed Digital Display -Total Feet Calibration Screen

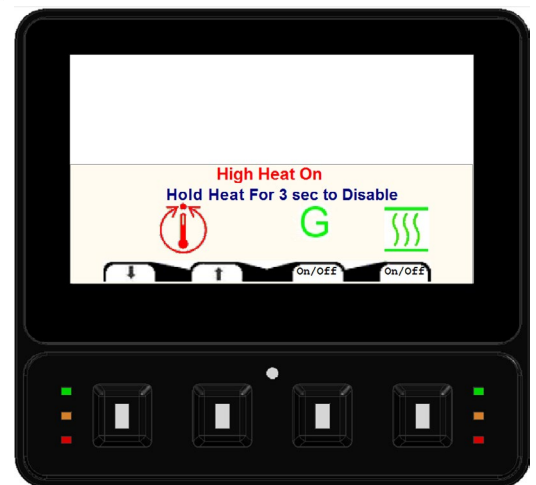
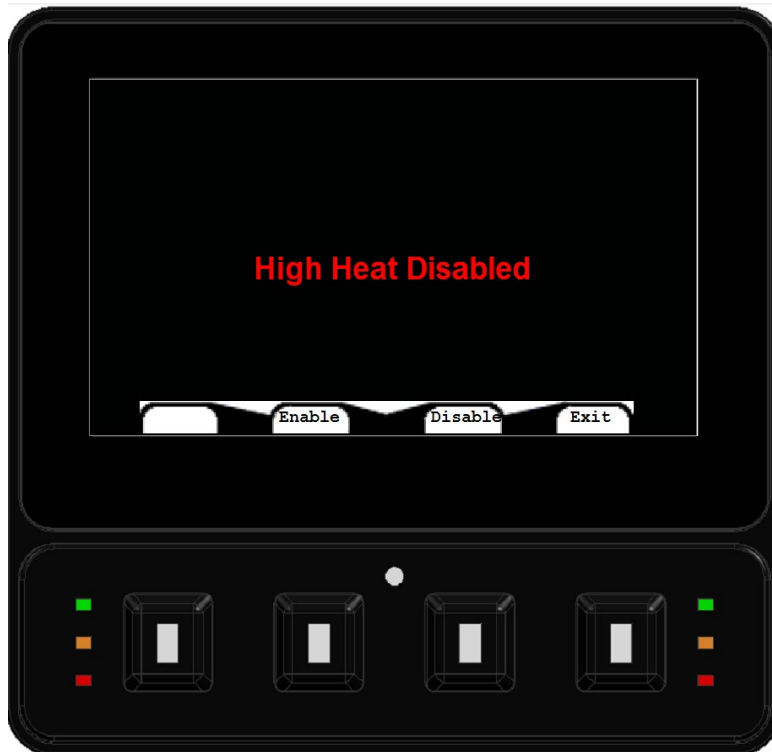
### Total Feet Screen



- Press button 2 (CAL) from the Total Feet Screen to calibrate Total Feet.
- Reset the Foot Total Values, then drive the machine to a known distance.
- Use the arrows to adjust the displayed value to the actual value.
- Press button 1 (reset) to reset values
- Press button 2 (up arrow) to increase total feet
- Press button 3 (down arrow) to decrease total feet
- Press 4 to EXIT to Main Screen.

## 4.26 Screed Digital Display - High Heat Screen

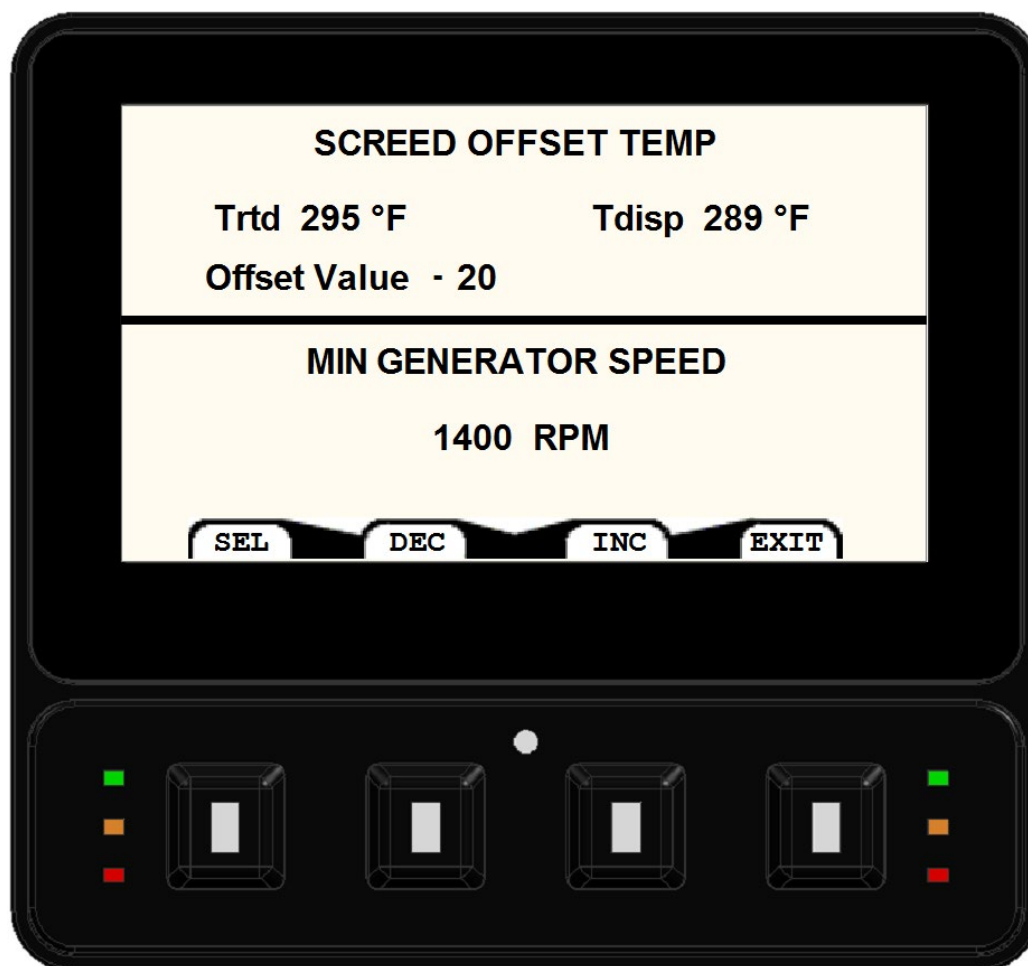
### High Heat Screen



- **Press and hold button 1 as the digital screen powers up to access the High Heat screen. This feature appears on the Left Hand screen only.**
- Press button 2 (ENABLE) to enable high heat.
- Press button 3 (DISABLE) to disable high heat. The status will show on the main screen.
- Press button 4 (EXIT) to the main screen.

## 4.27 Screed Digital Display - Screed Offset Temp/Generator

### Screed Offset Temp / Min. Generator Speed

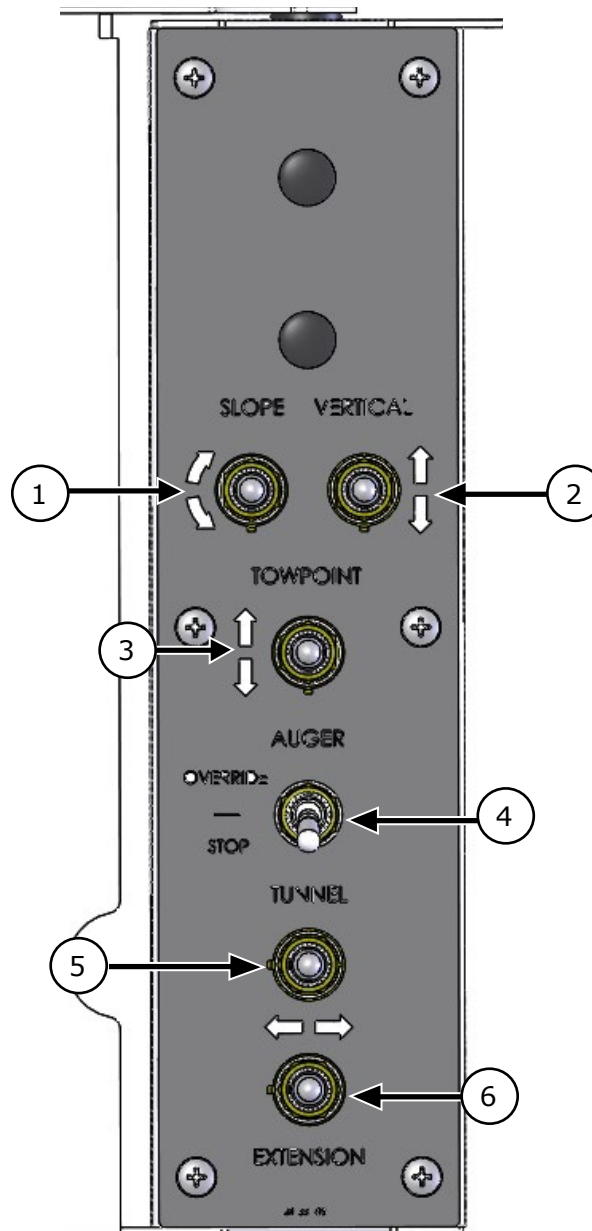


- **Press and hold button 1 as the digital screen powers up to access the Screed Offset Temp and Min. Generator Speed screen. This feature appears on the Right Hand screen only.**
- Press button 1 (SELECT) to toggle between the screed offset features and the min. generator speed option. Selection will highlight in green.
- Press button 2 (DEC) to decrease offset value by 1 point or decrease RPMs by 100.
- Press button 3 (INC) to increase offset value by 1 point or decrease RPMs by 100.
- Press button 4 (EXIT) to the main screen.

## 4.28 Remote Screed Box

Use the remote screed boxes for ground operations, including right and left side screed extension speed, auger controls with override, tow point raise/lower, vertical and slope controls and hydraulic tunnels left/right controls.

### Remote Screed Pendant

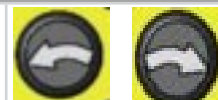




## Remote Screed Box Controls

### 1. Slope Left/Right Adjustment

Push Left Arrow to adjust screed slope left. Push Right Arrow to adjust screed slope right.



### 2. Slope Up/Down Adjustment

Push Up Arrow to raise screed slope. Push Down Arrow to lower screed slope.



### 3. Tow Point Raise / Lower

Push Up Arrow to raise tow point. Push Down Arrow to lower tow point.



### 4. Auger Override/Stop

Enable or disable auger.



### 5. Screed Tunnel Switch

Extends or retracts left and right side screed tunnel.



### 6. Screed Extensions Switches

Extends or retracts left and right side screed extensions.



## 4.29 Pre-Start Conditions

Asphalt paving requires a skill for balancing several variables. The screed operator must control the screed well to produce a mat of consistent texture and density. The variables to balance are:

- ✓ **Correct angle of attack**
- ✓ **Constant paver speed**
- ✓ **Consistent head of material**

The **Line of Pull** describes the critical relationship between the tractor, the screed and the paving surface. The tractor will average the ride, but the proper line of pull must also be maintained between the surface and the screed. This relationship is set using the tow-point.

An incorrect line of pull will result in increased wear rates and reduced pre-compaction of material. Additionally, the incorrect line of pull will adversely influence automation rates.

The **high tow point** with a thin lift will result in an upwards pull. The upwards pull applies pressure to the screed nose, resulting in a quick upwards movement and sluggish downward movement.

The **low tow point** with a thick lift will result in a line of pull that pulls downward on the screed rear. This will result in a slow reaction time to increase mat thickness.



**Set** the tow point **1 inch** higher than the loose mat thickness to be paved as a general rule.



## 4.30 Pre-Start Check List

- ☐ Read and understand operation and safety procedures for this machine before operating.
- ☐ Connect auger and conveyor wires to pump controls on new machines.
- ☐ Remove parts kits from hopper area before starting machine. Never operate conveyors until the parts kit has been removed.
- ☐ Inspect the paver and ensure all tools and loose items are removed from the paver decks. Ensure all steps and hand-holds are free of grease and oil.
- ☐ Keep a safety focus. Observe safety decals and warnings.
- ☐ Become familiar with all machine controls.
- ☐ Understand and follow all hazard alert decals on machine.
- ☐ Allow only trained and qualified personnel onto operator platform.
- ☐ Allow only one operator on platforms at time. Forbid riders.
- ☐ Walk around machine and perform visible inspections.
- ☐ Check all lubricant, coolant and fuel levels.
- ☐ Check that hydraulic tank is filled to 90% capacity.
- ☐ Perform visual inspections for signs of fluid leaks, excessive wear on any parts and any damage to machine. Make repairs before starting machine.
- ☐ Insert spray bar nozzles.
- ☐ Ensure all emergency stop buttons are on RUN.
- ☐ Ensure battery disconnect switches are on. Check for possible safety lock out tags on switches.
- ☐ Board machine using 3-point connection on steps and handrails provided across the screed.
- ☐ Set beacon lights to ON.
- ☐ Test hopper sides, screed lift and hydraulic extensions.
- ☐ Listen for unusual noises or vibrations.
- ☐ Ensure all personnel are clear of machine and drive-off zone.
- ☐ Ensure total visibility. Check that mirrors are mounted and positioned correctly. Never remove mirrors. Replace missing mirrors immediately.
- ☐ Operate machine in ambient temperature range of 125 °F – -10 °F (51.6 °C - -23.3 °C). Operate machine fluids in temperature range of 221 °F – -10 °F (104 °C - -23.3 °C).

### WARNING

Avoid serious injury or death.

**NEVER** start a machine with safety lockout tag attached.

**NEVER** move machine into path of moving vehicles.

**NEVER** change speeds while the machine is in motion. Always bring machine to a complete stop before shifting between speeds.

**NEVER** work at a speed greater than conditions allow.

**NEVER** operate machine on slopes or uneven surfaces.

**NEVER** operate machine on wooden bridges and bridges not rated to support machine weight.

W-1019

## Paver Speed for Tons Per Hour and Mat Thickness (Imperial)

Based on 12 ft.-wide lane. Mix compacted to 140 lbs./cu. ft.

Paver Speed (Feet Per Minute)		Mat Thickness (Inches)							
		1	2	3	4	5	6	7	8
10		42	84	126	165	210	252	294	336
15		63	126	189	252	315	378	441	504
20		84	168	252	336	420	504	588	672
25		105	210	315	420	525	630		
30		126	252	378	504	630			
35		147	294	441	588				
40		168	336	504	672				
45		189	378	567	756				
50		210	420	630					
55		231	462	693					
60		252	504	756					
65		273	546	819					
70		294	588						
75		315	630						
80		336	672						

## Paver Speed for Tons Per Hour and Mat Thickness (Metric)

Based on 3.7 m.-wide lane. Mix compacted to 2243 kg/cu. m.

Paver Speed (Meters Per Minute)		Mat Thickness (Millimeters)							
		25.4	50.8	76.2	101.6	127.0	152.4	177.8	203.2
3.0		38	76	114	150	191	229	267	305
4.6		57	114	171	229	286	343	400	457
6.1		76	152	229	305	381	457	533	610
7.6		95	191	286	381	476	572		
9.1		114	229	343	457	572			
10.7		133	267	400	533				
12.2		152	305	457	610				
13.7		171	343	514	686				
15.2		191	381	572					
16.8		210	419	629					
18.3		229	457	686					
19.8		248	495	743					
21.3		267	533						
22.9		286	572						
24.4		305	610						

## 4.31 Pre-Start Communication

### Know Your Role and Responsibilities

#### PAVER OPERATOR

- ▀ Communicate with the crew
- ▀ Prepare the machine for work
- ▀ Set flow gates
- ▀ Position the paver
- ▀ Maintain a constant speed

#### SCREED CREW

- ▀ Set up screed
- ▀ Communicate with the driver
- ▀ Check crown
- ▀ Check extension height settings
- ▀ Position Augers
- ▀ Position Sensors
- ▀ Maintain constant head of material
- ▀ Check depths and levels
- ▀ Watch for soft-base surfaces



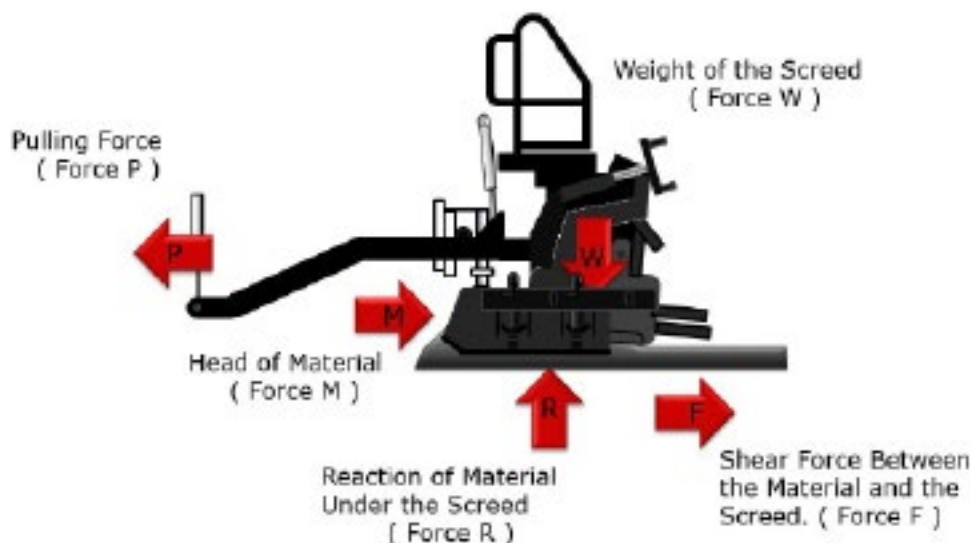
#### DUMP CREW

- ▀ Ensure safe and smooth truck engagement. Watch out for power lines, limbs and other obstructions. Ensure material is discharged en masse instead of dribbled into the paver.
- ▀ Eliminate spillage potential. Keep roadway in front of paver clear of material.
- ▀ Ensure sufficient supply of mix in hopper
- ▀ Communicate with the driver - ensure the truck driver and paver operator know when you are positioned between them. Communicate when it is safe to pull out into live traffic. Receive tickets from truck drivers.

## 4.32 Screed Operations

### Forces Acting On the Screed

- ▶ The Pull Force, **Force P**, is determined by the speed at which the paver tractor is pulling the screed. **Force M**, the Head of Material, is pushing against the pull, as is the Shear Force, **Force F**, between the material and the screed.
- ▶ **Force W**, the weight of the screed is pushing down against the upward **Force R**, the Reaction of the Material Beneath the Screed.
- ▶ The screed will fall when the paving speed increases due to the reduction of the head of material.
- ▶ The head of material also falls when the screed extensions are opened.
- ▶ Balance is achieved with constant paving speed, consistent material flow, and a maintained screed width and depth.



### Correction Time

- ▶ 1 1/2 paver lengths or 5 tow-arm lengths (50'-60' or 15.25-18.25 m) are required in order for the screed to correct given the forces enacted upon it.



## 4.33 Prepare the Screed

### Stringline the Screed

**Stretch a string across the screed to ensure the screed is level.**

1. **Check** the rear of the screed and adjust to level.





## 4.34 Screed Set Up

### Set Up Screed

See the following pages for details on the steps to set up the screed.

1. **Check** crown, extensions, angle of attack, slope and height settings.
2. **Set** starting blocks including compaction roll down. The rule of thumb for starting block size is mat thickness plus 25%.
3. **Null** screed.
4. **Set** to positive angle of attack.



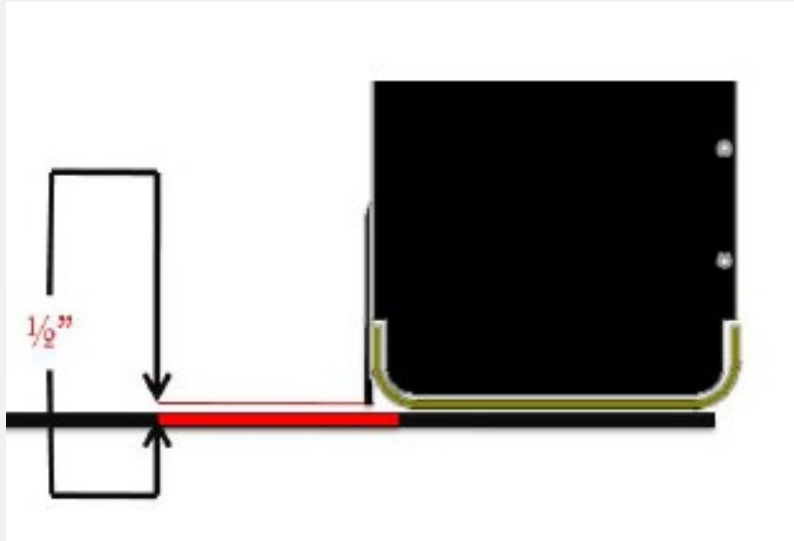
### Set Tow Point

- Set both tow points to depth of mat. The rule of thumb is to set the tow points at mat depth + 1 in. (25 mm).
- Remove any slack from tow arms by moving forward.



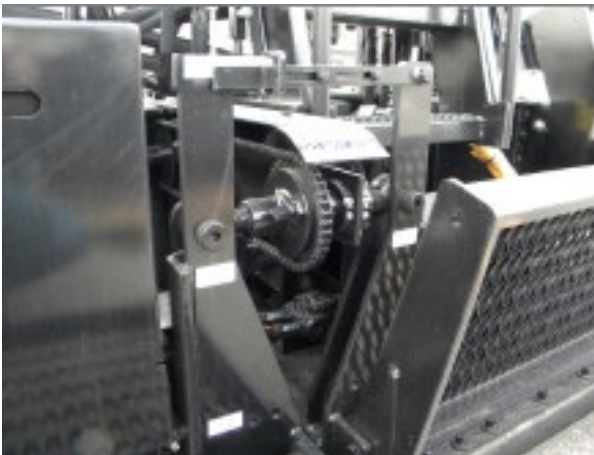
## Set Pre Strike-Off

- Mix designs vary and the pre strike-off plates must be adjusted in order to cause the screed to ride correctly over the mat being laid down.
- The force of the head of material against the strike-off will tend to roll the screed in a specific direction. The screed will ride on the nose when the strike-off is adjusted too low. Premature wearing of the front of the screed plate or bull nose will occur.
- Set the bottom of the strike-off to 1/2" above the screed bottom. Adjust the strike-off from the top of the screed (12.5 mm).



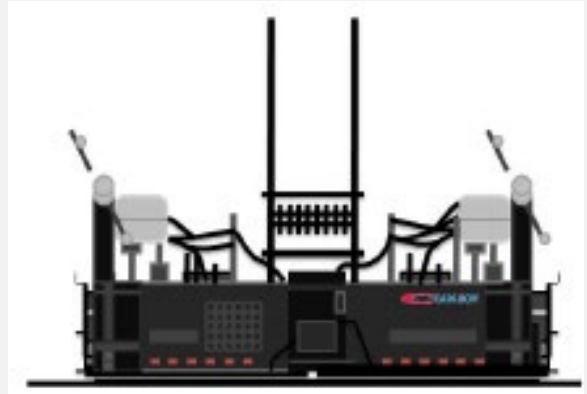
## Set Crown Height

- Lead crown refers to having more crown in the front of the main screed plate than on the rear edge. Lead crown settings allow extra material to flow to the center of mat to allow for material compaction.
- **Check** the crown using a stringline.
- **Set** to 1/8" (3.175 mm).



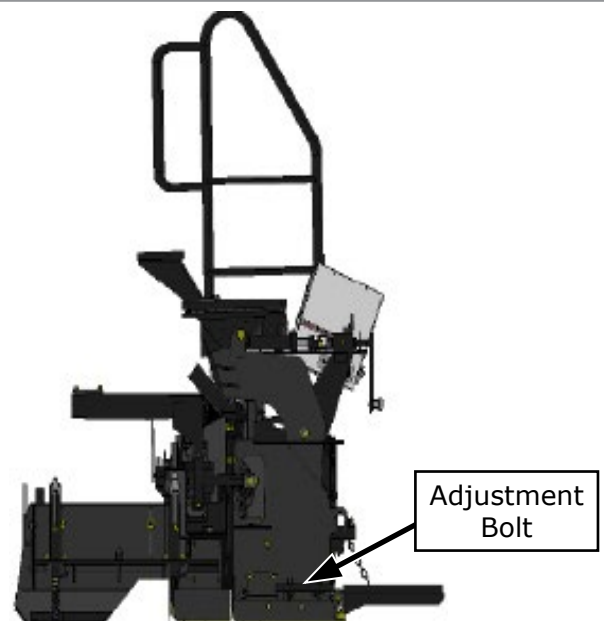
## Null Screed

1. **Raise** Screed UP.
2. **Position** boards beneath screed that are equal in thickness as the unrolled mat depth.  
**IMPORTANT: Fully support the screed bottom from front to rear with a board for every 10 feet of screed width.**
3. **Lower** Screed to rest on boards.
4. **Turn** depth cranks until screed face is resting level on boards.
5. **Turn** depth cranks one full turn counter-clockwise to set an initial angle of attack. The rear extension is set to 3/16" (4.5 mm). Hand cranks will have a small area of rotary movement where little resistance is felt. This indicates that the screed is nulled out.  
**NOTE: the angle of attack will be adjusted as paving operation begins based on material, temperature, head of material, tow point position and screed type.**
6. **Set** Screed heating to ON to pre-warm screed to the same temperature as the material to avoid material adhering to the screed bottom plate.  
**IMPORTANT: Never under-heat or over-heat the screed bottom.**



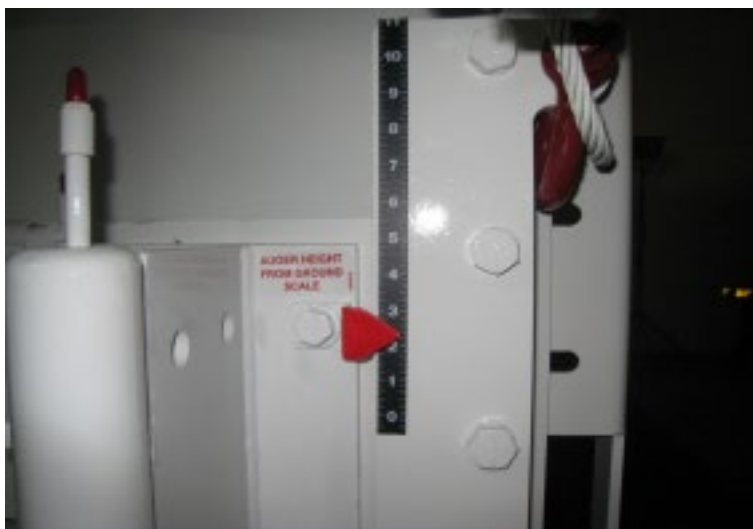
## Set Angle of Attack (including Screed Extensions)

- ▀ The pressure exerted by the rear pressure plate must be equal along the ENTIRE plate in order to produce a mat of consistent density and texture.
- ▀ As the angle of attack is changed on the main screed, it affects the vertical position on the rear extension. The angle of attack is normally set on the rear extension to 3/16 (4.5 mm).
- ▀ The tail of the extension should touch the level and show a 1/4" (6.5 mm) air-gap at the front of the extension.
- ▀ **Check** the flatness by using a straight-edged level along the main screed. Adjust as needed.



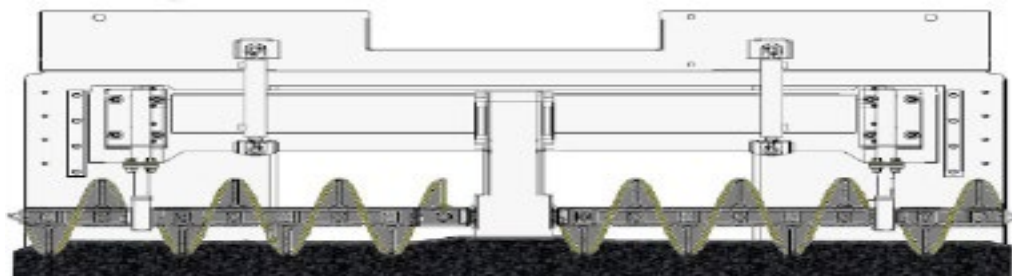
## Set Auger Height

- Auger height is determined by mat thickness and will control the head of material.
- Add 2" (50 mm) above mat height to auger height setting.**



## Adjust Pile Height and Head of Material

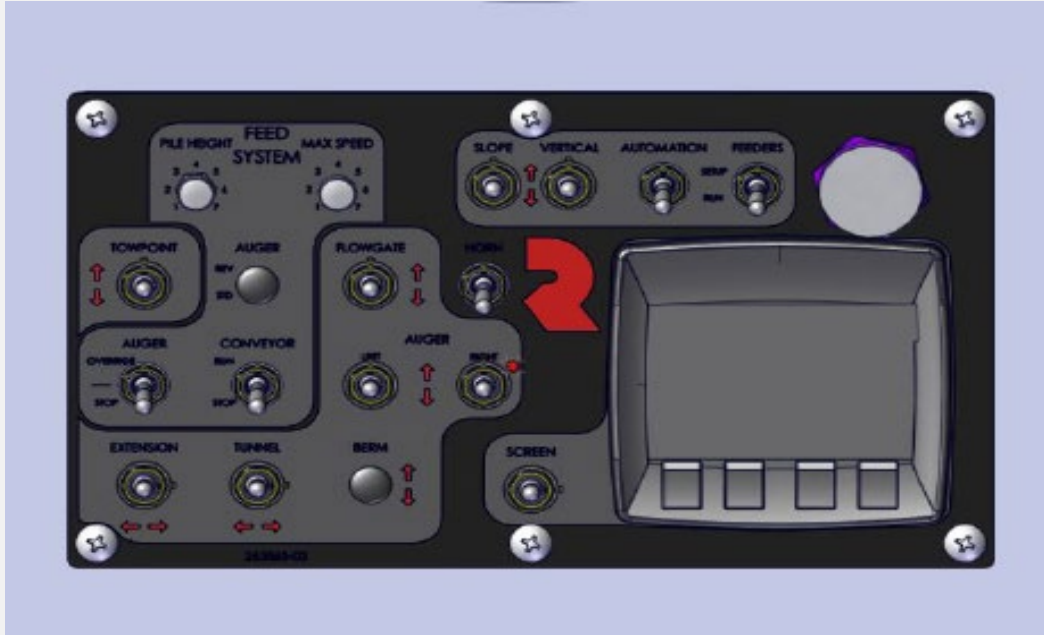
- 95% of all mat flaws originate from paving with an incorrect head of material.
- Run** augers 100% of the time. Ensure there is an even amount of material across the auger chamber.
- Use** a combination of flow gate adjustments and pile height adjustments to control the head of material.



## 4.35 Feed System Set Up

### Feed System

- The paver is equipped with an ultrasonic feed control system that automatically control the conveyor speed and auger speed in order to maintain a consistent head of material at the screed. The feeder system also promotes material mixing that produces a higher quality mat.



### Set Flow Gates

- Flow Gates are designed to meter the amount of material that is delivered to the auger chamber. Material will flood the center auger area if flow gates are set too high. The auger chamber should show an even amount of material across the tunnel, and the augers should turn freely.
- Set** flow gates to 3-4 to enable the material flow to stay evenly distributed across the auger chamber.



## Steps to Set Up Feed System

1. **Set** Pile Height. The rule of thumb is to set the dial at 3-4.
2. **Set** Augers 2" (50 mm) or higher than mat.
3. **Set** Flow Gates. The rule of thumb is 3-4.
4. **Feed** auger tunnel and extensions with a uniform head of material (half the auger height).
5. **Position** sonic feed sensor on end gate so that it is directed toward the rolling face of the head of material and positioned at 90 degrees to face of material.
6. **Set** Auger Speed. The rule of thumb is 3-4 on the dial.
7. **Adjust** Pile Height using dial to adjust the height of material as needed.  
***IMPORTANT! Never adjust augers speed. The augers should always be rotating.***
8. **Ensure** the Feed Set Up switch is in the RUN position once a uniform head of material is achieved.





## Keep Hopper Filled with Material

- **Stop** the paver before material drops below the flood gate.
- **Keep** conveyor deck covered with a minimum of 6 in. (152 mm) of material at all times.
- **Empty** the hopper as seldom as possible to achieve a more quality mat.



## Truck Exchanges

1. **Maintain** contact with drivers. Explain how much material is needed each time drivers unload.
2. **Ensure** trucks stop approximately 20" (.5 m) in front of the paver, then allow the paver to engage the truck. The driver should release the truck brakes to allow the paver to push against the truck. The dump operator will then signal the driver to raise the truck bed and begin dumping the load.
3. **NEVER** allow trucks to bump the paver to prevent bumps and ridges in the mat.
4. **NEVER** allow spillage so that mix is not compacted by the paver wheels, resulting in cold spot and uneven mat density.



## 4.36 Paving Techniques

### Mat Thickness

- Roll down is the differential value between non-compacted and compacted material.
- Always allow room for roll down to achieve proper mat thickness.

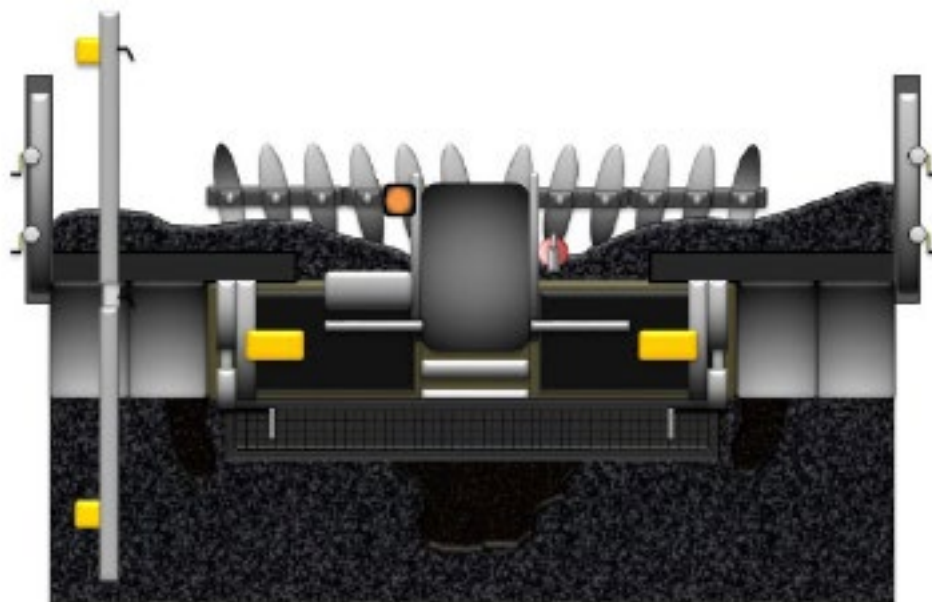
Desired Final Mat Thickness	Initial Thickness Required
1 in. (25.4 mm)	1.26 in. (32.0 mm)
2 in. (50.8 mm)	2.53 in. (64.3 mm)
3 in. (76.2 mm)	3.79 in. (96.3 mm)
4 in. (101.6 mm)	5.05 in. (128.3 mm)

### Material Management

- Keep material contained.
- Prevent excessive rolling of materials.
- Move material in a smooth uniform, uninterrupted manner.

### Head of Material

- Gradation changes in the mix design will affect the screed's reaction. When the head of material is irregular, the same imperfections will exist in the mat.





## Paving Techniques for Smoothness

Paving techniques and mix quality are critical to mat smoothness and durability. The Roadtec® RP-170e paver will produce a long-lasting, uniform mat if best practices are followed. Adjustments to the crown, automatic feed control and leveling systems may be required. Wide-width paving jobs may require the use of the 40-ft. sensor ski. Certain operational variables will continue to negatively impact the mat unless addressed:

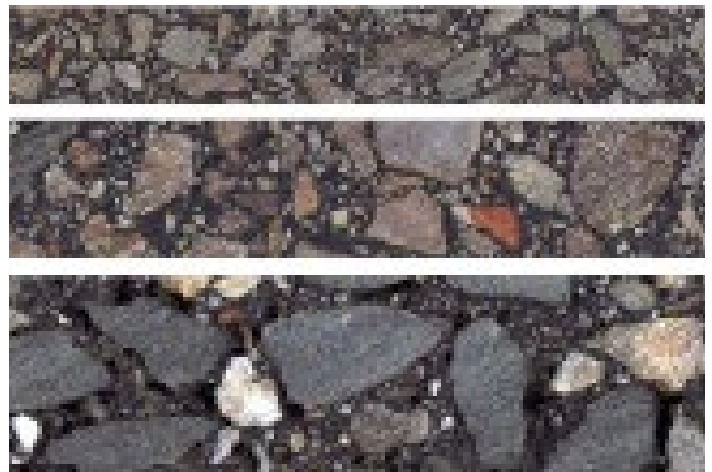
- Worn auger and screed components
- Fluctuating mix temperatures
- Paving thinner than the largest mix aggregate
- Inconsistent blend of aggregate mixes
- Roller improperly operated or maintained
- Trucks holding brakes or bumping paver
- Stop-and-go paving

## Pave with Proper Aggregate Sizes

### General rule:

**No mat should be thinner than twice the size of the largest aggregate.**

- Mixes designed for correction course paving or one-pass paving contain 5/8 to 3/4" or smaller aggregate and few fine grains.
- Aggregate size 1" to 1 1/2" can pass through a 3/3 screen, resulting in mix with larger aggregate than is ideal.
- Mat thickness will not be uniform; thin spots will drag aggregate along producing voids.
- Ensure mat depth will be at least twice the size of the largest aggregate in the mix.



## Prevent Ripples

Ripples are wave patterns in mat that can be observed on edges and across mat width. Ripples negatively impact durability and driving quality. The main cause is poor asphalt mix with too little asphalt and too many fine grains, and fluctuating mix temperatures.

### General rule:

**Address each condition listed below to prevent ripples.**

- Inconsistent mix size and temperature
- Poor foundation and subsurface condition
- Paver, screed plates or augers in disrepair
- Malfunctioning auto grade control
- Low tire pressure
- Loose screed pivot point
- Loose screw at angle of attack
- Poor operating practices, including improper strike-off settings, paving too fast/too thin, improper amount of material at head of screed
- Trucks holding brakes or intermittently applying brakes
- Rollers rolling too quickly or rolling before mat is cooled
- Rollers in poor condition

## Prevent Bumps and Depressions

### General rule:

#### Keep paver constantly moving and require good haul truck management.

- Bumps and depressions are a result of screed settlement when the paver stops.
- The auto grade system detects settlement as a dip and increases the angle of attack.
- Tow points falsely correct, causing the screed to rise above the mat thickness, creating a bump.
- Auto grade detects the bump, and then reduces the angle of attack, which results in another dip, causing the poor paving cycle to repeat.
- 15-20 feet is required before equilibrium is again achieved.



## Control Yield Factor

### General rule:

#### Control mat depth to control yield factor.

- Refers to calculated material amounts required for a specific job operation.
- **Yield = job length x job width x job depth**
- Yield Factor is a primary challenge of paving operations.
- Figuring depth is difficult because depth varies due to traffic ruts or broken mat edges.
- Greater correction to road surfaces means greater material usage.
- Manually adjust mat depth with angle of attack jacks; NEVER over-correct depth cranks.



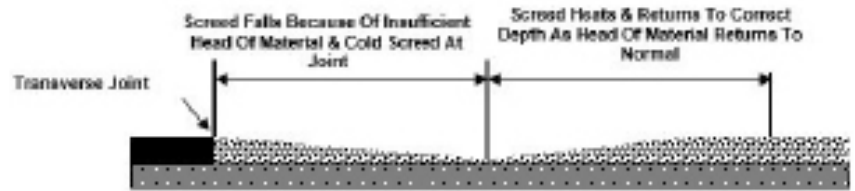
## Adjust Paver

- Paver adjustments are critical to mat quality.
- Adjust auger, flow gates, paving speed, screed position and material head levels.
- Underfeeding augers results in bumpy mat surface.
- Overfeeding augers creates ripples and shadows in mat, and causes excessive auger wear.



## Understand Transverse Joints

- Transverse joints are the points where previously paved mat joins newly paved mats and form when paving operations resume. Joint quality is a significant factor for mat quality.
- Poor transverse joints result in dip faults.
- Follow transverse joint construction procedures.

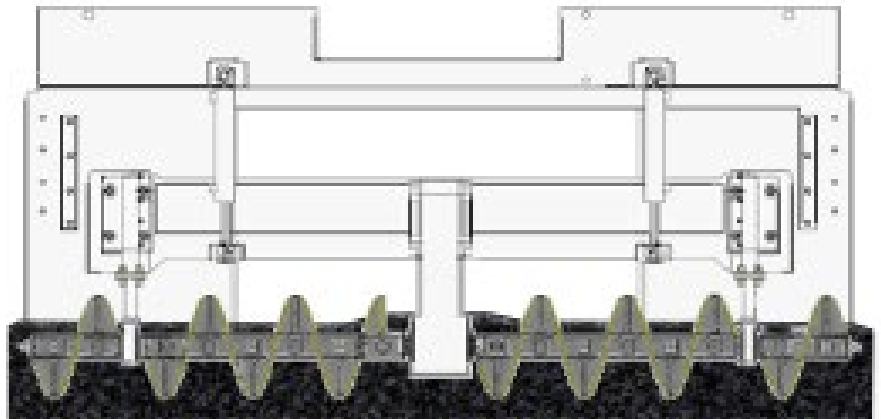


## Prevent Dip Faults

### General rule:

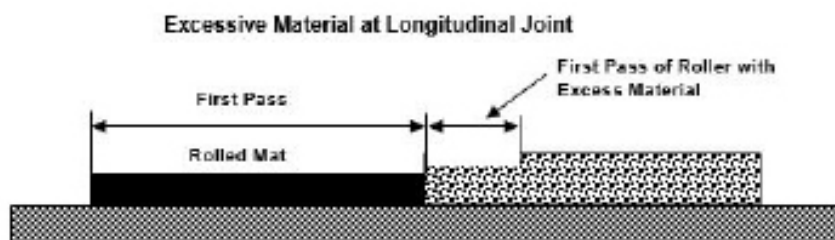
**Maintain constant head of material throughout entire paving operation to prevent dip faults.**

- Created when screed falls and tapers mat due to insufficient amounts of material at screed heads.
- Created when screed is cold.
- Taper ascends as paving operations resume creating a V-shape or dip in the mat.



## Prevent Poor Longitudinal Joints

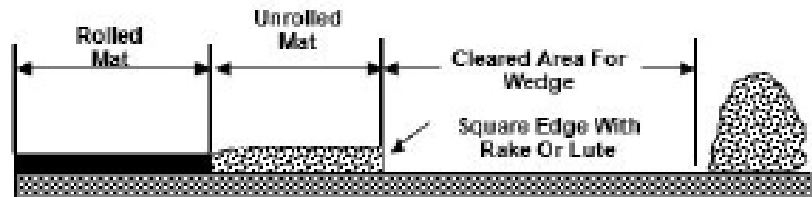
- Keep the first pass straight so that the second pass can stay within the required joint width of 3/4-1 inches.
- Rely on the joint matcher or the sensor to match the joint properly when using automatic equipment. Poor joints result from manually operating screed depth cranks and overcompensating, or from using poorly adjusted automatic controls. NOTE: Adjust the joint matcher sensor at 6 inches distance from the edge of the reference mat when needed to decrease deviations caused by rollers



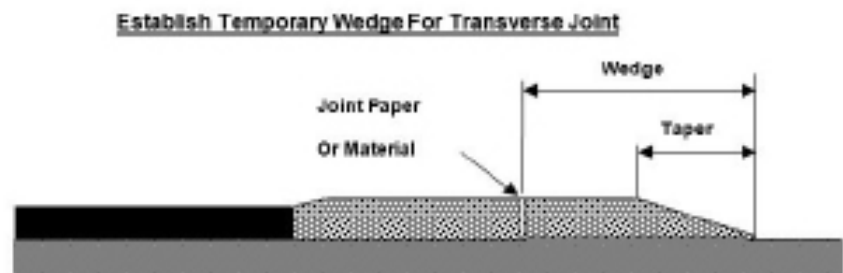
## 4.37 Create Quality Transverse Joints

### Create Quality Transverse Joints

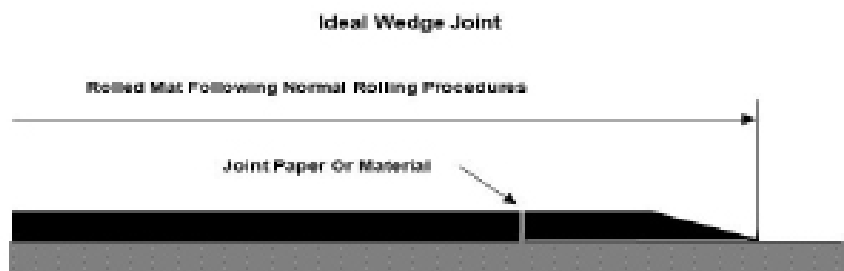
1. **Maintain** a consistent screed level until paving stops.
2. **Raise** the screed, then move paver away from the joint.
3. **Use** a rake or a lute to establish a square edge in the unrolled mat. Keep the roller operator back at least 6 ft. from the joint edge.



4. **Construct** a wedge using material raked away from the squared edge. The straight section on the wedge prevents the roller from breaking the squared edge of the previous mat, while also maintaining uniform compaction.



5. **Roll** the transverse joint using rolling patterns and techniques.



6. **Remove** the temporary wedge when paving operation begins.
7. **Spray** tack coat on squared edge of mat.
8. **Preheat** screed to 300 degrees F.
9. **Position** screed over new mat with screed front aligned to square edge.

NOTE: Refer to the table on the following page for the take-off block height.



**10. Refer** to the table below for take-off block height.

Block Height		1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00
Material Density Behind Screed %		MATERIAL THICKNESS (INCHES)							
76%		0.26	0.53	0.79	1.05	1.32	1.58	1.84	2.11
78%		0.23	0.46	0.69	0.92	1.15	1.38	1.62	1.85
80%		0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
82%		0.17	0.34	0.51	0.68	0.85	1.02	1.20	1.37
84%		0.14	0.29	0.43	0.57	0.71	0.86	1.00	1.14
86%		0.12	0.23	0.35	0.47	0.58	0.70	0.81	0.93
88%		0.09	0.18	0.27	0.36	0.45	0.55	0.64	0.73
90%		0.07	0.13	0.20	0.27	0.33	0.40	0.47	0.53
92%		0.04	0.09	0.13	0.17	0.22	0.26	0.30	0.35
94%		0.02	0.04	0.06	0.09	0.11	0.13	0.15	0.17

**11. Position** blocking under screed and away from square edge.

**12. Null** screed and introduce angle of attack.

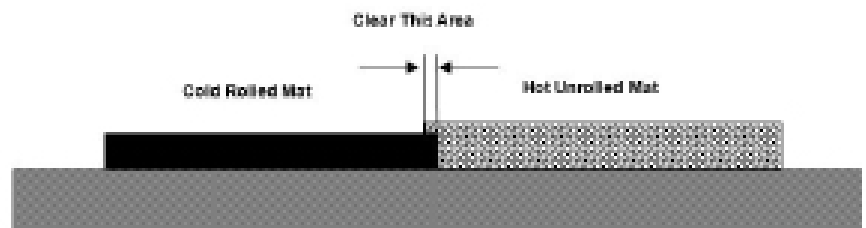
**13. Establish** correct head of material amount. Use shovel to fill out corners of material so that material head is equivalent to standard amounts used during paving operation.

14. Resume paving at the same speed used when paving previous mat.

**15. Fill** in voids at the joint when the screed has cleared the joints.

**16. Remove** hot mix left on cold surface.

**17. Lute** joint to obtain a uniform, smooth surface across the joint.

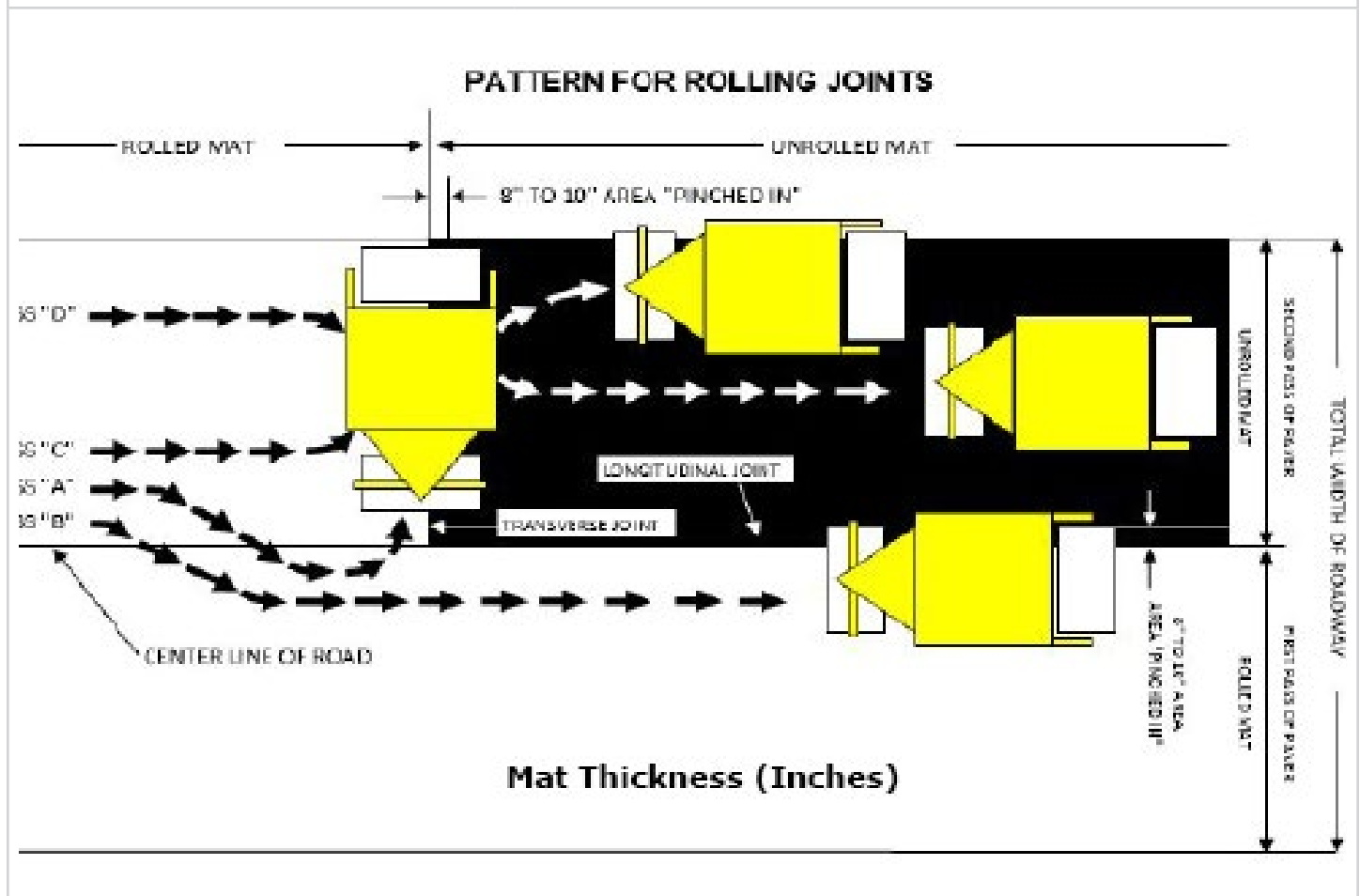


## Finalizing the Transverse Joint

- Pinch** Pass A and Pass B in both transverse and longitudinal joints. The pinch can be accomplished by overlapping 8-10 inches of roller on the edge of the previous mat, and then pinching the unrolled mat down to and onto the surface level of the reference mat, as shown.
- Pass** C and Pass D should pass over the joint at an angle to prevent the newly laid mat from pushing away from the joint.

NOTE: Be aware as the roller approaches the joint from the fresh mat that the wake in front of the roller does not produce a bump at the joint.

- Pass** A should be on the hot mat 8-10 inches away from the cold joint with B pass rolling this ridge of 8-10 inches of hot material in the direction toward the cold mat.



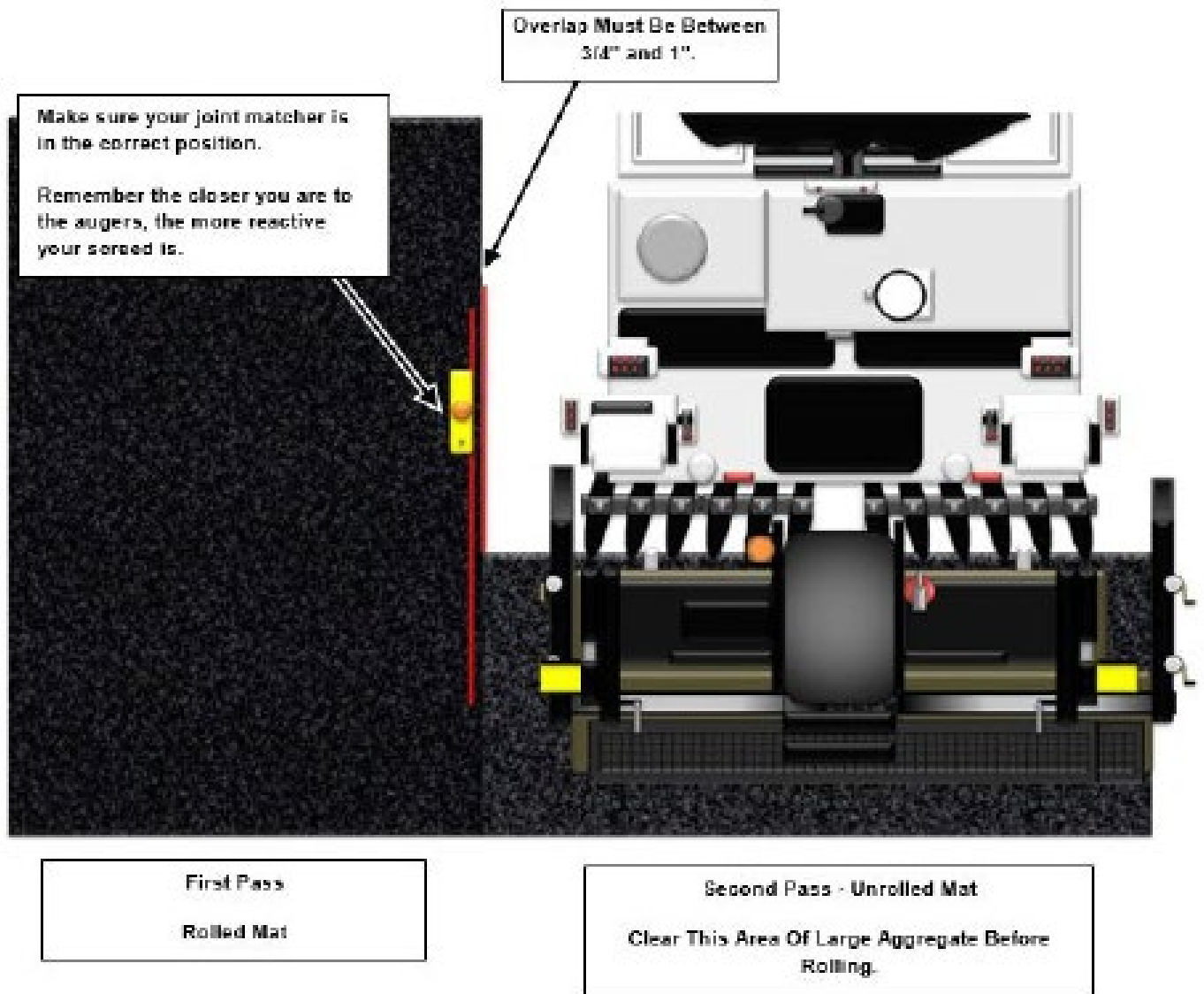
## The Second Pass on a Two-Pass Transverse Joint

- 1. Correctly position** the joint matcher.

NOTE: The closer to the augers, the more reactive the screed.

- 2. Clear** the area of the second pass of any large aggregate before rolling.

NOTE: The overlap must be between 3/4-1 inch.



## Set Up the Job

1. **Determine** what is needed to finish the job on time. Determine asphalt plant production, truck capacity, length of haul and traffic conditions.
2. **Determine** the tonnage per hour to calculate paver speed.
3. **Adjust** the operation in case of changing circumstances.
4. **Check** depth and yield before operations begin. Be aware of grade conditions, such as slope, low spots, high areas and HMA makeup. Remove high spots prior to paving. Mat thickness should be 1.5 times greater than the maximum aggregate size.
5. **Communicate** with the crew for higher productivity.
6. **Use** Grade Stakes for marking lines, radius points, ditches and back slopes.
7. **Match** production rates to the paver size.
8. **Consider** existing grade conditions. Pre-compacted material is considered an existing grade condition. Never confused texture strips with segregation. Existing grade conditions can cause texture stripping to occur due to the mat thickness.
9. **Advance** rubber tire pavers on stone or wet tack using the speed pot rather than the joystick.





## 4.38 Auger Extensions

### Auger Extensions

- Auger extensions are used to maintain a uniform head of material when the screed width is increased.

### Warnings

#### **⚠ DANGER**

Avoid serious injury or death!

**NEVER** service augers or conveyors, whether assembled or disassembled, while the engine is running.

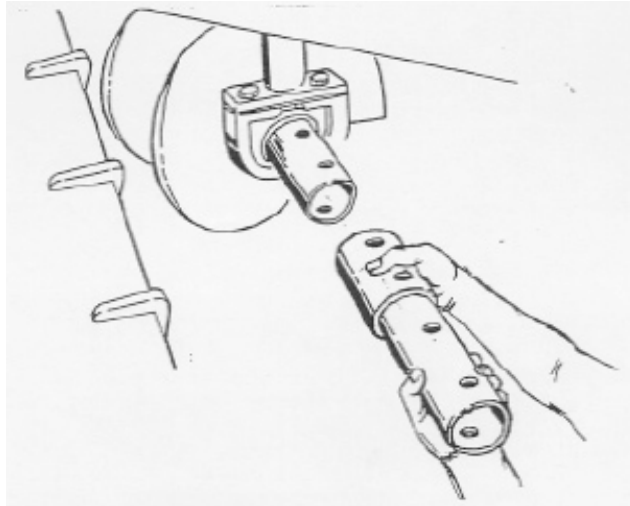
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### Assemble Extension

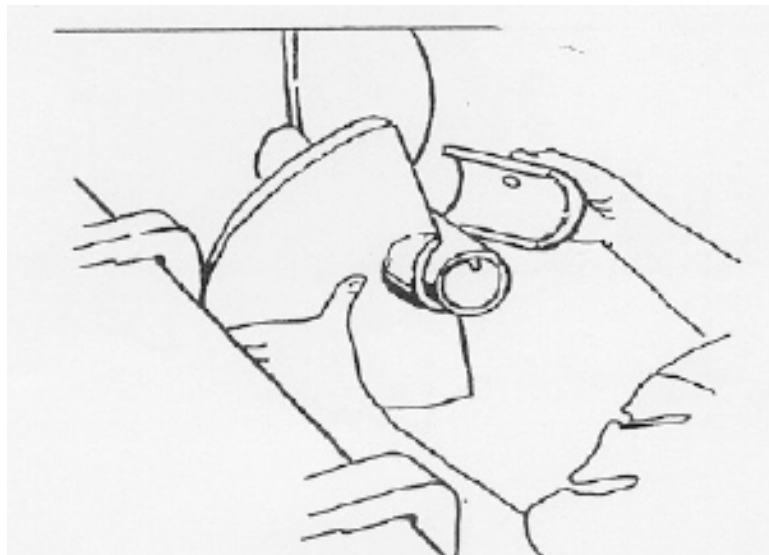
- 1. Remove** auger flight assembly adjacent to auger hanging bearing. Set flight and nut aside for later re-installation.
- 2. Remove** end cap and store.



- 3. Install** 1-foot basic shaft assembly using flight and nut removed in step 1. Use anti-seize.



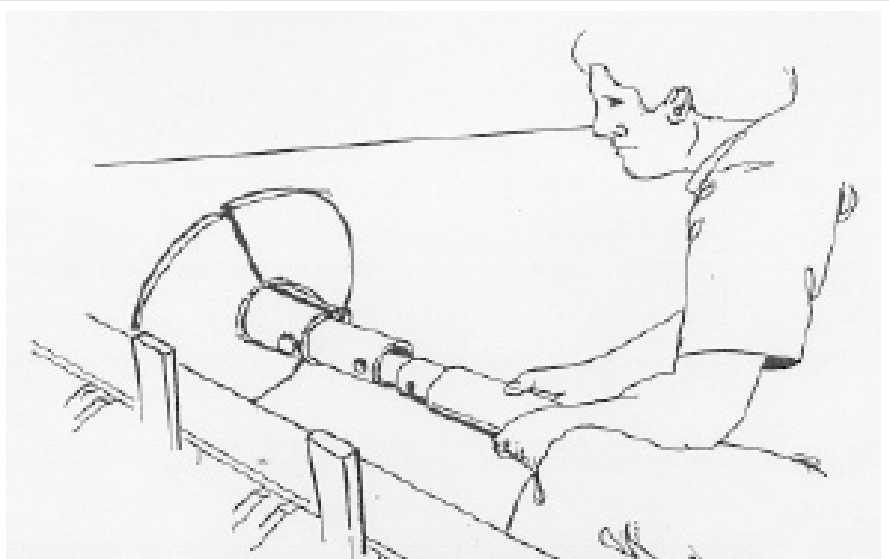
- 4. Install** flight assembly to shaft. Leave off end plug if additional auger extension is required, and assemble additional extensions.



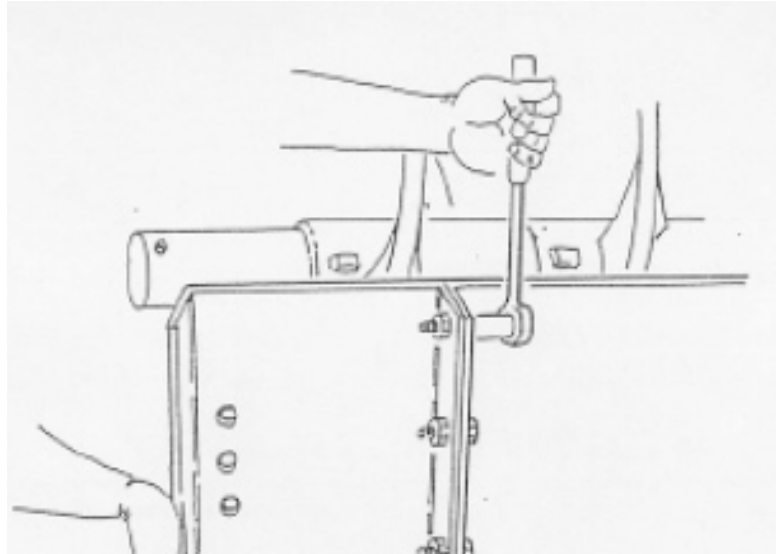
- 5. Torque** all bolts.

- 6. Install** 1-foot additional shaft assembly by applying anti-seize onto both holes then sliding the shaft into the hole normally occupied by the end plug.

- 7. Install** flight left installed in previous step. If additional extensions are required, leave off the end cap and last flight, then repeat this step.

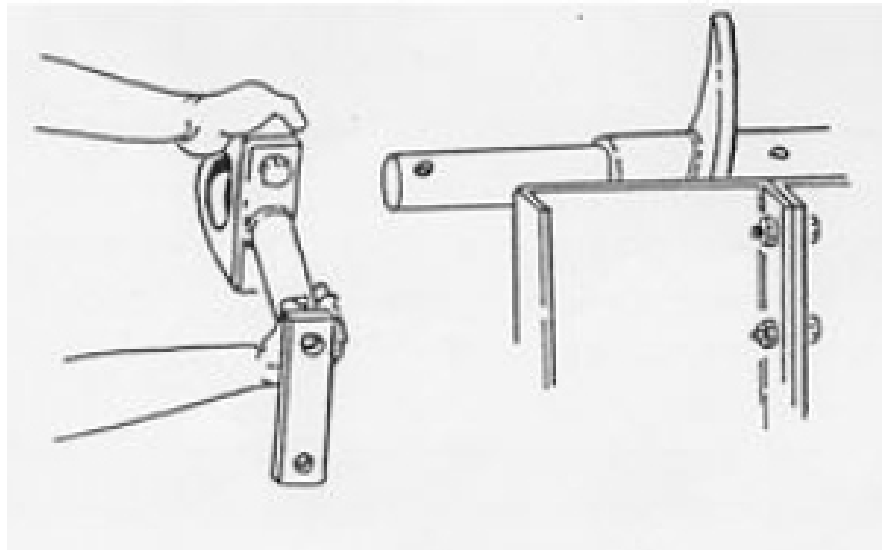


- 8. Install** auger hangers by fitting the last tunnel extensions with brackets for bearing and strut attachment.



- 9. Align** holes, then slide bearing hanger shaft into auger shaft.

- 10. Bolt** hanger bearing to tunnel extension using standard bolts.

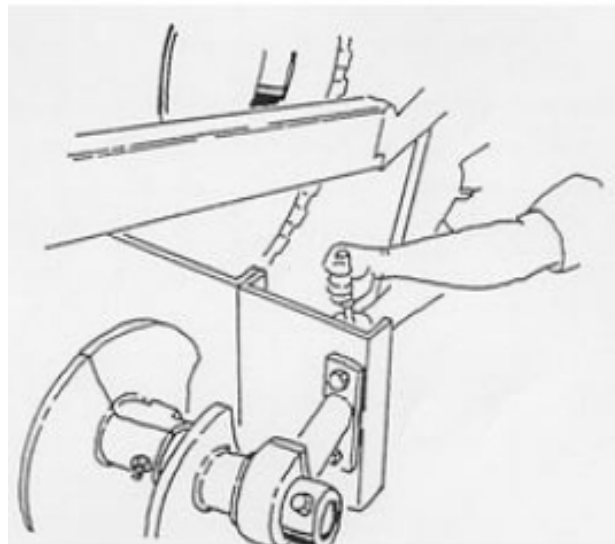


- 11. Install** last flight.

- 12. Fasten** strut between last tunnel extension and ear on tow point support.

- 13. Adjust** length by rotating rod.

- 14. Torque** all bolts.



## 4.39 Paving for Smoothness Tips

- Keep the hopper full.
- Control hopper wing cycling.
- Use a hopper insert.
- Maintain a consistent head of material.
- Time the conveyor and auger system.
- Keep the paver speed steady.
- Correct lead crown setting and strike off adjustments.
- Correct auger length.
- Use a thermal gun.
- Don't broadcast material.
- Use the grade control system.
- Train the crew.





## 4.40 Drive-Off Procedure

1. **Turn** Battery Disconnect Switch ON.



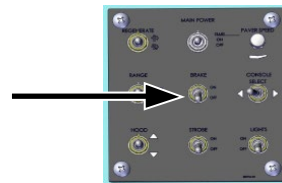
2. **Turn** E-Stops OFF.



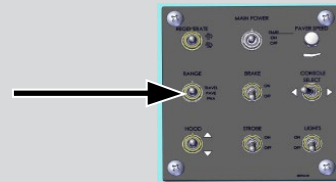
3. **Set** Joystick to CENTER (neutral).



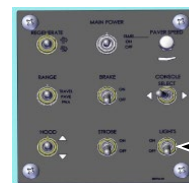
4. **Set** Parking Brake ON.



5. **Set** Range to LOW (pave range).



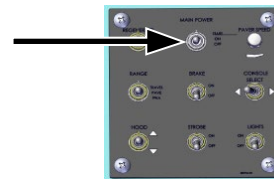
6. **Turn** Beacon Lights ON.



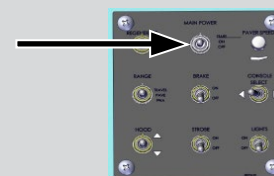
7. **Ensure** Feed System is OFF.



8. **Start** Engine by pushing Main Power switch to ON (CENTER position). Preheat light turns ON.

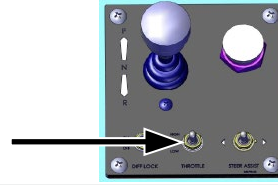


9. **Wait** until preheat light is OFF. **Sound** Horn. **Push** Main Power UP and hold for 2-3 seconds or until engine engages. Engine will engage at idle speed.



10. **Allow** engine to idle for 2-3 minutes. **Allow** coolant temperature to rise to 158°F (70°C).

- 11. Set** Throttle to HIGH (1900 RPM). **Check** gauges at full engine RPM for engine fault or error codes.



- 12. Push** Screed Lift UP and **hold** until screed is fully raised.



- 13. Release** switch and **attach** left and right support cables at rear of machine to pins on screed as shown.



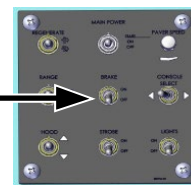
- 14. Lower** screed until it rests on support cables.

- 15. Position** tow points at bottom of scale with screed raised to maximum height and resting on screed support cables.

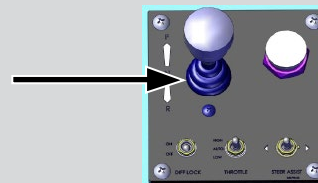
**NOTE:** Ensure screed will completely clear truck and ground while loading/unloading.



- 16. Release** Parking Brake.

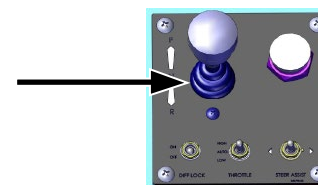


- 17. Set** Travel Joystick forward or reverse direction to move machine accordingly.



- 18. Travel** machine to desired location. **Stop** machine by moving Travel Joystick to center position.

**NOTE:** Adjust paver speed using Travel Speed dial. Stop machine by moving Travel Joystick to Center position.



## 4.41 Operate

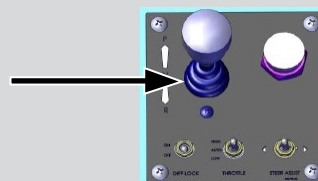
1. **Turn** Battery Disconnect Switch ON.



2. **Turn** E-Stops OFF.



3. **Set** Joystick to CENTER (neutral).



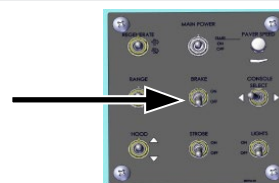
4. **Ensure** feed system is OFF.



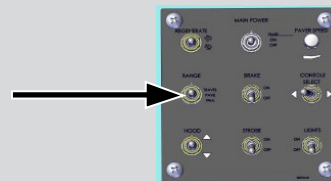
5. **Turn** screed heat ON.



6. **Set** Parking Brake ON.



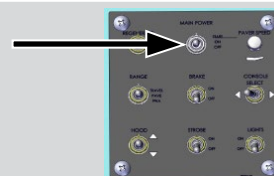
7. **Set** Range to LOW (pave range).



8. **Turn** Beacon Lights ON.

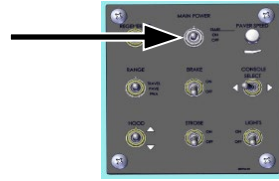


9. **Start** Engine by pushing Main Power switch to ON (CENTER position). Preheat light turns ON.



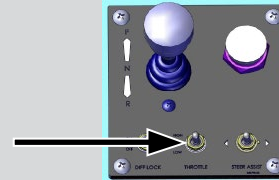


**10. Wait** until preheat light is OFF. **Sound** Horn. **Push** Main Power UP and hold for 2-3 seconds or until engine engages. Engine will engage at idle speed.



**11. Allow** engine to idle for 2-3 minutes. **Allow** coolant temperature to rise to 158°F (70°C).

**12. Set** Throttle to HIGH (1900 RPM). **Check** gauges at full engine RPM for engine fault or error codes.



**13. Push** Screed Lift UP and **hold** until screed is fully raised.



**14. Release** switch and **attach** left and right support cables at rear of machine to pins on screed as shown.



**15. Lower** screed until it rests on support cables.

**16. Position** tow points at bottom of scale with screed raised to maximum height and resting on screed support cables.



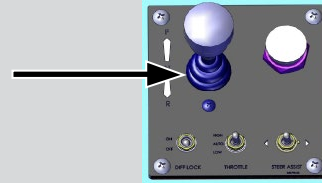
**17. Release** Parking Brake.



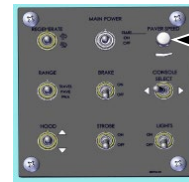
**18. Select** console for operator control.



**19. Set** Travel Joystick forward or reverse direction to move machine accordingly.

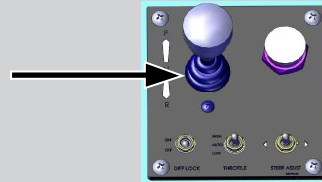


**20. Adjust** paver speed using Paver Speed.

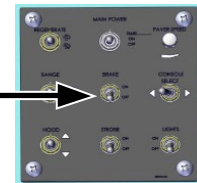


**21. Position** paver at paving starting point.

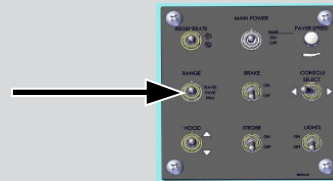
**NOTE:** *Stop machine by moving Travel Joystick to center position.*



**22. Set** Parking Brake ON.



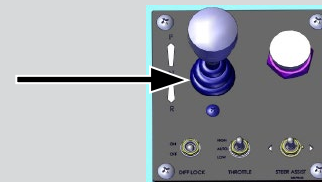
**23. Set** Range to LOW (pave range).



**24. Set** Screed to Float Mode



**25. Set** Screed in place and remove slack from tow arms by moving forward.



**26. Position** loaded haul truck or material transfer vehicle against rollers.

**27. Raise or lower** hopper to receive load.



**28. Lower** Frame down 7-10 seconds, or until it hits bottom.

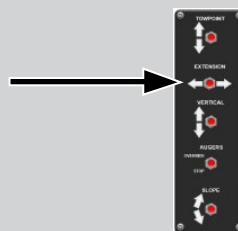
(OPTIONAL)

**29. Raise** Frame up 2 seconds for optimal ground contact.

**30. Set** Tow Point Scale.



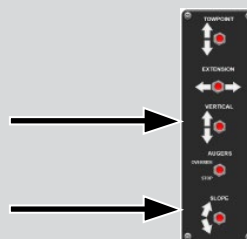
**31. Position** End Gates for paving width.



**32. Set** Flow Gates based on width of paving.

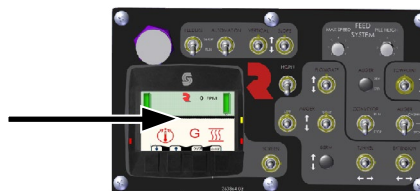


**33. Set** extension height and slope (if applicable).



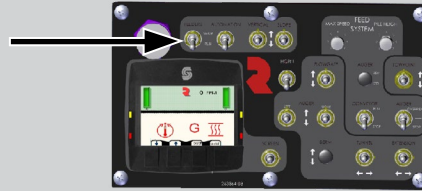
**34. Set** Crown height. ([See Set Crown Height.](#))

**35. Null** screed. ([See Null Screed.](#))



**36. Set** the Angle of Attack. ([See Set Angle of Attack.](#))

**37. Turn Feed System ON.**



**38. Set Auger height.**



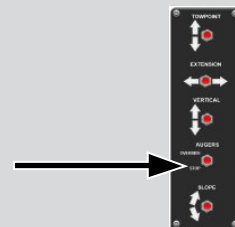
**39. Set Feed Speed dial.**



**40. Set Feed Mode to AUTO.**



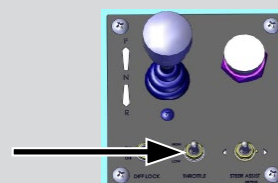
**41. Turn Augers ON.**



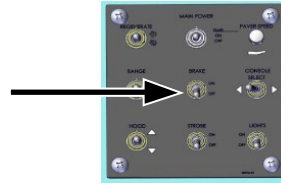
**42. Fill hopper with material and allow auger troughs to fill.**



**43. Set Throttle to HIGH (1900 RPM).**



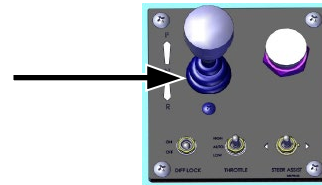
**44. Set** Parking Brake to OFF.



**45. Sound** Horn.



**46. Set** Travel Joystick to FORWARD and slowly increase speed knob until desired speed is reached.



**47. Adjust** feeder controls as needed.

**48. Adjust** Flow Gates as needed.

**49. Adjust** depth as needed.

**50. Adjust** grade system as needed.

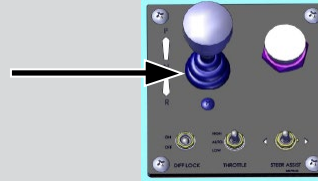
**51. Start** paving slowly and remain consistent.



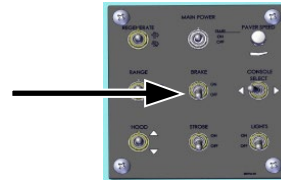
## 4.42 Park and Shut Down

1. **Move** machine to designated cleaning area using Joystick.

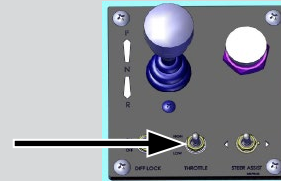
2. **Set** Joystick to CENTER (neutral).



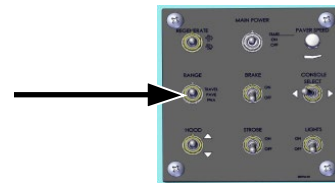
3. **Set** Parking Brakes ON.



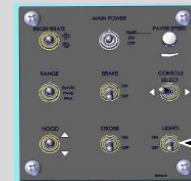
4. **Set** Throttle to LOW. **Idle** machine for three minutes.



5. **Set** Range to LOW.



6. **Turn** Beacon Lights OFF.



7. **Turn** Screed Heat and Generator OFF.

8. **Scrape** asphalt buildup from auger posts, screed extensions, steering components and push beam.

9. **Spray** release agent on augers, conveyors, hoppers, screed extensions and side plates.



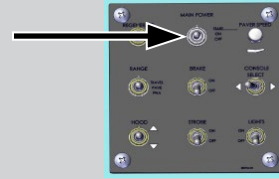
10. **Raise** screed extension verticals to fully raised (in case of machine transport).



11. **Grease** machine per lubrication chart.

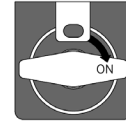
[See Lubrication Chart](#)

**12. Shut** down machine engine.



**13. Set** Battery Disconnect Switches to OFF.

**14. Perform** Lockout/Tag-out procedures.



## 5.0 Lubrication & Maintenance

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## 5.01 Service Summary

The life and reliability of a Roadtec RP-170e Rubber Tire Asphalt Paver is greatly affected by the frequency of maintenance. Dirt particles cannot be seen with the human eye, yet cause thousands of dollars of damage to mechanical and hydraulic systems. Commit to the following maintenance and lubrication schedules to maximize the life of the Roadtec RP-170e Rubber Tire Asphalt Paver.

1. Store lubricants in clean, covered and marked containers.
2. Clean containers used to carry lubricants from bulk storage tanks.
3. Clean around caps and plugs before removing.
4. Clean grease fitting and grease gun adapters before injecting grease.
5. Wash funnels with solvents and thoroughly dry before and after each use.
6. Clean all grease fittings and wipe up spills to avoid accumulation and hazardous walkways after performing lubrication.
7. Perform lubrication at end of day, just after machine wash down.
8. Follow lubrication schedules for suggested service frequencies.
9. Service machine more often than schedule recommends during severe operating conditions.
10. Use only approved lubricants.
11. All grease fittings are SAE standard unless otherwise noted.
12. Check fluid levels when machine is parked on level surface.
13. Never under-lubricate non-sealed bearings to avoid damaging fittings or components.
14. Grease non-sealed fittings until grease extrudes from fitting. One (1) ounce of EP-MPG equals one pump on standard one-pound grease gun.
15. Lubricate items not equipped with grease fittings, such as linkages, pins and levers with oil once a week.
16. Apply motor oil sparingly to provide necessary lubrication that prevents rust formation.
17. Clean components and apply anti-seize when rust has not yet formed.
18. Visually check entire machine for loose cap screws, nuts and pins. Repair and replace worn or damaged hardware.

## 5.01.01 Service Safely

- ▀ Follow the manufacturer's service manual and maintenance schedules to maintain the proper functionality of the machine and all its components.
- ▀ Permit only qualified personnel to perform service or maintenance to the machine.
- ▀ Always stop the engine and disconnect the batteries before servicing machine.
- ▀ Use proper tools in good working condition.
- ▀ Allow machine to cool before performing maintenance or repair.
- ▀ Disconnect battery and engine electronics before servicing machine.
- ▀ Use extreme caution when working beneath machine or any component.
- ▀ Stand to the side of the coolant tank when removing cap. Ensure radiator is cooled before servicing.

### **WARNING**

Avoid serious injury and death!

**NEVER** perform service or repair until completing machine shut down and lockout/tag out procedures.

**NEVER** rely on hydraulic support alone when working beneath equipment - use proper supports.

W-1020

## 5.02 Fluid Requirements

Component	Fluid	Interval	Capacity	
<b>Fuel Tank</b>	Ultra-Low Sulfur Diesel Fuel	Fill Daily	81 gal.	308 L
<b>DEF Tank</b>	Diesel Exhaust Fluid	Fill at Fuel Refill	5 gal.	19 L
<b>Hydraulic Tank</b>	ISO Vis. Grade 46 Hydraulic Oil Gravity API 30.2 Viscosity: CSt at 40°C - 46 CSt at 100°C - 6.6 SUS at 100°F - 239 SUS at 210°F - 49 Viscosity Index - 95 Hydraulic Fluid must meet Allison C3 Specification.	Check Daily	66 gal.	249 L
<b>Engine Oil</b>	15W40 Engine Oil (API CJ-4) Refer to the engine operation and service manual for more information. For European applications, ACEA E9 diesel engine oil may be used.	Drain, Flush & Refill every 1000 Hours	18.5 qts.	17.5 L
<b>Engine Coolant</b>	50/50 Mix High Performance Anti-Freeze & Water	Check Daily Drain, Flush & Refill every 1000 Hours	8.75 gal.	33 L
<b>Gear Oil</b>	Synthetic, high performance Gear Oil 80W-140	Planetaries and Hydraulic Pump Drive; Drain, Flush & Refill		
<b>Grease Points</b>	High temperature grease - NGLI grade 2 Shell	See Lubrication Chart		



## 5.03 Daily Maintenance

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## 5.03.01 Refill Diesel Fuel

- Refill daily at end of each day to reduce condensation in tank.
- 81 gal. tank (306 L)
- Use reputable grade diesel fuel with sulfur content below 0.0015%.
- Use only winter-grade fuel when operating at low ambient temperatures.
- Higher sulfur contents affect oil change intervals.
- Observe strict cleanliness when filling tank.

### Warnings

#### **WARNING**

Avoid occupational hazards!

**NEVER** use starting fluids in engine.

**NEVER** dispose of cigarettes, cigars or matches near machines.

**NEVER** overfill fuel tank or reservoirs.

W-1012

### Refill Diesel Fuel Tank

1. **Shut down** machine.
2. **Locate** fuel tank fill ports on operator station. The fuel gauge is located below at the step to the operator's station.
3. **Refill** with fuel promptly to prevent tank from running dry. If so, air-vent fuel filter and injection lines.





## 5.03.02 Refill Diesel Exhaust Fluid

- ✓ Check DEF daily. Refill DEF tank each time the fuel tank is refilled.
- ✓ Diesel Exhaust Fluid (DEF) is part of the After-treatment system that helps reduce engine emissions, resulting in cleaner air quality.
- ✓ 5 gal. tank (19 L). Use only Diesel Exhaust Fluid that meets the ISO-22241-1 requirements.

### Warnings

#### ⚠ WARNING

Avoid serious injury!

**ALWAYS** follow all safety requirements in the engine manufacturer's manual.

**NEVER** allow diesel exhaust fluid to come into contact with skin or eyes.

**NEVER** swallow DEF fluid.

W-1021

### Refill Diesel Exhaust Fluid

1. **Locate** DEF fill tank behind service door on right side of operator platform.
2. **Refill** DEF tank every time fuel tank is refilled.
3. **Use** only DEF that meets ISO-22241-1 requirements.



### 5.03.03 Check Engine Crankcase

- ✓ Check engine crankcase lubrication points daily.
- ✓ Refer to the engine manufacturer's manual for specific check points and intervals.

#### Warnings

#### **WARNING**

Avoid serious injury or death!

**ALWAYS** follow all safety precautions listed in the engine manufacturer's manual.

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1022

#### Check Engine Crankcase

1. **Check** lube points on engine crankcase.

2. **Lubricate** if needed.



## 5.03.04 Check Engine Oil Level

- Check engine oil levels daily.
- Refer to the engine manufacturer's manual for specific check points and intervals.

### Warnings

#### **⚠ WARNING**

Avoid serious injury or death!

**ALWAYS** follow all safety precautions listed in the engine manufacturer's manual.

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1022

### Check Engine Oil Level

- 1. Check** engine oil level daily using dipstick located under hood on machine left side.
- 2. Ensure** levels fall between ADD and FULL marks.
- 3. Add** SAE 15W-40 Shell or equivalent when needed.



## 5.03.05 Check Engine Coolant Level

- Check engine coolant levels daily.
- Refer to the engine manufacturer's manual for specific check points and intervals.

### Warnings

#### **WARNING**

Avoid serious injury or death!

**ALWAYS** follow all safety precautions listed in the engine manufacturer's manual.

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1022

### Check Engine Coolant Level

1. **Check** engine coolant level daily using sight gauge located on machine left side.

2. **Add** 50/50 anti-freeze and water when needed.

**IMPORTANT! Maintain engine coolant levels to 4 inches from bottom of cap.**

3. **Keep** radiator clean of debris and dirt. The radiator is clean when light can visibly pass from one side to the other.



## 5.03.06 Lubricate Conveyor Idler and Headshaft Bearings

- ▀ Lubricate conveyor idler and headshaft bearings daily.
- ▀ Lubricate bearings using the fittings bank located on machine rear right side with high temperature grease.

### Warnings

#### ⚠ WARNING

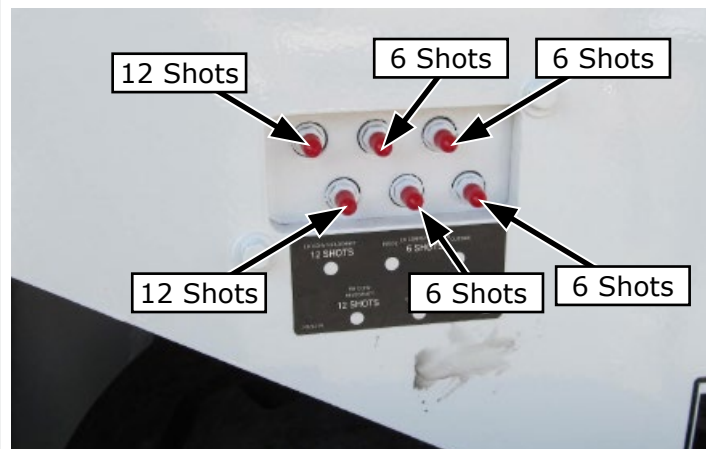
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1023

### Lubricate Conveyor Idler and Headshaft Bearings

1. **Lubricate** (4) conveyor idler bearings with 6 shots each while still hot.
2. **Lubricate** (2) headshaft bearings with 12 shots purged while hot.



## 5.03.07 Lubricate Screed Vibrator Bearings

- ▀ Lubricate vibrator bearings daily.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1023

### Lubricate Vibrator Bearings

1. **Lubricate** (4) bearings located on screed with 2 shots of high temperature grease.



## 5.03.08 Lubricate Auger Hanger and Chain Case Bearings

- ▀ Lubricate auger hanger bearings and auger chain case bearings daily.
- ▀ Lubricate bearings located on machine rear with high temperature grease.

### Warnings

#### ⚠ WARNING

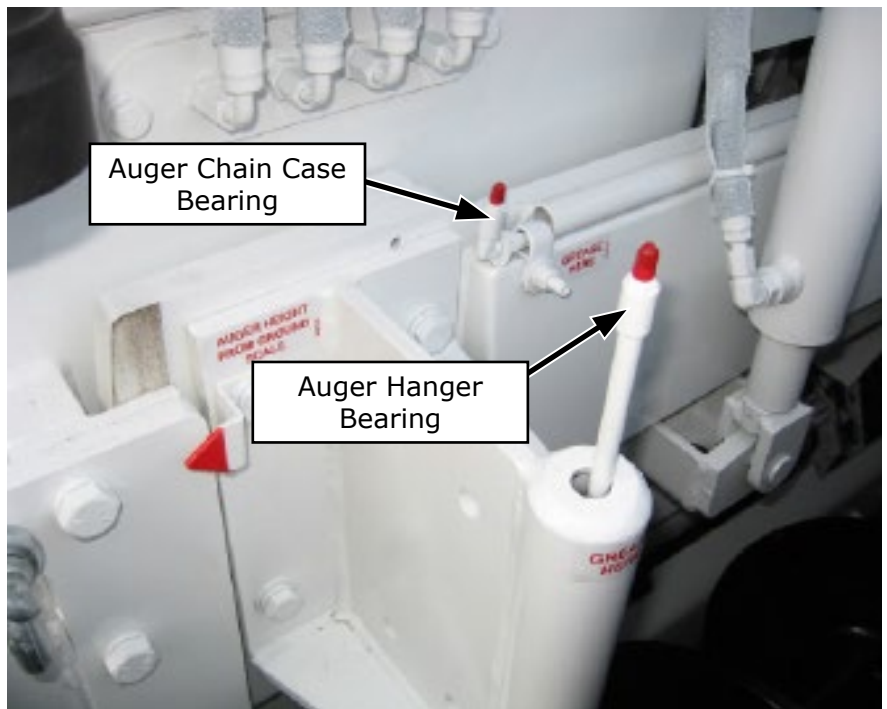
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1023

### Lubricate Conveyor Idler and Headshaft Bearings

1. **Lubricate** (2) auger hanger bearings with 4 shots of high temperature grease while hot.
2. **Lubricate** (2) auger chain case bearings with 3 shots of high temperature grease while hot.





## 5.03.09 Check Hydraulic Tank Oil Levels

- Check cold hydraulic tank oil levels daily.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

**NEVER** allow oil levels to fall below indicator line which can damage the hydraulic system.

**NEVER** use hands to locate hydraulic leaks - use cardboard. Oil is under pressure and may cause severe damage to tissues.

**NEVER** weld or cut on tank.

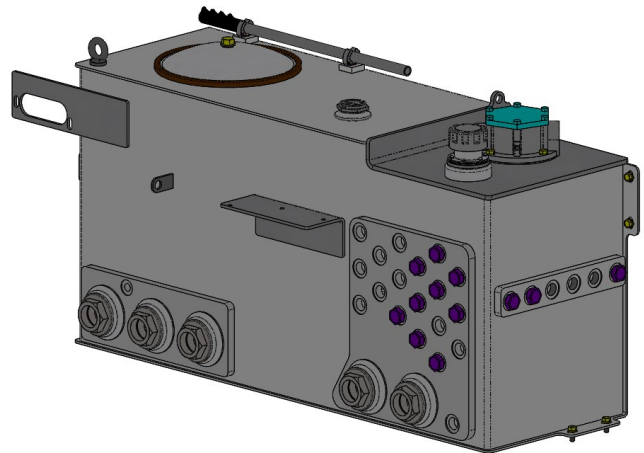
**NEVER** overfill tank which can cause excessive pressure and may damage components.

W-1024

### Lubricate Hydraulic Tank Oil Levels

- Check** hydraulic tank oil levels using sight gauge located on tank.
- Add** hydraulic oil ISO Vis. Grade 46 anti-wear or equivalent.

**IMPORTANT!** Normal operating temperatures range from 120°-180° F (49°-82° C). Maintain oil levels above half-way point on sight gauge and below top fill level.







## 5.04 50 Hours Maintenance

---



## 5.04.01 Check/Replace Engine Air Intake Filter

- ✓ Check engine air filter every **50 hours of operation**.
- ✓ Replace element immediately when holes, loose end seals, dented sealing surfaces and damage are discovered.

### Warnings

#### **⚠ DANGER**

Avoid serious injury or death!

**ALWAYS** engage hood service pins when working under hood.

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

D-1114

#### 1. TO CHECK FILTER

**Check** engine air cleaner restriction gauge located on machine left side. **Change** filter if needed.

#### 2. TO REPLACE FILTER

**Raise** the engine compartment hood.

3. **Engage** hood raise service pins.

4. **Remove** air inlet box.

5. **Pull** cover and elements straight from housing to avoid damaging the elements.

6. **Install** the new inner and out filter elements.

7. **Reinstall** the air filter

**IMPORTANT!** Never remove the plastic fin assembly.



## 5.04.02 Change Hydraulic Filters

- Change hydraulic filters after the **FIRST 50 hours of operation**, then every **250 hours** thereafter.
- Change (5) canister filters mounted inside the hydraulic tank and (2) 10-micron high pressure filters located inside the engine compartment.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

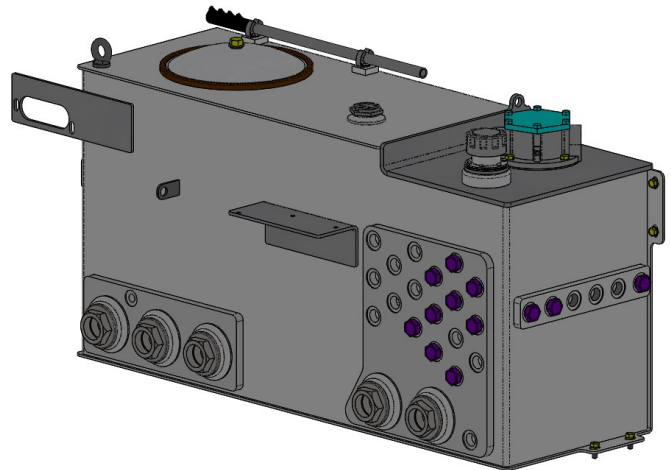
**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

**NEVER** use hands to locate hydraulic leaks - use cardboard. Oil is under pressure and may cause severe damage to tissues.

W-1025

### Change Hydraulic Filters

1. **Ensure** oil temperature is below 100°F (38°C).
2. **Clean** dirt and grease from around filter heads.
3. **Remove** filters and elements.
4. **Fill** new filters with clean hydraulic oil that has been filtered through a 10-micron element.
5. **Lubricate** filter gaskets with clean lubrication oil.
6. **Install** filters as specified by filter manufacturer.
7. **Tighten** filter cap.
8. **Start** the engine and check for leaks.  
**IMPORTANT!** Never check for leaks using hands or any other body part to avoid serious injury and death.



### 5.04.03 Check/Refill Battery Electrolyte Levels

- ✓ Check battery electrolyte levels every **50 hours of operation**.
- ✓ (2) batteries are located on the left hand side of the machine inside the battery box mounted in front of the right hand drive tire.

#### Warnings

#### **⚠ WARNING**

Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

**NEVER** allow open flames or sparks near batteries.

**NEVER** touch battery acid or electrolyte fluids. Wear gloves and protective clothing when servicing batteries.

W-1026

#### Check/Refill Battery Electrolyte Levels

- 1. Remove** vent well caps to view electrolyte level.
- 2. Maintain** electrolyte levels at the base of the vent well.
- 3. Refill** using distilled clean drinking water or iron free water when refilling electrolyte.



## 5.04.04 Lubricate Screed Endgate Jacks

▀ Lubricate screed endgate jacks every **50 hours of operation**.

### Warnings

#### **⚠ WARNING**

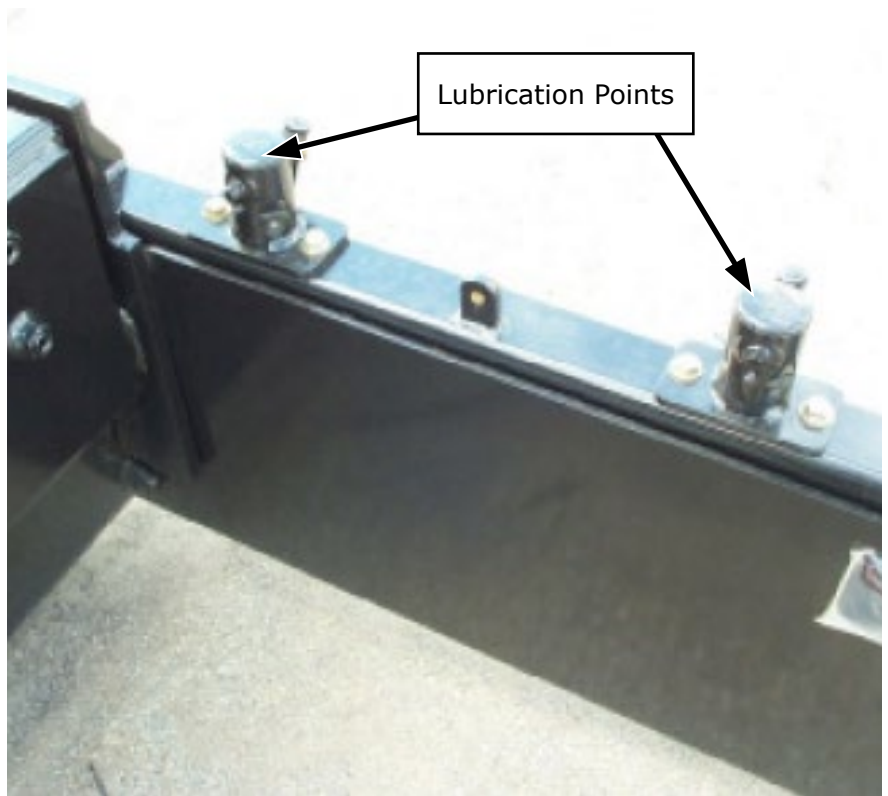
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Lubricate Screed Endgate Jacks

1. **Lubricate** (4) screed endgate jacks located on the machine rear left side with 2 shots each of high temperature grease.



## 5.04.05 Lubricate Angle of Attack Mechanisms

▀ Lubricate angle of attack mechanism every **50 hours of operation**.

### Warnings

#### ⚠ WARNING

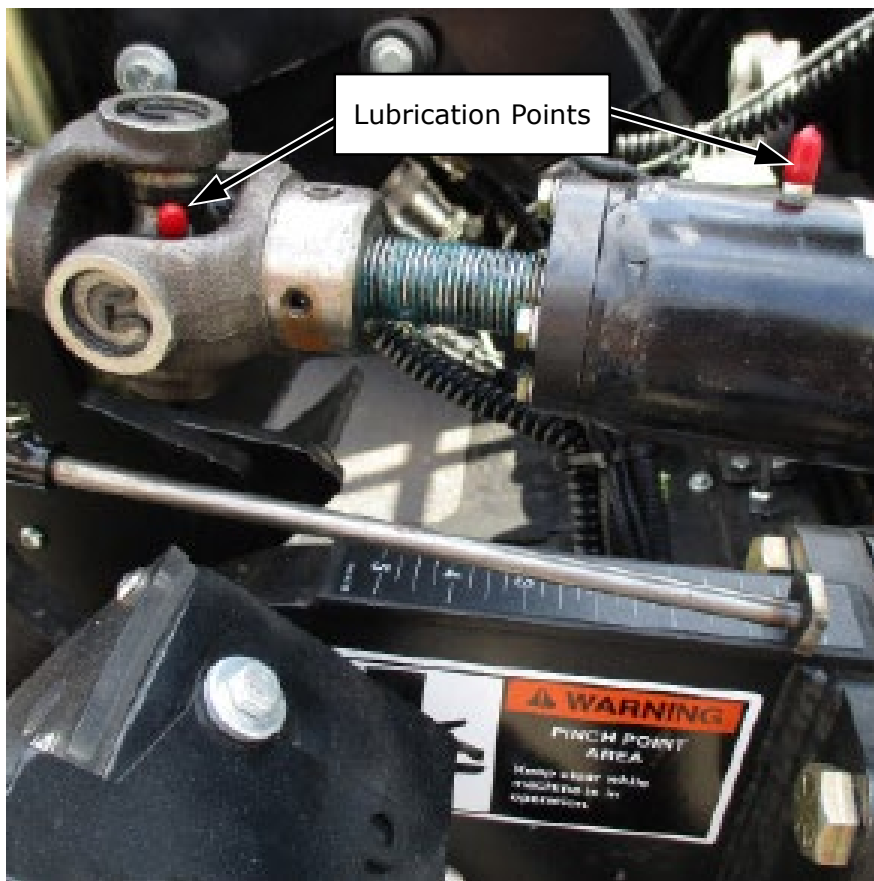
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Lubricate Angle of Attack Mechanisms

1. **Lubricate** (6) angle of attack mechanisms located on the screed right and left hand sides with 2 shots each of high temperature grease.





## 5.04.06 Lubricate Angle of Attack Threads

▀ Lubricate angle of attack threads every **50 hours of operation**.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Lubricate Angle of Attack Threads

1. **Lubricate** (2) angle of attack threads located on the top of the angle of attack component with a light coat of never seize.



## 5.04.07 Lubricate Screed Crown Threads

- ▀ Lubricate screed crown threads every **50 hours of operation**.

### Warnings

#### ⚠ WARNING

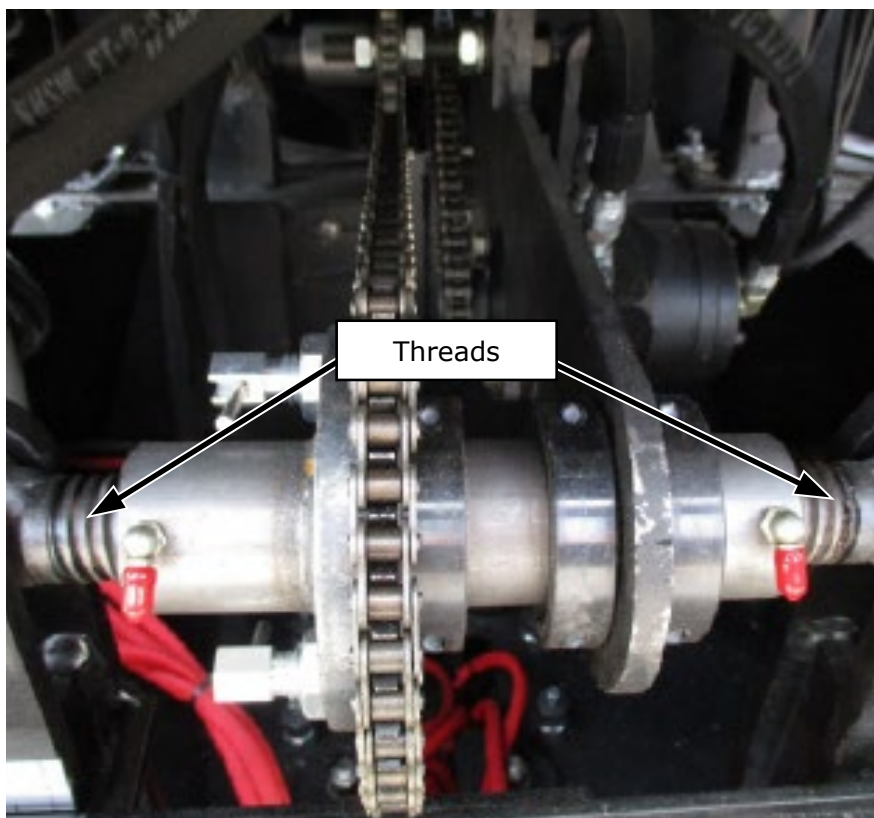
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Lubricate Screed Crown Threads

1. **Lubricate** (2) screed crown threads located on the screed crown with a light coat of never seize.



## 5.04.08 Lubricate Strike-off Tube

▀ Lubricate strike-off tube every **50 hours of operation**.

### Warnings

#### ⚠ WARNING

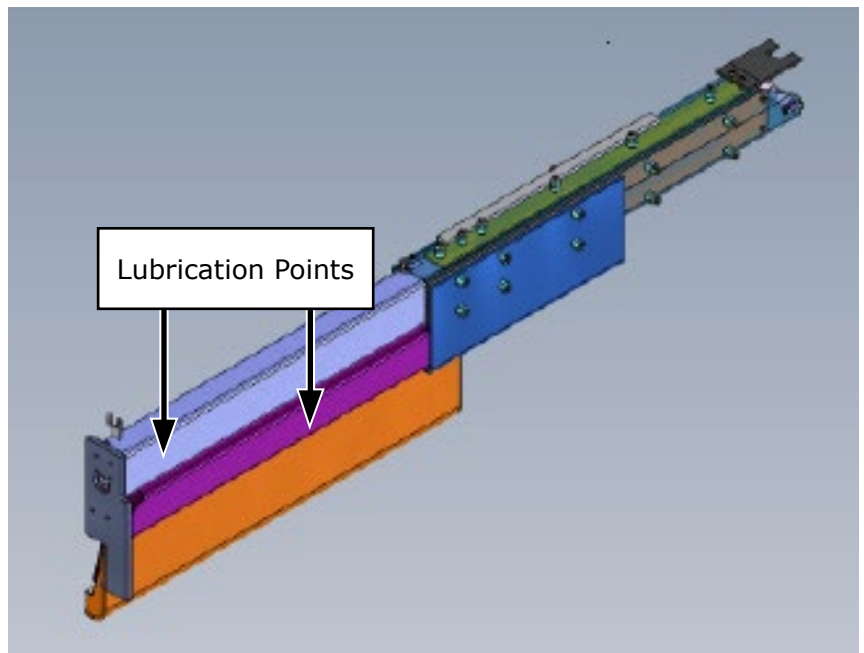
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Lubricate Strike-off Tube

1. **Lubricate** (2) strike-off tube points located on the screed rear left side with a light coat of never seize. Grease the length of the top and sides of the brass tube.



## 5.04.09 Check Tire Pressure

Check tire pressure every **50 hours of operation**.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

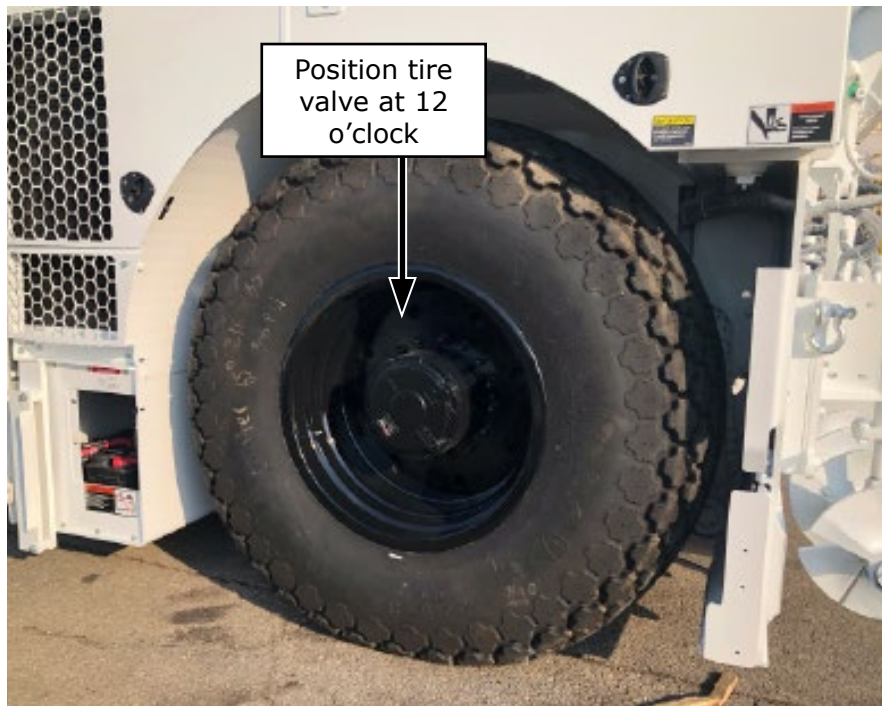
**NEVER** over inflate tires.

**NEVER** operate machine with under-inflated tires. Stand to the side of tire when servicing tire.

W-1028

### Check Tire Pressure

- 1. Check** (2) tires with tire valve positioned at 12 o'clock using pressure gauge. Depress valve to release water that might be in the fill tube since the tires contain a water ballast. Ensure inflation is at 38 psi.
- 2. Check** for any damage, punctures, wear or air bubbles. Ensure wheel lug nuts are tightened.
- 3. Inflate** tires if needed.



## 5.04.10 Lubricate Crown Control

- ▀ Lubricate screed crown control every **50 hours of operation**.

### Warnings

#### ⚠ WARNING

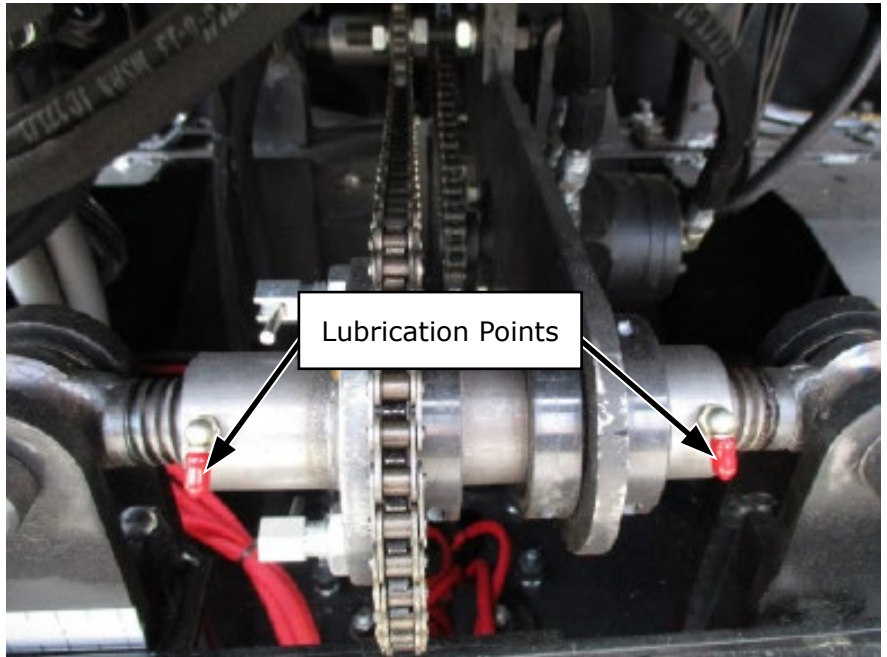
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Lubricate Crown Control

1. **Lubricate** screed crown control at (4) points with 2 shots of high temperature grease.



## 5.05 100 Hours Maintenance

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## 5.05.01 Change Engine Oil and Oil Filter

- Change the engine oil and the engine oil filter after the **FIRST 100 hours of operation**, then every **250 hours** thereafter.
- Use API CJ-4 (ACEA E9) diesel engine oil when the ambient temperature is above 0°F (-18°C) and below 104°F (40°C). Refer to the engine operation and maintenance manual for more information on engine oil and oil filters.

### Warnings

#### ⚠ WARNING

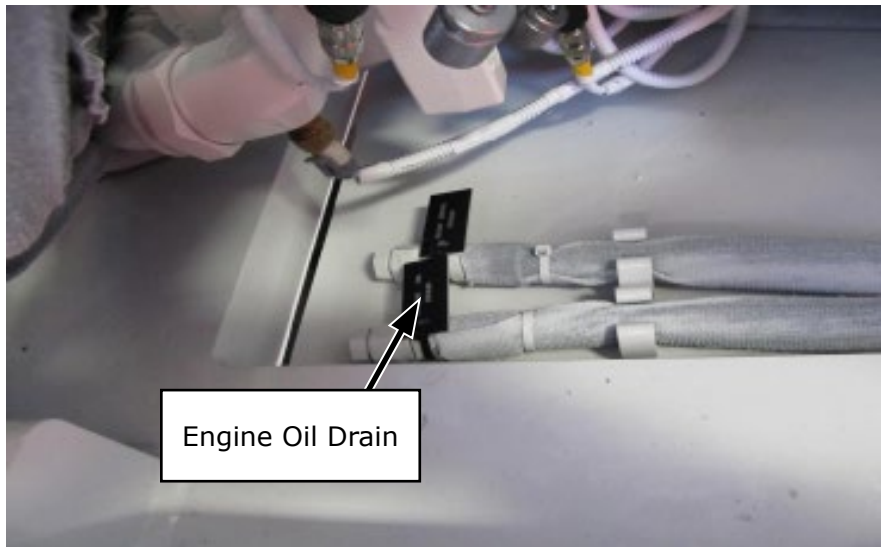
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Change Engine Oil

1. **Start** engine and run until engine reaches operation temperature.
2. **Locate** remote engine oil drain hose located behind the right hand engine access door.
3. **Remove** plug from drain hose. Drain all oil into suitable container.





## Change Engine Filter

4. **Clean** dirt and debris from around the oil filter head.
5. **Remove** filter.
6. **Fill** the new oil filter with clean engine oil.
7. **Apply** a light film of clean engine oil to the filter gasket.
8. **Install** the filter as specified by the manufacturer.  
***IMPORTANT!** Never over-tighten the filter to prevent damage to the threads or filter element seals.*
9. **Reinstall** the oil drain plug.
10. **Fill** the engine with the required amount of clean engine oil. (API CJ-4).
11. **Start** engine and run at idle.
12. **Inspect** for leaks at the filter and drain plug.
13. **Shut** the engine off, wait 10 minutes, and check the oil levels using the dipstick to ensure oil levels fall between the ADD and FULL marks.



## 5.06 250 Hours Maintenance

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## 5.06.01 Check/Replace Engine Air Intake Filter

- ✓ Check engine air filter every **250 hours of operation**.
- ✓ Replace element immediately when holes, loose end seals, dented sealing surfaces or damage are discovered.

### Warnings

#### **⚠ DANGER**

Avoid serious injury or death!

**ALWAYS** engage hood service pins when working under hood.

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

D-1114

### Check/Replace Engine Air Intake Filter

#### TO CHECK FILTER

1. **Check** engine air cleaner restriction gauge located on machine left side. Change filter if needed.

#### TO REPLACE FILTER

2. **Raise** the engine compartment hood.
3. **Engage** hood raise service pins.
4. **Remove** air inlet box.
5. **Pull** cover and elements straight from housing to avoid damaging the elements.
6. **Install** the new inner and outer filter elements.
7. **Reinstall** the air filter.  
**IMPORTANT!** Never remove the plastic fin assembly.



## 5.06.02 Change Engine Oil and Oil Filter

- Change the engine oil and the engine oil filter after the **250 hours of operation**.
- Use API CJ-4 (ACEA E9) diesel engine oil when the ambient temperature is above 0° F (-18° C) and below 104° F (40° C). Refer to the engine operation and maintenance manual for more information on engine oil and oil filters.

### Warnings

#### **⚠ WARNING**

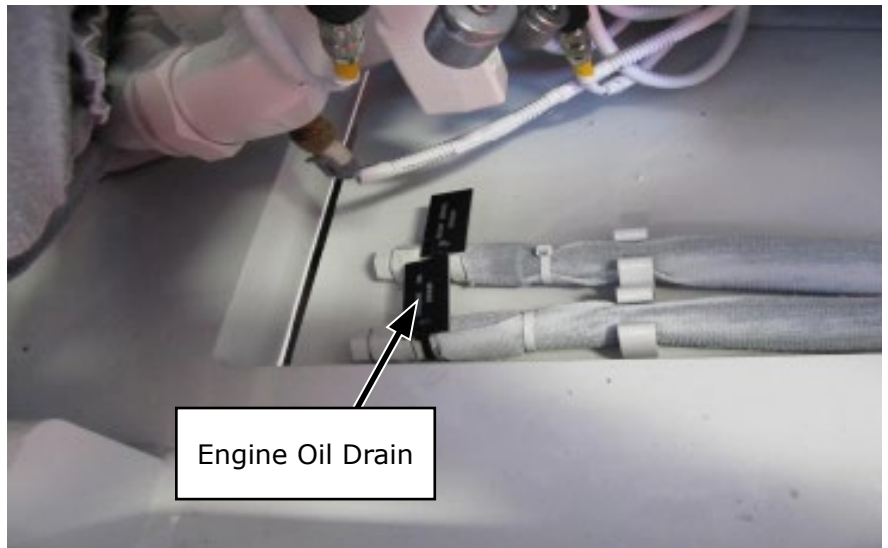
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Change Engine Oil

1. **Start** engine and run until engine reaches operation temperature.
2. **Locate** remote engine oil drain hose located behind the right hand engine access door.
3. **Remove** plug from drain hose. Drain all oil into suitable container.



## Change Engine Filter

1. **Clean** dirt and debris from around the oil filter head.
2. **Remove** filter.
3. **Fill** the new oil filter with clean engine oil.
4. **Apply** a light film of clean engine oil to the filter gasket.
5. **Install** the filter as specified by the manufacturer.  
**IMPORTANT!** Never over-tighten the filter to prevent damage to the threads or filter element seals.
6. **Reinstall** the oil drain plug.
7. **Fill** the engine with the required amount of clean engine oil. (API CJ-4).
8. **Start** engine and run at idle.
9. **Inspect** for leaks at the filter and drain plug.
10. **Shut** the engine off, wait 10 minutes, and check the oil levels using the dipstick to ensure oil levels fall between the ADD and FULL marks.



## 5.06.03 Change Engine Fuel Filter

- Change the engine fuel filter after every **250 hours of operation**.
- Fuel/water separation filter draws water from the fuel and stores the water in a reservoir that must be changed at regular intervals along with the fuel filter.

### Warnings

#### **⚠ WARNING**

Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

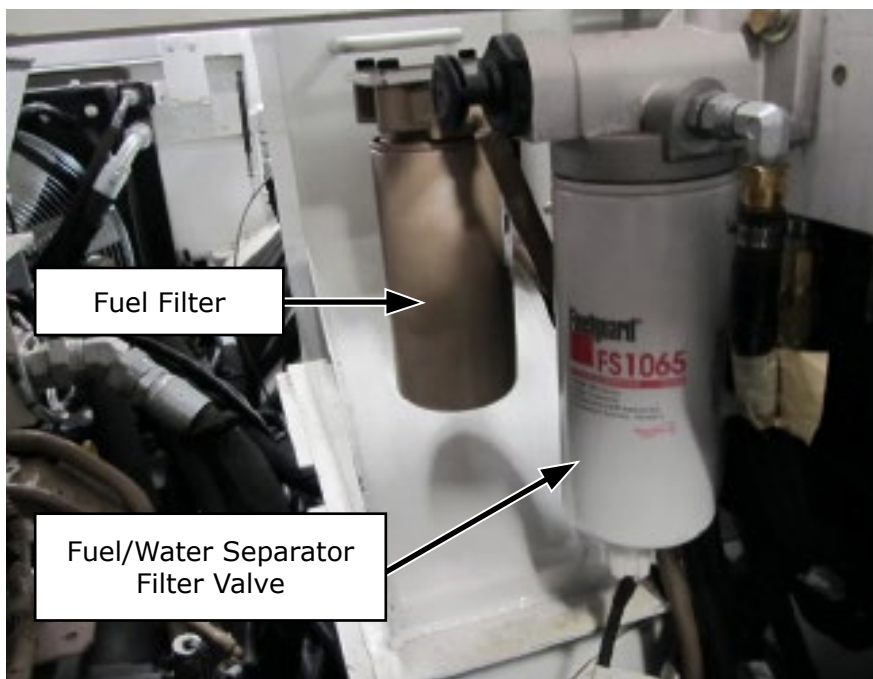
### Change Engine Fuel Filters

#### **CHANGE FUEL FILTERS**

- 1. Remove** the fuel filter.
- 2. Fill** the new fuel filter with clean fuel and lubricate the seals.
- 3. Start** the engine and check for leaks.

#### **DRAIN AND CHANGE FUEL/WATER SEPARATOR FILTER**

- 1. Open** the valve and drain all water collected in the reservoir on a DAILY basis.
- 2. Remove** the element and replace with a clean, new element.



## 5.06.04 Change Hydraulic Filters

- Change hydraulic filters after the **250 hours of operation**.
- Change (5) canister filters mounted inside the hydraulic tank and (2) 10-micron high pressure filters located inside the engine compartment.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

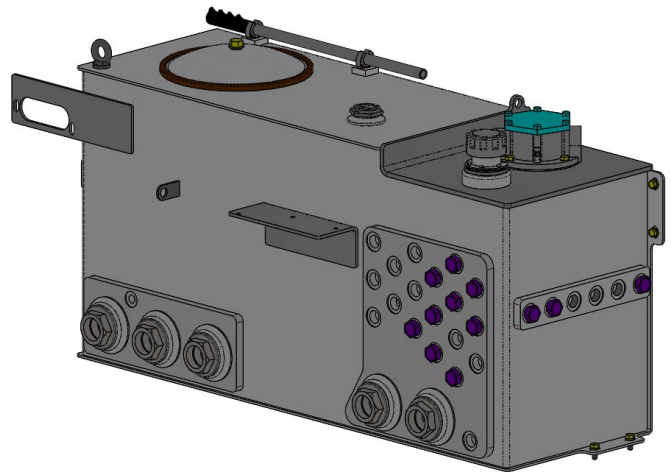
**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

**NEVER** use hands to locate hydraulic leaks - use cardboard. Oil is under pressure and may cause severe damage to tissues.

W-1025

### Change Hydraulic Filters

1. **Ensure** oil temperature is below 100°F (38°C).
2. **Clean** dirt and grease from around filter heads.
3. **Remove** filters and elements.
4. **Fill** new filters with clean hydraulic oil that has been filtered through a 10-micron element.
5. **Lubricate** filter gaskets with clean lubrication oil.
6. **Install** filters as specified by filter manufacturer.
7. **Tighten** filter cap.
8. **Start** the engine and check for leaks.  
**IMPORTANT!** Never check for leaks using hands or any other body part to avoid serious injury and death.





## 5.06.05 Change Wheel Planetary Oil

- Change wheel planetary oil after every **250 hours of operation**.
- Drain and refill (2) wheel planetary drives with 80w-140 high performance gear oil.

### Warnings

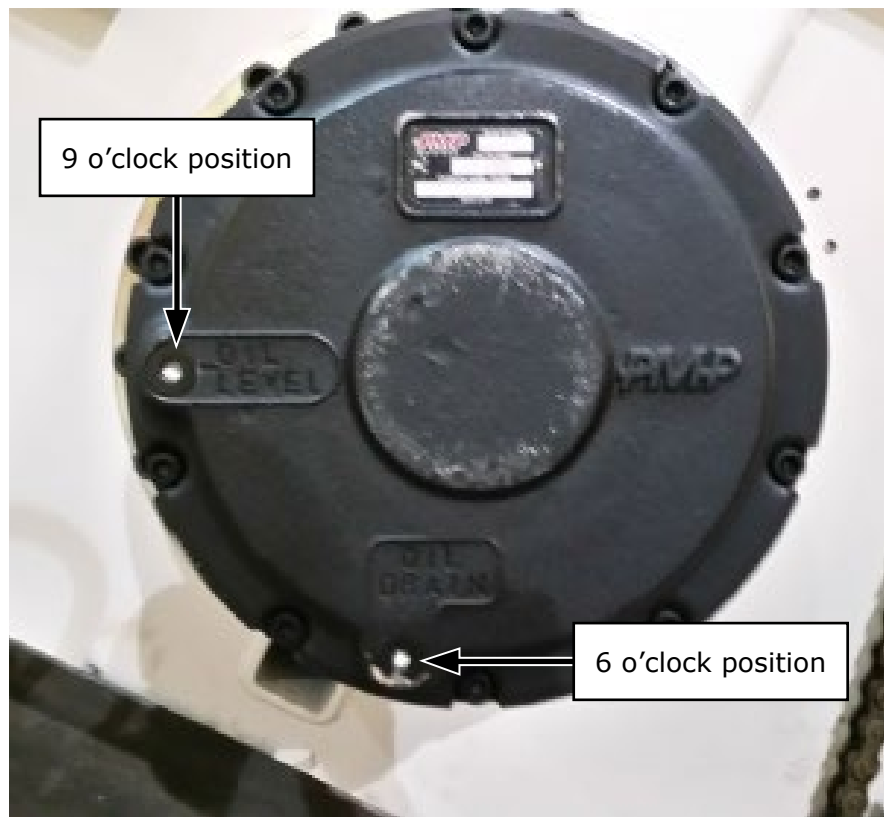
#### **⚠ WARNING**

Avoid serious injury or death!  
**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Change Wheel Planetary Oil

- 1. Position** machine on a completely level surface.
- 2. Clean** dirt and grease from around the port plugs.
- 3. Move** machine forward until both ports are positioned at the 6 o'clock position and the 9 o'clock position as shown.
- 4. Remove** the port plugs from the port positioned at 6 o'clock and drain gear oil.
- 5. Dispose** of gear oil in safe and legal manner.
- 6. Reinstall** the port plug positioned at 6 o'clock.
- 7. Refill** the hub with 80w-140 high performance gear oil through the port in the 9 o'clock position until gear oil starts to flow out of the port.
- 8. Reinstall** the port plug at the 9 o'clock position.



## 5.06.06 Change Pump Drive Gearbox Oil

Change pump drive gearbox oil after every **250 hours of operation**.

### Warnings

#### ⚠ WARNING

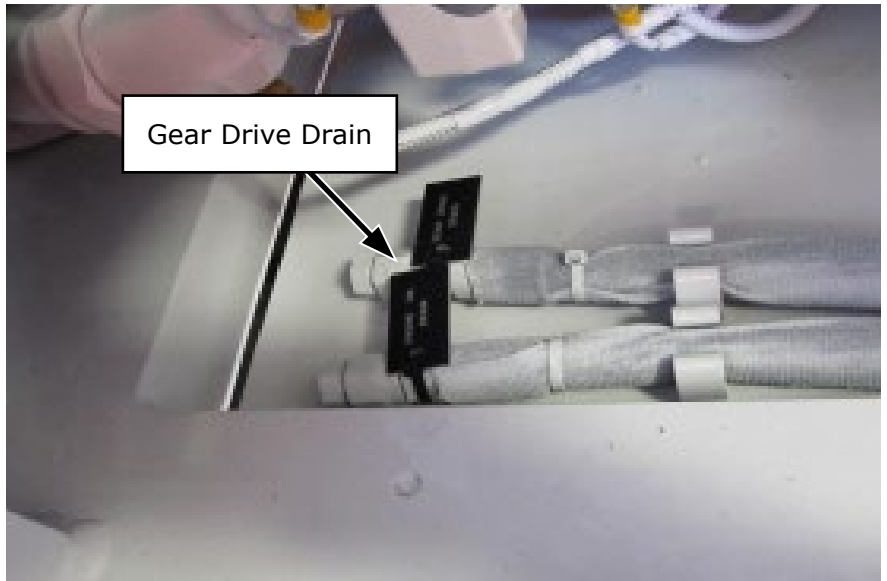
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Change Pump Drive Gearbox Oil

1. **Remove** the drain plug from the pump drive drain hose.

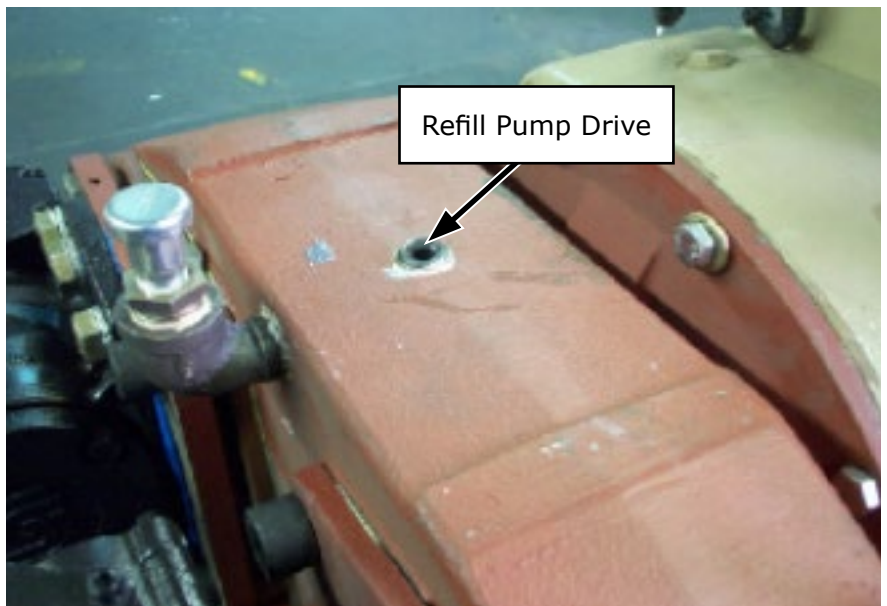


2. **Drain** oil into appropriate container. Dispose of the container in a legal and safe manner.

3. **Reinstall** drain plug.

4. **Refill** the pump drive with 3-5 quarts (2.84-4.73 liters) of 80w-140 high performance gear oil.

**IMPORTANT!** Always check oil levels using dip stick. Never overfill or under-fill pump drive gearbox to avoid damage.



## 5.06.07 Change Auger and Conveyor Planetary Oil

Change (2) auger and (2) conveyor planetary oil after every **250 hours of operation**.

### Warnings

#### ⚠ WARNING

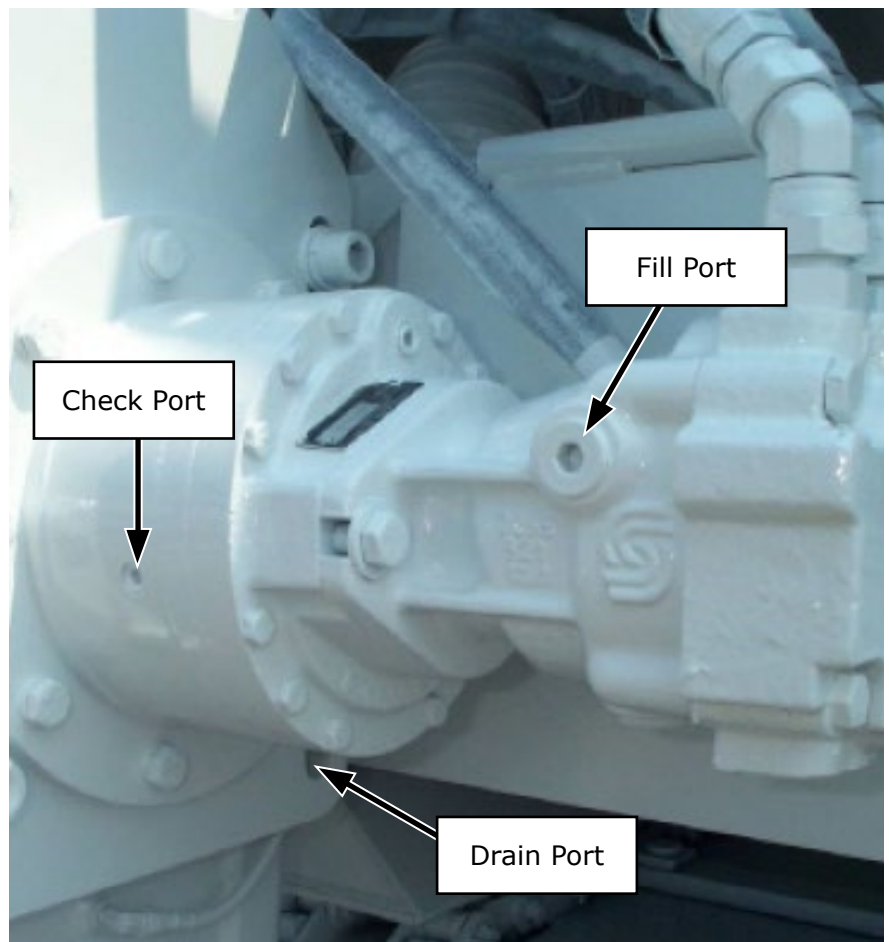
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Change Auger and Conveyor Planetary Oil

1. **Remove** the bottom port plug and drain the gear oil. Dispose of gear oil in a legal and safe manner.
2. **Reinstall** the drain plug.
3. **Remove** the fill and check plugs.
4. **Add** 80w-140 high performance gear oil through the fill port until oil begins to seep out of the check port.
5. **Reinstall** both the fill and check port plugs.



## 5.06.08 Lubricate Seat Pivot Bearing

- ▀ Lubricate seat pivot bearing with 2 shots high temperature grease every **250 hours of operation**.

### Warnings

#### **WARNING**

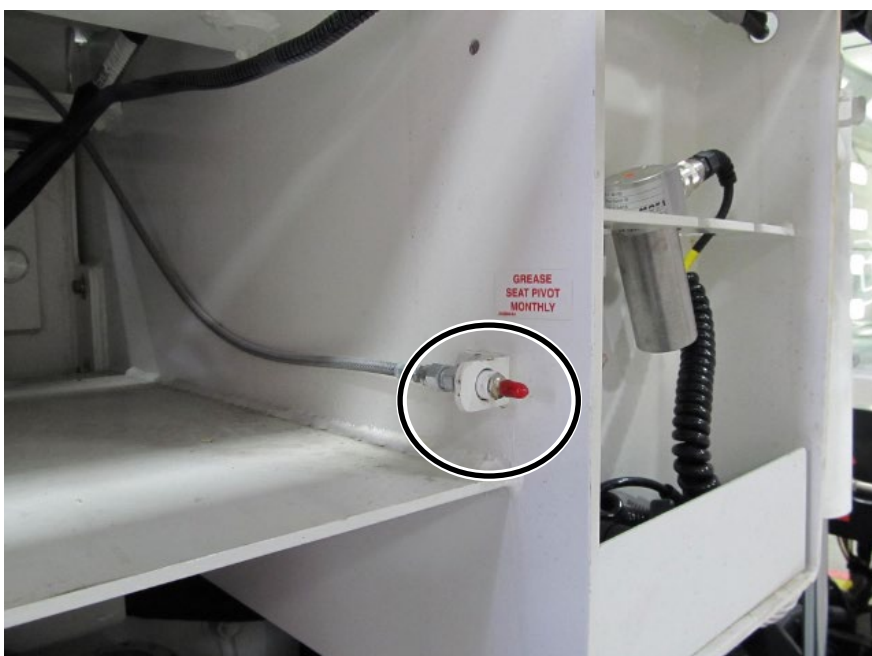
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Lubricate Seat Pivot Bearing

1. **Lubricate** 2 fittings with 2 shots high temperature grease.





## 5.07 1000 Hours Maintenance

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## 5.07.01 Flush and Clean Radiator

- ▣ Drain, flush and refill radiator after **1,000 hours of operation**.
- ▣ Refer to the engine manufacturer's manual for specific check points and intervals.

### Warnings

#### ⚠ WARNING



Avoid serious injury or death!  
**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected. Wait until the fluid has cooled before removing cap. Stand to the side and away from cap during removal.

W-1029

### Flush and Clean Radiator

1. **Open** drain valve and allow coolant to drain.
2. **Check** radiator for mineral build-up, rust or oil.
3. **Flush** out all contaminants with radiator cleanser.
4. **Flush** radiator with clean water.
5. **Refill** with 50/50 anti-freeze and water.
6. **Top** off with 1 liter of Cummins supplemental coolant additive.  
**IMPORTANT!** Maintain engine coolant levels to 4 inches from bottom of cap. Check sight glass to confirm coolant levels.





## 5.07.02 Replace Engine Breather

- ✓ Check engine breather every **1,000 hours of operation**.
- ✓ Replace element immediately when holes, loose end seals, dented sealing surfaces and damage are discovered.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

Engage hood service pins when working under hood.

W-1030

### Replace Engine Breather

1. **Raise** the engine compartment hood.
2. **Engage** hood raise service pins.
3. **Remove** air filter housing cover.
4. **Pull** cover and elements straight from housing to avoid damaging the elements.
5. **Install** the new inner and out filter elements.
6. **Reinstall** the air filter housing cover.  
**IMPORTANT!** Never remove the plastic fin assembly.



### 5.07.03 Flush Hydraulic Tank and Replace Strainer

▼ Drain, flush and refill hydraulic tank after every **1,000 hours of operation**.

#### Warnings

##### **WARNING**

Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

**NEVER** allow oil levels to fall below indicator line which can damage the hydraulic system.

**NEVER** use hands to locate hydraulic leaks - use cardboard. Oil is under pressure and may cause severe damage to tissues.

**NEVER** weld or cut on tank.

**NEVER** overfill tank which can cause excessive pressure and may damage components.

W-1024

#### Drain and Flush Hydraulic Tank

- 1. Clean** dirt and grease from around tank plug.
- 2. Remove** plug from the hydraulic drain hose.
- 3. Drain** fluid. Dispose of the oil in a legal and safe manner.



4. **Remove** and clean tank strainers. Replace if needed.

5. **Remove** the tank fill cap.

6. **Clean** tank thoroughly, vacuuming any particles from the bottom of the tank using a shop vacuum.



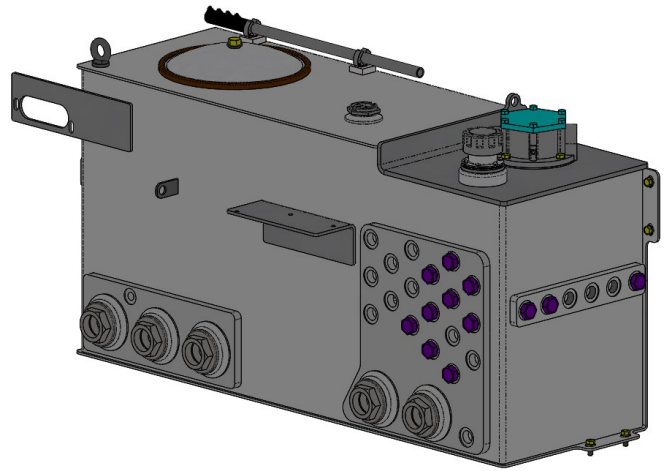
## Refill Hydraulic Tank

7. **Reinstall** drain plugs and strainers.

8. **Replace** hydraulic filters. See Section 4.04.02.

9. **Fill** tank to 90% capacity (68.4 gal. or 259 l) with clean hydraulic oil that has been filtered through a 10-micron element.

**IMPORTANT!** Refill tank to 90% capacity to prevent overflow due to heat expansion of the fluid.



## 5.07.04 Flush and Refill Wheel Planetary Oil

- Change wheel planetary oil after every **1,000 hours of operation**.
- Drain and refill (2) wheel planetary drives with 80w-140 high performance gear oil.

### Warnings

#### ⚠ WARNING

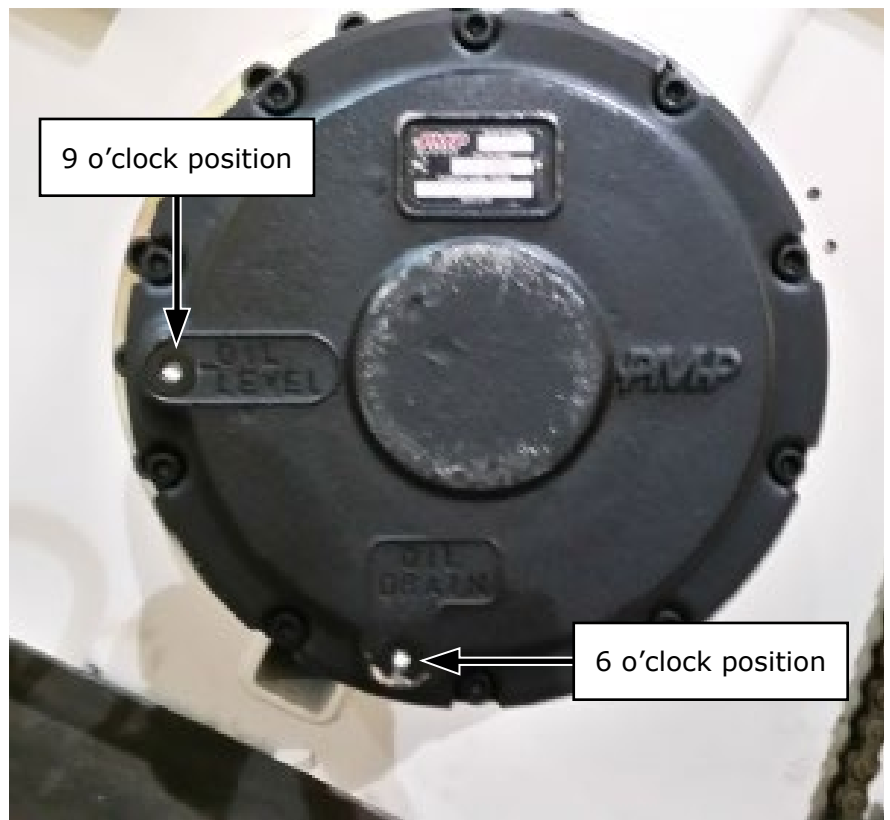
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Flush and Refill Wheel Planetary Oil

1. **Position** machine on a completely level surface.
2. **Clean** dirt and grease from around the port plugs.
3. **Move** machine forward until both ports are positioned at the 6 o'clock position and the 9 o'clock position as shown.
4. **Remove** the port plugs from the port positioned at 6 o'clock and drain gear oil.
5. **Dispose** of gear oil in safe and legal manner.
6. **Reinstall** the port plug positioned at 6 o'clock.
7. **Refill** the hub with 80w-140 high performance gear oil through the port in the 9 o'clock position until gear oil starts to flow out of the port.
8. **Reinstall** the port plug at the 9 o'clock position.



## 5.07.05 Flush and Refill Pump Drive Gearbox Oil

Change pump drive gearbox oil after every **1,000 hours of operation**.

### Warnings

#### **⚠ WARNING**

Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Flush and Refill Pump Drive Gearbox Oil

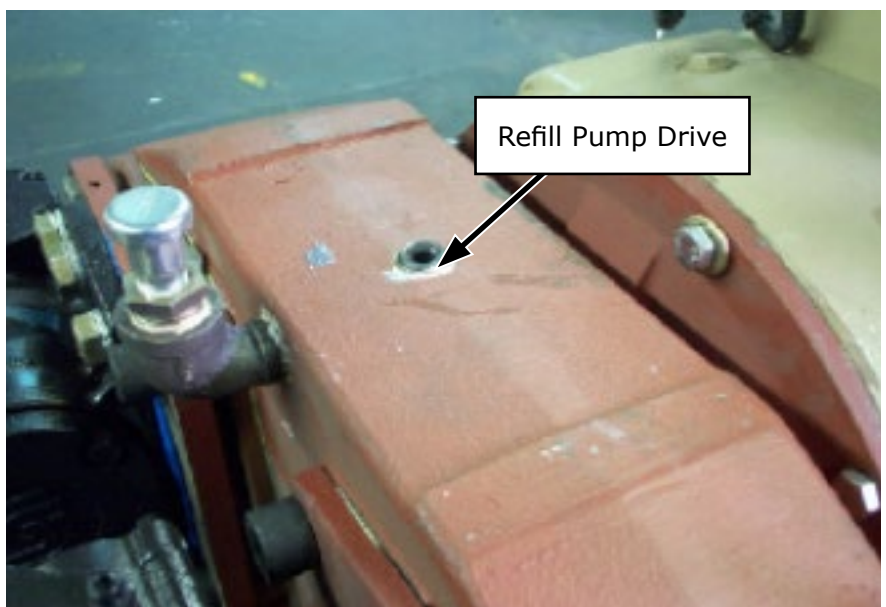
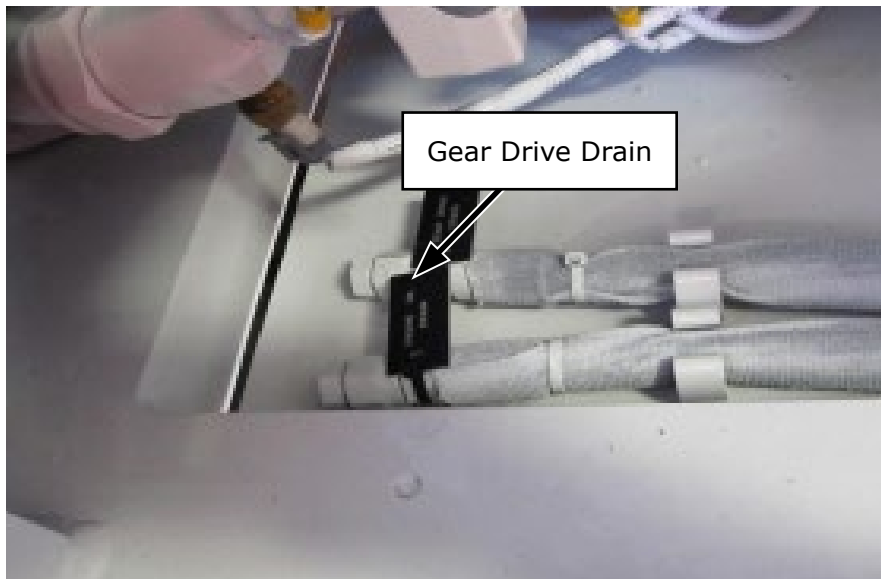
**1. Remove** the drain plug from the pump drive drain hose.

**2. Drain** oil into appropriate container. Dispose of the container in a legal and safe manner.

**3. Reinstall** drain plug.

**4. Refill** the pump drive with 3-5 quarts (2.84-4.73 liters) of 80w-140 high performance gear oil.

**IMPORTANT!** Always check oil levels using dip stick. Never overfill or under-fill pump drive gearbox to avoid damage.



## 5.07.06 Flush and Refill Auger and Conveyor Planetary Oil

- Change (2) auger and (2) conveyor planetary oil after every **1,000 hours of operation**.

### Warnings

#### ⚠ WARNING

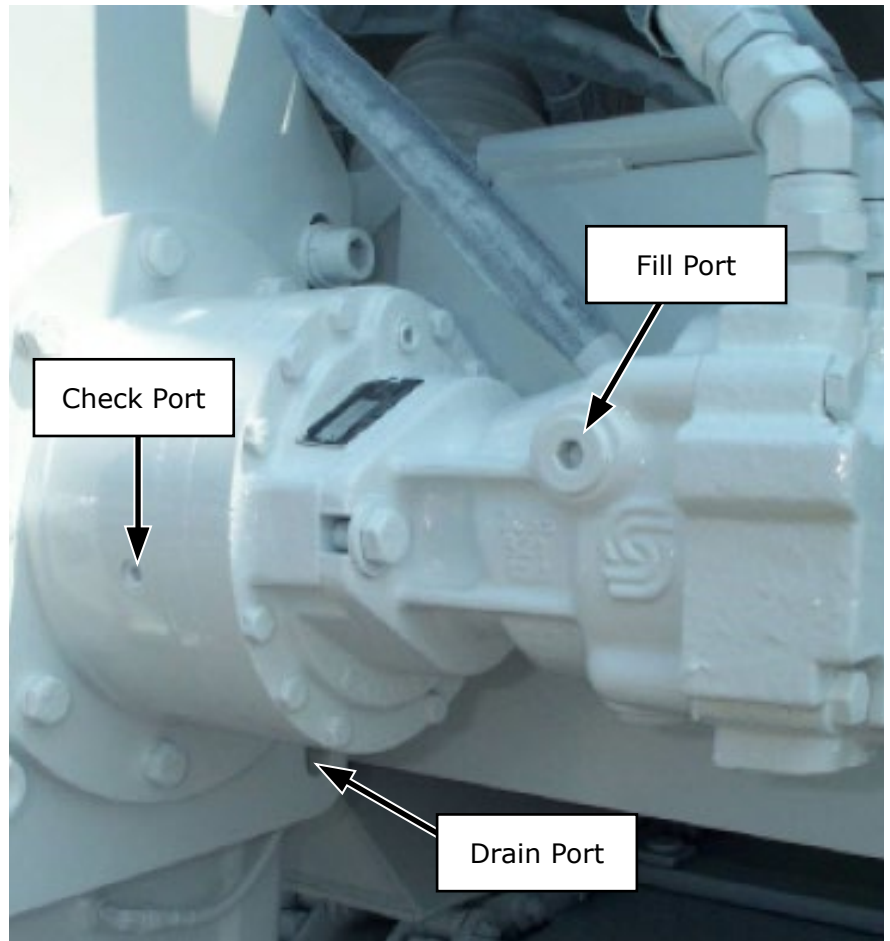
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Flush and Refill Auger and Conveyor Planetary Oil

1. **Remove** the bottom port plug and drain the gear oil. Dispose of gear oil in a legal and safe manner.
2. **Reinstall** the drain plug.
3. **Remove** the fill and check plugs.
4. **Add** 80w-140 high performance gear oil through the fill port until oil begins to seep out of the check port.
5. **Reinstall** both the fill and check port plugs.





## 5.07.07 Check and Refill Bogie Wheel Bearings

Check and refill (4) bogie wheel bearings every **1,000 hours of operation**.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Check and Refill Bogie Wheel Bearings

1. **Jack up** one side of the paver at a time just high enough to remove the bogie wheels.
2. **Remove** the retaining cap that exposes the retaining nut.
3. **Remove** the retaining nut and remove the wheel.
4. **Remove** both the inner and outer bearing from inside the wheel.
5. **Replace** any damaged bearings.
6. **Pack** all bearings with high temperature NLGI grade 2 grease only.
7. **Mount** the wheel back onto the bogie. Secure with retaining nut.
8. **Reinstall** the retaining cap.
9. **Repeat** process with opposite side of paver.



## 5.08 2000 Hours Maintenance

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## 5.08.01 Diesel Emissions Fluid Filters

- Change the diesel exhaust fluid tank head filter and the fluid filter cartridge every **2,000 hours of operation**.

### Warnings

#### ⚠ WARNING

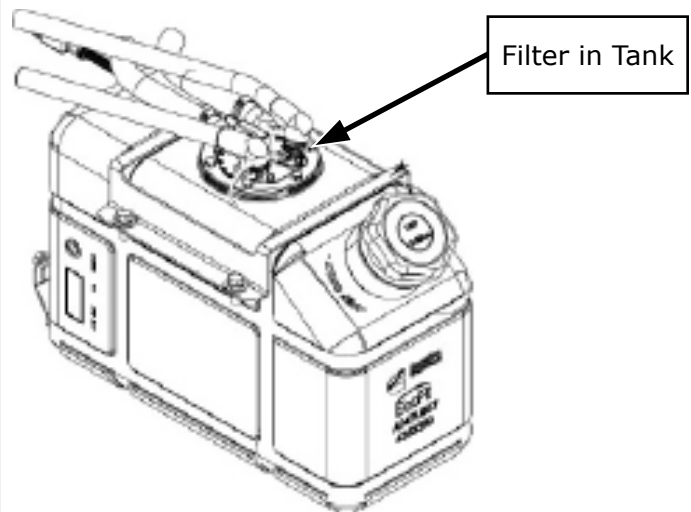
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

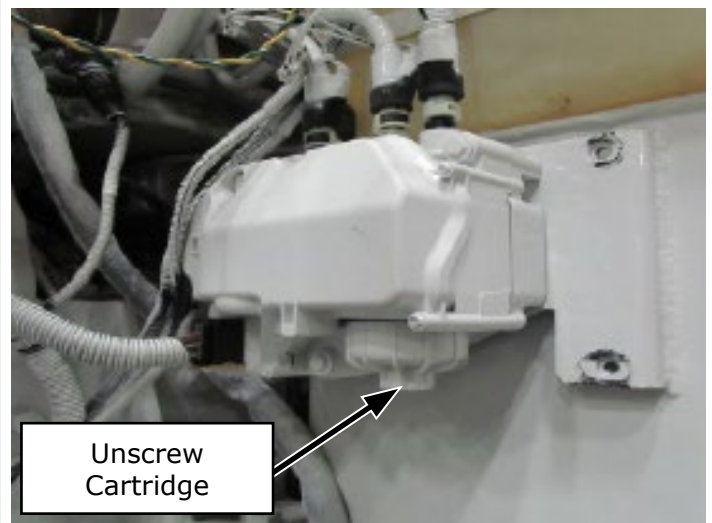
W-1027

### Change Diesel Emissions Fluid Filters

1. **Change** the tank head filter located in tank.



2. **Unscrew** the fluid filter cartridge and replace with new filter.





## 5.09 Maintenance Procedures

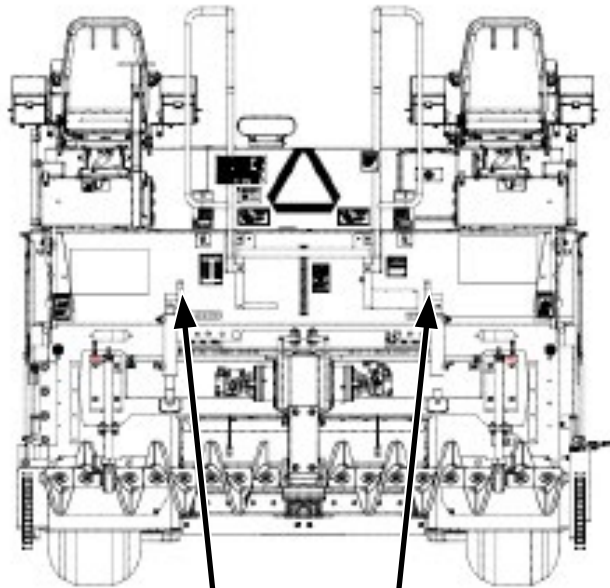
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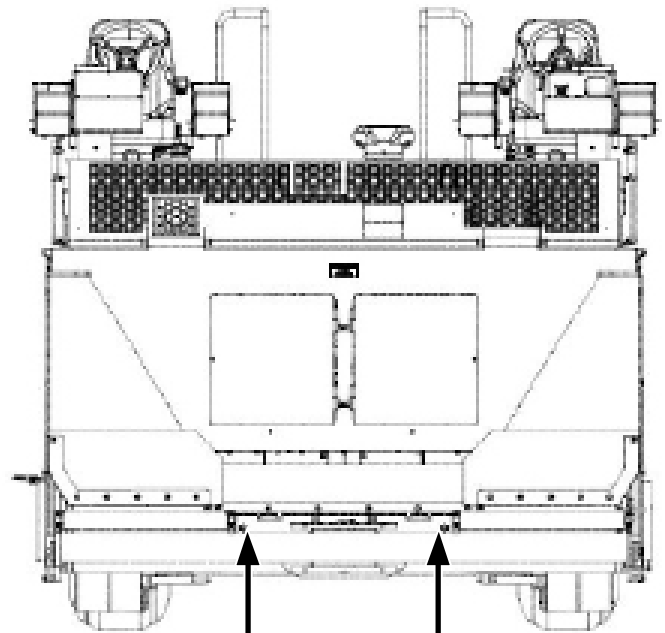
## 5.09.01 Machine Lifting Points

▲ Lifting points are located on the front and rear of the machine. Use cables rated at 20 tonnes.

### Lifting Points



Rear Lifting Points

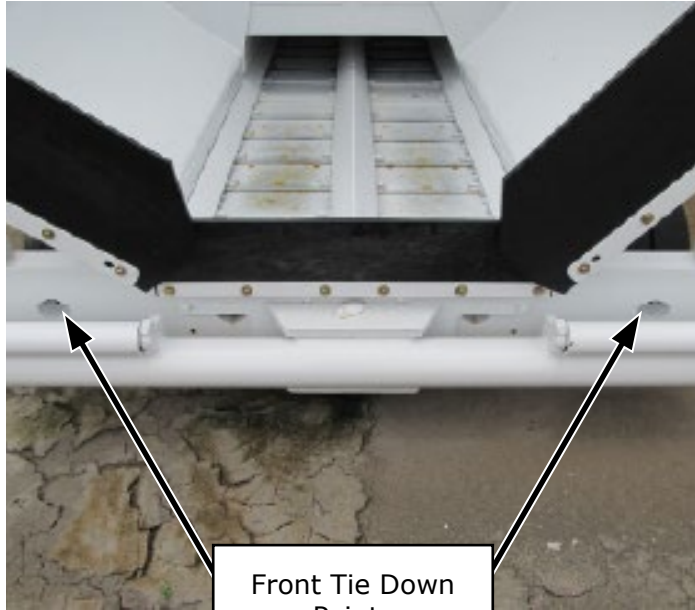


Front Lifting Points

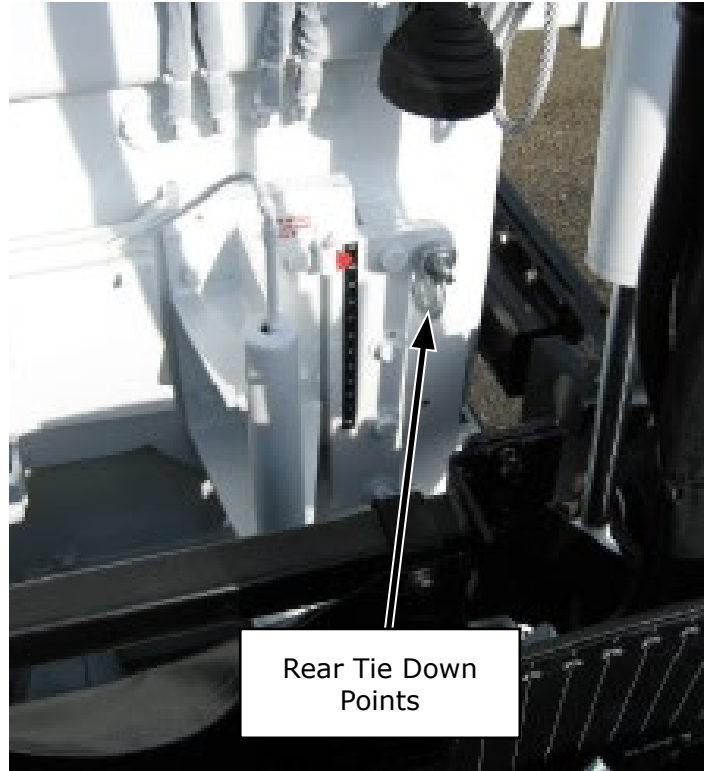
## 5.09.02 Machine Tie Down Points

▼ Tie down points are located on the front and rear of the machine.

### Tie Down Points



Front Tie Down  
Points



Rear Tie Down  
Points

### 5.09.03 Adjust Auger Drive Chain

- Check auger chain once a week. Adjust when needed or when auger chain under- performs.

#### Warnings

#### **WARNING**

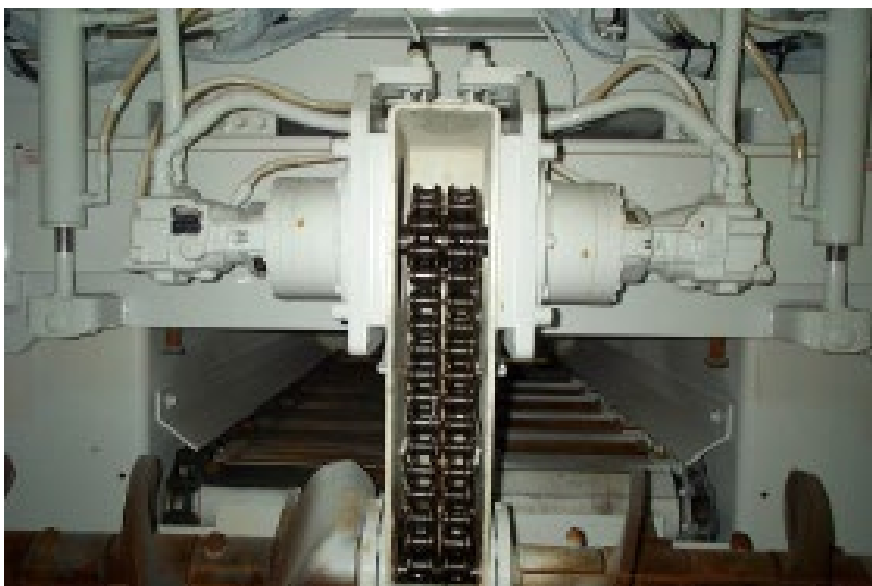
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

#### Adjust Auger Drive Chain

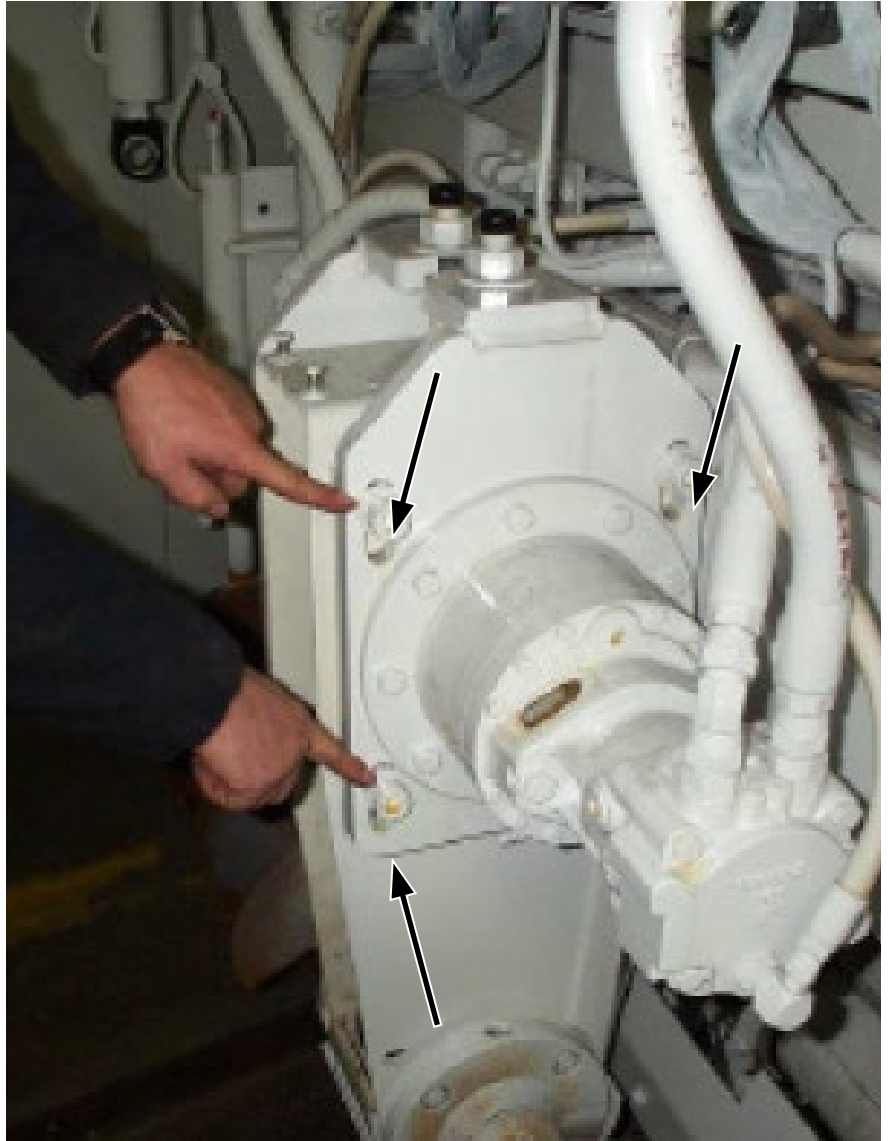
- 1. Check** the range of movement in the chain by twisting the auger shaft back and forth. Adjust the chain if there is more than 1/2" movement.





2. **Loosen** (4) auger drive mounting bolts using a 3/4" hex wrench.

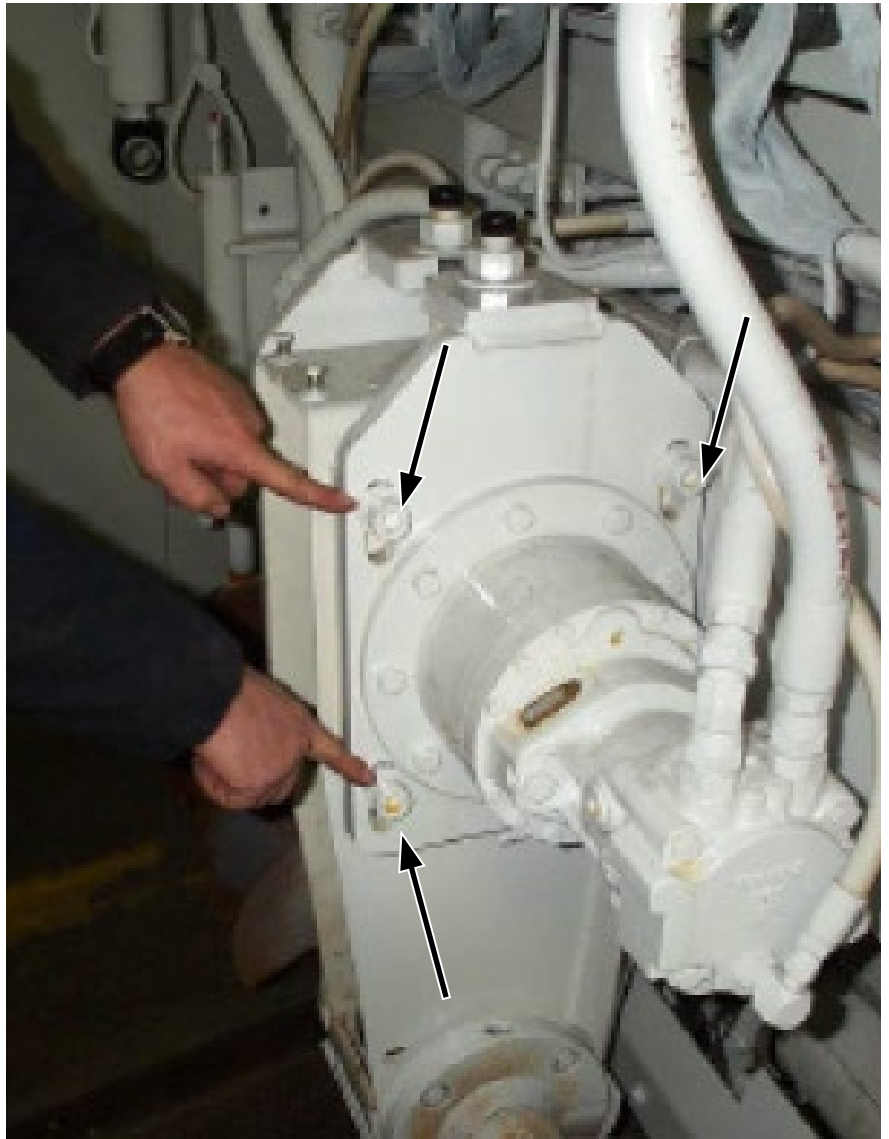
**IMPORTANT!** DO NOT completely remove bolts.



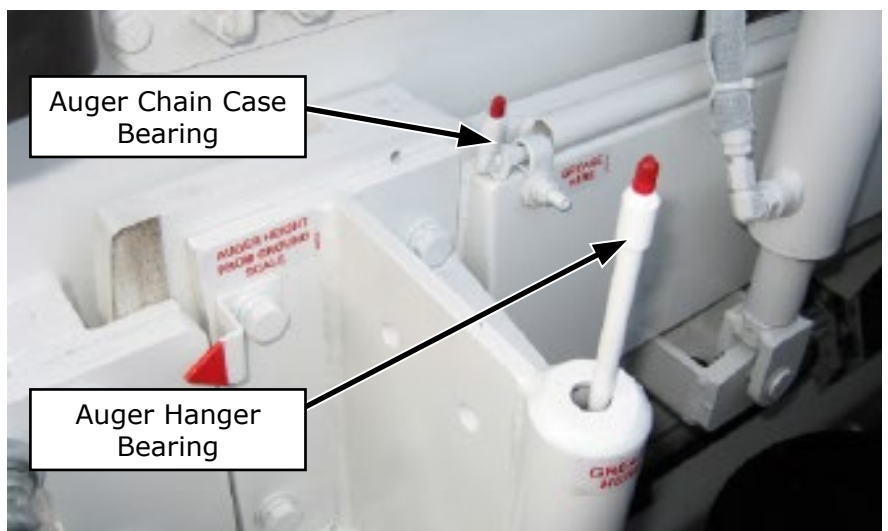
3. **Adjust** the tension by tightening the chain tension bolts with a 1" wrench. Tighten each chain until there is less than 1/2" movement in each auger shaft.



4. **Tighten** auger drive mounting bolts to secure.



5. **Purge** auger chain case bearings daily while they are hot using high temperature grease.



## 5.09.04 Adjust Conveyor Drive Chain

- Check conveyor drive chain once a week. Adjust when needed or when conveyor chain under-performs.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

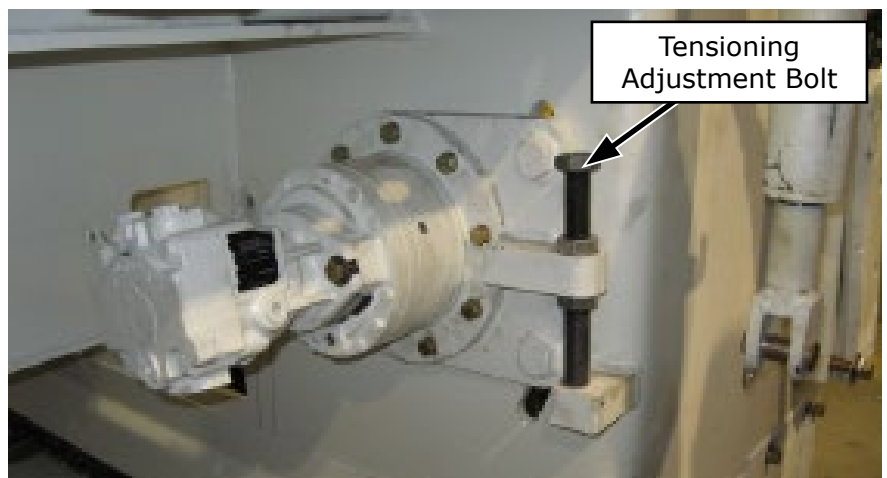
**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Adjust Conveyor Drive Chain

**IMPORTANT!** NEVER adjust drive chain while hot. Tension will increase when chains have cooled.

- Inspect** (2) conveyor drive chains to determine slack or movement.
- Adjust** tension if more than 1/2" of movement exists.
- Loosen** (2) chain drive chain securing bolts.
- Tighten** chain tension adjustment bolt until there is 1/2" or less movement in drive chain.
- Tighten** chain drive securing bolts to maintain tension.



## 5.09.05 Adjust Conveyor Drag Chain

- Check conveyor drag chain once a week. Adjust when needed or when conveyor chain under-performs.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

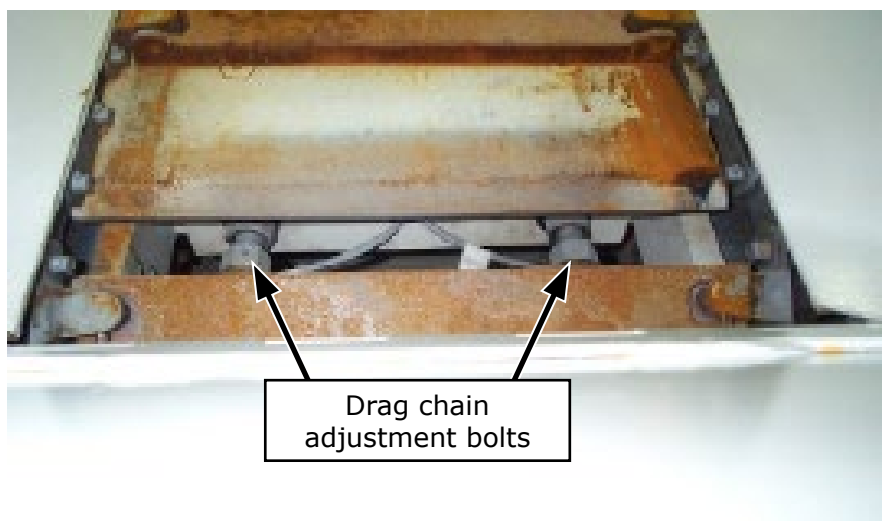
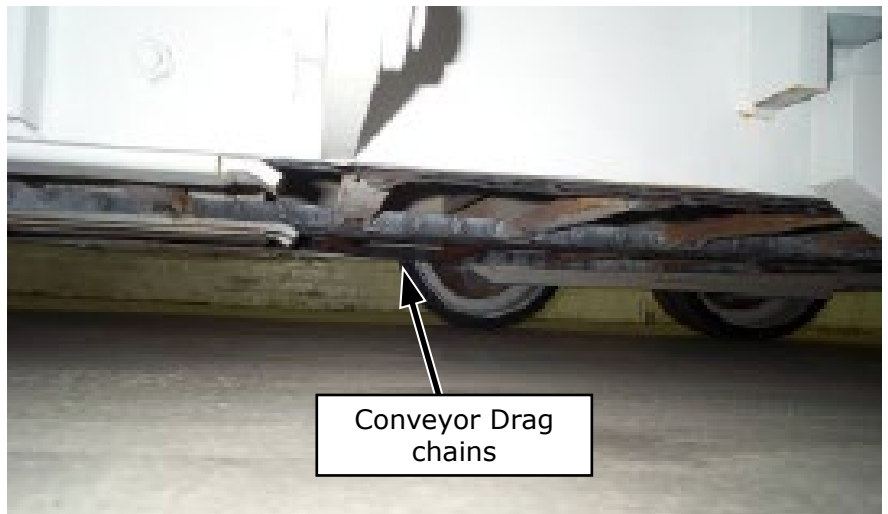
**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Adjust Conveyor Drag Chain

**IMPORTANT!** NEVER adjust drag chains while hot. Tension will increase when chains have cooled.

1. **Inspect** (2) conveyor drag chains under machine to determine slack or movement.
2. **Adjust** tension if more than 1/2" of movement exists.
3. **Loosen** lock nuts on drag chain adjustment bolts located at the front of the hopper.
4. **Apply** tension to both tensioner bolts evenly until there is less than 1/2" sag in both sides of the drag chain.
5. **Tighten** lock nuts.



## 5.09.06 Wash Down Machine

- Wash down machine at the end of each work day prior to greasing procedures while the asphalt material and the machine are still warm. The wash down system utilizes environmentally-friendly solvent to help remove asphalt and dirt from the machine.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

**NEVER** leave solvent on walkways or stairs. Take care when climbing on or off machine during procedure.

W-1031

#### NOTICE

Check local, state and federal regulations for oil waste material handling procedures. **NEVER** spray diesel on wheels. Degradation of rubber will lead to premature failure.

N-1029

### Wash Down Machine

- 1. Locate** the wash down system switch on the right side of the machine.
- 2. Position** machine where solvent and residue will not affect the paving operation or the environment.
- 3. Raise** screed, then secure with service cables.
- 4. Run** engine in low idle.
- 5. Clear** personnel of the area.
- 6. Set** Parking Brake.
- 7. Turn** right and left conveyor systems ON.
- 8. Point** wash down sprayer in safe direction away from persons.
- 9. Activate** spray system with the switch located next to the hose reel on the screed.



**10. Wash down:**

**Push Rollers** until they turn freely.

Hopper and flow gates,  
Conveyor chains and bars while rotating, rear conveyor drive sockets while rotating, auger flights and bearings while rotating, screed walkways, steps, and screed bottom, end gates ensuring they slide properly, hydraulic strike-offs between strike-offs and screed.

**IMPORTANT!** The wash down system is located on the screed. Check the site glass located on the screed near the wash down hose. The refill port is located on machine hood.



## 5.09.07 Manual Hood Raise and Brake Release

- Raise or lower the machine hood and release parking brakes without the engine running.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

**NEVER** leave solvent on walkways or stairs. Take care when climbing on or off machine during procedure.

**ALWAYS** reset manual overrides to locked position to avoid release of parking brakes and hood movement.

W-1032

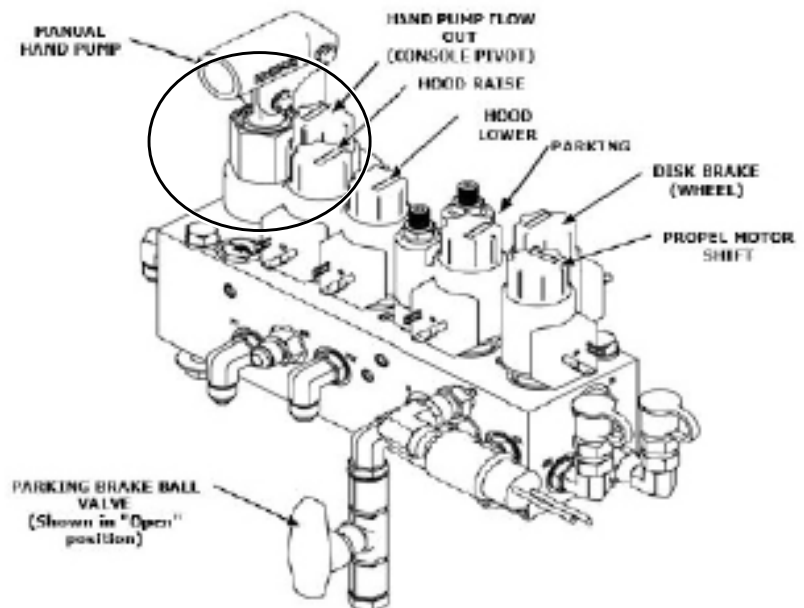
### Manual Hood Raise and Brake Release

- 1. Locate** the manual hand pump located beneath the left hand operator station floor plate.

#### RAISE HOOD

- 2. Remove** protective cap. Turn override screw counter clockwise until it stops in the UP position to activate manual override.
- 3. Insert** provided handle into the hand pump.
- 4. Pump** using handle until hood is completely raised.
- 5. Install** lock pin into hood prop to secure hood in raised position.
- 6. Reset** manual override by turning override screw clockwise until it stops in the DOWN position.
- 7. Replace** protective cap.

**IMPORTANT!** Reverse instructions to LOWER HOOD using Hood Lower override screw.





**RELEASE PARKING BRAKES**

**8. Remove** protective cap.

**9. Turn** parking override screw counter clockwise until it stops in the UP position to activate manual override.

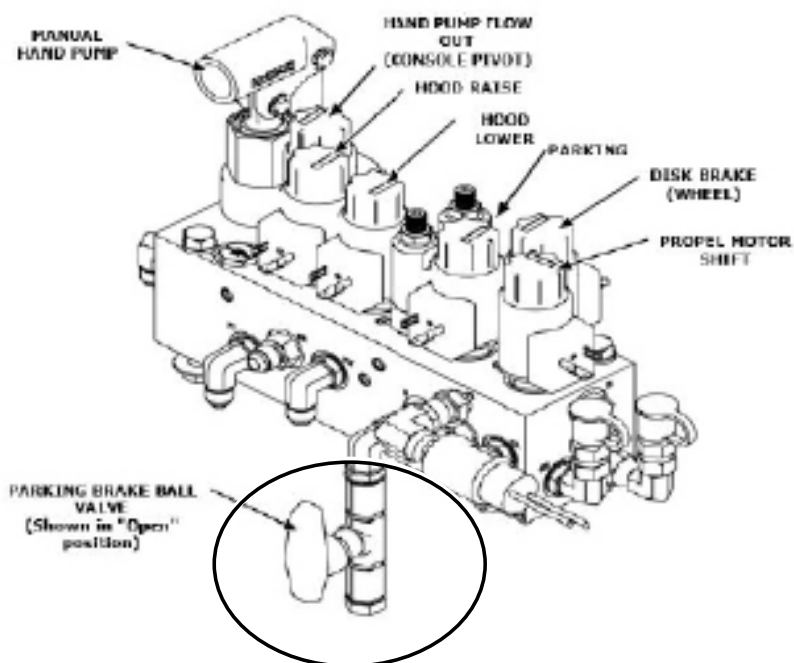
**10. Insert** provided handle into hand pump.

**11. Pump** until handle provides strong resistance.

**12. Turn** brake ball valve clockwise to close and release brakes.

**13. Reset** manual override by turning override screw clockwise until it stops in the DOWN position.

**IMPORTANT!** Reverse the steps above to apply parking brakes.





## 5.09.08 Engage / Disengage Propel Pump Bypass

- Engage or disengage the propel pump bypass.

### Warnings

#### ⚠ WARNING

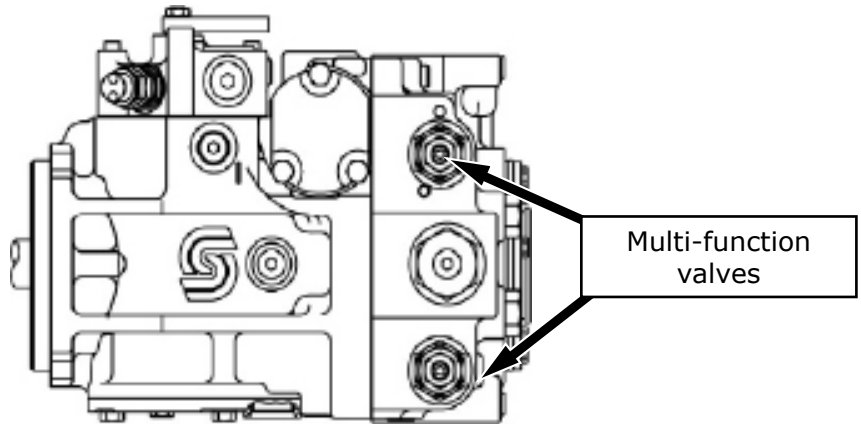
Avoid serious injury or death!

**NEVER** perform service or maintenance until machine is shut down and batteries are disconnected.

W-1027

### Engage / Disengage the Propel Pump Bypass

- 1. Turn** middle hex nut 3 turns counter clockwise relative to the larger hex nut to engage bypass feature of the multi-function valves on the propel pump.
- 2. Turn** middle hex nut clockwise until tightened to disengage the bypass feature of the multi-function valves on the propel pump.



## 5.09.09 Pivot Seats with Manual Hand Pump

- ▀ Pivot seats using the manual hand pump.

### Warnings

#### ⚠ WARNING

Avoid serious injury or death!

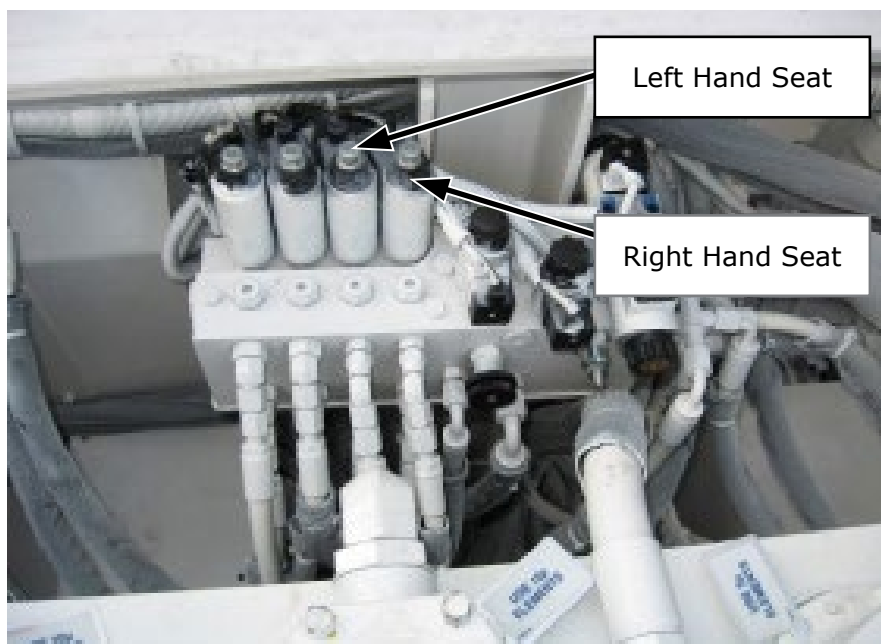
**ALWAYS** reset manual overrides to locked position to avoid unintentional seat pivoting when auxiliary pressure is restored.

**NEVER** leave solvent on walkways or stairs. Take care when climbing on or off machine during procedure.

W-1033

### Pivot Seats with Manual Hand Pump

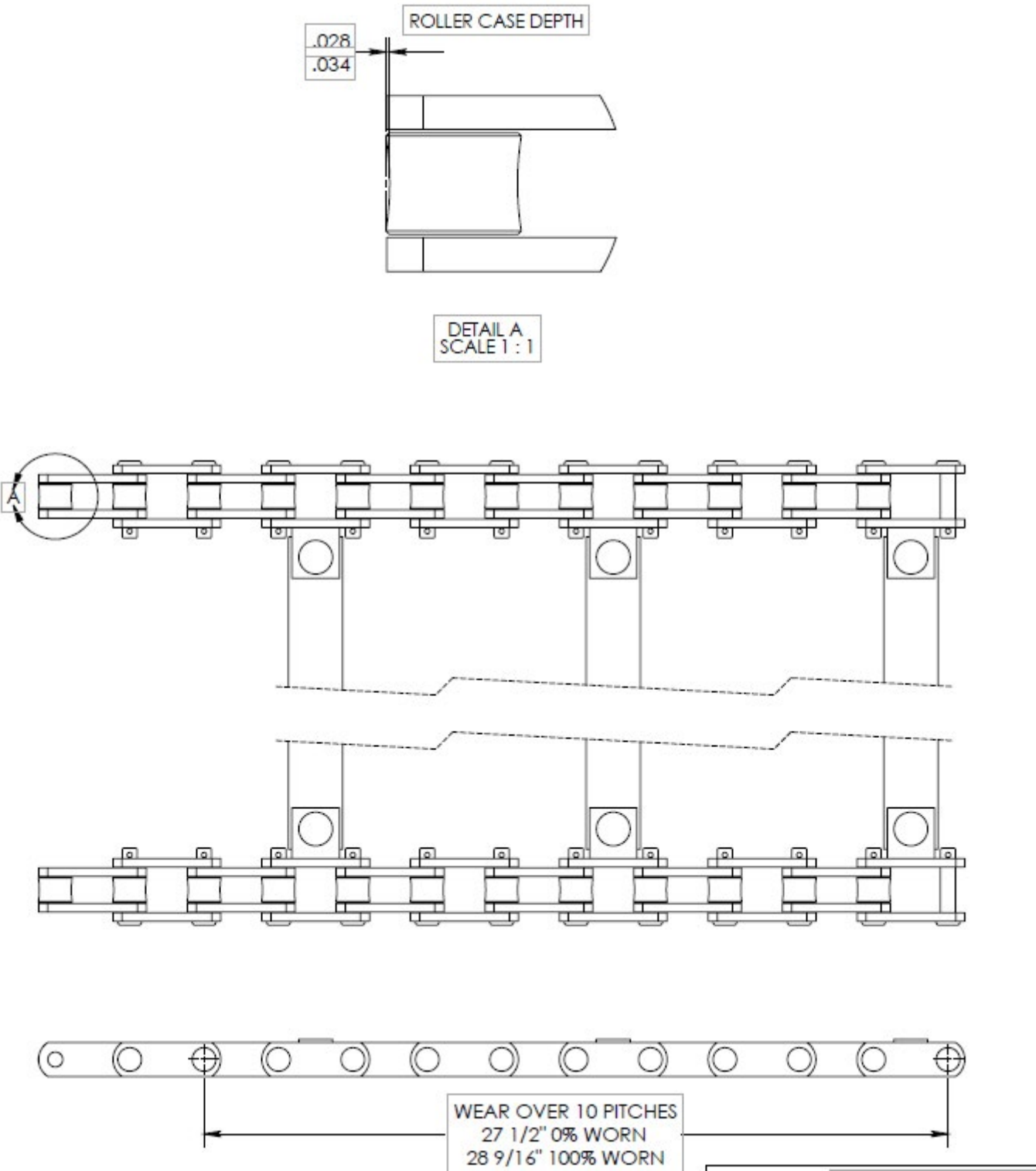
1. **Remove** lock pin from hood prop.
2. **Remove** protective cap.
3. **Turn** override screw counter clockwise until it stops in the UP position to activate manual override.
4. **Push or Pull** override while turning to lock left or right seat pivot valve.  
 UP/DOWN = valve enters bypass mode and is able to be manually actuated to pivot corresponding operator seat.  
 CENTER = valve in normal operating mode.
5. **Insert** provided handle into hand pump.
6. **Pump** until seat is in desired position.
7. **Reset** manual override on hand pump flow-out valve by turning override screw clockwise until it stops in the DOWN position.
8. **Replace** protective cap.



## 5.10 Wear Parts Guide

<u>Winter Check List</u>		
	<b><u>New</u></b>	<b><u>Replace</u></b>
Floor Plates	3/8" thick	3/16" thick
All Sprockets	Are hardened 1/8" of an inch	
Delta Plate Starts	3/8" thick	1/8" thick
Tee Pee/Center Guard	3-1/2" wide	3" wide
Guards Outside	3-7/8" wide	3-3/8" wide
Auger Segments	6"	4"
Chains	See chart	
EZ IV Screed Plates	1/2" thick	3/16" thick
Angle of Attack Screws	1/16" of vertical play	1/4" of vertical play
Endgate Shoes	1/2" thick	3/16" thick

# 5.11 Chain Wear Guide





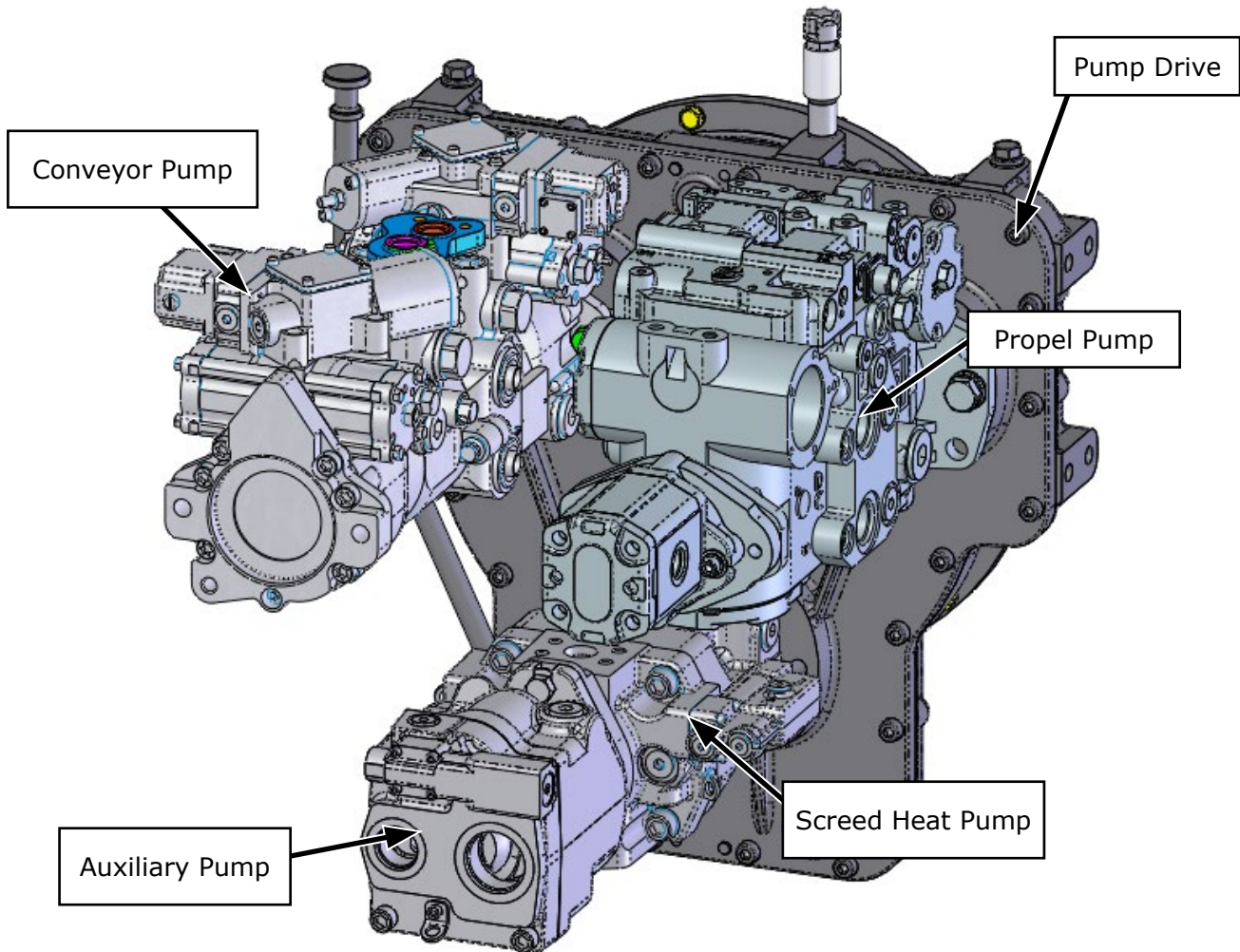
## 6.0 Hydraulic Systems

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## 6.01 Hydraulic Pump Drive System

### Hydraulic Pump Drive System



#### **Auxiliary Pump**

Sauer Danfoss Series 45 pressure compensated pump provides Hydraulic power to auxiliary systems including hopper wings, tow arm cylinders and hood lift.

#### **Propel Pumps**

Sauer Danfoss Series 42 pumps with relief pressure set at 4714 psi and charge pressure of 348 psi provide power to the Left Hand and Right Hand Propel Systems.

#### **Conveyor Pumps**

Sauer Danfoss Series 40 pumps with pressure relief set at 4060 psi and charge pressure at 283 psi provide power to Left Hand and Right Hand Conveyors.

#### **Screed Heat Pump**

Sauer Danfoss 75cc load sense pump has a max system pressure setting at 4600 psi and provides power to the screed for paving and accessories.

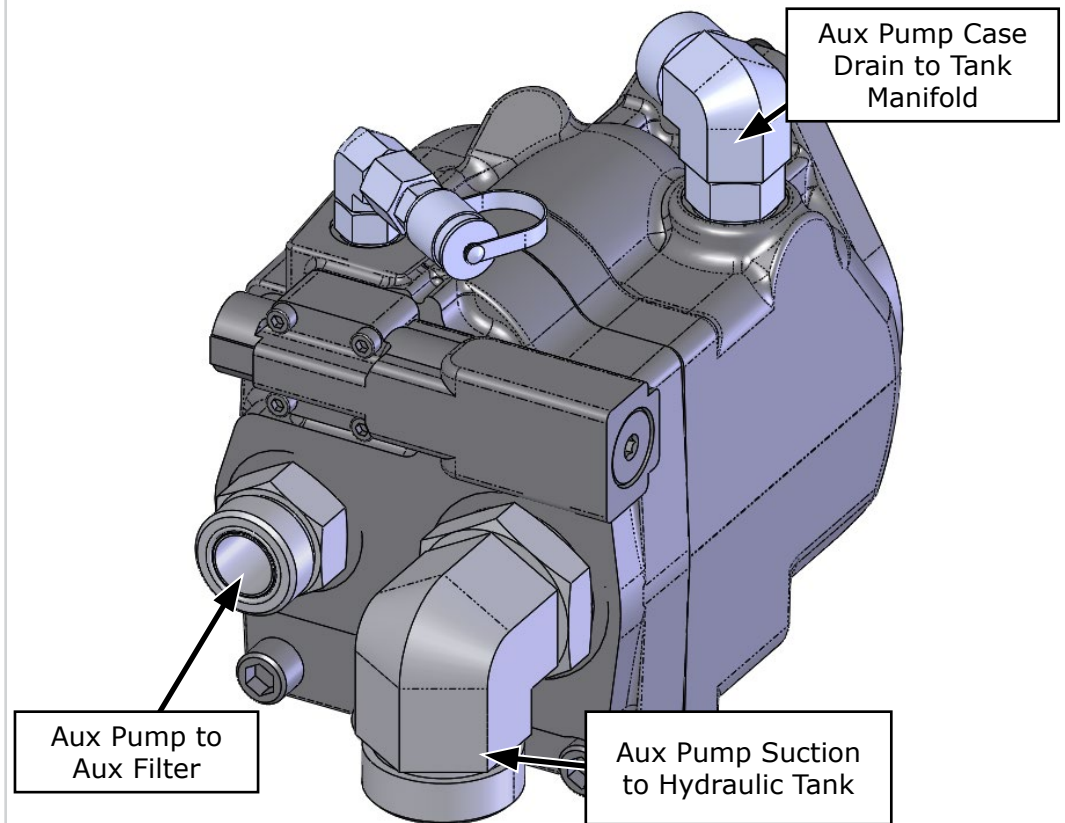




## 6.01.01 Auxiliary Pump

### Auxiliary Pump

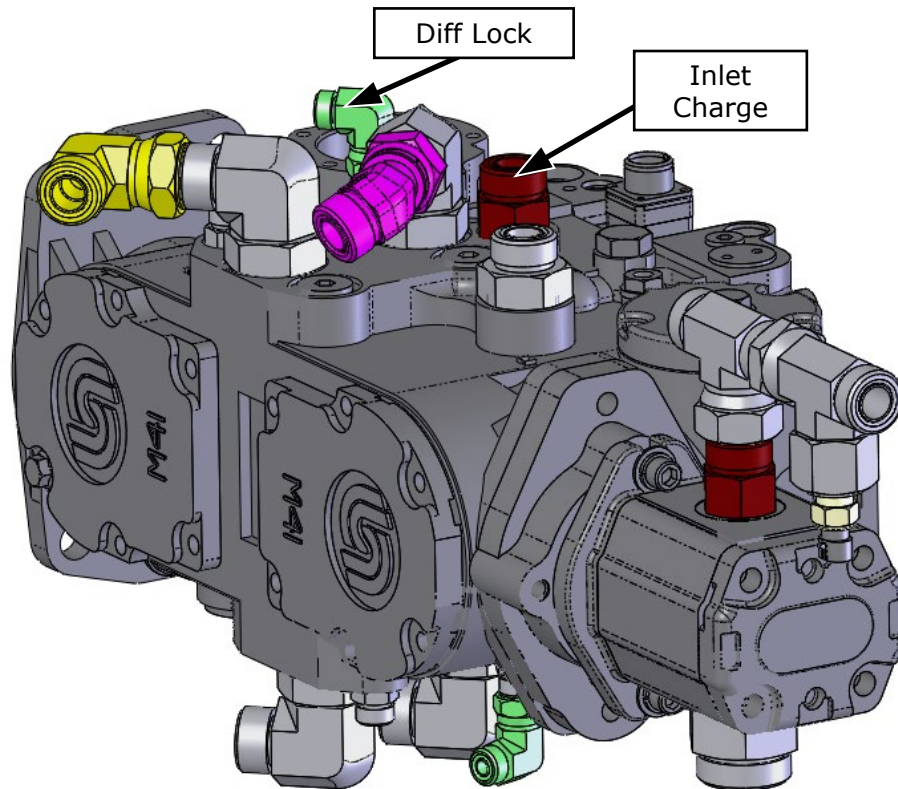
Sauer Danfoss, J Frame,  
S45 pump, open circuit  
60 CC  
Pressure compensator  
150 Bar (2175 psi)



## 6.01.02 Propel Pumps

### Propel Pumps

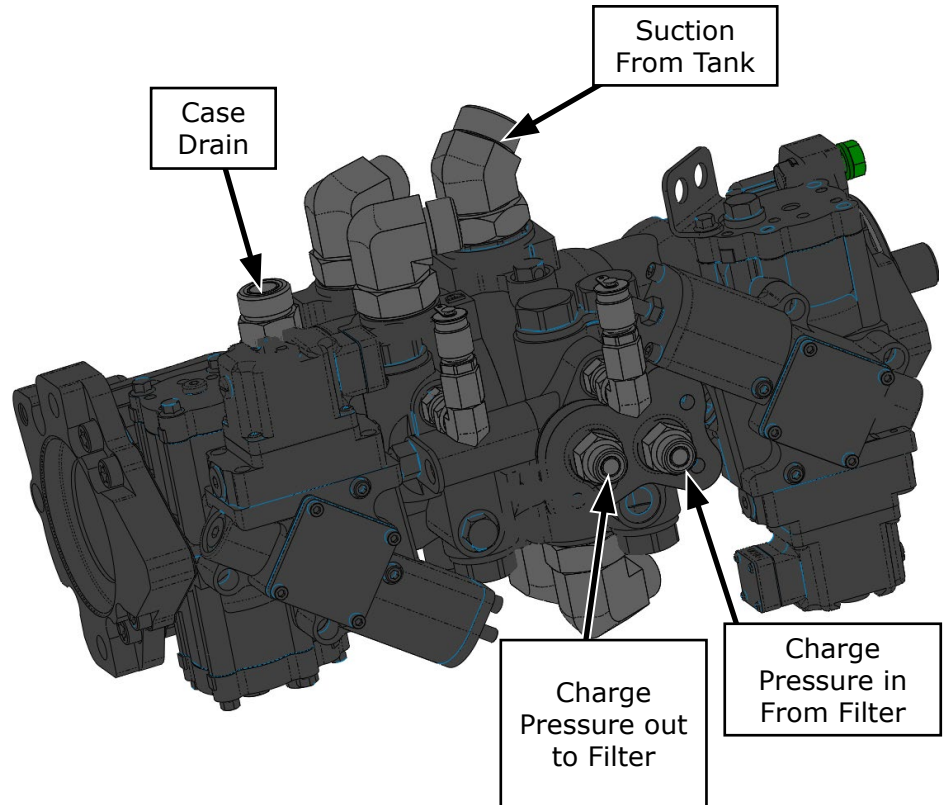
Sauer Danfoss, S42  
pump, 22.8 CC, EDC



### 6.01.03 Conveyor Pumps

#### Conveyor Pumps

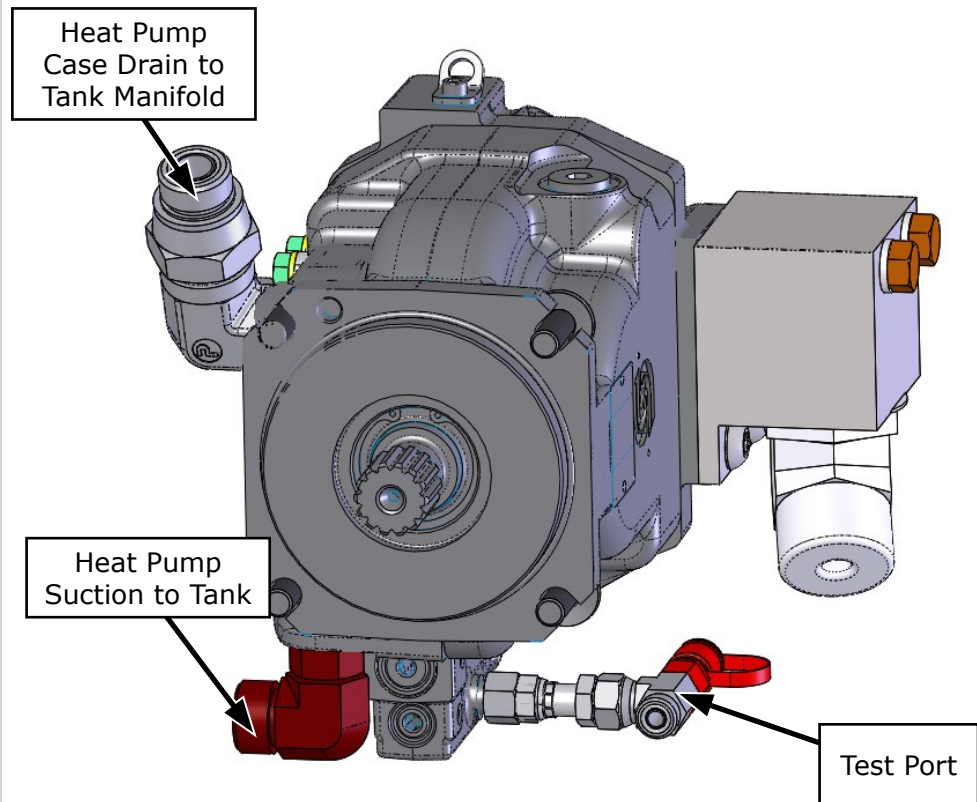
Sauer Danfoss, S40  
pump, EDC, CCW  
Rotation



## 6.01.04 Screed Generator Pump

### Screed Generator Pump

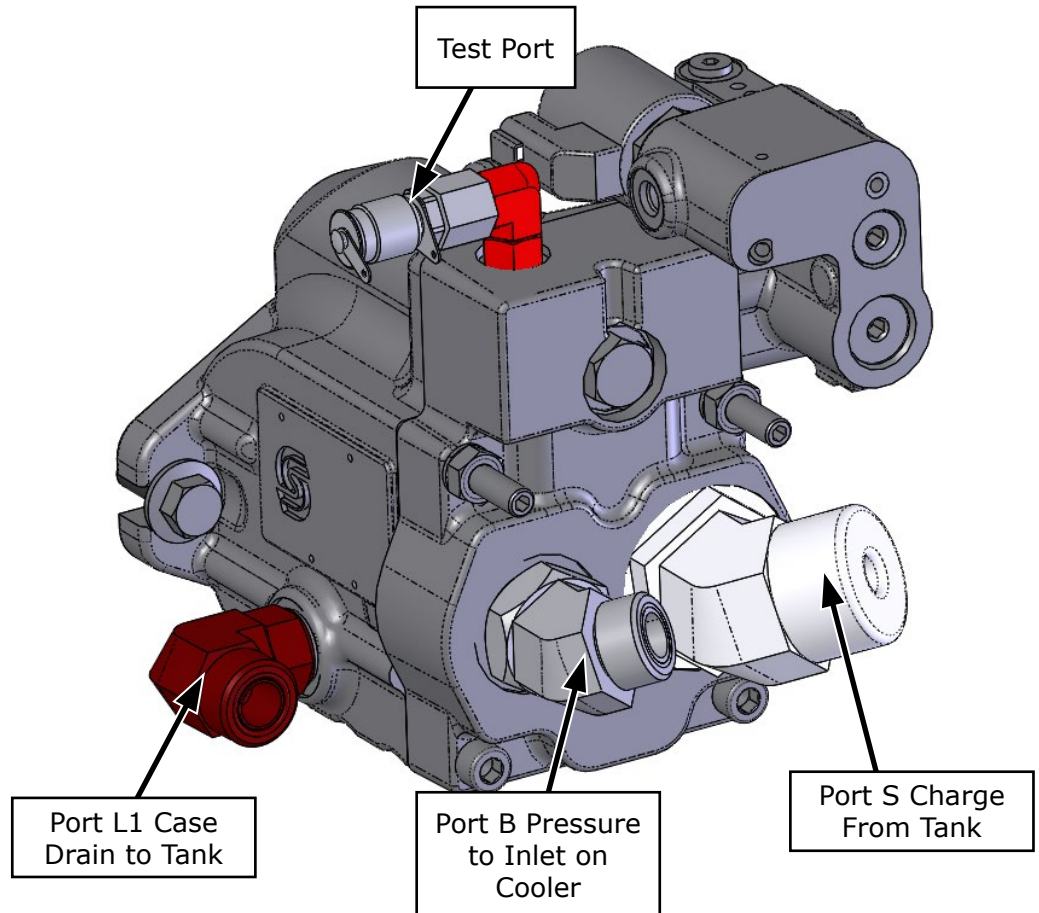
Sauer Danfoss Load Sense, S45 F-Frame, 74CC, Pressure Compensator setting 310 Bar (4495 psi)



## 6.01.05 Radiator Fan Pump

### Radiator Fan Pump

Sauer Danfoss Load  
Sense, S45 Pump,  
Pressure Compensated





## 6.02 Motors

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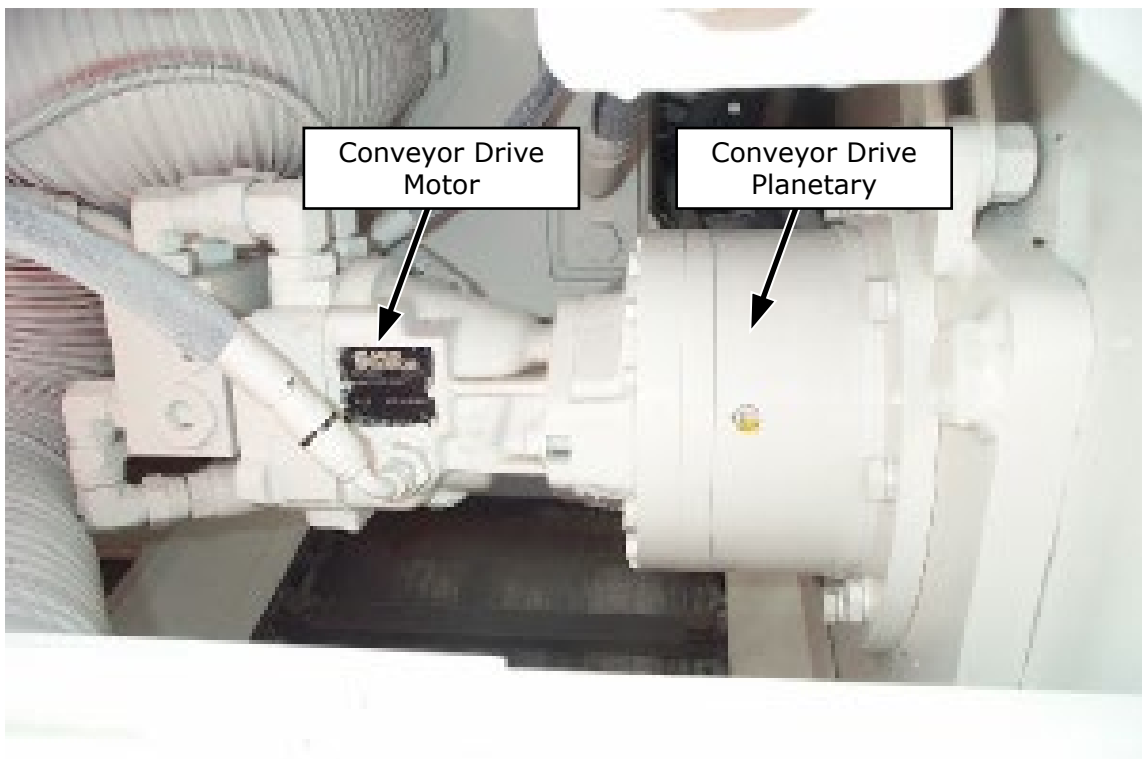
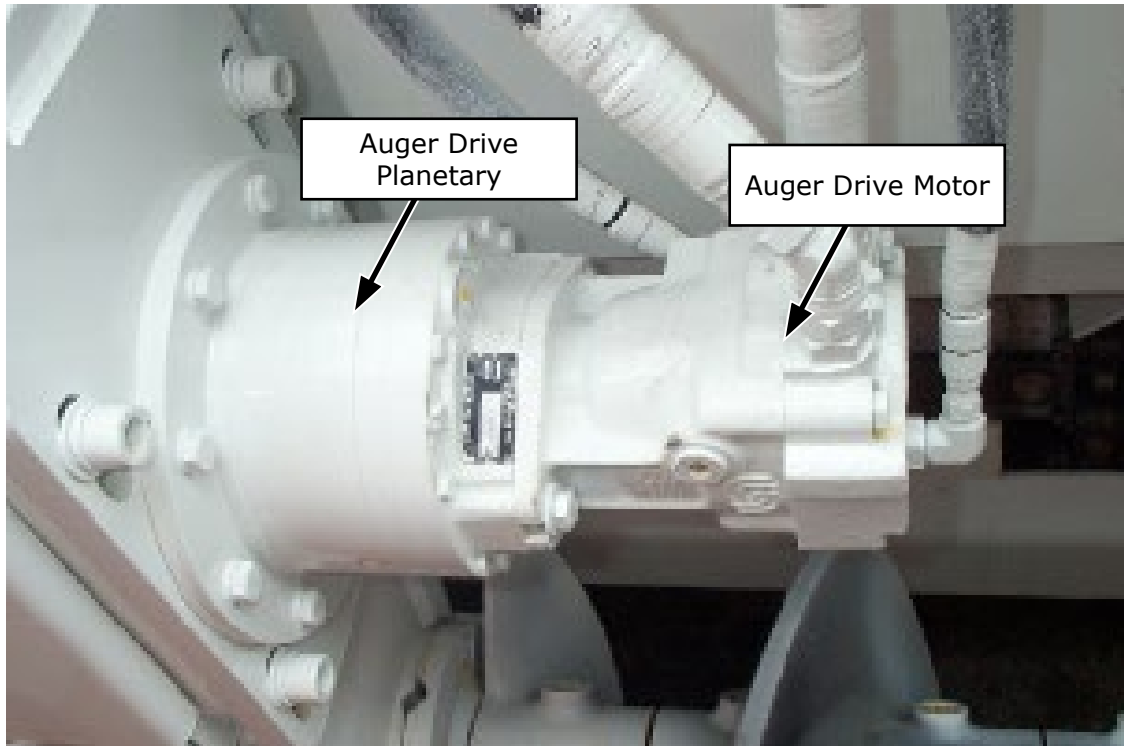




## 6.02.01 Auger and Conveyor Motors

### Auger and Conveyor Motors

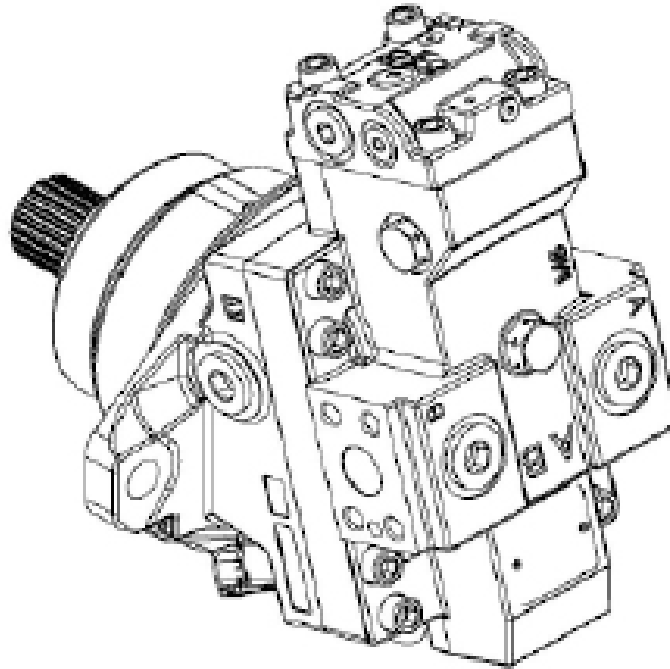
Sauer Danfoss 35 CC fixed displacement Series 40 motors with Fairfield planetaries.



## 6.02.02 Propel Drive Motors

### Propel Drive Motor

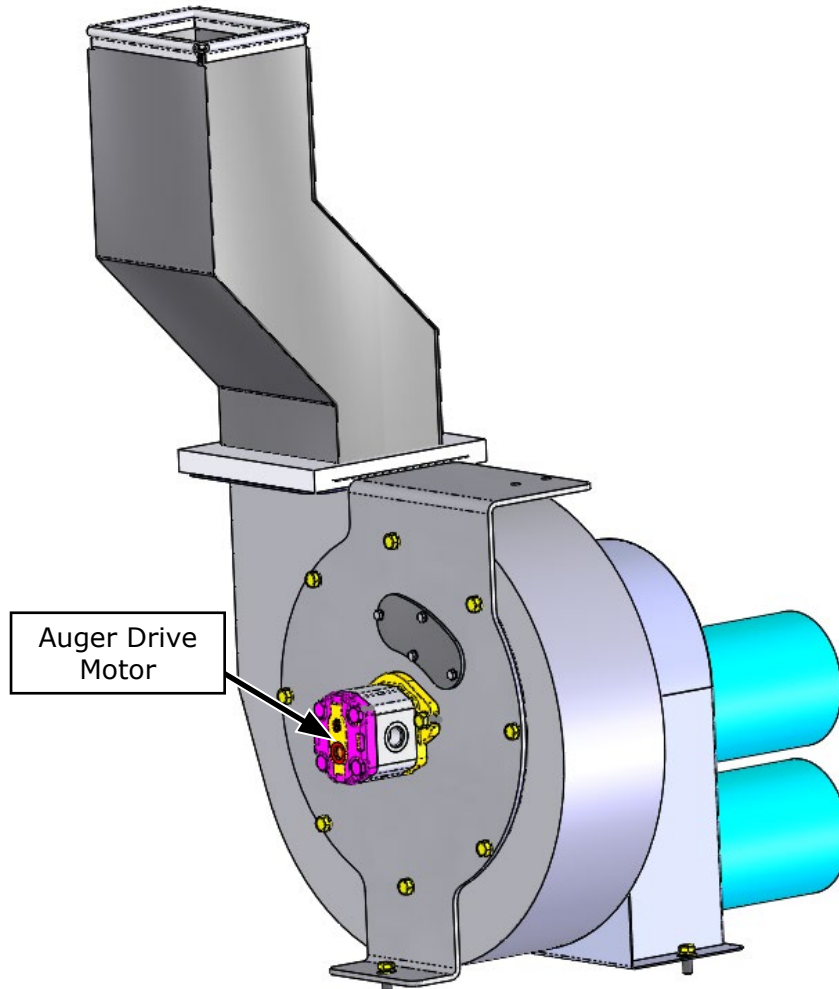
Sauer Danfoss Series H1 variable motors set for 110 cc max - 22 cc min. range.



## 6.02.03 Fume Extraction Motors

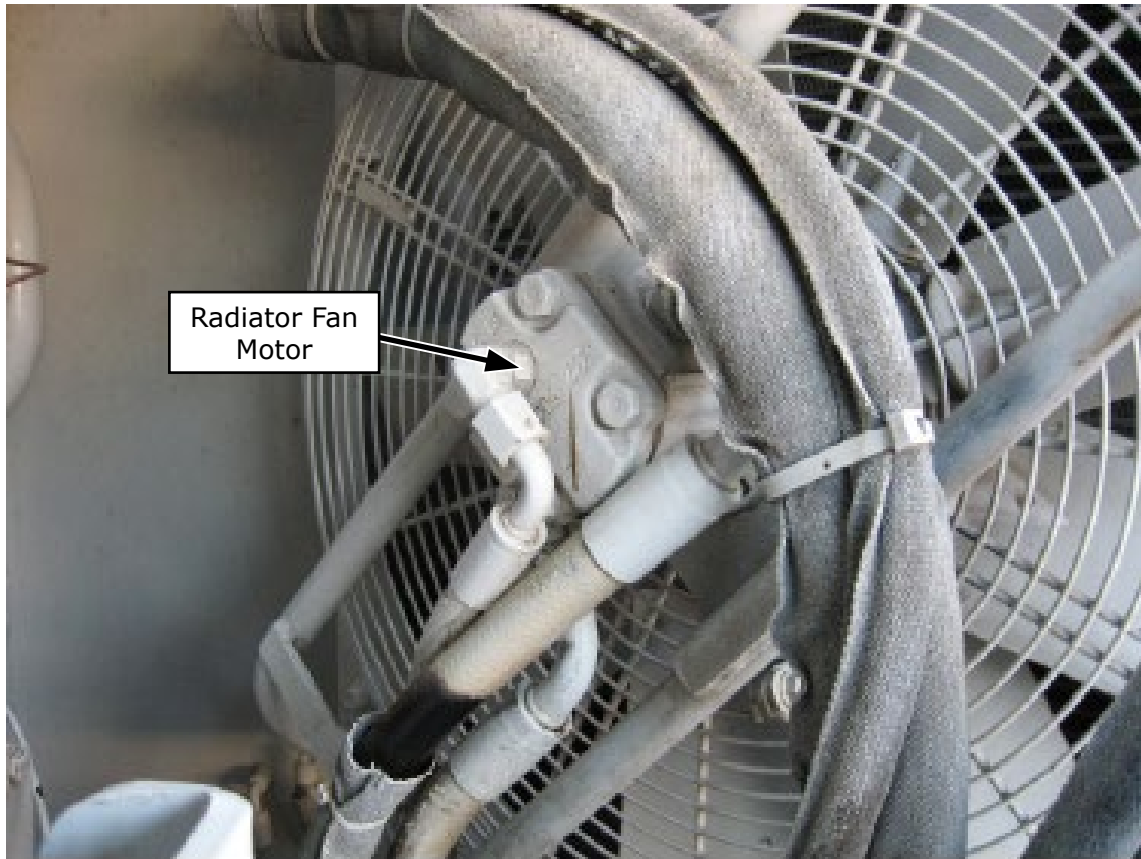
### Fume Extraction Motor

Sauer Danfoss 1.03 cid motor at 2,765 RPM



## 6.02.04 Radiator Fan Motor

### Radiator Fan Motor



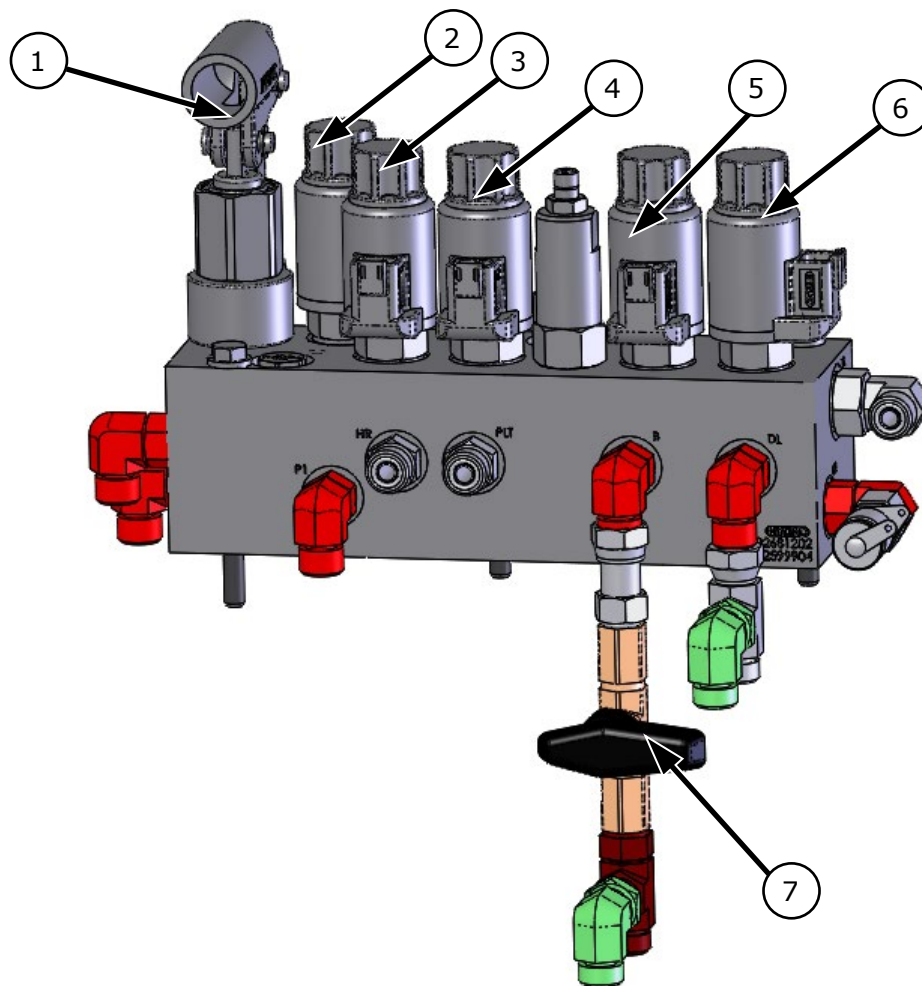
## 6.03 Valves

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## 6.03.01 Brake Shift, Hood Valve Stack

### Brake Shift, Hood Valve Stack

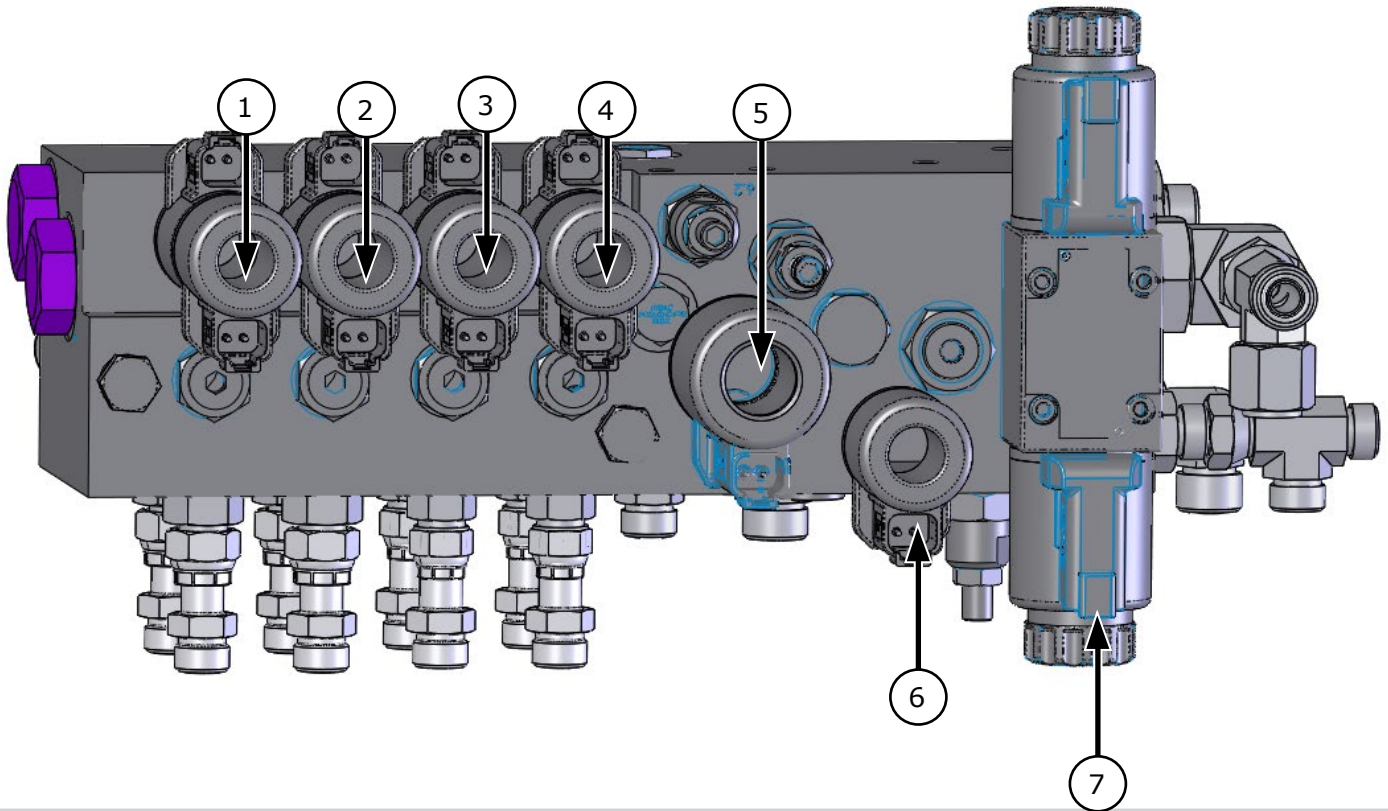


1. Manual Hand Pump
2. Hand Pump Flow Out (Console Pivot)
3. Hood Raise
4. Hood Lower
5. Parking Brake
6. Propel Motor
7. Parking Brake Ball Valve (shown in "Closed" position)



## 6.03.02 Rear Valve Stack

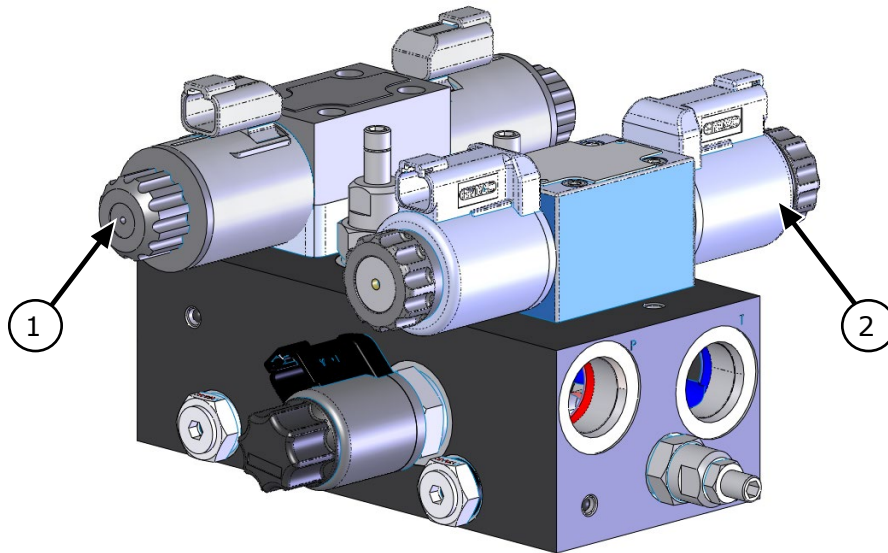
### Rear Valve Stack



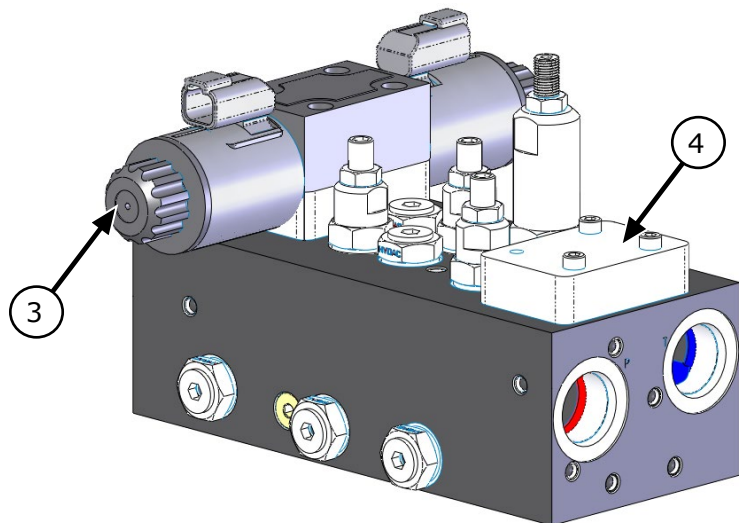
1. LH Auger Down/Up
2. RH Auger Down/Up
3. LH Seat Pivot
4. RH Seat Pivot
5. Fume Exhaust with Flow Control
6. Screed Float
7. Screed Raise/Lower

### 6.03.03 Tow Point Valves

#### Right Hand Side Tow Point Valve



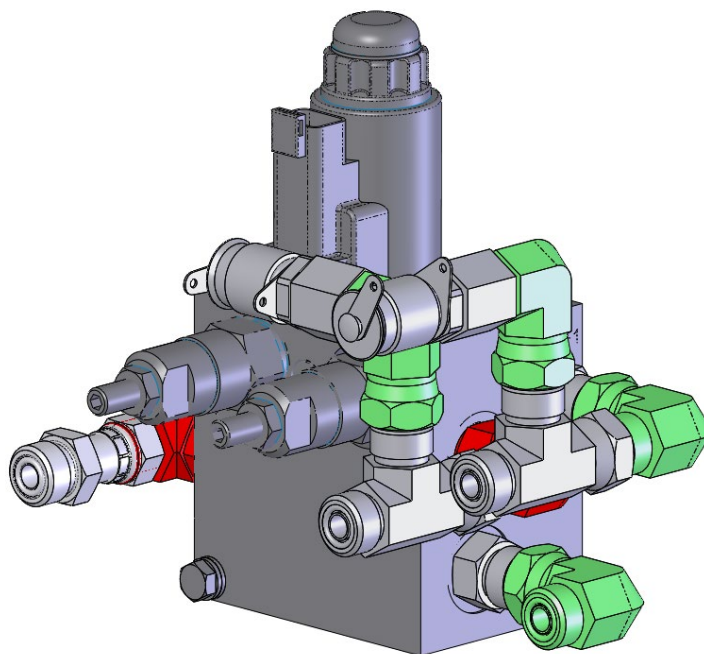
#### Left Hand Side Tow Point Valve



1. Right Hand Tow Point
2. Hopper Wing
3. Left Hand Tow Point
4. Truck Hitch

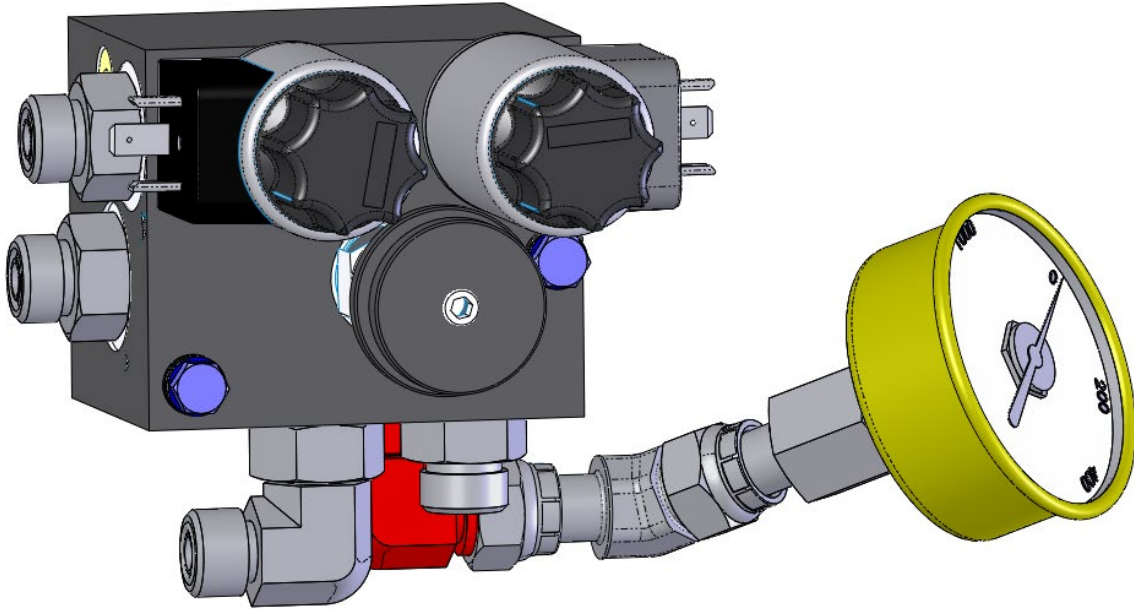
## 6.03.04 Differential Lock Valve

### Differential Lock Valve



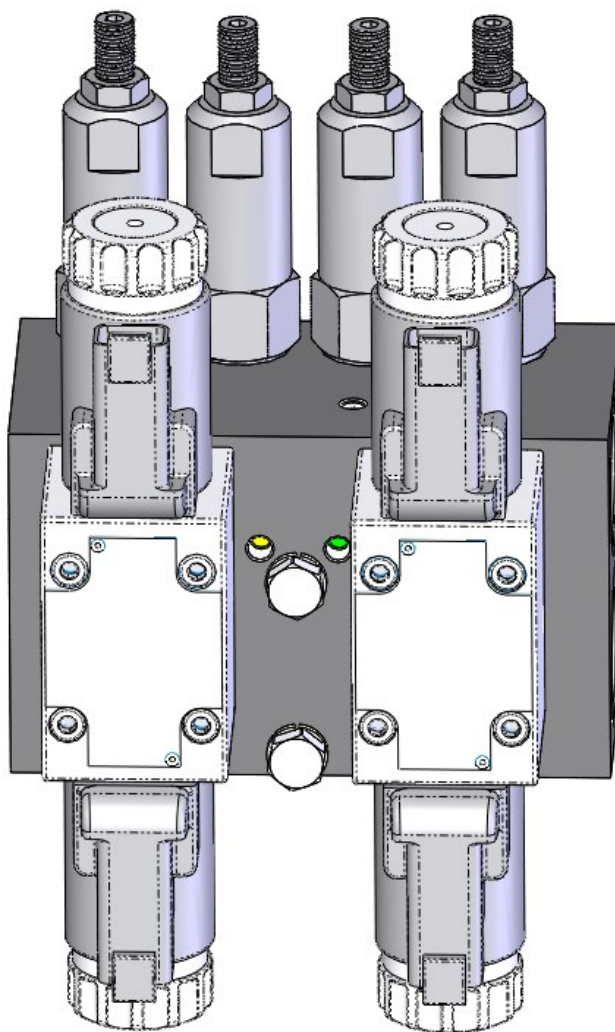
## 6.03.05 Screed Assist/Screed Boost Valve

### Screed Assist/Screed Boost Valve



## 6.03.06 Hydraulic Tunnel Extension Valve

### Hydraulic Tunnel Extension Valve



## 7.0 Maintenance Charts

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## 7.01 Daily Maintenance Chart

IDENTIFICATION	SERVICE	REMARKS
<b>Engine Crankcase</b>	Check	Refer to Engine Manual
<b>Engine Oil</b>	Check Level	Refer to Engine Manual
<b>Diesel Fuel</b>	Refill	Refill with ultra low diesel fuel
<b>Diesel Exhaust Fluid</b>	refill	Refill with DEF meeting ISO-22241-01
<b>Radiator</b>	Check level	Refill with 50/50 mix antifreeze and water
<b>Conveyor Idler Bearings</b>	Lubricate with high temp. grease	2 shots each grease fitting
<b>Vibrator Bearings</b>	Lubricate with high temp. grease	2 shot each grease fitting
<b>Conveyor Headshaft Bearings</b>	Lubricate with high temp. grease	Purge while hot and running
<b>Auger Hanger Bearings</b>	Lubricate with high temp. grease	Purge while hot
<b>Auger Chain Case Bearings</b>	Lubricate with high temp. grease	Purge while hot and running
<b>Hydraulic Tank</b>	Check Oil Level	Refill to 90% capacity with grade 46 hydraulic oil



## 7.02 50 Hour Maintenance

DATE	IDENTIFICATION	SERVICE	REMARKS
	<b>Engine Air Filter</b>	Check	Replace if in bad repair
	<b>Batteries</b>	Check electrolyte level	Refill if necessary
	<b>Tire Pressure</b>	Check pressure	Do not exceed 38 psi
	<b>Screed Endgate Jacks</b>	Lubricate with high temp. grease	2 shots each grease fitting
	<b>Angle of Attack Mechanism</b>	Lubricate with high temp. grease	2 shots each grease fitting
	<b>Angle of Attack Threads</b>	Lubricate with Never-Seize	Apply light coat of Never-Seize to threads
	<b>Screed Crown Threads</b>	Lubricate with Never-Seize	Apply light coat of Never-Seize to threads
	<b>Strike-Off Tube</b>	Lubricate with high temp. grease	Apply light coat of high temp. grease
	<b>Crown Control</b>	Lubricate with high temp. grease	2 shots each grease fitting
	<b>Hydraulic Filters</b>	Change	Change after the first 50 hours of operation on a new machine.

## 7.03 100 Hour Maintenance

---

DATE	IDENTIFICATION	SERVICE	REMARKS
	<b>Engine Oil and Filter</b>	Replace	Change after the first 100 hours of operation.

## 7.04 250 Hour Maintenance

DATE	IDENTIFICATION	SERVICE	REMARKS
	<b>Engine Air Filters</b>	Check	Replace if needed
	<b>Hydraulic Filters</b>	Replace	Change filters
	<b>Engine Oil and Filters</b>	Replace	Change filters
	<b>Engine Fuel Filter</b>	Replace	Change filters
	<b>Wheel Planetary</b>	Check, Flush, Drain, Refill	Check level; flush, drain and refill
	<b>Pump Drive Gearbox</b>	Check, Flush, Drain, Refill	Check level; flush, drain and refill
	<b>Auger Planetary</b>	Check, Flush, Drain, Refill	Check level; flush, drain and refill
	<b>Conveyor Planetary</b>	Check, Flush, Drain, Refill	Check level; flush, drain and refill
	<b>Seat Pivot Bearing</b>	Lubricate with High Temp. grease	2 shots each grease fitting

## 7.05 1000 Hour Maintenance

DATE	IDENTIFICATION	SERVICE	REMARKS
	<b>Hydraulic Tank</b>	Drain, Flush And Refill	Refill To 90% Capacity With Grade 46 Hydraulic Oil
	<b>Hydraulic Tank Strainer</b>	Replace	Replace In-Tank Hydraulic Filter
	<b>Wheel Drive Planetary</b>	Drain, Flush And Refill	Refill With SAE 80w-140 Synthetic Gear Oil
	<b>Radiator</b>	Drain, Flush And Refill	50/50 mix of water and anti-freeze
	<b>Pump Drive Gearbox</b>	Drain, Flush & Refill	Refill With 3-5 Qt. (2.84-4.73) 80w-140 gear oil. Never overfill or underfill
	<b>Breather</b>	Replace	Replace
	<b>Auger Planetary</b>	Drain, Flush And Refill	Drain, Flush and Refill
	<b>Conveyor Planetary</b>	Drain, Flush And Refill	Drain, Flush and Refill
	<b>Bogie Wheel Bearings</b>	Check, Refill	Check and Refill with high temperature grease

## 7.06 2000 Hour Maintenance

---

DATE	IDENTIFICATION	SERVICE	REMARKS
	<b>Diesel Emissions Fluid Filters</b>	Replace	Change after 2000 hours of operation.

## 8.0 Troubleshooting

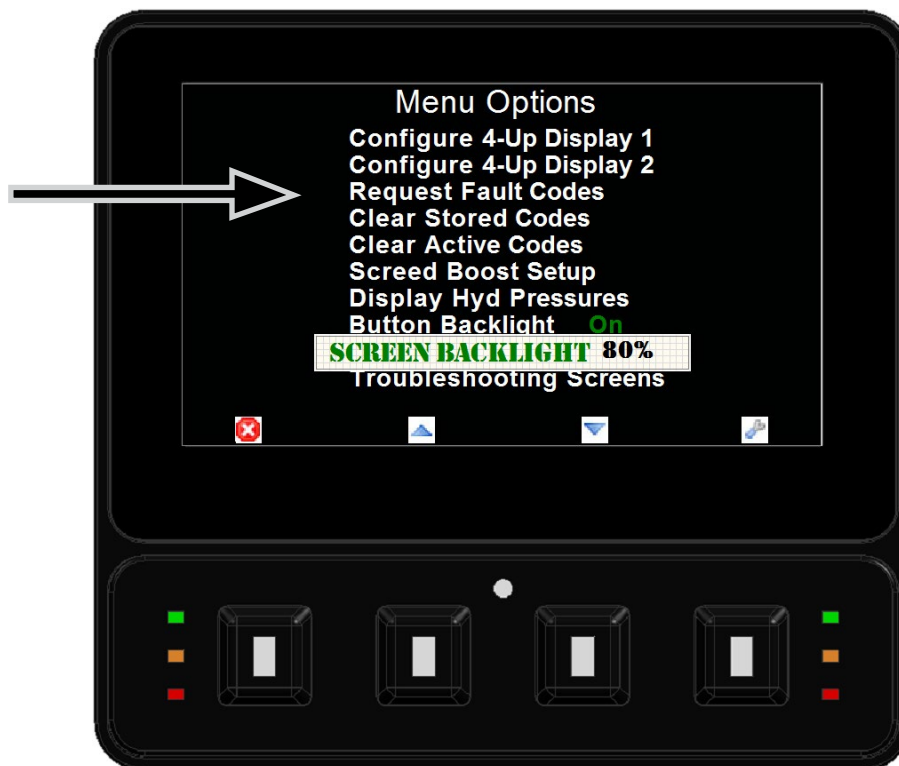
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## 8.01 Engine Diagnostic Screen

- Displays engine Error Code Messages (ECM) when engine malfunctions. ECM indicates malfunction using engine codes.

### Engine Diagnostic Screen



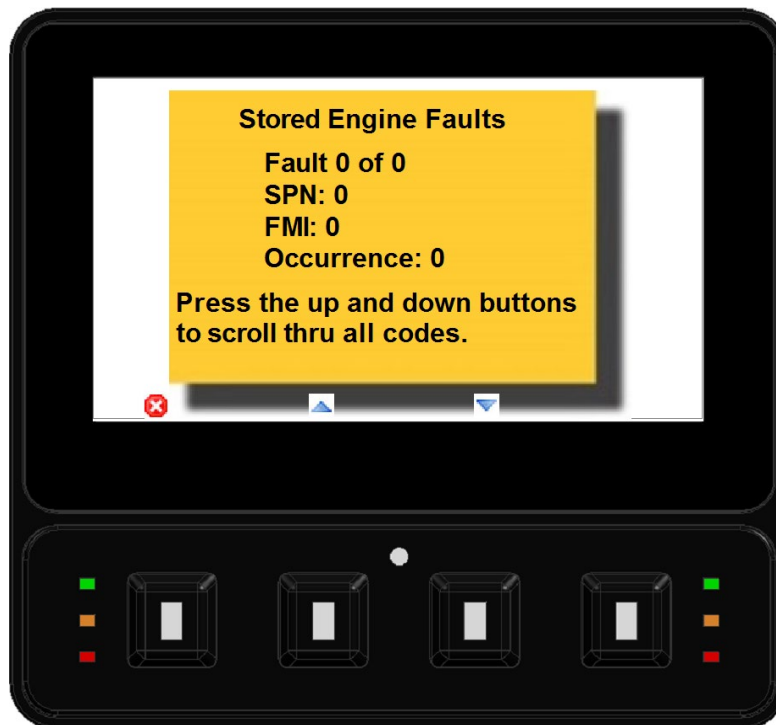
**Press** Request Fault Codes from the Menu Options Screen on the digital display.

The store fault codes screen appears. Press the up and down buttons to scroll through all fault codes.

Active codes and stored codes can be cleared from this screen by pressing the corresponding command.



## Engine Diagnostic Screen



The Society of Automotive Engineers established an exact listing of SPN and FMI codes that are universally used by all engine manufacturers.

**ECM** indicates the engine malfunction using engine codes.

Two codes are shown:

**1) SPN - Suspect Parameter Number indicates the system or component with failure.**

**2) FMI - Failure Mode Identifier indicates the type of failure that occurred in the component based on an average value system.**

Example:

SPN 110, FMI 03 indicates the failure of an engine coolant temperature circuit with an above average temperature.

The following pages chart the engine fault codes for reference.

## 8.01.01 Engine Fault Codes

SPN	FMI	Description
29	3	Remote Accelerator Pedal Position Sensor-Shorted High
29	4	Remote Accelerator Pedal Position Sensor-Shorted Low
84	2	Vehicle Speed Sensor Circuit-Data Incorrect
84	10	Vehicle Speed Sensor Circuit-Tampering Has Been Detected
91	3	Accelerator Pedal Position Sensor Circuit-Shorted High
91	4	Accelerator Pedal Position Sensor Circuit-Shorted Low
91	8	Accelerator Pedal Position Sensor Circuit-Low Frequency
91	8	Accelerator Pedal Position Sensor Circuit-High Frequency
91	19	SAE J1939 Multiplexing Accelerator Pedal Sensor System Error
91	2	Accelerator Pedal Idle Validation Circuit - Data Incorrect
91	13	Accelerator Pedal Idle Validation Circuit-Out Of Calibration
91	4	Accelerator Pedal Idle Validation Circuit - Shorted Low
93	2	OEM Alternate Torque Validation Switch-Data Incorrect
94	16	Fuel Pressure High - Warning
94	18	Fuel Pressure Low - Warning
94	3	Fuel Delivery Pressure Sensor Circuit-Shorted High
94	4	Fuel Delivery Pressure Sensor Circuit-Shorted Low
97	15	Water In Fuel Indicator High - Maintenance
97	3	Water In Fuel Sensor Circuit - Shorted High
97	4	Water In Fuel Sensor Circuit - Shorted Low
100	3	Engine Oil Pressure Sensor Circuit-Shorted High
100	4	Engine Oil Pressure Sensor Circuit-Shorted Low
100	18	Engine Oil Pressure Low-Warning
100	1	Engine Oil Pressure Low-Warning
100	1	Engine Oil Pressure Low - Critical
100	2	Engine Oil Pressure Sensor Circuit - Data Incorrect
102	3	Intake Manifold Pressure Sensor #1 Circuit-Shorted High
102	4	Intake Manifold Pressure Sensor #1 Circuit-Shorted Low
102	2	Intake Manifold Pressure Sensor Circuit-Data Incorrect
103	16	Turbo Charger #1 Speed High - Warning Level
105	3	Intake Manifold Temperature Sensor #1-Shorted High
105	4	Intake Manifold Temperature Sensor #1-Shorted Low
105	0	Intake Manifold Temperature #1 High-Critical
108	3	Ambient Air Pressure Sensor Circuit-Shorted High
108	4	Ambient Air Pressure Sensor Circuit-Shorted Low
108	2	Ambient Air Pressure Sensor Circuit-Data Incorrect
109	3	Engine Coolant Pressure Sensor Circuit-Shorted High
109	4	Engine Coolant Pressure Sensor Circuit-Shorted Low
109	1	Engine Coolant Pressure Low-Warning
110	3	Engine Coolant Temperature Sensor Circuit-Shorted High

SPN	FMI	Description
110	4	Engine Coolant Temperature Sensor Circuit-Shorted Low
110	0	Engine Coolant Temperature High-Critical
111	1	Engine Coolant Level Low-Critical
111	2	Engine Coolant Level Sensor Circuit-Data Incorrect
135	3	Fuel Pump Delivery Pressure Sensor Circuit-Shorted High
135	4	Fuel Pump Delivery Pressure Sensor Circuit-Shorted Low
156	3	Fuel Timing Pressure Sensor Circuit -Shorted High
156	4	Fuel Timing Pressure Sensor Circuit -Shorted Low
156	2	Fuel Timing Pressure Or Timing Actuator Stuck
157	3	Injector Metering Rail #1 Pressure Sensor Circuit - Shorted High
157	4	Injector Metering Rail #1 Pressure Sensor Circuit - Shorted Low
157	16	Injector Metering Rail #1 Pressure High-Warning Level
157	0	Injector Metering Rail #1 Pressure High-Warning Level
157	2	Fuel Pressure Sensor Error
166	2	Cylinder Power Imbalance Between Cylinders
167	16	Electrical Charging System Voltage High - Warning Level
167	18	Electrical Charging System Voltage Low - Warning Level
167	1	Electrical Charging System Voltage Low - Critical Level
168	18	Battery #1 Voltage Low - Warning
168	1	Battery #1 Voltage Low - Warning
168	16	Battery #1 Voltage High - Warning
168	0	Battery #1 Voltage High - Warning
174	0	Fuel Temperature High-Warning
174	3	Fuel Temperature Sensor Circuit-Shorted High
174	4	Fuel Temperature Sensor Circuit-Shorted Low
175	3	Engine Oil Temperature Circuit-Shorted High
175	4	Engine Oil Temperature Circuit-Shorted Low
175	0	Engine Oil Temperature High-Critical
190	2	Engine Speed/Position Sensor Circuit Lost Both Of Two Signals From Magnetic Pickup Sensor
190	10	Engine Speed/Position Sensor Circuit Lost Both Of Two Signals From Magnetic Pickup Sensor
190	0	Engine Speed High-Critical
191	16	Transmission Output Shaft (Tailshaft) Speed High-Warning
191	0	Transmission Output Shaft (Tailshaft) Speed High-Warning
191	18	Transmission Output Shaft (Tailshaft) Speed Low-Warning
191	1	Transmission Output Shaft (Aux Gov) Speed Low-Warning
251	2	Real Time Clock-Power Interrupt
558	2	Accelerator Pedal Idle Validation Circuit - Data Incorrect
558	13	Accelerator Pedal Idle Validation Circuit-Out Of Calibration
558	4	Accelerator Pedal Idle Validation Circuit - Shorted Low
620	4	Sensor Supply Voltage #2 Circuit-Shorted Low
620	3	Sensor Supply Voltage #2 Circuit-Shorted High

SPN	FMI	Description
626	11	Start Assist Device Control Circuit Error (Ether Injection)
626	1	Start Assist Device-Canister Empty (Ether Injection)
627	2	Power Lost Without Ignition Off
629	12	Engine Control Module-Critical Internal Failure
629	12	Engine Control Module-Warning Internal Hardware Failure
630	2	Engine Control Module-Data Lost
630	12	Engine Control Module-Warning Software Error
632	4	Fuel Shutoff Valve Circuit-Shorted Low
632	3	Fuel Shutoff Valve Circuit-Shorted High
632	7	Fuel Shutoff Valve-Stuck Open
633	5	Fueling Actuator #1 Circuit-Open Circuit
633	6	Fueling Actuator #1 Circuit-Grounded Circuit
633	3	Fuel Control Valve Circuit - Shorted High
633	2	Fuel Rail Actuator Circuit - Data Incorrect
633	7	Fuel Control Valve - Mechanically Stuck
635	7	Engine Timing Actuator Is Not Responding To ECM Commands
635	3	Engine Timing Actuator Circuit-Shorted High
635	5	Timing Actuator #1 Circuit - Open Circuit
635	6	Timing Actuator #1 Circuit - Grounded Circuit
635	2	Timing Actuator Circuit - Data Incorrect
639	9	SAE J1939 Multiplexing PGN Timeout Error
639	13	SAE J1939 Multiplexing Configuration Error
639	2	SAE J1939 Datalink - Cannot Transmit
639	9	SAE J1939 Not Fast Enough
644	2	External Speed Input (Multiple Unit Synchronization) - Data Incorrect
647	4	Fan Clutch Circuit-Shorted Low
651	6	Injector Solenoid Valve Cylinder #1 Circuit-Grounded Circuit
652	6	Injector Solenoid Valve Cylinder #2 Circuit-Grounded Circuit
653	6	Injector Solenoid Valve Cylinder #3 Circuit-Grounded Circuit
655	6	Injector Solenoid Valve Cylinder #5 Circuit-Grounded Circuit
656	6	Injector Solenoid Valve Cylinder #6 Circuit-Grounded Circuit
702	3	Auxiliary Input/Output #2 Circuit - Shorted High
703	3	Auxiliary Input/Output #3 Circuit - Shorted High
723	2	Engine Speed/Position #2 - Cam Sync Error
931	3	Fuel Supply Pump Actuator Circuit-Shorted High
931	7	Fuel Supply Pump Actuator-Mechanically Stuck
974	3	Remote Accelerator Pedal Position Sensor-Shorted High
974	4	Remote Accelerator Pedal Position Sensor-Shorted Low
974	19	SAE J1939 Multiplexing Remote Throttle Data Error
1043	4	Engine Speed/Position Sensor #1 (Crankshaft) Supply Voltage Circuit-Shorted Low
1043	3	Accelerator Pedal Position Sensor Supply Voltage Circuit - Shorted High
1043	4	Accelerator Pedal Position Sensor Supply Voltage Circuit - Shorted Low

SPN	FMI	Description
1043	11	Engine Speed/Position Sensor #2 (Camshaft) Voltage Supply
1079	4	Sensor Supply Voltage #1 Circuit-Shorted Low
1079	3	Sensor Supply Voltage #1 Circuit-Shorted High
1083	14	Auxiliary Temperature Sensor Input #1 Engine Protection-Critical
1083	3	Auxiliary Temperature Sensor Input #1 Circuit-Shorted High
1083	4	Auxiliary Temperature Sensor Input #1 Circuit-Shorted Low
1084	14	Auxiliary Pressure Sensor Input #2 Engine Protection-Critical
1084	3	Auxiliary Pressure Sensor Input #2 Circuit-Shorted High
1084	4	Auxiliary Pressure Sensor Input #2 Circuit-Shorted Low
1188	4	Turbo Charger #1 Wastegate Control Circuit-Shorted Low
1244	5	Fueling Actuator #2 Circuit - Open Circuit
1244	6	Fueling Actuator #2 Circuit - Grounded Circuit
1245	5	Timing Actuator #2 Circuit - Open Circuit
1245	6	Timing Actuator #2 Circuit - Grounded Circuit
1264	0	Engine Blowby - Warning Level
1264	3	Crankcase Blowby Pressure Sensor Circuit - Shorted High
1264	4	Crankcase Blowby Pressure Sensor Circuit - Shorted Low
1265	4	Engine Oil Burn Valve Solenoid Circuit-Shorted Low
1266	4	Engine Oil Replacement Valve Solenoid Circuit-Shorted Low
SPN	FMI	Description
1349	3	Injector Metering Rail #2 Pressure Sensor Circuit-Shorted High
1349	4	Injector Metering Rail #2 Pressure Sensor Circuit-Shorted Low
1349	16	Injector Metering Rail #2 Pressure High-Warning
1349	18	Injector Metering Rail #2 Pressure Low-Warning
1349	7	Injector Metering Rail #2 Pressure Malfunction
1377	2	Multiple Unit Synchronization Switch Circuit - Data Incorrect
1378	0	Change Lubricating Oil And Filter
1380	17	Low Oil Level In Centinel Makeup Oil Tank
1380	1	Low Oil Level In Centinel Makeup Oil Tank
1381	3	Fuel Supply Pump Inlet Pressure Sensor Circuit - Shorted High
1381	4	Fuel Supply Pump Inlet Pressure Sensor Circuit - Shorted Low
1381	18	Fuel Supply Pump Inlet Pressure Low - Warning Level
1383	31	Engine Hot Shutdown
1384	31	Engine Shutdown Commanded By J1939
1484	31	Additional OEM/Vehicle Diagnostic Codes Have Been Logged

## 8.02 Troubleshoot Engine Malfunctions

PROBLEM	CAUSE	RESOLUTION
<b>Engine will not start</b>	Parking brake OFF.	Set parking brake ON.
	Joystick not in neutral.	Set joystick to neutral.
	Feed System ON.	Feed System OFF.
	Battery disconnect switches OFF.	Set battery disconnect switches to on.
	E-stops OFF.	Set E-stops to ON.
	Weak/dead battery.	Charge or replace battery.
	Faulty ignition switch.	Replace.
	Faulty starter or starter solenoid.	Replace or replace.
<b>Engine turns over but will not start.</b>	No fuel.	Add fuel to tank.
	No voltage to fuel solenoid.	Ensure voltage is 24 volts when ignition switch is on.
	No fuel to injector pump.	Check fuel supply system.
	Fuel connections loose on injector pump.	Tighten all fuel filter fittings and connections from fuel tank to injector pump.
	Fuel filter plugged or restricted.	Replace fuel filter.
	Intake or exhaust system restricted.	Remove any restrictions.
<b>Engine will not shut off.</b>	Low idle set too high.	Set idle to low.
	Electrical wiring fault supplying power to fuel solenoid when key is in OFF position.	Repair wiring.
	Faulty injection pump fuel solenoid.	Check solenoid for defects or foreign material inhibiting proper operations.
	Engine using fumes drawn into air intake.	Locate and isolate source of fumes.

PROBLEM	CAUSE	RESOLUTION
<b>Low engine power output.</b>	Operation at high altitude.	De-rate engine power output for altitudes above 10,000 feet.
	Air intake restricted.	Remove restrictions.
	Air cleaner element dirty.	Clean or replace air cleaner elements.
	Fuel suction line or filter restricted.	Check fuel line for restrictions. Replace fuel filter element(s).
	Fuel return system restricted.	Correct restricted fuel return system.
	Fuel quality poor.	Verify by operating with a known fuel quality.
	Fuel transfer pump malfunctioning.	Replace fuel transfer pump. See engine manufacturer manual.
	Throttle improperly adjusted.	Adjust throttle controls.
	Injector malfunctioning.	Replace injector. See engine manufacturers manual.
<b>Low engine oil pressure.</b>	Engine de-rated due to clogged DPF.	Clean or flush DPF lines.
	Electrical power not being supplied to gauge.	Check fuse.
	Incorrect oil level.	Check for leaks. Add or drain engine oil. Check dipstick.
	Oil filter plugged.	Change oil filters.
	Oil diluted with fuel.	Replace fuel injector, fuel transfer pump and/or injection pump.
	Oil diluted with coolant.	Contact authorized engine repair facility.
	Incorrect oil specs.	Change oil. Check oil specs.
	Oil pressure sender or gauge malfunctioning.	Replace oil pressure sender of gauge.
	Coolant level too low.	Add coolant.

PROBLEM	CAUSE	RESOLUTION
<b>Engine coolant temperature above normal.</b>	Radiator fins damaged or obstructed.	Inspect radiator fins. Clean, repair or replace.
	Collapsed or restricted radiator hose.	Inspect hoses. Replace if needed.
	Loose fan drive belt.	Check belt tension and tighten if needed.
	Cooling fan shroud damaged or missing.	Inspect shroud. Repair, replace or install as needed.
	Incorrect or malfunctioning radiator cap.	Check radiator cap. Replace if needed.
	Temperature gauge malfunctioning.	Repair or replace sender and/or gauge.
	Thermostat stuck in closed position.	Test thermostat. Replace if needed.
	Dirt, scale or rust in cooling system.	Clean cooling system.





## 8.03 Troubleshoot Operations

PROBLEM	CAUSE	RESOLUTION
<b>Machine jerks when moving in forward or reverse.</b>	Fast movement of joystick control.	Move handle slowly when changing speed and/or direction.
	Parking brake not disengaged.	Release parking brake. Check for binding brake cable(s).
	Engine speed set too low.	Run engine at higher RPM.
	Low hydraulic fluid level.	Fill reservoir with correct fluid until visible in sight gauge.
	Air leaking into hydraulic system.	Tighten or replace hoses, fittings and/or filters(s).
	Hydrostatic pump is malfunctioning.	Repair or replace pump.
<b>Machine will not move with engine running or moves only in one direction.</b>	Parking brake engaged.	Release parking brake.
	Brush rotation control valve is bypassing oil at low pressure.	Repair or replace relief valve cartridge(s).
	Damaged hydrostatic pump.	Repair or replace hydrostatic pump.
	Damaged hydrostatic motor.	Repair or replace hydrostatic motor.
	Service brake engaged.	Return joystick to neutral.



## 8.04 Troubleshoot Hydraulic Systems

PROBLEM	CAUSE	RESOLUTION
<b>Hydraulic system overheats.</b>	Low hydraulic fluid level.	Fill with fluid until visible in sight gauge.
	Defective temperature gauge.	Replace gauge.
	Brush drive relief valve set too low or defective.	Adjust relief valve to 2500 psi. Replace if defective.
	Excessive ambient air temperature and high duty cycle.	Operate unit at slower ground speed and max engine RPM during hot weather.
	Plugged fins on fluid cooler.	Clean fins.
	Hydrostatic pump bypass valve defective or open.	Repair or replace.
	Worn hydrostatic pump.	Repair or replace.
<b>Bearing failure.</b>	Chips or other foreign matter in bearings.	Make sure clean oil is used. Essential for efficient operation and long life of bearings.
	Excessive or shock loads.	Reduce operating pressure. Observe maximum rating of operating pressure.
	System excessively hot.	See trouble section headed "system excessively hot." (heat breaks down lubricating qualities of hydraulic oil).
	Incorrect fluid.	See Roadtec®, Inc. oil recommendations.

PROBLEM	CAUSE	RESOLUTION
<b>Excessive pump noise.</b>	Low oil level.	Fill reservoir so that surface of oil is well above end of suction line during all of work cycle
	Wrong oil type.	Use good, clean hydraulic oil having the viscosity in accordance with Roadtec® recommendations
	Air leak in suction line. Air leak around shaft packing.	Pour hydraulic oil on joints and around shaft while listening for change in sound of operation. Tighten as required
	Restricted flow through suction piping.	Make sure suction line is not plugged with rags or other foreign material
	Air bound pump.	Air is locked in pumping chamber and has no way to escape. Stop pump immediately! Before restarting, partially open pressure line or install special by-pass line back to tank so that air can pass out of pump
	Restricted filter or strainer.	Clean filter or strainer
	Reservoir air vent plugged.	Air must be allowed to circulate in reservoir. Clean and/or replace breather
	Worn or broken parts	Replace
<b>Pump not delivering pressure</b>	Pump not delivering oil.	See trouble section headed pump not delivering oil.
	Pressure adjusting screw not set high enough.	Set adjusting screw to obtain desired operating pressure.
	Pressure being relieved through relief valve.	Inspect pump relief valves for dirt or electrical malfunction.
	Oil bypassing to reservoir.	Test circuit pressure progressively. Watch for open-center valves or other valves to open reservoir.
	Governor piston sticking.	Inspect governor for dirt or excessive scoring.
	Defective pressure gauge.	Install governor gauge known to be accurate in a line open to pump pressure.
	Gauge line is shut off.	

PROBLEM	CAUSE	RESOLUTION
<b>Excessive wear.</b>	Abrasive matter in the hydraulic oil being circulated through the pump.	Replace filters and oil more often.
	Oil viscosity too low at working conditions.	Check Roadtec® oil recommendations.
	Sustained high pressure above maximum pumps rating or higher than system requirements.	Reduce pump pressure to minimum required for installation.
	Air recirculation causing chatter in system.	Align body and piping to remove strains.
<b>Leakage at oil seal.</b>	Abrasives on pump shaft.	Protect shaft from abrasive dust or foreign material.
	Pressure in pump case.	Inspect case drain line for restriction.



## 8.05 Troubleshoot Batteries

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PROBLEM	CAUSE	RESOLUTION
<b>Battery not charging.</b>	Defective alternator.	Replace alternator.
	Alternator not turning.	Check v-belt tension.
	Defective regulator.	Replace regulator.
	Blown circuit breaker.	Replace circuit breaker.





## 8.06 Troubleshoot Fluid Motors

PROBLEM	CAUSE	RESOLUTION
<b>Motor turning in wrong directions.</b>	Incorrect piping between control valve and motor.	Check circuit to determine correct piping.
<b>Motor not turning over.</b>	System overload relief valve adjustment not set high enough.	Check system pressure and reset relief valve.
	Relief valve sticking open.	Remove dirt under pressure adjustment ball or piston.
	Free recirculation of oil to reservoir being allowed through system.	Directional control valve may be in open center neutral or other return line unintentionally open. Repair or replace valve.
	Driven mechanism binding because of misalignment.	Remove motor and check torque requirement of driven shaft.
	Pump not delivering pressure or volume.	Check pump delivery and pressure.
<b>External oil leakage from motor.</b>	Gaskets or O-ring leaking.	Replace.
<b>Motor turning in the wrong direction.</b>	Valves sticking or binding.	Check for dirt or gummy deposit. Check for contamination of oil. Check for air in system. Check for worn parts. Excessive wear may be due to oil contamination.
	Cylinder sticking or binding.	Check for dirt, gummy deposits or air leaks as above. Check for misalignment, worn parts or defective packing.
	Internal leakage in cylinder.	Repair or replace worn parts and loose packing. Check oil to see that viscosity is not too low. Check for excessive contamination or wear.
	Air in system.	Bleed air and check for leaks. Check pump packing and line connections on intake side by pouring hydraulic oil over suspected leak. As noise stops, the leak has been located. Tighten joints or change packing or gaskets where necessary.



## 8.07 Troubleshoot Electrical Systems

PROBLEM	CAUSE	RESOLUTION
<b>Indicator lights do not operate; control unit will not drive unit.</b>	Defective fuse.	Replace machine fuse.
	Defective control cable.	Replace control cable.
	Defective control module.	Replace control module.
<b>Indicator lights operate; control unit will not drive valve.</b>	Control cable may be damaged or disabled.	Replace cable.
	Moisture in cable connectors.	Dry out with heat or air.
	Defective control module.	Replace module.
	Defective valve or solenoid.	Manually actuate valve.
<b>Indicator lights do not operate; control unit will drive hydraulics.</b>	Indicator lamps burned out.	Replace lamps.
	Defective control module.	Replace control module.
<b>Both indicator lights operate; valves operate one way only.</b>	Defective hydraulic valve.	Check hydraulics by operating valve manually; if "OK", then check out resistance of valve coils or solenoid (about 8 ohms at 12 volts, about 30 ohms for servo valves.) Also check the machine wiring.
	Defective control module.	Repair and replace as require. Replace control module.
<b>Valve operates one way only. One indicator light working (and is the appropriate light for direction of travel).</b>	Defective control module.	Replace control module.
	Defective sensor.	Replace sensor.
<b>Valve operates, but only one indicator light functions.</b>	Defective indicator lamp.	Replace lamp.
<b>Valve operates properly, but both indicator lights remain on.</b>	Defective control module.	Replace control module.

PROBLEM	CAUSE	RESOLUTION
<b>Zero or null of control has shifted with respect to screed position.</b>	Slope control mounting bolts not tight.	Tighten bolts.
	Defective control module.	Replace control module.
	Defective sensor.	Replace sensor.
	Moisture build-up inside control housing on electrical connections.	Remove control module (panel) and dry out with heat or air.
<b>Only one indicator light on when valves are at null (ram not moving).</b>	Hydraulic valve drifting.	Readjust valve null.
	Control module defective.	Readjust control module.

## 9.0 Schematics

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# 9.01 Lubrication Chart

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## 9.02 Hydraulic Schematics

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## 9.03 Electrical Schematics

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## STANDARD WARRANTY

Roadtec, Inc. ("Manufacturer") warrants to the first end-user all new machinery and parts manufactured by it ("Products") to be free from defects in workmanship and material, commencing with the date of initial startup and for a period of twelve months thereafter or 1,000 hours of operation, whichever occurs first.\* **This limited warranty remains in force for the above time period only if all Manufacturer's operational and warranty procedures are followed and recommended maintenance is performed.** Manufacturer's liability hereunder is conditioned on the first end-user giving written notice to Manufacturer of any alleged defect no later than thirty days after the discovery of such alleged defect.

If, within such warranty period, any Product shall be proven to Manufacturer's satisfaction to be defective, it shall be repaired or replaced, at Manufacturer's option. All defective parts or components must be returned to Manufacturer freight prepaid, at a location specified by Manufacturer, for inspection before credit will be issued for new parts or components. The right to have a defective Product repaired or replaced shall constitute the first end-user's sole and exclusive remedy for breach of this limited warranty. Manufacturer may, at its sole discretion, refund the purchase price of the defective Product in lieu of repairing or replacing it, provided the defective Product is returned to Manufacturer freight prepaid at a location specified by Manufacturer, and such return is authorized by Manufacturer. Labor for warranty repair will be paid under a formula determined by Manufacturer.

Wear parts including, but not limited to, conveyor lines, screed plates, cutter teeth, tooth holders, scraper blades, track pads, tires and conveyor belts are warranted only if found to be defective at time of shipment, but are not warranted for the warranty period against wear or abuse.

No warranty shall apply to Products which have been repaired or altered by others so as, in Manufacturer's judgment, to adversely affect the same or which shall have been subject to negligence, accident, abuse or improper care, installation, maintenance, storage or other than normal use or service, during or after shipment. No warranty shall apply to any used Product. No warranty shall apply to any Product adversely affected by being used with any machinery, part or accessory not manufactured or authorized by Manufacturer. With respect to machinery, parts or accessories which are furnished but not manufactured by Manufacturer, the warranty obligation of the original equipment manufacturer shall be passed through to the first end user, but Manufacturer does not provide any warranty as to such items.

Manufacturer does not warrant or represent that any Product furnished by it meets any federal, state or local safety, environmental or electrical regulations. Manufacturer is wholly discharged from all liability under this warranty in the event that the purchaser of the Product fails to pay for it in accordance with the applicable purchase terms. This warranty extends only to the first end-user and is not transferable. This warranty may not be modified except pursuant to a written agreement signed by Manufacturer.

**THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED (EXCEPT WARRANTY OF TITLE), INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND ANY IMPLIED WARRANTY FROM COURSE OF DEALING OR USAGE OF TRADE, EACH OF WHICH IS EXPRESSLY DISCLAIMED. MANUFACTURER SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES WHATSOEVER WITH RESPECT TO MACHINERY, PARTS OR ACCESSORIES MANUFACTURED OR FURNISHED BY IT OR ANY SERVICES, UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO. IN NO EVENT SHALL MANUFACTURER BE LIABLE TO ANY PARTY FOR ANY LOSS OF USE, REVENUE OR PROFIT, OR FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR PUNITIVE DAMAGES WHETHER ARISING OUT OF BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHERWISE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.**



**ROADTEC, INC.**

**Chattanooga, Tennessee**

\* The warranty period for the Front Mounted Broom: FB-100e SN 4001 is six months or 500 hours of operation, whichever occurs first.



# Order Parts

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Provide the following information to the ROADTEC Parts Department for accurate parts order processing:

- Company name
- Purchase order number
- Personnel name and address
- Method of shipment
- Machine model and serial number
- Part number, description and quantity of parts
- Location of part(s) in Roadtec Parts Manual

**ROADTEC Parts**  
**800 Manufacturers Road**  
**Chattanooga, TN 37405**

**Phone 1-423-265-0600**  
**Toll Free 1-800-272-7100**  
**Fax 1-423-267-8686**

## Receipt of Parts

Responsibility for breakage, loss or damaged goods **ceases** upon delivery of the merchandise to the transportation company for which a receipt is received showing that the shipment was accepted by them in **good condition**.

If material listed on the bill of lading or express receipt is short, broken or damaged, **DO NOT** accept the shipment until the carrier's agent makes a notation of the shortage or damage on the expense bill. Notify the transportation company's agent at once and request an inspection.

### **IMPORTANT!**

**If the agent does not make an inspection, then an affidavit should be made that they were notified on a certain date and failed to do so. This affidavit with other papers will properly support your claim.**





# INDEX

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## Symbols

50 Hours Maintenance 179  
 100 Hours Maintenance 191  
 250 Hours Maintenance 195  
 1000 Hours Maintenance 205  
 2000 Hours Maintenance 215

## A

Air cleaner 31  
 alternator 37  
 ALTERNATOR 37  
 Angle of Attack Threads 186  
 Auger 26, 35, 39, 71, 132, 134, 145, 176, 204, 213, 223, 225, 249, 251  
 Auger Drive Chain 223  
 Auger Extensions 39, 145  
 Auger Hanger 176, 225  
 Automatic Grade Control 39  
 Automatic Slope Control 39  
 Auxiliary Pump 239, 241  
 auxiliary pumps 31  
 Averaging Ski 40

## B

batteries 37, 56, 57  
 BATTERY 37  
 Battery Disconnect Switches 43  
 Battery Electrolyte 183  
 Beacon Light 43  
 BEACON LIGHTS 43  
 Bogie Wheel Bearings 214  
 Brake Release 230

## C

CAN-bus 37  
 Chain Case Bearings 176  
 conveyor 56, 66, 124, 133, 135  
 Conveyor Drive Chain 226  
 Conveyor Idler 174  
 Conveyor Pumps 239, 243, 244  
 Conveyor System 36  
 Crown Control 190  
 Cut-off shoes 67  
 Cut-Off Shoes 40  
 cylinders 31

## D

Daily Maintenance 167  
 DEF 165  
 DEF Tank 165  
 Diesel Emissions Fluid Filters 217  
 Diesel Exhaust Fluid 165  
 DIMENSIONS 27  
 Dip Faults 139  
 Drive-Off Procedure 151  
 Drive System 33

## E

Electrical 11  
 Electrical System 37  
 electric systems 57  
 Emergency Stop Button 54  
 EMERGENCY STOP BUTTONS 43  
 engine 31  
 Engine Air Intake Filter 181, 197  
 Engine Coolant 165  
 Engine Diagnostic Gauge 77, 78, 79, 80, 81, 82, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 118, 119, 120  
 engine fault codes 31  
 Engine Oil 165, 193, 198, 263  
 extensions 39, 67, 71, 124, 127, 129, 134

## F

filters 31  
 FIRE EXTINGUISHER 44  
 Flow Gates 35, 133, 134  
 flow rate 66  
 Fluid Capacities  
   Fuel 31, 165, 169, 200  
   Hydraulic Tank 165, 177, 209, 210  
 FLUID REQUIREMENTS 165, 167  
 Forced Regen 103  
 Frame Lift Cylinders 236  
 Frame Raise 76, 152  
 Front Wheel Assist 40  
 fuel  
   cap 51  
 FUEL 169  
 Fuel Filter 200  
 Fuel pump 31  
 Fuel Tank 165  
 Fume Extraction System 36, 43

## G

Gearbox Oil 203, 212  
 Gear Oil 165  
 Grease Points 165  
 Ground Control Boxes 70, 74

## H

HAZARD ALERT SIGNS 44  
 Hazard Decals 59  
 head of material 43, 66, 71, 122, 127, 130, 131, 132, 133, 134, 136, 139  
 Headshaft Bearings 174  
 Hood Raise 230  
 Hopper 25, 35, 40, 71, 135, 258  
 hopper insert 40  
 Hopper Insert 40  
 HORN 44  
 hoses 51  
 Hydraulic 165, 295

hydraulic oil 58, 60, 177  
Hydraulic Strike-off Extensions 39

## L

Leg Tube Service Bar 43  
Lifting Points 221  
line of pull 66, 122  
Longitudinal Joints 139  
LUBRICATION 161, 293  
Lubrication Chart 165, 293  
LUBRICATION CHART 293

## M

Machine Danger Zones 45  
Machine Dimensions 27  
MAINTENANCE 161, 163, 259, 261, 262, 263, 264, 265  
Manual 19  
Material Feed System 35  
Material Safety Data Sheet (MSDS) 54, 58  
Mat thickness 66, 137  
Motors 249

## N

negative crown 67  
Nomenclature 25  
Null 129, 131  
Null Screed 131

## O

Operate 124  
operation 19  
Operation 19, 53, 63, 65  
Operator Station 25, 26  
optional equipment 39, 40  
Order Parts 301  
OSHA 49

## P

Parking Brake 103, 153  
Paving Techniques 136, 137  
personal protective equipment 48  
Personal Protective Equipment 48  
Personal Protective Equipment (PPE) 48  
pivot points 66  
positive crown 67  
Pre-Start Check List 124  
Propel Pump Bypass 232  
propel pumps 31  
Propel Pumps 242  
Proposition 65 Warning 15  
Pump Drive 165, 203, 212, 239  
Push Rollers 35

## R

Radiator 56  
Radiator Fan Motor 252  
Refill Diesel Fuel 169  
Reverse Alarm 44  
Right 69  
Right Hand Operator Console 70  
Roadtec 11  
RP-250e 19, 65, 163

## S

Safety 19, 41, 43, 48, 49, 53, 54, 58, 59, 164  
Schematics 291, 295, 297  
SCHEMATICS 291, 297  
Screed 25, 36, 39, 71, 72, 127, 128, 129, 131, 184, 187, 239, 257  
Screed Extensions 39, 131  
Screed Generator Pump 239  
Screed Lift 72  
Screed Set Up 129  
Serial number 11  
Service Department 11  
Set Flow Gates 133, 134  
Shipping Height 27  
Shipping Width 27  
Smoothness 137, 149  
Strainer 209  
strike-off plate 67  
stroke 31  
Synthetic Gear Oil 80W-140 165

## T

Throttle 75, 154, 157, 159  
Tie Down Points 222  
Tire Pressure 189  
tow points 36, 66, 129  
Tow Points 36  
Transverse Joints 139, 140  
Travel Joystick 75, 103, 158  
Troubleshooting 267  
Truck Hitch 40, 72  
Turbo charger 31

## V

VALVES 253  
Vibrators 67  
voltage 57

## W

Wheel Planetary Oil 202, 211

## Y

Yield Factor 138

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