

POWERTRAK COMMERCIAL & POWERTRAK COMMERCIAL PLUS REAR LOADERS

> SERVICE MANUAL ISSUED FEBRUARY 2025

> > TP1PTC-SM-0225



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IF INCORRECTLY USED, THIS EQUIPMENT CAN CAUSE SEVERE INJURY. THOSE WHO USE AND MAINTAIN THE EQUIPMENT SHOULD BE TRAINED IN ITS PROPER USE, WARNED OF ITS DANGERS, AND SHOULD READ AND FULLY UNDERSTAND THIS ENTIRE MANUAL BEFORE ATTEMPTING TO SET UP, OPERATE, ADJUST OR SERVICE THE EQUIPMENT. KEEP THIS MANUAL FOR FUTURE REFERENCE

PLEASE NOTE THAT THIS MANUAL IS APPLICABLE TO THE HEIL BODY ONLY. PLEASE CONSULT THE RESPECTIVE CHASSIS MANUAL FOR ANY AND ALL ISSUES OR QUESTIONS RELATED TO THE CHASSIS. HEIL CANNOT SPEAK FOR THE CHASSIS MAKER.

IMPORTANT SAFETY NOTICE

Proper service and repair are important to the safe, reliable operation of Heil Co.'s products. Service procedures recommended by Heil are described in this service manual and are effective for performing service operations. Some of these service operations may require the use of tools or blocking devices specially designed for the purpose. Special tools should be used when and as recommended. It is important to note that some warnings against the use of specific methods that can damage the product or render it unsafe are stated in the service manual. It is also important to understand these warnings are not exhaustive. Heil could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each method. Consequently, Heil has not undertaken any such broad evaluations. Accordingly, anyone who uses service procedures or tools which are not recommended by Heil must first satisfy himself thoroughly that neither his safety nor the product safety will be jeopardized by the method he selects.

Heil Environmental, as manufacturer of the equipment that is covered by this manual, is providing a product to the user who has acknowledged to have superior knowledge of the conditions of the use to which the product will be put. Heil Environmental relies upon the user's superior knowledge in specifying any changes or modifications including, but not limited to, the inclusion or non inclusion of options that are required by the user and the Heil product, and for the particular application of the user relative to the Heil product.

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SECTION 1 GENERAL INFORMATION

INTRODUCTION

The following sections are guides for maintenance and service of the Heil unit. The sections cover preventive maintenance, adjustment, and troubleshooting tips. Before performing maintenance, check the work area carefully to find all the hazards present and make sure all necessary safeguards or safety devices are used to protect all persons and equipment involved. In order to diagnose a problem quickly and effectively, a service person must be thoroughly familiar with the machine.

This section explains the system and its major components. Diagrams and schematics of the electrical and hydraulic systems are in the Service Manual Schematics section.

NOTICE

For CNG units, this Service Manual should be used in conjunction with any associated CNG System Manufacturer's Operation and Maintenance Manuals. Always read and understand all associated manuals alongside the Heil Parts and Service Manual and Heil Operation Manual before operating or servicing the unit. This manual does not contain and should not be relied upon to cover any CNG system specifics. You <u>must</u> consult the applicable CNG system manual as well as this Manual.



IMPORTANT!

- Before starting any maintenance, study this section of the manual.
- Read all hazard warnings and decals on the unit.
- Clear the area of other persons before performing any maintenance.
- Know and understand safe use of all controls.
- It is your responsibility to understand and follow manufacturer's instructions on equipment and care.

SERVICE/PARTS ASSISTANCE

Assistance in troubleshooting, repair and service is available by contacting the authorized Heil Dealer in your area. Parts are available at your Heil Dealer or through Heil. Heil personnel are trained to provide prompt and professional assistance.

ALWAYS give the unit serial number in any correspondence relating to the equipment.

See the back cover of this manual for Heil contact information.

RECOMMENDED SPARE PARTS

PART NO.	DESCRIPTION	QTY
BODY AND TAILGAT	EASSEMBLIES	·
022-3509	SEAL, TAILGATE, 240"	2
028-0479	SHOE, SLIDE	2
028-0358	SHOE, BLOCK CAST	2
204-8413	BEARING, THRUST	2
204-8414	BOLT, EYE	2
019-1242	SPRING, 1" OD X 6"	12
048-7263	PIN, SWEEP PIVOT	2
048-6268	PIN, CYLINDER SWEEP	2
003-4438	SPH BRG-QUAD LUB LOW	2
053-1908	F4000 T/G LATCH ASSEMBLY	1
HYDRAULICS		
001-7038	PTC, SLIDE	2
001-7039	CYLINDER, SWEEP, TAILGATE	2
001-6862	CYLINDER, TAILGATE RAISE	2
001-7121	CYLINDER, EJECTOR, DA TELESCOPIC, 25 YD.	1
001-7122	CYLINDER, EJECTOR, DA TELESCOPIC, 27 YD.	1
001-7128	CYLINDER, EJECTOR, DA TELESCOPIC, 32 YD.	1
031-2616	VALVE, SHUT-OFF, 2"	1
031-6554	COUNTERBALANCE VALVE	1
031-6272	VALVE, LOGIC	1
031-3285	VALVE, UNDERBODY	1
075-0578	STRAINER, SUCTION, 100 MESH	1
022-2707	GASKET, OIL TANK	1
060-0417	FILLER CAP	1
067-0630	GAUGE, SIGHT, THERMOMETER	1
075-0896	SUCTION STRAINER	1
075-0953	FILTER, RETURN LINE	3
075-0930	FILTER, PRESSURE HYDRAULIC	1
075-0712	BREATHER, FILTER	1
ELECTRICAL		
063-0122	SWITCH, PROXIMITY, SOURCING 18 MM	1
063-0124	SWITCH, PROX, 30MM,NC	1
108-7113-205	CIRCUIT BREAKER, MINI, 5 AMP., SILVER	1
108-7113-210	CIRCUIT BREAKER, MINI, 10 AMP., SILVER	2
108-8391	RELAY, FOOT PRINT, ISO 280	1

General Information

RECOMMENDED SPARE PARTS

PART NO.	DESCRIPTION	QTY
108-6752	RELAY, WEATHER PROOF	2
CONTROLS		
070-1391	HANDLE GRIP	2
013-5014	LEVER	3
108-2280	RUBBER BOOT, 4000	2
108-8464	SWITCH, TOGGLE SPST	2
108-8467	SWITCH, PUSH BUTTON, NO W/CONNECTOR	1
108-8444-001	CAP, ROCKER, PUMP	1

ELECTRONIC PARTS CATALOG (EPC)

The Parts Central EPC includes electronic versions of the Heil Parts Manuals, specific to a Customer's truck configuration and options. After registering and logging in, the user can search by **Keyword(s) or Part Number** and/or **Heil Body Serial Number** to quickly identify a spare part or browse a custom parts catalog.

<u>Note</u>: This tool is for reference use only and the cart functionality is disabled. Please contact your local Heil Dealer for parts quoting and ordering.

Registration and Login

Register online to gain access: https://epc.partscentral.com. Upon registration, you will receive an email notification confirming registration. Within 24 hours, your registration will be approved and you can log in using the login page.

	PARTS CENTRAL	
	🏝 User name / Email	
I	Password	
	Remember me	
	Are you a new user? Click here to re	egister 🔶
	2019 © interactive SP are	

PARTS	CENTRAL
A Name	A Last name
Password	🖬 Email
Company	📞 Phone
Address	
≁ Town	✓ Postcode
Select a country	~
🔎 Select a language	~
	SAVE
	ractive SP ares™

General Information

Search by Part Keyword(s) or Part Number in Body Serial Number

After login, you will land on the User Dashboard. At the top right of the Dashboard, there will be two search fields, as shown in the image below.



You can search by **Keyword(s) or Part Number** within a specific Heil Body **Serial Number**. For example, if you are looking for a **proximity switch** for Body Serial Number **HPS4959991**, you can enter this information into these two fields and the search results will include all parts within the **HPS4959991** body that contain the keywords **proximity** and **switch** within their part descriptions. See the image below.

From the search results list, you can select the right arrow icon to view the part within its associated assembly/kit, helping you identify the needed part. Alternatively, you can select the eye icon on the right to see part specifics (including any notes) and quickly add to cart (although this functionality is not yet turned on in the Parts Central EPC).

PART	SCENTRAL			5 _r 🛛 E	rand 🔒	Chris
希 Da	ishboard 🛛 🕖 Catalogues 🗸		proximity switch	Q in HF	S4959991	Q
Searc	h : proximity switch in HPS49	59991				
Code	Description	Catalogue				
035- 3712	GUARD, switch , proximity , TAILGATE LOCK	Half/Pack, Odyssey and Factor AFL / ELECTRICAL / KIT, ELECTRIC, BC	YDCY		۲	÷
063- 0122	switch, proximity, SOURCING, 18 MM	Half/Pack, Odyssey and Factor AFL / ELECTRICAL / KIT, ELECTRIC, BC	DDY		۲	⇒
063- 0123	switch, proximity, 30 MM.	Half/Pack, Odyssey and Factor AFL / ELECTRICAL / INSTALLATION, E	LECTRICAL, STEEL, TOP DOO!	2	۲	÷
063- 0123	switch, proximity, 30 MM.	Half/Pack, Odyssey and Factor AFL / ELECTRICAL / KIT, ELECTRIC, BC	DDY		۲	<i>></i>
212- 2228	DECAL, proximity switch , ADJUSTMENT	Half/Pack, Odyssey and Factor AFL / BODY AND TAILGATE / KIT, DEC WITH CNRG TAILGATE	CAL & TRIM, STANDARD, 28 YI	D.,	۲	÷
234- 3317	PLATE, STRIKER, proximity switch , TAILGATE LOCK, 1"	Half/Pack, Odyssey and Factor AFL / ELECTRICAL / KIT, ELECTRIC, BC	DDY		۰	<i>></i>
311- 3954	BRACKET, proximity switch , 30MM, LOADER	Half/Pack, Odyssey and Factor AFL / ELECTRICAL / KIT, ELECTRIC, BC	DDY		۰	÷
311- 6253	BRACKET, 30 MM, proximity switch , TAILGATE LOCK	Half/Pack, Odyssey and Factor AFL / ELECTRICAL / KIT, ELECTRIC, BC	YDCY		۰	>

Search by Body Serial Number

If you want to view an entire parts catalog for a particular Heil unit, you can search by only the Heil Body **Serial Number**, leaving the **Keyword(s)** / **Part Number** field blank. The search result will then be the Body Serial Number-specific parts catalog with familiar catalog sections that you can browse. You can navigate through the catalog using the section/topic menu in the left panel and then adjust an assembly/kit illustration size in the right panel with the mouse center scroll wheel. Additionally in the right panel, you can drag the image when holding down the left mouse button. See the image below.



For each assembly/kit, you can click on the interactive part callout reference numbers to highlight the corresponding part in the parts list, or you can click on a parts list line item to highlight its position on the illustration. See the image below.



PRECAUTIONARY STATEMENTS

Listed below are the definitions for the various levels of hazards. It is important that the operators of this equipment and people who service units read and understand all warnings as they relate to this equipment operation.

- DANGER indicates a hazardous situation, which if not avoided WILL result in DEATH or SERIOUS INJURY if you do not follow proper instructions.
- WARNING indicates a hazardous situation, which if not avoided COULD result in DEATH OR SERIOUS INJURY if you do
 not follow proper instructions.
- CAUTION indicates a hazardous situation, which if not avoided COULD result in MINOR to MODERATE INJURY if you do
 not follow proper instructions.
- NOTICE addresses practices not related to personal injury, such as property damage or damage to the equipment.

The following warnings are generally in the Operator's Manual for each specific unit, or are generic safety messages if an Operator's Manual does not have these safety messages. Other safety alert messages may be in other sections of the Service Manual or in an Operator's Manual. You must read and obey all safety alert messages in any manual produced by Heil to support your unit.

Failure to follow all instructions and safety precautions in this manual, in the Service Manual, in other manufacturer's manuals and on the safety decals attached to the product could result in serious injury or death to operators or bystanders and/or damage to property. Do not operate this vehicle before you read and understand the Operation Manual, the Parts Service Manual for this unit, other applicable manufacturer's manuals and the safety decals on the product. Each operator of this unit must read and understand all directions in this manual before they first operate this vehicle. Keep this manual in the cab for new operators and to remind all operators about safe use.

Never weld on a compressed natural gas vehicle unless the compressed natural gas fuel system has been purged with inert gas.

A DANGER

Do not operate the unit or perform repair or maintenance procedures on the unit until you read and understand all of the instructions in this manual. Failure to do so can result in death or serious injury to operators or bystanders.

🗚 DANGER

Make sure the unit is on firm, stable ground before you raise the body and clear the area of all unnecessary people. Do not prop a body unless it is on firm, stable ground. A unit not on firm, stable ground can roll when raising or propping the body. This can cause death or serious injury to you or bystanders.

A DANGER

Always prop the tailgate when you leave it raised for maintenance, service or cleaning procedures. Any part of your body between the unit's body and the tailgate while you prop the tailgate or when the tailgate is propped is dangerous. Death or serious injury can occur if any part of your body is between the tailgate and the body if the tailgate suddenly closes.

A DANGER

A tailgate in motion is dangerous. Serious injury or death can occur if a person is struck by a moving tailgate or becomes trapped between the tailgate and the body. Clear the area near the tailgate of all unnecessary people before you lower the tailgate.

The packer and crusher panels are dangerous. They can cause death or serious injury if a person is inside the hopper. Make sure no one is inside the hopper before you begin a packer or crusher function. Put the unit in the Lock-Out/Tag-Out mode if it is necessary to enter the hopper area.

A DANGER

Keep all parts of your body out from underneath the unit's body and away from the cylinders when raising or lowering the body. Serious injury or death will occur if the unit's body suddenly lowers and traps a part of your body.

A DANGER

Do not raise a body that has refuse while you do maintenance or service procedures. Refuse in the body can make the unit unstable. Always unload refuse from the body before you raise it for maintenance or service procedures. Always use the body props when you raise the body for maintenance or service procedures.

A DANGER

A full or partially full load of refuse is dangerous while you lower the body with inoperative controls. Refuse in the body can make the unit unstable and cause it to overturn. Serious injury or death can occur if the unit overturns due to instability caused by the loaded refuse. REMOVE the refuse before you block the body.

Lifting equipment that does not have sufficient lifting capability is dangerous. Equipment can fail and cause death or serious injury to the operator or bystanders. Make sure the lifting equipment has sufficient lifting capability and clear ALL persons not involved with the procedure away from the area.

A DANGER

The lifting equipment can fail. Serious injury or death can occur if the lifting equipment breaks and the body falls or the unit rolls over. Do not place your body or limbs between the unit's body and chassis while you remove the body-supporting timbers. Be attentive and prepared to move quickly away from the unit in the event there is an equipment failure.

Contact of the unit with overhead electric lines is dangerous. Death or serious injury can occur. Make sure there is adequate overhead clearance before you raise the container. If the unit does make contact with overhead electric lines do not touch any metal in the cab. Stay in the unit until help arrives..

Make sure the unit is in the Lockout/Tagout mode when you do ANY maintenance or service procedures, or when you go in the hopper, climb in or on the body or on equipment. Equipment can be operated when the unit is not in the Lockout/Tagout mode, equipment operated while you do maintenance or service procedures, go in the hopper or climb in or on the body or on equipment can cause death or serious injury.

Moving equipment can be dangerous to bystanders. Death or serious injury can occur if a person is in the wrong area or is not attentive to the operations. Clear the area of all unnecessary people before you operate the controls.

A WARNING

Raising the body with the tailgate closed can damage the underride bumper. The under ride bumper can hit the ground when the tailgate is not fully raised before you raise the body. Death or serious injury can occur and also cause damage to the unit.

Clear all people of the area before you lift a refuse container. Make sure the refuse is secure in the refuse container before you lift the container. Loose refuse can fall and cause death or serious injury.

The hydraulic fluid can be under pressure and can spray while you open the connection. Hydraulic fluid can cause damage to your eyes, hands or skin. Wear protective eye glasses, gloves and other clothing as necessary to protect you from the hydraulic fluid.

A unit that needs service or repair can malfunction and create a dangerous condition. A part failure during operation can cause death or serious injury to a person or damage to the unit. Repair or replace any failed or defective part immediately

Improper dumping of the refuse can cause the unit to tip or rollover. Death or serious injury can occur if the unit rolls or tips over. Empty as much refuse as you can with the packer panel before you raise the body.

Do not move the unit forward or backwards excessively fast (lurch) to dump the refuse load. Excessively fast movements with the body raised can make the body unstable and tip or roll the unit over. This can result in death or serious injury to the operator and damage the unit. Use only sufficient movement to loosen the load so that it will leave the body.

Isopropyl alcohol is flammable and is harmful to eyes and skin. Keep isopropyl alcohol away from heat or open sources of ignition. Flush eyes and skin with water for 15 minutes after contact. Seek immediate medical help.

A container that is not locked to the container lift mechanism is dangerous. The container can fall off the container lift mechanism and cause death or serious injury. Make sure you engage and lock the container latch bars before you lift the container.

Grabbing a refuse container with too much pressure can damage the container. Pieces of the container can "fly" off the container and cause moderate or minor injury to a bystander. Use enough pressure with the grabber to raise the container with the lift arm and not damage the container.

NOTICE

Do not move the unit forward or backwards excessively fast (lurch) to dump the refuse load. Excessively fast movements with the body raised puts a very high load on the body raise cylinders and could damage one or both cylinders and make the body unstable unable to lower. Inspect the cylinders after you dump each load and replace if necessary.

NOTICE

Do not operate the unit or perform repair or maintenance procedures on the unit until you read and understand the instructions in this manual. Failure to do so can result in damage to the unit or other property. If you do not understand a procedure or instruction, tell the owner or the designated person immediately. Do not operate the unit if you do not understand all procedures and instructions in this manual. The owner or designated person can contact your Heil dealer or Heil for additional help. See the Operator's Manual or Service Manual for contact information.

NOTICE

Grabbing a refuse container with too much pressure can damage the container. The container can become unusable. Use enough pressure with the grabber to raise the container with the lift arm and not damage the container.

NOTICE

The following lockout/tagout procedure represents Heil's minimum recommendation and should be used in conjunction with and should not supersede additional or more stringent safety requirements called out by your company policy. Please check with your supervisor to determine if your company has a specific lockout/tagout procedure. Contact your supervisor, Heil Technical Service, or reference *OSHA Regulation 1910.147* if you have any questions about Lockout/Tagout procedures.

LOCKOUT/TAGOUT PROCEDURE

\Lambda DANGER

This procedure MUST be followed before entering the unit's body or performing any maintenance, repair, or cleaning procedures on the unit.

If you do not have functioning Lockout/Tagout gear and/or are not an authorized employee, STOP and DO NOT initiate any service on the unit. Contact your supervisor immediately.

NOTICE

This Lockout/Tagout procedure represents Heil's minimum recommendation and should be used in conjunction with and should not supersede additional or more stringent safety requirements called out by your company's policy. Please check with your supervisor to determine if your company has a specific Lockout/Tagout procedure. Contact your supervisor, Heil Technical Service, or reference OSHA Regulation 1910.147 if you have any questions about Lockout/Tagout.

Watch the Service Shack Video online at www.Heil.com/Heil-Service-Shack by selecting Lock-Out/Tag-Out.

- A. Put the unit in a Lockout/Tagout mode:
 - 1. BEFORE you enter the unit's body
 - 2. BEFORE you perform ANY maintenance, repair or cleaning procedures on the unit.

B. All stored energy must be removed and/or protected against, common sources found on Heil units (Including, but not limited to):

- 1. Hydraulics
- 2. Electrical
- 3. Gravity
- 4. Pneumatics
- 5. Mechanical

C. Examples of some basic equipment required, see Figure 1:

- 1. Multi-hasp
- 2. Single-keyed red lock
- 3. Lockout tag



Figure 1. Examples of Lockout/Tagout Gear.

General Information

LOCKOUT/TAGOUT PROCEDURE (CONTINUED)

Follow These Steps:

- 1. APPLY the brakes. MAKE SURE the brakes do not let the unit move and they work properly.
- 2. Chock all wheels.
- 3. SET the tailgate props when the tailgate is raised for any service, maintenance or cleaning.
- 4. SET the body props when the body is raised for any service, maintenance or cleaning.
- 5. BEFORE disconnecting main battery power, VERIFY all the following stored energy sources are depleted according to your company policy:
 - a. Hydraulic (Such as forks or grabber arm in stowed position)
 - b. Pneumatic (Such as tag axles).
 - c. Mechnaical (Such as springs)
 - d. Gravity (Such as tailgate raised)
- 6. REMOVE the key from the ignition and store it in your pocket, or another secured location for your safety.
- 7. Disconnect the battery power by flipping the battery box disconnect switch to OFF.
 - a. VERIFY all electrical stored energy is depleted according to your company procedure.
- 8. INSERT the multi-hasp into the disconnect switch.
- 9. ATTACH your red single-keyed Lockout/Tagout lock with your tag exposed and visible to the multi-hasp.

a. ALWAYS use individually assigned locks and tags when performing ANY service or maintenance with other authorized employees. Each employee MUST place their personally assigned tag and lock to the multi-hasp connected to the disconnect switch.

- 10.REMOVE your lock key and put it in your pocket for your safety.
 - a. ONLY the person who placed the lock and tag on the multi-hasp is authorized to remove it.
 - b. NEVER remove another employee's Lockout/Tagout gear without approval from the authorized person responsible.

c. Shift or personnel changes: Off-going employees MUST provide all details pertaining to the unit's status to the oncoming employee(s). The oncoming employee(s) MUST perform the Lockout/Tagout procedure to verify all stored energy is removed from the unit BEFORE applying their Lockout/Tagout gear.

11. BEFORE removing your Lockout/Tagout gear to return the unit to service, follow these steps:

- a. INSPECT the work area to ensure all nonessential items have been removed.
- b. VERIFY all unit components are operationally intact.
- c. ENSURE all employees are safely positioned or removed from the area.
- d. NOTIFY all affected employees that the Lockout/Tagout devices are being removed.

STORING REFUSE IN THE BODY

Heil does not recommend storing refuse in the body overnight. The different types of debris and corrosive elements usually collected can cause severe corrosion inside the body, decreasing the life of your body and impact unloading. Additionally, storing refuse in the body overnight can increase the risk of fire.

MAINTENANCE/LUBRICATION INFORMATION

Before performing maintenance, check the work area carefully to find all the hazards present and make sure all safe guards or safety devices are in place to protect all persons and equipment involved.

WINCH GEAR OIL

When the unit has a winch option, check the level of the winch's gear oil every 40 hours of operation. Fill as needed with AGMA Grade 5 EP (90wt.) for an 8,000 lb. winch and AGMA Grade 7 EP (140 wt.) for a 12,000 lb. winch.

GREASE LUBRICANT RECOMMENDATION

Use a grease gun. Before engaging grease gun, clean the fitting. Always pump enough grease to purge the joint of contaminated grease and wipe off the excess. Lubricate a unit as shown on the lubrication decal on the unit and in the **Body Lubrication Guide** paragraph of this section.

Use grade NLG1000 grease or equivalent.

OIL LUBRICANT RECOMMENDATION

Use only non-detergent engine oil to lubricate all moveable mechanical parts not furnished with grease fittings. Apply sufficient oil to give good lubrication, but do not bathe parts in oil. Always wipe off excess oil.

HYDRAULIC OIL SPECIFICATIONS

Hydraulic fluid is one of the most important components in a hydraulic system. It transmits power, provides lubrication, cooling function and has the following features:

- High viscosity index and long service life
- · Outstanding cold temperature flow properties
- Fast water separation
- Excellent anti-wear performance
- Long term oxidation stability
- Superior rust and corrosion protection
- Exceptional shear stability / filter ability
- · Excellent thermal and hydrolytic stability
- Anti-foam characteristics
- High performance of air release characteristics

Current Heil standard hydraulic oil is Shell Tellus S2 VX 32. Please see product TDS and MSDS for more detailed information. We strongly recommend to use it on Heil products to get best system performance and oil service life.

The following oils can be used on Heil products, if Heil standard hydraulic oil (Shell Tellus S2 VX 32) is not available. System performance/oil service life may be compromised.

- Castrol Dual Range HV 32
- Chevron Rando HDZ 32
- Mobil DTE 10 Excel 32

STANDARD TORQUE DATA FOR NUTS AND BOLTS

The following recommended torque data is a general guideline. Recommended torque, in foot pounds, for all Standard Application nuts and bolts provided in the following table.

NOTICE

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Torque specifications on a drawing override torque values in the Standard Torque Data for Nuts and Bolts Table.

- All thread surfaces are clean and lubricated with SAE-30 engine oil. See notice above.
- Joints are rigid, that is no gaskets or compressible materials are used.
- When re-using nuts or bolts use minimum torque values.

STANDARD TORQUE DATA FOR NUTS AND BOLTS TABLE								
Bolt Size (D)	Nut Type (STD/Lock)	Thread Turns per Inch (p)	Grade	Heil Plain Dry Condition Torque Value (ft-lbs)	Heil Zinc Plated Fastener Torque Value (ft-lbs)	Heil Lubricated Fastener Torque Value (ft-lbs)	Heil Deformed Lock Nut Torque Value (ft-lbs)	
1/4	STD	20	5	9	8	6		
0.25			8	13	12	8		
		28	5	10	9	7		
			8	15	13	10		
	Lock	20	5				6	
			8				8	
		28	5				7	
			8				10	
5/16	STD	18	5	19	17	12		
.3125			8	27	24	17		
		24	5	21	19	14		
			8	29	27	19		
	Lock	18	5				12	
			8				17	
		24	5				14	
			8				19	
3/8	STD	16	5	33	30	22		
.375			8	47	42	31		
		24	5	38	34	25		
			8	54	48	35		

General Information

STANDAR	D TORQUE DA	TA FOR N	UTS AN	ND BOLTS	TABLE		
Bolt Size (D)	Nut Type (STD/Lock)	Thread Turns per Inch (p)	Grade	Heil Plain Dry Condition Torque Value (ft-lbs)	Heil Zinc Plated Fastener Torque Value (ft-lbs)	Heil Lubricated Fastener Torque Value (ft-lbs)	Heil Deformed Lock Nut Torque Value (ft-lbs)
	Lock	16	5				22
			8				31
		24	5				25
			8				35
7/16	STD	14	5	53	48	35	
.4375			8	76	68	49	
		20	5	60	54	39	
			8	84	76	55	
	Lock	14	5				35
			8				49
		20	5				39
			8				55
1/2	STD	13	5	82	73	53	
.500			8	115	104	75	
		20	5	92	83	60	
			8	130	117	84	
	Lock	13	5				53
			8				75
		20	5				60
			8				84
9/16	STD	12	5	118	106	77	
.5625			8	166	150	108	
		18	5	131	118	85	
			8	186	167	121	
	Lock	12	5				77
			8				108
		18	5				85
			8				121
5/8	STD	11	5	162	146	106	
.625			8	230	207	149	
		18	5	184	166	120	
	I			*	*	*	+

General Information

STANDARD TORQUE DATA FOR NUTS AND BOLTS TABLE							
Bolt Size (D)	Nut Type (STD/Lock)	Thread Turns per Inch (p)	Grade	Heil Plain Dry Condition Torque Value (ft-lbs)	Heil Zinc Plated Fastener Torque Value (ft-lbs)	Heil Lubricated Fastener Torque Value (ft-lbs)	Heil Deformed Lock Nut Torque Value (ft-lbs)
			8	260	234	169	
	Lock	11	5				106
			8				149
		18	5				120
			8				169
3/4	STD	10	5	288	260	188	
0.750			8	408	367	265	
		16	5	322	290	209	
			8	455	409	295	
	Lock	10	5				188
			8				265
		16	5				209
			8				295
7/8	STD	9	5	465	418	302	
0.8750			8	657	591	427	
		14	5	513	461	333	
			8	724	652	471	
	Lock	9	5				302
			8				427
		14	5				333
			8				471
1	STD	8	5	697	627	453	
1.0000			8	984	886	640	
		14	5	782	704	508	
			8	1105	994	718	
	Lock	8	5				453
			8				640
		14	5				508
			8				718
1-1/8	STD	7	5	869	782	565	
1.1250			8	1395	1256	907	

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General Information

Bolt Size (D) is and it of the set	STANDAR	D TORQUE DA			ND BOLTS	TABLE																																																																																																																																																																																																																	
Image in the state in	Bolt Size (D)	Nut Type (STD/Lock)	Thread Turns per Inch (p)	Grade	Heil Plain Dry Condition Torque Value (ft-lbs)	Heil Zinc Plated Fastener Torque Value (ft-lbs)	Heil Lubricated Fastener Torque Value (ft-lbs)	Heil Deformed Lock Nut Torque Value (ft-lbs)																																																																																																																																																																																																															
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<tr><td>1-1/2 STD 6 5 2134 1921 1387 </td><td></td><td></td><td></td><td>8</td><td></td><td></td><td></td><td>1909</td></tr> <tr><td>$\begin{array}{ c c c c c c c c c } 1.5000 & &$</td><td>1-1/2</td><td>STD</td><td>6</td><td>5</td><td>2134</td><td>1921</td><td>1387</td><td></td></tr> <tr><td>12 5 2401 2161 1561 12 8 3854 3468 2505 Lock 6 5 Image: Comparison of the symptotic symptot symptotic</td><td>1.5000</td><td></td><td></td><td>8</td><td>3425</td><td>3083</td><td>2226</td><td></td></tr> <tr><td>8 3854 3468 2505 Lock 6 5 1387 12 5 1 1561 1 8 1 2505</td><td></td><td></td><td>12</td><td>5</td><td>2401</td><td>2161</td><td>1561</td><td></td></tr> <tr><td>Lock 6 5 1387 8 2226 12 5 1561 8 2505</td><td></td><td></td><td></td><td>8</td><td>3854</td><td>3468</td><td>2505</td><td></td></tr> <tr><td>8 2226 12 5 1561 8 2505</td><td></td><td>Lock</td><td>6</td><td>5</td><td></td><td></td><td></td><td>1387</td></tr> <tr><td>12 5 1561 8 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& 1387 & 5 \\ \hline 1-1/2 & 5 & 2134 & 1921 & 1387 & 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 & $				8				1677	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			12	5				1190	1-1/2 STD 6 5 2134 1921 1387				8				1909	$\begin{array}{ c c c c c c c c c } 1.5000 & & & & & & & & & & & & & & & & & &$	1-1/2	STD	6	5	2134	1921	1387		12 5 2401 2161 1561 12 8 3854 3468 2505 Lock 6 5 Image: Comparison of the symptotic symptot symptotic	1.5000			8	3425	3083	2226		8 3854 3468 2505 Lock 6 5 1387 12 5 1 1561 1 8 1 2505			12	5	2401	2161	1561		Lock 6 5 1387 8 2226 12 5 1561 8 2505				8	3854	3468	2505		8 2226 12 5 1561 8 2505		Lock	6	5				1387	12 5 1561 8 2505				8				2226	8 2505			12	5				1561					8				2505
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General Information

BOLT TYPE IDENTIFICATION CHART

IH Type	S.A.E. Grade	Description	Bolt Head Marking**
1	1 or 2	No radial lines. Low or medium carbon steel not heat treated. NOT USED, replace with same grade bolt.	\bigcirc
5	5	Three radial lines. Quenched and tempered medium carbon steel.	\bigcirc
8	8	Six radial lines. Quenched and tempered special carbon or alloy steel	\bigcirc

General Information

TORQUE FOR HYDRAULIC TUBES AND FITTINGS

37 DEGREE FLARE (JIC) FITTINGS					
SET WRENCH TO (DRY TORQUE CAN VARY +/- 10%)					
NOMINAL TUBE OD	TORQUE WRENCH SETTING	ALTERNATE TORQUE UNITS			
1/8"	6.5 ft-lbs.	80 in-lbs.			
3/16"	9 ft-lbs.	110 in-lbs.			
1/4"	12.5 ft-lbs.	150 in-lbs.			
5/16"	16.5 ft-lbs.	200 in-lbs.			
3/8"	21 ft-lbs.	250 in-lbs.			
1/2"	41 ft-lbs.	490 in-lbs.			
5/8"	64 ft-lbs.	770 in-lbs.			
3/4"	89 ft-Ibs.	1070 in-lbs.			
7/8"	105 ft-lbs.	1260 in-lbs.			
1"	130 ft-lbs.	1560 in-lbs.			
1-1/4"	142.5 ft-lbs.	1710 in-lbs.			
1-1/2"	178.5 ft-lbs.	2140 in-lbs.			
2"	250 ft-lbs.	3000 in-lbs.			



Figure 2. Torque for Hydraulic Tubes and Fittings

General Information

TORQUE FOR HYDRAULIC TUBES AND FITTINGS (CONTINUED)

FROM SAE J2593 TABLE 7					
BOSS (ORB)	(STEEL) SET WRENCH TO (DRY TORQUE +0%, -25%)				
NOMINAL TUBE OD	TORQUE WRENCH SETTING	ALTERNATE TORQUE UNITS			
3/16"	9 ft-lbs.	110 in-lbs.			
1/4"	16.5 ft-lbs.	200 in-lbs.			
5/16"	21 ft-lbs.	250 in-lbs.			
3/8"	29 ft-lbs.	350 in-lbs.			
1/2"	64 ft-lbs.	770 in-lbs.			
5/8"	89 ft-lbs.	1070 in-lbs.			
3/4"	130 ft-lbs.	1560 in-lbs.			
7/8"	178.5 ft-lbs.	2140 in-lbs.			
1"	224 ft-lbs.	2690 in-lbs.			
1-1/4"	250 ft-lbs.	3000 in-lbs.			
1-1/2"	300 ft-lbs.	3600 in-lbs.			



Figure 3. Torque for Hydraulic Tubes and Fittings

General Information

TORQUE FOR HYDRAULIC TUBES AND FITTINGS (CONTINUED)

SPLIT-FLANGE (HALF CLAMP) CONNECTORS (CODE 61)					
SET WRENCH TO *DRY TORQUE*		IE*			
NOMINAL TUBE OD	BOLT SIZE	BOLT TORQUE [FT-LBS] *+/- 4 FT-LBS	BOLT TORQUE [IN-LBS] *+/- 50 IN-LBS		
1/2"	5/16-18 x 1.25	17 ft-lbs.	200 in-lbs.		
3/4"	3/8-16 x 1.25	25 ft-lbs.	300 in-lbs.		
1"	3/8-16 x 1.25	32 ft-lbs.	380 in-lbs.		
1-1/4"	7/16-14 x 1.50	41 ft-lbs.	490 in-lbs.		
1-1/2"	1/2-13 x 1.50	53 ft-lbs.	640 in-lbs.		
2"	1/2-13 x 1.50	61 ft-lbs.	730 in-Ibs.		
2-1/2"	1/2-13 x 1.75	86 ft-lbs.	1030 in-lbs.		
3"	5/8-11 x 1.75	144 ft-lbs.	1730 in-lbs.		
3-1/2"	5/8-11 x 2.00	125 ft-lbs.	1500 in-lbs.		
4"	5/8-11 x 2.00	125 ft-lbs.	1500 in-lbs.		
5"	5/8-11 x 2.25	125 ft-lbs.	1500 in-lbs.		



Figure 4. Bolt Torque Sequence.

COLD WEATHER WARMUP PROCEDURE

When ambient air temperature is cold (below 0 degrees F), it is necessary to warm up the unit's hydraulic oil before you start your daily route operation, check the oil level, or adjust hydraulic pressure settings. The hydraulic oil is sufficiently warmed when the temperature is between 120° and 160° F.

Moving parts on the unit are dangerous. Serious injury or death can occur if a person is struck by the equipment. Clear all people from the area before you operate the unit.

Follow the steps below to warm up the hydraulic oil.

- 1. START the TRUCK and let the engine idle.
- 2. APPLY the PARKING BRAKE and make sure it holds.
- 3. ENGAGE the HYDRAULIC PUMP for approximately five minutes.
- 4. MAKE SURE the AREA IS CLEAR of all unnecessary people BEFORE you operate the controls.
- 5. OPERATE the PACKER functions through ten (10) cycles while the engine idles. See the Operator's Manual for operation instructions.
- 6. Make sure the oil temperature on the site gauge is between 120° and 160° F. If not, repeat step 5.
- 7. Check for fluid leaks. Repair if necessary.
- 8. The unit is now ready to go on route.

BATTERY DISCONNECT SWITCH

The battery box is typically located on the street side of the chassis frame near the front of the body, however it can be mounted at a different location on different chassis. Become familiar with the location of the battery box and battery disconnect switch on your unit.

- 1. You must turn the battery disconnect switch to the OFF position whenever the unit is shut off for any length of time especially when the unit will be left unattended.
- 2. You must turn the battery disconnect switch to the ON position whenever you will use the unit.
- 3. You must check the position of the battery disconnect switch as part of the daily inspection.

NOTICE

Battery cables must be securely anchored and not rubbing other equipment. Cable insulation must be free of damage and abrasion. Inspect weekly.

NOTICE

Always disconnect the battery before welding on the chassis or body.

PROXIMITY SWITCH TROUBLESHOOTING

When one or more of a unit's functions do not operate properly and there are proximity switches in the circuits of the unit for these functions, refer to the following table as a guide to find the problem(s).

NOTICE

Heil proximity switches have a Light Emitting Diode (LED) on the switch to indicate when the switch is sensing metal. Green indicates the switch is ON. Yellow indicates the switch senses metal. Some proximity switches only have the yellow light.

Proximity Switch Troubleshooting Table				
Probable Cause	Remedy			
Loose or corroded electrical connections.	Replace the electrical connections.			
 Damaged Switch A. Cracked Ferrite core causing the fine internal wire to break. B. Cracked Ferrite core – but wire is not broken – the sensitivity of switch will increase which causes sensing distance to increase or switch work intermittently as the temperature changes. 	 DO NOT strike switch to make it work. DO NOT damage the switch when you adjust it. DO NOT adjust switch too close to the metal it is sensing. 			
Voltage spikes from truck chassis electrical system will break down the internal electronics of the proximity switch.	 Make sure the power source from the chassis manufacturer is clean. The body electrical system is protected from voltage spikes. 			
Improper Sensing Range	Adjust proximity switches to sense metal as follows: PROX. SWITCH METAL 18 MM — MAX. 3/16" SENSING DISTANCE 30 MM — MAX. 3/8" SENSING DISTANCE			
If the controller input light stays on when a switch is unplugged (the signal wire is carrying +12V DC)	Check the proximity switch electrical circuits for the source of the problem.			
If proximity switch LED light is NOT ON.	 Check the fuse relay block (Half/Packs with IFM controllers). The fuse/relay box is located in the cab. Or Check the in-line fuses (Side Loaders with IFM controllers). The in-line fuses are located in the cab. Unplug proximity switch. Check the power wire (terminal C) for +12 VDC with a multimeter. Check ground signal with multi-meter for continuity to chassis ground. Check the signal wire for continuity to appropriate controller input terminal. See Service Manual. If all three (3) wires are good, replace the proximity switch. 			

General Information

PROXIMITY SWITCH TROUBLESHOOTING (CONTINUED)



DECALS ON THE UNIT

Make sure you can read all hazard and instruction decals. Clean decals if you cannot read the words. See, Decal Care, for directions on cleaning decals.

Replace any decal that is damaged, missing, or not readable.

When you replace a part that has a decal, make sure a new decal is installed on the new part. See the Parts and Service Manual for a complete decal kit and individual decals. Order the decal kit and individual decals from your Heil Dealer or from Heil.

DECAL CARE

It is important that the decals are properly cleaned to make sure that they are readable and do not come off the unit. Use the following steps to clean the decals.

A. General Guidelines

Following these guidelines helps the decals adhere longer.

- Wash the decals with a blend of mild car wash detergent and clean water
- Rinse with clean water
- Let the vehicle air-dry or dry with a micro-fiber cloth
- Do not allow fuels to stay in contact with the decal for an extended period of time. Remove the fuel contamination as quickly as possible
- · Do not use carnauba-based wax over the decals
- Do not use a mechanical brush while washing the decals.

B. Pressure Washer Precautions

Pressure washing can cause damage to decals. It can cause the edges of the decals to lift and peel the decal away from the unit. Over time, the decal can fade, crack or chip away.

Use pressure washing only when other cleaning methods are not effective. If you use a pressure washer, use the following precautions.

- Spray nozzle opening: 40° wide pattern
- Spray angle: 65° from vehicle's body (do not use sharp angles this can lift the decals from the unit)
- Distance of nozzle to decal: 38 cm minimum
- Water pressure: <= 5.5 MPa
- Length of time: not more than 30 sec.
- NEVER use a "turbo pressure nozzle".

C.Remove Difficult Debris

When normal cleaning procedures do not remove difficult debris from the decals, try the following:

- Spot clean the decal with Isopropyl Alcohol and a micro-fiber cloth (rag)
- If these methods do not work on a problem area, call a Heil Dealer or Heil Customer Support.

General Information

DECAL CARE (CONTINUED)



INCORRECT TECHNIQUE Figure 6. Incorrect Technique

General Information

HYDRAULIC SYMBOLS


General Information

HYDRAULIC SYMBOLS (CONTINUED)



POWERTRAK® COMMERCIAL

General Information

ELECTRICAL SYMBOLS

SYMBOL DEFINITIONS

цц BATTERY FUSE SOLENOID CONTACT RELAY CR1 CR1 NORMALLY OPEN CONTACT OF CR1 11 NORMALLY CLOSED CONTACT OF CR1 INDICATOR LIGHT (GREEN) PUSH BUTTON SWITCH NORMALLY CLOSED م PUSH BUTTON SWITCH NORMALLY OPEN **TOGGLE SWITCH** DIODE PRESSURE SWITCH 0 LIMIT SWITCH NORMALLY OPEN LIMIT SWITCH NORMALLY CLOSED 000 ЧĤ CAPACITOR

SECTION 2 PUMPS

HYDRAULIC DRIVE CONTROL

There are multiple hydraulic drive configurations that achieve the same goal by utilizing different mechanisms and modes of operation.

A Clutch Shift PTO

Listed in the display as Cab Controller Output, OUT02 p16 – PTO Sol.

1. Not equipped

Applies to Constant Drive PTO or Crankshaft Driven Front Mount Pumps.

Option Config

Clutch Shift PTO, [OFF]

Operation, PTO output is disabled.

2. Without Pump Manifold

Transmission driven PTO utilizing either direct or remote mount hydraulic pump which is not equipped with a solenoidcontrolled manifold.

Option Config

Clutch Shift PTO, W/O Pump Manifold: [ON]

Operation - ON with System Enable, governed by the following EOS parameters:

Maximum Engine Speed for PTO Engagement: 1000 RPM

Maximum Engine Speed for PTO Operation: 1450 RPM

3. With Pump Manifold

Transmission driven PTO utilizing either direct or remote mount hydraulic pump which is equipped with solenoidcontrolled manifold.

Option Config

Clutch Shift PTO, W/Pump Manifold: [ON]

Operation - ON with System Enable, governed by the following EOS parameters:

Maximum Engine Speed for PTO Engagement: 1000 RPM

Maximum Engine Speed for PTO Operation: 2700 RPM

B. Single Pump, Gear or Vane

Applies to all PTO or Crankshaft driven Pumps with solenoid-controlled manifolds or dry valves.

Listed in the display as Cab Controller Output, OUT03 p15 - Pump 1 Sol.

1. Clutch Shift PTO Driven

Option Config

Clutch Shift PTO, W/Pump Manifold [ON]

Operation - ON with PTO Sol. after 500ms delay, governed by the following EOS parameters:

Maximum Engine Speed for PTO Engagement: 1000 RPM

Maximum Engine Speed for PTO Operation: 1450 RPM

Pumps

HYDRAULIC DRIVE CONTROL (CONTINUED)

2. Constant Drive PTO or Crankshaft Driven

Option Config

Clutch Shift PTO, [OFF]

Operation - ON with System Enable, governed by the following EOS parameters:

Maximum Engine Speed for PTO Engagement: 1000 RPM

C. Tandem Vane Pump

Applies to Operate at Idle, PTO or Crankshaft driven Tandem Pumps. Listed in the display as Cab Controller Output, OUT03 p15 - Pump 1 Sol. And OUT04 p14 - Pump 2 Sol.

1. Clutch Shift PTO Driven

Option Config

Clutch Shift PTO, W/Pump Manifold: [ON]

Operate at Idle: [ON] Arrow Right to adjust the Pump 1 Pressure Limit

Operation

Pump 1 is **ON** with the following:

PTO Sol. on for 500ms delay

AND main body pressure below Pump 1 Pressure Limit setpoint

AND Throttle Advance Switch OR Slide Activated, governed by the following EOS parameters:

Maximum Engine Speed for PTO Engagement: 1000 RPM

Maximum Engine Speed for PTO Operation: 1000 RPM

Pump 2 is ON with PTO Sol. after 500ms delay, governed by the following EOS parameters:

Maximum Engine Speed for PTO Engagement: 1800 RPM

Maximum Engine Speed for PTO Operation: 2000 RPM

2. Constant Drive PTO or Crankshaft Driven

Option Config

Clutch Shift PTO, [OFF]

Operate at Idle: [ON]

Operation

Pump 1 is **ON** with the following:

System Enable

AND main body pressure below Pump 1 Pressure Limit setpoint

AND Throttle Advance Switch OR Slide Activated, governed by the following EOS parameters:

Maximum Engine Speed for PTO Engagement: 1000 RPM

Maximum Engine Speed for PTO Operation: 1000 RPM

Pump 2 is ON with PTO Sol. after 500ms delay, governed by the following EOS parameters:

Maximum Engine Speed for PTO Engagement: 1800 RPM

Maximum Engine Speed for PTO Operation: 2000 RPM

TANDEM O.I.G.A.I. PUMP

A. Tandem Pump Design (Pre 2022)

Note: This design is still available, however it is not frequently installed. See figure below.



Figure 7.

A. Tandem Pump Design (Pre 2022) (CONTINUED)

The pump section (pump 1), closest to the input shaft operates the lift and shuts OFF first. The pump section (pump 2), farthest from the input shaft operates the packer and stays on at higher RPMs.

Note: The option will vary based on the vendor pump logic. See figures below.







Figure 9. Option Two.

Pumps

TANDEM O.I.G.A.I. PUMP (CONTINUED)

B. Tandem Pump Design (Post 2022)

Note: This design is commonly found on units manufactured after 2022.

In these systems, pump section P1 is closest to the pump shaft, while pump section P2 is the farthest from it. Both pump outlets are connected for combined flow, utilizing check valves to prevent backflow. All functions can operate with either P1 alone, P2 alone, or a combination of both P1 and P2. The low-torque pressure switch installed on P1 may occasionally be replaced by a pressure transducer installed on the underbody valve inlet.



Figure 10. Tandem Pump with Monobloc.

Figure 11. Pump Relief Valve.



Figure 12. Dual Vane Pump Monobloc Schematic.

TANDEM VANE PUMP O.I.G.A.I. HYDRAULIC SYSTEM TROUBLESHOOTING

The Operate-in-Gear-at-Idle (OIGAI) system is designed to perform the all operations at standard idle speed. It is comprised of three major components: the monoblock, tandem vane pump and PTO.

For this system, P1, or the front section (closest to the pump input shaft), and P2, or rear section (farthest from the input shaft) flows are combined using two (2) check valves preventing back flow. This means, either pump section or the combination of both pump sections can operate all body and tailgate functions.

A Troubleshooting

Some symptoms of a problem in the pump circuit could be no operation or slow operation.

A malfunction of one pump's section will affect specific speed and cycle times of the most demanding functions of the truck, or completely not work. For instance, the packer will work slowly, but the tipper will work correctly. Another example is the ejector extend will be slow but retract will be fine. However, even though it is possible for both sections to fail, in the case of no function on both sections, problems might be electrical or the PTO.

There are four primary causes for the pump circuit to not operate properly:

- Low or no voltage to the unloader valve coil.
- Malfunction in the manifold assembly.
- Internal problem with the pump.
- PTO slippage or not engaging.

Perform the following test after finding that there is insufficient or no flow to the loader and/or body valves.

NOTICE

Coil activation will vary depending on the working conditions.

Conditions for testing:

PUMP CONTROL MANIFOLD	SV4 - P2 PUMP ACTIVATION	SV2 - P2 PUMP ACTIVATION
Idle + System Enabled	OFF	ON
ldle + System Enabled + Throttle Advance Switch ON	ON	ON
Idle + System Enabled + Slide Activate + Pressure < Set pressure*	ON	ON
Idle + System Enabled + Slide Activate + Pressure > Set Pressure*	OFF	ON
Engine > 1000 RPM + System Enabled + Slide Activate	OFF	ON
Engine > 2000 RPM + System Enabled + Slide Activate	OFF	OFF

* The set pressure is either adjusted via the pressure switch installed on the manifold **OR** thru the Option Config at screen on the display if a transducer is installed on the underbody valve inlet.

1. With the system turned on and the engine operating at idle, test the voltage at the coils according to the condition chart above. It should read a minimum of 10 VDC. If proper voltage is present and the problem persists, proceed to step 2. If the voltage is below 10 VDC, check the electrical system for problems that can cause a drop or loss of voltage. Some examples are a broken or shorted wire, blown fuse, etc.

- a. If the voltage reads 0 V, make sure all conditions are met to activate the pump. For Example, side door interlock switch, low oil level switch, RPM reading, etc.
- 2. Use an ohm meter to check resistance in the coil. If the measurement is less than 5 ohms, or more than 20, then the coil is damaged. If the coil is damaged, replace the coil.
- 3. Eliminate all cartridge valves from the pump manifold circuit; unfortunately, on those pump manifold, limited options exist for forcing the fluid out of the pump.
 - a. For testing the P2 section of the pump, cap the manifold drain hose. This will force out the oil of P2 by overriding the solenoid valve AND the relief valve.
 - b. Next, for the P1 section replace the Solenoid cartridge valve SV4 AND the relief with long cavity plugs, **031-6650-101**.
- 4. If the first 3 tests are not positive, refer to the Power Take-Off 41 section for additional troubleshooting steps.
- 5. Restart the truck and test its functions. If the functions return to normal operation (speed and pressure within specifications), replace or repair the necessary parts.

POWER TAKE-OFF FAMILIES

We use three different Power Take-Off (PTO) families to drive the hydraulic pumps at Heil.

A Engine Driven PTO

Commonly called FEPTO. We use a crankshaft adapter then install a driveline and mount the pump in front of the engine.

B. Constant Drive Transmission Mount PTO

This PTO is driven by transmission interface gears and will provide power to the pump once the engine is running. They do not contain electrical, hydraulics, or a clutch.

C. Clutch Shift Transmission Mount PTO

This is PTO is driven by transmission interface gear and will provide power to the pump once the engine is running, the PTO solenoid is activated with 12V, and it's internal clutch is engaged.

PUMP TYPES

Constant Drive and Clutch Shift Transmission Mount PTO families can be found in three different pump types.

A. Direct Mount Pump

This is a very compact system and pump options are limited. The pump installed directly on the PTO flange has to be relatively small. See "Direct Mount Pump" image.



Figure 13. Direct Mount Pump.

B. Remote Mount Pump

This installation is more complex but offers greater flexibility and better pump options. The PTO and pump are not directly connected; instead, a driveline transfers power from the PTO to the pump that is remotely mounted with a separate bracket. See "Remote Mount Pump" image.



Figure 14. Remote Mount Pump.

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PUMP TYPES (CONTINUED)

C. Extended Shaft PTO

This PTO integrates direct-mount and remote-mount pump capabilities. Its built-in driveshaft allows for mounting a pump further from the PTO unit, creating space for a larger pump and manifold system.



Figure 15. Extended Shaft PTO.

PTO TROUBLESHOOTING

The following troubleshooting steps are used when the driveline is not equipped or not visible so outside testing must be performed to test if the pump is turning (ex., Clutch Shift Direct Mount or Extended Shaft). The Remote Mount Pump does not require a specific test because the driveline is visible from the outside.

A Check Voltage at the PTO Solenoid

Heil units have a solenoid valve attached to the drive unit. Once this solenoid is activated, it provides transmission oil pressure to the piston and engages the PTO clutches. See "PTO Pressure Switch" image.

1. Reading should be over 10V with the PUMP SWITCH ON and ENGINE RUNNING

NOTICE

On newer units, keep the solenoid connected and back-probe the connector. If the connector is undone, the controller will see an "Open Loop" condition (wire break) causing it to self-protect and shut-down the output.

B. Check Coil Resistance

Unplug the coil connector and measure resistance in Ohms. See "PTO Pressure Switch" image.

1. Coil resistance should be 8 ohm +/- 20%

C. PTO Pressure Switch Function

Only complete the following check if a PTO pressure switch is installed on the assembly. See "PTO Pressure Switch" image.

- 1. This is normally an open switch. Which means, when the transmission oil pressure reaches the pressure set-point (via the solenoid activation) it will close it's contact and allow it to send a signal to the controller
 - a. The PTO pressure switch is correctly activated when the blue wire switches to ground

NOTICE

On newer units, keep the switch connected and back-probe the connector. If the connector is disconnected, the controller will see and "Open Loop" condition when it is expecting signal feedback. Also, the in-cab display may show a warning when unplugging the switch.



Figure 16. PTO Pressure Switch.

D. Transmission Pressure Check

This is a multi-step process and each step of the following process will guide you through the failure mode.

- 1. Install a 500 PSI pressure gauge to the feed line between the transmission port and the PTO. See "Transmission Pressure Feed to PTO" image.
 - a. Tee-in the so the PTO will not engage
 - b. Start the unit and let the engine run at idle
 - (1) Expected Pressure:
 - (a) Pump OFF = 170 230 PSI
 - (b) Pump ON = 220 300 PSI



Figure 17. Transmission Pressure Feed to PTO.

- 2. If pressure is the same pump OFF vs pump ON, there may be a missing wire or TCM not configured correctly
- 3. If pressure difference is greater than 40 PSI, there is an internal leak such as:
 - a. Solenoid valve bypassing to sump
 - b. Clutch piston seal bypassing to sump
- 4. If pressure with pump OFF is lower than specifications, it's possible:
 - a. the Solenoid valve is bypassing to sump
 - b. there is a Transmission pressure problem (if so, follow the next step)
 - (1) Install a pressure gauge directly on the transmission port. See "Transmission Pressure Measurement" image.
 - (2) Check to see if the pressure is within the specifications provided above



Figure 18. Transmission Pressure Measurement.

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E. Clutch Slippage Test

Applies to the Chelsea 890 PTO only. See "Clutch Slippage Test" image.

- 1. Only the Chelsea 890 PTO has the clutch housing separated from the drive unit
- 2. Before testing, the unit **MUST** be completely cooled down to **room temperature**
- Using an infrared thermometer, measure the temperature by aiming the thermometer at the drive unit and clutch housing
 a. Take note of the reading and the exact location where the laser was pointing
- 4. Start the truck, turn the pump ON and deadhead a hydraulic function for a minimum of **five minutes** (For Odyssey models, deadhead the tailgate lock)
- 5. Shutdown the engine then take the same measurements and note the results as described in Line 3
 - a. If the clutch housing is much hotter than the drive unit, most likely the PTO clutches are slipping
 - (1) Clutch housing temperature will depend on the transmission temperature
 - (2) Example, 10F on a 300F reading is not a concern, however, 10F on a 100F reading is a concern



Figure 19. Clutch Slippage Test.

POWERTRAK[®] COMMERCIAL NOTES

SECTION 3 BODY AND TAILGATE

SPECIFICATIONS

A. Body

Hydraulic Oil Tank	40.6 Gal.
Hydraulic Oil System Capacity	Gal.
Hydraulic In-Tank Oil Filter (Units thru June 2004)	
Hydraulic In-Tank Oil Filter (Units July 2004 & After)	5-Micron
Hydraulic In-Tank Oil Filter (Units after May 2006)	
Hydraulic Tank Suction Strainer	140 Mesh Screen
Hydraulic Cylinders:	
Ejector;	
18 yd	
20 yd	
25 yd	
27 yd	
32 yd	5 Stages 7" Bore x 173.6" Stroke
Main System Relief Valve Pressure	
Ejector Relief Valve;	
Pump Pressure Relief (Valve "B")	
Outside Cylinder Rod End Relief (Valve "C")	

B. Tailgate

Hydraulic Cylinders:	
Sweep (lower panel)	5-1/2" Bore x 24" Stroke
Slide	5" Bore x 34.8" Stroke
Tailgate Raise	
Container Arm	
Roll Bar	
Reeving	
Tailgate Valve:	
Sweep (Lower Panel) Detent	
Sweep Back-Off Relief	
Optional Mechanism (Winch, Roll Bar)	
Upper Panel Detent – Mechanical Both Ways	
Tailgate Packer Mechanism Cycle Times (Empty Hopper);	
Complete Cycle	
Reload	

NOMENCLATURE





TAILGATE VALVE

The packing mechanism is controlled by two levers at the right rear corner of the tailgate. These levers control the upper panel and the lower panel. Refer to the operator's manual for correct operation of these two levers. The upper and lower panel functions can be operated independently by engaging one lever at a time.

ALTERNATOR "R" STATOR TERMINAL CORROSION PROTECTION

The "R" stator terminal on alternators can become corroded which is caused by oxygen in the atmosphere combining with impurities on the surface of the exposed conductor. This corrosion can interfere with the alternator's RPM signal which adversely affects the EOS (electronic overspeed switch) performance. To prevent corrosion, apply a sealant to the terminal to prevent oxygen in the atmosphere from coming in contact with the conductor. There are two main types of connections on the "R" stator terminal and each one requires a different sealant. See Figure below. Location of "R" Stator Terminal.

- 1. 3/8" female stud type connector Use Dipit as a sealant.
- 2. Molded pin plug Use antioxidant grease as a sealant.



Figure 21. Location of "R" Stator Terminal

AIR SUPPLY KITS PNEUMATIC DIAGRAMS



Figure 22. Air Supply Kits Pneumatic Diagram

Body and Tailgate

PO CHECK/DUMP COMBINATION AND TAILGATE CONTROLS VALVES

Shown below are the po check/dump combination and tailgate control valves.



Figure 23. Control Valves Viewed from Tailgate Looking Up

AUXILIARY VALVE SECTIONS



Figure 24. Clean Areas for Auxiliary Valve Sections

Body and Tailgate

TAILGATE SUPPORT PROPS



TURNBUCKLE CLAMPS / ACCESS COVER

Turnbuckle clamps are located on both sides of the unit and are used to keep the tailgate locked to the body. These clamps should never be opened (unscrewed) unless servicing the unit or before emptying the body, to be able to raise the tailgate.



Figure 26. Location of Access Cover and Turnbuckle Clamps

WELDING AND ELECTRONIC DEVICES / ELECTRICAL LUBRICANTS

Before welding on any unit with electronic devices like the Mobile Controller, electronic control units (ECUs), and proximity switches complete the following procedures.

Never weld on a compressed natural gas vehicle unless the compressed natural gas fuel system has been purged with inert gas. See Service Manual Section 1.

- Disconnect all battery connections.
- Place welding ground as close as possible to the area that is being repaired.
- Disconnect the Mobile Controller and all other electronic control units (ECUs).
- If welding within 24 inches of a proximity switch, remove the switch from the unit.

NOTICE

Failure to follow these procedures may cause damage to the devices. The damage comes from the inability of the devices to withstand the amperage, open circuit voltage and magnetic flux a welder can produce.

Electrical Anti-Corrosion Lubricant

It is very important that all Packard connectors are properly lubricated. The following compounds, by brand name, or functional equivalents, are approved for use.

- Truck-Lite Corrosion Preventive Compound
- GB ox-gard, anti-oxidant compound
- Burndy Penetrox A electrical joint compound.

These lubricants may be obtained at an electrical supply store.

POWERTRAK[®] COMMERCIAL NOTES

SECTION 4 MAINTENANCE AND ADJUSTMENT

BODY DAILY CHECKLIST

Make sure you perform a daily check of the unit. Refer to the Operator's Manual for the Daily Checklist. Many checks in the Daily Checklist are maintenance related, such as checking tire pressures and hoses for wear and damage.

DAILY CHECKLIST MAINTENANCE ITEMS				
ltem	Required Action			
Low air pressure in tires	Inflate the tire to the correct air pressure given on the tire.			
Worn tire	Replace when the wear is greater than allowed by law or before the tread is no longer visible.			
Damaged tire	Replace immediately BEFORE going on route.			
Hydraulic pump leaks	Determine the cause of the leak and repair immediately.			
Damaged hydraulic pump	Repair or replace IMMEDIATELY.			
Loose or missing hardware for the hydraulic pump	Tighten loose hardware. Replace missing hardware immediately.			
Damaged decal or decal not readable	Replace decal immediately.			
Low level of hydraulic oil	Fill the hydraulic oil tank immediately.			
Worn or damaged hoses	Replace immediately.			
Leaks at cylinders, hoses or fittings	Tighten loose connection.			
Loose or missing hardware	Tighten loose connections. Replace missing hardware.			
Worn fiber guards	Replace hoses/fittings as necessary. Install new fiber guard on new hoses.			
Worn or damaged tailgate lock components	Replace worn or damaged components.			
Loose or missing tailgate lock hardware	Tighten loose hardware. Replace missing hardware.			
Damaged tailgate seal	Replace seal.			
Body structure, lift arms, and/or attaching components have loose or missing hardware	Tighten loose hardware. Replace missing hardware.			
Body structure, lift arms, and/or attaching components have cracked weld joints	Repair immediately.			
Body mounting brackets have loose hardware, damaged hardware or cracked welds	Tighten loose hardware. Replace missing hardware. Repair cracked welds.			
Hopper liner (when equipped)	Inspect welds. Repair cracked welds. Check for damage or excessive wear. Replace as necessary.			
Air regulator	90 PSI, typically located street side in the cab behind the seat			
Operation	Operate All Functions to make sure all functions work correctly.			

BODY PREVENTIVE MAINTENANCE CHART

Preventive maintenance must be performed to ensure the safe and reliable operation of your unit. Use the chart below as a guideline for when essential items should checked and serviced. Severe use or adverse conditions may require more frequent maintenance.

BODY PREVENTIVE MAINTENANCE CHART						
*HOURS OF OPERATION						
COMPONENT/SYSTEM	8	40	200	1000	2000	CHECK/SERVICE
Hydraulic System						Check oil level – add if necessary
						Check cylinders, pump, hoses, tubes, fittings, and adapters for leaks. Check hoses for cracks, crushes, and cover blisters. Repair or replace if necessary with genuine Heil parts. Any replacement hose should be the same size and pressure rating as listed on the original OEM hose.
						Check Control valve seals for leaks. Repair or replace if necessary.
						Replace filter after first 30 days of operation, then every 6 months or 1000 hours of operation OR when filter bypass light is ON.
						Replace tank breather filter every time you replace filter element.
						Drain, flush, and refill. Change filter element. Change oil when oil sample shows to change oil.
Electrical, Battery Cables	A					Check for proper operation.
						Check battery cables from battery to starter for loose cables, rubbing or damage and abrasions to cables. Replace if necessary.
Operator Controls						
Front Mount Pump or Power Take- Off (PTO)						Check seals for leaks and operation. Replace if necessary
						Check drive line for smooth operation. Replace as necessary.
						Check set screws for tightness. Tighten as necessary.
						Make sure keys are in place. Replace if necessary.
						For greaseable PTOs (non-wet spline), remove the pump's bolt flange about 2 inches from the PTO and apply grease

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BODY PREVENTIVE MAINTENANCE CHART						
*HOURS OF OPERATION						
COMPONENT/SYSTEM	8	40	200	1000	2000	CHECK/SERVICE
						to female pilot of PTO pump flange. Failure to lubricate female pilot of PTO as given may cause damage to the pump shaft. Greasing is NOT required on wet spline PTOs such as the Chelsea 890/897 series.
Grease Fittings						Lubricate as shown on Body Lube Chart.
Body Undercoating						Inspect body undercoating and repair as necessary.
Tailgate Seal Integrity						
Packer/Ejector Cylinder Preventive Maintenance						See Packer/Ejector Cylinder Preventive Maintenance.
PTO/Transmission Interface Inspection						Check the torque on the PTO mounting screws and tighten to the proper torque specification
Slide assembly						Clean refuse from the slide assembly hydraulic components
* Daily = 8 hrs. Weekly = 40 hrs. Monthly = 200 hrs. 6 Months = 1000 hrs. Yearly = 2000 hrs.						

PTO INSPECTION AND PREVENTIVE MAINTENANCE

Due to normal torsional vibrations of transmission mounted Power Take-Offs (PTOs), it is important that Service Technicians include the PTO/transmission interface in their standard inspection and maintenance schedules. If a PTO Inspection and Preventive Maintenance schedule is not followed, it is possible that the PTO mounting screws can come loose, resulting in transmission fluid leaks between the PTO and transmission and potential damage to the PTO or drive train

1. ACTIONS

The tools and materials necessary to perform the Inspection/Preventive Maintenance are shown in **Table below**.

ltem	Part Number	Application	
Personal Protective Equipment	Commercially available	Safety protection as required by employer	
Wrench/Socket Set	Commercially available	To tighten PTO mounting 10mm 12 pt. head screw s	
Torque Wrench	Commercially available	To properly tighten PTO mounting screw s	
Marker	Commercially available	To make w itness marks on the PTO mounting flange	

Table. Tools and Materials

With the unit in LockOut/TagOut mode with the hydraulic pressure relieved, carefully follow the steps below.

- A. PTO/Transmission Interface Inspection/Preventive Maintenance (MONTHLY/200 HOURS OF OPERATION)
- (1) Inspect for transmission fluid leaking from the PTO/transmission interface. Thoroughly clean around this area.
- (2) Using a torque wrench, check the PTO mounting screws. If they are set less than 45 FT-LBS, tighten to 45 FT-LBS.
- (3) Using an oil-resistant marker, add a witness mark on each screw head and across the PTO mounting flange. For future inspections, this will help identify if the PTO mounting screws loosen over time. See Figure below.



Witness Marks on PTO Mounting Screws and Flange

- (4) Take the unit out of Lock-Out/Tag-Out mode and operate unit functions.
- (5) Check for transmission fluid leaks around the PTO/transmission interface. If there are leaks, contact Technical Services.
- (6) When there are no transmission fluid leaks, place the unit back into service.

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PACKER/EJECTOR CYLINDERS PREVENTIVE MAINTENANCE

It is critical to follow the guidelines of the **Body Preventive Maintenance Chart** and **Body Lubrication Guide** found in this section of this Service Manual and the Body Lubrication Guide decal on the unit. Failure to follow stated routine preventive maintenance can lead to premature cylinder failure that is not covered by your warranty.

Make sure that the unit is in Lock-Out/Tag-Out mode before you perform maintenance/service procedures, or when you enter or climb on the hopper/body/related assemblies. Equipment is operational when the unit is not in Lock-Out/Tag-Out mode. Equipment operated while you do maintenance or service procedures can cause serious injury or death so also make sure to clear the area around the unit of all bystanders.

Failure to follow these instructions can result in damage to the Heil body, truck chassis or can cause personal injury!

HEIL PACKER/EJECTOR CYLINDERS PREVENTIVE MAINTENANCE CHART

DAILY	WEEKLY
 Using a shovel, clean behind the packer panel and pockets around sphericals. DO NOT damage cylinder rods by striking with any metal object. 	 Grease Packer/Ejector cylinder spherical bearings/pins Inspect packer/ejector cylinder bearings/pins (both ends) for wear, rust or damage and replace if necessary.
 Visually inspect that lube lines (if equipped) are connected and not damaged or leaking. 	, , , , , , , , , , , , , , , , , , , ,
 Visually inspect packer tracks and hopper floor for excessive wear or damage. Repair or replace if necessary. 	

Side Loading and Premature Cylinder Failure can be caused by:

- Inadequate greasing intervals
 - o causing increased friction at spherical bearings
 - o potentially resulting in seizing of spherical bearings
- Packing into the second stage of a multistage cylinder (Non-Rear Loader)
- Binding of components caused by debris

BODY LUBRICATION GUIDE

Clean fittings before applying grease and always pump enough grease into joint to remove the old grease. Wipe off excess grease. Lubricate moveable mechanical parts without fittings every 60 days with non-detergent engine oil.



Figure 27. Lubrication Guide

REF NO.	DESCRIPTION	QTY.	FREQUENCY
1	Tailgate Hinge	2	Weekly/Every 40 Hours
2	Tailgate Raise Cylinder (Both Ends)	4	Weekly/Every 40 Hours
	Control Handles/Linkage;		Weekly/Every 40 Hours
	A. Upper Bellcranks	3	Weekly/Every 40 Hours
3	B. Kick-Out Lever	1	Weekly/Every 40 Hours
	C. Lower Yoke Assembly	2	Weekly/Every 40 Hours
	D. Control Handle Pivots	2	Weekly/Every 40 Hours
	PTO (Pump) Drive Line	4	Weekly/Every 40 Hours
4	Front Mount Pump Drive Line	3	Weekly/Every 40 Hours
5	Tailgate Turnbuckle Clamps	2	Weekly/Every 40 Hours
6	Ejector Cylinder	2	Weekly/Every 40 Hours
	Optional Mechanism Levers/Linkage;		Weekly/Every 40 Hours
7	A. Lever	1	Weekly/Every 40 Hours
	B. Yoke	1	Weekly/Every 40 Hours
_	Optional Mechanisms; (Not Shown)		Weekly/Every 40 Hours
8	A. Roll Bar – Pins	6	Weekly/Every 40 Hours
	B. Reeving – Pins	6	Weekly/Every 40 Hours
9	Tailgate Wear Bars/Slide Tracks		Brush Weekly/Every 40 Hours
10	Ejector Tracks		Brush Weekly/Every 40 Hours
11	Tailgate Latch Bolts (Not Shown)		Every 60 Days
12	Access Door Hinges (Not Shown)		Every 60 Days

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COLD WEATHER WARM-UP PROCEDURE

When ambient air temperature is cold (below 0 degrees F), it is necessary to warm up the unit's hydraulic oil before you start your daily route operation or to check the oil level. The hydraulic oil is sufficiently warmed when the temperature is between 120° and 160°F.

Moving parts on the unit are dangerous. Serious injury or death can occur if a person is struck by the equipment. Clear all people from the area before you operate the unit.

Follow the steps below to warm up the hydraulic oil.

- 1. START the TRUCK and let the engine idle.
- 2. APPLY the PARKING BRAKE and make sure it holds.
- 3. ENGAGE the HYDRAULIC PUMP for approximately five minutes.
- 4. MAKE SURE the AREA IS CLEAR of all unnecessary people BEFORE you operate the controls.
- 5. OPERATE the PACKER functions through ten (10) cycles while the engine idles. See the Operator's Manual for operation instructions.
- 6. Make sure the oil temperature on the site gauge is between 120° and 160°F. If not, repeat step 5.
- 7. Check for fluid leaks. Repair if necessary.
- 8. The unit is now ready to go on route.

PREPARING THE UNIT TO CHECK THE OIL LEVEL

Before checking the oil level or adding oil, make sure the unit is in the following position with all cylinders collapsed:

- Truck on level ground
- Tailgate and Body fully down and locked
- Ejector Panel at the front of the body
- Packer Panel in the in-transit position with all cylinders retracted
- Reeving Cylinder Fully Retracted

The oil tank is mounted behind the chassis cab. The oil level in the standard tank must be kept between the low and full marks as indicated on the sight gauge. See the figure below.





Figure 28. Hydraulic Oil Tank and Sight Gauge

CHECK OIL LEVEL

Check the hydraulic oil level (after warning up the oil) daily or every eight (8) hours, whichever comes first. Fill as necessary.

<u>Important</u>: Contamination is a hydraulic system's worst enemy. Do not let dirt enter the system. Use a clean rag and remove dirt or other contamination around any system component before you disconnect or remove it. While you fill the reservoir, filter the oil through a 200 mesh (or finer) screen. Never use a cloth to filter the oil.

WHEN TO CHANGE OIL FILTER ELEMENT

Change the filter more often under certain conditions such as an extremely dusty atmosphere or area. Use only Heil replacement filters. Purchase the filter element from your local Heil distributor.

Change the filter element when oil analysis shows the oil has expired.

CHANGE HYDRAULIC OIL FILTER ELEMENT

Watch the Service Shack Video online at www.Heil.com/Heil-Service-Shack and selecting Changing Filters.

Replace the hydraulic filter element after first 30 days of operation, then every 6 months or 1000 hours of operation OR when filter bypass light is **ON**. To change the hydraulic oil filter, refer to the figure below and follow these steps:

- 1. Using a 1/2" wrench, remove the four (4) nuts from the filter cover located on the hydraulic oil tank.
- 2. Set the nuts aside for reuse and then remove the filter cover.
- 3. Remove the filter element with the by-pass assembly and responsibly discard as required.
- 4. Clean the housing with a clean, lint-free cloth.
- 5. Check the o-ring and gasket. Replace them if necessary.
- 6. Lubricate all o-rings and gaskets.
- 7. Install new element.
- 8. Reinstall cover with nuts. Torque nuts to 13 ft-lbs.
- 9. Verify work completed. Refer to the **Filter Bypass Reset** [113] procedure.



Figure 29. Hydraulic Oil Filter
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DRAIN AND CLEAN THE HYDRAULIC OIL TANK

Change the hydraulic oil according to the applicable service intervals.

Remember that almost all hydraulic system malfunctions can be traced to dirt in the fluid. When working with the hydraulic system, the hands, tools, working area and parts must be as clean as possible.

Wear proper eye protection when you are working on or around hydraulic lines or components. Wear proper eye protection and avoid contact with hydraulic oil if possible. Never check for oil leaks with your hands.

Make sure the unit is in the Lock-Out/Tag-Out mode when you do maintenance or service procedures, or when you go in the hopper, climb in or on the body or on equipment. Equipment can be operated when the unit is not in the Lock-Out/Tag-Out mode. When the unit is not in the Lock-Out/Tag-Out mode, equipment operated while you do maintenance or service procedures, go in the hopper or climb in or on the body or on equipment can cause serious injury or death.

NOTICE

If your employer or company has a Lock-Out/Tag-Out procedure that is different from the following procedure, use your employer's or company's procedure. If your employer or company does not have a Lock-Out/Tag-Out procedure, use the procedure that follows.

To drain and clean the hydraulic oil tank, follow these steps:

- 1. Perform the **Lock Out/Tag Out procedures** 14. If you have any questions about the Lock-Out/Tag-Out procedure, please contact your supervisor or **ESG Technical Service**.
- 2. Disengage the pump, shut off the engine and remove the ignition key.
- 3. Remove the fill cap from the top of the tank.
- 4. Remove the drain plug from the bottom of the tank so that the oil drains into a container.
- 5. While fluid is draining from the tank, remove and replace the filter/breather assembly. Change the assembly every time the in-tank filter is replaced.
- 6. To drain the entire hydraulic system, disconnect all hoses at the adapter and drain the hoses into a container.
- 7. Remove and replace the in-tank filter as described in Change Hydraulic Oil Filter.
- 8. Remove the outlet flange and 100 mesh suction strainer to gain access to the tank inside.
- 9. Remove sediment from the tank bottom.
- 10. Install the outlet flange with a new gasket and the 100 mesh suction strainer into the tank.
- 11. Install the drain plug in the tank bottom.
- 12. Reconnect and tighten all hose connections that were disconnected.

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DRAIN AND CLEAN THE HYDRAULIC OIL TANK (CONTINUED)

NOTICE

Before filling the tank be sure the funnel is clean and 200 mesh (or finer) screen is used to strain the hydraulic oil.

- 13. Fill tank with recommended oil, checking the sight gauge as you fill. Refer to Hydraulic Oil Specifications 16.
- 14. Check the entire system to make sure all connections are tight and no leaks are found.

15. Start the truck's engine and engage the pump.

Moving equipment can be dangerous to bystanders. Serious injury or death can occur if a person is in the wrong area or is not attentive to the operations. Clear the area of all unnecessary people before you operate the controls.

- 16. Operate the packing panel through 10 cycles to be sure all air is out of the circuits.
- 17. Operate the automated container lift mechanism.
- 18. Operate tailgate full up and full down.
- 19. Operate body raise (dump units) full up and full down.
- 20. With the packing panel in the retracted position and lift in the in-transit position, check tank oil level. If necessary, add recommended oil as described under **Check Oil Level**

PURGE THE HYDRAULIC SYSTEM

If a catastrophic hydraulic component failure occurs, the hydraulic system must be flushed entirely

Remove the in-tank filter assembly cover and inspect the return oil filter and magnets to identify a catastrophic component failure. If the return filter has metal debris or the magnets are full of shavings, perform a complete hydraulic system flush to prevent future failures due to oil contamination.

To purge the system, follow these steps:

- 1. Completely retract all cylinders to remove as much oil as possible, directing it into the hydraulic reservoir.
- 2. Completely drain the hydraulic reservoir and discard the in-tank filter.
- 3. Remove all debris from the filter magnet of the unit's in-tank filter assembly.
- 4. Remove the hydraulic reservoir outlet flange and suction strainer.
- 5. Clean the hydraulic reservoir by removing all dirt and debris from the bottom of the tank. Rinse and clean the tank with a nonflammable cleaning solvent.
- 6. Remove, thoroughly clean, and reinstall the suction strainer, outlet flange, drain plug, system magnets, etc.
- 7. Reassemble the in-tank return filter assembly using a new OEM replacement filter
- 8. Remove the suction line from the pump and thoroughly clean the entire length of the inside of the suction line from the pump to the connection at the hydraulic reservoir.
- Half/Pack Only Remove both ends of the packing circuit's dump valve return line routed between the dump valve and hydraulic reservoir. Thoroughly clean the entire length of the return line between the dump valve and the hydraulic reservoir.
- 10. Replace the failed hydraulic component that has introduced the contamination into the system.

NOTICE

Before filling the tank be sure the funnel is clean and 200 mesh (or finer) screen is used to strain the hydraulic oil.

Maintenance and Adjustment

PURGE THE HYDRAULIC SYSTEM (CONTINUED)

- 11. Fill the hydraulic reservoir with clean hydraulic oil
- 12. Make sure the suction line shut-off valve is in the on position. Secure the handle with a plastic zip tie to prevent the valve from closing due to vibration or being inadvertently closed.
- 13. Double-check the routing of all lines and verify that all fittings, flanges, and covers are properly installed and tight.
- 14. Start the vehicle and turn the pump on.
- 15. Run each hydraulic function at engine idle "only." Operate each hydraulic function through one complete cycle to flush any residual contaminated oil from hydraulic cylinders. A complete cycle consists of operating a cylinder to its full extended position and retracting it to the completely collapsed position.
- 16. After cycling the cylinders as described, remove the filter cover and inspect the filter magnets. If the magnets are covered with metal, replace the filter element, clean the magnets, and reinstall the filter cover.
- 17. Operate each hydraulic function through a complete cycle at least ten times at engine idle.
- 18. Remove the filter cover and inspect the magnets. If the magnets are clean, proceed to step 21. If the magnets are covered with metal, repeat steps 18 through 20.
- 19. At engine throttle, operate each hydraulic function (except the packer) through a complete cycle at least ten times. Operate the packer to the full eject position at engine throttle and back at engine idle.
- 20. Install a new OEM in-tank hydraulic filter and reinstall the filter cover.
- 21. Check the hydraulic system for leaks.
- 22. Run the unit for 40 hours and recheck the hydraulic filter and system magnets for debris. Service the hydraulic filter and magnets as needed.

NOTICE

Extra magnets may be placed inside the hydraulic reservoir to accelerate the removal of metal particles.

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TAILGATE VALVE PRESSURE SETTINGS

The tailgate valve has some pressure settings that are adjustable. All valve pressure adjustments should be made with the engine running at the normal operating speed for the function that is being adjusted. Not all miniscule steps are listed below, only the main action steps are called out to simplify the procedure. Common sense must be used during the minor steps such as shutting off the pump to connect and disconnect a hydraulic pressure gauge, unlocking and locking an adjusting screw with a jam nut, reading the pressure gauge, bottoming out (deadheading) a function, etc. Generally, hydraulic pressures are increased by turning the pressure adjusting screw clockwise or decreased by turning the pressure adjusting screw counterclockwise. Follow the steps below to adjust the pressures.

NOTICE

Always place unit in Lock-Out/Tag-Out mode before starting any service or maintenance procedure.

A. Adjust the Lower Panel Hydraulic Detent

1. Connect an accurate 0-5000 PSI liquid filled pressure gauge to the gauge port quick disconnect fitting used to check the main system pressure. Adjust the lower panel hydraulic detent.

NOTICE

All mechanical linkages must be free of any binding.

2. Lower the main relief pressure by turning the main relief adjusting screw out (counter clockwise) 4 turns.

Stand clear when packing mechanism is in motion.

- 3. With the engine and pump "on" place the upper panel to the fully out position.
- 4. Move the lower panel control lever to shift the spool in either direction. The lower panel will travel to the end of the stroke but will not release the dent and shift to the neutral position.
- 5. Slowly turn the main relief valve adjusting screw in (clockwise) to increase the pressure. Watch the pressure gauge to see what the pressure is when the spool kicks out of dent and returns to the neutral position. The correct kick-out pressure for the lower panel is 2350 +/-50 PSI.

A DANGER

Do not stand in the hopper or on the hopper sill while adjustments are being made on the packing mechanism with the machine running.

- 6. If the setting is incorrect, place the unit in the lockout position and remove the rubber plug from the end of the upper panel spool to expose the dent release adjusting screw.
- 7. Insert a screwdriver and turn the dent adjusting screw in (clockwise) to increase the kick-out pressure or out (counterclockwise) to decrease the pressure.

NOTICE

Be careful not to force the adjusting screw or it may deform the internal adjusting rod and make the valve inoperative.

8. Repeat steps (2) through (5) to check the results.

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Maintenance and Adjustment

TAILGATE VALVE PRESSURE SETTINGS (CONTINUED)



Figure 30. Hydraulic Detent

B. Adjust the Upper Panel Hydraulic Detent

NOTICE

The upper panel has a hydraulic detent for down set @ 2400 PSI and mechanical detent for the up function and is adjusted mechanically. (See Upper Panel Kick-out Adjustment Procedures).

NOTICE

All mechanical linkages must be free of any binding.

1. Lower the main relief pressure by turning the main relief adjusting screw out (counter clockwise) 4 turns.

Stand clear when packing mechanism is in motion.

- 2. With the engine and pump "on" move the upper panel control lever to shift the spool in the down direction. The upper panel will travel to the end of the down stroke but will not release the dent and shift to the neutral position.
- 3. Slowly turn the main relief valve adjusting screw in (clockwise) to increase the pressure. Watch the pressure gauge to see what the pressure is when the spool kicks out of detent and returns to the neutral position. The correct kick-out pressure for the lower panel is 2350 +/-50 PSI.

A DANGER

Do not stand in the hopper or on the hopper sill while adjustments are being made on the packing mechanism with the machine running.

- 4. If the setting is incorrect, place the unit in the lockout position and remove the rubber plug from the end of the upper panel spool to expose the detent release adjusting screw.
- 5. Insert a screwdriver and turn the detent adjusting screw in (clockwise) to increase the kick-out pressure or out (counterclockwise) to decrease the pressure.

NOTICE

Be careful not to force the adjusting screw or it may deform the internal adjusting rod and make the valve inoperative.

Repeat steps (1) through (4) to check the results.

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TAILGATE VALVE PRESSURE SETTINGS (CONTINUED)

C.Adjustment of Relief Valve "B"

- 1. Lock the tailgate clamps and pull tailgate raise control lever, reading the main system pressure gauge. Adjust main system down until the gauge reads 2100 PSI.
- 2. Remove plugs or caps covering relief valve "B" and "C" in the ejector unload valve (see figure 6).
- 3. Turn adjustment screw of Valve "C" out of body 2 full turns (counter clockwise).
- 4. Turn adjustment screw of Valve "B" into the body 2 full turns (clockwise).
- 5. Pull ejector cylinder control lever to extend cylinder full out and momentarily bottom cylinder. Release the lever.
- 6. Pressure is now trapped in the cylinder. Check pressure gauge in ejector line. It should read approximately 1800* PSI.

NOTICE

If pressure does not hold, turn relief "B" adjusting screw in (clockwise) 1/2 turn and repeat steps 5 and 6.

- 7. Push the upper panel control lever and leave it in detented position, (upper panel cylinders bottomed in up position).
- 8. Observing both pressure gauges, slowly turn out (counterclockwise) on Relief "B" adjusting screw until Relief "B" reaches 2100 PSI. The ejector line pressure gauge will fall rapidly to 0 PSI. Relief "B" is now set at 2100 PSI.

NOTICE

Manually shift the upper panel control lever to neutral.

D.Adjustment of Relief Valve "C"

NOTICE

All adjustments must be made with throttle advance engaged.

- 1. Lock tailgate clamps and pull tailgate raise control lever, reading the main system pressure gauge. Adjust main system pressure up until gauge reads 2350 PSI.
 - 1800 PSI is an approximate measurement to insure pressure is trapped in the ejector line when the ejector is
 extended and the body is empty. As long as the trapped pressure is maintained above 1000 PSI for one minute, the
 ejector sweep resistance system will operate properly with no detrimental effect on payload.
- 2. Turn adjusting screw of Relief "C" in (clockwise) 2-1/2 turns.
- 3. Pull ejector cylinder control lever to extend cylinder full out and momentarily bottom cylinder. Release the lever.
- 4. Pressure is now trapped in the cylinder. Check pressure gauge in ejector line. It should read approximately 1800* PSI.

NOTICE

If pressure does not hold, turn relief "C" adjusting screw in (clockwise) 1/2 turn and repeat steps 3 and 4.

- 5. Push the upper panel control lever and leave it in detented position, (upper panel cylinders bottomed in up position).
- 6. Observing both pressure gauges, slowly turn out (counterclockwise) on Relief "C" adjusting screw until Relief "C" reaches 2350 PSI, the ejector line pressure gauge will fall rapidly to 0 PSI. Relief "C" is now set at 2350 PSI.

NOTICE

Manually shift the upper panel control lever to neutral.

7. Reinstall plugs or caps covering Reliefs "B" and "C".

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- 8. Reconnect the top kick-out, reverse Step 5 in Relief "B" adjustment.
- 9. Follow procedures to readjust the main relief.

Maintenance and Adjustment

UNDERBODY VALVE (MAIN RELIEF)

Hydraulic oil must be at or near operating temperature. If not warm, see **Cold Weather Warmup Procedure 64**. Remove dirt and grease around main relief.

NOTICE

All adjustments must be made with throttle advance engaged.

- 1. Lock tailgate clamps and pull tailgate raise control lever.
- 2. Read system pressure gauge, it should read 2500 +50/-0 PSI.
- 3. Remove dome nut.
- 4. Loosen lock nut.
- 5. Turn adjusting screw counterclockwise to decrease the pressure or turn screw clockwise to increase the pressure.
- 6. When correct pressure is attained, tighten lock nut and reinstall nut.
- 7. Recheck the system pressure.
- 8. Remove pressure gauges from fittings.

TROUBLESHOOTING GUIDE				
PROBLEM	PROBABLE CAUSE	REMEDY		
Ejector panel will not relieve	Ejector relief set higher than main relief	 Raise main relief setting Lower ejector relief setting 		
Ejector panel moves forward too much when	Ejector relief set too low	 Lower main relief setting Raise ejector relief setting 		
packing	Ejector relief valve stuck open	 Remove relief spool and clean Replace relief valve 		
Ejector panel moves forward when other functions of packing cycle are in use	Cylinder bottoms before manual Kick-Out center spool	1. Adjust top Kick-Out		
Inside cylinder sticks in sweep (lower) panel up position	Detent set higher than main relief	1. Lower the lower panel detent setting		
Lower panel will not tuck all the way (inside cylinders are partially extended)	Lower panel detent setting too low	1. Adjust lower panel detent setting up		

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KICK-OUT ADJUSTMENT (SLIDE UP)

The kick-out lever is on the inside of tailgate on the right hand side. Adjust as follows;

- 1. Adjust the linkage so it does not engage the slide cylinder. Loosen jam nuts (at both ends of the rod) and turn the adjusting rod clockwise to shorten (to kick-out sooner) or counterclockwise to lengthen (to kick-out later) the rod.
- 2. Run the slide all the way up. The shoes go out the top of the track on top of the tailgate by 1 inch.
- 3. Adjust the kick-out so the shoe stops 1.5 inches before it stops at the top as stated in step 2, when the linkage is not engaged.



Figure 31. Upper Right Side of Tailgate (Inside)

Maintenance and Adjustment

TAILGATE CONTROL LEVER ALIGNMENT

- 1. The Handles should be in line when in the neutral position and the outside cylinder in mid-stroke.
- 2. If out of alignment, loosen jam nuts on sweep control adjusting rod. Turn rod clockwise to shorten or counterclockwise to lengthen.

NOTICE

Adjustment can be made by turning sweep control lever only.



Figure 32. Location of Adjusting Rod and Sweep Control Lever.

POWERTRAK[®] COMMERCIAL Maintenance and Adjustment

SWEEP BACK-OFF RELIEF ADJUSTMENT

A relief is provided in the tailgate valve to allow the lower panel to back off slightly (2 to 5 inches of cylinder stroke) during the final stages of packing the load. If the cylinders back-off excessively (5 to 7 inches of cylinder stroke), the back-off relief needs to be adjusted or replaced.

For proper relief adjustment procedures, contact Heil Technical Services at 866-310-4345 for further instructions.

EJECTOR UNLOAD VALVE

The ejector unload value is located beside the underbody value. There are two different relief adjustments to make on this value. See the figure below.

NOTE: All adjustments must be made with the throttle advance engaged!



Figure 33. Ejector Unload Valve.

- 1. Start engine and engage PTO or front mount pump.
- 2. Place the upper panel in the fully out position.

A DANGER

Stand clear when packing mechanism is in motion.

- 3. Turn PTO or front mount pump to the OFF position.
- 4. Turn engine ignition to the OFF position, remove keys and follow the Lock Out/Tag Out procedure.

Do not stand in the hopper or on the hopper sill while adjustments are being made on the packing mechanism with the machine running.

- 5. Disconnect the top kick-out on the tailgate control lever. Do the following to disconnect the top kick-out:
 - (a) Remove the retaining capscrew from the kick-out pivot.
 - (b) Pull the control lever off of the pin.

Maintenance and Adjustment

EJECTOR UNLOAD VALVE (CONTINUED)

- 6. Start the engine and engage the PTO or front mount pump.
- 7. Push the upper panel control lever to move the upper panel to a full "up" position. Manually shift the lever back to neutral.



Stand clear when packing mechanism is in motion.



34. Disconnect Top Kick Out.

Adjust Relief Valve B

- 1. Lock the tailgate and read the main system pressure gauge. Adjust the main system pressure down until the gauge reads 2100 PSI.
- 2. Remove the plugs covering the relief valve B and relief valve C on the ejector unload valve. See the figure above.
- 3. Turn the slotted adjustment screw on valve C counterclockwise two full turns.
- 4. Turn the slotted adjustment screw on valve B clockwise two full turns.
- 5. Pull the ejector cylinder control lever to extend the cylinder fully out and momentarily bottom out the cylinder.
- 6. Release the lever. Pressure is trapped in the cylinder.
- 7. Check the pressure gauge in the ejector line. It should read approximately 1800 PSI.

NOTE: If pressure does not hold, turn the relief B adjusting screw clockwise, 1/2 turn and repeat steps 5, 6 and 7.

- 8. Push the upper panel control lever and leave it in detented position, (outside cylinders bottomed in retracted position).
- 9. Observing both pressure gauges, slowly turn the relief B adjusting screw counterclockwise until the pressure reaches 2100 PSI, the ejector line pressure gauge will fall rapidly to 0 PSI. Relief B is now set at 2100 PSI.

NOTE: Manually shift the upper panel control lever to neutral.

Maintenance and Adjustment

EJECTOR UNLOAD VALVE (CONTINUED)

Adjust Relief Valve C

NOTE: Make all adjustments with throttle advance engaged.

- 1. Lock the tailgate and read the main system pressure gauge. Adjust the main system pressure down until the gauge reads 2300 PSI.
- 2. Using a screwdriver, on relief C turn the slotted adjusting screw clockwise 2-1/2 turns.
- 3. Pull the ejector cylinder control lever to extend the cylinder full out and momentarily bottom out the cylinder.
- 4. Release the lever. Pressure is now trapped in the cylinder. Check the pressure gauge in the ejector line. It should read approximately 1800 PSI.

NOTE: If pressure does not hold, turn the relief C adjusting screw clockwise 1/2 turn and repeat steps 3 and 4.

- 5. Push the upper panel control lever and leave it in the detented position. (Outside cylinders bottomed in the retracted position.)
- 6. Observing both pressure gauges, slowly turn the relief C adjusting screw counterclockwise until relief C reaches 2350 PSI, the ejector line pressure gauge will fall rapidly to 0 PSI. Relief C is now set at 2350 PSI.

NOTE: Manually shift the upper panel control lever to neutral.

- 7. Reinstall the plugs covering reliefs B and C.
- 8. Reconnect the top kick-out. Do the following to reconnect the top kick-out:
 - (a) Reattach the control lever to the pin.
 - (b) Reattach the retaining capscrew from the kick-out pivot.
- 9. Follow the procedures to readjust the main relief.

Do not apply torque beyond this point, as damage to the adjusting screw could occur. If this happens, the adjusting screw will not operate properly and remain at maximum pressure even when the setting is lowered.

Maintenance and Adjustment

OPTIONAL CONTAINER MECHANISM ADJUSTMENT PROCEDURE

Install an accurate 3000 PSI gauge in the gauge port in section of the body and tailgate valve tapped for a 1/4" NPT gauge connection. MAKE SURE GAUGE HAS BEEN CHECKED FOR ACCURACY.

A. Winch

- 1. Disengage the front mount pump or PTO.
- 2. Remove the hoses or tubes and fittings connecting the valve to the winch at the tailgate valve ports.
- 3. Install o-ring plugs (3/4" 16) in two of the tailgate valve ports.
- 4. Engage the front mount pump or PTO.
- 5. Depress throttle advance and move the winch control lever in both directions.
- 6. The pressure should read 1400 PSI +/- 100 PSI for a 12,000 lb winch.
- 7. If pressure is incorrect, make the necessary adjustment by the following procedure;
 - a. Remove the cover nut which will expose the adjustment screw on the tailgate valve winch section.
 - b. Pull spool out to adjust the relief on detent cap end.
 - c. Push spool in to adjust the relief on spool yoke end
 - d. Loosen lock nut.
 - e. Turn adjusting screw clockwise (in) to increase the pressure or counterclockwise (out) to decrease the pressure.
 - f. After proper pressure is attained, tighten the lock nut and re-install cover nut.
- 8. Reconnect fittings, hoses or tubes if applicable.
- B. Arm Mechanism or Roll Bar- without winch Single Mechanism.
 - 1. Disengage the front mount pump or PTO.
 - 2. Depress throttle advance and engage mechanism control lever until cylinders bottom out in extended position.
 - 3. The pressure should read 1400 PSI +/- 100 PSI with cylinders extended.
 - 4. If pressure is incorrect, make the necessary adjustment by the following procedure;
 - a. Remove the cover nut which will expose the adjustment screw on the tailgate valve arm mechanism or roll bar section.
 - b. Pull spool out to adjust the relief on detent cap end.
 - c. Push spool in to adjust the relief on spool yoke end
 - d. Loosen lock nut.
 - e. Turn adjusting screw clockwise (in) to increase the pressure or counterclockwise (out) to decrease the pressure.
 - f. After proper pressure is attained, tighten the lock nut and re-install cover nut.

Maintenance and Adjustment

SLIDE SHOE REMOVAL



Figure 35. Illustration of Slide Shoe Cover Removed

OPTIONAL WINCH OIL LEVEL CHECK PROCEDURE

Check winch oil level every 2 months or 400 hours, whichever comes first. If low on oil, add AGMA Grade 7EP (140 wt.) gear oil. Example brand name is Texaco Meropa 460. Be sure lubricant added is functional equivalent of brand name. For more service information, see winch manual provided with the unit.



Figure 36. Winch Oil Housing

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REPAIRING CRACKED WELD JOINTS

Repair all cracked weld joints immediately after finding cracked weld joints. If you are unsure of the proper repair procedure, call Heil Technical Services at 866-310-4345.

OIL LUBRICANT RECOMMENDATION

Use only non-detergent engine oil to lubricate all moveable mechanical parts not furnished with grease fittings. Apply sufficient oil to give good lubrication, but do not bathe parts in oil. Always wipe off excess.

GREASE LUBRICANT RECOMMENDATION

Use a grease gun. Before engaging grease gun, clean the fitting. Always pump enough grease to purge the joint of contaminated grease and wipe off the excess. Lubricate a unit as given on the lubrication decal on the unit and in the Body Lubrication Guide paragraph of this section.

Use grade NLG1000 grease or equivalent.

TAILGATE LUBRICATION

See Grease Lubrication Recommendation 82 and Body Lubrication Guidein this section.

INSPECT PROXIMITY SWITCHES

See **Proximity Switch Troubleshooting** ²⁶ for recommended procedures for inspecting proximity switches.

CLEAN AND INSPECT THE TAILGATE SEAL

Daily, check the tailgate seal to make sure it mates properly with the body and inspect for possible wear, damage or leaking.

SECTION 5 BODY CONTROLLER HARDWARE

IN-CAB DISPLAY

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IN-CAB DISPLAY

Refer to the Heil PowerTrak[®] Commercial Operation Manual for screens on the InSight[™] Diagnostic Display related to operating the unit. The display also allows a qualified and authorized Service Technician to see detailed system information and make configuration changes based on option configuration.

HOME SCREEN



DISPLAY INDICATORS

- 1. System/PTO Indicates PTO or System Status
 - A. On units with a Clutch Shift PTO
 - RED, "ERROR" PTO output error.
 - GREEN, "PTO ON" PTO output ON and PTO pressure switch is activated.
 - YELLOW, "PTO ON" PTO output ON but PTO pressure switch is not activated.
 - GRAY, "PTO OFF" PTO output OFF
 - B. On units without a Clutch Shift PTO
 - GREEN, "SYSTEM ON" Hydraulic System is enabled.
 - GRAY, "SYSTEM OFF" Hydraulic System is disabled.

2. Trans Temp - (Optional) Indicates the High Temp Warning is active on the Allison Transmission. Only applies with Clutch shift PTO.

3. Filter Bypass

- GREEN, "FILTER OK" Return Filter is NOT in bypass.
- RED, "FILTER BYPASS" Return Filter is in bypass.
- 4. Low Oil (Optional) Included with Hydraulic Tank Monitoring
 - GREEN, "OIL OK" Oil Level is Good.
 - RED, "LOW OIL" Low Hydraulic Oil.
- 5. Tailgate Lock
 - GREEN, "TG LOCKED" Tailgate is locked.
 - RED, "TG UNLOCKED" Tailgate is unlocked.
- 6. Tailgate Open
 - GREEN, "TG CLOSED" Tailgate is closed.
 - RED, "TG OPEN" Tailgate is open.
- 7. Pump #1 (Optional) Included with manifold controlled hydraulic pump.
 - GREEN, "PUMP ON" Pump output ON.
 - GRAY, "PUMP OFF" Pump output OFF.
 - YELLOW, "ERROR" Pump output error, short or open circuit.
- 8. Unused These indicators will be blank.
- 9. Side Door (Optional) Included with Side Door Pump Shutdown, indicates Side Door Closed or Open,
 - GREEN, "SIDE DOOR CLOSED"
 - RED, "SIDE DOOR OPEN"
- 10. Unused These indicators will be blank

DISPLAY INDICATORS (CONTINUED)

11. Pump #2 - (Optional) Included with OAI hydraulic pump.

- GREEN, "PUMP ON" Pump output ON.
- GRAY, "PUMP OFF" Pump output OFF.
- YELLOW, "ERROR" Pump output error, short or open circuit.

12. Fault Indicator

- RED, "CRITIC FAULT" Critical Fault.
- RED, "CTRL. FAULT" Controller Fault.
- RED, "SYS. FAULT" System Fault.

STATUS LED

Indicates status of the display as described below.

- GREEN, 2Hz Flash Application Running
- GREEN, 5Hz Flash No Runtime system loaded
- GREEN, Continuous Application Stopped or No Application Loaded
- RED, 5Hz Flash Application Stopped due to Low Voltage
- RED, 10Hz Flash Application Stopped with error application is stopped
- RED, Continuous Application Stopped with Fatal Error

FUNCTION BUTTONS

Each button is assigned multiple functions which change by scrolling the **DOWN** directional arrow. The state of functions assigned to F2, F3 and F4 are retained through a power cycle. **Function text will be green when function is enabled**, **white when not**. Button Functions are listed below.

F1. Functions Button #1

• System Enable - enables the Hydraulic system

F2. Functions Button #2

- Strobe Lights turns on all strobes.
- Auto Strobe turns on all strobes with System Enable and vehicle speed below 20 MPH.
- Rear Strobe turns on all strobes on the rear of the vehicle.
- Front Strobe turns on all strobes on the front of the vehicle.

F3. Functions Button #3

- Work Lights turns on body Work Light #1 and all tailgate Work Lights.
- Auto Work Lt turns on body Work Light #1, tailgate hopper and tailgate side lights with System Enable and vehicle speed below 20MPH.
- Inside Hopper turns on tailgate hopper light.
- Outside Hopper turns on tailgate side light.
- Back-Up Assist turns on side body Back-up Assist lights.
- Camera Floods turns on tailgate camera lights.

F4. Functions Button #4

- Throttle Advance Enables engine throttle advance.
- Option Switch 1 turns on Option Output #1 in the Body Controller, must be enabled in Option Screen
- Option Switch 2 turns on Option Output #2 in the body Controller, must be enabled in Option Screen

Functions Enabled

This GREEN line indicates that a function associated with this button is active. Scroll down through the functions to locate the enabled function(s).

MESSAGE BANNER

Potential messages displayed.

1. Critical Faults – result in disabled functions, allowing limited to no operation. (RED)

- "Engine Speed Undetectable, Enable Service Mode and Reset System Enable." J1939 Communication with the Engine has been lost, or the Alternator R stator connection was lost. *To override and continue operation, enter Service Mode.*
- "Side Door Interlock. Close Side Door Reset System Enable."
 - To override and continue operation, enter Service Mode.
- "Hydraulic Temp Shutdown. Oil Temp Exceeds 200° F Reset System Enable."

Allow the system to cool and reset by cycling the system-enabled switch. To override and continue operation, enter Service Mode.

• "Transmission Temp High w/Clutch Shift PTO engaged, Reset System Enable. "

Allow system to cool and reset by cycling system enable switch. To override and continue operation, enter Service Mode.

- "Pump Shutdown Pressed, Reset Street side Switch, Restart System Enable." Optional Pump Shutdown System. To override and continue operation, enter Service Mode.
- "Pump Shutdown Pressed, Reset Curbside Switch Restart System Enable." Optional Pump Shutdown System. To override and continue operation, enter Service Mode.
- "Low Hydraulic Oil. Fill hydraulic tank to the proper level, Reset System Enable" *To override and continue operation, enter Service Mode.*

2. Operator Warnings – hazardous operating conditions. (RED)

- "Vehicle in motion with TG open. Close and secure TG"
- "Hydraulic Temp Warning Oil Temp Exceeds 180° F."
- "Vehicle in motion with Throttle Advanced. Verify Transmission Neutral." MPH exceeded zero with throttle advance engaged. Throttle Advance is temporarily disabled. Indication of a potential issue with the chassis Neutral signal.

3. Communication Failure – either intermittent or ongoing, between one or more controllers. Press ESC button to acknowledge. (RED)

- "Comms Lost, Multiple Controllers, Restore Comms and, press escape to clear."
- "Cab Controller Communication Lost, Restore Comms and, press escape to clear."
- "Body Controller Communication Lost, Restore Comms and, press escape to clear"
- "Tailgate Controller Communication Lost, Restore Comms and, press escape to clear."

4. Service Mode – system has been placed in service mode. (RED)

"SERVICE MODE !!!"

5. Tailgate Buzzer – visual indication that the Tailgate Buzzer switch is pressed. (BLUE)

"Operator Alert"

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Body Controller Hardware

MESSAGE BANNER (CONTINUED)

6. Hydraulic Filter Life – remaining filter life is below 5%. (BLACK)

"Hyd. Oil Filter Life @: ##%"

Hydraulic filter should be changed every 1000 pump hours

7. Hydraulic Oil Life - remaining oil life is below 5% (BLACK)

"Hyd. Oil Life @: ##%"

Hydraulic filter should be changed every 2000 pump hours

8. Hydraulic Oil/Ambient Temp - (Optional) displayed as default message. (BLACK)

"Hyd. Oil Temp.: ##° F" "Ambient Temp.: ##° F"

9. System OFF – Hydraulic System is turned off (GRAY)

"System OFF"

COUNTER SCREEN

This screen shows the different cycle counts. To navigate to this screen, press **RIGHT** on the arrow pad.

CYCLE COUNTS

Total Cycles are non-resettable counts, retained throughout the life of the unit controller.

Daily Cycles can be reset. Choose the count to be reset by scrolling down using the directional arrow.

TG Packer count is achieved by monitoring the tailgate Slide Active proximity switch.

To account for the split pack cycle, the Slide Active must engage two separate instances for a minimum of 7 seconds.

Tipper counts are achieved by monitoring the Tipper #1 and Tipper #2 inputs. The input must remain on for 2 seconds to achieve a count.

HOUR COUNTS

Maintenance Hours count the hours the hydraulic pump/PTO is enabled.

Hyd. Filter Life displays remaining life of the hydraulic filter based on 1000 hours of pump operation.

Hyd. Oil Life displays remaining life of the hydraulic oil based on 2000 hours of pump operation.

OTHER

Oil Temp High records the highest hydraulic oil temperature since reset.

Figure 38.

DISPLAY SCREEN

The Display Screen provides details about the display.



Figure 39.

- Program number/revision date. Exp: 109-0382-yyyymmdd
- Supply Voltage
- Internal Voltage
- Internal Temperature
- Maximum recorded operating temperature for the life of the display.
- CAN1 buss load percentage, the buss load for communications between the controllers and display.
- Current display program process time in microseconds.
- Maximum display program process time, in microseconds, during the current power cycle.

CAB CONTROLLER INPUTS

This screen displays the status of the Cab Controller inputs and parameters.



Figure 40.

INPUT	PIN #	DESCRIPTION	FUNCTION
IN00	55	PTO Pressure Sw.	ON with PTO engaged
IN01	36	Low Torque PSW.	ON with O.A.I. LTPSW
IN02	54	Trans Temp. High	ON with Trans. Over temp. warning
IN03	35	Chassis Neutral Sig.	ON/OFF with chassis Neutral, Active high or low signal
IN04	53	Spare In	
IN05	34	Spare In	
IN06	52	Spare In	
IN07	33	Spare In	
IN08	24	Spare In	
IN09	41	Spare In	
IN10	23	Spare In	
IN11	40	Spare In	
IN12	22	Spare In	
IN13	39	Spare In	
IN14	21	Spare In	
IN15	38	Engine Tach Freq	R-Stator or Tach Sig. used with absence of J1939
VBBS	10	Supply Voltage	Controller Power, Ignition Feed
VBB1	19	Supply Voltage	Supply Voltage for Outputs 00-08, Ignition Feed
VBB2	1	Supply Voltage	Supply Voltage for Outputs 08-15, Ignition Feed

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Body Controller Hardware

INPUT	PIN #	DESCRIPTION	FUNCTION
N/A	N/A	Controller Temp.	Current temp. of controller
N/A	N/A	Max. Controller Temp.	Highest recorded temp. life of unit
N/A	N/A	CAN1 Bus Load	Bus loading for controller network
N/A	N/A	Mobile Controller Program	109-0329-yyyymmdd

BODY CONTROLLER INPUTS

This screen displays the status of Body Controller inputs and parameters.



Figure 41.

INPUT	PIN#	DESCRIPTION	FUNCTION
IN00	55	Hyd. Press #1	Main body valve inlet pressure
IN01	36	Hyd. Press #2	CV valve pressure
IN02	54	Hyd. Oil Level	ON with hydraulic oil level good
IN03	35	Filter Psw.	ON with hydraulic filter not in bypass
IN04	53	Hyd. Oil Temp.	Hydraulic oil temp. at tank
IN05	34	Spare In	
IN06	52	Spare In	
IN07	33	Throttle Adv Sw.	ON with body throttle advance switch
IN08	24	Spare In	
IN09	41	Side Door Prx.	ON with body side door closed and latched
IN10	23	Right Turn Sig.	ON with chassis right turn signal
IN11	40	Left Turn Sig	ON with chassis left turn signal
IN12	22	Reverse Light Sig	ON with chassis back up lights
IN13	39	Stop Light Sig	ON with chassis brake lights
IN14	21	Tail Light Sig	ON with chassis tail lights
IN15	38	Spare In	
VBBS	10	Supply Voltage	Controller power, battery feed
VBB1	19	Supply Voltage	Supply voltage for outputs 00-08, battery feed
VBB2	1	Supply Voltage	Supply voltage for outputs 08-15, ignition feed

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Body Controller Hardware

INPUT	PIN#	DESCRIPTION	FUNCTION
N/A	N/A	Controller Temp.	Current temp. of controller
N/A	N/A	Max. Controller Temp.	Highest recorded temp. life of unit
N/A	N/A	CAN1 Bus Load	Bus loading for controller network
N/A	N/A	Controller Program	109-0330-yyyymmdd

TAILGATE CONTROLLER INPUTS

This screen displays the status of the Tailgate Controller inputs and parameters.



			•
INPUT	PIN#	DESCRIPTION	FUNCTION
IN00	55	Tipper Curb Side	ON with cart tipper activated, curb side
IN01	36	Tipper Street Side	ON with cart tipper activated, street side
IN02	54	Spare In	
IN03	35	Spare In	
IN04	53	Spare In	
IN05	34	Spare In	
IN06	52	Throttle Adv Sw.	ON with tailgate throttle advance switch
IN07	33	Buzzer Sw.	ON with tailgate buzzer switch
IN08	24	System PWR Street Side	ON with tailgate shutdown switch pulled out, street side
IN09	41	System PWR Curb Side	ON with tailgate shutdown switch pulled out, curb side
IN10	23	Work Light Sw.	ON with tailgate work lamp switch
IN11	40	Spare In	
IN12	22	Slide Active Prx.	ON with tailgate slide control lever activated
IN13	39	Sweep Active Prx.	ON with tailgate sweep control lever activated
IN14	21	Tailgate Lock Prx.	ON with tailgate locked, (optional)
IN15	38	Tailgate Close Prx.	ON with tailgate closed
VBBS	10	Supply Voltage	Controller power, battery feed
VBB1	19	Supply Voltage	Supply voltage for outputs 00-08, battery feed
VBB2	1	Supply Voltage	Supply voltage for outputs 08-15, ignition feed

Figure 42.

POWERTRAK® COMMERCIAL

Body Controller Hardware

INPUT	PIN#	DESCRIPTION	FUNCTION
N/A	N/A	Controller Temp.	Current temp. of controller
N/A	N/A	Max. Controller Temp.	Highest recorded temp. life of unit
N/A	N/A	CAN1 Buss Load	Bus loading for controller network
N/A	N/A	Controller Program	109-0331-yyyymmdd

CHASSIS VARIABLES (J1939)

This screen shows chassis variables from chassis J1939. Not all variables may be available, so their status won't update in those cases. If J1939 is unavailable, engine RPM is sourced from the alternator R Stator or tach signal.



Figure 43.

VARIABLE LIST	FUNCTION	
Engine RPM	Engine RPM from J1939 or Tach Sig.	
Road Speed	Vehicle MPH	
Engine % Torque	Engine percent torque	
Ambient Temp	Ambient temperature measured by chassis sensors	
J1939 Bus Load	Chassis J1939 bus load	
J1939 Baud Rate	Chassis J1939 baud rate	
Neutral	ON = Transmission in neutral	
Forward Gear	ON = Transmission in forward gear	
Reverse Gear	ON = Transmission in reverse gear	
Park Brake	ON = Park brake set	
Service Brake	ON = Service brake applied	
Brake Light Sig.	ON = Chassis brake lamps ON	
Right Turn Sig.	ON = Chassis right turn lamps ON	
Left Turn Sig.	ON = Chassis left turn lamps ON	
Tail Lamp Sig.	ON = Chassis tail lamps ON	
Back-Up Lamp Sig.	ON = Chassis back-up lamps ON	

CAB CONTROLLER OUTPUTS

This screen displays the status of Cab Controller outputs. Status of each output is: [ON] - Output is ON or [OFF] - Output is OFF. The state of each status is in brackets [].

Diagnostic features outputs 00 thru 07

[Disabled] - Output is disabled by option set or spare.

[Under Voltage on VBB] - Supply Voltage is too low.

[Over Voltage on VBB] - Supply Voltage is too high.

[Settings Invalid] - Program Error.

[Wire Break] - Open Circuits Detected

[Short Circuit] - Short Circuit Detected

[Over Current] - Overload on Circuit

Diagnostic features outputs 08 thru 15

[Disabled] - Output is disabled by option set or spare.





OUTPUT	PIN#	DESCRIPTION	FUNCTION
OUT00	18	Spare Out	
OUT01	17	Spare Out	
OUT02	16	PTO Sol.	Power to clutch shift PTO solenoid
OUT03	15	Pump 1 Sol.	Power to pump 1 solenoid
OUT04	14	Pump 2 Sol.	Power to pump 2 solenoid
OUT05	13	Spare Out	
OUT06	12	Spare Out	

OUTPUT	PIN#	DESCRIPTION	FUNCTION
OUT07	11	Sensor Power	Power supply to sensors, ON with ignition
OUT08	2	Body Out of Dim Sig.	Power to engine control relay, road speed limit or accelerator interlock
OUT09	3	Throttle Adv Sig.	Power to engine control relay, throttle advance
OUT10	4	Camera Reverse Trigger	Power to camera input, back-up
OUT11	5	Spare Out	
OUT12	6	Spare Out	
OUT13	7	Spare Out	
OUT14	8	In Cab Alarm 1	Tailgate buzzer or critical fault
OUT15	9	In Cab Alarm 2	Tailgate open or operator warning

BODY CONTROLLER OUTPUTS

This screen displays the status of Body Controller outputs. Status of each output is: [ON] - Output is ON or [OFF] - Output is OFF. The state of each status is in brackets [].

Diagnostic features outputs 00 thru 07

[Disabled] - Output is disabled by option set or spare.

[Under Voltage on VBB] - Supply Voltage is too low.

[Over Voltage on VBB] - Supply Voltage is too high.

[Settings Invalid] - Program Error.

[Wire Break] - Open Circuits Detected

[Short Circuit] - Short Circuit Detected

[Over Current] - Overload on Circuit

Diagnostic features outputs 08 thru 15

[Disabled] - Output is disabled by option set or spare.



Figure 45.

OUTPUT	PIN#	DESCRIPTION	FUNCTION
OUT00	18	Right Turn Light	NOT USED, power to mid body RH turn lamp
OUT01	17	Left Turn Light	NOT USED, power to mid body LH turn lamp
OUT02	16	Option Output 1	Optional output controlled by display button
OUT03	15	Option Output 2	Optional output controlled by display button
OUT04	14	Spare Out	
OUT05	13	Clearance/Marker Light	NOT USED, power to body clear/marker lamps
OUT06	12	Spare Out	
OUTPUT	PIN#	DESCRIPTION	FUNCTION
--------	------	---------------------	---
OUT07	11	Sensor Power	Power supply to sensors, ON with ignition
OUT08	2	Anti-Back Pack	Power to anti-back pack relay
OUT09	3	Spare Out	
OUT10	4	Work Light #1	Power to front of body work light
OUT11	5	Reverse Flood Light	Power to back-up assist lights
OUT12	6	Spare Out	
OUT13	7	Strobe 1	Power to front of body oval strobe lights
OUT14	8	Strobe 2	Power to front of body 360 strobe lights
OUT15	9	Spare Out	

TAILGATE CONTROLLER OUTPUTS

This screen displays the status of Tailgate Controller outputs. Status of each output is: [ON] - Output is ON or [OFF] - Output is OFF. The state of each status is in brackets [].

Diagnostic features outputs 00 thru 07

[Disabled] - Output is disabled by option set or spare.

[Under Voltage on VBB] - Supply Voltage is too low.

[Over Voltage on VBB] - Supply Voltage is too high.

[Settings Invalid] - Program Error.

[Wire Break] - Open Circuits Detected

[Short Circuit] - Short Circuit Detected

[Over Current] - Overload on Circuit

Diagnostic features outputs 08 thru 15

[Disabled] - Output is disabled by option set or spare.



Figure 46.				
OUTPUT	PIN#	DESCRIPTION	FUNCTION	
OUT00	18	Right Turn Light	RH multi-function strobe	
OUT01	17	Left Turn Light	LH multi-function strobe	
OUT02	16	Stop Light	NOT USED, power to stop lamps	
OUT03	15	Back Up Light/Alarm	NOT USED, power to back-up lamps	
OUT04	14	Tail Light	NOT USED, power to tail lamps	
OUT05	13	Clearance/Marker Light	NOT USED, power to clearance lamps	
OUT06	12	Tailgate Open Alarm	Power to tailgate open audible alarm	

Body Controller Hardware

OUTPUT	PIN#	DESCRIPTION	FUNCTION
OUT07	11	Sensor Power	Power supply to sensors, ON with Ignition
OUT08	2	Municipal Flash #1	Power to 7" flashing lamp
OUT09	3	Municipal Flash #2	Power to 7" flashing lamp
OUT10	4	Work Light #1	Power to tailgate side lamp(s)
OUT11	5	Reverse Flood Light	Power to camera work lamps
OUT12	6	Work Light #2	Power to tailgate hopper lamp(s)
OUT13	7	Strobe 1	Power to oval strobe lights
OUT14	8	Strobe 2	Power to 360 strobe light(s)
OUT15	9	Spare Out	

FAULT SCREENS

Access fault screens from the Home screen by using the UP directional arrow.

CRITICAL FAULTS

Critical faults disable functions, leading to limited operation or no operation. These faults appear in the Home Screen Message Banner, displaying one message at a time based on importance, allowing users to view the status of all critical faults.



Figure 47.

FAULT	CAUSE	EFFECT	RESET
Engine Speed Lost	System unable to determine engine RPM.	Pump shut down after 1 minute.	Cycle System Enable
Side Door Interlock	Input signal indicates side door has been opened.	Pump shut down immediately.	Cycle System Enable
Hyd. Temp Shutdown	Hyd. Temp. above 200° for 60 seconds.	Pump shut down after 1 minute.	Cycle System Enable
Transmission Temp High	Allison Trans. High Temp Warning is active.	Pump shut down after 1 minute.	Cycle System Enable
Pump Shutdown SS	Input signal indicates street side shutdown switch has been pressed.	Pump shut down immediately.	Cycle System Enable
Pump Shutdown CS	Input signal indicates curb side shutdown switch has been pressed.	Pump shut down immediately.	Cycle System Enable
Low Hydraulic Oil	Input signal indicates hydraulic Oil has fallen below a safe operating level.	Pump shut down immediately.	Cycle System Enable
Vehicle in Motion W/ Throttle Advanced	J1939 indicates Vehicle Wheel Speed greater than zero, with throttle advance active.	Throttle advance is interrupted.	Re-initiate Throttle Advance request

SYSTEM FAULTS

Access this screen from the Critical Fault screen by using the LEFT directional arrow.

System faults occur with the loss of a signal or, when a signal is out of the normal operating range. These faults are retained through a power cycle and will remain active until reset.

The "Reset All" button will reset all active System Faults. The "Reset Selected" will reset only the selected fault.



Figure 48.

FAULT	CAUSE
J1939 Comms Lost, Engine	System not receiving PGN 61444 from chassis. <i>If J1939 is not available, disable this fault, by selecting it and hold both reset buttons for 10 seconds.</i>
J1939 Comms Lost, Chassis	System not receiving PGN 61445 from chassis. If J1939 is not available, disable this fault, by selecting it and hold both reset buttons for 10 seconds.
J1939 Comms Lost, Transmission	System not receiving PGN 65265 from chassis. <i>If J1939 is not available, disable this fault, by selecting it and hold both reset buttons for 10 seconds.</i>
J1939/Neutral Signal Conflict	Hardwired neutral signal indicates transmissions is NOT in neutral while J1939 indicates transmission is in neutral. Hardwired neutral function must be verified.
Wire Break, Filter Pressure Sw.	Loss of filter bypass signal with engine OFF
Signal Low, Pressure Sensor #1	Input signal indicates the pressure reading is lower than the operating range of the sensor.
Signal High, Pressure Sensor #1	Input signal the pressure reading is higher than the operating range of the sensor.
Signal Low, Pressure Sensor #2	Input signal the pressure reading is lower than the operating range of the sensor.
Signal High, Pressure Sensor #2	Input signal the pressure reading is higher than the operating range of the sensor.
Wire Break, Hyd. Temp Sensor	Input signal resistance is high, temperature sensor disconnected.
Short to Ground, Hyd. Temp Sensor	Input signal resistance is low, temperature signal shorted to ground.

CONTROLLER FAULTS

Access this screen from the Critical Fault screen by using the RIGHT directional arrow.

Controller faults occur with the following:

- Supply voltage to a controller is lost or low.
- A controller output has an error, short or open circuit etc.
- Loss of communications with or between two controllers.

These faults are retained through a power cycle and once active will remain active until reset. The "Reset All" button will reset all active System Faults. The "Reset Selected" will reset only the selected fault.



Figure 49.

FAULT	CAUSE
Cab, Low Voltage, Supply Pwr.	VBBS Pin 10 - Supply Voltage < 10VDC
Cab, Low Voltage, Internal Pwr.	Controller internal voltage low
Cab, Low Voltage, Output Group1 Pwr.	VBB1 Pin 19 - Supply Voltage < 10VDC
Cab, Low Voltage, Output Group2 Pwr.	VBB2 Pin 01 - Supply Voltage < 10VDC
Cab, Output Error	Error diagnostic on one or more outputs 00 thru 07
Cab, Lost Comms w/ Display	Controller lost comms with in-cab display.
Cab, Lost Comms w/ Body	Controller lost comms with Body controller.
'Cab, Lost Comms w/TG	Controller lost comms with Tailgate controller.
Body, Low Voltage, Supply Pwr.	VBBS Pin 10 - Supply Voltage < 10VDC
Body, Low Voltage, Internal Pwr.	Controller internal voltage low

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Body Controller Hardware

FAULT	CAUSE
Body, Low Voltage, Output Group1 Pwr.	VBB1 Pin 19 - Supply Voltage < 10VDC
Body, Low Voltage, Output Group1 Pwr.	VBB2 Pin 01 - Supply Voltage < 10VDC
Body, Output Error	Error diagnostic on one or more outputs 00 thru 07
Body, Lost Comms w/ Display	Controller lost comms with in-cab display.
Body, Lost Comms w/ Body	Controller lost comms with Body controller.
Body, Lost Comms w/TG	Controller lost comms with Tailgate controller.
Tailgate, Low Voltage, Supply Pwr.	VBBS Pin 10 - Supply Voltage < 10VDC
Tailgate, Low Voltage, Internal Pwr.	Controller internal voltage low
Tailgate, Low Voltage, Output Group1 Pwr.	VBB1 Pin 19 - Supply Voltage < 10VDC
Tailgate, Low Voltage, Output Group2 Pwr.	VBB2 Pin 01 - Supply Voltage < 10VDC
Tailgate, Output Error	Error diagnostic on one or more outputs 00 thru 07
Tailgate, Lost Comms w/ Display	Controller lost comms with in-cab display.
Tailgate, Lost Comms w/ Body	Controller lost comms with Body controller.
Tailgate, Lost Comms w/ TG	Controller lost comms with Tailgate controller.
Display, Low Voltage, Supply Pwr.	Display Supply Voltage < 10VDC

PASSWORD PROTECTED SCREENS

To access password protected screens press and hold the OK button for 3 seconds.

This will switch the view to the password screen. Enter the password and press OK.





PASSWORD PROTECTED SCREEN	PASSWORD
Maintenance	4321
Option Config	123412

OPTION CONFIG

The Option Config screen is used to configure the system.

Press the OK button to turn the functions ON/OFF. Press ESC to exit screen.



Figure 51.

Clutch Shift PTO

ON, enables the PTO solenoid output and should be used when a Clutch Shift PTO is installed.

Additionally, the hydraulic pump may or may not be configured with a solenoid controlled manifold block.

Select "W/Pump Manifold" or "W/O Pump Manifold" by pressing the RIGHT/LEFT arrows.

W/Pump Manifold enables Pump 1 sol output and reconfigures the EOS to control Pump 1 instead of the PTO.

Operate at Idle

ON, enables Operate at Idle (O.A.I) tandem pump outputs Pump 1 solenoid and Pump 2 solenoid.

It also configures the EOS for O.A.I. Pumps and enables low torque pressure functions to shutdown Pump 1 at the selected pressure setpoint.

There are two potential methods to achieve the pressure shutdown of Pump 1.

- 1. Hyd. Press #1 a transducer monitoring the inlet pressure on the body control valve, arrow RIGHT to adjust Pump 1 pressure limit.
- 2. Low Torque Pressure switch wired to the Cab Controller, adjust pressure switch setting as required.

Operate in Neutral Only

ON, prevents "Pack on the Fly" functionality by disengaging the hydraulics when the transmission is not in neutral.

No Side Door Interlock (Default OFF)

ON, disables side door interlock pump shutdown. Turn OFF when optional side access door pump shutdown is not installed.

OPTION CONFIG (CONTINUED)

Hydraulic Tank Monitoring

ON, enables low hydraulic oil and hydraulic oil temperature monitoring. Enable hyd. temp and low hydraulic oil pump shutdown functions.

Multi-Function Strobe

ON, enables a secondary use of the tailgate turn lamps. When not in use as turn signals, the lamps can be used as alternating strobe lights.

Option Switches

ON, enables two multiplexed body controller outputs to be used for optional functions.

Blunt cut wires RED "OPTION-02" and RED "OPTION-03" are controlled from the home screen Function Button F4 881.

Municipal Flashers

ON, enables two tailgate-mounted alternating strobe/flashing lamps, typically 7" municipal flashers.

Out of Dimension

ON, enables the Out of Dimension circuit. The Out of Dimension output turns on at a set MPH when the tailgate is open, or side access door is not closed. Arrow RIGHT to adjust the MPH setpoint.

Active Low Neutral Sig.

Hardwired neutral signals provided by the chassis can be active high (+12VDC) or active low (Grounding).

ON, configures the cab controller neutral input to function with an active low neutral signal.

OFF, configures the cab controller neutral input to function with an active high neutral signal.

Tailgate Lock Indication

ON, enables tailgate lock/unlock indication.

Pump Shutdown Switches

ON, enables tailgate street and curb side Pump Shutdown switches.

Hyd. Pressure Monitoring

ON, enables body controller hydraulic pressure transducer input 00.

Telematics

ON, enables Connected Truck broadcast on chassis J1939 network.

Engine Idle

Arrow RIGHT to adjust engine idle. This is required on chassis not equipped with J1939.

This uses the alternator R-Stator or Tach. signal, in leu of J1939 messaging.

MAINTENANCE SCREEN

Filter Change Reset, press OK button to reset

Oil Change Reset, press OK button to reset

Service Mode, press OK button to activate. Service mode is strictly intended to allow pump operation while servicing or troubleshooting the unit.



Figure 52.

MOBILE CONTROLLER

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PROGRAMMABLE CONTROLLERS

Three identical 32 I/O Mobile Controllers are installed—Cab, Body, and Tailgate—each with unique programs shared with the In-Cab display. If your controller differs from the manual, it will still function the same. When ordering, please provide your unit's program to ensure you receive the correct model. See Programmable Controllers [126] for more details.

Each controller has an LED status indicator. If communication among the three controllers and the In-Cab display is continuous, the LED operates under the Mobile Controller's default parameters. If a controller loses communication with another or the In-Cab Display, the LED alternates between yellow and red for the power cycle.



LED COLOR	STATUS	DESCRIPTION
N/A	OFF	No supply voltage
Orange	1 Flash	Initialization
Green	Flash @ 5 Hz	No operating system loaded
Green	Flash @ 2 Hz	Application running (RUN MODE)
Red	Flash @ 5 Hz	Supply voltage low
Red	Continuous	Fatal error
Yellow/Red	Flash @ 5 Hz	Communication lost during current power cycle

Body Controller Hardware

PROGRAMMABLE CONTROLLERS (CONTINUED)

Cab Controller

Typically mounted inside the cab. On a conventional cab, this controller will be behind the driver seat or under the passenger seat. On a cab over engine it will be under the doghouse cover. This controller manages most of the unit functionality, including:

- Chassis interface, including J1939 comms
- Hydraulic Pump Controls
- Option Configuration
- Audible Alarms
- Pump hour count



Figure 53. Under Passenger Seat Location.



Figure 54. Doghouse Location.

PROGRAMMABLE CONTROLLERS (CONTINUED)

Body Controller

Mounted behind the access panel on the street side of the body, as shown below. This controller manages circuits local to the body, including:

- Strobe Lights
- Work Lights
- Oil Tanks Circuits
- Chassis FMVSS light inputs



Figure 55. Body Location, Street Side.

Body Controller Hardware

PROGRAMMABLE CONTROLLERS (CONTINUED)

Tailgate Controller

Mounted in the upper portion of the tailgate this controller manages circuits local to the tailgate, including:

- Strobe Lights
- Work Lights
- Tailgate controls



Figure 56. DuraPack 5000.



Figure 57. PowerTrak Commercial.

CONTROL FUSING

Control Fuses

The control system utilizes two fuses. Fuse #1 (F1) is powered by chassis ignition. Fuse #2 (F2) is battery powered by the cold side of the battery disconnect.

Fusing for RP170 Compliant Chassis

The below fuse holder is typically located within 8" of the RP170 power and ground connector.

On cab over chassis this should be under the doghouse cover. On conventional cab chassis this should be behind the seat.



RP170 POWER AND GROUND	FUSE	CIRCUIT
Ignition Power	F1 (20amp)	Cab Controller (Pin 10, Controller power)
		Cab Controller (Pin 19, Outputs 00-07)
		Cab Controller (Pin 01, Outputs 08-15)
		Body Controller (Pin 01, Outputs 08-15)
		Tailgate Controller (Pin 01, Outputs 08-15)
		In-Cab Display
Battery Disconnect	F2 (20amp)	Body Controller (Pin 10, Controller power)
		Body Controller (Pin 19, Outputs 00-07)
		Tailgate Controller (Pin 10, Controller power)
		Tailgate Controller (Pin 19, Outputs 00-07)
Ignition Power	F3 (10amp)	Spare
	F4 (10amp)	Spare

Body Controller Hardware

CONTROL FUSING (CONTINUED)

Fusing for NON RP170 Compliant Chassis

Non RP170 chassis uses a Power Relay Module, pictured below, with two build-in 20-amp fuses. This module is typically located near the chassis battery disconnect switch.

Remove cover to access fuses.



SOURCE	FUSE	CIRCUIT
Ignition Power	F1 (20amp)	Cab Controller (Pin 10, Controller power)
		Cab Controller (Pin 19, Outputs 00-07)
		Cab Controller (Pin 01, Outputs 08-15)
		Body Controller (Pin 01, Outputs 08-15)
		Tailgate Controller (Pin 01, Outputs 08-15)
		In-Cab Display
Battery Disconnect	F2 (20amp)	Body Controller (Pin 10, Controller power)
		Body Controller (Pin 19, Outputs 00-07)
		Tailgate Controller (Pin 10, Controller power)
		Tailgate Controller (Pin 19, Outputs 00-07)

CONTROL AREA NETWORK

The control system has multiple components that communicate over Control Area Networks or CAN.

- a. In-Cab Display
- b. Cab Controller (32 I/O Mobile Controller Control Module)
- c. Body Controller (32 I/O Mobile Controller Control Module)
- d. Tailgate Controller (32 I/O Mobile Controller Control Module)
- e. Chassis J1939 interface.

There are two discrete networks in the system.

a. CAN1 Network

Communications between the In-Cab Display, Cab, Body, and Tailgate Controller.

b. CH-J1939 Network

Communications between the Cab Controller and the truck chassis J1939.

Chassis J1939 Baud Rate

The cab controller automatically detects and sets the baud rate to match the chassis J1939 baud rate. Upon power up, the controller attempts to receive messages from the chassis with the initial baud rate of 250k. If no messages are received within 3 seconds the controller changes the baud rate to 500K and continues. The controller continues to alternate baud rates every 3 second. If no messages are received within 15 seconds a fault is set, the baud rate will rest at 250K.

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Body Controller Hardware

CONTROL AREA NETWORK (CONTINUED)

Network Schematic



Body Controller Hardware

CONTROL AREA NETWORK (CONTINUED)

System Architecture



SECTION 6 BODY CONTROLLER SOFTWARE

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Body Controller Software

MOBILE CONTROLLER DETAILS: PROGRAM 109-0382

DP5000 & Power Track Commercial Vehicle control system consists of 3 Controller **CR2530 (PN: 254-4912)**. Each Controller consists of 32 Inputs/Outputs. The Heil-2530 controllers operate with a voltage ranging from (8 to 32) Volt DC.

A Mobile Controller Indicator Lights

Each Controller has a two-color LED (Red / Green) that indicates its status. The LED operating status identifications are detailed in the table below.

Color	Status	Descriptions
-	Permanently off	No operating voltage
Red/Green	1x on	Initialization or reset checks
Green	5Hz	No operating system loaded
	2Hz	Application is running (RUN)
	Permanently on	Application stopped (STOP)
Red	5Hz	Application stopped due to under-voltage
	Permanently on	System fault (fatal error)

CONTROLLER & PROGRAM DETAILS

The following information provides details for the controller programs installed.

A. Program Table

Controller	Controller Type	Program Number	Name
1	Heil-2530 Controller (IFM-CR2530)	109-0379	CAB Controller
2	Heil- 2530 Controller (IFM-CR2530)	109-0380	BODY Controller
3	Heil-2530 Controller (IFM-CR2530)	109-0381	TAILGATE Controller
N/A	N/A	109-0382	DISPLAY

B. Inputs

The Controller Inputs are activated by positive +12-volt signals and some Ground signals (some chassis signals). All switches, proximity, pressure, toggle, push buttons, etc., used as input devices to the controller supply a +12-volt signal to a Heil-32 Extended Controller input to turn the input ON unless otherwise specified. With an input ON, the corresponding input field (with Description and Address) shown on the IN-SIGHT display will also be ON.

C. Outputs

During each cycle, the CPU analyzes the status of the inputs and, based on the programming logic, produces the appropriate +12-volt DC outputs.

D. Cab Controller Program

The tables below provide the connection details between the controller input, output and connector pins for program **109-0379**.

CAB CONTROLLER INPUTS				
Program Number:	:	109-0379		
Input Signal	Input Number	Pin Number		
PTO PRESSURE SW.	IN00	55		
LOW TORQUE PRES. SW.	IN01	36		
TRANS TEMP SIG	IN02	54		
CHASSIS NEUTRAL SIG	IN03	35		
PLUGGED	IN04	53		
PLUGGED	IN05	34		
PLUGGED	IN06	52		
PLUGGED	IN07	33		
PLUGGED	IN08	24		
PLUGGED	IN09	41		
PLUGGED	IN10	23		
PLUGGED	IN11	40		
PLUGGED	IN12	22		
PLUGGED	IN13	39		
PLUGGED	IN14	21		
TACH FREQ	IN15	38		
SUPPLY VOLTAGE CONTROLLER BAT	-	10		
SUPPLY VOLTAGE OUTPUT 00-07	-	19		
SUPPLY VOLTAGE OUTPUT 08-15	-	1		

CAB CONTROLLER OUTPUTS			
Program Nu	Program Number:		
Output Signal	Output Number	Pin Number	
SPARE OUT	OUT00	18	
SPARE OUT	OUT01	17	
PTO SOL.	OUT02	16	
PUMP 1 SOL.	OUT03	15	
PUMP 2 SOL.	OUT04	14	
SPARE OUT	OUT05	13	
SPARE OUT	OUT06	12	

Body Controller Software

CAB CONTROLLER OUTPUTS			
Program Number:		109-0379	
Output Signal	Output Number	Pin Number	
SENSOR POWER	OUT07	11	
BODY OUT OF DIM SIG	OUT08	2	
THROTTLE ADV SIG	OUT09	3	
CAMERA REVERSE TRIGGER	OUT10	4	
CAB STROBE	OUT11	5	
SPARE OUT	OUT12	6	
SPARE OUT	OUT13	7	
IN CAB ALARM 1	OUT14	8	
IN CAB ALARM 2	OUT15	9	

E. Body Controller Program

The tables below provide the connection details between the controller input, output and connector pins for program **109-0380**.

BODY CONTROLLER INPUTS				
Program Number:		109-0380		
Input Signal	Input Number	Pin Number		
PLUGGED	IN00	55		
PLUGGED	IN01	36		
HYD. OIL LEVEL OK	IN02	54		
HYD FILTER BYPASS PSW	IN03	35		
PLUGGED	IN04	53		
PLUGGED	IN05	34		
SS TAILGATE LOCKED PROX	IN06	52		
THROTTLE ADVANCE SW	IN07	33		
CS TAILGATE LOCKED PROX	IN08	24		
SIDE DOOR PROX	IN09	41		
RIGHT TURN LIGHT	IN10	23		
LEFT TURN LIGHT	IN11	40		
REVERSE LIGHT	IN12	22		
STOP LIGHT	IN13	39		
TAILLIGHT	IN14	21		
PLUGGED	IN15	38		
SUPPLY VOLTAGE CONTROLLER BAT	-	10		
SUPPLY VOLTAGE OUTPUT 00-07	-	19		
SUPPLY VOLTAGE OUTPUT 08-15	-	1		

BODY CONTROLLER OUTPUTS			
Progra	ım Number:	109-0380	
Output Signal	Output Number	Pin Number	
Not Used	OUT00	18	
Not Used	OUT01	17	
EJECTOR EXTEND SOL	OUT02	16	
EJECTOR RETRACT SOL	OUT03	15	
TAILGATE RAISE SOL	OUT04	14	
SPARE OUT	OUT05	13	
TAILGATE LOWER SOL	OUT06	12	

POWERTRAK® COMMERCIAL

Body Controller Software

BODY CONTROLLER OUTPUTS			
Progra	ım Number:	109-0380	
Output Signal	Output Number	Pin Number	
SENSOR POWER	OUT07	11	
ANTI-BACKPACK	OUT08	2	
SPARE OUT	OUT09	3	
WORK LIGHT #1	OUT10	4	
REVERSE FLOOD LIGHT	OUT11	5	
SPARE OUT	OUT12	6	
STROBE 1	OUT13	7	
STROBE 2	OUT14	8	
SPARE OUT	OUT15	9	

F. Tailgate Controller Program

The tables below provide the connection details between the controller input, output and connector pins for program **109-0381**.

TAILGATE CONTROLLER INPUTS				
Program Numbe	109-0381			
Input Signal	Input Number	Pin Number		
TIPPER CURB SIDE SW	IN00	55		
TIPPER STREET SIDE SW	IN01	36		
PLUGGED	IN02	54		
PLUGGED	IN03	35		
PLUGGED	IN04	53		
PLUGGED	IN05	34		
THROTTLE ADV SW.	IN06	52		
BUZZER SW	IN07	33		
SYSTEM PWR STREET SIDE	IN08	24		
SYSTEM PWR CURB SIDE	IN09	41		
WORK LIGHT SW	IN10	23		
PLUGGED	IN11	40		
SLIDE ACTIVE PRX	IN12	22		
SWEEP ACTIVE PRX	IN13	39		
TAILGATE LOCK PRX	IN14	21		
TAILGATE CLOSE PRX	IN15	38		
SUPPLY VOLTAGE CONTROLLER BAT	-	10		
SUPPLY VOLTAGE OUTPUT 00-07	-	19		
SUPPLY VOLTAGE OUTPUT 08-15	-	1		

TAILGATE CONTROLLER OUTPUTS			
Program Number:		109-0381	
Output Signal	Output Number	Pin Number	
RIGHT TURN LIGHT	OUT00	18	
LEFT TURN LIGHT	OUT01	17	
STOP LIGHT	OUT02	16	
BACK UP LIGHT/ALARM	OUT03	15	
TAILLIGHT	OUT04	14	
CLEARANCE/MARKER LIGHT	OUT05	13	

Body Controller Software

TAILGATE CONTROLLER OUTPUTS			
Progra	ım Number:	109-0381	
Output Signal	Output Number	Pin Number	
TAILGATE OPEN ALARM	OUT06	12	
SENSOR POWER	OUT07	11	
MUNICIPAL FLASH #1	OUT08	2	
MUNICIPAL FLASH #2	OUT09	3	
WORK LIGHT #1	OUT10	4	
REVERSE FLOOD LIGHT	OUT11	5	
SPARE OUT	OUT12	6	
STROBE 1	OUT13	7	
STROBE 2	OUT14	8	
SPARE OUT	OUT15	9	

I/O FUNCTIONS

The following information provides details for the input and output functions for the cab, body, and tailgate controller programs.

A Standard Cab Controller - Input Functions

1. PTO Pressure Switch (IN00 - PIN55)

Function: This input signal monitors the pressure feedback from Power Take-Off (PTO) system.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with PTO engaged

Input Device	Status	I/O Address	Status
Pressure Switch	Deactivated	%IBO	ON

2. Low Torque Pressure Switch (LTPSW) (IN01 - PIN36)

Function: This signal monitors the low torque pressure switch.

Condition	Condition Modifiable Parameters	
А	None	N/A

Function Logic: ON with O.A.I. (Operating at Idle) LTPSW

Input Device	Status	I/O Address	Status
Pressure Switch	Activated	%IB1	ON

3. Transmission Temperature Signal (IN02 - PIN54)

Function: The transmission temperature signal provides feedback on the temperature of the transmission Hydraulic Oil.

A None N/A	Condition	Modifiable Parameters	Default Setting	
	A	None	N/A	

Function Logic: ON with Trans. Over temp. warning

Input Device	Status	I/O Address	Status
Temperature Switch	Activated	%IB2	ON

4. Neutral Signal (IN03 - PIN35)

Function: This signal indicates whether the vehicle is in neutral gear.

Condition	Modifiable Parameters	Default Setting	
А	None	N/A	

Function Logic: ON/OFF with chassis Neutral, Active high or low signal.

Input Device	Status	I/O Address	Status
Pressure Switch	Activated	%IB3	ON

5. Tach Frequency (IN15 - PIN38)

Function: This signal monitors the tachometer frequency or R-stator signal from the engine.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: R-Stator or Tach Sig. used with absence of J1939.

Input Device	Status	I/O Address	Status
Tacho generator	Continuous Signal	%IB15	Engine RPM

B. Standard Cab Controller - Output Functions

1. PTO Solenoid (OUT02 - PIN16)

Function: This output controls the Power Take-Off (PTO) system solenoid.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Power to Clutch shift PTO solenoid

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	A1. Configure-Clutch Shift PTO	Activated	%MX0.0	ON
	A2. Configure-EV Chassis	Activated	%MX2.7	ON
В	System Enable (Ensures no critical faults)	Activated	CAN(HMI)	ON (See Note Below)
С	C1. Configure-Operates in neutral	Deactivated	%MX0.2	OFF
	C2. Neutral Signal	Activated	N/A	ON (See Note Below)
D	Pump Engine over speed (EOS)	Activated	N/A	ON (See Note Below)

Note: Conditions (A1 or A2) AND (B) AND (NOT C1 or C2) AND D will activate the PTO Solenoid.

Condition C to be true, when Input Neutral Sig (In03) is low or high based on configuration of active low neutral signal status. Reference Option Configure Screen [11].

Condition D to be true, When Engine RPM is less than 1000RPM and Reference Pump Section - Hydraulic Drive Control 34 for more details.

2. Pump 1 Solenoid (OUT03 - PIN15)

Function: This output controls a solenoid valve for Pump 1 (Single Vane Pump Manifold).

Condition Modifiable Parameters		Default Setting
A	None	N/A

Function Logic: Power to pump 1 solenoid

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	Enable Hydraulic Pump	Activated	N/A	ON (See Note Below)
В	Configure-Operates at Idle	Deactivated	%MX0.1	OFF
С	Configure-Clutch Shift PTO	Activated	%MX0.0	ON
D	Configure-Pump1 SOL	Activated	%MX0.14	ON
E	E1. Configure-Operates in neutral	Deactivated	%MX0.2	OFF
	E2. Neutral Signal	Activated	N/A	ON
F	Pump Engine over speed (EOS)	Activated	N/A	ON (See Note Below)
G	Configure-Operates at Idle	Activated	%MX0.1	ON

Condition	Function or Component	Status	I/O Address	Status
Н	H1. Throttle Advance SW (BODY Controller input)	Activated	IN07	ON
	H2. Throttle Advance SW (TG Controller input)	Activated	IN06	ON
	H3. Slide Active Prxy (TG Controller input)	Activated	IN012	ON

Note: Condition 1: (A) AND NOT (B) AND(C) AND(D) AND (NOT E1 OR E2) AND F

Condition 2: (A) AND (G) AND (H1 OR H2 OR H3) AND (NOT E1 OR E2) AND F

IF Condition 1 OR Condition 2 will activate pump 1 SOL output.

Condition A to be true when after 500ms PTO SOL is activated OR System enabled.

Condition F to be true when engine RPM is less than 1000RPM and Reference Pump Section - Hydraulic Drive Control 34 for more details.

3. Pump 2 Solenoid (OUT04 - PIN14)

Function: This output controls a solenoid valve for Pump 2.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Power to pump 2 solenoids

Conditions necessary to activate the circuit:

Conditio n	Function or Component	Status	I/O Address	Status
А	Configure-Operates at Idle	Activated	%MX0.1	OFF
В	Enable Hydraulic Pump	Activated	N/A	ON
С	Low Torque Press	Deactivated	NA	OFF (See Note Below)
D	D1. Configure-Operates in neutral	Deactivated	%MX0.2	OFF
	D2. Neutral Signal	Activated	N/A	ON
E	Pump Enable	Activated	N/A	ON (See Note Below)

Note: Conditions (A) AND (B) AND NOT (C) AND (NOT D1 OR D2) AND E will activate PUMP 2 SOL

Condition C to be true when LOW TORQUE PRESS SW (IN01-Pin36) gets Activated.

Condition E to be true when Engine RPM is B/w 1800 to 2000RPM and Reference Pump Section - Hydraulic Drive Control 34 for more details.

4. Sensor Power (OUT07 - PIN11)

Function: This output gives power to input devices connected to the CAB controller.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Power supply to sensors, ON with Ignition

Conditions: When Ignition is in ON and Controller is in ON condition, Sensor Power = ON

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5. Body Out of Dimension Signal (OUT08 - PIN02)

Function: This output controls vehicle cruise control 2 Speed.

Condition	Modifiable Parameters	Default Setting
A=Set MPH	1 to 120MPH (Road Speed Limit)	7MPH

Function Logic: Power to engine control relay, road speed limit or accelerator interlock

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	Configure-Out of Dimension	Activated	%MX0.8	ON
В	Vehicle Speed > Set MPH	Activated	N/A	ON
С	C1. TG Closed Proximity (TG Controller Input)	Deactivated	%IB15 (IN15)	OFF
	C2. System Pwr Curb Side (TG Controller Input)	Deactivated	%IB09 (IN09)	OFF

Conditions (A) AND (B) AND NOT (C1 OR C2) will activate body out of DIM S/g output.

6. Throttle Advance Signal (OUT09 - PIN03)

Function: This output controls the throttle advance signal.

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	Configure-Operates at Idle	Deactivated	%MX0.1	OFF
В	System Enable (Ensures no critical faults)	Activated	CAN(HMI)	ON
С	TG Enable	Activated	CAN(HMI)	ON
D	Neutral Signal	Activated	N/A	ON
F	F1. Throttle Advance SW (BODY Controller input)	Activated	%IB07 (IN07)	ON
	F2. Throttle Advance SW (TG Controller input)	Activated	%IB06 (IN06)	ON
	F3. Slide Active Prxy (TG Controller input)	Activated	%IB12 (IN012)	ON
G	Fault-Roll with TA active	Deactivated	NA	OFF

Conditions (NOT A) AND (B) AND (C) AND (D) AND (F1 OR F2 OR F3) AND NOT(G) will activate Throttle advance signal.

7. Camera Reverse Trigger (OUT10 - PIN04)

Function: This output gives power to camera input.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Power to camera input, back up

Body Controller Software

Condition	Function or Component	Status	I/O Address	Status
A	Reverse Light Signal (Body Controller input)	Activated	%IB12(IN12)	ON

Conditions: Reverse light signal will activate camera reverse trigger signal.

8. Cab Strobe (OUT11 - PIN05)

Function: This output gives power to camera input.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Power to CAB strobe lights

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	A1. Right Turn Signal (BODY Controller input)	De-activated	IN10(%IB10)	OFF
	A2. Left Turn Signal (BODY Controller input)	De-activated	IN11(%IB10)	OFF
В	B1. Strobe Enable	Activated	CAN(HMI)	ON
	B2. Front Strobe Enable	Activated	CAN(HMI)	ON
	B3. Auto Strobe	Activated	NA	ON (See Note Below)

Note: Conditions (NOT (A1 OR A2)) AND (B1 OR B2 OR B3) will activate the strobe light signal.

Condition B3 to be true when auto strobe is enabled in HMI and Vehicle speed is less than 20MPH and NO left or right signal.

9. In Cab Alarm 1 (OUT14 - PIN08)

Function: This output enables Alarm Buzzer-1.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Tailgate PB buzzer Press or Critical Fault

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	A1. Critical Faults	Activated	NA	ON (See Note Below)
	A2. Tailgate Buzzer PB (TG Controller input)	Activated	IN07(%IB07)	ON

Note: Conditions (A1 OR A2) will activate CAB ALARM BUZZER-1

A1 to be true when there's a critical shutdown fault, and this triggers the buzzer as a beep which is generated in a pulse form, lasting 500 milliseconds for both on and off periods of 4 sec or if the fault is reset.
10. In Cab Alarm 2 (OUT15 - PIN09)

Function: This output enables Alarm Buzzer-2.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Tailgate open or operator warning

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	A1. Tailgate Closed Prxy (TG controller input)	Deactivated	IN15(%IB15)	OFF
	A2. Tailgate Unlocked	Activated	NA	ON
	A3. Operator warning Faults	Activated	NA	ON
	A4. Service Mode	Activated	CAN(HMI)	ON

Conditions (A1 OR A2 OR A3 OR A4) will Activate CAB ALARM BUZZER-2

A1: Whenever the tailgate is opening (Feedback monitored from TG closed prxy-IN15)

A2: Tailgate lock sensors (SS and CS LOCK proximity feedback- IN06 and IN08 Body controller inputs) are deactivated, this condition applies only if the tailgate lock/unlock indication option is configured.

A3: Additionally, warnings are triggered if there are operator faults, such as high oil temperature or if the vehicle is moving without locking the tailgate.

A4: If the service screen is opened on the HMI when System Enable activated.

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C. Standard Body Controller - Input Functions

1. Hydraulic Oil Level OK (IN02 - PIN54)

Function: This input signal monitors the hydraulic oil level.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic: ON with hydraulic oil level good.

Input Device	Status	I/O Address	Status
Level switch	Activated	%IB2	ON

2. Hydraulic Filter Bypass PSW (IN03 - PIN35)

Function: Detects if the hydraulic filter bypass switch is activated.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with hydraulic filter not in bypass.

Input Device	Status	I/O Address	Status
Pressure Switch	Activated	%IB3	ON

3. Street-Side Tailgate Locked Prox (IN06 - PIN52)

Function: Provides feedback to confirm the tailgate is locked (sensor on SS) and activates Cab Alarm-2.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with Tailgate lock on SS side

Input Device	Status	I/O Address	Status
Proximity Switch	Activated	%IB6	ON

4. Throttle Advance Switch (IN07 - PIN33)

Function: Activates throttle advance for specific operations requiring higher engine speed.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with body throttle advance switch.

Input Device	Status	I/O Address	Status
Selector Switch	Activated	%IB7	ON

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5. Curb-Side Tailgate Locked Prox (IN08 - PIN24)

Function: Provides feedback to confirm the tailgate is locked (sensor on CS) activates Cab Alarm-2.

Condition	Modifiable Parameters	Default Setting			
А	None	N/A			

Function Logic: ON with Tailgate lock on CS side

Input Device	Status	I/O Address	Status
Proximity Switch	Activated	%IB8	ON

6. Side Door Prox (IN09 - PIN41)

Function: Detects if the side door is open or closed using a proximity sensor.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic: ON with body side door closed and latched.

Input Device	Status	I/O Address	Status
Proximity Switch	Activated	%IB9	ON

7. Right Turn Light (IN10 - PIN23)

Function: Deactivates strobe lights.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with chassis right turn signal.

Input Device	Status	I/O Address	Status
Right turn signal	Activated	%IB10	ON

8. Left Turn Light (IN11 - PIN40)

Function: Deactivates strobe lights.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with chassis left turn signal.

Input Device	Status	I/O Address	Status
Left turn signal	Activated	%IB11	ON

9. Reverse Light (IN12 - PIN22)

Function: Triggers the reverse camera signal and enables the reverse flood lights.

Condition	Modifiable Parameters	Default Setting		
A	None	N/A		
oction Logic: ON with chassis back-up lights				

Function Logic: ON with chassis back-up lights.

	Input Device	Status	I/O Address	Status
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Reverse turn ON signal	Activated	%IB12	ON
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10. Stop Light (IN13 - PIN39)

Function: Activates the brake lights when the brake pedal is pressed.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with chassis brake lights.

Input Device	Status	I/O Address	Status
Brake signal	Activated	%IB13	ON

11. Taillight (IN14 - PIN21)

Function: Activates the rear taillights and work light.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with chassis taillights.

Input Device	Status	I/O Address	Status
Taillight signal	Activated	%IB14	ON

D. Standard Body Controller - Output Functions

1. Ejector Extend Solenoid (OUT02 - PIN16)

Function: This output controls the ejector extend solenoid.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Power to the ejector extend solenoid (SOL) activates when the ejector extend (PB) is pressed. (Switch bank input)

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	Configure-Pneumatic Valve enabled	Activated	CAN(HMI)	ON
В	Condition for Allow Eject	Activated	NA	ON (See Note Below)
С	Communication Disconnection- BODY Controller	Deactivated	NA	OFF
D	Communication Disconnection- CAB & TG Controller	Deactivated	NA	OFF
E	System Enable (Ensures no critical faults)	Activated	CAN	ON
F	OSC Enable	Activated	NA	ON (See Note Below)
G	SWITCH 3 UP BUTTON-PB	Activated	CAN(SWB)	ON

Conditions: (A) AND (B) AND NOT (C) AND NOT (D) AND (E) AND (F) AND (G) will activate ejector extend solenoid output.

Condition B always be true.

Condition F to be true, when the vehicle is in neutral (input from CAB controller = IN03) and SWITCH 1 UP PB is pressed (SWB).

Condition F to be false, when the vehicle is not in neutral and if TG open or TG unlock is initiated.

Note: EJECTOR EXTEND SOL can be activated from HMI display and conditions A, B, C, D and F remains the same.

2. Ejector Retract Solenoid (OUT03 - PIN15)

Function: This output controls the ejector extend solenoid.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Power to the ejector retract solenoid (SOL) activates when the ejector retract (PB) pressed. (Switch bank input)

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	Configure-Pneumatic Valve enabled	Activated	CAN(HMI)	ON
В	Condition for Allow Eject	Activated	NA	ON (See Note Below)
С	Communication Disconnection-	Deactivated	NA	OFF

Condition	Function or Component	Status	I/O Address	Status
	BODY Controller			
D	Communication Disconnection- CAB & TG Controller	Deactivated	NA	OFF
Е	System Enable (Ensures no critical faults)	Activated	CAN	ON
F	OSC Enable	Activated	NA	ON (See Note Below)
G	SWITCH 3 DOWN BUTTON-PB	Activated	CAN(SWB)	ON

Conditions: (A) AND (B) AND NOT (C) AND NOT (D) AND (E) AND (F) AND (G) will activate Ejector retract solenoid output.

Condition B always true.

Condition F are true, when the vehicle is in neutral (input from CAB controller = IN03) and SWITCH 1 UP PB is pressed (SWB).

Condition F is false, when the vehicle is not in neutral gear and if TG open or TG unlock is initiated.

Note: EJECTOR RETRACT SOL is activated from HMI display and conditions A, B, C, D and F remains the same.

3. Tailgate Raise Solenoid (OUT04 - PIN14)

Function: This output controls the ejector retract solenoid.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Power to the tailgate raise solenoid (SOL) activates when the tailgate raise (PB) is pressed. (Switch bank input)

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	Configure-Pneumatic Valve enabled	Activated	CAN(HMI)	ON
В	Communication Disconnection- BODY Controller	Deactivated	NA	OFF
С	Communication Disconnection- CAB & TG Controller	Deactivated	NA	OFF
D	System Enable (Ensures no critical faults)	Activated	CAN	ON
E	OSC Enable	Activated	NA	ON (See Note Below)
F	SWITCH 2 UP BUTTON-PB	Activated	CAN(SWB)	ON

Conditions: (A) AND NOT (B) AND NOT (C) AND (D) AND (E) AND (F) will activate ailgate raise solenoid output.

Condition E to be true, when vehicle is in neutral (input from CAB controller=IN03) and SWITCH 1 UP PB is pressed (SWB).

Condition E to be false, when vehicle is not in neutral and if TG open or TG unlock is initiated.

Note: Tailgate raise SOL can be activated from HMI display and conditions A, B, C, and D remains the same.

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4. Tailgate Lower Solenoid (OUT04 - PIN14)

Function: This output controls the ejector retract solenoid.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Power to the Tailgate Lower solenoid (SOL) activates when the tailgate lower (PB) pressed. (Switch bank input)

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	Configure-Pneumatic Valve enabled	Activated	CAN(HMI)	ON
В	Communication Disconnection- BODY Controller	Deactivated	NA	OFF
С	Communication Disconnection- CAB & TG Controller	Deactivated	NA	OFF
D	System Enable (Ensures no critical faults)	Activated	CAN	ON
E	OSC Enable	Activated	NA	ON (See Note Below)
F	SWITCH 2 DOWN BUTTON-PB	Activated	CAN(SWB)	ON

Conditions: (A) AND NOT (B) AND NOT (C) AND (D) AND (E) AND (F) will activate Tailgate lower solenoid output.

Condition E to be true, when the vehicle is in neutral (input from CAB controller = IN03) and SWITCH 1 UP PB is pressed (SWB).

Condition E to be false, when Vehicle is not in Neutral gear and If TG open or TG unlock is initiated.

Note: Tailgate lower SOL can be activated from HMI display and conditions A, B, C, and D remains same.

5. Sensor Power (OUT07 - PIN11)

Function: This output gives power to input devices that are connected to the BODY controller.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic: Power supply to sensors, ON with ignition

Conditions: When the ignition is ON and the controller is in the ON condition, Sensor Power = ON

6. Anti-backpack (OUT08 - PIN02)

Function: This output controls the anti-backpack relay.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic: Power to anti-backpack relay when TG is closed.

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	Configure-Anti Backpack	Activated	CAN(HMI)	ON

Condition	Function or Component	Status	I/O Address	Status
В	Configure-Pneumatic Valve enabled	Deactivated	CAN(HMI)	OFF
С	TG Closed Proximity (TG Controller Input)	Activated	%IB15(IN15)	ON

Conditions: (A) AND NOT (B) AND (C) will activate the anti-backpack relay.

7. Work Light #1 (OUT10 - PIN04)

Function: This output controls the work lights.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Power to front of body work light is activated by taillight input signal.

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	Auto work light enable	Activated	CAN(HMI)	ON
В	System Enable (Ensures no critical faults)	Activated	CAN(CAB)	ON
С	Taillight Signal	Activated	%IB14(IN14)	ON
D	Vehicle Speed< 20MPH (CAB Controller data)	Activated	CAN(CAB)	ON

Conditions: (A) AND (B) AND (C) AND (D) will activate WORK LIGHT #1

Note: Work light can also be activated from the HMI selection.

8. Reverse Flood Light (OUT11 - PIN05)

Function: This output controls the reverse flood lights.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic: Power to the reverse flood lights is activated by the reverse light input signal.

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	Reverse Light Signal	Activated	%IB12(IN12)	ON
В	Aux Light enable	Activated	CAN(HMI)	ON

Conditions: (A) OR (B)

9. Cab Strobe - 1 (OUT13 - PIN07)

Function: This output controls the CAB strobe lights.

Condition Modifiable Parameters		Default Setting
А	None	N/A

Function Logic: Power to the front of body oval strobe.

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	A1. Right Turn Signal	Deactivated	IN10(%IB10)	OFF
	A2. Left Turn Signal	Deactivated	IN11(%IB10)	OFF
В	B1. Strobe Enable	Activated	CAN(HMI)	ON
	B2. Front Strobe Enable	Activated	CAN(HMI)	ON
	B3. Auto Strobe	Activated	NA	ON (See Note Below)

Note: Conditions: (NOT (A1 OR A2)) AND (B1 OR B2 OR B3) will activate strobe - 1 light signal.

Condition B3 to be true when auto strobe is enabled in HMI and the vehicle speed is less than 20MPH and NO left or right signal and System Enable (Ensures no critical faults).

10. Cab Strobe - 2 (OUT14 - PIN08)

Function: This output controls the CAB strobe - 2 lights.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic: Power to the front of body 360 strobe lights.

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	A1. Strobe Enable	Activated	CAN(HMI)	ON
	A2. Front Strobe Enable	Activated	CAN(HMI)	ON
	A3. Auto Strobe	Activated	NA	ON (See Note Below)

Note: Conditions (A1 OR A2 OR A3) will activate the strobe-2 light signal.

Condition B3 to be true when auto strobe is enabled in HMI, and the vehicle speed is less than 20MPH and NO left or right signal and System Enable (Ensures no critical faults).

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E. Standard Tailgate Controller - Input Functions

1. Tipper Curb-Side Switch (IN00 - PIN55)

Function: This input signal enables the tipper interlocks and street-side tipper cycle count.

Condition	Modifiable Parameters	Default Setting			
А	None	N/A			
 unction Logic: ON with cart tipper activated, curbside and when configure tipper interlock is enabled					

Function Logic: ON with cart tipper activated, curbside and when configure tipper interlock is enabled.

Input Device	Status	I/O Address	Status
Selector Switch	Activated	%IB0	ON

2. Tipper Street-Side Switch (IN01 - PIN36)

Function: This input signal enables the tipper interlocks and curbside tipper cycle count.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic: ON with cart tipper activated, curb side and when configure tipper interlock is enabled.

Input Device	Status	I/O Address	Status
Selector Switch	Activated	%IB1	ON

3. Throttle Advance Switch (IN06 - PIN52)

Function: Enables throttle advance output signal to activate relay.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with tailgate throttle advance switch.

Input Device	Status	I/O Address	Status
Selector Switch	Activated	%IB6	ON

4. Buzzer Push Button (IN07 - PIN33)

Function: Enables CAB alarm - 1.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with tailgate buzzer PB.

Input Device	Status	I/O Address	Status
Push Button	Activated	%IB7	ON

5. System Power Street-Side (IN08 - PIN24)

Function: Enables critical faults to shut down pumps and throttle advance signal (SS).

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with tailgate shut down switch pulled out, street side.

Input Device	Status	I/O Address	Status
Switch	Activated	%IB8	ON

6. System Power Curb-Side (IN08 - PIN24)

Function: Enables critical faults to shut down pumps and throttle advance signal (CS).

Condition	Modifiable Parameters	Default Setting		
А	None	N/A		
 unation Lanier ON with tellecte shutdown switch mulled out, such side				

Function Logic: ON with tailgate shutdown switch pulled out, curb side.

Input Device	Status	I/O Address	Status
Switch	Activated	%IB9	ON

7. Work Light Switch (IN10 - PIN23)

Function: Enables work light-1.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with tailgate work light switch.

Input Device	Status	I/O Address	Status
Switch	Activated	%IB10	ON

8. Slide Active Proxy (IN12 - PIN22)

Function: Enables tailgate pack cycle count.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic: ON with tailgate slide control lever activated and no electric tailgate valve.

Input Device	Status	I/O Address	Status
Proximity switch	Activated	%IB12	ON

9. Sweep Active Proxy (IN13 - PIN39)

Function: Optional.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with tailgate sweep control lever activated and no electric tailgate valve.

Input Device	Status	I/O Address	Status
Proximity switch	Activated	%IB13	ON

10. Tailgate Lock Proxy (IN14 - PIN21)

Function: Ensures tailgate lock status and enables alarm if unlocked.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with tailgate locked (optional).

Input Device	Status	I/O Address	Status
Proximity Switch	Activated	%lB14	ON

11. Tailgate Close Proxy (IN15 - PIN38)

Function: Ensures tailgate is closed and enables alarm if not.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: ON with tailgate closed.

Input Device	Status	I/O Address	Status
Proximity Switch	Activated	%IB15	ON

F. Standard Tailgate Controller - Output Functions

1. Right Turn Light (OUT00 - PIN18)

Function: This output controls the right turn signals.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic: Power to right turn signal input if smart function strobe option is enabled.

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	A1. Right turn signal (IN10 Body Controller input)	Activated	CAN	ON
	A2. Controllers' heartbeat error	Activated	NA	ON

Note: Conditions (A1 OR A2) will activate right turn light signal.

2. Left Turn Light (OUT01 - PIN17)

Function: This output controls the left turn signals.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic: Power to left turn signal input if smart function strobe option is enabled.

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	A1. Left turn signal (IN11 Body Controller input)	Activated	CAN	ON
	A2. Controllers' heartbeat error	Activated	NA	ON

Note: Conditions (A1 OR A2) will activate left turn light signal.

3. Tailgate Open Alarm (OUT06 - PIN12)

Function: This output enables the tailgate alarm.

Condition	Modifiable Parameters	Default Setting
А	None	N/A

Function Logic: Power to Tailgate Open Audible Alarm.

Conditions necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
А	Ignition	Activated	NA	ON
В	Tailgate closed Proximity	Deactivated	IN15	OFF
С	Tailgate function operated from HMI	Activated	CAN	ON

Note: Conditions (A AND NOT B) OR (C) will activate the tailgate open alarm.

4. Sensor Power (OUT07 - PIN11)

Function: This output gives power to input devices connected to the TG controller.

Condition	Modifiable Parameters	Default Setting	
А	None	N/A	

Function Logic: Power supply to sensors, ON with ignition.

Conditions: When the ignition is in ON and the controller is in ON condition, sensor power = ON.

SECTION 7 SCHEMATICS



REF.	PART No.	DESCRIPTION	QTY.
1	108-6461-001	CONNECTOR, 3 POS, PLUG	1
2	108-6461-002	CONNECTOR, 3 POS, RECEPT	1
3	108-6461-011	CONNECTOR, 2 POS, PLUG	5
4	108-6461-012	CONNECTOR, 2 POS, RECEPT	5
5	108-8588-011	CONNECTOR, 12 POS, RECEPT, A KEY	1
6	108-8588-013	CONNECTOR, 12 POS, PLUG, A KEY	1
7	108-8721-001	OVERMOLDED TERM, FEMALE 0.18 BULLET	4
8	108-8721-004	OVERMOLDED PLUG, 3 WIRE, 90°	2
9	108-8721-005	OVERMOLDED PLUG, 2 WIRE, 90°	2
10	108-8721-006	3 WIRE CAP	2







	WHITE "OPOLIND"
	WHITE GROUND
	GREEN "GROUND "
	GREEN "R TURN"
	YELLOW "L TURN"
	ORANCE "SIDE DOOR"
	ORANGE SIDE DOUR
	GRAY WORK LI #1
	GRAY "SIDE FLOOD"
)	GRAY "STROBE 1"
	GRAY "STROBE 2"
,	



N/C

- GROUND

REF PINOUT 108-8721-005

RED

WHITE



		BROWN "GROUND" GND N/A - GREEN "R TURN" TURN	BROWN "GROUND" GND BROWN "GROUND" GND BROWN "TAIL" TAIL RED "STOP" STOP	BV BROWN *GROUND* RAY *T/G ALARM* BLUE *BACK-UP* PIN-A		
TG SIDE		T	T			
PIN-A PIN-B		6				
				\$		
PIN-E	BLACK" CLEAR"					
PIN-F	BROWN "GROUND" 16AWG		¢			
	—BLACK SENSOR PW R —PLUGGED					
PIN-J	PLUGGED					
PIN-K						
PIN-L	-PLUGGED					
PIN-M	-PLUGGED					
	—GRAT WORK LI # 1 —PILIGGED					
PIN-P	PLUGGED					
	ODANOE "OVOTEN DOWED OW OO"					
	-ORANGE STSTEM POWER SW C S					
PIN-S	ORANGE "T/A SW"					
	ORANGE "BUZZER SW"					
	-ORANGE US HIPPER -ORANGE "IN02"					
PIN-W	WHITE "GROUND" 16AWG					
PIN-X	PLUGGED					







STOP / TURN / STROBE -







ſ]		
	CAP		
	GOLD TERM **GOLD TERM** **GOLD TERM**	CAP CAP	
CAN1	DIN C B A	A A A A A A A A A A A A A A A A A A A	
1 RAY "CAMERA LIGHTS" ANGE "SLIDE ACTIVE" HITE "GROUND"	BLACK BLACK NEUTRAL SHEILD SHEILD	RED "BATTERY" 12 AWG BLACK "IGNITION" 12 AWG WHITE "GROUND" 12 AWG BROWN "GROUND" 12 AWG	
AY "STROBE 2"			
ACK "SENSOR PW R" HTE "GROUND"))		
ANGE "T/G CLOSED" REEN "GROUND"			
ACK "CLEAR" ACK EUTRAL HIELD ED "BATTERY" 12 AWG LACK "IGNITION" 12 AWG	WG		
ROWN "GROUND" 12 AW	WG		





	CAP	PUMP PTO	
PLUGGED	PIN-1	PIN-1	RED "PUMP 2 SOL"
PLUGGED	PIN-2	PIN-2	RED "PUMP 1 SOL"
PLUGGED	PIN-3	PIN-3	RED "PTO SOL"
PLUGGED	PIN-4	PIN-4	WHITE "GROUND"
	PIN-5	PIN-5	ORANGE "PTO PRESS SW"
	PIN = 6		
			YELLOW "INO1"
	PIN = 8	PIN = 8	BLACK "SENSOR PWR"
	1 11 1 0		



REF	PART No	DESCRIPTION	QTY
1	108-6461-001	CONNECTOR, 3 POS PLUG	1
2	108-6461-007	CONNECTOR, 8 POS PLUG	3
3	108-6461-008	CONNECTOR, 8 POS RECEPTACLE	2
4	108-6461-009	CONNECTOR, 12 POS PLUG	1
5	108-6461-153	DT 3 WAY RECEPTACLE FLANGE	1
6	108-8411-003	CONNECTOR, 4 POS RECEPTACLE	1
7	108-8450-001	CAP, HEAT SHRINK	5
8	108-8572-001	IFM CONNECTOR 55 POLE	1
9	108-8588-001	DTM, 2 POS PLUG,	1
10	108-8588-002	DTM, 2 POS RECEPTACLE,	1
11	108-8588-017	DTM, 2 POS PLUG, BLUE	1
12	108-8588-018	DTM, 2 POS RECEPTACLE, BLUE	1
13	108-8588-200	2 PIN 1200HM DTM RESISTOR	1
14	108-8712-009	CONNECTOR, 9 POS, RECEPTACLE	1
15	108-8712-09C	CONNECTOR, 9 POS, CAP	1

HARNESS, CAB CONTROLLER CONVENT CAB, NON RP170 263-1882-001 07/25/2023, REV C

CAP	PUMP PTO	
PLUGGED PIN-1 PLUGGED PIN-2 PLUGGED PIN-3 PLUGGED PIN-4 PLUGGED PIN-5 PLUGGED PIN-6 PLUGGED PIN-7	PIN-1 PIN-2 PIN-3 PIN-4 PIN-5 PIN-6 PIN-7	RED RED WHI WHI WHI
PLUGGED PIN-8	PIN-8	-BLA





REF.	PART No.	DESCRIPTION	QTY.
1	108-4815-207	CONNECTOR, 31 POS PLUG (RP170 D-1)	1
2	108-4815-209	CONNECTOR, 8 POS PLUG (RP170 D-1A)	1
3	108-6461-001	CONNECTOR, 3 POS PLUG	1
4	108-6461-003	AT 4 POS PLUG	1
5	108-6461-004	AT 4 POS RECEPTACLE	1
6	108-6461-007	CONNECTOR, 8 POS PLUG	2
7	108-6461-008	CONNECTOR, 8 POS RECEPTACLE	2
8	108-6461-009	CONNECTOR, 12 POS PLUG	1
9	108-6461-153	DT 3 WAY RECEPTACLE FLANGE	1
10	108-7112-010	FUSE 10 AMP MINI BLADE	2
11	108-7112-020	FUSE 20 AMP MINI BLADE	2
12	108-8411-003	CONNECTOR, 4 POS RECEPTACLE	1
13	108-8450-001	CAP, HEAT SHRINK	7
14	108-8572-001	IFM CONNECTOR 55 POLE	1
15	108-8588-001	DTM, 2 POS PLUG, BLUE	1
16	108-8588-002	DTM, 2 POS RECEPTACLE, BLUE	1
17	108-8588-017	DTM, 2 POS PLUG, BLUE	1
18	108-8588-018	DTM, 2 POS RECEPTACLE, BLUE	1
19	108-8588-200	2 PIN 1200HM DTM RESISTOR	1
20	108-8610	BUSSMANN MINI FUSE HOLDER	1
21	108-8712-009	CONNECTOR, 9 POS, RECEPTACLE	1
22	108-8712-09C	CONNECTOR, 9 POS, CAP	1

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HEIL ENVIRONMENTAL WARRANTY STATEMENT

The Heil Co. d/b/a Heil Environmental ("Heil") warrants its solid waste collection equipment to be free from defects in material and workmanship under normal use for a period of one (1) year or 2000 hours of operation (whichever comes first) from the date of equipment In-Service or during the period of coverage offered by an extended warranty program, when proper service and maintenance as described in Heil Service Bulletins and Parts & Service Manuals are performed. The standard or extended equipment warranty is not transferable except for sales demonstration units.

This warranty is expressly limited to the repair or replacement of any component or part thereof, of any such refuse or recycling collection body manufactured by Heil that is proven to Heil's satisfaction to have been defective in material or workmanship. Such components or parts shall be repaired or replaced at Heil's option without cost to the standard purchaser for parts and labor provided such unit is returned to an authorized Heil Distributor for replacement or repair. The repair or replacement must be made during the standard or extended warranty coverage period. Before any warranty can be allowed on new equipment, a validated warranty registration form must be on file with Heil's Customer Service Department within sixty (60) days of the equipment's In-Service date. Wear items are excluded from warranty coverage.

All OEM service parts sold by Heil have a six (6) month warranty from the date of purchase. Aftermarket parts purchased from Heil are supported by a 90-day warranty. The parts warranty covers parts only, providing that factory inspection reveals a defect in material or workmanship. Labor, troubleshooting, equipment downtime, etc. is not covered under the parts warranty policy.

HEIL MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND MAKES NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE. HEIL DOES NOT ASSUME ANY LIABILITY OR ACCEPT CLAIMS FOR LOSS OF PROFITS, PRODUCT DOWN TIME OR ANY OTHER DIRECT, INCIDENTAL OR INDIRECT CONSEQUENTIAL LOSSES, COSTS, DAMAGES OR DELAYS.

Any improper use, operation beyond rated equipment or component capacity, substitution of parts that are not Heil-approved, or any alteration or repair by others in such a manner as in Heil's sole judgment affect the product operation or integrity shall void the warranty.

Other than the extension of the standard warranty period purchased under a supplemental Heil Extended Warranty Program, no employee or representative is authorized to modify this warranty in any way nor shall any other warranties be granted. No dealer-supplied warranty program is endorsed or supported by Heil.

Heil retains the right to modify its factory warranty program prospectively at any time.

The statements included herein is merely a summary of the full Limited Warranty provided by Heil. Please see the full limited warranty as outlined at https://www.heil.com/warranty/ under Heil Warranty Policies and Procedures



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