DuraPack® Python®

HIGH-PERFORMANCE AUTOMATED SIDE LOADER

OPERATION MANUAL

ISSUED JULY 2024

⚠ WARNING

Failure to follow all instructions and safety precautions in this manual, in the Service Manual, in other manufacturers' 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 this Operation Manual, the Service Manual for this unit, other applicable manufacturers' 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.

READ THIS MANUAL!

EVERY PERSON who will **OPERATE, MAINTAIN, REPAIR, OR OTHERWISE WORK** with the Heil unit **MUST READ AND UNDERSTAND** this entire Operator's Manual before starting the engine or activating any switches or controls. **MAKE SURE** to read the Service Manual for the unit **BEFORE** you do any maintenance or repair procedures.

ALL USERS of this equipment must be trained professionals who understand how the machine operates and know how to avoid the risks associated with driving the vehicle and with picking up, compacting, and dumping refuse in an ever-changing traffic environment.

If you do not understand an operation or instruction, seek additional help or instruction from a qualified source **BEFORE** you operate the unit.

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Issued July 2024

DuraPack Python

NOTES:

SECTION 1
INTRODUCTION

PREVIEW

Read this section to learn about:

- The responsibilities of the owner, the operator, and the mechanic
- Warranty information
- Telephone numbers and website URL for parts, technical support, warranty claims, training and manuals
- Identifying the different models
- Identifying the left (street side) of the unit
- The body and lift serial plates
- Various parts of the unit

HOW TO USE THIS MANUAL

Product Variance

This manual may cover options not included on your unit. Also, the location and appearance of the controls on your unit may be different than those shown in this manual. Make sure you know the location of the controls and how to properly operate the controls on your unit before operation.

Manual Sections

This manual is divided into thirteen (13) sections.

1. Introduction
2. Safety Messages and Decals
3. Lock-Out/Tag-Out Procedures
4. Features, Controls, Switches, and Indicator Lights
5. Body and Tailgate Props
6. Daily Checklist
7. Before Going on Route
8. On-Route Operation Procedures
9. Landfill/Transfer Station/Recycle Center Procedures
10. End of Day Procedures
11. Cortex Controller™
12. Preventive Maintenance Chart
13. Lubrication Guide
11.

Terminology

This manual uses terminology that is defined in the **Glossary** which is in Section 1, Introduction.

Directives

When we give directions for using the equipment, we capitalize key words. These words are usually a command followed by a result.

For example, “MOVE the body raise switch to LOWER ...”.

*Use of **Bold** and CAPITAL Letters*

We also put some words in **BOLD AND CAPS** for emphasis, usually related to safety or something of other importance, such as “**MAKE SURE** you close the side doors”.

We put some words in just bold for emphasis, such as “All warranty repairs **must** be performed by …”.

Each DANGER, WARNING, and CAUTION notice precedes its applicable text.

TO THE OWNER

This manual is designed to help ensure safe, efficient and proper operation of The Heil Co. d/b/a Heil Environmental ("Heil") DuraPack® Python® Automated Side Loader (ASL) refuse collection vehicle (or the unit).

The manual will familiarize you with the unit and will give you proper operating procedures and tips.

For chassis operation and maintenance instructions, see the Chassis Owner's Manual and the DuraPack® Python® Service Manual.

As the owner, you have several responsibilities:

- You must complete and return the warranty registration for the unit to Heil.
- You must make sure that each operator has the proper driver's license.
- You must make sure that the operator does not operate the unit under the influence of drugs or alcohol.
- You must make sure that the unit is properly maintained to meet all local, state and federal requirements along with FMCSA (Federal Motor Carrier Safety Administration) and DOT (Department of Transportation) .
- You must keep the vehicle maintained and properly adjusted to meet the manufacturer's standards and recommendations.
- You must keep accurate records of daily inspections, breakdowns, malfunctions, maintenance and repairs of the unit.
- You must make sure that repairs are made that may affect the safe operation of the unit before it is made available for operation.
- You must provide adequate lighting on the unit for safe operation under low light or night conditions.
- You must provide adequate training for each operator and mechanic that will operate the unit BEFORE an operator goes on route or BEFORE a mechanic performs maintenance or repair procedures.
- You must determine if an operator or mechanic has difficulties reading or understanding this manual. When a person has difficulties reading or understanding this manual, you must provide adequate assistance so that the person does understand the material in this manual.
- You must make sure that each operator uses the equipment on a route as given in the instructions of this manual and other manufacturers' manuals.
- You must provide on-going training for each operator and mechanic that operates the unit.
- You must make sure that this manual stays with the vehicle at all times.

Properly operated and maintained, your DuraPack® Python® unit should give you years of low-cost, trouble free service.

TO THE OPERATOR

⚠ 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 may result in injury or death to operators or bystanders.

NOTICE

For Compressed Natural Gas (CNG) units, this Operation 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.

As the operator of the unit, you have several responsibilities:

- You must have a valid driver's license.
- You must understand and follow all manufacturers' instructions for equipment operation.
- You must observe pertinent laws and regulations.
- Do not use drugs or alcohol while you operate the unit.
- You must read, study and understand all procedures and requirements of this Operation Manual before you operate the unit for the first time.If you do not understand or have difficulty reading this manual, YOU MUST tell the owner or designated person before you operate the unit. DO NOT operate the unit until you understand the procedures and requirements of this manual.
- You must receive proper training before you operate (or service and maintain) the unit. If you have not been trained, you must inform the owner.
- You must perform a daily inspection of the unit before you go on route. Refer to the **Daily Checklist** 69.
- You must make sure that all decals and labels are clean and readable.
- You must report to the owner (or the designated person) any and all deficiencies, malfunctions or problems you find during the daily inspection.
- You must read, understand and obey all safety messages and decals that are on the outside or in the cab of the unit.

TO THE OPERATOR (CONTINUED)

- Always use your employer's Lock-Out/Tag-Out procedures. If your employer does not have Lock-Out/Tag-Out procedures, use the **Lock-Out/Tag-Out Procedure** 51 in this manual.
- Before you start the engine or operate the unit for the first time
  - You must clear the area of other people.
  - You must learn and practice safe use of all controls and indicators before you operate the unit in a collection route environment or before you do repair or maintenance procedures.
- Before each time you start the engine or operate the unit, you must clear the area of other people.
- Before you operate the unit in reverse, you must make sure the area behind the unit is clear of other people, vehicles or other obstructions.
- You must make sure the unit is on hard, stable ground when you unload refuse at the landfill or transfer station.

TO THE MECHANIC

⚠ WARNING

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 may result in injury or death to operators or bystanders and/or damage to the unit or other property.

⚠ WARNING

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

NOTICE

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 **Customer Service and Repair Parts Contact Information** 11.

TO THE MECHANIC (CONTINUED)

As the mechanic of the unit, you have several responsibilities:

- You must have a valid driver's license if you operate the unit on a public road.
- You must understand and follow all manufacturers' instructions for equipment operation.
- You must observe pertinent laws and regulations.
- Do not use drugs or alcohol while you service or operate the unit.
- You must read, study and understand all procedures and requirements of this Operation Manual and the Service Manual before you operate the unit for the first time.
- If you do not understand or have difficulty reading this manual or the Service Manual, You must tell the owner or designated person before you operate or service the unit.
- DO NOT operate or service the unit until you understand the procedures and requirements of this manual and the Service Manual.
- You must receive proper training before you operate or service and maintain the unit. If you have not been trained, you must inform the owner.
- You must read, understand, and obey all safety messages and decals that are on the outside or in the cab of the unit.
- Always use your employer's Lock-Out/Tag-Out procedures. If your employer does not have Lock-Out/Tag-Out procedures, use the **Lock-Out/Tag-Out Procedure** 51 in this manual.
- Before you start the engine or operate the unit for the first time:
  - You must clear the area of other people
  - You must learn and practice safe use of all controls and indicators before you operate the unit or before you do repair or maintenance procedures.
- Before you operate the unit in reverse, you must make sure the area behind the unit is clear of other people, vehicles or other obstructions.

⚠ WARNING

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

WARRANTY CLAIMS AND INQUIRIES

The HEIL ENVIRONMENTAL WARRANTY STATEMENT is printed on the inside, back cover of this manual. Should a failure occur that is covered by this warranty, contact the nearest Heil dealer for warranty repair unless otherwise authorized by Heil.

For all parts, warranty claims, and inquiries, please give the dealer or service center the unit's model and serial number located on the body serial plate. See **Serial Plate Location** page for the location of the body serial plate.

CONTACT INFORMATION

Customer Care
Phone: 866-275-4345

Technical Service
Phone: 866-310-4345

Parts Central
Phone: 800-528-5308

4301 Gault Avenue North
Fort Payne, AL 35967
www.heil.com

MODELS

The DuraPack Python has four body models:

- Eject
- Service Hoist
- Serviceable Eject (Service Lift)
- Dump

Eject, Service Hoist, and Serviceable Eject (Service Lift) models use a Packer/Eject panel and two cylinders to compact the refuse from the hopper into the body (packer mode) and to push all of the refuse from the body (eject mode).

The Eject and Serviceable Eject (Service Lift) body models do not have Service Hoist Cylinders.

The Serviceable Eject (Service Lift) body model requires an external hoist and cable to raise the body a short distance for service and maintenance operations.

The Service Hoist body model is an Eject body with two service hoist cylinders to raise the body a short distance for service and maintenance operations.

The Dump body model is a Dump body with two hoist cylinders to raise the body to dump and empty the refuse.

SERIAL PLATE LOCATIONS

You determine the sides of the unit by facing the direction of forward travel. The left side is the street side and the right side is the curb side. The figure below shows the location of the serial plate on the streetside of the unit's body. See the next page for a description of the information that is on the serial plate.

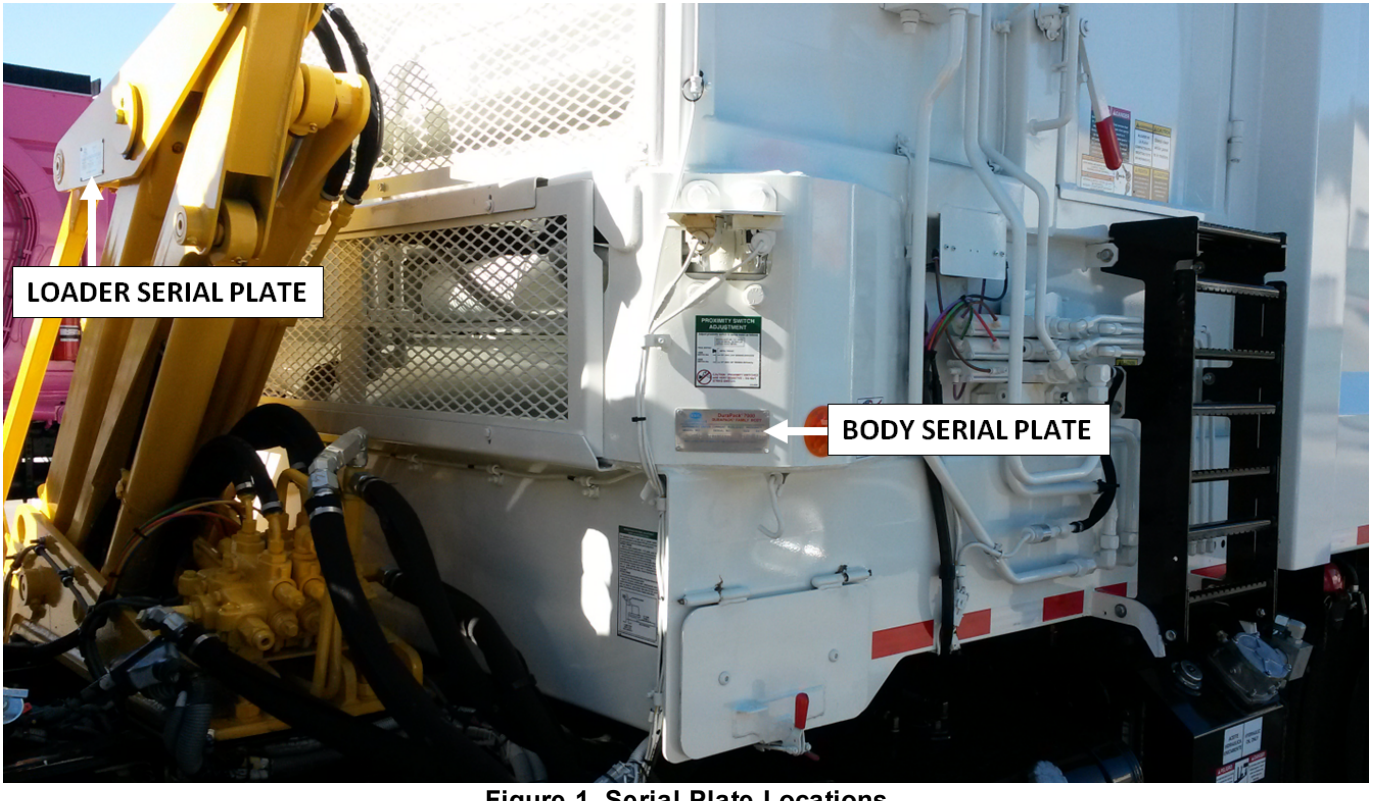
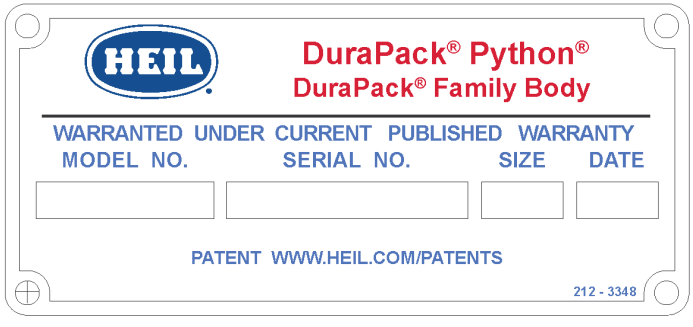


Figure 1. Serial Plate Locations

READING THE SERIAL PLATE

The serial plate is the “birth certificate” of the unit. See the figure below.



Information stamped in the boxes on the serial plate indicates:

Model number:
612-nnnn (“n” is any single-digit number)

Unit’s unique serial number

Body size (cu. yd.)

Date of manufacture (last number of the year followed by the number of the day of the year, e.g. J078 is year 2018 and the 78th day of 2018).

NOTICE

The code for the year of manufacture is in accordance with FMVSS 115. See the following table.

Year of Manufacture			
Year Code	**Year**	**Year Code**	**Year**
5	2005	F	2015
6	2006	G	2016
7	2007	H	2017
8	2008	J	2018
9	2009	K	2019
A	2010	L	2020
B	2011	M	2021
C	2012	N	2022
D	2013	P	2023
E	2014	R	2024

PRODUCT NOMENCLATURE

The figure below shows the major components and their typical location on the unit. See the following pages for brief descriptions of each component shown below.

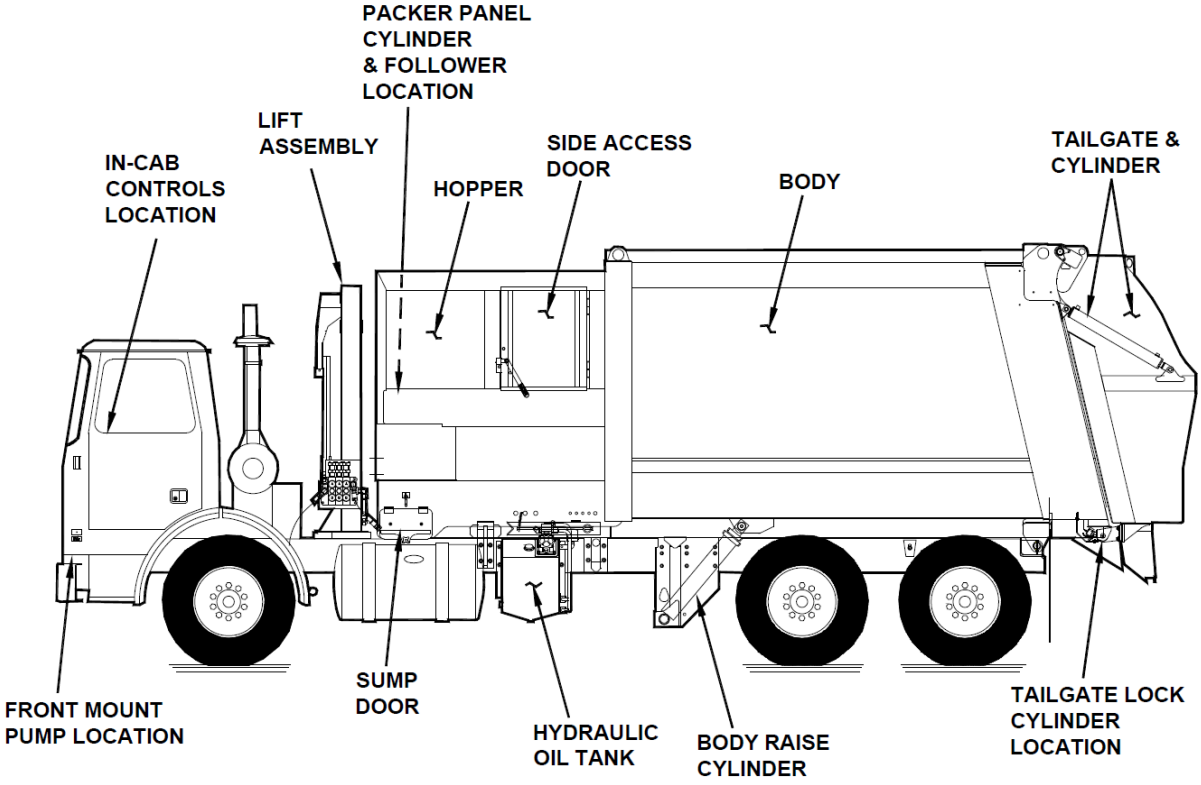


Figure 2. Product Nomenclature

PRODUCT NOMENCLATURE (CONTINUED)

Hydraulic Pump - The unit's hydraulic pump provides the oil flow for the hydraulic system. It is located either in front of the unit's engine or underneath the unit, powered by the transmission through a Power Take-Off (PTO). The pump is activated when the operator turns ON the SYSTEM POWER switch located on the in-cab control panel and is deactivated when the operator turns OFF the SYSTEM POWER switch. Depending on the pump and PTO combination, hydraulic oil may flow through the system when the pump is off, however, the operator controls are inoperative and the system hydraulic oil pressure is not sufficient to operate the unit's functions.

⚠ WARNING

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

Cab Controls – The standard cab control panel is located in the vehicle cab. See **Cab Controls, Switches and Indicator Lights** 55 for the different controls that may be installed in your unit. The standard and optional lift arm controls are located in the cab.

Lift Arm – Use the loader's lift arm to pick up and dump refuse from a refuse container into the hopper. (The loader is the assembly that includes the lift arm, the grabber assembly, hoses and other parts.) The operator can do this either inside the cab with the standard rocker switches, optional rocker switches or an optional joystick.

⚠ DANGER

Do not enter the hopper unless the unit is in the Lock-Out/Tag-Out mode. When the unit is not in the Lock-Out/Tag-Out mode, the packer/ejector panel can be operated. DEATH or SERIOUS INJURY may occur if the packer/ejector panel moves while a person is in the hopper.

Hopper – The hopper is the front part of the body assembly. The packer panel is in the hopper. The hopper is the loading chamber for the refuse. Refuse dumped into the unit falls inside the hopper where it is moved by the packer paddle into the body.

Body – The body stores the compacted refuse until you dump the refuse at the landfill. **DO NOT** enter the body from the hopper.

Body Props – Always use both body props, one on each side of the unit, when you raise the body for maintenance or service procedures.

⚠ WARNING

Make sure hopper area is clear of people on both sides of unit before starting packer cycle. Packer completes one or two cycles when ANY packer EXTEND button is ON or when AutoPack is ON and cart lowers from hopper. Death or serious injury can occur if any part of your body is in the hopper when the panel is in motion.

Packer/Eject Panel & Cylinders – The packer/eject panel is inside the hopper (at the front of the hopper) and has two functions:

- The packer function compacts the loaded refuse from the hopper into the body (packer mode)
- The eject function pushes the loaded refuse out of the body (eject mode) through the open tailgate.

During the PACKER mode, you extend the packer/eject panel cylinders to push the packer panel towards the rear of the body, which compacts the load.

The packer panel has a follower panel, so the operator can dump a container into the hopper no matter where the packer is in the pack cycle.

Normal operation of the AutoPack™ feature consists of one extension and retraction of the packer panel.

During the EJECT mode, you use the packer/eject panel and cylinders to remove the refuse from the body.

- On the Eject and Service hoist models when the tailgate is open, the EJECT mode lets the packer/eject panel travel further than during the packer mode. This extra travel of the panel removes ALL of the refuse from the body. You do not need to raise the body with an Eject or Service hoist body model to remove the refuse.

⚠ DANGER

Before entering the body area, place the unit in Lock-Out/Tag-Out mode. See **Lock-Out/Tag-Out Procedures** 51.

⚠ WARNING

The side door must be closed before you start a packer operation. Serious injury or death may occur if a person is inside the body or hopper. Make sure no one is inside the hopper or body before you close the door and begin a packer function.

Side Access Door – Use this street side door to enter the body when required for cleaning or other maintenance tasks. MAKE SURE the unit is in Lock-Out/Tag-Out mode and the keys removed from the ignition and in the operator's control BEFORE you enter through the side door.

The door has a proximity switch that the Cortex Controller™ uses to disable the hydraulic system unless the door is closed.

⚠ DANGER

Always prop a 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. Serious injury or death may occur if any part of your body is between the tailgate and the body if the tailgate suddenly closes.

Sump Doors – A sump door is located on the front corner on each side of the body and needs to be open when cleaning out the sump area.

Tailgate Props – Always use both tailgate props, one on each side of the unit, when you raise the tailgate for maintenance or service procedures.

Tailgate Cylinders – You use these cylinders to RAISE the tailgate before you unload the compacted refuse at the landfill. After you unload the refuse, you use the cylinders to LOWER the tailgate.

Tailgate Latches – The unit uses a mechanical latch on each side of the body to lock (latch) the tailgate. A "flag" at the back of the curb side of the body lets the operator see whether the tailgate is locked or unlocked. The flag is UP when the tailgate is FULLY DOWN (and LOCKED) and DOWN when the tailgate is OPEN (UNLOCKED). See **Body and Tailgate Props** 81.

Tailgate Lock Cylinders – Heil's patented Shur-Lock™ system uses tailgate lock cylinders to UNLOCK the tailgate before you RAISE the tailgate and to LOCK the tailgate after you LOWER the tailgate.

⚠ DANGER

A tailgate in motion is dangerous. Serious injury or death may 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.

Tailgate – Raise the tailgate at the landfill or transfer station to unload the refuse.

A red light and an alarm inside the cab let the operator know when the tailgate is raised. The red light illuminates (is ON) and the alarm sounds when the tailgate is RAISED. The light is OFF and the alarm stops when the tailgate is CLOSED.

NOTICE

You must use the tailgate lock cylinder (described previously) to unlock the tailgate in order to raise the tailgate or to fully close (lock) the tailgate.

⚠ 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.

⚠ 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.

⚠ WARNING

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

Body Raise (Body Hoist) Cylinders – Use these two cylinders to RAISE the body and unload compacted refuse out through the raised, open tailgate. After you unload the refuse, you use these cylinders to LOWER the body until it rests on the chassis.

You also RAISE the body with these cylinders to perform service or maintenance on the unit. When you do service or maintenance with the body raised, ALWAYS use the body props. After completion of the service or maintenance procedures, always LOWER the body until it rests on the chassis.

Cortex Controller™ – The unit has a Cortex Controller. The Cortex Controller monitors critical components and controls operation of the various functions. When the Cortex Controller detects a fault or unsafe condition, it alerts the operator with an indicator light and/or a buzzer alarm. During certain conditions, the Cortex Controller will not allow operation of all functions.

Hydraulic Oil Tank - The tank is the reservoir for the hydraulic oil which operates all hydraulic cylinders described above.

⚠ WARNING

Operating the unit's controls with a suspended load, such as a raised tailgate or a container on a lift mechanism, will allow the load to move even when the hydraulic pump is OFF.

Operator Controls – The standard operator controls for running the components are inside the vehicle cab. See **Controls, Switches, and Indicator Lights** 55 for the different controls that may be installed in your unit.

LIFT NOMENCLATURE

The figure below shows the major components of the lift arm.

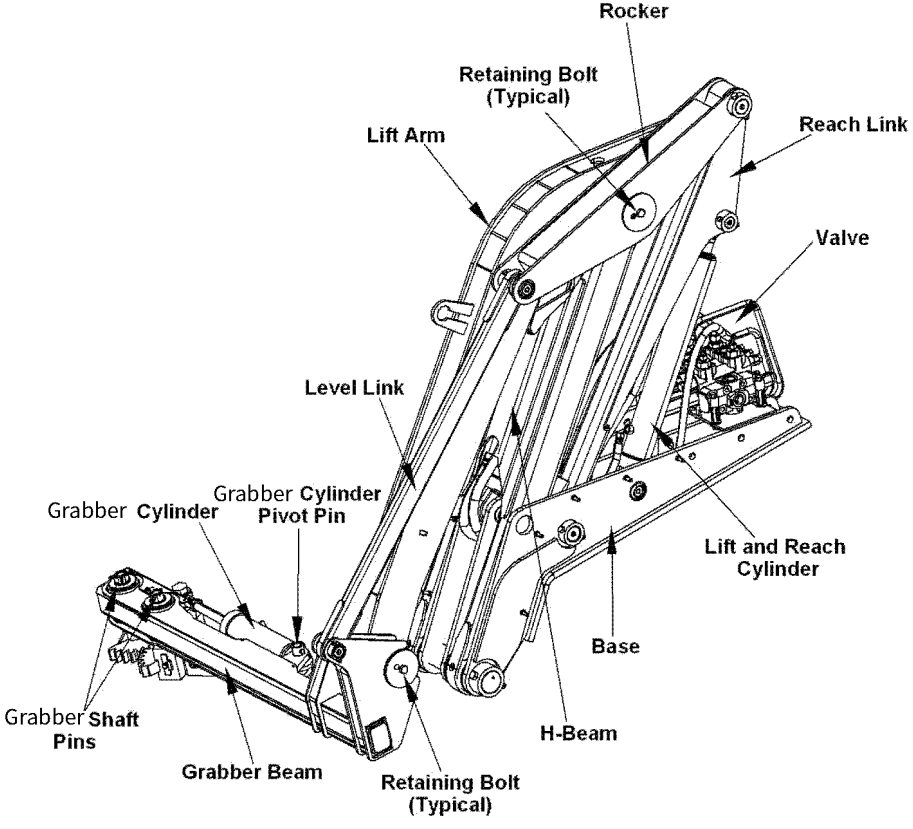


Figure 3. Lift Nomenclature

GLOSSARY

TERM	DEFINITION
accident	An incident that results in unintended harm.
AUTO	The command to select the AutoPack feature.
bin	The refuse collection container
body	The complete body assembly or the area of the body where the refuse is stored.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
collapsed position	The fully retracted position of a cylinder
Cortex Controller™	Heil Electronic Body Controller (Half/Pack®, Half/Pack® Freedom, Half/Pack® Sierra, Odyssey HP/ HPF/HPS, DuraPack® Python®, DuraPack® Rapid Rail®, DuraPack® 7000, MultiPack®, Rapid Rail®, and STARR® System units only).
Auto-Lift	A feature of the Python® loader that automatically lifts and dumps a container, then automatically removes the container from the hopper and brings the lift arm down.
DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
extend/EXTEND	Make a cylinder rod move out its base / Command to move the packer panel towards the body
fouling	Damage to the lid(s) of the refuse bins (containers) that interferes with unloading the refuse
fully retracted position	The packer/extend cylinder is fully retracted and the packer panel is all the way to the front of the hopper. May also be referred to as “Home Position” or “Front Head”.
grabber	The entire grabber assembly or the grabber arms.
GRIP	The command to close the grabber arms around a refuse container.
harm	An action that causes death, injury or property damage.

GLOSSARY

TERM	DEFINITION
hazard	A potential source of harm.
hopper	The loading chamber of the unit in front of the packer panel where you dump the refuse material.
illuminate	Make a lamp shine light (the lamp is on).
incident	An unintended and undesired event that has the potential to harm.
interlock	A safety mechanism that disables a function or action.
LATCHED	The condition when the tailgate is fully CLOSED, thereby locking the tailgate.
LOCK	Command to use the tailgate lock/unlock switch and lock the tailgate lock cylinders.
must	The action is mandatory.
NOTICE	Alerts you to practices not related to personal injury, such as damage to the unit or other equipment.
off/OFF	When a light or lamp does not illuminate / The position of a switch or other control to stop a function
on/ON	When a light or lamp illuminates / The position of a switch or other control to start a function
operator	Any person who uses the unit and its equipment. One who controls the operation of various unit accessories and mechanisms, loads material, performs functions such as operating the loader, cart tipping and packing of wastes or recycled products, and who may also drive the unit along the route during the collection process. The operator may also be the driver.
PN	Part Number
PTO	Power Takeoff
retract/RETRACT	Make a cylinder rod go into its base /

GLOSSARY

TERM	DEFINITION
	Command to move the packer panel towards the hopper
RPM	Revolutions Per Minute
Select-O-Pack™	The Select-O-Pack feature allows the operator to set the number of lift cycles before automatic operation of the packer.
side access door	The side access door is located on the street side of the unit. This is the preferred access into the body. ALWAYS **Lock-Out/Tag-Out** 51 the unit BEFORE entering the body.
top door (hopper cover)	This optional top door covers and uncovers the hopper. The cover is closed during transit and must be open during loading of refuse in the hopper.
unit	The Heil DuraPack® Python® refuse collection vehicle referred to in this manual.
UNLATCHED	The side access door is not closed or secured.
UNLOCK	Command to use the tailgate lock/unlock switch and unlock the tailgate lock cylinders
WARNING	Indicates a hazardous situation, which if not avoided, could result in death or serious injury.

SECTION 2
SAFETY MESSAGES AND DECALS

PREVIEW

Read this section to learn about:

- General safety precautions and safety precautions for the safe operation and maintenance of the unit
- The safety precautions for NOT towing another vehicle or machine
- Safety decals on the unit.

PRECAUTIONARY STATEMENTS

Read this entire manual and especially this safety section before you operate the vehicle. Failure to follow these important precautions could result in serious injury, death, or property damage.

This safety alert symbol indicates important safety messages in this manual and on safety decals attached to the equipment. Make sure you read all of these messages and follow the instructions and precautions.

In the general text of the manual and in the safety labels attached to the product, signal words indicate the type and seriousness of risk that you could encounter if you do not follow the precautions. The signal words and their definitions follow:

DANGER

DANGER indicates a hazardous situation which, if not avoided, WILL result in DEATH or SERIOUS INJURY.

WARNING

WARNING indicates a hazardous situation which, if not avoided, COULD result in DEATH or SERIOUS INJURY.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, COULD result in MINOR or MODERATE INJURY.

NOTICE

NOTICE addresses practices not related to personal injury, such as property damage or damage to the equipment.

The following pages provide a summary of some of the more important safety precautions that are in this manual. There are additional safety precautions in other sections of this manual that are not contained in this section. You must also read, understand and follow those messages.

DECALS

The following pages show the DANGER, WARNING and CAUTION decals and list the reflective safety materials that are on the vehicle. See the Parts and Service Manual for the location and part numbers of all decals on the unit.

NOTICE

Replace any decal with a new decal if the old decal is lost, destroyed, painted over or cannot be read. When you replace a part that had decals, make sure you install new decals on each new part. Decal part numbers can be found below and in the Parts Manual. You can purchase replacement decals from your **Heil Dealer** or from the **Heil Parts Central**, 800-528-5308.

REFLECTIVE SAFETY MATERIALS

See the Parts and Service Manual for the location and part numbers of the reflective safety materials on the unit.

NOTICE

Replace any safety material with new safety material if the old safety material is lost, destroyed, painted over or cannot be seen. When you replace a part that had safety material on it, make sure you install new safety material on the new replacement part. See the Parts and Service Manual for all part numbers and location of the safety materials.

You can purchase replacement decals from your **Heil Dealer** or from the **Heil Parts Central**, **800-528-5308**.

DUMP/SERVICE HOIST DECAL PLACEMENT

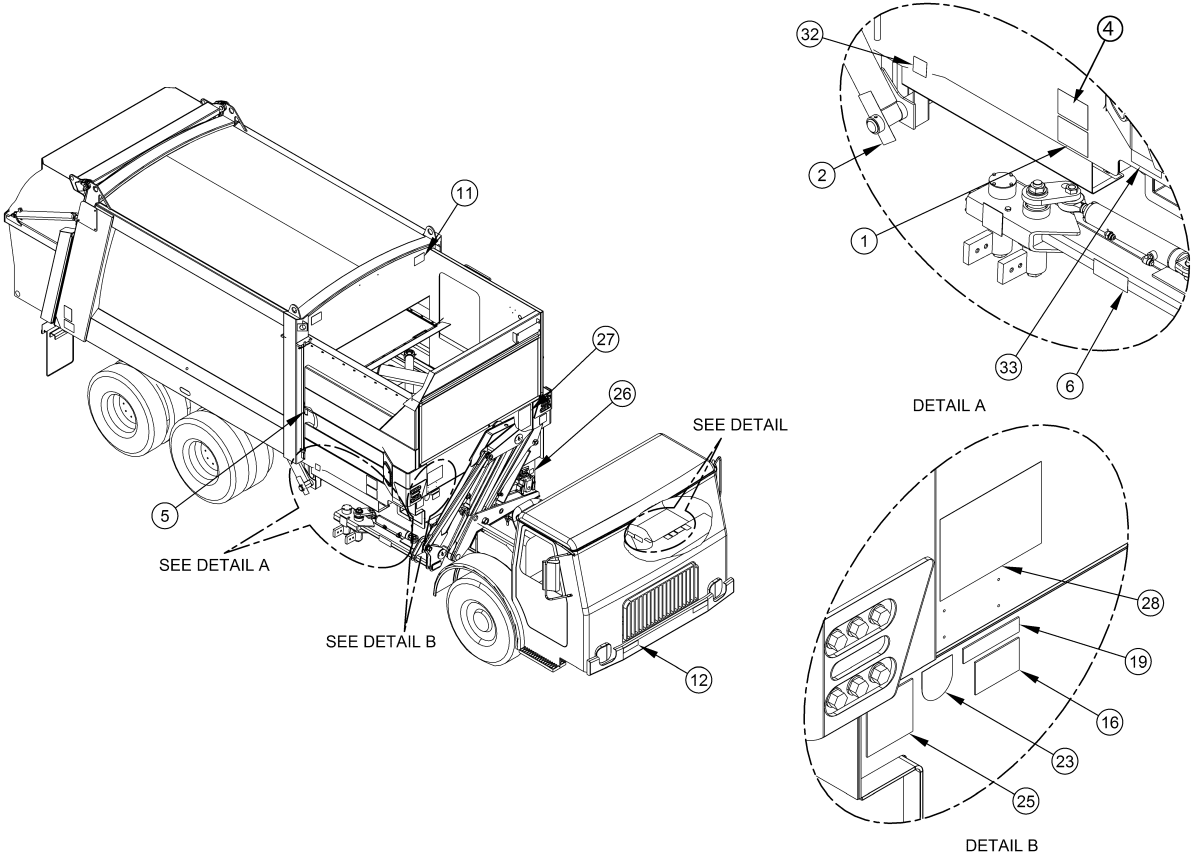


Figure 4.

DUMP/SERVICE HOIST DECAL PLACEMENT (CONTINUED)

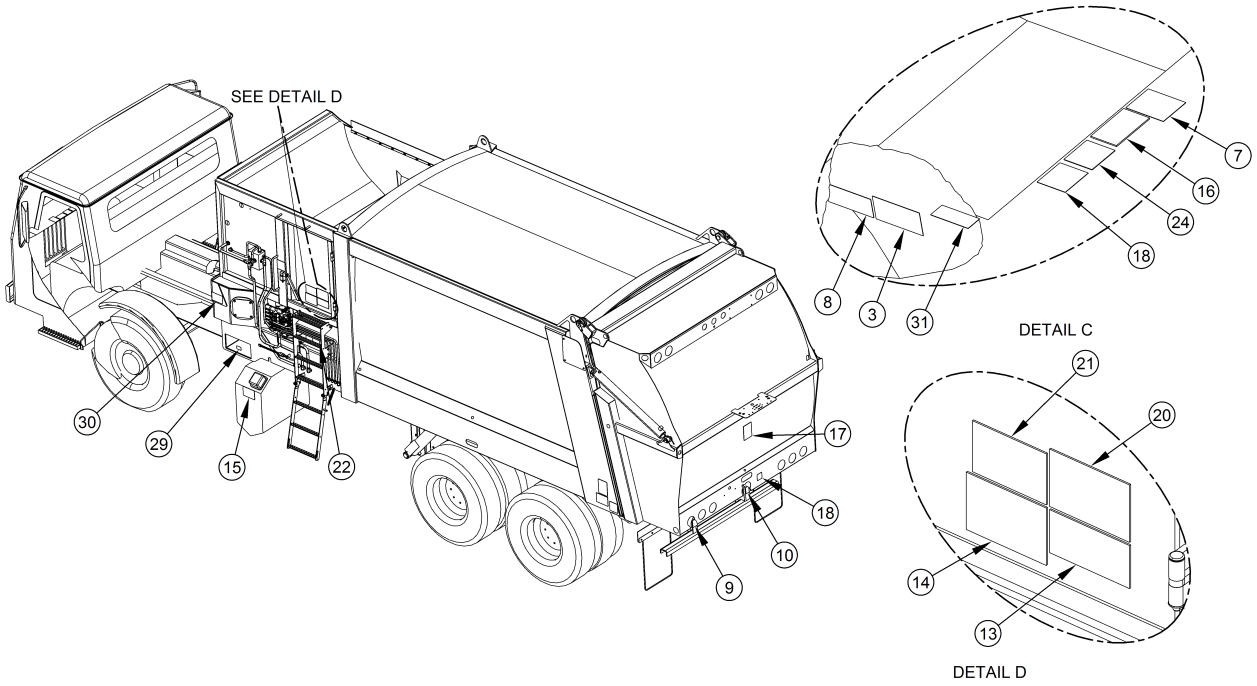


Figure 5.

DUMP/SERVICE HOIST DECAL PLACEMENT (CONTINUED)

ITEM	PART NO.	DESCRIPTION	EFF	QTY
-	212-2407	INSTALLATION, Decal, Dump/Service Hoist	-	REF
1	212-0980	DECAL, Danger, Stay Clear, Container Off Ground	-	1
2	212-1103	DECAL, Danger, Body Elevated, Lg.	-	2
3	212-1104	DECAL, Danger, Body Elevated, Small	-	1
4	212-1242	DECAL, Danger, Stand Clear, Automated Lift Device In Motion	-	1
5	212-1329	DECAL, Instruction, Body Prop	-	2
6	212-1330	DECAL, Warning	-	1
7	212-1584	DECAL, Overall Height	-	1
8	212-1626	DECAL, Danger, Tailgate Raise, Before Body	-	1
9	212-1631	DECAL, Warning, Bumper, Not Step	-	1
10	212-1634	DECAL, Danger, Stand Clear	-	1
11	212-1642	DECAL, Danger, Top Hopper and Tailgate Opening	-	5
12	212-1764	DECAL, Danger, Under Chassis, Stop Engine...	-	2
13	212-1780	DECAL, Caution, Side Door	-	1
14	212-1781	DECAL, Caution, Enter Body, Stop Engine	-	1
15	212-1782	DECAL, Hydraulic Oil Only	-	1
16	212-1783	DECAL, Warning, Operator's Manual	-	2
17	212-1801	DECAL, Danger, Stand Clear	-	3
18	212-1820	DECAL, Danger, Towing, In Cab	-	2
19	212-1841	DECAL, ANSI Specifications	-	1
20	212-1907	DECAL, Danger, Access Door	-	1
21	212-1911	DECAL, Caution, Panel In Motion	-	1
22	212-1914	DECAL, Caution, Ladder	-	1
23	212-1915	DECAL, Warranty Parts	-	1
24	212-1918	DECAL, Safety Instructions	-	1
25	212-2228	DECAL, Proximity Switch, Adjustment	-	5
26	212-2275	DECAL, Oil Level	-	1
27	212-2338	DECAL, Packer/Ejector Adjustment	-	1
28	212-2404	DECAL, Lubrication Guide	-	1
29	212-2605	DECAL, Sump Door	-	1

30	212-2689	DECAL, Flag	-	1
31	212-2738-010	DECAL, Auto/Manual Mode, Python lift	-	1
32	212-2875	DECAL, Battery, Warning	-	1
33	212-2920-002	DECAL, Lubrication Guide, Light Weight, Python Lift	-	1

EJECT DECAL PLACEMENT

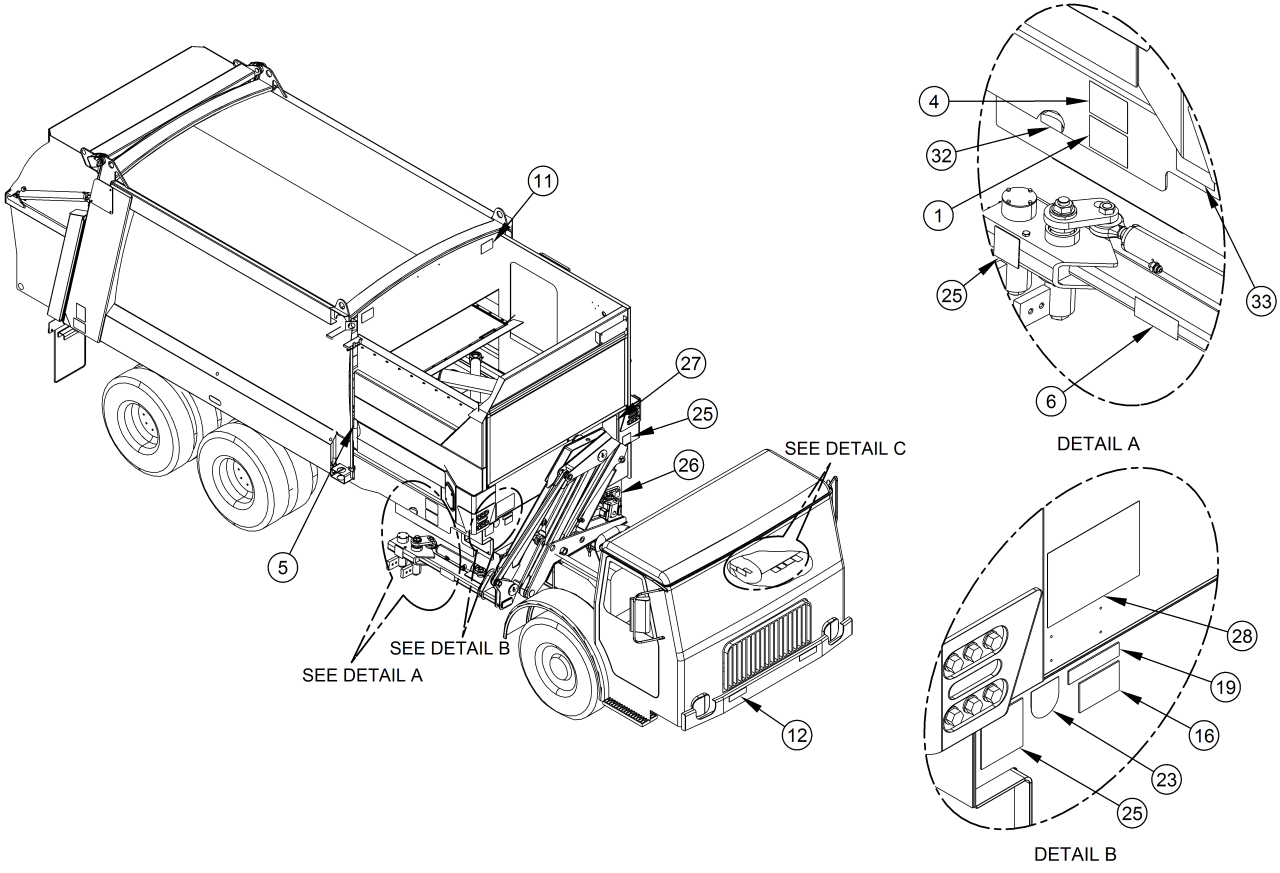


Figure 6.

EJECT DECAL PLACEMENT (CONTINUED)

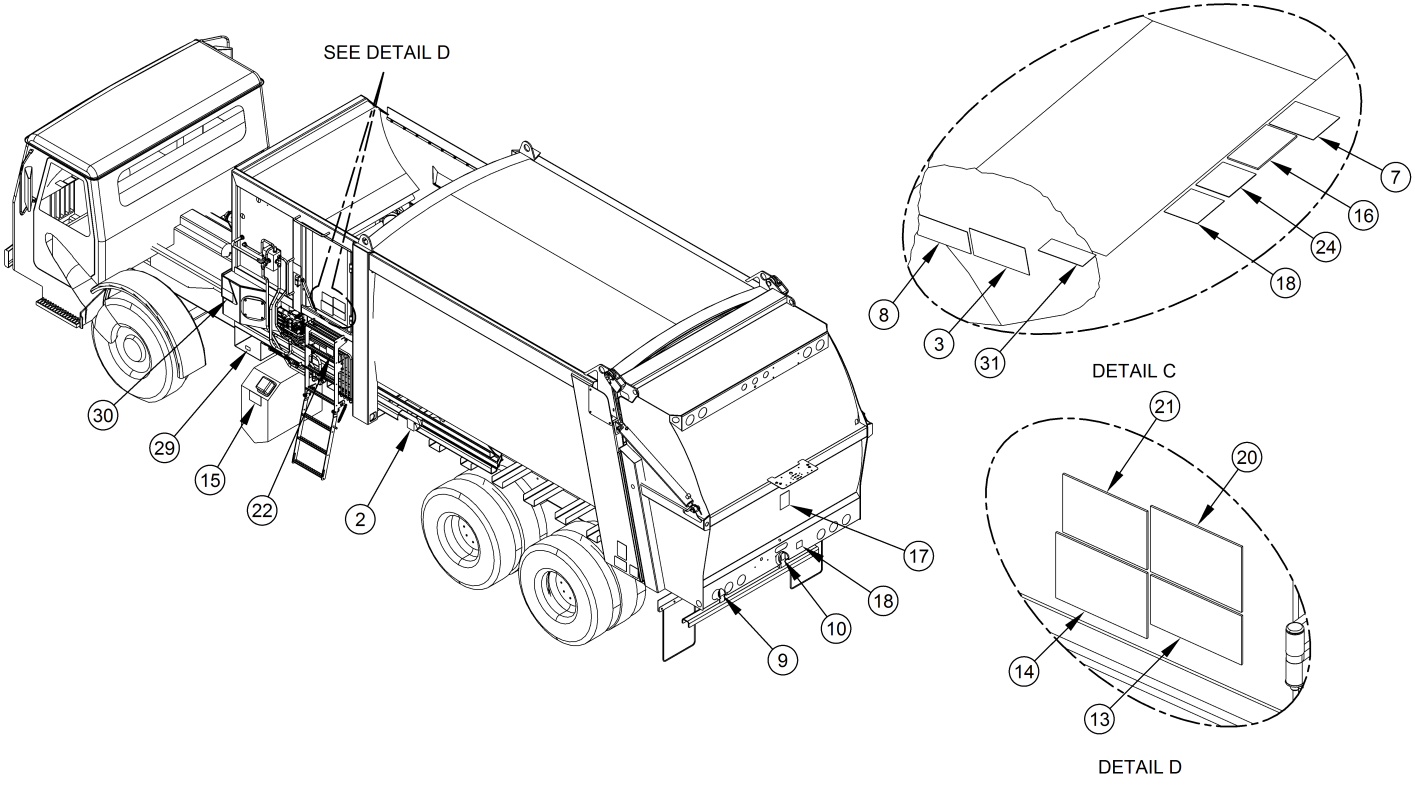


Figure 7.

EJECT DECAL PLACEMENT (CONTINUED)

ITEM	PART NO.	DESCRIPTION	EFF	QTY
-	212-2960	INSTALLATION, Decal, Eject	-	REF
1	212-0980	DECAL, Danger, Stay Clear, Container Off Ground	-	1
2	212-1103	DECAL, Danger, Body Elevated, Lg.	-	2
3	212-1104	DECAL, Danger, Body Elevated, Small	-	1
4	212-1242	DECAL, Danger, Stand Clear, Automated Lift Device In Motion	-	1
5	212-1329	DECAL, Instruction, Body Prop	-	2
6	212-1330	DECAL, Warning	-	1
7	212-1584	DECAL, Overall Height	-	1
8	212-1626	DECAL, Danger, Tailgate Raise, Before Body	-	1
9	212-1631	DECAL, Warning, Bumper, Not Step	-	1
10	212-1634	DECAL, Danger, Stand Clear	-	1
11	212-1642	DECAL, Danger, Top Hopper and Tailgate Opening	-	5
12	212-1764	DECAL, Danger, Under Chassis, Stop Engine...	-	2
13	212-1780	DECAL, Caution, Side Door	-	1
14	212-1781	DECAL, Caution, Enter Body, Stop Engine	-	1
15	212-1782	DECAL, Hydraulic Oil Only	-	1
16	212-1783	DECAL, Warning, Operator’s Manual	-	2
17	212-1801	DECAL, Danger, Stand Clear	-	3
18	212-1820	DECAL, Danger, Towing, In Cab	-	2
19	212-1841	DECAL, ANSI Specifications	-	1
20	212-1907	DECAL, Danger, Access Door	-	1
21	212-1911	DECAL, Caution, Panel In Motion	-	1
22	212-1914	DECAL, Caution, Ladder	-	1
23	212-1915	DECAL, Warranty Parts	-	1
24	212-1918	DECAL, Safety Instructions	-	1
25	212-2228	DECAL, Proximity Switch, Adjustment	-	5
26	212-2275	DECAL, Oil Level	-	1
27	212-2338	DECAL, Packer/Ejector Adjustment	-	1
28	212-2404	DECAL, Lubrication Guide	-	1
29	212-2605	DECAL, Sump Door	-	1

30	212-2689	DECAL, Flag	-	1
31	212-2738-010	DECAL, Auto/Manual Mode, Python lift	-	1
32	212-2875	DECAL, Battery, Warning	-	1
33	212-2920-002	DECAL, Lubrication Guide, Light Weight, Python Lift	-	1
-34	212-3551	DECAL, Preparing Unit to check Hydraulic Oil Level	-	1

DECAL IMAGES

Figure 8. Danger: Stay clear container off ground, PN 212-0980

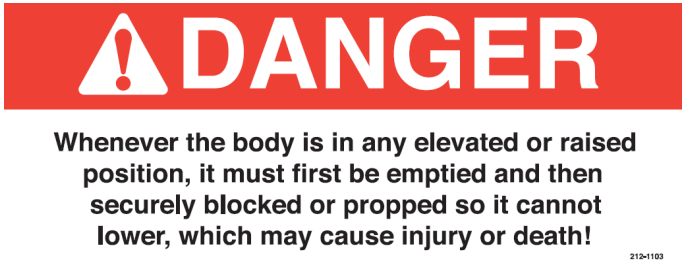


Figure 9. Danger: Elevated body emtpied and propped, PN 212-1103

Figure 10. Danger: Stand clear automatic lift, PN 212-1242

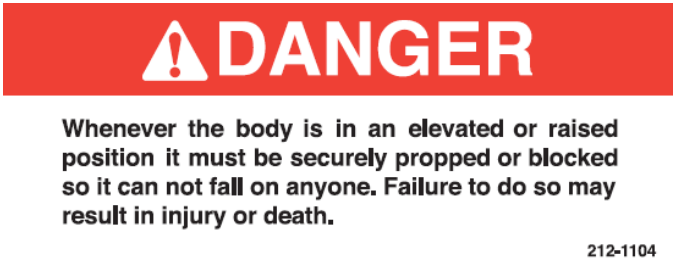


Figure 11. Danger: Elevated body propped, PN 212-1104

DECAL IMAGES (CONTINUED)

Figure 12. Danger: Stand clear tailgate, PN 212-1801

Figure 13. Warning: Never use bumper as step, PN 212-1631

Figure 14. Danger: Stand clear tailgate, PN 212-1634

Figure 15. Danger: Do not enter under chassis, PN 212-1764

DECAL IMAGES (CONTINUED)

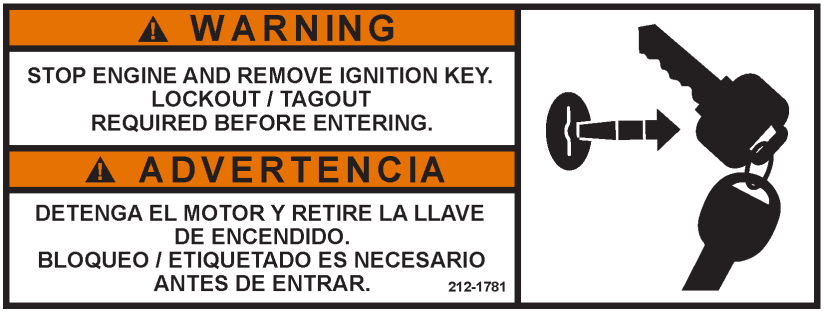


Figure 16. Warning: Lock-out / Tag-out, PN 212-1781

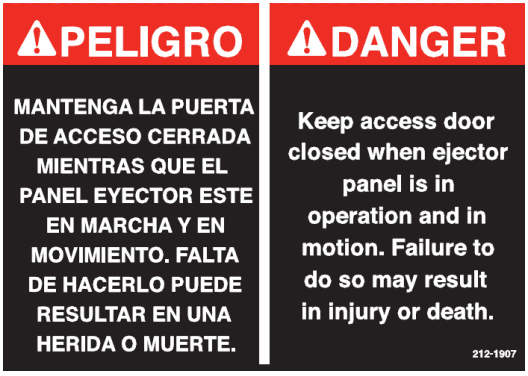


Figure 17. Danger: Access Door Closed, PN 212-1907

Figure 18. Caution: Side Access Door, PN 212-1780

Figure 19. Danger: Not an entrance or exit, PN 212-1642

DECAL IMAGES (CONTINUED)

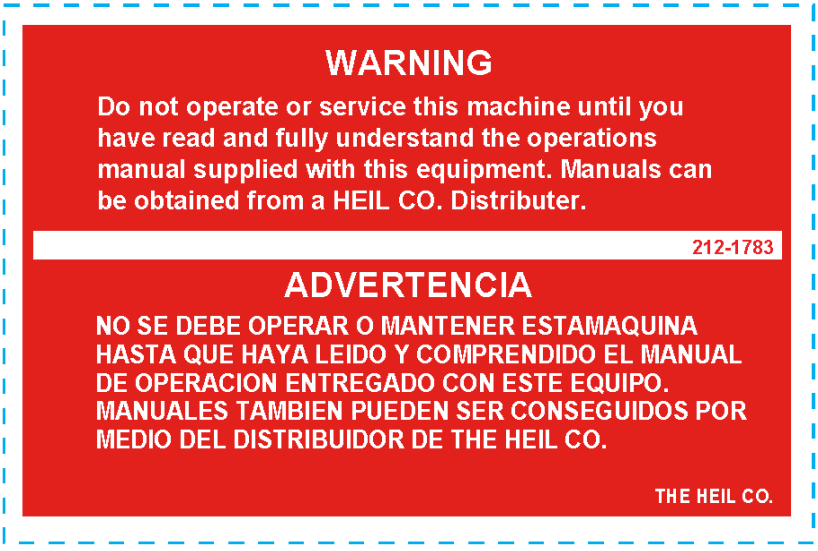


Figure 20. Warning: Operations Manual, PN 212-1783

Figure 21. Caution: Stand Clear Panel, PN 212-1911

DuraPack Python

DECAL IMAGES (CONTINUED)

Figure 22. Danger: Do not use for towing, PN 212-1820

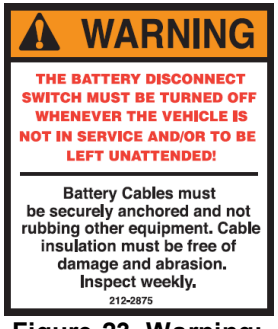


Figure 23. Warning: Battery disconnect switch, PN 212-2875

Figure 24. Caution: Ladder safety/balance, PN 212-1914

DECAL IMAGES (CONTINUED)

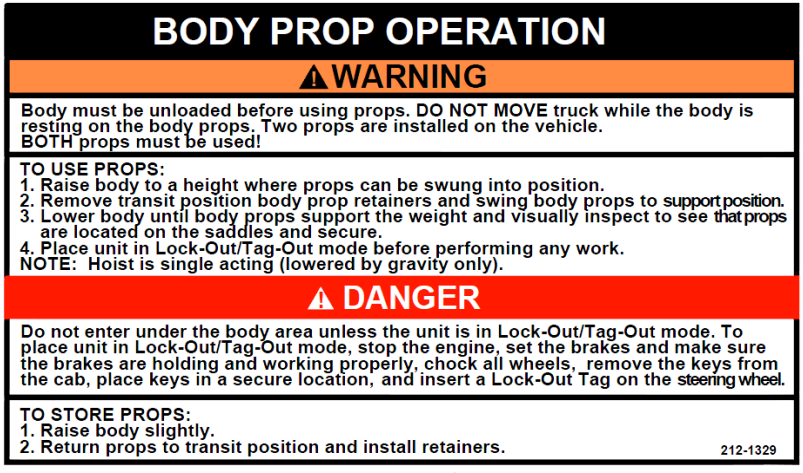


Figure 25. Danger: Body Prop Operation, PN 212-1329

Figure 26. Warning: Overall height, PN 212-1584

Figure 27. Warning: Keep away from gear, PN 212-1330

Figure 28. Danger: Raise Tailgate before Raising Body, PN 212-1626

DECAL IMAGES (CONTINUED)

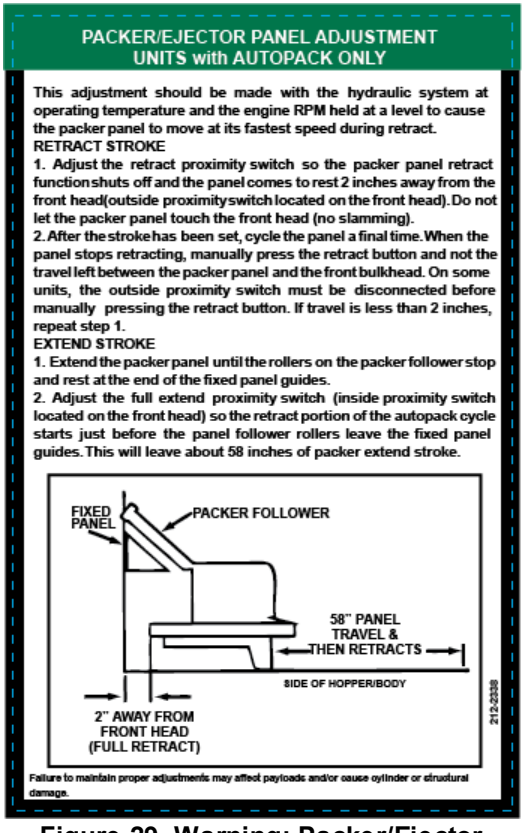


Figure 29. Warning: Packer/Ejector Panel Adjustment, PN 212-2338

Figure 30. ANSI Specifications, PN 212-1841

Figure 31. Warning: Overall Height, PN 212-1915

DECAL IMAGES (CONTINUED)

Figure 32. Safety Instructions, Back-up Alarm, PN 212-1918

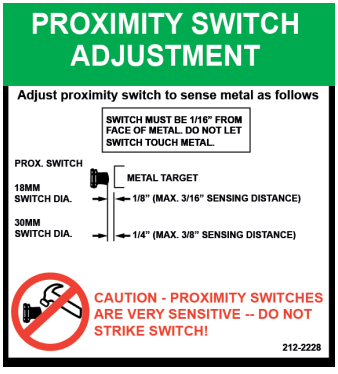


Figure 33. Warning: Proximity Switch Adjustment, PN 212-2228

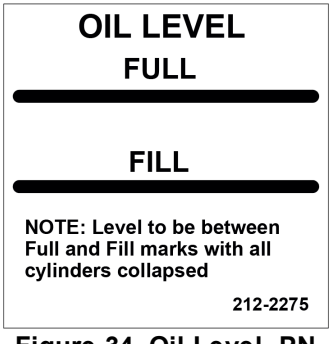


Figure 34. Oil Level, PN 212-2275

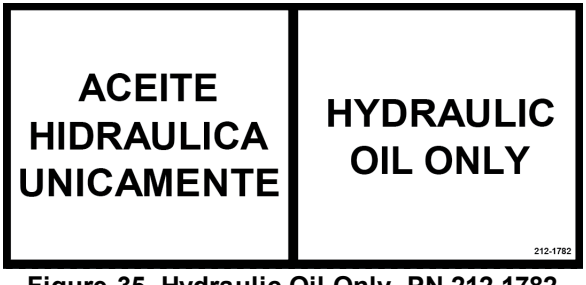


Figure 35. Hydraulic Oil Only, PN 212-1782

DECAL IMAGES (CONTINUED)

Figure 36. Flag, Made in the USA, PN 212-2689

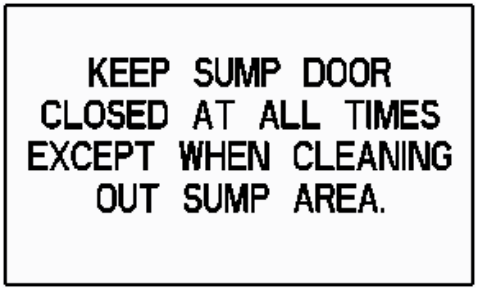


Figure 37. Keep Sump Door Closed, PN 212-2605

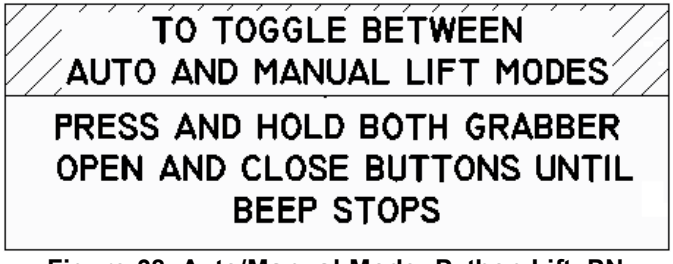


Figure 38. Auto/Manual Mode, Python Lift, PN 212-2738-010

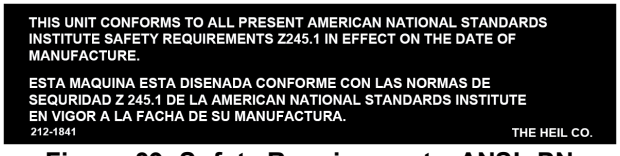


Figure 39. Safety Requirements, ANSI, PN 212-1841

DECAL IMAGES (CONTINUED)

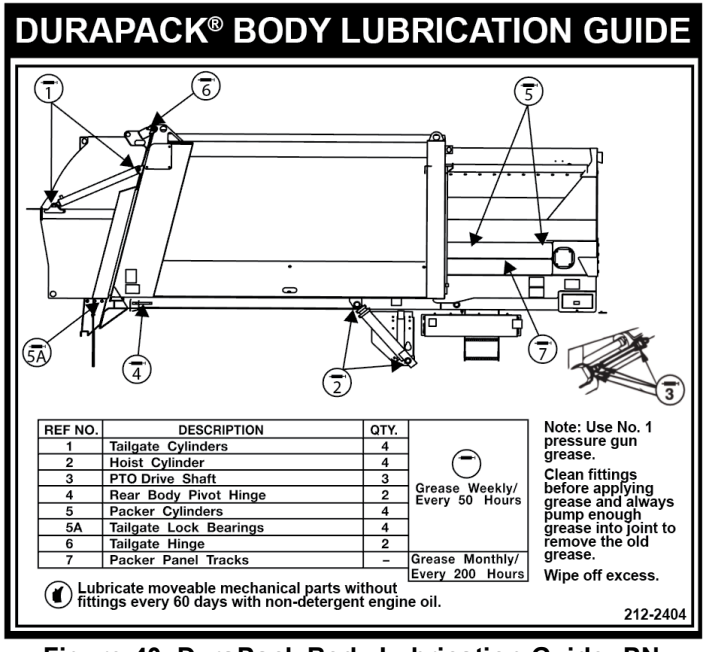


Figure 40. DuraPack Body Lubrication Guide, PN 212-2404

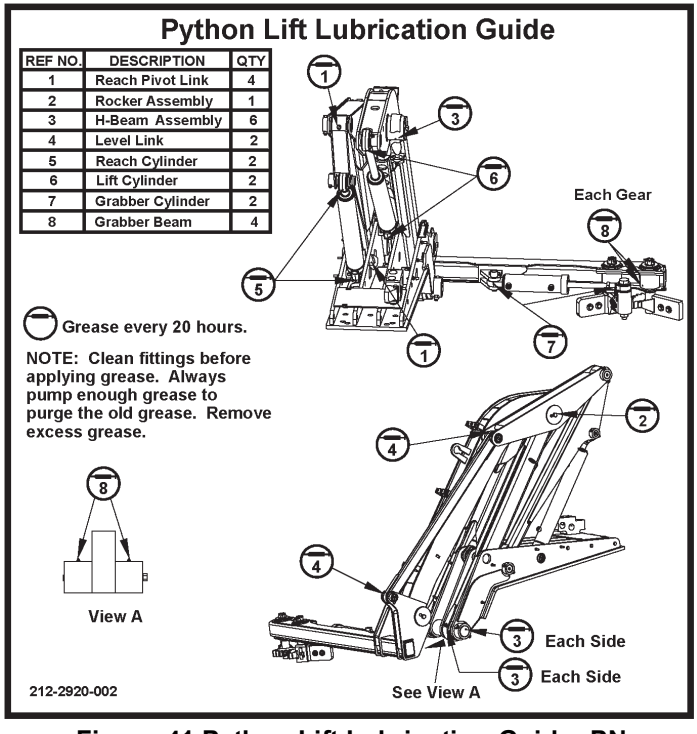
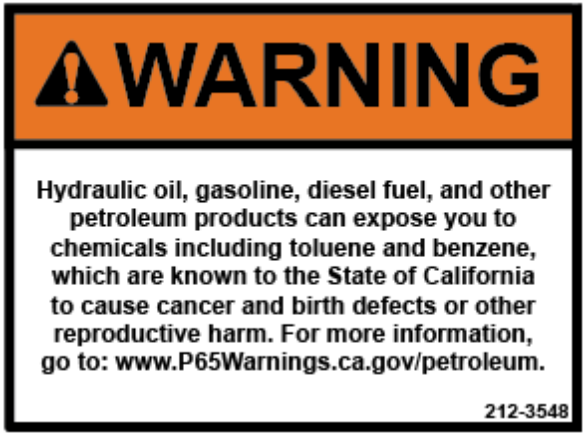


Figure 41.Python Lift Lubrication Guide, PN 212-2920-002

DECAL IMAGES (CONTINUED)



42. Warning Decal, PN 212-3548

CARE OF DECALS

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.

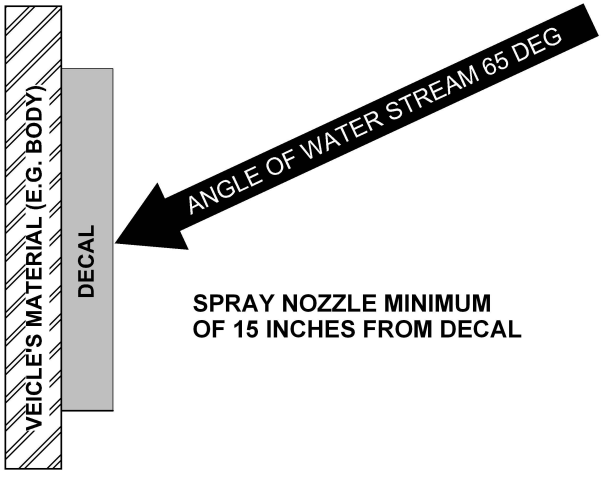
General Instructions

- 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.

Pressure Washer Precautions

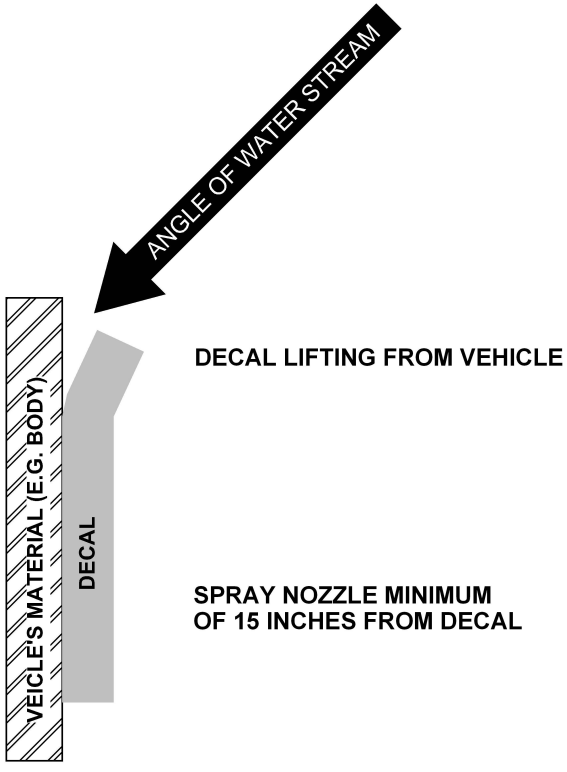
- Pressure washing can cause damage to decals. It can cause the edges of the decals to lift and peel the decal away from the unit. Over time, the decal can fade, crack or chip away.
- See the following figures for correct and incorrect methods of pressure washing.
- Use pressure washing only when other 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
  - Distance of nozzle to decal: 15" minimum
  - Water pressure: <= 800 psi
  - Length of time: not more than 30 sec.
  - Do not use sharp angles to clean the decals – this can lift the decals from the unit.
  - NEVER use a "turbo pressure nozzle".

PRESSURE WASHER TECHNIQUE



RECOMMENDED TECHNIQUE

Figure 43. Recommended Technique



INCORRECT TECHNIQUE

Figure 44. Incorrect Technique

ALTERNATIVE CLEANING PROCEDURE

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

⚠ WARNING

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.

- 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 Service.

SECTION 3
LOCK-OUT/TAG-OUT PROCEDURE

PREVIEW

Read this section to learn about the proper Lock-Out/Tag-Out procedures.

You MUST Lock-Out/Tag-Out a unit BEFORE:

- You enter the body
- Do maintenance or repair procedures.

LOCK-OUT/TAG-OUT PROCEDURE

NOTICE

Always use your employer's Lock-Out/Tag-Out procedures. If your employer does not have Lock-Out/Tag-Out procedures, use the procedures that follow. Contact your supervisor or Heil Technical Service if you have any questions about Lock-Out/Tag-Out procedures.

Put the unit in a Lock-Out/Tag-Out mode:

- BEFORE you enter the unit's body.
- BEFORE you perform maintenance, repair, or cleaning procedures on the unit.

☑ 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** 89 when you raise the tailgate for service, maintenance or cleaning.
4. If equipped, **SET the body props** 84 when you raise the body for service, maintenance or cleaning.
5. When there are in-cab controls, turn the ignition switch to ON, then:
   a. Move the switches of the hydraulic controls. This relieves the pressure in the cylinders.
   b. Turn the ignition switch to OFF.
6. When there are no in-cab controls, move the outside control levers to relieve the pressure in the cylinders.
7. Put a LOCK-OUT/TAG-OUT tag onto the steering wheel.
8. Remove the ignition key from the cab, lock the vehicle, and put the key in a secure location.

Figure 45. Lock-Out/Tag-Out Tag
(Do Not Operate Tag)

NOTICE

You can order Lock-Out/Tag-Out tags (Part No. 212-1586) through your Heil dealer or through Heil.

DuraPack Python

NOTES:

SECTION 4
FEATURES, CONTROLS, SWITCHES, AND INDICATOR LIGHTS

PREVIEW

Read this section to learn about the operation of the in-cab and outside controls, switches, buttons, and indicator lights.

NOTICE

The location and appearance of the controls may be different than those shown in this manual. Make sure you know the location of the controls and the how you operate the controls on your unit before you use the vehicle.

This section tells you:

- Learn about the unit's features and operation specifications
- The in-cab cab controls, switches and buttons
- How the in-cab controls work
- The in-cab indicator lights available
- The outside controls and how they work

FEATURES

InSight™ Diagnostic Display

The Cortex Controller™ uses the Insight™ Diagnostic Display for displaying the current status of Input/Output, Engine speed, Temperatures, etc. This can also be used for configuring or selecting different options in the Cortex Controller.

For more information on the Insight Diagnostic Display, refer to **Cortex Controller** and **Service Manual Automated Side Loader Cortex Controller Program 109-0285**.

Auto-Lift Mode

Auto-Lift Mode is standard on all Cortex Controller controlled Python units. While in Auto Mode, the lift will automatically retract and dump when holding the grabber close push button.

To toggle the control between Auto and Manual Lift Modes, press and hold both grabber open and close buttons simultaneously until the in cab alarm stops sounding.

Refer to **Operation Specifications** 59 and **Lifting and Loading Refuse with the Python Lift Arm** 103 for more information.

Select-O-Pack™

Select-O-Pack is a standard feature on all Cortex Controller™ controlled Heil DuraPack Automated Side Loaders. This feature automatically cycles the Auto-Pack after a predetermined number of lift cycles.

Refer to **Operation Specifications** 59 and **Compacting the Load** 106 for more information.

To set the number of lift cycles before automatic operation of the packer, follow these steps.

1. Turn the SYSTEM POWER switch OFF.
2. Press and hold the packer retract button for five (5) seconds. The in-cab alarm will begin to sound on the fifth second.
3. Each additional activation of the retract button will allow one additional lift cycle before automatically packing the load. If no further activation's of the packer retract button is performed, the Select-O-Pack function will be disabled.
4. Turn SYSTEM POWER switch ON.

You can also pack the refuse manually any time after loading the refuse in the hopper. You can use the in-cab controls for the packer panel to compact the load again with a manual cycle.

Auto/Manual Pack Mode

Auto/Manual Pack Mode is a standard feature on all Cortex Controller controlled products. While in Auto Mode, the packer will complete its cycle automatically with a momentary activation of the packer extend push button. While in manual mode, it will be necessary to hold the packer extend or retract buttons in order to keep the packer cycling.

Also while in manual mode, all control interlocks will be disabled. This is only intended for special occasions when an operator needs to bypass the control interlocks.

To toggle the control between Auto and Manual Pack Modes with the System Power Button ON, PRESS and HOLD the Packer Extend and Retract buttons simultaneously until the in cab alarm stops sounding.

UNIT INTERLOCKS

There are several interlocks provided to keep a specific function from operating when certain conditions exist. This will affect the operation of the unit and these conditions are as follows.

1. Pump Overspeed Interlock – the Cortex Controller™ is programmed to disengage the hydraulic pump when the engine speed exceeds a specific RPM (dependent on chassis) with the transmission in gear and the service brake applied. The pump will reengage when the engine speed drops below a specific RPM (again, dependent on chassis).
2. Side Door Interlock – If the side door is open, the hydraulic pump will not operate. The pump will operate only after side door is fully closed and the SYSTEM POWER switch is shut off and turned on again.
3. Filter Bypass Shutdown Interlock – If the hydraulic oil filter becomes contaminated, the hydraulic pump will shut-off. If the oil filter element is not replaced within six hours of bypass condition, the pump will only operate in 3-minute intervals. This 3-minute interval can be reset by cycling the pump switch off, then on again.
1. High Transmission Temperature Interlock (Option) – this interlock prevents operation of the pump when the transmission fluid temperature exceeds a safe operating range. The pump will not engage for three minutes after the transmission fluid has cooled to within operating range.
5. Hydraulic Pump Shutdown Interlock – this interlock prevents normal operation of the hydraulic pump when the Cortex Controller™ has become unable to correctly detect engine speed.
6. Lift Interlock – for Joystick Control – this interlock prevents two items from normal operation.
   a. Grabbers Open Interlock (Option) – prevents them from being opened with the lift in the raised position.
   b. Lift Raise Interlock (Option) – prevents the lift from raising when a specific grabber pressure is reached.
6. Lift Interlock – after raising the tailgate and extending the packer to eject or dump the load, the packer must be retracted to the front head before the lift will raise the first time.
7. Packer Interlock – the packer will not extend past the full extend switch unless the tailgate is open.

OPERATION SPECIFICATIONS

Pump System

- The pump will be on only when the in-cab red SYSTEM POWER switch is activated, the hopper side door is closed and locked, and the filter is not in by-pass mode.
- The pump will be active when the above conditions are met and the packer is activated.
- The lift will function in neutral or in gear when foot brake is applied and the RPM is below 900.
- The lift will grab, lift, lower and release in 6-8 seconds at engine idle (700 RPM).

Packer

- The packer will complete one cycle (extend and retract) in 12-14 seconds at 1200 RPM.
- The packer will slow during lift operation.
- The packer will function at any RPM.

Select-O-Pack™

- Triggered off the grabber release push-button, this system initiates a pack cycle once the programmed number of lift cycles have been completed. (Factory pre-set is two (2) lift cycles). See **Features** 57 and **Compacting the Load** 106 for more information.

Auto-Lift

- Toggle On/Off by holding grip and release buttons simultaneously five (5) seconds (until the in cab alarm stops sounding).
- Closing grabbers will initiate Auto-Lift sequence. Must hold grabber closed button to continue cycle.
- Cart will raise and retract automatically to the dump position.
- Operator manually replaces cart to desired position on the ground
- Pressing and holding grabber release (open) button will return lift to stowed position.
- See **Features** 57 and **Lifting and Loading Refuse with the Python Lift Arm** 103 for more information.

OPERATION SPECIFICATIONS (CONTINUED)

Warning Signals

- The arm extended light will activate any time the arm is extended or grabbers are not fully open.
- The arm extended light and alarm will activate when the arm is extended or grabbers are not fully open, the transmission is in gear and the foot brake is not applied.
- An alarm will sound and a light will illuminate if the body or tailgate are raised.
- The backup (reverse) alarm will sound if the body or tailgate is raised or the transmission is in reverse.

California Specific Warning Signals

- The California backup (reverse) alarm will sound with ignition off and the battery disconnect switch on.

Waste Management Specific Interlocks

- Arm will not raise with grabbers open.
- Grabbers will not open with arm raised
- Arm will not raise with hopper cover not fully open
- Lift will not raise with tailgate open.
- Lift will not function unless joystick sensor indicates that operator is grasping joystick.
- Road speed will not exceed 15 MPH with lift not stowed.

IN-CAB MAIN CONTROL PANEL

The In-Cab Main Control Panel can vary with different models of truck chassis. See the figure below for an illustration of a typical control panel. The control panels have labels or markings that identify each function and its operations. Make sure you are familiar with the control panel in your unit.

The labeling/marking scheme is straight-forward and identifies a function and its operations. Refer to the numbered callouts on the figure below and the corresponding description of each switch, button, and light on the following pages.

Figure 46. Control Panel

IN-CAB MAIN CONTROL PANEL (CONTINUED)

⚠ WARNING

After the System Power switch is pressed and motion of components has appeared to stop, additional movement can occur.

1. SYSTEM POWER ON and OFF/STOP SWITCH (RED) - Must be in the ON position for any function of the pack mechanism to operate. Side door must be closed.
   a. PULL for ON position.
   b. PUSH for OFF/STOP position.

NOTICE

The packer panel can be stopped at any position by pushing switch to OFF/STOP position.

2. PACKER EXTEND INDICATOR (GREEN) - A green light that illuminates to indicate the packer panel is extending. Light will go off when panel is stopped.
3. PACKER RETRACT INDICATOR (YELLOW) - A yellow light that illuminates to indicate the packer panel is retracting toward the front head. Light will go off when panel is fully back to front head.
4. HYDRAULIC PUMP INDICATOR (RED) - A red light that illuminates to indicate the hydraulic pump has been turned on. Light will go off when pump is disengaged.
5. CHANGE FILTER or FILTER BYPASS INDICATOR (RED) - A red light that flashes to indicate the filter is in or has been in bypass and the element needs to be changed as soon as possible. Each light flash is for each hour of operation with the filter in bypass.

NOTICE

When the transmission overheats, the hydraulic pump will automatically shut down for approximately 3 minutes. It is recommended that the transmission be placed in neutral and engine sped up to help cool the transmission.

6. TRANSMISSION TEMPERATURE INDICATOR (RED) (OPTION) - A red light that flashes to indicate the transmission fluid temperature has exceeded a safe operating range. Light will go off when transmission is cooled down.
7. LIFT ARM EXTENDED INDICATOR (RED) - A red light that illuminates to indicate the lift is extended and not in the grabbers open or transit position. Light will go off when lift is in the transit (stowed) position.
8. TAILGATE OPEN INDICATOR (RED) - A red light that illuminates to indicate the tailgate has been opened. Light will go off when tailgate is fully closed.
9. ALARM - Sounds when tailgate or body is opened or raised, the lift is extended, when switching between **Auto and Manual Pack Modes** 65 or **Auto and Manual Lift Modes** 65, when various other conditions occur, or a fault condition occurs. Refer to **Diagnostic Fault Codes** 125 and the Service Manual, "Body Controller Software" section.

IN-CAB MAIN CONTROL PANEL (CONTINUED)

10. BODY RAISED LIGHT (RED) - A red light that illuminates to indicate the body is raised off the chassis rail (Service Hoist and Service Lift Models). Light will go off when body is completely down on the chassis rail.
11. SIDE DOOR OPEN LIGHT (RED) - An optional red light that illuminates to indicate the side door is open or not fully closed. Light will go off when door is fully closed.
12. HOPPER COVER LIGHT (RED) - A optional red light that illuminates to indicate the hopper cover (top door) is closed over the hopper area. Light will go off when hopper cover is open and up against the body wall.
13. BODY RAISE/LOWER SWITCH - Controls raising and lower the body (Service Hoist and Service Lift models).
    a. PUSH to RAISE position to RAISE.
    b. PULL to LOWER position to LOWER.
14. TAILGATE RAISE/LOWER SWITCH - Controls raising and lowering of the tailgate.
    a. PUSH to RAISE position to RAISE.
    b. PULL to LOWER position to LOWER.
15. TAILGATE LOCK/UNLOCK TOGGLE SWITCH - Controls locking and unlocking of tailgate.
    a. PUSH to UNLOCK position to UNLOCK.
    b. PULL to LOCK position to LOCK.
16. HOPPER COVER SWITCH (OPTION) - Controls opening and closing of the hopper cover (top door).
    a. PUSH to CLOSE position to CLOSE.
    b. PULL to OPEN position to OPEN.
17. HOPPER FLOOD LIGHT SWITCH - An optional ON/OFF switch that when turned on, illuminates the hopper area. Use in minimal light conditions or darkness. Turn OFF when not needed.
18. LIFT FLOOD LIGHT SWITCH - An optional ON/OFF switch that when turned on, illuminates the area where the lift operates. Use in minimal light conditions or darkness. Turn OFF when not needed.
19. AUXILIARY FLOOD LIGHT SWITCH - An optional ON/OFF switch that may be used for other optional functions.
20. REAR STROBE LIGHT SWITCH - An optional ON/OFF switch that when turned on operates the rear strobe light. Turn OFF when not needed.

PYTHON LIFT JOYSTICK CONTROLS

The joystick controls all of the lift functions and has five (5) push buttons to control the grabbers, pump, and packer panel. They are identified as follows.

A. Joystick Movements

The joystick can be moved forward, backward, sideways and at an angle for the different functions. See the figure the right for the different movements and the functions they control.

1. LIFT RAISE - Pull and hold joystick to raise the lift. Release the joystick to stop the movement of the lift.
2. LIFT LOWER - Push and hold joystick to lower the lift. Release the joystick to stop the movement of the lift.
3. LIFT RETRACT - Move joystick to the left and hold to retract the lift. Release the joystick to stop the movement of the lift.
4. LIFT EXTEND - Move joystick to the right and hold to extend the lift. Release the joystick to stop the movement of the lift.
5. DUMP - Pull joystick down and to the left and hold for lift to move in and up to dump the container. Release the joystick to stop the movement of the lift.
6. UNDUMP - Push joystick up and to the right and hold for lift to move out and down to place container on the ground.
7. Trigger (Dead Man) - This optional trigger on the joystick is used as a dead man switch only. When equipped, **it must be depressed when operating the Joystick Lift control functions (raise, lower, in, out functions).** If it is released, the joystick lift functions will not operate.

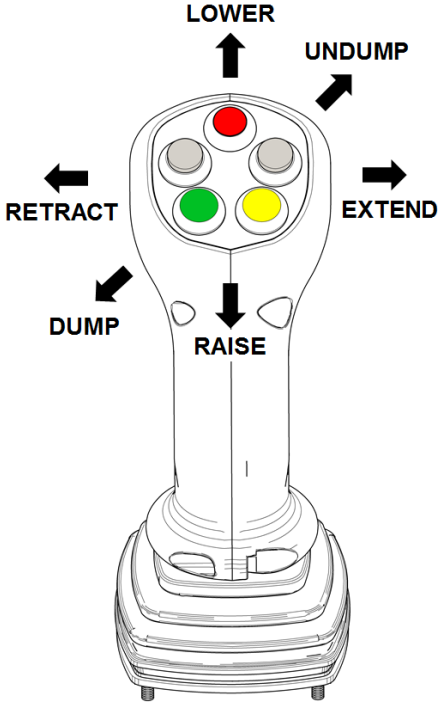


Figure 47. Python Lift Joystick Movements/Functions

PYTHON LIFT JOYSTICK CONTROLS

B. 5 Push-Button Controls

The joystick has 5 push-buttons on the handle that control the pump, grabbers, and packer panel extend/retract functions. See the figure below for the different functions of the push-buttons.

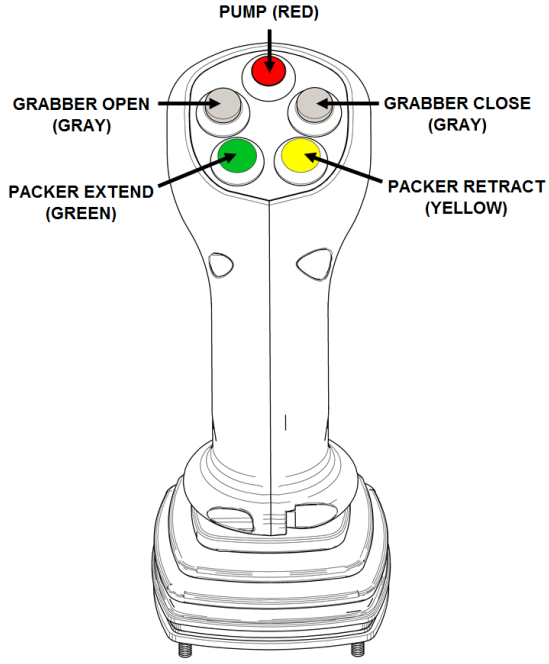


Figure 48. Python Lift Joystick Button Functions

NOTICE

The SYSTEM POWER SWITCH (red) must be pulled to the ON position and the pump switch depressed for the packer to work.

1. PUMP ON (RED) - DEPRESS and RELEASE button to activate the Hydraulic Pump. Depress button to turn Pump OFF.
2. PACKER EXTEND (GREEN) - DEPRESS and RELEASE button and the Packer Panel will go through one complete packing cycle.
3. PACKER RETRACT (YELLOW) - DEPRESS and RELEASE button and the Packer Panel will retract to the front of the body.
4. GRABBER OPEN (GRAY) - DEPRESS and HOLD button, when the grabbers get to the desired open position, release the button.
5. GRABBER CLOSE (GRAY) - DEPRESS and HOLD button until grabbers are fully closed around the container. Release button.

To toggle the control between Auto and Manual Lift Modes with the System Power Button ON, PRESS and HOLD the Grabber Open and Grabber Close buttons simultaneously until the in cab alarm stops sounding.

To toggle the control between Auto and Manual Pack Modes with the System Power Button ON, PRESS and HOLD the Packer Extend and Retract buttons simultaneously until the in cab alarm stops sounding.

For more information on Auto Modes, see **Features** 57.

PYTHON LIFT JOYSTICK CONTROLS

See the figure below for the Python Lift joystick decal.

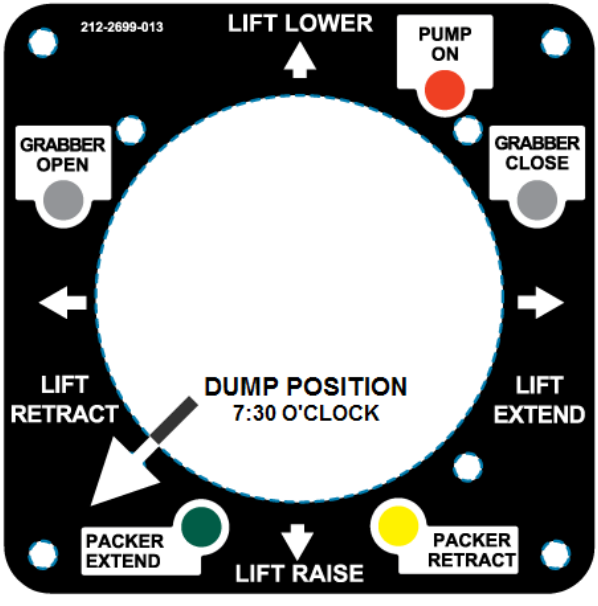


Figure 49. Python Lift Joystick Decal

SERVICE HOIST

The Service Hoist model has an outside control assembly that controls the raising and lowering of the body for service and maintenance operations by service personnel only.

The control is part of the service hoist pump. See the figure to the right and refer to **Propping the Body (Service Hoist Units)** 83 in the next section for Service Hoist and Factory Body Props operation procedures and additional safety notices.

Interconnected body props are installed on the unit. Both props MUST be used.

⚠ 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. Always use the body props when you must leave the body raised for maintenance or cleaning operations.

⚠ DANGER

The unit may roll when you raise the body on unstable or uneven ground and cause serious injury or death to you or bystanders. Do not prop the body while the unit is on unstable or uneven ground. Clear the area of all people not necessary for this procedure and set the unit on stable and even ground before you start this procedure. Make sure all tire pressures are correct.

Figure 50. Typical Service Hoist Controls Location

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NOTES:

SECTION 6
DAILY CHECKLIST

DAILY CHECKLIST

Make sure you perform a daily check of the unit. Make copies of the **Refuse Vehicle Daily Inspection** 72 on the next several pages to have the Operator mark completed items before each route. Many checks in the Daily Checklist are maintenance related, such as checking tire pressures and hoses for wear and damage.

Refer to the **Daily Checklist Maintenance Items Chart** below for items to check and the required action.

DAILY CHECKLIST MAINTENANCE ITEMS	
Item	**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

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DAILY CHECKLIST MAINTENANCE ITEMS	
Item	**Required Action**
Damaged tailgate seal	Replace seal
Body structure has loose or missing hardware	Tighten loose hardware Replace missing hardware
Body structure has 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
Air regulator (typically located at front of body)	90 PSI

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REFUSE VEHICLE DAILY INSPECTION

DATE: _____/_____/_____

UNIT NO. _____

Enter one of the following codes in the Inspection Results Code column:

Use a √ to indicate inspected and no repair, service or adjustment is necessary.
Use an **R** to indicate repair, service or adjustment is necessary.
Use an **N** to indicate vehicle not equipped.

FOLLOW ALL APPLICABLE LOCK-OUT / TAG-OUT PROCEDURES

Printed Name of Operator:

_____

I certify with the signature that follows that I performed a complete inspection in accordance with the following check list on the date given above.

Signature of Operator:

_____

Refer to **Preventative Maintenance Chart** 131 and **Lubrication Guide** 135 for additional information and requirements.

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CHECKS AND INSPECTIONS	INSPECTION RESULTS CODE (√/R/N)
INSPECT PER APPLICABLE MANUFACTURER MANUAL	
Cab/Drive	
Wheels and Tires	
Tractor and Chassis Electrical	
Chassis	
Engine & Transmission & Fluid Levels	
Tractor, 5th Wheel and Chassis Lubrication	
REFUSE COLLECTION SYSTEMS AND COMPONENTS	
CAB OUTSIDE AREA	
Check air pressure of tire. Add air if air pressure lower than recommended on the tire before going on route	
Check wear of tire tread. Replace tire worn below tire manufacturer's recommendation or state requirement before going on route	
Check tires for damage. Replace any damaged tire before going on route	
Inspect pump for leaks	
Inspect pump for damage or loose hardware	
Decals on bumper for damage and readability	
Inspect unit for refuse on or about the engine or exhaust components. **Remove all refuse to prevent a fire**	
BODY AND CHASSIS CURB SIDE INSPECTION	
Inspect level of hydraulic oil if tank is mounted on curb side. It must be full. **Add recommended oil as necessary**	
Inspect loader hydraulics for	
Cylinder, hoses and fittings for leaks	

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CHECKS AND INSPECTIONS	INSPECTION RESULTS CODE (√/R/N)
Hoses for wear and damage	
Cylinders for damage	
Loose or missing mounting hardware	
Worn fiber guards – replace hoses/fittings as necessary – MAKE SURE TO INSTALL FIBER GUARD ON NEW HOSE TO PREVENT HYDRAULIC LEAKS REACHING ENGINE SURFACES WHICH CAN CREATE A FIRE HAZARD	
Inspect decals on body prop for damage and readability	
Inspect body structure for damage, loose or missing nuts and bolts and for cracked welds and metal	
Inspect body mounting brackets for cracked welds, missing bolts or nuts or movement	
Inspect decals on curb side body for damage and readability	
Check air pressure of tires. Add air to any tire with air pressure lower than recommended before going on route	
Check wear of tire treads. Replace any tire worn below tire manufacturer's recommendation or state requirement before going on route	
Check tires for damage. Replace any damaged tire before going on route	
Inspect tailgate raise components	
Cylinder, hoses and fittings for leaks	
Hoses for wear and damage	
Cylinder for damage	
Loose or missing mounting hardware	
Inspect tailgate lock components	
Latch components for wear or damage	
Loose or missing mounting hardware	

CHECKS AND INSPECTIONS	INSPECTION RESULTS CODE (√/R/N)
Tailgate is locked	
TAILGATE	
Inspect decals on tailgate and underride bumper for damage and readability	
Inspect tailgate seal for visible damage	
Inspect underride bumper for damage and loose components	
BODY AND CHASSIS STREET SIDE INSPECTION	
Tailgate is locked	
Inspect tailgate lock components	
Latch components for wear and damage	
Loose or missing mounting hardware	
Inspect tailgate raise components	
Cylinder, hoses and fittings for leaks	
Hoses for wear and damage	
Cylinder for damage	
Loose or missing mounting hardware	
Check air pressure of tires. Add air to any tire with air pressure lower than recommended before going on route	
Check wear of tire treads. Replace any tire worn below tire manufacturer's recommendation or state requirements before going on route	
Check tires for damage. Replace any damaged tire before going on route	
Inspect all decals on curb side body for damage and readability	
Inspect body structure for damage, loose or missing nuts and bolts and for cracked welds	

CHECKS AND INSPECTIONS	INSPECTION RESULTS CODE (√/R/N)
Inspect body mounting brackets for cracked weld, missing bolts or nuts or movement	
Inspect decals on body prop for damage and readability	
Inspect level of hydraulic oil if tank is mounted on streetside. It must be full. **Add recommended oil as necessary**	
If equipped, the hopper cover is DOWN	
Battery disconnect switch is turned to OFF then:	
Check wiring and battery cables from the battery box to the engine starter for wear and other damage. **IMMEDIATELY REPLACE WORN OR DAMAGED WIRING**	
Check wiring and cables for loose connections. **IMMEDIATELY TIGHTEN LOOSE CONNECTIONS**	
OPERATION OF UNIT - *Skip this section if the unit will not be operated today*	
Close the air tank drain valve	
Turn battery disconnect to ON	
Apply parking brake	
Make sure the starter interlock operates – make sure unit will not start in gear	
Start the engine. Indicator lights and gauges show normal operation of engine	
Make sure the parking brake does not allow the vehicle to move forward or reverse at idle	
Make sure the throttle advance (if equipped) operates only in neutral	
Make sure all cab, body and tailgate lights operate	
Make sure the backup alarm and light operate	
Make sure all people not necessary and any hazards are clear of the area and then:	
If equipped, engage the PTO	
Pull the System Power Switch UP – the switch's red light is ON and the PUMP ON light is ON	

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CHECKS AND INSPECTIONS	INSPECTION RESULTS CODE (√/R/N)
Push the System Power Switch DOWN – the switch's red light is OFF and the PUMP ON light is OFF	
Pull the System Power Switch UP – the switch's red light is ON and the PUMP ON light is ON	
The FILTER CHANGE light is OFF. If not, and the filter was not changed before starting the unit, report this to your supervisor immediately. DO NOT go on route until the unit is repaired if the filter was not changed	
Operate the packer in the auto mode – the packer does one extend and retract cycle	
Operate the packer in the manual mode – manually extend and retract the packer	
Start a packer extend operation then press the Retract button. The packer should stop extending and move towards the cab.	
Start a packer retract operation then press the Extend button. The packer should stop retracting and move towards the body.	
The TRANS TEMP light is OFF. If not, report this to your supervisor immediately. Do not go on route until the unit is repaired	
Operate all four single functions of the lift with the standard Python joystick controls:	
OUT, IN, RAISE, LOWER, DUMP and UNDUMP	
Do a Coordinated Lift cycle with the standard Python joystick controls.	
If the body has refuse:	
Raise the body slightly – the BODY T/G UP light and alarm are ON	
Lower the body completely until it rests on the chassis	
The BODY T/G UP light and alarm are OFF	
If the body does not have refuse, use the in-cab controls and:	
Raise the body	
The BODY T/G UP light and alarm are ON	
Make sure the body props rotate fully down, then store the body props	

CHECKS AND INSPECTIONS	INSPECTION RESULTS CODE (√/R/N)
Lower the body completely	
The BODY T/G UP light and alarm are OFF	
Open the tailgate	
The BODY T/G UP light and alarm are ON	
Set the tailgate props	
Inspect the tailgate seal for damage	
Store the tailgate props and raise the tailgate completely	
Close the tailgate	
The BODY T/G UP light and alarm are OFF	
Make sure the tailgate flag is DOWN (if equipped).	
Move the lift arm to the TRANSIT position – lift arm is stowed and the grabber is fully OPEN and against the unit OR move the lift arm to the alternate position – lift arm is IN and the grabber is in the hopper	
Keep the engine running and continue the inspection	
IN-CAB INSPECTION	
Inspect all in-cab decals for damage and readability	
Do one automatic packer cycle	
Make sure the following control panel indicator lights are OFF:	
Body T/G UP	
TRANS TEMP	
FILTER CHANGE	
PUMP ON light is OFF – if it is ON, push the System Power Switch DOWN	

CHECKS AND INSPECTIONS	INSPECTION RESULTS CODE (√/R/N)
If equipped, check the operation of each camera	
FINAL INSPECTION	
While you walk completely around the vehicle, look for:	
Fluid leaks	
Cracked or damaged welds and metal	
Loose or missing bolts, nuts and clamps	

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NOTES:

SECTION 5
BODY AND TAILGATE PROPS

PREVIEW

Read this section to learn about:

- Using the body props
- Using the tailgate props

PROPPING THE BODY OF A SERVICE HOIST UNIT

Operators **MUST KNOW** how to **SAFELY** prop up the unit's body. You may need to prop the body up when you clean the inside of the body or for maintenance or repair procedures.

Observe and obey the following DANGER and WARNING notices while you prop the body with the factory body props.

⚠ 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.

⚠ DANGER

The unit may roll when you raise the body on unstable or uneven ground and cause serious injury or death to you or bystanders. Do not prop the body while the unit is on unstable or uneven ground. Clear the area of all people not necessary for this procedure and set the unit on stable and even ground before you start this procedure. Make sure all tire pressures are correct.

⚠ WARNING

Interconnected body props are installed on the unit. Both props MUST be used.

⚠ WARNING

Never drive the unit with the body propped.

NOTICE

Empty body of all refuse before using body props.

NOTICE

Units manufactured after April 2009 have the manual override valve. If you have not experienced problems with the service hoist, you may not need the override valve. If you have experienced problems with the service hoist, contact your Heil dealer or Heil.

PROPPING THE BODY OF A SERVICE HOIST UNIT (CONTINUED)

Factory Body Props

The factory-supplied body props are located on both sides under the body and forward of the rear wheels. Carefully follow the body propping procedures below.

☑ Follow These Steps:

Raising the Body

1. Empty body of all refuse.
2. Make sure that body is on firm, level ground with the Parking Brake engaged and holding and place chocks on the wheels.
3. CLOSE the manual override valve on the power unit – PUSH the knob IN and turn it CLOCKWISE.
4. **Lock-Out/Tag-Out** 51 the unit.
5. Remove the bolts and springs from the chassis mounting brackets. See the figure below.

Figure 51. Removing Bolts and Springs from Chassis Mounting Brackets

Raising the Body (Continued)

1. If equipped with quick disconnects, uncouple prior to raising the body.
2. Make sure there is adequate slack in hoses that do not have disconnects. If there is not adequate slack in hoses that do not have disconnects, remove those hose clamps.
3. Observe and obey the DANGER labels for an elevated chassis.
4. PRESS and HOLD the UP button to RAISE the body.
5. RELEASE the UP button when the body is at the height you want.
6. Release the prop handles and LOWER the body props, then PRESS the DOWN button to lower the body onto the lugs. See the figure below.

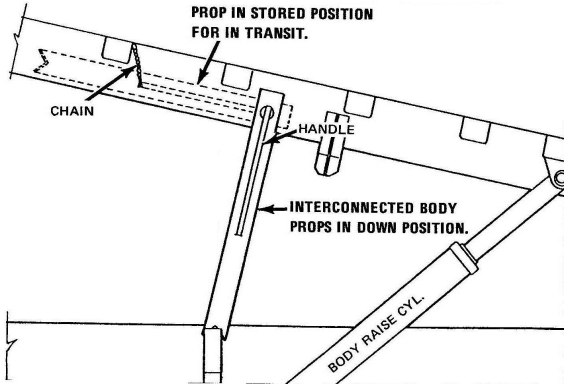

Figure 52. Factory Body Props

PROPPING THE BODY OF A SERVICE HOIST UNIT (CONTINUED)

Raising the Body (Continued)

7. NEVER open the override valve when the body is elevated.
8. Perform the maintenance or service procedures.

Lowering the Body

1. PRESS the UP button until the body is not resting on the body props.
2. RAISE the body props and store the handles.
3. Press and hold the DOWN button to lower the body.
4. Release the DOWN button when the body is completely down and resting on the chassis.
5. OPEN the manual override valve – PUSH the knob IN and turn it COUNTER-CLOCKWISE.
6. Make sure the manual override valve is open – PUSH the service hoist UP button. The body will not raise.
7. If any hose clamps were removed to create adequate slack during body raise, then re-install those hose clamps.
8. If equipped with quick disconnects, reattach the quick disconnects.
9. Install the bolts and springs to the chassis mounting brackets.

NOTES:

PROPPING THE BODY OF A SERVICE LIFT (SERVICEABLE EJECT) UNIT

Operators **MUST KNOW** how to **SAFELY** prop up the unit's body. You may need to prop the body up when you clean the inside of the body or for maintenance or repair procedures.

Observe and obey the following DANGER and WARNING notices while you use a service lift to raise the body.

⚠ 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.

⚠ DANGER

The unit may roll when you raise the body on unstable or uneven ground and cause serious injury or death to you or bystanders. Do not prop the body while the unit is on unstable or uneven ground. Clear the area of all people not necessary for this procedure and set the unit on stable and even ground before you start this procedure. Make sure all tire pressures are correct.

⚠ DANGER

All cranes, chains and cables used MUST be of adequate lift rating.

⚠ WARNING

Never drive the unit with the body propped.

NOTICE

Empty body of all refuse before raising the body with a service lift.

⚠ DANGER

All cranes, chains and cables used MUST be of adequate lift rating.

PROPPING THE BODY OF A SERVICE LIFT (SERVICEABLE EJECT) UNIT (CONTINUED)

Factory Body Props

The factory-supplied body props are located on both sides under the body and forward of the rear wheels. Carefully follow the body propping procedures below.

☑ Follow These Steps:

Raising the Body

1. Empty body of all refuse.
2. Make sure that body is on firm, level ground with the Parking Brake engaged and holding and place chocks on the wheels.
3. **Lock-Out/Tag-Out** 51 the unit.
4. Remove the bolts and springs from the chassis mounting brackets. See the figure below.

Figure 53. Removing Bolts and Springs from Chassis Mounting Brackets

Raising the Body (Continued)

5. Disconnect all wire harnesses, hydraulic hoses, and air lines that would prevent the body from raising or be damaged by the body raising.
6. Observe and obey the DANGER labels for an elevated chassis.
7. Connect a chain or cable sling with hooks from the front body chain hook lugs to an overhead crane, truck crane or other lifting device having adequate capacity to safely lift the body. See the figure below.

Figure 54. Front Body Chain Hook Lugs

8. Using the lifting device, slowly lift the body in a controlled manner high enough to lower the factory body props.

PROPPING THE BODY OF A SERVICE LIFT (SERVICEABLE EJECT) UNIT (CONTINUED)

Raising the Body (Continued)

9. RELEASE the prop handles and LOWER the body props. See the figure below.

Figure 55. Release and Lower Factory Body Props

10. Using the lifting device, slowly lower the body in a controlled manner until the body is resting on the prop stands. See the figure below.

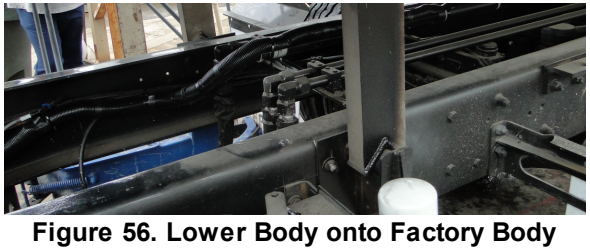

Figure 56. Lower Body onto Factory Body Props

11. Perform the maintenance or service procedures.

Lowering the Body

1. Observe and obey the DANGER labels for an elevated chassis.
2. Connect a chain or cable sling with hooks from the front body chain hook lugs (each side) to an overhead crane, truck crane or other lifting device having adequate capacity to safely lift the body.
3. Using the lifting device, slowly lift the body in a controlled manner high enough to raise (store) the factory body props. See the figure to the left.
4. Using the lifting device, slowly lower the body in a controlled manner until it is resting on the chassis frame.
5. With the body completely down and resting on the chassis, remove the cable or chain.
6. Reconnect all wire harnesses, hydraulic hoses, and air lines that were disconnected.
7. Install the bolts and springs to the chassis mounting brackets.

PROPPING THE TAILGATE

YOU MUST prop the tailgate when you open it for service or maintenance. Use the instructions that follow and prop the tailgate with either the factory-installed tailgate props or a tailgate prop built specifically for your unit.

Observe and obey the following DANGER and WARNING notices while you prop the tailgate with the factory tailgate props.

⚠ DANGER

A tailgate is dangerous while you raise or lower it. A prop may fail and cause the tailgate to close suddenly which can result in serious injury or death if you become trapped between the tailgate and the body. Do not walk under or go between the body and the tailgate when the tailgate is in motion, while you prop the tailgate or while the tailgate is propped.

Factory Tailgate Props

YOU MUST USE BOTH of the two support props at the rear of each unit whenever you open the tailgate for service or maintenance.

Refer to the figure on the next page and carefully follow the tailgate propping procedures below.

☑ Follow These Steps:

A. How to Use the Tailgate Props

1. Set unit on flat, stable ground, apply the parking brake, and chock the wheels.
2. Make sure the area around the tailgate is clear of all people.
3. UNLOCK the tailgate. Make sure the tailgate unlock flags are down (if equipped).
4. Use the tailgate raise lever or rocker switch in the cab (if equipped) to RAISE the tailgate enough to RELEASE and ROTATE the props so that you can SECURE each prop on its prop pin on each side of the tailgate.
5. LOWER the tailgate until you can SECURE each PROP on its pin.
6. Turn OFF the engine and REMOVE the ignition key.
7. Put the unit in the Lock-Out/Tag-Out mode. Refer to **Lock-Out/Tag-Out Procedure** 51.

PROPPING THE TAILGATE (CONTINUED)

B. How to Store the Tailgate Props

1. When you finish using the props, take the unit out of the Lock-Out/Tag-Out mode, insert the ignition key, and start the engine.
2. RAISE the tailgate enough so that you can REMOVE each prop bar from its pin, then ROTATE each prop so that you can put the props in the stored position.
3. SECURE each prop with a pin.
4. LOWER the tailgate until it is completely CLOSED.
5. LOCK the tailgate.

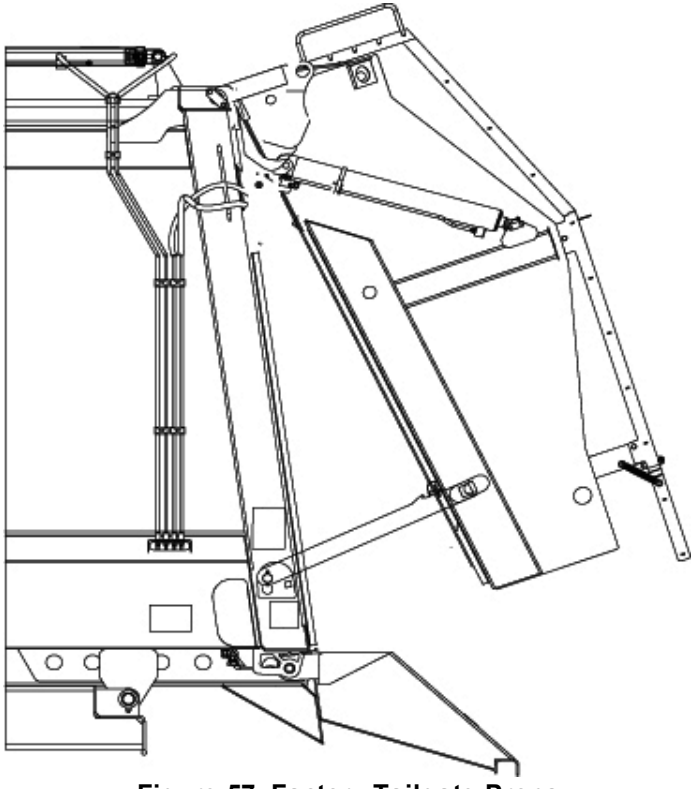

Figure 57. Factory Tailgate Props

SECTION 7
BEFORE GOING ON ROUTE

PREVIEW

Read this section to learn proper procedures for:

- Checking the unit each day
- Starting the unit in cold weather
- Setting the unit up for the route
- Removing power to the unit during periods of not using the unit.

BATTERY DISCONNECT SWITCH

The battery box is typically located on the streetside 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.

DAILY CHECKLIST

See the **Daily Check section** 69 for the daily checks and procedures checklist. Make a copy of the check list.

⚠ WARNING

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

BEFORE STARTING A ROUTE

Before you start a route, do the following:

- ☐ Perform an inspection of the unit with the **Daily Checklist** 69.
- ☐ Check the **Hydraulic Oil Level**.
- ☐ Cycle all **Hydraulic Functions**.
- ☐ If equipped, close the **Side Access Door**.
- ☐ If equipped, close the **Sliding Top Door (Hopper Cover)**.
- ☐ Check the **"In-transit" Settings**.

Use the Daily Checklist to Inspect the Unit

It is the operator's responsibility to do a visual inspection of the unit and make sure the unit is in good operating condition before you start a route.

The requirements for the daily checks are given in the **Daily Checklist section** 69. Make sure you complete the inspections on the checklist and you make all entries, including your signature.

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 or to check the oil level. The hydraulic oil is sufficiently warmed when the temperature is between 120° and 160°F.

⚠ WARNING

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 EXTEND and PACKER RETRACT functions through ten (10) cycles while the engine idles.
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.

PREPARING THE UNIT TO CHECK THE HYDRAULIC OIL LEVEL

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

- Truck – on level ground
- Tailgate and Body – fully down and locked
- Packer Panel – in the in-transit position with all cylinders retracted
- Lift Arm (if equipped) – is fully retracted

CHECK HYDRAULIC OIL LEVEL

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

CYCLE ALL HYDRAULIC FUNCTIONS

☑ Follow These Steps:

1. Operate the lift arm, grabbers, top door (if equipped), packing panel, body and tailgate functions two or three times each. See **Section 4** 55 for proper operation of controls.
2. Put the unit back in the position described above and check the oil level again.
3. Add oil if necessary. Refer to the Service Manual for instructions for filling the oil tank.

Current Heil standard hydraulic oil is **Shell Tellus S2 VX 32**. Please see product TDS and MSDS for more detail information about it. We strongly recommend to use it on Heil products to get best system performance and oil service life. Refer to the Service Manual for other approved hydraulic oils.

NOTICE

Cold weather operation requires special oil considerations. Viscosity should not exceed 7500 SSU at lowest startup temperature. Continuous operation should range between 40–1000 SSU for all temperature ranges.

NOTICE

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.

HYDRAULIC OIL TANK WITH SIGHT GAUGE

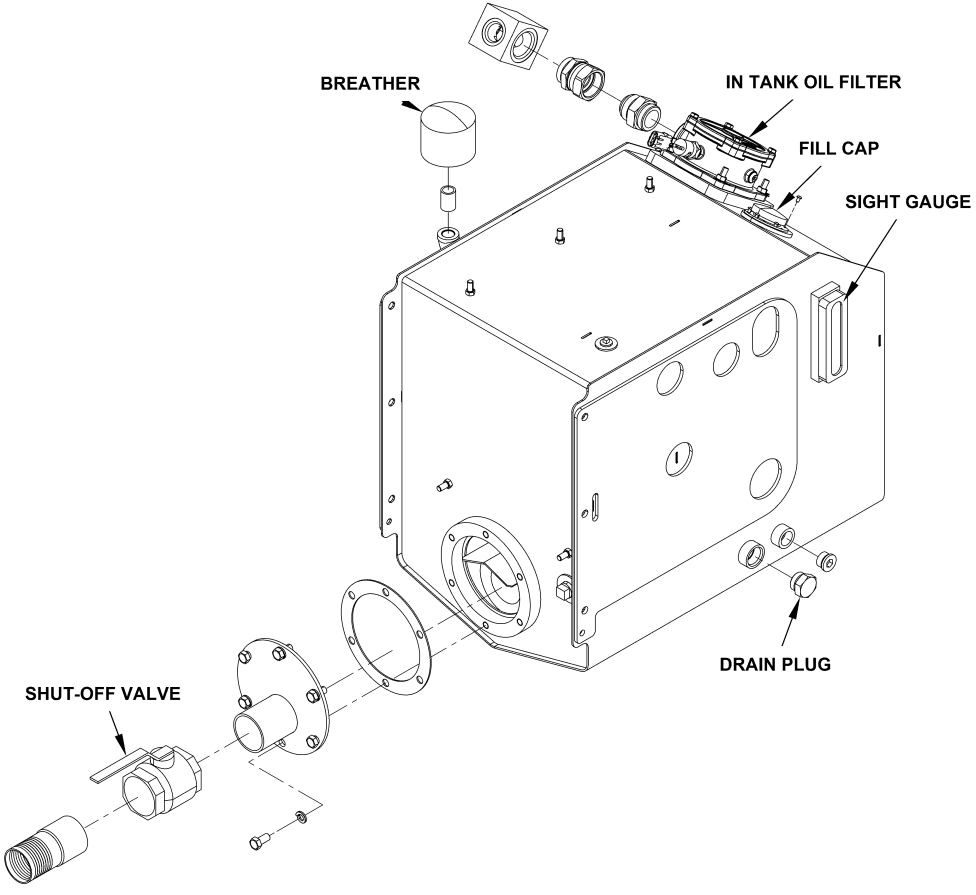

Figure 58. Hydraulic Oil Tank with Sight Gauge

CHECK THE TRAVELING OR "IN-TRANSIT" POSITION

When you travel to and from the landfill or transfer station, make sure the unit is in the In-Transit Position as follows:

- The Body is fully LOWERED.
- The Tailgate is DOWN and LOCKED.
- The Lift Arm is in a transit position:
  - The lift arm is fully stowed
  - The grabber arm assembly is against the chassis and the grabbers are fully open
- The Top Door (Hopper Cover) is:
  - For a unit before it is on-route – CLOSED
  - For an on-route unit – OPEN
- The Packer Panel is:
  - For an empty unit, it is at the front of hopper.
  - For a unit with refuse in the body, it is up tight against refuse.
- The PTO or Pump Switch is OFF.
- The Mirrors are properly adjusted and clean.
- The Side Access Door and Sump Doors are CLOSED and LATCHED.
- ALL outside lights operate properly.
- The street side driver's station is used for traveling.

Use of Curbside Drive

If equipped, drive from the curbside driver position **ONLY** on the collection route. **DO NOT** use this station during travel to and from a route, landfill, or transfer station.

DuraPack Python

NOTES:

SECTION 8
ON-ROUTE OPERATION PROCEDURES

PREVIEW

Read this section to learn about:

- Setting up the unit for a route
- Loading refuse manually with the lift arm
- Packing the load
- Packing on-the-move
- Washout system
- Setting up the unit for the landfill or transfer station.

DRIVING TO PICK-UP LOCATIONS

Whenever you drive to and from a route, along the route, to the landfill, etc., make sure the unit is set up in the **In-Transit Position**:

- The Body is fully LOWERED.
- The Tailgate is DOWN and LOCKED.
- The Lift Arm is in a transit position:
  - The lift arm is fully stowed
  - The grabber arm assembly is against the chassis and the grabbers are fully open
- The Top Door (Hopper Cover) is:
  - For a unit before it is on-route – CLOSED
  - For an on-route unit – OPEN
- The Packer Panel is:
  - For an empty unit, it is at the front of hopper.
  - For a unit with refuse in the body, it is up tight against refuse.
- The PTO or Pump Switch is OFF.
- The Mirrors are properly adjusted and clean.
- The Side Access Door and Sump Doors are CLOSED and LATCHED.
- ALL outside lights operate properly.
- The street side driver's station is used for traveling.

Use of Curbside Drive

If equipped, drive from the curbside driver position **ONLY** on the collection route. **DO NOT** use this station during travel to and from a route, landfill, or transfer station.

LIFTING AND LOADING REFUSE WITH THE PYTHON LIFT ARM

Use the following procedures at each stop along the route to load refuse into the unit. Observe all DANGER and WARNING hazard alerts.

NOTICE

If local rules and laws require more clearance, you must follow them.

1. Move the unit to a position that is best to load the refuse with the lift arm. Practice this maneuver for best results.
2. ADJUST the container spot mirror for BEST overhead vision of the hopper while you raise container.
3. PULL the SYSTEM POWER switch UP (and engage the PTO if equipped). The PUMP ON light should be ON.

NOTICE

If the engine RPMs go above 900, both pumps will be shut off and the lift will not operate.

4. The Operator's foot is on the service brake and the engine RPMs are at or below 900.

⚠ WARNING

Moving equipment can be dangerous. Serious injury or death may 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.

5. Make sure the loading area is clear of all unnecessary people.
6. Make sure the packer is in the **Auto Pack mode** 57.
7. If equipped, the hopper cover is OPEN. You can damage the unit if you try to load refuse if the hopper cover is CLOSED.

LIFTING AND LOADING REFUSE WITH THE PYTHON LIFT ARM (CONTINUED)

Auto-Lift Mode

⚠ DANGER

Contact of the unit with overhead electric lines is dangerous. Serious injury or death may occur. Make sure there is adequate overhead clearance before you raise the container. Refer to **Tables 1 and 2. Overhead Clearances**. 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.

NOTICE

If local rules and laws require more clearance, you must follow them.

All units are equipped with the Auto-Lift feature. This feature allows the operator to partially automate the lifting, dumping and returning the refuse container to the ground.

Auto-Lift

1. Toggle ON/OFF by holding grabber open and close buttons simultaneously for five (5) seconds (until the in cab alarm stops sounding).
2. Closing grabbers will initiate Auto-Lift sequence. Operator must hold grabber closed button to continue cycle.
3. Container will raise and retract automatically to the dump position.
4. Operator manually replaces cart to desired position on the ground.
5. Pressing and holding grabber release (open) button will return lift to stowed position.
6. Go to the next stop on the route.

LIFTING AND LOADING REFUSE WITH THE PYTHON® LIFT ARM (CONTINUED)

Manual Lift Mode

⚠ DANGER

Contact of the unit with overhead electric lines is dangerous. Serious injury or death may occur. Make sure there is adequate overhead clearance before you raise the container. Refer to **Tables 1 and 2. Overhead Clearances**. 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.

NOTICE

If local rules and laws require more clearance, you must follow them.

1. Command Extend with the joystick to make the lift extend towards the container. During reach the lift will retain its stowed height in close to the truck however reaching out farther from the unit requires the operator to control the lift height simultaneously while reaching.

NOTICE

Make sure the container is in the center of the grabbers. DO NOT use the tips of the grabbers to squeeze and lift the container.

2. Command Grab when the container is in the position. Grabbing the container lower in the strike zone will position the container farther into the hopper during full dump.
3. Command Dump by moving the joystick into the dump (7:30) position. The dump position is "sweet spot" that splits the in and up functions to get a perfect dump motion. Finding the dump position with the joystick usually requires practice to obtain a consistent and smooth dump motion. Amateur operators should error to the in position of the joystick rather than up while dumping. Erring to the up position will cause premature dumping and result in trash spilled on the ground.
4. Container Placement - Command down by moving the joystick forward. When the container is at the appropriate level, release and stow the grabbers. Note: If it is necessary to return the container to it's original position, beginner operators should completely lower the container first and then reach out as required. Only experienced operators should attempt to reach out while lowering the lift simultaneously.
5. Go to the next stop on the route.

LIFTING AND LOADING REFUSE WITH THE PYTHON® LIFT ARM (CONTINUED)

Operator Proficiency

While learning to operate the Python, the operator should not concentrate on speed (except dumping) but should focus on making precision movements with the lift. Exception to slow operation should be taken during the dump function. The operator must be aggressive while commanding the dump function to obtain a smooth dump motion without spilling trash on the ground. Once precision movements are mastered, lift speed will naturally occur. The joystick should be considered as an extension of the operator's body, as the precision movements are mastered and veteran operational status and experience is obtained.

NOTES:

COMPACTING THE LOAD

Loads can be compacted automatically or manually. In addition to the auto-pack mode during loading, you can pack the refuse manually any time after loading the refuse in the hopper. You can use the in-cab controls for the packer panel to compact the load again with a manual cycle.

Many factors affect how often you need to compact the load, including the operator's experience.

Select-O-Pack™

Select-O-Pack is a standard feature on all Cortex Controller™ controlled Heil Automated Side Loaders. This feature automatically cycles the Auto-Pack after a predetermined number of lift cycles.

Refer to **Select-O-Pack** in **Features** 57 for instructions on setting the Select-O-Pack feature.

Packing Near Full Load

When the body is near a full load, the packing cylinder will not extend fully before returning to the front of the hopper.

Packing On-The-Move

Heil DuraPack® Python® units can pack on-the-move. This means you can operate the packing mechanism while the vehicle is moving, as well as when it is stationary. The default mode of the body pump is the AUTO PACK mode. This allows for continuous packing while the SYSTEM POWER switch is set to ON (and if equipped, the PTO is engaged), the pump is ON and the unit's engine is running.

You can pack-on-the-move when the Cortex Controller determines that all conditions are OK. The Cortex Controller shuts down the pump system when the engine RPMs are above safe operating speeds or the Cortex Controller determines that conditions are not correct for pump operation. The packing cycle will not begin if the RPMs are above a safe operating speed.

Refer to **Auto/Manual Pack Mode** in **Features** 57 for operation of the Auto Pack feature.

Achieving Payloads

Read this section for advice and tips on how to pack the most efficient loads with your unit.

Payloads in any refuse/waste handling vehicle will vary greatly, depending on the type of material loaded. Dry bulk cardboard and reconstruction/building materials, Styrofoam, foam packing materials, loose plastic, etc. cannot be compressed and packed as effectively as wet, soft, garbage type materials. If dry materials can be mixed with some wet material, more effective payloads can be achieved.

Follow these techniques to attain greater efficiency in packing the load in your unit:

1. After you empty the first few bins, the body begins to fill and material can begin to "fall back" into the hopper
2. If the route allows, mix some wet bins in with dry bins. This helps compact the dry material more. Wet material also helps lubricate the body, which results in better packing.

LEAVING THE ROUTE FOR THE LANDFILL/ TRANSFER STATION

At the end of the route, or when the unit has a full load, prepare the unit to go to the landfill.

- The Body is fully LOWERED.
- The Tailgate is DOWN and LOCKED.
- The Lift Arm is in a transit position:
  - The lift arm is fully stowed
  - The grabber arm assembly is against the chassis and the grabbers are fully open
- The Top Door (Hopper Cover) is:
  - For a unit before it is on-route – CLOSED
  - For an on-route unit – OPEN
- The Packer Panel is:
  - For an empty unit, it is at the front of hopper.
  - For a unit with refuse in the body, it is up tight against refuse.
- The PTO or Pump Switch is OFF.
- The Mirrors are properly adjusted and clean.
- The Side Access Door and Sump Doors are CLOSED and LATCHED.
- ALL outside lights operate properly.
- The street side driver's station is used for traveling.

Use of Curbside Drive

If equipped, drive from the curbside driver position **ONLY** on the collection route. **DO NOT** use this station during travel to and from a route, landfill, or transfer station.

DuraPack Python

NOTES:

SECTION 9
LANDFILL/TRANSFER STATION/ RECYCLE CENTER PROCEDURES

PREVIEW

Read this section to learn about:

- Setup conditions to dump the refuse
- Unloading the refuse
- Using the sump and (optional) washout system
- Preparing the unit to return to route.

SETTING UP AN EJECT UNIT FOR UNLOADING

Set up the Unit

After positioning unit on firm stable ground for unloading at the landfill, set up as follows.

⚠ WARNING

Make sure that all individuals are clear of the point of operation before actuating controls. Be ready to stop or reverse the function.

1. Shift the transmission to NEUTRAL.
2. APPLY the parking brake and MAKE SURE it is holding.
3. PRESS and RELEASE the pump (red) button on the Joystick to activate the Pump.
4. UNLOCK the tailgate by PUSHING and HOLDING the tailgate latch toggle switch (located in control panel in cab), until the tailgate is completely unlocked.

Raise the Tailgate

⚠ DANGER

A tailgate in motion is dangerous. Serious injury or death may 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.

Raise the Tailgate (Continued)

1. PRESS the TAILGATE UP/DOWN switch to UP and HOLD the switch until the tailgate is COMPLETELY raised, which is about 30º above the body. See the figure below.
2. RELEASE the switch.

NOTICE

The BODY TAILGATE UP notification turns ON and the in-cab alarm will sound to indicate the tailgate is open.

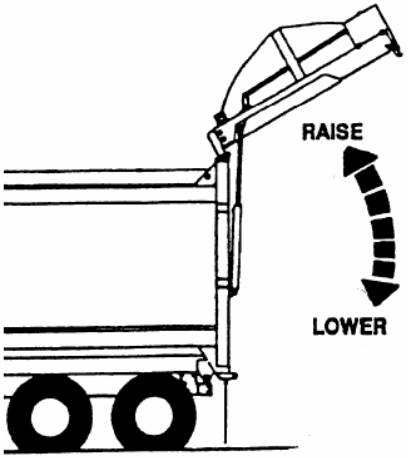

Figure 59. Raise the Tailgate

UNLOADING EJECT UNITS

After positioning unit on firm stable ground for unloading at the landfill and setting up as described in **Setting Up Eject Units for Unloading** 111, follow this procedure to unload a eject unit.

⚠ WARNING

Stand clear when body is raised or unloading.

⚠ WARNING

Keep access doors closed when packer is in motion.

NOTICE

ALWAYS raise the tailgate BEFORE raising body.

Emptying the Body

1. With the tailgate completely raised, EJECT (remove) the refuse by depressing the packer extend pushbutton (green) on the Joystick (located in the cab) until all refuse is emptied out of the body and the packer panel comes to a complete stop. Release the button.
2. To retract the panel, depress the packer retract pushbutton (yellow) on the Joystick (located in the cab) until panel is completely retracted forward into the body. Release the pushbutton.

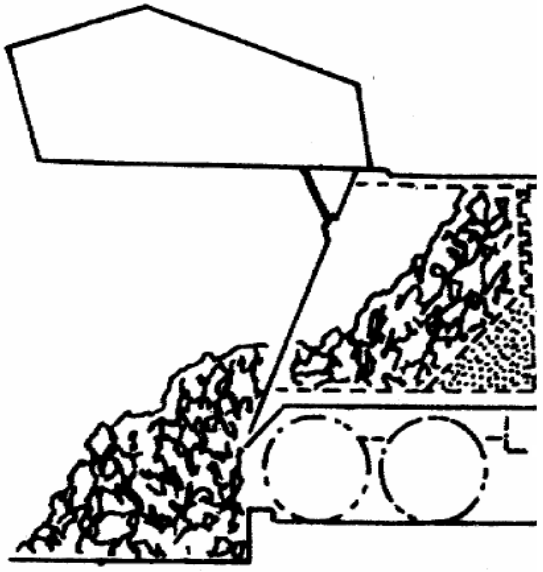

Figure 60. Ejecting the Refuse

UNLOADING AN EJECT UNIT (CONTINUED)

Prop the Tailgate

Before you clean and inspect the tailgate seal, prop the tailgate with the two factory body props. See **Propping the Tailgate** 89.

Clean/Inspect Tailgate Seal

BEFORE you lower the tailgate, MAKE SURE the area where the tailgate seal mates with the body is CLEAN AND FREE of any refuse and debris. Inspect seal for possible excessive wear or damage and replace if necessary. Report any excessive wear or damage to your supervisor.

⚠ DANGER

Stand clear when tailgate is in motion and during unloading cycle. Do not stand under or cross under raised tailgate. Doing so may result in injury or death.

Lower the Tailgate

1. PRESS the TAILGATE UP/DOWN switch to the UP position and HOLD to RAISE the tailgate sufficiently to rotate the props out of the prop pockets.
2. STORE the tailgate props.
3. PRESS the TAILGATE UP/DOWN switch to the DOWN position and HOLD to fully LOWER the tailgate until the tailgate flag is UP, then RELEASE the switch.

NOTICE

The BODY TAILGATE OPEN warning notification light will go OFF and the alarm will stop when body is FULLY down and the tailgate is completely closed.

Lock the Tailgate

Use the tailgate lock toggle switch to lock the tailgate.

UNLOADING AN EJECT UNIT (CONTINUED)

Clean Behind the Packer Panel

1. Extend the packer panel to the rear of the body.
2. Disengage the PTO or Pump Switch
3. Turn OFF engine and REMOVE the ignition key and place unit in **Lock-Out/Tag-Out mode** 51.

⚠ DANGER

Before entering the body area, place the unit in Lock-Out/Tag-Out mode. See **Lock-Out/Tag-Out Procedures** 51.

4. Open access door and clean behind the packer panel after each load.
5. Inspect packer tracks and hopper floor for excessive wear or possible damage.
6. Close access door and return packer panel to front of body.

Clean Out Hopper Sump

A sump door is located on the front corner on each side of the body and needs to be open when cleaning out the sump area. A cleaning tool is provided with each unit to clean out the sump area. Clean out the sump area after unloading at the landfill. Be sure to close and latch BOTH sump doors when completed.

NOTICE

Sump doors should be closed at all times except when open for cleaning.

Figure 61. Curb Side Hopper Sump Door Closed

Remove Refuse from the Engine and Exhaust Areas

Inspect unit for refuse on or about the engine or exhaust components. Remove all refuse to prevent a fire.

Preparing to Return to Route

MAKE SURE before you leave the landfill or transfer station that the unit is in the **In-Transit Position** 97.

SETTING UP A DUMP UNIT FOR UNLOADING

Set up the Unit

After positioning unit on firm stable ground for unloading at the landfill, set up as follows.

⚠ WARNING

Make sure that all individuals are clear of the point of operation before actuating controls. Be ready to stop or reverse the function.

1. Shift the transmission to NEUTRAL.
2. APPLY the parking brake and MAKE SURE it is holding.
3. PRESS and RELEASE the pump (red) button on the Joystick to activate the Pump.
4. UNLOCK the tailgate by PUSHING and HOLDING the tailgate latch toggle switch (located in control panel in cab), until the tailgate is completely unlocked.

Raise the Tailgate

⚠ DANGER

A tailgate in motion is dangerous. Serious injury or death may 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.

Raise the Tailgate (Continued)

1. PRESS the TAILGATE UP/DOWN switch to UP and HOLD the switch until the tailgate is COMPLETELY raised, which is about 30º above the body. See the figure below.
2. RELEASE the switch.

NOTICE

The BODY TAILGATE UP notification turns ON and the in-cab alarm will sound to indicate the tailgate is open.

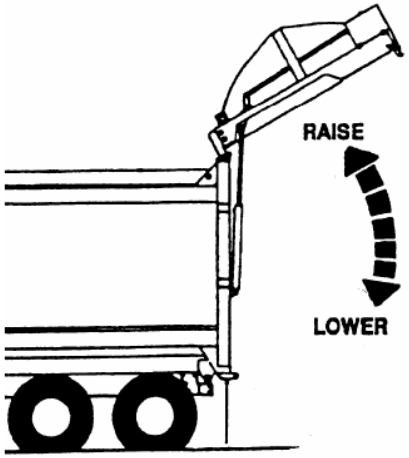

Figure 62. Raise the Tailgate

UNLOADING A DUMP UNIT

After positioning unit on firm stable ground for unloading at the landfill and setting up as described in **Setting Up Dump Units for Unloading** 115, follow this procedure to unload a dump unit.

⚠ DANGER

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

⚠ 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. Always use the body props when you must leave the body raised for maintenance or cleaning operations.

⚠ WARNING

Raising the body with the tailgate closed can damage the underride bumper. The underride bumper can hit the ground when the tailgate is not fully raised before you raise the body. Serious injury or death may occur.

Raising the Body

1. A unit with a tag axle may be unstable during dumping. ALWAYS lower the tag axle BEFORE you raise the body.
2. PRESS the TAILGATE UP/DOWN switch to UP and fully raise the tailgate, then RELEASE the switch.

NOTICE

Important: If a body raise cylinder hangs up for any reason as you raise the body, RELEASE the switch IMMEDIATELY so the body stops raising. Contact Heil Technical Service for more information.

3. PRESS the BODY UP/DOWN switch to UP and HOLD the switch until the body is COMPLETELY raised.

UNLOADING A DUMP UNIT (CONTINUED)

Raising the Body (Continued)

4. When the body is completely raised, RELEASE the BODY UP/DOWN switch.

⚠ WARNING

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

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.

5. When the refuse stops falling out of the body, SLOWLY BUT SUDDENLY move the unit FORWARD a short distance and then STOP to allow more refuse to fall out of the body. Experience will teach you how fast to move safely forward or backward before you apply the brakes.
6. If necessary, perform step 5 again but go BACKWARD and then STOP to allow more refuse to fall out of the body.
7. Perform steps 5 and 6 as necessary to remove all of the refuse from the body.

UNLOADING A DUMP UNIT (CONTINUED)

Lowering the Body

ALWAYS lower the body BEFORE you lower the tailgate. If you used body props, MAKE SURE they are in the stored position BEFORE you attempt to lower the body.

⚠ DANGER

Any part of your body between the unit's body and the chassis or cylinders while you raise the body is dangerous. Serious injury or death will occur if the unit's body suddenly lowers and traps a part of your body. Keep all parts of your body out from underneath the unit's body during this procedure.

1. PRESS the BODY UP/DOWN switch to the DOWN position.
2. HOLD the switch UNTIL the body fully mates with the chassis. When the body is COMPLETELY lowered, RELEASE the switch.

NOTICE

Important: If a body raise cylinder hangs up for any reason as you lower the body, RELEASE the switch IMMEDIATELY so the body stops lowering.

Prop the Tailgate

Before you clean and inspect the tailgate seal, prop the tailgate with the two factory body props. See **Propping the Tailgate** 89.

Clean and Inspect the Tailgate Seal

BEFORE you lower the tailgate, MAKE SURE the area where tailgate seal mates with the body is CLEAN AND FREE of any refuse and debris. Inspect the seal for possible excessive wear or damage and replace if necessary. Report any excessive wear or damage to your supervisor.

UNLOADING A DUMP UNIT (CONTINUED)

Lowering the Tailgate

⚠ DANGER

A tailgate in motion is dangerous. Serious injury or death may 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.

1. PRESS the TAILGATE UP/DOWN switch to the UP position and RAISE the tailgate sufficiently to rotate the props out of the prop pockets.
2. STORE the tailgate props.
3. PRESS the TAILGATE UP/DOWN switch to the DOWN position and fully LOWER the tailgate, then RELEASE the switch.

NOTICE

The BODY TAILGATE OPEN warning notification light will go OFF and the alarm will stop when body is FULLY down and the tailgate is completely closed.

Lock the Tailgate

Use the tailgate lock toggle switch to lock the tailgate.

Clean Behind the Packer Panel

1. Extend the packer panel to the rear of the body.
2. Disengage the PTO or Pump Switch
3. Turn OFF engine and REMOVE the ignition key and place unit in **Lock-Out/Tag-Out mode** 51.

⚠ DANGER

Before entering the body area, place the unit in Lock-Out/Tag-Out mode. See **Lock-Out/Tag-Out Procedures** 51.

4. Open access door and clean behind the packer panel after each load.
5. Inspect packer tracks and hopper floor for excessive wear or possible damage.
6. Close access door and return packer panel to front of body.

UNLOADING A DUMP UNIT (CONTINUED)

Clean Out Hopper Sump

A sump door is located on the front corner on each side of the body and needs to be open when cleaning out the sump area. A cleaning tool is provided with each unit to clean out the sump area. Clean out the sump area after unloading at the landfill. Be sure to close and latch BOTH sump doors when completed.

NOTICE

Sump doors should be closed at all times except when open for cleaning.

Figure 63. Curb Side Hopper Sump Door Closed

Remove Refuse from the Engine and Exhaust Areas

Inspect unit for refuse on or about the engine or exhaust components. Remove all refuse to prevent a fire.

Preparing to Return to Route

MAKE SURE before you leave the landfill or transfer station that the unit is in the **In-Transit Position** 101.

SECTION 10
CORTEX CONTROLLER™

PREVIEW

Read this section to learn about:

- Troubleshooting the Cortex Controller
- Operational specifications
- Hydraulic Filter Bypass
- Diagnostic Fault Codes

CORTEX CONTROLLER INSIGHT™ DIAGNOSTIC DISPLAY NOTIFICATIONS

When a fault has been set the In-Cab Alarm will sound a number of beeps that indicate which fault has occurred. See **Diagnostic Fault Codes** 125, the decal in the cab, or **Service Manual Automated Side Loader Cortex Controller™ Program 109-0285** for more information.

NOTICE

The In-Cab alarm is overridden by the Tailgate/Body alarm. For example, if the tailgate is open or the body is raised on Eject units, the alarm will sound for 2 seconds and pause for 10 seconds until that condition is resolved. Any diagnostic codes that are still present after the tailgate alarm has been resolved will then sound.

Hydraulic Pump Shutdown

The unit's pump shutdown system turns off the hydraulic pump when the return line filter becomes blocked (clogs) which starts the filter bypass system.

The sequences 1 through 3 occur after the filter clogs and bypass begins.

NOTICE

A filter bypass condition allows you to operate the hydraulic pump when the return line filter is blocked with sediment and other materials. You can cause damage to hydraulic components if you operate the unit with a blocked hydraulic oil filter. Change the filter as soon as you can.

1. START OF BYPASS TO END OF FIRST (1st) HOUR – The bypass light does not come on and the Cortex Controller does not beep.
2. SECOND (2nd) HOUR THROUGH FIFTH (5th) HOUR OF BYPASS – The filter bypass light flashes ON and OFF after the first full hour of bypass. The number of ON flashes indicates the number of full hours of bypass. The time the flash is OFF starts at about 5 seconds (for the first full hour of bypass) and decreases about 1 second for each full hour of bypass beginning with the second full hour of bypass the OFF time. For example, during the third hour of bypass (two complete hours of bypass), the light flashes ON twice and is OFF for approximately 4 seconds and the cycle repeats.
3. SIXTH (6th) HOUR AND AFTER – The pump will function for three minutes. The filter bypass light comes ON solid. The Cortex Controller beeps 13 times in a minute, pauses and the cycle repeats until you change the filter.

CORTEX CONTROLLER INSIGHT DIAGNOSTIC DISPLAY NOTIFICATIONS (CONTINUED)

Hydraulic Pump Shutdown (Continued)

4. UNTIL YOU CHANGE FILTER - You can operate the pump for three (3) minutes at a time until you change the filter. You can turn the pump OFF then turn it back ON.

After Hydraulic Filter Change

1. The Cortex Controller™ alarm continues to beep until the filter is clear for 15 minutes, then stops and the filter bypass light goes OFF.
2. To start the hydraulic system after you change the filter:
   - MAKE SURE the SYSTEM POWER switch is ON.
   - PRESS the PUMP ON switch.
3. The filter must stay clean for 15 minutes before the Cortex Controller resets the shutdown timer and normal operation resumes.

NOTES:

DIAGNOSTIC FAULT CODES

Each fault code consists of a two digit number. When a fault condition occurs, the in-cab buzzer will sound for five (5) seconds, then stop. It will then beep a number of times specifying the first digit of the code. The beep will pause for two (2) seconds, then resume to beep a number of times specifying the second digit of the code. Refer to the table to the right and the decal in the cab for definitions of warnings or fault conditions.

Fault Disabled Functions

Certain critical fault codes will disable the normal operation of some body functions. This is intended to avoid any potential damage that might result from the malfunction. These functions will remain disabled until the fault condition has been resolved and the fault code has been cleared. Some less critical fault conditions will not disable any of the body functions, but simply set a beep code.

For more information, refer to the Service Manual **Automated Side Loader Cortex Controller™ Program 109-0285**.

DIAGNOSTIC FAULT CODES	
BEEP CODE	**DEFINITION OF WARNINGS OR FAULT CONDITION**
31	HIGH TRANSMISSION TEMPERATURE
32	FILTER BYPASS SHUTDOWN
33	SIDE DOOR INTERLOCK
34	LOW HYDRAULIC OIL (OPTIONAL)
35	DEAD MAN JOYSTICK FAULT (OPTIONAL)
41	ENGINE SPEED NOT DETECTED
42	LOSS OF ENGINE IDLE CALIBRATION
43	LOSS OF ENGINE TACH. CALIBRATION
53	PACKER PROX. FAULT
54	FILTER PRESSURE SWITCH FAULT (OPTIONAL)
55	PACKER PRESSURE SWITCH FAULT
23	TORQUE LIMIT PRESSURE SWITCH FAULT (OPTIONAL)

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NOTES:

SECTION 10
END OF DAY PROCEDURES

PREVIEW

Read this section to learn about:

- Parking the Unit
- Washout System
- Final Inspection
- Report to Employer/Supervisor
- Ignition Keys

END OF DAY PROCEDURES

Parking the Unit

1. Park the unit in the space designated by your employer/supervisor.
2. Set the parking brake.

Final Inspection

Perform a final inspection of the unit:

1. Clear the area of all people.
2. Start the engine if it is not running.
3. Make sure all lights and in-cab control switches operate correctly.
4. Put the transmission in reverse while you press the service brake. The backup alarm should sound in the cab. If the alarm does not sound in the cab, report this to your employer/supervisor immediately.
5. Check the unit for fluid leaks from the hoses, cylinders, valves, pump and fittings. Report any leaks to your employer/supervisor.
6. Make sure all cylinders (except tailgate lock cylinders) are in their retracted position..
7. APPLY the parking brake.
8. Put the transmission in neutral and turn the engine OFF.
9. Put the unit in the **Lock-Out/Tag-Out mode** 53.
10. Open the air tank drain valve.
11. Turn the battery disconnect switch to OFF.
12. Follow the company policy for locking the cab doors.

Reports to Employer/Supervisor

Complete any reports required by your employer/supervisor. If you found any problems during the final inspection, prepare the necessary report for the employer/supervisor.

Ignition Keys

Put the ignition keys in a secure storage area designated by your employer/supervisor.

NOTES:

SECTION 11
PREVENTIVE MAINTENANCE CHART

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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 be checked and serviced.

*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.
Electrical, Battery Cables	☑					Check for proper operation.
		☑				Check battery cables from battery to starter for loose cables, rubbing or damage and abrasions to cables. Replace if necessary.

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*HOURS OF OPERATION						
COMPONENT/SYSTEM	**8**	**40**	**200**	**1000**	**2000**	**CHECK/SERVICE**
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 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** in Service Manual.
Packer/Ejector Panel Bolt-in Cylinder Mount Bolts			☑			Check for tightness. Bolt torques should be 192 Ft-Lbs. (lubricated threads)
*** Daily = 8 hrs. Weekly = 40 hrs. Monthly = 200 hrs. 6 Months = 1000 hrs. Yearly = 2000 hrs.**						

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NOTES:

SECTION 12
LUBRICATION GUIDE

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. Also refer to the chart on the next page.

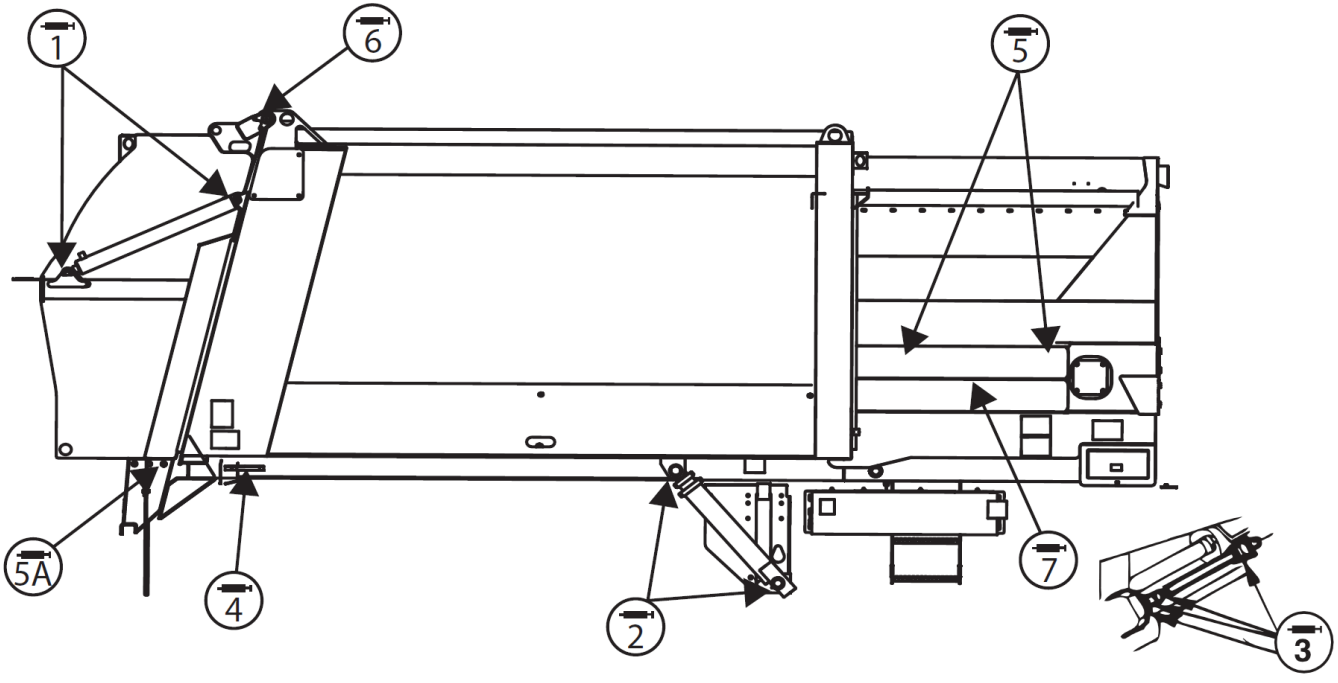

Figure 64. Body Lubrication Guide

BODY LUBRICATION GUIDE (CONTINUED)

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. Also refer to the image on the previous page.

REF NO.	DESCRIPTION	QTY.	FREQUENCY
1	Tailgate Cylinders	4	Weekly/Every 40 Hours
2	Hoist Cylinder	4	Weekly/Every 40 Hours
3	PTO Drive Shaft	3	Weekly/Every 40 Hours
4	Rear Body Pivot Hinge	2	Weekly/Every 40 Hours
5	Packer Cylinders	4	Weekly/Every 40 Hours
5A	Tailgate Lock Bearing	4	Weekly/Every 40 Hours
6	Tailgate Hinge	2	Weekly/Every 40 Hours
7	Packer Panel Tracks	-	Monthly/Every 200 Hours

PYTHON LOADER 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.

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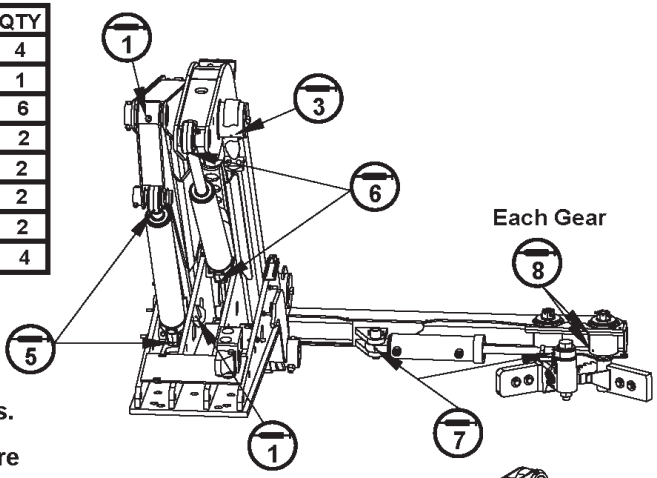
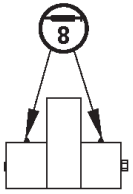
Python Lift Lubrication Guide

REF NO.	DESCRIPTION	QTY
1	Reach Pivot Link	4
2	Rocker Assembly	1
3	H-Beam Assembly	6
4	Level Link	2
5	Reach Cylinder	2
6	Lift Cylinder	2
7	Grabber Cylinder	2
8	Grabber Beam	4

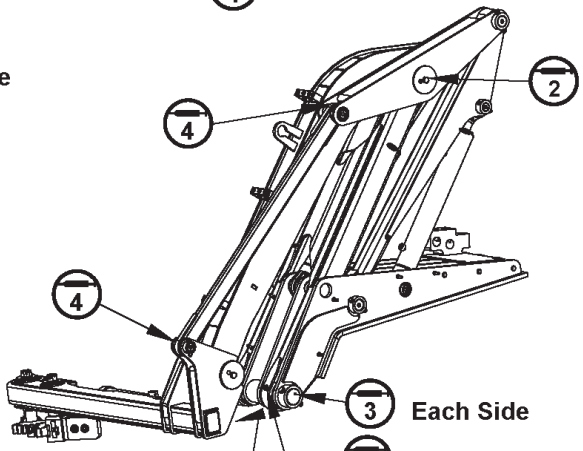


Grease every 20 hours.

NOTE: Clean fittings before applying grease. Always pump enough grease to purge the old grease. Remove excess grease.



View A



See View A

212-2920-002

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NOTES:

SECTION 13
COMPRESSED NATURAL GAS (CNG) OPTION

IMPORTANT SAFETY INFORMATION

⚠ WARNING

THIS IS A COMPRESSED NATURAL GAS VEHICLE. CNG units are powered by compressed natural gas, which operates under significant pressures. Only those properly trained. certified, and qualified on CNG vehicle applications should perform service. All users must be aware of the risks associated with electric vehicles. IF YOU ARE NOT SURE IF YOU ARE QUALIFIED, CONSULT YOUR ORGANIZATION'S EHS FUNCTION BEFORE USE OR PERFORMING ANY WORK. Please note that various procedures are different from other Heil bodies due to the CNG system – please read this Manual and related documents in full. This Manual does not substitute for proper training and certification.

NOTICE

A qualified person performing installation, repair, and maintenance work or system inspection on a CNG unit shall be properly trained in such functions. Where required, the training and licensing shall comply with local requirements.

Note: Local requirements can consist of provincial regulations or other requirements of the AHJ.

Figure 66.

IMPORTANT SAFETY INFORMATION (CONTINUED)

A. Safety Notices

Throughout this manual, safety notices are included to warn operators and maintenance technicians of the dangers associated with the described equipment operations and maintenance. Improper operation or maintenance procedures may cause serious injury or death. Safety notices accompany potentially hazardous situations throughout this manual. Please read and follow instructions carefully.

For supplemental information, refer to the following codes:

- United States: NFPA 52, State and Local Regulations, FMVSS 304
- Canada: CSA B109

⚠ DANGER

The CNG Fuel System contains some lines that are under continuous high pressure. DO NOT attempt to loosen or disconnect those lines.

⚠ DANGER

Natural Gas is Flammable and Explosive. Never use an open flame (match, lighter, or other) to light a work area near the CNG fuel storage system.

⚠ DANGER

Keep work area well ventilated.

⚠ WARNING

Do not start the engine if a natural gas leak is detected.

IMPORTANT SAFETY INFORMATION (CONTINUED)

⚠ WARNING

Never open system components while the system is under pressure. Treat all cylinders as full until defueling has been completed.

⚠ WARNING

Never weld or perform any type of "hot work" on any part of a compressed natural gas vehicle unless the compressed natural gas fuel system has been purged with inert gas. This includes but is not limited to refraining from using sandblasters, unshielded power tools, grinders, or spark-producing hand tools without completely purging the natural gas fuel system in accordance with the instructions provided herein.

⚠ WARNING

Avoid open flames and sparks near a compressed natural gas vehicle.

⚠ WARNING

Do not smoke cigarettes, cigars, or use any other lit or sparking items within 30 feet of a compressed natural gas vehicle or a dispensing/filling station. Do not use a cell phone or other electronic device within 30 feet of a compressed natural gas vehicle or a dispensing/filling station.

⚠ WARNING

When replacing CNG components, replace with equal or higher pressure rated components.

PROPERTIES OF NATURAL GAS

CNG is a naturally occurring hydrocarbon gas mixture which consists primarily of methane. This gas is lighter than air, which means if gas were to leak, it would float upwards and quickly dissipate into the atmosphere.

CNG will burn only when in an air-to-gas mixture of approximately 5-15% so its range of flammability is limited compared to other fuels. The gas also has an ignition temperature of 1076°F which is significantly higher than diesel. As a fuel, CNG is less expensive and burns cleaner than diesel fuel, producing low emissions. These characteristics make CNG an efficient, safe choice for fueling vehicles.

It is:

- Colorless
- Odorless
- Non-corrosive
- Non-toxic

It has an:

- Auto Ignition Point: 900 - 1170° F (482 - 632°C)
- Lower Explosive Limit (%): 3.8 – 6.5
- Upper Explosive Limit (%): 13 – 17

SIGNS OF A FUEL LEAK

An odorant which smells like rotten eggs is added to compressed natural gas to aid in detection of a leak. If you notice this kind of lingering odor coming from your vehicle, you may have a leak in the CNG fuel system.

NOTE: It is normal to detect this slight odor when the fueling nozzle is being connected or disconnected during the refueling process. The odor should quickly dissipate when fueling has been completed.

If you notice any of the following, you may have a leak in the CNG fuel system:

- Frosting at suspected leak point
- Bubbling in wet area
- Blowing or hissing sound
- Flames, if a leak has ignited

If a fuel leak is suspected, the system should be shut down immediately. Refer to **Fuel System Shut Down Procedure** 150. Have the unit inspected for leaks by a qualified service technician using a methane detector or an approved liquid leak detector. Do not use any other method or products to find leaks.

CNG FUEL SYSTEM COMPONENTS

The following pages detail a typical CNG system configuration. Your CNG fuel system configuration may vary.

A. Fuel Management Module (FMM) Functions

The CNG Fuel Management Module serves multiple functions within a natural gas vehicle (NGV) fuel system. These functions include:

- Storage tank refueling
- Transfer fueling (defueling)
- Pressure display of high pressure side of system
- Pressure display of low pressure side of system
- Manual and ignition controlled fuel shut-off
- Pressure reduction from storage tanks to engine supply
- Fuel system filtration
- Liquid removal from fuel system

B. Fuel Management Module (FMM) Components

1. Manual Shut-Off Valve

   The FMM Manual Shut-Off Valve isolates the fuel storage system from the engine.The manual shut-off valve handle is RED and is located on the left front of the fuel control module. Rotate the handle clockwise so arrow points right to the ‘OFF’ position to prohibit fuel flow from the tanks to the vehicle’s engine.

   Rotate the handle counterclockwise so arrow points up to the ‘ON’ position to allow fuel flow from the tanks to the vehicle’s engine.

2. High Pressure Gauge

   Refer to the manufacturer's manual for information.

3. Low Pressure Gauge

   Refer to the manufacturer's manual for information.

4. Fill Receptacles

   Fill receptacles are used to fill the CNG storage cylinders with fuel. There are two sizes: standard NGV1 (slow) or HD bus transit (fast) fill. The receptacles are equipped with built-in check valves to prevent fuel from escaping when the fuel fill nozzle is connected and disconnected.

CNG FUEL SYSTEM COMPONENTS (CONTINUED)

⚠ WARNING

Fill receptacles shall only be replaced with receptacles that are equal pressure rating.

⚠ WARNING

Prevent hoists or jacks from coming into direct contact with containers.

B. Fuel Management Module Components (Continued)

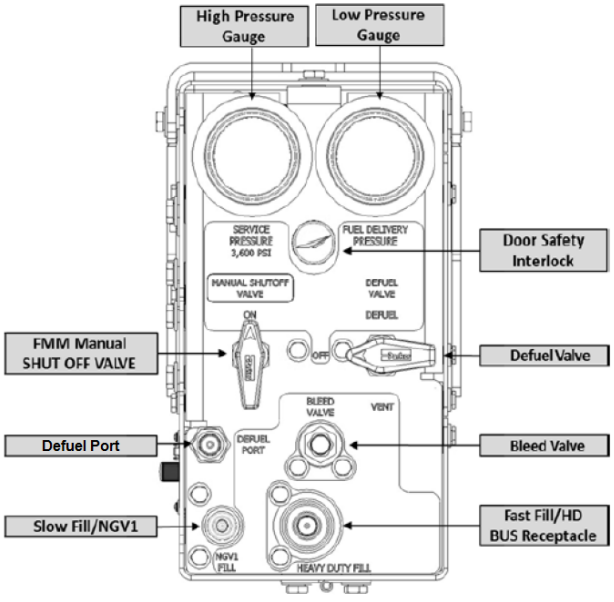


Figure 67. Manual Shut-Off Valve (Typical arrangement; models may vary slightly in component positioning.)

CNG FUEL SYSTEM COMPONENTS (CONTINUED)

⚠ WARNING

Prohibit personnel from walking on containers unless permitted by the container manufacturer.

C. CNG Fuel System Components

1. Fuel Cylinder(s)

   The fuel cylinder(s) stores CNG fuel at a service pressure of 3,600 psi. The fuel cylinders used on CNrG® Tailgate vehicles are type-4 composite containers, manufactured to meet FMVSS 304 and NGV2-2019 specifications. The fuel cylinders used on Top of Body and Back of Cab CNG vehicles with the Agility FMM varies, as those are supplied by the customer. In accordance with applicable regulations, the cylinders must display permanent labels which provide information necessary for inspection.

2. Cylinder Manual Shut-Off Valve

   The cylinder Manual Shut-Off Valve attached to each cylinder controls the flow of gas in and out of the cylinder. Each valve is located under a valve access cover labeled "MANUAL SHUTOFF VALVE" that is adjacent to the cylinder. Turn the valve handle FULLY clockwise to close the valve or FULLY counter-clockwise to open it.

3. Check Valve

   The 1-way check valve, located in the FMM box, is used to prevent fuel from backing up during the fuel filling process.

4. High Pressure Filter

   This filter is in the FMM box. Refer to the manufacturer's manual for information.

5. Pressure Regulator

   Refer to the manufacturer's manual for information.

6. Solenoid Valve

   Refer to the manufacturer's manual for information.

7. Pressure Relief Devices

   The Pressure Relief Devices (PRD) are thermally-activated valves that open at a temperature of approximately 230°F. In the event of a fire, they are designed to release the fuel stored in the cylinders a safe distance from the vehicle to prevent over-pressurizing the fuel cylinders. When activated, the PRD cannot be closed and will vent all gas.

CNG FUEL SYSTEM COMPONENTS (CONTINUED)

⚠ WARNING

The Bleed Valve shall not be used to defuel the system. The system must be defueled before using the bleed valve. See **Transfer Fueling (Defueling) section**.

C. CNG Fuel System Components (Continued)

8. High Pressure Lines

   These are stainless steel lines carrying high pressure CNG gas in them. They are routed between FMM box and CNG tanks located on the truck to connect various CNG components to each other as needed to function correctly. They are also located from any of the auxiliary fill locations you may have as an option on your truck going to FMM box. These lines are high pressure lines that can be isolated from the CNG tanks by closing the shutoff valve on individual tanks for service.

9. High Pressure Live Lines

   These are stainless steel lines carrying high pressure CNG gas in them. They are routed between CNG tank valve port to the PRD (pressure relief device) for each tank. These lines are high pressure lines that CANNOT be isolated from the CNG tanks by closing the shutoff valve on individual tanks for service and the tank has to be completely defueled and purged before any maintenance work is done on these lines.

10. Vent Lines

    These are stainless steel lines connecting the outlet of PRD (pressure relief device) port and venting the gas to atmosphere at top of the vehicle when the PRD activates. In normal operation, they do not carry any pressure in them and are isolated from the high pressure system as long as the PRD does not activate or is not uninstalled.

⚠ WARNING

1. Only qualified personnel shall be permitted to service pressure relief devices.
2. No pressure relief valve that has been in service shall be repaired or reworked without the written authorization of the pressure relief device manufacturer, valve manufacturer, fuel container manufacturer, or vehicle manufacturer. Any device that has been activated shall not be reworked or reused and shall be removed from service.
3. No pressure relief device that has been in service shall be reinstalled on another fuel cylinder.

NOTES:

FUEL SYSTEM SHUT DOWN PROCEDURE

1. Turn OFF the Fuel Management Module (FMM) Manual Shut-Off Valve.
2. Turn OFF the Fuel Cylinder Manual Shut-Off Valve on EACH tank.

CNG VEHICLE OPERATOR EMERGENCY RESPONSE

⚠ WARNING

During an emergency situation, never jeopardize safety to shut down the system. If it becomes evident that the steps cannot be safely completed, move to a safe distance, call 9-1-1 and alert emergency personnel of the situation, informing them of the presence of a CNG system and that it is not properly shut down.

Emergency Response for Gas Leaks

If the vehicle has sustained damage or a gas leak is detected:

1. Do not approach the vehicle if any sources of ignition may exist such as fire, sparks, electrostatic charges, lights or electronic devices.
2. If the vehicle is indoors, move the vehicle outside and away from any ignition sources.
3. Do not use road flares.
4. Do not smoke or allow anyone else to smoke near the vehicle.
5. Turn OFF the ignition switch, set the parking brake and turn OFF the battery at the main disconnect.
6. If it is safe to do so, turn OFF the Fuel Management Module Manual Shut-Off Valve and turn OFF the Fuel Cylinder Manual Shut-Off Valve on EACH tank. Check the fuel system near the damaged area for leaks by smell, sight, and sound. CNG is odorized and can be detected by smell.
7. Keep traffic and pedestrians away.
8. Beware that gas may continue to leak once ignition is turned off and the manual shutoff valves are closed.
9. Have a qualified technician verify leak locations with suitable methane detection fluid.
10. Have the leaks repaired by a qualified technician immediately.

Vehicle Fire Procedures

In the event of a CNG fire, it is imperative that the vehicle operator acts quickly:

1. Get passengers out of the vehicle as quickly as possible.
2. Evacuate the area.
3. Call 9-1-1.
4. If possible without putting yourself in harm's way, dump the refuse load from the body and move the vehicle a safe distance away from any burning refuse.

CNG VEHICLE OPERATOR EMERGENCY RESPONSE (CONTINUED)

CNG Vehicle Emergency Shut Down Procedure

⚠ WARNING

During an emergency situation, never jeopardize safety to shut down the system. If it becomes evident that the steps cannot be safely completed, move to a safe distance, call 9-1-1 and alert emergency personnel of the situation, informing them of the presence of a CNG system and that it is not properly shut down.

NOTICE

Defueling shall be performed only by a qualified person using written procedures.

Complete the following steps to shut down the CNG system:

1. Turn OFF Ignition and Electrical System.
2. Turn OFF Fuel Management Module Manual Shut-Off Valve.
3. Turn OFF the Fuel Cylinder Manual Shut-Off Valve on EACH tank.
4. Call Technical Services at 866-310-4345 for further assistance.

Emergency Venting/Defueling Procedure

If an emergency arises in which the fuel must be purged immediately, an emergency vent can be performed as follows:

1. Ensure that an electrical ground connection has been established between the cylinders, the vent system, and earth ground.
2. Connect the on-board defueling connection to the vent system using a conductive high pressure defueling hose.
3. Slowly open the hand valve to achieve a slow and steady flow to prevent freezing. No gas flow may indicate a normally closed solenoid valve on the cylinder. Consult the vehicle manufacturer for information on opening electronic solenoids.
4. Allow the on-board storage system to vent completely.
5. When completed, disconnect the on-board defueling connection from the vent system and disconnect the earth ground.

STARTING VEHICLE

NOTICE

Starting a natural gas vehicle requires a delay between the battery power being turned on and the starter motor being activated.

1. Make sure that the system has been properly leak tested and that no leaks exist.
2. Make sure that plastic caps are installed on all exposed vent lines. For tailgate mounted CNG, vent lines route to the top of the tailgate. If the plastic caps are missing, contact Heil Parts Central for replacement caps at 800-528-5308.
3. Make sure that the cylinder shut-off valves (one on each cylinder) are “OPEN” and the manual shut-off valve is “ON”.
4. Make sure that the FMM door is closed and all the remote fill locations (if present on truck) dust cap on receptacle are closed. If open, the truck will not crank.
5. Without starting the engine, turn the key to the “RUN” position and wait 20-30 seconds. This will allow the fuel to properly fill the system and provide adequate back-pressure for the high-pressure solenoid valve to function properly.
6. Start the engine.
7. If this is the first start of the day, let the vehicle idle for five minutes. This will allow coolant to warm the fuel and ensure that the low-pressure lines down-stream of the primary pressure regulator do not freeze up. On extremely cold days, the vehicle may have to idle for a longer period until the fuel warms adequately.

FUELING PROCEDURE

NOTICE

MUST confirm that the unit is being filled from a CNG source.

A. CNG Fueling Steps

Two options exist for filling a vehicle with CNG – timed fill or fast fill. Despite the size of the receptacle, the fueling hose connects in the same manner for either type of fill.

⚠ WARNING

BEFORE fueling the CNrG® Solenoid System (if equipped), **Fuel Fill Mode** MUST be engaged on the in-cab InSight™ Diagnostic Display. **While Fuel Fill Mode is engaged, the system will not detect leaks.**

The steps include:

1. Locate the fueling fill receptacle in the CNG fuel module. Optional fill receptacles may be installed in a remote location on the vehicle's front bumper.
2. Remove the dust cover on the fill receptacle.
3. Remove fueling nozzle from the CNG dispenser holder.

FUELING PROCEDURE (CONTINUED)

5. Begin fueling the CNG vehicle.
6. When complete, disengage the Fueling Nozzle.
7. Return the nozzle to the CNG dispenser.
8. Replace the dust cover on the receptacle.
9. Close the CNG fuel module door and engage door lock.

B. Types of Fueling Nozzles

Dependent upon the fueling station, different types of fueling nozzles may be utilized. Refer to the figures below and on the next page to determine which type of fueling hoses you will be using.

1. Type 1:

   When utilizing this type of nozzle, follow directions below to refuel:

   a. Slide the nozzle over the receptacle intake. In order to properly engage the fill hose with the receptacle, hold the nozzle in one hand. With the free hand, twist the lever counterclockwise to line up the two arrows, facing each other. Complete the connection by pushing the fueling hose fully onto the receptacle.

   b. Once the nozzle fits completely onto the fill receptacle, you will hear a click and the arrow on the lever will shift, misaligning with the arrow on the actual nozzle. This indicates that the nozzle fueling nozzle is properly seated onto the receptacle.

   a. When the nozzle fully connects, turn the lever clockwise until both arrows are pointing toward the fill receptacle to begin fueling.

   b. When fueling is complete, release the nozzle connection. Holding the nozzle in one hand, use the other hand to turn the nozzle so that arrows again point toward each other (as shown in step "a"). You will hear a release of pressure.

   e. Disconnect the fuel hose, and return it to the fuel dispenser.

Figure 68. Type 1 Fueling Nozzle

FUELING PROCEDURE (CONTINUED)

B. Types of Fueling Nozzles (Continued)

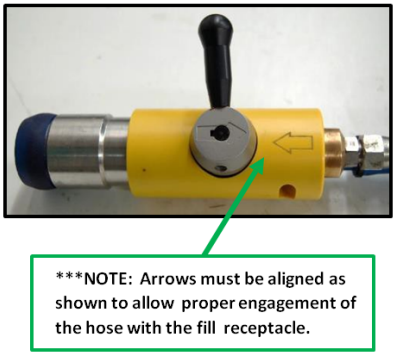


Figure 69. Type 1 Fueling Nozzle

1. Type 1 (Continued):

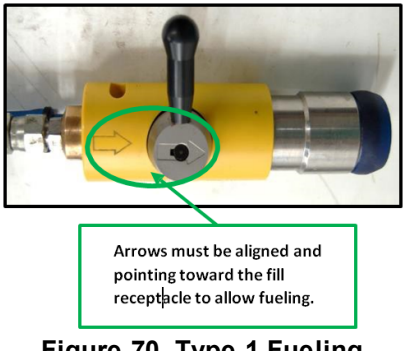


Figure 70. Type 1 Fueling Nozzle

2. Type 2:

   This fueling nozzle operates in the following manner:

   a. Locate fill receptacle and remove dust cap.
   b. Slide fueling hose nozzle onto the fueling receptacle.
   c. Compress the hand grip until the locking lever engages.
   d. Begin fueling.
   e. When complete, release the locking lever and disconnect the fueling hose.

Figure 71. Type 2 Fueling Nozzle

FUELING PROCEDURE (CONTINUED)

3. Type 3:

   To utilize this nozzle:

   a. Locate fill receptacle and remove dust cap.

   b. Holding firmly, press nozzle onto fill receptacle.

   c. Rotate lever clockwise 180° to begin fueling.

   d. When fueling is complete, rotate lever counterclockwise 180° to allow fuel hose disconnection.

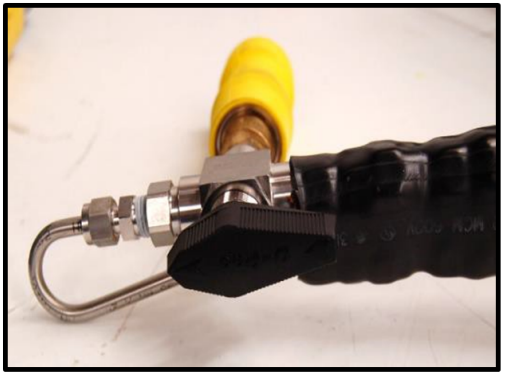


Figure 72. Type 3 Fueling Hose

NOTES:

CNG FUEL SYSTEM MAINTENANCE

Routine maintenance of the compressed natural gas system in accordance with the **CNG Fuel System Inspections Section** 162 will ensure that the system and components are functioning properly. Refer to your Heil Service Manual for CNG fuel system schematics.

⚠ WARNING

1. Only qualified personnel shall be permitted to service relief devices.
2. No pressure relief valve that has been in service shall be repaired or reworked without the written authorization of the pressure relief device manufacturer, valve manufacturer, fuel container manufacturer, or vehicle manufacturer. any device that has been activated shall not be reworked or reused and shall be removed from service.
3. No pressure relief device that has been in service shall be reinstalled on another fuel cylinder.

⚠ WARNING

A qualified performing installation, repair, and maintenance work or system inspection shall be properly trained in such functions. Where required, the training and licensing shall comply with local requirements.

NOTE: Local requirements can consist of provincial regulations or other requirements of AHJ.

⚠ WARNING

Reinstall containers to their original configuration using approved gaskets, bolts, nuts, washers, and parts in accordance with the recommendations of the vehicle or container manufacturer or system installer.

⚠ WARNING

System components must not be under pressure during servicing. Servicing components under pressure may cause serious injury.

MAINTENANCE PART NUMBERS

When replacing CNG components, replace with equal or higher pressure rated components.

Customers should replace the FMM with the version/Part Number that is currently on their truck.

PART NUMBER	DESCRIPTION
151-4784	Standard Fuel Management Module

PART NUMBER	DESCRIPTION
151-4785	Smart Fuel Management Module

Note: For a complete breakdown of the FMM and CNG system, refer to the Parts Central Electronic Parts Catalog (EPC).

Register online to gain access to the EPC:
https://epc.partscentral.com

Google Chrome web browser is recommended.

NOTES:

DEPRESSURIZING PROCEDURE FOR HEIL TRADITIONAL CNG TAILGATE SYSTEM

It is necessary to prepare the truck to be serviced. A mechanic's initial focus while preparing the vehicle for service should be **safety**. The primary preparation involves relieving the pressure within the system BEFORE performing any maintenance procedures on the truck that does not involve working on or near CNG fuel system or its components. Use the following procedure to remove fuel pressure from the lines connected to the high-pressure filter assembly.

⚠ WARNING

After following the Depressurization Procedure, pressure will still remain inside the fuel cylinder(s). Use care when loosening fittings for the first time. DO NOT open any cylinder Manual Shut-Off Valves after any CNG fitting, connection, or component is loosened or disassembled

⚠ WARNING

Never weld on any fuel system components without completely defueling the components. Protect fuel system components from heat damage by either removing or covering the components with a welding blanket or other approved shielding when working near CNG fuel system or its components. Check for the presence of gas leaks before welding. Welding can ignite the fuel, resulting in an explosion or fire causing serious personal injury or death.

DEPRESSURIZING PROCEDURE FOR HEIL TRADITIONAL CNG TAILGATE SYSTEM (CONTINUED)

1. Make sure that the vehicle ignition is turned OFF, vehicle parked on level ground, parking brake on, wheels chocked on one axle or more.
2. Close ALL cylinder Manual Shut-Off Valves (one on each cylinder) by turning the valve clockwise to the OFF position. See the image below.

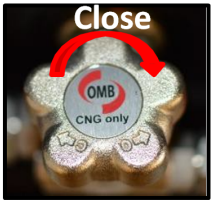


Figure 73. Cylinder Manual Shut-Off Valve

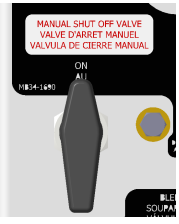


Figure 74. Manual Shut Off Valve

HIGH PRESSURE FILTER DRAIN PROCEDURE

1. Remove the excess fuel in the filter per the **Depressurizing Procedure** 158.
2. Make sure the FMM Manual Shut-Off Valve is in the OFF position.
3. Locate and access the high pressure coalescing filter inside the filter service access door. The filter location will vary, depending on the system configuration.
4. Locate the drain plug at the bottom of the filter. Hold a cloth under the port to catch any draining liquid.
5. Remove the plug and allow the liquid inside the filter to drain.
6. Re-install the drain plug and torque to 27 FT-LBS.
7. Follow the Repressurizing procedure in this manual for the system applicable on your truck.

HIGH PRESSURE FILTER CHANGE PROCEDURE

1. Remove the excess fuel in the filter per the depressurization procedure.
2. Ensure the FMM Manual Shut-Off Valve is in the OFF position.
3. Locate and access the high pressure coalescing filter inside the service access door/panel. The filter location will vary, depending on the system configuration.
4. Unscrew and remove the filter bowl from the filter housing. Note the filter is equipped with wrench flats to assist removal.
5. Empty and clean the filter bowl.
6. Remove the filter element by grasping and pulling it downward out of the filter housing. Place the new filter element into position and press it into place.
7. Install a new o-ring (supplied with the filter element) into the groove on the filter housing, using lubricant supplied in the kit.
8. Re-install the filter bowl in the filter housing and torque to 40 FT-LBS.
9. Follow the Repressurizing procedure in this manual for the system applicable on your truck.

WELDING AND HOT WORK PROCEDURES

⚠ WARNING

Never weld or perform any hot work that may introduce or produce sparks on a compressed natural gas vehicle unless the compressed natural gas fuel system has been purged with inert gas.

⚠ DANGER

Never weld on any fuel system components. Welding can ignite the fuel, resulting in an explosion or fire causing serious personal injury or death.

If any welding or 'hot work' (i.e., any work that involves burning or use of tools that produce a spark, flame, or source of ignition) is required on a CNG fuel vehicle excluding the CNG fuel system, you must perform the following procedures:

1. Conduct work in a well-ventilated area.
2. Perform defueling procedure as instructed in this manual.

WELDING AND HOT WORK PROCEDURES (CONTINUED)

3. Purge the CNG fuel system with inert gas, including the tanks. See **Purging with an Inert Gas Prior to Welding or Major Repairs**.
4. Use a welding blanket to protect the fuel system from slag and sparks produced from welding and hot work operations.
5. Once the work is finished, refuel the system and make sure it's running as expected.

LIFTING THE VEHICLE

⚠ WARNING

Never use any part of the fuel system as a lifting point to raise the vehicle. Do not allow fuel system components to come into contact with any part of the lifting device. The fuel system can become damaged, resulting in a leak. Serious personal injury or death can occur if the gas is ignited.

Always raise the vehicle using the lifting points recommended by the vehicle manufacturer. Refer to the vehicle manufacturer's instructions for correct lifting instructions.

TOWING THE VEHICLE

⚠ WARNING

Do not attach towing equipment to or allow towing equipment to come into contact with any part of the fuel system. The fuel system can become damaged, resulting in a leak. Serious personal injury or death can occur if the gas is ignited.

Before towing the vehicle, close the Manual Shut-Off Valves on the FMM and all fuel cylinders using the **Fuel System Shut Down Procedure** 150.

Once the fuel system is shut down, follow the vehicle manufacturer's instructions for towing the vehicle.

NOTES:

PRE-TRIP INSPECTION

Perform a Pre-Trip Inspection each day before driving the vehicle.

1. Verify the Manual Shut-Off Valve on the FMM is in the ON position.
2. Check the high-pressure gauge on the FMM to ensure it is operating and reading in a range consistent with the fuel gauge on the dash board. The fuel system maximum pressure is 3,600 psi.

   NOTE: Pressure of less than 250 psi could make the engine run rough.
3. Check the vent ports and vent caps for any signs the PRDs have been activated. Verify the vent ports and vent caps are clear of debris or damage.
4. Check the entire fuel system for any signs of damage or wear. Include checks for:

   a. Gas leaks – Smell for gas, look for frost or ice, and listen for hissing noises at joints and components.

   b. Look for external damage to housings and covers.
5. Drain the low pressure filters per the engine manufacturer's recommendation.
6. Turn the ignition key to ON and check that the low pressure gauge reading is approximately 85-150 psi.
7. Verify the dashboard fuel gauge is functioning properly.
8. Have the fuel system and cylinders inspected by a certified CSA Cylinder and Fuel System Inspector if damage is found on any part of the components or structural parts of the fuel system.

WEEKLY SYSTEM INSPECTION

Perform the Weekly System Inspection to ensure the system is operating correctly, safely, and to maximize component performance.

1. Verify all of the cylinder Manual Shut-Off Valves move freely and are in the ON position.
2. Visually inspect the fuel system for any signs of damage or wear.
3. Check for damage on the cylinder shields and covers.
4. Check to ensure the cylinders are mounted securely. Inspect the mounts, brackets, rubber isolators, and all fasteners.
5. Check for leaks on all CNG fuel plumbing tubes, hoses, and fuel flow components. Check for the odor of rotten eggs. Look for frosting or the sound of hissing at valves and fittings.
6. If any system components or structural parts are damaged, the system and cylinders must be inspected by a certified fuel system inspector.

CNG FUEL SYSTEM INSPECTION/PREVENTIVE CARE SCHEDULE

ITEM	FREQUENCY
Check Vent Lines	Daily
Drain Low Pressure Filter	Daily
Perform **Daily CNG Fuel System Inspection** 164 on next page.	Daily
Replace Low Pressure Filter	Refer to the engine manufacturer for maintenance and replacement guidelines.
Drain High Pressure Filter	Weekly
Replace High Pressure Filter Element	At regular oil change intervals or every 30,000 miles
Drain Vent Lines	Every month (or immediately if vent cap is missing. MUST replace with new vent cap)
Leak Test with Methane Detector	Monthly, or if involved in any accident, or if you smell gas.
Component Inspection	Monthly
Cylinders	Inspect compressed gas cylinders as outlined by cylinder manufacturer
NOTE: All inspections to be completed by a qualified and trained person.	

CNG FUEL CYLINDER AND SYSTEM INSPECTION

⚠ WARNING

If a CNG-fueled vehicle has been involved in an accident or fire, the system and cylinders must be inspected by a certified CNG fuel system inspector. The system shall be repaired and retested before being returned to service.

NOTICE

Inspections must be performed by qualified inspectors using guidelines from the fuel cylinder manufacturer in addition to the guidelines listed here.

1. Based on cylinder manufacturer recommendations, FMVSS 304, and industry standard practices, visual CNG cylinder inspections should be performed every 12 months by a qualified inspector.
2. In addition, Heil recommends a daily walk-around or pre-trip and post-trip visual inspection be performed.
3. The qualified person performing the repair and retesting shall prepare a document certifying that the CNG fuel system is acceptable for return to service and present the document to be retained by the vehicle's owner/operator and a copy to be retained by the qualified person.By license number or vehicle identification number, the document shall identify the vehicle CNG fuel system parts worked on, describe the work done and dates of work, and provide the qualified person’s name and contact information.

DAILY CNG FUEL SYSTEM INSPECTION

Inspect the following items each day before vehicle operation:

1. Make sure all manual tank valves and the red-handled emergency shutoff valve on the FMM are in the OPEN position.
2. Check the high pressure gauge to make sure enough fuel is on-board and refuel if necessary.
3. Drain the low pressure filters located at engine per the engine manufacturers’ recommendation.
4. Turn the ignition key to the on position, and watch the low pressure gauge. It should show between 85-140 psi.
5. Check the dashboard fuel gauge to make sure it is functioning.
6. Check the entire fuel system for any signs of damage or wear. Include checks for:
   a. Gas leaks – Smell for gas, look for frost or ice and listen for hissing noises at joints and components.
   b. Pressure Relief Device (PRD) components – Make sure all PRD vent line caps are in place.
   c. Structural damage – Housings, covers bent or damaged, fasteners missing or loose, check inside of tailgate for dents over 1/4” deep, or punctures.
7. Check the FMM door sensor interlock by opening the door and trying to start the vehicle. The vehicle should not start.

Notes:

DAILY CNG FUEL SYSTEM INSPECTION (CONTINUED)

8. If any system components or structural parts are damaged, perform a detailed inspection.

If everything checks out good, the vehicle is cleared for operation. If anything is wrong, a qualified CNG system technician should make the necessary repairs.

For instructions on how to perform a detailed CNrG® fuel system inspection, see Detailed CNrG® Fuel System Inspection. 167

DAILY CNrG® FUEL SYSTEM INSPECTION

Inspect the following items each day before vehicle operation. If all items pass inspection, the vehicle is cleared for operation. If any issues are identified, a qualified CNG System Technician should make the necessary repairs.

1. Check all CNrG® Tailgate guards and covers for damage.
2. Remove the Oblong Access Covers fastened with Thumbscrews.

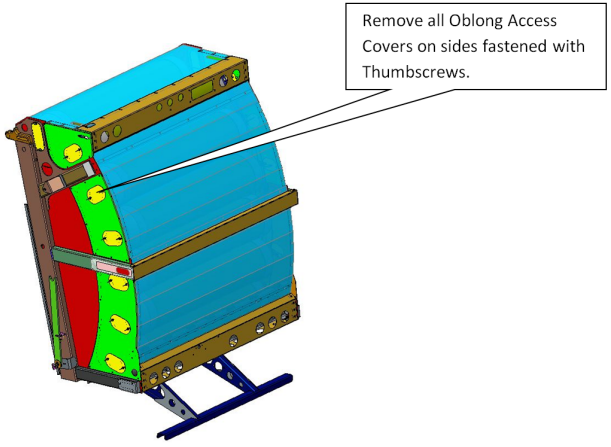


Figure 75. Tailgate Access Covers

3. Thoroughly pressure wash inside (refuse side) of tailgate and inspect for any dents over 1/4” in depth, or punctures.
4. Make sure cylinders mounts are secure. Check mounts and all fasteners.

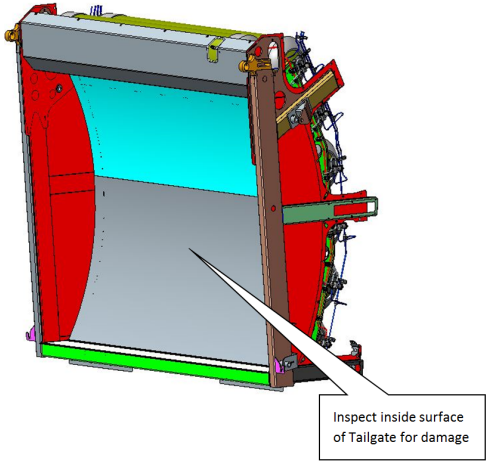


Figure 76. Inside Tailgate Surface

5. Verify cylinder labels are in place and for each cylinder, make sure cylinder service life has not expired.
6. Inspect cylinder valves and PRDs for leaks and damage.
7. Inspect all plumbing tubes, hoses and fuel flow components for leaks. A CNG Gas Leak Detector is recommended.
8. Examine all cylinders for damage using the cylinder manufacturer’s guidelines. Inspection records should be kept with vehicle records, and the system label should be updated to reflect the current inspection status.
9. Check condition of tailgate to body hose connection and guards.

CNG FUEL SYSTEM TROUBLESHOOTING

Heil offers support via the technical assistance line, as well as products, such as a Fuel Module Mini-Tester (Part Number 044-0488), to assist with troubleshooting.

Please provide the following when calling Heil Technical Services at 866-310-4345 with troubleshooting questions:

1. Serial # of CNG Fuel Module
2. Truck Serial #
3. Details of:
   - When the problem started
   - What the problem entails
   - Any troubleshooting performed
   - Results of troubleshooting actions

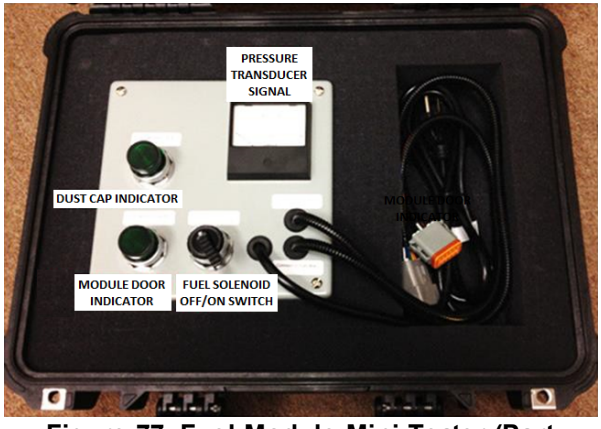


Figure 77. Fuel Module Mini-Tester (Part Number 044-0488)

CNG FUEL SYSTEM TROUBLESHOOTING (CONTINUED)

The following table lists possible problems, along with causes, corrections, and results.

PROBLEM OBSERVED	POSSIBLE CAUSES	CORRECTIVE/ DIAGNOSTIC ACTIONS	RESULTS AND OTHER ACTIONS
Vehicle's starter will not operate.	Interrupt door switch signal is not being properly recognized by the vehicle.	Disconnect the 12-pin electrical connector at the rear of the fuel module. Use an ohm meter or continuity tester across pins 9 (GRN) and 10 (YEL) of the fuel module side of the connector (female connector). Press and release the fuel module interrupt door switch. When the switch is depressed, there should be continuity between pins 9 (GRN) and 10 (YEL). Continuity should be lost when the switch is released.	If operation of the door switch makes and breaks continuity as described, and the starter will not operate, there is most likely a problem in the vehicle's wiring. If the operation of the door switch does NOT make or break continuity as described, there is most likely a wiring problem in the fuel module. If the problem cannot be resolved, call **866-310-4345** for technical assistance.

CNG FUEL SYSTEM TROUBLESHOOTING (CONTINUED)

The following table lists possible problems, along with causes, corrections, and results.

PROBLEM OBSERVED	POSSIBLE CAUSES	CORRECTIVE/DIAGNOSTIC ACTIONS	RESULTS AND OTHER ACTIONS
Vehicle's starter operates but the vehicle does not run.	Fuel is not making it through the fuel module to the engine.	*The manual valve on the front of the fuel module should be set to "On". *The fuel module high pressure gauge should read above 5000 psi. Disconnect the 12-pin electrical connector at the rear of the fuel module. Use a DC voltmeter across pins 8 (BLU) and 9 (GRN) of the vehicle side of the connector (male connector). The voltage should read: • Ignition switch "Off" 0 vdc. • Ignition switch "Run" 12 vdc. • Ignition switch "Start" 12 vdc. *Reconnect the 12-pin electrical connector at the rear of the fuel module. Have an assistant repeatedly cycle the ignition switch between "Off" and "Run" while listening for the "click" of the fuel solenoid being actuated near the maintenance door.	*If the voltage does NOT change as described, the problem is most likely located in the vehicle's electrical signal that actuates the fuel solenoid. *If the voltage changes as described and the "click" of the fuel solenoid is detected, the problem is most likely an engine control problem prohibiting the vehicle from starting. *If the voltage changes as described but the "click" of the fuel solenoid is NOT detected then the problem is most likely a failed solenoid in the fuel module. *If the problem cannot be resolved, call **866-310-4345** for technical assistance.

CNG FUEL SYSTEM TROUBLESHOOTING (CONTINUED)

The following table lists possible problems, along with causes, corrections, and results.

PROBLEM OBSERVED	POSSIBLE CAUSES	CORRECTIVE/DIAGNOSTIC ACTIONS	RESULTS AND OTHER ACTIONS
Heil Standard CNG and CNrG™ Tailgate Solenoid System Options: In-cab fuel gauge does not indicate the fuel level correctly.	The fuel module pressure transducer, the fuel gauge or the interconnecting wiring may be defective.	Confirm that the 12-pin electrical connector at the rear of the fuel module is connected and place the vehicle's ignition switch in the "Run" position. Use a voltmeter to read: • Voltage between connector positions 2 (RED) and 3 (BLK). the voltage should be 12 vdc. • Voltage between connector positions 3 (BLK) and 4 (WHT). the voltage should be between 0.5 to 5.0 vdc.	*If the voltage across 2 and 3 is 0 or significantly below battery voltage, there is a problem with the vehicle's wiring not supplying power to the fuel module's pressure transducer. *If the voltage across 3 and 4 is either 0 or 5.5 vdc, the fuel module's pressure transducer is most likely defective. Call **866-310-4345** for technical assistance. *If the voltage across 3 and 4 is between 0.5 to 5.0 vdc then the fuel module's pressure transducer is operating correctly. The problem is likely in the vehicle's wiring or the in-cab fuel gauge. *If the problem cannot be resolved, call **866-310-4345** for assistance.

CNG FUEL SYSTEM TROUBLESHOOTING (CONTINUED)

The following table lists possible problems, along with causes, corrections, and results.

PROBLEM OBSERVED	POSSIBLE CAUSES	CORRECTIVE/DIAGNOSTIC ACTIONS	RESULTS AND OTHER ACTIONS
Heil CNrG™ Tailgate Solenoid System Option: In-cab Display does not indicate the fuel level correctly or an alarm is activated on the Display indicating "Transducer-# Unplugged/Short Check Sensor and Wiring" Fail for a given Tank#.	The fuel cylinder pressure transducer or the interconnecting wiring may be defective.	Confirm that the 3pin electrical connector at the transducer is connected and place the vehicle's ignition switch in the "Run" position. Use a voltmeter to read: • Voltage between connector positions A (BRN) and B (BLK). The voltage should be approximately 12 vdc. • Voltage between connector positions B (BLK) and C (YEL). The voltage should be between 0.5 to 5.0 vdc.	*If the voltage across A and B is 0 or significantly below battery voltage, there is a problem with the vehicle's wiring not supplying power to the fuel module's pressure transducer. *If the voltage across B and C is either 0 or 5.5 vdc, the fuel tank's pressure transducer is most likely defective. Call **866-310-4345** for technical assistance. *If the voltage across B and C is between 0.5 to 5.0 vdc then the fuel module's pressure transducer is operating correctly. The problem is likely in the Display or the Controller. *If the problem cannot be resolved, call **866-310-4345** for assistance.

CNG FRONT OF BODY / TOP OF BODY DECAL PLACEMENT

In addition to the decal shown below, there may be other decals placed on the Fuel Management Module (FMM), tank compartments or elsewhere on the CNG system components. Refer to the CNG Fuel System Manufacturer's Operation and Maintenance Manuals for replacement decal part numbers.

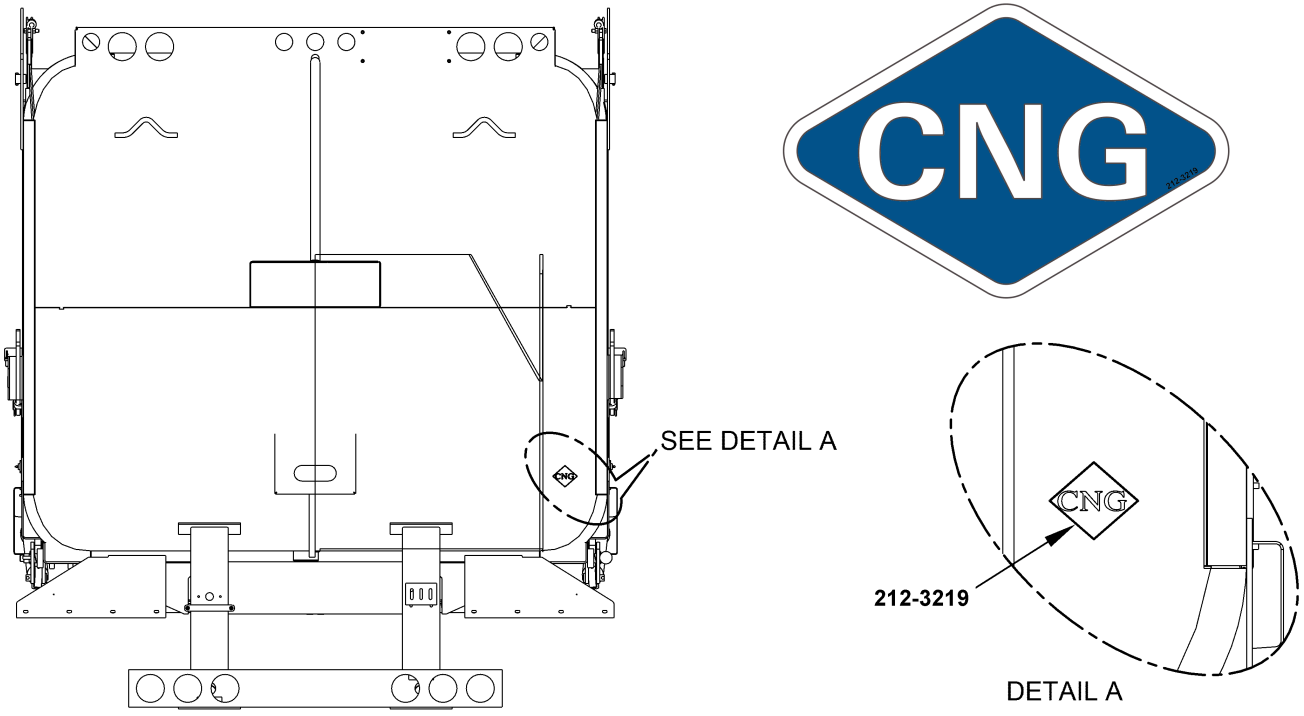
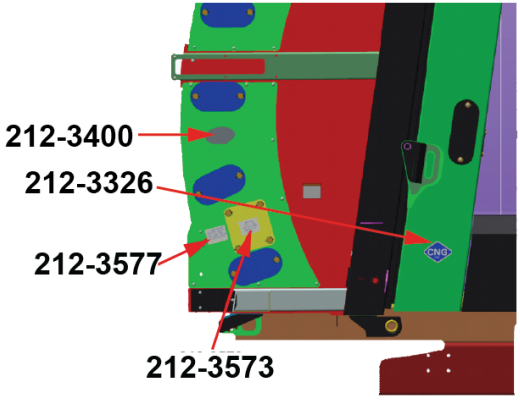
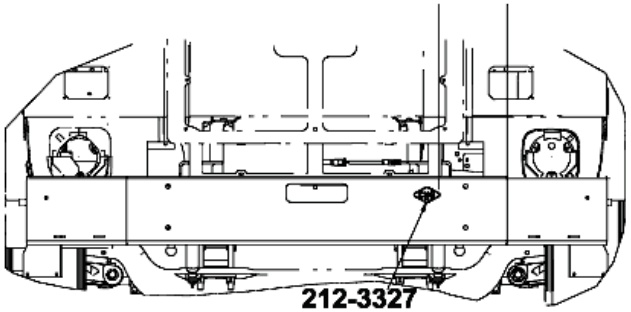


Figure 78.

CNrG TAILGATE DECAL PLACEMENT

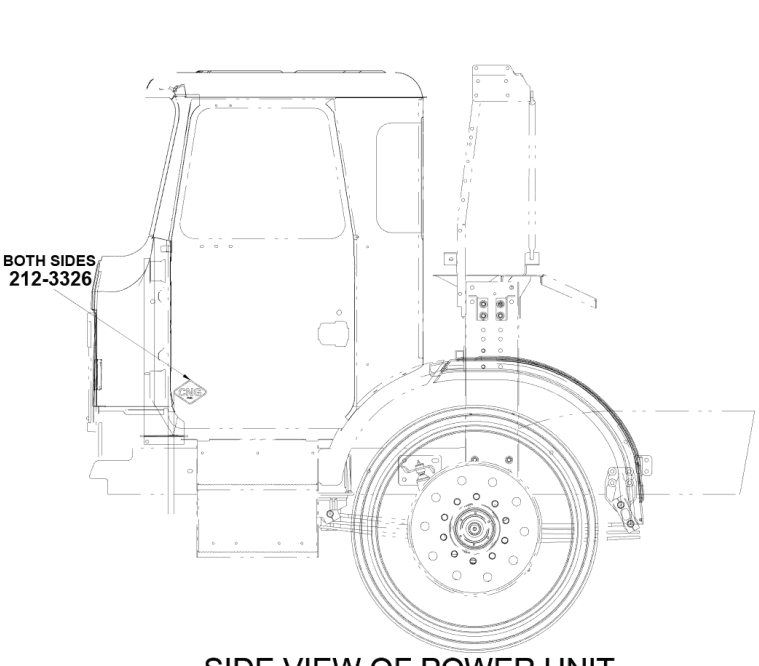
In addition to the decals shown below, there may be other decals placed on the Fuel Management Module (FMM), tank compartments or elsewhere on the CNG system components. Refer to the CNG System Manufacturer's Operation and Maintenance Manuals for replacement decal part numbers.



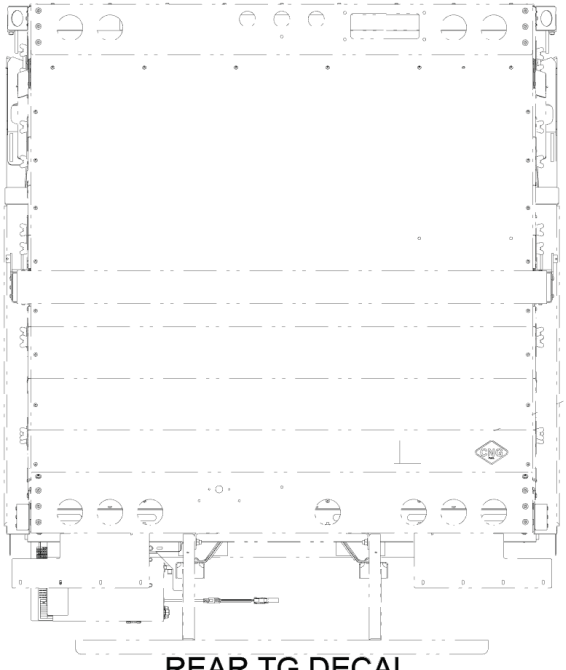


FRONT BUMPER DECAL

CNrG® TAILGATE DECAL PLACEMENT (CONTINUED)



SIDE VIEW OF POWER UNIT



REAR TG DECAL

CNrG® TAILGATE DECAL IMAGES

Figure 79.CNG Fuel (5.88" x 3.88"), PN 212-3326

Figure 80.CNG Fuel (4.25" x 2.63"), PN 212-3327

Figure 81. Warning: Vehicle uses CNG fuel, PN 212-3387

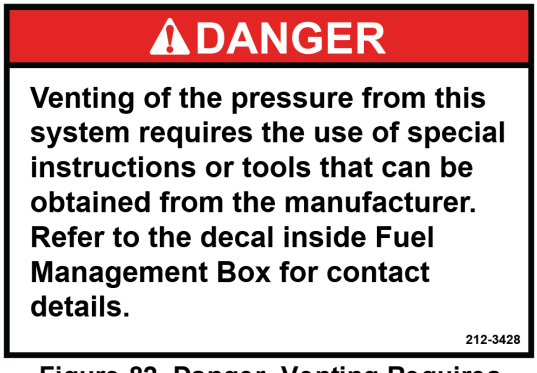


Figure 82. Danger, Venting Requires Special Instructions/Tools, PN 212-3428

CNrG TAILGATE DECAL IMAGES

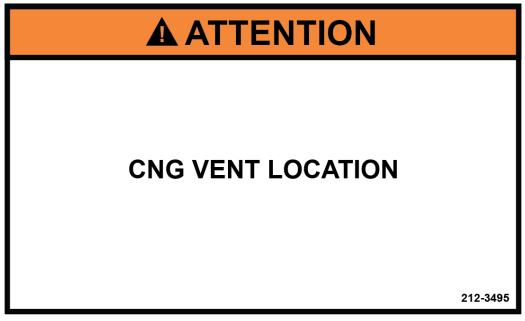


Figure 83. Attention, CNG Vent Location, PN 212-3495

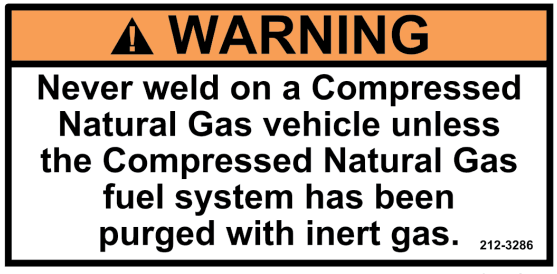


Figure 84. Warning, Never weld on CNG vehicle unless purged, PN 212-3286

Figure 85. Warning, CNrG Solenoid System, CNG tank empty before removing transducer, PN 212-3388

CNrG TAILGATE DECAL IMAGES

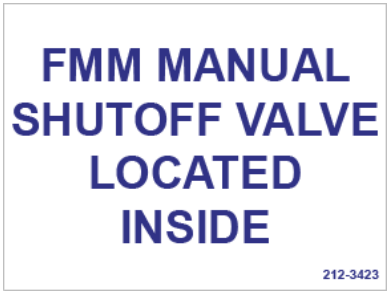


Figure 86. FMM Manual Shutoff Located Inside, PN 212-3423

Figure 87. CNG Tank Manual Shutoff Valve, PN 212-3422

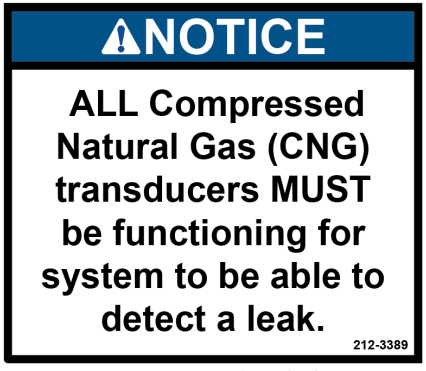


Figure 88. Notice, CNrG Solenoid System, Transducers MUST be functioning, PN 212-3389

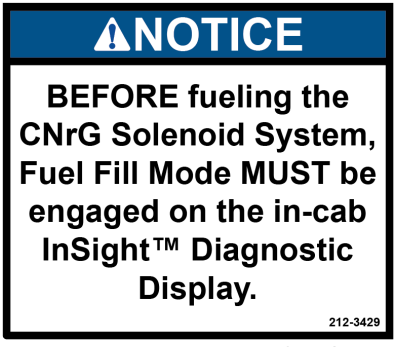


Figure 89. Notice, CNrG Solenoid System, Fuel Fill Mode MUST Be Engaged, PN 212-3429

CNrG TAILGATE DECAL IMAGES

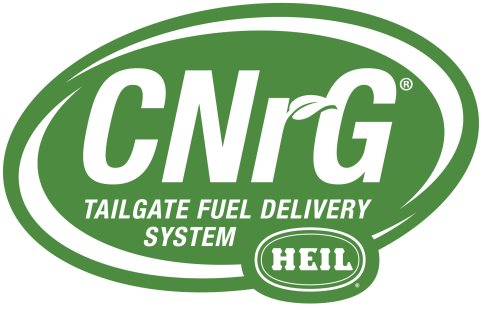


Figure 90. Heil CNrG Tailgate Fuel Delivery System, PN 212-3400

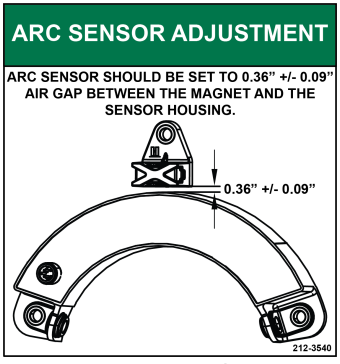


Figure 91. Arc Sensor Adjustment, PN 212-3540

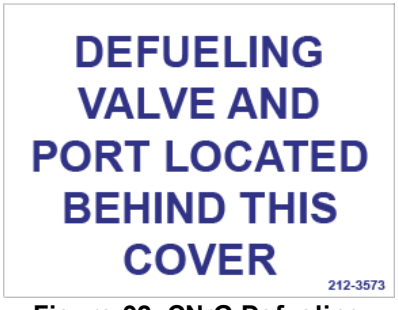


Figure 92. CNrG Defueling Valve and Port Location, PN 212-3573

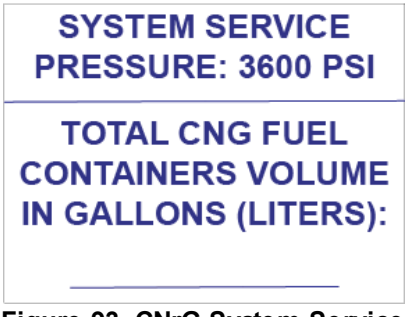


Figure 93. CNrG System Service Pressure, PN 212-3577

HEIL CNrG SENTINEL® SOLENOID SYSTEM OPTION

When equipped, the optional Heil CNrG Solenoid System will monitor and display live in-cab CNG system and tank pressures and notifications on the InSight Diagnostic Display. Additionally, the system detects and alerts of leaks (visually and audibly) while closing solenoid valves of affected tanks to isolate the leak(s).

On the display, tanks are numbered starting with the tank at the top of the of the CNrG tailgate, "TANK-1", and ending with the tank lowest in the CNrG tailgate, in the system shown below, "TANK-7". When the system is operating without any issues, all boxes are green as shown below.

Figure 94. Main Display Screen

Summary of Features

- Display screen inside the cab which gives live pressure monitoring for each tank and system.
- Visual warning in form of messages and color on the screen along with audible alarm whenever solenoid failure occurs.
- System visual and audible warning if one of the pressure transducers is unplugged in either ignition ON or OFF conditions.
- Whenever the ignition is OFF and truck is not running, system gives audible alarm in the event of any leaks on tank or system side. The operator needs to turn the ignition ON and check the display screen that will show the tank location of the leak.
- As a safety feature, all solenoids will be closed whenever there is a leak. A maintenance bypass code will need to be entered to be able to open solenoids and drive the vehicle. The leak detection feature is available only when the ignition is OFF.
- Leaks are detected at a pressure difference of 600 psi.

HEIL CNrG SENTINEL SOLENOID SYSTEM OPTION (CONTINUED)

Pressure Transducer Sensors

⚠ WARNING

ALL Pressure Transducer Sensors MUST be functioning for System to be able to detect a leak.

⚠ WARNING

Tank MUST be empty before removing tank Pressure Transducer Sensor.

Plugged directly into the live port of the valve of each tank and behind the FMM (Fuel Management Module) box live line, the pressure transducer sensors measure live pressures of each tank and of the system. When a pressure transducer sensor fails or becomes unplugged, the system sends a visual warning on the InSight Diagnostic Display along with an audible alarm.

Whenever there is a single sensor issue, the main screen will show which sensor has failed as shown in the figure to the top right. However, if there are multiple sensor issues, it will tell you to go to alarm summary screen to get more details as shown in the figure to the bottom right.

NOTICE

The audible buzzer will be active regardless of ignition ON or ignition OFF and will not turn OFF until the issue is corrected.

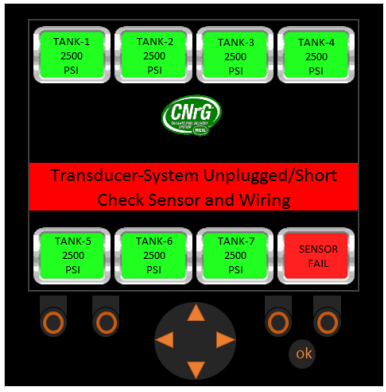


Figure 95. Pressure Transducer Sensor behind FMM

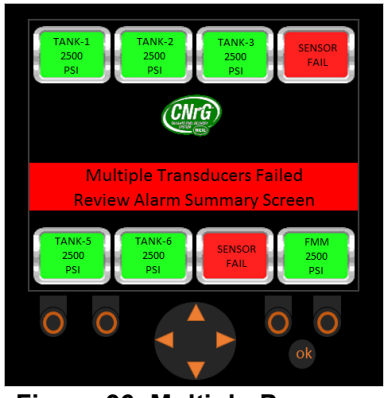


Figure 96. Multiple Pressure Transducer Sensors Unplugged/Faulty

HEIL CNrG SENTINEL SOLENOID SYSTEM OPTION (CONTINUED)

The Alarm Summary Screen can be reached by pressing the right arrow on the display twice.

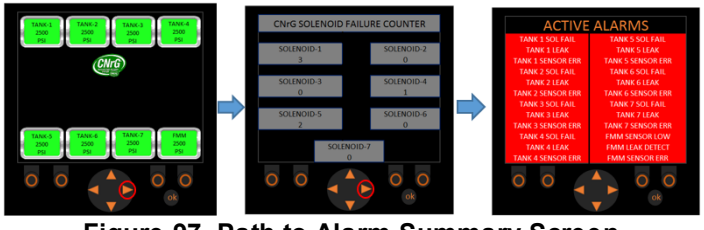


Figure 97. Path to Alarm Summary Screen

Figure 98. Alarm Summary Screen

Solenoid System Function

The valve body on each CNG tank has an integrated solenoid. The solenoids are normally closed when the ignition is OFF and open when ignition is ON and a voltage is supplied to them.

Leak Detection/Solenoid Lock

The system is capable of detecting a leak in the system or leak in any tank when the ignition is initially OFF and the leak starts. For safety purposes, if a leak is detected, all solenoids are locked in the closed position and not allowed to open until a maintenance code is entered and bypass is activated. The audible alarm activates whenever there is pressure difference detected of 600 psi or more and the truck ignition is OFF (ignition must be turned ON to see more details about the leak on the display screen).

NOTICE

Authorized Service Personnel should contact Heil Technical Service for the maintenance code to unlock the CNG solenoids.

HEIL CNrG SENTINEL SOLENOID SYSTEM OPTION (CONTINUED)

Leak Detection/Solenoid Lock (Continued)

The figures on this page show example display screenshots of possible leak detection notifications. Other leak detection notifications exist and are not shown here.

⚠ WARNING

You must follow all safety/emergency procedures of your company in the event of a CNG leak. At a minimum, follow the instructions on Emergency Shutdown Procedure section of this manual.

Figure 99. Tank 1 Leak. Maintenance Bypass Required.

Figure 100. Mutiple Tank Leaks. Maintenance Bypass Required.

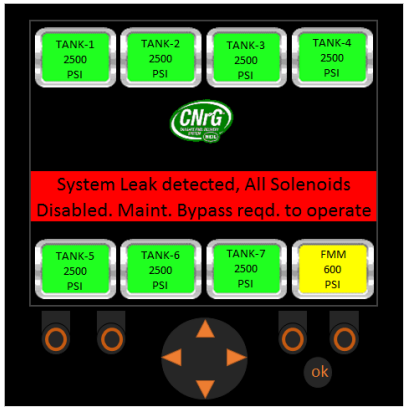


Figure 101. System Leak. Maintenance Bypass Required.

HEIL CNrG SENTINEL SOLENOID SYSTEM OPTION (CONTINUED)

Solenoid Failure Detection

The system is capable of detecting solenoid failures to open (in the event of a wiring or component issue) when the ignition is turned ON as per requirement of NFPA 52.

Whenever there is a single solenoid issue, the main screen will show which solenoid has failed as seen on the figure to the top right of this page. However, if there are multiple solenoid issues, it will tell you to go to alarm summary screen to get more details as seen in the figure to the bottom right. **Alarm Summary Screen** 182 can be reached by pressing the right arrow on the display twice.

The figures on this page show example display screenshots of solenoid failure detection notifications. Other solenoid failure detection notifications exist and are not shown here.

To defuel after a solenoid failure on one of the tanks, first refer to **Heil CNrG™ Solenoid System Defueling After Solenoid Failure** 189 and then use one of the methods described in **CNG Fuel Module Defueling Methods**.

NOTICE

The audible buzzer will be active only when ignition is ON and will not turn OFF until the issue is corrected.

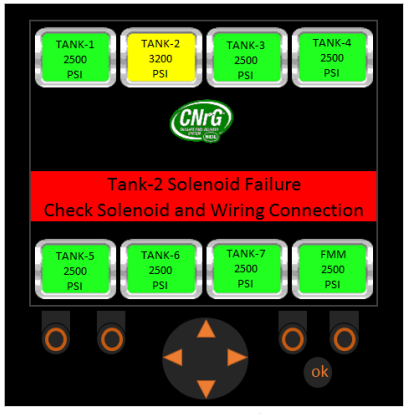


Figure 102. Display Screenshot: Tank 2 Solenoid Failure

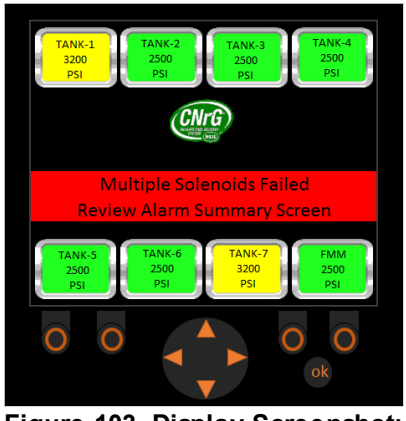


Figure 103. Display Screenshot: Multiple Solenoids Failed

HEIL CNrG SENTINEL SOLENOID SYSTEM OPTION (CONTINUED)

Maintenance Bypass

The following are the steps must be followed by a qualified maintenance technician after getting any display messages described in this manual. This will allow a qualified service person to get the truck back on route/correct the issue:

⚠ WARNING

Enabling Bypass Mode will disable System Leak Interlocks. Bypass will not open the solenoid of a leaking tank.

1. Driver will need to call maintenance department of their company in order to drive/move the truck since all solenoids are locked and need maintenance bypass for them to open.
2. For any leaking tank, open the oblong access covers on the street side of the CNrG tailgate and then close that tank's manual shut off valve. (You must correct the leaking tank before the system will allow the solenoid for that tank to open.) In case of system leak, solenoids will not open until Bypass Mode is "ON" (system leak is a leak detected in the line going from FMM to tanks on high pressure side).
3. Go inside the cab and on display screen hold "ok" button on screen until it prompts you to enter maintenance code.
4. Enter the maintenance bypass code and you will see the screen shown in the figure to the right.

NOTICE

Authorized Service Personnel should contact Heil Technical Service for the maintenance bypass code to unlock the CNG solenoids.

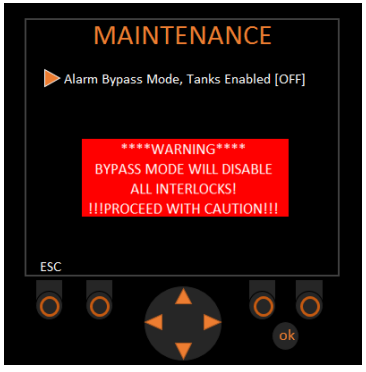


Figure 104. Display Screenshot: Maintenance Screen

5. Make sure you have first closed the manual shut off valves on the tanks that are leaking (Step 2). You will notice that the Bypass Mode is OFF by default. Press "ok" button and turn ON Bypass Mode. Once you do this, all solenoids (except leaking tank/tanks) open. However, all tanks are now connected to each other and to the main supply/return line. This is the reason it is very important to first perform Step 2 before performing this step.
6. You will now be able to drive the truck to your maintenance department to evaluate and repair the leak. The audible alarm will not go OFF until the issue is corrected.

HEIL CNrG SENTINEL SOLENOID SYSTEM OPTION (CONTINUED)

Low Fuel Level Detection

The system is capable of detecting low fuel levels and will give audible and visual alerts that the truck needs to be refueled, as shown in the figure below. Whenever pressure drops below 500 psi on the system side, the system will show a Low Fuel Warning alert message along with an audible alert.

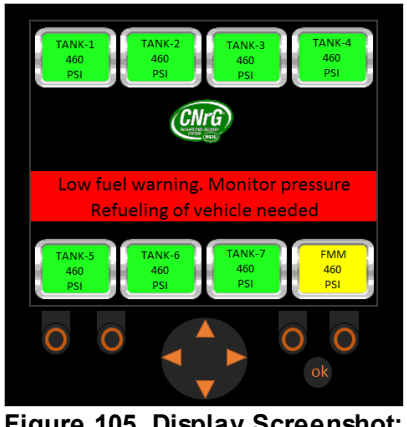


Figure 105. Display Screenshot: Low Fuel Warning

CNG Tank Option Configuration

The system is designed for different tank configurations and is a common design which will work from 3 tank to 7 tank system. This helps the customer to upgrade to higher DGE (Diesel Gallon Equivalents) by adding more tanks without need to modify anything in this system. The figure below shows a snapshot of the Tank Option Configuration maintenance screen where you can configure the number of tanks on the truck.

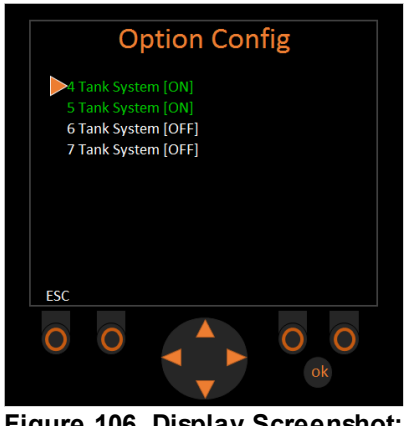


Figure 106. Display Screenshot: Tank Option Configuration

HEIL CNrG SENTINEL SOLENOID SYSTEM OPTION (CONTINUED)

System Inputs

The display screenshot shown below (within the maintenance mode menu) is used for troubleshooting and maintenance to gather information for the current status of the Ignition Power (ON or OFF) and the system voltage being supplied to the Controller. It also provides the software revisions of the Display and Controller programs.

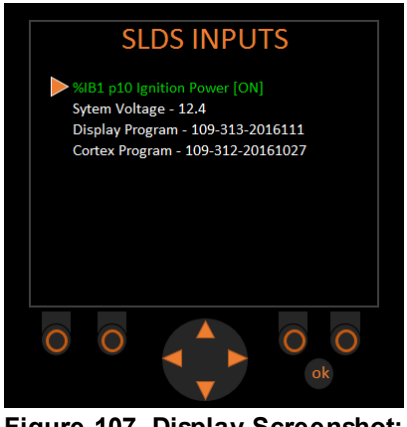


Figure 107. Display Screenshot: System Inputs

System Outputs

The display screenshot shown below (within the maintenance mode menu) is used for troubleshooting and maintenance to gather information for the current status of the Solenoids on each Tank (ON or OFF). It also provides the status of the System Alarm for the Controller.

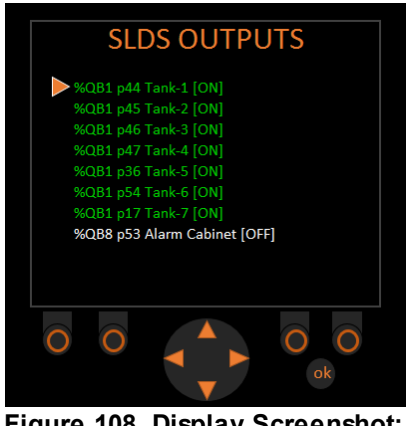


Figure 108. Display Screenshot: System Outputs

HEIL CNrG SENTINEL SOLENOID SYSTEM OPTION (CONTINUED)

Ignition Power OFF

The display notification shown in the figure below will only be displayed in the event that the InSight™ Diagnostic Display has Ignition Power and the Controller does not have Ignition Power. This Alarm can be beneficial in the event that all Tank Solenoids Valves have failed to open due to the loss of Ignition Power, which is required to open the Tank Solenoids Valves.

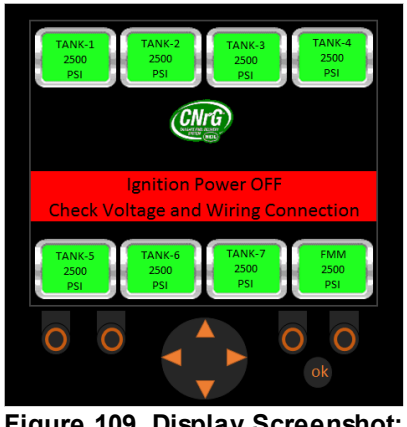


Figure 109. Display Screenshot: Ignition Power OFF

System Over Voltage

The display notification shown in the figure below will only be displayed in the event that the System Voltage is greater than 36 volts for 10 seconds, indicating that there is voltage too high to safely operate the Controller and Display.

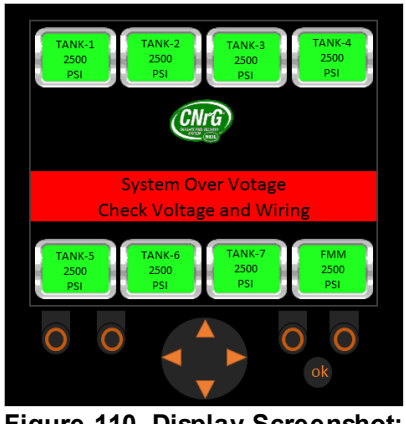


Figure 110. Display Screenshot: System Over Voltage

HEIL CNrG SENTINEL SOLENOID SYSTEM OPTION (CONTINUED)

System Under Voltage

The display notification shown in the figure below will only be displayed in the event that the System Voltage is less than 8 volts, indicating that there is voltage too low to safely operate the Controller and Display.

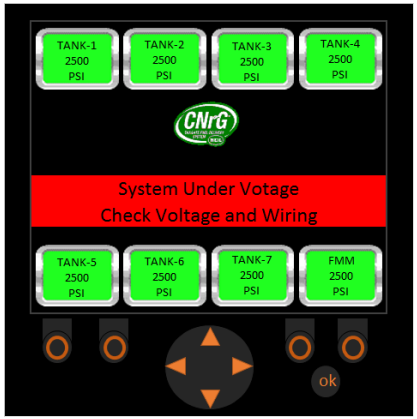


Figure 111. Display Screenshot: System Under Voltage

Fuel Fill Mode

For the CNrG Solenoid System only, engage Fuel Fill Mode on the in-cab InSight™ Diagnostic Display to open the CNG solenoids, allowing for fast fill fueling. The "FUEL FILL MODE" button turns green when engaged. After Fuel Fill Mode is engaged, the Fuel Fill Mode remains active for one (1) hour or until the ignition key switch cycles ON-OFF-ON.

⚠ WARNING

BEFORE fueling the CNrG Solenoid System (if equipped), **Fuel Fill Mode** MUST be engaged on the in-cab InSight™ Diagnostic Display. **While Fuel Fill Mode is engaged, the system will not detect leaks.**

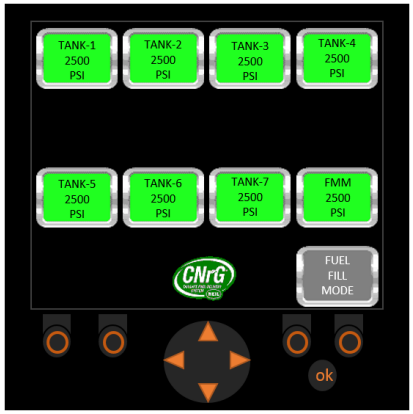


Figure 112. Display Screenshot: Fuel Fill Mode OFF

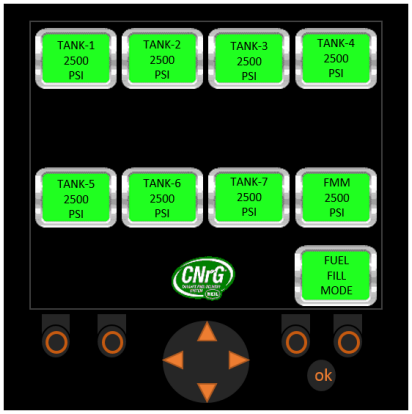


Figure 113. Display Screenshot: Fuel Fill Mode ON

NOTES:

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C

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I

L

T

U

W

DuraPack Python

NOTES:

HEIL ENVIRONMENTAL WARRANTY STATEMENT

Our products are subject to a limited warranty as outlined in the document linked below – please see the linked Heil Warranty Policies & Procedures for our full, limited warranty.
As a summary, 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 (if one is offered on a particular product), 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. Heil only warrants the collection body. Please consult respective chassis manufacturer for respective specifics on chassis.

Ask your local Heil Dealer about our Extended Warranty offerings or contact Heil Customer Care at 866-ASK-HEIL (866.275.4345). For Warranty programs for international accounts outside of North America please consult with your Regional Manager for further details and/or appropriate policies.

EXCEPT AS CONTAINED IN THE HEIL WARRANTY POLICIES AND PROCEDURES, 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 FOR LOSS OF PROFITS, PRODUCT, TIME, OR ANY OTHER DIRECT, INCIDENTAL, OR INDIRECT CONSEQUENTIAL LOSSES, DAMAGES OR DELAYS. ANY IMPROPER USE, OPERATION BEYOND RATED EQUIPMENT/ 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 AFFECTS THE PRODUCT OPERATION OR INTEGRITY SHALL VOID THE WARRANTY.

Heil retains the right to modify its factory warranty program at any time. The warranty in place at the time of your respective purchase applies.

Please see the full limited warranty as outlined at https://www.heil.com/warranty/ under Heil Warranty Policies and Procedures.

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