NYC Half/Pack®

24AB SERIES 301-325, 401-417

SERVICE MANUAL

ISSUED SEPTEMBER 2024

TP1NYHP-SM-0924

Environmental Solutions Group
201 W. Main Street, Ste 300
Chattanooga, TN 37408
Heil Customer Care: 866.275.4345

⚠ WARNING

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

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

IMPORTANT SAFETY NOTICE

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

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

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BODY AND TAILGATE

INTRODUCTION

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

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

IMPORTANT!

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

SERVICE/PARTS ASSISTANCE

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

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

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

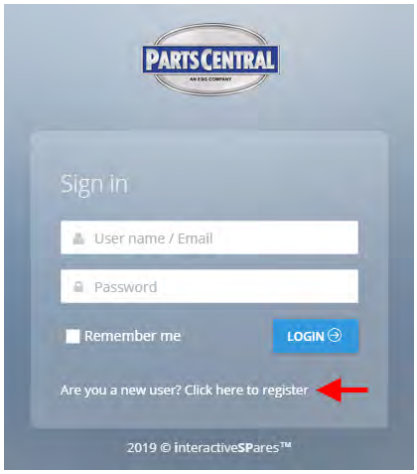
ELECTRONIC PARTS CATALOG (EPC)

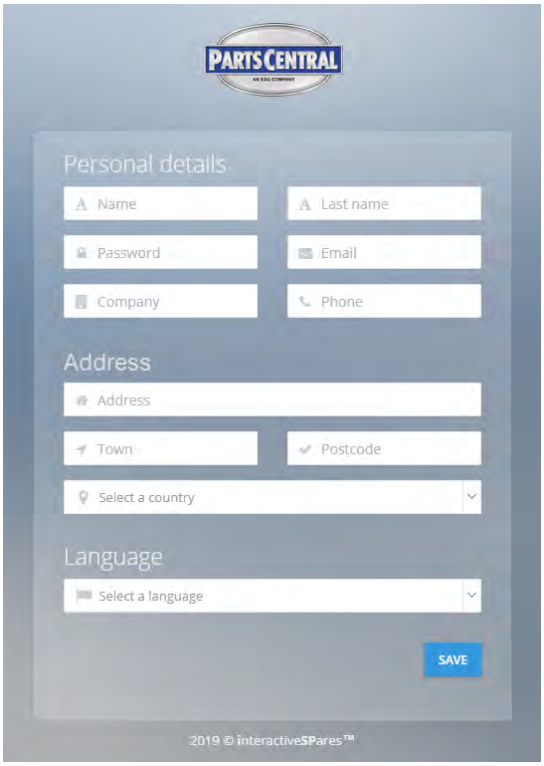
The Parts Central EPC includes electronic versions of the Heil Parts Manuals, specific to a Customer's truck configuration and options. After registering and logging in, the user can search by **Keyword(s) or Part Number** and/or **Heil Body Serial Number** to quickly identify a spare part or browse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

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

Registration and Login

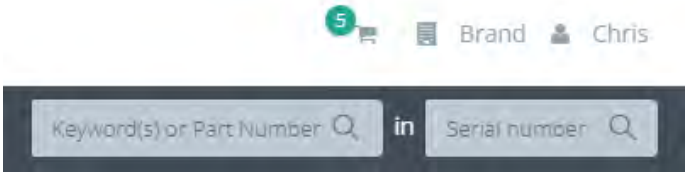
Register online to gain access: **https://epc.partscentral.com**. Upon registration, you will receive an email notification confirming registration. Within 24 hours, your registration will be approved and you can log in using the **login page**.





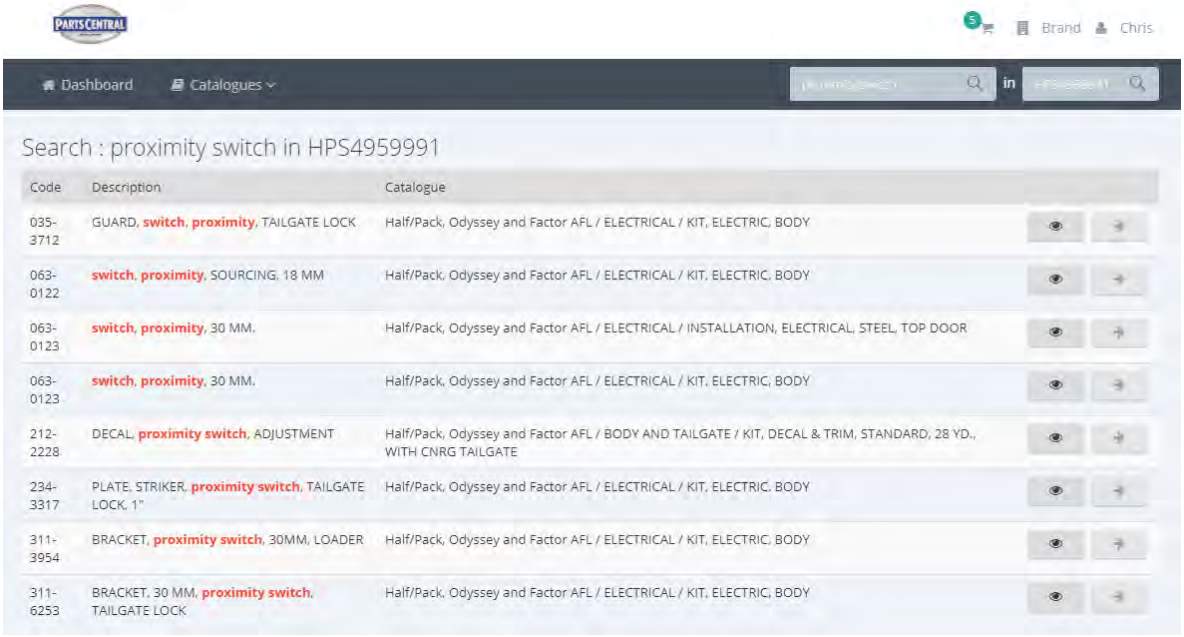
Search by Part Keyword(s) or Part Number in Body Serial Number

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



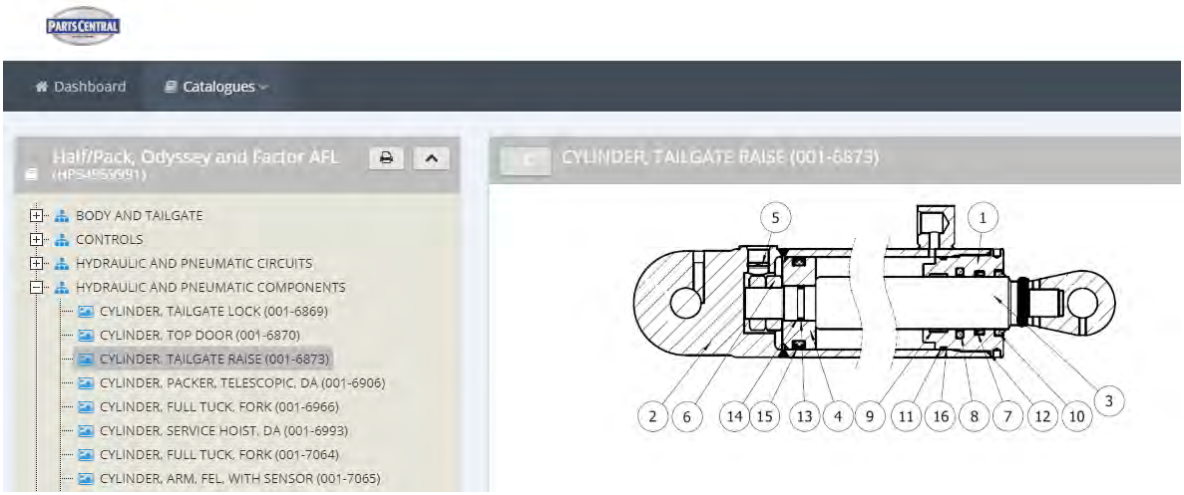
You can search by **Keyword(s) or Part Number** within a specific Heil Body **Serial Number**. For example, if you are looking for a **proximity switch** for Body Serial Number **HPS4959991**, you can enter this information into these two fields and the search results will include all parts within the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

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

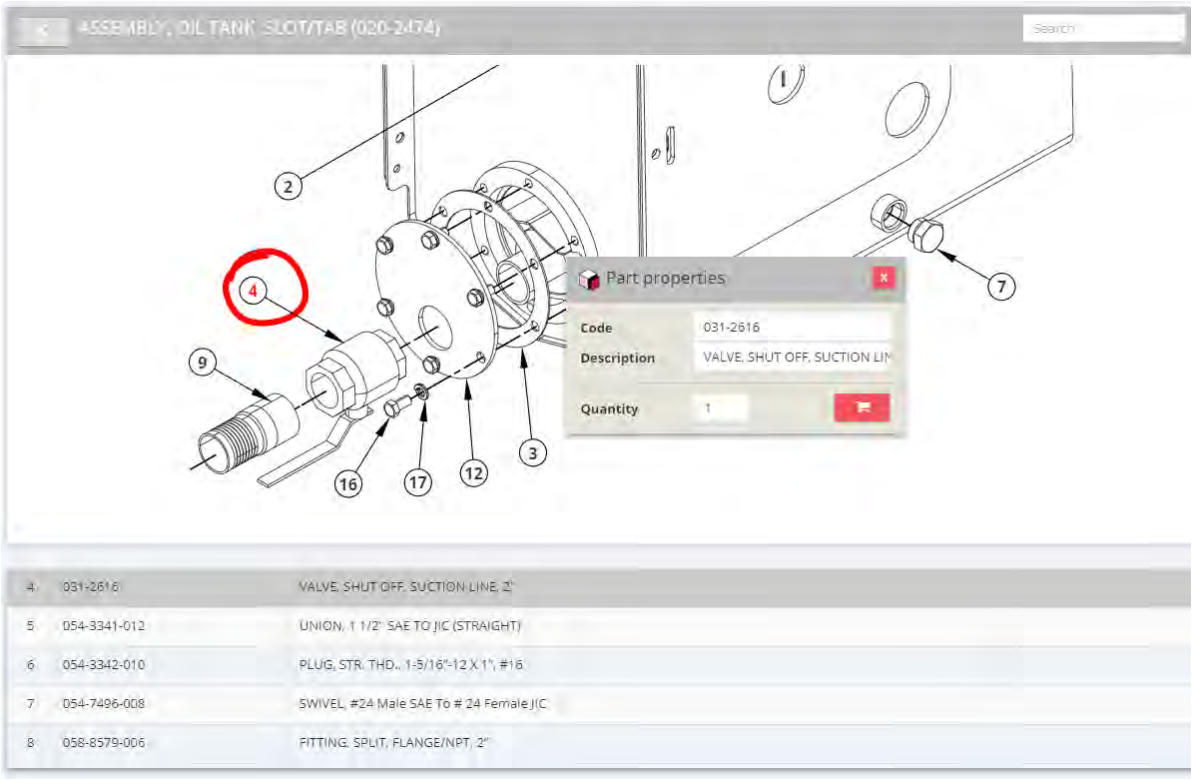


Search by Body Serial Number

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



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



PRECAUTIONARY STATEMENTS

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

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

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

⚠ WARNING

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

⚠ DANGER

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

⚠ DANGER

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

⚠ DANGER

Close the hopper door, when practical and based on employee training, before climbing the ladder to access the top of the truck body. Always maintain three points of contact with the ladder. Before attempting to access the top the truck body, always use a fall protection system that complies with the requirements of and use as described in ANSI Z245.1.

⚠ DANGER

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

⚠ DANGER

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

⚠ DANGER

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

⚠ 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.

⚠ DANGER

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

⚠ DANGER

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

⚠ DANGER

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

⚠ DANGER

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

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

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

⚠ 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.

⚠ WARNING

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

⚠ WARNING

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

NOTICE

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

NOTICE

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

NOTICE

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

NOTICE

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

LOCKOUT/TAGOUT PROCEDURE

⚠ DANGER

Serious injury or death may result if you do not follow this procedure.

⚠ WARNING

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

NOTICE

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

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

A. Put the unit in a Lockout/Tagout mode:

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

B. Common energy sources found on Heil units (Including, but not limited to):

- Hydraulics
- Electrical
- Gravity
- Pneumatics

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

- Multi-hasp
- Single-keyed red lock
- Lockout tag

Figure 1. Examples of Lockout/Tagout Gear.

Follow These Steps:

1. APPLY the brakes. MAKE SURE the brakes do not let the unit move and they work properly.
2. Chock all wheels.
3. SET the tailgate props when the tailgate is raised for any service, maintenance or cleaning.
4. SET the body props when the body is raised for any service, maintenance or cleaning.
5. When there are in-cab controls, turn the ignition switch to ON then:
   a. MOVE the controls for the hydraulics to release the cylinder pressure.
   b. OPERATE the electrical functions to release any stored electrical energy from the system.
   c. TURN the ignition switch to OFF.
   d. REMOVE the key from the ignition switch and place the key inside your pocket, or in another secured location for your safety.
6. When there are no in-cab controls, MOVE the outside control levers to relieve the pressure in the cylinders.
7. With the ignition power OFF, cycle all of the controls to the arms, forks, tailgate, etc. to verify all stored energy is released.
8. Set the battery box disconnect switch to the OFF position.
9. Insert the multi-hasp into the disconnect switch lock hole.
10. Attach your red single-keyed Lockout/Tagout lock with your tag exposed and visible to the multi-hasp.
    a. ALWAYS use individually assigned locks and tags when performing ANY service or maintenance with other authorized employees. Each employee MUST place their personally assigned tag and lock to the multi-hasp connected to the disconnect switch.
11. REMOVE your lock key and put it in your pocket for your safety.
    a. ONLY the person who placed the lock and tag on the multi-hasp is authorized to remove it.
    b. NEVER remove another employee's Lockout/Tagout gear without approval from the authorized person responsible.
    c. Shift or personnel changes: Off-going employees MUST provide all details pertaining to the unit's status to the oncoming employee(s). The oncoming employee(s) MUST perform the Lockout/Tagout procedure to verify all stored energy is removed from the unit BEFORE applying their Lockout/Tagout gear.
12. BEFORE removing your Lockout/Tagout gear to return the unit to service, follow these steps:
    a. INSPECT the work area to ensure all nonessential items have been removed.
    b. VERIFY all unit components are operationally intact.
    c. ENSURE all employees are safely positioned or removed from the area.
    d. NOTIFY all affected employees that the Lockout/Tagout devices are being removed.

STORING REFUSE IN THE BODY

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

MAINTENANCE/LUBRICATION INFORMATION

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

GREASE LUBRICANT RECOMMENDATION

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

Use grade NLG1000 grease or equivalent.

OIL LUBRICANT RECOMMENDATION

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

HYDRAULIC OIL SPECIFICATIONS

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

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

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

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

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

STANDARD TORQUE DATA FOR NUTS AND BOLTS

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

NOTICE

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

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

STANDARD TORQUE DATA FOR NUTS AND BOLTS TABLE

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

STANDARD TORQUE DATA FOR NUTS AND BOLTS TABLE

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

STANDARD TORQUE DATA FOR NUTS AND BOLTS TABLE

Bolt Size (D)	Nut Type (STD/Lock)	Thread Turns per Inch (p)	Grade	Heil Plain Dry Condition Torque Value (ft-lbs)	Heil Zinc Plated Fastener Torque Value (ft-lbs)	Heil Lubricated Fastener Torque Value (ft-lbs)	Heil Deformed Lock Nut Torque Value (ft-lbs)
		18	5	184	166	120	
			8	260	234	169	
	Lock	11	5				106
			8				149
		18	5				120
			8				169
3/4	STD	10	5	288	260	188	
0.750			8	408	367	265	
		16	5	322	290	209	
			8	455	409	295	
	Lock	10	5				188
			8				265
		16	5				209
			8				295
7/8	STD	9	5	465	418	302	
0.8750			8	657	591	427	
		14	5	513	461	333	
			8	724	652	471	
	Lock	9	5				302
			8				427
		14	5				333
			8				471
1	STD	8	5	697	627	453	
1.0000			8	984	886	640	
		14	5	782	704	508	
			8	1105	994	718	
	Lock	8	5				453
			8				640
		14	5				508
			8				718

STANDARD TORQUE DATA FOR NUTS AND BOLTS TABLE

Bolt Size (D)	Nut Type (STD/Lock)	Thread Turns per Inch (p)	Grade	Heil Plain Dry Condition Torque Value (ft-lbs)	Heil Zinc Plated Fastener Torque Value (ft-lbs)	Heil Lubricated Fastener Torque Value (ft-lbs)	Heil Deformed Lock Nut Torque Value (ft-lbs)
1-1/8	STD	7	5	869	782	565	
1.1250			8	1395	1256	907	
		12	5	975	877	634	
			8	1564	1408	1017	
	Lock	7	5				565
			8				907
		12	5				634
			8				1017
1-1/4	STD	7	5	1227	1104	797	
1.2500			8	1969	1772	1280	
		12	5	1358	1222	883	
			8	2179	1961	1417	
	Lock	7	5				797
			8				1280
		12	5				883
			8				1417
1-3/8	STD	6	5	1608	1447	1045	
1.3750			8	2580	2322	1677	
		12	5	1830	1647	1190	
			8	2938	2644	1909	
	Lock	6	5				1045
			8				1677
		12	5				1190
			8				1909
1-1/2	STD	6	5	2134	1921	1387	
1.5000			8	3425	3083	2226	
		12	5	2401	2161	1561	
			8	3854	3468	2505	
	Lock	6	5				1387

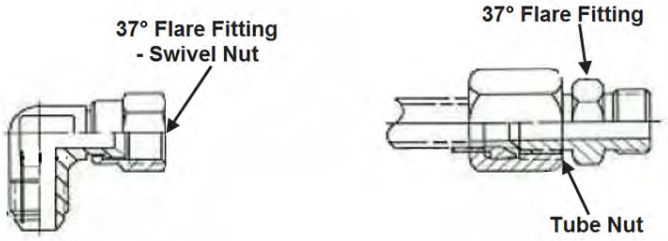
STANDARD TORQUE DATA FOR NUTS AND BOLTS TABLE							
Bolt Size (D)	Nut Type (STD/Lock)	Thread Turns per Inch (p)	Grade	Heil Plain Dry Condition Torque Value (ft-lbs)	Heil Zinc Plated Fastener Torque Value (ft-lbs)	Heil Lubricated Fastener Torque Value (ft-lbs)	Heil Deformed Lock Nut Torque Value (ft-lbs)
			8				2226
		12	5				1561
			8				2505

BOLT TYPE IDENTIFICATION CHART

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

TORQUE FOR HYDRAULIC FITTINGS

37 Degree Flare (JIC) Fittings		
	SET WRENCH TO	
Nominal Tube OD	Torque Wrench Setting	Alternate Torque Units
1/8"	6.5 ft-lbs.	80 in-lbs.
3/16"	9 ft-lbs.	110 in-lbs.
1/4"	12.5 ft-lbs	150 in-lbs.
5/16"	16.5 ft-lbs	200 in-lbs.
3/8"	21 ft-lbs	250 in-lbs.
1/2"	41 ft-lbs	490 in-lbs.
5/8"	64 ft-lbs	770 in-lbs.
3/4"	89 ft-lbs	1070 in-lbs.
7/8"	105 ft-lbs	1260 in-lbs.
1"	130 ft-lbs	1560 in-lbs.
1-1/4"	142.5 ft-lbs	1710 in-lbs.
1-1/2"	178.5 ft-lbs	2140 in-lbs.
2"	250 ft-lbs	3000 in-lbs.



COLD WEATHER WARMUP PROCEDURE

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

⚠ 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 functions through ten (10) cycles while the engine idles. See the Operator's Manual for operation instructions.
6. Make sure the oil temperature on the site gauge is between 120° and 160° F. If not, repeat step 5.
7. Check for fluid leaks. Repair if necessary.
8. The unit is now ready to go on route.

BATTERY DISCONNECT SWITCH

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

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

NOTICE

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

NOTICE

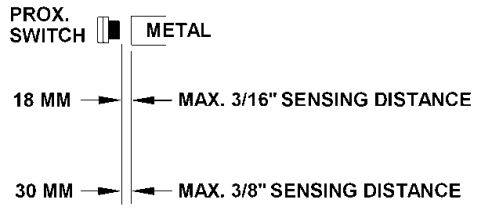
Always disconnect the battery before welding on the chassis or body.

PROXIMITY SWITCH TROUBLESHOOTING

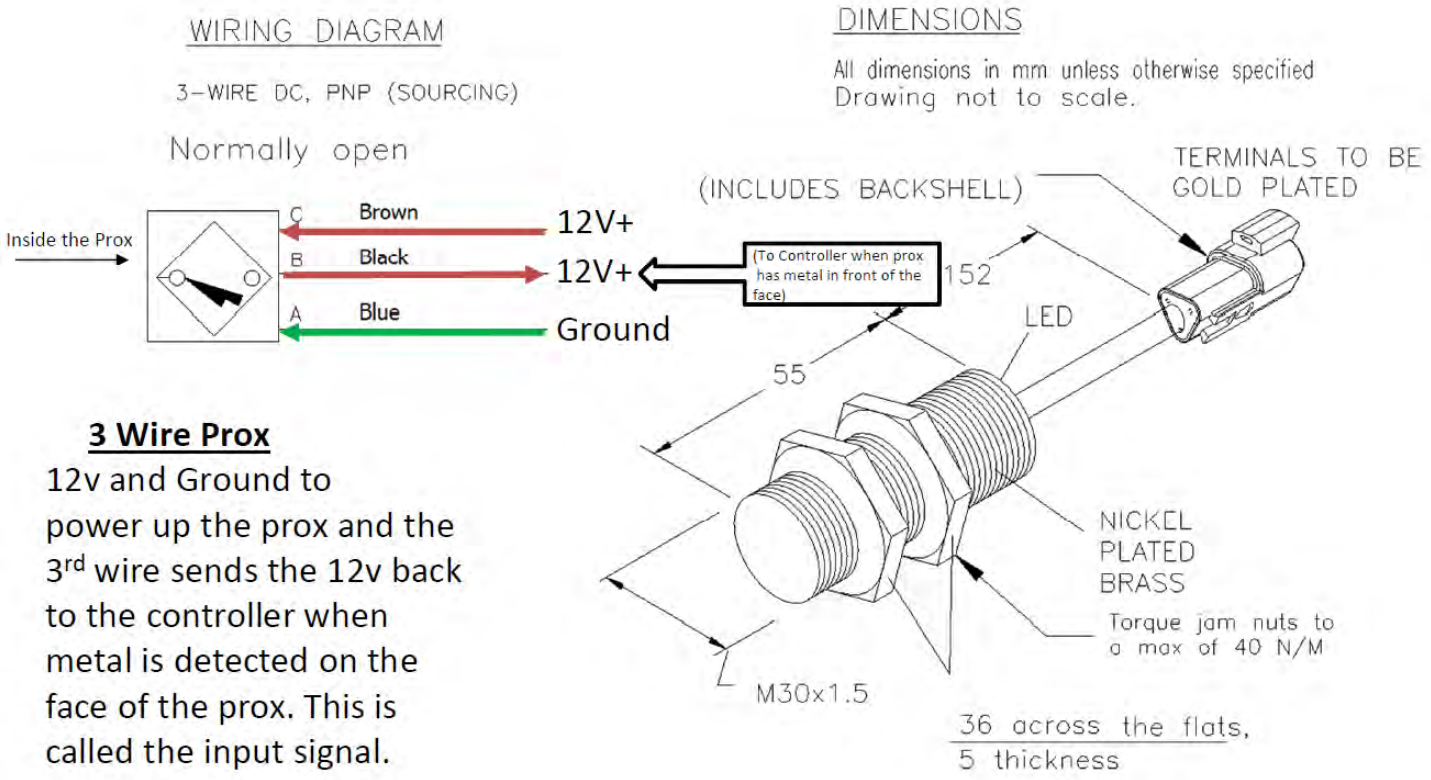
When one or more of a unit's functions do not operate properly and there are proximity switches in the circuits of the unit for these functions, refer to the following table as a guide to find the problem(s).

NOTICE

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

Proximity Switch Troubleshooting Table	
Probable Cause	Remedy
Loose or corroded electrical connections.	Replace the electrical connections.
Damaged Switch A. Cracked Ferrite core causing the fine internal wire to break. B. Cracked Ferrite core – but wire is not broken – the sensitivity of switch will increase which causes sensing distance to increase or switch work intermittently as the temperature changes.	• DO NOT strike switch to make it work. • DO NOT damage the switch when you adjust it. • DO NOT adjust switch too close to the metal it is sensing.
Voltage spikes from truck chassis electrical system will break down the internal electronics of the proximity switch.	1. Make sure the power source from the chassis manufacturer is clean. 2. The body electrical system is protected from voltage spikes.
Improper Sensing Range	Adjust proximity switches to sense metal as follows: 
If the controller input light stays on when a switch is unplugged (the signal wire is carrying +12V DC)	Check the proximity switch electrical circuits for the source of the problem.
If proximity switch LED light is NOT ON.	1. Check the fuse relay block (Half/Packs with IFM controllers). The fuse/relay box is located in the cab. Or Check the in-line fuses (Side Loaders with IFM controllers). The in-line fuses are located in the cab. 2. Unplug proximity switch. 3. Check the power wire (terminal C) for +12 VDC with a multi-meter. 4. Check ground signal with multi-meter for continuity to chassis ground. 5. Check the signal wire for continuity to appropriate controller input terminal. See Service Manual. 6. If all three (3) wires are good, replace the proximity switch.

PROXIMITY SWITCH TROUBLESHOOTING (CONTINUED)



3 Wire Prox

12v and Ground to power up the prox and the 3rd wire sends the 12v back to the controller when metal is detected on the face of the prox. This is called the input signal.

DECALS ON THE UNIT

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

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

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

DECAL CARE

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

A. General Guidelines

Following these guidelines helps the decals adhere longer.

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

B. Pressure Washer Precautions

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

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

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

C. Remove Difficult Debris

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

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

DECAL CARE (CONTINUED)

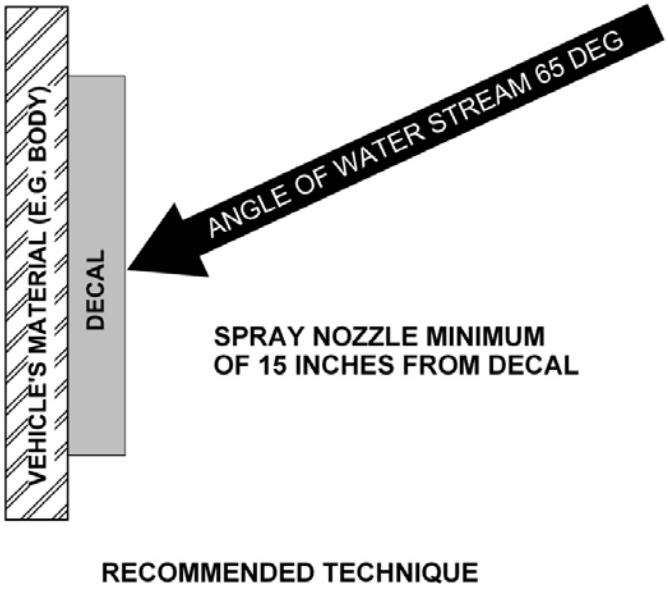


Figure 2. Recommended Technique

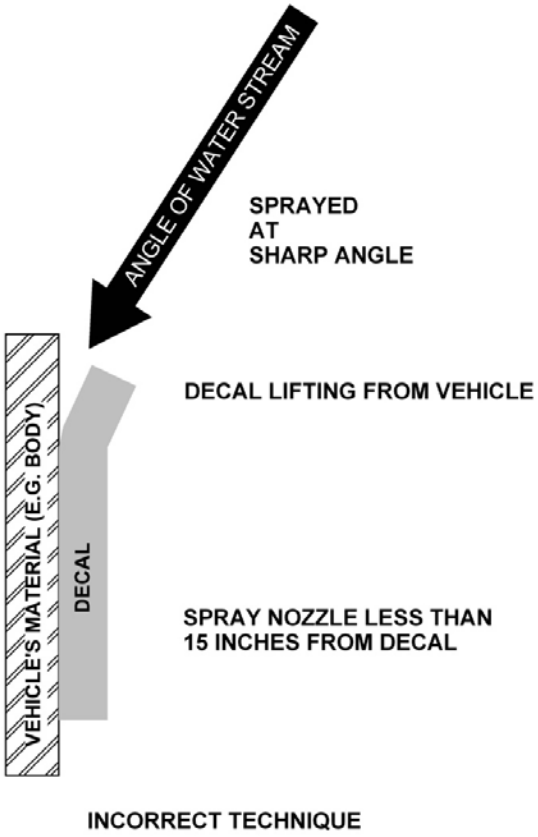
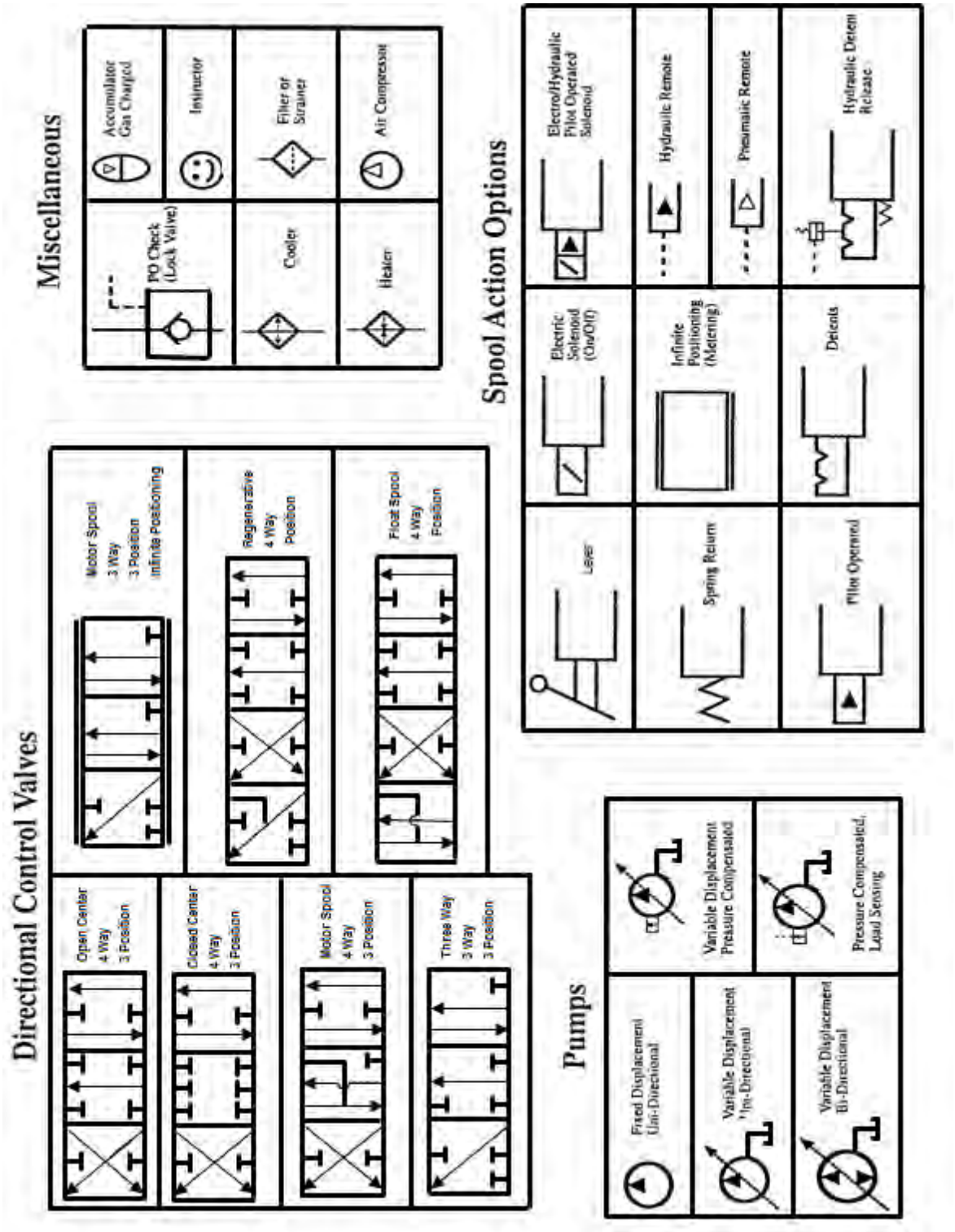
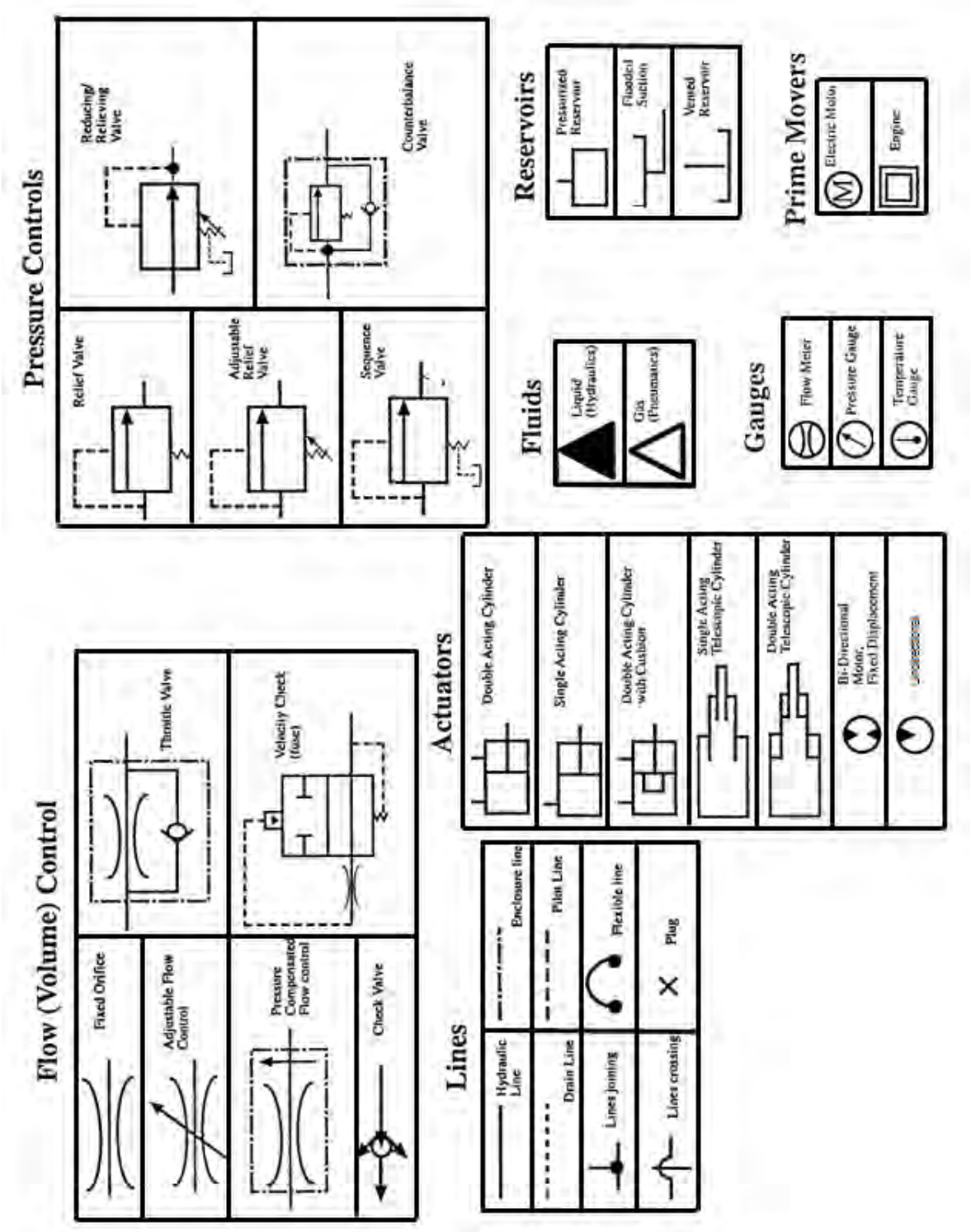


Figure 3. Incorrect Technique

HYDRAULIC SYMBOLS

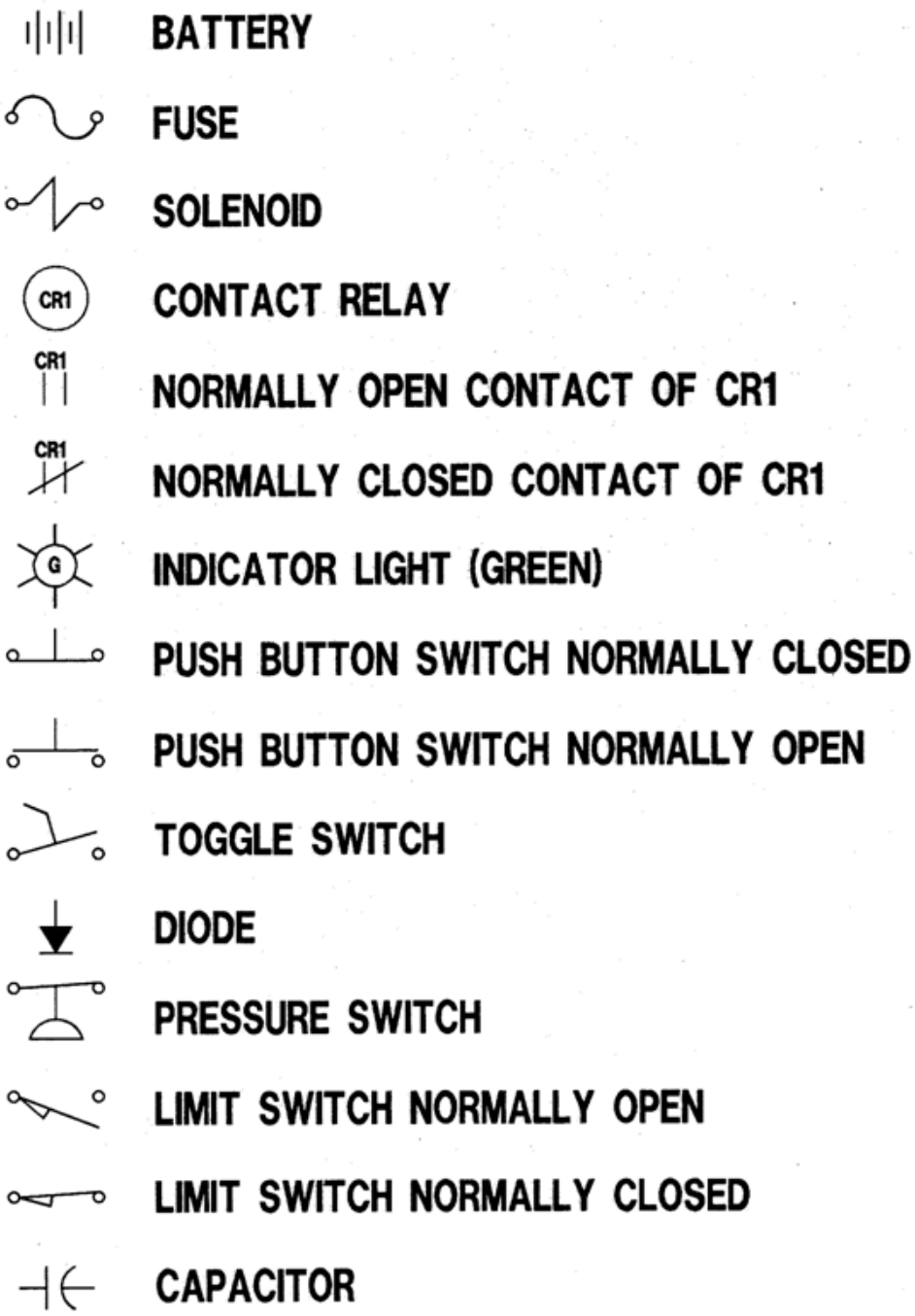


HYDRAULIC SYMBOLS (CONTINUED)



ELECTRICAL SYMBOLS

SYMBOL DEFINITIONS



BODY NOMENCLATURE

The figure below shows the major components and their typical locations on the unit.

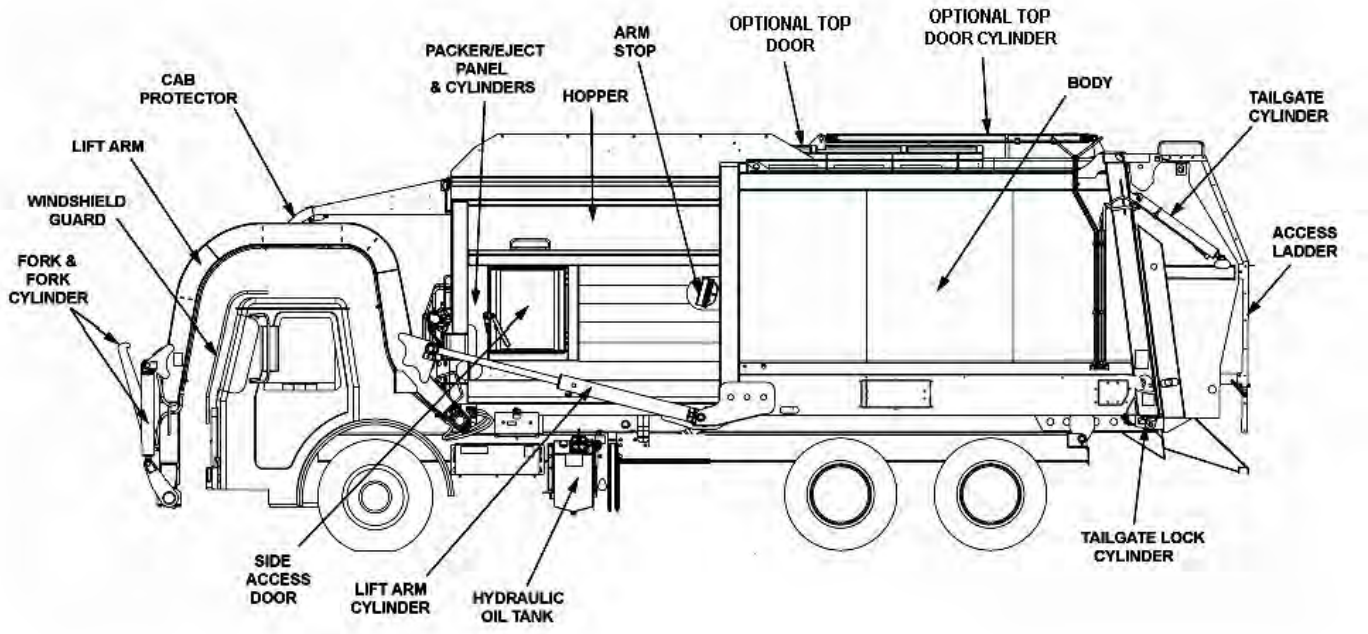


Figure 4. Body Nomenclature

TAILGATE NOMENCLATURE

The figure below shows the major tailgate components and their locations on the unit.

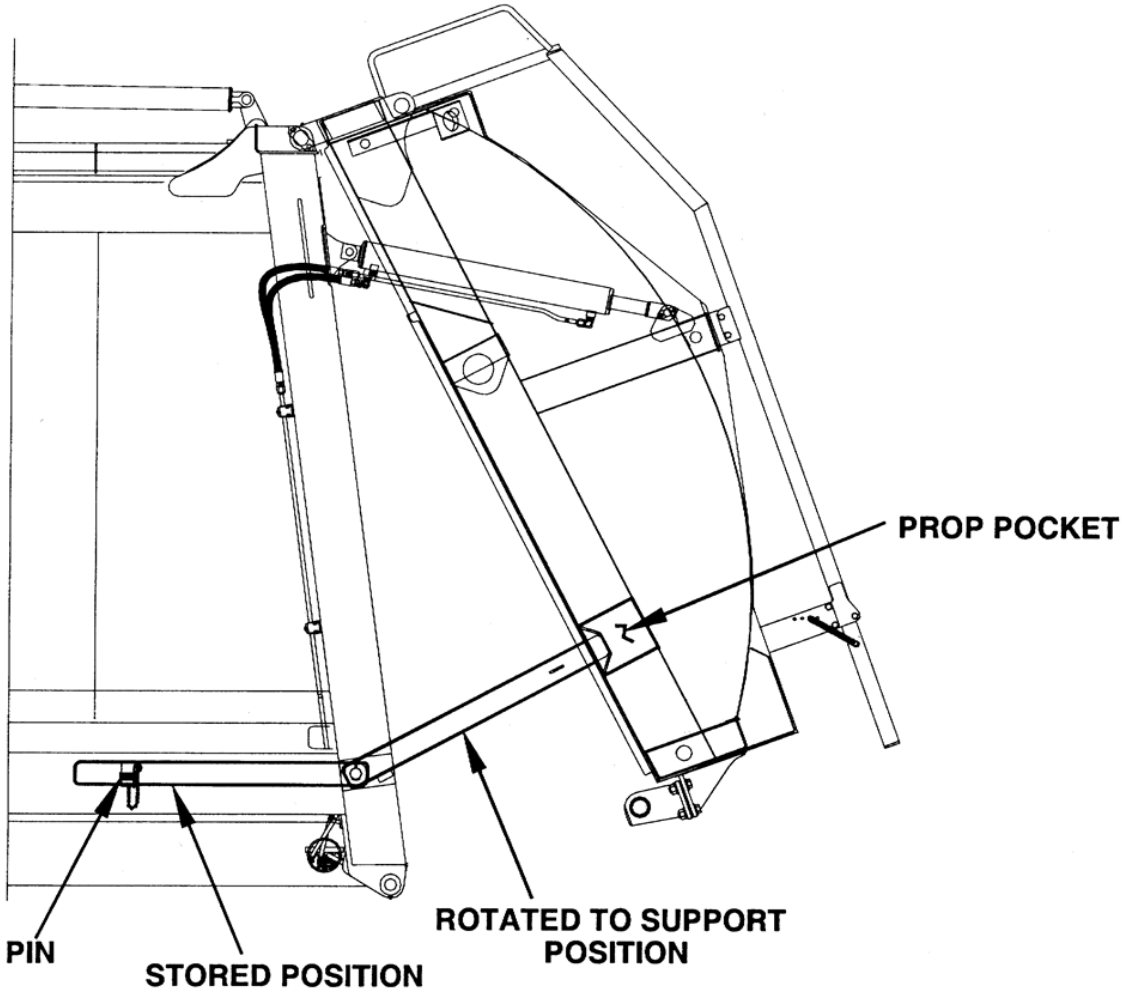


Figure 5. Tailgate Nomenclature

TAILGATE SUPPORT PROPS

Two support props are on the unit and must be used whenever the tailgate is opened for service or maintenance. Both props must be used.

⚠ 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.

⚠ CAUTION

Two props are installed on the unit. Both props must be used!

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) and **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** 15 mode.

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.

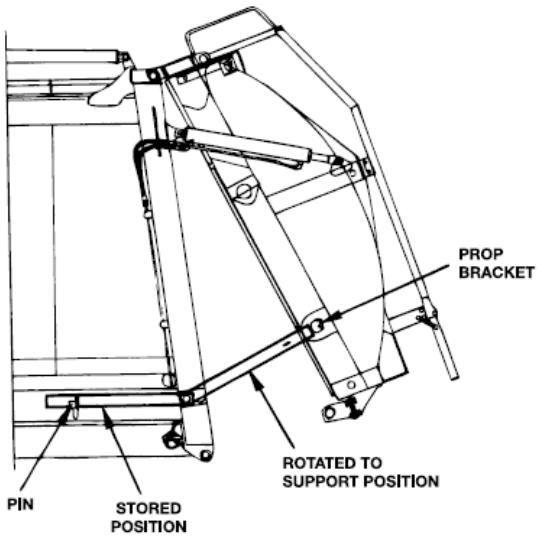


Figure 6. Tailgate Support Props

SIDE ACCESS DOOR

A hinged access door is located on the street side of the unit and provides access to the body area for cleanout purposes. Never enter the door unless the truck engine is stopped, the ignition key is removed, and the unit is in **Lock-Out/Tag-Out mode** 15. See the figure below.

⚠ WARNING

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

Figure 7. Side Access Door

SIDE ACCESS DOOR PROXIMITY SWITCH

One 18mm sourcing or sinking proximity switch located by the side access door. This switch is adjusted properly when the sensing gap between switch and target is 1/8”. See the figure below.

NOTICE

Side door must be closed and latched prior to adjustment of the side door proximity switch.

Figure 8. Side Door Proximity Switch

SLIDING TOP DOOR

A sliding top door is located on the top of the body to cover the hopper area when going to and from landfill, route, etc. to eliminate refuse from blowing out the hopper area. Shown in the figure below are some of the related parts.

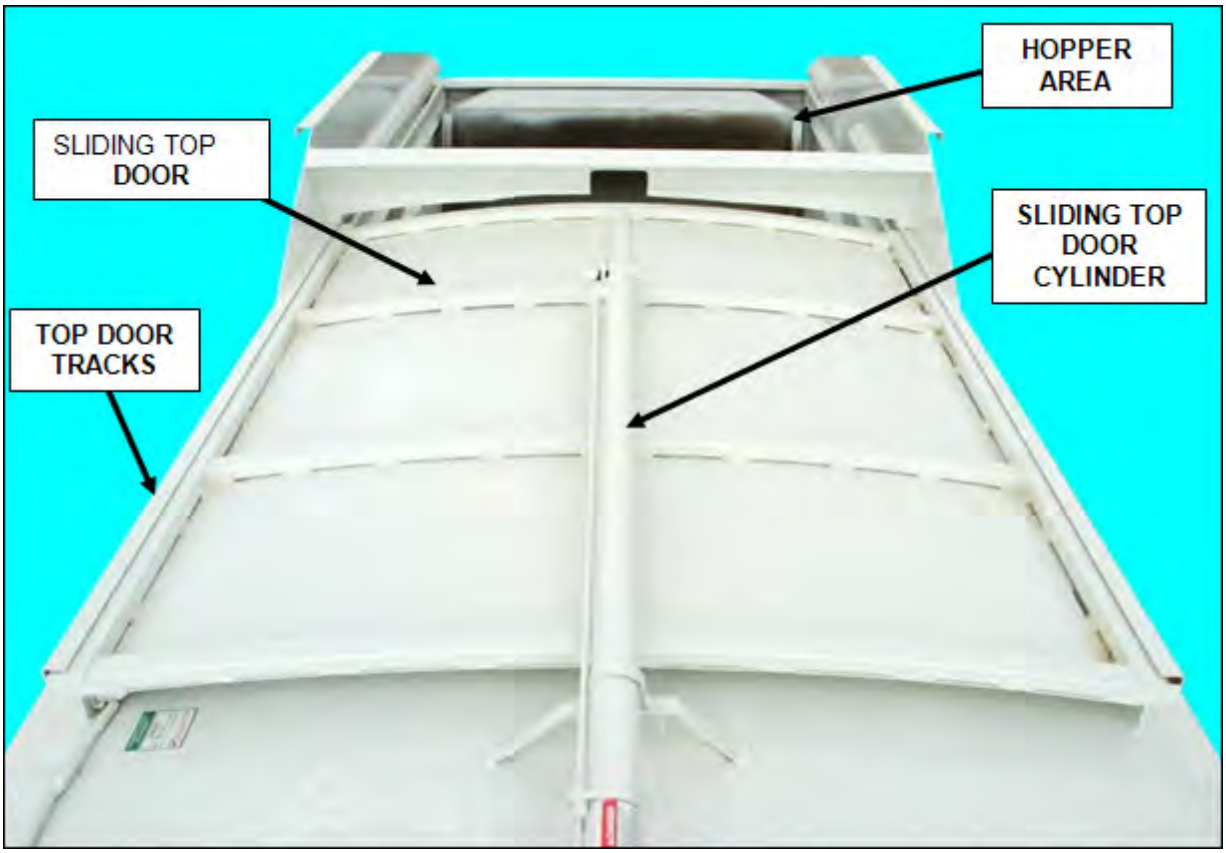


Figure 9. Sliding Top Door

SUMP DOORS

A sump with a door is located on both sides of the front head of the unit. The sump area may be cleaned out by opening the door and using the sump tool.

Doors should be closed at all times except when cleaning out. See the figure below.

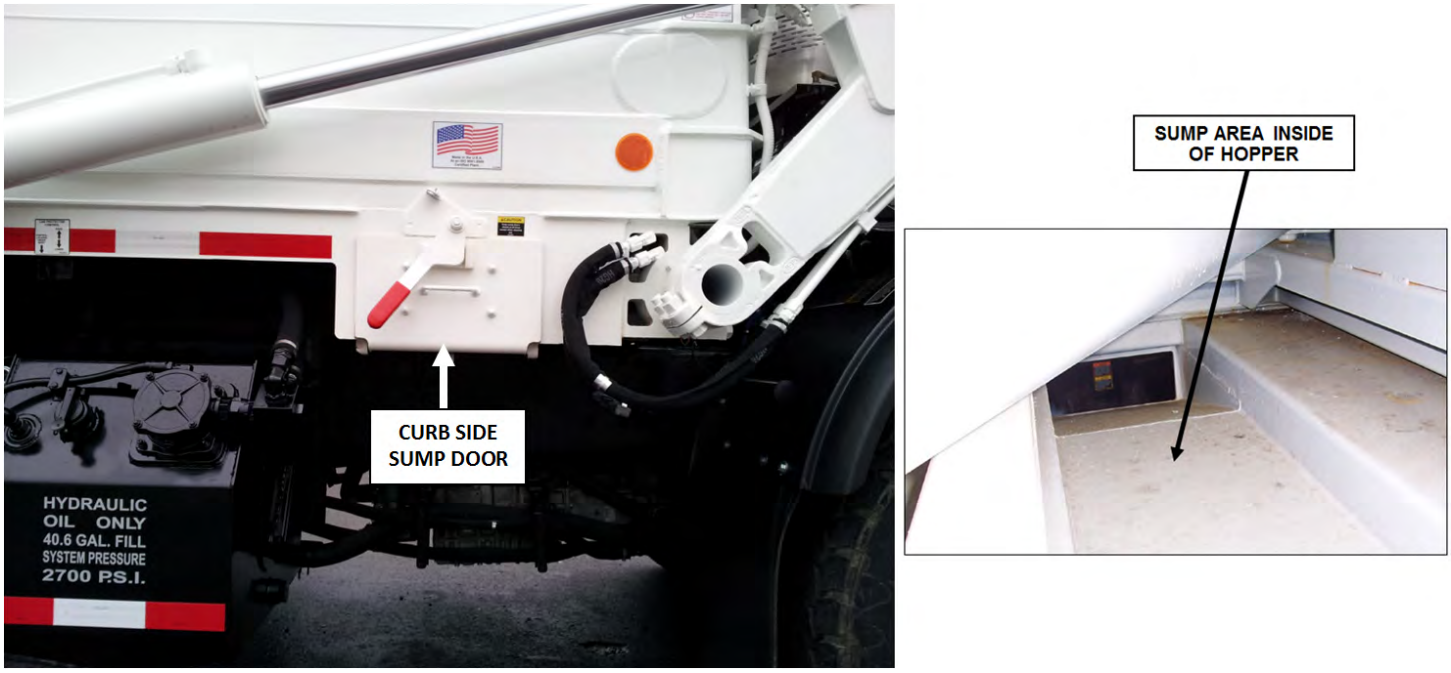


Figure 10. Sump Door and Internal Area

MAINTENANCE AND ADJUSTMENT

BODY DAILY CHECKLIST

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

DAILY CHECKLIST MAINTENANCE ITEMS	
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.
Damaged tailgate seal	Replace seal.
Body structure, lift arms, and/or attaching components have loose or missing hardware	Tighten loose hardware. Replace missing hardware.
Body structure, lift arms, and/or attaching components have cracked weld joints	Repair immediately.
Body mounting brackets have loose hardware, damaged hardware or cracked welds	Tighten loose hardware. Replace missing hardware. Repair cracked welds.
Hopper liner (when equipped)	Inspect welds. Repair cracked welds. Check for damage or excessive wear. Replace as necessary.
Air regulator	90 PSI, typically located street side in the cab behind the seat
Operation	Operate All Functions to make sure all functions work correctly.

BODY PREVENTIVE MAINTENANCE CHART

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

BODY PREVENTIVE MAINTENANCE CHART						
*HOURS OF OPERATION						
COMPONENT/SYSTEM	**8**	**40**	**200**	**1000**	**2000**	**CHECK/SERVICE**
Hydraulic System	☑					Check oil level – add if necessary
		☑				Check cylinders, pump, hoses, tubes, fittings, and adapters for leaks. Check hoses for cracks, crushes, and cover blisters. Repair or replace if necessary with genuine Heil parts. Any replacement hose should be the same size and pressure rating as listed on the original OEM hose.
		☑				Check Control valve seals for leaks. Repair or replace if necessary.
				☑		Replace filter(s) 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(s). Change oil when oil sample shows to change oil.
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.
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

BODY PREVENTIVE MAINTENANCE CHART						
*HOURS OF OPERATION						
COMPONENT/SYSTEM	**8**	**40**	**200**	**1000**	**2000**	**CHECK/SERVICE**
						to female pilot of PTO pump flange. Failure to lubricate female pilot of PTO as given may cause damage to the pump shaft. Greasing is NOT required on wet spline PTOs such as the Chelsea 890/897 series.
Grease Fittings		☑				Lubricate as shown on Body Lube Chart.
Body Undercoating					☑	Inspect body undercoating and repair as necessary.
Fork Bearing Block Bolts (Front Loaders Only)			☑			For Front Loaders Only, each of the four fork bearing block bolt torques should be 460 Ft-Lbs.
Tailgate Seal Integrity	☑					
Packer/Ejector Cylinder Preventive Maintenance	☑	☑				See **Packer/Ejector Cylinder Preventive Maintenance** 49.
PTO/Transmission Interface Inspection			☑			Check the torque on the PTO mounting screws and tighten to the proper torque specification
* Daily = 8 hrs. Weekly = 40 hrs. Monthly = 200 hrs. 6 Months = 1000 hrs. Yearly = 2000 hrs.						

PTO INSPECTION AND PREVENTIVE MAINTENANCE

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

1. ACTIONS

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

Table . Tools and Materials

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

With the unit in Lock-Out/Tag-Out mode with the hydraulic pressure relieved, carefully follow the steps below.

A. PTO/Transmission Interface Inspection/Preventive Maintenance (MONTHLY/200 HOURS OF OPERATION)

(1) Inspect for transmission fluid leaking from the PTO/transmission interface. Thoroughly clean around this area.

(2) Using a torque wrench, check the PTO mounting screws. If they are set less than 45 FT-LBS, tighten to 45 FT-LBS.

(3) Using an oil-resistant marker, add a witness mark on each screw head and across the PTO mounting flange. For future inspections, this will help identify if the PTO mounting screws loosen over time. See Figure below.

Witness Marks on PTO Mounting Screws and Flange

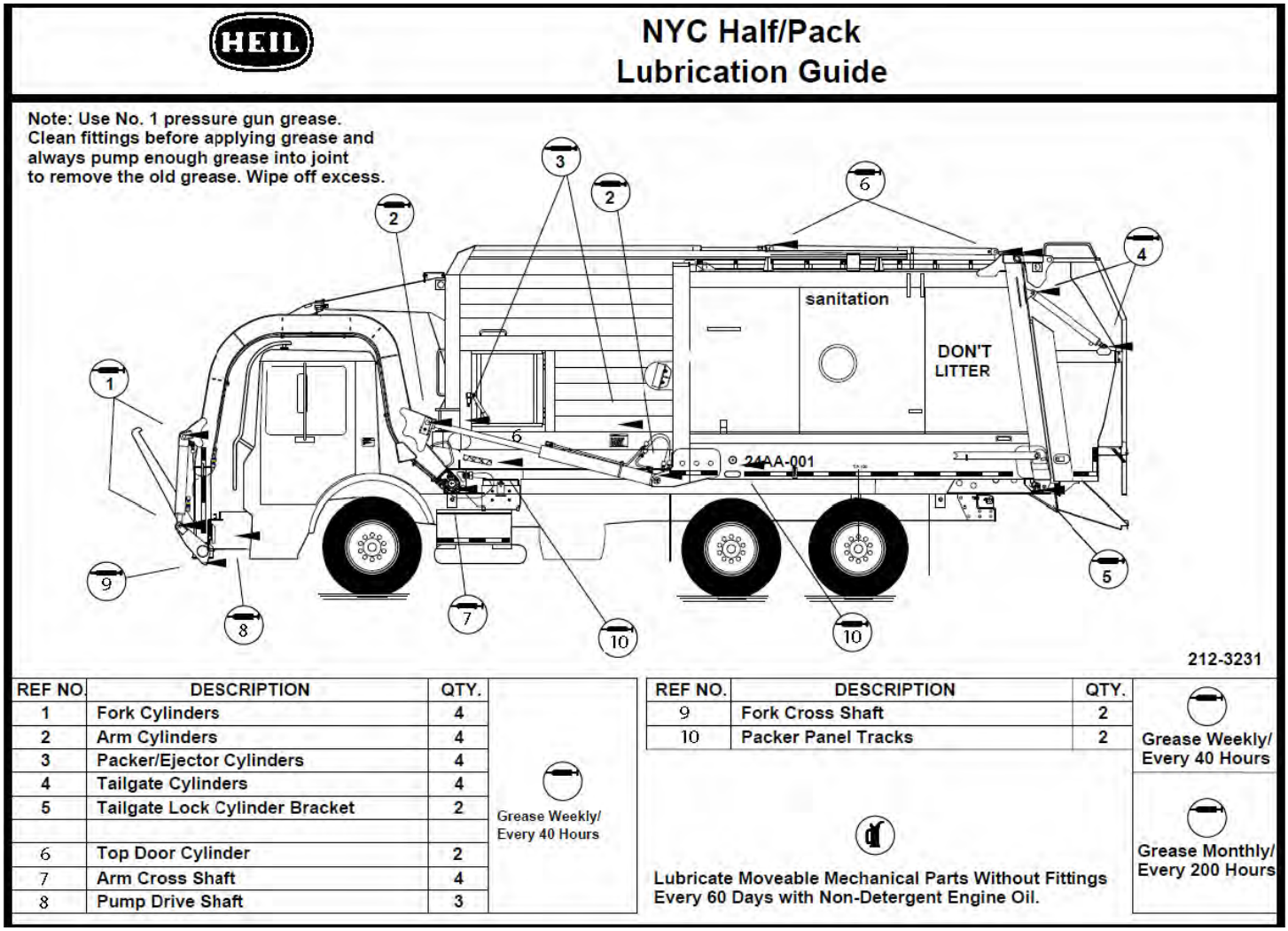
(4) Take the unit out of Lock-Out/Tag-Out mode and operate unit functions.

(5) Check for transmission fluid leaks around the PTO/transmission interface. If there are leaks, contact Technical Services.

(6) When there are no transmission fluid leaks, place the unit back into service.

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.



REF NO.	DESCRIPTION	QTY.
1	Fork Cylinders	4
2	Arm Cylinders	4
3	Packer/Ejector Cylinders	4
4	Tailgate Cylinders	4
5	Tailgate Lock Cylinder Bracket	2
6	Top Door Cylinder	2
7	Arm Cross Shaft	4
8	Pump Drive Shaft	3

Grease Weekly/ Every 40 Hours

REF NO.	DESCRIPTION	QTY.
9	Fork Cross Shaft	2
10	Packer Panel Tracks	2

Grease Weekly/ Every 40 Hours

Grease Monthly/ Every 200 Hours

Lubricate Moveable Mechanical Parts Without Fittings Every 60 Days with Non-Detergent Engine Oil.

Figure 11. NYC Half/Pack Lubrication Guide, PN 212-3231

PACKER/EJECTOR PANEL ADJUSTMENT

Follow this procedure and refer to the figure below to adjust the Packer/Ejector for Autopack units.

NOTICE

Failure to maintain proper adjustment may affect payloads and/or cause structural damage to the unit.

1. At normal throttle speed, adjust the retract proximity switch so pack/eject panel comes to rest 2” away from the front head (outside switch located on the curbside of the front head).
2. Raise and prop the tailgate. Refer to Tailgate Support Props.
3. Turn OFF engine and remove ignition keys. Place unit in Lock-Out/Tag-Out. Refer to Service Manual Section 1.
4. Enter body through the rear of unit and make a chalk mark on the body side sheet 81” from packer panel scraper bar. See the figure below.
5. With everyone OUT and AWAY from the body/tailgate, extend the packer/eject panel until the scraper reaches the 81” mark.
6. Adjust the full extend proximity switch (inside switch located on the curbside of the front head) so the retrack position of the autopack cycle starts at the 81” mark.

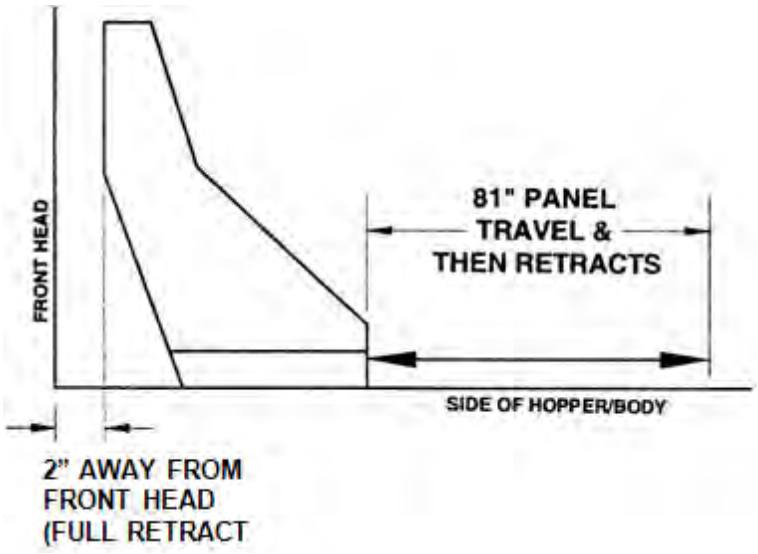


Figure 12. Packer/Ejector Panel Adjustment Diagram

AUTOPACK PROXIMITY SWITCHES

Two 30mm sourcing proximity switches are located on the right front (curbside) corner of the front head. These switches are adjusted properly when the gap between switch and target is 1/4”. See the figure below.

Figure 13. Autopack Proximity Switches

AUXILIARY QUICK DISCONNECT HOOK UP

In the event that the unit has hydraulic system trouble and is unable to use the hydraulic system, the body can be emptied of refuse by hooking up an auxiliary pump system to the quick disconnects on the unit as shown in the figure below.

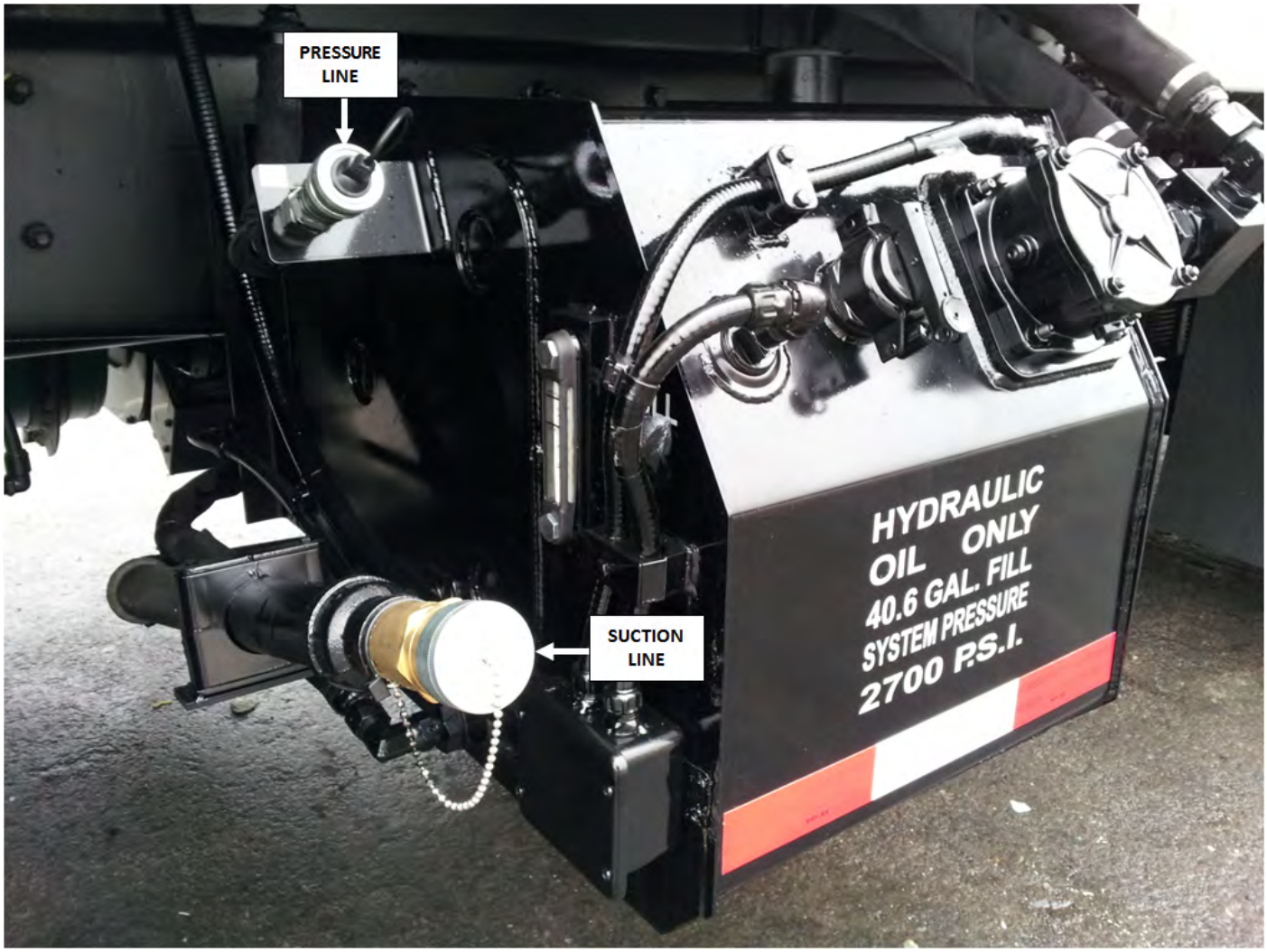


Figure 14. Auxiliary Quick Disconnect Hook Up

PACKER/EJECTOR CYLINDERS PREVENTIVE MAINTENANCE

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

⚠ WARNING

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

⚠ CAUTION

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

HEIL PACKER/EJECTOR CYLINDERS PREVENTIVE MAINTENANCE CHART

DAILY	WEEKLY	MONTHLY
• Using a plastic bladed shovel, clean behind the packer panel and pockets around spherical's. DO NOT damage cylinder rods by striking with any metal object. • Visually inspect that lube lines (if equipped) are connected and not damaged or leaking. • Visually inspect packer tracks and hopper floor for excessive wear or damage. Repair or replace if necessary.	• Grease Packer/ Ejector cylinder spherical bearings/ pins • Inspect packer/ ejector cylinder bearings/pins (both ends) for wear, rust or damage and replace if necessary.	**Half/Pack®, DuraPack® Python® and DuraPack® Rapid Rail®** Inspect the Packer/Ejector Panel start and stop travel positions and, if necessary, adjust the proximity switches for retract and extend settings. Refer to **Packer/Ejector Panel Adjustment** in Service Manual. **Half/Pack® (Featuring Odyssey® Controls)** Perform the operational **Checks and Inspections** found in the Operation Manual. If unit recalibration is required, refer to **Half/Pack® (Featuring Odyssey® Controls) Cylinder Sensors Calibration** in Service Manual.

Side Loading and Premature Cylinder Failure can be caused by:

- Inadequate greasing intervals.
  - o causing increased friction at spherical bearings
  - o potentially resulting in seizing of spherical bearings
- Packing into the second stage of a multistage cylinder.
- Binding of components caused by debris (see figure to right).

COLD WEATHER WARM-UP PROCEDURE

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

⚠ 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. See the Operator's Manual for operation instructions.
6. Make sure the oil temperature on the site gauge is between 120° and 160°F. If not, repeat step 5.
7. Check for fluid leaks. Repair if necessary.
8. The unit is now ready to go on route.

PREPARING THE UNIT TO CHECK THE OIL LEVEL

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

- Truck – on level ground
- Tailgate and Body – fully down and locked
- Packer Panel – at the front of the body
- Forks – fully tucked
- Lift Arms – fully raised

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

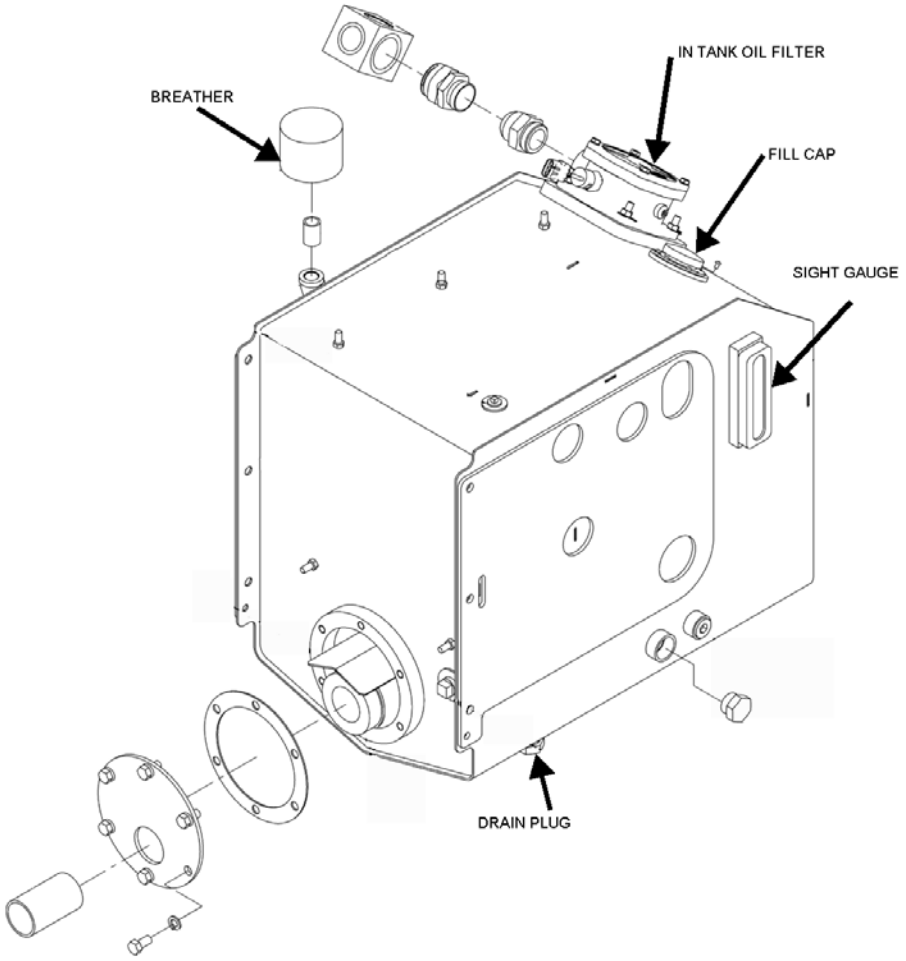


Figure 15. Hydraulic Oil Tank and Sight Gauge

CHECK OIL LEVEL

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

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

WHEN TO CHANGE OIL FILTER ELEMENT

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

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

CHANGE HYDRAULIC OIL FILTER ELEMENT

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

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

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

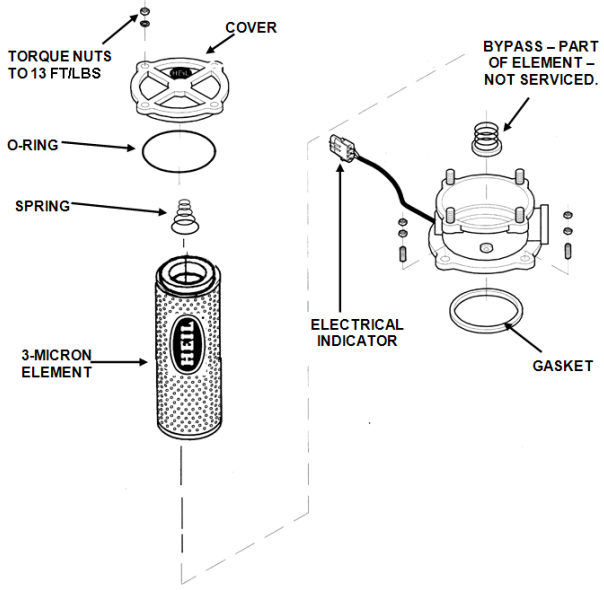


Figure 16. Hydraulic Oil Filter

DRAIN AND CLEAN THE HYDRAULIC OIL TANK

Change the hydraulic oil when the oil sample shows to change it.

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

⚠ CAUTION

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

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

1. Disengage the pump, shut off the engine and remove the ignition key.

⚠ WARNING

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

NOTICE

If your employer or company has Lock-Out/Tag-Out procedures that are different from the following procedures, use your employer's or company's procedures. If your employer or company does not have Lock-Out/Tag-Out procedures, use the procedures that follow.

2. Contact your supervisor if you have any questions about Lock-Out/Tag-Out procedures. If your supervisor has any questions, that person can contact ESG Technical Service. Perform the **Lock Out/Tag Out procedures** 15.
3. Remove the fill cap from the top of the tank.
4. Remove the drain plug from the bottom of the tank so that the oil drains into a container.
5. While fluid is draining from the tank, remove and replace the filter/breather assembly. Change the assembly every time the in-tank filter is replaced.
6. To drain the entire hydraulic system, disconnect all hoses at the adapter and drain the hoses into a container.
7. Remove and replace the in-tank filter as described in **Change the Hydraulic Oil Filter**.
8. Remove the outlet flange and 100 mesh suction strainer to gain access to the tank inside.
9. Remove sediment from the tank bottom.
10. Install the outlet flange with a new gasket and the 100 mesh suction strainer into the tank.
11. Install the drain plug in the tank bottom.
12. Reconnect and tighten all hose connections that were disconnected.

DRAIN AND CLEAN THE HYDRAULIC OIL TANK (CONTINUED)

NOTICE

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

13. Fill tank with recommended oil, checking the sight gauge as you fill. Refer to **Hydraulic Oil Specifications** 17.
14. Check the entire system to make sure all connections are tight and no leaks are found.
15. Start the truck's engine and engage the pump.

⚠ WARNING

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

16. Operate the packing panel through 10 cycles to be sure all air is out of the circuits.
17. Operate the automated container lift mechanism.
18. Operate tailgate – full up and full down.
19. Operate body raise (dump units) – full up and full down.
20. With the packing panel in the retracted position and lift in the in-transit position, check tank oil level. If necessary, add recommended as described under **Check Oil Level** 53.

PURGE THE HYDRAULIC SYSTEM

If the hydraulic system becomes contaminated because of component failure or some other reason, you must purge the hydraulic system.

To purge the system, follow these steps:

1. Extend the packer/ejector cylinder to lower the oil level in the tank.
2. Remove and replace the in-tank oil filter element in the tank.
3. Engage the packer/ejector control lever and allow the oil to circulate through the new filter, cleaning the oil.

NOTICE

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

4. Repeat the procedure as necessary until the system is purged.

NOTICE

If contaminated hydraulic oil reaches the cylinders, the unit may need to be removed from service until the contamination is removed. For more information, contact the Heil Technical Services.

PRESSURE ADJUSTMENT SETTINGS

A. Unit Preparation

Follow these unit preparation steps prior to making any pressure adjustments listed in this section.

1. Make sure area around unit is clear to enable arm and fork operation.
2. Place wheel chocks on both sides of driver side rear wheel.
3. Make sure parking brake is set.
4. Notify anyone in area that the arms and forks will be operated during this procedure.
5. Make sure unit is full of hydraulic oil.
6. Make sure hydraulic oil is at least 100 degrees F before beginning any pressure checks or adjustments.
   a. If unit oil is not at desired temperature, engage the hydraulic pump.
   b. Activate and hold the tailgate lock function for two minutes.
   c. After two minutes release tailgate lock function and cycle the packer/ejector circuit to mix the hot oil.
   d. Repeat steps (b) and (c) until oil is at desired temperature.

NOTICE

The unit must remain in neutral during all pressure setting procedures. Make sure that the work area is clear of uninvolved people and that the parking brake is fully applied and wheels fully chocked.

B. Required Tools

These are the tools required to make pressure adjustments.

QUANTITY	TOOL
1	1/8” open end wrench
1	Ratchet with screwdriver attachment
1	0-5000 PSI hydraulic pressure gauge

C. Streetwise Hydraulics™ Valve Locations

The hydraulic control valve has been split and relocated to the street side of the body. The arm, fork and packer hydraulic circuits are now located behind a steel cover as seen in Figure 8 on the next page. The Electric-Over-Hydraulic portion of valve that controls the tailgate lock/unlock, tailgate open/close and top door open/close hydraulic circuits is now located behind a steel cover as seen in Figure 9 on the next page.

PRESSURE ADJUSTMENT PROCEDURES (CONTINUED)

The hydraulic control valve has been split and relocated to the street side of the body. See the figures below.

Figure 17. Steel Cover Protecting Arm, Fork and Packer Hydraulic Circuits

Figure 18. Rear Cover Protecting Electric-Over-Hydraulic Portion of Valve

PRESSURE ADJUSTMENT PROCEDURES (CONTINUED)

D. Pressures

			NYC Diesel
HYDRAULIC PRESSURES	UNDERBODY VALVE	MAIN RELIEF @1200 ENGINE RPM	2900 BODY MAIN RELIEF - 2900 PSI / PUMP COMPENSATOR - 2700 PSI +50 / -00
		PACKER EXTEND	STANDARD/SIERRA 2650 PSI SIERRA/FREEDOM 2000 PSI
		PACKER RETRACT	2650 PSI
		ARMS UP	NO CIRCUIT RELIEF
		ARMS DOWN 8000# ARMS	1250 PSI
		FORKS UP	NO CIRCUIT RELIEF
		FORKS DOWN	NO CIRCUIT RELIEF
		AUXILIARY SECTION-TAILGATE VALVE SUPPLY	2500 PSI
		AUXILIARY SECTION-OPTION VALVE SUPPLY - SEE NOTE 3	2000 PSI
	TAILGATE VALVE (PARKER)	TOP DOOR CLOSE	750 PSI
		TOP DOOR OPEN	500 PSI
		TAILGATE OPEN	1300 PSI
		TAILGATE CLOSE	1300 PSI
		TAILGATE UNLOCK	2500 PSI
		TAILGATE LOCK	2500 PSI
FUNCTION CYCLE TIMES		AUTOPACK CYCLE TIME @ 45 GPM	18-21 sec @ 48 GPM @1350 RPM
		ARM ONLY CYCLE TIME - 8000# ARMS @ 45 GPM	13-18 sec @ 45 GPM
		TAILGATE	RAISE 14-25 sec LOWER 14-17 sec
		TOP DOOR CYCLE TIME	CLOSE12-17 sec OPEN 26.32 sec

F. Contact **Heil Technical Services** at **866-310-4345** for help with pressure adjustments.

PRESSURE ADJUSTMENT PROCEDURES (CONTINUED)

NOTES:	1: Main Pressure settings have a tolerance range of +/- 50 p.s.i. and are to be set at operating speed - WI594
	2: Port Relief Pressure settings have a tolerance range of +/- 100 p.s.i. and are to be set at operating speed - WI594
	3: Options include: Carry Can Hydraulic Supply, Commercial Gripper, Adjustable Forks, Hydraulic Cab Shield
	4: Throttle Advance set to 1250 rpm
	5: Unless noted, all pressures are good for Standard, Sierra, and Freedom units
	6: Cycle Times based on 700 RPM at idle.

CLAMP-ON ARM BOLTS MAINTENANCE

Check clamp-on arm bolts for tightness monthly. See the figure below.

NOTICE

Do not use an impact wrench as thread damage might occur.

NOTICE

If bolts are removed, the bolts MUST be replaced. Contact your local Heil Dealer or Parts Central for parts.

Torque as follows:

1. Lubricate threads with anti-seize compound.
2. Torque the lock nut to 600 ft. lbs. using a torque wrench.

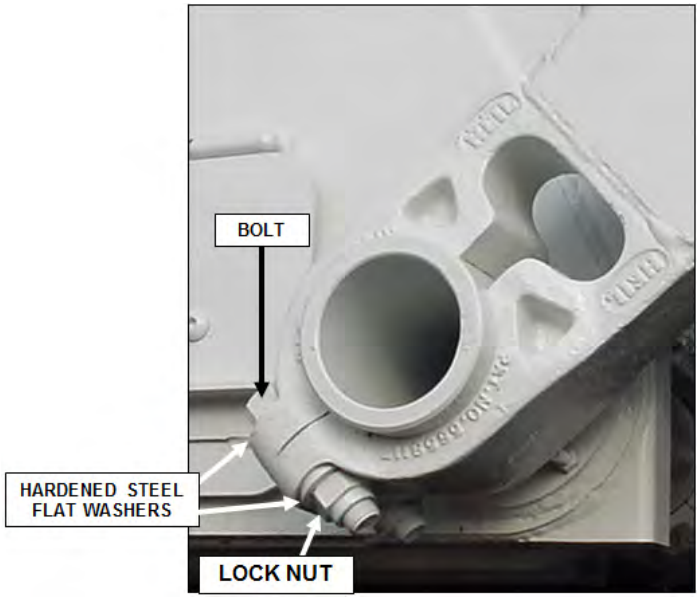


Figure 19. Clamp-on Arm Bolts Maintenance

CORTEX CONTROLLER™ LOCATION

The Cortex Controller is located in the cab doghouse area. See the figure below.

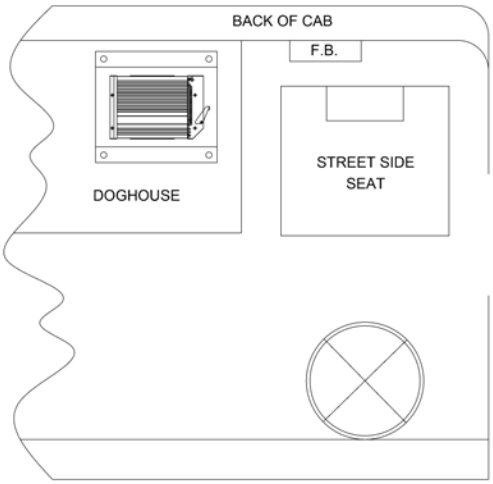


Figure 20. Cortex Controller™ In-Cab Location

WELDING AND ELECTRONIC DEVICES / ELECTRICAL LUBRICANTS

Before welding on any unit with electronic devices like the Cortex Controller™ and proximity switches, complete the following procedures.

⚠ WARNING

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

- Disconnect all battery connections.
- Place welding ground as close as possible to the area that is being repaired.
- Disconnect the Cortex Controller.
- If welding within 24 inches of a proximity switch, remove the switch from the unit.

NOTICE

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

Electrical Anti-Corrosion Lubricant

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

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

These lubricants may be obtained at an electrical supply store.

REPAIRING CRACKED WELD JOINTS

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

INSPECT PROXIMITY SWITCHES

See **Proximity Switch Troubleshooting** 25 for recommended procedures for inspecting proximity switches.

TAILGATE LUBRICATION

See **Grease Lubrication Recommendation** and **Body Lubrication Guide** in this section.

CLEAN AND INSPECT THE TAILGATE SEAL

Periodically check the tailgate seal to make sure it mates properly with the body and inspect for possible wear, damage or leaking. Replace the seal as necessary. See the figure below.

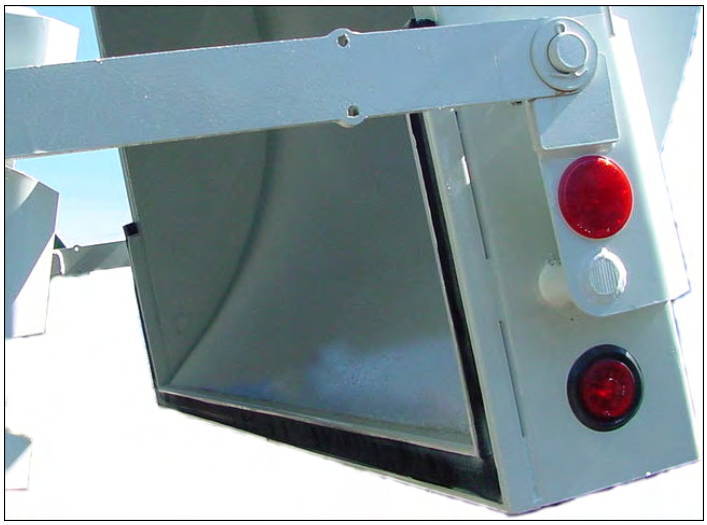


Figure 21. Tailgate Seal

PROCEDURE TO UNLOAD REFUSE FROM AN INOPERABLE NYC HALF/PACK®

The following outlines the procedure to unload refuse from an inoperable NYC Half/Pack®. In this procedure, an air compressor is used to pneumatically actuate the hydraulic valves on the unit when the unit is connected to an auxiliary hydraulic supply. **This procedure requires the NYC Half/Pack® unit to be equipped with an air diverter valve with control panel. See the figure under Step 5**.

1. Tools, Materials, and Parts Needed

   The materials and tools necessary to perform the rework are outlined in the table below.

ITEM	PART NUMBER	APPLICATION
Personal Protective Equipment	Commercially available	Safety protection as required by employer
Auxiliary Hydraulic Supply	Commercially available	See “Hydraulic Truck Transfusion Unit Operation and Service Manual” for more information.
Air Compressor	Commercially available	Rated for at least 100 PSI
Air Compressor Hose with Quick Disconnect	Commercially available	Rated for at least 150 PSI
Bucket	Commercially available	To catch any hydraulic oil from auxiliary hydraulic connections

2. Prepare the Unit and Work Area

   For this procedure, normal Lock-Out/Tag-Out procedures are not possible. However, it is imperative that ALL safety precautions are followed prior to and during the procedure. Clear the area around the unit of all unnecessary people and equipment. **It is critical to ensure the front fork arms are either at rest on the saddle “fully back” or “fully extended” and at rest on the ground while this procedure is being performed.** It is strongly recommended that (i) the truck be positioned in anticipation of the load being discharged onto the ground behind the unit, (ii) the unit has been “wheel chocked” to prevent movement, (iii) the truck be quarantined from other units, and (iv) uninvolved personnel are moved outside the quarantine area for the payload discharge procedure.

   NOTE: You should familiarize yourself with local environmental regulations before discharging a load of refuse onto bare ground. A temporary liner, secondary containment of runoff, isolation from surface water, or other protective measures may be required; check with regulatory officials before proceeding.

3. Corrective Action

   With unit prepared as described above, carefully follow the steps below to unload refuse from an inoperable NYC Half/Pack®.

⚠ WARNING

Follow all safety warning decals affixed to the unit (both inside and outside the cab) and all safety measures in the NYC Half/Pack® Operation Manual related to operating the unit.

(1) Turn the truck’s ignition OFF and remove the keys.

(2) Turn OFF the suction valve located on the lower backside of the hydraulic oil tank.

PROCEDURE TO UNLOAD REFUSE FROM AN INOPERABLE NYC HALF/PACK® (CONTINUED)

(3) Place bucket on floor beneath pressure and return hydraulic connections next to hydraulic oil tank. See the figure below left.

(4) Attach and activate the auxiliary hydraulic connections to the NYC Half/Pack® unit from the auxiliary hydraulic supply. See the figure below right and reference Hydraulic Truck Transfusion Unit Operation and Service Manual.

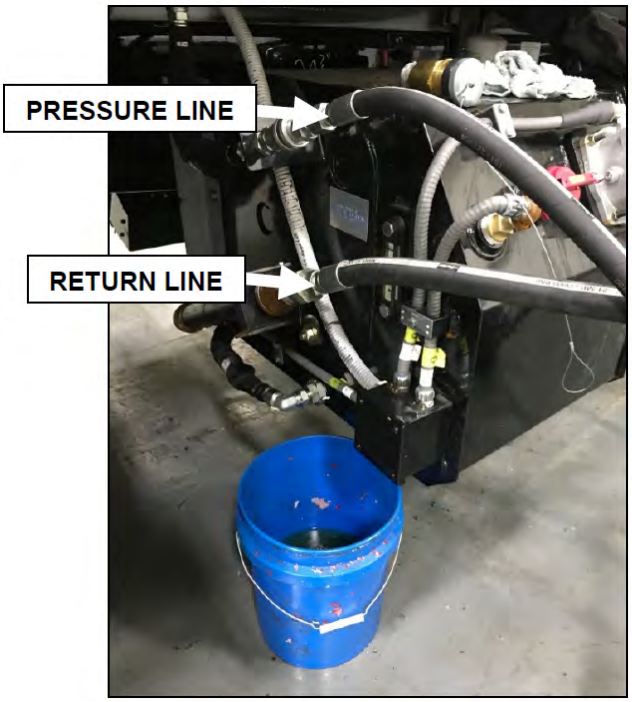


Figure 22. Auxiliary Hydraulic Connections

Figure 23. Auxiliary Hydraulic Supply Unit

PROCEDURE TO UNLOAD REFUSE FROM AN INOPERABLE NYC HALF/PACK® (CONTINUED)

(5) On the air diverter valve control panel, located on the street side of the body, remove dust cap from the “air input” port and then attach an air compressor hose quick disconnect. See the figures below.

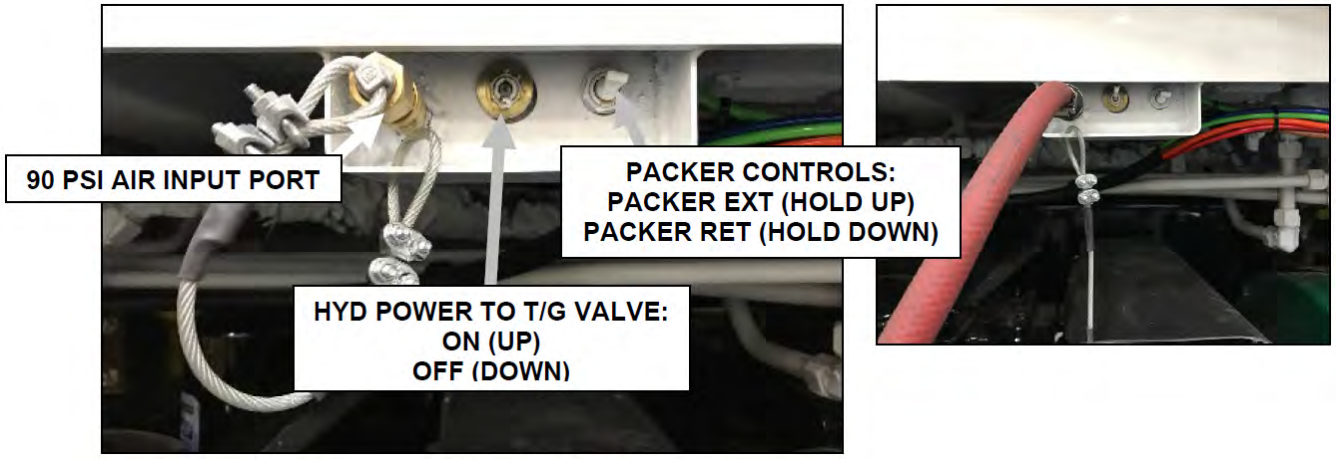


Figure 24. Air Diverter Valve Control Panel (Left) and Air Input with Air Line Attached (Right)

(6) Set the air compressor to 90 PSI. Then turn the air compressor ON. When the air compressor is producing an output of 90 PSI, proceed to step (7).

(7) On the air diverter valve control panel, push the middle toggle switch ON (UP position). This supplies hydraulic power to the tailgate valve. Leave this ON to operate the tailgate functions.

(8) Remove the tailgate valve cover and set aside.

PROCEDURE TO UNLOAD REFUSE FROM AN INOPERABLE NYC HALF/PACK® (CONTINUED)

(9) On the tailgate valve, push the button shown below in the figure below to manually unlock the tailgate.

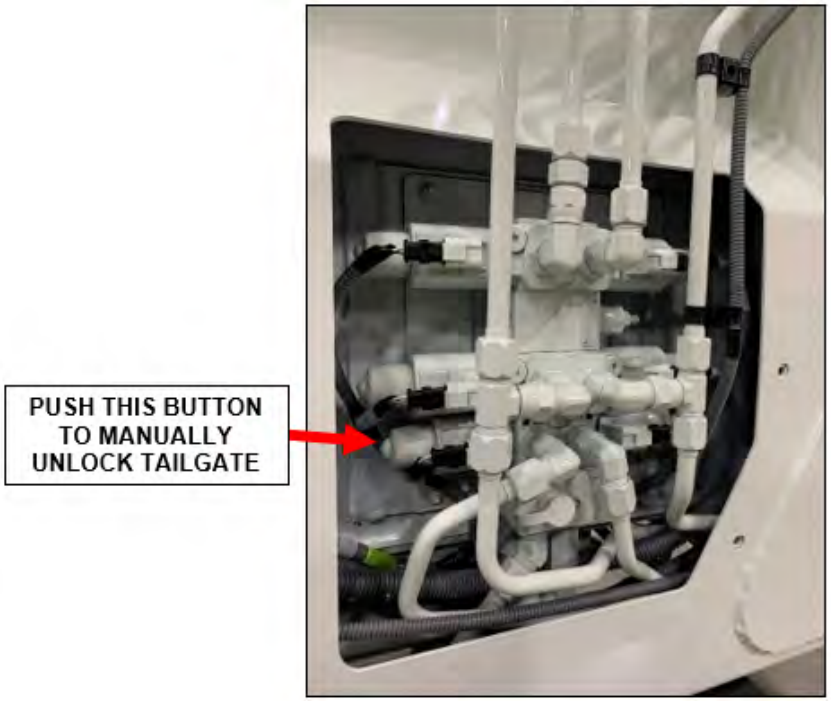


Figure 25. Tailgate Valve: Manual Unlock Tailgate Button

(10) On the tailgate valve, manually push and hold the button shown below in the figure below to manually fully raise the tailgate. DO NOT ALLOW ANYONE TO POSITION THEMSELVES BETWEEN THE OPEN TAILGATE AND THE BODY UNLESS THE TAILGATE HAS BEEN FULLY LOWERED ONTO THE TAILGATE PROPS.

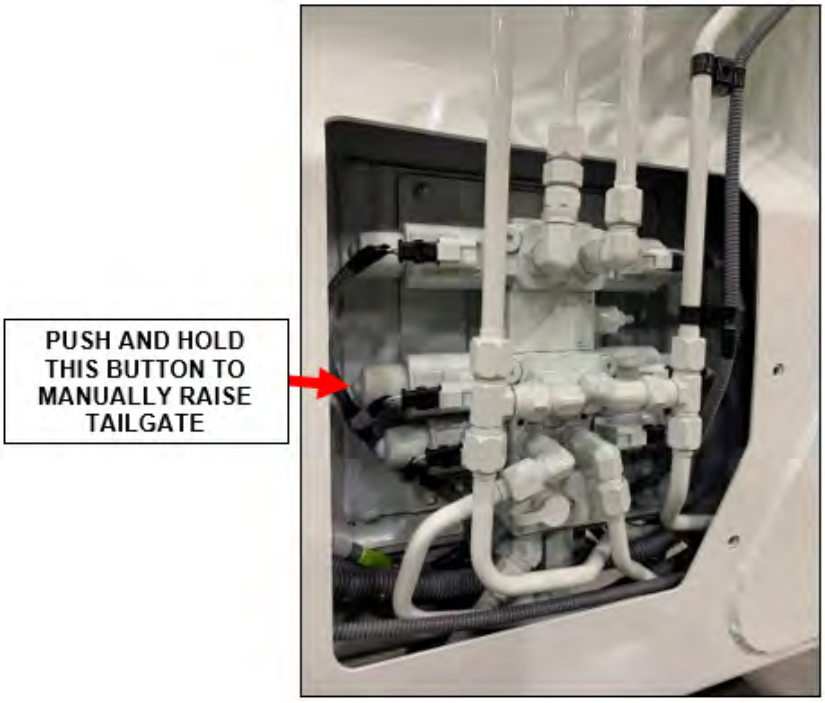


Figure 26. Tailgate Valve: Manual Raise Tailgate Button

PROCEDURE TO UNLOAD REFUSE FROM AN INOPERABLE NYC HALF/PACK® (CONTINUED)

(11) On the air diverter valve control panel (figure under Step 5), push and hold the packer switch to extend position (UP) until the load is ejected. Depending on the flow rate of the auxiliary hydraulic source, this could take up to several minutes. Once the load is ejected, retract the packer blade.

(12) On the tailgate valve, push the button shown below in the figure below to manually lower the tailgate. DO NOT ALLOW ANYONE TO POSITION THEMSELVES BETWEEN THE OPEN TAILGATE AND THE BODY DURING THIS PROCESS.

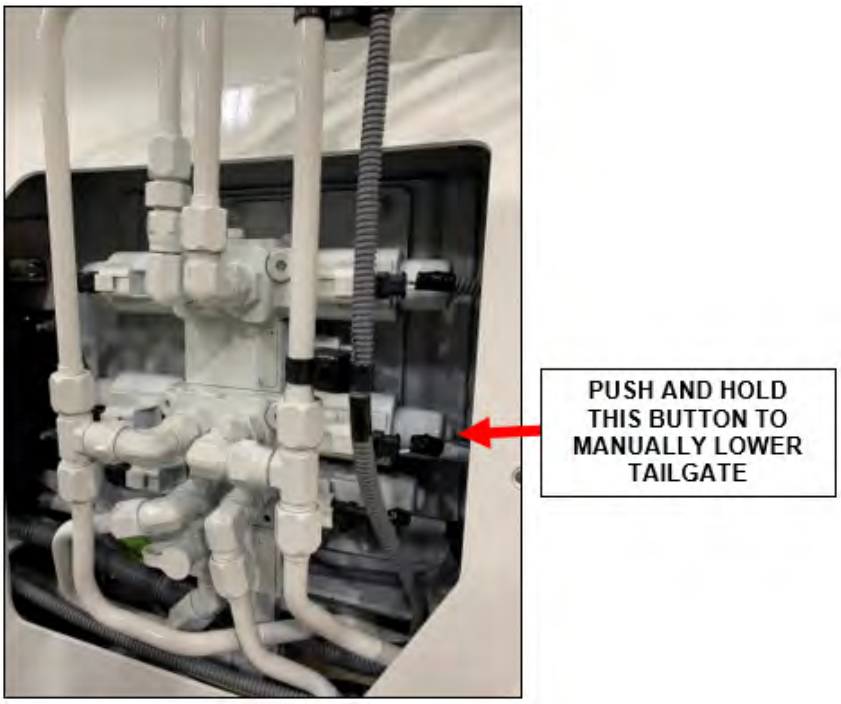


Figure 27. Tailgate Valve: Manual Lower Tailgate Button

(13) On the tailgate valve, push and hold the button shown below in the figure below to manually lock the tailgate.

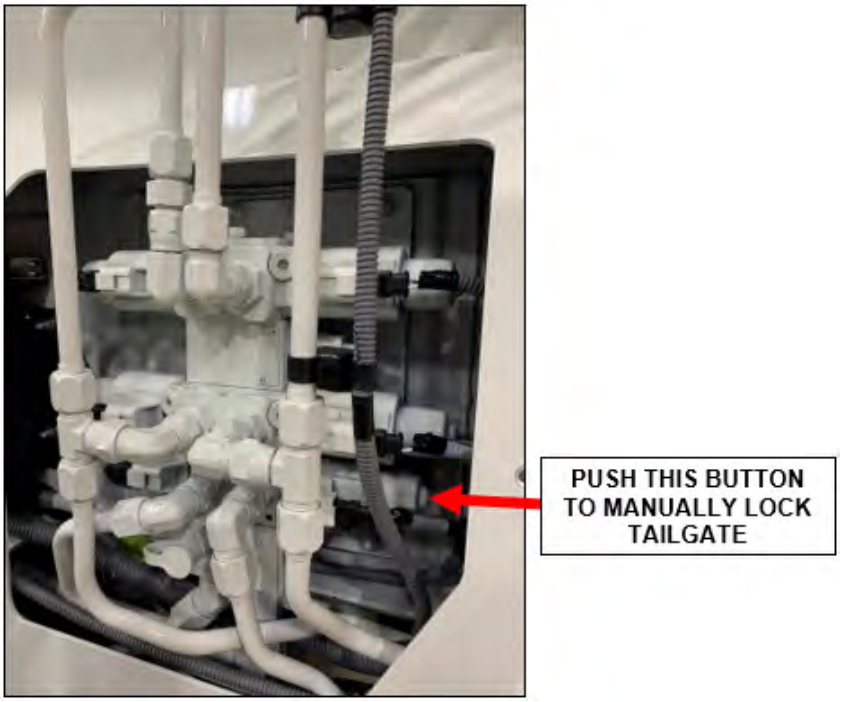


Figure 28. Tailgate Valve: Manual Lock Tailgate Button

PROCEDURE TO UNLOAD REFUSE FROM AN INOPERABLE NYC HALF/PACK® (CONTINUED)

(14) Detach the air compressor hose from the air diverter valve control panel “air input” port and reinstall the dust cap.

(15) Shut down and disconnect the auxiliary hydraulic connections.

(16) Turn ON the suction valve located on the back of hydraulic oil tank.

(17) Check the fluid level in the hydraulic oil tank and fill as needed. Refer to **Preparing the Unit to Check the Oil Level** 51 .

If you have any questions regarding the information, please contact Heil Technical Services at 866-310-4345.

CORTEX CONTROLLER™ 40 I/O ASSEMBLY

Issued September 2024
Service Manual

CORTEX CONTROLLER™ 40 I/O ASSEMBLY

There are no serviceable parts within the Cortex Controller™ housing. Refer to the figure below. Do not open the Cortex Controller™ housing. Send the Cortex Controller™ to Heil Environmental for repair or programming.

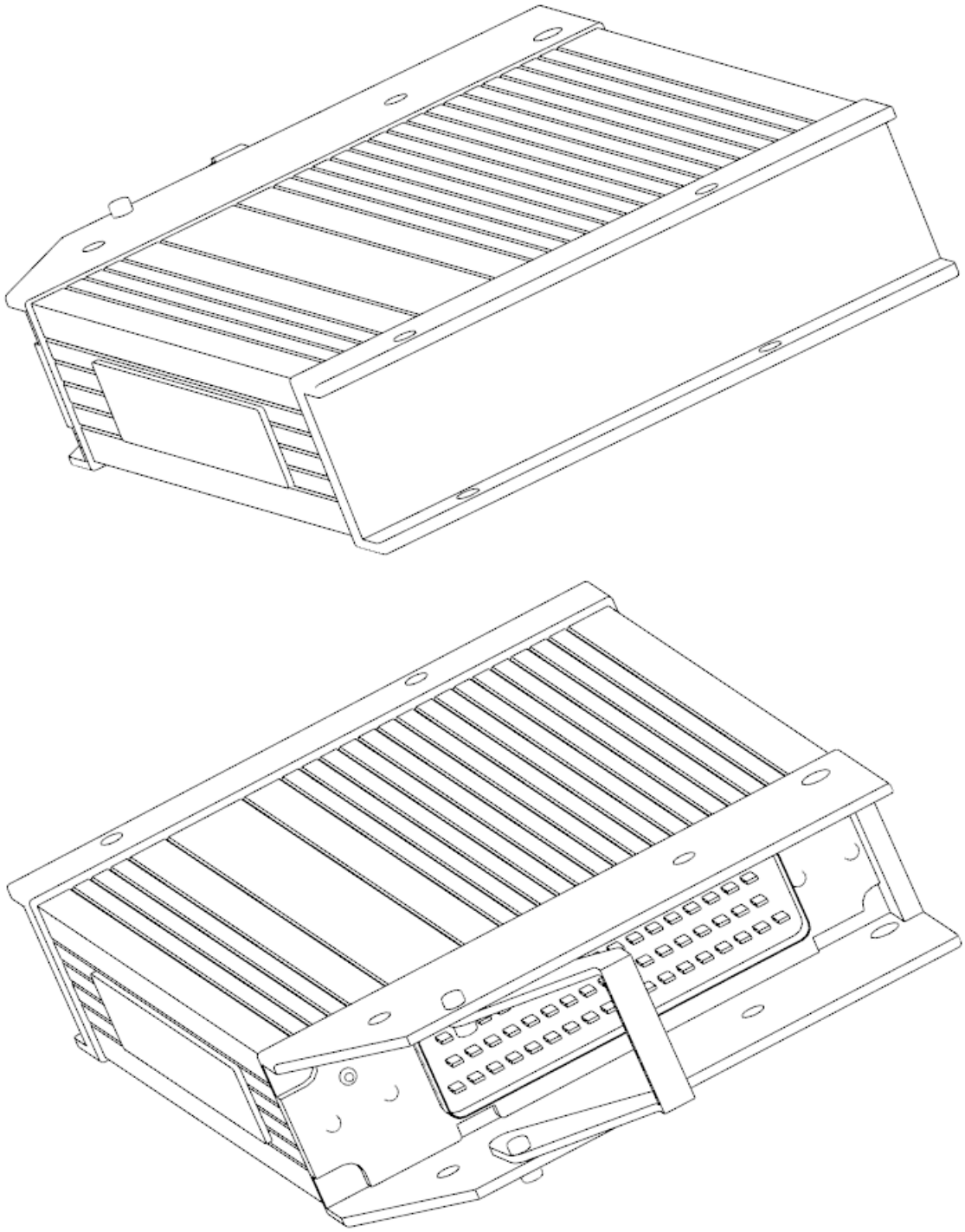


Figure 29. 40 I/O Cortex Controller™ Hardware

CORTEX CONTROLLER™ PIN NUMBER DIAGRAM

Refer to the figure below for the Cortex Controller™ female pin locations.

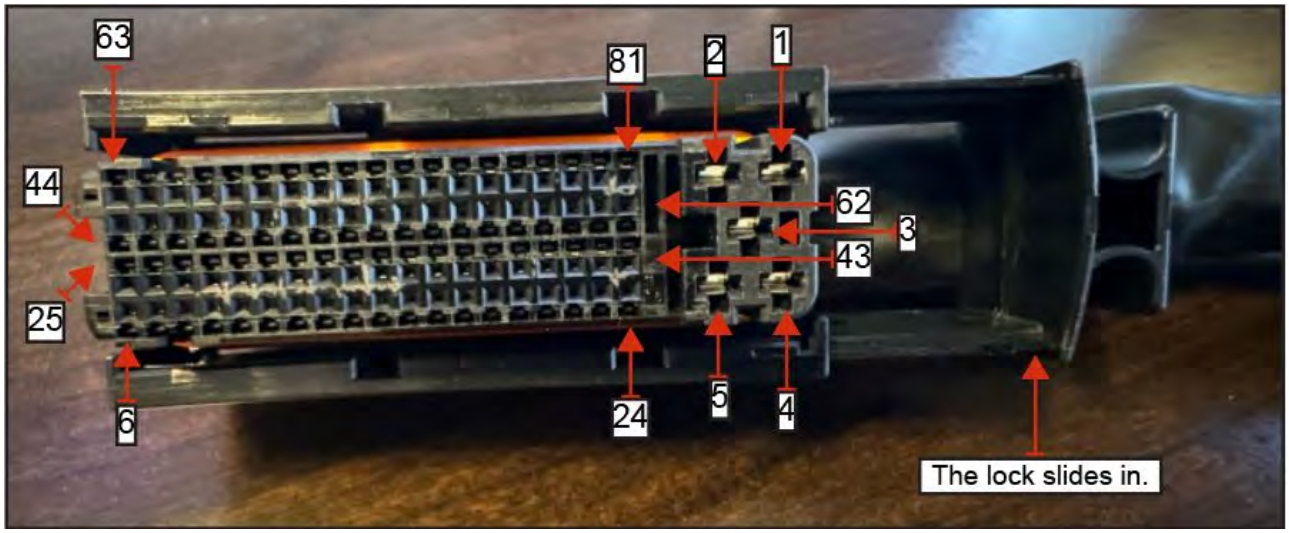


Figure 30. Cortex Cable Connection, Female Pin Positions.

CORTEX CONTROLLER™ 55-POLE CABLE ASSEMBLY

Follow these steps to assembly the Cortex Controller Cable.

A. Cable and Controller Parts Identification

See the figure below to identify the 55-Pole Cable Connector parts.

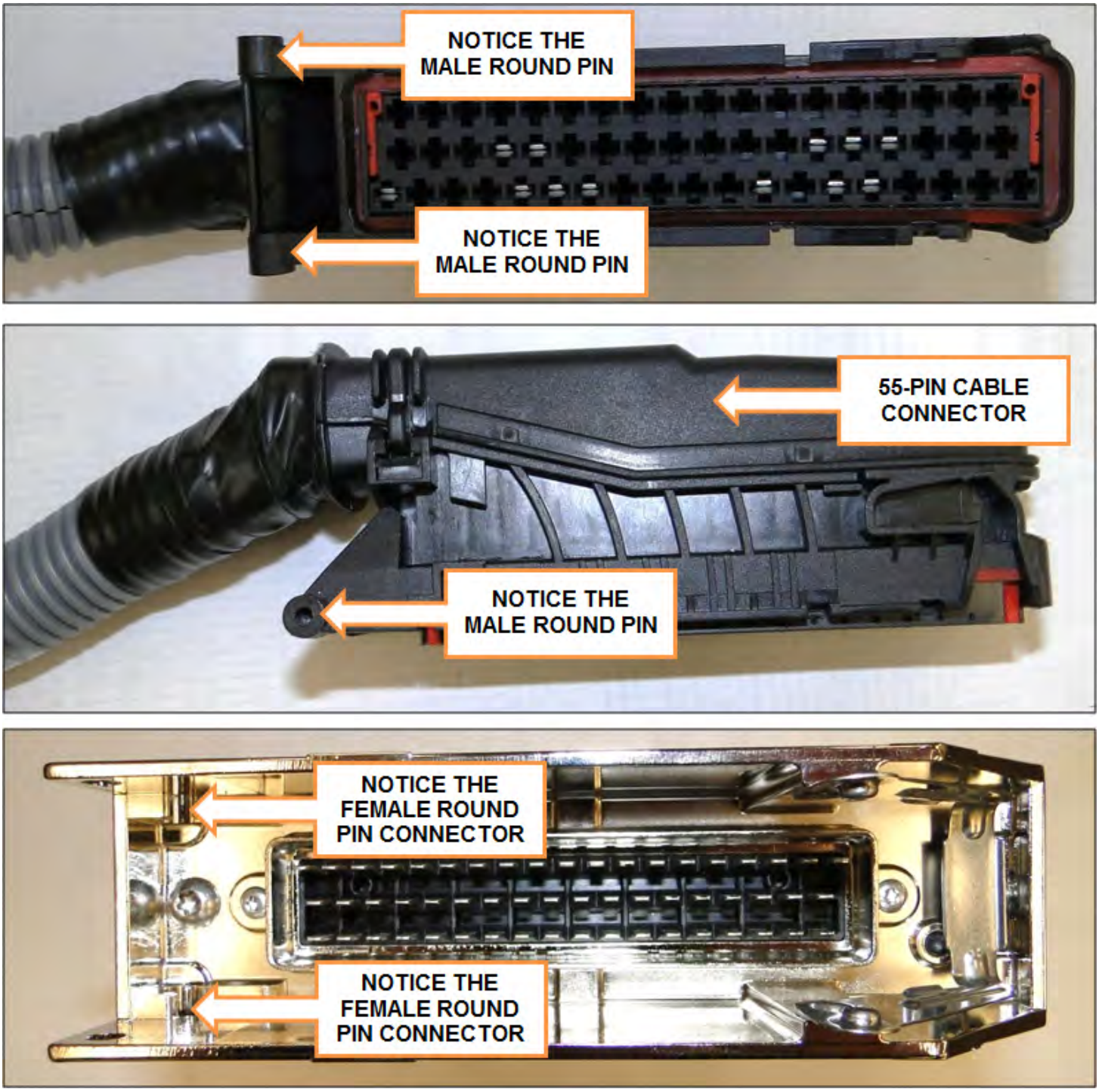


Figure 31. Cable Controller Plastic Male Hinge Pins and Controller Female Slot Connectors

CORTEX CONTROLLER™ 55-POLE CABLE ASSEMBLY (CONTINUED)

B. Female Controller Connector Close-Up View

See the figure below to identify the controller female connector.

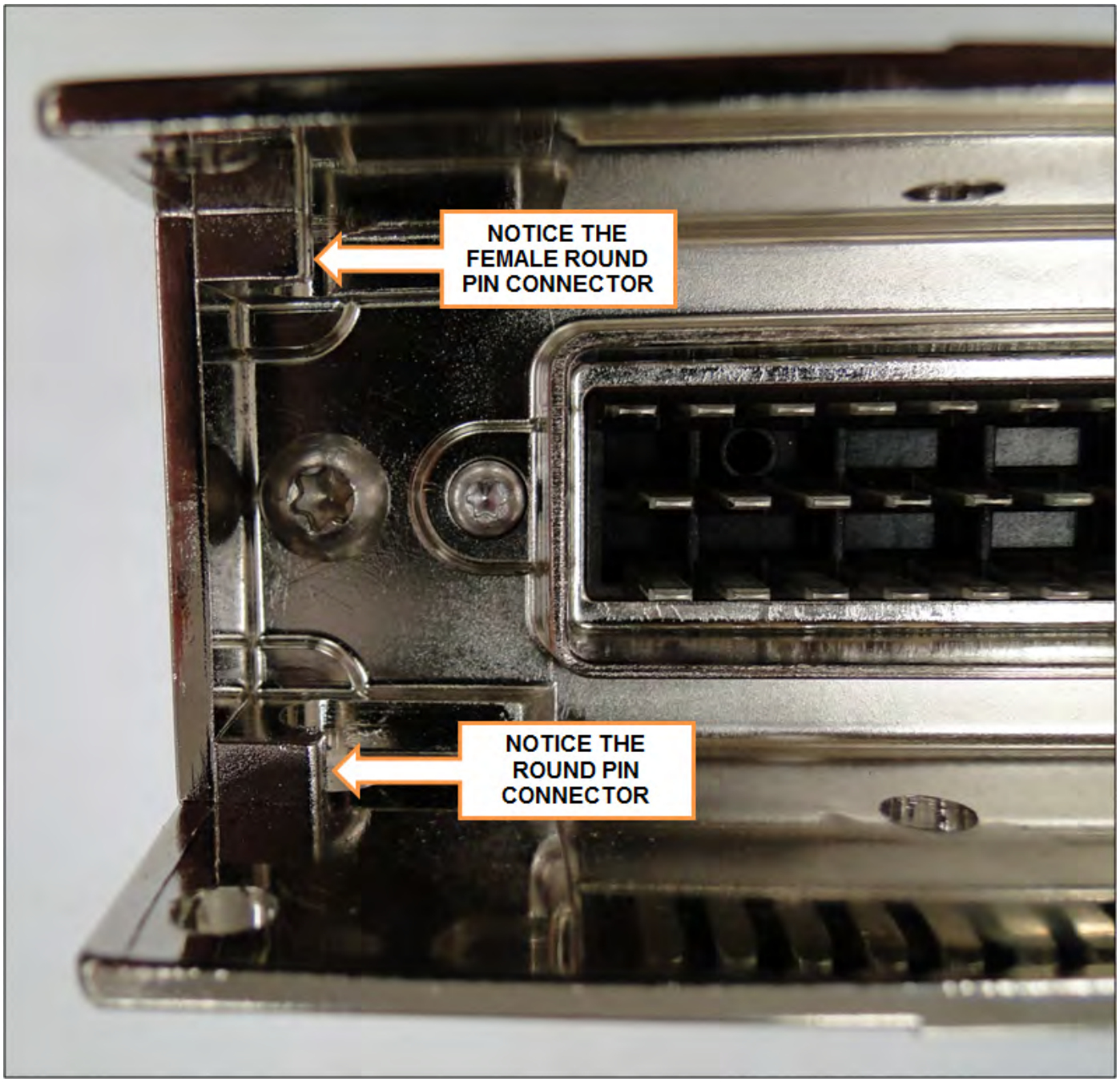


Figure 32. Female Controller Connector Slots

CORTEX CONTROLLER™ 55-POLE CABLE ASSEMBLY (CONTINUED)

C. Connecting the 55-Pole Cable Connector

Refer to the figure below and then slide cable male connectors into controller female connectors.

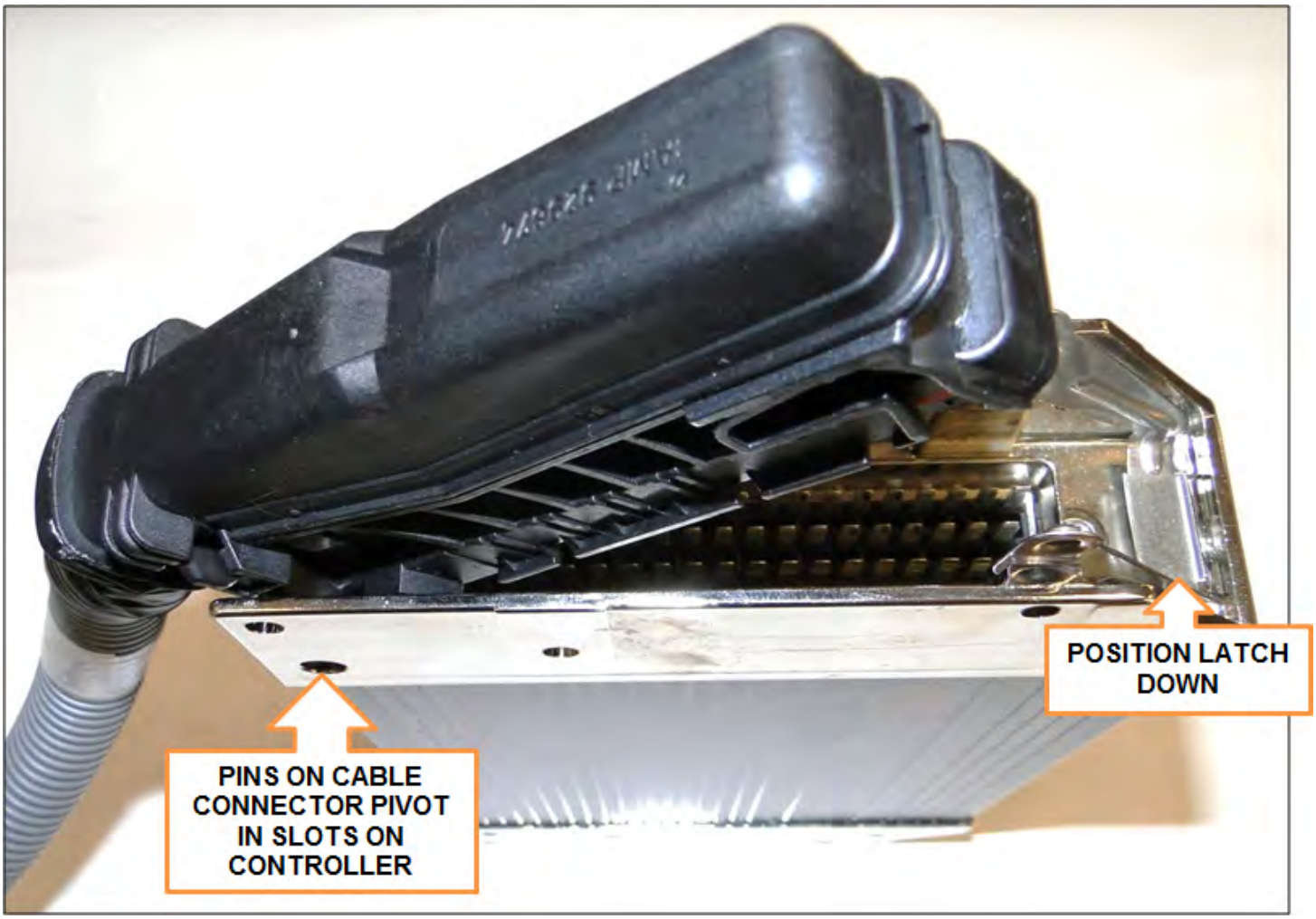


Figure 33. Cable Connector Pivoting on Controller

CORTEX CONTROLLER™ 55-POLE CABLE ASSEMBLY (CONTINUED)

D. Pivot Cable Connector and Latch

1. While keeping left side of cable connector seated, carefully pivot cable connector until flush with controller. See the figure below.

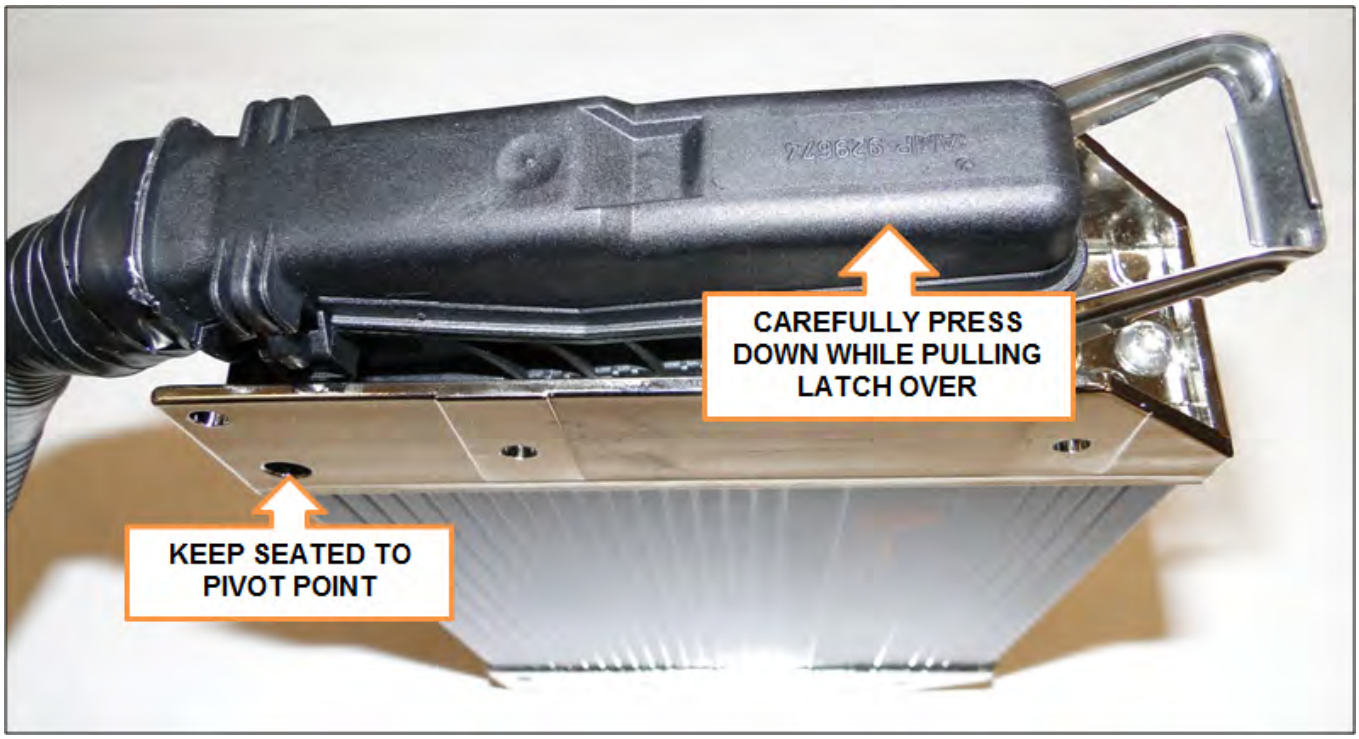


Figure 34. Slowly Press Down While Keeping Left Cable Connector Pivot Point in Place

2. Latch cable to controller until latch is secure and flush with rear of cable connector. See the figure below.

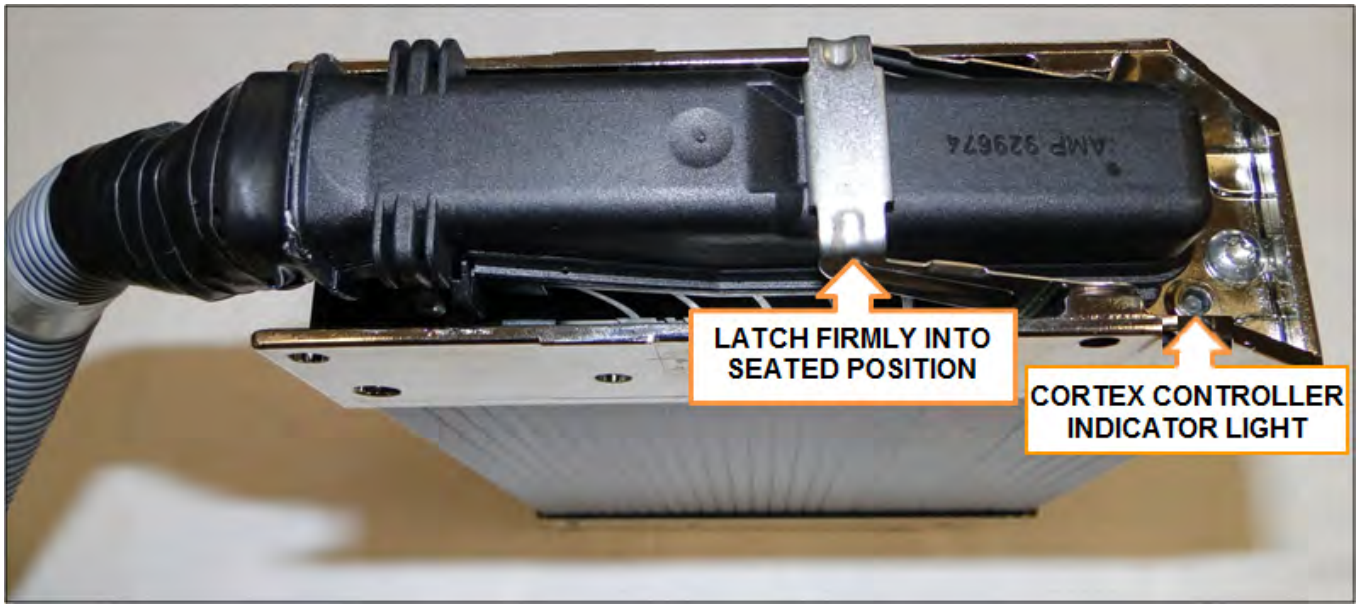


Figure 35. Latch Controller to Cable Connector

3. To remove cable from controller, reverse above process.

INSIGHT™ STANDARD DIAGNOSTIC DISPLAY

See the figures below for front and rear photos and rear illustration. Contact Heil for re-programming of the display.

Figure 36. Insight Display Front Photo

Figure 37. Insight Display Rear Photo

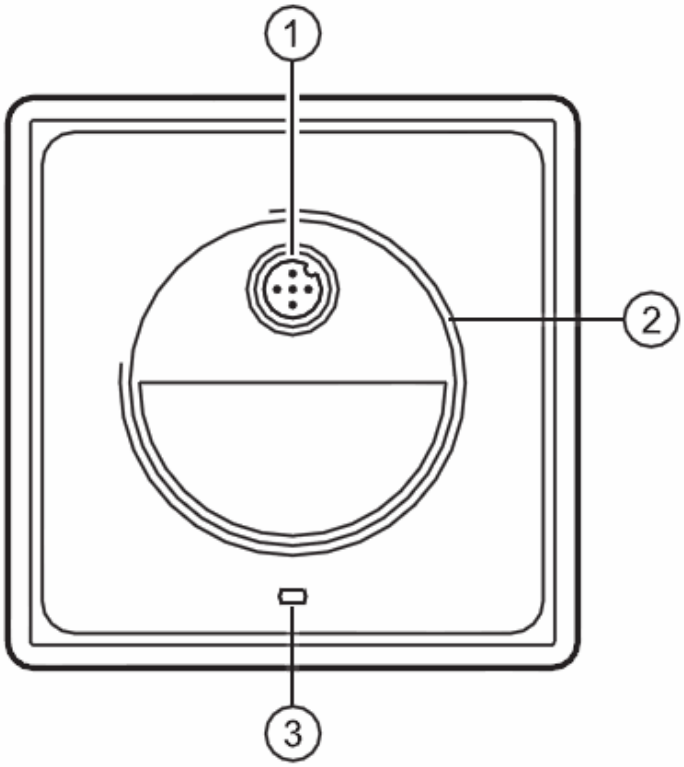


Figure 38. Insight Display Rear Illustration

(1) M12 connector
(2) M52 thread for fixing nut
(3) Locating pins

INSIGHT™ STANDARD DIAGNOSTIC DISPLAY CABLE

See the figure below for a rear view of the display with cable connected.

Figure 39. Rear View of Display with Cable Connected

CORTEX CONTROLLER™ PROGRAMMING

Contact Heil Environmental for re-programming of the Cortex Controller.

PROGRAMMING CABLES AND ADAPTERS

Description	Part Number
Cortex Controller RS232 Cable	263-1678
InSight™ CAN Programming Cable	263-1721
USB to RS232 Adapter	108-8619
USB to CAN Adapter	108-8620
USB to M12 Cable (USB to 7" and 12" Displays)	108-8714

CORTEX CONTROLLER™ PROGRAM 109-0298

Issued September 2024
Service Manual

Section 1: Cortex Controller Hardware

1.01: Cortex Controller Indicator Lights

The Cortex Controller used here is a single control unit with 40 Input / Outputs, which operates with a voltage ranging from (10 to 32) Volt DC. The Cortex Controller has a three-color LED (Red / Green / Blue) which indicates the current status of the Controller. The LED Operating Status identifications are detailed in the table below

LED Color	Status	Description
OFF	OFF	No Operating Voltage
Yellow	1 x ON	Initialization or Reset Checks
Green	5.0 Hz	No Operating System Loaded
Green	2.0 Hz ON	Run Stop
Red	2.0 Hz ON	Run with Error Fatal Error or Stop with Error
Blue*	2.0 Hz*	Communication OK between 2 controllers (for 80 I/O Cortex Controller)*

Note*: LED will flash Blue when there is a good communication between the 2 halves of the Controller. This condition is applicable only for 80 I/O Cortex Controllers.

1.02: Inputs

The Cortex Controller Inputs are activated by a positive +12 volt signal. All Switches, Proximity, Pressure, Toggle, Push buttons, etc., used as input devices to the Controller, supply a +12 volt signal to a Cortex Controller input to turn the Input ON unless otherwise specified.

With an Input ON, the corresponding Input field (with Description and Address) shown on the INSIGHT display will also be ON.

Refer section 5.02 for more details about Diagnostic display options and INSIGHT display tool.

1.03: Outputs

During each cycle the CPU will analyze the status of the inputs, and based upon the logic of the programming, will produce the appropriate +12 Volt DC outputs.

With an Output ON, the corresponding Output field (with Description and Address) shown on the INSIGHT display will also be ON.

Refer section 5.02 for more details about Diagnostic display options and INSIGHT display tool.

1.04: Communication Ports

There are 2-CAN and 1-RS232 communication ports in each 40 I/O Cortex Controllers which will be utilized for the programming and communication purpose. For an 80 I/O Controller there is total 4-CAN & 2-RS-232 ports. The Serial port (RS-232) in the Master Controller will be utilized to download user programs via Cortex Download tool (Downloader 32) and CAN ports in the Master Controller for communication between Controller and field devices.

1.05: Diagnostic Display

Refer section 5.02 for more details about Diagnostic display options and INSIGHT display tool.

1.06: Cortex - Connector Pin Details

The table below gives connection details between Cortex Controller Input/output and Connector Pins.

- **PROGRAM: 109-0298** - **REVISION: 20141117** **NYC HALF-PACK CORTEX STREETWISE**		**I/O ADDRESS**	**CONNECTOR PIN-OUT DETAILS**
IN-CAB INPUT FUNCTIONS			
A01	SYSTEM POWER SWITCH	%IX0.01	P1-27
A02	NOT USED. FUTURE EXPANSION	%IX0.12	P1-20
A03	CHASSIS REVERSE SIGNAL	%IX0.13	P1-2
A04	PACKER EXTEND PUSH BUTTON	%IX0.14	P1-21
A05	HYDRAULIC PUMP ENABLE SWITCH	%IX0.15	P1-38
A06	CHASSIS NEUTRAL SIGNAL	%IX1.06	P1-18
A07	PACKER RETRACT PUSH BUTTON	%IX2.06	P1-16
IN-CAB OUTPUT FUNCTIONS			
B01	ARMS RAISE INTERLOCK	%QX0.00	P1-44
B02	IN-CAB ALARM	%QX0.01	P1-45
B03	HYDRAULIC PUMP ON	%QX0.03	P1-47
B04	PACKER RETRACT	%QX0.05	P1-54
B05	THROTTLE LIMIT	%QX0.11	P1-22
B06	MANUAL PACKER OVERRIDE	%QX0.12	P1-41
B07	PACKER EXTEND	%QX0.13	P1-42
B08	ARMS DOWN INTERLOCK	%QX0.14	P1-43
B09	SECONDARY WARNING ALARM (FUTURE EXPANSION)	%QX0.15	P1-4
BODY INPUT FUNCTIONS			
C01	L.H. TAILGATE LATCHED PROXIMITY SWITCH	%IX0.02	P1-9
C02	PACKER FULL RETRACTED PROXIMITY SWITCH	%IX0.03	P1-28
C03	HYDRAULIC OIL TEMP (NC opens @ 125 degree)	%IX0.04	P1-10
C04	PACKER FULL EXTENDED PROXIMITY SWITCH	%IX0.05	P1-29
C05	HYDRAULIC FILTER PRESSURE SWITCH	%IX0.06	P1-11
C06	TAILGATE CLOSED PROXIMITY SWITCH	%IX0.07	P1-30
C07	SIDE DOOR PROXIMITY SWITCH	%IX1.04	P1-19
C08	CAB PROTECTOR PROXIMITY SWITCH	%IX1.05	P1-55

- **PROGRAM: 109-0298** - **REVISION: 20141117** **NYC HALF-PACK CORTEX STREETWISE**		**I/O ADDRESS**	**CONNECTOR PIN-OUT DETAILS**
IN-CAB INPUT FUNCTIONS			
C09	LIFT ABOVE TRANSIT PROXIMITY SWITCH (NC)	%IX2.00	P1-48
C10	HYDRAULIC OIL LEVEL LOW SENSOR	%IX2.01	P1-49
C11	LIFT ABOVE TRANSIT PROXIMITY SWITCH (NO)	%IX2.02	P1-31
C12	R.H. TAILGATE LATCHED PROXIMITY SWITCH	%IX2.03	P1-50
C13	TOP DOOR OPEN PROXIMITY SWITCH	%IX2.05	P1-52
C14	HYDRAULIC OIL TEMP (NC opens @ 200 degree)	%IX2.07	P1-35
BODY OUTPUT FUNCTIONS			
D01	RIGHT SIDE FLOOD LAMP	%QX0.02	P1-46
D02	AUXILIARY REVERSE LAMP RIGHT HAND SIDE	%QX0.04	P1-36
D03	SERVICE BRAKE SOLENOID	%QX0.06	P1-17
D04	AUXILIARY REVERSE LAMP LEFT HAND SIDE	%QX0.08	P1-39
D05	LEFT SIDE FLOOD LAMP	%QX0.09	P1-3
D06	BACKUP/TAILGATE ALARM	%QX0.10	P1-40

Section 2: J1939 Details

The Engine information is directly read through the SAE J1939 standard. SAE J1939 is the vehicle bus standard used for communication and diagnostics among vehicle components, like heavy duty truck industry.J1939 is used in heavy vehicles for on-street and Off-road operations and works on the physical layer with CAN-high speed according to ISO11898. J1939 is a multi-master system with decentralized network management without channel-based communication.
J1939 can provide information's like Engine RPM, Transmission Gear info, Parking Brake Info, and Road Speed.

Section 3: Default Parameters

3.01 Program 109-0298 Parameter Defaults

Sl. No.	Parameter	Default Setting
A	Max Engage Speed (in Neutral)	1500 RPM
B	Max Operating Speed (in Neutral)	1550 RPM
C	Max Engage Speed (in Gear)	1750 RPM
D	Max Operating Speed (in Gear)	1800 RPM
E	Packer Extend Time (before retract)	24 Seconds
F	Packer Retract Time (before fault)	15 Seconds
G	Bypass Time Reset	900 Seconds (15 Minutes)
H	Pump Bypass Run Time	180 Seconds (3 Minutes)
I	Start Filter Warning	5 Hours
J	Start Filter Shutdown	6 Hours

Section 4: I/O Functions

The following sheets detail the functionality as well as provide circuit diagrams for each of the input and output function provided through the Cortex Controller.

4.01: Standard In-Cab Input Functions

A01 Input Function – System Power Switch (In Cab Input %IX0.01)

This circuit monitors the ON/OFF status of the System Power Switch (“mushroom button”). This “mushroom button” should be in “Up” position for the system to be operative. If “Depressed” system power will be turned OFF.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic:

Input Device	Status	I/O Address	Status
System Power Switch	Activated	%IX0.01	ON

A02 Input Function -- SPARE (In Cab Input %IX0.12)

This Input is a SPARE and used for future expansion

Function Logic:

Input Device	Status	I/O Address	Status
NOT USED. FUTURE EXPANSION			

A03 Input Function – Chassis Reverse (In Cab Input %IX0.13)

This circuit monitors the ON/OFF status of the Chassis Reverse signal. This input is ON when the Engine transmission is put into Reverse. This input, when turned ON, will enable the Reverse and Side flood lights also the Backup Tailgate alarm.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic:

Input Device	Status	I/O Address	Status
Chassis Reverse	Activated	%IX0.13	ON

A04 Input Function -- Packer Extend Push Button (In Cab Input %IX0.14)

This circuit monitors the ON/OFF status of the Packer Extend button. When this button is pressed, the Packer Extend input is ON.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic:

Input Device	Status	I/O Address	Status
Packer Extend Button	Activated	%IX0.14	ON

A05 Input Function – Hydraulic Pump Enable switch (In Cab Input %IX0.15)

This switch is used to turn ON the Hydraulic Pump. This is a momentary toggle switch which when turned ON will enable the Hydraulic Pump Input.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic :

Input Device	Status	I/O Address	Status
Hydraulic Pump Enable Switch	Activated	%IX0.15	ON (momentary)

A06 Input Function -- Chassis Neutral Signal (In Cab Input %IX1.06)

This circuit monitors the Transmission Neutral circuit. This input is enabled when the Engine transmission is put into Neutral.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic:

Input Device	Status	I/O Address	Status
Chassis Transmission	In Neutral	%IX1.06	ON

A07 Input Function -- Packer Retract Push Button (In Cab Input %IX2.06)

This circuit monitors the ON/OFF status of the Packer Retract button. When this button is pressed, the Packer Retract input is ON.

Conditio	Modifiable	Default

n	Parameters	Setting
A	None	N/A

Function Logic:

Input Device	Status	I/O Address	Status
Packer Retract Button	Activated	%IX2.06	ON

4.02: Standard In-Cab Output Functions

B01 Output Function – Arms Raise Interlock (In Cab Output %QX0.00)

This output function controls the Arms Raise interlock circuit. This interlock will prevent the Arms from being raised if the Packer is not fully retracted, the Cab protector down switch has not been activated, or the Top Door is not fully open.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit

Condition	Function or Component	Status	I/O Address	Status
A	Lift Above Transit proximity switch (N.O.)	Deactivated	%IX2.02	OFF
B	Packer Full Retracted proximity	Deactivated	%IX0.03	OFF
C	or Top Door Fully Open Prox. Switch	Deactivated	%IX2.05	OFF
D	or Cab Protector Prox. Down Switch	Deactivated	%IX1.05	OFF

Note: With 'A' true, condition (B OR C OR D) will activate the Arms Raise Interlock output.

B02 Output Function – In-Cab Alarm (In Cab Output %QX0.01)

This output function controls the Cab Alarm circuit. See Section 6.05 and 6.06 for a complete explanation of the Beep Codes associated with this unit.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	Critical Fault	N/A	N/A	ON
B	System Fault	N/A	N/A	ON
C	Tailgate Closed Prox.	Deactivated	%IX0.07	OFF

D	Tailgate Latched L.H.S. Prox.	Deactivated	%IX0.02	OFF
	Or Tailgate Latched R.H.S. Prox.	Deactivated	%IX2.03	OFF
E	Hydraulic Pump	Deactivated	%QX0.03	OFF
F	Packer Extend PB	Activated	%IX0.14	ON
G	Packer Retract PB	Deactivated	%IX2.06	OFF
H	System Power Switch	Deactivated	%IX0.01	OFF
I	and Hydraulic Pump Enable Switch	Enabled	%IX0.15	ON (momentary)
J	Hydraulic Oil Level Indicator	Deactivated	%IX2.01	OFF
K	Hydraulic Oil Temperature 125F	Deactivated	%IX0.04	OFF
	and Hydraulic Oil Temperature 200F	Deactivated	%IX2.07	OFF
L	and Beep Code	Activated	N/A	ON(Refer Section 6.04)

Note: Multiple items will cause the In-Cab Alarm to chime continuously: Item (C OR D) OR (E AND F AND G) OR (H AND I) OR (J OR K) OR 'L'. If none of these conditions are met then the In-Cab Alarm will alarm based on the Critical or System Alarm. See section 6.05 and 6.06 for more information on Critical and System Alarms.

B03 Output Function – Hydraulic Pump (In Cab Output %QX0.03)

This output function controls the Hydraulic Pump. Circuit will engage the pump upon activation of the Chassis Transmission Neutral signal.

Condition	Modifiable Parameters	Default Setting
A	Pump Max. Engage Speed (in Neutral)	1500 RPM
B	Pump Max. Operate Speed (in Neutral)	1550 RPM
C	Pump Max. Engage Speed (in Gear)	1750 RPM
D	Pump Max. Operate Speed (in Gear)	1800 RPM

Conditions Necessary to activate the circuit

Condition	Function or Component	Status	I/O Address	Status
A	System Power Switch	Activated	%IX0.01	ON
B	Chassis Transmission	In Neutral	%IX1.06	See Note
C	Critical Fault	Deactivated	NA	OFF
D	Side Door Proximity	Activated	%IX1.04	ON
E	Hydraulic Pump Enable Switch	Enabled	%IX0.15	ON (momentary)

Note: With condition (A) true, if condition (B) is ON the pump will function below 1500 RPM and up to 1550 RPM. With condition (A) true, if condition (B) is OFF the pump will function below 1750 RPM and up to 1800 RPM. With condition (A

AND B AND C AND D) true, condition 'E' will activate the Hydraulic Pump Solenoid.

B04 Output Function – Packer Retract Solenoid (In Cab Output %QX0.05)

This output function controls the Packer Retract circuit. There are two modes for Packer operation i.e., Auto mode and Manual mode. To toggle the control between Auto mode and Manual mode, turn ON the System Power switch, press and hold the Extend and Retract buttons simultaneously for five seconds or until the In-Cab Alarm stops sounding. With the Tailgate open the Packer will operate in manual mode only.

Condition	Modifiable Parameters	Default Setting
A	Packer Extend Time	24 Seconds

Conditions Necessary to activate the circuit

Condition	Function or Component	Status	I/O Address	Status
A	System Power Switch	Activated	%IX0.01	ON
	and Hydraulic Pump Enable Switch	Enabled	%IX0.15	ON (momentary)
	and Packer Extend P.B.	Deactivated	%IX0.14	OFF
	and Packer Full Retracted Prox.	Deactivated	%IX0.03	OFF
B	or Packer Retract Push Button	Activated	%IX2.06	ON
C	Packer Full Extend Proximity Switch	Activated	%IX0.05	ON
D	or Packer Extend Solenoid	Activated	%QX0.13	ON
	and Tailgate Closed Proximity	Activated	%IX0.07	ON
	and Hydraulic Pump	Activated	%QX0.03	ON
E	and Tailgate Closed Proximity	Activated	%IX0.07	ON
	Packer Full Extend Proximity Switch	Activated	%IX0.05	ON

Note: With 'A' true, condition B OR (C AND D) will activate the output. The output can also be activated with condition 'E' true. Retract function can be manually operated by pressing the Retract button (B). Condition 'D' will initiate a Retract action during an Auto-Pack cycle.

B05 Output Function – Throttle Limit (In Cab Output %QX0.11)

This output function controls the engine Throttle Limit circuit.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	and Hydraulic Pump	Activated	%QX0.03	ON
B	Chassis Transmission	In Neutral	%IX1.06	ON

Note: Conditions (A AND B) true will activate the Throttle Limit output.

B06 Output Function – Manual Packer Override (In Cab Output %QX0.12)

This output function controls the Manual Packer Override circuit.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	Lift Above Transit proximity sw.(N.O)	Deactivated	%IX2.02	OFF

Note: Condition 'A' true will activate the Manual Packer Override control.

B07 Output Function – Packer Extend Solenoid (In Cab Output %QX0.13)

This output function controls the Packer Extend circuit. There are two modes for packer operation Auto and Manual. To toggle the control between Auto and Manual modes, turn the System Power switch ON, press and hold the Packer Extend and Retract buttons simultaneously for five seconds or until the In-Cab alarm stops sounding. With the Tailgate open the packer will operate only in manual mode.

Condition	Modifiable Parameters	Default Setting
A	Packer Extend Time	24 Seconds

Conditions Necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	System Power Switch	Activated	%IX0.01	ON
	and Hydraulic Pump Enable Switch	Enabled	%IX0.15	ON (momentary)
	and Packer Retract Solenoid	Deactivated	%QX0.05	OFF
	and Hydraulic Pump	Activated	%QX0.03	ON
	Side Door Proximity	Activated	%IX1.04	ON
B	and Packer Extend P.B.	Activated	%IX0.14	ON
C	and Tailgate Closed Proximity	Deactivated	%IX0.07	OFF
	or Packer Full Extend Proximity Switch	Deactivated	%IX0.05	OFF

D	and Packer Extend P.B.	Deactivated	%IX0.14	OFF
E	and Packer Extend Solenoid	Activated	%QX0.13	ON
	and Tailgate Closed Proximity	Activated	%IX0.07	ON
	and Hydraulic Pump	Activated	%QX0.03	ON

Note: With 'A' true condition (B AND C) will activate the Packer Extend solenoid in manual mode. With (A AND D AND E) true will activate the Packer Extend solenoid in Auto mode.

B08 Output Function – Arms Down Interlock(In Cab Output %QX0.14)

This output function controls the Arms Down interlock circuit.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit

Condition	Function or Component	Status	I/O Address	Status
A	Lift Above Transit proximity sw.(N.O)	Deactivated	%IX2.02	OFF
B	or Top Door Fully Open Prox. Switch	Deactivated	%IX2.05	OFF
C	or Cab Protector Prox. Down Switch	Deactivated	%IX1.05	OFF

Note: With 'A' true, condition (B OR C) will activate the Arms Down Interlock output.

B09 Output Function – Secondary Warning Alarm (In Cab Output %QX0.15)

This output function controls the Secondary Warning Alarm and used for future expansion.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit

Condition	Function or Component	Status	I/O Address	Status
NOT USED. FUTURE EXPANSION				

4.03: Standard Body Input Functions

C01 Input Function – L.H Tailgate Latched Proximity Switch (Body Input %IX0.02)

This circuit monitors the ON/OFF status of the L.H.S Tailgate Latched proximity switch. This input is turned ON when the L.H.S Tailgate Cylinder shaft is in the extended position which is sensed by the L.H. Tailgate Proximity switch.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic:

Input Device	Status	I/O Address	Status
L.H.S Tailgate Latched proximity switch	Activated	%IX0.02	ON

C02 Input Function – Packer Fully Retracted Proximity Switch (Body Input %IX0.03)

This circuit monitors the ON/OFF status of the Packer Fully Retracted proximity switch. This input is ON when the Packer has reached its home position (i.e. fully retracted position).When the input is OFF it is considered that the Packer is not in home position (i.e. Packer is either Extending or Retracting).

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic:

Input Device	Status	I/O Address	Status
Packer Full Retracted proximity switch	Activated	%IX0.03	ON

C03 Input Function – Hydraulic Oil Temp (125°) (Body Input %IX0.04)

This circuit monitors the ON/OFF status of the Hydraulic Oil Temp (125°) switch. The switch is closed below 125° and opens when temperature reaches 125°.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic:

Input Device	Status	I/O Address	Status
Hydraulic Oil Temperature switch (125°)	Activated	%IX0.04	ON

C04 Input Function – Packer Fully Extended Proximity Switch (Body Input %IX0.05)

This circuit monitors the ON/OFF status of the Packer Fully Extended proximity switch. This input is ON when the Packer has reached its extended position which occurs during the Packer Extending operation or when ejecting the trash.

Condition	Modifiable	Default

	Parameters	Setting
A	None	N/A

Function Logic:

Input Device	Status	I/O Address	Status
Packer Fully Extended proximity switch	Activated	%IX0.05	ON

C05 Input Function – Hydraulic Filter Pressure Switch (Body Input %IX0.06)

This circuit monitors the ON/OFF status of the Hydraulic Filter pressure switch. If this input is OFF, the hydraulic filter is in bypass.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic

Input Device	Status	I/O Address	Status
Hydraulic Filter pressure switch	Activated	%IX0.06	ON

C06 Input Function – Tailgate Closed Proximity Switch (Body Input %IX0.07)

This circuit monitors the ON/OFF status of the Tailgate Closed proximity switch. Packer cylinder (Auto/Manual mode) is activated based on the status of this input.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic

Input Device	Status	I/O Address	Status
Tailgate Closed proximity switch	Activated	%IX0.07	ON

C07 Input Function – Side Door Proximity Switch (Body Input %IX1.04)

This circuit monitors the ON/OFF status of the Side Door proximity switch. The Side door should always be in the Closed position (ON). If the Side door is open then Hydraulic pump and Packer will be turned OFF. The Side door is opened only for Servicing/Maintenance purpose.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic:

Input Device	Status	I/O Address	Status
Side Door Closed proximity switch	Activated	%IX1.04	ON

C08 Input Function – Cab Protector Proximity Switch (Body Input %IX1.05)

This circuit monitors the ON/OFF status of the Cab Protector Proximity switch. The input is ON when the Cab Protector is in down position.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic:

Input Device	Status	I/O Address	Status
Cab Protector proximity switch	Activated	%IX1.05	ON

C09 Input Function – Lift Above Transit Proximity Switch (NC) (Body Input %IX2.00)

This circuit monitors the ON/OFF status of the Lift above Transit proximity switch Normally Closed (N.C.) contact. This input will be in OFF position when the Arms are in down position and ON when Arms are UP.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic

Input Device	Status	I/O Address	Status
Lift Above Transit proximity switch (N.C.)	Activated	%IX2.00	ON

C10 Input Function –Hydraulic Oil Level Low Sensor (Body Input %IX2.01)

This circuit monitors the ON/OFF status of the Low Hydraulic Oil Level sensor. This input is used to measure the Oil level in the Hydraulic oil tank and will be OFF when the Oil Level in the tank goes below a certain level which is predetermined.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic

Input Device	Status	I/O Address	Status

Hydraulic Oil Level Low	Activated	%IX2.01	ON

C11 Input Function – Lift Above Transit Proximity Switch (N.O.) (Body Input %IX2.02)

This circuit monitors the ON/OFF status of the Lift Above Transit Proximity switch Normally Open (N.O.) contact. This input will be in ON position when the Arms are in down position and OFF when Arms are UP.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic

Input Device	Status	I/O Address	Status
Lift Above Transit proximity switch (N.O.)	Activated	%IX2.02	ON

C12 Input Function – R.H. Tailgate Latched Proximity Switch (Body Input %IX2.03)

This circuit monitors the ON/OFF status of the R.H.S. Tailgate Latched proximity switch. This input is turned ON when the R.H.S Tailgate Cylinder shaft is in the extended position which is sensed by the R.H. Tailgate Proximity switch.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic

Input Device	Status	I/O Address	Status
R.H.S. Tailgate Latched proximity switch	Activated	%IX2.03	ON

C13 Input Function – Top Door Open Proximity Switch (Body Input %IX2.05)

This circuit monitors the ON/OFF status of the Top Door Open proximity switch. The input will be ON when the Top Door is fully opened.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic

Input Device	Status	I/O Address	Status
Top Door Open proximity switch	Activated	%IX2.05	ON

C14 Input Function – Hydraulic Oil Temp (200°) (Body Input %IX2.07)

This circuit monitors the ON/OFF status of the Hydraulic Oil Temp (200°) switch. The switch is closed below 200° and opens when temperature reaches 200°.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Function Logic

Input Device	Status	I/O Address	Status
Hydraulic Oil Temp sw. (200°)	Activated	%IX2.07	ON

4.04: Standard Body Output Functions

D01 Output Function – Right Hand Side Flood Lamp Output (Body Output %QX0.02)

This output function controls the Right Hand Side Flood Lamp output.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit

Condition	Function or Component	Status	I/O Address	Status
A	Chassis Reverse	Activated	%IX0.13	ON

Note: With condition (A) true, will turn ON the Right Hand Side Flood Lamp.

D02 Output Function – Auxiliary R.H.S Reverse Flood Lamp Output (Body Output %QX0.04)

This output function controls the Auxiliary Right Hand Side Reverse Flood Lamp output.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit

Condition	Function or Component	Status	I/O Address	Status
A	Chassis Reverse	Activated	%IX0.13	ON

Note: With condition (A) true, will turn ON the Auxiliary Right Hand Side Reverse Flood Lamp.

D03 Output Function – Service Brake Solenoid (Body Output %QX0.06)

This output function controls the Service Brake solenoid output.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit

Condition	Function or Component	Status	I/O Address	Status
A	Lift Above Transit Prox. (N.O.)	Deactivated	%IX2.02	OFF
B	Lift Above Transit Prox. (N.C.)	Activated	%IX2.00	ON
C	Chassis Neutral Signal	Varies	%IX1.06	See Note

D	Hydraulic Pump Output	Activated	%QX0.03	ON

Note: With condition (A AND B) true and (C) OFF OR condition (D) true and (C) ON the Service Brake output will be ON.

D04 Output Function – Auxiliary L.H.S Reverse Flood Lamp Output (Body Output %QX0.08)

This output function controls the Auxiliary Left Hand Side Reverse Flood Lamp output.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit

Condition	Function or Component	Status	I/O Address	Status
A	Chassis Reverse	Activated	%IX0.13	ON

Note: With condition (A) true, will turn ON the Auxiliary Left Hand Side Reverse Flood Lamp.

D05 Output Function – Left Hand Side Flood Lamp Output (Body Output %QX0.09)

This output function controls the Left Hand Side Flood Lamp output.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit

Condition	Function or Component	Status	I/O Address	Status
A	Chassis Reverse	Activated	%IX0.13	ON

Note: With condition (A) true, will turn ON the Left Hand Side Flood Lamp.

D06 Output Function – Backup / Tailgate Alarm (In Cab Output %QX0.10)

This output function controls the Backup/Tailgate Alarm circuit.

Condition	Modifiable Parameters	Default Setting
A	None	N/A

Conditions Necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	Chassis Reverse	Activated	%IX0.13	ON
B	Tailgate Closed Prox.	Deactivated	%IX0.07	OFF
C	Tailgate Latched L.H.S. Prox.	Deactivated	%IX0.02	OFF

	Or Tailgate Latched R.H.S. Prox.	Deactivated	%IX2.03	OFF

Note: With condition (A OR B OR C) true will activate the Backup / Tailgate alarm.

Section 5: Special Features

5.01: 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.

Pressing the Extend Push Button while the hydraulic pump is turned off turns on the in-cab alarm.

The packer can be “toggled” between Auto and Manual mode by holding the Packer Retract and Packer Extend push buttons down simultaneously for 5 seconds. The alarm will sound during this 5 seconds period. By performing this action when in Auto mode the packer will be placed in Manual mode and vice versa.

5.02: INSIGHT Display Functionality:

Cortex Controller uses a hand held device (INSIGHT) for displaying the current status of Input / Output, Engine speed, Temperatures etc., and can be used to SET / RESET any particular Input / Output bit. This can also be used for configuring or selecting different options in Cortex controller.

The basic display terminal with all the function keys is as shown in the figure below.

Fig: INSIGHT Display Unit

5.02.01: Operating Elements

INSIGHT is a basic 2.8” color Display unit, which consists of 4 freely programmable backlit function keys and a H.M.I (Graphic) display terminal:

The display is fitted with the following operating elements:

1. **4 Function Keys with Pressure points**
2. **1 Rocker switch (**KEY_UP / KEY_DOWN / KEY_LEFT / KEY_RIGHT)
3. **Status LED's** (Function display with 2-colour LED (red/green)).
4. **OK Key Push Button**
5. **H.M.I Display**.

1. Function Keys: There will be 4 backlit freely programmable function keys available in INSIGHT. These can be used as password protection keys (for Ex: key from left to right can be considered as **"1 – 2 – 3 - 4 or A – B - C – D"**) or these function keys can be assigned specific function / Operation.

2. Rocker Switch: The Rocker switch may be used for cursor movement function (Up / Down / Right / Left). This can also be used for navigation purpose from current page to next page or to the previous page.

3. Status LED's: It has 2 color LED (Red / Green). Refer section 5.04.04 for more details.

4. OK Key Push Button: This key is used for enabling or disabling the Input /Output from H.M.I.
For Ex: When a particular Input / Output bit is selected using Rocker switch, the OK key can be used to turn ON / OFF that particular bit. Once a particular bit is turned ON / OFF, the respective bit color will be changed from Red to Green or vice versa, which will be displayed on the H.M.I terminal as shown in the figure below.

Note: By holding the OK button down for 10 seconds and entering **"4 – 3 – 2 – 1"** we can get access to the screen to Reset the Arm Cycle counts and Packer cycle counts.

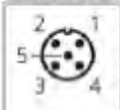
5. H.M.I Display: This is used for displaying the current status of the Input / Output, Engine Run Speed, Temperature, Auto/ Manual mode etc.
This can be programmed for graphically representing a process. This can also be used for changing the set points for Analog values. Following figure shows current state of the Input / Output variables.

Fig: INSIGHT Display with Input / Output Status indication

5.02.02: Display Operating States:

5.02.03: Rear Panel Housing connection:

Table below provides Wiring details for the Interface cable of INSIGHT display unit

Illustration	Pin	Designation	Note
	1	n.c.	----
	2	VBB	8...32 V DC
	3	GND	terminal 31
	4	CAN_H	
	5	CAN_L	

Sl No.	Operating States	State Transition Conditions	LED Color	Flashing Frequency
1	INIT state (Reset)	1. Operating system initialized or 2.Waiting for correct supply voltage 3. Temporary state replaced by RUN or STOP	Yellow	-
2	Run state	Operating voltage reached minimum value	Green	2 Hz
3	Stop state	1. Application program not loaded 2. STOP command sent from interface	Green Green flashing	N/A 5 Hz
4	ERROR state	Supply Voltage is too low	RED	5 Hz
5	FATAL Error state	1. Memory Error (RAM / Flash) 2. Exception error 3. Operating system error	RED	-

5.02.04: Display Status LED's:

LED Color	Flashing Frequency	Description
OFF	Permanently OFF	No Operating Voltage
Green	5 Hz	No Operating system loaded
Green	2 Hz	RUN State (application is running)
Green	Permanently ON	STOP State (application stopped)
Red	5 Hz	Application stopped due to under voltage
Red	Permanently ON	FATAL ERROR or STOP state with error
Yellow / Orange	Briefly ON	INIT state, reset checks

Section 6: Diagnostics

6.01: Testing I/O Voltage

To test the voltage at an input or output terminal a Digital Multi Meter is always the best tool.
Incandescent test lights cannot be used to test inputs from certain electronic input devices, the amperage required to light and incandescent tester may exceed the maximum output of the device. If using a test light it must be an LED type tester.
Upon inspection of the Cortex Controller assembly, note that there are through holes in the upper circuit boards. These holes provide test probe access to the lower I/O terminals.

6.02: Monitoring Input Status

Input status can be determined by the state of the LED indicators located on the face of the Cortex Controller.

6.03: Monitoring Output Status

Output status can be determined by the state of the LED indicators located on the face of the Cortex Controller.

6.04: Diagnostic Display Messages

When a fault has been set the IN-Cab Alarm will sound and a Diagnostic message will be displayed with the status of respective Input / Output in the Insight display unit.
There are two classes of faults the first is a System Fault. A System Fault indicates a possible electrical problem with some part of a specific circuit. The second is a Critical Fault. A Critical Fault indicates that a problem is occurring which, has or will shut the Hydraulic Pump system down.

6.05: Critical Fault Diagnostic Messages

- **High Oil Temperature, Pump Disabled**

  This fault is activated when the hydraulic oil temperature has exceeded 200° F.

  Indication: A. The System Oil Temperature has exceeded 200° F.
  B. High Oil Temperature. Pump Disabled (Insight Display)

  Disabled Functions: Hydraulic Pump

  Fault Reset: Oil Temperature must fall below 200° F.

- **Filter Bypass Shutdown**

  The hydraulic system has been operating in bypass condition in excess of the number of hours set by the Start Filter Shutdown parameter. When this fault occurs a diagnostic message will be displayed in the Insight display.

  Indications: A. The Hydraulic filter needs servicing. The Pump is disabled.
  B. Filter Bypass Shutdown (Insight Display)

  Disabled Functions: Hydraulic Pump

  Fault Reset: Cycling the System Power switch will allow Pump for 3 minutes of further operation or service Hydraulic filter or replace Hydraulic oil filter.

- **Side Door Open, Pump Disabled**

The Cortex Controller has lost the signal from the “Side Door Switch” during operation of the hydraulic Pump. When this fault occurs a diagnostic message will be displayed in the Insight display.

Indications: A. The Side Door has been opened during operation of the unit
B. An open has occurred in the Side Door input circuit.
C. The Side Door proximity switch has failed.
D. Side Door Open. Pump Disabled (Insight Display)

Disabled Functions: Hydraulic Pump and all Packer functions

Fault Reset: Close the Side Door or repair faulty Side Door proximity switch.

- **Low Oil Level, Pump Disabled**

The Hydraulic Oil level has dropped below a safe operating level. When this fault occurs a diagnostic message will be displayed in the Insight display.

Indications: A. Low Hydraulic Oil Level
B. Low Oil Level. Pump Disabled (Insight Display)

Disabled Functions: Hydraulic Pump

Fault Reset: Refill hydraulic oil tank.

Note: This fault is option dependent and is only available on certain product configurations.

- **Engine Not Running**

The Pump is enabled and the Cortex Controller does not read engine RPM to be greater than 400 RPM. When this fault occurs a diagnostic message will be displayed in the Insight display.

Indication: A. The Ignition switch has been left in the run position with the Engine shutdown.
B. Engine Not Running (Insight Display)

Disabled Functions: Hydraulic Pump

Fault Reset: Check to ensure Engine is running

- **RPM Signal Lost, Check J1939**

The Engine RPM signal has been lost from the Chassis to the Controller. When this fault occurs a diagnostic message will be displayed in the Insight display.

Indication: A. RPM Signal Lost, Check J1939 (Insight Display)

Disabled Functions: Hydraulic Pump

Fault Reset: Cycling the System Power Switch will allow three minutes of further operation.

6.06: System Fault Diagnostic Messages

- **Filter Bypass Switch Fault**

The Cortex Controller has lost the signal from the Filter Pressure Switch while Hydraulic Pump was in operation. This is recognized as a fault because there should be no Hydraulic pressure to bypass the filter under this condition. When this fault occurs a diagnostic message will be displayed in the Insight display.

Indication: A. The Filter Bypass Pressure Switch has been disconnected.
B. An open has occurred in the filter bypass input circuit.
C. The filter pressure switch has failed open.
D. Filter Bypass Switch Fault (Insight Display)

Disabled Functions: None

Fault Reset: Cycle System Power Switch or Restore filter pressure switch input to Cortex Controller

Note: This fault is applicable on dry valve pump systems only.

- **Lift Above Transit Proximity Switch Short**

The Lift Above transit proximity is shorted during operation. When this fault occurs a diagnostic message will be displayed in the Insight display.

Indications: A. Invalid activation of proximity switch.
B. Input circuit is shorted to ground.
C. Proximity switch is out of adjustment.
D. Lift Above Transit Shorted Switch Fault (Insight Display)

Disabled Functions: Arms, Service Brake

Fault Reset: Cycle the System Power Switch or Check for correct alignment of the proximity switch or replace the faulty proximity sensor.

- **Lift Above Transit Proximity Switch Open**

The Lift Above transit proximity is open during operation. When this fault occurs a diagnostic message will be displayed in the Insight display.

Indications: A. Invalid activation of proximity switch.
B. Input circuit is shorted to ground.
C. Proximity switch is out of adjustment.
D. Lift Above Transit Shorted Switch Fault (Insight Display)

Disabled Functions: Arms, Service Brake

Fault Reset: Cycle the System Power Switch or Check for correct alignment of the proximity switch or replace the faulty proximity sensor.

- **Hydraulic Oil Temperature Low Fault**

The Hydraulic Oil temperature has dropped below a safe operating level (<125° F). When this fault occurs a diagnostic message will be displayed in the Insight display.

Indications: A. Low Hydraulic Oil Temperature
B. Hydraulic Oil Temp. Switch Fault (Insight Display)

Disabled Functions: Hydraulic Pump

Fault Reset: Hydraulic Oil temperature needs to reach a temperature (>125° F) which is safe for operation.

- **Packer Proximity Switch Fault**

The Cortex Controller has received a signal from both packer proximity switches at the same time. When this fault occurs a diagnostic message will be displayed in the Insight display.

Indication:
A. Invalid activation of one or both proximity switches.
B. One or both input circuits are shorted to ground.
C. One or both proximity switches are out of adjustment.
D. Packer Prox. Switch Fault. (Insight Display)

Disabled Functions: None

Fault Reset: Cycle the System Power Switch or Check for correct alignment of the proximity switch or replace the faulty proximity sensor.

- **Packer Retract Has Timed Out**

The Cortex Controller has a timer to monitor Packer Extend and Packer Retract operations. If the Packer Extend time exceeds 24 seconds before the Packer Extend prox. switch is activated or if the Packer Retract time exceeds 15 seconds before the Packer Retract prox. switch is activated this fault is activated. In Auto Pack, the Packer will automatically retract. Packer Extend may time out when the body is full or when operated at engine idle (low hydraulic pump flow) Packer Retract may time out when the Packer cannot fully retract due to the accumulation of material behind the Packer panel. When this fault occurs a diagnostic message will be displayed in the Insight display.

Indication:
A. Packer Retract prox. switch is not activated 15 seconds after the start of the retract cycle.
B. Packer Extend prox. is not activated 24 seconds after start of extend cycle.
C. Auto-Pack Time Out (Insight Display)

Disabled Functions: Packer Retract, Packer Extend

Fault Reset: A. Check Packer Retract prox. switch for proper operation and adjustment. Remove accumulated material from behind Packer panel.
B. Check Packer Extend prox. switch for proper operation and adjustment. Operate Packer above engine idle.

- **Filter Bypass Hours**

The hydraulic system has been operating in bypass condition in excess of the number of hours set by the Start Filter Shutdown parameter. The hours in bypass will display in the error message. This message is displayed during the 3 minute shutdown timer.

Indications: A. The Hydraulic filter needs servicing. The Pump will only work for 3 minutes.

Disabled Functions: Hydraulic Pump

Fault Reset: Cycling the System Power switch will allow Pump for 3 minutes of further operation or service Hydraulic filter or replace Hydraulic oil filter.

- **Arms Interlock, Cab Protector Up, Lower Cab Protector to Continue**

If the Arms have been raised and the Cab protector Proximity switch is OFF (i.e. Cab Protector is in UP position), then the diagnostic message will be displayed in the Insight display.

Indication: A. Lift Above Transit Proximity position (N.O) is OFF.
B. Cab Protector Proximity Switch is OFF.
C. Arms Interlock Cab Protector Up. Lower Cab Protector to Continue (Insight Display)

Disabled Functions: Arms up function is disabled.

Fault Reset: Lower cab protector

- **Arms Interlock, Top Door Not Fully Open**

If the Arms have been raised when the Top Door is not fully open then Arms will be moved downwards and the diagnostic message will be displayed in the Insight display.

Indication: A. Arms Over height light ON.
B. Top Door Open light ON.
C. Arms will move down.
D. Arms Interlock. Top Door Not Fully Open (Insight Display)

Disabled Functions: Arms up function is disabled.

Fault Reset: Open the Top Door fully.

- **Packer Extend Interlock**

If the Arms have been raised then the diagnostic message will be displayed in the Insight display.

Indication: A. Packer Extend Interlock (Insight Display)

Disabled Functions: Packer Extend operation in Manual mode.

Fault Reset: Check for the faulty Lift Above transit Prox. Switch (N.O) or lower the Arms below height

- **Arms Interlock, Packer Not Retracted**

If the Arms have been raised and the Packer Fully Retracted Proximity switch is OFF (i.e. either Packer is in Extending mode or still in Retracting mode with Packer not fully in Retracted position) then Arms will be raised and a diagnostic message will be displayed in the Insight display.

Indication: A. Packer Full Retracted Prox. Switch is OFF.
B. Arms raised (UP position) ON.
C. Arms Interlock. Packer Not Retracted (Insight Display)

Disabled Functions: Arms up function is disabled.

Fault Reset: Retract the packer.

- **Top Door Not Fully Open, Pack Cycle Not Allowed**

If the Top Door is not fully open and Packer Extend Push Button is pressed, Packer cycle will not be allowed and the diagnostic message will be displayed in the Insight display.

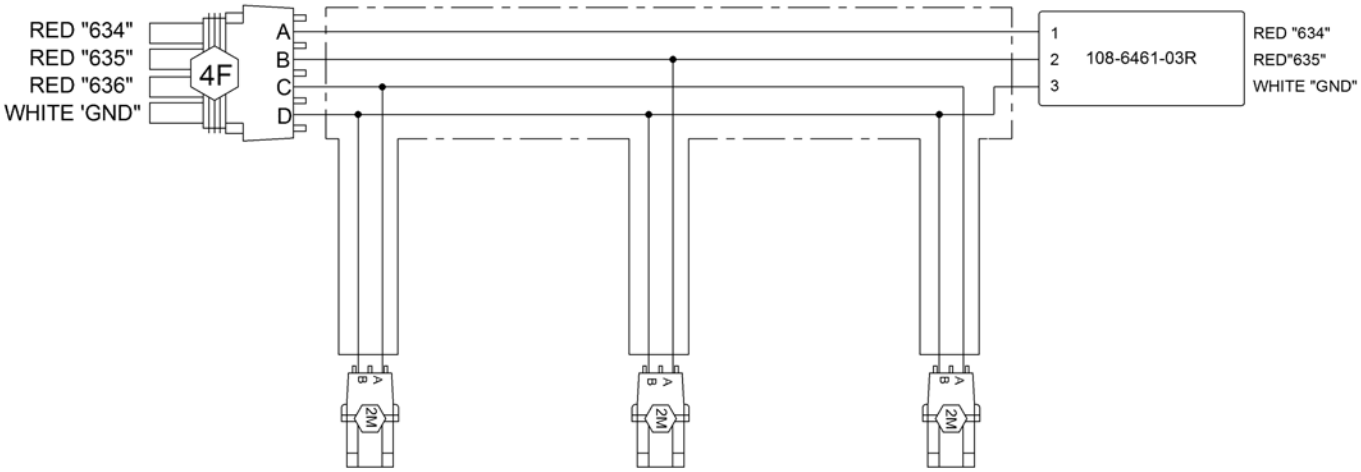
Indication: A. Top Door Open light ON.
B. Packer Extend Push Button pressed.
C. Top Door Not Fully Open. Pack Cycle Not Allowed (Insight Display)

Disabled Functions: Packer

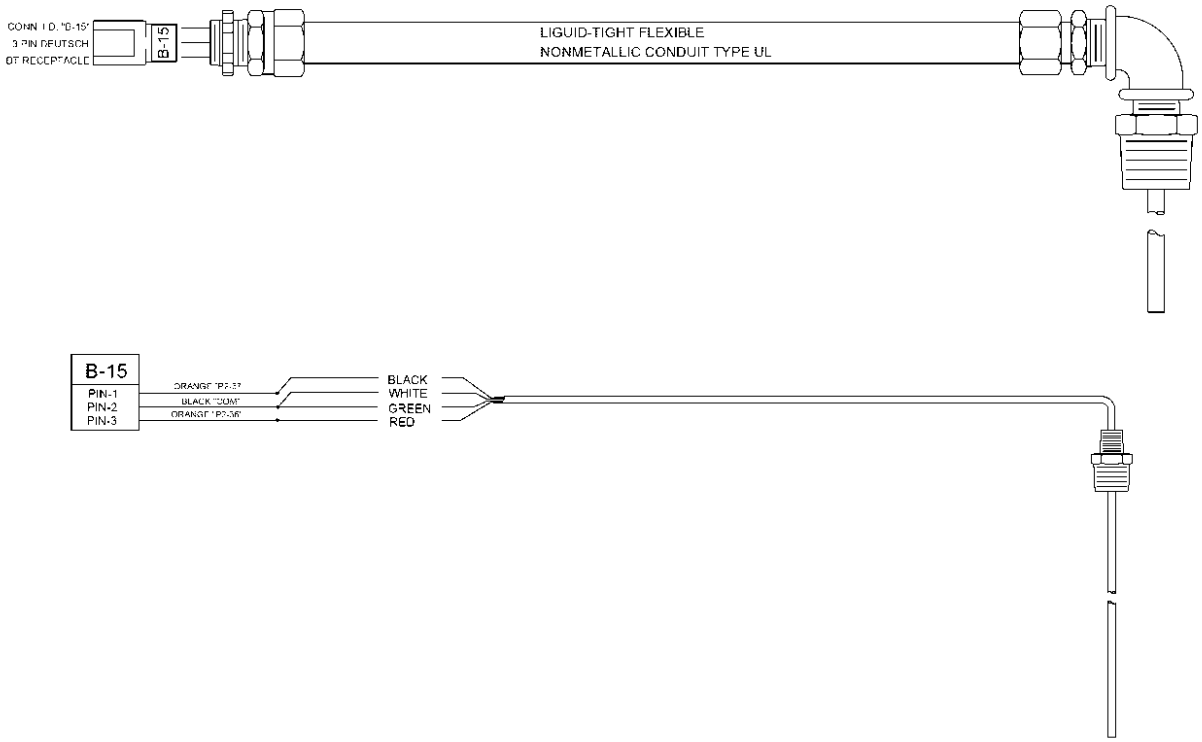
Fault Reset: Open the Top Door fully. Check Top Door, Packer Extend prox. switch for proper operation.

SCHEMATICS

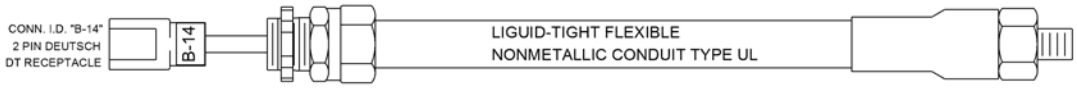
FLASHING LIGHTS HARNESS - 263-0719-001

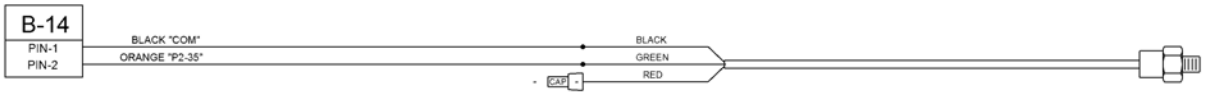


TEMPERATURE SENSOR HARNESS - 263-1057-001

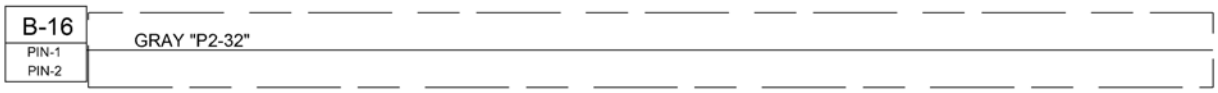


FILTER SENSOR HARNESS - 263-1057-002

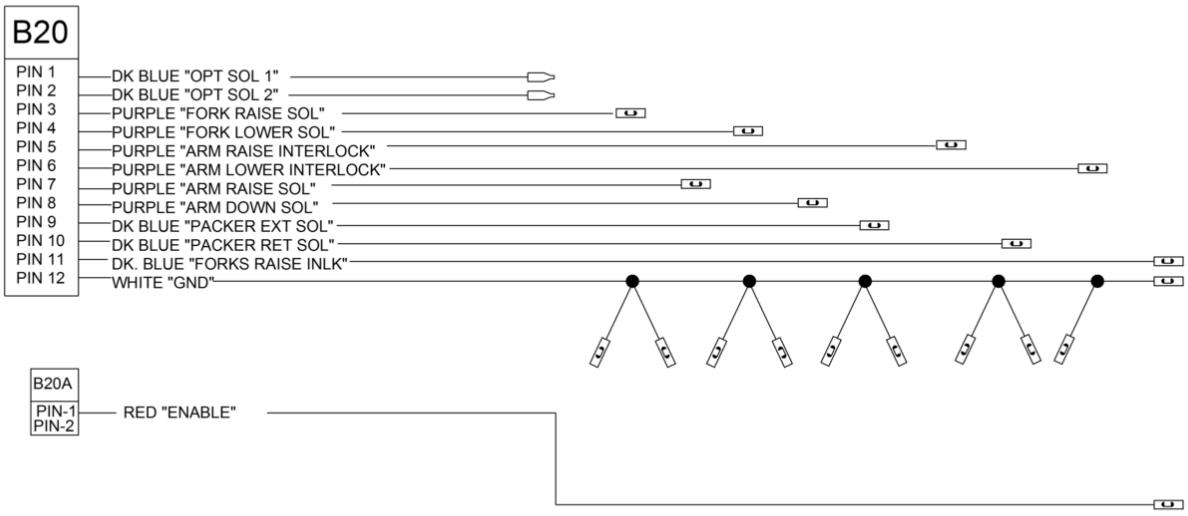




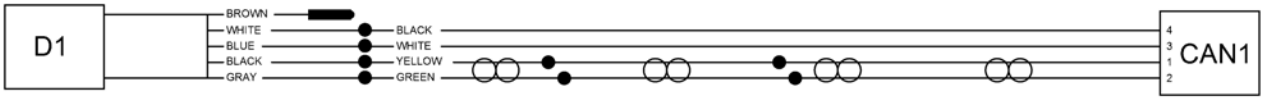
SERVICE BRAKE VALVE HARNESS - 263-1057-003



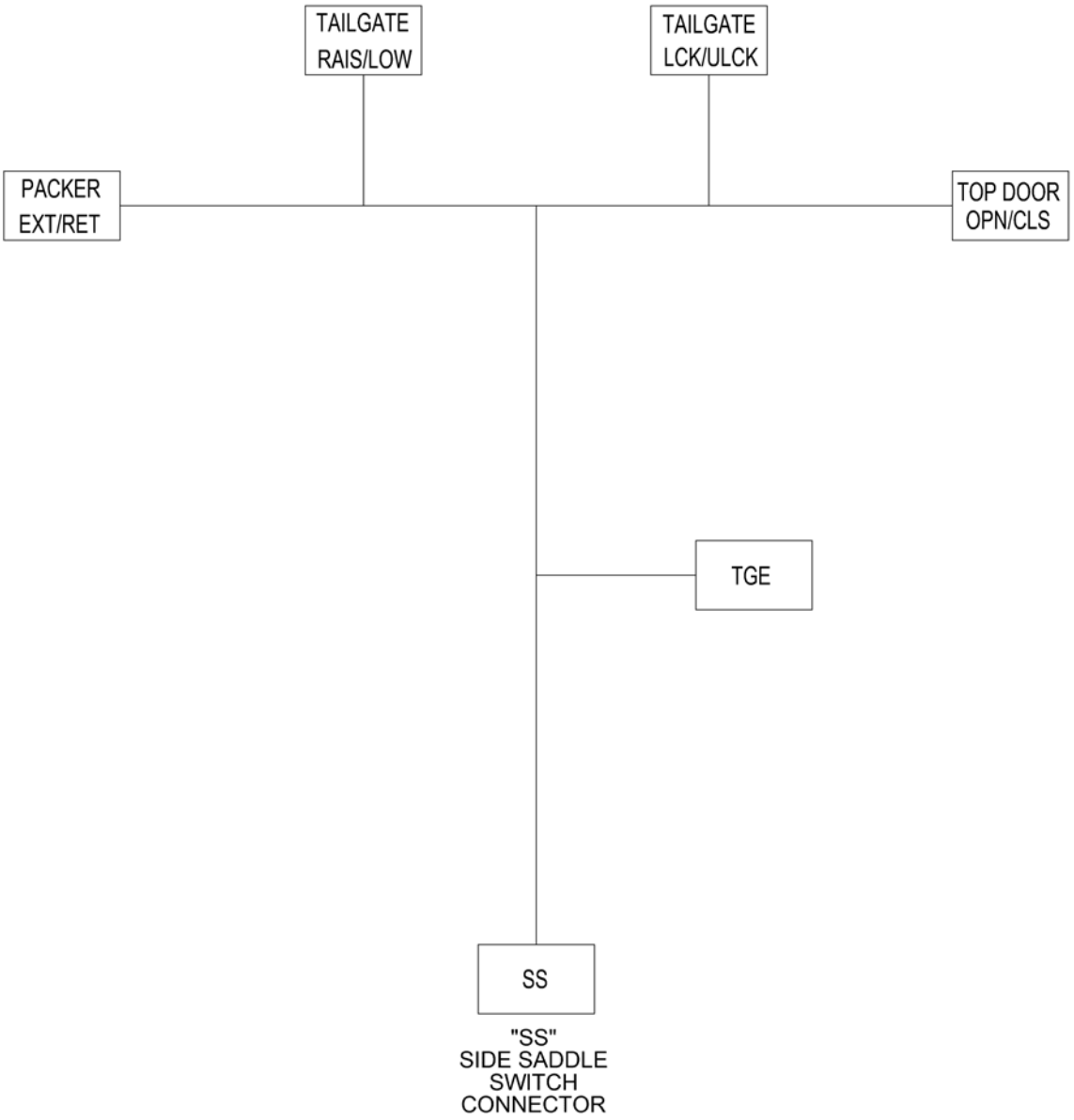
STREETWISE HYDRAULICS™ RESIDENTIAL
MAC VALVE ASSEMBLY – 263-1723-002



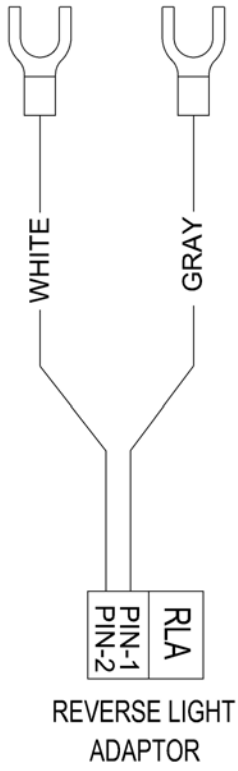
AFL INSIGHT™ DIAGNOSTIC DISPLAY HARNESS - 263-1751



CORTEX CONTROLLER™ SWITCHES HARNESS - 263-1781-002

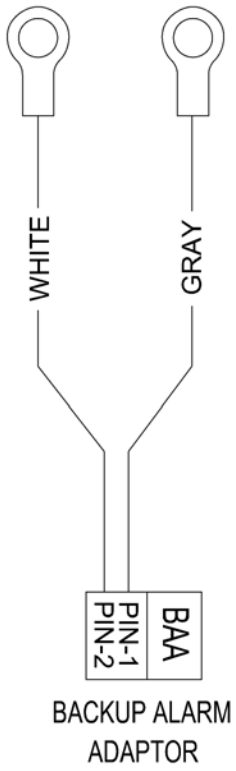


CORTEX CONTROLLER™ REVERSE LIGHT ADAPTER HARNESS - 263-1783-004



REVERSE LIGHT
ADAPTOR

CORTEX CONTROLLER™ BACKUP ALARM ADAPTER HARNESS - 263-1783-005



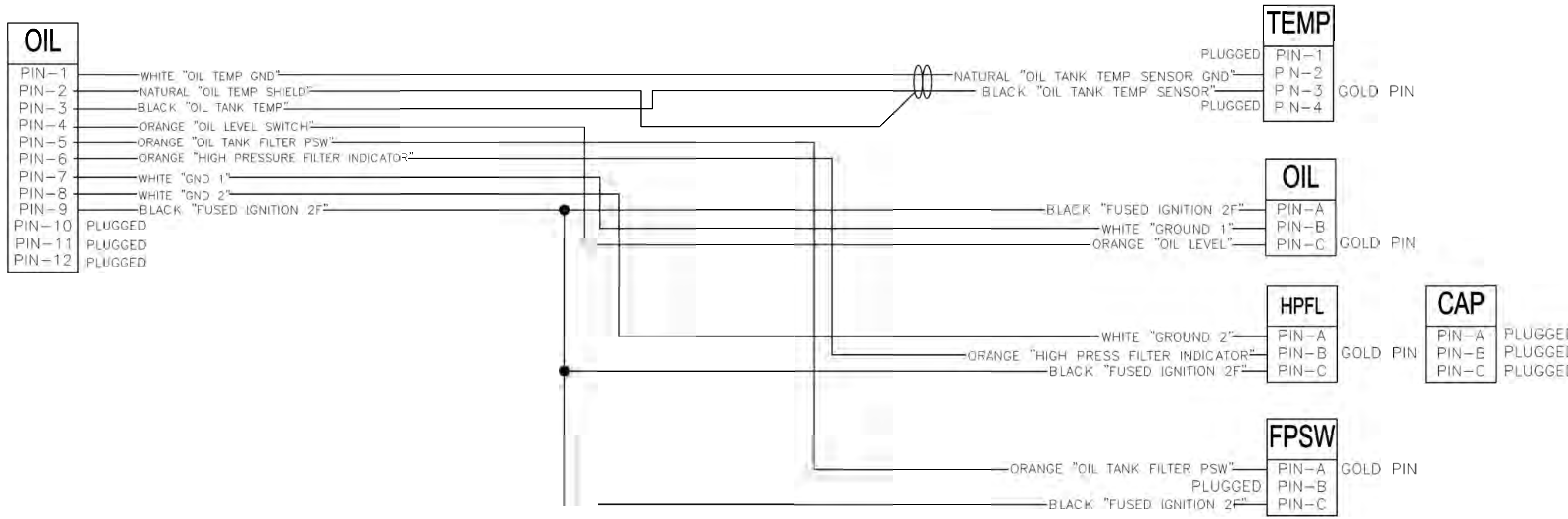
REV	WAS	DATE	DOC. NO.	CHK'D
A2	ADDED FMM CONNECTOR	[illegible]	[illegible]	—
A1	ADDED JMPR CONNECTOR	[illegible]	[illegible]	—
—	RELEASED	[illegible]	[illegible]	

THE HEIL CO.
FORT PAYNE, AL

TITLE: SCHEMATIC, CAB TO BODY
2021 HP REFRESH, RP170

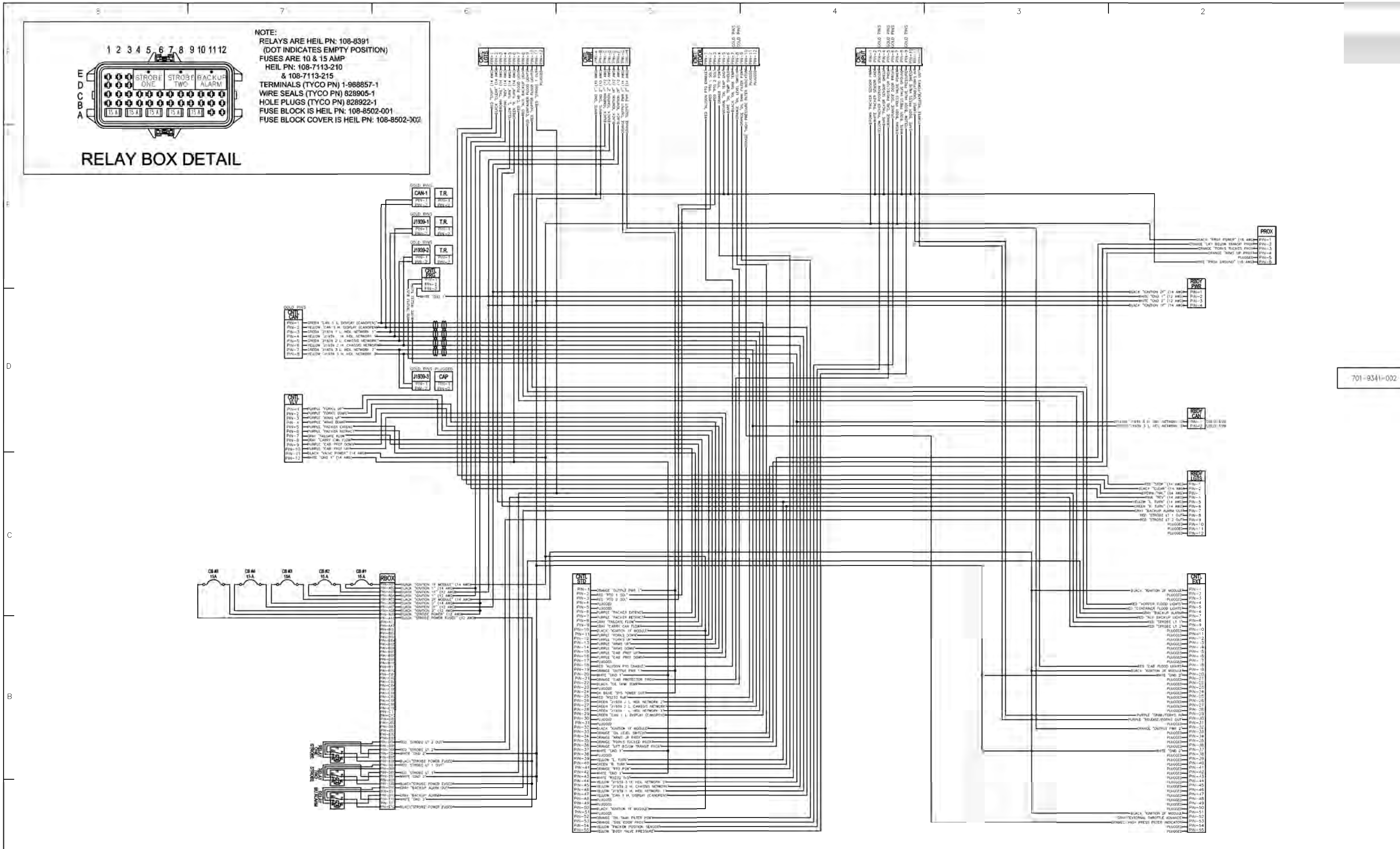
DIVISION: 42C
CODE: M
DATE: 05/24/21
SCALE: 1=1
MATERIAL: NONE
DRAWN BY: SJ
PART No.: 701-9340-007

263-1908-011


OIL
PIN-1
PIN-2
PIN-3
PIN-4
PIN-5
PIN-6
PIN-7
PIN-8
PIN-9
PIN-10 PLUGGED
PIN-11 PLUGGED
PIN-12 PLUGGED
WHITE "OIL TEMP GND"
NATURAL "OIL TEMP SHIELD"
BLACK "OIL TANK TEMP"
ORANGE "OIL LEVEL SWITCH"
ORANGE "OIL TANK FILTER PSW"
ORANGE "HIGH PRESSURE FILTER INDICATOR"
WHITE "GND 1"
WHITE "GND 2"
BLACK "FUSED IGNITION 2F"
TEMP
PLUGGED PIN-1
NATURAL "OIL TANK TEMP SENSOR GND" PIN-2
BLACK "OIL TANK TEMP SENSOR" PIN-3 GOLD PIN
PLUGGED PIN-4
OIL
BLACK "FUSED IGNITION 2F" PIN-A
WHITE "GROUND 1" PIN-B
ORANGE "OIL LEVEL" PIN-C GOLD PIN
HPFL
WHITE "GROUND 2" PIN-A
ORANGE "HIGH PRESS FILTER INDICATOR" PIN-B GOLD PIN
BLACK "FUSED IGNITION 2F" PIN-C
CAP
PIN-A PLUGGED
PIN-B PLUGGED
PIN-C PLUGGED
FPSW
ORANGE "OIL TANK FILTER PSW" PIN-A GOLD PIN
PLUGGED PIN-B
BLACK "FUSED IGNITION 2F" PIN-C

"OIL TANK TEMP SENSOR" TO BE A SINGLE TWISTED PAIR CABLE WITH SHIELD SUCH AS GENERAL CABLE C2534A.

THE HEIL CO.	FORT PAYNE, AL
DIVISION	42C
CODE	M
DATE	7/22/20
SCALE	NTS
TITLE	SCHEMATIC, OIL TANK 2021 HP REFRESH
MATERIAL	NONE
DRAWN BY	RBW
PART No.	701-9341-011

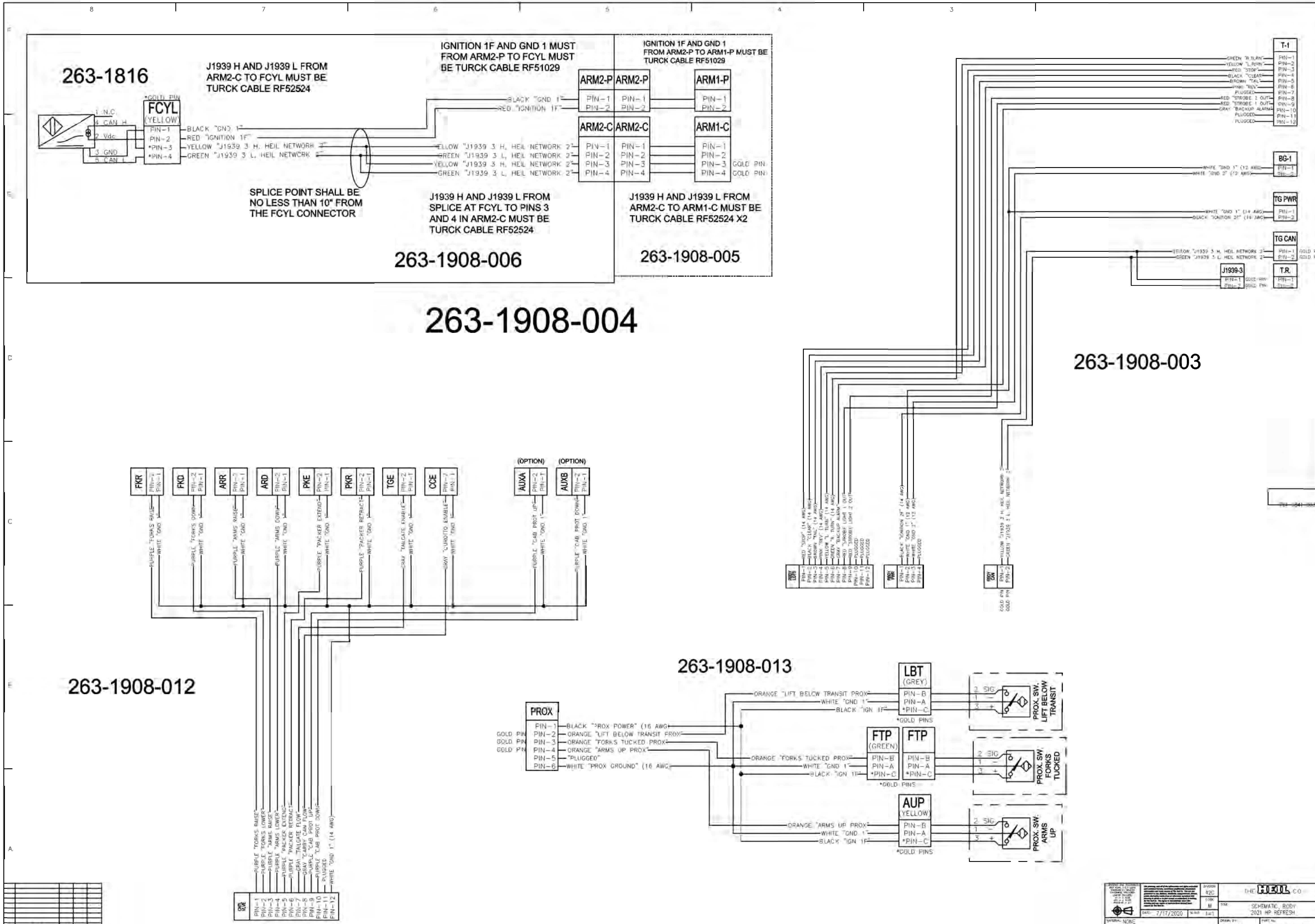


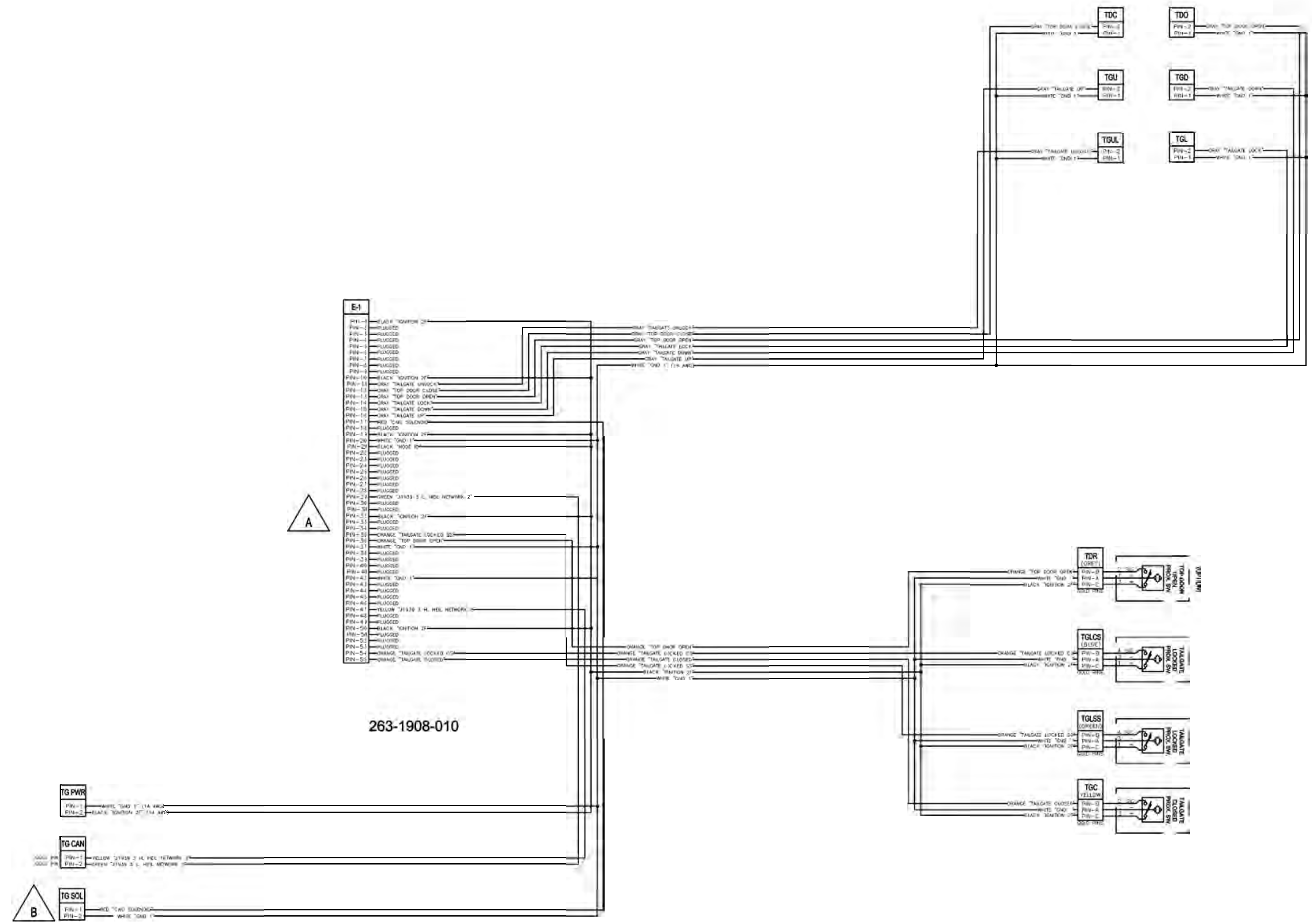
ALL WIRE TO BE 18 AWG TXL UNLESS NOTED. ALL SPLICES SHOULD BE IN MAIN TRUNK. ALL CAN/J1939 WIRES SHOULD BE TWISTED BEFORE INSTALLATION

THE HEIL CO.
FORT PAYNE, AL

SCHEMATIC, CONTROLLER
2021 HP REFRESH

DATE: 07/17/20 SCALE: NTS
MATERIAL: NONE
DRAWN BY: DGL
PART No.: 701-9341-002


263-1816
J1939 H AND J1939 L FROM ARM2-C TO FCYL MUST BE TURCK CABLE RF52524
IGNITION 1F AND GND 1 MUST FROM ARM2-P TO FCYL MUST BE TURCK CABLE RF51029
IGNITION 1F AND GND 1 FROM ARM2-P TO ARM1-P MUST BE TURCK CABLE RF51029
FCYL (YELLOW)
ARM2-P
ARM2-P
ARM1-P
ARM2-C
ARM2-C
ARM1-C
SPLICE POINT SHALL BE NO LESS THAN 10" FROM THE FCYL CONNECTOR
J1939 H AND J1939 L FROM SPLICE AT FCYL TO PINS 3 AND 4 IN ARM2-C MUST BE TURCK CABLE RF52524
J1939 H AND J1939 L FROM ARM2-C TO ARM1-C MUST BE TURCK CABLE RF52524 X2
263-1908-006
263-1908-005
263-1908-004
T-1
BG-1
TG PWR
TG CAN
J1939-3
T.R.
263-1908-003
FKR
FKD
ARR
ARD
PKE
PKR
TGE
CCE
(OPTION)
AUXA
(OPTION)
AUXB
263-1908-012
263-1908-013
PROX
LBT (GREY)
FTP (GREEN)
FTP
AUP (YELLOW)
PROX. SW. LIFT BELOW TRANSIT
PROX. SW. FORKS TUCKED
PROX. SW. ARMS UP
THE HEIL CO.
SCHEMATIC, BODY 2021 HP REFRESH
7/17/2020
701-9341-003



J1939 & CAN WIRING SHALL BE
J1939/1802-0 CABLE

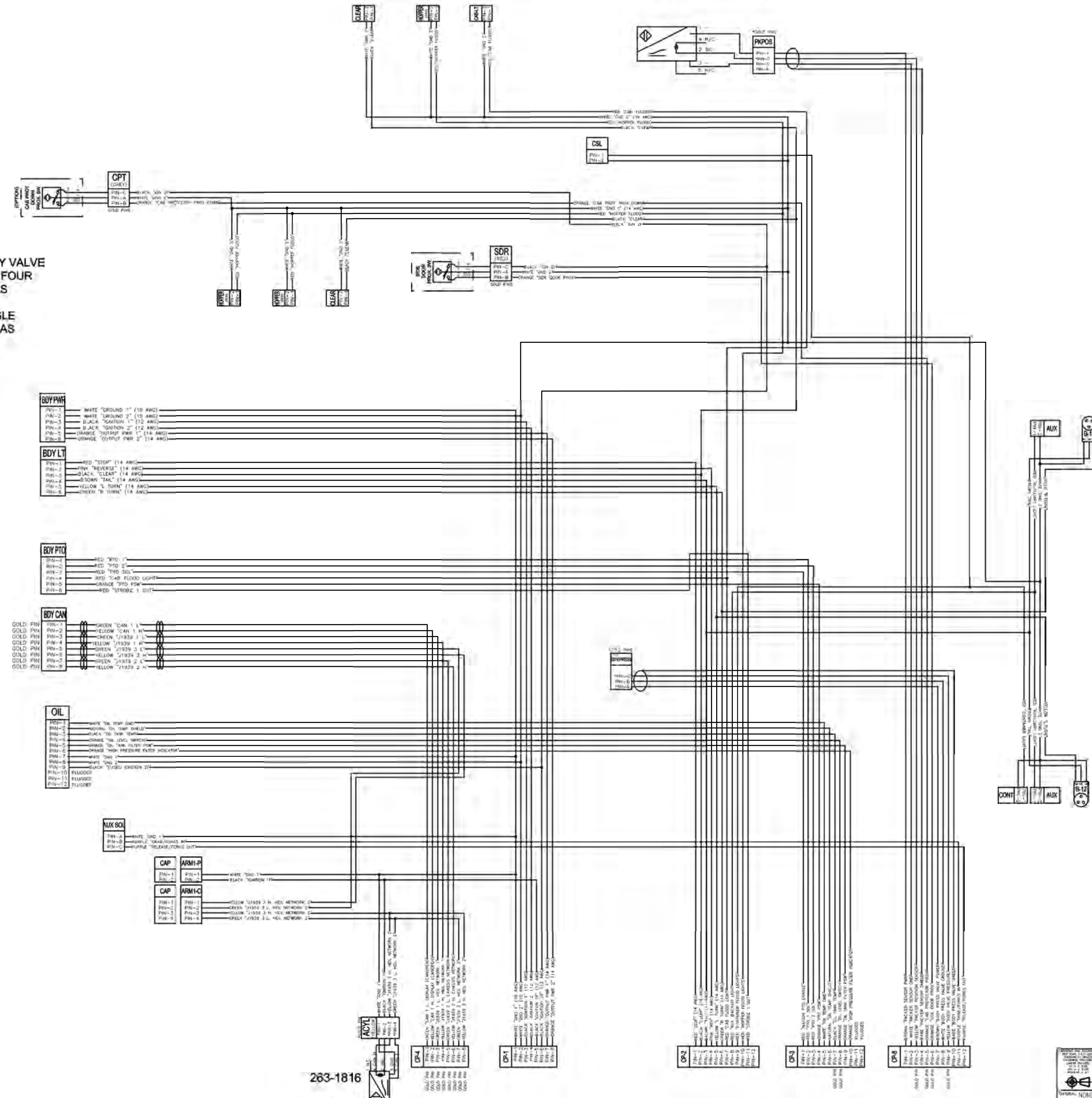
REV	WAS	DATE	ECO No.	ZONE
B	ADDED TG SOL CONN	[illegible]	[illegible]	—
A	ADDED PWR TO CAB CNTL	[illegible]	[illegible]	—
—	RELEASED	[illegible]	[illegible]	—

THE HEIL CO.
FORT PAYNE, AL

TITLE: SCHEMATIC, TG NODE/VALVE 2021 HP REFRESH

DIVISION: 42C
CODE: M
DATE: 7/23/20
SCALE: 1=1
MATERIAL: N/A
DRAWN BY: RBW
PART No.: 701-9341-010

NOTE:
1) "PACKER POSITION SENSOR" AND "BODY VALVE PRESSURE" CABLE TO BE TWISTED PAIR, FOUR CONDUCTOR WITH SHIELD CABLE SUCH AS HELUKABLE #17050
2) "OIL TANK TEMP SENSOR" TO BE A SINGLE TWISTED PAIR CABLE WITH SHIELD SUCH AS GENERAL CABLE C2534A.
3) J1939 WIRING MUST BE J1939/1802-0 CABLE



263-1816

DIVISION 42C	THE HEIL CO		
CODE M	TITLE: SCHEMATIC, BODY FRONT, GROTE 2021 HP REFRESH		
DATE: 7/16/2020	SCALE: 1=1		
MATERIAL: NONE	DRAWN BY: RBW	PART No: 701-9341-021	

NYC Half/Pack
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NYC Half/Pack
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NYC Half/Pack
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U

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HEIL ENVIRONMENTAL WARRANTY STATEMENT

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

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

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

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

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

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

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

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

www.heil.com

Customer Care:
866-ASK-HEIL
(866-275-4345)

The Heil Co.
4301 Gault Avenue North
Fort Payne, AL 35967-9984

Parts Central:
800-528-5308

Technical Service:
866-310-4345
TechSupport@DoverESG.com