DuraPack® Python®

HIGH-PERFORMANCE AUTOMATED SIDE LOADER

SERVICE MANUAL

ISSUED JULY 2024

TP1DPPY-SM-0724

Environmental Solutions Group
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Chattanooga, TN 37408
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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.

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

NOTES

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NOTES

SECTION 1
GENERAL INFORMATION

General Information

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.

NOTICE

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

IMPORTANT!

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

SERVICE/PARTS ASSISTANCE

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

RECOMMENDED SPARE PARTS

PART NO.	DESCRIPTION	QTY
BODY AND TAILGATE ASSEMBLIES		
022-3509	SEAL, TAILGATE	2
003-5142	BEARING, LOCK	2
022-4058	SEAL, SUMP DOOR	1
094-2834	PANEL, RUBBER, FOLLOWER, SIDE	2
LOADER AND GRABBER ASSEMBLIES		
093-3227	ASSEMBLY, DRIVE GEAR, GRABBER	1
062-0804	ASSEMBLY, ROLLER, TRI-CUFF	2
062-0805	ASSEMBLY, GRABBER, ROLLER, 4”	2
071-0843	BELT, ARM, 47”	1
071-0837	BELT, HUGGER, 30/150	1
019-1242	SPRING, 1" OD X 6"	2
015-2928	SPACER, ROLLER, 1-1/2” O.D.	1
014-1711	LINER, RUBBER, 90 GAL.	1
HYDRAULICS		
001-7110	CYLINDER, PACKER, WITHOUT SCRAPERS, 26 YD	1
001-6873	CYLINDER, TAILGATE RAISE	1
001-7097	CYLINDER, PACKER, 26 YD	1
001-7037	CYLINDER, PACKER, DUMP, 26 YARD	1
001-7107	CYLINDER, PACKER, TELESCOPIC, DA, 33 YD	1
001-7109	CYLINDER, PACKER, TELESCOPIC, DA, 28 YD	1
001-6973	CYLINDER, DUMP	1
001-6993	CYLINDER, SERVICE HOIST, DA	1
001-6869	CYLINDER, TAILGATE LOCK	1
001-6954	CYLINDER, BODY HOIST, DA	1
001-7069	CYLINDER, LIFT AND REACH	1
003-4432	PIVOT BEARING	1
031-3310	RESTRICTOR CHECK VALVE	1
031-6264	N-LINE CHECK VALVE,#16 FSAE 5PSI	1
094-2526	RUBBER BELTING FOLLOWER	1
031-6221	PORT RESTRICTION VALVE	1
031-5790-002	VALVE, RELIEF	1
031-6227	VALVE, REGENERATION	1
031-6377	VALVE, 4-STACK DUMP	1
031-6378	VALVE, 3-STACK DUMP	1
031-6412	VALVE, LIFT CONTROL	1

RECOMMENDED SPARE PARTS

PART NO.	DESCRIPTION	QTY
031-6297	ASSEMBLY, PNEUMATIC TOGGLE VALVE FITTING	1
060-0417	CAP, FILLER, 4”	1
067-0630	GAUGE, SIGHT, THERMOMETER	1
075-0712	FILTER, BREATHER	1
075-0953	FILTER, RETURN LINE	1
031-5601	DISCONNECT, QUICK	1
ELECTRICAL		
063-0108	SWITCH, PROXIMITY, NO SOURCING, 18 MM	1
063-0109	SWITCH, PROXIMITY, NO SOURCING, 30 MM	3
063-0120	SWITCH, PRESSURE, LOW TORQUE	1
069-0032	KIT, MICRO RELAY	1
CONTROLS		
031-5785	SWITCH, TOGGLE, AIR	2
063-0115	SWITCH, PRESSURE, W/CONNECTOR	1
108-8253	ASSEMBLY, PUSH BUTTON 2, NO, ILLUMINATED,	1
108-8254	ASSEMBLY, PUSH BUTTON 2, NO, ILLUMINATED,	1
108-7858-001	PUSH BUTTON, NO, ILLUMINATED, RED	1
031-6260	JOYSTICK, PNEUMATIC, PUSH	1

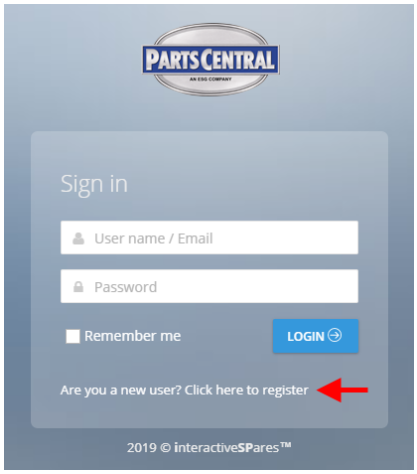
ELECTRONIC PARTS CATALOG (EPC)

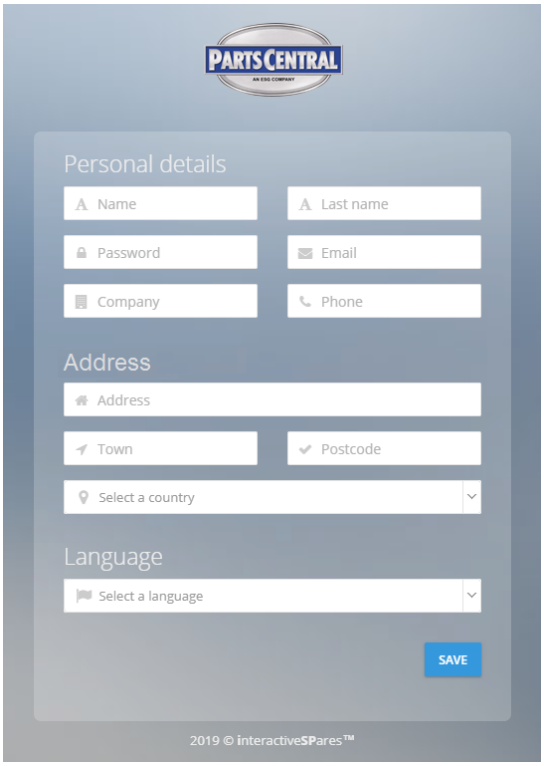
The Parts Central EPC includes electronic versions of the Heil Parts Manuals, specific to a Customer's truck configuration and options. After registering and logging in, the user can search by **Keyword(s) or Part Number** and/or **Heil Body Serial Number** to quickly identify a spare part or browse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

Note: This tool is currently 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**.

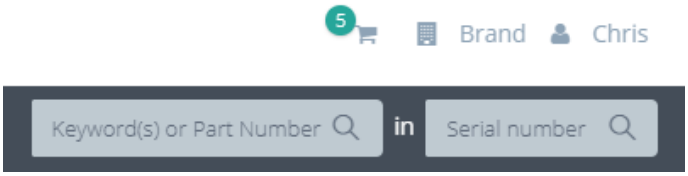




General Information

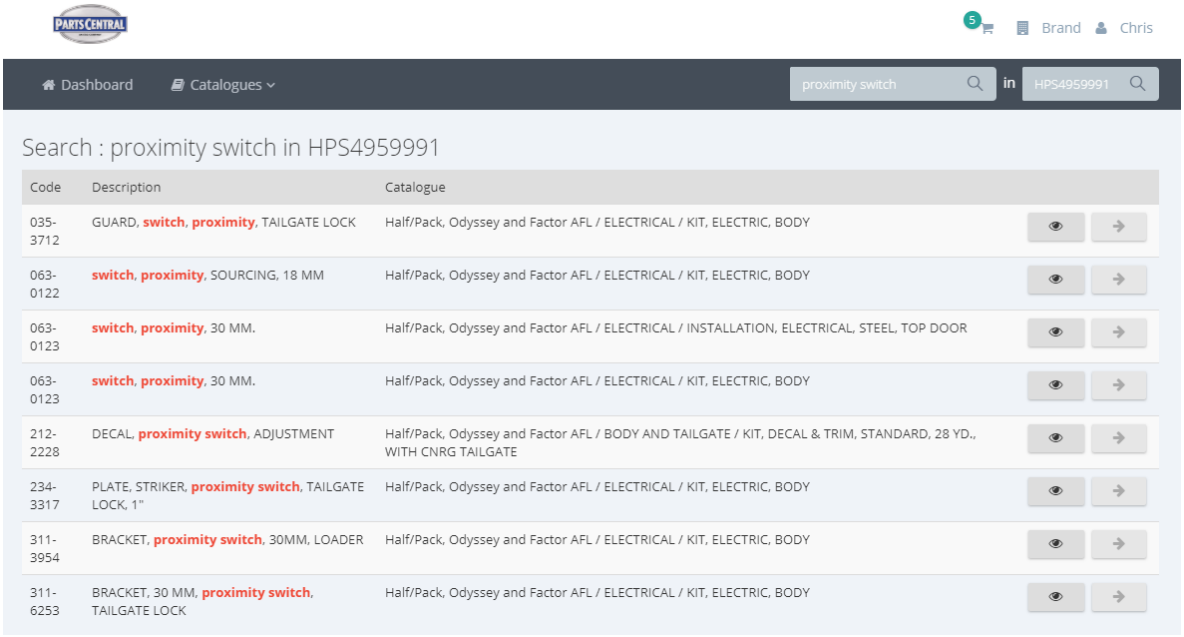
Search by Part Keyword(s) or Part Number in Body Serial Number

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



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

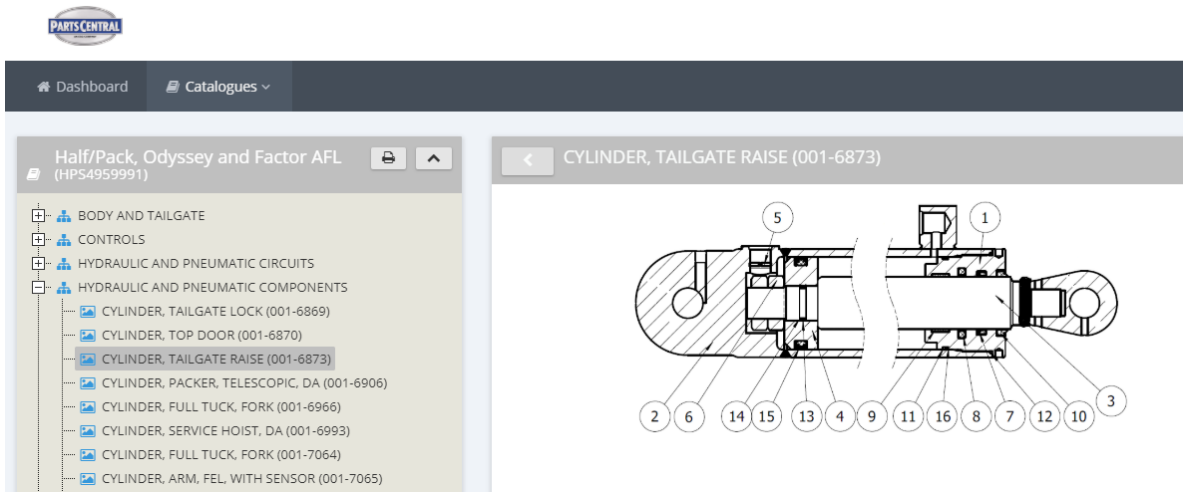
From the search results list, you can select the right arrow icon to view the part within its associated assembly/kit, helping you identify the needed part. Alternatively, you can select the eye icon on the right to see part specifics (including any notes) and quickly add to cart (although this functionality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



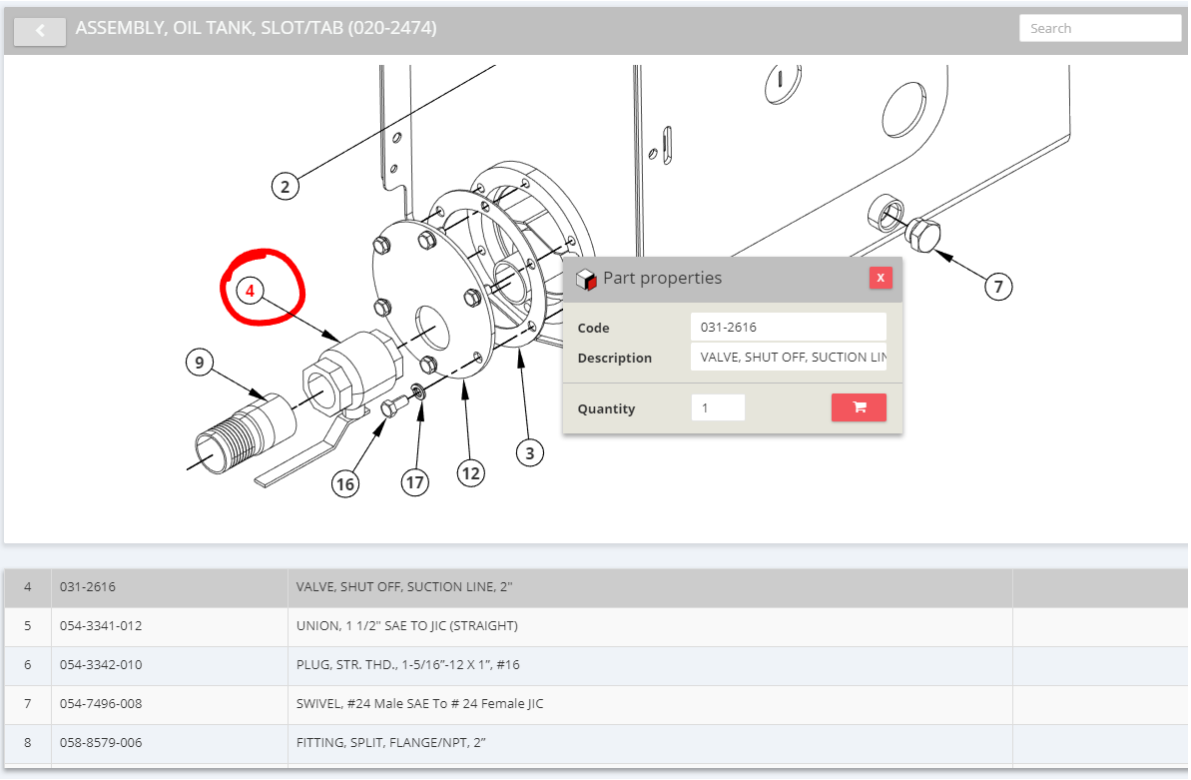
General Information

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.



4	031-2616	VALVE, SHUT OFF, SUCTION LINE, 2"
5	054-3341-012	UNION, 1 1/2" SAE TO JIC (STRAIGHT)
6	054-3342-010	PLUG, STR. THD., 1-5/16"-12 X 1", #16
7	054-7496-008	SWIVEL, #24 Male SAE To # 24 Female JIC
8	058-8579-006	FITTING, SPLIT, FLANGE/NPT, 2"

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.

⚠ WARNING

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

⚠ 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

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.

General Information

⚠ 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 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 death or serious injury.

General Information

⚠ 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.

General Information

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

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

NOTICE

You can order Lock-Out/Tag-Out Tags through your Heil Dealer or through Heil.

LOCK-OUT/TAG-OUT PROCEDURES

NOTICE

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

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

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

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

Figure 1. Lock-Out/Tag-Out (Do Not Operate) Tag

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 you raise the tailgate for service, maintenance or cleaning.
4. SET the body props when you raise the body for service, maintenance or cleaning.
5. When there are in-cab controls, turn the ignition switch to ON then:
   a. Move the switches of the hydraulic controls. This relieves the pressure in the cylinders.
   b. Release any stored electrical energy from the system.
   c. Turn the ignition switch to OFF.
6. When there are no in-cab controls, move the outside control levers to relieve the pressure in the cylinders.
7. With the power off, cycle all of the controls to the arms, forks, tailgate, etc. This ensures all stored energy is released.
8. Remove the ignition key from the cab and put the key in your pocket for your safety.

9. Turn off the power at the battery box by switching the battery disconnect to the OFF position.
10. Insert the red Lock-Out/Tag-Out clasp into the disconnect switch hole.
11. Insert the red key Lock-Out/Tag-Out lock with your tag exposed and visible into the paddle switch holes now that they are lined up.
12. Remove the lock key and put into your pocket for safety.
13. You can order Lock-Out/Tag-Out Tags (Part Number 212-1586) through your Heil Dealer or through Heil.

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. This corrosion can affect unloading and decrease the structural life of the body. In addition, storing refuse in the body overnight can increase the risk of fire.

MAINTENANCE/LUBRICATION INFORMATION

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

WINCH GEAR OIL

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

GREASE LUBRICANT RECOMMENDATION

Use a grease gun. Before engaging grease gun, clean the fitting. Always pump enough grease to purge the joint of contaminated grease and wipe off the excess. Lubricate a unit as given 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 component in hydraulic system. It transmits power, provides lubrication and cooling function and has following features:

- High viscosity index
- 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 / filterability
- Excellent thermal and hydrolytic stability
- Anti-foam characteristics

HYDRAULIC OIL SPECIFICATIONS (CONTINUED)

- 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 detail information about it. 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. But system performance and/or 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 for use as 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 TUBES AND FITTINGS

FLAT FACE ORFS FITTINGS		
	SET WRENCH TO	
NOMINAL TUBE OD	TORQUE WRENCH SETTING	ALTERNATE TORQUE UNITS
1/4"	21 ft-lbs.	250 in-lbs.
3/8"	33.5 ft-lbs.	400 in-lbs.
1/2"	50 ft-lbs.	600 in-lbs.
5/8"	50 ft-lbs.	600 in-lbs.
3/4"	75 ft-lbs.	900 in-lbs.
1"	105 ft-lbs.	1260 in-lbs.
1-1/4"	130 ft-lbs.	1560 in-lbs.
1-1/2"	178.5 ft-lbs.	2140 in-lbs.

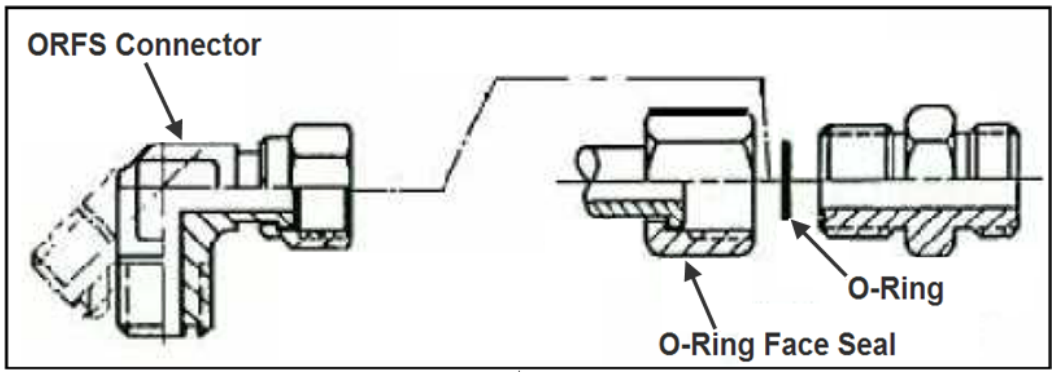


Figure 2. Torque for Hydraulic Tubes and Fittings

TORQUE FOR HYDRAULIC TUBES AND FITTINGS (CONTINUED)

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.

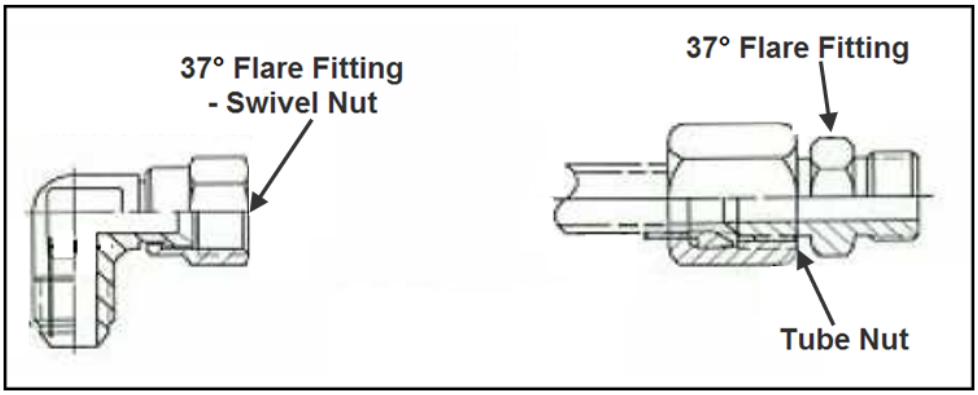


Figure 3. Torque for Hydraulic Tubes and Fittings

TORQUE FOR HYDRAULIC TUBES AND FITTINGS (CONTINUED)

FROM SAE J2593 TABLE 7		
BOSS (ORB)	**(STEEL) SET WRENCH TO**	
NOMINAL TUBE OD	**TORQUE WRENCH SETTING**	**ALTERNATE TORQUE UNITS**
3/16"	9 ft-lbs.	110 in-lbs.
1/4"	16.5 ft-lbs.	200 in-lbs.
5/16"	21 ft-lbs.	250 in-lbs.
3/8"	29 ft-lbs.	350 in-lbs.
1/2"	64 ft-lbs.	770 in-lbs.
5/8"	89 ft-lbs.	1070 in-lbs.
3/4"	130 ft-lbs.	1560 in-lbs.
7/8"	178.5 ft-lbs.	2140 in-lbs.
1"	224 ft-lbs.	2690 in-lbs.
1-1/4"	250 ft-lbs.	3000 in-lbs.
1-1/2"	300 ft-lbs.	3600 in-lbs.
ALUMINUM SET		
TORQUE WRENCH SETTING	**ALTERNATE TORQUE UNITS**	
6 ft-lbs.	70 in-lbs.	
11 ft-lbs.	130 in-lbs.	
14 ft-lbs.	170 in-lbs.	
21 ft-lbs.	250 in-lbs.	
37.5 ft-lbs.	450 in-lbs.	
54 ft-lbs.	650 in-lbs.	
91.5 ft-lbs.	1100 in-lbs.	
116.5 ft-lbs.	1400 in-lbs.	
146 ft-lbs.	1750 in-lbs.	
154 ft-lbs.	1850 in-lbs.	
200 ft-lbs.	2400 in-lbs.	

TORQUE FOR HYDRAULIC TUBES AND FITTINGS (CONTINUED)

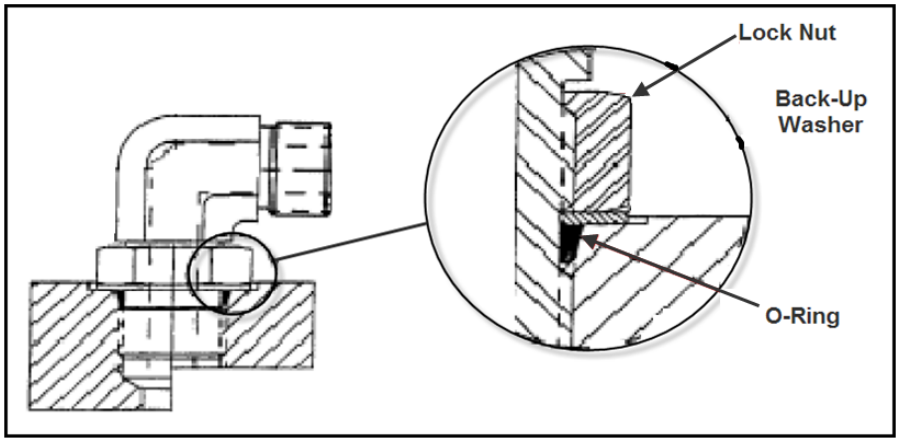


Figure 4. Torque for Hydraulic Tubes and Fittings

SPLIT - FLANGE (HALF CLAMP) CONNECTORS (CODE 61)				
		SET WRENCH TO		
NOMINAL TUBE OD	**BOLT SIZE**	**BOLT TORQUE [FT-LBS]**	**BOLT TORQUE [IN-LBS]**	**ALUMINUM FT-LBS [IN-LBS]**
1/2"	5/16-18 x 1.25	17 ft-lbs.	200 in-lbs.	12 [130]
3/4"	3/8-16 x 1.25	25 ft-lbs.	300 in-lbs.	17 [200]
1"	3/8-16 x 1.25	32 ft-lbs.	380 in-lbs.	21 [250]
1-1/4"	7/16-14 x 1.50	41 ft-lbs.	490 in-lbs.	27 [320]
1-1/2"	1/2-13 x 1.50	53 ft-lbs.	640 in-lbs.	35 [420]
2"	1/2-13 x 1.50	61 ft-lbs.	730 in-lbs.	40 [480]
2-1/2"	1/2-13 x 1.75	86 ft-lbs.	1030 in-lbs.	56 [670]
3"	5/8-11 x 1.75	144 ft-lbs.	1730 in-lbs.	94 [1130]
3-1/2"	5/8-11 x 2.00	125 ft-lbs.	1500 in-lbs.	82 [980]
4"	5/8-11 x 2.00	125 ft-lbs.	1500 in-lbs.	82 [980]
5"	5/8-11 x 2.25	125 ft-lbs.	1500 in-lbs.	82 [980]

TORQUE FOR HYDRAULIC TUBES AND FITTINGS (CONTINUED)

SPLIT- FLANGE (HALF CLAMP) CONNECTORS (CODE 62)				
		SET WRENCH TO		
NOMINAL TUBE OD	BOLT SIZE	BOLT TORQUE [FT-LBS]	BOLT TORQUE [IN-LBS]	ALUMINUM FT-LBS [IN-LBS]
1/2"	5/16-18 x 1.25	17 ft-lbs.	200 in-lbs.	12 [130]
3/4"	3/8-16 x 1.25	30 ft-lbs.	360 in-lbs.	20 [240]
1"	3/8-16 x 1.25	46 ft-lbs.	550 in-lbs.	30 [360]
1-1/4"	1/2-13 x 1.75	69 ft-lbs.	830 in-lbs.	45 [540]
1-1/2"	5/8-11 x 2.25	125 ft-lbs.	1500 in-lbs.	82 [980]
2"	3/4-10 x 2.75	209 ft-lbs.	2510 in-lbs.	136 [1640]

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 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.

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

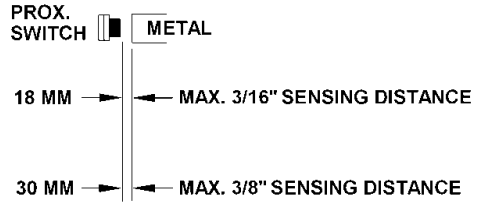
Always disconnect the battery before welding on the chassis or body.

PROXIMITY SWITCH TROUBLESHOOTING

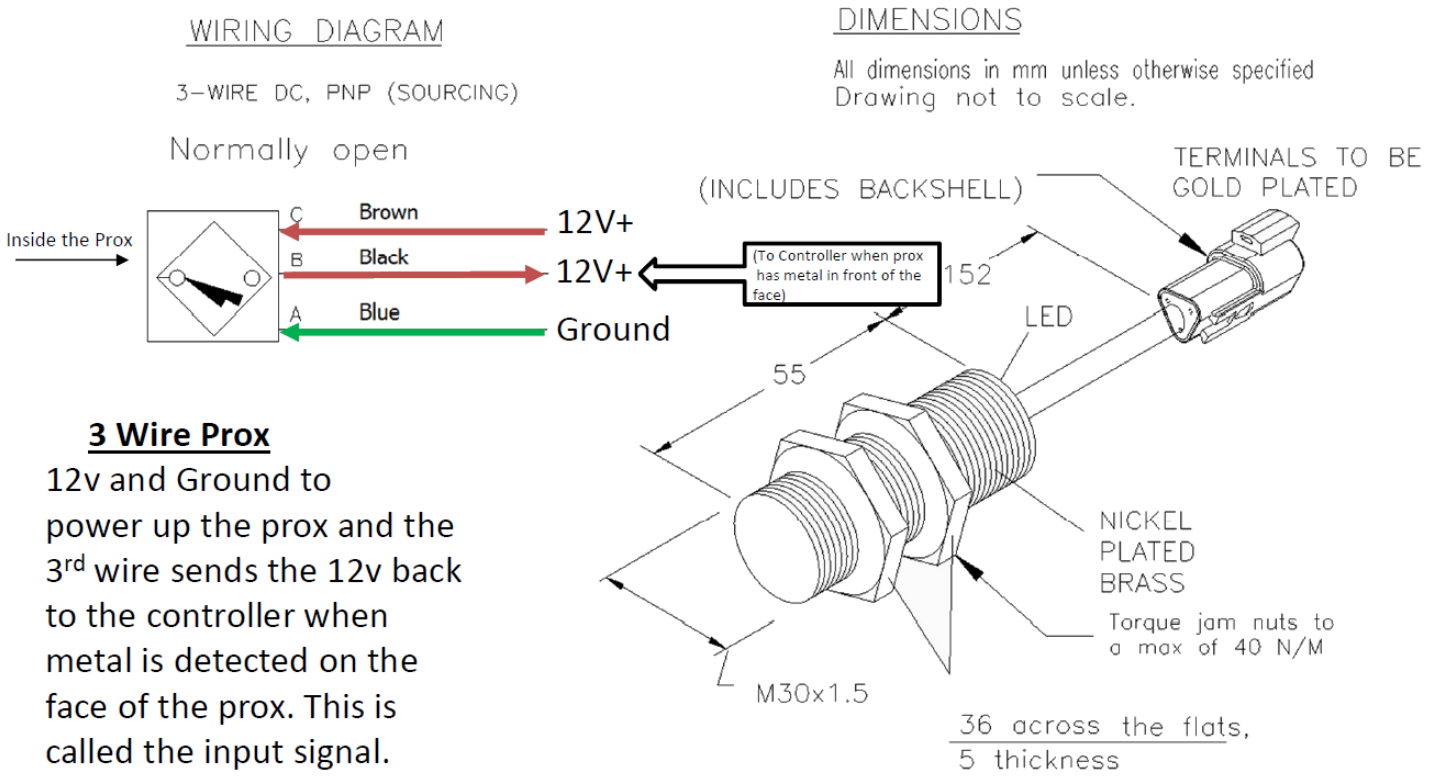
When one or more of a unit's functions do not operate properly and there are proximity switches in the circuits of the unit for these functions, refer to the following table as a guide to find the problem(s).

NOTICE

Heil proximity switches have a Light Emitting Diode (LED) on the switch to indicate that the switch is sensing metal. The light changes color when the switch senses 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 for directions on cleaning decals.

Replace any decal that is damaged, missing, or is 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 or 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 Instructions

Following these instructions 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)

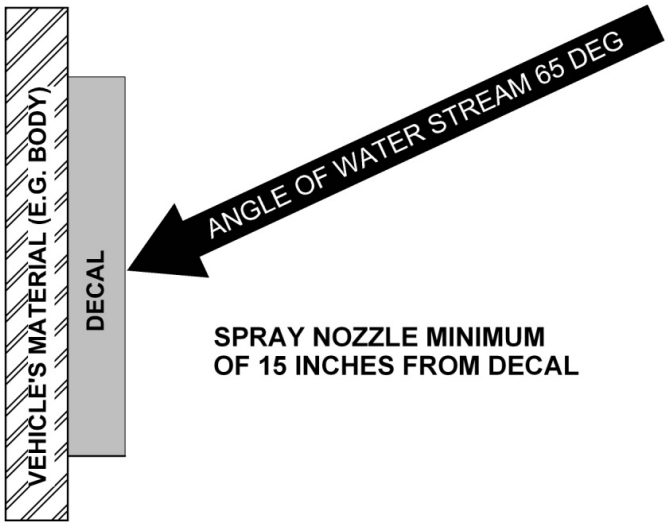


Figure 5. Recommended Technique

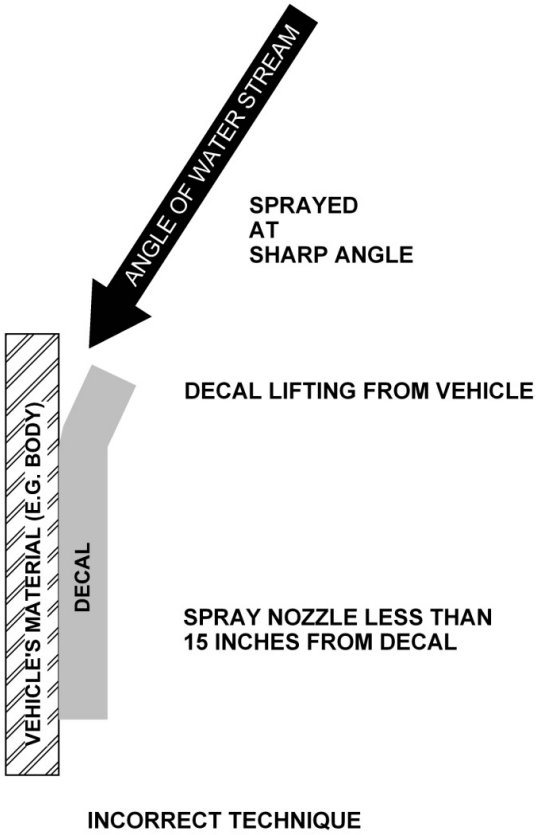
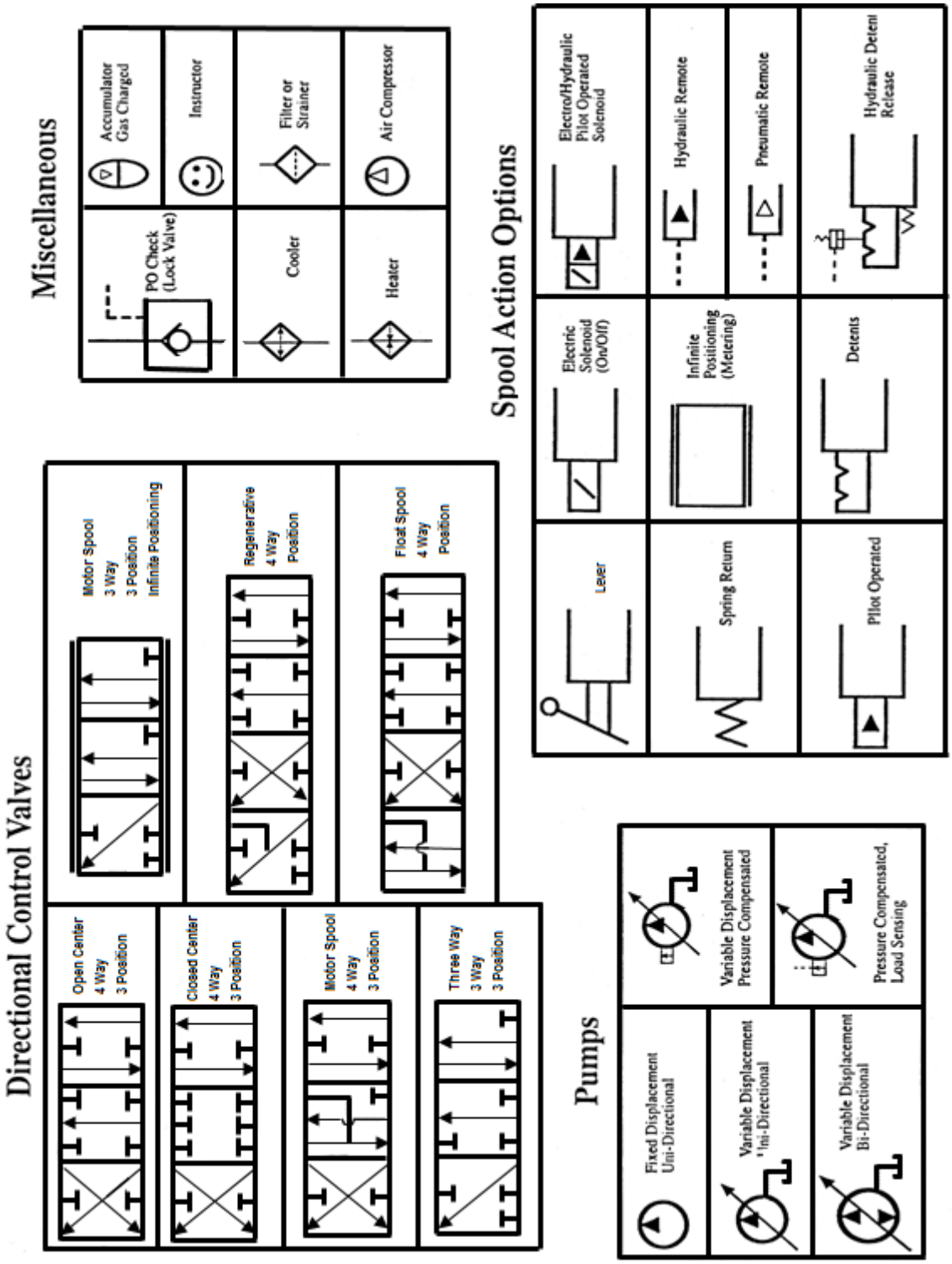
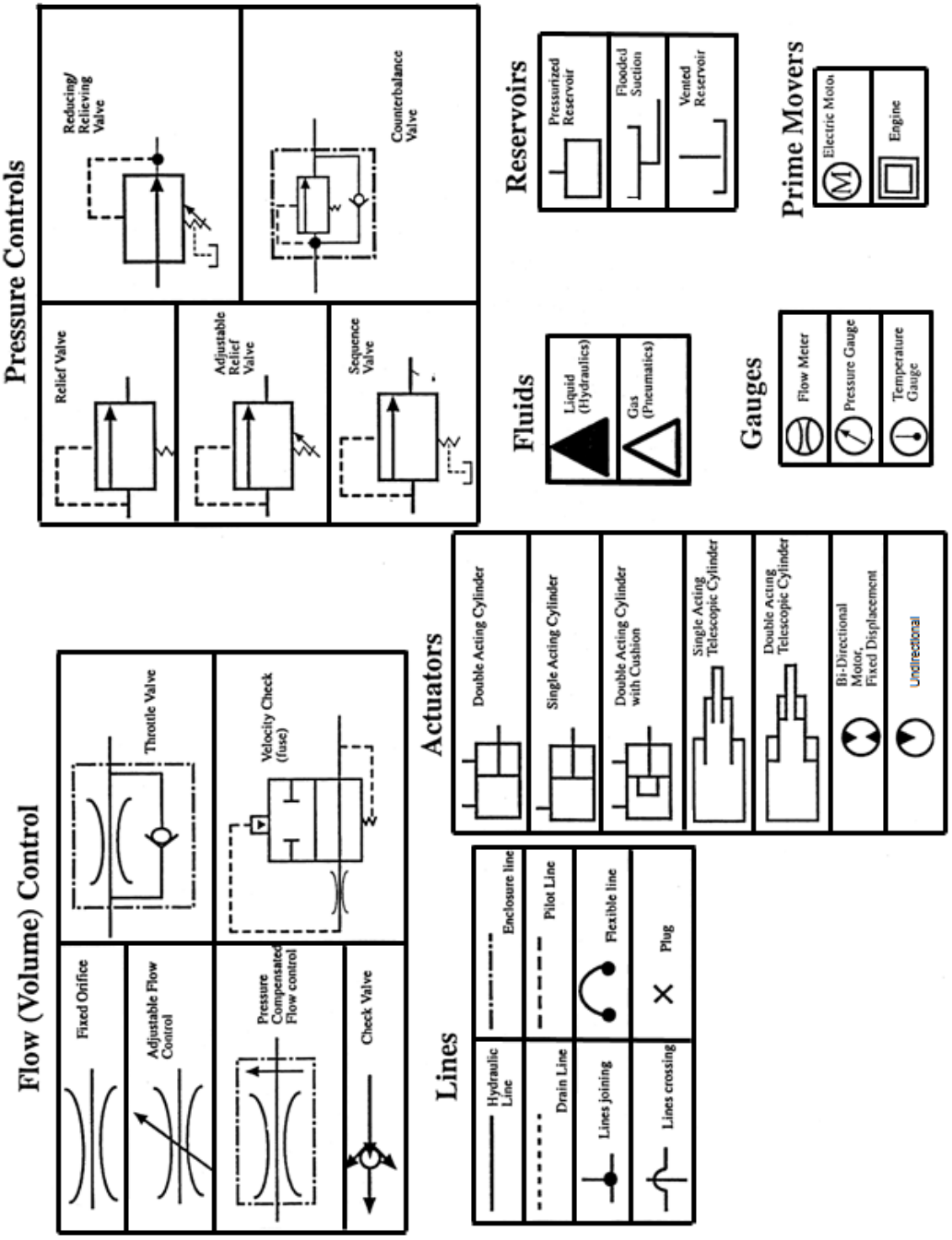


Figure 6. Incorrect Technique

HYDRAULIC SYMBOLS

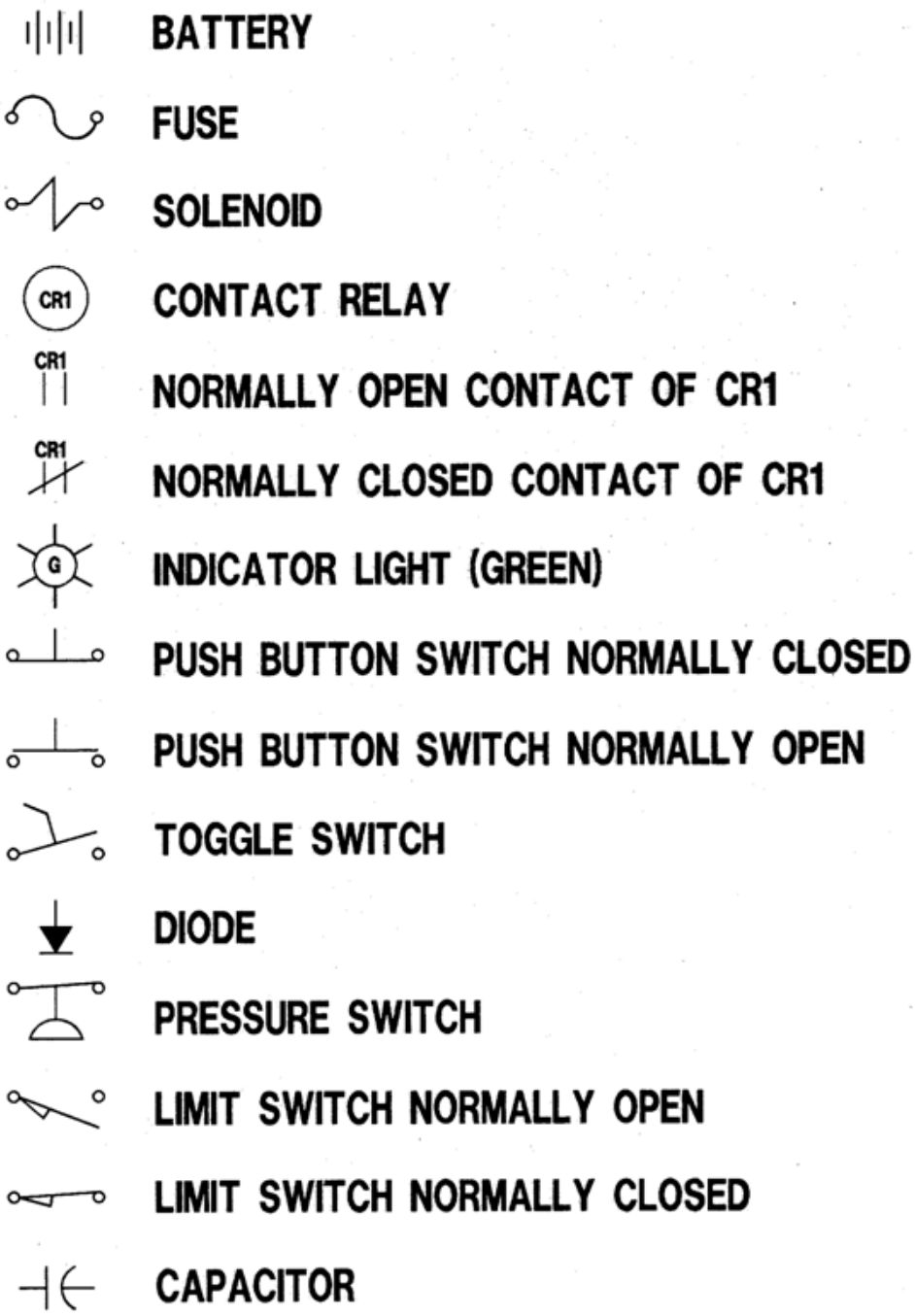


HYDRAULIC SYMBOLS (CONTINUED)



ELECTRICAL SYMBOLS

SYMBOL DEFINITIONS



SECTION 2
PUMPS

TANDEM VANE PUMP WITH MONOBLOCK SEPARATE OUTLET FLOW

Rapid Rail and Python Auto Side Loader

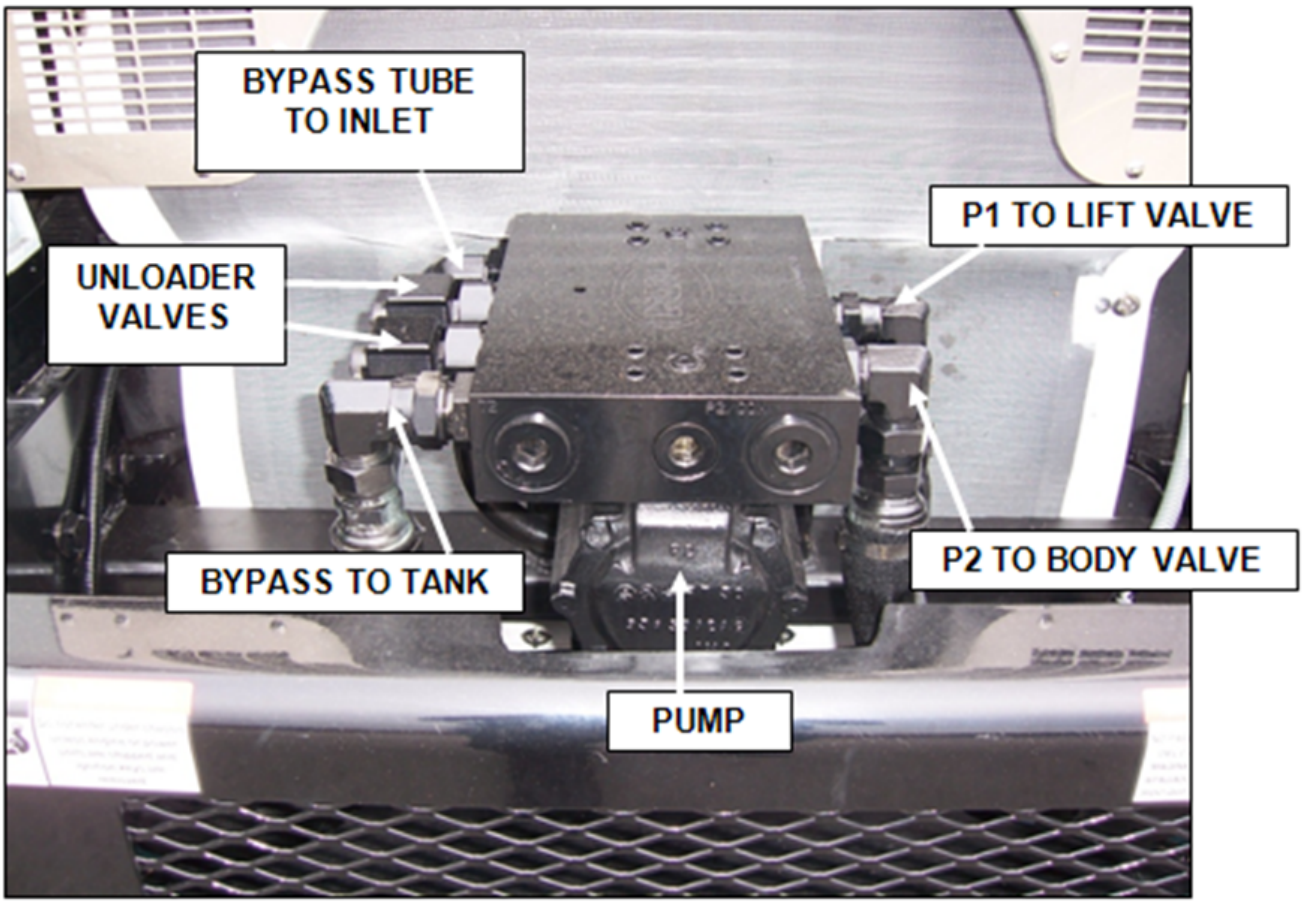
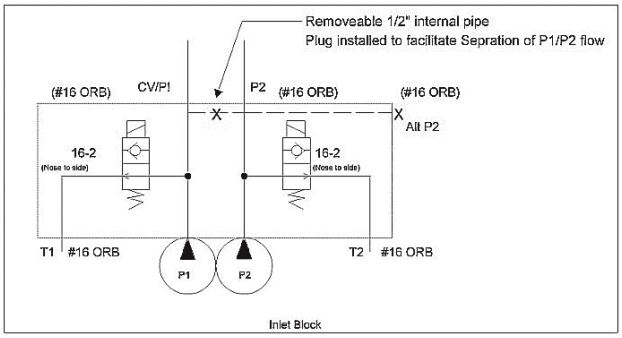


Figure 7. Tandem Vane Pump with Monoblock

In the Monoblock Operate-in-Gear-at-Idle hydraulic system, the pump section (pump 1) closest to the input shaft operates the lift and shuts OFF first. The pump section (pump 2) farthest from the input operates the packer and stays ON at higher RPMs.



Isolated Flow

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

The Operate-in-Gear-at-Idle (OIGAI) system is designed to perform the side loading operations at standard idle speed. It is comprised of two major components, the monoblock tandem vane pump and attached unloader valve assembly.

On Rapid Rail systems the P1 or front section (closest to the pump input shaft) operates the loader section of the truck while the P2 or rear section (farthest from the input shaft) operates the body section, which includes the packer. On F7000 series units the flows from both pump sections are combined to run the lift (loader) then exit the lift valve to operate the body valve. On the Python, P1 goes to the lift and P2 combines after the lift valve to run the body.

The unloader valve assemblies consist of a manifold (pressure) block, a normally open (N.O. or NO) cartridge valve and a 12VDC-solenoid coil. In operation mode, the current is supplied to the valve coil causing the valve to close, forcing pump flow to the respective hydraulic circuit. In bypass mode, the coil is de-energized causing the valve to open, allowing the oil to re-circulate either back to tank or to the pump inlet.

A. Troubleshooting

The symptoms of a problem in the pump circuit are no operation or slow operation of the loader or packer system. Since the F7000 series uses combined flows, a possible symptom of system malfunction is the packer operating at half the normal speed. On a Rapid Rail body with a Rapid Rail lift, each pump section controls one aspect of the system independent of the other. A malfunction of one pump's section will normally only affect one function of the truck. For example the packer will work correctly but not the loader or vice versa.

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

- Low or no voltage to the unloader valve coil.
- Malfunction in the unloader valve assembly.
- Internal problem with the pump.

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

1. Check the Electrical Supply to the Unloader Valve Coils
   a. With the system turned on and the engine operating at idle, test the voltage at the coil. It should read a minimum of 10 VDC. If proper voltage is present and the problem persists, proceed to step 2. If the voltage is below 10 VDC, check the electrical system for problems that can cause a drop or loss of voltage to the unloader valve solenoid coil. Some examples are a broken or shorted wire, blown fuse, fault in the side door switch (if equipped), no alternator input or a failed PLC calibration.
   b. Use an ohm meter to check resistance in the coil. If the measurement is less than 5 ohms or more than 20 then the circuit coil is damaged. If the coil is damaged, replace the coil.
2. Eliminate the Unloader Valve from the Circuit
   a. With the engine off, remove the bypass line from the pressure block port marked bypass . Disconnect the pressure hose or hoses sending oil to the lift and body functions. On the Rapid Rail and Pythons, there are two pressure hoses to be capped; on the F7000 and F4000 there is one hose to be capped. Cap and plug the tube connection for the bypass to the pump inlet. This forces all oil to the hydraulic circuits as if the pump is on. (NOTE: Pump control switches in the cab are no longer effective.)
   b. Restart the truck and test the functions. If the lift and packer functions return to normal operation (speed and pressure within specifications), replace or repair the unloader assembly.

NOTICE

If flow is present and the lift or packer operate only with no load, check the main relief valves for proper adjustment and operation.

TANDEM VANE PUMP O.I.G.A.I. HYDRAULIC SYSTEM TROUBLESHOOTING (CONTINUED)

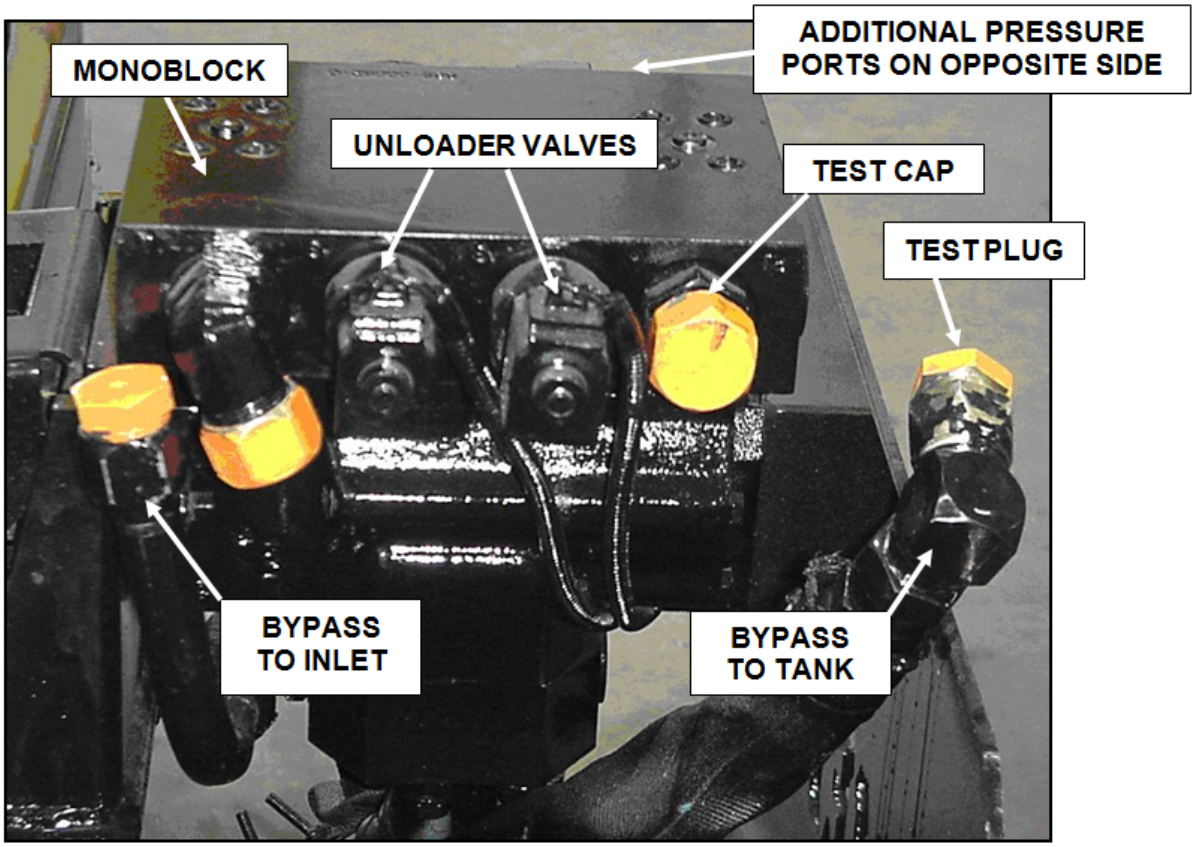


Figure 8.

MOUNT PUMP MONOBLOCK TO TANDEM PUMP

Follow these steps when mounting a monoblock to the tandem pump.

1. Loosen the rear end cap bolts and front mounting cap bolts to allow slight movement between the P1, center pump, and P2 housings. This aligns the P1 and P2 pressure ports with the monoblock.
2. Mount the monoblock using the eight (8) cap screws with hi-collar lock washers and torque the cap screws. NOTE: Make sure the o-rings stay in place.
3. Re-torque the bolts on the rear end cap and front mounting cap housings of the pump.
4. If either the unloader valve cartridge or the pilot valve cartridge (that screw into the unloader valve cartridge) is removed, it needs to be re-torqued. Re-torque the unloader cartridge to 110 ft. lbs. and the pilot cartridge (not shown) to 15 ft. lbs.

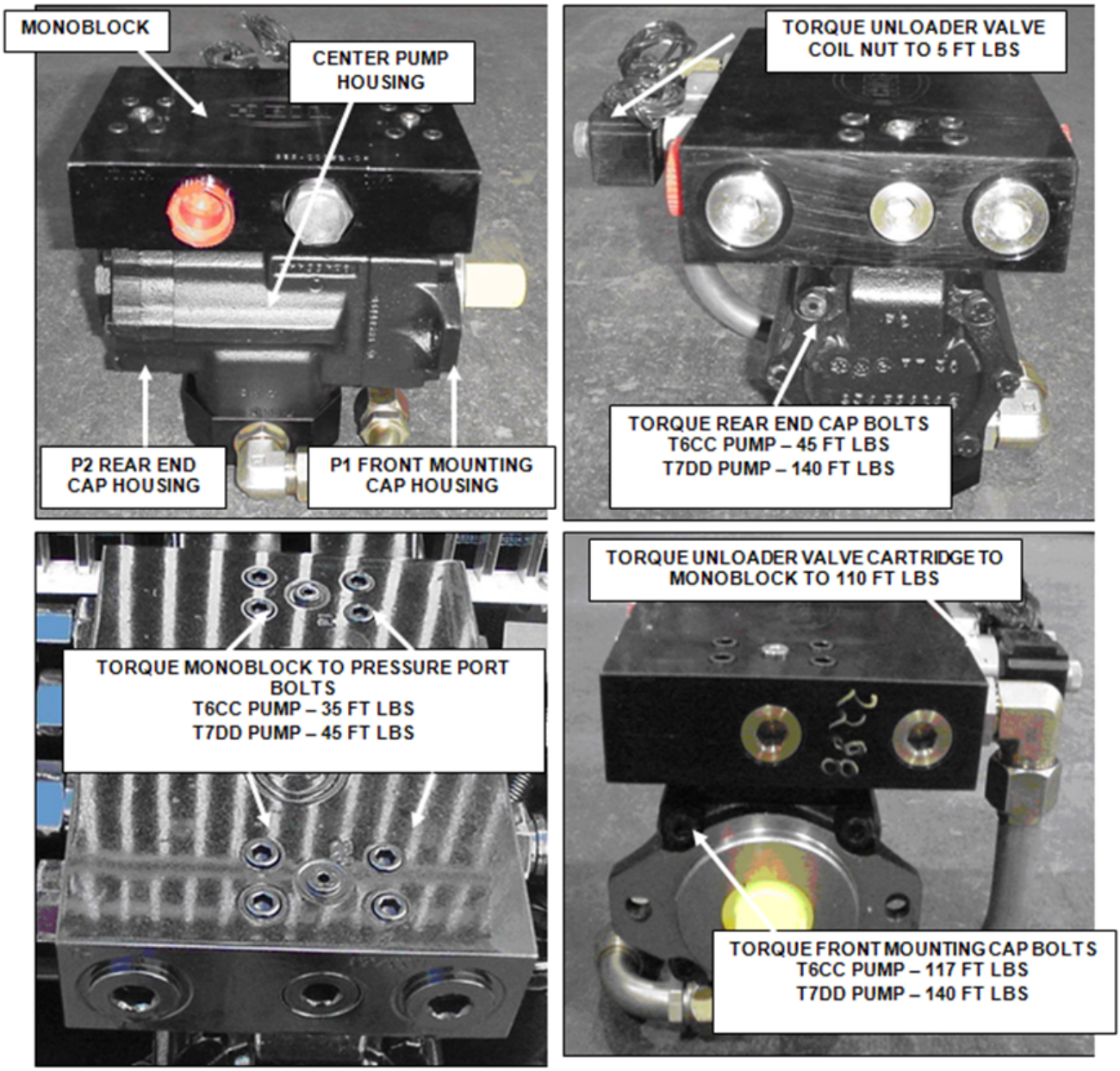


Figure 9.

NOTES

SECTION 3
LIFT ARM

Lift Arm

NOMENCLATURE

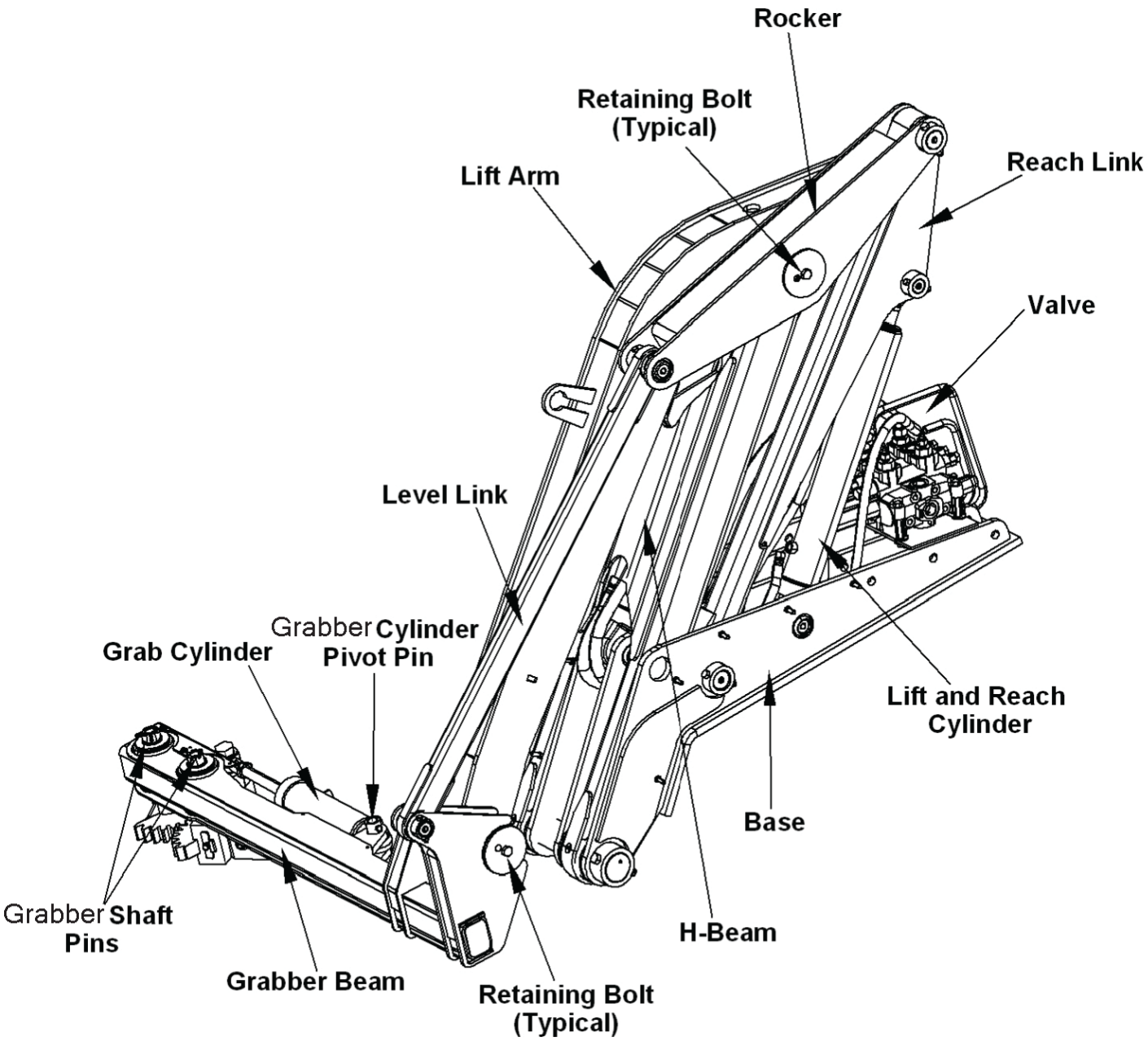


Figure 10. Lift Arm Nomenclature

Lift Arm

SPECIFICATIONS

NOTICE

All pressures are +/- 100 PSI at operating temperature. See **Lift Control Valve Pressure Adjustments** 55 and **Relief Valve Adjustment** pages for valve adjustment procedures.

A. Hydraulic Cylinders

Lift and Reach	3.1" Bore X 16" Stroke
Grab	3.1" Bore X 8" Stroke
Level	2.48" X 14.48" Stroke

B. Body

Main Relief	2500 PSI
CNrG® Tailgate Raise	1500 PSI
Top Door or Hopper Cover	1500 PSI

C. Lift Valve

Main Relief Valve Pressure	2300 PSI
Reach In/Out	2500/1250 PSI
Reach Relief In/Out	2500/1250 PSI
Arm Up/Down	2500/1250 PSI
Packer Pressure Switch	2200 PSI

D. Grabber

Relief	1250/1250 PSI

E. Cycle Times

Lift Cycle Time Standard Python	7 - 9 Seconds
Packer Cycle Time	12-16 Seconds

F. Lift Capacity (@700 RPM idle)

Standard Python - Less than 6 Feet	1250 lbs
Standard Python - 6 Feet and Beyond	645 lbs
Hydraulic Pump	31 GPM @ 750 RPM @ 2500 PSI

Lift Arm

LIFT ARM PREVENTIVE MAINTENANCE CHART

Maintenance performed on a regular schedule is preventive maintenance. Normal maintenance intervals are based on an 8-hour day and average operating conditions. Severe use or adverse conditions make it necessary to do this maintenance more frequently.

Watch the **Preventive Arm Lift Maintenance** video on the **Heil Service Shack (https://www.heil.com/heil-service-shack)**.

REF NO.	ACTIVITY	INTERVAL	SERVICE/CHECK
1	Grease Lift	(20 hrs)	See the **Python Lift Lubrication Guide** 47 or the lubrication decal on the lift arm.
2	Check Pin Retaining Bolts – Tighten	Weekly (40 hrs)	Check for broken bolts. This may indicate bearing or pin damage. Replace the bolt and the bearing and pin retained by the bolt. Use anti-seize compound on any pins or bearings that are replaced.
3	Hydraulic Plumbing	Weekly (40 hrs)	Check for damage, worn, or leaking hoses, tubes or fittings. Replace as necessary. NOTE: Do not replace steel tubes with hoses.
4	Cycle Times (900 maximum RPM while operating lift)	Weekly (40 hrs)	Check lift operation. Normal engine RPMs should not exceed 900. The lift operates at approximately 7 – 8 second cycle time. Cycle times includes grab, lift, lower and release.
5	Check Mounts	Weekly (40 hrs)	• Make sure chassis rail is undamaged. • Make sure chassis bolts are present and tight. • Check brackets for cracks. • Make sure lift bolts are present and secure.
6	Check Lift Mount Base Bolts	Weekly (40 hrs)	Visually inspect mounting bolts for security and movement. Check the nuts and bolts to make sure the weld is secure. See **Check Lift and Torque Mount Base Bolts** 48 for bolt replacement instructions.
7	Lift Stress or Weld Cracks	Weekly (40 hrs)	Check lift for any structural cracks or cracks in the areas of welds. Cracks must be ground out and repaired. If cracking continues replace the affected parts. See **Lift and Weld Cracks Decision Tree** 61 in this section.
8	Grabber Assembly with Belt	Weekly (40 hrs)	Inspect belt condition for wear, cuts or damage. Replace if present.
9	Hoses	Weekly (40 hrs)	Check for tears, wear or holes and replace as necessary.
10	Fiber Guards	Weekly (40 hrs)	Check for tears or holes and replace as necessary.
11	Shaft Retainer Bolts	Monthly (200 hrs)	• Make sure both pins are present and tight. If one pin fails, replace both pins. • Make sure the collar key is present. If one fails.
12	Grabber Cylinder Pivot Bolt	Monthly (200 hrs)	Check for tightness.
13	Hydraulic Relief Valves	Twice Yearly (1000 hrs)	Check main relief and port reliefs for proper settings. For more information see **Lift Control Valve Pressure Adjustments** 55 in this section.

PYTHON LIFT 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.

NOTICE

If a grease zerk is missing or damaged, replace as necessary.

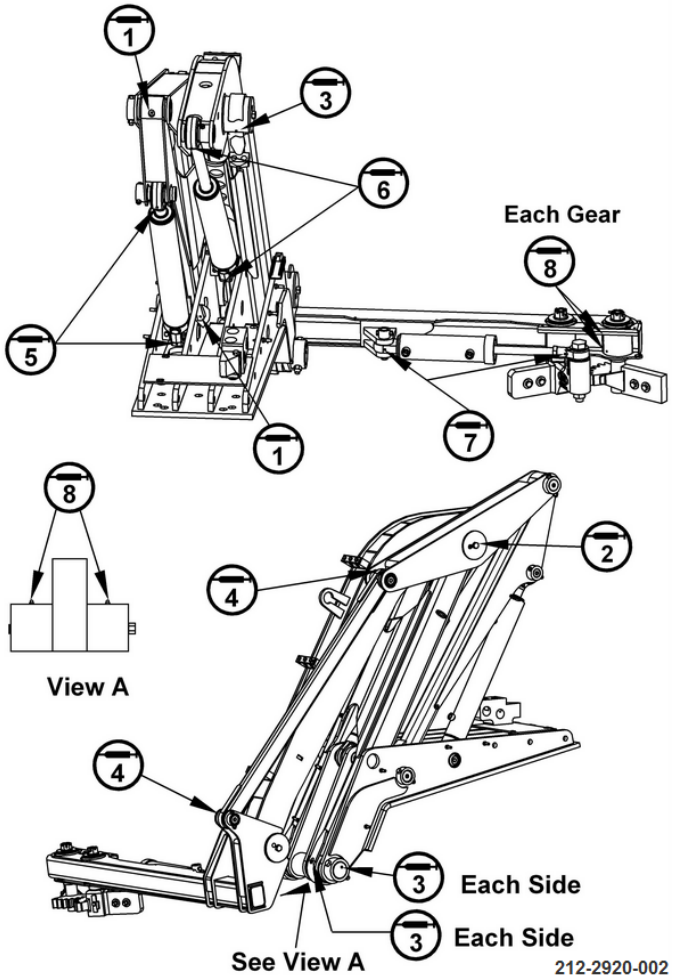


Figure 11. Python Lift Lubrication Guide

REF NO.	DESCRIPTION	QTY.	FREQUENCY
1	Reach Pivot Link	4	Every 20 Hours
2	Rocker Assembly	1	Every 20 Hours
3	H-Beam Assembly	6	Every 20 Hours
4	Level Link	2	Every 20 Hours
5	Reach Cylinder	2	Every 20 Hours
6	Lift Cylinder	2	Every 20 Hours
7	Grabber Cylinder	2	Every 20 Hours
8	Grabber Beam	4	Every 20 Hours

CHECK LIFT AND TORQUE MOUNT BASE BOLTS

When the Lift Base Mounting bolts weld is cracked, you must replace the bolts and nuts. The goal of this torque method is to achieve a 59,000lb clamp load consistently. A torque multiplier is not accurate enough at the values required. This method (torque/turn) is accurate and repeatable.

This method is required for field installation where proper torquing equipment may not be available. It also allows proper bolt torquing using standard wrenches and “cheater” bars.

A. Tools Required

Quantity	Tool
1	Torque wrench (1” and 5/8” sockets)
1	Combination wrench (1” and 5/8”)
1	Welding equipment
1	Personal protective equipment

B. Parts Required

See Parts Manual for replacement parts.

C. Before Replacing Lift Mount Bolts

1. Visually inspect the lift mount bolts on both the street side and curb side. See the illustration for locations.
2. Make sure the bolts are secure and there is no movement.
3. Make sure welded bolts do not have cracks.
4. If any lift mount bolt is loose, cracked or broken, replace all bolts. Use only the parts specified. Lower grade parts are not acceptable.
5. After torquing, bolts and nuts cannot be reused. To install and torque bolts, complete section D below.

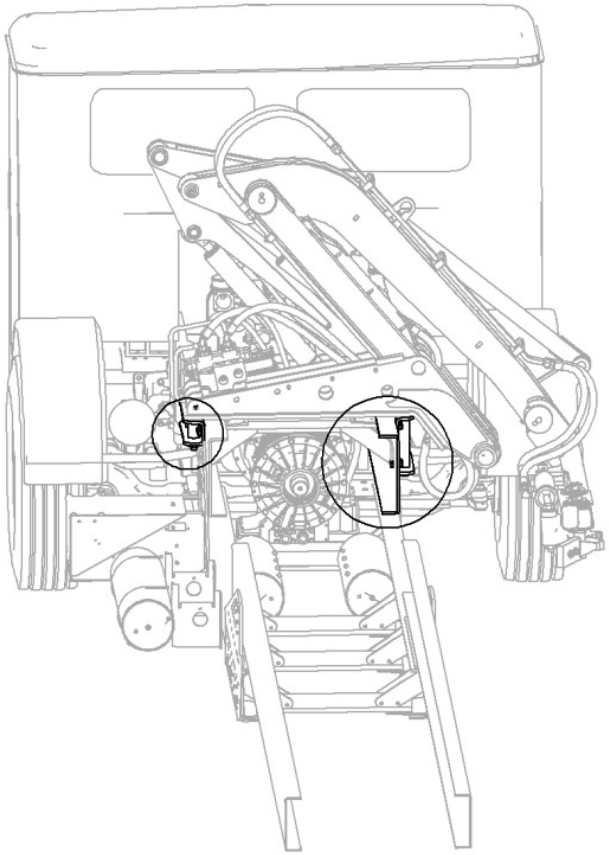


Figure 12. Lift Mount Base

D. Replace Lift Mount Bolts

1. Make sure the threads on both the bolt and nut are dry (no lubrication) before installation.
2. Install bolt into lift base and lift mount brackets.
3. Thread nuts onto bolts and hand tighten.
4. Use a torque wrench with a combination wrench to tighten the nut to 100 ft-lbs., holding bolt-head and turning nut.
5. Mark nut, washer and lift base with a paint market at a corner.
6. Count around 3-1/2 nut flats and mark the center of the nut, washer and lift base.

CHECK LIFT AND TORQUE MOUNT BASE BOLTS (CONTINUED)

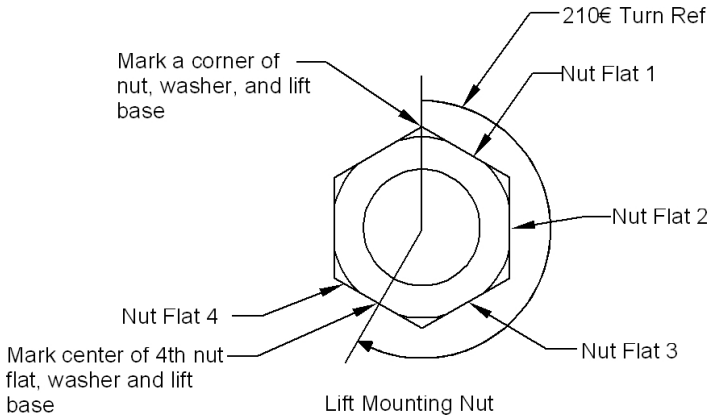


Figure 13. Lift Mount Bolt

7. Use a wrench and extension handle to turn the nut's marked corner to the second mark at the center of the fourth nut flat. It is critical that the head of the bolt is held in place and not allowed to rotate further. Brace the wrench handle as necessary.
8. Weld the nut to the bolt as specified. Welding the nut prevents the nut from loosening and prevents the bolt and nut from being reused.
9. Do not remove paint marks

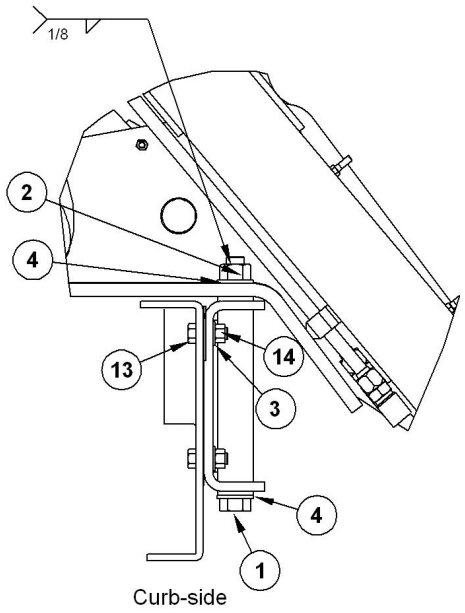


Figure 14. Lift Mount Bolt Location

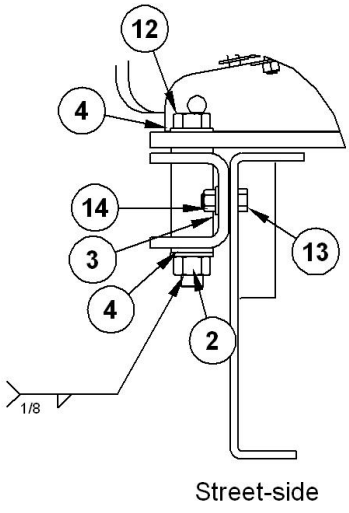


Figure 15. Lift Mount Bolt Location

UNIVERSAL BELT AND TRI-CUFF GRABBER ADJUSTMENTS

A. 60-90 Gallon Belt Grabbers

Adjust the grabber belt length so the distance between the roller on the inner arm and the outside roller is 30” (+/- 1”). See illustration below.

NOTICE

The grabber belt holes on the inside end of the belt are farther apart to make longer adjustments. The holes on the outside end of the belt are closer together to make shorter adjustments.

NOTICE

When the grabbers are used with the Python Lift, adjust the outer rollers so that they do not touch each other when the grabbers are completely closed.

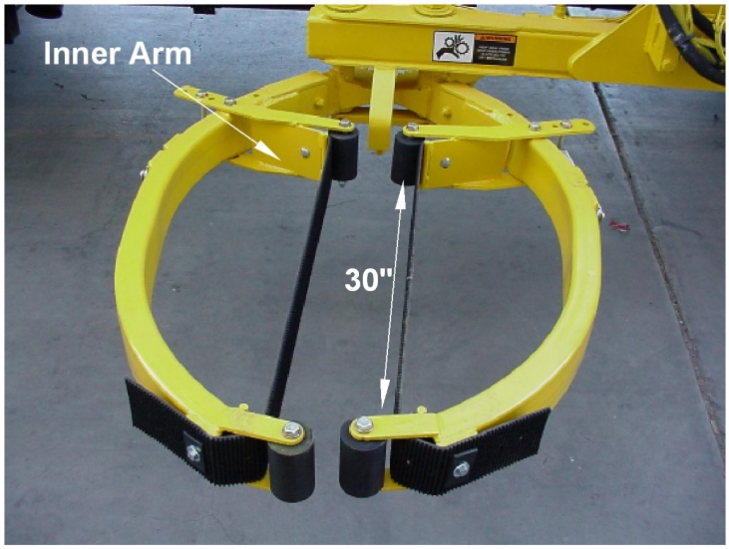


Figure 16. 60-90 Gallon Belt Grabbers

UNIVERSAL BELT AND TRI-CUFF GRABBER ADJUSTMENTS (CONTINUED)

B. 90-300 Gallon Belt Grabbers

Adjust the grabber belt length so the distance between the inner arm and the outside roller is approximate 30” (+/- 1”) to obtain a firm grip for smaller containers. The total overall length of the grabber belt must be set to obtain a firm grip for larger containers. See illustration below.

NOTICE

Do not adjust the total overall belt length too far as this may cause the grabber belt to touch or wear against the outer arm.

NOTICE

When used with the Python lift the grabbers should be adjusted so the outer rollers do not touch each other when the grabbers are completely closed.

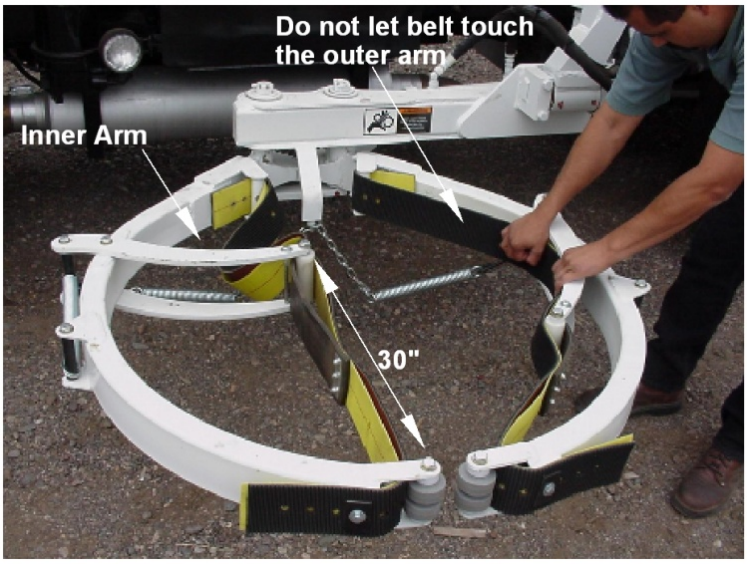


Figure 17. 90-300 Gallon Belt Grabbers

UNIVERSAL BELT AND TRI-CUFF GRABBER ADJUSTMENTS (CONTINUED)

C. 30-110 Gallon Tri-Cuff Belt Grabbers

Adjust the grabber belt length so the distance between the roller on the inner arm and the outside roller is 30” (+/- 1”). See illustration below.

NOTICE

The grabber belt holes on the inside end of the belt are farther apart to make longer adjustments. The holes on the outside end of the belt are closer together to make shorter adjustments.

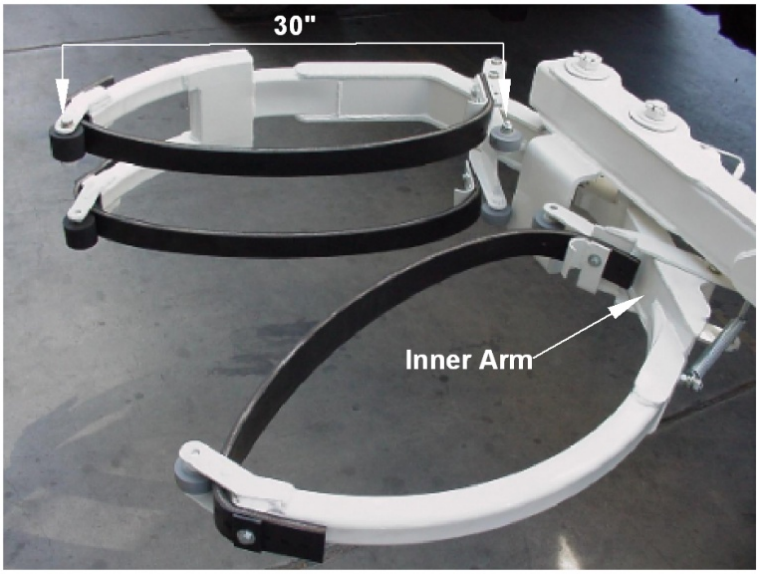


Figure 18. 30-110 Gallon Tri-Cuff Belt Grabbers

LIFT-STOWED AND GRABBERS OPEN PROXIMITY SWITCHES

Adjust the proximity switches to deactivate if grabber or arms are extended outside the width of the vehicle. You will need a 15/16" wrench. The grabbers open proximity switch should be adjusted so that it is activated when the grabbers are fully open. To make adjustments to the lift-stowed (lift-in) proximity switch, you will need a 7/16" wrench. The lift-stowed proximity switch should be adjusted so that it is activated when the lift arm is fully stowed or retracted. See the figure below.

Watch the **Preventive Arm Lift Maintenance** video on the **Heil Service Shack (https://www.heil.com/heil-service-shack)**.

Figure 19. Lift Arm Proximity Switches

LIFT CONTROL VALVE

Some key areas are shown below on the standard lift control valve. The Python Lift uses a precision-machined parallel control valve that does not have interchangeable spools. Each spool is matched to the individual bore. See **Lift Control Valve Pressure Adjustments** 55.

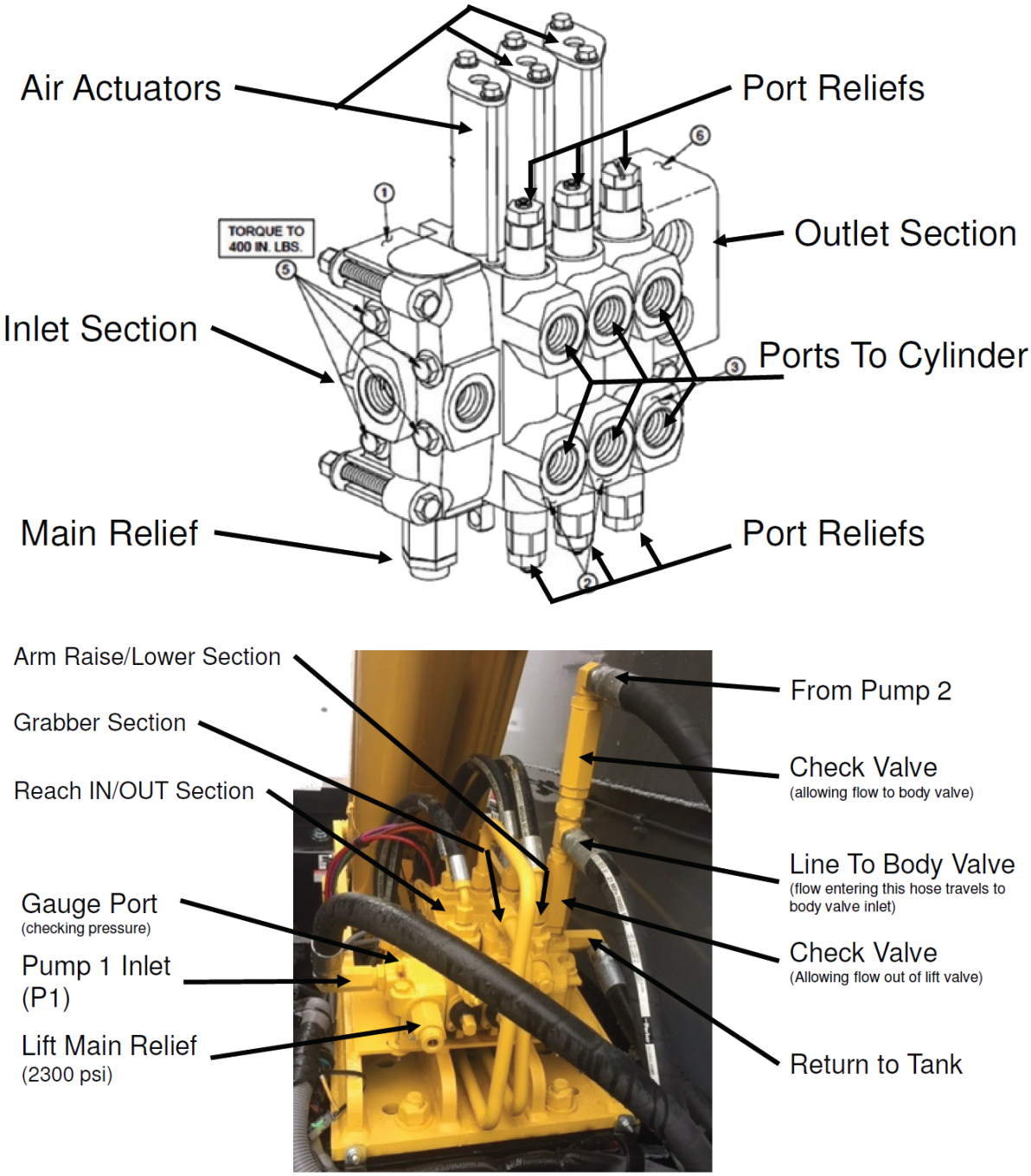


Figure 20. Python Lift Control Valve

LIFT CONTROL VALVE PRESSURE ADJUSTMENTS

The lift control valve has adjustable hydraulic pressure settings that should be checked twice yearly (1000 hrs). All lift valve pressure adjustments are made with the engine running at idle. In general, hydraulic pressures are normally increased by turning the pressure adjusting screw clockwise. Follow the steps below to adjust the pressures on the Python lift arm.

Watch the **Preventive Arm Lift Maintenance** video on the **Heil Service Shack (https://www.heil.com/heil-service-shack)**.

Quantity	Tool
1	Personal protective equipment
1	Pressure gauge (0-5000)
1	1-1/2" Wrench
1	15/16" Wrench
1	7/16" Wrench
1	1/8" Wrench
1	1/2" Hex Wrench
1	Wire cutters
1	Slotted Screwdriver

⚠ 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.

⚠ WARNING

The hydraulic fluid may be under pressure and may spray while you open the connection. Hydraulic fluid may 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.

NOTICE

This procedure requires two properly trained technicians.

Before checking or adjusting the pressure settings, you will need to find a properly trained technician to help. When you are able to recruit some help, create hand signals to use while working together. Nonverbal communication will be key to keeping yourself and any bystanders safe while working with the Python lift arm.

The trained technician will operate the controls form inside the cab, while you will be working on the pressure settings from the street side.

To start checking the Lift Arm Valve Pressures, you will need to put the lift arm in Manual Mode.

A. To Place the Lift Arm In Manual Mode

1. Make sure the key switch is on.
2. The system power is on.
3. Then hold the grabber open and grabber close buttons at the same time, until the alarm stops sounding.

LIFT CONTROL VALVE PRESSURE ADJUSTMENTS (CONTINUED)

B. Checking and Making Adjustments

1. Connect a 0-5000 psi pressure gauge to the gauge port on the inlet of the valve. See the image below.

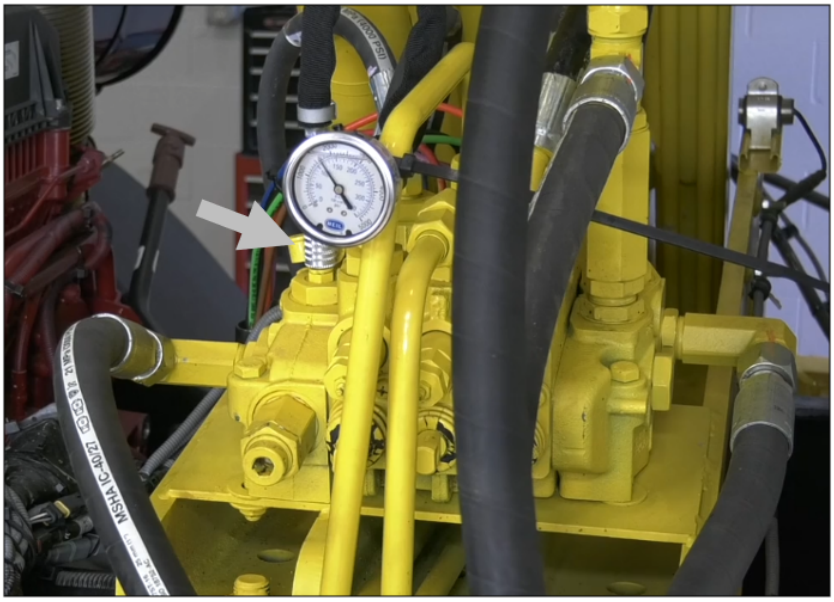


Figure 21. Inlet Section Pressure Gauge Port

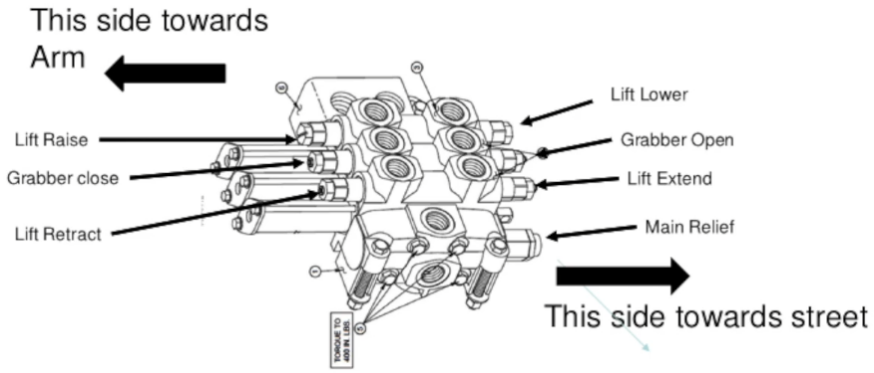


Figure 22. Seven Python Valve Pressure Settings

LIFT CONTROL VALVE RELIEF PRESSURE SETTINGS (PSI)			
LIFT MAIN RELIEF	LIFT UP (RAISE) / DOWN (LOWER)	GRABBER OPEN / CLOSE	LIFT IN (RETRACT) / OUT (EXTEND)
2300	2500 / 1250	1250 / 1250	2500 / 1250

LIFT CONTROL VALVE PRESSURE ADJUSTMENTS (CONTINUED)

B. Checking and Making Adjustments (Continued)

2. To check the main relief on the lift valve, dead head any function that has a higher set point - like lift retract or lift raise, and hold that function while monitoring the pressure gauge. (Dead heading is when you extend or retract a cylinder to its maximum mechanical limit, and continue to maintain pressure for that circuit.)
3. To make adjustments to the main relief, you will first need to loosen the jam nut with a 1-1/2” wrench.
4. To make the adjustment you will need a 1/2” hex wrench, or a socket with ratchet.
5. To check the lift raise and lift retract port relief valves, you will need to raise the main relief one 1/2 turn clockwise so that it is high enough to allow you to see the 2500 psi.
6. Check all port reliefs by dead heading each function, one by one.
7. To make adjustments to the lift lower or lift raise port relief valves, you will need to loosen the jam nut with a 15/16” wrench. Then make the adjustment with a slotted socket bit, or a large slotted screwdriver.
8. To make pressure adjustments to the lift extend, lift retract, grabber open, or grabber close port relief valves; you will need to loosen the jam nuts with a 7/16” wrench. Then make the adjustments with a 1/8” wrench or socket with ratchet.
9. After making pressure relief adjustments, you will need to bring the main relief setting back down to 2300 PSI. To do this, view your pressure gauge while dead heading lift retract. Lower the main relief until the gauge reads 2300 PSI, and then tighten the jam nut.
10. After making pressure adjustments, make sure that all port relief valve jam nuts are tight. Then clean up your work area by removing the pressure gauge, replacing the dust cover over the gauge port, and wiping down the area.

C. To Place the Lift Arm In Automated Mode

1. Make sure the key switch is on.
2. The system power is on.
3. Then hold the grabber open and grabber close buttons at the same time, until the alarm stops sounding.

REMOVE GRABBER BEAM ASSEMBLY

The grabber beam connects the grabber gears and grabbers to the lift arm. If the beam is damaged, you must replace the grabber beam. You need the following tools to replace the grabber beam.

A. Tools Required

Quantity	Tool
1	Personal protective equipment
1	Socket wrench (3/4” and 9/16”)
1	Impact wrench (3/4”, 15/16” and 9/16” sockets)
2	3/4” JIC plugs and caps for hydraulic fittings
1	1-1/4” wrench
1	1-1/8” wrench
1	10” C-clamp
1	1-1/2” steel rod
1	2lb hammer
	Plastic ties

B. Replace Grabber Arm

Replacing the grabber beam requires two people. To replace the beam, complete the following steps:

1. Use the 3/4” wrench and the impact wrench with the 3/4” socket to remove the bolts that connect the grabber arm to the grabber gear assembly.
2. Disconnect the grabber proximity switch cable. Use plastic ties to tie the cable out of the way.
3. Remove grabbers and set aside.
4. Use the impact wrench with the 15/16” socket to remove the retainer plate and the pin retaining bolt. See the figure below. DO NOT remove the pin yet. You will remove the pin in a later step.

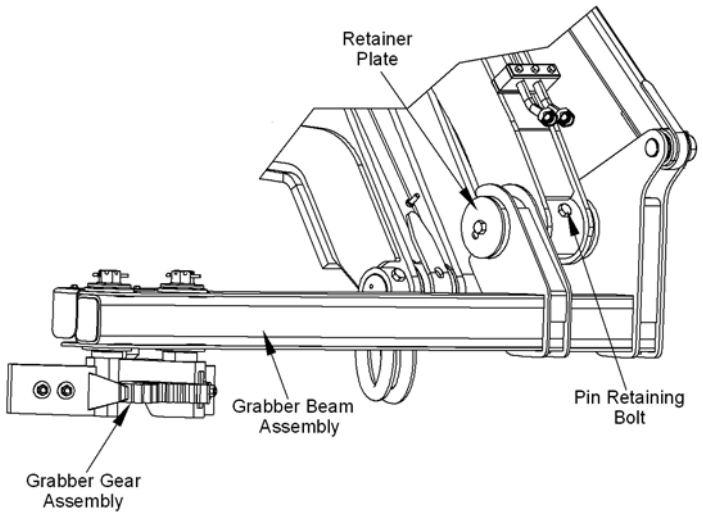


Figure 23. Grabber Beam and Gear Assemblies with Retainer Plate and Pin Retaining Bolt

REMOVE GRABBER BEAM ASSEMBLY (CONTINUED)

5. To make the pin easier to remove, insert a different bolt with a washer into the bolt hole. Inserting this bolt makes it easier to remove the pin. DO NOT use the original bolt.
6. Use the 9/16” wrench and the impact wrench with the 9/16” socket to remove the level pin retaining bolt. See the figure below. DO NOT remove the pin.

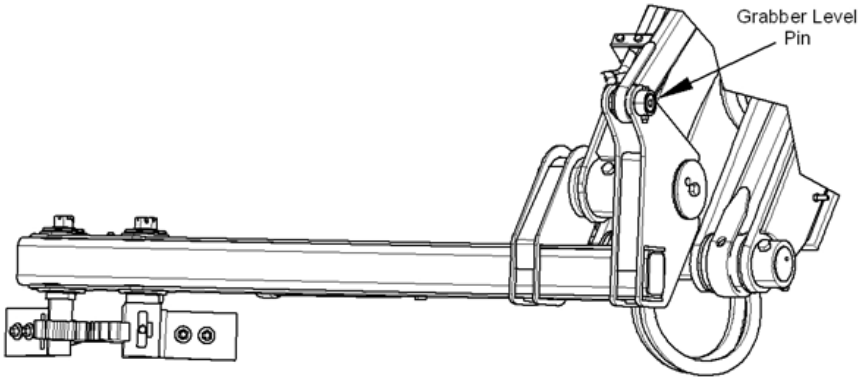


Figure 24. Grabber Level Pin Location

7. Use the 1-1/4” and 1-1/8” wrenches to disconnect the two grabber cylinder hydraulic hoses.
8. Use the 3/4” plugs and caps to cap off the hydraulic fittings and hoses.
9. Use the plastic ties to tie the hydraulic hoses out of the way.
10. Support the grabber arm assembly and use the C-clamp to secure the arm assembly to the support. In the Figure below, the arm assembly is supported by a fork lift.

Figure 25. Secured Grabber Arm

11. Remove the grabber level pin.
12. Use the 1-1/2” steel rod and the 2 lb hammer to remove the grabber pin. Make sure the spacers in the bore do not fall out when you remove the grabber pin. Use plastic ties to hold the spacers in place. Make sure you lay aside the retainer plate from the opposite side when you remove the pin.
13. Slowly lower the grabber beam assembly.

NOTICE

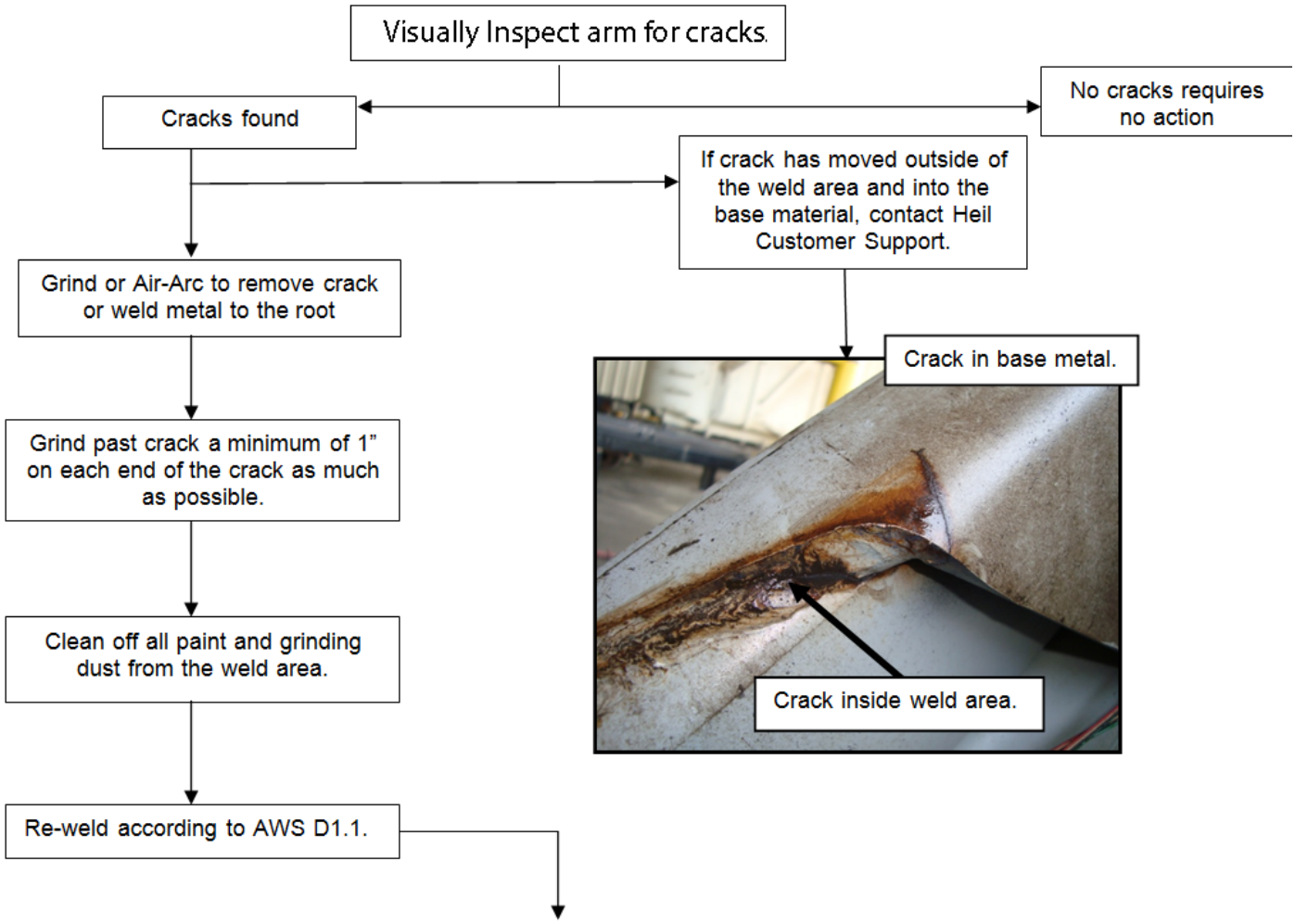
Before re-installing pins, be sure to coat all pins with anti-seize compound.

Lift Arm

14. To replace the arm, perform these steps in reverse.

LIFT AND WELD CRACKS DECISION TREE

Use this decision tree to help you decide whether to repair a crack or to replace the entire lift arm.



Weld Procedure			
.045 ER70S-X	**.35 ER70S-X**	**5/13 ER6010**	**1/8 ER7018**
Volts: 37 - 32	**Volts:** 26 – 30	**Amps:** 170	**Amps:** 130
WFS: 450 – 525 IPM	**WFS:** 500 – 575 IPM	**Polarity**: DC+	**Polarity:** DC+

Follow these welding requirements for repairing the lift arm.

1. All material shall be free from paint, soil, grease, dirt, and any other non-metal contamination.
2. Weld according to the Weld Procedure.
3. All welds shall be in conformance of AWS D1.1.
4. Inspection supervisor required.
5. Attach the ground lead as close as practical to the section where you are working. Disconnect the battery negative or ground cable from the battery.

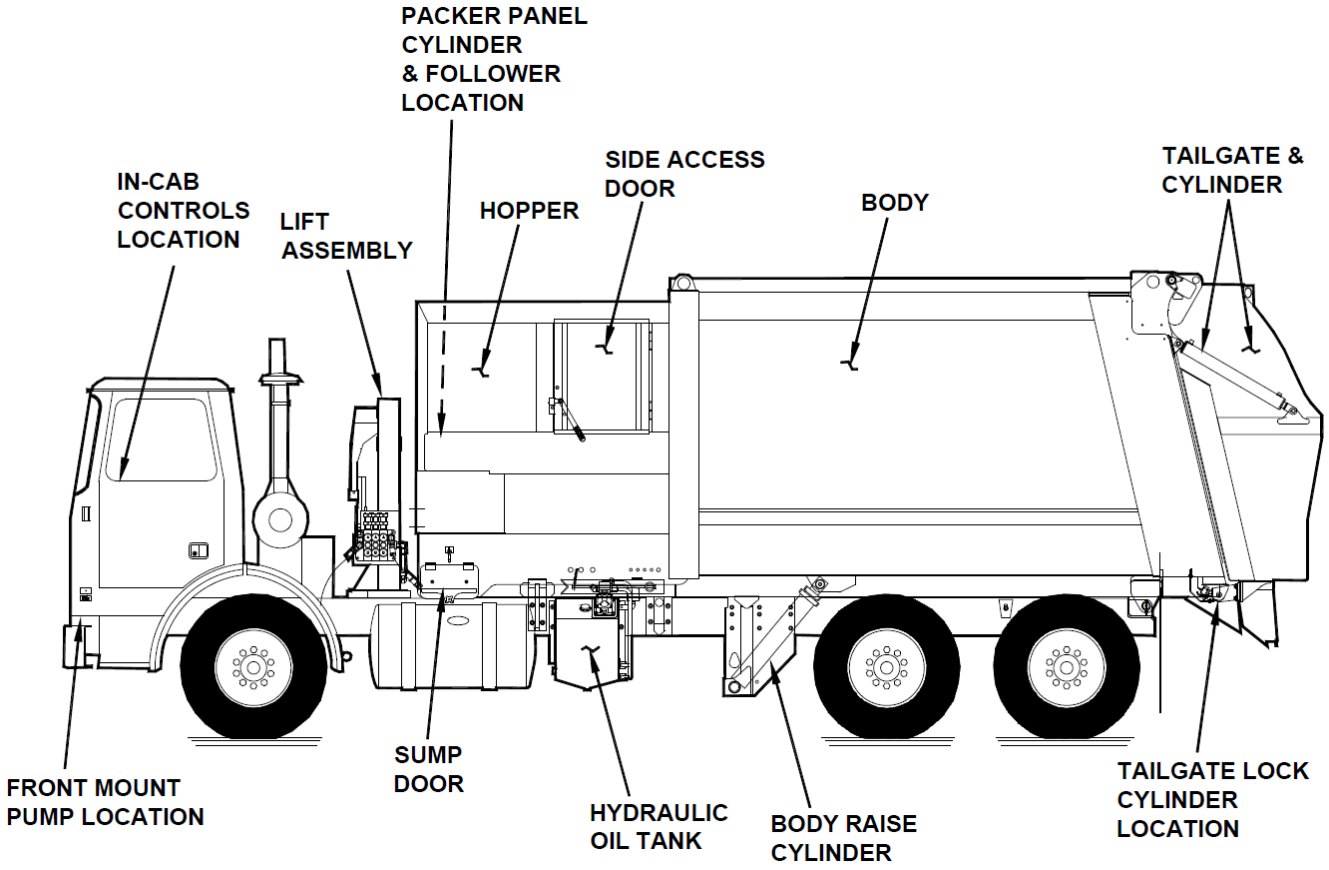
NOTES

SECTION 4
BODY AND TAILGATE

BODY AND TAILGATE

BODY NOMENCLATURE

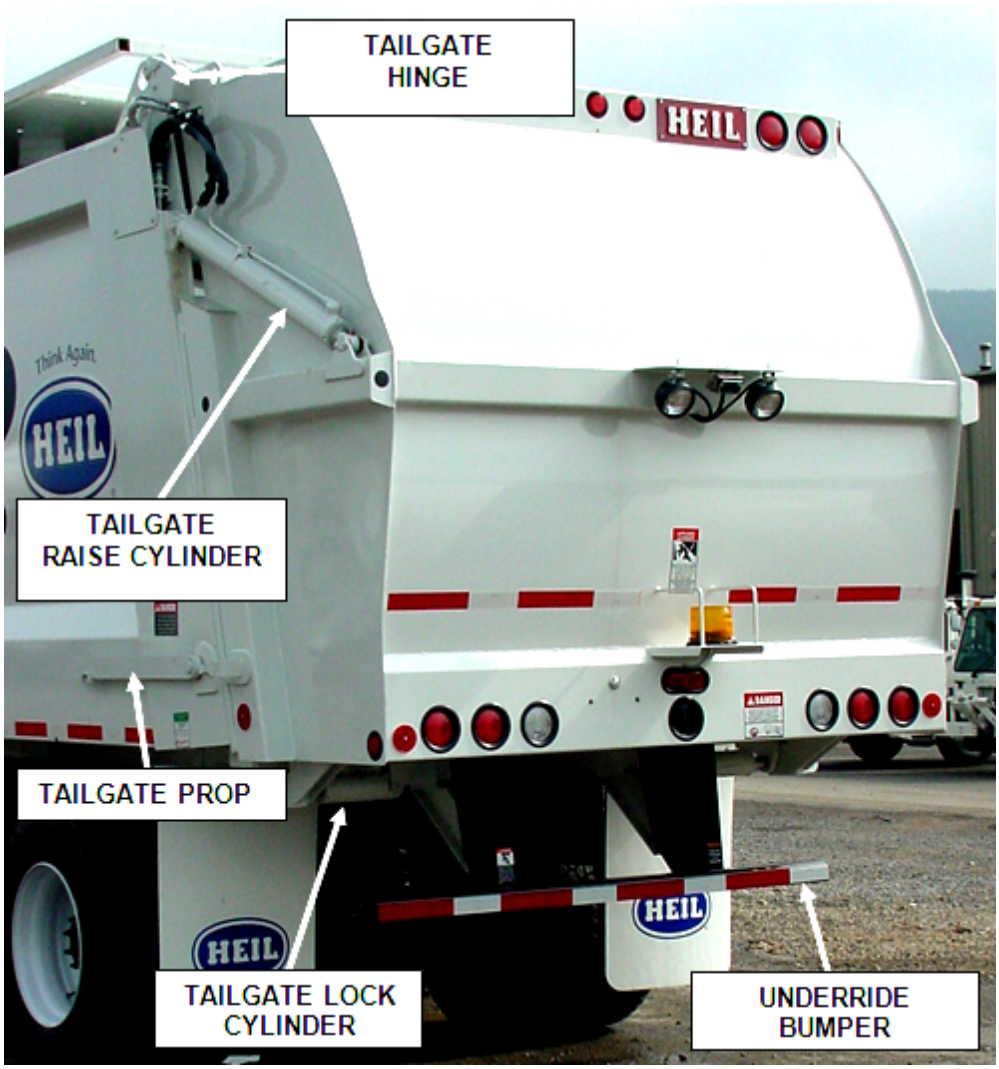
Shown below are some of the features of the body.



BODY AND TAILGATE

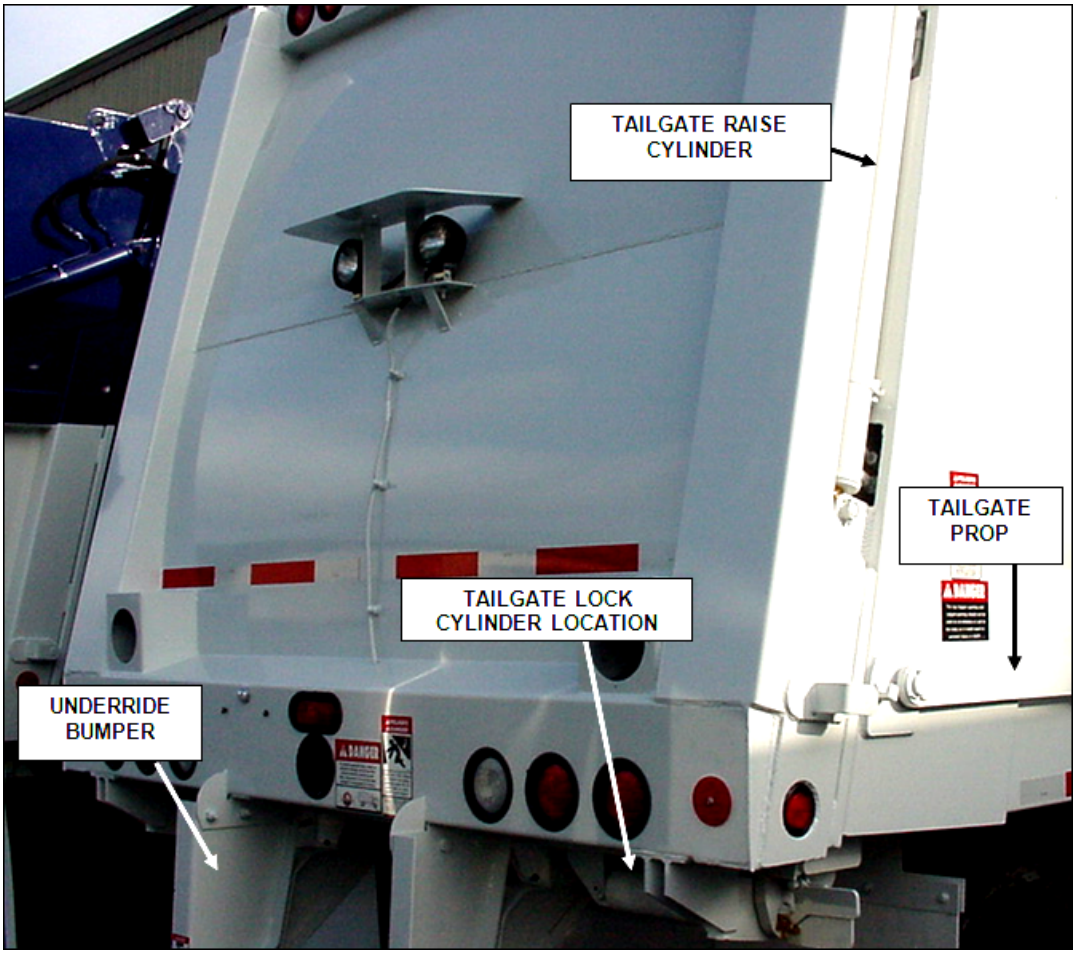
TAILGATE NOMECLATURE

Shown below are some of the features of the tailgate.



OPTIONAL FLAT TAILGATE NOMENCLATURE

The optional Flat Tailgate weighs about the same as the standard bubble tailgate. This tailgate is not designed to save weight but to transfer more weight to the front axle to achieve a more desirable weight distribution. Shown below are some of the features of the optional Flat Tailgate.



PROPPING THE BODY OF A SERVICE HOIST UNIT

Operators **MUST KNOW** how to **SAFELY** prop up the unit's body. You may need to prop the body up when you clean the inside of the body or for maintenance or repair procedures. Observe and obey the following DANGER and WARNING notices while you prop the body with the factory body props.

⚠ DANGER

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

⚠ DANGER

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

⚠ WARNING

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

⚠ WARNING

Never drive the unit with the body propped.

NOTICE

Empty body of all refuse before using body props.

NOTICE

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

PROPPING THE BODY OF A SERVICE HOIST UNIT (CONTINUED)

The factory-supplied body props are located on both sides under the body and forward of the rear wheels. Refer to the figure to the right and carefully follow the body propping procedures below.

☑ Follow These Steps to Raise the Body:

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

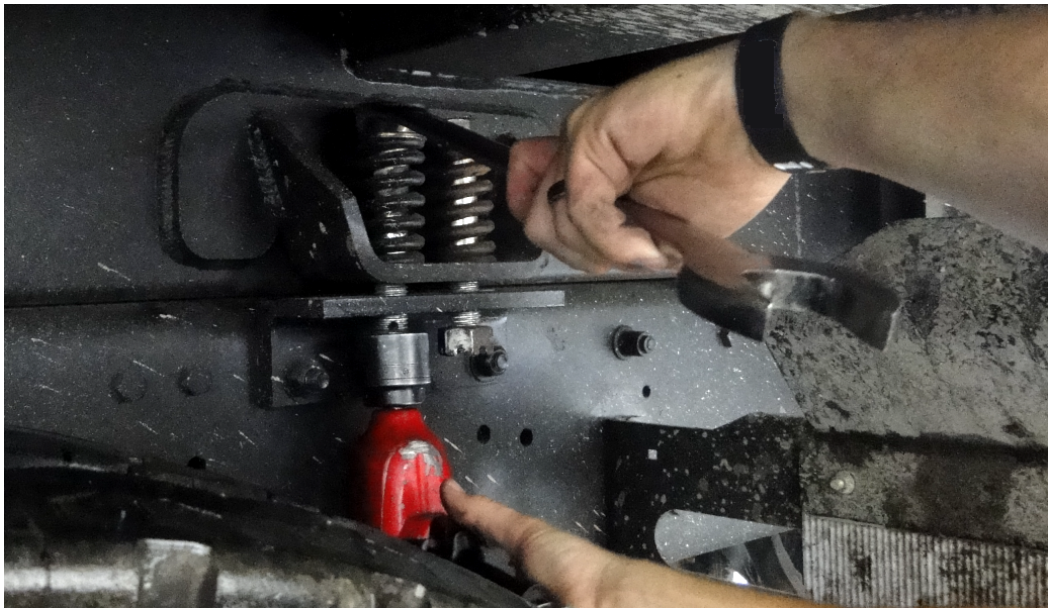


Figure 26. Removing Bolts and Springs from Chassis Mounting Brackets

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

PROPPING THE BODY OF A SERVICE HOIST UNIT (CONTINUED)

12. NEVER open the override valve when the body is elevated.
13. Perform the maintenance or service procedures.

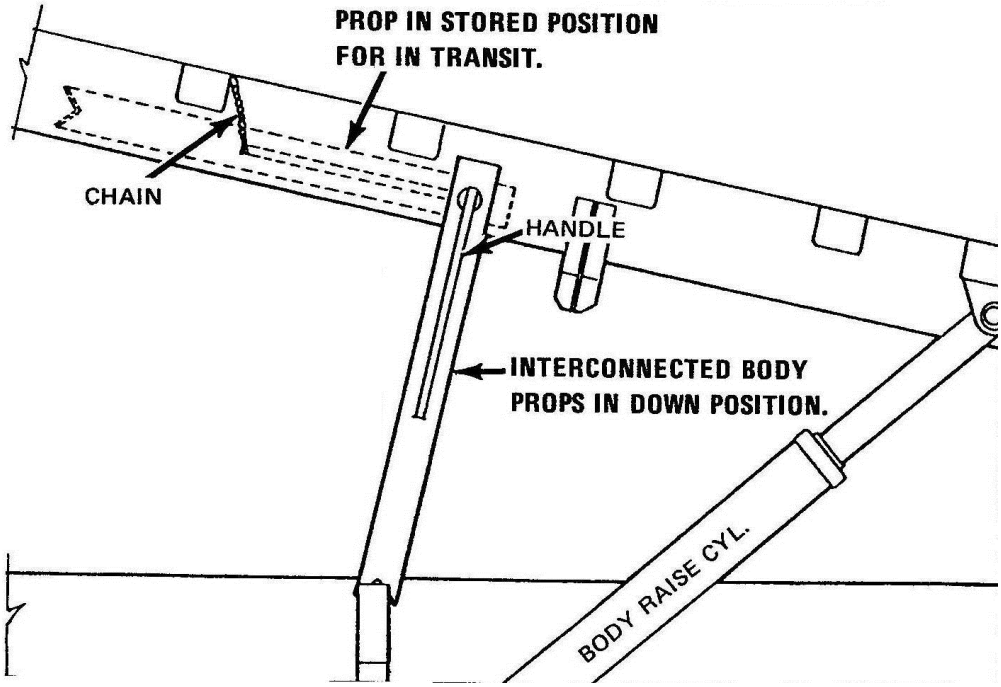


Figure 27. Factory Body Props

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

Operators **MUST KNOW** how to **SAFELY** prop up the unit's body. You may need to prop the body up when you clean the inside of the body or for maintenance or repair procedures. Observe and obey the following DANGER and WARNING notices while you use a service lift to raise the body.

⚠ DANGER

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

⚠ DANGER

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

⚠ DANGER

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

⚠ WARNING

Never drive the unit with the body propped.

NOTICE

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

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

The factory-supplied body props are located on both sides under the body and forward of the rear wheels. Refer to the figure to the right and carefully follow the body propping procedures below.

☑ Follow These Steps to Raise the Body:

1. Empty body of all refuse.
2. Make sure that body is on firm, level ground with the Parking Brake engaged and holding and place chocks on the wheels.
3. **Lock-Out/Tag-Out** 14 the unit.
4. Remove the bolts and springs from the chassis mounting brackets. See the figure below.

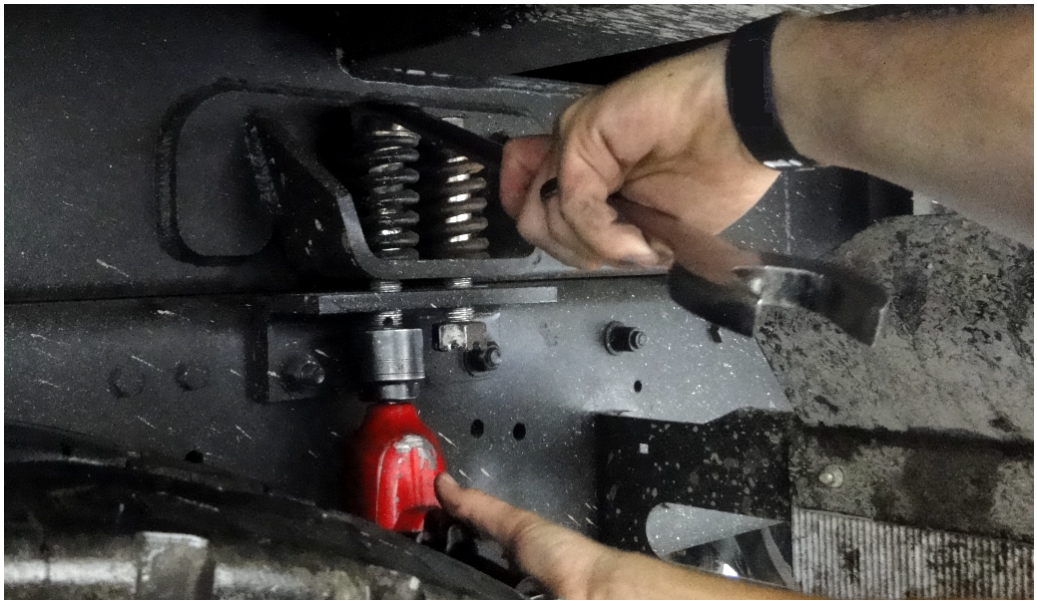


Figure 28. Removing Bolts and Springs from Chassis Mounting Brackets

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

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

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

29. Front Body Chain Hook Lugs

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

Figure 30. Release and Lower Factory Body Props

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

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

31. Release and Lower Factory Body Props

11. Perform the maintenance or service procedures.

☑ Follow These Steps to Lower the Body:

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

BODY AND TAILGATE

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

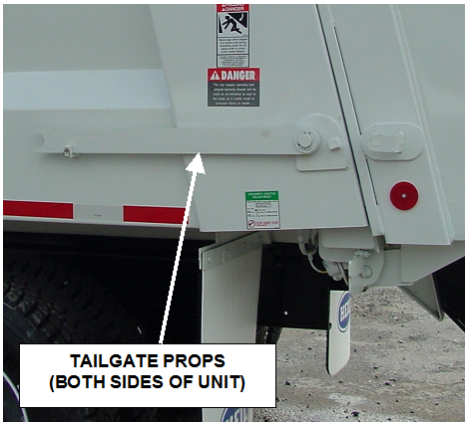
Two props are installed on the unit. Both props must be used!

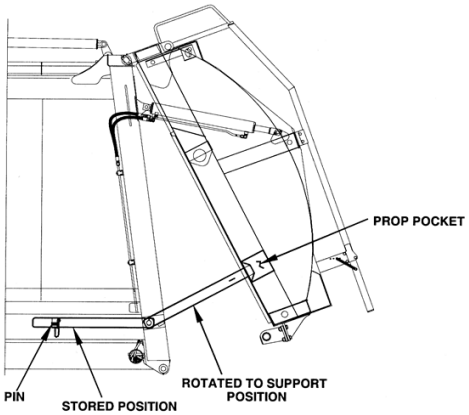
A. How to Use the Tailgate Props

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** 14 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.





BODY AND TAILGATE

SIDE ACCESS DOORS

Hinged access doors are located on each side of the unit. See the figure below.

⚠ WARNING

Make sure the unit is in the Lock-Out/Tag-Out mode when you do maintenance or service procedures, when you go in the hopper, enter the side access doors, or climb on the body or 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, enter the hopper or climb on the body or equipment can cause serious injury or death.

Figure 32. Side Access Door

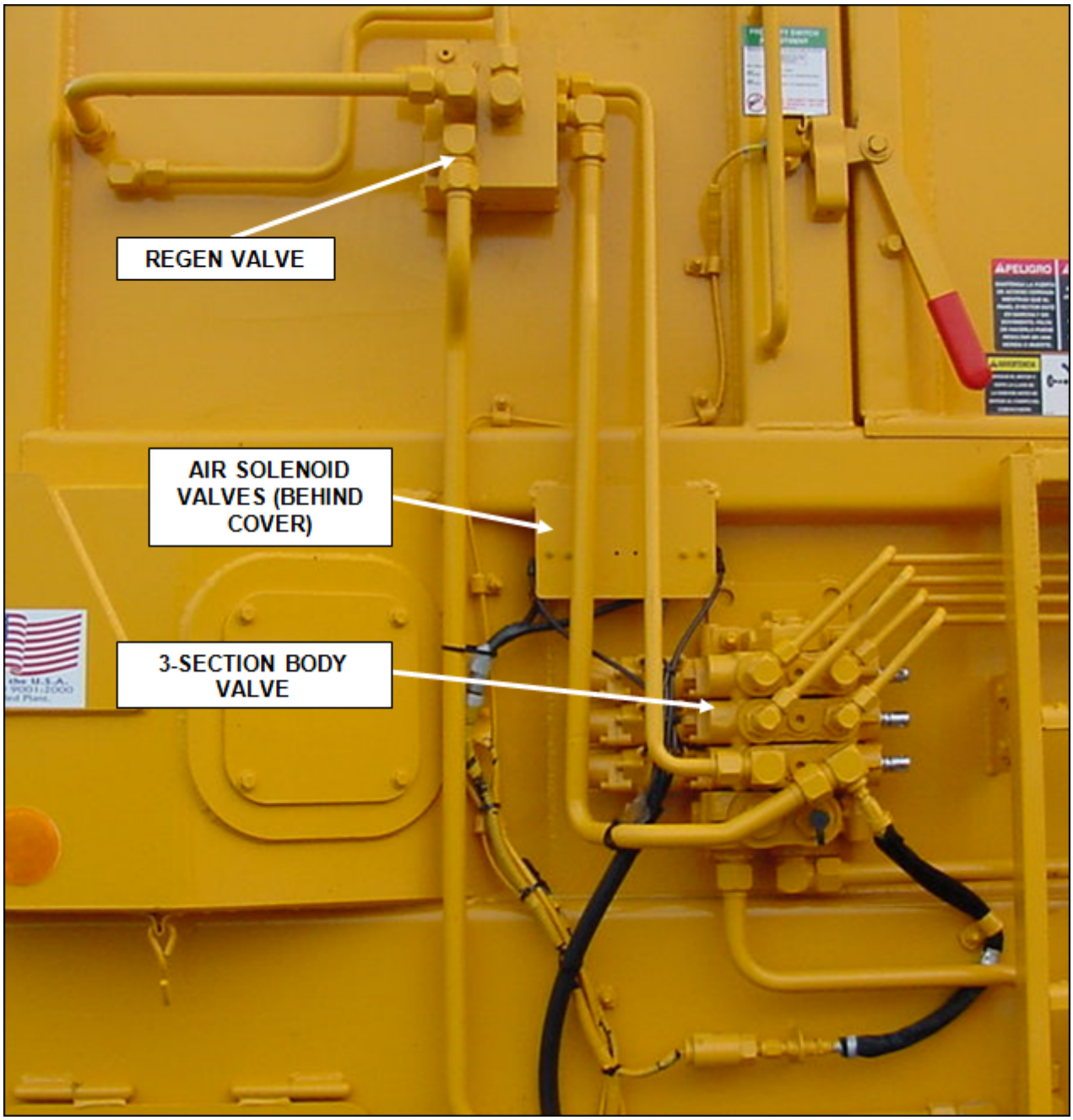
BODY SUMP DOORS

Sump doors are located on the front corner of each side of the body. Open the doors when cleaning out the sump area. A cleaning tool is provided with each unit. Close the doors at all times except when cleaning. Cleaning should occur daily. See the figure below.

Figure 33. Body Sump Doors

MAIN CONTROL AND REGENERATIVE VALVES

The image below shows the regenerative valve and body valve locations on the street side of the unit.



REGENERATIVE VALVE (031-6227)

Part time regenerative valve during packer extend.

Full time dump valve during packer retract.

Also see **Regenerative Valve Troubleshooting Guide** 92.

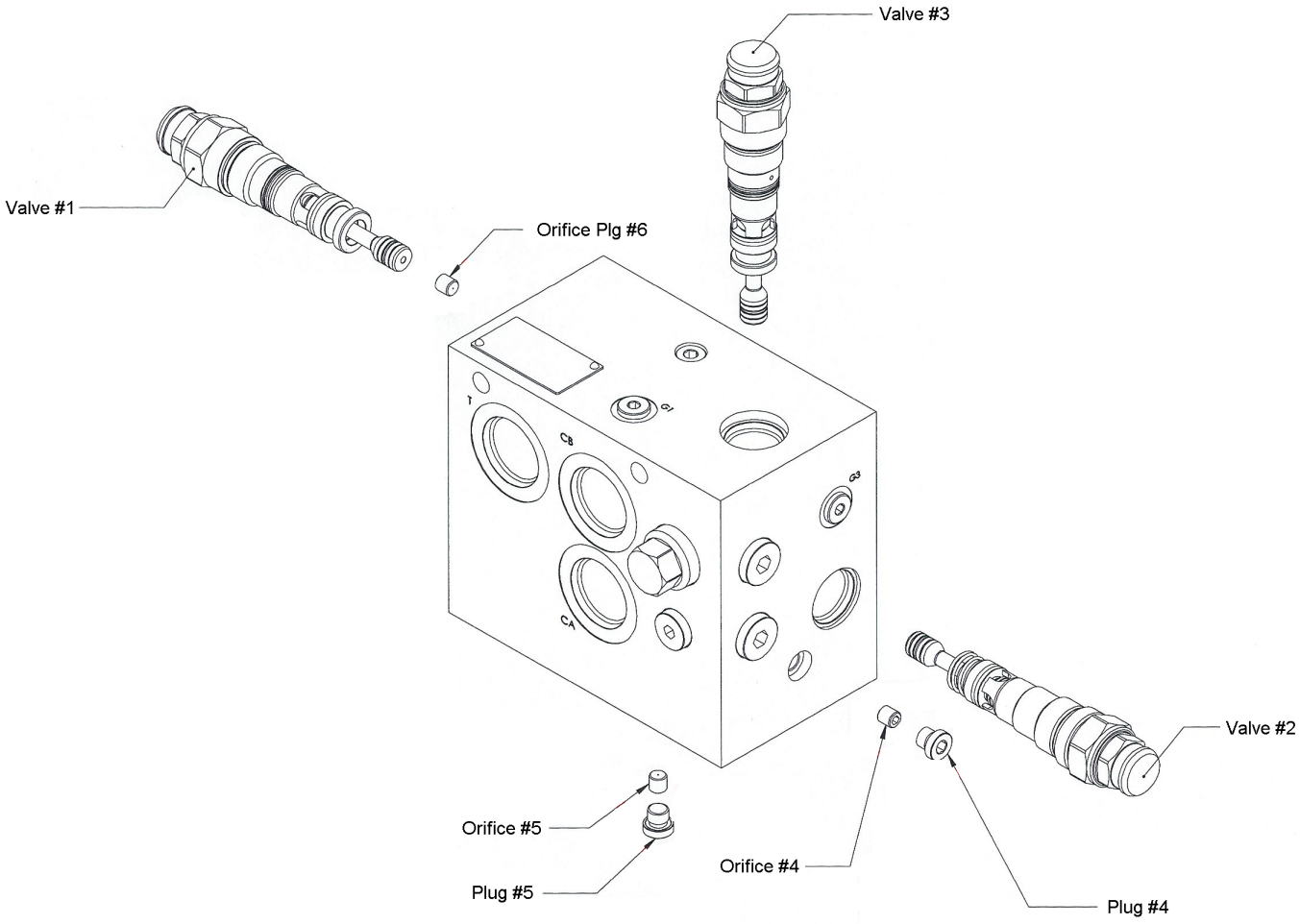


Figure 34. Regenerative Valve

AIR SUPPLY REGULATOR – PNEUMATIC DIAGRAMS

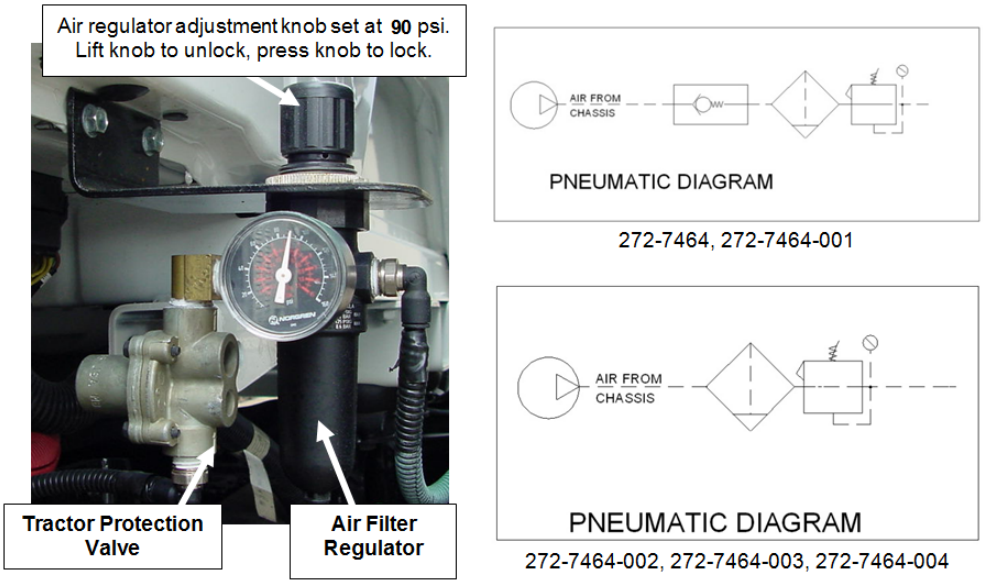


Figure 35. Air Supply Regulator

WELDING AND ELECTRONIC DEVICES / ELECTRICAL LUBRICANTS

Before welding on any unit with electronic devices like the Cortex Controller™, electronic control units (ECUs), 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 and all other electronic control units (ECUs).
- If welding within 24 inches of a proximity switch, remove the switch from the unit.

NOTICE

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

Electrical Anti-Corrosion Lubricant

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

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

These lubricants may be obtained at an electrical supply store.

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** 30 for recommended procedures for inspecting proximity switches.

NOTES

SECTION 5
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.
Tailgate Seal Integrity	☑					
Packer/Ejector Cylinder Preventive Maintenance	☑	☑	☑			See **Packer/Ejector Cylinder Preventive Maintenance** 87.
Packer/Ejector Panel Bolt-in Cylinder Mount Bolts			☑			Check for tightness. Bolt torques should be 192 Ft-Lbs. (lubricated threads)
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

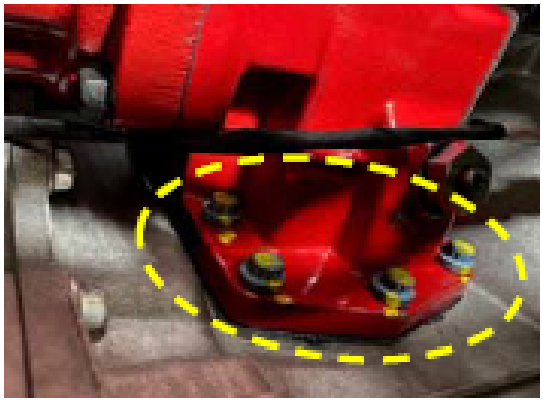
With the unit in Lock-Out/Tag-Out mode with the hydraulic pressure relieved, carefully follow the steps below.

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

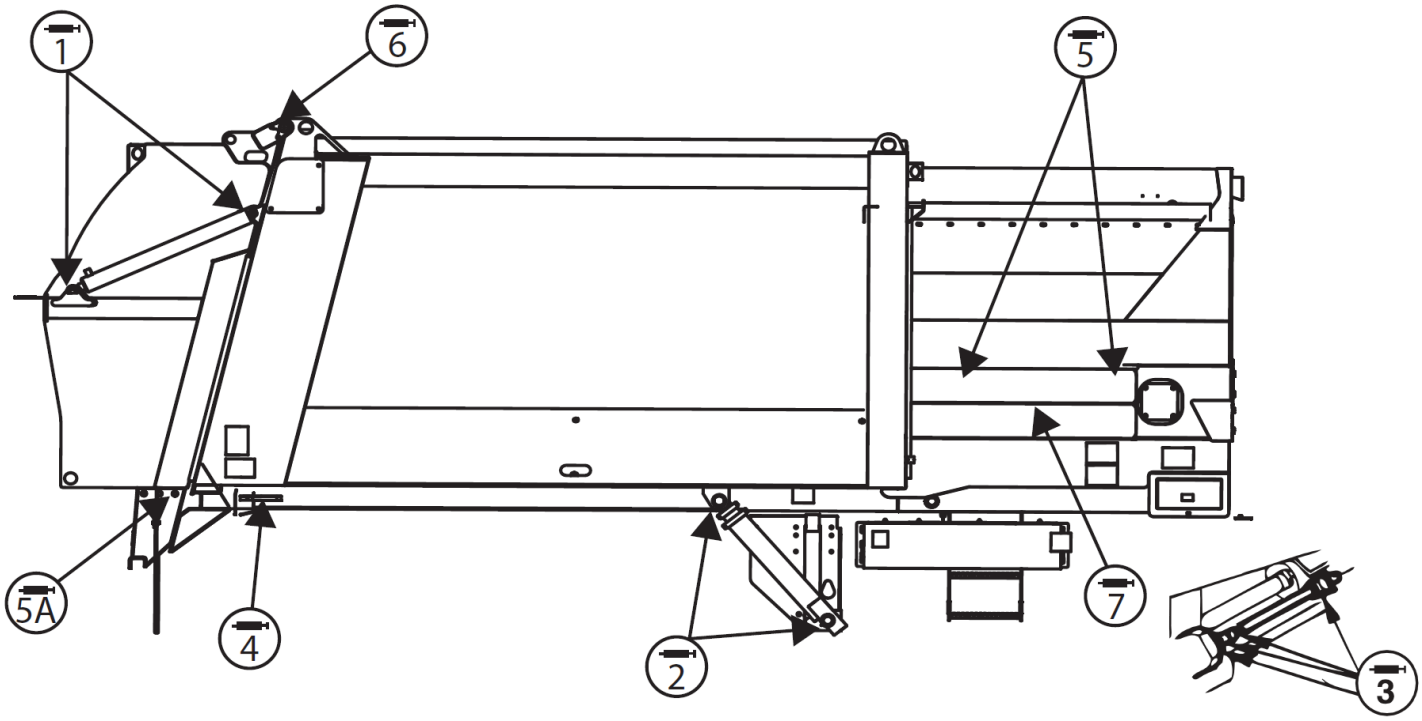
(4) Take the unit out of Lock-Out/Tag-Out mode and operate unit functions.

(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. Also see **Lift Arm Lubrication Guide**.



REF No.	DESCRIPTION	QTY.	Frequency
1	Tailgate Cylinders	4	Weekly/Every 50 Hours
2	Hoist Cylinder	4	Weekly/Every 50 Hours
3	PTO Drive Shaft	3	Weekly/Every 50 Hours
4	Rear Body Pivot Hinge	2	Weekly/Every 50 Hours
5	Packer Cylinders	4	Weekly/Every 50 Hours
5A	Tailgate Lock Bearing	4	Weekly/Every 50 Hours
6	Tailgate Hinge	2	Weekly/Every 50 Hours
7	Packer Panel Tracks	-	Monthly/Every 200 Hours

PACKER/EJECTOR CYLINDERS PREVENTIVE MAINTENANCE

It is critical to follow the guidelines of the **Body Preventive Maintenance Chart** 83 and **Body Lubrication Guide** 86 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.
  - causing increased friction at spherical bearings
  - 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).

PRESSURE ADJUSTMENTS

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. MAKE SURE the unit is on flat, stable ground and apply the parking brake and chock the wheels.
3. Notify anyone in area that the arms and forks will be operated during this procedure.
4. Make sure unit is full of hydraulic oil.
5. 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.
6. Connect a 5000 psi hydraulic gauge to the quick-disconnect located on the lift arm control valve.
7. Start the engine and engage the hydraulic 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.

⚠ WARNING

The hydraulic fluid may be under pressure and may spray while you open the connection. Hydraulic fluid may 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.

NOTICE

This procedure requires two properly trained technicians, one to operate the controls from within the cab while the other will be working on the pressures settings from the street side of the unit.

NOTICE

The unit must remain in neutral during all pressure setting procedures.

B. Required Tools

These are the tools required to make pressure adjustments.

Quantity	Tool	Quantity	Tool
1	Personal protective equipment	1	1/8" Wrench
1	Pressure gauge (0-5000)	1	1/2" Hex Wrench
1	1-1/2" Wrench	1	Wire cutters
1	15/16" Wrench	1	Slotted Screwdriver
1	7/16" Wrench		

PRESSURE ADJUSTMENTS (CONTINUED)

C. Standard Pressures and Cycle Times

DURAPACK® PYTHON® STANDARD PRESSURES AND CYCLE TIMES										
MODEL	LIFT MAIN RELIEF	LIFT UP / DOWN	GRABBER RELIEF OPEN / CLOSE	REACH RELIEF IN (RETRACT) / OUT (EXTEND)	BODY MAIN RELIEF	PACKER PRESSURE SWITCH	CNrG® TAILGATE RAISE PORT RELIEF	TOP DOOR OR HOPPER COVER	LIFT CYCLE TIME	PACKER CYCLE TIME
Dump	2300	2500 / 1250	1250 / 1250	2500 / 1250	2500	2200	1500 PSI	1500 PSI	7 - 9 sec @ 28 GPM	12 -16 @ 27 GPM
Eject	2300	2500 / 1250	1250 / 1250	2500 / 1250	2500	2200	1500 PSI	1500 PSI	7 - 9 sec @ 28 GPM	12 -16 @ 27 GPM
EOS SETTINGS	Lift Controls Disengage at 900 rpm - Lift Pump Disengage at 1050 RPM - Body Pump 1600 RPM									
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									

D. Packer Pressure Switch

The packer pressure switch is connected to the special 90° elbow that goes into the packer valve section. This switch is set at 2200 PSI. Make sure the orifice inside the snubber is clean and open so that fluid flow is not blocked. If you remove the snubber for cleaning, be sure to replace it to keep the pressure switch from failing. When setting the packer pressure, use a 5000 psi and the tailgate lock function to adjust the pressure. See the figures below.

- Lower pressure - Turn set screw counter-clockwise.
- Raise pressure – Turn set screw clockwise.

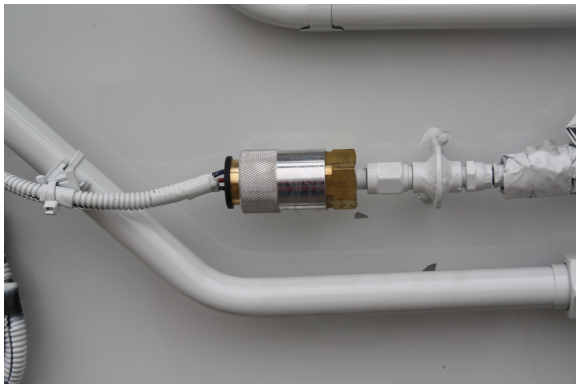


Figure 36. Packer Panel Switch

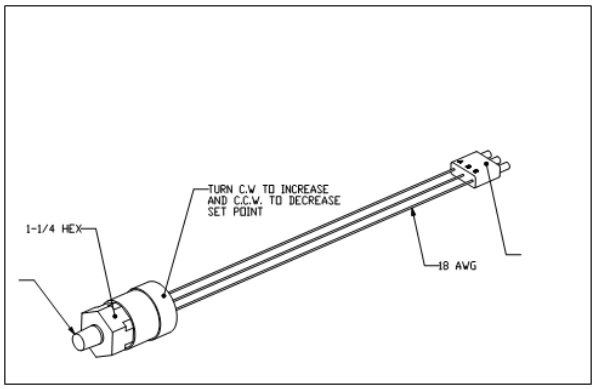


Figure 37. Packer Pressure Switch Adjustment

1. Install the 0-5000 PSI pressure gauge in the fitting on the inlet section.
2. Install a test harness between the pressure switch and the body harness.
3. The hydraulic oil must be at or near operating temperature. If not, warm the oil.
4. Remove any dirt around the main relief valve.
5. Lower the main relief to 2200 psi +/- 10 psi using the tailgate lock function.
6. Disconnect the full extend packer proximity switch.

PRESSURE ADJUSTMENTS (CONTINUED)

D. Packer Pressure Switch (Continued)

7. For Operate-In-Gear-At-Idle units, start the engine, leave it idling and place the transmission in neutral. Set the parking brake.
8. Deadhead the packer fully extended.
9. Increase the pressure switch setting until the test light stays on.
10. Decrease the pressure switch setting until the test light goes off. Decrease the pressure switch approximately 1/8 turn every two seconds.
11. Return the main relief to 2500 psi.

NOTICE

It is very import to make pressure changes slowly. Quick changes can result in mistakes.

E. Verify Pressure Switch Setting

1. Install the 0-5000 PSI pressure gauge in the fitting on the inlet section.
2. Install a test harness between the pressure switch and the body harness.
3. The hydraulic oil must be at or near operating temperature. If not, warm the oil.
4. Remove any dirt around the main relief valve.
5. Lower the main relief to 2000 psi +/- 10 psi using the tailgate lock function.
6. Disconnect the full extend packer proximity switch.
7. For Operate-In-Gear-At-Idle units, start the engine, leave it idling and place the transmission in neutral. Set the parking brake.
8. Deadhead the packer fully extended.
9. Slowly increase the main relief by small increments (1/16 – 1/8 turns). Pause for at least three (3) seconds between increments. Increase the main relief until the test light goes out.
10. Note the main relief pressure setting. This is the value of the pressure switch setting.
11. Return the main relief to 2500 psi.

F. Lift Control Valve

Refer to **Lift Control Valve Pressure Adjustments** 55 in the Lift Arm section.

G. Body Control Valve

Body Valve Pump 1

The following procedure will show pressure from Pump 1 only, having a power beyond system on the Python, the lift valve is daisy chained with the body valve. The lift main relief is normally set at 2300 PSI.

Following the below procedure will show 2300 PSI and turn the body valve relief valve adjustment screw will not change the pressure.

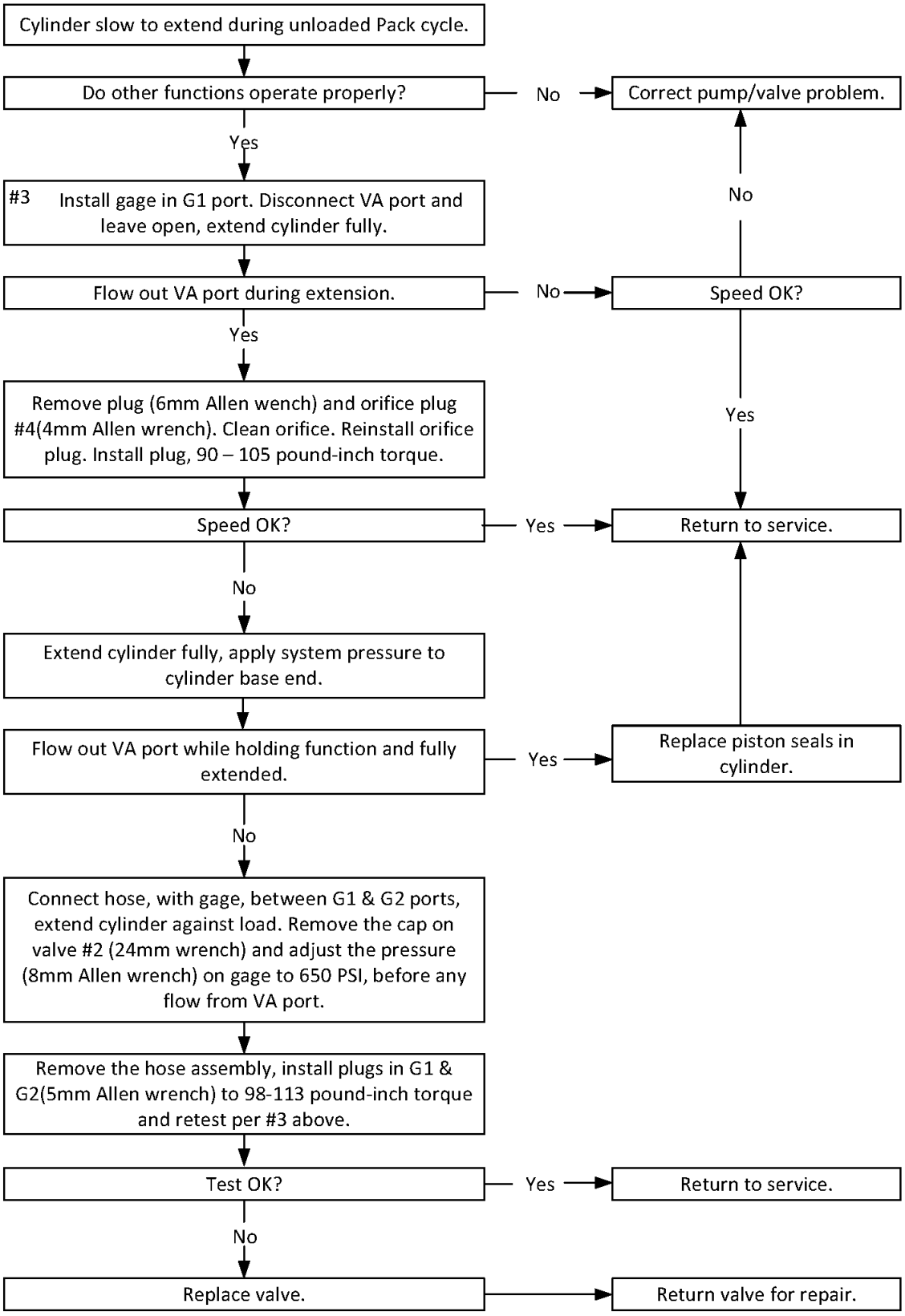
1. Install 5000 psi pressure gauge on body valve quick-disconnect.
2. Activate and hold tailgate lock air toggle.
3. Verify pressure on gauge reads 2500 psi.
4. If pressure reading is incorrect, using an open end wrench, remove caste nut on main relief.

5. Using allen wrench loosen jam nut on body main relief.
6. Using allen wrench on main relief adjusting screw, adjust main relief by turning "in" (clockwise) to increase pressure or “out” (counter-clockwise) to decrease pressure.
7. Using allen wrench tighten jam nut. When tightening jam nut, use allen wrench to hold adjusting screw to prevent adjustment screw from turning.
8. Using allen wrench replace and tighten caste nut.

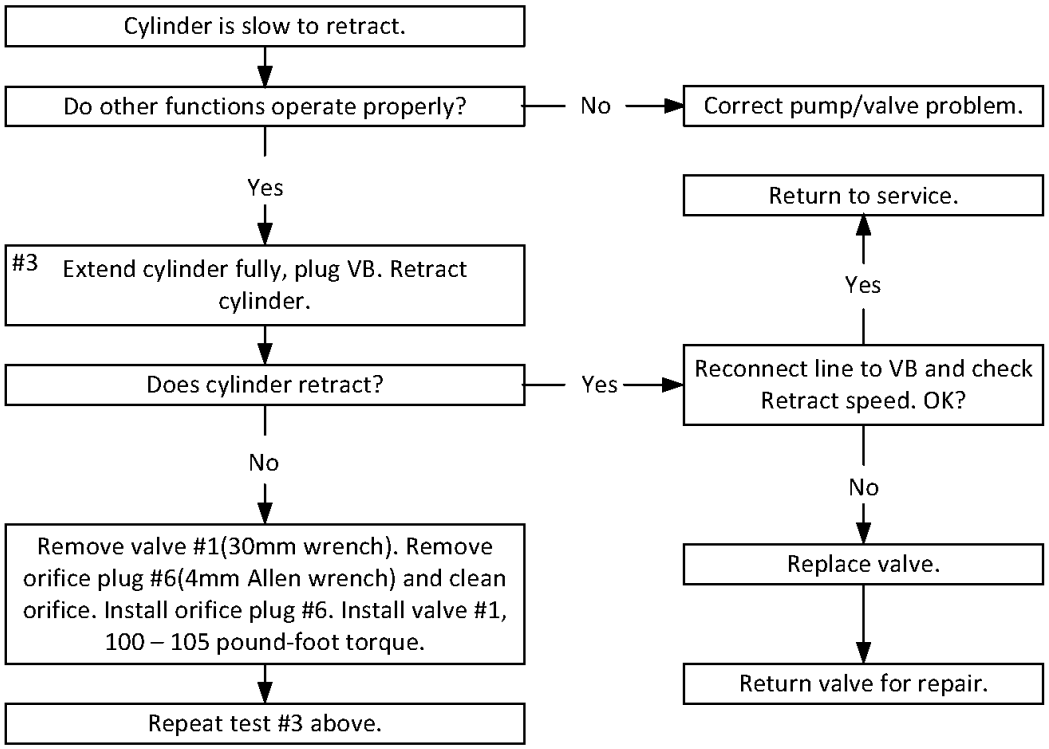
Body Valve Pump 2

1. Install 5000 psi pressure gauge on body valve quick-disconnect.
2. Disconnect low torque pressure switch installed on the pump.
3. Unlock and slightly raise the tailgate
4. Activate packer extend until it reaches the end stroke and hold the function while a helper watch the gauge.
5. Verify pressure on gauge reads 2500 psi.
6. If pressure reading is incorrect, using an open end wrench, remove caste nut on main relief.
7. Using allen wrench loosen jam nut on body main relief.
8. Using allen wrench on main relief adjusting screw, adjust main relief by turning "in" (clockwise) to increase pressure or “out” (counter-clockwise) to decrease pressure.
9. Using allen wrench tighten jam nut. When tightening jam nut, use allen wrench to hold adjusting screw to prevent adjustment screw from turning.
10. Using allen wrench replace and tighten caste nut.
11. Return packer home.
12. Lower and lock the tailgate.
13. Reconnect Low Torque pressure switch.
14. Remove pressure gauge.

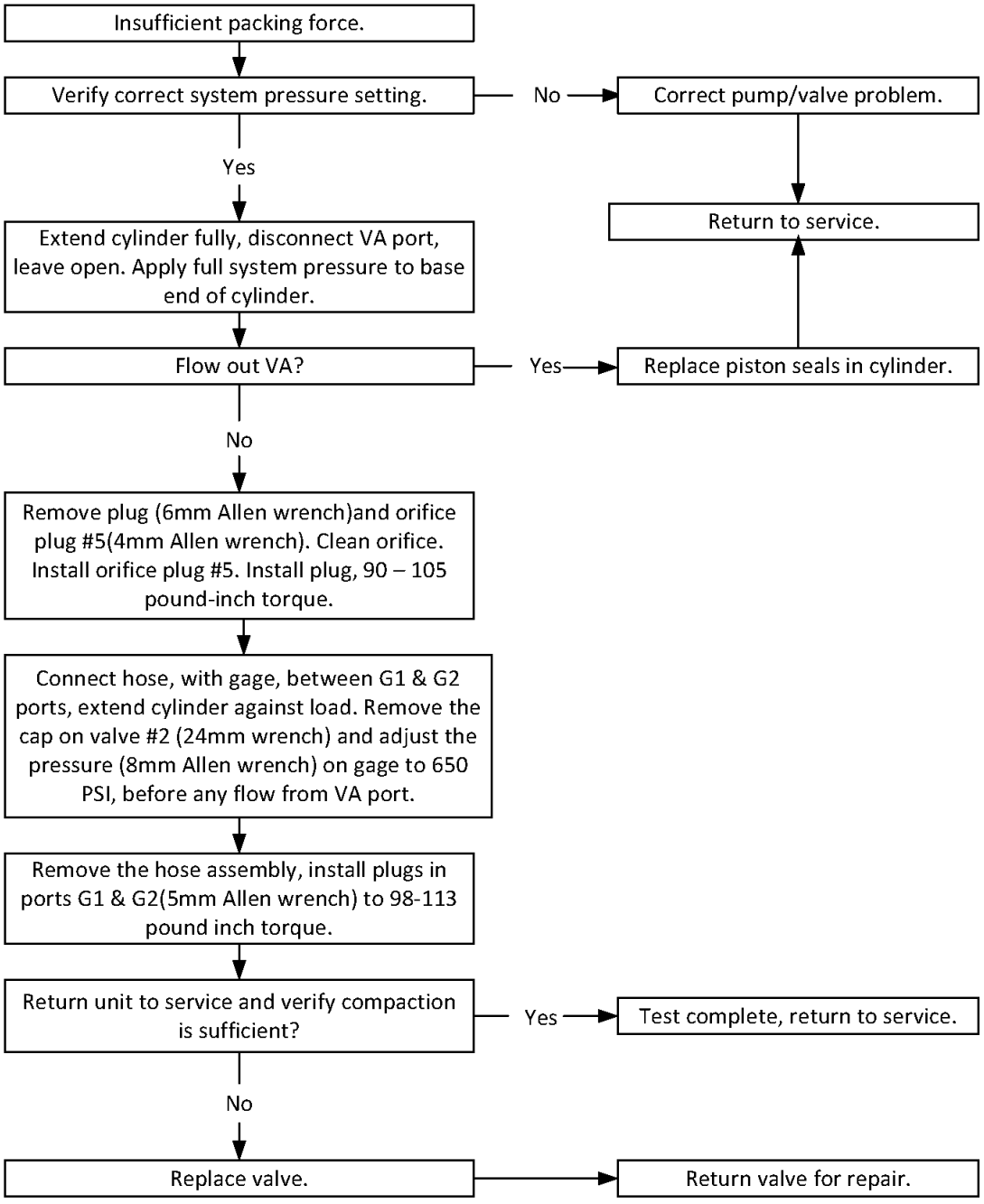
REGENERATIVE VALVE (031-6227) TROUBLESHOOTING GUIDE



REGENERATIVE VALVE (031-6227) TROUBLESHOOTING GUIDE (CONTINUED)



REGENERATIVE VALVE (031-6227) TROUBLESHOOTING GUIDE (CONTINUED)



PACKER/EJECTOR PANEL ADJUSTMENT

Proper maintenance of the packer panel and ejector panel is important to the overall operation of the unit. Failure to maintain proper adjustment can affect payload and cause cylinder or structural damage.

A. Retract Stroke

Make this adjustment with the hydraulic system at operating temperature and the engine RPM held at a level to cause the packer panel to move at its fastest speed during retract. On some units, the fastest packer speed during retract occurs at engine idle.

1. Adjust the retract proximity switch so the packer panel retract function shuts off and the panel comes to rest two (2) inches away from the front head. (The outside proximity switch is located on the front head.) Do not let the packer panel contact the front head. See the Figure below.
2. After the retract stroke is set, cycle the packer panel again. When the panel stops retracting, manually press the retract button and note the travel left between the packer panel and the front bulkhead. On some units the outside proximity switch must be disconnected before you manually press the retract button. If the travel is less than 2”, repeat step (1).

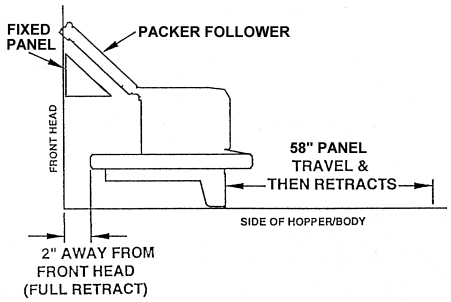


Figure 38. Packer Pressure Panel Adjustment

B. Extend Stroke

1. Extend the packer panel until the rollers on the packer follower panel stop and rest at the end of the fixed panel guides. See the Figure below.
2. Adjust the full extend proximity switch (inside proximity switch located on the front head) so the retract portion of the autopack cycle starts just before the packer panel follower rollers leave the fixed panel guides.

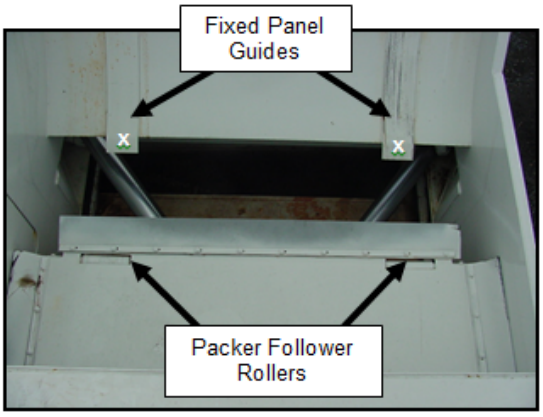


Figure 39. Packer Pressure Panel Adjustment

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 – in the in-transit position with all cylinders retracted
- Lift Arm (if equipped) – is fully retracted

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

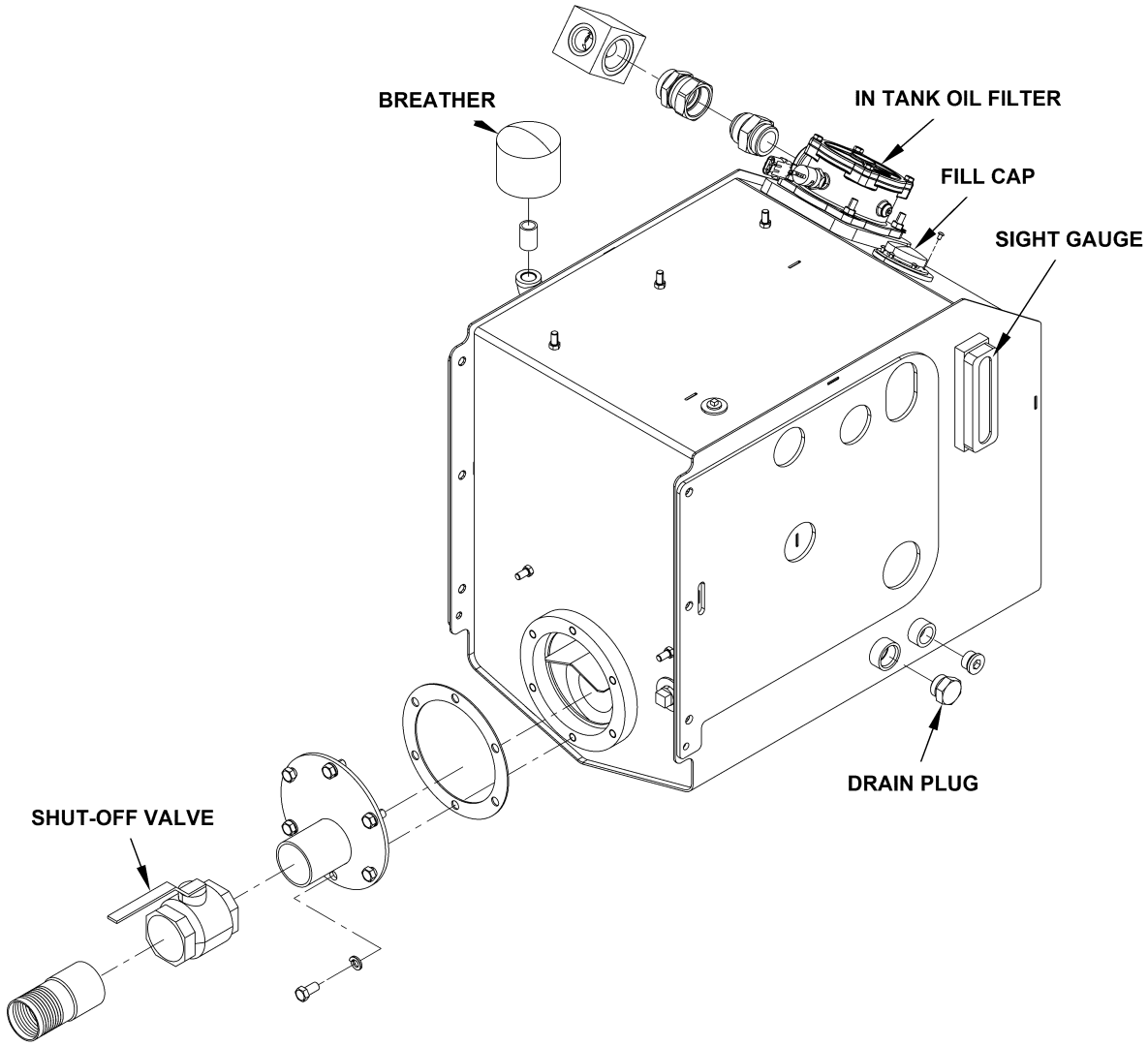


Figure 40. Hydraulic Oil Tank and Sight Gauge

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.

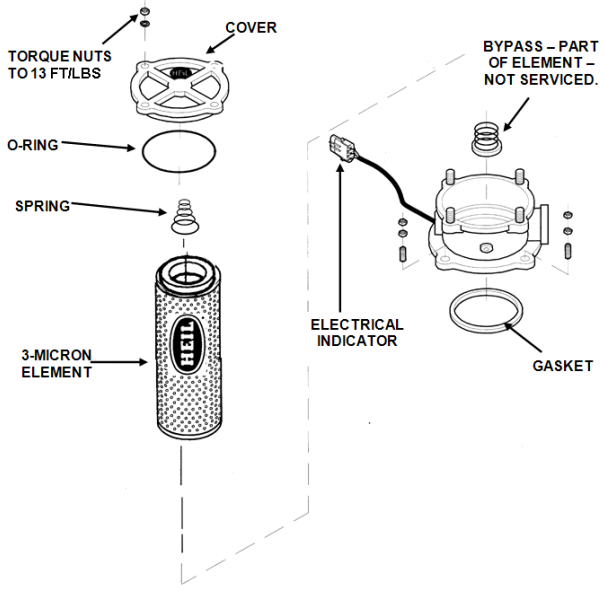


Figure 41. Hydraulic Oil Filter

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** 14.
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** 16.
14. Check the entire system to make sure all connections are tight and no leaks are found.
15. Start the truck's engine and engage the pump.

⚠ 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** 97.

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.

TAILGATE LUBRICATION

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

CLEAN AND INSPECT THE TAILGATE SEAL

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

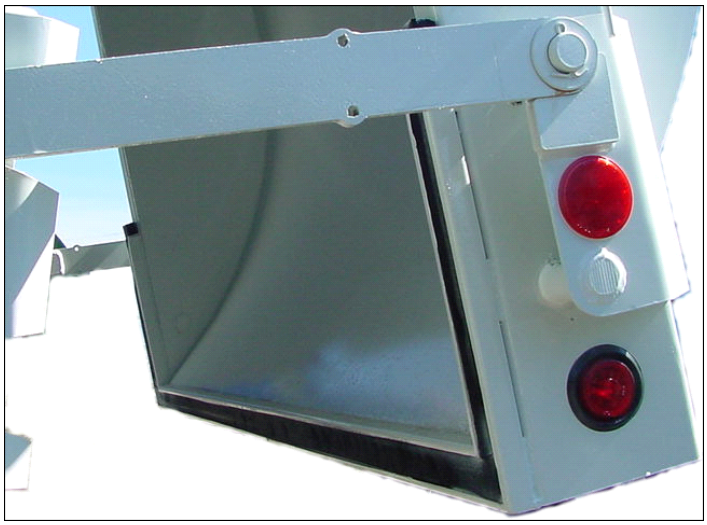


Figure 42. Tailgate Seal

NOTES

SECTION 6
BODY CONTROLLER HARDWARE

NOTES

CORTEX CONTROLLER™ 40 I/O ASSEMBLY

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.

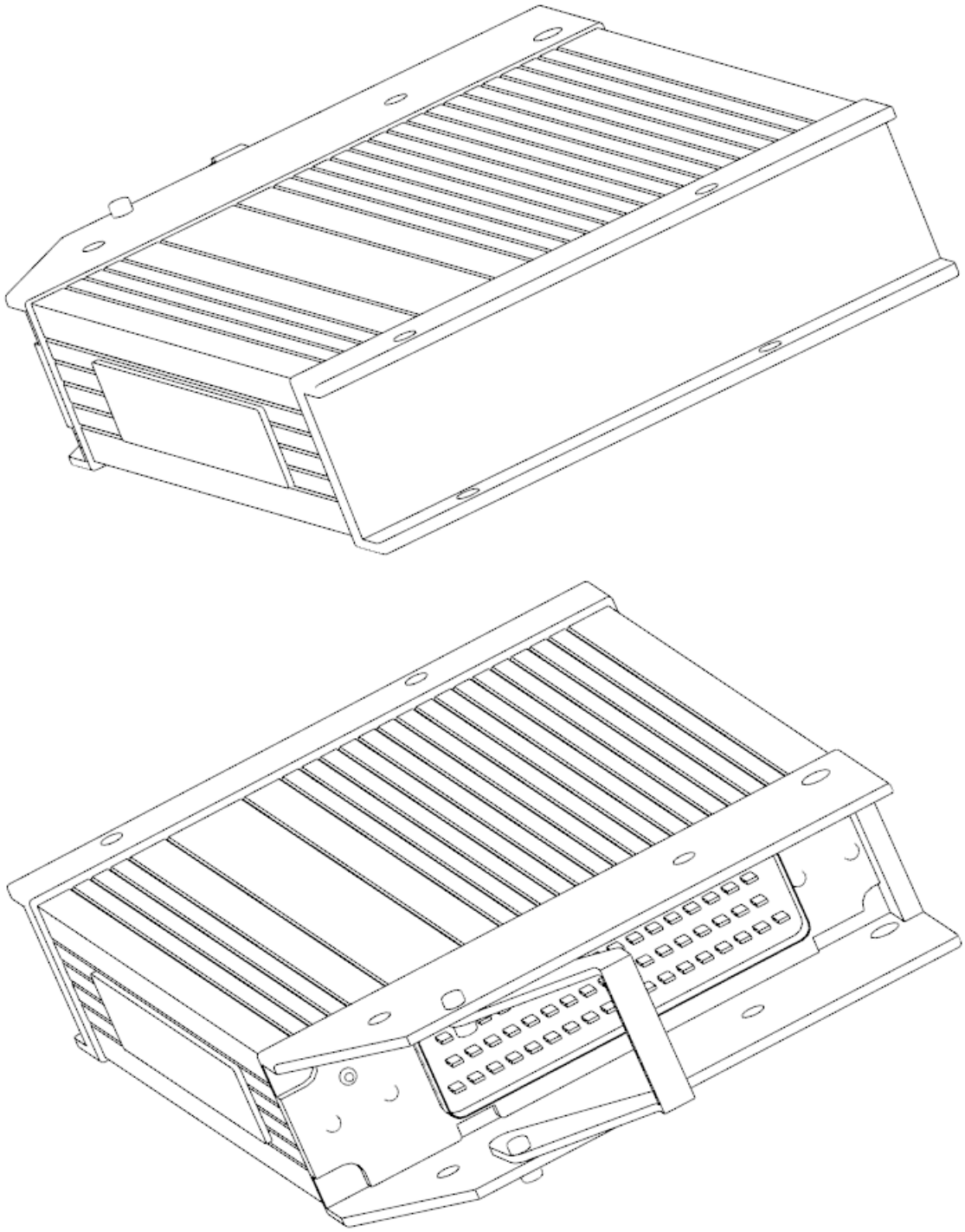


Figure 43. 40 I/O Cortex Controller™ Hardware

CORTEX CONTROLLER™ PIN NUMBER DIAGRAM

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

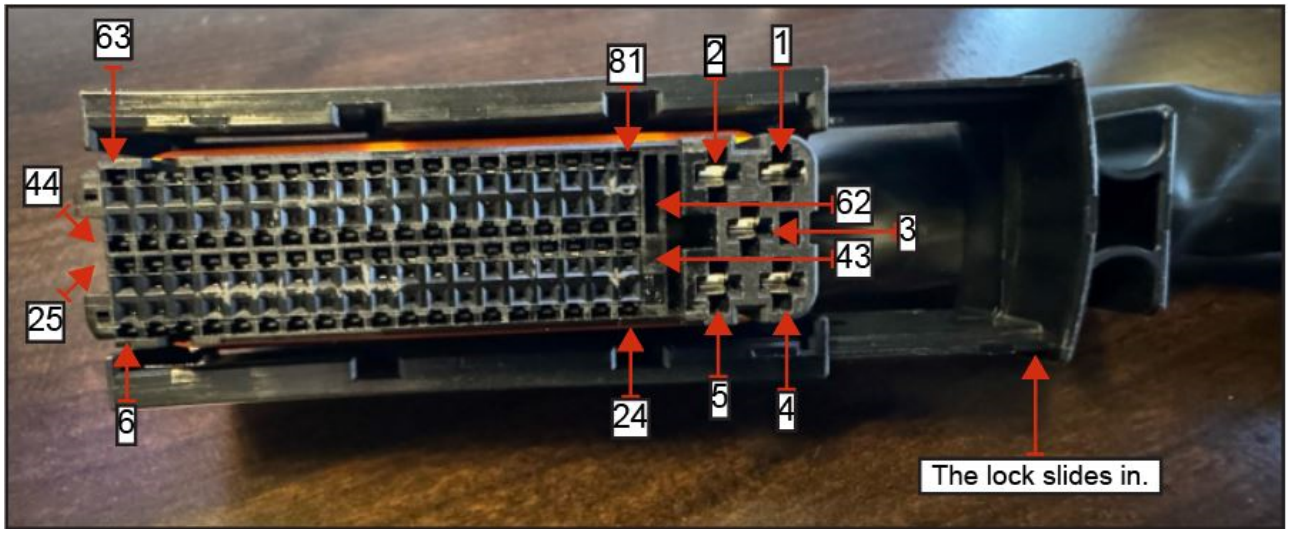


Figure 44. Cortex Cable Connection, Female Pin Positions.

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.

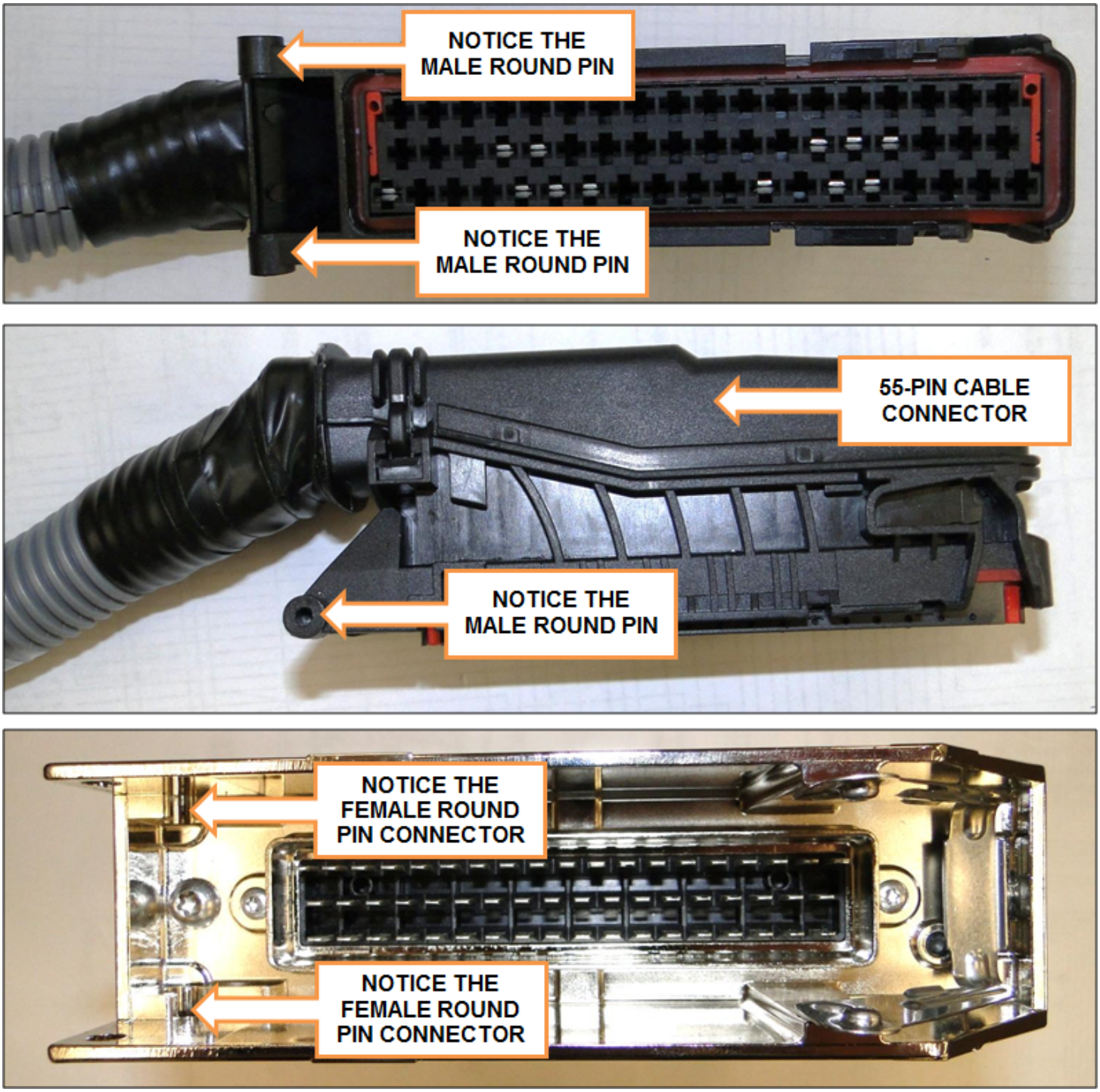


Figure 45. Cable Controller Plastic Male Hinge Pins and Controller Female Slot Connectors

CORTEX CONTROLLER™ 55-POLE CABLE ASSEMBLY (CONTINUED)

B. Female Controller Connector Close-Up View

See the figure below to identify the controller female connector.

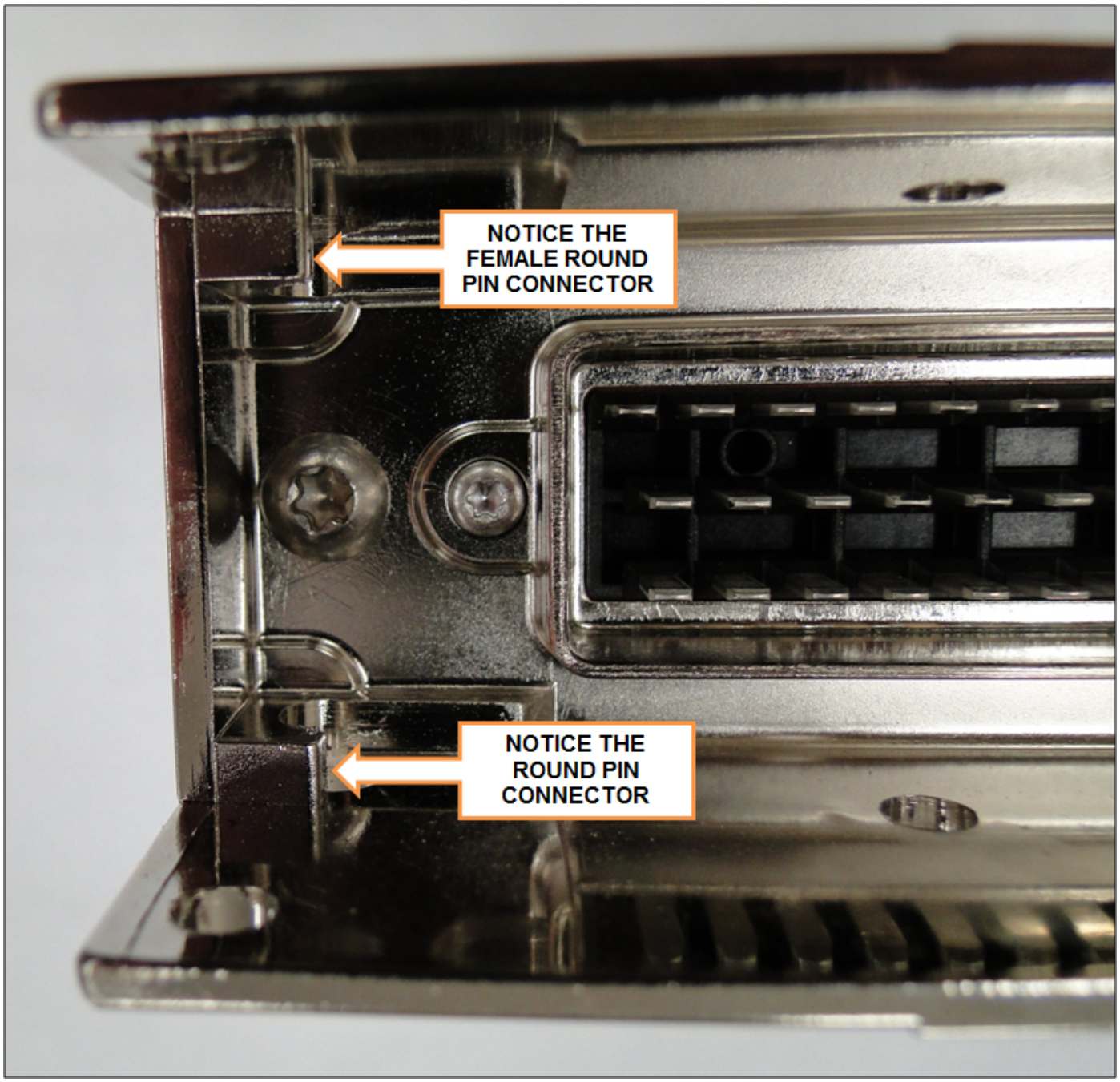


Figure 46. Female Controller Connector Slots

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.

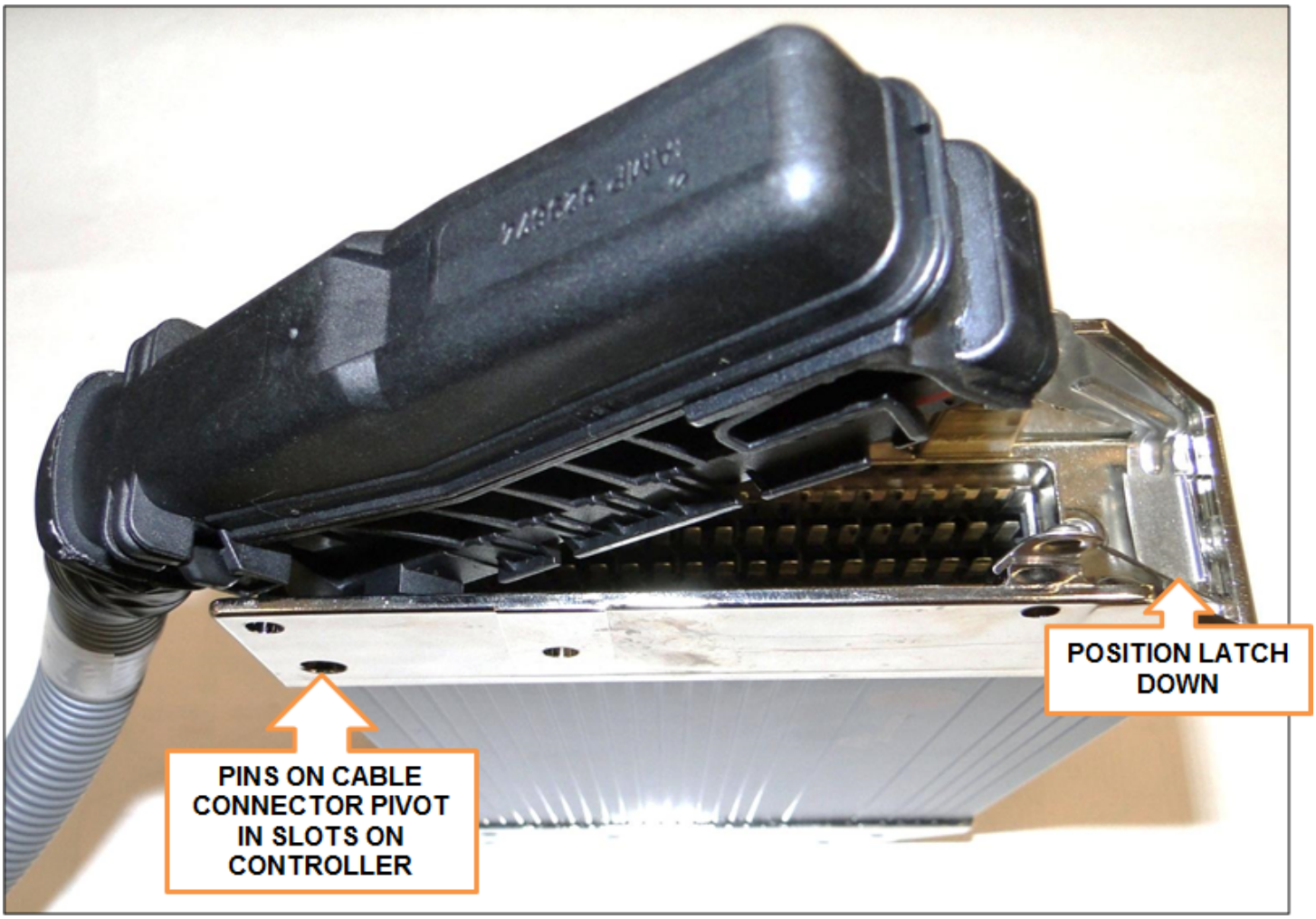


Figure 47. Cable Connector Pivoting on Controller

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.

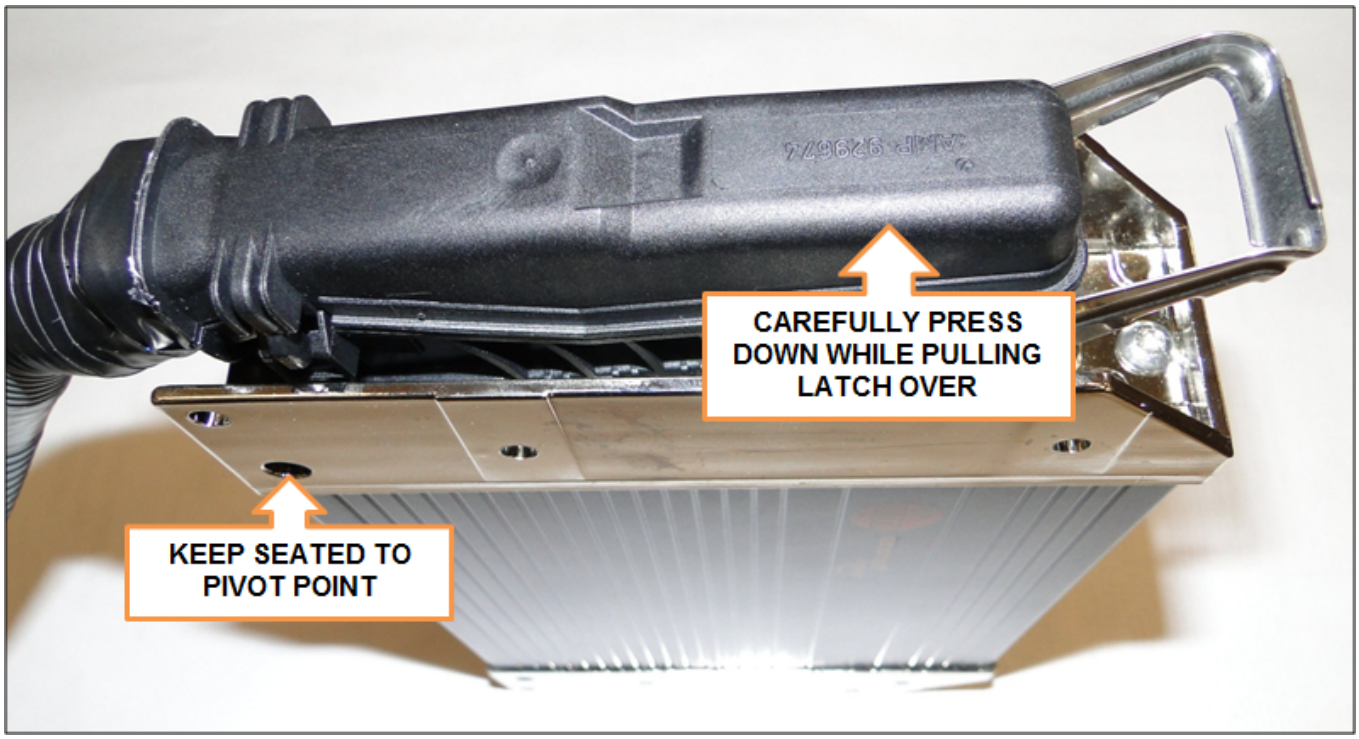


Figure 48. Slowly Press Down While Keeping Left Cable Connector Pivot Point in Place

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

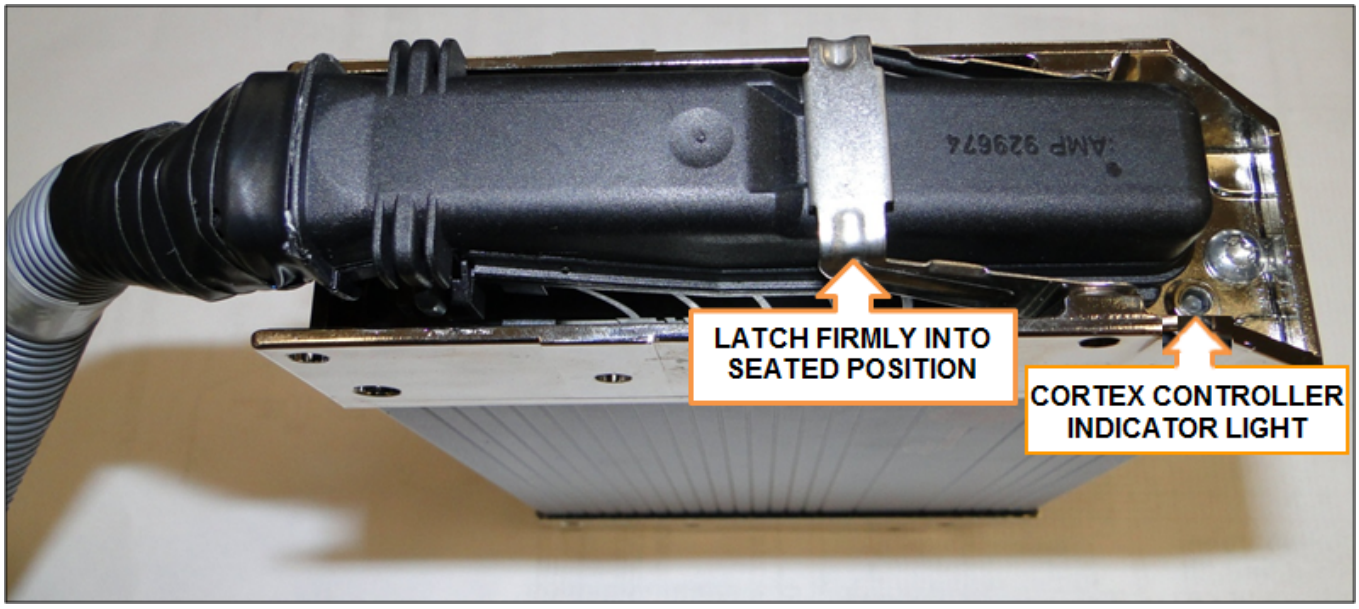


Figure 49. Latch Controller to Cable Connector

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 50. Insight Display Front Photo

Figure 51. Insight Display Rear Photo

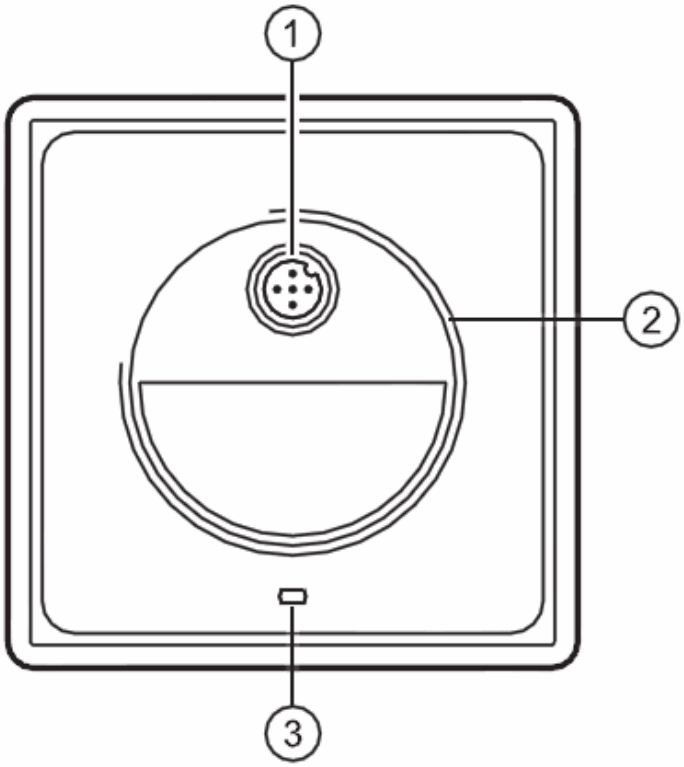


Figure 52. Insight Display Rear Illustration

(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 53. 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

SECTION 7
BODY CONTROLLER SOFTWARE

Automated Side Loader Cortex Controller™ Program 109-0285 (Rev 20210223)

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 is equipped with the potential of having multiple types of Inputs. Some of which are strictly binary active high meaning they are activated by a positive 12 Volt signal. Some of the binary inputs can be configured to function as active low meaning they are activated by a ground signal. Some inputs can be configured as analog and can be used to respond to a voltage or current range. Unless otherwise specified, all Switches, Proximity, Pressure, Toggle, Push Buttons, etc., used as input devices to the Controller, supply a +12 Volt signal to their respective inputs to turn the Input ON. One exception to this is an analog hydraulic oil temperature transmitter.
With an Input ON, the corresponding Input field (with Description and Address) shown on the INSIGHT display will also be ON.
Refer section 5.05 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 5.05 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 5.05 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: 109-0285 - REVISION: 20191118 **ASL – (7000 O.I.G.A.I / O.I.N / Multipack / Python) Unit**		**Automated Side Loader Unit**	**Connector Pin-Out Details**
STANDARD INPUTS			
A01	GRABBER OPEN PUSH BUTTON	%IX0.01	P1-27
A02	SIDE DOOR CLOSED PROX.	%IX0.02	P1-9
A03	TAILGATE CLOSED PROX.	%IX0.03	P1-28
A04	PACKER FULL EXTEND PROX.	%IX0.04	P1-10
A05	FILTER PRESSURE SWITCH	%IX0.05	P1-29
A06	PACKER FULL RETRACT PROX.	%IX0.07	P1-30
A07	LOW TORQUE PRESSURE SWITCH	%IX0.12	P1-20
A08	PACKER EXTEND PUSH BUTTON	%IX0.14	P1-21
A09	SYSTEM POWER SWITCH	%IX0.15	P1-38
A10	CHASSIS NEUTRAL SIGNAL	%IX1.04	P1-19
A11	HYDRAULIC PUMP ENABLE PUSH BUTTON	%IX1.05	P1-55
A12	PACKER RETRACT PUSH BUTTON	%IX1.06	P1-18
A13	GRABBER FULL OPEN PROX.	%IX2.00	P1-48
A14	TAILGATE CONTROL PROX.	%IX2.02	P1-31
A15	GRABBER CLOSE PRESSURE SWITCH	%IX2.03	P1-50
A16	CHASSIS SERVICE BRAKE SIGNAL	%IX2.04	P1-51
A17	PACKER PRESSURE SWITCH	%IX2.05	P1-52
A18	GRABBER CLOSE PUSH BUTTON	%IX2.06	P1-16
A19	LIFT RETRACTED PROX.	%IX2.07	P1-35
MULTI-FUNCTION INPUTS			
B01	IN-CAB ENABLE, STROBE (FUNCTION HAS BEEN REMOVED)	%IX0.00	P1-8
B02	HYDRAULIC OIL TEMP. 0.5-4.5 VDC ANALOG	%IX0.00	P1-8

Body Controller Software

B03	LIFT LOWERED PROX (PYTHON UNIT)	%IX0.06	P1-11
B04	THROTTLE ADVANCE SWITCH (MULTIPACK UNIT)	%IX0.06	P1-11
B05	LIFT RAISED PROX (7000 O.I.G.A.I. AND O.I.N. UNITS)	%IX0.06	P1-11
B06	PACKER TRAVEL POSITION SWITCH	%IX0.13	P1-2
B07	TRASMISSION TEMPERATURE SWITCH	%IX0.13	P1-2
B08	IN-CAB ENABLE, REAR STROBE	%IX1.07	P1-37
B09	IN-CAB ENABLE, TURN SIGNAL	%IX1.07	P1-37
B10	OIL LEVEL SWITCH	%IX1.07	P1-37
B11	BODY DOWN PROX. (NON-MULTIPACK UNITS)	%IX2.01	P1-49
B12	TAILGATE BUZZER SWITCH (MULTIPACK UNIT)	%IX2.01	P1-49
STANDARD OUTPUTS			
C01	REAR STROBE (IN-CAB ENABLE ACTIVATED)	%QX0.00	P1-44
C02	PACKER PUMP (P2)	%QX0.02	P1-46
C03	LIFT RETRACT SOLENOID (MULTIPACK AND PYTHON UNIT)	%QX0.03	P1-47
C04	PACKER RETRACT SOLENOID	%QX0.04	P1-36
C05	PACKER EXTEND SOLENOID	%QX0.05	P1-54
C06	LIFT RAISE SOLENOID (MULTIPACK AND PYTHON UNIT)	%QX0.07	P1-53
C07	FILTER BYPASS INDICATOR	%QX0.08	P1-39
C08	LIFT EXTENDED INDICATOR	%QX0.09	P1-3
C09	TAILGATE OPEN INDICATOR	%QX0.12	P1-41
C10	LIFT PUMP (P1)	%QX0.14	P1-43
C11	IN-CAB ALARM	%QX0.15	P1-4
MULTI-FUNCTION OUTPUTS			
D01	BODY RAISED (PYTHON)	%QX0.01	P1-45
D02	THROTTLE ADVANCE (MULTIPACK UNIT)	%QX0.01	P1-45
D03	TAILGATE HYDRAULIC POWER (MULTIPACK UNIT)	%QX0.06	P1-17
D04	FRONT STROBE (IN-CAB ENABLE ACTIVATED) (NON-MULTIPACK UNITS)	%QX0.06	P1-17
D05	OUT OF DIMENSION WM	%QX0.06	P1-17
D06	GRABBER CLOSE SOLENOID	%QX0.10	P1-40

D07	LIFT RAISE INTERLOCK (O.I.G.A.I. AND O.I.N. UNITS WITH 3 LEVER)	%QX0.10	P1-40
D08	GRABBER OPEN SOLENOID (PYTHON)	%QX0.11	P1-22
D09	GRABBER OPEN INTERLOCK SOLENOID (O.I.G.A.I. AND O.I.N. UNITS WITH 3 LEVER)	%QX0.11	P1-22
D10	JOYSTICK ENABLE (MULTIPACK OR PYTHON)	%QX0.13	P1-42
D11	TRANS TEMP INDICATOR (7000 O.I.G.A.I)	%QX0.13	P1-42
D12	THROTTLE LIMIT (7000 O.I.N)	%QX0.13	P1-42

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 7000 O.I.N. PUMP OPERATION

PUMP		PTO		VANE PUMP CONTROL MANIFOLD				GROUND SPEED	
PUMP INSTALLATION TYPE		MAX. ENGAGE RPM	MAX. OPERATE RPM	PUMP 1 MAX. ENGAGE RPM	PUMP 1 MAX. OPERATE RPM	PUMP 2 MAX. ENGAGE RPM	PUMP 2 MAX. OPERATE RPM	MAX. MPH PUMP/PTO ENGAGE	MAX. MPH PUMP/PTO OPERATE
FRONT MOUNT/CONSTANT DRIVE PTO									
	TANDEM VANE PUMP	NA	NA	1300	1600	1350	1800	1-45 25 default	1-45 25 default
CLUTCH SHIFT PTO PUMP									
	TANDEM VANE PUMP	1300	1800	1300	1600	1350	1800	1-45 25 default	1-45 25 default

3.02 7000 O.I.G.A.I. PUMP OPERATION

PUMP		PTO		VANE PUMP CONTROL MANIFOLD				GROUND SPEED	
PUMP INSTALLATION TYPE		MAX. ENGAGE RPM	MAX. OPERATE RPM	PUMP 1 MAX. ENGAGE RPM	PUMP 1 MAX. OPERATE RPM	PUMP 2 MAX. ENGAGE RPM	PUMP 2 MAX. OPERATE RPM	MAX. MPH PUMP/PTO ENGAGE	MAX. MPH PUMP/PTO OPERATE
FRONT MOUNT/CONSTANT DRIVE PTO									
	TANDEM VANE PUMP	NA	NA	800	900	1500	1800	1-45 25 default	1-45 25 default

CLUTCH SHIFT PTO PUMP									
	TANDEM VANE PUMP	800	1800	800	900	1500	1800	1-45 25 default	1-45 25 default

3.03 PYTHON PUMP OPERATION

PUMP		PTO		VANE PUMP CONTROL MANIFOLD				GROUND SPEED	
PUMP INSTALLATION TYPE		MAX. ENGAGE RPM	MAX. OPERATE RPM	PUMP 1 MAX. ENGAGE RPM	PUMP 1 MAX. OPERATE RPM	PUMP 2 MAX. ENGAGE RPM	PUMP 2 MAX. OPERATE RPM	MAX. MPH PUMP/PTO ENGAGE	MAX. MPH PUMP/PTO OPERATE
FRONT MOUNT/CONSTANT DRIVE PTO									
	TANDEM VANE PUMP	NA	NA	1050	1350	1550	3000	1-45 25 default	1-45 25 default
CLUTCH SHIFT PTO PUMP									
	TANDEM VANE PUMP	1050	3000	1050	1350	1550	3000	1-45 25 default	1-45 25 default

3.04 MULTI-PACK PUMP OPERATION

PUMP		PTO		VANE PUMP CONTROL MANIFOLD				GROUND SPEED	
PUMP INSTALLATION TYPE		MAX. ENGAGE RPM	MAX. OPERATE RPM	PUMP 1 MAX. ENGAGE RPM	PUMP 1 MAX. OPERATE RPM	PUMP 2 MAX. ENGAGE RPM	PUMP 2 MAX. OPERATE RPM	MAX. MPH PUMP/PTO ENGAGE	MAX. MPH PUMP/PTO OPERATE
FRONT MOUNT/CONSTANT DRIVE PTO									
	TANDEM VANE PUMP	NA	NA	1050	1350	1550	3000	1-45 25 default	1-45 25 default
CLUTCH SHIFT PTO PUMP									
	TANDEM VANE PUMP	1050	3000	1050	1350	1550	3000	1-45 25 default	1-45 25 default

3.05: Additional Parameters

Sl. No.	Parameter	Default Setting
A	Start Filter Warning	5 Hours
B	Start Filter Shutdown	6 Hours
C	Grabber Close Time	1.74 Seconds = (87*.02 Seconds)
D	Filter Reset Time	15 Minutes
E	Auto Pack Time Out	30 seconds
F	Packer Auto Retract Time Out	30 seconds
G	Pump Bypass Run Time	180 Seconds

3.06: Option Config

Python OIGAI		
Option	**Description**	**Conflicts**
Body Raised Ind	ON, enables Body Raised warning and indicator circuits. Intended for Dump Bodies	None
Rear Strobe	Not Used	N/A
Rear Strobe Pump	Not Used	N/A
Front Strobe	ON, enables Front Strobe Output	Out of Dim. Signal
Front Strobe Pump	Not Used	N/A
Low Torque Limit	ON, enables Low Torque Pressure Switch Function	None
Lift Stow	ON, allows operator to stow the lift Grabber Open and Lift Retract on the fly.	None
Coordinated Dump	ON, enables Auto Lift	None
Low Hyd Oil Ind	ON, enables Low Oil Level Detection	Republic
Grabber Lift Interlock	ON, prevent operator from opening grabber with lift raised	None
Republic	ON, causes Strobe lights to disengage with Chassis turn signals active	Low Hyd Oil Ind
Packer Travel Position	Not Used	N/A
Select Truck Type	Allow Program Setup, Chooses Body Type	N/A
J1939 Baud Rate	Changes controller J1939 Baud Rate 250k/500k	N/A
Oil Temp Sensor	ON, Enables Hydraulic Oil Temp Sensor	None
Out of Dim. Limit	ON, Enables Out of Dimension. Output. Default setpoint 7 mph w/1-12 mph range. Default function includes Lift and Body components w/option for Lift only.	Front Strobe Pump
Max. Spd. Lift Operate	Press OK to set maximum MPH for Lift Operation. Default setpoint 7 mph w/1-12 mph range.	None
Max. Spd Hyd. Pump	Press OK to set maximum MPH for Hyd. Pump/PTO Operation. Default setpoint 25 mph w/1-45 mph range.	None
Multi-Pack OIGAI		
Option	**Description**	**Conflicts**
N/A	Not Used	N/A
Rear Strobe	Not Used	N/A
Rear Strobe Pump	Not Used	N/A
Front Strobe	ON, Enables Front Strobe Output	None

Front Strobe Pump	Not Used	N/A
Low Torque Limit	ON, Enables Low Torque Pressure Switch Function	None
Lift Stow	ON, Allow operator to stow the lift Grabber Open and Lift Retract on the fly.	None
Coordinated Dump	ON, Enables Auto Lift	None
Low Hyd Oil Ind	ON, Enables Low Oil Level Detection	Republic
N/A	Not Used	N/A
Republic	ON, Causes Strobe lights to disengage with Chassis turn signals active	Low Hyd Oil Ind
Packer Travel Position	Not Used	N/A
Select Truck Type	Allow Program Setup, Chooses Body Type	N/A
J1939 Baud Rate	Changes controller J1939 Baud Rate 250k/500k	N/A
Oil Temp Sensor	ON, Enables Hydraulic Oil Temp Sensor	None
N/A	Not Used	N/A
Max. Spd Lift Operate	Press OK to set maximum MPH for Lift Operation. Default setpoint 7 mph w/1-12 mph range.	None
Max. Spd Hyd. Pump	Press OK to set maximum MPH for Hyd. Pump/PTO Operation. Default setpoint 25 mph w/1-45 mph range.	None
F7000		
Option	**Description**	**Conflicts**
Body Style Dump	ON, enables Body Raised warning and indicator circuits. Intended for Dump Bodies	None
Rear Strobe	Not Used	N/A
Rear Strobe Pump	Not Used	N/A
Front Strobe	ON, Enables Front Strobe Output	None
Front Strobe Pump	Not Used	N/A
Low Torque Limit	ON, Enables Low Torque Pressure Switch Function	None
Side Flood	Not Used	N/A
In-Cab Joystick	ON, prevent operator from opening grabber with lift raised with Joystick Button	N/A
Grabber Lift Interlock	ON, prevent operator from opening grabber with lift raised	None
Low Hyd Oil Ind	ON, Enables Low Oil Level Detection	Republic
Republic	ON, Causes Strobe lights to disengage with Chassis turn signals active	Low Hyd Oil Ind
Packer Travel Position	Not Used	N/A

Select Truck Type	Allow Program Setup, Chooses Body Type	N/A
J1939 Baud Rate	Changes controller J1939 Baud Rate 250k/500k	N/A

Section 4: I/O Functions

The following sheets details Input, and Output functions provided through the CORTEX Controller.

Note: Status of all the Inputs/Outputs can be monitored using the Insight In-Cab display. Refer section 5.05 for more details about Diagnostic display options and INSIGHT display.

4.01: Standard Input Functions

A01 Grabber Open Push Button (Input %IX0.01)

This circuit monitors the ON/OFF status of the Grabber Open button. When this button is pressed, the Grabber Open input will be ON.

Function Logic:

Input Device	Status	I/O Address	Status
Grabber Open Button	Activated	%IX0.01	ON

A02 Side Door Closed Proximity Switch (Input %IX0.02)

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, the Hydraulic pump and Packer will be turned OFF. The Side door is opened only for Servicing/ Maintenance purpose.

Function Logic:

Input Device	Status	I/O Address	Status
Side Door Closed Proximity Switch	Activated	%IX0.02	ON

A03 Tailgate Closed Proximity Switch (Input %IX0.03)

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

Function Logic:

Input Device	Status	I/O Address	Status
Tailgate Closed Proximity Switch	Activated	%IX0.03	ON

A04 Packer Full Extend Proximity Switch (Input %IX0.04)

This circuit monitors the ON/OFF status of the Packer Extend Proximity Switch. The input is ON when the Packer is Fully Extended which occurs during the Packer Extending operation or when ejecting the trash.

Function Logic:

Input Device	Status	I/O Address	Status
Packer Full Extend Proximity Switch	Activated	%IX0.04	ON

A05 Filter Pressure Switch (Input %IX0.05)

This circuit monitors the ON/OFF status of the Filter Pressure Switch. The input is OFF when the Filter is in Bypass.

Function Logic:

Input Device	Status	I/O Address	Status
Filter Pressure Switch	Activated	%IX0.05	ON

A06 Packer Full Retract Proximity Switch (Input %IX0.07)

This circuit monitors the ON/OFF status of the Packer Retract 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 at home position (i.e. Packer is either Extending or Retracting).

Function Logic:

Input Device	Status	I/O Address	Status
Packer Full Retract Proximity Switch	Activated	%IX0.07	ON

A07 Low Torque Pressure Switch (Input %IX0.12)

This circuit is only functional on a Python unit. It monitors the ON/OFF status of the Low Torque Pressure Switch. This pressure switch monitors the pressure on hydraulic Pump1. The input is on when pressure reaches the pressure switch setpoint.

Function Logic:

Input Device	Status	I/O Address	Status
Low Torque Pressure Switch	Activated	%IX2.05	ON

A08 Packer Extend Push Button (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.

Function Logic:

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

A09 System Power Switch (Input %IX0.15)

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.

Function Logic:

Input Device	Status	I/O Address	Status
System Power Switch	Activated	%IX0.15	ON

A10 Chassis Neutral Signal (Input %IX1.04)

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

Function Logic:

Input Device	Status	I/O Address	Status
Chassis Transmission	In Neutral	%IX1.04	ON

A11 Hydraulic Pump Enable Push Button (Input %IX1.05)

This circuit monitors the ON/OFF status of the Hydraulic Pump Enable button. This is a momentary toggle switch which when turned ON will enable the Hydraulic Pump Input.

Function Logic:

Input Device	Status	I/O Address	Status
Hydraulic Pump Enable Button	Activated	%IX1.05	ON

A12 Packer Retract Push Button (Input %IX1.06)

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

Function Logic:

Input Device	Status	I/O Address	Status
Packer Retract Button	Activated	%IX1.06	ON

A13 Grabber Full Open Proximity Switch (Input %IX2.00)

This circuit monitors the ON/OFF status of the Grabber Open proximity switch. This input is ON when the Grabber is fully Open (i.e. Release the Can).

Function Logic:

Input Device	Status	I/O Address	Status
Grabber Full Open Proximity Switch	Activated	%IX2.00	ON

A14 Tailgate Control Proximity Switch (Input %IX2.02)

This circuit is only functional on a Multi-Pack unit. This circuit monitors the ON/OFF status of the Tailgate Control Proximity Switch. This input is used along with the Remote Throttle Advance switch to speed and advance the engine idle. This is activated by using the hydraulic control handles on the Tailgate.

Function Logic:

Input Device	Status	I/O Address	Status
Tailgate Control Proximity	Activated	%IX2.02	ON

A15 Grabber Close Pressure Switch (Input %IX2.03)

This circuit monitors the ON/OFF status of the Grabber Closed Pressure switch. This input is ON when the pressure in the Grabber cylinder reaches the set point.

Function Logic:

Input Device	Status	I/O Address	Status
Grabber Close Pressure Switch	Activated	%IX2.03	ON

A16 Chassis Service Brake (Input %IX2.04)

This circuit monitors the ON/OFF status of the Chassis Service Brake. This input will be ON when the Service brakes are applied.

Function Logic:

Input Device	Status	I/O Address	Status
Chassis Service Brake	Activated	%IX2.04	ON

A17 Packer Pressure Switch (Input %IX2.05)

This circuit monitors the ON/OFF status of the Packer Pressure Switch. The Packer Pressure Switch Time is a programmed time delay which delays the response to the activation of this input. This input is used to turn ON/OFF the Packer. This input is used to retract the packer automatically when the Body packs out.

Function Logic:

Input Device	Status	I/O Address	Status
Packer Pressure Switch	Activated	%IX2.05	ON

A18 Grabber Close Push Button (Input %IX2.06)

This circuit monitors the ON/OFF status of the Grabber Close button. When this button is pressed, the Grabber closed will be turned ON.

Function Logic:

Input Device	Status	I/O Address	Status
Grabber Close Button	Activated	%IX2.06	ON

A19 Lift Retracted Proximity Switch (Input %IX2.07)

This circuit monitors the ON/OFF status of the Lift Retracted Switch. This input is ON when the Lift is in the stowed position.

Function Logic:

Input Device	Status	I/O Address	Status
Lift Retracted Prox. Switch	Activated	%IX2.07	ON

4.05: Multi-Function Inputs

B01 Not Used (Input IX0.00)

This circuit is not used.

Related Option Configurations

Option	Status	Functionality
N/A	OFF	N/A

Function Logic:

Input Device	Status	I/O Address	Status
N/A	N/A	%IX0.00	N/A

B02 Hydraulic Oil Temp. Sensor (Input IX0.00)

This circuit monitors the hydraulic oil temp sensor. This is an analog sensor with a voltage range of 0.5-4.5VDC. The temperature range for the sensor is -580 to 3020 degrees F.

Related Option Configurations

Option	Status	Functionality
Oil Temp Sensor	ON	Input %IX0.00 Is Used as Oil Temp Signal

Function Logic:

Input Device	Status	I/O Address	Status
Hydraulic Oil Temp	Temp = ((3600/4) * (Volts-0.5))-580	%IX0.00	0.5-4.5Volts

B03 Lift Lowered Proximity Switch (Input %IX0.06)

This circuit monitors the ON/OFF status of the Lift Lowered proximity switch. This circuit is only used in a PYTHON unit. This is ON when the Lift arm is in the Lowered position.

Related Option Configurations

Selected Truck	Status	Functionality
Python	-	Input %IX0.06 Is Used as Lift Lowered Prox.

Function Logic:

Input Device	Status	I/O Address	Status
Lift Lowered Proximity Switch	Activated	%IX0.06	ON

B04 Throttle Advance Switch (Input %IX0.06)

This circuit monitors the ON/OFF status of the tailgate Throttle Advance Switch. This circuit is used only on a MULTIPACK unit.

Related Option Configurations

Selected Truck	Status	Functionality
Multi-Pack	-	Input %IX0.06 Is Used as Throttle Advance Switch.

Function Logic:

Input Device	Status	I/O Address	Status
Throttle Advance Extend Switch	Activated	%IX0.06	ON

B05 Lift Raised Proximity Switch (Input %IX0.06)

This circuit monitors the ON/OFF status of the Lift Raised proximity switch. This circuit can be used only in 7000 (O.I.G.A.I / O.I.N) units. This input is ON when the Lift is in Raised position.

Related Option Configurations

Option	Status	Functionality
Selected Truck Type	7000 OIN	Input %IX0.06 Is Used as Lift Raised Prox.
Selected Truck Type	7000 OIGIA	Input %IX0.06 Is Used as Lift Raised Prox.

Function Logic:

Input Device	Status	I/O Address	Status
Lift Raised Proximity Switch	Activated	%IX0.06	ON

B06 Travel Position Switch (Input %IX0.13)

This circuit is not used.

Related Option Configurations

Option	Status	Functionality
Packer Travel Position	ON	Input %IX0.13 Is Used as Travel Position Switch

Function Logic:

Input Device	Status	I/O Address	Status
Packer Travel Position Switch	Activated	%IX0.13	ON

B07 Transmission Temp. Signal (Input %IX0.13)

This circuit monitors the transmission temperature warning indicator output from the Allison ECU. This ECU output normally turns ON when the transmission sump fluid temperature reaches 250°F which turns OFF the input to the control.

Related Option Configurations

Option	Status	Functionality
Packer Travel Position	OFF	Input %IX0.13 Is Used as Trans. Temp. signal

Function Logic:

Input Device	Status	I/O Address	Status

Transmission Temp. Switch	Activated	%IX0.13	ON

B08 Rear Strobe In-Cab Enable (Input %IX1.07)

This input is controlled by the strobe light switch in the control panel and is used to enable Tailgate mounted strobe lights.

Related Option Configurations

Option	Status	Functionality
Low Hyd. Oil Ind.	OFF	Input %IX1.07 Is Used as Rear Strobe Sw.
Republic	OFF	

Function Logic:

Input Device	Status	I/O Address	Status
Strobe Light In-Cab Enable	Activated	%IX1.07	ON

B09 Turn Signal Light Enable (Input %IX1.07)

This circuit monitors the status of the Turn Signal Light enable circuit. This circuit is used for disabling Front Strobe, Rear Strobe and Veolia strobe circuits. This circuit can be used only in Non-MULTIPACK units.

Related Option Configurations

Option	Status	Functionality
Low Hyd. Oil Ind.	OFF	Input %IX1.07 Is Used chassis turn signal and disables Rear Strobes.
Republic	ON	

Function Logic:

Input Device	Status	I/O Address	Status
Turn Signal Enable Circuit	Activated	%IX1.07	ON

B10 Oil Level Switch (Input %IX1.07)

This circuit monitors the status of the Oil level switch in the Hydraulic tank. The switch is ON when the hydraulic oil level is good.

Related Option Configurations

Option	Status	Functionality
Low Hyd. Oil Ind.	ON	Input %IX1.07 Is Used as Low Oil Sensor.
Republic	OFF	

Function Logic:

Input Device	Status	I/O Address	Status
Oil Level Switch	Activated	%IX1.07	ON

B11 Body Down Proximity (Input %IX2.01)

This circuit monitors the ON/OFF status of the Body Down Proximity Switch. The input is ON when the body is down. This circuit can be used only in NON-MULTIPACK units.

Related Option Configurations

Option	Status	Functionality

Selected Truck Type	7000 OIN	Input %IX2.01 Is Used as Body Lowered Prox.
Selected Truck Type	7000 OIGAI	Input %IX2.01 Is Used as Body Lowered Prox.
Selected Truck Type	Python OIGAI	Input %IX2.01 Is Used as Body Lowered Prox.

Function Logic:

Input Device	Status	I/O Address	Status
Body Down Proximity	Activated	%IX2.01	ON

B12 Tailgate Buzzer Push Button (Body Input %IX2.01)

This circuit monitors the ON/OFF status of the Tailgate/helper Buzzer switch. This switch activates the In-Cab Alarm and used in MULTIPACK units only.

Related Option Configurations

Option	Status	Functionality
Selected Truck Type	Multipack OIGAI	Input %IX2.01 Is Used as Tailgate Buzzer Switch

Function Logic:

Input Device	Status	I/O Address	Status
Tailgate Buzzer Switch	Activated	%IX2.01	ON

4.02: Standard Output Functions

C01 Rear Strobe Light (Output %QX0.00)

This circuit operates the Rear Strobe light circuit.

Related Option Configurations

Option 1	Status	Functionality
Republic	OFF	Input %IX1.07 Is Used as Rear Strobe Enable Circuit
Low Hyd. Oil Ind.	OFF	
Option 2	**Status**	**Functionality**
Republic	ON	Input %IX1.07 Is Used as Turn Signal, Rear Strobes are disabled with chassis turn signal
Low Hyd. Oil Ind.	OFF	

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	Optional Rear Strobe Enable Circuit	Activated	%IX1.07	ON
B	OR	Hydraulic Pumps Enabled	Activated	%IX1.05	ON (momentary)
C	OR	Chassis Reverse	Activated	J1939 gear	ON

Note: Conditions (A OR B OR C) true, will activate the Rear Strobe circuit.

C02 Packer Pump (P2) (Output %QX0.02)

This output function controls the Packer Pump (P2).

Body Controller Software

Related Option Configurations

Option	Status	Functionality
Selected Truck Type	7000 OIN	Configures controller for DPF 7000, Operate in Neutral
Selected Truck Type	7000 OIGIA	Configures controller for DPF 7000, Operate in Gear at Idle
Selected Truck Type	Python OIGIA	Configures controller for DPF Python, Operate in Gear at Idle
Selected Truck Type	Multipack OIGIA	Configures controller for DPF Multi-Pack, Operate in Gear at Idle
Max. Spd Hyd. Pump	25 MPH default	1-45 MPH range.

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	System Power Switch	Activated	%IX0.15	ON
B	AND	Critical Faults	Inactive	N/A	See 6.04.01(Beep Codes)
C	AND	Hydraulic Pump Enable PB	Enabled	%IX1.05	ON (momentary)

Note: With Condition (A AND B) true, Condition C will enable the hydraulic system. Hydraulic Pumps will operate in accordance with the selected truck type and speed parameters.

Selected Truck Type (7000 OIN)					
Condition	**Logic**	**Function or Component**	**Status**	**I/O Address**	**Status**
A	-	Packer Extend Solenoid	Activated	%QX0.05	ON
B	OR	Packer Retract Solenoid	Activated	%QX0.04	ON
C	AND	Chassis Neutral	Deactivated	%IX1.04	OFF
OR					
A1	-	Lift Pump (P1)	Activated	%QX0.14	ON
Speed Parameters				**Default Setting**	
Maximum Vehicle Speed				25 MPH	
Maximum Engage Engine Speed				1500 RPM	
Maximum Operating Engine Speed				1800 RPM	

Note: With the hydraulic system enabled, condition ((A OR B) AND C) OR A1, will activate (Packer Pump) within the speed parameters.

Selected Truck Type (7000 OIGAI)					
Condition	**Logic**	**Function or Component**	**Status**	**I/O Address**	**Status**
A	-	Chassis Neutral	Activated	%IX1.04	ON
B	OR	Packer Extend Solenoid	Activated	%QX0.04	ON
C	OR	Packer Retract Solenoid	Activated	%QX0.05	
D	OR	Lift Pump (P1)	Activated	%QX0.14	ON
Speed Parameters				**Default Setting**	
Maximum Vehicle Speed				25 MPH	
Maximum Engage Engine Speed				1350 RPM	
Maximum Operating Engine Speed				1800 RPM	

Note: With the hydraulic system enabled and, condition (A AND B) true, OR C true, will activate (Packer Pump).

Selected Truck Type (PYTHON)					
Option Configurations					
Low Torque Limit	ON	Input %IX0.12 (Low Torque Press Sw.) disengages Pump 2			
Condition	**Logic**	**Function or Component**	**Status**	**I/O Address**	**Status**
A	-	Packer Extend Solenoid	Activated	%QX0.04	ON
B	OR	Packer Retract Solenoid	Activated	%QX0.05	ON

Speed Parameters	Default Setting
Maximum Vehicle Speed	25 MPH
Maximum Engage Engine Speed	1500 RPM
Maximum Operating Engine Speed	3000 RPM

Note: Condition (A OR B), will keep Condition C (Packer Pump) activated in Python mode.

Selected Truck Type (Multipack)					
Option Configurations					
Low Torque Limit	ON	Input %IX0.12 (Low Torque Press Sw.) disengages Pump 2			
Condition	**Logic**	**Function or Component**	**Status**	**I/O Address**	**Status**
A	-	Packer Extend Solenoid	Activated	%QX0.04	ON
B	OR	Packer Retract Solenoid	Activated	%QX0.05	ON
C	OR	Chassis Neutral	Activated	%IX1.04	ON
D	OR	Tailgate Control Prox.	Activated	%IX2.2	ON
E	OR	Throttle Advance Switch	Activated	%IX0.6	ON

Speed Parameters	Default Setting
Maximum Vehicle Speed	25 MPH
Maximum Engage Engine Speed	1500 RPM
Maximum Operating Engine Speed	3000 RPM

Note: With condition (A OR B OR C OR D OR E) true, will keep the Packer Pump activate in Multipack mode.

C03 Lift Retract Solenoid (Output %QX0.03)

This output function controls the Lift Retract function for the Python Auto-Lift. The standard Python lift has two modes for lift operation, Auto-Lift mode and Manual mode. To toggle the control between the two modes, press and hold the Grabber Close and Grabber Open buttons simultaneously for five seconds or until the in-cab alarm stops sounding. Additionally, the Coordinated Dump option must be turned ON for Auto-Lift to functions.

Related Option Configurations

Option	Statu	Functionality

	s	
Coordinated Dump	ON	Enables Auto-Lift
Lift Stow	ON	Enables Lift Auto Stow

Condition	Modifiable Parameters	Default Setting
A	Grabber Close Time	1.74 Sec.

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	**Auto-Lift**	ON	N/A	
B	AND	Joystick Enable	Activated		
C	AND	Grabber Close Button	Activated	%IX2.06	ON
D	AND	Grabber Open Button	Deactivated	%IX0.01	OFF
E	AND	Grabber Close Time	Expired	%QX0.10	ON 1.4 Seconds
OR					
A1	-	**Lift Stow**	ON	N/A	N/A
A2	AND	Grabber Close Button	Activated	%IX2.06	ON
A3	AND	Grabber Open Button	Deactivated	%IX0.01	OFF

Note: This Output can be used in MULTIPACK and PYTHON units. The lift retract solenoid is used to retract the lift during the dumping of a container or during stowing of the lift.

C04 Packer Retract Solenoid (Output %QX0.4)

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 Pressure Switch Time	7 Seconds

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	Auto Pack	Extending	%QX0.5	ON
B	AND	Packer Full Extend Prox. Sw.	Activated	%IX0.04	ON (momentary)
C	OR	Packer Pressure Sw.	Deactivated	%IX2.05	OFF
D	OR	Packer Extend Timeout	Expired	%QX0.5	ON 30 Seconds
E	AND	Packer Extend PB	Deactivated	%IX0.14	OFF
OR					
	-	Manual Pack	ON	N/A	N/A
A1	AND	Grabber Close Button	Activated	%IX2.06	ON

A2	AND	Grabber Open Button	Deactivated	%IX0.01	OFF

Note: During the Auto-Pack cycle (condition A true), condition ((B OR C OR D) AND E) will activate the output.
Retract function can be manually operated by pressing the Retract button (A1 AND A2) . Condition 'E' will initiate a Retract action during an Auto-Pack cycle.

C05 Packer Extend Solenoid (Output %QX0.05)

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	None	N/A

Conditions necessary to activate the circuit

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	System Power Switch	Activated	%IX0.15	ON
	AND	Hydraulic Pump Enable PB	Enabled	%IX1.05	ON (momentary)
	AND	Packer Retract Button	Deactivated	%IX1.06	OFF
AND					
B	AND	Packer Retract Button	Deactivated	%IX1.06	OFF
	AND	Packer Pressure Switch	Activated	%IX2.05	ON
	AND	Packer Full Extend Proximity Switch	Deactivated	%IX0.04	OFF
	AND	Tailgate Closed Proximity	Activated	%IX0.03	ON
AND					
C		Packer Extend Push Button	Activated	%IX0.14	ON (momentary)
OR					
D		Grabber Open PB, Select-O-Pack Start	Activated	%IX0.1	ON

Note: With the conditions (A AND B) true, Function (C OR D) activates the Packer Extend Solenoid.

C06 Lift Raise Solenoid (Body Output %QX0.07)

This output function controls the Lift Raise function for the Python Auto-Lift. The standard Python lift has two modes for Lift operation, Auto-Lift mode and Manual mode. To toggle the control between the two modes press and hold the Grabber Close and Grabber Open buttons simultaneously for five seconds or until the In-Cab alarm stops sounding.

Condition	Modifiable Parameters	Default Setting
A	Grabber Close Time	1.74 Sec.

Conditions Necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	Grabber Close Button	Activated	%IX2.06	ON
B	and Grabber Open Button	Deactivated	%IX0.01	OFF

C	and Joystick Enabled	Activated	%QX0.13	ON

Note: This Output can be used in MULTIPACK and PYTHON units. With Condition (B AND C) true condition A will activate the Lift Raise output. With Auto-Lift mode enabled the Grabber Close button will close the Grabber for the duration of the Grabber Close Time, then trigger the Lift Raise and Retract functions to bring the lift into the dump position.

C07 Filter Bypass Indicator (Output %QX0.08)

This output function controls the Filter Bypass Indicator. Activation of this light indicates that the filter is or has been in bypass, within the past fifteen minutes. The light will turn ON for 1 second for every hour for the 1st 5 hours that the filter is in bypass. (i.e. During the first hour the light will flash for 1 second then pause for 11 seconds, During the second hour the light will flash for 2 seconds then pause for 10 seconds Etc.). Once the accumulated time has reached the "Start Filter Warning" that is, once the bypass time reaches 5 hours' time the indicator will become continuous.

This sequence will continue until the 6th hour when the light will turn ON continuously and Fault #32 will be set. At this point the pump will shut OFF i.e. Once the accumulated time reaches the "Start Filter Shutdown" time the hydraulic pump will be disengaged, and the indicator will flash continuously. Under this condition, the pump will only be allowed to operate in 3-minute intervals. Turning the System Power Switch OFF then ON again will reset the 3-minute time interval. The pump will continue to operate in this fault mode until the hydraulic filter has been serviced and is no longer bypassing oil. Once the filter has been changed the light will stay ON until the pump has run for 30 minutes with a clean filter.

Condition	Modifiable Parameters	Default Setting
A	Start Filter Warning	5 Hours
B	Start Filter Shutdown Warning	6 Hours

Conditions Necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	and Filter Pressure Switch	Deactivated	%IX0.05	OFF
	and System Power Switch	Activated	%IX0.15	ON
B	Lift Pump (P1)	Activated	%QX0.14	ON
C	or Packer Pump (P2)	Activated	%QX0.02	ON

Note: With condition 'A' true, condition (B ORC) will activate the Filter Bypass Indicator output.
These conditions indicate that the Filter is in Bypass. Each time this condition occurs the indicator will continue the flash sequence for 15 minutes after bypass conditions have subsided. Under cold weather conditions, the hydraulic filter may go into bypass when low oil temperatures create a high oil viscosity. This will subside when the hydraulic system reaches operating temperature.

C08 Lift Extended Indicator (Output %QX0.09)

This output function controls the lift extended indicator.

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 Retracted Prox. Switch	Deactivated	%IX2.07	OFF
B	Grabber Full Open Prox.	Deactivated	%IX2.00	OFF

Note: With condition (A OR B) true, the Lift Extended Indicator will be activated.

C09 Tailgate Open Indicator (In Cab Output %QX0.12)

This output function controls the Tailgate Open indicator light.

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	Tailgate Closed Proximity Switch	Deactivated	%IX0.03	OFF

Note: With conditions (A) true, the Tailgate Open indicator will activate.

C10 Lift Pump (P1) (Output %QX0.14)

This output function controls Hydraulic Pump (P1), the Lift Pump.

Related Option Configurations

Option	Status	Functionality
Selected Truck Type	Python OIGIA	Configures controller for DPF Python, Operate in Gear at Idle
Selected Truck Type	Multipack OIGIA	Configures controller for DPF Multi-Pack, Operate in Gear at Idle

Parameters	Default Setting	Range
Max.Spd Lift Operate	7 MPH	1 to 12 MPH
Max.Spd Hyd. Pump	25 MPH	1 to 45 MPH

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	System Power Switch	Activated	%IX0.15	ON
	AND	Hydraulic Pump Enable PB	Activated	%IX0.04	ON (momentary)
AND					
Selected Truck Type (PYTHON) OR (Multi-Pack)					
B	OR	Chassis Service Brake	Applied	%IX2.04	ON (900 rpm max)
C	OR	Chassis Transmission	In Neutral	%IX1.04	ON (1350 rpm max)
D	OR	Packer Extend Solenoid	Activated	%QX0.05	ON (1350 rpm max)
Selected Truck Type (Multipack)					
E	OR	Tailgate Control Prox..	Slide Active	%IX2.02	ON (1350 rpm max)
F	OR	T/G Throttle Advance Switch	T/A Toggle	%IX0.6	ON (1350 rpm max)

Note: With conditions (A) true, conditions (B OR C OR D OR E OR F) will engage the pump within the speed parameters.

11 In Cab Alarm (Output %QX0.15)

This output function controls the Cab Alarm circuit.

Related Option Configurations

Option	Status	Functionality
Selected Truck Type	Multipack OIGAI	Input %IX2.01 Is Used as Tailgate Buzzer Switch
Body Raise Ind	ON	Input %IX2.01 Is Used as Dump Body Down Prox.

Conditions Necessary to activate the circuit;

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	Critical Fault	Active	N/A	N/A
	OR	System Fault	Active	N/A	N/A
OR					
B	-	Selected Truck Type	Multipack OIGAI	ON	N/A
	AND	Tailgate Buzzer PB	Activated	%IX2.01	OFF
OR					
C	-	Selected Truck Type	Multipack OIGAI	OFF	N/A
	AND	Body Raise Ind	ON	N/A	N/A
	AND	Body Down Prox.	Deactivated	%IX2.01	OFF
OR					
D	-	Lift Extend Indicator	Activated	%QX0.09	ON
	AND	Chassis Service Brake	Deactivated	%IX2.04	OFF
	AND	Chassis Neutral Signal	Deactivated	%IX1.04	OFF
OR					
E	-	System Power Switch	Deactivated	%IX0.15	OFF
	AND	Hydraulic Pump Enable PB	Enabled	%IX1.05	ON
OR					
	-	Packer Extend PB	Activated	%IX0.14	ON
	AND	Engine Speed Out of Range	N/A	N/A	N/A
OR					
D		Tailgate Closed Prox.	Deactivated	%IX0.03	OFF

Note: Multiple items will cause the In-Cab Alarm to chime continuously. See section 6.04.01 and 6.04.02 for more information on critical and system alarms.

4.04: Multi-Function Outputs

D01 Body Raised Indicator (Output %QX0.01)

This output function controls the Body Raised Indicator light

Related Option Configurations

Option	Status	Functionality
Body Raise Ind	ON	Input %IX2.01 Is Used as Dump Body Down Prox.

Conditions Necessary to activate the circuit:

Condition	Function or Component	Status	I/O Address	Status
A	Body Down Proximity Switch	Deactivated	IX2.01	OFF

Note: With the Body Down Proximity switch deactivated, the Body Raised Indicator will be active.

D02 Throttle Advance (Output %QX0.01)

This output function controls the Throttle Advance signal transmitted to the vehicle's engine.

Related Option Configurations

Option	Status	Functionality
Selected Truck Type	Multipack OIGAI	Output %QX0.01 Is Used as Tailgate Throttle Advance Switch

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	OR	Tailgate Hydraulic Power	Activated	%QX0.06	ON
B	OR	Chassis Transmission	In Neutral	%IX1.04	ON

Note: This control is used only in MULTIPACK unit. With condition (A AND B) true Throttle Advance output will activate.

D03 Tailgate Hydraulic Power (Output %QX0.06)

This output function controls the solenoid activating the Tailgate controls. This output is active only when the Tailgate control proximity switch is active, or the remote Throttle Advance has been activated.

Related Option Configurations

Option	Status	Functionality
Selected Truck Type	Multipack OIGAI	Output %QX0.06 Is Used as Tailgate Hydraulic Power Sole.

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	System Power Switch	Activated	%IX0.15	ON
	AND	Hydraulic Pump Enable PB	Activated	%IX0.04	ON (momentary)
AND					
B	OR	Tailgate Control Prox.	Activated	%IX2.02	ON
C	OR	Throttle Advance Sw.	Activated	%IX0.06	ON

Note: This Output can be used only in MULTIPACK unit. With condition (A AND B) true, function (C OR D) will activate the Tailgate Hydraulic Power output.

D04 Front Strobe Light (Output %QX0.06)

This circuit operates the Front Strobe light circuit.

Related Option Configurations

Option	Status	Functionality
Front Strobe	ON	Output %QX0.06 Is Used as Front Strobe Circuit
Out of Dim. Signal	Disabled	
Republic	ON	Input %IX1.07 Is Used as Turn Signal, Rear Strobes are disabled with chassis turn signal

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	System Power Switch	Activated	%IX0.15	ON
	AND	Hydraulic Pump Enable PB	Activated	%IX0.04	ON (momentary)
OR					
B	-	Optional Rear Strobe Enable Circuit	Activated	%IX1.07	ON
OR					
C	OR	Chassis Reverse	Activated	J1939 gear	Reverse

Note: Conditions (A OR B OR C) true, will activate the Front Strobe circuit. This Output can be used only in Non-MULTIPACK units. With conditions (A OR B OR C) true, function (D) will activate the Front Strobe circuit.

D05 Out Of Dimension (Output %QX0.06)

This circuit operates the Front Strobe light circuit.

Related Option Configurations

Option	Status	Functionality
Front Strobe	OFF	Output %QX0.06 Is Used as Out of Dimension Signal
Out of Dim. Limit	Enabled	
Selected Truck Type	Python OIGAI	
-	1-12 mph	Set Speed for Out of Dimension

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	Vehicle Speed > Set Speed	N/A	N/A	N/A
AND					
B	-	Side Door Closed Prox.	Deactivated	%IX0.02	OFF
C	OR	Lift Extended Indicator	Activated	%QX0.09	ON
D	OR	Body Raised Indicator	Activated	%QX0.01	ON
E	OR	Tailgate Open Indicator	Activated	%QX0.12	ON

Note: With condition (A) true, will activate the Front Strobe circuit. This Output can be used only in Non-MULTIPACK units. With conditions (A OR B OR C) true, function (D) will activate the Front Strobe circuit.

D06 Grabber Close Solenoid, (Output %QX0.10)

This output function controls the Grabber Close circuit. The lift has two modes for lift operation, Auto-Lift mode and Manual mode. The default mode is Manual mode. To toggle the control between the two modes, press and hold the Grabber Close and Grabber Open buttons simultaneously for five seconds or until the In-Cab alarm stops sounding.

Condition	Parameters	Setting
A	Grabber Close Time	1.4 Sec

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	System Power Switch	Activated	%IX0.15	ON
	AND	Hydraulic Pump Enable PB	Activated	%IX0.04	ON (momentary)
AND					
B	-	Joystick Enable Solenoid	Activated	%QX0.13	ON
C	AND	Grabber Close Button	Activated	%IX2.06	ON
D	AND	Grabber Open Button	Deactivated	%IX0.01	OFF

Note: This Output can be used in 7000 (O.I.G.A.I / O.I.N) units.
With Condition (A AND B AND C AND D) true, the Grabber close output will turn ON. With Auto-Lift mode disabled the Grabber Close button will offer manual control of the grabber close function only. With Auto-Lift mode enabled the Grabber Close button will close the grabber for duration of the Grabber Close Time, then trigger the lift raise and retract functions to bring the lift into the dump position. The Lift pump (D) or System Power (C) turning OFF will reset the grabber close timer to the initial value.

D07 Lift Raised Interlock Enabled (Output %QX0.10)

This circuit operates the Lift Raised Interlock circuit.

Related Option Configurations

Option	Status	Functionality
Selected Truck Type	7000 OIGAI	Output %QX0.10 Is Used as Grabber Closed
Selected Truck Type	7000 OIN	Output %QX0.10 Is Used as Grabber Closed

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	Lift raised Proximity	Activated	%IX0.06	ON
AND					
B	-	Packer Extend Push Button	Activated	%IX0.14	ON
	AND	Tailgate Closed Proximity	Deactivated	%IX0.03	OFF
	AND	Packer Full Extend Proximity	Activated	%IX0.04	ON
OR					
C	-	Grabber Close Pressure Switch	Activated	%IX2.03	ON

Note: This Output can be used only in 7000 (O.I.G.A.I / O.I.N) units with 3 lever control.
With conditions (B OR C) true, function 'A' will activate the Lift Raised Interlock circuit.

D08 Grabber Open Solenoid (Output %QX0.11)

This output function controls the Grabber Open circuit. The lift has two modes for lift operation, Auto-Lift mode and Manual mode. The default mode is Manual mode. To toggle the control between the two modes, press and hold the Grabber Close and Grabber Open button simultaneously for five seconds or until the In-Cab alarm stops sounding.

Related Option Configurations

Option 1	Status	Functionality
Selected Truck Type	7000 OIGAI	Input %IX0.06 Is Used as Lift Raised Prox.
Selected Truck Type	7000 OIN	Input %IX0.06 Is Used as Lift Raised Prox.
Grabber Lift Interlock	ON	Output %IX0.06 Must be OFF to Open the Grabber
Option 2	**Status**	**Functionality**
Selected Truck Type	Python OIGAI	Input %IX0.06 Is Used as Lift Lowered Prox.
Selected Truck Type	Multipack OIGAI	Input %IX0.06 Is Used as Lift Lowered Prox.
Grabber Lift Interlock	ON	Output %IX0.06 Must be ON to Open the Grabber
Grabber Lift Interlock	OFF	Output %IX0.06 is ignored

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	Grabber Close Button	Deactivated	%IX2.06	OFF
B	AND	Grabber Open Button	Activated	%IX0.01	ON
AND					
C	-	Grabber Lift Interlock	Activated	N/A	ON
D	OR	Lift Raised Proximity	Deactivated	%IX0.06	OFF
OR					
E	-	Grabber Lift Interlock	Deactivated	N/A	OFF
F	OR	Lift Lowered Proximity	Activated	%IX0.06	ON

Note: This Output can be used in 7000 (O.I.G.A.I / O.I.N) or MULTIPACK or PYTHON units. With Condition (A AND B) true, condition (C OR D) will activate the F7000 Lift Grabber Open Output. With Condition (A AND B) true, condition (E OR F) will activate the Python Lift Grabber Open Output.

With Auto-Lift mode disabled the Grabber Open button will Offer manual control of the grabber open function only. With Auto-Lift mode enabled the Grabber Open button will open the grabber and trigger the lift lower and retract functions to bring the lift into the stowed position.

D09 Grabber Open Interlock Solenoid (Output %QX0.11)

This output function controls the Grabber Open Interlock circuit.

Related Option Configurations

Option	Status	Functionality
Selected Truck Type	7000 OIGAI	Output %QX0.10 Is Used as Grabber Closed
Selected Truck Type	7000 OIN	Output %QX0.10 Is Used as Grabber Closed

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	Grabber Lift Interlock	Activated	N/A	ON
B	AND	Lift Raised Proximity	Activated	%IX0.06	ON

Note: This Output can be used only in 7000 (O.I.G.A.I / O.I.N) units with 3 lever control.

Conditions (A AND B) true, will activate the Grabber open Interlock output. Refer to Section 5.02 for more information on how these inputs enable/disable auto or manual pack mode. In Auto-Pack mode, condition (B) true will turn ON the Grabber Open Interlock Solenoid output.

D10 Joystick Enable (Output %QX0.13)

This output function controls the air going to the control joystick/levers.

Related Option Configurations

Option	Setting	Functionality
Selected Truck Type	Python OIGAI	Output %QX0.13 Is Used as Joystick Enable
Selected Truck Type	Multipack OIGAI	Output %QX0.13 Is Used as Joystick Enable
Lift Stow	ON	Enables lift stow feature
Max. Spd Lift Operate	(1-45MPH) Default 7 MPH	Sets the maximum road speed for lift operation

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	System Power Switch	Activated	%IX0.15	ON
	AND	Hydraulic Pump Enable PB	Activated	%IX0.04	ON (momentary)
B	AND	Engine RPM	< 900 RPM	J1939	N/A
C	AND	Chassis Neutral	Activated	%IX1.04	ON
OR					
1A	-	System Power Switch	Activated	%IX0.15	ON
	AND	Hydraulic Pump Enable PB	Activated	%IX0.04	ON (momentary)
1B	AND	Engine RPM	< 900 RPM	J1939	N/A
1C	AND	Chassis Service Brake	Activated	%IX2.04	ON
1D	AND	Vehicle Speed	< 7 MPH	J1939	N/A
OR					
2A	-	System Power Switch	Activated	%IX0.15	ON
	AND	Hydraulic Pump Enable PB	Activated	%IX0.04	ON (momentary)
2B	AND	Lift Stow	ON	N/A	N/A
2C	AND	Grabber Open PB	ON	%IX0.01	ON
2D	AND	Grabber Full Open Prox.	Deactivated	%IX2.00	OFF
2E	OR	Lift Retracted Prox.	Deactivated	%IX2.07	OFF

Note: This Output is used only in MULTIPACK or PYTHON units.
The output will come ON under three distinct conditions:
1. Pump Enabled (A), Engine Speed < 900 RPMs(B) and the chassis is in Neutral (C). (i.e. stationary operation.)
2. Pump Enabled (1A), Engine Speed < 900 RPMs(1B), chassis Service brake is applied (1C) and vehicle MPH is <7 (1D) (i.e. slowing down and coming up to a stop.)
3. Pump Enabled (2A), Lift Stow (2B), Grabber Open button (2C), Grabber not fully opened (2D) OR Lift not fully stowed (2E) (i.e. stowing lift while pulling away from a stop.)

D11 Transmission Temperature Indicator (Output %QX0.13)

This output function controls the Transmission indicator light.

Related Option Configurations

Option	Status	Functionality
Selected Truck Type	7000 OIGAI	Output %QX0.13 Is Used as Trans Temp Indicator

Conditions Necessary to activate the circuit:

Condition	Logic	Function or Component	Status	I/O Address	Status
A	-	Lift Pump (P1)	Activated	%QX0.14	ON
B	AND	Trans Temp Switch	Deactivated	%IX0.13	OFF

Note: This Output can be used only in 7000 O.I.G.A.I. unit. With condition A true, condition B will activate the Transmission temperature indicator. The indicator will flash, once per second, when Fault #31 is set. This indicates the transmission fluid temperature has exceeded a safe operating range.

D12 Throttle Limit (Output %QX0.13)

This output function controls the engine Throttle Limit circuit. Used on operate at idle DPF700 unit

Related Option Configurations

Option	Status	Functionality
Selected Truck Type	7000 OIN	Output %QX0.10 Is Used as Grabber Closed

Conditions Necessary to activate the circuit:

Condition	Function or Component		Status	I/O Address	Status
A	-	System Power Switch	Activated	%IX0.15	ON
	AND	Hydraulic Pump Enable PB	Activated	%IX0.04	ON (momentary)
AND					
B	AND	Chassis Neutral	Activated	%IX1.04	ON

Note: This Output can be used only in 7000 O.I.N. unit. With (A) true, condition 'B' will activate the Engine Throttle Limit.

Section 5: Special Features

5.01: Select-O-Pack

Select-O-Pack is a standard feature on all CORTEX controlled Automated side loader products. This feature automatically cycles the Auto-Pack after a predetermined number of lift cycles.

Select-O-Pack Adjustment:

1. Turn the System Power OFF
2. Press and hold the Retract Button for 5 seconds *(The beeper will begin to sound at 5 seconds)*
3. Each additional activation of the Retract Button will allow one additional lift cycle before automatically packing the load. With no further activation of the Retract Button performed the Select-O-Pack function will be disabled.
4. Turn the System Power "ON" to store the setting into memory.

5.02: Auto/Manual Pack Mode

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

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

To toggle the control between Auto and Manual modes press and hold the Packer Extend and Retract buttons simultaneously until the in-cab alarm stops sounding.

5.03: Python Lift Auto-Lift/Manual Mode

Auto-Lift/Manual Lift Mode is a standard feature on all CORTEX Controlled Python Lifts. With Auto-Lift mode enabled the Grabber Close button will close the grabber for the duration of the Grabber Close Time, then trigger the lift raise and retract functions to bring the lift into the dump position.

The Grabber Open button will open the grabber and trigger the lift lower and retract functions to bring the lift into the stowed position.

To toggle the control between Auto-Lift and Manual modes press and hold the Grabber Close and Grabber Open buttons simultaneously for five seconds or until the in-cab alarm stops sounding.

5.04: Lift Coordinated Mode

Lift Coordinated Mode is standard on all CORTEX Controlled Python units. While in Auto Mode the lift will automatically retract and dump when holding the grabber close push button according to the Grab Time parameter (1.74 Seconds is the default: Grabber Close Time).

To toggle the control between Auto and Manual modes press and hold the Grabber Open and Grabber Close push buttons simultaneously until the in-cab alarm stops sounding.

5.05: 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

5.05.01: 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 5.05.04 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.

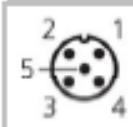
5.05.02: Display Operating States:

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	-

Fig: INSIGHT Display with Input / Output Status indication

5.05.03: 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	

5.05.04: 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

With an Input ON, the corresponding Input field (with Description and Address) located in INSIGHT display will also be ON. Refer section 5.05 for more details about Diagnostic display options and INSIGHT display tool.

6.03: Monitoring Output Status

With an Output ON, the corresponding Output field (with Description and Address) located in INSIGHT display will also be ON. Refer section 5.05 for more details about Diagnostic display options and INSIGHT display tool.

6.04: Diagnostic Beep Codes

Each Diagnostic code consists of a two-digit number. When a fault has been set the In-Cab Alarm will sound for 5 seconds, then pause. Then beep a number of times specifying the first digit of the code, pause for 2 seconds. Then resume to beep a number of times specifying the second digit of the code. See the following or the decal in the cab for the explanation of each beep

code.
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.

6.04.01: Critical Faults

- **Fault #31- High Transmission Temperature (optional equipment)**

Operate in Gear At Idle (O.I.G.A.I) units monitor the temperature of the transmission sump fluid and the fluid flowing out of the torque converter to the cooler. This fault will be set when either of these temperature levels exceed operating range. The maximum operating temperature for the transmission sump fluid is 250°F. The maximum operating temperature for the converter out fluid is 300°F.

Indication: A. The transmission temperature has exceeded a safe operating range.
B. An open has occurred in the Trans. Temp. Input circuit.

Disabled Functions: Hydraulic Pump

Fault Reset: In order to reset this fault:
1. the trans. must be placed in neutral range
2. and the engine must be running at or above idle speed
3. And the trans. temperature must cool to a safe level and remain at a safe level for three minutes.

Note: This fault is option dependent and is only available on with Operate In Gear At Idle (O.I.G.A.I) units.

- **Fault #32- Filter Bypass Shutdown (standard equipment)**

The hydraulic system has been operating in bypass condition in excess of 6 hours set by the Start Filter Shutdown parameter.

Indications: The hydraulic filter needs servicing
A.

Disabled Functions: Hydraulic Pump

Fault Reset: Cycling the System Power Switch will allow three minutes of further operation or service hydraulic filter

- **Fault #33- Side Door Interlock (standard equipment)**

The CORTEX Controller has lost the signal from the “Side Door Switch” during operation of the hydraulic Pump(s).

Indications: A. The side door has been opened during operation of the unit
B. An open has occurred in the Side Door input circuit.
B. C. The Side Door proximity switch has failed.

Disabled Functions: Hydraulic Pump

Fault Reset: Cycling the System Power Switch

- **Fault #34- Low Hydraulic Oil (optional equipment)**

The CORTEX Controller has lost the signal from the “Oil Level Switch”.

Indications: A. Low Hydraulic Oil
B. Signal wire break or disconnect.

Disabled Functions: Hydraulic Pump

Fault Reset: Fill Oil Tank or Restore Low Oil signal.

- **Fault #41- Critical Fault, J1939 Engine Comms Error (standard equipment)**

The CORTEX Controller has is not receiving J1939 engine messages.

Indications: A. Incorrect Baud Rate setting.
B. Incorrect wiring to chassis J1939 interface.

Disabled Functions: Hydraulic Pump

Fault Reset: Cycling the System Power Switch

6.04.02: System Faults

- **Fault #23 – Engine Low Torque Pressure (optional equipment)**

The CORTEX Controller has received a signal from the low torque pressure switch indicating that the engine cannot keep up with the demand by the pump.

Indication: A. Pump turns OFF.

Disabled Functions: Pump will not function.

Fault Reset: When the pressure returns to below 1500 PSI, the switch will reset. If the switch Does not reset, there is a possible problem with the switch or the harnessing.

- **Fault #53- Packer Proximity Switch Fault (standard equipment)**

The CORTEX Controller has received a signal from both packer proximity switches at the same time.

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.

Disabled Functions: None

Fault Reset: N/A

- **Fault #54- Filter Bypass Switch Fault (optional equipment)**

The CORTEX Controller has lost the signal from the filter pressure switch while neither 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.

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 to open.

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 units only.

- **Fault #55- Packer Pressure Switch Fault (standard equipment)**

The CORTEX Controller has lost the signal from the packer pressure switch while the packer extend function was not in operation. This is recognized as a fault because there should be no hydraulic pressure to packer extend circuit under this condition.

Indication: A. The Packer Pressure Switch has been disconnected
B. An open in the Packer Pressure Switch circuit
C. The Packer Pressure Switch has failed open.

Disabled Functions: None

Fault Reset: N/A

SECTION 9
SCHEMATICS

HARNESS: 263-1479-007

C-1
PIN-A
PIN-C
PIN-F
PIN-H
PIN-J
PIN-K
PIN-L
PIN-N
PIN-D*
PIN-E*
PIN-T
PIN-B*
PIN-P
PIN-R
PIN-S
PIN-U
PIN-V
PIN-M
PIN-G*
PIN-W
PIN-X

RED "638"
RED "637"
RED "634"
RED "633"
RED "630"
RED "631"
RED "635"
WHITE "GND CAB"
BLACK "IGN" (12 AWG)
PINK "REV"
RED "P1-19"
DARK BLUE "P1-4"
RED "P1-20"
DK BLUE "P1-6A"
BLACK "+12V"

OPTIONAL SIDE FLOOD CONTROL
OPTIONAL FRONT STROBE CONTROL
OPTIONAL HOPPER LIGHT CONTROL
OPTIONAL REAR STROBE CONTROL
OPTION CONTROL CIRCUIT
OPTION CONTROL CIRCUIT
OPTIONAL LIFT FLOOD CONTROL

FUSE #4 SIDE FLOOD 10 AMP
FUSE #3 HOPPER/ STROBE 10 AMP
OPTION FUSE #2 10 AMP

SEE NOTE "G"
0.11" FEMALE PUSH ON MOLEX 0190020034 OR EQUIV
BUZZER
BODY RAISED
HYD. FILTER BYPASS
LIFT EXTENDED
TAILGATE OPEN
PACKER EXTEND
PACKER RETRACT
C-6 PIN-1 PIN-2

C-D PIN-D PIN-C PIN-B PIN-A
C-D PIN-D PIN-C PIN-B PIN-A

C-2
PIN-1
PIN-2
PIN-3
PIN-4
PIN-5
PIN-6
PIN-7
PIN-8
PIN-9
PIN-10
PIN-11
PIN-12
PIN-13
PIN-14
PIN-15
PIN-16
PIN-17
PIN-18
PIN-19
PIN-20
PIN-21
PIN-22
PIN-23
PIN-24
PIN-25
PIN-26
PIN-27
PIN-28
PIN-29
PIN-30
PIN-31

RED "P1-1"
RED "P1-14"
RED "P1-9"
RED "P1-3"
RED "P1-2"
RED "P1-15"
RED "P1-21"
DARK BLUE "P1-16"
DARK BLUE "P1-4"
RED "P1-19"
DARK BLUE "P1-17"
DARK BLUE "P1-6"
DARK BLUE "P1-22"
RED "P1-20"
DARK BLUE "P1-12"
DARK BLUE "P1-23"
DARK BLUE "P1-11"
DARK BLUE "P1-5"
DARK BLUE "P1-10"
RED "P1-8"
RED "P1-7"
WHITE "GND CAB"
RED "P1-13"
RED "P1-13A"
PINK "903"
"920 - A103"
"922 - A142"
"921 - A117"
BROWN "801"

JOYSTICK ENABLE
031-6087-012 NC SOLENOID VALVE
C-3 PIN-A PIN-B
RED
BLACK
108-8468-021
SEE NOTE "C"
108-8468-006
C-9 PIN-A PIN-B PIN-C PIN-D
WHITE "GND"
RED "P1-13"
BROWN "801"
OPTIONAL REAR STROBE SWITCH
OPTIONAL FRONT STROBE SWITCH
SEE NOTE "D"
C-A PIN-A PIN-B PIN-C
108-8468-008
108-8468-007
DARK BLUE "P1-17"
DARK BLUE "P1-6A"
DARK BLUE "P1-6"
DARK BLUE "P1-6B"
RED "P1-15"
RED "P1-13A"

SYSTEM POWER
PUMP ON
FUSE #1 5 AMP
BLACK "5A"
RED "P1-19"
RED "P1-20"
DARK BLUE "P1-12"

LIFT CONTROL INTERLOCK
031-6087-012 NC SOLENOID VALVE
C-3 PIN-A PIN-B
RED
BLACK
RED "P1-20"
WHITE "GND CAB"
108-8468-004
C-8 PIN-A PIN-B PIN-C
JOYSTICK ENABLE
031-6087-012 NC SOLENOID VALVE
C-3 PIN-A PIN-B
RED
BLACK
108-8468-003
SEE NOTE "B"

HYD. PUMP ENABLE
BLACK "5A"
DARK BLUE "P1-23"
PACKER EXTEND
BLACK "5A"
DARK BLUE "P1-11"
PACKER RETRACT
BLACK "5A"
DARK BLUE "P1-5"

GRABBER OPEN/ OPEN INTERLOCK
031-6087-012 NC SOLENOID VALVE
C-4 PIN-A PIN-B
RED
BLACK
RED "P1-8"
WHITE "GND CAB"
GRABBER CLOSE/ LIFT INTERLOCK
031-6087-012 NC SOLENOID VALVE
C-5 PIN-A PIN-B
RED
BLACK
RED "P1-7"
WHITE "GND CAB"

C-5A PIN-A PIN-B PIN-C "J'STK"
SEE NOTE "H"
C-5A PIN-A PIN-B PIN-C "STANDARD"

C-7 PIN-1 PIN-2 PIN-3 PIN-4 PIN-5 PIN-6
C-B PIN-1 PIN-2 PIN-3 PIN-4 PIN-5 PIN-6
SEE DETAIL "A"
108-8468-009
AUTO-NEUTRAL ENABLE
SEE NOTE "E"
AUTO-NEUTRAL RELAY

IN-CAB CONTROL PANEL

HARNESS 263-1479-008
108-8468-010
C-C PIN-A PIN-B PIN-C
(ADD AS REQD)
OPTIONAL SIDE FLOOD SWITCH
SEE NOTE "F"

PTO MOUNTED DAI PUMP
372-5790-002
NON PTO MOUNTED DAI PUMP
372-5790-001
C-7 PIN-1 PIN-2 PIN-3 PIN-4 PIN-5 PIN-6
BODY RAISED
SEE NOTE "A"
TRANS TEMP RELAY
SEE NOTES "A" & "C"
DETAIL "A"

HYD. PUMP ENABLE
BLACK "5A"
DARK BLUE "P1-23"
PACKER EXTEND
BLACK "5A"
DARK BLUE "P1-11"
PACKER RETRACT
BLACK "5A"
DARK BLUE "P1-5"
GRABBER OPEN
BLACK "5A"
DARK BLUE "P1-16"
GRABBER CLOSE
BLACK "5A"
DARK BLUE "P1-22"

263-1789. SEE 372-1819-005 FOR REMAINDER OF HARNESS INSTALLATION.

TO 372-1819-005 12 WAY PLUG ON AUX ROCKER SWITCH CONTROLS

AUX
PIN-1 BROWN "GRIP"
PIN-2 ORANGE "RELEASE"
PIN-3 GREEN "EXTEND"
PIN-4 BLACK "RETRACT"
PIN-5 GRAY "LOWER"
PIN-6 RED "RAISE"
PIN-7 PLUGGED
PIN-8 PLUGGED
PIN-9 PLUGGED
PIN-10 PLUGGED
PIN-11 PURPLE "SWITCH POWER"
PIN-12 PLUGGED

PURPLE "SWITCH POWER"
BLACK WIRE TO BE SPLICED INTO BLACK "5A" BETWEEN FUSE AND E-STOP
108-7760
BLACK
AUX CONTROLS ENABLE/DISABLE
RED "P1-13"
WHITE "GND"

C-4 PIN-1 PIN-2
ORANGE "RELEASE"
WHITE "GND"
PLUGS IN BETWEEN C-4 ON 263-1479-008 & GRABBER OPEN MAC VALVE IN CONTROL PANEL.

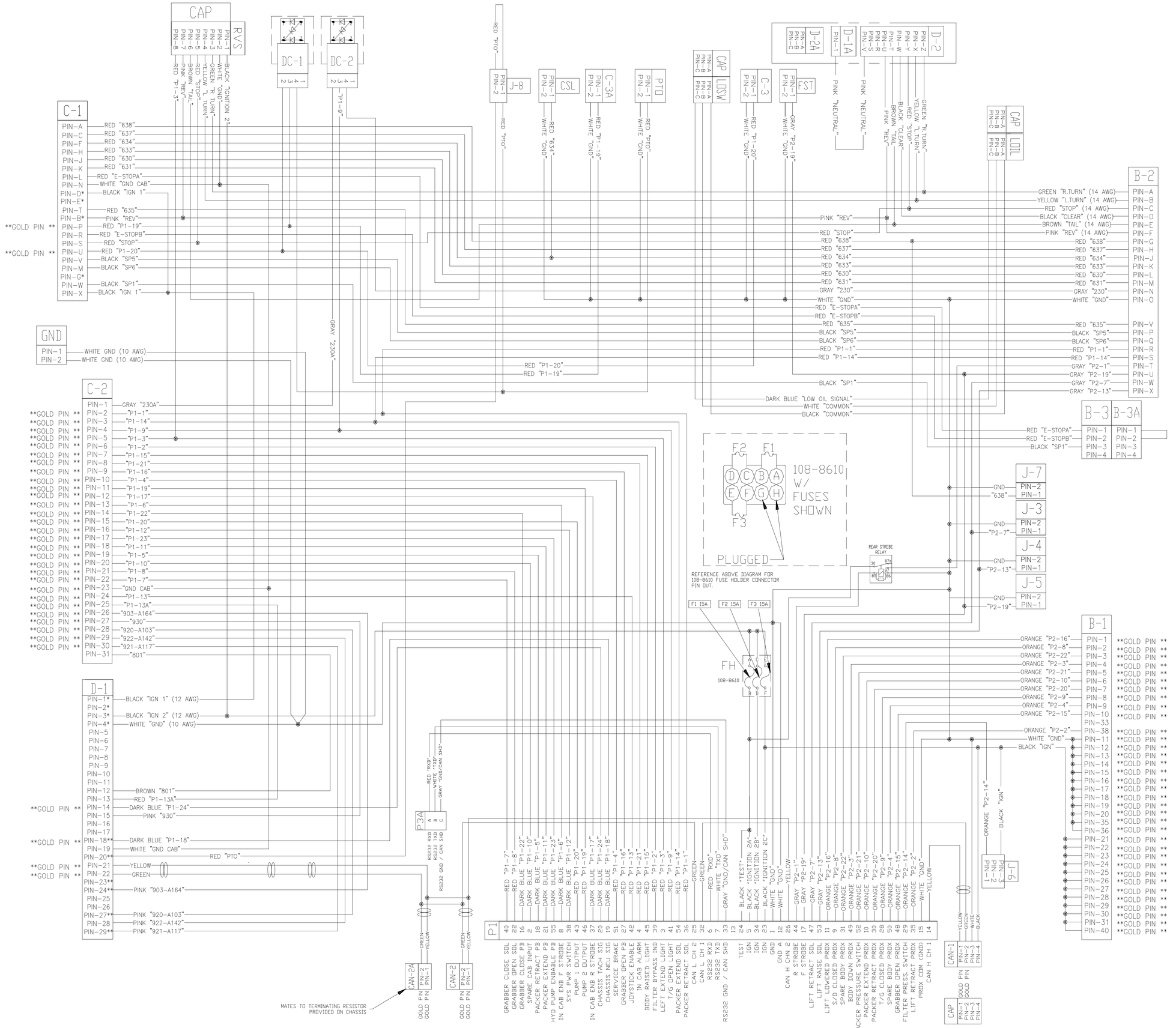
C-5 PIN-1 PIN-2
BROWN "GRIP"
WHITE "GND"
PLUGS IN BETWEEN C-5 ON 263-1479-008 & GRABBER CLOSE MAC VALVE IN CONTROL PANEL.

C-9 PIN-1 PIN-2 PLUGGED PIN-3 PIN-4 PLUGGED
WHITE "GND"
RED "P1-13"
CONNECTS TO C-9 ON 263-1479-008

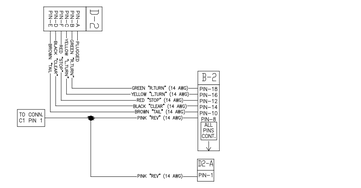
SWITCH TO BE ADDED TO CONTROL PANEL IN OPTIONS SLOT FOR ACTIVATION/DEACTIVATION OF AUXILIARY LIFT CONTROLS.

701-9064-001

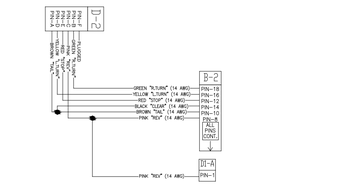
SCHEMATIC, CAB CONTROLS, DPF PYTHON, 7000, MULTIPACK
701-9064-001
8/23/2012



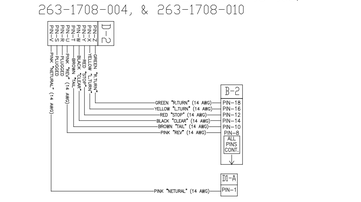
PINOUT FOR HARNESS 263-1708-001



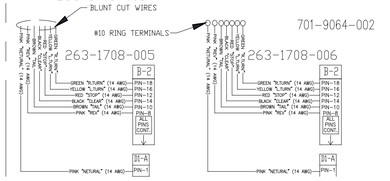
PINOUT FOR HARNESS 263-1708-002



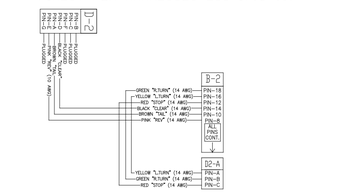
PINOUT FOR HARNESSES 263-1708-003, 263-1708-004, & 263-1708-010



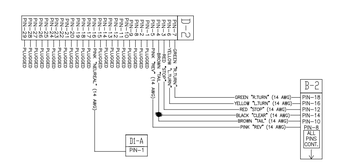
PINOUT FOR HARNESSES 263-1708-005, & 263-1708-006



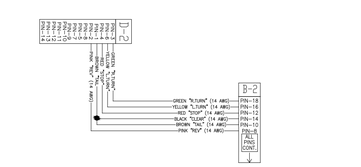
PINOUT FOR HARNESSES 263-1708-007



PINOUT FOR HARNESS 263-1708-008



PINOUT FOR HARNESS 263-1708-009



SCHEMATIC, CAB TO BODY, DPF PYTHON, 7000, MULTIPACK
701-9064-002
8/7/2012

263-1479-003

C-1

RED "638" — PIN-A
RED "637" — PIN-C
RED "634" — PIN-F
RED "633" — PIN-H
RED "630" — PIN-J
RED "631" — PIN-K
RED "635" — PIN-L
WHITE "GND" — PIN-N
BLACK "IGN" — PIN-D*
PIN-E*
RED "635" — PIN-T
PIN-B*
PIN-P
RED "P1-20" — RED "P1-20A" — PIN-R
PIN-S
RED "P1-20A" — PIN-U
BLACK "SP5" — PIN-V
BLACK "SP6" — PIN-M
PIN-G*
PIN-W
PIN-X

OPTIONAL SIDE FLOOD CONTROL
OPTIONAL FRONT STROBE CONTROL
OPTIONAL HOPPER LIGHT CONTROL
OPTIONAL REAR STROBE CONTROL
OPTION CONTROL CIRCUIT
OPTION CONTROL CIRCUIT
OPTIONAL LIFT FLOOD CONTROL

FUSE #4 SIDE FLOOD 10 AMP
FUSE #3 HOPPER/ STROBE 10 AMP
OPTION FUSE #2 10 AMP
FUSE #1 5 AMP

L. HAND BUCKET RAISED (R) — RED "P1-7"
UPPER TAILGATE OPEN (R) — RED "P1-13"
BUZZER — RED "P1-21"
BODY RAISED (R) — RED "P1-15"
HYD. FILTER BYPASS (R) — RED "P1-2"
R. HAND BUCKET RAISED (R) — RED "P1-3"
LOWER TAILGATE OPEN (R) — RED "P1-9"
PACKER EXTEND (G) — RED "P1-14"
PACKER RETRACT (Y) — RED "P1-1"

263-1479-004

C-2

GRAY "230A" — PIN-1
RED "P1-1" — PIN-2
RED "P1-14" — PIN-3
RED "P1-9" — PIN-4
RED "P1-3" — PIN-5
RED "P1-2" — PIN-6
RED "P1-15" — PIN-7
RED "P1-21" — PIN-8
DARK BLUE "P1-16" — PIN-9
DARK BLUE "P1-4" — PIN-10
RED "P1-19" — PIN-11
DARK BLUE "P1-17" — PIN-12
DARK BLUE "P1-6" — PIN-13
DARK BLUE "P1-22" — PIN-14
RED "P1-20" — PIN-15
DARK BLUE "P1-12" — PIN-16
DARK BLUE "P1-23" — PIN-17
DARK BLUE "P1-11" — PIN-18
DARK BLUE "P1-5" — PIN-19
DARK BLUE "P1-10" — PIN-20
RED "P1-8" — PIN-21
RED "P1-7" — PIN-22
"GND CAB" — PIN-23
RED "P1-13" — PIN-24
RED "P1-19" — PIN-25
PINK "903" — PIN-26
PIN-27
PIN-28
PIN-29
PIN-30
PIN-31

OPTIONAL INPUT DEVICE — DARK BLUE "P1-16"
OPTIONAL INPUT DEVICE — DARK BLUE "P1-4"
REAR STROBE SWITCH (OPTIONAL) — DARK BLUE "P1-17"
FRONT STROBE SWITCH (OPTIONAL) — DARK BLUE "P1-6"
OPTIONAL INPUT DEVICE — DARK BLUE "P1-22"

SYSTEM POWER (R) — RED "P1-20" — RED "P1-20"
PUMP ON (R) — BLACK "5A" — DARK BLUE "P1-12"

HYD. PUMP ENABLE — BLACK "5A" — DARK BLUE "P1-23"
PACKER EXTEND — BLACK "5A" — DARK BLUE "P1-11"
PACKER RETRACT — BLACK "5A" — DARK BLUE "P1-5"
OPTIONAL INPUT DEVICE — DARK BLUE "P1-10"
SIDE FLOOD LIGHT SWITCH (OPTIONAL) — RED "P1-8"

DARK BLUE "P1-12"
DARK BLUE "P1-12"
WHITE "GND CAB"
PINK "903"
C-7 (PIN-1, PIN-3, PIN-5, PIN-6, PIN-4, PIN-2)

SEE DETAIL "A"

IN-CAB CONTROL PANEL

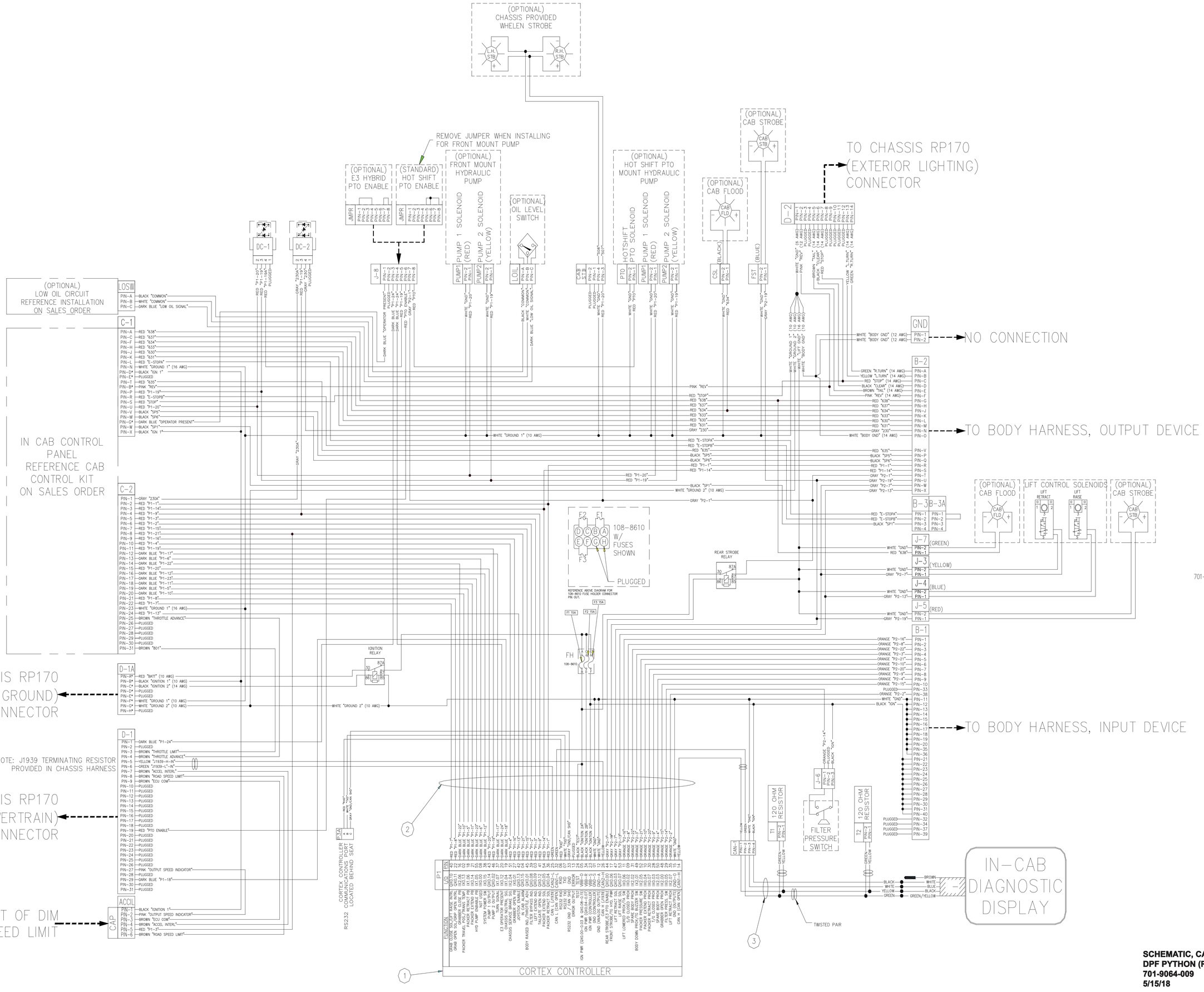
701-9064-003

PTO MOUNTED OAI PUMP
C-7 (PIN-1, PIN-3, PIN-5, PIN-6, PIN-4, PIN-2)
372-5790-002
BODY RAISED (R)
SEE NOTE "A"
TT (PIN-1, PIN-4, PIN-3, PIN-5, PIN-2)
TRANS TEMP RELAY (3, 4, 5, 1, 10)

NON PTO MOUNTED OAI PUMP
C-7 (PIN-1, PIN-3, PIN-5, PIN-6, PIN-4, PIN-2)
372-5790-001

DETAIL "A"

SCHEMATIC, CAB CONTROLS
701-9064-003
8/27/12


(OPTIONAL) CHASSIS PROVIDED WHELEN STROBE
L.H. STB
R.H. STB
REMOVE JUMPER WHEN INSTALLING FOR FRONT MOUNT PUMP
(OPTIONAL) E3 HYBRID PTO ENABLE
(STANDARD) HOT SHIFT PTO ENABLE
(OPTIONAL) FRONT MOUNT HYDRAULIC PUMP
PUMP 1 SOLENOID (RED)
PUMP 2 SOLENOID (YELLOW)
(OPTIONAL) OIL LEVEL SWITCH
(OPTIONAL) HOT SHIFT PTO MOUNT HYDRAULIC PUMP
HOTSHIFT PTO SOLENOID
(OPTIONAL) CAB STROBE
(OPTIONAL) CAB FLOOD
TO CHASSIS RP170 (EXTERIOR LIGHTING) CONNECTOR
D-2
GND
NO CONNECTION
B-2
TO BODY HARNESS, OUTPUT DEVICE
B-3
B-3A
(OPTIONAL) CAB FLOOD
LIFT CONTROL SOLENOIDS
LIFT RETRACT
LIFT RAISE
(OPTIONAL) CAB STROBE
J-7 (GREEN)
J-3 (YELLOW)
J-4 (BLUE)
J-5 (RED)
B-1
TO BODY HARNESS, INPUT DEVICE
(OPTIONAL) LOW OIL CIRCUIT REFERENCE INSTALLATION ON SALES ORDER
LOSW
C-1
IN CAB CONTROL PANEL REFERENCE CAB CONTROL KIT ON SALES ORDER
C-2
108-8610 W/ FUSES SHOWN
PLUGGED
REFERENCE ABOVE DIAGRAM FOR 108-8610 FUSE HOLDER CONNECTOR PIN OUT.
REAR STROBE RELAY
IGNITION RELAY
FH
TO CHASSIS RP170 (POWER AND GROUND) CONNECTOR
D-1A
NOTE: J1939 TERMINATING RESISTOR PROVIDED IN CHASSIS HARNESS
TO CHASSIS RP170 (POWERTRAIN) CONNECTOR
D-1
OUT OF DIM SPEED LIMIT
ACCIL
CAP
CORTEX CONTROLLER
RS232 COMMUNICATIONS PORT LOCATED BEHIND SEAT
P3A
P1
CORTEX CONTROLLER
120 OHM RESISTOR
T1
T2
FILTER PRESSURE SWITCH
J-6
TWISTED PAIR
IN-CAB DIAGNOSTIC DISPLAY
701-9064-009
SCHEMATIC, CAB ELECT
DPF PYTHON (RP170)
701-9064-009
5/15/18

REFERENCE REAR VISION SYSTEM ON SALES ORDER FOR EXACT DETAILS.
(WIRING DETAILED HERE IS INTENDED SPECIFICALLY FOR W/M UNITS)

ALLEY CAMERA TRIGGER
CAB CAMERA TRIGGER

YELLOW (CAMERA A) — YELLOW "LH ALLEY TRIGGER"
ORANGE (CAMERA B) — GREEN "RH ALLEY TRIGGER"
RED (CAMERA POWER +12 VDC) — BLACK "IGNITION"
BLACK (CAMERA GROUND) — WHITE "GROUND"
WHITE (CAMERA C) — GREEN "RH CAB TRIGGER"
NC — YELLOW "LH CAB TRIGGER"
BLUE (CAMERA R) — PINK "REV"
NO — RED "HOPPER CAM TRIGGER"

RVS
PIN-1 — BLACK "IGNITION"
PIN-2 — WHITE "GROUND"
PIN-3 — GREEN "RH CAB TRIGGER"
PIN-4 — YELLOW "LH CAB TRIGGER"
PIN-5 — PLUGGED
PIN-6 — PLUGGED
PIN-7 — PINK "REV"
PIN-8 — RED "HOPPER CAM TRIGGER"

IN CAB CONTROL PANEL REFERENCE CAB CONTROL KIT ON SALES ORDER

C-1
PIN-A — RED "638"
PIN-C — RED "637"
PIN-F — RED "634"
PIN-H — RED "633"
PIN-J — RED "630"
PIN-K — RED "631"
PIN-L — RED "E-STOPA"
PIN-N — WHITE "GROUND 1" (16 AWG)
PIN-O* — BLACK "IGNITION 1" (14 AWG)
PIN-E* — GRAY "P2-18" (14 AWG)
PIN-T — RED "635"
PIN-B* — PINK "REV"
PIN-P — RED "P1-19"
PIN-R — RED "E-STOPB"
PIN-S — RED "STOP"
PIN-U — RED "P1-20"
PIN-V — BLACK "SPS"
PIN-M — BLACK "SPB"
PIN-O* — PLUGGED
PIN-W — BLACK "SPI"
PIN-X — BLACK "IGNITION 1" (14 AWG)

C-2
PIN-1 — GRAY "230A"
PIN-2 — RED "P1-1"
PIN-3 — RED "P1-4"
PIN-4 — RED "P1-9"
PIN-5 — RED "P1-3"
PIN-6 — RED "P1-2"
PIN-7 — RED "P1-15"
PIN-8 — RED "P1-21"
PIN-9 — RED "P1-16"
PIN-10 — RED "P1-4"
PIN-11 — RED "P1-19"
PIN-12 — DARK BLUE "P1-17"
PIN-13 — PLUGGED
PIN-14 — DARK BLUE "P1-22"
PIN-15 — RED "P1-20"
PIN-16 — DARK BLUE "P1-12"
PIN-17 — DARK BLUE "P1-23"
PIN-18 — DARK BLUE "P1-11"
PIN-19 — DARK BLUE "P1-6"
PIN-20 — DARK BLUE "P1-10"
PIN-21 — RED "P1-8"
PIN-22 — RED "P1-7"
PIN-23 — WHITE "GROUND 1" (16 AWG)
PIN-24 — RED "P1-13"
PIN-25 — PLUGGED
PIN-26 — PINK "903-A164"
PIN-27 — PLUGGED
PIN-28 — PLUGGED
PIN-29 — PLUGGED
PIN-30 — PLUGGED
PIN-31 — PLUGGED

TO CHASSIS RP170 (POWER AND GROUND) CONNECTOR
D-1A
PIN-1 — RED "BATT" (10 AWG)
PIN-2 — BLACK "IGNITION 1" (10 AWG)
PIN-3 — BLACK "IGNITION 2" (14 AWG)
PIN-4 — PLUGGED
PIN-5 — PLUGGED
PIN-6 — WHITE "GROUND 1" (10 AWG)
PIN-7 — WHITE "GROUND 2" (10 AWG)
PIN-8 — PLUGGED

NOTE: J1939 TERMINATING RESISTOR PROVIDED IN CHASSIS HARNESS
IR-04 J1939 PIN-1 — YELLOW "J1939-H-IN"
IR-04 J1939 PIN-2 — GREEN "J1939-L-IN"

TO CHASSIS RP170 (POWERTRAIN) CONNECTOR
D-1
PIN-1 — PLUGGED
PIN-2 — PLUGGED
PIN-3 — PLUGGED
PIN-4 — PLUGGED
PIN-5 — YELLOW "J1939-H-IN"
PIN-6 — GREEN "J1939-L-IN"
PIN-7 — BROWN "ACCEL INTERL"
PIN-8 — BROWN "ROAD SPEED LIMIT"
PIN-9 — BROWN "ECM COMMON"
PIN-10 — PLUGGED
PIN-11 — PLUGGED
PIN-12 — PLUGGED
PIN-13 — PLUGGED
PIN-14 — PLUGGED
PIN-15 — PLUGGED
PIN-16 — PLUGGED
PIN-17 — PLUGGED
PIN-18 — PLUGGED
PIN-19 — RED "PTO ENABLE"
PIN-20 — PLUGGED
PIN-21 — PLUGGED
PIN-22 — PLUGGED
PIN-23 — PLUGGED
PIN-24 — PLUGGED
PIN-25 — PLUGGED
PIN-26 — PLUGGED
PIN-27 — PLUGGED
PIN-28 — PINK "903-A164"
PIN-29 — DARK BLUE "P1-18"
PIN-30 — PLUGGED
PIN-31 — PLUGGED

OPTIONAL ACCELERATOR INTERLOCK OR VEHICLE SPEED LIMITER
ACCIL / CAP
PIN-1 — BLACK "IGNITION 2"
PIN-2 — WHITE "GROUND 2"
PIN-3 — BROWN "ECU COM"
PIN-4 — BROWN "ACCEL INTERL"
PIN-5 — BROWN "OUT OF DIM"
PIN-6 — BROWN "ROAD SPEED LIMIT"

CAP — IR-04 J1939 PIN-1 — YELLOW "J1939 1 H"
CAP — IR-04 J1939 PIN-2 — GREEN "J1939 1 L"
T120 OHM

DC-1
PIN "P1-25" — RED
PIN "P1-19" — RED
PLUGGED

DC-2
GRAY "230A"
RED "P1-19"
GRAY "230A"
PLUGGED

(OPTIONAL) FRONT MOUNT HYDRAULIC PUMP
PUMP1 PUMP 1 SOLENOID (RED)
PUMP2 PUMP 2 SOLENOID (YELLOW)
PIN-1 — WHITE "GND"
PIN-2 — RED "P1-20"
PIN-1 — WHITE "GND"
PIN-2 — RED "P1-19"

CAB MOUNT STROBES
CAB STB PIN-1 — PLUGGED
PIN-2 — WHITE "GND"
PIN-3 — PLUGGED
PIN-4 — RED "P1-20"

(OPTIONAL) HOT SHIFT PTO MOUNT HYDRAULIC PUMP
PTO HOTSHIFT PTO SOLENOID
PUMP1 PUMP 1 SOLENOID (RED)
PUMP2 PUMP 2 SOLENOID (YELLOW)
PIN-1 — WHITE "GND"
PIN-2 — RED "P1-20"
PIN-1 — WHITE "GND"
PIN-2 — RED "P1-19"

(OPTIONAL) CAB FLOOD
CAB FLD (BLACK)
CSL PIN-1 — WHITE "GND"
CSL PIN-2 — RED "634"

CAB MOUNT STROBES
FST PIN-1 — WHITE "GND"
FST PIN-2 — GRAY "P2-19"

TO CHASSIS RP170 (EXTERIOR LIGHTING) CONNECTOR
D-2
PIN-1 — WHITE "GND" (6 AWG)
PIN-2 — PINK "REV" (6 AWG)
PIN-3 — PLUGGED
PIN-4 — PLUGGED
PIN-5 — PLUGGED
PIN-6 — PLUGGED
PIN-7 — PLUGGED
PIN-8 — PLUGGED
PIN-9 — PLUGGED
PIN-10 — PLUGGED
PIN-11 — PLUGGED
PIN-12 — BROWN "TAIL" (14 AWG)
PIN-13 — BLACK "CLEAR" (14 AWG)
PIN-14 — RED "STOP" (14 AWG)
PIN-15 — YELLOW "L.TURN" (14 AWG)
PIN-16 — GREEN "R.TURN" (14 AWG)

GND
PIN-1 — WHITE "BODY GND" (12 AWG)
PIN-2 — WHITE "BODY GND" (12 AWG)
→ NO CONNECTION

WHITE "GROUND 1" (10 AWG)
WHITE "GROUND 2" (10 AWG)
WHITE "GROUND 2" (16 AWG)
WHITE "BODY GND" (10 AWG)

B-2
PIN-A — GREEN "R.TURN" (14 AWG)
PIN-B — YELLOW "L.TURN" (14 AWG)
PIN-C — RED "STOP" (14 AWG)
PIN-D — BLACK "CLEAR" (14 AWG)
PIN-E — BROWN "TAIL" (14 AWG)
PIN-F — PINK "REV" (14 AWG)
PIN-G — RED "638"
PIN-H — RED "637"
PIN-J — RED "634"
PIN-K — RED "633"
PIN-L — RED "630"
PIN-M — RED "631"
PIN-N — GRAY "230"
PIN-O — WHITE "BODY GND" (14 AWG)
→ TO BODY HARNESS, OUTPUT DEVICE
PIN-V — RED "635"
PIN-P — BLACK "SPS"
PIN-Q — BLACK "SPB"
PIN-R — RED "P1-1"
PIN-S — RED "P1-14"
PIN-T — GRAY "P2-1"
PIN-W — GRAY "P2-7"
PIN-X — GRAY "P2-13"

B-3 / B-3A
RED "E-STOPA" — PIN-1
RED "E-STOPB" — PIN-2
BLACK "SPI" — PIN-3
PIN-4

J-7 (GREEN) — WHITE "GND" PIN-2, RED "638" PIN-1
J-3 (YELLOW) — WHITE "GND" PIN-2, GRAY "P2-7" PIN-1
J-4 (BLUE) — WHITE "GND" PIN-2, GRAY "P2-13" PIN-1
J-5 (RED) — WHITE "GND" PIN-2, GRAY "P2-19" PIN-1

(OPTIONAL) LIFT FLOOD — CAB FLD
LIFT CONTROL SOLENOIDS — LIFT RETRACT, LIFT RAISE
(OPTIONAL) STROBE — STB

F2 F1 D C B A E F G H T3 T2
108-8610 W/ FUSES SHOWN
PLUGGED
REFERENCE ABOVE DIAGRAM FOR 108-8610 FUSE HOLDER CONNECTOR PIN OUT.
F1 15A
F2 15A
FH 108-8610

REAR STROBE RELAY
87A, 30, 86, 85, 87

IGNITION RELAY
87A, 30, 86, 85, 87

B-1
ORANGE "P2-16" — PIN-1
ORANGE "P2-8" — PIN-2
ORANGE "P2-22" — PIN-3
ORANGE "P2-3" — PIN-4
ORANGE "P2-21" — PIN-5
ORANGE "P2-10" — PIN-6
ORANGE "P2-20" — PIN-7
ORANGE "P2-9" — PIN-8
ORANGE "P2-4" — PIN-9
ORANGE "P2-15" — PIN-10
PLUGGED — PIN-33
ORANGE "P2-2" — PIN-38
WHITE "GROUND 2" (16 AWG) — PIN-11
BLACK "IGNITION 2" — PIN-12
PIN-13
PIN-14
PIN-15
PIN-16
PIN-17
PIN-18
PIN-19
PIN-20
PIN-35
PIN-36
PIN-21
PIN-22
PIN-23
PIN-24
PIN-25
PIN-26
PIN-27
PIN-28
PIN-29
PIN-30
PIN-31
PIN-40
PLUGGED — PIN-32
PLUGGED — PIN-34
PLUGGED — PIN-37
PLUGGED — PIN-39
→ TO BODY HARNESS, INPUT DEVICE

SHIELDED CABLE
SHIELD DRAIN
BROWN
YELLOW
WHITE
BROWN

701-9064-010

CORTEX CONTROLLER
CAN 1 (CAN A) HIGH
CAN 1 (CAN A) LOW
RS232 GND
RS232 TXD
RS232 RXD
CAN 1 (CAN A) SHIELD
CAN 1 (CAN A) LOW
CAN 1 (CAN A) HIGH
CAN 1 (CAN A) SHIELD
CORTEX CONTROLLER LOCATED BEHIND SEAT
P1 I/O PIN
FUNCTION
GRAY "230A"
RED "P1-1"
RED "P1-4"
RED "P1-9"
RED "P1-3"
RED "P1-2"
RED "P1-15"
RED "P1-21"
RED "P1-16"
RED "P1-19"
DARK BLUE "P1-17"
DARK BLUE "P1-22"
RED "P1-20"
DARK BLUE "P1-12"
DARK BLUE "P1-23"
DARK BLUE "P1-11"
DARK BLUE "P1-6"
DARK BLUE "P1-10"
RED "P1-8"
RED "P1-7"
RED "P1-13"
DARK BLUE "P1-18"
RED "P1-25"
RED "P1-19"
RED "P1-18"
RED "P1-21"
RED "P1-14"
RED "P1-22"
RED "P1-12"
RED "P1-23"
RED "P1-11"
RED "P1-6"
RED "P1-10"
RED "P1-8"
RED "P1-7"
RED "P1-13"
RED "P1-5"
RED "P1-17"
RED "P1-24"
GRAY "230A"
GRAY "P2-18"
GRAY "230A"
ORANGE "CAN SHD"
ORANGE "CAN LOW"
ORANGE "CAN HIGH"
GRAY "P2-1"
GRAY "P2-7"
GRAY "P2-13"
GRAY "P2-19"
GRAY "P2-2"
GRAY "P2-8"
GRAY "P2-14"
GRAY "P2-20"
GRAY "P2-3"
GRAY "P2-9"
GRAY "P2-15"
GRAY "P2-21"
GRAY "P2-4"
GRAY "P2-10"
GRAY "P2-16"
GRAY "P2-22"
GRAY "P2-5"
GRAY "P2-11"
GRAY "P2-17"
GRAY "P2-23"
GRAY "P2-6"
GRAY "P2-12"
GRAY "P2-18"
GRAY "P2-24"
WHITE "GND"
BLACK "IGNITION 2"
BLACK "TEST"
BLACK "IGNITION 2A"
BLACK "IGNITION 2B"
BLACK "IGNITION 2C"
WHITE "GROUND 2"
GRAY "P2-1"
GRAY "P2-7"
GRAY "P2-13"
GRAY "P2-19"
ORANGE "P2-1"
ORANGE "P2-7"
ORANGE "P2-13"
ORANGE "P2-19"
ORANGE "P2-2"
ORANGE "P2-8"
ORANGE "P2-14"
ORANGE "P2-20"
ORANGE "P2-3"
ORANGE "P2-9"
ORANGE "P2-15"
ORANGE "P2-21"
ORANGE "P2-4"
ORANGE "P2-10"
ORANGE "P2-16"
ORANGE "P2-22"
ORANGE "P2-5"
ORANGE "P2-11"
ORANGE "P2-17"
ORANGE "P2-23"
ORANGE "P2-6"
ORANGE "P2-12"
ORANGE "P2-18"
ORANGE "P2-24"
WHITE "GND"
BLACK "IGNITION 2C"
CORTEX CONTROLLER

120 OHM RESISTOR T2 — PIN-1, PIN-2
120 OHM RESISTOR T1 — PIN-1, PIN-2
YELLOW
GREEN
TWISTED PAIR

PIN-1 YELLOW
PIN-2 GREEN
PIN-3 "GROUND 2"
PIN-4 "IGNITION 2C"
PIN-5 BLACK "IGNITION 2C"

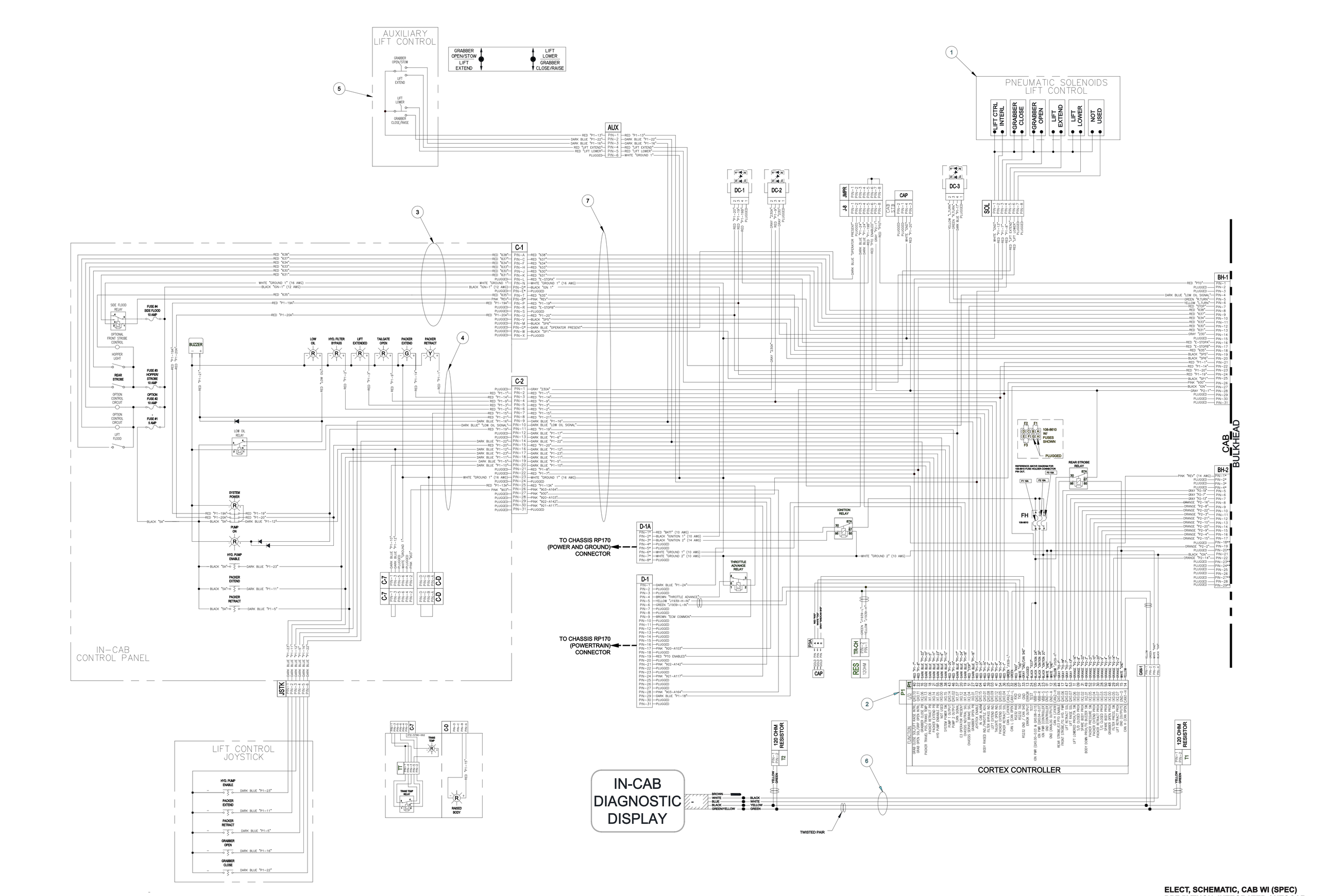
LTRQ — PLUGGED, ORANGE "LOW TORQUE", GRAY "P2-19", BLACK "IGNITION 2C"
LOW — DARK BLUE "P1-17", WHITE "GROUND 2", BLACK "IGNITION 2C"
J-6 — ORANGE "P2-14", PLUGGED, BROWN
OIL TEMP — WHITE, YELLOW, BROWN

M12 PIN-2, PIN-4, PIN-3, PIN-1
LOW TORQUE PRESSURE SWITCH
LOW OIL SWITCH
FILTER PRESSURE SWITCH
HYD OIL TEMP .05...4.5 VDC .5A...302 °F

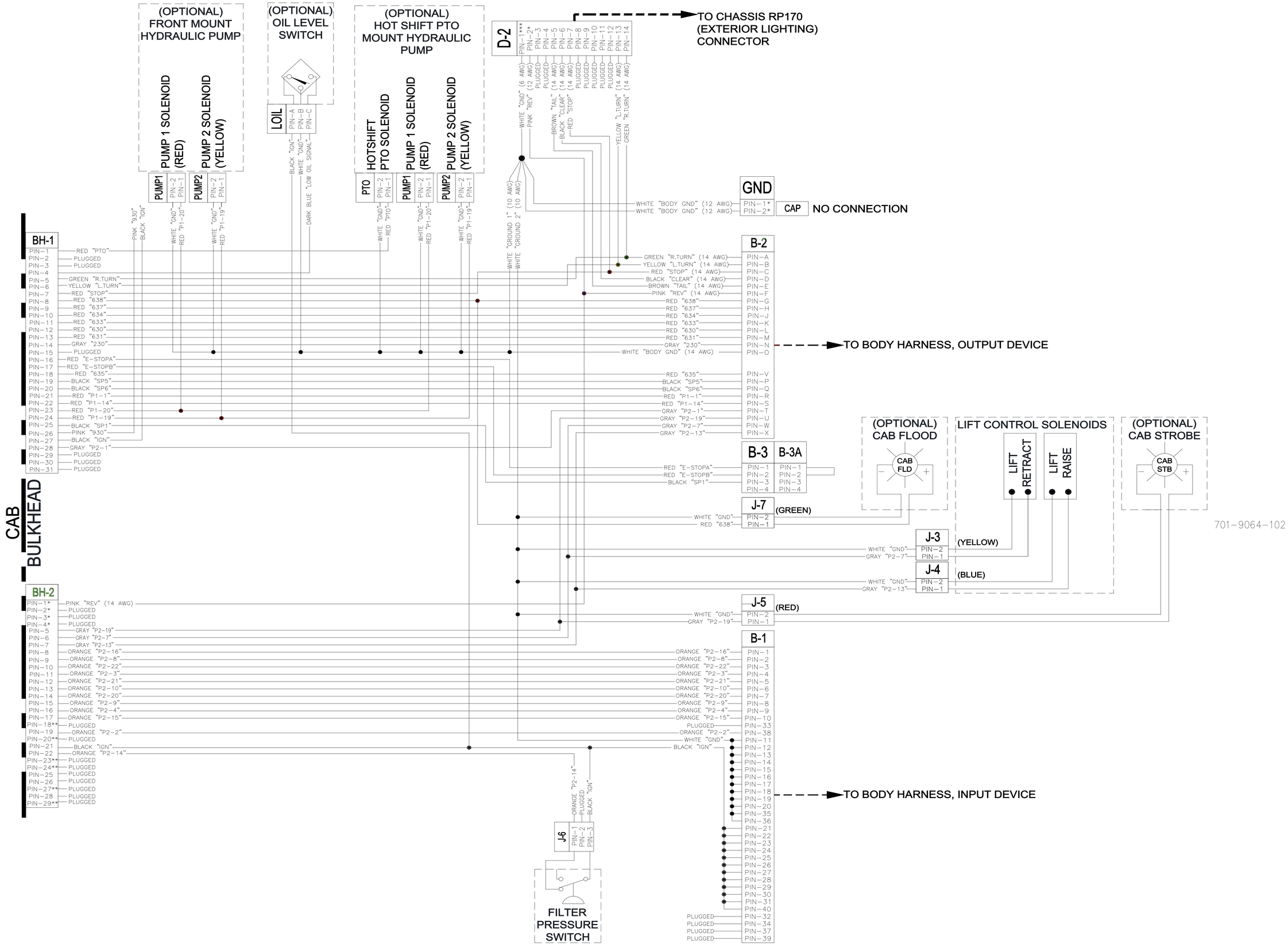
IN-CAB DIAGNOSTIC DISPLAY
BROWN
WHITE
BLUE
BLACK
GREEN/YELLOW
BLACK
WHITE
YELLOW
GREEN

1 2 3 4

SCHEMATIC, CAB ELECTRICAL
2020 PYTHON (RP170) CHASSIS
701-9064-010
07/18/18



ELECT, SCHEMATIC, CAB WI (SPEC)
DPF PYTHON, INTEGRATED AUTOCAR
701-9064-101
6/16/17



ELECT, SCHEMATIC, CHASSIS WI (SPEC)
DPF PYTHON, INTEGRATED AUTOCAR
701-9064-102
6/19/17

PNEUMATIC DIAGRAM BODY CONTROLS

(BROWN) TAILGATE LOCK

(ORANGE) TAILGATE LOWER

AIR TOGGLE

(GREEN) TAILGATE RAISE

(BLACK) AIR SUPPLY TO BODY

(PURPLE) TAILGATE UNLOCK

(MAIN CONTROL PANEL)

PNEUMATIC DIAGRAM LIFT CONTROLS

(BLUE) LIFT RETRACT

(PURPLE) LIFT RAISE

(ORANGE) GRABBER OPEN

(GREEN) GRABBER CLOSE

LIFT CONTROL SOLENOIDS

LIFT CTRL INTERL

GRABBER CLOSE

GRABBER OPEN

LIFT EXTEND

LIFT LOWER

NOT USED

EXHAUST EXIT CAB

EXHAUST EXIT CAB

JOYSTICK

(BLUE) NOT USED

(RED) NOT USED

BUNDLE #2

CAB BULKHEAD

(BROWN) LIFT LOWER

(RED) LIFT EXTEND

BUNDLE #1

(BLACK) JOYSTICK AIR SUPPLY

(BROWN) LIFT LOWER

(BLACK) AIR SUPPLY TO LIFT

JOYSTICK ORIENTATION

REAR

STREET SIDE

CURB SIDE

FORWARD

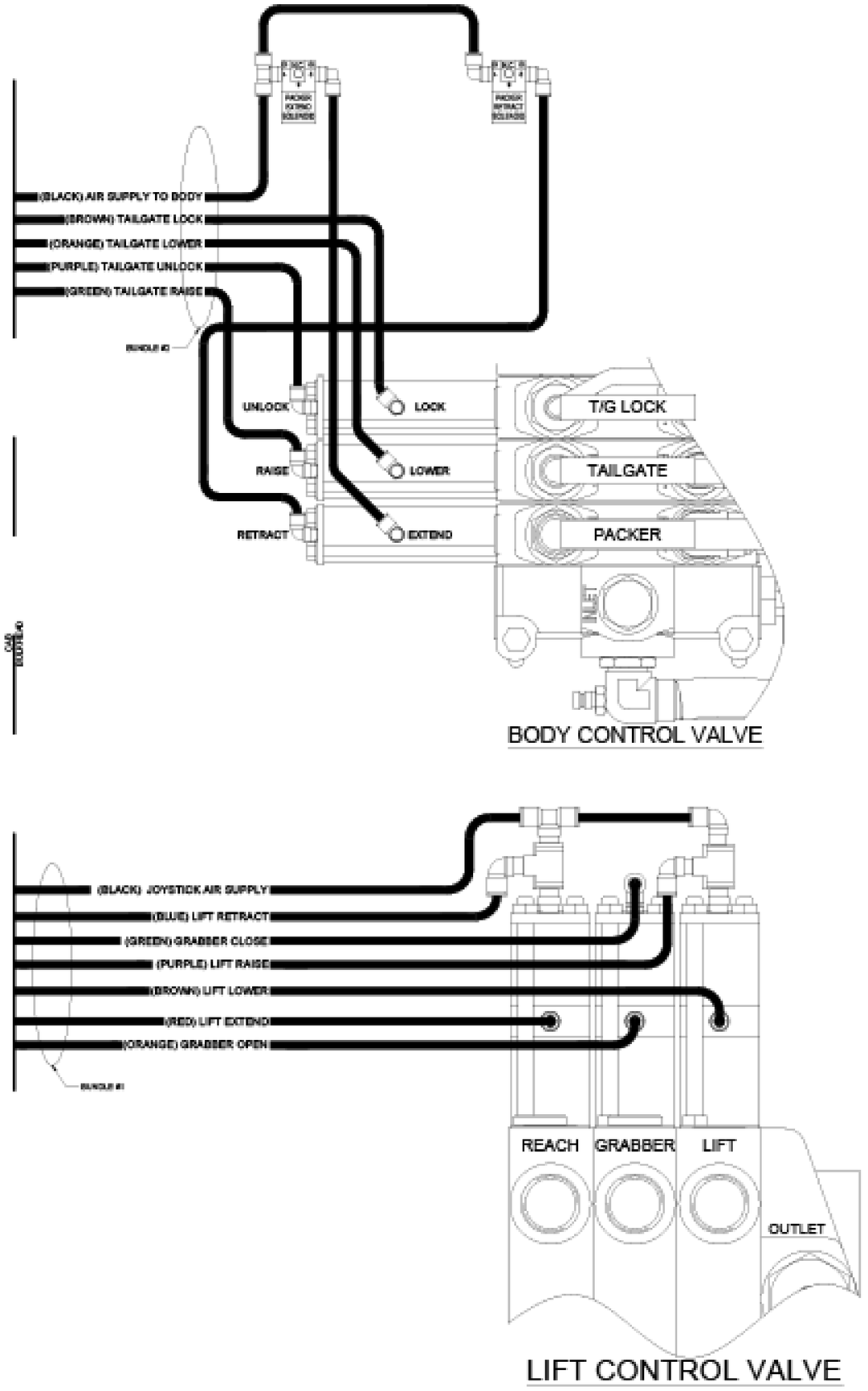
FILTER/REGULATOR

(BLACK)

SUPPLY FROM PRESSURE PROTECTION VALVE

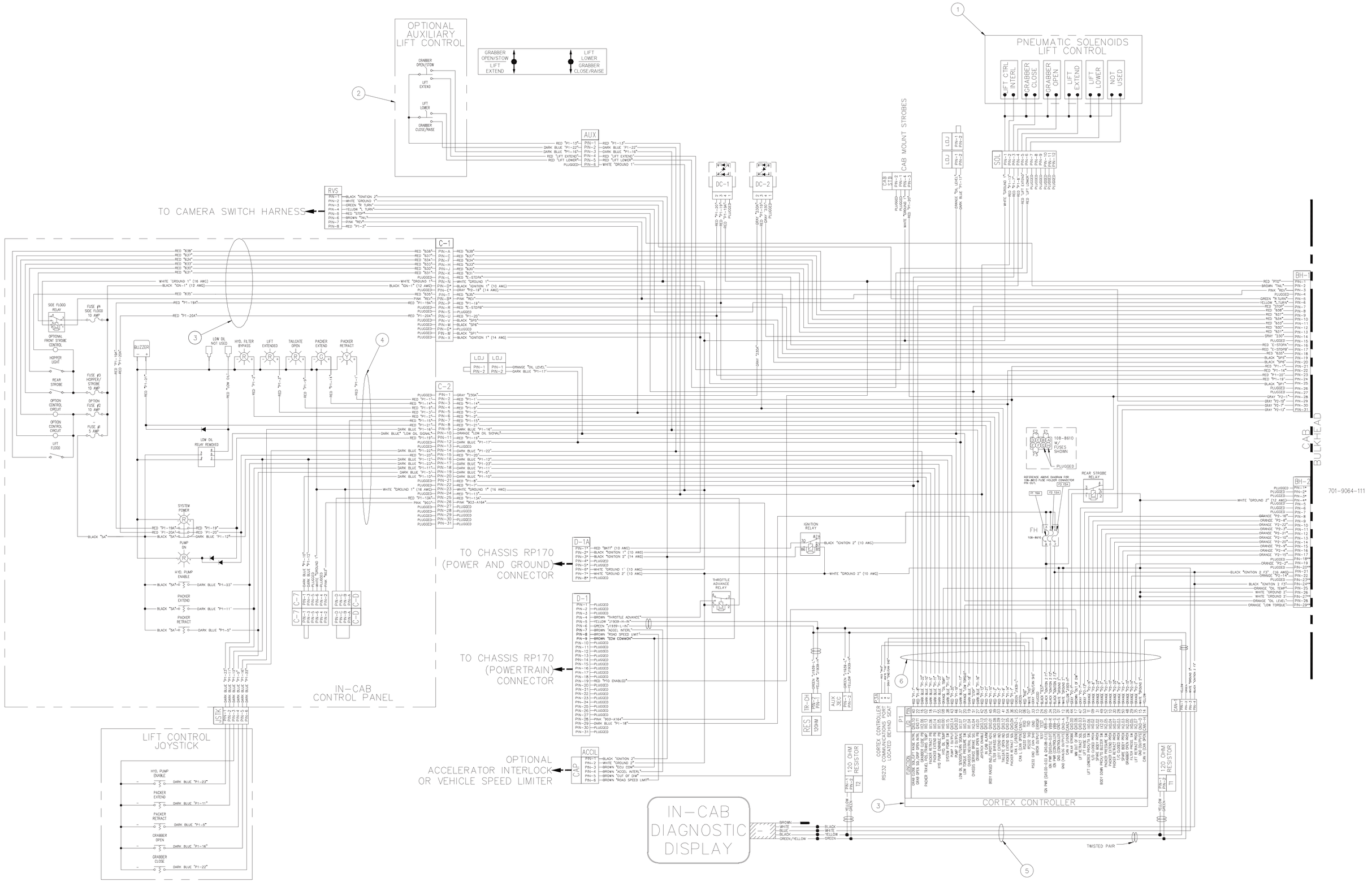
701-9064-103

PNEUMATIC DIAGRAM, CAB
DPF PYTHON, INTEGRATED AUTOCAR
701-9064-103
6/26/17



701-9064-104

PNEUMATIC DIAGRAM, BODY/LIFT
DPF PYTHON, INTEGRATED AUTOCAR
701-9064-104
6/26/17



SCHEMATIC CAB ELECTRICAL
2020 WM PYTHON, POWER OF ONE
701-9064-111
10/15/19

CAB BULKHEAD

(OPTIONAL) FRONT MOUNT HYDRAULIC PUMP

PUMP1 PUMP 1 SOLENOID (RED) — PIN-2, PIN-1
PUMP2 PUMP 2 SOLENOID (YELLOW) — PIN-2, PIN-1

WHITE "GND" — RED "P1-20"
WHITE "GND" — RED "P1-19"

NO CONNECTION

PINK "930"
BLACK "IGN"

(OPTIONAL) HOT SHIFT PTO MOUNT HYDRAULIC PUMP

PTO HOTSHIFT PTO SOLENOID — PIN-2, PIN-1
PUMP1 PUMP 1 SOLENOID (RED) — PIN-2, PIN-1
PUMP2 PUMP 2 SOLENOID (YELLOW) — PIN-2, PIN-1

WHITE "GND" — RED "PTO"
WHITE "GND" — RED "P1-20"
WHITE "GND" — RED "P1-19"

TO CHASSIS RP170 (EXTERIOR LIGHTING) CONNECTOR

D-2

PIN-1***	WHITE "GND" (6 AWG)
PIN-2***	PINK "REV" (12 AWG)
PIN-3	PLUGGED
PIN-4	PLUGGED
PIN-5	PLUGGED
PIN-6	BROWN "TAIL" (14 AWG)
PIN-7	BLACK "CLEAR" (14 AWG)
PIN-8	RED "STOP" (14 AWG)
PIN-9	PLUGGED
PIN-10	PLUGGED
PIN-11	PLUGGED
PIN-12	YELLOW "L.TURN" (14 AWG)
PIN-13	GREEN "R.TURN" (14 AWG)
PIN-14	PLUGGED

WHITE "GROUND 1" (10 AWG)
WHITE "GROUND 2" (10 AWG)

GND

WHITE "BODY GND" (12 AWG) — PIN-1*
WHITE "BODY GND" (12 AWG) — PIN-2*
→ NO CONNECTION

BH-1

PIN-1	RED "PTO"
PIN-2	BROWN "TAIL"
PIN-3	PINK "REV"
PIN-4	PLUGGED
PIN-5	GREEN "R.TURN"
PIN-6	YELLOW "L.TURN"
PIN-7	RED "STOP"
PIN-8	RED "638"
PIN-9	RED "637"
PIN-10	RED "634"
PIN-11	RED "633"
PIN-12	RED "630"
PIN-13	RED "631"
PIN-14	GRAY "230"
PIN-15	PLUGGED
PIN-16	RED "E-STOPA"
PIN-17	RED "E-STOPB"
PIN-18	RED "635"
PIN-19	BLACK "SP5"
PIN-20	BLACK "SP6"
PIN-21	RED "P1-1"
PIN-22	RED "P1-14"
PIN-23	RED "P1-20"
PIN-24	RED "P1-19"
PIN-25	BLACK "SP1"
PIN-26	PINK "930"
PIN-27	BLACK "IGN"
PIN-28	GRAY "P2-1"
PIN-29	GRAY "P2-19"
PIN-30	GRAY "P2-7"
PIN-31	GRAY "P2-13"

B-2

PIN-A	GREEN "R.TURN" (14 AWG)
PIN-B	YELLOW "L.TURN" (14 AWG)
PIN-C	RED "STOP" (14 AWG)
PIN-D	BLACK "CLEAR" (14 AWG)
PIN-E	BROWN "TAIL" (14 AWG)
PIN-F	PINK "REV" (14 AWG)
PIN-G	RED "638"
PIN-H	RED "637"
PIN-J	RED "634"
PIN-K	RED "633"
PIN-L	RED "630"
PIN-M	RED "631"
PIN-N	GRAY "230"
PIN-O	WHITE "BODY GND" (14 AWG)
PIN-V	RED "635"
PIN-P	BLACK "SP5"
PIN-Q	BLACK "SP6"
PIN-R	RED "P1-1"
PIN-S	RED "P1-14"
PIN-T	GRAY "P2-1"
PIN-U	GRAY "P2-19"
PIN-W	GRAY "P2-7"
PIN-X	GRAY "P2-13"

→ TO BODY HARNESS, OUTPUT DEVICE

B-3 B-3A

RED "E-STOPA"	PIN-1	PIN-1
RED "E-STOPB"	PIN-2	PIN-2
BLACK "SP1"	PIN-3	PIN-3
	PIN-4	PIN-4

(OPTIONAL) LIFT FLOOD — CAB FLD

LIFT CONTROL SOLENOIDS
LIFT RETRACT
LIFT RAISE

(OPTIONAL) STROBE — STB

J-7 (GREEN)
WHITE "GND" — PIN-2
RED "638" — PIN-1

J-3 (YELLOW)
WHITE "GND" — PIN-2
GRAY "P2-7" — PIN-1

J-4 (BLUE)
WHITE "GND" — PIN-2
GRAY "P2-13" — PIN-1

J-5 (RED)
WHITE "GND" — PIN-2
GRAY "P2-19" — PIN-1

BH-2

PIN-1*	PLUGGED
PIN-2*	PLUGGED
PIN-3*	PLUGGED
PIN-4*	WHITE "GROUND 2" (12 AWG)
PIN-5	PLUGGED
PIN-6	PLUGGED
PIN-7	PLUGGED
PIN-8	ORANGE "P2-16"
PIN-9	ORANGE "P2-8"
PIN-10	ORANGE "P2-22"
PIN-11	ORANGE "P2-3"
PIN-12	ORANGE "P2-21"
PIN-13	ORANGE "P2-10"
PIN-14	ORANGE "P2-20"
PIN-15	ORANGE "P2-9"
PIN-16	ORANGE "P2-4"
PIN-17	ORANGE "P2-15"
PIN-18**	PLUGGED
PIN-19	ORANGE "P2-2"
PIN-20**	PLUGGED
PIN-21	BLACK "IGNITION 2 F3" (16 AWG)
PIN-22	ORANGE "P2-14"
PIN-23**	PLUGGED
PIN-24**	BROWN
PIN-25	YELLOW
PIN-26	WHITE
PIN-27**	DRAIN
PIN-28	ORANGE "OIL LEVEL"
PIN-29**	ORANGE "LOW TORQUE"

B-1

ORANGE "P2-16"	PIN-1
ORANGE "P2-8"	PIN-2
ORANGE "P2-22"	PIN-3
ORANGE "P2-3"	PIN-4
ORANGE "P2-21"	PIN-5
ORANGE "P2-10"	PIN-6
ORANGE "P2-20"	PIN-7
ORANGE "P2-9"	PIN-8
ORANGE "P2-4"	PIN-9
ORANGE "P2-15"	PIN-10
PLUGGED	PIN-33
ORANGE "P2-2"	PIN-38
WHITE "GROUND 2" (16 AWG)	PIN-11
BLACK "IGNITION 2 F3" (16 AWG)	PIN-12
	PIN-13
	PIN-14
	PIN-15
	PIN-16
	PIN-17
	PIN-18
	PIN-19
	PIN-20
	PIN-35
	PIN-36
	PIN-21
	PIN-22
	PIN-23
	PIN-24
	PIN-25
	PIN-26
	PIN-27
	PIN-28
	PIN-29
	PIN-30
	PIN-31
	PIN-40
PLUGGED	PIN-32
PLUGGED	PIN-34
PLUGGED	PIN-37
PLUGGED	PIN-39

→ TO BODY HARNESS, INPUT DEVICE

LTRQ — PIN-4, PIN-3, PIN-2, PIN-1
PLUGGED
ORANGE "LOW TORQUE"
WHITE "GROUND 2" (16 AWG)
BLACK "IGNITION 2 F3" (16 AWG)

M12 — PIN-2, PIN-4, PIN-3, PIN-1
LOW TORQUE PRESSURE SWITCH

LOW OIL — PIN-C, PIN-B, PIN-A
ORANGE "OIL LEVEL"
WHITE "GROUND 2" (16 AWG)
BLACK "IGNITION 2 F3" (16 AWG)
LOW OIL SWITCH

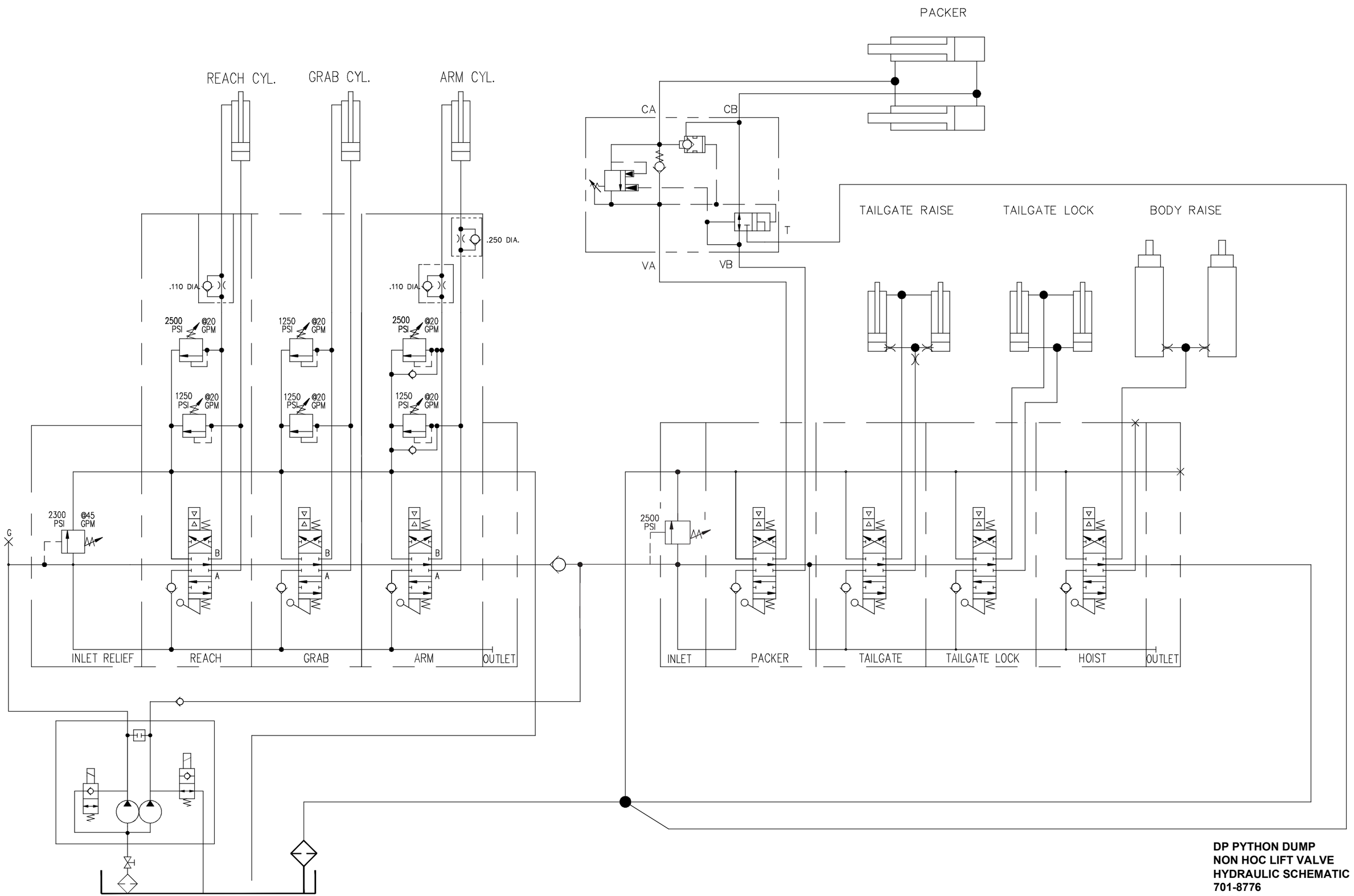
OIL TEMP — PIN-B, PIN-C, PIN-A
WHITE
YELLOW
BROWN
SHIELD DRAIN
HYD OIL TEMP .05..4.5 VDC -58...302 °F

J-6 — PIN-1, PIN-2, PIN-3
ORANGE "P2-14"
PLUGGED
BLACK "IGNITION 2 F3" (16 AWG)
FILTER PRESSURE SWITCH

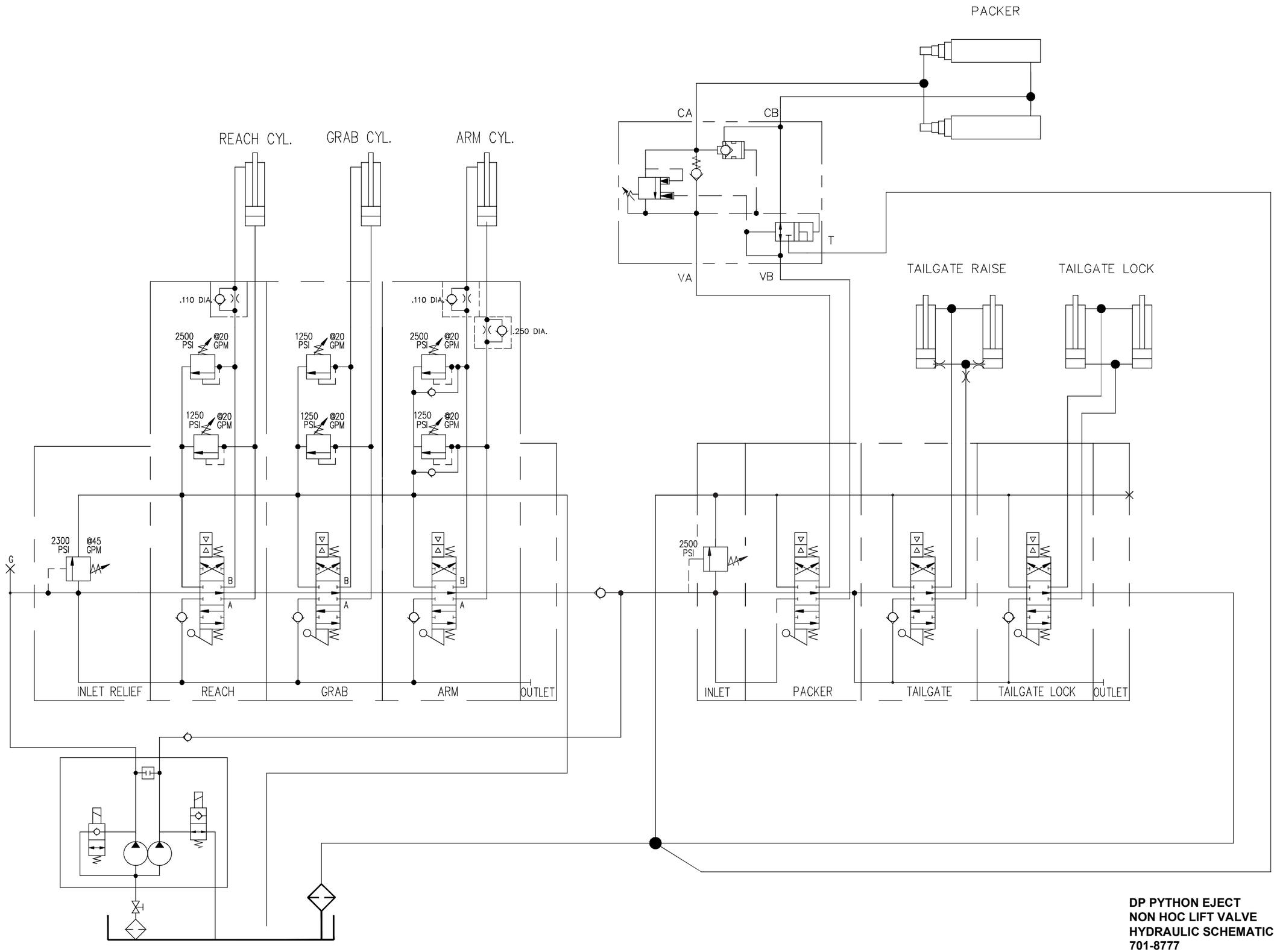
701-9064-111

SCHEMATIC, CHASSIS ELECTRICAL
2020 WM PYTHON, POWER OF ONE
701-9064-112
10/15/19

HYDRAULIC SCHEMATICS

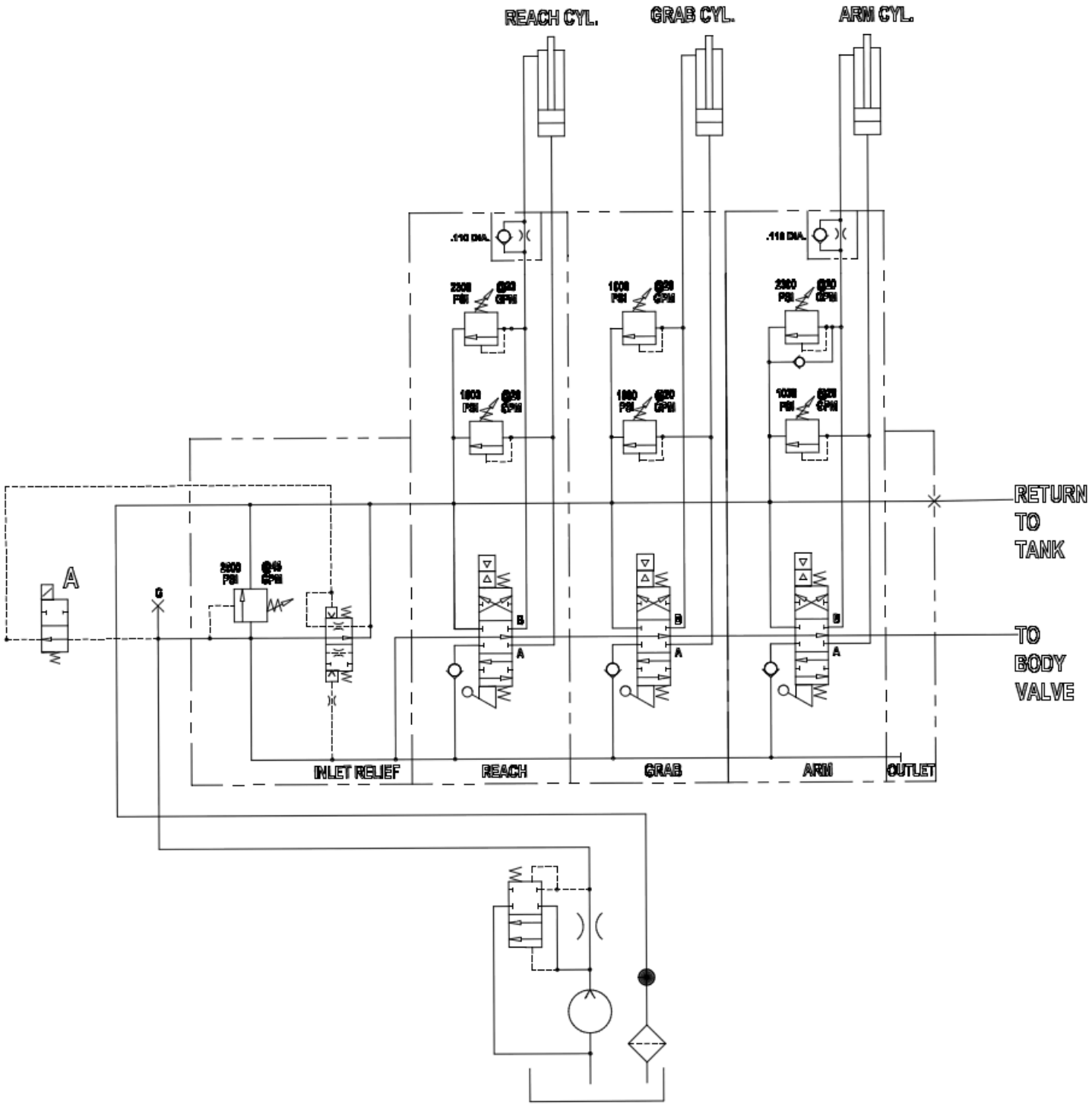


DP PYTHON DUMP
NON HOC LIFT VALVE
HYDRAULIC SCHEMATIC
701-8776
10/09



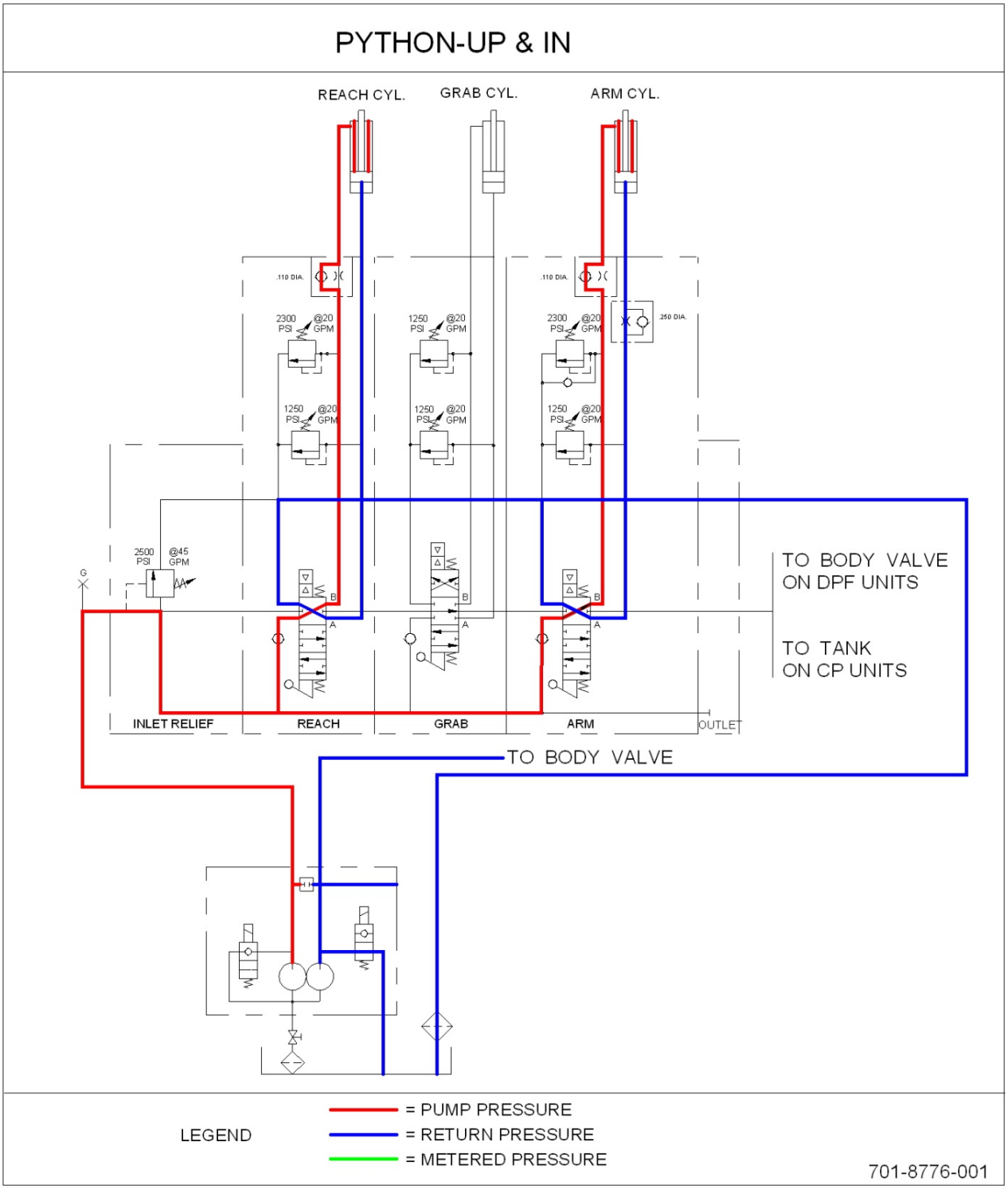
DP PYTHON EJECT
NON HOC LIFT VALVE
HYDRAULIC SCHEMATIC
701-8777
10/09

LIFT ARM HYDRAULIC SCHEMATIC

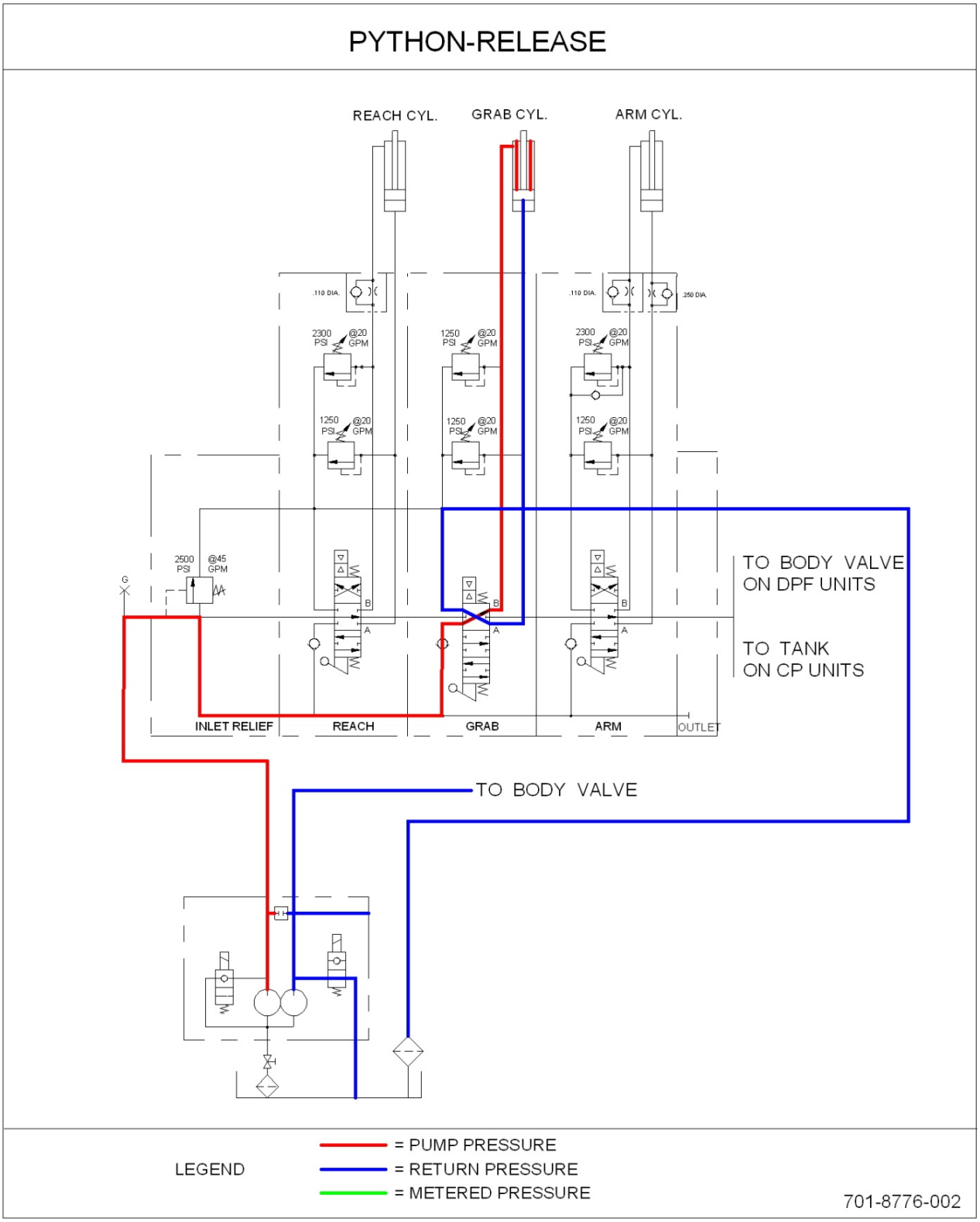


NOTE: Solenoid "A" is energized when pump is tuned on.

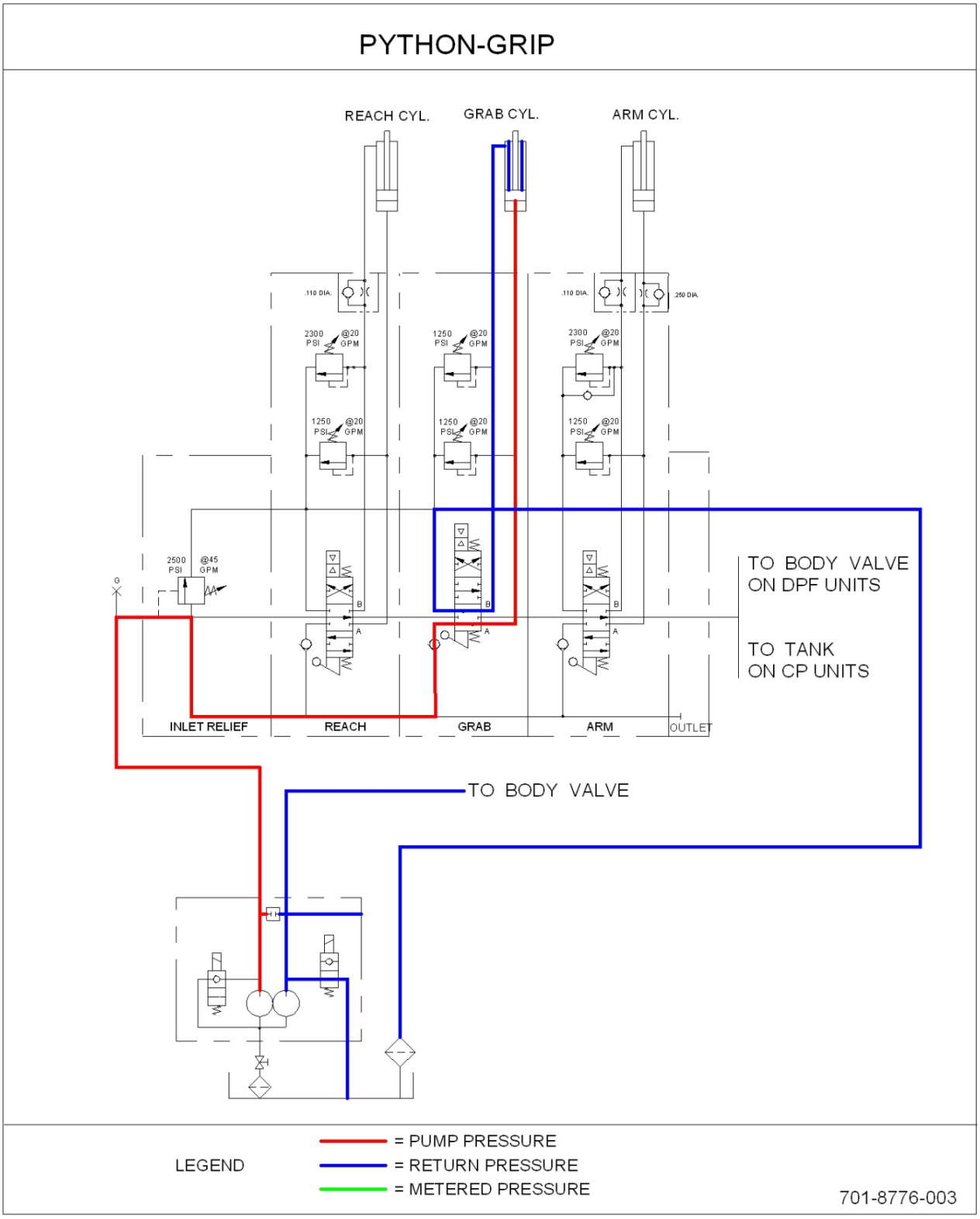
LIFT ARM UP AND IN FLOW DIAGRAM - 701-8776-001



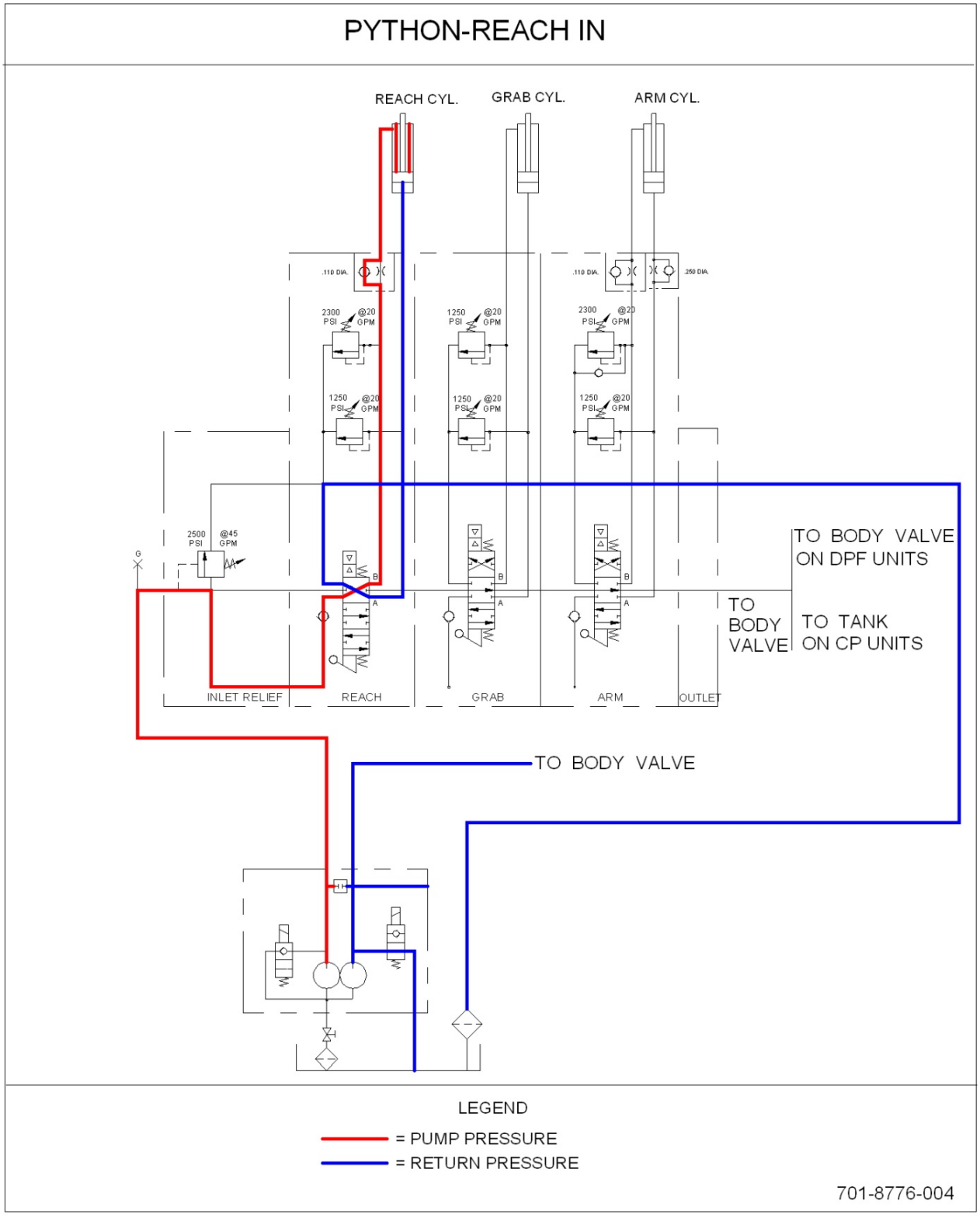
LIFT ARM RELEASE FLOW DIAGRAM - 701-8776-002



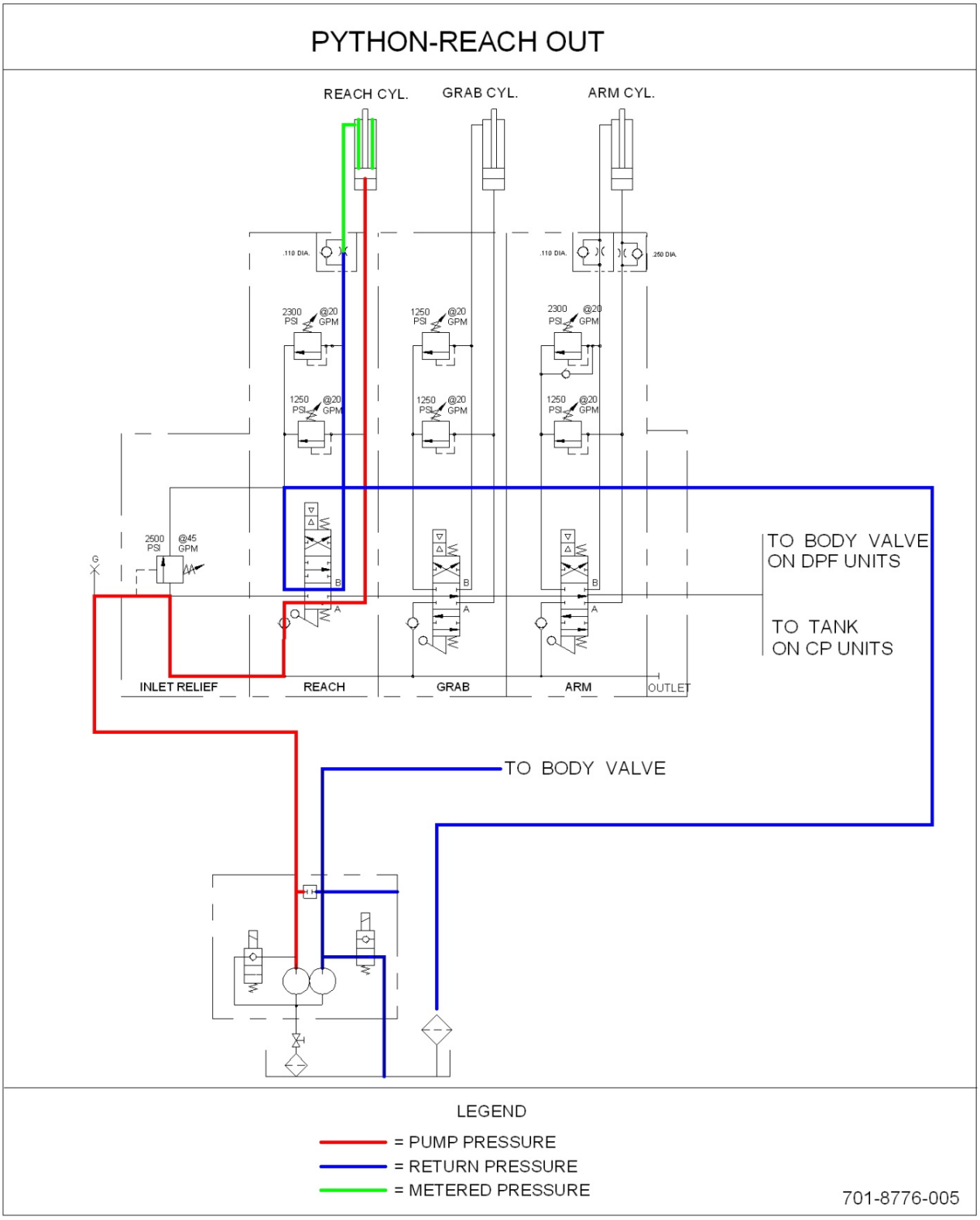
LIFT ARM GRAB FLOW DIAGRAM - 701-8776-003



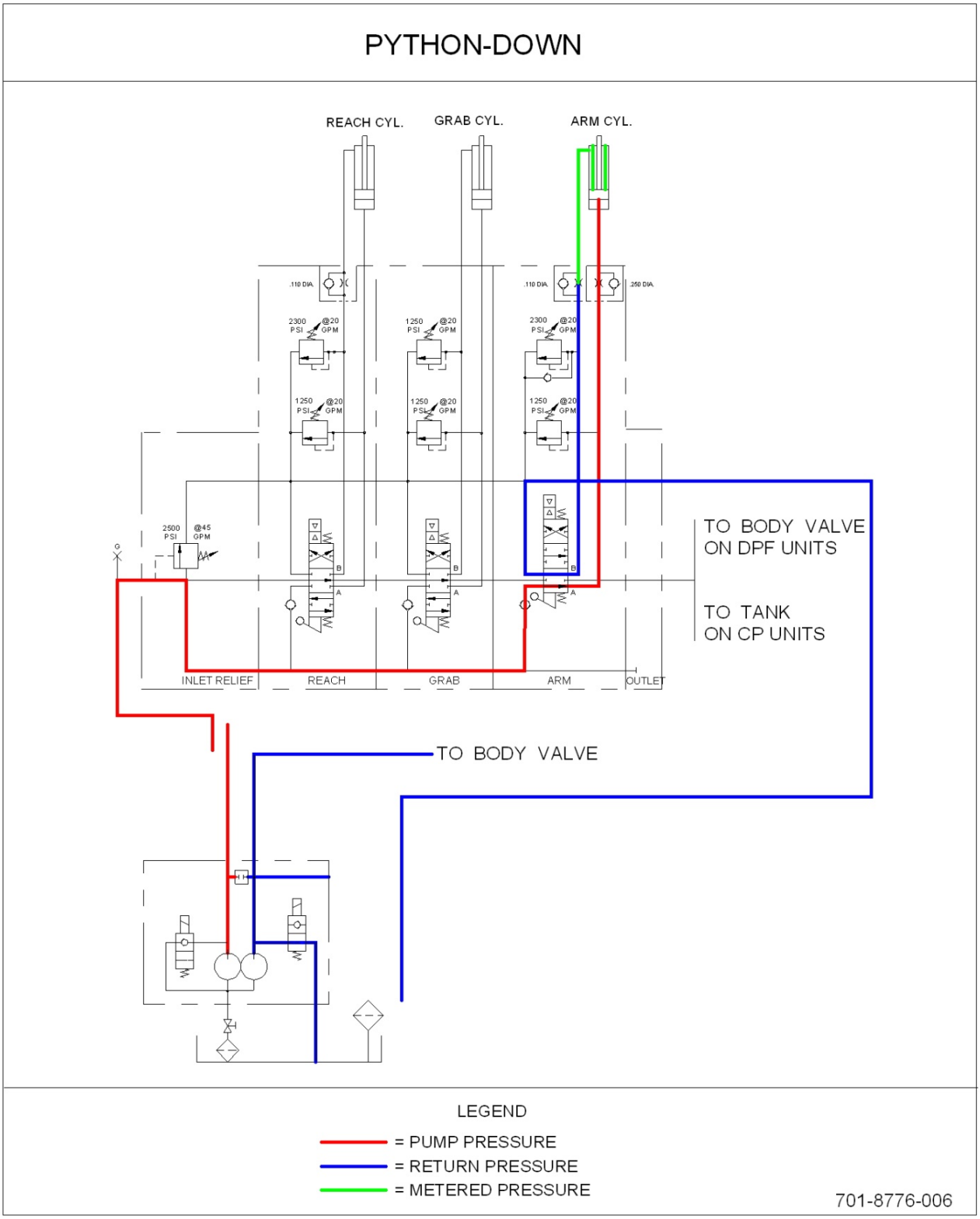
LIFT ARM REACH IN FLOW DIAGRAM - 701-8776-004



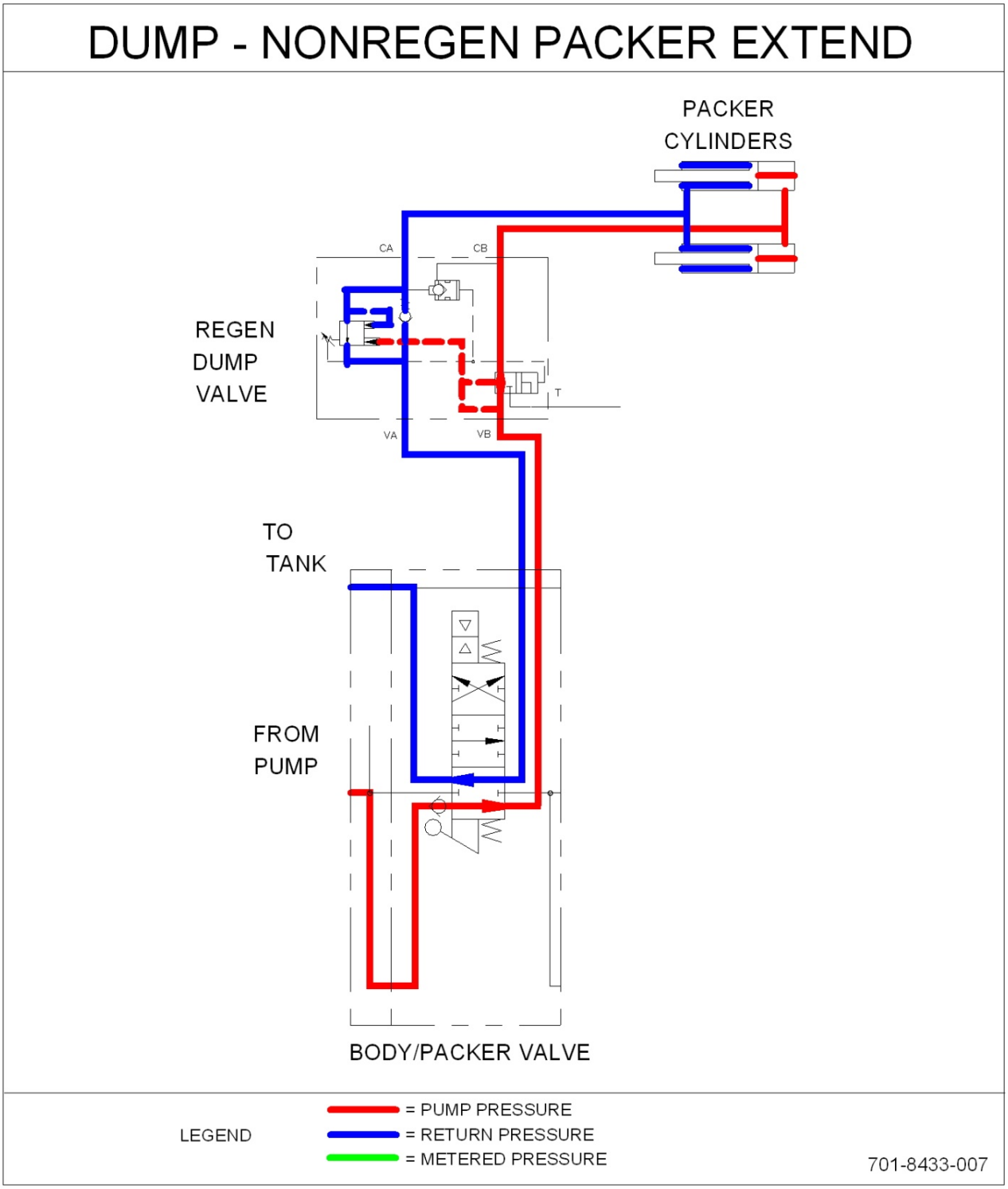
LIFT ARM REACH OUT FLOW DIAGRAM - 701-8776-005



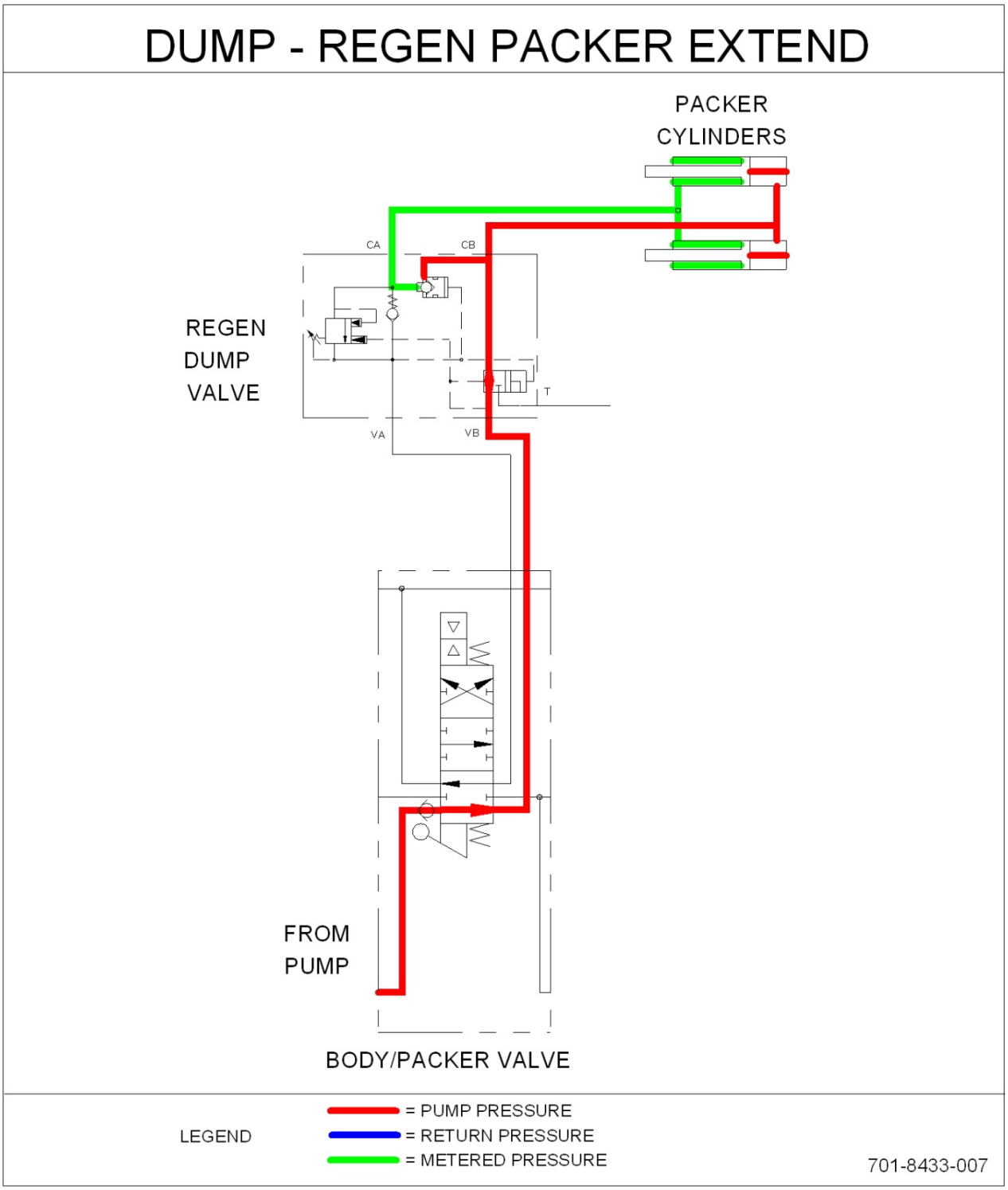
LIFT ARM DOWN FLOW DIAGRAM - 701-8776-006



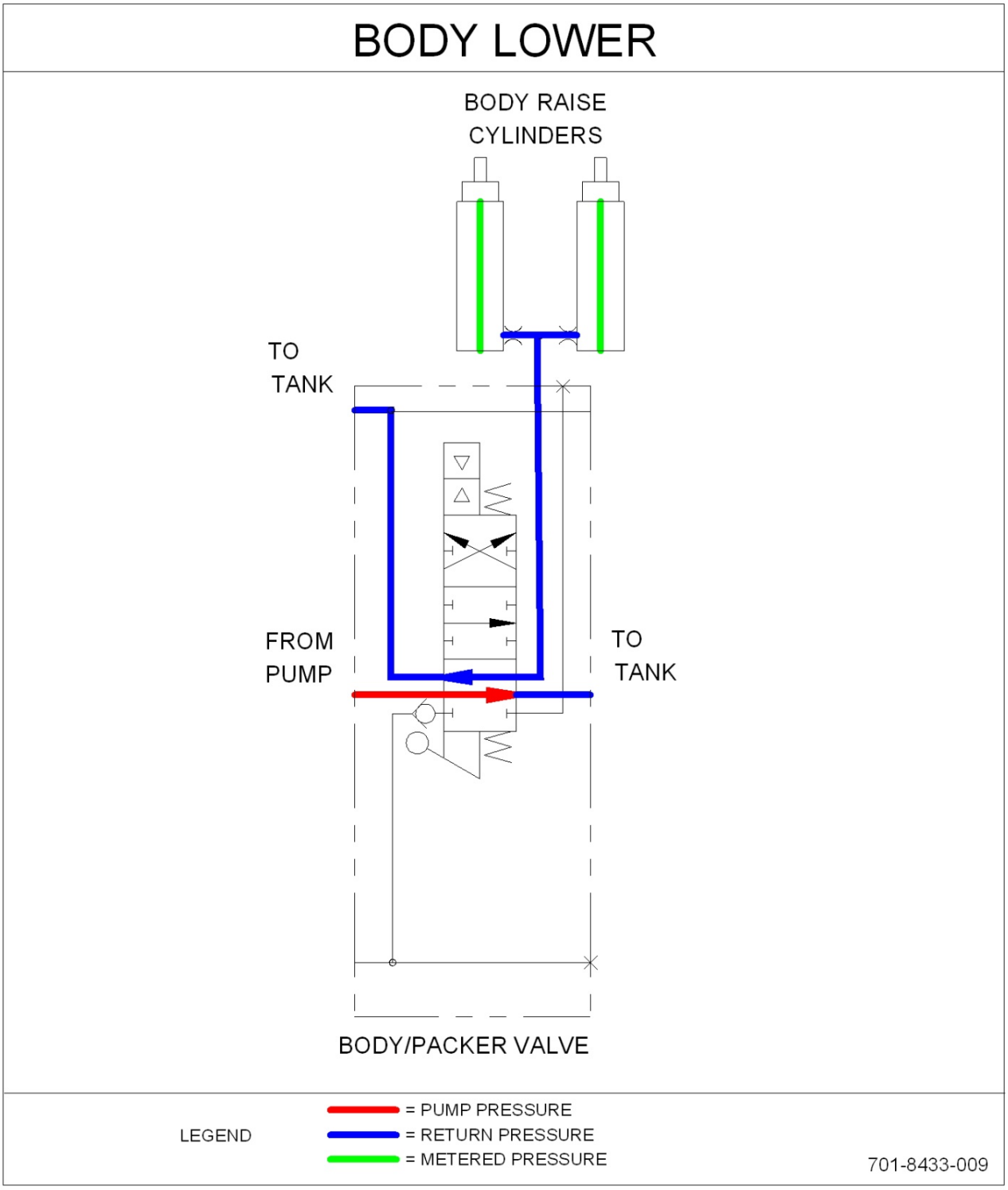
NON-REGENERATIVE PACKER EXTEND FLOW DIAGRAM FOR DUMP UNITS - 701-8433-007



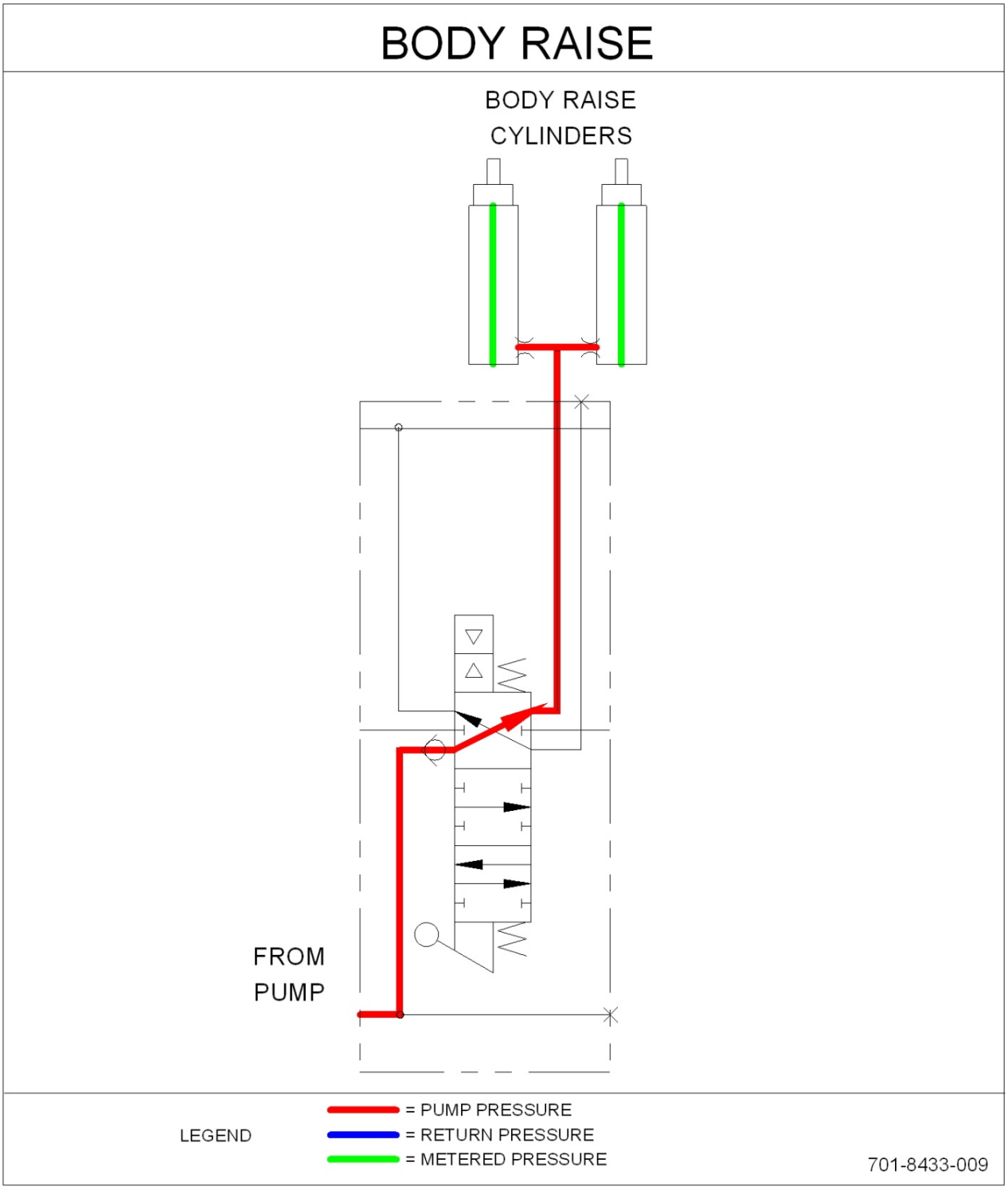
REGENERATIVE PACKER EXTEND FLOW DIAGRAM FOR DUMP UNITS - 701-8433-007



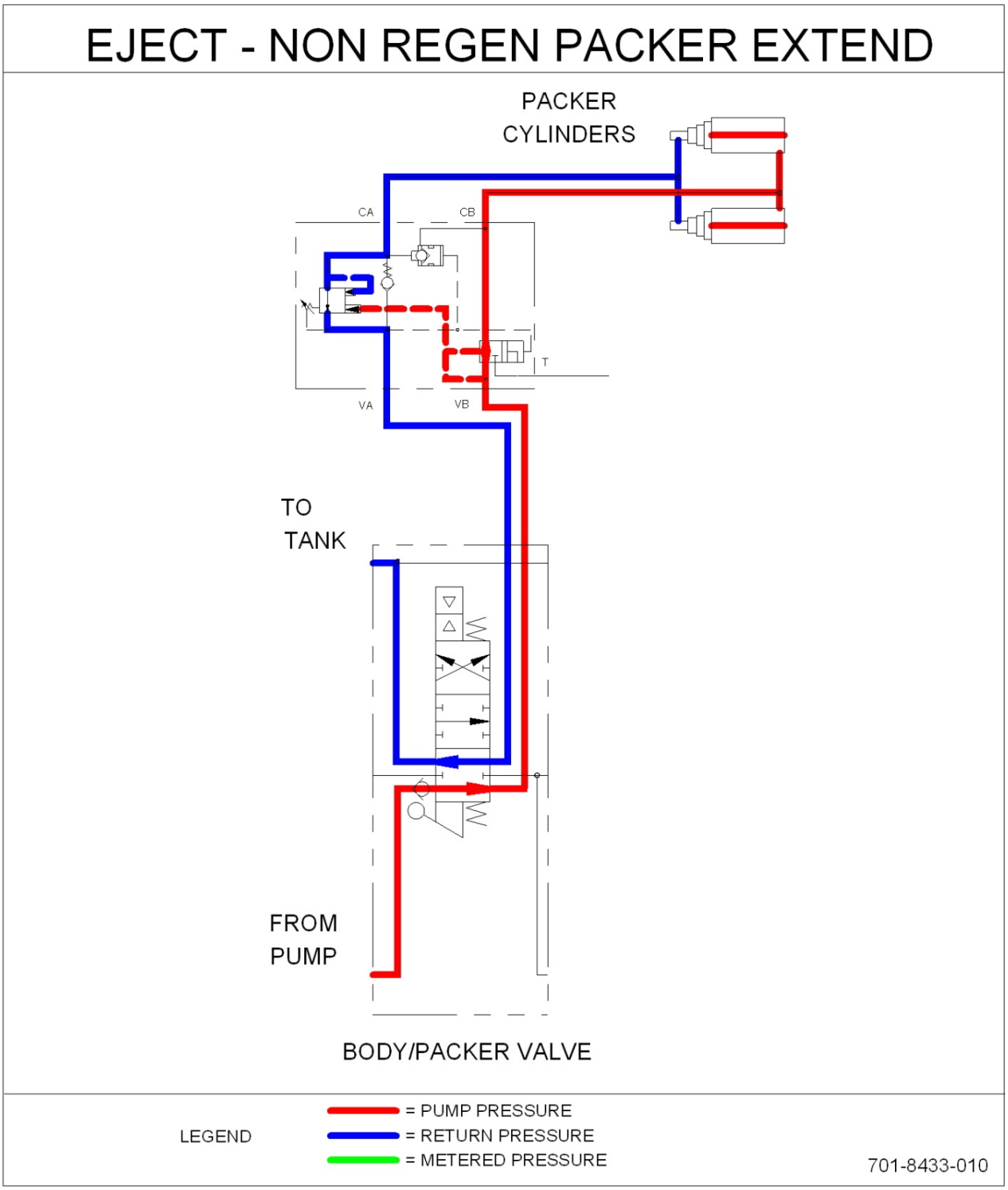
BODY LOWER FLOW DIAGRAM - 701-8433-009



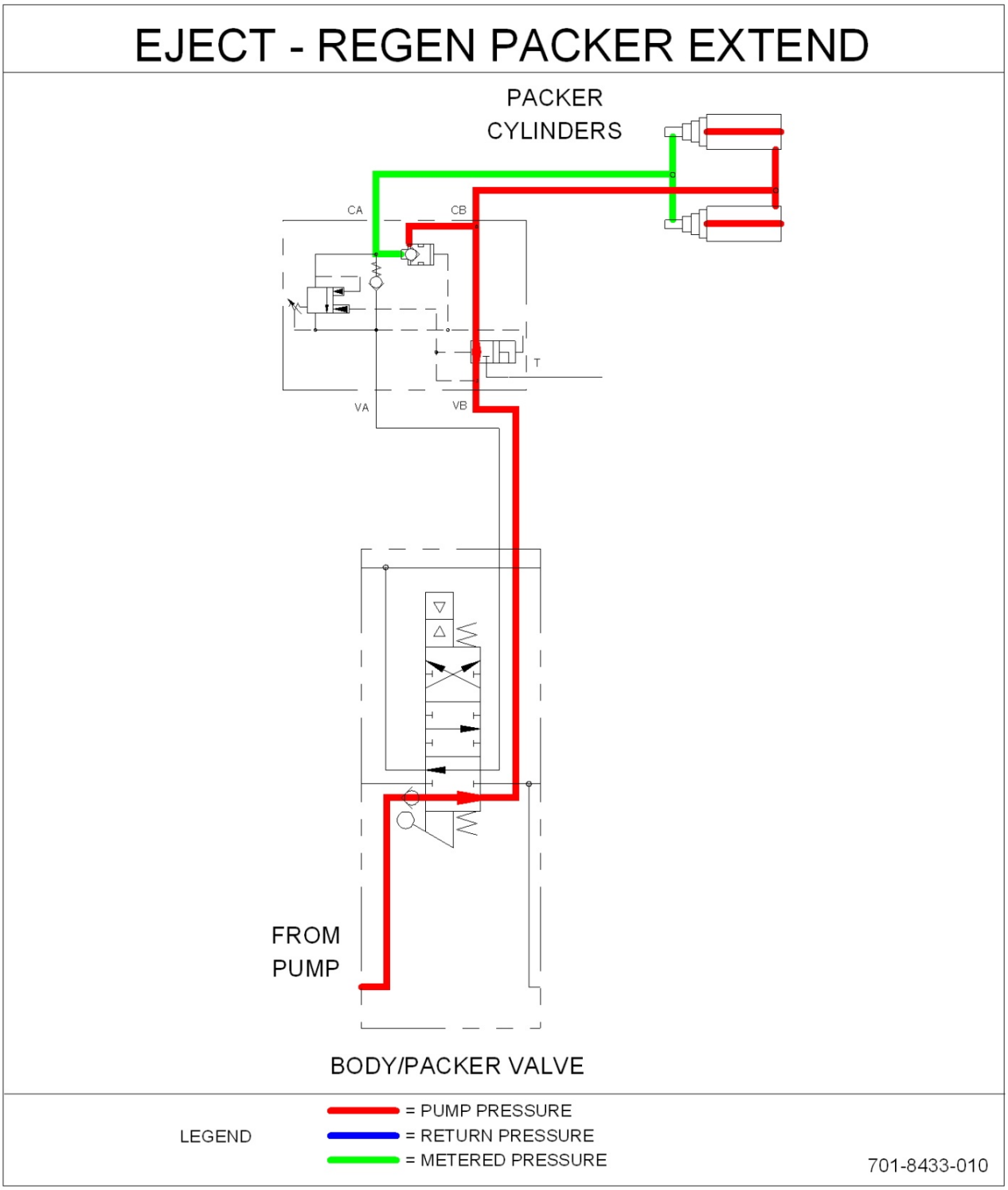
BODY RAISE FLOW DIAGRAM - 701-8433-009



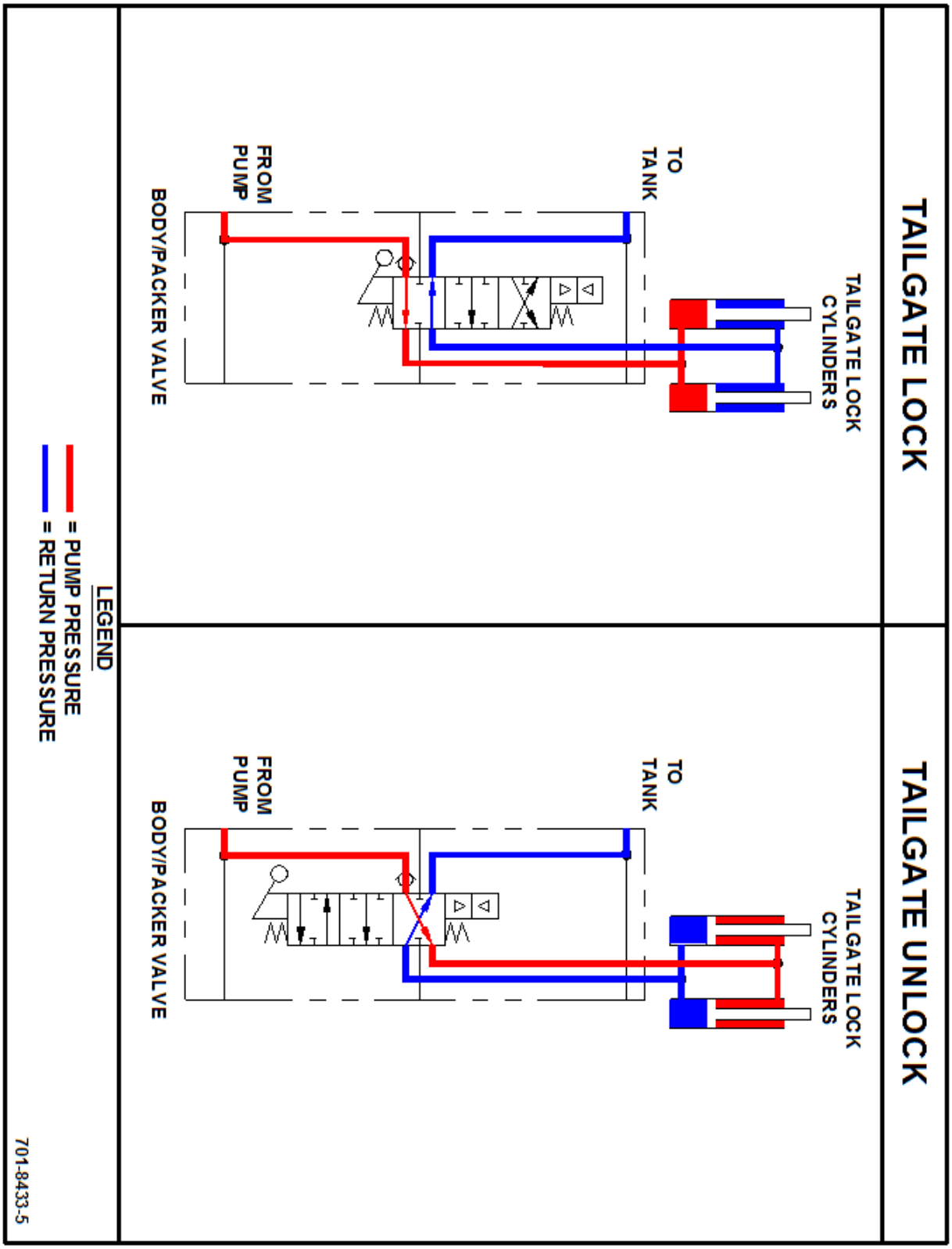
NON REGENERATIVE PACKER EXTEND FLOW DIAGRAM FOR EJECT UNITS - 701-8433-010



REGENERATIVE PACKER EXTEND FLOW DIAGRAM FOR EJECT UNITS - 701-8433-010



TAILGATE RAISE AND TAILGATE LOWER FLOW DIAGRAMS - 701-8433-5



INDEX

INDEX

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