Installation Manual

Table of Contents

General Information

INTRODUCTION

This manual provides instructions for installing the EZ Trac® Hydraulic AWD system. Addendums are available for special systems and/or manufacturers where necessary.

The following manuals are available for download at
https://www.eztracawd.com/

Please consult the appropriate manuals before starting any job.

- D711061 Installation Manual (this manual)
- D711062 Parts Catalog
- D711043 Operator's Manual
- D711044 Service Manual
  D711065 FORD®F-750 2017+ Install Addendum
- D711066 EZ Trac® Software Manual
- D711053 Twin Power EZ Trac® Kit

The following videos are available on our website and YouTube channel to help each step of the way:

- EZ Trac® Software Installation Video
- EZ Trac® Operators Video
- EZ Trac® Installation Video
- EZ Trac® Start-Up Software Usage
- EZ Trac® Software Technician Video

For questions about the EZ Trac® Hydraulic AWD system, please contact:

By Phone: +1 (844) 289-3987
By E-Mail: eztracinfo@tdsdrive.com, eztservice@tdsdrive.com

A complete pictorial breakdown of all the individual parts in the EZ Trac® Hydraulic AWD system can be found in the EZ Trac® Parts Catalog (D711062) by visiting https://www.eztracawd.com/install-service. Refer to this catalog for proper identification of parts required for service.

The terms right and left in these instructions are the same as the operator's right hand and left hand when positioned in the operator's seat facing forward.

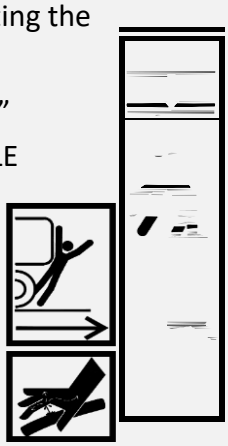
IMPORTANT: Cleanliness is essential when installing or servicing hydraulic components. Always keep the hoses, connectors, and ports suitably capped or covered to eliminate contamination. When making hydraulic connections, areas surrounding the connection should be thoroughly cleaned so that contamination will not enter the system. **DO NOT** let dirt or water enter the system.

CAUTION: Make sure that the system pressure is relieved and hydraulic oil temperature has cooled to a safe temperature before disconnecting any lines or connections. Pressurized fluid escaping from the system can cause serious personal injury.

Safety Procedures

- Make sure you fully understand all controls BEFORE operating the EZ Trac® Hydraulic AWD system. See Operator's Manual (D711043) or Operator's Training Video on www.eztracawd.com**.**

- The safety information given does not replace safety codes, insurance needs, federal, state, and local laws.
- Standard safety procedures should be observed and practiced when operating or servicing the EZ Trac® system. **CAUTION** should always be practiced.
- All components **MUST** be securely and correctly mounted and connected BEFORE operating the system.
- In the event of any malfunction in the system, the EZ Trac system should be turned "OFF" immediately and not operated again until the machine is correctly serviced. SEE TROUBLE SHOOTING SECTION.



- **DANGER:** When raising the front of the vehicle, make sure that a dependable lifting device is used. Use jack stands whenever possible to support the vehicle. Always apply the "PARK" or "EMERGENCY BRAKE".
- **DANGER:** Escaping hydraulic fluid under pressure can have sufficient force to penetrate the skin, causing serious personal injury. Fluid escaping from a small hole can be almost invisible. Use a piece of cardboard or wood, rather than your hands, to search for suspected leaks. If fluid penetrates your skin, contact a doctor immediately.
- **DO NOT** alter axles in ANY manner; alteration may reduce the strength of axle, resulting in possible damage or personal injury.
- **DO NOT** alter any component of the EZ Trac® system. Unauthorized modification may result in damage or personal injury, as well as void any warranties associated with your EZ Trac® Hydraulic AWD system.

- **DANGER:** Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion, which may result in serious bodily injury. **DO NOT** attempt to mount a tire unless you have the proper equipment and experience to perform the job safely.

- **WARNING**: Instructions printed on decals MUST be obeyed completely to prevent possible damage or injury. If decals are destroyed, lost, damaged or cannot be read, replace immediately.
- **WARNING:** Any damaged high-pressure hose should be replaced with an equivalent reinforced hose.

Service Notes

- This Installation Manual describes the installation instructions for the EZ Trac® Hydraulic AWD system. You must read and understand all procedures and safety precautions presented in this manual before conducting any service work on the system.
- Proper tools must be used to perform the installation procedures in this manual. Some procedures require the use of special tools for safe and correct service. Failure to use the proper and/or special tools when required can cause damage to the system components.
- You must follow your company's safety procedures and use proper safety equipment when you service or repair the system.
- The information contained in this manual was current at the time of publication and is subject to change without notice or liability. EZ Trac® reserves the right to modify the system and/or procedures and to change the specifications at any time without notice and without incurring obligation.

EZ Trac® uses the following types of notices for potential safety problems and to give information that will prevent damage to equipment:

⚠ WARNING
A warning indicates procedures that must be followed exactly. Serious personal injury can occur if the procedure is not followed.
⚠ CAUTION
A caution indicates procedures that must be followed exactly. Damage to equipment or suspension components and personal injury can occur if the procedure is not followed.
NOTE
A note indicates an operation, procedure or instruction that is important for correct service.

1 Pre-Installation

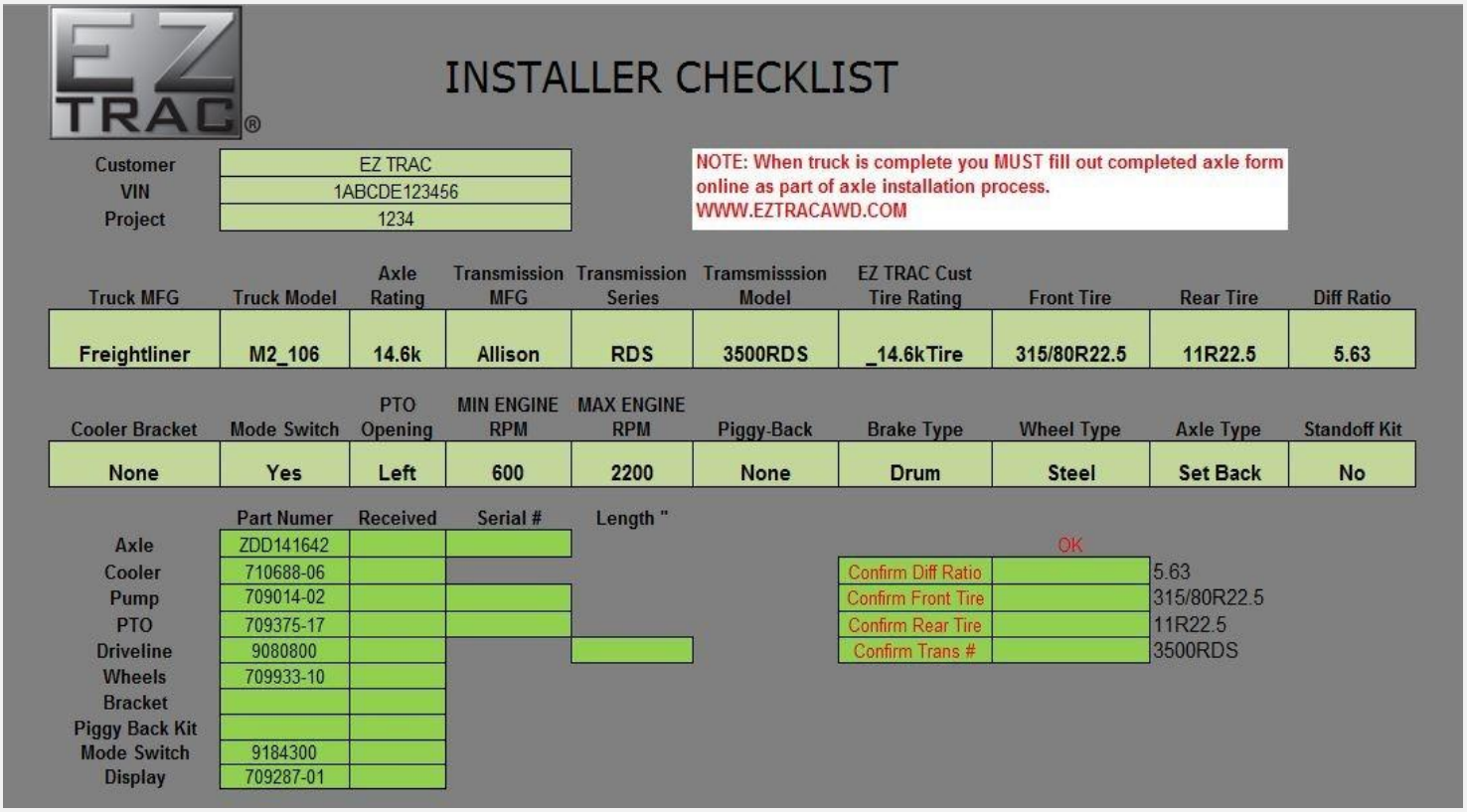
1.0 Pre-Install Checklist

Prior to starting the installation, please review and confirm that all parts listed in the kit checklist are received in proper condition. If any damaged parts are received, please contact EZ Trac® for directions. Each kit will come with this checklist. Pictures and additional checklists are in the appendix of this manual.

Note the comments on how to use the Installer Checklist. If you find something does not match, please contact eztservice@tdsdrive.com.

Fill out the Installer Checklist form in the following order:

1. Verify Truck Information (see “Truck MFG”, “Truck Model”, “Transmission MFG”, “Transmission Model”)
2. Verify Tire Sizes (see “Front Tire”, “Rear Tire”)
3. Verify Differential Ratio (see “Diff Ratio”)
4. Confirm Parts Match and Are Received (see “Received”)



INSTALLER CHECKLIST

Customer	EZ TRAC
VIN	1ABCDE123456
Project	1234

NOTE: When truck is complete you MUST fill out completed axle form online as part of axle installation process.
WWW.EZTRACAWD.COM

Truck MFG	Truck Model	Axle Rating	Transmission MFG	Transmission Series	Tramsmisssion Model	EZ TRAC Cust Tire Rating	Front Tire	Rear Tire	Diff Ratio
Freightliner	M2_106	14.6k	Allison	RDS	3500RDS	_14.6kTire	315/80R22.5	11R22.5	5.63

Cooler Bracket	Mode Switch	PTO Opening	MIN ENGINE RPM	MAX ENGINE RPM	Piggy-Back	Brake Type	Wheel Type	Axle Type	Standoff Kit
None	Yes	Left	600	2200	None	Drum	Steel	Set Back	No

	Part Numer	Received	Serial #	Length "
Axle	ZDD141642			
Cooler	710688-06			
Pump	709014-02			
PTO	709375-17			
Driveline	9080800			
Wheels	709933-10			
Bracket				
Piggy Back Kit				
Mode Switch	9184300			
Display	709287-01			

	OK	
Confirm Diff Ratio		5.63
Confirm Front Tire		315/80R22.5
Confirm Rear Tire		11R22.5
Confirm Trans #		3500RDS

Once you verify you have all the correct parts, move on to the installation. At the end, record the driveshaft length. When each truck is complete, please submit on our completed axle page: https://www.eztracawd.com/install-service

Note: It is important to submit the completed axle form to ensure proper handling of any future service matters.

1.1 Required Tools and Guidelines

REQUIRED TOOLS

- Axle Jack
- Jack Stands
- Frame Drill
- Torque Wrench capable of ~740 ft-lbs. (depending on U-bolt size)
- Laptop
- Phases Software (available online at www.eztracawd.com/product-literature)

GUIDELINES FOR CUSTOM INSTALLATION

The EZ Trac® Hydraulic AWD system is sold as a packaged unit intended to facilitate the system installation on a wide range of vehicles used for an even wider variety of vocations. The package approach allows more components to be assembled and connections to be in place, lessening the time required for installation. Where the vocational requirements do not allow for standard installation, it is possible to relocate some components of the EZ Trac® system to conform to the vocational constraints. These general guidelines should be considered when relocating components. For applications that fall outside of these guidelines, contact EZ Trac® Engineering.

A. Hydraulic Package Assembly

The hydraulic package assembly consists of the integrated oil cooler/filter/reservoir assembly, and the electronic control unit. This includes the Main Control valve, Wire Harness, and mounting brackets. The kit is pre-assembled, but if needed it is possible to separate components. It also includes the wiring harness and mounting brackets. If items are separated, changes such as new hoses, or wire harness extension may need to be supplied.

Option 1: Using the Pre-Assembled Hydraulic Package

Note:

- Cooler fan airflow must be considered when locating the hydraulic package.
- Ensure cooler fan has at least 3” of clearance for proper air flow.
- Extend wire harnesses as required by using Extension Legs available from EZ Trac®.

Option 2: Mounting the components individually requires consideration of the following:

Electronic Control Unit (ECU)

- The Electronic Control Unit and wire harness connector must be protected from direct exposure to the elements and/or pressure washing. It must also be protected from temperatures in excess of 185° F. ECU has an IP65 protection rating.
- The ECU and the computer connector plug on the wire harness must be located in an area accessible for service.

Hydraulic Oil Reservoir

- The hydraulic oil reservoir cannot be shared with other hydraulic systems.
- The hydraulic reservoir must be located above any other EZ Trac® system components. The reservoir fill neck must be accessible, and the sight glass should be visible to an operator working at ground level.
- Protect the cooling core, temperature sensor, and oil level switch wiring from accidental contact or damage.
- Locate assembly in an area that allows free air flow — intake and exhaust — away from other heat sources.

Main Control Valve

- If the Main control valve must be relocated, please orient the valve as delivered from TDS.

2 Axle Removal and Installation

2.0 Axle Removal and Installation

1. Position vehicle in a safe level location on a concrete or hard surface.
2. Shift transmission to neutral.
3. Set parking/emergency brake.
4. Place chocks in front of and behind rear wheels to prevent movement of the vehicle.
5. Use appropriate lifting device to raise front of vehicle high enough to be able to remove OEM axle and install EZ Trac® axle.
6. Support the vehicle frame with suitable jack stands behind front suspension.
7. Remove front wheels.
8. Replace two lug nuts on each wheel end to retain the brake drums.
9. Disconnect drag link(s) from the steer arm(s) on the axle and tie the link(s) up out of the way.
10. If needed, disconnect shock absorbers, and pull them to the side.
11. Disconnect the remaining air, and speed sensors from the axle, noting where each is to be reconnected.

CAUTION
The wheel ends are free to roll; it may be helpful to operate the brake adjusters to lock the front brakes.
CAUTION
With the drag link(s) disconnected, the wheel ends are free to steer and may do so spontaneously as the axle is being moved. Be careful to avoid using the steerable parts as hand holds. Be careful to avoid placing your hands where they may be pinched if the wheel ends steer due to shifting, etc.
CAUTION
When disconnected, the shock absorbers may extend with some force.

12. Remove and discard U-bolts and U-bolt nuts. Replacement U-bolts and nuts are not included in your EZ Trac® kit.

    Contact your truck dealer for replacement U-bolts and nuts. **U-Bolts, Washers, and Nuts must always be replaced!**
13. Remove axle from vehicle, retain spacer blocks and shock mounts for re-use with the new axle.

    Note: Make sure that spacer blocks are installed the exact way that they are removed.
14. Place EZ-TRAC axle on mobile lifting device; lock axle in place to prevent the axle from rolling over.
15. Carefully move axle into place under truck suspension, avoiding other components.
16. Place axle spacer on axle with locating pins in locating pin holes.
17. Align locating pin holes with leaf spring pins while raising axle into place.

CAUTION

The axle assembly weighs approximately 1320 lbs. and is extremely top-heavy. Use a mobile lifting device that can safely support and maneuver the weight of the axle while preventing it from rolling over. Be careful to keep your hands from areas that may be pinched due to steering and/or shifting of the axle while removing it from under the vehicle.

Figure 2.1

18. Install new U-bolts, nuts, and washers.
19. Check axle alignment per chassis manufacturer's specifications before tightening U-bolts.
20. Tighten U-bolts evenly and torque to manufacturers suggested specification. Typical torque values and torquing procedure can be found in the Appendix section of this manual.
21. Attach drag link to the steering ear.

CAUTION

Check the steering arm taper. The steering arm taper must match the drag link taper. The drag link nut must torque against the steering arm.

22. Attach the shock absorbers to the axle (if removed).
23. Connect air and electrical lines to axle per manufacturer specifications.
24. Perform ABS functionality test per chassis manufactures specification.

CAUTION

An additional ABS check is required following the EZ Trac® electrical installation to ensure there is no interference. See start-up procedure.

25. Torque drag link castle nut, shock absorber mounting hardware, and all air fittings to OEM-suggested torque specification. Make sure to install a cotter pin into the drag link(s) castle nut.

26. Check drag link clearance with steer arm(s) through entire steering range.
27. Install wheels (after completing hydraulic hose installation). Torque lug nuts to 450-500 ft-lbs.

NOTE: Re-check wheel nut torque after first 50-100 miles.

28. Adjust steering stops as required per OEM manual.
29. Check steering wheel is centered when wheels are facing forward. If steering wheel is turned off center, it can be corrected during the Front-End Alignment procedure.
30. Check for wheel and brake clearance through the entire steering range.
31. **Use Caution** not to turn steering stop in too far and contact the wheel seal.
32. **When truck is completed, it should be finished by alignment center. Truck should be aligned, steering stops set, and internal steering poppets in steering gear set. Failure to do so may void warranty.**

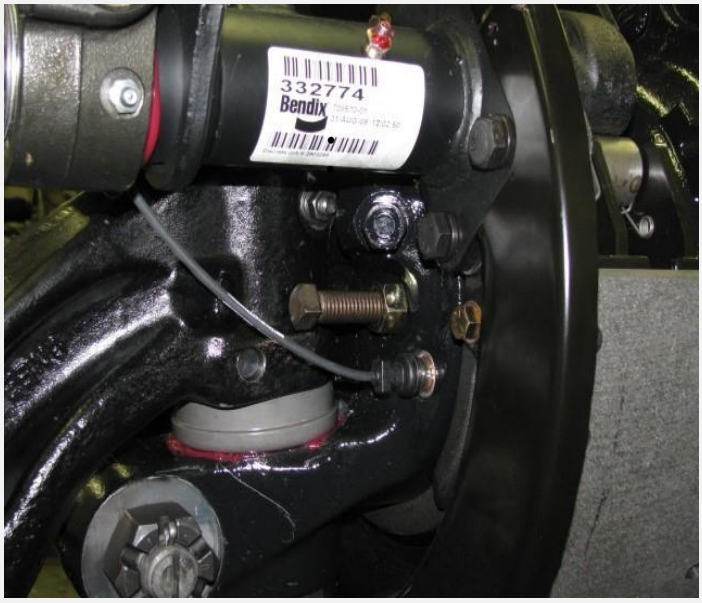


Figure 2.2

33. Refer to truck manufacturer specifications for alignment settings. Reference Materials are available on EZ TRAC website.

CAUTION
Do not drive vehicle above 15 MPH for more than 5 minutes until the hydraulic installation is complete and the pump is primed.

3 PTO Installation

3.0 PTO Installation

1. Install oil pressure switch into pressure switch port of PTO solenoid. This is only used as a fluid plug; the wires will not be connected. The Pressure Switch may be used by Piggy-Back pump supplier if needed. Tie up the loose wires as shown in figure 3.1

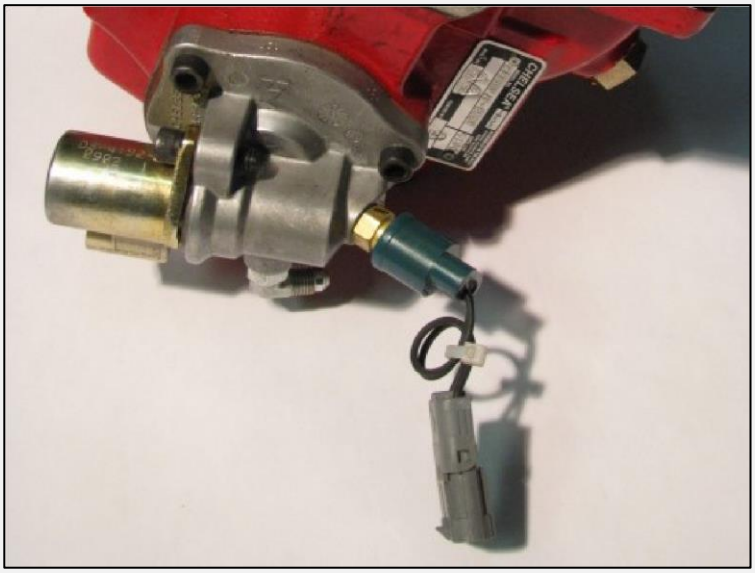


Figure 3.1: PTO Pressure Switch

2. Adjust lube hose elbow to desired orientation prior to mounting PTO.

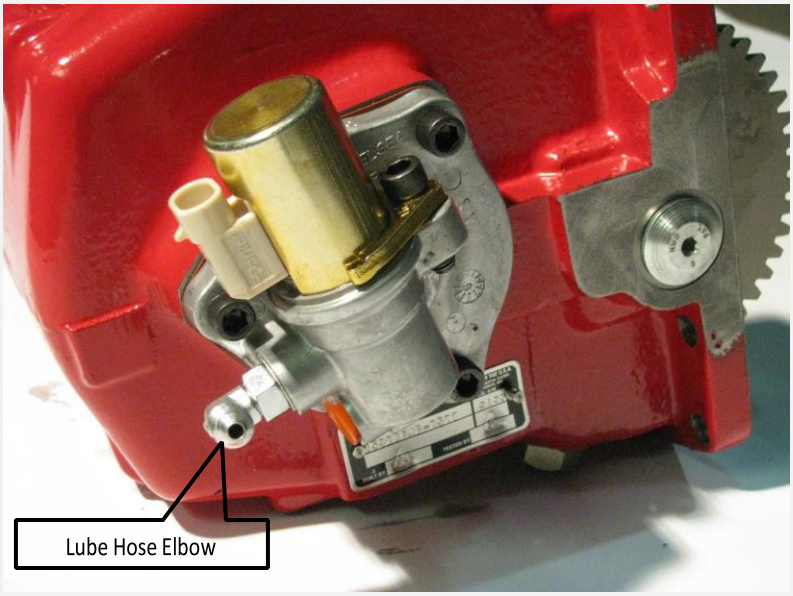


Figure 3.2 PTO Lube Hose Connection

3. Follow PTO installation instructions packaged with PTO to install the PTO.

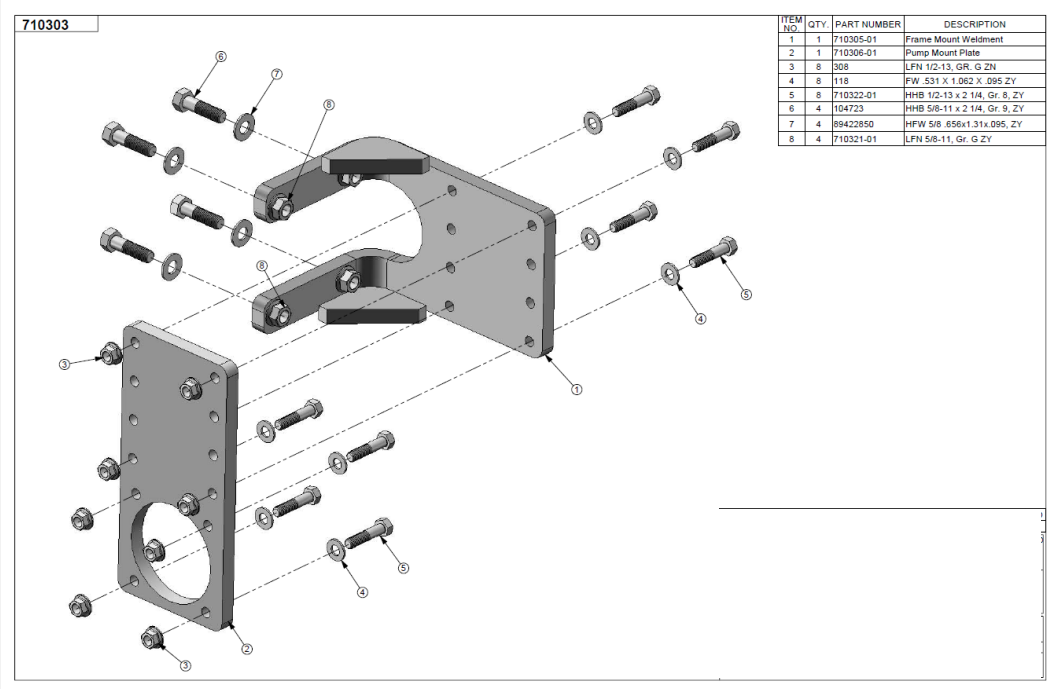
IMPORTANT: Disregard all electrical instructions provided with the Primary Pump PTO. Refer to the Electrical Wiring Section of this manual for electrical connections.

4. Identify the transmission lube port and install the PTO lube hose if applicable. Route the lube hose to avoid sharp bends or contact with other components. Anchor the lube hose securely. A tee fitting may be required at the transmission lube port if multiple PTOs are being utilized. Torque hose to 12 ft-lbs.

4 Hydraulic Pump

4.0 UNIVERSAL PUMP MOUNT

Confirm the specific bracket on the shipment checklist. Below is the standard bracket. It has three height adjustments available to optimize most any driveline angle. The hardware for attaching the bracket to the frame as well as attaching the brackets together and attaching the pump to the brackets are in the EZ trac Fitment kit (K710303). A minimum of four supplied ½ grade 8 bolts must be used to hold the brackets together.



ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	710305-01	Frame Mount Weldment
2	1	710306-01	Pump Mount Plate
3	8	308	LFN 1/2-13, GR. G ZN
4	8	118	FW .531 X 1.062 X .095 ZY
5	8	710322-01	HHB 1/2-13 x 2 1/4, Gr. 8, ZY
6	4	104723	HHB 5/8-11 x 2 1/4, Gr. 9, ZY
7	4	89422850	HFW 5/8 .656x1.31x.095, ZY
8	4	710321-01	LFN 5/8-11, Gr. G ZY

4.1 Pump Installation

1. Position pump on the truck for fit-up. Consider the following:
    - **DO NOT WELD TO FRAME RAILS.**
    - Allow adequate distance and clearance for driveline components between primary pump and primary pump PTO.
    - Minimum distance from PTO to primary pump = 17 in
    - Maximum distance from PTO to primary pump = 60 in; larger distances are possible with a carrier bearing.
    - The primary pump shaft and PTO shaft should be parallel with each other.

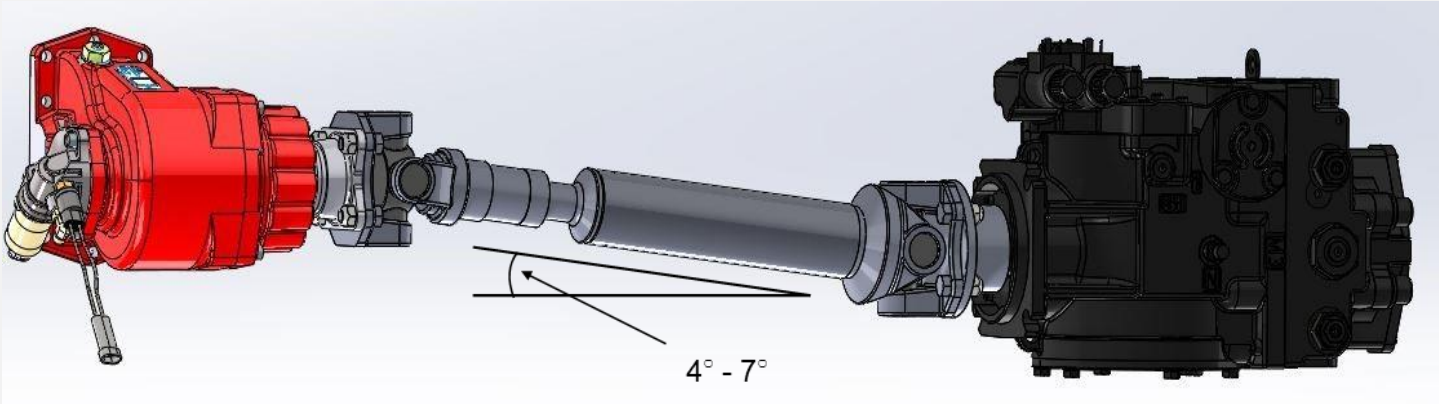


Figure 4.1: Driveline Angle

- Allow enough room for hydraulic and electrical connections.
- There are three possible pump orientations (A, B, or C) as shown in Figure 4.2; use different orientations for ground clearance or hose routing.

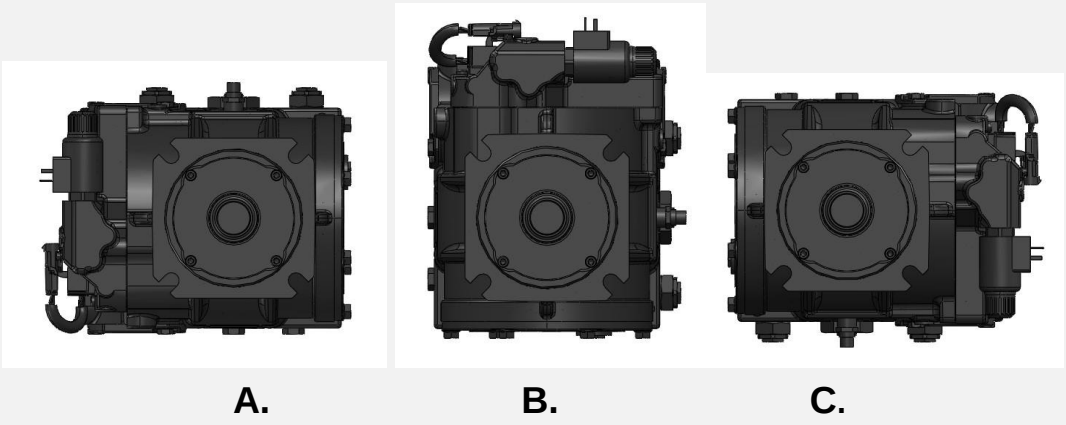


Figure 4.2: Allowable Primary Pump Orientations

2. Use universal pump bracket as a template and drill holes as needed through frame.

<u>Note:</u> Refer to truck manufacturer specifications for frame drilling and modifications

3. Mount bracket to frame using 5/8-inch, grade 8 fasteners.
4. Mount primary pump to pump bracket using 1/2-inch, Grade-8 fasteners.
5. Check that primary pump driveline angle is between 4 and 7 degrees in both vertical and horizontal directions.
6. Mount auxiliary pump if applicable.
7. Check for and/or install a back-plate and seal if a piggyback pump is added later.

   If Piggy-Back pump is to be installed and isn't plumbed, please use appropriate O-ring seal Table 1 below. Prior to shipment, please remove fuses and put in glovebox to ensure the system cannot be operated during transport.

Table 1 O ring size

SAE A	151
SAE B	154
SAE C	158

8. After installation of the PTO and Pump, be sure to affix labels that ship with the PTO in appropriate locations, Figure 4.4.

Figure 4.4

5 Driveline

5.0 Driveline

A Dana 1410 series or equivalent drive shaft must be used for an EZ Trac installation. The 1410 series driveline is rated for 400 Nm torque at 3000 RPM. TDS supplies the components for the EZ Trac Driveline. Once the length is known the parts need to be taken to an Authorized Spicer Driveshaft company. **The driveshaft must be balanced to 3200 rpm.**

1. Install primary pump yoke.
2. Use thread lock and Torque set screw in pump yoke to 16 ft-lbs.
3. Measure distance from primary pump flange to primary pump PTO flange.
4. Ensure that the tube shaft and slip yoke are put together in the correct orientation. When assembled, the driveshaft should exactly match the orientation of the shaft shown in the print above. The yoke on the PTO flange must be parallel to the yoke on the primary pump.
5. Grease both U-joints and slip yoke.
6. Install drive shaft in between primary pump and primary pump PTO output flange (see Figure 5.1).
7. Torque eight companion flange bolts to 63-75 ft-lbs.
8. After driveshaft installed, confirm there is a 4-7° angle with the primary pump input shaft axis.

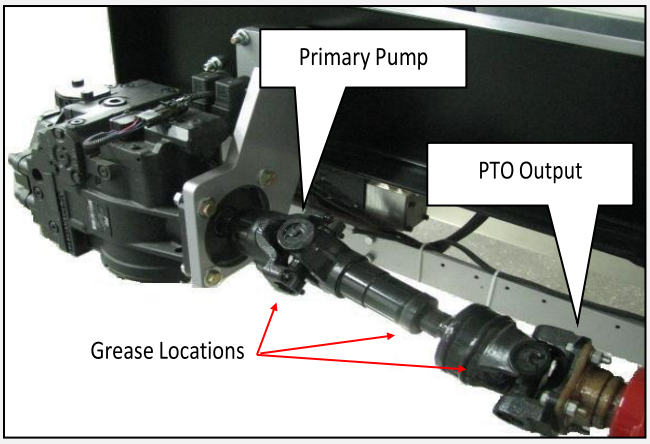


Figure 5.1

6 Cooler Package

6.0 Hydraulic Package

1. Refer to truck manufacturer specifications for frame drilling requirements. Each manufacturer has requirements regarding size, spacing and other guidelines.
2. Lay out cooler mounting specific to your kit.

   Cooler Drilling information is located inside of the cooler behind the access panel
3. Consider the following when drilling the frame:
   - **DO NOT WELD TO FRAME RAILS.**
   - Before drilling frame, be sure area on the opposite side of surface to be drilled is clear of obstructions such as air lines, electrical wiring, or other items.
   - Do not drill the frame flanges, as this may result in frame failure.
4. Mount Appropriate Package in desired location as specified by customer.

   If location is not known, please contact EZT customer or TDS for confirmation of location and mounting type.
5. Multiple cooler package mountings are available as shown in the Appendix of this manual.
6. In some cases, the valve will be removed from the cooler package, and mounted in the frame rail or other location, figure 6.1.
7. The mounting bolt pattern for cooler is 5.5” x 5.5” square with 9/16” bolt holes, figure 6.2.

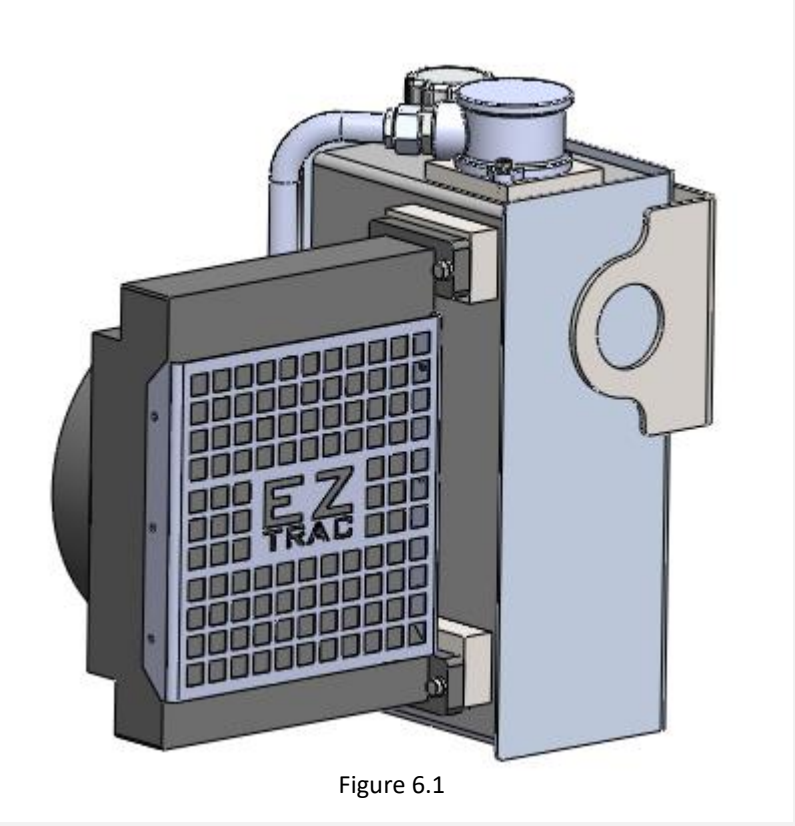


Figure 6.1

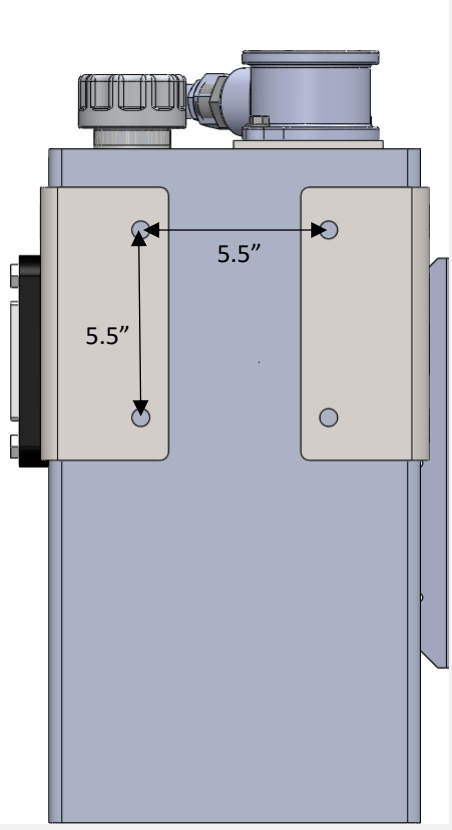


Figure 6.2

7 Electrical

7.0 Electrical

Reference the proper electrical schematic for help with installation. Additionally, read the truck manufacturer electrical body builder manual for proper procedures for adding electrical connections and components.

For a digital version of the electrical schematic refer to Drawing **9154001** and **9154001-42-**Pin which can be found at https://www.eztracawd.com/install-service .

Chassis electrical systems vary from vehicle manufactures. If you cannot find your specific wiring installation instructions in this manual, or if there are special circumstances associated with your installation, please contact EZ Trac® Engineering at eztracengineering@tdsdrive.com.

For each truck, other than custom chassis trucks, you will be using the following items as a baseline. The main harness kit is TDS™ part number **9114002**. The kit includes the following items:

9024018	Valve Leg
9024002	Pump Control Leg
9024003	12-volt battery leg
9024004	Temperature and level switch leg
9024012	Main Backbone (For mode switch “E” software)
9024013	Cab Leg for Display and mode switch
9024014	Cab Leg Extension (From backbone to cab firewall)
9024300	EZ Trac® Switch

- **DO NOT** run the harness along a main battery cable. This can cause CAN interference.
- Each leg can be run separately to its location and then connected to the backbone. See instructions and pictures below.
- After wires are run through the cab and chassis, verify proper length. Extra length can be bundled up in the frame rail. If any leg of the harness is short, please contact EZ Trac® Engineering for assistance. We can send an extension for any of the legs. **DO NOT MODIFY WIRE HARNESS.**

Figure 7.1 — Backbone (9024012)

1. Layout the Backbone harness (see figures 7.1, 7.2, 7.3) and identify plug ends. These ends are keyed to prevent incorrect connection. Start with backbone at EZ Trac® Controller and work your way down the harness. Make sure that the wiring is put away neatly and protected. Use P-clamps, zip ties, or other fasteners as necessary.
2. Locate the end with the 42-pin controller connection and start connections there.

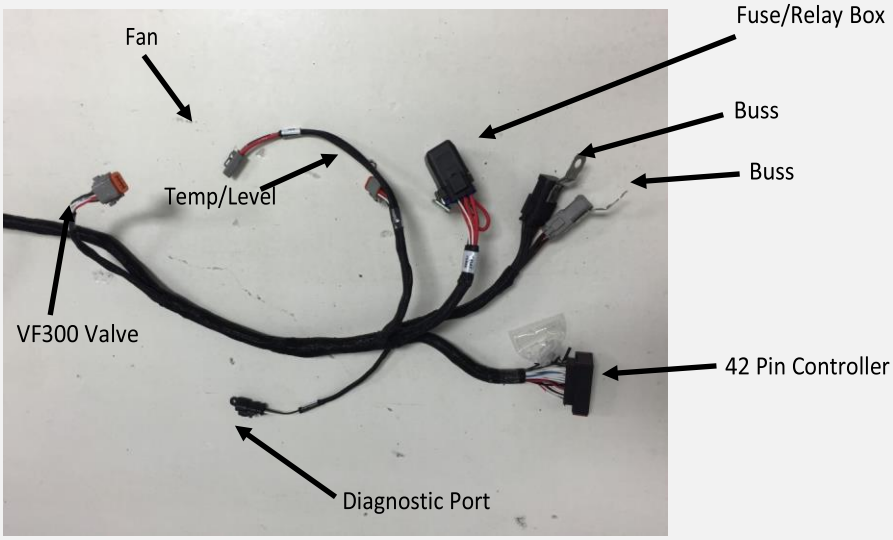


Figure 7.2

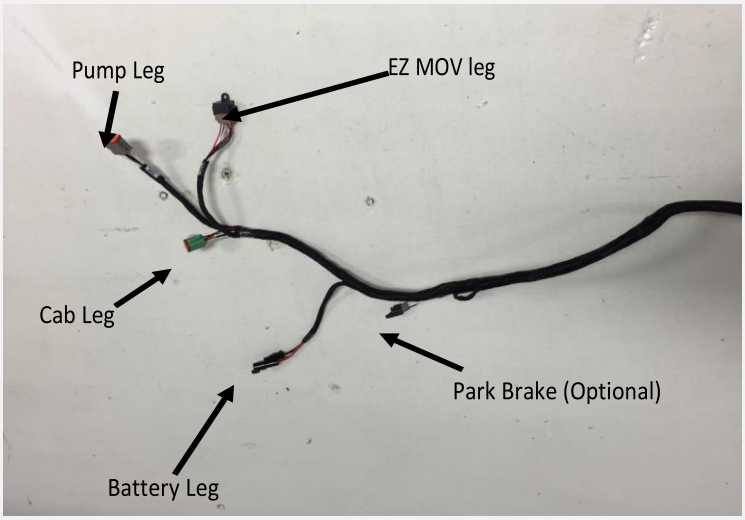


Figure 7.3

3. Connect the other end to corresponding harness legs.

4. After laying the harness out, you can connect each leg individually to its branch off or on the truck (see Figures 7.4 and 7.5 next page).

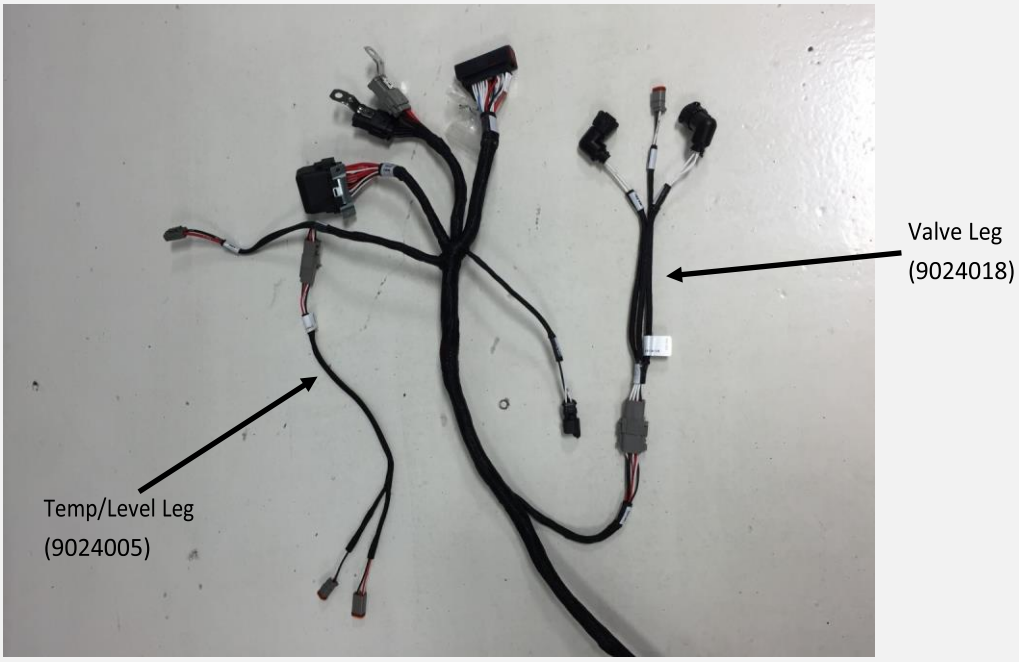


Figure 7.4

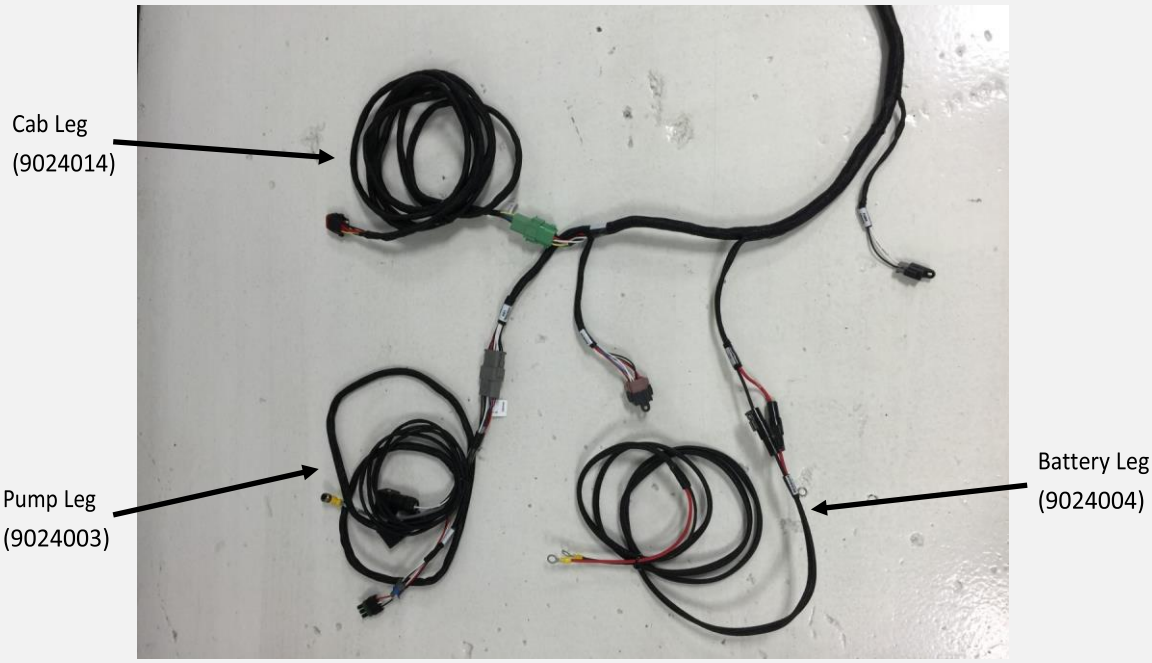


Figure 7.5

5.Locate the in-cab leg (9024013) and install into the cab.

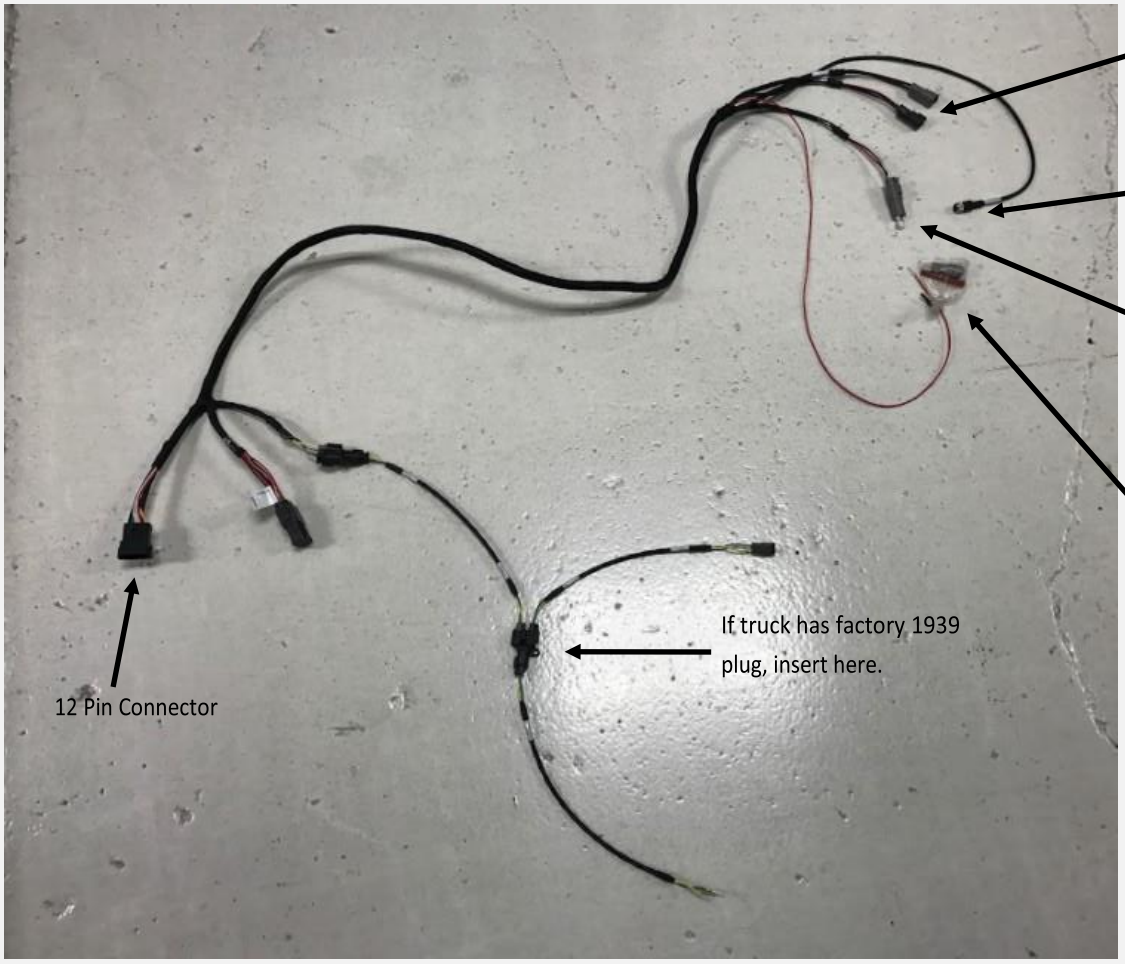
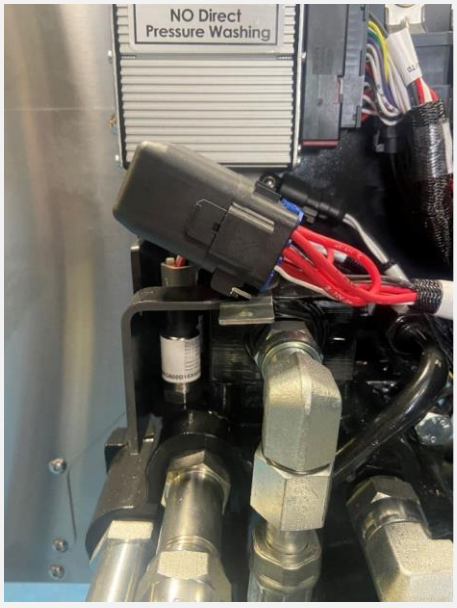


Figure 7.6



Fuse Block must be mounted so that wires slope downwards

Figure 7.7

6. Different Trucks have standard or special CAN “tap” points. We will list the trucks and specific locations for getting CAN tap points as well as key hot locations. Refer to the Body builder manuals for current info, new models and chassis can include new wiring locations.

Freightliner, Western Star

Figure 7.8

J1939 SPLICE PACK

EZ TRAC Connector

Figure 7.9

SPLICE PACK to C22

9014005

Figure 7.10

IGN SPLICE PACK

Figure 7.11

DASH SPLICE PACK

JUMPER To Jiffy Splice

9014004

Kenworth & Peterbilt

- Ignition Tap Points are Blunt cut or Bullet Connectors. Use supplied Jiffy Splice connector (see Figure 7.12 to the right).

Figure 7.12 (right)
(B, C) DASH Blunt Cut, Crimp on Socket to Jiffy Splice (Ignition)

Mack Granite

Figure 7.12

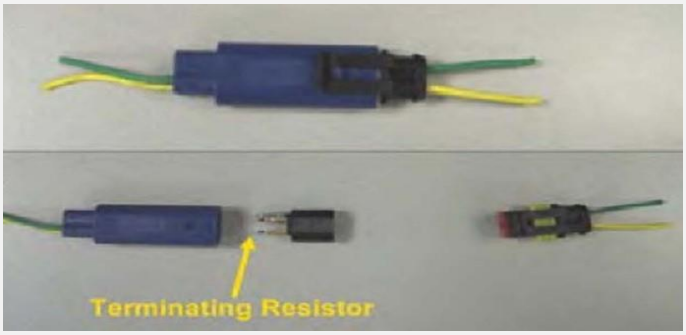


Figure 7.13
(B) DELPHI Plug w/ Resistor

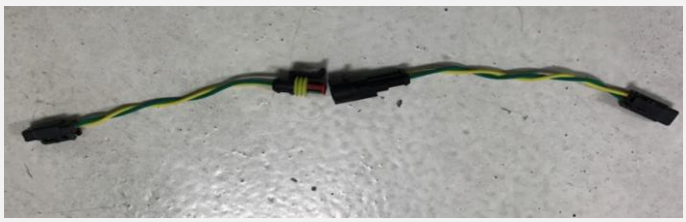


Figure 7.14
(B) DELPHI 2 pc Jumper to C18, C19
9014002, 9014003

- Ignition Tap Points are Blunt cut or Bullet Connectors. Use supplied Jiffy Splice connector (see Figure 7.12).
- Plug into existing J1939 and use existing resistor.

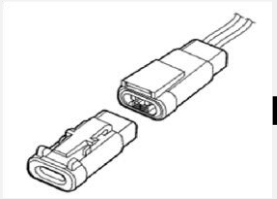


Figure 7.16
DTM Receptacle w/ Resistor (9034506 Resistor)

Figure 7.17
DELPHI 2-pc Jumper to C18, C19 (9014002, 9014003)

All Trucks can use the following Generic Connection via OBD.

Extract Pins from OBD, insert into 2-pin receptacle, plug pins from EZ Trac® harness into OBD Connector. See Jiffy Splice in Figure 7.12 on previous page (36).

11. If OBD Connector is Black. Extract C & D from OBD.
12. If OBD connector is Green, CAN wires will be in F & G or H & J.
13. Plug C & D wires from truck into DT04-6P connector 1 & 2 ports respectively.
14. Plug 2 Deutsch Pins wires Green & Yellow into C & D on OBD connector respectively.

	2016 +		Before 2016
PIN	**CIRCUIT ASSIGNMENT**	**PIN**	**CIRCUIT ASSIGNMENT**
A	Ground	A	Ground
B	+12V	B	+12V
C	J1939 @ 500 kbps (OBD CAN)	C	J1939 @ 250 kbps (Vehicle CAN)
D		D	
E	Not Connected	E	Not Connected
F	J1939 @ 250 kbps (Vehicle CAN)	F	Not Used (J1708/J1587)
G		G	
H	CAN_H @ 250 kbps or Spare	H	CAN_H @ 20 kbps or Spare
J	CAN_L @ 250 kbps or ISO9141 K-Line	J	CAN_L @ 250 kbps or ISO9141 K-Line

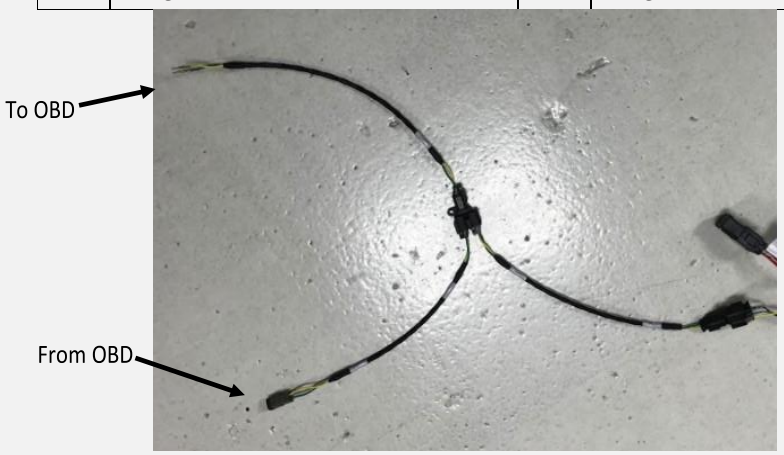


Figure 7.18
Standard Harness Connectors

14. Install switch (9024300 Grey Connectors) into dash using 22mm hole (see Figure 7.12 on page 36).

15. Install switch (9024302 Black Connectors) Mode Switch for trucks with this option (see Figure 7.12 on page 36).
16. 7/8 max step drill works well for most dash materials without any damage.
17. Pull wires through firewall of truck. If connector is too large remove pins from connector, pull through and reinstall back in connector (see chart in Figure 7.19 below for In-Cab Harness Pinout).

    TIP: Take pictures for reference even though wires are stamped with numbers.

PIN	COLOR	DESCRIPTION
1	Yellow	CAN-H
2	Red	EZ Trac® Lmp
3	Red	Ignition
4	Black	Ground
5	Purple	Mode S
6	Blue	Ground
7	Black	EZ Trac® Switch
8	Green	CAN-L
9	White	PTO In
10	White	PTO Out
11	Red	Mode L
12	PLUG	—

Figure 7.19

Figure 7.20

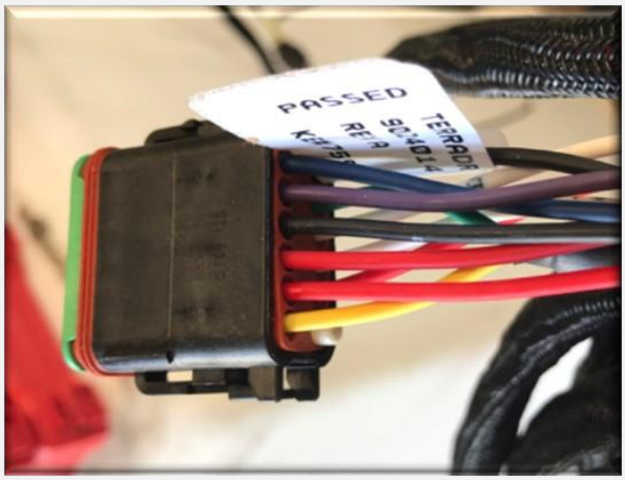


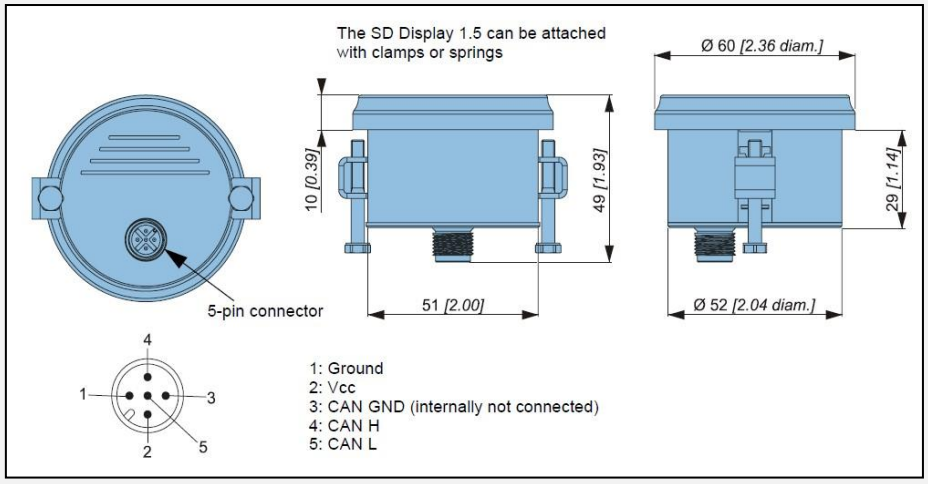
Figure 7.21
Completed Pinout

19. When installing the switches only one nut is required. Remove the second nut and discard. If both buttons are used make sure they are oriented the same direction. See Figures 7.22 & 7.23.
20. Use the second nut to retain to the dash face. Tighten carefully but snug to avoid damage to switch. Use the proper wrench and avoid using tools with teeth such as an adjustable pliers. **DO NOT** over torque nut.

Figure 7.22

Figure 7.23

21. Locate a suitable mounting location for the display within reach of the operator.
22. Drill 2.0625” hole (Figure 7.25).



EZ Trac Compact Display Reference

Figure 7.23

23. Insert Display and mount using included hardware (Figure 7.26).
24. Plug carefully into round connector on harness. Tighten fully (Figure 7.27)

Figure 7.26

Figure 7.27

Completed Installation

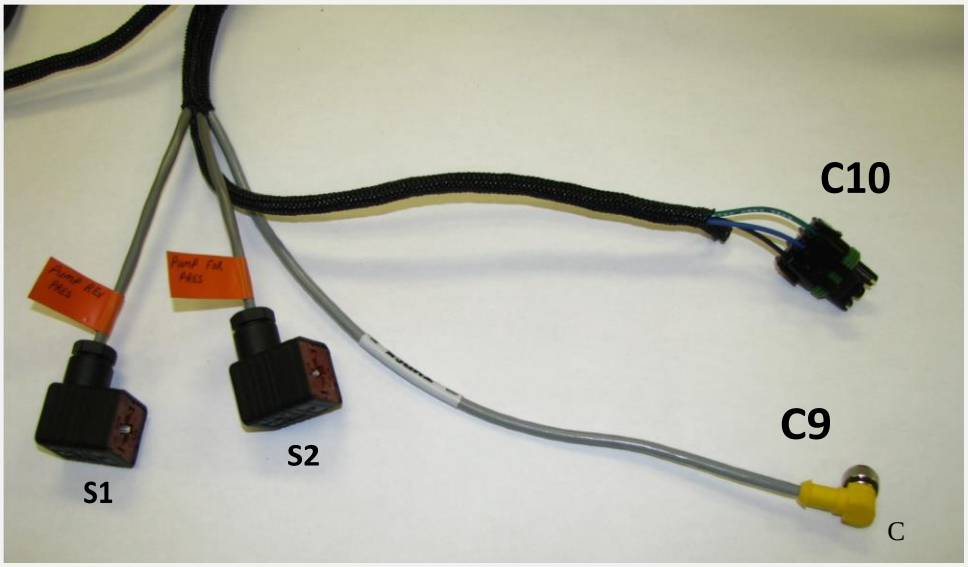


Figure 7.28: Primary Pump Connections

25. Plug connector S1 into pump solenoid S1. "Pump Fwd. Pressure" S1 is the solenoid closest to the primary pump input shaft (Figure 7.28).
26. Plug connector S2 into pump solenoid S2. "Pump S2" or "Pump Rev Pressure" (Figure 7.28).
27. Plug connector C10 into the pump feedback connection on the primary pump (Figure 7.29).

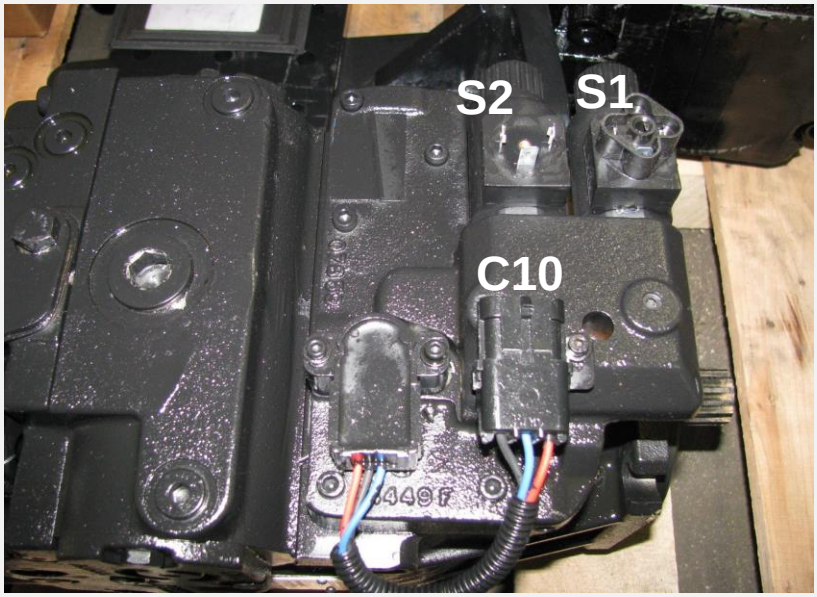


Figure 7.29: Primary Pump

28. Plug connector C9 connector into the pump speed sensor on the side of the primary pump (Figure 7.30).

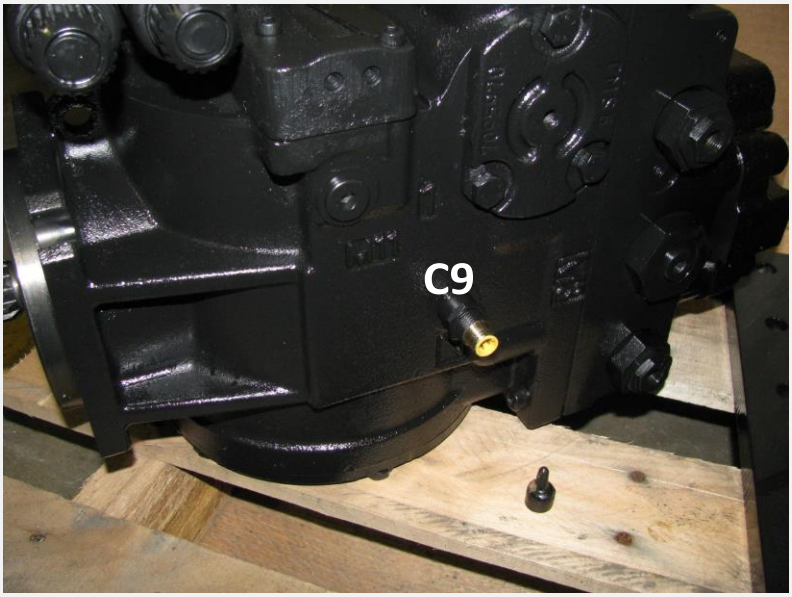


Figure 7.30 Primary Pump Speed Sensor

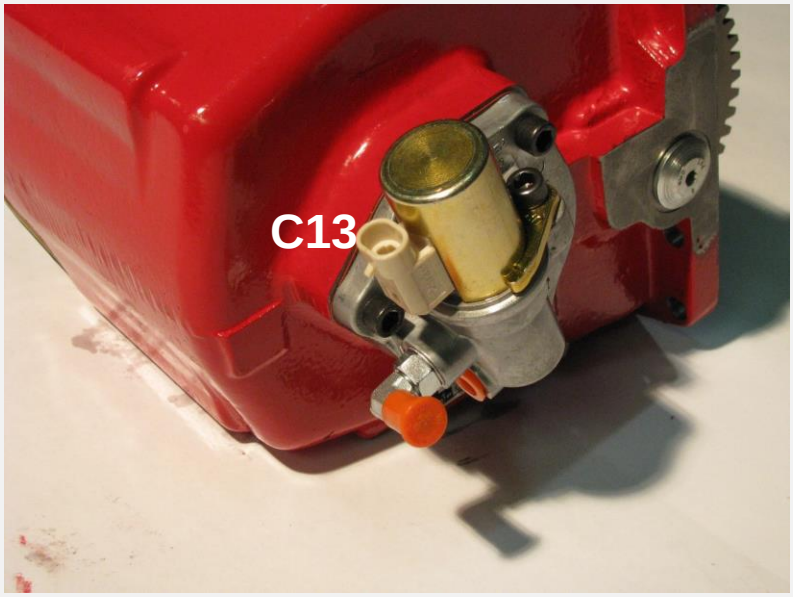
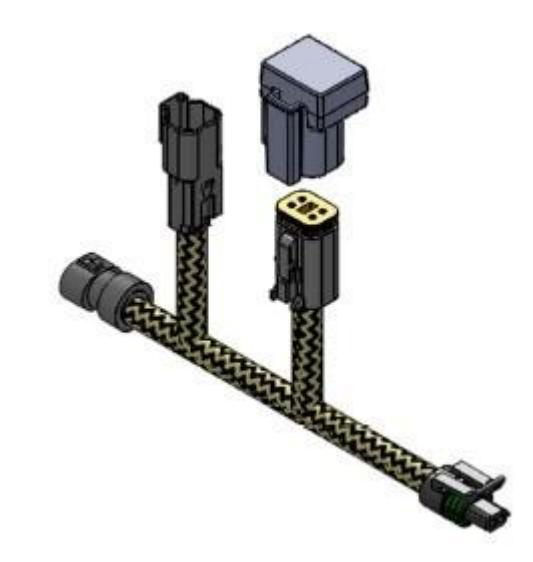


Figure 7.31: PTO Shifting Solenoid

29. Plug connector C13 into the PTO shifting solenoid (Figure 7.31).

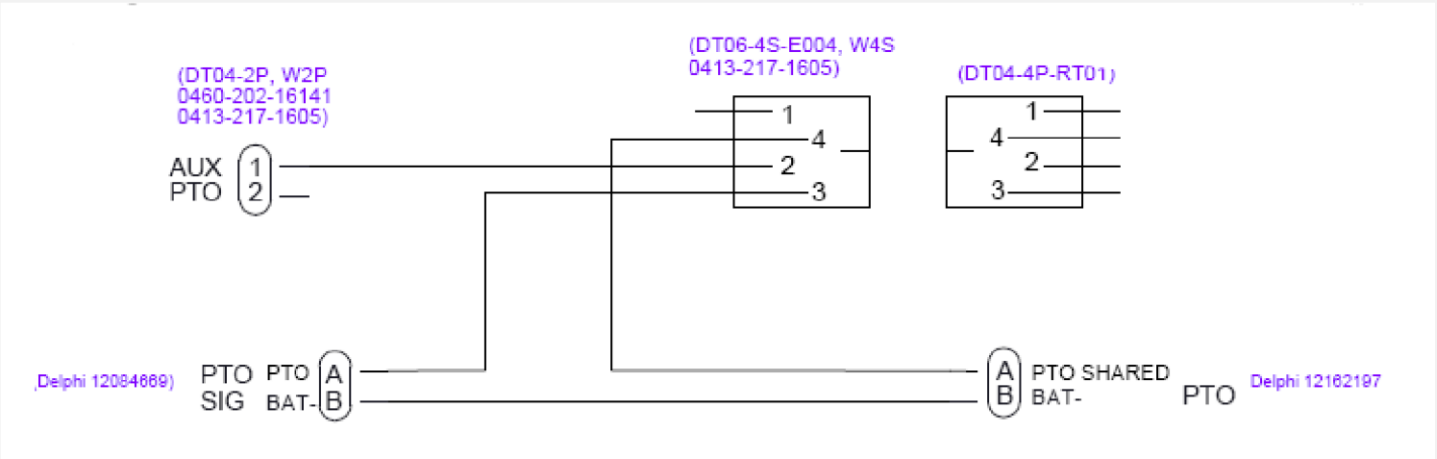
Piggyback Pump Electrical Connections - Optional (If supplied in Kit, plug into harness, and cover up female plug until alternate plug is used.



EZ-TRAC Part Number: 9024011

1. Unplug PTO connection C13. See Figure 7.31.
2. Plug the PTO Diode Jumper into PTO shifting solenoid.
3. Plug harness PTO connection C13 into PTO Diode Jumper.
4. Customer PTO (12vdc) in Deutsch Connector Pin 1.

Figure 7.32: Piggyback pump Diode kit

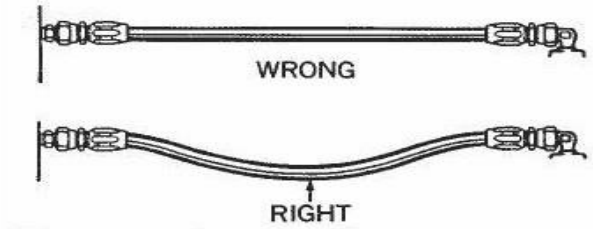


8 Hydraulic Plumbing

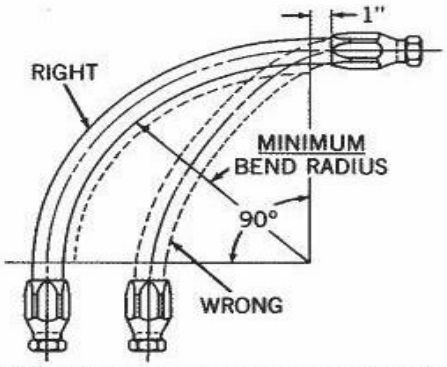
8.0 Hydraulic Plumbing

STANDARD PROCEDURES

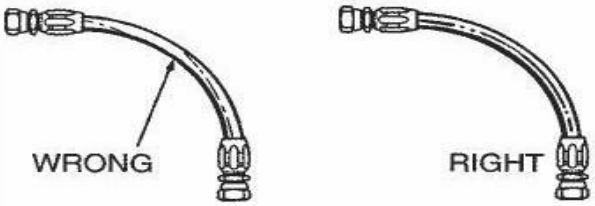
1. Prior to mounting the reservoir, determine if it is in the final location or if it could be moved to a final location later.
2. If the reservoir is in its final location, please proceed to Section 8.1. If not, read below.
3. If the reservoir is relocated, be sure to add the extra hose length needed.
4. Upon first installation, please tie up extra length hoses out of any danger.
5. If hoses need to be disconnected during relocation, please label and complete start-up tests to verify the system works properly once the cooler has been moved.
6. Guidelines for hose routing are provided in figure 8.1 on the next page.
7. Proceed to the following pages for hose measuring procedures.
8. Combine hoses to each wheel and sleeve at least 4’ to ensure they are sleeved 12” past the hose guide loop.
9. Use hose sleeves on hoses wherever hoses move or there a possibility of rubbing.
10. Caution not to route hoses where they may rub on sharp surfaces.
11. Retain hoses as often as needed to safely keep them from chafing or rubbing.
12. Caution not to run hoses close to high ambient temperature items such as Turbo Chargers, Exhaust manifolds, or DEF burning devices. If hoses need to be near such items, please wrap the hoses in a heat resistant shield if they are within 12” of ambient temperatures over 250F.
13. Install wheels and steer vehicle from stop to stop to ensure proper hose movement without interference of any items.
14. Check that tires do not rub on chassis, drag links, or other truck components.
15. Check steering with springs loaded and unloaded; verify there are no issues with steering arms and drag link.
16. Make sure hoses do not rub on battery cables or charging lugs.



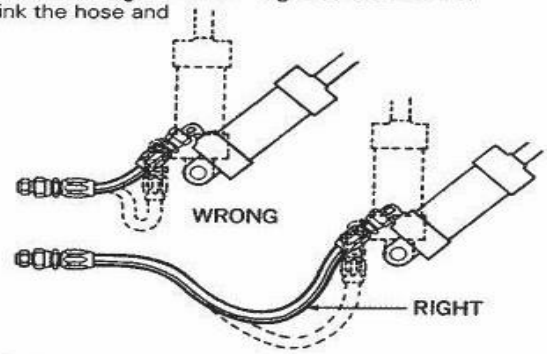
Under pressure, a hose may change in length. Always provide some slack in the hose to allow for this shortening or elongation. (However, excessive slack in hose lines may cause poor appearance.)



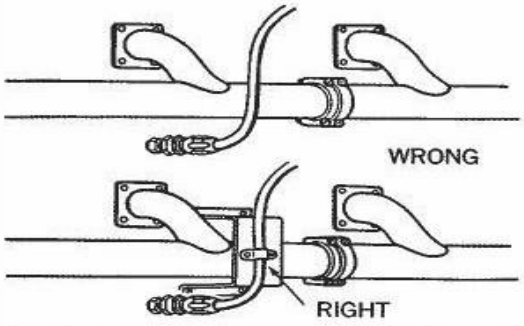
At bends, provide sufficient hose so that it does not have a bend radius less than its recommended minimum bend radius. Too tight a bend may kink the hose and restrict or stop the fluid flow. In many cases the proper use of adapters and hose fittings can eliminate tight bends or kinks.



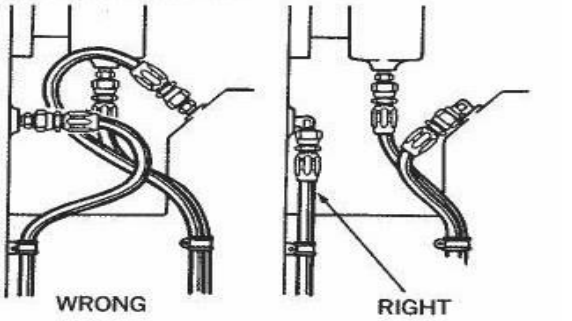
If a hose is installed with a twist in it, operating pressures tend to force it straight. This can loosen the fitting nut. Twisting can cause reinforcement separation and the hose could burst at the point of strain.



In applications where there is considerable vibration or flexing, allow additional hose length. The metal hose fittings, of course, are not flexible, and proper installation protects metal parts from undue stress, and avoids kinks in the hose.



When hose lines pass near an exhaust manifold or other heat source, they should be insulated by a heat resistant boot, firesleeve or a metal baffle. In any application, brackets and clamps keep hoses in place and reduce abrasion. For installations where abrasion to hose cover cannot be prevented with the use of clamps or brackets, a steel protective coil or abrasion resistant sleeve should be placed over the hose.



When 90° adapters were used, this assembly became neater-looking and easier to inspect and maintain. It uses less hose, too!

EATON Aeroquip Fluid Conveyance Products A-HOOV-MC001-E January 2005

Figure 8.1 Hose routing

8.1 Measuring Hydraulic Hose

HOW TO MEASURE HYDRAULIC HOSE

Hose assemblies for the EZ Trac system are custom built for each individual unit. The K711034 EZ Trac hose sheet, figure 8.2, is included in the installation manual to facilitate the process of ordering the hose kit and maintaining a record should replacement hose assemblies be required. These basic instructions are provided as guidelines to ensure that hose assembly measurements are consistent and reduce the possibility of hose assembly length errors. It must be recognized that during hose installation, hoses may be routed differently than the routing used for the measuring process. Hose assemblies built to lengths requested K711034 EZ Trac hose sheet, figure 8.2, become the property of the customer. If a different length assembly is required, the customer will assume financial responsibility for the replacement hose assembly.

Refer to Fig. 8.1 for basic information on hose routing. Always consider wrench clearance, fitting length, and hose stiffness when routing hoses. Also consider relative movement
between the components being connected by the hose assembly or any components (tie rods, steering gears, drivelines, suspensions) that may require special consideration.

TOOLS REQUIRED

1. Measuring Tape (min. 25' length preferred)
2. Marking Pen
3. Hose Fittings and Hose Routings Worksheet, figure 8.2
4. Hose***** (min. 25' length preferred; 1/2"-1" diameter preferred)
5. Cable Ties

*****A length of hose or flexible cable is preferred over a direct reading from a measuring tape. The hose or cable is less likely to kink and gives a more accurate length for bends. It also presents a better visual guide for determining appearance and for choosing hose assembly support points.

PROCEDURE General Principles

1. Hose assembly lengths are to be measured from seal face to seal face of the adapters that they will be connected to. Hose assembly lengths will be rounded up to the next 1/2".

2. Hose assemblies will have straight swivel fittings on both ends. Abrupt changes of direction will be accomplished with adapter fittings. Make sure that adequate clearance is available for the fitting if hoses are routed through openings in frame members or other confined spaces.
3. Hose assemblies will be continuous between system adapters. If bulkhead adapters are used for temporary installations, only one set of hoses will be supplied. The customer will be responsible for any hose assemblies required for relocated components.
4. Hose assembly lengths will be entered on a copy of the K711034 EZ Trac hose sheet, figure 8.2, and will be referenced by item number in any discussions to promote clarity.
5. Schematics, solid model drawings, and written descriptions are used to identify the hose assembly attachment points. Except for some adapters used for directional changes, all required hydraulic fittings should be included with the EZ Trac unit.

Hose Measurement

1. Using the K711034 EZ Trac hose sheet, figure 8.2, and the hydraulic schematic as a guide to identify the hose assembly connection points, use the hose or flexible cable to mimic the routing path of the finished hose assembly. Begin at one component and pull toward the second component as needed.
2. Use cable ties to support the measuring hose as required to retain the measuring hose in the routing path.
3. Install any adapters required to accommodate wrench or hose fitting clearance.
4. Holding the end of the measuring hose at the adapter seal surface of the second component, work back through the routing path to the first component adjusting the length as required.
5. Use the marker pen to indicate on the measuring hose the adapter seal surface at the first component.
6. Remove the measuring hose from the routing path, then use the tape measure to determine the required assembly length.
7. Record the required length on the K711034 EZ Trac hose sheet, figure 8.2.
8. Repeat sequence for each hose assembly on the worksheet.
9. Reference numbers are provided for valve, pump, cooler, and axle below.

Project #			K711034 Hose Kit For use with EZ-Trac Equipped with In-Hub Charge Pump	*Sales Order #*
Item Number	Hose Part Number	Length of hose (to nearest 1/2 inch)		
		3/4 Hose 5000 PSI	**-12 JIC Female Swivel x -12 JIC Female Swivel**	
1	36555	____ ____ ____ . ____	P90 Hydro Pump, Port "A" to Addiflow valve code 62 flange -12 JIC 90 deg elbow "A" Port	
2	36555	____ ____ ____ . ____	P90 Hydro Pump, Port "B" to Addiflow valve code 62 flange -12 JIC 90 90 deg elbow "B" Port	
		5/8 Hose 2000 PSI	**-08 JIC Female Swivel x -10 JIC Female Swivel (Use with 200023-P1 -08 JIC-FS X -08 JIC-M 45 deg Elbow)**	
3	3545L	____ ____ ____ . ____	RH Knuckle "T" Port to -10 JIC Elbow / Tee Asm on Reservoir	"T" Port is top front on drum brake axle "T" Port is top rear on disk brake axle
4	3545L	____ ____ ____ . ____	LH Knuckle "T" Port to -10 JIC Elbow / Tee Asm on Reservoir	"T" Port is top front on drum brake axle "T" Port is top rear on disk brake axle
		5/8 Hose 2000 PSI	**-08 ORS 90 deg Female Swivel x -10 ORS Female Swivel**	
5	3541K	____ ____ ____ . ____	RH Knuckle "C" Port to -10 ORS Elbow / Tee Asm on Reservoir	"C" Port is center rear on drum brake axle "C" Port is center front on disk brake axle
6	3541K	____ ____ ____ . ____	LH Knuckle "C" Port to -10 ORS Elbow / Tee Asm on Reservoir	"C" port is center rear on drum brake axle "C" Port is center front on disk brake axle
		1/2 Hose 2000 PSI	**-08 JIC 90 deg Female Swivel x -10 JIC Female Swivel**	
7	3537E	____ ____ ____ . ____	Hydro Pump, Port "M3" to Addiflow Valve Port "G" -10 JIC 90 deg Elbow	
		5/8 Hose 6000 PSI	**-10 JIC Female Swivel x -12 JIC Female Swivel**	
8	3645E	____ ____ ____ . ____	RH Knuckle HP REV Port to Addiflow valve "B2" port code 62 -12 JIC 90 deg elbow	HP REV Port is top rear, short -10 JIC 90 deg elbow on drum brake axle HP REV Port is bottom front, long -10 JIC 90 deg elbow on disk brake axle
		5/8 Hose 6000 PSI	**-10 ORS Female Swivel x -12 ORS Female Swivel**	
9	3641A	____ ____ ____ . ____	RH Knuckle HP FWD Port to Addiflow valve "A2" port code 62 -12 ORS 90 deg elbow	HP FWD Port is bottom rear, long -10 ORS 90 deg elbow on drum brake axle HP FWD Port is top front, short -10 ORS 90 deg elbow on disk brake axle
		5/8 Hose 6000 PSI	**-10 JIC Female Swivel x -12 JIC Female Swivel**	
10	3645E	____ ____ ____ . ____	LH Knuckle HP REV Port to Addiflow valve "B1" Port code 62 -12 JIC 90 deg elbow	HP REV Port is top rear, short -10 JIC 90 deg elbow on drum brake axle HP REV Port is bottom front, long -10 JIC 90 deg elbow on disk brake axle
		5/8 Hose 6000 PSI	**-10 ORS Female Swivel x -12 ORS Female Swivel**	
11	3641A	____ ____ ____ . ____	LH Knuckle HP FWD Port to Addiflow valve "A1" Port code 62 -12 ORS 90 deg elbow	HP FWD Port is bottom rear, long -10 ORS 90 deg elbow on drum brake axle HP FWD Port is top rear, short -10 ORS 90 deg elbow on disk brake axle
		1" Hose 1300 PSI	**-16 JIC Female Swivel x -16 JIC Female Swivel**	
12	35655	____ ____ ____ . ____	P90 Hydro Pump suction, Port "S" to Reservoir -16 JIC 90 deg elbow, back side closest to bottom	
		1" Hose 1300 PSI	**-12 JIC Female Swivel x -16 JIC Female Swivel**	
13	3565J	____ ____ ____ . ____	P90 Hydro Pump case drain, Port "L1" or "L2" to reservoir -16 JIC 90 deg elbow on return filter port	**Imprtant: Use higher of the two, ("L1" or "L2") to ensure a full pump case**
		2 3/8" Cordura	**Protective Hose Sleeve**	
14	103379		Kit includes a standard length of 720". Please enter total needed(if over 720")	
		5/8" Hose 2000 PSI	**-12 JIC Female Swivel x -10 ORS Female Swivel (optional)**	
15	3541E	____ ____ ____ . ____	Jumper hose from VF300 valve to check valve on reservoir assembly when valve is moved	Submit @ www.eztracaxle.com under product selector Or email to hoses@tdsdrive.com

Figure 8.2 K711034 EZ Trac hose sheet

Valve Plumbing

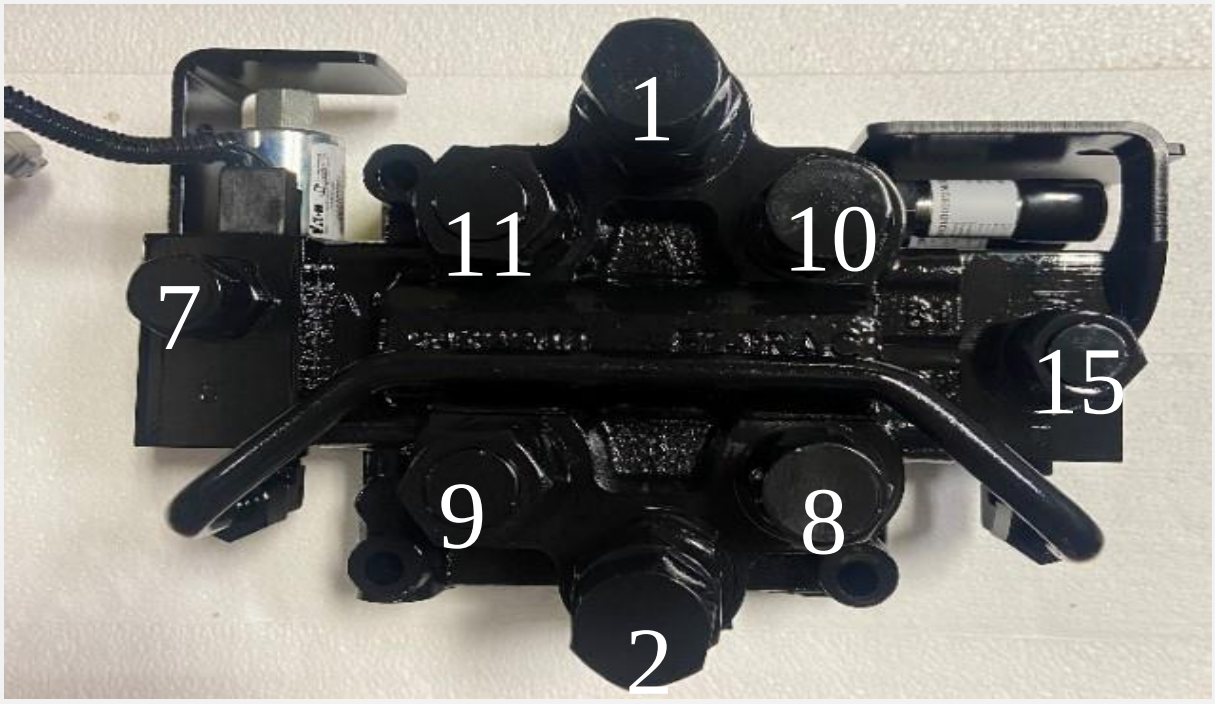


Figure 8.3: Valve Port Location

1: A Port from Pump

2: B Port from Pump

7: Charge Line Hose from M3 Port on Pump

8: B2 Port to RH Wheel Motor

9: A2 Port to RH Wheel
Motor 10: B1 Port to LH
Wheel Motor

11: A1 Port to LH Wheel Motor

15: Drain Port to Cooler

(Corresponding numbers match numbers on figure 8.2)

Pump Plumbing

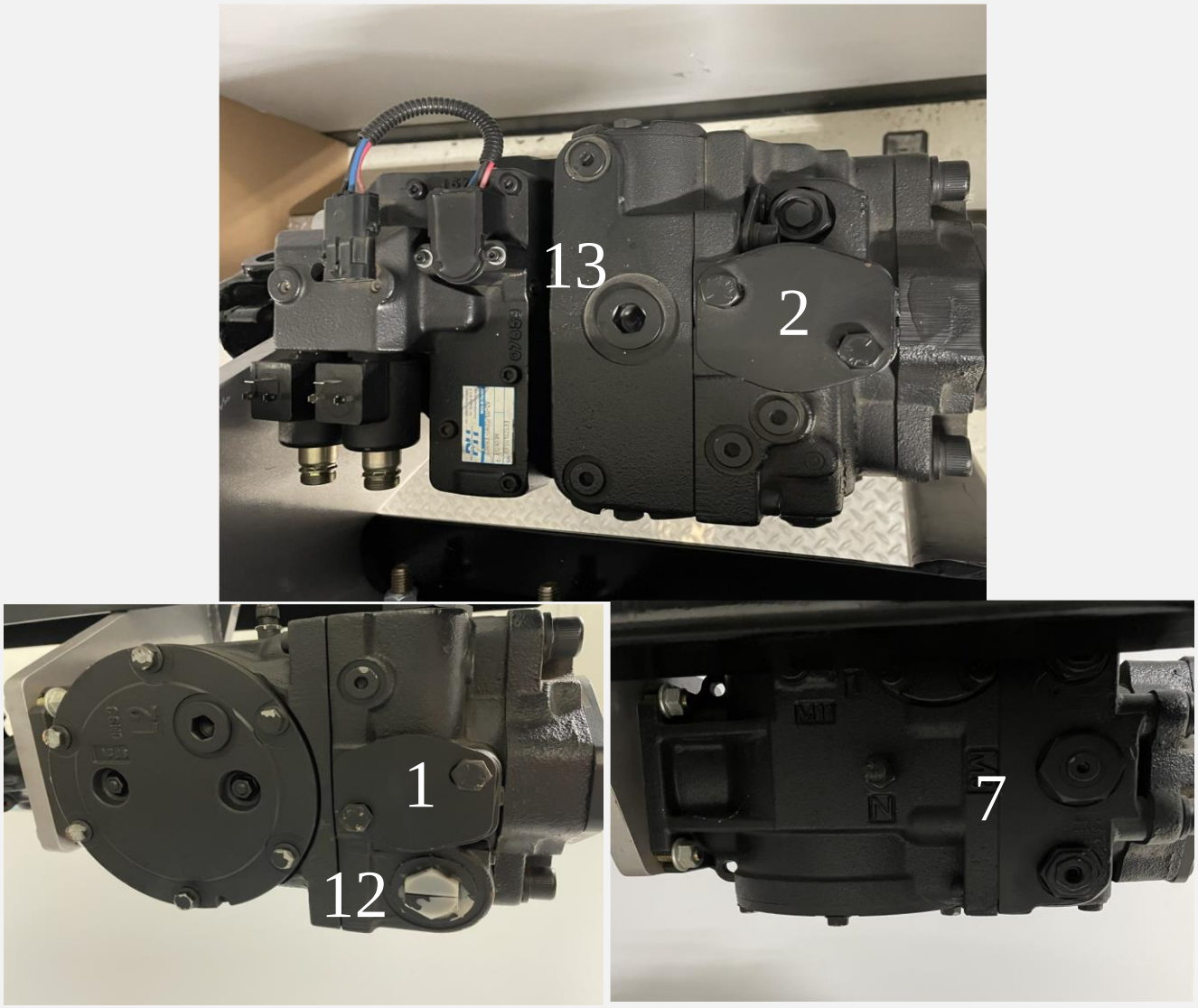


Figure 8.4 Pump Port Location

1: A Port to Valve

2: B Port to Valve

7: M3 Port to Valve

12: Suction Port to Cooler

13: Case Drain to Cooler

(Corresponding numbers match numbers on figure 8.2)

Cooler Plumbing

3: To Knuckle T Port
4: To Knuckle T Port
5: To Knuckle C Port
6: To Knuckle C Port
12: To Suction Port on Pump
13: To Case Drain Port on Pump
15: To Valve Drain

(Corresponding numbers match numbers on figure 8.2)

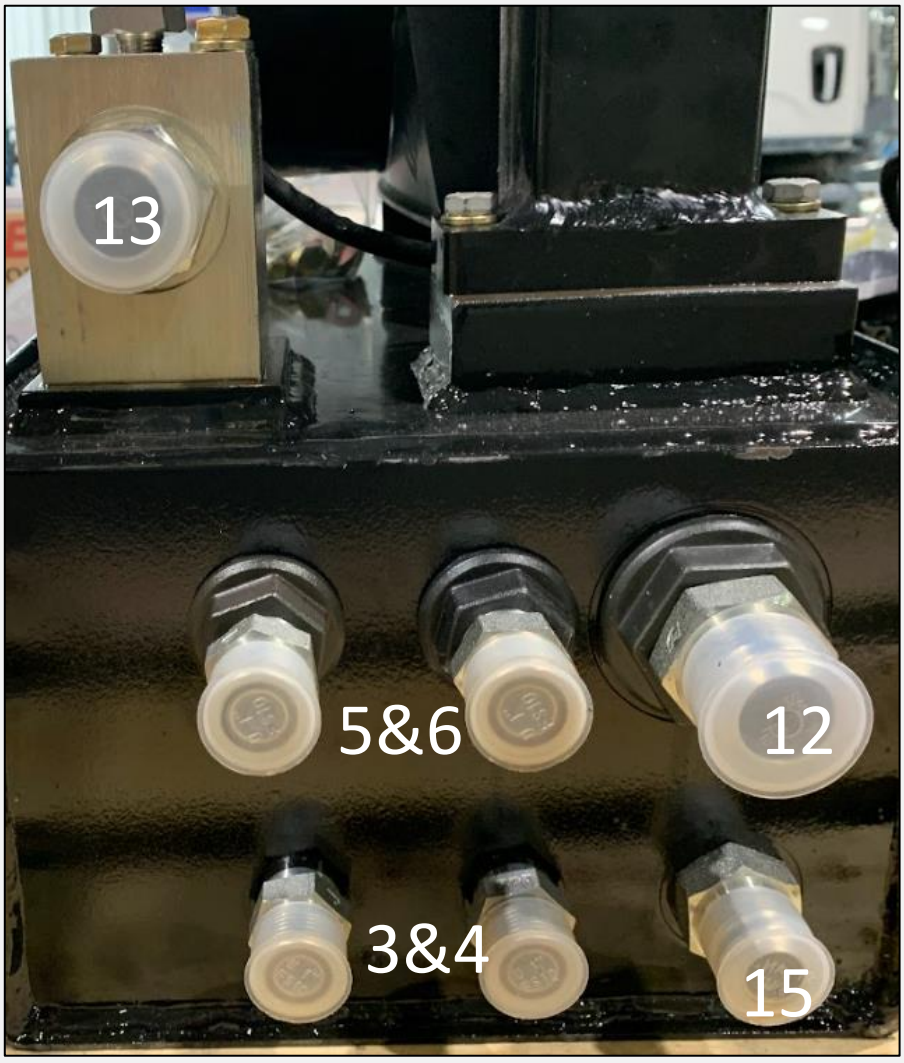
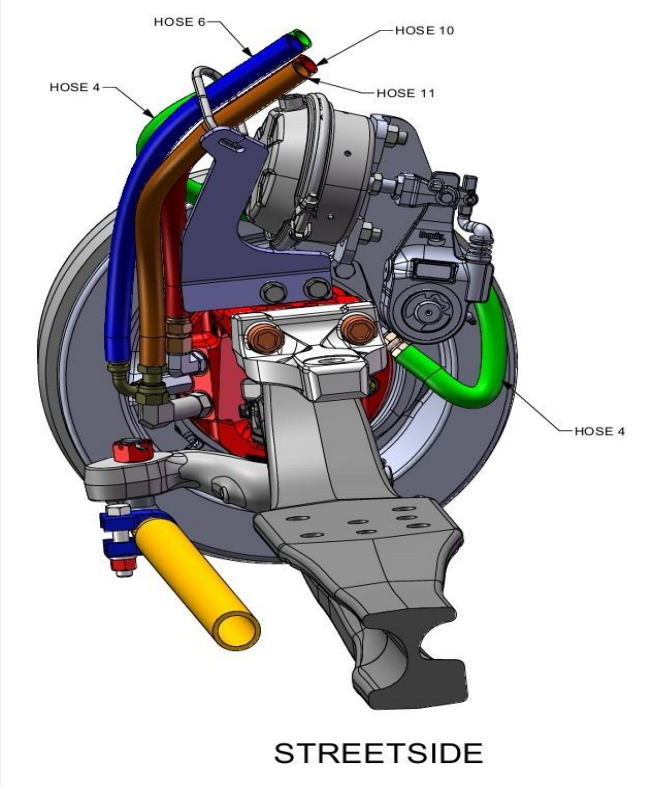


Figure 8.5 Cooler Assembly

Axle Plumbing



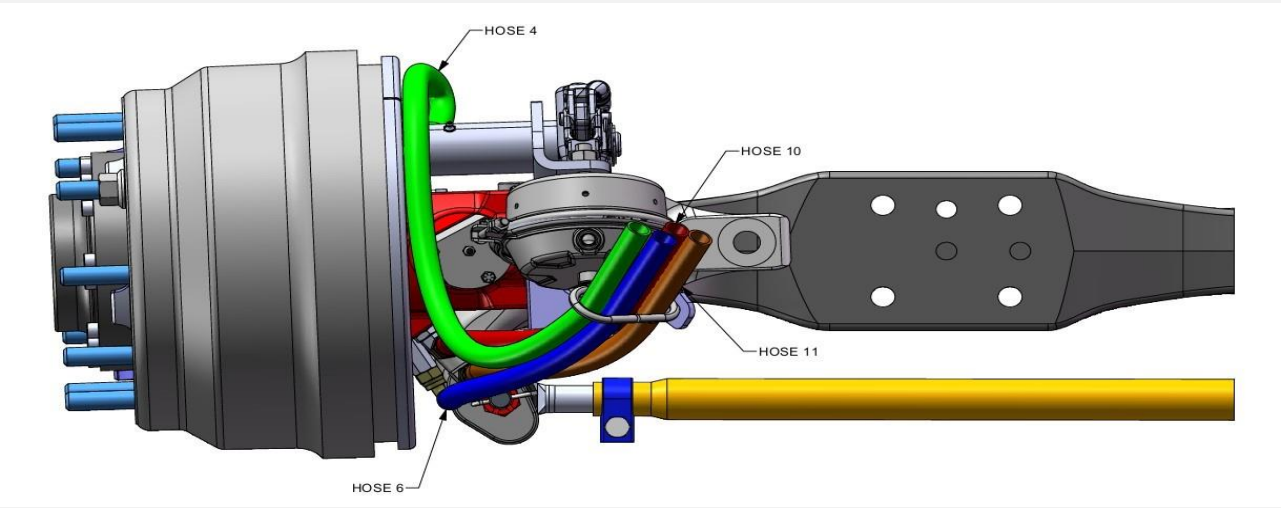


Figure 8.6 AXLE HOSES, DRUM BRAKE (STREETSIDE VIEW)

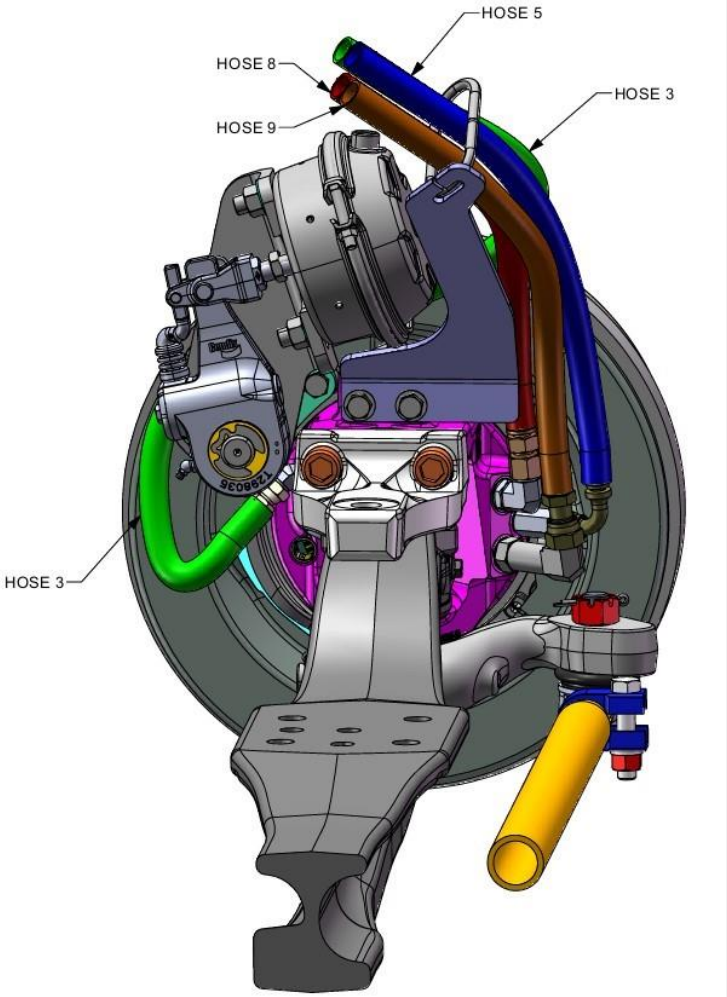
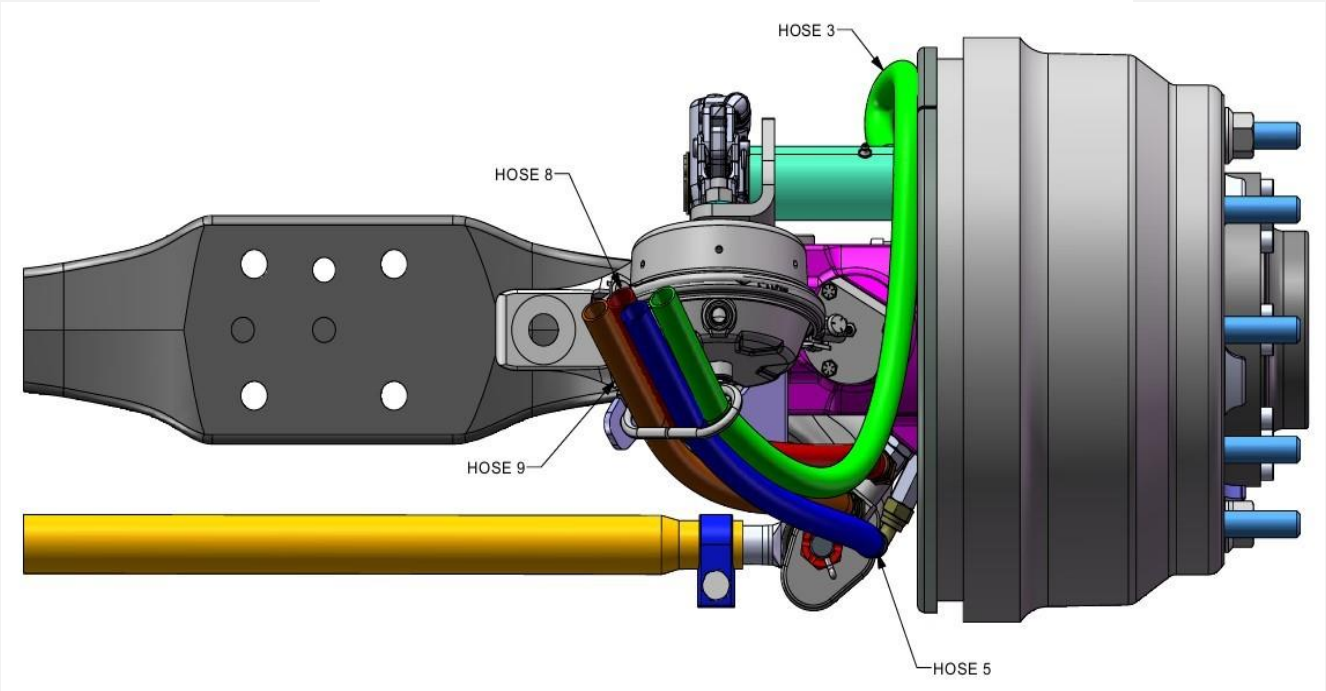


Figure 8.7 AXLE HOSES, DRUM BRAKE (CURBSIDE VIEW)



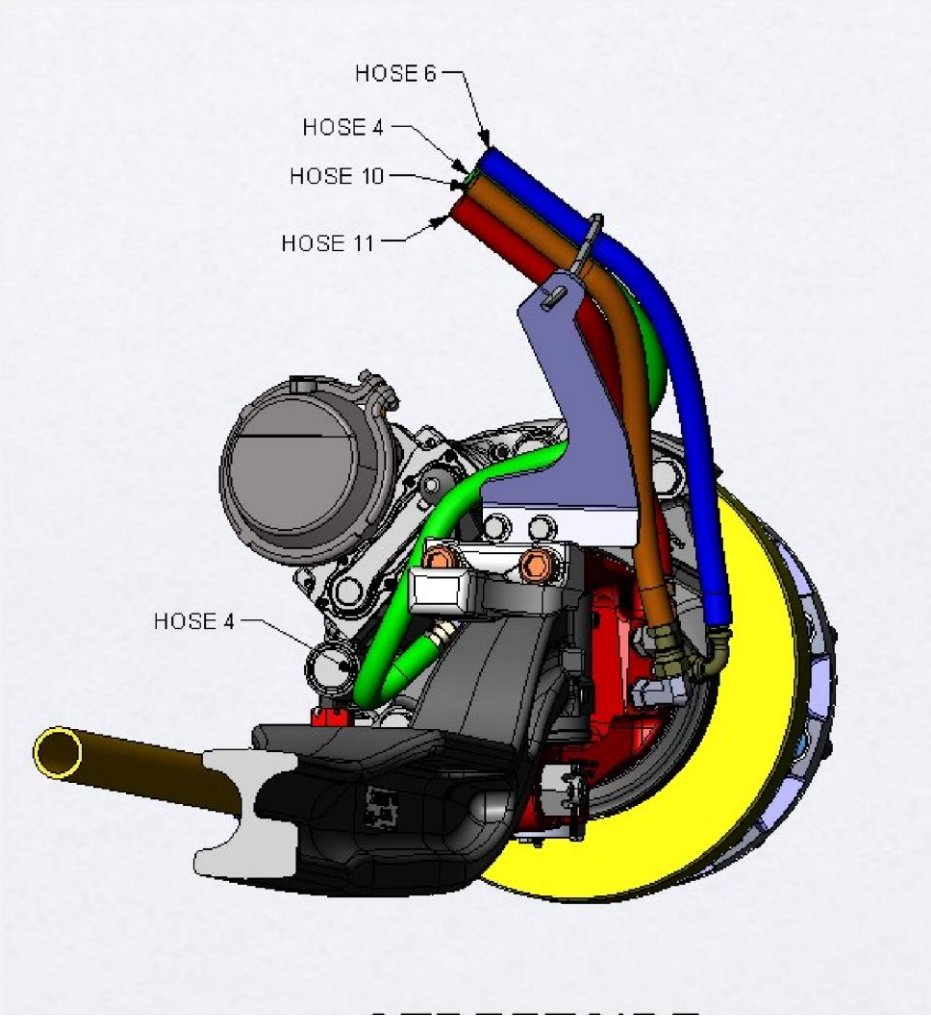
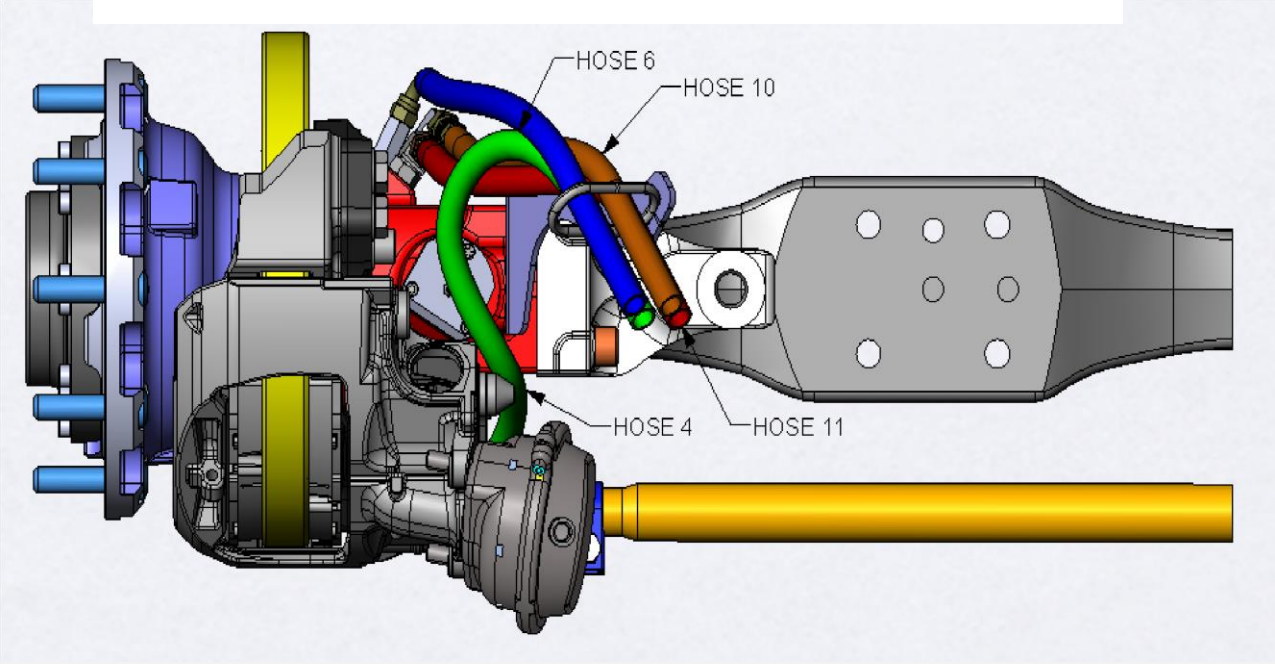


Figure 8.8 AXLE HOSES, DISC BRAKE (STREETSIDE VIEW)



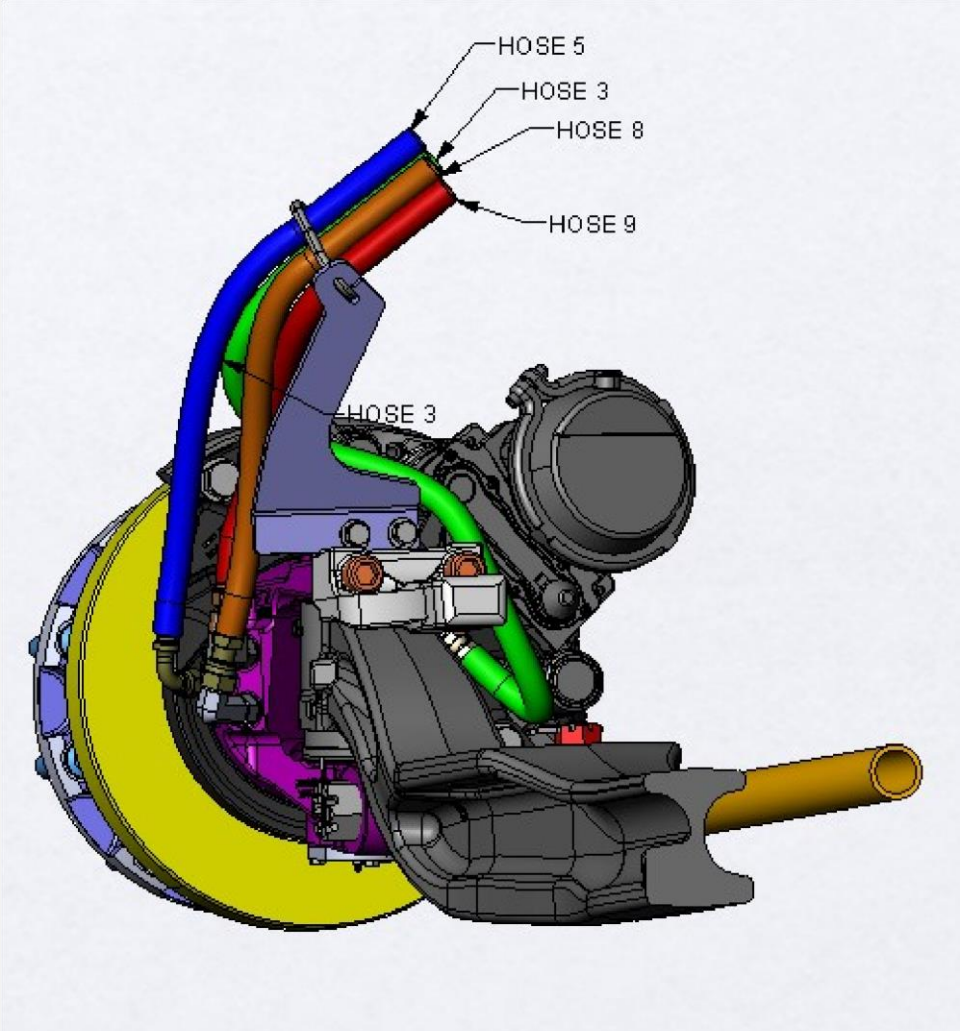
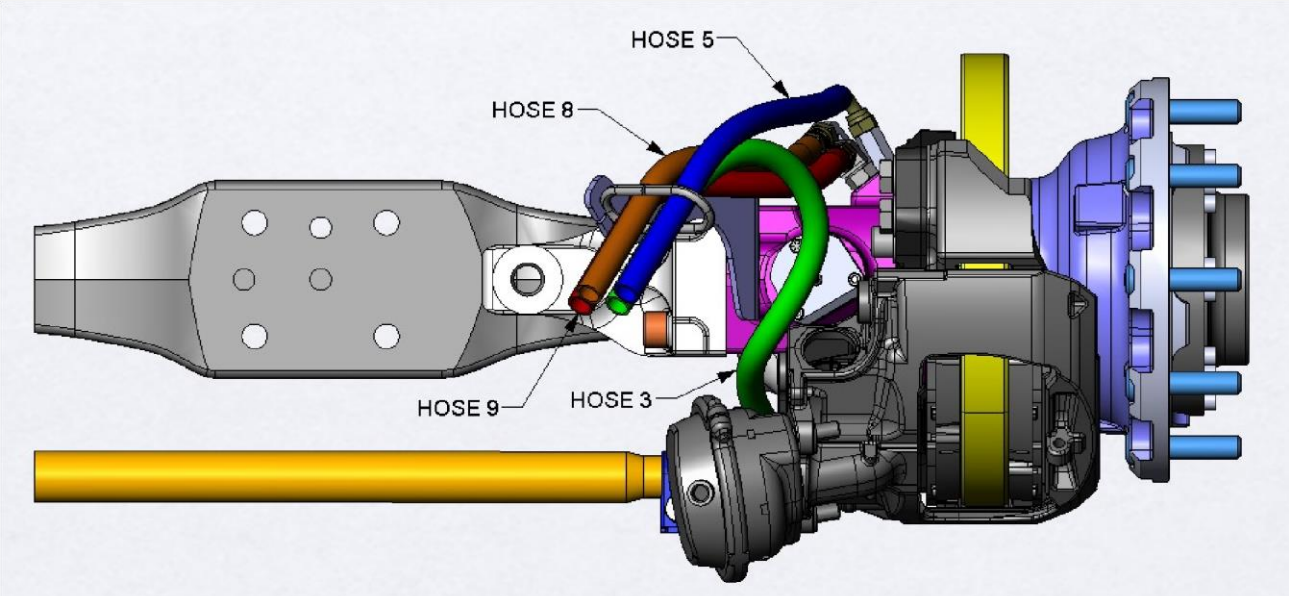
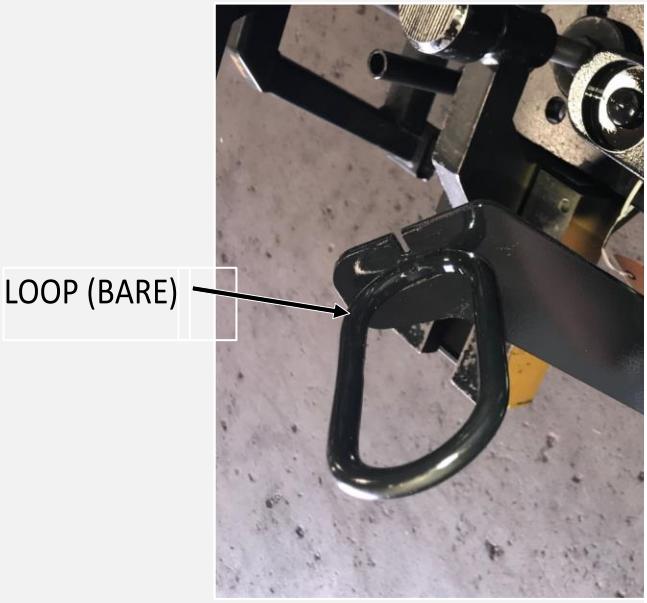


Figure 8.9 AXLE HOSES, DISC BRAKE (CURBSIDE VIEW) HOSE ROUTINGS Hose Routing at Knuckle





LOOP W/4 HOSES

NOTE: T port hose should route to the top of the knuckle and be captured via p-clamp on top of kingpin. All hoses meet on top before going through the hose ring.

After the hose loop, capture the hoses again before passing over or under the frame rail. Normal P clamps will not survive. Steel brackets are needed. Extra Rings are provided in kit.

Figure 8.10 Hose Guide

All hoses need to pass through the Hose Ring on the Axle. Make a loop after going through the top to allow for movement during steering.

Figure 8.11 Hose Guide with Hoses

9 Start-up Procedure (In Hub Charge Pump)

9.0 Start-Up Procedure

- At this point you should have all the EZ Trac components installed. Double check that all hardware is torqued to the required specification and all electrical connections are secured.

- You should also have verified the truck specifications match those in the configuration sheet.

- Print out the startup procedure and use for each use. You can print out copies of the checklists which start in Section 11. You should print this out for each installation to ensure each task is being done.

- If this is your first time completing a startup, make sure you have installed the software included in the software kit on USB **9076000**. To proceed you should have connected your laptop to a truck and verified communication. If you need cables, please order **9084101**.

HYDRAULIC OIL REQUIREMENTS

Use of hydraulic fluid defined by the ISO 12380 and ISO 6743-4 standards is recommended.

For temperate climates, HV 46 or HV 68 is recommended.

These specifications correspond to category 91H of the CETOP standard, parts 1, 2, and 3 of the DIN 51524, and grades VG32, VG46, and VG68 of the ISO 6743-4.

Standardized Fluid Designation:
HV: HM mineral fluids providing improved temperature and viscosity properties (DIN 51524 part 3)
Class 32 (ISO VG 32): Viscosity of 32 cSt at 40°C
Class 46 (ISO VG 46): Viscosity of 46 cSt at 40°C
Class 68 (ISO VG 68): Viscosity of 68 cSt at 40°C

The oil viscosity must **always** be between 9 and 500 cst..
The maximum operating temperature of the oil is 95°C (203°F) and is controlled by a temperature sensor.
The following table provides a list of oils that meet the required specifications. Other brands with equivalent specifications may also be used.
Note: For continuous operation in cold climates (below 32°F) the ISO 32 viscosity grade of the above oils may be used. In the case of extreme cold climates (below 0°F), Shell Tellus* Oils TX in ISO viscosity grade 22 have been used.

Oil Cleanliness
The hydraulic fluid must meet a cleanliness level code of 22/18/13 or better per the ISO 4406 standard.

EZ Trac Oil Fill-Up:

Inspect all hydraulic hoses to ensure they are sized and rated according to the hydraulic schematic and routed and secured away from moving parts, high temperature components, and electrical connections.

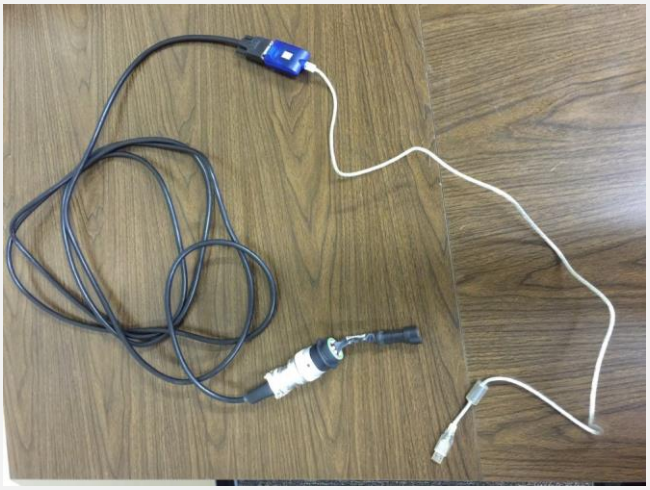
CAUTION
Do not overfill the reservoir. Overfilling may lead to hydraulic fluid loss if operating on slopes greater than 12 deg. (24% grade) The full level mark is located next to the oil sight gauge on the fan inlet side of the Cooler.

Action Item	**Necessary Outcome**	☑
Add Oil to Hydraulic Reservoir	**Fill 3/4 up into sight glass**	
Fill Case drain of Primary Pump	Fill <30 mins before startup	
Check entire EZ Trac system for leaks	No hydraulic oil leaks	
Find Diagnostic Port on Reservoir	Connect Phases Cable	

Laptop Connection

If this is the first time you are connecting your laptop, please see Phases Technician Manual D711066.

Connect laptop computer with PHASES software to EZ Trac communication port using the diagnostic cable 9084101.



Action Item	☑
Confirm connection between laptop and controller*	

Figure 9.1 Laptop Connector Cables

Figure 9.2 Phases Screenshot

*See Figure 9.2: Laptop is connected properly if Phases displays "Reading Values from SmartDrive" when the truck ignition is switched ON (engine remains OFF).

If controller shows the screen below Figure 9.3, it is not loaded with proper software. Please contact EZ Trac service.

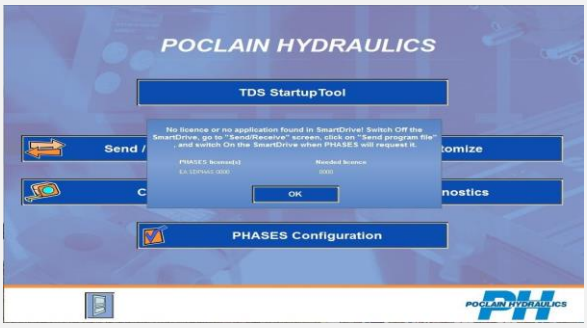


Figure 9.3

Controller Input Checks:

1. Switch truck ignition ON (engine remains OFF).
2. Read the following values from the Phases—Diagnostics—Input/Output screen.

Action Item	Necessary Outcome	☑
Hold EZ Trac ON/OFF switch	Switch On = **1**	
Release EZ Trac ON/OFF switch	Switch Off = **0**	
Check reservoir oil level switch	Full Oil = **1**	
Check battery voltage input	**12.0** +/- 3.0 V	
Check high pressure forward sensor	**0.5** +/- 0.05 V	
Check high pressure reverse sensor	**0.5** +/- 0.05 V	

Check temperature sensor	**Around 1.9V @80F**	
Check pump feedback	**2.5** +/- 0.10 V	
Check 12V sensor power supply	**12.0** +/- 0.60 V	
Check 5V sensor power supply	**5.0** +/- 0.25 V	

CAN Communication

1. Verify Braking status for Service and Park Brake are active. Phases—Diagnostics—Display
2. Verify that allowable gear is selected in Phases.

Action Item	Necessary Outcome	☑	Notes
Check brake status with only park brake applied	Braking Activated = 1		
Check brake status with park brake and service brake applied	Braking Activated = 1		
Check brake status with neither brake applied	Braking Activated = 0		
Check brake status with only service brake applied	Braking Activated = 1		

Truck Specific Parameters

1. Verify the following parameters are correct in the Program. Phases—Customize
2. Verify that allowable gear is selected in Phases.
3. Verify that min and max engine rpm are selected.

Action Item	Necessary Outcome	Value	☑
Front Tire Radius (See Table 9.1)	Truck matches phases		
Rear Tire Radius (See Table 9.1)	Truck matches phases		
Differential Ratio	Truck matches phases		
PTO Ratio (See Table 9.2)	Match for Transmission		
Motor Displacement (See Table 9.3)	Match for Axle #		

Tire Size versus Radius (Metric) and PTO Charts

Table 9.1 Tire Radius

Tire	Cir
9R22.5	2.97
10R22.5	3.12
11R24.5	3.40
11R22.5	3.24
12R24.5	3.49
12R22.5	3.33
13R22.5	3.44
18R22.5	3.53
235/80R22.5	2.90
245/75R22.5	2.87
255/70R22.5	2.88
255/80R22.5	2.99
265/75R22.5	2.98
275/80R24.5	3.26
275/70R22.5	2.95
275/80R22.5	3.16
285/75R24.5	3.20
295/75R22.5	3.11
295/60R22.5	2.83
295/80R22.5	3.21
305/75R24.5	3.36
305/70R22.5	3.06
305/85R22.5	3.34
315/80R22.5	3.32
365/70R22.5	3.28
385/65R22.5	3.28
425/65R22.5	3.46
445/50R22.5	3.12
445/65R22.5	3.54
455/55R22.5	3.24
Bridgestone M860 315/80R22.5	3.31

Table 9.2 PTO Ratio (Engine Speed / Pump Speed Coefficient)

TDS #	Chelsea #	3000 /3500	4000 /4500 /4700
709375-13	870XEFJP-B5XV	1.13	
709375-14	870XEFJP-B3XV	1.13	
709375-15	870XFFJP-B5XV	1.28	
709375-16	870XFFJP-B3XV	1.28	
709375-17	870XGFJP-B5XV	1.45	
709375-18	870XGFJP-B3XV	1.45	
709375-19	870XDFJP-B5XV	.99	1.42
709375-20	870XDFJP-B3XV	.99	1.42
709375-23	870XBFJP-B5XV		1.24
709375-24	870XBFJP-B3XV		1.24
709375-25	870XCFJP-B5XV		1.33
709375-26	870XCFJP-B3XV		1.33
Note: B5XV is Street Side, B3XV is Curb Side			

Table 9.3 Motor Displacement

Axle Part number versus motor displacement lookup

ZDD20264**64**2

Product Selector	Phases Value
38	623
45	737
51	836
57	934
64	1049
70	1147
76	1245
83	1360

CAN Address Verification Under Display Option:

If no display select 0, if using a display select 1

Under J1939 Source Address…

- of engine ECU select 0 as default (Contact EZ Trac if other)
- of gearbox ECU select 3 as default
- of Parking Brake Signal (Cruise CCVS) See Below
- of Service Brake Signal (Cruise CCVS) See Below
- of Parking Brake Signal (EBC1 ABS) See Below
- of Service Brake Signal (EBC1 ABS) See Below

Typical addresses for signals are: 0, 3, 11, 17, 21, 33, 49.

Each truck manufacturer is different. Below, Table 9.4 CAN Addresses, are the addresses we have seen for each as the default you should try. If you get a CAN Fault, try correcting one at a time until you find it.

SPECIAL NOTE: YOU MUST TURN OFF THE TRUCK AND RESTART PHASES EACH TIME YOU CHANGE A CAN ADDRESS TO VALIDAET THE CHANGE!

Table 9.4 CAN Address

	Kenworth	Peterbilt	Freightliner	International	Western Star	Mack	Ford	Hino
Parking Brake Signal (Cruise CCVS)	49,33	0,33	0,33,11	0,11,33	49	17	11	33
Service Brake Signal (Cruise CCVS)	49,33	0,33	0,23,33	0,11,33	49	17	11	33
Parking Brake Signal (EBC1 ABS)	49	3,49	49,33	0,33	49,11	11	0	0,11
Service Brake Signal (EBC1 ABS)	49	3,49	49,33	0,33	49,11	11	0	0,11

In Park Brake Information type, you can choose 0-CCVS, 1-EBC1, 2-Digital CCVS is usually the best.

In Service Brake information type, you can choose 0-EBC1, 1-CCVS, 2-Digital CCVS is usually the best.

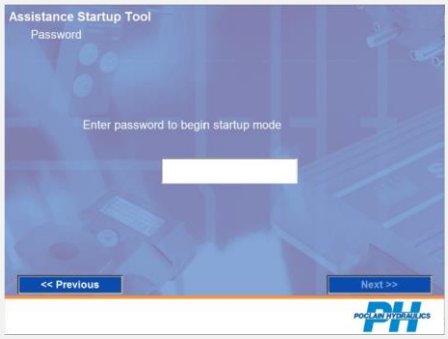
This list is not meant to be a sole resource as manufacturers can change addresses at any time.

Front Axle Start-Up Preparations:

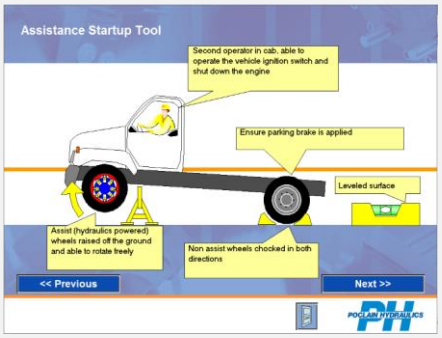
1. Apply the park brake and block the rear tires in both directions to prevent the vehicle from rolling.
2. Raise the front of the vehicle until the front tires are lifted off the ground.
3. Use jack stands to support the vehicle.
4. Make sure all front tires are completely off the ground.

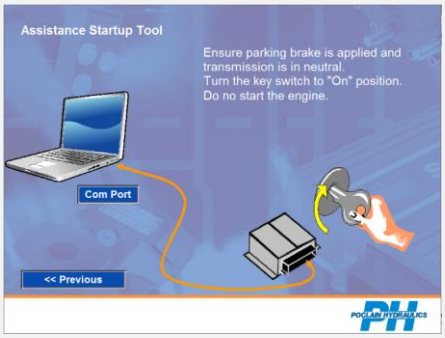
EZ Trac Startup Tool Instructions:

1. Turn truck ignition OFF.
2. Open Phases on laptop.
3. Click on TDS Startup Tool.
4. Click Next and enter the password “ez2start”.



5. Read through screens and follow the instructions.

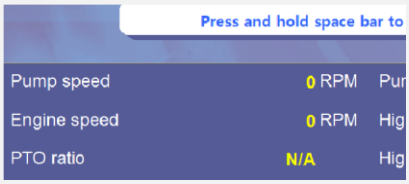




6. Assistance Startup Tool Menu is displayed. *Start engine within 10 seconds or restart start-up procedure.

Phases Startup Checks:

1. Ensure that the engine RPM display on the laptop screen shows the correct information. If so, Phases startup has successfully connected to the smart drive.



2. Use the TDS Startup Tool to perform the following checks. (To engage, press and hold space bar, and disengage, release space bar).

Prime Primary Pump Charge Pump:

- Use the TDS Startup Tool to perform the following checks. (To engage, press and hold space bar, and disengage, release space bar).
    1. Start truck.
    2. Spin left and right EZ Trac tires by hand. The wheels should turn freely.
    3. Select ZP1, ZP2, ZP3 and PTO.
    4. Engage by holding down on space bar.
    5. Turn on PTO for 3 seconds, turn off PTO, and wait for driveshaft to stop turning.
    6. Repeat steps 3 and 4 until **32bar** is read on the High-Pressure area of the display.
    (Pumps come pre-set to 32bar +/- 1 bar. Contact TDS if set to other pressure.)

Action Item	Necessary Outcome	☑
Spin Left and Right tires with engine ON EZ Trac OFF	Wheels spin freely.	
Spin Left and Right tires with engine ON and ZP1, ZP2, ZP3 and PTO ON	Wheels do not spin once charge pressure builds up.	
Confirm Charge Pressure	32 bar pressure at primary pump port	
Check entire EZ Trac system for leaks	No hydraulic oil leaks	
Add hydraulic oil to refill reservoir	Oil level fills up at least ¾ of the sight glass	

Turn EZ Trac Wheels:

1. Select ZP1, ZP2, ZP3, PTO, and Pump Fwd. (0).
2. Engage by holding down on space bar.
3. Allow the wheels to turn for 1 minute.
4. Release space bar to disengage.
5. Change the direction to reverse (9).
6. Engage by holding down on space bar for 1 minute.
7. Release space bar to disengage.
8. Repeat steps 1 through 6 three times.

Action Item	Necessary Outcome	☑
Turn ON EZ Trac with direction set to (0)	Wheels rotate forward	
Turn ON EZ Trac with direction set to (9)	Wheels rotate backwards	
Check PTO ratio shown in Startup tool matches product selector. (+/- .05)	PTO Ratio Matches	
High pressure is higher than High pressure return while spinning tires	Hoses and PSI sensors are installed correctly	
Engine RPM Matches Truck Tachometer	Engine CAN is correct	

Relief Pressure Test:

⚠ **WARNING: This Procedure builds full hydraulic pressure on the system components.**

1. Select ZP1, ZP2, ZP3, PTO, and Pump Fwd. (0).

2. Engage by holding down on space bar.
3. Apply the service brakes until the front wheels stop turning.
4. Hold service brake for 5 seconds; system will build full hydraulic pressure. 5. Verify full relief setting is achieved. (Normally 420 bar)
6. Release service brake.
7. Release space bar to disengage. 8. Repeat in Rev (9)

9. Exit out of TDS Startup Tool.

Action Item	☑
Complete Relief Pressure Test	
Check and fix system leaks or drips	
Add hydraulic oil to reservoir	

NOTICE!

Before the test drive, ensure the steering stops are set and that tires do not rub on hoses or chassis components.

It is the responsibility of the installer to have the truck aligned, steering stops set, and steering poppets set before delivery to the end user! Failure to do so may result in equipment damage and warranty denial!

Post Start-Up Procedure Inspection

1. Lower vehicle to the ground.
2. Complete pre-trip walk around to make sure all wires, hoses and other items are secured and safe.
3. Open PHASES on laptop.
4. Turn ON truck and read the following values from the **Phases – Diagnostics – Display** screen.

ABS Electronic Interference Test:

Complete check-out procedure for chassis equipped with an antilock brake system (ABS). This test should include operating any added circuits under the following test conditions:

- Engine running and brake air system pressure within operating range.
- Chassis stationary.
- Brake pedal pressed and held for a full application pressure.
- Operate added electrical equipment in all starting, running and shutdown modes. Listen for any air exhausting from the ABS modulator valves. If air exhausts from the controllers, this indicates an interference condition which must be corrected before the chassis is released for highway use.

Driving Tests:

1. Prepare the truck for driving.

   Note: The driving tests require two people; one person to operate the vehicle and one person to monitor Phases on a laptop computer.

1. Complete the following Tests while monitoring the **Phases – Diagnostics – Errors and Phases – Diagnostics – Display** screens on the laptop.

10 Troubleshoot Guide

10.0 Troubleshooting Guide

Sections:

1. Cannot Connect Laptop	5. Drive Test Issues
2. Start-Up Tool Issues	6. Error Codes
3. Inputs/Outputs Issues	7. FAQ
4. CAN Issues	

10.1. Cannot Connect Laptop

	Issue	Suggestion
A	Does ECU have Power?	Check fuses, battery connections and 42 pin connector
B	Is cable plugged in?	Check USB cable from laptop is plugged into ECU Diagnostic Plug
C	Is this the first time?	Go through the Phases Technician Manual to set up the computer

10.2. Startup Tool Issues

	Issue	Suggestion
A	PTO Ratio is not within 5%	Verify Transmission Model and PTO in Figure 7.1 match shipment
B	No Pump RPM	Check pump rpm sensor and wiring for damage and continuity
C	No Engine RPM	Verify there are no CAN errors regarding Engine ECU
D	High Pressure Return goes higher	Check that FWD sensor wire is on MA Sensor or E below
E	Wheels turn Backward	Check that hoses from A & B on pump match that on valve
F	PTO will not turn	Verify Hydraulic line from Transmission to PTO is connected as well as wire harness is plugged into PTO Solenoid.
G	Pressure never came up to 32 Bar or Relief pressure too low	If pressure is zero, then verify the PTO and pump shaft are turning. If pressure is low (20 bar) increase charge pressure to 32. If relief pressure is too low, increase after contacting EZ-TRAC service.

10.3. Input/Output Issues

	Issue	Suggestion
A	Switch Does not go to 1 when depressed	Verify connections on switch and made. Check harness
B	Oil Level does not go to 1 when full	Check switch wiring, arrow is up on level switch.
C	Battery Voltage outside 12V +/- 3v	Make sure system is a 12-volt system and battery is charged
D	Forward PSI Sensor is not near .5v	If near 0v measure power, if near 5v make sure it is not shorted
E	Reverse PSI Sensor is not near .5v	If near 0v measure power, if near 5v make sure it is not shorted
F	Temp Sensor is near 0v or 5v	Make sure there is 5 volts on power pin and Ground on Ground pin
G	Pump Feedback Sensor not near 2.5V	If open or shorted check wiring harness
H	Power Supplies are not near 12 & 5V	Verify controller has at least 12volts and a proper ground

10.4. CAN Issues

	Issue	Suggestion
A	CAN Error Signals	Make sure CAN wires in cab match truck specific locations
B	Engine ECU Error	Make sure ECU parameter is set to 0 for Engine
C	Transmission ECU Error	Make sure ECU parameter is set to 3 for Gearbox
D	Service Brake Error	See chart (Page 69) for Specific model and set Service Brake selection to CCVS
E	Park Brake Error	See chart (Page 69) for Specific model and set Park Brake selection to CCVS
		If you still have troubles, run a CAN trace on J1939 and contact EZ-TRAC

10.5. Drive Test Issues

	Issue	Suggestion
A	Truck Faults out after about 5 seconds	Make sure Startup Tool and air is purged properly. Turn off truck and try 3-5 more times. If it continues Run Startup tool again and validate settings. Check oil level. Check pressure sensor resting voltage in Phases
B	Brake Status does not change	Change Park brake to digital and test Service brake only. Then Change service brake to digital and test park brake only. Change CAN address until you get both signals.
C	Gear Selected does not change	Make sure you have no CAN Errors
D	Theoretical Rear Wheel speed is off	Make sure you put in the correct Tire size and differential ratio
E	System does not achieve assist pressure	Make sure parameters are set for correct PTO and Motor sizes
F	System shifts violently	Though the shift is aggressive if High pressure is higher than High pressure return it should be ok.
G	Truck Faults out in sharp turns	Make sure all parameters are correct and speed calculations done by EZ-TRAC are correct. Watch pump displacement percent while in full turn. If it hits 100% and High pressure drops down below 80 bar with foot off the brake, contact EZ-TRAC
H	Error Codes are Displayed	Clear error codes and drive again to see if you generate current errors. Look up error codes in section IV

10.6. Error Codes

Code	Error (**BOLD** most common)	Suggestion
1	Low Battery Voltage	Charge batteries and verify voltage matches Input Screen
2	High Battery Voltage	Make sure batteries are hooked up properly in series or parallel

3	Low 12V Supply	Make sure controller has proper Battery voltage and Ground
4	High 12V Supply	Make sure controller has proper Battery voltage and Ground
5,6	5V Supply Error	Make sure controller has proper Battery voltage and Ground
12	Gnd Port	Make sure there is not a power connected to ground wire of ECU
74	**Pump Control Loop Error**	**Swashplate is moving in the opposite direction as expected pump command. S1 & S2 are normally backward. Could also be Pump Command Inversion is wrong.**
76	Pump Feedback Sensor	Make sure wires are not damaged on pump and that Input screen shows 2.5 volts when pump is in neutral
78	Pump Drift Error	Pump does not react in a predicable way. Uncommon
83	**CAN Communication Error**	**Any error with CAN will trigger this message. (Look for other error)**
84,90	Forward Direction Pressure Sensor Error	Sensor is out of range when in use
84,90	Reverse Direction Pressure Sensor Error	Sensor is out of range when in use
86	Pump Solenoid S1 Disconnection	Wiring to DIN connector is likely loose in S1 connector
87	Pump Solenoid S2 Disconnection	Wiring to DIN connector is likely loose in S2 connector
98	Temperature Sensor Out of Range	Normally an open circuit or short in sensor
99	Swashplate Position Error	Sensor is giving voltage feedback out of range. Likely wiring is damaged or 5V sensor issue
102	Over Temperature	System has run too hot
112	Pump Speed Sensor Error	Pump sensor is out of range with engine rpm. Wrong PTO ratio, damaged sensor, damaged pump tone ring or pump coupling
113	**PTO Clutch Activation Error**	**PTO is activated when ECU is not driving. This happens if Piggyback pump turns on PTO when EZ TRAC is not running**
114	**CAN Communication Error with ABS ECU**	**J1939 CAN address is wrong or not broadcast on ABS ECU**
115	**CAN Communication Error with Engine ECU**	**Normally J1939 wires are not hooked up or hooked up wrong**
116	**CAN Communication Error with Gearbox ECU**	
117	Pump Turning with PTO Off	If used with Piggyback Pump this is normal

121	VS3 Activation Error	Low Charge Pressure. Likely a faulty pressure sensor. Check pressures on Startup Tool
125	**CAN Communication Error With CCVS**	**J1939 CAN Address is wrong or not broadcast on one of the Brake Signals** D711061
128	**Pressure Not Achievable**	**Normally at installation and first startup if there is air in the lines this could occur. Turn off engine and try again. Also check Machine Calculations if pump is near 100% displacement after full startup test**
129	Oil Level Too Low	Verify oil in reservoir and connection of level switch wires
157	Charge Pressure too high	If pressure in HPMB1 is higher than charge pressure. Normally pressure sensors are backward on valve
197	Error on machine configuration	One of the parameters is out of range. Make sure proper program and parameter file is loaded.
218	Error ON the Output Shaft Speed Sensor	Check sensor voltage and for any damage to speed sensor

10.7. FAQ

	Statement	Suggestion
A	Can I drive the truck with just the axle installed?	Only to move around parking lot at speeds less than 5mph. Please contact EZ-TRAC for any questions.
B	When I turn on the PTO to run my other device the EZ-TRAC light blinks slowly.	This is a warning that the EZ-TRAC pump is turning but is not being commanded by the EZ-TRAC ECU. It's normal when using a piggy-back pump and not an issue.
C	When I turn on the Key, the EZ-TRAC Light blinks slowly.	This means there is some sort of error. If you have a dash display it will show you the warning. This could include Low oil or if the truck was recently service a CAN wire may have been disconnected
D	The EZ-TRAC system does not come back on when the truck goes back into 1st gear.	The EZ-TRAC system will automatically disengage above 1st gear and remain "Armed" until it hits a pre-set speed. Once it hits that speed (Normally 25mph) it will turn off and the system needs to be turned back on by the operator once the system is slow enough to be engaged.
E	I can't get the EZ-TRAC system to come on.	To first enable the system the truck must be in 1st or Rev gear, Park Brake off and foot entirely off the brake.
F	When can I turn the system on?	You can push the button at any time. The electronics will only allow the system to come on in allowable gears. You don't have to stop the truck to engage.
G	Can I use the EZ-TRAC system with my winch?	You can run the EZ-TRAC system at any time. If the winch package has been enabled to operate with the Park Brake off, you can run both.
H	PTO seems to be noisy.	When the PTO is on and the pump is not under much load it can seem noisy. This is ok and not an issue for the PTO. If you drive and the noise does not lessen with higher loads, please check for loose bolts or driveline issues.
I	My reservoir is low, what type of oil should I use?	Please check to see if there is a sticker on the reservoir. If no sticker is visible and you need to fill please see section 9.0 for hydraulic oil requirements.
J	I broke or damaged a part.	See Parts manual D711062 for a complete list of parts.
K	Is there anything special about the brakes?	We use standard Bendix Brakes for Drum and Disc. See parts manual D711062 for a list of each kit.
L	My ABS Sensor light is on.	If at first startup make sure the sensors are plugged in, pushed in fully and you drive the truck around for more than 15 minutes. Error should clear. If it does not have truck inspected by dealer

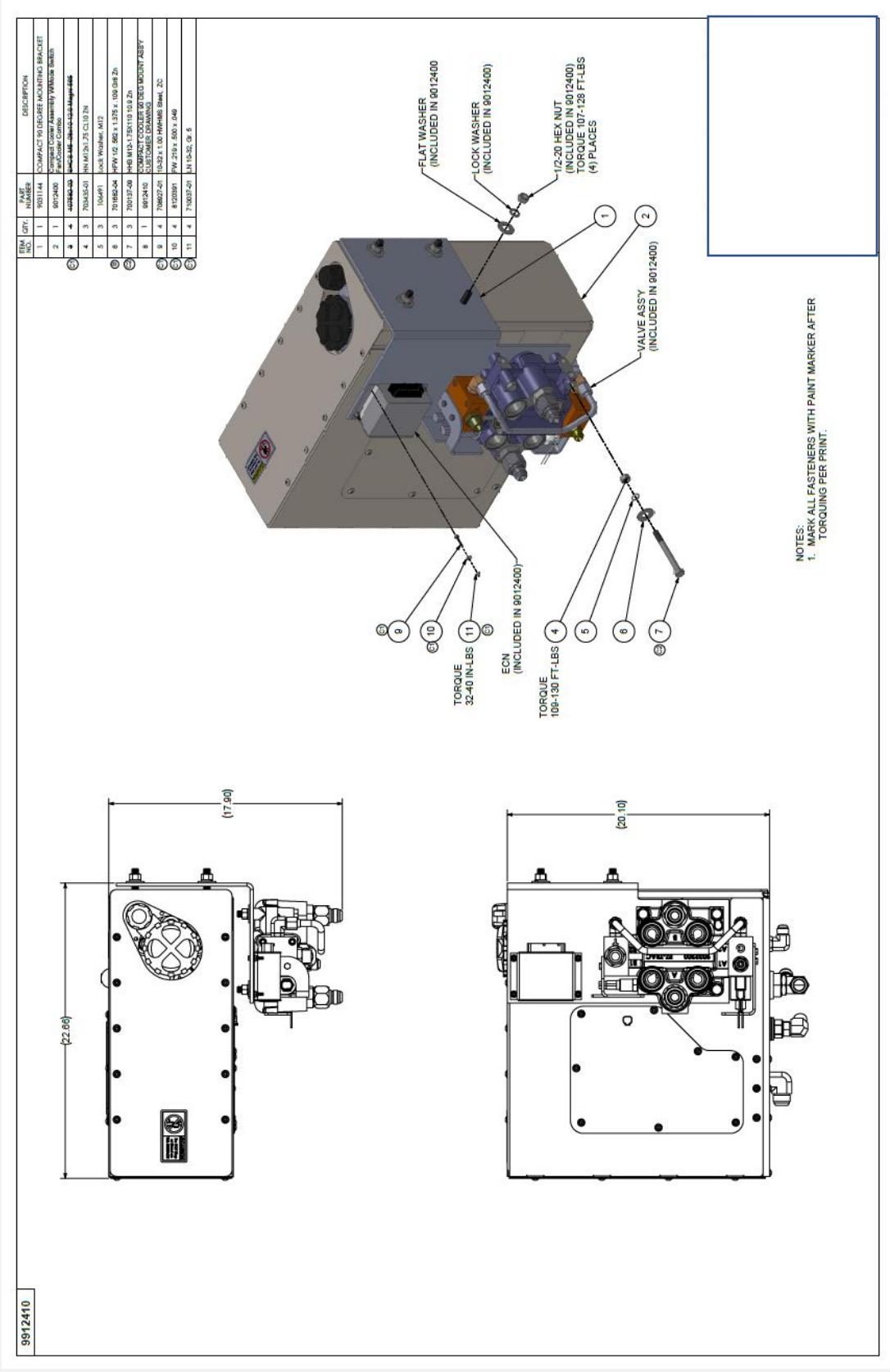
11 Appendix

11.0 As-Shipped Components

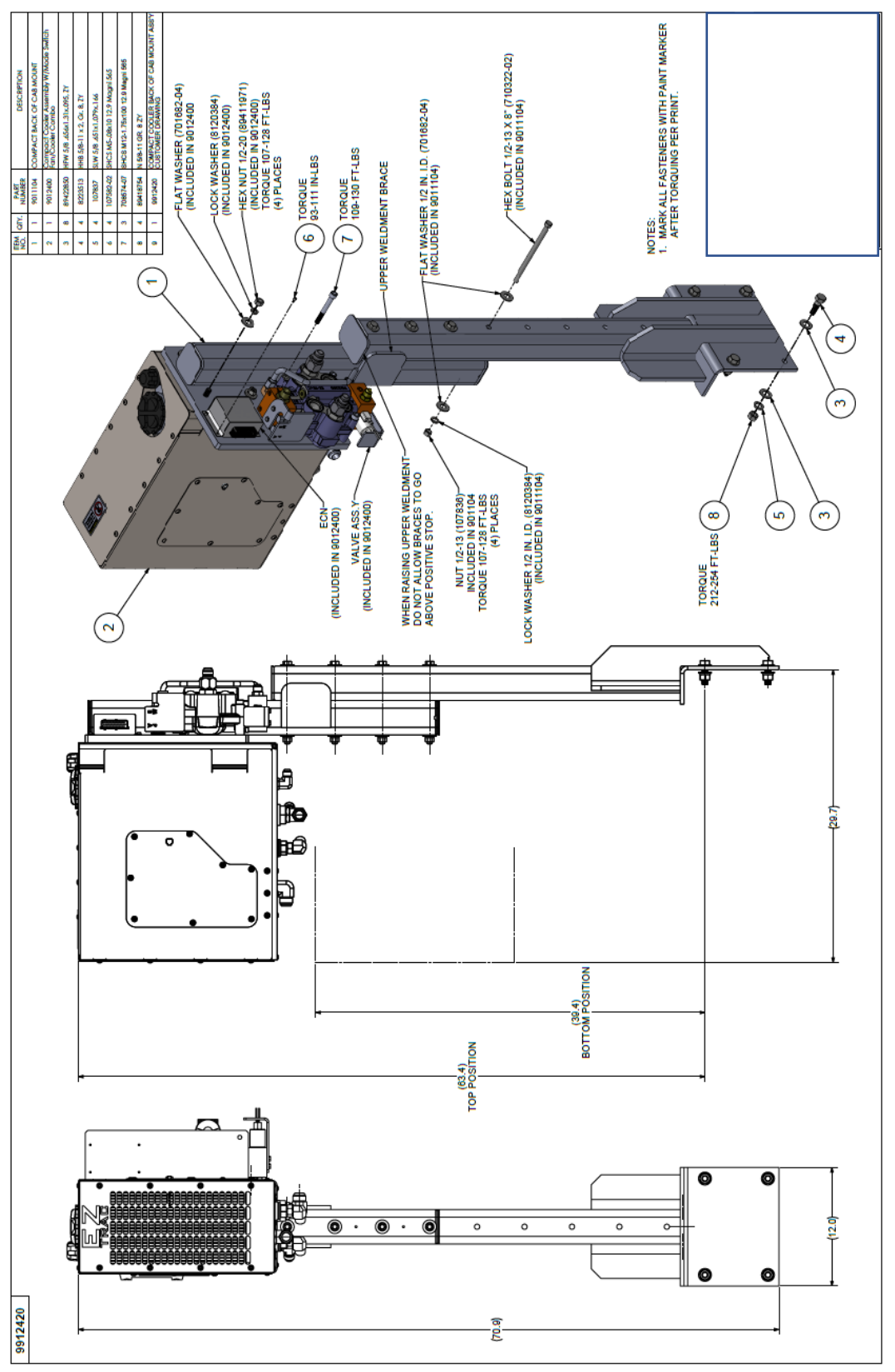
Each EZ Trac® shipment contains the following components:

- EZ Trac® Axle Assembly
- Hydraulic Package Assembly
- Hydraulic Fitment Kit
- Primary Pump
- Primary Pump PTO
- Universal Pump Mount Bracket
- Electrical Kit
- Drive Line Kit
- Wheels
- Hose Kit (see Hose Worksheet in Hydraulic Plumbing section)

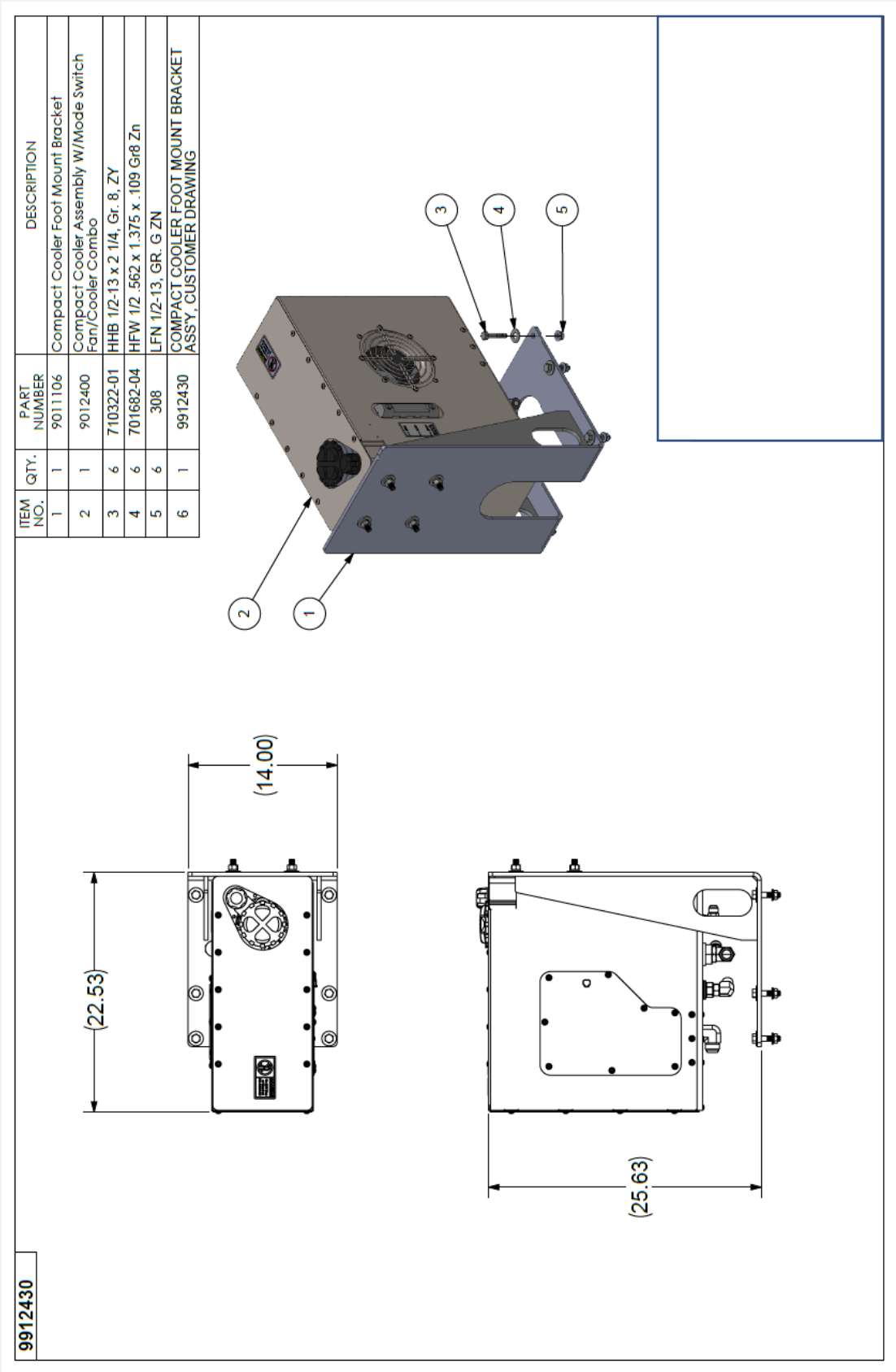
A. 90 DEGREE BRACKET COOLER/RESERVOIR (Optional)



B. ADJUSTABLE BACK OF CAB BRACKET (Optional)

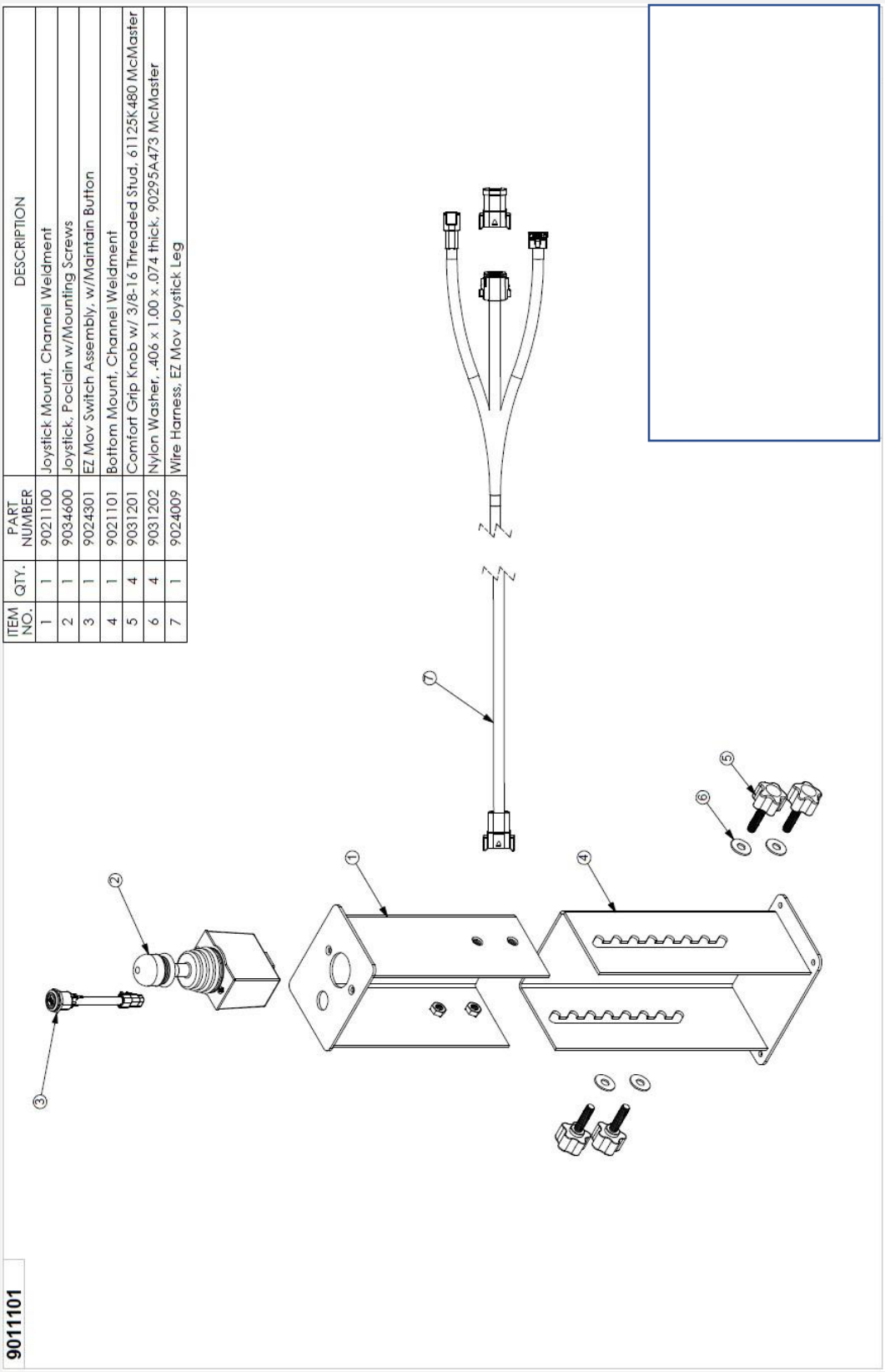


C. FOOT MOUNT BRACKET FOR COOLER/RESERVOIR (Optional)



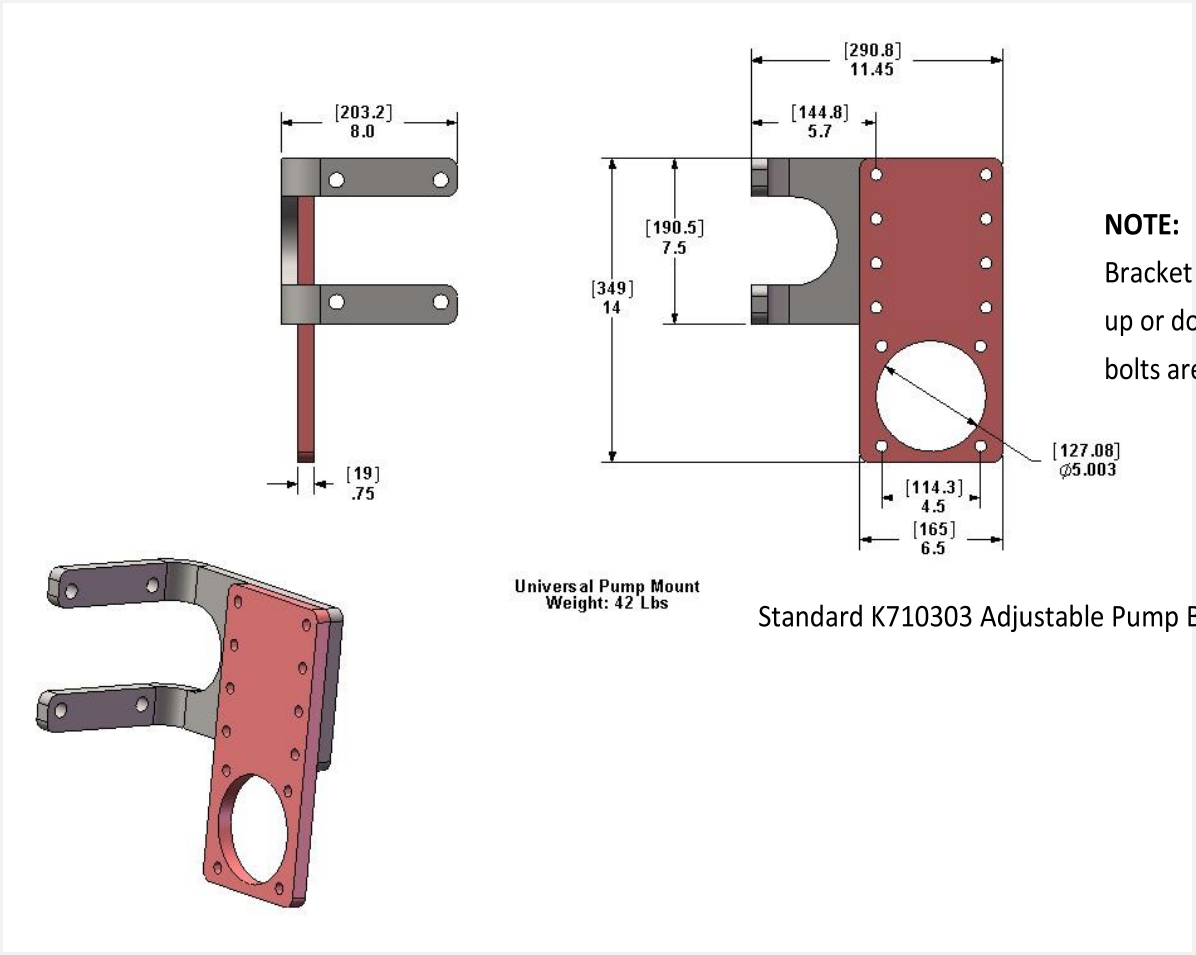
D. EZ-MOV PROPEL JOYSTICK ASSEMBLY (Optional)

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	9021100	Joystick Mount, Channel Weldment
2	1	9034600	Joystick, Poclain w/Mounting Screws
3	1	9024301	EZ Mov Switch Assembly, w/Maintain Button
4	1	9021101	Bottom Mount, Channel Weldment
5	4	9031201	Comfort Grip Knob w/ 3/8-16 Threaded Stud, 61125K480 McMaster
6	4	9031202	Nylon Washer, .406 x 1.00 x .074 thick, 90295A473 McMaster
7	1	9024009	Wire Harness, EZ Mov Joystick Leg



UNIVERSAL PUMP MOUNT

Confirm the specific bracket on the shipment checklist. Below is the standard Bracket as well as a couple other types of brackets that may come with a kit.



NOTE:
Bracket can be adjusted up or down as long as 4 bolts are used.

Standard K710303 Adjustable Pump Bracket

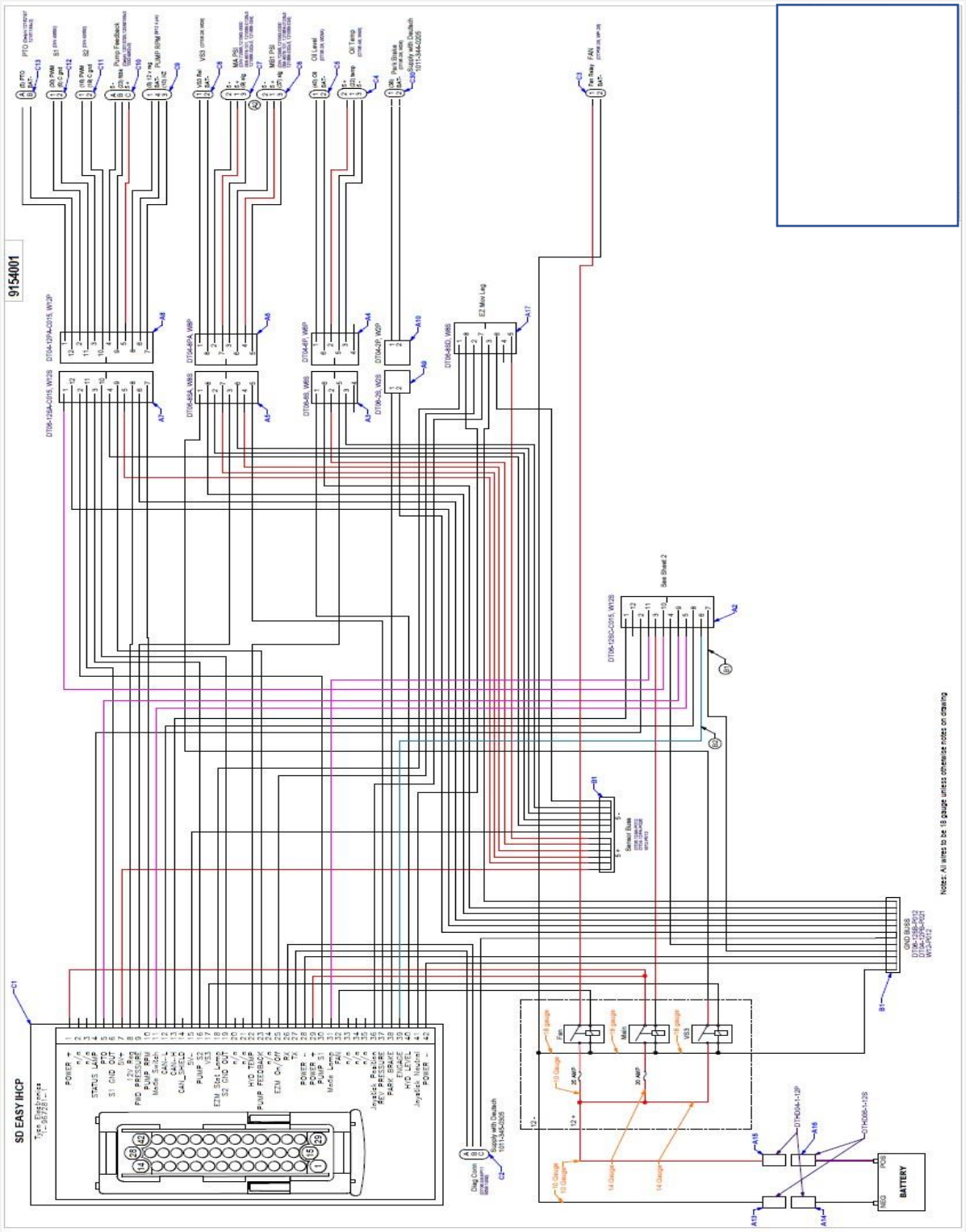
11.1 MILESTONES AND TASK LIST

STEP	DESCRIPTION	NOTES	DONE
A	**Installer Prep Tasks**		
	Set up Tire Company to put tires on new wheels		
	Set up supply for new U-Bolts		
	Set up location for Alignment (factory specs)		
	Set up Driveline Company to make driveshaft		
	Complete Pre-Install Checklist		
B	**Remove Axle**		
	Measure and order new U-bolts		
	Raise and Properly Support Truck		
	Disconnect Air Lines, Speed Sensors and Drag Link(s)		
	Safely remove old axle		
C	**Install EZ Trac® Axle**		
	Install and bolt EZ-TRAC axle in place		
	Install Drag Link(s) with no interference		
	With Tires on set axle stops for maximum turning		
	Install Brake Lines		
	Install Speed Sensors		
D	**Install Pump and PTO**		
	Install PTO		
	Drill Frame and Mount Pump Bracket Per OEM Guidelines		
	Mount Pump and Install Front Coupling		
	Measure Driveline and submit to Assembly and Balance Center		
	Install Driveshaft (U-Joints should be greased)		
E	**Install Reservoir and Valve Assembly**		
	Determine Location based on Project		

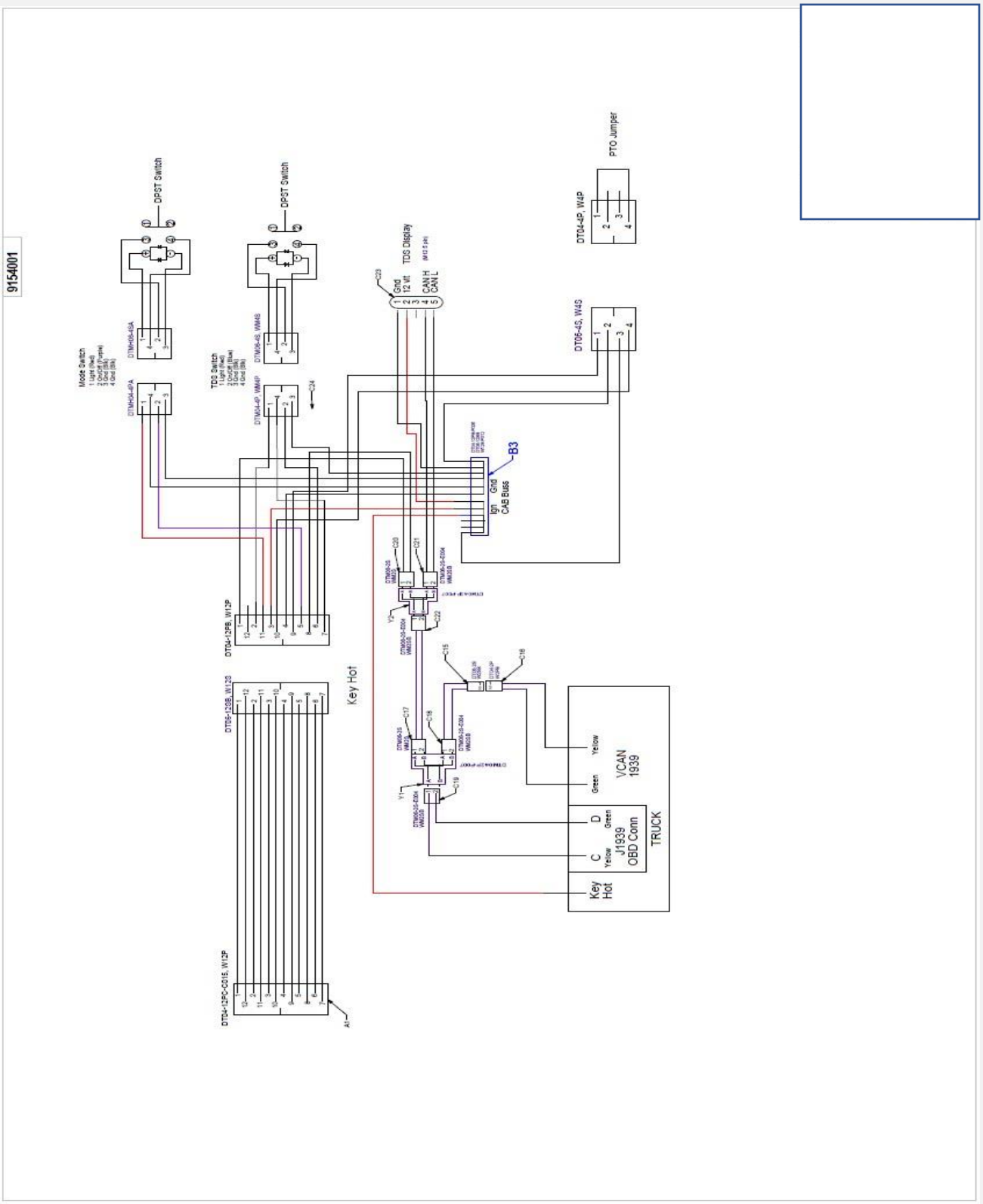
	Drill and Mount the Reservoir and Valve		
F	**Measure Hoses**		
	Measure Hoses for system		
	Submit Hoses in Product Selector & Confirm urgency with EZ-TRAC		

STEP	DESCRIPTION	NOTES	DONE
G	**Wiring Harness**		
	Install Wiring Harness		
H	**Install Hoses**		
	Install all Hoses (Mark when each it tightened)		
	Support and confirm proper routing		
I	**Communications and Electronics Check**		
	Verify Communication with ECU		
	Complete Pre-Drive Electronics Check (Sensors and CAN)		
J	**Start-Up and Drive Test**		
	Fill Reservoir and verify Pump Case Drain is full		
	Complete START UP PROCEDURE CHECK LIST		
K	**Complete Job**		
	Fill out completed job form and submit to TDS		

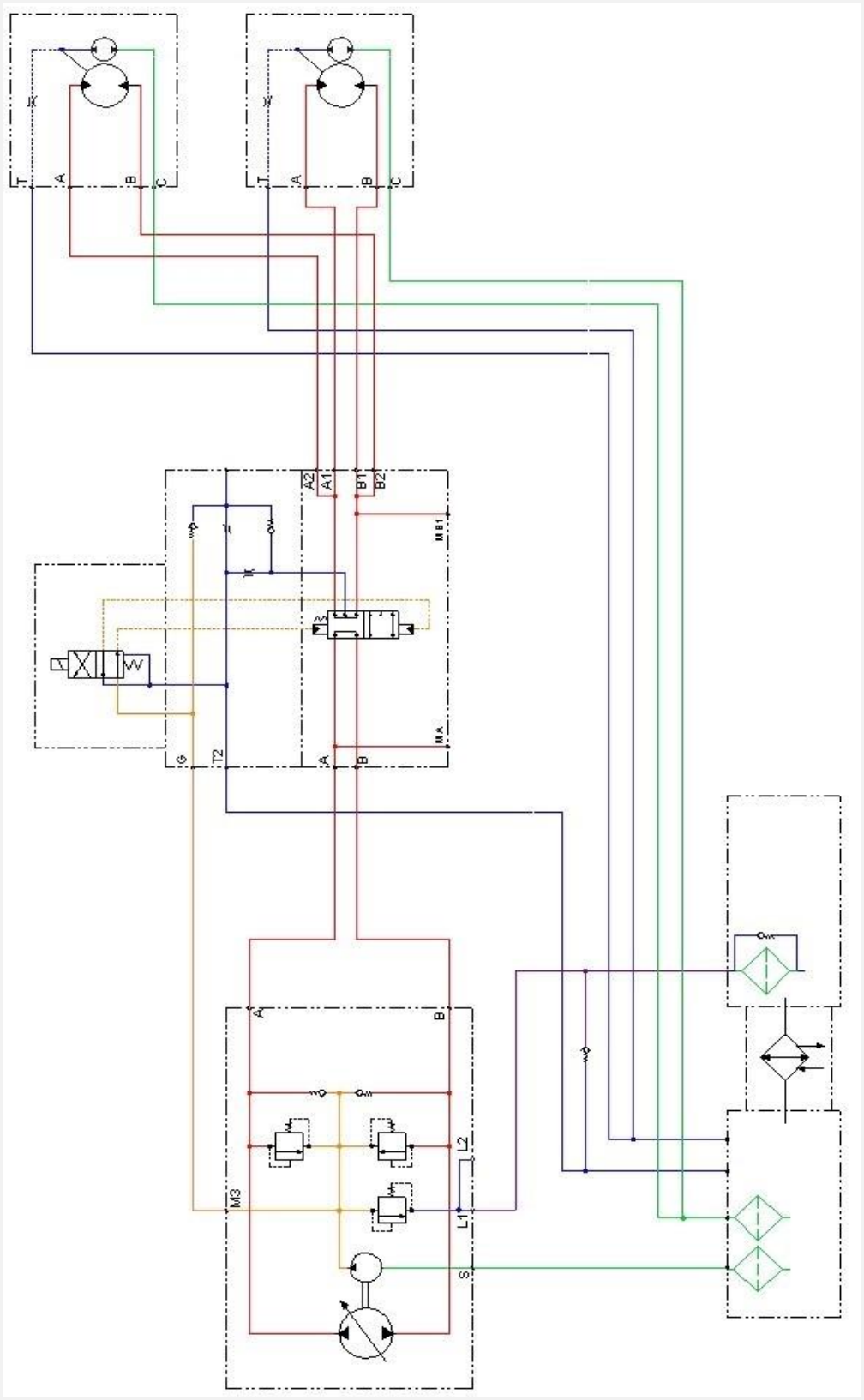
ELECTRICAL SCHEMATIC (Main)



ELECTRICAL SCHEMATIC (CAB Portion)



Hydraulic Schematic



TORQUE CHARTS

Hose Adapter Charts

TORQUE SPECIFICATIONS (FT.LBS.)			
SIZE	TORQUE	SIZE	TORQUE
04 ORS [1]	10-12	04 JIC [1]	10-13
06 ORS [1]	18-20	06 JIC [1]	18-21
08 ORS [1]	32-35	08 JIC [1]	37-42
10 ORS [1]	46-50	10 JIC [1]	52-62
12 ORS [1]	65-73	12 JIC [1]	79-87
16 ORS [1]	92-113	16 JIC [1]	108-113
02 ORB [2]	4-6	02 ORB [3]	4-6
04 ORB [2]	14-16	04 ORB [3]	13-15
06 ORB [2]	24-26	06 ORB [3]	21-24
08 ORB [2]	37-60	08 ORB [3]	37-43
10 ORB [2]	72-80	10 ORB [3]	43-52
12 ORB [2]	73-135	12 ORB [3]	68-83
16 ORB [2]	113-220	16 ORB [3]	112-123

1. to be used on female connections, like hose ends, tube nuts and *steel caps.
2. to be used in ORB applications in conjunction with ORS connections.
3. to be used in ORB applications in conjunction with JIC connections.

* Steel caps allowed to be tightened between 50-100% of tabulated value - does not require torque wrench, but must not leak.

TORQUE SPECIFICATIONS (Nm)			
SIZE	TORQUE	SIZE	TORQUE
04 ORS [1]	14-16	04 JIC [1]	14-18
06 ORS [1]	24-27	06 JIC [1]	24-29
08 ORS [1]	43-48	08 JIC [1]	50-57
10 ORS [1]	62-68	10 JIC [1]	71-84
12 ORS [1]	88-99	12 JIC [1]	107-118
16 ORS [1]	125-153	16 JIC [1]	146-153
02 ORB [2]	5-8	02 ORB [3]	5-8
04 ORB [2]	19-22	04 ORB [3]	18-20
06 ORB [2]	33-35	06 ORB [3]	28-33
08 ORB [2]	50-81	08 ORB [3]	50-58
10 ORB [2]	98-108	10 ORB [3]	58-71
12 ORB [2]	99-183	12 ORB [3]	92-113
16 ORB [2]	153-298	16 ORB [3]	152-167

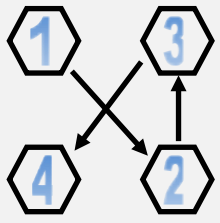
1. to be used on female connections, like hose ends, tube nuts and *steel caps.
2. to be used in ORB applications in conjunction with ORS connections.
3. to be used in ORB applications in conjunction with JIC connections.

* Steel caps allowed to be tightened between 50-100% of tabulated value - does not require torque wrench, but must not leak.

U BOLT TORQUE SPECS (GRADE 8)

DIA	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"	1"	1-1/8"	1-1/4"
TORQUE (FT LBS)	35	45	65	90	125	300	480	730	1300	1740

1. Lubricate threads and washers with oil or anti-seize compound 2. Tighten U-bolts until all nuts are “snug”
3. Tighten in sequence shown below.
4. Torque to 1/3rd final torque value
5. Repeat torque procedure to 2/3rds and finally the target torque value.



Re-torque U-bolts after 100-500 miles. Spring “Setting” may occur after driving for a period of time. Follow manufacturer guidelines for service after initial re-torque procedure.

ASTM A354-BD / SAE GRADE 5

Bolt Size	TPI	Proof Load (lbs.) [1]	Clamp Load (lbs.) [2]	Tightening Torque (ft lbs.)		
				Galv+Waxed	Galv	Plain
1/4	20	2700	2025	4	11	8
5/16	18	4450	3338	9	22	17
3/8	16	6600	4950	15	39	31
7/16	14	9050	6788	25	62	49
1/2	13	12050	9038	38	94	75
9/16	12	15450	11588	54	136	109
5/8	11	19200	14400	75	188	150
3/4	10	28400	21300	133	333	266
7/8	9	39250	29438	215	537	429
1	8	51500	38625	322	805	644
1 1/8	7	56450	42338	397	992	794
1 1/4	7	71700	53775	560	1400	1120
1 3/8	6	85450	64088	734	1836	1469
1 1/2	6	104000	78000	975	2438	1950
1 3/4	5	104500	78375	1143	2857	2286
2	4 1/2	137500	103125	1719	4297	3438
2 1/4	4 1/2	178750	134063	2514	6284	5027
2 1/2	4	220000	165000	3438	8594	6875
2 3/4	4	271150	203363	4660	11651	9321
3	4	328350	246263	6157	15391	12313

ASTM A354-BD / SAE GRADE 8

Bolt Size	TPI	Proof Load (lbs.) [1]	Clamp Load (lbs.) [2]	Tightening Torque (ft lbs.)	
				Lubricated	Plain
1/4	20	3800	2850	6	12
5/16	18	6300	4725	12	25
3/8	16	9300	6975	22	44
7/16	14	12750	9563	35	70
1/2	13	17050	12788	53	107
9/16	12	21850	16388	77	154
5/8	11	27100	20325	106	212
3/4	10	40100	30075	188	376
7/8	9	55450	41588	303	606
1	8	72700	54525	454	909
1 1/8	7	91550	68663	644	1287
1 1/4	7	120000	90000	938	1875
1 3/8	6	138600	103950	1191	2382
1 1/2	6	168600	126450	1581	3161
1 3/4	5	228000	171000	2494	4988
2	4 1/2	300000	225000	3750	7500
2 1/4	4 1/2	390000	292500	5484	10969
2 1/2	4	480000	360000	7500	15000
2 3/4	4	517650	388238	8897	17794
3	4	626850	470138	11753	23507
3 1/4	4	745500	559125	15143	30286
3 1/2	4	874650	655988	19133	38266
3 3/4	4	1014300	760725	23773	47545
4	4	1163400	872550	29085	58100

12 Truck Checklist

Print off for each truck.

Software Version B02683Q-E

VIN _____

JOB _____

Truck _____ of _____

Milestone	Description	Notes	Complete
1	**INSTALLER PREP TASKS**		
	Set up Tire Company to put tires on new wheels		
	Set up supply for new U-Bolts		
	Set up location for Alignment (factory specs)		
	Set up Driveline Company to make driveshaft		
	Complete Pre-Install Checklist		
2	**REMOVE AXLE**		
	Measure and order new U-bolts		
	Raise and Properly Support Truck		
	Disconnect Air Lines, Speed Sensors and Drag Link(s)		
	Safely remove old axle		
3	**INSTALL EZ-TRAC AXLE**		
	Install and bolt EZ-TRAC axle in place		
	Install Drag Link(s) with no interference		
	With Tires on set axle stops for maximum turning		
	Install Brake Lines		
	Install Speed Sensors		
4	**INSTALL PUMP & PTO**		
	Install PTO		
	Drill Frame and Mount Pump Bracket Per OEM Guidelines		
	Mount Pump and Install Front Coupling		

	Measure Driveline and submit to Assembly and Balance Center		
	Install Driveshaft (U-Joints should be greased)		
5	**INSTALL RESERVOIR & VALVE ASSY**		
	Determine Location based on Project		
	Drill and Mount the Reservoir and Valve		
6	**MEASURE HOSES**		
	Measure Hoses for system		
	Submit Hoses in Product Selector & Confirm		
7	**WIRING HARNESS**		
	Install Wiring Harness		
8	**INSTALL HOSES**		
	Install all Hoses (Mark when each it tightened)		
	Support and confirm proper routing		
9	**COMMUNICATION & ELECTRONICS CHECK**		
	Verify Communication with ECU		
	Complete Pre-Drive Electronics Check (Sensors and CAN)		
10	**STARTUP & DRIVE TEST**		
	Fill Reservoir and verify Pump Case Drain is full		
	Complete START UP PROCEDURE CHECK LIST		
11	**COMPLETE JOB**		
	Fill out completed job form and submit to TDS		

Project #			K711034 Hose Kit For use with EZ-Trac Equipped with In-Hub Charge Pump	*Sales Order #*
Item Number	Hose Part Number	Length of hose (to nearest 1/2 inch)		
		3/4 Hose 5000 PSI	**-12 JIC Female Swivel x -12 JIC Female Swivel**	
1	36555	____ ____ ____ . ____	P90 Hydro Pump, Port "A" to Addiflow valve code 62 flange -12 JIC 90 deg elbow "A" Port	
2	36555	____ ____ ____ . ____	P90 Hydro Pump, Port "B" to Addiflow valve code 62 flange -12 JIC 90 90 deg elbow "B" Port	
		5/8 Hose 2000 PSI	**-08 JIC Female Swivel x -10 JIC Female Swivel (Use with 200023-P1 -08 JIC-FS X -08 JIC-M 45 deg Elbow)**	
3	3545L	____ ____ ____ . ____	RH Knuckle "T" Port to -10 JIC Elbow / Tee Asm on Reservoir	"T" Port is top front on drum brake axle "T" Port is top rear on disk brake axle
4	3545L	____ ____ ____ . ____	LH Knuckle "T" Port to -10 JIC Elbow / Tee Asm on Reservoir	"T" Port is top front on drum brake axle "T" Port is top rear on disk brake axle
		5/8 Hose 2000 PSI	**-08 ORS 90 deg Female Swivel x -10 ORS Female Swivel**	
5	3541K	____ ____ ____ . ____	RH Knuckle "C" Port to -10 ORS Elbow / Tee Asm on Reservoir	"C" Port is center rear on drum brake axle "C" Port is center front on disk brake axle
6	3541K	____ ____ ____ . ____	LH Knuckle "C" Port to -10 ORS Elbow / Tee Asm on Reservoir	"C" port is center rear on drum brake axle "C" Port is center front on disk brake axle
		1/2 Hose 2000 PSI	**-08 JIC 90 deg Female Swivel x -10 JIC Female Swivel**	
7	3537E	____ ____ ____ . ____	Hydro Pump, Port "M3" to Addiflow Valve Port "G" -10 JIC 90 deg Elbow	
		5/8 Hose 6000 PSI	**-10 JIC Female Swivel x -12 JIC Female Swivel**	
8	3645E	____ ____ ____ . ____	RH Knuckle HP REV Port to Addiflow valve "B2" port code 62 -12 JIC 90 deg elbow	HP REV Port is top rear, short -10 JIC 90 deg elbow on drum brake axle HP REV Port is bottom front, long -10 JIC 90 deg elbow on disk brake axle
		5/8 Hose 6000 PSI	**-10 ORS Female Swivel x -12 ORS Female Swivel**	
9	3641A	____ ____ ____ . ____	RH Knuckle HP FWD Port to Addiflow valve "A2" port code 62 -12 ORS 90 deg elbow	HP FWD Port is bottom rear, long -10 ORS 90 deg elbow on drum brake axle HP FWD Port is top front, short -10 ORS 90 deg elbow on disk brake axle
		5/8 Hose 6000 PSI	**-10 JIC Female Swivel x -12 JIC Female Swivel**	
10	3645E	____ ____ ____ . ____	LH Knuckle HP REV Port to Addiflow valve "B1" Port code 62 -12 JIC 90 deg elbow	HP REV Port is top rear, short -10 JIC 90 deg elbow on drum brake axle HP REV Port is bottom front, long -10 JIC 90 deg elbow on disk brake axle
		5/8 Hose 6000 PSI	**-10 ORS Female Swivel x -12 ORS Female Swivel**	
11	3641A	____ ____ ____ . ____	LH Knuckle HP FWD Port to Addiflow valve "A1" Port code 62 -12 ORS 90 deg elbow	HP FWD Port is bottom rear, long -10 ORS 90 deg elbow on drum brake axle HP FWD Port is top rear, short -10 ORS 90 deg elbow on disk brake axle
		1" Hose 1300 PSI	**-16 JIC Female Swivel x -16 JIC Female Swivel**	
12	35655	____ ____ ____ . ____	P90 Hydro Pump suction, Port "S" to Reservoir -16 JIC 90 deg elbow, back side closest to bottom	
		1" Hose 1300 PSI	**-12 JIC Female Swivel x -16 JIC Female Swivel**	
13	3565J	____ ____ ____ . ____	P90 Hydro Pump case drain, Port "L1" or "L2" to reservoir -16 JIC 90 deg elbow on return filter port	**Imprtant: Use higher of the two, ("L1" or "L2") to ensure a full pump case**
		2 3/8" Cordura	**Protective Hose Sleeve**	
14	103379		Kit includes a standard length of 720". Please enter total needed(if over 720")	
		5/8" Hose 2000 PSI	**-12 JIC Female Swivel x -10 ORS Female Swivel (optional)**	
15	3541E	____ ____ ____ . ____	Jumper hose from VF300 valve to check valve on reservoir assembly when valve is moved	Submit @ www.eztracaxle.com under product selector Or email to hoses@tdsdrive.com

START UP CHECKLIST

EZ Trac Parts Checklist

Project #

Pre-Install Checklist

Item	Recv'd	Description	Part Number	Serial #
A		Axle		
B		Cooler Package		n/a
C		Primary Pump		
D		Primary PTO		
E		Primary Driveline		n/a
F		Wheels		n/a
G		Hoses	To be ordered later	n/a
H		Diode Kit	Piggyback Kit K7710167-01	n/a
J		Cooler Bracket	(if needed)	n/a

Truck Specs Confirmation

Item	Conf	Description	TASK	Part Number
A		Front Tire	Actual tire matches Product Selector	
B		Rear Tire	Actual tire matches Product Selector	
C		Transmission	Actual Matches Product Selector	
D		Rear Diff Ratio	Actual Matches Product Selector	

Completed Axle Checklist for Submission

Item	Description	Serial # / Filename	Length
A	Axle		n/a
B	Pump		n/a
C	VIN		n/a
C	PTO		n/a
D	Driveline Length	n/a	
E	Project Number		n/a
F	Parameter File		n/a

START UP CHECKLIST

Controller Input Checks:

1. Switch truck ignition ON (engine remains OFF).
2. Read the following values from the Phases—Diagnostics—Input/Output screen.

Action Item	Necessary Outcome	☑
EZ Trac ON/OFF switch (Hold to turn on)	Switch On = **1,** Switch Off = **0**	
EZ Trac Mode Switch (Hold to turn on) (option)	Switch On = **1,** Switch Off = **0**	
Check reservoir oil level switch	Full Oil = **1**	
Check battery voltage input	**12.0** +/- 3.0 V	
Check high pressure forward sensor	**0.5** +/- 0.05 V	
Check high pressure reverse sensor	**0.5** +/- 0.05 V	
Check temperature sensor	**Around 1.9V @80F**	
Check pump feedback	**2.5** +/- 0.10 V	
Check 12V sensor power supply	**12.0** +/- 0.60 V	
Check 5V sensor power supply	**5.0** +/- 0.25 V	

CAN Communication

1. Verify Braking status for Service and Park Brake are active. Phases—Diagnostics—Display
2. Verify that allowable gear is selected in Phases.

Action Item	Necessary Outcome	☑	Notes
Check brake status with only park brake applied	Braking Activated = 1		
Check brake status with park brake and service brake applied	Braking Activated = 1		
Check brake status with neither brake applied	Braking Activated = 0		
Check brake status with only service brake applied	Braking Activated = 1		

Truck Specific Parameters

1. Verify the following parameters are correct in the Program. Phases—Customize

Action Item	Necessary Outcome	Value	☑
Front Tire Radius (See chart 7.1)	Truck matches phases		
Rear Tire Radius (See chart 7.1)	Truck matches phases		
Differential Ratio	Truck matches phases		
PTO Ratio (See Chart 7.2)	Match for Transmission		
Motor Displacement (See Chart 7.3)	Match for Axle #		

START UP CHECKLIST

2. Verify that allowable gear is selected in Phases.

Action Item	Necessary Outcome	☑
Add Oil to Hydraulic Reservoir	**Fill 3/4 up into sight glass**	
Fill Case drain of Primary Pump	Fill <30 mins before startup	
Check entire EZ Trac system for leaks	No hydraulic oil leaks	

Action Item	Necessary Outcome	☑
Spin Left and Right tires with engine ON EZ Trac OFF	Wheels spin freely	
Spin Left and Right tires with engine ON and ZP1, ZP2, ZP3 and PTO ON	Pressure charge builds up, wheels don't' spin	
Confirm Charge Pressure	32 bar pressure at primary pump port	
Check entire EZ Trac system for leaks	No hydraulic oil leaks	
Add hydraulic oil to refill reservoir	Oil level fills up at least ¾ of the sight glass	

Action Item	Necessary Outcome	☑
Turn ON EZ Trac with direction set to (0)	Wheels rotate forward	
Turn ON EZ Trac with direction set to (9)	Wheels rotate backwards	
Check PTO ratio shown in Startup tool matches product selector. (+/- .05)	PTO Ratio Matches	
High pressure is higher than High pressure return while spinning tires	Hoses and PSI sensors are installed correctly	
ENGINE RPM Check	Engine RPM matches Tachometer in truck	
Run Wheels (EACH) forward and Backward 3 times each for 1 minute	Purge air from the lines	

Action Item	Necessary Outcome	☑
Complete Relief Pressure Test	Confirm Relief Setting	
Check and fix system leaks or drip	Confirm Zero Leaks	
Add hydraulic oil to reservoir	Air Should be out of lines	

Action Item	Necessary Outcome	☑	Notes
Verify Transmission Gear. Selected and Actual Check in: Phases—Diagnostics—Display	Forward = 1 or 2,3,4 etc. Neutral = 0 Reverse = -1		

START UP CHECKLIST

Verify you are seeing Pump Speed and Engine speed when engaged in: Phases—Diagnostics—Display	Sensors and CAN should value for Engine and Pump should be correct		
Drive Forward and verify pressure is achieved. Target pressure is variable but normally 150-250 bar. Setting is found in Phases—Customize—High Pressure Control Loop	Driving Forward: (> 5% throttle) **High Pressure = Target bar setting** **Return Pressure = 35-40 bar**		
Drive in Reverse and verify pressure is achieved. Target pressure is variable but normally 150-250 bar. Setting is found in Phases—Customize—High Pressure Control Loop	Driving Forward: (> 5% throttle) **High Pressure = Target bar setting** **Return Pressure = 35-40 bar**		
Engage system from a stop and drive around. Slow down and stop. Disengage system.	Smooth shift with no error codes		
Engage and disengage the system while moving at speeds above 5mph	Smooth shift with no error codes		
Drive Truck with transmission locked into max allowed gear. Drive up to governed RPM.	No error codes		
Engage and Disengage the Mode Switch while driving	Smooth shift with no error codes		
Confirm no engagement in non-allowed gear	Pushing EZ TRAC button the system remains OFF		
Perform upshift and downshift in allowable gear range (if applicable)	Smooth shift with no error codes		
Confirm disengagement during upshift into non allowed gear	Smooth shift with no error codes		
Confirm engagement during downshift into highest allowed gear	Smooth shift with no error codes		
Confirm service brake bypass in forward (apply service brake while driving with system engaged)	Bypass Function Activated goes to 1 and EZ-TRAC button flashes		
Perform complete turn circle at maximum steering angle both directions	Pressure regulation setting maintained in turn, no error codes		
Confirm no error codes were generated during testing			
Clear all stored error codes that have been resolved			
Perform full CAN diagnostic check with truck manufacturer service tool	No truck error codes generated from adding EZ Trac controller to CAN Bus		

Terra Drive Systems

(219) 279-2801

9098 W. 800 S.
Brookston, IN 47923

eztracsales@tdsdrive.com
eztracservice@tdsdrive.com