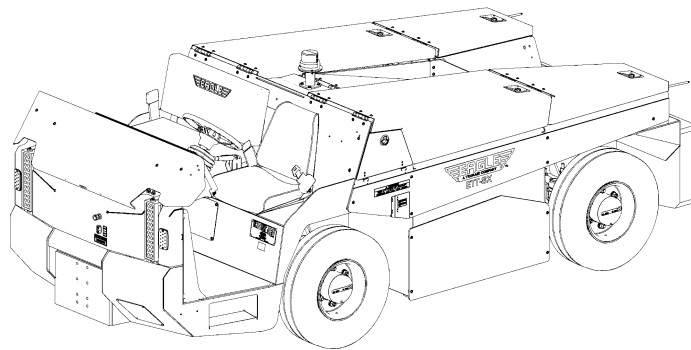




# OPERATION & SERVICE MANUAL



## Model: eTT-8X/ eTT-12X Electric Tow Tractor

04/2024 – Rev. 04

**For Spare Parts, Operations & Service Manuals or Service Needs  
Scan the QR code or visit [Tronair.com/aftermarket](http://Tronair.com/aftermarket)**



**Eagle Tugs**  
1 Air Cargo Pkwy East  
Swanton, OH 43558

Phone: (734) 442-1000 | 800-671-0431  
Web: [www.eagletugs.com](http://www.eagletugs.com)  
Email: [sales@eagletugs.com](mailto:sales@eagletugs.com)

REVISION	DATE	TEXT AFFECTED
01	05/2023	Original Release
02	08/2023	Modified 22.0 Camera Feature
03	11/2023	Modified 8.1 Preventive Maintenance Schedule, 8.2 Fluids, Added section 8.7 Brake Service
04	04/2024	Updated graphics, added sections 11.1.1 Assembly, LH Grille with Turn and 11.1.2 Assembly, RH Grille with Turn



## TABLE OF CONTENTS

	<u>PAGE</u>
<b>1.0 PRODUCT INFORMATION .....</b>	<b>1</b>
1.1 DESCRIPTION.....	1
1.2 MODEL & SERIAL NUMBER.....	1
1.3 MANUFACTURER.....	1
1.4 SPECIFICATIONS .....	2
1.4.1 Vehicle Specifications .....	3
1.4.2 Chassis System .....	3
1.4.3 Vehicle Weight (without cab).....	3
1.4.4 Traction Specifications .....	3
1.4.5 Pump Specifications.....	3
1.4.6 Transfer Case .....	3
1.4.7 Axles .....	4
1.4.8 Tires .....	4
1.4.9 Electrical .....	4
1.4.10 Battery Specifications:.....	4
1.4.10.1 Battery Option 1 .....	4
1.4.10.2 Battery Option 2 .....	4
1.4.11 Performance.....	4
<b>2.0 SAFETY INFORMATION.....</b>	<b>5</b>
2.1 USAGE AND SAFETY INFORMATION .....	5
2.2 IMPORTANT SAFETY NOTICE.....	5
2.3 GENERAL .....	5
2.4 GENERAL SAFETY .....	6
<b>3.0 TRAINING .....</b>	<b>6</b>
3.1 TRAINING REQUIREMENTS .....	6
3.2 TRAINING PROGRAM .....	6
3.3 OPERATOR TRAINING .....	6
<b>4.0 PUTTING INTO SERVICE .....</b>	<b>6</b>
4.1 UNPACKING AND SETTING UP.....	6
<b>5.0 OPERATION.....</b>	<b>7</b>
5.1 OPERATOR REQUIREMENTS .....	7
5.2 OPERATOR WORKSTATION .....	7
5.3 PRE-OPERATION CHECKLIST .....	7
5.3.1 Daily Pre-Operation Checklist .....	7
5.3.2 Weekly Operation Checklist .....	8
5.4 STARTUP/SHUTDOWN AND SAFE TOWING.....	8
5.4.1 Starting the Unit .....	8
5.4.2 Shutting Down the Unit .....	8
5.4.3 Load Towing and Pushing Safety.....	8
5.4.4 Cold Vehicle Care Safety .....	8
5.5 CONTROLS AND INSTRUMENTATION .....	9
5.5.1 Multi-Function Display .....	10
5.5.2 Inching Mode.....	11
5.5.3 Steering Sync Operation .....	11
<b>6.0 PACKAGING AND STORAGE .....</b>	<b>12</b>
6.1 HANDLING .....	12
6.1.1 Tie Downs .....	12
6.1.2 Jacking and Jack Stand locations .....	12
6.1.3 Weight Distribution Without Battery.....	13
6.1.4 Flat Towing .....	13
<b>7.0 TROUBLESHOOTING .....</b>	<b>14</b>
7.1 OPERATIONAL TROUBLESHOOTING.....	14
7.2 ERROR CODES .....	16
<b>8.0 MAINTENANCE.....</b>	<b>18</b>
8.1 PREVENTIVE MAINTENANCE SCHEDULE .....	18
8.2 FLUIDS .....	19
8.3 HYDRAULIC SIGHT GLASS AND FILL.....	20
8.4 HYDRAULIC FILTER .....	21
8.5 PLANETARY AXLE SERVICE POINTS.....	22
8.6 TRANSFER CASE SERVICE .....	23
8.7 BRAKE SERVICE .....	24
8.8 BATTERY CARE INSTRUCTIONS.....	25



8.8.1	Lead Acid Battery Care .....	25
8.8.2	Lithium Battery Care .....	28
<b>9.0</b>	<b>DRIVETRAIN .....</b>	<b>29</b>
9.1	ASSEMBLY, COOLING FANS.....	29
9.2	ASSEMBLY, MOTOR CTRLR WITH HEATSINK .....	31
9.3	ASSEMBLY, MOTOR AND XFER CASE.....	33
9.4	ASSEMBLY, MOTOR AND XFER CASE (ETT-12X) .....	37
9.5	ASSEMBLY, FRONT AXLE .....	41
9.6	ASSEMBLY, AXLES AND DRIVESHAFTS.....	42
<b>10.0</b>	<b>HYDRAULIC SYSTEM.....</b>	<b>47</b>
10.1	ASSEMBLY, SPIN-ON FILTER.....	47
10.2	ASSEMBLY, STEERING WHEEL.....	48
10.3	ASSEMBLY, BRAKE PEDAL .....	49
10.4	ASSEMBLY, BRAKE PEDAL SUB-ASSEMBLY .....	50
10.5	ASSEMBLY, ACCUMULATOR .....	53
10.6	ASSEMBLY, HYDRAULIC TANK.....	54
10.7	ASSEMBLY, MANIFOLD BLOCK .....	55
10.8	ASSEMBLY, PUMP MOTOR (ETT-12X) .....	56
10.9	ASSEMBLY, STEER BLOCK.....	57
10.10	ASSEMBLY, HYDRAULIC SYSTEM .....	58
<b>11.0</b>	<b>CHASSIS .....</b>	<b>77</b>
11.1	ASSEMBLY, FRONT GRILLE.....	77
11.1.1	Assembly, LH Grille With Turn .....	78
11.1.2	Assembly, RH Grille With Turn.....	79
11.2	ASSEMBLY, CHASSIS SUB.....	80
<b>12.0</b>	<b>OPERATOR COMPARTMENT.....</b>	<b>84</b>
12.1	PRX SENSOR BUZZLITE W CONNECT .....	84
12.2	ASSEMBLY, PARKING BRAKE CABLE .....	85
12.3	ASSEMBLY, DASH PANEL .....	86
12.4	ASSEMBLY, OPERATOR COMPARTMENT.....	88
<b>13.0</b>	<b>ELECTRICAL SYSTEM.....</b>	<b>91</b>
13.1	ASSEMBLY, BATTERY CABLES .....	91
13.2	ASSEMBLY, ELECTRICAL PANEL .....	100
13.3	ASSEMBLY, ELECTRICAL PANEL .....	105
13.4	ASSEMBLY, CHARGE JACK SUB .....	106
13.5	ASSEMBLY, ELECTRICAL SYSTEM.....	107
<b>14.0</b>	<b>ASSEMBLY, STD COLOR PANELS.....</b>	<b>121</b>
14.1	ASSEMBLY, REAR MIDDLE DOOR.....	121
14.2	ASSEMBLY, MOTOR DOOR.....	122
14.3	ASSEMBLY, STANDARD COLOR PANELS .....	123
<b>15.0</b>	<b>ASSEMBLY, ALT COLOR PANELS .....</b>	<b>124</b>
15.1	STORAGE DOOR SUB .....	124
15.2	ASSEMBLY, BATTERY DOOR, LH .....	125
15.3	ASSEMBLY, BATTERY DOOR, RH .....	126
15.4	ASSEMBLY, ALT COLOR PANELS .....	129
<b>16.0</b>	<b>ASSEMBLY, DECALS &amp; LABELS.....</b>	<b>131</b>
16.1	ASSEMBLY, DECALS & LABELS.....	131
<b>17.0</b>	<b>ETT-8X &amp; -12X FEATURES AND OPTIONS.....</b>	<b>138</b>
17.1	OPTION A – CHARGER COMPAT KIT, GECI.....	140
17.2	OPTION B – CHARGER COMPAT KIT, AMTK .....	141
17.3	OPTION C – CHARGER COMPAT KIT, SVS.....	143
<b>18.0</b>	<b>IGNITION FEATURE.....</b>	<b>144</b>
18.1	OPTION A – KEYED IGNITION.....	144
18.2	OPTION B – KEYLESS IGNITION.....	145
<b>19.0</b>	<b>BATTERY FEATURE.....</b>	<b>146</b>
19.1	OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-8X .....	146
19.2	OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-12X .....	154
19.3	OPTION C – 510 AH LEAD-ACID BATTERY .....	163
<b>20.0</b>	<b>BACKUP ALARM FEATURE .....</b>	<b>169</b>
20.1	OPTION A – BACKUP ALARM.....	169
20.2	OPTION B – SMART BACKUP ALARM .....	170
<b>21.0</b>	<b>OPERATOR CAB FEATURE .....</b>	<b>171</b>
21.1	OPTION A – OPERATOR CAB – NO AC .....	171
21.2	OPTION O – (ETT-8X) – NO OPERATOR CAB WITH PST MT BEA.....	182
21.3	OPTION O – (ETT-12X) – NO OPERATOR CAB WITH PST MT BEA.....	183





21.4	ADDITIONAL CAB FEATURES .....	186
<b>22.0</b>	<b>CAMERA FEATURE.....</b>	<b>187</b>
22.1	BACKUP CAMERA, REAR .....	187
<b>23.0</b>	<b>DECK FEATURE .....</b>	<b>189</b>
23.1	DIAMOND TREAD PVC DECK.....	189
<b>24.0</b>	<b>FIRE EXTINGUISHER, 5 LB ABC, FEATURE .....</b>	<b>190</b>
<b>25.0</b>	<b>FRONT HITCH FEATURE .....</b>	<b>191</b>
25.1	OPTION A – 2.125 S LEVEL E-HITCH .....	191
25.2	OPTION B – 2.125 S LEVEL E-HITCH A-LK .....	192
25.3	OPTION C – PINTEL HITCH .....	193
25.4	OPTION D – 1.5 SGL LEVEL E-HITCH .....	194
25.5	OPTION E – 1.5 MLT LEVEL E-HITCH .....	196
25.6	OPTION O – NO FRONT HITCH.....	198
<b>26.0</b>	<b>LIGHTING FEATURE .....</b>	<b>199</b>
26.1	OPTION A – TURN SIGNAL .....	199
26.2	OPTION B – TURN SIGNAL .....	201
26.3	OPTION D – RR SPOTLIGHT, TURN SIGNAL .....	202
<b>27.0</b>	<b>MIRROR FEATURE.....</b>	<b>204</b>
27.1	OPTION C – MIRROR (NO CAB) .....	204
<b>28.0</b>	<b>REAR HITCH FEATURE .....</b>	<b>205</b>
28.1	OPTION A – 2.125 S LEVEL E-HITCH .....	205
28.2	OPTION B – 2.125 S LEVEL E-HITCH A-LK .....	206
28.3	OPTION C – PINTEL HITCH .....	207
28.4	OPTION D – 1.5 SGL LEVEL E-HITCH .....	208
28.5	OPTION E – 1.5 MTL LEVEL E-HITCH .....	210
<b>29.0</b>	<b>SEAT FEATURE.....</b>	<b>212</b>
29.1	OPTION A - NO SEAT SWITCH .....	212
29.2	OPTION O – SEAT SWITCH .....	213
<b>30.0</b>	<b>TIRE FEATURE .....</b>	<b>214</b>
30.1	OPTION A – SNW CBL, STD PNE TIRES.....	214
30.2	OPTION B – FOAM FILLED TIRE .....	214
30.3	OPTION C – SNW CBL, FOAM F TIRES .....	214
30.4	OPTION O – STD PNEUMATIC TIRES.....	214
<b>31.0</b>	<b>TOWBAR FEATURE .....</b>	<b>215</b>
31.1	TOWBAR HEAD HOLDERS .....	215
<b>32.0</b>	<b>PROVISION OF SPARES.....</b>	<b>216</b>
32.1	SOURCE OF SPARE PARTS.....	216
32.2	ORDERING SPARE/SERVICE PARTS.....	216
32.3	RECOMMENDED SPARE PARTS LIST.....	216
<b>33.0</b>	<b>IN SERVICE SUPPORT.....</b>	<b>217</b>
33.1	TECHNICAL ASSISTANCE .....	217
<b>34.0</b>	<b>GUARANTEES/LIMITATION OF LIABILITY - EAGLE 3-YEAR WARRANTY .....</b>	<b>217</b>
<b>35.0</b>	<b>APPENDICES .....</b>	<b>218</b>



From everyone at Tronair, we would like to say thank you for purchasing an Eagle eTTX series tow tractor. We take a lot of pride in the quality of the products that we build, as well as, our continued customer service. Our goal is to build a long-term relationship with our customers. We want you, the customer, to be 100% satisfied with your experience. To us, this means that your Eagle eTTX series tractor is functionally superior to any other products you have used. This also means that your Eagle product is continually supported in a professional, timely manner.



**WARNING!**

**Read this manual in its entirety before putting your Eagle tow tractor into service. This manual contains important safety instructions. Improper usage or a failure to follow the safety requirements listed in this manual could result in severe injury or death.**

**1.0 PRODUCT INFORMATION**

**1.1 DESCRIPTION**

This manual is designed as a reference guide to make the reader more familiar with the Eagle-specific components of the Eagle eTTX series tow tractor models. This manual includes part numbers and descriptions to assist the reader in ordering component spare/service parts. The manual also outlines the Scheduled Maintenance Intervals recommended by Tronair in order to keep your vehicle running properly.

**1.2 MODEL & SERIAL NUMBER**

Reference nameplate on unit

**1.3 MANUFACTURER**

**Tronair / Eagle Tugs**

1 Air Cargo Pkwy East  
Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301

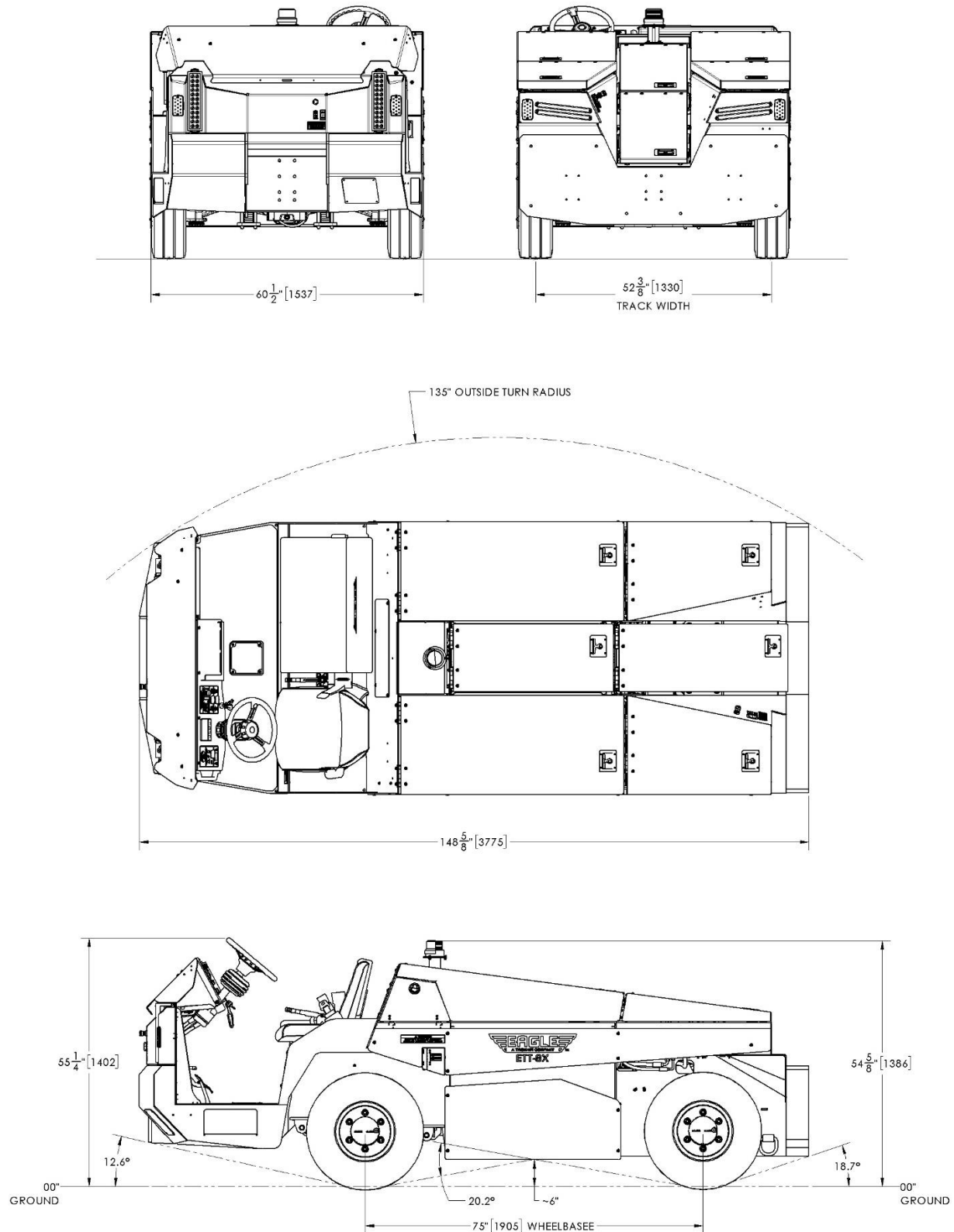
Fax: (419) 867-0634

E-mail: [sales@tronair.com](mailto:sales@tronair.com)

Website: [www.eagletugs.com](http://www.eagletugs.com)

Please check [www.eagletugs.com](http://www.eagletugs.com) periodically for updates to this manual, operations manual, and service bulletins that affect your tractor

## 1.4 SPECIFICATIONS





#### 1.4.1 Vehicle Specifications

<b>Model</b>	<b>GVW*</b> lbs (kg)	<b>Rated DBP</b> lbf (kN)	<b>Vertical Hitch Capacity</b> lbf (N)	<b>Towing Capacity †</b> lbs (kg)
eTT-8X	10,060 (6,441)	8000 (35.6)	500 (2200)	115,000 (52,000)
eTT-12X	14,470 (6,563)	12,000 (53.3)	500 (2200)	170,000 (77,110)

† Towing Capacity applies to 1% grade, dry surface condition.

\* GVW listed for the heaviest battery option 1

#### 1.4.2 Chassis System

Length (not including hitches) ..... 148.6 in (3,775 mm)  
 Width ..... 60.5 in (1,537 mm)  
 Height at Wheels ..... 55.25 in (1,402 mm)  
 Step-In Height ..... 18.4 in (467 mm)  
 Ground Clearance ..... 6 in (152 mm)

#### 1.4.3 Vehicle Weight (without cab)

<b>Lead Acid Battery Option</b>	<b>eTT-8X</b>	<b>eTT-12X</b>
Gross Vehicle Weight.....	10,060 lbs (4,563 kg)	14,470 lbs (6,563 kg)
Weight distribution.....	51% Front / 49% Rear	41% Front / 59% Rear
<b>Lithium Battery Option</b>	<b>eTT-8X</b>	<b>eTT-12X</b>
Gross Vehicle Weight.....	8,130 lbs (3,688 kg)	13,600 lbs (6,168 kg)
Weight distribution.....	49% Front / 51% Rear	48% Front / 52% Rear

#### 1.4.4 Traction Specifications

	<b>eTT-8X</b>	<b>eTT-12X</b>
Motor Model .....	InMotion TSP 180/6-200.....	Dana TM4
Motor Type .....	AC Induction.....	SRIPM
Motor Power.....	18.4 kW – S2 60 min .....	40 kW – S2 60 min
Motor IP Rating .....	20 .....	66
Inverter Model .....	InMotion AC80L70-C35T.....	InMotion AC80L70-C35T
Inverter Power Max .....	700A – 2 min .....	700A – 2 min
Inverter Power Nom .....	350A – S2 60 min .....	350A – S2 60 min
Inverter IP Rating .....	65 .....	65
Inverter Cooling.....	Active Finned Heatsink.....	Active Finned Heatsink

#### 1.4.5 Pump Specifications

	<b>eTT-8X</b>	<b>eTT-12X</b>
Motor Model .....	CFR APE125-0002-0019-1 .....	CFR AMP173-150-SAE A
Motor Type .....	AC Induction.....	AC Induction
Motor Power.....	1.2 kW – S2 60 min .....	4 kW – S2 60 min
Motor IP Rating .....	44 .....	44
Inverter Model .....	InMotion ACS80S .....	InMotion ACS80S
Inverter Power Max .....	175A – 1 min .....	175A – 1 min
Inverter Power Nom .....	80A – S2 60 min .....	80A – S2 60 min
Inverter IP Rating .....	65 .....	65
Inverter Cooling.....	Passive Flat Heatsink.....	Passive Flat Heatsink

#### 1.4.6 Transfer Case

Gear Ratio Low ..... 4.85  
 Gear Ratio High ..... 1.5  
 Output Flange ..... DIN100  
 Shift Pressure (max)..... 507 psi (35 bar)



- 1.4.7      Axles
- Wheelbase .....60.5 in (1,537 mm)
- Track Width .....52.4 in (1,330 mm)
- Inside Steering Angle .....35°
- Steering Working Pressure .....180 psi (12.4 bar)
- Center Differential Ratio .....2.818
- Planetary Ratio .....4.235
- Overall Ratio .....11.936
- Service Brake Working Pressure .....685 psi (47 bar)
- Service Brakes .....Dry Disc
- Parking Brakes .....Dry Disc, front only
- Input Flange .....DIN100
- 1.4.8      Tires
- Tire Size .....7.00 R12 | TL
- 1.4.9      Electrical
- System Voltage .....80V Floating Ground
- Lighting/Logic Voltage .....12V Floating Ground
- 12V Converter Rating .....Dual 500W
- 1.4.10     Battery Specifications:
- Nominal Voltage .....80V
- Connector Type .....DIN/Euro
- Compartment Length .....36.5 ± 0.25 in (1,295 mm)
- Compartment Width .....20.5 ± 0.25 in (575 mm)
- Compartment Height .....29 ± 0.25 in (797 mm)
- 1.4.10.1   Battery Option 1
- Battery chemistry .....Lead Acid
- Industrial Designation .....20-85-13
- Capacity .....530 Ahr
- 1.4.10.2   Battery Option 2
- Battery chemistry .....Lithium Iron Phosphate
- Capacity .....420 Ahr
- 1.4.11     Performance
- Top Speed - Low .....5 mph (8 kph)
- Top Speed - Drive .....15 mph (24.1 kph)
- Outside Turning Radius .....135 in (3,429 mm)
- Approach Angle Without Hitch .....13°
- Departure Angle Without Hitch .....19°
- Breakover Angle .....20°

## 2.0 SAFETY INFORMATION

### 2.1 USAGE AND SAFETY INFORMATION

To insure safe operations please read the following statements and understand their meaning. Also refer to your equipment manufacturer's manual for other important safety information. This manual contains safety precautions which are explained below. Please read carefully.



#### **WARNING!**

Warning is used to indicate the presence of a hazard that can cause **severe personal injury, death, and/or substantial property damage** if the Warning Notice is ignored.



#### **CAUTION!**

Caution is used to indicate the presence of a hazard, which will or can cause **minor personal injury or property damage** if the Caution Notice is ignored.

### 2.2 IMPORTANT SAFETY NOTICE

Appropriate service methods and proper repair procedures are essential for the safe and reliable operation of all industrial equipment as well as the personal safety of the individual performing the work. This service manual provides general directions for accomplishing service and repair work with tested and effective techniques. Following them will help assure reliability.

There are numerous variations in procedures, techniques, tools, and parts for servicing equipment, as well as in the skill of the individual doing the work. This manual cannot anticipate all such variations and provide advice or cautions as to each. Accordingly, anyone who departs from the instructions provided in this manual must first establish that he compromises his/her personal safety and/or the equipment integrity by his/her choice of methods, tools or parts.

### 2.3 GENERAL

The following list contains some general warnings that you should follow when you work on equipment:

- Always wear safety glasses for eye protection.
- Use safety stands whenever a procedure requires you to be under the equipment.
- Be sure that the ignition switch and battery is disconnected unless otherwise required by the procedure.
- Set the parking brake when working on the equipment. Place wheel chocks on the tires to provide further restraint from inadvertent equipment movement.
- Keep yourself and your clothing away from moving parts when the tractor is moving.
- Do not smoke while working on the equipment.
- To avoid injury, always remove rings, watches, loose hanging jewelry, and loose clothing before beginning to work on the equipment. Tie long hair securely behind the head.

For more information regarding safety please refer to the operations manual provided with your tug. This manual can also be found on the Eagle Tugs website at [www.eagletugs.com](http://www.eagletugs.com).

## 2.4 GENERAL SAFETY

The following safety recommendations are not intended to cover all possible safety aspects of the eTTX series tow tractor. Please use common sense in addition to the safety recommendations that follow.



### **WARNING!**

**Failure to comply with the following safety precautions can result in serious injury or death as well as equipment damage.**

- Always do the Pre-Operation Inspection before using the tractor.
- If you have not operated this equipment previously, practice driving and operating it in a safe and clear (not congested) area until you are familiar with all aspects of its operation.
- Always operate the tractor at a speed appropriate for the environmental conditions and the towed load. Slow down in congested areas, when moving a large load, or when conditions reduce traction or visibility.
- Always take care when driving on a slope or uneven ground. Reduce speed and take turns slowly in a controlled manner.
- When working on or around the tractor, take care to keep well clear of any moving components including tires, fans, and driveshafts. Also keep clear of hot surfaces such as drive and motor components.
- The eTTX series tractor is intended to be operated on hard improved surfaces. Never drive on soft surfaces, and avoid potholes and damaged pavement.
- The traction battery, contactor, and busbar connections are capable of dangerous electrical discharge and electric shock. Stay away from electrical components and connections unless trained in service and repair on this type of equipment.

## 3.0 TRAINING

### 3.1 TRAINING REQUIREMENTS

The employer of the operator is responsible for providing a training program sufficient for the safe operation of the unit.

### 3.2 TRAINING PROGRAM

The employer provided operator training program should cover safety procedures concerning use of the unit in and around the intended aircraft at the intended aircraft servicing location.

### 3.3 OPERATOR TRAINING

The operator training should provide the required training for safe operation of the unit.

**NOTE: Maintenance and Trouble Shooting are to be performed by a skilled and trained technician.**

## 4.0 PUTTING INTO SERVICE

### 4.1 UNPACKING AND SETTING UP

The following directions specify the correct steps that should be taken once you receive delivery of your eTTX series tow tractor. These steps will ensure that the tow tractor will operate safely. Reference the Parts and Preventive Maintenance Manual for details as appropriate.

- During the unloading of your tractor, note any shipping damage and report it to Tronair and the shipping company. Verify that all components appear to be in order and undamaged.
- Remove manual and any shipped-loose components from the operator compartment.
- Install shipped-loose components per the Parts and Preventive Maintenance Manual.
- Read this manual in its entirety, paying close attention to all safety requirements.
- Verify that tires are inflated.
- Verify that the battery state of charge is above 30%.
- Check the hydraulic fluid level.
- Familiarize yourself with the tractor operation and control.

## 5.0 OPERATION

### 5.1 OPERATOR REQUIREMENTS

The eTTX series tow tractor is a piece of industrial equipment and has inherent safety risks. As such, the operator of the tow tractor is expected to have a fork truck or similar license, or be otherwise trained in the usage of material handling equipment.

The operator should read this manual in its entirety before operating the tow tractor.

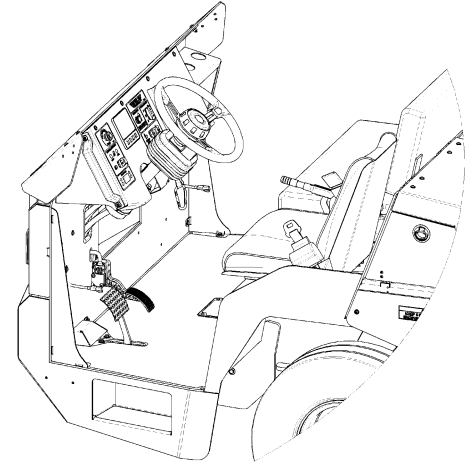
The operator should be familiar with all aspects of the tow tractor before operating it.

### 5.2 OPERATOR WORKSTATION

Your eTTX series tow tractor features an ergonomically designed operator's workstation. This is the only operator workstation on the tractor. Do not sit on or stand on the tractor outside of this area during tractor movement.

The operator should be seated with the seatbelt secured when moving or operating the tractor.

Keep arms and legs within the perimeter of the tractor's frame to avoid injury. Always place the tractor in Neutral and apply the parking brake before exiting the tractor.



### 5.3 PRE-OPERATION CHECKLIST

The following inspections should be conducted as stated below. Additional inspections may be required due to unusual operating conditions.

#### WARNING!



**Any problems noted during inspection should be corrected as soon as possible. Failure to promptly attend to problems could compromise safety and/or the tractor's performance. Do not attempt to make repairs. Contact a qualified mechanic.**

#### 5.3.1 Daily Pre-Operation Checklist

Daily Pre-Operation Checklist	Satisfactory	Service Required	Not Applicable
<b>Walk-Around Inspection</b>			
Verify no evidence of leaks under and around the tractor			
Visually verify tires are fully inflated			
Verify rims and tires free from damage including tire tread			
Verify tire tread is free from debris			
Verify lights, mirrors, and reflectors are clean			
<b>Operational Checks</b>			
Verify that the dash display is free of errors and warnings			
Verify that battery state of charge is above 30%			
Verify that horn is operational			
Verify that lights, flashers, and beacon work properly			
<b>Cab Inspection (if equipped)</b>			
Verify windows clean			
Verify windows free of cracks and chips			
Verify windshield wipers operate properly			
Verify heater and fans operate properly			





### 5.3.2 Weekly Operation Checklist

Weekly Pre-Operation Checklist	Satisfactory	Service Required	Not Applicable
Walk-Around Inspection			
Verify tire inflation pressure (pneumatic tires only)			
<b>Battery/Motor Compartment Inspection</b>			
Check top of battery for debris, electrolyte, or electrolyte residue			
Check hydraulic fluid level (top off if necessary)			
Verify visible wiring free of damage			
Verify battery cable connection tight			

### 5.4 STARTUP/SHUTDOWN AND SAFE TOWING

#### 5.4.1 Starting the Unit

1. With feet firmly on the floor mat, adjust the seat to a comfortable position.
2. Sit in the operator seat and buckle the seat belt.
3. Verify that the FNR selector switch is in the neutral position.
4. Verify the E-stop is in the up position.
5. Turn on the tractor with the ignition switch.
6. Select the desired transmission gear (LOW for towing, HIGH for unloaded travel)
7. Release the parking brake.
8. Verify that the intended path of the tractor is clear of obstructions and personnel and then proceed with driving.

#### 5.4.2 Shutting Down the Unit

1. Bring the tractor to a complete stop with the service brake.
2. Put the tractor in neutral using the FNR selector switch.
3. Set the parking brake by pulling the parking brake handle.
4. Turn the tractor off by turning the ignition switch.
5. For extensive periods of time, where the tractor will not be in use, for Lithium batteries, turn the switch on the back of the battery to the off position. This will help prevent the battery from discharging overtime.

#### 5.4.3 Load Towing and Pushing Safety

If towing or pushing a load, check to see that:

- The towed load is securely connected to the hitch of the tractor. Be sure hitch is locked/fastened into the closed position.
- For maximum tractor and load control and stability, as well as towing power, be sure the towbar is parallel to the ground when connected to the tractor's hitch.
- Ensure the plane or other towed load clears all obstacles when towing.

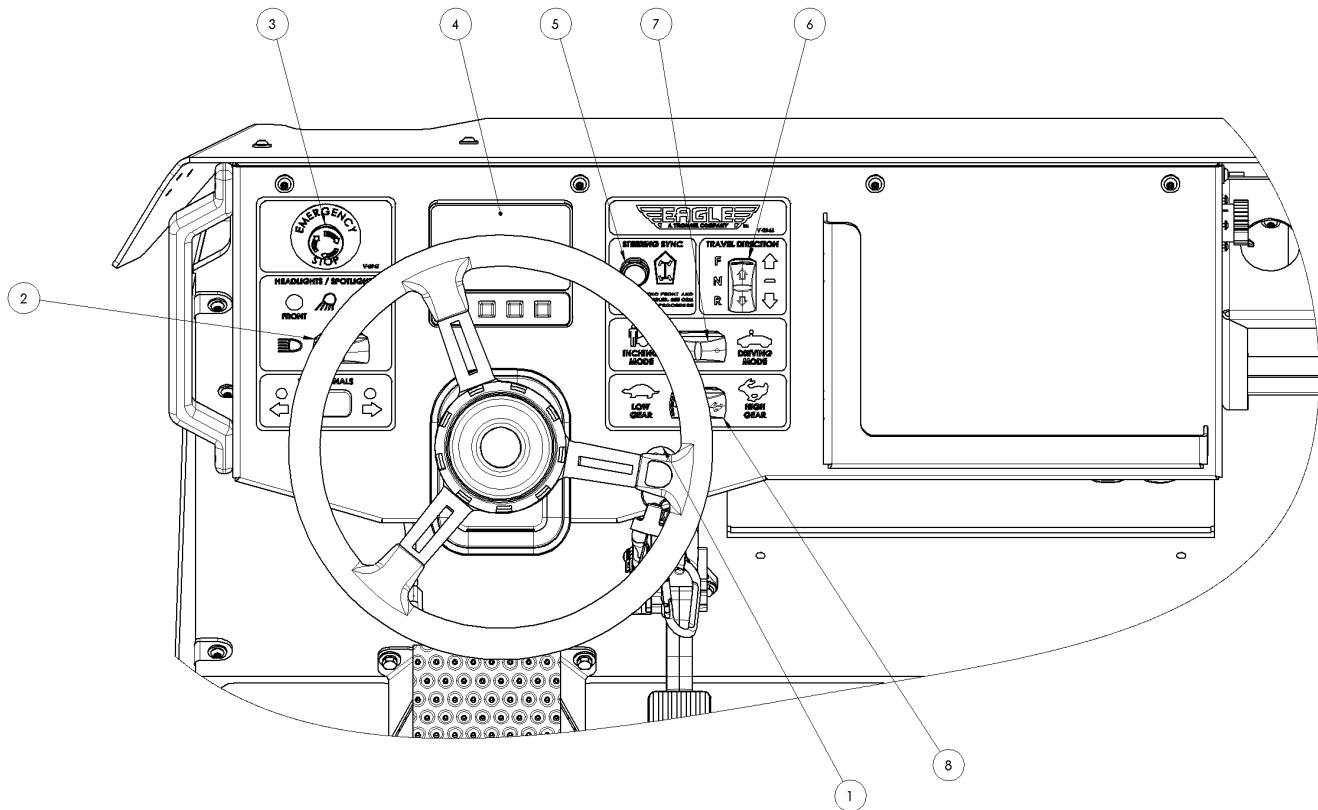
#### 5.4.4 Cold Vehicle Care Safety

In cases where the tractor is in a cold environment, at start-up, extra care should be made to warm up the tractor before towing. Towing the tractor cold will greatly reduce the amount of weight it can tow and reduce the battery's performance.

At start-up, drive the tractor (unloaded) around to gradually warm up the battery.

For more information on battery care, refer to section 8.1 Preventive Maintenance Schedule.

## 5.5 CONTROLS AND INSTRUMENTATION



1. **Ignition Switch:** Your tractor is equipped with a keyed or keyless ignition switch. The switch provides power to the tractor to turn the controls system on. Note, the third momentary position is used to start-up the truck and the second maintained position is used to keep it on. If the E-stop is pressed, the truck will get power in the momentary switch position, but will turn off immediately in the maintained switch position.
  2. **Headlight Switch:** The headlight switch is an on/off type. There is no hi/low beam control position.
  3. **Emergency Stop:** In the event of an emergency, the emergency stop button will shut down the tractor.
- Note that steering functionality requires the tractor be on to function.**
4. **Multi-function Digital Display:** The digital display module provides critical information on the tractor operational status. The digital display module includes detailed I/O diagnostics that enable troubleshooting of various tractor systems without needing a laptop or other external device. The digital display can provide specific motor control diagnostic codes that allow easy troubleshooting.
  5. **Steering Sync Switch:** Steering Sync switch allows the operator to sync the front and rear axle. The vehicle is equipped with 4-wheel hydraulic steering system. Press-hold the Steering Sync switch and turn the steering wheel all the way to left till it hits the bump stops. Release the switch and resume normal vehicle operation.
  6. **Forward / Neutral / Reverse Selector Switch:** The FNR switch allows the operator to select a travel direction. Neutral should be used during inching operation and before turning off the tractor.
  7. **Drive/Inch Mode Selector Switch:** The Drive/Inch mode selector switch allows the operator to put the tractor in inching mode which enables the low speed inching controls at the front and rear of the vehicle for single operator hitch connection.
  8. **Transfer Case Gear Selector Switch:** The transfer case gear selector allows for switching between LOW gear for towing, and HIGH gear for unloaded operation. Gear changes can only be performed while stationary.
  9. **Parking Brake Lever (Not shown above):** The parking brake can be engaged or released with the parking brake lever located between the driver and passenger seats. The parking brake should never be used to stop a moving unit except in an emergency situation.

### 5.5.1 Multi-Function Display

#### Operation Screen:

The multi-function display allows for monitoring a wide range of vehicle parameters. The default running operation screen includes all of the following diagnostic information:

- Battery charge indicator
- Speedometer
- Traction Drive Current Meter
- Low/High Gear Indicator
- Parking Brake Indicator
- Traction Motor Temperature
- Traction Drive Temperature
- Battery Voltage
- Hours



#### Imperial/Metric Units:

Press **C** then **B** at the same time for 3 seconds to toggle from Imperial to Metric Units.

#### Error Messages:

The multi-function display is capable of showing many error, warning, and informational messages such as Low Battery Level, Motor Inverter Fault, and others.

#### I/O Diagnostics:

Press **D** to from the Operation Screen to view the I/O diagnostics menu. This menu allows you to review a wide range of data about the vehicle. Flip between diag screens using the arrows, and use **D** to exit the diagnostics.

See below for a brief description of each parameter.

#### Diagnostic Screen 1 – Low/High Gear Parameters:

- MAX SPD L: Max Low motor RPM parameter setting
- MAX SPD H: Max High motor RPM parameter setting
- CUR MODE: Current Speed Mode on the traction controller

#### Diagnostic Screen 2 – Throttle Parameters:

- TPS1 Value: Throttle Wiper 1 current voltage
- TPS2 Value: Throttle Wiper 2 current voltage
- THR CMND: The throttle percent currently being sent to the traction drive, from -100% for full reverse to +100% for full forward.

#### Diagnostic Screen 3 – Traction Drive Parameters:

- TRAC DRV TEMP: Temperature of the traction drive inverter
- TRAC MTR TEMP: Temperature of the traction motor
- TRAC MTR RPM: Traction motor RPM
- TRAC RMS CUR: Current traction motor torque current

#### Diagnostic Screen 4 – Hydraulic Pump Parameters:

- PUMP DRV TEMP: Pump inverter temperature
- PUMP MTR TEMP: Pump motor temperature
- PUMP MTR RPM: Pump motor speed
- PUMP STATUS: ON for throttle command to pump, OFF for no throttle command
- LOW PRESS SW: Status of the low pressure switch
- HIGH PRESS SW: Status of the high pressure switch
- PRESS STATE: Pressure state based on the two pressure switches, LOW, NORMAL, or HIGH.

#### Diagnostic Screen 5 – Shifting Parameters:

- LOW GEAR SW: Status of the low gear switch input
- LOW GEAR SENS: Status of the low gear sensor
- SHIFT LOW SOL: Output status of the shift low solenoid
- HIGH GEAR SW: Status of the high gear switch input
- HIGH GEAR SENS: Status of the high gear sensor
- SHIFT HIGH SOL: Output status of the shift high solenoid

### 5.5.1 Multi-Function Display (*continued*)

Diagnostic Screen 6 – Inching Parameters:

- DRIVE-INCH MODE: Status of the Drive/ Inch switch
- INCH-FWD SWITCH: Status of the Inch forward switch on either of the front or rear Inching switches
- INCH-REV SWITCH: Status of the Inch reverse switch on either of the front or rear Inching switches
- INCH HOLD TIME: Maximum inching duration before timeout

Diagnostic Screen 7 – Miscellaneous I/O:

- P BRAKE SW: Parking brake switch status
- S BRAKE SW: Service brake switch status
- HIGH HYD TEMP: Hydraulic overtemp switch status
- FWD SW: Forward switch input status
- REV SW: Reverse switch input status
- BRAKE RLY: Brake relay power output status
- FAN RLY: Cooling fan relay power output status

Diagnostic Screen 8.1 – Battery Parameters for Lead Acid battery:

- STATE OF CHARGE: Current state of charge
- VOLTAGE: Current battery voltage
- TEMPERATURE: Current battery temp
- TOTAL AH DISCH: Total lifetime battery amp-hours discharged
- TOTAL AH CHARG: Total lifetime battery amp-hours charged

Diagnostic Screen 8.2 – Battery Parameters for Lithium battery:

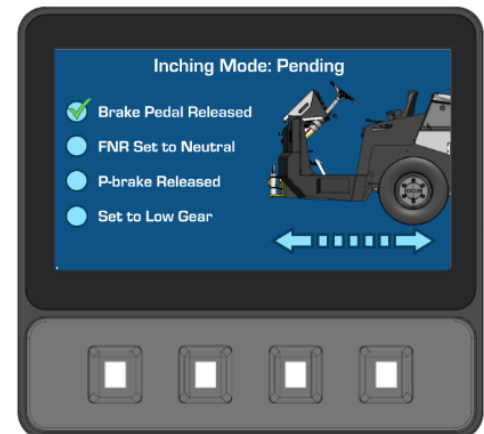
- STATE OF CHARGE: Current state of charge
- VOLTAGE: Current battery voltage
- TEMPERATURE: Current battery temp
- Battery diagnostic parameters

### 5.5.2 Inching Mode

Inching mode allows the tractor to be controlled from the front or rear of the unit at a very slow and controlled speed.

To enable inching functionality, switch the DRIVE/INCH mode switch in the dash to the INCH position. In order to complete the transition to inching mode, the following requirements must also be met.

- Service brake pedal released
- FNR switch set to neutral
- P-brake released
- Transfer case set to LOW



As each requirement is met, the display module will dynamically reflect the status. Once the display shows that the Inching mode is active, the inching switches (1 at the front and 1 at the rear) will be enabled.

To inch, press and hold the inching switch in the desired direction. The tractor will roll in the requested direction for as long as the switch is pressed, up to a maximum value. If additional inching travel is required, release and then re-press the switch.

To return to normal operation, return to the operator compartment and return the DRIVE/INCH mode switch in the dash to the DRIVE position.

### 5.5.3 Steering Sync Operation

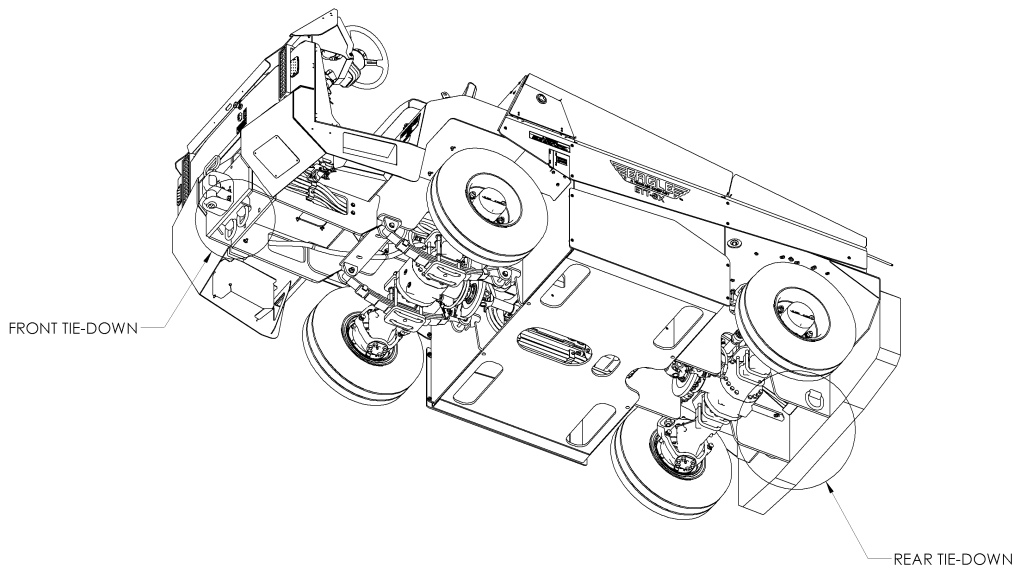
The steering calibration mode is used to recalibrate the front and rear axles in the event that a synchronization is lost between the front and rear steering.

To perform steering sync, set the FNR directional switch to neutral. Apply the parking brake and set the DRIVE/INCH switch to DRIVE. Press and hold the STEERING SYNC SWITCH on the dash with one hand and, use the other hand to turn the steering wheel all the way to the left till it dead heads. Release the STEERING SYNC SWITCH. Perform visual inspection of the steering while turning all the way from left to right while being stationary.

## 6.0 PACKAGING AND STORAGE

### 6.1 HANDLING

#### 6.1.1 Tie Downs

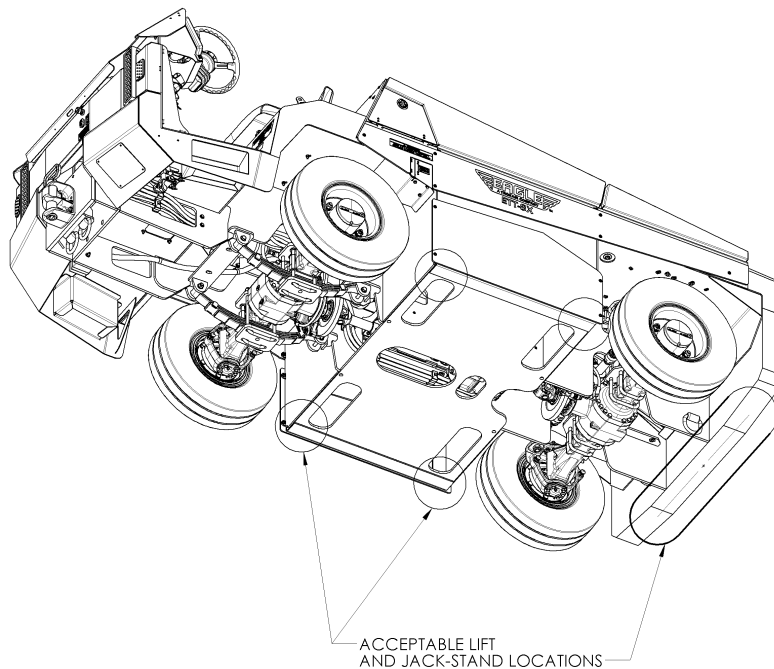


The eTTX is equipped with four heavy duty tie-down rings located on the front and rear of the tractor. These tie-downs provide for safe ground transportation.

When securing the tractor, chains/straps should not make contact with the tractor in any area other than the tie down rings. At no point should the hitches be used for securing the tractor.

#### 6.1.2 Jacking and Jack Stand locations

When lifting the eTTX with jacks use the locations shown above for maximum safety.

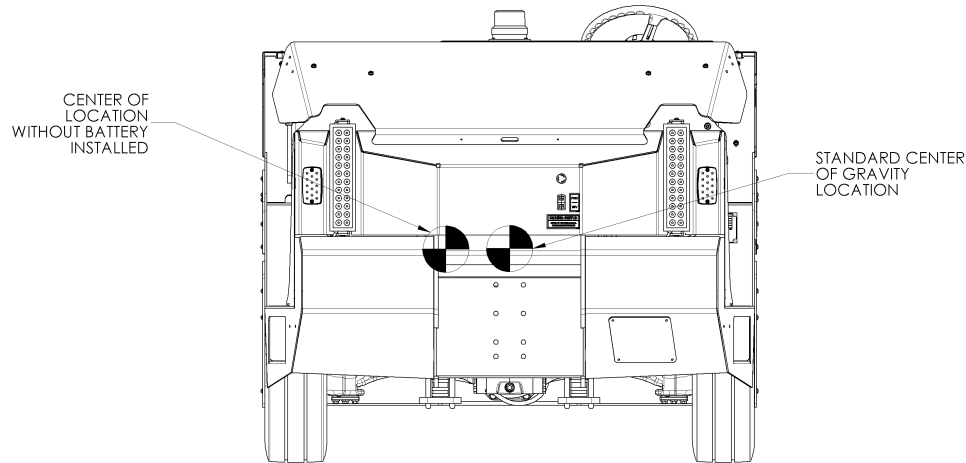


Jacks and jack stands should be rated for 5 short tons or 5 metric tons minimum when using one located at each corner of the tractor.

Wheel lug nut torque: 200 ft-lb

### 6.1.3 Weight Distribution Without Battery

The battery or batteries of the eTTX series tractor constitutes a large portion of the total tractor weight. Removal of the battery will result in a large shift in center of gravity location. For a single battery option, the center of gravity will shift from the center. For dual battery option, the center of gravity location will not be affected.



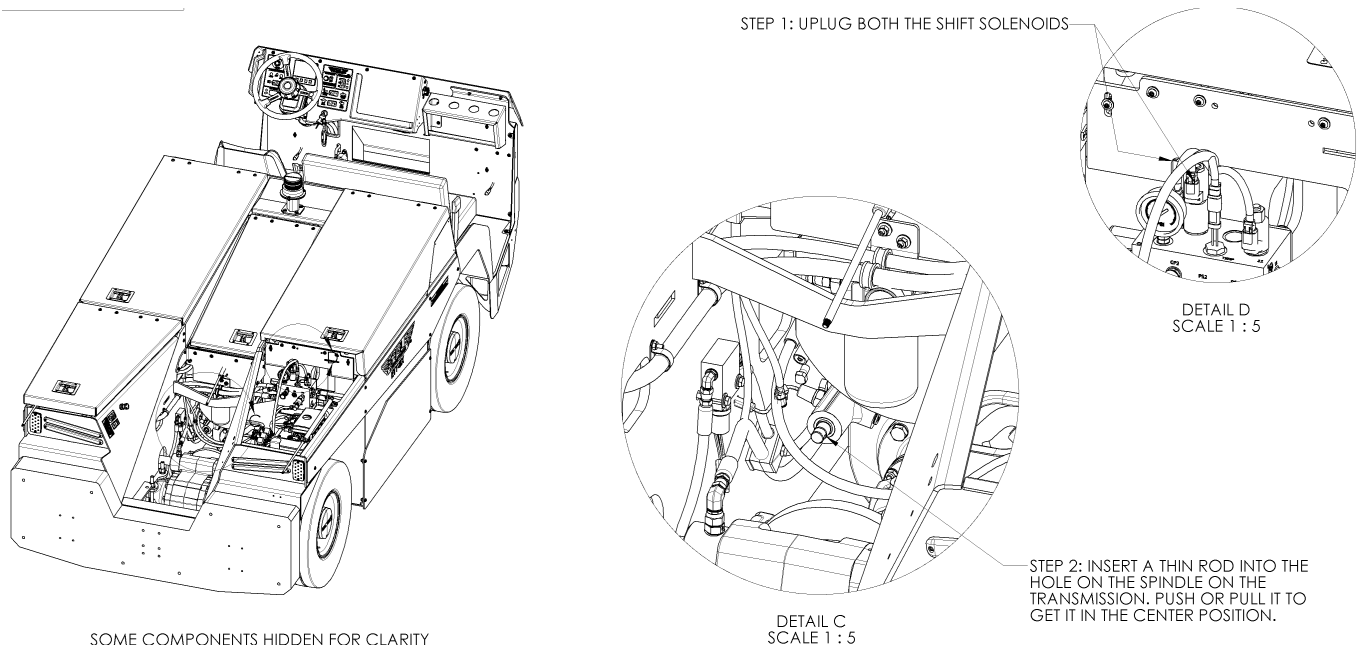
When transporting or handling a tractor without a battery installed, the new center of gravity needs to be taken into account. When lifting with a fork lift, always lift from the heavy side (non-battery side). When lifting with jacks, factor in the new center of gravity location.

### 6.1.4 Flat Towing

Should the eTTX tractor be disabled, it can be flat towed for short distances as long as the following is observed:

- The maximum speed should never exceed 5 mph / 4.5 kph
- The maximum distance should not exceed .5 mile / .8 kilometer
- The tractor is turned off and the battery is disconnected
- The tractor should be put in Neutral using the below mentioned steps.

During towing, the axles may be steered with the steering wheel, but at a greatly increased effort.





## 7.0 TROUBLESHOOTING

### 7.1 OPERATIONAL TROUBLESHOOTING

<b>Tractor won't move when the throttle pedal is pressed</b>
Verify that the parking brake is released. Confirm by looking at the display module for the parking brake icon. If the indicator graphic does not turn off the parking brake proximity sensor is not working correctly
Verify that the tractor is in the selected gear by looking at the dash shift selector switch and display module. A brand-new transmission may hesitate when shifting until the gears get some hours on them. Switch between high/tow a couple times to attempt to get the transmission fully into the desired gear
Verify that the tractor is in Drive Mode
Verify that no active codes are present that could be impeding travel
Use the display module diagnostics to verify the throttle pedal input is working correctly
<b>Tractor won't inch when switches are pressed</b>
Verify that the tractor is in inch mode
Use the display module to verify that all inching mode requirements have been met
Verify that the surface you are on is flat and level. The inching functionality is not intended to be used while under load, including up-slope
Use the display module diagnostics to verify that inching switch input commands are being received
<b>Tractor drives very slowly (creeping) and will not speed up</b>
The tractor may be in limp-home mode. Use the display module to verify that there are no active errors or codes that could be causing the issue
Incorrectly installed UVW cables can cause this issue. Inspect the UVW cables to verify that they are properly installed on the motor and the traction drive
A faulty motor speed sensor can cause this issue. Use the display module to watch the motor speed while driving at a slow speed. The input should be smooth during travel. If the motor speed oscillates between positive and negative while traveling, replace the drive motor encoder bearing
Low battery state of charge will put the vehicle in Limp-mode. Check if the battery state of charge is below 30%. If so, plug in to a charger.
<b>Tractor battery does not last long before needing to be charged</b>
Battery life is directly dependent on usage of the tractor. Some causes of short battery life are shown below
Do not tow loads in high gear. High gear is intended to be used for unloaded travel only. Towing while in high gear will drain the battery very quickly
After a full equalization charge on the battery, inspect the specific gravity of each cell. If the specific gravity is lower than a full charge, have the charger serviced. If any individual cell differs by more than .020 from the nominal 1.290 (positive or negative), have the battery serviced
Verify that the drivetrain is freely moving and that no bearings, brakes, or other components are creating resistance in the drivetrain
<b>Charger is giving an error message or not working properly</b>
Tronair does not service the battery charger for the truck. For the most expedient assistance with a charger issue, please contact the manufacturer of the charger directly. Tronair can assist with working with the charger manufacturer if you do not get a prompt response
<b>Battery is not performing properly or cells are out of specification</b>
Tronair does not service the battery for the truck. For the most expedient assistance with a battery issue, please contact the manufacturer of the battery directly. Tronair can assist with working with the battery manufacturer if you do not get a prompt response
<b>Vehicle is crabbing when the steering wheel is held in straight position</b>
Perform steering sync operation using the instruction mentioned above. ( <i>Section 5.5.4</i> )

7.1 OPERATIONAL TROUBLESHOOTING (*continued*)

**Hydraulic pump runs more frequently than usual, or does not shut off**

One possible cause is that the system cannot maintain pressure. A relief valve stuck in the open position or any other valve or seal that is bleeding pressure from the accumulator will result in reduced battery life and increased component wear

- Let the pump charge the system and then shut off. With the pump off, listen for any hydraulic bleed-by that is draining the accumulator pressure
- Watch the pressure gage located on the manifold block once the system has charged. The pressure should hold at a steady rate. If no pressure bleeds seem to be present and the system can hold pressure for a long period of time, there may be an issue with the gear pump
- Test the time to charge the accumulator from a fully depressurized state. If the accumulator takes longer to charge than when new, the hydraulic pump may be worn or damaged. An alternative cause of frequent pump operation is a loss of accumulator pre-charge. The accumulator relies on highly compressed nitrogen to store hydraulic energy. If some of the nitrogen leaks out, the accumulator will store much less energy and the pump will have to work much more often
- Test the number of turns possible on the steering wheel after the pump charges the system up, before the pump turns back in in response to low pressure. If the amount of turns differs significantly from when new, the accumulator pre-charge should be checked



## 7.2 ERROR CODES

Below are error codes for the traction and pump motor controllers. Should one of these devices detect an issue, the device and error code will be displayed on the vehicle display module.

### **202: Controller Overcurrent**

Effect: System shutdown of all drive components (motor, pump, contactors)

This error means that the electrical current to the motor has exceeded pre-set limits. Possible causes are:

- The U/V/W cables to the motor are shorted to the tractor frame or each other. Verify that the U/V/W cables are in good condition and not shorted. Replace the cables if necessary.
- There is noise on the speed encoder signal. Verify that the speed encoder is working properly (that the tractor drives smoothly). If not, replace the speed encoder.
- If the motor cables and speed encoder are working correctly and the issue persists, replace the controller.

### **207-209: Phase Not Connected**

This error means that one of the U, V, or W wires are not connected properly. Possible causes are:

- One of the U, V, or W wires is loose. Verify motor U, V, and W connections are tight and secure.
- One of the U, V, or W wires is faulty or improperly crimped. Verify that the U, V, and W wires are in good condition with good crimps. Replace as necessary.

**Motor Temperature Sensor:** Ensure motor temperature sensor is connected properly.

**600: Not Connected** – Check wiring on the motor temperature sensor. Sensor is defective.

**601: Short Circuit** – Check wiring on the motor temperature sensor. Sensor is defective.

**602: Moderately high** – Event is set if motor temperature is above a predefined setpoint. Max allowed AC current is limited.

**603: High** – Event is set if motor temperature is above a predefined setpoint. Motor is disabled.

**604: Moderately low** – Event is set if motor temperature is below a predefined setpoint. Max allowed AC current is limited.

**Controller Temperature Sensor:** Ensure cooling fins are free of debris.

**700: Not Connected** – Sensor inside the controller is defective.

**701: Short Circuit** – Sensor inside the controller.

**702: Moderately high** – Event is set if controller temp is above a predefined setpoint. Max allowed AC current is limited.

**703: High** – Event is set if controller temp is above a predefined setpoint. Motor is disabled.

**704: Moderately low** – Event is set if controller temp is below a predefined setpoint. Max allowed AC current is limited.

### **800: Sensor Supply not connected**

### **801: Sensor Supply High current**

This error means that the 5V and 12V controller output currents are out of range. Possible causes are:

- The motor speed encoder connection is faulty. Verify encoder wiring connection and repair any issues.
- The motor speed encoder is faulty. Replace the motor speed encoder.

### **802-805: Encoder Fault**

Effect: Shutdown throttle

This error means that the motor speed encoder data cannot be read reliably by the controller. Possible causes are:

- The motor speed encoder has a wiring connection issue. Verify speed encoder connection and wiring.
- The motor encoder is faulty. Replace the encoder.

**Open Drain Output faults:** Check wiring for respective coils below or the coils are defective.

**1001, 1011, 1021, 1031** – Main contactor faults.

**1002, 1012, 1022, 1032** – Shift low solenoid faults

**1003, 1013, 1023, 1033** – Shift high solenoid faults

**1004, 1014, 1024, 1034** – Brake light relay faults

**1006, 1016, 1026, 1036** – Cooling fan relay faults

## 7.2 ERROR CODES (Continued)

### 1250- 1280: PDO Timeout

Effect: Shutdown throttle

This error means that the CAN communication failed to transmit data properly. Possible causes are:

- Faulty CAN wiring. Verify the CAN communication wires between the controller and the display module and repair as necessary.
- Missing CAN termination jumper. Verify the jumper wire connection between pins 9 and pins 22 on the pump controller
- Missing CAN termination resistor near the display. Verify the 120-ohm 3 pin resistor under the dash is connected.

### 10110 – 10114 Pedal Handler faults

- Check if the wiring for accelerator pedal is intact.
- Faulty accelerator pedal.

Code	Fault Message	Effect of Fault	Possible Cause	Set/ Clear Conditions
Warning	Return to Neutral Before Driving	Disable throttle output	The unit is keyed on with the vehicle direction rocker set to Forward or Reverse instead of Neutral	Set Gear To Neutral
Warning	Inch Mode Time Up	Disable throttle output	Inching hold time surpassed	Release The Forward/ Reverse Inching Switch And Re-Press
Fault	Throttle Compare Fault, Service Throttle Pedal	Disable all traction and pump activity	If the throttle pedal wiper 1 and 2 compare fail	Force A Key Cycle To Reset
Fault	Inching Switch Fault, Service Inching Switches	Disable all traction and pump activity	If an inching switch is active (forward or reverse) on key-on	Force A Key Cycle To Reset
Fault	Inching Switch Fault, Service Inching Switches	Disable all traction and pump activity	If both inching switch inputs (forward and reverse) are activated simultaneously	Force A Key Cycle To Reset
Fault	Motor Control Fault	Disable all traction and pump activity	If the motor RPM exceeds 1.5x the command speed during inching	Force A Key Cycle To Reset
Fault	Pressure Switch Or Pump Failure, Service Hydraulic System	Disable all traction and pump activity	If the pump motor runs for <b>30</b> seconds continuously without triggering the Pressure Good or Pressure High state	Force A Key Cycle To Reset
Fault	Hydraulic Fluid Over Temp	Disable all traction and pump activity	If the hydraulic temp switch shows over-temp	Force A Key Cycle To Reset
Fault	Pressure Switch Fault, Service Pressure Switches	Disable all traction and pump activity	If both high and low pressure switches are OFF at the same time	Force A Key Cycle To Reset
Fault	Low Battery, Charge Required	Reduce vehicle speed to 1 mph	battery SOC falls to <b>30%</b> or lower	Force A Key Cycle To Reset
Fault	Battery Low Voltage, Please Charge Or Service	Reduce vehicle speed to 1 mph	If the battery voltage reported falls below <b>60V</b> for <b>2</b> or more seconds at a time	Force A Key Cycle To Reset
Fault	Gear Shift Fault	Disable throttle output	If the gear sensor output stays 0 for 5 seconds	Gear Sensor=1
Fault	Operator Presence Switch Error, Traction Disabled	Disable all traction and pump activity	Operator seat switch opened	Set Gear To Neutral. Seat Switch = Closed



## 8.0 MAINTENANCE

### 8.1 PREVENTIVE MAINTENANCE SCHEDULE

Any items found to be deficient during the preventive maintenance review should be repaired or replaced. All fluids found low should be topped off. Refer to this section for fluid and filter specifications and part numbers.

\* See relevant diagrams/instruction in this section for these items.

† Whichever time period is shorter.

Preventive Maintenance Item	Daily	Weekly	First 50 hours	First 150 hours	500 hours	1000 hours or annually †
Perform daily pre-operation checklist	X					
Check hydraulic fluid level and top off as necessary (Section 8.3)		X				
Verify tire pressure and add air as necessary		X				
Perform battery equalization charge then water (For Battery option 1)		X				
Re-torque front and rear axle U-bolts			X			
Drain and replace axle oil; center & planetaries (1 <sup>st</sup> time only: Section 8.5)				X		
Drain and replace transfer case oil (1 <sup>st</sup> time only: Section 8.6)				X		
Check axle oil level, center and planetaries					X	
Clean axle oil breathers (Section 8.5)					X	
Grease upper and lower kingpin grease fittings on axles					X	
Check transfer case oil level					X	
Clean transfer case oil breather					X	
Grease driveshaft U-joints and slip shafts					X	
Inspect wheel lug nuts and tighten if necessary					X	
Check all battery cable connections for tightness and corrosion						X
Drain and replace axle oil; center and planetaries (Section 8.5)						X
Clean axle magnetic drain plugs						X
Drain and replace transfer case oil (Section 8.6)						X
Clean transfer case magnetic drain plug						X
Drain hydraulic fluid from tank and replace (Section 8.3)						X
Remove and clean hydraulic magnetic drain plug						X
Replace hydraulic filter, A-ES12-0485 (Section 8.4)						X
Inspect axle U-bolts for loosening and tighten if necessary						X
Re-torque driveshaft U-joint straps and flange hardware						X
Inspect wet brake discs for wear and replace if necessary						X
Check front parking brake disc and pads and replace if necessary						X
Inspect steering tie-rod ball ends for play and replace if necessary						X
Inspect steering tie-rod adjustment nuts and tighten if necessary						X
Inspect steering stops and re-set/tighten if necessary						X
Inspect steering sensor potentiometers						X



8.1 PREVENTIVE MAINTENANCE SCHEDULE *(continued)*

Preventive Maintenance Item	Daily	Weekly	First 50 hours	First 150 hours	500 hours	1000 hours or annually †
Inspect all hydraulic tubes and hoses for wear/damage and leaks						X
Inspect hitch pins for wear and replace if beyond specifications						X
Inspect motor / transfer case mount isolators and replace if necessary						X
Check steering accumulator pre-charge pressure (key-on hours)						X

8.2 FLUIDS

		FLUID SPECIFICATIONS	
Fluid	Recommendation	Requirement	Volume approximate
Hydraulic Fluid	MOBIL AERO HF	MIL-PRF-5606	7.5 gal (28.4 L)
Axle Gear Oil	FUCHS TITAN EG LS 90 (GL5)	API GL5	1 gal (3.7 L)
Transfer Case Oil	ELF SF3 (GL4)	API GL4	1 gal (3.7 L)
Brake Fluid	MOBIL AERO HF	MIL-PRF-5606	0.5 gal (2.0 L)

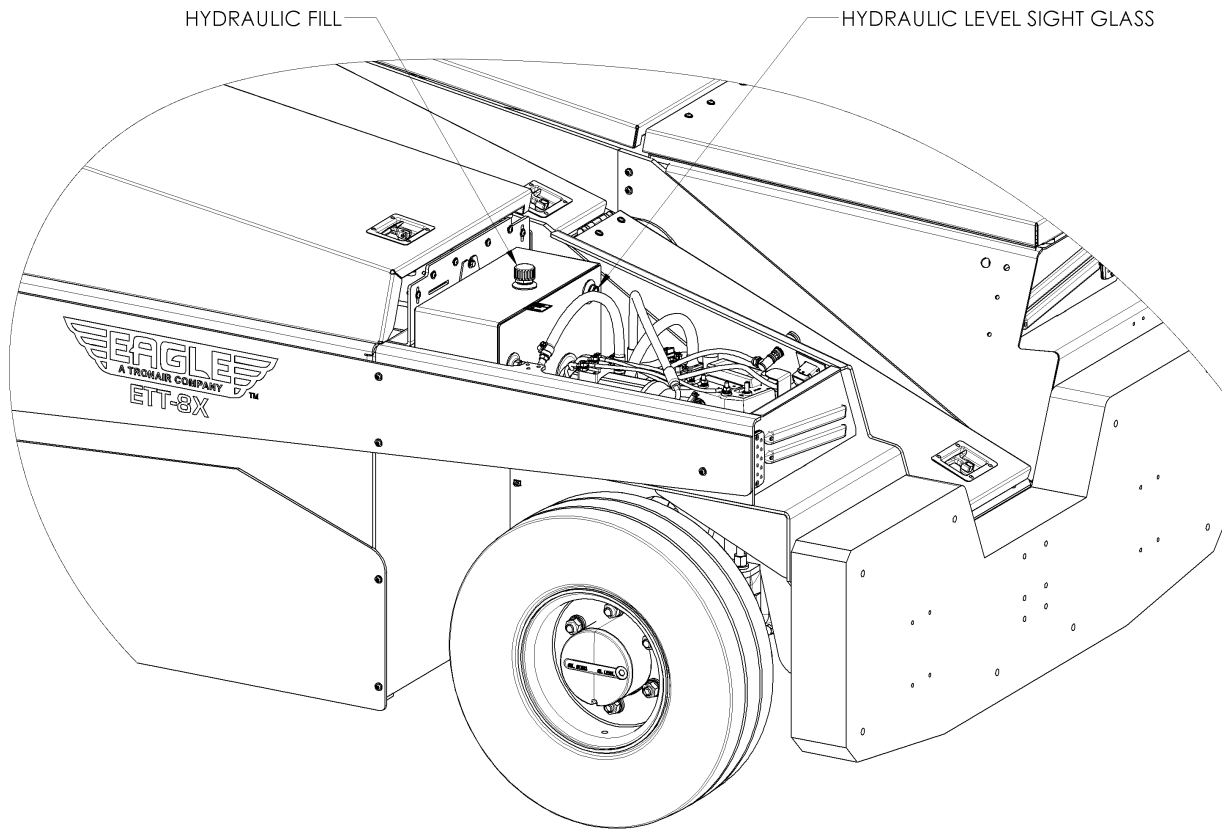
8.3 HYDRAULIC SIGHT GLASS AND FILL

**Hydraulic Fluid:**

Recommendation ..... MOBIL AERO HF

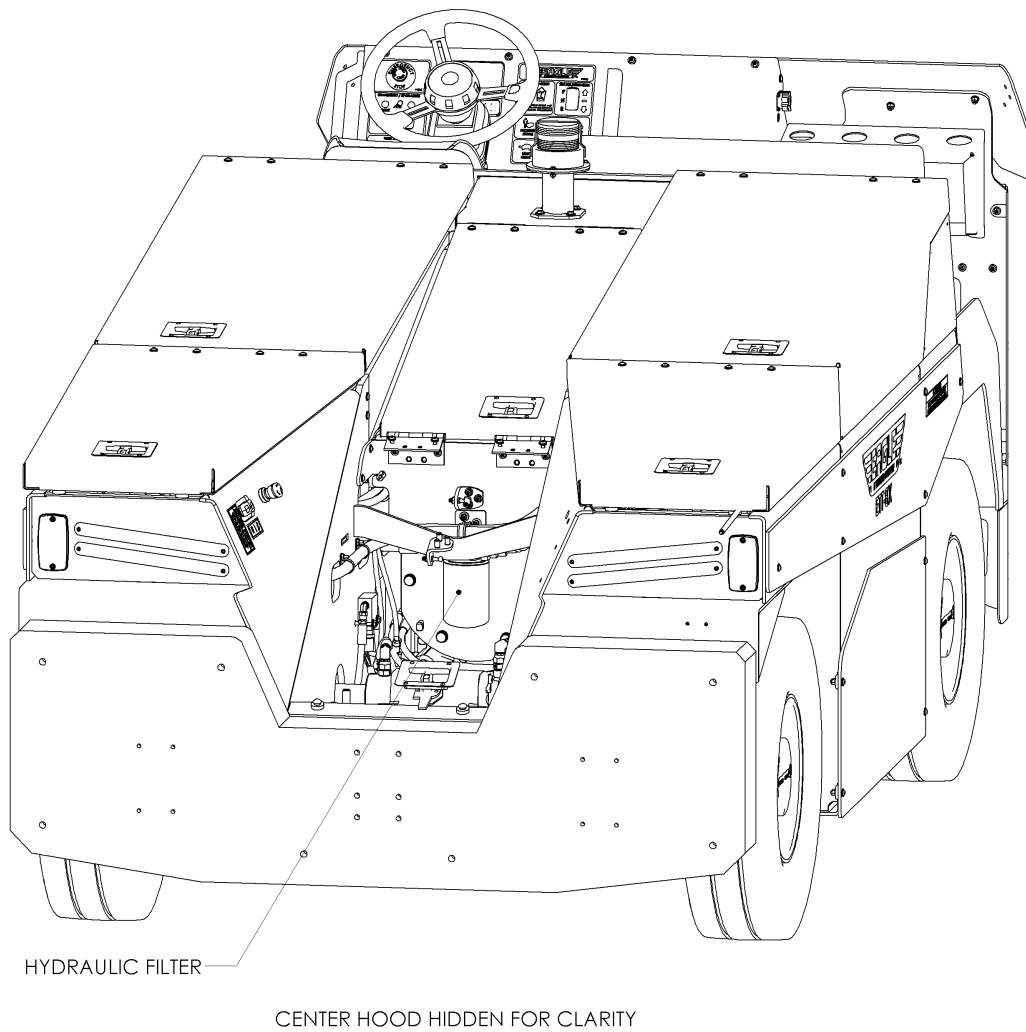
Total Volume ..... 10.3 gal (39 l) approximate

Tank Volume ..... 7.5 gal (28.4 l) approximate



HOOD REMOVED FOR CLARITY

8.4 HYDRAULIC FILTER  
Hydraulic Filter ..... A-ES12-0485

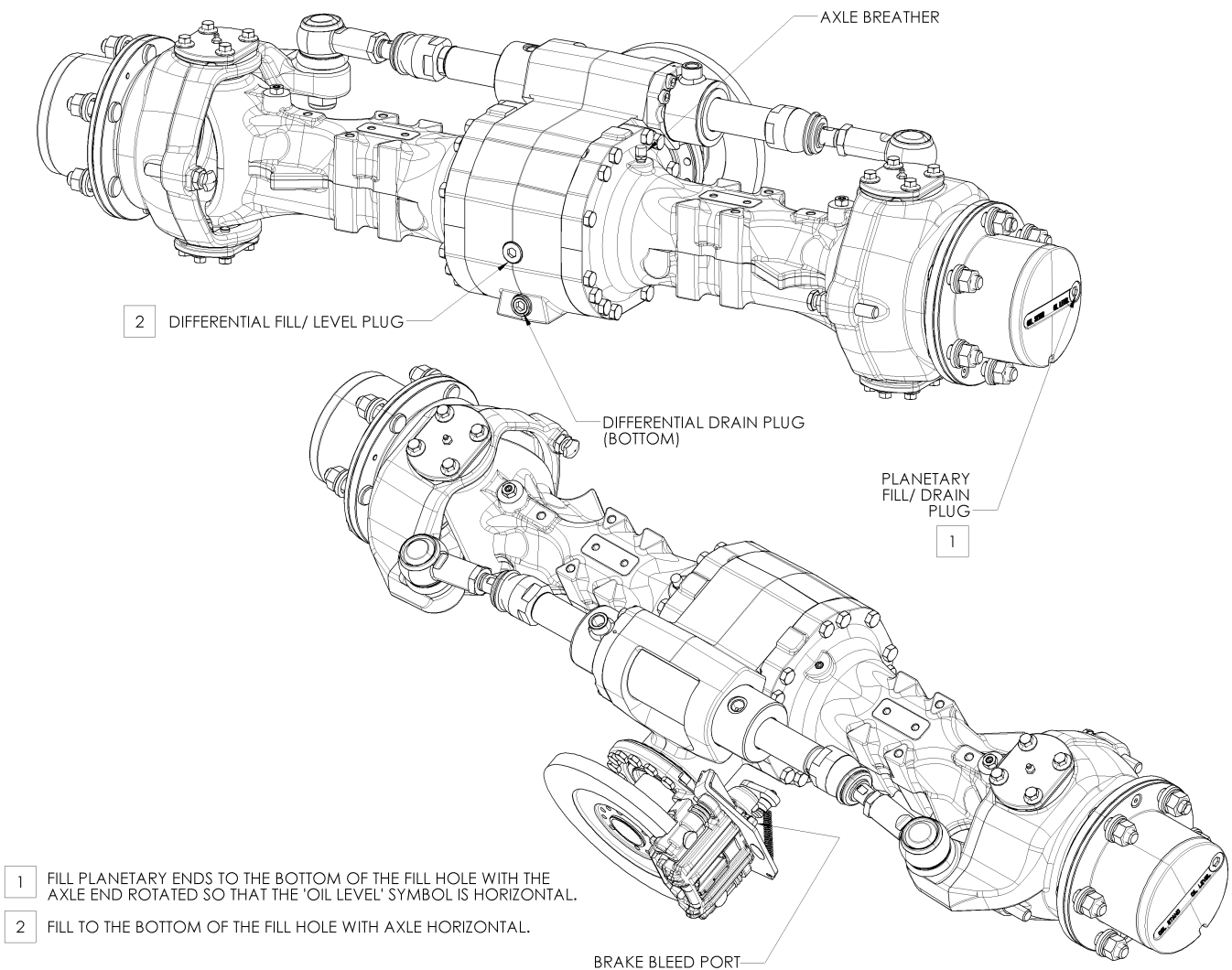


## 8.5 PLANETARY AXLE SERVICE POINTS

### Axle Gear Oil:

Recommendation .....	FUCHS TITAN EG LS90 (GL5)
Center Volume .....	0.9 gal (3.5 l) approximate
Planetary Volume (each) .....	0.1 gal (0.4 l) approximate
Total Volume (each axle) .....	1 gal (3.9 l) approximate

Oil level should be maintained at the bottom of the planetary and differential Oil Fill ports.



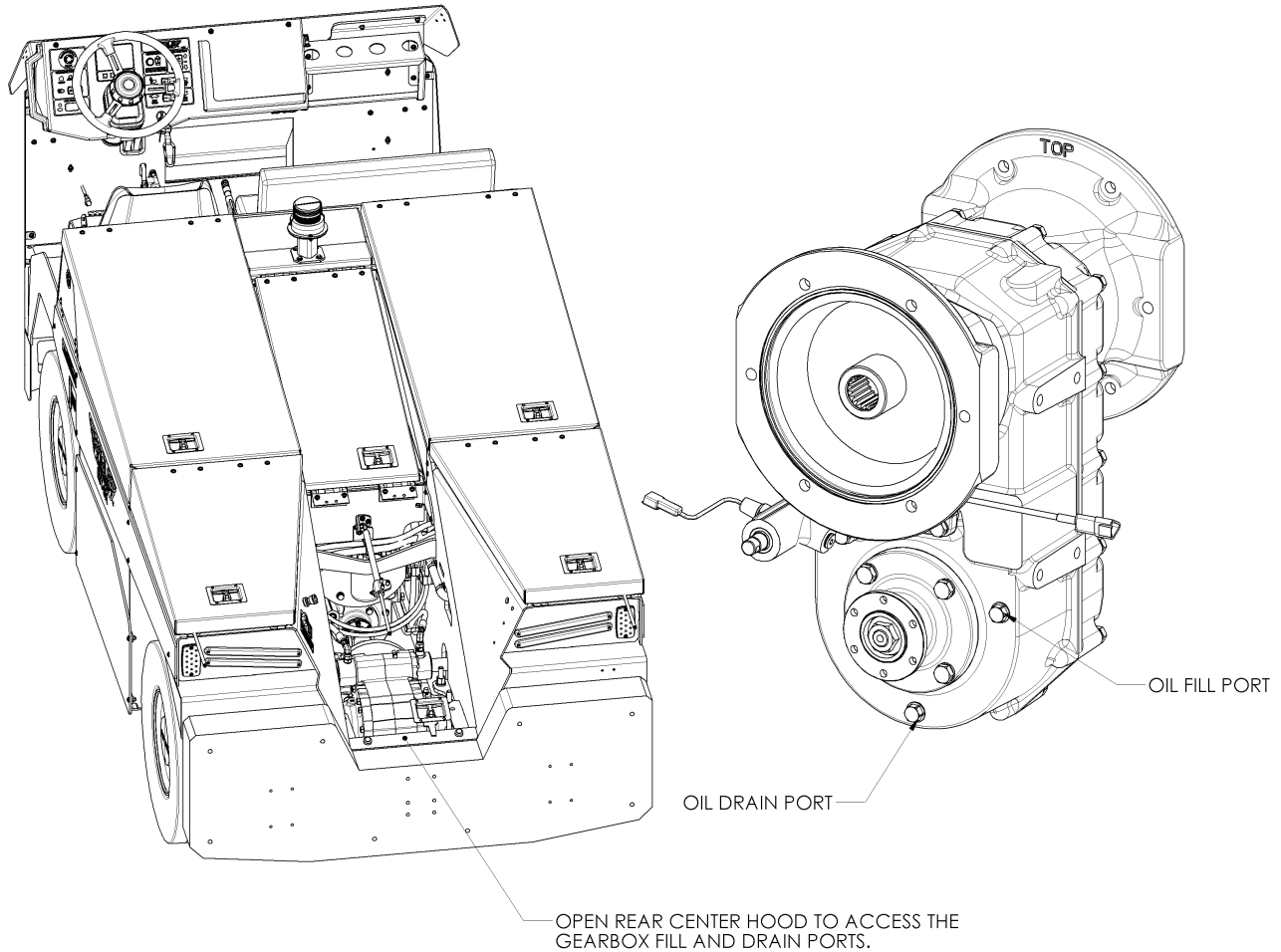
## 8.6 TRANSFER CASE SERVICE

### Transfer Case Oil:

Recommendation ..... ELF SF3 (GL4)

Volume ..... 1 gal (3.7 l) approximate

Oil level should be maintained at the bottom of the Oil Fill port.





## 8.7 BRAKE SERVICE

### Brake Fluid:

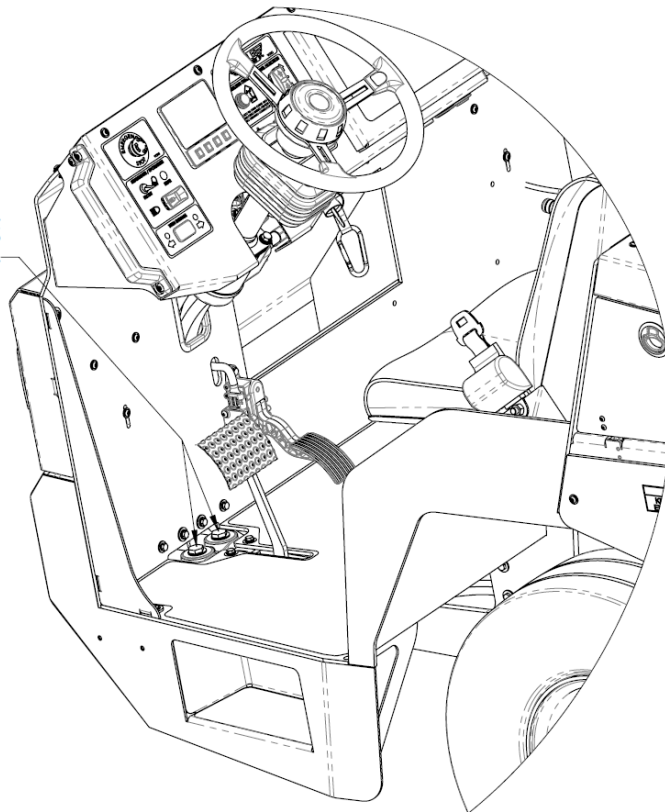
Recommendation ..... MOBIL AERO HF

Volume ..... 0.5 gal (2.0 l) approximate

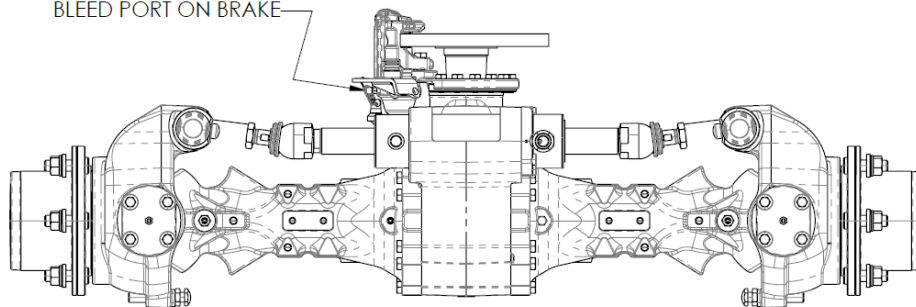
Use bleed ports on brake caliper sets, front and rear. Fill master cylinder reservoirs, re-cap reservoirs, and then pump brakes to fill lines and bleed air. Repeat until lines are full and reservoir is  $\frac{3}{4}$  full.

Volume shown is approximate to fill both front and rear lines. Rear lines will require more fluid than the front.

FILL PORTS ON MASTER CYLINDERS.  
REPLACE CAPS/PLUGS  
AND COVER AFTER FILLING.



BLEED PORT ON BRAKE



## 8.8 BATTERY CARE INSTRUCTIONS

The ETT-8X and -12X Eagle Tugs have the option to be configured with a lead acid or lithium battery. Both options have different requirements for care to be considered to ensure the best potential for performance and battery life.

**Note: Tronair / Eagle Tugs is not a battery nor charger manufacturer, but Tronair may recommend certain brands and models. The below information applies regardless of what brand and model traction battery or charger is on the truck.**

### 8.8.1 Lead Acid Battery Care

#### 8.8.1.1 Battery Basics

The ETTX traction battery is a heavy-duty industrial battery designed specifically for electrical vehicle usage. The battery is a collection of 40 individually sealed cells combined into two heavy gage steel trays. The battery provides the motive power for the ETTX as well as providing necessary ballast weight.

For a lead acid battery, individual battery cells consist of lead plates separated from each other by porous mats. The lead plates are immersed in a sulfuric acid solution. Discharging and charging the battery causes chemical reactions between the lead plates and the sulfuric acid. This chemical process is repeatable and provides the basis for continued charge and discharge cycles.

Batteries produce both voltage and amperage. Voltage is the measure of electrical potential and can be thought of analogously as the fluid "pressure" in the electrical system. Amperage is the quantity of current flow and is likewise analogous to fluid "flow". Both voltage and amperage work together to do work in the battery system. The product of voltage and amperage is watts.

Each battery cell produces a nominal voltage of 2.0 volts. The actual voltage ranges from 2.15 volts when fully charged, to 1.97 volts when completely discharged. The cells are wired in series which causes the voltage to add from each cell. The 40 cells at 2.0 volts per cell creates an 80V nominal battery.

Batteries are rated in ampere-hours. An ampere hour is the number of amps (current) a battery can supply in a given amount of time. Most batteries are rated at a 6-hour discharge, meaning that the current output is spread over a 6-hour period of time. The ampere hour rating along with the battery voltage determine the total amount of energy a battery can store.

To measure the current state of charge of a battery cell, the most accurate method is by using specific gravity. The acid solution in the battery varies greatly by charge level. A fully charged battery will have a very strongly acidic electrolyte. In a fully discharged battery the acid solution is very weak. This has to do with the sulfuric acid in the solution being absorbed into the lead plates during discharge. Sulfuric acid and water have different densities, so an accurate measure of the density (specific gravity) of the electrolyte will tell you the percentage of acid present in the electrolyte. The specific gravity reading can be measured with a hydrometer and should be compared to a chart provided by the battery manufacturer to accurately determine state of charge.

The battery electrolyte loses water over time to both evaporation and electrolysis (breaking up of water into hydrogen and oxygen through an applied electric current). The electrolysis happens naturally as part of the charging cycle. Water has to be re-introduced into the battery to account for the water loss. Each cell should be topped off regularly to prevent a low electrolyte situation. Low electrolyte in the battery will lead to reduced power output and can damage the cells.

To ensure that all 40 individual cells are working at the same level, an equalization charge is periodically required. The equalization charge is essentially a controlled overcharge. It ensures that all cells are at their absolute maximum capacity. Battery water levels should be corrected immediately after equalization. The equalization charge will have heated the electrolyte, causing it to expand and be at its highest level. If you water a cold battery and then equalize, the electrolyte will overflow, spilling acid on the ground.

#### 8.8.1.2 Charger Basics

The purpose of the charger is to use electrical power to reverse the chemical reaction in the battery and return it to a charged state.

During the charge process, the lead plates in the battery reverse their chemical charge and the electrolyte acid becomes more concentrated. The specific gravity will also change, reflecting the change in acid concentration.

Tronair only recommends the use of smart chargers with ETTX batteries. Smart chargers communicate with a battery monitoring module installed to the battery. This module informs the charger of voltage and temperature of the battery to prevent overcharging and extend the life of the battery.

The charge cycle starts out at a high amperage, up to 23 amps per 100 ampere hours of battery capacity. As the battery charge state rises, the charge amperage will slowly taper off to 5 amps per 100 ampere hours of battery capacity until the battery reaches a full charge.

An equalization charge will hold the final charge amperage of 5 amps per 100 ampere hours for approximately three hours past full charge. This provides an opportunity for all cells to reach their absolute maximum charge levels. The equalization phase of charging will also cause degassing of the electrolyte through electrolysis. The bubbles created during degassing are beneficial to the battery. The bubbles stir the electrolyte and prevent concentrated acid from settling to the bottom of the battery cells.

Batteries produce heat when discharged and charged. During charging the battery temperature can rise significantly to the point of damaging the battery. The battery should never exceed 115°F/46°C at any time. A smart charger monitors the temperature and will cut back on charging amperage should the battery temperature approach the 115°F/46°C limit.

The ETTX tractor line features a Burton style charge connector on the side of the tractor. This connector is where you plug the charger into the tractor. A small switch located in the charge connector will prevent tractor drive-off when the charger is plugged in.

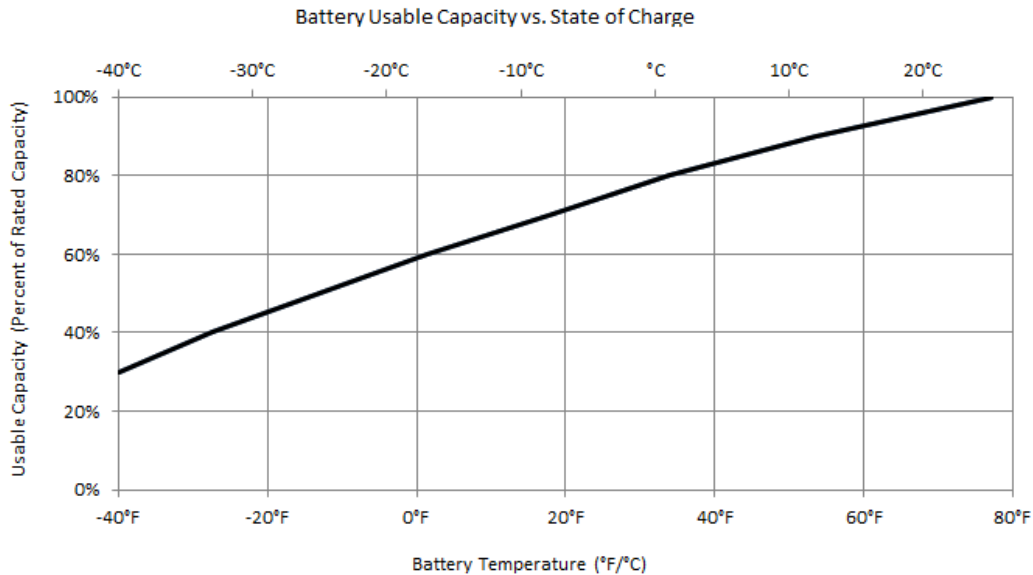
#### 8.8.1.3 Cold Weather Usage

There are two issues that batteries face in extremely cold weather; Reduced Capacity and Freezing Electrolyte.

#### 8.8.1.4 Reduced Capacity

As the battery temperature drops, the internal resistance of the battery increases and the usable capacity is decreased. At a battery temperature of  $-10^{\circ}\text{F}$  /  $-23^{\circ}\text{C}$ , the battery can only deliver roughly 50% of the rated capacity. At higher loads, the usable capacity is reduced even further. During a tow event, the ETTX tractor can demand large amounts of current from the battery. A battery cold-soaked to a low temperature may not be able to maintain voltage at the required current, leading to error messages and an inability to tow the load.

See the below chart for a general idea of the temperature effect on capacity.



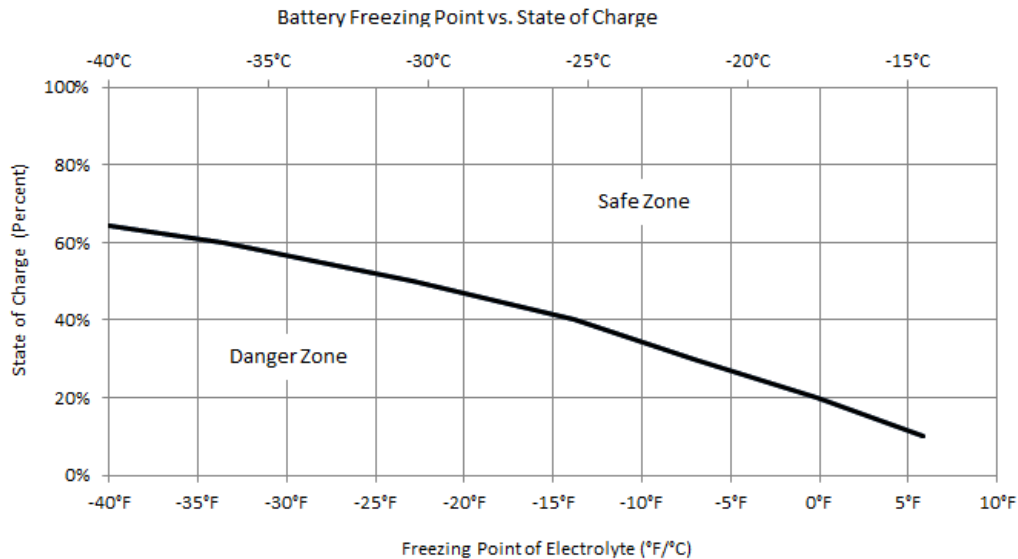
There are a few ways to ensure that the tractor will be able to perform in cold weather:

1. When leaving a tractor/battery in cold weather for long periods, ensure that the battery is fully charged. This will ensure the maximum possible capacity during cold operation, and will also prevent possible electrolyte freezing (see following page).
2. The battery will produce heat internally during normal usage. Because of this behavior, a battery stored in a climate controlled environment will be usable in a non-climate controlled environment without degradation of performance. The battery will maintain the internal temperature while in use.
3. The battery is heated during a charge cycle. This can warm or maintain battery temperature even if the battery is being charged in a cold environment.

#### 8.8.1.5 Electrolyte Freezing

The electrolyte in the ETTX traction battery is a weak sulfuric acid solution. As the battery is discharged, the acid is absorbed by the battery plates and the electrolyte becomes weaker turning into mostly water. A deeply discharged battery will readily freeze in cold weather. If the electrolyte freezes it can damage or destroy the battery.

It is very important that any tractor/battery stored in cold weather be stored with a fully charged battery. This will eliminate the danger of freezing. Refer to the below chart as a reference for state of charge versus freezing temperature.



#### 8.8.2 Lithium Battery Care

##### 8.8.2.1 Cold Weather Usage

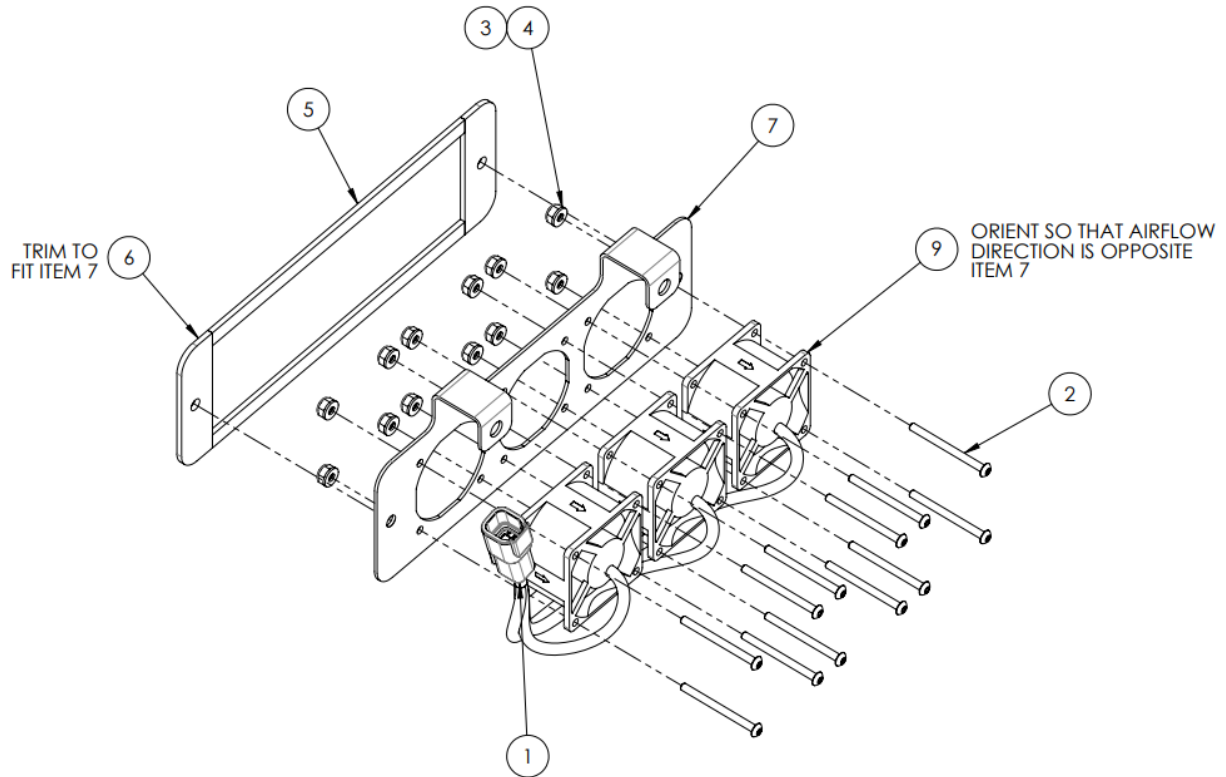
Lithium under cold weather conditions cannot accept a charge under 32°F. The battery will need to be warmed up either by heaters or by driving the ETTX tractor at start-up. However, the batteries provided include a "Battery Management Systems" (BMS), and will protect the battery from taking a charge at low temperatures until it has warmed up to optimal conditions. BMS also monitors the voltage and temperature of the battery to prevent overcharging and extend the life of the battery.

If the battery is cold, it will also lead to low performance results. Cold battery temperatures will greatly reduce the load capacity at which the ETTX tractors can tow. Extra care should be taken to ensure the battery is warmed up before towing a load.

##### 8.7.2.2 Charger Basics

In regards to storage, lithium batteries have a much slower self-discharge rate in comparison to lead acid. This means that lithium doesn't require a full charge, equalization charge, or float charge when left unused for extensive periods of time. However, it is recommended for long term storage to turn off the battery's switch, located on the back, to help prolong the battery's life.

9.0 **DRIVETRAIN**  
9.1 **ASSEMBLY, COOLING FANS**



### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

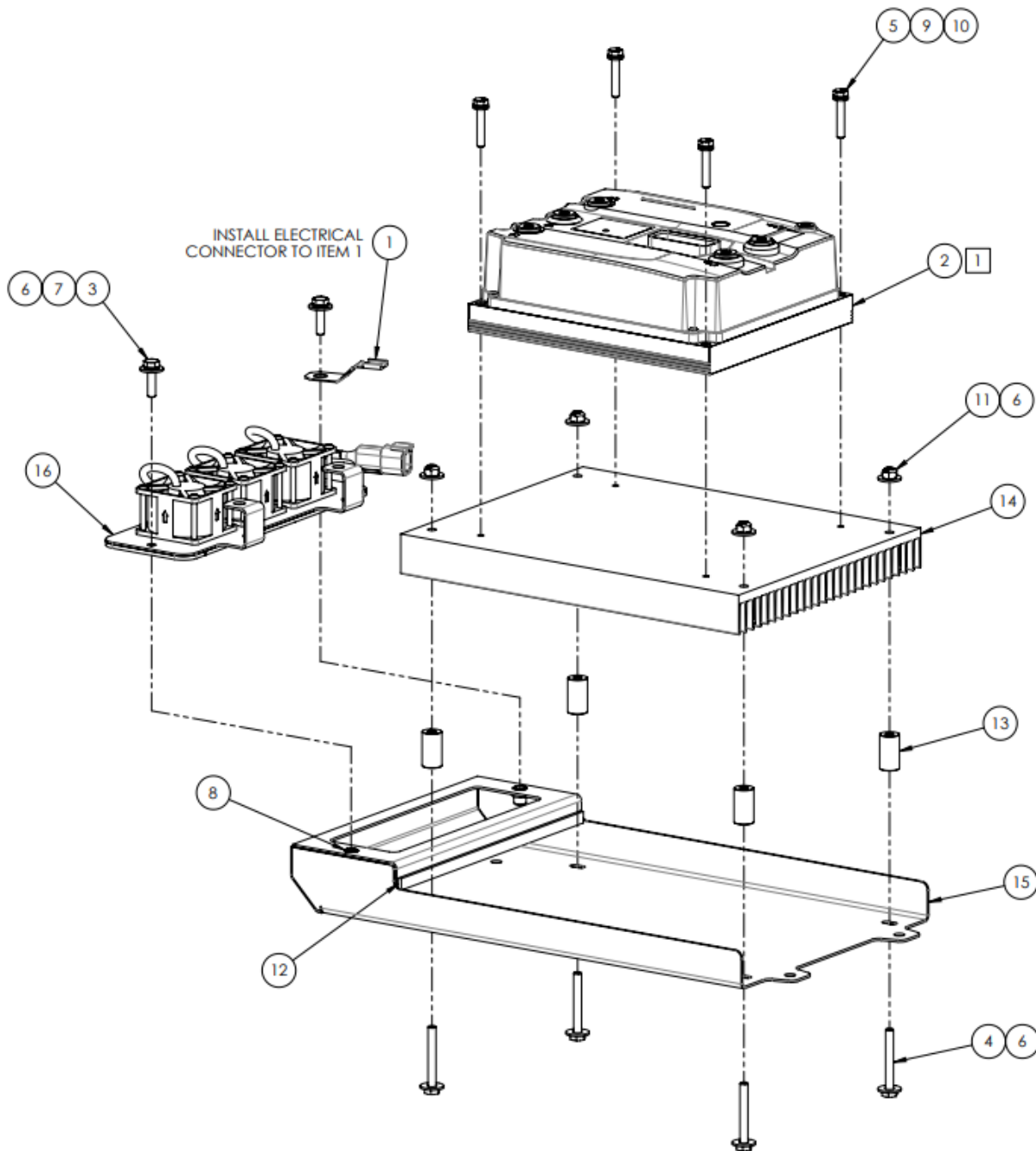
Item	Part Number	Description	Qty
1	DTM04-6P	DEUTSCH CONNECTOR	1
2	G-1154-102220	SCREW, #8-32 X 2.00" LG. SST SOC BUTT. HD CAP	12
3	G-1202-1020	STOPNUT, #8-32 ELASTIC	12
4	G-1250-1020N	FLATWASHER, #8 NARROW	12
5	H-1204-03	TAPE, NEOPRENE FOAM SEALING, 1/8" X 3/8"	As Needed
6	H-1204-10	TAPE, NEOPRENE FOAM SEALING, 1/8" X 1"	As Needed
7	S-3930-00	FAN MOUNTING PLATE (P)	1
8	WM-6P	DEUTSCH CONNECTOR LOCK	1
9	Z-11063	ASY, FAN WITH TERMINALS	3



**Model: eTT-8X / eTT-12X**  
**Electric Tow Tractor**

This page left blank intentionally.

## 9.2 ASSEMBLY, MOTOR CTRLR WITH HEATSINK



1 APPLY A THIN UNINTERRUPTED LAYER OF THERMAL INTERFACE COMPOUND SUCH AS TOCTITE TC 4 OR EQUIVALENT TO BOTTOM OF DRIVE BEFORE MOUNTING TO HEATSINK





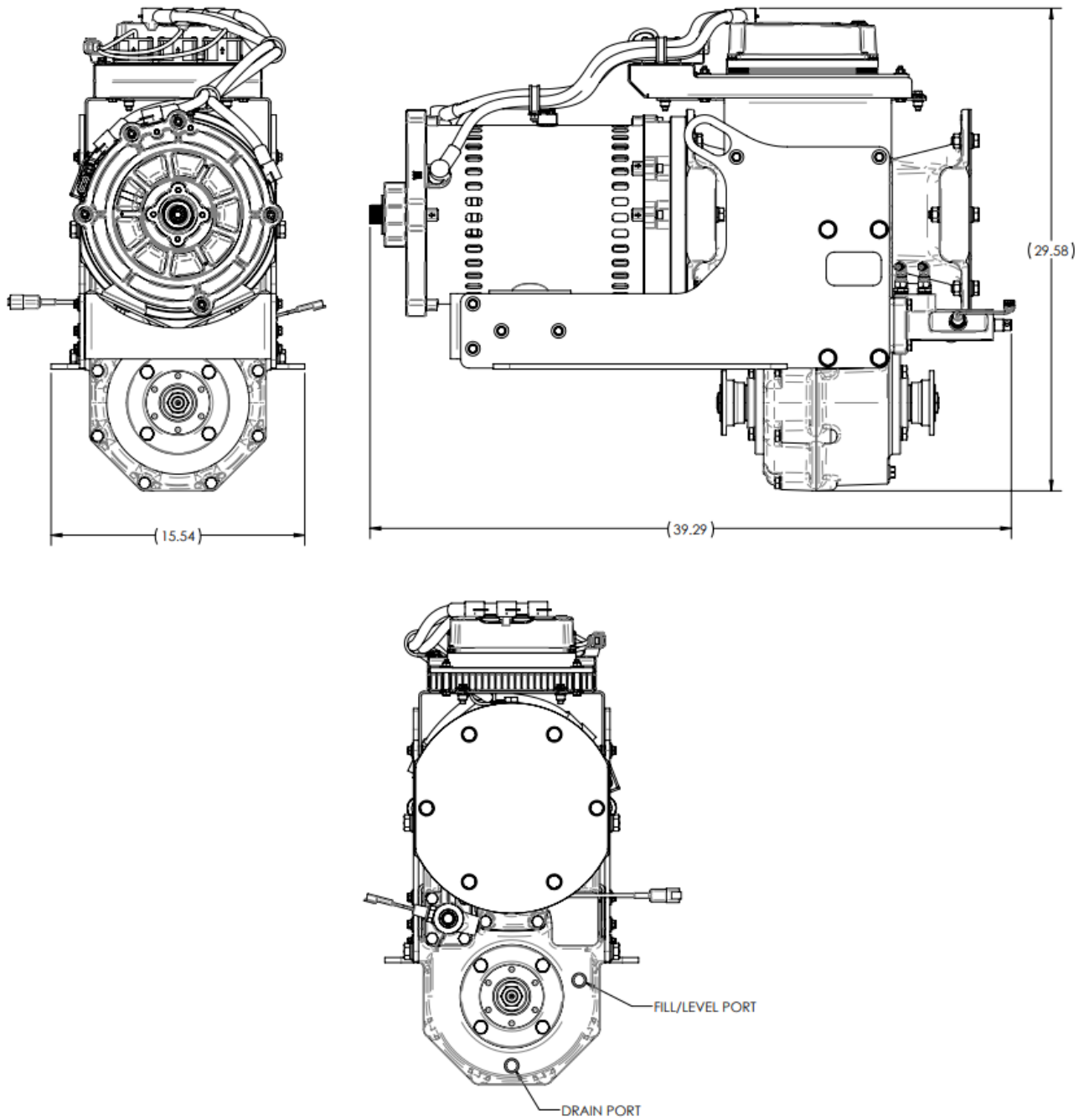
9.2 ASSEMBLY, MOTOR CTLR WITH HEATSINK (*continued*)

**Parts List**

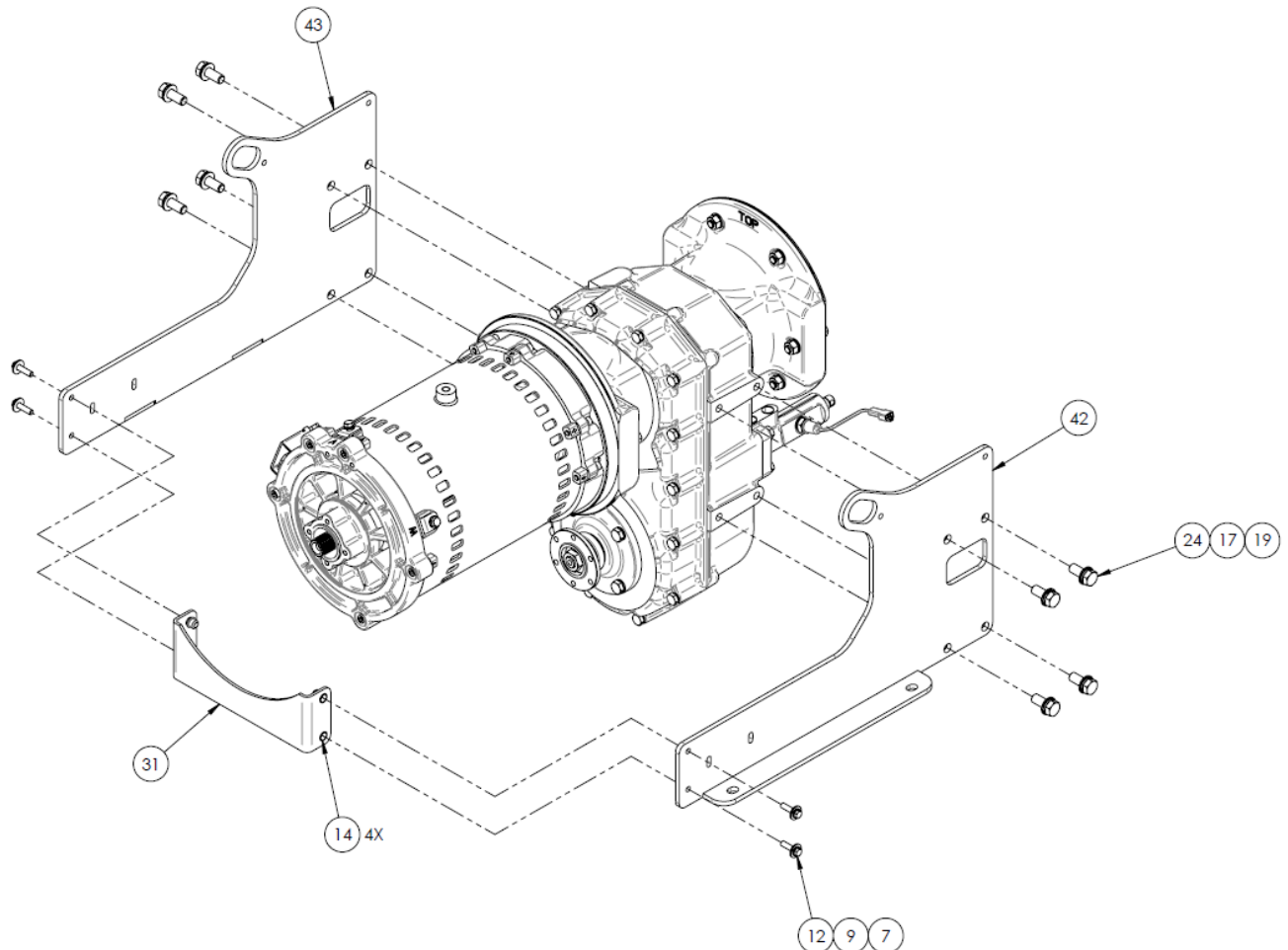
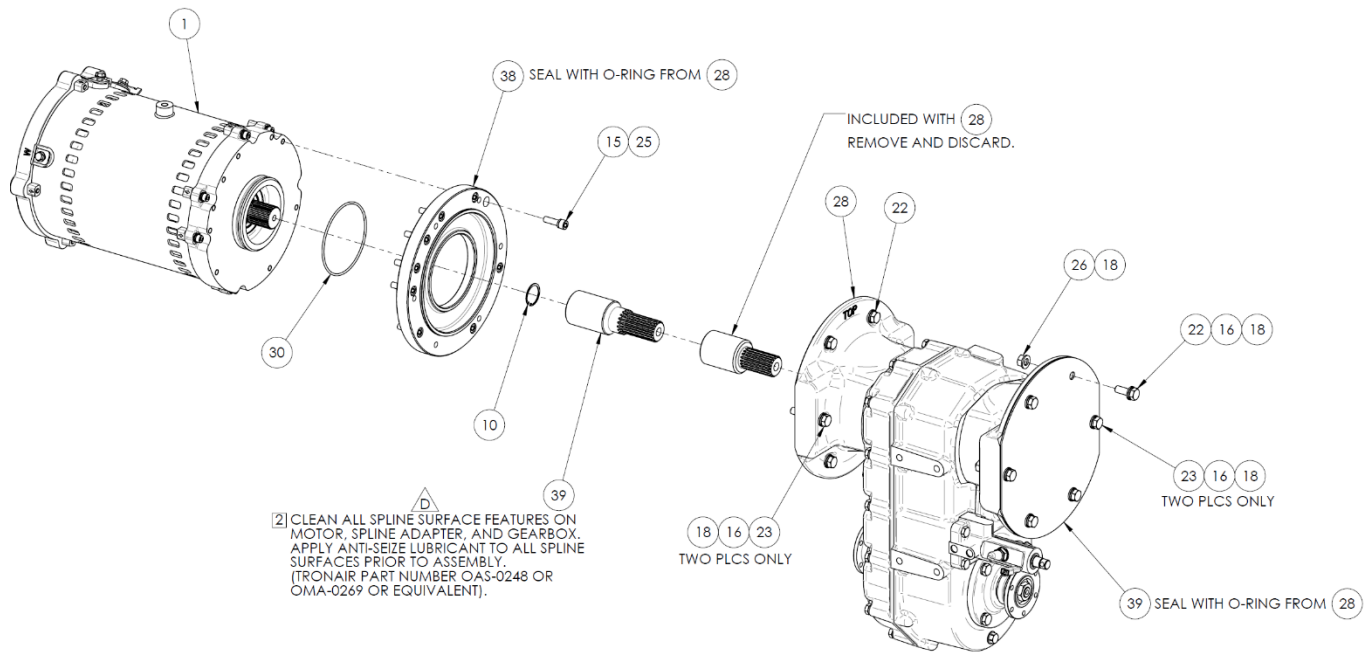
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	1027-003-1200	DEUTSCH RETAINER CLIP	1
2	EC-3475	INVERTER, INMOTION 700A	1
3	G-1100-105010	BOLT, 1/4-20 X 1.0" LG HEX HD GR 5	2
4	G-1100-105020	BOLT, 1/4-20 X 2.0" LG HEX HD GR 5	4
5	G-1114-060035	BOLT, M6X1.0 X 35 CLASS 8.8	4
6	G-1250-1050W	G-1250-1050W	10
7	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	2
8	G-1439-1050-S	NUTSERT, THIN WALL 1/4-20	2
9	G-1514-M60R	LOCKWASHER, M6 REGULAR	4
10	G-1515-M60	FLATWASHER, M6	4
11	G-1727-1050	NUT, 1/4-20 TOP LOCK ZINC	4
12	H-1204-03	TAPE, NEOPRENE FOAM SEALING, 1/8" X 3/8"	As Needed
13	H-4566-11	SPACER, .252 ID X .625 OD X 1.125	4
14	H-5024	HEATSINK, MODIFIED	1
15	Z-11005-00	WLD, DRIVE COOLING PLENUM (P)	1
16	Refer above section	ASY, COOLING FANS	1

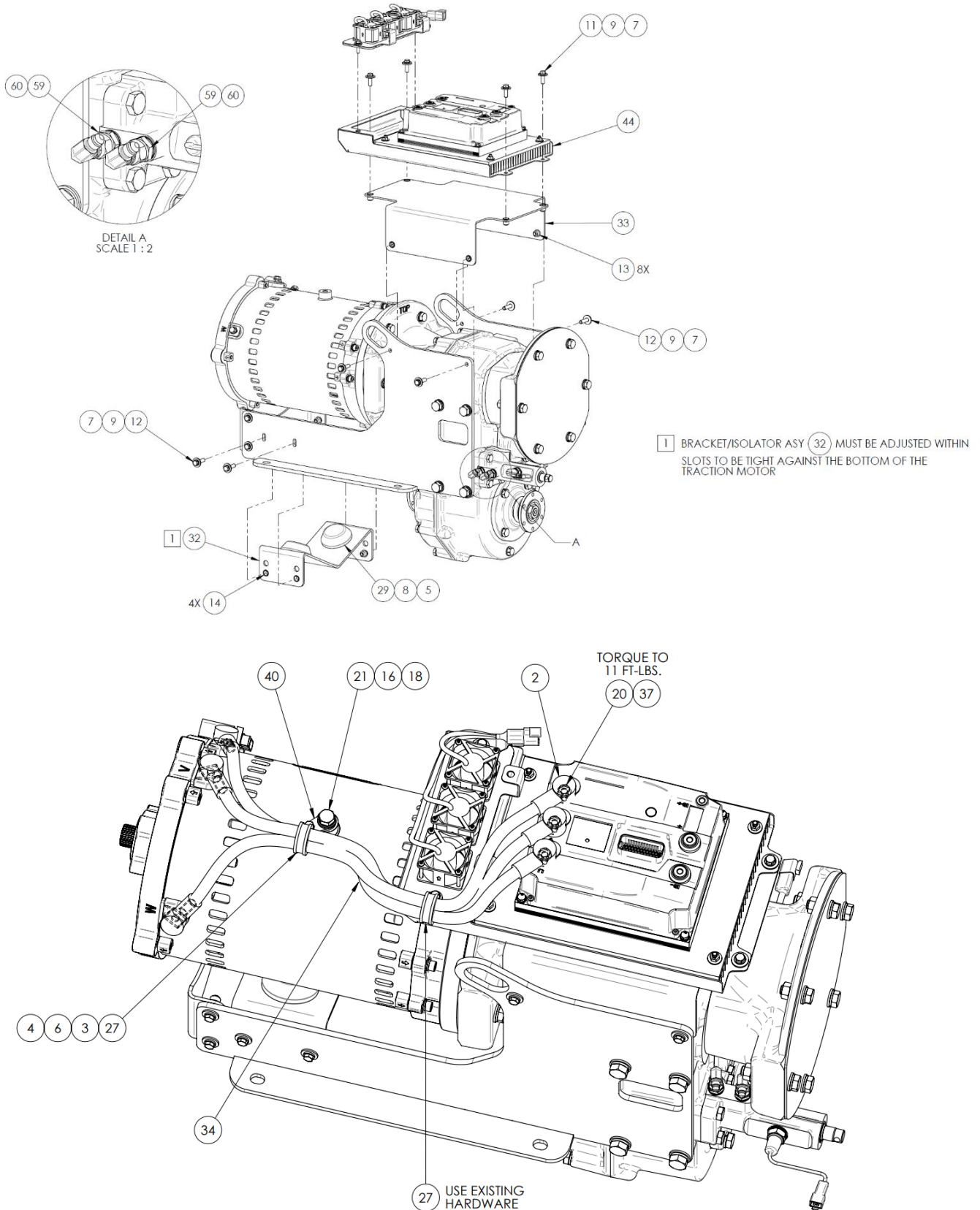
9.3 ASSEMBLY, MOTOR AND XFER CASE



### 9.3 ASSEMBLY, MOTOR AND XFER CASE (continued)



### 9.3 ASSEMBLY, MOTOR AND XFER CASE (continued)





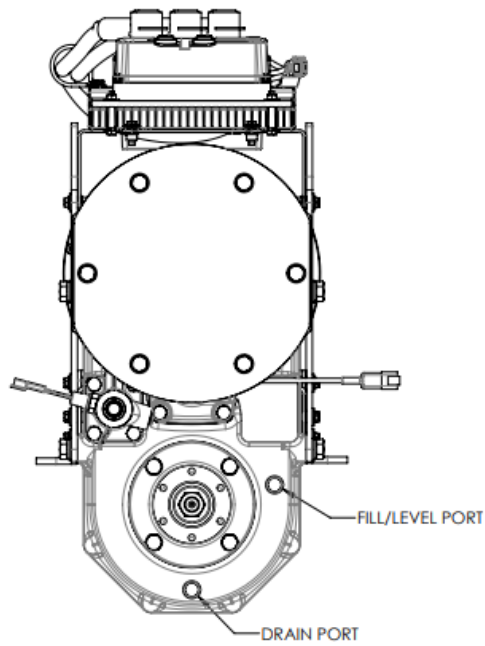
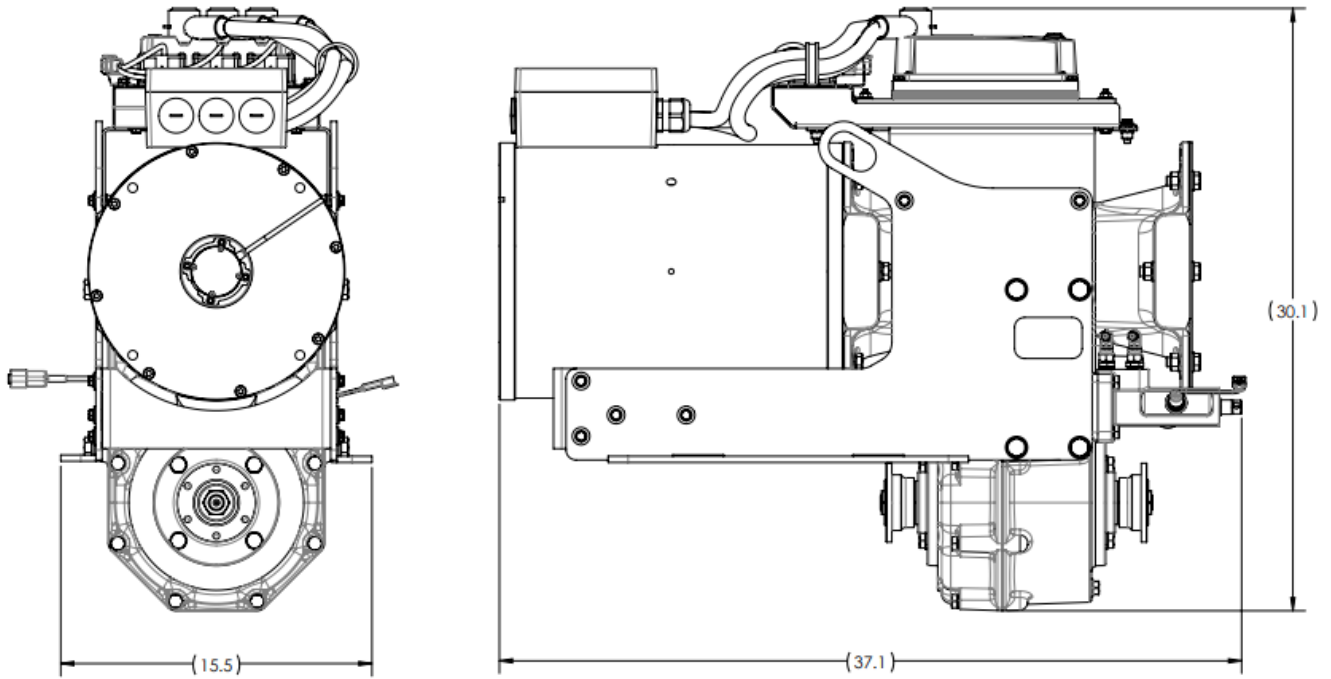
9.3 ASSEMBLY, MOTOR AND XFER CASE (continued)

**Parts List**

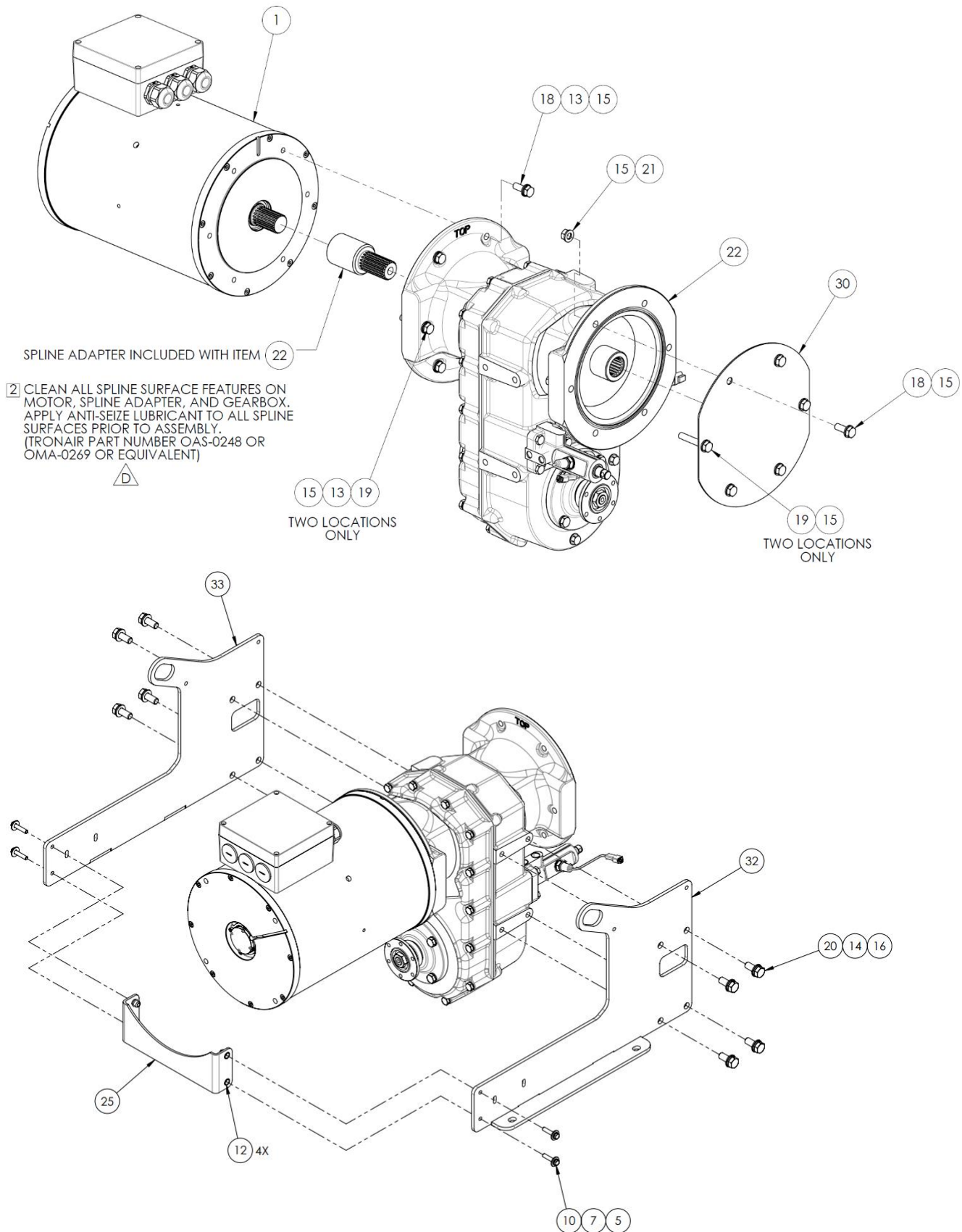
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	A-ES12-0420	TRACTION MOTOR	1
2	EC-2110	BATTERY, TERMINAL INSULATOR	6
3	G-1100-105006	BOLT, 1/4-20 X 3/4" LG HEX HD GR 5	1
4	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	1
5	G-1202-1070	STOPNUT, 3/8-16 ELASTIC	2
6	G-1250-1050W	FLATWASHER, 1/4 WIDE	1
7	G-1250-1060W	FLATWASHER, 5/16 WIDE	16
8	G-1250-1070W	FLATWASHER, 3/8 WIDE	2
9	G-1251-1060R	LOCKWASHER, 5/16 REGULAR	16
10	G-1391-13	RING, INTERNAL RETAINING	1
11	G-1420-106010	BOLT, 5/16-18 X 1.0" LG. HEX HD GR 8	4
12	G-1420-106012	BOLT, 5/16-18 X 1-1/4" LG. HEX HD GR 8	12
13	G-1439-1060-S	NUTSERT, THIN WALL 5/16-18	8
14	G-1440-1060-S	NUTSERT, THICK WALL 5/16-18	8
15	G-1491-108016	SOC HD CAP SCR, M10X1.5 X 35	9
16	G-1514-M120R	LOCKWASHER, M 12 REGULAR	13
17	G-1514-M140R	LOCKWASHER, M 14 REGULAR	8
18	G-1515-M120	FLATWASHER, M12	19
19	G-1515-M140	FLAT WASHER, M14	8
20	G-1533-080020	BOLT M8-1.25 X 20mm LG. CLASS 10.9	3
21	G-1533-120020	BOLT M12-1.75 X 20mm LG. CLASS 10.9	1
22	G-1533-120035	BOLT M12-1.75 X 35mm LG. CLASS 10.9	8
23	G-1533-120070	BOLT M12-1.75 X 70mm LG. CLASS 10.9	4
24	G-1533-140035	HEX BOLT, M14 X 2.0 X 35, CLASS 10.9	8
25	G-1626-M10Z	LOCKWASHER, M10 HIGH COLLAR	9
26	G-1793-16	NUT, HEX CLASS 8 M12X1.75	6
27	H-3521-15	CLAMP, CUSHIONED LOOP 1 1/4"	2
28	H-4863	TRANSFER CASE, 2 SPEED (368)	1
29	H-4868	ISOLATOR, MOTOR	2
30	HC-2000-250	O-RING, SERIES 2	1
31	J-7862-00	PLATE, TIE (P)	1
32	J-7863-00	PLATE, MOTOR SUPPORT (P)	1
33	J-7864-00	PLATE, DRIVE MOUNTING (P)	1
34	K-5535	ASY, UVW MOTOR CABLES	1
35	MC5315X6X14	M14 X 1.5 DIN M 6 JIC M	2
36	N-2002-14-S	ELBOW 90°, -06 F JIC X -04 M JIC	2
37	NVSP-21-016-CB	M8 BELLEVILLE LOCK WASHER	3
38	R-3416	ADAPTER, MOTOR	1
39	R-3417	SPLINE ADAPTER	1
40	S-3957-00	MOUNTING TAB, BATTERY CABLES	1
39	S-4191-00	TRANSFER CASE COVER PLATE (P)	1
42	Z-11514-00	WLD, LH MOTOR MOUNT (P)	1
43	Z-11515-00	WLD, RH MOTOR MOUNT (P)	1
44	Z-11822	ASY, MOTOR CTRLR WITH HEATSINK	1

9.4 ASSEMBLY, MOTOR AND XFER CASE (ETT-12X)

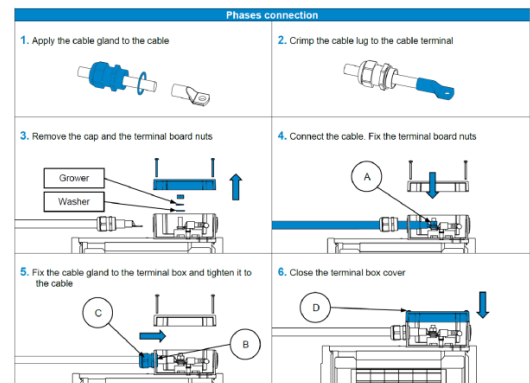
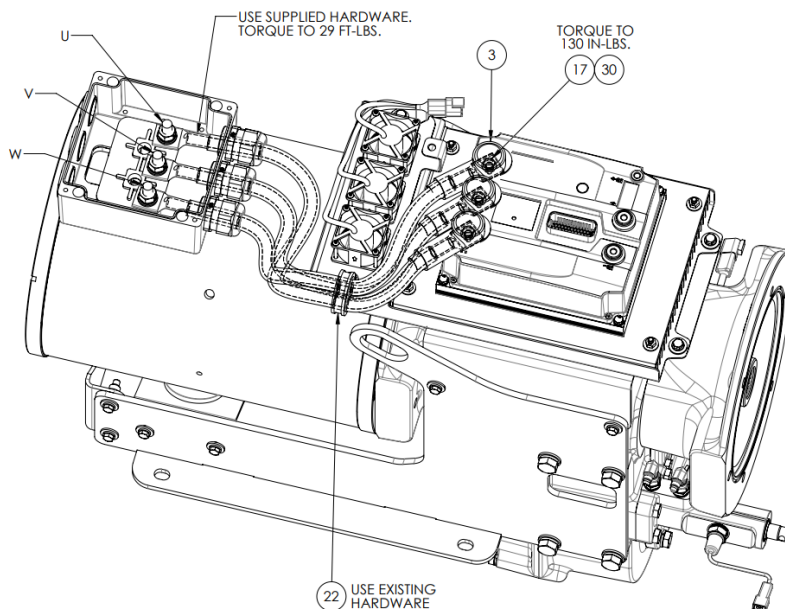
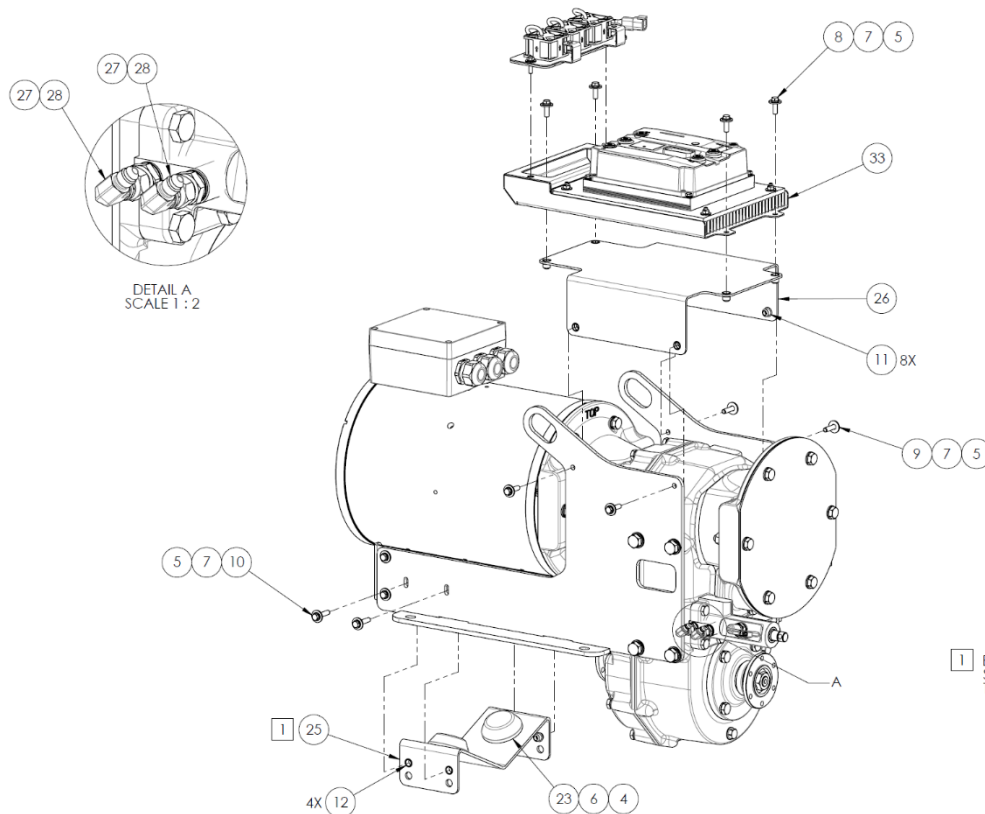


9.4 ASSEMBLY, MOTOR AND XFER CASE (continued)





9.4 ASSEMBLY, MOTOR AND XFER CASE (continued)







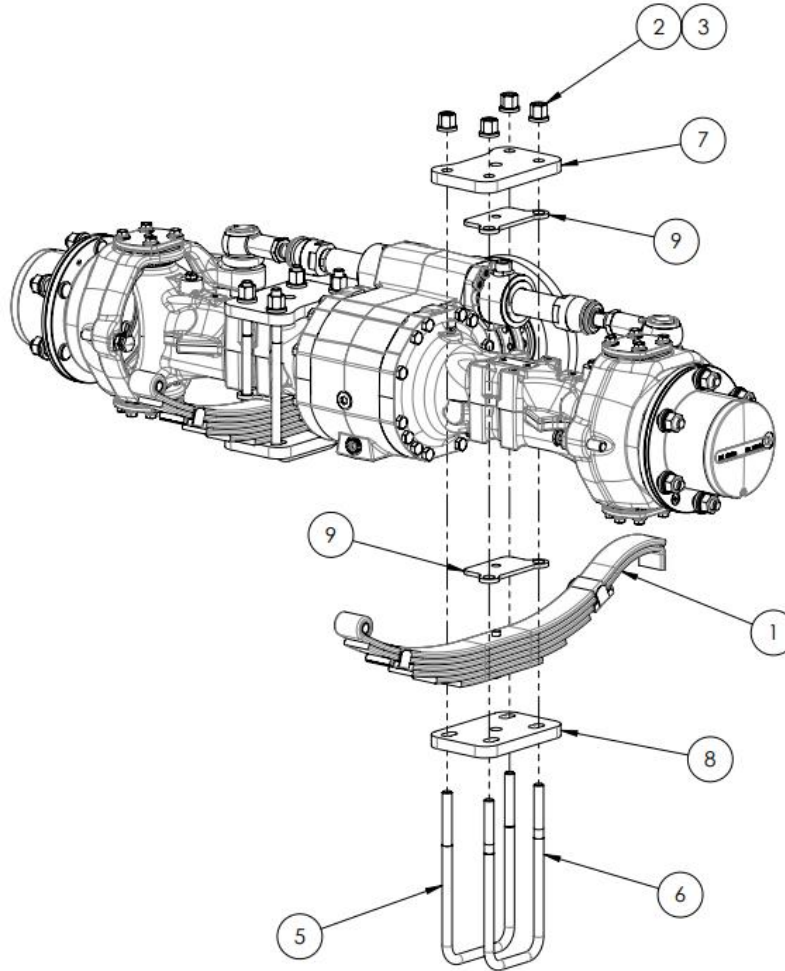
9.4 ASSEMBLY, MOTOR AND XFER CASE (continued)

**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	EC-3367	TRACTION MOTOR, 40KW	1
2	EC-3388	ASY, UVW MOTOR CABLE	3
3	EC-3393	BATTERY TERMINAL INSULATOR	3
4	G-1202-1070	STOPNUT, 3/8-16 ELASTIC	2
5	G-1250-1060W	FLATWASHER, 5/16 WIDE	16
6	G-1250-1070W	FLATWASHER, 3/8 WIDE	2
7	G-1251-1060R	LOCKWASHER, 5/16 REGULAR	16
8	G-1420-106010	BOLT, 5/16-18 X 1.0" LG. HEX HD GR 8	4
9	G-1420-106012	BOLT, 5/16-18 X 1-1/4" LG. HEX HD GR 8	4
10	G-1420-106014	BOLT, 5/16-18 HEX HD GR 8	8
11	G-1439-1060-S	NUTSERT, THIN WALL 5/16-18	8
12	G-1440-1060-S	NUTSERT, THICK WALL 5/16-18	8
13	G-1514-M120R	LOCKWASHER, M 12 REGULAR	6
14	G-1514-M140R	LOCKWASHER, M 14 REGULAR	8
15	G-1515-M120	FLATWASHER, M12	18
16	G-1515-M140	FLAT WASHER, M14	8
17	G-1533-080016	BOLT M8-1.25 X 16mm LG. CLASS 10.9	3
18	G-1533-120035	BOLT M12-1.75 X 35mm LG. CLASS 10.9	8
19	G-1533-120070	BOLT M12-1.75 X 70mm LG. CLASS 10.9	4
20	G-1533-140035	HEX BOLT, M14 X 2.0 X 35, CLASS 10.9	8
21	G-1793-16	NUT, HEX CLASS 8 M12X1.75	6
22	H-3521-23	CLAMP, CUSHIONED LOOP 1 3/4"	1
23	H-4863	TRANSFER CASE, 2 SPEED (368)	1
24	H-4868	ISOLATOR, MOTOR	2
25	J-7862-00	PLATE, TIE (P)	1
26	J-7863-00	PLATE, MOTOR SUPPORT (P)	1
27	J-7864-00	PLATE, DRIVE MOUNTING (P)	1
28	MC5315X6X14	M14 X 1.5 DIN M 6 JIC M	2
29	N-2002-14-S	ELBOW 90°, -06 F JIC X -04 M JIC	2
30	NVSP-21-016-CB	M8 BELLEVILLE LOCK WASHER	3
31	S-4191-00	TRANSFER CASE COVER PLATE (P)	1
32	Z-11332-00	WLD, LH MOTOR MOUNT (P)	1
33	Z-11333-00	WLD, RH MOTOR MOUNT (P)	1
34	Refer above section	ASY, MOTOR CTRLR WITH HEATSINK	1

## 9.5 ASSEMBLY, FRONT AXLE

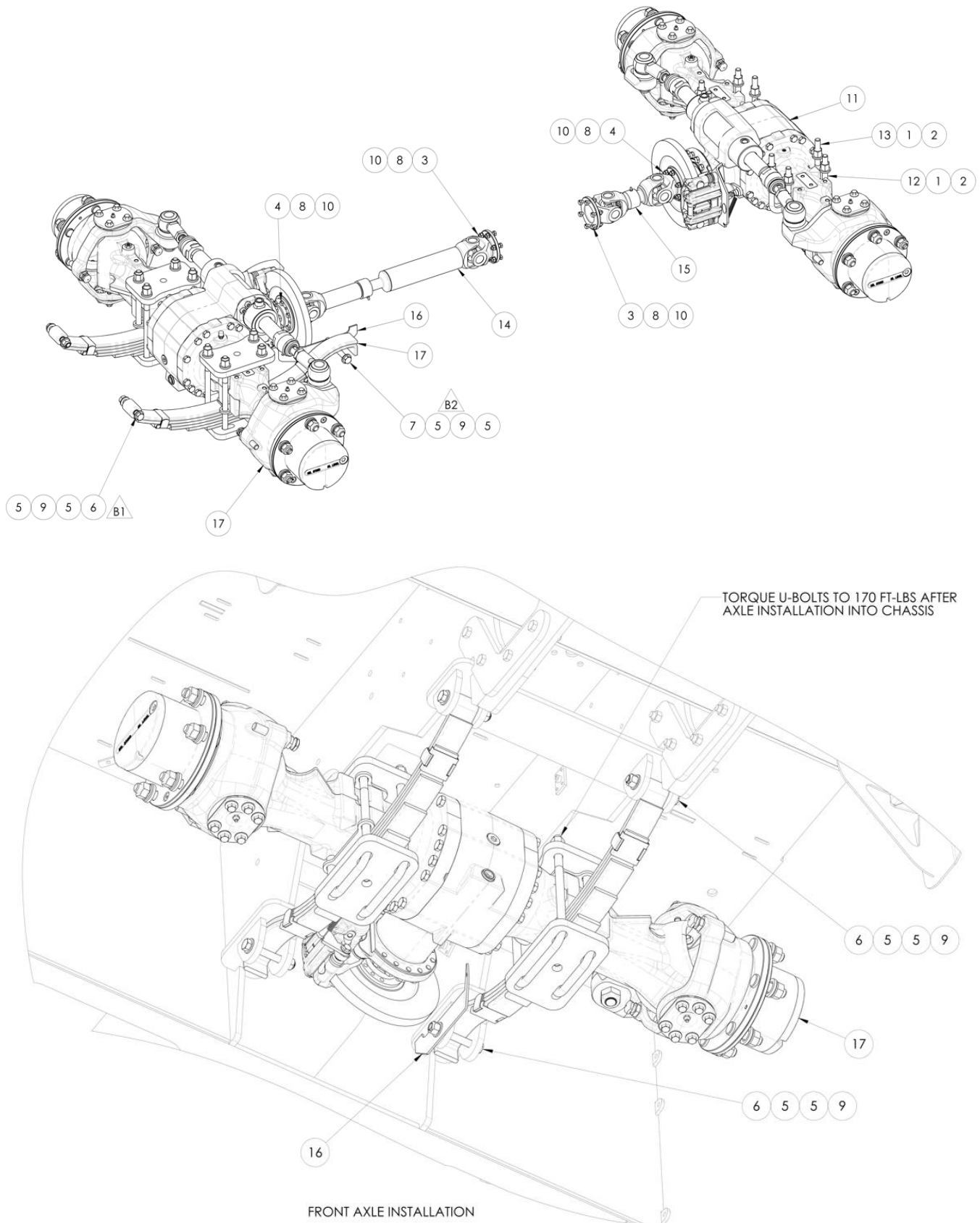


### Parts List

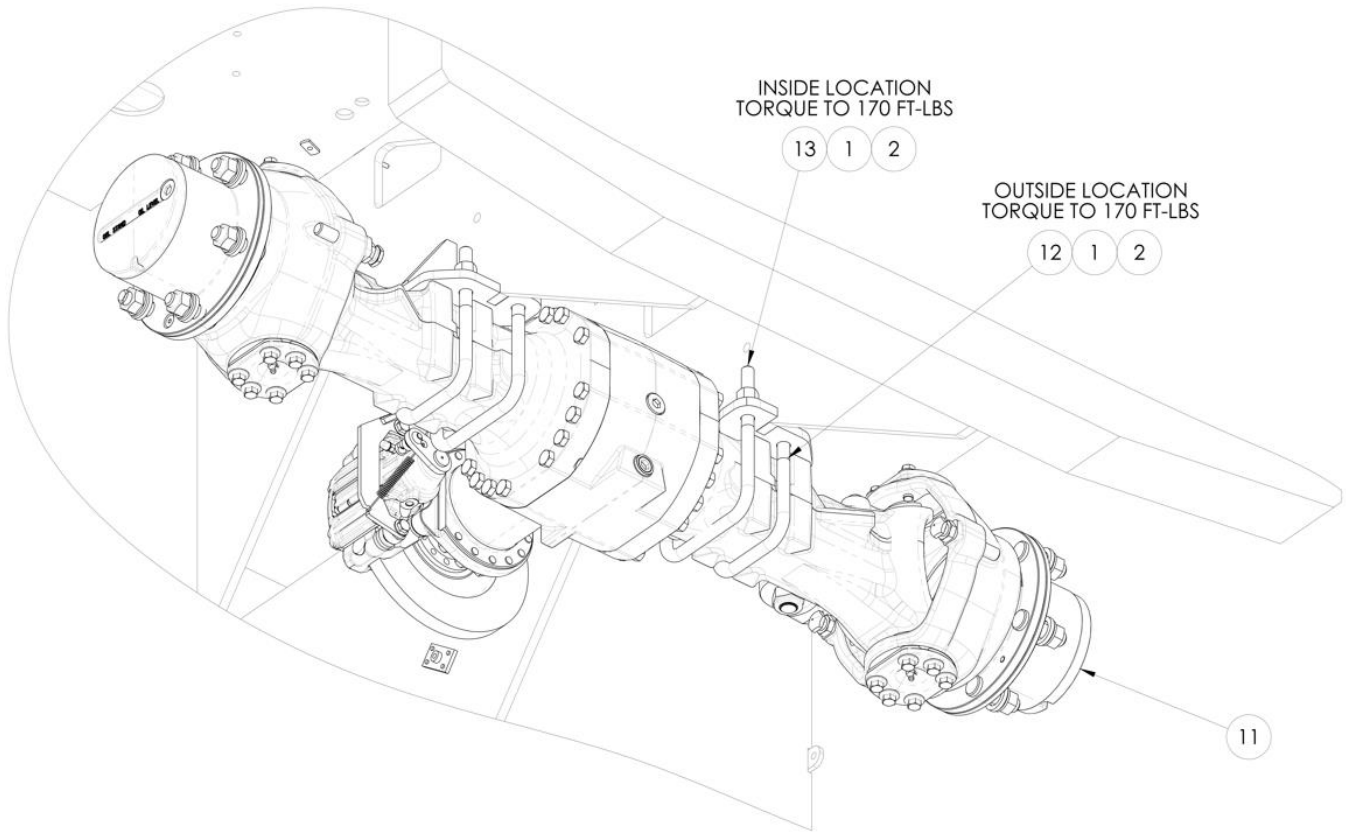
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	A-TT10-00116	LEAF SPRING, TT12	2
2	A-TT4-00365	NUT, AXLE U-BOLT	8
3	A-TT4-00366	WASHER, AXLE U-BOLT	8
4	H-4860	AXLE, FRONT PLANETARY (211)	1
5	H-4879	U-BOLT, FRONT, 10.875" LG	2
6	H-4880	U-BOLT, FRONT, 10.70" LG	2
7	S-4109-00	U-BOLT PLATE	2
8	S-4110-00	U-BOLT PLATE, BOTTOM	2
9	S-4111-00	PLATE, AXLE SPACER	4

## 9.6 ASSEMBLY, AXLES AND DRIVESHAFTS

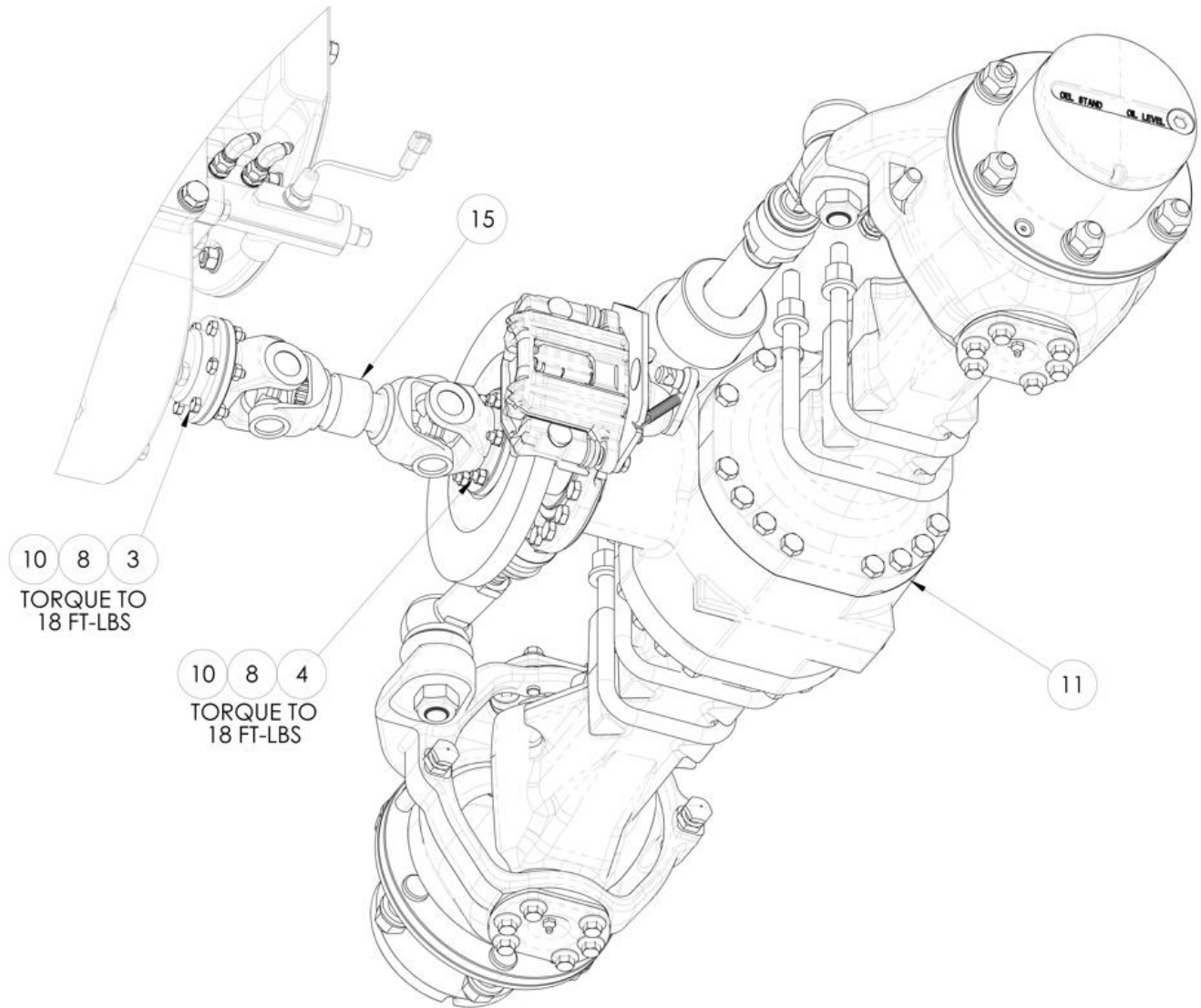


9.6 ASSEMBLY, AXLES AND DRIVESHAFTS (*continued*)



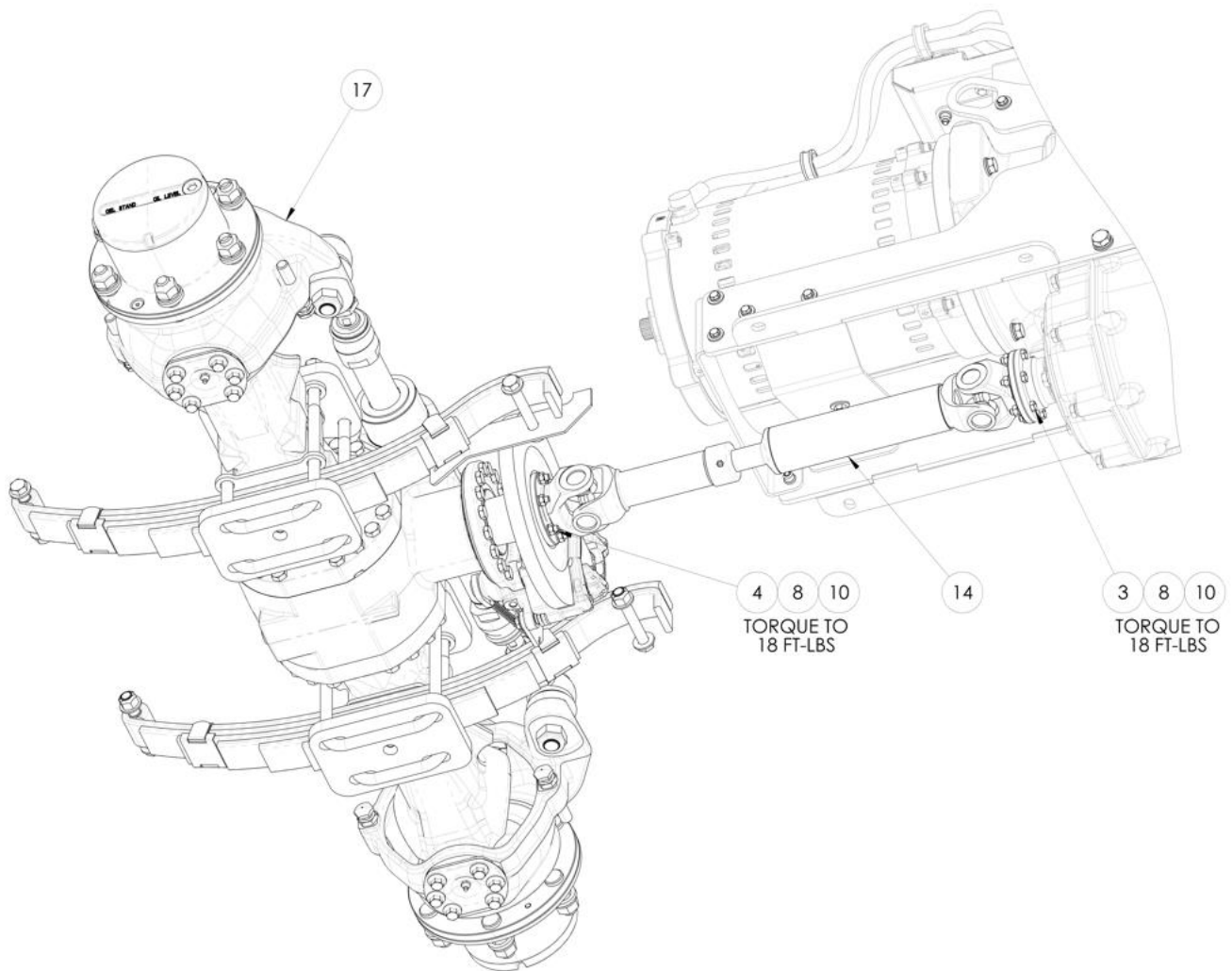
REAR AXLE INSTALLATION

9.6 ASSEMBLY, AXLES AND DRIVESHAFTS *(continued)*



REAR DRIVESHAFT

9.6 ASSEMBLY, AXLES AND DRIVESHAFTS (*continued*)



FRONT DRIVESHAFT



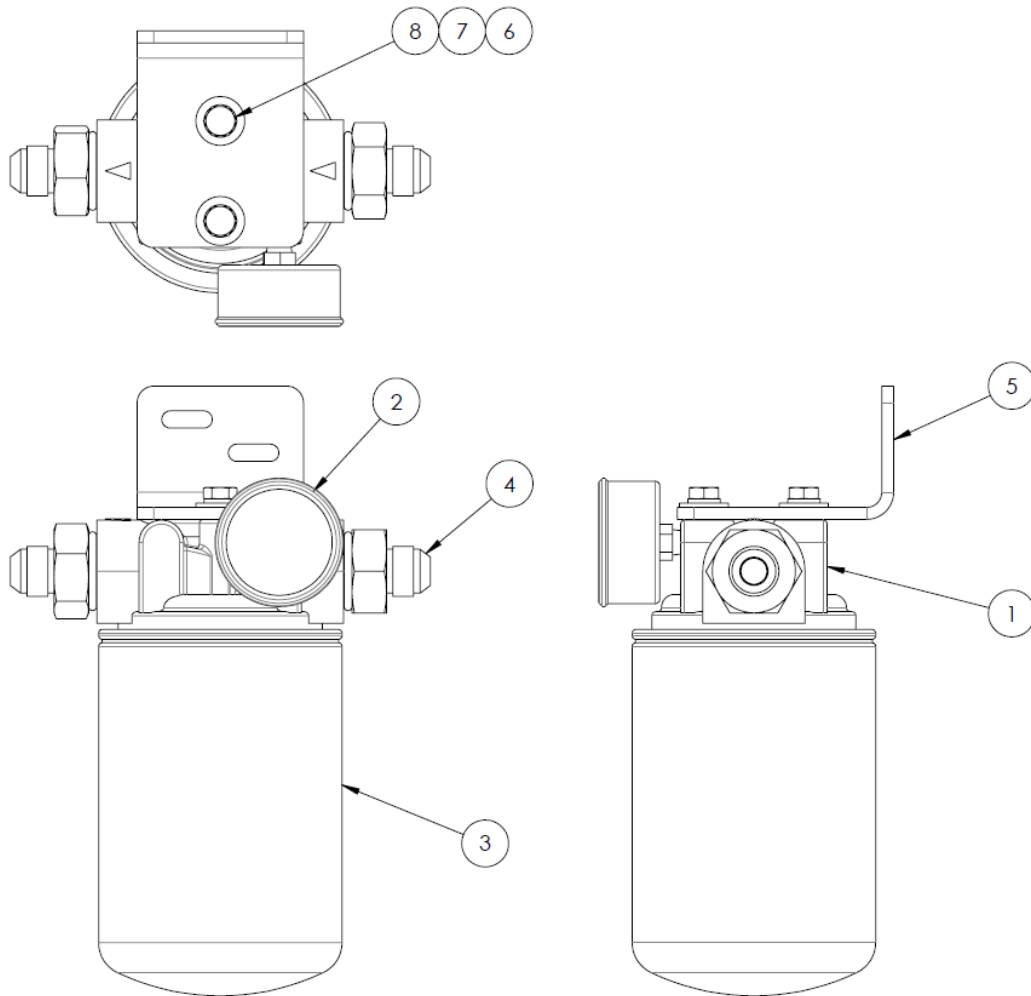
9.6 ASSEMBLY, AXLES AND DRIVESHAFTS (continued)

**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	A-TT4-00365	NUT, AXLE U-BOLT	8
2	A-TT4-00366	WASHER, AXLE U-BOLT	8
3	G-1114-080030	BOLT M8-1.25 X 30mm LG. CLASS 8.8	12
4	G-1114-080040	BOLT M8-1.25 X 40mm LG. CLASS 8.8	12
5	G-1250-1210N	FLATWASHER, 9/16 NARROW	8
6	G-1420-121540	BOLT, 9/16-18 X 4.0" HEX HD GR 8	3
7	G-1420-121544	BOLT, 9/16-18 X 4.5" HEX HD GR 8	1
8	G-1514-M80R	SPLIT LOCK WASHER M8	24
9	G-1727-1215	NUT, 9/16-18 TOP LOCK ZINC	5
10	G-1793-09	NUT, HEX CLASS 8 M8X1.25	24
11	H-4861	AXLE, REAR PLANETARY (211)	1
12	H-4881	U-BOLT, REAR, 7.50" LG	2
13	H-4882	U-BOLT, REAR, 7.875" LG	2
14	H-4909	FRONT DRIVESHAFT	1
15	H-4910	REAR DRIVESHAFT	1
16	S-4350-00	BRACKET, BRAKE HOSE (P)	1
17	Z-11518	ASY, FRONT AXLE	1

**10.0 HYDRAULIC SYSTEM**  
**10.1 ASSEMBLY, SPIN-ON FILTER**



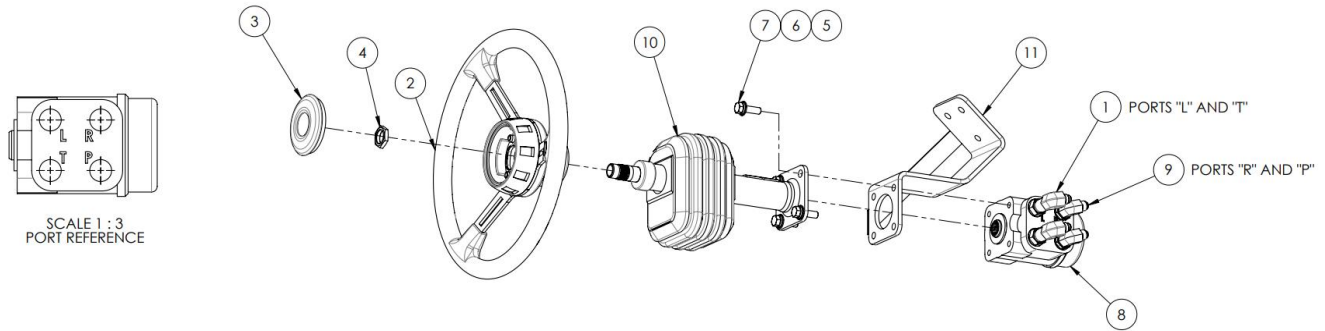
**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	A-ES12-0486	HYD FILTER HEAD	1
2	A-ES12-0487	FILTER PRESSURE INDICATOR	1
3	A-ES12-0485	HYD FILTER, SPIN-ON	1
4	N-2007-14-S-B	CONNECTOR, STR THD	2
5	S-4089-00	BRACKET, FILTER (P)	1
6	G-1250-1050W	FLATWASHER, 1/4 WIDE	2
7	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	2
8	G-1100-105006	BOLT, 1/4-20 X 3/4" LG HEX HD GR 5	2



## 10.2 ASSEMBLY, STEERING WHEEL

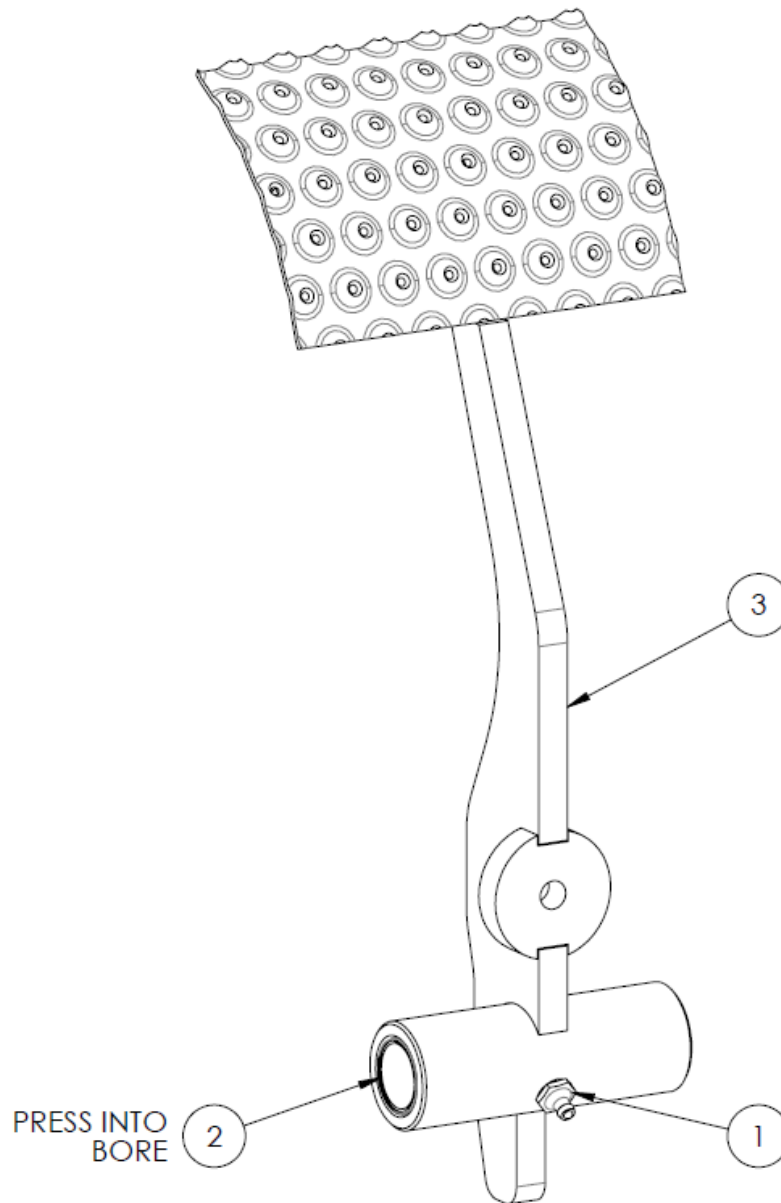


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	6-8 CC5OX-S	ELBOW LONG, -06 M JIC X -08 M ORB	2
2	A-TN4-00809E	STEERING WHEEL, 14"	1
3	A-TT10-00811	HORN BUTTON	1
4	A-TT10-00813	WHEEL NUT, 13/16-20 UNEF	1
5	G-1250-1070N	FLATWASHER, 3/8 NARROW	4
6	G-1251-1070R	LOCKWASHER, 3/8 REGULAR	4
7	G-1420-107012	BOLT, 3/8-16 X 1.25" HEX HD GR 8	4
8	HC-2789-00	STEERING VALVE (WP)	1
9	N-2001-09-S-B	ELBOW, STRAIGHT THREAD	2
10	XL00-14-019-SA	TILT STEERING COLUMN	1
11	Z-11390-00	WELDMENT, STEERING MOUNT (P)	1

### 10.3 ASSEMBLY, BRAKE PEDAL

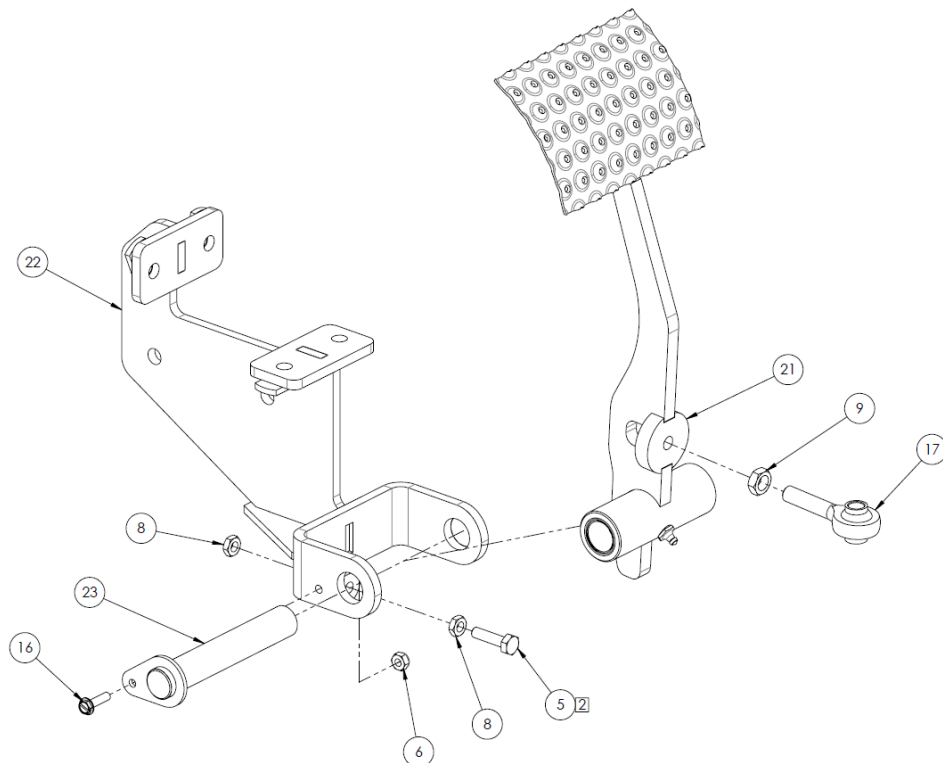
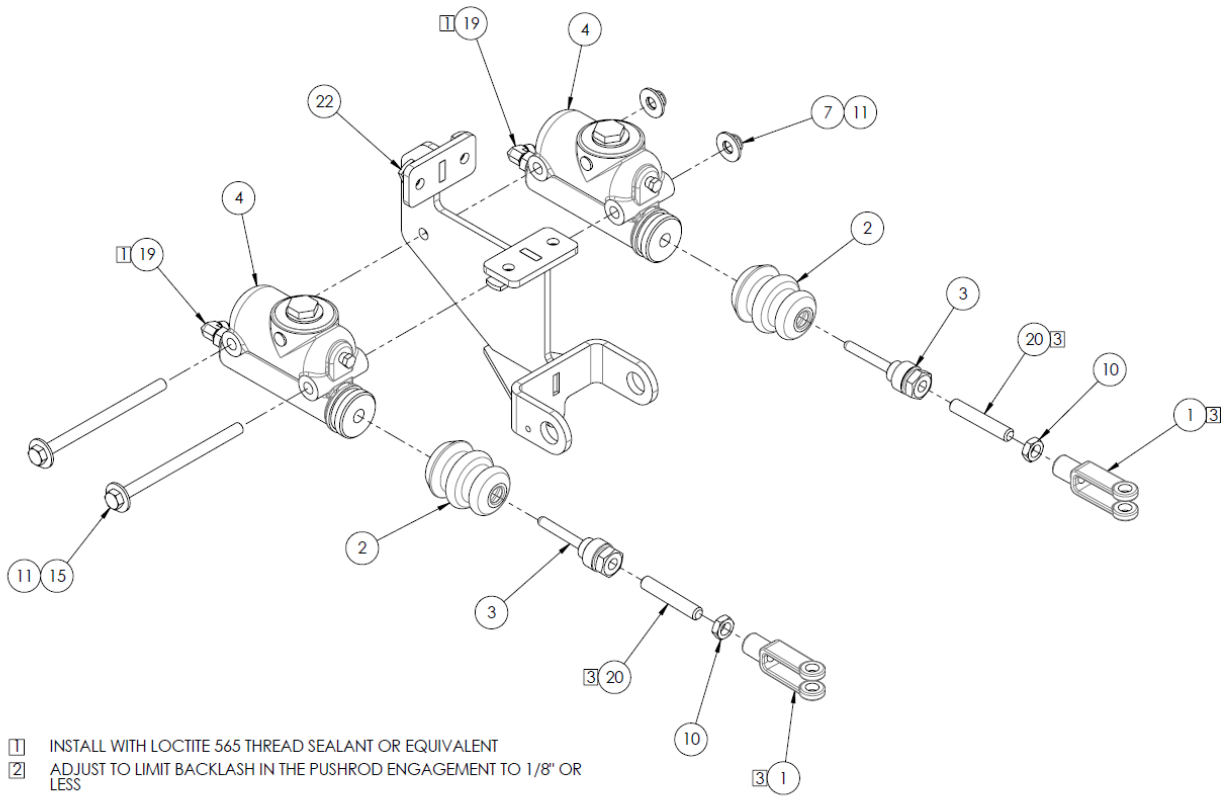


### Parts List

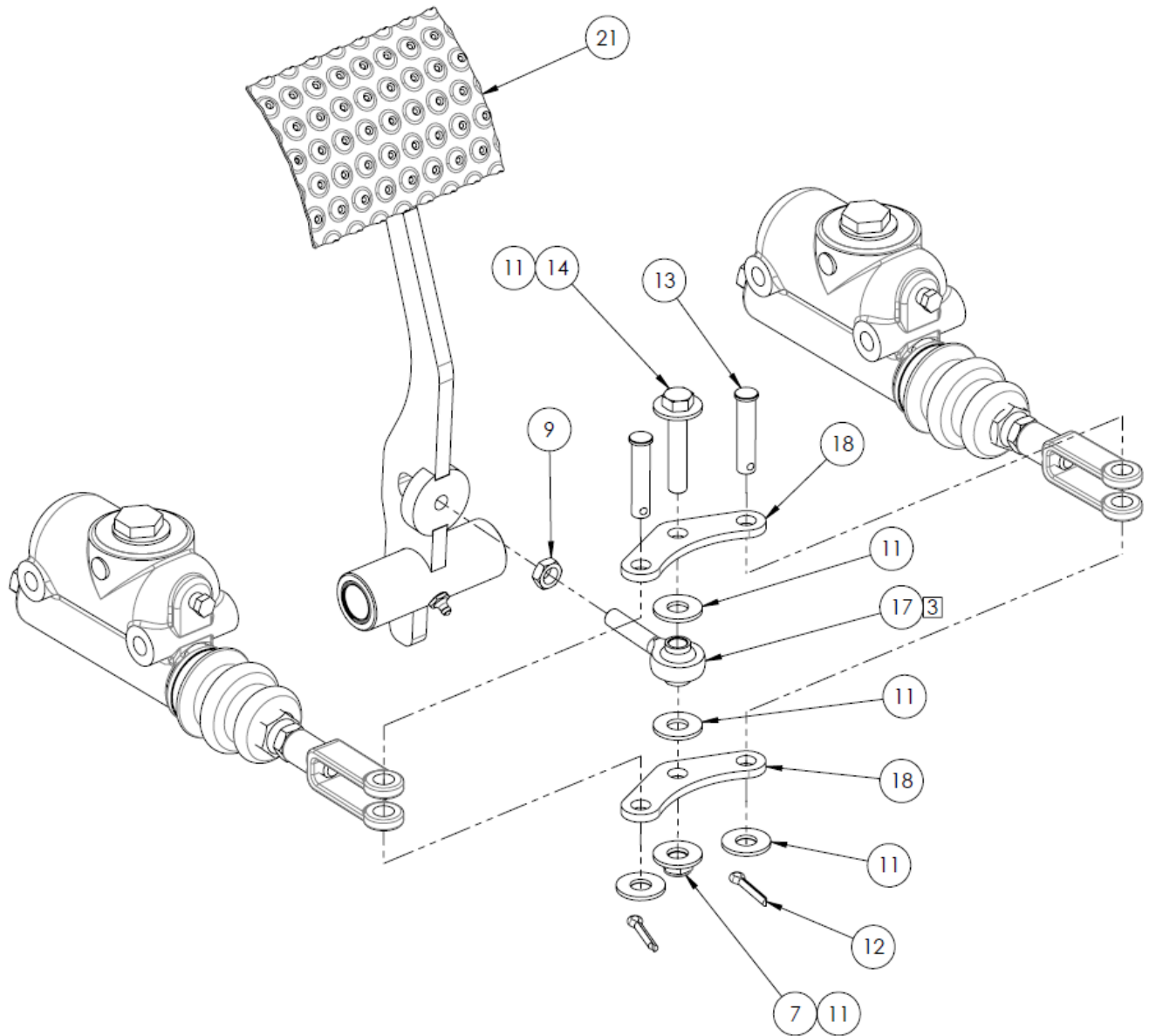
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	A-RTT50-0328	GREASE ZERK	1
2	C-TT4-10188	NYLINER BEARING	2
3	Z-11785-00	WLD, BRAKE PEDAL (P)	1

## 10.4 ASSEMBLY, BRAKE PEDAL SUB-ASSEMBLY



10.4 ASSEMBLY, BRAKE PEDAL SUB-ASSEMBLY (continued)





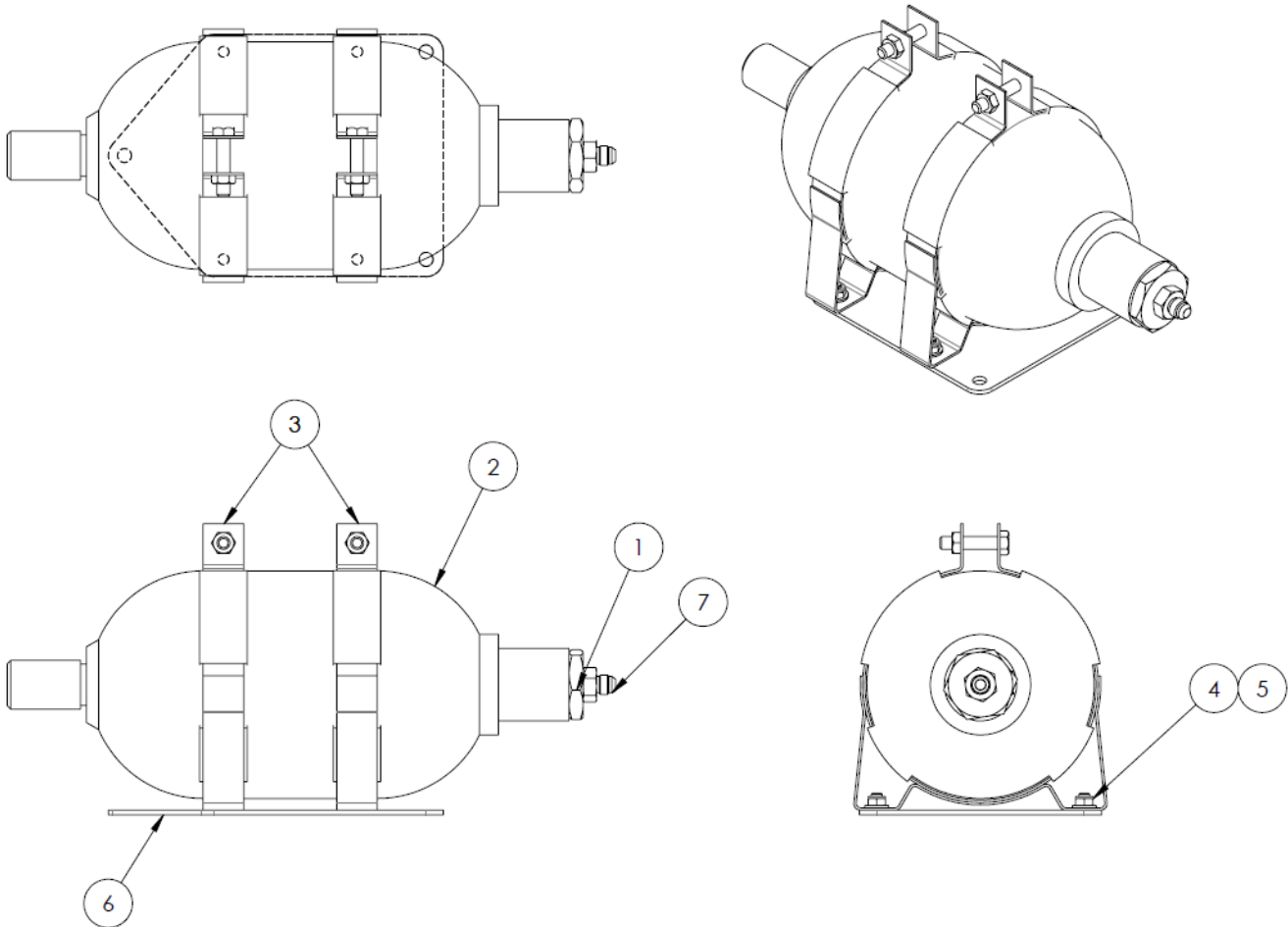
10.4 ASSEMBLY, BRAKE PEDAL SUB-ASSEMBLY *(continued)*

**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	A-ETT8-0530	BRAKE, PEDAL CLEVIS	2
2	A-TN3E-00159	BRAKE PUSHROD BOOT	2
3	A-TN3E-00160	PUSHROD, MASTER CYLINDER	2
4	A-TN3E-00161	MASTER CYLINDER	2
5	G-1100-105010	BOLT, 1/4-20 X 1.0" LG HEX HD GR 5	1
6	G-1202-1035	STOPNUT, #10-32 ELASTIC	1
7	G-1202-1070	STOPNUT, 3/8-16 ELASTIC	3
8	G-1207-1050	NUT, 1/4-20 JAM	2
9	G-1207-1075	NUT, 3/8-24 JAM	1
10	G-1207-1085	NUT, 7/16-20 JAM	2
11	G-1250-1070W	FLATWASHER, 3/8 WIDE	10
12	G-1301-04	PIN, 5/32 X 1.0" LG. COTTER	2
13	G-1302-30	PIN, 3/8 X 1.50 LG CLEVIS	2
14	G-1420-107020	BOLT, 3/8-16 X 2.0" HEX HD GR 8	1
15	G-1420-107054	BOLT, 3/8-16 X 5.5" HEX HD GR 8	2
16	G-1720-103506	SCR, #10-32X.75 MACH HEX WSH HD	1
17	H-5014-06	ROD END, SUPER SWIVEL 3/8	1
18	J-8191-00	BAR, EQUALIZER (P)	2
19	N-2005-03-S	90° ELBOW, 1/8 M NPT X -04 M JIC	2
20	R-3393	PUSHROD, BRAKE	2
21	Refer above section	ASY, BRAKE PEDAL	1
22	Z-11786-00	WLD, BRAKE MOUNT (P)	1
23	Z-11787-00	WLD, ROTATION PIN (P)	1

## 10.5 ASSEMBLY, ACCUMULATOR

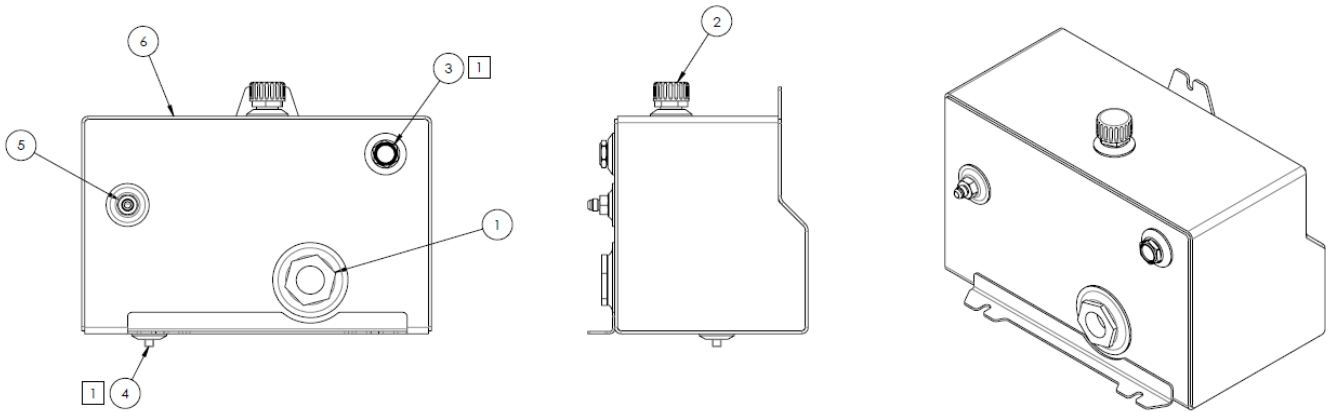


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	20-8 F5OG5-S	REDUCER, -20 SAE ORB M X -08 SAE ORB F	1
2	A-ETT8-0454-C8	CHARGED ACCUMULATOR, 1 GALLON	1
3	ET08-09-001-CA	BRACKET, ACCUMULATOR	2
4	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	4
5	G-1250-1060N	FLATWASHER, 5/16 NARROW	4
6	J-8217-00	PLATE, ACCUMULATOR MTG (P)	1
7	N-2007-09-S-B	ADAPTER, -06 M JIC X -08 M ORB	1

## 10.6 ASSEMBLY, HYDRAULIC TANK



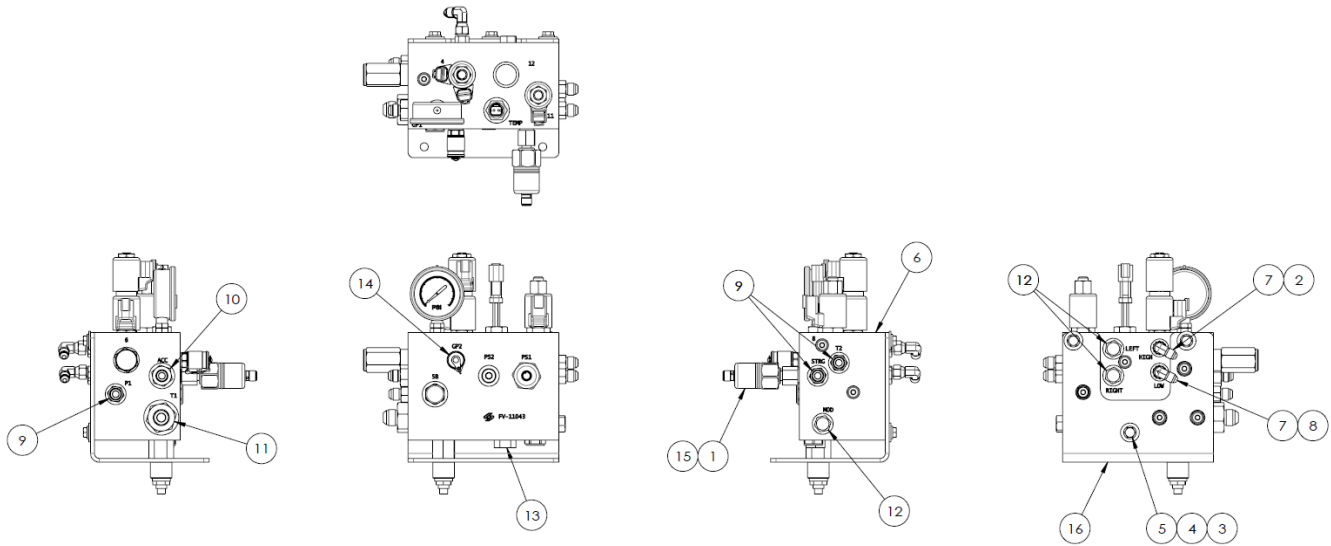
1 INSTALL SPECIFIED FITTINGS WITH LOCTITE 565 PIPE THREAD SEALANT OR EQUIVALENT

### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	A-ES12-0488	HYDRAULIC TANK STRAINER	1
2	A-ES12-0550	HYD FILLER-BREATHER CAP	1
3	A-ES12-0551	HYD SIGHT GAGE	1
4	A-ES12-0552	MAGNETIC DRAIN PLUG, .5 NPT	1
5	N-2007-09-S-B	ADAPTER, -06 M JIC X -08 M ORB	1
6	Z-11878-00	WLD, HYD TANK (P)	1

10.7 ASSEMBLY, MANIFOLD BLOCK



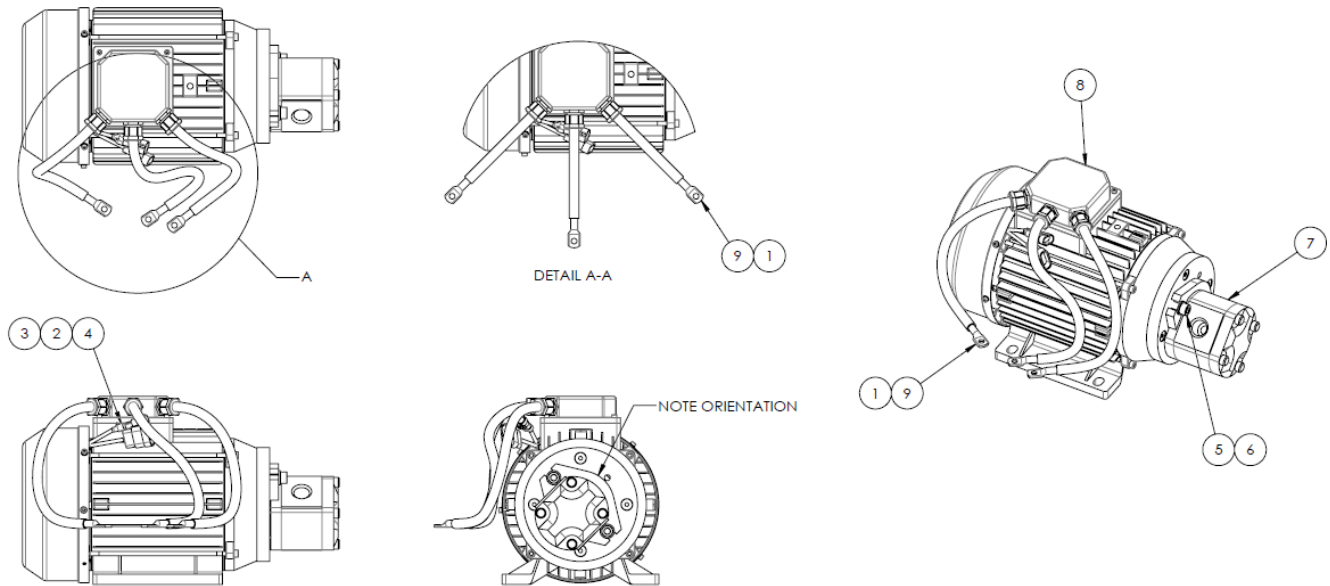
### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	EC-3493-PGM-1	PRESSURE SENSOR, PROGRAMMED (ETT-8X)	1
1	EC-3493-PGM-2	PRESSURE SENSOR, PROGRAMMED (ETT-12X)	1
2	ET00-09-003-CA	ADAPTER, -04 SAE ORB M X -04 JIC M X .031 ORIFICE	1
3	G-1250-1060W	FLATWASHER, 5/16 WIDE	3
4	G-1251-1060R	LOCKWASHER, 5/16 REGULAR	3
5	G-1420-106012	BOLT, 5/16-18 X 1-1/4" LG. HEX HD GR 8	3
6	HC-2983	MANIFOLD BLOCK, 24V	1
7	N-2002-03-S	ELBOW, SWIVEL NUT	2
8	N-2007-03-S-B	CONNECTOR, STR THD	1
9	N-2007-08-S-B	ADAPTER, -06 JIC M X -06 ORB M	3
10	N-2007-09-S-B	ADAPTER, -06 M JIC X -08 M ORB	1
11	N-2007-14-S-B	CONNECTOR, STR THD	1
12	N-2053-05-S-B	PLUG, HEX HD W/ O-RING	3
13	N-2053-06-S-B	PLUG, HEX HD W/O-RING	1
14	N-2544-04	CPLG, QUICK DISCONNECT MB	1
15	N-2846-02	FITTING, ADAPTOR	1
16	S-4084-00	BRACKET, MANIFOLD (P)	1



## 10.8 ASSEMBLY, PUMP MOTOR (ETT-12X)

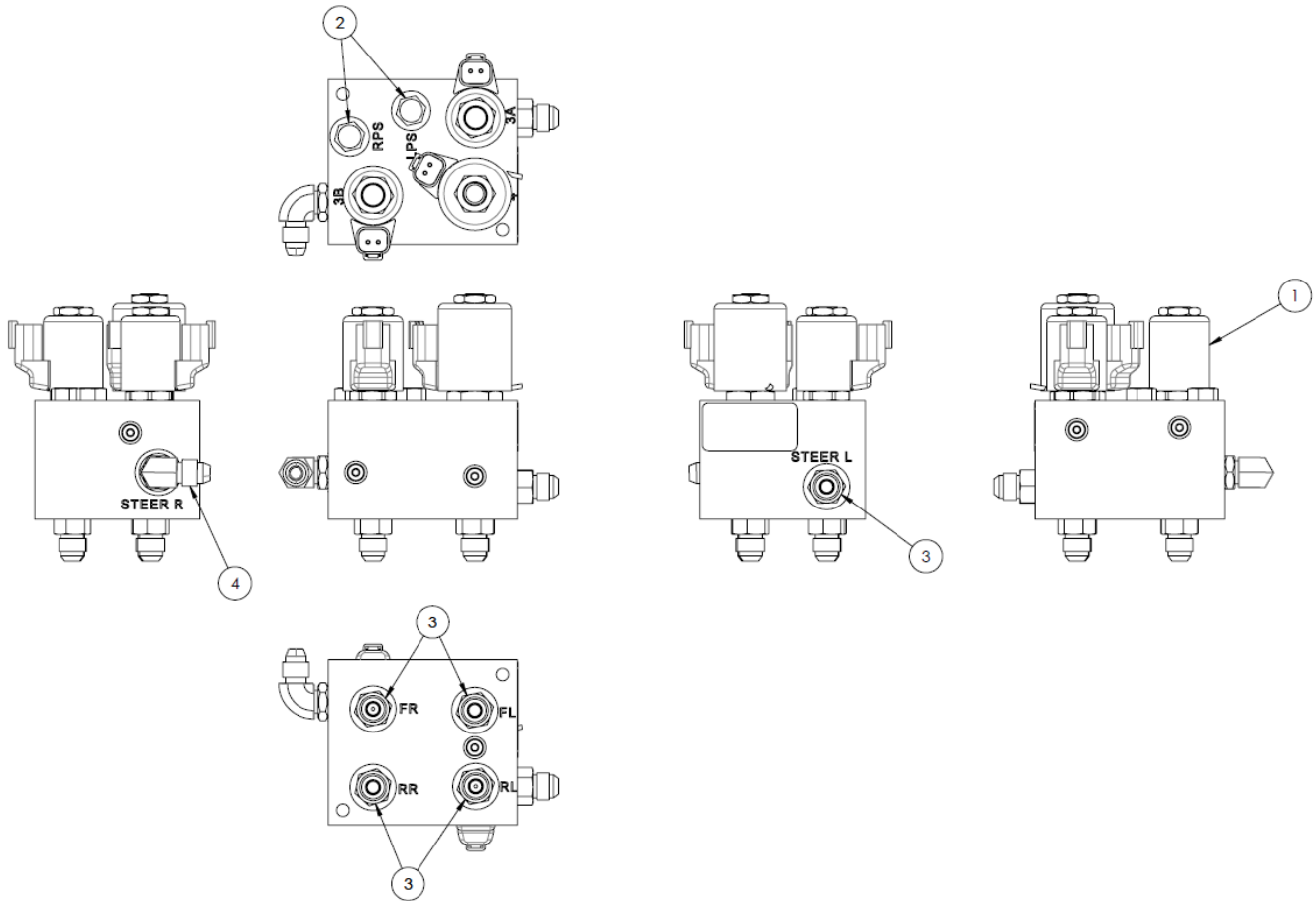


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	EC-1057-01	TUBING, BLACK 3/4" HEAT SHRINK (NOT SHOWN)	9"
2	EC-3489-01	TERMINAL, AMP SUPERSEAL	2
3	EC-3490-01	WIRE SEAL, AMP SUPERSEAL	2
4	EC-3491	CONNECTOR, AMP SUPERSEAL	1
5	G-1491-108015	SOC HD CAP SCR, M10X1.5 X 30	2
6	G-1515-M100	FLATWASHER, M10	2
7	HC-2973	PUMP, GEAR 9T SAE-A 0.4IN3	1
8	LAVT-09-001-CA	HYDRAULIC PUMP MOTOR	1
9	NVSP-33-001-CB	BATTERY CABLE LUG, 5/16, 1-2 AWG	3

## 10.9 ASSEMBLY, STEER BLOCK

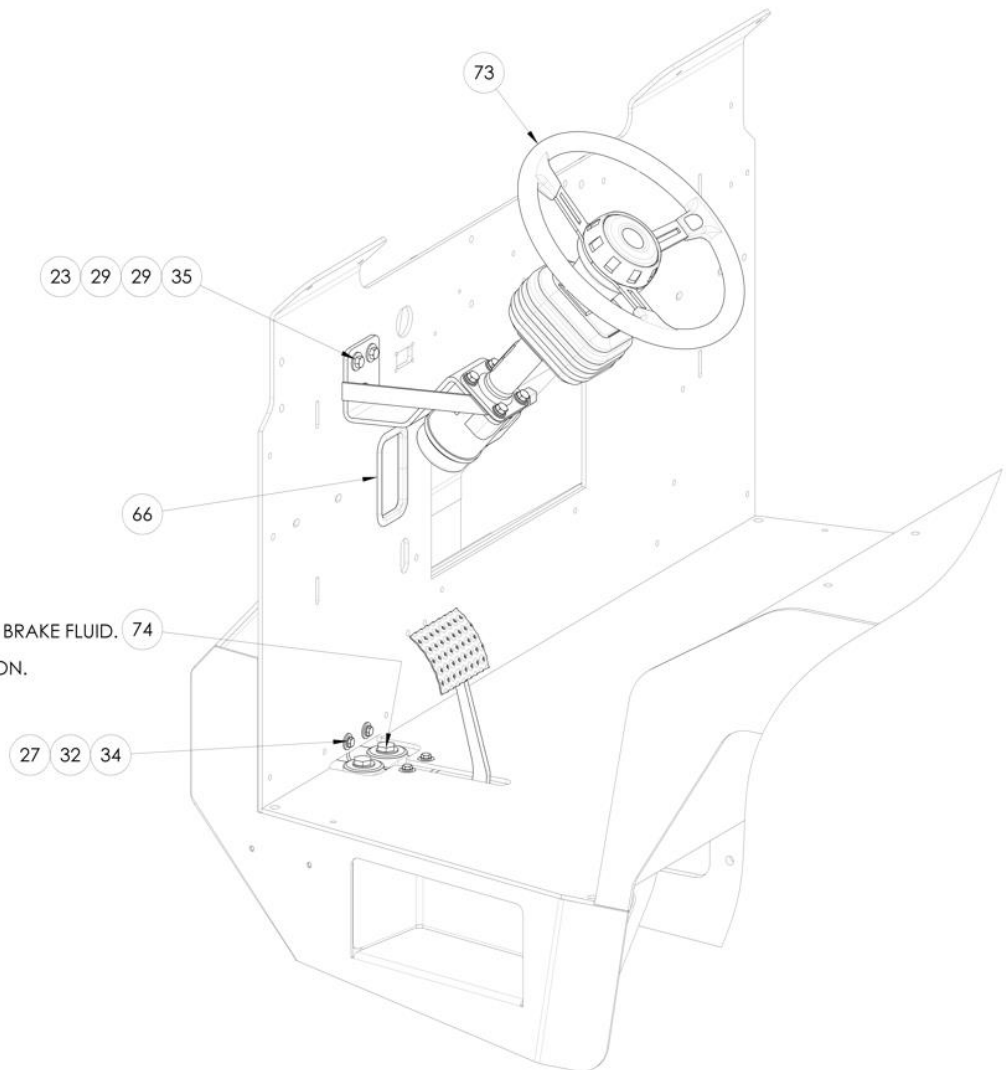
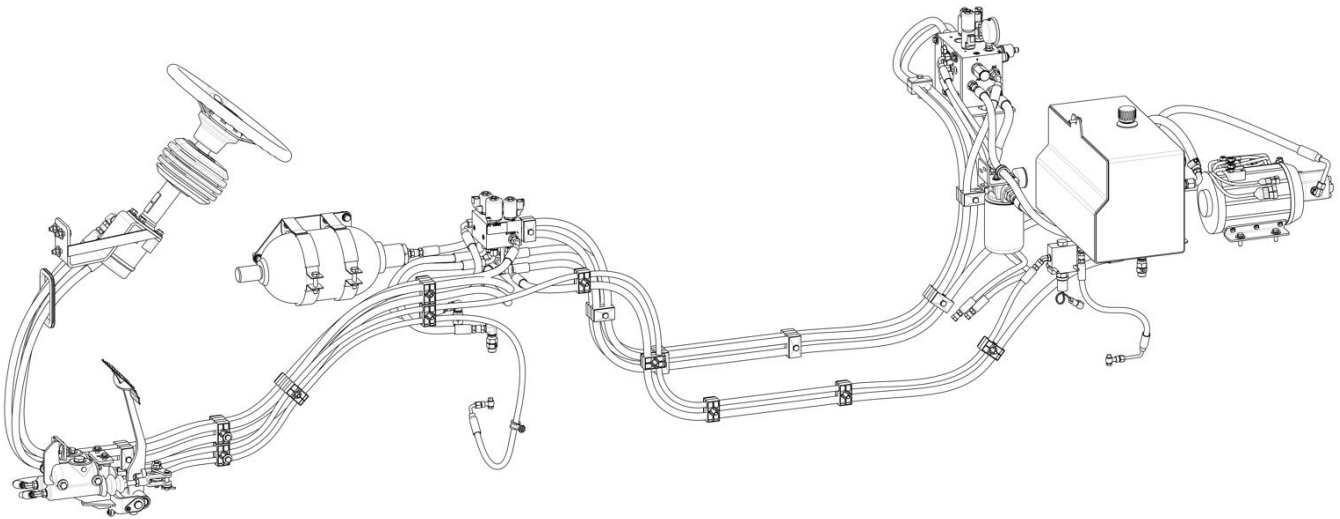


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

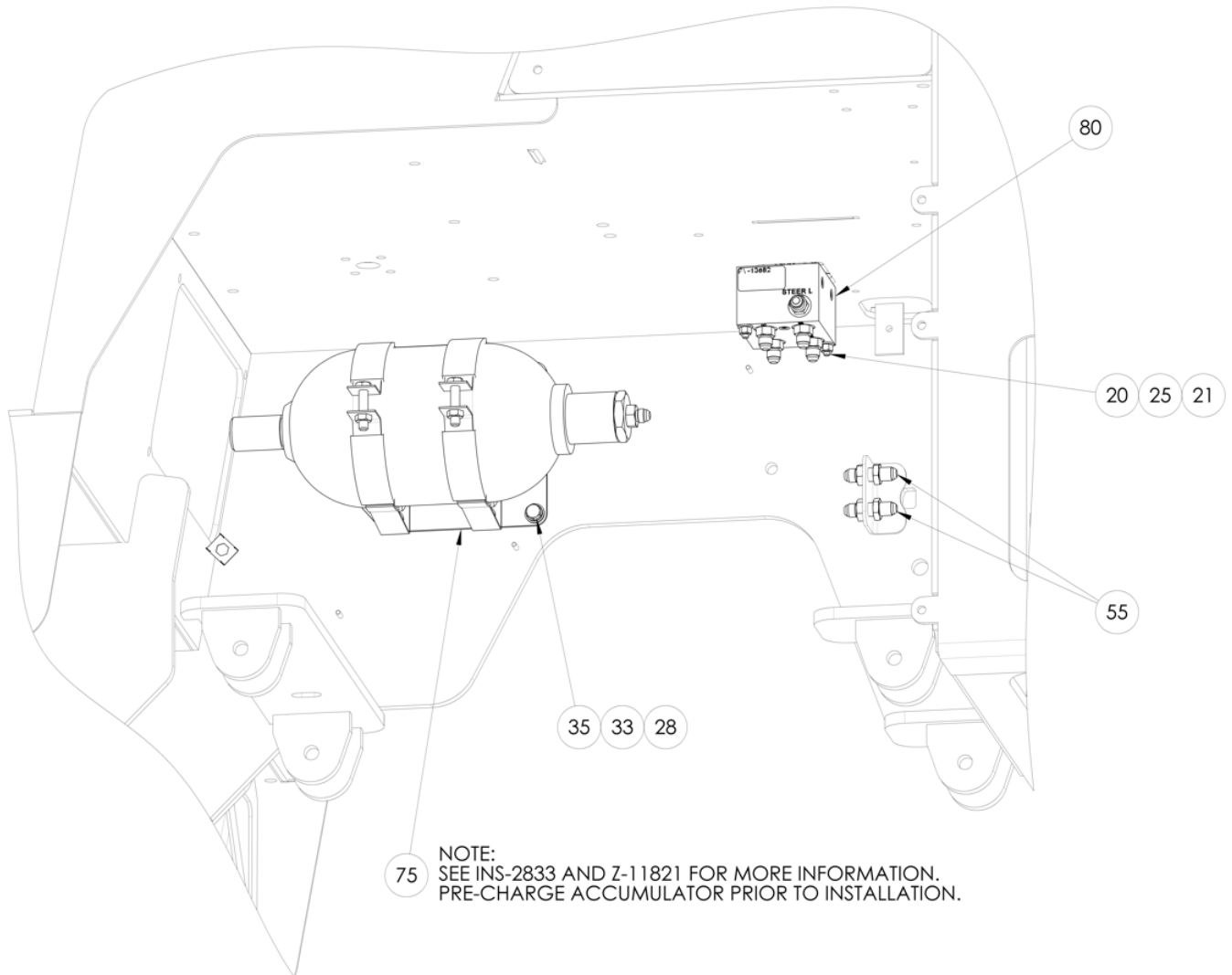
Item	Part Number	Description	Qty
1	HC-2937	STEERING SYNCH VALVE	1
2	N-2053-03-S-B	PLUG, HEX HD W/O-RING	2
3	N-2007-08-S-B	ADAPTER, -06 JIC M X -06 ORB M	5
4	N-2001-08-S-B	ELBOW, STRAIGHT THREAD	1

10.10 ASSEMBLY, HYDRAULIC SYSTEM

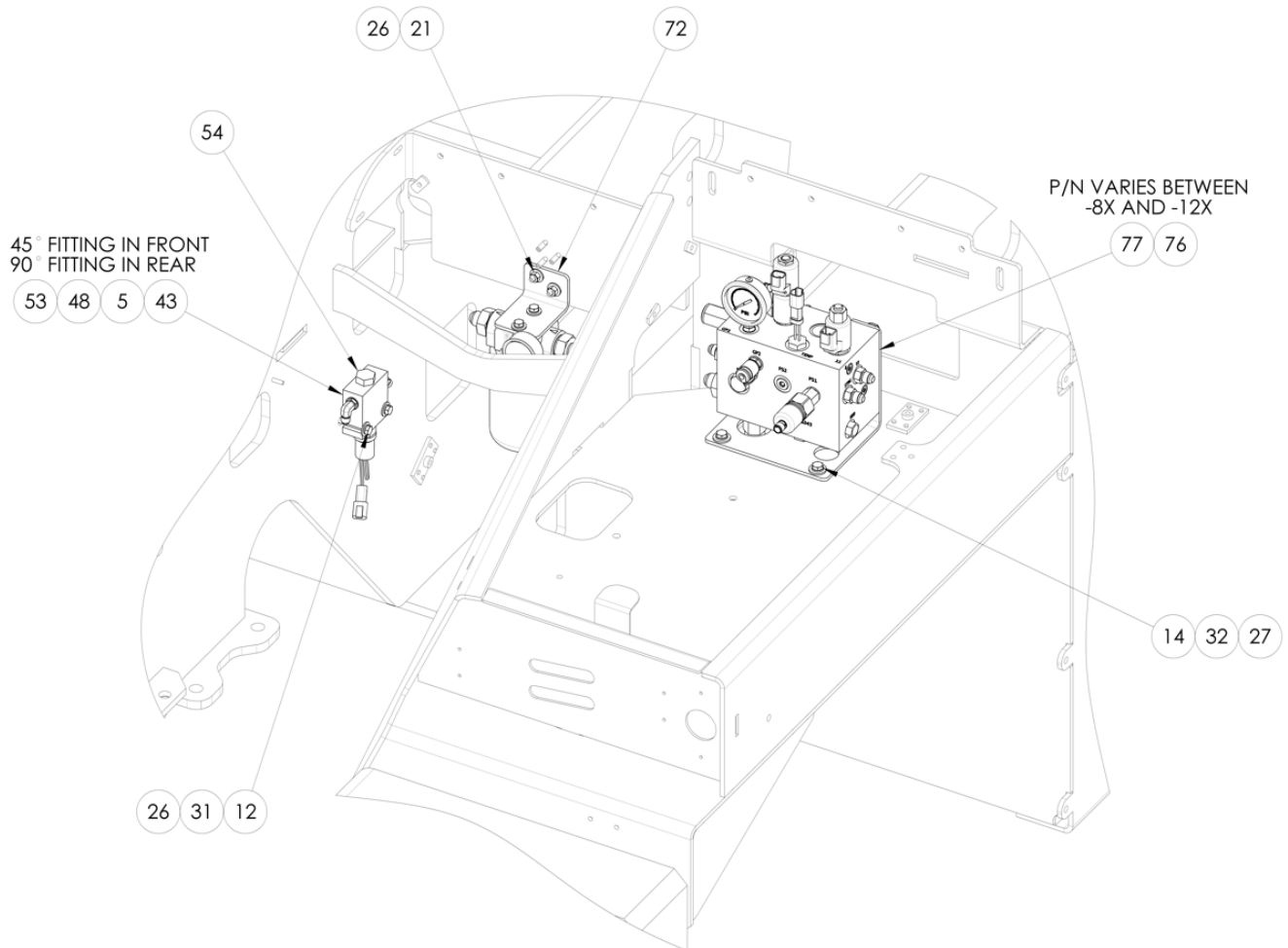


NOTE:  
MUST USE ONLY MINERAL OIL BASED BRAKE FLUID.  
DOT FLUID IS NOT ACCEPTABLE.  
SEE INS-2833 FOR MORE INFORMATION.

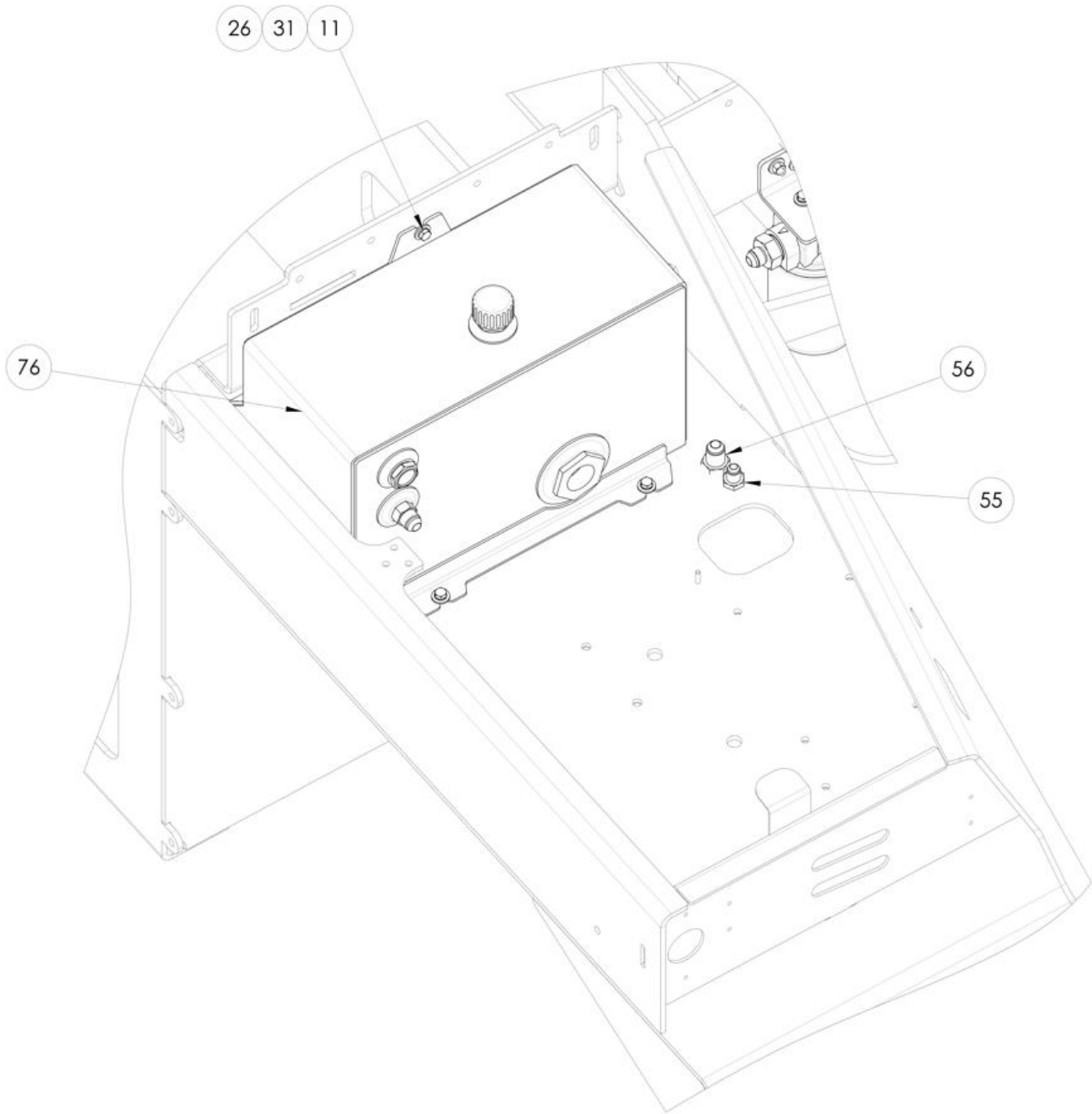
10.10 ASSEMBLY, HYDRAULIC SYSTEM (*continued*)



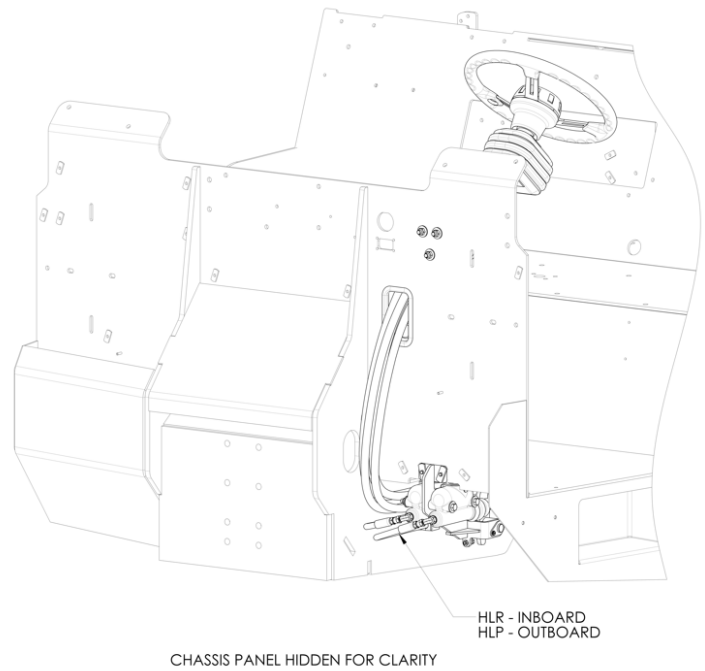
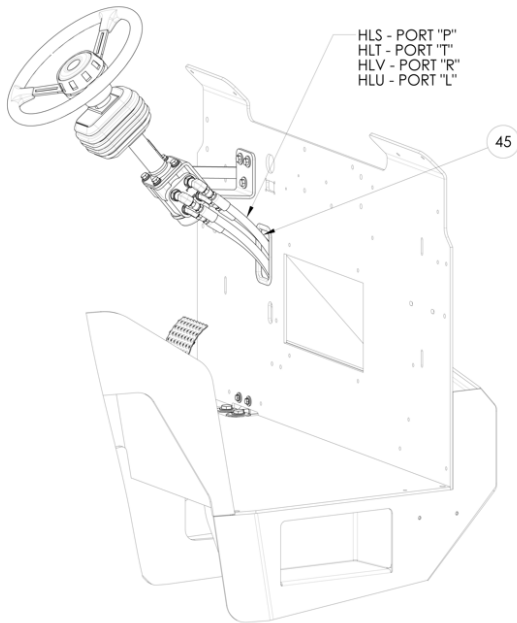
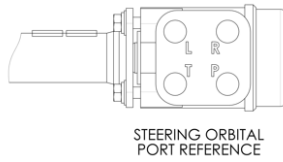
10.10 ASSEMBLY, HYDRAULIC SYSTEM (*continued*)



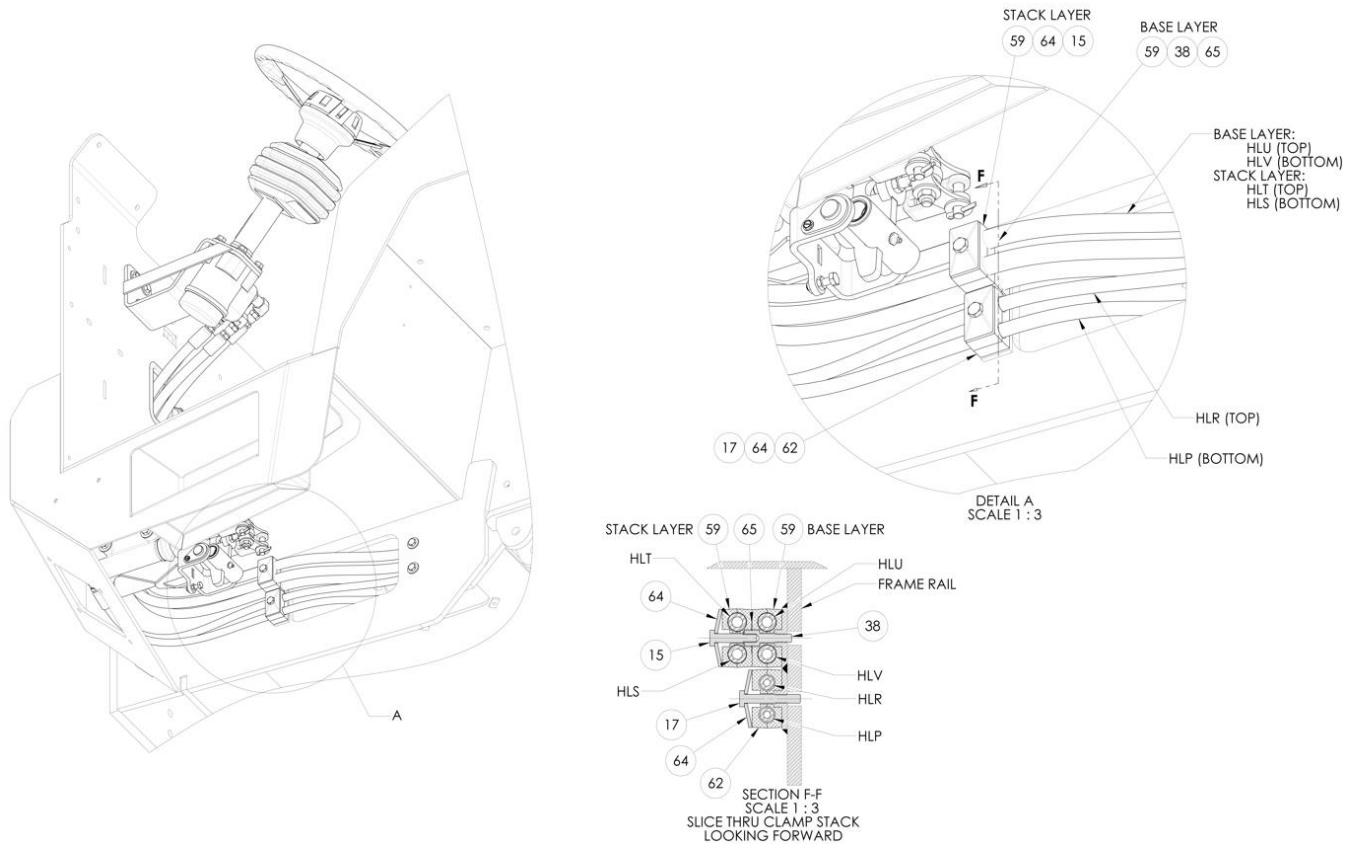
10.10 ASSEMBLY, HYDRAULIC SYSTEM (continued)



10.10 ASSEMBLY, HYDRAULIC SYSTEM (*continued*)

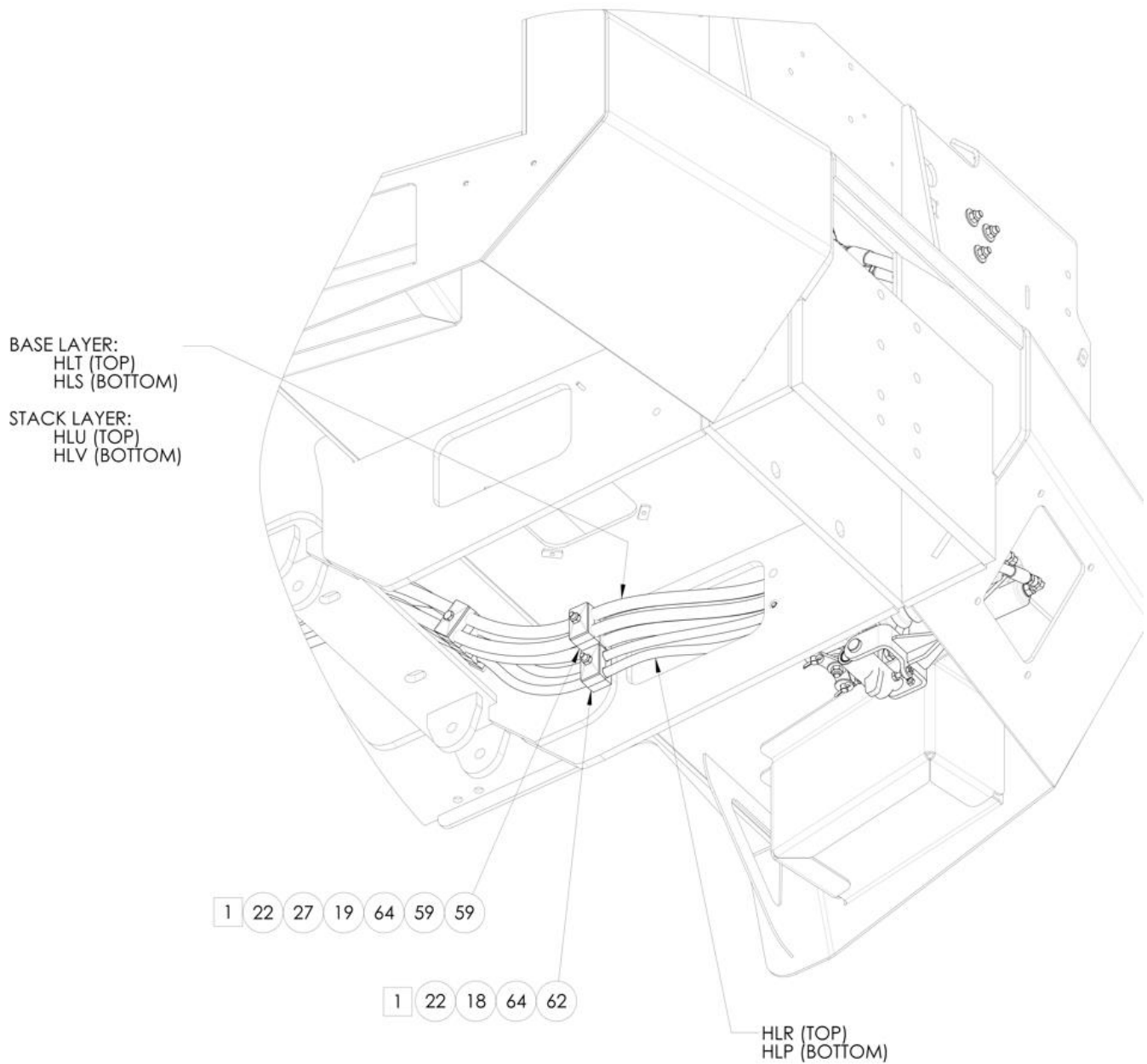


10.10 ASSEMBLY, HYDRAULIC SYSTEM (*continued*)



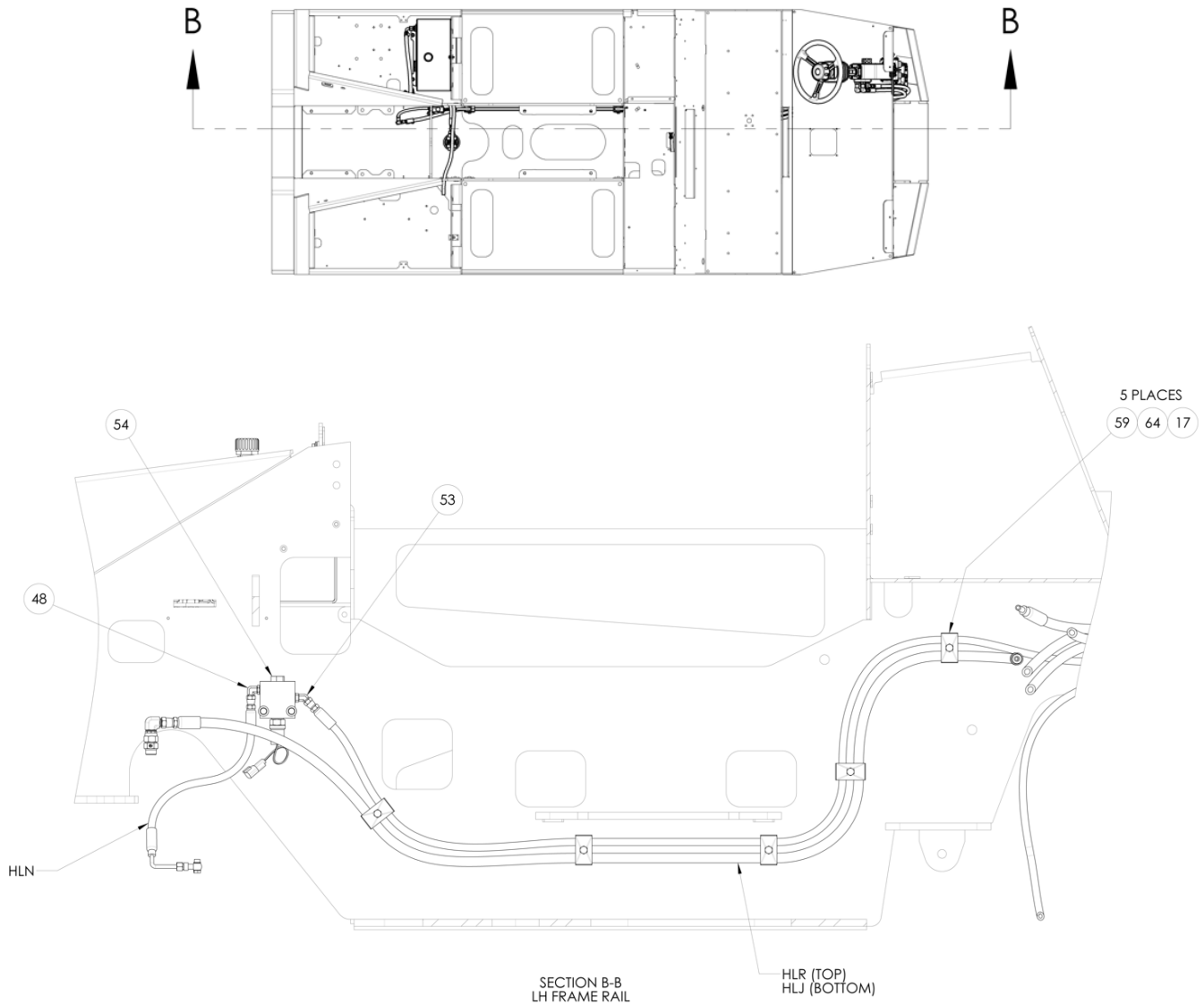


10.10 ASSEMBLY, HYDRAULIC SYSTEM (continued)

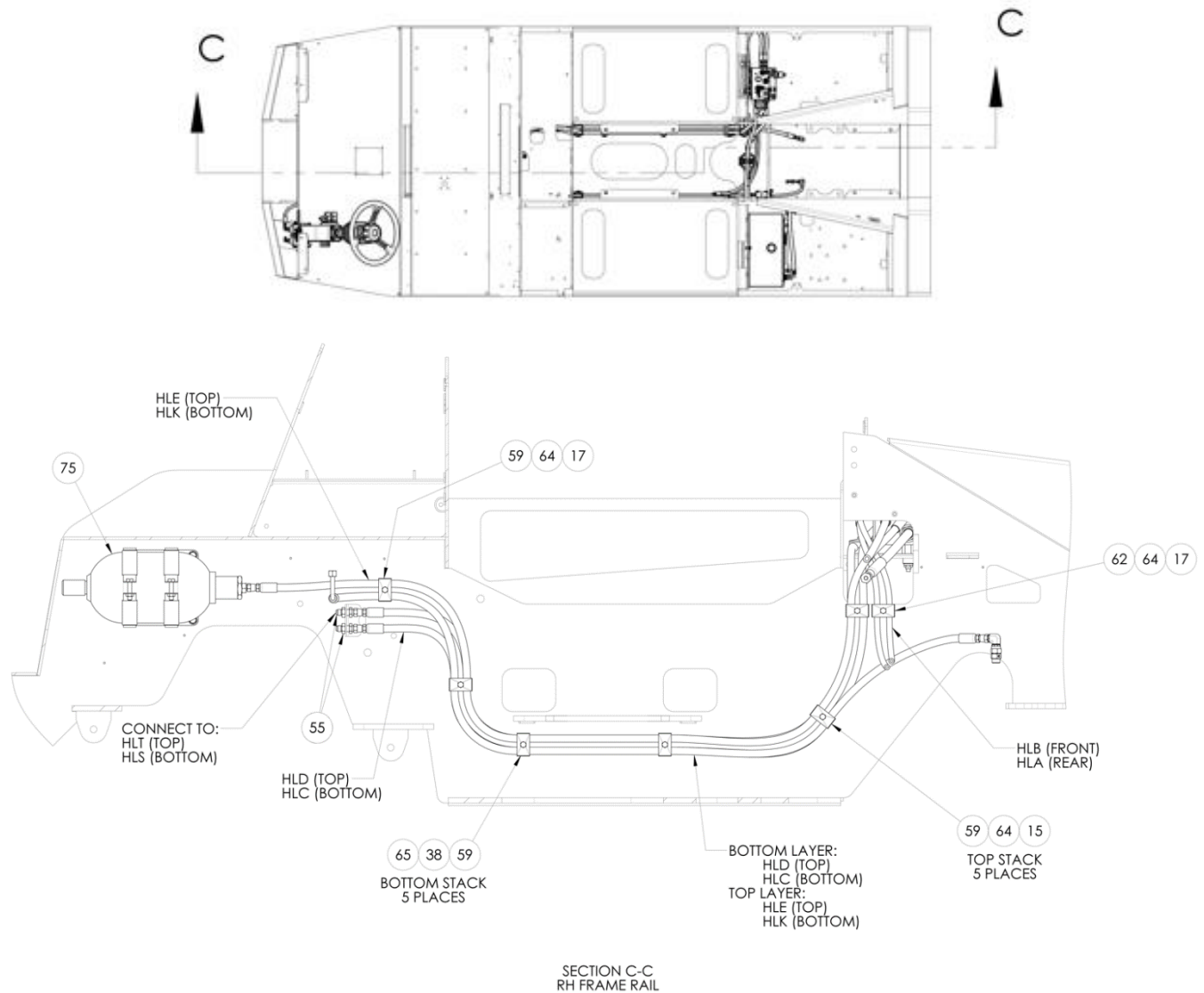




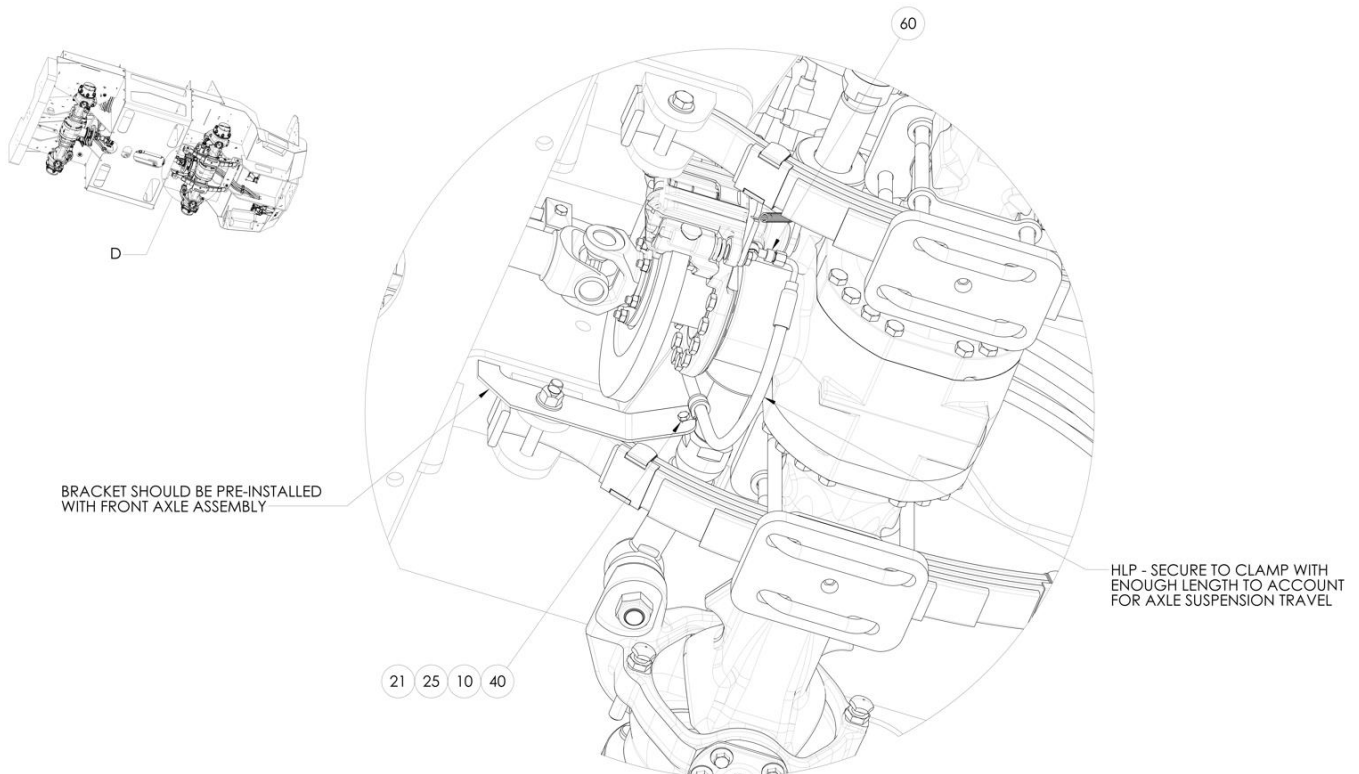
10.10 ASSEMBLY, HYDRAULIC SYSTEM (*continued*)



10.10 ASSEMBLY, HYDRAULIC SYSTEM (continued)



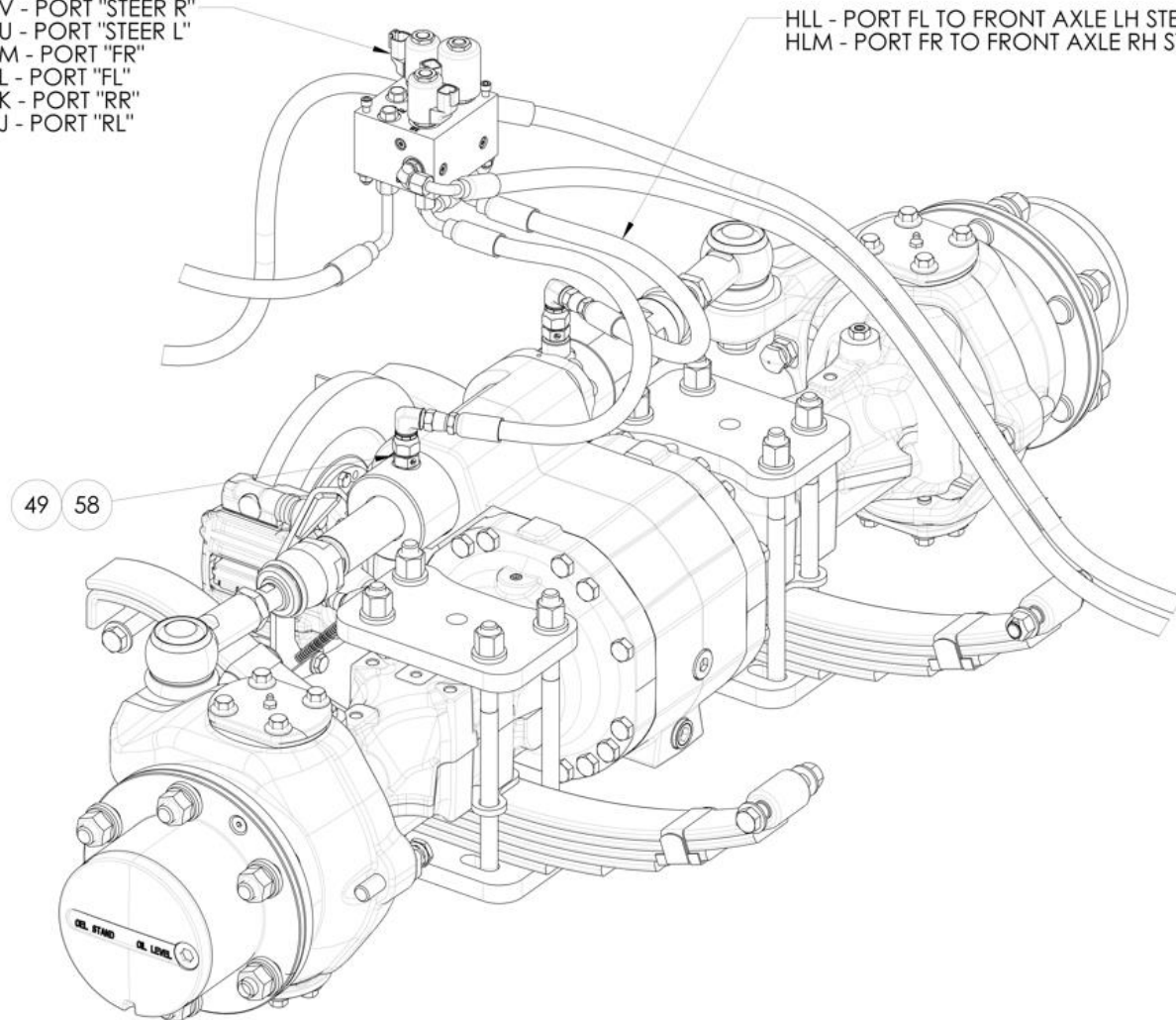
10.10 ASSEMBLY, HYDRAULIC SYSTEM (*continued*)



10.10 ASSEMBLY, HYDRAULIC SYSTEM (*continued*)

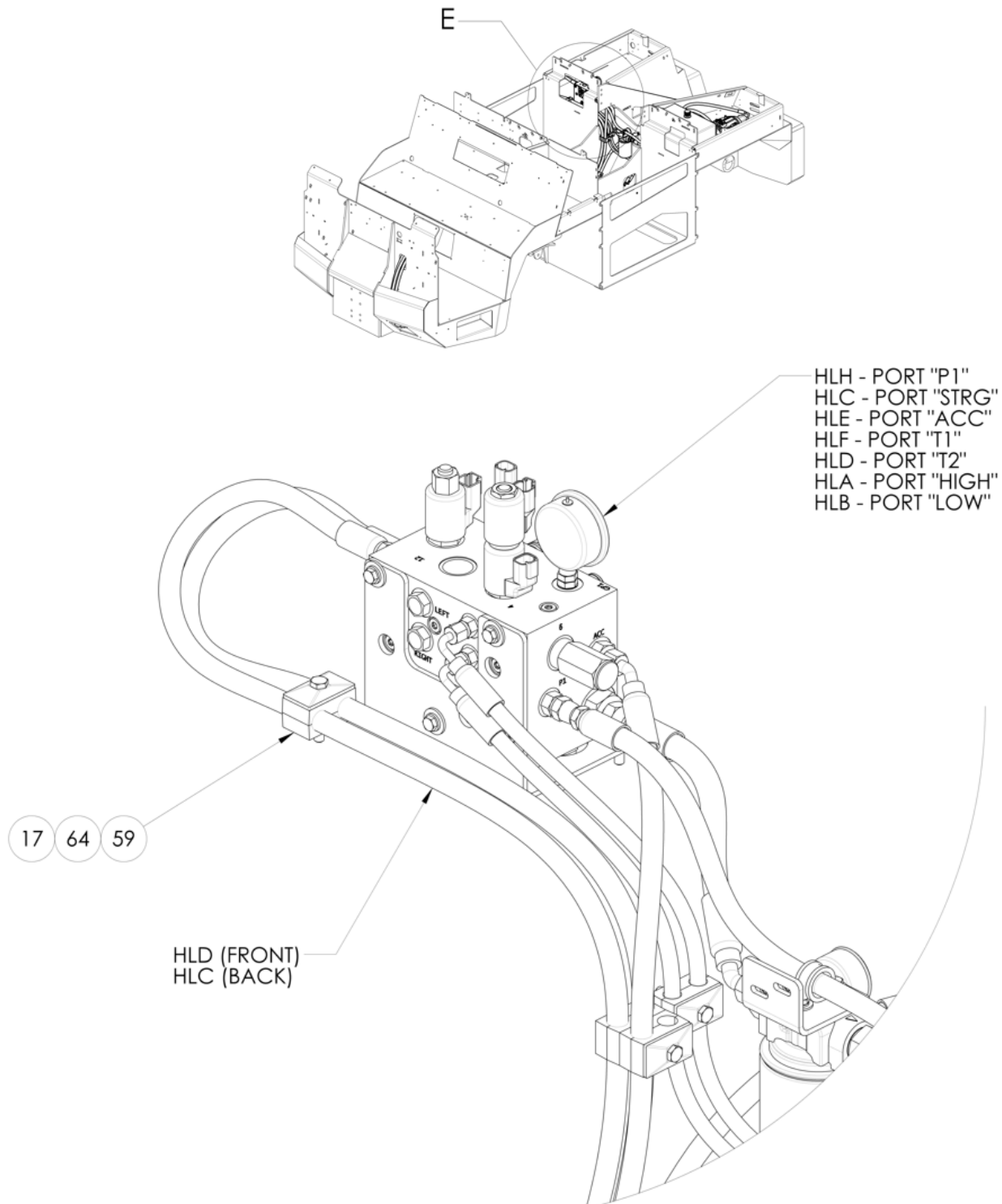
HLV - PORT "STEER R"  
HLU - PORT "STEER L"  
HLM - PORT "FR"  
HLL - PORT "FL"  
HLK - PORT "RR"  
HLJ - PORT "RL"

HLL - PORT FL TO FRONT AXLE LH STEER PORT  
HLM - PORT FR TO FRONT AXLE RH STEER PORT



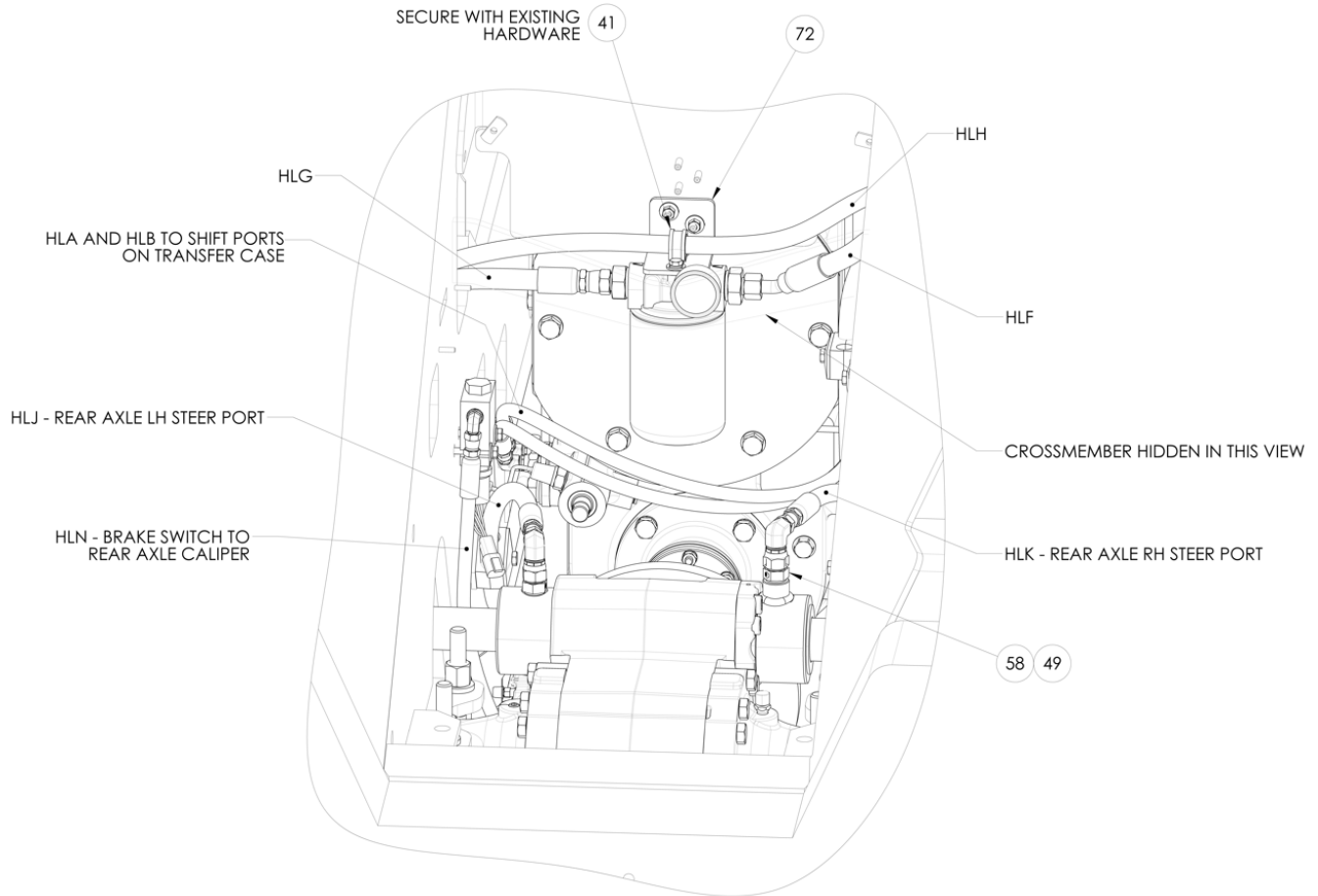
STEER MANIFOLD AND FRONT AXLE  
STEERING CONNECTIONS

10.10 ASSEMBLY, HYDRAULIC SYSTEM (continued)



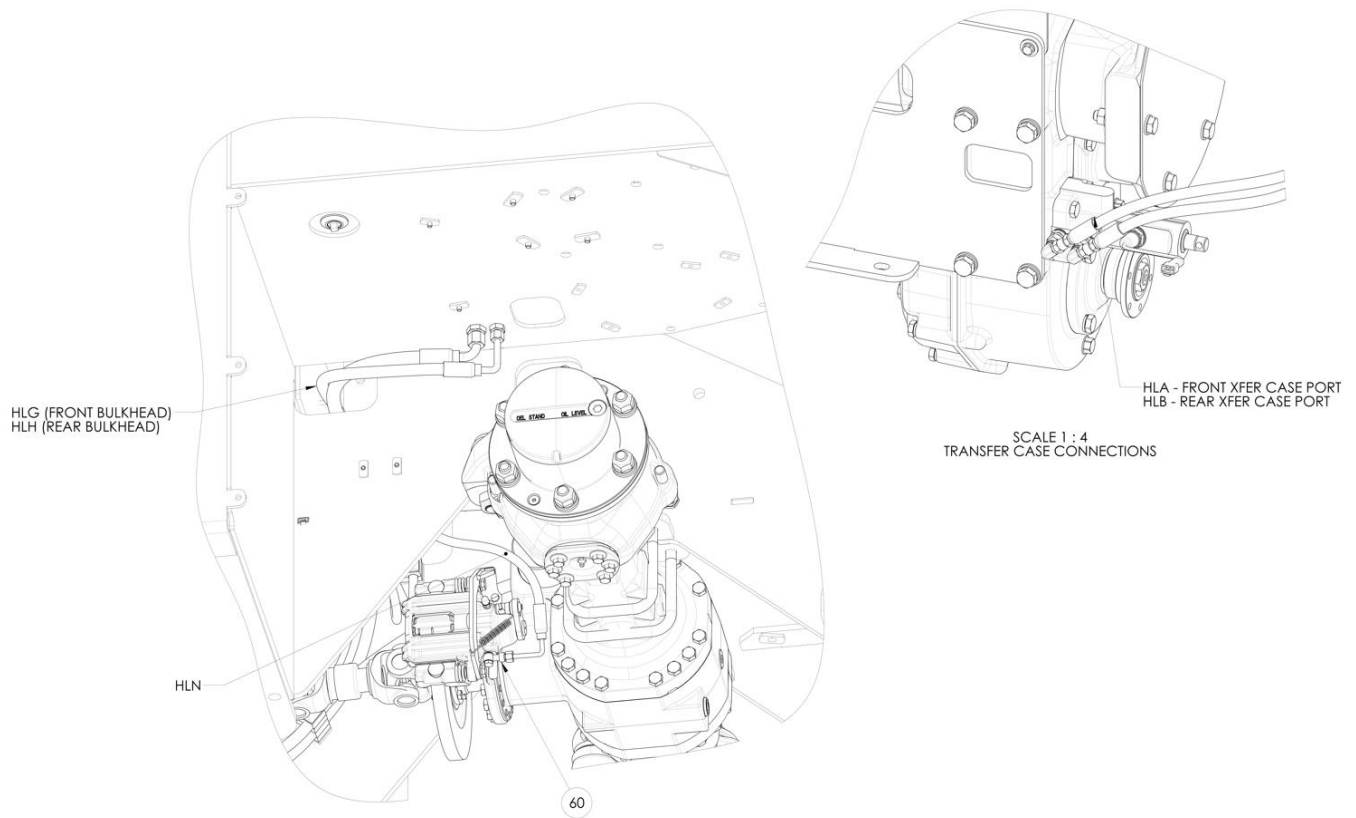
DETAIL E  
CHASSIS HIDDEN FOR CLARITY

10.10 ASSEMBLY, HYDRAULIC SYSTEM (*continued*)



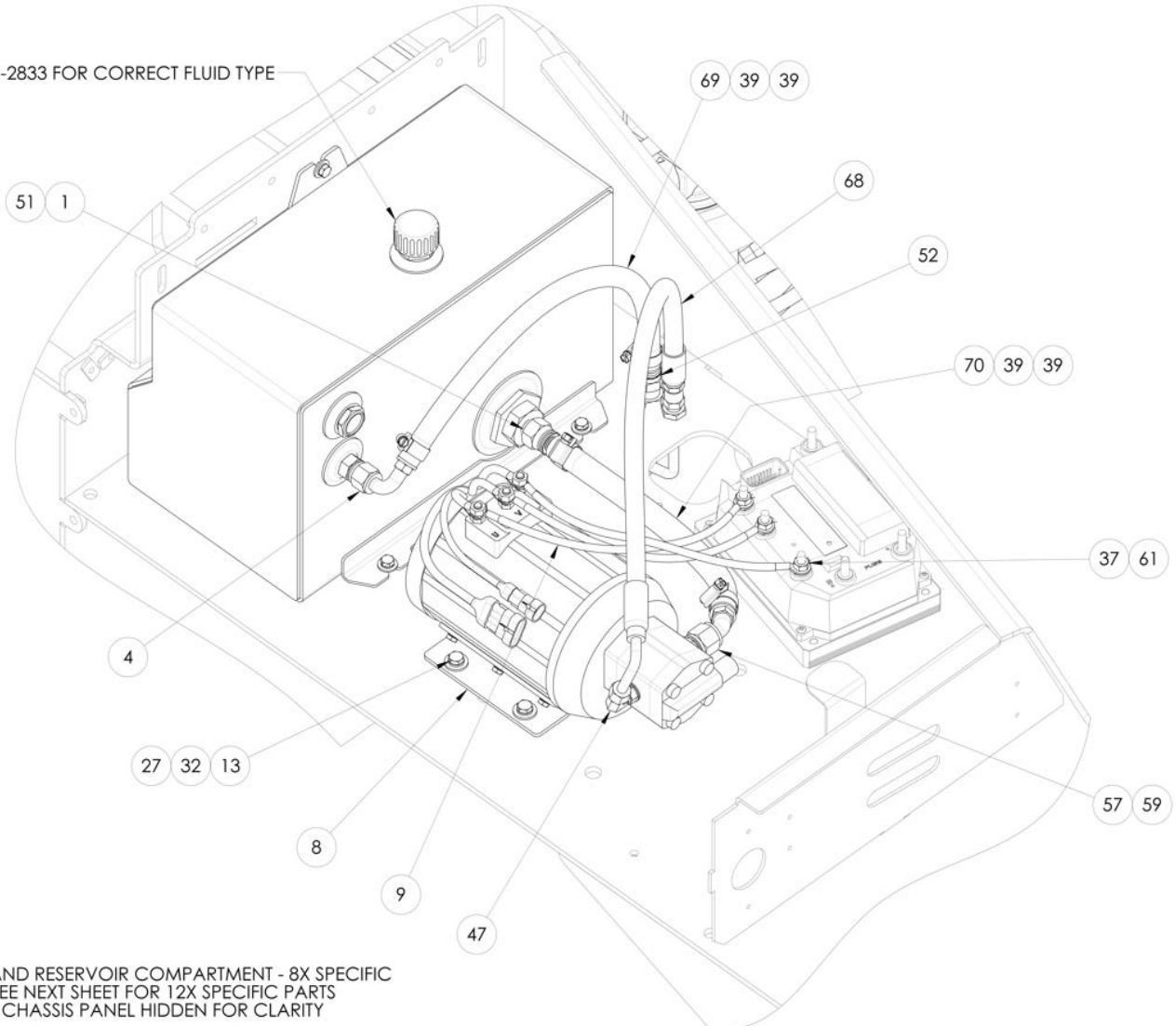


10.10 ASSEMBLY, HYDRAULIC SYSTEM (*continued*)



10.10 ASSEMBLY, HYDRAULIC SYSTEM (*continued*)

SEE INS-2833 FOR CORRECT FLUID TYPE



PUMP AND RESERVOIR COMPARTMENT - 8X SPECIFIC  
SEE NEXT SHEET FOR 12X SPECIFIC PARTS  
CHASSIS PANEL HIDDEN FOR CLARITY





10.10 ASSEMBLY, HYDRAULIC SYSTEM (continued)

**Parts List**

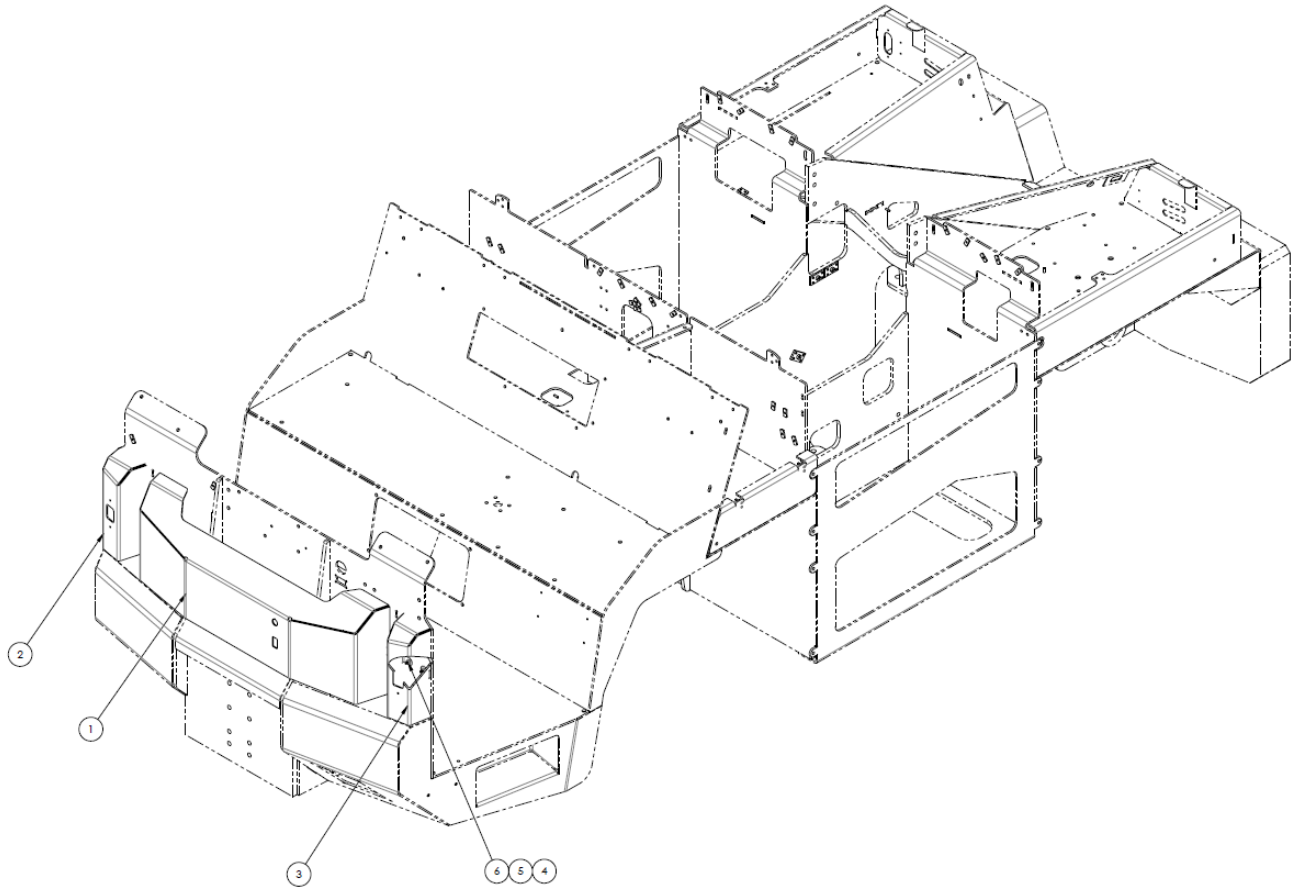
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	30682-10-10	HOSE BARB-10 JIC F-10 BARB	1
2	30682-12-12	HOSE BARB, -12 F JIC X 3/4" BARB	-
3	33982-12-12	90 DEG HOSE BARB 12 JIC	-
4	33982-8-8	HOSE BARB, 90° ELBOW, -08 F JIC X 1/2" BARB	1
5	A-ES12-0468-1	BRAKE PRESSURE SWITCH	1
6	C5315X12X16	ADAPTER, -16 M SAE ORB X -12 M JIC	-
7	C5315X6X10	ADAPTER, -10 M SAE ORB X -06 M JIC	-
8	EC-3108	ASSEMBLY, PUMP/ MOTOR	1
9	EC-3488	BATTERY CABLE KIT, PUMP	1
10	G-1100-105006	BOLT, 1/4-20 X 3/4" LG HEX HD GR 5	1
11	G-1100-105010	BOLT, 1/4-20 X 1.0" LG HEX HD GR 5	3
12	G-1100-105022	BOLT, 1/4-20 X 2-1/4" LG HEX HD GR 5	2
13	G-1100-106010	BOLT, 5/16-18 X 1.0" LG. HEX HD GR 5	4
14	G-1100-106012	BOLT, 5/16-18 X 1-1/4" LG. HEX HD GR 5	2
15	G-1100-106014	BOLT, 5/16-18 X 1-1/2" LG. HEX HD GR 5	7
16	G-1100-106020	BOLT, 5/16-18 X 2.0" LG. HEX HD GR 5	10
17	G-1100-106024	BOLT, 5/16-18 X 2-1/2" LG. HEX HD GR 5	1
18	G-1100-106030	BOLT, 5/16-18 X 3" HEX HD GR 5	1
19	G-1100-106040	BOLT, 5/16-18 X 4.0" LG. HEX HD GR 5	1
20	G-1151-105036	SCR, 1/4-20 HEX SOC HD CAP	2
21	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	5
22	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	2
23	G-1202-1070	STOPNUT, 3/8-16 ELASTIC	3
24	G-1250-1050N	FLATWASHER, 1/4 NARROW	3
25	G-1250-1050W	FLATWASHER, 1/4 WIDE	7
26	G-1250-1060W	FLATWASHER, 5/16 WIDE	12
27	G-1250-1070N	FLATWASHER, 3/8 NARROW	3
28	G-1250-1070W	FLATWASHER, 3/8 WIDE	6
29	G-1250-1090N	FLATWASHER, 1/2 NARROW	-
30	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	5
31	G-1251-1060R	LOCKWASHER, 5/16 REGULAR	10
32	G-1251-1070R	LOCKWASHER, 3/8 REGULAR	3
33	G-1251-1090R	LOCKWASHER, 1/2 REGULAR	-
34	G-1420-106010	BOLT, 5/16-18 X 1.0" LG. HEX HD GR 8	4
35	G-1420-107012	BOLT, 3/8-16 X 1.25" HEX HD GR 8	6
36	G-1420-109014	BOLT, 1/2-13 X 1-1/2" HEX HD GR 8	-
37	G-1793-09	NUT, HEX CLASS 8 M8X1.25	3
38	G-1871-03	STACKING BOLT, HYD CLAMP	8
39	H-1426-04	CLAMP, HOSE, SAE -12	6
40	H-3521-04	CLAMP, CUSHIONED LOOP 9/16"	1

10.10 ASSEMBLY, HYDRAULIC SYSTEM (continued)

Item	Part Number	Description	Qty
41	H-3521-09	CLAMP, CUSHIONED LOOP 7/8"	1
42	H-3521-15	CLAMP, CUSHIONED LOOP 1 1/4"	-
43	HC-2939	3 WAY VALVE BLOCK #4	1
44	K-5577	KIT, HYDR. HOSES ETTX	1
45	MC5515X6X14	ELBOW 90°, M14X1.5 M METRIC ORB X -06 M JIC	1
46	N-2001-03-S-B	ELBOW, STRAIGHT THREAD	1
47	N-2002-15-S	ELBOW 90°, -08 F JIC X -06 M JIC	4
48	N-2007-18-S-B	ADAPTER, -12 SAE ORB M X -12 JIC M	-
49	N-2007-45-S-B	ADAPTER, -16 M SAE ORB X -10 M JIC	1
50	N-2026-05-S	HOSE BARB, -08 JIC M X 1/2" BARB	1
51	N-2042-03-S-B	ELBOW 45°, -04 M SAE ORB X -04 M JIC	1
52	N-2061-03-S	BULKHEAD, -06 M JIC X -06 M JIC W/ NUT	3
53	N-2061-04-S	BULKHEAD, -08 M JIC X -08 M JIC, W/NUT	1
54	N-2747-10-S	HOSE BARB, 45° ELBOW, -10 M JIC X 5/8"	1
55	N-3054-08M18-SB	ADAPTOR, METRIC	4
56	N-3054-10M18-SB	ADAPTER, M18X1.5 M METRIC ORB X -10 M JIC	1
57	N-3181	BANJO ADAPTER, M10X1.0 M METRIC ORB X -06 M JIC	2
58	NVSP-21-016-CB	M8 BELLEVILLE LOCK WASHER	3
59	NVSP-24-015-CF	HYD CLAMP - DUAL 15MM SMOOTH	7
59	NVSP-24-015-CG	HYD CLAMP - DUAL 16MM SMOOTH	23
61	NVSP-24-017-CC	HYD CLAMP - COVER PLATE	20
62	NVSP-24-018-CB	HYD CLAMP - SAFETY PLATE	8
63	NVSP-24-042-CB	METAL CORE EDGE TRIM	14
64	S-4350-00	BRACKET, BRAKE HOSE (P)	1
65	TF-1038-04-17.5	HYDRAULIC HOSE ASSEMBLY	-
66	TF-1038-18-26.5	HYDRAULIC HOSE ASSEMBLY	1
67	TF-1105-08	PUSH-LOK HOSE, 1/2" ID	20
68	TF-1105-10	PUSH-LOK HOSE, 5/8 ID	12
69	TF-1143-12	SUCTION HOSE, 3/4" ID	-
70	Refer above section	ASY, SPIN-ON FILTER	1
71	Refer above section	ASY, STEERING WHEEL	1
72	Refer above section	ASY, BRAKE PEDAL SUBASSEMBLY	1
73	Refer above section	ASY, ACCUMULATOR	1
74	Refer above section	ASY, HYDRAULIC TANK	1
75	Refer above section	ASY, MANIFOLD BLOCK	1
76	Refer above section	ASY, PUMP MOTOR	-
77	Refer above section	ASY, STEER BLOCK	1

**11.0 CHASSIS**  
**11.1 ASSEMBLY, FRONT GRILLE**

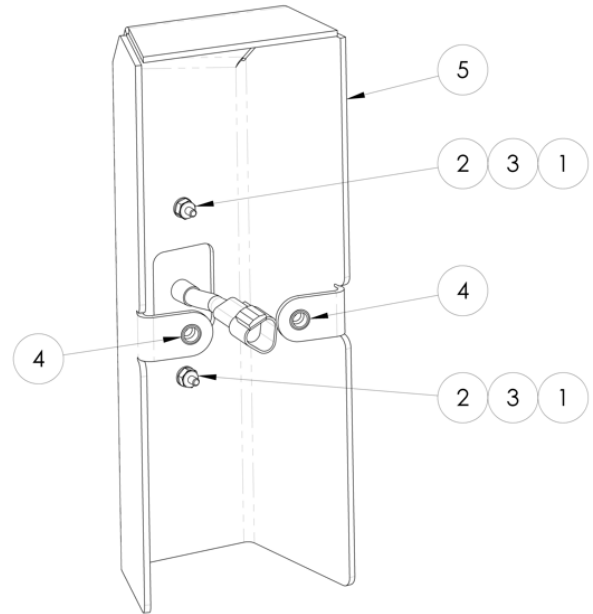
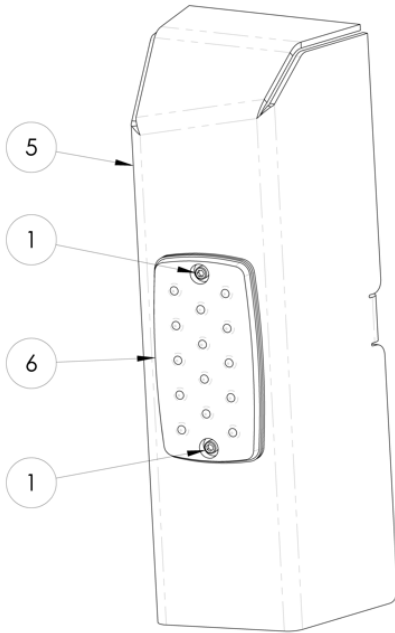


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	S-4154-00	GRILLE, CENTER (WP)	1
2	Z-12344	GRILLE, RH (WP)	1
3	Z-12345	GRILLE, LH (WP)	1
4	326-009	BHCS, 1/4-20 x 1" LG	6
5	G-1250-1050N	FLATWASHER, 1/4 NARROW	6
6	G-1439-1050-S	NUTSERT, THIN WALL 1/4-20	6

### 11.1.1 Assembly, LH Grille With Turn

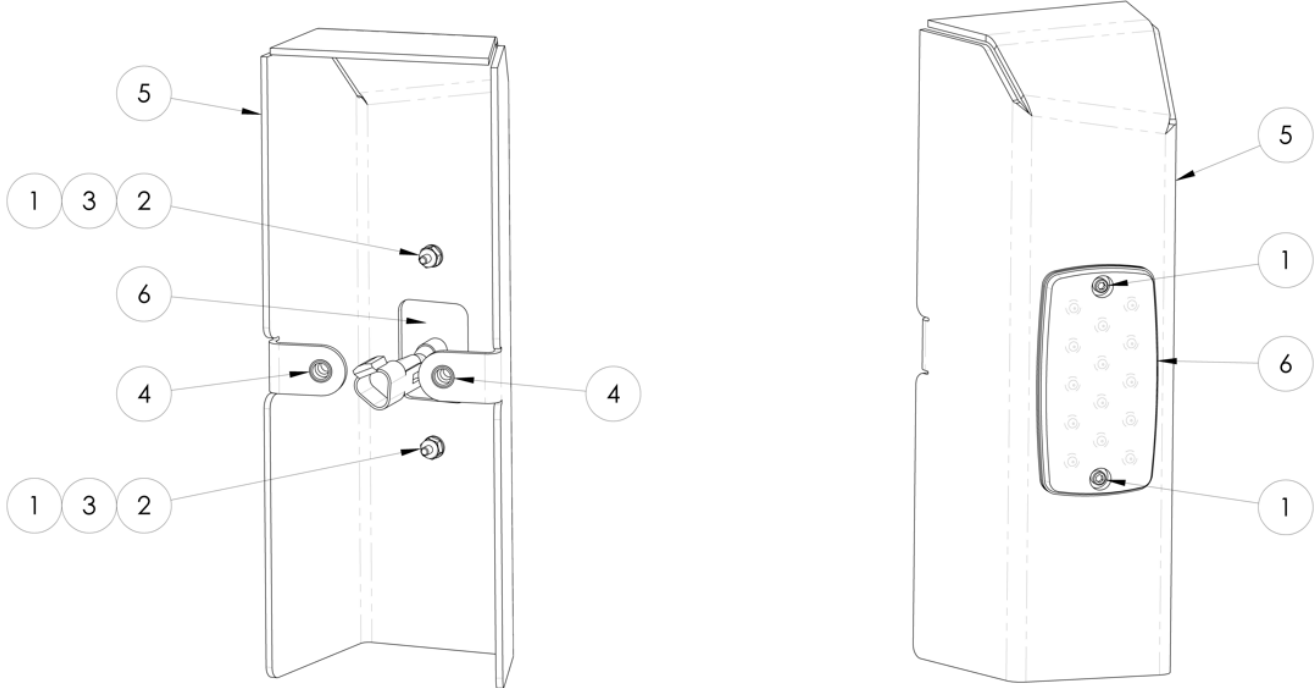


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	G-1151-102006	SCREW, #8-32 X 3/4" SOCKET HD CAP	2
2	G-1202-1020	STOPNUT, #8-32 ELASTIC	2
3	G-1250-1020N	FLATWASHER, #8 NARROW	2
4	G-1439-1050-S	NUTSERT, THIN WALL 1/4-20	2
5	S-4156-00	GRILLE, LH (WP)	1
6	Z-9826	ASY, TURN IND W/CONNECTOR	1

11.1.2 Assembly, RH Grille With Turn



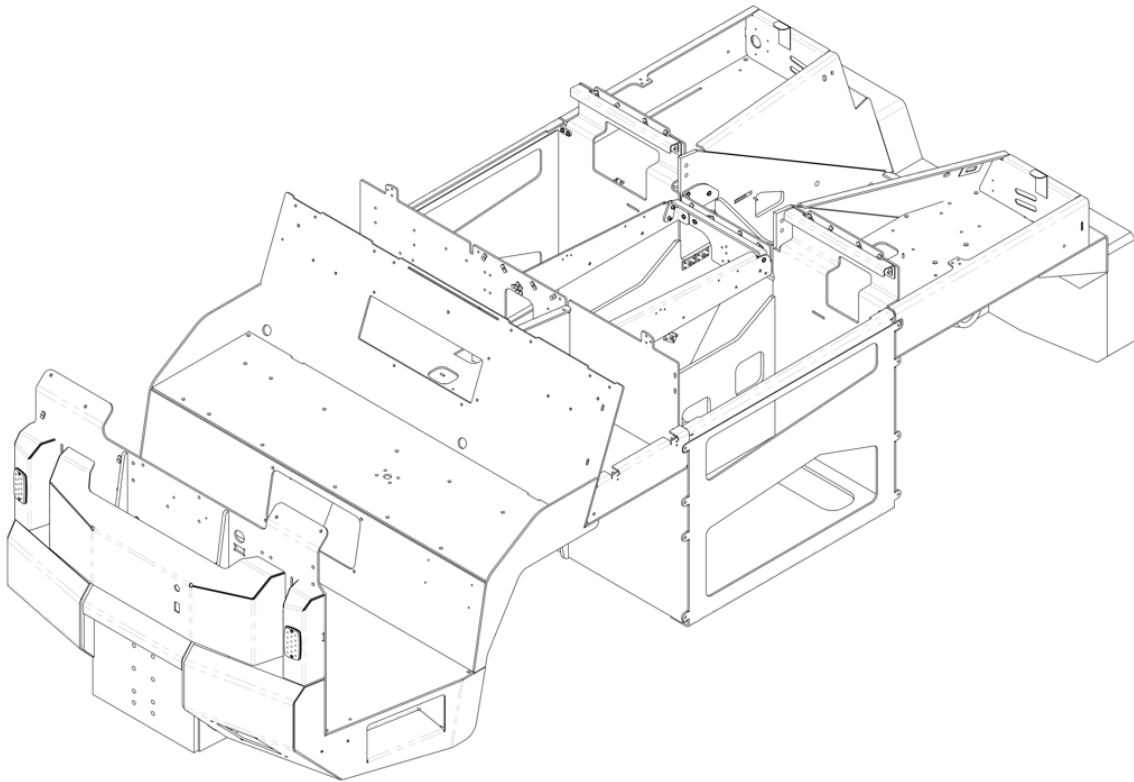
### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

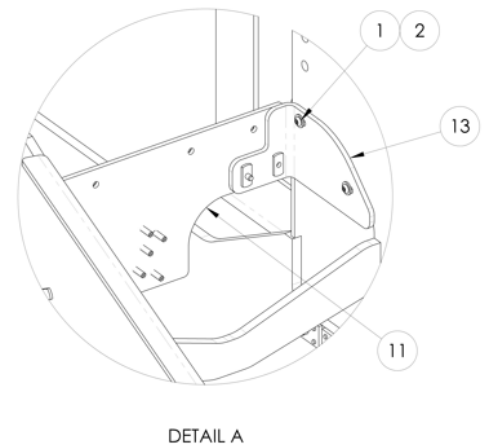
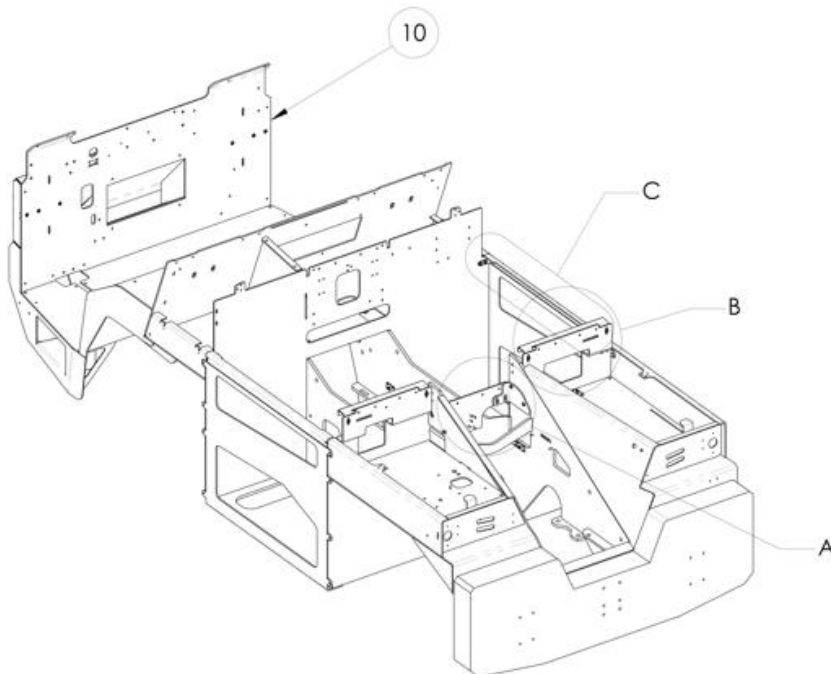
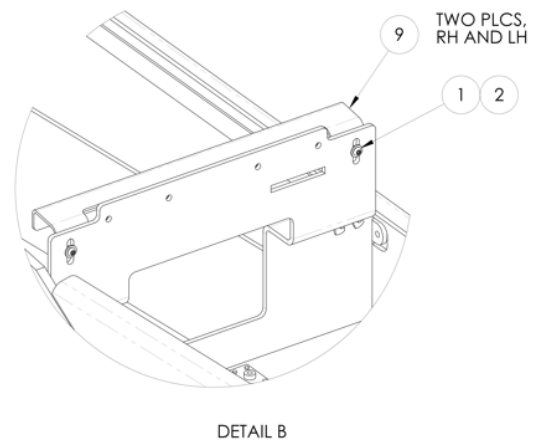
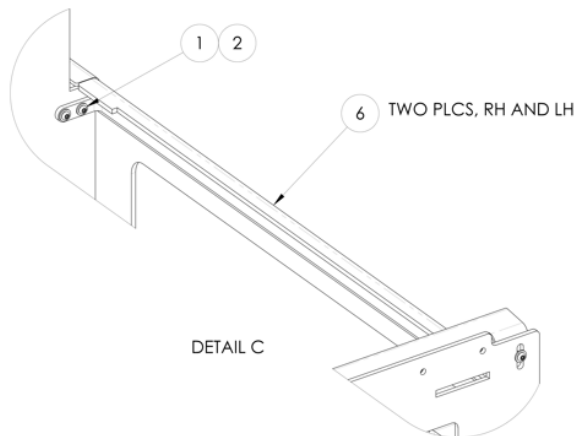
Item	Part Number	Description	Qty
1	G-1151-102006	SCREW, #8-32 X 3/4" SOCKET HD CAP	2
2	G-1202-1020	STOPNUT, #8-32 ELASTIC	2
3	G-1250-1020N	FLATWASHER, #8 NARROW	2
4	G-1439-1050-S	NUTSERT, THIN WALL 1/4-20	2
5	S-4155-00	GRILLE, RH (WP)	1
6	Z-9826	ASY, TURN IND W/CONNECTOR	1



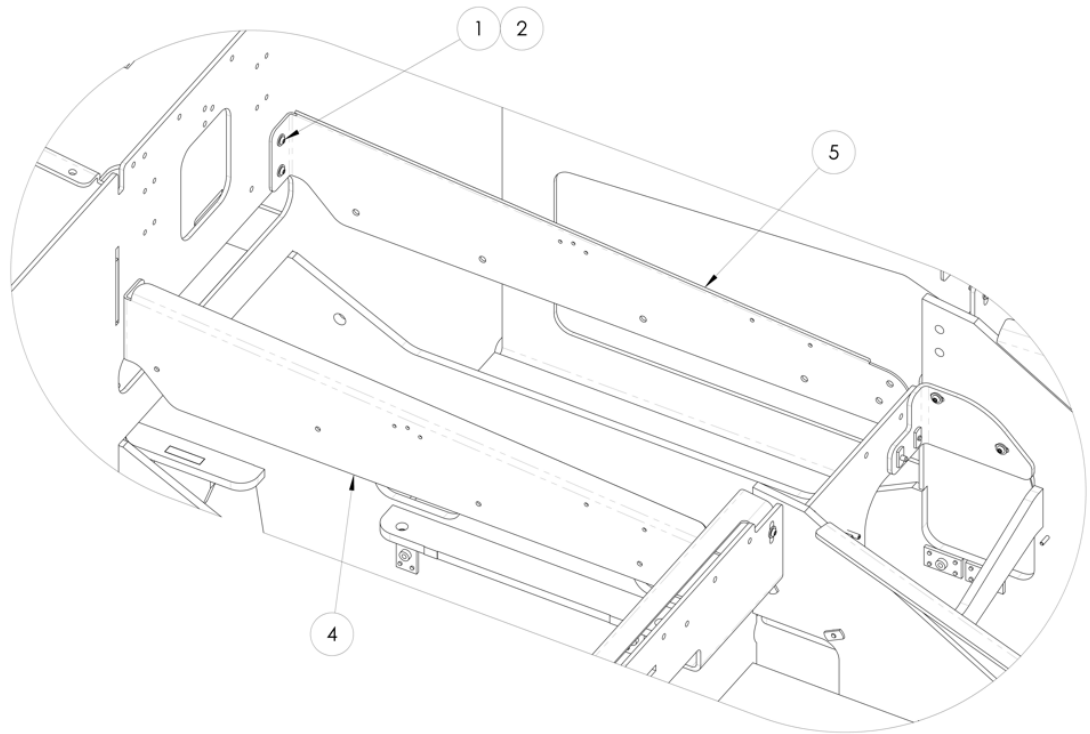
11.2 ASSEMBLY, CHASSIS SUB



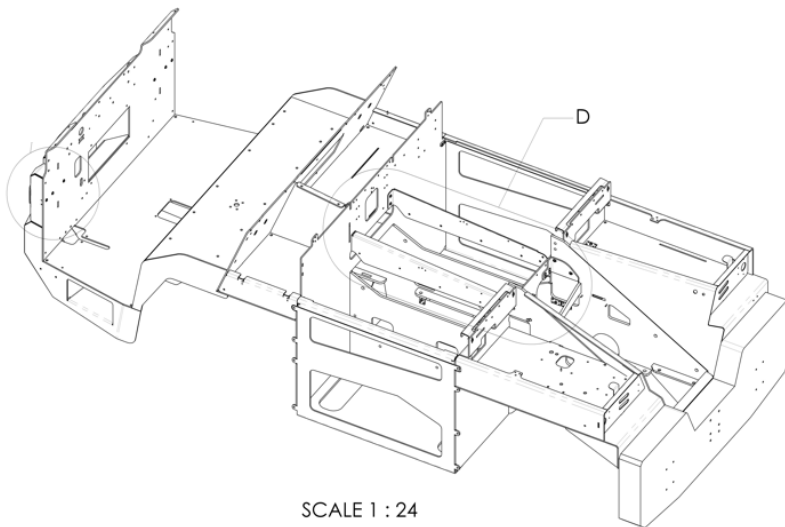
11.2 ASSEMBLY, CHASSIS SUB (*continued*)



11.2 ASSEMBLY, CHASSIS SUB (continued)

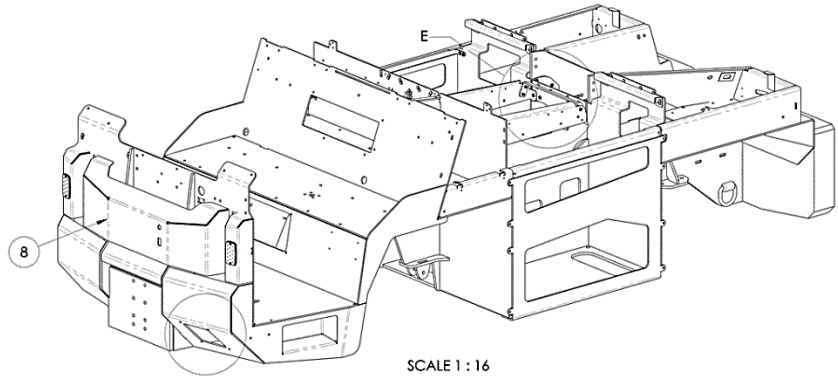
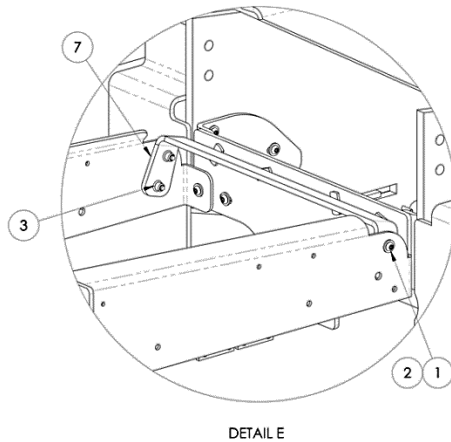


DETAIL D



SCALE 1 : 24

11.2 ASSEMBLY, CHASSIS SUB (continued)

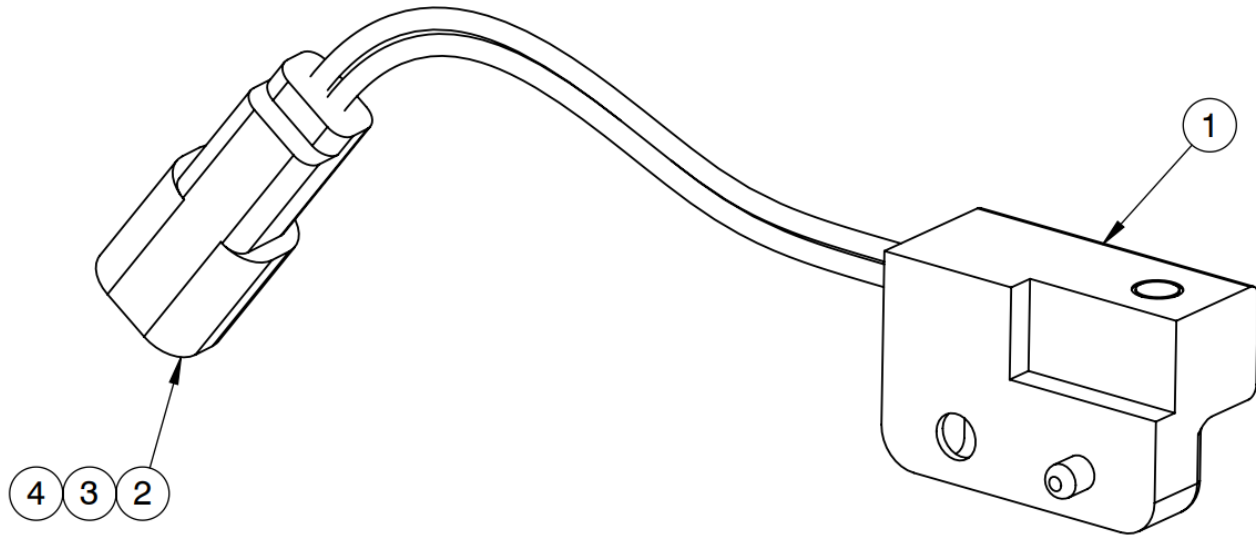


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS, 1/4-20 x 1" LG	27
2	G-1250-1050N	FLATWASHER, 1/4 NARROW	27
3	G-1440-1050-S	NUTSERT, THICK WALL 1/4-20	3
4	J-7896-00	INSIDE BULKHEAD, LH (WP)	1
5	J-7897-00	BATTERY BULKHEAD, RH (WP)	1
6	J-8037-00	BATTERY TRIM (WP)	2
7	J-8260-00	MIDDLE DOOR STRIKE PLATE (P)	1
8	Z-11438	ASSY, FRONT GRILLE	1
9	Z-11538-00	WLD, BATTERY DOOR STRIKE PLATE (WP)	2
10	Z-11794-00	WLD, VEHICLE CHASSIS (WP)	1
11	Z-12336-00	WLD, FILTER MOUNT PLATE (P)	1
12	Z-12337-00	WLD, LH BRACKET (P)	1
13	Z-12338-00	WLD, RH BRACKET (P)	1

12.0 OPERATOR COMPARTMENT  
12.1 PRX SENSOR BUZZLITE W CONNECT

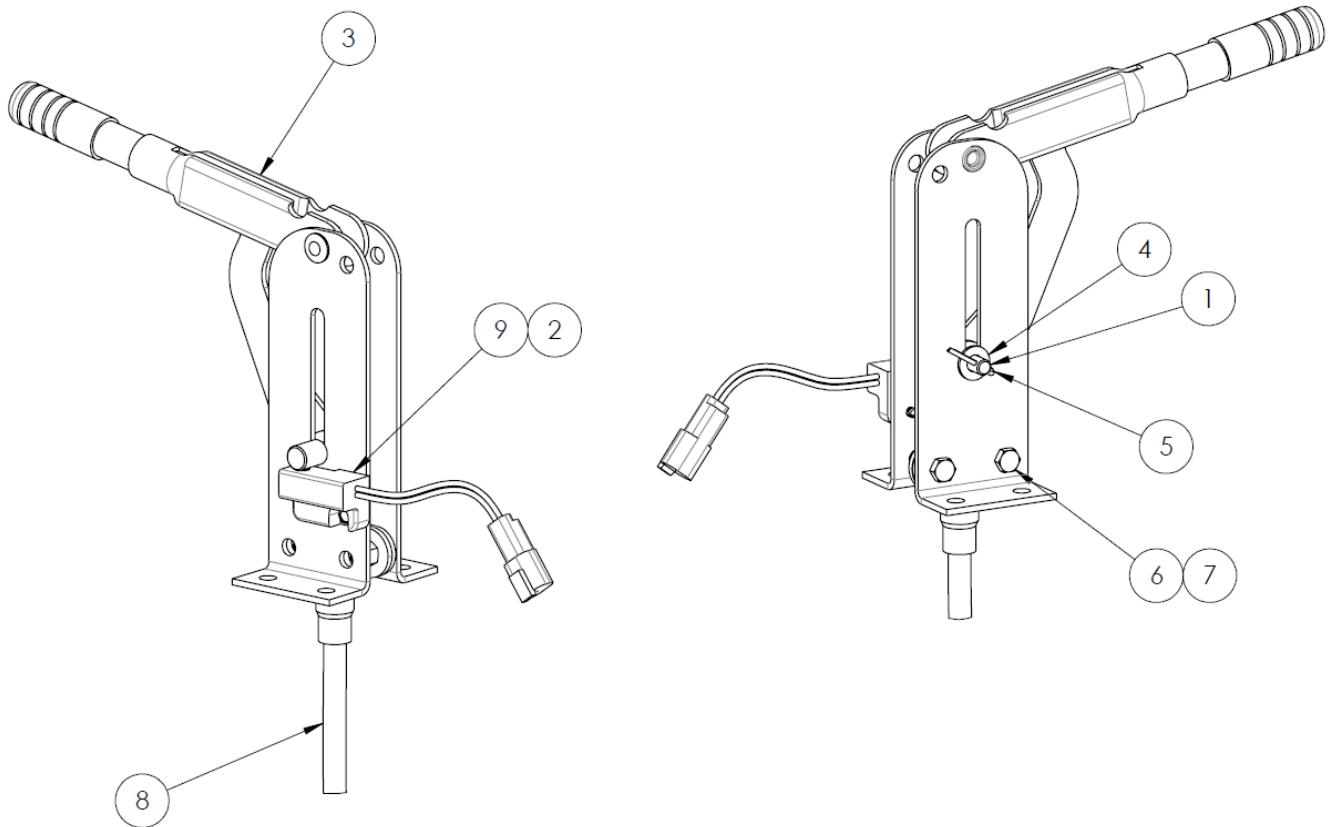


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	82050000	PROXIMITY SENSOR BUZZLITE	1
2	DT04-2P	DEUTSCH CONNECTOR	1
3	W2P	DEUTSCH LOCK	1
4	0460-215-16141	DEUTSCH TERMINAL	2

## 12.2 ASSEMBLY, PARKING BRAKE CABLE

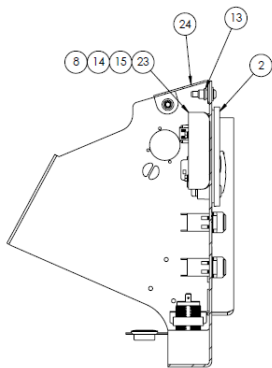


### Parts List

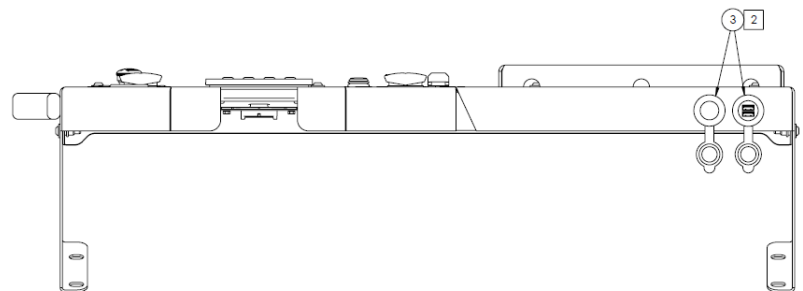
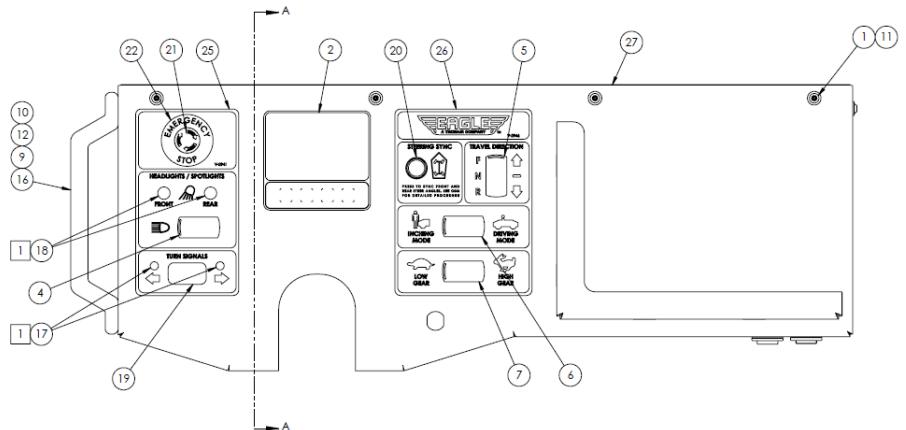
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	81008429	BUZZLITE PRK BRAKE CONTACT PIN	1
2	82066700	MOUNTING SCREW BUZZLITE	1
3	A-TT4-00141	BRAKE LEVER-HAND	1
4	G-1250-1060N	FLATWASHER, 5/16 NARROW	1
5	G-1301-01	PIN, 3/32 X 1 LG COTTER	1
6	G-1420-106006	BOLT, 5/16-18 X 3/4" LG. HEX HD GR 8	2
7	G-1727-1060	NUT, 5/16-18 TOP LOCK ZINC	2
8	H-5051	CABLE, PARKING BRAKE	1
9	Refer above section	PRX SENSOR BUZZLITE W CONNECT	1

## 12.3 ASSEMBLY, DASH PANEL



SECTION A-A



- NOTES:
- 1 SECURE WITH HOT MELT ADHESIVE.
  - 2 REMOVE AND DISCARD MOUNTING PLATE. SECURE WITH BACKING NUTS.

## Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS, 1/4-20 x 1" LG	6
2	EC-3309	OPERATOR DISPLAY MODULE	1
3	EC-3404	OUTLET, 12V USB+SOCKET, PANEL	1
4	EC-3450-01	LIGHTS SWITCH	1
5	EC-3450-03	FNR SWITCH	1
6	EC-3450-04	DRIVE/INCH SWITCH	1
7	EC-3450-05	HIGH/LOW SWITCH	1
8	G-1114-040008	BOLT, METRIC, CLASS 8.8, M4X0.7X8	4
9	G-1154-106212	SCR, 5/16-18 SOC BUT HD CAP	2
10	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	2
11	G-1250-1050N	FLATWASHER, 1/4 NARROW	6
12	G-1250-1060N	FLATWASHER, 5/16 NARROW	2
13	G-1439-1050-S	NUTSERT, THIN WALL 1/4-20	6
14	G-1514-M40R	SPLIT LOCK WASHER (M4)	4
15	G-1515-M40	FLAT WASHER, M4	4
16	H-1584	HANDLE	1
17	H-4693-05	PANEL PLUG, Ø5/16	2



12.3 ASSEMBLY, DASH PANEL *(continued)*

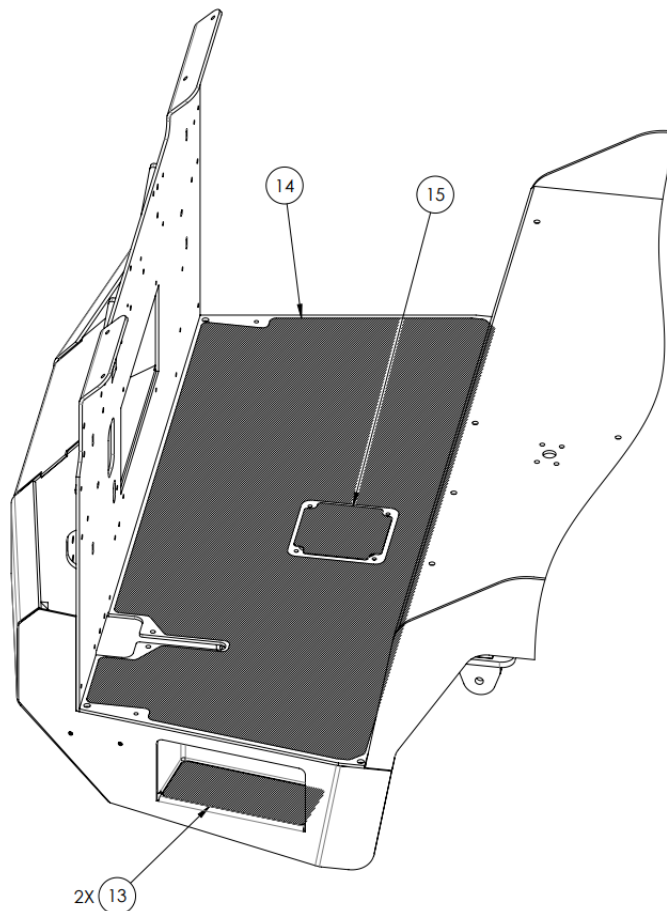
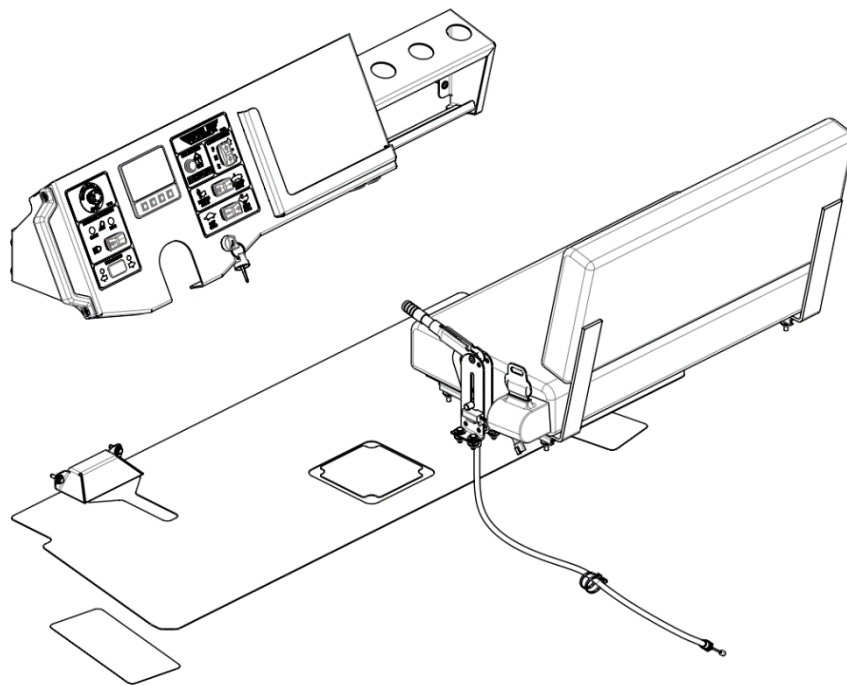
**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

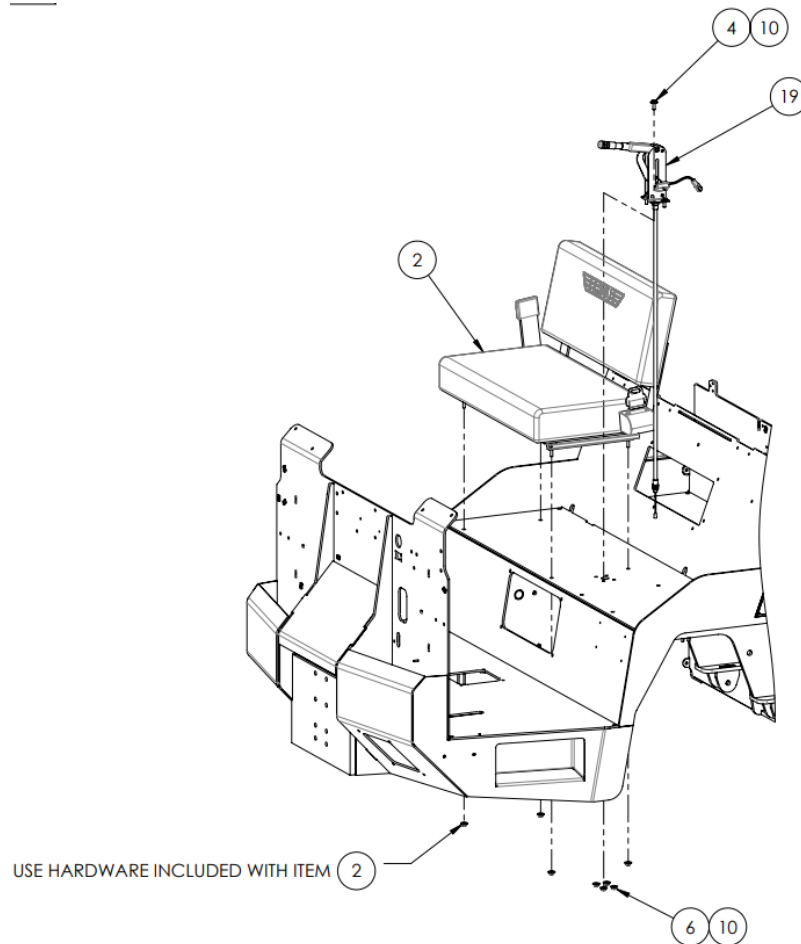
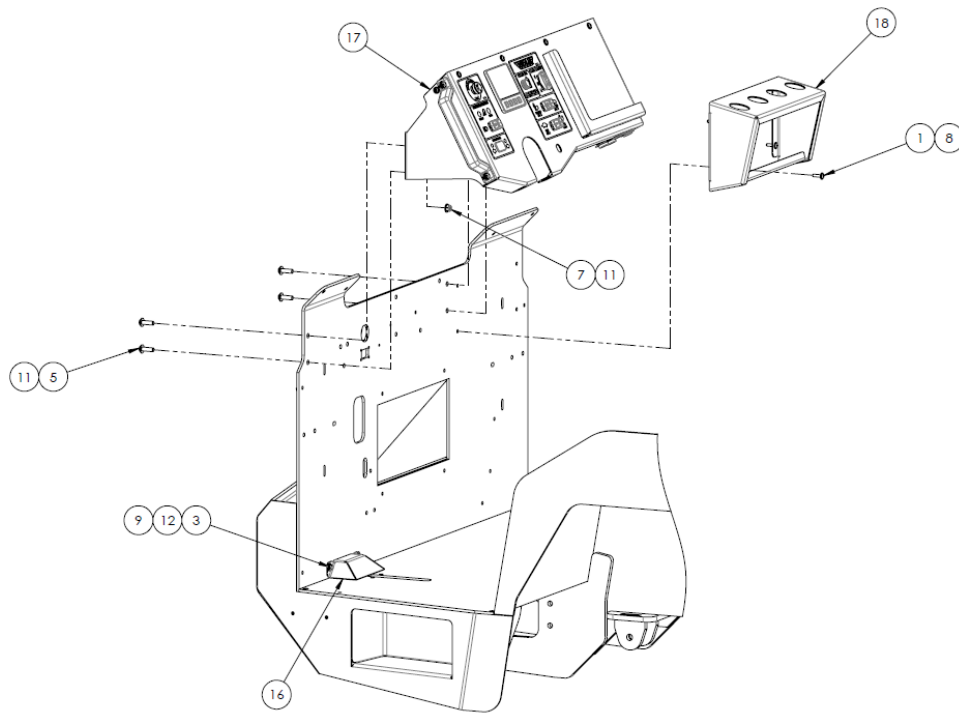
Item	Part Number	Description	Qty
18	H-4693-09	PANEL PLUG, 1/2"	2
19	H-4992	SVR EMPTY SWITCH PLUG	1
20	NVSP-05-042-CA	MOMENTARY SWITCH PUMP CONTROL	1
21	NVSP-14-041-CA	E-STOP BUTTON	1
22	NVSP-14-042-CA	E-STOP PLACARD	1
23	S-3926-00	DISPLAY BRACKET	1
24	S-4377-00	BEAUTY COVER, DASH (P)	1
25	V-2941	LABEL, ETTX DASH LH	1
26	V-2946	LABEL, ETT-8 DASH RH	1
27	Z-11807-00	WLD, DASH PANEL (P)	1



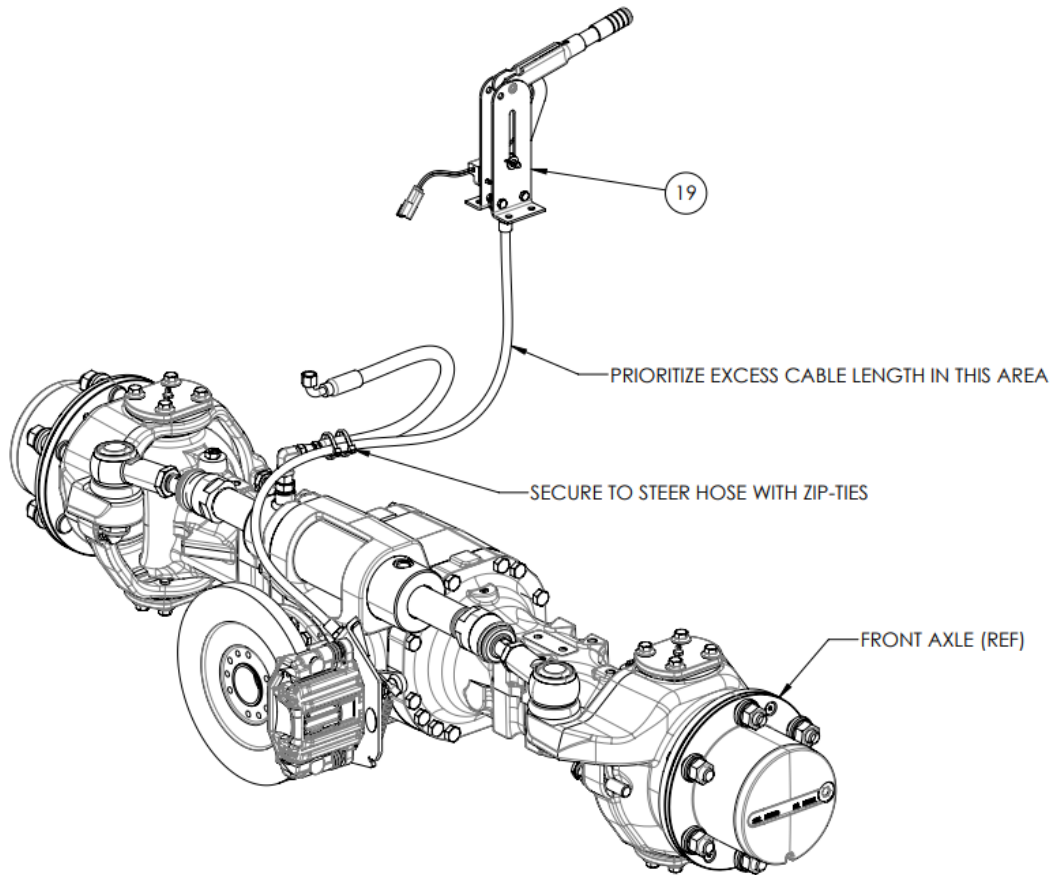
12.4 ASSEMBLY, OPERATOR COMPARTMENT



12.4 ASSEMBLY, OPERATOR COMPARTMENT *(continued)*



12.4 ASSEMBLY, OPERATOR COMPARTMENT (continued)

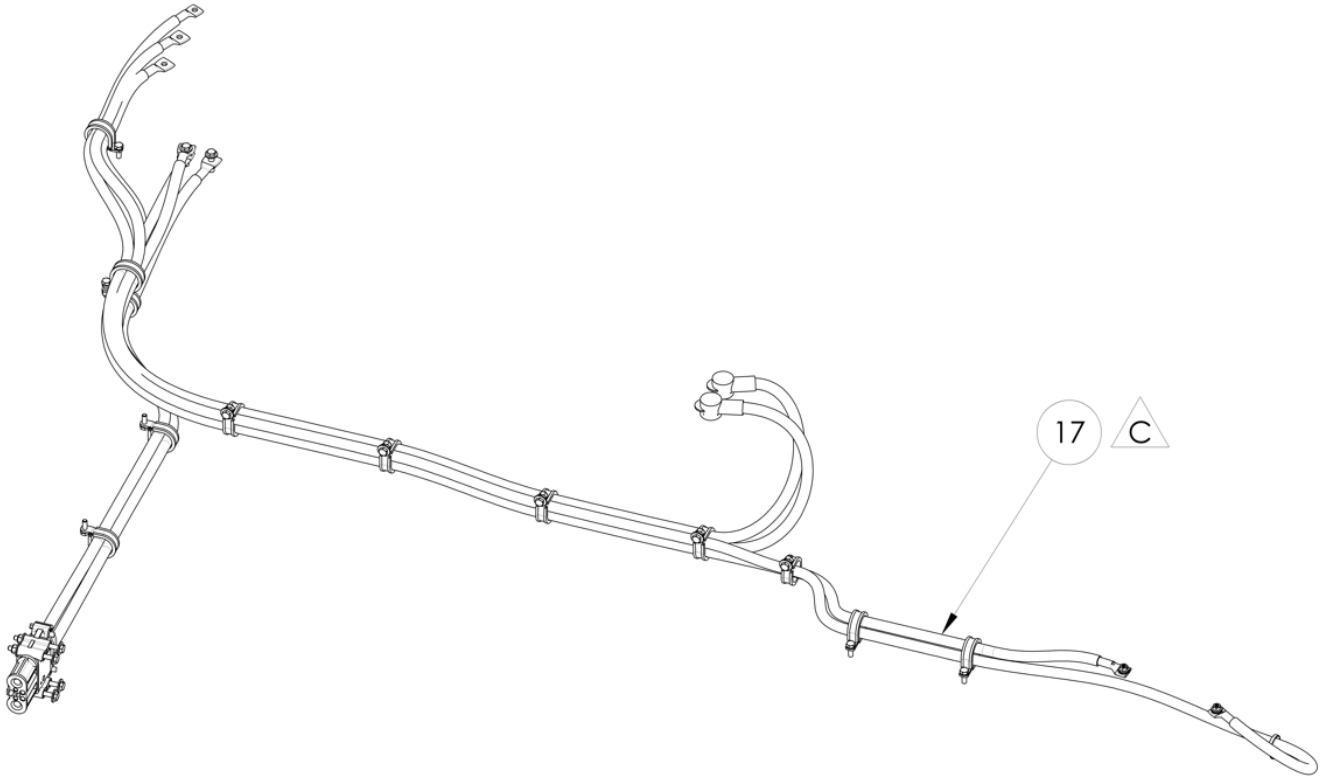


### Parts List

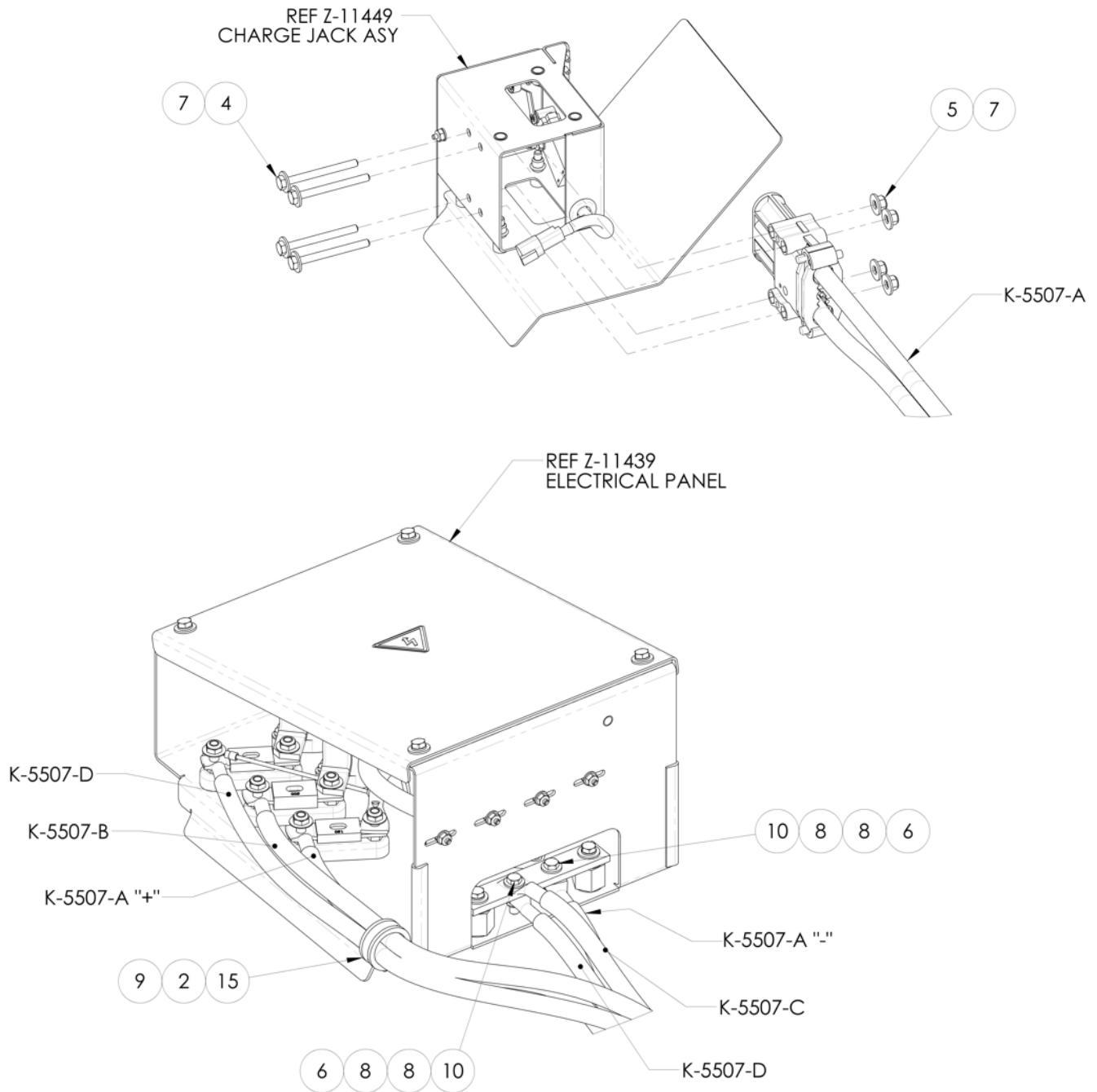
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS, 1/4-20 x 1" LG	4
2	A-TT10-00048	BENCH SEAT W/ SEATBELT	1
3	G-1100-105010	BOLT, 1/4-20 X 1.0" LG HEX HD GR 5	2
4	G-1100-106010	BOLT, 5/16-18 X 1.0" LG. HEX HD GR 5	4
5	G-1154-107212	SCREW, 3/8-16 X 1-1/4" LG. SOCKET BUTT HD CAP	4
6	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	8
7	G-1202-1070	STOPNUT, 3/8-16 ELASTIC	4
8	G-1250-1050N	FLATWASHER, 1/4 NARROW	4
9	G-1250-1050W	FLATWASHER, 1/4 WIDE	2
10	G-1250-1060W	FLATWASHER, 5/16 WIDE	12
11	G-1250-1070N	FLATWASHER, 3/8 NARROW	8
12	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	2
13	H-4915	GRIP TAPE, STEP	2
14	H-5020	GRIP TAPE, FLOOR MAT	1
15	H-5021	GRIP TAPE, ACCESS PANEL	1
16	S-4332-00	SHIELD, MASTER CYLINDER (P)	1
17	Refer above section	ASY, DASH PANEL	1
18	Z-11819-00	WELDMENT, BATON HOLDER (P)	1
19	Refer above section	ASY, PARKING BRAKE CABLE	1

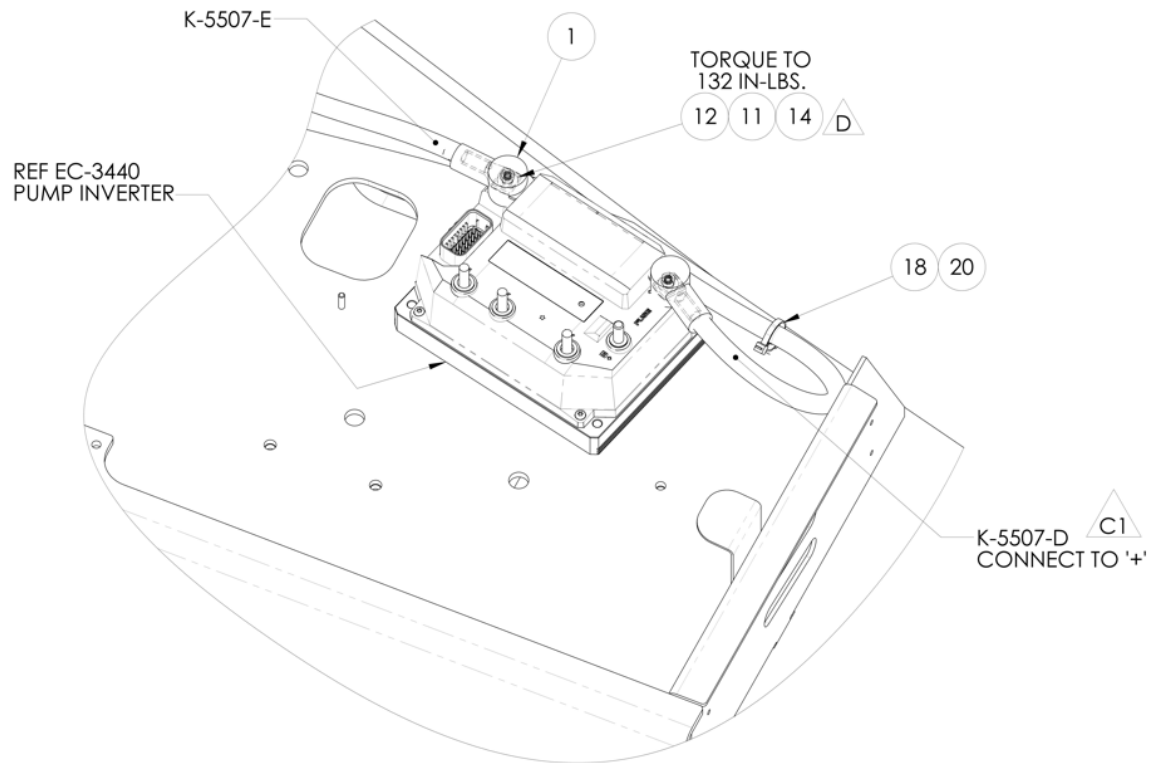
**13.0 ELECTRICAL SYSTEM**  
**13.1 ASSEMBLY, BATTERY CABLES**



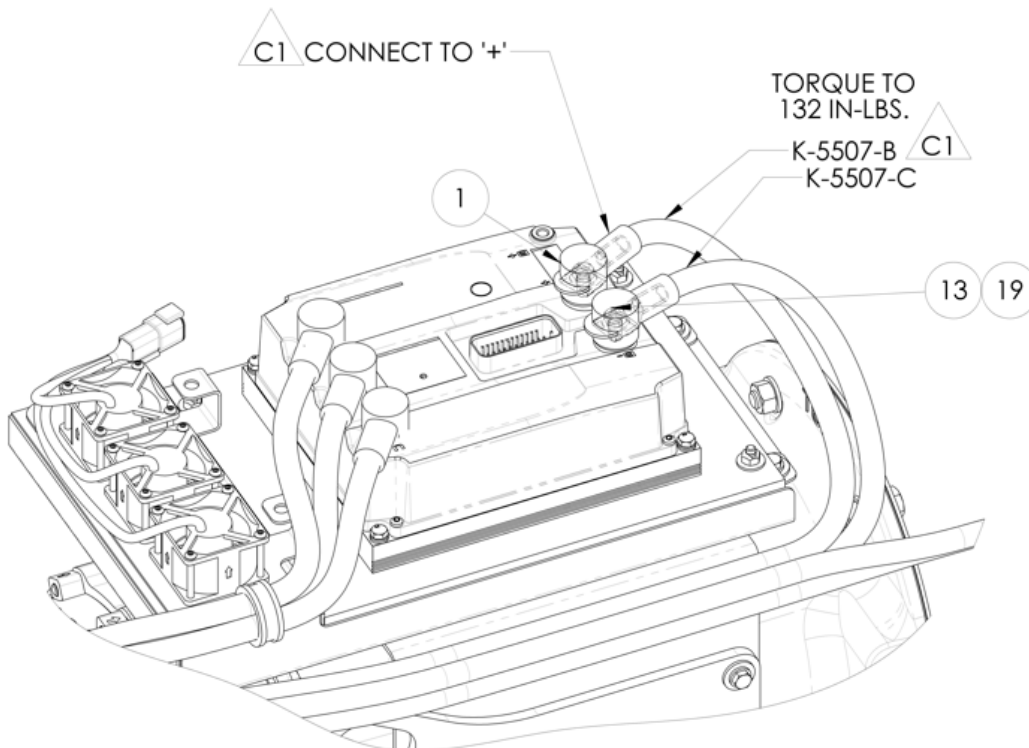
13.1 ASSEMBLY, BATTERY CABLES (*continued*)



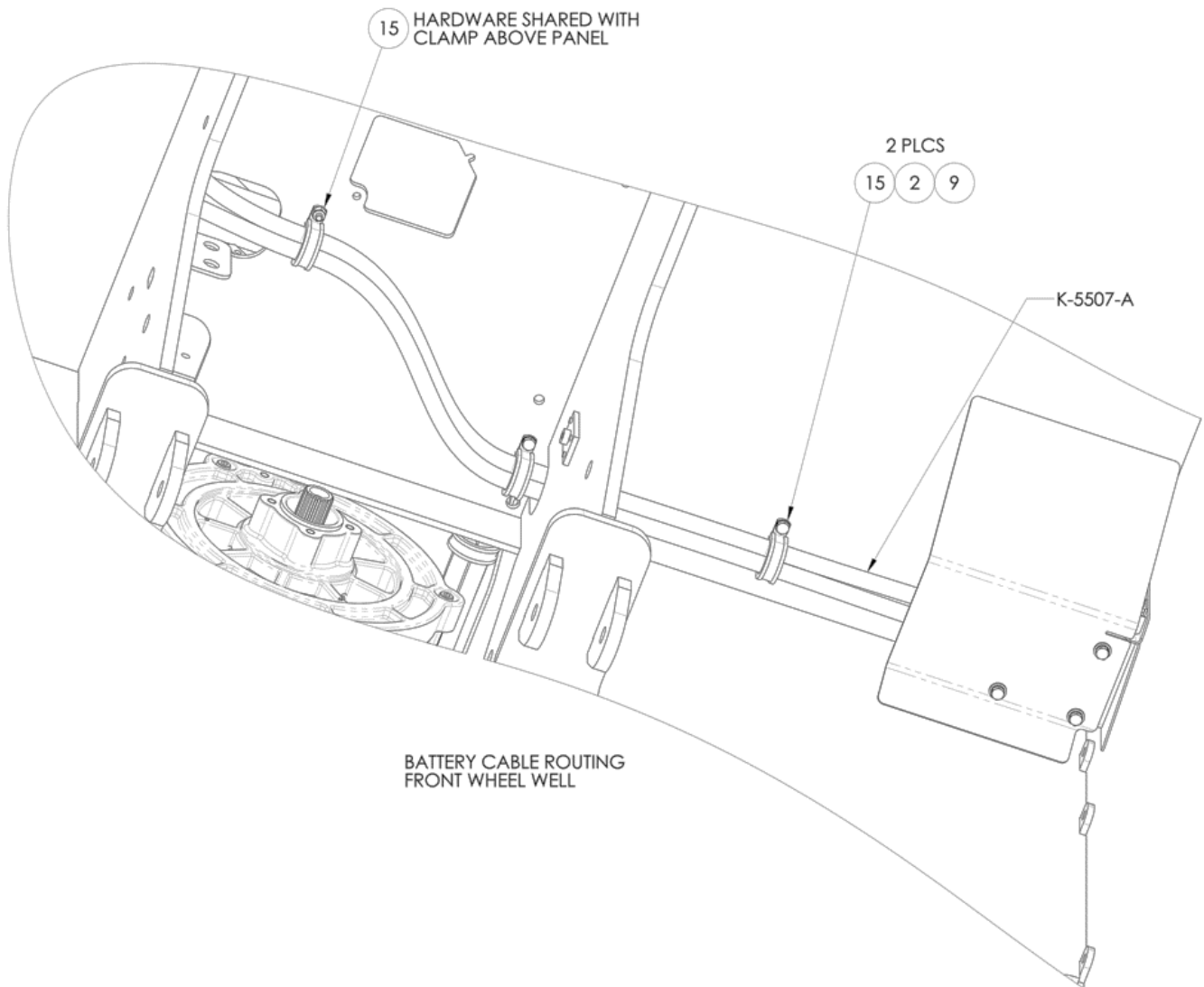
13.1 ASSEMBLY, BATTERY CABLES (*continued*)



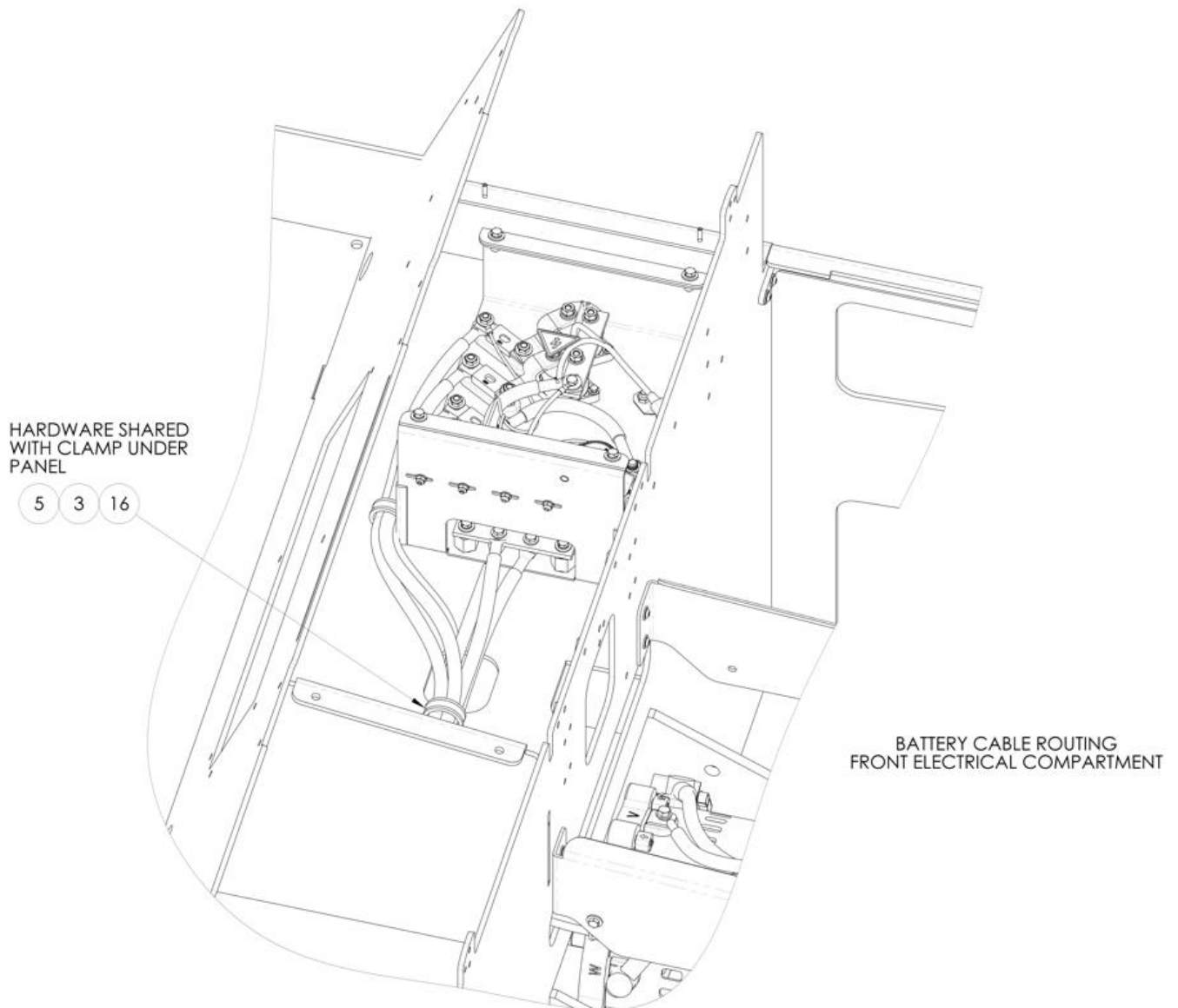
NOTE: SOME COMPONENTS ARE HIDDEN FOR CLARITY



13.1 ASSEMBLY, BATTERY CABLES (*continued*)

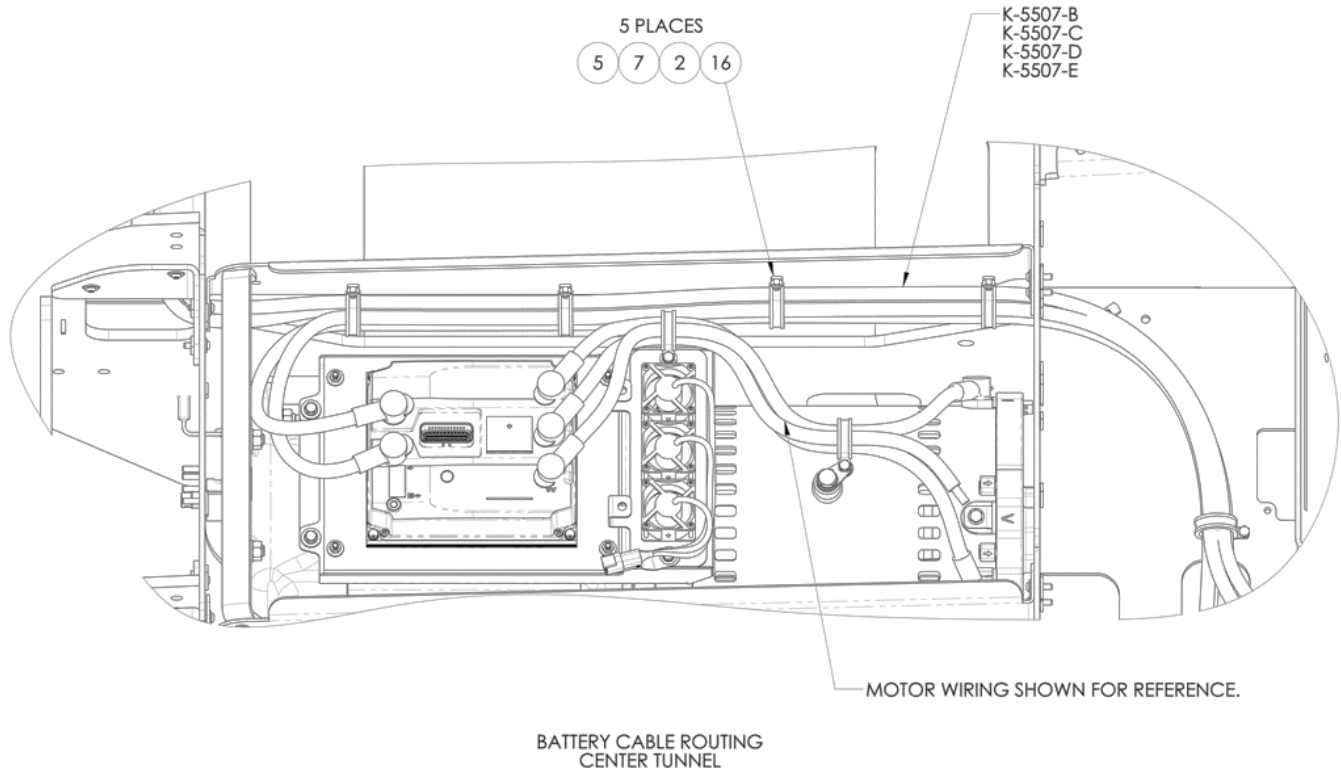


13.1 ASSEMBLY, BATTERY CABLES (*continued*)

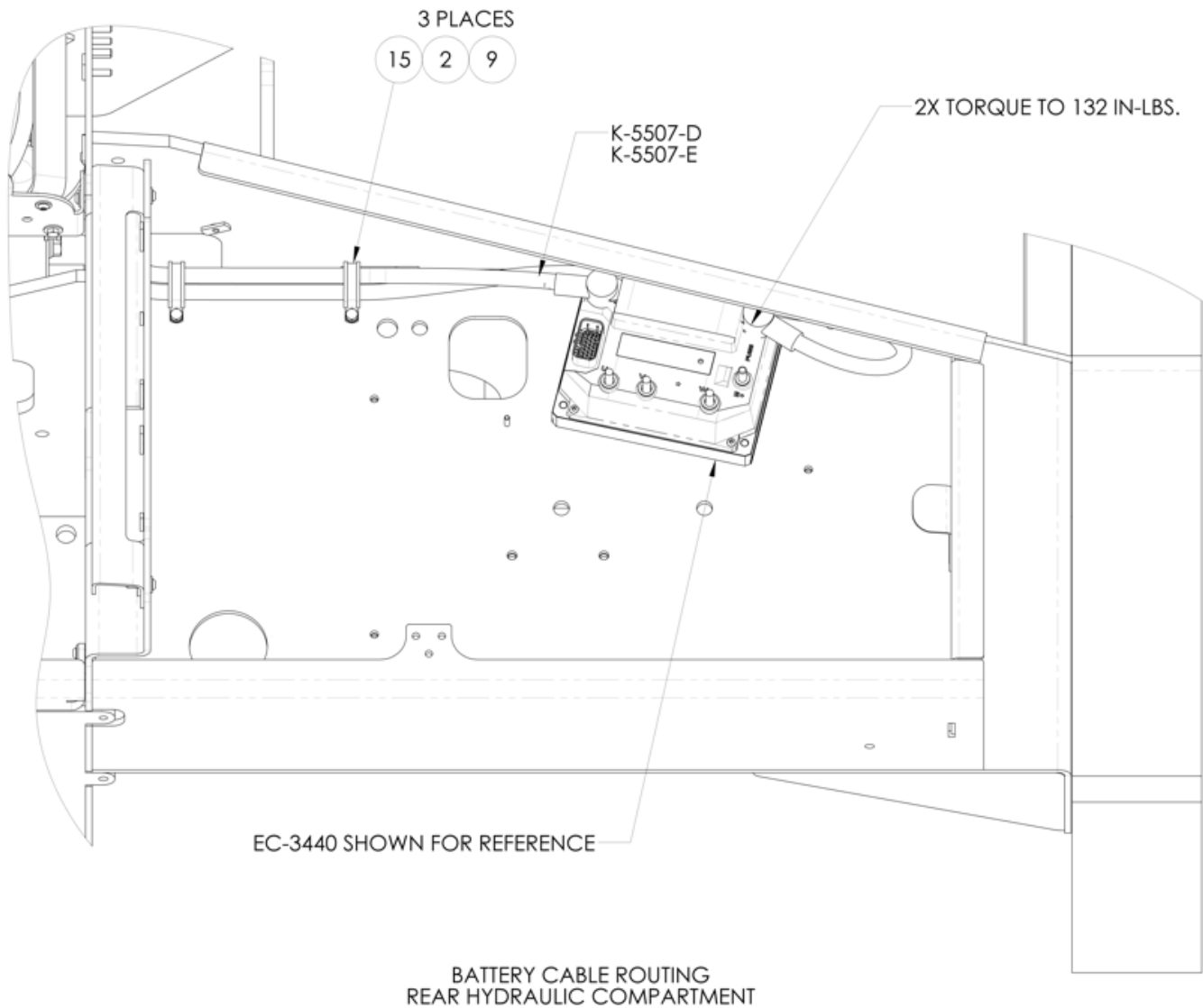




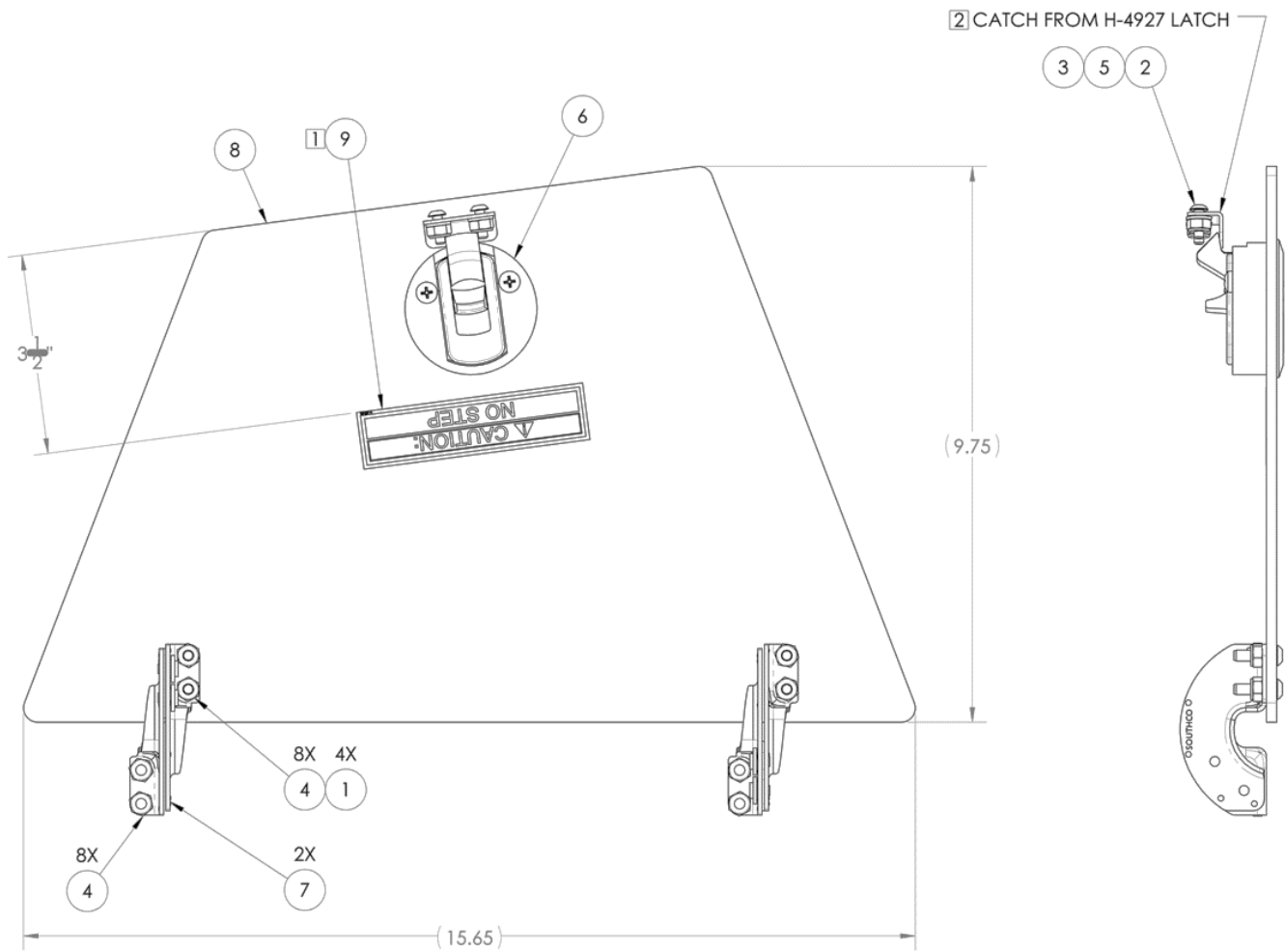
13.1 ASSEMBLY, BATTERY CABLES (*continued*)



13.1 ASSEMBLY, BATTERY CABLES (*continued*)



13.1 ASSEMBLY, BATTERY CABLES (*continued*)





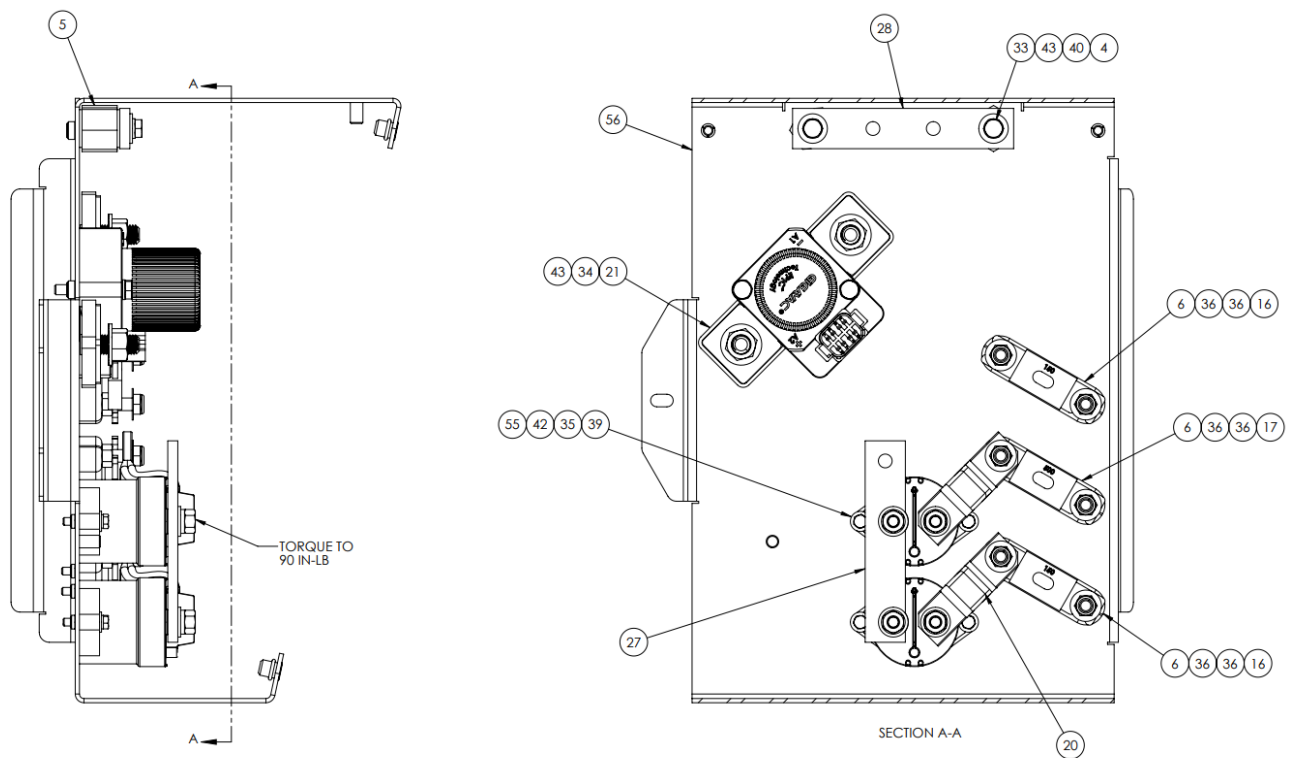
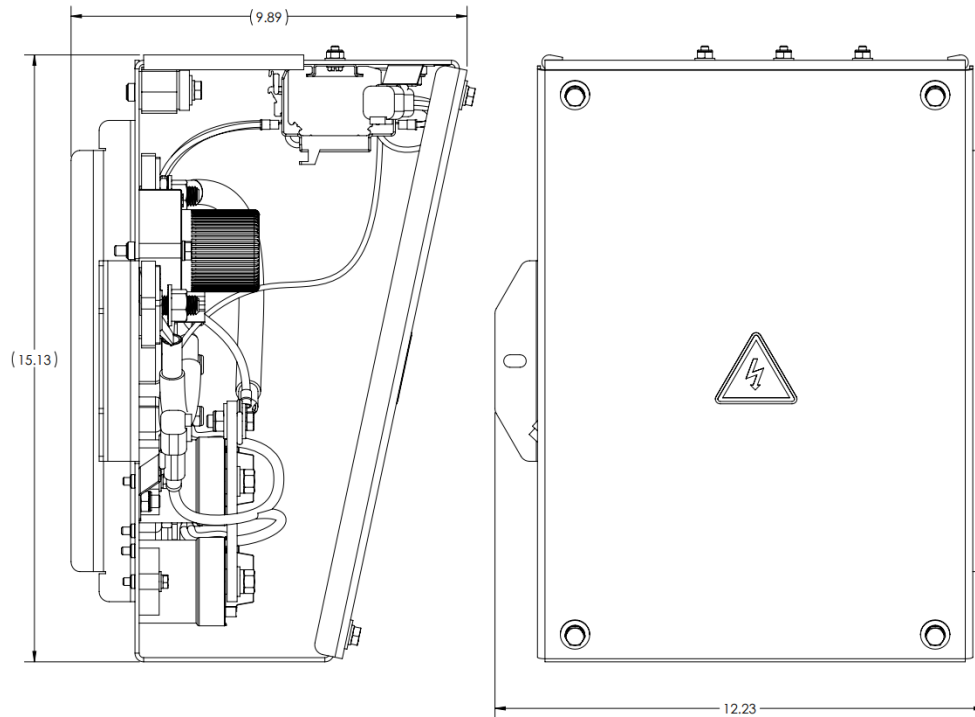
13.1 ASSEMBLY, BATTERY CABLES (continued)

**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

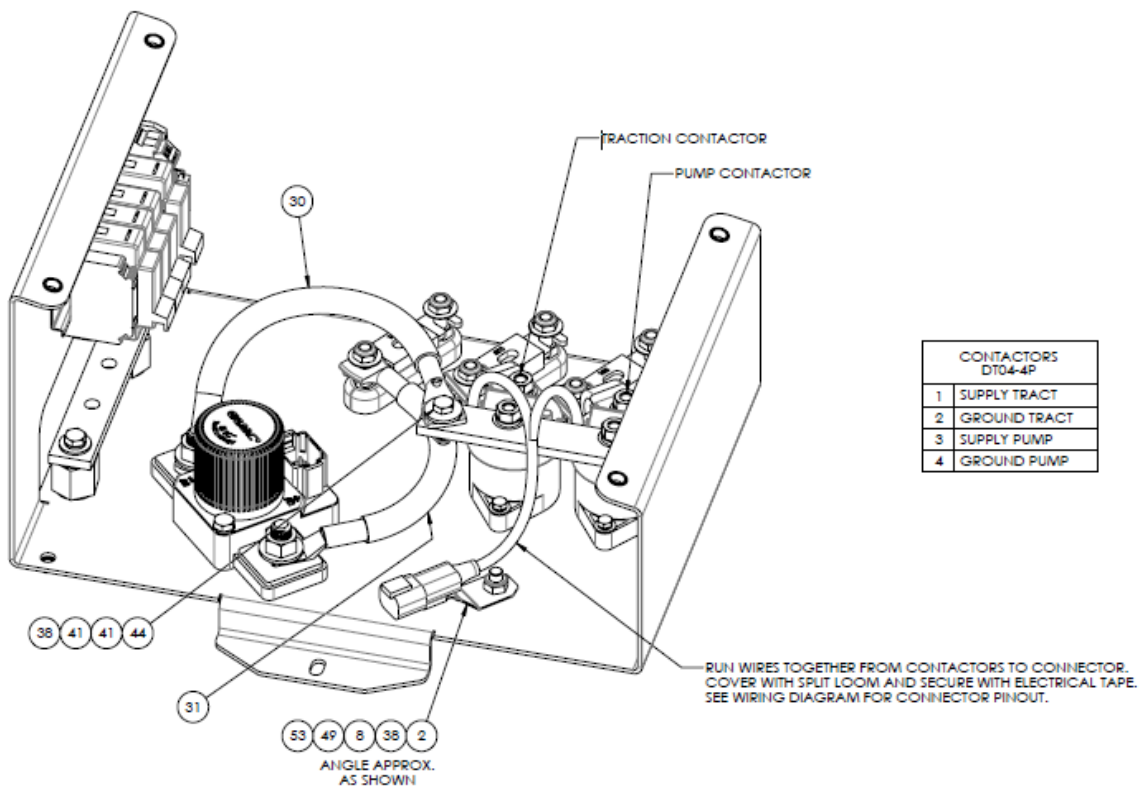
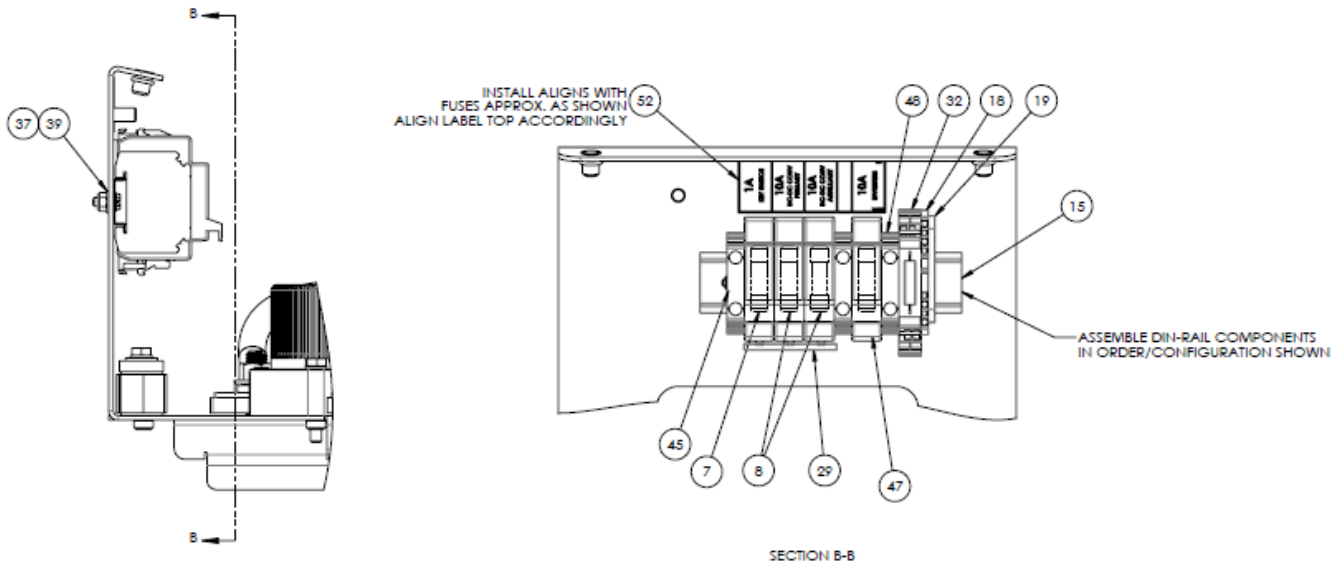
Item	Part Number	Description	Qty
1	EC-2110	BATTERY, TERMINAL INSULATOR	4
2	G-1100-105006	BOLT, 1/4-20 X 3/4" LG HEX HD GR 5	10
3	G-1100-105010	BOLT, 1/4-20 X 1.0" LG HEX HD GR 5	1
4	G-1100-105026	BOLT, 1/4-20 X 2-3/4" LG HEX HD GR 5	4
5	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	10
6	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	2
7	G-1250-1050W	FLATWASHER, 1/4 WIDE	13
8	G-1250-1060N	FLATWASHER, 5/16 NARROW	4
9	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	5
10	G-1420-106012	BOLT, 5/16-18 X 1-1/4" LG. HEX HD GR 8	2
11	G-1514-M80R	SPLIT LOCK WASHER M8	2
12	G-1515-M80	FLATWASHER, M8	2
13	G-1533-080016	BOLT M8-1.25 X 16mm LG. CLASS 10.9	2
14	G-1793-06	NUT, HEX CLASS 8, M6x1.0	2
15	H-3521-15	CLAMP, CUSHIONED LOOP 1 1/4"	7
16	H-3521-19	CLAMP, CUSHIONED LOOP 1 1/2"	5
17	K-5507	BATTERY CABLE KIT	1
18	N/A	CABLE TIE	1
19	NVSP-21-016-CB	M8 BELLEVILLE LOCK WASHER	2
20	NVSP-24-022-CA	CABLE TIE ANCHOR STD (Ø.375 X .27 THK)	1

## 13.2 ASSEMBLY, ELECTRICAL PANEL



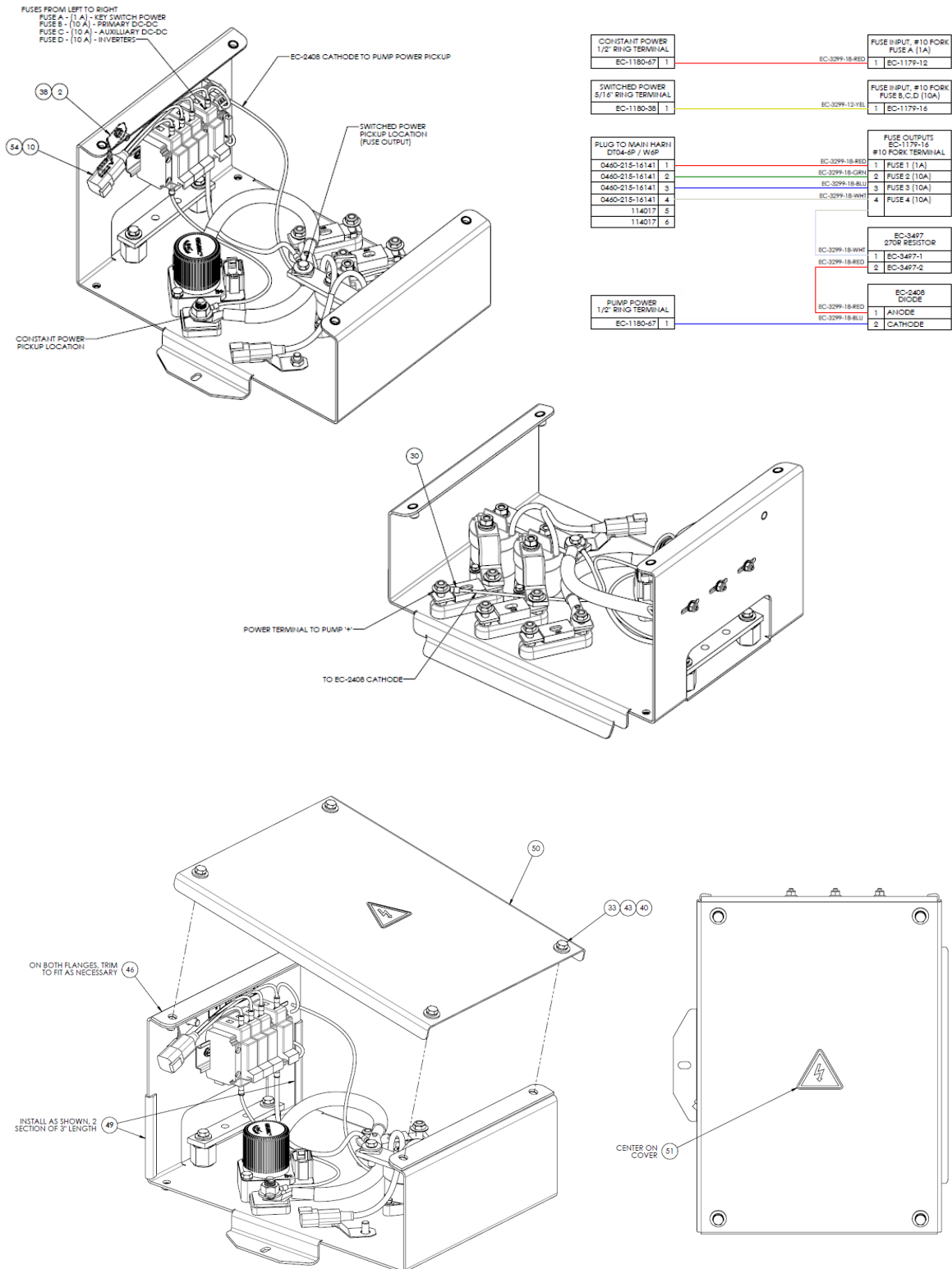
STEP 1

13.2 ASSEMBLY, ELECTRICAL PANEL (continued)



STEP 2

## 13.2 ASSEMBLY, ELECTRICAL PANEL (continued)



13.2 ASSEMBLY, ELECTRICAL PANEL (continued)

**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	0460-215-16141	DEUTSCH TERMINAL	4
2	1027-003-1200	DEUTSCH RETAINER CLIP	2
3	114017	DEUTSCH EMPTY SOCKET PLUG	2
4	12050	SPLIT LOOM, 3/8"	7"
5	13015	RECTIFIER ISOLATOR	2
6	A-MTT5-0225	ANN FUSE HOLDER	3
7	BLN-1	10X38 FUSE, 250V, 1A	1
8	BLN-10	10X38 FUSE, 250V, 10A	3
9	DT04-4P	DEUTSCH CONNECTOR	1
10	DT04-6P	DEUTSCH CONNECTOR	1
11	EC-1179-12	#10 FORK TERMINAL, 14-18 AWG.	5
12	EC-1179-16	#10 FORK TERMINAL, 10-12 AWG.	1
13	EC-1180-38	TERMINAL, RING YEL 5/16, 10 AWG	2
14	EC-1180-67	TERMINAL, RING BLUE 1/2	1
15	EC-1514*006.00	35MM DIN RAIL	1
16	EC-1619-09	FUSE, ANL 150	2
17	EC-1619-19	FUSE, ANL-500	1
18	EC-2408	TERMINAL BLOCK, DIODE 4COND.	1
19	EC-2411	PLATE, END DIODE BLOCK	1
20	EC-2998	CABLE, FLEXIBLE BRAIDED	2
21	EC-3006	CONTACTOR, 600A, 12V	1
22	EC-3299-12-YEL	TXL WIRE, 18 AWG, YELLOW	10
23	EC-3299-18-BLU	TXL WIRE, 18 AWG, BLUE	21
24	EC-3299-18-GRN	TXL WIRE, 18 AWG, GREEN	6
25	EC-3299-18-RED	TXL WIRE, 18 AWG, RED	17
26	EC-3299-18-WHT	TXL WIRE, 18 AWG, WHITE	6
27	EC-3316	BUSBAR, ETT	1
28	EC-3317	BUSBAR, ETT	1
29	EC-3361-3	FUSE INPUT BUS, 3 POLE	1
30	EC-3389	BATTERY CABLE	1
31	EC-3390	BATTERY CABLE	1
32	EC-3497	RESISTOR, DIN MOUNTED, 270R	1
33	G-1100-105006	BOLT, 1/4-20 X 3/4" LG HEX HD GR 5	6
34	G-1100-105016	BOLT, 1/4-20 X 1-3/4" LG HEX HD GR 5	2
35	G-1150-103510	SCREW, #10-32 X 1.0" LG HEX HD MACHINE	4
36	G-1152-103510	SCREW, #10-32 X 1.0" LG SOCKET FLAT HD CAP	6
37	G-1202-1035	STOPNUT, #10-32 ELASTIC	3
38	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	3
39	G-1250-1030N	FLATWASHER, #10 NARROW	7





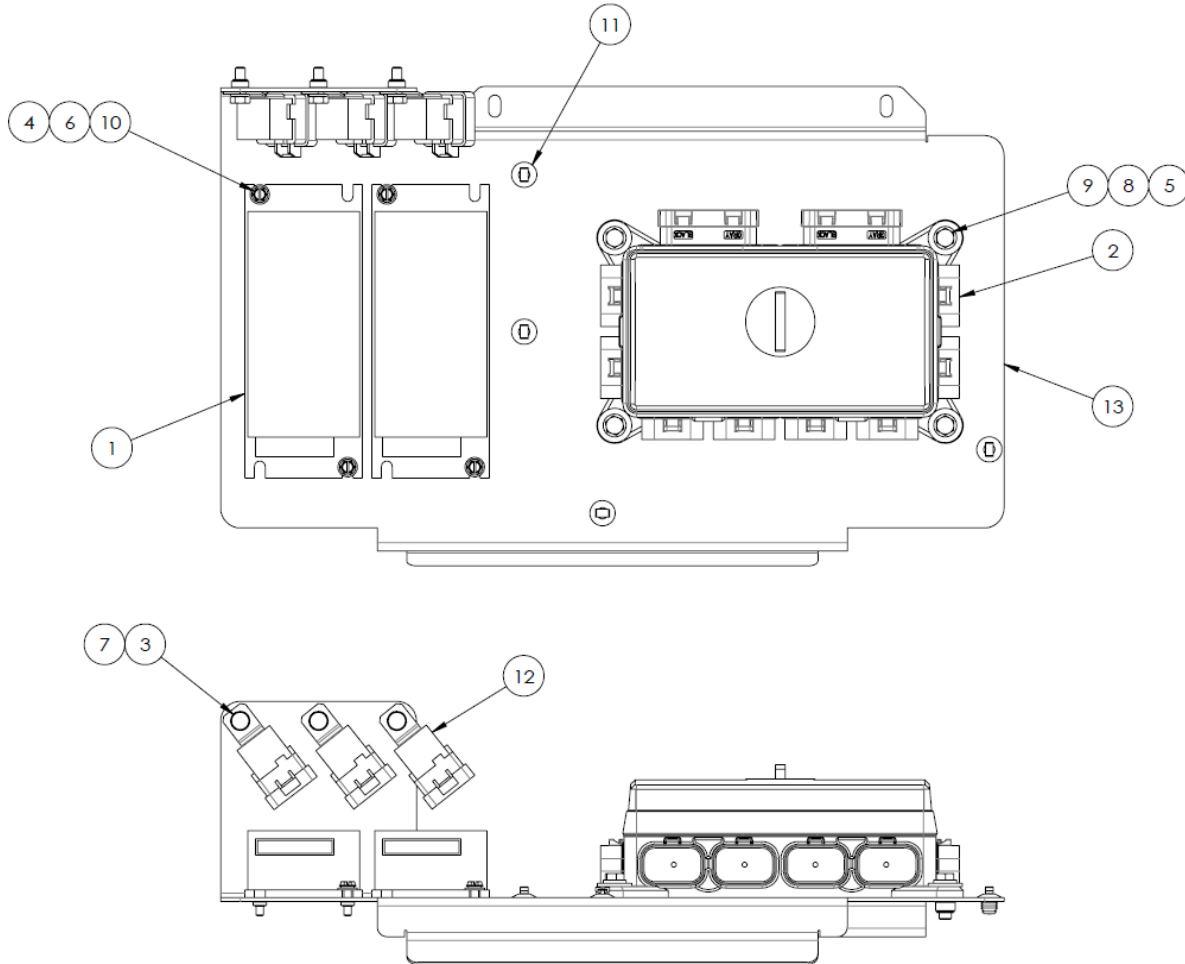
13.2 ASSEMBLY, ELECTRICAL PANEL (continued)

**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
40	G-1250-1050W	FLATWASHER, 1/4 WIDE	6
41	G-1250-1060W	FLATWASHER, 5/16 WIDE	2
42	G-1251-1030R	LOCKWASHER, #10 REGULAR	4
43	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	8
44	G-1420-106010	BOLT, 5/16-18 X 1.0" LG. HEX HD GR 8	1
45	G-1720-103504	SCR,#10-32X0.5 MACH HEX WSH HD	3
46	H-1204-10	TAPE, NEOPRENE FOAM SEALING	2
47	LAVT-05-006-CA	10X 38 DIN DIN RAIL MOUNTED FUSE HOLDER	4
48	LAVT-05-009-CA	35MM DIN RAIL END STOP	3
49	NVSP-24-042-CA	METAL CORE EDGE TRIM, 1/8	6
50	S-4211-00	COVER PANEL (P)	1
51	V-1050	LABEL, ISO ELECTRICAL SHOCK	1
52	V-2944	LABEL, FUSE BLOCK	1
53	W4P	DEUTSCH LOCK	1
54	W6P	DEUTSCH CONNECTOR LOCK	1
55	Z-11102	ASY, CONTACTOR AND TERMINALS	2
56	Refer above section	ASY, ELECTRICAL PANEL	1

### 13.3 ASSEMBLY, ELECTRICAL PANEL

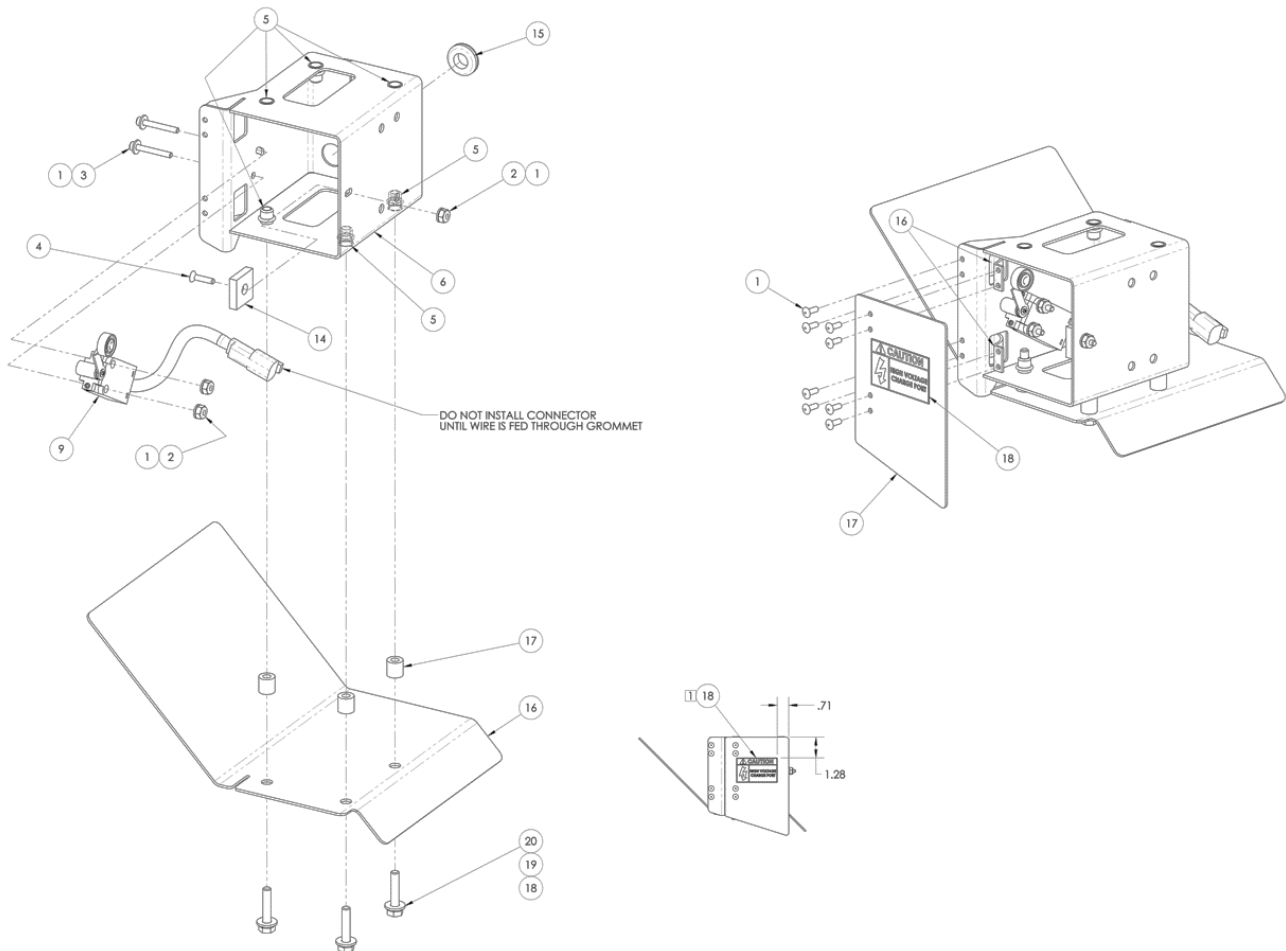


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	AE-OPT-0320-B	DC-DC CONVERTER, 300W	2
2	EC-3391	FUSE BOX, MOD	1
3	G-1100-105006	BOLT, 1/4-20 X 3/4" LG HEX HD GR 5	3
4	G-1250-1030N	FLATWASHER, #10 NARROW	4
5	G-1250-1060W	FLATWASHER, 5/16 WIDE	4
6	G-1251-1030R	LOCKWASHER, #10 REGULAR	4
7	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	3
8	G-1251-1060R	LOCKWASHER, 5/16 REGULAR	4
9	G-1420-106010	BOLT, 5/16-18 X 1.0" LG. HEX HD GR 8	4
10	G-1720-103506	SCR,#10-32X.75 MACH HEX WSH HD	4
11	NVSP-24-022-CA	CABLE TIE ANCHOR STD (Ø.375 X .27 THK)	4
12	NVSP-31-002-CA	SEALED RELAY	3
13	S-4134-00	PANEL, ELECTRICAL (P)	1

### 13.4 ASSEMBLY, CHARGE JACK SUB

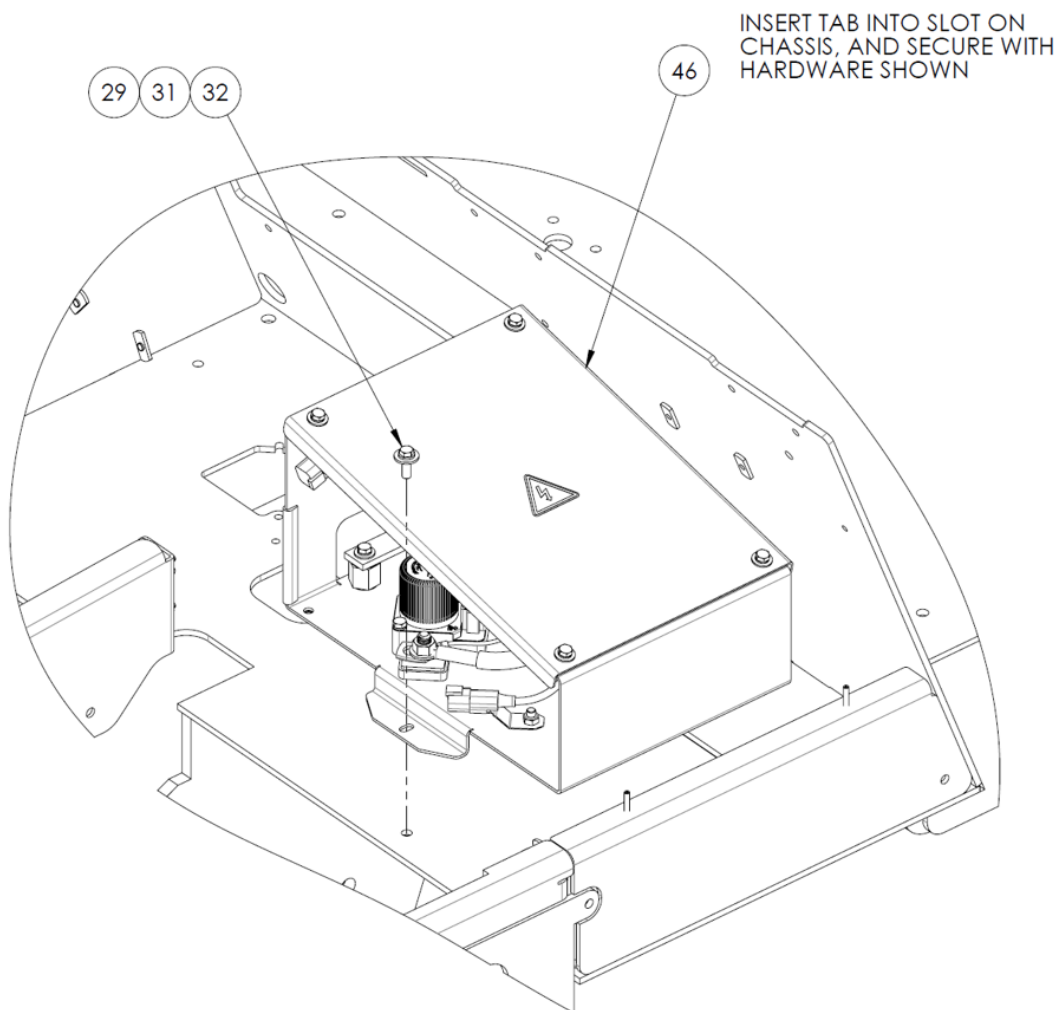
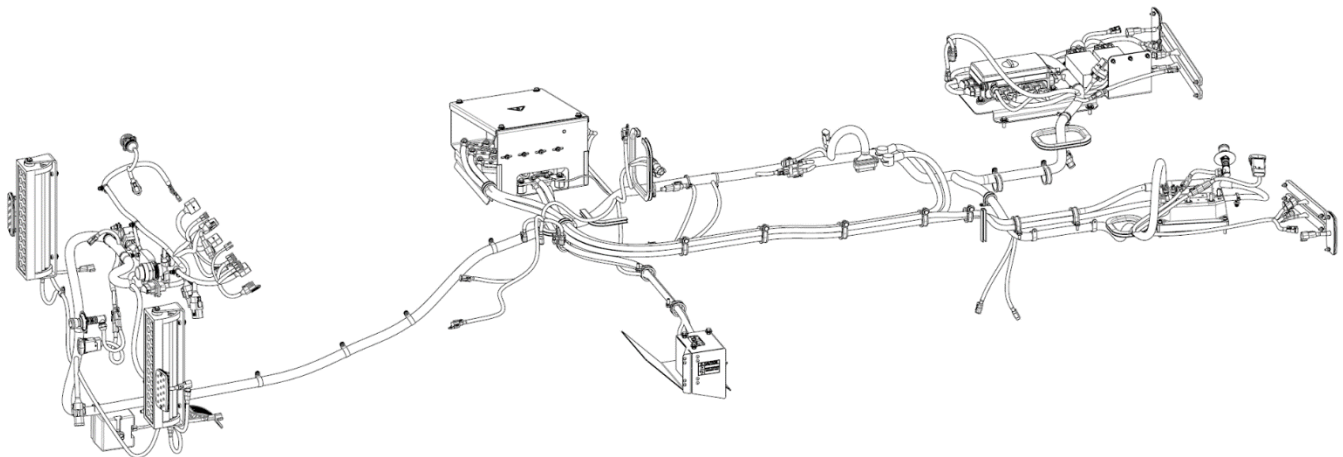


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

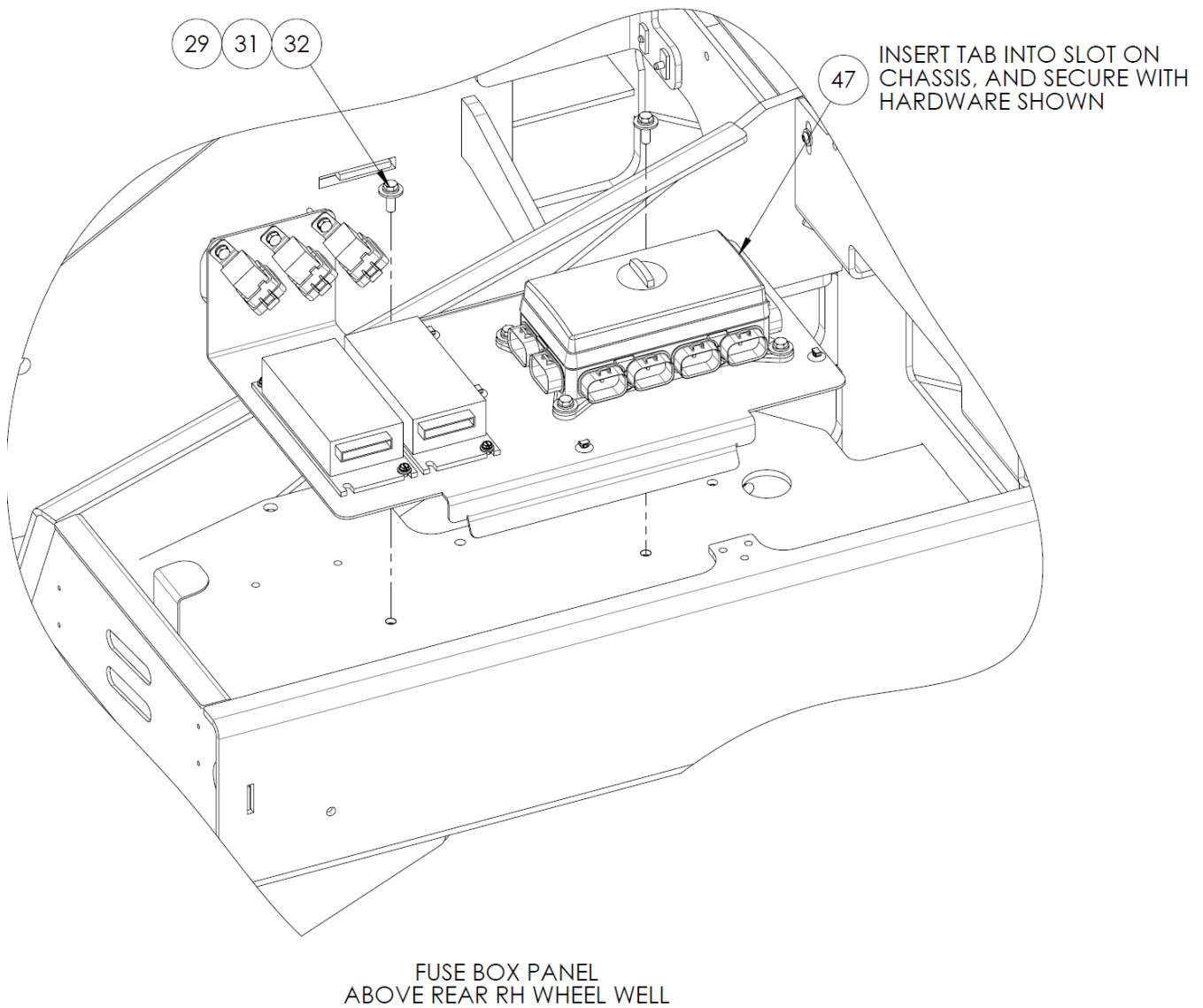
Item	Part Number	Description	Qty
1	A-ETT12-00494	ETT12 BATTERY CHARGE DECAL	REF.
2	G-1100-105014	BOLT, 1/4-20 X 1-1/2" LG HEX HD GR 5	3
3	G-1151-102012	SCREW, #8-32 X 1-1/4" SOCKET HD CAP	2
4	G-1152-102110	SCR, SOC FLT HD 82 DEG CAP	1
5	G-1202-1020	STOPNUT, #8-32 ELASTIC	3
6	G-1250-1020N	FLATWASHER, #8 NARROW	5
7	G-1250-1050N	FLATWASHER, 1/4 NARROW	3
8	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	3
9	G-1351-13-SS	RIVET, 5/32 OPEN-END SS	8
10	G-1439-1050-S	NUTSERT, THIN WALL 1/4-20	6
11	H-1901-20	GROMMET, 1/2 INCH	1
12	H-4844	MAGNET, CHARGE JACK DOOR	1
13	H-4874	HINGE, BLIND	2
14	H-4900-050804	SPACER, 1/4 SCR X 1/2 OD X 1/2 LG	3
15	S-4092-00	DOOR, CHARGE JACK (P)	1
16	S-4395-00	CRUD DEFLECTOR, CHARGE JACK (P)	1
17	Z-11091	ASY, LIMIT SW WITH CONN	1
18	Z-11462-00	WLD, CHARGE JACK HSG (P)	1

13.5 ASSEMBLY, ELECTRICAL SYSTEM

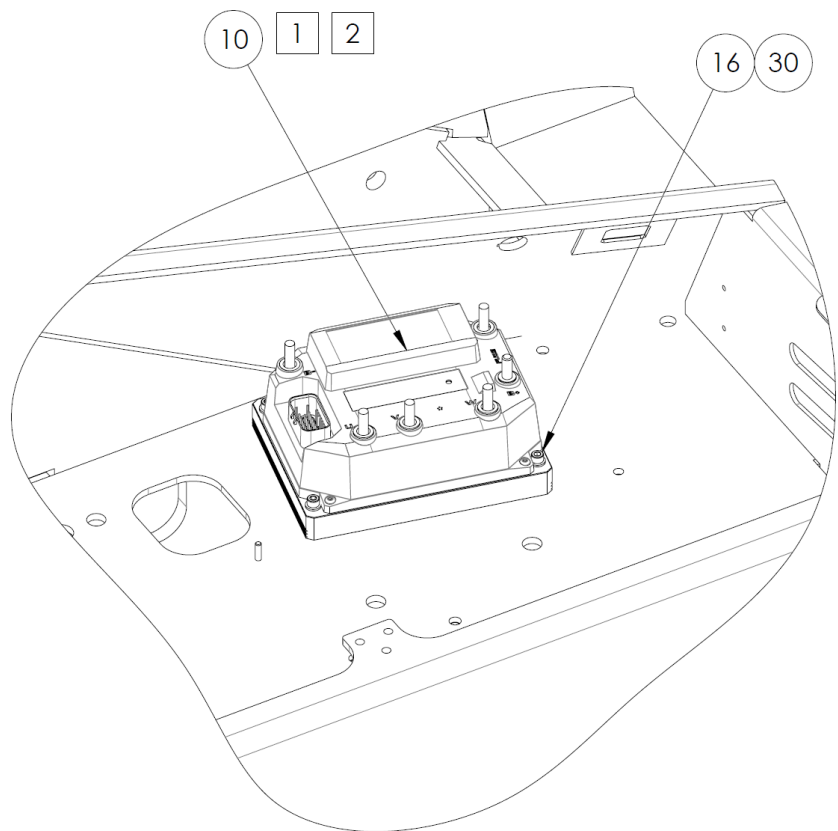
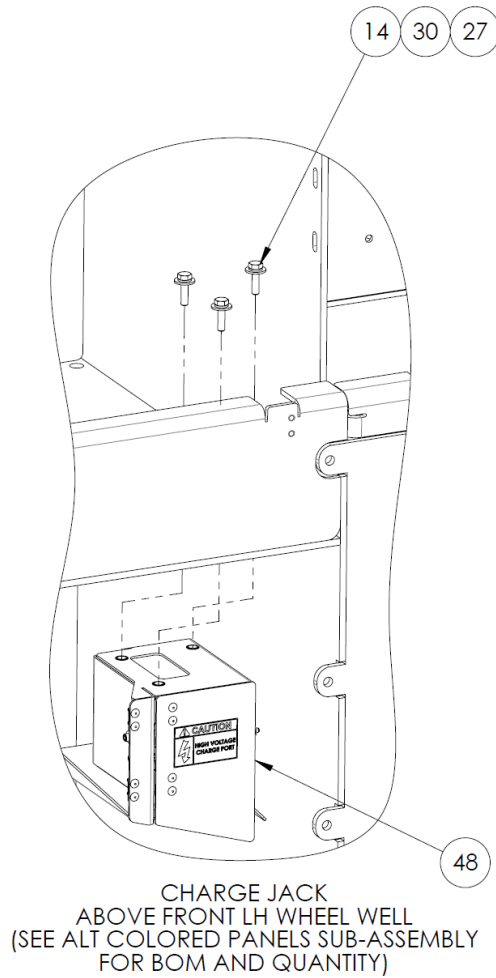


CONTACTOR PANEL  
ABOVE FRONT RH WHEEL WELL

13.5 ASSEMBLY, ELECTRICAL SYSTEM (*continued*)

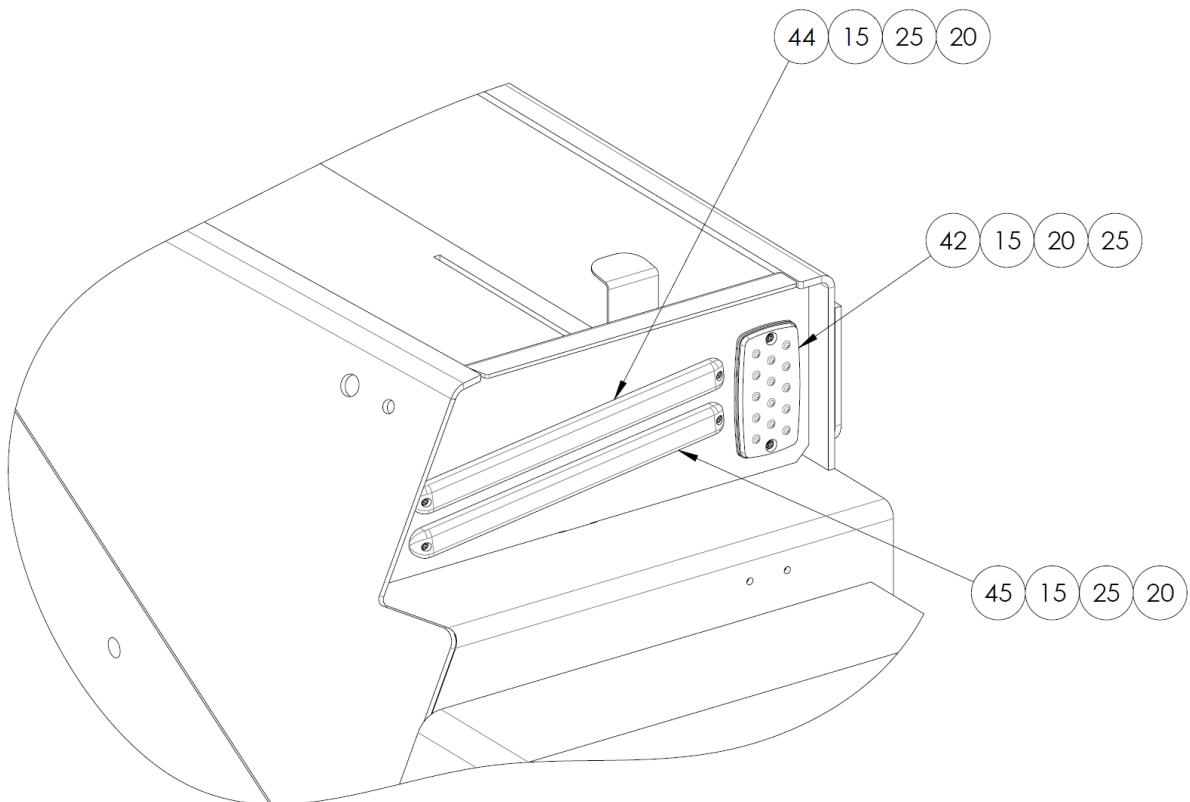
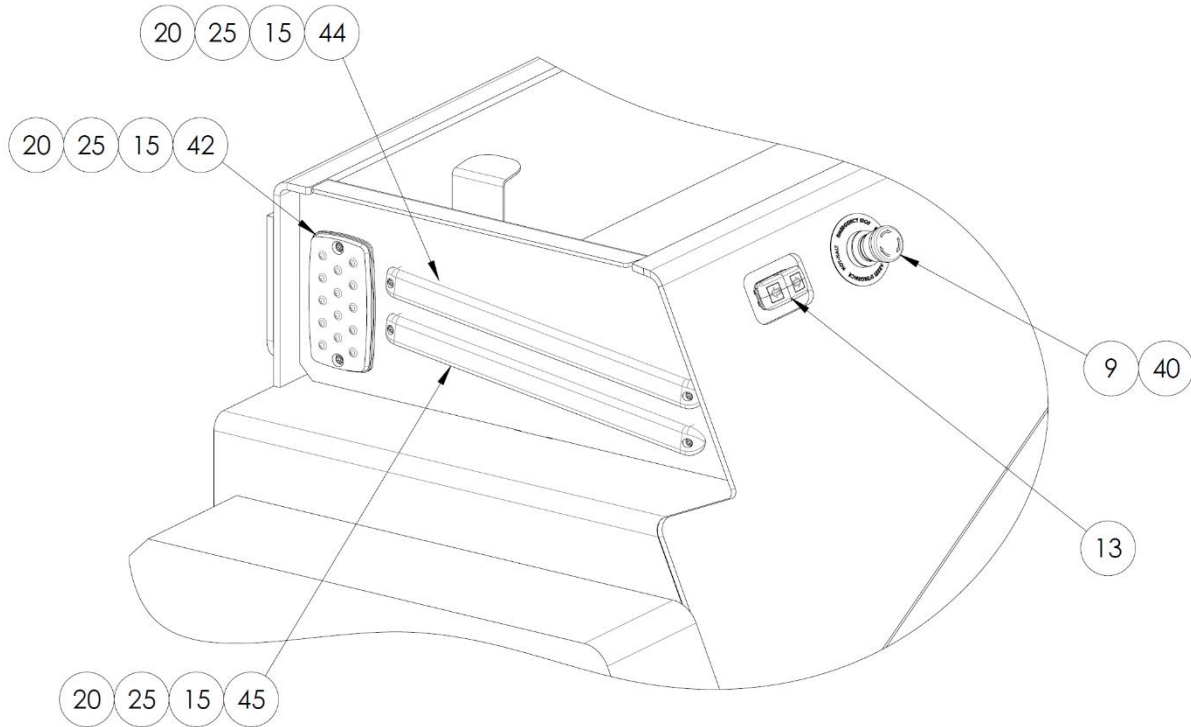


13.5 ASSEMBLY, ELECTRICAL SYSTEM (*continued*)



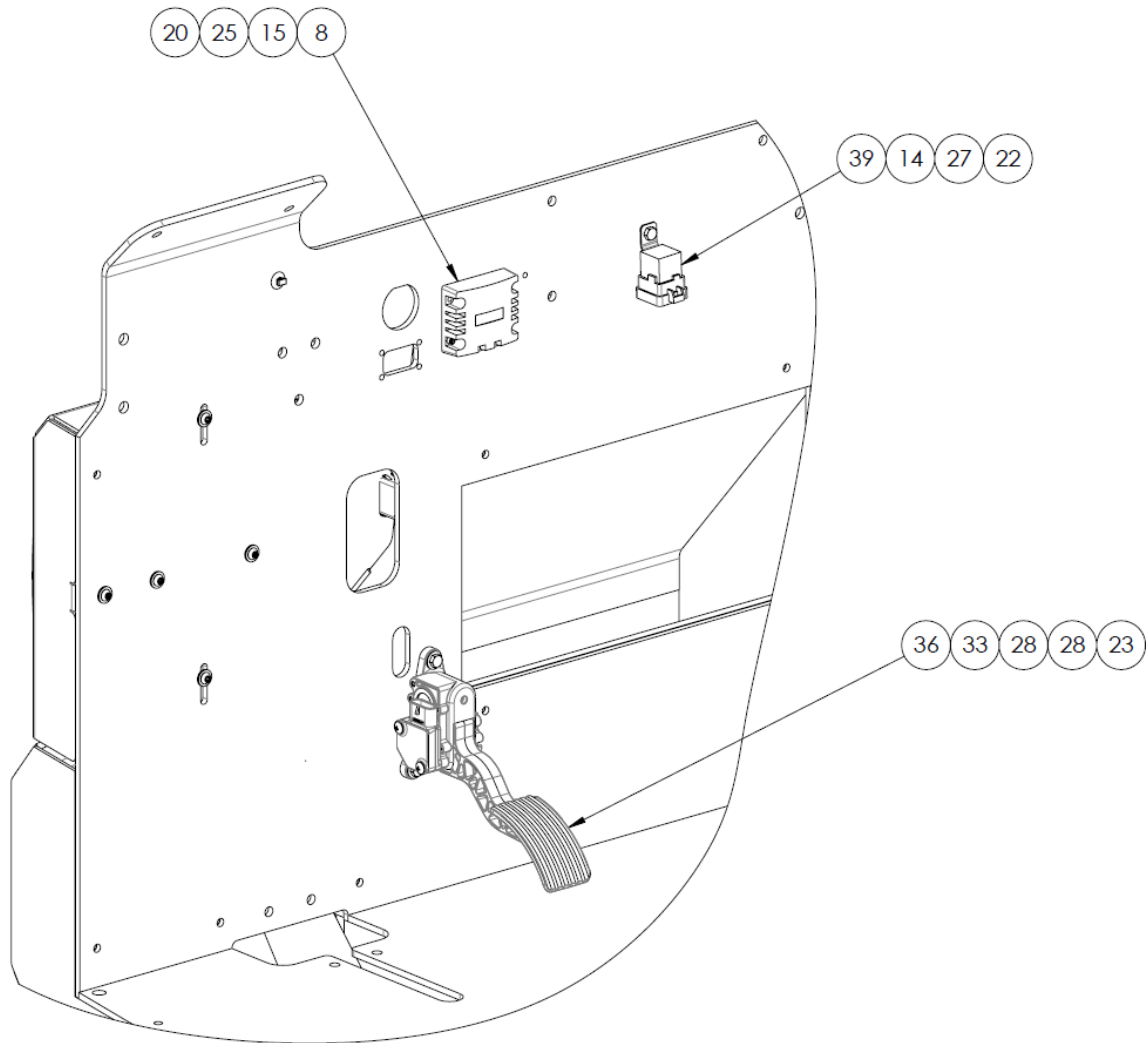
PUMP INVERTER  
ABOVE REAR LH WHEEL WELL

13.5 ASSEMBLY, ELECTRICAL SYSTEM *(continued)*



LIGHTING AND CONTROLS  
REAR RH CORNER

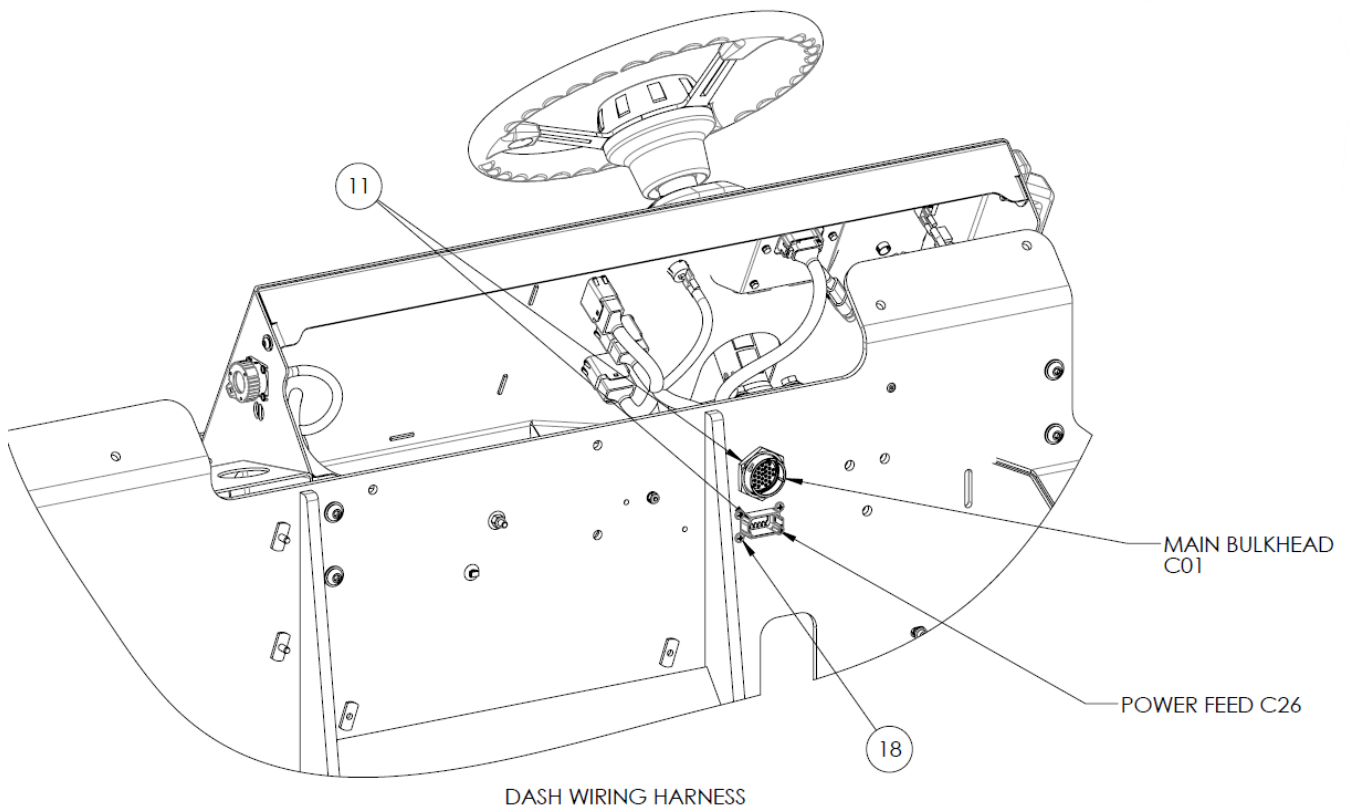
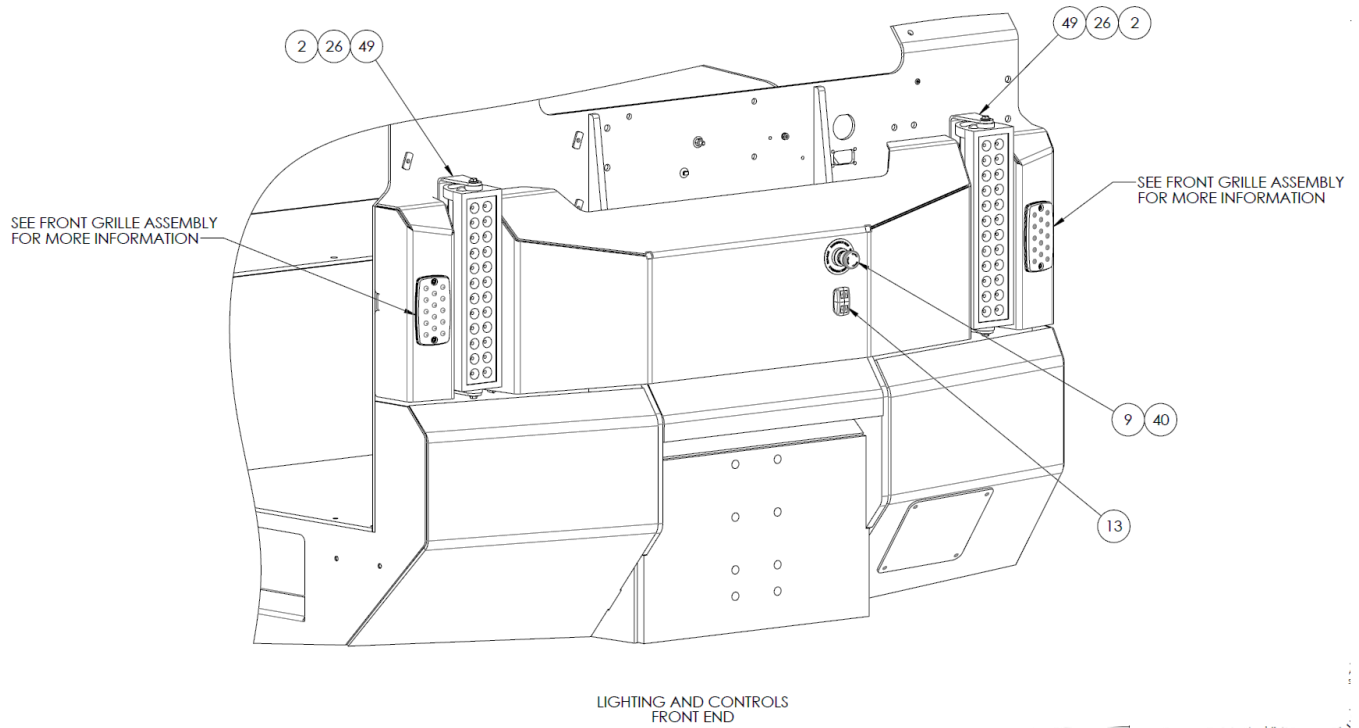
13.5 ASSEMBLY, ELECTRICAL SYSTEM *(continued)*



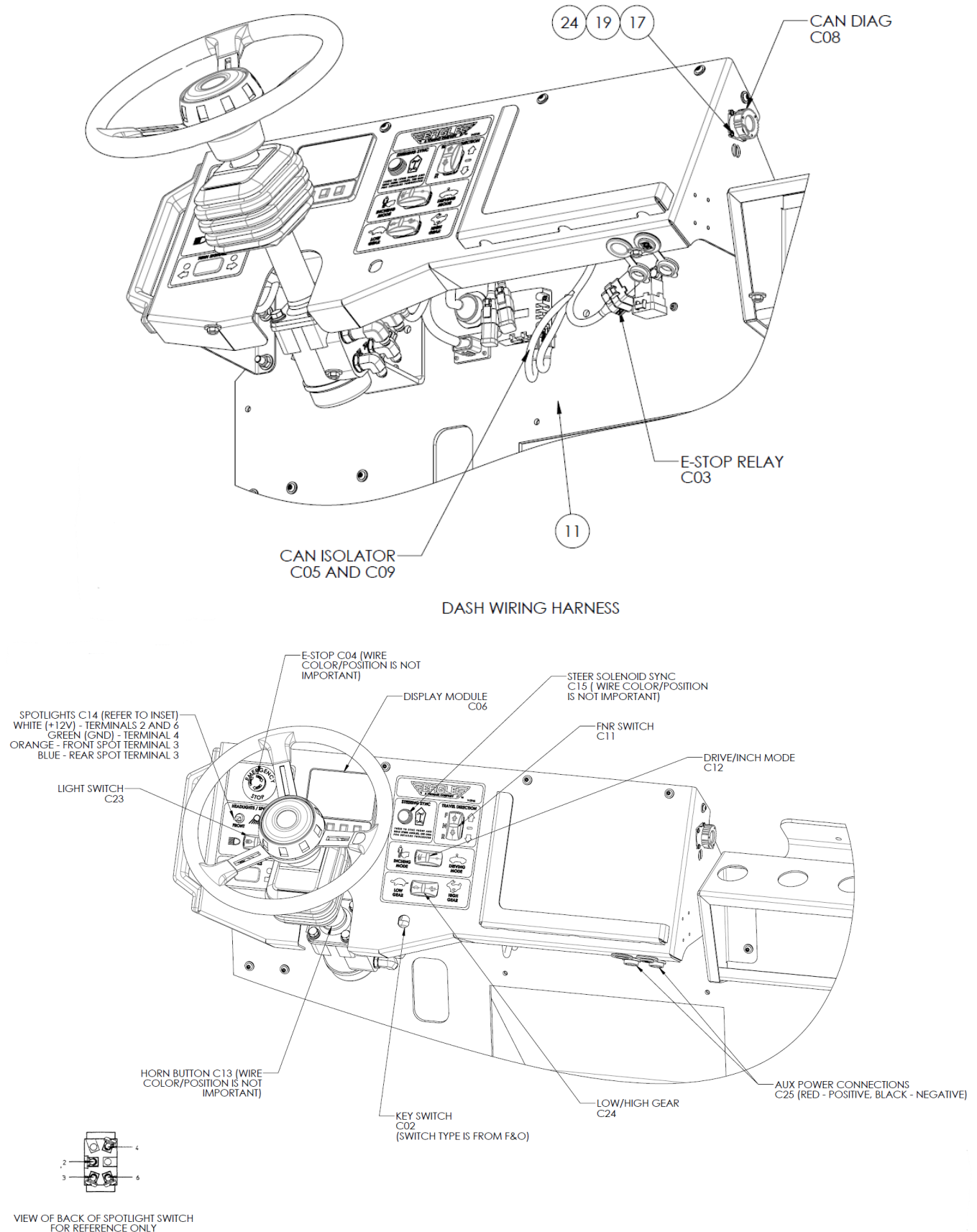
OPERATOR COMPARTMENT ITEMS



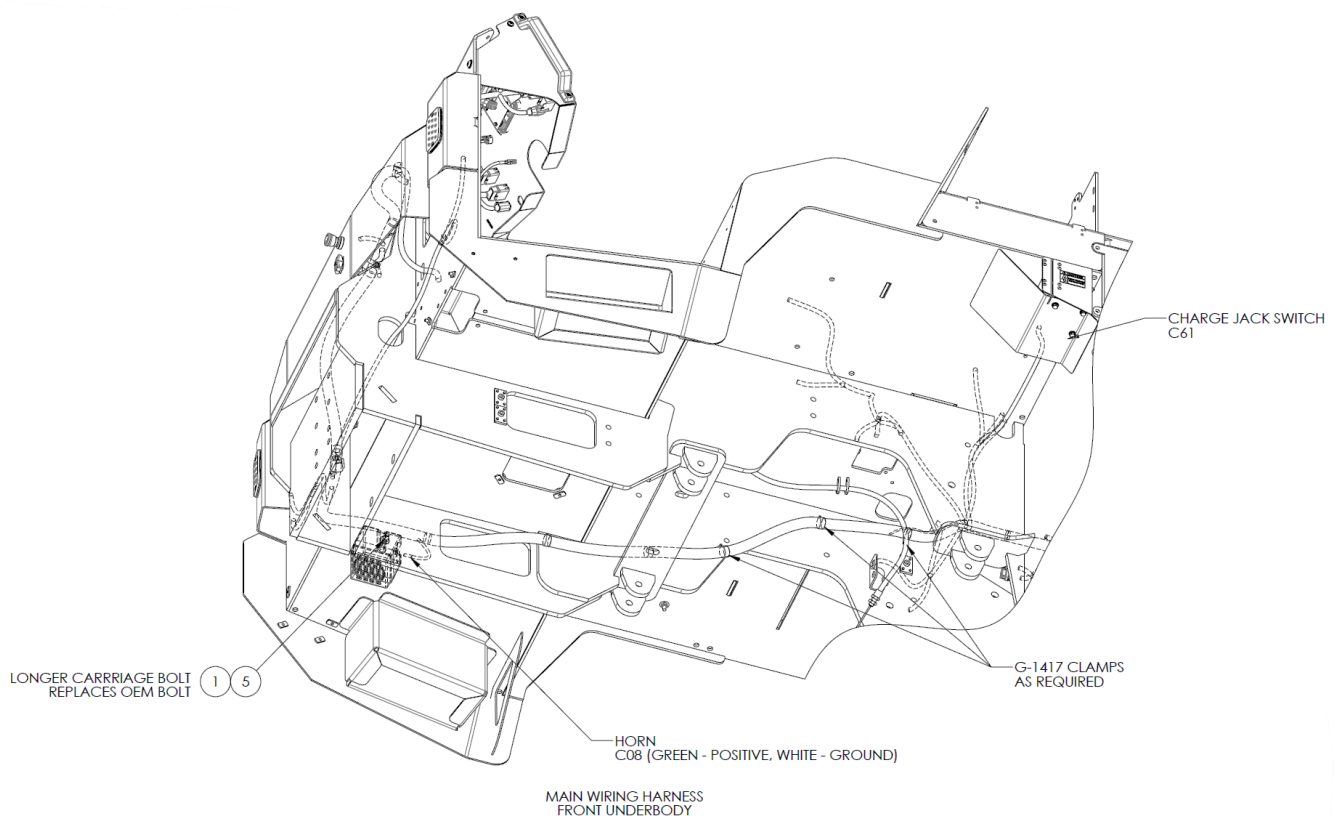
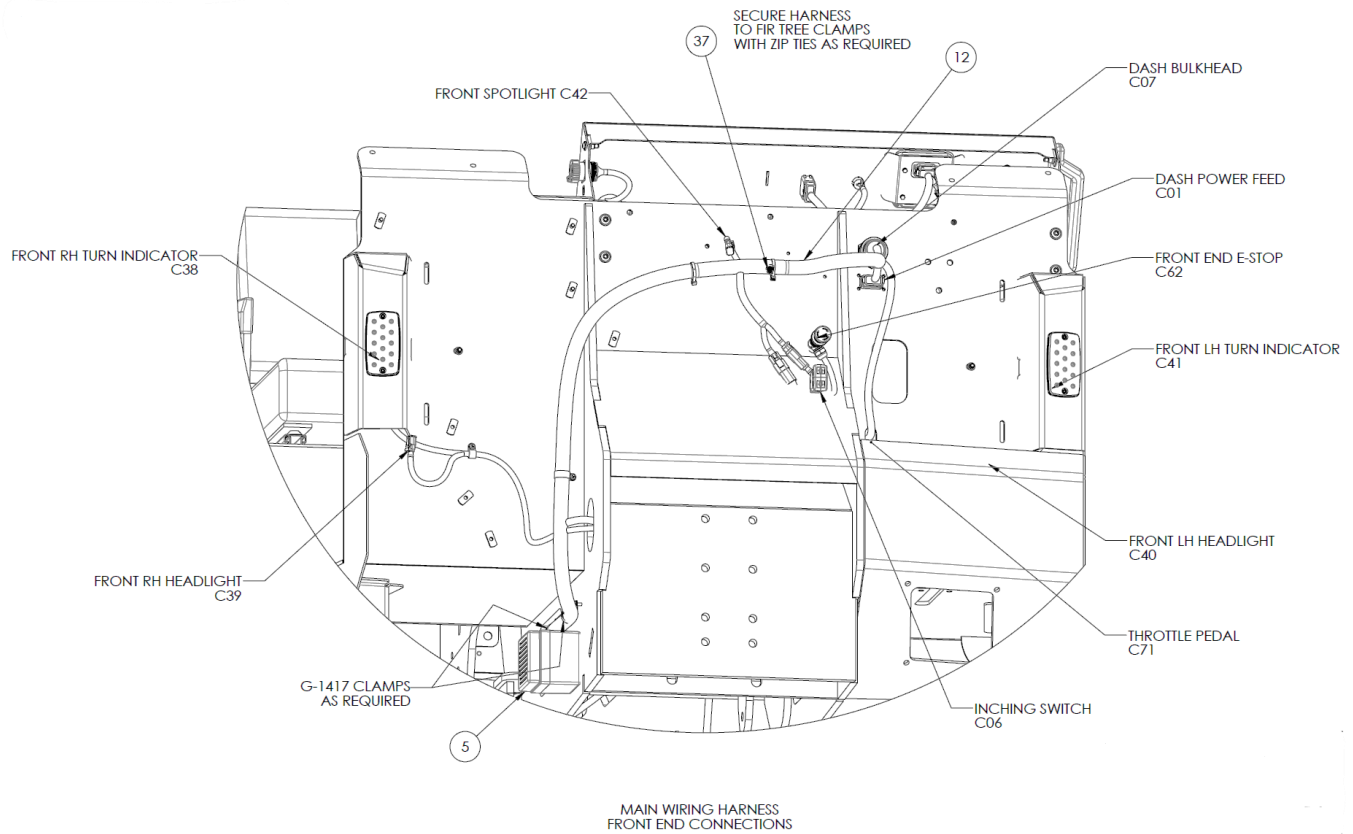
13.5 ASSEMBLY, ELECTRICAL SYSTEM (*continued*)



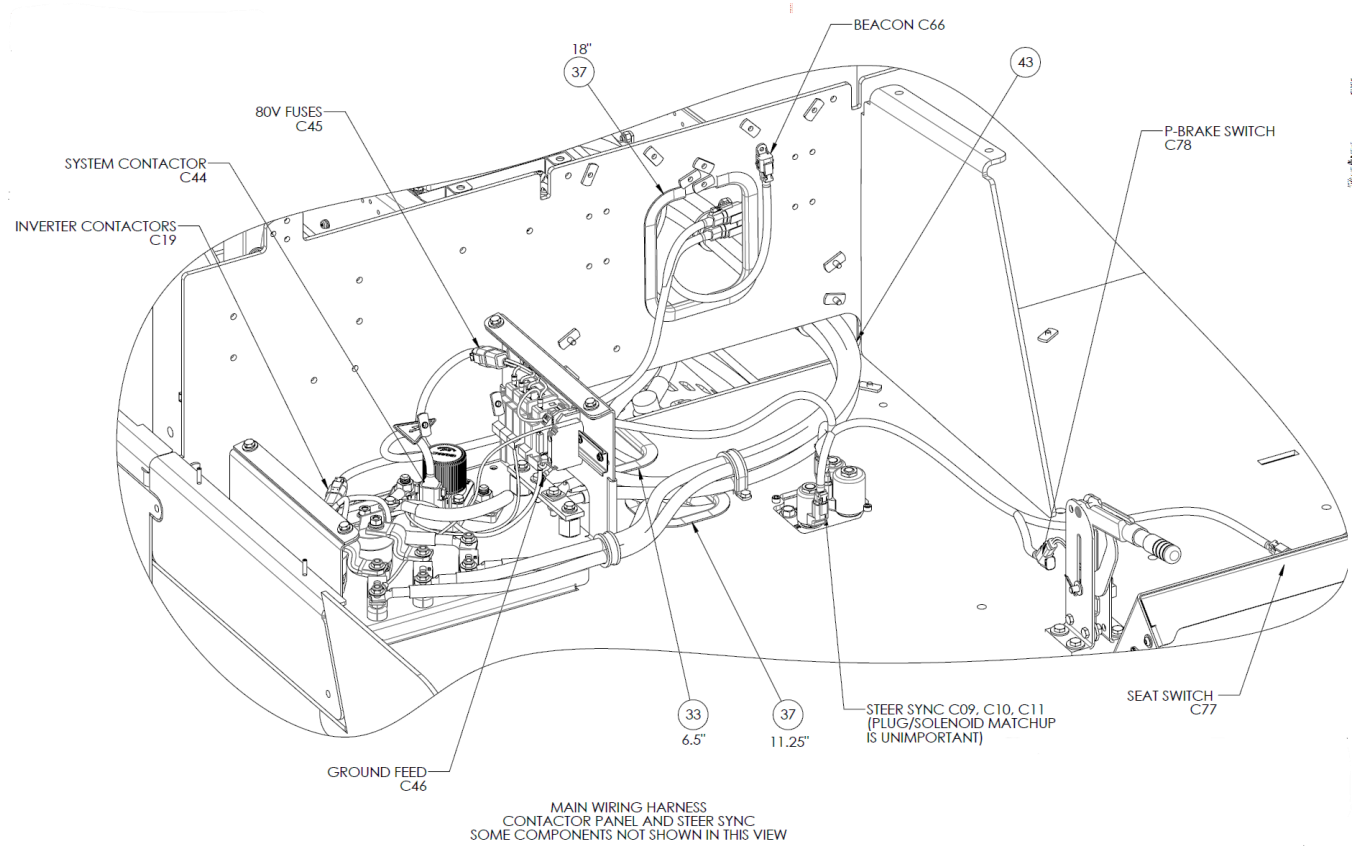
13.5 ASSEMBLY, ELECTRICAL SYSTEM (continued)



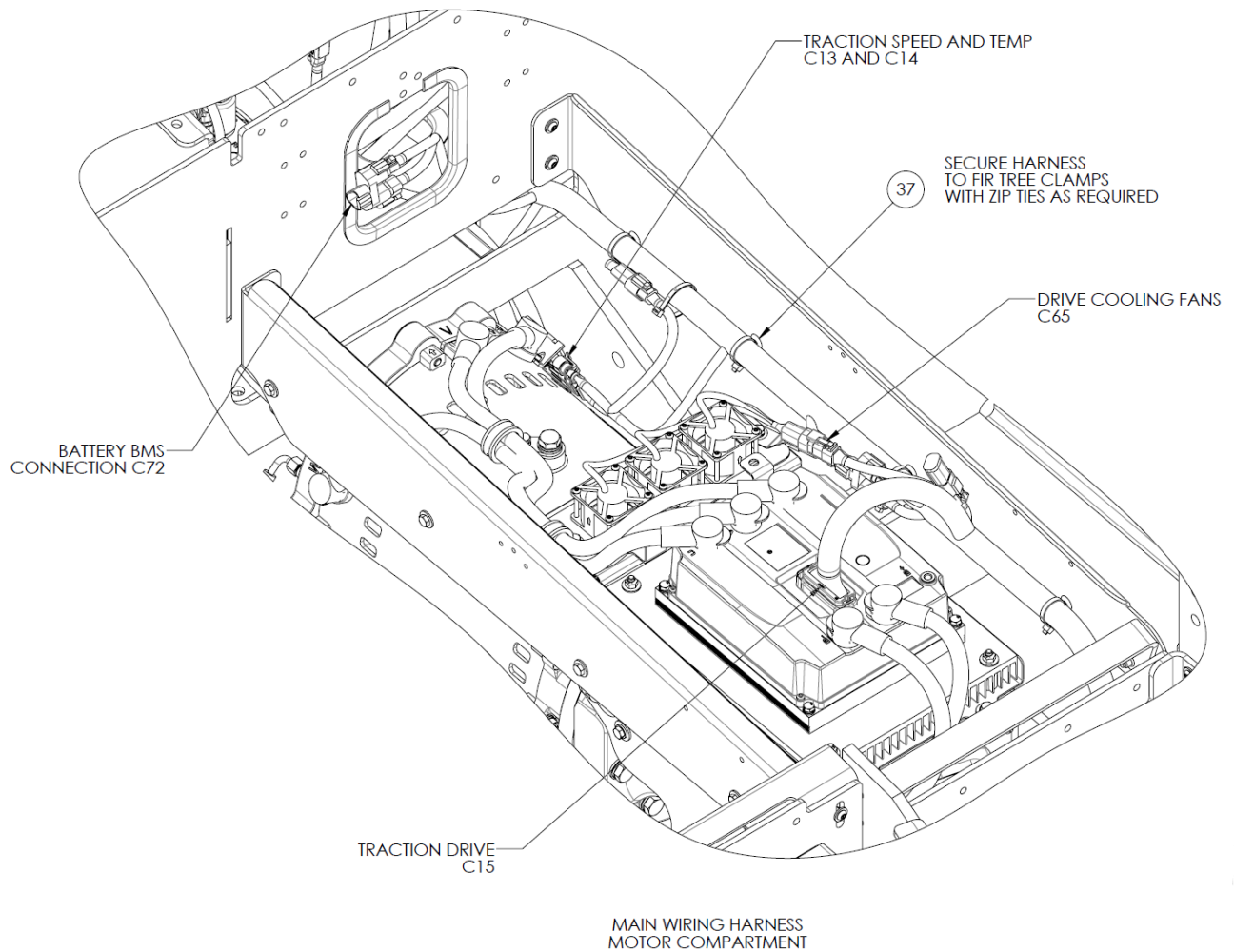
### 13.5 ASSEMBLY, ELECTRICAL SYSTEM (continued)



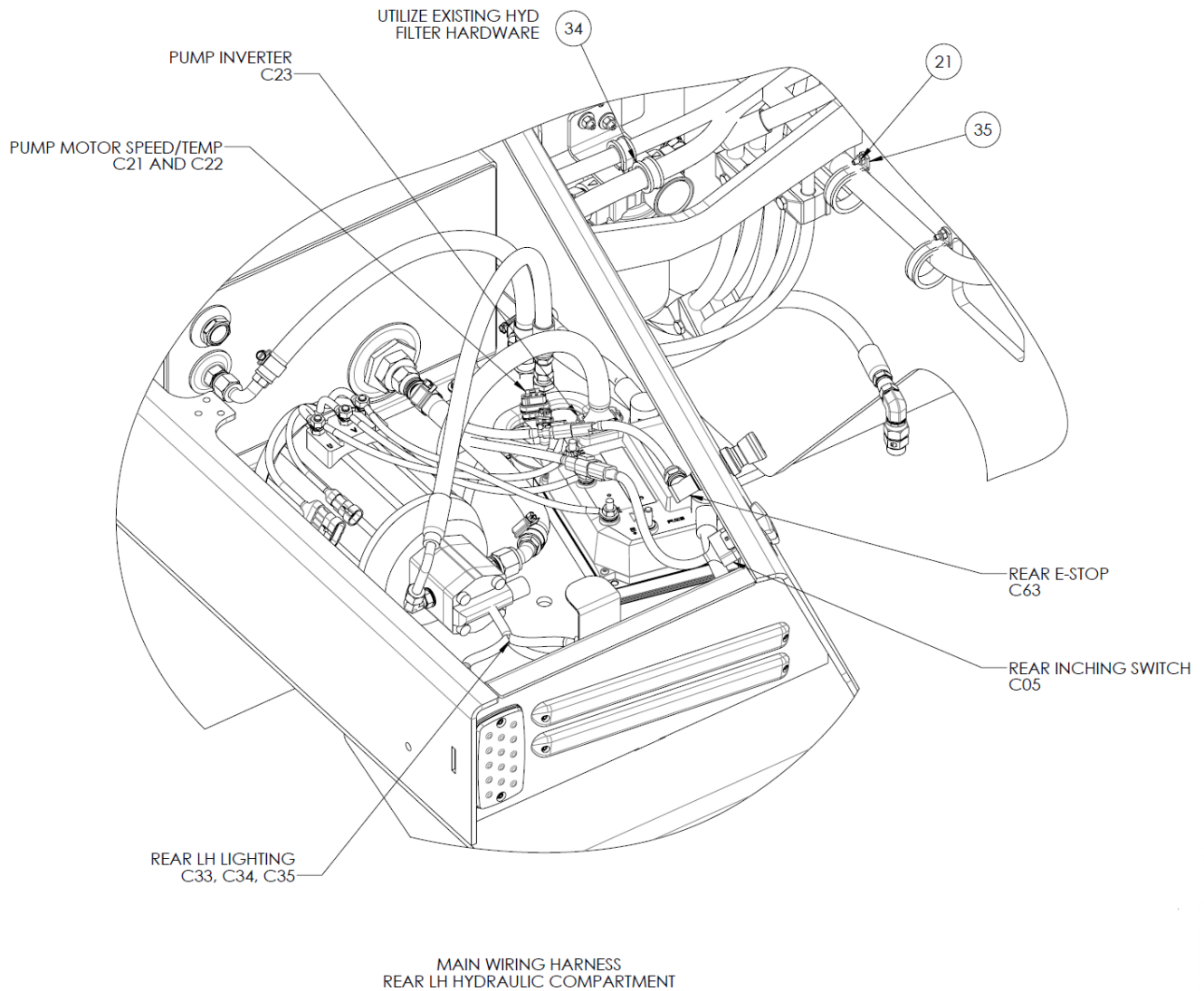
13.5 ASSEMBLY, ELECTRICAL SYSTEM (*continued*)



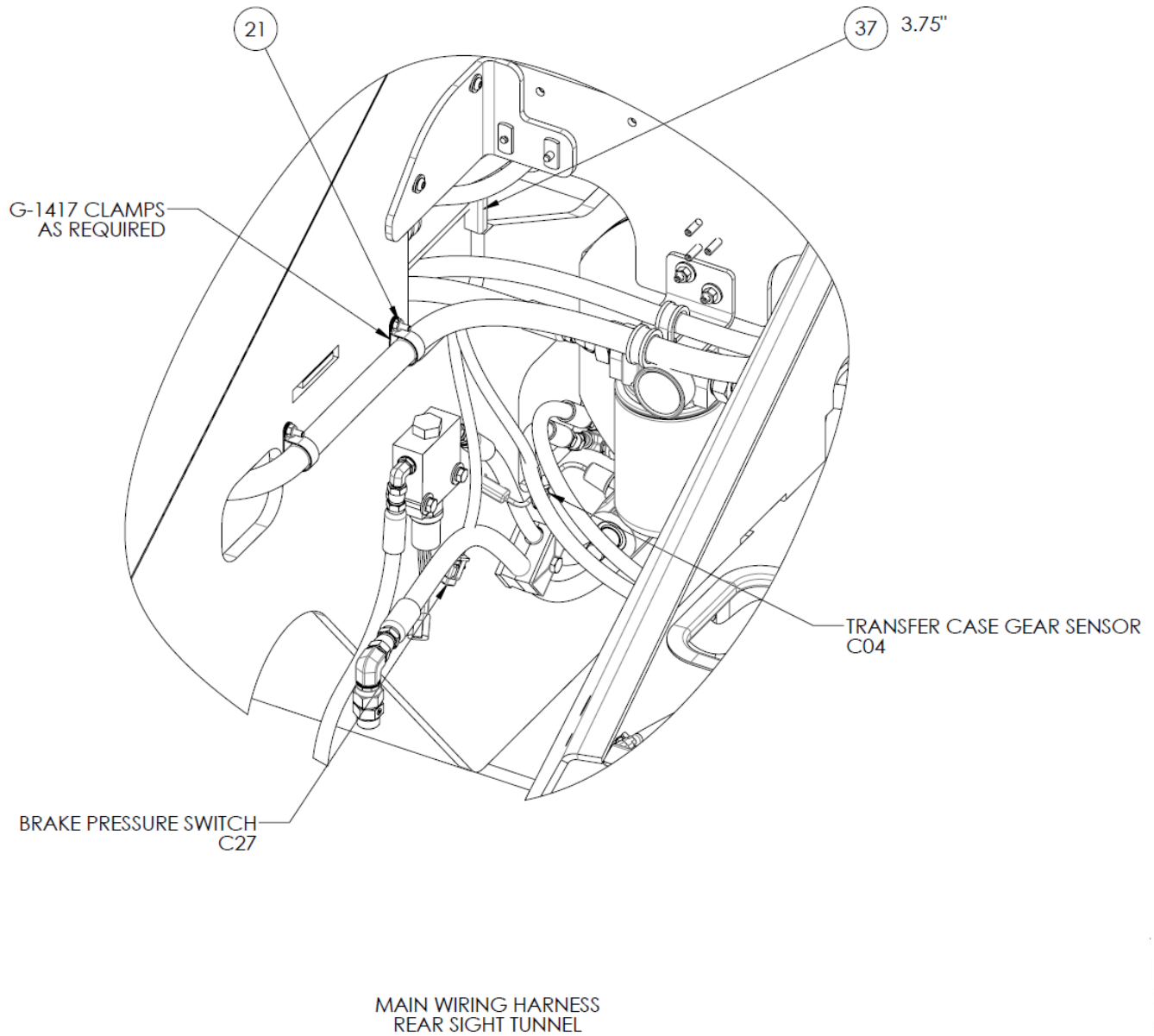
13.5 ASSEMBLY, ELECTRICAL SYSTEM (*continued*)



13.5 ASSEMBLY, ELECTRICAL SYSTEM (*continued*)

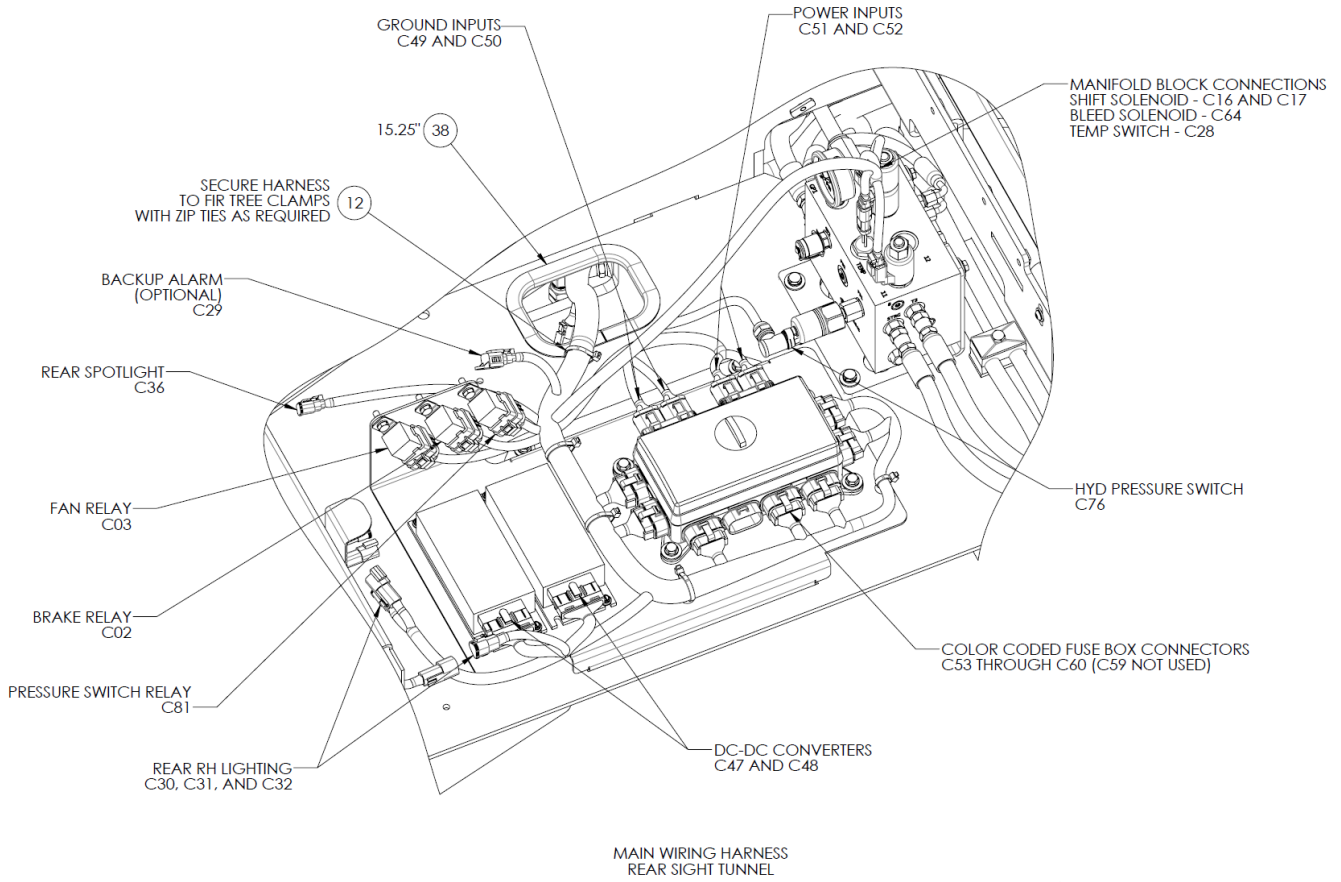


13.5 ASSEMBLY, ELECTRICAL SYSTEM (continued)





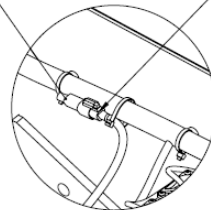
### 13.5 ASSEMBLY, ELECTRICAL SYSTEM (continued)



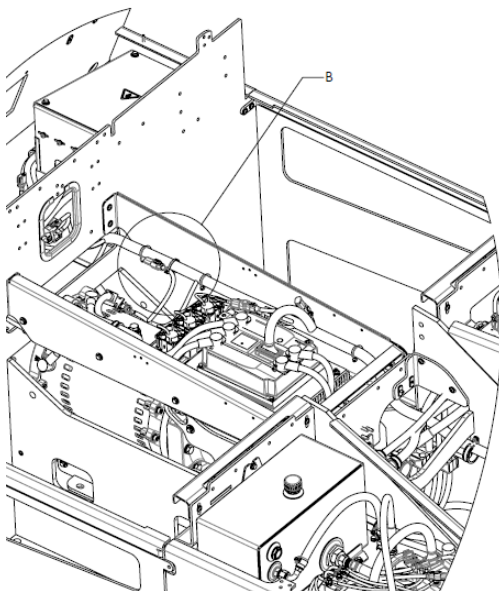
REFER JUMPER CONNECTIONS FOR ETT-8X AND ETT-12X

46 45 44 6

C82  
SECURE IT WITH A CABLE TIE



DETAIL B  
SCALE 1 : 4



ETT-8X JUMPER CONNECTIONS FOR 6

DT04-3P/ W3S		
0460-215-16141	A	EC-3299-18-RED
114017	B	
0460-215-16141	C	

ETT-12X JUMPER CONNECTIONS FOR 6

DT04-3P/W3S		
114017	A	EC-3299-18-RED
0460-215-16141	B	
0460-215-16141	C	





13.5 ASSEMBLY, ELECTRICAL SYSTEM (continued)

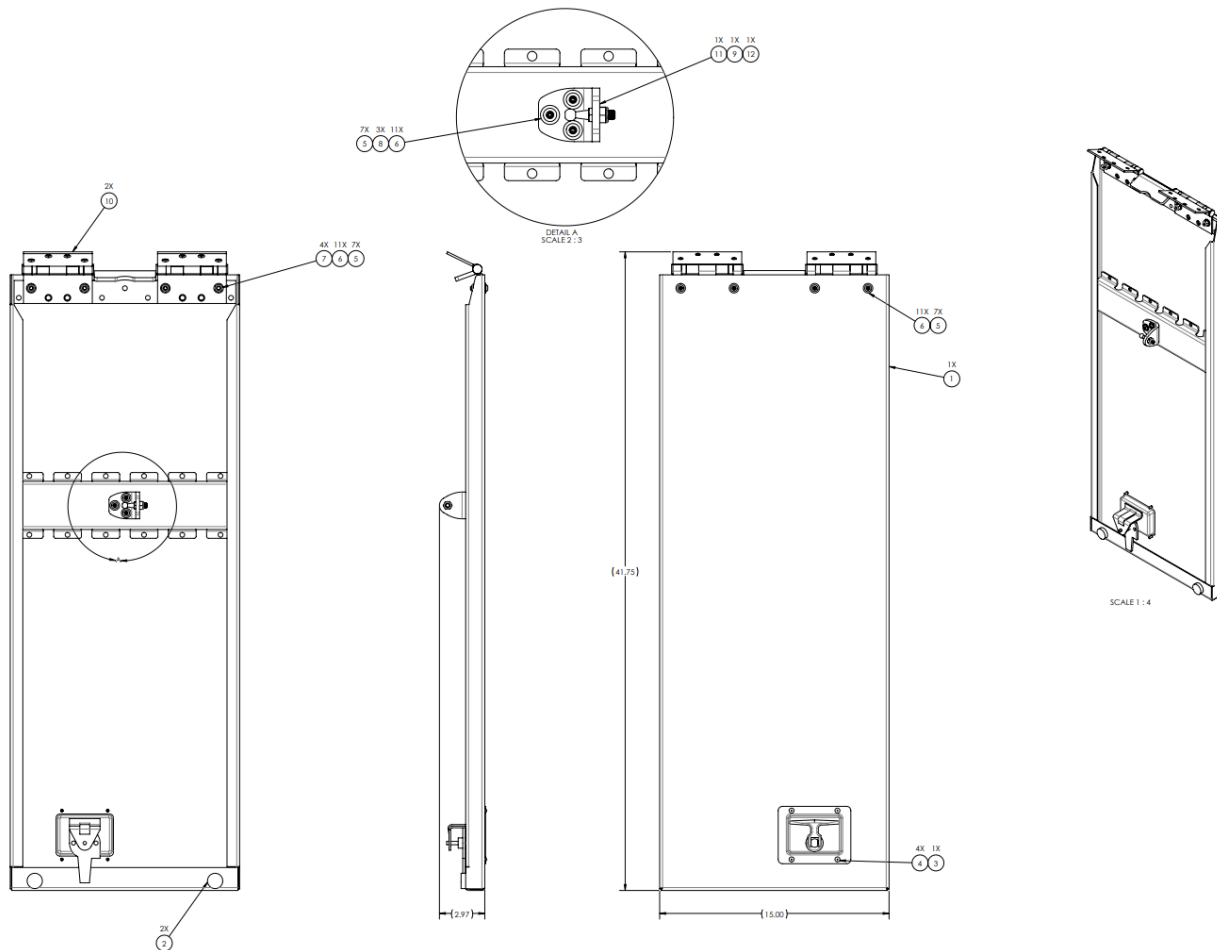
**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	324-042	BOLT, CARRIAGE, 3/8-16 X 1 1/2 SS	1
2	326-009	BHCS, 1/4-20 x 1" LG	4
3	A-RTT12-00052	ELECTRONIC HORN	1
4	EC-3356	CAN ISOLATOR	1
5	EC-3399	E-STOP, IP67	2
6	EC-3440	PUMP DRIVE-INMOTION ACS80S	1
7	EC-3483	DASH HARNESS	1
8	EC-3487	MAIN VEHICLE HARNESS	1
9	ET00-14-001-CA	SVR ROCKER, (ON)-NONE-(ON), SPDT	2
10	G-1100-105010	BOLT, 1/4-20 X 1.0" LG HEX HD GR 5	4
11	G-1100-105016	BOLT, 1/4-20 X 1-3/4" LG HEX HD GR 5	4
12	G-1151-102006	SCREW, #8-32 X 3/4" SOCKET HD CAP	18
13	G-1154-100004	SCREW, #4-40 X 1/2" LG. SOC BUTT. HD CAP	4
14	G-1178-103005	SCREW, #10 X 5/8 PAN HEAD SELF TAPPING	4
15	G-1202-1000	STOPNUT, #4-40 ELASTIC	4
16	G-1202-1020	STOPNUT, #8-32 ELASTIC	18
17	G-1202-1035	STOPNUT, #10-32 ELASTIC	14
18	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	1
19	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	3
20	G-1250-1000N	FLATWASHER, #4 NARROW	4
21	G-1250-1020N	FLATWASHER, #8 NARROW	18
22	G-1250-1050N	FLATWASHER, 1/4 NARROW	4
23	G-1250-1050W	FLATWASHER, 1/4 WIDE	4
24	G-1250-1060N	FLATWASHER, 5/16 NARROW	6
25	G-1250-1060W	FLATWASHER, 5/16 WIDE	3
26	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	7
27	G-1251-1060R	LOCKWASHER, 5/16 REGULAR	3
28	G-1420-106010	BOLT, 5/16-18 X 1.0" LG. HEX HD GR 8	3
29	G-1420-106012	BOLT, 5/16-18 X 1-1/4" LG. HEX HD GR 8	3
30	H-3521-11	CLAMP, CUSHIONED LOOP 1"	1
31	NVSP-14-033-CA	THROTTLE PEDAL DUAL ANALOG	1
32	NVSP-24-022-CA	CABLE TIE ANCHOR STD (Ø.375 X .27 THK)	10
33	NVSP-24-042-CB	METAL CORE PLASTIC EDGE TRIM - 1/4	70"
34	NVSP-31-002-CA	SEALED RELAY	1
35	Refer above section	ASY, BATTERY CABLES	1
36	Kit, TBC	TAIL LIGHT WITH CONNECTOR	2
37	Kit, TBC	REVERSE LIGHT WITH CONNECTOR	2
38	Refer above section	ASY, ELECTRICAL PANEL	1
39	Refer above section	ASSY, ELECTRICAL PANEL	1
40	Refer above section	ASY, CHARGE JACK SUB	1
41	Kit, TBC	ASY, WORKLIGHT WITH CONN	2
42	Kit, TBC	ASY, TURN IND W/CONNECTOR	4

## 14.0 ASSEMBLY, STD COLOR PANELS

### 14.1 ASSEMBLY, REAR MIDDLE DOOR

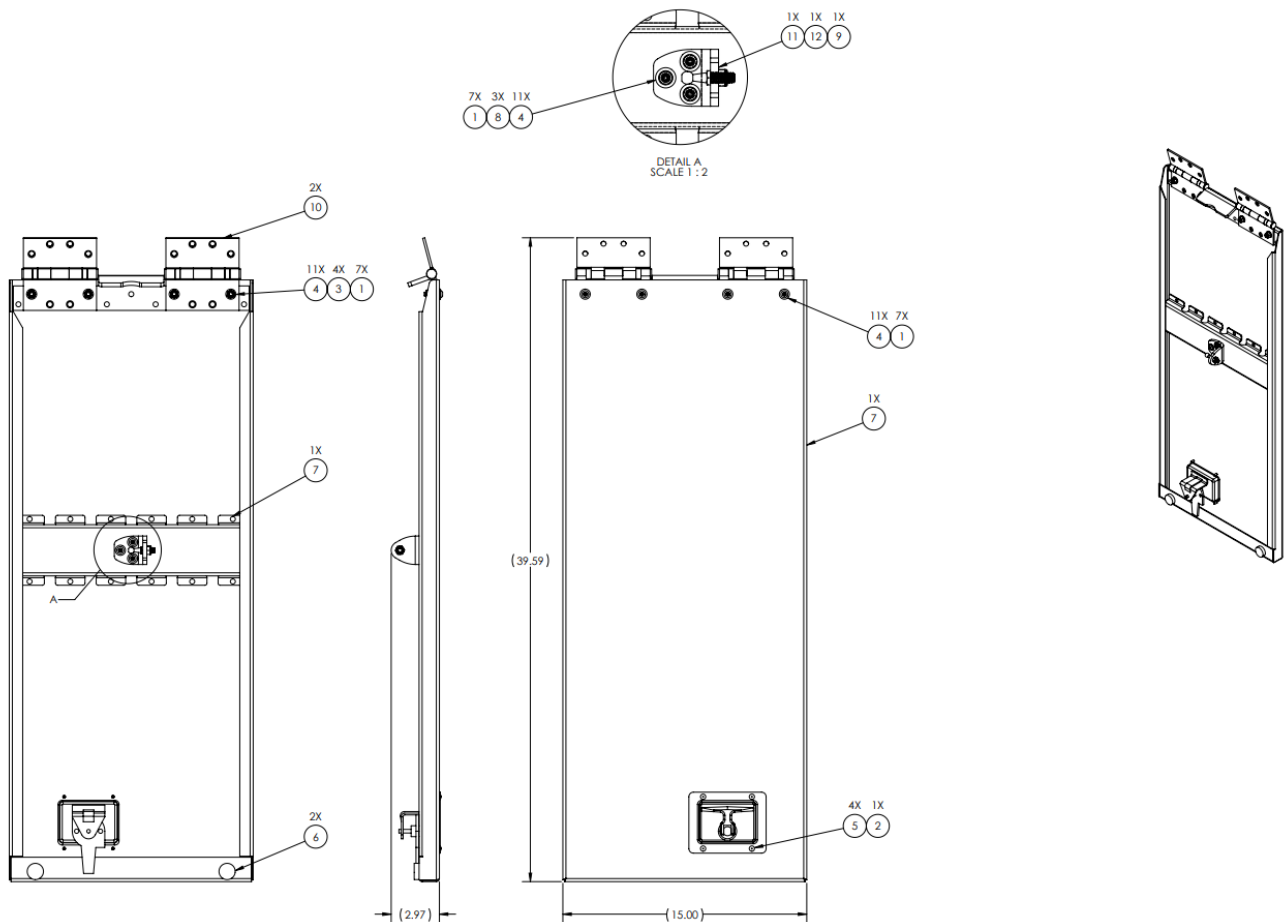


## Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	Z-11874-00	WLD, REAR MIDDLE DOOR (WP)	1
2	NVSP-21-004-CA	RUBBER PRESS-IN BUMPER	2
3	C-TT4-0012-2	T HANDLE LATCH	1
4	G-1351-13-SS	RIVET, 5/32 OPEN-END SS	4
5	326-009	BHCS, 1/4-20 x 1" LG	7
6	G-1250-1050N	FLATWASHER, 1/4 NARROW	11
7	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	4
8	G-1439-1050-S	NUTSERT, 1/4-20 OPEN END	3
9	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	1
10	H-5034	HINGE	2
11	S-4348-00	MOUNT BRACKET (P)	1
12	394-069	BALL STUD FOR GAS SPRING	1

## 14.2 ASSEMBLY, MOTOR DOOR

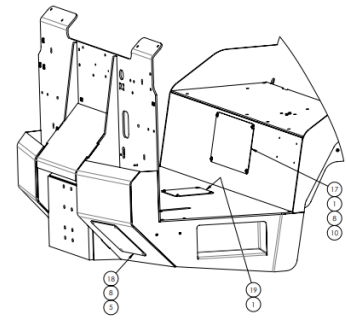
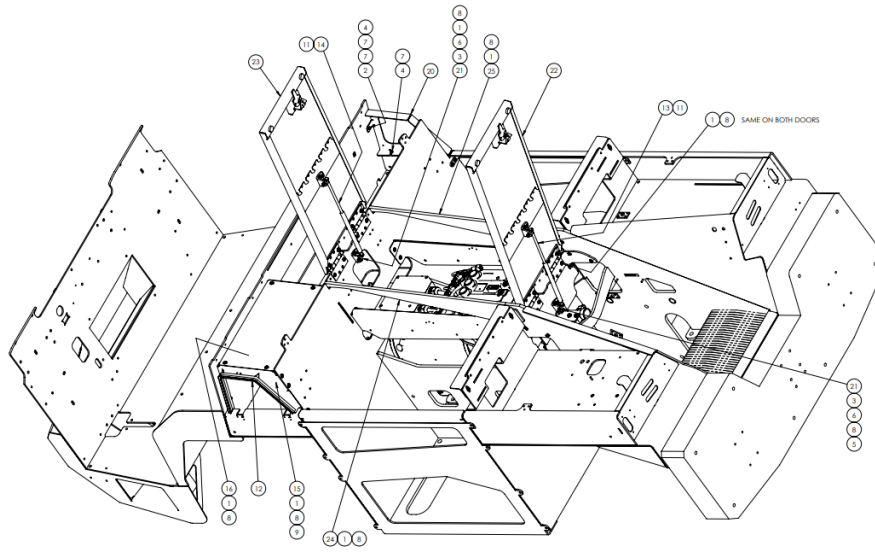


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS, 1/4-20 x 1" LG	7
2	C-TT4-0012-2	T HANDLE LATCH	1
3	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	4
4	G-1250-1050N	FLATWASHER, 1/4 NARROW	11
5	G-1351-13-SS	RIVET, 5/32 OPEN-END SS	4
6	NVSP-21-004-CA	RUBBER PRESS-IN BUMPER	2
7	Z-11877-00	WLD, MOTOR DOOR (WP)	1
8	G-1439-1050-S	NUTSERT, 1/4-20 OPEN END	3
9	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	1
10	H-5034	HINGE	2
11	S-4348-00	MOUNT BRACKET (P)	1
12	394-069	BALL STUD FOR GAS SPRING	1

### 14.3 ASSEMBLY, STANDARD COLOR PANELS

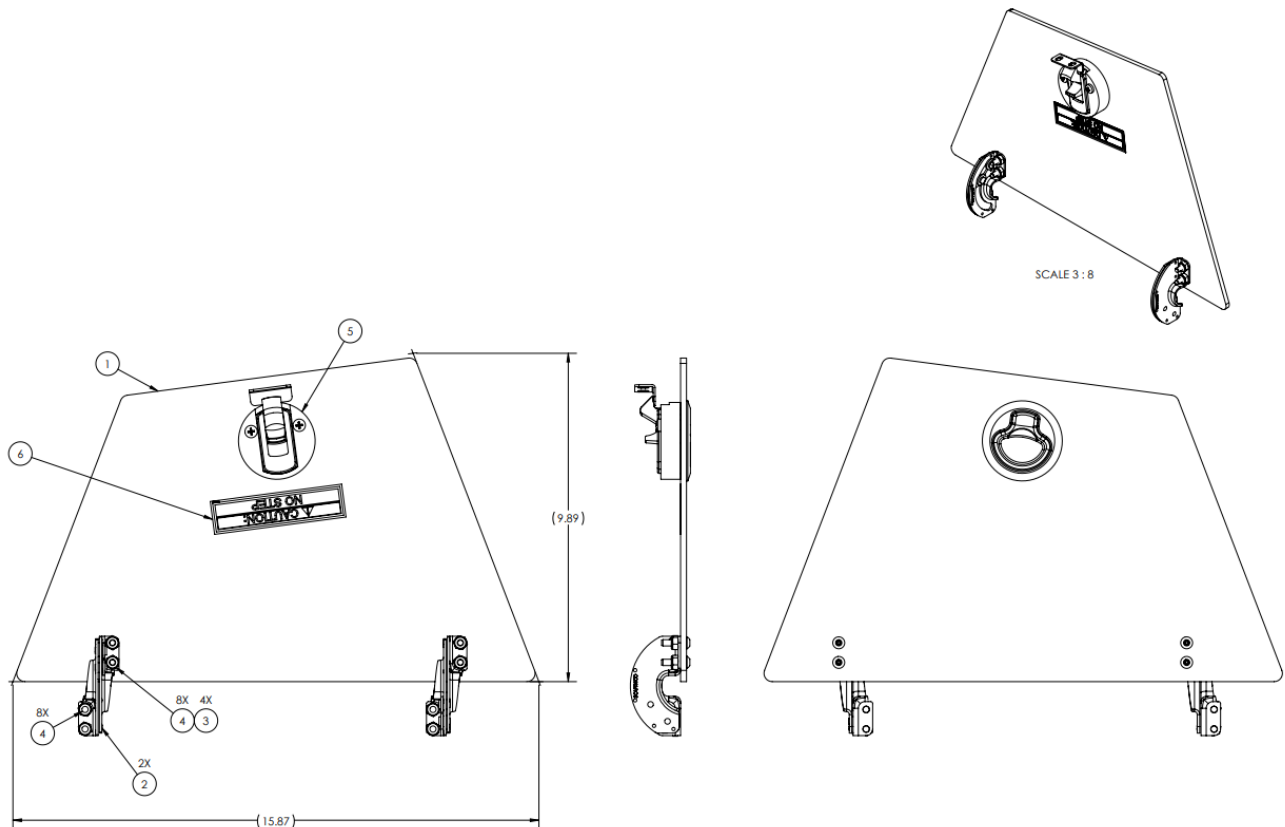


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS, 1/4-20 x 1" LG	31
2	326-038	BHCS, 10-32 x 3/4 LG	1
3	394-069	BALL STUD FOR GAS SPRING	2
4	G-1202-1035	STOPNUT, #10-32 ELASTIC	3
5	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	7
6	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	2
7	G-1250-1030N	FLATWASHER, #10 NARROW	4
8	G-1250-1050N	FLATWASHER, 1/4 NARROW	34
9	G-1439-1050-S	NUTSERT, 1/4-20 OPEN END	6
10	G-1440-1050-S	NUTSERT, THICK WALL 1/4-20	6
11	H-4652	END FITTING FOR GAS SPRING	4
12	H-4931-26.1	BULB SEAL, PUSH ON	1
13	H-5041	GAS SPRING	1
14	H-5043	GAS SPRING	1
15	S-4198-00	LOCKER THRESHOLD (P)	1
16	S-4214-00	LOCKER ROOF (P)	1
17	S-4226-00	ACCESS PANEL (WP)	1
18	S-4301-00	BRAKE ACCESS COVER (WP)	1
19	S-4333-00	COVER, BALLAST ACCESS (P)	1
20	S-4343-00	ELECTRICAL FAUX FRAME (P)	1
21	S-4348-00	MOUNT BRACKET (P)	2
22	Refer above section	ASY, REAR MIDDLE DOOR	1
23	Refer above section	ASY, MOTOR DOOR	1
24	Z-11882-00	WLD, GAP PATCH, LH (WP)	1
25	Z-11883-00	WLD, GAP PATCH, RH (WP)	1

**15.0 ASSEMBLY, ALT COLOR PANELS**  
**15.1 STORAGE DOOR SUB**

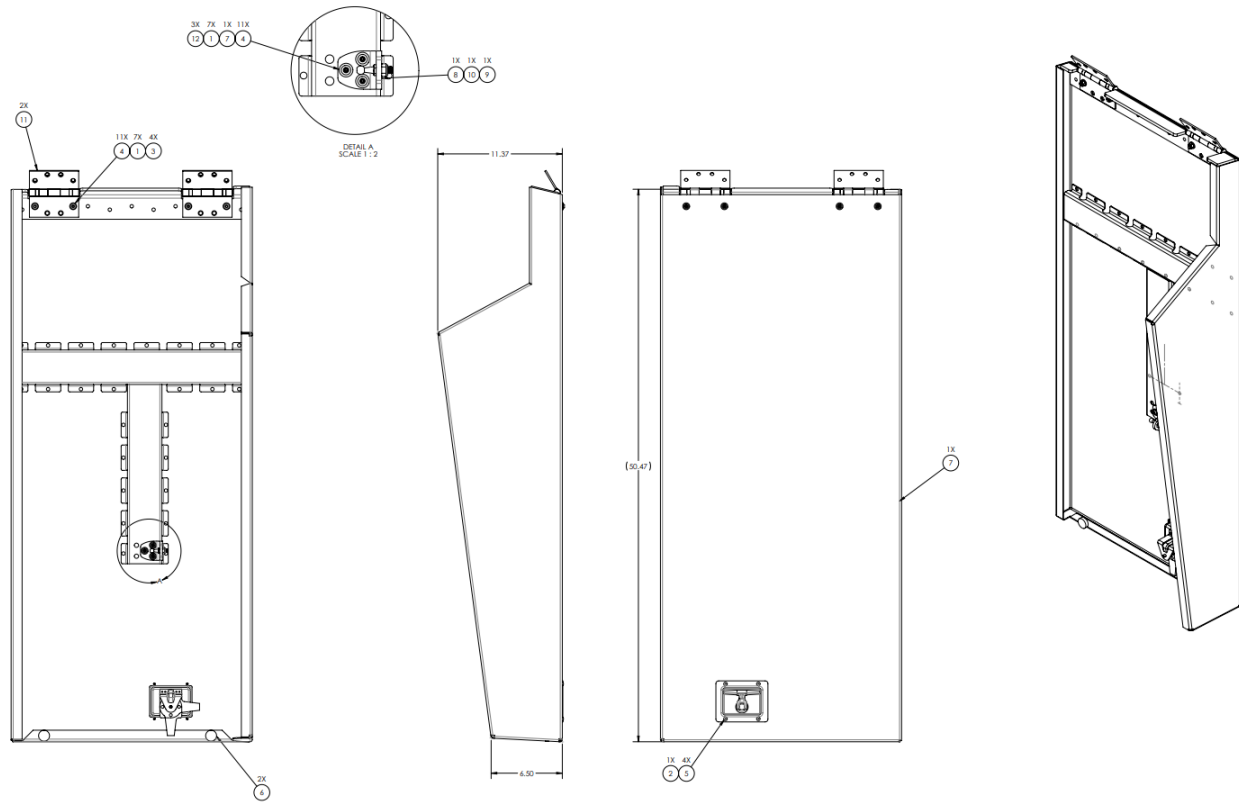


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-038	BHCS, 10-32 x 3/4 LG	4
2	G-1154-102204	SCREW, #8-32 X .50" LG. SOC BUTT. HD CAP	2
3	G-1202-1020	STOPNUT, #8-32 ELASTIC	2
4	G-1202-1035	STOPNUT, #10-32 ELASTIC	8
5	G-1250-1020N	FLATWASHER, #8 NARROW	2
6	H-4927	LATCH, STAINLESS, 1/8"-1/4" DOOR THICKNESS	1
7	H-5028	HINGE, CONCEALED, 90	2
8	J-8229-00	STORAGE ACCESS DOOR (P)	1
9	V-2545	LABEL, NO STEP	REF.

## 15.2 ASSEMBLY, BATTERY DOOR, LH

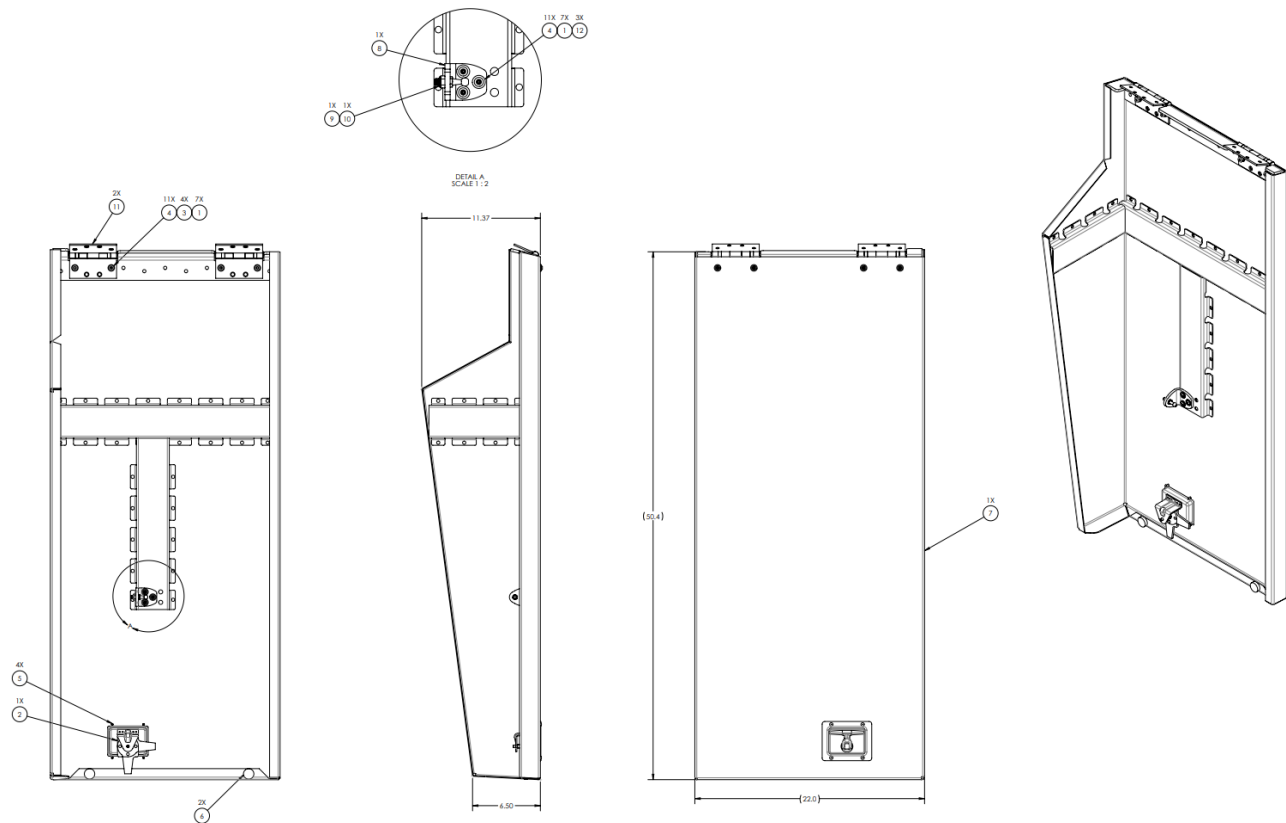


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS, 1/4-20 x 1" LG	7
2	C-TT4-0012-2	T HANDLE LATCH	1
3	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	4
4	G-1250-1050N	FLATWASHER, 1/4 NARROW	11
5	G-1351-13-SS	RIVET, 5/32 OPEN-END SS	4
6	NVSP-21-004-CA	RUBBER PRESS-IN BUMPER	2
7	Z-11858-00	WLD, BATTERY DOOR, LH (P)	1
8	S-4348-00	MOUNT BRACKET (P)	1
9	394-069	BALL STUD FOR GAS SPRING	1
10	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	1
11	H-5034	HINGE	2
12	G-1439-1050-S	NUTSERT, 1/4-20 OPEN END	3

### 15.3 ASSEMBLY, BATTERY DOOR, RH

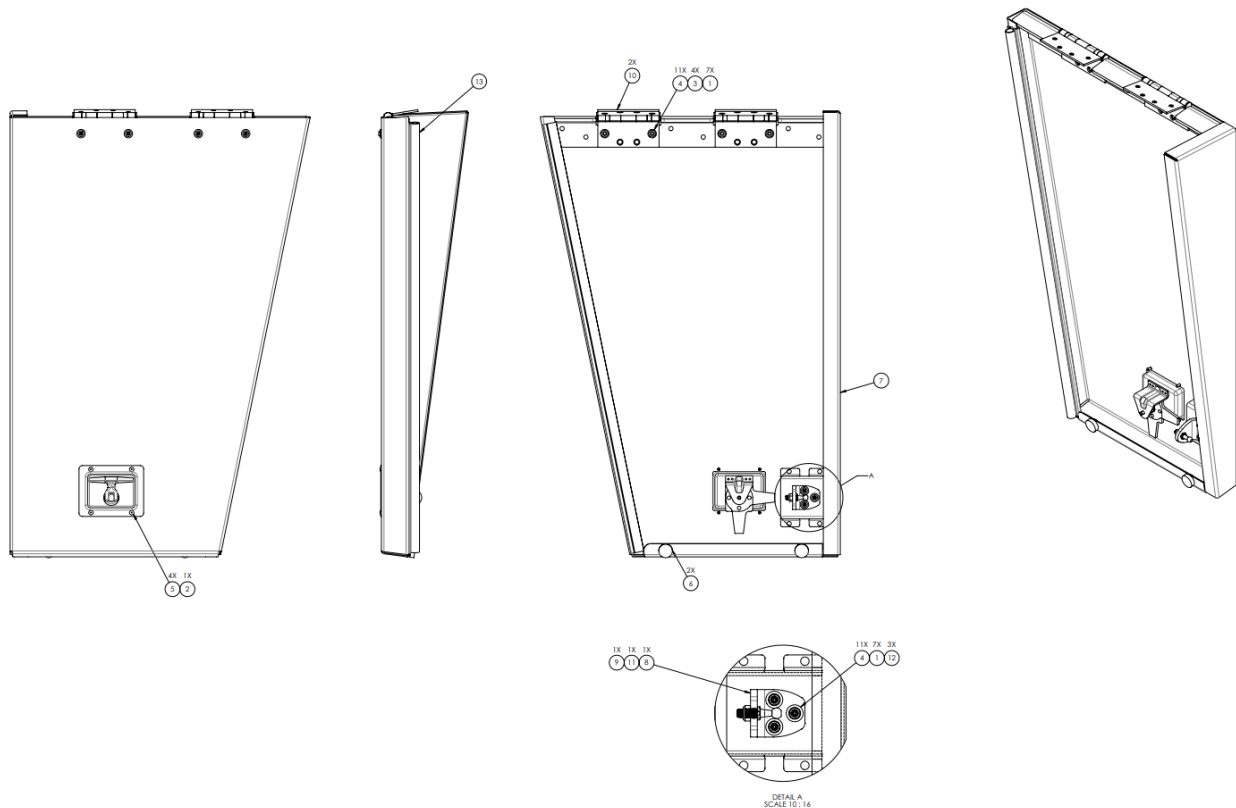


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS, 1/4-20 x 1" LG	7
2	C-TT4-0012-2	T HANDLE LATCH	1
3	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	4
4	G-1250-1050N	FLATWASHER, 1/4 NARROW	11
5	G-1351-13-SS	RIVET, 5/32 OPEN-END SS	4
6	NVSP-21-004-CA	RUBBER PRESS-IN BUMPER	2
7	Z-11864-00	WLD, BATTERY DOOR, RH (P)	1
8	S-4348-00	MOUNT BRACKET (P)	1
9	394-069	BALL STUD FOR GAS SPRING	1
10	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	1
11	H-5034	HINGE	2
12	G-1439-1050-S	NUTSERT, 1/4-20 OPEN END	3

15.3 ASSEMBLY, REAR DOOR, LH (continued)



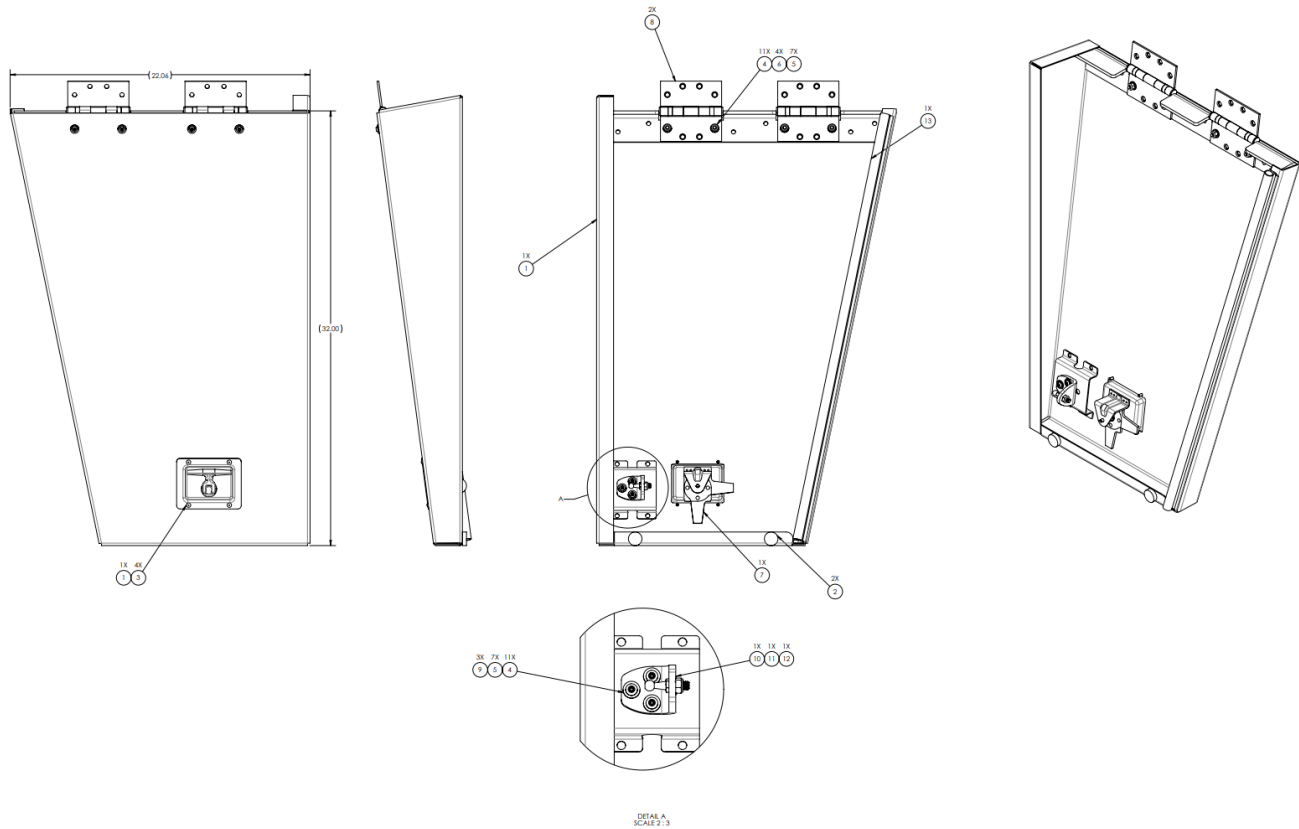
### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS, 1/4-20 x 1" LG	7
2	C-TT4-0012-2	T HANDLE LATCH	1
3	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	4
4	G-1250-1050N	FLATWASHER, 1/4 NARROW	11
5	G-1351-13-SS	RIVET, 5/32 OPEN-END SS	4
6	NVSP-21-004-CA	RUBBER PRESS-IN BUMPER	2
7	Z-11870-00	WELD, REAR DOOR, LH (P)	1
8	S-4348-00	MOUNT BRACKET (P)	1
9	394-069	BALL STUD FOR GAS SPRING	1
10	H-5034	HINGE	2
11	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	1
12	G-1439-1050-S	NUTSERT, 1/4-20 OPEN END	3
13	H-5040	PUSH-ON BULB SEAL	1



15.3 ASSEMBLY, REAR DOOR, LH (continued)

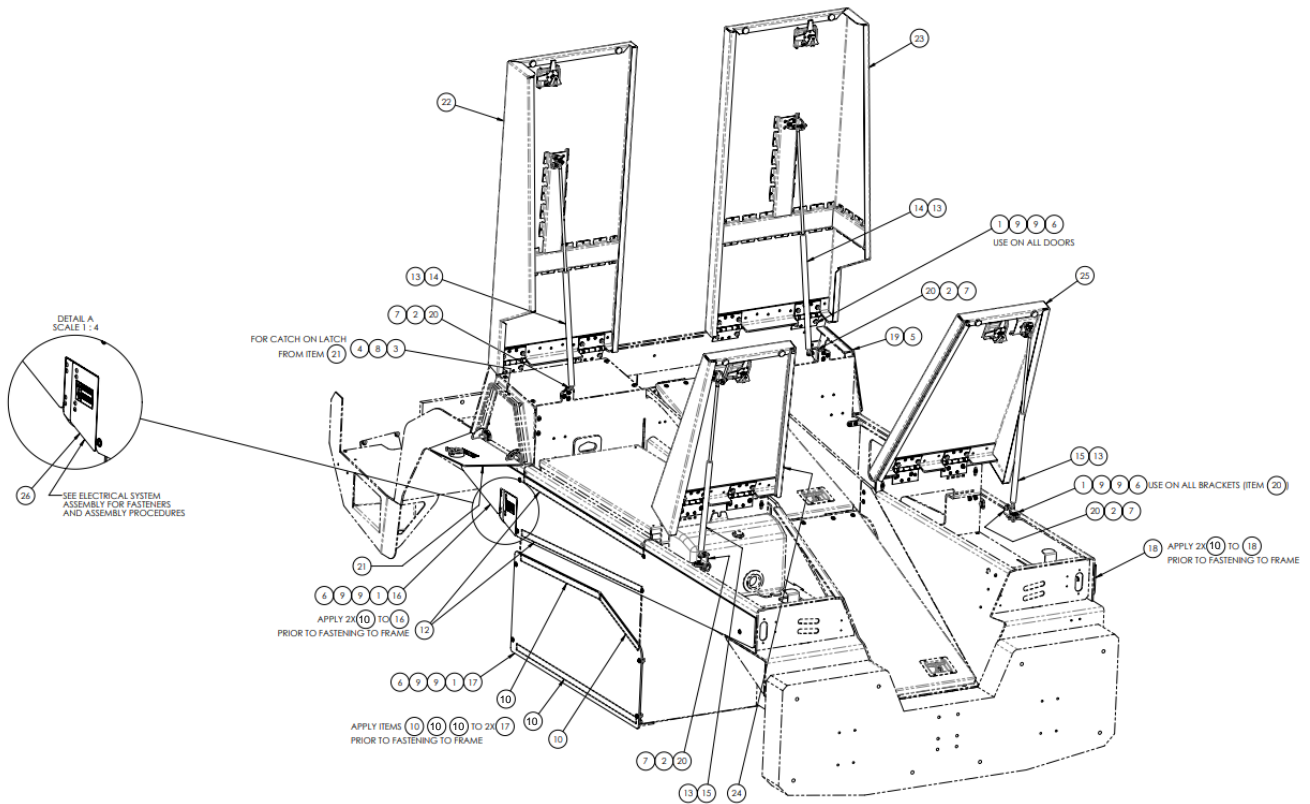


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	Z-11872-00	WELD, REAR DOOR, RH (P)	1
2	NVSP-21-004-CA	RUBBER PRESS-IN BUMPER	2
3	G-1351-13-SS	RIVET, 5/32 OPEN-END SS	4
4	G-1250-1050N	FLATWASHER, 1/4 NARROW	11
5	326-009	BHCS, 1/4-20 x 1" LG	7
6	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	4
7	C-TT4-0012-2	T HANDLE LATCH	1
8	H-5034	HINGE	2
9	G-1439-1050-S	NUTSERT, 1/4-20 OPEN END	3
10	S-4348-00	MOUNT BRACKET (P)	1
11	394-069	BALL STUD FOR GAS SPRING	1
12	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	1
13	H-5040	PUSH-ON BULB SEAL	1

## 15.4 ASSEMBLY, ALT COLOR PANELS



### NOTE:

#### ORDER OF ASSEMBLY OF DOORS FOR EASE OF INSTALLATION:

- 1 Z-11869 ASY, REAR DOOR, LH (ASSEMBLE HYDRAULIC OIL TANK TO FRAME PRIOR TO ASSEMBLY OF THIS DOOR.)
- 2 Z-11871 ASY, REAR DOOR, RH
- 3 Z-11857 ASSY, BATTERY DOOR, LH
- 4 Z-11863 ASY, BATTERY DOOR, RH



15.4 ASSEMBLY, ALT COLOR PANELS *(continued)*

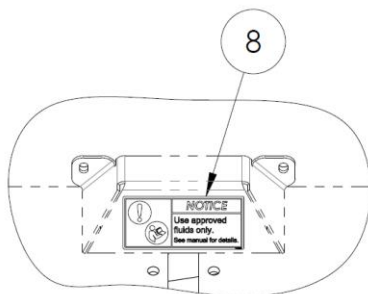
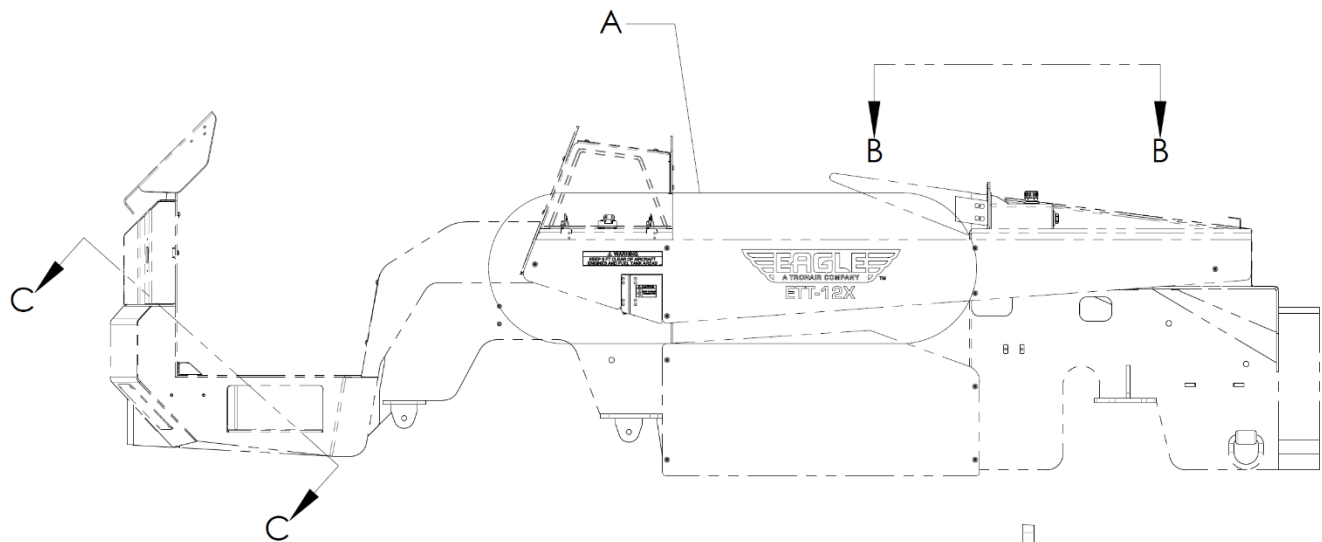
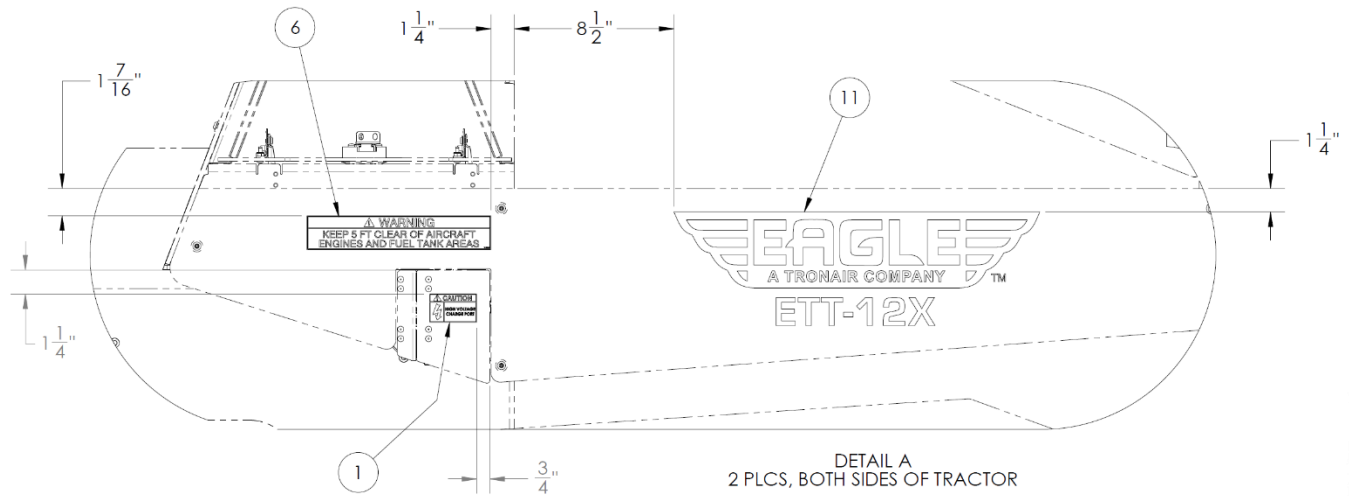
### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS, 1/4-20 x 1" LG	48
2	394-069	BALL STUD FOR GAS SPRING	4
3	G-1154-102204	SCREW, #8-32 X .50" LG. SOC BUTT. HD CAP	2
4	G-1202-1020	STOPNUT, #8-32 ELASTIC	2
5	G-1202-1035	STOPNUT, #10-32 ELASTIC	4
6	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	40
7	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	4
8	G-1250-1020N	FLATWASHER. #8 NARROW	2
9	G-1250-1050N	FLATWASHER, 1/4 NARROW	88
10	H-1204-10	TAPE, NEOPRENE FOAM SEALING	As Needed
13	H-4652	END FITTING FOR GAS SPRING	8
14	H-4950	GAS SPRING	2
15	H-5031	GAS SPRING	2
16	J-7973-00	UPPER SIDE ARMOR, LH (P)	1
17	J-7974-00	LOWER SIDE ARMOR (P)	2
18	J-7975-00	UPPER SIDE ARMOR, RH (P)	1
19	J-8041-00	ELECTRICAL FAUX DOOR (P)	1
20	S-4348-00	MOUNT BRACKET (P)	4
21	Refer above section	STORAGE DOOR SUB	1
22	Refer above section	ASSY, BATTERY DOOR, LH	1
23	Refer above section	ASY, BATTERY DOOR, RH	1
24	Refer above section	ASY, REAR DOOR, LH	1
25	Refer above section	ASY, REAR DOOR, RH	1
26	Refer above section	ASY, CHARGE JACK SUB	1

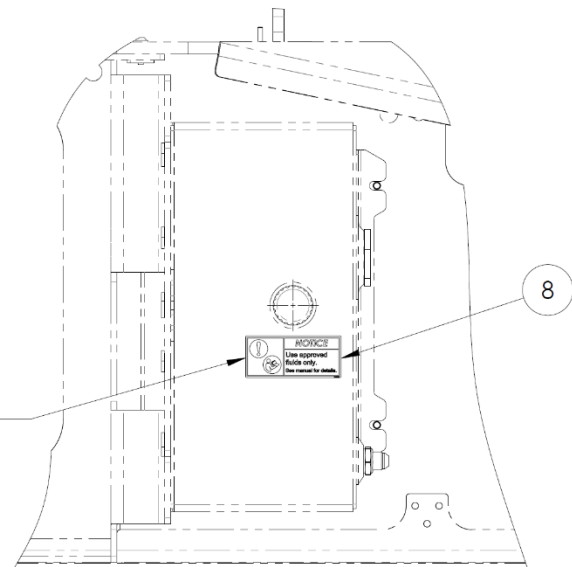
## 16.0 ASSEMBLY, DECALS & LABELS

### 16.1 ASSEMBLY, DECALS & LABELS



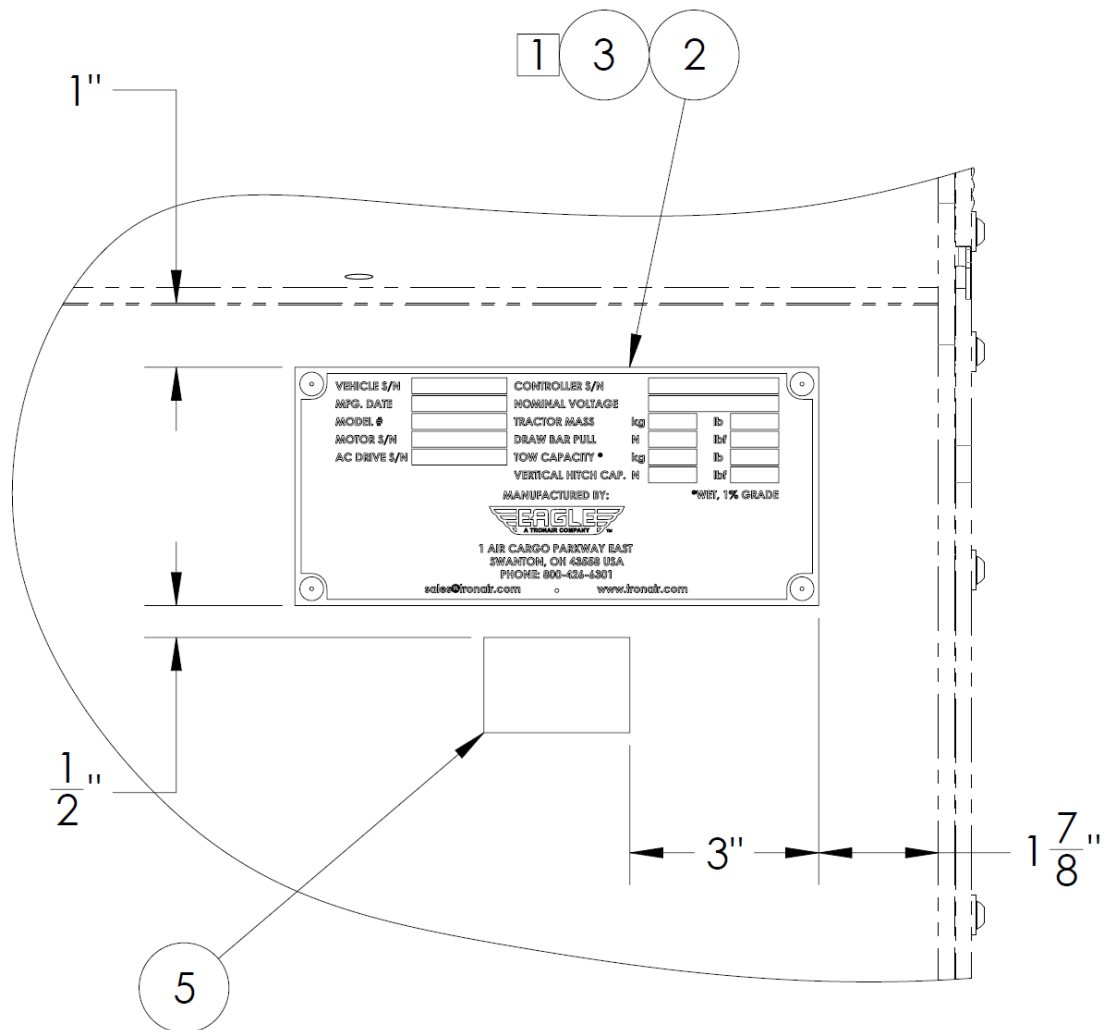
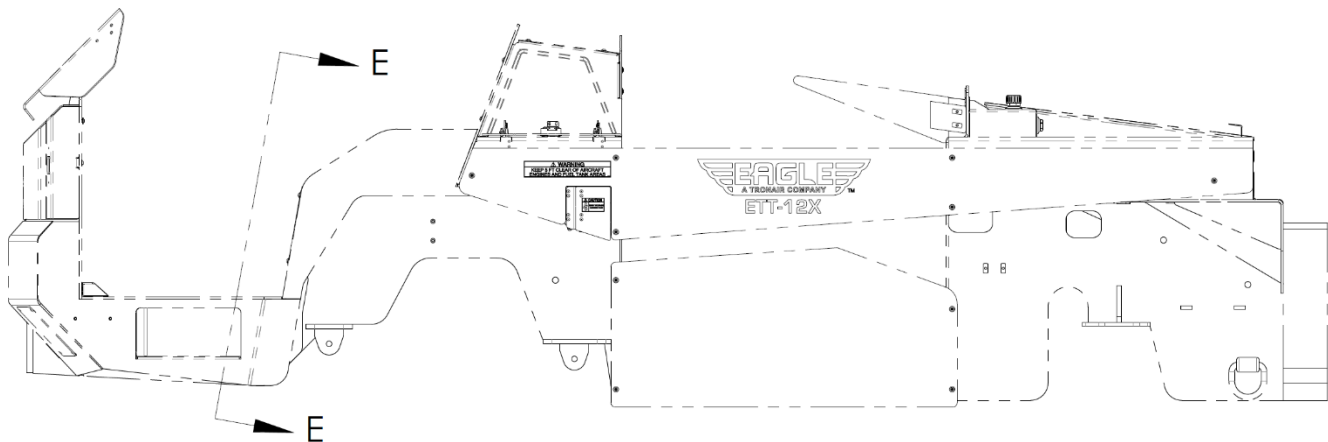
SECTION C-C

LOCATE ADJACENT TO  
FILL PORT AS SHOWN



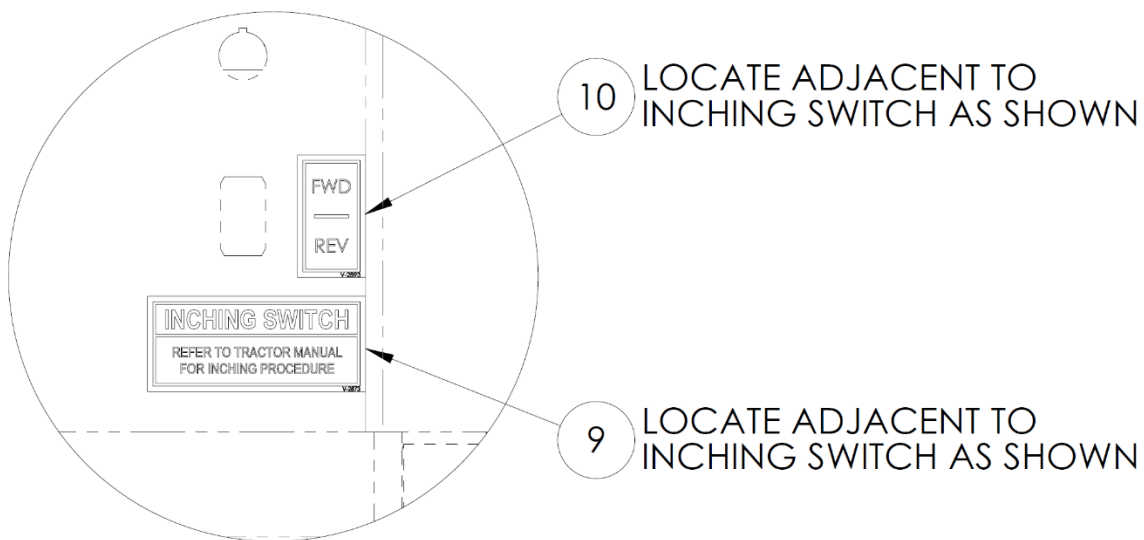
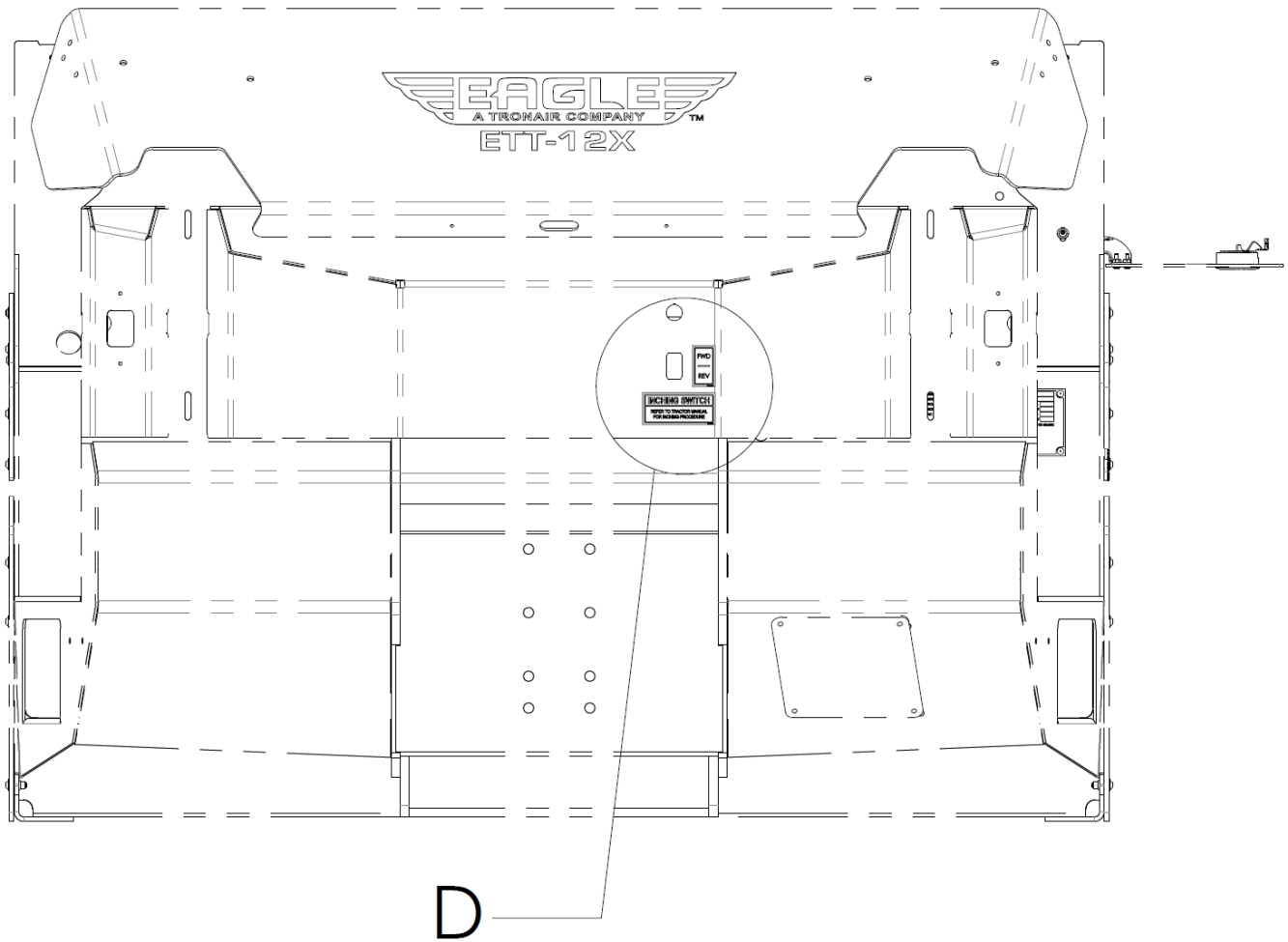
SECTION B-B

16.1 ASSEMBLY, DECALS & LABELS (continued)



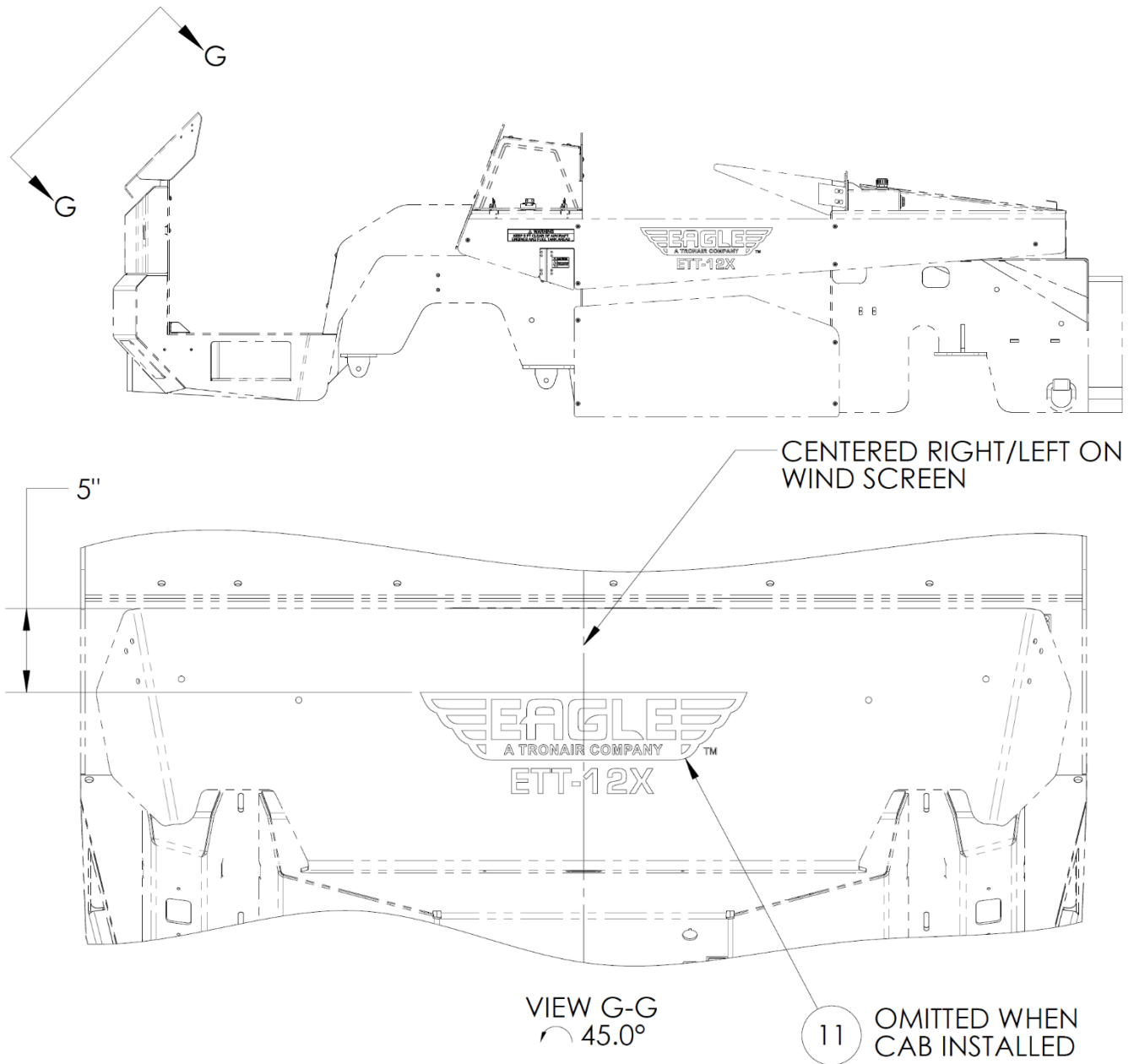
SECTION E-E

16.1 ASSEMBLY, DECALS & LABELS (*continued*)

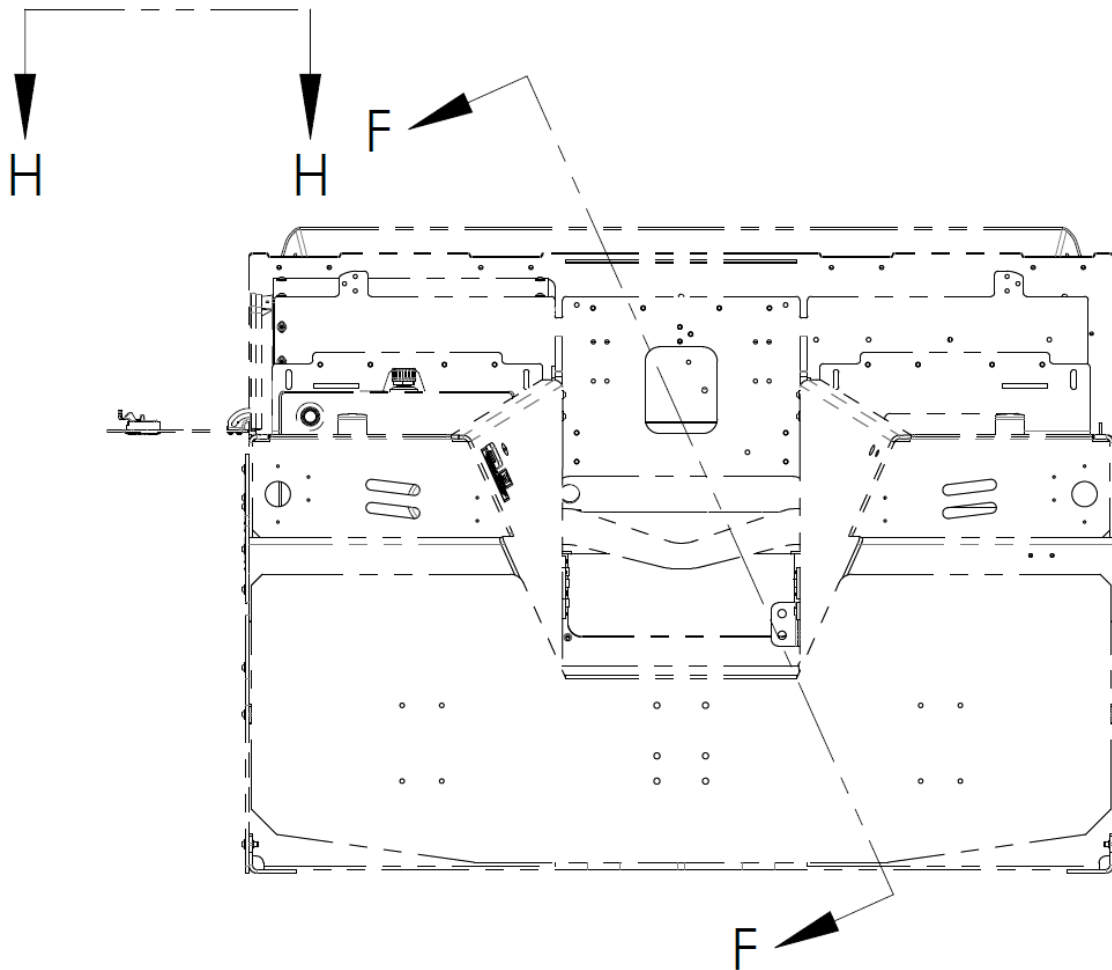


DETAIL D

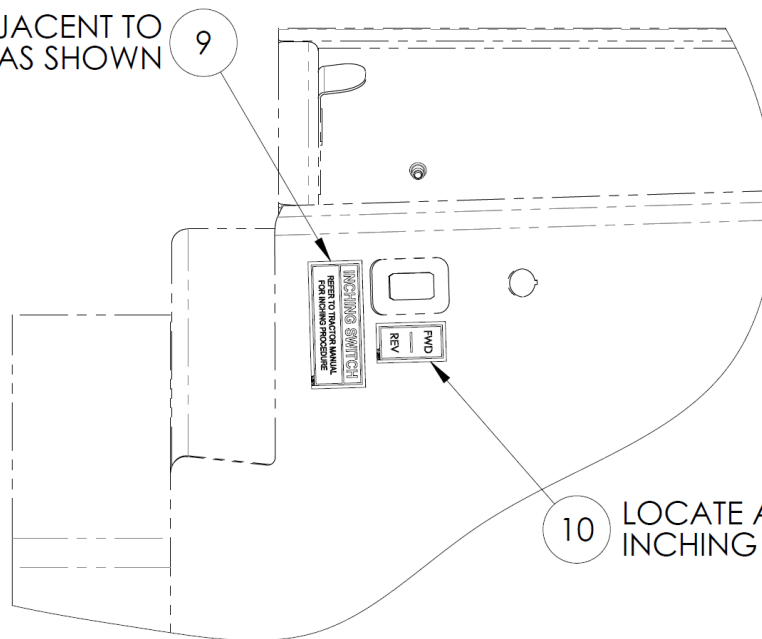
16.1 ASSEMBLY, DECALS & LABELS (*continued*)



16.1 ASSEMBLY, DECALS & LABELS (*continued*)



LOCATE ADJACENT TO  
INCHING SWITCH AS SHOWN

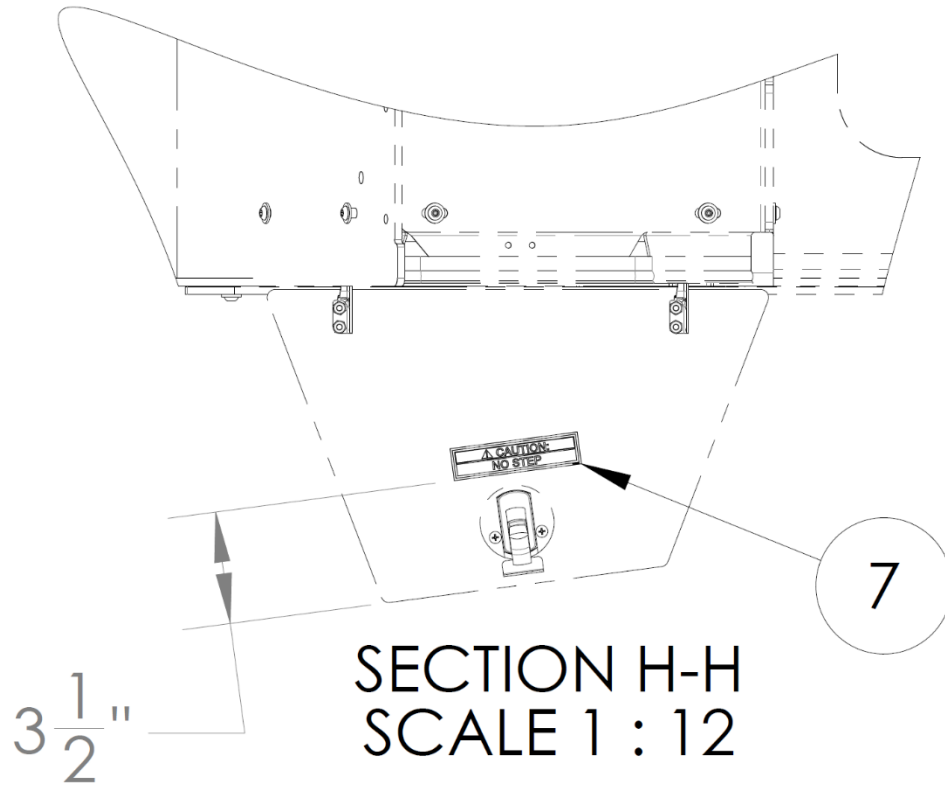


LOCATE ADJACENT TO  
INCHING SWITCH AS SHOWN

SECTION F-F  
SCALE 1 : 6



16.1 ASSEMBLY, DECALS & LABELS (*continued*)





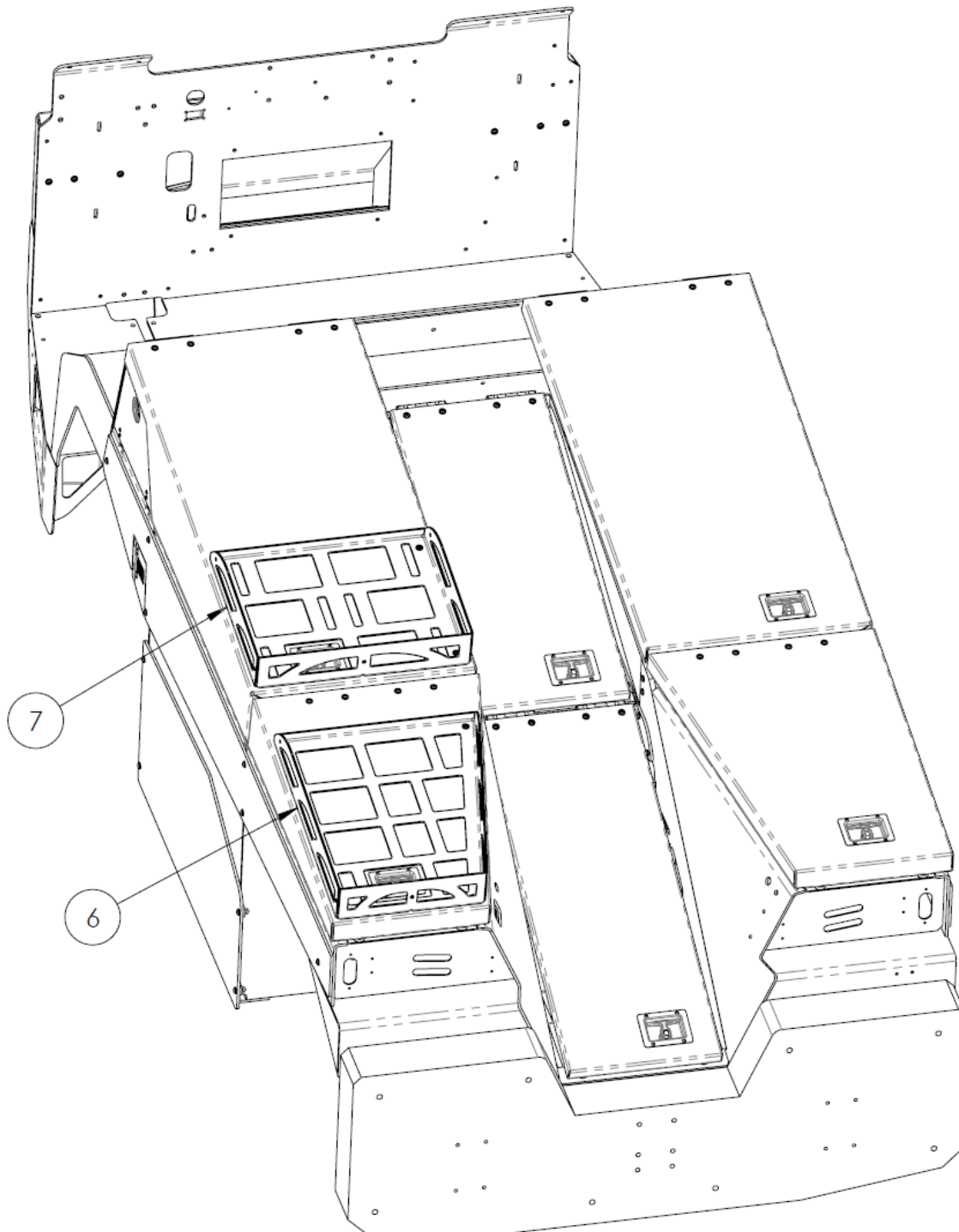
16.1 ASSEMBLY, DECALS & LABELS *(continued)*

**Parts List**

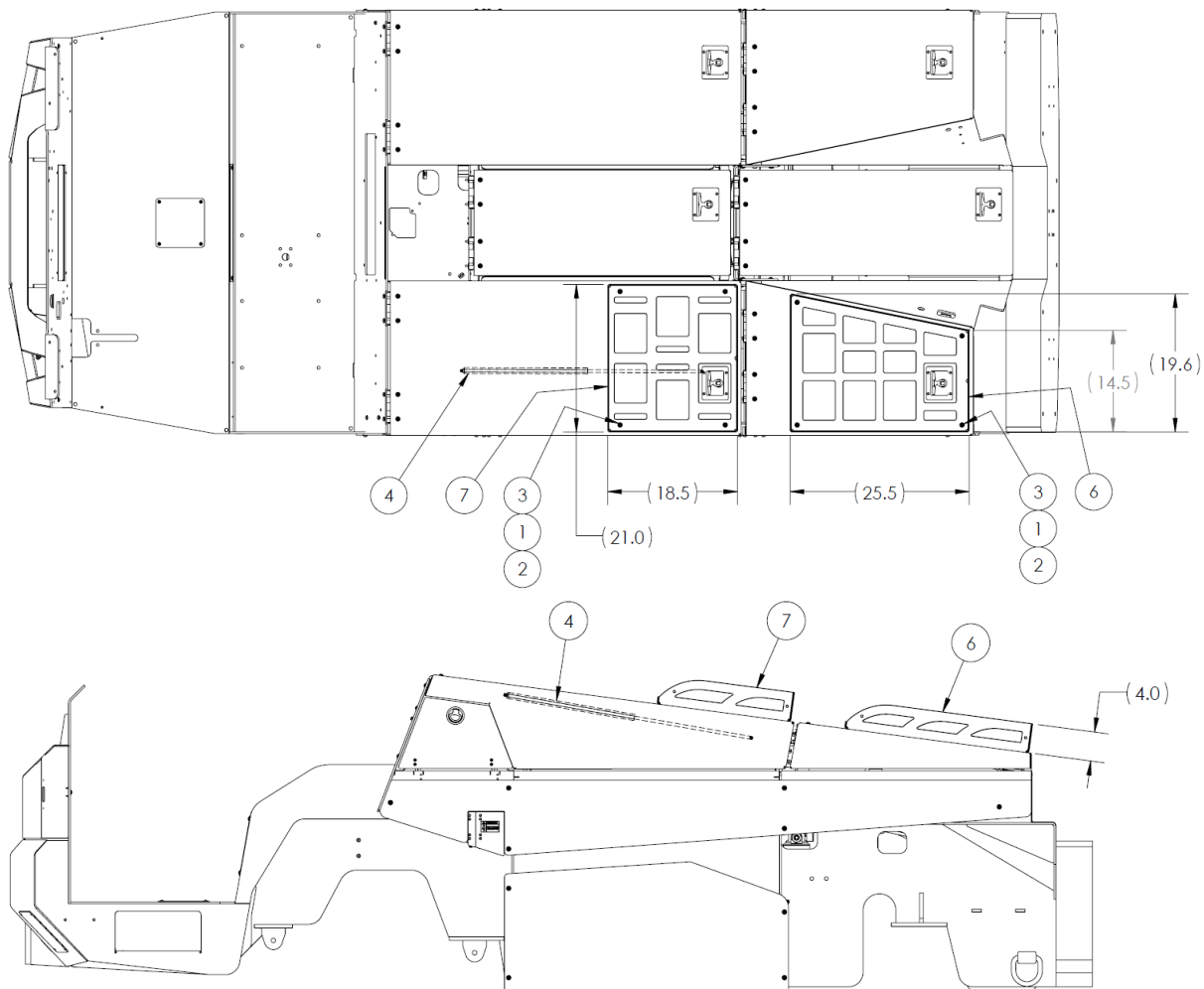
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	A-ETT12-00494	ETT12 BATTERY CHARGE DECAL	1
2	ET00-14-005-SA	DATA PLATE - ETT AND MTT	1
3	G-1351-26-SS	RIVET, 3/16 X .501-.625 OPEN-END SS	4
4	INS-2731	INS, ELECTRIC TUGS DATA PLATES	1
5	V-1001	LABEL, MADE IN USA	1
6	V-1814	LABEL, WARNING KEEP 5 FT	2
7	V-2545	LABEL, NO STEP	1
8	V-2745	LABEL, APPROVED FLUIDS NOTICE	2
9	V-2873	LABEL, INCHING SWITCH	2
10	V-2893	FWD/REV DECAL	2
11	V-2942	TRACTOR DECAL, ETT-8X	3
	V-2943	TRACTOR DECAL, ETT-12X	

17.0 ETT-8X &-12X FEATURES AND OPTIONS



## 17.0 ETT-8X &-12X FEATURES AND OPTIONS (continued)



### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS 1/4-20 X 1" LG	8
2	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	8
3	G-1250-1050N	FLATWASHER, 1/4 NARROW	16
5	H-5069	GAS SPRING	1
6	S-4378-00	CHOCK BASKET, LEFT REAR	1
7	S-4379-00	CHOCK BASKET, FRONT	1

### CHARGER PREPARATION

On the following pages are the charging kit preparations information for the following options.

Chock Basket - REF. INS-2778

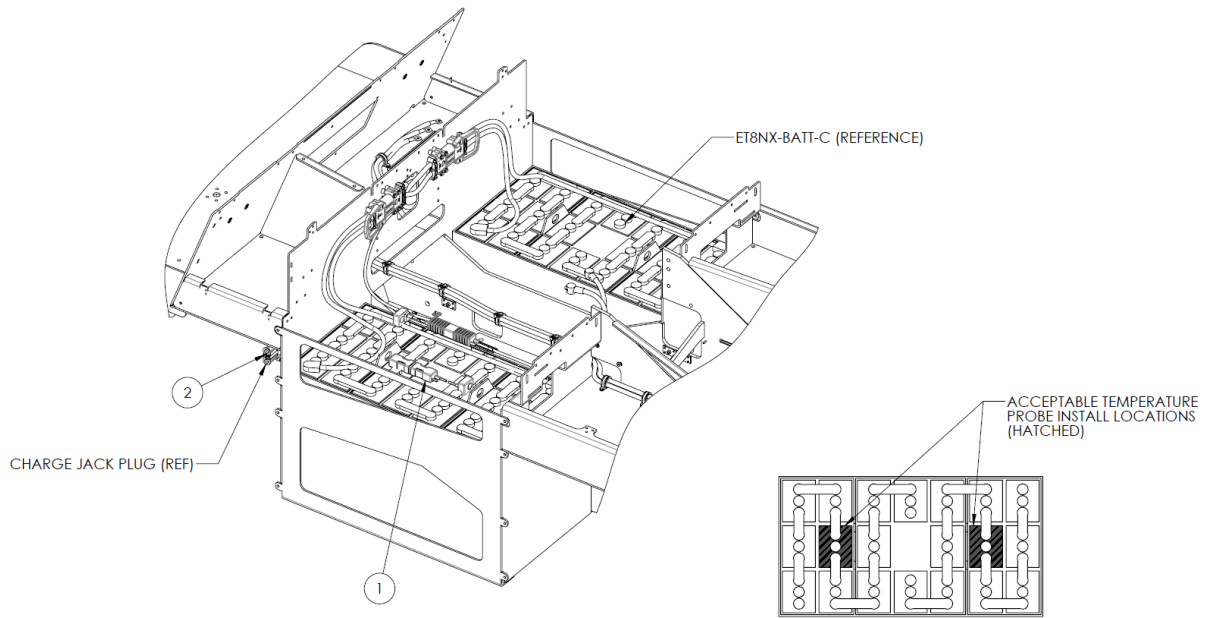
17.1 OPTION A – CHARGER COMPAT KIT, GECI

DESCRIPTION:

Charger compatibility kit for GECI brand chargers including EC-3301-XXX-XXX AND OPT-NVSP-052-A. This kit is required for the truck to be compatible and usable with the charger.

COMPATIBILITY NOTES:

Only applicable to lead-acid battery Option ET8NXBATT-C



### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	OPT-NVSP-053-A	BATTERY CHARGER MODULE, GECI	1
2	Z-11273	KIT, CHARGER COMPAT, AMTK/GECI	1

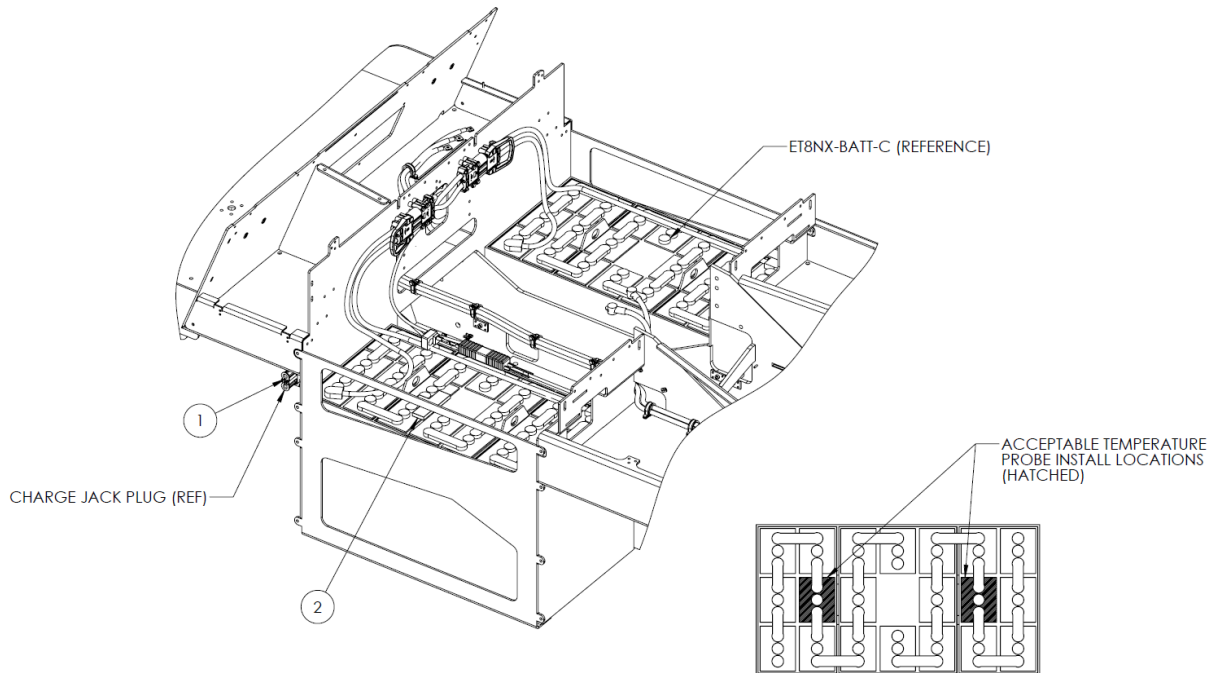
## 17.2 OPTION B – CHARGER COMPAT KIT, AMTK

### DESCRIPTION:

Charger compatibility kit for Ametek brand chargers including battery mate, Ultracharge, and Ultramax chargers. This kit is required for the truck to be compatible and usable with the charger.

### COMPATIBILITY NOTES:

Only applicable to lead-acid battery Option ET8NXBATT-C

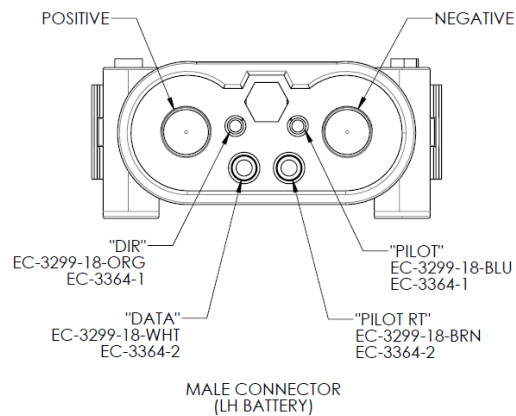
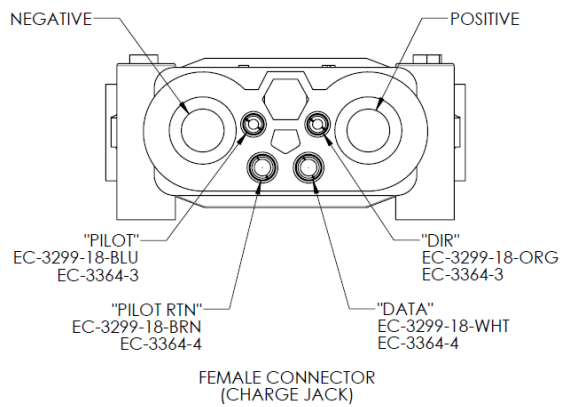
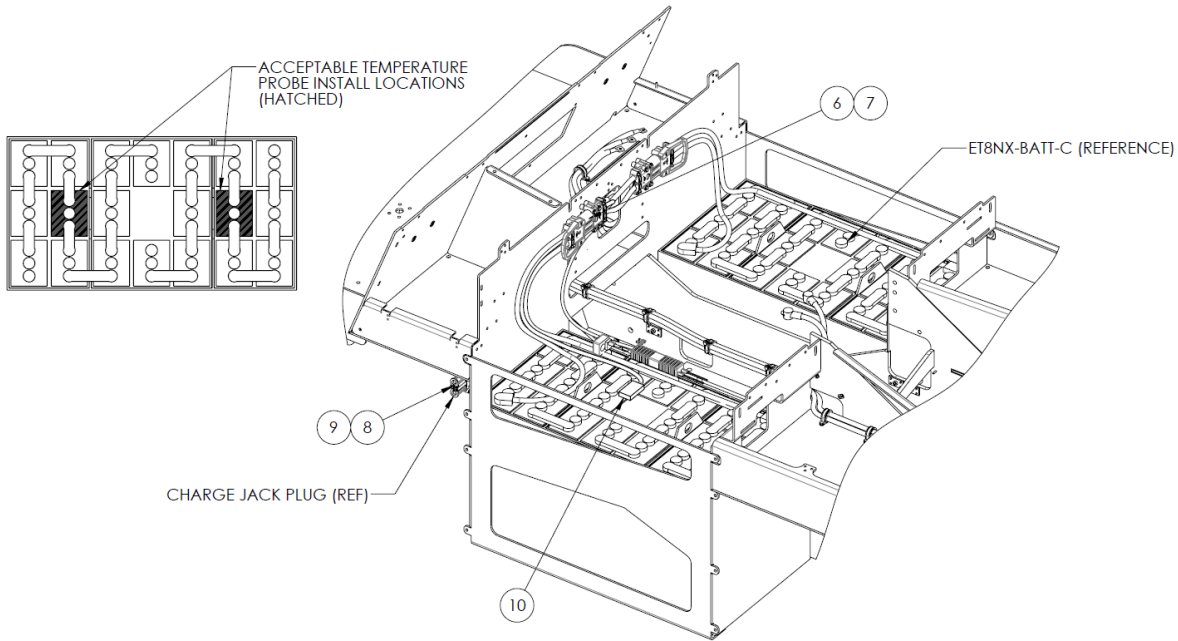


## Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	Z-11273	KIT, CHARGER COMPAT, AMTK/GECI	1
2	OPT-NVSP-009-B	BID, AMETEK BRAND CHARGERS	1

17.2 OPTION B – CHARGER COMPAT KIT, AMTK (continued)



FEMALE CONNECTOR (CHARGE JACK)		1 2 3 4 5	MALE CONNECTOR (LH BATTERY CONNECTOR)	
DESC.	TERMINAL P/N		DESC.	TERMINAL P/N
PILOT	EC-3364-3		PILOT	EC-3364-1
DIR	EC-3364-3		DIR	EC-3364-1
PILOT RTN	EC-3364-4		PILOT RTN	EC-3364-2
DATA	EC-3364-4		DATA	EC-3364-2

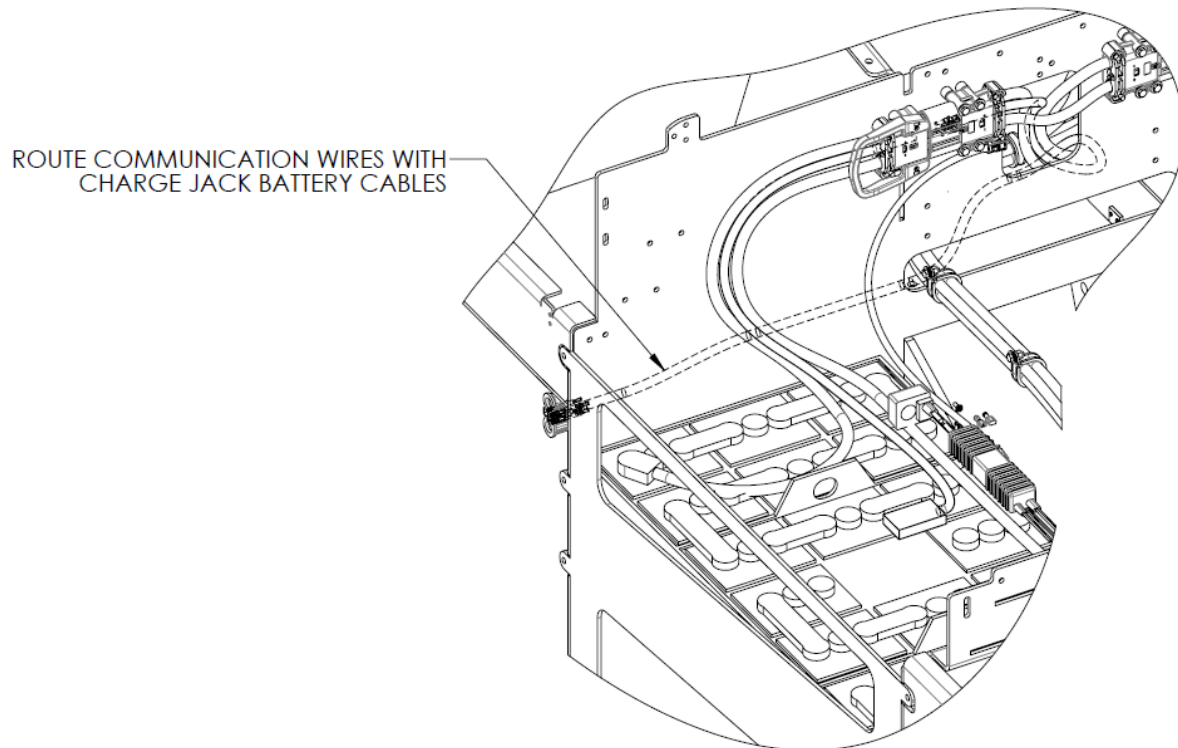
### 17.3 OPTION C – CHARGER COMPAT KIT, SVS

**DESCRIPTION:**

Charger compatibility kit for Webasto SVS and DVS series chargers. This kit is required for the truck to be compatible and usable with the charger.

**COMPATIBILITY NOTES:**

Only applicable to lead-acid battery option ET8NXBATT-C.



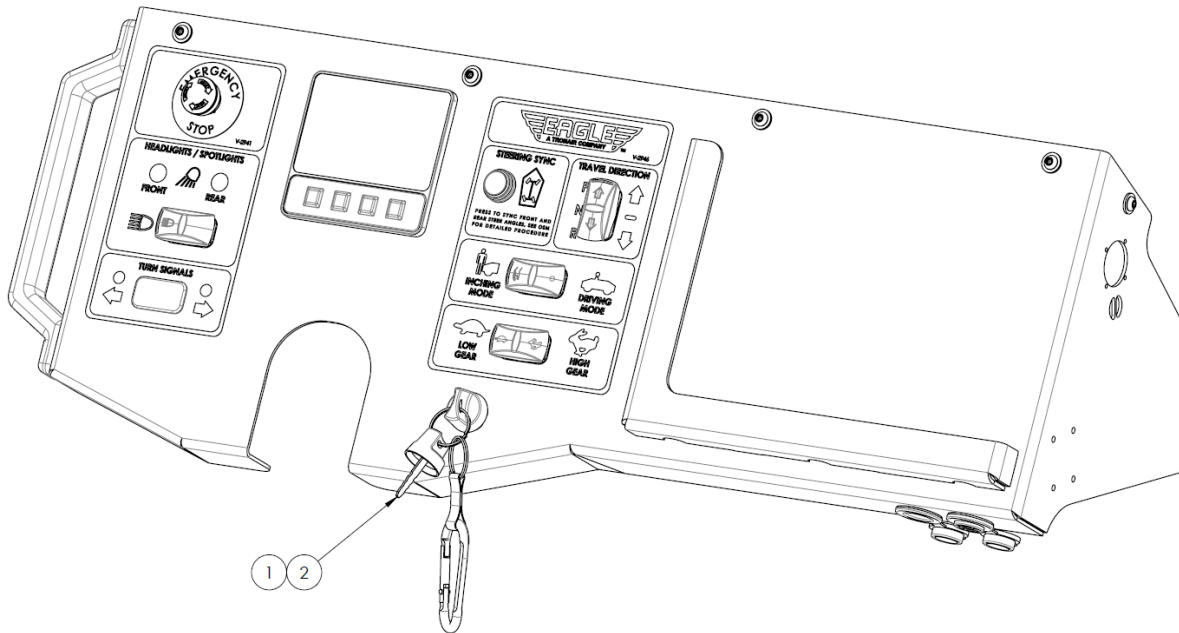
## Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	12050	SPLIT LOOM, 3/8"	60"
2	EC-3299-18-BLU	TXL WIRE, 18 AWG, BLUE	60"
3	EC-3299-18-BRN	TXL WIRE, 18 AWG, BROWN	60"
4	EC-3299-18-ORG	TXL WIRE, 18 AWG, ORANGE	60"
5	EC-3299-18-WHT	TXL WIRE, 18 AWG, WHITE	60"
6	EC-3364-1	EURO AUX TERMINAL - PIN UPPER	2
7	EC-3364-2	EURO AUX TERMINAL - PIN LOWER	2
8	EC-3364-3	EURO AUX TERMINAL - SOCKET UPPER	2
9	EC-3364-4	EURO AUX TERMINAL - SOCKET LOWER	2
10	OPT-NVSP-009-A	BMID, FOR SVS/DVS CHARGERS	1
N/S	INS-2803	INSTRUCTIONS, BMID INSTALL	1



18.0 IGNITION FEATURE  
18.1 OPTION A – KEYED IGNITION

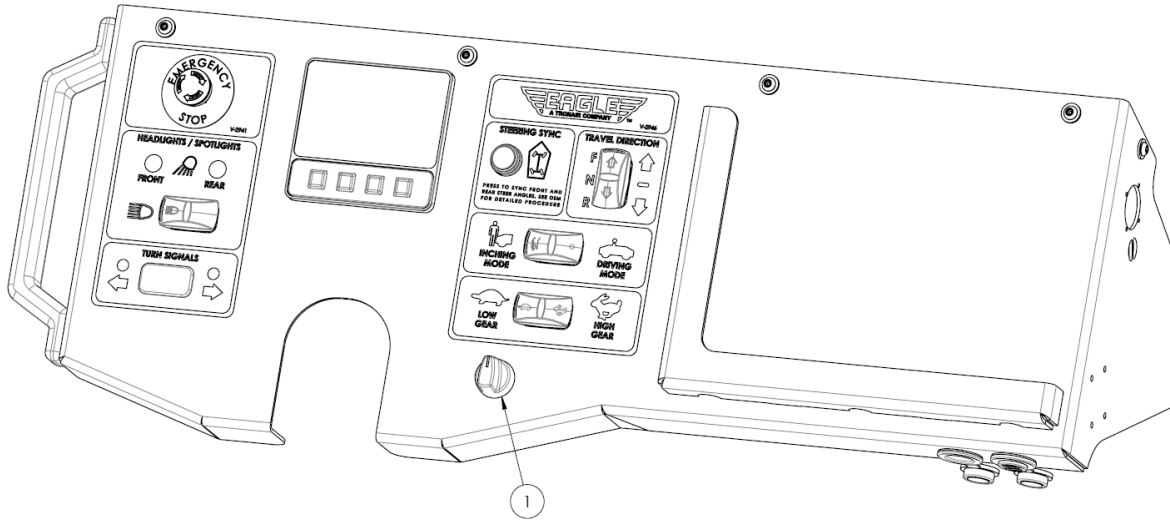


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	H-4725	CARABINER, EAGLE KEYCHAIN	1
2	NVSP-05-005-CA	IGNITION SWITCH, 3-POS, KEYED	1

## 18.2 OPTION B – KEYLESS IGNITION



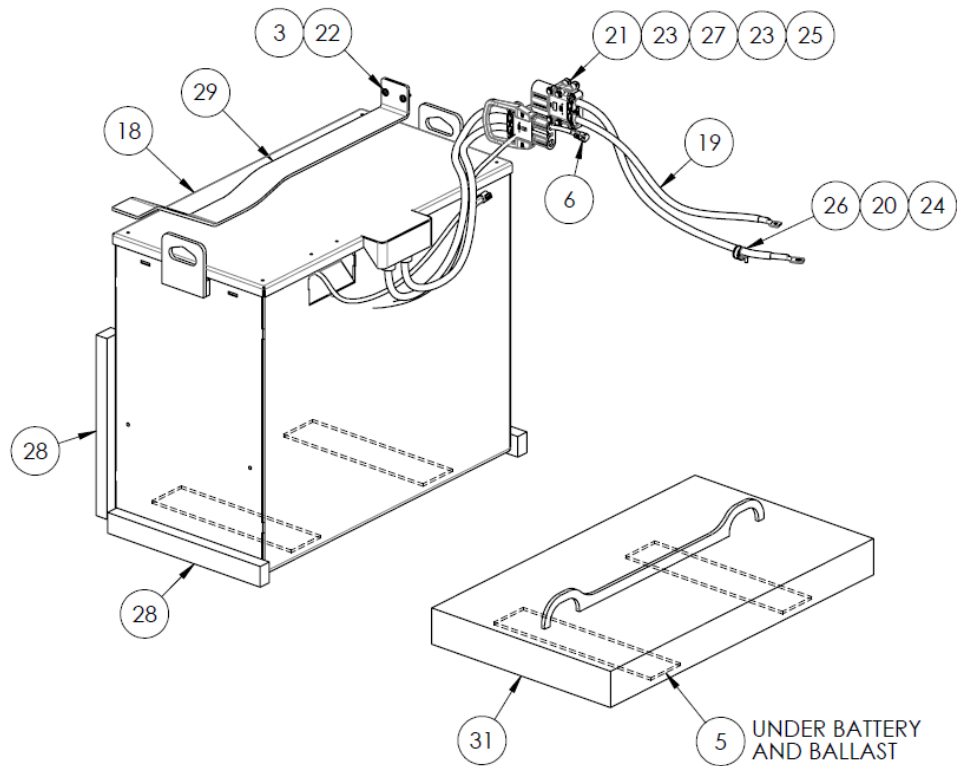
### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

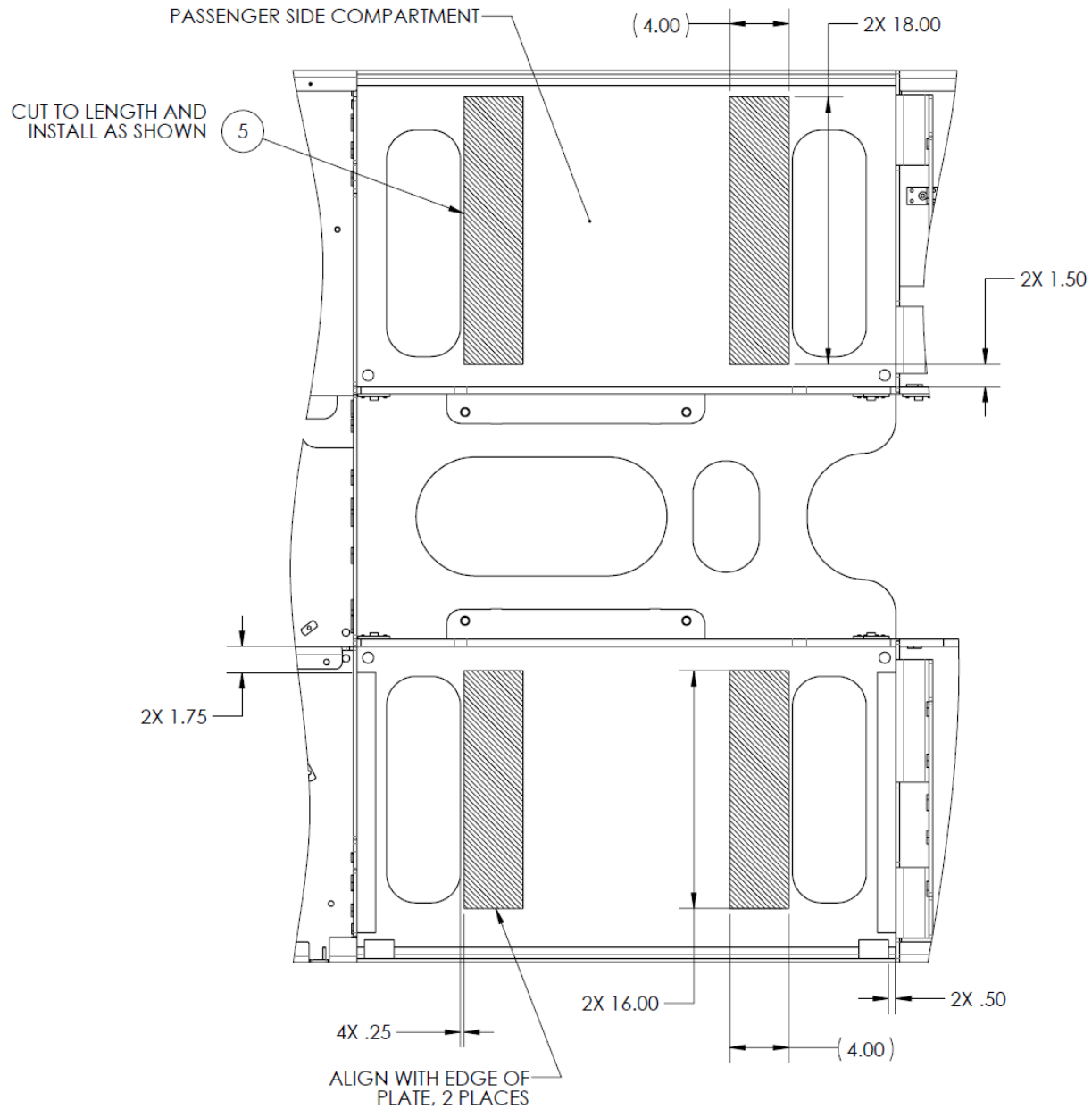
Item	Part Number	Description	Qty
1	NVSP-05-005-CB	KEYLESS IGNITION SWITCH, 3 POS	1

## 19.0 BATTERY FEATURE

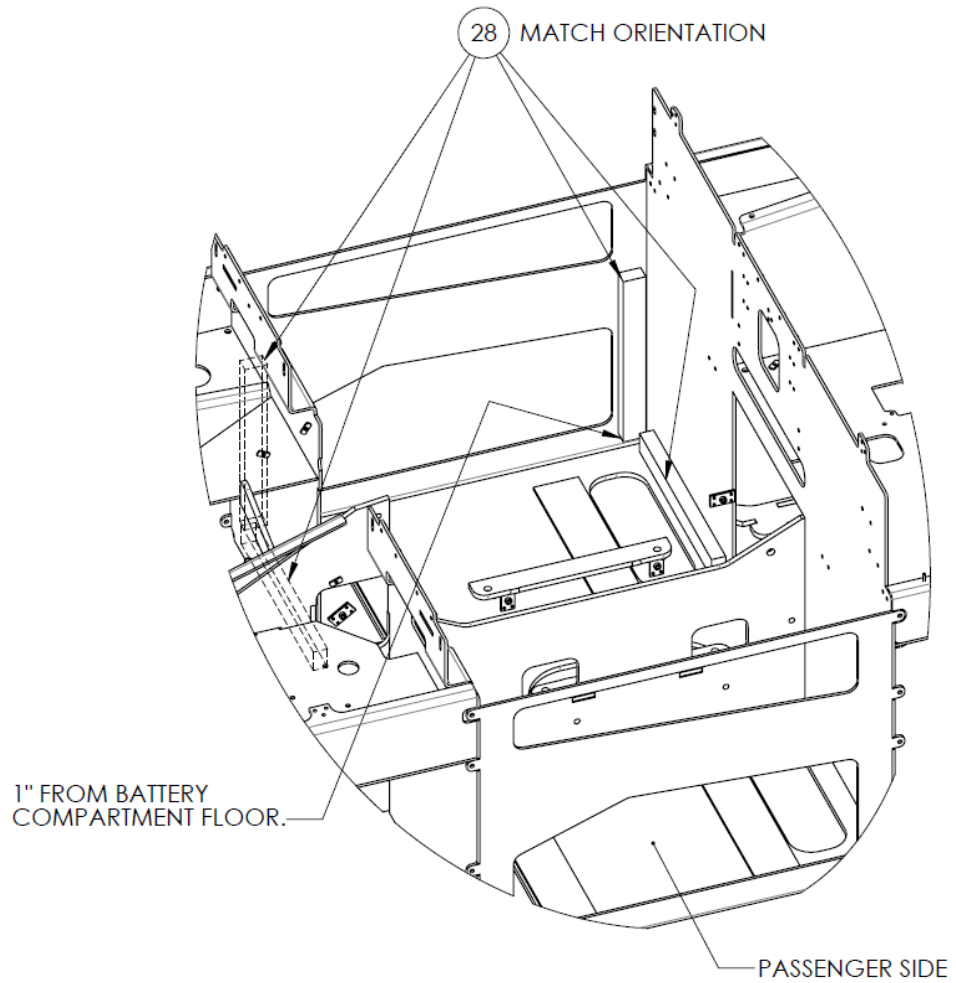
### 19.1 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-8X



19.1 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-8X (continued)

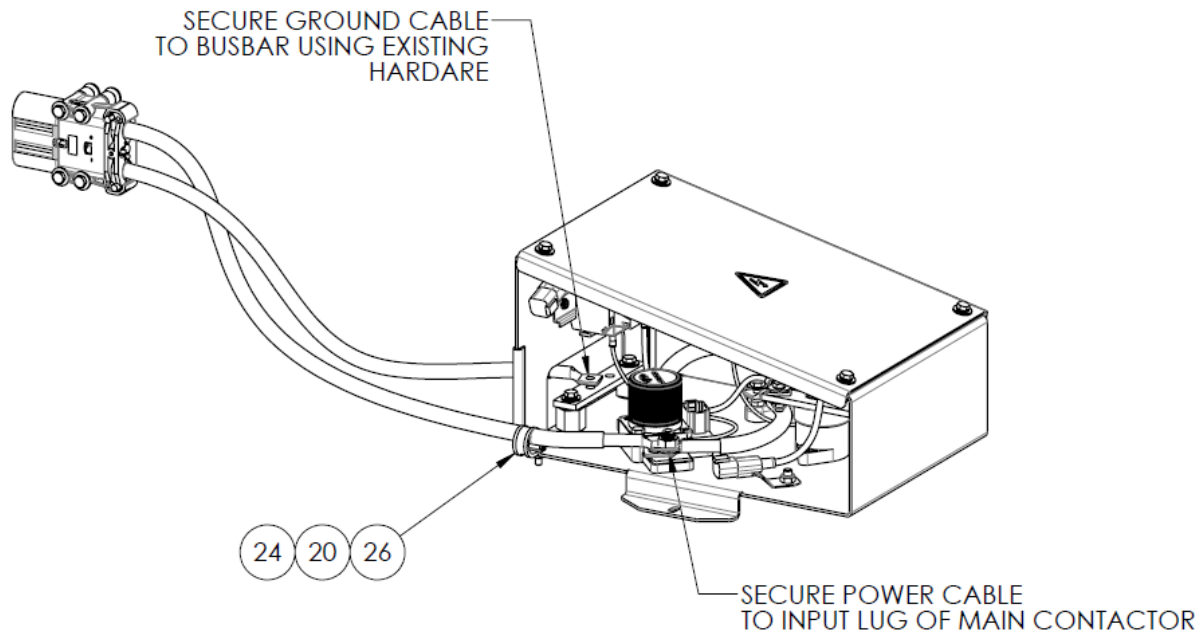


19.1 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-8X (continued)

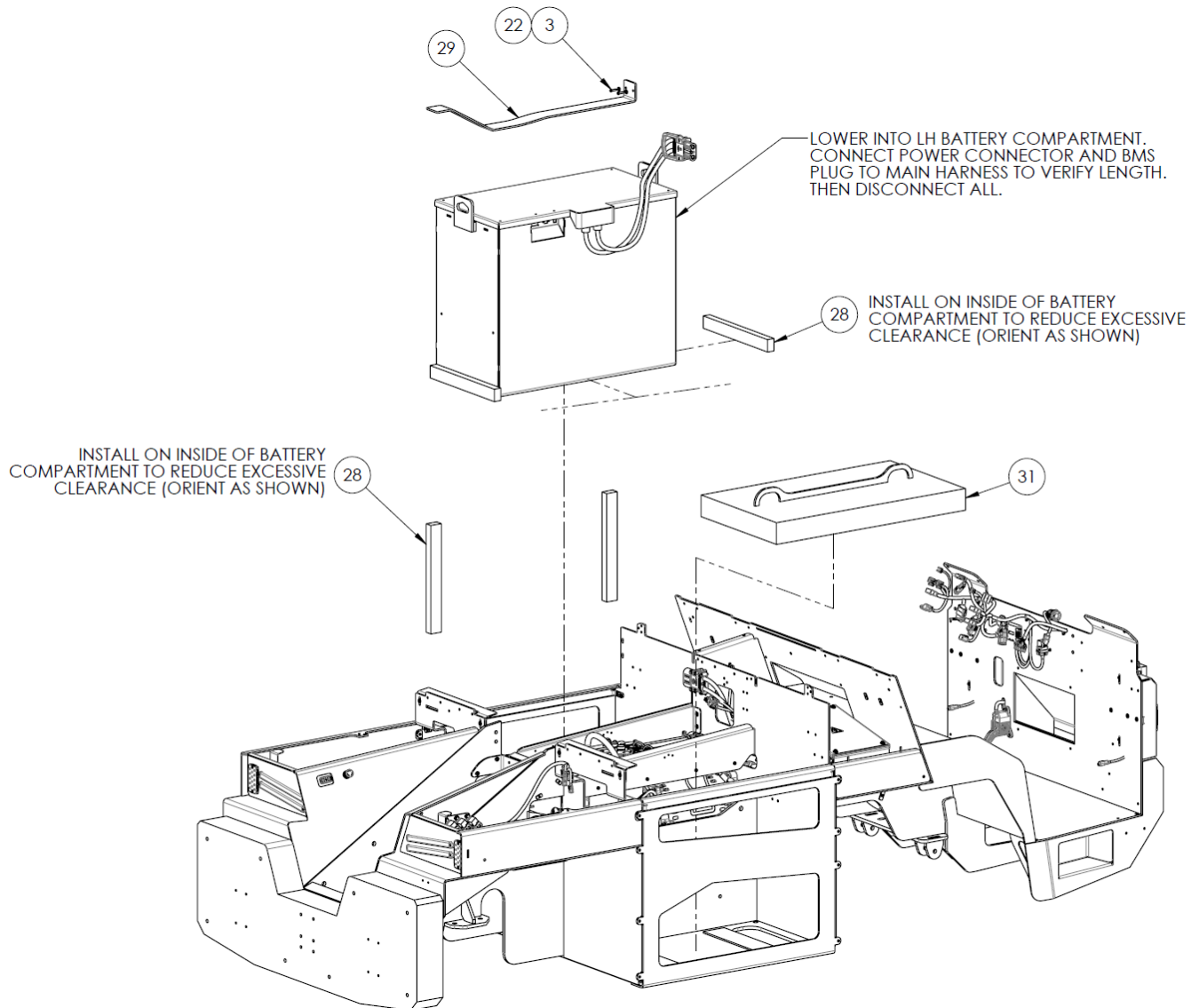


NOTE: SECURE ALL SPACERS WITH 2 SIDED TAPE AT THE LOCATIONS SHOWN ABOVE.

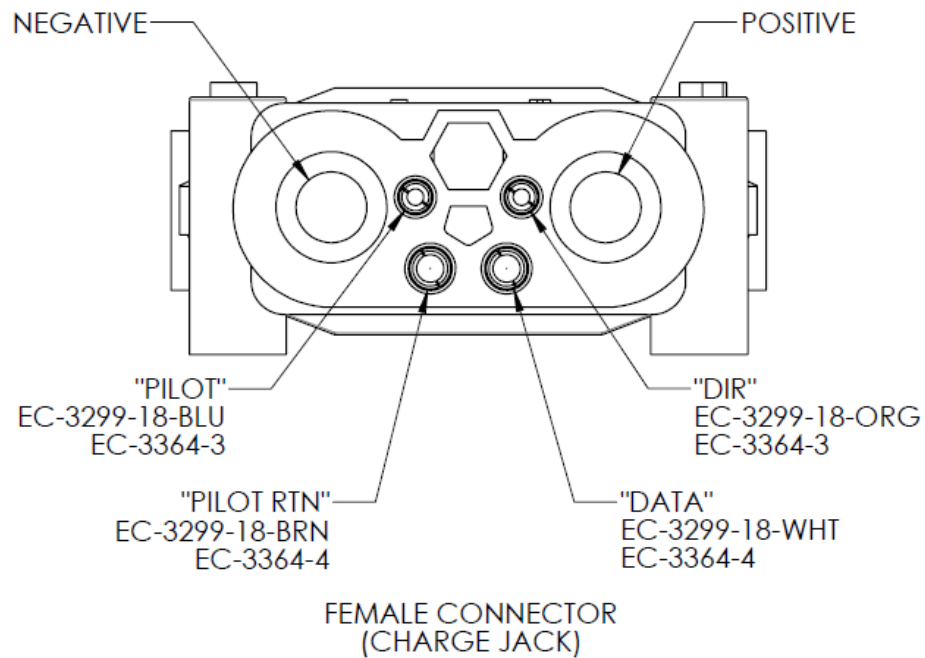
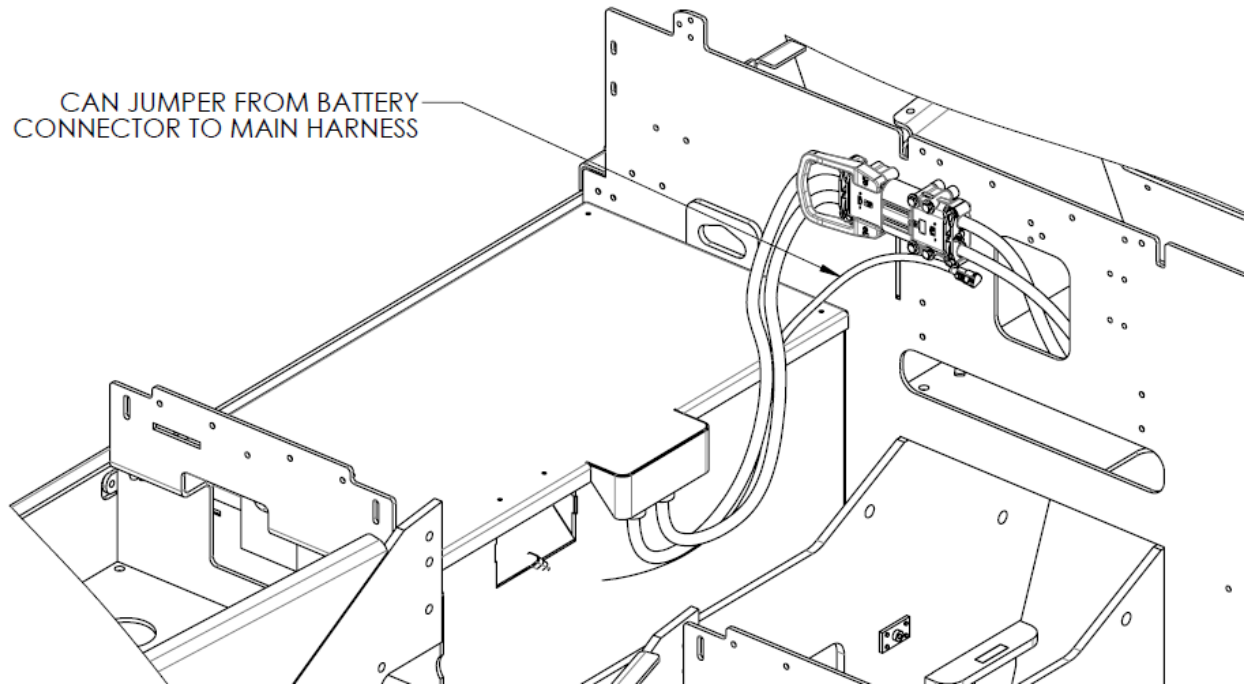
19.1 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-8X (continued)



19.1 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-8X (continued)

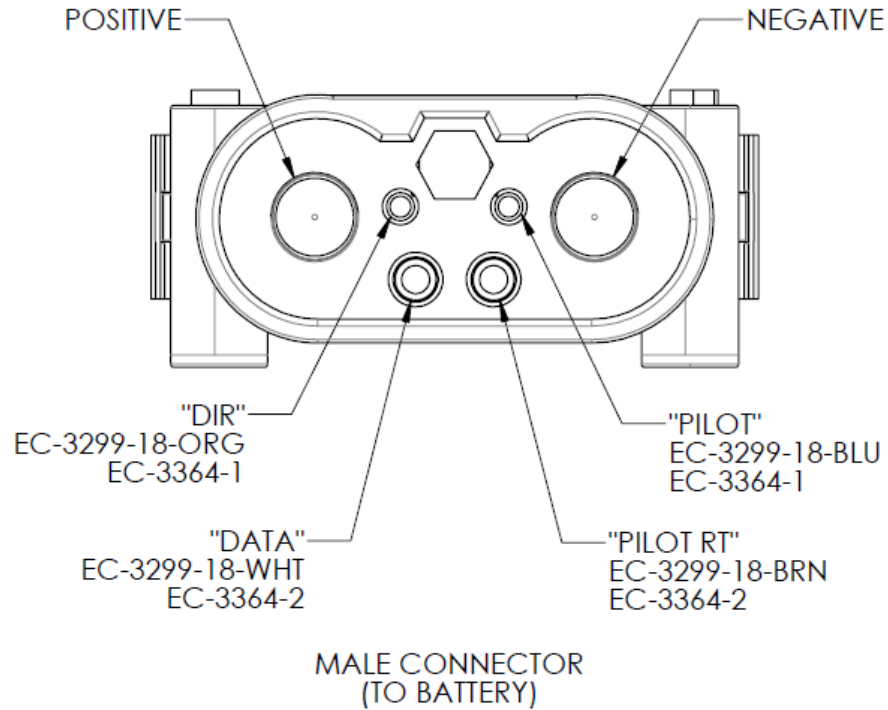


19.1 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-8X (continued)





19.1 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-8X (continued)



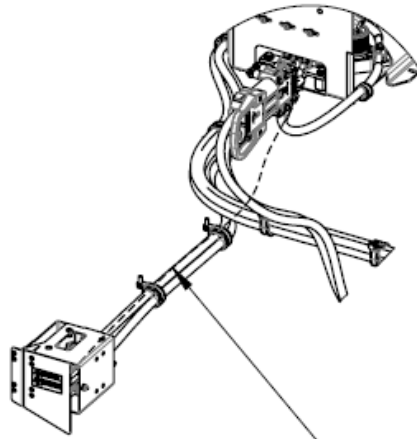
FEMALE CONNECTOR (CHARGE JACK)	
DESC.	TERMINAL P/N
PILOT	EC-3364-3
DIR	EC-3364-3
PILOT RTN	EC-3364-4
DATA	EC-3364-4

EC-3299-18-BLU (BLUE, 18AWG), 58" LONG  
EC-3299-18-ORG (ORANGE, 18AWG) 58" LONG  
EC-3299-18-BRN (BROWN, 18AWG) 58" LONG  
EC-3299-18-WHT (WHITE, 18AWG) 58" LONG

MALE CONNECTOR (BATTERY CONNECTOR)	
DESC.	TERMINAL P/N
PILOT	EC-3364-1
DIR	EC-3364-1
PILOT RTN	EC-3364-2
DATA	EC-3364-2

CHARGER COMMUNICATION LEAD

19.1 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-8X (continued)



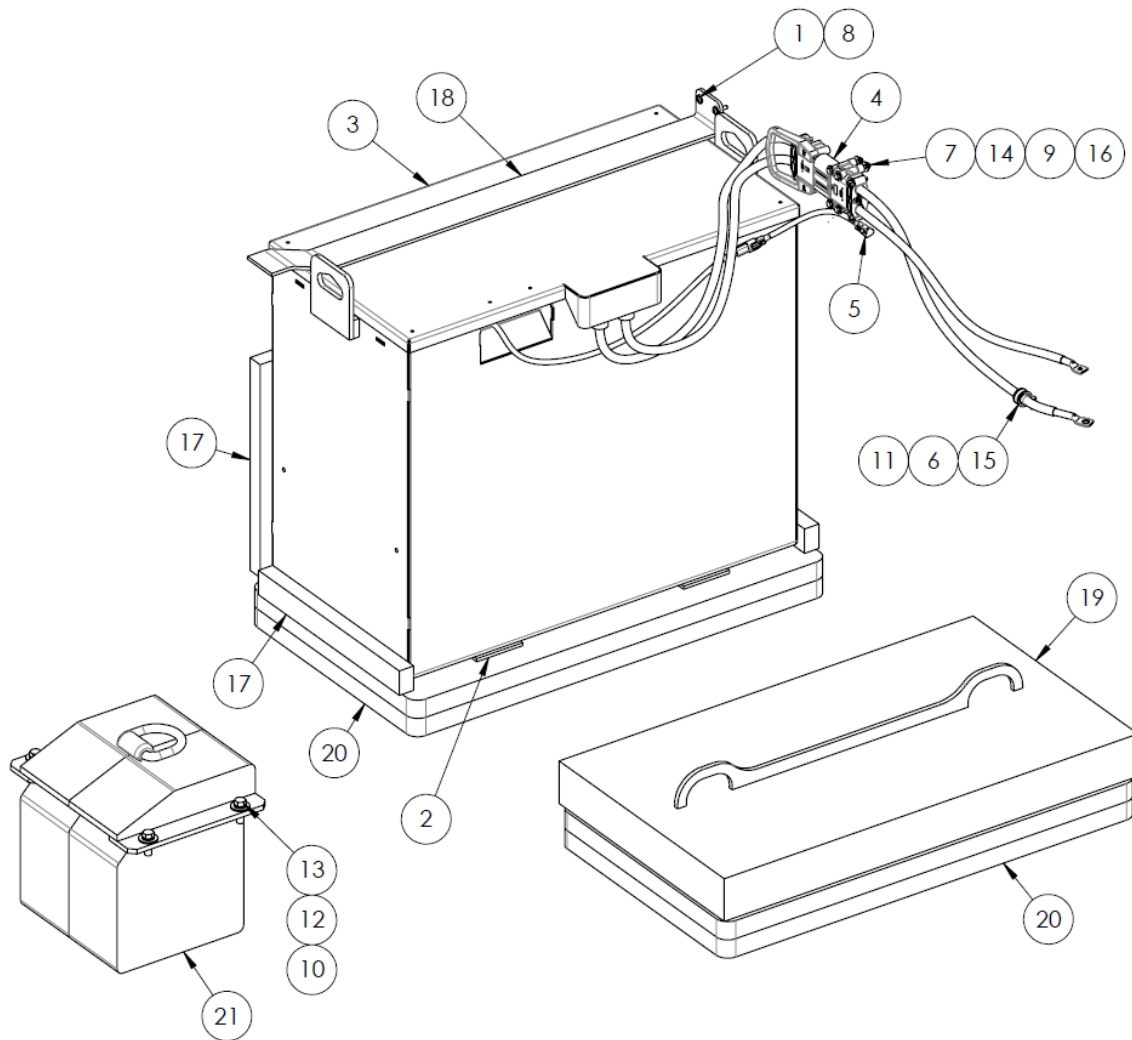
RUN COMMUNICATION WIRES FROM CHARGE JACK CONNECTOR, TO TRUCK SIDE OF BATTERY CONNECTOR. SEE INCLUDED SCHEMATIC.

### Parts List

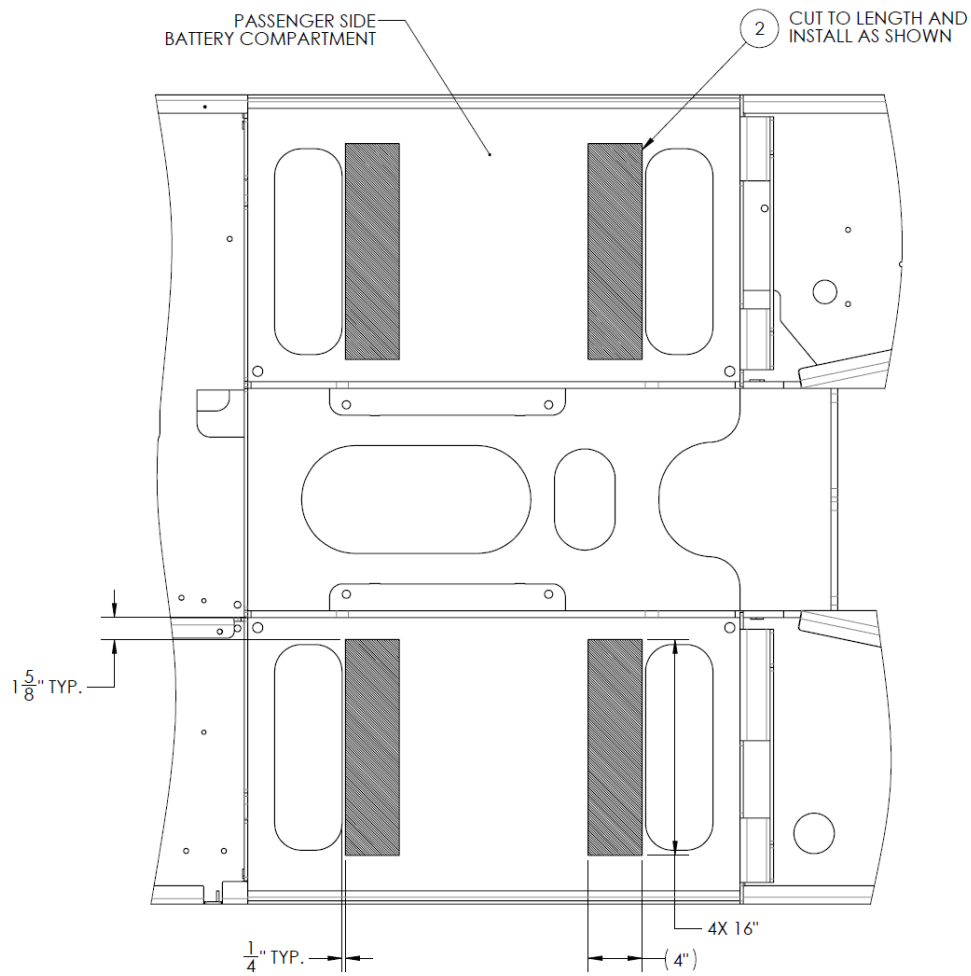
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>K-5503</b>	<b>KIT, BATTERY LI 315 AH:</b> consist of;	
1	0462-209-16141	DEUTSCH SOCKET	6
2	12050	SPLIT POLYLOOM 3/8	92"
3	326-009	BHCS, 1/4-20 X 1" LG	2
5	A-ES12-0448	RUBBER BATTERY PAD	288 in <sup>2</sup>
6	DT06-3S	DEUTSCH CONNECTOR	2
7	EC-3299-18-BLK	WIRE, TXL, 18 AWG, BLACK	12"
8	EC-3299-18-BLU	WIRE, TXL, 18 AWG, DARK BLUE	58"
9	EC-3299-18-BRN	WIRE, TXL, 18 AWG, BROWN	58"
10	EC-3299-18-GRN	WIRE, TXL, 18 AWG, GREEN	12"
11	EC-3299-18-ORG	WIRE, TXL, 18 AWG, ORANGE	58"
12	EC-3299-18-WHT	WIRE, TXL, 18 AWG, WHITE	58"
13	EC-3299-18-YEL	WIRE, TXL, 18 AWG, YELLOW	12"
14	EC-3364-1	UPPER AUXILLIARY PIN	2
15	EC-3364-2	LOWER AUXILLIARY PIN	2
16	EC-3364-3	UPPER AUXILLIARY SOCKET	2
17	EC-3364-4	LOWER AUXILLIARY SOCKET	2
18	EC-3385	TRAC BATT, 80V 315 AH LITHIUM	1
19	EC-3405	BATTERY CABLE	1
20	G-1100-105006	BOLT, 1/4-20 HEX HD GR 5	1
21	G-1100-105026	BOLT, 1/4-20 HEX HD GR 5	4
22	G-1250-1050N	FLATWASHER, 1/4 NARROW	2
23	G-1250-1050W	FLATWASHER, 1/4 WIDE	8
24	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	1
25	G-1727-1050	NUT, 1/4-20 TOP LOCK ZINC	4
26	H-3521-09	CLAMP, CUSHIONED LOOP 7/8"	1
27	H-4566-04	SPACER, 1/4 ID X 5/8 OD X 1/2	4
28	H-4918	SPACER, BATTERY – MOD	4
29	J-8484-00	HOLD DOWN, LH, 315 AH	1
30	W3S	DEUTSCH LOCK	2
31	Z-11396-00	W, SGL, LITH BALLAST, RH	1

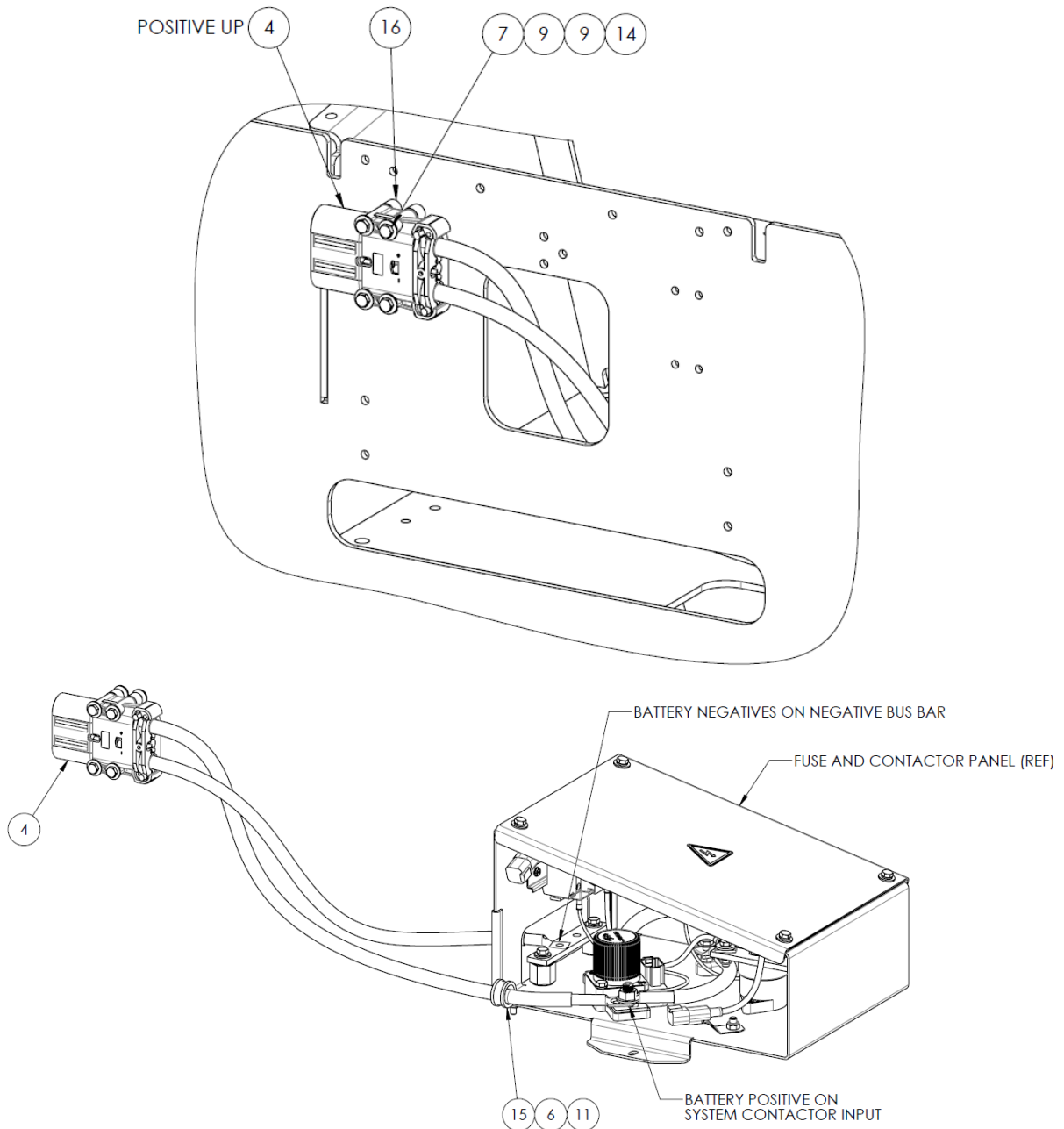
19.2 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-12X



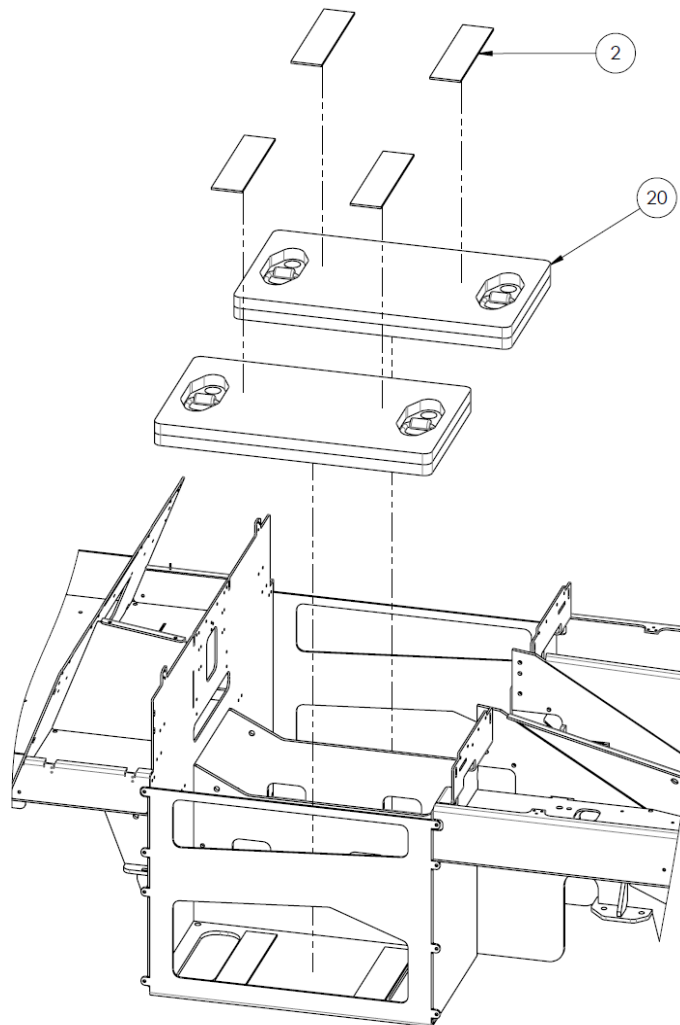
19.2 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-12X (*continued*)



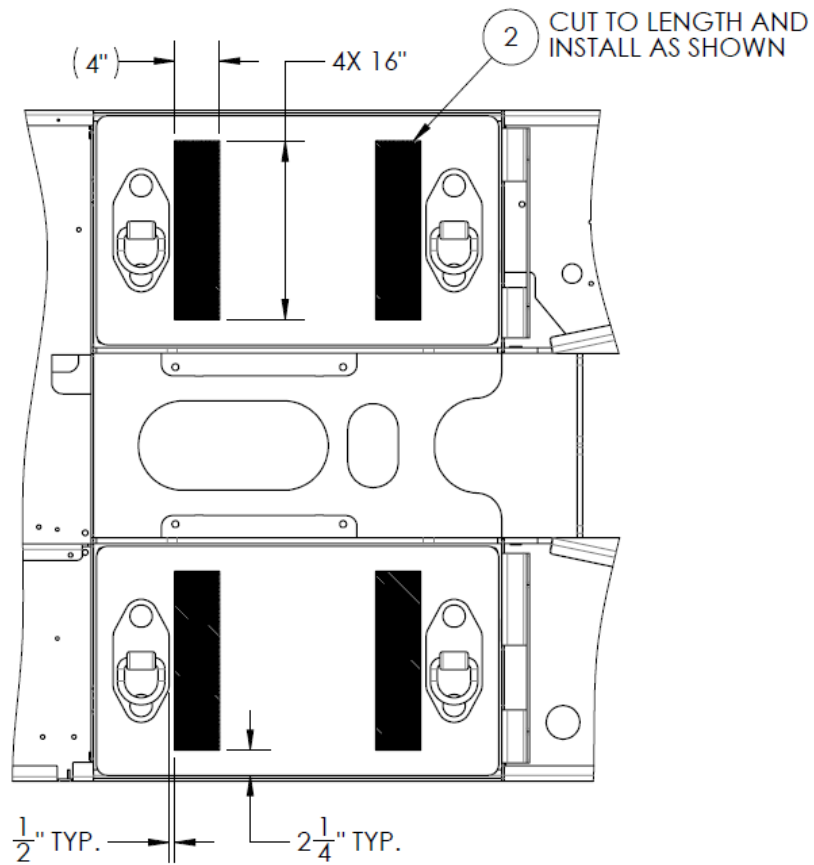
19.2 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-12X (continued)



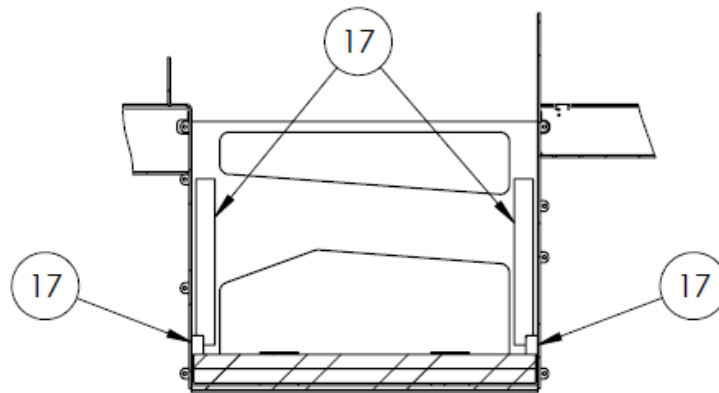
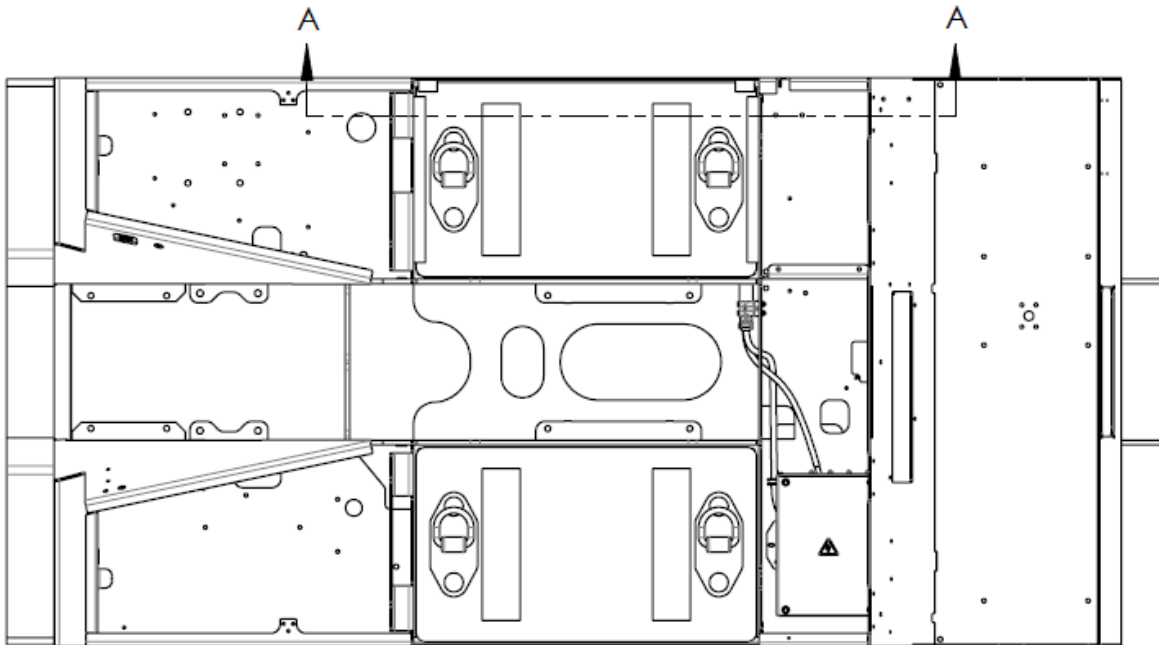
19.2 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-12X (*continued*)



19.2 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-12X (continued)



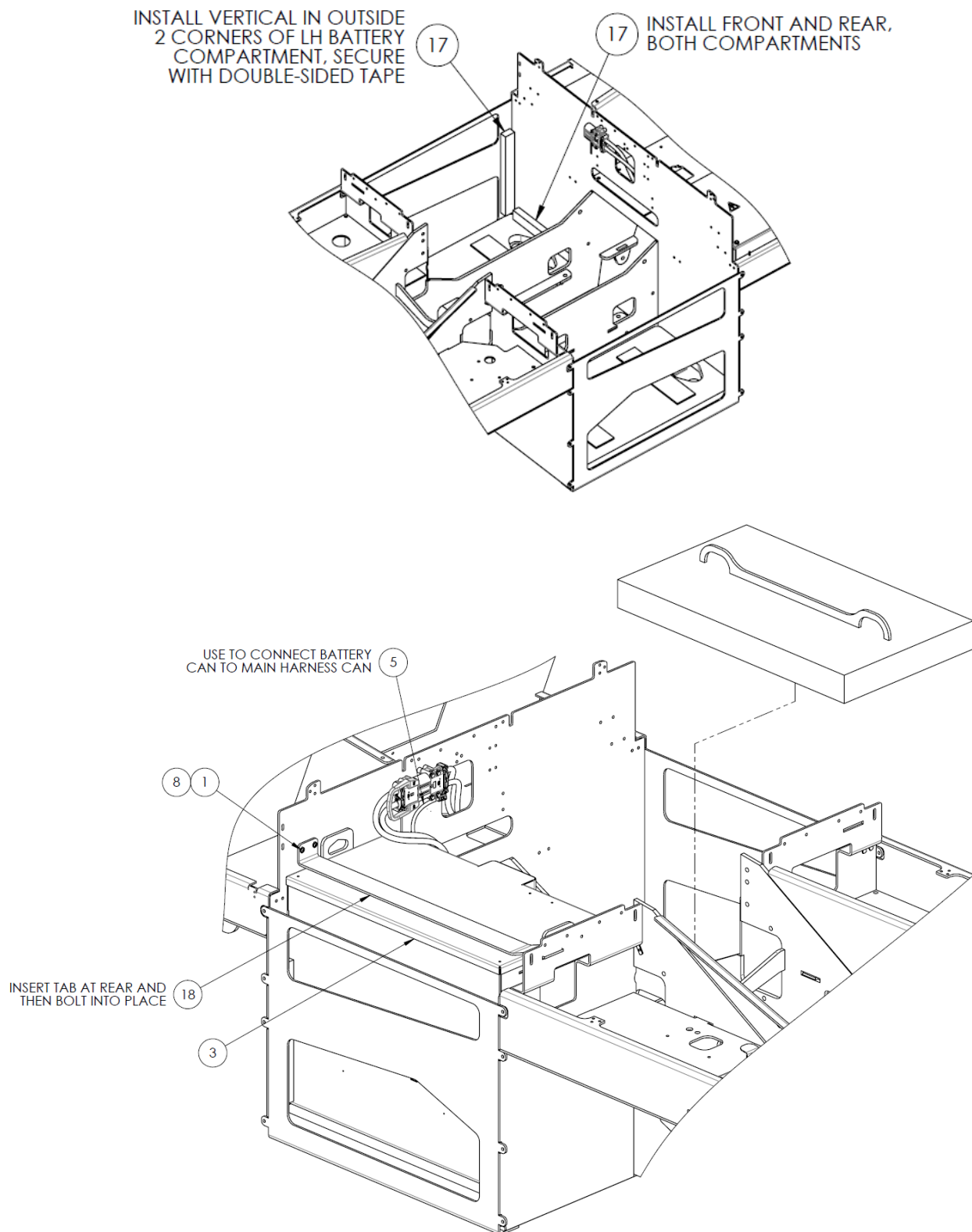
19.2 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-12X (continued)



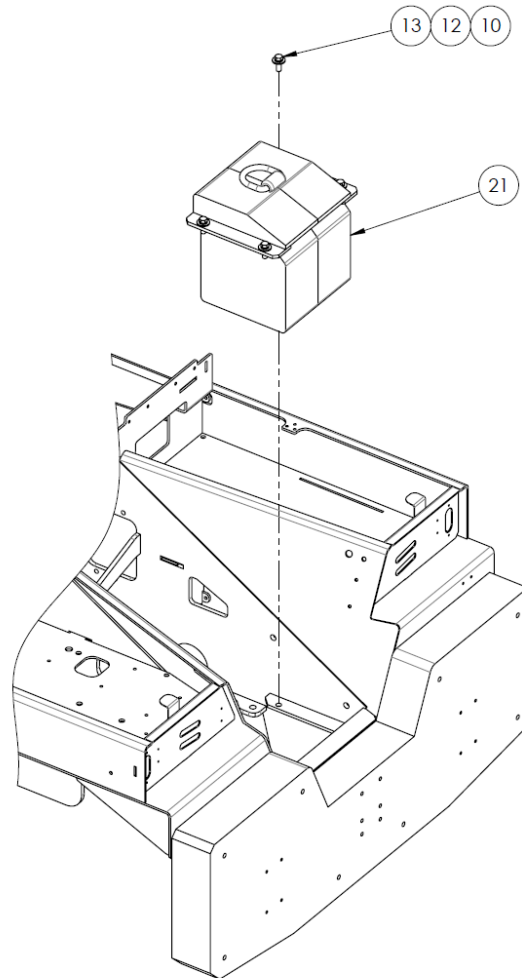
SECTION A-A



19.2 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-12X (continued)



19.2 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-12X (*continued*)





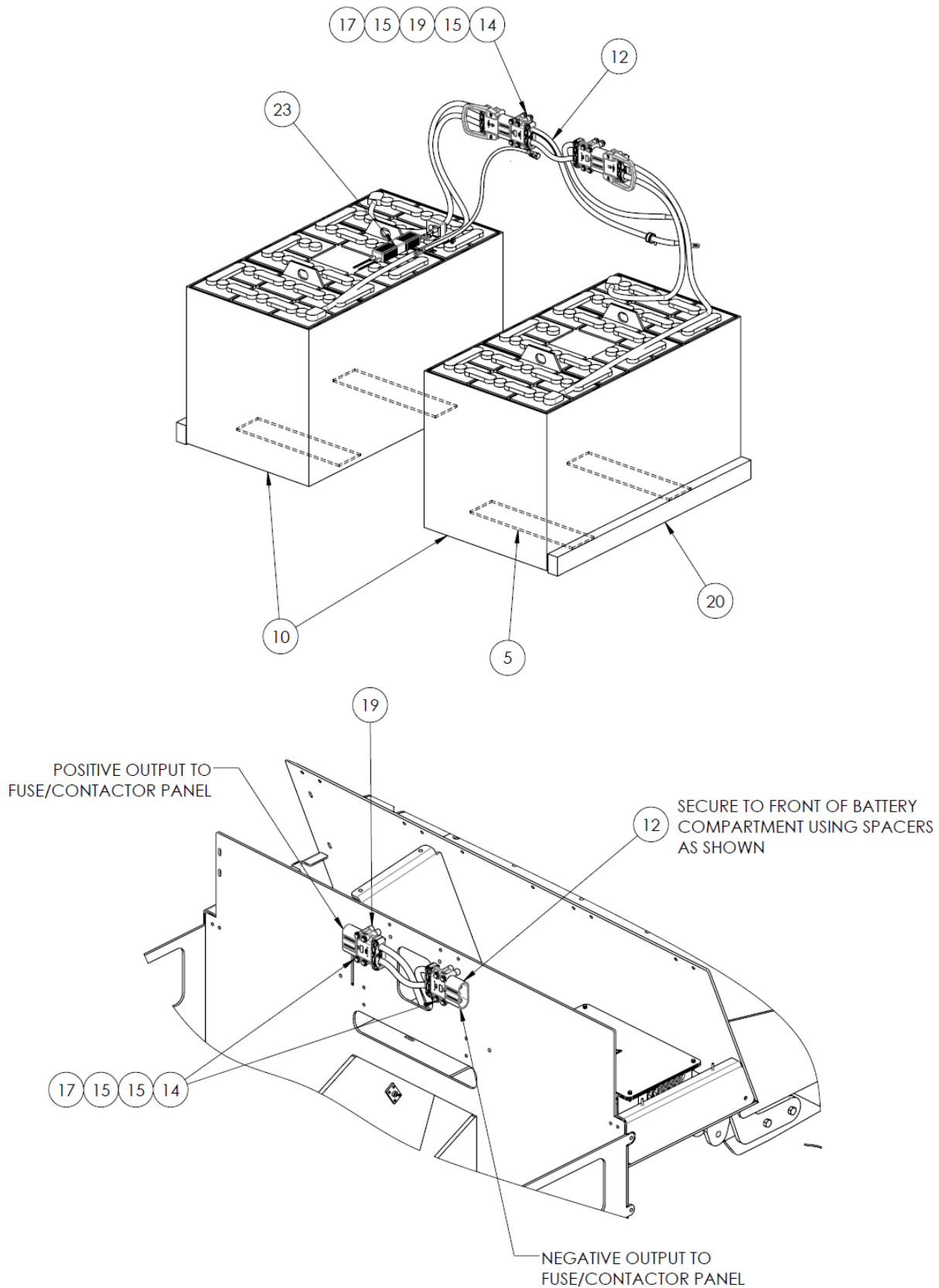
19.2 OPTION A – 315 AH LITHIUM BATTERY KIT – ETT-12X (continued)

### Parts List

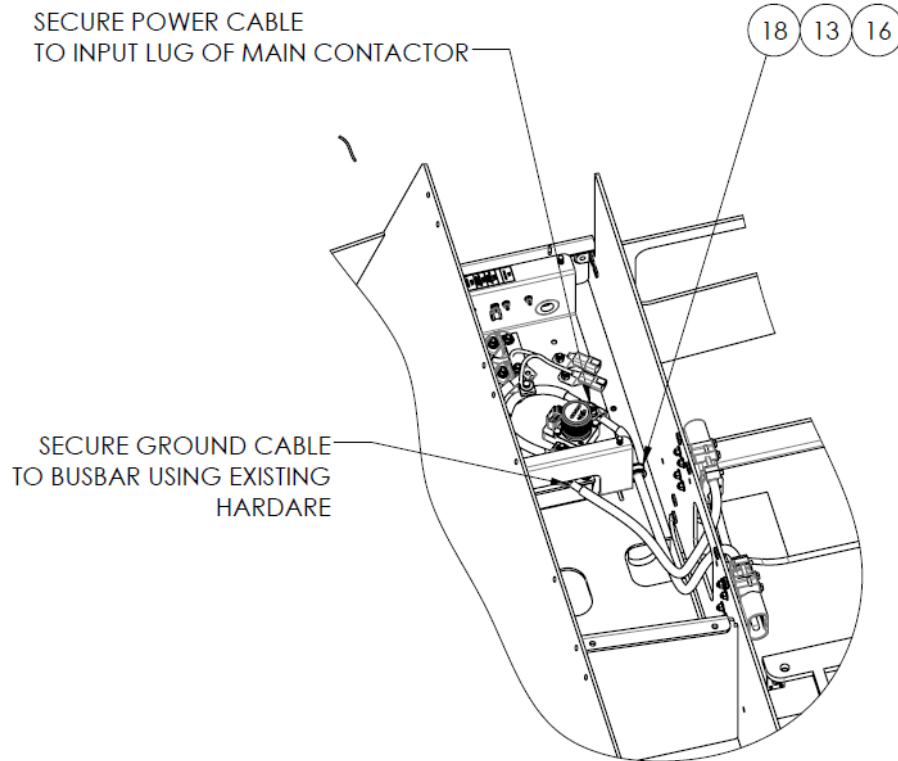
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>K-5594</b>	<b>KIT, BATTERY LI 315 AH:</b> consist of;	
1	326-009	BHCS, 1/4-20 x 1" LG	2
2	A-ES12-0448	EPDM RUBBER PAD, ADHESIVE BACKED	4
3	EC-3385	TRACT BATT, 80V 315 AH LITHIUM	1
5	EC-3405	BATTERY CABLE	1
6	EC-3494	HARNESS, BATTERY CAN	1
7	G-1100-105006	BOLT, 1/4-20 X 3/4" LG HEX HD GR 5	1
8	G-1100-105026	BOLT, 1/4-20 X 2-3/4" LG HEX HD GR 5	4
9	G-1250-1050N	FLATWASHER, 1/4 NARROW	2
10	G-1250-1050W	FLATWASHER, 1/4 WIDE	8
11	G-1250-1090W	FLATWASHER, 1/2 WIDE	4
12	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	1
13	G-1251-1090R	LOCKWASHER, 1/2 REGULAR	4
14	G-1420-109014	BOLT, 1/2-13 X 1-1/2" HEX HD GR 8	4
15	G-1727-1050	NUT, 1/4-20 TOP LOCK ZINC	4
16	H-3521-09	CLAMP, CUSHIONED LOOP 7/8"	1
17	H-4566-04	SPACER, 1/4 ID X 5/8 OD X 1/2" LG STL	4
18	H-4918	SPACER, BATTERY - MOD	4
19	J-8267-00	HOLD DOWN, BATTERY (P)	1
20	Z-11396-00	BALLAST, RH, SINGLE LITHIUM (WP)	1
21	Z-11758-00	BALLAST, UNDER-BATTERY (WP)	2

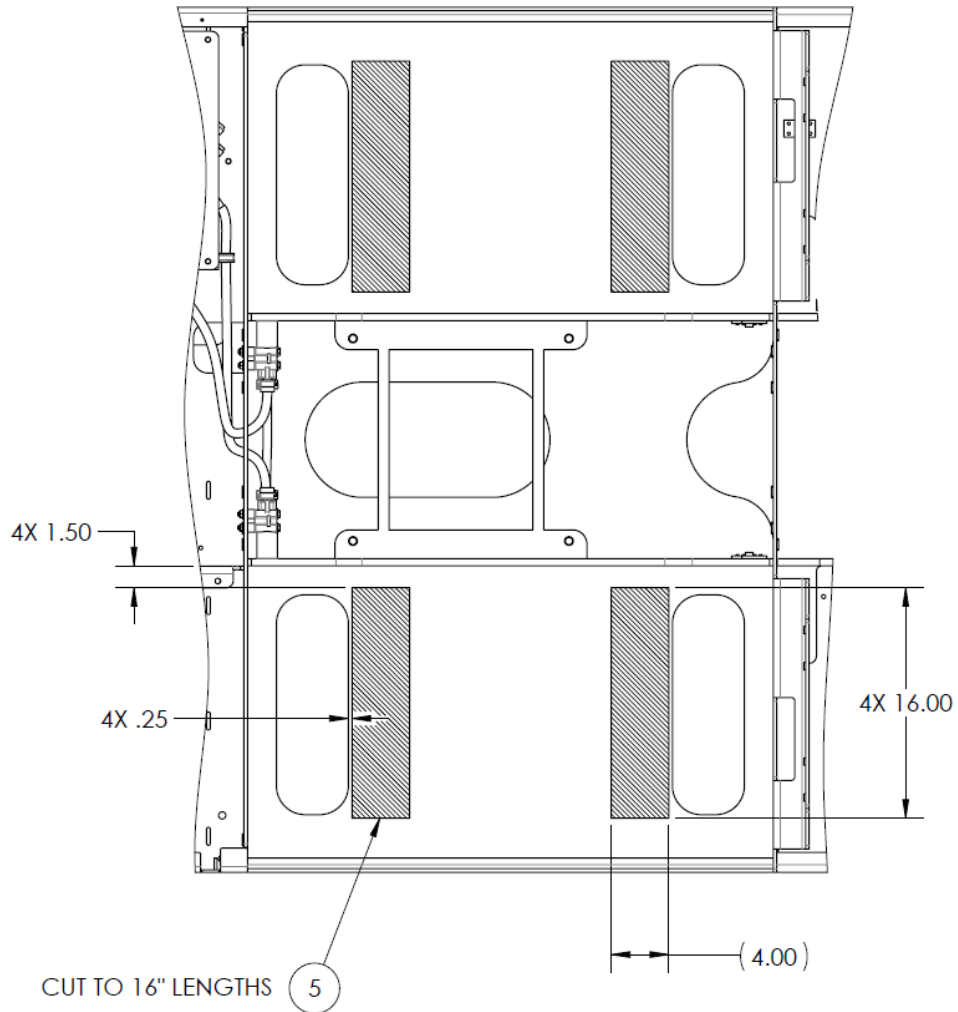
19.3 OPTION C – 510 AH LEAD-ACID BATTERY



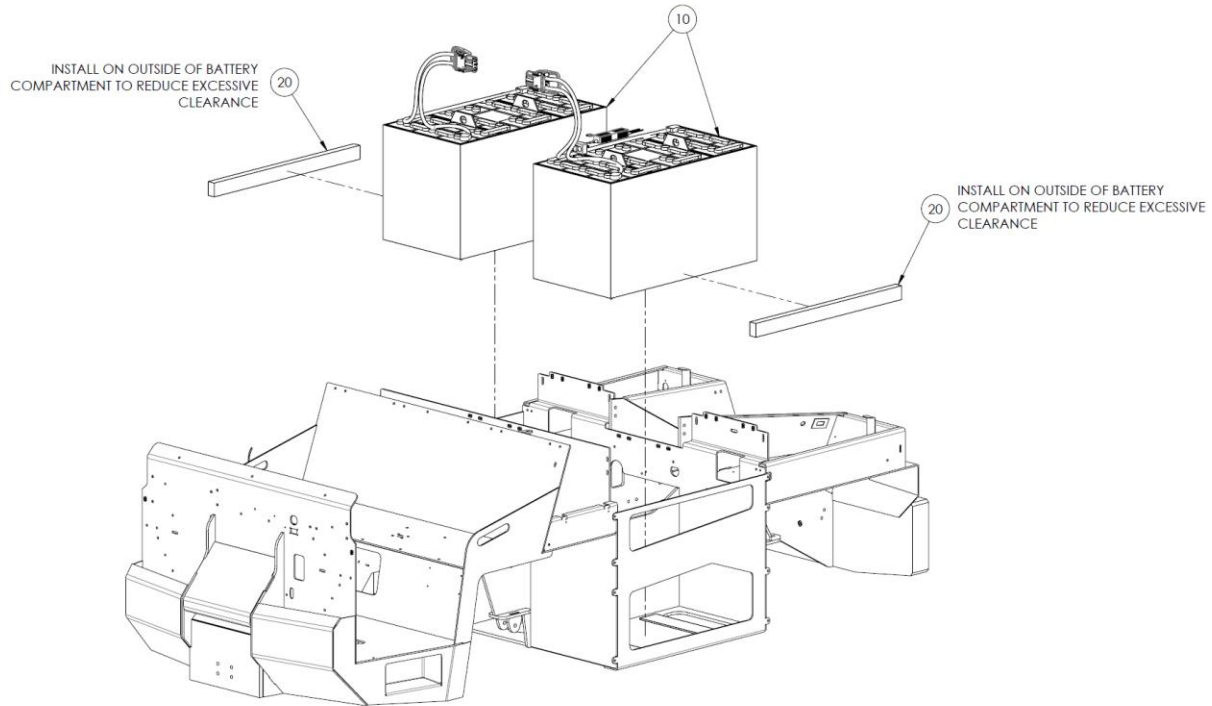
19.3 OPTION C – 510 AH LEAD-ACID BATTERY (continued)



19.3 OPTION C – 510 AH LEAD-ACID BATTERY *(continued)*



19.3 OPTION C – 510 AH LEAD-ACID BATTERY (continued)



DEUTSCH DT06-3S	
DESC.	POSITION
CAN HIGH	A
CAN LOW	B
(UNUSED)	C

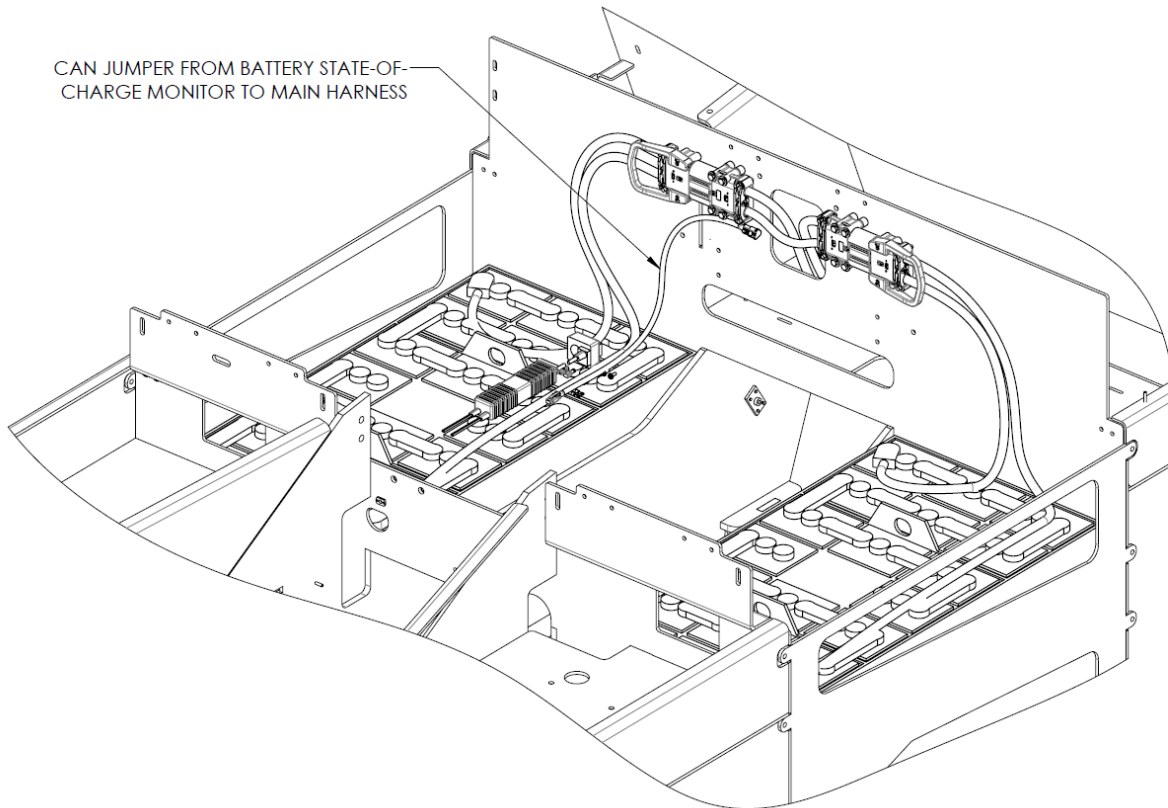
EC-3299-18-YEL (YELLOW, 18AWG), 25" LONG

EC-3299-18-GRN (GREEN, 18AWG) 25" LONG

DEUTSCH DTM06-2S	
DESC.	POSITION
CAN HIGH	1
CAN LOW	2

CAN COMMUNICATION JUMPER

19.3 OPTION C – 510 AH LEAD-ACID BATTERY (continued)



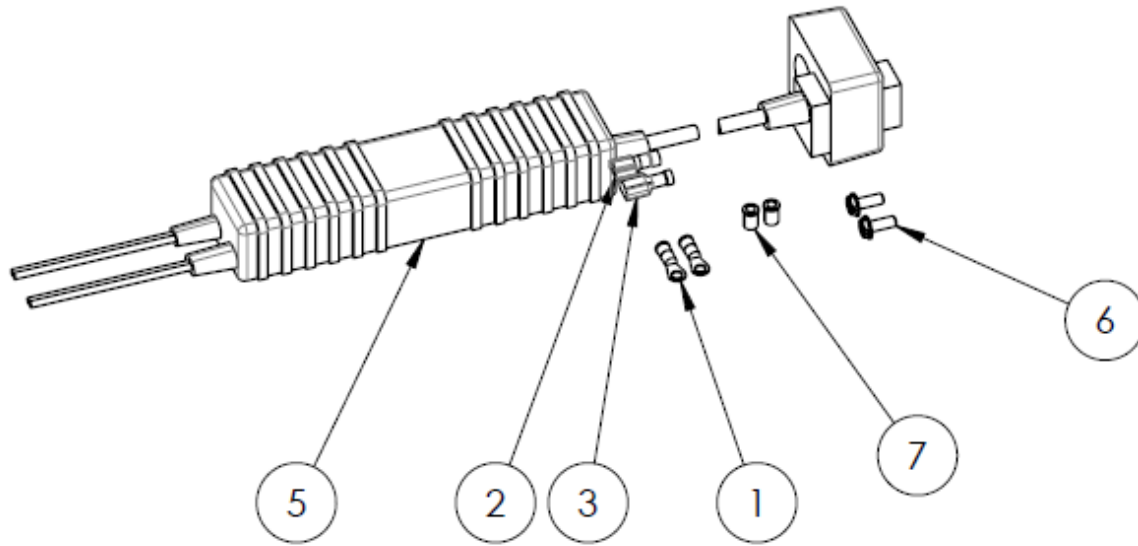
### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>K-5523</b>	<b>KIT, BATTERY LEAD ACID:</b> consist of;	
1	0462-201-20141	SOCKET - DEUTSCH TERMINAL	2
2	0462-209-16141	DEUTSCH SOCKET	2
3	12050	SPLIT POLYLOOM 3/8	25"
4	114017	CAVITY PLUG, DEUTSCH, 16 SIZE	1
5	A-ES12-0448	RUBBER BATTERY PAD	288 in <sup>2</sup>
6	DT06-3S	DEUTSCH CONNECTOR	1
7	DTM06-2S	DEUTSCH CONNECTO	1
8	EC-3299-18-GRN	WIRE, TXL, 18 AWG, GREE	25"
9	EC-3299-18-YEL	WIRE, TXL, 18 AWG, YELLOW	25"
10	EC-3384	TRAC BATT, 40V 510 AH LD ACID	2
12	EC-3416	BATTERY CABLE	1
13	G-1100-105006	BOLT, 1/4-20 HEX HD GR 5	1
14	G-1100-105026	BOLT, 1/4-20 HEX HD GR 5	8
15	G-1250-1050W	FLATWASHER, 1/4 WIDE	16
16	G-1251-1050R	LOCKWASHER, 1/4 REGULAR	1
17	G-1727-1050	NUT, 1/4-20 TOP LOCK ZINC	8
18	H-3521-09	CLAMP, CUSHIONED LOOP 7/8"	1
19	H-4566-04	SPACER, 1/4 ID X 5/8 OD X 1/2	8
20	H-4916	SPACER, BATTERY	2
21	W3S	DEUTSCH LOCK	1
22	WM2S	DEUTSCH LOCK	1
23	Z-11486	ASY, BATTERY MONITOR	1



19.3 OPTION C – 510 AH LEAD-ACID BATTERY (continued)

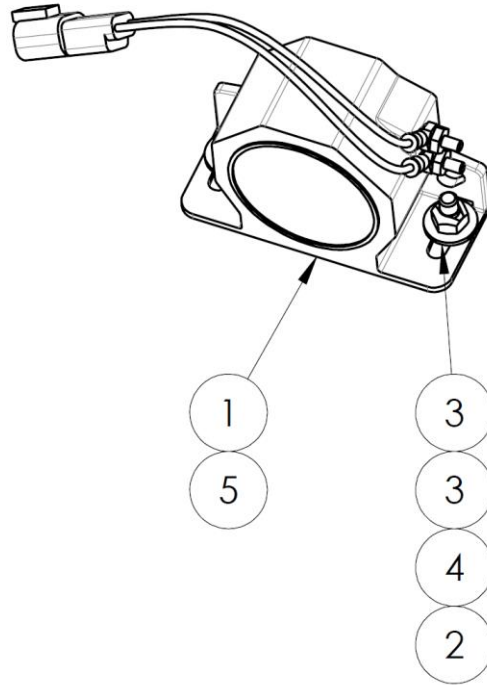


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>Z-11486</b>	<b>BATTERY MONITOR:</b> consist of;	
1	EC-1180-21	TERMINAL, RING BLUE #10	2
2	EC-1326-01	DISCONNECT, FEMALE RED 1/4 F/I	1
3	EC-1327-01	DISCONNECT, MALE RED 1/4	1
4	EC-3299-18-BLK	WIRE, TXL, 18 AWG, BLACK	40"
5	EC-3331	BATTERY MONITOR, 60-180 VDC	1
6	G-1720-103504	SCR, #10-32X1/2 MACH HEX WSH HD	2
7	NVSP-24-026-CA	THREADED INSERT, BRASS, 10-32	2

20.0 **BACKUP ALARM FEATURE**  
20.1 **OPTION A – BACKUP ALARM**

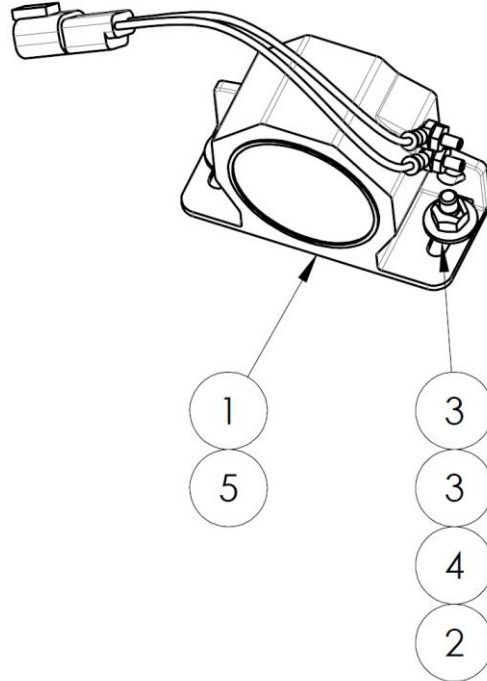


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	AE-OPT-0001	BACKUP ALARM	1
2	G-1100-105010	BOLT, 1/4-20 HEX HD GR 5	2
3	G-1250-1050W	FLATWASHER, 1/4 WIDE	4
4	G-1727-1050	NUT, 1/4-20 TOP LOCK ZINC	2
5	Z-11174	BACKUP ALARM PIGTAIL	1

20.2 OPTION B – SMART BACKUP ALARM

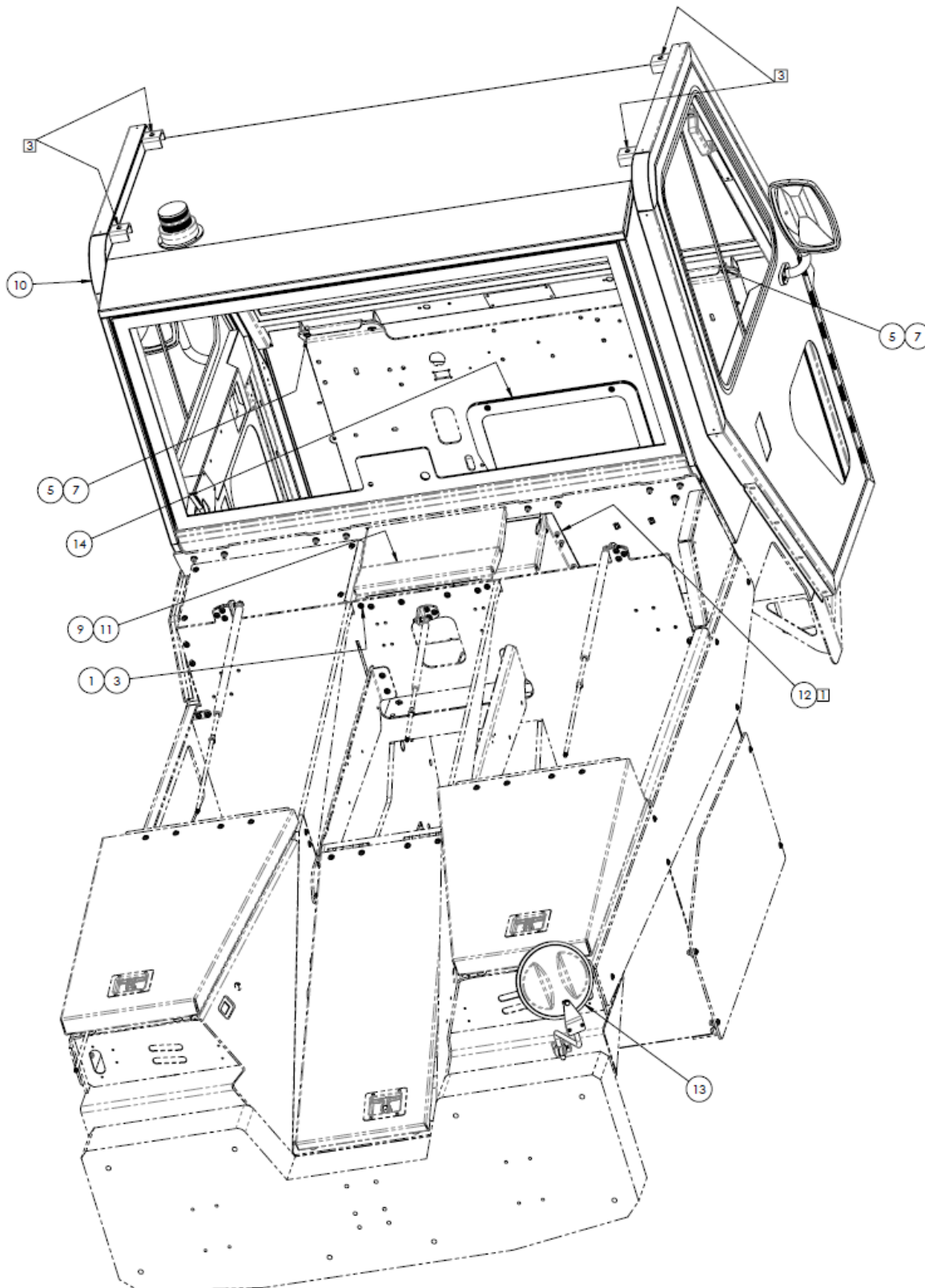


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	G-1100-105010	BOLT, 1/4-20 HEX HD GR 5	2
2	G-1250-1050W	FLATWASHER, 1/4 WIDE	4
3	G-1727-1050	NUT, 1/4-20 TOP LOCK ZINC	2
4	OPT-NVSP-029-A	SMART BACKUP ALARM (ALARM ONLY)	1
5	Z-11174	BACKUP ALARM PIGTAIL	1

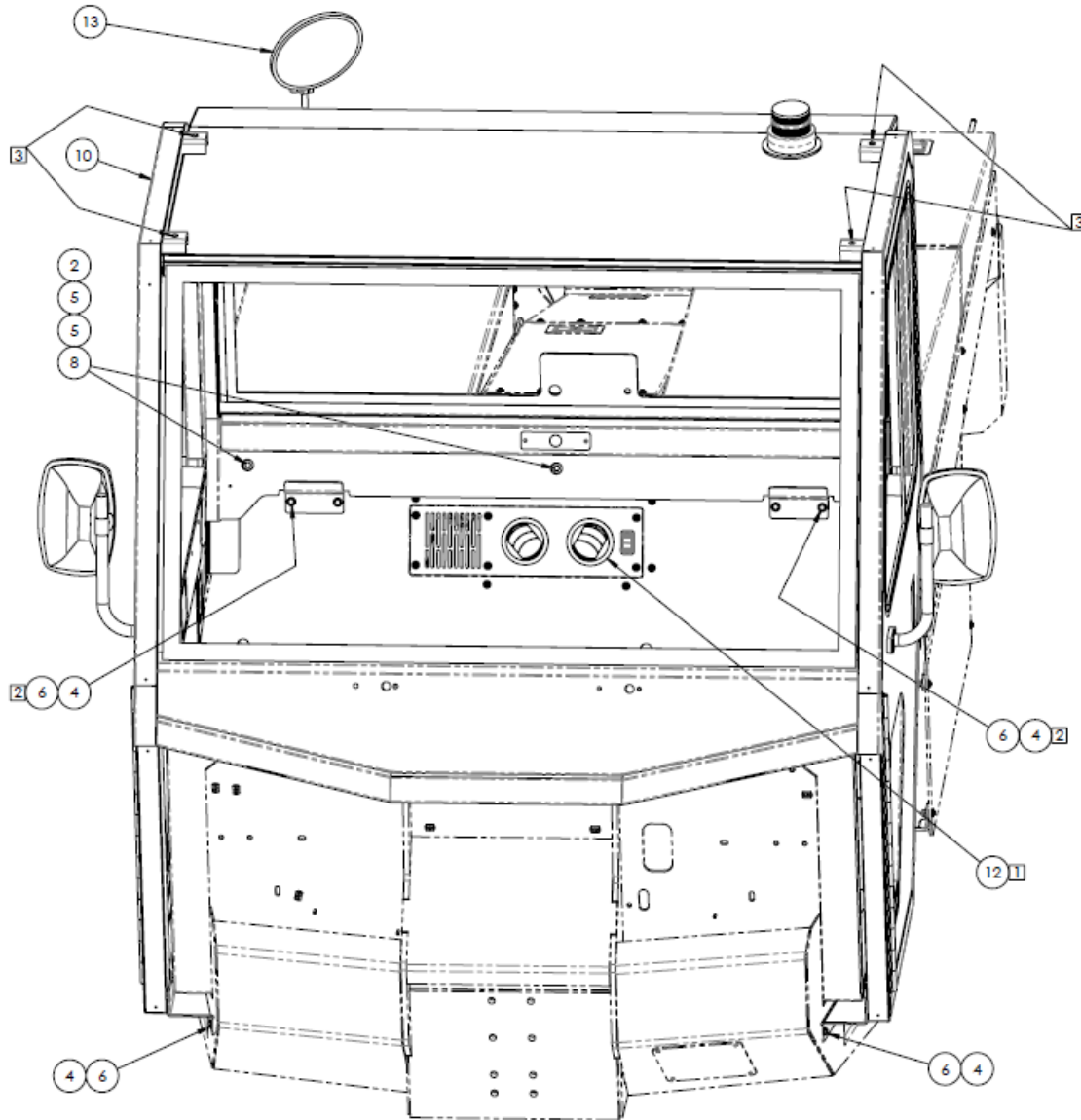
**21.0 OPERATOR CAB FEATURE**  
**21.1 OPTION A – OPERATOR CAB – NO AC**



21.1 OPTION A – OPERATOR CAB – NO AC (*continued*)

NOTES:

- ① RECOMMEND ASSEMBLY OF ⑫ Z-11642 "NPN, HEATER MODULE" TO CHASSIS PRIOR TO ASSEMBLY OF H-4942 "CAB, ETT-8/12X" TO CHASSIS, IF POSSIBLE. SEE DRAWING Z-11642 FOR SPECIFIC INSTRUCTIONS FOR SEQUENCE OF ASSEMBLY.
- ② ASSEMBLE BRACKETS FROM H-4942 "CAB, ETT-8/12X" TO CHASSIS PRIOR TO LOWERING CAB TO MEET CHASSIS.
- ③ USE 4X LIFTING HOLES ON TOP OF H-4942 "CAB, ETT-8/12X" TO HOIST IN TO POSITION AND LOWER ON TO CHASSIS.





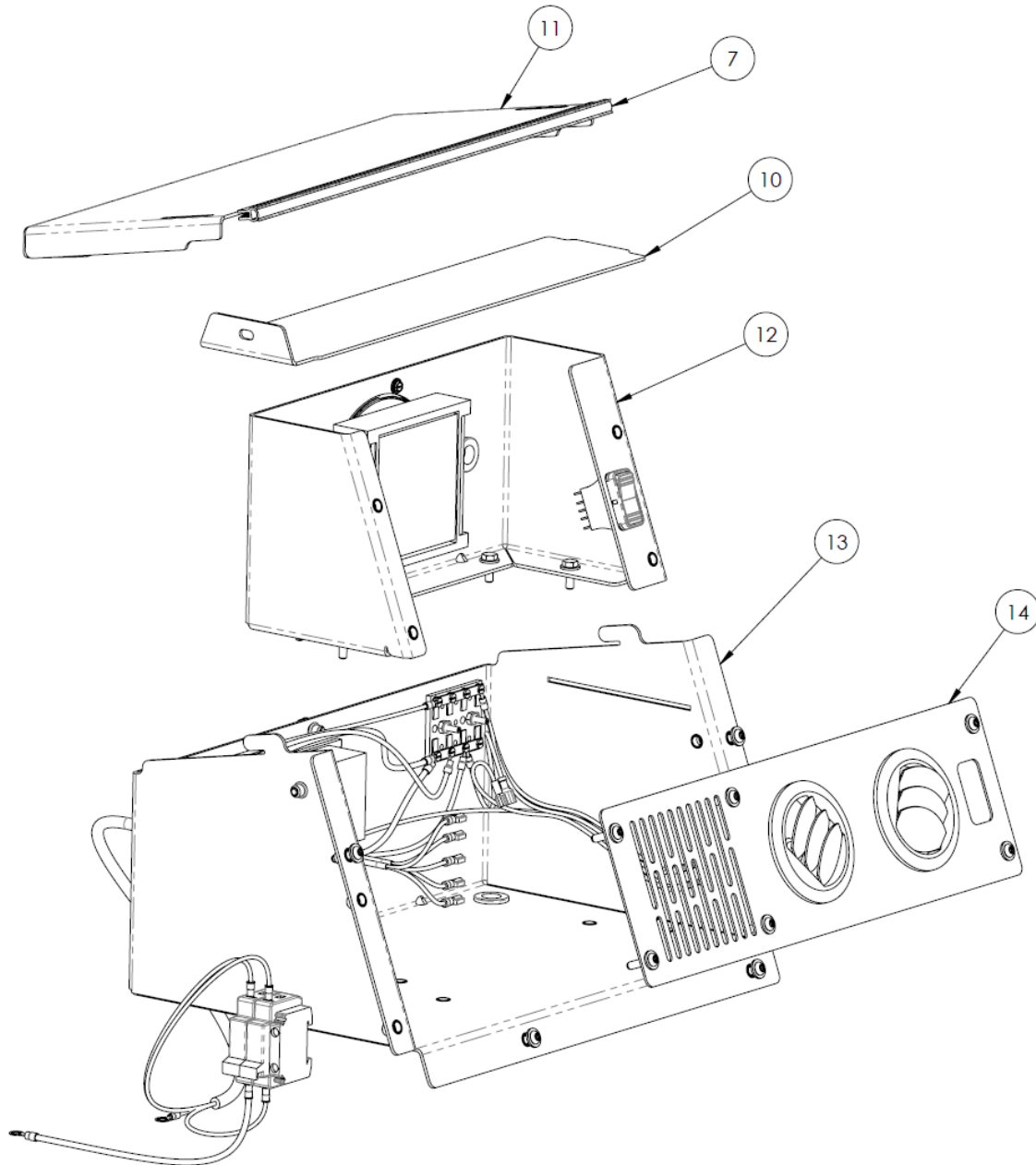
21.1 OPTION A – OPERATOR CAB – NO AC (continued)

**Parts List**

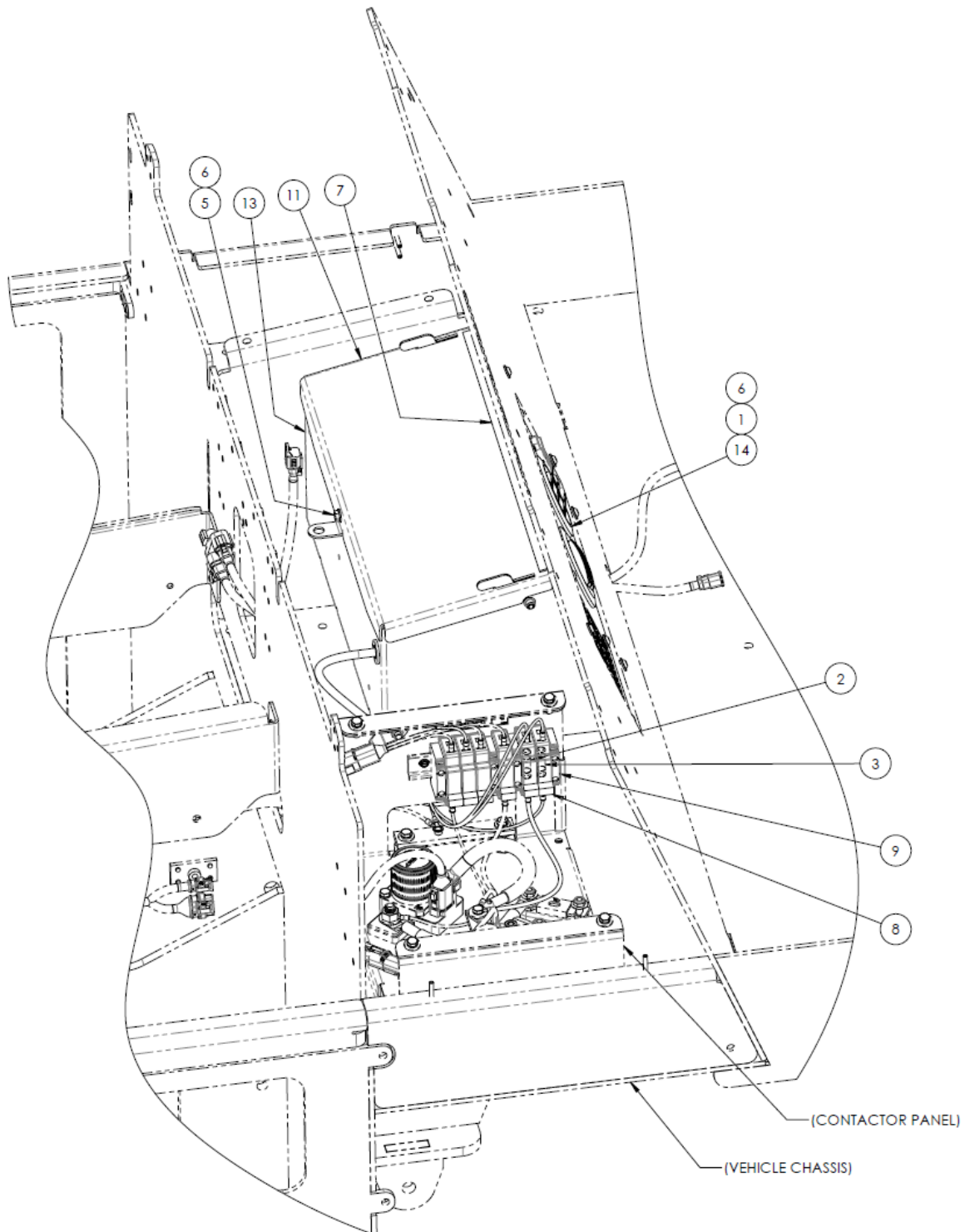
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS 1/4-20 X 1"LG	2
2	G-1202-1060	STOPNUT, 5/16-18 ELASTIC	3
3	G-1250-1050N	FLATWASHER, 1/4 NARROW	2
4	G-1250-1050W	FLATWASHER, 1/4 WIDE	8
5	G-1250-1060W	FLATWASHER, 5/16 WIDE	10
6	G-1420-105010	BOLT, 1/4-20 HEX HD GR 8	8
7	G-1420-106010	BOLT, 5/16-18 X 1.0" LG. HEX HD GR 8	4
8	G-1420-106014	BOLT, 5/16-18 HEX HD GR 8	3
9	G-1439-1050-S	NUTSERT, 1/4-20 OPEN END	2
10	H-4942	CAB, E-ETT8-NX	1
11	S-4368-00	CVR CENTER, (BRVO S-4328)	1
12	Z-11642	NPN, HEATER MODULE	1
13	Z-11695	SUB-ASSY, REAR VIEW MIRROR	1
14	Z-11853	ASSY, SIGHT TUNNEL WINDOW	1

21.1 OPTION A – OPERATOR CAB – NO AC (continued)



21.1 OPTION A – OPERATOR CAB – NO AC (continued)







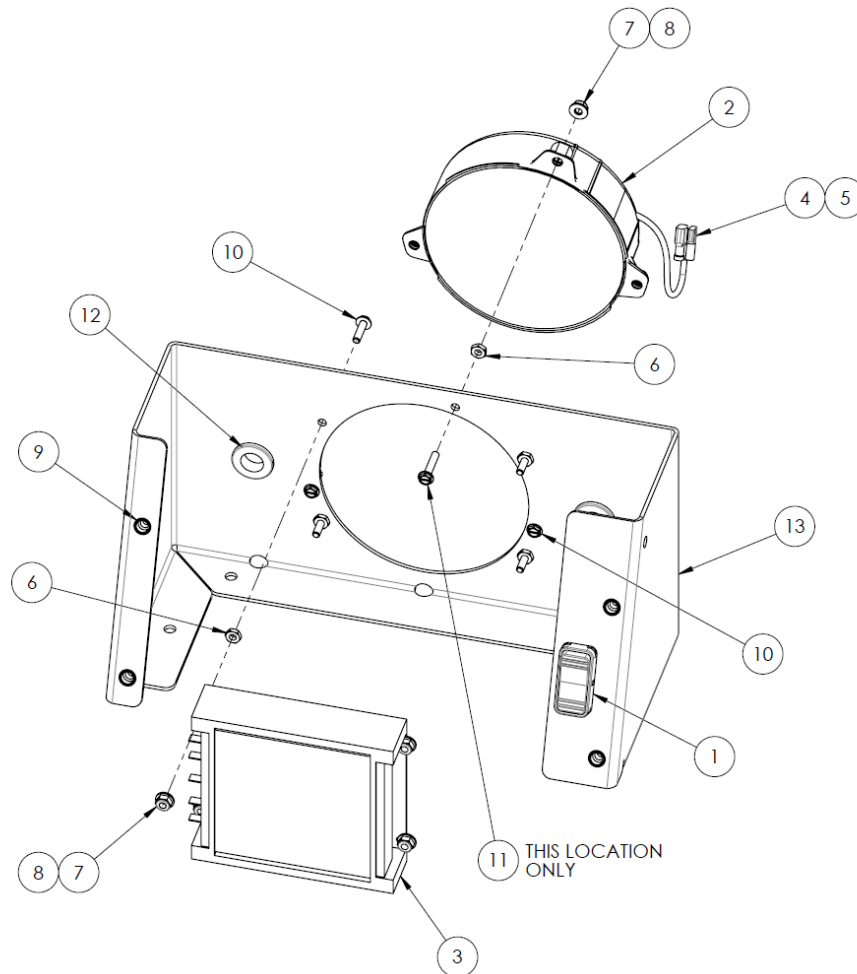
21.1 OPTION A – OPERATOR CAB – NO AC (continued)

**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>Z-11642</b>	<b>HEATER MODULE:</b> consists of;	
1	326-009	BHCS, 1/4-20 x 1" LG	11
2	EC-3429-30	10X38 FUSE, 500V, 30A, SLOW-BLOW	1
3	EC-3429-15	10X38 FUSE, 500V, 15A, SLOW-BLOW	1
4	EC-3467	WIRE HARNESS, ETT8-NX CAB	1
5	G-1100-105006	BOLT, 1/4-20 X 3/4" LG HEX HD GR 5	7
6	G-1250-1050N	FLATWASHER, 1/4 NARROW	18
7	H-4931-18.88	BULB SEAL, PUSH ON	1
8	LAVT-05-006-CA	10X 38 DIN RAIL MOUNTED FUSE HOLDER	2
9	LAVT-05-009-CA	35MM DIN RAIL END STOP	1
10	S-4303-00	MIDDLE COVER, HEATER BOX (P)	1
11	S-4304-00	TOP COVER, HEATER BOX (P)	1
12	Z-11643	ASY, HEATER BOX FRONT	1
13	Z-11644	ASY, HEATER BOX REAR	1
14	Z-11757	DIFFUSER SUB-ASSEMBLY	1

21.1 OPTION A – OPERATOR CAB – NO AC (continued)

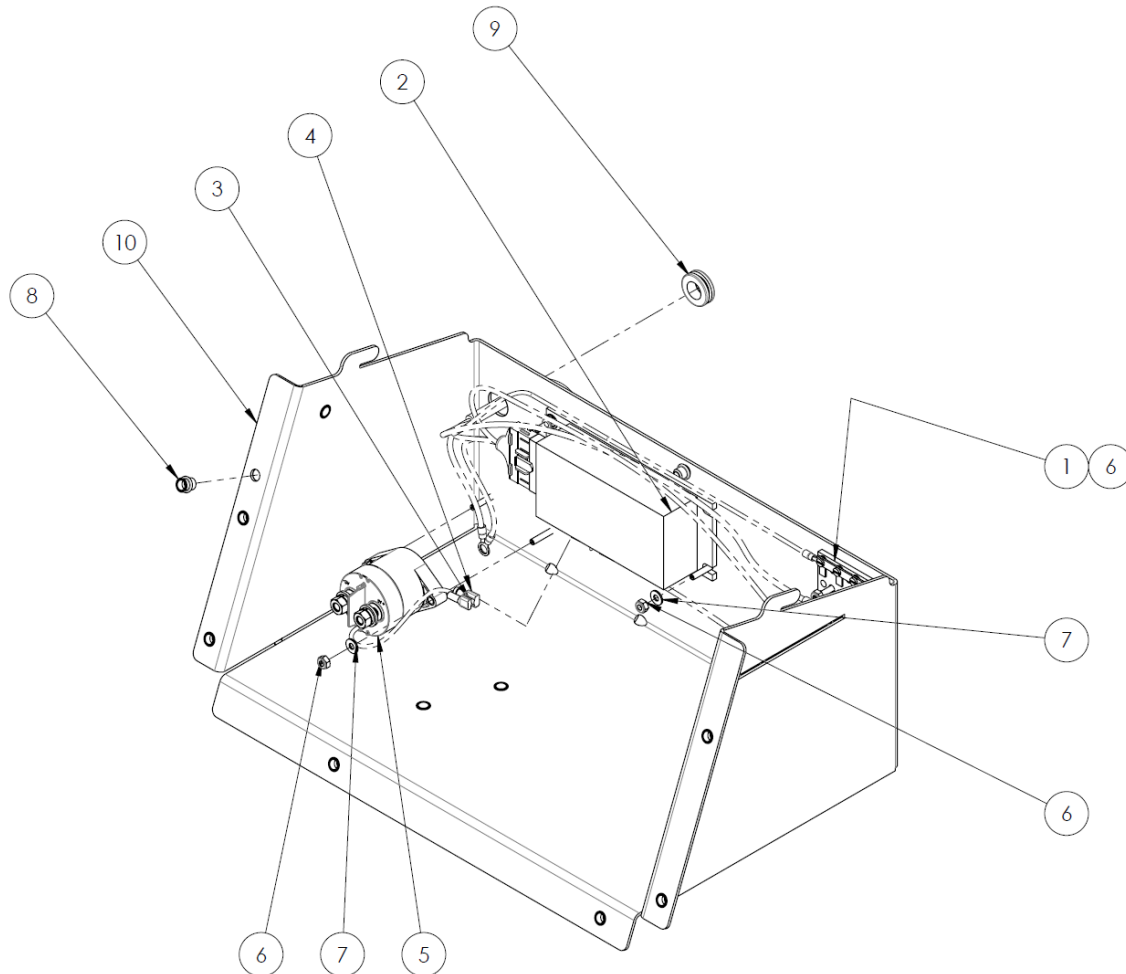


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>Z-11643</b>	<b>HEATER BOX FRONT:</b> consists of;	
1	A-ES12-0801	DPST ROCKER SWITCH	1
2	A-MTT5-0235	5.2 IN BLOWING FAN	1
3	AE-OPT-0300-B	HEATER CORE	1
4	EC-1326-01	DISCONNECT, FEMALE 1/4" RED	1
6	EC-1327-01	DISCONNECT, .250 X .032 MALE, 18-22 AWG	1
8	G-1200-1035	NUT, #10-32 HEX	7
9	G-1202-1035	STOPNUT, #10-32 ELASTIC	7
10	G-1250-1030N	FLATWASHER, #10 NARROW	7
11	G-1439-1050-S	NUTSERT, THIN WALL 1/4-20	4
13	G-1720-103506	SCR,#10-32X.75 MACH HEX WSH HD	6

21.1 OPTION A – OPERATOR CAB – NO AC (continued)

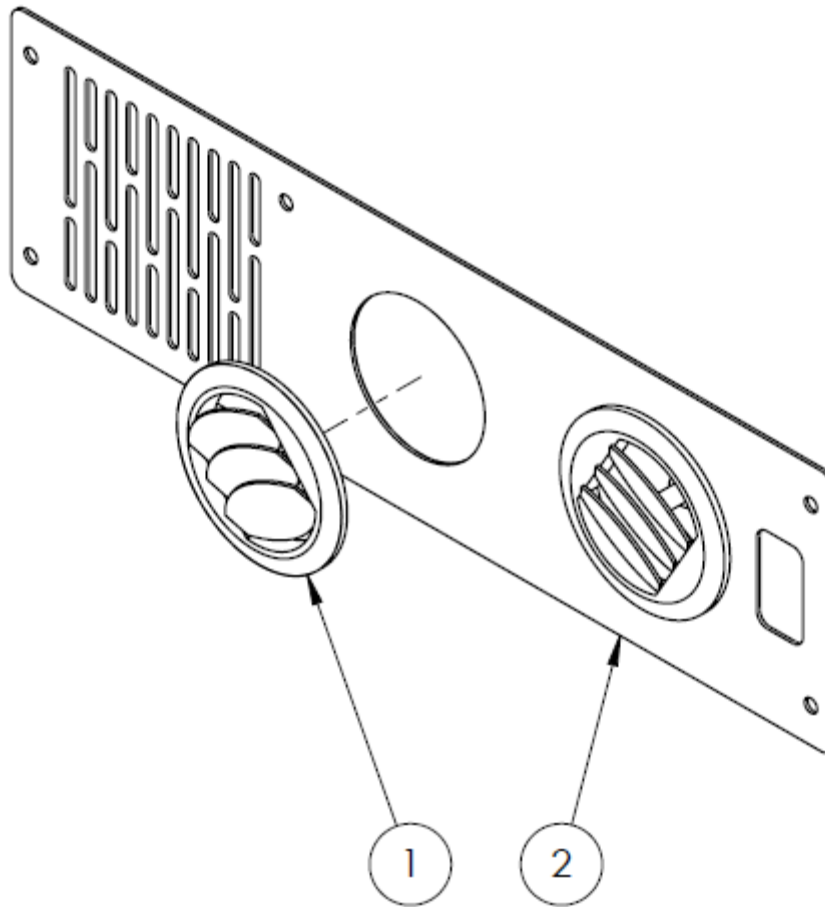


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>Z-11644</b>	<b>HEATER BOX REAR:</b> consists of;	
1	A-TT4-00300	TERMINAL BLOCK TT & RTT	1
2	AE-OPT-0320-B	DC-DC CONVERTER 500W 80V->12V	1
3	EC-1326-01	DISCONNECT, FEMALE RED 1/4 F/I	1
4	EC-1327-01	DISCONNECT, MALE RED 1/4	1
5	EC-3326	CONTACTOR, 12V	1
6	G-1202-1035	STOPNUT, #10-32 ELASTIC	6
7	G-1250-1030N	FLATWASHER, #10 NARROW	4
8	G-1439-1050-S	NUTSERT, 1/4-20 OPEN END	14
9	H-1901-22	GROMMET	2
10	S-4251-00	PANEL, HEATER BOX A	1

21.1 OPTION A – OPERATOR CAB – NO AC *(continued)*

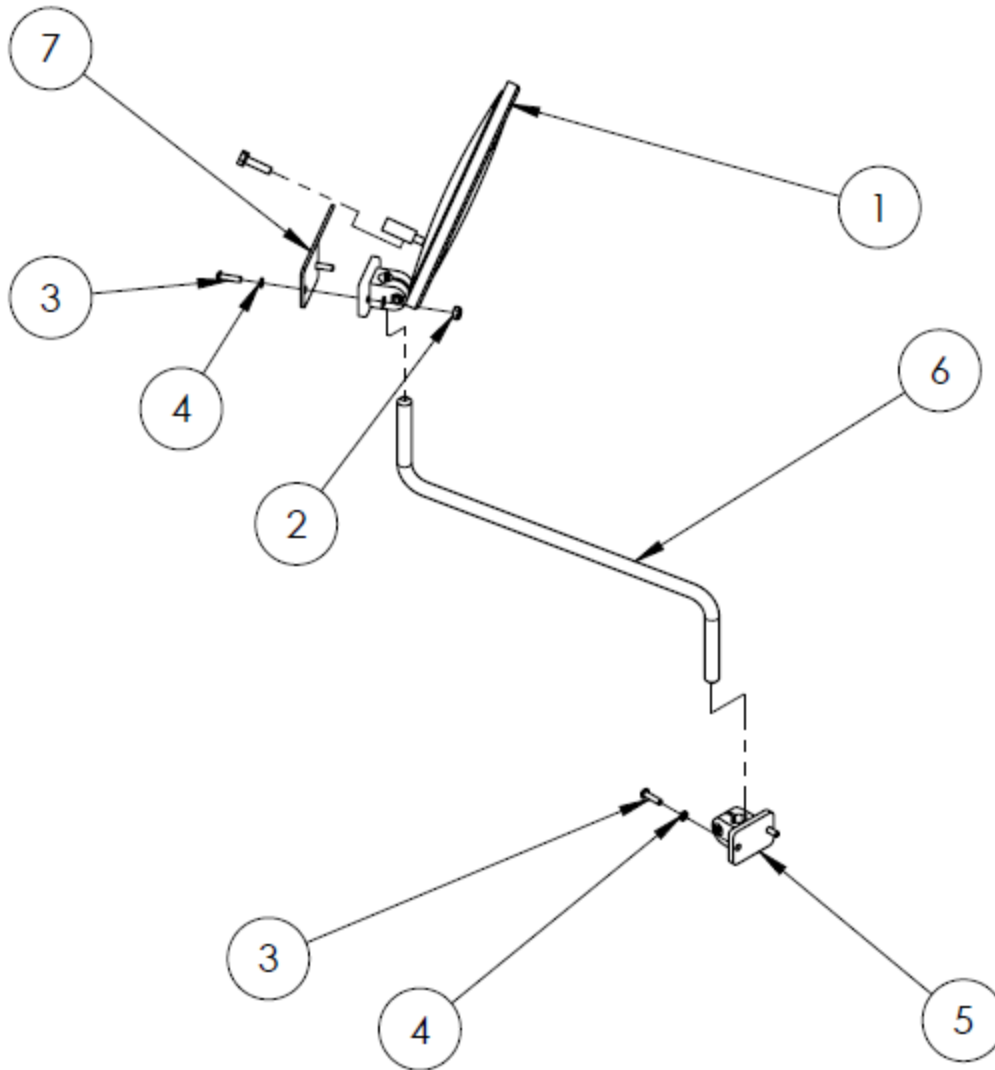


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>Z-11757</b>	<b>DIFFUSER:</b> consists of;	
1	A-MTT5-0236	ADJUSTABLE LOUVER-CAB MTT5	2
2	S-4305-00	DIFFUSER PLATE, HEATER BOX	1

21.1 OPTION A – OPERATOR CAB – NO AC (continued)

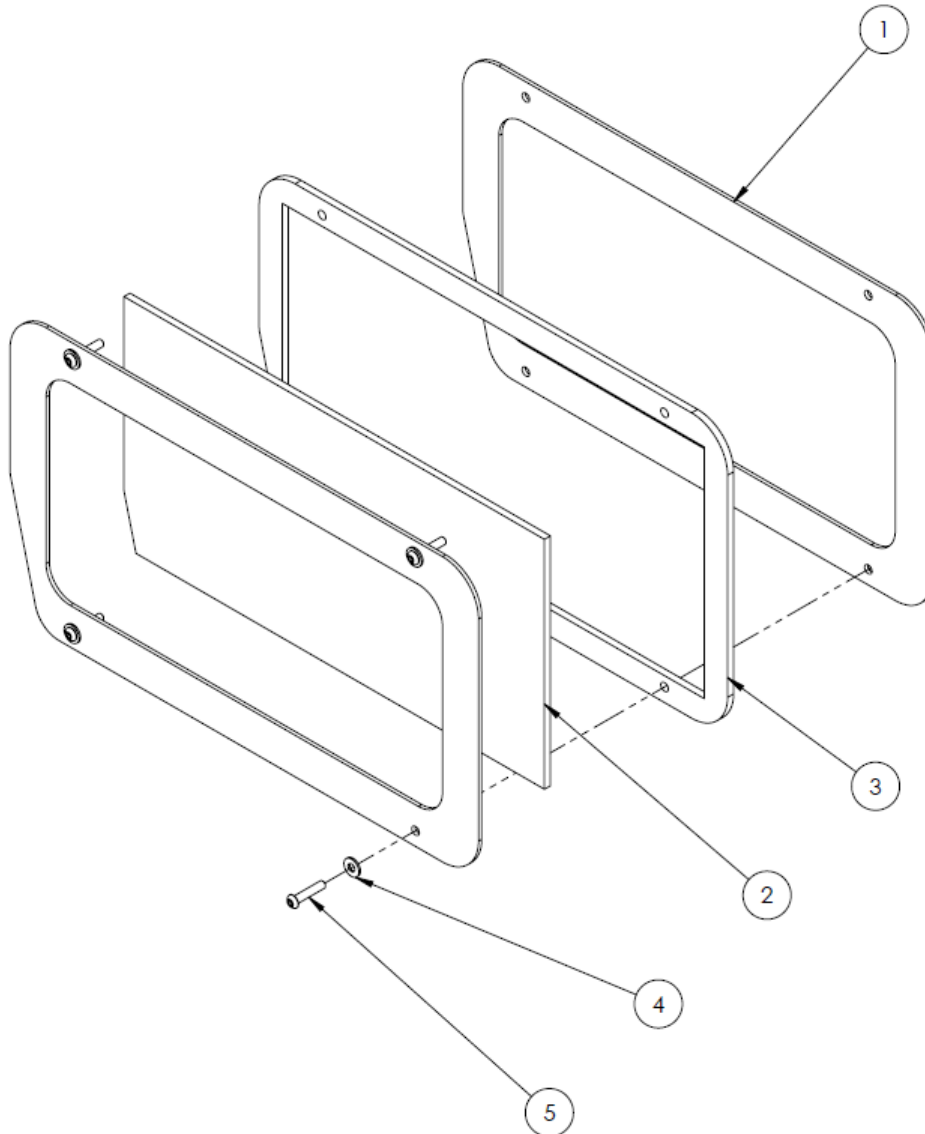


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>Z-11695</b>	<b>REAR VIEW MIRROR:</b> consists of;	
1	AE-OPT-0052-B	8" OUTSIDE MIRROR-CAB	1
2	G-1202-1035	STOPNUT, #10-32 ELASTIC	2
3	G-1476-103106	SCR, #10-32 SOC BUT HD CAP	4
4	G-1502-1030R	LOCKWASHER, 10 REGULAR S.S.	6
5	H-4997	BRACKET, VERTICAL ROD	2
6	R-3445	REAR MIRROR HOLDER	1
7	S-4278-00	BRACKET, REAR MIRROR	1

21.1 OPTION A – OPERATOR CAB – NO AC (continued)

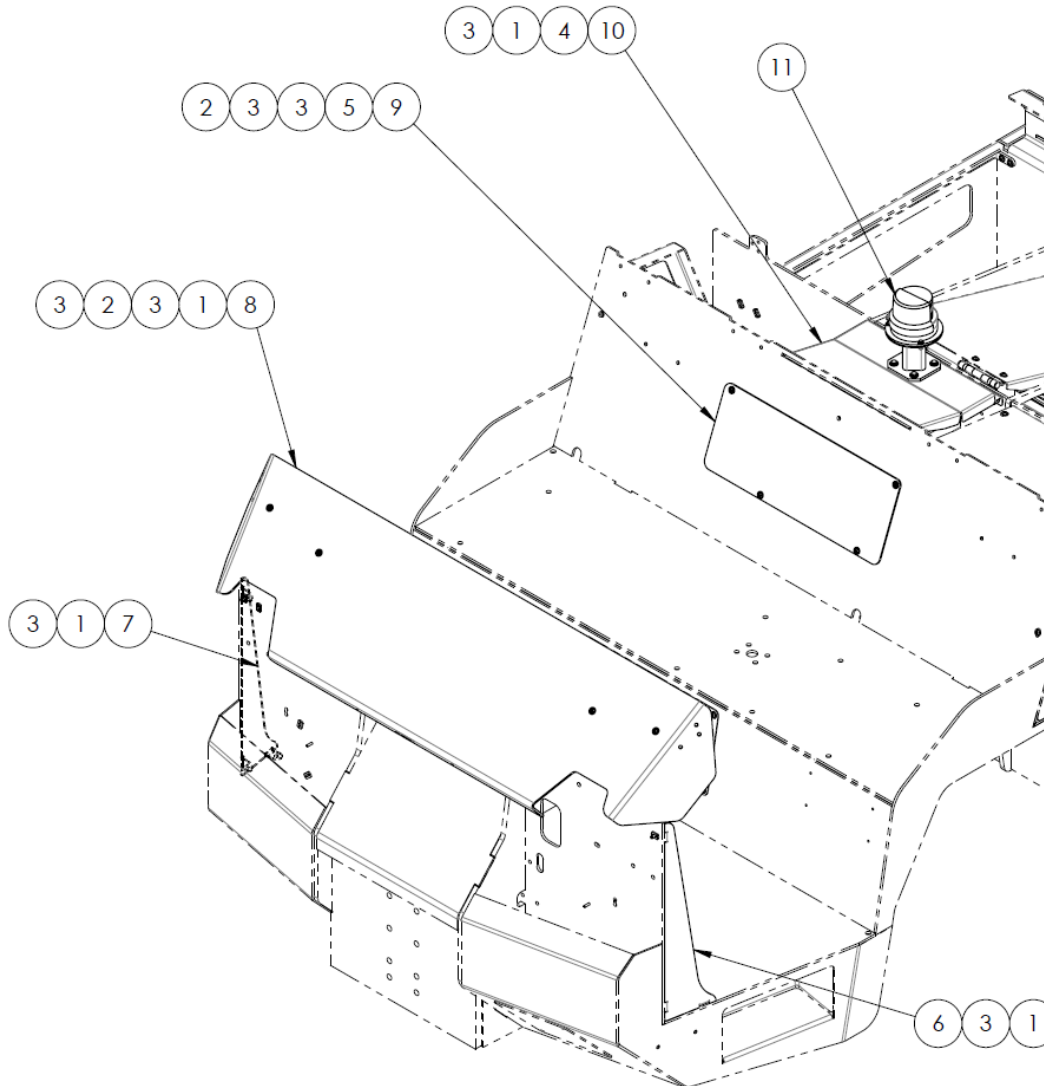


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>Z-11853</b>	<b>SIGHT TUNNEL WINDOW:</b> consists of;	
1	J-8235-00	FRM, SIGHT TUNNEL WINDOW	2
2	J-8233	WINDOW, SIGHT TUNNEL	1
3	J-8234-00	MID FRM, SIGHT TNL WINDOW	1
4	G-1250-1050N	FLATWASHER, 1/4 NARROW	4
5	G-1476-105012	SCR, 1/4-20 SOC BUT HD CAP	4

21.2 OPTION O – (ETT-8X) – NO OPERATOR CAB WITH PST MT BEA

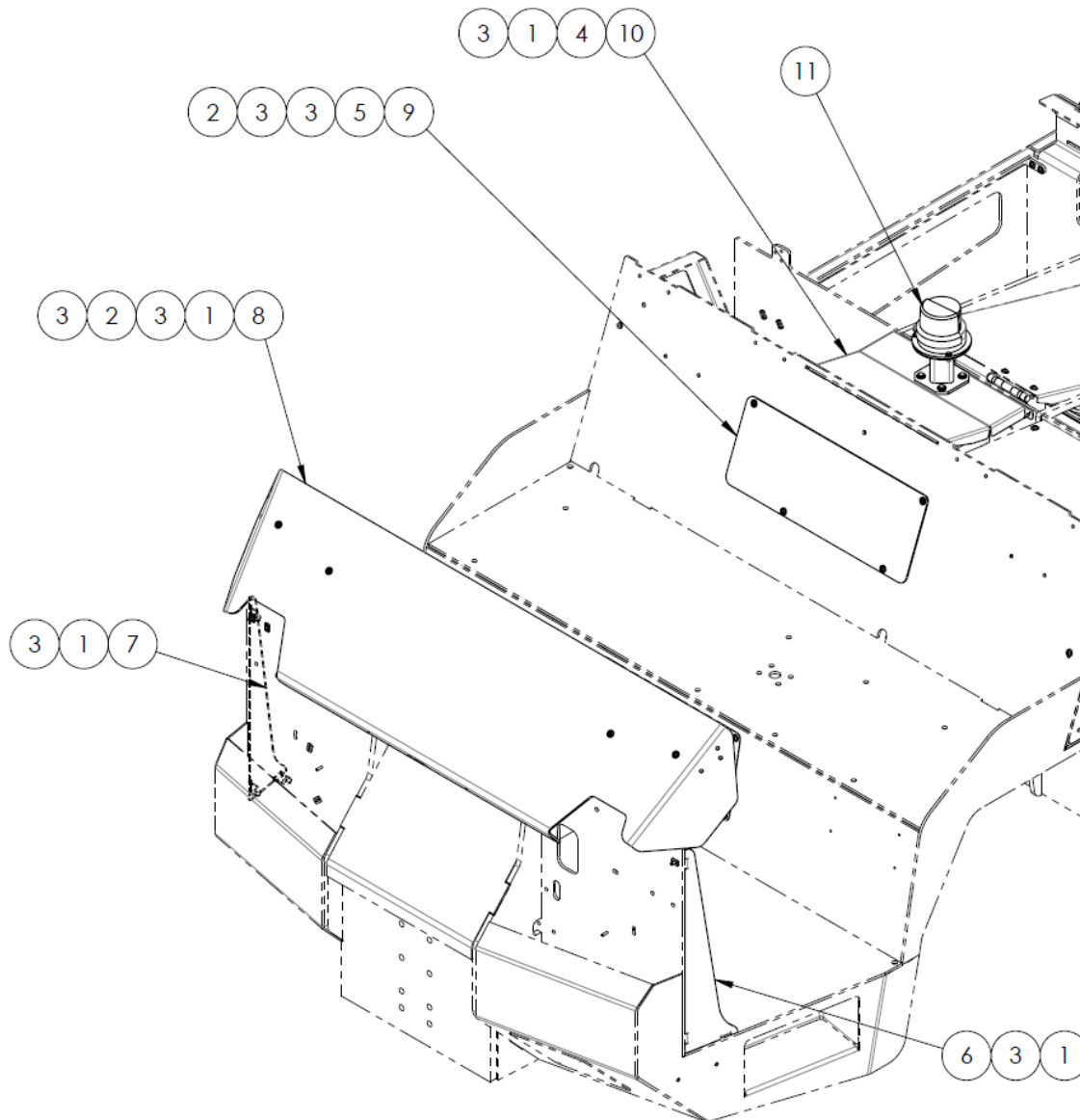


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

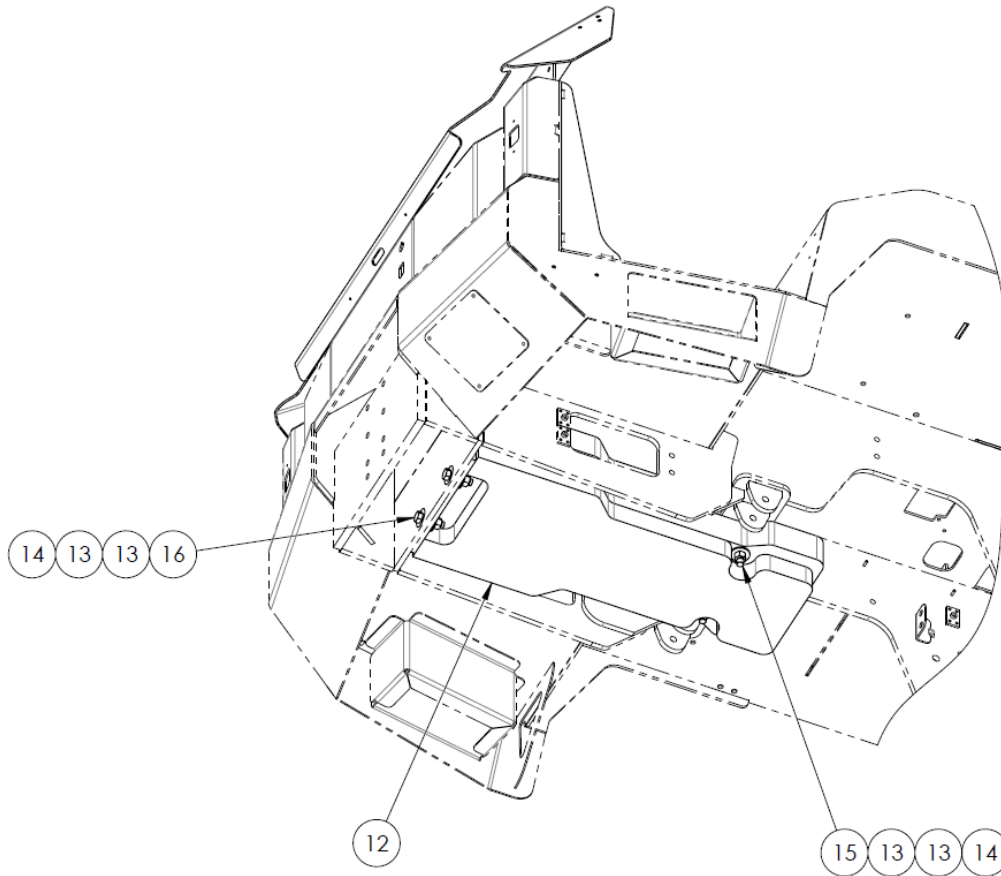
Item	Part Number	Description	Qty
1	326-009	BHCS 1/4-20 X 1"LG	12
2	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	8
3	G-1250-1050N	FLATWASHER, 1/4 NARROW	24
4	G-1439-1050-S	NUTSERT, 1/4-20 OPEN END (ADD TO XA BOM)	2
5	G-1476-105012	SCR, 1/4-20 SOC BUT HD CAP	4
6	J-7964-00	FRONT TRIM, LH	1
7	J-7965-00	FRONT TRIM, RH	1
8	J-7988-00	WINDSHIELD	1
9	J-8197-00	COVER PLATE, HEATER	1
10	S-4369-00	COVER CENTER, BEACON	1
11	Z-10765	ASY, POST MOUNTED LED STROBE	1
N/S	H-4736-17-S	SHIPPING COVER, ETTX W/O CAB	1

21.3 OPTION O – (ETT-12X) – NO OPERATOR CAB WITH PST MT BEA





21.3 OPTION O – (ETT-12X) – NO OPERATOR CAB WITH PST MT BEA (continued)

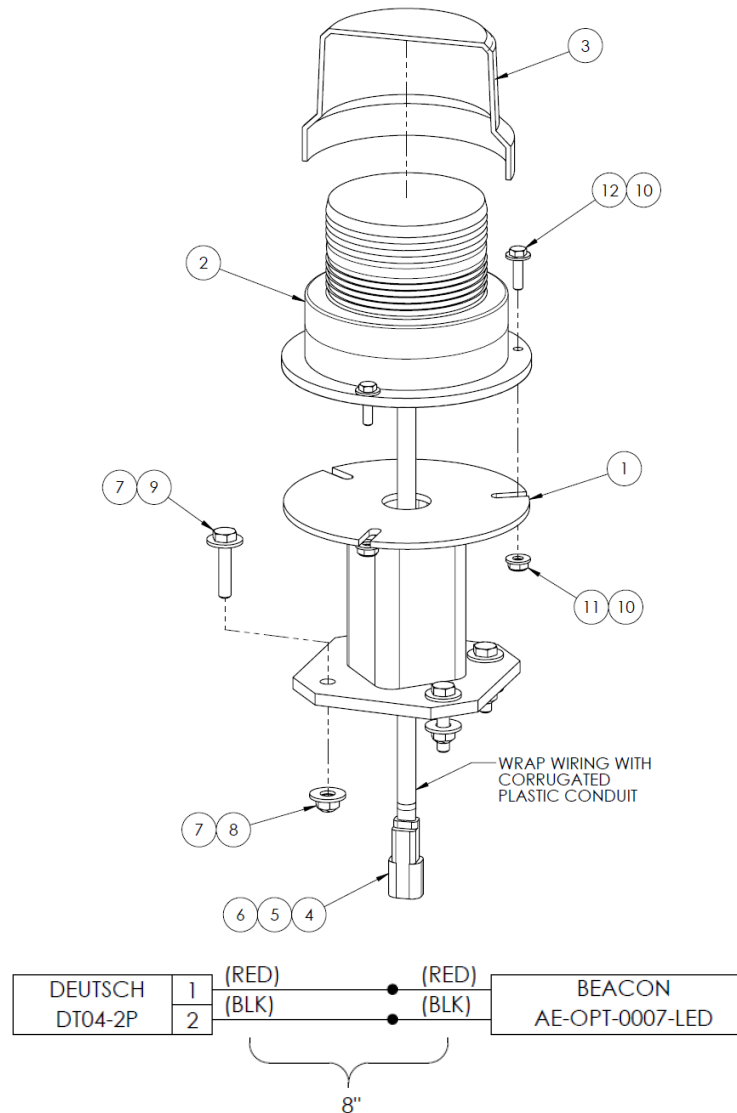


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	326-009	BHCS 1/4-20 X 1"LG	12
2	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	8
3	G-1250-1050N	FLATWASHER, 1/4 NARROW	24
4	G-1439-1050-S	NUTSERT, 1/4-20 OPEN END (ADD TO XA BOM)	2
5	G-1476-105012	SCR, 1/4-20 SOC BUT HD CAP	4
6	J-7964-00	FRONT TRIM, LH	1
7	J-7965-00	FRONT TRIM, RH	1
8	J-7988-00	WINDSHIELD	1
9	J-8197-00	COVER PLATE, HEATER	1
10	S-4369-00	COVER CENTER, BEACON	1
11	Z-10765	ASY, POST MOUNTED LED STROBE	1
12	Z-10765	ASY, POST MOUNTED LED STROBE	1
13	Z-11756-00	BALLAST WELDMENT (WP)	8
14	G-1250-1100W	FLATWASHER, 5/8 WIDE	4
15	G-1727-1100	NUT, 5/8-11 TOP LOCK ZINC	2
16	G-1420-110050	BOLT, 5/8-11 X 5.0" HEX HD GR 8	2
N/S	H-4736-17-S	SHIPPING COVER, ETTX W/O CAB	1

21.3 OPTION O – (ETT-12X) – NO OPERATOR CAB WITH PST MT BEA (continued)



### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>Z-10765</b>	<b>POST MOUNT LED STROBE:</b> consists of;	
1	Z-10766-00	WLD, BEACON POST	1
2	AE-OPT-0007-LED	LED STROBE, ROOF MOUNTED	1
3	JP-166	COVER, STROBE LIGHT	1
4	DT04-2P	DEUTSCH CONNECTOR	1
5	W2P	DEUTSCH LOCK	1
6	0460-215-16141	DEUTSCH TERMINAL	2
7	G-1250-1050W	FLATWASHER, 1/4 WIDE	8
8	G-1727-1050	NUT, 1/4-20 TOP LOCK ZINC	4
9	G-1100-105012	BOLT, 1/4-20 HEX HD GR 5	4
10	G-1250-1030N	FLATWASHER, #10 NARROW	6
11	G-1203-1035	JAMNUT, 10-32 ELASTIC	3
12	G-1150-103506	SCREW, #10-32 HEX HD MACH	3



21.4 ADDITIONAL CAB FEATURES

**Parts List**

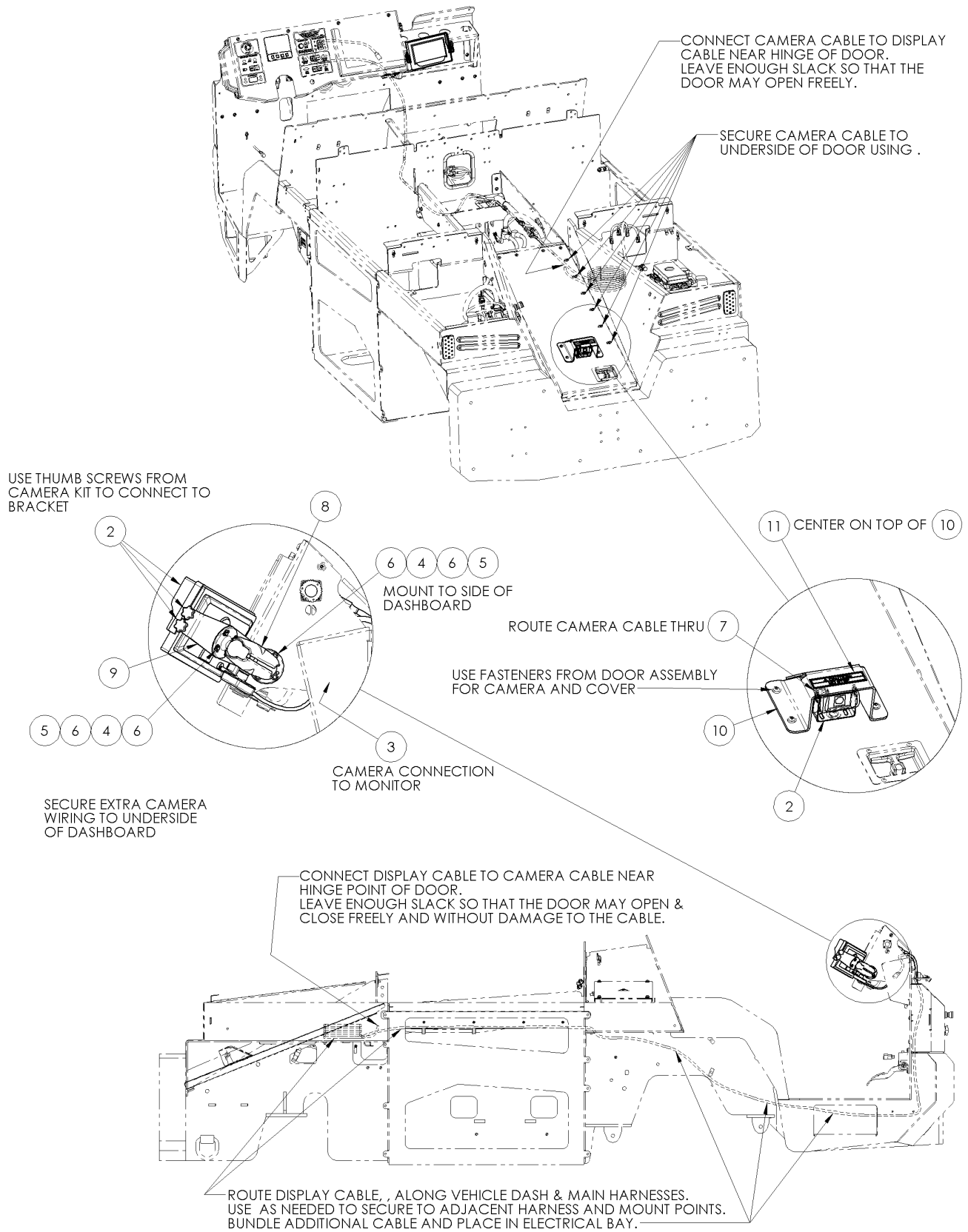
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Part Number	Description	Qty
4416850	FAN	2
4942DA100*	DOOR ASSEMBLY, LH*	1
4942DA200*	DOOR ASSEMBLY, RH*	1
56Z540	DOME LIGHT	4
A141	SWITCHES (FOR THE OVERHEAD CONSOLE)	2
A273-A	REAR WIPER ARM	5
A306	FRONT WIPER ARM	1
A307	FRONT WIPER BLADE	5
A310-1	DOOR STRAP	1
A412	LEFT DOOR ROTARY LATCH	1
A412-A	RIGHT DOOR ROTARY LATCH	1
A419	DOOR CATCH (STRIKER BOLT)	2
A458	LEFT DOOR OUTER HANDLE/RELEASE	1
A459	RIGHT DOOR OUTER HANDLE/RELEASE	1
A471	LEFT DOOR INNER HANDLE/RELEASE	1
A472	RIGHT DOOR INNER HANDLE/RELEASE	1
A473	REAR WIPER MOTOR	1
A474	REAR WIPER BLADE	5
IAE002	FRONT WIPER MOTOR KIT (INCLUDES MOTOR, PIVOT SHAFT, AND LINKAGE)	1
48026	SUN VISOR	1
A413	LINKAGE ASSY	1
A413-A	LINKAGE ASSY	1
A455	WINDSHIELD	1
A456	REAR WINDOW	1
A457	LOWER GLASS DOOR	1

\*4942DA100 & 4942DA200 MUST BE ORDERED WITH PRODUCTION ORDERS

## 22.0 CAMERA FEATURE

## 22.1 BACKUP CAMERA, REAR





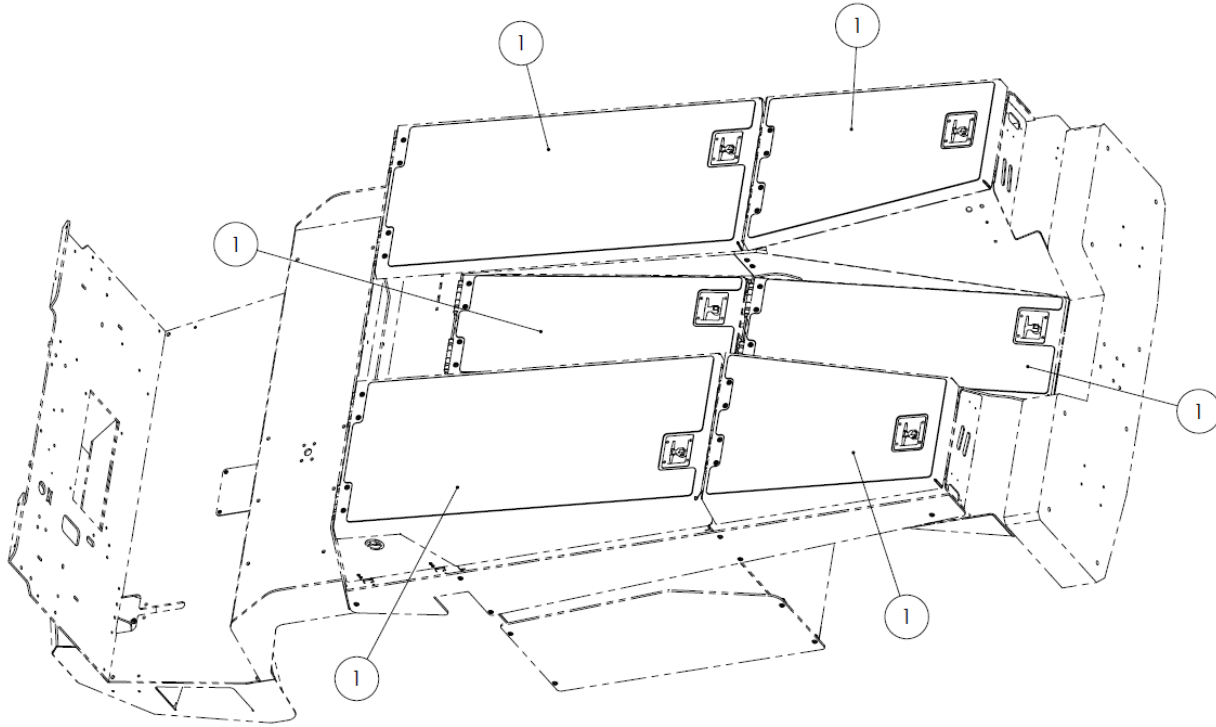
22.1 BACKUP CAMERA, REAR (continued)

### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	491-086	CABLE TIE, 5.9 LG	30
2	EC-3409	REAR VIEW CAMERA	1
3	EC-3457	WIRE HARNESS, ET8NX-CAMERA	1
4	G-1150-102012	SCREW, #8-32 X 3/4" LG HEX HD MACHINE	8
5	G-1202-1020	STOPNUT, #8-32 ELASTIC	8
6	G-1250-1020N	FLATWASHER, #8 NARROW	16
7	H-1901-20	GROMMET, 1/2 INCH	1
8	H-5050	ARM, ARTICULATING	1
9	S-4372-00	DISPLAY MOUNT (WP)	1
10	S-4506-00	COVER, CAMERA (WP)	1
11	V-2545	LABEL, NO STEP	1

23.0 DECK FEATURE  
23.1 DIAMOND TREAD PVC DECK

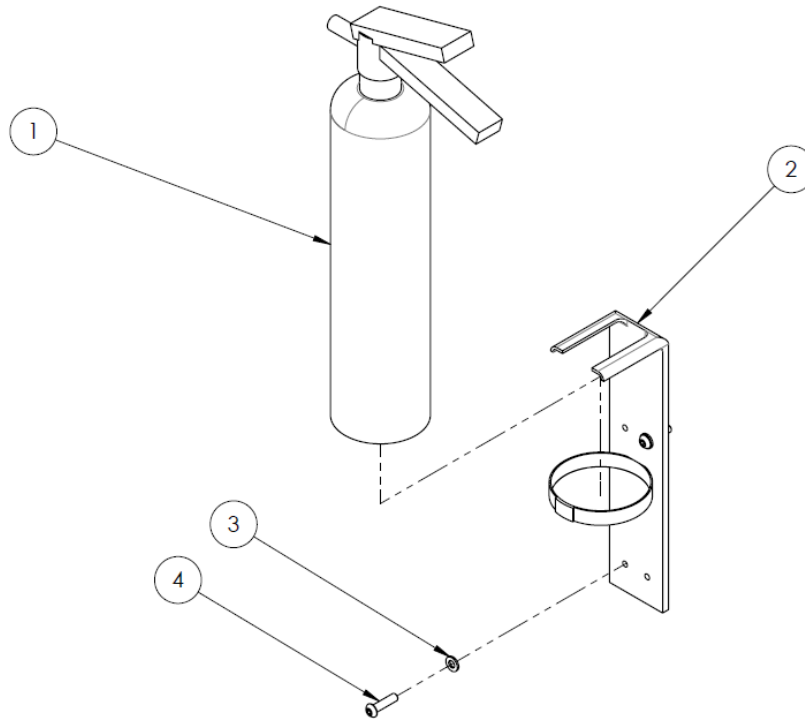


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	K-5593	KIT, DECKING, ETT8-NX	1

## 24.0 FIRE EXTINGUISHER, 5 LB ABC, FEATURE

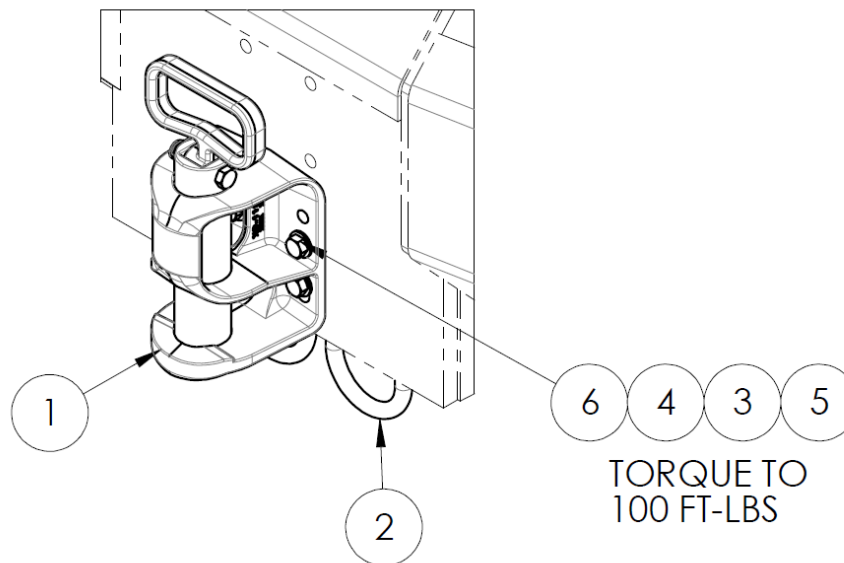


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	H-3075	FIRE, EXTINGUISHER	1
2	H-3076	BRACKET, EXTINGUISHER	1
3	G-1502-1050R	LOCKWASHER, 1/4 REGULAR S.S.	2
4	G-1476-105010	SCR, 1/4-20 SOC BUT HD CAP	2

**25.0 FRONT HITCH FEATURE**  
25.1 OPTION A – 2.125 S LEVEL E-HITCH



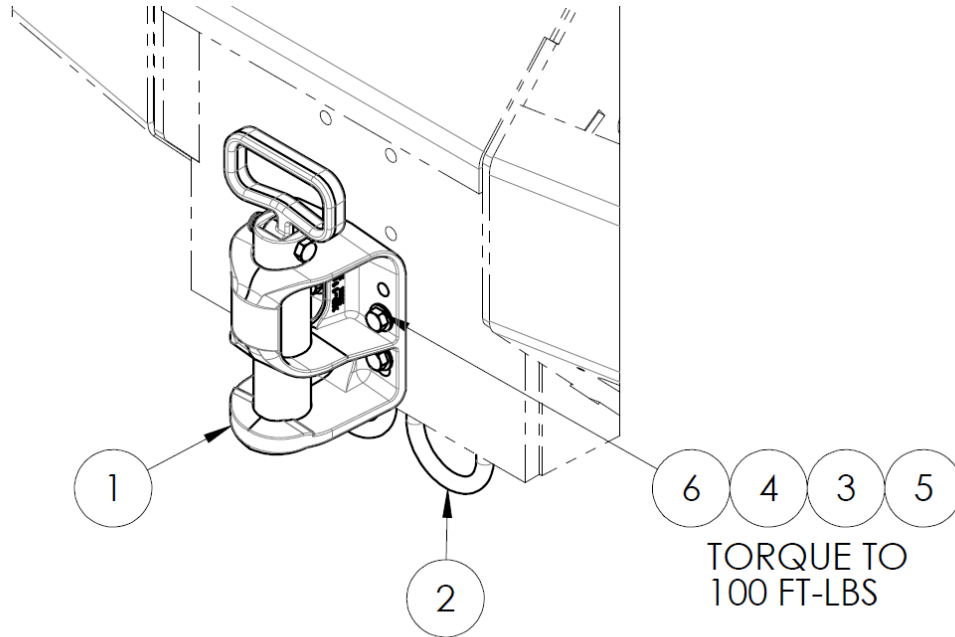
### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	AE-OPT-0033-1	E HITCH	1
2	Z-10536-00	WLD, TIE DOWN	1
3	G-1250-1090W	FLATWASHER, 1/2 WIDE	4
4	G-1250-1090N	FLATWASHER, 1/2 NARROW	4
5	G-1202-1090	STOPNUT, 1/2-13 ELASTIC	4
6	G-1420-109024	BOLT, 1/2-13 X 2-1/2 H.H. GR 8	4



25.2 OPTION B – 2.125 S LEVEL E-HITCH A-LK

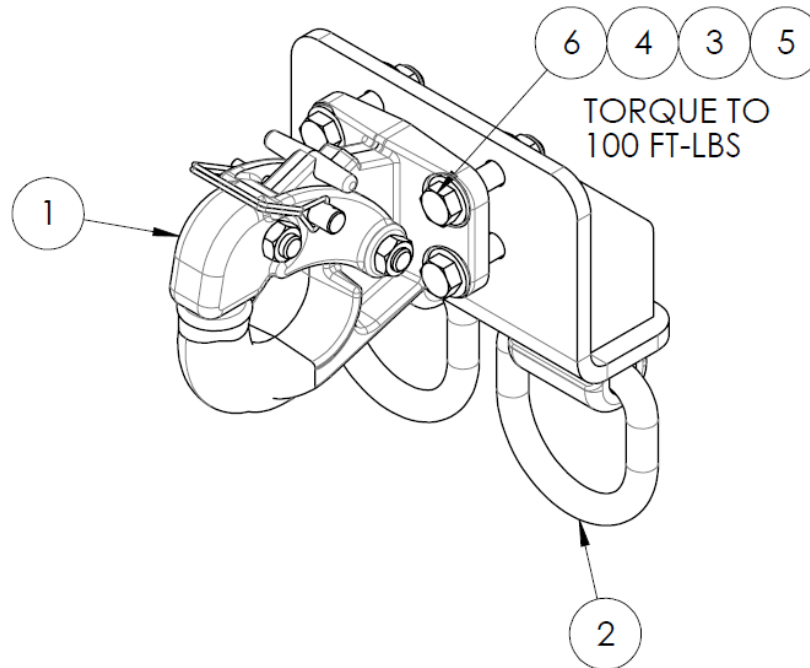


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	OPT-NVSP-034-A	E HITCH 2-1/8 PIN W/AUTOLOCK	1
2	Z-10536-00	WLD, TIE DOWN	1
3	G-1250-1090W	FLATWASHER, 1/2 WIDE	4
4	G-1250-1090N	FLATWASHER, 1/2 NARROW	4
5	G-1202-1090	STOPNUT, 1/2-13 ELASTIC	4
6	G-1420-109024	BOLT, 1/2-13 X 2-1/2 H.H. GR 8	4

25.3 OPTION C – PINTEL HITCH

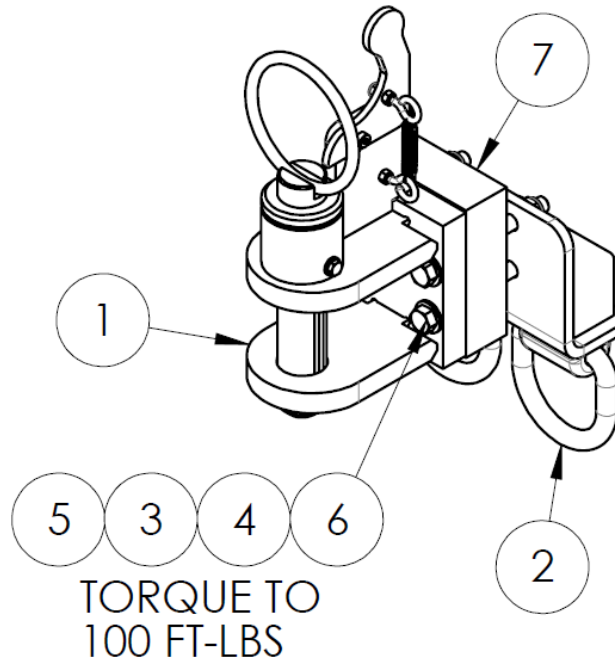


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	AE-OPT-0028	PINTLE HOOK	1
2	Z-10536-00	WLD, TIE DOWN	1
3	G-1250-1090W	FLATWASHER, 1/2 WIDE	4
4	G-1250-1090N	FLATWASHER, 1/2 NARROW	4
5	G-1202-1090	STOPNUT, 1/2-13 ELASTIC	4
6	G-1420-109024	BOLT, 1/2-13 X 2-1/2 H.H. GR 8	4

25.4      OPTION D – 1.5 SGL LEVEL E-HITCH

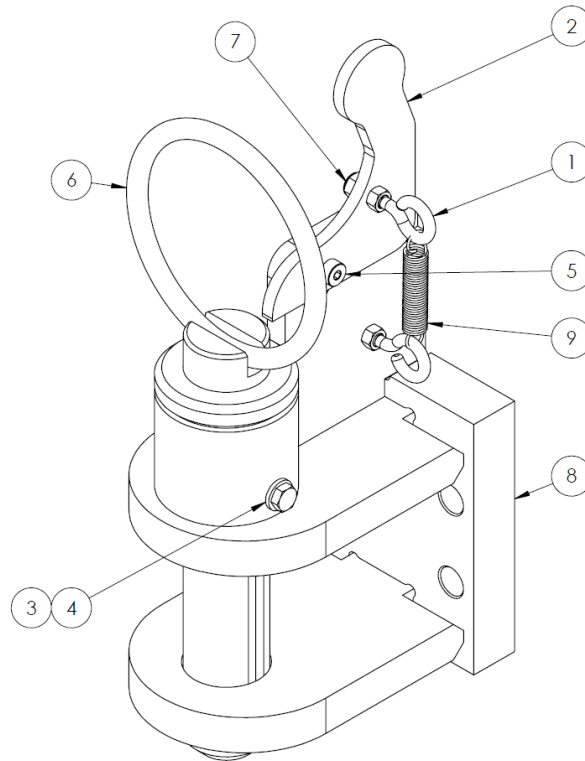


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	K-5267	KIT, SINGLE LEVEL TOW HITCH	1
2	Z-10536-00	WLD, TIE DOWN	1
3	G-1250-1090W	FLATWASHER, 1/2 WIDE	4
4	G-1250-1090N	FLATWASHER, 1/2 NARROW	4
5	G-1202-1090	STOPNUT, 1/2-13 ELASTIC	4
6	G-1420-109050	BOLT, 1/2-13 HEX HD GR 8	4
7	J-8155-00	SPCR BLK, S LEVEL E-HITCH	1

25.4 OPTION D – 1.5 SGL LEVEL E-HITCH (*continued*)

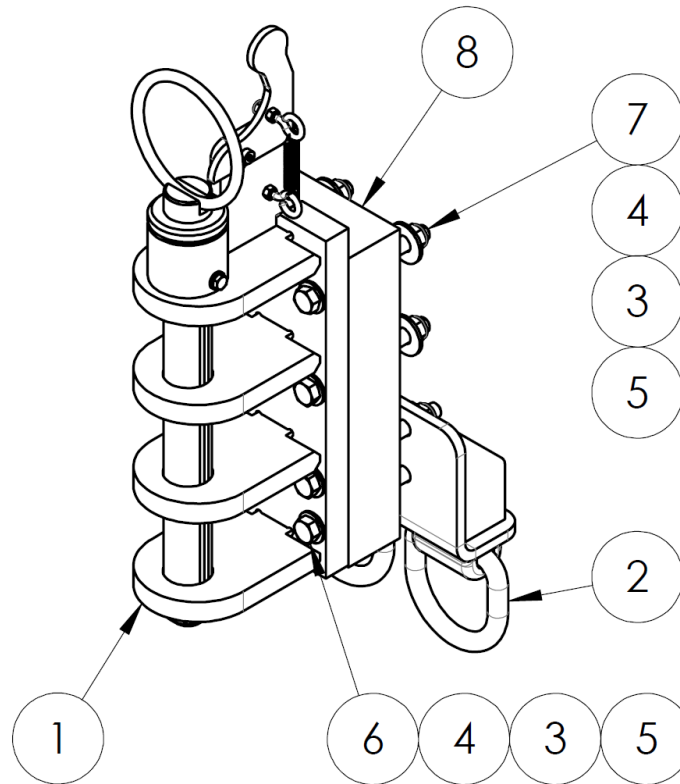


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>K-5267</b>	<b>KIT, SINGLE LEVEL TOW HITCH:</b> consists of;	
1	H-4328	EYEBOLT, 1/2 EYE 1/4-20 THREAD	2
2	J-6859	PLATE, LEVER	1
3	G-1420-106006	BOLT, 5/16-18 HEX HD GR 8	1
4	G-1502-1060R	LOCKWASHER, 5/16 REGULAR S.S.	1
5	G-1708-1050025	SCREW, HEX SOCKET HD SHLD	1
6	Z-10188	WELDMENT, PIN	1
7	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	1
8	Z-10193	WELDMENT, SINGLE LEVEL HITCH	1
9	H-4339	EXTENSION SPRING, 2.25-4.6 LG	1

25.5 OPTION E – 1.5 MLT LEVEL E-HITCH



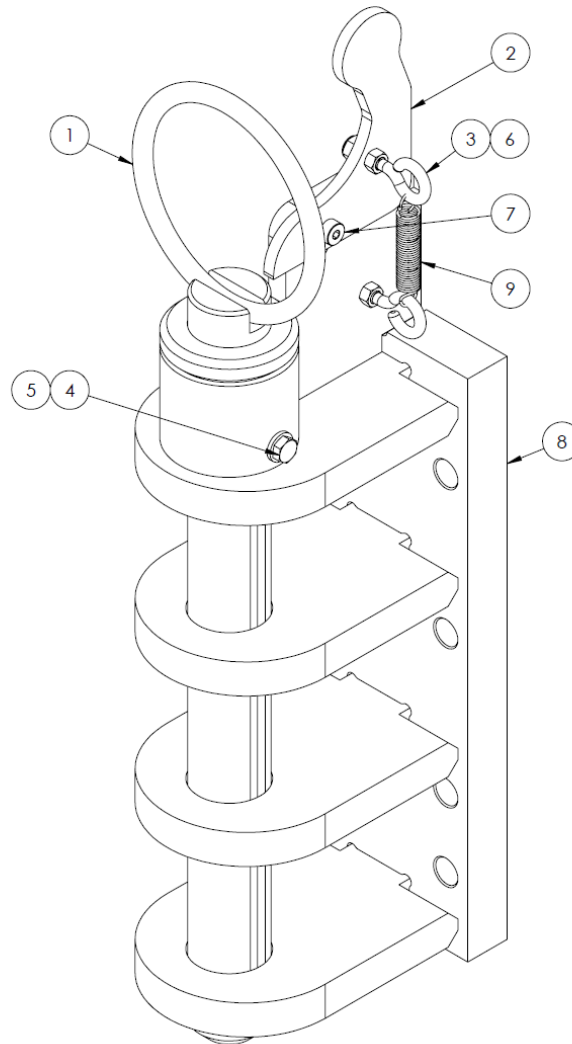
TORQUE TO  
100 FT-LBS

### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	K-5266	KIT, THREE LEVEL TOW HITCH	1
2	Z-10536-00	WLD, TIE DOWN	1
3	G-1250-1090W	FLATWASHER, 1/2 WIDE	8
4	G-1250-1090N	FLATWASHER, 1/2 NARROW	8
5	G-1202-1090	STOPNUT, 1/2-13 ELASTIC	8
6	G-1420-109054	BOLT, 1/2-13 HEX HD GR 8	4
7	G-1420-109550	BOLT, 1/2-20 HEX HD GR 8	4
8	J-8187-00	SPR BLK, MLTI-LVL E-HITCH	1

25.5 OPTION E – 1.5 MLT LEVEL E-HITCH (*continued*)

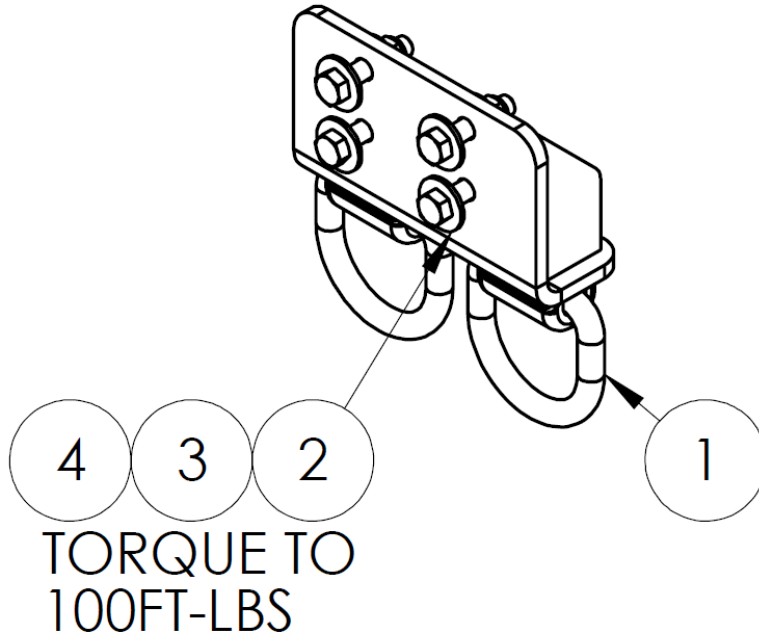


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>K-5266</b>	<b>KIT, THREE LEVEL TOW HITCH:</b> consists of;	
1	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	1
2	G-1420-106006	BOLT, 5/16-18 HEX HD GR 8	1
3	G-1500-1050	NUT, 1/4-20 HEX S.S.	1
4	G-1502-1060R	LOCKWASHER, 5/16 REGULAR S.S.	1
5	G-1708-1050025	SCREW, HEX SOCKET HD SHLD	1
6	H-4328	EYEBOLT, 1/2 EYE 1/4-20 THREAD	2
7	H-4339	EXTENSION SPRING, 2.25-4.6 LG	1
8	J-6859	PLATE, LEVER	1
9	Z-10132	WELDMENT, HITCH PIN	1
10	Z-10189	WELDMENT, MULTILEVEL HITCH	1

25.6 OPTION O – NO FRONT HITCH

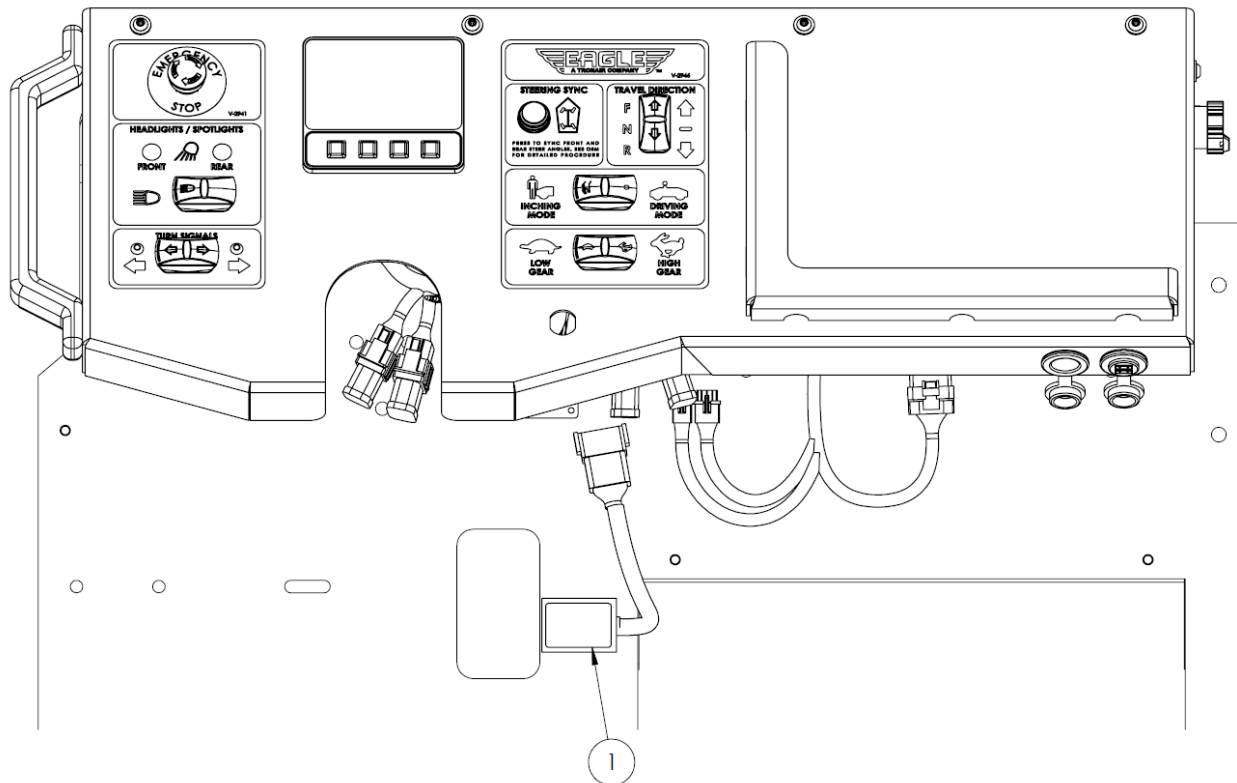


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

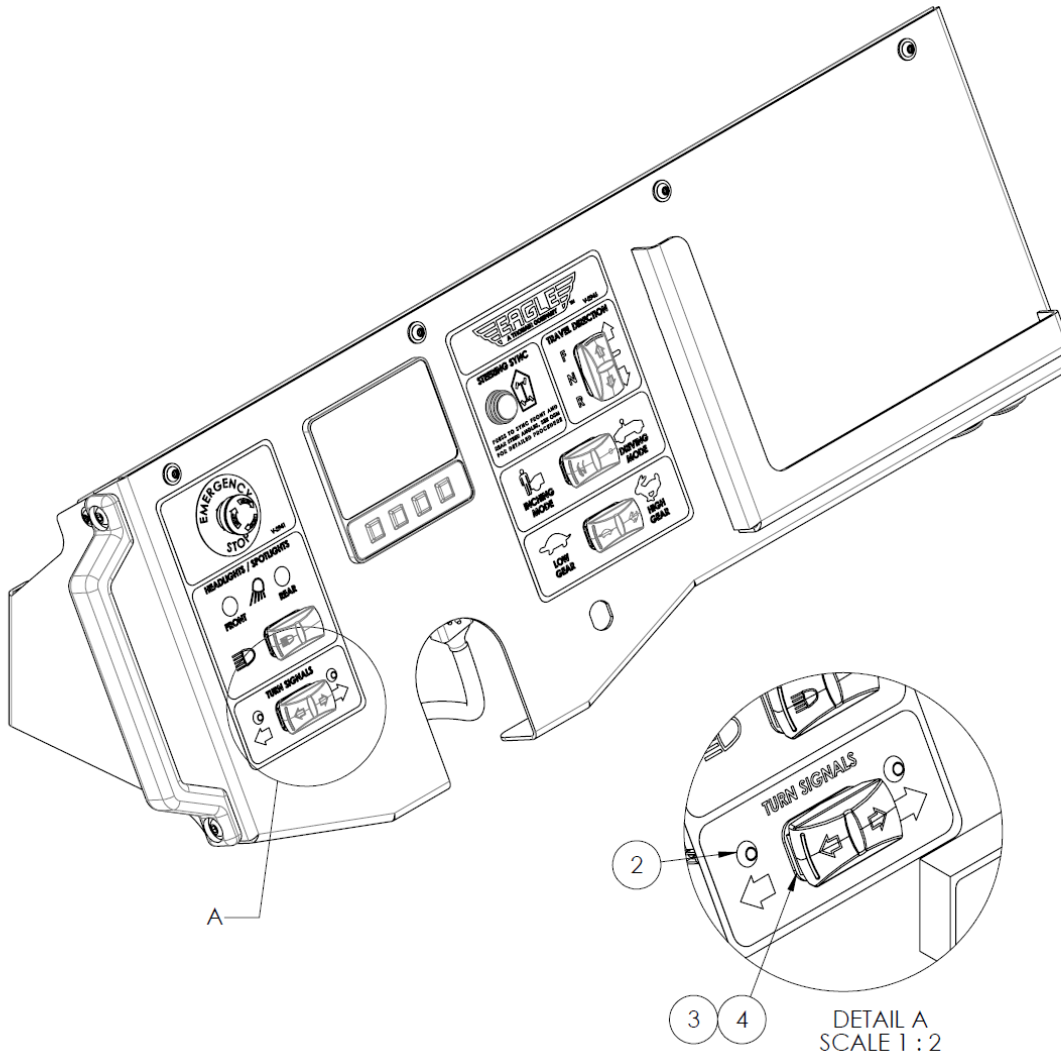
Item	Part Number	Description	Qty
1	Z-10536-00	WLD, TIE DOWN	1
2	G-1250-1090W	FLATWASHER, 1/2 WIDE	8
3	G-1202-1090	STOPNUT, 1/2-13 ELASTIC	4
4	G-1420-109022	BOLT, 1/2-13 HEX HD GR 8	4

**26.0 LIGHTING FEATURE**  
**26.1 OPTION A – TURN SIGNAL**





26.1 OPTION A – TURN SIGNAL *(continued)*

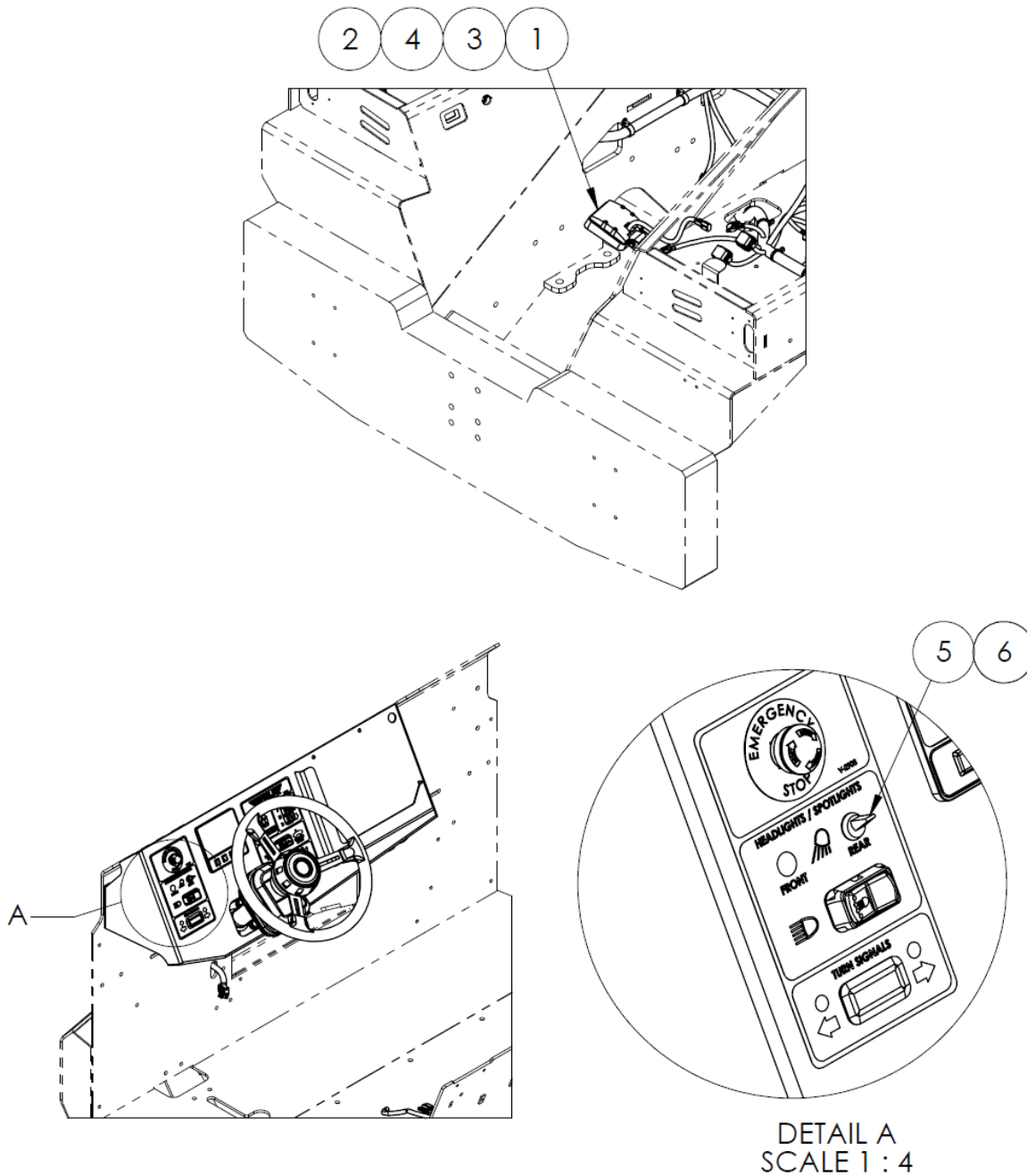


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	Z-10836	ASY, TURN SIG MODULE WITH CONN	1
2	NVSP-14-035-CA	LED PANEL INDICATOR AMBER	2
3	EC-3359	TURN SIG WIRING W PILOTS	1
4	EC-3450-02	TURN SIGNAL SWITCH	1

26.2 OPTION B – TURN SIGNAL

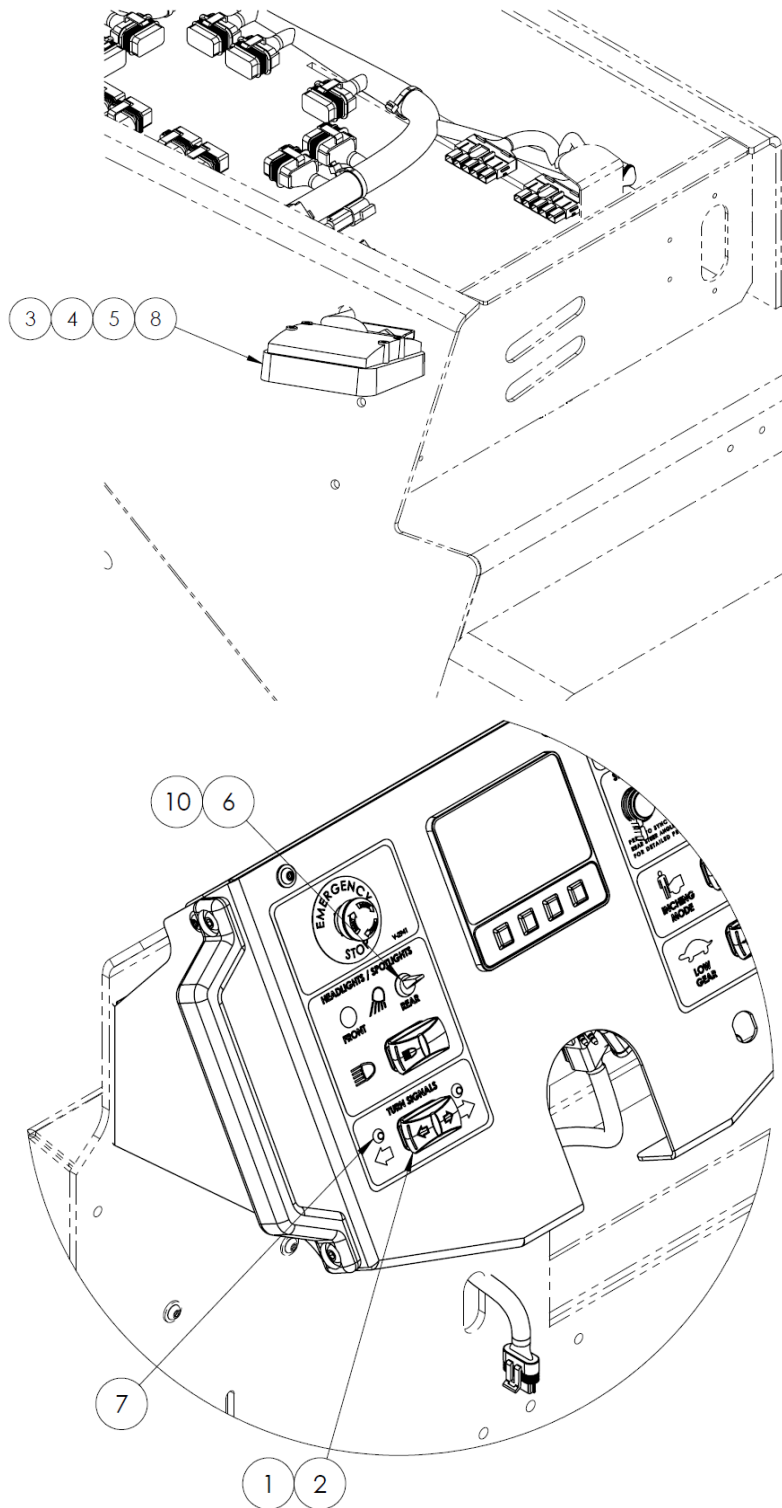


### Parts List

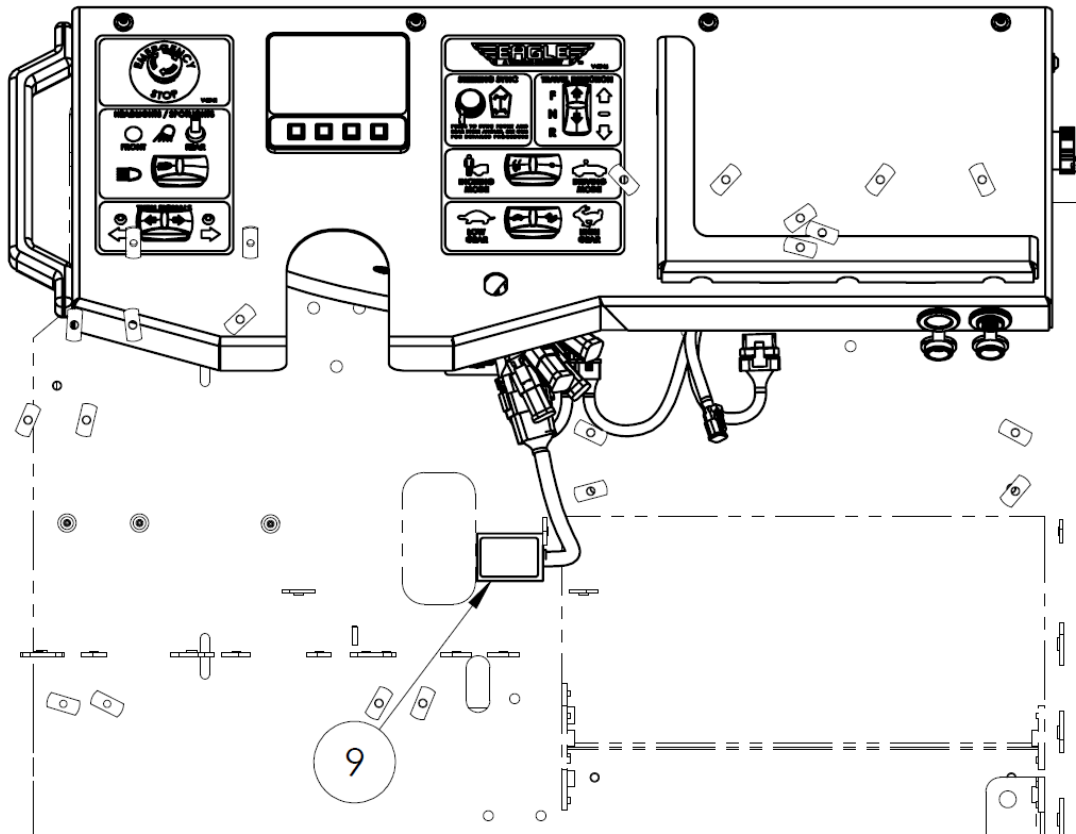
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	Z-9825	ASY, HEADLIGHT W/CONNECTOR	1
2	G-1793-12	NUT, HEX CLASS 8 M10X1.5	1
3	G-1515-M100	FLATWASHER, M10	1
4	G-1514-M100R	LOCKWASHER, M 10 REGULAR	1
5	NVSP-14-008-CA	TOGGLE SWITCH	1
6	Z-10863	ASY, SPOT SWITCH WIRING	1

26.3 OPTION D – RR SPOTLIGHT, TURN SIGNAL



26.3 OPTION D – RR SPOTLIGHT, TURN SIGNAL (continued)

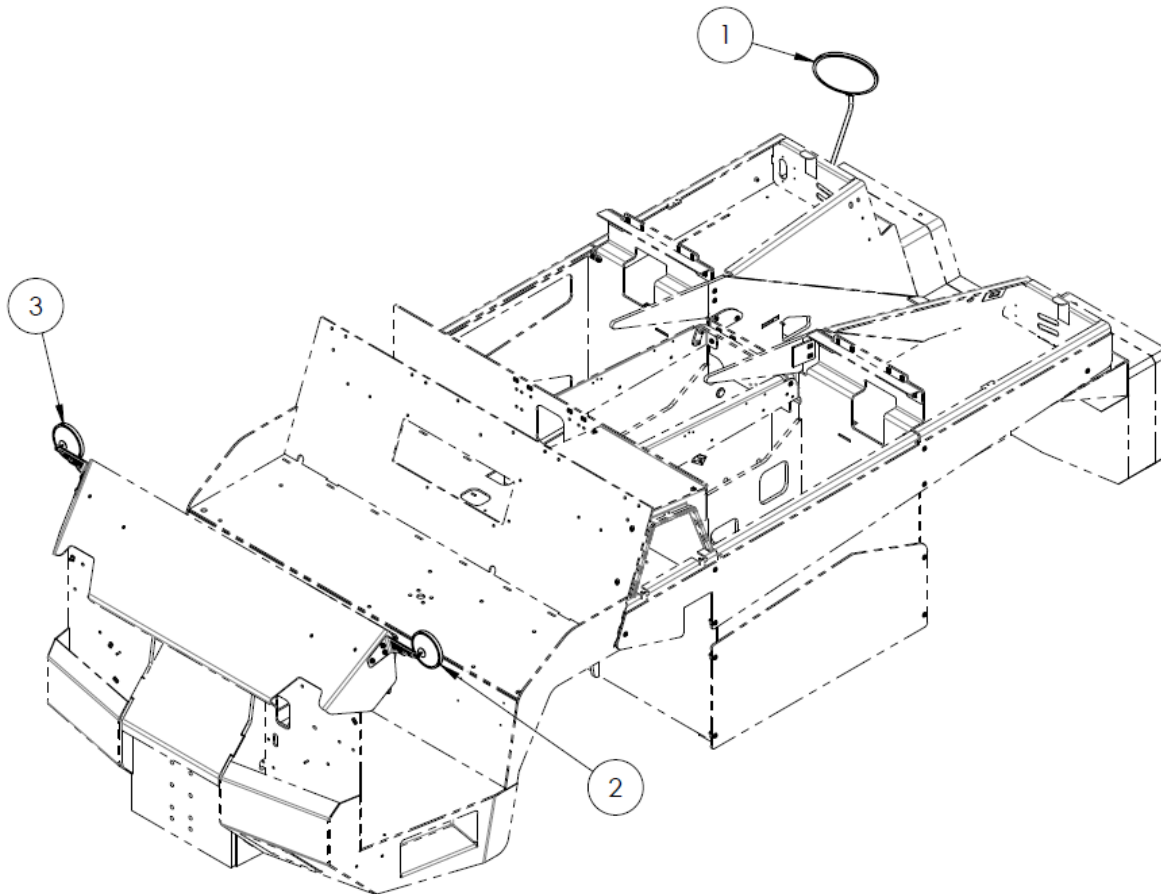


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	EC-3359	TURN SIG WIRING W PILOTS	1
2	EC-3450-02	TURN SIGNAL SWITCH	1
3	G-1514-M100R	LOCKWASHER, M 10 REGULAR	1
4	G-1515-M100	FLATWASHER, M10	1
5	G-1793-12	NUT, HEX CLASS 8 M10X1.5	1
6	NVSP-14-008-CA	SPOTLIGHT SWITCH DASH ILLUMINATED	1
7	NVSP-14-035-CA	LED PANEL INDICATOR AMBER	2
8	Z-9825	ASY, HEADLIGHT W/CONNECTOR	1
9	Z-10836	ASY, TURN SIG MODULE WITH CONN	1
10	Z-10863	ASY, SPOT SWITCH WIRING	1

27.0 MIRROR FEATURE  
27.1 OPTION C – MIRROR (NO CAB)

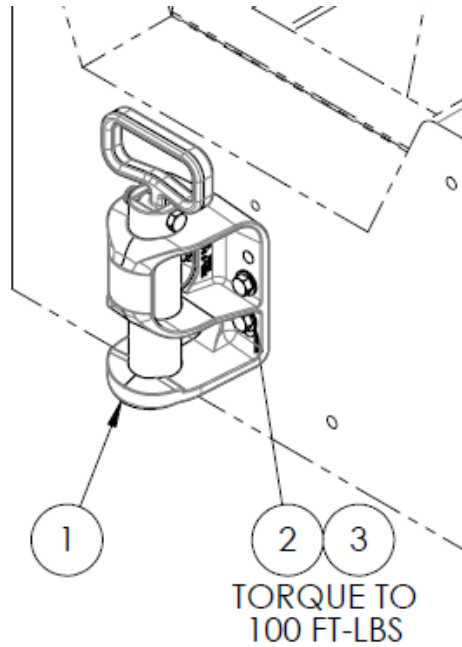


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	Z-11695	SUB-ASSY, REAR VIEW MIRROR	1
2	Z-11752	ASSY, SIDE VIEW MIRROR, LH	1
3	Z-11753	ASSY, SIDE VIEW MIRROR, RH	1

**28.0 REAR HITCH FEATURE**  
28.1 OPTION A – 2.125 S LEVEL E-HITCH

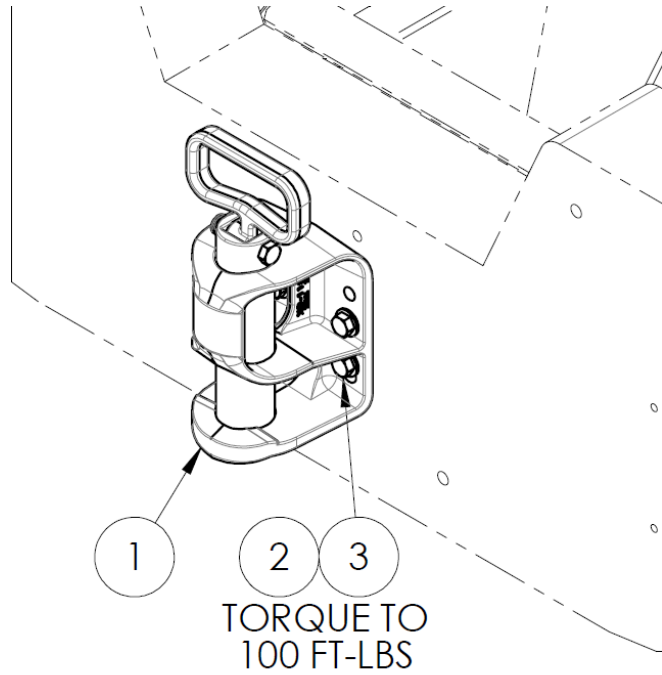


**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	AE-OPT-0033-1	E HITCH	1
2	G-1250-1090N	FLATWASHER, 1/2 NARROW	4
3	G-1420-109014	BOLT, 1/2-13 HEX HD GR 8	4

28.2 OPTION B – 2.125 S LEVEL E-HITCH A-LK

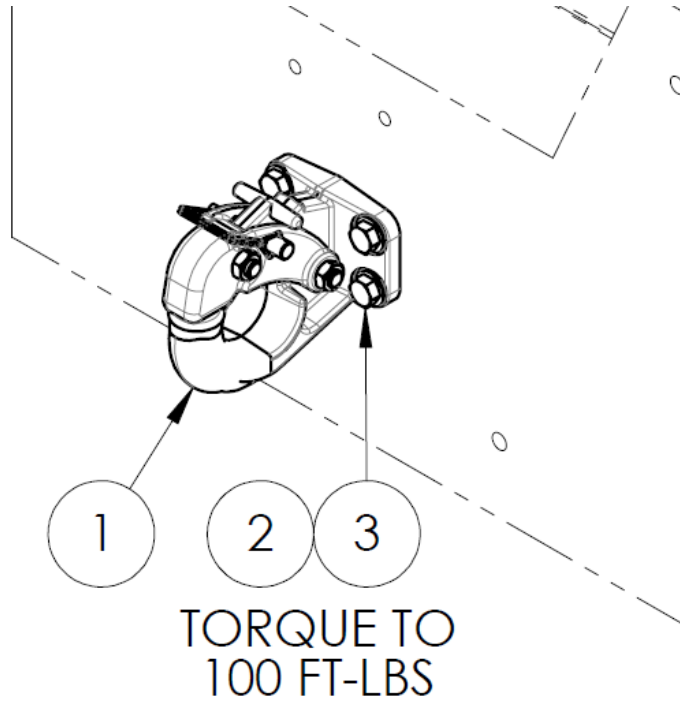


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	OPT-NVSP-034-A	E HITCH 2-1/8 PIN W/AUTOLOCK	1
2	G-1250-1090N	FLATWASHER, 1/2 NARROW	4
3	G-1420-109014	BOLT, 1/2-13 HEX HD GR 8	4

28.3 OPTION C – PINTEL HITCH



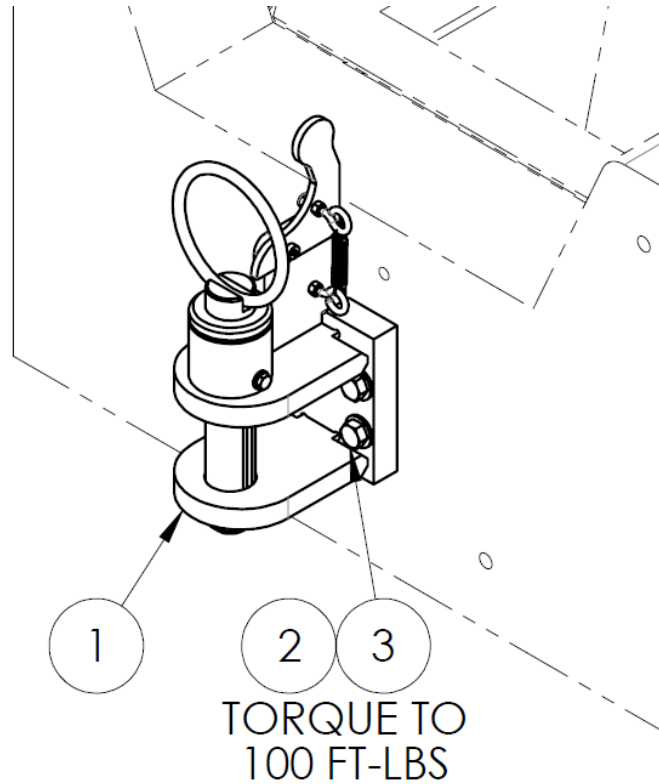
**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	AE-OPT-0028	PINTLE HOOK	1
2	G-1250-1090N	FLATWASHER, 1/2 NARROW	4
3	G-1420-109014	BOLT, 1/2-13 HEX HD GR 8	4



28.4 OPTION D – 1.5 SGL LEVEL E-HITCH

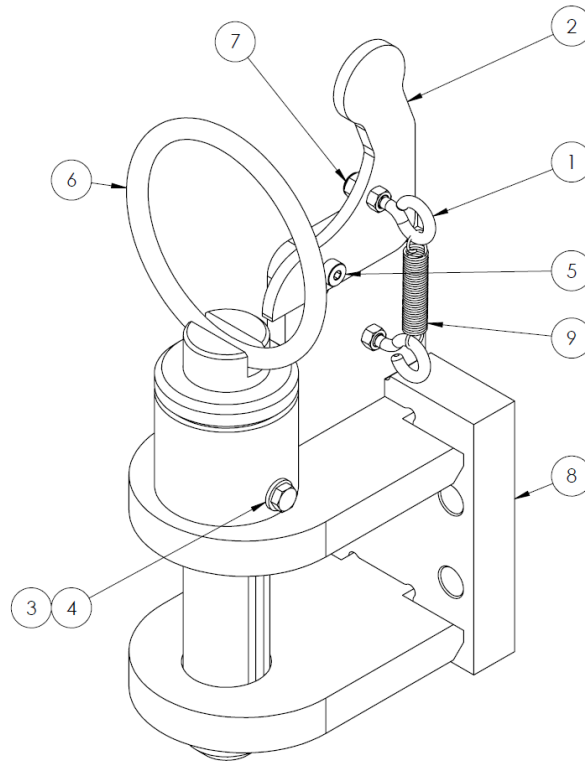


**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	K-5267	KIT, SINGLE LEVEL TOW HITCH	1
2	G-1250-1090N	FLATWASHER, 1/2 NARROW	4
3	G-1420-109020	BOLT, 1/2-13 HEX HD GR 8	4

28.4 OPTION D – 1.5 SGL LEVEL E-HITCH (*continued*)

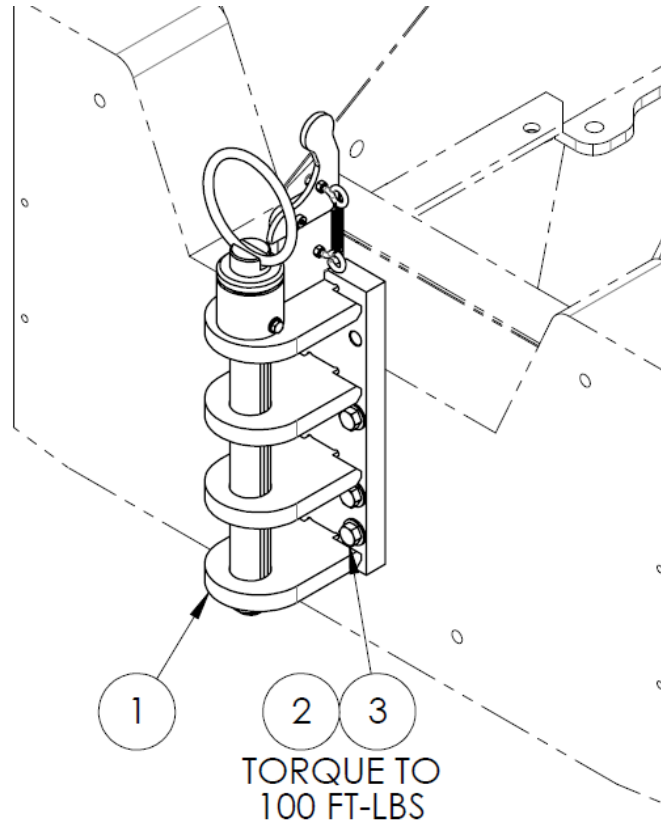


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>K-5267</b>	<b>KIT, SINGLE LEVEL TOW HITCH:</b> consists of;	
1	H-4328	EYEBOLT, 1/2 EYE 1/4-20 THREAD	2
2	J-6859	PLATE, LEVER	1
3	G-1420-106006	BOLT, 5/16-18 HEX HD GR 8	1
4	G-1502-1060R	LOCKWASHER, 5/16 REGULAR S.S.	1
5	G-1708-1050025	SCREW, HEX SOCKET HD SHLD	1
6	Z-10188	WELDMENT, PIN	1
7	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	1
8	Z-10193	WELDMENT, SINGLE LEVEL HITCH	1
9	H-4339	EXTENSION SPRING, 2.25-4.6 LG	1

28.5      OPTION E – 1.5 MTL LEVEL E-HITCH

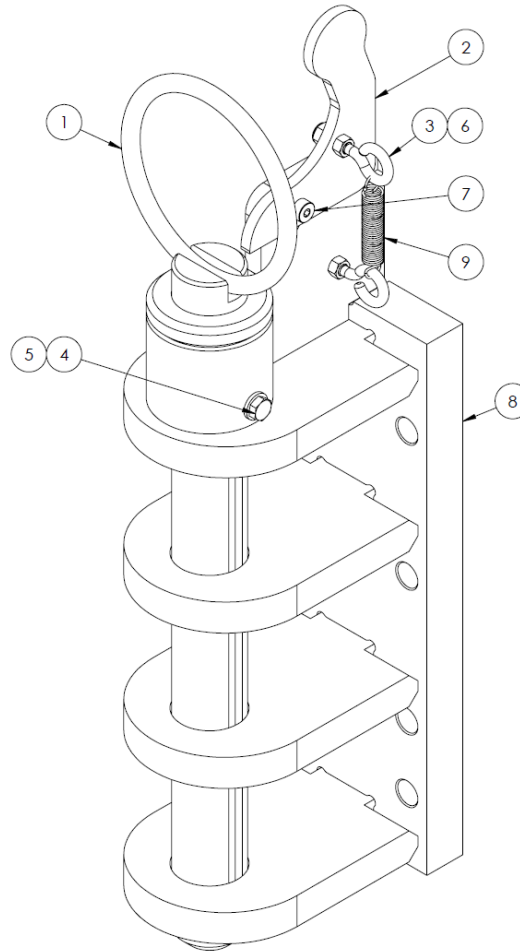


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	K-5266	KIT, THREE LEVEL TOW HITCH	1
2	G-1250-1090N	FLATWASHER, 1/2 NARROW	6
3	G-1420-109020	BOLT, 1/2-13 HEX HD GR 8	6

28.5 OPTION E – 1.5 MTL LEVEL E-HITCH (*continued*)

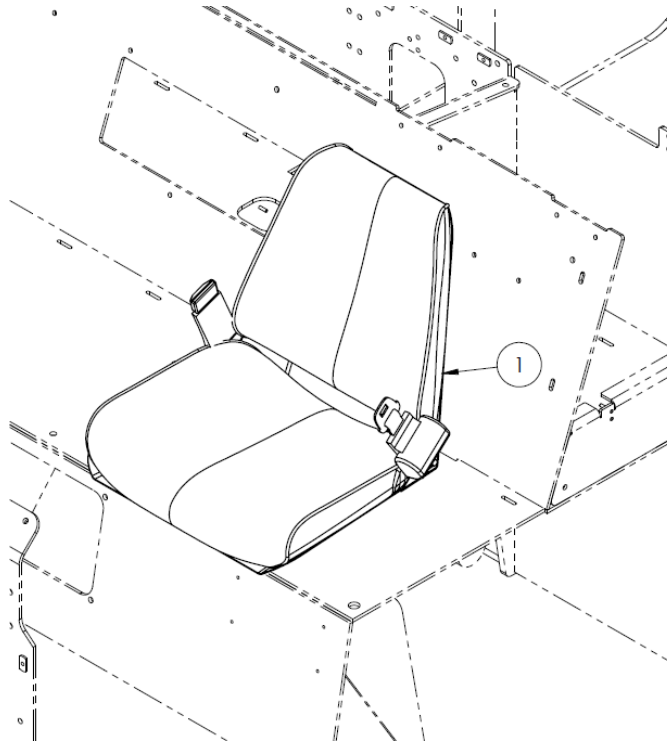


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	<b>K-5266</b>	<b>KIT, THREE LEVEL TOW HITCH:</b> consists of;	
1	G-1202-1050	STOPNUT, 1/4-20 ELASTIC	1
2	G-1420-106006	BOLT, 5/16-18 HEX HD GR 8	1
3	G-1500-1050	NUT, 1/4-20 HEX S.S.	1
4	G-1502-1060R	LOCKWASHER, 5/16 REGULAR S.S.	1
5	G-1708-1050025	SCREW, HEX SOCKET HD SHLD	1
6	H-4328	EYEBOLT, 1/2 EYE 1/4-20 THREAD	2
7	H-4339	EXTENSION SPRING, 2.25-4.6 LG	1
8	J-6859	PLATE, LEVER	1
9	Z-10132	WELDMENT, HITCH PIN	1
10	Z-10189	WELDMENT, MULTILEVEL HITCH	1

29.0 SEAT FEATURE  
29.1 OPTION A - NO SEAT SWITCH

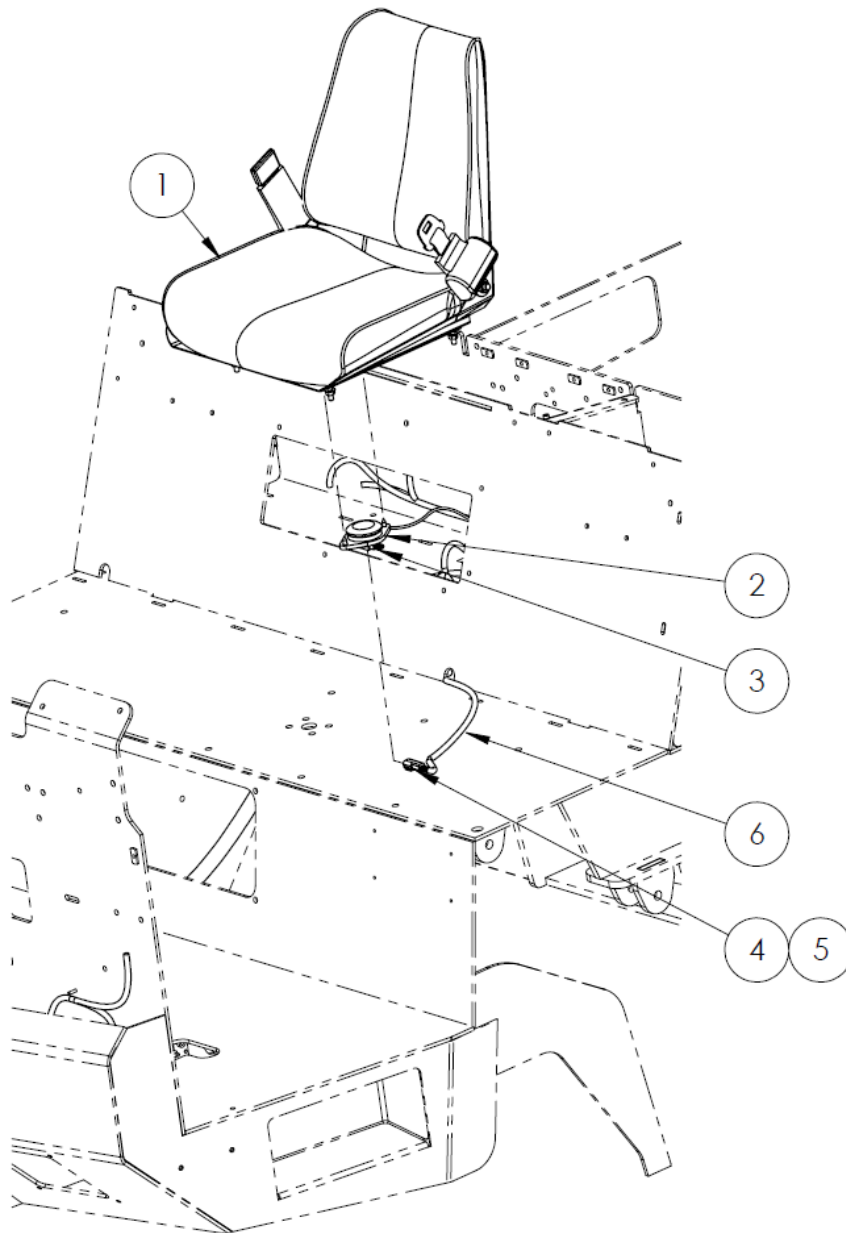


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	A-TT4-0048-1	BUCKET SEAT W BELT & HARDWARE	1

29.2 OPTION O – SEAT SWITCH

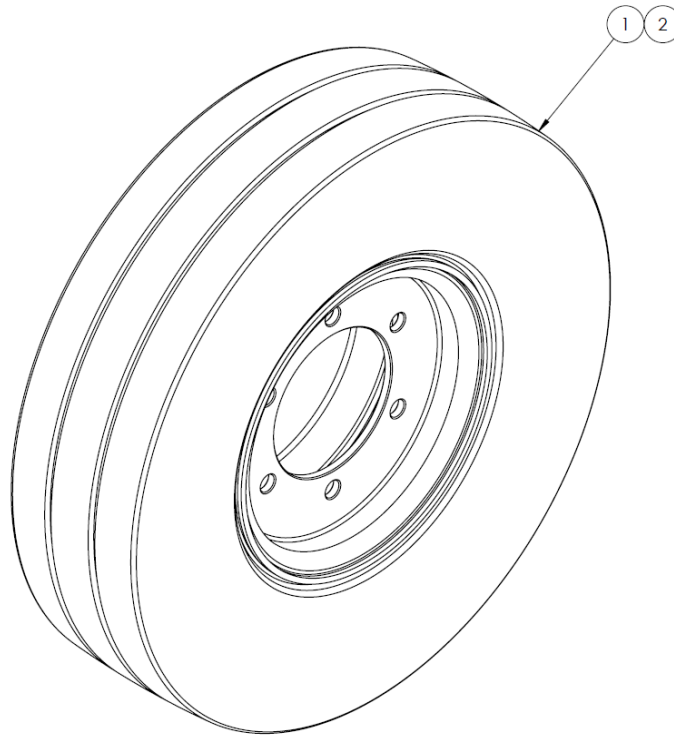


### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	DT04-2P	DEUTSCH CONNECTOR	1
2	EC-1326-01	DISCONNECT, FEMALE RED 1/4 F/I	2
3	GR1020	KILL SWITCH FOR SINGLE SEAT	1
4	H-4912	OPERATOR SEAT (W/ SW MOUNT)	1
5	0460-215-16141	DEUTSCH TERMINAL	2

## 30.0 TIRE FEATURE



### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

#### 30.1 OPTION A – SNW CBL, STD PNE TIRES

Item	Part Number	Description	Qty
1	Z-11335	ASY, TIRE AND RIM, 700R12	4
2	U-1223	SNOW CABLES, 7.00R12	2

#### 30.2 OPTION B – FOAM FILLED TIRE

Item	Part Number	Description	Qty
1	Z-11795	ASY, TIRE AND RIM, FOAM, 700R12	4

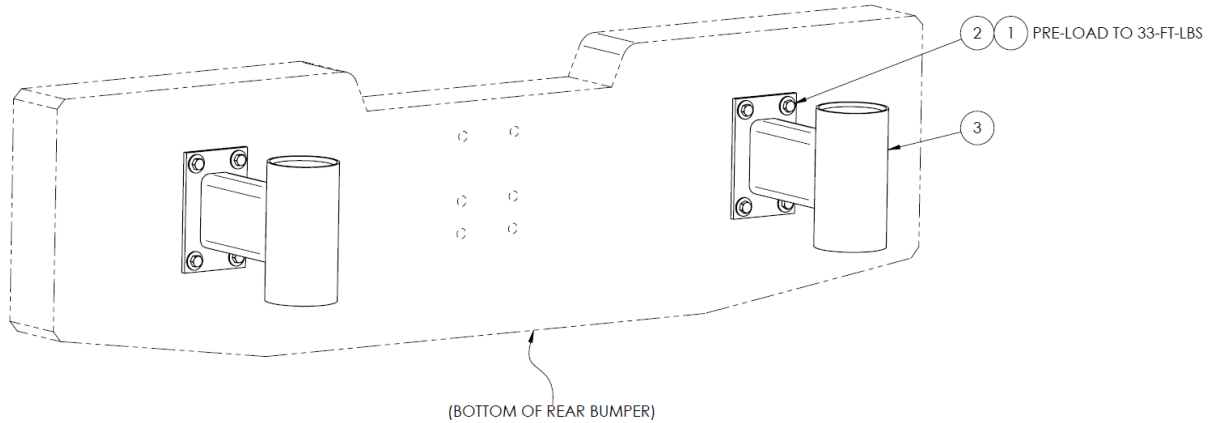
#### 30.3 OPTION C – SNW CBL, FOAM F TIRES

Item	Part Number	Description	Qty
1	U-1223	SNOW CABLES, 7.00R12	2
2	Z-11795	ASSY, TIRE & RIM, FOAM, 700R12	4

#### 30.4 OPTION O – STD PNEUMATIC TIRES

Item	Part Number	Description	Qty
1	Z-11335	ASY, TIRE AND RIM, 700R12	4

31.0 TOWBAR FEATURE  
31.1 TOWBAR HEAD HOLDERS



### Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	G-1250-1070W	FLATWASHER, 3/8 WIDE	8
2	G-1420-107010	BOLT, 3/8-16 HEX HD GR 8	8
3	Z-11605-00	WLD, T-BAR HEAD HOLDER	2





## 32.0 PROVISION OF SPARES

### 32.1 SOURCE OF SPARE PARTS

Spare parts may be obtained from the manufacturer:

**Tronair / Eagle Tugs**

1 Air Cargo Pkwy East  
Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301

Fax: (419) 867-0634

E-mail: sales@tronair.com

Website: www.eagletugs.com

For Spare Parts, Operations & Service Manuals or Service Needs:

Scan the QR code or visit Tronair.com/aftermarket



### 32.2 ORDERING SPARE/SERVICE PARTS

Tronair inventories many of the spare/service parts found in its eTT series tow tractors, and most of these parts can be shipped the day after the order is received. Non-stock parts orders will be shipped as soon as the parts are available.

### 32.3 RECOMMENDED SPARE PARTS LIST

Description	Part Number	Suggested Replacement Interval
Hydraulic Filter	A-ES12-0485	Annually
Key Switch Contactor	EC-3006	As Required
Drive Contactor	Z-11102	As Required
ANL Fuse – 500A (Traction)	EC-1619-19	As Required
ANL Fuse – 150A (Pump/Charge)	EC-1619-09	As Required
Key Switch Relay	NVSP-31-002-CA	As Required
Mini Fuse, 2A (Power Dist. Box)	MIN-2	As Required
Mini Fuse, 5A (Power Dist. Box)	MIN-5	As Required
Mini Fuse, 7.5A (Power Dist. Box)	MIN-7.5	As Required
Mini Fuse, 10A (Power Dist. Box)	MIN-10	As Required
Mini Fuse, 15A (Power Dist. Box)	MIN-15	As Required
Cube Relay (Power Dist. Box)	XL00-81-001-CA	As Required
10X38 FUSE, 250V, 1A	BLN-1	As Required
10X38 FUSE, 250V, 1A	BLN-10	As Required
Headlight	EC-3400	As Required
Front Turn Indicator	Z-9826	As Required
Reverse Lamp	Z-11367	As Required
Amber Marker Lamp	Z-9826	As Required
Work light	Z-11367	As Required
Stop/Tail/Turn Lamp	Z-11366	As Required
12V DC-DC Converter	AE-OPT-0320-B	As Required
Hydraulic Block Coil Kit	ET00-59-001-CA	As Required
Drive Cooling Fan	Z-11062	As Required
Parking Brake Proximity Switch	Z-9940	As Required
Hydraulic Pressure Switch	EC-3493-PGM-1	As Required
Tire, 7.00 R12   TL	Z-11335	As Required
Traction Motor Encoder	ET00-54-001-CA	As Required



### 33.0 IN SERVICE SUPPORT

Contact Tronair for technical services and information. See Section 1.3 – Manufacturer.

#### 33.1 TECHNICAL ASSISTANCE

When addressing a repair procedure or operational problem, please remember that Tronair technical support is only a phone call away. Tronair technicians are available to assist you in vehicle diagnostics and recommended repair procedures. We encourage you to use this service to reduce machine down-time and to gain a better understanding of proper repair procedures.

### 34.0 GUARANTEES/LIMITATION OF LIABILITY - EAGLE 3-YEAR WARRANTY

The Eagle Tugs (Eagle) 3-Year Warranty covers all NEW TT-series, TTR-series, eTT-series, XL-series, eXL-series and USATS tow tractors, used in aviation applications. Eagle Tugs warrants that these tractors will be free from defects in material and workmanship for a period of 3 years or 3,000 operating hours from date of delivery, with the exception of the electrical system which is covered for a period of 1 year or 1,000 hours (See electrical component warranty for eTT & eXL electric tow tractors below).

Electrical Component Warranty for eTT & eXL electric tow tractors: The following electrical components will be covered under Eagle's 3-year Warranty as they are considered major drive train components: Traction & Hydraulic Pump Motors, Drive Inverter for both the Traction and Hydraulic Pump Motors, Main & Pump Contactors, High and Low Hydraulic Pressure Switches, Steer & Shift Solenoids, DC-DC Converters, and the Programmable Vehicle Controller. This warranty does not extend to the batteries and battery chargers as these are warranted directly to the user by their respective manufacturer and not by Eagle or an Authorized Service Representative.

This warranty does not apply to any Eagle tow tractor, or component part(s) that have damage caused by: misuse of the vehicle, accidents, collision or object striking the vehicle, vandalism, fire, explosion or water damage, using contaminated or improper fuel/fluids, customer-applied chemicals to painted surfaces, improper handling or application, maintenance neglect including lack of lubricants or fluids; nor does it extend to the Eagle tow tractor and/or parts which have been repaired or altered outside of Eagle's plant or the facility of an Authorized Service Representative without the permission of Eagle. Furthermore, any modification of the tow tractor's electrical system MUST be preapproved and documented in writing by Eagle. Failure to do so voids the unit's electrical component warranty.

This warranty does not apply to routine maintenance or wearable parts of the Eagle tow tractor such as: tires, brake pads or shoes, ball joints, kingpins, u-joints, wheel bearings, filters, seals, spark plugs, hoses, belts, light bulbs, batteries (Diesel & Gas tractors), fuses or similar items. Also snow plows and transit pro options are warranted directly to the user by their respective manufacturer and not by Eagle or an Authorized Service Representative. However, all brackets, guards, and mounts made by Eagle for these options are covered under the 3-year Warranty.

This warranty does not cover or provide credit for the following: tractor rental or other substitute equipment; lodging; loss of time, income, sales or profits; loss of the use of tractor; telephone calls or communication expense; lift truck; storage fees; injury or death to persons or damage or destruction of property; or consequential, incidental or punitive damages

Warranty Claim Procedure: When a warranty situation arises, it is essential that the customer contact our Product Support Group (PSG) at 1-800-426-6301 (prompt 6). The customer will need to provide PSG with the tow tractor serial number and operating hours. A PSG representative will analyze the problem and determine the next steps. In many cases Eagle's technical support personnel will be able to analyze the problem and recommend a solution that will solve the problem and reduce down time. If further service is required, an Eagle product support representative will work with customer personnel to arrange a service provider and/or will send parts to your facility for the repair as quickly as possible. The determination of a warrantable claim will be at the sole discretion of Eagle.

Notice of any claimed defect must be given to Eagle within the warranty period and within ten (10) days after such defect is discovered. Liability under this warranty is limited to either replacing or repairing, at Eagle's election, any part or parts deemed defective after examination by Eagle or an Authorized Service Representative. Eagle reserves the right to use remanufactured parts as replacements in warranty claims.

At Eagle's election, any part replaced under warranty as defective can be sent out for third party inspection. If the part is not found to be defective, or abuse was the cause for the failure, all associated costs related to the warranty claim may be charged to the customer. All parts returned to Eagle by a customer must be received without further damage. If returned items are not properly packaged for return shipping to Eagle or an Authorized Service Representative via prepaid transportation, the customer will be charged for the full value of the item that was damaged upon return. This warranty does not extend beyond its original term for any Eagle tow tractor or part replaced or repaired under warranty.

Labor Allowance: A labor allowance may be issued upon request at Eagle's discretion. Allowable labor hours and a per hour labor rate will be determined by Eagle according to reasonable automotive standards.



#### 34.0 **GUARANTEES/LIMITATION OF LIABILITY - EAGLE 3-YEAR WARRANTY** *(continued)*

EXCEPT AS SET FORTH ABOVE, ALL WARRANTIES, CONDITIONS, REPRESENTATIONS, INDEMNITIES AND GUARANTEES, EXPRESS OR IMPLIED, WHETHER ARISING BY STATUTE, CUSTOM OF TRADE OR UNDER ORAL OR WRITTEN STATEMENTS MADE BY OR ON BEHALF OF EAGLE NEGOTIATIONS WITH CUSTOMER, DISTRIBUTOR, DEALER, OR ANY REPRESENTATIVE, ARE HEREBY OVERWRITTEN AND EXCLUDED, AND NO LIABILITY SHALL ATTACH TO EAGLE, EITHER IN CONTRACT OR IN TORT, OR STRICT LIABILITY IN TORT, FOR ANY DAMAGE TO PROPERTY, LOSS OF PROFITS, DAMAGES, COSTS, CHARGES, LIABILITY OR EXPENSES, WHETHER DIRECT OR INDIRECT, CONSEQUENTIAL OR OTHERWISE, WHICH ARISE OUT OF OR IN CONNECTION WITH THE SALE OR USE OF ANY EAGLE MACHINE OR THE SUPPLY OF SERVICES.

SUBJECT TO CHANGE WITHOUT NOTICE

Please check our website [www.eagletugs.com](http://www.eagletugs.com) periodically for service bulletins and updates to manuals.

\*Note: The Eagle Tugs 3-Year Warranty covers TT-series, TTR-series, eTT-series, XL-series, eXL-series and USATS tow tractors used in aviation applications. All MTT, RTT-series, Transit Pro tow tractors, and all Eagle models which are used in non-aviation/industrial applications are covered under the Eagle Standard Warranty of 1 Year or 2,000 hours. Eagle Bob Tails are covered under Ford Motor Company's Standard Warranty for each respective Ford truck model.

#### 35.0 **APPENDICES**

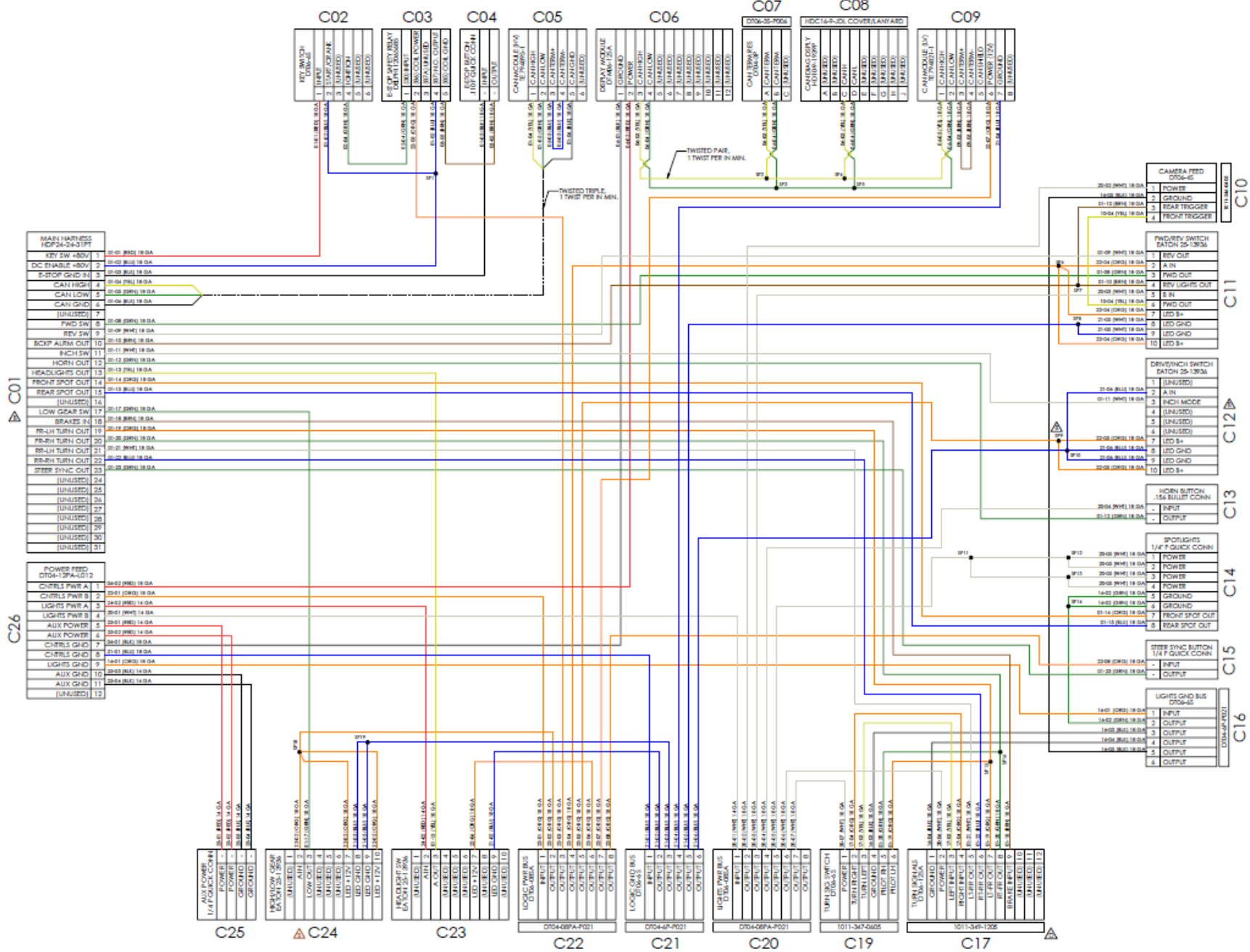
- APPENDIX I Dash Panel Harness (INS-2771)
- APPENDIX II Main Vehicle Harness (INS-2774)
- APPENDIX III Hydraulic Schematic (INS-2777)





## **APPENDIX I**

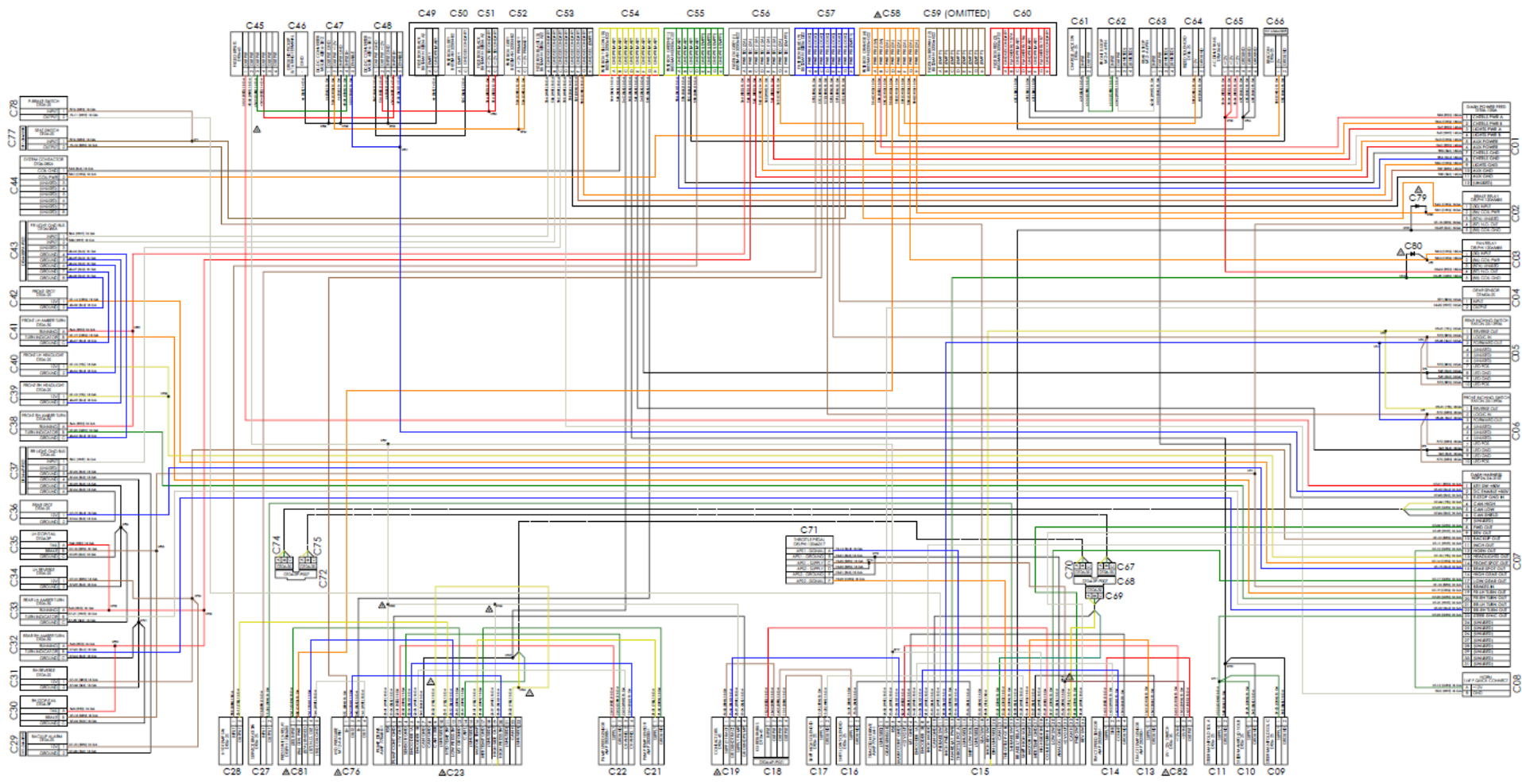
### **Dash Panel Harness (INS-2771)**





## **APPENDIX II**

### **Main Vehicle Harness (INS-2774)**







## **APPENDIX III**

### **Hydraulic Schematic (INS-2777)**

