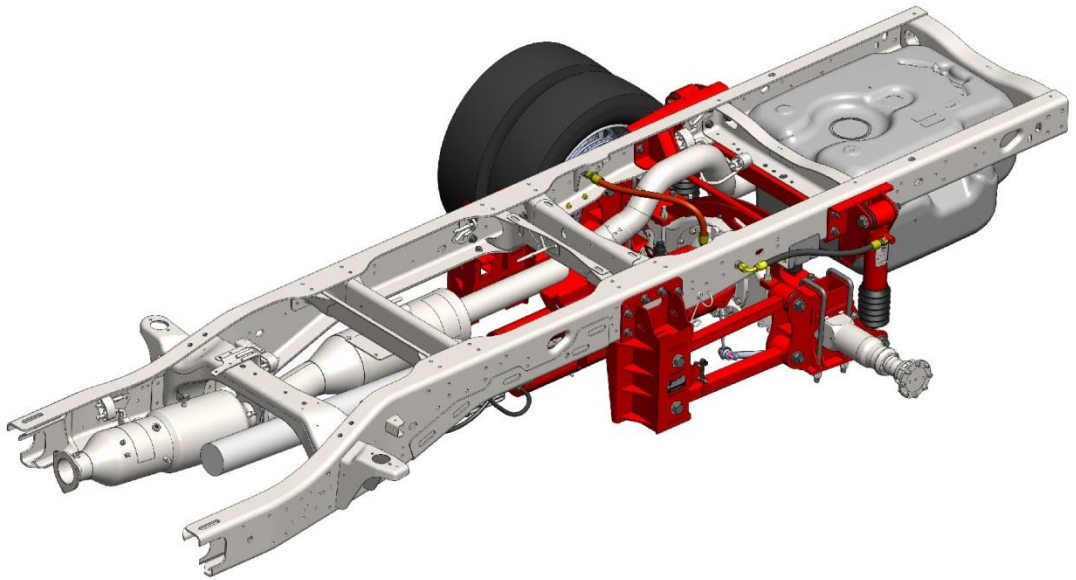


DS120R-DS135R

DS120R DS135R

Rear Axle Suspension System
for Ram 4500/5500 Cab Chassis
based Ambulance, Transit Bus
and Limo



Operator Manual

D10907 Rev AD 12/2018

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Introduction

This manual provides operating information for the LiquidSpring CLASS® DS120R/DS135R series of rear axle suspension systems for the Ram 4500/5500 Cab Chassis.

The system provides the following performance benefits:

- Reduced Impact Harshness
- Improved Road Isolation
- Improved High-Speed Stability
- Improved Handling Response
- Better Control of Body Ride Motions
- Maintained Optimized Ride Height

Throughout this manual, important product information is indicated. These terms are defined as follows:

NOTE: Includes additional information to enable accurate and easy performance of procedures.

IMPORTANT: Includes additional information that if not followed could lead to hindered product performance and/or product failure.

CAUTION: A caution indicates procedures that must be followed exactly. Damage to equipment or suspension components and personal injury can occur if the procedure is not followed.

WARNING: A warning indicates procedures that must be followed exactly. Serious personal injury can occur if the procedure is not followed.

These instructions cover the following models:

Model	Application
DS120R-A	2014 and newer 4500 Cab Chassis
DS120R-A12	2012 and prior 4500 Cab Chassis
DS120R-A13	2013 4500 Cab Chassis
DS120R-AF	2014 and newer 4500 Cab Chassis
DS120R-ALA	2014 and newer 4500 Cab Chassis
DS135R-B	2014 and newer 5500 Cab Chassis
DS135R-B13	2013 Cab Chassis
DS135R-AF	2014 and newer 5500 Cab Chassis

Instructions pertaining to a specific model will be indicated.

LiquidSpring LLC reserves the right to modify the suspension and/or procedures and to change specifications at any time without notice and without incurring obligation.

Suspension Rating

Model	Suspension Rating
DS120R-A, DS120R-A12, DS120R-AF, DS120R-ALA, DS120R-A13	12,000 lbs
DS135R-B, DS135R-B13, DS135R-AF	13,500 lbs

WARNING: Overloading suspension system may result in abnormal handling characteristics and premature wear of components.

Serial Number Tag Information

The suspension model, serial number, and maximum axle capacity are found on an aluminum tag that is riveted to the Left Hand Suspension Hanger as shown in Figure 2. This information will aid you when contacting the chassis manufacturer or LiquidSpring LLC.



Figure 1. Suspension Identification

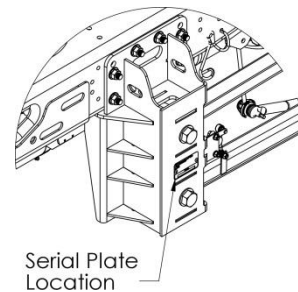


Figure 2. Serial Number Tag Location

Vehicle Towing and Jacking Information

Before attempting any type of towing procedures, the OEM/Coach Builder must be referred to for the recommended towing methods.

NOTE: Before towing vehicle, check with local authorities, such as Department of Transportation, for permissible towing methods. Some states do not permit towing vehicles by chains or towing straps.

Do not attach tow apparatus (hooks, chains, straps, etc.) to the suspension components.

WARNING: Attaching towing equipment to improper locations and failure to utilize OEM/Coach Builder recommended towing methods could result in one or more of the following:

- Damage to the suspension and/or vehicle,
- Loss of vehicle control,
- Possible disconnect from the vehicle.

WARNING: Do not apply jack to bottom of front hanger or other suspension components. Applying a jack to improper locations can result in damage to the suspension and/or vehicle and severe personal injury.

Torque Specifications

Most of the fasteners used in this suspension are graded fasteners. These fasteners have the strength and hardness properties required for their particular function. If replaced, they must be replaced with fasteners of the same grade, size, and form as the original in order to prevent failure.

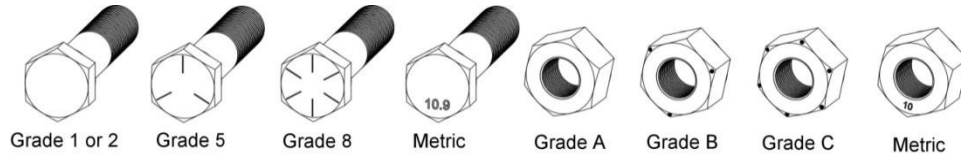
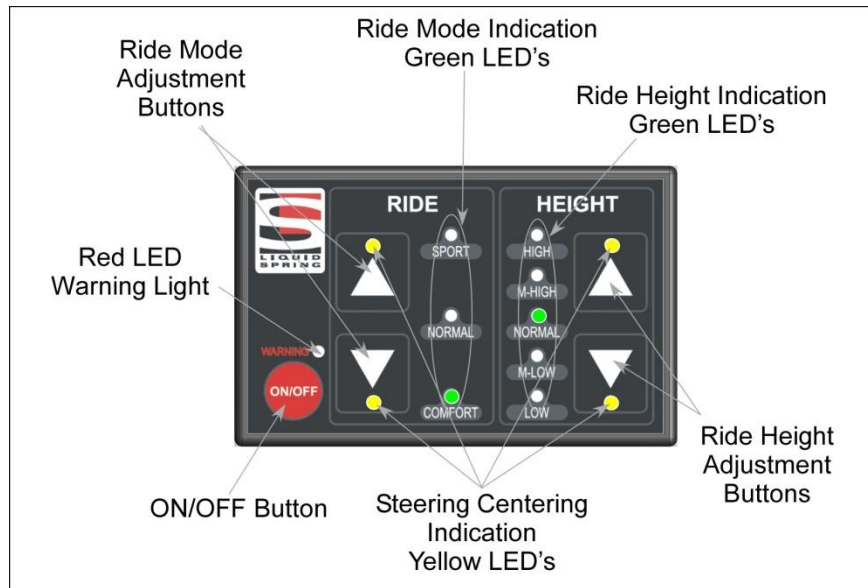


Figure 3. Identification of fastener grades.

Description	Size	Grade	Torque Specification	
			Lb-ft	Nm
Axle Clamp Attachment Nuts	1/2-13	C	86-105	117-142
Axle Clamp Attachment Screw	1/2-13	C	86-105	117-142
Axle Clamp Brake Line Screw (OEM Reuse)	M8-1.2	N/A	18	25
Axle Clamp U-Bolt Flange Nuts	3/4-16	G	See Procedure	
Bleed Screws	3/8-24	N/A	13-18 in-lbs	1-2
Bridge Mount Nuts	5/8-11	C	172-210	233-285
Bridge U-Bolt Flange Nuts	5/8-18	G	180	244
Bridge, Brake Line Securing Nut	5/16-18	C	20-24	27-33
Bulkhead Fitting Jam Nut	7/8-14	N/A	85	115
Control Arm Flange Nuts	1-8	G	600	813
Cross Member Reinforcement Nuts	1/2-13	C	86-105	117-142
Hanger Mount Bolts (OEM Reuse)	M14-2	10.9	120-145	163-197
Hanger Mount Nuts	5/8-11	C	172-210	233-285
Height Sensor Linkage Ball Stud Nut	5/16-18	C	14-17	19-23
Height Sensor Mount Nuts	5/16-18	C	14-17	19-23
Hose Connections, -10	7/8-14	N/A	36-63 in-lbs	4-7
Hose Connections, -4	7/16-20	N/A	12 in-lbs	1
Jounce Bumper to Mount Plate [2013 and newer]	3/8-16	8	35	47
Jounce Stop Bolt	M10-1.5	10.9	42	57
Parking Brake Relocation Bracket Fasteners	5/16-18	C	20-24	27-33
Power Module Manifold Bracket Screws	3/8-16	8	39	53
Power Module Mount Nuts	M10-1.5	10.9	43-53	47-58
Power Module Reservoir Support Screws	#10-16	N/A	Snug Only	
Steering Sensor Bracket Nuts (OEM Reuse)	M14-2	10.9	120-145	163-197
Steering Sensor Linkage Ball Stud	5/16-18	N/A	14-17	19-23
Steering Sensor Linkage Bracket U-Bolt Nuts	1/4-20	2	60-85 in-lbs	7-10
Steering Sensor Mounting Screws	5/16-18	8	14-17	19-23
Strut Lower Mount Flange Nuts	1-8	G	250	339
Strut Upper Mount Flange Nuts	1-8	G	600	813
Sway Bar Mount to Frame [2012 and prior models]	M10-1.5	10.9	43-53	47-58
Sway Bar to Mount [2012 and prior models]	M12-1.75	10.9	76	103
Track Rod Frame Mount Nuts	5/8-11	C	172-210	233-285
Track Rod Nuts	5/8-11	C	172-210	233-285
Upper Strut Mount Bracket Nuts	5/8-11	C	172-210	233-285
Volume Mount Clamps	5/16-24	N/A	240 in-lbs	27
Volume Mount to Frame Fasteners	M10-1.5	10.9	43-53	47-58
Volume Mount to Hanger Nuts	1/2-13	C	86-105	116-142

System Operation



System Start Up

- In most instances, the suspension system can be left alone to operate automatically.
- After startup, all the indicator lights will flash on for 1-2 seconds, and then the Green Ride Height Indication LED and Green Ride Mode Indication LED will light to show the current Ride Mode and Ride Height.
- The four yellow LED's will light up if the steering wheel is approximately 10°-20° each side of straight ahead, but will not light up when steering wheel exceeds 20° from center. If the vehicle is steered straight ahead and the four yellow LED's are not lit (and the red warning LED is not lit) see Calibrating the Steering Sensor Only.
- When the steering wheel is turned more than 20° off center, the four Yellow Steering Centering Indication LED will not be lit.

ON/OFF Button

Pressing the ON/OFF button will enable/disable the suspension. When the suspension is ON, relevant LED's are lit up. When the suspension is OFF, none of the LED's are lit. It is recommended to leave the suspension ON at all times unless the vehicle or suspension is being serviced.

IMPORTANT: After turning the vehicle ignition off, the suspension system will remain powered for 1 hour before shutting off.

Warning Light

If the Red LED warning light is continuously illuminated along with one or more of the other indicator lights, please refer to the **Troubleshooting Section** on page 11.

Ride Mode Adjustment

Press the UP/DOWN arrow buttons to change the ride mode between SPORT, NORMAL, and COMFORT. The Green indicator light will show the set mode.

- **Comfort Mode** provides a smooth, soft ride. Use for normal city and highway driving.
- **Sport Mode** provides more “feel” or response to the road conditions. Use where road conditions or personal preference demand more control.
- **Normal Mode** is a balance between Comfort and Sport. Use where more control than Comfort is desired, but better ride than Sport.

The setting can be changed at any time. Based on road conditions, steering wheel angle, and the vehicle speed, the system automatically adjusts to provide the best handling while providing a smooth ride. All three settings will feel similar on a smooth road.

Ride Height Adjustment

Press the UP/DOWN arrow buttons to change ride height from NORMAL to HIGH (body up) or LOW (body down).

Note: HIGH ride height is not available on model DS120R-ALA.

- A solid green LED will indicate the selected height. A flashing green LED will indicate the

current height and that height adjustment is occurring. When a single solid green LED is lit, the selected height has been achieved.

- Two solid green LEDs will be lit if the current height is not the selected height and height adjustment is not occurring.
- If LOW or HIGH heights are selected while the vehicle is traveling at less than 10 mph or stopped, the suspension height is either lowered or raised.
- If LOW or HIGH heights are selected while the vehicle is traveling at greater than 10 mph, the suspension will ignore the selected height and remain in NORMAL height unless the vehicle speed goes below 10 mph within 2 minutes of selecting the height. In this instance, the NORMAL height green LED will flash and the selected height green LED will be lit solid until the speed goes below 10 mph within 2 minutes of selecting the height. If the vehicle speed doesn't go below 10mph within the 2 minute period, the suspension will remain in NORMAL height indicated by only the NORMAL height green LED lit solid.
- If LOW height is selected and the ignition is turned off before LOW height is achieved, the system will continue to lower to LOW height. When LOW height is selected the system will monitor and maintain the kneeled position by only lowering as needed for 1 hour after the ignition is turned off.
- If HIGH height is selected and the ignition is turned off before HIGH height is achieved, the system will stop adjusting ride height. When HIGH height is selected the system will monitor and maintain the current position by only lowering as needed for 1 hour after the ignition is turned off.
- The door switch function (if equipped) is disabled when the driver display LOW or HIGH height is selected before the door is opened on vehicles equipped with a door switch for kneeling.

Ride Height Changes Due to Temperature

CLASS® utilizes a compressible liquid for its spring and damping, which expands and contracts with temperature changes. When the vehicle and / or suspension system is turned off, moderate ambient temperature changes will cause the suspension ride height to change; ride height will increase with increased temperature and decrease with decreased temperature. When system is turned on again, it automatically returns the suspension to the selected ride height. While the suspension system can be used immediately upon start-up, it is recommended to allow the suspension system to automatically adjust the ride height for a brief period (less than 30 seconds)

before driving away. Some ride harshness may be noticed until NORMAL ride height is achieved.

Depressurizing the System

1. Turn the ignition key to "Run" and ensure that the LiquidSpring driver display LEDs light up and that the red "Warning" LED is not lit. If the red "Warning" LED is lit, proceed to the Trouble Shooting Section.

WARNING: Do not run vehicle in an enclosed building without adequate ventilation or without ducting exhaust fumes outside. Operation of a vehicle inside an enclosed building can lead to serious injury or death.

1. Press and release the Red ON/OFF button on the driver display. All LEDs on the driver display should go out.
2. Press and release the Red ON/OFF button again. The LEDs on the driver display should all flash and then only the four yellow arrow LEDs, one green ride mode indicator LED, and one green ride height indicator LED should remain lit.
3. Press and release the HEIGHT DOWN arrow button to lower the vehicle to the LOW height.
4. Press and hold the HEIGHT DOWN arrow button for approximately 2 minutes.
5. Release the HEIGHT DOWN arrow button.
6. Press and release the ON/OFF button to disable the system.
7. Turn off the vehicle ignition.

If any of the hydraulic connected components is to be removed and serviced, it is recommended to also follow the following steps:

8. Locate 3/16" ID PVC Tubing. Note: Alternatively, a bleed kit similar to the Actron 7840 Bleed Kit can be used.
9. Attach the PVC tubing to one of the upper bleed screws on the Left Hand Secondary Volume Assembly and place the other end in a bucket.

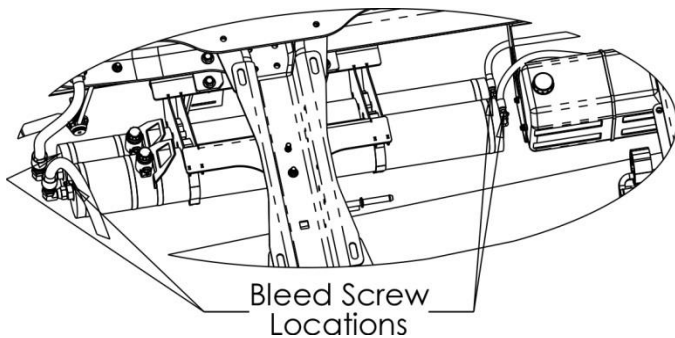


Figure 4. Bleed screw locations.

10. Open the bleed screw slightly to relieve any residual pressure.
11. After pressure is relieved, close the bleed screw and torque to 13-18 ft-lbs.

Notes:

- Jacking up the chassis of a lowered, depressurized chassis will cause a slight vacuum in the system and minimize fluid loss while disconnecting hoses.
- For service of non-hydraulic connected suspension components, the suspension system can be first raised to the HIGH height, appropriate jack stands placed under the chassis, then depressurized as listed above lowering the chassis onto the jack stands. **Not Available on DS120R-ALA.**

Bleeding the System

1. Verify system is turned OFF by either pressing the ON/OFF button on the driver interface until the lights are turned off or turning the ignition off.
2. Locate 3/16" ID PVC Tubing (not included with kit). Note: Alternatively, a bleed kit similar to the Actron 7840 Bleed Kit can be used.
3. Attach the PVC tubing to one of the upper bleed screws on the Left Hand Secondary Volume Assembly and place the other end in a bucket.

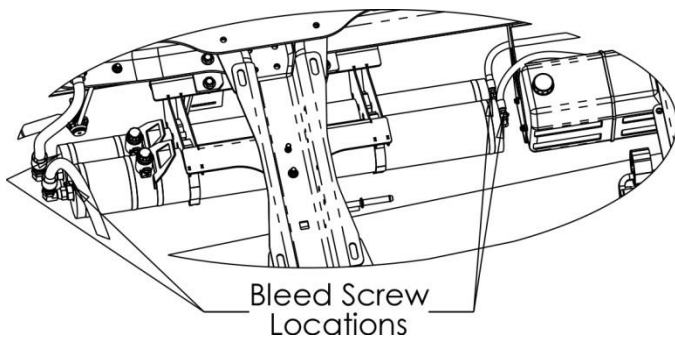


Figure 5. Bleed screw locations.

4. Open the bleed screw slightly.

5. After air bubbles are no longer present, close the bleed screw and torque to **13-18 ft-lbs.**
6. Repeat with remaining bleed screws. Note: the system may need to be powered on and allowed to re-pressurize .
7. Repeat with other side.

Calibrating the Steering Sensor Only

Note: The yellow lights only light up when the steering sensor indicates the center location. They will not be lit outside of 10°-20° off center.

IMPORTANT: The LiquidSpring CLASS® system includes an automatic self-centering routine. In conditions such as driving on highway with significant side wind, the yellow lights may temporarily not be lit when the steering wheel is exactly centered. Rotate slowly from center to full steering stop, then repeat the opposite direction. If the yellow lights momentarily light up during the travel in one or the other direction, the system is operating normally and the steering sensor does not need to be manually re-centered. Continue operating normally.

If the yellow lights do not light up at all during turning the steering wheel, following the instructions below.

1. Verify that the front wheels are steered straight ahead.
2. To begin the calibration, turn the ignition key to "Run" and ensure that the LiquidSpring driver display lights up and that the red "Warning" LED is not lit or flashing.

WARNING: Do not run vehicle in an enclosed building without adequate ventilation or without ducting exhaust fumes outside. Operation of a vehicle inside an enclosed building can lead to serious injury or death.

3. Press and release the Red ON/OFF button on the driver display. All LEDs on the driver display should go out.
4. Press and release the Red ON/OFF button again. The LEDs on the driver display should all flash and then only the four yellow arrow LEDs, one green ride mode indicator LED, and one green ride height indicator LED should remain lit.
5. Press and hold both Ride Height Adjustment Buttons simultaneously until the SPORT, COMFORT, HIGH, and LOW green LED's begin to flash.
6. As soon as the four green LED's begin to flash, press the ON/OFF button to stop the process.
7. Verify that the four yellow arrow LED's are lit.
8. Steering calibration is completed.

Calibrating the System

IMPORTANT: Proper calibration of the system must be conducted with the vehicle loaded to the as delivered condition with body installed. For calibration on an empty chassis cab, LiquidSpring recommends weight be added to the frame approximately equal to the planned body to allow for proper bushing deflections.

Note: The LiquidSpring Calibration routine will automatically determine maximum and minimum suspension ride height. Based on those ride heights, the system will determine the correct normal design ride height. The calibration system will also calibrate the steering sensor.

1. Verify that the front wheels are steered straight ahead.
2. Lower the vehicle to the ground and remove any jack stands and any other obstructions from under the vehicle.
3. To begin the calibration, turn the ignition key to "Run" and ensure that the LiquidSpring driver display lights up and that the red Error light is not blinking.

WARNING: Do not run vehicle in an enclosed building without adequate ventilation or without ducting exhaust fumes outside. Operation of a vehicle inside an enclosed building can lead to serious injury or death.

4. Press and release the Red ON/OFF button on the driver display. All lights on the driver display should go out.
5. Press and release the Red ON/OFF button a second time. The lights on the driver display should all flash then only show the four yellow arrow lights, one green ride mode indicator, and one green ride height indicator.
6. Press and hold both Ride Height Adjustment Buttons simultaneously until the SPORT, COMFORT, HIGH, and LOW green LED's begin to flash. The suspension system will begin to rise to the full high position, and then lower to the full lowered position.
7. After the system completes the calibration routine, the suspension will return to the original ride height.
8. Turn off the ignition for at least 3 minutes. Note: The suspension system will not use the calibrated ride height settings until power has been cycled.

Note: Pressing the red ON/OFF button on the driver display does not cycle power to the LiquidSpring suspension system, but only will enable/disable the system.

9. Turn the ignition back to Run, then press the Red ON/OFF button twice and verify the suspension system moves to the new and correct ride height.
10. Calibration is now completed.

Checking Fluid Level

1. Turn the ignition key to "Run" and ensure that the LiquidSpring driver display LEDs light up and that the red "Warning" LED is not lit. If the red "Warning" LED is lit, proceed to the Trouble Shooting Section.

WARNING: Do not run vehicle in an enclosed building without adequate ventilation or without ducting exhaust fumes outside. Operation of a vehicle inside an enclosed building can lead to serious injury or death.

2. Press and release the Red ON/OFF button on the driver display. All LEDs on the driver display should go out.
3. Press and release the Red ON/OFF button again. The LEDs on the driver display should all flash and then only the four yellow arrow LEDs, one green ride mode indicator LED, and one green ride height indicator LED should remain lit.
4. After the suspension system stops leveling, check the fluid level in the reservoir. If low, fill to the indicated line.

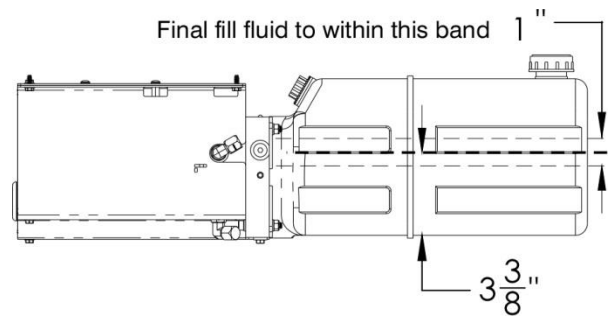


Figure 6. Final fill fluid level.

5. To add fluid, remove filler/breather cap on reservoir.
6. Locate a container of Compressible Fluid.
7. Add fluid to the reservoir until the fluid level is within the band shown in Figure 6.

Note: LiquidSpring Compressible Fluid is shipped in 1 gallon containers compatible with hand pumps such as Autotec 57429.

8. Replace filler/breather cap and retighten.

Checking Fittings for Leaks

WARNING: The system operates under high fluid pressure (up to 3500 psi). Do not attempt to locate leaks

by feeling with hands or any part of the body. High pressure fluids can penetrate the skin and cause severe tissue damage.

1. While system is at ride height and pressurized, visually examine fittings and hose connections for any source of leaks. Do not use hands to search for leak. If the source of the leak is a fitting or other component, depressurize the system and repair or replace as needed.
2. Tighten hose nuts if the leak is coming from the connection between the hose nut and a fitting. Depressurize the system before tightening anything. Replace hose if the leak is coming from anywhere else on the hose.

WARNING: Never tighten a hydraulic fitting or hose under pressure. Always depressurize the system before adjusting fittings and hoses.

3. Clean all fluid from hose and fittings to visually identify any leaks.

IMPORTANT: Over-tightening hoses and fittings can damage components and lead to leaks.

See Installation Manual for additional instructions.

Service Intervals

Once Daily or Before Each Shift of Usage

- Check the suspension system to be sure it is fully operational.
 - After starting vehicle, verify all LED's on the driver display flash briefly, then the Green Ride Height and Ride Mode LED's are lit and the Red Warning LED does not stay on or flash.
 - Verify the four Yellow LED's are lit when the steering wheel is centered.
 - Verify that they system is at NORMAL ride height, with a steady green LED.
 - If the Driver Display indicates a blinking ride height LED, allow the system to complete leveling as indicated by a steady green LED.
 - If LOW or HIGH height is shown with a solid green LED, use the arrow buttons to raise or lower the suspension.
 - Refer to *Ride Height Adjustment* Section.
- Visually inspect struts, hoses, and fittings for signs of leakage.
 - For leakage resulting in fluid pooled on the floor greater than 1" in diameter, it is recommended to service the system immediately.

- For signs of leakage or weeping that results in wetness on components or a single drop, it is recommended to monitor the leak and schedule repair service accordingly.

Initial 1,000 mile (1,600 km) Inspection

- Inspect bolts and nuts at the control arm pivots to assure they are properly torqued.
- Inspect u-bolts to assure they are properly torqued.
- Thoroughly inspect all hydraulic connections for signs of leakage.
- Inspect reservoir fluid level.

Routine Maintenance 25,000 miles (40,000 km) or 6 month maximum Interval

- Inspect bolts and nuts at the control arm pivots to assure they are properly torqued.
- Inspect u-bolts to assure they are properly torqued.
- Thoroughly inspect all hydraulic connections for signs of leakage.
- Inspect reservoir fluid level.
- Check all suspension components for any signs of damaged/broken components, looseness, or wear.

Maintenance Record

Date of Purchase	Name and Address of Dealer	
Model of Vehicle	Vehicle Identification Number (VIN)	
Suspension Model Number	Suspension Serial Number	

Date	Mileage	Service Performed

Troubleshooting

The LiquidSpring CLASS® system includes on-board diagnostics to assist in pin-pointing potential issues. When a fault in the system occurs, the red warning light on the Drivers Interface will light along with one or more of the other lights on the interface.

Driver Interface Lights	Condition	Cause	Correction
Warning + RIDE: SPORT	Battery Voltage in excess of 16VDC	Vehicle charging system providing incorrect voltage.	Inspect and replace as necessary.
		LiquidSpring system not connected to 12VDC electrical system	Inspect and replace as necessary
Warning + RIDE: NORMAL	Pump Motor runs in excess of 3 minutes	See <i>Issues with Vehicle Raising/Pump Section</i>	See <i>Issues with Vehicle Raising/Pump Section</i>
Warning + RIDE: COMFORT	Battery Voltage below 9 VDC	Vehicle charging system providing incorrect voltage	Inspect and replace as necessary
		80A fuse blown / Loss of battery voltage on circuit W25	Inspect / Repair Replace as necessary
Warning + HEIGHT: HIGH	Issue with Right Hand Height Sensor	See <i>Issues with Height Sensors Section</i>	See <i>Issues with Height Sensors Section</i>
Warning + HEIGHT: NORMAL	System kneels in excess of 3 minutes without suspension movement	See <i>Issues with Vehicle Lowering/Dump Valve Section</i>	See <i>Issues with Vehicle Lowering/Dump Valve Section</i>
Warning + HEIGHT: LOW	Issue with Left Hand Height Sensor	See <i>Issues with Height Sensors Section</i>	See <i>Issues with Height Sensors Section</i>
Slow or Fast Blinking Warning Light	Driver Interface can not communicate with ECU.	See <i>Issues with Driver Interface</i>	See <i>Issues with Driver Interface</i>

Issues with Vehicle Raising/Pump

Condition	Cause	Correction
Vehicle Leveled, Pump continues to run	Pump motor shorted out.	Contact LiquidSpring for further instructions.
	Software issue	Turn off ignition, wait 30 seconds, restart vehicle.
	Excessive noise in height sensor	See <i>Issues with Height Sensors</i>
Vehicle Not Leveled (or Raised), Pump runs	Reservoir fluid level low	Fill reservoir to specified level.
	Hydraulic leak in system	Check for fluid leaks and repair or replace.
	Vehicle overloaded	Check vehicle loading and correct.
	Air in pump	Check fluid level in reservoir and fill accordingly. Fully depressurize system and restart leveling.
	Internal leak in power module	Replace power module.
	Height sensor error	See <i>Issues with Height Sensors</i>
Vehicle Not Leveled (or Raised), Pump does not run	System not turned on.	Turn system on.
	Blown fuse	Check system fuses
	Loss of electrical power	Check wiring between power module and battery.
Pump runs for short time then stops	Motor controller over temperature	Contact LiquidSpring for further instructions.
Pump runs intermittently	Loose connector or wiring	Check wiring harness connections and battery connections. Repair as necessary.

Issues with Vehicle Lowering/Dump Valve

Condition	Cause	Correction
Vehicle does not lower (kneel).	System not turned on	Turn system on
	Blown fuse	Check system fuses and replace as necessary
	Obstacle under vehicle frame	Remove obstacle
	Wiring harness disconnected	Check wiring harness connections and reconnect
	Loss of electrical power	Check wiring between power module and battery
	Power module filters plugged	Contact LiquidSpring for further instructions
	Internal power module blockage	Contact LiquidSpring for further instructions
Vehicle slow lowering (kneeling)	Partial internal power module blockage	Contact LiquidSpring for further instructions

Issues with One Corner Not Leveling Properly

Condition	Cause	Correction
One side will not raise or lower	Internal power module blockage	Contact LiquidSpring for further instructions
	Low voltage	Check battery voltage.
	Wiring harness disconnected	Check wiring harness connections and reconnect
	Obstacle under vehicle frame	Remove obstacle
	Power module filters plugged	Contact LiquidSpring for further instructions
One corner raises and lowers slower than other corners	Height sensor error	See <i>Issues with Height Sensors</i>
	Internal power module blockage	Contact LiquidSpring for further instructions
	Filter partially clogged	Contact LiquidSpring for further instructions

Issues with Height Sensors

Condition	Cause	Correction
Vehicle or corner stops leveling at incorrect height	Damaged height sensor and/or linkage	Inspect height sensor components. Replace as necessary.
	Incorrect calibration	Recalibrate vehicle – see System Operation section.
	Incorrect height sensor installation	Inspect height sensor components and correct.
Corner height where leveling stops is inconsistent	Sensor or Linkage loose	Inspect installation of height sensor and linkages and tighten if necessary
	Loose connector / wire	Inspect wiring between sensor and power module for loose connection
Vehicle will not level - no height sensor signal	Height Sensor wiring shorted, broken, or disconnected	Inspect wiring between sensor and power module.
	Malfunction in Sensor	Replace sensor.
No Height Sensor Signal change while driving	Linkage broken/disconnected	Inspect installation of height sensor and linkages. Correct and/or replace.

Issues with Ride/Handling

Condition	Cause	Correction
Vehicle rolls side to side excessively	System inactive (Drivers interface dark)	Turn system on (press On/Off button)
	No electrical power to system	Inspect and replace as necessary
	Strut bushings worn	Inspect and replace as necessary
	Control arm bushings worn	Inspect and replace as necessary
	Sway bar bushings worn	Inspect and replace as necessary
	Strut mounting loose	Inspect and replace as necessary
	Rate Valve wiring shorted, broken, or disconnected	Inspect wiring and correct/replace as necessary.
	Voltage to Rate Valve solenoid too low	Check battery voltage.
	Rate Valve Poppet Jammed open	Contact LiquidSpring for further instructions
Excessive stiffness when on flat, straight road	No vehicle speed signal	See <i>Issues with Vehicle Speed Signal</i> section.
	Short to Rate Valve	Check wiring between rate valve (on secondary volume) and power module for signs of shorts. Replace as necessary.
	Wiring to Rate Valve incorrect	Inspect wiring and correct as necessary

Issues with Steering Sensor

Condition	Cause	Correction
No steering signal (reduced roll control when cornering)	Steering sensor wiring broke or incorrect.	Inspect wiring to steering sensor and correct as necessary.
	Steering sensor malfunction	Replace sensor
	Steering sensor not installed correctly	Inspect installation and correct as necessary
Yellow lights on driver display not lit when steered straight ahead.	Zero point of steering sensor incorrect.	See <i>Calibrating the Steering Sensor Only</i> .
Intermittent steering sensor signal	Loose connector / wire	Check wiring between Steering sensor and Power module for loose connection.

Issues with Vehicle Speed Signal

Condition	Cause	Correction
System leveling excessively while driving.	Speed Sensor wiring shorted, broken, or disconnected	Inspect wiring and repair/replace as necessary
	Speed signal malfunction	Replace OEM speed sensor. See OEM service manual.
Intermittent speed sensor signal	Loose connector / wire	Check wiring between Speed sensor and Power module for loose connection.

Issues with Vehicle Brake Signal

Condition	Cause	Correction
Vehicle will not level	Brake signal wire not correctly tapped.	Inspect wiring and repair/replace as necessary.
	Brake switch malfunction	Replace OEM speed sensor. See OEM service manual.
Intermittent leveling	Loose connector / wire	Inspect wiring and repair/replace as necessary.

Issues with Door Switch

Condition	Cause	Correction
Vehicle will not kneel when rear door opened	Short or break in wiring between door switch and power module.	Inspect wiring and repair/replace as necessary.
	Door switch malfunction	Inspect door switch and repair/replace as necessary
Vehicle kneels whenever speed below 5mph	Short or break in wiring between door switch and power module.	Inspect wiring and repair/replace as necessary.
	Door Switch out of adjustment	Check installation of door switch and adjust as necessary
	Door switch malfunction	Inspect and replace per body builder instructions.
Intermittent door switch signal	Loose connector / wire	Inspect wiring and repair/replace as necessary.

Issues with Vehicle Ignition Signal

Condition	Cause	Correction
System does not turn on (no leveling or stiffness control)	No ignition signal to controller or driver interface	Inspect wiring and repair/replace as necessary.
	Ignition "sensor" malfunction	Inspect and replace per OEM service manual.
System does not turn off once ignition switched off	Signal side short to battery	Inspect wiring and repair/replace as necessary.
	Ignition "sensor" malfunction	Inspect and replace per OEM service manual.
System intermittently works	Loose connector / wire	Inspect wiring and repair/replace as necessary.

Issues with Vehicle Park Signal

Condition	Cause	Correction
System will start up but won't level when parked	No park signal to controller	Inspect wiring and repair/replace as necessary.
	Park sensor malfunction	Inspect and replace per OEM service manual.
System levels when stopped and not in park	Park signal always on	Inspect wiring and repair/replace as necessary.
	Park sensor malfunction	Inspect and replace per OEM service manual.
Intermittent leveling when stopped in or out of park	Loose connector / wire	Inspect wiring and repair/replace as necessary.

Issues with Driver Interface

Condition	Cause	Correction
Warning light blinks, system appears to level.	CAN wires crossed or not connected.	Inspect wiring and repair/replace as necessary.
	Malfunctioning Driver Interface	Inspect and replace as necessary.
Warning light blinks, system does not appear to operate (level)	No power to ECU (5A 18ga Red Wire)	Inspect wiring and repair/replace as necessary.
	No ignition signal to ECU (Yellow Wire)	Inspect wiring and repair/replace as necessary.
	CAN wires crossed or not connected.	Inspect wiring and repair/replace as necessary.

Issues with Power Module

Condition	Cause	Correction
Pump exhibits high pitch whine immediately after pump stops or when vehicle lowering	The Check Valve is stuck open	Replace Power Module
Pump running under heavy load and leveling slow	The Check Valve is only partially open	Replace Power Module
Pump running under heavy load and no leveling	The Check valve is stuck closed	Replace Power Module
Hydraulic fluid leaking from Power Module	O-ring failure	Replace O-ring
	Manifold cracked	Replace Power Module
	Fitting loose	Tighten fittings
	Valve loose	Tighten valves to correct torque
	Bolts between manifolds loose/broken	Replace and /or tighten bolts to correct torque
	Hydraulic line loose	Tighten hydraulic line correctly
	Bolts between reservoir and manifold loose/broken	Replace and/or tighten bolts to required torque
	Broken / cracked reservoir	Replace reservoir

Issues with Strut Assembly

Condition	Cause	Correction
Hydraulic Leak	Weld failure between cylinder and end	Replace strut
	Cylinder fracture	Replace strut
	Threads stripped between cylinder and gland	Replace strut
	Seals worn out	Replace strut
	Rod severely scratched or dented	Replace strut
	Fitting loose	Tighten or replace fittings
	Hose failure	Replace failed hose
	Hose cut	Replace failed hose
Rod broken at bushing housing	Weld failure	Replace strut
Rod doesn't move freely in/out cylinder	Piston jammed in cylinder	Replace strut
Rod moves very easily in/out cylinder	Piston broken therefore no damping	Replace strut
Reduced damping level	Damping components broken/worn out	Replace strut
Strut upper mount not securely attached to frame or Strut	Bolts attaching bracket to frame broken / came out	Replace bolts and tighten to required torque
	Bolt attaching strut to bracket broke / came out	Replace bolts and tighten to required torque
	Weld Failure	Replace strut upper mount
	Structural failure	Replace strut upper mount
Strut lower mount not securely attached to axle or strut	Bolts attaching bracket to axle broken / came out	Replace bolts and tighten to required torque
	Bolt attaching strut to bracket broke / came out	Replace bolts and tighten to required torque
	Weld Failure	Replace strut lower mount
	Structural failure	Replace strut lower mount

Issues with Secondary Volume Assembly

Condition	Cause	Correction
Hydraulic Leak	Weld failure between tube and end	Replace secondary volume welded assembly
	Weld failure between tube and manifold	Replace secondary volume welded assembly
	Cylinder fracture	Replace secondary volume welded assembly
	Bleed screw loose	Tighten bleed screws to appropriate torque
	Fitting loose	Tighten all fittings
	Hose failure	Replace failed hose
loose or no longer attached	Hose cut	Replace failed hose
	Bolts attaching bracket to frame broken / came out	Replace bolts and tighten to required torque
	Bolt attaching volumes to bracket broke / came out	Replace bolts and tighten to required torque
	Weld Failure	Replace brackets
Structural failure	Replace brackets	

Parts List Information

Abbreviations

HCS Hex Cap Screw

HFB Hex Flange Bolt

SHCS Socket Head Cap Screw

SFHS Serrated Flange Hex Screw

HN Hex Nut, Non-locking

LHN Locking Hex Nut

LFN Locking Flange Nut

CHN Castle Hex Nut

HTCN Hex Thin Castle Nut

HFW Hardened Flat Washer

SLW Spring Lock Washer

SAE SAE O-Ring Fitting

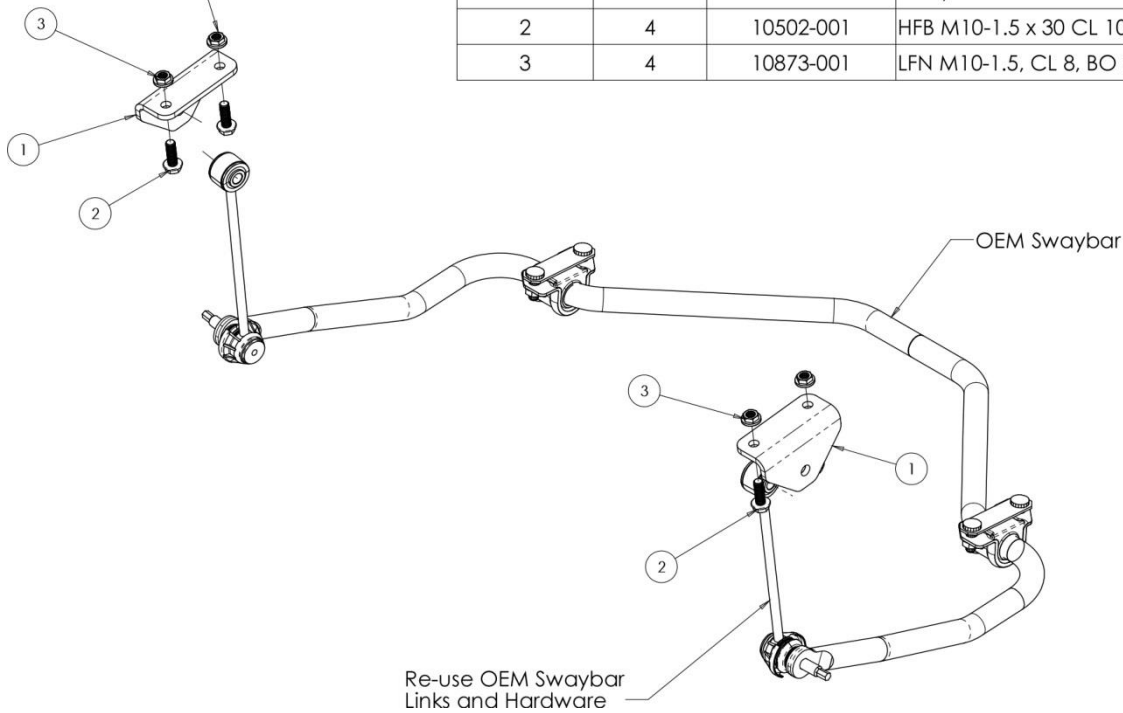
37° SAE or JIC 37° Flare Fitting

LH Left Handed Part

RH Right Handed Part

Part Identification

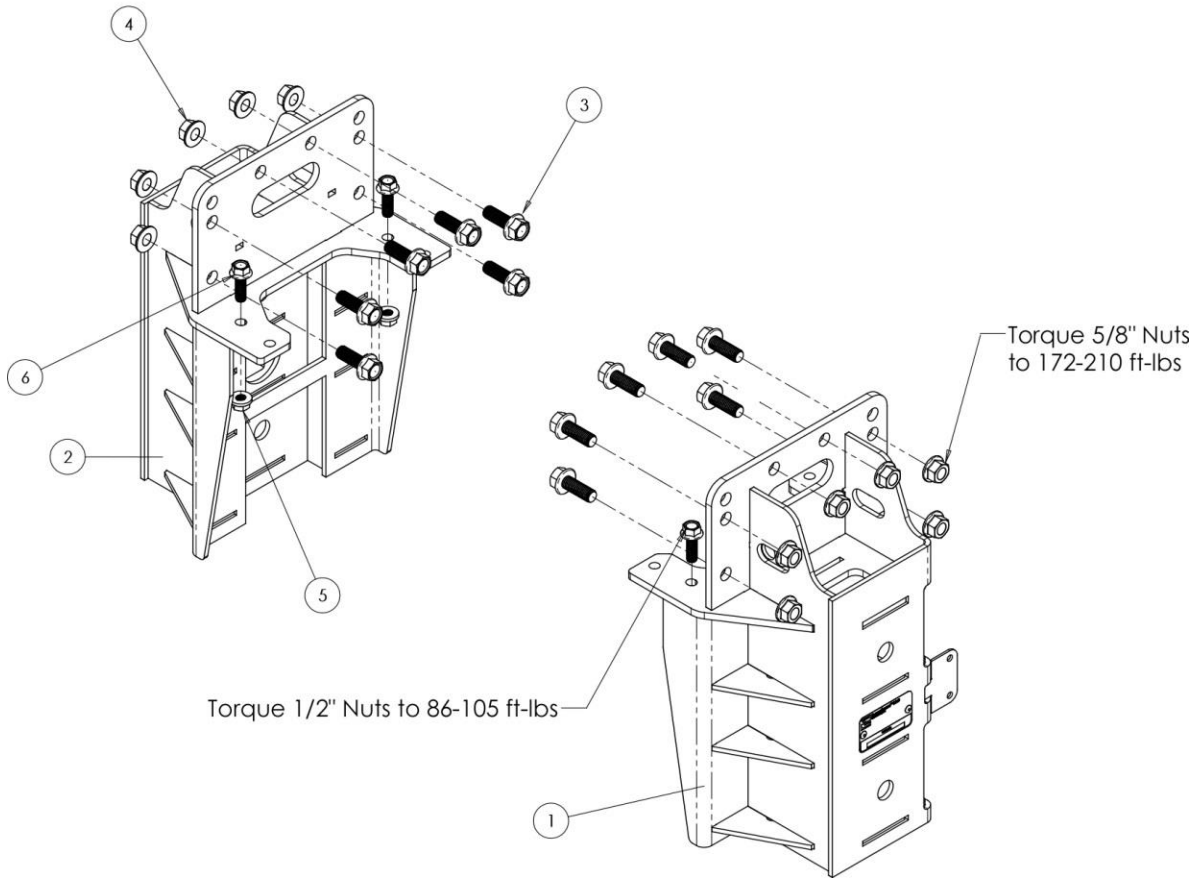
Torque M10 Fasteners
to 43-53 ft-lbs



Swaybar Link Mounting Components for 2012 & prior models

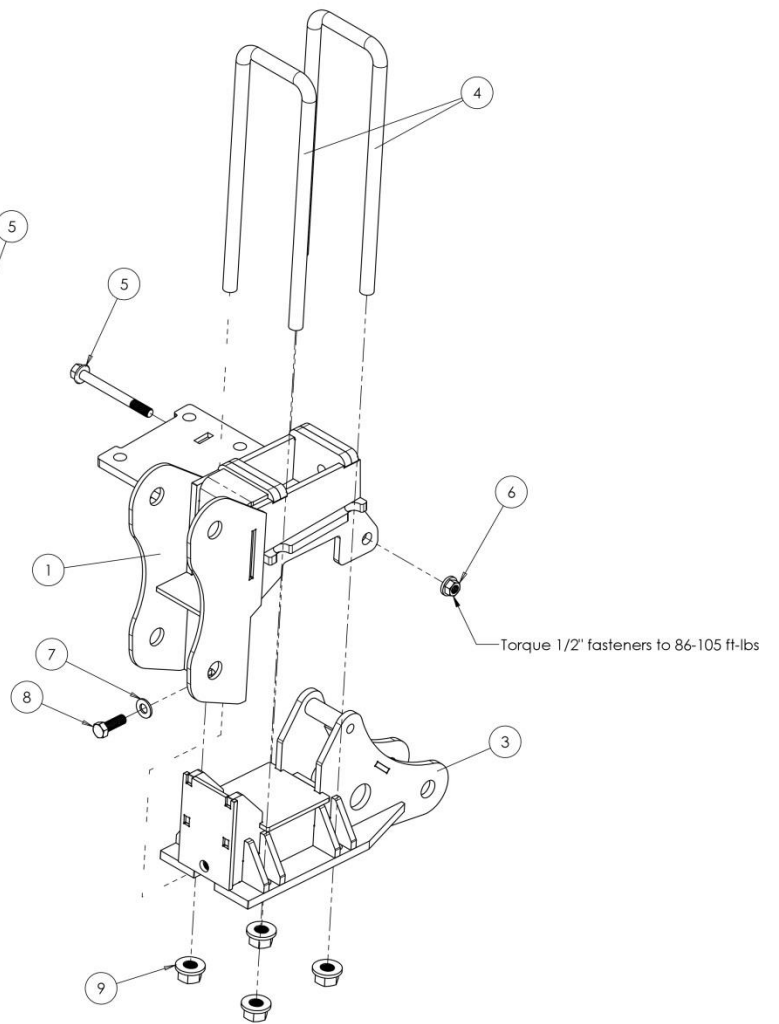
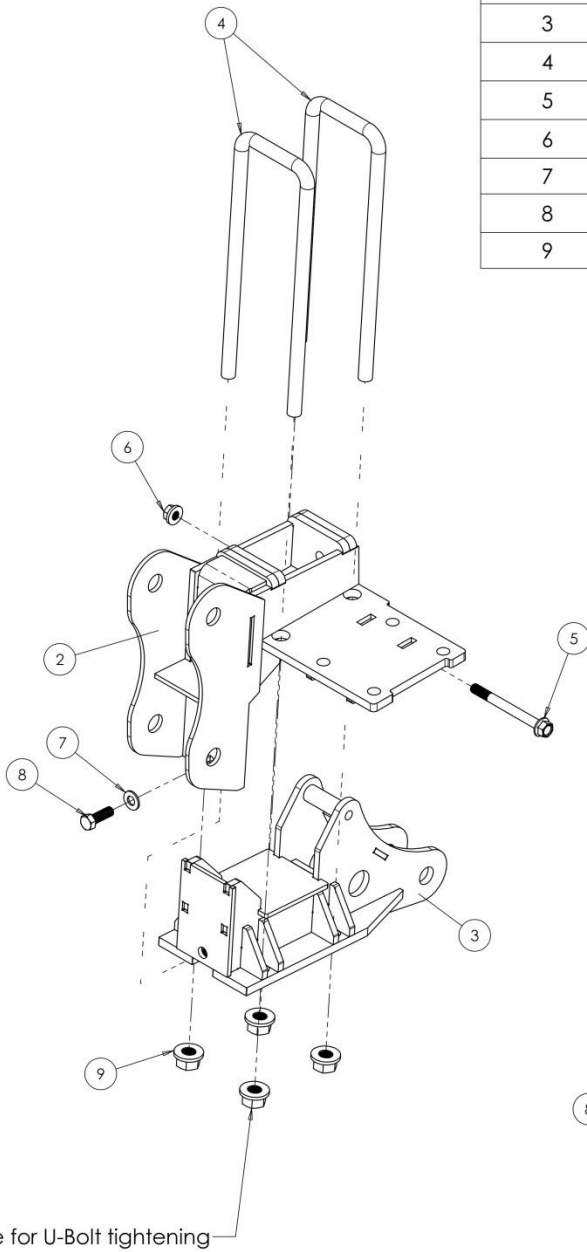
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	10905-001	Swaybar Link Mount
2	4	10502-001	HFB M10-1.5 x 30 CL 10.9 Z
3	4	10873-001	LFN M10-1.5, CL 8, BO Serrated

Front Hanger Components			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	10730-002	Asy, Front Hanger, LH
2	1	10729-004	Wldmnt, Front Hanger, RH
3	12	10874-175	HFB 5/8-11x1.750, Gr. 8, BO
4	12	10012-008	LFN 5/8-11 Gr G, Black Phos
5	4	10012-007	LFN 1/2-13, Gr. G, Black Phos
6	4	10885-150	HFB 1/2-13x1.500, Gr. 8, BO



Axle Clamp Components

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	10745-003	Weldment, Axle Seat LH
2	1	10745-004	Weldment, Axle Seat RH
3	2	10744-002	Weldment, Axle Cradle
4	4	10064-003	U-Bolt 3/4-16 x 14.63 Tri-8
5	2	10885-500	HFB 1/2-13x5.000, Gr. 8, BO
6	2	10012-007	LFN 1/2-13, Gr. G, Black Phos
7	2	10006-007	HFW 1/2 Z
8	2	10011-008	HCS 1/2-13x1.500, Gr. 8, Zinc
9	8	10012-012	LFN 3/4-16, Gr. G, Black Phos



*See Note for U-Bolt tightening

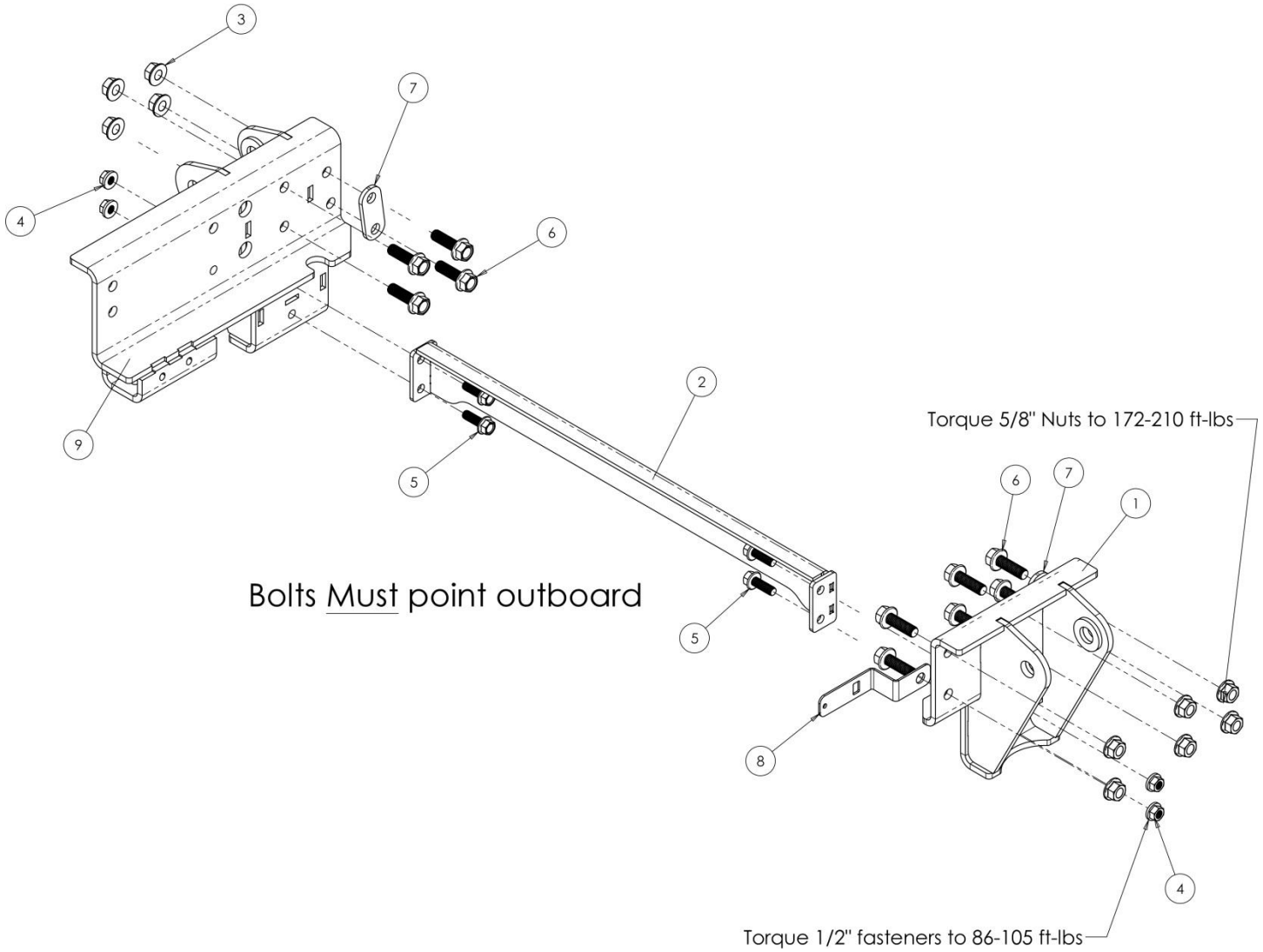
***U-Bolts:**

- Stage 1: Tighten to 100Nm [74 ft-lbs]
- Stage 2: Tighten to 200Nm [148 ft-lbs]
- Stage 3: Tighten to 300Nm [222 ft-lbs]
- Stage 4: Tighten to 400Nm [295 ft-lbs]

Tighten in Criss-Cross Pattern

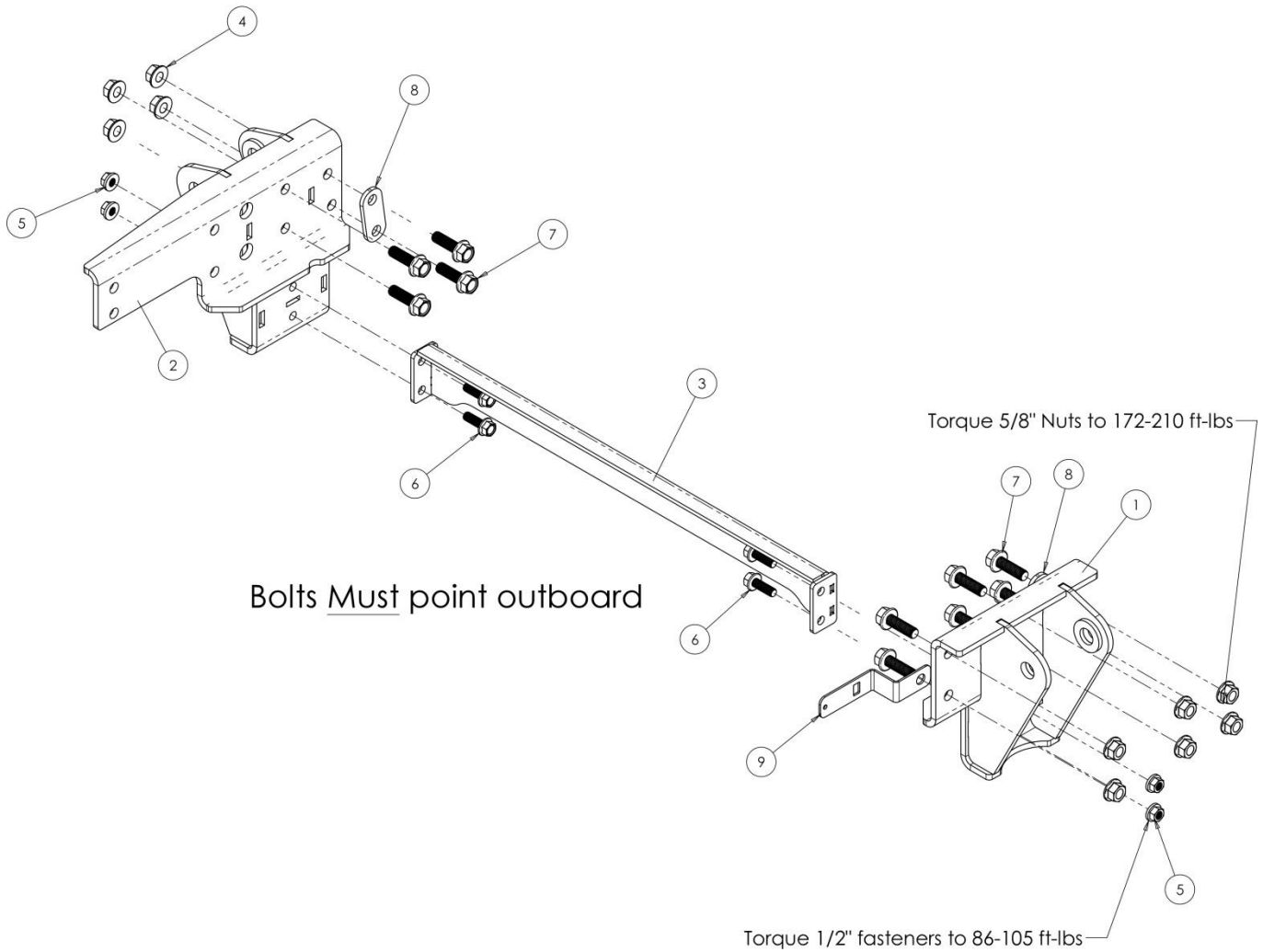
[2013 and later models]

Upper Strut Mount Components			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	10790-003	Wldmnt, Upper Strut Mount, LH
2	1	10782-002	Wldmnt, Crossmember Reinforcement
3	10	10012-008	LFN 5/8-11 Gr G, Black Phos
4	4	10012-007	LFN 1/2-13, Gr. G, Black Phos
5	4	10885-150	HFB 1/2-13x1.500, Gr. 8, BO
6	10	10874-200	HFB 5/8-11x2.000, Gr. 8, BO
7	2	10912-001	Backing Plate
8	1	10919-001	Brake line relocation bracket
9	1	10790-005	Wldmnt, Upper Strut Mount, RH



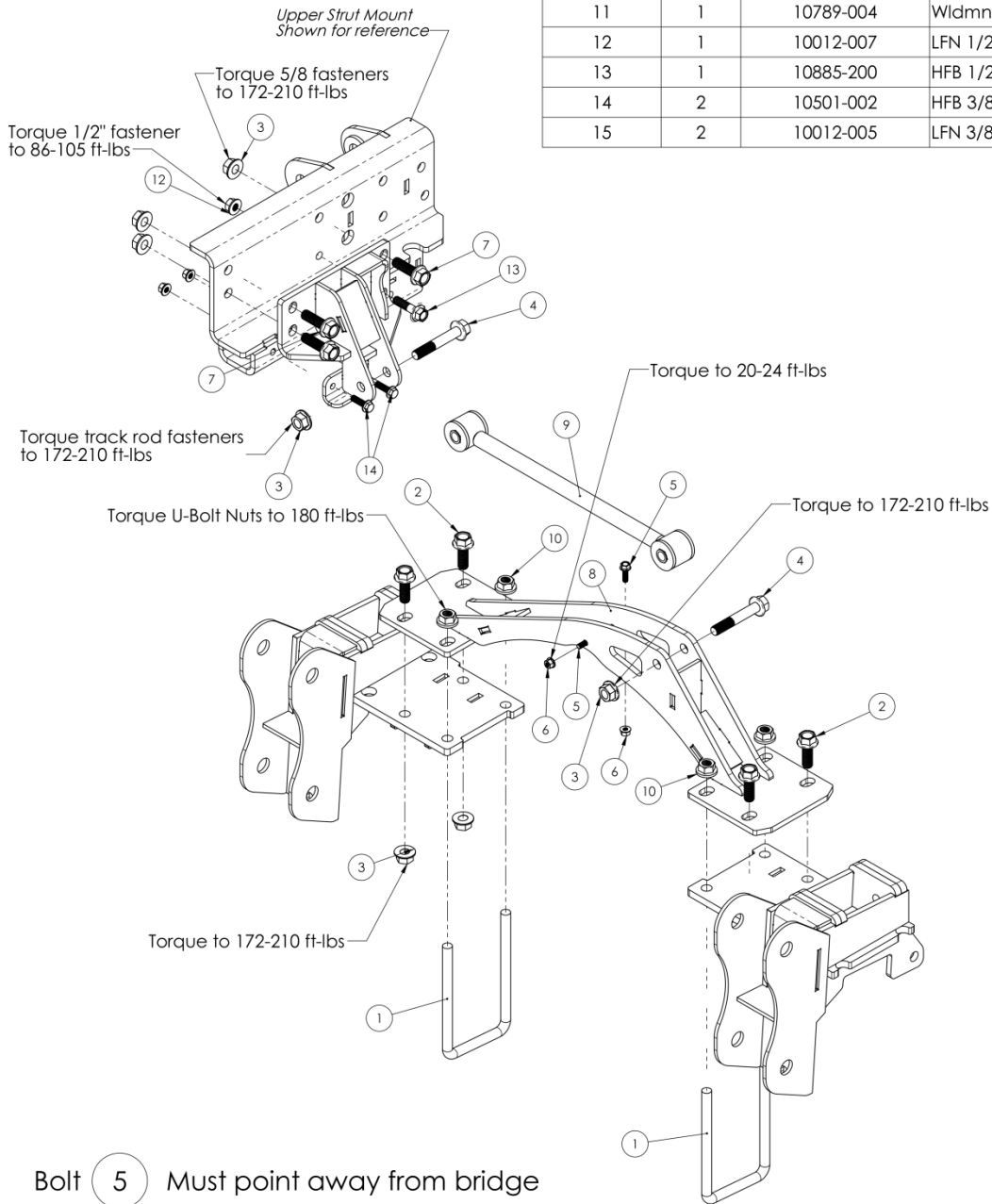
[2012 and prior models]

Upper Strut Mount Components			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	10790-003	Wldmnt, Upper Strut Mount, LH
2	1	10790-004	Wldmnt, Upper Strut Mount, RH
3	1	10782-002	Wldmnt, Crossmember Reinforcement
4	10	10012-008	LFN 5/8-11 Gr G, Black Phos
5	4	10012-007	LFN 1/2-13, Gr. G, Black Phos
6	4	10885-150	HFB 1/2-13x1.500, Gr. 8, BO
7	10	10874-200	HFB 5/8-11x2.000, Gr. 8, BO
8	2	10912-001	Backing Plate
9	1	10919-001	Brake line relocation bracket



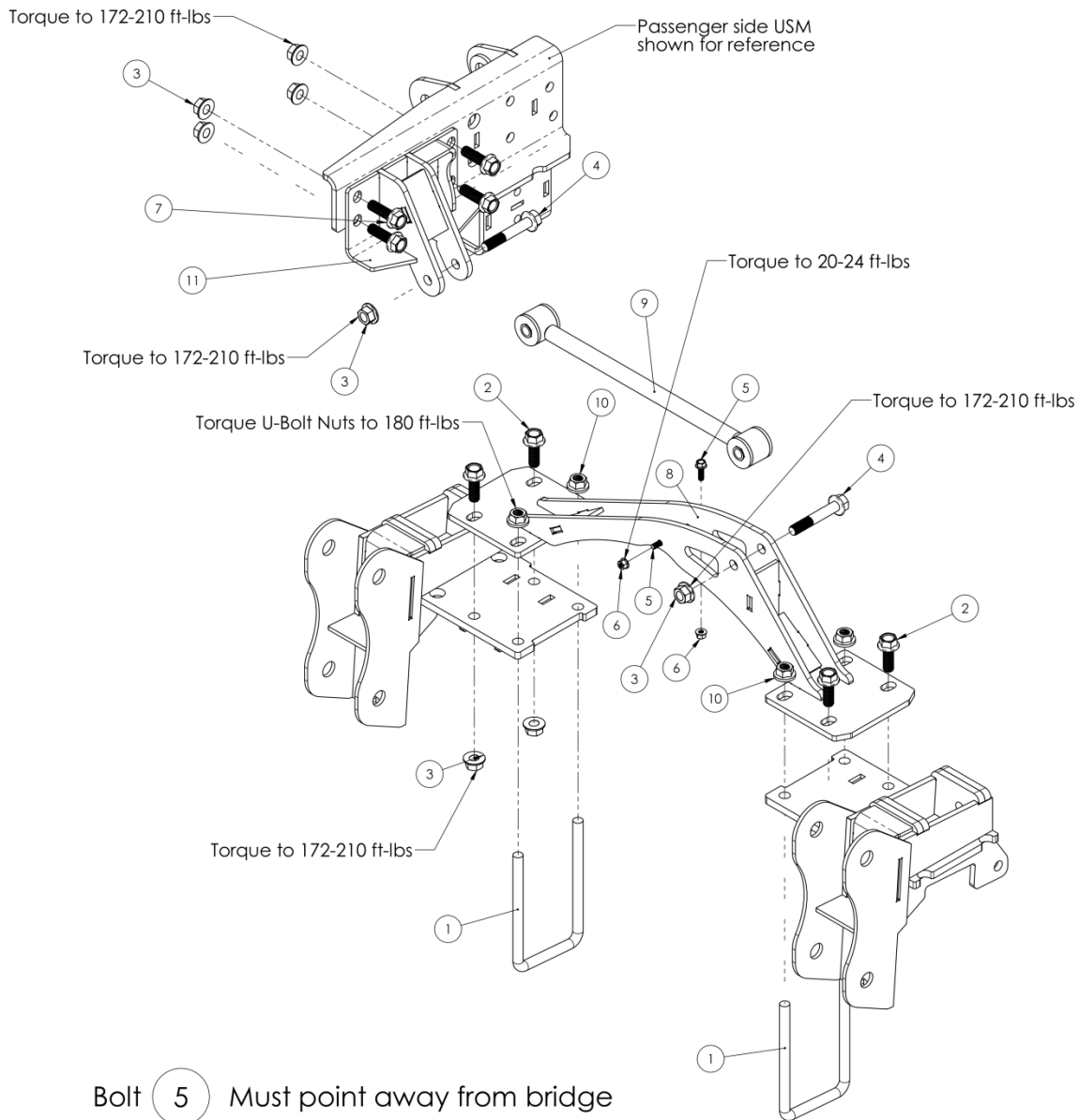
[2013 and later models]

Bridge Components			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	10064-002	U-Bolt, 5/8-18 x 8.5 x 8.0, Slanted
2	4	10874-175	HFB 5/8-11x1.750, Gr. 8, BO
3	9	10012-008	LFN 5/8-11 Gr G, Black Phos
4	2	10874-375	HFB 5/8-11x3.750, Gr. 8, BO
5	2	10886-100	HFB 5/16-18 x 1.000, Gr. 8, BO
6	2	10012-010	LFN 5/16-18, Gr. G, Black Phos
7	3	10874-200	HFB 5/8-11x2.000, Gr. 8, BO
8	1	10762-003	Weldment, Bridge
9	1	10786-002	Asy, Track Rod
10	4	10012-013	LFN 5/8-18, Gr. G, Black Phos
11	1	10789-004	Wldmnt, Track Rod Mnt
12	1	10012-007	LFN 1/2-13, Gr. G, Black Phos
13	1	10885-200	HFB 1/2-13x2.000, Gr. 8, BO
14	2	10501-002	HFB 3/8-16 x 1.250, Gr 8, BO
15	2	10012-005	LFN 3/8-16, Gr G, Z

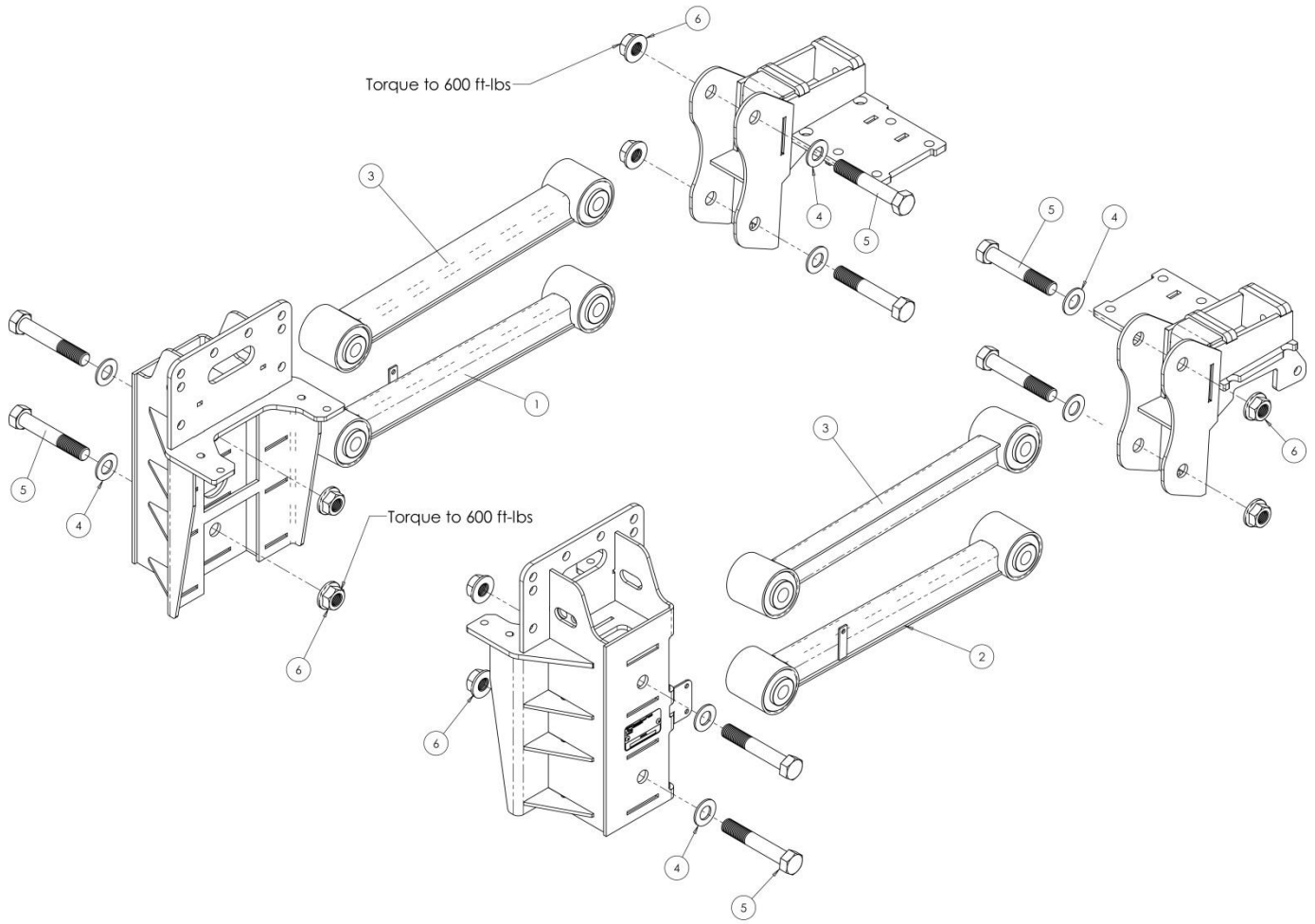


[2012 and prior models]

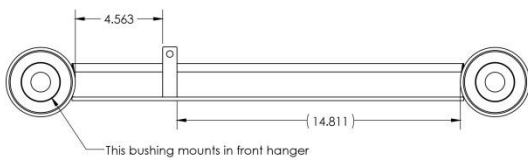
Bridge Components			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	10064-002	U-Bolt, 5/8-18 x 8.5 x 8.0, Slanted
2	4	10874-175	HFB 5/8-11x1.750, Gr. 8, BO
3	10	10012-008	LFN 5/8-11 Gr G, Black Phos
4	2	10874-375	HFB 5/8-11x3.750, Gr. 8, BO
5	2	10886-100	HFB 5/16-18 x 1.000, Gr. 8, BO
6	2	10012-010	LFN 5/16-18, Gr. G, Black Phos
7	4	10874-200	HFB 5/8-11x2.000, Gr. 8, BO
8	1	10762-003	Weldment, Bridge
9	1	10786-002	Asy, Track Rod
10	4	10012-013	LFN 5/8-18, Gr. G, Black Phos
11	1	10789-003	Wldmnt, Track Rod Mnt



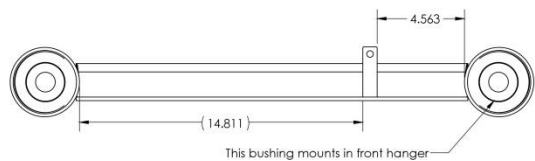
Control Arm Components			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	10777-005	Asy, Control Arm, RH, Lower
2	1	10777-004	Asy, Control Arm, LH, Lower
3	2	10777-006	Asy, Control Arm, Upper
4	8	10006-004	HFW 1.000, Zinc
5	8	10003-003	HB 1.000-8x6.000, Gr. 8, Zinc
6	8	10012-003	LFN 1-8, Gr G, Z Top Lock



Driver Side
Lower Control Arm
P/N: 10777-004

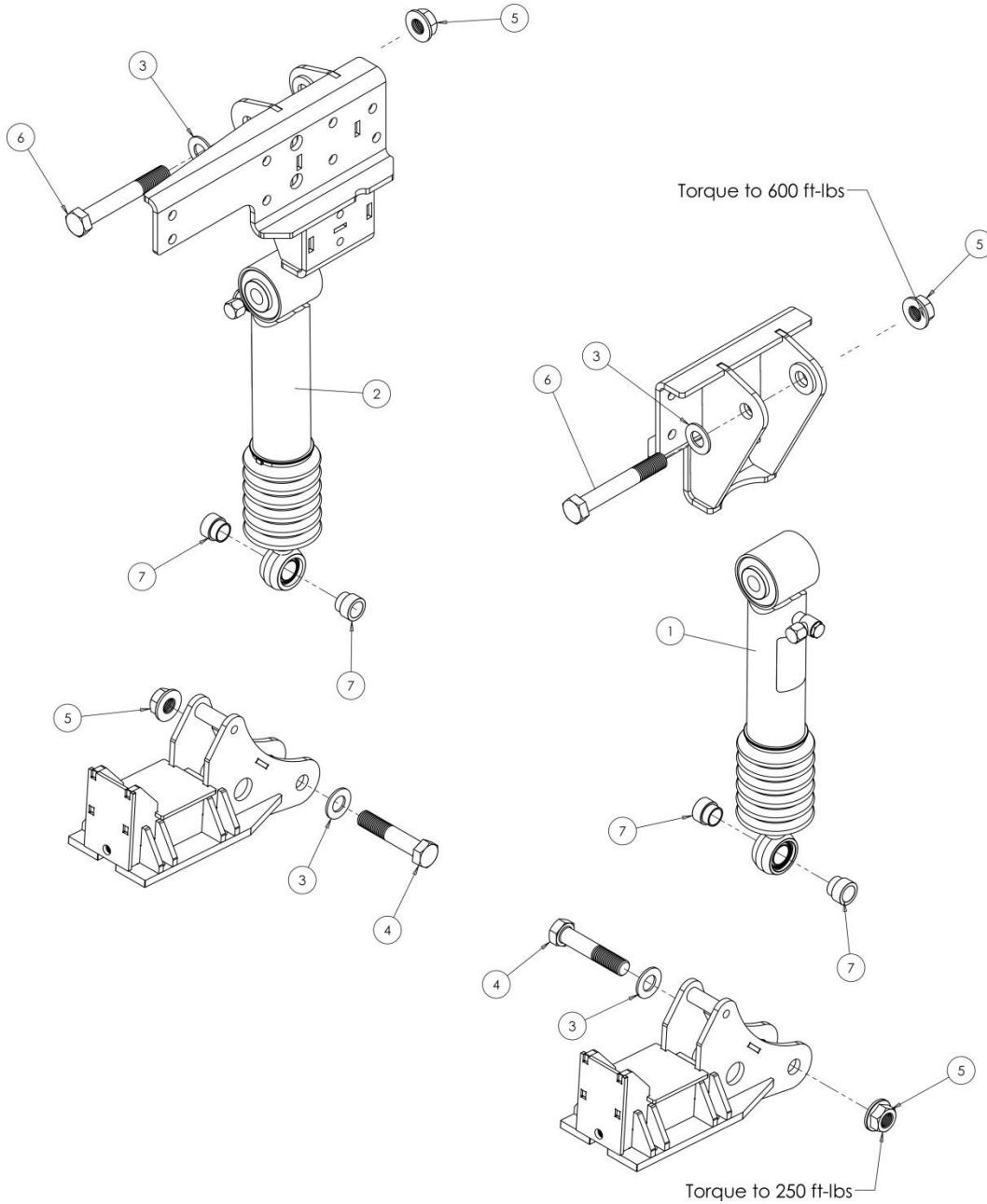


Passenger Side
Lower Control Arm
P/N: 10777-005



[All 2012 and prior 4500 Cab Chassis models]

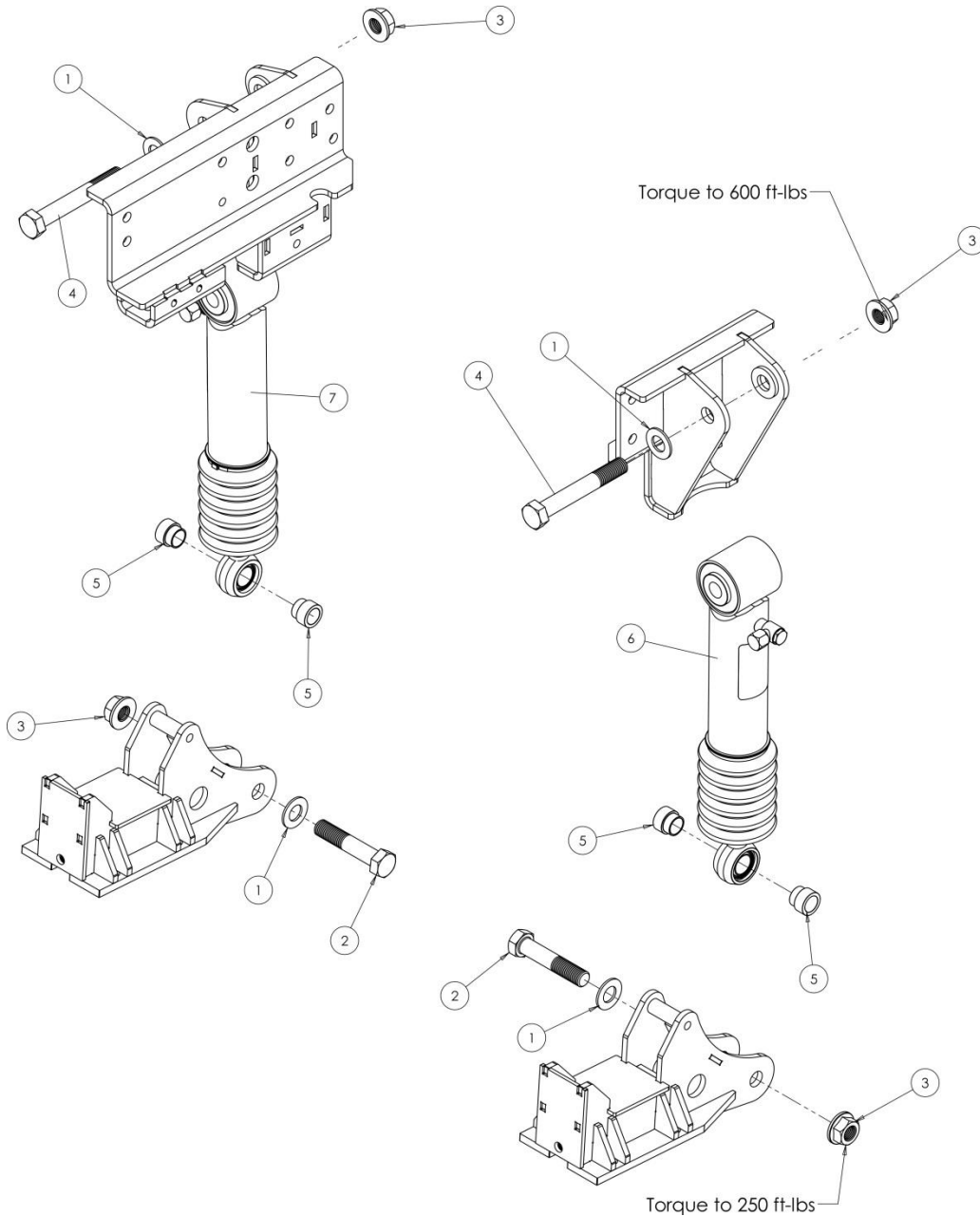
Strut Components			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	10877-002	Asy Strut 2.75ID x 3.50 OD x 1.375
2	1	10877-001	Asy Strut 2.75ID x 3.50 OD x 1.375
3	4	10006-004	HFW 1.000, Zinc
4	2	10003-008	HCS 1-8 x 5.000, Gr 8, Z
5	4	10012-003	LFN 1-8, Gr G, Z Top Lock
6	2	10003-006	HCS 1.000-8 x 7.000, Gr. 8, ZY
7	4	10640-004	Bearing Spacer, 1.24 x 1.06 x .693



[All 2013 and later 4500 and 5500 Cab Chassis models]

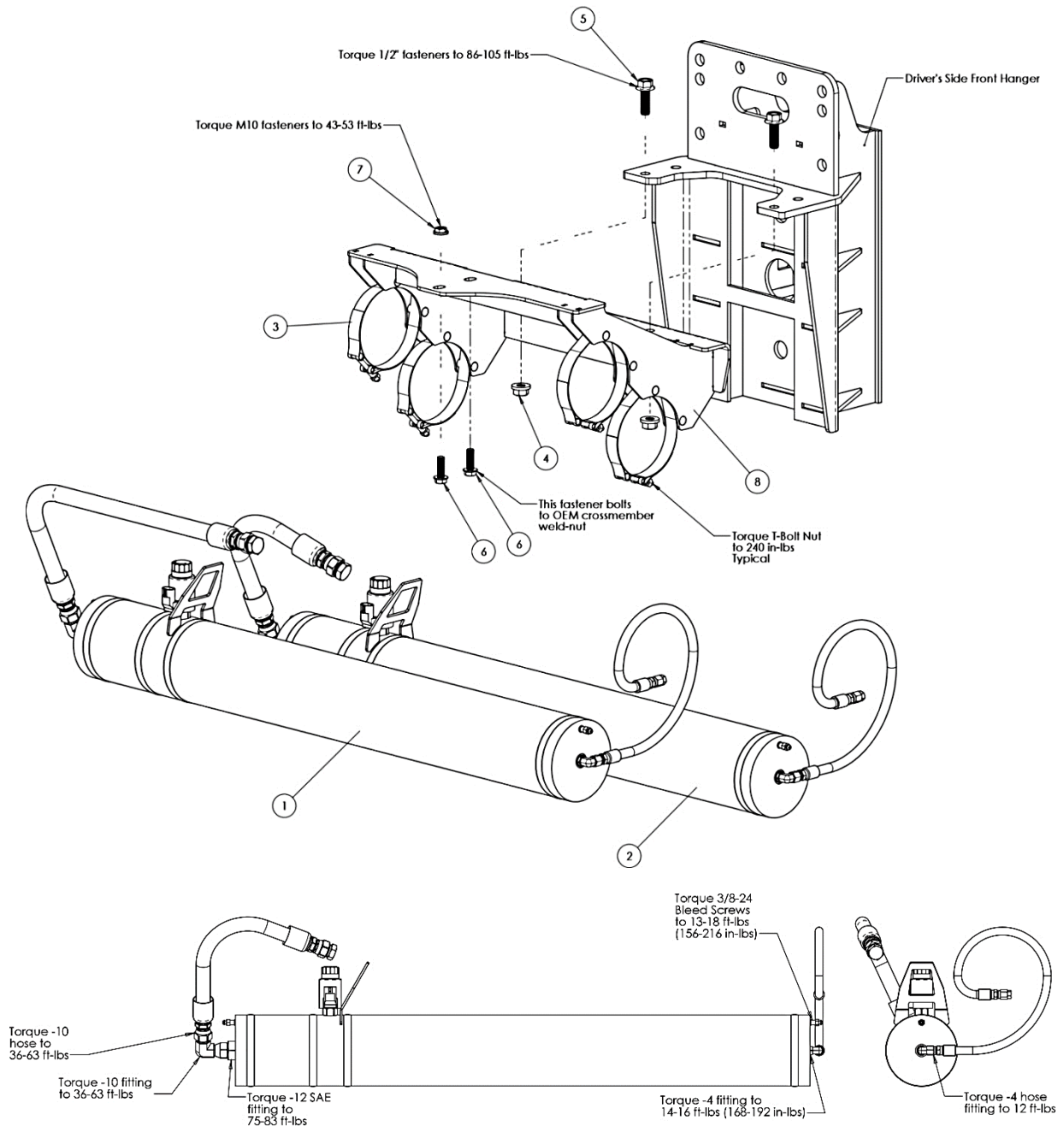
Strut Components

ITEM NO.	QTY.	PART NUMBER		DESCRIPTION
		DS120R 4500	DS135R 5500	
1	4	10006-004		HFW 1.000, Zinc
2	2	10003-008		HCS 1-8 x 5.000, Gr. 8, ZY
3	4	10012-003		LFN 1-8, Gr. G, Z Top Lock
4	2	10003-006		HCS 1-8 x 7.000, Gr. 8, ZY
5	2	10640-004		Bearing Spacer, 1.25 x 1.02 x .693
6	1	10877-002	10838-002	Asy Strut, Port Left
7	1	10877-001	10838-001	Asy, Strut, Port Right



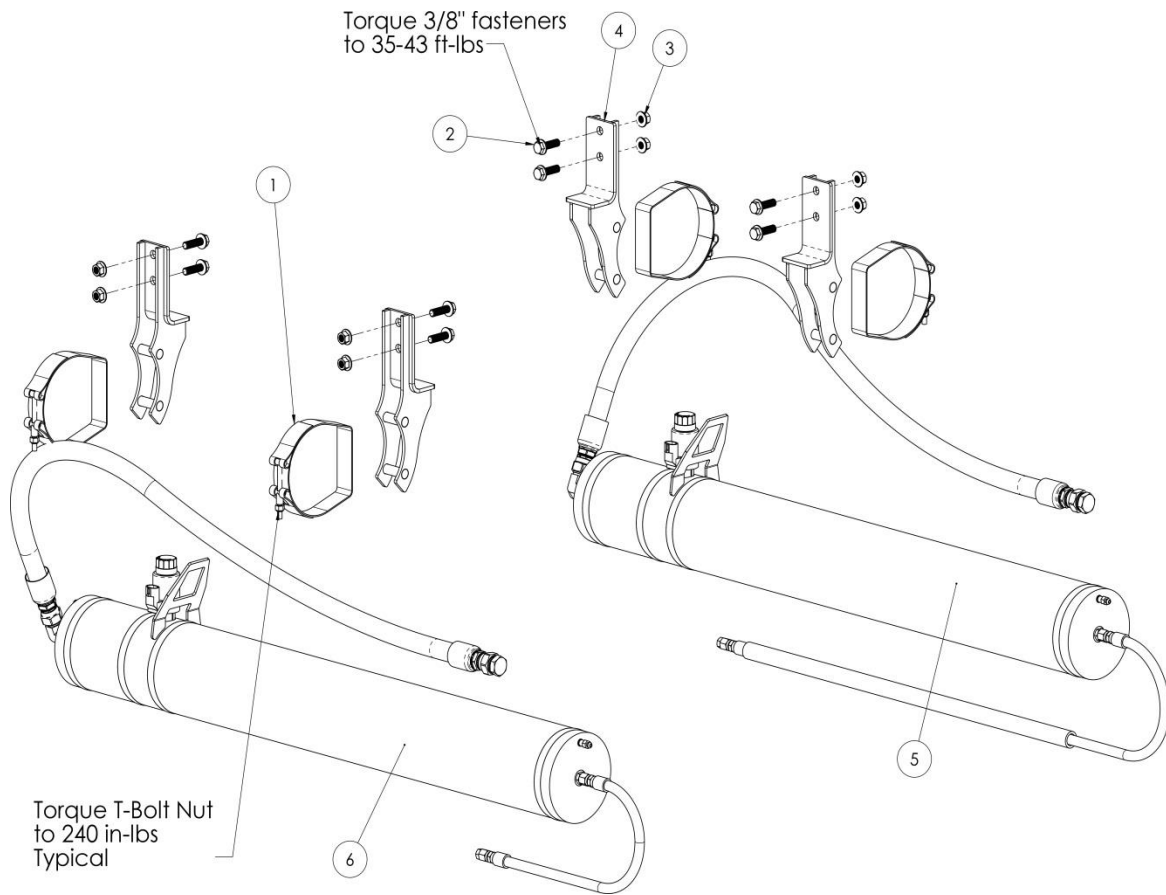
Secondary Volume Components [All Models except for DS120R-AF and DS135R-AF]

ITEM NO.	QTY.	PART NUMBER All 4500 models	PART NUMBER All 5500 models	DESCRIPTION
1	1	10597-016	10597-024	Asy, 2 nd Volume, Ram, RH
2	1	10597-015	10597-023	Asy, 2 nd Volume, Ram, LH
3	4	10843-003		T-Bolt Clamp, Range 4.60-5.22
4	2	10012-007		LFN 1/2-13, Gr. G, Black Phos
5	2	10885-150		HFB 1/2-13x1.500, Gr. 8, BO
6	2	10502-001		HFB M10-1.5 x 30 CL 10.9 Z
7	1	10873-002		LFN M10-1.5, CL 10.9 Z
8	1	10830-004		Wldmnt, Volume Mount, Twin

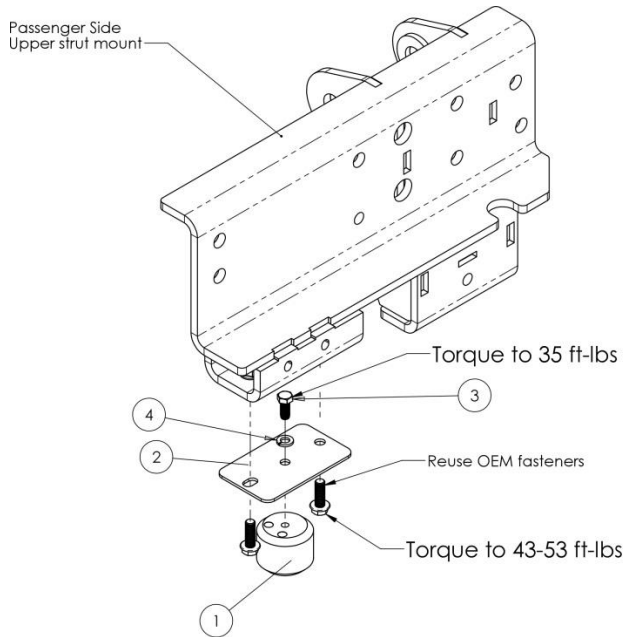
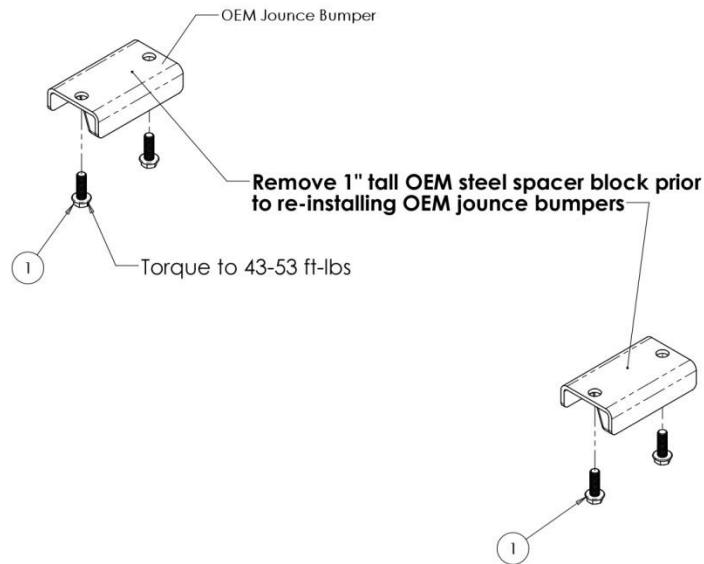


Secondary Volume Components [DS120R-AF and DS135R-AF Model Vehicles only]

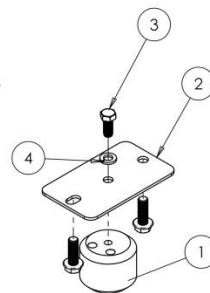
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	4	10843-003	T-Bolt Clamp, Range 4.60-5.22
2	8	10501-002	HFB 3/8-16 x 1.25, Gr 8, BO
3	8	10012-005	LFN 3/8-16, Gr. G, Z
4	4	10830-015	Volume Mount Weldment
5	1	10597-043 [DS120R-AF]	Asy, 2 nd Volume 50x374, LH
		10597-053 [DS135R-AF]	Asy, 2 nd Volume 50x450, LH
6	1	10597-044 [DS120R-AF]	Asy, 2 nd Volume 50x374, RH
		10597-054 [DS135R-AF]	Asy, 2 nd Volume 50x450, RH



Jounce Bumper Components for 2012 & prior models			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	4	10502-001	HFB M10-1.5 x 30 CL 10.9 Z

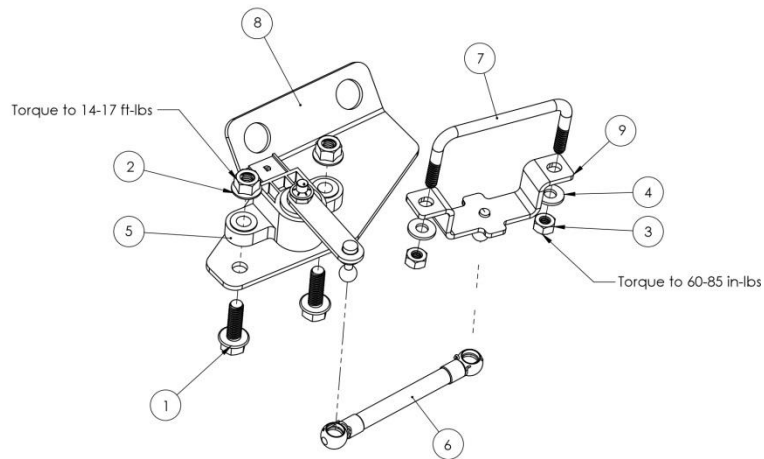


Discard OEM Bumpers and replace with assembly shown

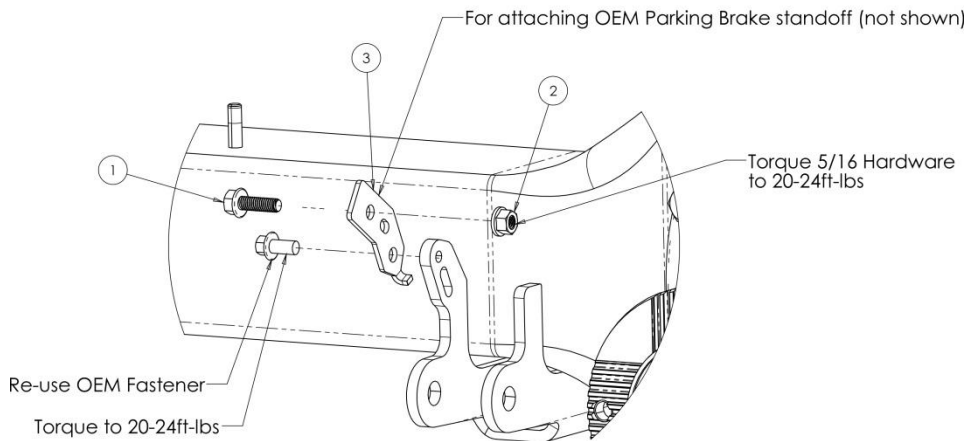


Jounce Bumper Components for 2013 and newer models			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	10867-002	Jounce Bumper, 2.313" Dia x 1.875" T
2	2	10889-001	Jounce Bumper Mount Plate
3	2	10461-003	HCS 3/8-16x.875 Gr 8 Z
4	2	10237-003	SLW 3/8, Z
5	2	10873-002	LFN M10-1.6, CL 10.9 Z

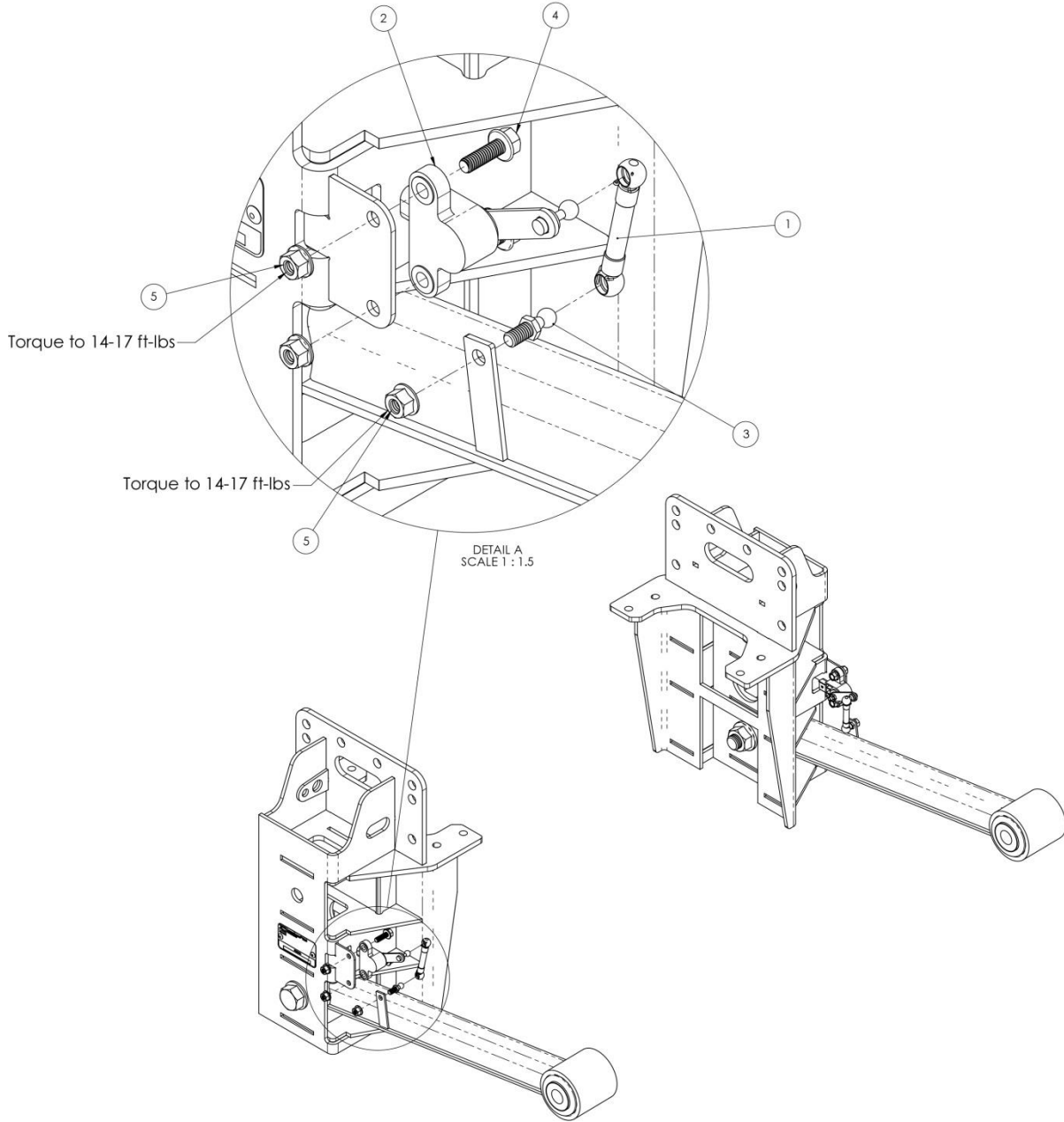
Steering Sensor Components			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	10886-100	HFB 5/16-18 x 1.000, Gr. 8, BO
2	2	10012-010	LFN 5/16-18, Gr. G, Black Phos
3	2	10004-013	LHN .250-20, Gr. C, Zinc
4	2	10006-009	HFW 1/4, .625x.281x.064, Z
5	1	10586-002	Asy, Steering Sensor
6	1	10587-006	Asy, Linkage, 3.938" SS
7	1	10669-005	U-Bolt, 1/4-20 x 3.00 x 1.375 Gr 5 SQ
8	1	10904-001	Steering Sensor Mount Plate
9	1	10733-002	Wldmnt, Steering Ball Stud Mnt

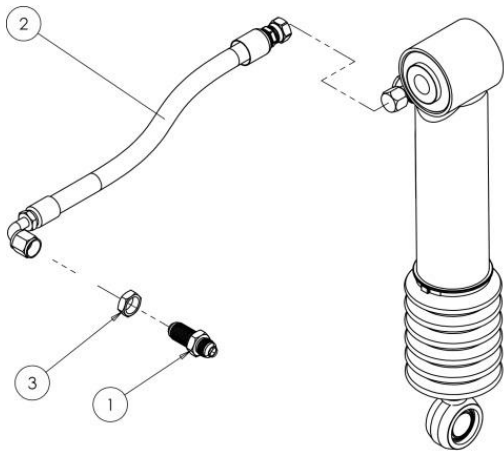


Parking Brake Relocation Components			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	10886-100	HFB 5/16-18 x 1.000, Gr. 8, BO
2	1	10012-010	LFN 5/16-18, Gr. G, Black Phos
3	1	10902-001	Parking Brake Relocating Bracket



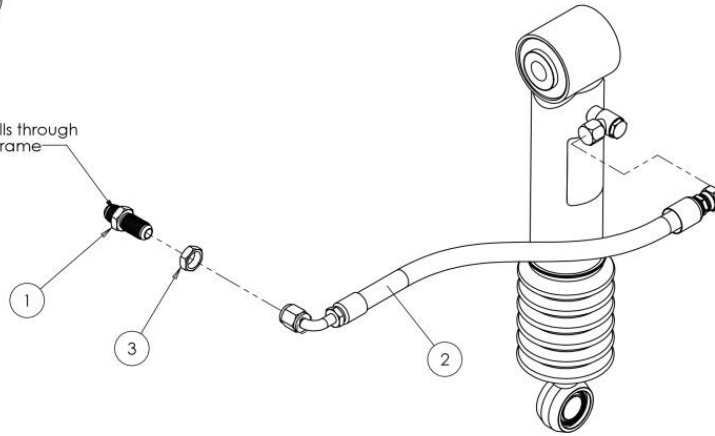
Height Sensor Components			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	10587-005	Asy, Linkage
2	2	10586-001	Asy, Height Sensor
3	2	10591-001	Ball Stud, 10mm x 5/16-18
4	4	10886-100	HFB 5/16-18 x 1.000, Gr. 8, BO
5	6	10012-010	LFN 5/16-18, Gr. G, Black Phos



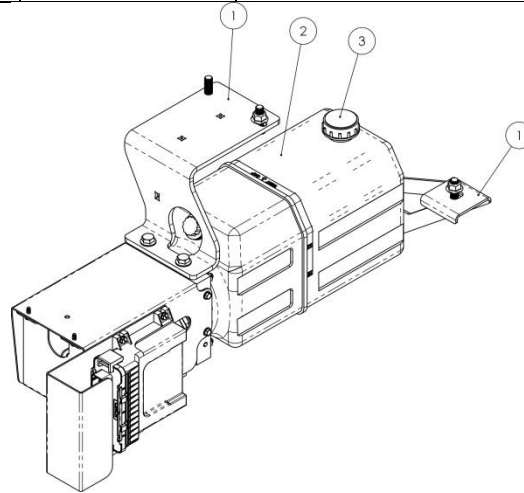


-10 Hose Components			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	10321-034	Hyd. Fit -10 37 x -10 37 Blkhd
2	2	10810-007	Asy, Hose, -10 x 25-3/16"
3	2	10321-035	Hyd. Fit -10 Blkhd Locknut

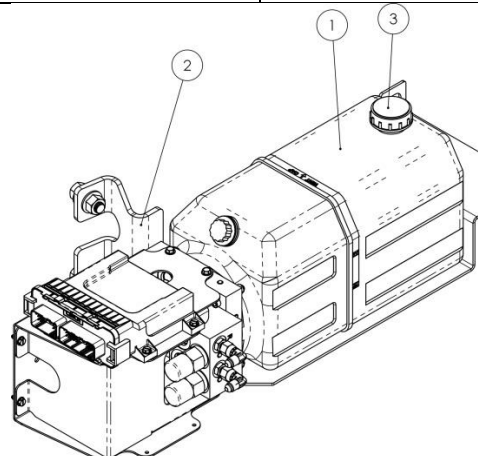
Bulkhead installs through hole drilled in frame



Power Module Mounting [DS120R-A, DS120R-A12, DS120R-A13, DS135R-B, and DS135R-B13]			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	10887	Kit, Power Module Mounting, Ram
2	1	11023-001	Asy, Power Module, RAM 4500 (2013 and later)
		11023-002	Asy, Power Module, RAM 4500 (2012 and earlier)
		11023-003	Asy, Power Module, RAM 5500
		11023-005	Asy, Power Module, DS120R-ALA
3	1	10614-001	Breather Cap

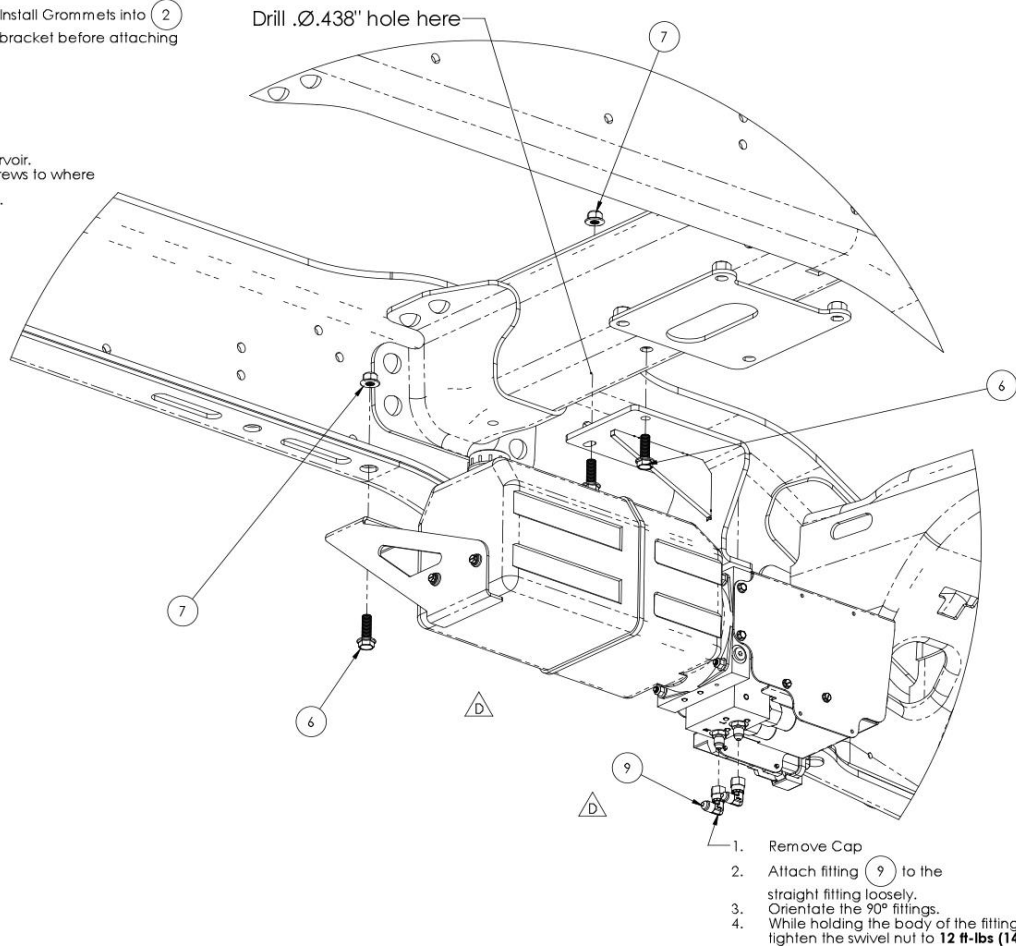
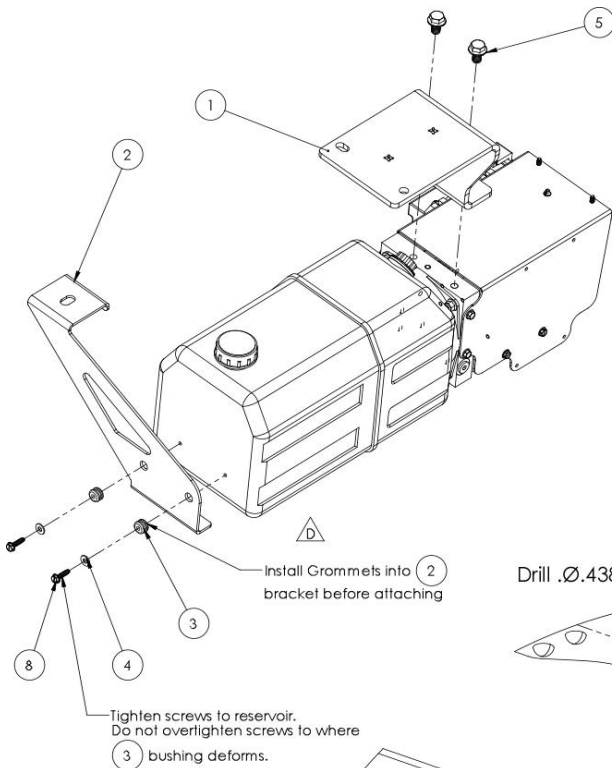


Power Module Mounting [DS120R-AF and DS135R-AF]			
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	11013-003 [DS120R-AF]	Asy, Power Module, RAM 4500
		11013-005 [DS135R-AF]	Asy, Power Module, RAM 5500
2	1	11094	Kit, Power Module Mounting, RAM-AF
3	1	10614-001	Breather Cap



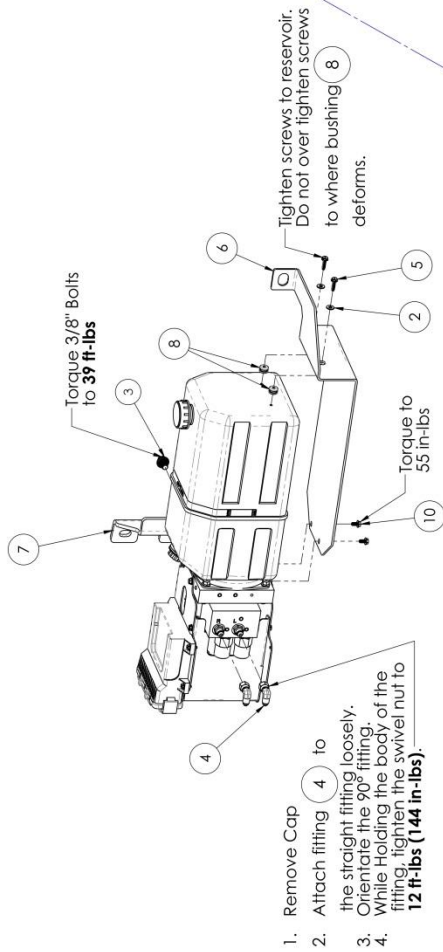
[DS120R-A, DS120R-A12, DS120R-A13, DS135R-B, DS135R-B13]

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	10799-008	Wldmnt. Power Mod Manifold Mnt
2	1	10798-005	Power Module Reservoir Mount
3	2	10805-004	Grommet, .19 ID x .56 OD x .375 T
4	2	10088-001	FW #10, Zinc
5	2	10252-003	SFHS 3/8-16 x .625, Gr 8.2, Z
6	3	10502-001	HFB M10-1.5 x 30 CL 10.9 Z
7	2	10873-002	LFN M10-1.5, CL 10.9 Z
8	2	10510-002	STS #10-16 x .750, Z, Hex Head
9	2	10322-021	Hyd Fit 90, -4 37 x -4 37 F
10	1	D10887	Document, Kit, Power Module Mounting, RAM



[DS120R-AF and DS135R-AF]

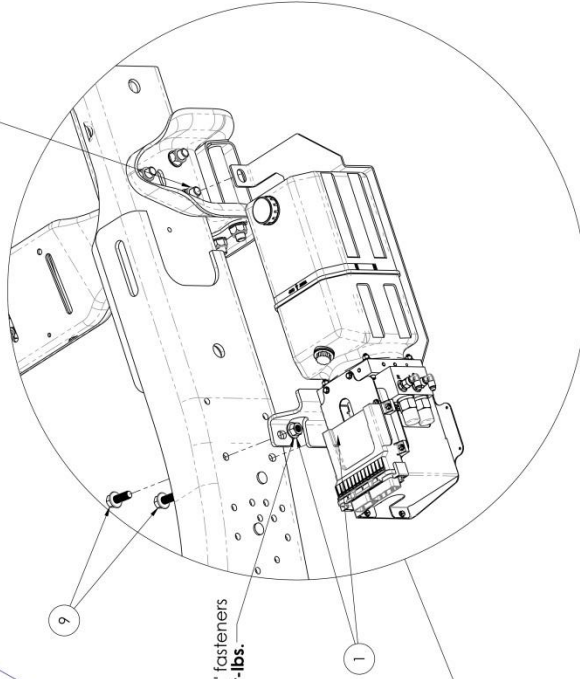
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	10012-007	LFN 1/2-13, Gr. G, Black Phos
2	2	10088-001	FW # 10, Zinc
3	2	10252-003	SFHS 3/8-1.6 x .625, Gr.8.2, Z
4	2	10322-021	Hyd FIt 90, -4.37 x -.4.37 F
5	2	10510-002	STS #10-16 x .750, Z, Hex Head
6	1	10798-013	Power Module Reservoir Mount
7	1	10799-012	Power Module Manifold Mount
8	2	10805-004	Grommet, .19 ID x .56 OD x .375 T
9	2	10885-125	HFB 1/2-13x1.250, Gr. 8, BO
10	2	11207-001	HFB M5-0.8X10 CL, 10.9 BO



1. Remove Cap
2. Attach fitting 4 to the straight fitting loosely.
3. Orientate the 90° fitting.
4. While Holding the body of the fitting, tighten the swivel nut to 12 ft-lbs (144 in-lbs).

Step 1: Attach Brackets to Powermodule as shown.

Step 2: Install Power Module under Cab on Passenger side. Use brackets as shown to attach to framerail using existing holes.

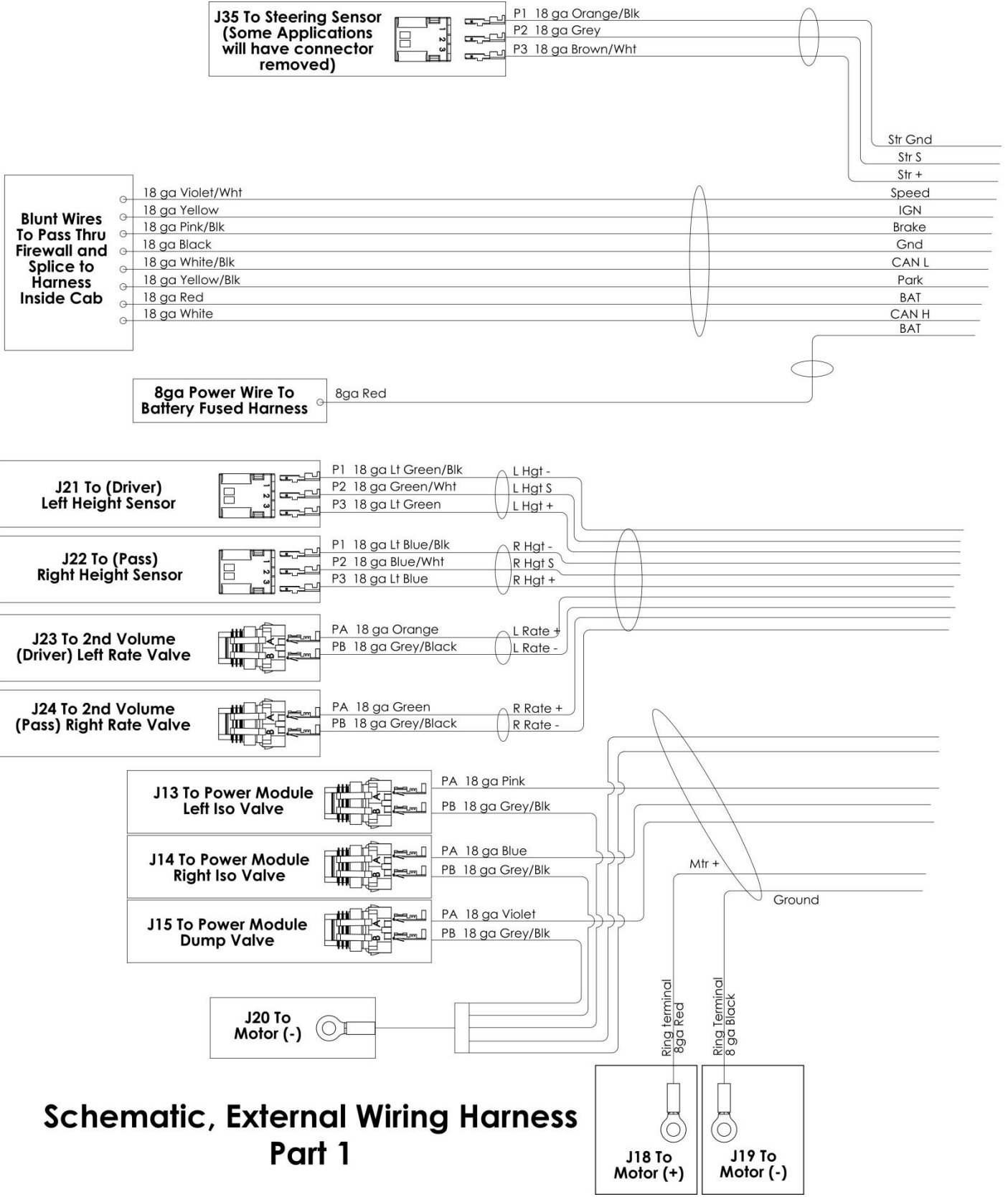


Install Reservoir mount onto rear lower M16 crossmember bolt. Re-Torque M16 nut to 207 ft-lbs.

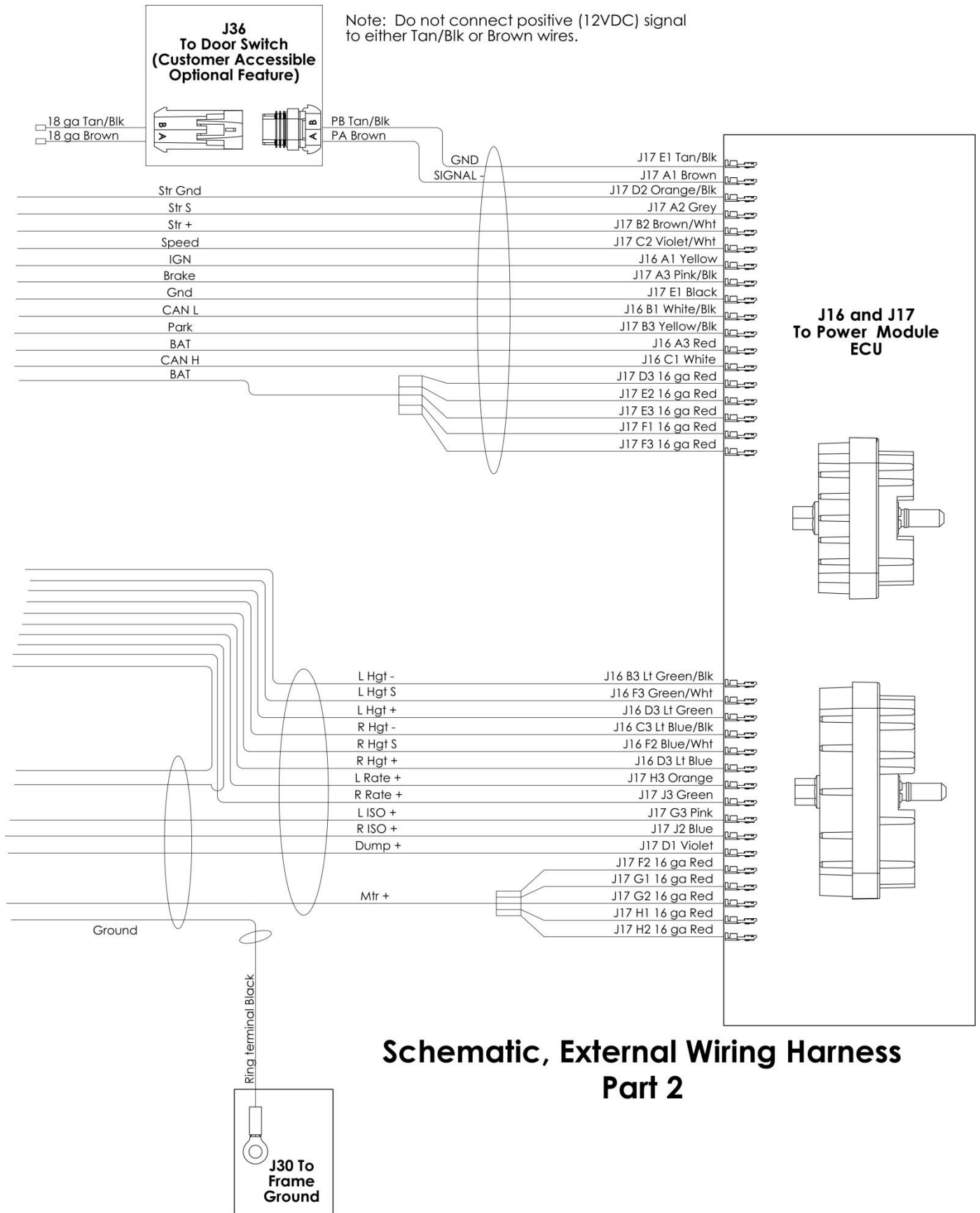
Torque 1/2" fasteners to 86-105 ft-lbs.

DETAIL A
SCALE 1:5

Electrical Schematics

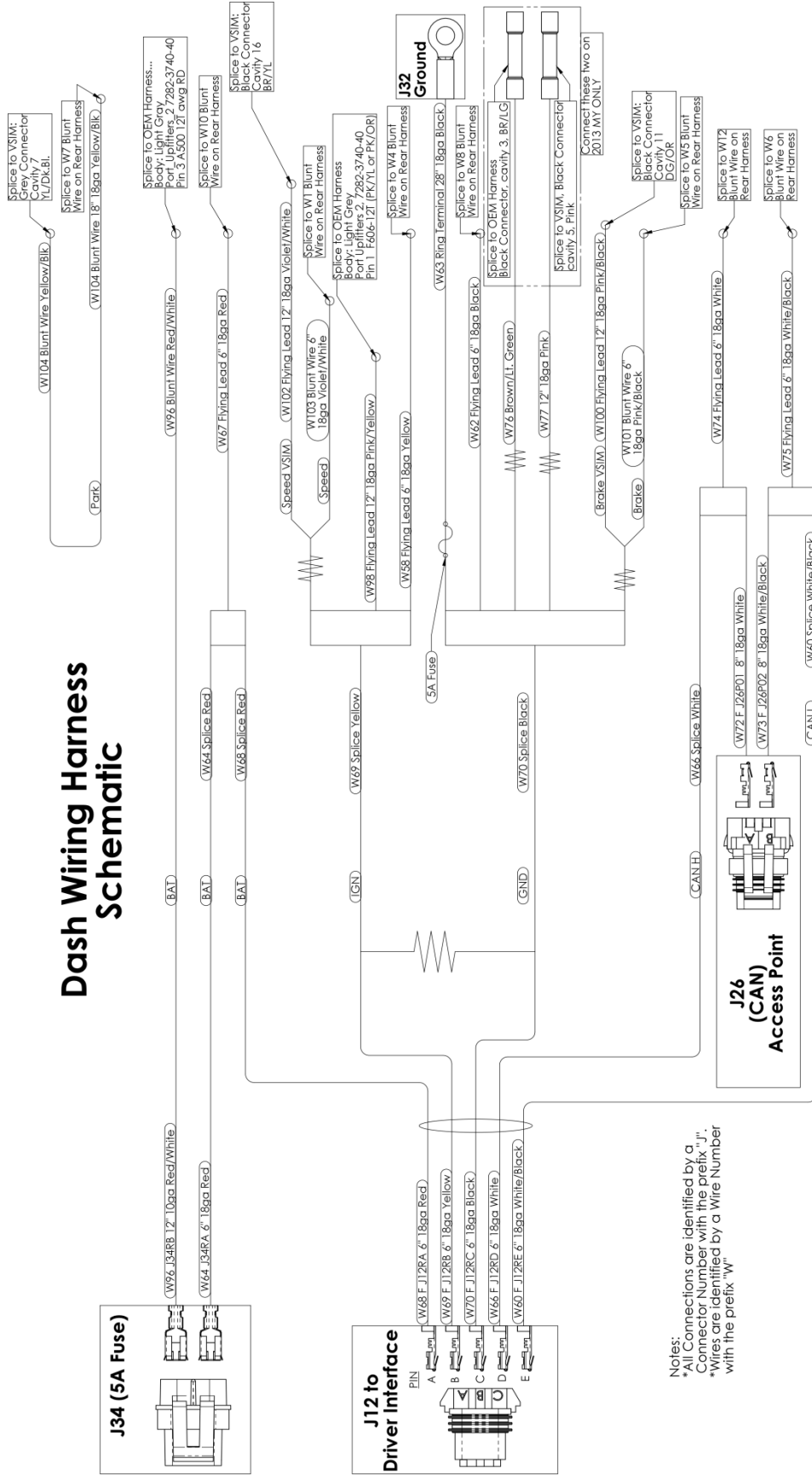


Schematic, External Wiring Harness Part 1



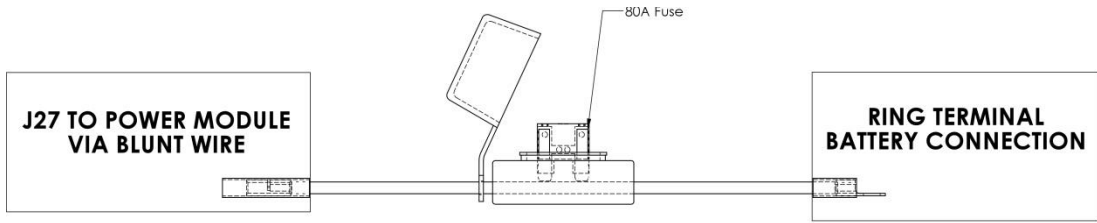
Schematic, External Wiring Harness Part 2

Dash Wiring Harness Schematic



Notes:
 *All connections are identified by a Connector Number with the prefix "J".
 *Wires are identified by a Wire Number with the prefix "W"

2013 and Prior



Schematic, Battery Fuse Lead



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