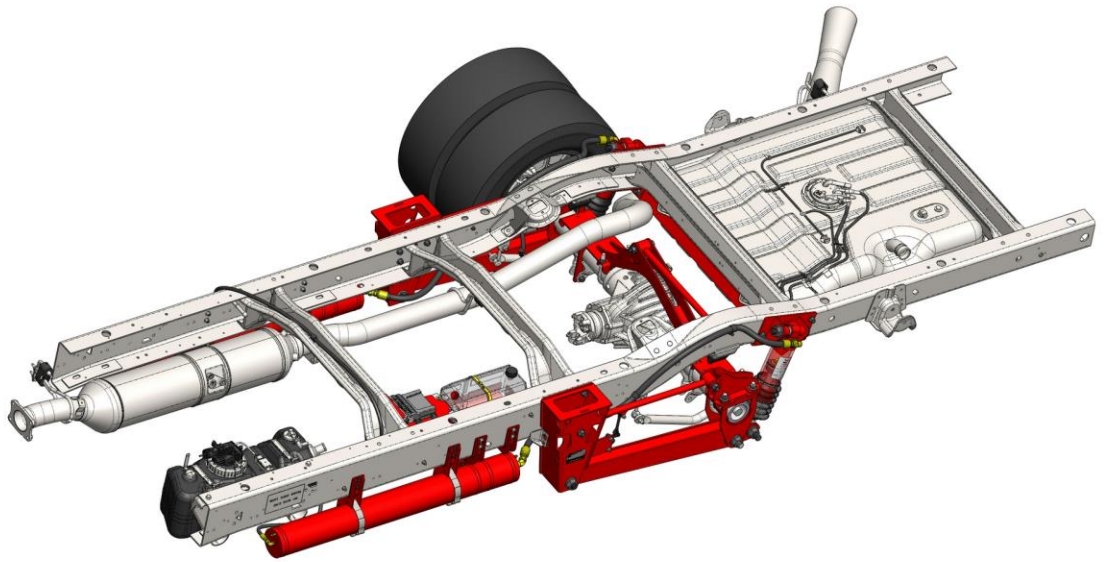


# DS96GM2/GM3

**DS96GM2**

**DS96GM3**

Rear Axle Suspension System  
for Chevrolet/GMC G3500/4500  
Cutaway Chassis



## Installation / Operator Manual

D11325 REV R 03/19

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## Introduction

This manual provides installation information for the LiquidSpring CLASS® DS96GM2 and DS96GM3 series of rear axle suspension systems for the General Motors Chevrolet/GMC G3500/G4500 cutaway chassis.

Before you begin installation of the suspension system:

1. Read and understand all instructions and procedures prior to installation of components.
2. Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.
3. Follow your company’s maintenance and service, installation, and diagnostics guidelines.
4. Use proper tools when required to help avoid serious personal injury and damage to components.

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.

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 Application and Rating

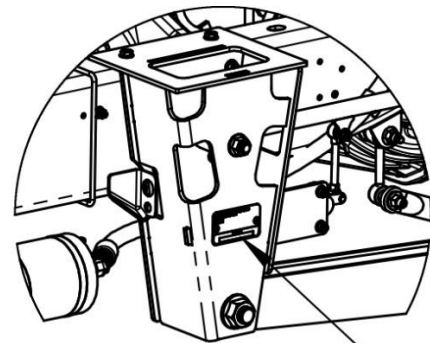
Model	Model Years	Rear Axle GAWR	Fuel Tank Location	LiquidSpring Kit	LiquidSpring Suspension Rating	<b>WARNING:</b> Overloading suspension system may result in abnormal handling characteristics and premature wear of components.
G3500	2013 - 2017	8,600 lbs	Mid-ship	DS96GM2-AM, -AMC	8,600 lbs	
			Rear	DS96GM2-AR, -ARC		
	2018 - Current	8,600 lbs	Mid-ship	DS96GM3-AM	8,600 lbs	
			Rear	DS96GM3-ALF		
G4500	2013 - 2017	9,600 lbs	Mid-ship	DS96GM2-AM, -AMC	9,600 lbs	
			Rear	DS96GM2-AR, -ARC		
	2018 - Current	9,600 lbs	Mid-ship	DS96GM3-AM	9,600 lbs	
			Rear	DS96GM3-AR DS96GM3-ALF		

## Serial Number Tag Information

The serial number is found on an aluminum tag 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



Serial Plate Location

Figure 2. Serial Number Tag Location

## Vehicle Towing and Jacking Information

Before attempting any type of towing procedures, contact the Chassis OEM or Vehicle Manufacturer for instructions.

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 Chassis OEM or Vehicle Manufacturer 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.**

## Abbreviations

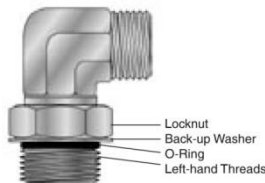
The following abbreviations will be used throughout the manual.

HCS	Hex Cap Screw (also HB)
HFB	Hex Flange Bolt
SHCS	Socket Head Cap Screw
SFHS	Serrated Flange Hex Screw
STS	Self Tapping Screw
HN	Hex Nut, Non-locking
LHN	Locking Hex Nut
LFN	Locking Flange Nut

HFW	Hardened Flat Washer
SLW	Spring Lock Washer
FW	Flat Washer
SAE	SAE O-Ring Fitting
37°	SAE or JIC 37° Flare Fitting (F – Female)
LH	Left Handed Part
RH	Right Handed Part
UCA	Upper Control Arm
LCA	Lower Control Arm
USM	Upper Strut Mount
PM	Power Module

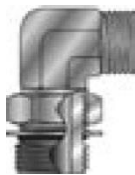
## Hydraulic Fitting Assembly

### SAE O-Ring Adjustable Fittings



**Figure 3. Adjustable SAE fitting**

1. Inspect components to ensure that male and female port threads and sealing surfaces are free of burrs, nicks and scratches, or any foreign material.
2. If O-ring or seal is not pre-installed to fitting male port end, install proper size O-ring or seal, taking care not to damage it.
3. Lubricate O-ring with light coat of the system fluid or a compatible lubricant to help the O-ring slide smoothly into the port and avoid damage.



**Figure 4. Locknut completely backed off.**

4. Back off lock nut as far as possible. Make sure back-up washer is not loose and is pushed up as far as possible.
5. Screw fitting into port until the back-up washer or the retaining ring contacts face of the port. Light wrenching may be necessary. Over tightening may damage washer.
6. To align the tube end of the fitting to accept incoming hose assembly, unscrew the fitting by the required amount, but not more than one full turn.
7. Using two wrenches, hold fitting in desired position and tighten locknut to the proper torque value:  
-4 fitting: **14-16 ft-lbs (168-192 in-lbs)**  
-12 fitting: **75-83 ft-lbs.**
8. Inspect to ensure that O-ring is not pinched and that washer is seated flat on face of port.

### SAE O-Ring Non-Adjustable Fitting

1. Inspect components to ensure that male and female port threads and sealing surfaces are free of burrs, nicks and scratches, or any foreign material.
2. If O-ring or seal is not pre-installed to fitting male port end, install proper size O-ring or seal, taking care not to damage it.

3. Lubricate O-ring with light coat of the system fluid or a compatible lubricant to help the O-ring slide smoothly into the port and avoid damage.
4. Screw fitting into port and tighten to proper torque:
  - 4 fitting: **26-28 ft-lbs (310-341 in-lbs)**
  - 12 fitting: **75-83 ft-lbs.**

#### JIC 37° Fitting

1. Inspect components to ensure that male and female threads and sealing surfaces are free of burrs, nicks

and scratches, or any foreign material. Annular tool marks of 100µin with the thread are permissible.

2. Lubricate the threads and the entire surface of the cone with system fluid.
3. Align mating components for hand connection and turn flare nut until sealing surfaces make full contact.
4. Using two wrenches, hold fitting in desired position and tighten to the proper torque:

-4 fitting: <b>9-12 ft-lbs</b>	-10 fitting: <b>36-63 ft-lbs</b>
-8 fitting: <b>27-39 ft-lbs</b>	-12 fitting: <b>65-88 ft-lbs</b>

## Pre-Installation

1. Check the vehicle wheel alignment prior to installation to insure pre-existing conditions do not exist.
2. It is suggested, but not required, to remove the attached body to ease installation.
3. A chassis lift can be used in assistance of the installation of the suspension system.
4. Measure and record the wheelbase and tire-to-frame dimensions on each side prior to disassembly.

## Frame Preparation

**IMPORTANT: The OEM frame is coated with a soft corrosion preventative. This coating needs to be removed from areas where LiquidSpring mounting brackets attach. Failure to adequately remove the coating may result in multiple applications of torque to maintain correct clamp load.**

1. Disconnect battery.
2. Chock the front tires.
3. Jack up the rear frame of the vehicle to remove the load from the rear leaf springs.
4. Place jack stands under the frame and block the rear tires from moving.

Note: Jack stands can be placed under the axle and the tires removed for ease of access. It is recommended to place an additional jack stand under the pinion to prevent the axle from rotating.

5. Remove the OEM shock absorbers.
6. Remove the OEM leaf springs and rear shackles.
7. Disconnect the parking brake cable by the following:
  - a. Verify that the parking brake is not applied.
  - b. Locate the parking brake connector (see Figure 5).



**Figure 5. Parking Brake Connector**

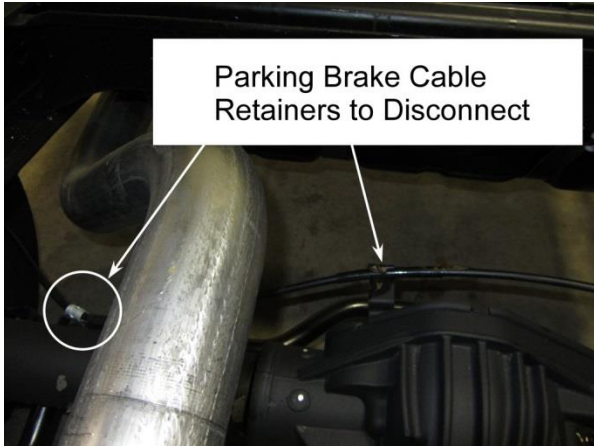
- c. Flatten the rear most dimple and unhook the rear cable.
- d. Locate the parking brake equalizer (see Figure 6).



**Figure 6. Parking Brake Equalizer**

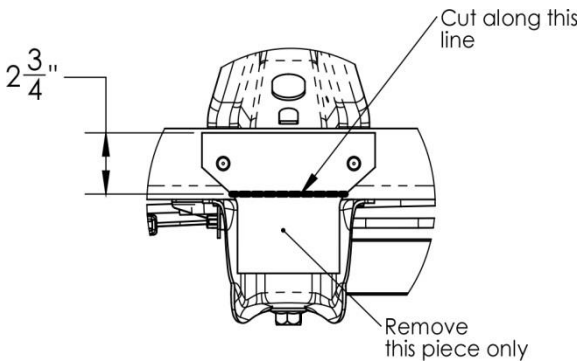
- e. Unhook the passenger side parking brake cable from the equalizer.
- f. Disconnect the passenger side parking brake cable from the frame bracket.
- g. Squeeze the tabs on the grey connector and slip the parking brake cable out of the way.

- h. By squeezing the tabs, disconnect the driver side parking brake cable from the equalizer and slip the parking brake cable out of the frame bracket.
- i. Remove the parking brake cable retainers from the driver side of the frame, both fore and aft of the axle. Retain the cable retainers and fasteners for reuse.
- j. Disconnect the passenger side parking brake cable from axle tube. The mount will be reused to remount the cable. Discard the screw.



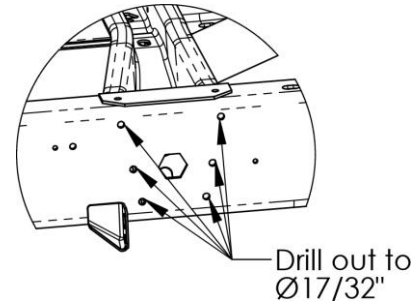
**Figure 7. Passenger Side Parking Brake Cable Retainers at Axle**

- 8. Cut top plate from front spring hanger as shown. Do NOT cut into frame rail.



**Figure 8. Cutting of OEM front spring hanger**

- 9. Remove the front leaf hangers. The rivets can be removed by grinding, air chiseling, or torching off the heads. Then use a hammer and punch to remove the remainder of the rivet. Leave top plate riveted to top of frame rail.
- 10. Clean coating from frame where hanger will contact the frame.



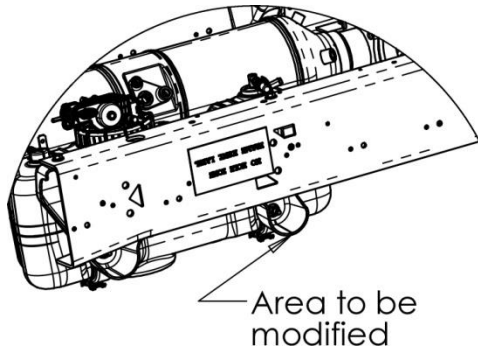
**Figure 9. Hanger hole drilling**

- 11. Drill out the (6) six mount holes to Ø17/32” on each side.
- 12. If the vehicle is equipped with a mid-ship fuel tank, it is recommended to drop the fuel tank temporarily to provide clearance to the inside of the frame.
- 13. Locate the plastic fuel line retainers, inside of the driver side frame rail.

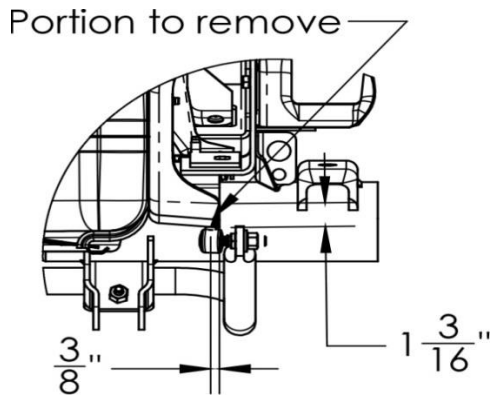


**Figure 10. Fuel line retainer**

- 14. Loosen the plastic fuel line retainers, starting with the position just forward of the shock absorber and forward towards the cab. Leave these lines loose to allow clearance while drilling secondary volume mounts. Note: Fuel lines for mid-ship tank may vary.
- 15. **[Diesel, rear mounted fuel tank vehicles only]** Locate the side mounted DEF tank. Below the frame, locate the rearmost guard around the attaching fastener, see Figure 11. Trim off the lower lip approximately 1/4”-3/8” deep and 1”-1-3/16” high. See Figure 12.

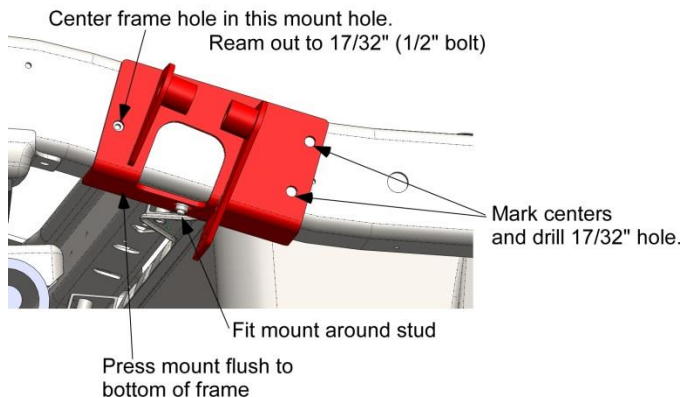


**Figure 11. DEF tank mount to be modified.**



**Figure 12. Area to remove from DEF tank mount.**

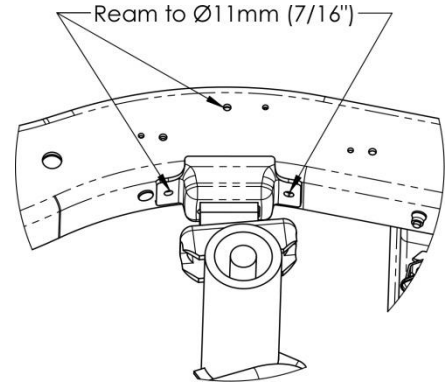
16. Locate the Left Hand Upper Strut Mount and place against frame as shown in Figure 13, fitting around the stud below the frame/cross-member connection. Center frame hole in forward hole and hold flush to bottom of frame.
17. Clean off coating from frame where upper strut mounts will contact the frame.



**Figure 13. Upper Strut Mount Drilling (Left Hand Shown).**

18. Mark centers of remaining rear-most holes. Drill  $\text{Ø}17/32$ ".
19. Ream out indicated hole to  $\text{Ø}17/32$ ".

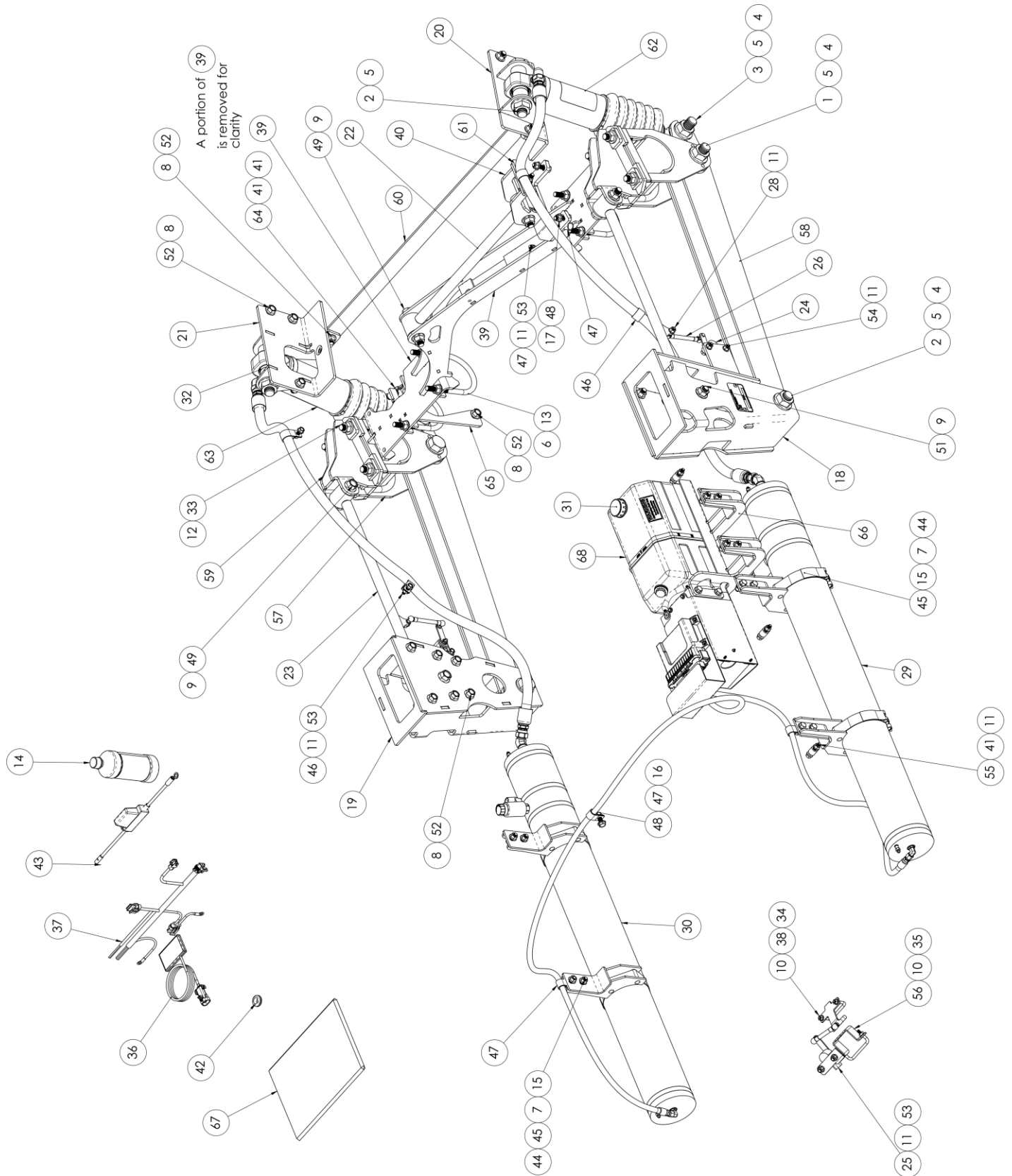
20. Upper Strut Mount can be attached. See Upper Strut Mounts on Page 20.
21. Repeat with Right Hand Upper Strut Mount.
22. On the driver side, at the frame hump, locate the following holes and ream out to  $\text{Ø}7/16$ " or  $\text{Ø}11\text{mm}$ .



**Figure 14. Track Rod Mount holes to be reamed out. Driver side only.**

23. See Page 22, Page, 26, and Page 28 for additional drilling requirements.

**DS96GM2-AR and -ARC, DS96GM3-AR**

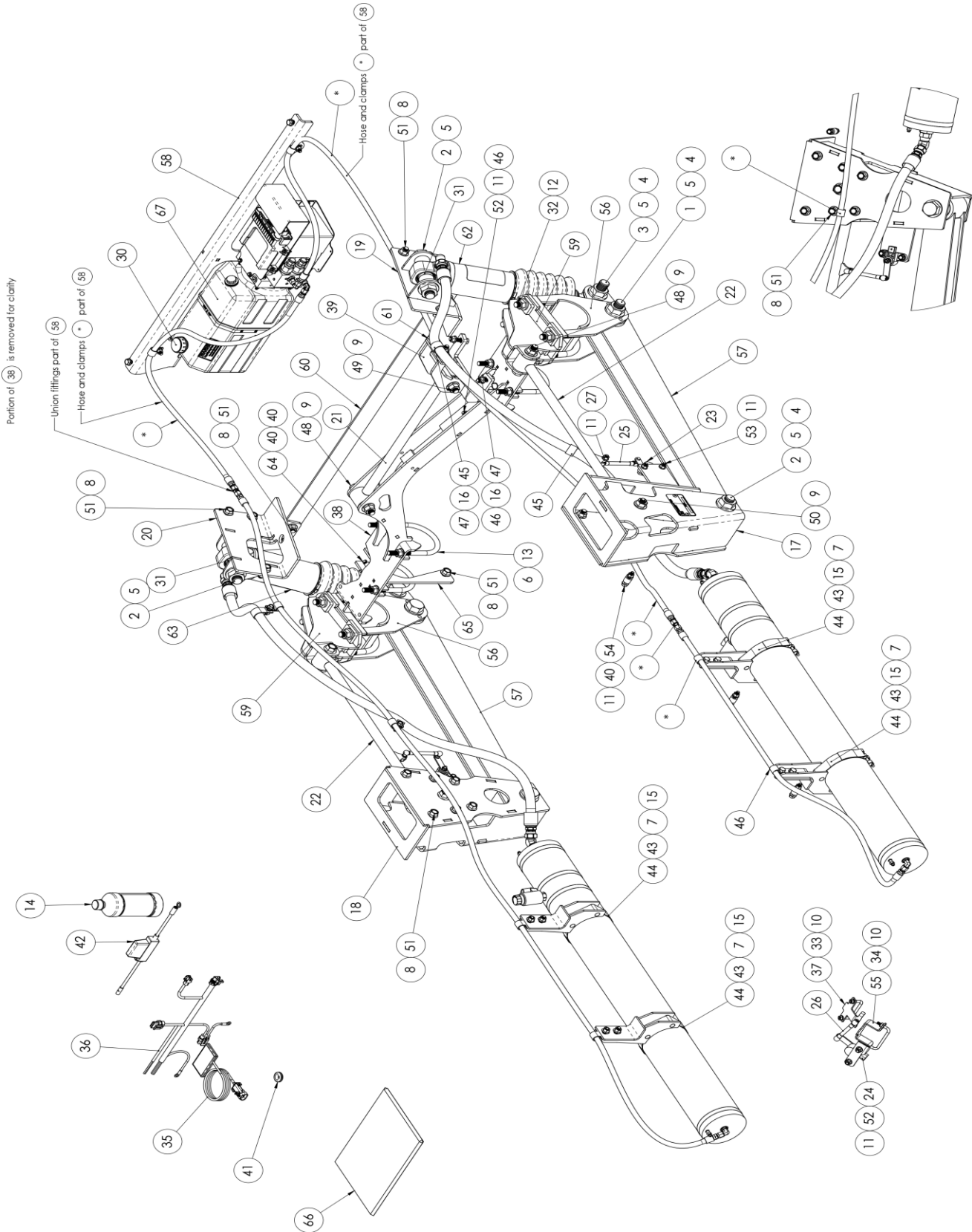




## DS96GM2-AR and -ARC, DS96GM3-AR

DS96GM2-AR and -ARC, DS96GM3-AR							
ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	10003-003	HB 1-8x6", Gr. 8	37	1	10704-006	Wiring Harness, Dash,GM G
2	4	10003-004	HB 1-8x6-1/2", Gr. 8	38	1	10733-003	Pitman Arm Bracket
3	2	10003-005	HCS 18 x 4-1/2"	39	1	10762-014	Bridge
4	8	10006-004	HFW 1.000	40	1	10789-024	Track Rod Frame Mount
5	8	10012-003	LFN 1-8, Gr G	41	5	10800-004	Tube, .69 OD x .42 ID x .625L, Z
6	6	10012-004	LFN 1/2-20, Gr. G	42	1	10805-005	Grommet, .63 ID x 1.13 OD x .38 T
7	8	10012-005	LFN 3/8-16, Gr G	43	1	10815-001	Wiring Harness, Fused Battery Lead
8	23	10012-007	LFN 1/2-13, Gr. G	44	4	10830-023	Volume Mount, DS96GM2-AR
9	6	10012-008	LFN 5/8-11 Gr G			10830-015	Volume Mount, DS96GM2-ARC
10	4	10012-009	LFN 1/4-20, Gr. G	45	4	10843-003	T-Bolt Clamp, Range 4.88-5.5
11	14	10012-010	LFN 5/16-18, Gr. G	46	4	10855-002	Vinyl-Coated Loop Clamp, 1" ID
12	8	10012-013	LFN 5/8-18, Gr. G	47	5	10855-003	Vinyl-Coated Loop Clamp, 5/8" ID
13	3	10383-002	U-Bolt 1/2-20 x 6.50 Gr 5	48	4	10873-002	LFN M10-1.5, CL 10.9 Z
14	1	10474-001	Compressible Fluid, 16 oz	49	3	10874-375	HFB 5/8-11x3.750, Gr. 8
15	8	10501-001	HFB 3/8-16 x 1.000 Gr 8	50	1	10874-400	HFB 5/8-11x4.00, Gr. 8
16	1	10502-001	HFB M10-1.5x30 CL 10.9	51	2	10874-600	HFB 5/8-11 x 6", Gr. 8
17	3	10502-002	HFB M10-1.5x40 CL 10.9	52	23	10885-125	HFB 1/2-13x1.250, Gr. 8
18	1	10538-003	Hanger, LH	53	5	10886-100	HFB 5/16-18 x 1.000, Gr. 8
19	1	10539-006	Hanger, RH	54	4	10886-125	HFB 5/16-18 x 1.25, Gr. 8
20	1	10564-003	Upper Strut Mount, LH	55	3	10886-175	HFB 5/16-18 x 1.75 Grade 8
21	1	10564-004	Upper Strut Mount, RH	56	1	10904-004	Bracket, Steering Sensor
22	1	10570-003	Track Rod	57	2	10947-002	Lower Control Arm Mount
23	2	10570-004	Upper Control Arm	58	2	10953-002	Lower Control Arm
24	2	10586-001	Asy, Height Sensor	59	2	10984-001	Wldmnt, UCA Mount
25	1	10586-002	Asy, Steering Sensor	60	1	10988-001	Crossmember Reinforcement
26	2	10587-006	Asy, Linkage, 3.938" SS	61	1	10993-002	Track Rod Mnt, Bolt Plate
27	1	10587-007	Asy, Linkage, 2.887" SS	62	1	10994-001	Strut Assembly, LH
28	2	10591-003	Ball Stud 5/16-18 x .75L	63	1	10994-002	Strut Assembly, RH
29	1	10597-029	Volume Assembly, LH	64	1	11008-045	HCS M8-1.25x45 CL 8.8
30	1	10597-030	Volume Assembly, RH	65	1	11048-001	Bracket, Bridge Orientation
31	1	10614-001	Cap, Filler/Breather	66	1	11318	Kit, Power Module Mount
32	8	10640-002	Bearing Spacer	67	1	11324	Kit, Drawing, DS96GM2
33	4	10642-001	U-Bolt 5/8-18 x 7.00 Gr 8	68	1	11345-001	Power Module, DS96GM2-AR (2013-2017)
34	1	10669-002	U-Bolt, 1/4-20 x 2.44 x 1.38 Gr 2			11345-002	Power Module, DS96GM2-ARC (2013-2017)
35	1	10669-005	U-Bolt, 1/4-20 x 3.00 x 1.38 Gr 2			11345-003	Power Module, DS96GM3-AR (2018-Current)
36	1	10680-001	Driver Interface				

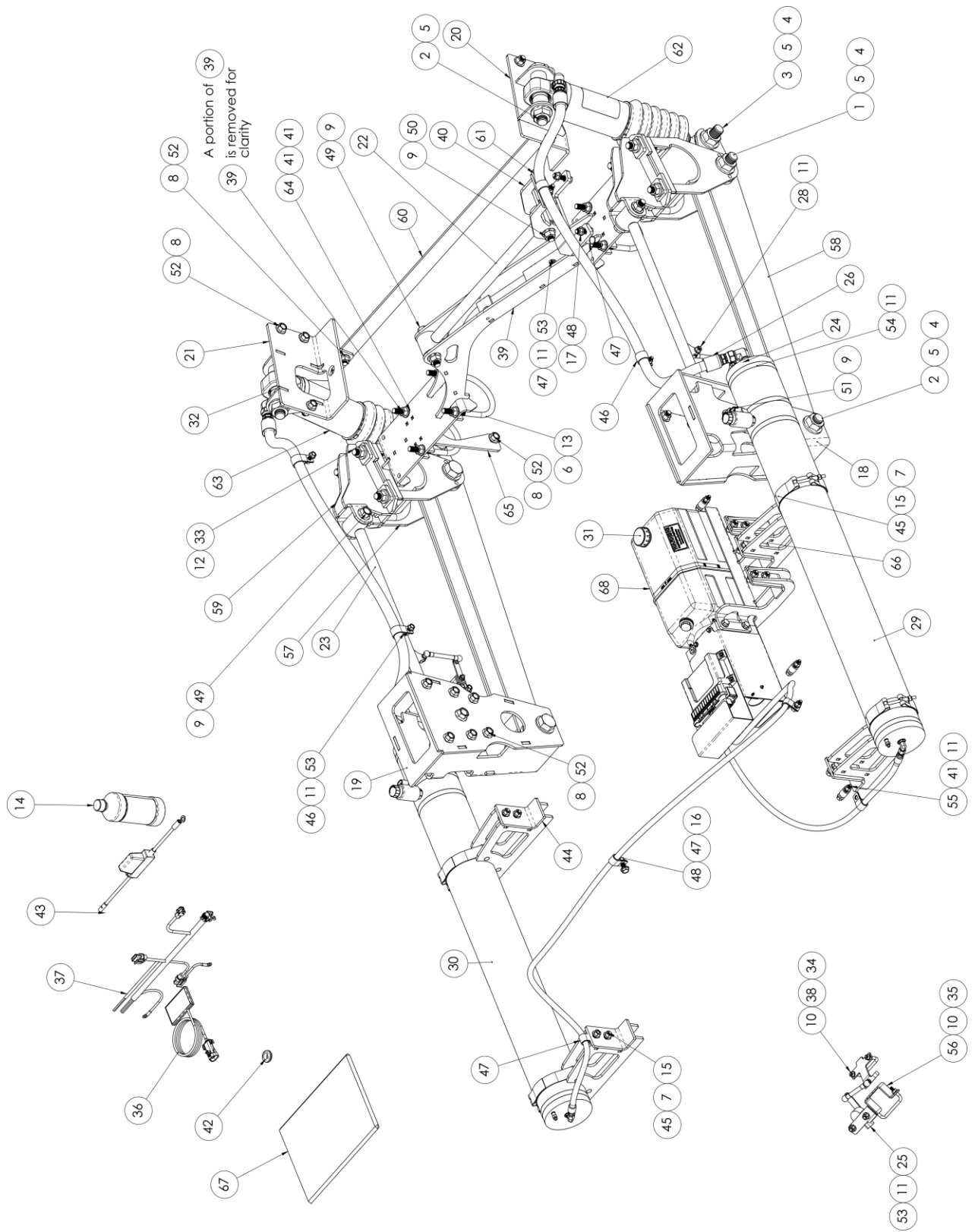
**DS96GM2-AM and -AMC, DS96GM3-AM**



## DS96GM2-AM and -AMC, DS96GM3-AM

DS96GM2-AM and -AMC							
ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	10003-003	HB 1-8x6", Gr. 8	36	1	10704-006	Wiring Harness, Dash,GM G
2	4	10003-004	HB 1-8x6-1/2", Gr. 8	37	1	10733-003	Pitman Arm Bracket
3	2	10003-005	HCS 18 x 4-1/2"	38	1	10762-014	Bridge
4	8	10006-004	HFW 1.000	39	1	10789-024	Track Rod Frame Mount
5	8	10012-003	LFN 1-8, Gr G	40	5	10800-004	Tube, .69 OD x .42 ID x .625L, Z
6	6	10012-004	LFN 1/2-20, Gr. G	41	1	10805-005	Grommet, .63 ID x 1.13 OD x .38 T
7	8	10012-005	LFN 3/8-16, Gr G	42	1	10815-001	Wiring Harness, Fused Battery Lead
8	23	10012-007	LFN 1/2-13, Gr. G	43	4	10830-023	Volume Mount, DS96GM2-AM
9	6	10012-008	LFN 5/8-11 Gr G			10830-015	Volume Mount, DS96GM2-AMC
10	4	10012-009	LFN 1/4-20, Gr. G	44	4	10843-003	T-Bolt Clamp, Range 4.88-5.5
11	14	10012-010	LFN 5/16-18, Gr. G	45	4	10855-002	Vinyl-Coated Loop Clamp, 1" ID
12	8	10012-013	LFN 5/8-18, Gr. G	46	5	10855-003	Vinyl-Coated Loop Clamp, 5/8" ID
13	3	10383-002	U-Bolt 1/2-20 x 6.50 Gr 5	47	3	10873-002	LFN M10-1.5, CL 10.9 Z
14	1	10474-001	Compressible Fluid, 16 oz	48	3	10874-375	HFB 5/8-11x3.750, Gr. 8
15	8	10501-001	HFB 3/8-16 x 1.000 Gr 8	49	1	10874-400	HFB 5/8-11x4.00, Gr. 8
16	3	10502-002	HFB M10-1.5x40 CL 10.9	50	2	10874-600	HFB 5/8-11 x 6", Gr. 8
17	1	10538-003	Hanger, LH	51	23	10885-125	HFB 1/2-13x1.250, Gr. 8
18	1	10539-006	Hanger, RH	52	5	10886-100	HFB 5/16-18 x 1.000, Gr. 8
19	1	10564-003	Upper Strut Mount, LH	53	4	10886-125	HFB 5/16-18 x 1.25, Gr. 8
20	1	10564-004	Upper Strut Mount, RH	54	3	10886-175	HFB 5/16-18 x 1.75 Grade 8
21	1	10570-003	Track Rod	55	1	10904-004	Bracket, Steering Sensor
22	2	10570-004	Upper Control Arm	56	2	10947-002	Lower Control Arm Mount
23	2	10586-001	Asy, Height Sensor	57	2	10953-002	Lower Control Arm
24	1	10586-002	Asy, Steering Sensor	58	1	10969	Kit, Power Module Mount, Rear
25	2	10587-006	Asy, Linkage, 3.938" SS	59	2	10984-001	Wldmnt, UCA Mount
26	1	10587-007	Asy, Linkage, 2.887" SS	60	1	10988-001	Crossmember Reinforcement
27	2	10591-003	Ball Stud 5/16-18 x .75L	61	1	10993-002	Track Rod Mnt, Bolt Plate
28	1	10597-029	Volume Assembly, LH	62	1	10994-001	Strut Assembly, LH
29	1	10597-030	Volume Assembly, RH	63	1	10994-002	Strut Assembly, RH
30	1	10614-001	Cap, Filler/Breather	64	1	11008-045	HCS M8-1.25x45 CL 8.8
31	8	10640-002	Bearing Spacer	65	1	11048-001	Bracket, Bridge Orientation
32	4	10642-001	U-Bolt 5/8-18 x 7.00 Gr 8	66	1	11324	Kit, Drawing, DS96GM2
33	1	10669-002	U-Bolt, 1/4-20 x 2.44 x 1.38 Gr 2	67	1	11345-001	Power Module, DS96GM2-AM (2013-2017)
34	1	10669-005	U-Bolt, 1/4-20 x 3.00 x 1.38 Gr 2			11345-002	Power Module, DS96GM2-AMC (2013-2017)
35	1	10680-001	Driver Interface			11345-003	Power Module, DS96GM3-AM (2018 - Current)

DS96GM3-ALF

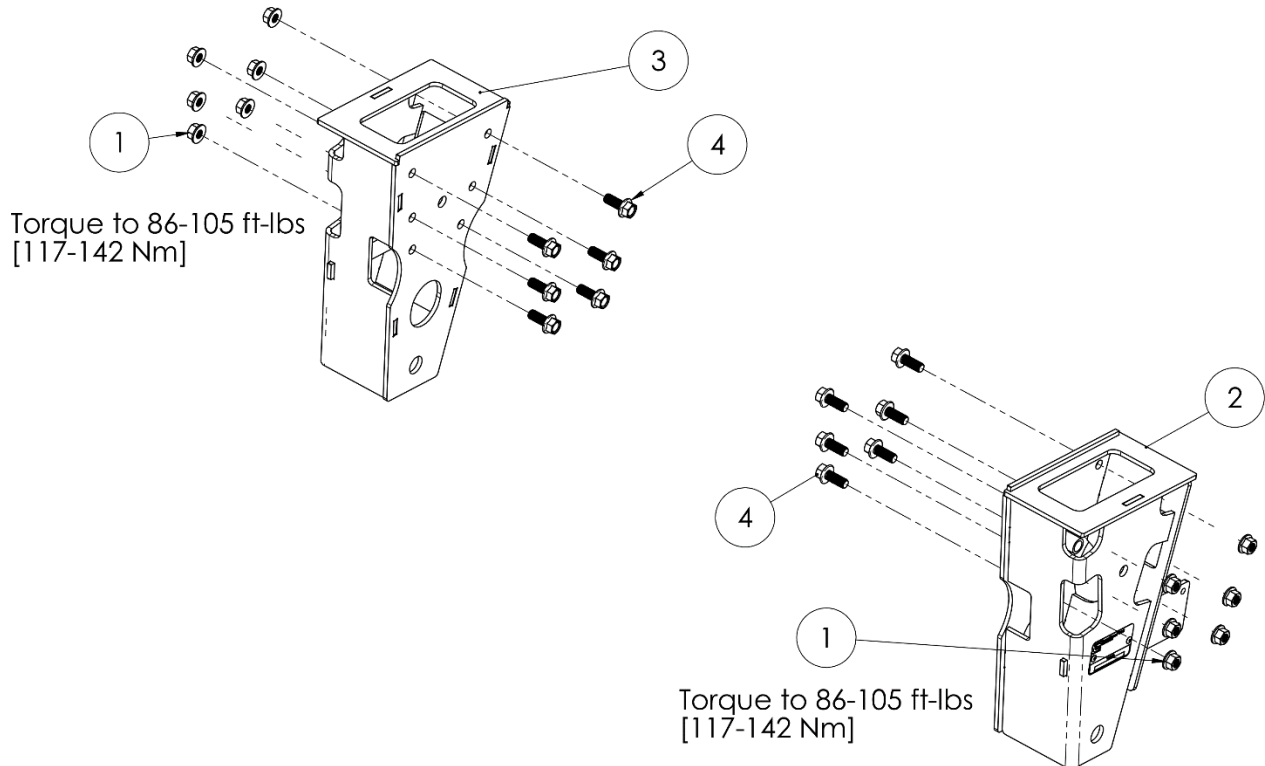


## DS96GM3-ALF

DS96GM3-ALF							
ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	10003-003	HB 1-8x6", Gr. 8	35	1	10669-005	U-Bolt, 1/4-20 x 3.00 x 1.38 Gr 2
2	4	10003-004	HB 1-8x6-1/2", Gr. 8	36	1	10680-001	Driver Interface
3	2	10003-005	HCS 18 x 4-1/2"	37	1	10704-006	Wiring Harness, Dash,GM G
4	8	10006-004	HFW 1.000	38	1	10733-003	Pitman Arm Bracket
5	8	10012-003	LFN 1-8, Gr G	39	1	10762-014	Bridge
6	6	10012-004	LFN 1/2-20, Gr. G	40	1	10789-024	Track Rod Frame Mount
7	8	10012-005	LFN 3/8-16, Gr G	41	5	10800-004	Tube, .69 OD x .42 ID x .625L, Z
8	23	10012-007	LFN 1/2-13, Gr. G	42	1	10805-005	Grommet, .63 ID x 1.13 OD x .38 T
9	6	10012-008	LFN 5/8-11 Gr G	43	1	10815-001	Wiring Harness, Fused Battery Lead
10	4	10012-009	LFN 1/4-20, Gr. G	44	4	10830-029	Volume Mount
11	17	10012-010	LFN 5/16-18, Gr. G	45	4	10843-003	T-Bolt Clamp, Range 4.88-5.5
12	8	10012-013	LFN 5/8-18, Gr. G	46	4	10855-002	Vinyl-Coated Loop Clamp, 1" ID
13	3	10383-002	U-Bolt 1/2-20 x 6.50 Gr 5	47	6	10855-003	Vinyl-Coated Loop Clamp, 5/8" ID
14	1	10474-001	Compressible Fluid, 16 oz	48	4	10873-002	LFN M10-1.5, CL 10.9 Z
15	8	10501-001	HFB 3/8-16 x 1.000 Gr 8	49	3	10874-375	HFB 5/8-11x3.750, Gr. 8
16	1	10502-001	HFB 3/8-16 x 30 CL 10.9	50	1	10874-400	HFB 5/8-11x4.00, Gr. 8
17	3	10502-002	HFB M10-1.5x40 CL 10.9	51	2	10874-600	HFB 5/8-11 x 6", Gr. 8
18	1	10538-003	Hanger, LH	52	23	10885-125	HFB 1/2-13x1.250, Gr. 8
19	1	10539-006	Hanger, RH	53	8	10886-100	HFB 5/16-18 x 1.000, Gr. 8
20	1	10564-003	Upper Strut Mount, LH	54	4	10886-125	HFB 5/16-18 x 1.25, Gr. 8
21	1	10564-004	Upper Strut Mount, RH	55	3	10886-175	HFB 5/16-18 x 1.75 Grade 8
22	1	10570-003	Track Rod	56	1	10904-004	Bracket, Steering Sensor
23	2	10570-004	Upper Control Arm	57	2	10947-002	Lower Control Arm Mount
24	2	10586-001	Asy, Height Sensor	58	2	10953-002	Lower Control Arm
25	1	10586-002	Asy, Steering Sensor	59	2	10984-001	Wldmnt, UCA Mount
26	2	10587-006	Asy, Linkage, 3.938" SS	60	1	10988-001	Crossmember Reinforcement
27	1	10587-007	Asy, Linkage, 2.887" SS	61	1	10993-002	Track Rod Mnt, Bolt Plate
28	2	10591-003	Ball Stud 5/16-18 x .75L	62	1	10994-001	Strut Assembly, LH
29	1	10597-139	Volume Assembly, LH	63	1	10994-002	Strut Assembly, RH
30	1	10597-140	Volume Assembly, RH	64	1	11008-045	HCS M8-1.25x45 CL 8.8
31	1	10614-001	Cap, Filler/Breather	65	1	11048-001	Bracket, Bridge Orientation
32	8	10640-002	Bearing Spacer	66	1	11318	Kit, Power Module Mount
33	4	10642-001	U-Bolt 5/8-18 x 7.00 Gr 8	67	1	11324	Kit, Drawing, DS96GM2
34	1	10669-002	U-Bolt, 1/4-20 x 2.44 x 1.38 Gr 2	68	1	11345-003	Power Module, DS96GM3-AM (2018 – Current)

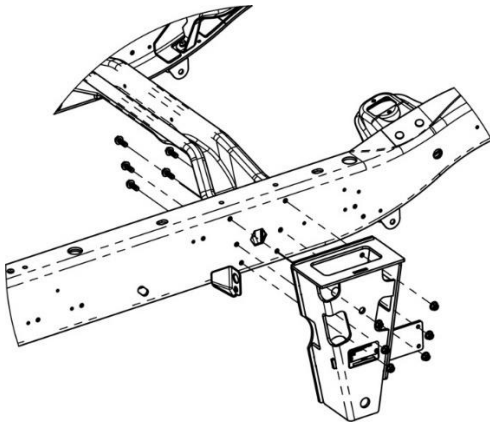
## Installation

### Front Hangers



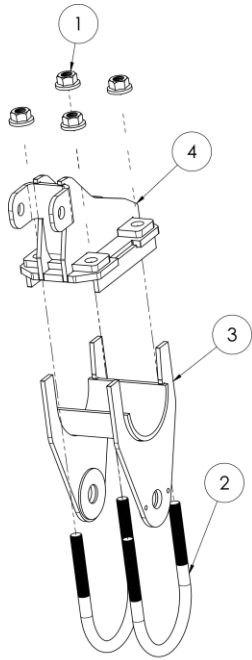
ITEM	QTY.	PART NUMBER	DESCRIPTION
1	12	10012-002	LFN ½-13 Gr G
2	1	10538-003	Left Hand Hanger
3	1	10539-006	Right Hand Hanger
4	12	10885-125	HFB ½-13 x 1-1/4" Gr. 8

1. Remove coating from frame where hanger will contact the frame.
2. Install the Left Hand Hanger (with serial tag) to the driver side of the frame using the (6) ½-13 x 1-1/4" Hex Flange Bolts and ½-13 Locking Flange Nuts.
3. Torque to **86-105 ft-lbs**. Note: On DS96GM2-AM (vehicles with mid-ship mounted fuel tanks), see **Hose Attachment and Routing [DS96GM2-AM and -AMC, DS96GM3-AM]** Section, before tightening all fasteners.
4. Repeat with Right Hand Hanger to the passenger side of the frame.

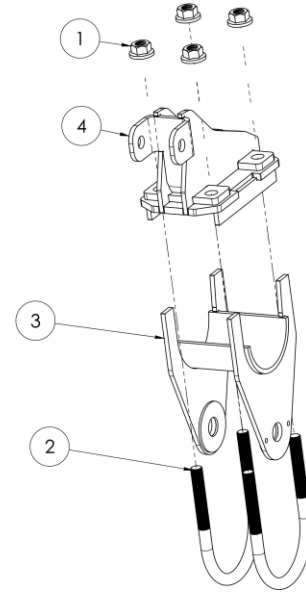


**Figure 15. Installation of Front Hangers**

## Axle Connection



- For U-Bolts:
- Lubricate U-Bolt threads with oil or anti-seize compound to reduce nut friction.
  - Tighten all U-Bolt nuts until they are snug only.
  - Tighten in a criss-cross sequence in the stages listed below:  
 Stage 1: 75 ft-lbs  
 Stage 2: 150 ft-lbs  
 Stage 3: 200 ft-lbs

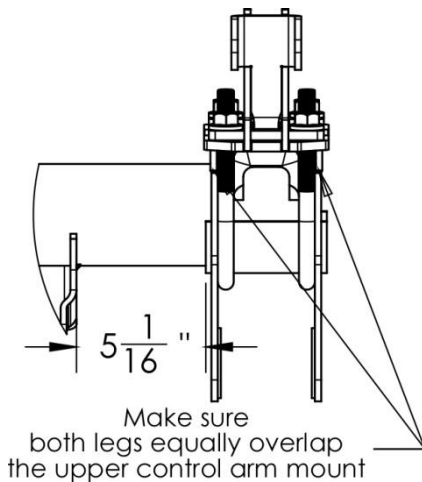


ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	8	10012-13	LFN 5/8-18 Gr G	3	2	10947-002	LCA Mount
2	4	10642-001	U-Bolt 5/8-18 x 7 Gr 8	4	2	10984-001	UCA Mount

1. Place the Upper Control Arm Mount on top of the axle seat, with the locating bolt head centered in the top slot. Orientate the UCA clevis forward.
2. Slip the Lower Control Arm Mount under the axle until the extended legs line up with the UCA mount.

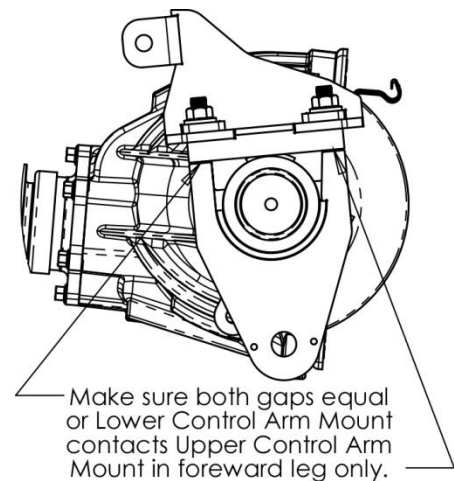
**IMPORTANT: To aid control arm installation, do not torque until after control arms are installed.**

Note. It is recommended that the gaps between the upper control arm mount and lower control arm mount be equal, or have the forward set contacting on both sides.



**Figure 16. Axle clamp installation.**

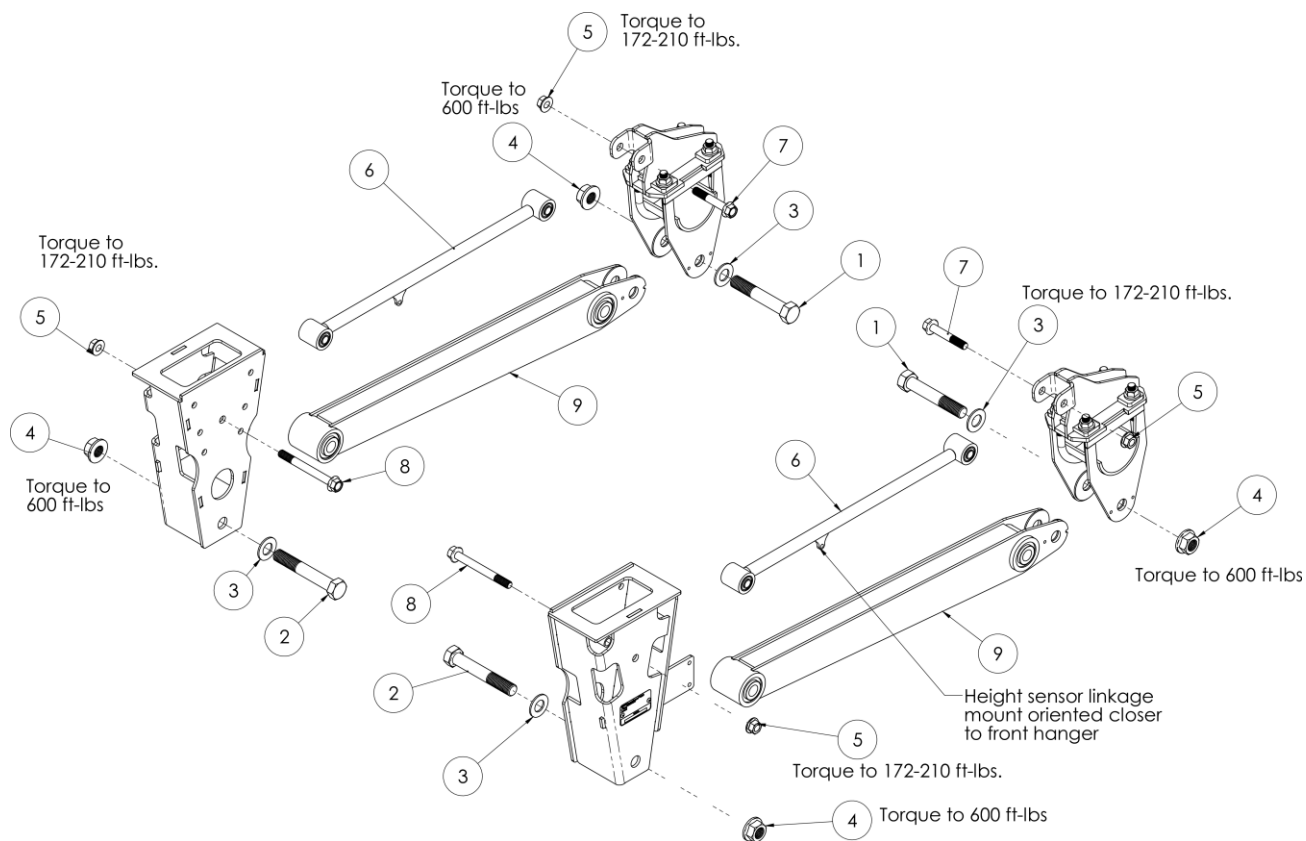
3. Slip the 5/8" U-Bolts under the LCA mount and secure using the 5/8" Locking Flange Nuts.
4. Snug down 5/8" Locking Flange Nuts, but



**Figure 17. Check mount orientation.**

Repeat for other side

## Control Arms



ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	10003-003	HCS 1-8 x 6" Gr. 8	6	2	10570-004	Upper Control Arm
2	2	10003-004	HCS 1-8 x 6-1/2" Gr. 8	7	2	10874-375	HFB 5/8-11 x 3-3/4" Gr.8
3	4	10006-004	HFW 1"	8	2	10874-600	HFB 5/8-11 x 6" Gr 8
4	4	10012-003	LFN 1-8 Gr G	9	2	10953-002	Lower Control Arm
5	4	10012-008	LFN 5/8-11 Gr G				

1. Loosely install the Upper and Lower Control Arms as shown above.

Note: Orientate Upper Control Arms with height sensor tab forward and down.

**IMPORTANT: Fasteners must be orientated towards the outboard as shown.**

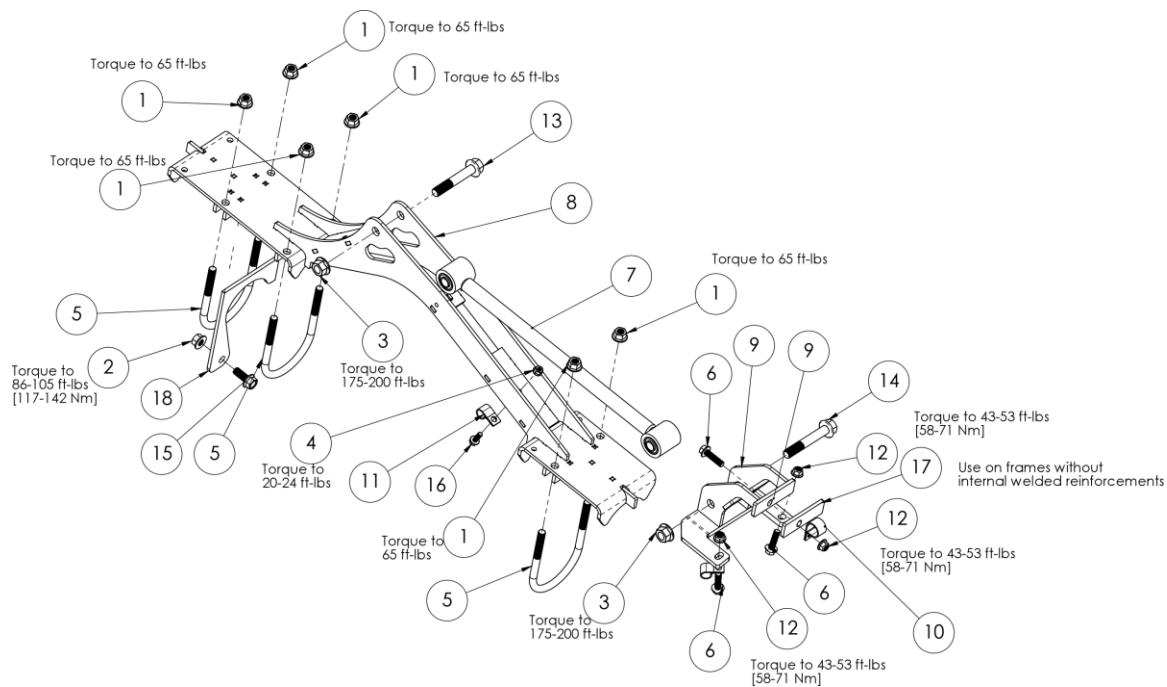
**IMPORTANT: Verify that the 1"-8 x 6.00" Hex Cap Screw is used to attach the Lower Control Arm to the LCA mount at the axle and that the 1"-8 x 6-1/2" Hex Cap Screw is used to attach the LCA to the Hanger.**

2. Torque U-Bolts as specified in **Axle Connection** Section.
3. Do not tighten control arm fasteners until track rod is in place and axle is raised to ride height.

Note: The axle must be held at ride height before torquing control arm bolts to prevent preloading the bushings. See section **Final Torque**, page 39



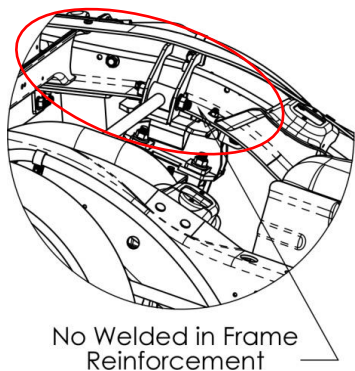
## Track Rod Mounting



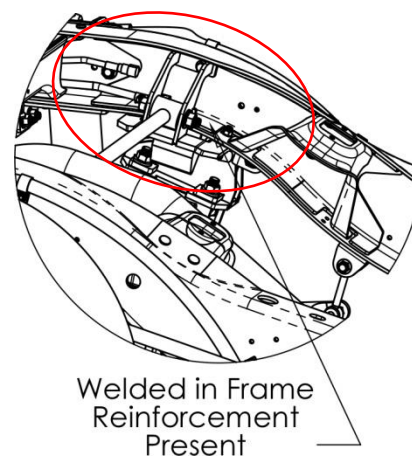
ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	6	10012-004	LFN 1/2-20, Gr G, BO	10	1	10855-002	Vinyl-Coated Loop Clamp 1" ID
2	1	10012-007	LFN 1/2-13, Gr. G	11	2	10855-003	Vinyl-Coated Loop Clamp, 5/8" ID
3	2	10012-008	LFN 5/8-11 Gr G, BO	12	3	10873-002	LFN M10-1.5 CL 10.9 Z
4	1	10012-010	LFN 5/16-18 Gr. G BO	13	1	10874-375	HFB 5/8-11 x 3.750, Gr 8, BO
5	3	10383-002	U-Bolt 1/2-20 x 6.50 Gr 5	14	1	10874-400	HFB 5/8-11 x 4.00, Gr 8, BO
6	3	10502-002	HFB M10-1.5 x 40 CL 10.9 Z	15	1	10885-125	HFB 1/2-13 x 1-1/4" Gr. 8
7	1	10570-003	Track Rod	16	1	10886-100	HFB 5/16-18 x 1.000, Gr 8 BO
8	1	10762-014	Track Rod Mount Bridge	17	1	10993-002*	Track Rod Mount Spacer Plate*
9	1	10789-024	Track Rod Frame Mount	18	1	11048-001	Bracket, Bridge Orientation

\*The Track Rod Mount Spacer Plate is only used on chassis without the welded in reinforcement plate. See instructions below.

1. Visually inspect the inside of the chassis frame rail in the area that "humps" over the rear axle and note if GM has welded in frame reinforcement. See figures below.



**Figure 18. Frame without internal frame reinforcement. Add 10993-002.**

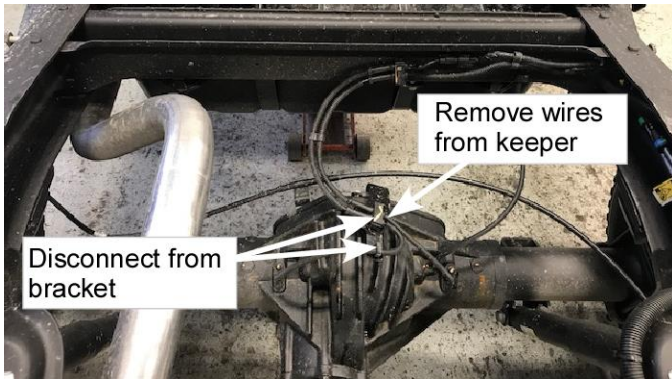


**Figure 19. Frame with internal frame reinforcement. Do not add 10993-002.**

2. Install the Track Rod Frame Mount to the driver side frame rail, with the two arms attached from beneath

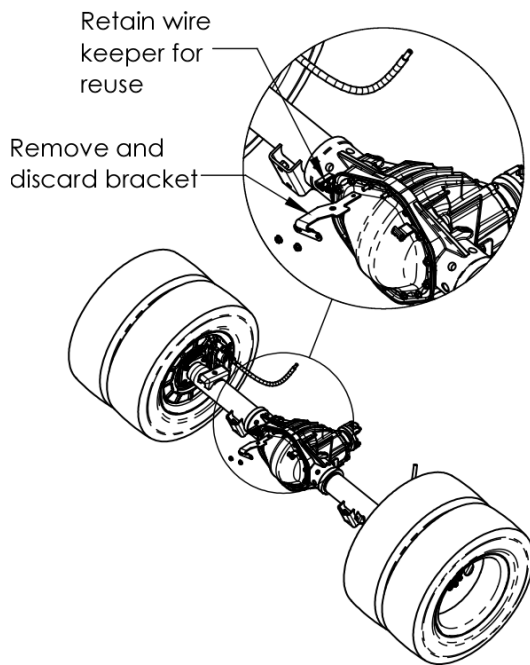
the frame. If the frame is not equipped with a welded in frame reinforcement, add the 10993-002 Track Rod Mount Spacer Plate, item 16, between the track rod mount and the frame.

3. Snug down the fasteners.
4. On 2018 Model Year and Later:
  - a. Located the ABS sensor wires clipped to the top of the axle. Release the wires from the Keeper Clip.
  - b. Remove the two plastic clips from the mount bracket. Do not discard.



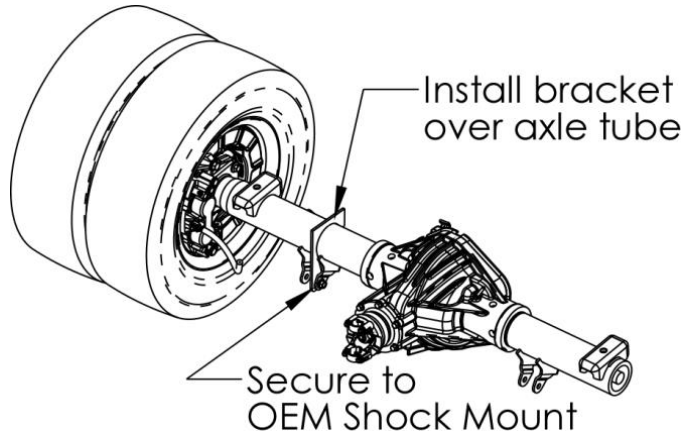
**Figure 20. 2018 and Later OEM wire removal**

- c. Remove and discard the bracket from on top of the axle.



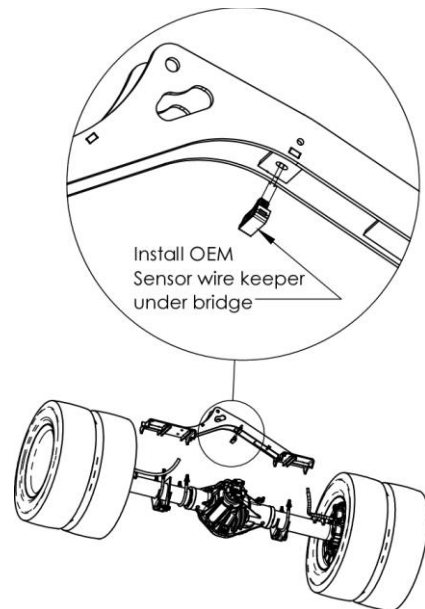
**Figure 21. 2018 and Later bracket removal**

5. Slip the Bridge Orientation Bracket over the axle and secure to the indicated passenger side shock mount hole. Torque fasteners to **86-105 ft-lbs.**



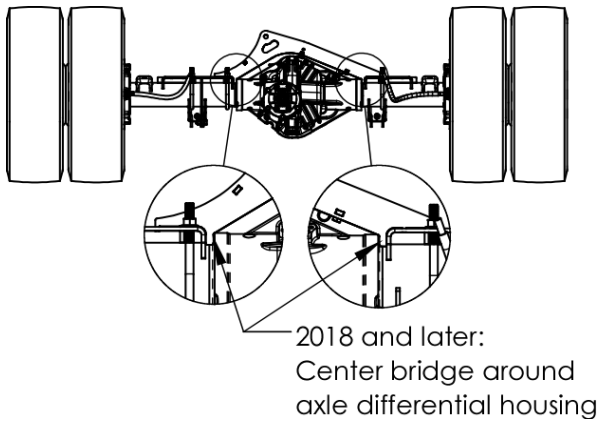
**Figure 22. Installation of Bridge Orientation Bracket.**

6. On 2018 Model Year and Later:
  - a. Attach the previously removed wire Keeper Clip, upside down, under the provided slot on the bridge.

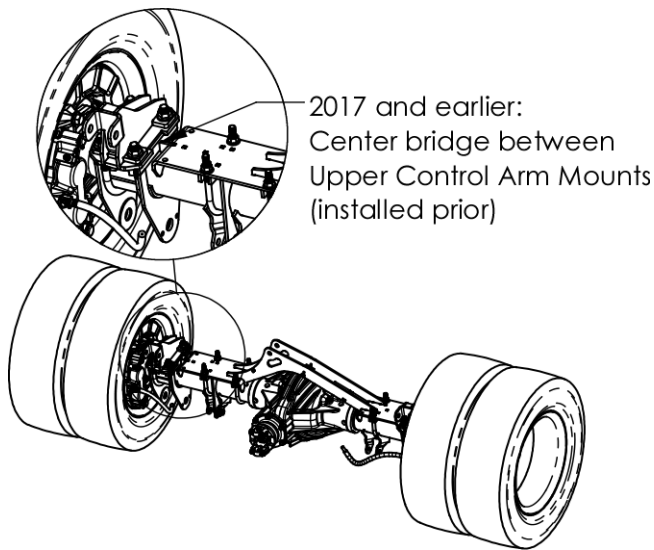


**Figure 23. Reinstalling the OEM Sensor wire Keeper Clip**

- b. Place the bridge on top of the axle and loosely clip in the ABS wires into the Keeper.
7. Install the track rod bridge.
8. On 2018 and later model years, the bridge will be centered about the center differential housing. On 2017 and prior model years, the bridge will be centered between the two previously installed upper control arm mounts.



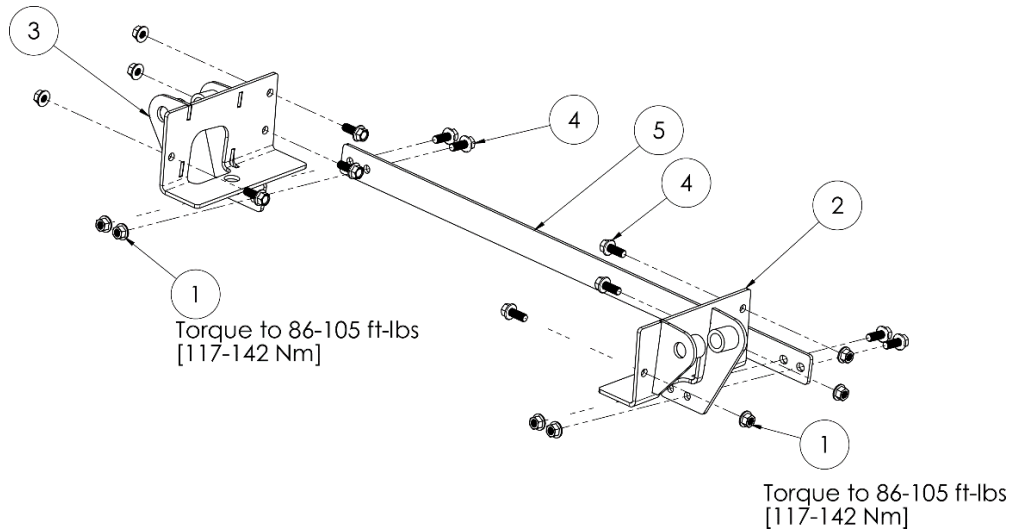
**Figure 24. 2018 and Later Centering Track Rod Bridge**



**Figure 25. 2017 and earlier Centering Track Rod Bridge, Passenger side shown, driver side similar.**

9. Slip U-bolts under the axle, through shock mounts, and torque **U-bolts to 65 ft-lbs**.
10. On 2018 and later model years, verify that the ABS sensor wires are securely clipped and attach the single wire to the hole provided on the side of the bridge.
11. Loosely install the track rod.
12. Axle must be held at ride height before torquing track rod fasteners to prevent preloading the bushings. See Section **Final Torque** on **Page 39**.

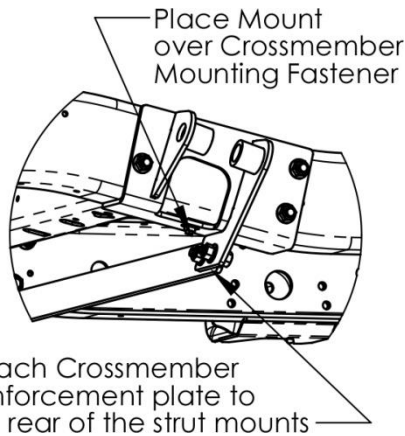
## Upper Strut Mounts



ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	10	10012-007	LFN 1/2-13 Gr G	4	10	10885-125	HFB 1/2-13 x 1.250 Gr 8
2	1	10564-003	Left Hand Upper Strut Mount	5	1	10988-001	Crossmember Reinforcement
3	1	10564-004	Right Hand Upper Strut Mount				

1. Remove coating from frame where the upper strut mount attaches to the frame.
2. Loosely attach the Left Hand and Right Hand Upper Strut Mounts to the frame.

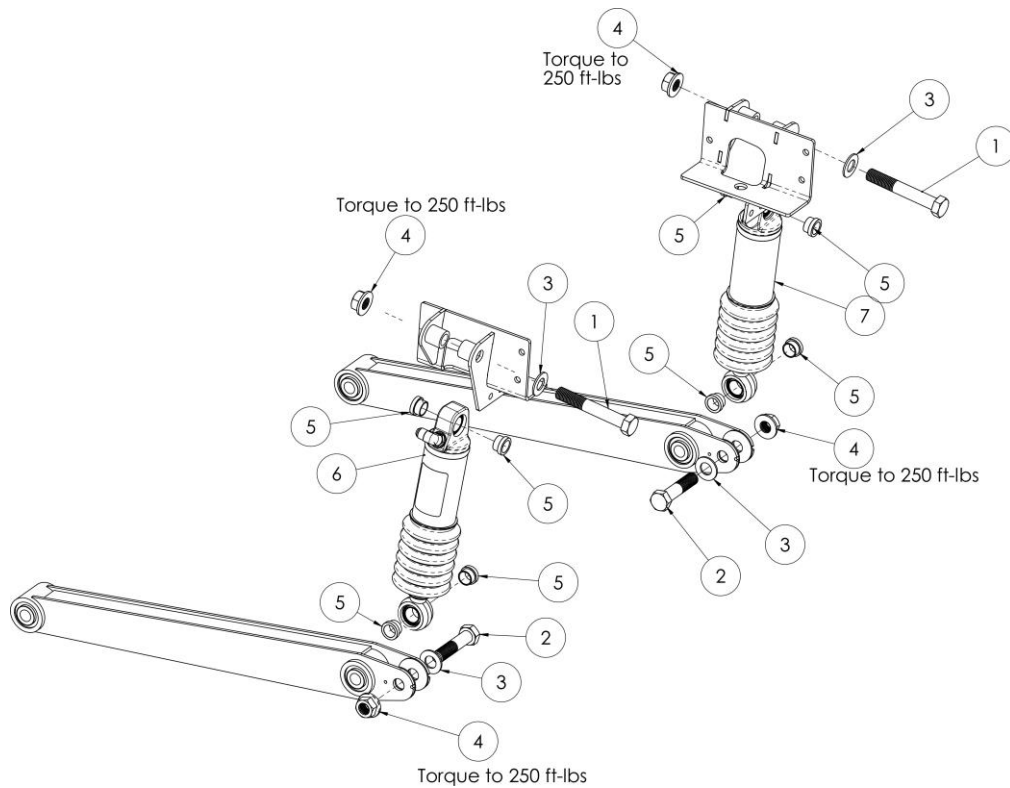
**IMPORTANT: Bolts must point away from fuel tank.**



**Figure 26. Installation of upper strut mount.**

3. Attach the cross-member reinforcement plate to the rear of the upper strut mounts.
4. Torque all fasteners to **86-105 ft-lbs.**

## Struts



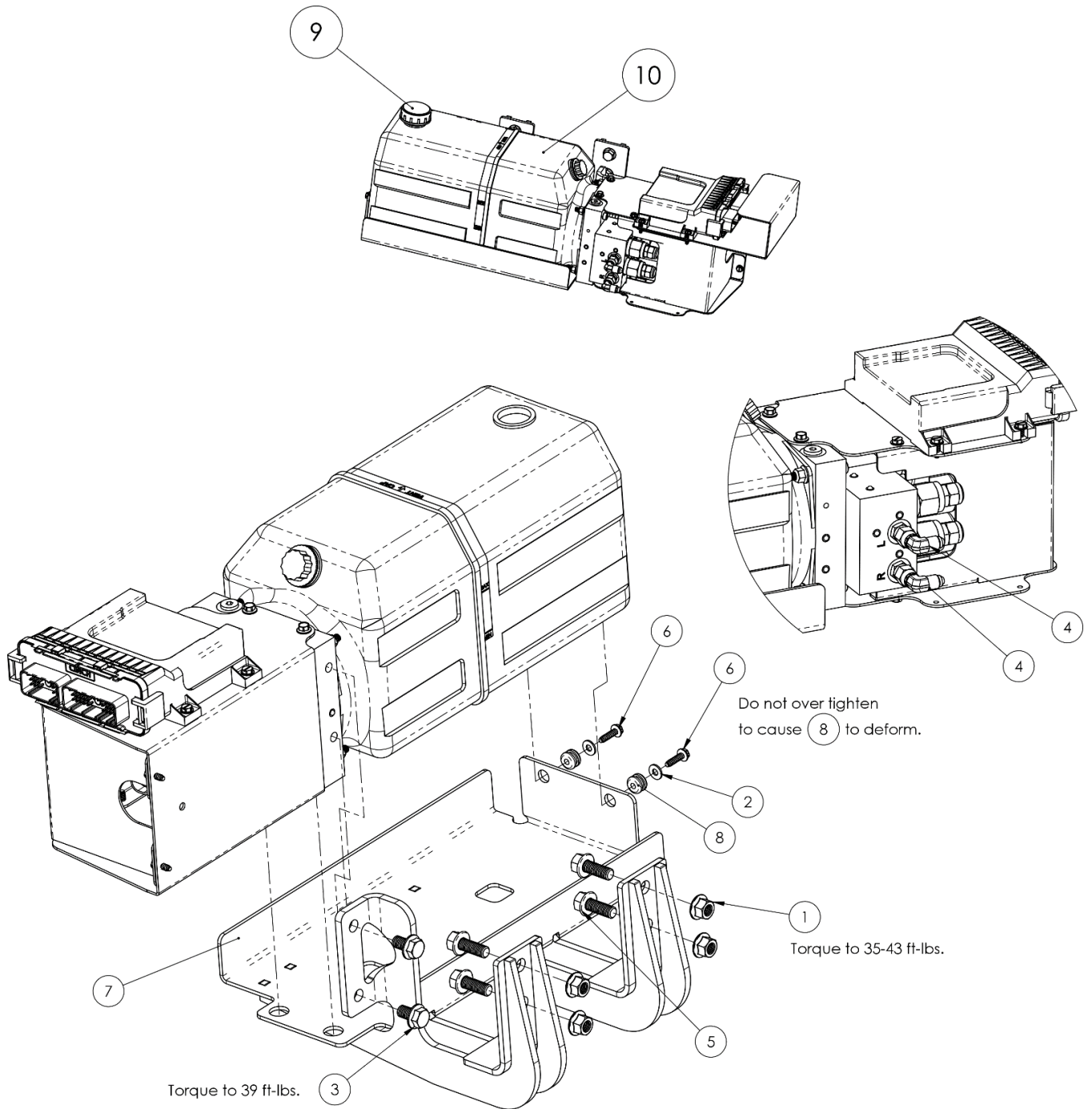
ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1		10003-004	HCS 1-8 x 6-1/2" Gr 8	5	8	10640-002	Bearing Spacer, 1.25x1.02x.318
2	2	10003-005	HCS 1-8 x 4-1/2", Gr. 8	6	1	10994-001	Left Hand Strut
3	4	10006-004	HFW 1"	7	1	10994-002	Right Hand Strut
4	4	10012-003	LFN 1-8				

1. Install the Left Hand Strut assembly as shown making sure to install bearing spacers on both upper and lower mounts.

Note: Verify Hydraulic port is pointed forward.

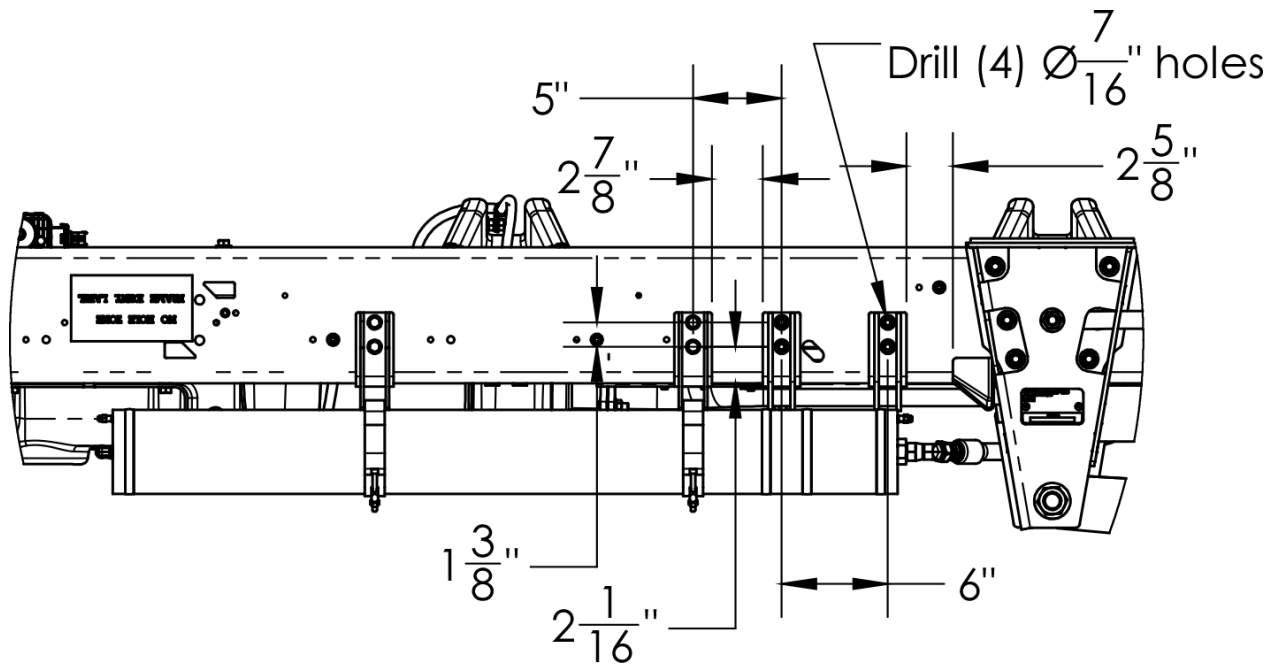
2. Repeat for installation of Right Hand Strut assembly.
3. Torque upper and lower strut mounts to **250 ft-lbs**.

**Power Module [DS96GM2-AR and -ARC, DS96GM3-AR and -ALF]**



ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1*	4	10012-005	LFN 3/8-16 Gr G	7*	1	10798-025	Power Module Mount
2*	2	10088-001	FW #10	8*	2	10805-004	Grommet
3*	2	10252-003	SFHS 3/8-16 x 5/8" Gr 8.2	9	1	10614-001	Cap, Breather/Fill
4*	2	10322-021	Hyd. Fit, 90 -4 37 x -4 37 F	10	1	11345-001	Power Module, DS96GM2-AR ('13-'17)
5*	4	10501-001	HFB 3/8-16 x 1" Gr 8			11345-002	Power Module, DS96GM2-ARC ('13-'17)
6*	2	10510-002	STS #10-16 x 3/4" Hex Head			11345-003	Power Module DS96GM3-AR, -ALF ('18-current)

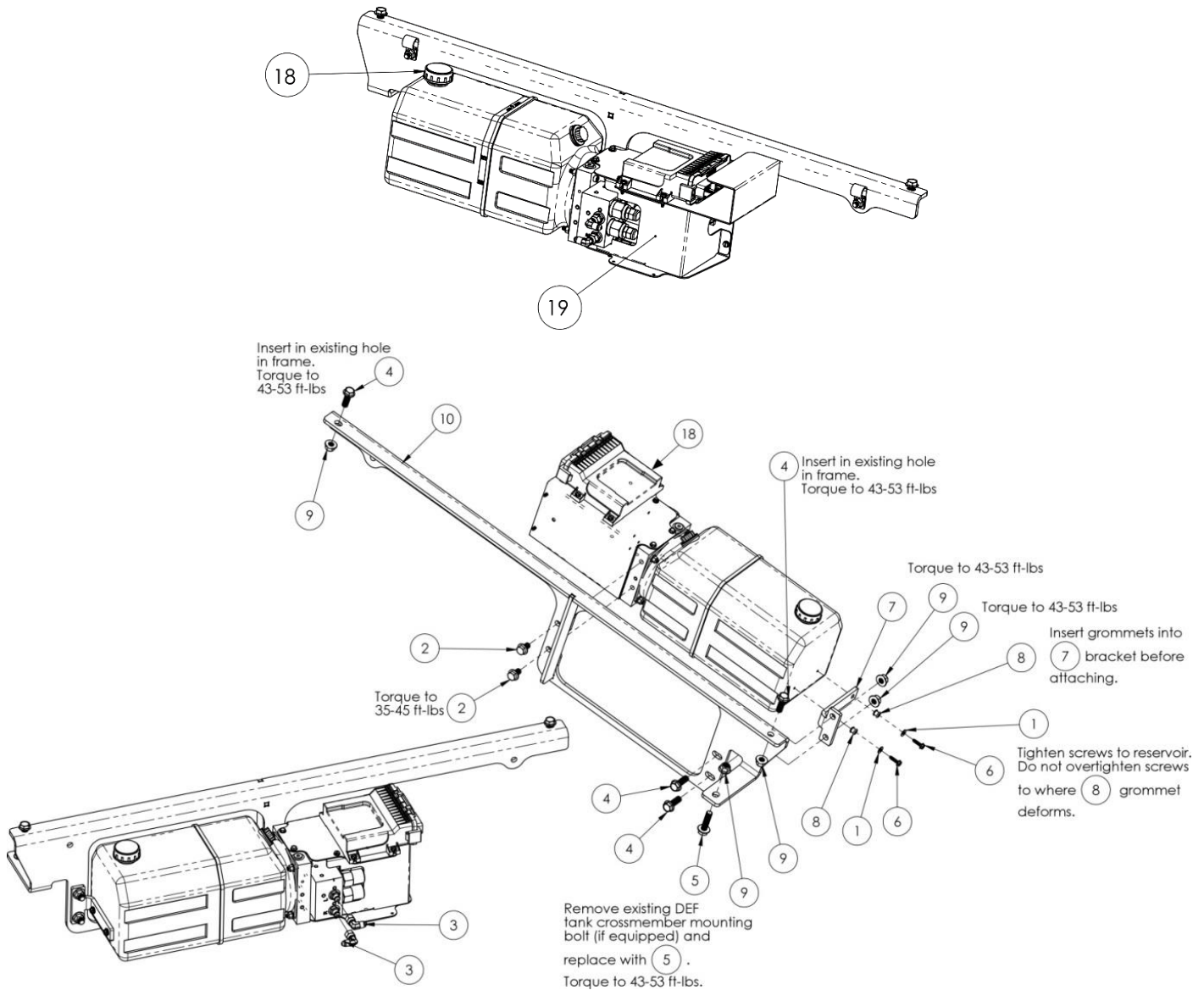
\*Components part of Power Mounting Kit P/N 11318



**Figure 27. Power Module Mount Drill Pattern.**

1. Remove coating from frame where the Power Module Mount attaches to the frame.
2. Locate the Power Module Mount
3. Place the mount under the frame in the location shown in **Figure 27**
4. Mark and drill (4)  $\text{Ø}7/16''$  holes.
5. Insert the grommets into the Power Module Mount as shown above.
6. Locate the Power Module and attach to the mount as shown above. Torque the  $3/8''$  fasteners to **39 ft-lbs**. Tighten the #10 fasteners without deforming the grommets.
7. **IMPORTANT: Do not overtighten screws into reservoir. Bushings should not be deformed when attached. Overtightening of screws can damage plastic reservoir.**
8. Mount the Power Module and Mount to the frame using the holes just drilled and the (4)  $3/8'' \times 1''$  Flange Head Bolts and locking flange nuts. **Torque to 35-43 ft-lbs.**
9. Locate the Breather Cap. Replace top plug with Breather Cap.
10. Remove the (2) caps from the fittings on the power module.
11. Locate (2) -4 JIC Elbows.
12. Attach the elbows to the straight fittings located in the power module manifold, loosely.
13. Orientate the elbows as shown.
14. While holding the body of the fitting, tighten the swivel nut to **12 ft-lbs**.

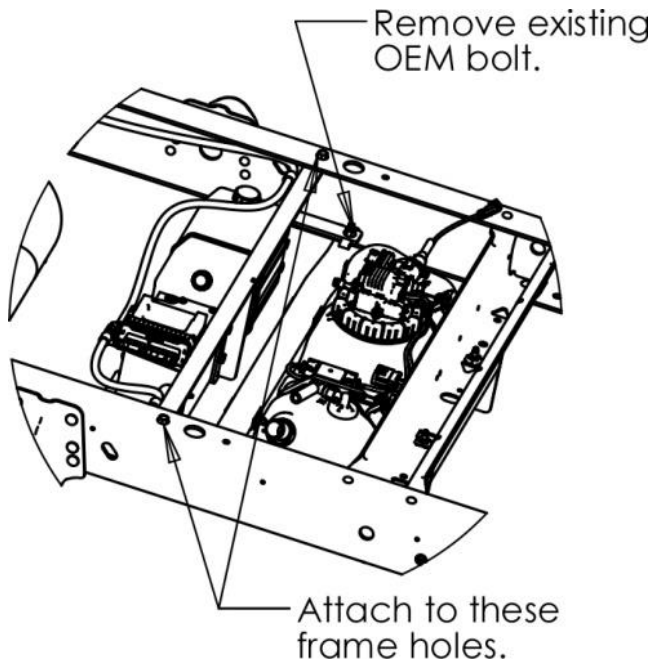
## Power Module [DS96GM2-AM and -AMC, DS96GM3-AM]



ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1*	2	10088-001	FW #10	12*	1	10675-007	Hose, -4 x 52-5/8" L
2*	2	10252-003	SFHS 3/8-16 x .625 Gr 8.2	13*	1	10675-008	Hose, -4 x 105-1/4" L
3*	2	10322-021	Hyd. Fit 90, -4 3/7 x -4 3/7 F	14*	7	10855-003	Vinyl-Coated Loop Clamp, 5/8" ID
4*	4	10502-001	HFB M10-1.5 x 30 CL 10.9	15*	2	10012-010	LFN 5/16-18, Gr G
5*	1	10502-002	HFB M10-1.5 x 40 CL 10.9	16*	2	10886-100	HFB 5/16-18 x 1.000 Gr 8
6*	2	10510-002	STS #10-16 x .750 Hex Head	17*	1	10860-001	Fire Sleeve, 5/8" ID x 60" L
7*	1	10798-007	Reservoir Mount	18	1	10614-001	Cap, Breather/Fill
8*	2	10805-007	Grommet, .19 ID x .44 OD x .375T	19	1	11345-001	Power Module, DS96GM2-AM ('13-'17)
9*	5	10873-002	LFN M10-1.5, CL 10.9			11345-002	Power Module, DS96GM2-AMC ('13-'17)
10*	1	10970-002	Frame Mount			11345-002	Power Module, DS96GM3-AM ('18-Current)
11*	2	10321-036	Hyd. Fit, -4 3/7 x -4 3/7 Union				

\*Components part of Power Mounting Kit P/N 10969 (#11-17 not shown)



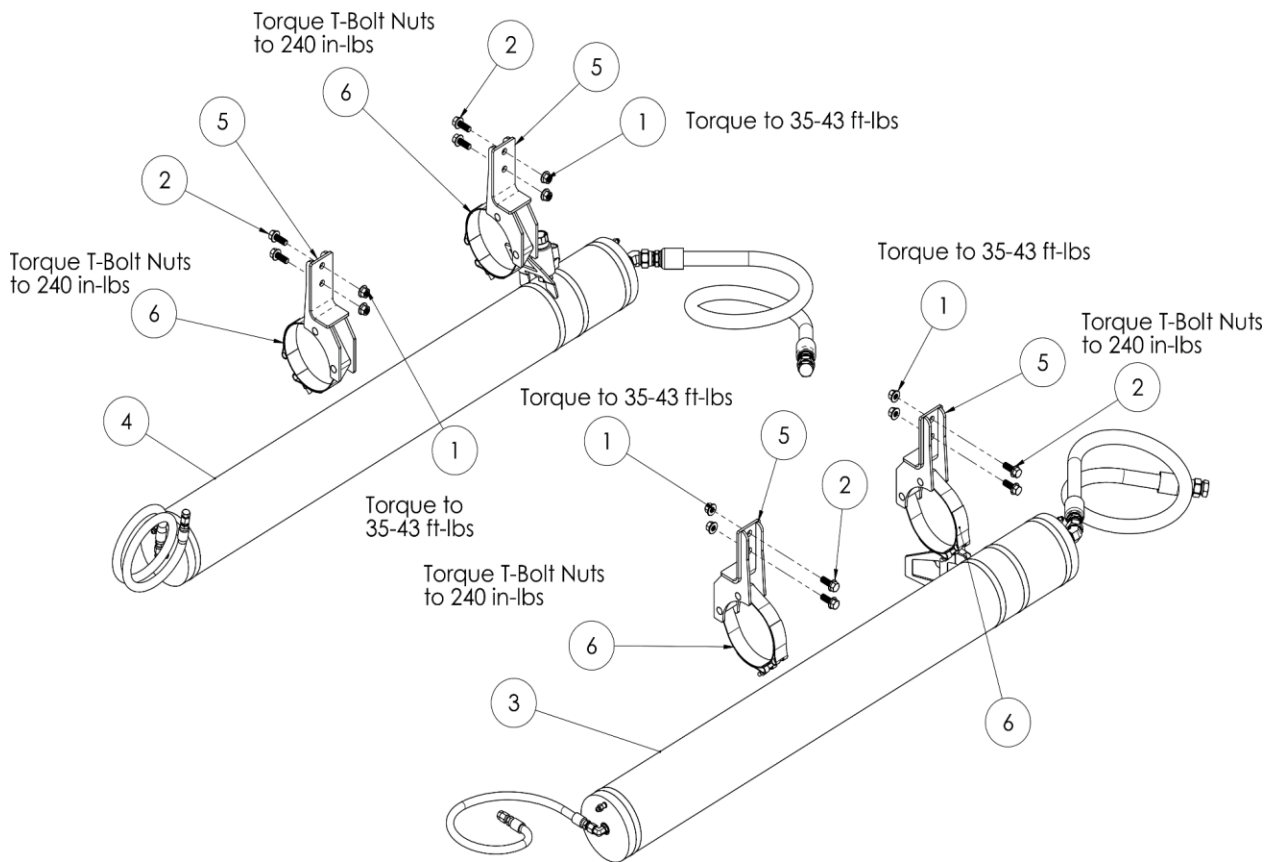


**Figure 28. -AM and -AMC Power Module Mounting**

1. Remove coating from frame where the frame mount attaches to the frame.
  2. [Diesel rear mounted DEF tank only]. Remove the lower cross-member mounting bolt on passenger side.
  3. Locate the Frame Mount and attach it to the frame at the indicated frame holes.
  4. Locate the Power Module Assembly
  5. Attach the bracket to the power module pump head manifold using the serrated flange screws. **Torque to 35-45 ft-lbs.**
  6. Locate the Power Module Reservoir Mount and grommets.
  7. Install the grommets into the reservoir mount.
  8. Attach bracket to the reservoir using the flat washers and self-tapping screws.
- IMPORTANT: Do not overtighten screws into reservoir. Bushings should not be deformed when attached. Overtightening of screws can damage plastic reservoir.**
9. Remove the (2) caps from the fittings on the power module.
  10. Locate (2) -4 JIC Elbows.
  11. Attach the elbows to the straight fittings located in the power module manifold, loosely.
  12. Orientate the elbows as shown.

13. While holding the body of the fitting, tighten the swivel nut to **12 ft-lbs.**
14. Locate the Breather Cap. Replace top plug with Breather Cap.

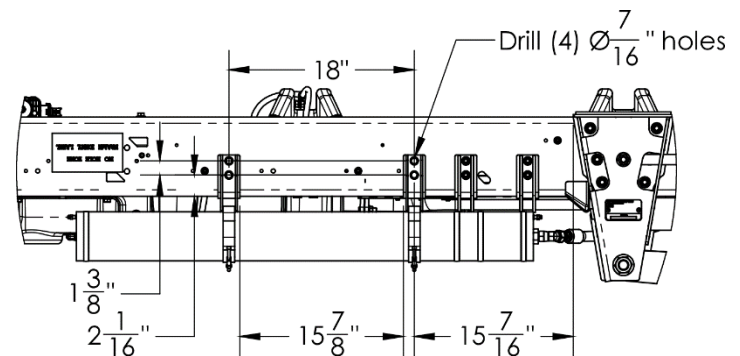
## Secondary Volumes (DS96GM2-AR and -AM)



ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	8	10012-005	LFN 3/8-16 Gr G	4	1	10597-030	Volume Assembly, RH
2	8	10501-001	HFB 3/8-16 x 1" Gr 8	5	4	10830-023	Volume Mount
3	1	10597-029	Volume Assembly, LH	6	4	10843-003	T-Bolt Clamp

1. Locate (2) Volume Mounts.
2. Place the mounts against the driver side frame, forward of the front hanger. Figure 29 shows suggested locations. The mounts can be relocated based on frame mounts, etc.
3. Remove coating from frame where the volume mounts attach to the frame.

**Important:** Locate the mounts such that the distance between two mounts as wide as possible. Avoid partially drilling through existing frame holes and inside fuel line mounts.



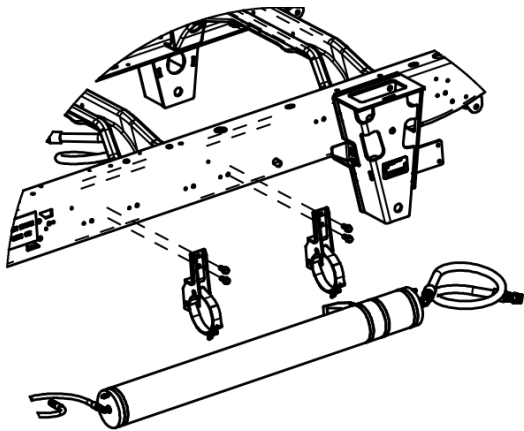
**Figure 29. Volume suggested mount locations**

4. Verifying the mounts are held flush to the bottom of the frame and utilizing the mount hole pattern, mark the locations of the mounting holes and drill (2)  $\text{Ø}7/16$ " holes per mount.
5. Attach the two mounts with 3/8" Flange Bolts and Nuts. **Torque to 35-43 ft-lbs.** Note: Orientate nuts outboard.

6. Repeat with Volume Mounts on the passenger side of the frame.
7. Locate the Left Hand Volume, which includes the shorter -4 hydraulic hose attached.

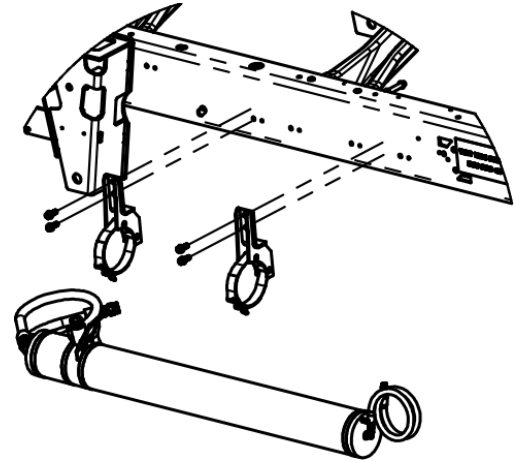
**WARNING: Each Volume Assembly is heavy (in excess of 100 lbs). Use of a portable lift, crane, or suitable jack is recommended to support the Volume Assembly during installation.**

8. Raise the volume assembly until the volume contacts both mounts. Rotate the volume assembly until the bleed screws are located to the top and as vertical as possible. The Rate Valve and Guard should be perpendicular to the side of the frame, pointing inboard, under the frame rail. See Figure 30.
9. Locate (2) T-Bolt Clamps, open the mounts, and place them in the mounts, on top of the two pegs.
10. Secure both clamps around the volume and torque the T-Bolt nut to **240 in-lbs.**



**Figure 30. Left Hand Volume installation.**

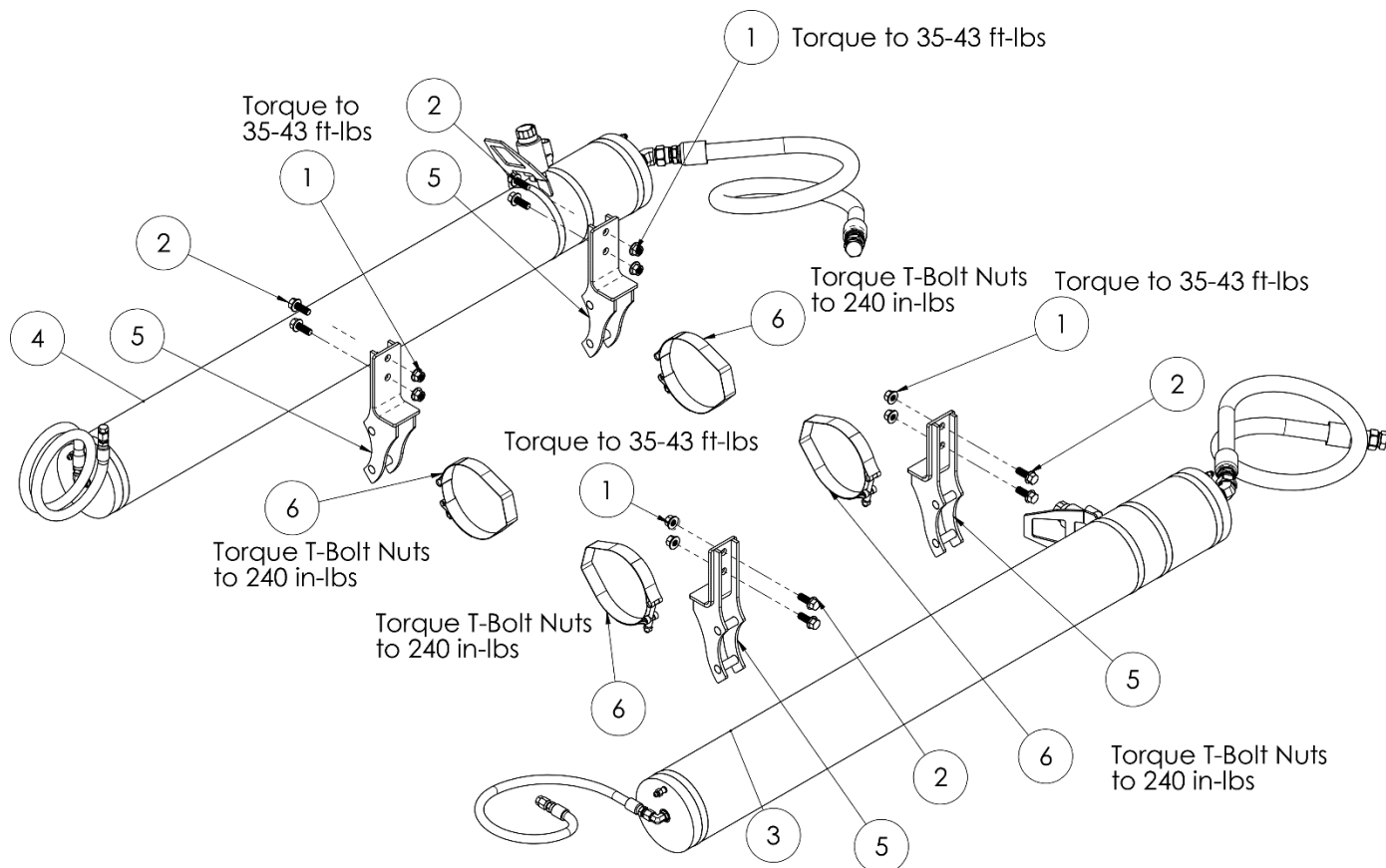
11. Locate the Right Hand Volume.
12. Raise the volume assembly until the volume contacts both mounts. Rotate the volume assembly until the bleed screws are located to the top and as vertical as possible. The Rate Valve and Guard should be pointing up, outboard of the frame. See Figure 31.



**Figure 31. Right Hand Volume installation.**

13. Locate (2) T-Bolt Clamps, open the mounts, and place them in the mounts, on top of the two pegs.
14. Secure both clamps around the volume and torque the T-Bolt nut to **240 in-lbs.**

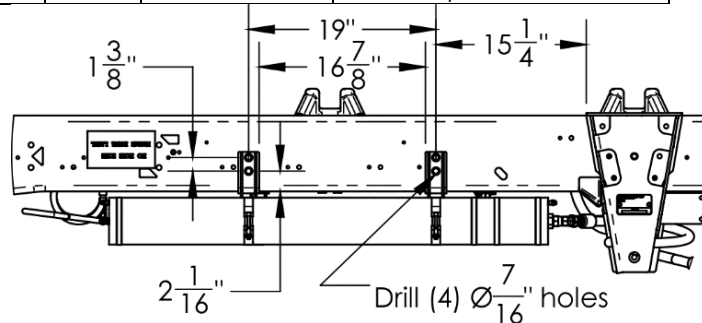
## Secondary Volumes (DS96GM2-ARC and -AMC)



ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	8	10012-005	LFN 3/8-16 Gr G	4	1	10597-030	Asy, Volume Right Hand
2	8	10501-001	HFB 3/8-16 x 1", Gr 8	5	4	10830-015	Volume Mounts
3	1	10597-029	Asy, Volume Left Hand	6	4	10843-003	T-Bolt Clamp

1. Locate (2) Volume Mounts.
2. Place the mounts against the driver side frame, forward of the front hanger. Figure 32 shows suggested locations. The mounts can be relocated based on frame mounts, etc.
3. Remove coating from where volume mounts attach to the frame.

**Important:** Locate the mounts such that the distance between two mounts as wide as possible. Avoid partially drilling through existing frame holes and inside fuel line mounts.



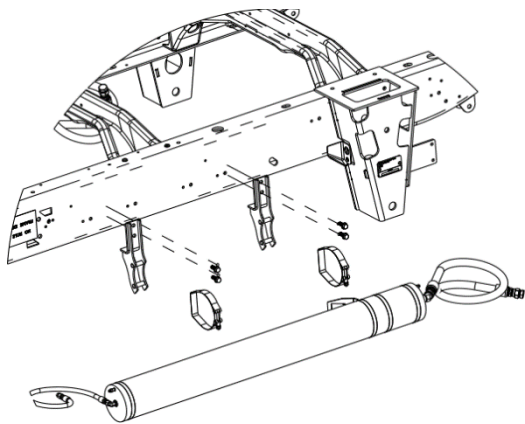
**Figure 32. Volume suggested mount locations**

4. Verifying the mounts are held flush to the bottom of the frame and utilizing the mount hole pattern, mark the locations of the mounting holes and drill (2)  $\text{Ø}7/16$ " holes per mount.
5. Attach the two mounts with 3/8" Flange Bolts and Nuts. **Torque to 35-43 ft-lbs.** Note: Orientate nuts outboard.

6. Repeat with Volume Mounts on the passenger side of the frame.
7. Locate the Left Hand Volume, which includes the shorter -4 hydraulic hose attached.

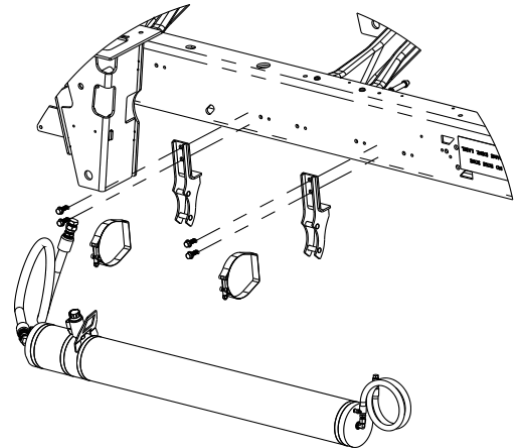
**WARNING: Each Volume Assembly is heavy (in excess of 100 lbs). Use of a portable lift, crane, or suitable jack is recommended to support the Volume Assembly during installation.**

8. Raise the volume assembly until the volume contacts both mounts. Rotate the volume assembly until the bleed screws are located to the top and as vertical as possible. The Rate Valve and Guard should be perpendicular to the side of the frame, pointing inboard, under the frame rail. See Figure 33.
9. Locate (2) T-Bolt Clamps, open the mounts, and place them in the mounts, around the two pegs.
10. Secure both clamps around the volume and torque the T-Bolt nut to **240 in-lbs.**



**Figure 33. Left Hand Volume installation.**

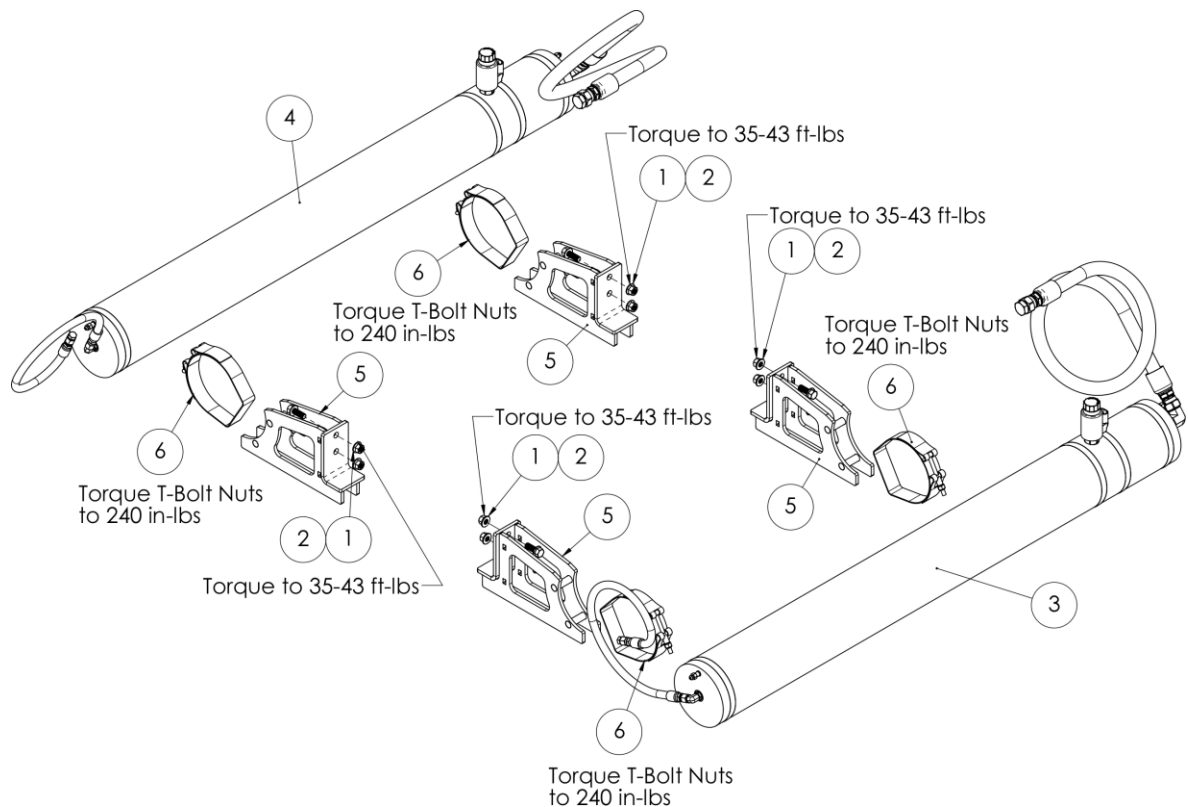
11. Locate the Right Hand Volume.
12. Raise the volume assembly until the volume contacts both mounts. Rotate the volume assembly until the bleed screws are located to the top and as vertical as possible. The Rate Valve and Guard should be pointing up, outboard of the frame. See Figure 34.



**Figure 34. Right Hand Volume installation.**

13. Locate (2) T-Bolt Clamps, open the mounts, and place them in the mounts, around the two pegs.
14. Secure both clamps around the volume and torque the T-Bolt nut to **240 in-lbs.**

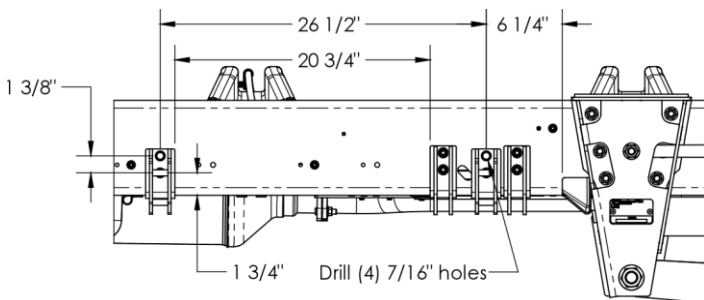
## Secondary Volumes (DS96GM3-ALF)



ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	8	10012-005	LFN 3/8-16 Gr G	4	1	10597-140	Asy, Volume Right Hand
2	8	10501-001	HFB 3/8-16 x 1", Gr 8	5	4	10830-029	Volume Mounts
3	1	10597-139	Asy, Volume Left Hand	6	4	10843-003	T-Bolt Clamp

1. Locate (2) Volume Mounts.
2. Place the mounts against the driver side frame, forward of the front hanger. Figure 32 shows suggested locations. The mounts can be relocated based on frame mounts, etc.
3. Remove coating from frame where the volume mounts attach to the frame.
4. Verifying the mounts are held flush to the bottom of the frame and utilizing the mount hole pattern, mark the locations of the mounting holes and drill (2)  $\text{\O}7/16''$  holes per mount.
5. Attach the two mounts with 3/8" Flange Bolts and Nuts. **Torque to 35-43 ft-lbs.** Note: Orientate nuts outboard.
6. Repeat with Volume Mounts on the passenger side of the frame.
7. Locate the Left Hand Volume, which includes the shorter -4 hydraulic hose attached.

**Important:** Locate the mounts such that the distance between two mounts as wide as possible. Avoid partially drilling through existing frame holes and inside fuel line mounts.

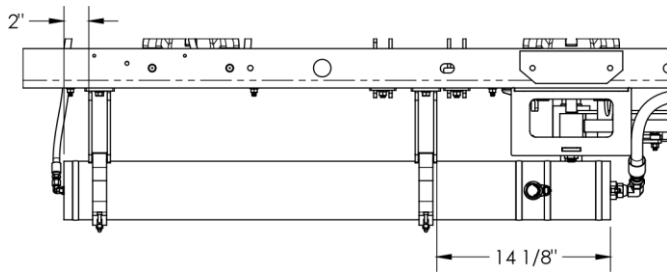


**Figure 35. Volume suggested mount locations**

**WARNING:** Each Volume Assembly is heavy (in excess of 100 lbs). Use of a portable lift, crane, or suitable jack is recommended to support the Volume Assembly during installation.

8. Raise the volume assembly until the volume contacts both mounts. Rotate the volume assembly until the bleed screws are located to the top and as vertical as possible.
9. Locate (2) T-Bolt Clamps, open the mounts, and place them in the mounts, around the two pegs.

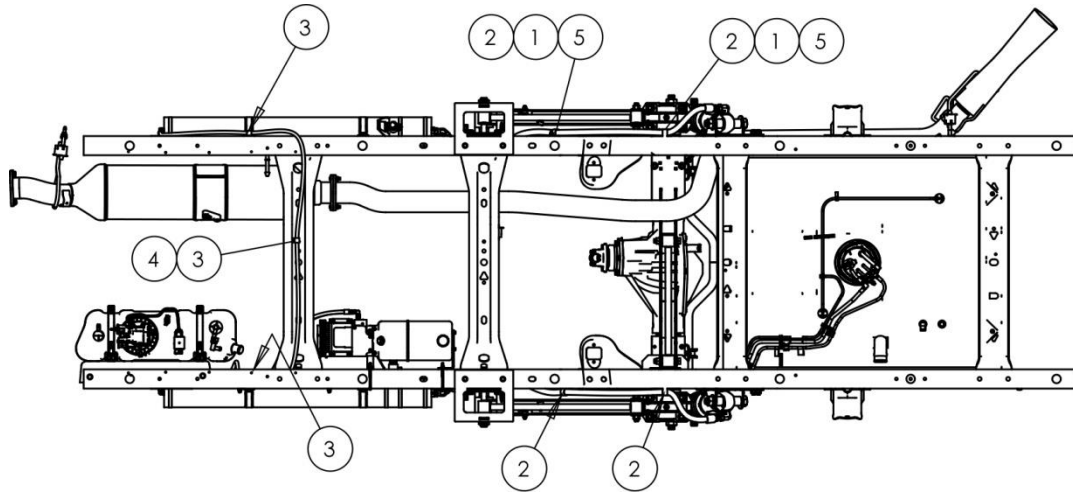
- 
- Secure both clamps around the volume and torque the T-Bolt nut to **240 in-lbs**.



**Figure 36. Volume Placement on Mounts.**

- Position the Volume so that it sits in front of the Front Hanger as shown in Figure 36.
- Locate the Right Hand Volume.
- Raise the volume assembly until the volume contacts both mounts. Rotate the volume assembly until the bleed screws are located to the top and as vertical as possible.
- Locate (2) T-Bolt Clamps, open the mounts, and place them in the mounts, around the two pegs.
- Secure both clamps around the volume and torque the T-Bolt nut to **240 in-lbs**.
- Position the Volume so that it sits in front of the Front Hanger as shown in Figure 36.

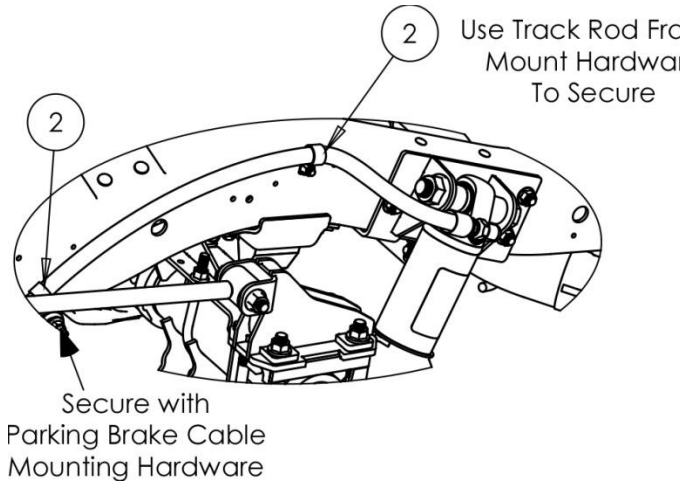
## Hose Attachment and Routing [DS96GM2-AR and -ARC, DS96GM3-AR]



ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	10012-010	LFN 5/16"-18 Gr G	4	1	10873-002	LFN M10-1.5 CL 10.9
2	4	10855-002	Vinyl Coated Loop Clamp, 1" ID	5	2	10886-100	HFB 5/16-18 x 1.000" Grade 8
3	3	10855-003	Vinyl Coated Loop Clamp, 5/8" ID				

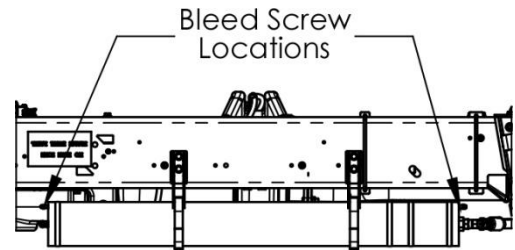
**CAUTION:** Attachment of the hydraulic hoses may result in some spillage of fluid. Use of oil absorbent mats is recommended.

1. Locate -10 hose on Left Hand (driver side) Secondary Volume.
2. Route hose to strut area, around inboard of front hanger, then outboard of frame and over axle.



**Figure 37. Drive side hose routing.**

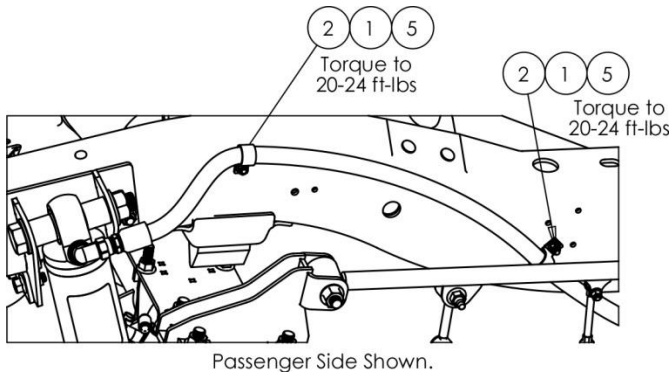
3. Locate 3/16" ID PVC Tubing (not included with kit). Note: Alternatively, a bleed kit similar to the Actron 7840 Bleed Kit can be used.
4. Attach the PVC tubing to the bleed screw on the -10 hose side of the Left Hand Secondary Volume Assembly and place the other end in a bucket.



**Figure 38. Bleed screw locations.**

5. Open the bleed screw slightly to relieve any residual pressure.
6. After pressure is relieved, close the bleed screw and torque to **13-18 ft-lbs.**
7. Remove the cap from the strut port.
8. Raise the end of the -10 (5/8") hose, attached to the volume assembly, above the secondary volume to prevent fluid loss.
9. Remove the plug from the end of the hose.
10. Attach the hose end (-10 JIC fitting) to the strut port.
11. Torque to **36-63 ft-lbs.**
12. Secure hose with clamps as shown in Figure 37.
13. Repeat with the opposite side.





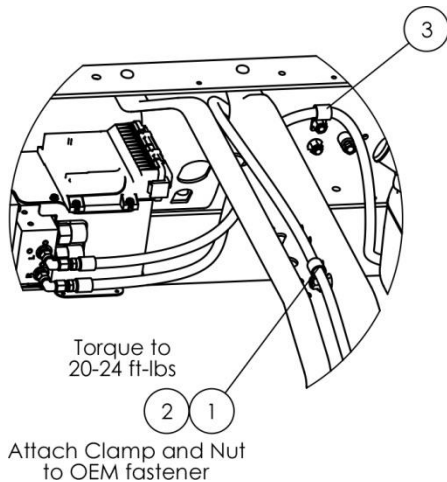
**Figure 39. Passenger Side -10 hose routing.**

14. Use hose clamps to secure hoses from movement and chafing.

**CAUTION:** Make sure the hose is not chafing or in contact with any sharp edges.

15. Attach the PVC tubing to the bleed screw on the -4 hose side of the Left Hand Secondary Volume Assembly and place the other end in a bucket.
16. Open the bleed screw slightly to relieve any residual pressure.
17. After pressure is relieved, close the bleed screw and torque to **13-18 ft-lbs.**
18. Route the Left Hand (Driver side) -4 (1/4") hydraulic hose, attached to the volume assembly, to the Power Module. Use of hose clamps is recommended to secure the hose from movement or chafing.

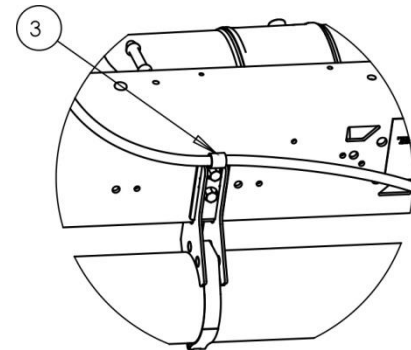
**CAUTION:** Make sure the hose is not chafing or in contact with any sharp edges.



**Figure 40. Driver side and Passenger side -4 Hose routing.**

19. Remove the plug from the hose end.
20. Attach the hose end to the fitting in the port marked "L". Torque to **12 ft-lbs. Do not over tighten.**

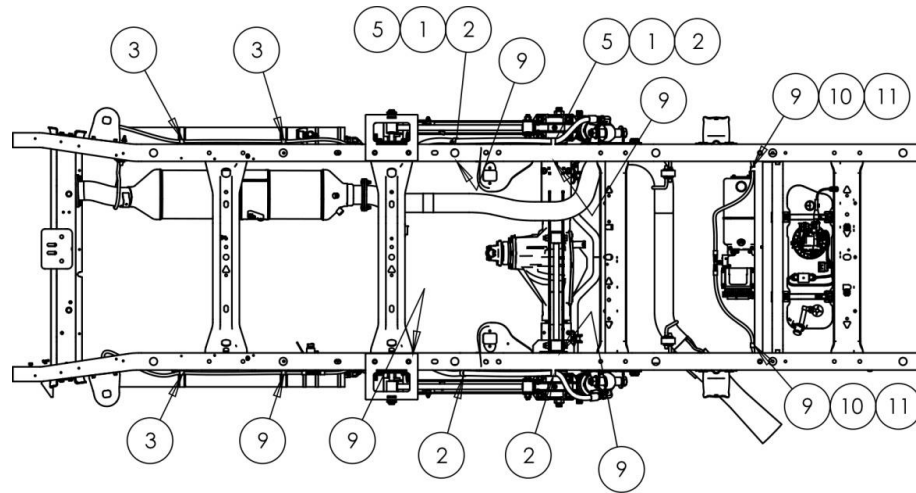
21. Repeat with the opposite side.
22. Attach the hose end to the fitting in the port marked "R". Torque to **12 ft-lbs. Do not over tighten.**



**Figure 41. Passenger side -4 hose routing.**

23. Clean up any fluid spillage.

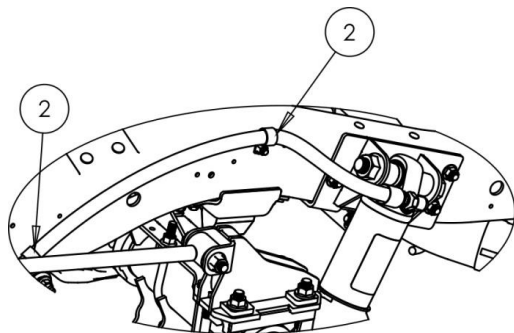
## Hose Attachment and Routing [DS96GM2-AM and -AMC, DS96GM3-AM]



Components found in DS96GM2-AM Top Level Kit				Components found in 10969 Power Module Mounting Kit			
ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	10012-010	LFN 5/16"-18 Gr G	6	2	10321-036	Hyd. Fit, -4 37 x -4 37 Union
2	4	10855-002	Vinyl Coated Loop Clamp, 1" ID	7	1	10675-007	Hose, -4 x 52-5/8" L
3	3	10855-003	Vinyl Coated Loop Clamp, 5/8" ID	8	1	10675-008	Hose, -4 x 105-1/4" L
4	1	10873-002	LFN M10-1.5 CL 10.9	9	7	10855-003	Vinyl-Coated Loop Clamp, 5/8" ID
5	2	10886-100	HFB 5/16-18 x 1.000" Grade 8	10	2	10012-010	LFN 5/16-18, Gr G
				11	2	10886-100	HFB 5/16-18 x 1.000 Gr 8
				12	1	10860-001	Fire Sleeve, 5/8" ID x 60" L

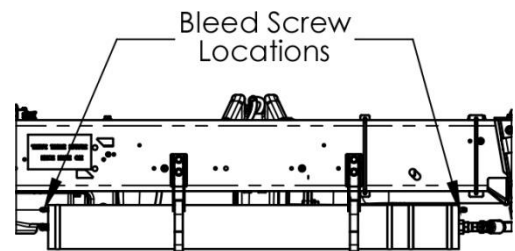
**CAUTION:** Attachment of the hydraulic hoses may result in some spillage of fluid. Use of oil absorbent mats is recommended.

1. Locate -10 hose on Left Hand (driver side) Secondary Volume.
2. Route hose to strut area, around inboard of front hanger, then outboard of frame and over axle.



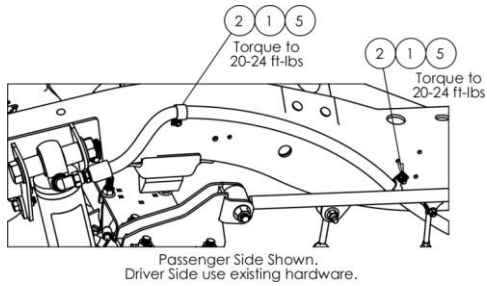
**Figure 42. Drive side hose routing.**

3. 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.
4. Attach the PVC tubing to the bleed screw on the -10 hose side of the Left Hand Secondary Volume Assembly and place the other end in a bucket.



**Figure 43. Bleed screw locations.**

5. Open the bleed screw slightly to relieve any residual pressure.
6. After pressure is relieved, close the bleed screw and torque to **13-18 ft-lbs.**
7. Remove the cap from the strut port.
8. Raise the end of the -10 (5/8") hose, attached to the volume assembly, above the secondary volume to prevent fluid loss.
9. Remove the plug from the end of the hose.
10. Attach the hose end (-10 JIC fitting) to the strut port.
11. Torque to **36-63 ft-lbs.**
12. Secure hose with clamps as shown in Figure 37.
13. Repeat with the opposite side.

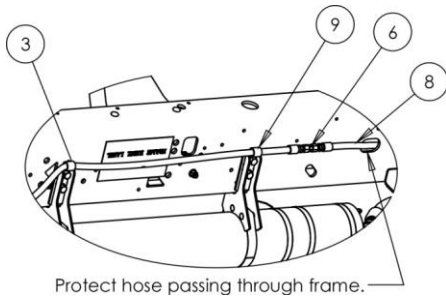


**Figure 44. Passenger Side -10 hose routing.**

14. Use hose clamps to secure hoses from movement and chafing.

**CAUTION:** Make sure the hose is not chafing or in contact with any sharp edges.

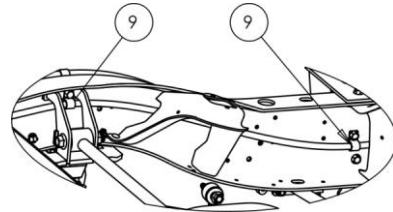
15. Attach the PVC tubing to the bleed screw on the -4 hose side of the Left Hand Secondary Volume Assembly and place the other end in a bucket.
16. Open the bleed screw slightly to relieve any residual pressure.
17. After pressure is relieved, close the bleed screw and torque to **13-18 ft-lbs.**
18. Locate the -4 Union Fitting and the 105-1/4" -4 (1/4") hydraulic hose in the Power Module Mount Kit.
19. Route the Left Hand (Driver side) -4 (1/4") hydraulic hose to the outboard side of the frame and along the frame.



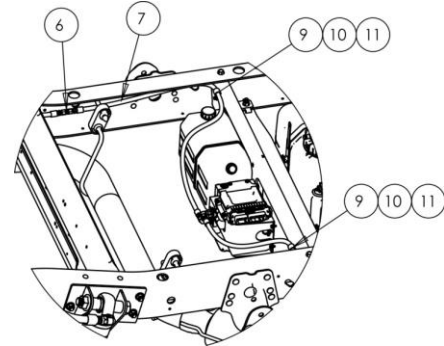
**Figure 45. Routing to -4 hose on driver side.**

20. Remove the plug from the hose end.
21. Attach the -4 JIC union fitting. Tighten to **12 ft-lbs. Do not over tighten.**
22. Attach one end of the 105-1/4" -4 hose to the other end of the union and tighten to **12 ft-lbs. Do not over tighten.**
23. Route the -4 hydraulic hose to the Power Module. Use hose clamps as indicated in Figure 45, Figure 46, and Figure 47.

**CAUTION:** Make sure the hose is not chafing or in contact with any sharp edges.

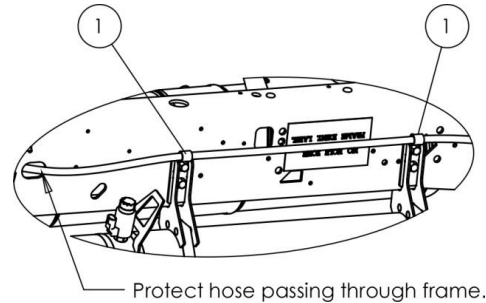


**Figure 46. Frame inboard hose routing on driver side.**

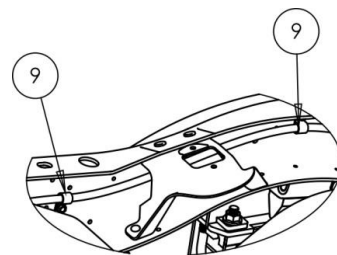


**Figure 47. Hose routing aft of axle to power module.**

24. Attach the hose end to the fitting in the port marked "L". Torque to **12 ft-lbs. Do not over tighten.**
25. Repeat with the opposite side, routing and securing hose. See Figure 47, Figure 48, and Figure 49.
26. Attach the hose end to the fitting in the port marked "R". Torque to **12 ft-lbs. Do not over tighten.**



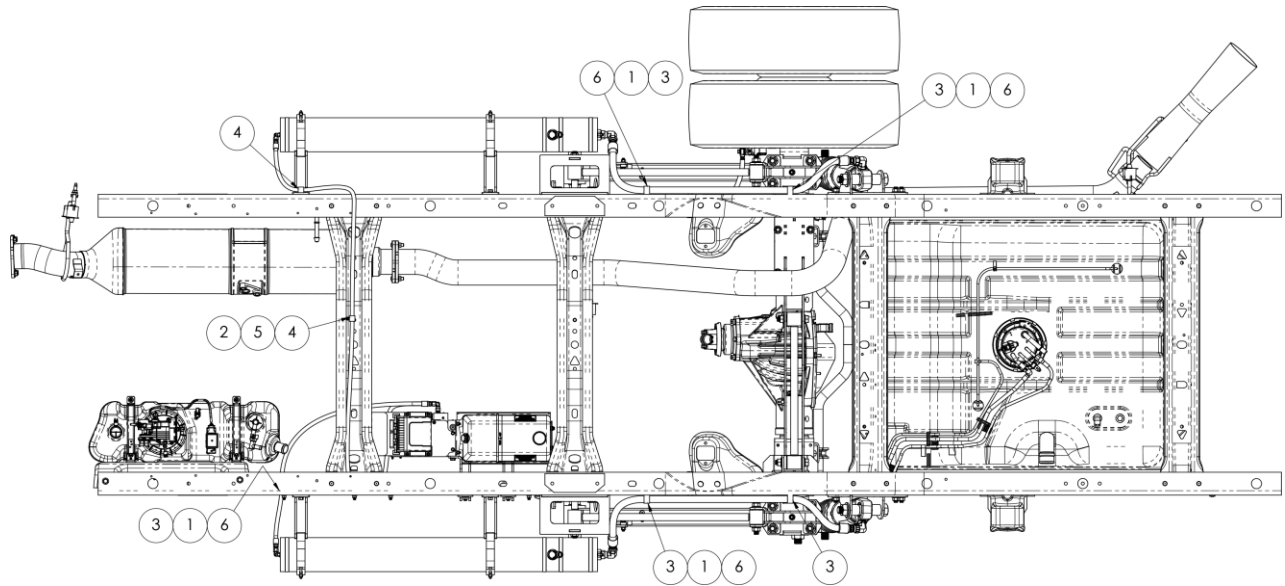
**Figure 48. Passenger side -4 hose routing.**



**Figure 49. Frame inboard -4 hose routing on passenger side.**

27. Clean up any fluid spillage.

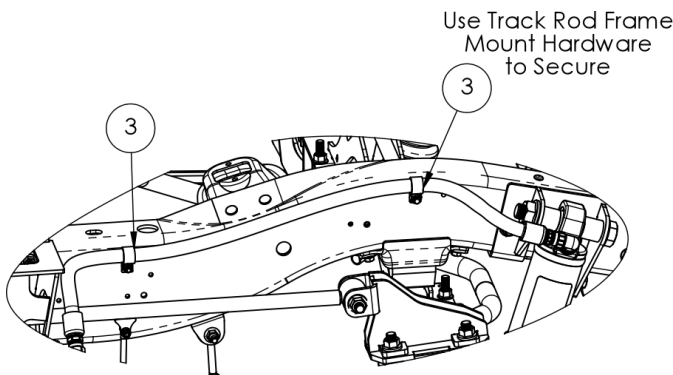
## Hose Attachment and Routing [DS96GM3-ALF]



ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	10012-010	LFN 5/16"-18 Gr G	4	2	10855-003	Vinyl Coated Loop Clamp, 5/8" ID
2	1	10502-001	HFB M10-1.5x30	5	1	10873-002	LFN M10-1.5 CL 10.9
3	5	10855-002	Vinyl Coated Loop Clamp, 1"ID	6	4	10886-100	HFB 5/16-18 x 1.000" Grade 8

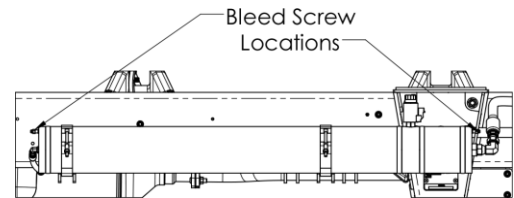
**CAUTION:** Attachment of the hydraulic hoses may result in some spillage of fluid. Use of oil absorbent mats is recommended.

1. Locate -10 hose on Left Hand (driver side) Secondary Volume.
2. Route -10 hose to the strut area as show in Figure 50.



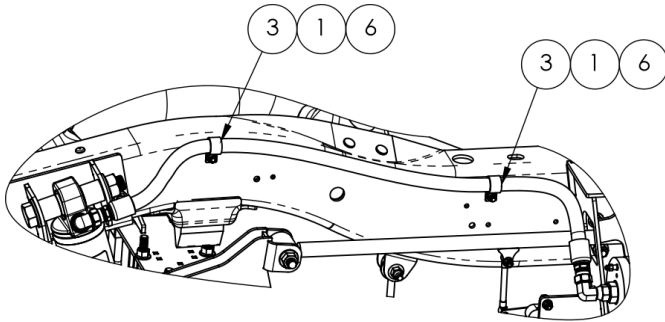
**Figure 50. Drive side hose routing.**

3. 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.
4. Attach the PVC tubing to the bleed screw on the -10 hose side of the Left Hand Secondary Volume Assembly and place the other end in a bucket.



**Figure 51. Bleed screw locations.**

5. Open the bleed screw slightly to relieve any residual pressure.
6. After pressure is relieved, close the bleed screw and torque to **13-18 ft-lbs**.
7. Remove the cap from the strut port.
8. Raise the end of the -10 (5/8") hose, attached to the volume assembly, above the secondary volume to prevent fluid loss.
9. Remove the plug from the end of the hose.
10. Attach the hose end (-10 JIC fitting) to the strut port.
11. Torque to **36-63 ft-lbs**.
12. Secure hose with clamps as shown in Figure 37.
13. Repeat with the opposite side.



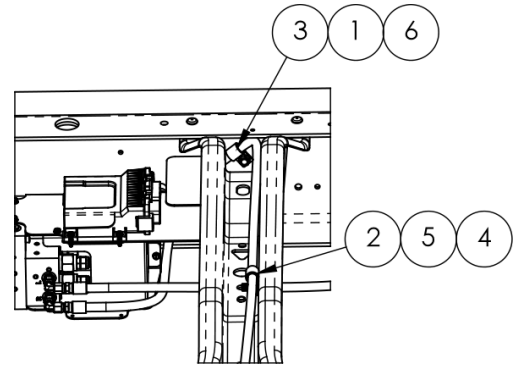
**Figure 52. Passenger Side -10 hose routing.**

14. Use hose clamps to secure hoses from movement and chafing.

**CAUTION:** Make sure the hose is not chafing or in contact with any sharp edges.

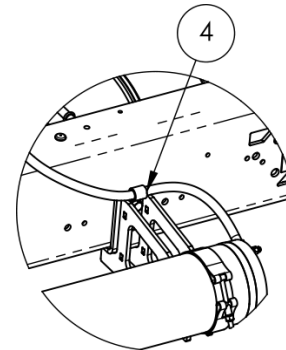
15. Attach the PVC tubing to the bleed screw on the -4 hose side of the Left Hand Secondary Volume Assembly and place the other end in a bucket.
16. Open the bleed screw slightly to relieve any residual pressure.
17. After pressure is relieved, close the bleed screw and torque to **13-18 ft-lbs.**
18. Route the Left Hand (Driver side) -4 (1/4") hydraulic hose, attached to the volume assembly, to the Power Module. Use of hose clamps is recommended to secure the hose from movement or chafing.

**CAUTION:** Make sure the hose is not chafing or in contact with any sharp edges.



**Figure 53. Driver side and Passenger side -4 Hose routing.**

19. Remove the plug from the hose end.
20. Attach the hose end to the fitting in the port marked "L". Torque to **12 ft-lbs. Do not over tighten.**
21. Repeat with the opposite side.
22. Attach the hose end to the fitting in the port marked "R". Torque to **12 ft-lbs. Do not over tighten.**



**Figure 54. Passenger side -4 hose routing.**

23. Clean up any fluid spillage.

## Chassis Assembly

### Spacers for fuel lines

1. Locate the following parts in the kit:
  - a. (3) 10012-010 LFN 5/16-18
  - b. (3) 10886-175 HFB 5/16-18 x 1-3/4"
  - c. (3) 10800-004 Tube, .69OD x 5/8" L
2. Reattach the Fuel line plastic clips to existing frame holes using the Spacers between the clips and frame.



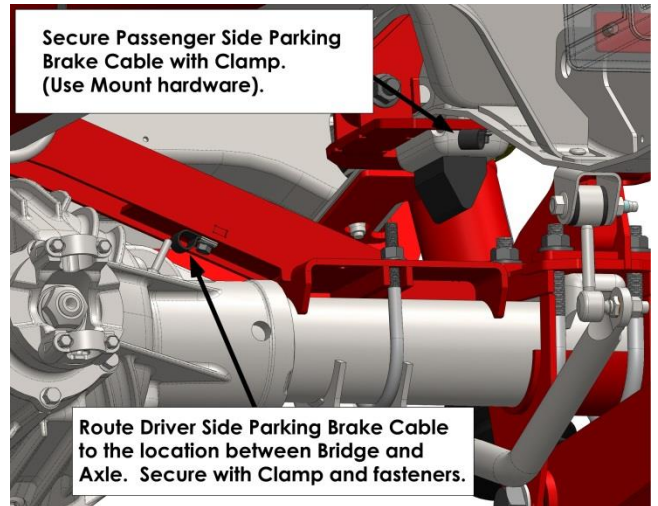
**Figure 55. Fuel line clip spaced away from frame.**

3. Torque to **14-17 ft-lbs.**

### Parking brake cable routing

1. Reroute Driver side parking brake cable around back of strut and between bridge and differential housing. Use (1) 5/8" ID Vinyl Coated Loop Clamp, (1) HFB 5/16"-18 x 1", and (1) LFN 5/16"-18 to secure cable.

**IMPORTANT: Make sure parking brake cable does not rub on tire throughout entire travel.**



**Figure 56. Parking Brake Cable Routing**

2. Route Driver Side Parking Brake through OEM wire hanger and front hanger.



**Figure 57. Routing of parking brake cables.**

3. Locate the (2) 10800-004 Tubes and 11008-045 HCS M8-1.25 x 45.



**Figure 58. Passenger side parking brake remounting.**

4. Secure the passenger side parking brake cable to the original mount using the provided hardware. Orient the mount to route cable around passenger side strut and away from the tire and exhaust.
5. Route the passenger side parking brake cable over to the driver side front hanger.
6. Pull both the passenger and driver side parking brake cables through the hanger and reconnect to Parking Brake Equalizer and Connector.

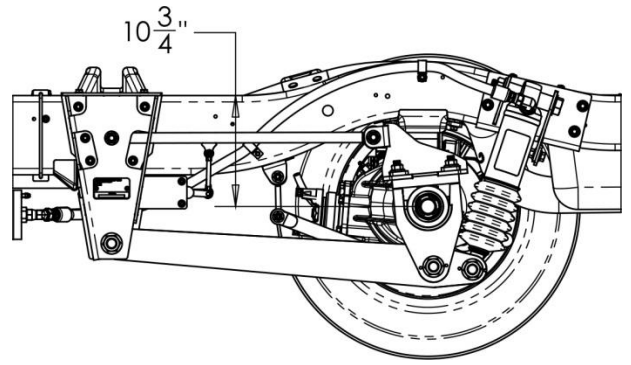


**Figure 59. Reshape wire keeper to hold parking brake cable away from volume mounts.**

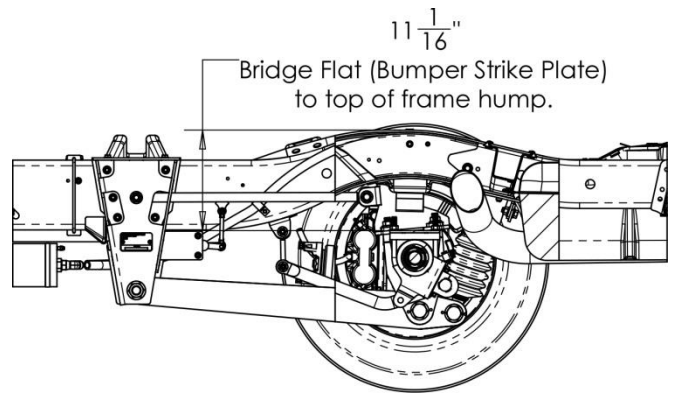
7. Bend the wire keeper along the frame to push the parking brake cable away from the secondary volume mounts.
8. Verify when parking brake is applied and released that it does not hang up on any of the mounts.

*Final Torque*

1. Raise axle to ride height.



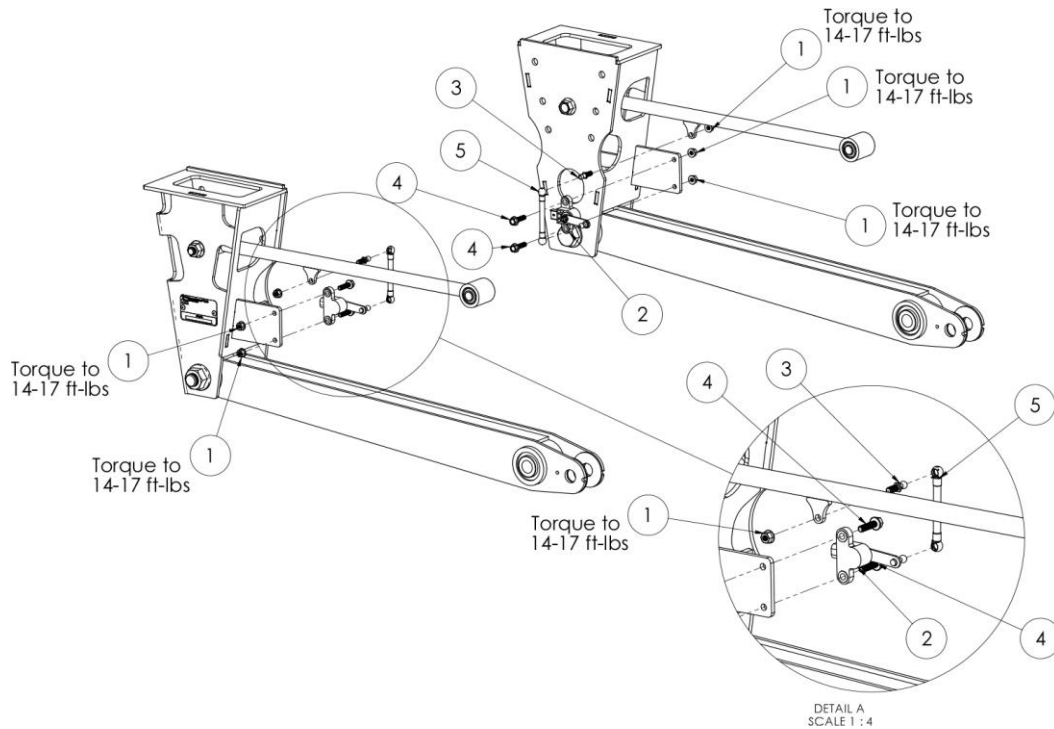
**Figure 60. Target Ride Height.**



**Figure 61. Alternate Ride Height**

2. Torque all Control Arm fasteners per specifications listed in *Control Arms*
3. Torque all Track Rod fasteners per specification listed in *Track Rod Mounting*.
4. Torque all Track Rod Frame Mount fasteners per specification listed in *Track Rod Mounting*.
5. [DS96GM2-AM only] If mid-ship fuel tank was dropped previously, raise and reattach fuel tank.

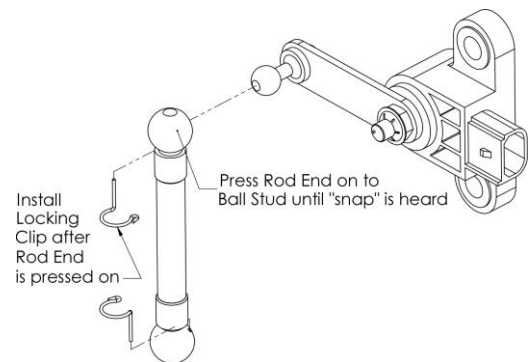
## Height Sensors



ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	10586-001	Asy, Height Sensor	4	2	10591-003	Ball Stud, 5/16-18 x .75L
2	2	10587-006	Asy, Linkage, 3.938" SS	5	4	10886-125	HFB 5/16-18 x 1.25 Gr 8
3	6	10012-010	LFN 5/16-18 Gr G				

**IMPORTANT: Strut assemblies must be installed prior to the installation of the height sensors.**

1. Locate the Height Sensor, Linkage Assembly, and Ball Stud.
2. Attach the Ball Stud to the Left Hand (Driver Side) Upper Control Arm, orientated with the ball pointing inboard, using the 5/16"-18 Locking Flange Nut. Torque to **14-17 ft-lbs.**
3. Attach the Height Sensor to the Left Hand (Driver Side) Hanger using the 5/16"-18x1.00" Hex Flange Bolt and 5/16"-18 Locking Flange Nut. Torque to **14-17 ft-lbs. Do not over torque.**
4. Snap the Linkage Assembly to the ball stud attached to the lower control arm and to the ball stud on the Height Sensor arm. **Install locking clip as shown.**

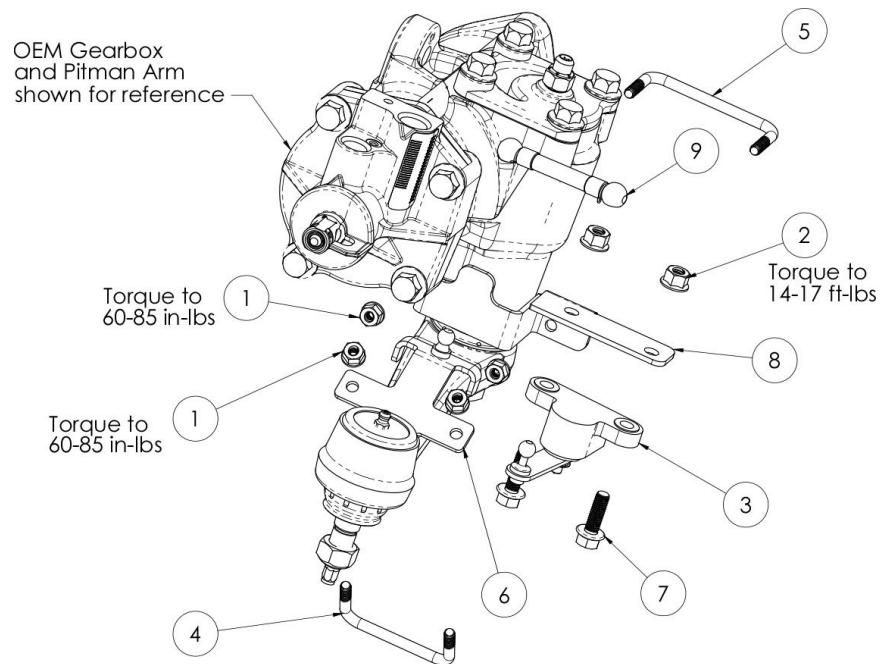


**Figure 62. Height Sensor Linkage Installation.**

5. Repeat with the Right Hand (Passenger Side).



## Steering Sensors



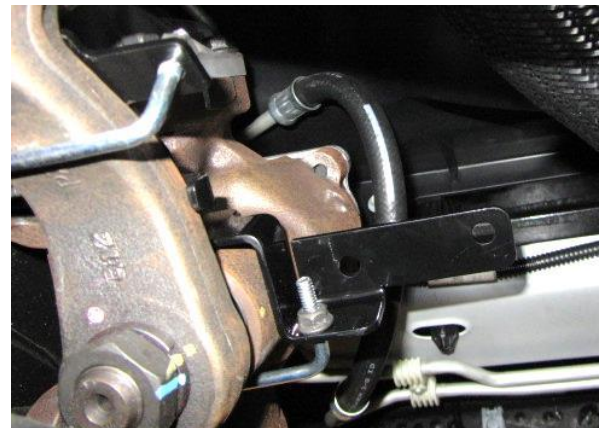
ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	10012-009	LFN 1/4-20 Gr G	6	1	10733-003	Pitman Arm Bracket
2	2	10012-010	LFN 5/16-18 Gr G	7	2	10886-100	HFB 5/16-18 x 1.000 Gr 8
3	1	10586-002	Asy, Steering Sensor	8	1	10904-004	Bracket, Steering Sensor
4	1	10669-002	U-Bolt, 1/4-20 x 2.438 x 1.375 Gr 2	9	1	10587-007	Asy, Linkage, 2.887" SS
5	1	10669-005	U-Bolt, 1/4-20 x 3.00 x 1.375 Gr 2				

1. Raise the front end of the vehicle per OEM instructions.

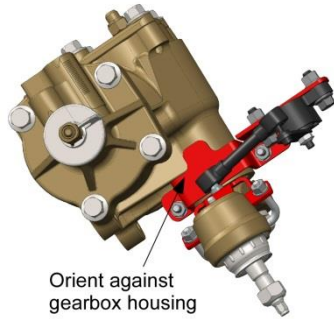


**Figure 63. Access panel removal.**

2. Remove front panel.
3. Locate the OEM gearbox and pitman arm.
4. Install Steering Sensor Bracket around gearbox, with the cutout near the tab, against the rib. See Figure 64 and Figure 65.

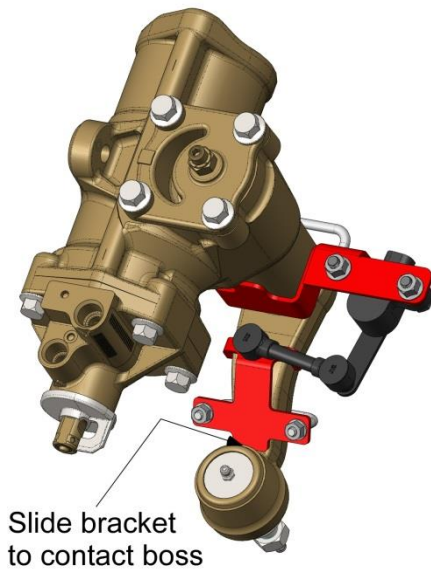


**Figure 64. Installation of Steering Sensor Bracket**



**Figure 65. Steering Sensor Bracket placement.**

5. Secure bracket with 3" wide x 1-3/8" leg 1/4"-20 U-bolt. Torque to **60-85 in-lbs.**
6. Install the Pitman Arm Bracket over the pitman arm. Slide bracket to contact boss. See Figure 66.



**Figure 66. Pitman Arm Bracket installation.**

7. Secure bracket with 2-7/16" wide x 1-3/8" leg 1/4"-20 U-bolt.
8. Install Steering Sensor onto bracket attached to gearbox. Torque fasteners to **14-17 ft-lbs. Do not over torque.**
9. Snap one end of the Steering Sensor Linkage over the ball on the pitman arm mounted bracket and the other on the ball on the steering sensor.
10. Verify Steering Sensor components are correctly orientated. It is recommended to steer the steering wheel full lock to lock to verify steering sensor does not over travel.



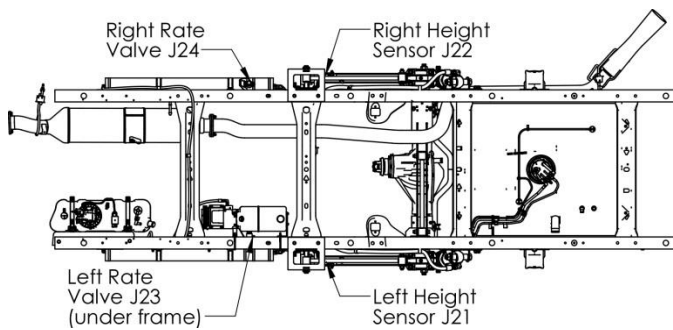
**Figure 67. Steering sensor components installed.**

11. Install the locking clips.

## Electrical

### External Electrical Installation:

1. Locate the External Electrical Harness attached to the power module.
2. Unroll the wiring harness and using the External Electrical Harness wiring diagram, found in the Appendix A: Electrical Schematics section, identify the connection ends.
3. Locate the trunk containing the Height Sensor (J21 and J22) and the Rate Valve (J23 and J24) connections.
4. Route the trunk towards the height sensors and rate valves.



**Figure 68. Sensor connections**

5. Connect the height sensor and rate valve connections.
6. Secure the harness to OEM harness on the driver side. Use of plastic clips is recommended.
7. Locate the Black 8ga. wire ground ring terminal, J30, branch near the power module.
8. Locate and drill  $\text{\O}1/4$ " hole in frame. Remove frame coating(s) as needed to ensure metal-to-metal contact between the ring terminal and frame.
9. Attach the ground ring terminal, J30, to the chassis frame for grounding. Sealant should be applied after ring terminal is secured.
10. Route the remaining trunk (containing the blunt wires and steering sensor blunt wires) towards the cab. Secure to OEM wiring harness.
11. Remove the under dash trim panel.
12. Remove the trim pieces from the driver side door foot well. It is recommended unbolting the driver seat and leaning it over to provide access to the wires under the seat.
13. Under the foot well trim, drill an  $\text{\O}3/4$ " hole and insert grommet to protect the wires harness from chafing.



**Figure 69. Access hole drilled into driver side foot well.**



**Figure 70. Access hole as seen from below cab.**

14. Locate the bundle of (8) eight blunt wires.
15. Remove the electrical tape at the end of the loom.
16. Locate the Speed (Purple/White) and Brake (Pink/Black) wires.
17. Pull these two wires from the bundle. Additional electrical tape may have to be removed. The Speed wire will connect to the ABS controller under the cab on the driver side and the Brake will tie into the OEM wires along the frame rail.
18. Retape the remaining wires.
19. Feed the remaining wires from the bundle into the cab through the  $\text{\O}3/4$ " hole.



**Figure 71. Wiring harness routed into cab.**

*Dash Harness Installation*

20. Locate the Dash Harness.
21. Identify the following 18ga wires on the Dash harness and crimp each wire to the corresponding wire on the External Harness fed into the cab:
  - Red (Battery)
  - Yellow (Ignition)
  - Black (Ground)
  - White (CAN High)
  - White/Black (CAN Low)
  - Yellow/Black (Park)\*\*

\*\* If Yellow/Black wire is missing from external harness, Yellow/Black wires do not need to be connected under dash.

22. Make the following connections:

Liquidspring Dash Harness	→	OEM Wire
Red (Battery)	→	Red/White (under seat)
Yellow (Ignition)	→	Brown (OEM 341) under seat
Black (Ground)	→	Ground stud
Yellow/Black (Park)**	→	Ground stud
Purple/White (Speed)*	→	<b>2013-2017:</b> Yellow/Black (under vehicle in ABS actuator) <b>2018-Current:</b> Green/White (under vehicle in Electronic Brake Control Module)
Pink/Black (Brake)*	→	Lt Blue in Frame

\*Wires from External Harness

\*\* If Yellow/Black wire is missing from external harness, Yellow/Black wires do not need to be connected under dash.

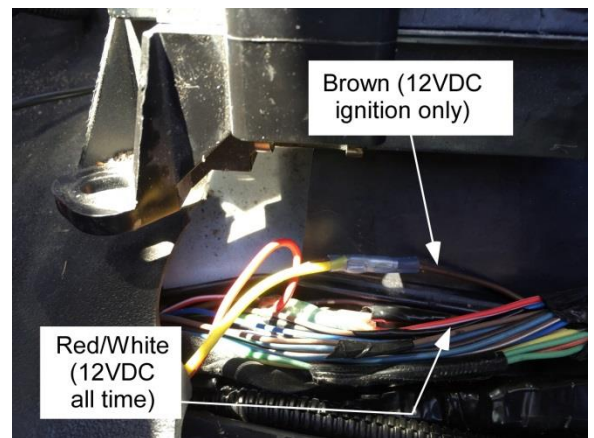
**NOTE: Speed signal from chassis is different between 2013-2017 and 2018-Current model years. Make sure to use the correct power module with the model year.**

23. Locate the wiring bundle under the driver seat and open cover.



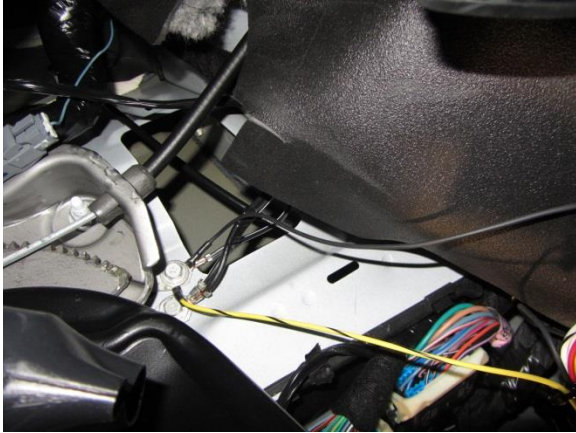
**Figure 72. Wiring access under driver seat.**

24. Locate the brown wire (OEM 341) and splice the Ignition (Yellow) wire from the Dash Harness. Verify that the brown wire has 12VDC only with ignition ON or RUN.
25. Locate the red/white wire and splice the Battery (Red) wire from the Dash Harness. Verify that the red/white wire has 12VDC all time.



**Figure 73. Brown and Red/White wires spliced to Dash Harness.**

26. Close cover.
27. Route the Black ring terminal, Yellow/Black ring terminal, and CAN connector under the floor matting to the kick panel.
28. Remove kick panel.
29. Attach the Black and Yellow/Black ring terminals to sheet metal to ground.



**Figure 74. Black and Yellow\Black ring terminal connections.**

30. Route the CAN connector to be accessed as necessary.
31. Reinstall kick panel.



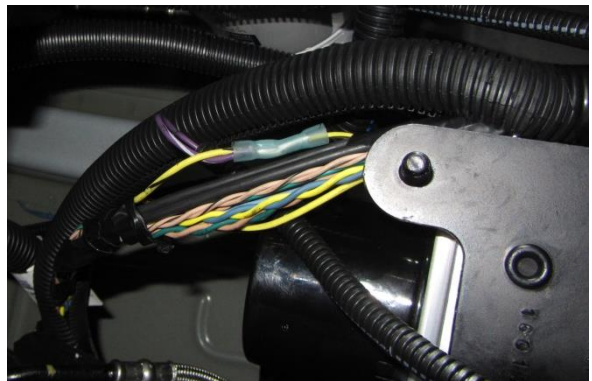
**Figure 75. CAN connector recommended location.**

32. Locate the Driver Interface.
33. Mount the Driver Interface to the dash in an appropriate location.
34. Route the Driver Display harness to the dash harness connector, J12, and connect.
35. Secure all wires under the dash.
36. Reinstall all trim panels.
37. Reinstall driver seat.
38. Under the vehicle (beneath the driver seat), locate the brake ABS actuator (for 2013-2017 vehicles) or the Electronic Brake Control Module (for 2018 and later vehicles). Locate the wiring bundle to the actuator.



**Figure 76. ABS actuator, under cab.**

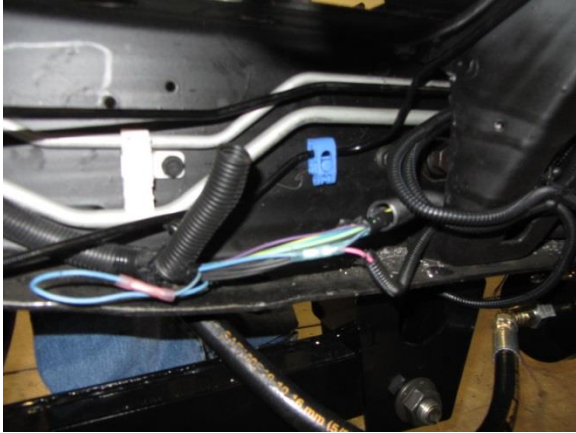
39. Locate the Yellow/Black wire in the bundle.



**Figure 77. Splicing LS Purple/White wire to OEM Yellow/Black wire.**

40. **2013-2017:**  
Splice the Yellow/Black wire to the Speed (Purple/White) wire pulled from the External wiring harness. Install heat shrink tubing over the connection.
- 2018 and Later:**  
Splice the Green/White wire to the Speed (Purple/White) wire pulled from the External wiring harness. Install heat shrink tubing over the connection.
41. Re-cover and tape up.
42. Locate the Light Blue wire in the OEM Harness, along the driver side frame rail, behind the cab. Verify wire provides 12VDC with brakes applied and 0VDC with brakes not applied.

**CAUTION:** Do not use the Light Blue wire in the ABS Controller wire bundle.



**Figure 78. Light Blue wire spliced to Pink/Black wire. OEM Light Blue wire shown near cross member between rear suspension hangers. Wire may be found along driver side frame rail, closer to cab.**

43. Splice the Light Blue wire to the Brake (Pink/Black) wire pulled from the External wiring harness. Install heat shrink tubing over the connection.
44. Re-cover and tape up.
45. Locate the branch containing connector J35.
46. Route branch to the steering sensor and connect.
47. Secure the harness.
48. Locate the Red 8ga battery connection branch.
49. Route branch to the auxiliary battery positive terminal.
50. Locate the Battery Fuse Lead containing the 80 amp fuse.
51. Remove the 80 amp fuse.
52. Crimp the fuse lead to the 8ga battery connection branch blunt end.
53. Melt the heat shrink on the crimped connection to seal the splice.
54. Connect to the positive terminal post.

Note: GM uses side mount connections. A replacement terminal connection screw, such as the Solid Brass Battery Bolt Extender LYNX by East Penn, p/n 07050) may be required to attach to the battery.

55. Replace the 80 amp fuse.

#### *Driver Interface Installation:*

1. Locate the Driver Interface.
2. Mount the Driver Interface to the dash in an appropriate location.
3. Route the Driver Interface harness to the dash harness connector, J26, and connect.

4. Secure all wires under the dash.
5. Replace the 80 amp fuse at the battery.

#### *Optional Door Electrical Harness Installation:*

The optional door harness can be used to remotely activate the system “kneeling” feature in which the suspension automatically lowers to a point slightly less than maximum jounce travel. The door harness can be utilized in two actuation methods.

**IMPORTANT: Do not connect positive (12VDC) signal to either the W98 Tan/Blk or W93 Brown wires. Applying positive (12VDC) to either of these wires can result in ECU failure.**

#### A. Single Wire - Ground Signal From Source

Ground is provided to the door harness Brown (W93) wire from a grounding source (e.g. multiplex signal, switch, etc.). If a remote switch is used, it is recommended to use a normally closed (NC) door switch which remains open when the door is closed (or closed when the door is opened). One side of the switch must be connected to a ground source and the other side routed to the door harness. If multiple switches are used, they should be wired in a parallel arrangement with the door harness. Requires single wire routed from source to door harness.

#### B: Dual Wire – Ground Signal From System

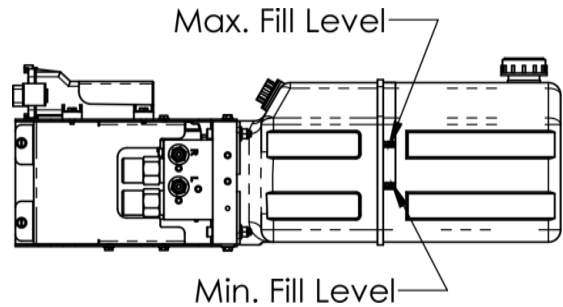
Ground is provided by the suspension system when the Brown (W93) wire is connected to the Tan/Black (W98) wire of the door harness. This arrangement requires a remote switch that is a normally closed (NC) door switch which remains open when the door is closed (or closed when the door is opened). One side of the switch needs to be connected to the door harness Brown (W93) wire and the other side to the door harness Tan/Black (W98) wire. Requires two wires routed from switch to door harness.

1. Door harness wires are located on the main external wiring harness as a branch near the power module.
2. Unwrap the door harness wires.
3. Based on the selected actuation method above, strip the end(s) of the door harness blunt wire(s) and connect the end(s) to the signal source using a heat shrinkable butt-splice. Crimp the connection(s) accordingly and apply heat to the insulator to seal the connection(s).

#### *Initial System Fill*

1. Install the wheels and tires. Torque wheel nuts to OEM specifications.
2. Reconnect the negative cable to the vehicle battery.

3. Verify that the front wheels are steered straight ahead.
4. Lower the vehicle to the ground and remove any jack stands from under the vehicle. The suspension should be in the kneeled position.
5. 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.



**Figure 79. Final fill fluid level.**

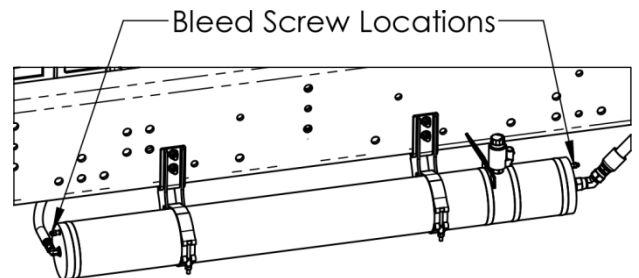
**WARNING: Do not run vehicle in an enclosed building without adequate ventilation or without ducting exhaust fumes outside. Operation of a vehicle inside an enclosed building can lead to serious injury or death.**

6. Press and release the Red ON/OFF button on the driver display. All LEDs on the driver display should go out.
7. 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.
8. The green ride height indicator LED should indicate “Low” and begin flashing as the pump/motor starts. If pump/motor does not start, check Trouble Shooting Electrical Section.
9. Monitor the fluid level in the reservoir. If the level drops below 1/4 of the tank, press and release the Red ON/OFF button to shut off the system, refill the reservoir, and turn the system back on by pressing the Red ON/OFF button.
10. If the suspension system does not begin to rise to a preset ride height after 3 minutes, stop the system and check the following first and then repeat this step:
  - a. Check for any fluid leaks.
  - b. Check that the hoses are properly connected.
  - c. Completely depressurize the system. See Depressurizing the System section, under System Operation
11. After the suspension system stops leveling, check the fluid level in the reservoir. If low, fill to the indicated line. Additional fluid can be purchased from LiquidSpring.

**CAUTION:** Adding any fluid other than Compressible Fluid from LiquidSpring LLC to the system will result in incorrect operation and will damage critical components of the system. Using unapproved fluid in the LiquidSpring system will void the LiquidSpring Warranty.

#### *Bleeding the System*

1. Locate 3/16” ID PVC Tubing (not included with kit). Note: Alternatively, a bleed kit similar to the Actron 7840 Bleed Kit or Lisle 19200 Brake Bleeding Kit (found at Sears) can be used.
2. 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 80. Bleed screw locations.**

3. Open the bleed screw slightly.
4. After air bubbles are no longer present, close the bleed screw and torque to **13-18 ft-lbs.**
5. Repeat with remaining three bleed screws.

#### *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 “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.**

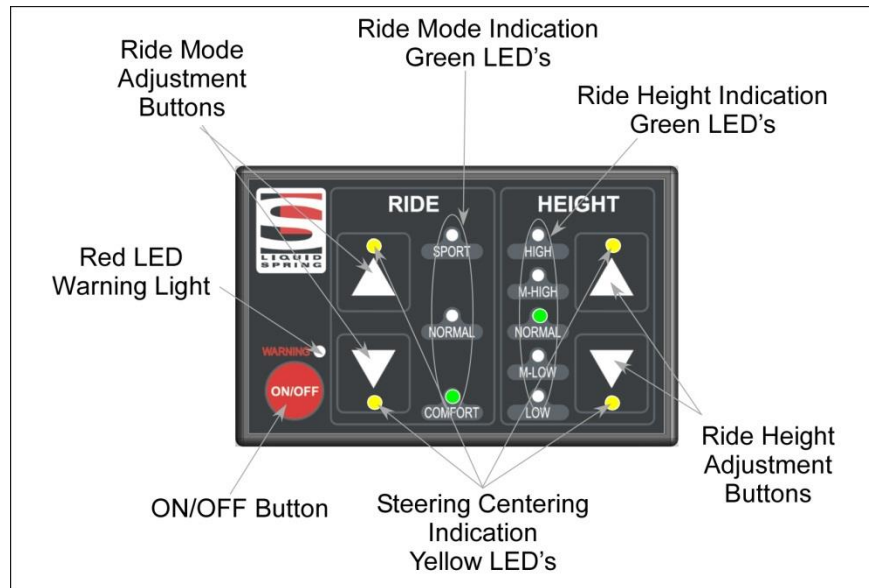
4. Press and release the Red ON/OFF button on the driver display. All LEDs on the driver display should go out.
5. Press and release the Red ON/OFF button again. The LEDs on the driver display should all flash and then only the four yellow arrow LEDs, one green ride mode indicator LED, and one green ride height indicator LED should remain lit.
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.
10. Press and release the Red ON/OFF button on the driver display. All LEDs on the driver display should go out.
11. 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.
12. Calibration is now completed.



## 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 53.

### 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).

- 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.

**IMPORTANT:** While parked for an extended time with the vehicle and/or suspension system turned off, suspension ride will change with temperature change. Increases in ambient temperature or parking in direct sunlight can cause the suspension ride height to increase. As temperature lowers, the suspension ride height can decrease.

### *Depressurizing the System*

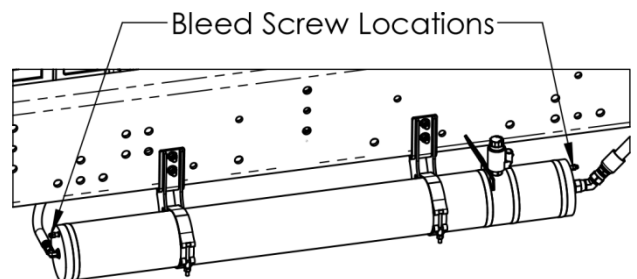
1. Turn the ignition key to "Run" and ensure that the LiquidSpring driver display LEDs light up and that the red "Warning" LED is not lit. If the red "Warning" LED is lit, proceed to the Trouble Shooting Section.

**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 81. 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.

#### 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 (Full)

See Section *Calibrating the System*, on page 47

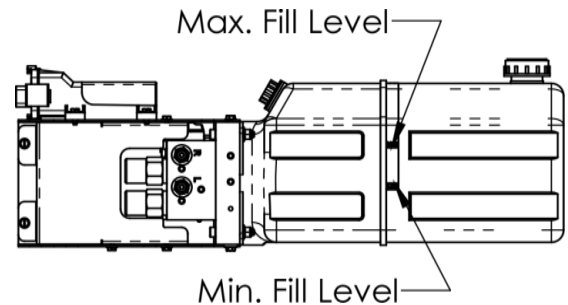
#### Checking Fluid Level

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.

**CAUTION: Adding any fluid other than Compressible Fluid from LiquidSpring LLC to the system will result in incorrect operation and will damage critical components of the system. Using unapproved fluid in the LiquidSpring system will void the LiquidSpring Warranty.**



**Figure 82. 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 82.
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.**

---

## 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 to NORMAL height.
    - Refer to the 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 the Front Hanger, Upper Strut mount, Volume mount, and Power Module mount bolt and nuts to assure they are properly torqued.
- 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

- Check all suspension components for any signs of damaged/broken components, looseness, or wear.
- Inspect bolts and nuts at the control arm pivots to assure they are properly torqued.
- Inspect bolts and nuts at both the frame and axle mount ends of the track rod 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.

## 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
	Height sensor error	See <i>Issues with Height Sensors</i>
One corner raises and lowers slower than other corners	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
	No vehicle speed signal	See <i>Issues with Vehicle Speed Signal</i> section.
Excessive stiffness when on flat, straight road	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*

<b>Condition</b>	<b>Cause</b>	<b>Correction</b>
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*

<b>Condition</b>	<b>Cause</b>	<b>Correction</b>
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*

<b>Condition</b>	<b>Cause</b>	<b>Correction</b>
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*

<b>Condition</b>	<b>Cause</b>	<b>Correction</b>
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*

<b>Condition</b>	<b>Cause</b>	<b>Correction</b>
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*

<b>Condition</b>	<b>Cause</b>	<b>Correction</b>
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*

<b>Condition</b>	<b>Cause</b>	<b>Correction</b>
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*

<b>Condition</b>	<b>Cause</b>	<b>Correction</b>
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



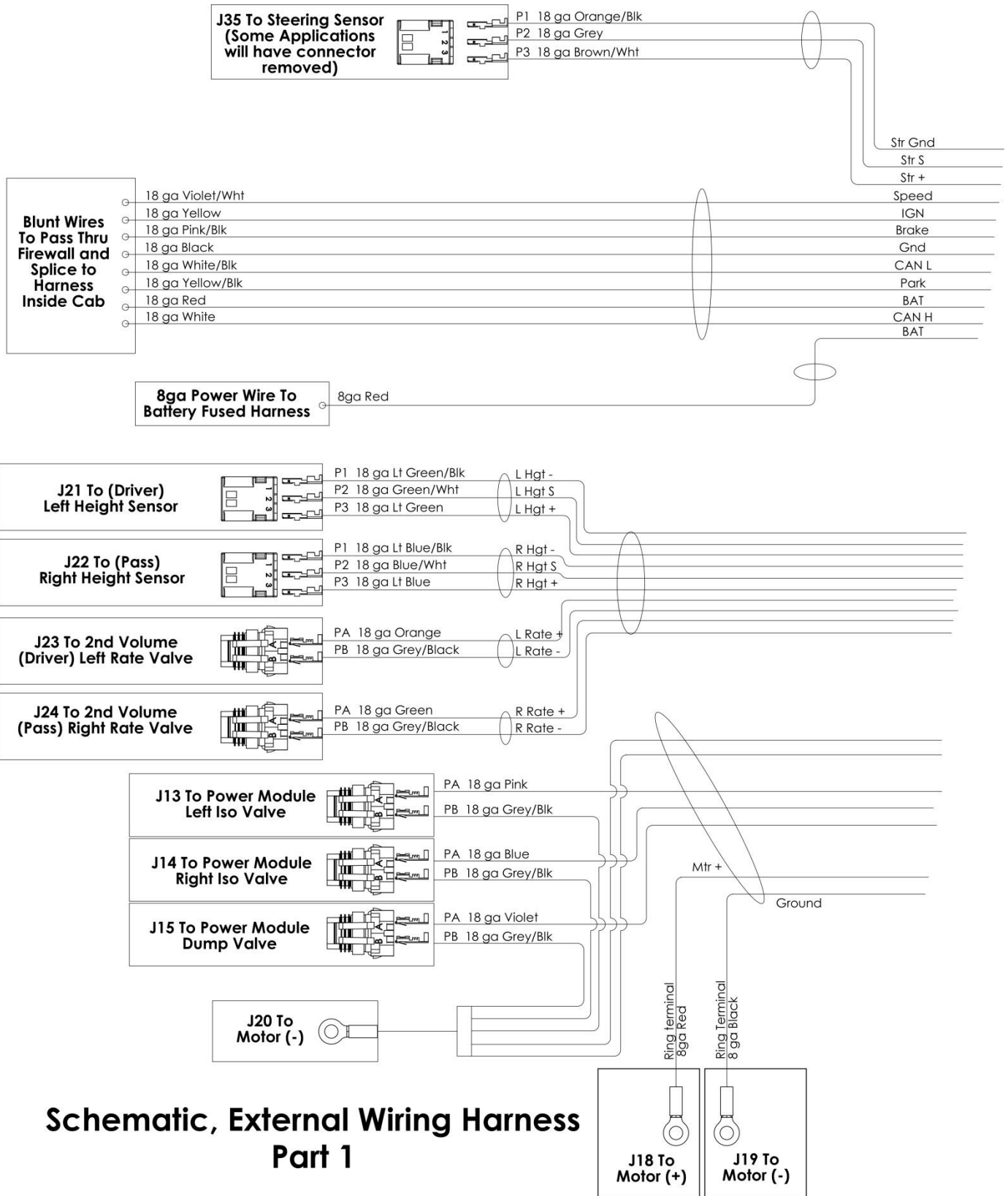
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*Issues with Secondary Volume Assembly*

<b>Condition</b>	<b>Cause</b>	<b>Correction</b>
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	

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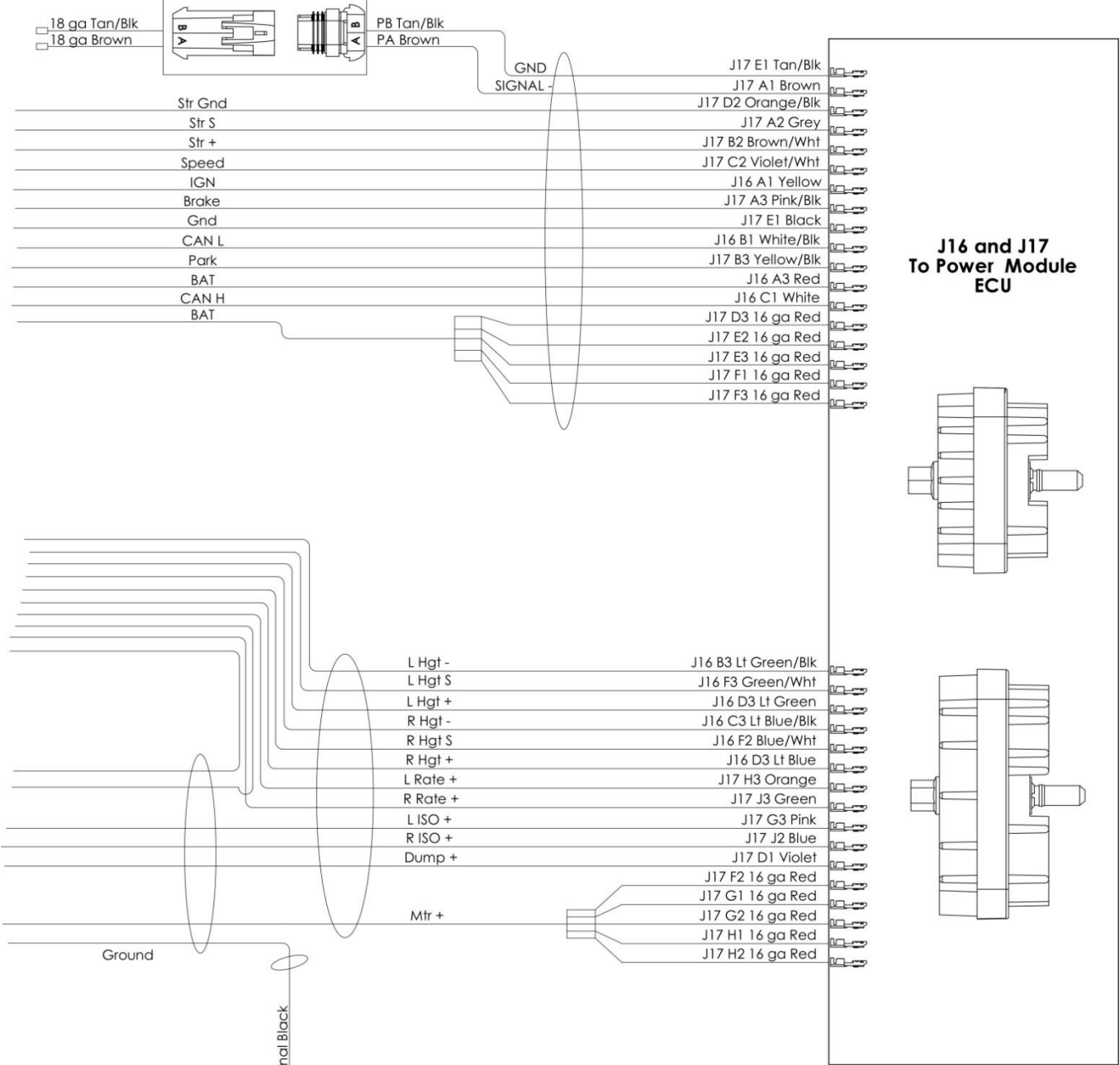
# Appendix A: Electrical Schematics



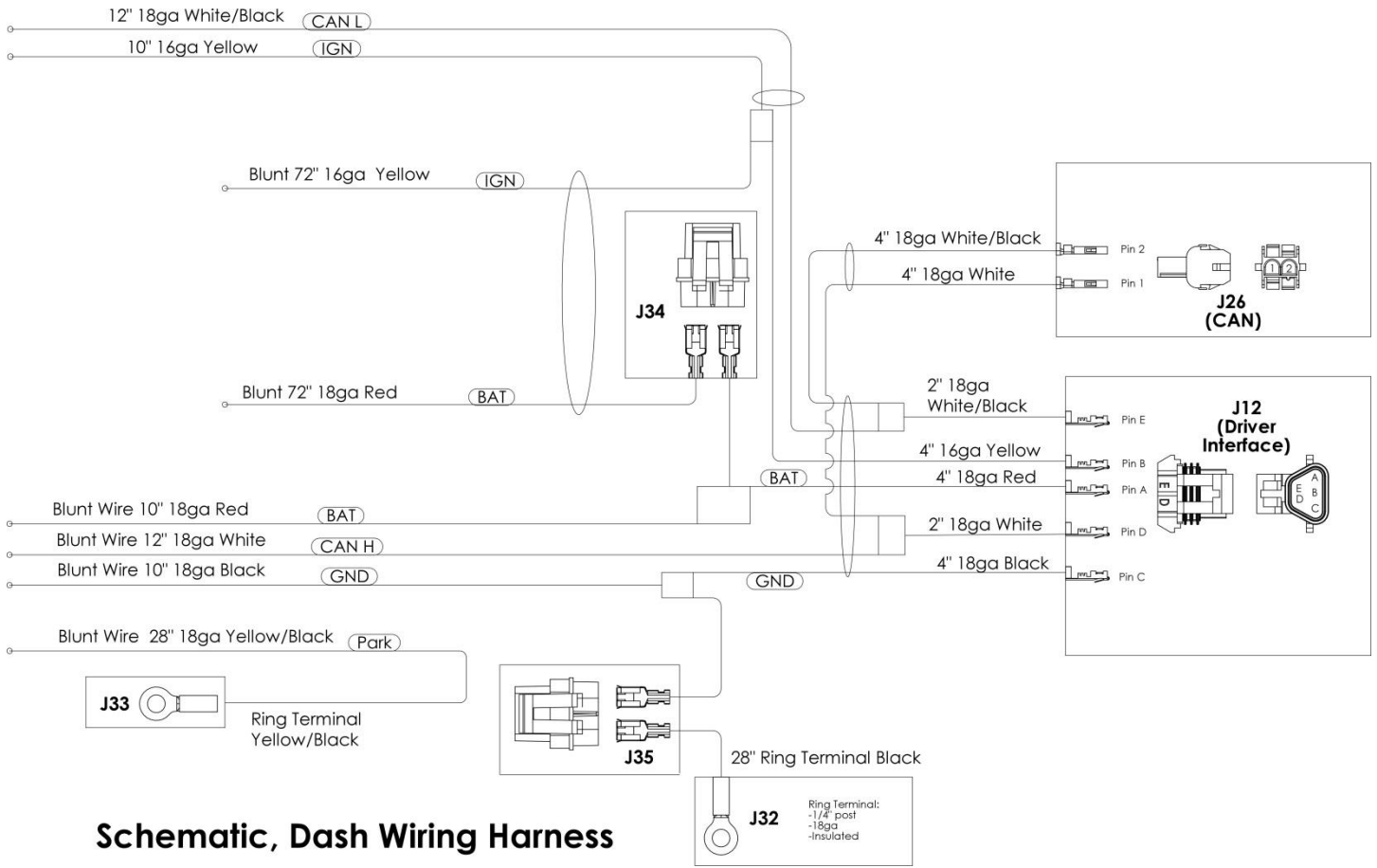
**Schematic, External Wiring Harness Part 1**

**J36  
To Door Switch  
(Customer Accessible  
Optional Feature)**

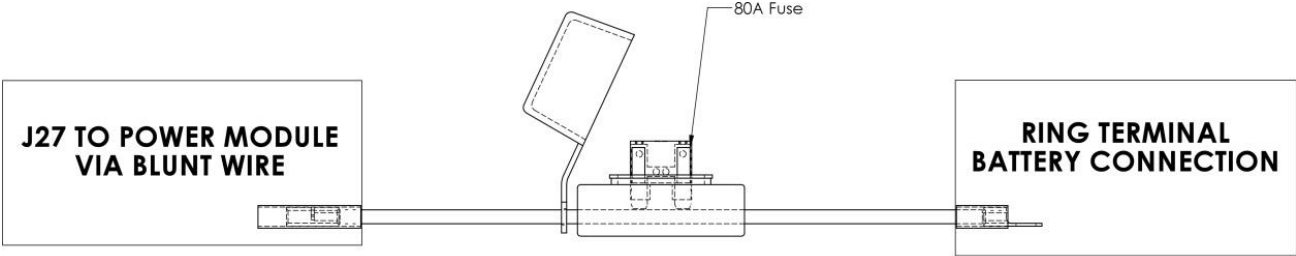
Note: Do not connect positive (12VDC) signal to either Tan/Blk or Brown wires.



## Schematic, External Wiring Harness Part 2



**Schematic, Dash Wiring Harness**



**Schematic, Battery Fuse Lead**



**LiquidSpring™ LLC**

4899 E 400 S  
Lafayette, IN 47905

Phone: 765-474-7816

Fax: 765-474-7826

Web: [www.liquidspring.com](http://www.liquidspring.com)

Information contained in this publication is subject to change without notice or liability. LiquidSpring LLC reserves the right to revise the information presented or discontinue the production of parts described at any time.



# CLASS<sup>®</sup> Product Limited Warranty

**LIQUIDSPRING™ LLC**  
4899 E 400 S  
LAFAYETTE, IN 47905  
PH: 765-474-7816, FAX: 765-474-7826  
[WWW.LIQUIDSPRING.COM](http://WWW.LIQUIDSPRING.COM)

## Warranty Conditions

LiquidSpring LLC warrants that all **CLASS<sup>®</sup>** products shall be free of defects in material and workmanship provided the product has been \*properly assembled, \*installed by a designated/qualified installer, properly maintained, serviced, and \*used normally for the given application and within the rated capacities. The end user is responsible for operating, inspecting, and maintaining the product according to applicable product and vehicle owner's manuals and for instructing all operators and maintenance personnel on proper use and maintenance.

## Coverage

The starting date for warranty coverage will be the earlier date of the date purchased by the first end user or when the vehicle is put into service and ends when the time is reached in the warranty coverage period below. Proof of such date is the responsibility of the first end user. If the starting date cannot be satisfactorily determined, then the date of product manufacture based on the product serial number shall be used as the effective starting date.

### Main Structural Components - 48 Months or 100,000 miles whichever occurs first.

Major structural components are defined as frame hangers, control arms, axle clamp group, transverse torque arm, axle and frame mounts, and secondary volumes. All wear items such as bushings and strut seals are excluded.

### Other Components – 36 Months or 50,000 miles whichever occurs first.

Other components include all power module components, electrical components, wire harnesses, valves, hydraulic lines, and wear items such as bushings and strut seals.

### Labor – 12 Months – See Coverage Statement Above.

Estimated labor time and cost must be pre-approved prior to conducting warranty repair work for reimbursement consideration.

## Claims

1. Review warranty conditions and coverage to determine if component is warrantable.
2. Locate product Serial number, Warranty starting date (see Coverage above), Mileage, vehicle manufacturer and VIN.
3. Contact LiquidSpring LLC to address claim.

Components must be returned to LiquidSpring LLC **Prepaid** and identified with a LiquidSpring LLC issued Returned Goods Authorization Number (RGA#) to qualify for reimbursement by LiquidSpring LLC. LiquidSpring LLC must authorize all warranty repairs at a cost determined and approved by LiquidSpring LLC **before any repairs are started**.

**Warranty Contact:** (765) 474-7816 (Option #1)  
Service@liquidspring.com

## Limitations and Exclusions

The liability of LiquidSpring LLC under this limited warranty is solely limited to the repair or replacement of defective material and workmanship by an authorized party. LiquidSpring LLC shall not be liable for use of non-LiquidSpring LLC components or for repairs performed by unauthorized parties. This warranty does not include any expense of or related to transportation of parts outside the Continental United States or compensation for inconvenience or loss of use while the product is being repaired. LiquidSpring LLC shall not be liable for any expense, loss, or damage (direct, incidental, consequential or exemplary – including, but not limited to towing expenses, travel expenses, vehicle rental, downtime expenses, incidental charges or any other losses arising in connection with the sale, use or inability to use the product) resulting from the warranty-covered component found to be defective.

No expressed warranty is given by LiquidSpring LLC with respect to its product except at specifically set forth herein. Any warranty implied by law, including any warranty of merchantability or fitness for particular purpose, is limited to the expressed warranty term provided in the warranty coverage. The expressed warranty does not apply in the event of: use of non-LiquidSpring LLC replacement components; improper installation, maintenance or repair; misuse, negligence, or abuse including but not limited to overloading, unauthorized alterations or modifications.



# CLASS<sup>®</sup> Product Limited Warranty

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[WWW.LIQUIDSPRING.COM](http://WWW.LIQUIDSPRING.COM)

## Warranty Labor Coverage

COMPONENT	ALLOWABLE LABOR HOURS (*)
Strut (each)	0.75
Wiring Harness (Rear Main)	3.00
Power Module	1.00
Pressure Relief Valve/ Isolation Valve	0.50**
ECU (External)	0.50
Hose Replacement (each)	0.75
Height Sensor	0.50
Steering Sensor	0.75
Rate Valve	0.50
Track Rod	1.50
One Control Arm	1.50
Pair of Control Arms	2.00
12V Motor	1.00
General Diagnostics	Contact Customer Service

(FOR ANY COMPONENT(S) NOT LISTED ABOVE, THE ALLOWABLE LABOR HOURS MUST BE APPROVED BY LIQUIDSPRING LLC. PRIOR TO THE WORK BEING PREFORMED.)

\*LABOR HOURS BASED ON \$85.00 PER HOUR.

\*LABOR FOR DIAGNOSIS WILL NOT BE COVERED WITHOUT PRIOR CONSENT FROM LIQUIDSPRING LLC.

\*\*0.50hr. FOR FIRST VALVE REMOVAL 0.25hr. FOR EACH ADDITIONAL

### Obtaining Warranty Parts

1. Obtain **LiquidSpring LLC** suspension serial number  
(Located on driver's side front hanger see Operator's Manual for details)
2. Obtain mileage of suspension
3. Obtain In-service date of suspension
4. Give a detailed description of the problem

### Contact LiquidSpring LLC

Customer Service Dept. -- Phone: 765-474-7816 Email: [Service@liquidspring.com](mailto:Service@liquidspring.com)



## Installation Check List

Installer:		Installation Date:	
Inspector:		Inspection Date:	
Suspension S/N:		VIN:	

### FRAME PREPARATION:

- Battery Disconnected
- Upper Strut Mount and Track Rod Frame Mount drilled or reamed out.

### FRONT HANGER INSTALLATION:

- 1/2"-13 Nuts torqued to **86-105 ft-lbs.**

### AXLE CLAMP INSTALLATION:

- 5/8"-18 U-Bolts torqued in stages up to **175-200 ft-lbs.**

### CONTROL ARMS INSTALLATION:

- Lower Control Arms correctly orientated.
- 1"-8 Nuts torqued to **600 ft-lbs**, at ride height.
- 5/8"-11 Nuts torqued to **172-210 ft-lbs**, at ride height.

### TRACK ROD/TRACK ROD BRIDGE/TRACK ROD FRAM MOUNT INSTALLATION:

- 1/2"-13 Nuts (Bridge Orientation) torqued to **86-105 ft-lbs.**
- 5/8"-11 Nuts torqued to **175-200 ft-lbs.**
- M10 Nuts torqued to **43-53 ft-lbs.**
- 1/2"-20 U-Bolts torqued to **65 ft-lbs.**
- Driver Side Parking Brake routed under bridge.
- Clamp 5/16"-18 nuts torqued to **20-24 ft-lbs.**
- OEM ABS wires securely attached (2018 and later).

### UPPER STRUT MOUNT/CROSS MEMBER REINFORCEMENT:

- Cross member Reinforcement installed on the rear side of the upper strut mount.
- Bolts point outboard, away from fuel tank.
- 1/2"-13 Nuts torqued to **85-105 ft-lbs.**

### STRUT INSTALLATION:

- Bearing spacers inserted.
- 1"-8 Nuts torqued to **250 ft-lbs.**

### SECONDARY VOLUME INSTALLATION:

- 3/8"-16 nuts torqued to **35-43 ft-lbs.**
- 5/16"-24 T-bolt clamps torqued to **240 in-lbs.**

### POWER MODULE INSTALLATION:

- 3/8"-16 serrated screws torqued to **39 ft-lbs.**
- #10-16 screw to reservoir **snug only.**
- 3/8"-16 nuts torqued to **35-43 ft-lbs.** [DS96GM2-AR/ARC]
- M10-1.5 Nuts torqued to **43-53 ft-lbs.** [DS96GM2-AM/AMC]
- Replaced top plug with Breather Cap.

**HOSE INSTALLATION:**

- 4 Hose fittings torqued to **12 ft-lbs.**
- 10 Hose fittings torqued to **36-63 ft-lbs.**
- Bleed screws closed and torqued to **13-18 ft-lbs.**
- Hoses secured with standoffs and/or clamps.

**CHASSIS ASSEMBLY INSTALLATION:**

- Spacer for fuel line on driver side installed and torqued to **14-17 ft-lbs.**
- Parking brake cable re-routed and secured.
- Parking brake cable does not touch tire or strut during full travel.

**HEIGHT SENSOR INSTALLATION:**

- 5/16"-18 Nuts torqued to **14-17 ft-lbs.**
- Locking Clips installed.

**STEERING SENSOR INSTALLATION:**

- Steering Sensor Bracket attached to Gearbox. U-bolt torqued to **60-85 in-lbs.**
- Steering Sensor Linkage Bracket attached to Pitman Arm. U-bolt torqued to **60-85 in-lbs.**
- Steering Sensor installed. 5/16"-18 Nuts torqued to **14-17 ft-lbs.**
- Locking Clips installed.

**WIRING HARNESS INSTALLATION:**

- Dash harness installed.
- All appropriate wiring splices between external harness and dash harness made.
- External harness routed and secured.
- External harness connected to Rate Valves and Height Sensors.
- External harness connected to Steering Sensor.
- Dash harness Ignition Wire (Yellow) spliced to OEM Brown wire under seat.
- Dash harness Battery Wire (Red) spliced to OEM Red/White wire under seat.
- Dash harness Ground Wires (Black) and Park Wire (Yellow/Black) secured to ground stud.
- External harness Speed wire (Purple/White) spliced to OEM Yellow/Black wire at ABS actuator.
- External harness Brake wire (Pink/Black) spliced to OEM Light Blue wire.
- Driver Interface installed and connected to Dash Harness.
- Battery harness with Fuse Lead connected to Battery and External Harness.
- Door harness installed (if equipped with rear door switch).
- All connector locks secured.
- All connections sealed.
- All harnesses properly secured from chaffing, heat, and located away from moving parts..

**INITIAL FILL/CALIBRATION:**

- Battery connected.
- Suspension rose to ride height.
- Reservoir at proper level.
- Calibration completed.