



# Spartan Fire, LLC

Campaign Service Bulletin  
CSB23-260-003

**DATE:** 5/10/2023

**APPLIES TO:** This service bulletin applies to a 2021 model year, Metro Star model Emergency Response chassis cab built in February 2022.

**CONDITION:** Changes based on new product testing to improve steering geometry and reliability.

**CORRECTION:** Replace steering assist cylinder bracket, officer side steering arm, assist cylinder steering hose, install frame rail reinforcement, and relocate air dryer and governor.

**LABOR ALLOCATION:** 18 hours

**CLASSIFICATION:** V3

**PARTS NEEDED:**

## Steering Upgrade Parts

| <u>QTY</u> | <u>Part Number</u> | <u>Description</u>                  |
|------------|--------------------|-------------------------------------|
| 1          | 0346-BB1-001       | Zerk ¼ -28 SAE Grease Fitting       |
| 1          | 06W-06JA06JB108    | Hose Asm 06-387TC/ST90/108"         |
| 1          | 079685-003         | Steer Arm, Right Hand               |
| 2          | 125X350CP          | Cotter Pin – 1/8 X3.50              |
| 2          | 22962-051          | 1" Flat Washer                      |
| 2          | 30550-027          | 1" – 14 UNF X 3 ½" Hex Bolt         |
| 1          | 3161-KK1-001       | BRKT, Assist Cyl MTG                |
| 3          | 10180200FH8Y       | Bolt- 5/8 – 18 X 2.00LG FLG GR8 YEL |
| 1          | 10180250FH8Y       | Bolt- 5/8 – 18 X 2.50LG FLG GR8 YEL |
| 4          | 1018FLN8Y          | Nut – 5/8-18 FLG LK GR8 YEL         |

*Reference Kit: S-3779-001*

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## Frame Reinforcement Parts

| <u>QTY</u> | <u>Part Number</u> | <u>Description</u>                    |
|------------|--------------------|---------------------------------------|
| 1          | 7386-CC1-002       | Reinf. Frame, L9, RH                  |
| 1          | 08130175FH8ZF      | Bolt Hex FLG ½-13 x1.75 Grade 8 ZN    |
| 8          | 08130200FH8ZF      | Bolt Hex FLG ½ -13 X 2.00 Grade 8 ZN  |
| 1          | 08130225FH8ZF      | Bolt Hex FLG ½ -13 X 2.00 Grade 8 ZN  |
| 10         | 0813FLN8ZF         | Nut FLG Lock ½-13 Grade G ZN          |
| 3          | 10110200FH8ZF      | Bolt Hex FLG 5/8-11 X 2.00 Grade 8 ZN |
| 4          | 10110275FH8Y       | Bolt 5/8-11 X 2.75 LG Flg GR8 Yel     |
| 4          | 1011FLN8Y          | Nut 5/8-11 FLG LK GR8 Yel             |
| 3          | 1011FLN8ZF         | Nut FLG Lock 5/8-11 Grade G ZN        |

Reference Kit: S-3768-003

## Air Dryer Relocation Parts

| <u>QTY</u> | <u>Part Number</u> | <u>Description</u>                       |
|------------|--------------------|------------------------------------------|
| 1          | 0639-MM5-015       | Hose ASM-Compr Disch 0.50" ID 136.00" LG |
| 1          | 3405-MM5-002       | BRKT-AIR DRYER UPR, HDG                  |
| 1          | 3406-MM5-002       | BRKT-AIR DRYER LWR                       |
| 3          | S332SSG10          | UMPCO CLAMP – 5/8"                       |
| 3          | 08130100FH8ZF      | BOLT HEX FLG ½-13 X 1.00 GRADE 8 ZN FLM  |
| 2          | 08130125FH8ZF      | BOLT HEX FLG ½-13 X 1.25 GRADE 8 ZN FLM  |
| 2          | 08130150FH8ZF      | BOLT HEX FLG ½-13 X 1.50 GRADE 8 ZN FLM  |
| 2          | 08130200FH8ZF      | BOLT HEX FLG ½-13 X 2.00 GRADE 8 ZN FLM  |
| 6          | 0813FLN8ZF         | NUT FLG LOCK ½ -13 GRADE G ZN FLM        |

## Air Governor Relocation Parts

| <u>QTY</u> | <u>Part Number</u> | <u>Description</u>                 |
|------------|--------------------|------------------------------------|
| 11 ft      | 0724-MM5-G01       | Hose 266 SAE J1402 – 4 T/C 410 S/S |
| 1 ft       | 2517-MM5-003       | ¼ " Nylon Tube – Green             |
| 2          | 05180325H5Z        | Bolt-5/16-18 Lock Zinc             |
| 2          | 0518LN5Z           | Nut – 5/16 – 18 Lock Zinc          |
| 4          | 05FWSAEZ           | WASHER-5/16 FLAT SAE ZINC          |

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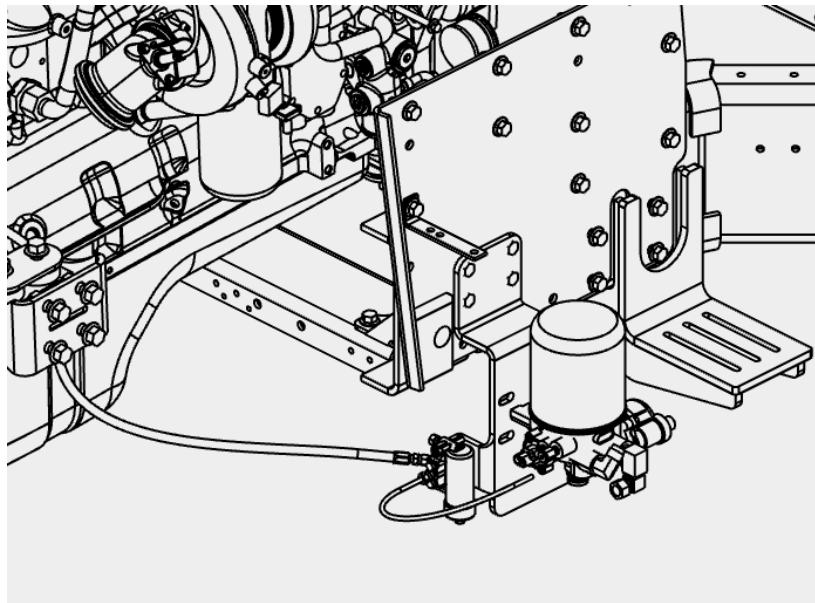
## GENERAL INSTRUCTIONS:

Thoroughly review entire service bulletin before starting work. If there are questions or concerns with steps defined in this service bulletin, contact Spartan Fire, LLC. Customer & Product Support Group.

All applicable industry safety standards must be followed when performing work identified in this procedure.

## STEP-BY-STEP INSTRUCTIONS

- 1) Remove air dryer and bracket from right side frame rail. *See Figure 3.1.*
  - a. Locate the air dryer on right side frame rail in front of the steer tire.
  - b. Remove air lines and electrical connections.
  - c. Remove air governor from bracket.
  - d. Remove air dryer from bracket.
  - e. Remove air dryer bracket from frame and discard bracket.

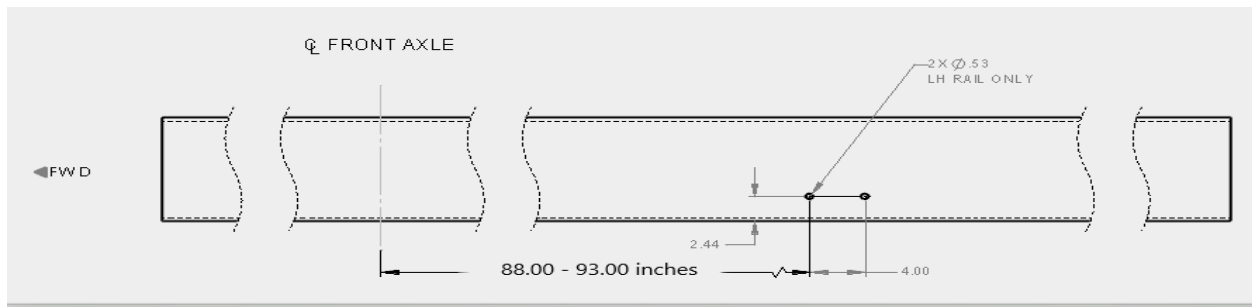


**Figure 3.1**

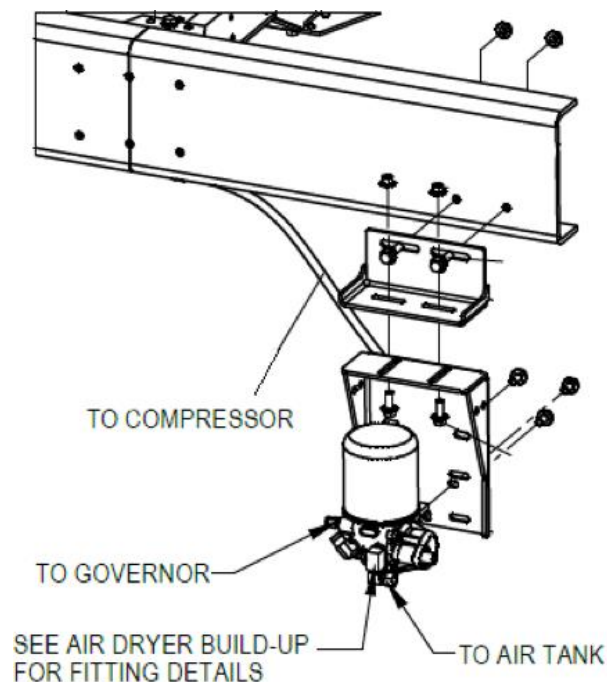
- 2) Install air dryer and governor on left side frame rail. *(See Figure 4.2)*
  - a. Drill two holes as shown in Figure 4.1. The recommendation is to locate the holes 88 -93 inches from the centerline of the front axle to the forward most

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- hole, but ultimately the new brackets and air dryer should be used as a template to mark the holes to ensure proper clearance with other items in the region.
- Mount new upper air dryer bracket (3405-MM5-002) to left side frame.
  - Fasten lower air dryer bracket (3406-MM5-002) to the upper bracket.
  - Mount air dryer to left side brackets.
  - Torque all ½ inch fasteners to 75 ft. lbs



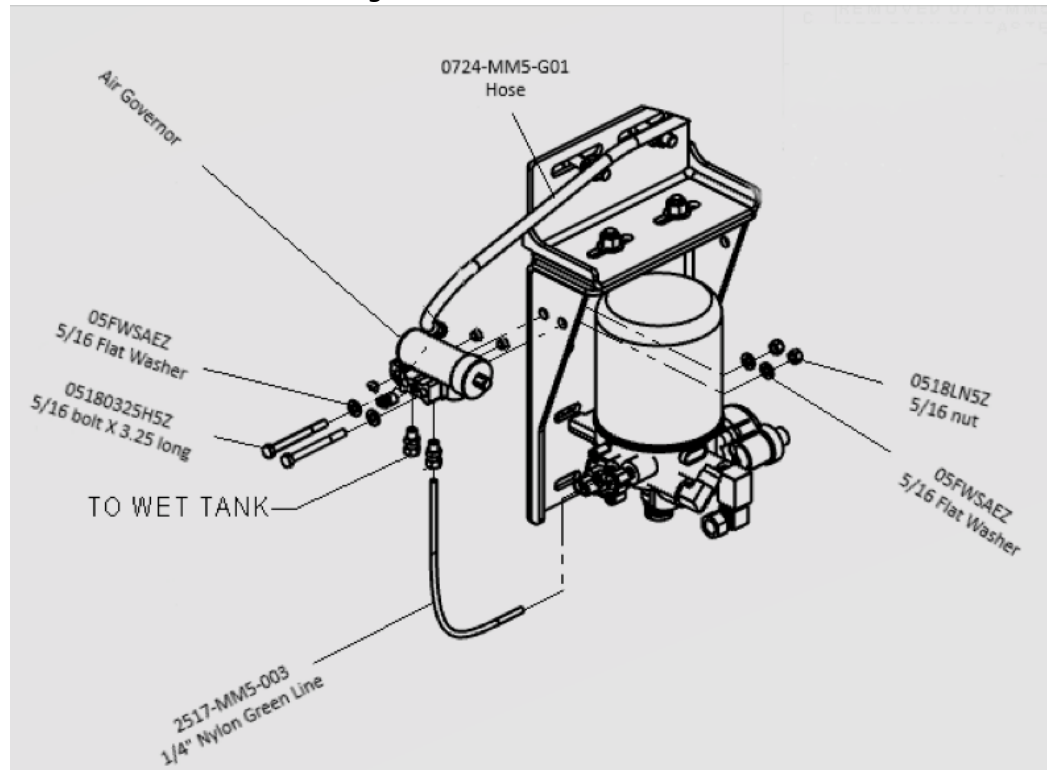
**Figure 4.1**



**Figure 4.2**

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- f. Take the air governor that was removed in step 1c and install it on the new driver's side bracket. See Figure 5.1

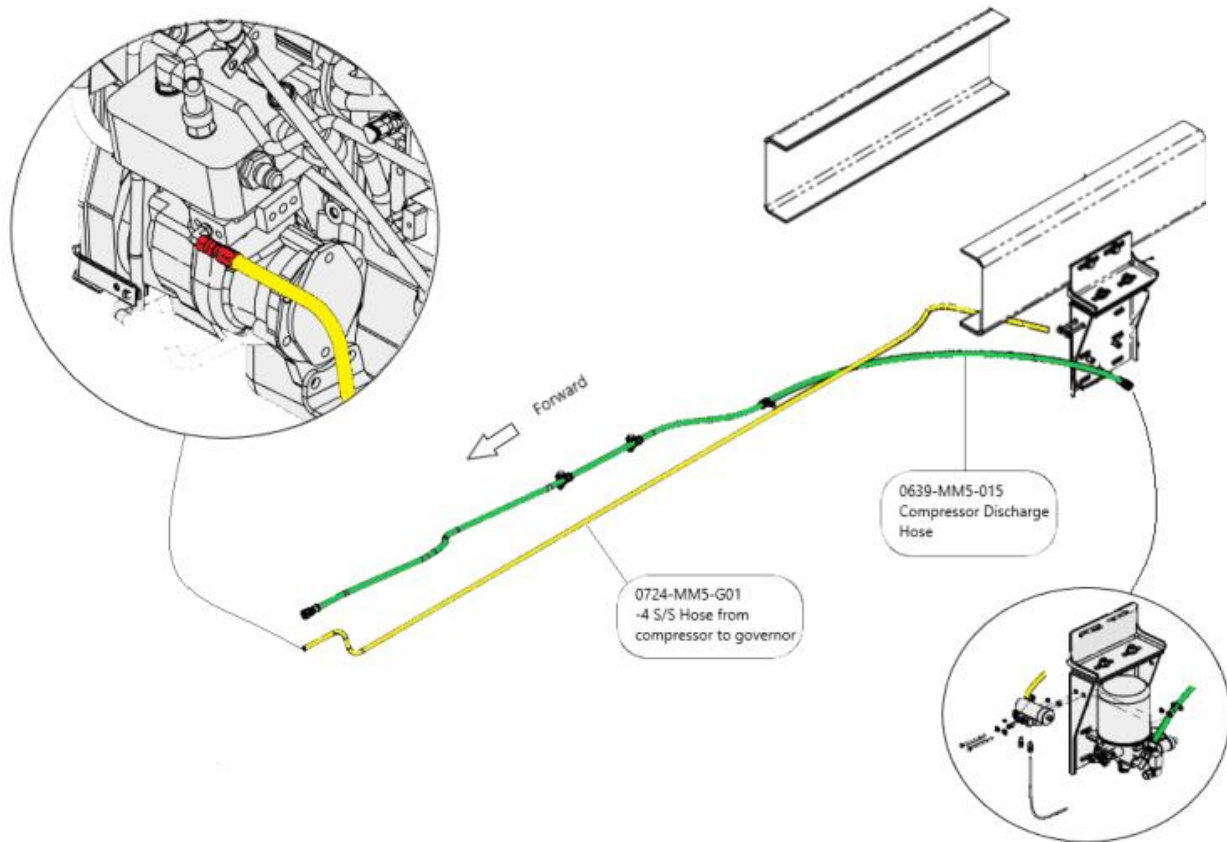


**Figure 5.1**

- a. Reroute electrical connector from right side frame rail location to left side frame location.
- b. Reconnect electrical connector to air dryer now located on the left side frame rail.
- c. Install new compressor discharge line (pn 0639-MM5-015) and governor line (pn 0724-MM5-G01).
- d. Ensure compressor discharge line is routed clear of all hoses, harnesses, etc. to prevent chafing.
- e. The compressor discharge line must be mounted on a downward slope from the compressor to the dryer.

See Figure 6.1

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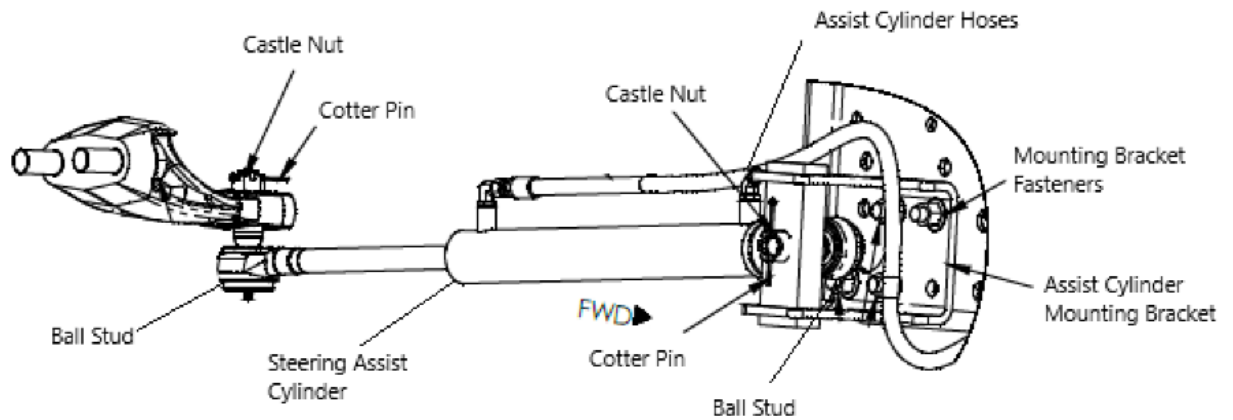


**Figure 6.1**

- 3) Remove steering assist cylinder and mounting bracket.
  - a. Remove assist cylinder hydraulic hoses. Label hose ends for proper reinstallation.
  - b. Remove cotter pins from each assist cylinder stud.
  - c. Loosen the castle nuts 4-5 turns.
  - d. Use appropriate puller tool to unseat the ball stud from the mount.
  - e. Once loosened from the mount, completely remove the castle nuts.
  - f. Remove the assist cylinder.
  - g. Remove the steering assist cylinder mounting bracket fasteners.
  - h. Discard steering assist cylinder mounting bracket.

*(See Figure 7.1)*

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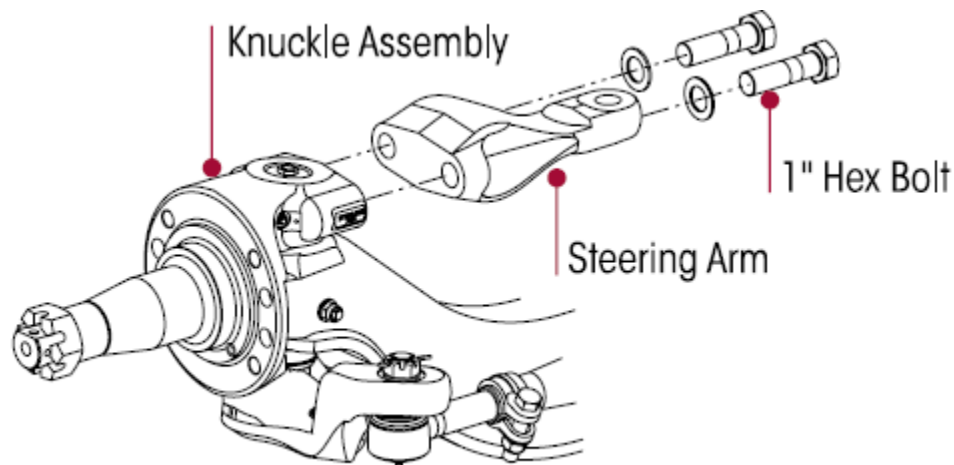


**Figure 7.1**

#### 4) Disassemble Steering Arm

- a. Remove the two steering arm to knuckle hex bolts that hold the steering arm to the knuckle.
- b. Remove the steering arm from the knuckle. Gently tap the outside of the steering arm with a leather or plastic mallet if steering arm does not separate by hand.

(See Figure 7.2)



**Figure 7.2**

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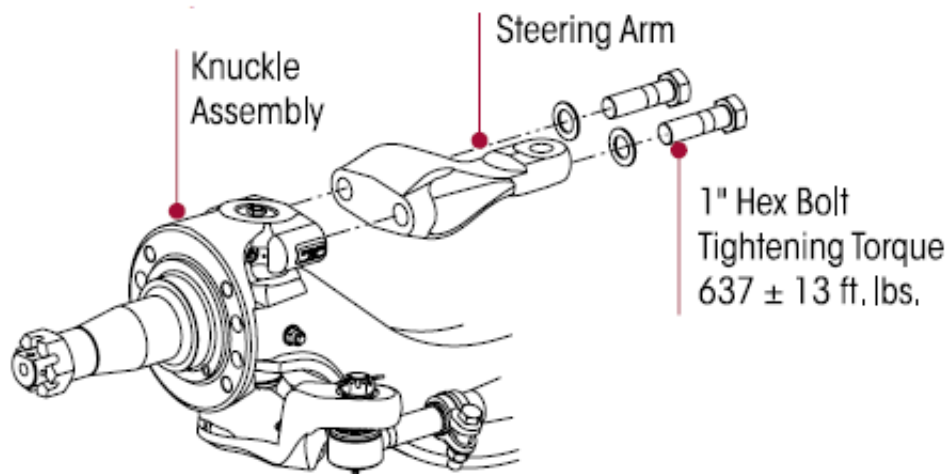
## 5) Reassemble Steering Arm

### **WARNING**

TAKE CARE WHEN YOU USE LOCTITE ADHESIVE TO AVOID SERIOUS PERSONAL INJURY. READ THE MANUFACTURER'S INSTRUCTIONS BEFORE USING THIS PRODUCT. FOLLOW THE INSTRUCTIONS CAREFULLY TO PREVENT IRRITATION TO THE EYES AND SKIN. IF LOCTITE ADHESIVE MATERIAL GETS INTO YOUR EYES, FOLLOW THE MANUFACTURER'S EMERGENCY PROCEDURES. HAVE YOUR EYES CHECKED BY A PHYSICIAN AS SOON AS POSSIBLE. |

- a. Use a tap to remove old thread-locker compound from the internal threads in the steering knuckle.
- b. Use new steering arm hex bolts (pn: 30550-027) and new washers (pn: 22962-051). Coat at least half of the thread area with Loctite 680 adhesive.
- c. Insert the hex bolts through the new steering arm. Hand start the bolts into the knuckle assembly.
- d. Tighten the steering arm hex bolts to  $637 \pm 13$  foot pounds torque.

(See Figure 8.1)

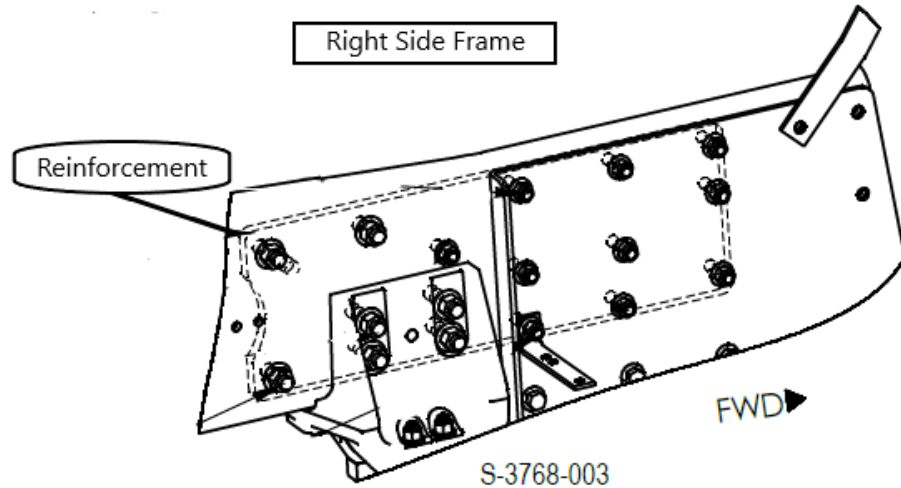


**Figure 8.1**

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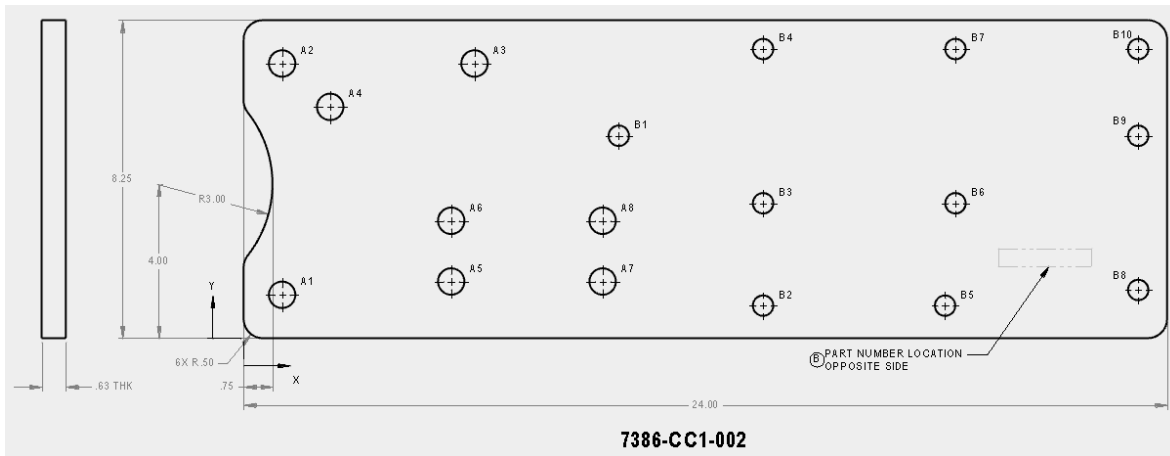


- 6) Install right side frame rail reinforcement.
  - a. Support front engine crossmember and splay rail.
  - b. Remove the fasteners shown in Figure 9.1 in preparation for the installation of the reinforcement.



**Figure 9.1**

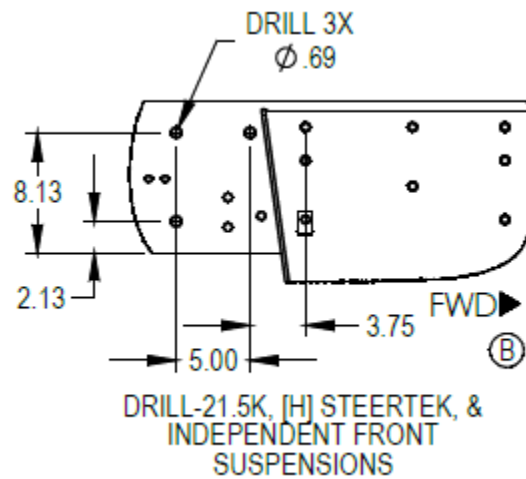
- c. Verify reinforcement plate is correct part number (7386-CC1-002) before installation. (See part number location in Figure 9.2)



**Figure 9.2**

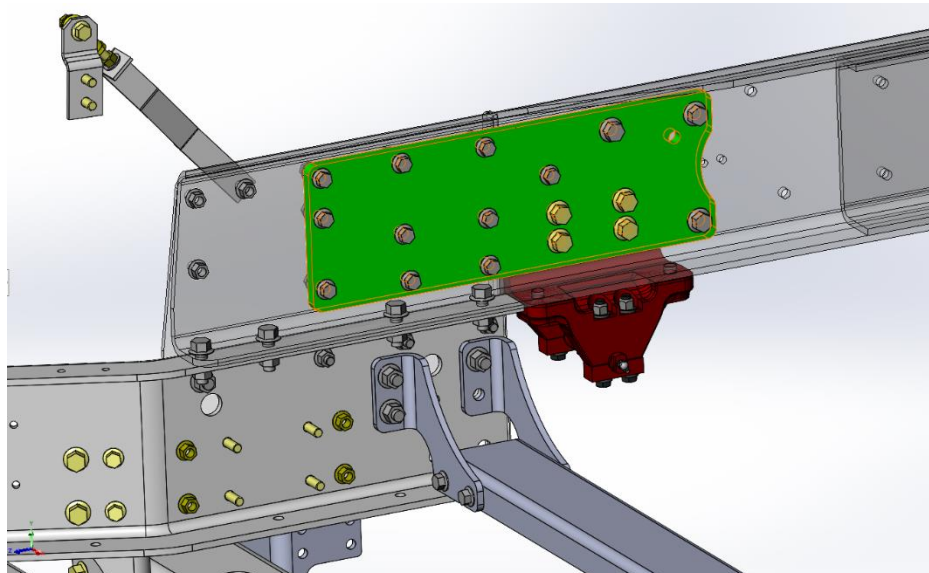
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- d. Prepare frame rail for reinforcement by drilling three holes indicated in figure 10.1



**Figure 10.1**

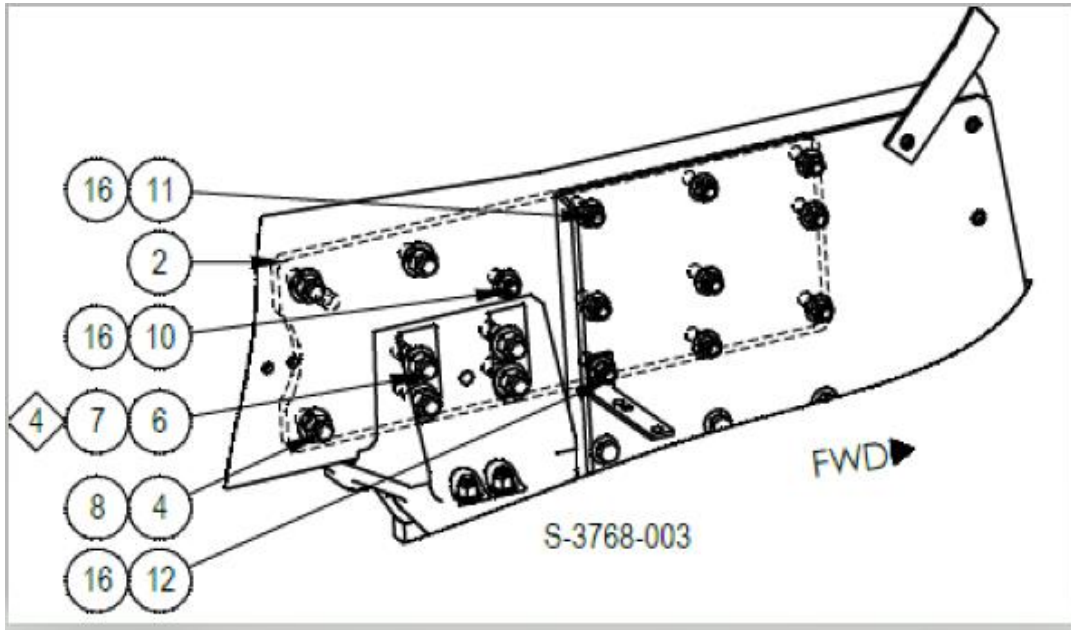
- e. Install reinforcement inside inner frame rail as shown in Figure 10.2



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**Figure 10.2**

- f. Install fasteners with nuts on the outside of frame rail (see Figure 11.1) and torque nut side to torque spec listed in table 11.2.



**Figure 11.1**

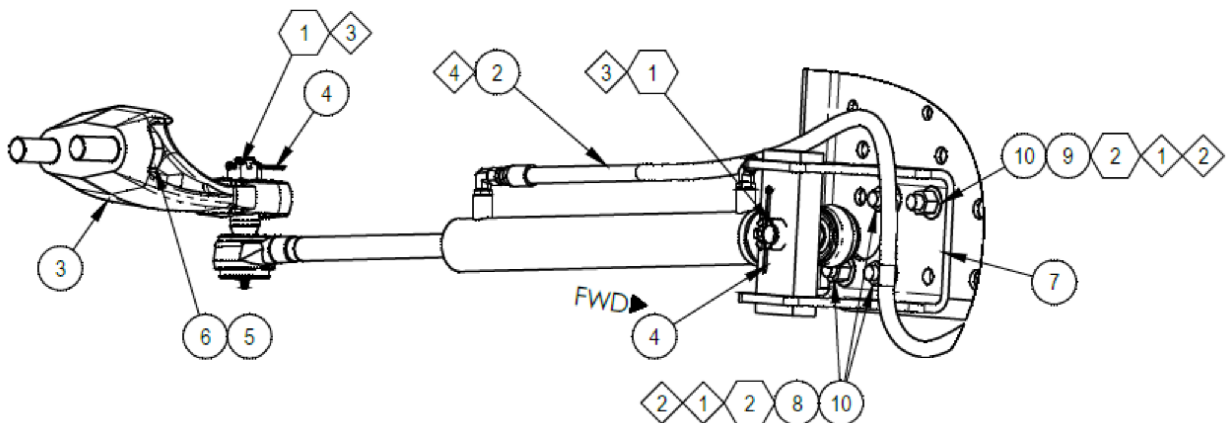
| Item | Part Number   | Description                               | S-3768-003<br>QTY | Torque Spec<br>(Nut Side) |
|------|---------------|-------------------------------------------|-------------------|---------------------------|
| 2    | 7386-CC1-002  | Reinf, Frame, L9,RH,Steertek              | 1                 |                           |
| 4    | 10110200FH8ZF | Bolt Hex FLG 5/8-11 X 2.00 Grade 8 ZN FLM | 3                 |                           |
| 6    | 10110275FH8Y  | Bolt Hex FLG 5/8-11 X 2.75 Grade 8 ZN FLM | 4                 |                           |
| 7    | 1011FLN8Y     | Nut- 5/8-11 FLG LK GR8 Yel                | 4                 | 178 ft. lbs               |
| 8    | 1011FLN8ZF    | Nut FLG Lock 5/8-11 Grade G ZN FLN        | 3                 |                           |
| 10   | 08130175FH8ZF | Bolt Hex FLG 1/2-13 X 1.75 Grade 8 ZN FLN | 1                 |                           |
| 11   | 08130200FH8ZF | Bolt Hex FLG 1/2-13 X 2.00 Grade 8 ZN FLN | 8                 |                           |
| 12   | 08130225FH8ZF | Bolt Hex FLG 1/2-13 X 2.25 Grade 8 ZN FLN | 1                 |                           |
| 16   | 0813FLN8ZF    | Nut FLG Lock 1/2-13 Grade G ZN FILM       | 10                | 75 ft. lbs                |

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**Table 11.2**

7) Reinstall assist cylinder and new bracket. (See Figure 12.1)

- a. Install new steering assist cylinder bracket part number 3161-KK1-001 (Item 7) using new bolts (item 8-9) and new nuts (item 10). Install bolts hand tight. Do not torque until after the steering assist cylinder is installed.  
*Note: Bolt item 9 is longer and must be installed in the location noted in Figure 12.1.*
- b. Install 90° grease zerk (0346-BB1-001) into frame mounted end of assist cylinder, oriented as shown in Figure 6.2. Reinstall steering assist cylinder ball studs into new mounting bracket and steering arm. Install castle nuts snug.
- c. Torque each castle nut to 145 ft lbs. If castle nut slot does not align with the cotter pin hole in the ball stud initially, tighten nut slightly to align the slot with the hole. **Do not loosen to align the slot to the hole.**
- d. Install cotter pins through castle nut and ball stud and bend cotter pins over.
- e. Torque the new 5/8" diameter bolts in new steering assist cylinder bracket to 201 ft lbs.  
*See Figure 12.1 and Table 13.1*



**Figure 12.1**

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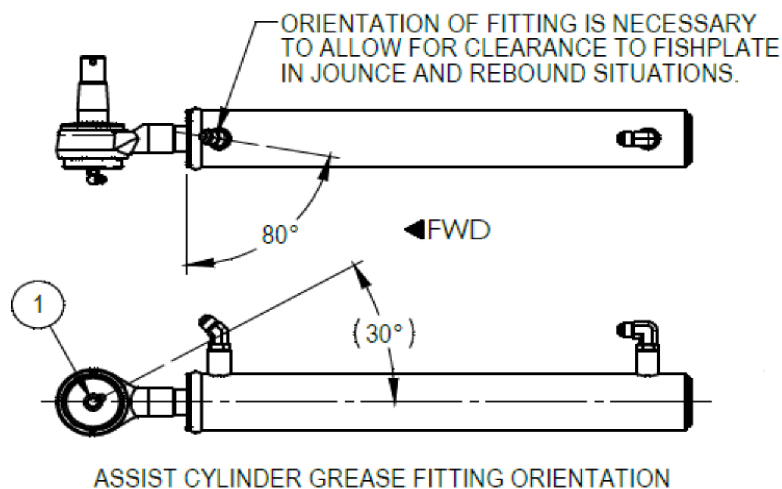
|                                                                                                                          |           |            |            |
|--------------------------------------------------------------------------------------------------------------------------|-----------|------------|------------|
| 1 DO NOT REUSE FASTENERS. THEY ARE TORQUED TO 90% PROOF.                                                                 |           |            |            |
| 2 ASSIST CYLINDER NEEDS TO BE INSTALLED BEFORE BRACKET IS TORQUED.                                                       |           |            |            |
| 3 CONTINUE TIGHTENING, DO NOT BACK OFF, TO ALIGN THE NUT SLOT WITH THE COTTER HOLE TO PERMIT ASSEMBLY OF THE COTTER PIN. |           |            |            |
| 4 REFER TO SPARTAN P/N 0208-BB1 FOR ALL FITTING INSTALLATION SPECIFICATIONS.                                             |           |            |            |
| 1                                                                                                                        | TORQUE    | RANGE (OZ) | DRIVE SIDE |
|                                                                                                                          | 145 LB-FT | 120-170    | NUT        |
| 2                                                                                                                        | TORQUE    | RANGE (OZ) | DRIVE SIDE |
|                                                                                                                          | 201 LB-FT | 192-212    | NUT        |

| ITEM | PART NUMBER     | DESCRIPTION                                   | QTY |
|------|-----------------|-----------------------------------------------|-----|
| 1    | 0346-BB1-001    | ZERK-1/4-28 SAE GREASE FITTING                | 1   |
| 2    | 06W-06JA06JB108 | HOSE ASM 06-387TC/ST90/108" (2125-MM5)        | 1   |
| 3    | 079685-003      | STEER ARM, RIGHT HAND (REF AXLE 1173-DD1-002) | 1   |
| 4    | 125X350CP       | COTTER PIN-1/8 X 3.50                         | 2   |
| 5    | 22962-051       | 1" FLAT WASHER                                | 2   |
| 6    | 30550-027       | 1"-14 UNF X 3 1/2" HEX BOLT                   | 2   |
| 7    | 3161-KK1-001    | BRKT, ASSIST CYL MTG                          | 1   |
| 8    | 10180200FH8Y    | BOLT - 5/8-18 X 2.00LG FLG GR8 YEL            | 3   |
| 9    | 10180250FH8Y    | BOLT - 5/8-18 X 2.50LG FLG GR8 YEL            | 1   |
| 10   | 1018FLN8Y       | NUT - 5/8-18 FLG LK GR8 YEL                   | 4   |

**Table 13.1**

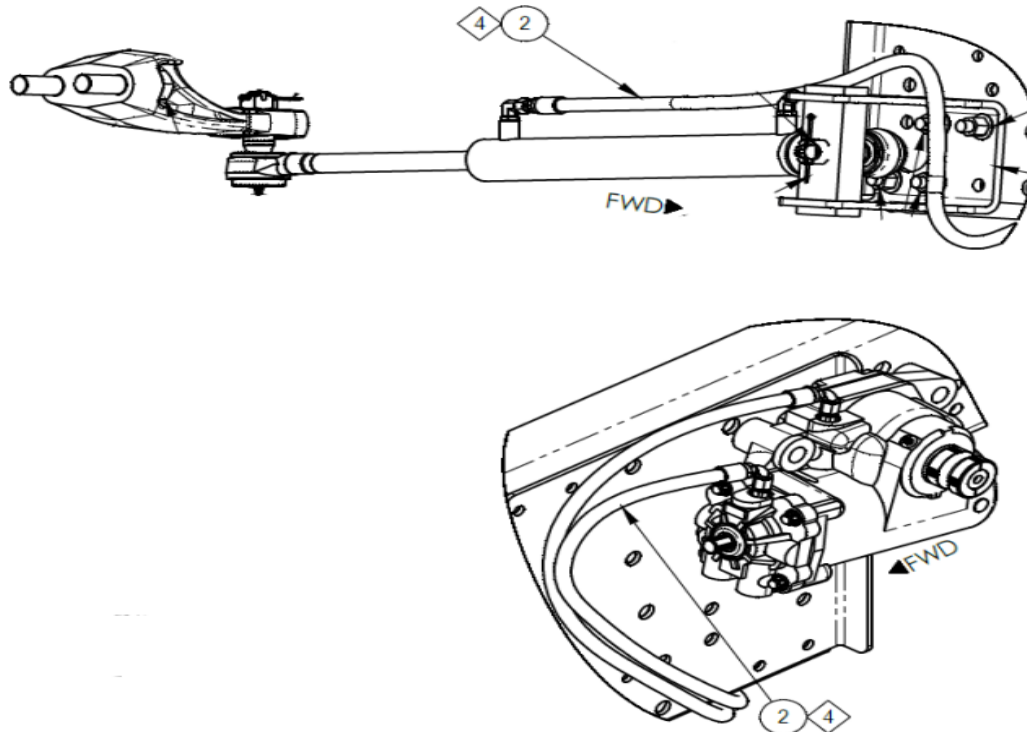
- f. Verify correct orientation of fittings on the assist cylinder before reconnecting hoses. See Figure 13.2



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**Figure 13.2**

- g. Reconnect hydraulic hoses to assist cylinder, noting proper port orientation per labels installed in step 3a. Replace hose plumbed to rear assist port with longer hose to improve routing (06W-06JA06JB108). Also, refer to *Figure 14.1* below for proper hose orientation.



**Figure 14.1**

## 8) Finalize Repair

- a. Fill power steering reservoir to the full mark with power steering fluid
- b. Start the engine and cycle the steering completely from one side to the other several times to purge any air that may have entered the assist cylinder hoses.
- c. After 9-10 cycles, check power-steering level and top off to full mark.

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