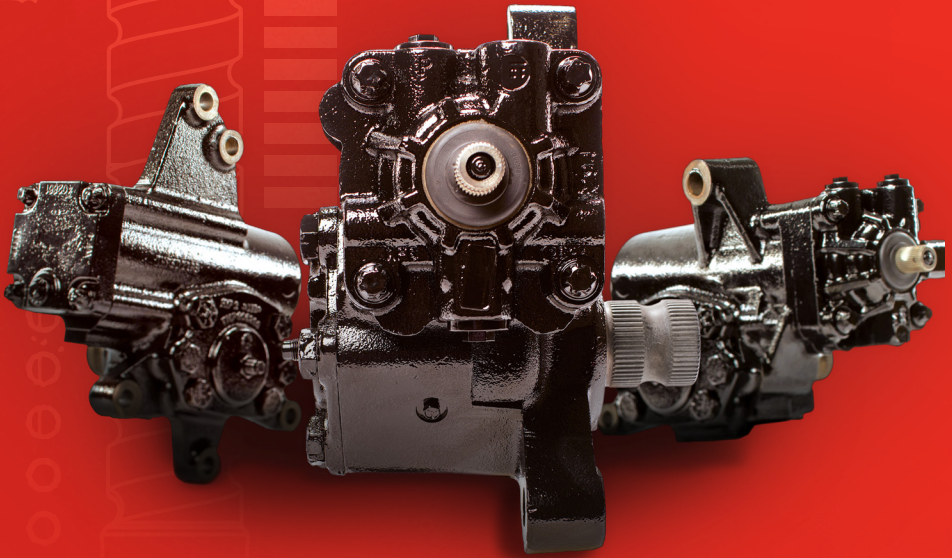




# ***Service Bulletin REM-019***

## ***Core Credit Guidelines and Remanufactured Gear Installation***



a brand of



**TRW**  
Commercial Steering Systems

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**Core Credit Guidelines and  
Remanufactured Gear Installation**

Feb 2020

**TRW Commercial Steering Systems**

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# Core Credit Guidelines

## 1. Drain the Core

With the gear placed over an appropriate oil collection container - rotate the input shaft full left and full right to purge the fluid from the gear.

## 2. Install Input Shaft Protector

Place the input shaft protector, from the replacement gear, on the steering gear core. If for some reason the cap protector from the new gear cannot be used, an alternative can be used such as a piece of hose, plastic tubing or cardboard tubing. Input shaft protectors are also available through your authorized TRW Distributor.

Part Number	Description
091713	1" Input Shaft Cover
087011	13/16" Input Shaft Cover

## 3. Install Port Plugs

The pressure inlet port, return port and all auxiliary ports should be capped with acceptable port plugs Fig. 2

<b>NOTE</b>	Port plugs ensure contamination and moisture are kept out of critical components during the return shipment. Port plugs that come with your new service or remanufactured gear can be used in your return core.
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### PORT PLUG Part Numbers (100pcs):

036137X1 3/4-16 thread  
036138X1 9/16-18 thread  
036280X1 M16X1.5  
036295X1 M18X1.5

## 4. Identify the Core

The TRW core group number will start with TAS or THP and be followed by six digits. The core group number is embossed on the side of the housing. Fig. 3

<b>NOTE</b>	The HF and HFB lines of steering gears are now obsolete. Cores from these gears will NOT be accepted for credit.
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## 5. Remove External Equipment

Deduction to remove external equipment is \$40 per item removed.

- Remove the pitman arm.
- Remove the universal joint.

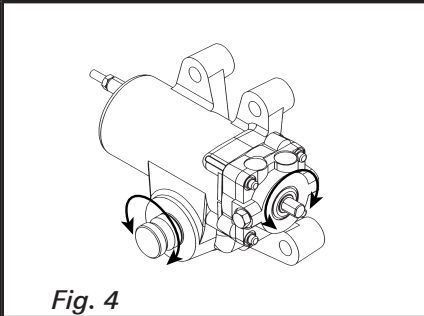
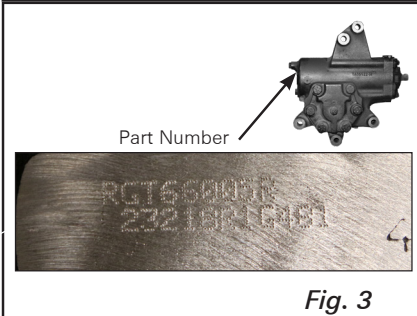
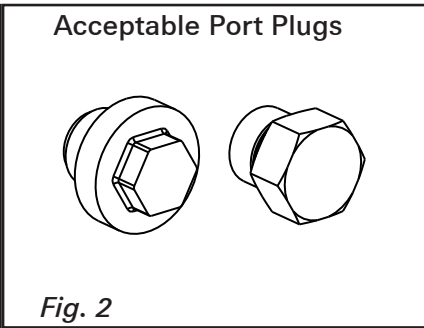
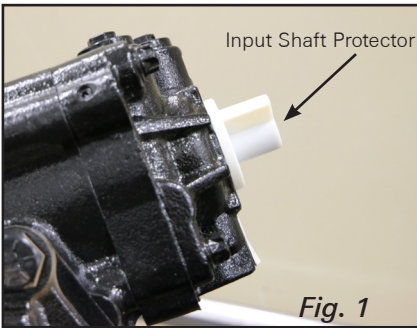
## 6. Check for Damage.

Damage deduction is \$200.

- The output shaft must rotate with the input shaft. Fig. 4

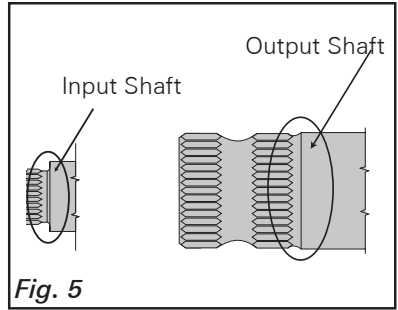
**Evaluation:** Place a 12 point socket with ratchet on the input shaft using the ratchet rotate the input shaft clockwise and counterclockwise, ensure that the output shaft rotates with input rotation.

<b>NOTE</b>	There is not a socket that will fit metric 1MM X 79 input shaft.
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# Deduction Guidelines

Infraction	Deduction
Pitman arm not removed	\$60
U-joint / Coupling not removed	\$60
Mounting bolt/bracket not removed	\$60
Input or Output Shaft will not Rotate	\$200
Input or Output Shaft Cracked or Twisted	\$400
Cracks, Holes and/or Torch/Weld Damage on Gear	\$200
Excessive Corrosion on Gear	\$80
Missing Inputs, Outputs, or Parts - more than 2 Bolts Missing on Gear	\$200
Missing Port Plugs Installed on Gear (Push-In Plugs not Acceptable)	\$70
Fittings Used Instead of Port Plugs	\$60
Gear Not Drained	\$60
Improper Packed Skid	\$100 per Skid
Poppet Bolt Missing	\$50
Input Shaft Protector Missing	\$60



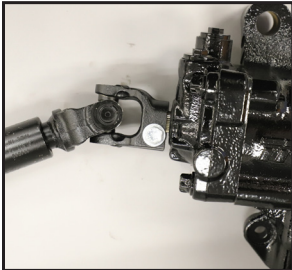
**Fig. 5**

- Input and output shaft serrations must be free of visible cracks or twists.

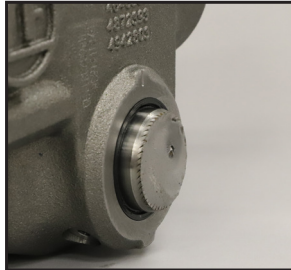
**Evaluation:** Look for cracks or twists in the areas shown. Fig. 5

- Look for torch / welding damage anywhere on the unit. A common location for welding damage is on the input shaft.
- Units must be completely assembled.

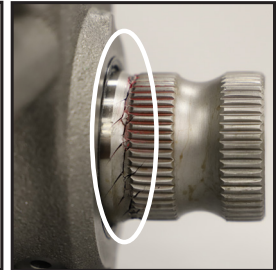
## Examples of Infractions



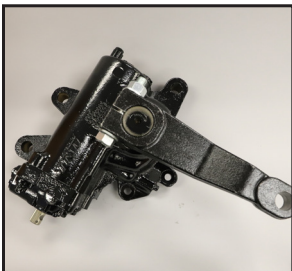
External Component not Removed (U-Joint)



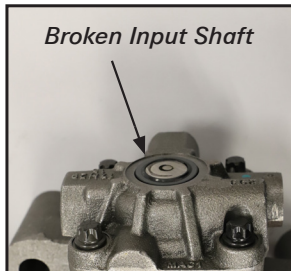
Damaged Component (Output Shaft)



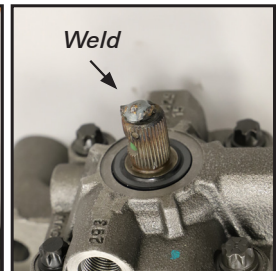
Cracked Output Shaft



External Component not Removed (Pitman Arm)



Damaged Component (Input Shaft)



Weld Damage on Gear

# Remanufactured Gear Installation

## Steering Gear Installation

1. Verify that axle stops are set to manufacturer's wheelcut or clearance specifications.
2. Bolt gear to frame, torque to vehicle manufacturer's recommendation.
3. Connect reservoir return line to steering gear return port.
4. Connect hydraulic line from pump to steering gear pressure port.
5. Connect steering column to input shaft, torque pinch bolt to vehicle manufacturer's recommendation.
6. Install pitman arm on output shaft, with timing marks aligned. Torque bolt to vehicle manufacturer's recommendation

### NOTE

Check the sector shaft to ensure there is no looseness. If loose perform the sector shaft adjustment procedure found at [www.trucksteering.com](http://www.trucksteering.com) to set the adjustment.

7. Connect drag link to pitman arm.
8. Perform **Air Bleeding the Steering System** procedure on page 8.

Access the instructional video for Flushing and Air Bleeding on our YouTube channel at [www.youtube.com/user/trwcsc](http://www.youtube.com/user/trwcsc) or follow QR code link.

Flushing and Air Bleeding  
video QR code:



## Initial Poppet Setting Procedure

To set the poppets on a new or remanufactured steering gear, follow these simple steps:

1. Make sure the axle stop bolts are set to vehicle manufacturer's wheelcut or clearance specifications.
2. Raise the front end so the steer axle tires are off the ground.
3. Start the engine and let it idle.
4. Steer the vehicle in one direction until you contact the axle stop. Pull hard on the steering wheel.
5. Now, steer the vehicle in the opposite direction until you contact the axle stop. Again, pull hard on the steering wheel.
6. Turn the vehicle off.

*Poppets are now set. Lower the vehicle and remove the jack.*

*For this procedure to work correctly, you must have 1) A new or remanufactured gear received from TRW or your vehicle manufacturer's aftermarket system, or 2) a used gear on which poppet seats have been replaced or reset during gear disassembly and assembly procedures. Also, a fixed stop bolt or a poppet adjusting screw must be part of the steering gear assembly.*

Access the instructional video for Poppet Setting on our YouTube channel at [www.youtube.com/user/trwcscs](http://www.youtube.com/user/trwcscs) or follow QR code link.

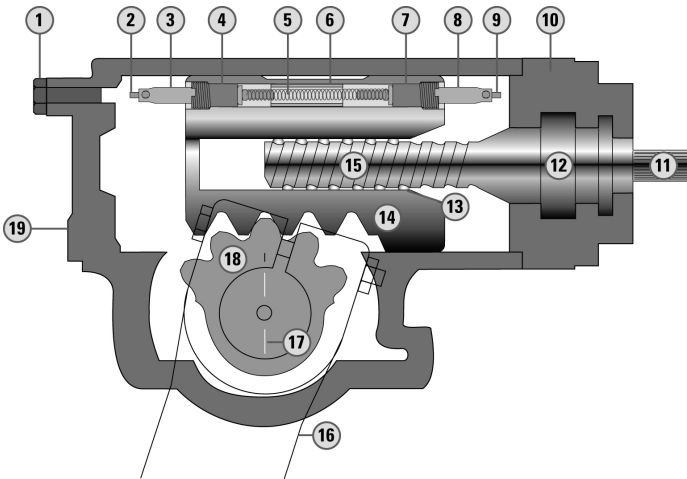
Poppet Setting  
video QR code:



## What are Poppets?

Poppets are pressure unloading valves, inside the rack piston, that “relieve” just before a full turn is made in each direction. When poppets are set or reset correctly, system pressure will be reduced before the axle stop bolt contacts the axle stop in both directions.

*Steering Gear - Section View*



- |                        |                               |
|------------------------|-------------------------------|
| 1. Fixed Stop Bolt     | 11. Input Shaft               |
| 2. Lower Poppet        | 12. Valve                     |
| 3. Lower Poppet Seat   | 13. Recirculating Steel Balls |
| 4. Lower Poppet Sleeve | 14. Rack Piston               |
| 5. Spring              | 15. Worm Screw                |
| 6. Push Tube           | 16. Pitman Arm                |
| 7. Upper Poppet Sleeve | 17. Timing Marks              |
| 8. Upper Poppet Seat   | 18. Sector Shaft              |
| 9. Upper Poppet        | 19. Housing                   |
| 10. Valve Housing      |                               |



# Air Bleeding the Steering System

## Visual Identification

When you air bleed a steering system, you are allowing air trapped in the cavities of the steering gear to escape. As a general rule, if your steering gear has a manual bleed screw located on the top of the gear you will use the Manual Bleed method on page 9. If your gear does not have a manual bleed screw you should use the Automatic Bleed method.

## Automatic Bleed Gears

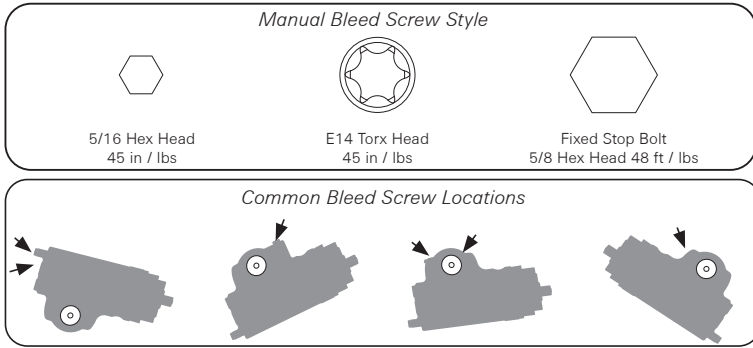
1. Fill the reservoir.
2. Start the engine, let it run for 10 seconds - without steering, then shut it off.
3. Check the reservoir, and refill if the fluid level has dropped.
4. Repeat at least three times, checking and refilling the reservoir each time if necessary.

<b>NOTE</b>	Do not allow the fluid level to drop significantly or run out of the reservoir. This may induce air into the system.
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<b>NOTE</b>	If at any time during this procedure the steering fluid becomes aerated (small air bubbles mix with the steering fluid) if the top of the filter is not visible through the fluid, shut off system and allow fluid to become clear of air again (approximately 5-10 minutes) and start the process over from step 1.
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5. Start the engine and let it idle for 2 minutes - without steering. Shut off the engine and check the fluid level in the reservoir. Refill if required.
6. Start the engine again. Slowly steer the vehicle from full left to full right several times. If at any time air bubbles are visible in the reservoir, stop steering, maintain steering wheel position, allow air to dissipate and fluid to clear, then continue steering. Automatic bleed systems should now be free from trapped air.
7. Finally, be sure to check the fluid level in the reservoir. Refill if necessary before returning the vehicle to service.

# Manual Bleed Gears



1. Fill the reservoir.
2. Start the engine, let it run for 10 seconds - without steering, then shut it off.
3. Check the reservoir and refill if the fluid level has dropped.
4. Repeat this process at least three times, checking and refilling the reservoir each time if necessary.

**NOTE** Do not allow the fluid level to drop significantly or run out of the reservoir. This may induce air into the system.

**NOTE** If at any time during this procedure the steering fluid becomes aerated (small air bubbles mix with the steering fluid) if the top of the filter is not visible through the fluid, shut off system and allow fluid to become clear of air again (approximately 5-10 minutes) and start the process over from step 1.


5. Start the engine and let it idle for 2 minutes - without steering. Shut off the engine and check the fluid level in the reservoir. Refill if required.
6. Start the engine again. Steer the vehicle from full left to full right several times.
7. Again, check the fluid level in the reservoir.

**CAUTION** Do not turn steering wheel with bleed screw loosened.

8. With the engine idling, steer from full left turn to full right turn several times. Stop steering with the wheels pointed straight ahead and loosen the manual bleed screw 2-3 turns.
9. Allow air and aerated fluid to “bleed out” until fluid appears without bubbles.
10. Close the bleed screw, refill the reservoir if required.
11. Repeat this process three or four times until all the air is discharged. Torque manual bleed screw to 45 in/lb.

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Choose reliability.  
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drive with the confidence to keep your  
vehicle, and your business, on the road.

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