




SAFETY NOTICE


 **STOP!** Before you begin, please read this manual carefully. The repair procedures outlined in this manual are for repairing the Sheppard Integral Power Steering Gear. To ensure safe and reliable operation, these service and repair procedures must be followed carefully.



THIS MANUAL CONTAINS A NUMBER OF SAFETY SIGNAL WORDS LIKE: DANGER, WARNING, CAUTION, IMPORTANT, or NOTE. The information following a safety signal word is very important.

When you see the word  **DANGER** it means the information will help you avoid an extreme hazard that could kill or cause a very serious injury every time.

When you see the word  **WARNING** it means there is a hazard that is not as serious as DANGER but the hazard could cause injury or death if you do not follow the proper rules or procedures.

When you see the  **CAUTION** it means the information that follows will help avoid damage to the steering gear.

The signal words IMPORTANT or NOTE are used to draw attention to ways of doing your job better or right.

Manual Plunger Adjustment

Relief plunger adjustment should be checked during pre-delivery. Any time tire size or steering gears are changed, relief plunger adjustment will be necessary. A relief plunger is located in each end cap of the steering gear; One for right turn, one for left turn.

TOOLS REQUIRED:

Small blade screwdriver



WARNING

FOR OTHER EQUIPMENT, TOOLS OR SAFETY PROCEDURES ALWAYS FOLLOW THE VEHICLE MANUFACTURER'S PROCEDURES FOR LIFTING AND BLOCKING.

ADDITIONAL REFERENCES:

Vehicle Manufacturer's Service Manual

R. H. Sheppard Co. - Maintenance & Troubleshooting Video (Optional)

PROCEDURE:

NOTE: Never attempt to adjust relief plungers until the axle stops are set following Vehicle Manufacturer's Specifications.

1. Park the vehicle on a clean, dry, solid surface-preferably concrete. Set the parking brake and block the wheels.
2. Place the transmission in neutral and start the engine.
3. Allow the engine to operate at idle speed.

NOTE: It is always best to have 2 people when setting plungers; 1 to steer the vehicle and 1 to set and check adjustments.

4. Locate the plungers.
5. Determine which plunger is used to adjust right and left turns based on direction of pitman arm travel.
6. Turn the steering wheel to a full left turn and check the clearance. If the clearance is not 1/8", plunger adjustment will be necessary.



WARNING

IF THE STOP BOLT HITS THE AXLE UNDER PRESSURE, RELEASE THE WHEEL IMMEDIATELY! DAMAGE TO STEERING COMPONENTS MAY RESULT.

7. Return the front tires to the straight ahead position and release the steering wheel. Using the screwdriver, adjust the plunger for left turn. Turning the plunger in will increase the clearance between the stop bolt and the axle, while turning the plunger out will decrease the clearance. Do not adjust the plunger with pressure on the steering wheel. Seal damage can result.



WARNING

NEVER ADJUST THE PLUNGER BEYOND FLUSH WITH THE END CAP. LEAKAGE OR PERSONAL INJURY MAY RESULT.

8. Turn the steering wheel to a full left turn. Check the 1/8" clearance.
9. If further adjustment is required, repeat steps 7 & 8 until the 1/8" clearance is achieved.
10. Repeat steps 6 thru 9 for the right turn.

Set Automatic Plungers

Automatic plungers are set at the factory and do not need to be set unless tire size is changed or wheel cut is extended. It is recommended that the setting of automatic plungers be checked at pre-delivery. Do not adjust or set Auto Plungers unless axle gap is wrong or tire size is changed! All Sheppard Auto Plunger equipped steering gears are manufactured with the auto plungers set for minimum wheel cut. Once set following this procedure, no other adjustment or setting is required

TOOLS REQUIRED:

Hydraulic Jack

PROCEDURE:

1. Park the vehicle on a solid surface. Set the parking brake, chock the wheels and tilt the hood or cab to access the front tires.
2. Verify that your steering gear has auto plungers. Steering gears with auto plungers will have the word "AUTO" cast into the housing as shown. Plastic caps on the plunger hole is a secondary means of verification
3. Raise the front wheels until the tires clear the surface. Make sure axle stops are set to manufacturers specifications.
4. Start the engine and turn the wheel to a full lock in both directions. Contacting the axle stop with the wheels off the ground will set the auto plunger to the correct position.

NOTE: As you reach the end of travel, you will feel the piston contact the plunger. Continue turning until you reach the axle stop bolt.

5. Return the wheels to straight ahead. Lower the vehicle.
6. Shut off the engine. Lower the hood or cab and remove the wheel chocks.

Adjust Automatic Plungers

Auto Plungers require NO ADJUSTMENT unless tire size is changed or wheel cut is reduced. Do not adjust auto plungers unless you are in one of these conditions!

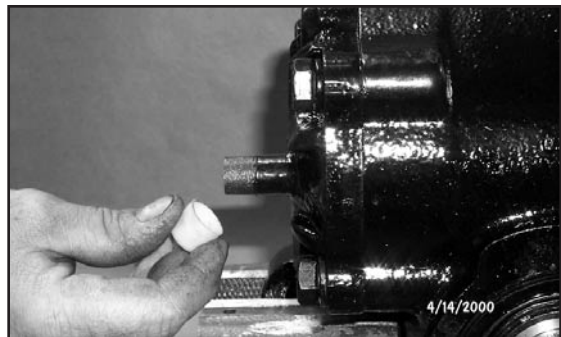
TOOLS REQUIRED:

1/4" Punch
Ball Peen Hammer

DO NOT USE A SCREWDRIVER TO ADJUST AUTO PLUNGERS!

PROCEDURE:

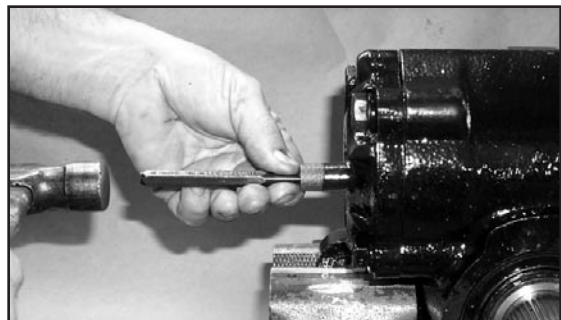
1. Park the vehicle on a solid surface. Set the parking brake, chock the wheels and tilt the hood or cab to access the front tires.
2. Verify that your steering gear has auto plungers. Steering gears with auto plungers will have the word "AUTO" cast into the housing as shown. Plastic caps on the plunger hole is a secondary means of verification.
3. Remove the plastic caps from both plunger holes. Carefully insert the 1/4" plunger into the plunger hole and drive the auto plunger in until it bottoms in the bore. Repeat this procedure for both ends of the steering gear. Replace the plastic caps.



WARNING TAKE CARE WHEN USING THE PUNCH TO INSURE PLUNGER BORE IS NOT DAMAGED. A LEAK CAN OCCUR IF THE BORE IS DAMAGED DURING THIS PROCEDURE.

IMPORTANT: Make sure there are no sharp edges on your punch that could damage the bore.

4. Set the Auto Plunger following the "Set Automatic Relief Plungers" section of this manual.



Auto Plunger Repair Procedure

Under normal use the Sheppard Auto Plunger system requires no regular maintenance. The auto plunger is serviceable only as a kit and is only required if a leak is present.. Sheppard part number 18212821K will fit both the cylinder head and bearing cap end of the steering gear.

TOOLS REQUIRED

Various Metric Sockets and Ratchet
Slotted Screwdriver Bit and Suitable Socket and Ratchet
1/4" Drift Punch
1/4" Pin Punch
1/4" Center Punch
10mm open End Wrench
Hammer

CYLINDER HEAD REPAIR PROCEDURE

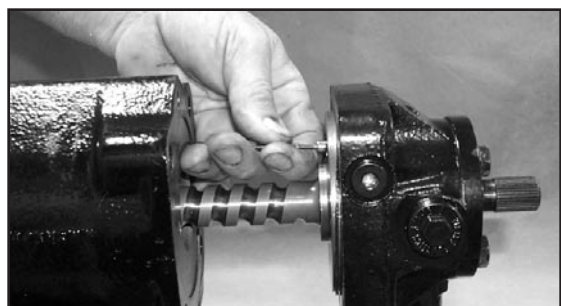
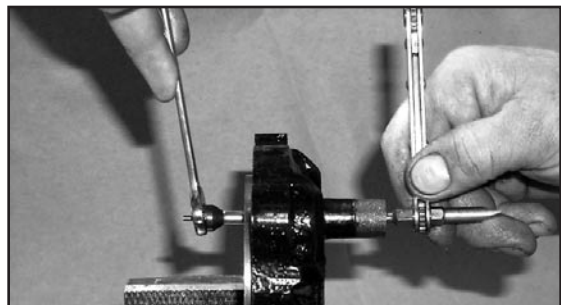
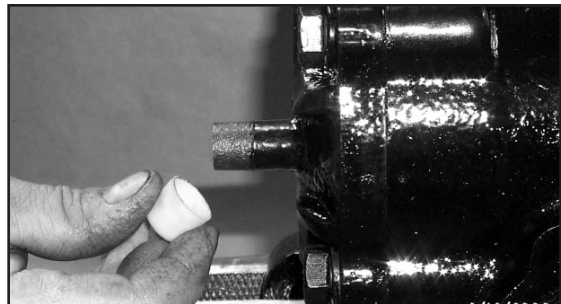
1. Park the vehicle on a clean dry surface (preferably concrete). Set the parking brake and block the wheels. Tilt the hood or raise the cab following the procedures outlined in the vehicle manufacturer's service manual. Identify the steering gear as being equipped with auto plungers. If you have a question on identifying the steering gear, contact the Field Service Department of the R. H. Sheppard Co. Place a drain pan under the steering gear.
2. Mark the cylinder head and housing for re-assembly. Remove the four attaching bolts from the cylinder head using an appropriate size socket and ratchet. Remove the cylinder head
3. Place the cylinder head in a vise. Remove the plastic plug from the auto plunger hole. Using a 1/4" punch and hammer, drive the auto plunger assembly in until it bottoms in the bore. The spring pin, flange and plunger body should be accessible for repair at this point

CAUTION Failure to keep the 1/4" punch straight in the bore or hitting the plunger too hard can result in damage to the steering gear or auto plunger assembly.

4. Carefully insert the screwdriver bit into the plunger bore to engage the slotted head of the plunger body. Using the 10mm open end wrench to hold the flange across the flat sides, carefully turn the flange to remove the flange from the plunger body. Do not allow the screwdriver bit to slip off the plunger body in the process, damage to the bore can result. Discard the flange.

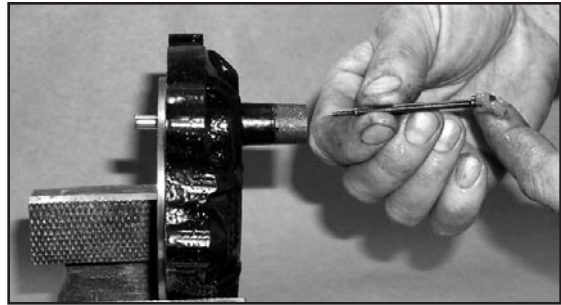
NOTE: The auto plunger flange is held in place with patch lock and the threads are staked at the factory It will require approximately 15-20 inch pounds of torque to remove the flange.

5. Remove the plunger body from the spring pin and discard. It may be necessary to tap the plunger body to remove it from the spring pin. Use of a 1/8" pin punch is recommended.



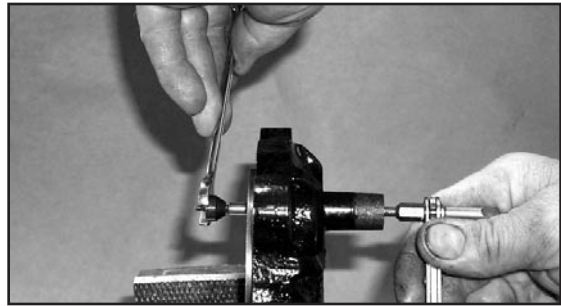
6. Coat the O-ring of the plunger assembly with a light coat of grease and install the plunger body through the spring pin.

IMPORTANT: Check the plunger bore for nicks or gouges before installing the plunger assembly. Take care not to introduce dirt or contaminants in the plunger bore when reassembling.



7. Use the screwdriver bit and ratchet to hold the plunger body. Screw the flange onto the plunger body using the 10mm open end wrench until the flange contacts the spring pin.

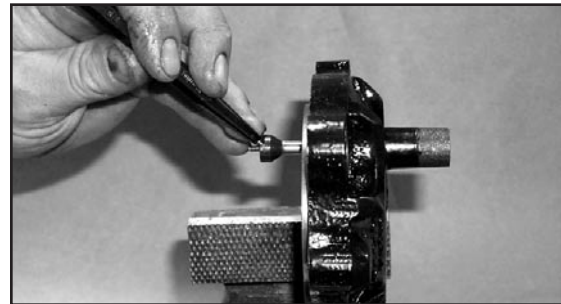
NOTE: The plunger body has patch lock on the threads and will require approximately 15 to 20 inch pounds of torque to overcome the patch lock.



! WARNING THE FLANGE MUST CONTACT THE SPRING PIN. STEERING GEAR DAMAGE OR A LEAK CAN RESULT.

8. With the flange against the spring pin, use the center punch to stake the threads of the plunger body. Take care to not bend the plunger when staking the threads.

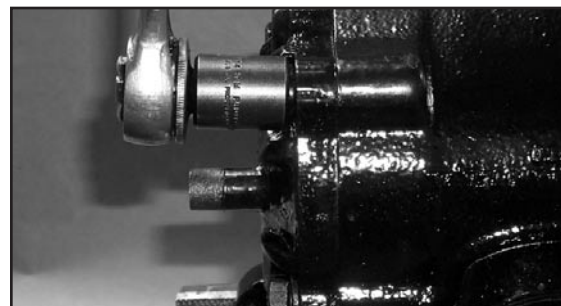
! WARNING USE EXTREME CAUTION WHEN STAKING THE THREADS OF THE PLUNGER BODY. HITTING THE THREADS TOO HARD WILL BEND THE PLUNGER AND CAUSE STEERING FAILURE



9. Install the cylinder head onto the steering gear taking care to align the marks from disassembly. Torque the attaching bolts to specification. Install the plastic cap over the plunger boss.

10. Fill the reservoir with an approved fluid. Start the engine. Check and correct the fluid level and check for leaks.

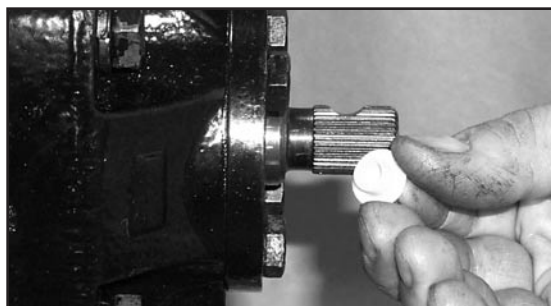
11. Set the auto plungers following the procedure in this manual. Lower the hood or cab following the procedures in the vehicle manufacturer's service manual.



Bearing Cap of Input End Auto Repair

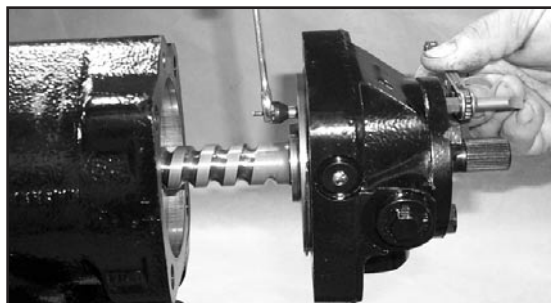
1. Park the vehicle on a clean dry surface (preferably concrete). Set the parking brake and block the wheels. Tilt the hood or raise the cab following the procedures outlined in the vehicle manufacturer's service manual. Identify the steering gear as being equipped with auto plungers. If you have a question on identifying the steering gear, contact the Field Service Department of the R. H. Sheppard Co. at 1-800-274-7437. Place a drain pan under the steering gear.
2. Mark the bearing cap and housing for re-assembly. Remove the universal joint from the input shaft of the steering gear.
3. Remove the plastic plug from the plunger hole and drive the auto plunger in until it bottoms using the 1/4" punch and hammer. Remove the four attaching bolts from the bearing cap using an appropriate size socket and ratchet.

CAUTION Failure to keep the 1/4" punch straight in the bore or hitting the plunger too hard can result in damage to the steering gear or auto plunger assembly.



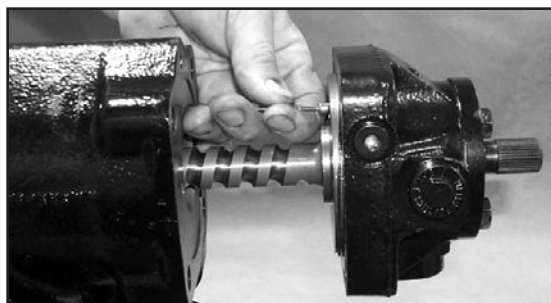
4. Separate the bearing cap assembly from the housing by turning the input shaft out of the housing. Turn the shaft until it stops.

DANGER DO NOT FORCE THE SHAFT WHEN TURNING IT OUT OF THE HOUSING. BINDING OF THE SHAFT AND STEERING GEAR DAMAGE CAN RESULT.



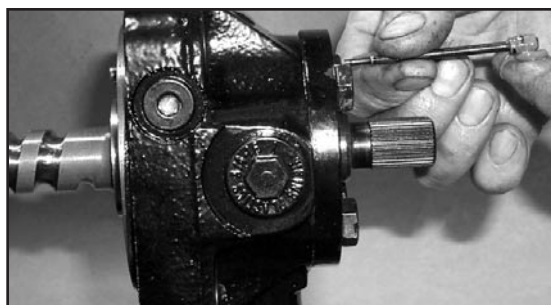
5. Carefully insert the screwdriver bit into the plunger bore to engage the slotted head of the plunger body. Using the 10mm open end wrench to hold the flange across the flat sides, carefully turn the flange to remove the flange from the plunger body. Do not allow the screwdriver bit to slip off the plunger body in the process as damage to the bore can result. Discard the flange.

NOTE: The auto plunger flange is held in place with patch lock and the threads are staked at the factory. It will require approximately 15-20 inch pounds of torque to remove the flange



6. Remove the plunger body from the spring pin and discard. It may be necessary to tap the plunger body to remove it from the spring pin. Use of a 1/8" pin punch is recommended.
7. Coat the O-ring of the plunger assembly with a light coat of grease and install the plunger body through the spring pin.

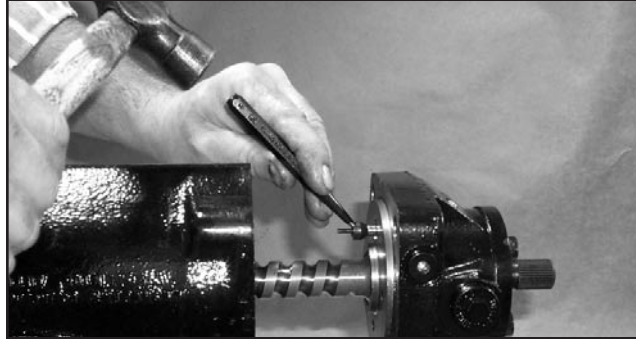
IMPORTANT: Check the plunger bore for nicks or gouges before installing the plunger assembly. Take care not to introduce dirt or contaminants in the plunger bore when reassembling.



- Use the screwdriver bit and ratchet to hold the plunger body. Screw the flange onto the plunger body using the 10mm open end wrench until the flange contacts the spring pin.

NOTE: The plunger body has patch lock on the threads and will require approximately 15-20 inch pounds of torque to overcome the patch lock

! WARNING THE FLANGE MUST CONTACT THE SPRING PIN. STEERING GEAR DAMAGE OR A LEAK CAN RESULT



- With the flange against the spring pin, use the center punch to stake the threads of the plunger body. Take care to not bend the plunger when staking the threads.

! DANGER USE EXTREME CAUTION WHEN STAKING THE THREADS OF THE PLUNGER BODY. HITTING THE THREADS TOO HARD WILL BEND THE PLUNGER AND CAUSE STEERING FAILURE

- Remove the block and install the bearing cap assembly onto the housing taking care to align the reassembly marks made earlier. Install the plug in the plunger hole. Torque the attaching bolts to specifications.
- Install the universal joint onto the steering gear input shaft following the procedures in the vehicle manufacturer's service manual.
- Fill the reservoir with an approved fluid. Start the engine, check and correct the fluid level and check for leaks.
- Set the auto plungers following the procedure in this manual. Lower the hood or cab following the procedures in the vehicle manufacturer's service manual.