



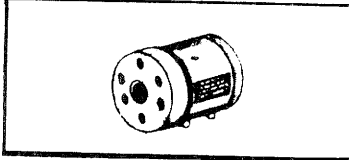
AIR-O-MATIC

POWER STEERING

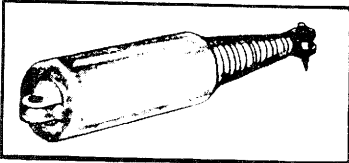
**GENERAL
INSTALLATION
BULLETIN 82805**
WITH RECOMMENDED
MAINTENANCE SCHEDULE.

THE AIR-O-MATIC POWER STEERING SYSTEM

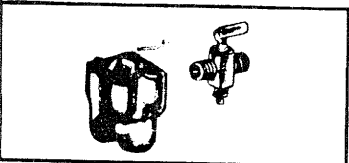
AIR-O-MATIC is an air power steering assist system designed to ease manual steering operations on motor vehicles where a compressed air supply (9CFM Minimum) is available. The Air-O-Matic system operates from the normal vehicle air pressure (Normally 120PSI) and consists of three major components which install quickly and easily into your manual steering system when these instructions are accurately followed. The three major components are:



1. A SEALED TORQUE VALVE which installs into the drag link (illustrated Below). The Torque Valve senses the steering forces and automatically meters the appropriate amount of air to the Power Cylinder.



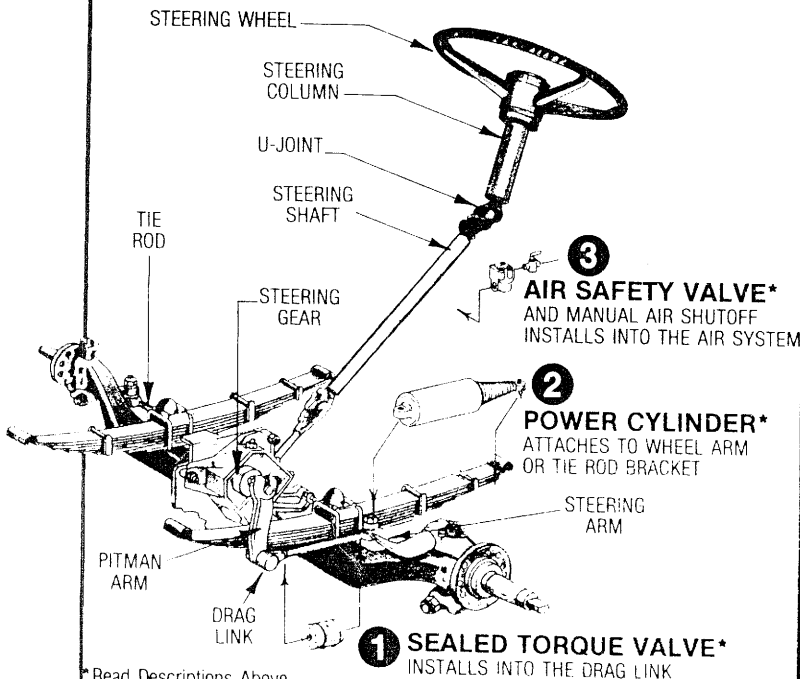
2. THE AIR-O-MATIC POWER CYLINDER attaches to either a left-hand (illustrated below) or right-hand wheel arm bracket or to the tie rod depending on your type of vehicle. The Power Cylinder receives the metered air from the Torque Valve and, in turn, provides the power that assists you in turning the wheels.



3. AN AIR SAFETY VALVE AND MANUAL SHUTOFF VALVE installs in the air supply line to the Torque Valve. The function of the Safety Valve is to conserve air in the event the air pressure in the reservoir falls

below approximately 65psig. When this occurs, steering reverts to manual automatically. Then when air pressure builds up again, to approximately 12psig above cutoff setting, the valve will re-open and power steering assist is restored. The Safety Valve is not a regulating valve that can be adjusted to provide more or less power. The Manual Shutoff Valve is used to terminate the air supply manually enabling you to service your system.

TYPICAL STEERING SYSTEM



IMPORTANT!

Read Prior to Attempting Installation!

THE AIR-O-MATIC SYSTEM IS DESIGNED FOR USE WITH EXISTING MANUAL STEERING. WITH MANUAL STEERING IT IS POSSIBLE FOR EXISTING IRREGULARITIES TO GO UNNOTICED UNTIL POWER STEERING HAS BEEN INSTALLED. THEREFORE, IT IS CRITICAL THAT YOUR MANUAL STEERING SYSTEM BE IN PROPER ADJUSTMENT PRIOR TO INSTALLING AIR-O-MATIC POWER STEERING!

WE HAVE INCLUDED INSTRUCTIONS ON PAGES 2, 3 AND 4 THAT WILL ENABLE YOU TO CHECK, AND ADJUST WHEN NECESSARY, YOUR MANUAL STEERING SYSTEM PRIOR TO INSTALLING AIR-O-MATIC. FOLLOW THESE INSTRUCTIONS STEP BY STEP BEGINNING WITH THE "PREPARING YOUR VEHICLE" SECTION BELOW. BE SURE TO COMPLETE EACH STEP BEFORE GOING TO THE NEXT. REMEMBER, AIR-O-MATIC IS DESIGNED ONLY TO PROVIDE A POWER ASSIST TO YOUR MANUAL STEERING SYSTEM! AIR-O-MATIC WILL NOT CORRECT EXISTING PROBLEMS IN YOUR MANUAL STEERING SYSTEM!

This manual contains general instructions that apply to all Air-O-Matic systems and must be used in conjunction with more specific supplementary instructions provided with each component kit of your Air-O-Matic system.

PREPARING YOUR VEHICLE FOR AIR-O-MATIC INSTALLATION

1 CHECK THE ENTIRE STEERING SYSTEM for worn tie rod ends, steering column binding or loose U-joints, binding kingpins, worn wheel bearings, broken springs, worn tires and other possible component wear. Adjust, correct or replace worn parts when necessary.

2 CHECK TOE-IN AND CAMBER and adjust if necessary to meet the manufacturer's specifications for the vehicle.

3 CHECK THE VEHICLE'S CASTER SETTING. Requirements vary with vehicle type, use and weight carried on front axle. Normally, the caster setting specified by the vehicle manufacturer for MANUAL steering will provide good steering with Air-O-Matic (Follow step by step the instructions on page 4.)

4 CHECK THE STEERING GEAR. With the steering column disconnected and the drag link removed, the Worm Bearing Preload, Total Mesh Preload and Backdrive Characteristic must be checked. (Refer to and follow the step by step instructions on page 3.)

For checking preloads, refer to the steering gear manufacturer's specifications. It is desired to have the settings on the low end of the suggested range. If the manufacturer's specifications are not available refer to the specifications on page 3.

5 CENTER THE STEERING GEAR according to the step by step instructions on page 3. Be sure that the pitman arm is in the center of the Non-Backlash area.

WHEN YOU HAVE CAREFULLY AND THOROUGHLY PERFORMED THE PREPARATIONS STEP BY STEP AS OUTLINED ABOVE YOU ARE READY TO INSTALL YOUR AIR-O-MATIC POWER STEERING SYSTEM BY FOLLOWING THE INSTALLATION PROCEDURES ON PAGE 2.

INSTALLATION PROCEDURES

IMPORTANT! DO NOT PROCEED WITHOUT HAVING COMPLETED EACH STEP OUTLINED IN THE "PREPARING VEHICLE" SECTION ON PAGE 1.

1 ASSEMBLE THE TORQUE VALVE TO THE DRAG LINK as outlined on the instructions accompanying your drag link conversion kit. **NOTE THAT THE ROTATING END of the Torque Valve must be at the pitman arm end of the drag link with exhaust ports pointing downward.**

2 PLACE THE FRONT (ROAD) WHEELS IN A PERFECTLY STRAIGHT-AHEAD POSITION by sighting them with the rear wheels and by comparing the distance from the front wheel (not tire) to the spring at an identical point on each side of the vehicle.

3 WITH THE FRONT WHEELS STRAIGHT and the steering gear **CENTERED**, as outlined on page 3, adjust the drag link to the precise length that will enable it to be connected to the pitman arm and the steering arm without effecting their straight-ahead positions. Install the drag link as outlined on the reverse side of the Drag Link Instruction Sheet that accompanies the drag link kit. On applications where the power cylinder mounts on a left-hand wheel arm bracket, do not fully tighten the ball joint nut on the steering arm at this point.

DOUBLE CHECK INPUT SHAFT ALIGNMENT (CENTER MARKS) AND WHEEL POSITION AFTER INSTALLING THE DRAG LINK. IT IS CRITICAL THAT THE STRAIGHT-AHEAD POSITION OF THE FRONT WHEELS AND THE ALIGNMENT OF THE INPUT SHAFT NOT BE DISTURBED.

4 MOUNT BRACKETS AND POWER CYLINDER in accordance with the specific instructions included with each of the two bracket assemblies. A Wheel Arm Mount Application will have: 1.) A Wheel Arm Bracket Assembly, 2.) A Frame Bracket Assembly; A Tie Rod Mount Application will have: 1.) An Axle Bracket Assembly, 2.) A Tie Rod Bracket Assembly.

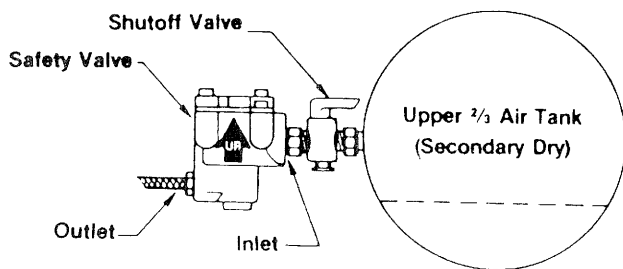
5 WITH THE STEERING GEAR INPUT SHAFT IN THE CENTERED POSITION, reinstall the steering shaft, aligning the steering wheel king spoke to correspond to this "straight-ahead" position. If necessary remove and reposition steering wheel on column shaft. **DO NOT CHANGE DRAG LINK LENGTH.**

6 INSTALL THE AIR DELIVERY COMPONENTS. Using the schematics included in the Wheel Arm or Axle Bracket Instructions adhere to the following precautions when installing the Air Delivery components:

- Air supply is to be from a secondary Dry Tank air reservoir (normally the front brake reservoir). Not from a wet (supply) air reservoir or primary reservoir which is for the rear brakes.

- Use pipe sealant when either fitting is steel.

- Unless stated otherwise in the specific Bracket Instructions, install the Manual Shutoff Valve and the Safety Valve directly into any unused port in the upper 2/3 of the air reservoir as shown in the illustration.



- **NOTE: IF THE INSTALLATION REQUIRES THAT THE SAFETY VALVE BE MOUNTED REMOTELY FROM THE AIR RESERVOIR, THE AIR HOSE USED BETWEEN THE RESERVOIR AND THE SAFETY VALVE MUST MEET DOT AND SAE SPECIFICATIONS FOR AIR BRAKE HOSES.**

- Use only Air-O-Matic hose from the Safety Valve to the Torque Valve and from the Torque Valve to the Power Cylinder.

- Do not use less than 3/8 inside diameter hose unless specified by Air-O-Matic.

- If dash-mounted shutoff valve is desired do not use a valve other than specified by Air-O-Matic.

- When routing lines, allow for travel of Torque Valve, Power Cylinder and Axle movement. Consider full right and left turns and full spring deflection.

- Do not run air lines over sharp edges, moving parts or hot surfaces.

- Allow generous bends (3" minimum radius) to prevent kinking.

- Tie down the longer runs of lines to control routing.

- A small amount of engine oil on the I.D. of the hose and the O.D. of the push-on fitting will ease assembly. Make sure both barbs on the push-on fitting enter hose.

- **MAKE FINAL INSTALLATION CHECK AS OUTLINED AT BOTTOM RIGHT OF THIS SHEET BEFORE TURNING ON AIR!**

CHECKING BACKLASH & S

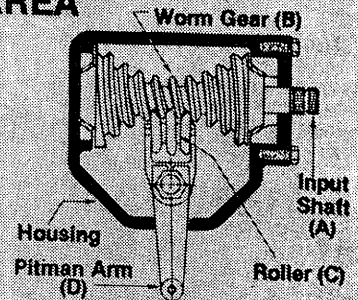
IN ORDER TO INSTALL your Air-O-Matic system you will be required to locate Backlash and Non-backlash areas of the steering gear. Therefore, it is important to understand what backlash is and what causes it.

WHEN YOU TURN the steering wheel in your vehicle you are turning a steering shaft which is connected to the input shaft (A) of the worm gear (B) in your steering gear box. As the worm gear turns in either direction it generates a forward or backward motion against the roller (C) which in turn causes the pitman arm (D) to move forward or backward.

IT IS THE POSITION of the roller (C) in relation to the worm gear (B) that determines your vehicle's Backlash and Non-backlash areas as described in the illustration below.

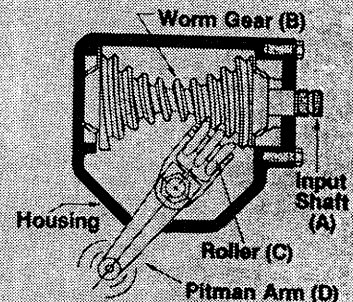
NON-BACKLASH AREA

When you drive straight down a level road, the pitman arm (D) should be in such a position that the roller (C) is at the center of the worm gear. In this ideal position you achieve maximum mesh between the roller and worm gears. This is considered the Non-backlash area. Too little mesh adjustment will permit the gears to lash through center. Too much will cause the gears to bind.



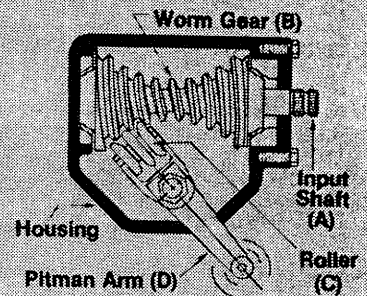
BACKLASH AREA

As you turn the steering wheel in one direction and the roller gear moves away from its Centered position, some of the mesh between the gears is lost, resulting in a Backlash area. The farther from center the gear travels the greater the Backlash. Backlash can now be felt as the pitman arm is "wiggled" back and forth.



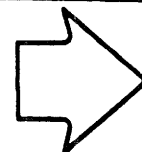
BACKLASH AREA

As the steering wheel is turned in the opposite direction the roller gear again moves away from its Centered position and again some of the mesh between the gears is lost resulting in a second Backlash area.



NOTE! THE BACKLASH AND NON-BACKLASH AREAS DESCRIBED ABOVE ARE THE AREAS YOU MUST BE ABLE TO LOCATE, CHECK, AND IF NECESSARY, ADJUST, PRIOR TO INSTALLING THE AIR-O-MATIC SYSTEM. YOU CAN MAKE THE NECESSARY CHECKS AND, IF NECESSARY, ADJUSTMENTS BY FOLLOWING THE STEP BY STEP INSTRUCTIONS ON PAGE 3. BEFORE STARTING, HOWEVER, IT IS NECESSARY TO DETERMINE WHETHER YOUR STEERING GEAR IS A "RECIRCULATING BALL TYPE" OR A "WORM AND ROLLER TYPE" (BOTH ILLUSTRATED AT TOP OF NEXT PAGE). IF YOU ARE UNCERTAIN WHICH STEERING GEAR IS USED ON YOUR VEHICLE CHECK THE HOUSING FOR THESE IDENTIFYING MARKS: IF THE HOUSING IS MARKED "NSK" OR "SAGINAW" YOUR STEERING GEAR IS RECIRCULATING BALL. IF THE HOUSING IS MARKED "ROSS" IT IS THE WORM AND ROLLER TYPE (UNLESS IT IS MARKED "ROSS TD" IN WHICH CASE YOU MUST REFER TO SUPPLEMENTARY INSTRUCTIONS.)

FINAL INSTALLATION CHECKLIST



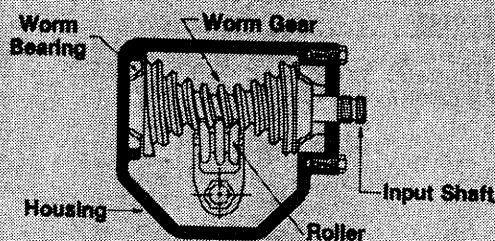
AFTER COMPLETING step by step installation perform the following checks to assure proper installation of your Air-O-Matic system.

- Check torque on all fasteners (bolts, nuts, screws, etc.) that were used during the assembly of the system.

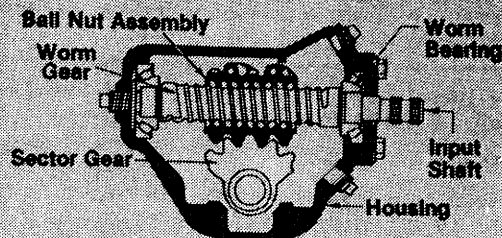
- Lubricate socket on power cylinder piston rod and on each end of the drag link.

Centering Gear Prior to Air-O-Matic Installation

Worm and Roller Steering Gear



Recirculating Ball Steering Gear (Also known as ball nut or ball screw type)



Checking Worm Bearing Preload

NOTE! DISCONNECT THE STEERING SHAFT FROM THE STEERING GEAR INPUT SHAFT! DISCONNECT THE DRAG LINK FROM THE PITMAN ARM! FOLLOW STEPS 1, 2, 3 AND 4 FOR WORM AND ROLLER STEERING GEARS. USE STEPS 1A, 2A, 3A AND 4A FOR RECIRCULATING BALL TYPES. REFER TO INSTRUCTIONS ON PAGE 2 TO DETERMINE STEERING GEAR TYPES.

WORM BEARING PRELOAD CHECK (For Worm and Roller Steering Gear)

STEP 1 Slowly turn the input shaft in one direction until the pitman arm roller is near the end of the worm gear. (CAUTION! DAMAGE CAN RESULT IF THE ROLLER IS FORCED ALL THE WAY TO THE END OF THE WORM GEAR!) Reverse the rotation of the input shaft ¼ turn. This will free the roller from the worm gear. Backlash can now be felt between the roller and worm gears as the pitman arm is "wiggled" back and forth.

IMPORTANT! ALL TORQUE READINGS ARE WITH THE STEERING GEAR STABILIZED AT 65-75° F.

STEP 2 With an inch-pound torque wrench on the input shaft measure the worm bearing preload by oscillating the torque wrench back and forth. **BE CAREFUL NOT TO ALLOW THE WORM TO ENGAGE THE ROLLER.** The worm bearing preload is measured in this backlash area.

STEP 3 The worm bearing preloads with the input shaft moving should be between 5 and 11 inch-pounds (for steering gears with more than 10,000 miles operation) and between 9 and 16 inch-pounds for steering gears with less than 10,000 miles operation. Record measured torque.

STEP 4 If the worm bearing preload is within the above specifications proceed to the **TOTAL MESH PRELOAD** check. If worm bearing preload is not within the above specifications it will require adjustment according to your manufacturer's service manual.

WORM BEARING PRELOAD CHECK (For Recirculating Ball Steering Gear)

STEP 1A Slowly turn the input shaft in one direction until the worm ball nut is almost to the end of the worm gear. (CAUTION! DAMAGE TO THE NUT ASSEMBLY CAN RESULT IF THE NUT IS RUN ALL THE WAY TO THE END OF THE WORM SHAFT.) Reverse the rotation of the input shaft ¼ turn. This will free the sector gear from the ball nut. Backlash can now be felt between the sector gear and ball nut as the pitman arm is "wiggled" back and forth.

IMPORTANT! ALL TORQUE READINGS ARE WITH THE STEERING GEAR STABILIZED AT 65-75° F.

STEP 2A With an inch-pound torque wrench on the input shaft measure the worm bearing preload by oscillating the torque wrench back and forth. **BE CAREFUL NOT TO ALLOW THE WORM NUT TO ENGAGE THE SECTOR GEAR.** Worm bearing preload is measured in this backlash area.

STEP 3A The worm bearing preload should measure between 6 and 16.5 inch-pounds with the input shaft moving. Record the measured torque.

STEP 4A If the worm bearing preload is within the above specifications proceed to the **TOTAL MESH PRELOAD** check. If the worm bearing preload is not within the above specifications it will require adjustment in accordance with the manufacturer's service manual.

Total Mesh Preload Check

STEP 1 Having already checked the worm bearing preload, check the total mesh preload as follows: Using an inch-pound torque wrench, slowly turn the input shaft from one backlash area to the other. The input shaft should turn smoothly and as you pass through the Non-Backlash area the torque should be:

FOR WORM AND ROLLER STEERING GEAR 9 to 11 inch-pounds PLUS the worm bearing preload previously measured.

FOR RECIRCULATING BALL STEERING GEAR 8 to 12 inch-pounds PLUS the worm bearing preload previously measured.

STEP 2 If the torque reading is not within the above specifications or the input shaft does not turn smoothly, adjustment or repair will be necessary in accordance with the manufacturer's service manual.

Backdrive Check

Starting at the extreme ends (left and right) the pitman arm is to be pushed toward center. **THE BACKDRIVE SHOULD BE SMOOTH!** If the backdrive is rough or impossible, repair of the steering gear will be necessary in accordance with the manufacturer's service manual.

Centering the Steering Gear

STEP 1 **CENTER THE STEERING GEAR AS FOLLOWS:** with the pitman arm (roller) in one backlash area slowly turn the input shaft back toward center, and at the same time "wiggle" the pitman arm back and forth. When the point is reached where the pitman arm will no longer "wiggle" you have located one edge of the **Non-Backlash** area. Put a temporary mark on the housing "in line" with a similar mark on the input shaft to identify this point.

STEP 2 Continue to rotate the input shaft while "wiggling" the pitman arm until the other edge of the **Non-Backlash** area is located. Place another temporary mark on the housing "in line" with the mark previously placed on the input shaft. Midway between the two marks on the housing is the **center of the Non-Backlash** area. (If the **Non-Backlash** area is greater than one (1) full turn of the input shaft this must be considered when determining the midway point.) **MARK THIS CENTER ON THE HOUSING!** The temporary mark on the input shaft should line up with this "CENTER" on the housing when the vehicle is being driven straight down a level road.

STEP 3 As a final check of the temporary **CENTER** mark, check the amount of input shaft turn you are able to make on each side of **CENTER**. **WITHIN** the **Non-Backlash** area. The **Non-Backlash** area should be equal and a minimum of ¼ turn on each side of **CENTER**.

STEP 4 Once the **CENTER** position has been proven, mark it permanently on the housing and the input shaft. In addition, while **CENTERED**, place a permanent mark on the pitman arm "in line" with a permanent mark on the housing. These two sets of marks will serve as a permanent reference for **CENTER** and must be "in line" when determining the precise length of the drag link (Refer to installation procedures).

MAKE THESE ADDITIONAL CHECKS PRIOR TO THE AIR BEING TURNED ON!

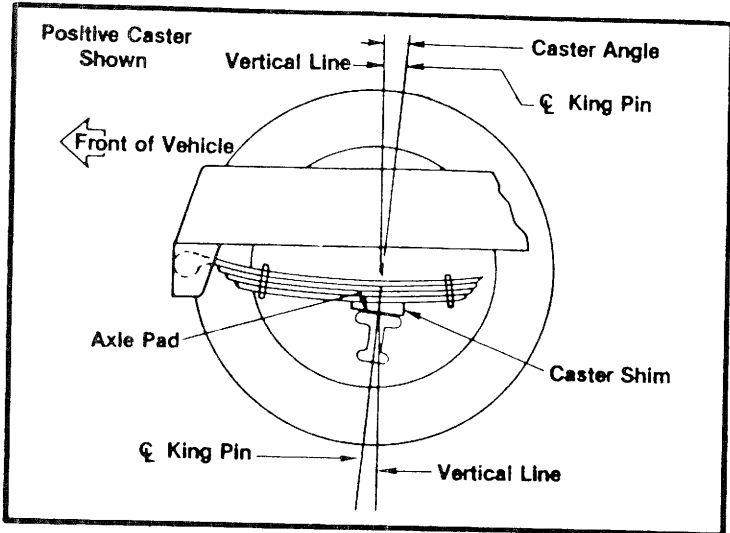
- Slowly turn the wheels as far as they will go in one direction (consider full suspension travel) and check:
 - A. Clearance between Torque Valve, Power Cylinder, Hoses and the existing vehicle components. Consider that the drag link (Torque Valve) can "roll" or rotate in the sockets.
 - B. Measure the Power Cylinder maximum/minimum as specified in the mounting bracket instructions. Adjust wheel stops if necessary.
 - C. The air lines should be free to travel without kinking, pinching or touching sharp edges or hot surfaces.
 - D. Hoses are to be tied to control movement.
- TURN WHEELS IN OPPOSITE DIRECTION AND REPEAT THE ABOVE PROCEDURE.**

THE FOLLOWING CHECKS ARE TO BE MADE WITH THE FULL WEIGHT OF THE VEHICLE ON THE WHEELS: WARNING! DO NOT TOUCH THE INNER EDGE OF THE STEERING WHEEL WHEN TESTING! IF AIR LINES HAVE BEEN CROSSED, THE STEERING WHEEL MAY SPIN AND IT WILL NOT BE POSSIBLE TO STEER THE VEHICLE! USE PALMS OF OPEN HANDS ON OUTER EDGE OF STEERING WHEEL!

- Build up air pressure.
- With palms of open hands on the outer edge of the steering wheel, slowly turn the wheel. If the steering wheel jerks back and forth, recheck hose routing for possible air lines reversed at Torque Valve.
- Check for air leaks. A short burst of air when the steering wheel is released is normal.

CASTER Checking and Adjustments

Caster is the forward (negative) or backward (positive) lean of the kingpin when viewed from the side of the vehicle. Proper caster setting is essential for good steering in any motor vehicle. These instructions, when properly followed, will enable you to check and, if necessary, adjust your caster setting.



THE PURPOSE OF CASTER is to stabilize the front wheels. When a castered wheel is turned in either direction it tends to lift the front of the vehicle. It is this lifting force that causes the wheels to return to their "straight ahead" position.

TOO LITTLE CASTER can cause wheel instability, wandering and poor wheel return.

TOO MUCH CASTER can cause hard steering, darting, oversteer, shimmy and also poor wheel return.

CASTER SETTING

Just enough positive caster should be provided to have wheel stability and good wheel return. Requirements will vary with vehicle type, use and weight carried on front axle. Normally, the caster setting specified by the vehicle manufacturer for **MANUAL** steering will provide good steering with Air-O-Matic.

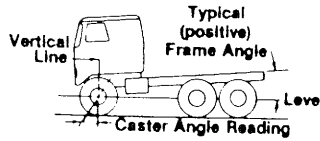
In general, the caster for a tandem drive vehicle should be between $\frac{1}{2}^\circ$ and $1\frac{1}{2}^\circ$ positive; for a single drive $1\frac{1}{2}^\circ$ to $2\frac{1}{2}^\circ$ positive. There should not be more than $\frac{1}{2}^\circ$ difference from side to side and the left should never be greater than the right. If the caster is less than $\frac{1}{2}^\circ$ or greater than $2\frac{1}{2}^\circ$ positive unsatisfactory steering may result.

IMPORTANT! MAKE CASTER SETTINGS PRIOR TO INSTALLING AIR-O-MATIC! CASTER SETTINGS MADE AFTER INSTALLATION WILL REQUIRE UNWARRANTED CHANGES IN DRAG LINK LENGTH!

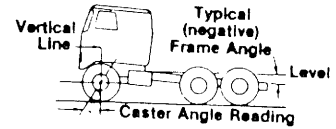
MEASURING CASTER

Caster can be measured by placing a machinist's protractor head on the machined surface of the axle pad. **MAKE SURE AXLE PAD IS FREE OF DIRT, ETC.** Caster can also be determined by a front end machine or caster gauge.

IN MAKING A CASTER CHECK THE FRAME ANGLE MUST BE CONSIDERED! GENERALLY THE FRAME ANGLE IS LEVEL UNDER OPERATING CONDITIONS, BUT...



If the frame is up, **ADD** the frame angle to the caster angle measured above.



If the frame is down, **SUBTRACT** the frame angle from the caster angle measured above.

CHANGING CASTER

To change caster, insert caster shim plates under the spring. The thick end of the shim to the front decreases caster. The thick end to the rear increases caster.

NOTE! IF YOUR AIR-O-MATIC INSTALLATION USES A TIE ROD MOUNT REQUIRING THAT AN AXLE BRACKET BE MOUNTED ON TOP OF THE AXLE PAD INSTALL THE BRACKET NOW TO REDUCE OVERALL INSTALLATION TIME.

RECOMMENDED MAINTENANCE AND SAFETY CHECKS

DAILY:

- Drain water from all air tanks.
- Examine all steering components including the Air-O-Matic for loose, damaged, cracked or worn parts.
- Check for loose, damaged or dislocated (hazardous positioning) of air lines.

WEEKLY:

- Perform the above, plus check all fasteners (screws, bolts, nuts, etc. for proper torque requirements).
- Lubricate power cylinder piston rod socket and both drag link sockets.

QUARTERLY: (Or 25,000 miles)

- Internally lubricate system (See maintenance bulletin)

SEMI-ANNUALLY: (Or 50,000 miles)

- Check Safety Valve (See maintenance bulletin)

ANNUALLY: (Or 100,000 miles)

- Dismantle, clean and inspect safety valve. (See maintenance bulletin)

CAUTION:

- When any component of the Air-O-Matic system is replaced, new fasteners (screws, bolts, nuts, etc.) must be used and torqued as specified.
- Use only Air-O-Matic supplied parts when replacing any component of the Air-O-Matic system.

THE AIR-O-MATIC POWER STEER COMPANY

Limited Warranty

THE AIR-O-MATIC POWER STEER COMPANY (herein called "AIR-O-MATIC") warrants to the original purchaser that its Air Power Steering Assist Units, including the Control Valve, Power Cylinder and attachments (all of which are hereinafter referred to as the "Units"), are reasonably free from defects in material and workmanship, when properly installed according to AIR-O-MATIC'S recommended Installation Instructions and Procedures, and when used under normal use and service. AIR-O-MATIC'S sole obligation under this warranty shall be limited to the replacement or repair of any part or parts of the Units which may be proven defective under normal use and service within twelve (12) months after installation of the Units for the original purchaser or before the vehicles on which such Units have been installed have been driven one hundred thousand (100,000) miles, whichever event shall first occur, and which AIR-O-MATIC'S examination shall disclose to its satisfaction to be thus defective. In no event shall AIR-O-MATIC be liable for consequential or special damages, or for transportation, installation, adjustment, or other expenses which may arise in connection with such Units or parts. In the event any of the Units or parts are found to be defective in material and workmanship, the original purchaser waives his or its rights to consequential, special or incidental damages, and such original purchaser's exclusive remedy shall be the replacement or repair of such Unit or parts. **THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING THE WARRANTY OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR USE OR PURPOSE, CAPACITY AND ALL OTHER OBLIGATIONS OR LIABILITIES ON AIR-O-MATIC'S PART, AND AIR-O-MATIC NEITHER ASSUMES, NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT, ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF SUCH UNITS. THIS WARRANTY SHALL NOT APPLY TO ANY UNIT OR ANY PART THEREOF WHICH HAS BEEN SUBJECT TO IMPROPER INSTALLATION, ACCIDENT, NEGLIGENCE, ALTERATION, ABUSE OR MISUSE. AIR-O-MATIC MAKES NO WARRANTY WHATSOEVER IN RESPECT TO ACCESSORIES OR PARTS NOT SUPPLIED BY AIR-O-MATIC. THE TERM "ORIGINAL PURCHASER," SHALL BE DEEMED TO MEAN THAT PERSON, FIRM OR CORPORATION FOR WHOM THE UNIT IS ORIGINALLY INSTALLED.**



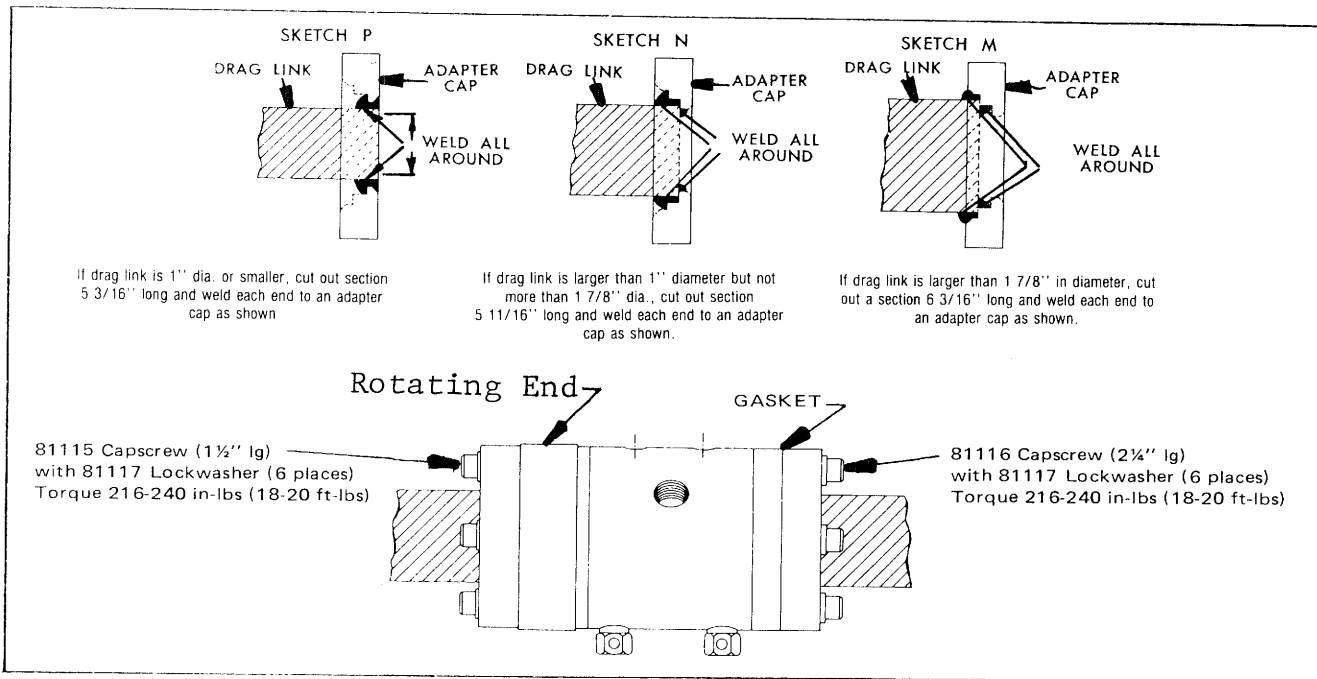
Air-O-Matic
POWER STEERING

Maradyne Corporation

4540 West 160th Street
Cleveland, Ohio 44135 USA

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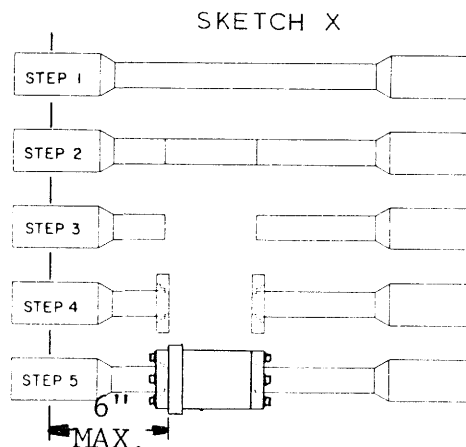


IMPORTANT:

- Rotating end of Torque Valve must be within 6" of Pitman End.
- Exhaust Ports must be DOWN!
- See Page 2 for Assembly, Torquing, and Adjustment requirements.
- Lubricate both Sockets

STEPS TO FOLLOW FOR INSTALLATION OF TORQUE VALVE IN DRAG LINK

- Step 1—Remove drag link from vehicle.
- Step 2—Carefully study Sketches M, N and P shown above to determine correct length of section to be cut out of drag link. When this has been done, then accurately measure and mark on drag link where section is to be cut out.
- Step 3—Accurately and squarely cut out section.
- Step 4—Weld an adapter cap to each drag link end as shown in the sketch selected in Step 2.
- Step 5—Assemble valve to drag link ends by means of cap screws, torque as outlined above.



The torque valve must be installed in the drag link. The drag link must be long enough to accommodate the valve. It should also be observed before installation that there will be ample clearance for valve in any position of the drag link in its full travel both ways. Remove drag link and accurately measure its diameter to determine length of section to be cut out for valve. Study Sketches M, N and P and the steps to follow after drag link has been removed as shown in Sketch X. Cuts must be made square and in a straight section of drag link as near as possible to pitman arm, but not so close that valve will strike pitman arm when in its closest position. Care must be taken when measuring length of section to be cut out of drag link to be sure that overall length of drag link will be the same after installation of torque valve as it was before installation. If too much or not enough length is

cut out, then the steering gear box will be off center position after installation of torque valve. This is very important. Adapter caps must be allowed to cool before installing the torque valve. Each drag link end should be welded all around the adapter cap as shown in Sketches M, N and P. It is important to do a good job of welding. It is also necessary that the face S as shown in Sketches M, N and P be clean and flat and that the end of the drag link is not permitted to extend beyond the face of the adapter cap. The torque valve should be installed so that the rotating end is nearest the pitman arm. This end of the torque valve can be rotated to any position for alignment. The other end cannot be rotated, and will roll only as the drag-link rolls.