CLARK

Service School Topic.....

DATE: 7 March 1974 SST-12

SUBJECT: Troubleshooting Disc Brake System All Models Ref. Group No. 30

1. Check air pressure for proper PSIG.
   a. Check condition of air supplied for water, sludge, etc.

2. Check master cylinder fluid level.
   a. If make up tanks are not on unit, the fluid reservoir level may require refilling to compensate for the self-adjusting features of the disc brake system. On larger machines, it may require refilling three times during the lining life. On smaller machines, one refill is normally required for the duration of lining life unless an external leak is evident.

3. Check for leaks in following area.
   a. Lines and fitting from the master cylinder to brake head.
   b. Fluid leaks at piston area: Boots originally have fluid installed in them for lubrication and storage, drain boot and retest.
   c. Fluid leak from cap area.
   d. Fluid leak from bleeder screws.
   e. Fluid leak from caliper head cross drill plugs.
   f. Fluid leaks from cracked or broken castings.

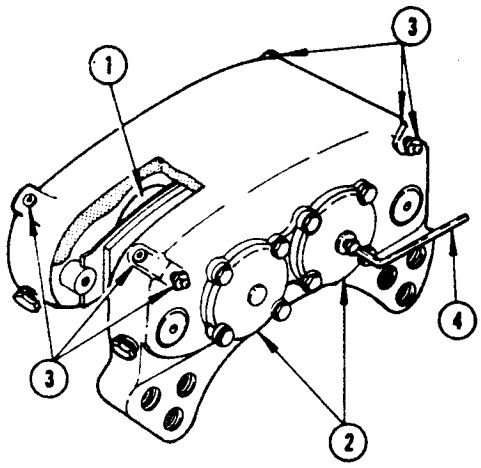
4. Check for worn out linings.
   a. Minimum lining thickness is 1/8 inch, wear beyond this limit can cause leakage.
      (1) Some units may reach this wear limit in shorter hours than others depending on job application and operator technique. Brake lining thickness must be checked at no more than 50 hour intervals.

5. Check brake disc for excessive wear.
   a. Minimum thickness is .450 inch, wear beyond this limit can cause excessive brake temperature, thus shortening brake lining life. May also cause excessive piston travel and misalignment resulting in seal leakage.

6. Check brake system for residual pressure in system.
   a. Residual pressure check valve must be removed or a hole of approximately .029/.063 drilled through center of residual valve on front and rear master cylinder.
      (1) Maximum residual pressure is 2 PSI to 4 PSI.
   b. If system has excessive residual pressure:
      (1) Foot pedal not releasing properly.
         A. Air present at power cluster at all times.
      (2) Relay valve malfunctioning.
         A. Air present at power cluster at all times
      (3) Master cylinder piston not retracting properly.
         A. Scored master cylinder piston or bore.
         B. Dirt blocking by-pass port.
         C. Seal swollen blocking port due to wrong oil.
         D. Piston return spring missing or weak.
         E. Piston in air chamber not returning properly.

SERVICE INSTRUCTIONS

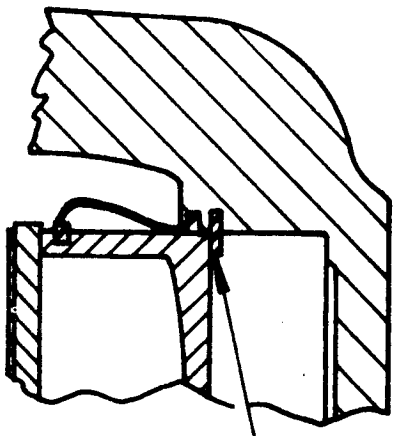
1



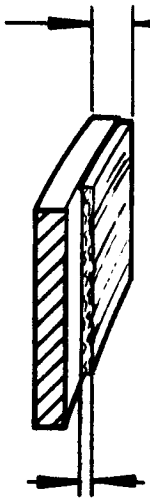
Check for leakage

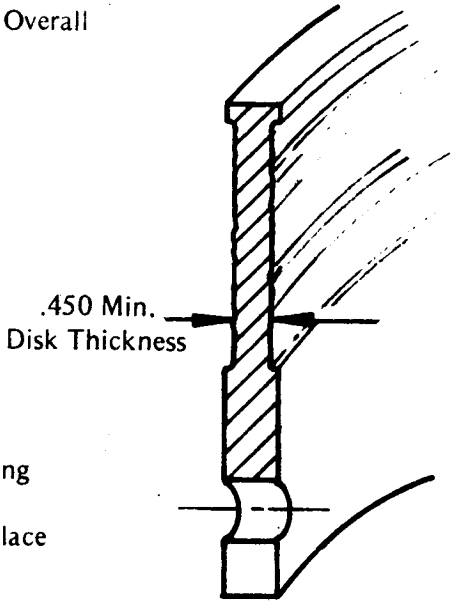
1. Pistons
2. Caps
3. Pipe Plugs and Bleeders
4. Brake Lines

2



If linings are worn beyond the 1/8" limit, the piston can pop out causing leak





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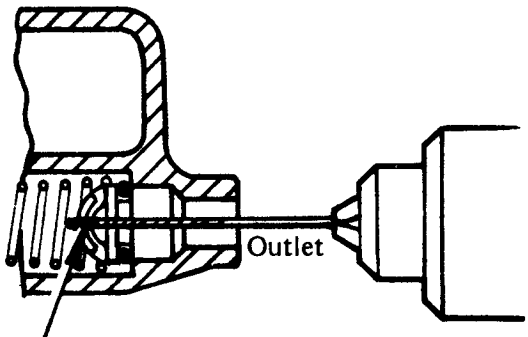
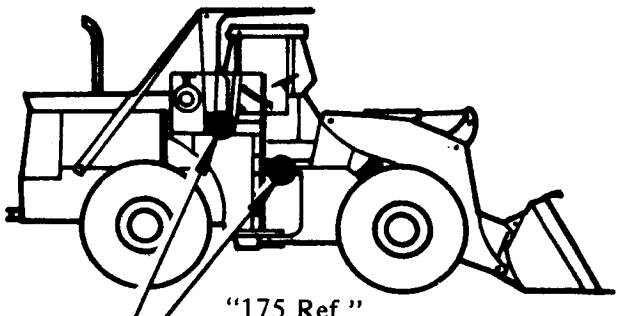


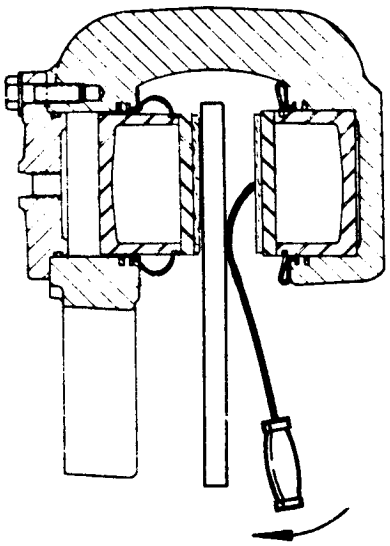
Check valve - Drill 1/32" hole or remove. Check valve can cause excessive brake heat or squeal.



Check master cylinders front and rear for fluid level (make-up tank should be added to allow full lining wear without fluid addition).

Over →

4



Open bleeder then push pistons back by inserting pry bar here. This will allow new linings to be installed easily.

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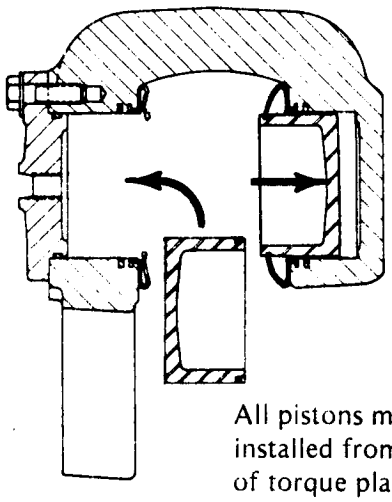
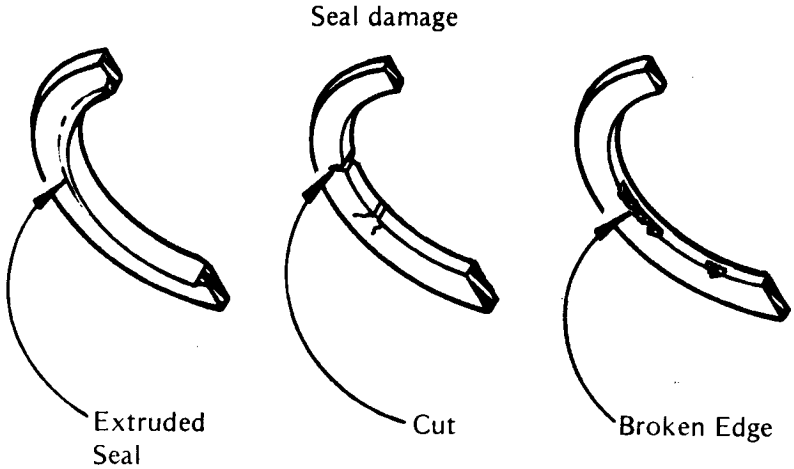


All pistons must be installed from center of torque plate.

1. Install seals.
2. Install boots.
3. Replace piston with pits or grooves.
4. Push pistons through boot and seal. Lubricate with caster oil, or system fluid - turn piston by hand until located through seal.
   Note: Improperly located pistons and excessive force (mechanical aids) will result in cut seals.

6



Replace seals if any of the described conditions exist.

7

Persistant leaks after above repairs

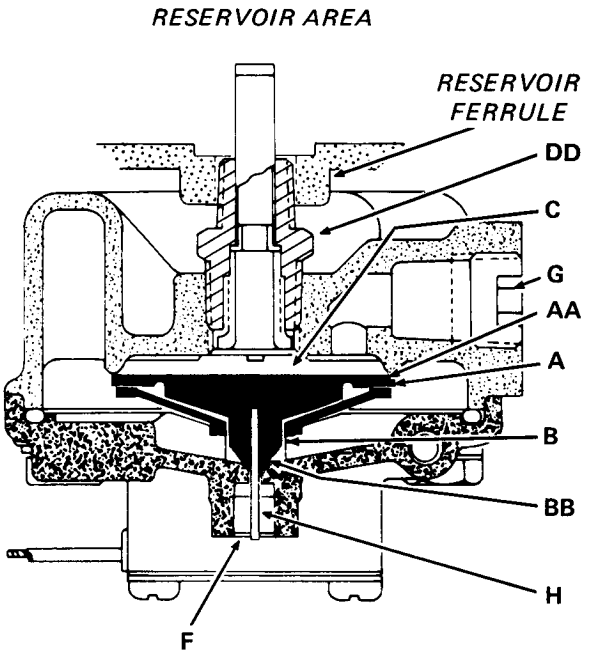
Check the brake head for cracks (caps - piston bores) by using "spot check."

For more detailed instructions, see service manual.

AUTOMATIC DRAIN VALVES FOR AIR RESERVOIRS

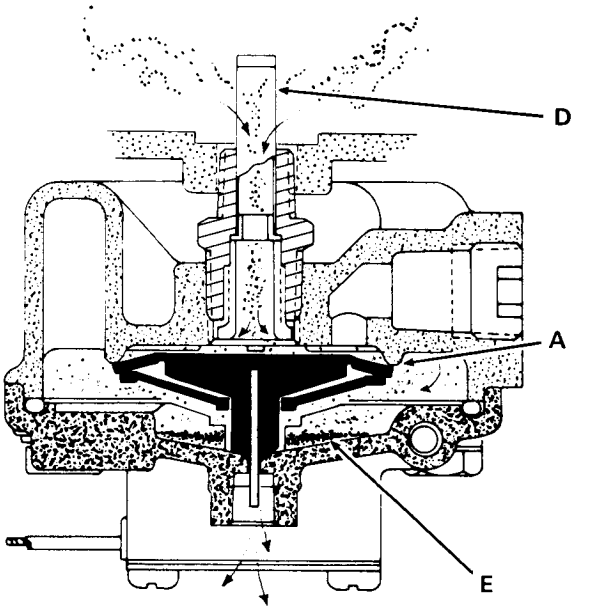
The automatic reservoir drain valve is designed to eject moisture and contaminants from the air system reservoir each time there is a reduction in air reservoir pressure. It is operated automatically from changes in reservoir air pressure and requires no manual assistance or control lines from other sources.

FIGURE 1



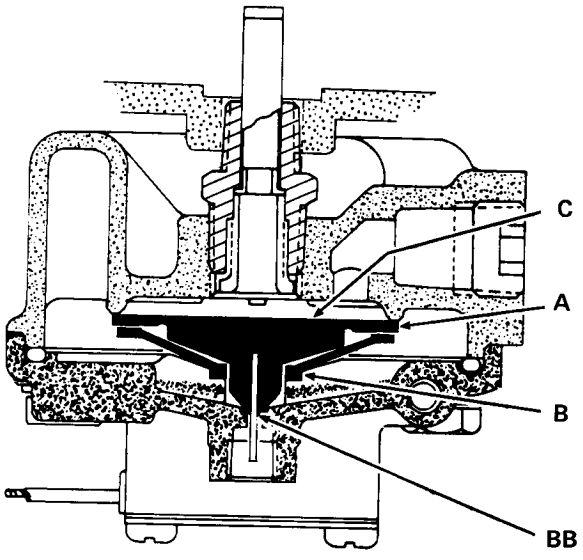
(See Figure 1) When there is no pressure in the air tank, the inlet valve (A) and exhaust valve (B) of diaphragm (C) are on their respective seats (AA & BB).

FIGURE 2



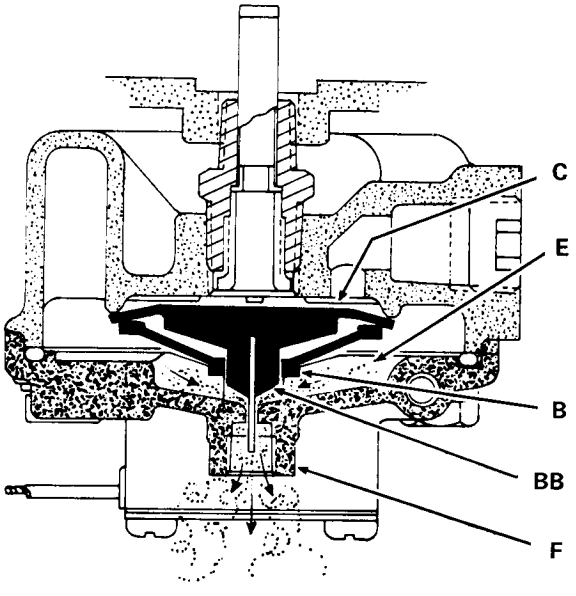
(See Figure 2) When the system is charged air pressure of 5 PSI in the reservoir opens inlet valve (A) and permits air and contaminants to pass through filter element (D) and collect in the sump area (E). The inlet valve (A) remains open while system pressure is increasing until the maximum governed air pressure is reached.

FIGURE 3



(See Figure 3) When the governed air pressure is reached, the pressure above and below diaphragm (C) balances, and the inlet valve (A) closes. Exhaust valve (B) remains on its seat (BB).

FIGURE 4

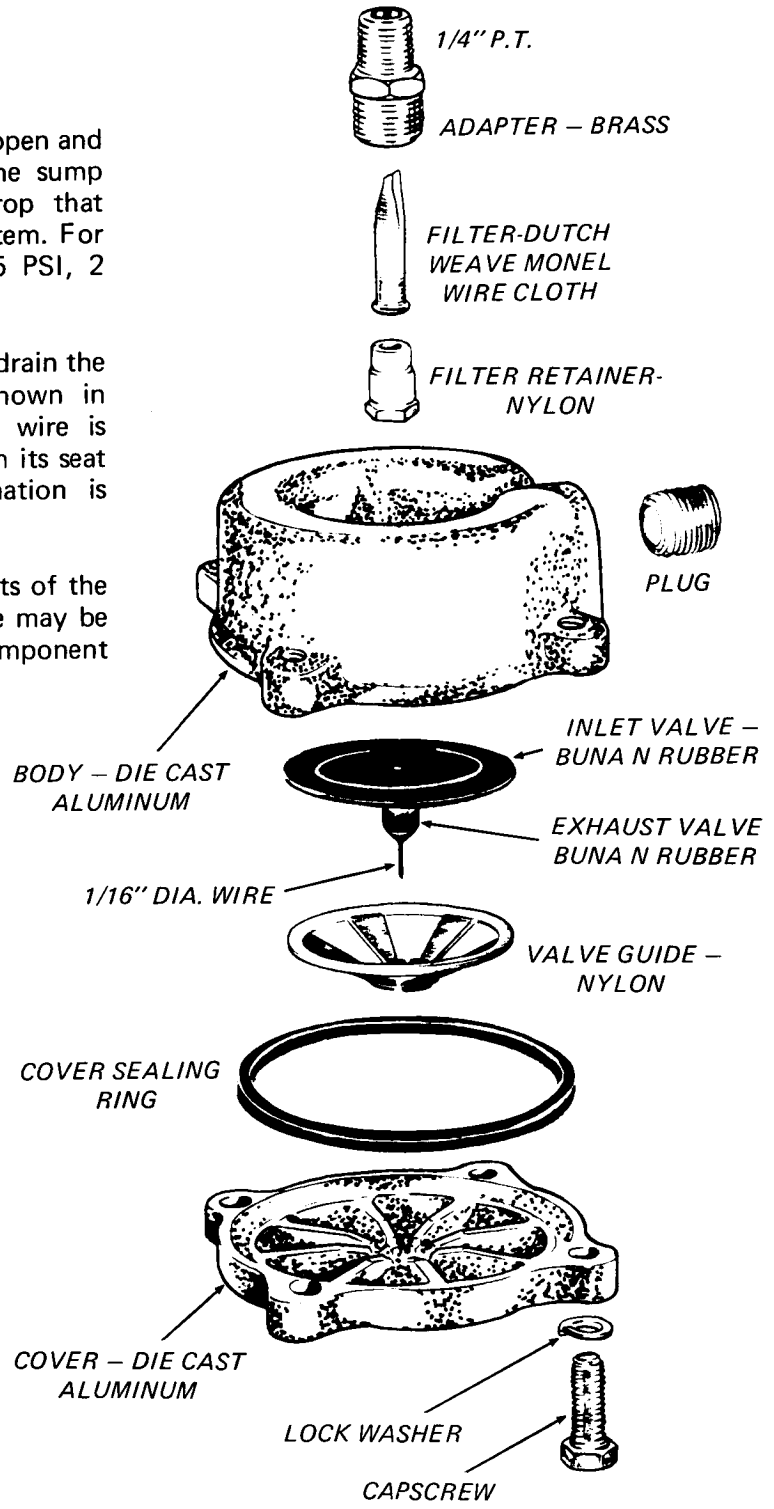


(See Figure 4) When air pressure in the reservoir drops approximately 2 PSI, pressure below diaphragm (C) is greater than pressure above it. This pressure lifts the center portion of diaphragm (C) which in turn lifts exhaust valve (B) from its seat (BB). Any water or foreign material collected in the sump area (E) is expelled through the exhaust port (F) to the atmosphere until the sump pressure drops sufficiently to close the exhaust valve.

The length of time that the valve remains open and the amount of moisture ejected from the sump depends upon the reservoir pressure drop that occurs each time air is used from the system. For example, if the system pressure drops 5 PSI, 2 cubic centimeters of liquid will be ejected.

If for any reason it becomes necessary to drain the valve manually, the 1/16" wire (H), shown in Figure 1, can be depressed. When this wire is depressed, exhaust valve (B) is lifted from its seat (BB) and the moisture and contamination is drained from the sump area (E), manually.

An exploded view of the component parts of the automatic drain valve is shown. The valve may be disassembled and cleaned. The rubber component parts and seals may be replaced.



CLARK Service gram

August 20, 1971

MICHIGAN SG-371A

Group Ref. No. 400

(This bulletin supersedes and replaces SG-371 dated 3-3-71.
Reason: To revise service interval for tightening brake disc mounting bolts.)

SUBJECT: Brake Disc Mounting Bolt Torque. Applicable to all 55 IIIA, 75 IIIA, 85 IIIA, & 175A (427A Series) Tractor Shovels equipped with Disc Brakes.

Brake Disc Mounting Bolts: Check brake disc mounting bolts after first 250 operating hours. If any bolts show evidence of loosening, all brake disc mounting bolts should be re-tightened as follows:

1. Tighten all brake disc mounting bolts to 159-175 ft. lbs.

2. Repeat entire procedure so that each individual bolt is checked twice. Subsequent checking will not be necessary unless brake disc is replaced.

Replacement of Brake Disc: If at any time it is necessary to replace the brake disc, all mounting bolts should be tightened in the following manner:

1. Tighten all brake disc mounting bolts to 159-175 ft. lbs.

2. Repeat entire procedure so that each individual bolt is checked twice.

3. After first 250 operating hours, check brake disc mounting bolts. If any bolts show evidence of loosening, all brake disc mounting bolts should be re-tightened as described in Steps 1 and 2 above.

Refer to Service Tool Release STR-7 for data on torque wrench and adapter equipment necessary to perform the above operations.

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CLARK

Service Tool Release

August 20, 1971 STR-7

SUBJECT: Torque Wrench Adapters for Use When Checking Torque on Brake Disc Mounting Bolts

MICHIGAN Service Gram SG-371A calls for brake disc mounting bolts to be tightened to 159-175 ft. lbs. This Service Tool Release provides two torque wrench adapters to facilitate tightening the brake disc mounting bolts with wheel and tire assembly in place. Both adapters are to be used with a standard 10 inch socket extension and a 200 ft. lb. capacity torque wrench, with 1/2 inch drive. Torque wrench handle length should be 24 inches (20 inches to center of handle pivot).

The box end adapter is designed for use on Models 55 IIIA, 85 IIIA, and 175A (427A Series). The open end adapter is designed for use on Model 75 IIIA where spacing of brake disc mounting bolts prohibits use of box end adapter.

It must be emphasized that use of these adapters with a torque wrench changes the lever length of the torque wrench, resulting in an inaccurate reading at the torque wrench scale. It will be necessary to use the following formula to determine the corrected wrench scale reading when the desired torque is being applied to the bolt head.

A = Length of adapter
L = Lever length of torque wrench
Ta = Desired torque at bolt head
Tw = Torque wrench scale reading

$$Tw = \frac{Ta \times L}{L + A}$$

The above formula when applied to the use of a 3-1/2 inch adapter with a torque wrench having a lever length of 20 inches to obtain a torque value of 159 to 175 ft. lbs. at the bolt head will give a wrench scale reading of approximately 136 to 149 ft. lbs.

Refer to Figures 1 and 2 for correct use and fabrication instructions for box end and open end adapters.

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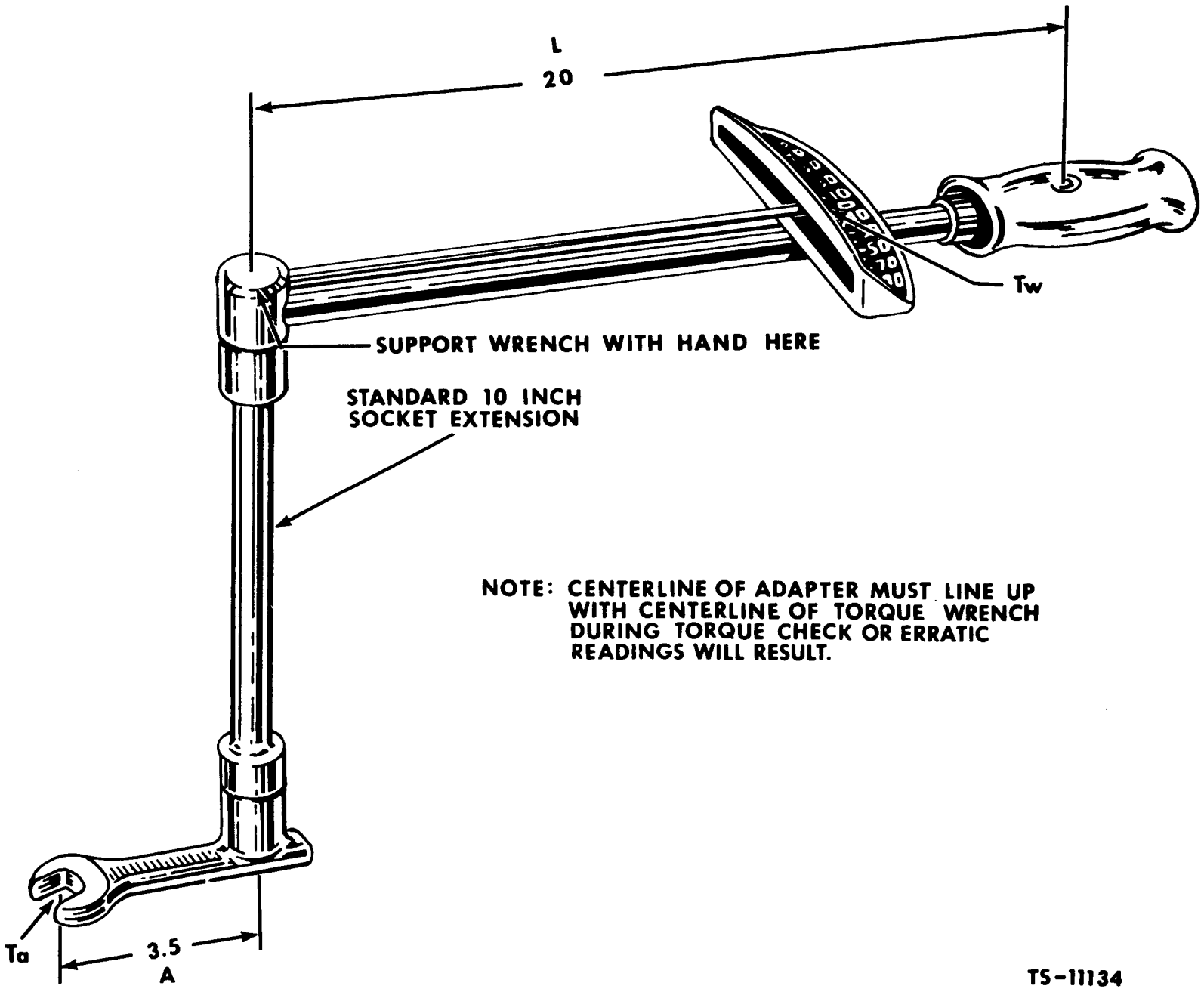
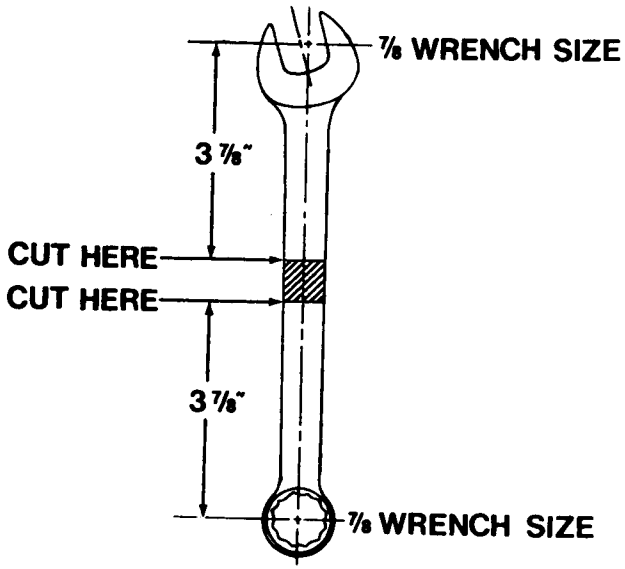
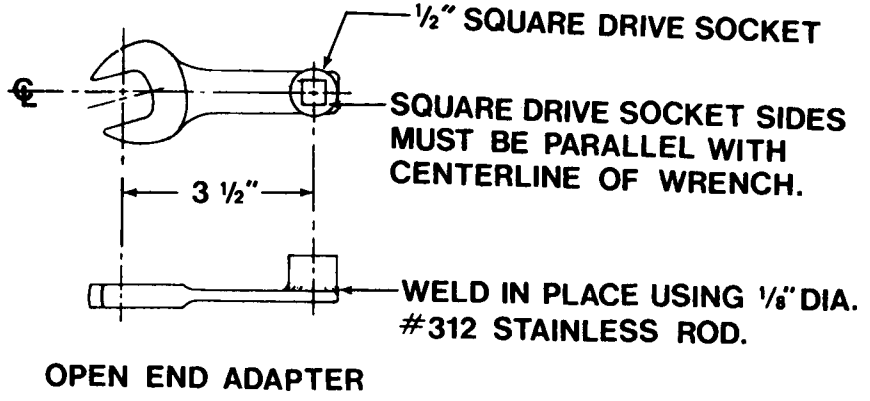


Figure 1. Use of Torque Wrench with Adapter

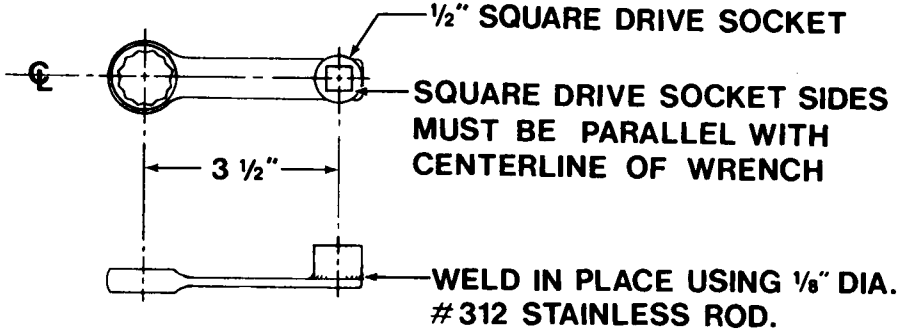
SG-371A



STANDARD ⅞" COMBINATION WRENCH



OPEN END ADAPTER



BOX END ADAPTER

(3E14)

Figure 2. Fabrication of Torque Wrench Adapters

TS-11135

CLARK Service gram

23 October 1974

MICHIGAN SG-439A
Group Ref. No. 400

(This bulletin supersedes and replaces SG-439, dated 26 July 1972.
REASON: To clarify installation instructions and include Model 175B).

SUBJECT: Disc Type Parking Brake Assy
Models 175B, 275B & 475-111A

An improvement change has been made on the subject model machines employing a disc type parking brake, to alleviate the possibility of the locknut, which retains the brake pad and actuating arm, loosening in service and rendering the brake ineffective. The self locking type nut has been replaced with two 7D-08 Jam Nuts. This change became effective on machines shipped from the factory with the following serial numbers:

MODEL	EFFECTIVE S/N's
175B	427A395 & after
275B	425B110, 425B111, 425B114, 425B129, 425B130, 425B132, 425B134, 425B135, 425B141, 425B144 & after
475-111A	421F134, 421F137, 421F139, 421F141 & after

It is recommended that the above described change be incorporated on existant machines in the field, employing the disc type parking brake, at the first opportunity in the interest of safety and to prevent the possible loss of an effective parking brake. Machine serial numbers on which this change is recommended are as follows:

MODEL	SERIAL NUMBERS
175B	Not Required
275B	425B101 thru 425B109, 425B112, 425B113, 425B115, 425B121 thru 425B128, 425B131, 425B133, 425B142, 425B143
475-111A	421F109, 421F122, 421F124 thru 421F133, 421F135, 421F136, 421F138, 421F140

PARTS REQUIRED (per machine):

2 - 7D-08 Jam Nut

Install parts as shown in Fig. 1 herein.

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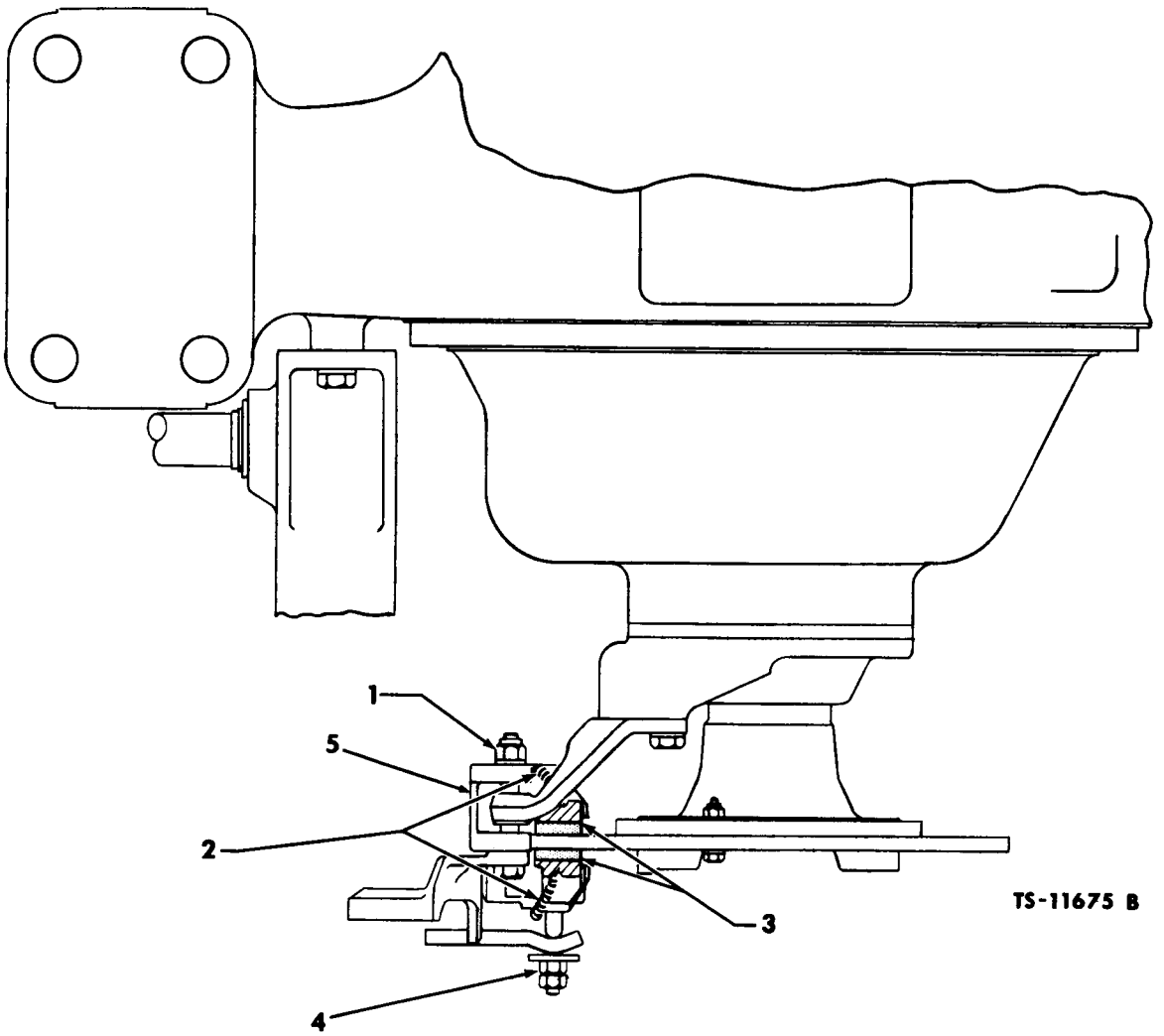

Fig. 1

1. Upper Caliper Mounting Bolt
2. Return Spring
3. Pad & Lining Assembly
4. Remove Existant Locknut. Install One 7D-08 Nut and Adjust Nut to Provide .010" (0,25 mm) Clearance Between Disc & Lining on One Side Only. Install Second 7D-08 Nut & Lock in Place
5. Item 1 Should be Tightened Until Flatwasher is Tight Plus 5 ft. lbs. (0,69 kgm), No More. Item 5 Must be Able to Float.

CLARK Service gram

November 22, 1972

MICHIGAN SG-456
Group Ref. No. 400
200

SUBJECT: Improved Wheel Disc Brake System
Model 175B

Product improvement changes have been made to the components of the wheel disc brake system used on the subject model machine. These changes consist of incorporating the use of high temperature material in the brake head piston packings (Item 14, Fig. 1) and the piston retaining cap seals (Item 11, Fig. 1) as well as in the axle wheel hub seals (Item 22, Fig. 2) to improve their heat resisting qualities.

Also involved is the removal of the residual pressure check valve and spring (Items 20 & 21, Fig. 3) from the master cylinder section of the air-over-hydraulic power cluster. Removal of the check valve and spring eliminates trapping of residual pressure in the brake lines, requiring a longer travel of the master cylinder piston and primary cup (Items 25 & 24, Fig. 3) before system pressure is built up, thus alleviating the possibility of extrusion of the primary cup into the by-pass port in the master cylinder body. Elimination of residual pressure in the brake lines also assures that system pressure holding brake head pistons against the brake lining is fully relieved when the brakes are released, thus alleviating the possibility of the brake linings dragging on the wheel discs.

The above described changes became effective on machines shipped from the factory with machine serial numbers 427A219, 427A361 thru 427A364, 427A369, 427A375 & after.

It is recommended that when any part of the brake system is repaired or overhauled, for any reason, that the above described changes be incorporated by use of the parts listed below.

PARTS REQUIRED (per machine):

Qty.	Part No.	Description
8	949847	Kit, Brake Head Seal (Items 11, 13 & 14, Fig. 1)
4	125248	Oil Seal, Wheel Hub (Item 22, Fig. 2)
2	949848	Kit, Master Cyl. (Items 24,25 & 27, Fig. 3 plus a boot which is to be discarded).
32	947935	Piston, Brake Head (Item 12, Fig. 1) - Optional as required.
16	947932	Lining, Brake (Item 6, Fig. 1) - Optional as required.

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INSTALLATION:

949847 Brake Head Seal Kit - Brake head assemblies must be removed from machine. Install seal kits in accordance with instructions in Shop Manual 2501.

125248 Wheel Hub Oil Seal - With brake head assemblies removed, remove planetary assemblies and install wheel hub oil seals as outlined in Shop Manual 1989.

949848 Master Cylinder Repair Kit - Disconnect air and hydraulic lines from brake power cluster assemblies and remove power clusters from machine. Install repair kit as follows:

1. Separate air cylinder from master cylinder by removing fastening bolts.

2. Using screwdriver or suitable pick, remove lock ring from groove in end of cylinder bore. Internal parts should slide out or can be fished out.

3. Using only denatured alcohol or hydraulic brake fluid, clean all parts thoroughly. Use only lint-free cloth in cleaning.

4. Discard check valve and spring, Items 20 & 21 in Fig. 3. Replace Items 24, 25 & 27 with new parts in kit.
   NOTE: Kit contains a rubber boot which is to be discarded since it is not used in this application.

5. Lubricate all parts and the cylinder bore with clean brake fluid and reassemble in opposite sequence of disassembly.

6. Reassemble master cylinder to air cylinder and reinstall power cluster in machine. Reconnect air and hydraulic brake lines.

7. When all other changes to brake system have been completed, fill master cylinders with clean brake fluid and bleed brake system as outlined in Shop Manual 2501.

947935 Brake Head Pistons (Optional) & 947932 Brake Linings (Optional)

These parts when used are to be installed as outlined in Shop Manual 2501.

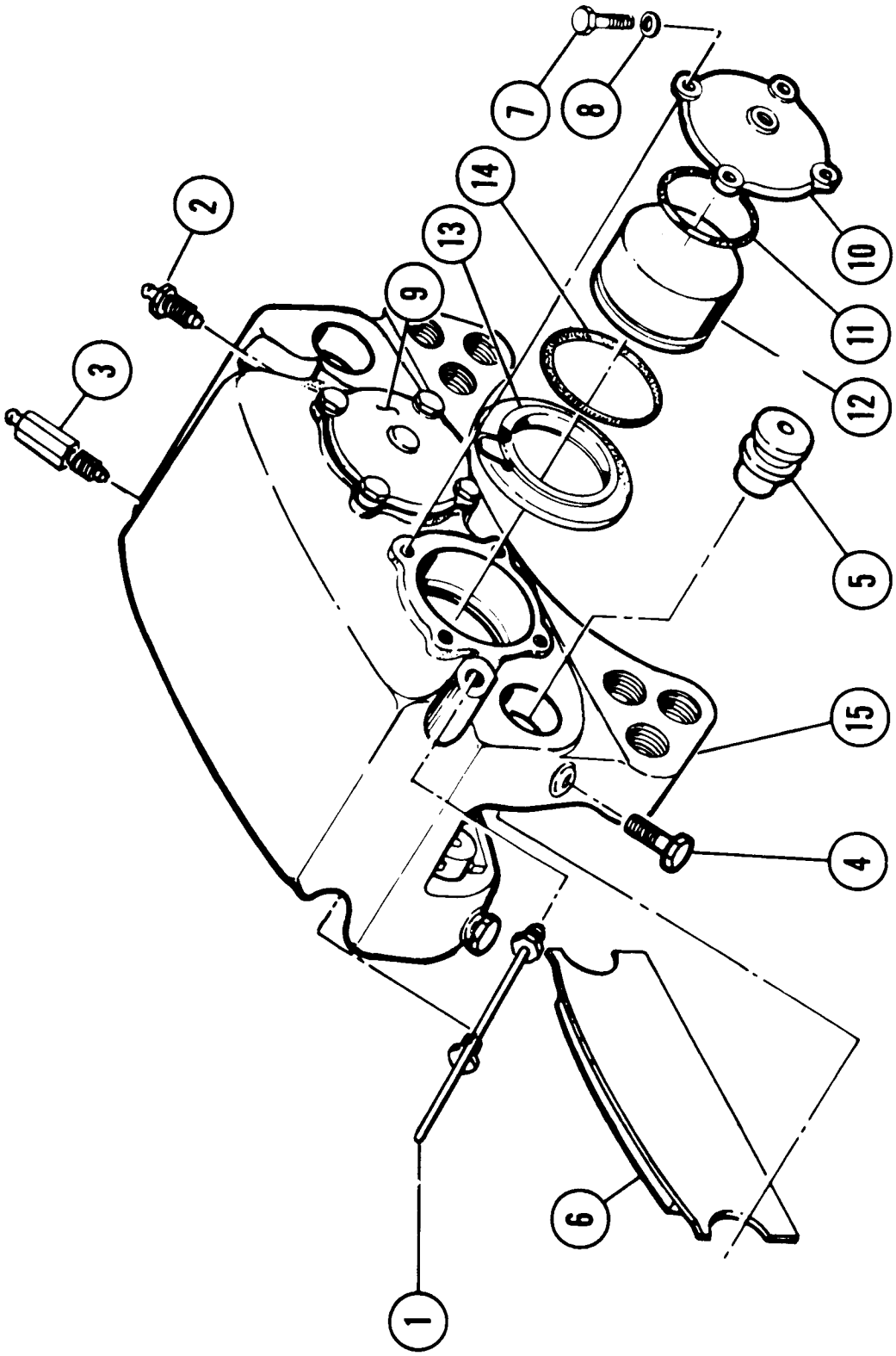

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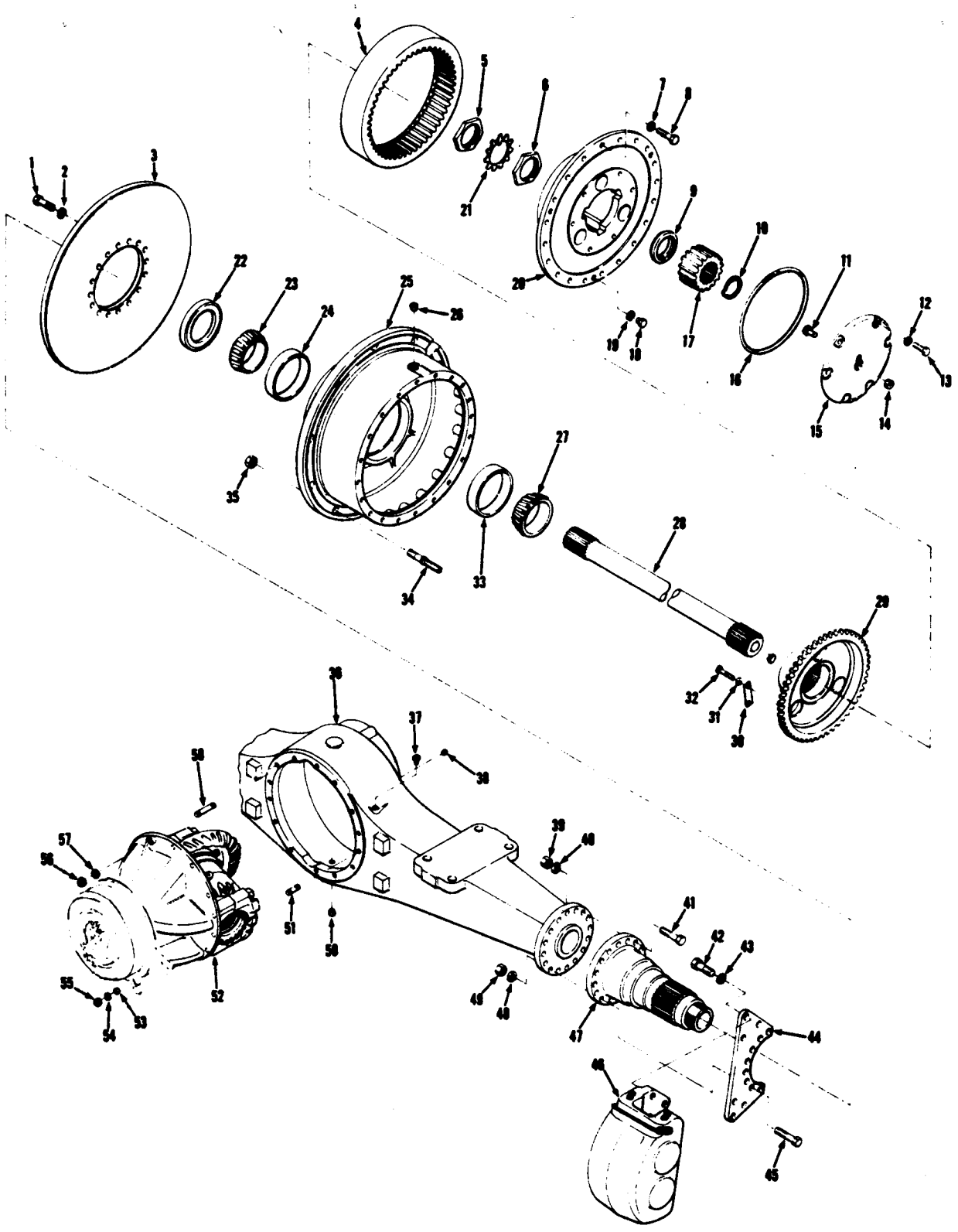
Fig. 1



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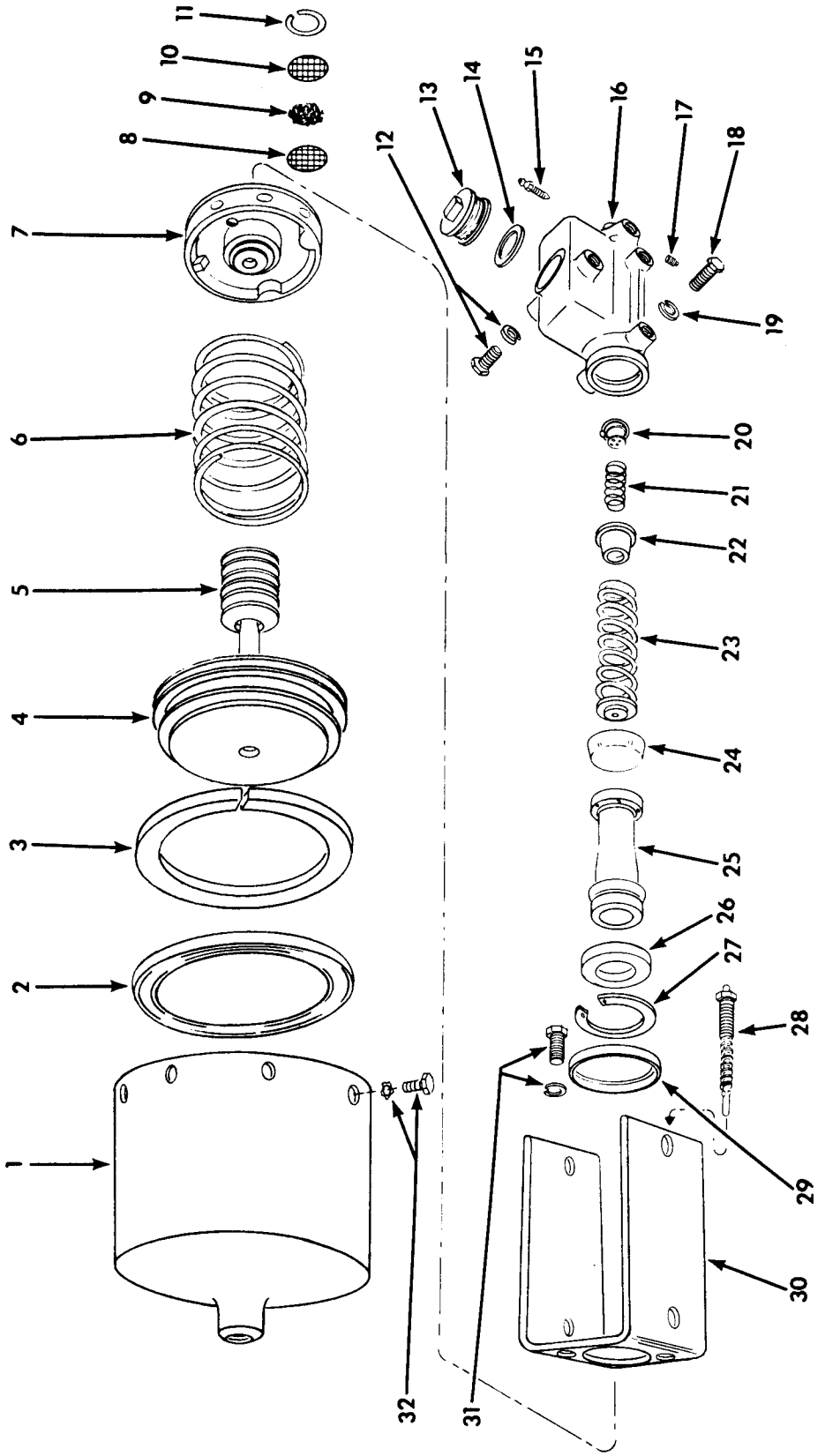
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Fig. 3

TS-3227

CLARK Service gram

31 October 1973

MICHIGAN SG-490
Group Ref. No. 400

SUBJECT: Replacement of Brake Piping Hose from Compressor Discharge Tube to Tank Model 175B G. M. & 275B Cummins

An improvement change has been made on subject model machines which features the use of a new improved brake piping hose from compressor discharge tube to air tank. This hose is designed to provide longer service life at the temperatures encountered on subject model machines. It is recommended that whenever service replacement of this hose is required on subject model machines that the new improved hose be used.

PARTS REQUIRED (per machine):

175B G. M.	Use Figure 1
1 - 2504865	Hose
1 - 40F-8	Adapter Union
275B Cummins	Use Figure 2
1 - 2504863	Hose
1 - 40F-8	Adapter Union

INSTALLATION:

1. Refer to appropriate installation drawing, Figure 1 for Model 175B G. M. or Figure 2 for 275B Cummins and remove existing hose (Item 8, Figure 1) for 175B G. M. or (Item 108, Figure 2) for 275B Cummins.

2. Install new hose, part number 2504865 for 175B G. M., or part number 2504863 for 275B Cummins using 1 - 40F-8 Adapter Union to connect hose to compressor discharge tube.

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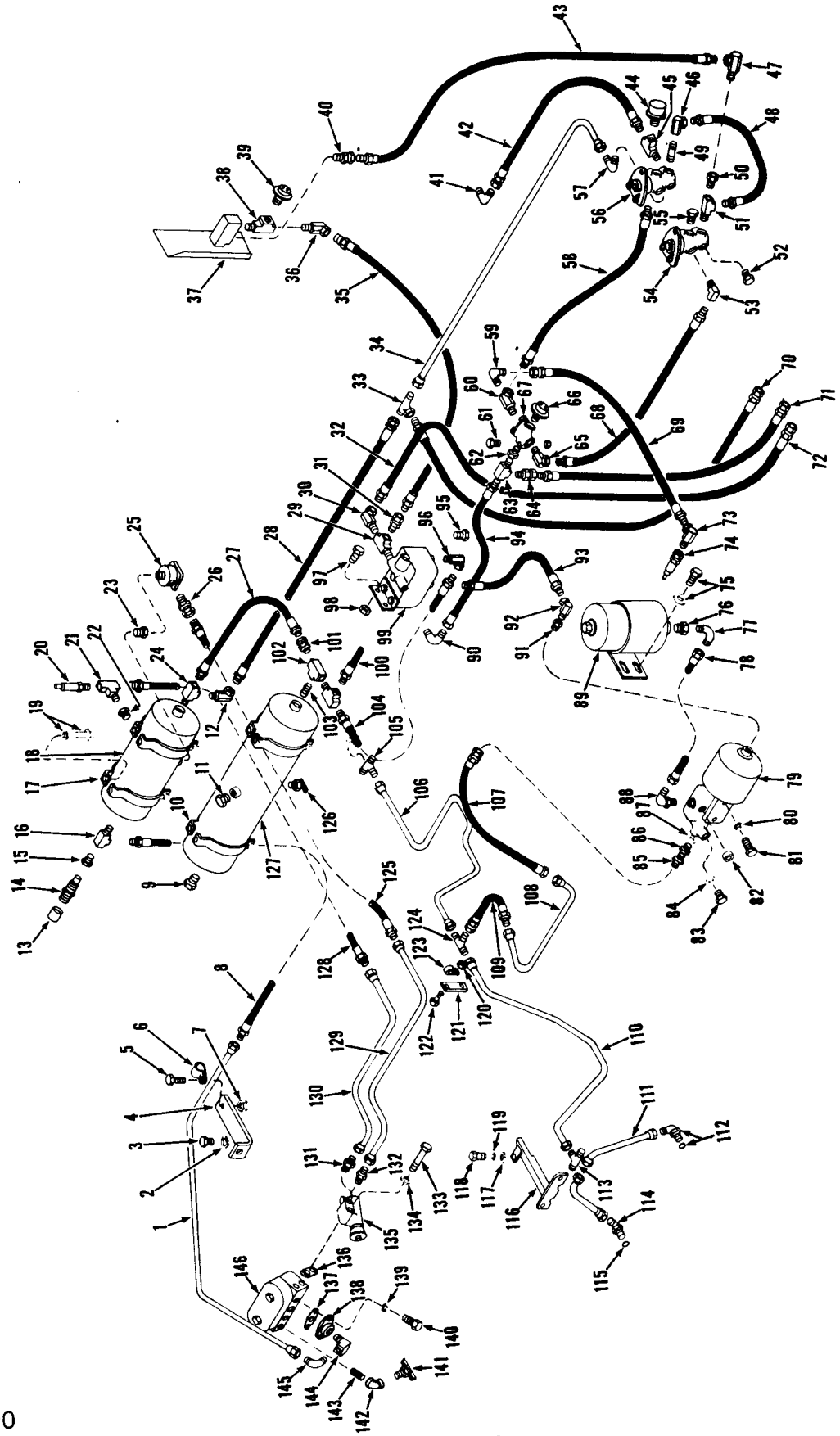

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Figure 1

SG-490

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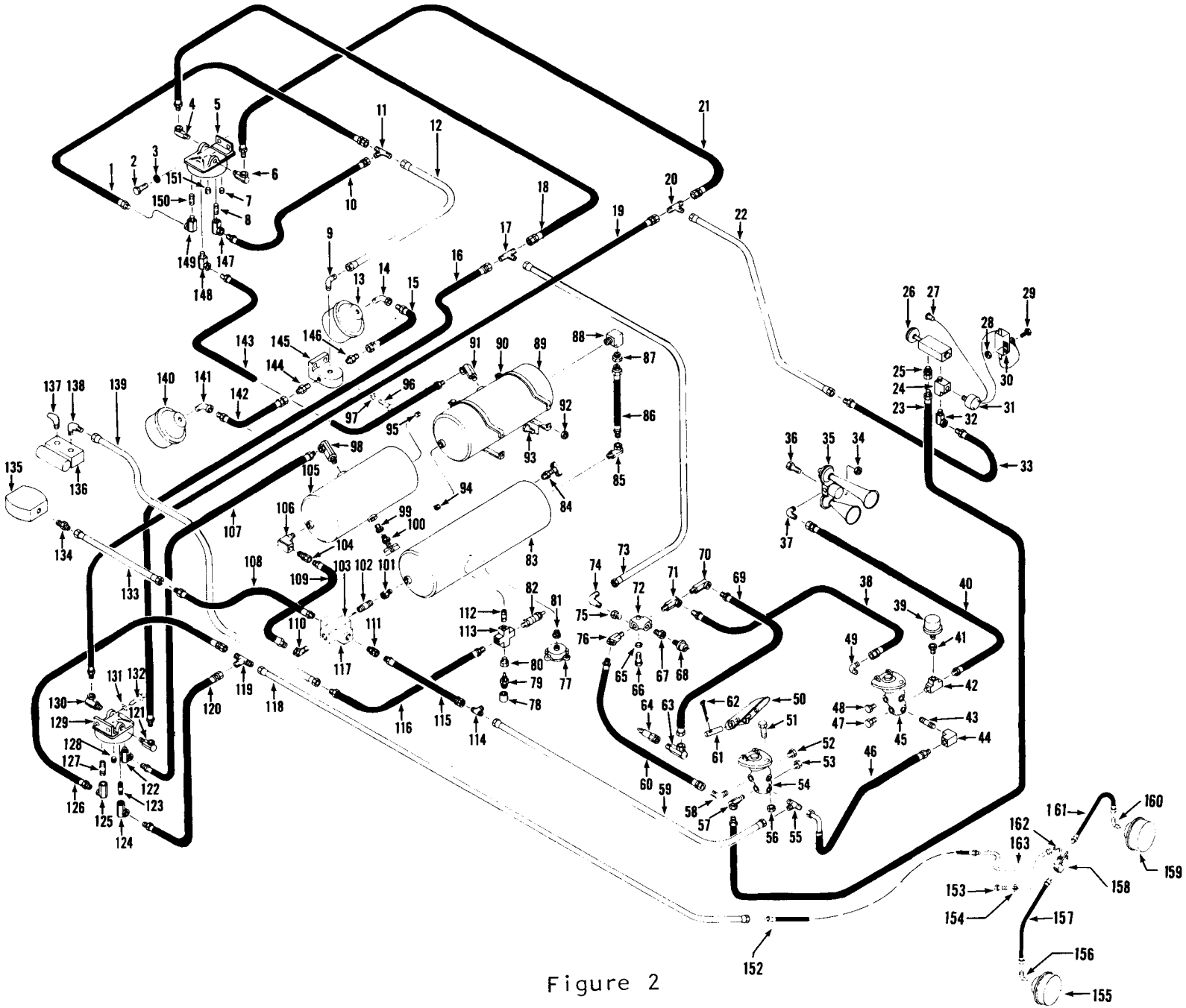


Figure 2

CLARK Service gram

15 May 1974

MICHIGAN SG-495
Group Ref. No. 400

SUBJECT: Addition of Brake Fluid Reservoirs
Model 175B Tractor Shovel

An improvement change has been made on subject model machines, which features the addition of brake fluid reservoirs on both front and rear tractor halves providing a greater supply of brake fluid for both front and rear master cylinders. This change became effective on Model 175B tractor shovels shipped from the factory with serial numbers 427B101 and after. This improvement may be made on subject model machines in the field bearing serial numbers 427A101 thru 427A999 by using parts listed below and installing them in accordance with the following instructions.

PARTS REQUIRED (per machine):

2 - 960005	Cap, Master Cylinder
2 - 2501154	Reservoir
2 - 2501470	Hose
2 - 33F-4	Elbow
2 - 19F-1	Bushing
2 - 17K-4	Adapter Fitting, 90°
4 - 24C-612	Bolt
4 - 656672	Washer
4 - 546169	Tapped Block

INSTALLATION:

1. Weld (2) 546169 Tapped Blocks on front frame with a .31 fillet weld all around each block as shown in Figure 1, using a .1875 diameter AWS-E-7014 electrode or equivalent.

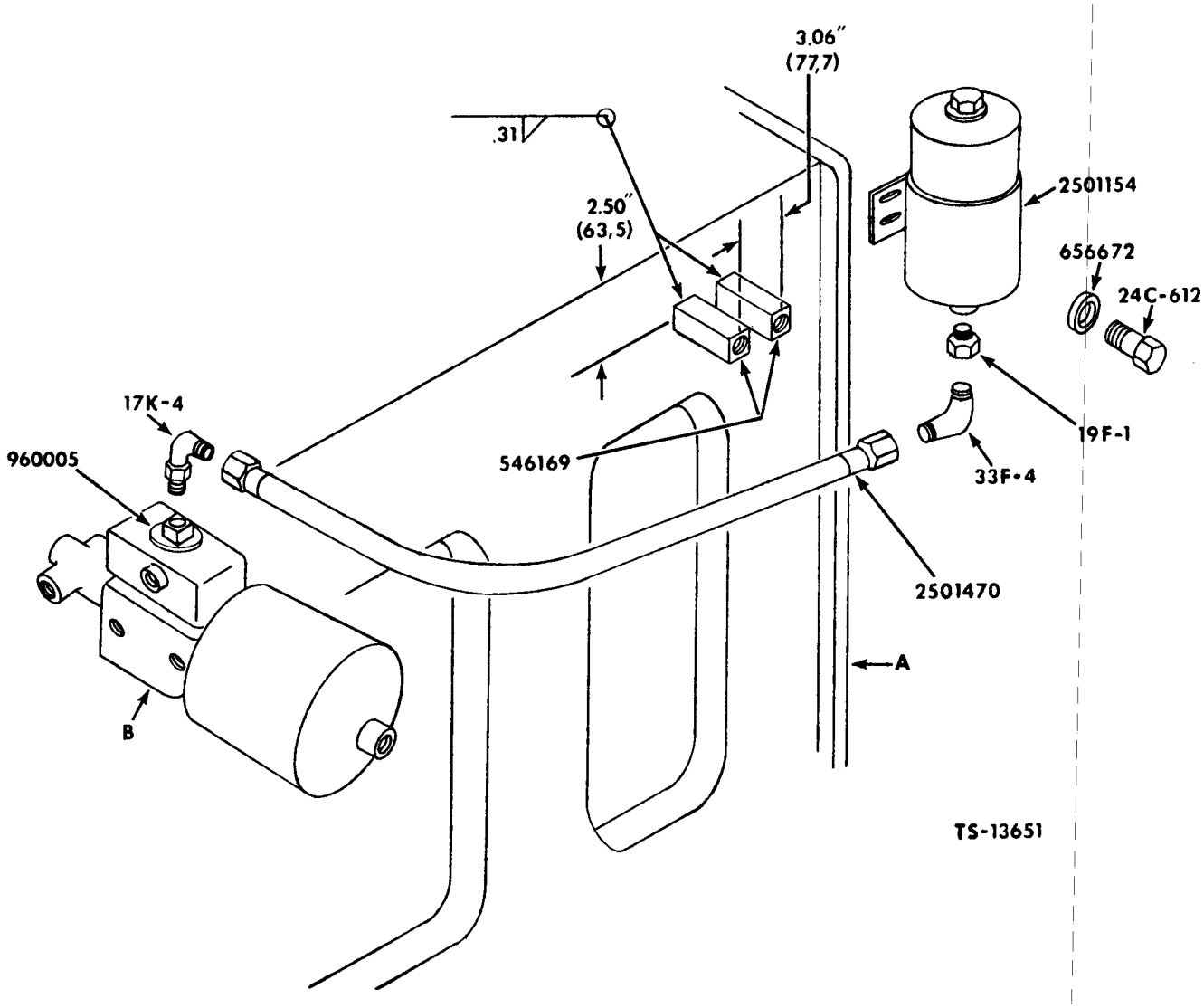
2. Weld (2) 546169 Tapped Blocks to inside rear wall of cockpit with a .18 fillet weld all around each block as shown in Figure 2 using a .1875 diameter AWS-E-7014 electrode or equivalent.

3. Install (1) 2501154 Reservoir on front frame as shown in Figure 1 and (1) 2501154 Reservoir on inside rear wall of cockpit as shown in Figure 2, using tapped blocks installed in Steps 1 and 2. Fasten each reservoir in place using (2) 24C-612 Bolts and (2) 656672 Washers.

4. Remove existing fill cap from each master cylinder and install (1) 960005 Cap in its place.

5. Install (1) 19F-1 Reducer Bushing in the bottom of each reservoir.

6. Install (1) 17K-4 90° Adapter Fitting in the new fill cap on both master cylinders.


3.06"
(77,7)
.31
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2501154
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TS-13651

Figure 1

7. Install (1) 33F-4 Elbow in reducer bushing in bottom of both reservoirs.

8. Install both 2501470 Hoses connecting reservoir assemblies to master cylinder assemblies as shown in Figures 1 and 2.

9. Fill brake fluid reservoirs with SAE J-1703 (Clark 850487) brake fluid and bleed brakes as described in applicable operators manual.

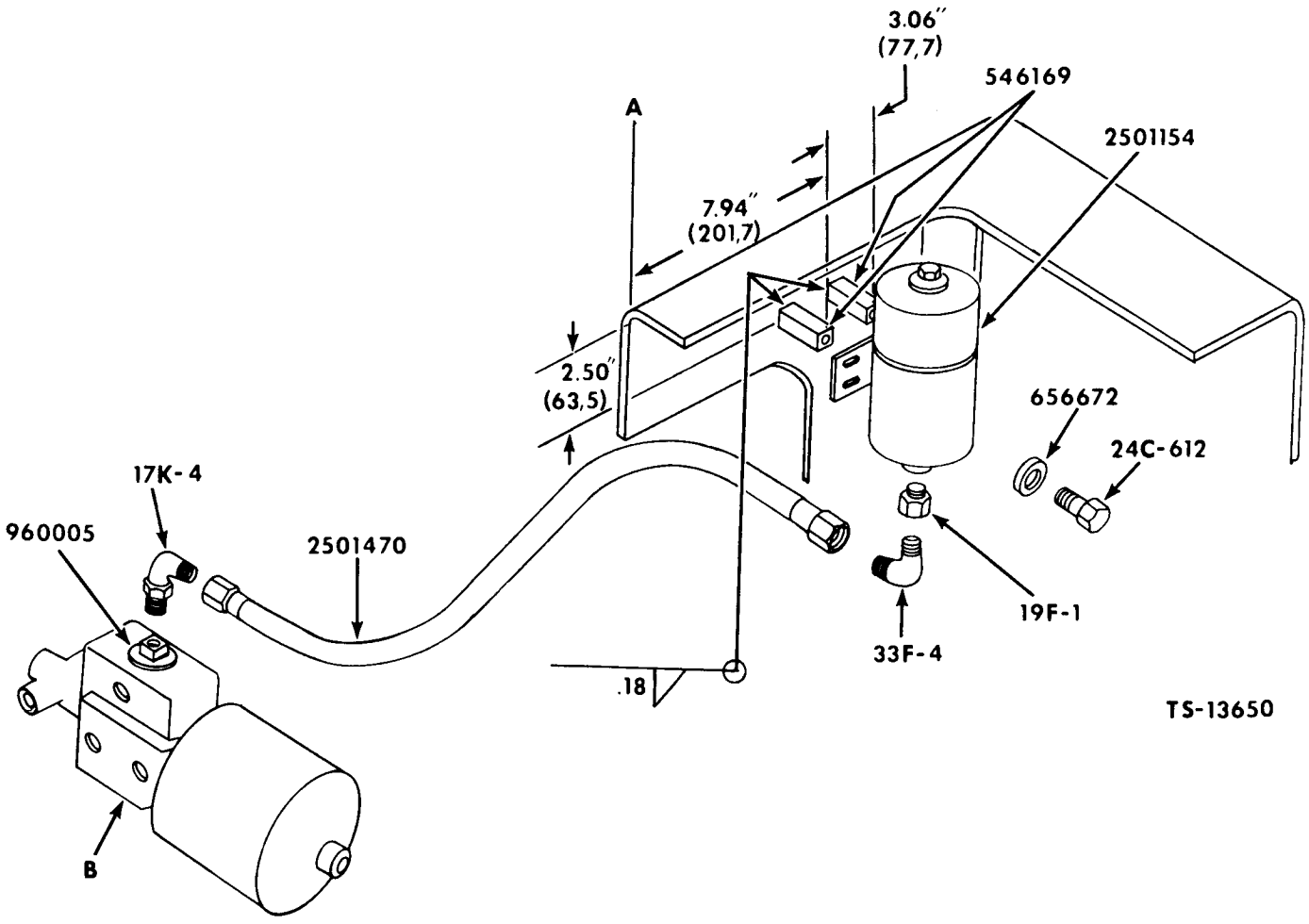

Figure 2

CLARK Service gram

20 November 1974

MICHIGAN SG-498A
Group Ref. No. 400

(This bulletin supersedes and replaces SG-498, dated 16 January 1974. REASON: Updated to clarify installation of disc brake guard).

SUBJECT: Front Axle Disc Brake Guard
Model 85-IIIA & 175B Tractor Shovels

An improvement change has been made on Model 175B Tractor Shovels, which features the addition of front axle disc brake guards. This change became effective on Model 175B Tractor Shovels shipped from the factory bearing the following serial numbers: 427B211, 427B212, 427B214 thru 427B216, 427B218 thru 427B227 & 427B229 and after.

This improvement may be made, if desired, on Model 175B Tractor Shovels with serial numbers 427A101 thru 427A999, 427B101 thru 427B210, 427B213, 427B217 and 427B228. This improvement may also be made, if desired, on Model 85-IIIA Tractor Shovels bearing serial numbers 401B101 and after & 426A101 and after. The improvement may be accomplished by using parts listed below and installing them in accordance with the following instructions.

PARTS REQUIRED (per machine):

2 -	125592	Guard, Brake
8 -	224727	Washer
8 -	125596	Bolt
8 -	111656	Washer (Existing)

INSTALLATION:

NOTE: It will be necessary to block up the front frame to permit removal of front wheel and tire assemblies to accomplish the installation of front axle disc brake guards.

Adequate safety precautions must be taken to prevent possible accidents and injuries while doing this work. Adequate and safe blocking must be employed to securely support the front frame while work is being accomplished.

1. With front frame securely blocked, remove front wheel and tire assemblies.

2. Remove existing brake line guard and retain guard and inboard mounting bolts for reuse. (Brake line guard not used on 85-IIIA).

3. Disconnect and remove brake lines to gain access to brake head mounting bolts used to mount disc brake guard. See Figure 1.

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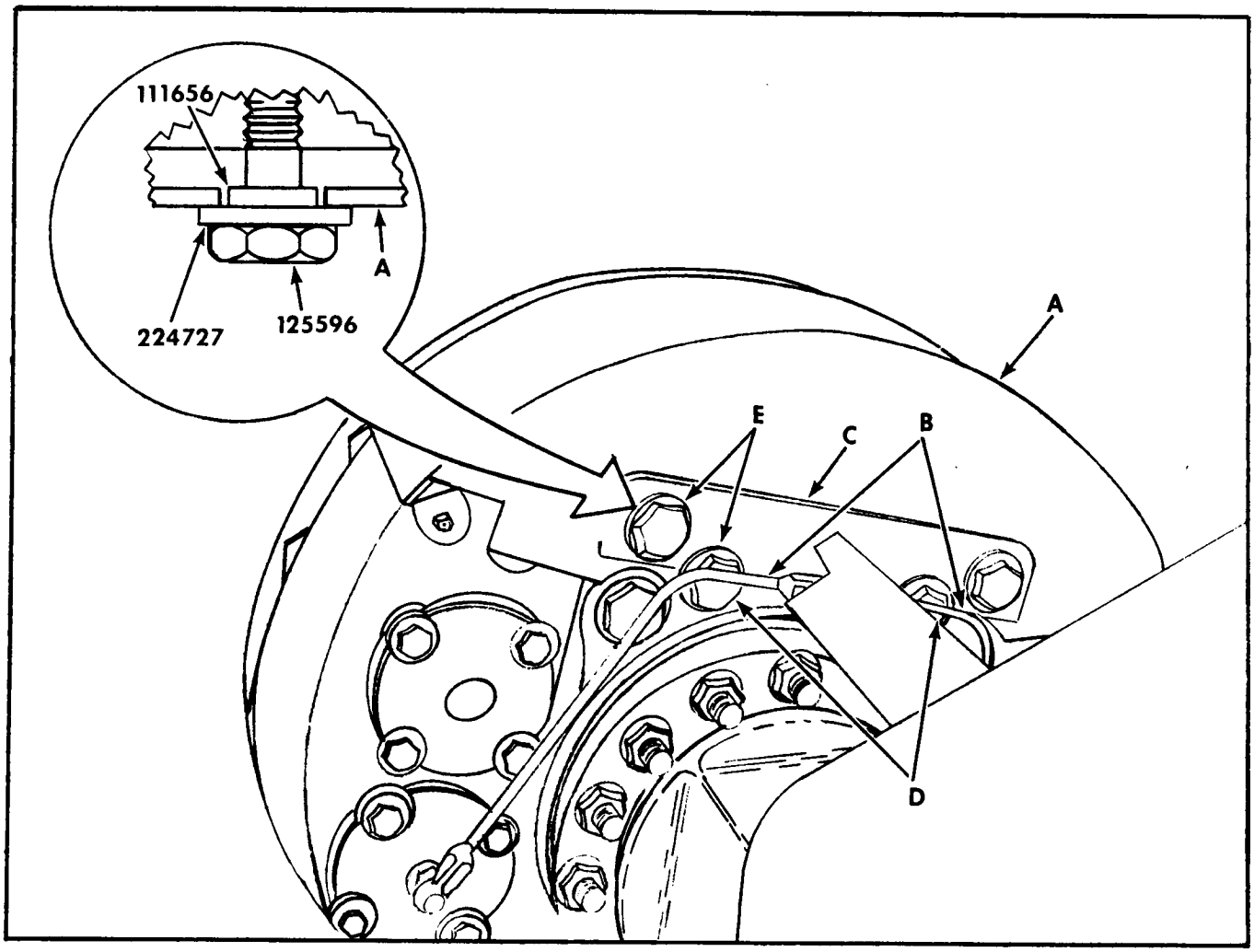


TS-14004

Figure 1

A. Brake Guard
B. Brake Lines
C. Brake Line Guard (Applicable to 175B only)
D. Use these Bolts to Fasten Brake Guards in place. Ref. - Step #5
E. 125596 Bolts, 224747 Washers & 111656 Washers

4. Remove and discard eight mounting bolts, four per side, to allow for installation of brake guard.

5. Position brake guards on brake heads and fasten in place with two 125596 Bolts and two 224727 Washers on each brake guard as shown in Figure 1.

6. Reinstall brake lines and bleed brake system as described in appropriate operators manual.

7. Reinstall brake line guards using original inboard mounting bolts and four new 125596 Bolts, 224727 Washers, and four 111656 Washers, two of each per side.

8. Tighten brake disc mounting bolts to 282-310 ft. lbs. torque.

9. Reinstall wheel and tire assemblies and tighten wheel mounting bolts to 320 ft. lbs. torque with oiled threads on Model 175B and 425 ft. lbs. dry on Model 85-111A. Recheck torque on all wheel mounting bolts.

10. Remove blocking from front frame.

CLARK Service gram

27 February 1976

MICHIGAN SG-587
Group Ref. No. 200
400

SUBJECT: Improvements to Brake System and Inner Wheel Hub Bearing (Cone)
Model 175B Tractor Shovel

The following improvements have been made to the brake system and wheel hub bearing on the 175B.

(1) REMOTE BRAKE FLUID RESERVOIRS. To provide a greater supply of brake fluid (Service Gram SG-495). This became effective on machines shipped from the factory with serial numbers: Cummins powered 438C101 and after; G. M. powered 427B101 and after.

(2) FRONT AXLE DISC BRAKE GUARDS (Service Gram SG-498A). This became effective on machines shipped from the factory with serial numbers: Cummins powered 438C101 and after; G.M. powered 427B211, 427B212, 427B214, 427B216, 427B218 thru 427B227, 427B229 and after.

(3) DUCTILE IRON BRAKE HEADS. Additional strength for longer life. This became effective on machines shipped from the factory with serial numbers:

Cummins Powered	G. M. Powered
438C142	427C160
438C146 front only	427C161 rear only
438C148 front only	427C162
438C149 rear only	thru
438C151	427C165
438C153 front only	427C166 rear only
438C154 front only	427C167
438C155 rear only	thru
438C157 front only	427C181
438C158	427C182 rear only
438C160	All after
All after	

(4) ADDITION of BRAKE COMPENSATOR VALVES. To increase the life of the primary cup in the master cylinder. This became effective on machines shipped from the factory with serial numbers: Cummins powered 438C121 and after; G. M. powered 427C121 and after.

(5) REMOVAL of the RESIDUAL PRESSURE CHECK VALVE and SPRING from MASTER CYLINDER. To reduce brake drag.

(6) IMPROVED INNER WHEEL HUB BEARING. This has been accomplished by using 127819 Bearing Cone (TIMKEN ONLY).

Printed in U.S.A.

When replacing one or more of the original (cast iron) brake heads, it is recommended that all brake heads on the machine be replaced and all other improvements in this Service Gram be incorporated at that time.

It is strongly recommended that the Brake Compensator Valves be installed without delay. Refer to INSTRUCTION FORM 003093 attached for procedure.

Ductile iron brake heads were installed on all 192156 and 192157 Axle Assemblies with axle serial number 433433 and after. Axle serial numbers are stamped on the banjo housing directly below the identification plate as shown in Figure 1. Ductile iron brake heads may be identified by the letter "D", approximately .625 in. (15,8 mm) in height, cast into the brake head as shown in the cut-a-way view in Figure 2.

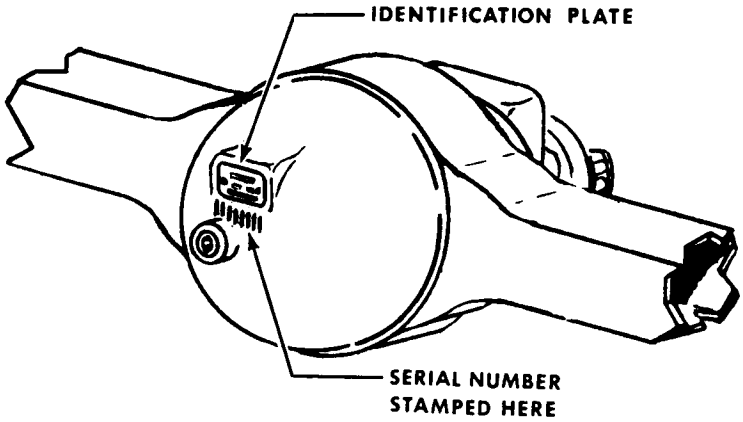


Figure 1

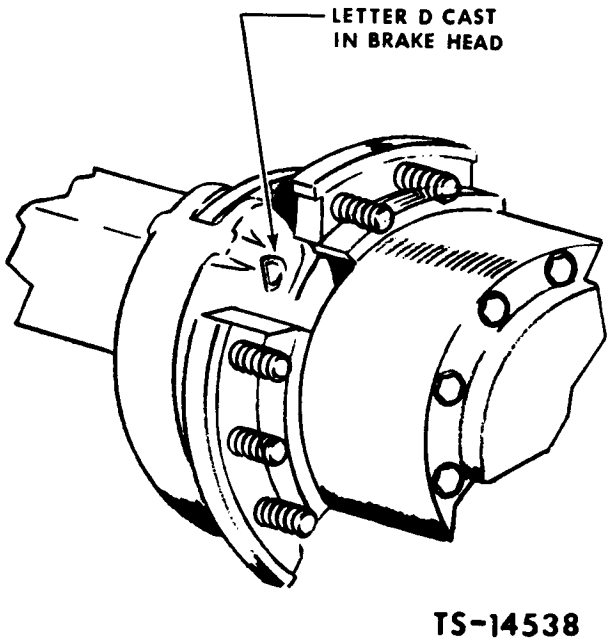


Figure 2

Part numbers of the ductile iron brake heads are:

128343 R. H. Front
L. H. Rear

128344 L. H. Front
R. H. Rear

When wheel hub is removed inspect the inner web area for cracks. If cracks exist replace hub assembly. If hub is not cracked replace inner and outer wheel hub bearings and oil seals. Use bearing cone 127819 (Timken Only). Refer to Shop Manual 1989 for disassembly and assembly procedures.

Removal of the residual pressure check valve and spring from the master cylinder is described in Item 4 on Page 2 of Form 003093.

When making these improvements be sure to check brake disc wear. Discs worn to less than .450 in. (11,4 mm) should be replaced. Whenever brake discs are replaced all mounting bolts are to be tightened in the following manner:

1. Tighten all brake disc mounting bolts to 159-175 ft. lbs. (22,0-24,2 kgm) torque.

2. Repeat entire process so that each individual bolt is checked twice.

3. After the first 250 operating hours on a new disc, check brake disc mounting bolts. If any bolts show evidence of loosening all brake disc mounting bolts should be retightened as described in Steps 1 and 2 above.

After improvements have been made to the brake system the following checks must be made.

1. Check air pressure, 95-110 psi normal.

2. Check lines, fittings, boots, caps bleeder screws and plugs for leaks.

3. Check brake system for excessive residual pressure.

   a. Install pressure gauge (0-10 or 0-20 psi) and gate valve between the power cluster and brake head at any convenient point.

      Gate valve is to be installed between gauge and pick-up point.

   b. Shut gate valve prior to brake application.

   c. Apply brakes to bleed added line thoroughly.

   d. Remove reservoir cover and check return hole at bottom of fluid reservoir to make sure that hole is free of possible contamination.

   e. Check master cylinder for full fluid in reservoir.

   f. Check all lines to be sure that no leaks are present, as pressure being checked is small.

g. Apply brake and hold briefly.

h. Release brake and open gate valve slowly to full open position.

i. Read gauge for pressure. Allow 30 seconds for gauge to stabilize.

If gauge reads above 2-4 psi, check the following:

SYMPTOM: Air Pressure remains at power cluster at all times.

Cause: Foot pedal not releasing properly.

Cause: Relay valve malfunctioning.

SYMPTOM: Master cylinder not reacting properly.

Cause: Scored piston or bore.

Cause: Blocked by-pass port due to:

a. Dirt in port.

b. Swollen seal caused by use of wrong fluid.

Cause: Piston return spring missing or weak.

Cause: Piston in air chamber not returning properly.

FORM 003093
INSTALLATION INSTRUCTIONS
2501983 BRAKE COMPENSATOR VALVES
MODEL 175B

Applicable to the following serial numbers:

U. S. Built Machines	Canadian Built Machines
Cummins - 438C101 thru 438C120	Cummins - 438C101CAC thru 438C105CAC
G. M. - 427A101 thru 427C120	G. M. - 427A101CAC thru 427C135CAC

PARTS REQUIRED (Per machine):

1 - 960621 Kit consisting of the following:

1 -	2511377	Tube Assembly
1 -	2511363	Tube Assembly
2 -	2511089	Mounting Plate
2 -	2501983	Compensator Valve
*2 -	2506979	Gasket
*2 -	2511196	Gasket
2 -	1675961	Adapter
2 -	699005	Adapter
4 -	24C-620	Bolt
4 -	4E-06	Lockwasher
4 -	25E-17	Flatwasher
2 -	949848	Repair Kit, Master Cylinder
850487	Brake Fluid SAE J-1703 (Not included in kit)	

*NOTE: The 2506979 Gasket and the 2511196 Gasket are made from the same material ahd have the same outside diameter but may be identified by their inside diameter. See Figure 1.

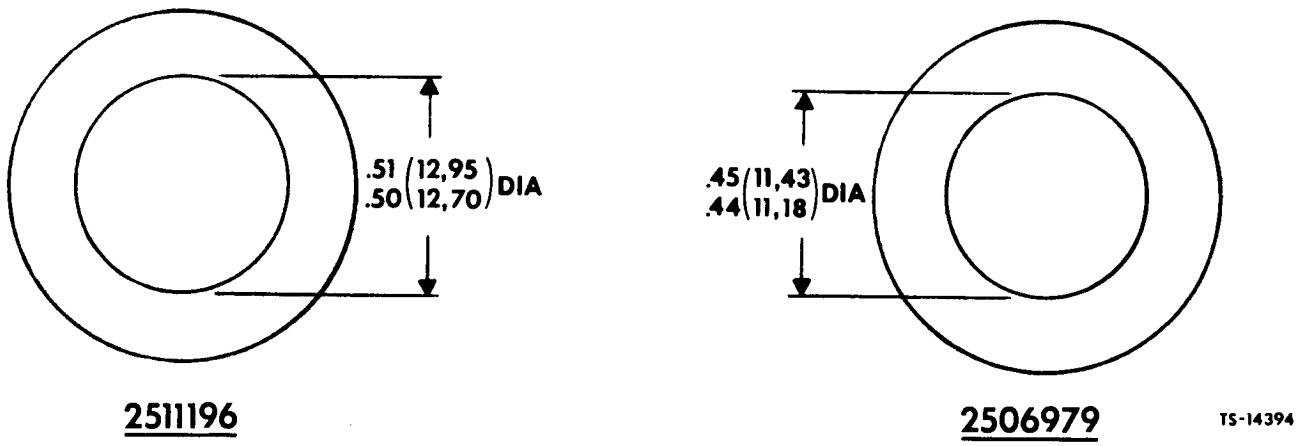


Figure 1

INSTALLATION:

CAUTION: KEEP BRAKE SYSTEM CLEAN AND FREE OF FOREIGN MATERIAL AT ALL TIMES TO INSURE PROPER OPERATION OF SYSTEM.

1. Front Frame Installation

1. Park machine on a level surface, block wheels and apply parking brake.
2. Drain brake fluid from front master cylinder.
3. Rebuild master cylinder using Items 24, 25 & 27 shown in Figure 2, from 949848 Repair Kit.
4. Remove and omit Items 20 & 21 if they are present at this time.

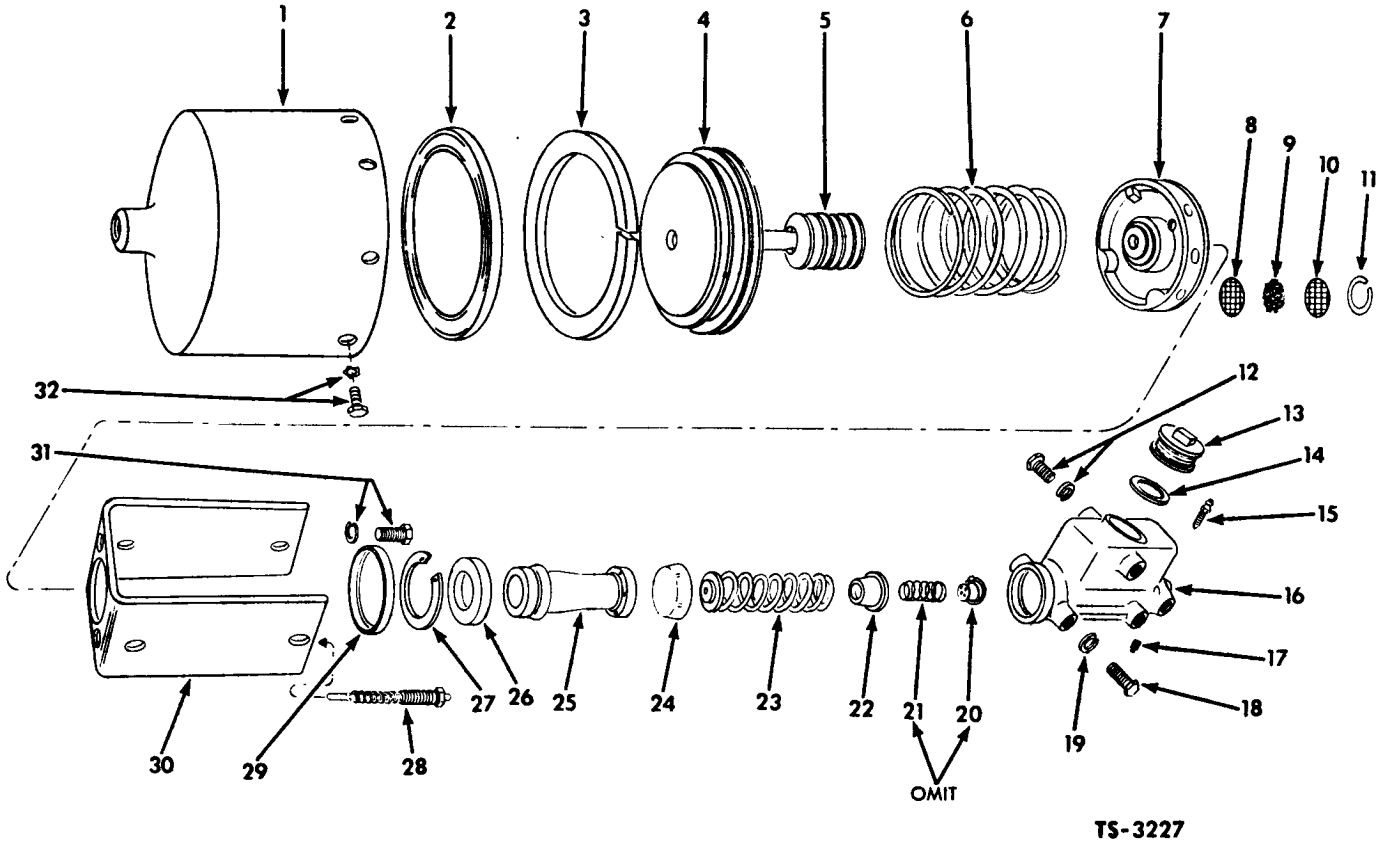


Figure 2

5. Weld 2511089 Mounting Plate to front frame with a .19 inch fillet weld as shown in Figure 3.

6. Install 2501983 Compensator Valve on mounting plate as shown in Figure 3 using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

7. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 3.

8. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as shown in Figure 3.

9. Install 2511363 Tube Assembly connecting master cylinder to brake compensator valve as shown.

10. Refill front master cylinder reservoir with SAE J-1703 (70R3) brake fluid, available under Clark Part Number 850487.

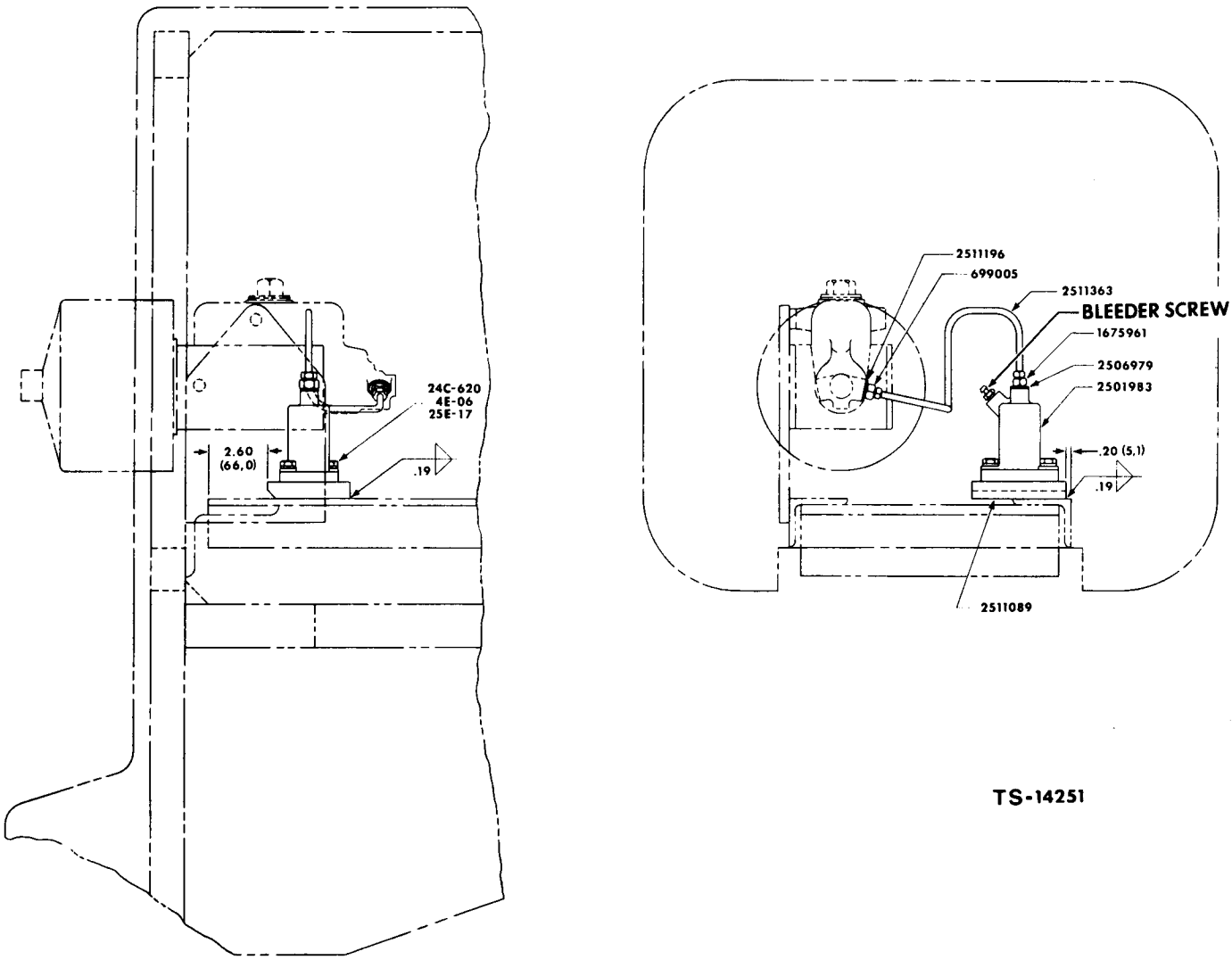


Figure 3

FORM 003093
9/75

II. Rear Frame Installation

1. Drain brake fluid from rear master cylinder.
2. Rebuild rear master cylinder using Items 24, 25 & 27 shown in Figure 2 from 949848 Repair Kit. Remove Items 20 & 21 if they are present at this time.
3. Weld 2511089 Mounting Plate to rear frame as shown in Figure 4.
4. Install 2501983 Compensator Valve on mounting plate as shown in Figure 4 using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.
5. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 4.
6. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as illustrated in Figure 4.
7. Install 2511377 Tube Assembly connecting master cylinder and brake compensator valve as shown.
8. Refill rear master cylinder reservoir with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

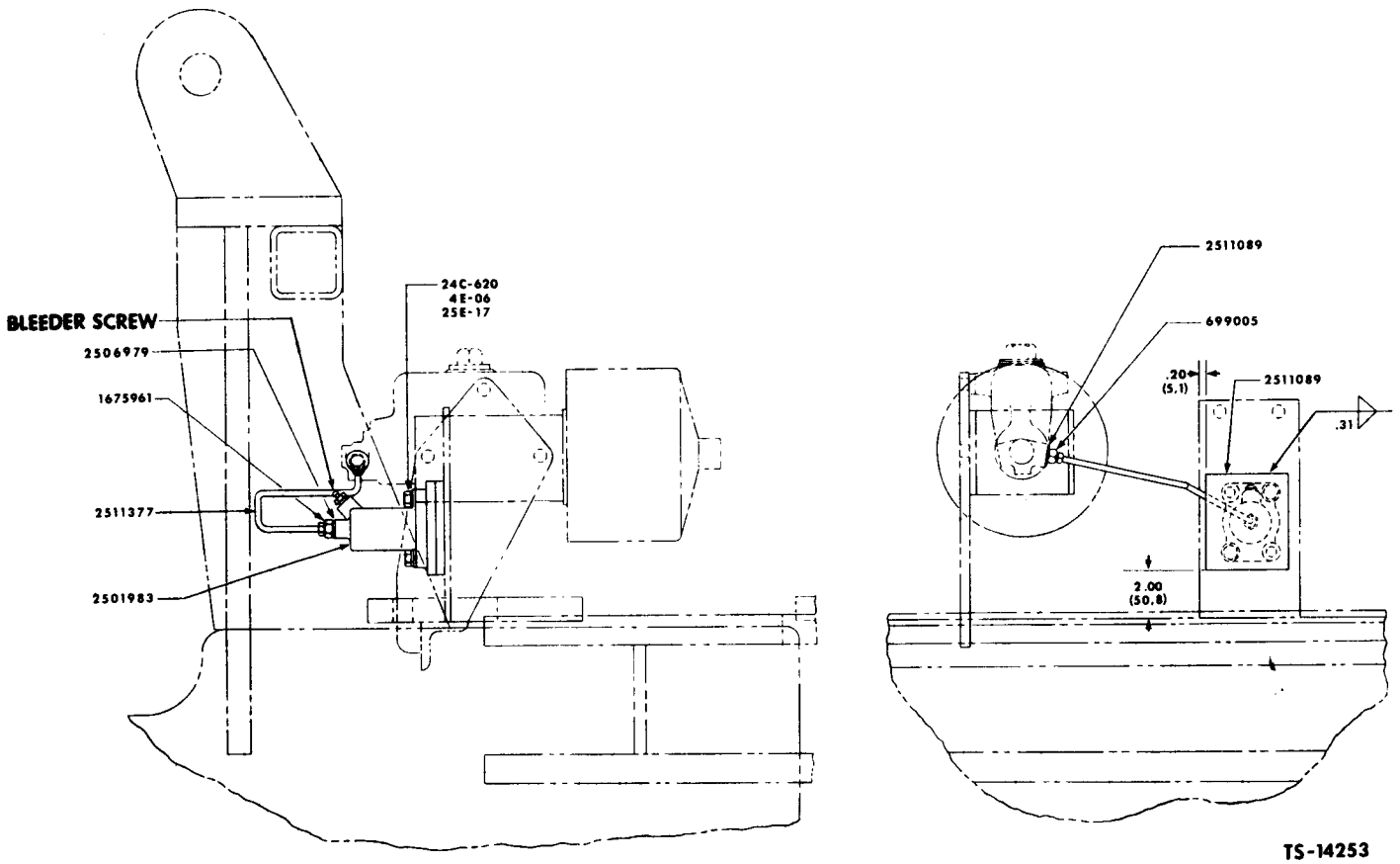


Figure 4

FORM 003093
9/75

III. Bleeding Procedure

1. Bleed brake lines and compensator valves to remove all traces of air from the system. Use a bleeder hose wherever possible and proceed as outlined below. See Figures 3 & 4 and Figure 5, Item 1 for location of bleeder screws. A helper will be required.

   A. Open one bleeder screw and depress brake pedal, close bleeder screw, then release brake pedal. Repeat this several times until fluid from bleeder screw is free of bubbles.

   B. Actutate brakes several times.

   C. Repeat Step A until no bubbles are observed in fluide from bleeder screw.

   D. Repeat entire process at each bleeder screw on each brake head and compensator valve. Keep master cylinder reservoir full at all times.

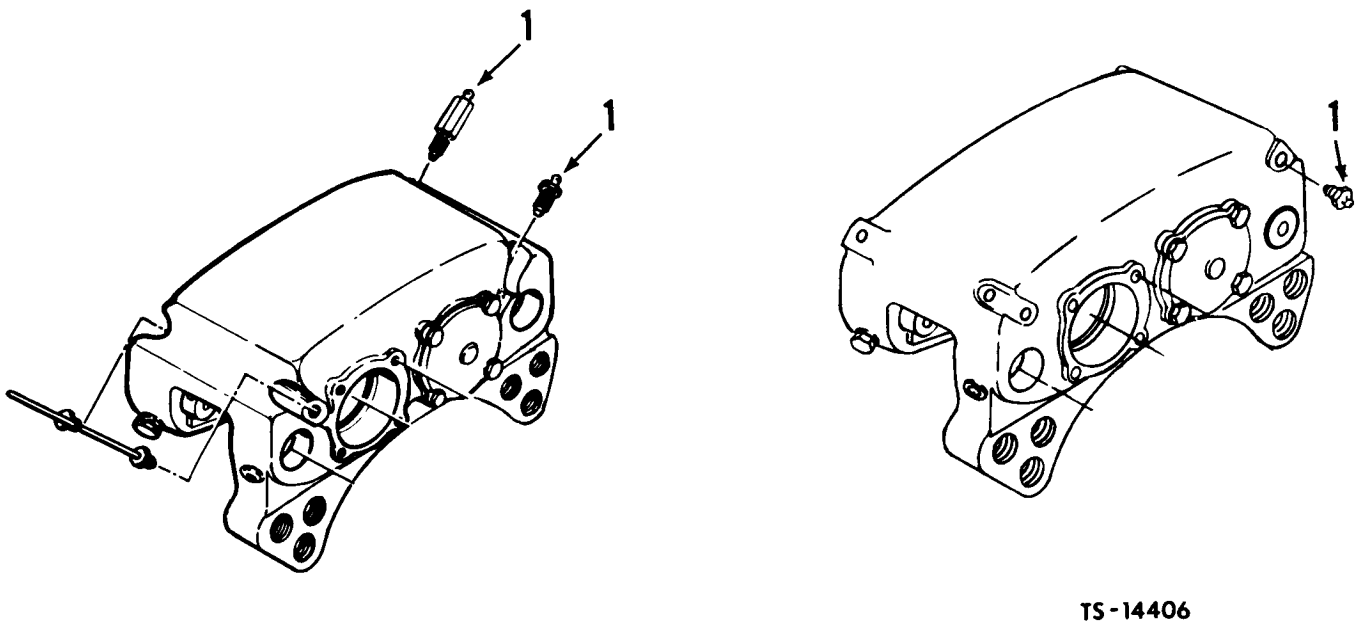


Figure 5

CLARK Service gram

October 1980

MICHIGAN SG-619B
Group Ref. No. 400

(This bulletin replaces SG-619A, dated August 1980. REASON: Information Revision).

SUBJECT: **Service Instructions for Aerofiner and Air Line Filter Assembly**

(A) AEROFINER OPERATION:

In normal operation, air passes through the space between the desiccant canister and the outer shell, cooling in the process. The water and oil droplets that condense, drop to the bottom sump of the container as the air makes a 180° turn. The air then passes through the oil separator which removes dirt particles, oil and water mist. The air continues upward through the desiccant bed where it is exposed to the immense surface area of the desiccant which has a tremendous attraction for water molecules. Mositure is removed from the air without the need for further condensation. As the air continues to pass through the drying bed, it is exposed to drier desiccant and its moisture content is reduced until the air becomes 'super dry'.

At the top of the unit, the air flows through the outlet and discharge line into the air reservoir. At this point, the air is so dry that its temperature can drop considerably before condensation can occur. See Figure 1 for air flow diagram.

COMPRESSOR LOADED

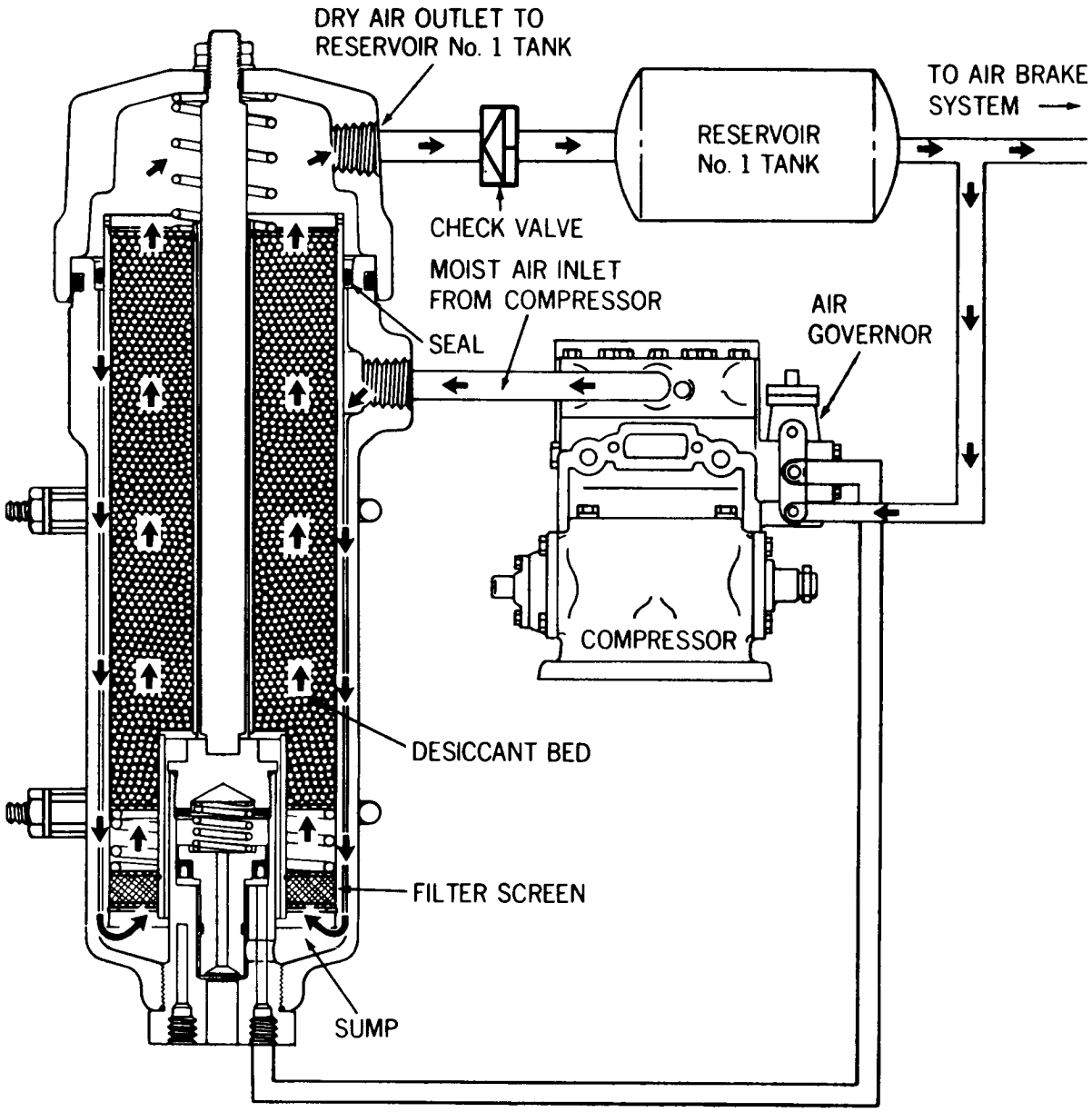


Figure 1.

COMPRESSOR UNLOADED

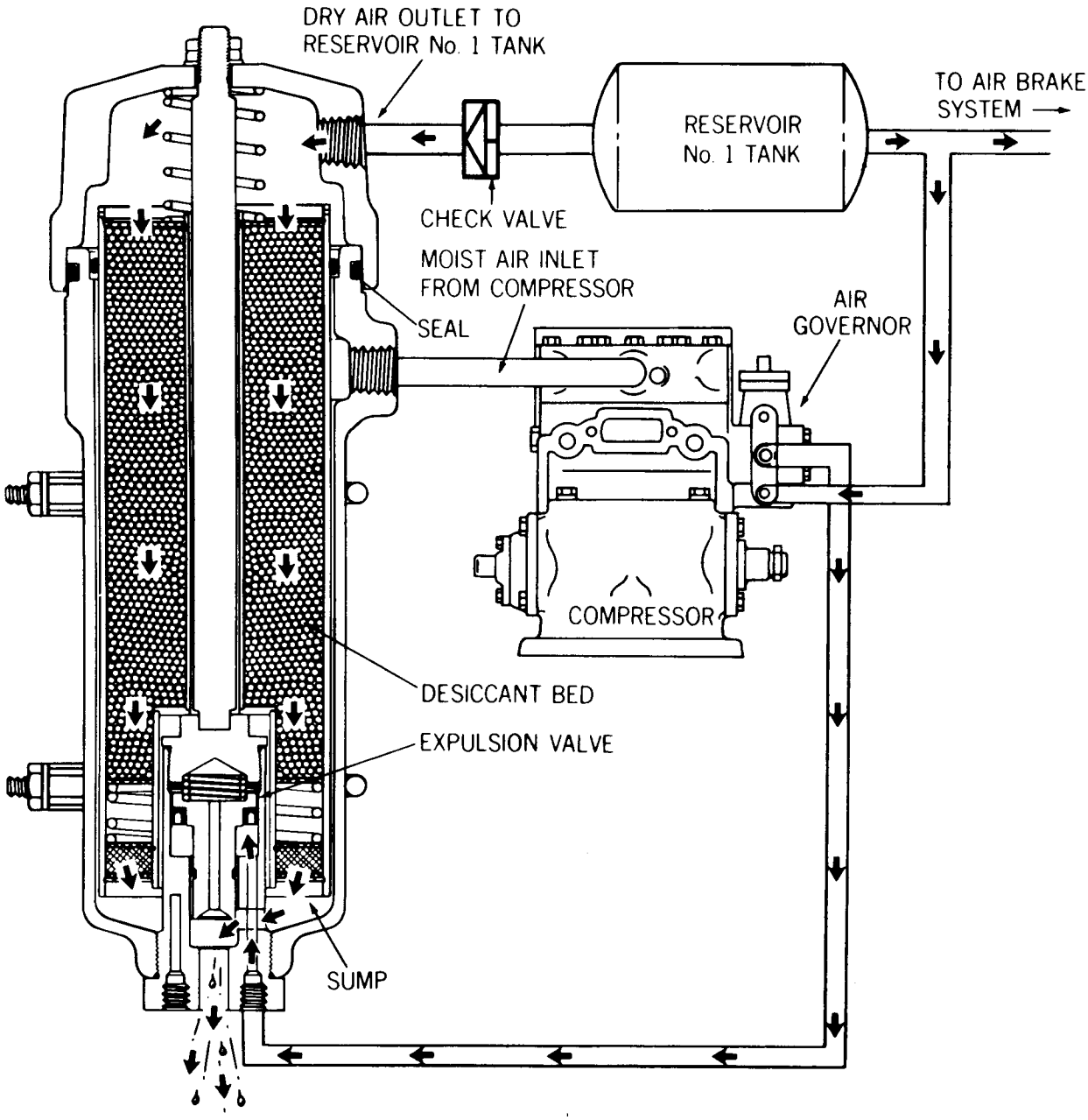


Figure 2.

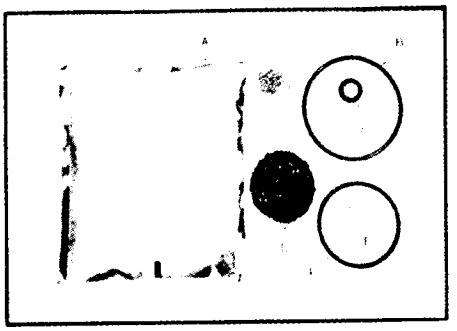
When the system reaches governor cutout pressure, air pressure from the unloader line enters the expulsion valve and moves the plunger off its seat. The sudden opening of the valve permits the pressurized air in the drier and connecting lines to flow through the desiccant in a reverse direction.

The sudden decompression of the drying bed removes moisture from the pores of the desiccant. By this rapid decompression, oil, particles and moisture are exhausted from the sump through the expulsion valve. The pressurized air is very efficient in removing water on its reverse flow through the desiccant bed. If the purge cycle continues beyond the time required to decompress, no further action takes place. When air compression resumes, the unloader line is exhausted, the expulsion valve plunger reseats, and the drying process is resumed.

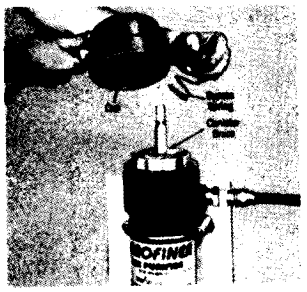
(B) AEROFINER SERVICE INSTRUCTIONS:

NOTE: Before servicing, bleed air system to zero psi.

*EVERY 500 OPERATING HOURS

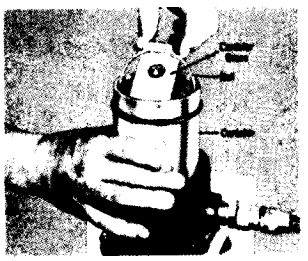


2510803
DESICCANT
REFILL KIT



STEP 1

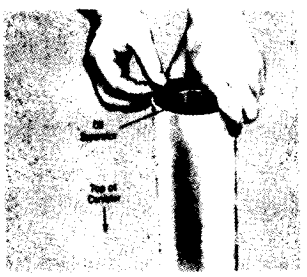
To remove the cap, first release the pressure from the unit by loosening the hose fitting from the port adapter at the inlet or outlet. Then remove the top retaining nuts with a 13/16" end wrench. Next, remove the cap and bypass spring.



STEP 2

Using the bail, remove the canister from the Aerofiner housing. It may be necessary to loosen the canister from the housing by using a twisting back and forth motion while pulling upwards.

NOTE: During reassembly, rotate the canister while inserting and make sure the canister O-ring seats below the housing shoulder.

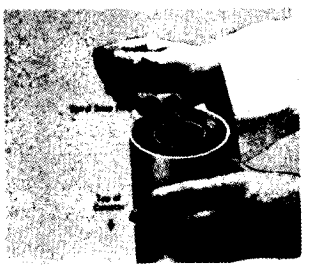


STEP 3

CAUTION – DO NOT REMOVE TOP SCREEN

Invert the canister and, with a small screwdriver, release and remove the retaining ring. Then while the canister is still inverted, remove screen number one and the oil separator.

NOTE: During reassembly, make sure the oil separator pad is pushed below the snap ring groove.



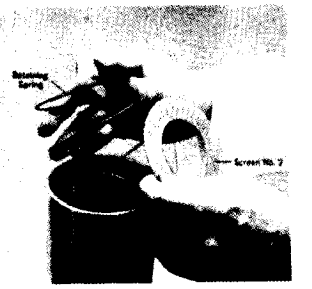
STEP 4

Using a small screwdriver, release and remove the next retaining ring from the center post.

CAUTION: Screen is under spring tension. Hold screen down with vise grips or a similar tool, clamping on the outer canister wall in the vertical position while depressing the screen.

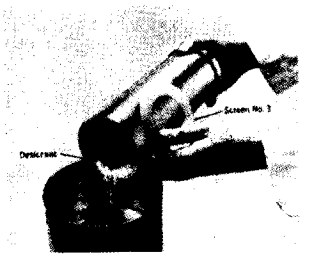
STEP 5

Remove number two screen and desiccant retaining spring.



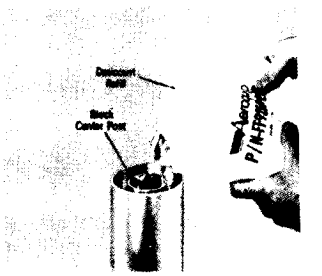
STEP 6

Tip canister over a receptacle and remove screen number three, allowing desiccant to flow out.



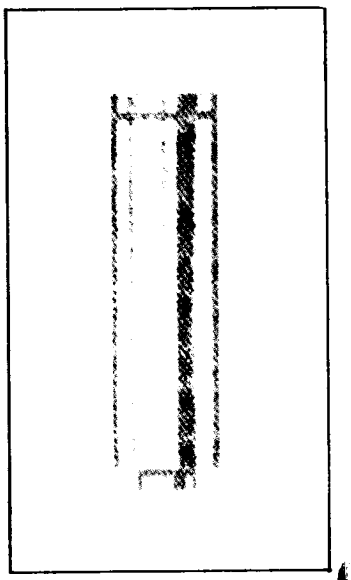
STEP 7

Clean all components before reassembly. Then pour new premeasured desiccant into canister. Jar desiccant canister to settle the desiccant. Reassemble in revere order, replacing all O-rings with the new O-rings included in the replacement kit. Lubricate all O-rings before inserting canister in housing.



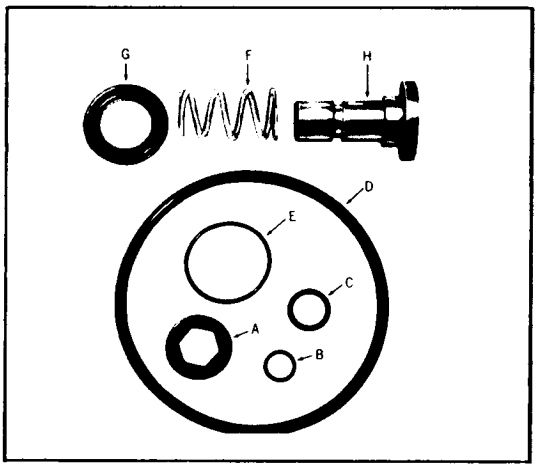
961419 Canister Replacement Kit

For large volume users, a complete canister kit is available as a spare. Follow steps 1 and 2 as described above and install in the body in reverse order. Retrieved container can be recharged using Kit Number 2510803 and following all steps described above. If the recharged canister is to be stored it should be sealed from the atmosphere in a plastic bag.



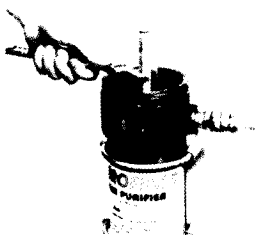
*Revised Service Interval

Purge Valve Service Instructions

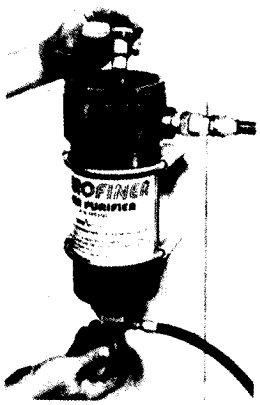


A. Included in 2510803	**Gasket**
B. Included in 2510803	**O-Ring**
C. 25K-30018	**O-Ring**
D. 961488	**O-Ring**
E. 25K-20112	**O-Ring**
F. 961425	**Spring**
G. 961489	**"U" Cup**
H. 961423	**Valve**

1. Follow Step 1 and 2 from the basic Aerofiner Service Instructions on the preceding page.



2. To remove the center post assembly, turn the center post assembly counterclockwise using a ⅝" box wrench. Care must be taken not to bend the shaft assembly from improper prying with the wrench.



3. Remove the purge valve and valve spring. Insert a screwdriver into the purge hole at the bottom center of the housing and push up. This will free the valve and valve spring. Remove the "U" cup seal from the valve body.

4. (Re-assembly) The inside of the valve body must be cleaned and free from scratches or burrs prior to re-assembly. Lubricate the new O-Ring and "U" cup. Place the "U" cup seal into the valve body with the "U" facing downward. Install O-Ring into the new valve and insert valve, stem down, into the valve body. Place the new spring on top of the valve.

5. (Re-assembly) Replace the two O-Rings, one on each end of the shaft assembly, and the gasket seal with the new ones. Insert shaft assembly into housing and thread together. Shaft is to be tightened wrench tight.

CAUTION: The housing is aluminum. Care must be taken not to cross thread the shaft assembly into the housing.

(C) TROUBLESHOOTING:

PROBLEM	CAUSE	REMEDY
1. Purge air continually blows out the purge port while compressor is pumping.	1. Purge valve sticking open due to ice on valve seat (below freezing)	1. Warm purge valve to melt ice. If condition continues install heater.
	2. Purge valve held open by foreign particles on valve seat.	2. Insert screwdriver in ejector valve hole on bottom and lift valve to purge foreign article or dismantle and clean.
	3. Faulty governor.	3. Disconnect pilot line from governor. If leak stops and air is being expelled from governor line, problem is the governor.
	4. Damaged purge valve in Aerofiner or valve spring has taken set.	4. Disconnect purge valve line from governor. If leak continues, replace purge valve and spring in Aerofiner.
2. Leakage occurs while compressor is unloaded.		
a) Continuous leakage.	1. Bad check valve at #1 air tank.	1. Clean or replace check valve.
b) Pulsating leakage.	2. Governor malfunction.	2. Clean, rebuild or replace governor.
3. Continual on-off purge cycle.	1. No check valve at air reservoir inlet (#1 tank).	1. Install check valve.
	2. Air reservoir check valve faulty.	2. Replace check valve.
	3. Air reservoir drain cock open.	3. Close drain cock.
	4. Governor malfunction.	4. Check for continuous air leaks around compressor unloader valve with air system at maximum pressure. If cycling occurred when compressor was unloaded, check unloader valve for bypass leakage. Also check governor for hi-low limits.

PROBLEM	CAUSE	REMEDY
3. Continual on-off purge cycle (continued).	5. Unloader valve (on compressor).	5. Check for continuous air leaks around compressor unloader valve with air system at maximum pressure.
4. Aerofiner not purging or cycling.	1. Faulty governor.	1. If below freezing, governor may be frozen. Warm governor to melt ice.
	2. Aerofiner purge valve line hooked up to wrong port on governor or on Aerofiner.	2. Check piping. Purge valve line must go from the "air" port on the Aerofiner to an "unloaded" port on the governor. (See governor data sheet attached).
	3. Purge line plugged.	3. Remove purge line and inspect for blockage.
5. Large amount of water in air reservoir (#1 tank).	1. Aerofiner in by-pass mode due to: a) Road shock.	a) Remove Aerofiner cap. Check to see if canister "O" ring is above housing seat. Reseat canister and re-install cap. If unit does not have canister brace, install brace before replacing cap.
	b) Canister and desiccant plugged.	b) Disassemble canister, clean and re-charge with desiccant replacement kit, or replace canister with new canister.
	Desiccant saturated with water.	Not enough cooling of air — use longer line between compressor and Aerofiner.

(D) AIR LINE FILTER SERVICE INSTRUCTIONS:

EVERY 10 OPERATING HOURS

Before each work shift, check the air line filter service indicator, see Figure 3. Located on top of the filter unit, a yellow caution signal pops into view when the filter element is plugged. This signal remains up even when the air supply is turned off. Reset the caution signal after servicing the filter element.

1. Bleed off all air pressure.
2. Loosen bayonet type clamp ring.
3. Remove bowl.
4. Remove bronze filter element.
5. Clean filter element and bowl in solvent, air dry and reinstall.
6. Re-set service indicator.

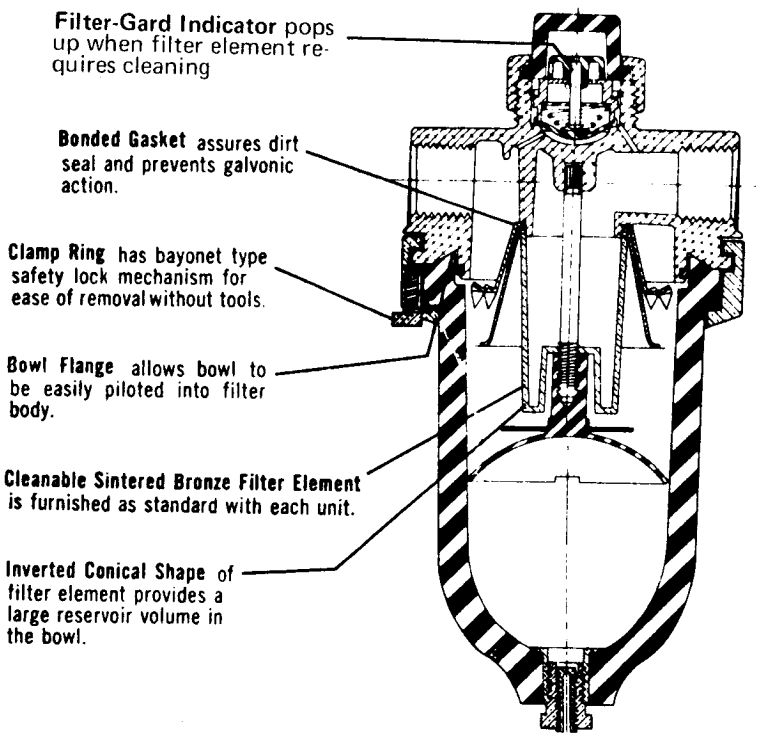


Figure 3.

CLARK Service gram

22 June 1977

MICHIGAN SG-627B
Group Ref. No. 400

(This bulletin supersedes and replaces SG-627A, dated 2 February 1977. REASON: Revised to include Model 45B Aerofiner Installation)

SUBJECT: Installation of Aerofiner Air Dryer
Models 45B, 55B, 75B, 125B & 175B

The Aerofiner air dryer is available for use on 45B, 55B, 75B, 125B and 175B Tractor Shovels. The 2505709 Air Dryer has been made available for the purpose of providing cleaner drier air for the brake system. The air dryer may be installed on these machines, if desired, by ordering parts listed under the appropriate model heading and installing them as instructed in this bulletin.

PARTS REQUIRED (Per machine):

A. Model 45B

1 -	2505709	Air Dryer
1 -	1M-22360	Hose
1 -	2517649	Hose
1 -	521874	Clamp
1 -	42F-3	Adapter Fitting 90°
2 -	31F-4	Elbow 90°
2 -	356617	Reducer Bushing
1 -	2502069	Decal
1 -	2517415	Hose Assembly
1 -	2516878	Bracket Assy
4 -	18C-620	Bolt
4 -	25E-17	Washer
4 -	60D-06	Locknut
1 -	2505705	Pipe
1 -	2517414	Hose Assembly
1 -	30H-52	Clip
1 -	743563	Hose (Bulk cut to 60 in, 1524 mm)
1 -	40K-04	Pipe Plug
4 -	619021	Flatwasher
1 -	5K-212	Pipe Nipple
1 -	27F-1	Elbow 90°
3 -	1736910	Tie Straps
1 -	593370	Check Valve
1 -	593297	Adapter Union

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PARTS REQUIRED (Cont'd.)

B. Model 55B

1 - 2505709	Air Dryer
2 - 356617	Reducing Bushing
1 - 521874	Clamp
2 - 40F-3	Connector
2 - 31F-4	Adaptor Union 90°
1 - 2505705	Pipe
1 - 743563	Hose (Bulk cut to 60 in, 1524 mm)
1 - 36F-1	Adapter Union Str.
1 - 593370	Check Valve
1 - 72F-3	Drain Cock
1 - 940636	Elbow
1 - 612497	Hose (Bulk Cut to 54 in, 1372 mm)
2 - 884725	Pipe, Male
1 - 610545	Hose (Bulk Cut to 60 in, 1524 mm)
1 - 884721	Pipe, Male
1 - 884756	Swivel, Female 90°
1 - 647285	Hose (Bulk Cut to 54 in, 1372 mm)
1 - 884774	Swivel, Female Str.
1 - 2502069	Decal

C. Model 75B

1 - 2505709	Air Dryer
2 - 356617	Reducing Bushing
1 - 521874	Clamp
1 - 42F-9	Elbow 90°
2 - 31F-4	Adapter Union 90°
1 - 2505705	Pipe
1 - 743563	Hose (Bulk Cut to 60 in, 1524 mm)
1 - 42F-3	Elbow 90°
1 - 593370	Check Valve
1 - 72F-3	Drain Cock
1 - 612497	Hose (Bulk Cut to 54 in, 1372 mm)
2 - 884725	Pipe, Male
1 - 610545	Hose (Bulk Cut to 60 in, 1524 mm)
1 - 884721	Pipe, Male
1 - 884756	Swivel, Female 90°
1 - 884742	Swivel, Female 90°
1 - 647285	Hose (Bulk Cut to 54 in, 1372 mm)
1 - 884774	Swivel, Female Str.
1 - 884781	Pipe, Male
1 - 2502069	Decal

D. Model 125B

1 - 2505709	Air Dryer
1 - 2516878	Bracket Assy
4 - 18C-620	Bolt
4 - 25E-18	Washer
4 - 60D-06	Locknut
2 - 356617	Reducing Bushing
1 - 521874	Clamp
2 - 31F-4	Adapter Union 90°
1 - 2505705	Pipe
1 - 743563	Hose (Bulk Cut to 60 in, 1524 mm)
1 - 31F-1	Adapter Union 90°
1 - 593370	Check Valve
1 - 72F-3	Drain Cock
1 - 29F-3	Street Elbow
1 - 40F-8	Connector
1 - 612497	Hose (Bulk Cut to 54 in, 1372 mm)
2 - 884725	Pipe, Male
1 - 610545	Hose (Bulk Cut to 60 in, 1524 mm)
1 - 884721	Pipe, Male
1 - 884756	Swivel, Female Str.
1 - 647285	Hose (Bulk Cut to 54 in, 1372 mm)
1 - 884774	Swivel, Female Str.
1 - 884781	Pipe, Male
1 - 888123	Swivel, Female 90°
1 - 2502069	Decal

E. Model 175B

1 - 2505709	Air Dryer
1 - 2516878	Bracket Assy
4 - 18C-620	Bolt
4 - 25E-18	Washer
4 - 60D-06	Locknut
2 - 356617	Reducing Bushing
1 - 31F-4	Adapter Union 90°
1 - 593370	Check Valve
1 - 31F-1	Adapter Union 90°
1 - 72F-3	Drain Cock
1 - 42F-9	Elbow 90°
1 - 2505705	Pipe
1 - 521874	Clamp
1 - 743563	Hose (Bulk Cut to 60 in, 1524 mm)
1 - 40F-8	Connector
1 - 40F-3	Connector
1 - 612497	Hose (Bulk Cut to 54 in, 1372 mm)
2 - 884725	Pipe, Male
1 - 610545	Hose (Bulk Cut to 60 in, 1524 mm)
1 - 884721	Pipe, Male
1 - 884756	Swivel, Female 90°
1 - 647285	Hose (Bulk Cut to 54 in, 1372 mm)
1 - 888123	Swivel, Female 90°
1 - 884774	Swivel, Female Str.
1 - 2502069	Decal

INSTALLATION:

1. With wheels blocked, bleed off air pressure and mount air dryer as shown. See Figure 1 for Models 55B and 75B, and Figure 2 for Models 45B, 125B and 175B.

   CAUTION: DO NOT INSTALL AIR DRYER ON A MACHINE EQUIPPED WITH AN ALCOHOL INJECTOR.

2. Refer to appropriate installation drawing, Figure 3 for 45B, Figure 4 for 55B, Figure 5 for 75B, Figure 6 for 125B or Figure 7 for 175B, and install parts as shown.

3. Check all connections for leaks and correct as required.

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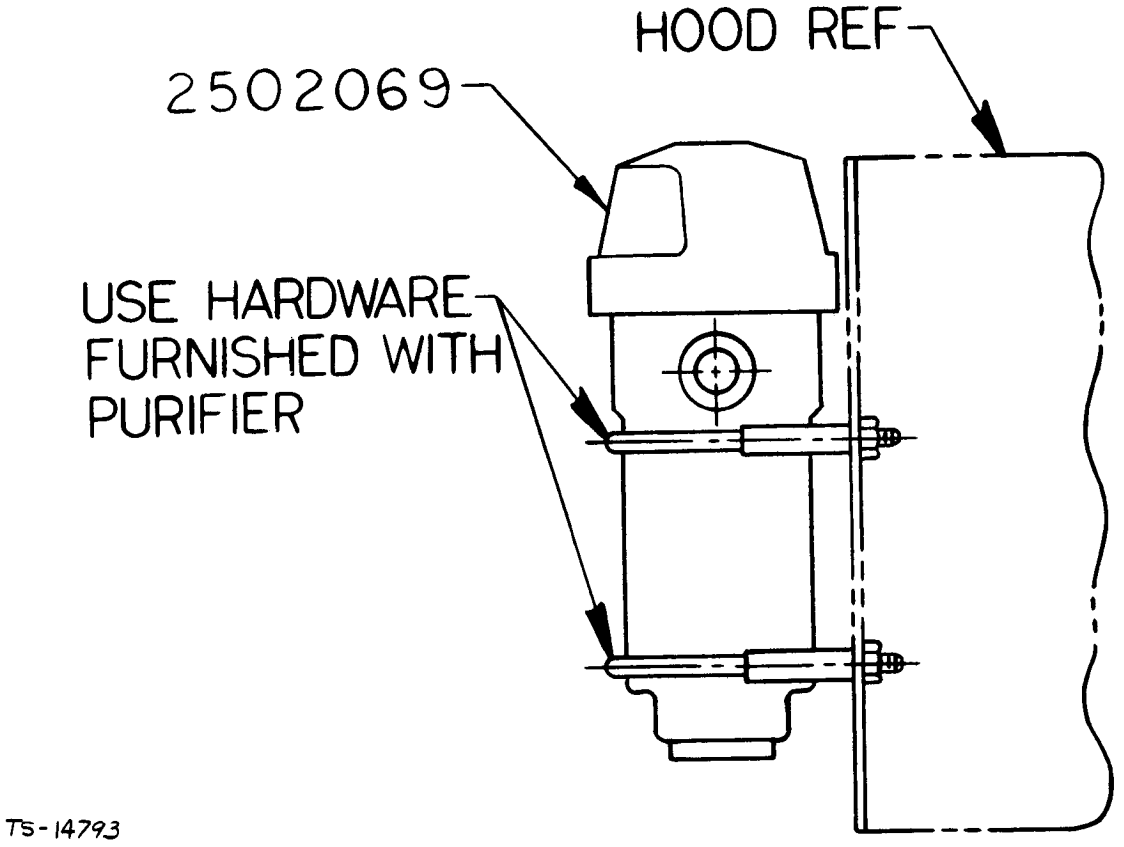


Figure 1 - Air Dryer Mounting for Models 55B and 75B

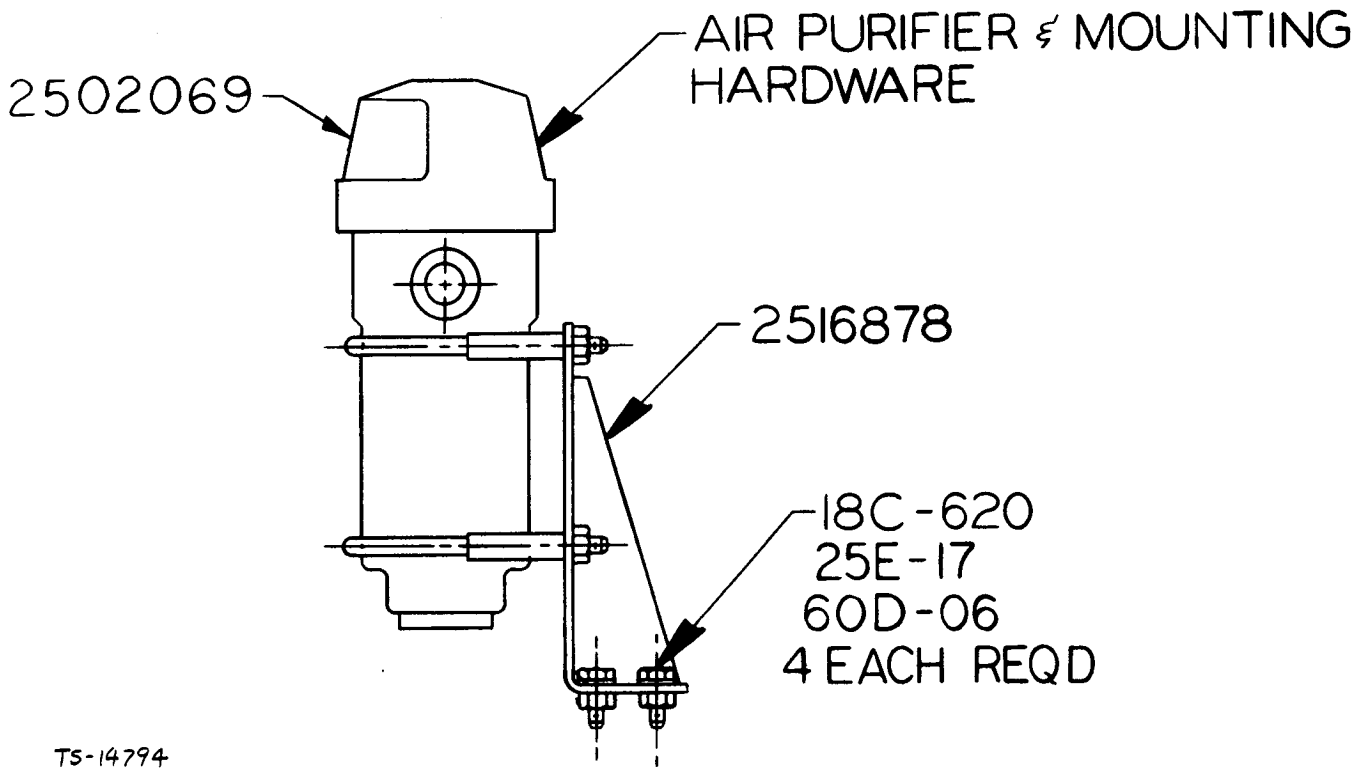
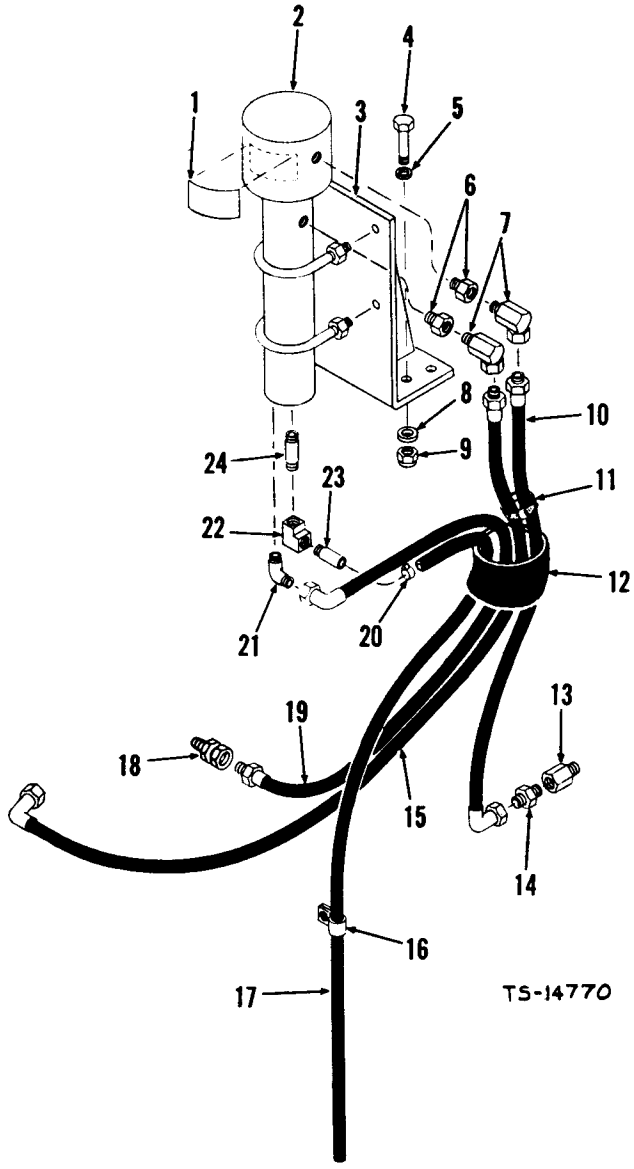


Figure 2 - Air Dryer Mounting for Models 45B, 125B and 175B



1.	2502069	Decal
2.	2505709	Air Dryer
3.	2516878	Bracket
4.	18C-620	Bolt
5.	25E-17	Washer
6.	356617	Bushing
7.	31F-4	Adapter Union
8.	619021	Washer
9.	60D-06	Nut
10.	2517414	Hose
11.	1736910	Tie Straps
12.	1M-22360	Hose
13.	593370	Valve Check
14.	38F-9	(EXISTING)
15.	2517415	Hose
16.	30H-52	Clip
17.	743563	Hose
18.	593297	Adapter
19.	2517649	Hose
20.	521874	Clamp
21.	42F-3	Elbow
22.	27F-1	Elbow
23.	2505705	Pipe
24.	5K-212	Nipple
25.	40K-04	Plug

Figure 3 - Air Dryer Installation for Model 45B

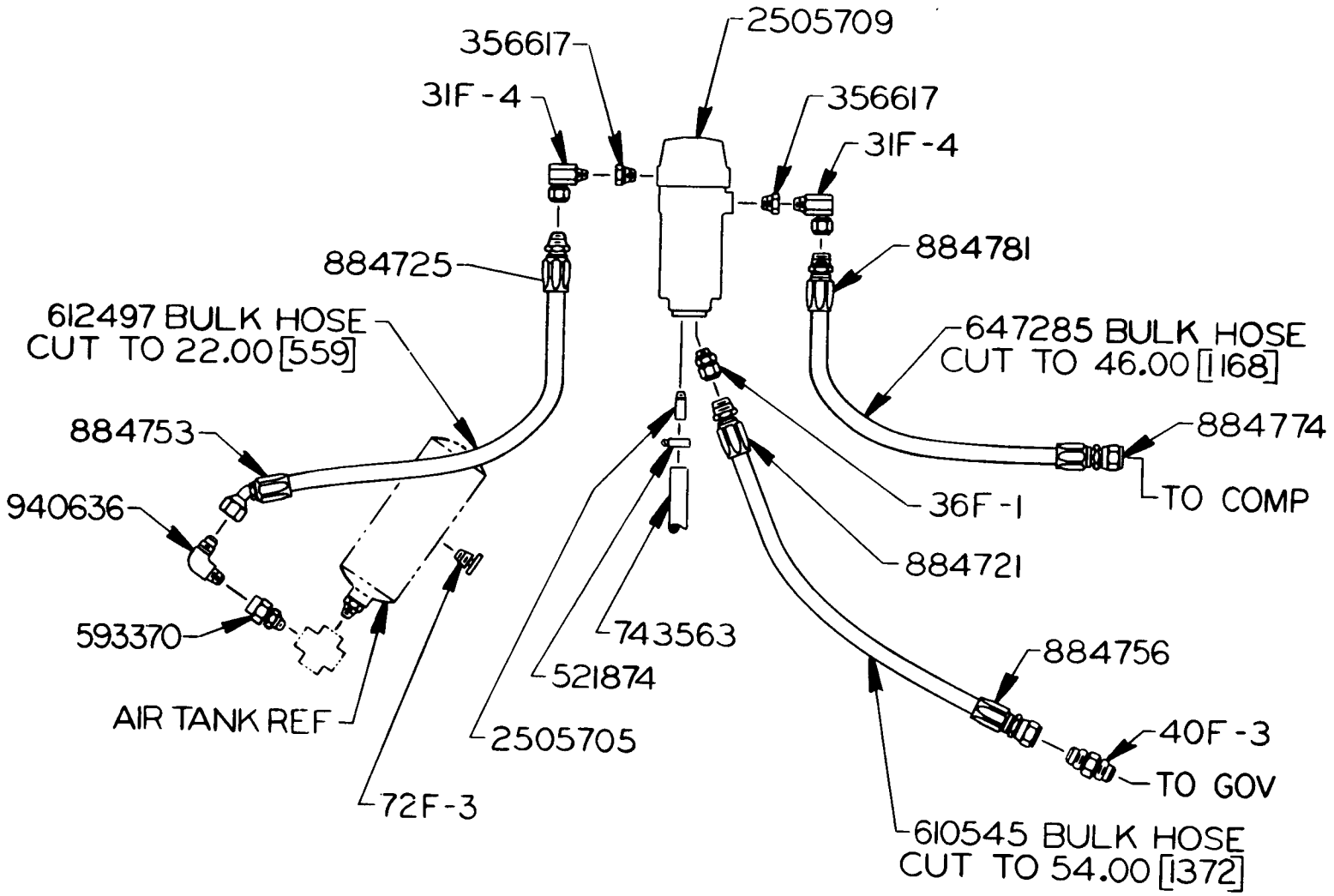


Figure 4 - Air Dryer Installation for Model 55B

TS-14795

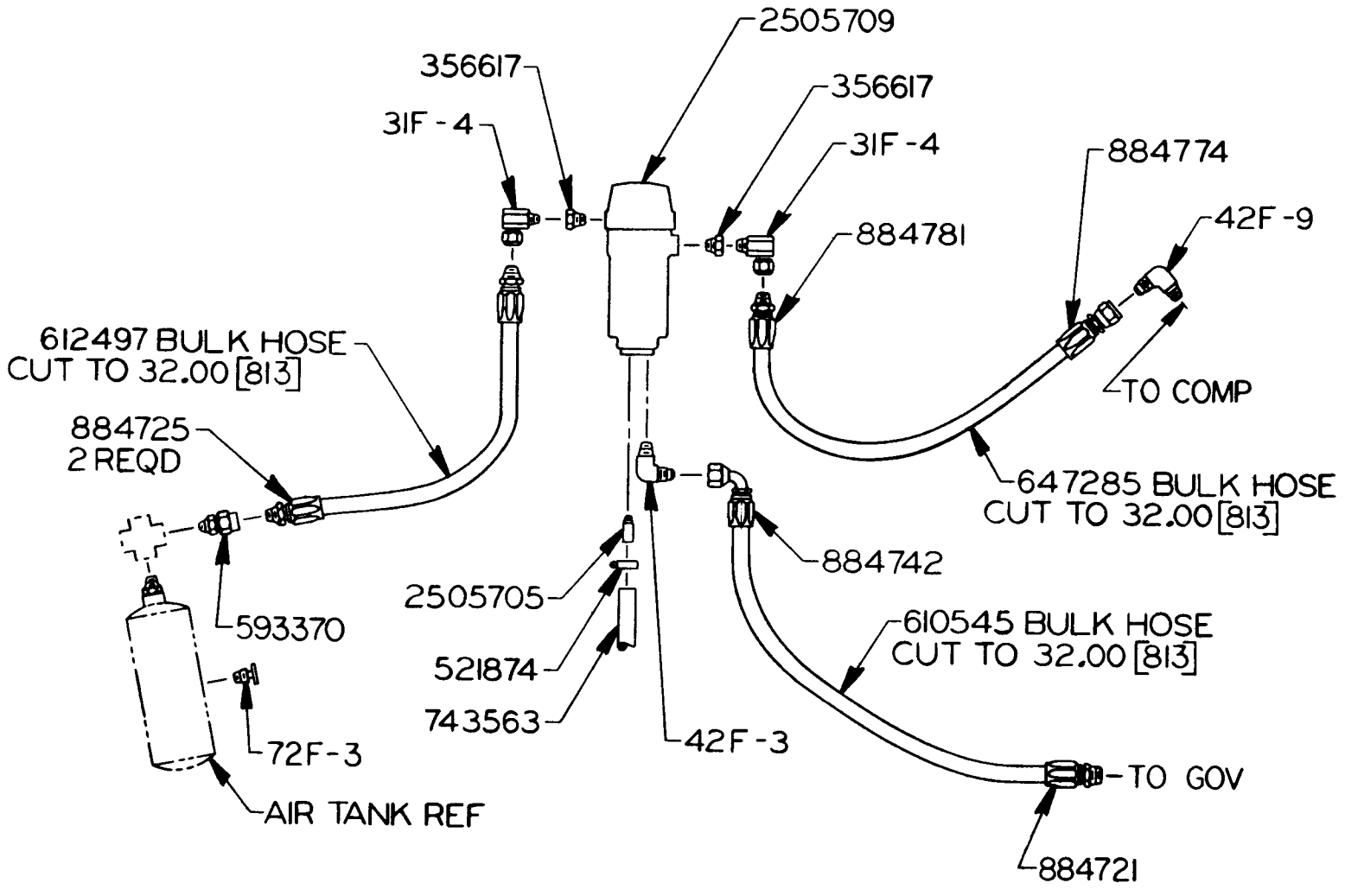


Figure 5 - Air Dryer Installation for Model 75B

TS-14796

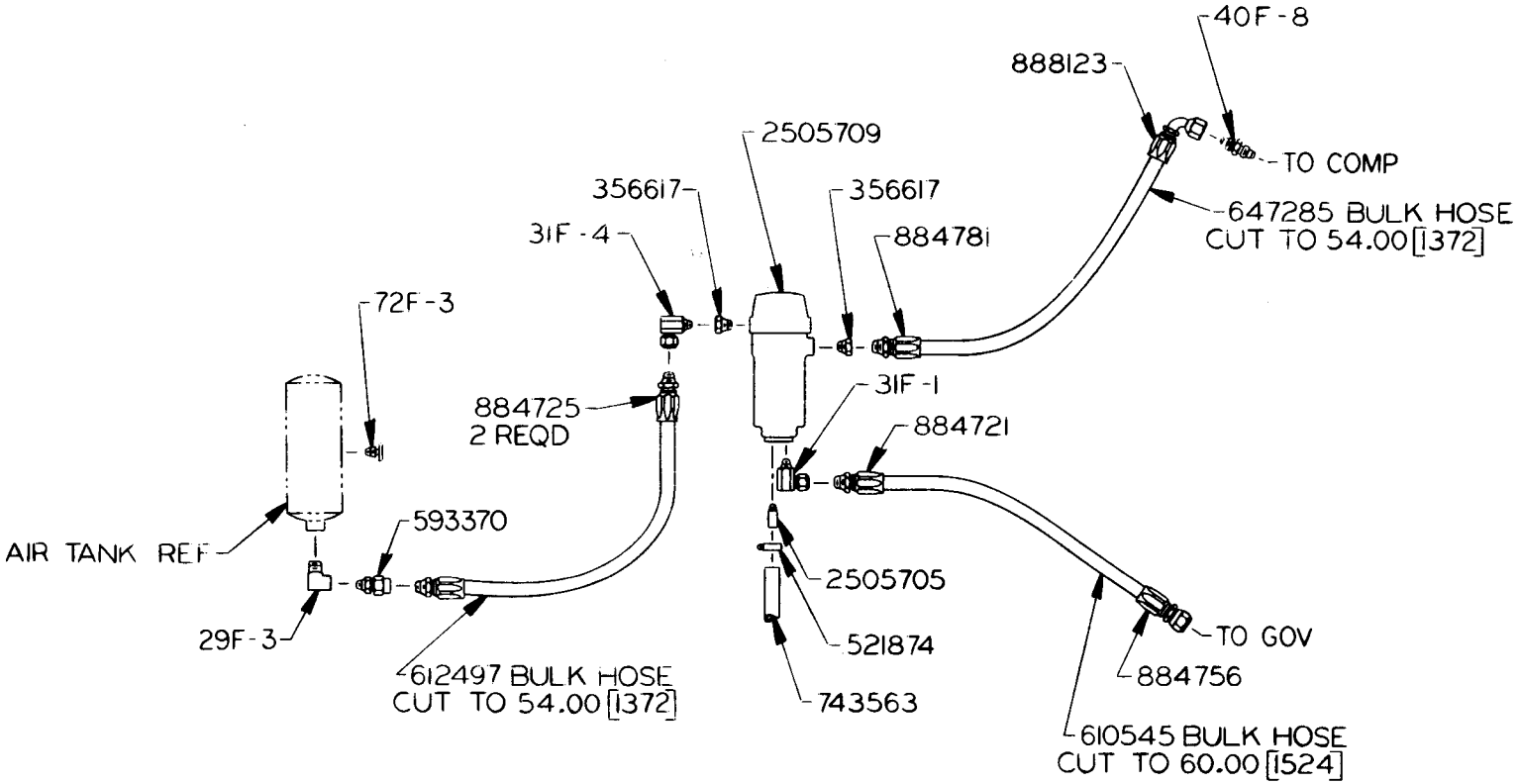


Figure 6 - Air Dryer Installation for Model 125B

TS-14797

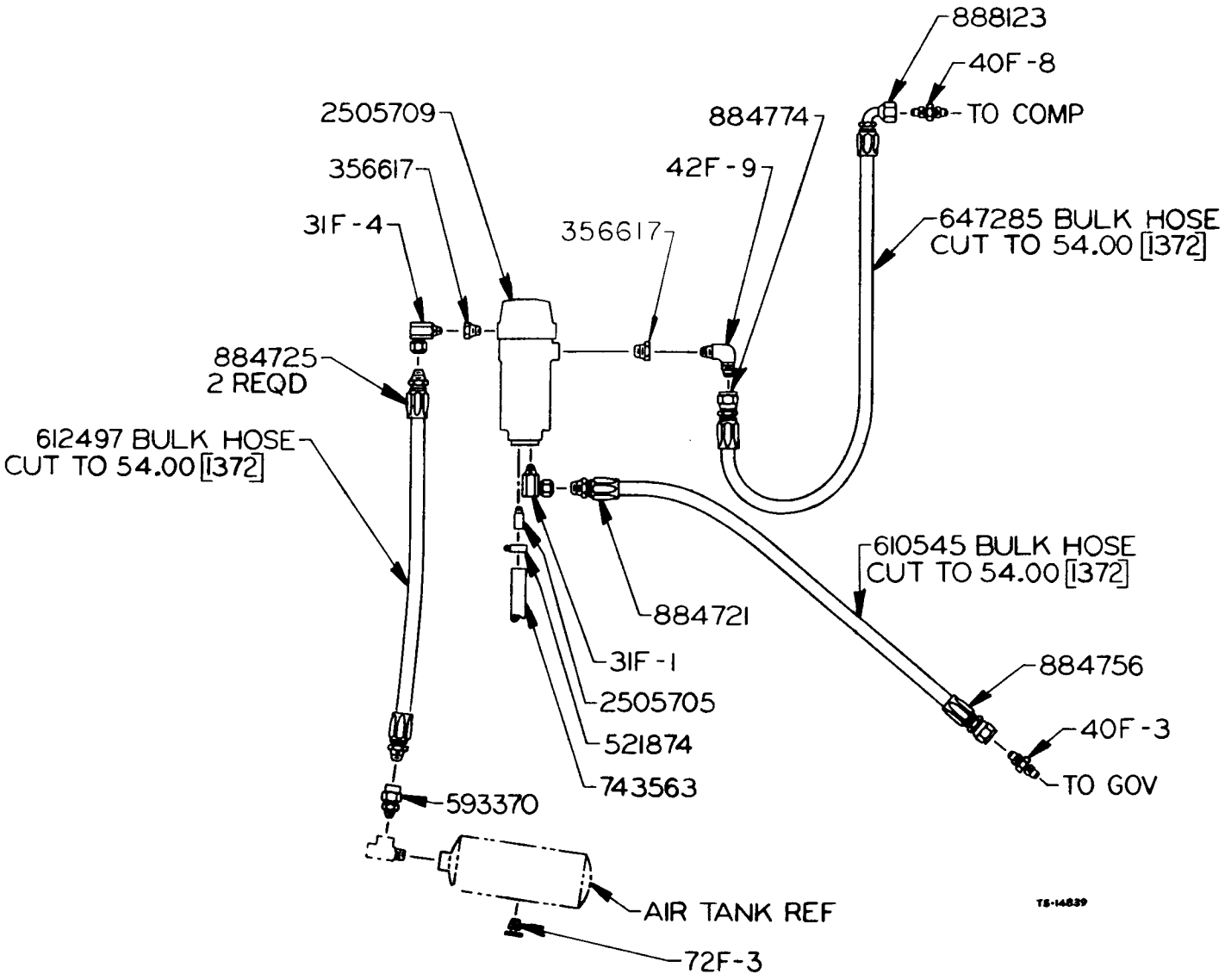


Figure 7 - Air Dryer Installation for Model 175B

CLARK Service gram

14 September 1977

MICHIGAN SG-663
Group Ref. No. 400

(This issue replaces pages 1 & 2 of SG-663, dated 3 August 1977. REASON: Updated to provide corrected serial number information on page 2.)

SUBJECT: Brake Compensator Kits -
Model 55-IIIA, 75-IIIA, 75B, LF-75B, 85-IIIA, 125B, 175B

IMPORTANT: YOUR ATTENTION IS DIRECTED TO THE FOLLOWING INFORMATION, AS LACK OF UPDATING COULD RESULT IN REDUCTION OF BRAKE HOLDING ABILITY WITHOUT FREQUENT BRAKE APPLICATION.

A serious attempt was made to located customer units and supply parts for all units, to extend the life of the primary cup in the master cylinder. This would update the machines in the serial number grouping as listed in this Service Gram in Section A to current production standards. Every machine in this grouping should be checked when worked on to see if the Compensator Kit has been installed.

If a machine does not have a Compensator Kit on it and appears on the serial number list in Section B, parts were not supplied as we were unable to locate the unit. It is important that parts are ordered from Central Parts and the unit updated as quickly as possible. File a Warranty Request for parts only.

Parts were shipped to the owners of machines which do not appear on the list in Section B. If these machines do not have Compensator Kits installed, an inquiry should be made to the location of the parts. If not parts are available new parts should be ordered. A Warranty Request does not apply in this case, because we have already furnished parts direct to the customer at no charge.

The following brake Compensator Kits are available from the Central Parts Division:

KIT NUMBER	INSTALLATION FORM NUMBER	MODEL APPLICATION
960613	003111	55-IIIA (Dual), 75 (429A & 435A), LF-75B
960614	003035	125B (Dual)
960615	003085	85-IIIA (Dual)
960616	003088	85-IIIA (Single
960617	003089	75-IIIA (Single
960618	003090	55-IIIA (Single)
960620	003092	75B (443A & 447A Dual)
960621	003093	175B (Dual)

SECTION A

I.

		U.S. BUILT MACHINES	CANADIAN BUILT MACHINES
55-IIIA	Cummins	433AIII thru 433B510	433B461CAC thru 433B549CAC
55-IIIA	G.M.	416A520 thru 416C647	416C101CAC thru 416C625CAC
75B	Cummins	428A101 thru 428A265	NOT BUILT
75B	G.M.	435A101 thru 435A433	435A431CAC thru 435A485CAC
LF-75B	G.M.	448A101 thru 448A105	NOT BUILT

These machines have dual master cylinders. Use Kit number 961613.

II.

		U.S. BUILT MACHINES	CANADIAN BUILT MACHINES
125B	Cummins	439A101 thru 439A328	439A151CAC thru 439A310CAC
125B	G.M.	441A101 thru 441A266	441A141CAC thru 441A295CAC

These machines have dual master cylinders. Use Kit Number 960614.

III.

		U.S. BUILT MACHINES	CANADIAN BUILT MACHINES
85-IIIA	Cummins	426B101 thru 426B242	426B101CAC thru 426B255CAC
85-IIIA	G.M.	401D101 thru 401D233	401D101CAC thru 401D305CAC

These machines have dual master cylinders. Use Kit Number 960615.

IV.

		U.S. BUILT MACHINES	CANADIAN BUILT MACHINES
85-IIIA	Cummins	426A101 thru 426A220	426A101CAC thru 426A111CAC
85-IIIA	G.M.	401B101 thru 401C145	401C101CAC thru 401C106CAC

These machines have single master cylinders. Use Kit Number 960616.

V.

		U.S. BUILT MACHINES	CANADIAN BUILT MACHINES
75-IIIA	Cummins	480B101 thru 408B349	408B101CAC thru 408B308CAC
75-IIIA	G.M.	409B101 thru 409B419	409B101CAC thru 409B321CAC

These machines have single master cylinders. Use Kit Number 960617.

VI.

		U.S. BUILT MACHINES	CANADIAN BUILT MACHINES
55-IIIA	Cummins	433A101 thru 433A110	NOT BUILT
55-IIIA	G.M.	416A101 thru 416A519	416A101CAC thru 416A520CAC

These machines have single master cylinders. Use Kit Number 960618.

VII.

		U.S. BUILT MACHINES	CANADIAN BUILT MACHINES
75B	Cummins	443A101 thru 443A305	443A131CAC thru 443A215CAC
75B	G.M.	447A101 thru 447A290	447A141CAC thru 447A320CAC

These machines have dual master cylinders. Use Kit Number 960620.

VIII.

		U.S. BUILT MACHINES	CANADIAN BUILT MACHINES
175B	Cummins	438C101 thru 438C120	438C101CAC thru 438C105CAC
175B	G.M.	427A101 thru 427C120	427A101CAC thru 427C135CAC

These machines have dual master cylinders. Use Kit Number 960621.

SECTION B

Machines on the following list were not able to be located. Check your records to see if any of the following are in your area and not updated.

55-IIIA Cummins	Use Kit Number	Use Form Number
433A146	960613	003111
433A176	960613	003111
433A185	960613	003111
433B156	960613	003111
433B168	960613	003111
433B221	960613	003111
433B222	960613	003111
433B292	960613	003111
433B293	960613	003111
433B295	960613	003111
433B399	960613	003111
433B429	960613	003111
433B493	960613	003111
433B496	960613	003111

55-IIIA G. M.	Use Kit Number	Use Form Number
416A118	960618	003090
416A159	960618	003090
416A168	960618	003090
416A171	960618	003090
416A185	960618	003090
416A187	960618	003090
416A198	960618	003090
416A221	960618	003090
416A230	960618	003090
416A231	960618	003090
416A253	960618	003090
416A281	960618	003090
416A318	960618	003090
416A331	960618	003090
416A338	960618	003090
416A369	960618	003090
416A389	960618	003090
416A405	960618	003090
416A408	960618	003090
416A430	960618	003090
416A439	960618	003090
416A451	960618	003090
416A454	960618	003090
416A468	960618	003090
416A477	960618	003090
416A509	960618	003090
416A518	960618	003090
416A520	960613	003111

55-IIIA G. M. (Continued)	Use Kit Number	Use Form Number
416A525	960613	003111
416A528	960613	003111
416A538	960613	003111
416A541	960613	003111
416A578	960613	003111
416C101	960613	003111
416C109	960613	003111
416C198	960613	003111
416C247	960613	003111
416C263	960613	003111
416C291	960613	003111
416C472	960613	003111
416C492	960613	003111
416C555	960613	003111

75-IIIA Cummins	Use Kit Number	Use Form Number
408B114	960617	003089
408B125	960617	003089
408B158	960617	003089
408B171	960617	003089
408B185	960617	003089
408B186	960617	003089
408B202	960617	003089
408B205	960617	003089
408B220	960617	003089
408B230	960617	003089
408B245	960617	003089
408B246	960617	003089
408B306	960617	003089
408B318	960617	003089
408B341	960617	003089
408B108CAC	960617	003089

75-IIIA G. M.	Use Kit Number	Use Form Number
409B103	960617	003089
409B104	960617	003089
409B128	960617	003089
409B137	960617	003089
409B138	960617	003089
409B161	960617	003089
409B162	960617	003089
409B183	960617	003089
409B192	960617	003089
409B201	960617	003089
409B211	960617	003089
409B222	960617	003089
409B231	960617	003089
409B237	960617	003089
409B238	960617	003089
409B307	960617	003089
409B328	960617	003089
409B332	960617	003089

75-IIIA G.M. (Continued)	Use Kit Number	Use Form Number
409B380	960617	003089
409B395	960617	003089
409B400	960617	003089
409B401	960617	003089

75B Cummins	Use Kit Number	Use Form Number
428A117	960613	003111
428A154	960613	003111
428A158	960613	003111
428A201	960613	003111
428A249	960613	003111
443A167	960620	003092

75B G. M.	Use Kit Number	Use Form Number
435A122	960613	003111
435A161	960613	003111
435A242	960613	003111
435A267	960613	003111
435A325	960613	003111

85-IIIA Cummins	Use Kit Number	Use Form Number
426A123	960616	003088
426A149	960616	003088
426A151	960616	003088
426A163	960616	003088
426A168	960616	003088
426A174	960616	003088
426A219	960616	003088
426B109	960615	003085
426B122	960615	003085
426B158	960615	003085
426B191	960615	003085
426B213	960615	003085

85-IIIA G. M.	Use Kit Number	Use Form Number
401B101	960616	003088
401B106	960616	003088
401B113	960616	003088
401C111	960616	003088
401C112	960616	003088
401C124	960616	003088
401C170	960615	003085

125B Cummins	Use Kit Number	Use Form Number
439A110	960614	003035
439A126	960614	003035
439A129	960614	003035
439A137	960614	003035
439A157	960614	003035
439A160	960614	003035
439A173	960614	003035

125B G. M.	Use Kit Number	Use Form Number
441A216	960614	003035
441A235	960614	003035

175B Cummins	Use Kit Number	Use Form Number
438C111	960621	003093

175B G. M.	Use Kit Number	Use Form Number
427A101	960621	003093
427A128	960621	003093
427A129	960621	003093
427A133	960621	003093
427A272	960621	003093
427A273	960621	003093
427B164	960621	003093
427B188	960621	003093
427B195	960621	003093
427B250	960621	003093
427B252	960621	003093
427B273	960621	003093
427B377	960621	003093
427B382	960621	003093
427B457	960621	003093
427B464	960621	003093
427B466	960621	003093

CLARK

FORM 003090 Revised
INSTALLATION INSTRUCTIONS
2501983 BRAKE COMPENSATOR VALVE
MODEL 55-IIIA

Applicable to the following serial numbers:

U. S. Built Machines

Cummins - 433A101 thru 433A110
G. M. - 416A101 thru 416A519

Canadian Built Machines

G. M. - 416A101CAC thru 416A520CAC

PARTS REQUIRED (Per machine):

Model 55-IIIA (Machines with single master cylinders only)

1 - 960618 Kit consisting of the following:

1 -	2516488	Tube Assembly
1 -	2511089	Mounting Plate
1 -	2501983	Compensator Valve
*1 -	2506979	Gasket
*1 -	2511196	Gasket
1 -	1675961	Adapter
1 -	699005	Adapter
2 -	24C-620	Bolt
2 -	4E-06	Lockwasher
2 -	25E-17	Flatwasher
1 -	949848	Repair Kit, Master Cylinder

850487 Brake Fluid SAE J-1703 (Not included in kit)

*NOTE: The 2506979 Gasket and the 2511196 Gasket are made from the same material and have the same outside diameter but may be identified by their inside diameter. See Figure 1.

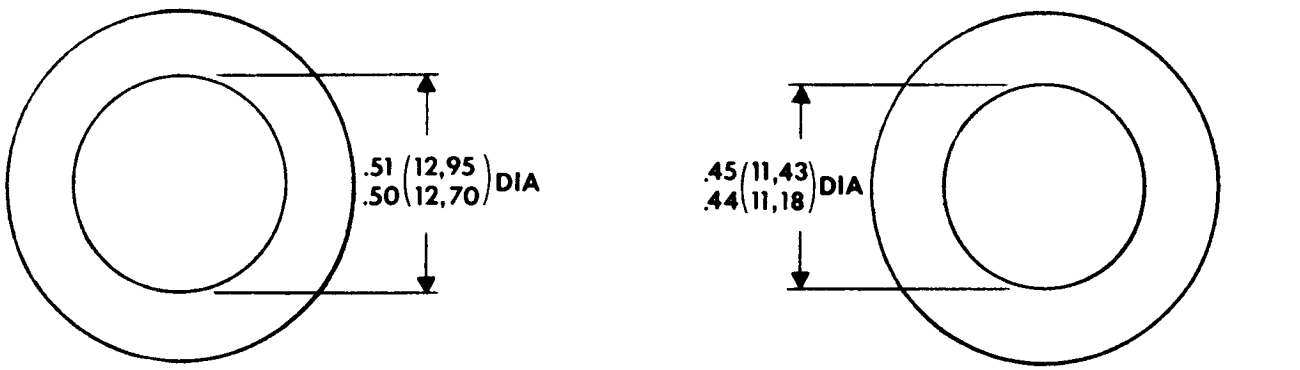


Figure 1 (7E7) SG-663

INSTALLATION:

CAUTION: KEEP BRAKE SYSTEM CLEAN AND FREE OF FOREIGN MATERIAL AT ALL TIMES TO INSURE PROPER OPERATION OF SYSTEM.

1. Park machine on a level surface, block wheels and apply parking brake.

2. Drain brake fluid from master cylinder.

3. Rebuild master cylinder using Items 24, 25 & 27 as shown in Figure 2, from 949848 Repair Kit.

4. Remove and omit Items 20 & 21 if they are present at this time.

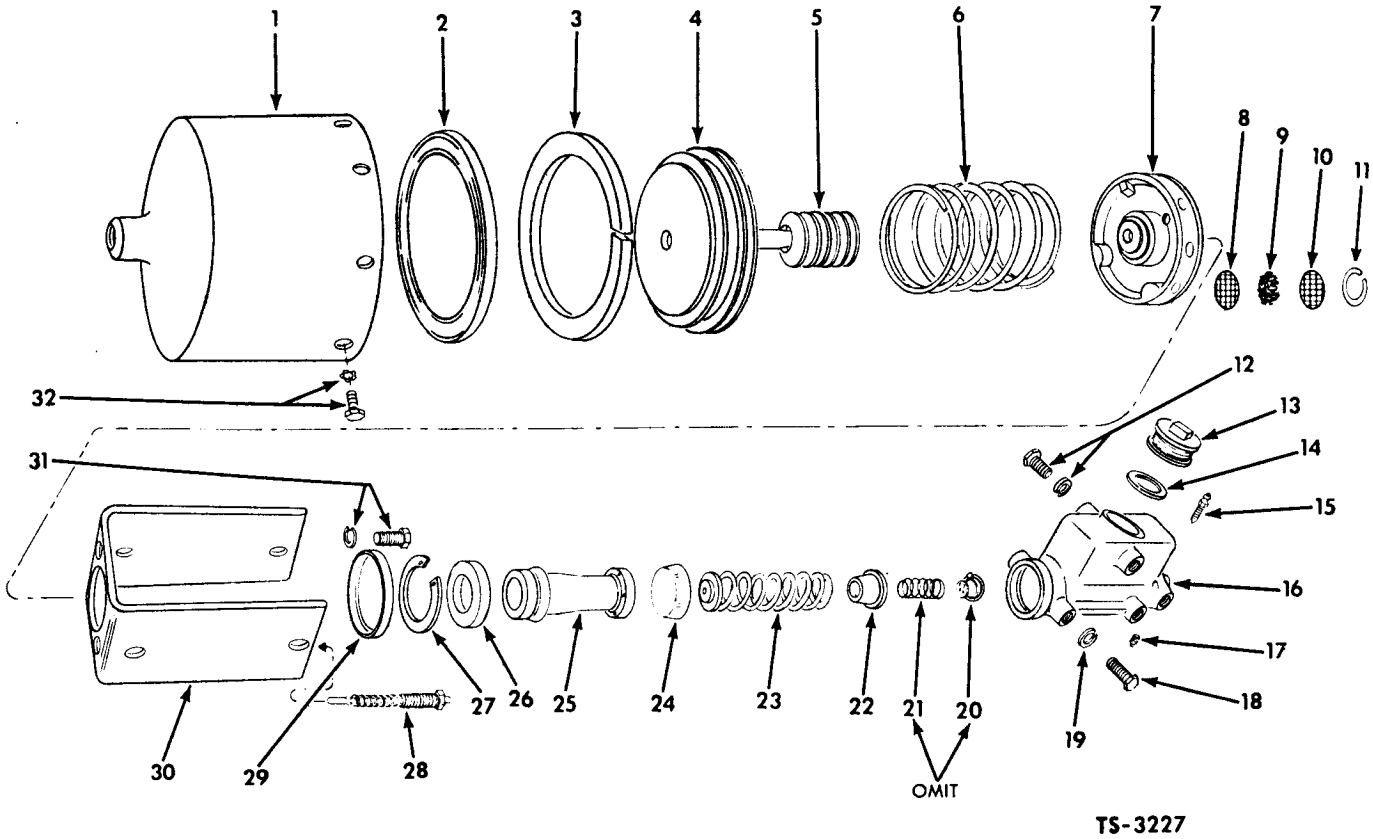


Figure 2

5. Weld 2511089 Mounting Plate to L. H. cockpit channel as shown in Figure 3 using a .31 inch fillet weld on two sides.

6. Install 2501983 Compensator Valve on mounting plate as shown using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

7. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown.

8. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as shown in Figure 3.

9. Install 2516488 Tube Assembly connecting master cylinder and brake compensator valve as shown in Figure 3.

10. Refill master cylinder with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

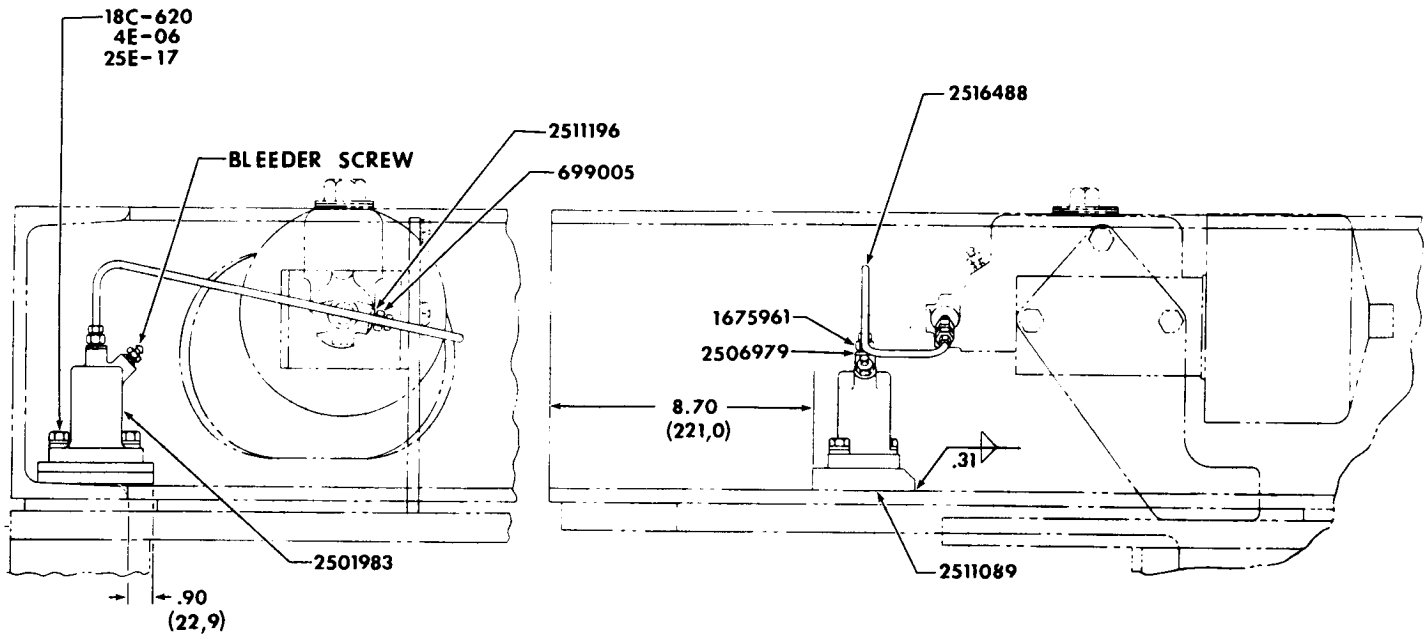


Figure 3

11. Bleed brake lines and compensator valve to remove all traces of air from the system. Use a bleeder hose wherever possible and proceed as outlined below. Use Figure 3 and Figure 4, Item 1 for location of bleeder screws. A helper will be required.

    A. Open one bleeder screw and depress brake pedal, close bleeder screw, then release brake pedal. Repeat this several times until fluid from bleeder screw is free of bubbles.

    B. Actuate brakes several times.

    C. Repeat Step A, until no more bubbles are observed in fluid from bleeder screw.

    D. Repeat entire process at each bleeder screw on each brake head and compensator valve. Keep master cylinder full at all times.

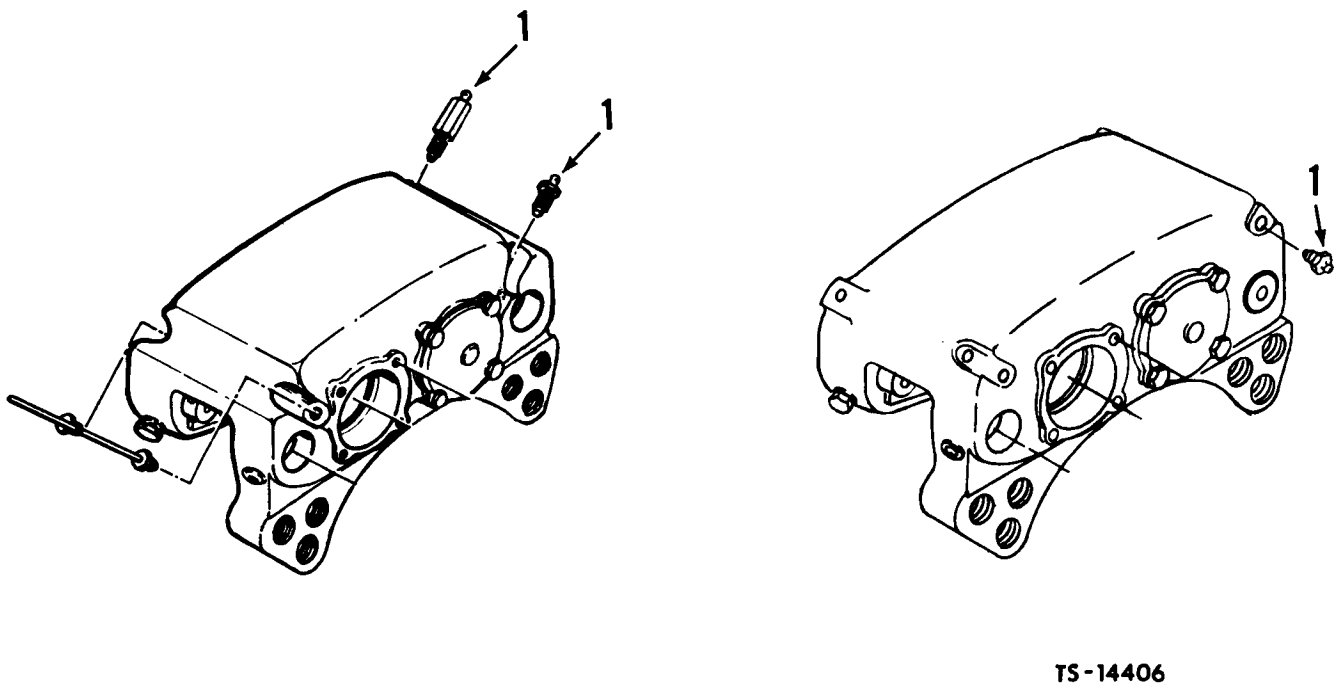


Figure 4

CLARK

FORM 003111
INSTALLATION INSTRUCTIONS
2501983 BRAKE COMPENSATOR VALVES
MODEL 55-IIIA, 75B & LF-75B

Applicable to the following models and serial numbers:

U.S. Built Machines

55-IIIA (Machines with dual master cylinders)
Cummins-433A111 thru 433B510
G.M.----416A520 thru 416C647

75B & LF-75B
Cummins-428A101 thru 428A265
G.M.----435A101 thru 435A433
G.M.----448A101 thru 448A105

Canadian Built Machines

55-IIIA(Machines with dual master cylinders)
Cummins-433B461CAC thru 433B549CAC
G.M.----416C101CAC thru 416C625CAC

75B
Cummins-428ACAC Series Not Built
G.M.----435A431CAC thru 435A485CAC

PARTS REQUIRED (Per Machine):

1 - 960613 Kit consisting of the following:

1 - 2511193	Tube Assembly
1 - 2511194	Tube Assembly
2 - 2511089	Mounting Plate
2 - 2501983	Compensator Valve
*2 - 2506979	Gasket
*2 - 2511196	Gasket
2 - 1675961	Adapter
2 - 699005	Adapter
4 - 24C-620	Bolt
4 - 4E-06	Lockwasher
4 - 25E-17	Flatwasher
2 - 961163	Repair Kit, Master Cylinder

850487 Brake Fluid SAE J-1703 (Not included in kit)

*NOTE: The 2506979 Gasket and the 2511196 Gasket are made from the same material and have the same outside diameter but may be identified by their inside diameter as illustrated in Figure 1.

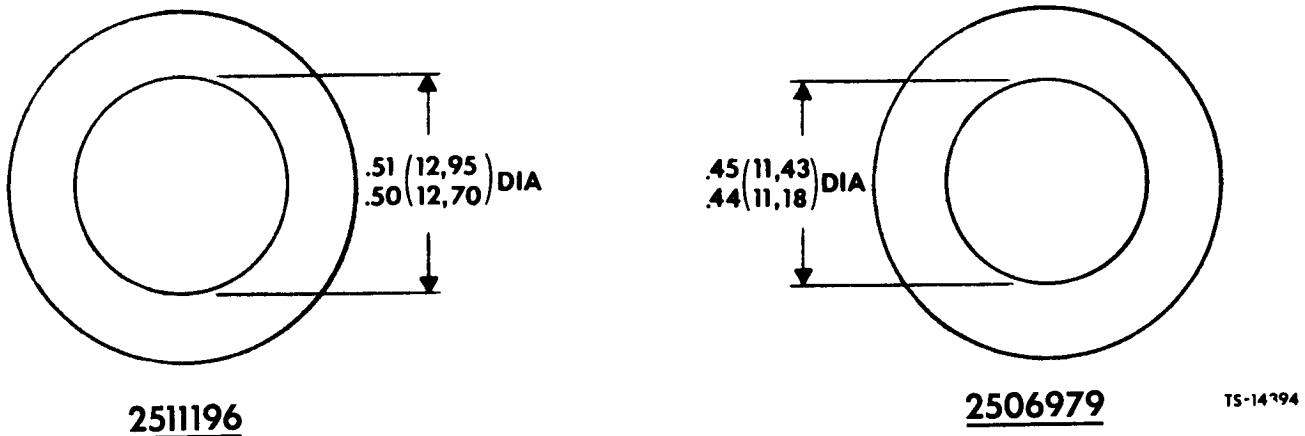


Figure 1.

INSTALLATION:

CAUTION: KEEP BRAKE SYSTEM CLEAN AND FREE OF FOREIGN MATERIAL AT ALL TIMES TO INSURE PROPER OPERATION OF THE SYSTEM.

I. Front Frame Installation

1. Park machine on a level surface, block wheels and apply parking brake.
2. Drain brake fluid from front master cylinder.
3. Rebuild master cylinder using items, 24, 25 & 27 shown in Figure 2 from 961163 Repair Kit.
4. Remove and omit Items 20 & 21 if they are present at this time.

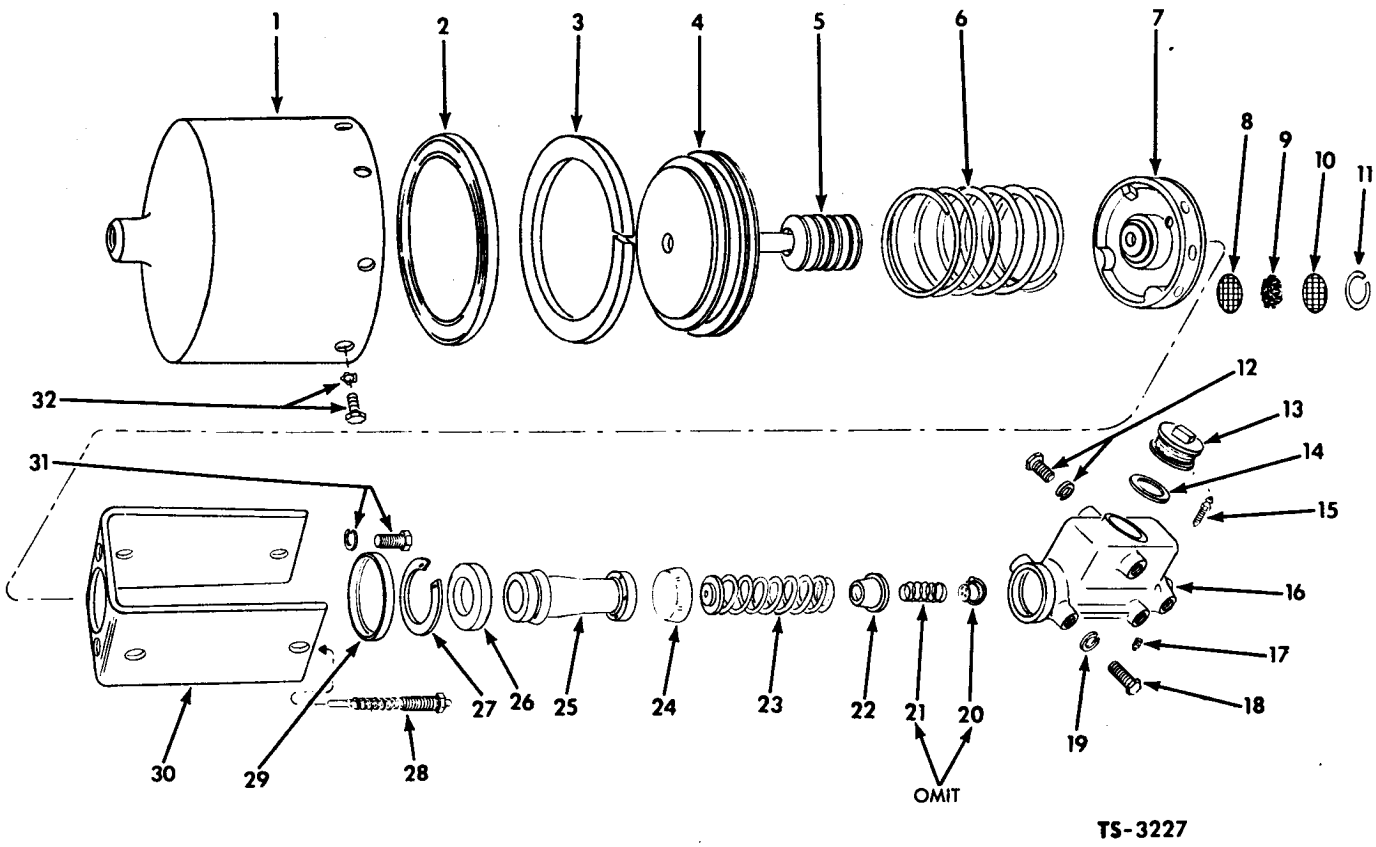


Figure 2.

5. Weld 2511089 Mounting Plate to front frame with a .31 inch fillet weld on two sides as shown in Figure 3.

6. Install 2501983 Compensator Valve on mounting plate as shown in Figure 3 using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

7. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 3.

8. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as illustrated in Figure 3.

9. Install 2511194 Tube Assembly connecting master cylinder and brake compensator valve as shown.

10. Refill master cylinder with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

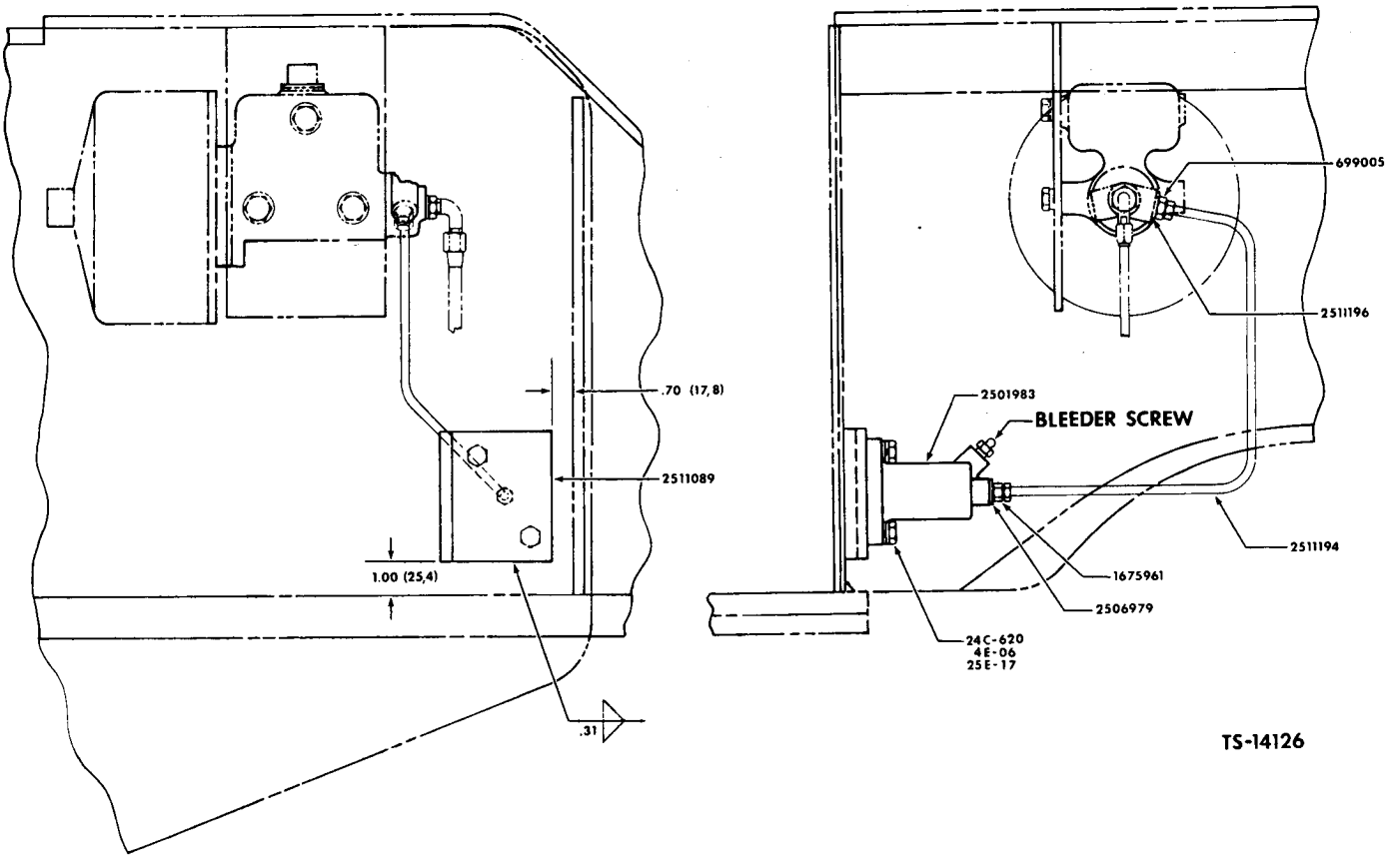


Figure 3.

FORM 003111

II. Rear Frame Installation

1. Drain brake fluid from rear master cylinder.

2. Rebuild rear master cylinder using Item 24, 25 & 27 as shown in Figure 2, from 961163 Repair Kit. Remove and omit Items 20 & 21 if they are present at this time.

3. Weld 2511089 Mounting Plate to rear frame with a .31 inch fillet weld on two sides as shown in Figure 4.

4. Install 2501983 Compensator Valve on mounting plate as shown in Figure 4 using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

5. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 4.

6. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as illustrated in Figure 4.

7. Install 2511193 Tube Assembly connecting master cylinder and brake compensator valve as shown.

8. Refill master cylinder with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

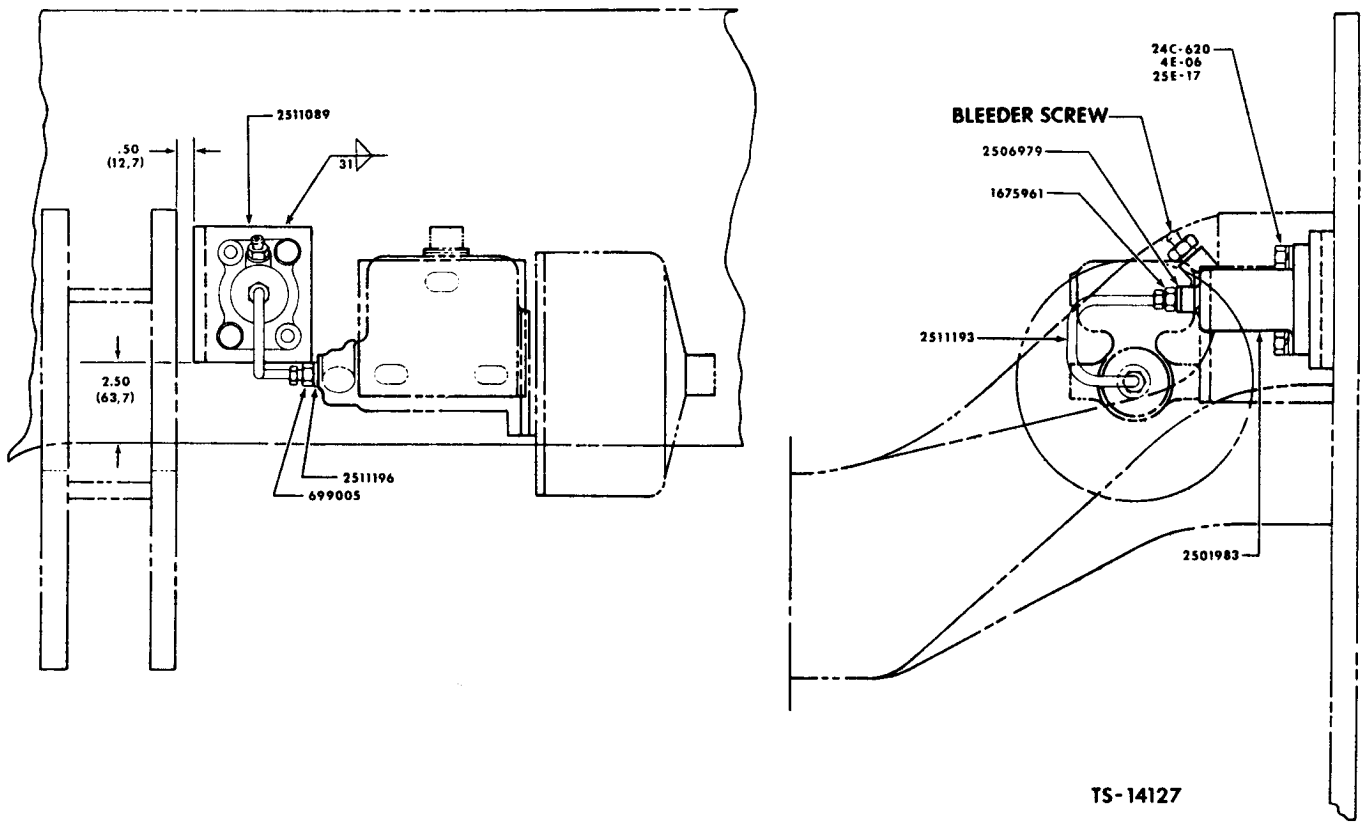


Figure 4.

FORM 003111

III. Bleeding Procedure

1. Bleed brake lines and compensator valves to remove all traces of air from the system. Use a bleeder hose wherever possible and proceed as outlined below. See Figures 3 & 4 and Figure 5, Item 1 for location of bleeder screws. A helper will be required.

   A. Open bleeder screw and depress brake pedal, close bleeder screw, then release brake pedal. Repeat this several times until fluid from bleeder screw is free of bubbles.

   B. Actuate brakes several times.

   C. Repeat Step A, until no more bubbles are observed in fluid from bleeder screw.

   D. Repeat entire process at each bleeder screw on each brake head and compensator valve. Keep master cylinder full at all times.

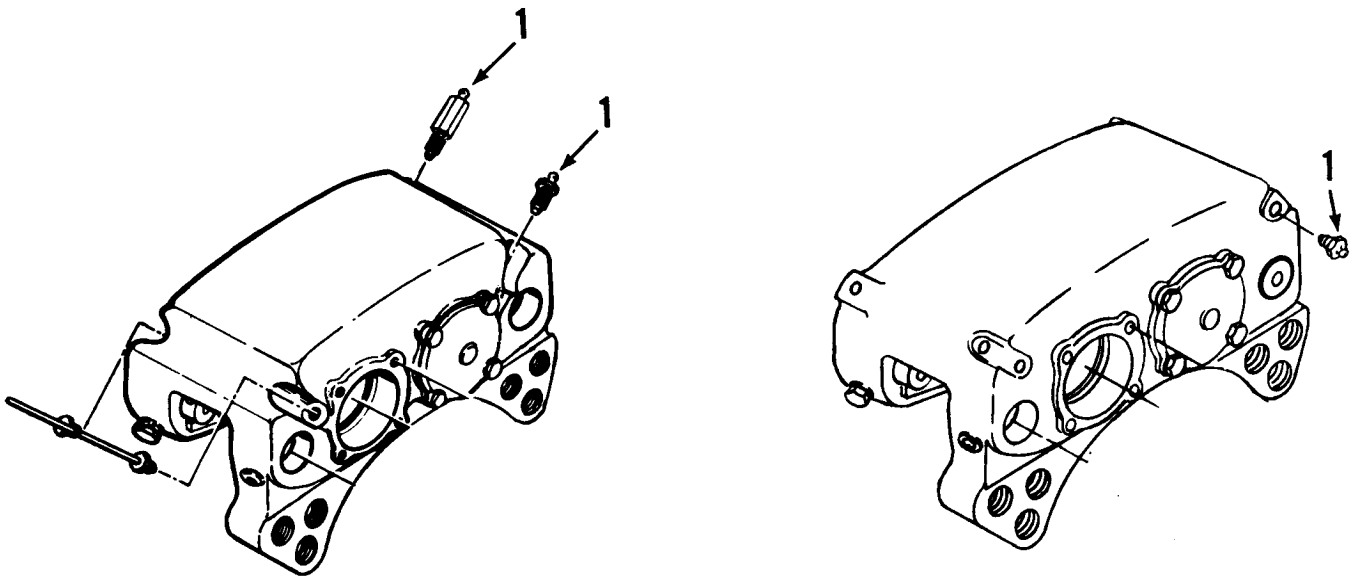


Figure 5.

CLARK

FORM 003089
INSTALLATION INSTRUCTIONS
2501983 BRAKE COMPENSATOR VALVE
MODEL 75-IIIA

Applicable to the following serial numbers:

U. S. Built Machines	Canadian Built Machines
Cummins - 408B101 thru 408B349	Cummins - 408B101CAC thru 408B308CAC
G. M. - 409B101 thru 409B419	G. M. - 409B101CAC thru 409B321CAC

PARTS REQUIRED (Per machine):

1 - 960617 Kit consisting of the following:

1 -	2513396	Tube Assembly
1 -	2511089	Mounting Plate
1 -	2501983	Compensator Valve
*1 -	2506979	Gasket
*1 -	2511196	Gasket
1 -	1675961	Adapter
1 -	699005	Adapter
2 -	24C-620	Bolt
2 -	4E-06	Lockwasher
2 -	25E-17	Flatwasher
1 -	949848	Repair Kit, Master Cylinder
850487		Brake Fluid SAE J-1703 (Not included in kit)

*NOTE: The 2506979 Gasket and the 2511196 Gasket are made from the same material and have the same outside diameter but may be identified by their inside diameter. See Figure 1.

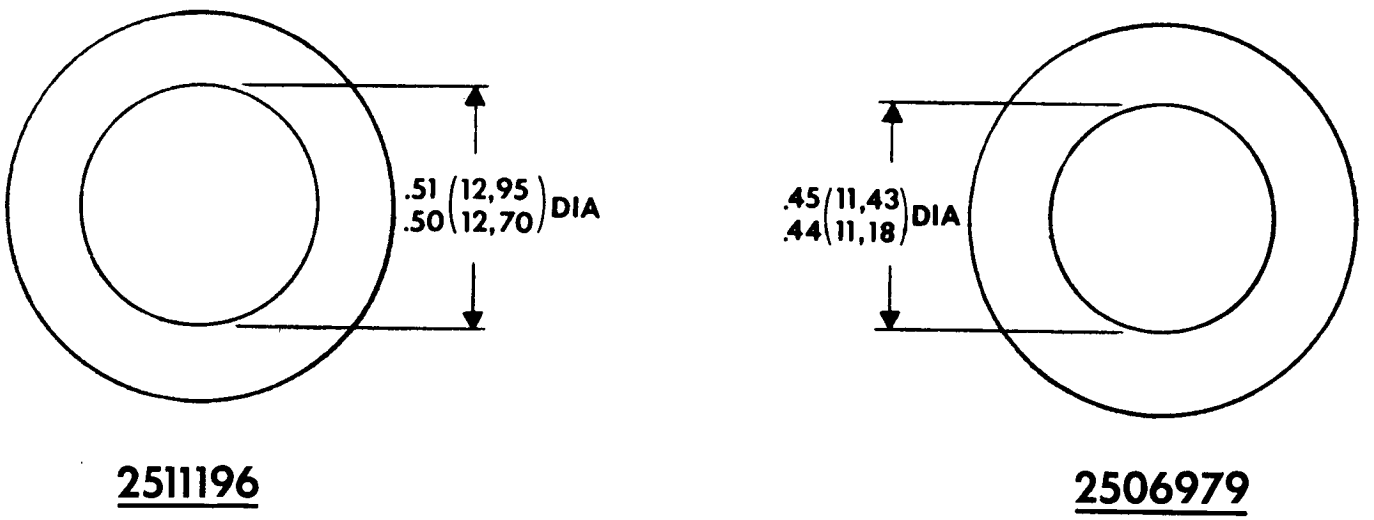


Figure 1

INSTALLATION:

CAUTION: KEEP BRAKE SYSTEM CLEAN AND FREE OF FOREIGN MATERIAL AT ALL TIMES TO INSURE PROPER OPERATION OF SYSTEM.

1. Park machine on a level surface, block wheels and apply parking brake.

2. Drain brake fluid from master cylinder.

3. Rebuild master cylinder using Items 24, 25 & 27 shown in Figure 2, from 949848 Repair Kit.

4. Remove and omit Items 20 and 21 if they are present at this time.

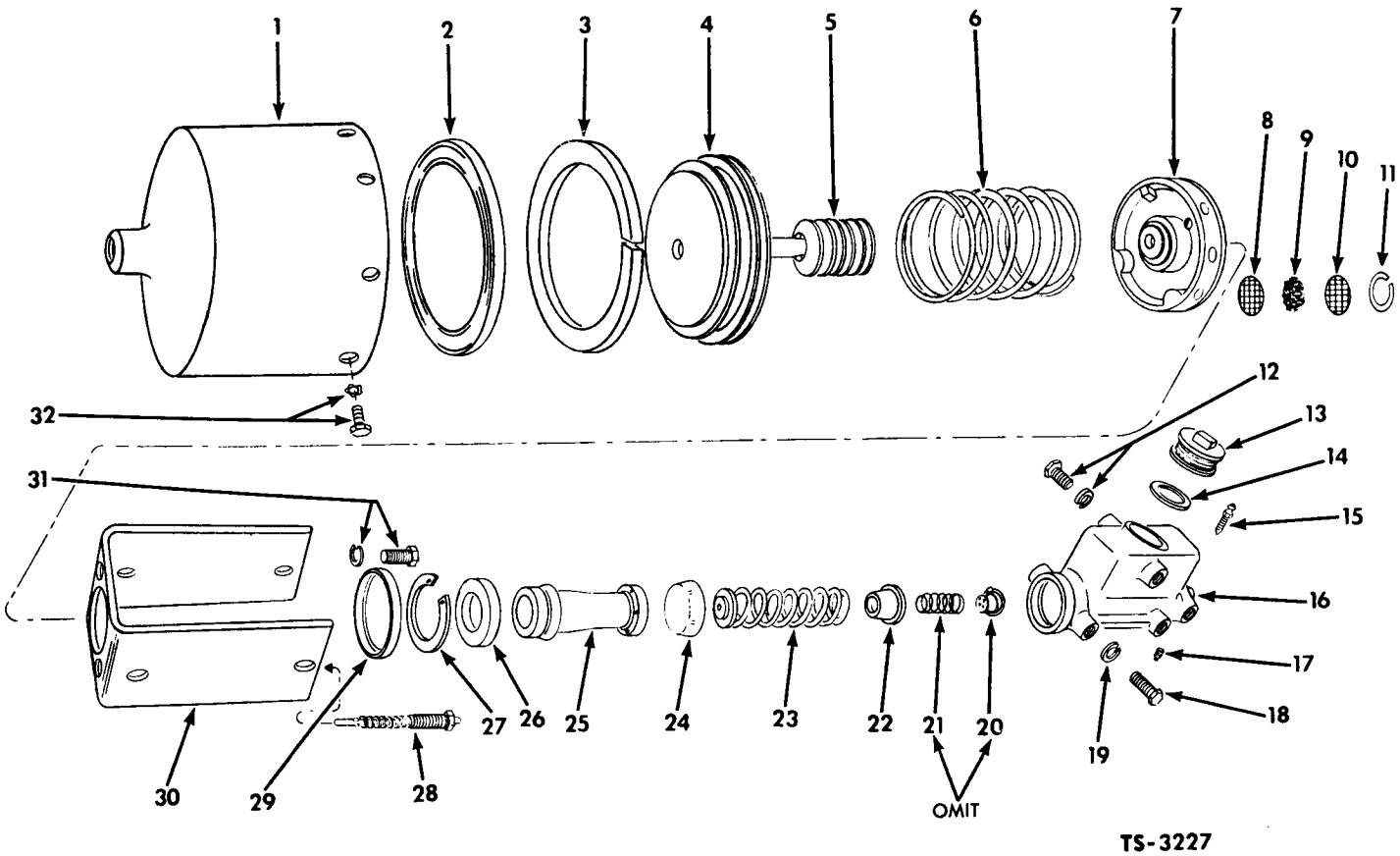


Figure 2

5. Weld 2511089 Mounting Plate to right hand inside panel of cockpit base as shown in Figure 3 using a .31 inch fillet on two sides.

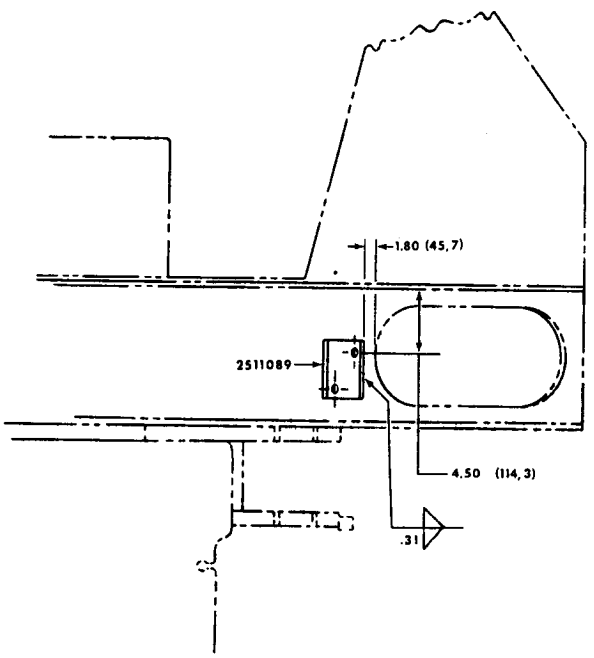
6. Install 2501983 Compensator valve on mounting block as shown using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23 - 25 ft. lbs. torque.

7. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 3.

8. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as shown in Figure 3.

9. Install 2513396 Tube Assembly connecting master cylinder and brake compensator valve as shown.

10. Refill master cylinder with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.



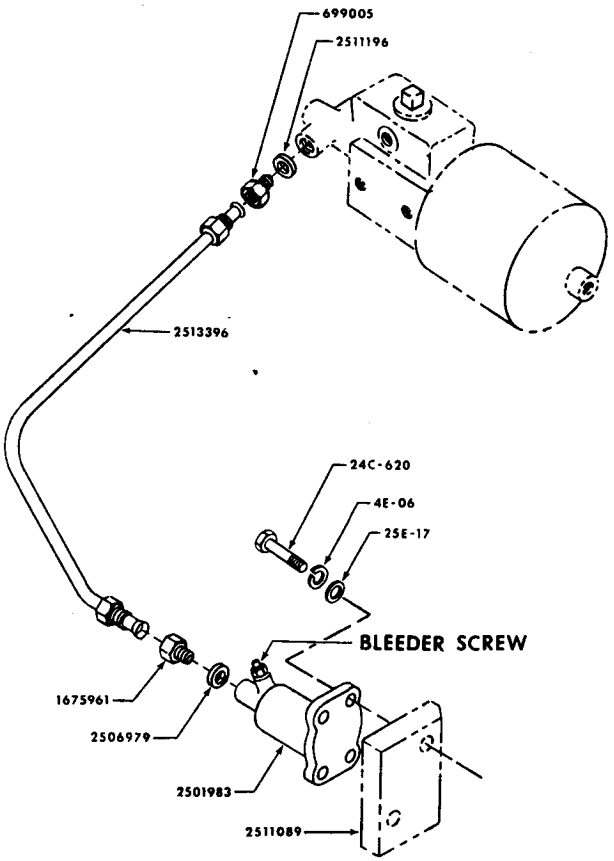


Figure 3

11. Bleed brake lines and compensator valve to remove all traces of air from the system. Use a bleeder hose wherever possible and proceed as outlined below. See Figure 3 and Figure 4, Item 1, for location of bleeder screws. A helper will be required.

    A. Open one bleeder screw and depress brake pedal, close bleeder screw, then release brake pedal. Repeat this several times until fluid from bleeder screw is free of bubbles.

    B. Actuate brakes several times.

    C. Repeat Step A, until no bubbles are observed in fluid from bleeder screw.

    D. Repeat entire process at each bleeder screw on each brake head and compensator valve. Keep master cylinder full at all times.

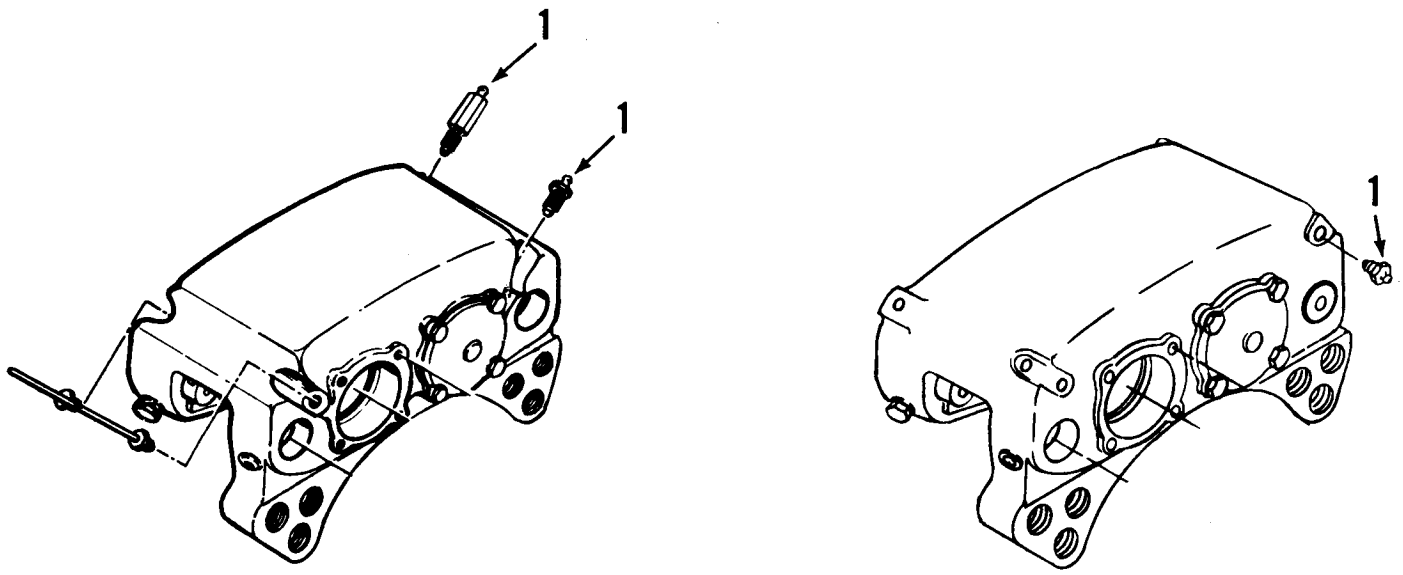


Figure 4

CLARK

FORM 003092
INSTALLATION INSTRUCTIONS
2501983 BRAKE COMPENSATOR VALVES
MODEL 75B

Applicable to the following serial numbers:

U. S. Built Machines

Cummins - 443A101 thru 443A305
G. M. - 447A101 thru 447A290

Canadian Built Machines

Cummins - 443A131CAC thru 443A215CAC
G. M. - 447A141CAC thru 447A320CAC

PARTS REQUIRED (Per machine):

1 - 960620 Kit consisting of the following:

	1 - 2511308	Tube Assembly
	1 - 2511194	Tube Assembly
	2 - 2511089	Mounting Plate
	2 - 2501983	Compensator Valve
*	2 - 2506979	Gasket
*	2 - 2511196	Gasket
	2 - 1675961	Adapter
	2 - 699005	Adapter
	4 - 24C-620	Bolt
	4 - 4E-06	Lockwasher
	4 - 25E-17	Flatwasher
	2 - 961163	Repair Kit, Master Cylinder

850487 Brake Fluid SAE J - 1703 (Not included in kit)

*NOTE: The 2506979 Gasket and the 2511196 Gasket are made from the same material and have the same outside diameter, but may be identified by their inside diameter. See Figure 1.

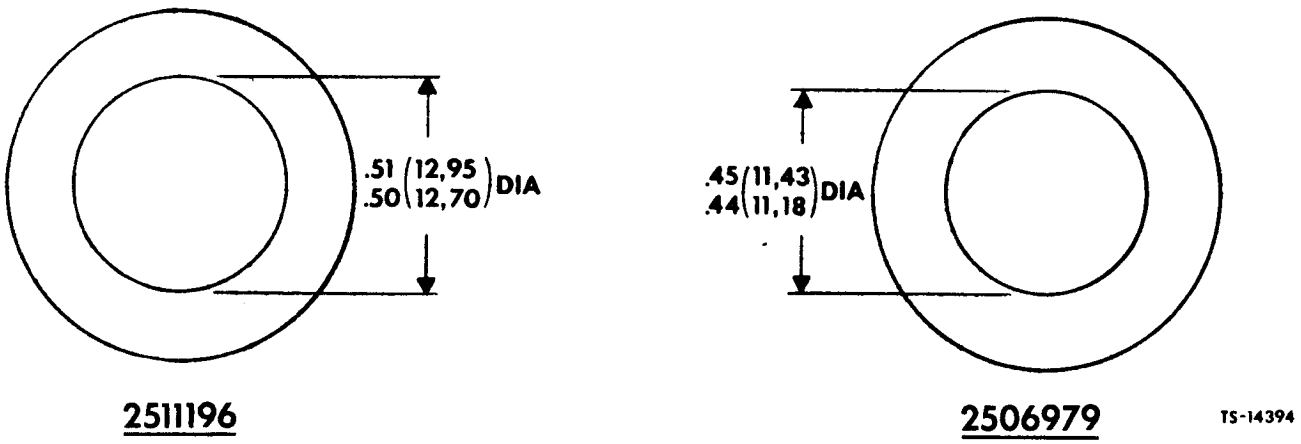


Figure 1

INSTALLATION:

CAUTION: KEEP BRAKE SYSTEM CLEAN AND FREE OF FOREIGN MATERIAL AT ALL TIMES TO INSURE PROPER OPERATION OF SYSTEM.

I. Front Frame Installation

1. Park machine on a level surface, block wheels and apply parking brake.

2. Drain brake fluid from front master cylinder.

3. Rebuild master cylinder using items 24, 25 & 27 shown in Figure 2 from 961163 Repair Kit.

4. Remove and omit Items 20 and 21 if they are present at this time.

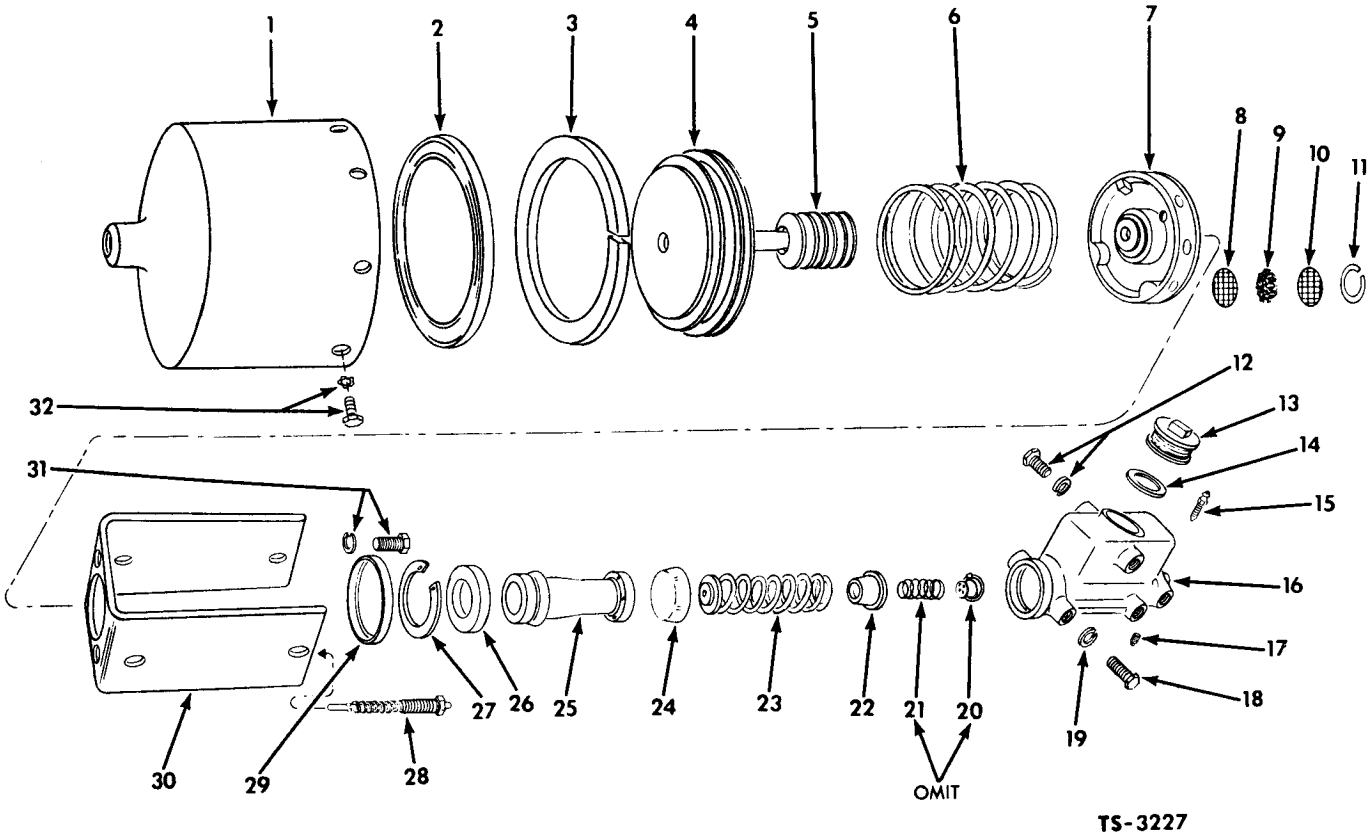


Figure 2.

5. Weld 2511089 Mounting Plate to front frame with a .31 inch fillet weld on two sides as shown in Figure 3.

6. Install 2501983 Compensator Valve on mounting plate as shown in Figure 3, using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

7. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 3.

8. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as shown in Figure 3.

9. Install 2511194 Tube Assembly connecting master cylinder and brake compensator valve as shown.

10. Refill front master cylinder with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

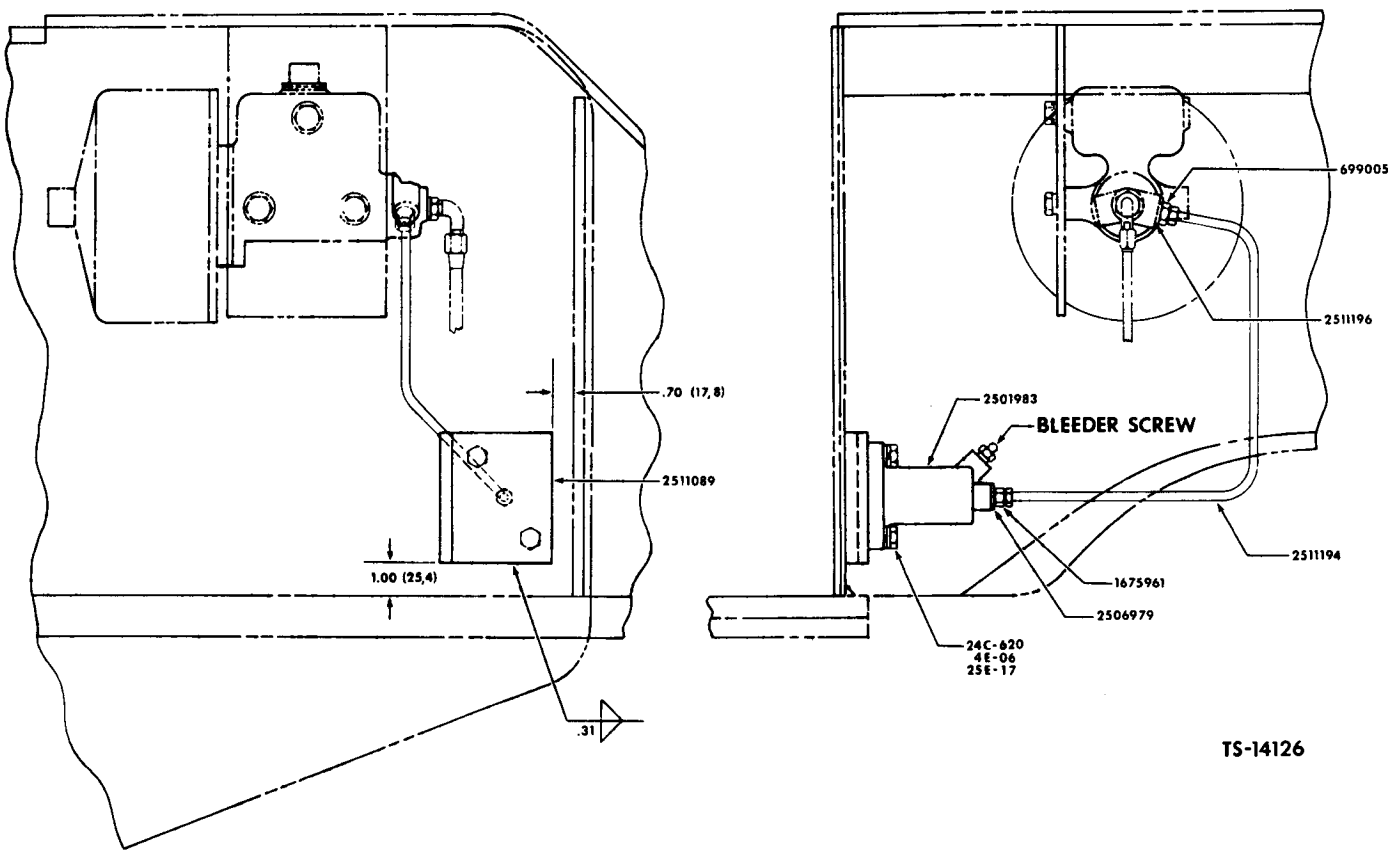


Figure 3.

II. Rear Frame Installation

1. Drain brake fluid from rear master cylinder.

2. Rebuild rear master cylinder using Items 24, 25 & 27 as shown in Figure 2, from 961163 Repair Kit. Remove and omit items 20 & 21 if they are present at this time.

3. Weld 2511089 Mounting Plate to rear frame with a .31 inch fillet weld on two sides as shown in Figure 4.

4. Install 2501983 Compensator Valve on mounting plate as shown in Figure 4 using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

5. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 4.

6. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as shown in Figure 4.

7. Install 2511308 Tube Assembly connecting master cylinder and brake compensator valve as shown.

8. Refill master cylinder with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

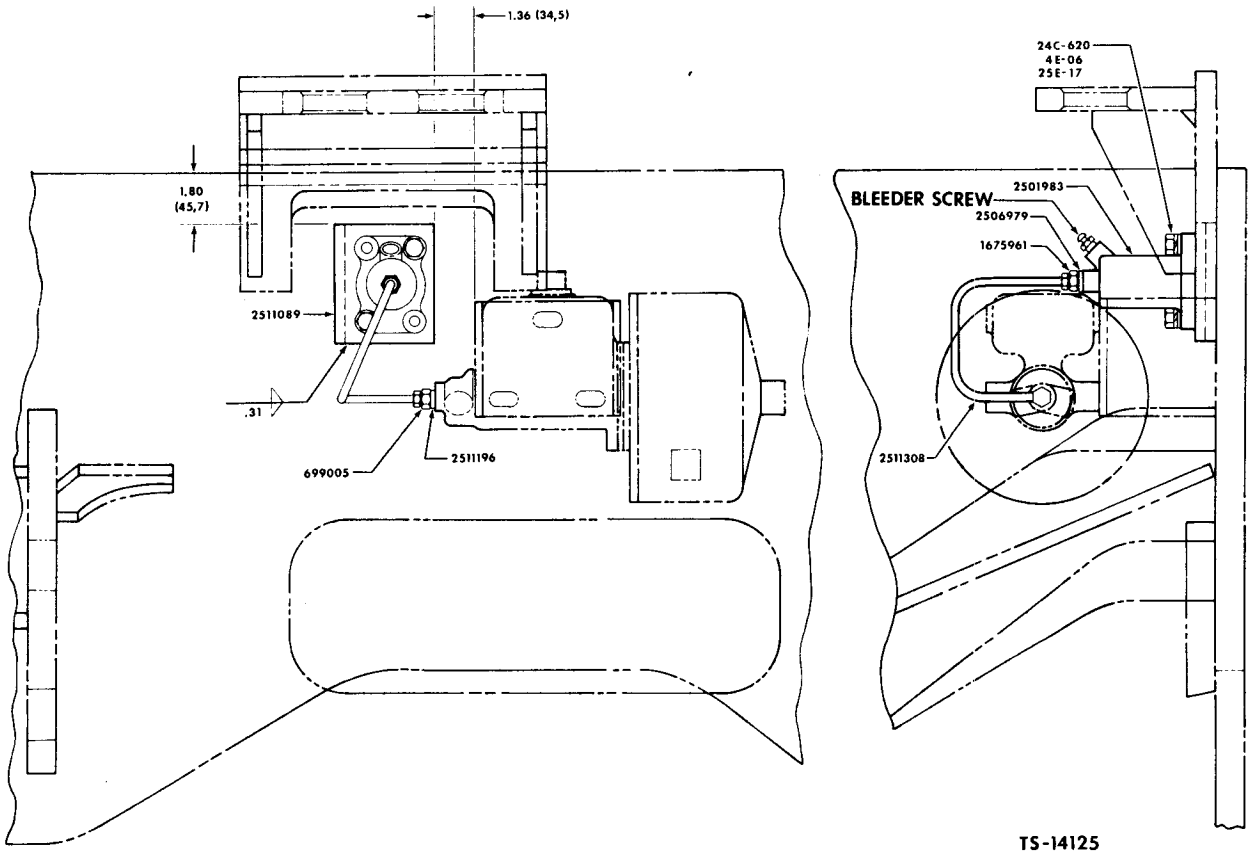


Figure 4.

III. Bleeding Procedure

1. Bleed brake lines and compensator valves to remove all traces of air from the system. Use a bleeder hose wherever possible and proceed as outlined below. See Figures 3 & 4 and Figure 5, Item 1 for location of bleeder screws. A helper will be required.

   A. Open bleeder screw and depress brake pedal, close bleeder screw, then release brake pedal. Repeat this several times until fluid from bleeder screw is free of bubbles.

   B. Actuate brakes several times.

   C. Repeat Step A, until no bubbles are observed in fluid from bleeder screw.

   D. Repeat entire process at each bleeder screw on each brake head and compensator valve. Keep master cylinder reservoir full at all times.

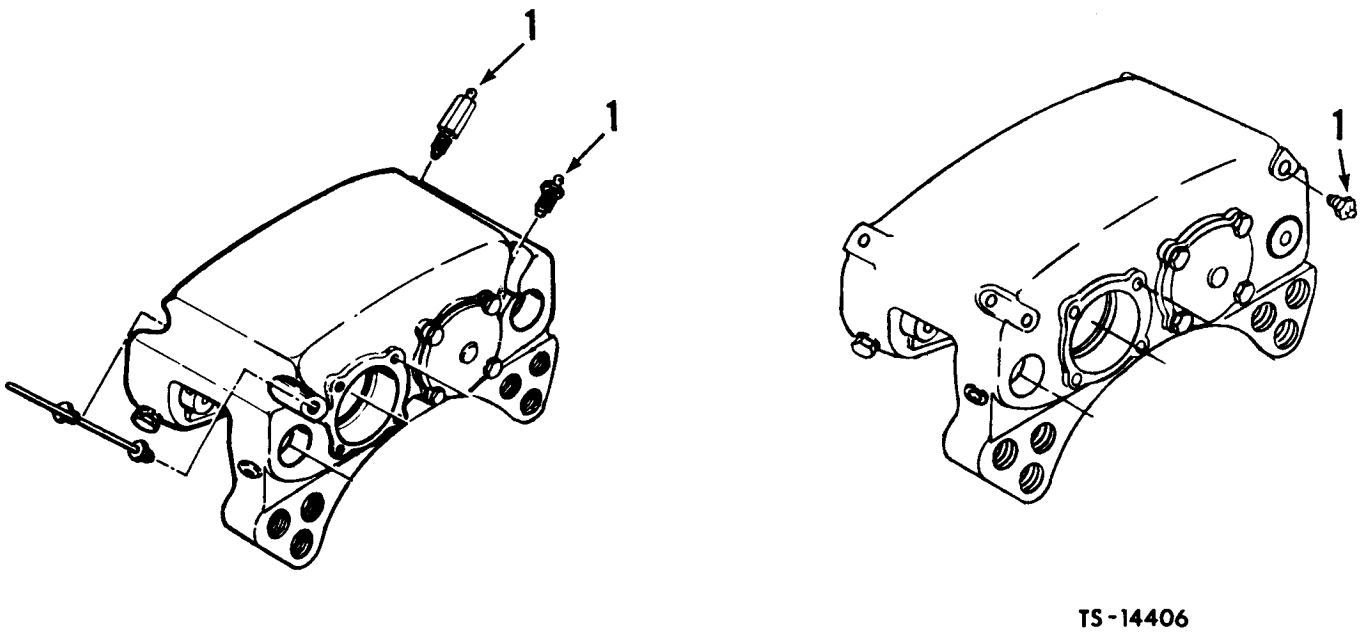


Figure 5.

FORM 003088
INSTALLATION INSTRUCTIONS
2501983 BRAKE COMPENSATOR VALVE
MODEL 85-111A

Applicable to the following serial numbers:

U. S. Built Machines	Canadian Built Machines
Cummins - 426A101 thru 426A220	Cummins - 426A101CAC thru 426A111CAC
G. M. - 401B101 thru 401C145	G. M. - 401C101CAC thru 401C106CAC

PARTS REQUIRED (Per machine):

Model 85-111A (Machines with single master cylinders only)

1 - 960616 Kit consisting of the following:

1	- 2513398	Tube Assembly
1	- 2511089	Mounting Plate
1	- 2501983	Compensator Valve
*1	- 2506979	Gasket
*1	- 2511196	Gasket
1	- 1675961	Adapter
1	- 699005	Adapter
2	- 24C-620	Bolt
2	- 4E-06	Lockwasher
2	- 25E-17	Flatwasher
1	- 949848	Repair Kit, Master Cylinder

850487 Brake Fluid SAE J-1703 (Not included in kit)

*NOTE: The 2506979 Gasket and the 2511196 Gasket are made from the same material and have the same outside diameter but may be identified by their inside diameter. See Figure 1.

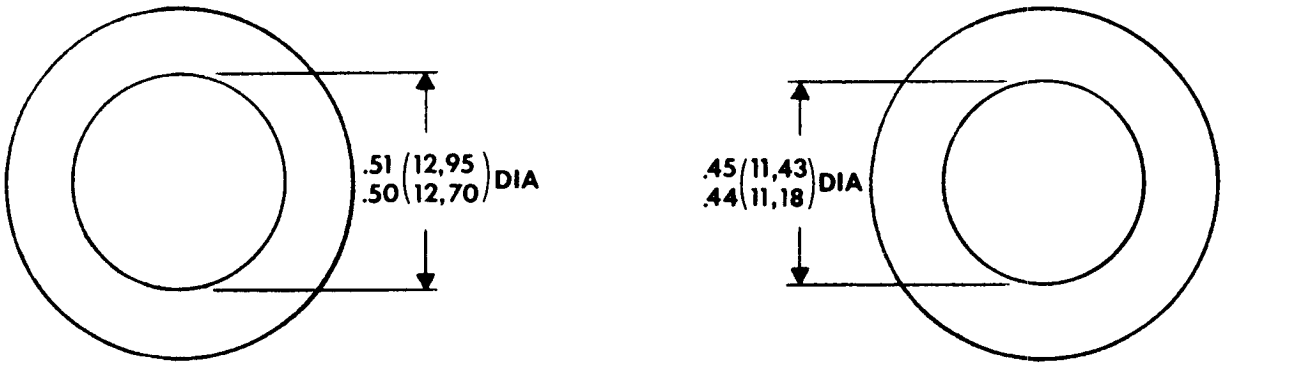


Figure 1

INSTALLATION:

CAUTION: KEEP BRAKE SYSTEM CLEAN AND FREE OF FOREIGN MATERIAL AT ALL TIMES TO INSURE PROPER OPERATION OF SYSTEM.

1. Park machine on a level surface, block wheels and apply parking brake.

2. Drain brake fluid from master cylinder.

3. Rebuild master cylinder using Items 24, 25 & 27 shown in Figure 2 from 949848 Repair Kit.

4. Remove and omit Items 20 and 21 if they are present at this time.

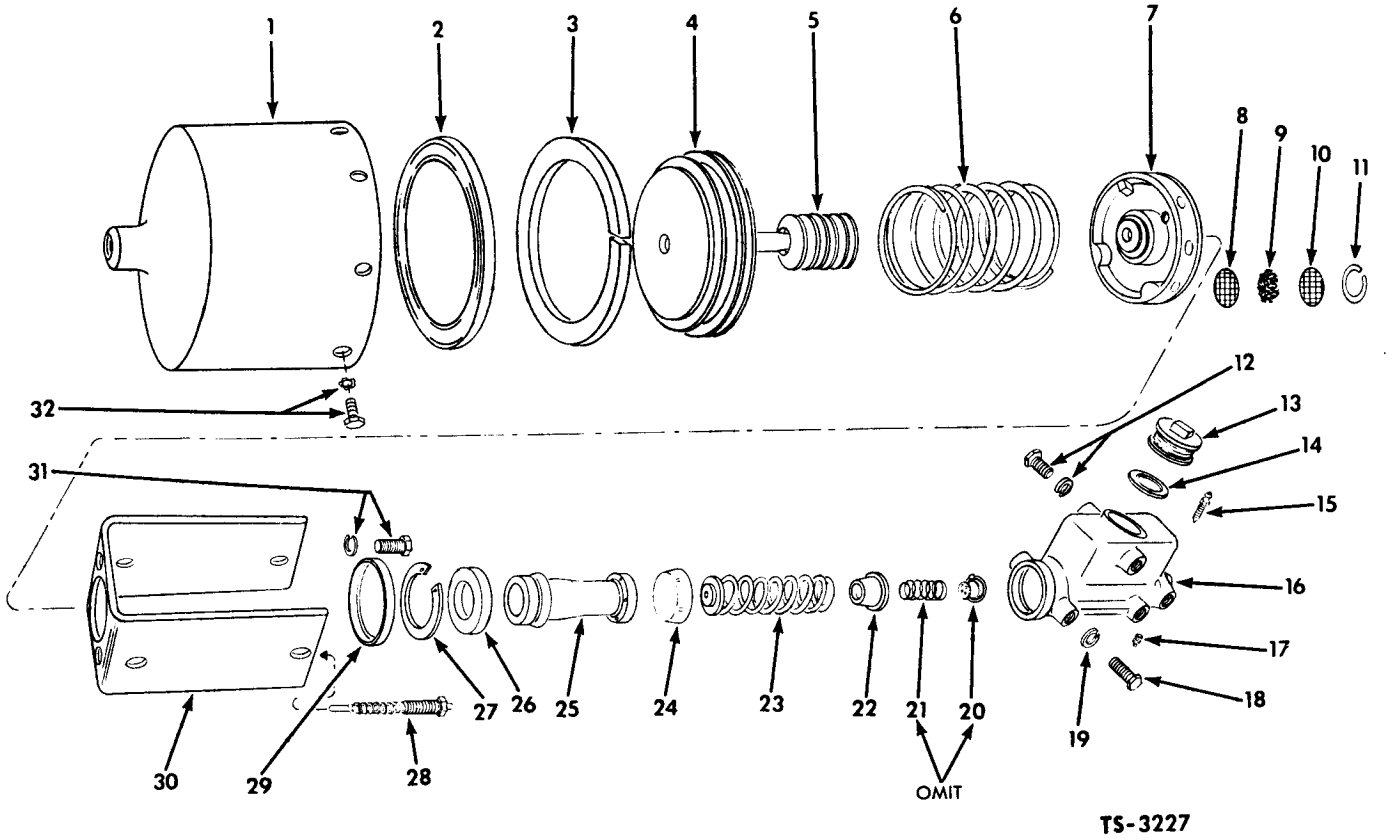


Figure 2

5. Weld 2511089 Mounting Plate to right hand inside panel of cockpit base as shown in Figure 3 using a .31 inch fillet weld on two sides.

6. Install 2501983 Compensator Valve on mounting plate as shown using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

7. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 3.

8. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as shown in Figure 3.

9. Install 2513398 Tube Assembly connecting master cylinder and brake compensator valve as illustrated in Figure 3.

10. Refill master cylinder with SAE J-1703 (70R3) brake fluid available under Clark part number 850487.

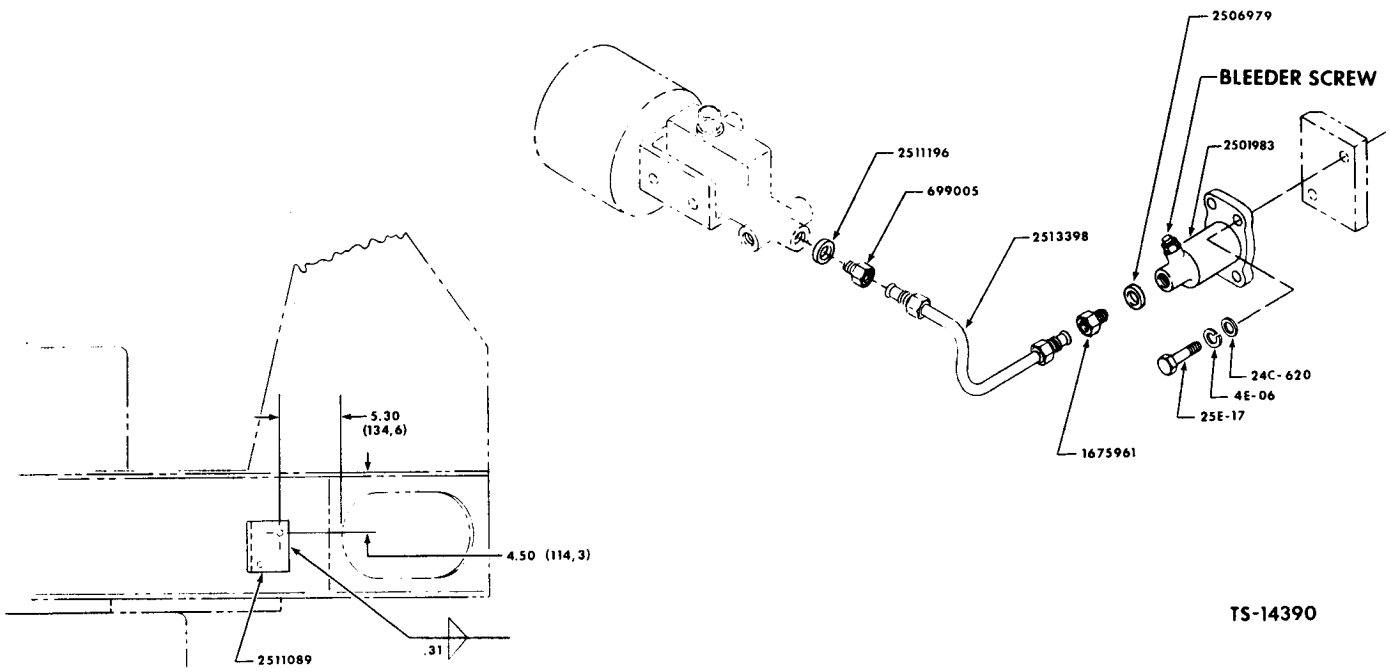


Figure 3

11. Bleed brake air lines and compensator valve to remove all traces of air from the system. Use a bleeder hose wherever possible and proceed as outlined below. See Figure 3 and Figure 4, Item 1, for location of bleeder screws. A helper will be required.

    A. Open one bleeder screw and depress brake pedal, close bleeder screw, then release brake pedal. Repeat this several times until fluid from bleeder screw is free of bubbles.

    B. Actuate brakes several times.

    C. Repeat Step A, until no bubbles are observed in fluid from bleeder screw.

    D. Repeat entire process at each bleeder screw on each brake head and compensator valve. Keep master cylinder full at all times.

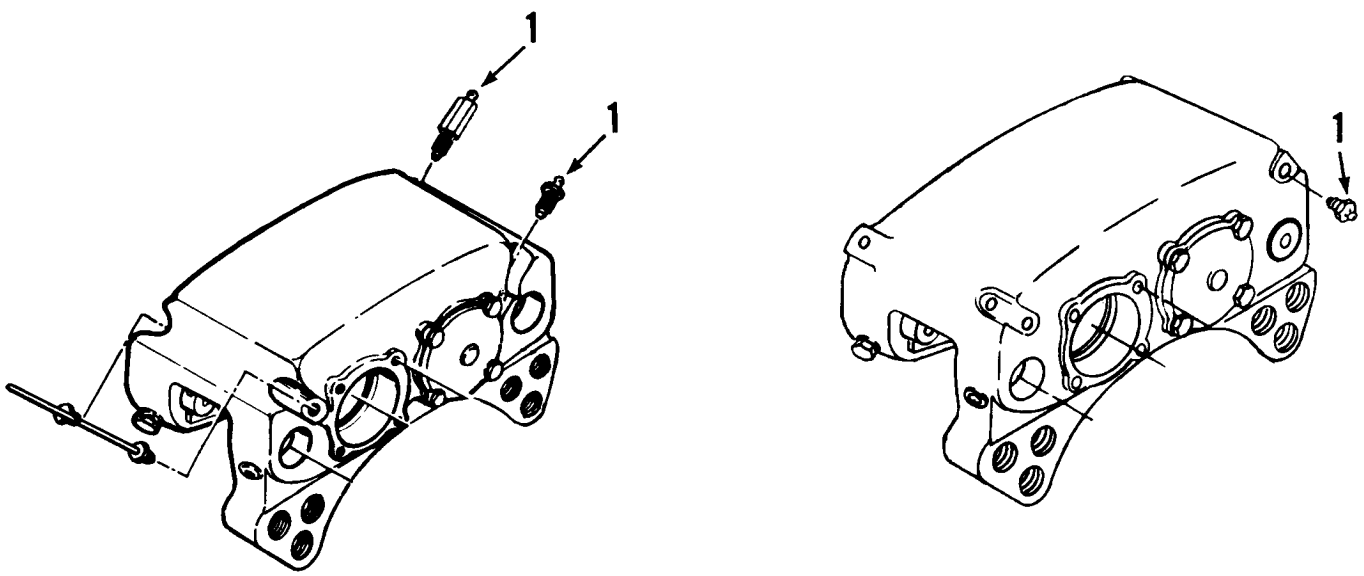


Figure 4

FORM 003085
INSTALLATION INSTRUCTIONS
2501983 BRAKE COMPENSATOR VALVES
MODEL 85-IIIA

Applicable to the following serial numbers:

U. S. Built Machines	Canadian Built Machines
Cummins - 426B101 thru 426B242	Cummins - 426B101CAC thru 426B255CAC
G.M. - 401D101 thru 401D233	G.M. - 401D101CAC thru 401D305CAC

PARTS REQUIRED (Per Machine):

Model 85-IIIA (Machines with dual master cylinders only)

1 - 960615 Kit consisting of the following:

1	- 2513397	Tube Assembly
1	- 2513398	Tube Assembly
2	- 2511089	Mounting Plate
2	- 2501983	Compensator Valve
*2	- 2506979	Gasket
*2	- 2511196	Gasket
2	- 1675961	Adapter
4	- 24C-620	Bolt
4	- 4E-06	Lockwasher
4	- 25E-17	Flatwasher
2	- 949848	Repair Kit, Master Cylinder

850487 Brake Fluid SAE J-1703 (Not included in Kit)

*NOTE: The 2506979 Gasket and the 2511196 Gasket are made from the same material and have the same outside diameter but may be identified by their inside diameter as illustrated in Figure 1.

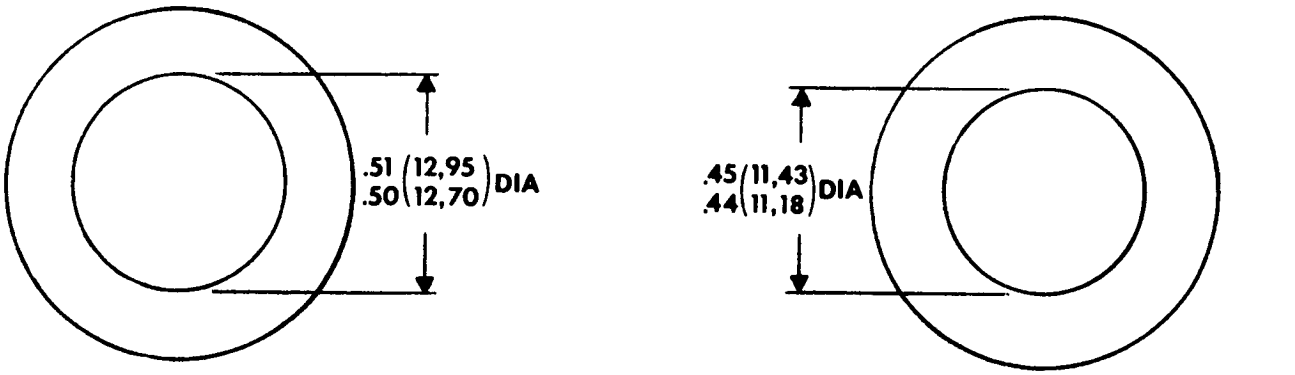


Figure 1.

INSTALLATION:

CAUTION: KEEP BRAKE SYSTEM CLEAN AND FREE OF FOREIGN MATERIAL AT ALL TIMES TO INSURE PROPER OPERATION OF THE SYSTEM.

I. Front Frame Installation

1. Park machine on a level surface, block wheels and apply parking brake.
2. Drain brake fluid from front master cylinder.
3. Rebuild master cylinder using items 24, 25 and 27 shown in Figure 2 from 949848 Repair Kit.
4. Remove and omit Items 20 and 21 if they are present at this time.

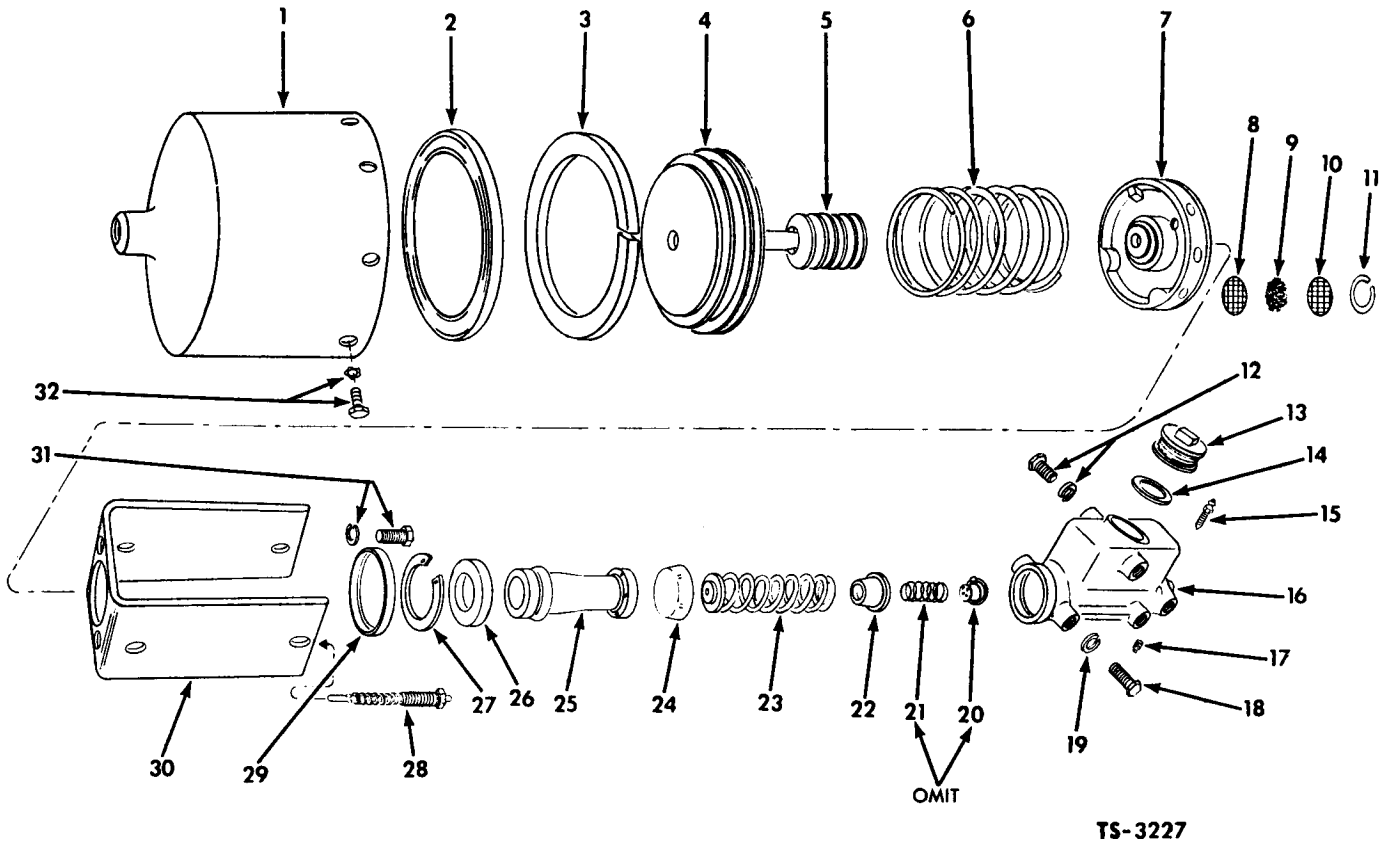


Figure 2.

FORM 003085

5. Weld 2511089 Mounting Plate to front frame with a .31 inch fillet weld on two sides as shown in Figure 3.

6. Install 2501983 Compensator Valve on mounting plate as shown in Figure 3. using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

7. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 3.

8. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as illustrated in Figure 3.

9. Install 2513397 Tube Assembly connecting master cylinder and brake compensator valve as shown.

10. Refill master cylinder with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

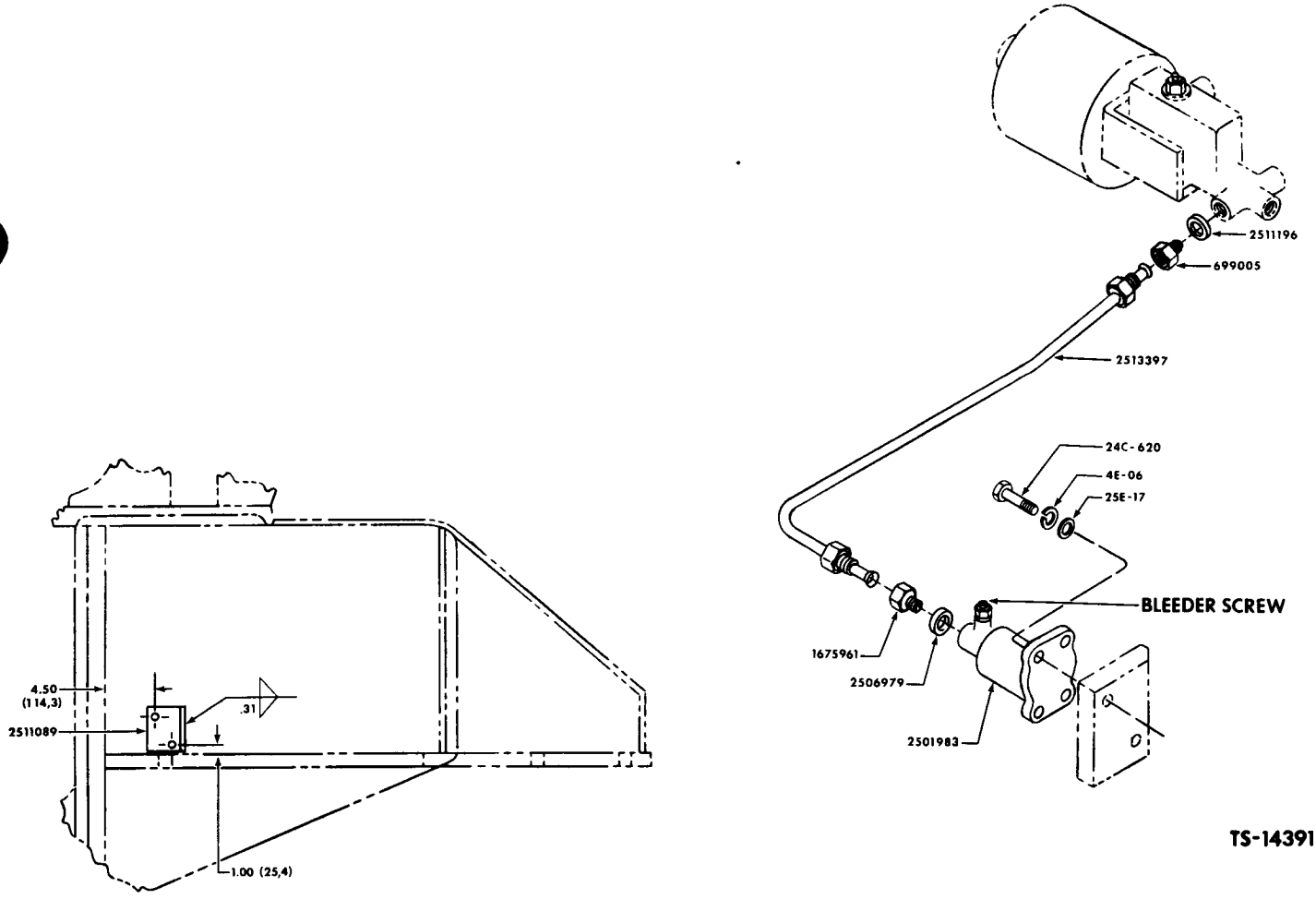


Figure 3.

II. Rear Frame Installation

1. Drain brake fluid from rear master cylinder.

2. Rebuild rear master cylinder using Items 24, 25 and 27 as shown in Figure 2, from 949848 Repair Kit. Remove and omit Items 20 & 21 if they are present at this time.

3. Weld 2511089 Mounting Plate to inside of left hand panel of cockpit base with a .31 inch fillet weld on two sides as shown in Figure 4.

4. Install 2501983 Compensator Valve on mounting plate as shown in Figure 4 using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

5. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 4.

6. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as illustrated in Figure 4.

7. Install 2513398 Tube Assembly connecting master cylinder and brake compensator valve as shown.

8. Refill master cylinder with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

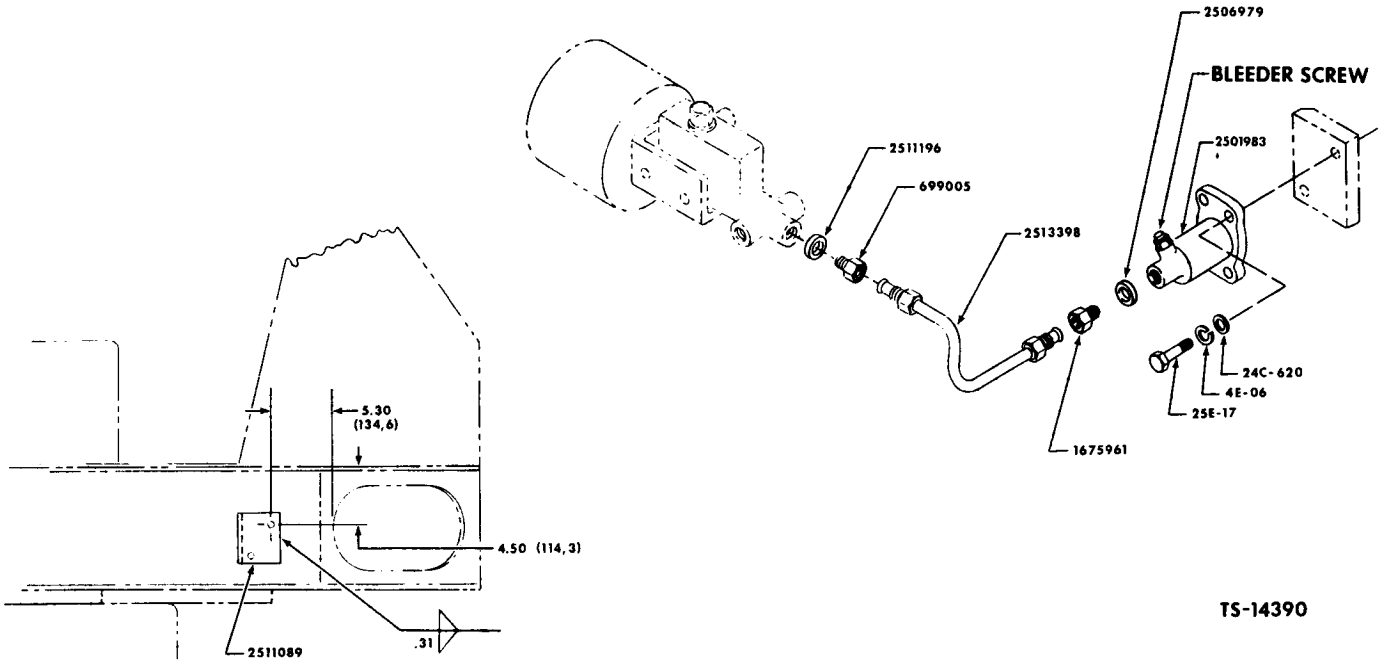


Figure 4.

II. Rear Frame Installation

1. Drain brake fluid from rear master cylinder.

2. Rebuild rear master cylinder using Items 24, 25 & 27 shown in Figure 2 from 949848 Repair Kit. Remove and omit Items 20 & 21 if they are present at this time.

3. Weld 2511089 Mounting Plate to rear frame as shown in Figure 4 using a .31 inch fillet weld on two sides.

4. Install 2501983 Compensator Valve on brake compensator valve on mounting plate as shown in Figure 4 using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

5. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 4.

6. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as illustrated in Figure 4.

7. Install 2511338 Tube Assembly connecting master cylinder to brake compensator valve as shown.

8. Refill rear master cylinder reservoir with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

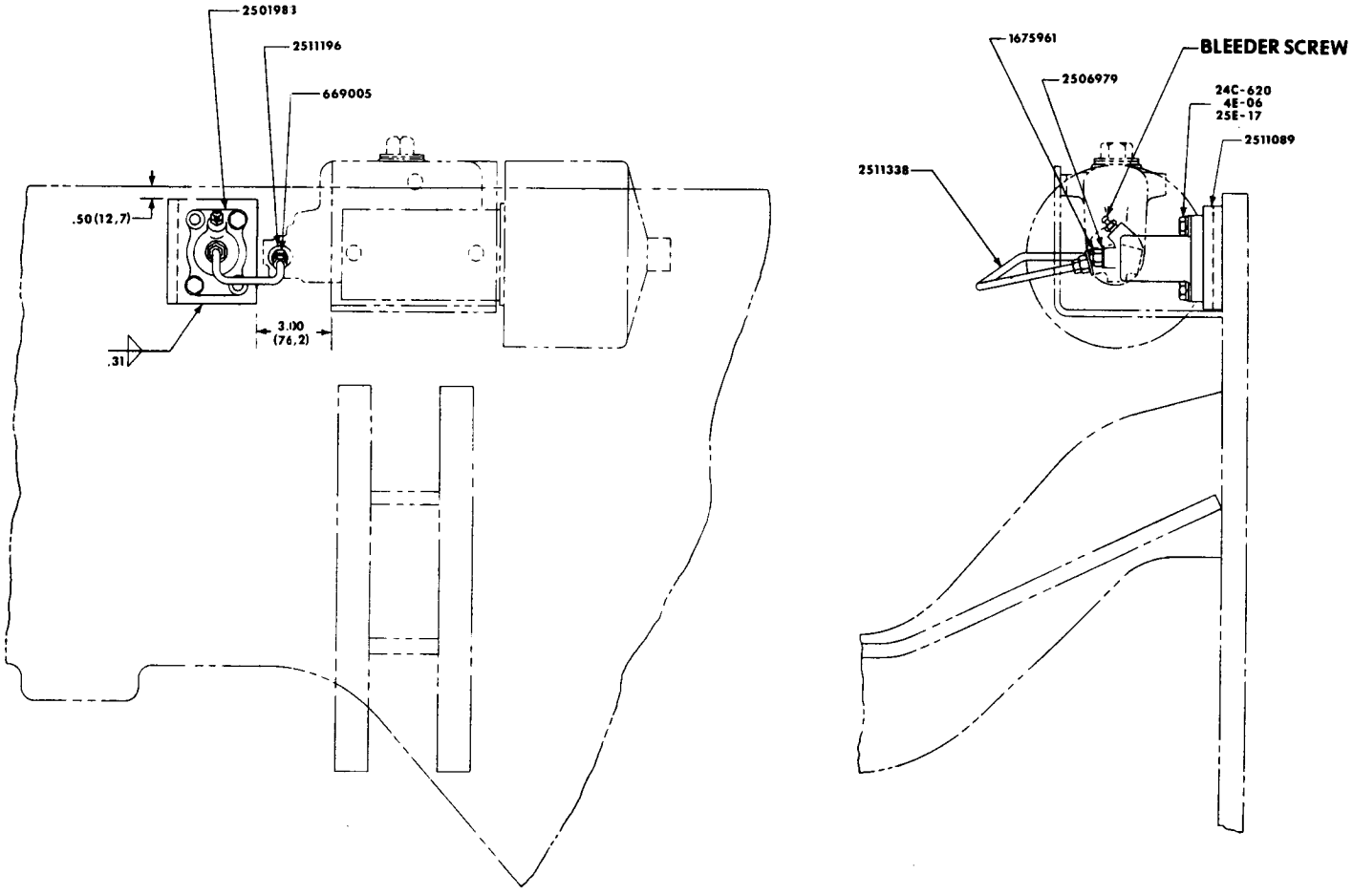


Figure 4

TS-14252

III. Bleeding Procedure:

1. Bleed brake lines and compensator valves to remove all traces of air from the system. Use a bleeder hose wherever possible and proceed as outlined below. See Figures 3 & 4 and Figure 5, Item 1 for location of bleeder screws. A helper will be required.

   A. Open bleeder screw and depress brake pedal, close bleeder screw, then release brake pedal. Repeat this several times until fluid from bleeder screw is free of bubbles.

   B. Actuate brakes several times.

   C. Repeat Step A, until no bubbles are observed in fluid from bleeder screw.

   D. Repeat entire process at each bleeder screw on each brake head and compensator valve. Keep master cylinder full at all times.

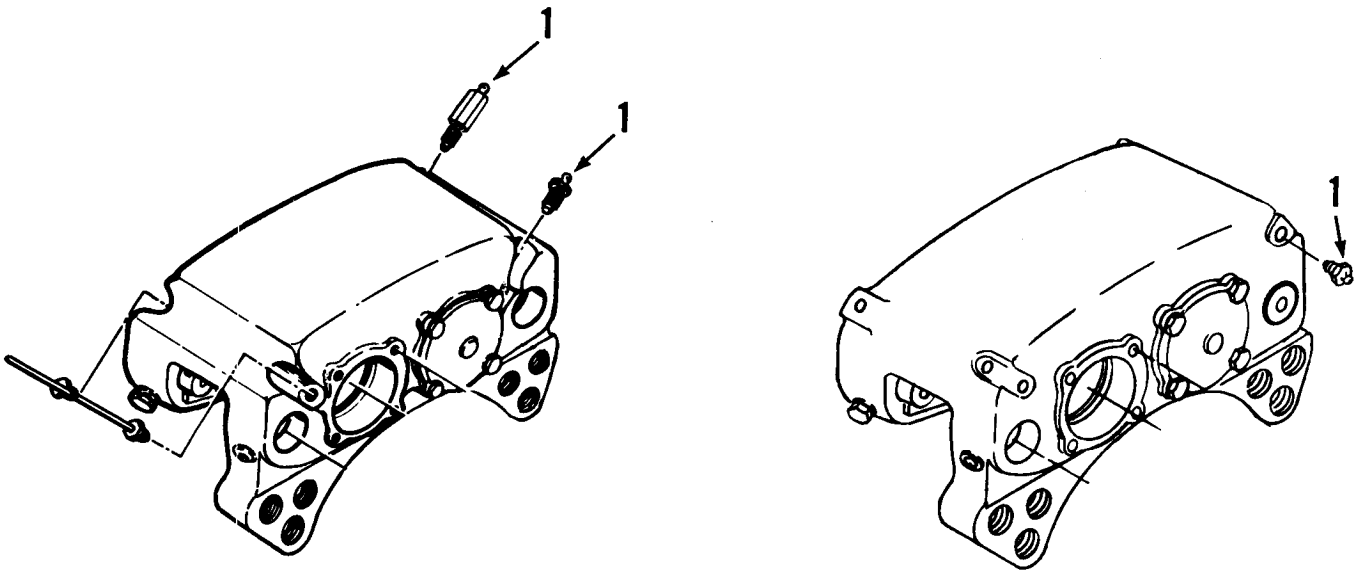


Figure 5.

FORM 003035
INSTALLATION INSTRUCTIONS
2501983 BRAKE COMPENSATOR VALVES
MODEL 125B

Applicable to the following serial numbers:

U. S. Built Machines	Canadian Built Machines
Cummins - 439A101 thru 439A328	Cummins - 439A151CAC thru 439A310CAC
G. M. - 441A101 thru 441A266	G. M. - 441A141CAC thru 441A295CAC

PARTS REQUIRED (Per machine):

1 - 960614 Kit consisting of the following:

1	- 2511434	Tube Assembly
1	- 2511338	Tube Assembly
2	- 2511089	Mounting Plate
2	- 2501983	Compensator Valve
*2	- 2506979	Gasket
*2	- 2511196	Gasket
2	- 1675961	Adapter
2	- 699005	Adapter
4	- 24C-620	Bolt
4	- 4E-06	Lockwasher
4	- 25E-17	Flatwasher
2	- 949848	Repair Kit, Master Cylinder

850487 Brake Fluid SAE J-1703 (Not included in kit)

*NOTE: The 2506979 Gasket and the 2511196 Gasket are made from the same material and have the same outside diameter but may be identified by their inside diameter. See Figure 1.

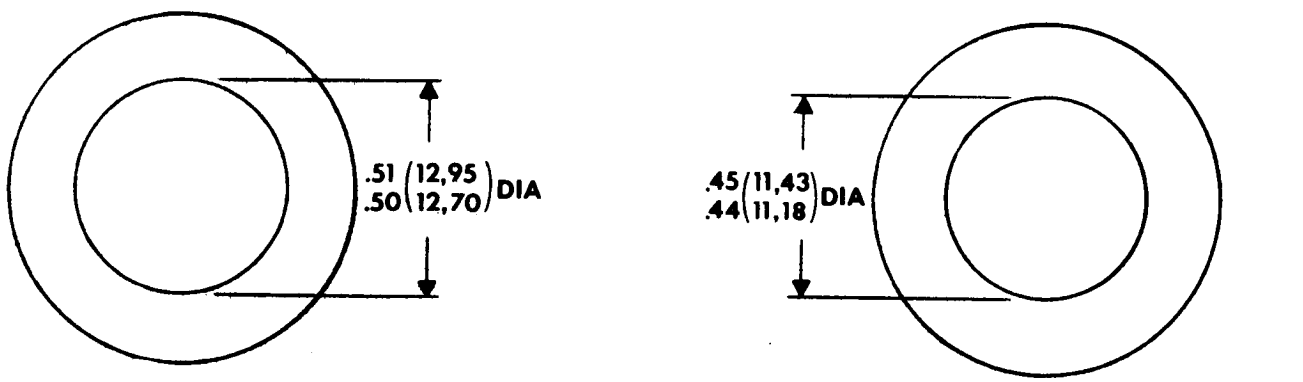


Figure 1.

Figure 1

INSTALLATION:

CAUTION: KEEP BRAKE SYSTEM CLEAN AND FREE OF FOREIGN MATERIAL AT ALL TIMES TO INSURE PROPER OPERATION OF SYSTEM.

1. Front Frame Installation

1. Park machine on a level surface, block wheels and apply parking brake.
2. Drain brake fluid from front master cylinder.
3. Rebuild front master cylinder using Items 24, 25 & 27 shown in Figure 2 from 949848 Repair Kit.
4. Remove and omit Items 20 and 21 if they are present at this time.

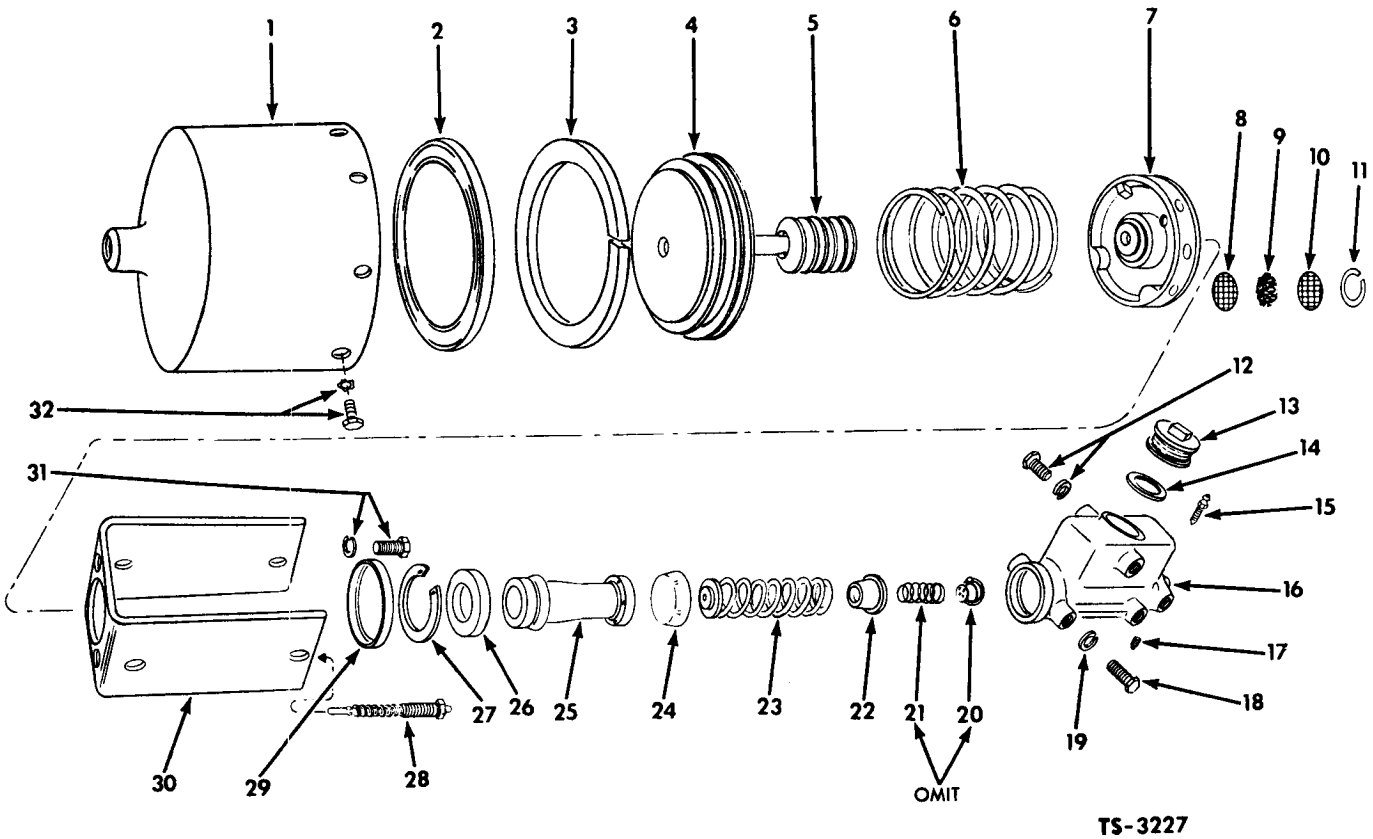


Figure 2

5. Weld 2511089 Mounting Plate to front frame with a .31 inch fillet weld on two sides as shown in Figure 3.

6. Install 2501983 Compensator Valve on mounting plate as shown in Figure 3 using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

7. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown.

8. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as shown in Figure 3.

9. Install 2511434 Tube Assembly connecting master cylinder to brake compensator valve as shown.

10. Refill front master cylinder reservoir with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

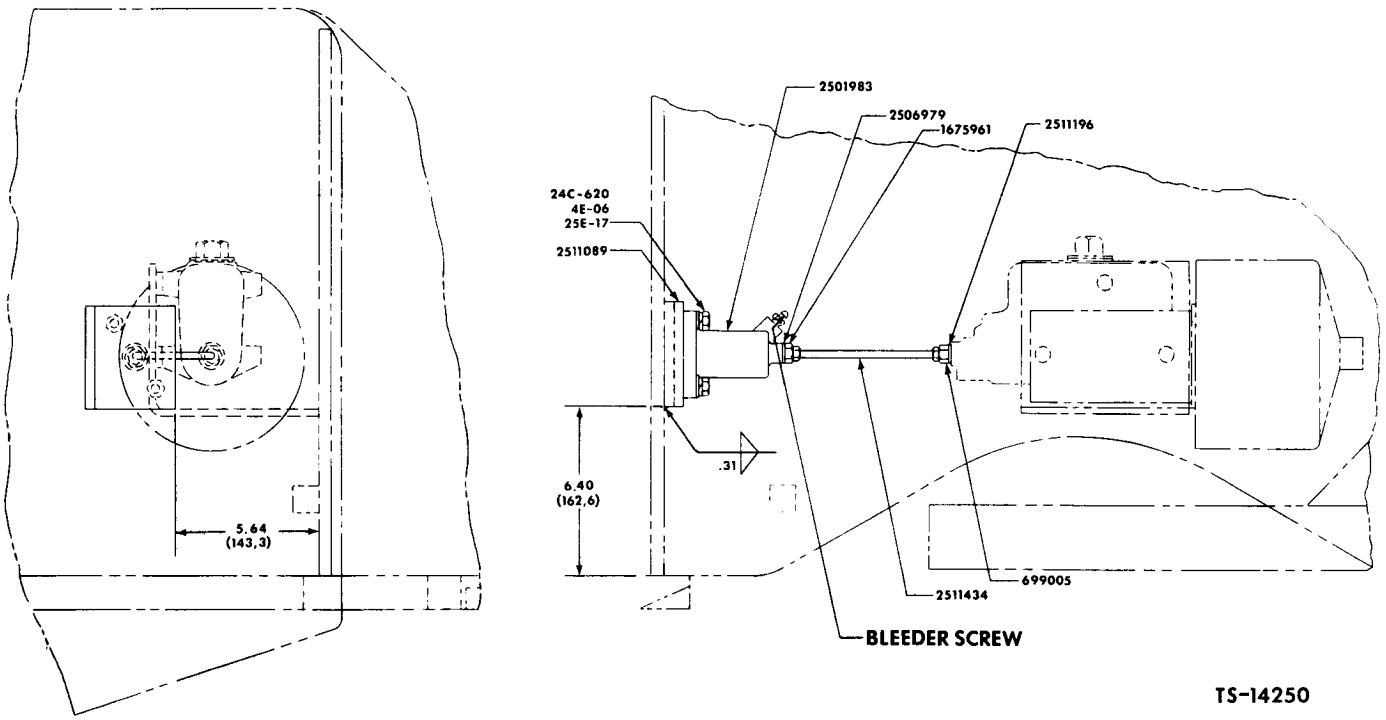


Figure 3

II. Rear Frame Installation

1. Drain brake fluid from rear master cylinder.

2. Rebuild rear master cylinder using Items 24, 25 & 27 shown in Figure 2 from 949848 Repair Kit. Remove and omit Items 20 & 21 if they are present at this time.

3. Weld 2511089 Mounting Plate to rear frame as shown in Figure 4 using a .31 inch fillet weld on two sides.

4. Install 2501983 Compensator Valve on brake compensator valve on mounting plate as shown in Figure 4 using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

5. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 4.

6. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as illustrated in Figure 4.

7. Install 2511338 Tube Assembly connecting master cylinder to brake compensator valve as shown.

8. Refill rear master cylinder reservoir with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

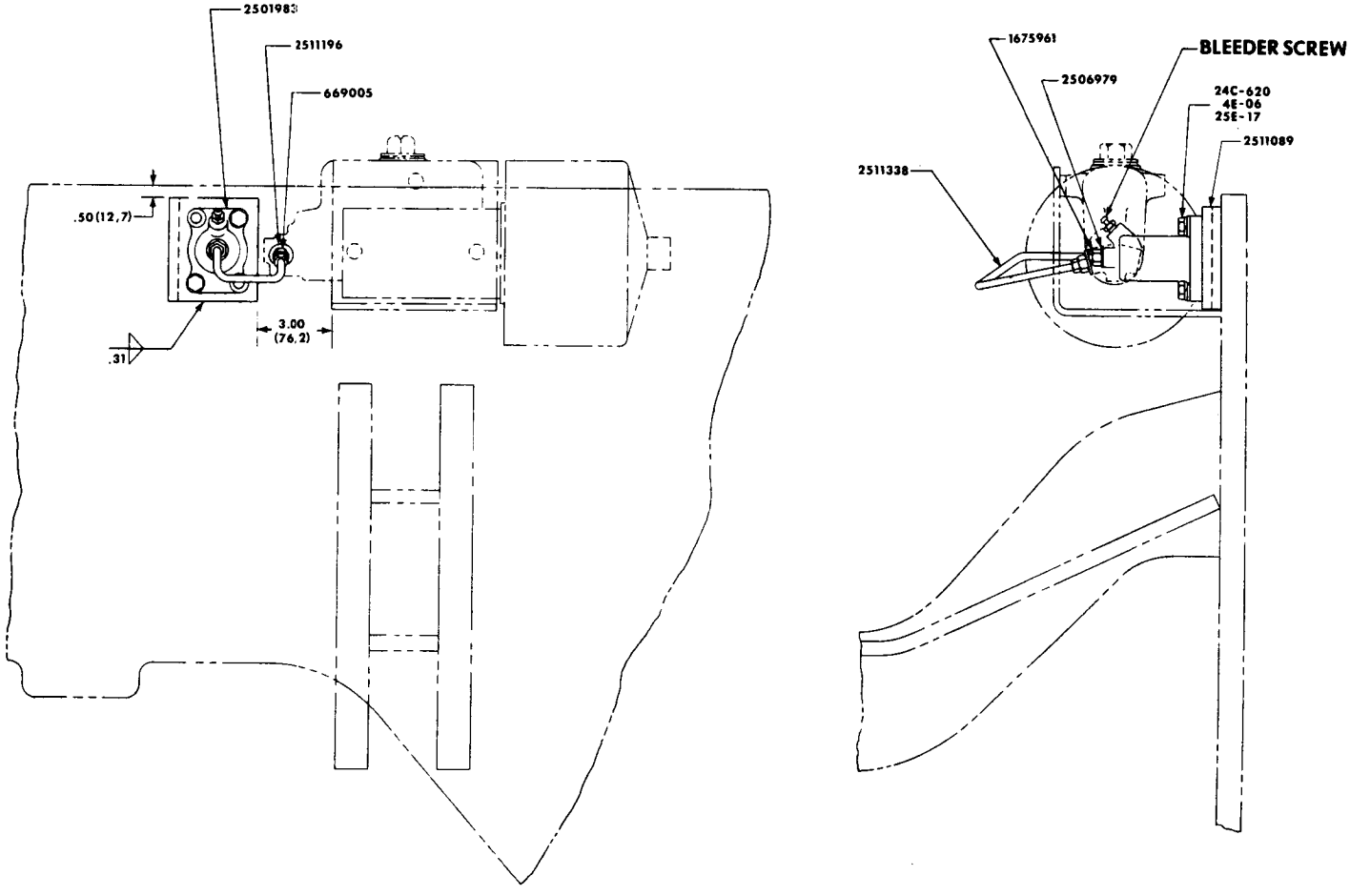


Figure 4

TS-14252

III. Bleeding Procedure

1. Bleed brake lines and compensator valves to remove all traces of air from the system. Use a bleeder hose wherever possible and proceed as outlined below. See Figures 3 & 4 and Figure 5, Item 1, for location of bleeder screws. A helper will be required.

   A. Open one bleeder screw and depress brake pedal, close bleeder screw, then release brake pedal. Repeat this several times until fluid from bleeder screw is free of bubbles.

   B. Actuate brakes several times.

   C. Repeat Step A, until no more bubbles are observed in fluid from bleeder screw.

   D. Repeat entire process at each bleeder screw on each brake head and compensator valve. Keep master cylinder reservoir full at all times.

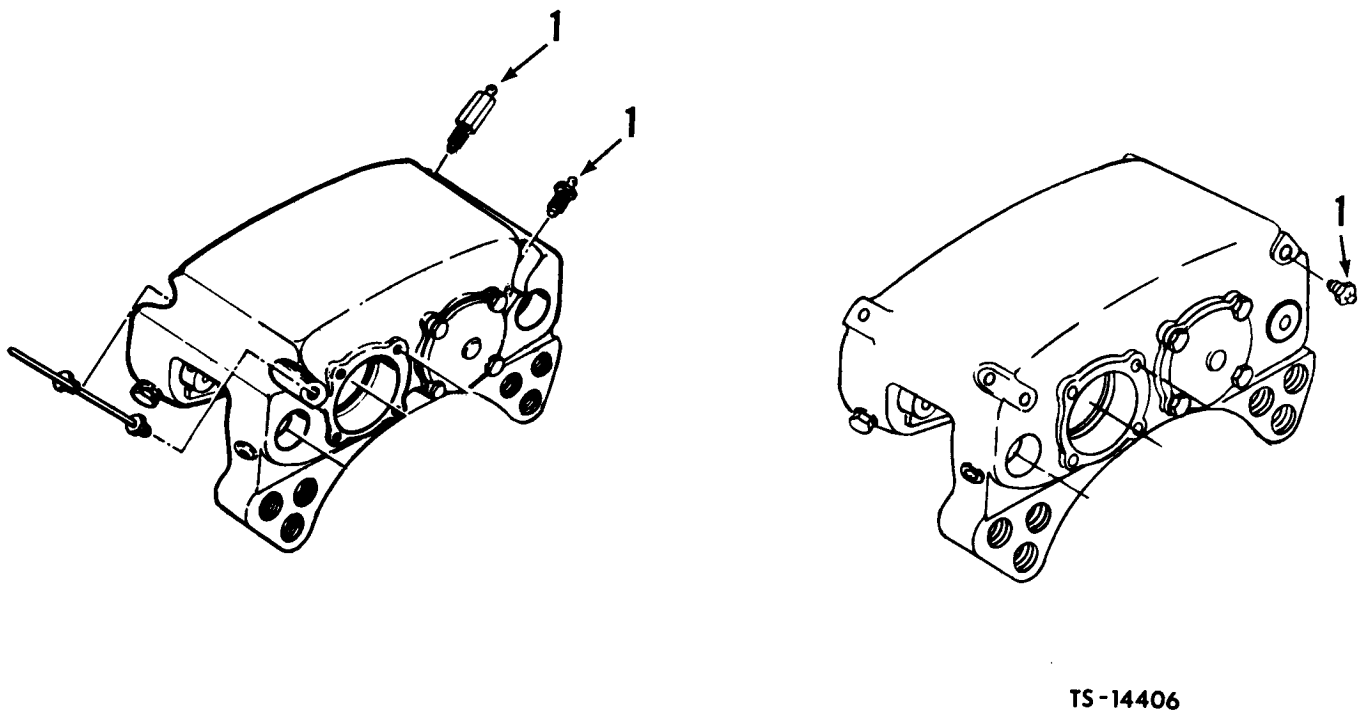


Figure 5

FORM 003093
INSTALLATION INSTRUCTIONS
2501983 BRAKE COMPENSATOR VALVES
MODEL 175B

Applicable to the following serial numbers:

U. S. Built Machines

Cummins - 438C101 thru 438C120
G. M. - 427A101 thru 427C120

Canadian Built Machines

Cummins - 438C101CAC thru 438C105CAC
G. M. - 427A101CAC thru 427C135CAC

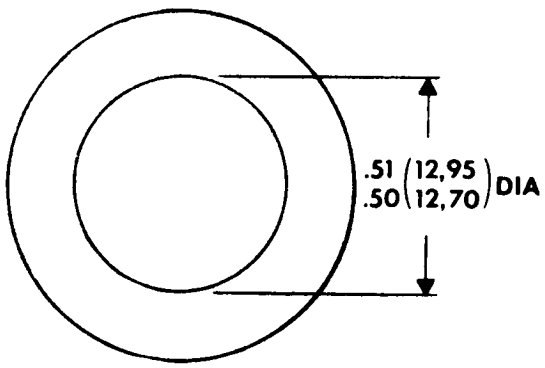
PARTS REQUIRED (Per machine):

1 - 960621 Kit consisting of the following:

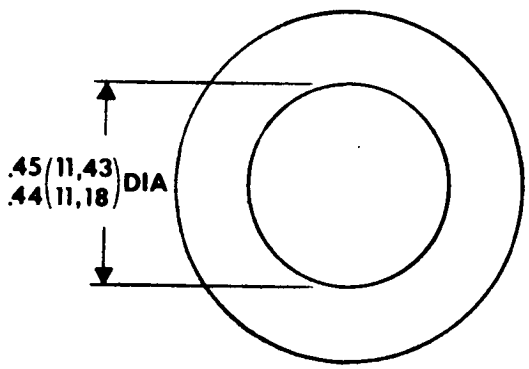
1 -	2511377	Tube Assembly
1 -	2511363	Tube Assembly
2 -	2511089	Mounting Plate
2 -	2501983	Compensator Valve
*2 -	2506979	Gasket
*2 -	2511196	Gasket
2 -	1675961	Adapter
2 -	699005	Adapter
4 -	24C-620	Bolt
4 -	4E-06	Lockwasher
4 -	25E-17	Flatwasher
2 -	949848	Repair Kit, Master Cylinder

850487 Brake Fluid SAE J-1703 (Not included in kit)

*NOTE: The 2506979 Gasket and the 2511196 Gasket are made from the same material ahd have the same outside diameter but may be identified by their inside diameter. See Figure 1.



2511196



2506979

TS-14394

Figure 1 (7F15) SG-663

INSTALLATION:

CAUTION: KEEP BRAKE SYSTEM CLEAN AND FREE OF FOREIGN MATERIAL AT ALL TIMES TO INSURE PROPER OPERATION OF SYSTEM.

1. Front Frame Installation

1. Park machine on a level surface, block wheels and apply parking brake.
2. Drain brake fluid from front master cylinder.
3. Rebuild master cylinder using Items 24, 25 & 27 shown in Figure 2, from 949848 Repair Kit.
4. Remove and omit Items 20 & 21 if they are present at this time.

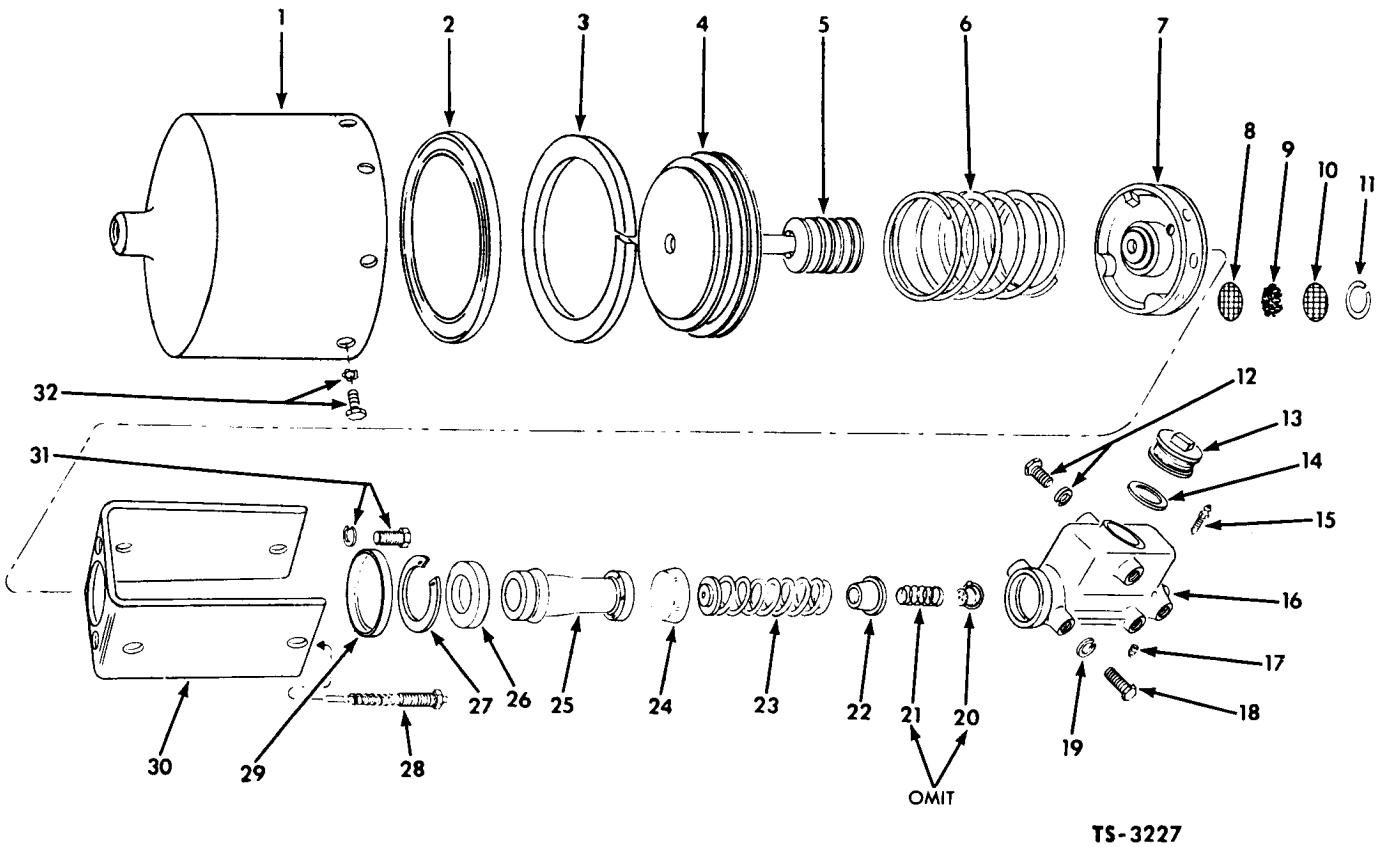


Figure 2

5. Weld 2511089 Mounting Plate to front frame with a .19 inch fillet weld as shown in Figure 3.

6. Install 2501983 Compensator Valve on mounting plate as shown in Figure 3 using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.

7. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 3.

8. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as shown in Figure 3.

9. Install 2511363 Tube Assembly connecting master cylinder to brake compensator valve as shown.

10. Refill front master cylinder reservoir with SAE J-1703 (70R3) brake fluid, available under Clark Part Number 850487.

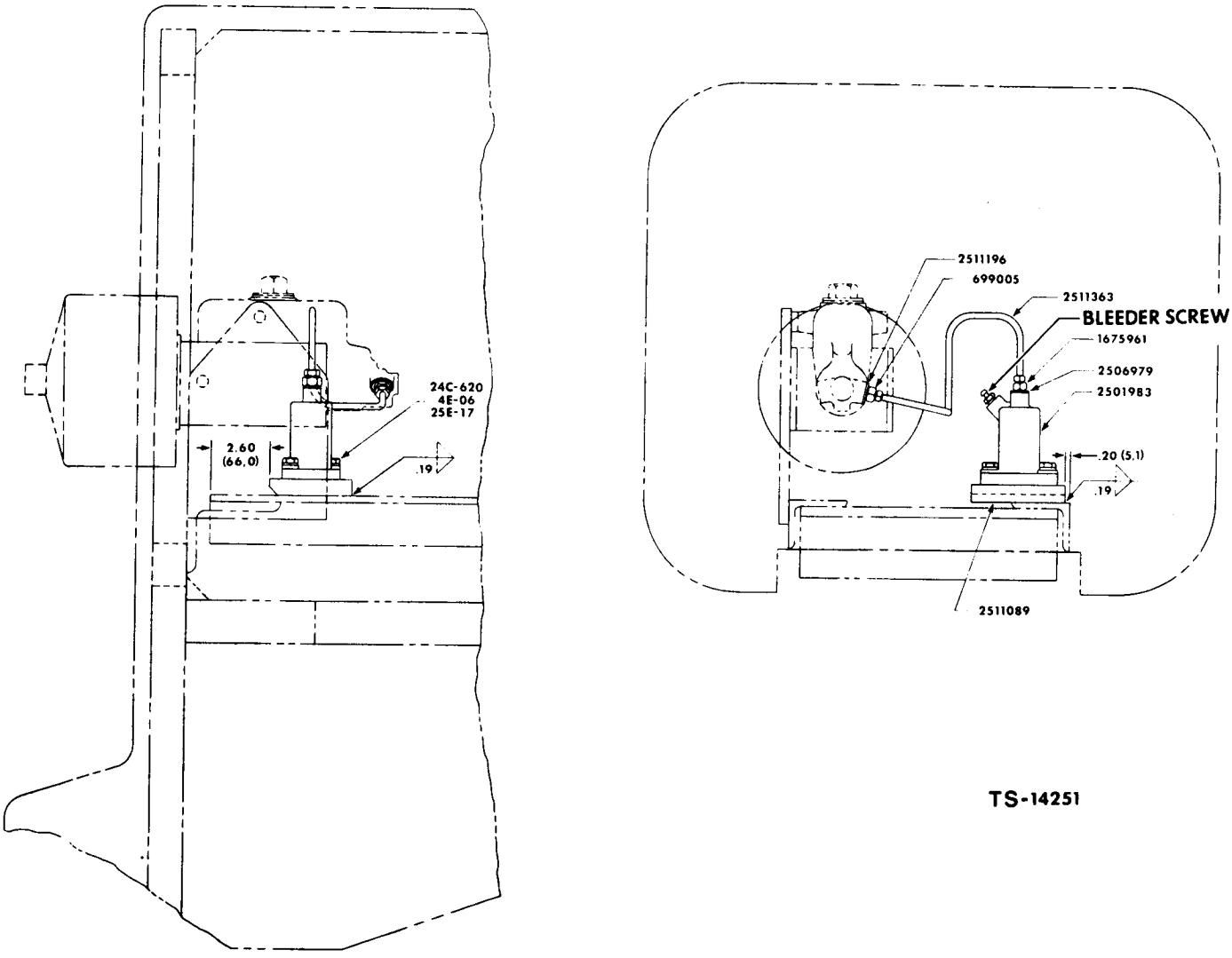


Figure 3

FORM 003093
9/75

II. Rear Frame Installation

1. Drain brake fluid from rear master cylinder.
2. Rebuild rear master cylinder using Items 24, 25 & 27 shown in Figure 2 from 949848 Repair Kit. Remove Items 20 & 21 if they are present at this time.
3. Weld 2511089 Mounting Plate to rear frame as shown in Figure 4.
4. Install 2501983 Compensator Valve on mounting plate as shown in Figure 4 using two 25E-17 Flatwashers, two 4E-06 Lockwashers and two 24C-620 Bolts. Tighten bolts to 23-25 ft. lbs. torque.
5. Remove plug on outlet section of master cylinder and install 2511196 Gasket and 699005 Adapter as shown in Figure 4.
6. Install 2506979 Gasket and 1675961 Adapter on brake compensator valve as illustrated in Figure 4.
7. Install 2511377 Tube Assembly connecting master cylinder and brake compensator valve as shown.
8. Refill rear master cylinder reservoir with SAE J-1703 (70R3) brake fluid, available under Clark part number 850487.

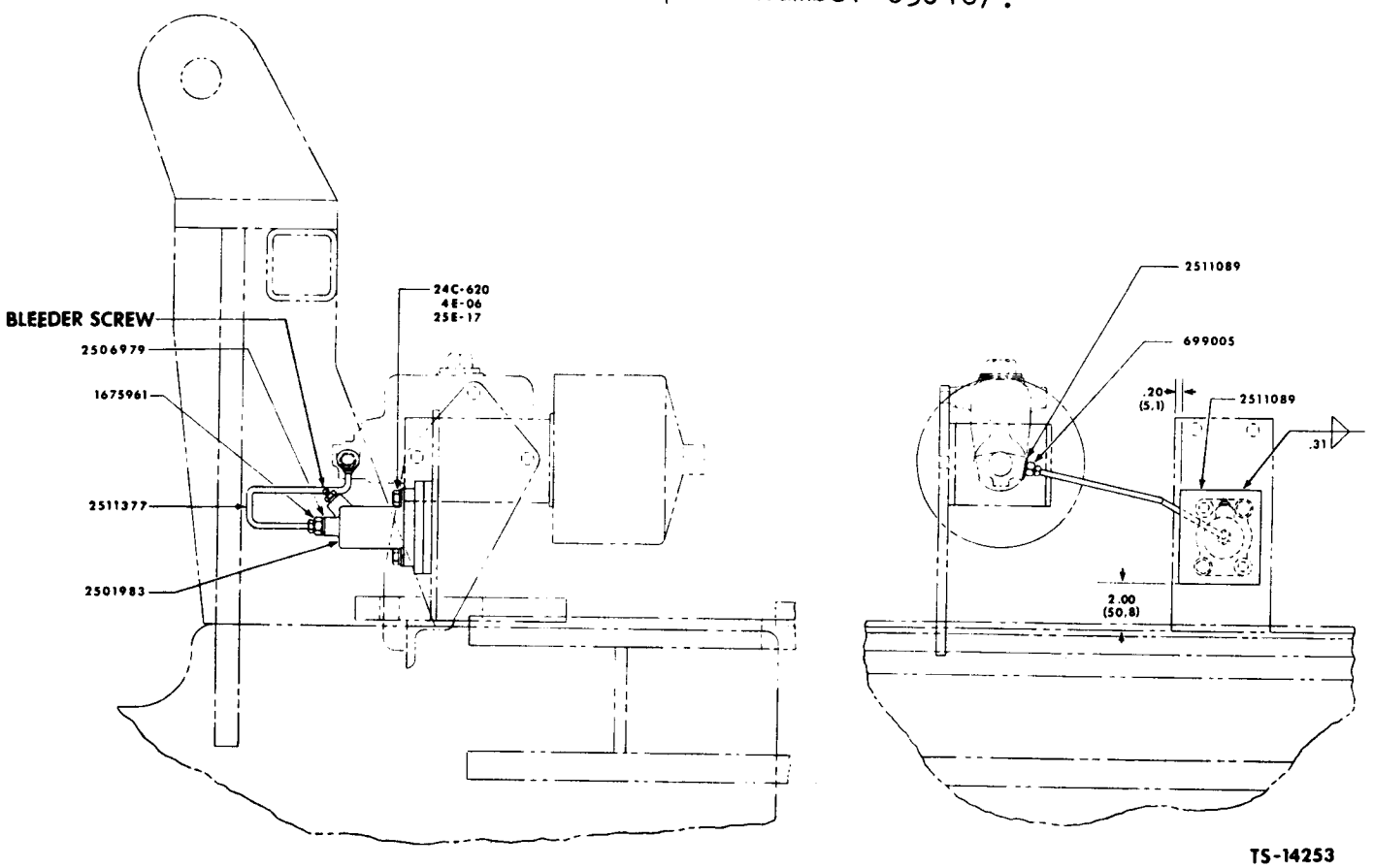


Figure 4

III. Bleeding Procedure

1. Bleed brake lines and compensator valves to remove all traces of air from the system. Use a bleeder hose wherever possible and proceed as outlined below. See Figures 3 & 4 and Figure 5, Item 1 for location of bleeder screws. A helper will be required.

   A. Open one bleeder screw and depress brake pedal, close bleeder screw, then release brake pedal. Repeat this several times until fluid from bleeder screw is free of bubbles.

   B. Actutate brakes several times.

   C. Repeat Step A until no bubbles are observed in fluide from bleeder screw.

   D. Repeat entire process at each bleeder screw on each brake head and compensator valve. Keep master cylinder reservoir full at all times.

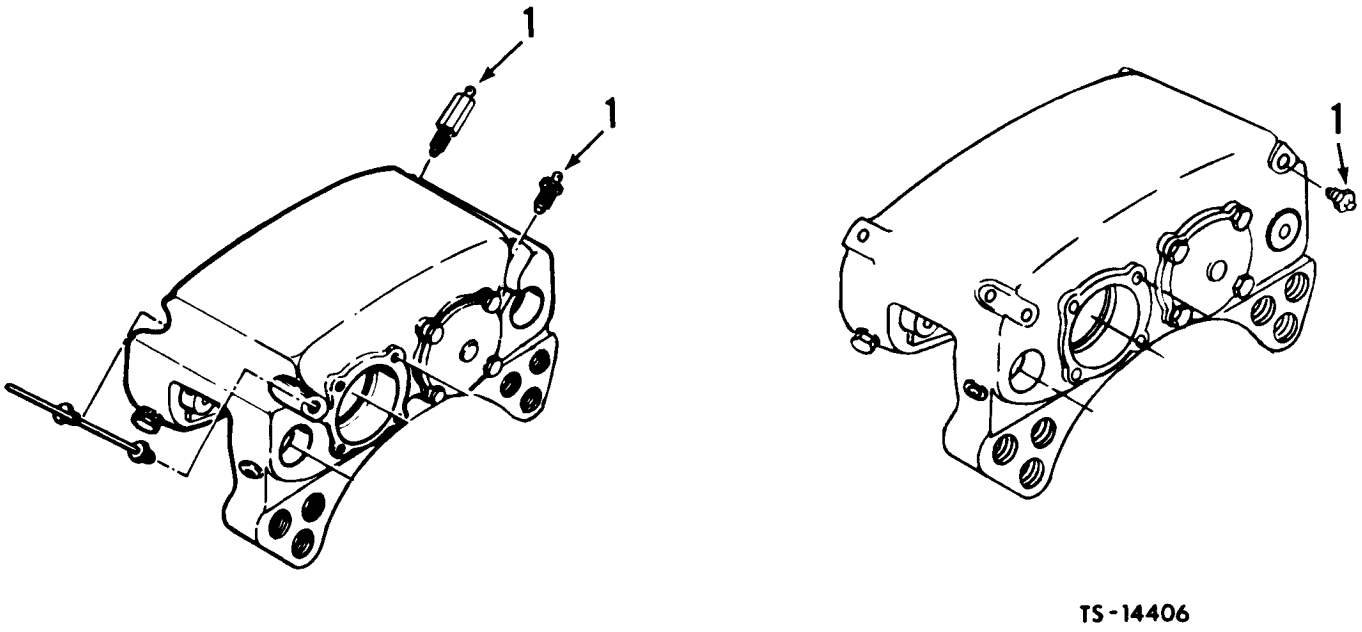


Figure 5

CLARK Service gram

29 March 1978

MICHIGAN SG-681
Group Ref. No. 400
2500

SUBJECT: Brake System Maintenance

Good brake system maintenance is necessary for safe operation of any machine.

Leaking or broken brake lines or fittings should be properly repaired or replaced immediately. A machine should not be operated with the brakes in this condition.

The practice of operating a machine where a broken brake line has been "pinched" or "blocked off" is very dangerous and should not be allowed. The complete brake system is needed for safe brake operation.

Use oversize brake linings on shoe type brakes whenever the inside diameter of the brake drum has been increased by remachining. Adjust brake to specifications.

Linings on disc type brakes should be replaced when worn to less than .125 in (3,2 mm) thickness.

Brake discs should be replaced when worn to less than .450 in (11,4 mm) thickness.

A customer should be advised in writing whenever the brake system of a machine has been observed to be in need of repairs or to be improperly repaired.

Printed in U.S.A.

November 1982

CLARK

SERVICE GRAM

*(This bulletin replaces SG-758B, dated February 1981.
REASON: Service Interval revision and model revision).

MICHIGAN SG - 758C
Group Ref. No. 400

*SUBJECT: Troubleshooting and Servicing the Stratoflex Cyclo-Gard Air Dryer
Model 75B,75C,125B,125C,175B,175C,
275B,275C,475B,475C,675B and 675C
Wheel Loaders
Model 280IIIA,280B,380IIIA and 380B
Wheel Dozers

Air Dryer Part Number:

2528200 – 75B,75C,125B,125C,675B and 675C Wheel Loaders (Vertical Mounted)
2525462 – 175B Wheel Loaders (Horizontal Mounted)
2536747 – 175C Wheel Loaders (Vertical Mounted)
2523927 – 275B,275C,475B,475C Wheel Loaders (Vertical Mounted)
2525386 – 280-IIIA and 280B, Wheel Dozers (Horizontal Mounted)
2528531 – 380-IIIA and 380B Wheel Dozers (Vertical Mounted)

Improvement changes have been made on the air dryers used on machines listed above.

These changes have been made to improve the efficiency and durability of the air dryer.

The following changes have been made (See Figure 1 for location of parts):

1. Exit Tube (Item 12) – The exit tube is now cast in one piece for greater strength.

2. Baffle Assembly (Item 10) – The baffle assembly now has a bolt and nut installed for easier and safer removal of the baffle from the air dryer body (See Figure 1 for instructions for installation of the bolt and nut in baffles on existing air dryers). The baffle has been removed in existing air dryers by blowing it out of the air dryer body with compressed air, which could be unsafe.

3. Mounting Bracket (Item 23) – The mounting bracket is now attached to the air dryer under the body flange for easier service and removal of the head assembly.

4. Heater Element (Item 15) – The air dryer heating element is now a 24 volt, 17 watt, replacing the 24 volt, 30 watt heater previously used.

   NOTE: *When replacing the 30 watt heater with the new 17 watt heater, 1 - new 964054 Reducer Bushing must be used.*

The changes listed above can be made on existing air dryers.

See Figure 1 for part numbers and descriptions.

The Stratoflex Cyclo-Gard air dryer needs periodic servicing to keep it working at maximum efficiency.

CLARK EQUIPMENT COMPANY • P.O. BOX 547, PIPESTONE ROAD • BENTON HARBOR, MICHIGAN 49022

* AT 250 HOURS OR SOONER, DEPENDING ON ATMOSPHERIC AND MECHANICAL CONDITION OF THE COMPRESSOR, THE CYCLO-GARD AIR DRYER SHOULD BE CHECKED FOR PROPER OPERATION. THE DRYER SHOULD ALSO BE DISASSEMBLED AND CLEANED AT THIS TIME.

The only moving parts in the air dryer are the check valve (Part No. 962513, See Figure 1) and the unloader valve (Part No. 962525, See Figure 1). No maintenance is required as long as the unloader valve discharges when the compressor is running in the unload cycle.

TROUBLESHOOTING:

1. The unloading cycle should last for only a few seconds. If the compressor is cycling at all times and the cycles are 30 - 50 seconds apart, the problem is in the check valve.

   NOTE: *There is also a check valve on the inlet side of the wet tank. Both check valves would have to be replaced.*

2. If the air system cannot be brought up to operating pressures, and air is escaping through the unloader valve:

   A. Disconnect the governor line at the unloader valve, and start the engine.

      1. If air is escaping out the governor line, the governor is faulty.

      2. If air is escaping out the unloader, the unloader valve is stuck in the open position, or it is leaking, replace it. **NOTE:** *The unloader valve can also be rebuilt. See Figure 2 for the service kit number and the parts it includes.*

         a. If ambient temperature is below freezing, check the heater element.

            1. Wiring may be faulty.

            2. Heater element may be carbonized from excessive oil in the compressed air.

         b. If the unloader is defective, a plug can be installed in the valve outlet until the unloader valve can be replaced or repaired. The plug is located in the side of the air dryer (See Figure 1). Remove the adapter in the unloader valve. Remove the plug from the side of the air dryer. Insert the plug in place of the adapter. **NOTE:** *The outlet must not be plugged for more than 2 operating hours. The plug must then be removed and the air dryer allowed to drain.*

3. If there is no blowdown when the compressor is in the unload cycle:

   A. The unloader valve should be replaced or rebuilt, as soon as possible. (See NOTE in Step 2, Section B).

   B. Continued operation can allow the water level to build up in the sump of the unit. If the water level becomes higher than the inlet port, the air pressure can lift the water with enough force to damage the baffle, which will not allow the unit to cool the air and will cause moisture in the reservoirs.

4. The air dryer is designed to remove heat from compressed air. If freezing is occuring before or in the dryer:

   A. High humidity combined with low temperature could cause the air dryer to freeze up.

   B. It may be necessary to insulate the tubing if freezing is occuring before or in the air dryer.

5. When the air dryer is checked, the air tanks should also be checked and drained. Too much moisture in the tank shows that either the air dryer or the air system is not working properly. Both systems should be checked.

6. If the air dryer does not have double springs, change it at the time of servicing by ordering 1 – 963120 Air.Dryer Service Kit which includes:

   1 – Exit Tube (Item 12, Figure 1).

   2 – Springs (Items 6 and 9, Figure 1).

   1 – Gasket (Item 11, Figure 1).

   2 – Strainer Plates (Item 8, Figure 1).

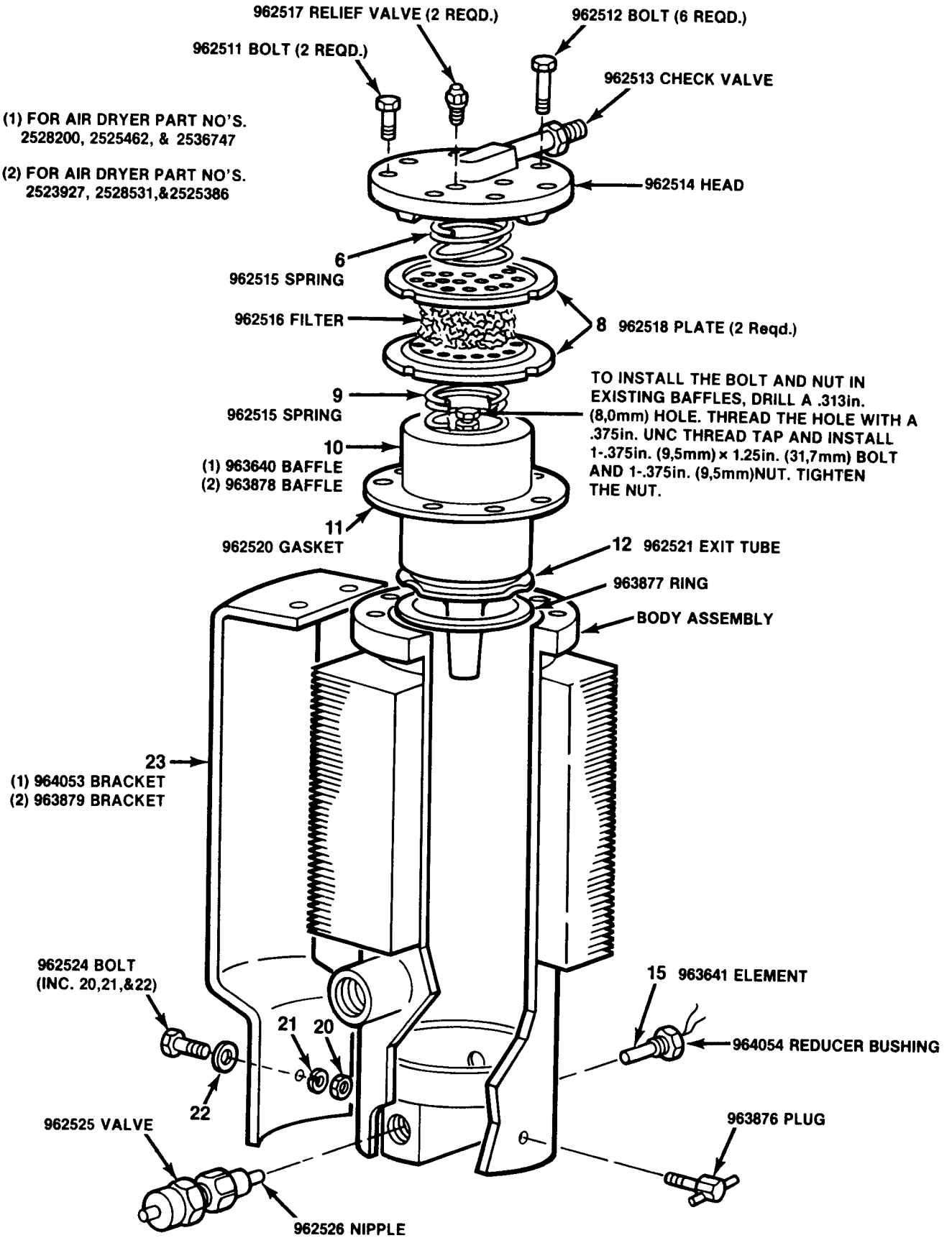
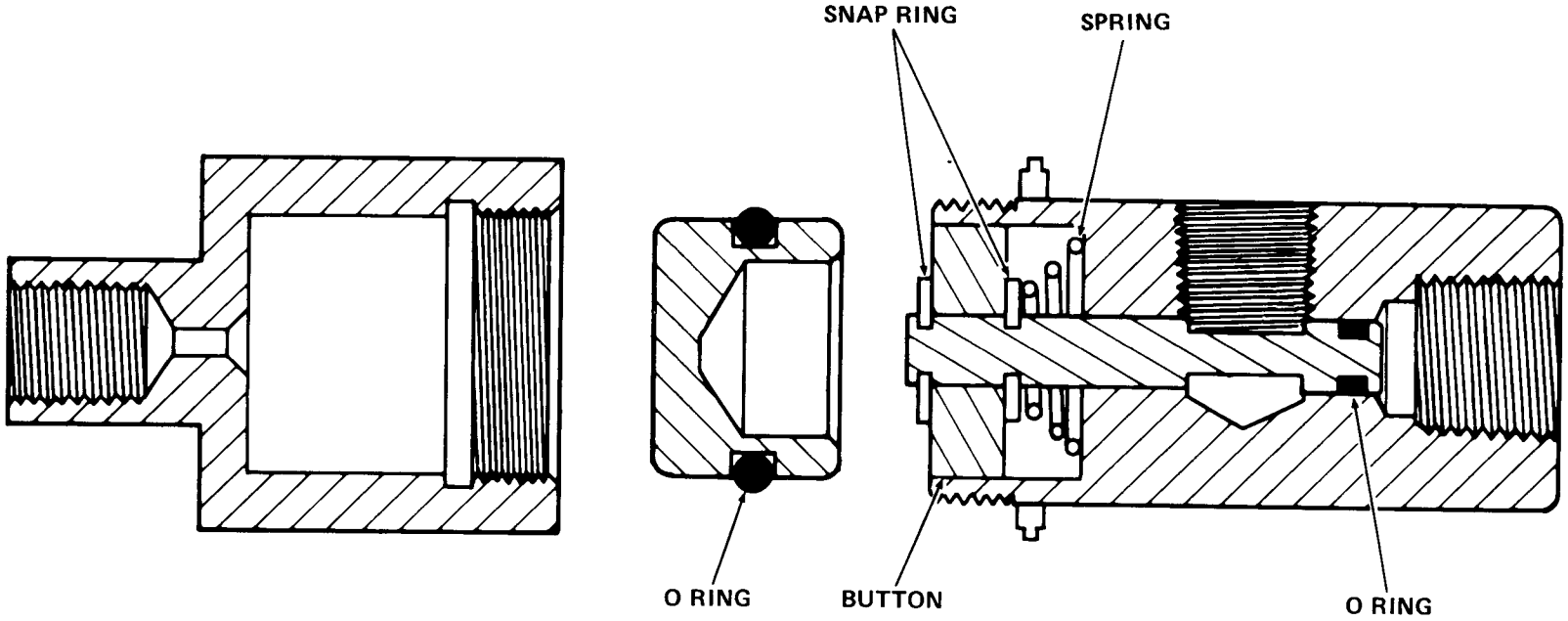

962517 RELIEF VALVE (2 REQD.)
962512 BOLT (6 REQD.)
962511 BOLT (2 REQD.)
962513 CHECK VALVE
* (1) FOR AIR DRYER PART NO'S. 2528200, 2525462, & 2536747
(2) FOR AIR DRYER PART NO'S. 2523927, 2528531,&2525386
962514 HEAD
6
962515 SPRING
962516 FILTER
8 962518 PLATE (2 Reqd.)
9
962515 SPRING
TO INSTALL THE BOLT AND NUT IN EXISTING BAFFLES, DRILL A .313in. (8,0mm) HOLE. THREAD THE HOLE WITH A .375in. UNC THREAD TAP AND INSTALL 1-.375in. (9,5mm) x 1.25in. (31,7mm) BOLT AND 1-.375in. (9,5mm)NUT. TIGHTEN THE NUT.
10
(1) 963640 BAFFLE
(2) 963878 BAFFLE
11
962520 GASKET
12 962521 EXIT TUBE
963877 RING
BODY ASSEMBLY
23
(1) 964053 BRACKET
(2) 963879 BRACKET
962524 BOLT (INC. 20,21,&22)
21
20
22
15 963641 ELEMENT
964054 REDUCER BUSHING
962525 VALVE
963876 PLUG
962526 NIPPLE

Figure 1



(SERVICE KIT NUMBER 963148)

962525 UNLOADER VALVE

TS – 20377

Figure 2

CLARK Service gram

17 September 1979

MICHIGAN SG-767
Group Ref. No. 400

SUBJECT: Installation of Ductile Iron Brake Head Assemblies Model 175B

A field modification (FM-136) was made to Model 175B Tractor Shovels replacing all cast iron brake head assemblies with ductile iron brake head assemblies less linings.

At this time, some machines have not been located. The list below gives each machine serial number that has not been modified to date.

Any time a machine on this list is serviced, the brakes should be checked and any brake heads that are not ductile iron should be replaced.

SERIAL NUMBERS	SERIAL NUMBERS	SERIAL NUMBERS
427A-112	427B-135	427B-324
427A-142	427B-148	427B-326
427A-143	427B-159	427B-341
427A-147	427B-160	427B-346
427A-166	427B-165	427B-360
427A-170	427B-172	427B-363
427A-182	427B-174	427B-373
427A-192	427B-183	427B-382
427A-212	427B-188	427B-388
427A-215	427B-189	427B-400
427A-216	427B-204	427B-405
427A-219	427B-216	427B-416
427A-251	427B-217	427B-419
427A-254	427B-222	427B-420
427A-261	427B-243	427B-427
427A-271	427B-249	427B-431
427A-272	427B-255	427B-432
427A-273	427B-256	427B-436
427A-278	427B-270	427B-443
427A-322	427B-273	427C-103
427A-336	427B-281	427C-109
427A-342	427B-290	427C-112
427A-347	427B-294	427C-120
427A-385	427B-298	427C-130
427A-408	427B-305	427C-136
427B-116	427B-306	438C-112
427B-129	427B-307	438C-113
427B-132	427B-318	438C-116

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SERIAL NUMBERS	SERIAL NUMBERS
438C-127	427A-260CAC
438C-149	427A-264CAC
438C-102CAC	427B-224CAC
438C-122CAC	427B-225CAC
427A-104CAC	427C-135CAC

When replacing brake heads, you should also inspect the complete brake system of each machine for the following:

1. Brake disc wear. Discs worn to less than .450 in (11,4 mm) thickness must be replaced.

2. Brake lining wear. Linings worn to less than .125 in (3,2 mm) thickness must be replaced.

3. Compensator Valve. If the machine is not equipped with compensator valves, it is recommended that kit 960621 be installed. If the machine is equipped with compensator valves, check their condition and repair or replace as needed.

4. Remote brake fluid reservoir. If the machine is not equipped with these reservoirs, it is recommended that they be installed at this time. See SG-495 for parts required and installation instructions.

5. Brake lines, fittings and valves. Check for leaks or damaged components and repair or replace as necessary.

6. Wheel hub bearing. Check the condition of the inner hub bearing and replace as needed.

7. Wheel hub. Especially on log loaders. Check the inner web area for cracks and replace as needed.

INSTALLATION INSTRUCTIONS:

1. Securely block machine for wheel and tire removal.

2. Remove wheel and tire assembly.

3. Disconnect brake lines and plug them to prevent loss of brake fluid.

4. Remove existing brake heads.

5. Install lining assemblies in brake head assemblies. See Figure 1 and Figure 2.

6. Install new brake head assemblies.

7. Tighten brake head mounting bolts to 282-310 ft. lbs. (39,0-42,9 kgf•m or 382,3-420,3 N•m) torque. See Figure 3.

8. Install brake lines.

9. Install wheel and tire assemblies.

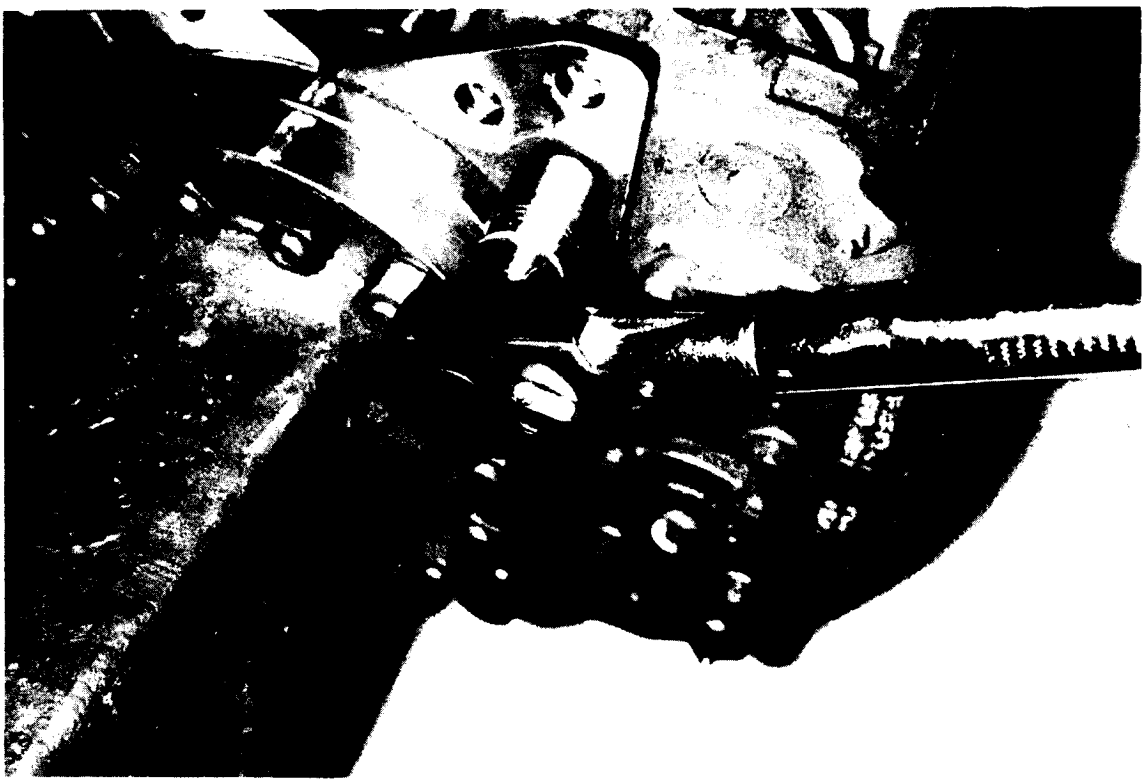
10. Tighten wheel mounting bolts to 320 ft. lbs. (44,2 kgf•m or 433,9 N•m) torque.

TS-31065

Figure 1. Install brake lining and carrier assemblies

TS-31064

Figure 2. Install retaining pin and tighten locking bolt



TS-31164

Figure 3. Install Brake Head Assys.

11. Bleed brake system as follows:

    A. Make sure that the brake fluid reservoirs are kept full of fluid at all times during the bleeding procedure.

    B. With all control levers in neutral position, start engine and maintain idle rpm.

    NOTE: Use of a drain hose on bleeder valve is recommended.

    C. Open bleeder valve and depress brake pedal. Then close bleeder valve and release brake pedal. See Item 1, Figure 4.

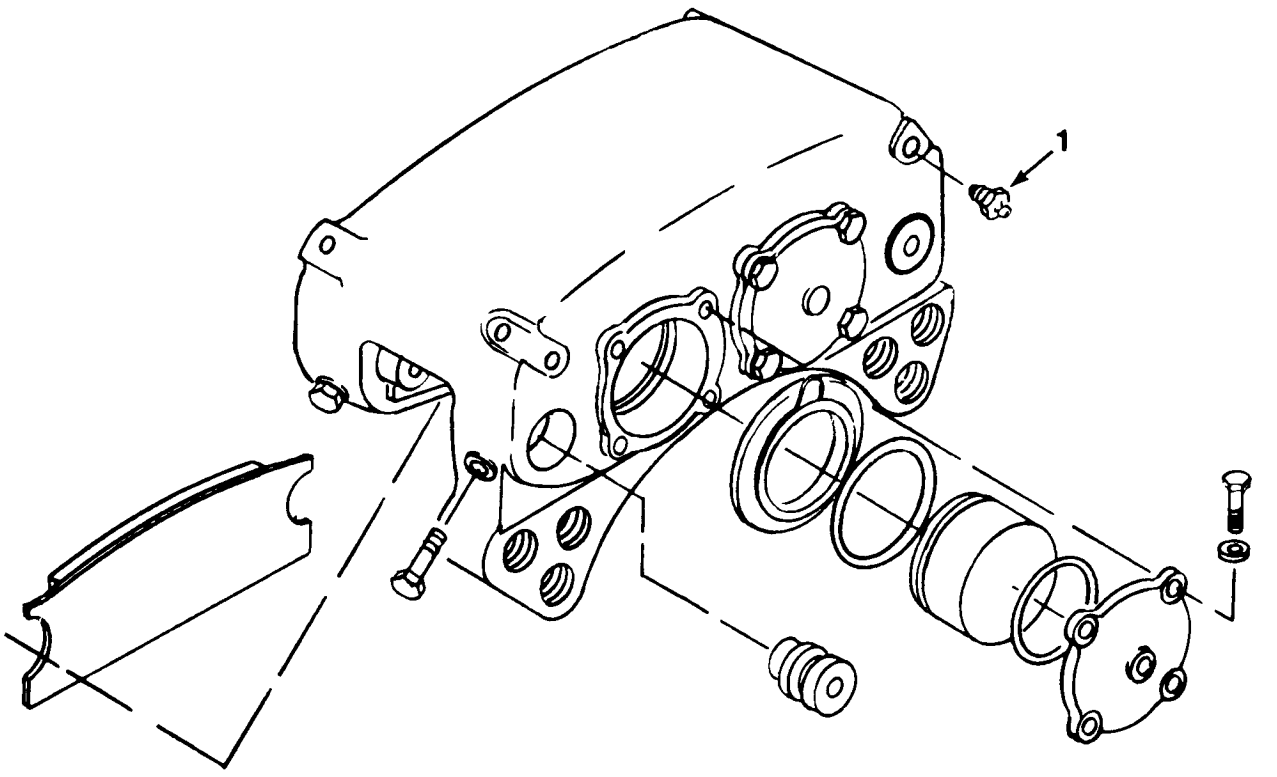
    D. Actuate brakes several times.

    E. Repeat Step "C" until there are no bubbles in fluid from bleeder valve.

    F. Perform Steps C, D & E at each of the other brake heads to complete the bleeding process.

12. Refill brake fluid reservoirs as required.

13. Remove blocking.



TS-13477

Figure 4, Brake Head Bleeder Screw

CLARK Service gram

June 1982

MICHIGAN SG - 929
Group Ref. No. 400

SUBJECT: Improved Parking Brake Head Mounting
Models 175B, 175C, 275B, 275C, 475IIIA, 475B and 475C Wheel Loaders
with S/N: 175B Cummins 438C,D
GM 427C,D
175C Cummins 490A, 491A
275B Cummins 425A,B,C,D, 482A,B
GM 479A
275C Cummins 492A
475IIIA Cummins 421E,F
475B Cummins 421G,H,J
GM 420B
475C Cummins 487A, 483A
GM 488A

Improved parking brake head mounting bolts can be installed on machines with serial numbers listed above. These will replace the mounting bolts presently used.

The new mounting bolts will reduce the possibility of over tightening and causing damage to the brake head.

To make this change, order the parts from the parts list below and follow the installation instructions.

PARTS LIST FOR ONE MACHINE:

1 - 841133 Parking Brake Head Mounting Bolt Kit consisting of:

a. 2 - Bushings
b. 2 - Springs
c. 4 - Washers
d. 2 - Bolts
e. 2 - Nuts

INSTALLATION:

1. Put the machine on a level surface.

2. Put the machine in the 'SERVICE' position; Bucket on the ground, parking brake applied, engine stopped, ignition key removed, red warning flag on steering wheel, safety link connected, wheels blocked.

3. See Figure 1 and remove and discard the existing bolt (Item 37) washer (Item 42) and nut (Item 43).

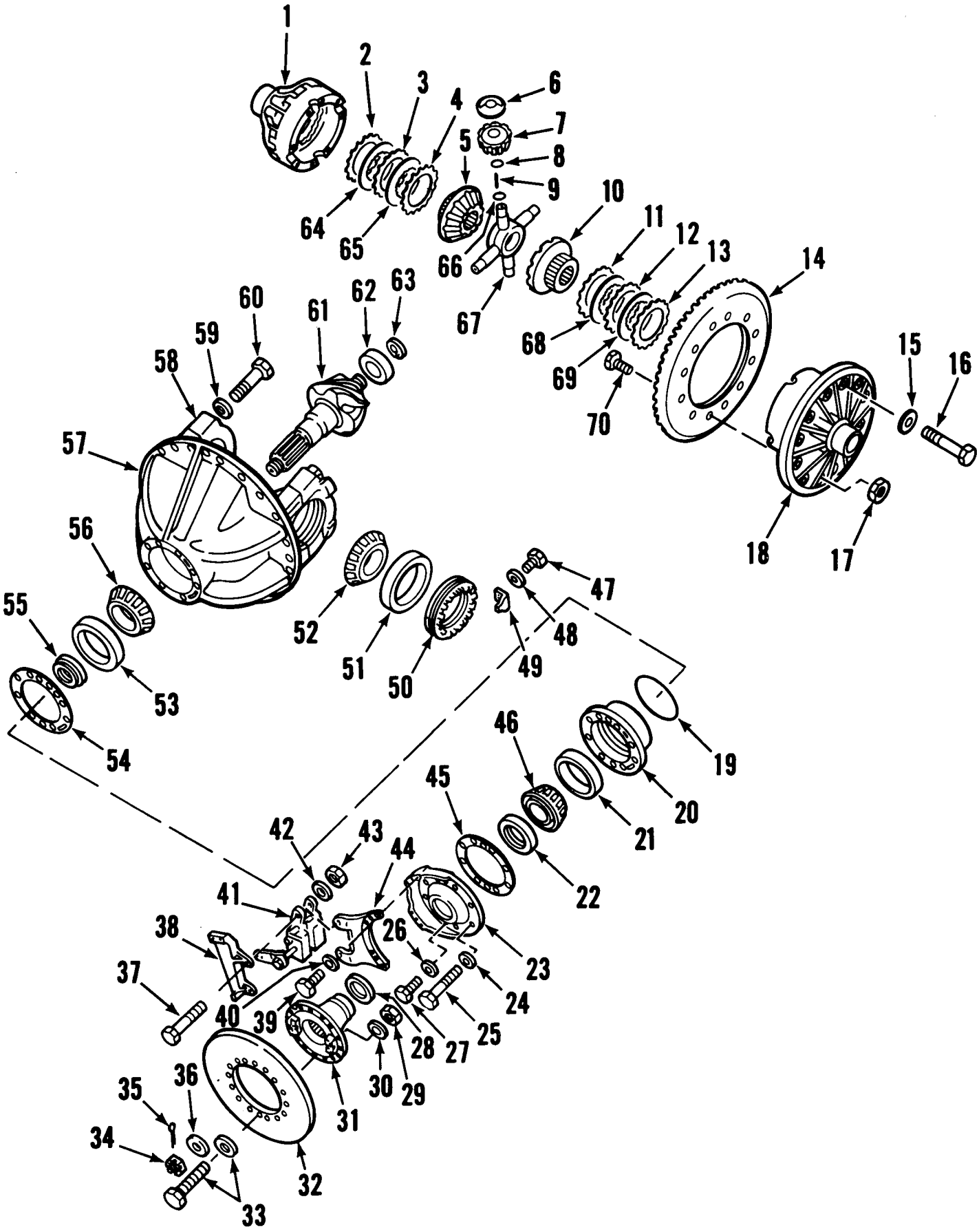
4. See Figure 2 and install the washer (Item 1) bushing (Item 2) and spring (Item 3) on the bolt (Item 4).

5. See Figure 2 and install the bolt assembly through the brake head housing, brake mounting bracket and cable return bracket as shown.

6. See Figure 2 and install the washer (Item 5) and nut (Item 6). Tighten the nut to a torque of 20 - 30 lbf·ft (27,1 - 40,7 N·m) (2,8 - 4,1 kgf·m).

7. Repeat steps 3 thru 6 for the other side of the brake head.

8. Make sure all connections are tight. Remove warning flag from steering wheel. Disconnect safety link. Remove blocks from wheels.



TS 11425

Figure 1
- 3 -
(11K23)

SG - 929

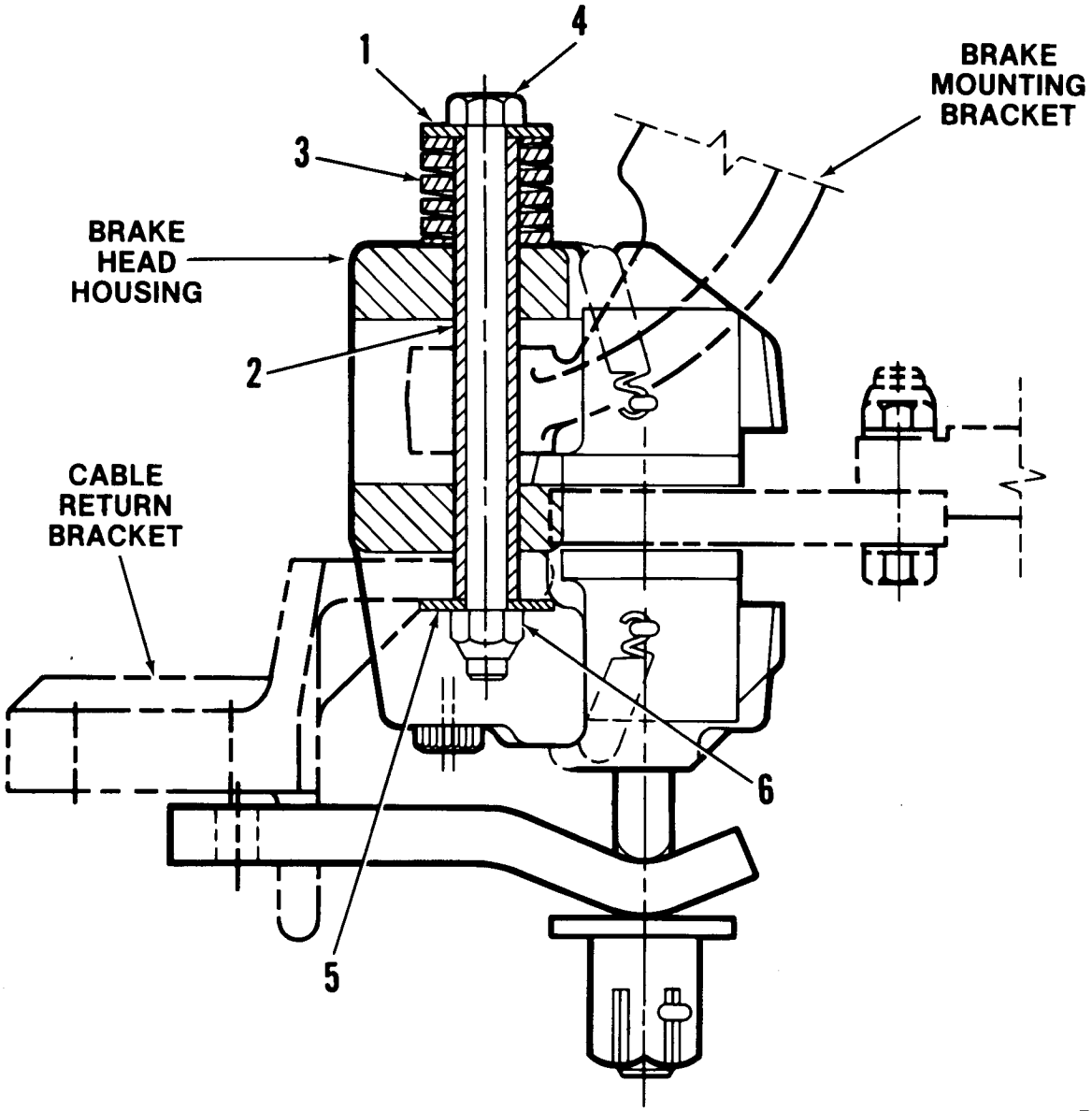

1
4
3
BRAKE MOUNTING BRACKET
BRAKE HEAD HOUSING
2
CABLE RETURN BRACKET
6
5
TS-21529

Figure 2