

PARTS & SERVICE NEWS

REF NO. AA01225

DATE October 12, 2001

(C)

Page 1 of 11

SUBJECT: IMPROVED WORK EQUIPMENT CONTROL VALVE AND REPLACEMENT PROCEDURE

PURPOSE: To provide proper replacement procedures for replacing work equipment control valves with new, improved control valves.

APPLICATION: Komatsu Wheel Loaders: WA800-2L A20001 thru A20019
 WA800-2LC A20020 thru A20028
 WA800-3LC A50001 thru A50016
 WA900-1L A20001 thru A20007
 WA900-1LC A20008 thru A20024
 WA900-3LC A50001 thru A50012

FAILURE CODE: P100MA

DESCRIPTION:

Some wheel loaders in operation have experienced decreased lifting power and increased boom drift due to internal and external leakage in the work equipment control valve(s). Internal leakage can be attributed to erosion of the spool bore within the control valve. External leakage has occurred due to cracks in the valve body.

A new control valve assembly has been manufactured to help prevent either of these problems from occurring. A modification to the shape of the spool has been implemented to reduce wear to the bore of the valve. The valve body itself has been fabricated using a material of greater strength for prevention of cracks.

Installation of the new control valve results in a need for piping modifications due to the new layout of the valves. The modification is outlined in this bulletin along with other necessary information for installation of the new valves.

NOTE: Intermediate valves that contained the spool improvement only, were available in the past. The part numbers of the new valves, equipped with the improved spool and valve body, are listed in Table 1 on the following page. Serial numbers for distinguishing the difference from old and new valves are listed in Figure 2. The serial numbers are stamped on the valve body.

Replace the control valves if it has been determined that a leakage problem exists within one of the control valves. Refer to Testing & Adjusting in the shop manual for boom operating specifications. Refer to Troubleshooting in the shop manual for information on determining faulty components within the work equipment system.

⚠ IMPORTANT ⚠

Observe all safety rules before performing any tests or maintenance on the machine. Refer to the Safety Section of the manual for information on working on and around the vehicle. Refer to Testing and Adjusting section of the manual for information on releasing hydraulic pressure before removing any hydraulic components for maintenance.

| TABLE 1. PARTS LIST FOR VALVE REPLACEMENT | | |
|--|---------------------------|-----------------|
| Part Number | Description | Quantity |
| 709-12-11807 | Control Valve | 2 |
| 709-12-13603 | Control Valve (WA900-3LC) | 2 |
| 07002-21423 | O-ring | 4 |
| 07002-22034 | O-ring | 4 |
| 07042-20108 | Plug | 1 |
| 07102-20305 | Hose | 1 |
| 07102-203A4 | Hose | 2 |
| 07102-203A5 | Hose | 1 |
| 415-62-11350 | Elbow | 4 |
| 427-62-11485 | Tube | 1 |
| 709-12-12740 | Tee | 1 |
| 709-12-12750 | Elbow | 1 |

NOTE: Some components from the current valve installation are to be used. Inspect these components for wear and for damage. Replace components as necessary.

If it has been determined that the equipment valves need to be replaced, refer to Figures 1 & 2 for differences in plumbing between the current installation and the new installation. Part numbers and serial numbers have been included in order to properly identify and compare the components. Refer to Figures 3 & 4 for differences in internal operation of the new valves.

NOTE: If it has been determined that a new equipment valve must be installed, both equipment valves on the machine must be replaced, as a pair, due to the difference in piping.

| Applicable Models | Applicable Work Equipment Valves |
|------------------------------------|----------------------------------|
| WA800-2L WA800-2LC WA800-3LC | 709-12-11805 or prior numbers |
| WA900-1L WA900-1LC | 709-12-11805 or prior numbers |
| WA900-3LC | 709-12-13601 or prior numbers |

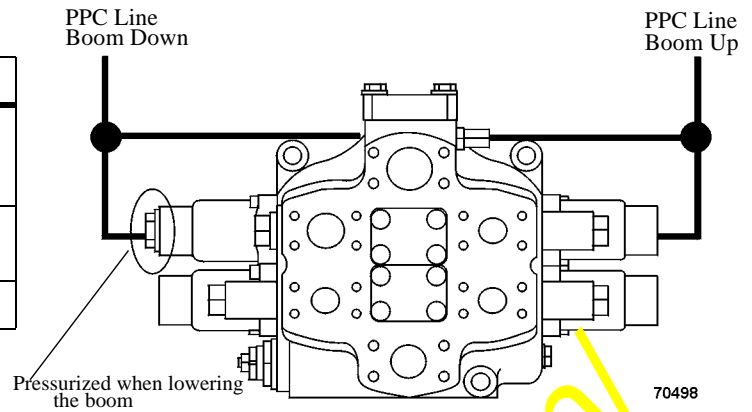
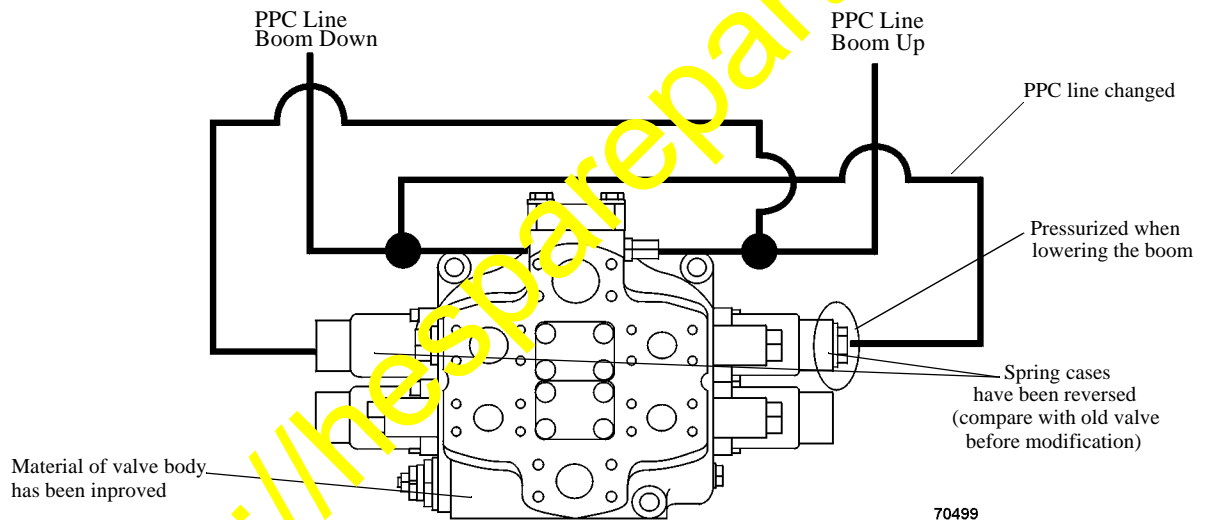


FIGURE 1. VALVE APPEARANCE BEFORE MODIFICATION



| SPOOL CHANGE ONLY | | |
|---|----------------------------------|---|
| Applicable Models | Applicable Work Equipment Valves | Serial Numbers of Work Equipment Valves |
| WA800-2L WA800-2LC WA800-3LC WA900-1L WA900-1LC | 709-12-11806 | CMN000098 |
| WA900-3LC | 709-12-13602 | KKK00024 |

| SPOOL & VALVE BODY CHANGES | | |
|---|----------------------------------|---|
| Applicable Models | Applicable Work Equipment Valves | Serial Numbers of Work Equipment Valves |
| WA800-2L WA800-2LC WA800-3LC WA900-1L WA900-1LC | 709-12-11807 | CMN00104 |
| WA900-3LC | 709-12-13603 | KKK00025 |

FIGURE 2. VALVE APPEARANCE AFTER MODIFICATION

709-12-11805
709-12-13601

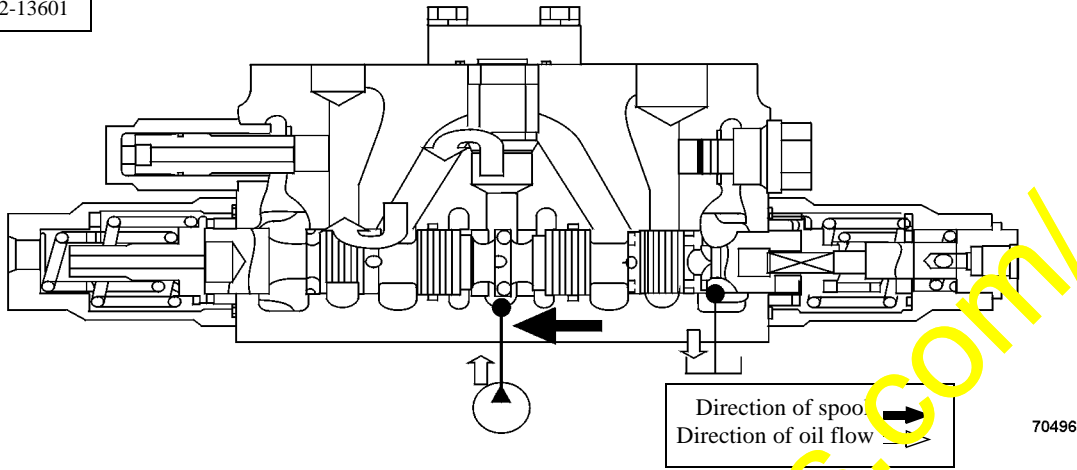


FIGURE 3. INTERNAL OPERATION OF VALVE BEFORE SPOOL CHANGE (BOOM LOWERING)

709-12-11806
709-12-11807
709-12-13602
709-12-13603

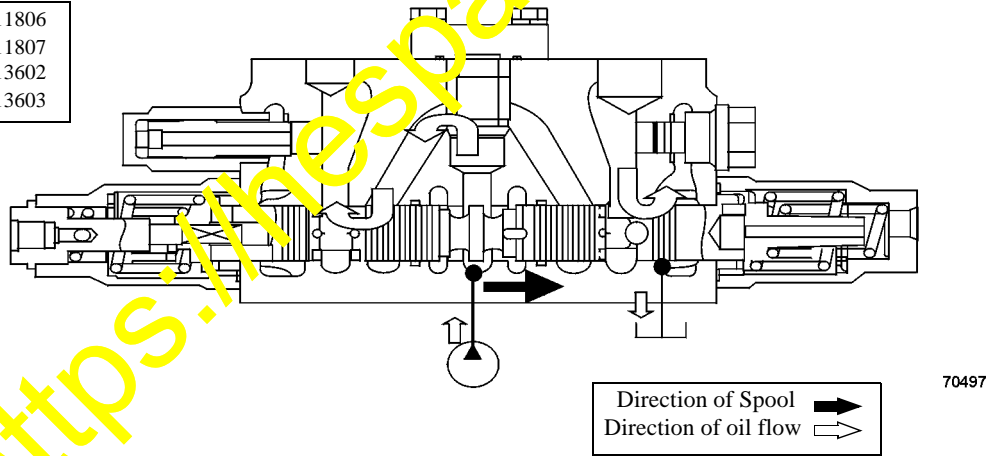


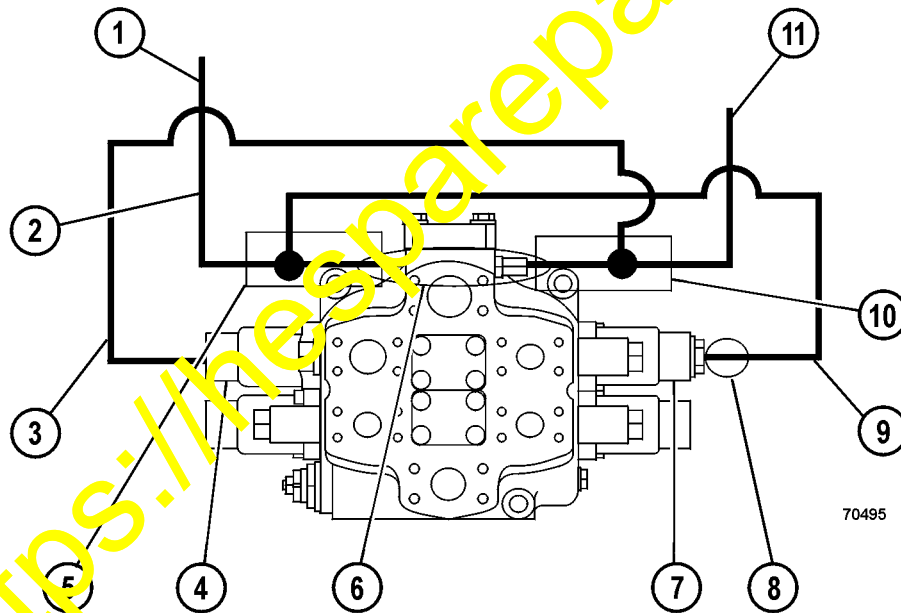
FIGURE 4. INTERNAL OPERATION OF VALVE AFTER SPOOL CHANGE (BOOM LOWERING)

FRONT VALVE

| Part Number | Description | Quantity | Boom Up Circuit | Boom Down Circuit | Callout # on Drawing | Remarks |
|--------------|-------------|----------|-----------------|-------------------|----------------------|-----------------|
| 07102-20305 | Hose | 1 | x | | 3 | |
| 427-62-11483 | Tube | 1 | | x | 2 | |
| 07102-203A4 | Hose | 1 | | x | 9 | |
| 709-12-12750 | Elbow | 1 | | x | 8 | 2.6 mm orifice |
| 07002-22034 | O-ring | 1 | | x | | |
| 07042-20108 | Plug | 1 | | x | | |
| 709-12-12740 | Tee | 1 | | x | 5 | |
| 07002-21423 | O-ring | 1 | | x | | |
| 415-62-11350 | Elbow | 2 | | x | | |
| 07002-22034 | O-ring | 1 | x | x | | For Replacement |
| 07002-21423 | O-ring | 1 | x | x | | For Replacement |

REAR VALVE

| Part Number | Description | Quantity | Boom Up Circuit | Boom Down Circuit | Callout # on Drawing | Remarks |
|--------------|-------------|----------|-----------------|-------------------|----------------------|-----------------|
| 07102-203A5 | Hose | 1 | x | | 3 | |
| 07102-203A4 | Hose | 1 | | x | 9 | |
| 415-62-11350 | Elbow | 2 | x | x | 5 | |
| 07002-22034 | O-ring | 2 | x | x | | For Replacement |
| 07002-21423 | O-ring | 2 | x | x | | For Replacement |



- | | | |
|-------------------------|---------------------------|-------------------------|
| 1. PPC Line (Boom Down) | 5. Tee / Elbow | 9. Hose |
| 2. Tube | 6. Float Selector Valve | 10. Tee / Elbow |
| 3. Hose | 7. Boom Down Spring Case | 11. PPC Line (Boom Up) |
| 4. Boom Up Spring Case | 8. Elbow (2.6 mm Orifice) | |

FIGURE 5. PILOT PIPING

NOTES:

- Boom circuit piping only, is to be modified. Bucket circuit piping remains the same. (Modification occurs downstream of the joint block.)
- Elbow (8) must contain a 2.6 mm orifice. Used on both front and rear valves. (Switch position of left hand and right hand elbow tees at the rear valve.)
- Use new O-rings at all disconnected piping joints.

○ Parts are not to be reused.

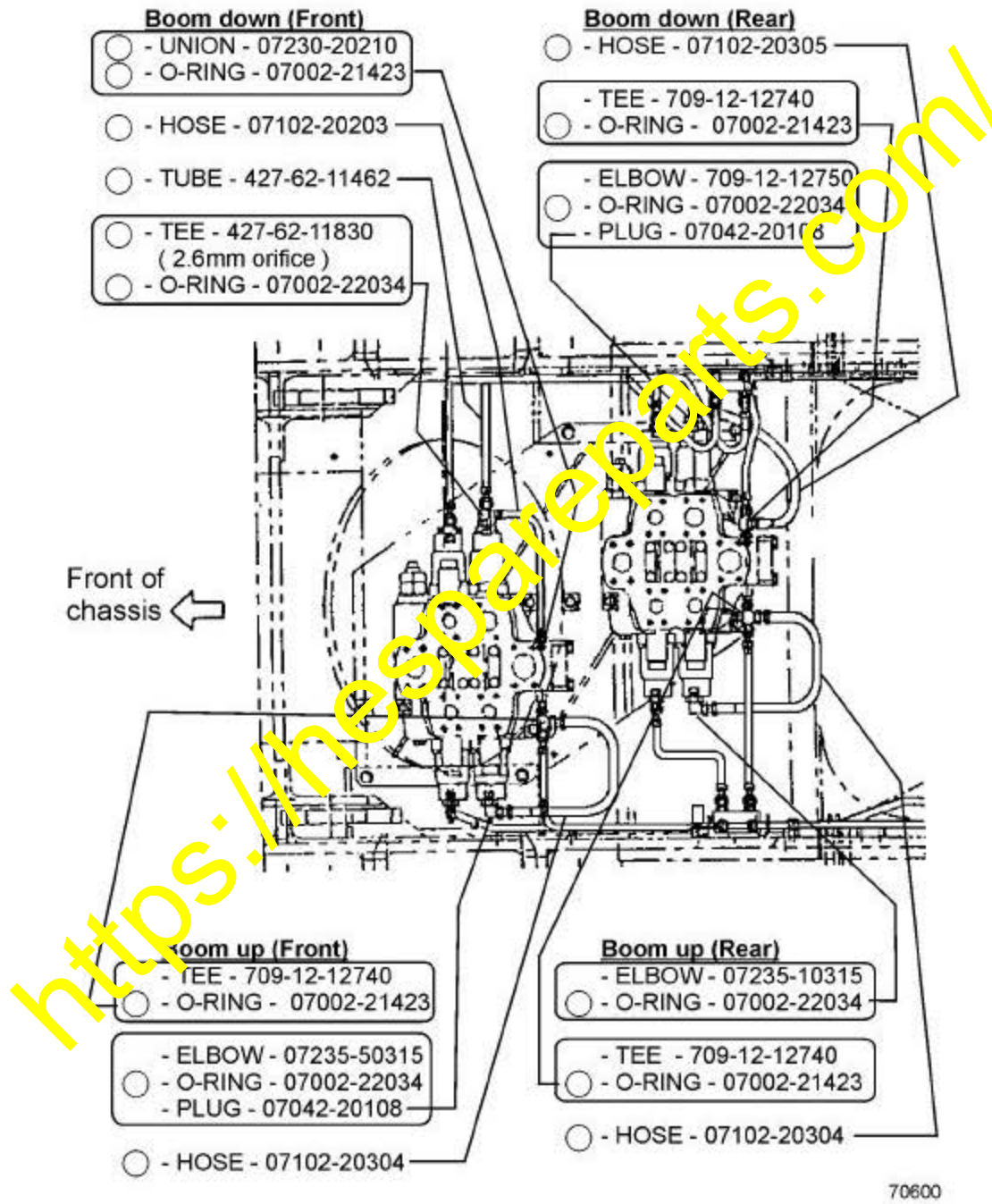


FIGURE 6. PIPING BEFORE INSTALLATION OF NEW VALVES

● New parts to be installed with new valves.
Parts are listed in table 1.

☆ Install downward at a 45° angle.

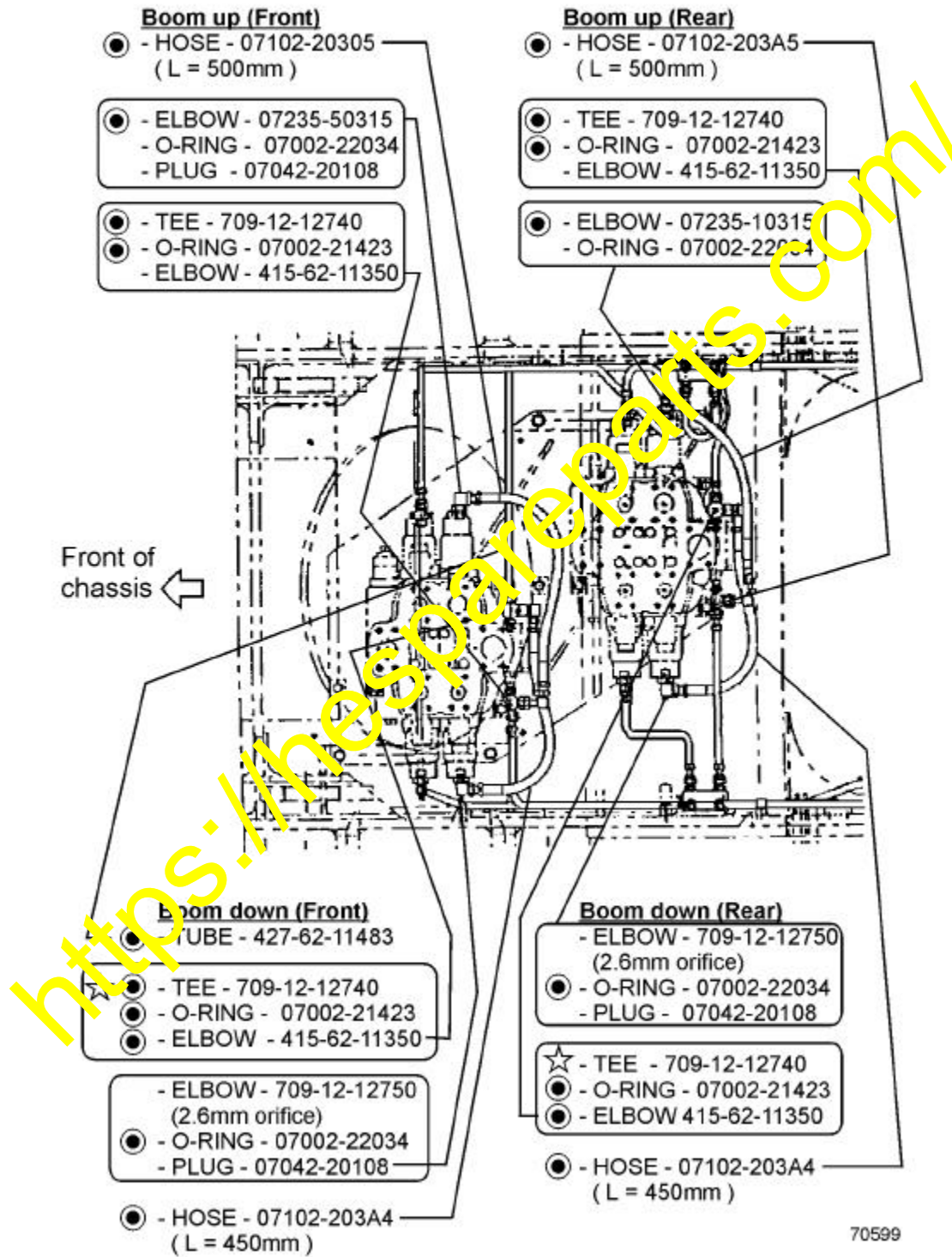
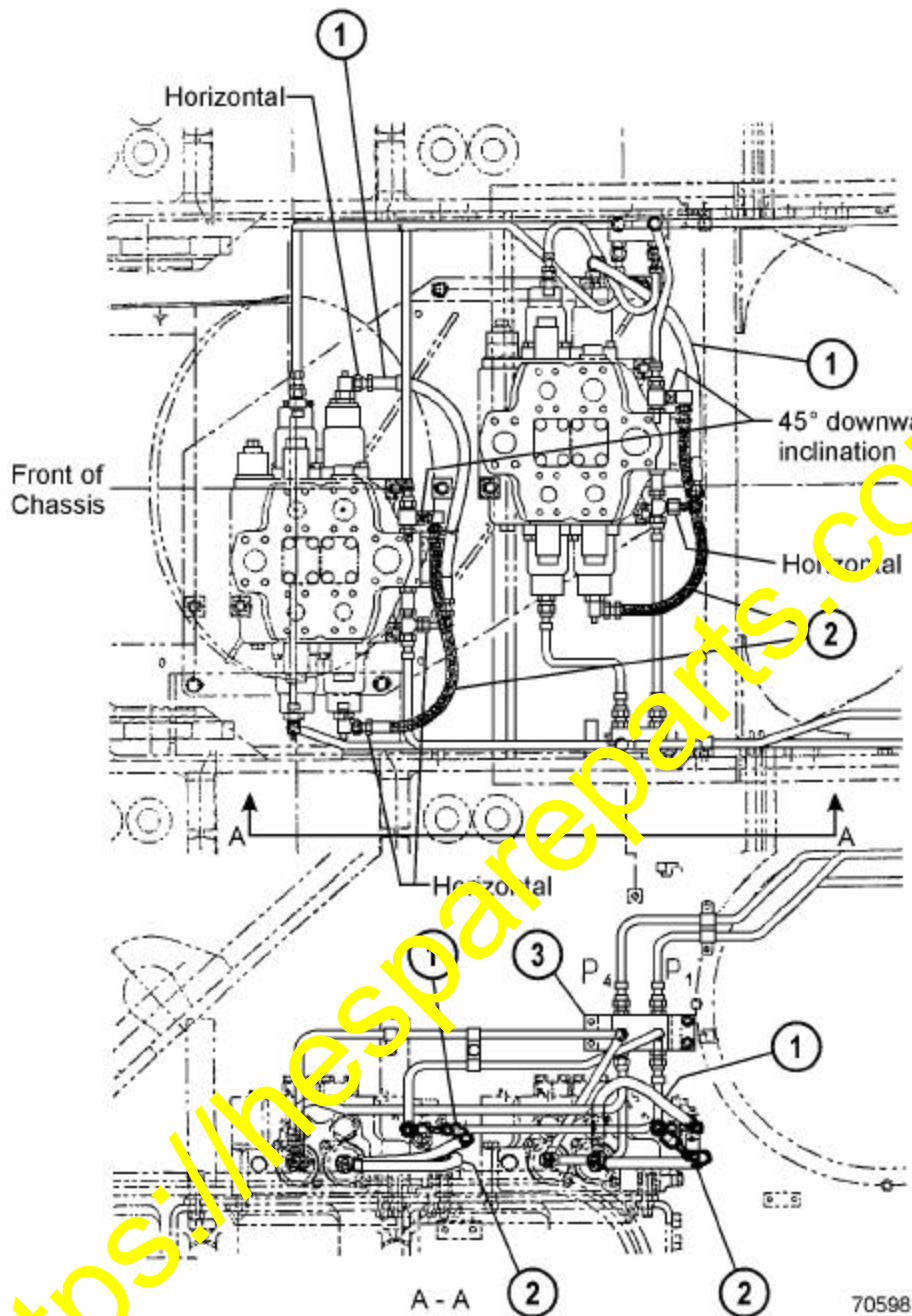


FIGURE 7. PIPING AFTER INSTALLATION OF NEW VALVES



- 1. Hose (07102-20305)
- 2. Hose (07102-203A4)
- 3. PPC Line Joint Block

FIGURE 8. ORIENTATION OF PIPING COMPONENTS

AIR BLEEDING FROM THE HYDRAULIC CIRCUITS

1. Bleed the air from the piston pumps. Refer to the following procedures in this bulletin for removing air from the piston pumps.
2. Bleed the air from the filter case. Refer to the following procedures in this bulletin for removing air from the filter case.
3. Though it is not essential to this procedure, it is recommended that the brake circuit be bled at this time to ensure proper operation of all hydraulic circuits. Refer to *Testing and Adjusting* in the appropriate shop manual for the proper procedure for removing air from the brake circuit.

NOTE: Always follow the procedures for bleeding air as outlined in the shop manual.

BLEEDING AIR FROM THE PISTON PUMPS (WA800-2L/2LC & WA900-1L/1LC)

Refer to Figures 9 through 12.

1. Loosen plugs (1, 2 & 3) on the suction tubes for the piston pumps.
2. Loosen the adapter on the block end of case drain hose (4).
3. Open valve (5) to pressurize the oil inside the hydraulic tank. (approx. 0.98 kPa (0.01 kg/cm²))



Ensure the oil filler cap is tight before pressurizing the hydraulic tank. Gradually pressurize the tank in order to avoid oil spray from the plug and/or the adapter. If air pressure is lost in the air tank, charge with air using the inflation couplers.

4. Continue to pressurize the hydraulic tank until air is no longer evident at plugs (1, 2 & 3) and hose (4).
5. Tighten the plugs and hose adapter after the air has been removed from the system.
6. Check the oil level in the hydraulic tank and fill as necessary.

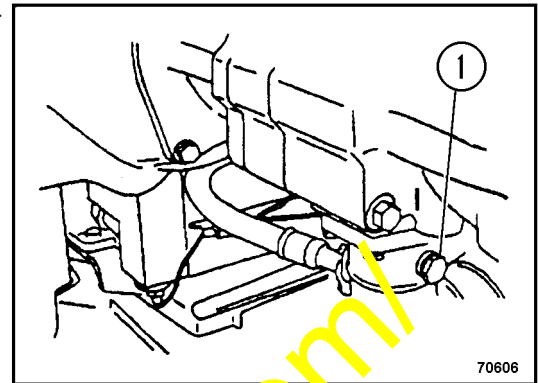


FIGURE 9.

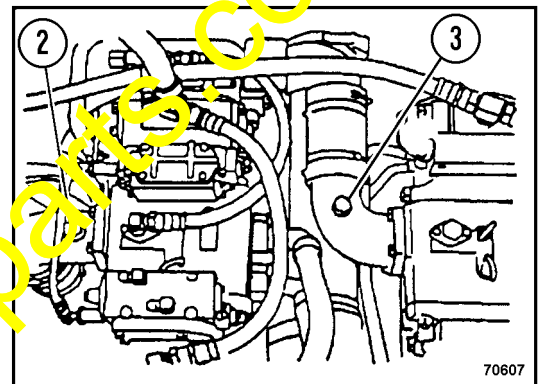


FIGURE 10.

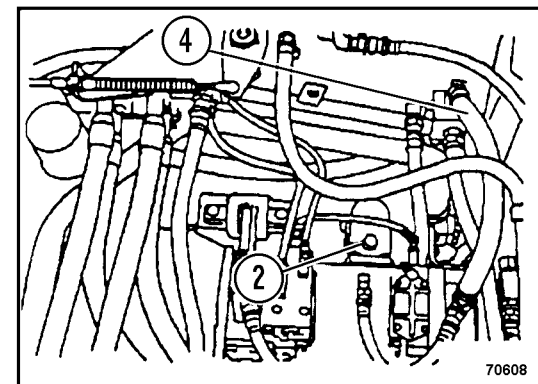


FIGURE 11.

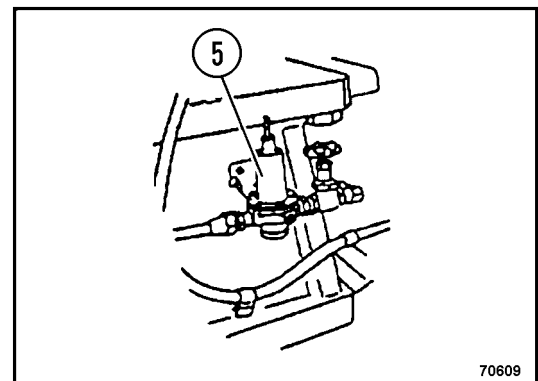


FIGURE 12.

BLEEDING AIR FROM THE PISTON PUMPS (WA800-3LC & WA900-3LC)

Refer to Figures 13 through 16.

1. Loosen oil filler cap (1).
2. Loosen plugs (2, 3 & 4) on the suction tubes for each piston pump. All three plugs must be loosened. Allow the oil and air to flow out of the plugs. After all of the air has been purged, tighten the plugs.
3. Let the machine sit for 10 minutes to allow oil to fill inside of the piston pumps.
4. Check the oil level and fill if necessary. Tightly secure the oil filler cap.
5. Loosen connector (5) at the block side of case drain hose (6). Do not loosen any of the other case drain hoses at the block.
6. Run the engine at low idle and allow oil and air to flow from the connector until all of the air is purged.
7. Tighten connector (5).
8. Check the oil level, and add if necessary.

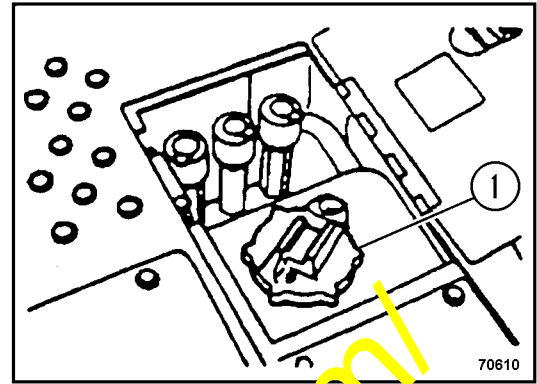


FIGURE 13.

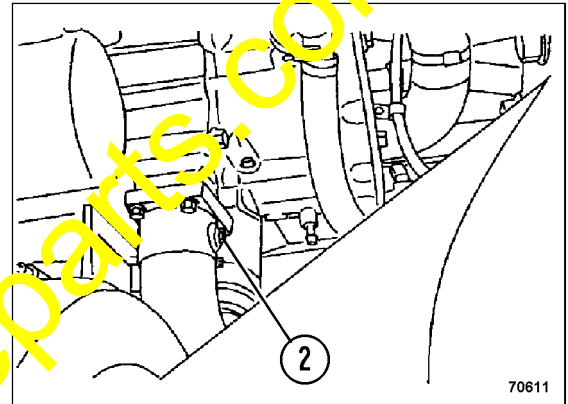


FIGURE 14.

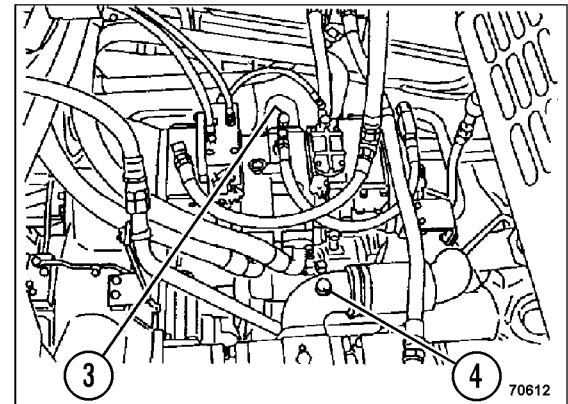


FIGURE 15.

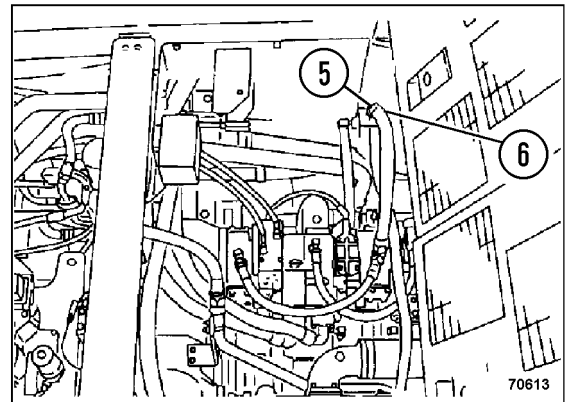


FIGURE 16.

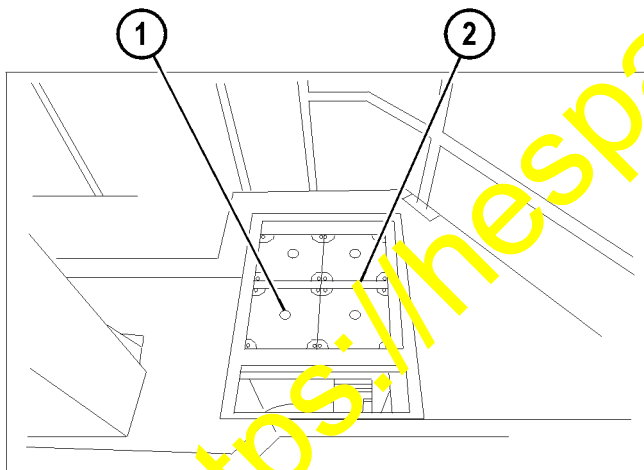
BLEEDING AIR FROM THE FILTER CASE / RETURN LINE

1. Run the engine at low idle. Extend and retract the steering cylinders, bucket cylinders, and boom cylinders 4 to 5 times each. Use care when extending the cylinders. **DO NOT** extend the cylinders to the end of the cylinder stroke. Stop 100 mm (3.94 in.) before the end of the stroke.

 **CAUTION**

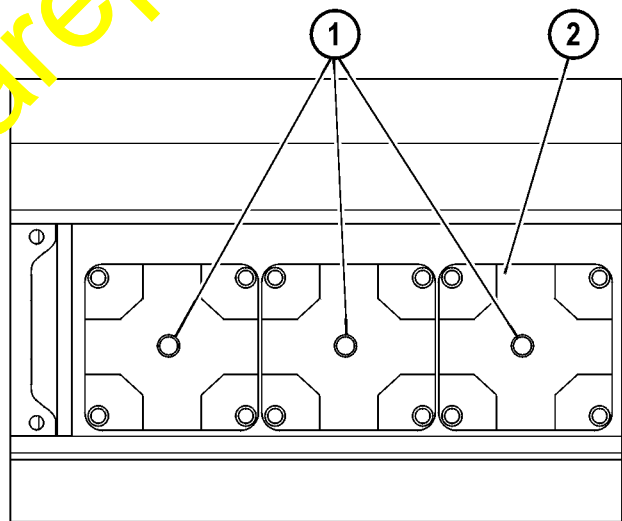
If the engine is initially operated at high idle or if the cylinders are extended to the end of their stroke, air within the cylinder will cause damage to the piston packing.

2. Extend and retract the steering cylinders, bucket cylinders, and boom cylinders 3 to 4 times to the end of their stroke.
3. Lower the boom and bucket, and stop the engine. Loosen bleeder plug (1, Figures 17 & 18) to bleed air from the hydraulic tank. Tighten the plug after all of the air is released.
4. Check the oil level in the hydraulic tank. Fill the tank with oil if necessary. Refer to the Operation and Maintenance Manual for information on checking the oil level and adding oil.
5. Start the engine, and increase engine speed. Repeat step 2 through step 4 until all air is purged from the tank.
6. After all air is bled from the tank, tighten the bleeder plug to a torque of 8 ± 1 ft.lbs. (11.5 ± 1.5 Nm).



1. Bleeder Plug 2. Filter Cover

FIGURE 17. - WA800-2 AND WA900-1



1. Bleeder Plug 2. Filter Cover

FIGURE 18. - WA800-3 & WA900-3