# PARTS & SERVICE NEWS

| REF NO. | AA98166C |
|---|---|
| DATE | March 19, 2002 |



*This Parts and Service News supersedes the previous issue AA98166A dated March 22, 1999 and AA98166B dated August 3, 2000. Both previously issued Parts and Service News should be discarded.*

**SUBJECT:** RELOCATION OF DESICCANT AIR DRYER

**PURPOSE:** This publication updates and corrects Serial Numbers published previously. To introduce a new Air Dryer (PC0778) and improve it's functional efficiency by reducing the air inlet temperature thru physical relocation.

**APPLICATION:** WA800-2 and WA900-1 Wheel Loaders
S/N's WA800-2LC - A20003, A20020 & Higher
S/N's WA900-1LC - A20008 & Higher
S/N's WA800-2L - A20001 thru A20019
S/N's WA900-1L - A20001 thru A20007

**FAILURE CODE:** 450099

**DESCRIPTION:** Remove present Air Dryer and install new Air Dryer to the L.H. ROPS post.
Install Air Expansion Tank.
Install Air Dryer Purge Tanks.
Install larger diameter air hoses.

## INTRODUCTION:

In some enviroments and/or duty cycles, the rear frame location of the existing Air Dryer will allow the air inlet temperature to reach a high temperature such that the cooling of air, and moisture evaporation process, is not complete.

This Parts and Service News announces a new Air Dryer and physical relocation of the air dryer, addition of an expansion tank, purge tanks, and a reworking of the air supply system. Tests have shown that this improvement will reduce the air dryer inlet temperature to 150°F (66°C) or less, thereby improving the functional efficiency of the Air Dryer.

### FIELD REWORK

The Field Rework consists of:

1. Removing the existing Air Dryer from the current rear frame location and install new the new Air Dryer on L.H. ROPS post (Figure 1).
   - Welding of mounting pads is required (Figure 2)
   - L.H. Deck plate requires 70 x 140mm cut-out to allow for piping installation (Figure 2).
2. Installing a new Air Expansion Tank at the former air dryer location and installing new Purge Tanks are on (Figure 1).
3. Installing new, larger diameter air supply hoses where applicable and changing the routing of lines as necessary (Figure 3).
   - Welding of mounting pads for clamps is required.

### PARTS REMOVAL

1. Remove parts as shown in Figure 1.
2. Remove parts as shown in Figure 2.

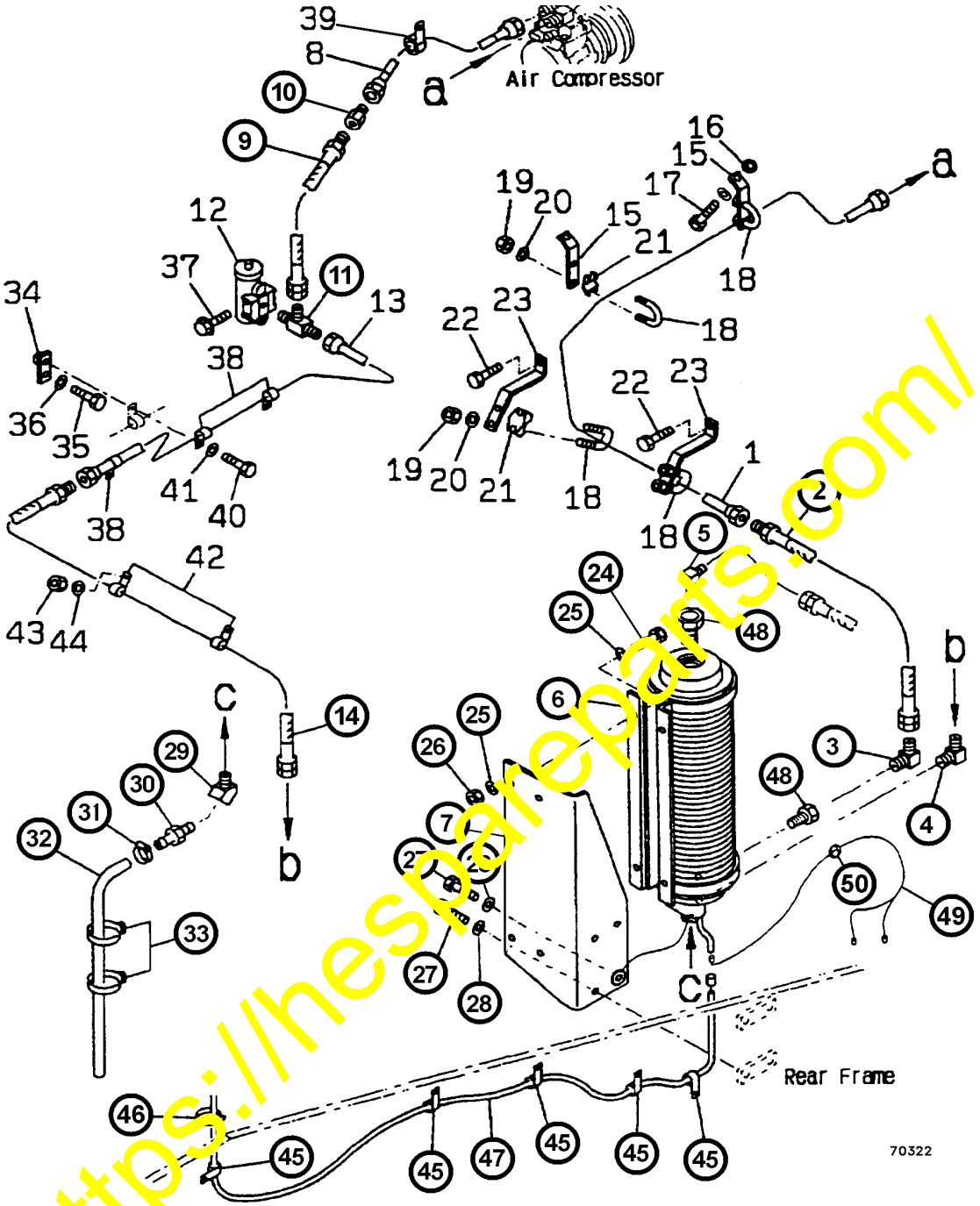


FIGURE 1. AIR DRYER PIPING (FIGURE 3581 from PARTS CATALOG)
Remove parts with **CIRCLED** callouts.

[ 2]. Hose (427-W90-1470)
[ 3]. Elbow (427-W90-1411)
[ 4]. Elbow (427-W90-1420)
[ 5]. Elbow (427-W90-1451)
[ 6]. Air Dryer Assembly (PC0114)
[ 7]. Bracket (427-W90-1440)
[ 9]. Hose (427-35-12840)
[10]. Connector (427-35-12810)
[11]. Elbow (427-W90-1152)
[14]. Hose (427-W90-1490)
[24]. Bolt (01010-81035)
[25]. Washer (01643-31032)
[26]. Nut (01580-11008)
[27]. Bolt (01010-81230)
[28]. Washer (01643-31232)
[29]. Elbow (427-W90-1460)
[30]. Nipple (427-W90-1430)
[31]. Clip (07285-00220)
[32]. Hose (07287-01910)
[33]. Band (08034-20519)
[45]. Clip (362-43-18780) (4 only)
[46]. Band (08034-20519)
[47]. Wire (425-W90-1331)
[48]. Fitting, Adaptor (WA5817)
[49]. Harness (427-N81-1120)
[50]. Band (08034-00519)

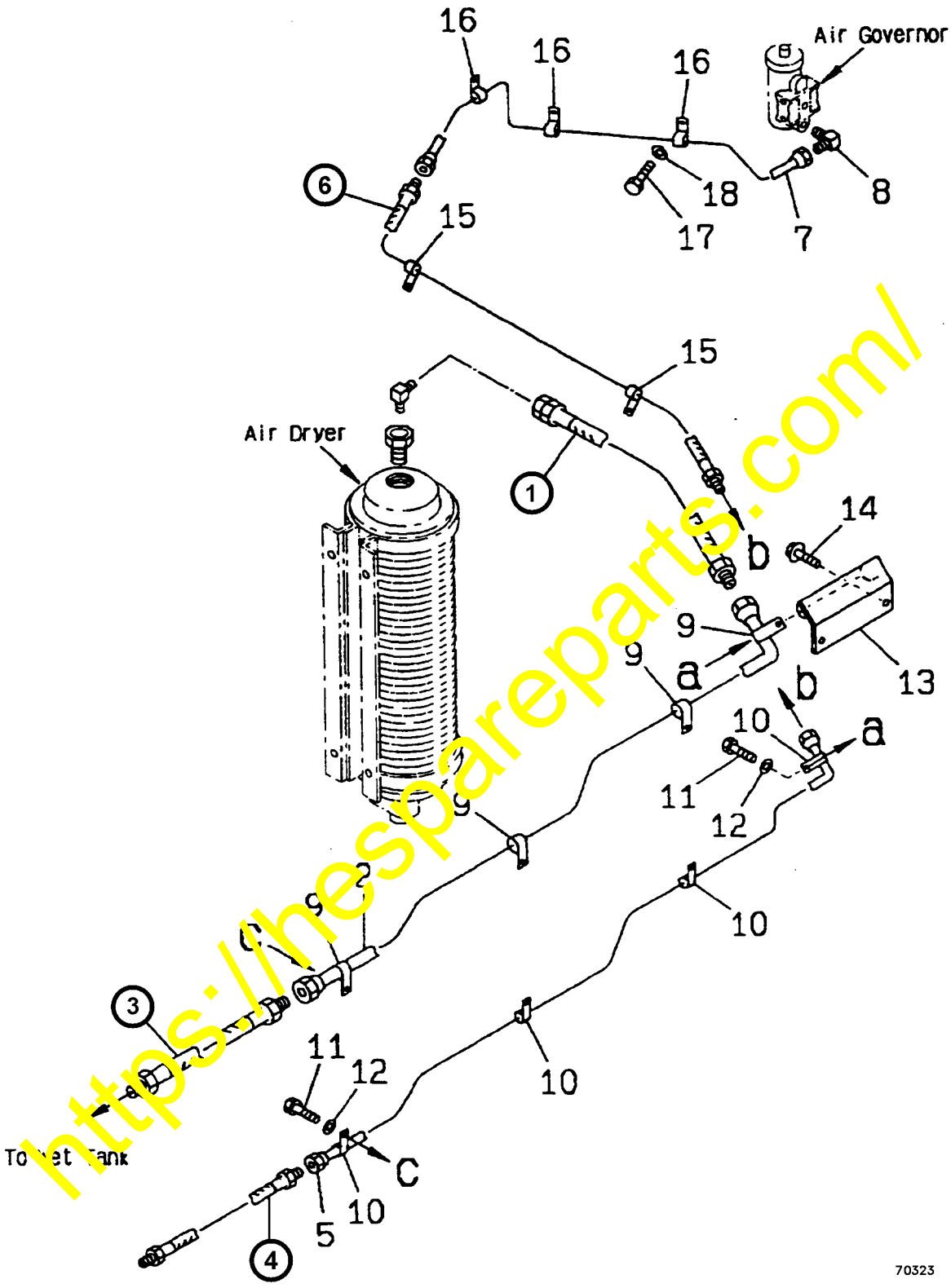


FIGURE 2. AIR DRYER PIPING (FIGURE 3582 from PARTS CATALOG)
Remove parts with **CIRCLED** callouts.

[ 1]. Hose (427-W90-1480)
[ 3]. Hose (427-35-11720)
[ 4]. (428-35-11170)
[ 6]. (427-35-12660)

**PARTS REQUIRED**

*Existing Parts removed (Figure 1)

| Figure 1 | | | |
|---|---|---|---|
| **Ref No.** | **Qty.** | **Part Number** | **Description** |
| 2 | 1 | 427-W90-1470 | HOSE |
| 3 | 1 | 427-W90-1411 | ELBOW |
| 4 | 1 | 427-W90-1420 | ELBOW |
| 5 | 1 | 427-W90-1451 | ELBOW |
| 6 | 1 | PC0778 | AIR DRYER ASSY. |
| 7 | 1 | 427-W90-1440 | BRACKET |
| 9 | 1 | 427-35-12840 | HOSE |
| 10 | 1 | 427-35-12810 | CONNECTOR |
| 11 | 1 | 427-W90-1152 | ELBOW |
| 14 | 1 | 427-W90-1490 | HOSE |
| 24 | 4 | 01010-81035 | BOLT |
| 25 | 8 | 01643-31032 | WASHER |
| 26 | 4 | 01580-11008 | NUT |
| 27 | 4 | 01010-81230 | BOLT |
| 28 | 4 | 01643-31232 | WASHER |
| 29 | 1 | 427-W90-1460 | ELBOW |
| 30 | 1 | 427-W90-1430 | NIPPLE |
| 31 | 1 | 07285-00220 | CLIP |
| 32 | 1 | 07287-01010 | HOSE |
| 33 | 2 | 08034-20519 | BAND |
| 45 | 5 | 362-43-18780 | CLIP |
| 46 | 5 | 08034-20519 | BAND |
| 47 | 1 | 425-W90-1331 | WIRE |
| 48 | 2 | WA5817 | FITTING ADAPTOR |
| 49 | 1 | 427-N81-1120 | HARNESS |
| 50 | 10 | 08034-00519 | BAND |

*Existing Parts removed (Figure 2)

| Figure 2. | | | |
|---|---|---|---|
| **Ref No.** | **Qty.** | **Part Number** | **Description** |
| 1 | 1 | 427-W90-1480 | HOSE |
| 3 | 1 | 427-35-11720 | HOSE |
| 4 | 1 | 428-35-11170 | HOSE |
| 6 | 1 | 427-35-12660 | HOSE |

*New Parts added (Figure 3 through Figure 10)

| Ref. No. | Qty. | Part No. | Description | Remarks |
|---|---|---|---|---|
| 1, Figure 4 | 4 | 01010-22308 | BOLT | TO MOUNT AIR DRYER BRACKET |
| 2. Figure 4 | 4 | 01643-31232 | WASHER | TO MOUNT AIR DRYER BRACKET |
| 3, Figure 4 | 2 | 01573-22308 | SEAT | TO MOUNT AIR DRYER BRACKET |
| 4, Figure 4 | 1 | 427-W90-A170 | DRYER BRACKET MTG. | ASSEMBLE TO ROPS |
| 5, Figure 4 | 4 | 01010-61025 | BOLT | TO MOUNT AIR DRYER TO BRACKET |
| 6, Figure 4 | 4 | 01643-31032 | WASHER | TO MOUNT AIR DRYER TO BRACKET |
| 7, Figure 4 | 2 | PC0778 | AIR DRYER DESICCANT | MOUNTED ON ROPS |
| 8, Figure 4 | 1 | 427-W90-420 | FITTING ELBOW | AIR SYSTEM OUTLET-AIR DRYER |
| 9, Figure 4 | 1 | VC6036 | REDUCER BUSHING | AIR SYSTEM OUTLET-AIR DRYER |
| 10, Figure 4 | 2 | E2577 | TEE | AIR SYS. OUTLET/COMP. INLET-AIR DRYER |
| 11, Figure 4 | 2 | WB0362 | FITTING, ADAPTOR | AIR DRYER OUTLET TO AIR SYSTEM |
| 12, Figure 4 | 2 | WB0468 | FITTING, ADAPTOR | AIR SYSTEM OUTLET-AIR DRYER |
| 13, Figure 4 | 1 | HA6165 | HOSE | COMP. INLET TO COMP. INLET-AIR DRYER |
| 14, Figure 4 | 1 | HA0718 | HOSE | GOV. INLET-AIR DRYER TO GOV. INLET-AIR DRYER |
| 15, Figure 4 | 1 | HA6377 | HOSE | AIR SYS. OUTLET TO AIR SYS. OUTLET-AIR DRYER |
| 16, Figure 4 | 2 | WB0347 | FITTING TEE | GOVERNOR INLET-AIR DRYER |
| 17, Figure 4 | 2 | R1395 | PIPE COUPLING | GOVERNOR INLET-AIR DRYER |
| 18, Figure 4 | 1 | 07102-20225 | HOSE | GOV. INLET-AIR DRYER TO GOV. EXPANSION TANK |
| 19, Figure 4 | 1 | 427-W90-1420 | FITTING ELBOW | GOVERNOR INLET-AIR DRYER |
| 1, Figure 5 | 4 | WA4649 | CLAMP | EXPANSION TANK DRAIN HOSE CLAMP |
| 2, Figure 5 | 4 | 01643-31232 | WASHER | EXPANSION TANK DRAIN HOSE CLAMP |
| 3, Figure 5 | 4 | 01010-81016 | BOLT | EXPANSION TANK DRAIN HOSE CLAMP |
| 4, Figure 5 | 1 | HA1416 | HOSE | EXPANSION TANK DRAIN |
| 5, Figure 5 | 1 | WB1106 | FITTING-FEMALE | EXPANSION TANK DRAIN |
| 6, Figure 5 | 1 | 561-35-62830 | JOINT | EXPANSION TANK DRAIN |
| 7, Figure 5 | 1 | 23S-4[illegible]-11330 | DRAIN VALVE | EXPANSION TANK DRAIN |
| 8, Figure 5 | 1 | 5[illegible]5-4[illegible]11460 | CHAIN | EXPANSION TANK DRAIN |
| 1, Figure 6 | 1 | HA[illegible]16 | HOSE | PURGE TANK OUTLET-AIR DRYER TO PURGE TANK |
| 2, Figure 6 | 1 | HA7763 | HOSE | PURGE TANK OUTLET-AIR DRYER TO PURGE TANK |
| 3, Figure 6 | 20 | 01571-01218 | CAPSCREW | MOUNTING HOSES |
| 4, Figure 6 | 20 | 01010-31216 | SEAT | MOUNTING HOSES |
| 5, Figure 6 | 20 | 01643-31445 | FLAT WASHER | MOUNT HOSES |
| 6, Figure 6 | 10 | TG2562 | CLAMP | MOUNT HOSES |
| 7, Figure 6 | 2 | WB0461 | STRAIGHT ADAPTOR | PURGE TANK INLET |
| 8, Figure 6 | 1 | 427-W90-A350 | HOSE | COMP. INLET-AIR DRYER TO EXPANSION TANK |
| 9, Figure 6 | 4 | 428-35-11170 | HOSE | REUSE EXISTING HOSE |
| 10, Figure 6 | 10 | TG2568 | CLAMP | MOUNT HOSES |

| | | | | |
|---|---|---|---|---|
| 11, Figure 6 | 1 | 427-W90-A371 | HOSE | AIR DRYER CHECK VALVE TO WET TANK SUPPLY |
| 1, Figure 7 | 22 | 01643-31032 | WASHER | VARIOUS LOCATIONS |
| 2, Figure 7 | 4 | TC1233 | NUT | MOUNT PURGE TANK |
| 3, Figure 7 | 2 | EG6207 | PURGE TANK | MOUNTED NEXT TO EXPANSION TANK |
| 4, Figure 7 | 6 | C5770 | PLUG | PURGE TANK |
| 5, Figure 7 | **2** | WB0461 | STRAIGHT ADAPTOR | PURGE TANK INLET |
| 6, Figure 7 | 1 | 566-35-42350 | SAFETY VALVE | EXPANSION TANK SIDE |
| 7, Figure 7 | 1 | 07326-10402 | FITTING ADAPTOR | EXPANSION TANK SIDE |
| 8, Figure 7 | 1 | 07323-30400 | FITTING ELBOW | EXPANSION TANK SIDE |
| 9, Figure 7 | 1 | 566-35-42690 | EXPANSION TANK | REAR FRAME-INSIDE |
| 10, Figure 7 | 2 | 566-35-14410 | FITTING ADAPTOR | EXPANSION TANK-TOP AND END |
| 11, Figure 7 | 2 | 07042-00415 | PLUG | EXPANSION TANK |
| 12, Figure 7 | 1 | 427-35-A1120 | HOSE | EXPANSION TANK TO AIR DRYER |
| 13, Figure 7 | 1 | 07822-00402 | TUBE | JOINT TO GOVERNOR-EXPANSION TANK |
| 14, Figure 7 | 1 | 427-W90-A330 | HOSE | GOV. EXP. TANK TO GOV. INLET AIR DRYER |
| 15, Figure 7 | 1 | 427-W90-A320 | HOSE | AIR COMPRESSOR TO EXPANSION TANK |
| 16, Figure 7 | 1 | 427-35-12660 | HOSE | REUSE EXISTING HOSE |
| 17, Figure 7 | 1 | 427-W90-A430 | HOSE | SHUTTLE VALVE TO AIR COMPRESSOR |
| 18, Figure 7 | 1 | 427-W90-A150 | BRACKET | FOR EXPANSION TANK |
| 19, Figure 7 | 12 | 01010-81230 | BOLT | MOUNT EXPANSION TANK AND MOUNT SURGE TANK |
| 20, Figure 7 | 12 | 01643-31238 | WASHER | MOUNT EXPANSION TANK AND MOUNT SURGE TANK |
| 21, Figure 7 | 1 | 07238-10315 | CONNECTOR | SHUTTLE VALVE AT EXP. TANK |
| 22, Figure 7 | 4 | TG9225 | LOCKNUT | MOUNT EXPANSION TANK TO BRACKET |
| 23, Figure 7 | 4 | WA0720 | FLAT WASHER | MOUNT EXPANSION TANK TO BRACKET |
| 24, Figure 7 | 1 | 427-W90-A310 | BRACKET | MOUNT NEXT TO EXPANSION TANK |
| 25, Figure 7 | 8 | 01643-31230 | WASHER | EXPANSION TANK DRAIN HOSE CLAMP |
| 26, Figure 7 | 4 | 01571-01016 | SEAT | EXPANSION TANK DRAIN HOSE CLAMP |
| 27, Figure 7 | 1 | 07102-20304 | HOSE | SHUTTLE VALVE TO GOV. AT EXP. TANK |
| 28, Figure 7 | 1 | 208-72[illegible]7210 | ELBOW | SHUTTLE VALVE AT EXP. TANK |
| 29, Figure 7 | 1 | [illegible]324-[illegible]0300 | TEE | SHUTTLE VALVE OUTLET |
| 30, Figure 7 | [illegible] | [illegible]2W-[illegible]2-17710 | NIPPLE | SHUTTLE VALVE OUTLET |
| 31, Figure [illegible] | [illegible] | 195-78-22570 | ELBOW | GOV. EXPANSION TANK BRACKET |
| 32, Figure 7 | 2 | EG2565 | U-BOLT | ASSEMBLE EXPANSION TANK |
| 33, Figure 7 | 1 | HA7763 | HOSE | PURGE TANK OUTLET - AIR DRYER TO PURGE TANK |
| 1, Figure 8 | 2 | WB0261 | 90 DEGREE FITTING | PURGE TANK OUTLET & AIR SYSTEM OUTLET DRYER |
| 2, Figure 8 | 2 | DD3535 | LONG NIPPLE | COMP. INLET AIR DRYER |
| 3, Figure 8 | 1 | 566-35-6A110 | JOINT | EXPANSION TANK-SIDE |
| 4, Figure 8 | 1 | 07043-70312 | PLUG | JOINT-EXPANSION TANK-SIDE |
| 5, Figure 8 | 1 | 07043-70211 | PLUG | JOINT-EXPANSION TANK-SIDE |
| 6, Figure 8 | 1 | 07834-00413 | FITTING ELBOW | EXPANSION TANK SIDE |

| | | | | |
|---|---|---|---|---|
| 7, Figure 8 | 2 | MM0070 | CAPSCREW | GOVERNOR-EXPANSION TANK |
| 8, Figure 8 | 2 | 01643-30823 | WASHER | GOVERNOR-EXPANSION TANK |
| 9, Figure 8 | 1 | 07834-00410 | ELBOW | GOVERNOR-EXPANSION TANK |
| 10, Figure 8 | 3 | 07831-00411 | SLEEVE | GOVERNOR-EXPANSION TANK |
| 11, Figure 8 | 1 | 07832-00410 | NUT | GOVERNOR-EXPANSION TANK |
| 12, Figure 8 | 1 | EH9534 | GOVERNOR ASSY. | MOUNTED BELOW EXPANSION TANK |
| 13, Figure 8 | 1 | WB1106 | FITTING ADAPTOR | EXPANSION TANK LOWER |
| 14, Figure 8 | 10 | TG2568 | CLAMP | MOUNT HOSES |
| 15, Figure 8 | 4 | 01010-81016 | BOLT | EXPANSION TANK DRAIN HOSE CLAMP |
| 16, Figure 8 | 22 | 01643-31032 | WASHER | VARIOUS LOCATIONS |
| 17, Figure 8 | 1 | 427-W90-A280 | ADAPTOR CONV. | GOV. INLET-AIR DRYER |
| 18, Figure 8 | 1 | 427-W90-1420 | FITTING ELBOW | COMP. INLET-AIR DRYER |
| 19, Figure 8 | 1 | 569-35-61120 | VALVE, CHECK DOUBLE | ASSEMBLED TO EXP. TANK BRACKET |
| 20, Figure 8 | 2 | 01010-80612 | BOLT | ASSEMBLE VALVE TO EXP. TANK BRACKET |
| 21, Figure 8 | 2 | 01643-30623 | WASHER | ASSEMBLE VALVE TO EXP. TANK BRACKET |
| 22, Figure 8 | 1 | 07238-10208 | CONNECTOR | ENGINE AIR COMPRESSOR |
| 23, Figure 8 | 1 | 07324-80100 | COUPLING | ENGINE AIR COMPRESSOR |
| 24, Figure 8 | 1 | 07325-10100 | NIPPLE | ENGINE AIR COMPRESSOR |
| 25, Figure 8 | 1 | 427-35-12320 | TUBE | ENGINE AIR COMPRESSOR |
| 26, Figure 8 | 1 | 421-09-12540 | ELBOW | ENGINE AIR COMPRESSOR |
| Figure 9 | 1 | 427-W90-1331 | WIRING HARNESS | REWORK (SEE Figure 9) |
| 1, Figure 10 | 1 | 08022-14003 | TERM (MALE) | SEE Figure 10 |
| 2, Figure 10 | 2 | 08021-10400 | TERM (FEMALE) | SEE Figure 10 |

## INSTALLATION OF PARTS

1. Weld mounting seats (3, Figure 4).
2. Cut out 70 x 140mm notch in L.H. Deck plate (Figure 4) to allow piping installation.
3. Remove the existing Air Dryer from the current location and discard. Mount new Air Dryer to the L.H. ROPS post (Figure 4).
4. Mount new bracket (4, Figure 4) to ROPS post using capscrews and washers.
5. Install Air Dryer (7, Figure 4) to bracket using capscrews, washers, and nuts.
6. Install Expansion Tank Bracket using capscrews and washers to mounting pads where the previous Air Dryer was formerly mounted.
7. Install Expansion Tank to bracket using U-bolts, washers, and nuts (Figure 6).
8. Install Purge Tank Bracket in new location next to Expansion Tank using capscrews and washers (Figure 6).
9. See page 22 for GOVERNOR TESTING & ADJUSTING.

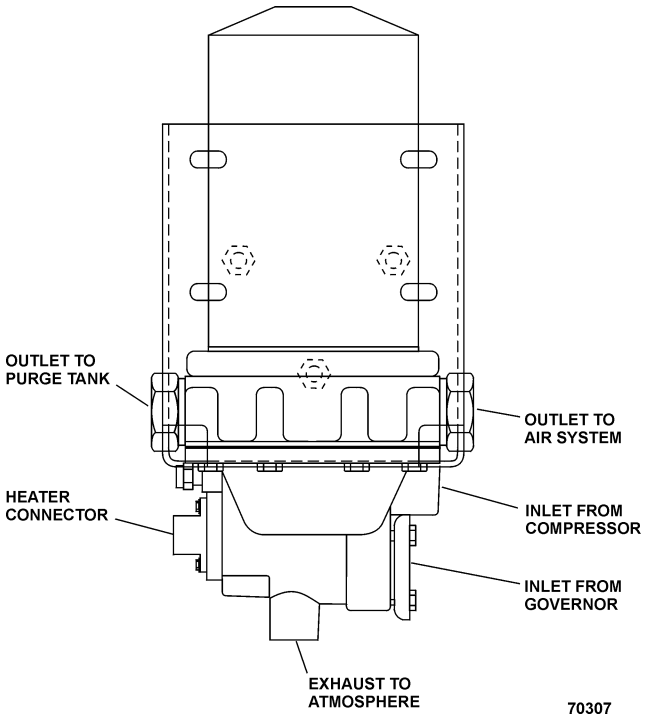


Figure 3. Air Dryer Desiccant

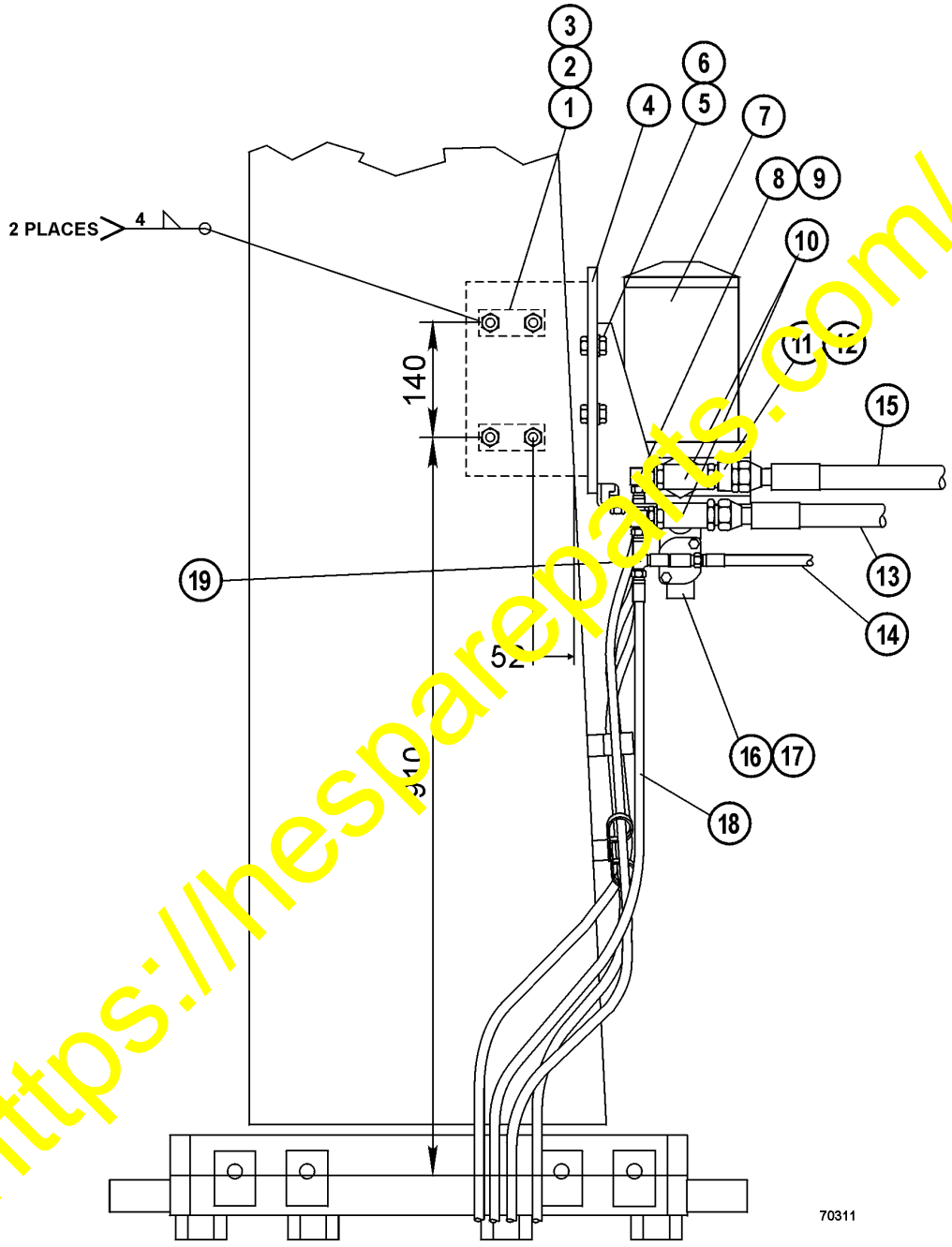


Figure 4. Air Piping - Upper L.H. ROPS

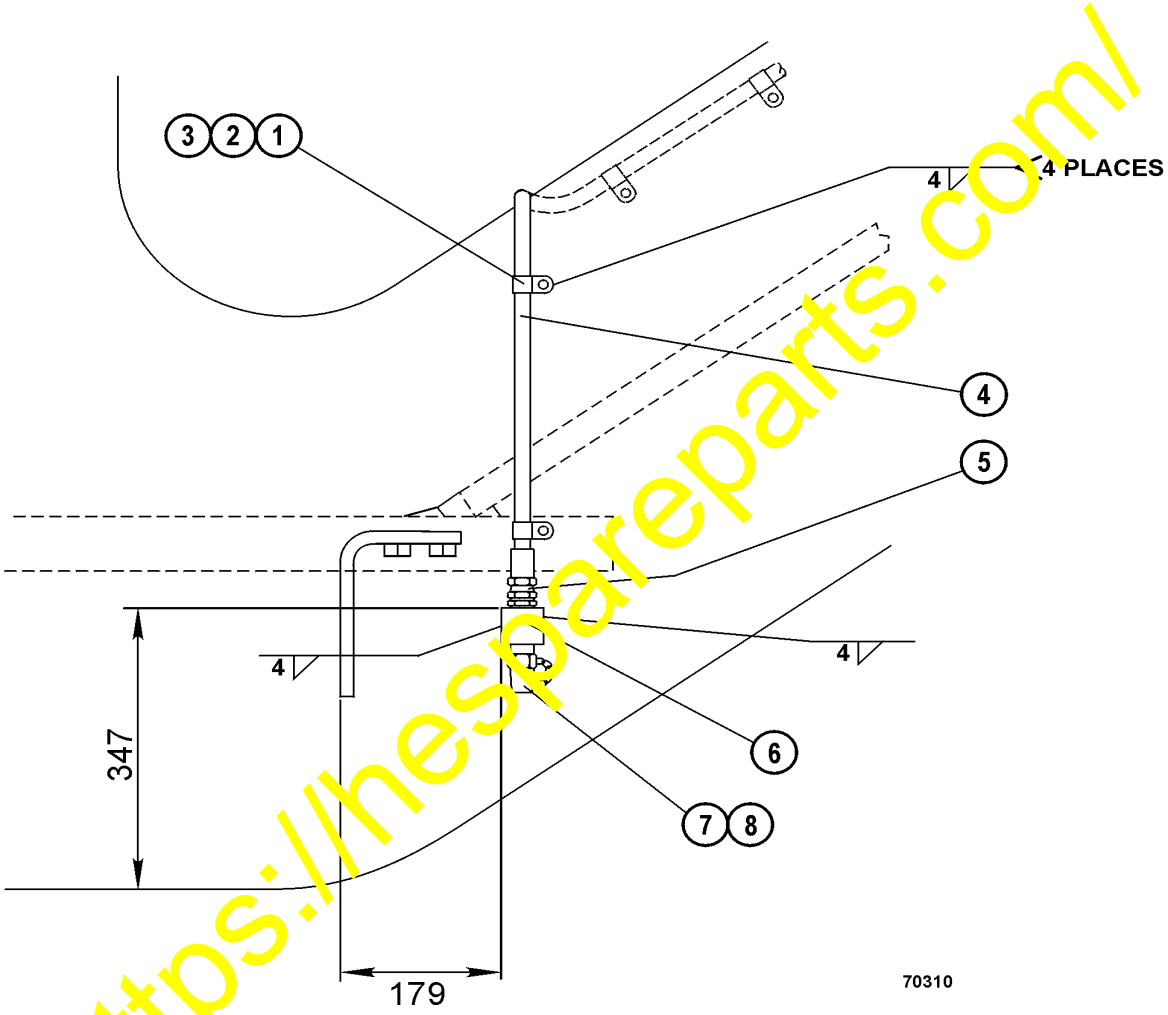


Figure 5. Rear Frame Air Dryer Piping (Lower)

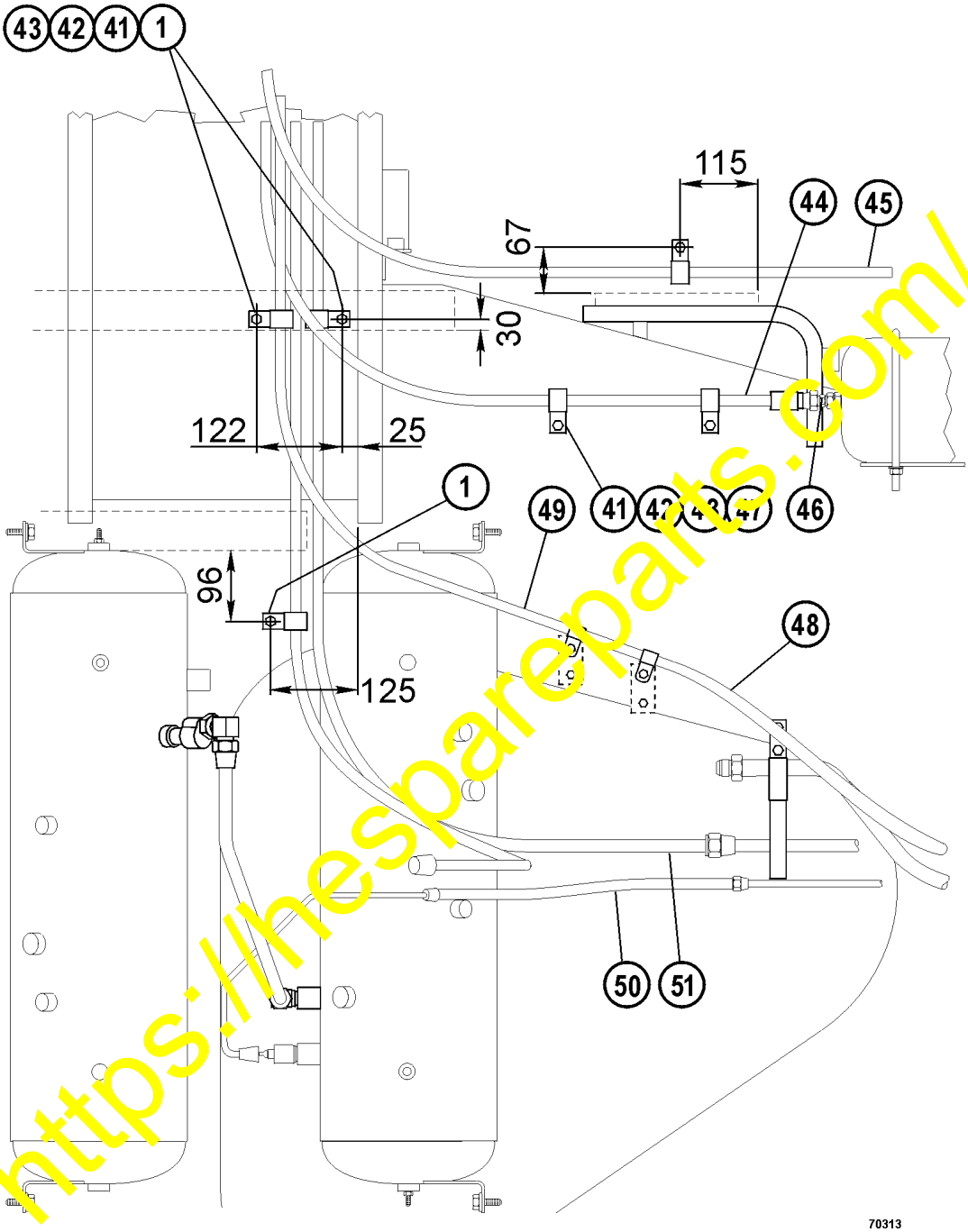




Figure 6. Rear Frame Air Dryer Piping (Front)

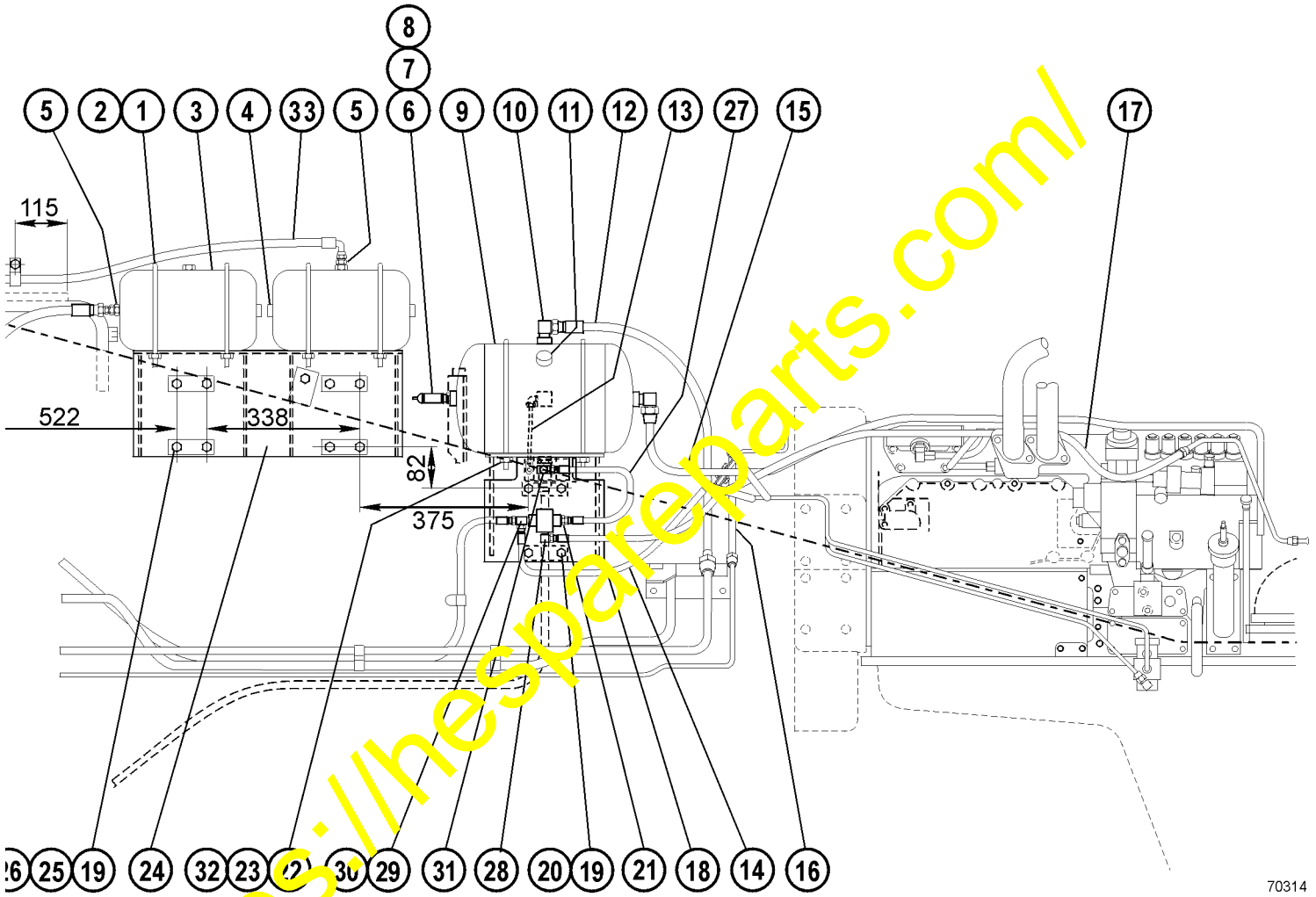


Figure 7. Rear Frame Air Dryer Piping

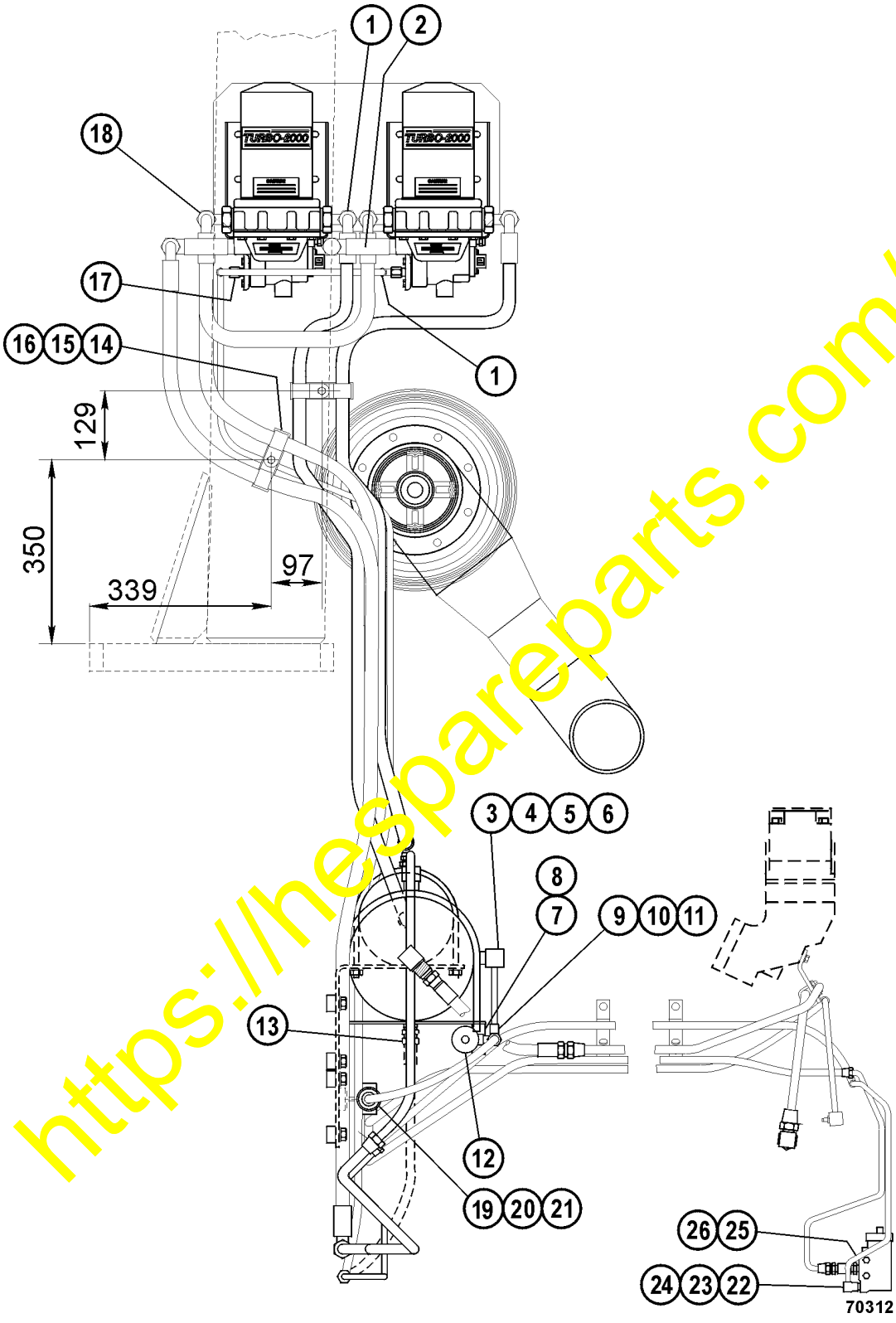


Figure 8. Air Piping (Rear)

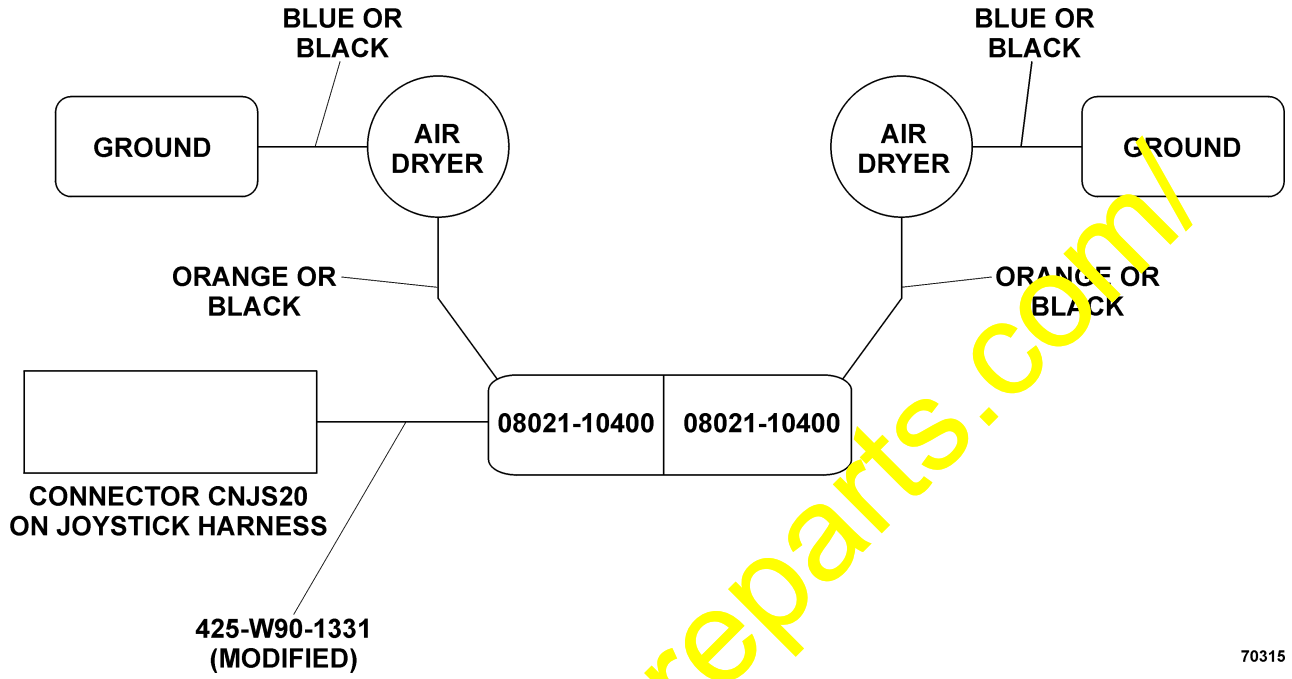


Figure 9. Air Dryer Electrical Schematic

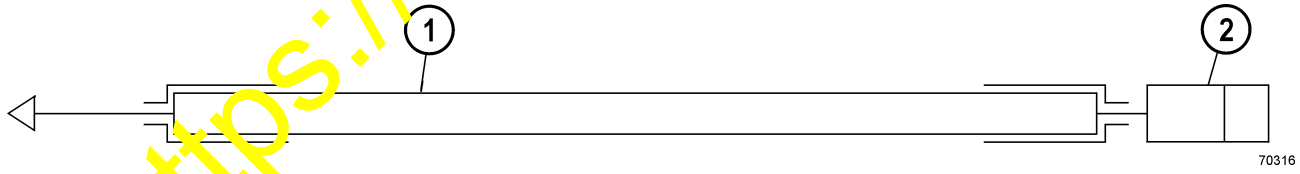


Figure 10. Air Dryer Harness Modifications

1. Existing Harness (425-W90-1331) 2. Connector (08022-14001)

*NOTE: Remove connector (2, Figure 10) and install connector (08022-14003) supplied in kit.*

## AIR DRYER

The air dryer is a desiccant type dryer. The wheel loader uses two air dryer units, mounted behind the operator cab.

The air dryer (1, Figure 11) receives hot compressed air from the expansion tank (6), which it cools, dries and filters before sending it to the wet tank (3) located on the right hand deck. This reduces the build up of dirt and moisture in the vehicle air system. The system incorporates separate, isolated purge tanks (2).

The air dryers consist of a housing (light weight aluminum and steel construction) and a spin-off cartridge. Below the cartridge are five ports; the inlet port B receives compressed air from the expansion tank (6). The outlet port A directs clean/dry air to the wet tank (3) and truck air system. The purge port D contains a bleed valve directing air to and from the isolated purge tank. The unloader port C contains an unloader valve that receives a signal from the primary governor. The exhaust port E expels accumulated moisture and contaminants.

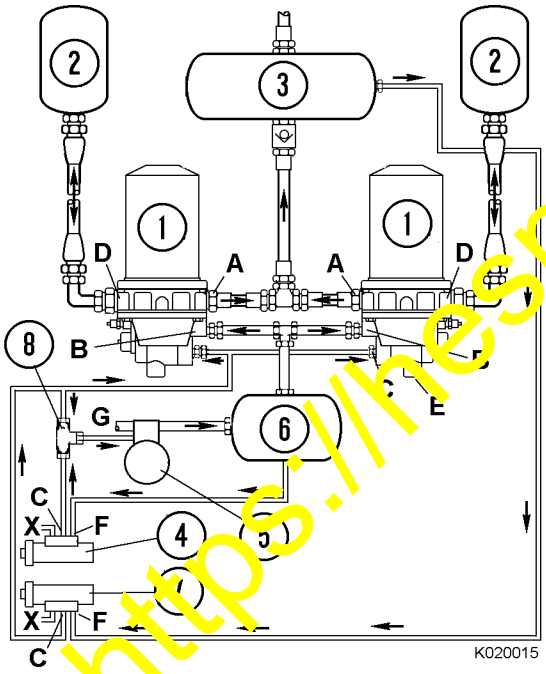


FIGURE 11. AIR DRYER DIAGRAM

### COMPONENTS

1. Air Dryer
2. Purge Tank
3. Wet Tank
4. Secondary Governor
5. Air Compressor
6. Expansion Tank
7. Primary Governor
8. Shuttle Valve

### PORTS

A: Outlet/Check Valve
B: Inlet Port
C: Unloader Port
D: Purge Tank Port
E: Dryer Exhaust
F: Governor Inlet Port
G: Compressor Air Inlet
X: Governor Exhaust

## OPERATION

Refer to Figure 12 and 13 for diagrams of the air dryer and related components during the air system charging cycle and the unload and purge cycle.

Note: Only one air dryer is shown in the illustrations. Operation is identical for both.

### Charging Cycle

Hot, compressed air enters each air dryer (14, Figure 12) through the inlet port B. As the hot air enters the dryer, the air expands, oil and water vapor condense, and accumulate in the sump. The air passes through three filters and a cloth bag that remove carbon and other contaminates. Vapor is absorbed by the desiccant as air travels through the desiccant bed housed in the cartridge. The clean, dry air is then directed out port A to the wet tank (10) and the vehicle air system and simultaneously to the purge tank (1) through the purge port D.

### Purge Cycle

When air pressure in the wet tank (10, Figure 13) reaches 8.3 kg/cm2 (118 psi), (primary governor ©cut-out[a] pressure) air from governor port C flows to the shuttle valve (9) and to the compressor (8), signalling it to stop pumping. This same air flows into the air dryer unloader valve (3), opening exhaust port E.

This action causes a sudden discharge of air through the exhaust port E of the dryer. The filtered, dried purge air, which has accumulated in the isolated purge tank (1), slowly bleeds back through the air dryer. This action regenerates desiccant, cleans filters and expels the contaminants out the exhaust port E and completes the regeneration cycle.

### Stand-by Mode

When the air system drops to the primary governor regulated cut-in[a] pressure, 7.6 kg/cm2 (108 psi), the air dryer unloader valve (3) closes as the unloader line pressure evacuates through the exhaust port X of the governor. The compressor is signaled to load and resume pumping.

### Secondary Governor

The secondary governor will not signal the compressor to unload during normal operation. However, if a blockage occurs in the line between the expansion tank, air dryers, and the wet tank, such as an air dryer element that needs to be replaced, expansion tank pressure may increase to 9.0 kg/cm2 (128 psi) and the secondary governor will provide the signal to turn the compressor off.

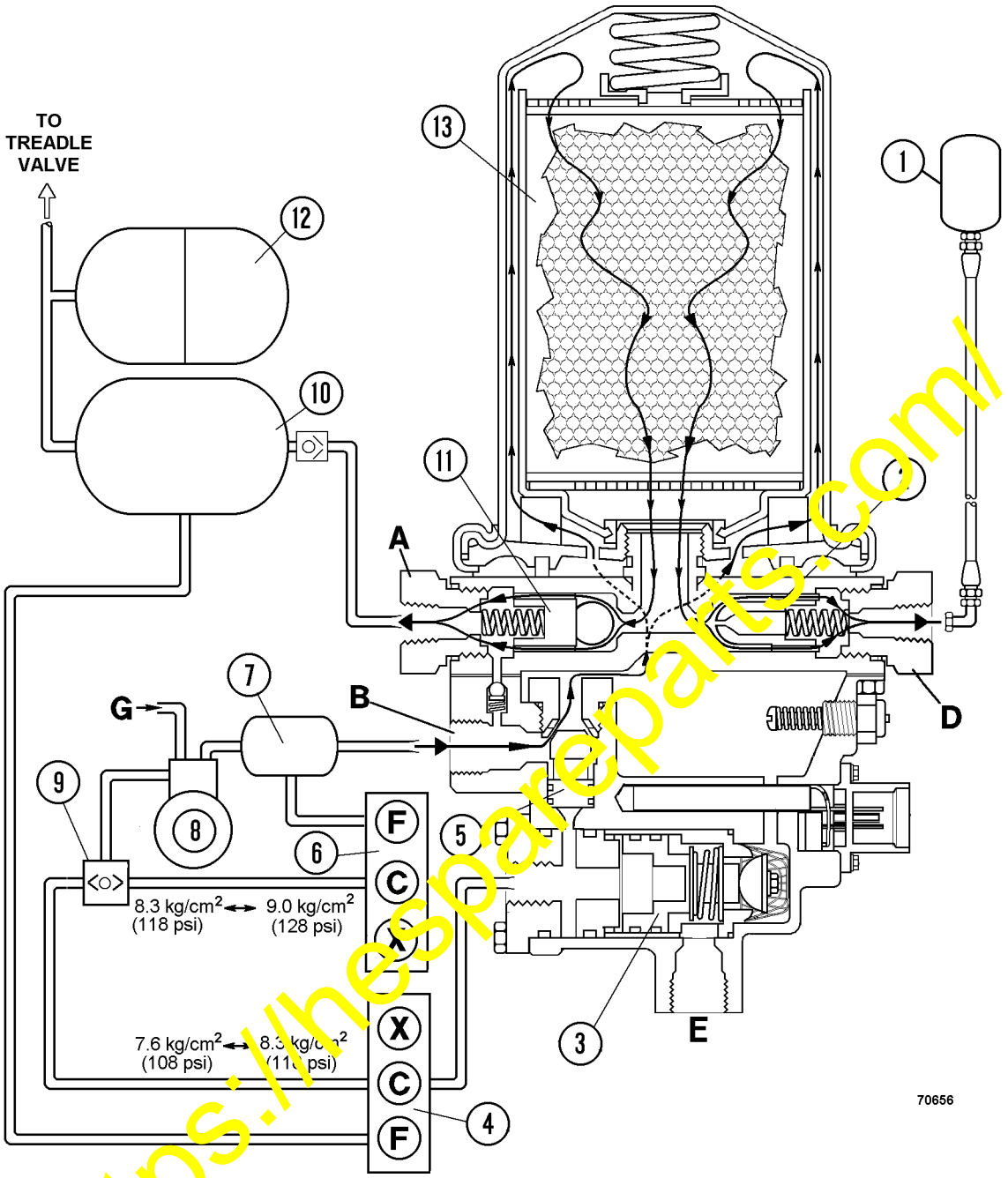


FIGURE 12. CHARGE CYCLE

**COMPONENTS**

1. Purge Tank
2. Bleed Valve
3. Unloader Valve
4. Primary Air Governor
5. Turbo Valve
6. Secondary Air Governor
7. Expansion Tank
8. Air Comporessor
9. Shuttle Valve
10. Wet Tank
11. Check Valve
12. Dry Tank
13. Air Dryer

**PORTS**

A: Check Valve
B: Dryer Intake
C: Unloader
D: Purge Tank
E: Dryer Exhaust
F: Governor Air Supply
G: Compressor Air Intak
X: Governor Exhaust

Refer to Figure 14 for Valve Locations:

VALVES OPEN- Ball Check Valve (5); Unloader Valve (9)

VALVES CLOSED- Check Valve (2); Bleed Valve (13); Turbo Valve (7)

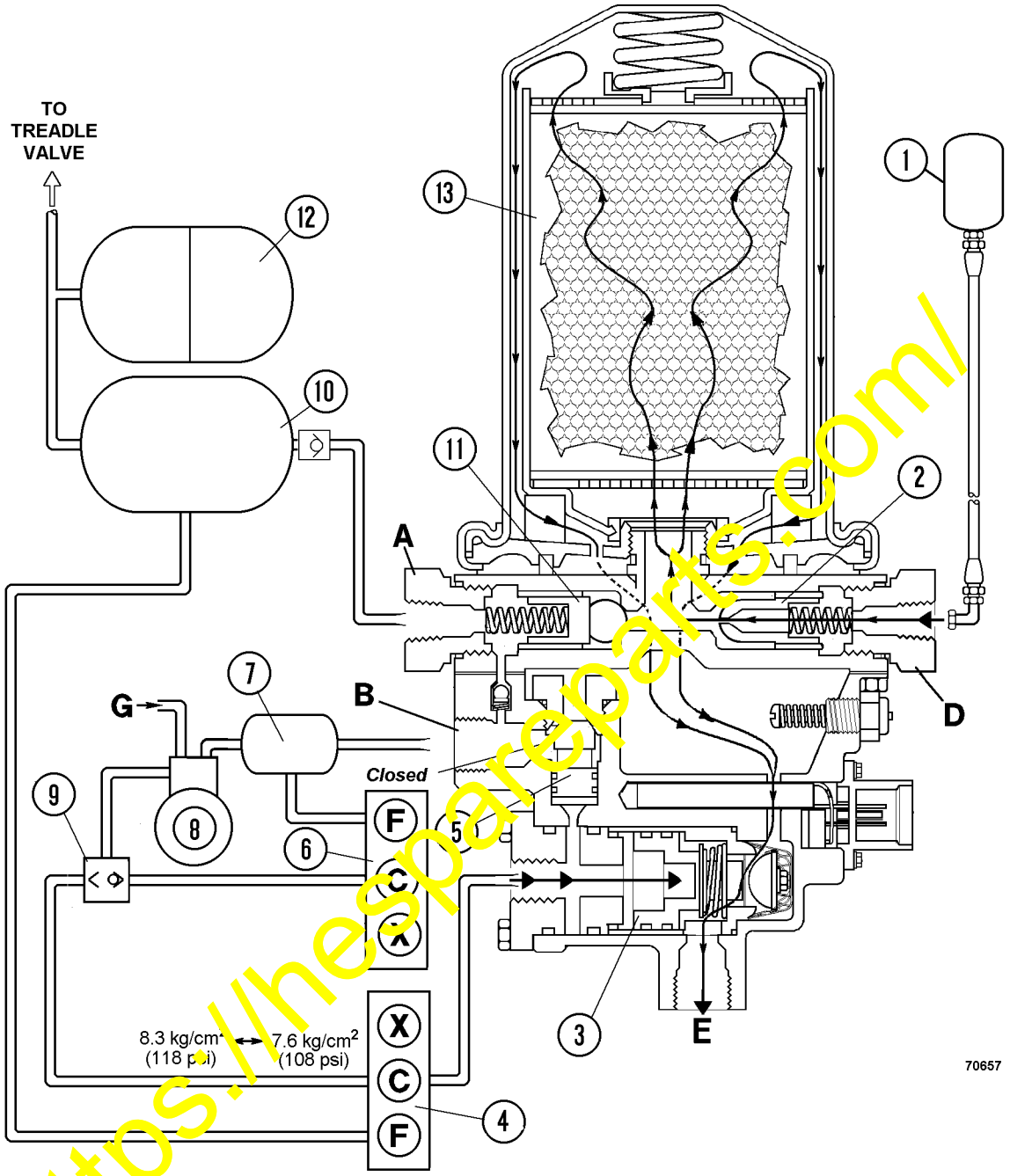


FIGURE 13. UNLOAD/PURGE CYCLE

**COMPONENTS**

1. Purge Tank
2. Bleed Valve
3. Unloader Valve
4. Primary Air Governor
5. Turbo Valve
6. Secondary Air Governor
7. Expansion Tank
8. Air Comporessor
9. Shuttle Valve
10. Wet Tank
11. Check Valve
12. Dry Tank
13. Air Dryer

**PORTS**

A: Check Valve
B: Dryer Intake
C: Unloader
D: Purge Tank
E: Dryer Exhaust
F: Governor Air Supply
G: Compressor Air Intake
X: Governor Exhaust

Refer to Figure 14 for Valve Locations:

VALVES OPEN- Ball Check Valve (5); Unloader Valve (9)

VALVES CLOSED- Check Valve (2); Bleed Valve (13); Turbo Valve (7)

## General Precautions

Whenever working on or near air systems and components, always observe the following:

1. If the vehicle is equipped with an air-actuated brake system, the vehicle's wheels must be chocked. Block the wheels and make sure the vehicle will not roll, before releasing the brakes and before performing any test and/or isolating the air dryer.

2. Stop the engine when working under a vehicle.

3. Never connect or disconnect a hose or line containing air pressure. Never remove a component or a pipe plug unless you are certain all system air pressure has been exhausted.

4. Always wear safety glasses when working with air pressure. Never look directly into air dryer ports.

5. Never exceed recommended working air pressure.

6. Never attempt to disassemble an air dryer until you have read and understood all recommended procedures. Use only proper tools and observe all precautions pertaining to the use of those tools.

## Removal

1. Drain the air system.

2. Disconnect heater wiring.

3. Mark the air lines for later reference and disconnect from the air dryer.

4. Remove the lock nuts, washers, and capscrews that attach the air dryer to the vehicle.

## Installation

1. Position the air dryer. Install the capscrews, washers, and lock nuts.
   Tighten capscrews to 37 ft. lb (80 N.m) torque.

2. Inspect lines and fittings. Replace any that are damaged.

3. Connect all air lines, taking care to match marked line with appropiate port.

4. Connect the heater wiring.

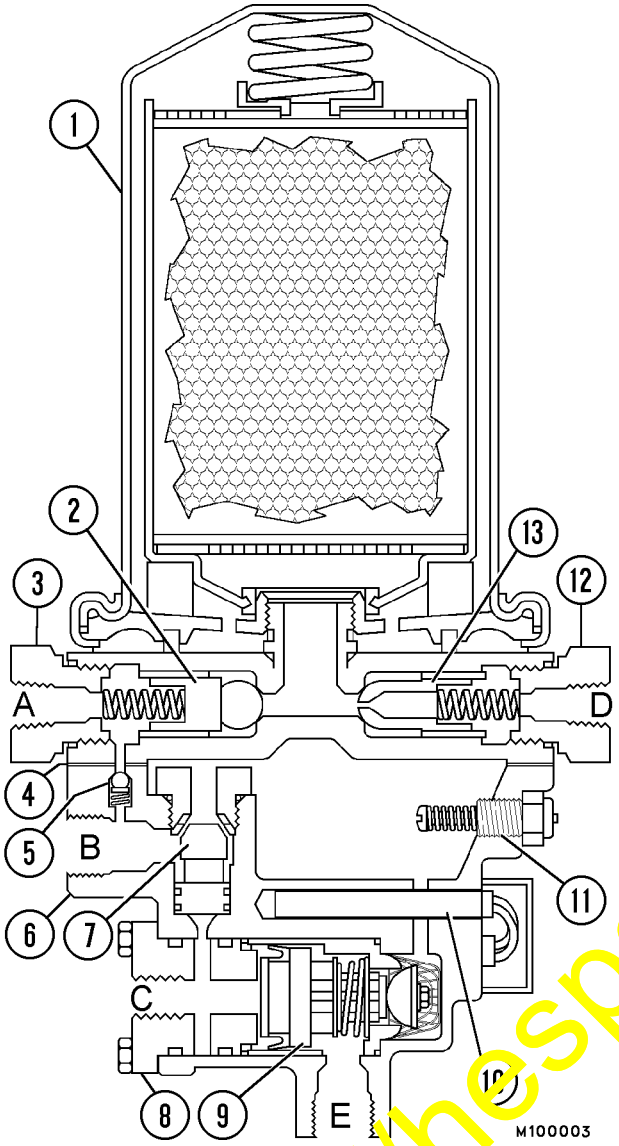


Figure 14. Turbo 2000 Air Dryer

COMPONENTS

1. Desiccant Cartridge
2. Check Valve Kit
3. Check Valve Nut
4. Body Gasket
5. Ball Check Valve
6. Bottom Cap Assembly
7. Turbo Valve
8. Seal Retainer
9. Unloader Valve
10. Heater
11. Safety Valve
12. Bleed Valve Nut
13. Bleed Valve

PORTS

A. Check Valve
B. Intake
C. Unloader
D. Purge Tank
E. Exhaust

## Desiccant Cartridge Service

### Symptoms/Actions

1. Regular service interval.

   1 year/5000 Hours

   *NOTE: The above is a **guideline only**.*
   *Check the tank(s) on regular basis.*
   *If moisture exists, replace cartridge.*

2. Water in tanks.

   Desiccant cartridge requires regular servicing at intervals determined by compressor duty cycle or type of operation, evironment, etc.

## Desiccant Cartridge Replacement

1. Drain the air system.

2. Using a strap wrench, turn the desiccant cartridge (1, Figure 14.) counterclockwise and remove it. Discard cartridge.

3. Remove and discard O-ring from adaptor plate stud.

NOTE: *If there is excessive oil in the check valve port, compressor may require servicing.*

4. Clean top surface of adaptor plate and threaded stud.

5. Using grease supplied with cartridge, apply a light coating on the O-ring. Install O-ring on adaptor stud.

6. Apply a generous coat of grease on the new desiccant cartridge gasket surface.

7. Thread new cartridge onto adaptor stud turning clockwise. When gasket contacts adaptor plate, tighten cartridge ½ Turn only.
   **DO NOT OVER-TIGHTEN**.

## Unloader Valve Service

### Symptons/Actions

1.Dryer won't exhaust.

Start engine and build pressure to just before "cut-out" pressure. Cycle several times. If dryer does not exhaust, replace unloader valve.

2. Air leak at exhaust port during the:
a) Charge Mode;

Start engine and build pressure to just before "cut-out". Stop engine. Apply soap solution at exhaust port or listen for air leak at exhaust port. If a leak is present, replace unloader valve.

3. Pressure slow or no build.

Start engine and build pressure to just before "cut-out". Stop engine. Apply soap solution at exhaust port or listen for air leak at exhaust port. If a leak is present, replace unloader valve.

4. Compressor cycles rapidly.
Remove governor line from UNL port on air dryer. Start engine and build to cut-out pressure. Stop engine. If no air leaks are present, replace unloader valve.

## Unloader Valve Replacement

1. Disconnect the unloader air line.

2. Remove the two fasteners that attach the unloader valve retainer (8, Figure 14). Remove the retainer.

3. Remove the unloader valve assembly (9) from the unloader port and discard.

NOTE: *If there is excessive oil in the unloader port, compressor may require servicing.*

4. Clean the unloader port thoroughly.

5. Remove the three (3) O-Rings from the retainer and discard.

6. Using lubricant supplied with kit, lightly grease the new O-rings.

7. Install on the retainer the two (2) thickest O-rings. Then install the third (thinner) O-ring.

8. Install the new filter screen in the unloader cavity, open end out.

9. Apply a light coating of grease around the O-ring seat on valve assembly. Install the thin O-ring on the unloader valve seat.

10. Aligning the valve exhaust port with the air dryer exhaust port, install the unloader valve assembly. Use care not to dislodge the O-ring from its seat.

*If the air dryer exhaust port and unloader valve exhaust port do not align, air dryer will not unload.*

11. Install retainer.

12. Apply a light coating of grease on the threads of the two retainer bolts.

13. Install the two retainer bolts and tighten to **10-15 ft. lb. (13.56-20.34 N.m)** torque.

14. Reconnect the unloader air line to air dryer unloader port.

## Bleed Valve Service

### Symptom

1. Water in tanks.

2. Slow or no purge

### Operation Check

Start engine and build air pressure allowing dryer to exhaust. Stop engine. After initial exhaust, air should bleed with decreasing intensity out the exhaust port for approximately 45 seconds. If air fails to bleed as described, replace bleed valve kit.

### Bleed Valve Replacement

1. Drain the air system

2. Disconnect the air line at air dryer purge port.

3. Remove bleed valve nut (12, Figure 14).

4. Remove and discard O-ring, spring and spindle.

5. Clean bleed valve nut and cavity area.

6. Position new spindle in the cavity with spring pocket side out. Install spring.

7. Using grease supplied with kit, apply a light coating on O-ring. Install O-ring on nut.

8. Apply light coating of grease on nut threads. Install nut and tighten to 60 ft. lb. (81.35 N.m) torque.

9. Re-connect air line to air dryer purge port.

## Check Valve Service

### Symptom

1. Dryer frequently unloads.
2. Air continually flows from exhaust port when compressor is in standby mode.
3. Wet tank pressure drops rapidly.

NOTE: *The above symptoms could also lead to turbo valve replacement. A malfunctioning turbo valve will tend to allow pressure to drop to "cut-in" pressure within seconds.*

### Operational Check

Disconnect line at purge port and plug. Start engine and build pressure to "cut-out" pressure. Stop engine.
Apply soapy solution around exhaust port.
If soap bubbles exist, replace check valve.

### Check Valve Replacement

1. Drain air system.

2. Disconnect air line from outlet port.

3. Remove check valve nut (3, Figure 14).

4. Remove and discard O-ring, spring, spindle, and ball.

NOTE: *If there is excessive oil in the check valve port, compressor may require servicing.*

5. Clean nut and cavity area.

6. Install new ball in cavity. Next, position spindle with spring pocket facing out. Install spring.

7. Using grease supplied with kit, apply a light coating on O-ring. Install O-ring on nut.

8. Apply a light coating of grease to threads of nut. Install nut and tighten to 60 ft. lb. (81.35 N.m) torque.

9. Re-connect air line to air dryer outlet port.

## Turbo Valve Service

### Symptom

1. Dryer frequently unloads.
2. Air continually flows from exhaust port when compressor is in standby mode.
3. System pressure drops very rapidly.

NOTE: *The above symptoms could also lead to check valve replacement. A malfunctioning turbo valve will tend to allow pressure to drop to cut-in pressure within seconds.*

### Operational Check:

Disconnect line at purge port and plug. Start engine and build pressure to cut-out pressure.
Stop engine.
Apply soapy solution around exhaust port.
If soap bubbles exist, replace turbo valve.

### Turbo Valve Replacement

1. Drain the air system.
2. Disconnect the heater wiring. Disconnect the inlet and unloader lines from their respective ports. Mark lines for later assembly.
3. Remove eight bolts from bottom cap and set aside. Discard gasket.
4. Remove turbo nut, valve stop, and valve (7, Figure 14) and discard.
5. Clean cavity area thoroughly.
6. Lightly coat the two small O-ring surfaces and install on piston. Carefully install valve in cavity with tapered side up.
7. Place valve stop on top of valve concave side down.
8. Lightly lube large O-ring and place on nut. Install flat seal into nut.
9. Install nut and tighten to 50 ft. lb. (68 N.m) torque.
10. Place gasket on bottom cap aligning small hole with small check valve. Locate bottom cap so that inlet port is directly below outlet port. Install the eight bolts set aside during disassembly and tighten to 15-20 ft. lb. (20 -27 N.m) torque.
11. Re-connect inlet and unloader lines as previously marked to air dryer.
12. Re-connect heater wiring.

## Heater Assembly Service

### Symptom

1. Dryer won't exhaust.
2. Exhaust port leaks.
3. Cannot build pressure.

### Operational Checks

Thermostat must be cooled to at least 35° F (2°C) to check.

1. Connect an ohmmeter across the heater electrical terminals. The reading should show a closed circuit.

2. If the reading shows an open circuit, replace heater assembly.

### Heater Assembly Replacement

1. Disconnect heater leads.
2. Remove the two screws from heater cover.
3. Remove heater/thermostat assembly (10, Figure 14) and discard.
4. Thoroughly clean entire area.
5. Apply a light coating of anti-seize to the heater element and to the thermostat cavity only. Do not apply this compound to screws.
6. Install new heater. Twist slightly to spread anti-seize. Install new set screw until snug. Set screw will protrude from bottom cap about 0.125 inch (3.18 mm). **DO NOT OVER-TIGHTEN**.
7. Install new thermostat. Coil wires around heater cover posts allowing wires to protrude through slots. Place the two #6-32 x 1.125 inches (2.86 cm) screws in heater cover and attach the thermostat.
8. Fill heater cover with non-corrosive RTV.
9. Connect blue heater wire to a good chassis ground.
10. Connect orange wire to ignition switch.
11. Seal and route heater wires carefully.

## GOVERNOR TESTING AND ADJUSTING

1. After installation of the parts has been completed, ensure that there are no leaks in the air system, and the governors are working properly. Run the engine and check the cycling pressures of the governors. Adjust if necessary. Refer to the table below for the proper governor specifications.
2. Connect an air supply of 130 psi (9.1 kg/cm²) to the supply port on the governor. The supply port is stamped "RES". The thread size of the port is 1/8 PT.
3. Install a 0-200 psi. pressure gauge in the unloader port. The unloader port is the center port and is stamped "UNL". Thread size of the port is 1/8 PT.
4. Remove the rubber cover located on top of the governor.
5. Loosen the locknut on the setscrew.
6. Turn on the air supply and observe the gauge.
7. Increase the pressure until a sudden pressure jump appears on the gauge. This is the current cut-out pressure.
8. Decrease the pressure until the gauge suddenly drops back to 0 psi. This is the cut-in pressure.
9. Rotate the screw on top of the governor to adjust the pressure. Turn the screw clockwise to decrease the pressure. Turn the screw counter-clockwise to increase the pressure. One turn is approximately equal to 16 psi (1.1 kg/cm²).
10. Check the pressure after adjusting the screw. If the cut-out pressure is not within the specifications, bleed off the supply pressure, and rotate the screw accordingly. Repeat this step until the proper specification is attained.
11. After the screw has been set to the proper pressure, repeat steps 15 and 16 several times to ensure the pressures are constant. Adjust as necessary.
12. Apply Loctite to the bottom face of the locknut, and tighten the nut. Install the rubber cover.

**GOVERNOR SPECIFICATIONS**

| GOVERNOR | LOCATION | CUT - IN PRESSURE | CUT-OUT PRESSURE |
|---|---|---|---|
| Primary | Lower RH side of engine | 108 ± 4 psi (7.6 ± 0.3 kg/cm²) | 118 ± 4 psi (8.3 ± 0.3 kg/cm²) |
| Secondary | LH side of rear engine frame under expanstion tank | 118 ± 4 psi (8.3 ± 0.3 kg/cm²) | 128 ± 4 psi (9.0 ± 0.3 kg/cm²) |

# AIR DRYER TROUBLESHOOTING

**Problem:** Air continually exhausts from the exhaust port when the compressor is in the standby mode.

| Possible Cause | Remedy |
|---|---|
| The air dryer check valve is worn. | Clean cavity. Replace check valve assembly. |
| Turbo valve is damaged or worn. | Clean cavity. Replace turbo valve assembly. |
| The air dryer unloader valve seal is worn. | Clean cavity. Replace unloader valve assembly. |

**Problem:** System air pressure drops rapidly.

| Possible Cause | Remedy |
|---|---|
| Fittings are loose or damaged. | Tighten and/or replace as necessary. |
| Air reservoir, tubing, or hoses are damaged. | Repair or replace as necessary. |
| The air dryer check valve is worn. | Clean cavity. Replace check valve assembly. |
| Turbo valve is leaking. | Clean cavity. Replace turbo valve assembly. |
| The air dryer unloader valve seal is worn. | Clean cavity. Replace unloader valve assembly. |

**Problem:** The air compressor goes into the standby mode but cycles rapidly.

| Possible Cause | Remedy |
|---|---|
| Fittings are loose or damaged. | Tighten and/or replace as necessary. |
| Air reservoir, tubing, or hoses are damaged. | Repair or replace as necessary. |
| The air dryer check valve is worn. | Clean cavity. Replace check valve assembly. |
| Turbo valve is worn. | Clean cavity. Replace turbo valve assembly. |
| Air governor malfunctioning. | Replace governor valve. |
| The air dryer unloader valve seal is worn. | Clean cavity. Replace unloader valve assembly. |

**Problem:** Air flows from the exhaust port when the air compressor is trying to build up pressure.

| Possible Cause | Remedy |
|---|---|
| The unloader valve is worn. | Clean cavity. Replace unloader valve assembly. |
| Dirt/foreign material is stuck in unloader valve. | Clean cavity. Replace unloader valve assembly. |
| Air governor malfunctioning. | Replace governor valve. |
| Heater assembly malfunctioning. (32°F). | Replace heater assembly. |

# AIR DRYER TROUBLESHOOTING (Continued)

**Problem:** The air compressor runs continuously (system pressure will not build).

| Possible Cause | Remedy |
|---|---|
| Fittings are loose or damaged. | Tighten or replace loose or damaged fittings. |
| Air reservoir, tubing, or hoses are damaged. | Repair or replace damaged items. |
| The air compressor needs serviced or replaced. | Rebuild or replace the air compressor. |
| The air dryer unloader valve is worn. | Clean cavity. Replace the unloader valve ass'y. |
| The air compressor capacity too low for vehicle. | Install larger air compressor. |
| Line between governor and air compressor is blocked. | Replace the line or remove the blockage. |
| Air governor malfunctioning. | Replace governor valve. |

**Problem:** The air dryer does not unload when the air compressor goes into standby mode.

| Possible Cause | Remedy |
|---|---|
| The line between the air governor and the air dryer unloader port is missing. | Install or replace the air line, or tighten the fittings. |
| The unloader valve is worn. | Clean cavity. Replace the unloader valve ass'y. |
| Ice has formed in the unloader valve. | Check heater assembly; replace if necessary. |
| The heater is malfunctioning. | Check heater assembly; replace if necessary. |
| The unloader valve sleeve is misaligned. | Align unloader valve sleeve. |

**Problem:** The safety valve opens.

| Possible Cause | Remedy |
|---|---|
| The air dryer check valve is blocked. | Clean cavity. Replace the check valve assembly. |
| The air brake system is blocked down stream from the air dryer. | Remove blockage or replace the necessary components. |
| The air compressor governor valve is malfunctioning. | Replace the compressor air governor valve. |
| The safety valve is malfunctioning | Replace the safety valve. |

# AIR DRYER TROUBLESHOOTING (Continued)

**Problem:** Water accumulation in air system (tanks).

| Possible Cause | Remedy |
|---|---|
| Desiccant is contaminated. | Replace desiccant cartridge. |
| The air compressor capacity too low for vehicle. | Install larger air compressor and replace desiccant cartridge. |
| Bleed valve is malfunctioning. | Clean cavity. Replace bleed valve assembly. |
| The line between the purge tank and the air dryer purge port is missing, leaking, or damaged. | Install or replace the air line, or tighten fittings. |
| Line between the compressor and air dryer too short (Insufficient pre-cool). | Fit new line with a minimum length of 6 ft. (1.83 m) copper line or 12 ft. (3.66 m) of steel braided teflon. |

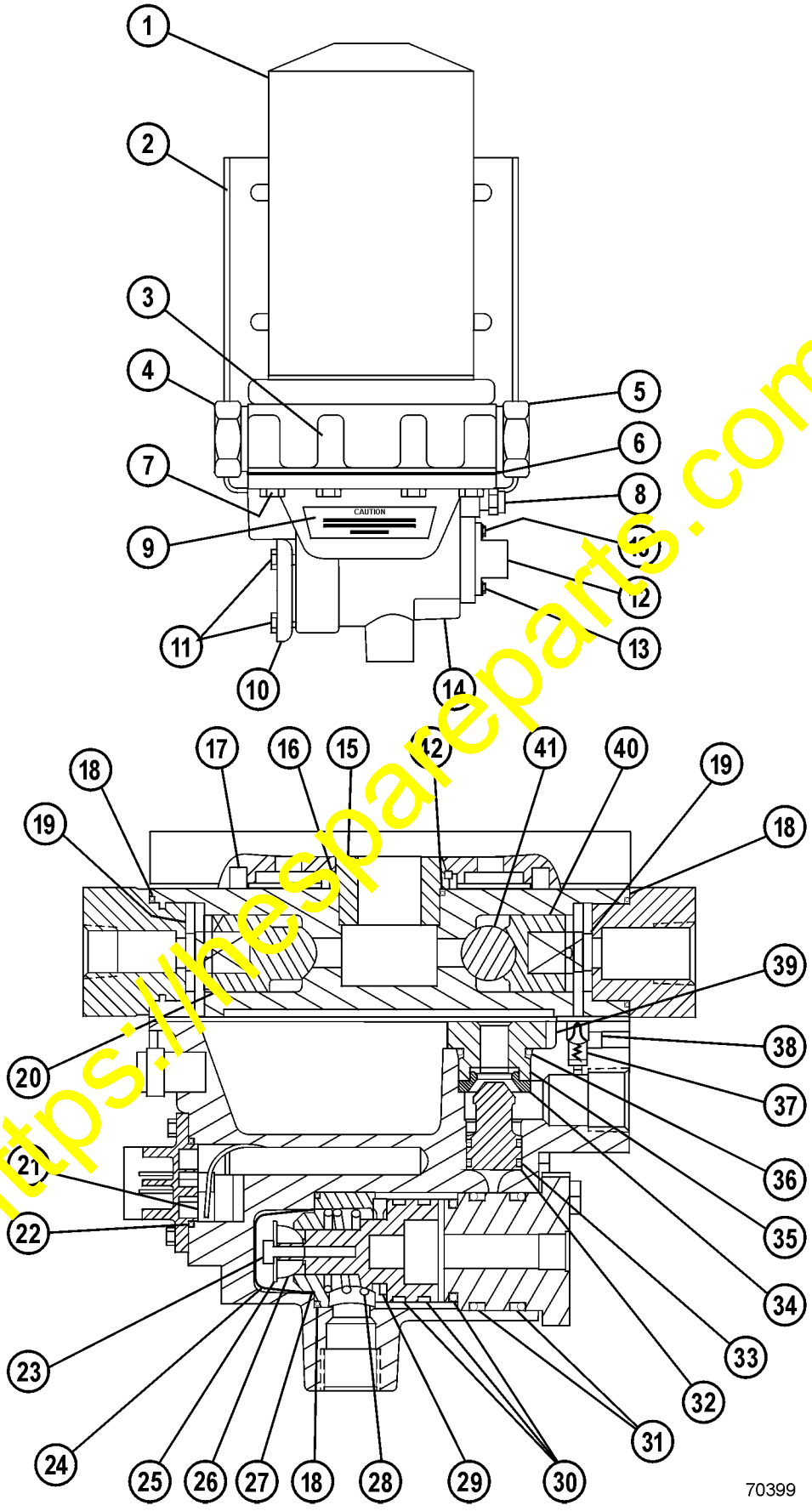


Figure 15. Turbo 2000 Air Dryer Assembly

## TURBO 2000 AIR DRYER ASSEMBLY

| REF NO. | PART NO. | QTY. | DESCRIPTION |
|---|---|---|---|
| 1 | | 1 | CARTRIDGE, DESICCANT (1)/(2) |
| 2 | BF4908 | 1 | BRACKET, MOUNTING |
| 3 | | 1 | PLATE, ADAPTOR (1)/(3) |
| 4 | BF3710 | 1 | NUT, CHECK VALVE |
| 5 | BF3705 | 1 | NUT, BLEED VALVE |
| 6 | VJ8001 | 1 | GASKET |
| 7 | TD0791 | 1 | CAPSCREW - 3/8" - 16NC X 1 1/4" |
| 8 | VS6000 | 1 | VALVE, SAFETY |
| 9 | BF3600 | 1 | LABEL, EXHAUST CAUTION |
| 10 | PC0114 | 1 | RETAINER, SEAL |
| 11 | TR1306 | 2 | CAPSCREW - 1/4" - 20NC X 1" |
| 12 | | 1 | HEATER - 24V, 75W (1)/(4) |
| 13 | | 1 | SCREW - #8 - 32NC X 1/2" (1)/(4) |
| 14 | | 1 | CAP, BOTTOM (1)/(5) |
| 15 | BF3704 | 1 | ADAPTER, CARTRIDGE (3) |
| 16 | BF3709 | 1 | O-RING (2) |
| 17 | | 1 | GASKET (1)/(2) |
| 18 | VD9206 | 3 | O-RING (6) |
| 19 | | 2 | SPRING (2)/(5)/(9) |
| 20 | | 1 | SPINDLE, BLEED VALVE (1)/(9) |
| 21 | | 1 | GUIDE, FOAM (1)/(4) |
| 22 | WA0057 | 1 | O-RING (4) |
| 23 | | 1 | SCREW (1)/(7) |
| 24 | BF3708 | 1 | SCREEN, TRASH (7) |
| 25 | BF3595 | 1 | WASHER, COMPRESSION (7) |
| 26 | | 1 | BALL, 1/2 (1)/(7) |
| 27 | | 1 | SLEEVE (1)/(7) |
| 28 | | 1 | SPRING (1)/(7) |
| 29 | | 1 | PISTON/SPINDLE (1)/(7) |
| 30 | BF3601 | 3 | O-RING (7) |
| 31 | BF3585 | 2 | O-RING (7) |
| 32 | BF3602 | 1 | VALVE, COMPRESSOR UNLOADER (8) |
| 33 | | 2 | O-RING (1)/(8) |
| 34 | BF3607 | 1 | VALVE, STOP (8) |
| 35 | BF3606 | 1 | SEAL (8) |
| 36 | BF3605 | 1 | O-RING (8) |
| 37 | BF3609 | 1 | VALVE, CHECK (5) |
| 38 | BF3608 | 1 | SEAT, CHECK VALVE (5) |
| 39 | BF3604 | 1 | SEAT, UNLOADER VALVE (8) |

**TURBO 2000 AIR DRYER ASSEMBLY (Continued)**

| REF NO. | PART NO. | QTY. | DESCRIPTION |
|---|---|---|---|
| 40. | | 1 | SPINDLE (1)/(6) |
| 41. | | 1 | BALL (1)/(6) |
| 42. | 370944R1 | 1 | O-RING (3) |
| NSS | NSS | | NOTE: (1) NOT SERVICED SEPARATELY. |
| KT | BF3703 | | (2) PART OF CARTRIDGE REPLACEMENT KIT BF3703. |
| KT | BF5096 | | (3) PART OF SERVICE KIT BF5096. |
| KT | BF5098 | | (4) PART OF SERVICE KIT BF5098. |
| KT | BF5095 | | (5) PART OF BOTTOM CAP KIT BF5095. |
| KT | RK1869 | | (6) PART OF CHECK VALVE KIT RK1869. |
| KT | RK0109 | | (7) PART OF UNLOADER KIT RK0109. |
| KT | BF4068 | | (8) PART OF TURBO VALVE KIT BF4068. |
| KT | BF4067 | | (9) PART OF BLEED VALVE KIT BF4067. |