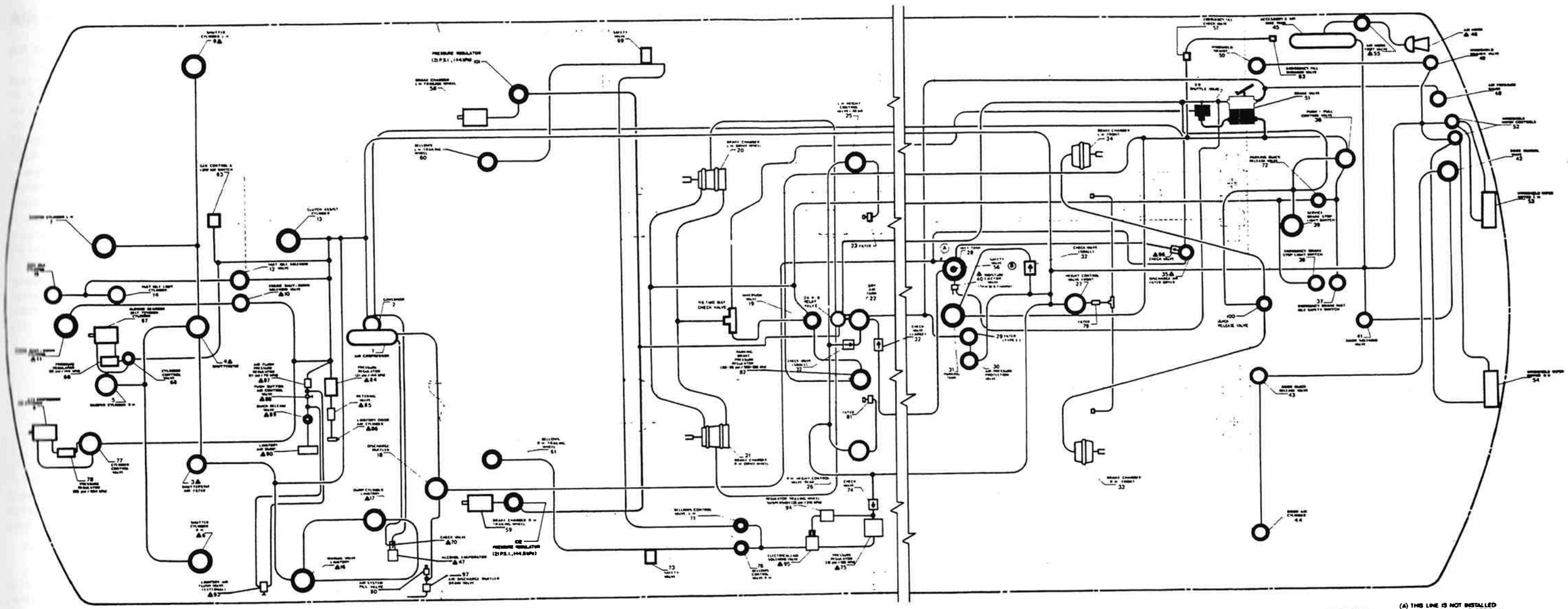
Date 1-1-89

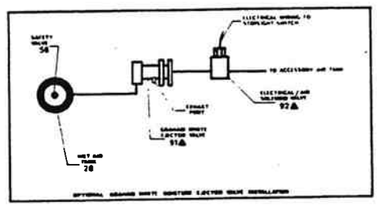
MC-9 MAINTENANCE MANUAL

SECTION 4

AIR SYSTEM AND BRAKES

SUBJECT **PAGE**





ITEM	DESCRIPTION	LOCATION
1	AIR COMPRESSOR	ENGINE COMPT.
2	GOVERNOR	ENGINE COMPT.
3 ▲	SHUTTERSTAT AIR FILTER	ENGINE COMPT.
4 ▲	SHUTTERSTAT	ENGINE COMPT.
5	DAMPER CYLINDER - R. H.	BLOWER COMPT.
6 ▲	SHUTTER CYLINDER - R. H.	ENGINE COMPT.
7	DAMPER CYLINDER - L. H.	BLOWER COMPT.
8 ▲	SHUTTER CYLINDER - L. H.	ENGINE COMPT.
9	A/C AIR CYLINDER	ENGINE COMPT.
10 ▲	ENGINE SHUT-DOWN SOLENOID VALVE	ENGINE COMPT.
11 ▲	ENGINE SHUT-DOWN CYLINDER	ENGINE COMPT.
12	FAST IDLE SOLENOID VALVE	ENGINE COMPT.
13	CLUTCH ASSIST CYLINDER	ENGINE COMPT.
14	FAST IDLE LIMIT CYLINDER	ENGINE COMPT.
15	FAST IDLE CYLINDER	ENGINE COMPT.
16 ▲	MANUAL VALVE - LAVATORY	ENGINE COMPT.
17 ▲	DUMP CYLINDER - LAVATORY	ENGINE COMPT.
18	DISCHARGE MUFFLER	ENGINE COMPT.
19	INVERSION VALVE	REAR WHEEL HSG.
20	BRAKE CHAMBER - L. H. DRIVE WHEEL	REAR WHEEL HSG.
21	BRAKE CHAMBER - R. H. DRIVE WHEEL	REAR WHEEL HSG.
22	DRY AIR TANK	REAR WHEEL HSG.
23	L. H. REAR SUSPENSION AIR FILTER	REAR WHEEL HSG.
24	2-3 RELAY VALVE	REAR WHEEL HSG.
25	HEIGHT CONTROL VALVE - L. H. - REAR	REAR WHEEL HSG.
26	HEIGHT CONTROL VALVE - R. H. - REAR	REAR WHEEL HSG.
27	HEIGHT CONTROL VALVE - FRONT	FRONT WHEEL HSG.
28	WET AIR TANK	FRONT WHEEL HSG.
29	TYPE "E" FILTER	FRONT WHEEL HSG.

ITEM	DESCRIPTION	LOCATION
30	AIR PRESSURE PROTECTION VALVE	FRONT WHEEL HSG.
31	PARKING TANK	FRONT WHEEL HSG.
32	CHECK VALVE (LARGE & SMALL)	WHEEL HSGS.
33	BRAKE CHAMBER - R. H. - FRONT	FRONT WHEEL HSG.
34	BRAKE CHAMBER - L. H. - FRONT	FRONT WHEEL HSG.
35 ▲	DISCHARGE AIR FILTER DRYER	FRONT WHEEL HSG.
36	PUSH - PULL CONTROL VALVE	INTERIOR - FRONT
37	EMERGENCY BRAKE FAST IDLE SAFETY SWITCH	SPARE TIRE COMPT.
38	EMERGENCY BRAKE STOP LIGHT SWITCH	SPARE TIRE COMPT.
39	SERVICE BRAKE STOP LIGHT SWITCH	SPARE TIRE COMPT.
40 ▲	MOIST. EJECTOR VALVE (SEALCO & TAPELLO ONLY)	FRONT WHEEL HSG.
41	DOOR SOLENOID VALVE	SPARE TIRE COMPT.
42	DOOR MANUAL VALVE	DASH
43	DOOR QUICK RELEASE VALVE	SPARE TIRE COMPT.
44	DOOR AIR CYLINDER ENT. DOOR	INTERIOR - FRONT
45	ACCESSORY & AIR RIDE TANK	TOOL COMPT.
46 ▲	AIR HORN	ENGINE COMPT.
47 ▲	ALCOHOL EVAPORATOR	ENGINE COMPT.
48	AIR PRESSURE GAUGE	DASH
49	WINDSHIELD WASHER VALVE	DASH
50	WINDSHIELD WASHER	TOOL COMPT.
51	BRAKE VALVE	SPARE TIRE COMPT.
52	WINDSHIELD WIPER CONTROLS	DASH
53	WINDSHIELD WIPER MOTOR - L. H.	EXTERIOR - FRONT
54	WINDSHIELD WIPER MOTOR - R. H.	EXTERIOR - FRONT
55 ▲	AIR HORN FOOT VALVE	DRIVER'S FOOT REST
56	SAFETY VALVE (130 psi / 9.00 kPa) (SEE NOTE B)	FRONT WHEEL HSG.
57	EMERGENCY TEE CHECK VALVE	TOOL COMPT.
58	BRAKE CHAMBER - L. H. TRAILING WHEEL	REAR WHEEL HSG.

ITEM	DESCRIPTION	LOCATION
59	BRAKE CHAMBER - R. H. TRAILING WHEEL	REAR WHEEL HSG.
60	BELLOWS - L. H. TRAILING WHEEL	REAR WHEEL HSG.
61	BELLOWS - R. H. TRAILING WHEEL	REAR WHEEL HSG.
62		
63	GENERATOR CONTROL & LOW AIR SWITCH	ENGINE COMPT.
64		
65		
66	BLOWER BELT PRESSURE REGULATOR (21 psi / 144 kPa)	ENGINE COMPT.
67	BLOWER GEARBOX BELT TENSION CYLINDER	ENGINE COMPT.
68	A/CYLINDER CONTROL VALVE	ENGINE COMPT.
69	SAFETY VALVE (150-90 psi / 344-379 kPa) L. H. TRAIL. WH.	ENGINE COMPT.
70 ▲	CHECK VALVE - ALCOHOL EVAPORATOR	ENGINE COMPT.
71	L. H. BELLOWS CONTROL VALVE	ENGINE COMPT.
72	PARKING QUICK RELEASE VALVE	SPARE TIRE COMPT.
73	SAFETY VALVE (130-90 psi / 344-379 kPa) R. H. TRAIL. WH.	ENGINE COMPT.
74	CHECK VALVE - BELLOWS SUSPENSION	ENGINE COMPT.
75 ▲	TRAIL. WH. SUSP. PRESS. REG. (10 psi / 103 kPa) (UNLOAD)	ENGINE COMPT.
76	R. H. BELLOWS CONTROL VALVE	ENGINE COMPT.
77	AC BELT TENSION CYLINDER CONTROL VALVE	ENGINE COMPT.
78	AC BELT TENSION PRESSURE REG. (135 psi / 934 kPa)	ENGINE COMPT.
79	FRONT SUSPENSION AIR FILTER	FRONT WHEEL HSG.
80	AIR SYSTEM FILL CHECK VALVE	ENGINE COMPT.
81	R. H. REAR SUSPENSION AIR FILTER	REAR WHEEL HSG.
82	PARKING BRAKE PRESSURE REG. (80-90 psi / 550-580 kPa)	REAR WHEEL HSG.
83	EMERGENCY FILL SC HEADER VALVE	TOOL COMPT.
84 ▲	LAV. DR. PRESSURE REGULATOR (21 psi / 144 kPa)	UNDER LAV. SINK
85 ▲	LAV. DOOR CYLINDER METERING VALVE	UNDER LAV. SINK
86 ▲	LAV. DOOR CYLINDER	LAVATORY COMPT.
87 ▲	AIR FLUSH PRESSURE REGULATOR (11 psi / 76 kPa)	UNDER LAV. SINK

ITEM	DESCRIPTION	LOCATION
88 ▲	LAV. AIR FLUSH PUSH BUTTON AIR CONTROL VALVE	LAVATORY COMPT.
89 ▲	LAV. AIR FLUSH QUICK RELEASE VALVE	UNDER LAV. SINK
90 ▲	LAV. AIR FLUSH PUMP	ENGINE COMPT.
91 ▲	CARLISLE WHITE MOISTURE EJECTOR VALVE	FRONT WHEEL HSG.
92 ▲	ELECTRICAL / AIR SOLENOID VALVE	FRONT WHEEL HSG.
93 ▲	LAVATORY AIR FLUSH VALVE (EXTERNAL)	ENGINE COMPT.
94	REGULATOR TRAILING WH. SUSP. (35 psi / 241 kPa)	ENGINE COMPT.
95 ▲	ELECT / AIR SOLENOID VALVE (TR SUSP UNLOAD)	ENGINE COMPT.
96 ▲	CHECK VALVE AIR DRYER WHEEL HSG.	FRONT WHEEL HSG.
97	DRAIN VALVE - AIR DISCHARGE MUFFLER	ENGINE COMPT.
98	TWO WAY CHECK VALVE	REAR WHEEL HSG.
99	SHUTTLE VALVE	APARK TIRE COMPT.
100	FRT. BRAKE QUICK RELEASE VALVE	ENGINE TIRE COMPT.
101	TRAIL. WH. PRESS. REG. (A. R. (21 P.S.I., 144 kPa)	TRAIL. WH. HSG.
102	TRAIL. WH. PRESS. REG. R.H. (21 P.S.I., 144 kPa)	TRAIL. WH. HSG.
XXX	OPTIONAL EQUIPMENT	

(A) THIS LINE IS NOT INSTALLED ON COACHES HAVING OPTIONAL DISCHARGE AIR DRYER

(B) THIS SAFETY VALVE IS INSTALLED ON DISCHARGE AIR DRYER IN COACHES HAVING OPTIONAL DISCHARGE AIR DRYER

Figure 4-1. MC—9 Air Line Diagram.

AIR SYSTEM AND BRAKES

AIR SYSTEM

The air system of the coach provides a means for braking, suspension, and for operating controls and accessories. This section covers brakes and air operated accessories. Details of the suspension system are covered in Section 12 of this manual. The air operating entrance door mechanism is covered in Section 3. The radiator shutter control system is covered under Section 6.

Included in this section is a schematic drawing of all air system components as well as a schematic drawing of the coach parking brake air system.

The basic air system consists of a compressor (which is mounted on and driven by the engine), air reservoirs, filters, and the necessary fittings and piping.

The brake system consists of brake chambers (one at each wheel), brake application valve, quick release valve, relay valve, parking brake (push-pull) valve, reservoirs, check valves and filters, and necessary fittings and connecting piping. See figure 4-1.

WARNING: To avoid personal injury when working on or around air systems and components, the following precautions should be observed:

1. Always block vehicle wheels. Stop engine when working under a vehicle. Venting vehicle air system pressure may cause vehicle to roll. Keep hands away from chamber push rods and slack adjusters; they may apply as system pressure drops.

2. Vent all air pressure from system.

3. Never connect or disconnect a hose or line containing air pressure. It may whip as air escapes. Never remove a component or pipe plug unless you are certain all system pressure has been vented.

4. Never exceed recommended air pressure and always wear safety glasses when working with air pressure. Never look into air jets or direct them toward anyone.

5. Never attempt to disassemble a component until you have read and understand recommended procedures. Some components contain powerful springs and injury can result if not properly disassembled. Use only proper tools and observe all precautions pertaining to use of those tools.

BRAKE OPERATION

The brakes used on the MC-9 coach incorporated both service and parking air operated brakes. Operation of the air operated parking brake is as follows. (Refer to figure 4-2 for schematic.)

NORMAL RUNNING - With the handle of the push-pull valve pushed in, air pressure from the parking and emergency reservoir is delivered to the control port of the inversion valve and then to the lock port of the rear brake actuator. Air pressure acting on piston A moves it forward and contacts rollers B rolling them up ramp A-A. As long as air pressure remains in lock port area, rollers B are not in contact with shaft F and normal service brake applications will permit shaft F to move freely.

PARK'NG - To park, the handle of the push-pull valve is pulled out. This vents the control port of the inversion valve and the lock port of the rear brake actuator. Spring D then forces rollers B against collar G thereby engaging rollers B with shaft F. When the control port of the inversion valve is vented, piston H moves forward to contact exhaust valve J. This action opens passage between parking and emergency reservoir port L and parking diaphragm port K. The valve then delivers 85 psi (586 kPa) regulated emergency reservoir pressure to the parking diaphragm of the actuator.

LOSS OF AIR PRESSURE WHILE PARKED - If there is a reduction of air pressure while parked, the force output of the diaphragm is reduced. The push rod force, however, is transferred to the mechanical lock mechanism to keep the brake applied. In this position rollers B are now wedged between collar G and shaft F preventing the return of shaft F to a released position. Shaft F is now locked in the applied position.

EMERGENCY OPERATION - If air pressure should be lost from the service reservoirs, the emergency brakes may be applied by pulling out the handle of the push-pull valve. Air from the emergency reservoir which is protected by a single check valve applies the brakes as described under parking.

If air is lost from the emergency reservoir and the wet service reservoir, a normal stop can be made with the service brakes because the dry service reservoir is protected by a single check. If pressure is lost from the emergency reservoir at a relatively slow rate, a partial parking application will be made when the handle of the push-pull valve trips automatically at about 40 psi (276 kPa). The inversion valve will likewise automatically trip at about the same pressure and apply the parking brakes even though the push-pull valve does not trip.

If pressure drops during operation, four parking brake applications can still be made. Parking and emergency brakes will not apply automatically until parking reservoir pressure drops below 40 psi (276 kPa).