416 KE DISTRIBUTOR VALVE

416a Operation of KE Distributor Valve

For effective functioning of the air brake system the KEGisl distributor valve has to operate effectively during

- Charging stage
- Application stage and
- Release stage.

(i) Charging Stage (see figure 4.16)

During this stage the compressed air flows from the driver's brake valve into the brake pipe which charges the control reservoir, bottom cover chamber and auxiliary reservoir. In twin pipe air brake system the auxiliary reservoir is also charged through the feed pipe from the rear end.

Charging of control reservoir

During charging the compressed air flows from brake pipe, dirt collector, isolating valve and through choke to brake pipe chamber above the large piston and to the 'A' controller.

Due to brake pipe pressure acting on top of the large piston, the three pressure valve is pushed down and port gets closed by the large diaphragm. Air also flows to the 'A' controller through choke. It passes through sensitivity port 2 and from there to the bottom cover chamber through port 2c. From the bottom cover chamber the air enters the control reservoir. When the BP pressure above the large diaphragm gets equal to control reservoir pressure (at bottom cover chamber) the large piston diaphragm gets lifted up and opens port 2b.

Charging of Auxiliary Reservoir

For charging the auxiliary reservoir air from BP passes from dirt collector to the 'R' charger via the isolating valve. Air entering the 'R' charger passes through the intermediate piece and opens the sealing flap. Therefrom air enters the auxiliary reservoir and charges it to **5 kg/cm^2**. Simultaneously the auxiliary reservoir is charged by the feed pipe through dirt collector, isolating cock and check valve with choke to 6kg/cm^2 from the rear end.

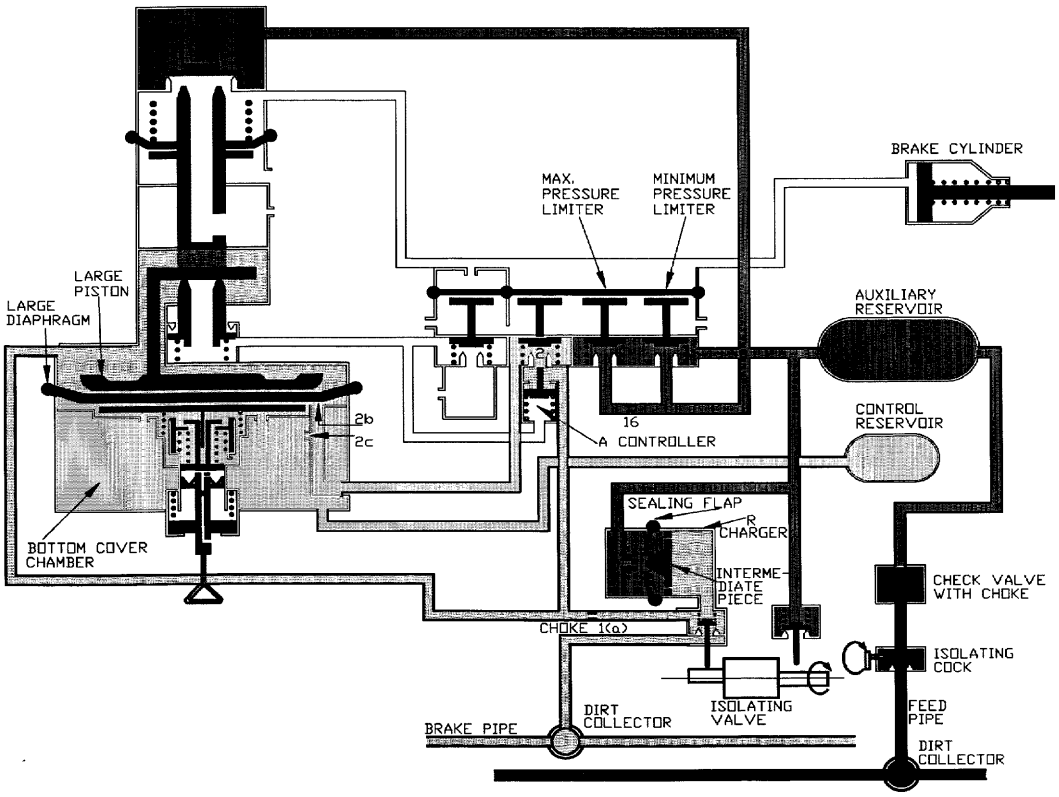


Figure 4.16 - KE DISTRIBUTOR VALVE (CHARGING STAGE)

ii) Application Stage

The application of brakes can either be emergency, full service or graduated.

Emergency application

When the brake pipe pressure is reduced from **5kg/cm^2** to zero the passage from auxiliary reservoir to the brake pipe is closed by the sealing flap in the 'R' charger, because of differential pressure acting on either side of the sealing flap. At the same time pressure differential acts across the large diaphragm of the three pressure valve which pushes the piston unit (large & small) upwards. The upward movement of the piston unit closes the outlet port by uplifting of the control sleeve.

In addition to this the outlet port at the top of the three pressure valve closes and the inlet port opens. The air from auxiliary reservoir through the open inlet port, the minimum pressure limiter, the maximum pressure limiter enters the brake cylinder.

When the pressure in the brake cylinder reaches **0.8 kg/cm^2** the minimum pressure limiter gets closed and there after maximum pressure limiter gets closed when the pressure in the brake cylinder reaches **3.8kg/cm^2**. With the rise in BC pressure the 'A' controller gets closed, maintaining the pressure in the control reservoir .

During full brake application the brakes are applied at slower rate than in emergency application. BP pressure to be reduced by **1.5kg/cm^2** instead of **5kg/cm^2**.

Note: At the beginning i.e. when BP is reduced and control sleeve uplifts outlet port - BP from top of the control sleeve reaches U-chamber already open to atmosphere and some BP thus vent off. This causes a sudden extra drop in the remaining BP pressure inside the DV and accelerates the effect of brake application propagating this action throughout the length of the train.

By this action brake cylinder pressure starts to rise. The brake cylinder pressure also acts on diaphragm at U-controller, A controller, Minimum Pressure limiter and maximum pressure limiter. As BC start to rise the A controller valve is closed isolating BP and CR. Also the U controller is closed and local reduction of BP is stopped. As BC reaches 0.8kg. it closes the minimum pressure limiter and now the rising BC pressure can pass through maximum limiter through choke 16 which regulates the rate of BC rising. As BC reaches **3.8±0.1** maximum pressure limiter also closes and no further rise of BC is possible. (This rise of BC **3.8+.1** come to effect at BP drop **1.5 kg**.)

Graduated application (see figure 4.17)

When the brake pipe pressure is reduced in steps for graduated application of brakes the increase in brake cylinder pressure is at a controlled rate and in proportion to brake pipe pressure reduction.

As soon as the brake cylinder pressure rises in proportion to brake pipe pressure reduction it causes the piston unit (large & small) to move down into lap position thereby closing the top inlet port without opening the top outlet port. Thus feeding of air from the auxiliary reservoir to the brake cylinder is cut off. This cycle is repeated every time BP is reduced in steps effecting graduated application of brakes.

iii) Release Stage

For releasing the brakes when the pressure in the brake pipe is increased the pressure above the large piston increases. Thus the differential pressure across the large piston reduces. As a result the piston unit (large & small) moves down thereby opening the top outlet port and closing the top inlet port. The brake cylinder pressure thus passes through the outlet port and gets exhausted to atmosphere through the release choke provided. As the BP pressure reaches **4.85 kg/cm^2** the brake cylinder is

almost completely drained and the three pressure assembly attains its charging/running position again.

Note: In twin pipe system during successive application and release of brakes air flows from feed pipe to the auxiliary reservoir directly. Thus the brake pipe pressure feeds directly the three pressure valve. This result in faster rise of brake pipe.

Graduated release

If the pressure in the brake pipe is increased in steps, the releasing procedure starts as before. However the top outlet port get closed and come to lap position as soon as piston unit (large & small) moves up due to fall of brake cylinder pressure.

Manual Release

Some times manual release of brakes is very helpful and thus provision is made in the distributor valve for manually releasing the brakes. When a short pull is given to pulling lever it tilts the pressure piece. As a result pressure rod and pin are pushed upwards against force of spring. The reservoir and passes through port 48(a) and then from narrow passage 47(a) to atmosphere. This will continue until the brake pipe pressure acting on large piston moves the supporting plate down. This results in downward movement of the pin thereby closing the passage of air to exhaust.

If however there is no more pressure, in brake pipe (i.e. after emergency application), if short pull is given to release handle then pressure piece is tilted & pin remains in top position. As a result control reservoir pressure is completely exhausted. The tilted pressure piece is then immediately restored to its initial position by spring. The brake cylinder pressure starts exhausting after control reservoir is exhausted upto **1.2 kg/cm^2** and then simultaneously both get exhausted completely.

During refilling the pressure in brake pipe rises more rapidly via choke 1(a) and port (2) so that large piston immediately moves down causing the pin to move to lap position.

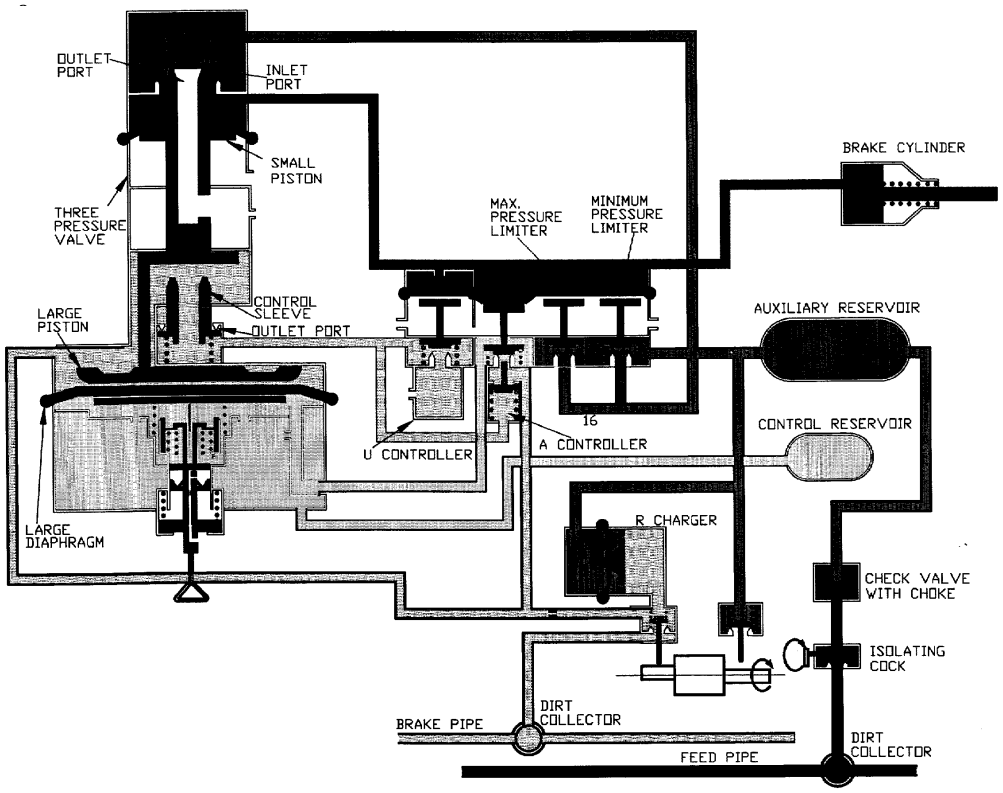


Figure 4.17 - KR DISTRIBUTOR VALVE (GRADUATED APPLICATION)

416b Overhauling procedure

Follows the procedure as given in 415i. For POH kit refer annexure 4.2.

416c Testing of KE type Distributor Valve

The testing of the KE distributor valve is to be done on the same test bench as is used for the C3W distributor valve and following the same procedure as given in 415g. The acceptable values of the various parameters are given in para 417

417 TEST REPORT

PROFORMA FOR C3W/KE DISTRIBUTOR VALVE

Type of Valve …… **Sr. No. ……**

Table 4.6

Sr. No.	Description of Test	Results Required	Observation	
1.	AR Charging Time from 0 to 4.8 Kg/ cm^2 (Main Reservoir pressure > 7.5 Kg/ cm^2)	270+/- 30 sec for C3W (170 +/- 10 sec for KE)		
2.	CR Charging Time from 0 to 4.8 Kg/cm^2 (Main Reservoir pressure >7.5 Kg/cm^2)	260+/- 20 sec for C3W (160 +/- 10 sec for KE)		
3.	Leakage Test (Brake Release) Check DV Leakage by Soap water only at joints.	No Leakage		
	FULL SERVICE APPLICATION & RELEASE			
	Brake Cylinder filling time from 0 to 3.6 Kg/cm^2	3 to 5 seconds		
	Maximum Brake Cylinder Pressure	3.8 +/- 0.1 Kg/cm^2		
	Leakage Test (Application) Check Leakage in DV by Soap water only at joints	No Leakage		
	Brake Cylinder Release Time from Max.B.C. Pressure i.e. from 3.8 +/-0.1 Kg/cm^2 to 0.4 Kg/cm^2	15 to 20 Seconds		
	OVERCHARGE PROTECTION (BP pressure 6 Kg/$cm^{2)}$	CR pressure should not increase by more than 0.1 Kg/cm^2 in 25 sec.		
	CR overcharge reduction test Overcharge CR to 5.7 Kg/cm^2 and pull double release lever for 3 seconds.	Overcharged CR should come to regime pressure of 5 Kg/cm^2.		
	EMERGENCY APPLICATION		Single pipe	Twin Pipe
	Brake Cylinder filling Time from 0 to 3.6 Kg/cm^2	3 to 5 Seconds		
	Maximum Brake Cylinder Pressure	3.8 ± 0.1 Kg/cm^2		
	Leakage Test (Emergency) Check Leakage in DV by Soap water only at joints	No Leakage		
	Brake Cylinder Release Time from Max. B. C. Pressure i.e. from 3.8 ± 0.1 Kg/cm^2 to 0.4 Kg/cm^2	15 to 20 Seconds		
	SENSITIVITY & INSENSITIVITY			
	BP pressure drop at the rate of 0.6 Kg/cm^2 in 6 Seconds	Brake should start applying within 1 Sec.		
	With a pressure drop stopped immediately after the operation of Quick Service Valve	Brakes must remain applied.		
	BP pressures drop of 0.3 Kg/cm2 maximum in 60 seconds.	Brakes must not apply.		

Sr. No.	Description of Test	Results Required	Observation
	REFEEDING		
	Create leak in BC through a 2 mm choke	BC pressure should decrease initially but re-feeding should be available and BC pressure should get stabilized at some pressure.	
	GRADUATED APPLICATION Decrease BP pressure in steps as below – BP Pressure (Kg/cm2) 4.8 4.6 4.4 4.2 4.0 3.8 3.6		B.C Pressure
	Continue Graduated Application until max. BC Pressure is obtained BP Pressure at maximum brake application	BP pressure drop must be between 1.4 and 1.6 Kg/cm^2 BP pressure drop must be between 3.4 & 3.7 Kg/cm^2	
	GRADUATED RELEASE Increase BP pressure in steps as below – BP Pressure (Kg/cm2) 3.6 3.8 4.0 4.2 4.4 4.6 4.8		BC Pressure
	Check BP Pressure when BC pressure is 0.4 Kg/cm^2 (Recharging pressure to release BC Fully)	4.85 Kg/cm^2 approx.	
	QUICK RELEASE TEST		
	Apply emergency brake & pull briefly the double release valve lever	Brake cylinder & CR are automatically exhausted to zero	
	CR check valve reset test. Start recharging of the system	Control reservoir should be isolated from atmosphere when brake pipe pressure exceeds 0.2 Kg/cm^2.	
	Twin pipe operation. Repeat the test : i). Full service application and release. ii). Emergency application.	Fill in column against test nos. 3 & 6	

418 PASSENGER EMERGENCY ALARM SYSTEM

Passenger emergency alarm system consists of two components:

(i) Passenger Emergency Alarm Signal Device (PEASD).
(ii) Passenger Emergency Alarm Valve (PEAV).

These two components in combination give an indication to the driver that some passenger is in need to stop the train. The indication is transmitted from the coach when the passenger pulls the chain

419 PASSENGER EMERGENCY ALARM SIGNAL DEVICE (refer figure 4.18)

Passenger Emergency Alarm Signal Device (PEASD) is a manually operated pilot vent valve. It is operated through mechanical force exerted by pulling the alarm chain provided inside the coaches for emergency use.

The passenger emergency alarm signal device does not need any maintenance during normal service except when it is found damaged or is due for periodic overhauling.

419a Overhauling

The passenger emergency alarm signal device should be completely dismantled and overhauled during every POH or if there is anysome specific trouble.

419b Tools and equipment

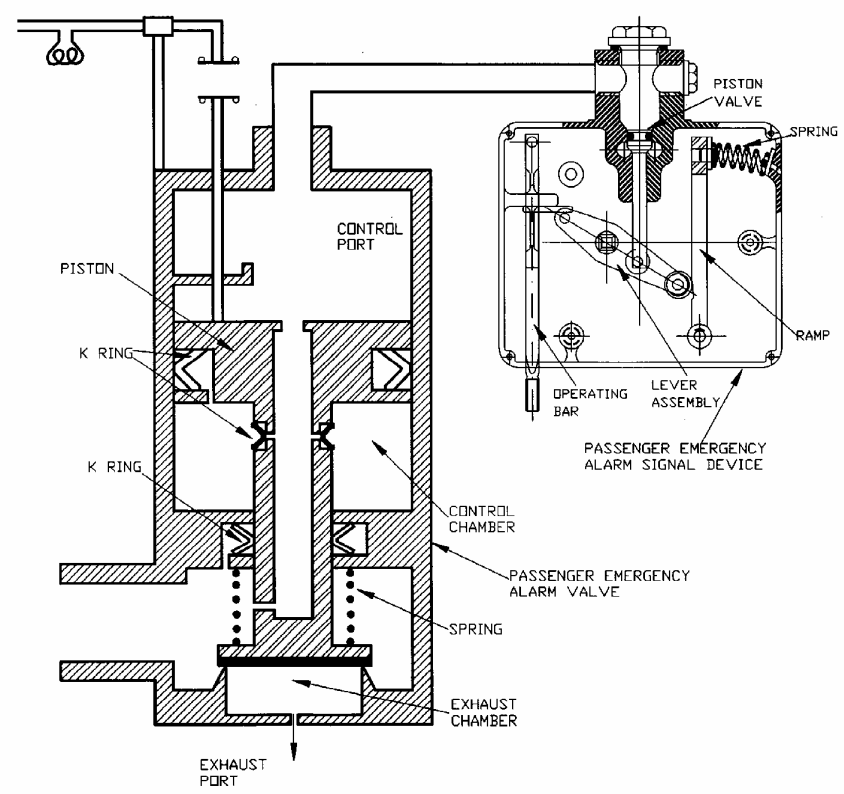
The tools and fixtures required for overhauling of passenger emergency alarm signal device are as follows.

a) Bench vice
b) Working table
c) Screw driver
d) Spanner 30 mm
e) Allen key for M6 and M8 Screw.
f) Open ended spanners -size 14 AF.

419c Disassembly

The passenger emergency alarm signal device after removing from the coach should be disassembled as follows:

- Unscrew 4 Nos. Counter sunk screws and remove the Cover.
- Pull out the sleeve and the lever assembly.



- Pull out the ramp and the spring slowly.
- Take out the operating spindle assembly.
- Unscrew Stop using suitable spanner and take out the washer, piston and 'O' ring.
- Remove 'O' ring from the piston.

419d Cleaning of Parts

- Clean all the metallic parts using kerosene or equivalent solvent.
- Dry all the components using low-pressure compressed air.
- Ensure smooth scratch less finish of the bore for the displacement of the piston assembly.

419e Replacement of Parts

- Inspect all moving parts for abnormal wear, tear, crack and deformation. Replace the part if found defective.
- Replace the 'O' ring and other rubber parts.
- Replace the spring of ramp in case of cracks, kinks or permanent set.
- Replace damaged threaded screws.

419f Assembly

- To assemble the passenger emergency alarm signal device (PEASD) follow the instruction for disassembly in the reverse sequence.
- Lubricate the pivot, roller and moving parts and ensure smooth operation of the components.

419g Testing of Passenger emergency Alarm Signal Device (refer figure 4.19)

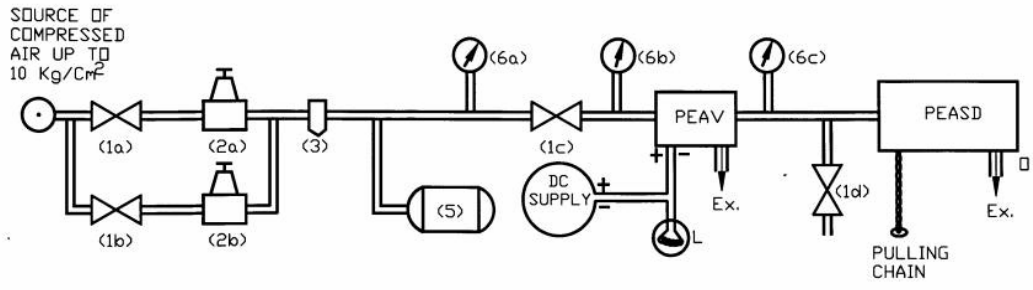
After overhauling of the passenger emergency alarm signal device it is checked for leakage at exhaust port and all over body with soap solution. Also check the mechanical chain pulling for smooth functioning.

A) Leakage Test

i. Close cock (1b) and open cock (1a), to apply air pressure of **10 kg/cm^2**. See that cock (1d) is closed.
ii. See that pressure indicated by the gauge (6a) stabilizes at **10 kg/cm^2**.
iii. Use pressure regulator (2a), if necessary, to adjust the pressure upto **10 kg/cm^2**.
iv. Open cock (1c) and wait till the pressure indicated by the gauges (6a) and (6b) and (6c) stabilizes at 10 kg/sq.cm. Wait for a few more minutes.
v. Check for leakage by applying soap solution all over the body of the pull off box or PEASD.
vi. No leakage is permitted, close cock 1(a) and 1(c), open cock (1d) and discharge the air pressure.

B) Functional Test

i. Close Cock (1d) and open cock (1c).
ii. Open cock (1b) and apply air pressure of **5 kg/cm^2**.
iii. See that the pressure indicated by the gauge (6a) stabilizes at **5 kg/cm^2**.
iv. Use pressure regulator (2b) if necessary to adjust the pressure upto **5 kg/cm^2**.



S.NO.	DESCRIPTION	NO. OFF
1(a,b,c,d)	ISOLATING COCK	4
2a & 2b	PRESSURE REGULATOR	2
3	OIL SEPARATOR	1
5	AIR RESERVOIR(40 litre)	1
6(a,b,c)	PRESSURE GAUGE	3

Fig. 4.19 TEST BENCH SCHEMATIC FOR TESTING PEAV AND PEASD

v. Pull the operating hook. Air pressure should start exhausting through the pull off box (PEASD) and PEAV.

vi. Air pressure inside the reservoir must be vented to atmosphere and gauge (6c) should read **0 kg/sq.cm**.

vii. As soon as pressure starts exhausting, lever of the pull off box should get locked in applied position.

viii. It should not be possible to stop the exhaust pressure without getting the lever locked in applied position.

ix. Reset the pull off box by turning square knob in clock- wise position. Repeat step (i) to (v), there should be no leakage.

420. **PASSENGER EMERGENCY ALARM VALVE (PEAV) (refer figure 4.20)**

Passenger coaches are fitted with an alarm chain pull arrangement to enable passengers to stop the train by pulling the alarm chain from within the coach in case of any emergency. Alarm chain in turn is connected to the two Passenger Emergency Alarm Signal Device which are situated at either side of one end wall of the coach. PEASD'S are connected to the Passenger Emergency Alarm Valve PEAV through a 10mm control pipe. BP pressure is fed to the PEAV through a 20mm branch pipe. In the event of alarm chain pull air is depleted from the control pipe connecting PEAV and PEASD causing BP pressure to exhaust through the 4mm choke in the PEAV. This causes partial application of brakes.

This drop in pressure in the brake pipe line is also observed in the flow meter fitted in the locomotive for the driver to stop the train.

420a **Overhauling of PEAV**

For effective and reliable functioning overhauling should be done every POH or if there is any specific trouble.

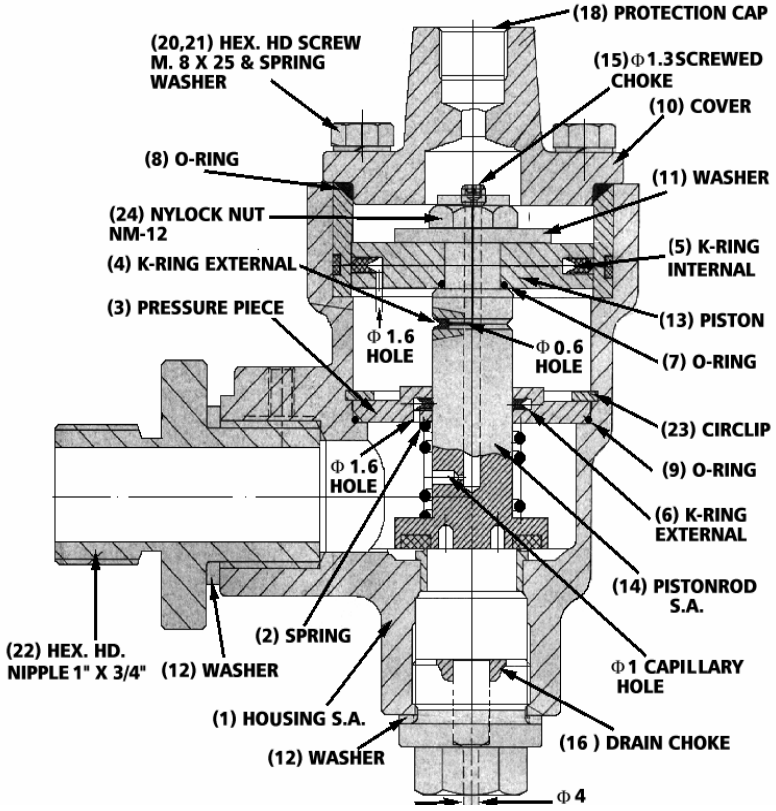


Figure 4.20 : PASSENGER EMERGENCY ALARM VALVE ASSEMBLY

420b **List of tools and fixtures**

Table 4. 7

S.No	Description
1.	Rotatory PEAV holding fixture clamped on work bench
2.	General tools (A) D/E Spanner (11-13mm), (14-19mm) and (32 -36mm) (B) Socket Spanner with driving handle (11,13,,19mm) (C) Pipe wrench 250 mm (D) Screw Driver (8 mm blade) (E) Needle pokers (0.5, 0.8,1.0 dia) (F) Blunt tool (for K-ring) (G) Internal (long nose) circlip plier
3.	Kerosene tank
4.	Pin End Tool (suitable length and pin size)

420c Procedure for Overhauling

Before dismantling PEAV the outer body should be cleaned to remove dust and dirt by detergent solution followed by drying with air jet.

- Unscrew the Hexagonal Nipple (22) with washer (12) and then clamp the equipment to the holding fixture.
- Keeping the bottom side up unscrew the drain choke (16) with sealing washer (12).
- Turn and lock the PEAV top side up in the fixture and unscrew 4 Nos. Hex Head screw (M8 x 25) and remove cover (10) and 'O' Ring (8).
- Turn the PEAV to horizontal position keeping the top side of the PEAV to your right (or working hand side). Insert the pin-end-tool from the bottom side of PEAV and engage the pins of the tool to the two holes provided on the piston valve end and hold the pin-end-tool.
- With the help of 19 mm socket unscrew the 12 mm nylock nut (24) at the other end of the piston rod (14). Also remove washer (11).
- Push the piston rod to the upper side of the PEAV by the already engaged pin-end-tool against the compressed spring. By this action piston (13) along with K-ring (5) will come to the upper end of the PEAV body. Take out the pin-end-tool and remove the piston (13) with K-ring (5). Also take out 'O' Ring (7).
- Turn the PEAV top side up and with the help of a long nose internal circlip plier carefully take off circlip (23) from its groove (gently press the pressure piece by a screw driver against the spring force while trying to with draw the circlip).
- Take out the piston rod (14) along with K-ring (4), pressure piece (3) with K-ring(6) and spring (2). Also take out 'O' ring (9).
- Separate all the parts of the subassemblies.
- Unscrew the screwed choke (15) at the top end of the piston rod carefully with the screw driver.

Note: Pressed bush and seat bush need not be taken out from the body.

420d Cleaning of parts

- Clean all the metallic parts including housing (1) with a hair brush and kerosene oil and the rubber parts by detergent soap solution.
- Sponge all parts dry by a clean cloth and also remove any residues by dry air jet.
- Clean all the capillary passages on piston (13), pressure piece (3), Piston rod (4), drain choke (16) and the screwed choke (15) with the help of suitable Needle poker and blow air jet through.

420e Inspection and replacement of parts

- Check spring is free of kinks and rust, check free height and spring characteristics.
- Ensure the housing (1) is free of any crack or breakage, and internal bore surface is smooth. Ensure seat of bush is free of any dent or scratch.
- Threaded portion should be free from any damage and threads should not be damaged or wornout.
- Ensure all capillary holes are clear.
- Outer cylindrical surface of the piston rod should be free of scratches and smooth.
- During scheduled overhauling all rubber and rubber bonded parts should be replaced.
- Ensure the grooves for K-rings on piston, pressure piece and piston rod are clean and are not having any deep denting or scratches.

420f Assembly

- Smear light film of grease on all parts.
- Place properly the K-rings 4,5,6 on piston rod, piston and pressure piece respectively. Screw the screwed choke at the top end of piston rod.
- Hold the PEAV housing (1) on the fixture and proceed further assembly by reversing the sequence adopted for dismantling.
- Screw drain choke (16) and Nipple (22) with washers (12) to the valve.
- After assembling the PEAV should be tested for the prescribed performance on a suitable test bench. After testing place suitable protection cap on cover, nipple and drain choke openings to protect entry of dirt and dust into PEAV during storage. Nipple threads shall be suitably protected to avoid damage.

420g Test Procedures for PEAV

- Test bench as shown in the schematic in **fig. 4.19**.
- Source of compressed air at **10Kg/cm^2**.
- 110V DC Supply
- Indicating lamp

i) Electrical Test

This test is to be conducted during application test (functional test).

ii) Leakage Test

- Connect the PEAV to the test bench. When PEAV is being tested, make sure that the passenger emergency signal device fitted on the test bench is already a tested and approved one.
- Fix an operating hook to the signal device operating lever.
- Close cock (1c), (1d) and by opening cock (1a) admit compressed air at a regulated pressure of **10 kg/sq.cm** into the system.
- If required, adjust pressure regulator (2a) so that the gauge (6a) reading stabilizes at **10 kg/cm**.
- Open valve (1c) and charge the PEAV. Apply soap solution all over the alarm valve. No leak is permitted from any part of the body.
- Close (1c) and after waiting for a few minutes check pressure drop in gauge (6b).
- There should not be any drop in pressure in gauge. (6b).
- Close cock (1a) and discharge the PEAV by operating cock (1d).
- Close cock 1(c) and 1(d).

(iii) Functional Test

A) Charging

1. Open cock (1b) and charge the reservoir up to **5 kg/cm^2**, using pressure reducer (2b).
2. Open valve (1c) and charge the PEAV up to **5kg/cm^2**.
3. Wait till gauges (6a) and (6b) and (6c) are stabilized and show the same pressure .
4. These gauges should show a pressure of **5 kg/cm^2** and if the pressure is not equal to **5 kg/cm^2**, adjust the pressure regulator.
5. In this position emergency brake valve is charged.
6. Check leakage from exhaust port `O' of the PEASD, there should not be any leak.
7. Indicating lamp (L) should be off in this position.

B) Application

1. Apply a voltage of 110 V DC to the circuit of the indicating lamp of the PEAV as shown in the figure.
2. Pull the operating hook of the signal device and observe that the air pressure starts venting from both the PEASD and the PEAV from their exhaust ports continuously.
3. The lamp should glow.
4. The gauge (6b) should stabilize at an intermediate reading to balance between the inlet and the exhaust rate of flow of the compressed air.
5. Reset the signal device with the resetting key and note.
6. The venting of air pressure from the exhaust of the signal device should stop. It should also stop from the exhaust of the PEAV and the indication lamp should switch off.
7. The gauge (6b) and (6c) should start building up to **5 kg/sq. cm**.
8. Now again check for leakage all over the alarm valve, especially at the exhaust port. No leakage is permitted.

9. Close cock (1c) and pull the operating hook of the signal device.
10. Wait till gauge (6b) read zero.
11. Disconnect the alarm valve from the test stand and wipe out all soap suds from the device.
12. Close all open ports with suitable closure plugs till further fitment on the coach.

421 CHECK VALVE (see figure 4.21)

Check valve with choke (NON RETURN VALVE) is fitted in the branch line of feed pipe before auxiliary reservoir. Check valve allows flow of air in one direction as indicated by the arrow on the body and reverse flow of air is prevented thus avoiding fall in auxiliary reservoir pressure. A choke of 3 mm is fitted at the outlet port of the valve to have a uniform filling of air in the auxiliary reservoir of all the coaches in a rake. The check valve with choke is completely dismantled and overhauled once in every POH or when there is some specific trouble.

421a Tools and plant

Double ended spanner - A/F 24x27 mm.
Screw Driver – 12"(300 mm)
Vice.

421b Procedure for overhauling

i) Disassembly

- Hold the check valve in a vice.
- Unscrew the cap nut carefully and take out the spring.
- Take out the valve seat and valve assembly from the body. Remove valve seat washer.
- Unscrew the choke of 3mm from the body.

ii) Cleaning of Parts

- Clean the exterior with a jet of air.
- Clean all metal parts with wire brush and kerosene oil.

iii) Replacement of Parts

- Replace all rubber parts.
- Replace the spring if it has kinks or crack mark or if the spring has lost its stiffness or is heavily corroded.
- Replace the choke of 3mm if screwing slot is damaged or threads are heavily corroded.
- Inspect the valve seat of body for any minor scratch and lap the seat to remove such scratch marks.

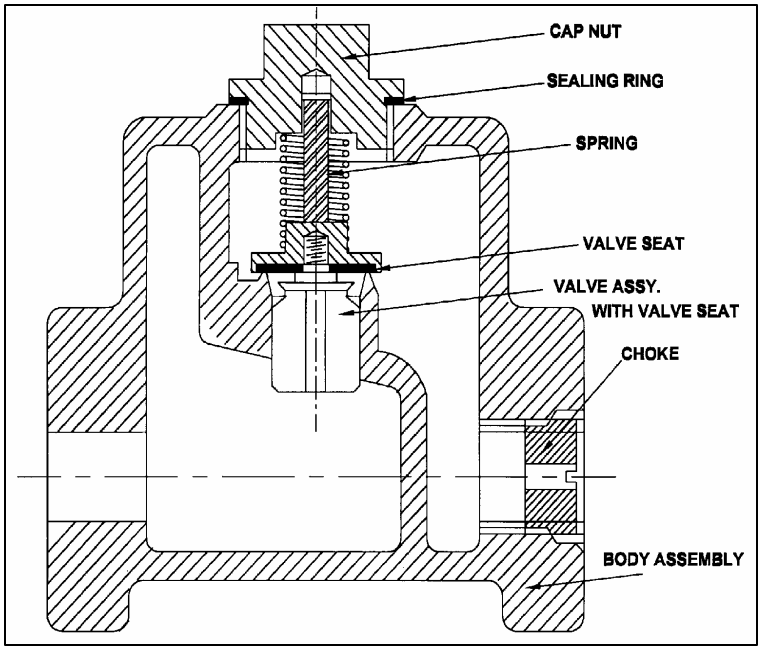


Figure 4.21 CHECK VALVE WITH CHOKE

iv) Assembly

- Fit a new valve seat in the housing, using Araldite.
- Insert the valve assembly in the housing from the top bore of the valve.
- Apply a sealing grease like Aseol Calla or equivalent on the cap threads and screw the cap to the body tightly after fitting spring.
- Apply sealing grease like Aseol Calla or equivalent on the choke threads before screwing it to the outlet port of the body.

v) Testing of check valve with choke

- After overhauling fix the check valve with choke on the test bench.
- Apply air pressure at inlet port in the direction of arrow. Air should freely flow through the outlet port.
- Blank the outlet port and apply air pressure at the inlet port. Check for leakage at cap with soap water solution. No leakage is permitted.
- Connect air supply to the outlet port firstly at 2Kg/cm^2 and afterwards at 5Kg/cm^2. There should be no air flow or leak through the inlet port.

422 ISOLATING COCK (refer figure 4.22)

Ball type isolating cocks are provided on the feed pipe branch line before the auxiliary reservoir as well as on the branch pipe leading to brake cylinders and passenger emergency alarm valve.

Isolating cocks can be operated to cut-off air supply to these equipments as per the service requirements.

In recent coaches ball type isolating cocks vent type is provided on the branch pipe leading to brake cylinder to drain brake cylinder pressure in the event of brake binding.

The isolating cocks are to be completely dismantled and overhauled once in every POH or when there is some specific trouble.

422a Tools & Plant

The following tools and fixtures are required for overhauling.

D/E Spanner A/F 13x14
D/E Spanner A/F 16x17
Special Tool
Vice.

422b Procedure

i) Disassembly

- Hold the isolating cock in a vice.
- Unscrew the nut from the stem and take out the handle assembly.
- Unscrew the gland and carefully pull out the stem from the body.
- Remove the two gland packings.
- Using special tool unscrew the plug and remove it from the bore of the body.
- Remove sealing washer from the plug.
- Remove the ball seats and the ball.

ii) Cleaning of Parts

- Blow a jet of air to clean the dust on the external surface.
- Clean the metallic parts using wire brush and kerosene oil.
- Clean the internal parts i.e. valve seats, ball etc. with nylon bristle brush.
- Clean rubber parts with soap water solution.

iii) Replacement of Parts

- Replace all rubber parts and gland packing etc.
- Replace the ball if heavy scratch marks or dents are found on the surface of the ball.
- Replace if threads of the stem / plug are heavily corroded.

iv) Assembly

- Insert ball seat into its seat in the bore of the body.
- Insert ball after applying a light coat of grease so that the ball fixes on valve seat in to the bore of the body. While inserting the ball, slotted portion to accommodate the stem should face the top of the body.
- Insert the ball seat to touch the ball.
- Assemble the stem from the top hole, after fixing the gland packing in such

Fig. 4.22 ISOLATING COCK

a way the stem tip enters into the ball slot.

- Fit sealing washer on plug.
- Screw the plug into the bore of the body with special tool after greasing the threads with Aseol Calla or equivalent.
- Fix the handle on the stem and fasten it.

422c Testing of ball type isolating cock

- After overhauling fit the isolating cock in the test bench .
- Operate the cock few times for the free movement.
- Close the outlet port with dummy flange.
- Put the handle in open position and apply air pressure at **10Kg/cm^2** from the inlet port. Check for leakage with soap water solution.
- No leakage is permitted.
- Put the handle in off position and check for leakage through the outlet port after removing the dummy flange.
- No leakage is permitted.

423. ROUND TRIP EXAMINATION

Salient Features

(i). Round trip examination is performed on a rake to ensure all equipment and subassemblies of air brake system are properly positioned on each coach of the rake.

(ii). Round trip examination is performed before train leaves the originating station.

(iii). The following maintenance attention is given in the round trip examination.

a). All worn out brake blocks are changed.

b). All the brake rigging pins should be intact and of correct size.

c). Dimension `A' of slack adjuster is adjusted to the specified valve.

d). Hose couplings for brake pipe on consecutive coaches are coupled to one another.

e). Hose coupling for feed pipe on consecutive coaches are coupled to one another.

f). All cut off angle cocks are kept open except those at the rear end of the train.

g). Brake pipe and feed pipe hose coupling at the rear end of the train are placed on their respective hose pipe coupling supports.

h). Isolating cock of distributor valves of all the coaches are in open position.

i). Isolating cocks placed before the auxiliary reservoir, brake cylinders and the passenger emergency alarm valve are in open position**.**

j). Pressure gauges for brake pipe and feed pipe are provided in brake van.

k). No leakage from the auxiliary reservoir, brake cylinder, control reservoir, and dirt collector.

l). Conduct rake test as per annexure 4.6

m). Release brake and see that all the brake cylinder pistons are fully inside.

n). Guard's emergency brake valve provided in brake van is working properly**.**

424. MAINTENANCE SCHEDULE 'A' *(Monthly Examination)*

The following major maintenance works are carried out during the schedule 'A' examination on Air Brake system.

A. All the maintenance activities performed during 'Round Trip Examination' are also carried out under Schedule 'A'. With references to the Air brake system the following activities are carried out.

i) Visual inspection of the rake/ coach is carried out to check any damage on the brake or feed pipe hose coupling or hanging hose pipe; the suspension brackets of air brake equipment and anti-pilferage device provided on the components are also checked for any defects. For example hanging hose pipe is shown in the **figure 4.46**. In case of any damage, the same is attended to / replaced.

ii) The Air Brake sub-assemblies of coaches are cleaned thoroughly from outside. The moving parts such as slack adjuster and brake rigging system are greased.

iii) The sub-assemblies of Air Brake System, such as slack adjuster are checked for 'A' and 'e' Dimensions.

iv) Leakage test is done for brake pipe, feed pipe and its connecting pipes.

v) Service Application and Release test of the rake is performed to ensure full brake power.

B. The Manual Brake Release test is carried out on every coach of the rake, to ensure proper functioning of the release lever, fitted below the distributor valve .

C. Micro Switch Test is performed to ensure that the Cam operated Micro Switch provided on end wall near Passenger Emergency Alarm Signal Device for the audio-visual indication, functions properly.

D. The guard van valve test is carried out on a coach to ensure functioning of the guard van valve during every alternate 'A' schedule.

E. The passenger emergency alarm valve and device test is carried out on a coach to ensure that the passenger emergency alarm valve (PEAV) and passenger emergency alarm signal device (PEASD) work properly in conjunction. This test is carried out in every alternate 'A' schedule.

425 MAINTENANCE SCHEDULE 'B'
(Tri-monthly Examination)

The following maintenance work should be attended during schedule 'B'

A. All the maintenance activities performed during schedule 'A'
B. Thorough inspection and repairs of brake gear components..
C. The alarm chain pull test to ensure proper working of passenger emergency alarm system for partial application of brakes.

426 MAINTENANCE SCHEDULE 'C'
(Half yearly examination)

The coaches of which the schedule 'C' maintenance is expected are required to be detached from the rake and taken to the sick line. The following maintenance work of Air Brake System needs to be attended during schedule 'C' examination.

A. All the maintenance activities performed during schedule 'B'
B. Thorough checks of slack adjusters for any damage and mal-functioning and subsequent replacement.
C. Testing of pressure gauges and replacement of the defective or inaccurate gauge (for SLR/ Guard compartment).
D. Apart from above maintenance activities, the coaches that are brought for Schedule 'C' maintenance are subjected to 'Single Car Test'.