DEMU DPC

INTRODUCTION

DEMU SERVICE:

1400 HP DEMU (Diesel Electric Multiple Unit) has been inducted in Indian railways to replace the existing slow moving Loco hauled passenger train in non-electrified mainline sections and also for low traffic density branch line services.

The high acceleration potential of DEMU makes them suitable to work as fast passenger transportation services between cities.

One unit of DEMU consists of four coaches:

1. Driving power car (DPC),
2. Trailer car (TC)
3. Driving trailer car (DTC).

DPC: Driving power car is a coach that houses the diesel electric power plant. Around 50% of the coach space is occupied by the plant and balance is for the passengers. It has one control station. The control station is used when train is moving in direction where the DPC is leading.

TC: Trailer car (TC) is a simple coach that is meant only for passengers.

DTC: Driving trailer coach (DTC) is also a coach meant only for the passengers. However, one end of this coach has parallel operator control station. This is used by the operator when the train is moving in the direction where DTC is the leading coach.

Multiple operation of DEMU is possible upto 04 units so as to meet varying demands of traffic existing in the section.

DEMU is designed for maximum speed of 100 Kmph

The power car is provided with the 20 T axle load bogie whereas the trailer car is fitted with 16t axle load bogies suitable for main line coaches.

SYSTEM DESCRIPTION (Propulsion system)

Power Pack

The driving power car has a single power pack consisting of a diesel engine (KTA-50-L) complete with brush less traction alternator and matching exciter rotating rectifier set.

Rectification

Three phases AC output obtained from the alternator is rectified by the three phase bridge rectifier to get DC output. This main rectifier is modular in construction and under frame mounted feeding DC supply to the traction motors.

Traction motor

Four axle mounted, self-ventilated traction motors are mounted on two bogies of the DPC. The motors are permanently connected in four parallel combinations utilizing the full capability of the traction alternator output thus eliminating combination change and field weakening operation. There exists a provision of isolation upto two traction motors in event the traction motors becoming faulty.

Traction motors used are

1. TM 4303-DY (BHEL)
2. C1005 TM (Crompton Greaves)

Control System

Excitation and load control Module (ELCM) system is designed to operate in conjunction with brushless alternator and Woodward make EG3P/EG1 PC type fuel actuators mounted on the diesel engine. Excitation control regulates the alternator excitation by regulating the current to the exciter stator on any given notch in such a way that constant KW output from the alternator and thus a constant HP is obtained from the diesel engine even with varying current output fed to the traction motors. In addition, ELCM also controls the diesel engine speed and maintains it constant on a particular notch from full unloading to full loading by regulating the current to the actuator coil controlling the fuel supply to the diesel engine.

Various protection features are incorporated to indicate the various faults that may occur and take necessary corrective action.

The control equipment mainly consists of master controller, Electro- pneumatic (EP) contactor, Electro- magnetic (EM) contactors, reversers, electro-pneumatic relays and MCBs. The line contactors, negative isolation contactors, reverse's shunt etc. are mounted in motor Switch GroupBox and motor overload relays, general purpose relays, excitation contactor, blocking diode panel etc. are mounted in Electrical Control Group Switch Box for underframe mountings.

Vehicular couplers

There are four nineteen pin inter vehicular couplers viz., A, B, C & D within the 3 coach formation in a DEMU and three nineteen pin inter- vehicular couplers viz., A, B & C between any two DEMU. The 'D' coupler is used for connecting and controlling the auxiliary alternator supply to the lights and fans in the three coaches of a DEMU. The A, B & C couplers run throughout the 3 DEMU and by either energizing or de- energizing a wire, we are able to control the operation of various components of power or control system remotely from either the DPC or DTC at either end.

Auxiliary Supply

An 18 KW auxiliary brushless alternator, self cooled, belt driven from traction alternator shaft with its rectifier and regulator is provided to supply 135/110 V DC (+/-5%) regulated supply over the entire speed range of the engine speed from no load to full load. However, 110 V battery is also provided to supply lighting, fan and control loads during emergency when diesel engine is not in operation.

Compressor

A belt driven compressor at the non traction alternator end of the engine is provided to supply compressed air at a required rate at 8 kg/cm^2 at idling speed of the diesel engine for the brake system. Compressor used is TRC 2507 of Elgi make.

PARAMETERS OF DEMU Operating Parameters of DEMU

3.	Track Gauge	:	1676 mm
4.	Composition of a unit	:	1 DPC + 2 TC + 1 DTC
5.	Estimated Service Weight (Dense Crush Load)	:	188 Tonnes [80T (DPC) + 60 T (TC) + 60 T (TC)+ 60T (DTC)]
		:	260 T
	For 4 coach train formation	:	520T
	For 8 coach train formation For 12 coach train formation For 16 coach train formation	:	780T 1040T
6.	Maximum axle load	:	20T (DPC) 16T (TC & DTC)
7.	Wheel arrangement of power car powered)	:	Bo-Bo (All axles independently
8.	Wheel diameter	:	952 mm (new) 877 mm (Fully worn) 914.5 mm (Half worn)
9.	Effective traction power output of diesel engine	:	1317 BHP
10.	Power transmission	:	Electric AC/DC
11.	Maximum operating speed 110	:	100 km/h (With capacity to run upto Kmph
12.	Clearance above rail level	:	Minimum of 102 mm (with coaches fully loaded and wheels in fully worn condition)
13.	Reference site conditions	:	Ambient Temperature : 55 Deg. C

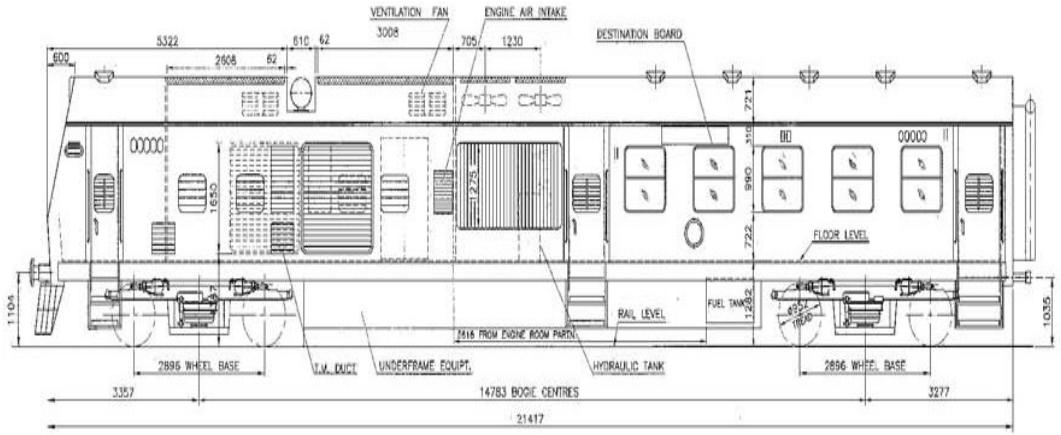
& 55-60 Deg. C inside engine room
Humidity : 100 %

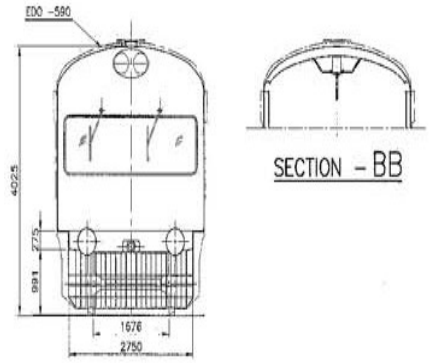
Attitude : 0- 600 meter above sea level

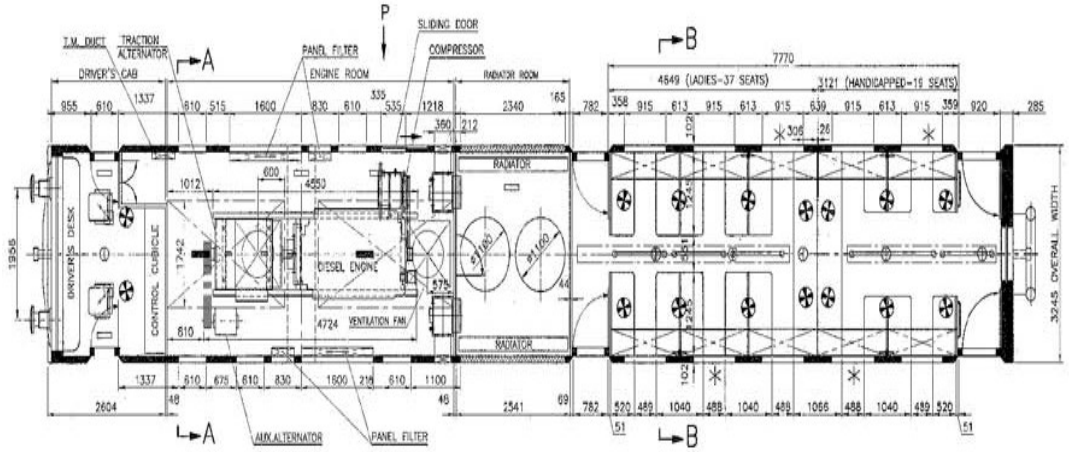
Leading Particulars of1400 HP DEMU Power Car

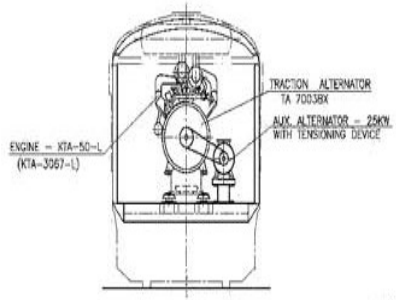
1.	Length over headstock	:	21417 mm
2.	Distance between bogie centers	:	14783 mm
3.	Bogie wheel base	:	2896 mm
4.	Wheel diameter	:	952 mm (New)
5.	Tread wear	:	37.5 mm
6.	Overall width	:	3245 mm
7.	Height from rail level to top of roof	:	3886 mm
8.	Height from rail to floor level	:	1282 mm
9.	Maximum height of center line of centre buffers above rail level for unloaded vehicles.	:	1104 mm

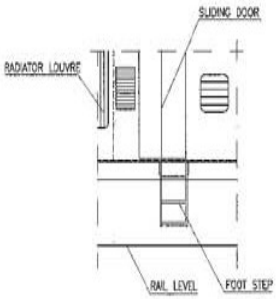
LAYOUT OF DPC COACH

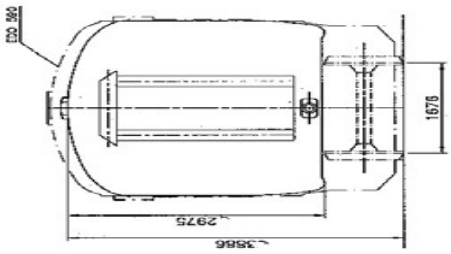


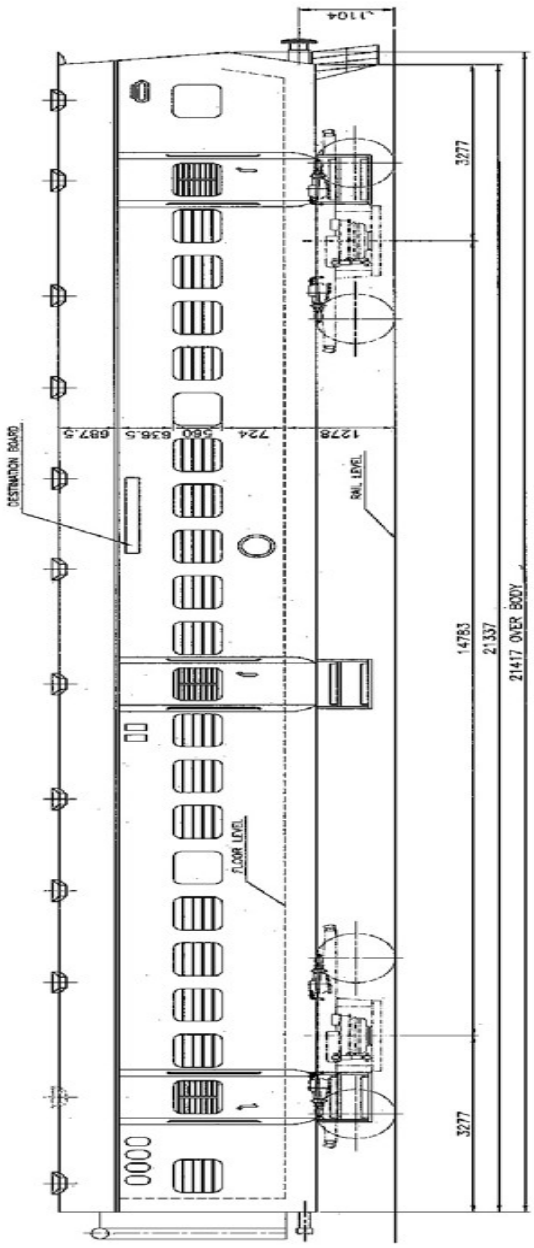


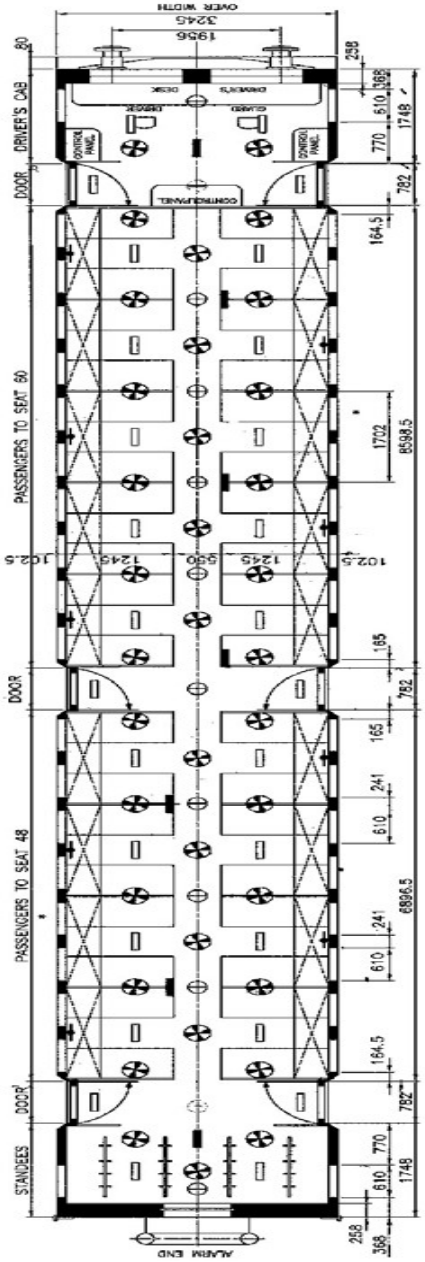






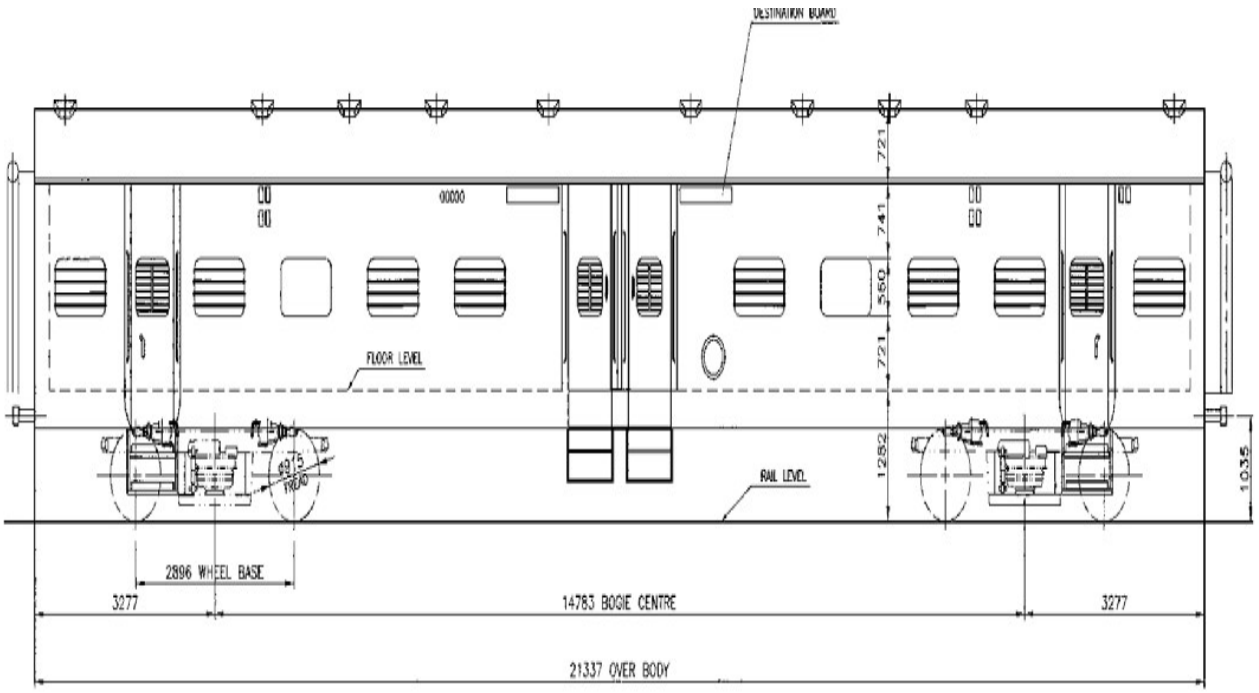


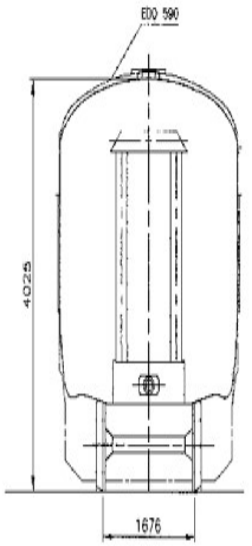


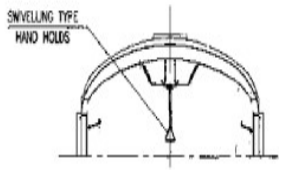


LAYOUT OF DTC COACH

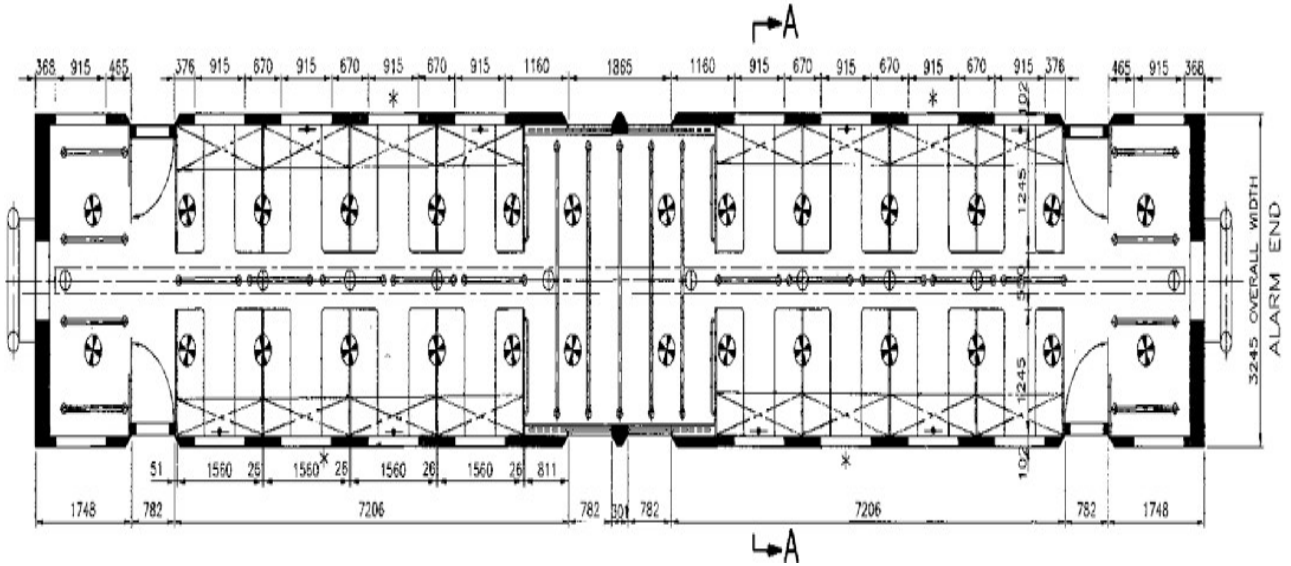
LAYOUT OF TC COACH







SECTION – AA



ELECTRO-PNEUMATIC BRAKE UNIT

ELECTRO-PNEUMATIC BRAKE UNIT (Kbr VIIIc) – ESCORTS

INTRODUCTION

1. General

The electro-pneumatic brake unit Kbr VIIIc acting in conjunction with the modular brake controller Esbc IIIM is a system in which two brake systems, working independently, are combined. These are the electrically controlled and the automatic air brakes.

The EP brake unit type Kbr VIIIc comprises all the controller sub-assy's of the electrically controlled and the automatic air brake, which are mounted on a common valve bracket. In order to facilitate installation, the unit is of the smallest possible dimensions.

All the required pipe connections and electrical connections are also combined in the valve bracket. This makes it possible to remove any piece of sub-assy. separately, without having to break or remove any pipe connections.

2. Design

The EP brake unit comprises the sub-assemblies listed below:

a) Application magnet valve (item a) EV 208 3Vt.
b) Holding magnet valve (item b) EV 207 3Vt.
c) Safety valve type AKL (item c)
d) Triple valve Fe 114 So (item d) direct release.
e) Pressure limiting valve (item e) Hdb 3/3.6.
f) Stabilizing valve (item f)
g) Check Valve (item g)
h) Valve bracket (item h).

3. Operation

The Modular brake controller Esbc IIIM controls the apparatus of both the electrically controlled and the automatic air brakes.

Through the contacts actuated in the brake controller, in accordance with the position of the main handle, the circuit excited the magnet valves, items 'a' and 'b', is opened or closed. During application with the automatic air brake, auto valve unit in the modular brake controller regulates the pressure in the brake pipe.

The connections provided in the Valve bracket as well as the connection between the different sub-assly's of the EP brake unit may be seen from the annexed diagram.

Application Magnet Valve

The application magnet valve, item 'a', is excited and hence open in the application and emergency application positions, compressed air flows from the main reservoir pipe via the application magnet valve, item 'a', the pressure limiting valve, item 'e'

and the check valve item ‘g’, into the brake cylinders. The brake cylinder pressure is determined by the duration of the excitation of the magnet valve, item ‘b’.

Holding Magnet Valve

The holding magnet valve, item ‘b’, is excited and hence closed in the holding, application, self-lapping and emergency application positions. The brake cylinders are then isolated from the atmosphere.

Safety Valve

During a purely pneumatic application initiated through the triple valve, item ‘e’, the safety valve, item ‘c’ limits the brake cylinder pressure to a maximum of 4 kg/cm2 (57 psi).

Triple Valve

The triple valve for direct release, item ‘d’, serves for application and release on operation of the automatic air brake, in accordance with pressure changes in the brake pipe. In addition, the release of the electrically controlled air brake is effected via the triple valve in release position.

Pressure Limiting Valve

During electrically controlled application the pressure limiting valve, item ‘e’, limits the brake cylinder pressure to a maximum of 3.6 kg/cm2 (51 psi).

Stabilizing Valve

The stabilizing valve, item ‘f’, in the release position connects the auxiliary reservoir with a bulb, whereby the pressure in the auxiliary reservoir is reduced by about 0.2 kg/cm2 (3 psi) lower than that in the brake pipe. This pressure reduction is necessary in order to avoid the possibility that pressure fluctuations in the brake pipe might cause the triple valve, item ‘d’, to move from release position into lap position. The stabilizing valve is controlled by the brake cylinder pipe. On brake application, the bulb previously mentioned is exhausted through the stabilizing valve.

Check Valve

During purely pneumatic application, the check valve, item ‘g’, prevents the escape of air from the brake cylinders through the open holding magnet valve.

EP BRAKE

Application

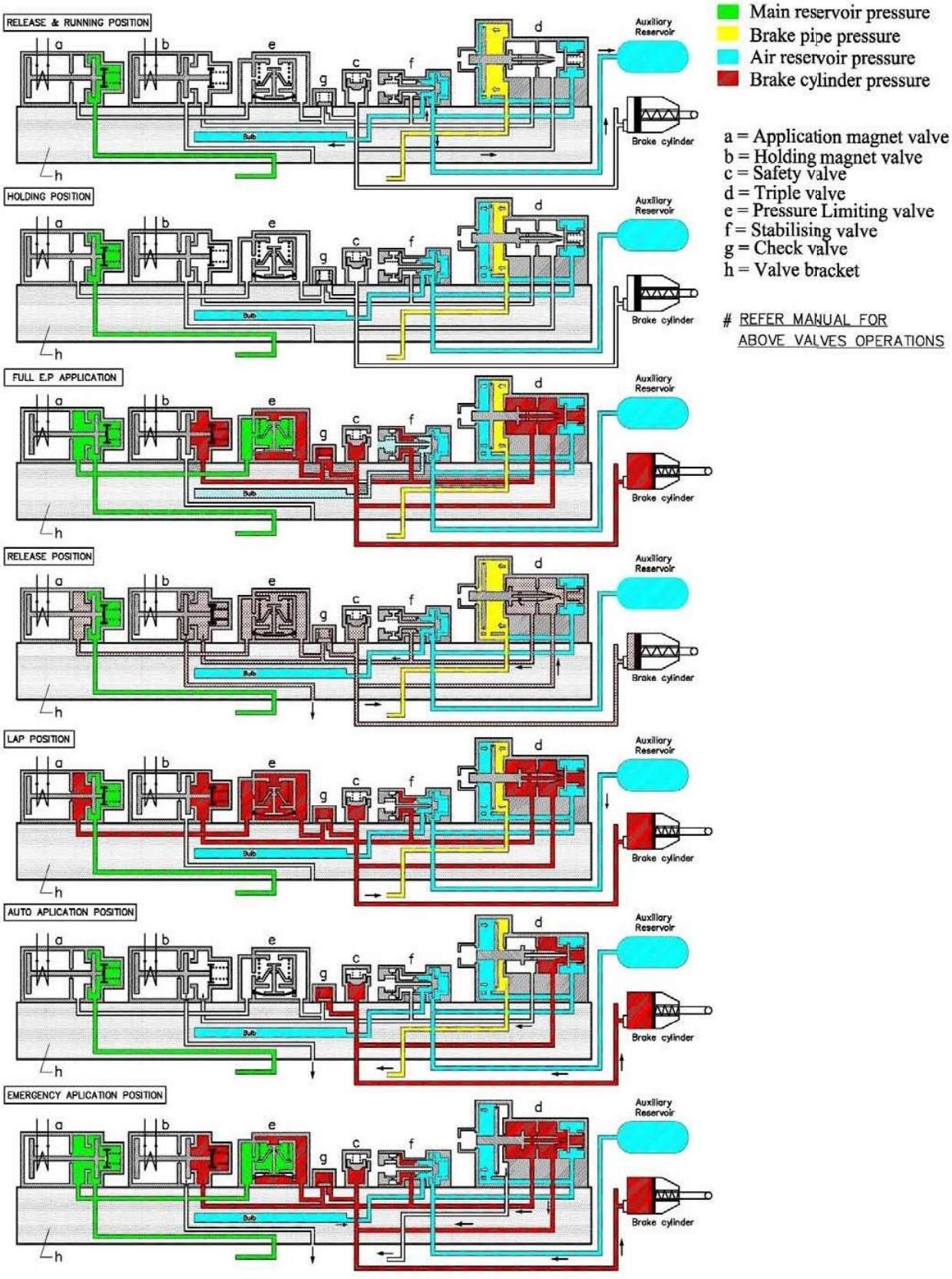
During application, the holding magnet valve, item ‘b’, is excited and cuts off communication between the brake cylinders and the atmosphere. The application magnet valve, item ‘a’, is also excited and allows air from the main reservoir pipe to flow through the pressure limiting valve, item ‘e’ and the check valve, item ‘g’, into the brake cylinders, where the pressure is limited to 3.6 kg/cm2 by the limiting valve. The pressure in the brake cylinder acts on the piston of the stabilizing valve, item ‘f’, pressing it towards the left against the force of a spring, by which means the bulb which was connected to the auxiliary reservoir during release is exhausted.

Holding position

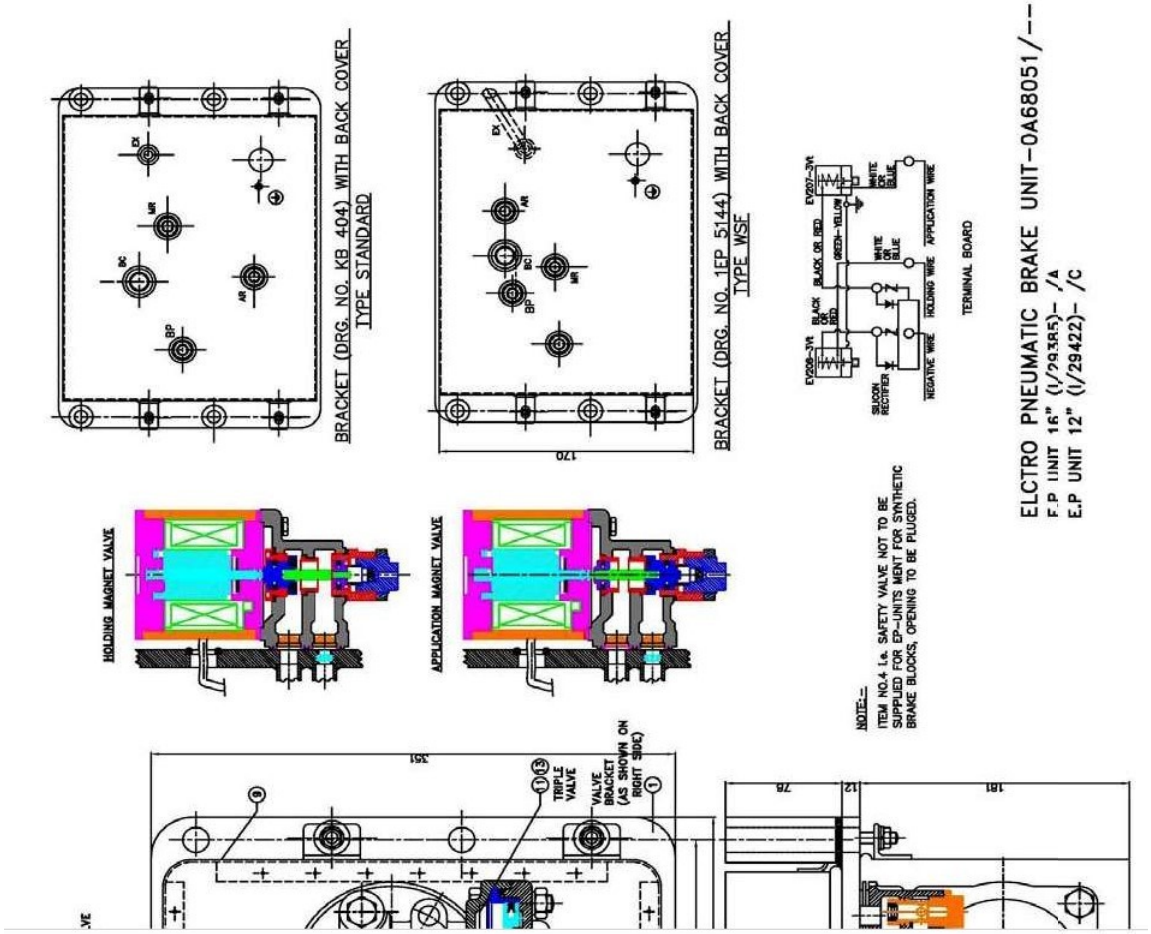
In the holding position only the holding magnet valve item ‘b’ is excited. Both magnet valves are closed, so that compressed air is neither supplied nor released from, the brake cylinders.

Release

During release neither magnet valve is excited. The air in the brake cylinders flows through the triple valve in the release position and the open holding magnet valve, item ‘b’, to atmosphere. The stabilizing valve, item ‘f’, connects the auxiliary reservoir to a bulb in the valve bracket.



SCHEMATIC DIAGRAMS OF E.P. UNIT AT DIFFERENT POSITIONS



ELECTRO PNEUMATIC BRAKE UNIT

MAGNET VALVE (EV 207-3Vt)

The Magnet valve EV 207-3Vt drawing no. 3 A 82337 is used as both application and release valve for the electrically controlled brake. The valve is mounted on the valve bracket of the EP brake unit. When the electrically controlled brake is operated by means of the driver's brake valve, depending on the brake handle position selected, the magnet valve acts as a braking valve by allowing compressed air from the filling pipe to pass via a maximum pressure limiter into the pipe leading to the brake cylinders, or as release valve by connecting the brake cylinders to atmosphere.

The magnet, type G-21, used in this valve is designed for a 100% load period and voltage fluctuations of ±30%.

The valve is supplied for DC. The rated voltage is marked on the indication plate, together with the power input, valve type and serial number and manufacturing year etc.

Design and Operation

The magnet valve consists of two main parts, the magnet and, flanged to it, the valve body containing the air passages. In the body, which contains pressed-in valve seating bushes, a valve head with a rubber-facing insert moves in upper and lower guides and is fitted with K type air seals. The guides are so designed as to relieve the valve head from air-pressure so that the armature of the magnet need only work against the spring. The tension of the spring can be regulated by means of the set screw with a Hex: socket head. The principal parts of the magnetic element are the armature with pull rod, the coil, casing core flange, armature stop, terminal board and protective cover.

When the circuit is broken and there is no current in the magnet, the armature is held up by the spring. The air passage is closed. When the magnet is excited, the magnet core lifts the spring loaded valve head from its seat.

Installation

The valve should be installed upright, with the magnet at the top. It is built for attachment to the valve bracket of the brake unit.

Maintenance

No routine maintenance is required. Should any fault occur in the magnetic component, the whole valve magnet can be exchanged without taking down the air pressure component.

During general inspections or in the event of failure it is expedient to take down the magnet valves for disassembly. The individual parts of the air pressure component should be carefully cleaned. Defective sealing members should be replaced.

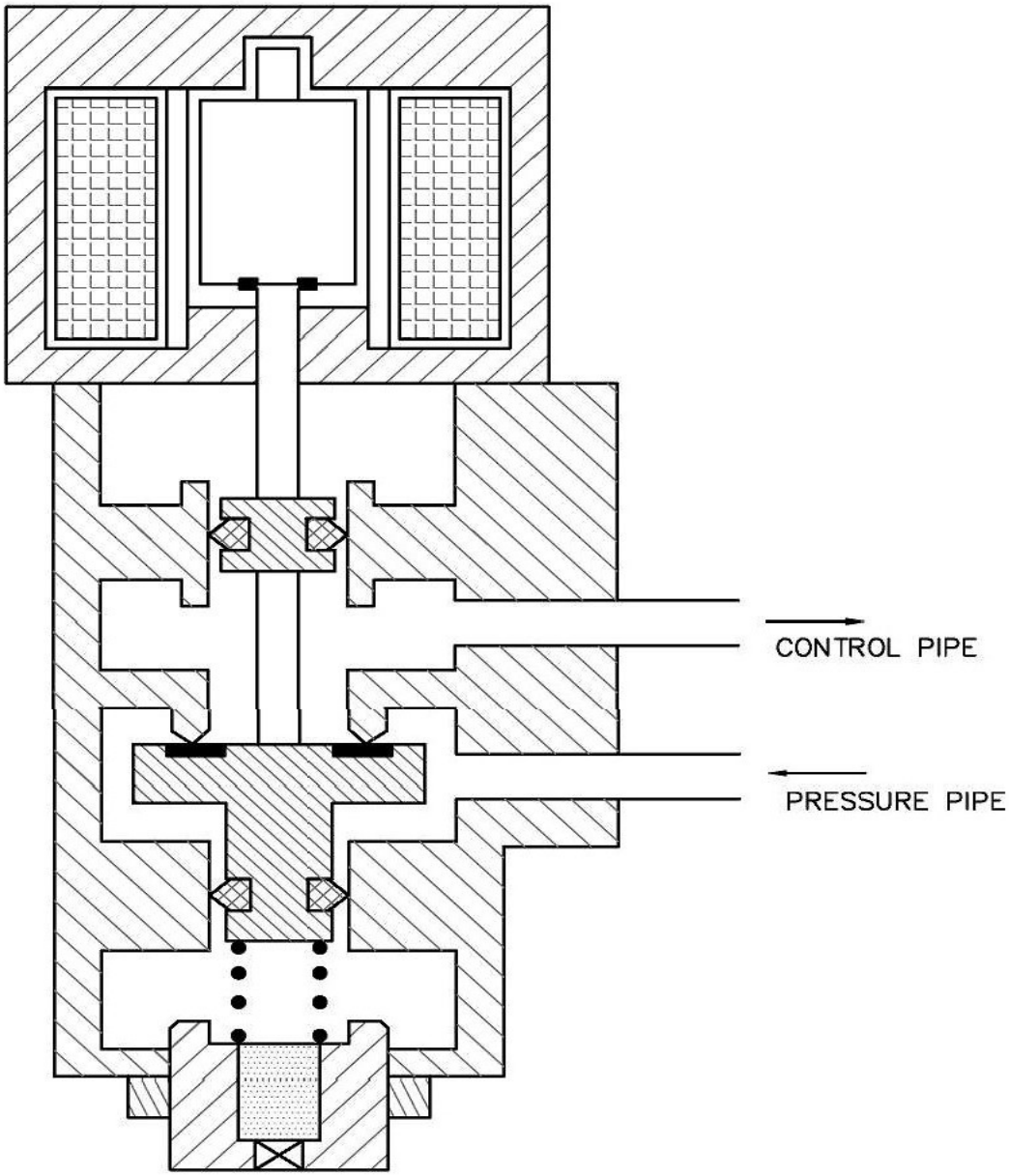
If the valve magnet has been functioning perfectly upto that time, it should not be disassembled but only cleaned externally. The protective cover must be removed in order to check and clean the cable connections. The easy motion of the armature must be verified. One or two drops of acid-free oil may introduce between the draw rod and the sintered bearing through which it passes.

If a field coil has to be exchanged, the screws in the casing of the magnet must be opened to make it possible to remove the flange from the casing and thus gain access to the field coil, when a coil is exchanged, all parts of the valve magnet should be carefully cleaned, and defective parts replaced.

Before re-assembly, the armature and working surfaces in the magnet should be wiped over with a rag dipped in acid-free oil. Any accumulation of lubricant should be avoided.

The K-type air seals in the air pressure component must be also lightly greased on re-assembly, as well as their sealing and guide surfaces and the spring. No lubricant should touch

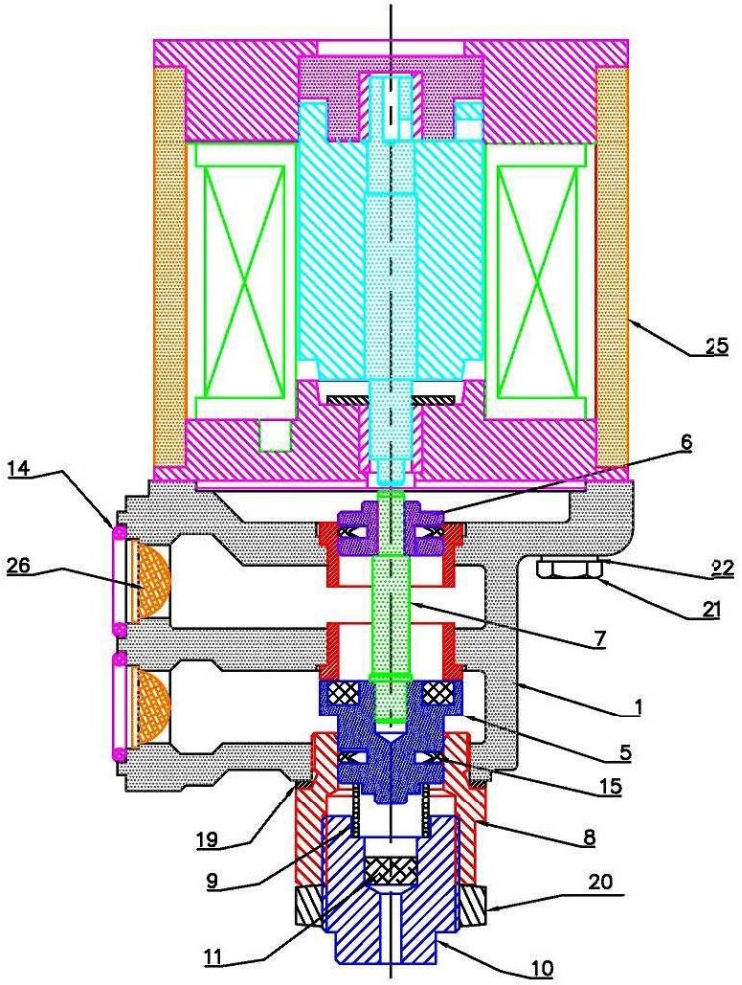
the valve seat and the rubber-facing insert. When inserting the K air seals care must be taken not to bend back and damage the sealing edges.



Solonoid deenergised : passage closed
Solonoid energised : passage opened

Drawn solonoid deenergised

MAGNET VALVE (EV 207- 3Vt)



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10	ADJUSTING SCREW	4A83777	1		26	FILTER	4A43212	2	B
9	COMP. SPRING	4A60934A	1	C	25	VALVE MAGNET G21 S/A	2EP5025	1	C
8	VALVE GUIDE	4A83783	1	C	22	SPRING WASHER B6	DIN 127	2	
7	VALVE ROD	4A99588	1		21	HEX. HEAD SCREW (M6X22)	DIN 933	2	
6	PISTON	4A83780	1		20	HEX. NUT (M26x1.5)	DIN 80705	1	
5	VALVE HEAD S/A	4EP 5561	1		19	SEALING RING A30x36	DIN 7603	1	A
5–7	PISTON S/A	4A 99589–I/53593	1	C	15	K–RING	N890/20.1	2	B
1	HOUSING S/A	4A83782–I/41030	1		14	O RING (16x2.5 B)	DIN 3770	2	B
ITEM NO.	DESCRIPTION	DRG.NO.	NO. OFF	CAT.	ITEM NO.	DESCRIPTION	DRG.NO.	NO. OFF	CAT.

MAGNET VALVE EV 207-3Vt (110 V)
(Drg. no. 3A 82337)

HOLDING MAGNET VALVE (EV 208)

1. General

The magnet valve EV 208K-3Vt drawing no. 3A 82330 is used as holding and release valve for the electrically controlled air brake. The valve is mounted on the valve bracket of the EP brake unit and serves to disconnect the brake cylinders from the atmosphere during electrically controlled application and to allow the air in the brake cylinders to escape to atmosphere during electrically controlled release.

The magnet valve is supplied for DC. The rated voltage is marked on the indication plate, as well as the power input, valve type and serial number.

The magnet type G-21 used in this valve is designed for a 100% load period and voltage fluctuations of ±30%.

2. Design

The magnet valve consists of two main parts, the magnet and, flanged to it, the valve body containing the air passages. The body contains a valve which is guided above and below and fitted with K type air seals. The upper and lower valve guides are so designed that the valve disc is relieved of air pressure so that the armature of the valve magnet need only work against the spring. The tension of the spring can be adjusted by means of a set screw with a Hex. socket head. The principal parts of the valve magnet are the armature with pull rod, the magnet coil, casing, core flange, armature stop, terminal board and protective cover. The valve should be installed upright, with the magnet at the top.

3. Operation

When the magnet is not under current the force of the spring presses the armature upwards, lifting the valve off its seat. The air passage is then open. When the magnet is excited the armature presses the valve onto its seat, against the force of the spring. The air passage isthen closed.

i. Holding magnet valve (EV-208): (DRG. NO. 3A 82339.)
ii. Application magnet valve (EV-207) (DRG. NO. 3A 82337)

CONSTRUCTION, OVERHAULING & MAINTENANCE

Construction wise, both valve, i.e. holding and application, are almost identical with most of the components common. They have a common coil (items 24 & 25), which is mounted on to the respective housings (item 1) by hex screws (item 18 & 21). The housing contains a piston sub-assy. (item 4- 6 and 5-7) which moves inside it and closes or opens the passage when the magnet coil is energized. The other parts of the valves are adjusting screw (item 9 & 10) by which tension of the spring (item 8 & 9) can be regulated. The piston sub-assy. also contains two K rings (item 14 & 15) for sealing different chambers. A filter (item 10 & 11) is provided in the adjusting screw to protect the valves from dust.

No routine maintenance is required. However, should any fault occur in the magnetic components, the whole valve magnet can be replaced without taking down the pneumatic sub- assly.

During POH, the valves should be completely dismantled and the various parts should be cleaned as already mentioned. Rubber parts, such as K-rings, O-rings, etc. should be replaced after 2 years of service. Piston sub-assy. should be checked for wear and tear and must be replaced if the sealing marks on the rubber exceeds 0.2 mm in depth, otherwise the pistons are to be replaced after 3 years of service as a matter of principle. Magnet coil should be checked for their movement of spindle at 110V±30% DC. In case of sluggish movement or jamming, replace the coil. Other parts as and when found worn out or damaged must be replaced.

During assembly, care must be taken that all parts are clean. Rubber parts and other moving parts are to be greased lightly. After assembling the pneumatic portion, check for the piston movement which should not be less than 1.3 mm. After complete assembly, the valves are to be tested individually on a test bench for their function.

TESTING

Holding magnet valve EV-208 and application magnet valve EV-207 are tested according to Pruf 1055 and Pruf 1042 respectively on a common test bench to drg. no. KB 1101. The testing generally includes measuring of valve lift, sealing and function, sensitivity and steps (application and release). It is very important to check these valves on a separate test bench before they are fitted on the EP unit bracket.

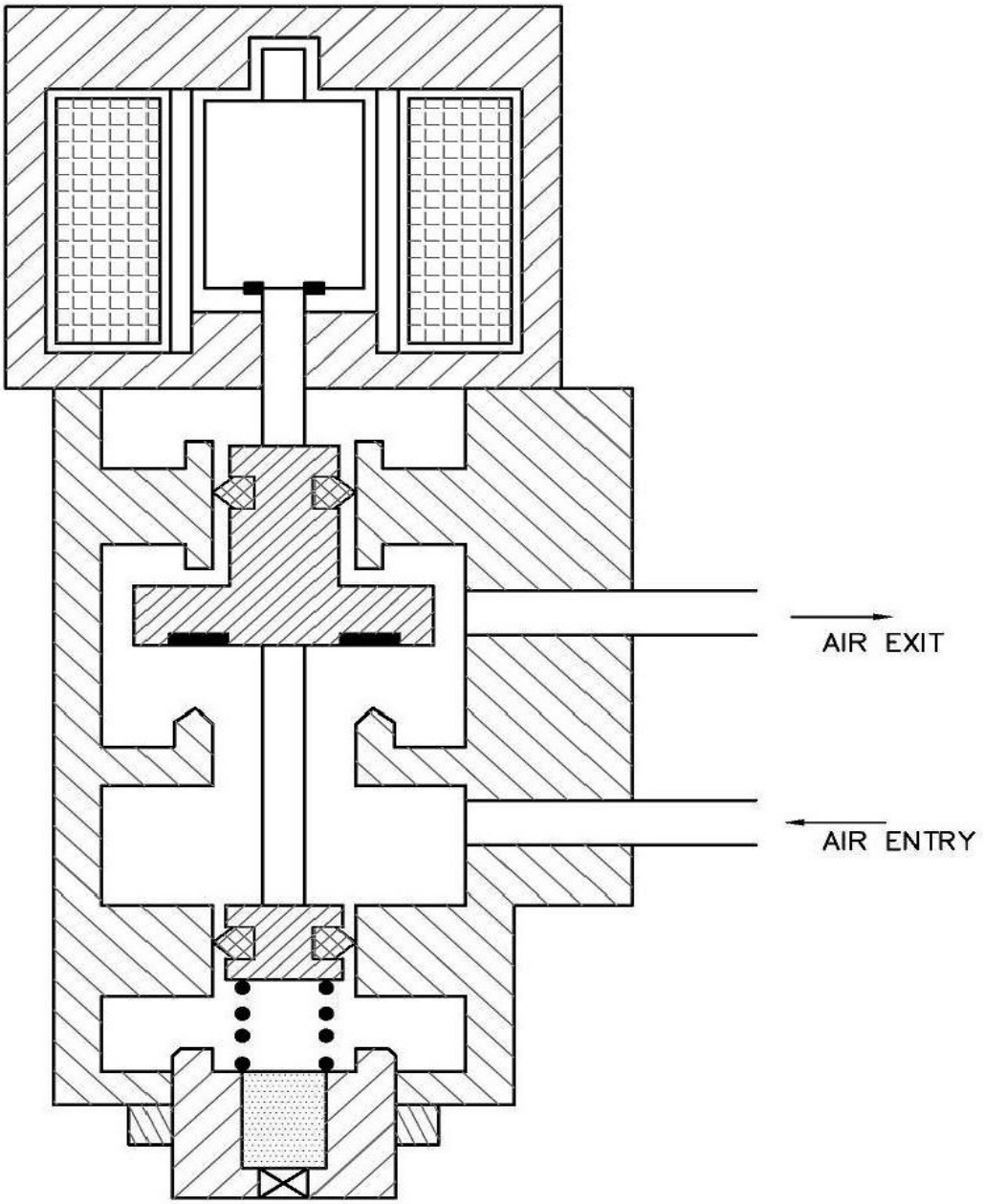
ADJUSTMENT

Generally in electrical application and release, application and release timings are controlled by mean of chokes provided in the EP bracket under these valves. Unless any major changes are required in the brake and release timings of a coach some minor adjustments in timings can be done by tightening or loosening the adjusting screw (item 9 & 10). In case of increasing or decreasing release timings, it can be done by the regulating screw of holding magnet valve and similarly for application timings by regulating screw of application magnet valve. Tightening the screw in holding magnet valve will decrease the release timings and vice versa. Similarly tightening of the screw in the application magnet valve will increase the application timings and vice versa.

OPERATIONAL CHECKS

During routine operational checks, the valves should be checked for their proper functioning. From the exhaust port of the EP bracket, no air should leak either during release or application position. Also check the valves for quick and smooth movement of the piston. Any minor adjustments of the timings (application & release) can also be done by these valves as explained earlier. Also check for any

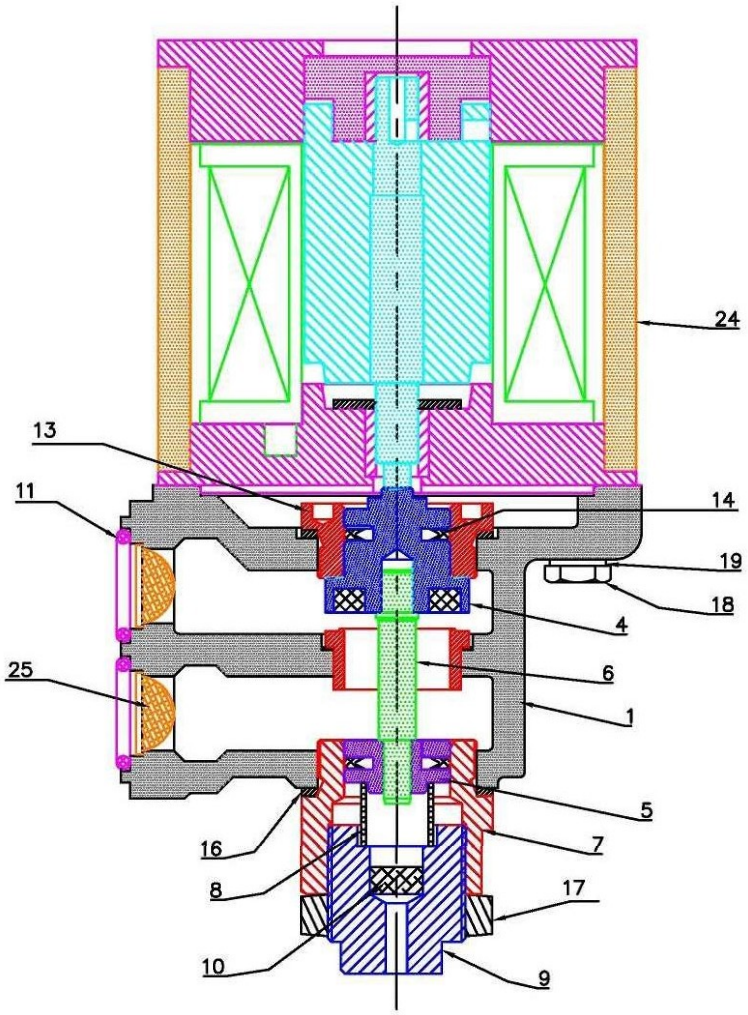
defective wiring, if found, it should be replaced. As a matter of principle the valve should be cleaned after every two months.



Solonoid deenergised : passage opened
Solonoid energised : passage closed

Drawn solonoid deenergised

MAGNET VALVE (EV 208- 3Vt)



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9	ADJUSTING SCREW	4A83777	1		24	VALVE MAGNET G21 S/A	2EP5025	1	C
8	COMP. SPRING	4A60934A	1	C	19	SPRING WASHER B6	DIN 127	2	
7	VALVE GUIDE	4A83783	1	C	18	HEX. HEAD SCREW (M6X22)	DIN 933	2	
6	VALVE ROD	4A99588	1		17	HEX. NUT (M26x1.5)	DIN 80705	1	
5	PISTON	4A83780	1		16	SEALING RING A30x36	DIN 7603	2	A
4	VALVE HEAD S/A	4EP 5561	1		14	K-RING	N890/20.1	2	B
4-6	PISTON S/A	4A 99589-I/53593	1	C	13	VALVE GUIDE	4A 83776	1	
1	HOUSING S/A	4A83774-I/41034	1		11	O RING (16x2.5 B)	DIN 3770	2	B
ITEM NO.	DESCRIPTION	DRG.NO.	NO. OFF	CAT.	ITEM NO.	DESCRIPTION	DRG.NO.	NO. OFF	CAT.

MAGNET VALVE EV 208-3Vt (110 V)
(Drg. no. 3A 82339)

SAFETY VALVE, TYPE AKL (DRG. NO. 4A 11422)

The safety valve AKL protects the brake cylinders from over pressure. When the pressure reaches its permissible maximum limit, the safety valve discharges air into the open. The blow-off capacity is 78 chf/min. at 145 psi (2600 ltrs./min. at 10 kg/cm2). The valve assembly comprises a valve cone, and the screw plug with adjusting screw in the upper part of the body, the spring and tightening screw in the lower part, and the connecting nipple.

Compressed air enters through the connecting nipple, passes through holes in the bottom of the lower part into the spring chamber and lifts the valve cone up as soon as the pressure overcomes the set tension of the spring. After the piston has been lifted air flows across the total bottom area of the valve cone and forces same against the screw plug in the upper part. The air escapes through the exhaust holes leading into the open and passes through the slack piston wall of the valve cone and through a small hole in the piston wall into the upper part of the valve cone. Due to the influence of the resulting pressure distribution, the valve cone closes again. The closing pressure can be adjusted by the adjusting screw.

INSTALLATION

The valve unit should be installed vertically between or immediately behind the brake cylinder line. The removal of the actual valve from the firmly inserted connecting nipple should not be impeded.

CONSTRUCTION, OVERHAULING & MAINTENANCE

The safety valve consists of a housing sub-assy. (item 6) comprising of upper part (made out of brass) and lower part (made out of steel) which are screwed and machined together. The valve cone (item 7) is lapped for sealing against the housing with grinding powder, brasso and a special tool. To the valve cone, through a link (item 13) is attached a tension spring (item 5), spring tightening screw (item 3) and nut (item 2). This complete assembly is placed inside the housing and the blow-off pressure is adjusted by the nut (item 2). On the top of valve cone is a locking cap (item 9) with a hex nut (item 8), a regulating screw (item 11) and hex nut (item 10). The closing pressure is adjusted by this regulating screw.

Generally, safety valve type AKL requires very little maintenance in day to day working. During POH the safety valve is to be completely dismantled and all the parts cleaned and washed with kerosene or petrol. The major components which need attention during overhauling are tension spring and valve cone. Tension spring of the safety valve must be replaced after every two years of service. In case it is found rusty or damaged, it must be replaced immediately. Every time, safety valve is opened the sealing ring (item 4) should be changed. Other parts, such as joining piece, spring tightening screw, links, locking cap, hex nut, and regulating screw should be replaced if found damaged. Every time a valve cone is replaced it is to be lapped with the housing with lapping powder and brasso. It is always recommended that in case of replacement of valve cone, the housing sub-assy. should also be replaced for proper lapping and matching to give perfect sealing.

In order to use safety valves in conjunction with the synthetic brake blocks, the tension spring to drg. no. 4A 37074 is to be replaced with tension spring to drg. no. 4A 37074/2 and adjusted to 2.2 kg/cm2 blow off pressure.

ADJUSTMENTS

The safety valve is adjusted for two pressures:

a) Working pressure (blow off pressure)
b) Closing pressure (shut off pressure)

Working Pressure (blow off pressure)

Safety valves used in EP brake units for use in conjunction with cast iron brake blocks are set at 4.0±0.1 kg/cm2 blow off pressure where those in conjunction with the synthetic brake blocks EP installed after additional pressure limiting valve and before brake cylinder and set at

2.2 kg/cm2 pressure. The blow off pressure is adjusted by tightening or loosening of the nut for spring tightening screw (item 2). For increasing the blow off pressure the nut is tightened. After the set adjusted pressure is reached the nut is locked by a split pin.

Closing pressure (shut off pressure)

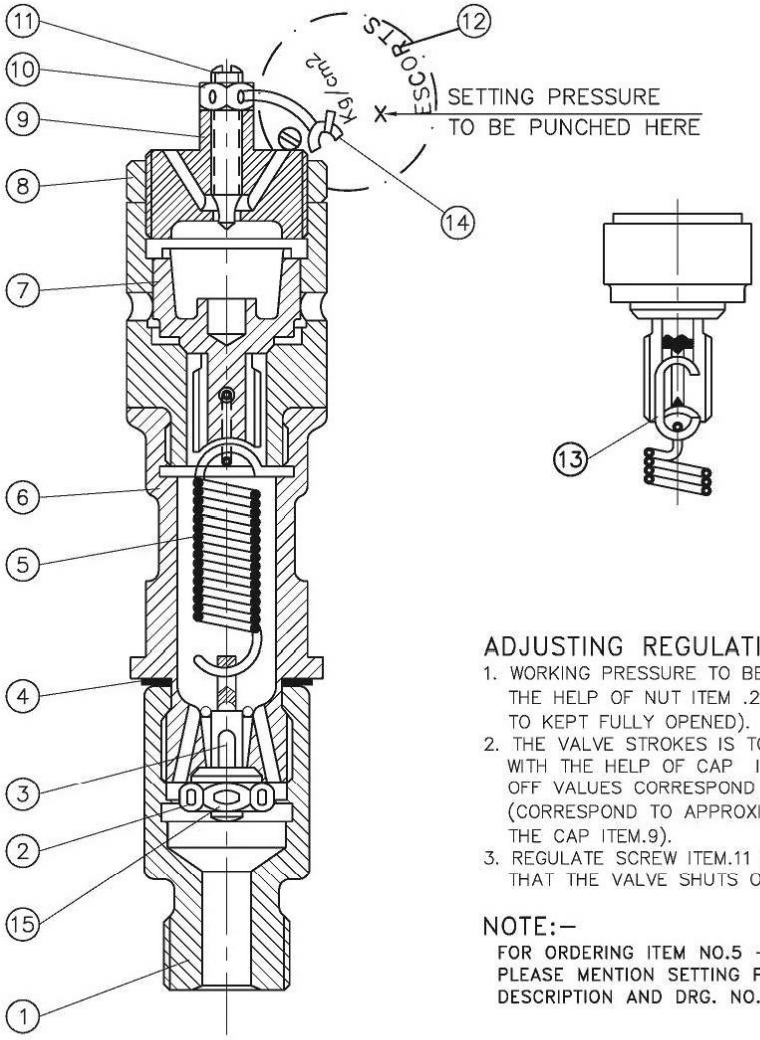
When safety valve blows at 4.0 kg/cm2 it automatically closes at 3.7 ± 0.1 kg/cm2 i.e. after a drop of 0.3 kg/cm2 maximum. This closing pressure is adjusted by the movement of regulating screw (item 11). Initially, locking cap (item 9) is screwed in fully to touch the valve cone and is then rotated back by one revolution and locked by hex nut (item 8). Fine regulations in the pressure drop are then controlled by this regulating screw (item 11). After getting the set pressure drop, this screw is locked by hex. nut (item 10). It is recommended that the setting of the safety valve should always be done on the test bench.

TESTING

The safety valves (type AKL) are tested on a test bench to drg. pruf 1274 and are also tested in accordance with pruf 1274 for adjustment, leakage, sensitivity, blow off capacity and proper functioning. Safety valves thus tested and adjusted will give satisfactory service and will not change their set values in running operations.

OPERATION CHECKS

During operational checks safety valves are to be tested for their blow off pressure once every month. This is so because during normal running operations such conditions may not arise. It should be opened in case the blow off pressure and shut off pressures vary. In case of continuous blowing off of the shut off pressure, check for the free movement of the valve cone. Clean all the parts and apply a little grease in all the moving parts. If a safety valve starts leaking at low pressures, lap the valve cone with the housing as explained earlier.



ADJUSTING REGULATIONS:–

1. WORKING PRESSURE TO BE ADJUSTED WITH THE HELP OF NUT ITEM .2 (SCREW ITEM 11 THEN TO KEPT FULLY OPENED).
2. THE VALVE STROKES IS TO BE SO ADJUSTED WITH THE HELP OF CAP ITEM 9. THAT BLOW OFF VALUES CORRESPOND TO DRG. NO. 4A18242a (CORRESPOND TO APPROXIMATELY 1 TURN OF THE CAP ITEM.9).
3. REGULATE SCREW ITEM.11 IN SUCH A WAY THAT THE VALVE SHUTS OFF AFTER A FULL

NOTE:–

FOR ORDERING ITEM NO.5 – TENSION SPRING PLEASE MENTION SETTING PRESSURE ALONG WITH DESCRIPTION AND DRG. NO.

8	HEX. NUT	1	4A26252			1	
7	VALVE CONE	1	4A26148	15	SPLIT PIN (3x20)	1	DIN94
6	HOUSING (ASSY.)	1	4A18202	14	BRASS WIRE (ø1x100)	1	DIN1757
5	TENSION SPRING	1	4A37074	13	LINK	1	4A20622
4	SEALING RING	1	4A29412	12	IDENTIFICATION MARK	1	4KB228
3	SPRING TIGHTENING SCREW	1	4A11602	11	REGULATING SCREW	1	4A11601
2	NUT FOR SPRING TIGHTENING SCREW	1	4A11603/1	10	HEX. NUT	1	4A18204
1	JOINING PIECE	1	4A26155	9	LOCKING CAP	1	4A11600
ITEM NO.	DESCRIPTION	NO. OFF	DRG.NO.	ITEM NO.	DESCRIPTION	NO. OFF	DRG.NO.

SAFETY VALVE (AKL-4Kg/cm2)
(Drg. no. 4A 11422a)

PRESSURE LIMITING VALVE

1. General

The function of the pressure limiting valve drawing no. 2A 81335 is to limit the air pressure in the brake cylinders to a specified value. For installation in pipe lines, the valve is supplied with a supporting bracket from which it can be removed for maintenance work without necessitating the breaking of pipe of pipe connections or removal of pipes. In the case of EP brake equipment the model without a bracket is used, the HdB valve being mounted on the valve bracket of the EP brake unit.

The spring in the pressure limiting valve is selected and adjusted to correspond to the maximum pressure desired.

2. Design

The pressure limiting valve consists of a body with 2 chambers, 'a' and 'b' in which a piston is fitted. Between the two chambers is a valve seat which is opened and closed by the piston. A spring 'c' holds the piston in its lower end position and keeps the passage between chambers 'a' and 'b' open. At the lower end of the piston are a diaphragm plate and diaphragm.

3. Operation

The piston is normally held down by the force of the spring (8) so that the passage between the chambers remains open.

The air entering the valve flows through chamber 'a' and the open valve seat into chamber 'b' and the pipe downstream of the valve. A certain pressure builds up in chamber 'a' and via the seat, as well as in chamber 'b', and this acts on the diaphragm. As soon as the pressure in chamber 'b' reaches the value for which the spring 8 is adjusted, the piston is pressed upwards against the force of the spring and the valve seat closed. Communication between chamber ' 'a' and b' is interrupted when the pressure in chamber 'b' drops against the spring 'c' reopens the passage, allowing air to pass once more.

The inlet valve is balanced so that the closing pressure remains independent of the incoming pressure; this also ensures high re-feeding sensitivity.

Construction, Overhauling & Maintenance

Taking into consideration the functional importance and operation of the pressure limiting valve in the working of EP unit, it is very important to overhaul the valve during every POH. Basically the valve consists of a grey cast iron housing (item 1) into which a valve head (item

2) moves against the force of a comp. spring (item 8). A rubber diaphragm (item 10) is pressed in the groove 2 of the housing and rests on a diaphragm plate (item 9). A supporting ring (item

14) is screwed in for adjusting the max. pressure. The valve head moves inside a locking screw (item 13) which is securely tightened by a special spanner 4A 47440.

To overhaul the pressure limiting valve it should be dismantled completely. The locking screw (item 13) must never be opened by ordinary screw driver or by chisel and hammer, but a special spanner to escort drg. 4A 47440 should be used. After complete dismantling of the valve, the cast iron housing should be washed with

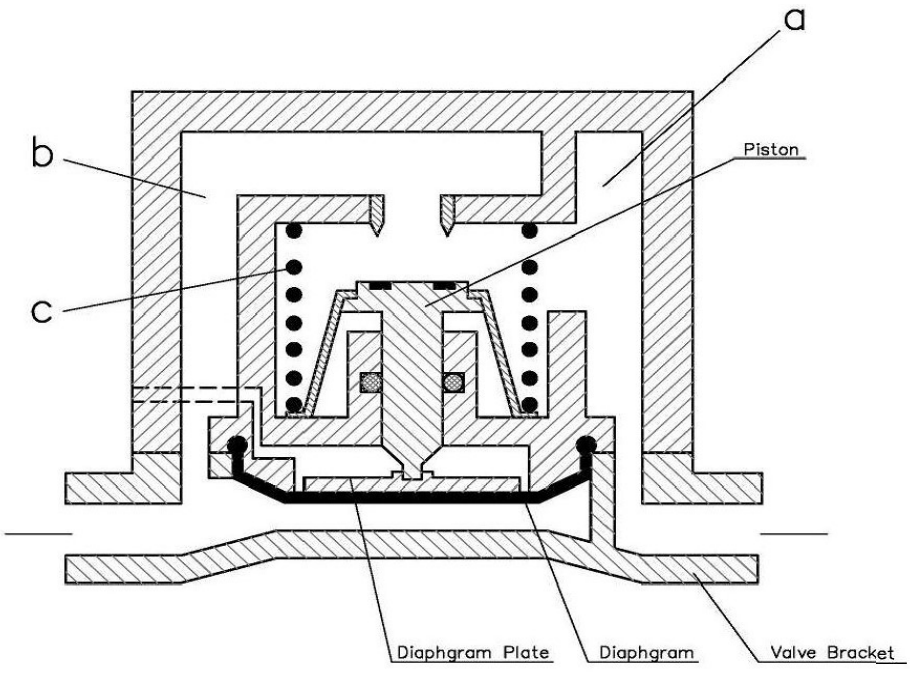
petrol. The rubber parts and valve head are to be washed with soap water solution. Examine the condition of these parts and replace in case of damage or wear and tear. In any case all the rubber parts including to valve head must be replaced after a period of two years.

The compression spring (item 8) which also controls the adjustment of BC pressure should be inspected for any rust or wear. This spring must be replaced after a period of 3 years or earlier if found rusty or damaged. Filter (item 6) should be washed in petrol and before re-assembling should be dried thoroughly. Before assembling the valve all the components should be cleaned. A light grease should be applied on the valve head and inside the locking screw (item4) locking screw should be free and smooth. Flat sealing ring (item 12) should be

replaced every time the valve is opened for overhauling. Cable compound 'B' is to be applied in hot condition on the threading of the supporting ring (item 14). After cooling down the supporting ring, it is then to be screwed in by special spanner 4A 59318. The use of cable compound is only as an additional precaution against disturbance of maximum adjusted pressure. Sealing lip of rubber diaphragm (item 10) is to be seated properly on to its groove in the valve housing. The exhaust plug if found missing must be replaced. Mounting sealing rings

(item 11) should always be replaced when the pressure limiting valve is opened for

overhauling. The free movement of the diaphragm against the force of the spring should be checked with hand before mounting the valve on to the test bench for testing.



a = INCOMING MR PRESSURE

b = OUTPUT B.C PRESSURE

C = COMP. SPRING

PRESSURE LIMITING VALVE

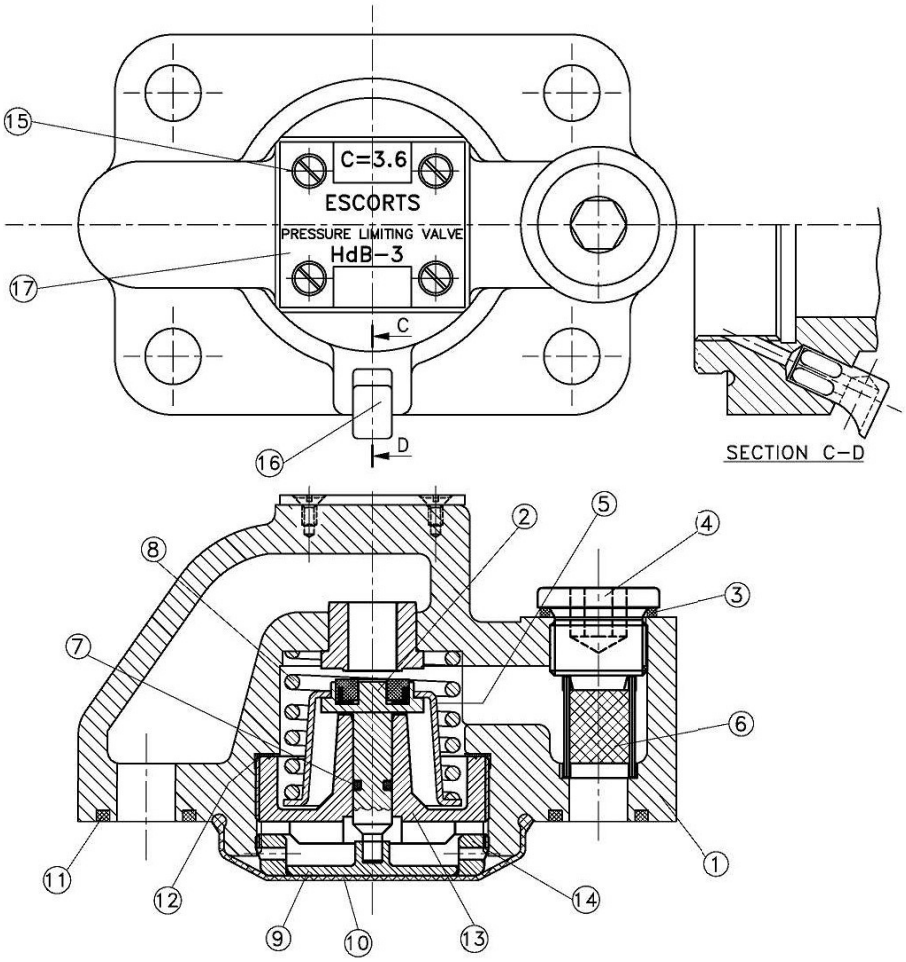
TESTING ADJUSTMENT

The pressure limiting valve is individually tested on a separate test bench to drg. no. 4A 82436 according to pruf 3089 for setting of max. brake cylinder pressure of 3.6±0.1 kg/cm2. Adjustment of pressure is done by the supporting ring (item 14). The clockwise rotation of the supporting ring decrease the pressure, whereas anti-clockwise rotation will increase the pressure. Once the pressure limiting valve is adjusted and tested as per pruf 3089, the pressure is not likely to vary from the desired adjusted pressure. Also the testing includes the leakage from the exhaust port and the leakage from the main reservoir to brake cylinder when the valve head is in closed position. The release timings of BC can also be recorded in the test bench to check for the open passage of PLVs valve head.

The maximum range of adjustment of BC pressure from 3.2 to 3.8 kg/cm2 may be possible with maximum and minimum tightening of supporting ring.

OPERATION CHECKS

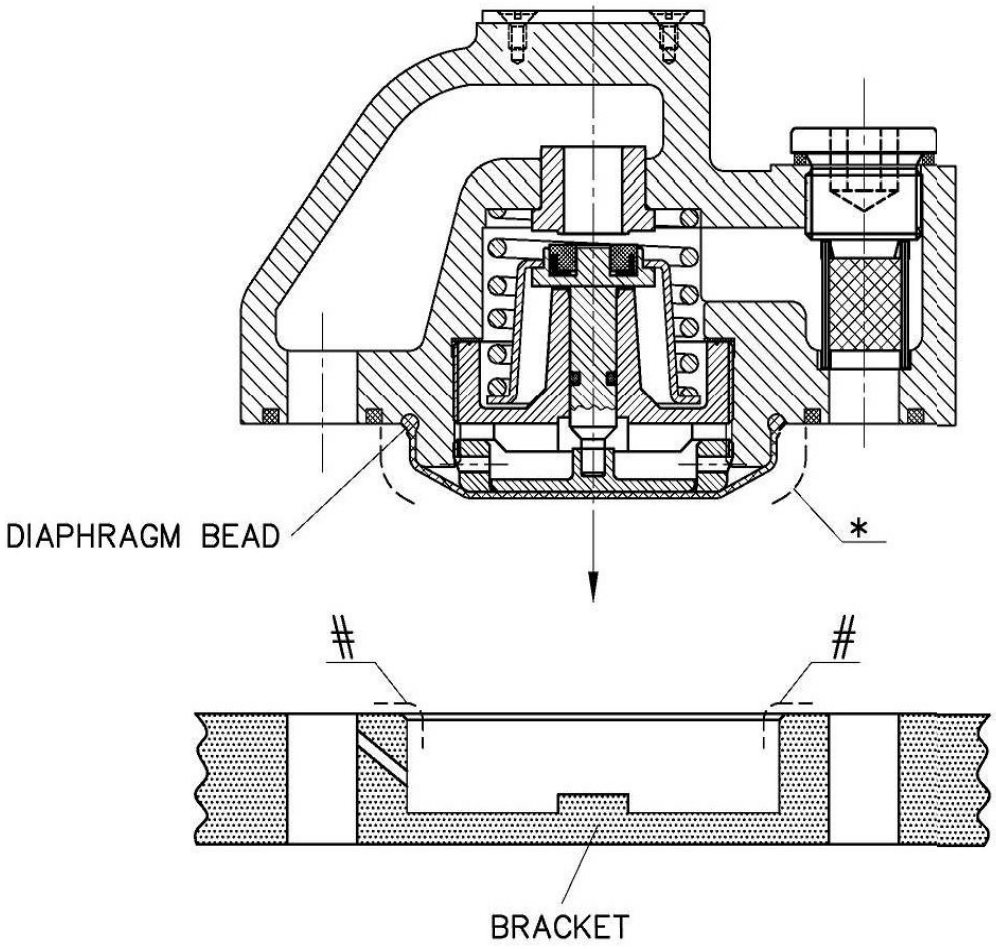
Normally the adjustment of pressure limiting valve does not get disturbed. As and when it is observed that the adjustment has been disturbed, against it as explained above for correct functioning. Any leakage from exhaust port or anywhere else will also cause disturbance in the pre-adjusted pressure. In the case of leakage from exhaust port, change the flat sealing ring (item 12) and O-ring (item 7). Press the diaphragm (item 10) on to its groove if it is not properly pressed in. Scratches, dent marks or wear and tear of the polished surface of the valve head could also be the cause of leakage from the exhaust port (which later on affects the adjusting pressure). This valve head must be replaced in case of such defects. Choking of the filter (item 6) may cause slow charging of the BC pressure, it is, therefore, advisable to clean the filter after regular intervals. Period to be decided by the user Railways based on field experience.



9	DIAPHRAGM PLATE	4A31332	1						
8	COMPRESSION SPRING	4A30485/3	1	C	17	NAME PLATE	KB193	1	
7	O-RING	4A40125/6	1	B	16	EXHAUST PLUG	4A34520	1	
6	FILTER	4A57215	1	B	15	COUNTER SUNK SCREW	M3X6 DIN63	4	
5	SPRING PLATE	4A31335	1		14	ADJUSTING RING	4A31337	1	
4	LOCKING SCREW	4A57216	1		13	LOCKING SCREW	4A42840	1	
3	SEALING RING (A20x24)	DIN7603	1	A	12	FLAT SEALING RING	4A31340/3	1	A
2	VALVE HEAD (SUB ASSY.)	4A74548-I/16130	1	C	11	SEALING RING	4A27763/32	2	B
1	HOUSING (SUB ASSY.)	3A81384-I/39410	1		10	DIAPHRAGM	4A40667	1	B
S.NO.	DESCRIPTION	DRG.NO.	NO. OFF	CAT.	S.NO.	DESCRIPTION	DRG.NO.	NO. OFF	CAT.

ALT.01-17.2.06

PRESSURE LIMITING VALVE
(Drg. no. 2A81335)



NOTE:–

* DIAPHRAGM SHOULD BE SNUGLY INSTALLED AND AREA AS SHOWN IN DOTTED SHOULD BE APPLIED WITH THIN FILM OF GREASE FOR EASY INSERTION OF ASSY. CARE TO BE TAKEN WHILE TIGHTENING FOUR HEX. NUTS THAT NUTS ARE EQUALLY TIGHTEN DIAGONALLY IN STEPS

\# CHECK FOR NO DENTS/SHARP EDGES

Recommended method of diaphragm installation & fixing of sub assembly.

PRESSURE LIMITING VALVE ON EP UNIT BRACKET

TRIPLE VALVE (Type Fe114)

1. General

The function of the triple valve Fe 114 drawing no. 1A 68053 is to admit compressed air to the brake cylinders or to exhaust them in accordance with the pressure conditions prevailing in the brake pipe. When the pressure in the brake pipe is reduced the brake cylinders are charged; when the brake pipe pressure is increased, they are exhausted. It is possible by gradually reducing the pressure in the brake pipe to obtain a gradual increase of brake cylinder pressure. It is not possible, however, to obtain gradual decrease of brake cylinder pressure by gradually increasing the brake pipe pressure. Increasing the brake pipe pressure results in full release and hence exhausting of the brake cylinders, i.e. the triple valve only provides for direct release.

The triple valve is provided with a valve bracket to which the necessary pipes can be connected.

When this triple valve is used with EP brake equipment it is mounted on the Valve bracket of the EP brake unit. In this system the triple valve is used for operation of the brake purely by air pressure.

2. Design

The Fe 114 triple valve is designed on modern lines. It contains no ground-in parts such as slide valve or piston rings, but only rubber-sealed valves and K-type air seals. A piston in the body of the triple valve divides it into 5 chambers.

Leakage between the piston and the body is prevented by K type air seals. One end of the piston rod is pierced by a longitudinal passage and forms a valve seat. The brake cylinders are exhausted through this valve seat. Another valve seat serves for charging the brake cylinders. Both valve seats are opened and closed by means of a spring loaded double seated valve.

3. Operation

1. Charging and release position.

The charging of the auxiliary reservoir takes place through the triple valve in release position. Compressed air flows from the brake pipe L to the right hand side of the piston L/R. The piston is urged to the left and opens the passage from L to R. The auxiliary reservoir is filled. The passage from R to C is closed and the brake cylinder C connected to atmosphere.

2. Application position

On application, the pressure in the brake pipe L is reduced. The pressure in the auxiliary reservoir, which is as high as the original brake pipe pressure, urges the piston L/R to the right. This first cuts communication from C to atmosphere, and also interrupts communication between L and R. Further motion of the piston

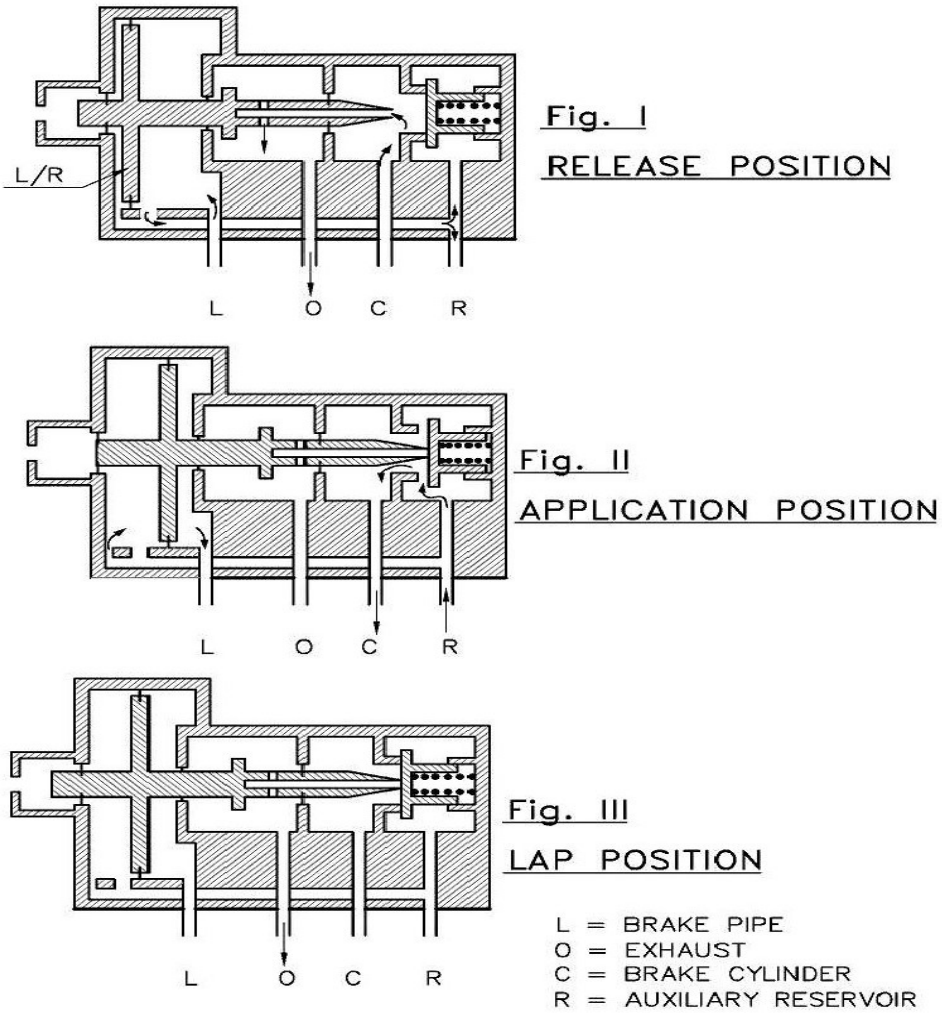
towards the right lifts the double seated valve from its seat, against the force of the spring, and establishes communication between R and C. Thereupon air pressure flows from the auxiliary reservoir into the brake cylinders.

3. Lap position

As soon as the pressure in the auxiliary reservoir has fallen to the same value as the brake pipe pressure, the piston L/R is moved to the left and the triple valve goes into lap position. In this position the connection from R to C and from C to atmosphere is closed.

4. Release

During release the triple valve takes up the same position as in the charging position. As soon as the pressure in the brake pipe L is increased and exceeds the pressure in the auxiliary reservoir, the piston L/R is moved to the left again and communication established between C and the atmosphere. air escapes from the brake cylinders to atmosphere and the brakes released. The auxiliary reservoir is simultaneously recharged with air.



TRIPLE VALVE (Fe 114 So)

Construction, Overhauling & Maintenance

The triple valve consists of a housing sub-assembly (item 1) made out of grey cast iron. A cover (item 2) is fixed at the lower end of the housing by 4 nos. hex head bolts and nuts (items 22 & 23). A screw bush (item 9) is screwed in to the housing sub assly. The piston (item 4) actuates inside the cover and the screw bush which is duly supported by K rings (item 15). The top chamber valve plate (item 6) seals the R and C chambers. The valve plate is forced to rest on its seat by a compression spring (item 11). A filter (item 14) is provided at exist of the aux. reservoir to filter the air going into the brake cylinders.

The triple valve 12" and 16" differ from each other in the following respects :

S. No.	Triple Valve	16" CI / Syn BB	12" CI / Syn BB
1.	Bush with filling	8 orifices	6 orifices

	choke (item 30)		
2.	Release choke (item 31)	Nil	1 no.
3.	O-ring (item 26)	Nil / 1 no.	1 no.
4.	Housing (item 1)	Bigger choke	Smaller choke
5.	Brake application choke (item 3)	Nil / 1 no	1 no.

Triple valves, in general, should be opened after every 3 months, for cleaning purposes. During the POH, the valve should be completely dismantled and the parts cleaned for visual inspection. Triple valve contains maximum number of K-rings / O-rings hence all the rubber parts must be replaced after 2 years of service. Whenever the piston assy. shows marks of wear & tear/scratches on the ground surface, it should be replaced. Similarly, if the valve plate (item

6) shows marks on the sealing surface which are more than 0.4 mm deep or wear and tear on the ground surface, it should be replaced. Before assembling the valve, all the parts must be cleaned. Rubber parts should be washed in soap water solution. All the moving and rubber parts should be lightly greased. The inner surface of the bush with filling choke should be polished with brasso for perfect sealing. The comp. spring (item 11) should be replaced after every 3 years of service. The filter should be washed and cleaned in petrol before assembling. The dust filter (item 7) should also be cleaned with petrol and checked for any damage before assembly. After the triple valve is assembled, it should be tested on a separate test bench.

TESTING

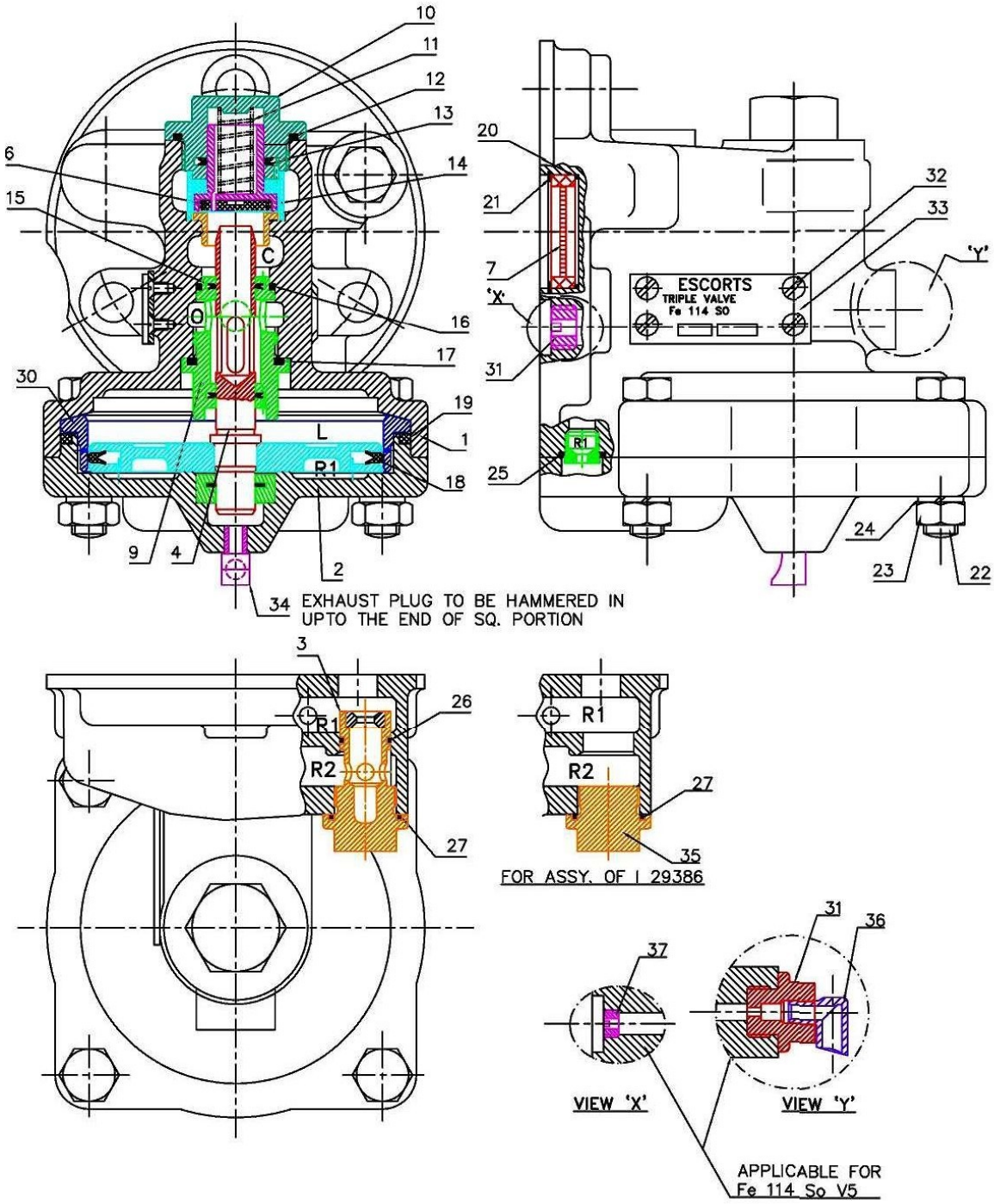
Triple valve is tested separately on a test bench to drg. KB 1102 in accordance to pruf 3107. This testing will include overall and internal leakage between the various chambers, auto application and release timings, application steps, initial filling of aux. reservoir sensitivity and insensitivity tests etc. Functionally, the triple valve plays a very important role in the operation of auto brakes, therefore, it is important to check each valve after the overhauling according to the pruf 3107 for the above mentioned tests.

ADJUSTMENTS

No adjustments are required to be made on the triple valve. However, the only precaution that needs to be observed is that triple valve for motor coaches (16”) and driving trailer/plain trailers (12’) do not mix-up with each other. Respective name plates must be there to identify these valves.

OPERATIONAL CHECKS

For slow charging of aux. reservoir triple valve should be cleaned especially bush with filling choke and piston. Also check should be made for easy and free movement of piston. In case of any leakage from the exhaust port of the EP bracket, clean or replace the rubber parts of the triple valve. In case of any variation into auto application or release timings the valve should be overhauled and checked on the test bench for correct timings. **The mounting seal on the EP bracket for triple valve must be replaced after 3 years.** In case of any leakage from the mounting, replace this seal.



TRIPLE VALVE Fe 114 So

(Drg. no. 1A 68053/...)

PART LIST OF TRIPLE VALVE

S.NO.	DESCRIPTION	NO.OFF a	b	c	d	e	DRG.NO.	MATERIAL	REMARKS	CAT.
37	LOCKING SCREW M10x1	–	–	–	–	1	DIN908		PRESENTLY USED IN METRO	
36	EXHAUST PLUG	–	–	–	–	1	4A34520			
35	LOCKING SCREW	1	–	–	–	–	4A94630		ONLY FOR 16" UNIT USED C.I BRAKE BLOCK	
34	EXHAUST PLUG	1	1	1	1	1	4A34520			
33	NAME PLATE	–	–	–	–	1	4A42210			
33	NAME PLATE	–	–	–	1	–				
33	NAME PLATE	–	–	1	–	–	KB191/B			
33	NAME PLATE	–	1	–	–	–				
33	NAME PLATE	1	–	–	–	–	KB191/A			
32	COUNTER SUNK SCREW (AM3x6)	4	4	4	4	4	DIN63			
31	RELEASE CHOKE	–	–	–	–	1	4A42214/10		PRESENTLY USED IN METRO	
31	RELEASE CHOKE	–	–	–	1	–	4A68035/4			
31	RELEASE CHOKE	–	–	1	–	–	4A68035/3			
31	RELEASE CHOKE	–	1	–	–	–	4A68035/2			
30	BUSH WITH FILLING CHOKE	–	–	–	–	1	4A55178/10		8 NOS. HOLES OF ø0.9	
30	BUSH WITH FILLING CHOKE	–	–	–	1	–	4A55178/11		2 NOS. HOLES OF ø0.7	
30	BUSH WITH FILLING CHOKE	–	–	1	–	–	4A55178/3		6 NOS. HOLES OF ø1.1	
30	BUSH WITH FILLING CHOKE	–	1	–	–	–	4A55178/4		6 NOS. HOLES OF ø1.1	
30	BUSH WITH FILLING CHOKE	1	–	–	–	–	4A55178/9		8 NOS. HOLES OF ø1.1	
27	O-RING	1	1	1	1	1	4A42182			B
26	O-RING	1	1	1	1	1	4A40125/1			B
25	O-RING	1	1	1	1	1	4A50884			B
24	SPRING WASHER A12	4	4	4	4	4	DIN127			
23	HEX. NUT	4	4	4	4	4	DIN934	6 S		
22	HEX. HEAD BOLT M12x50	4	4	4	4	4	DIN931	8 G		
21	CIRCLIP (INTERNAL) 40x1.75	1	1	1	1	1	DIN472			
20	ROUND CORD RING	1	1	1	1	1	5A37523			B
19	SEALING RING	1	1	1	1	1	4A52904			B
18	K-RING	1	1	1	1	1	N890/105.2			B
17	SEALING RING	1	1	1	1	1	4A27763/23			B
16	ROUND CORD RING	1	1	1	1	1	4A27763/26			B
15	K-RING	3	3	3	3	3	N894/14.8			B
14	FILTER	1	1	1	1	1	4A42197			B
13	K-RING	1	1	1	1	1	N891/20.8			B

12	SEALING RING	1	1	1	1	1	4A27763/31			B
11	COMP. SPRING	1	1	1	1	1	4A37656/7			C
10	CAP SCREW	1	1	1	1	1	4A56790			
9	SCREW BUSH	–	–	–	1	–	4AB1275			
9	SCREW BUSH	1	1	1	–	1	4A94644			
7	DUST FILTER	1	1	1	1	1	4A42381	I–15917		B
6	VALVE PLATE	1	1	1	1	1	4A56792	I–24962		C
4	PISTON	–	–	–	1	–	4AB1271	I–39341		
4	PISTON	1	1	1	–	1	4A94642	I–48681		
3	BRAKE APPLICATION CHOKE	–	–	–	–	1	4A68034/2	I–29429		
3	BRAKE APPLICATION CHOKE	1	–	–	–	–	4A68034/6		FOR K–TYPE C.B.B (16" UNIT)	
3	BRAKE APPLICATION CHOKE	–	–	1	–	–	4A68034/5		FOR K–TYPE C.B.B (12" UNIT)	
3	BRAKE APPLICATION CHOKE	–	–	–	1	–	4A68034/4	I–39400		
3	BRAKE APPLICATION CHOKE	–	–	1	–	–	4A68034/3	I–29428	C.I BRAKE BLOCK	
3	BRAKE APPLICATION CHOKE	–	1	–	–	–	4A68034/2	I–29429	C.I BRAKE BLOCK	
2	COVER	1	1	1	1	1	4AB1284	I–39345		
1	HOUSING COMPLETE	–	–	–	–	1	3A68055			
1	HOUSING COMPLETE	–	–	1	1	–	3A68055	I–29426		
1	HOUSING COMPLETE	–	1	–	–	–	3A68055	I–29427		
1	HOUSING COMPLETE	1	–	–	–	–	3A68055	I–29386		
	TRIPLE VALVE Fe 114 SoGr. 5"	–	–	–	–	x	1A 60053/e		PRESENTLY USED IN METRO	
	TRIPLE VALVE Fe 114 SoGr. 3"	–	–	–	x	–	1A 60053/d	I–39098		
	TRIPLE VALVE Fe 114 SoGr. 12"	–	–	x	–	–	1A 60053/c	I–29424	C.I–B.B /K–TYPE C.B.B	
	TRIPLE VALVE Fe 114 SoGr. 14"	–	x	–	–	–	1A 60053/b	I–29425		
	TRIPLE VALVE Fe 114 SoGr. 16"	x	–	–	–	–	1A 60053/a	I–29886	C.I–B.B /K–TYPE C.B.B	
S.NO.	DESCRIPTION	a	b	c	d	e	DRG.NO.	MATERIAL	REMARKS	CAT.
		NO.OFF								

STABILIZING VALVE

1. General

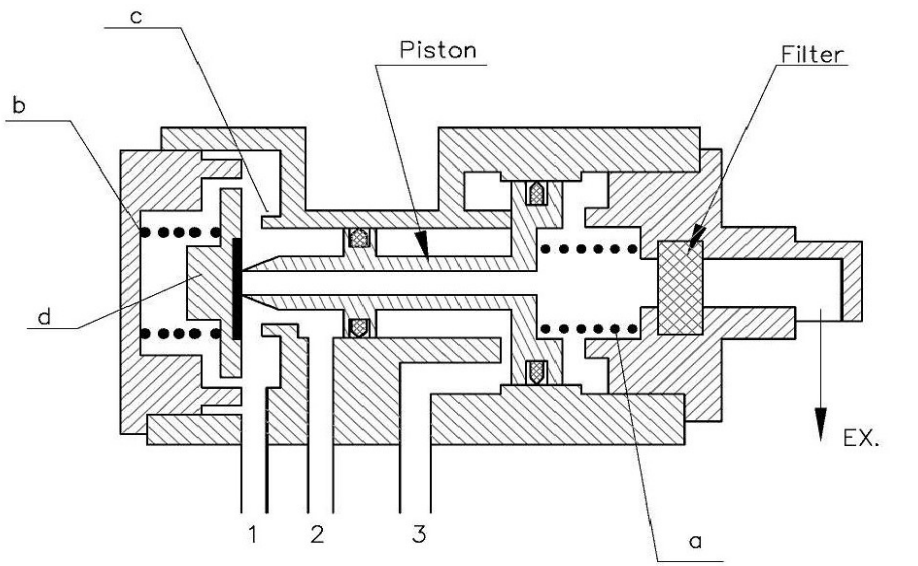
The stabilizing valve drawing no. 3A 47492/1 is used in conjunction with the electrically controlled air brake. It is mounted on the Valve bracket of the EP brake unit. The purpose of this valve is to reduce the pressure in the auxiliary reservoir to about 0.2 kg/cm2 (3 psi) below the pressure reigning in the automatic brake pipe. This reduction is necessary in order to prevent the direct release triple valve connected to the EP brake unit from being moved out of release position into lap position by pressure fluctuations which may occur. The stabilizing valve reduces the pressure in the auxiliary reservoir by connecting it with a bulb in the Valve bracket. The stabilizing valve is controlled by the pressure in the brake cylinder.

2. Design

The stabilizing valve consists of a body with 3 chambers, containing a stepped piston. These chambers are connected by ports to the respective pipe connections in the Valve bracket. The piston is fitted in the body with K type air seals and contains a longitudinal air passage. The body has an exhaust port at one side, protected by a filter. Next to the exhaust port is fitted a spring ‘a’ which holds the piston in its left hand end position. On the other side of the piston is a double seated valve which is held against its seat by a spring‘b’.

3. Operation

In release position, i.e. when the brake cylinders are exhausted the piston is pushed to the left by spring ‘a’ upto the stop, lifting the double seated valve from its seat ‘c’ against the force of the spring ‘b’. This establishes communication between chambers 1 and 2. The valve seat ‘d’ remains closed so that the exhaust port is shut off. When air is admitted to the brake cylinder on application of the brake the air pressure also acts in chamber 2 and on the piston. The latter is pressed to the right against the force of the spring ‘a’. Spring ‘b’ presses the double seated valve onto its seat ‘c’, isolating chamber 1. The valve seat ‘d’ is opened, thus establishing communication between chamber ‘2’ and the exhaust. As soon as the brake is released again and the cylinders exhausted, the stabilizing valve returns to its initial position.



1 = TO AUXILIARY AIR RESERVOIR

2 = TO BULB

3 = FROM BRAKE CYLINDER

STABILISING VALVE

CONSTRUCTION, OVERHAULING AND MAINTENANCE

The stabilizing valve at the time of POH should be stripped off completely. The valve consists of a housing (item 1) made out of bronze. Inside the housing is a valve piston (item 2), which divides the housing into three different chambers, namely aux. reservoir (R.), bulb (K) and brake cylinder (C). During application of the brakes, the valve piston moves to the left against the force of a spring (item 10) and the bulb is exhausted to the atmosphere. Two K rings (item 3 & 4) are provided in the valve piston for dividing K and C chambers. The valve head (item

5) rests on its sealing surface against of the spring (item 8). During release operation, the valve piston lifts this valve head against the force of the spring (item 8) thereby connecting chambers R and K. An exhaust plug (item 13) is provided on to the locking screw (item 11). A filter (item 14) is provided in chamber R passage for filtering the air going into the bulb. To overhaul the stabilizing valve, it is dismantled from the unit bracket and is completely stripped open. All the rubber parts are cleaned in soap water solution. K rings (item 3 & 4) must be replaced during every POH. The valve head (item 5) is to be checked for the seat depression. Replace it if the **depression is more than 0.2 mm.** Since the valve piston moves inside the polished surface of the housing every time the brakes are applied or released, the housing to be especially checked for wear and tear. Also check for the finish of the surface on which the two K rings move. The housing must be replaced if such defects are observed on its sealing surface. Both the compression springs (item 8 & 10), which are constantly under compression and tension, must be replaced **after a period of 3 years,** but rusty or damaged springs must be replaced as and when found with such defects. Every time the locking screw (item 6) is opened, sealing ring (item 7) must be replaced. Before assembling the valve, all the parts must be cleaned thoroughly. Light grease be applied on the K-rings and inside the housing. Filter (item 14) should be cleaned with petrol and dried before fitting it back. Special care should be taken while tightening locking screw (item 6) so as to protect the valve head (item 5) for any damage. Generally, this locking screw should be tightened fully by hand and finally with a ring spanner. The round cord rings (item 9) must be replaced every time the valve comes for POH.

TESTING

The stabilizing valve after overhauling is to be tested on a separate test bench to drg. no. 4A 80570 and to pruf 3044. This testing will indicate leakage in general as well as leakage in between any of the three chambers. The testing will also indicate proper functioning of the valve and the timings for exhausting or charging the bulb K, which will ensure an easy movement of the valve piston and also proper valve lift.

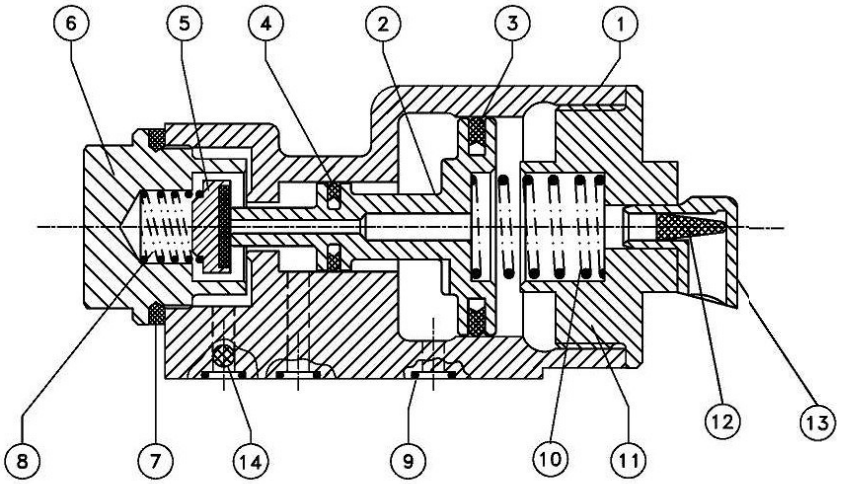
ADJUSTMENT

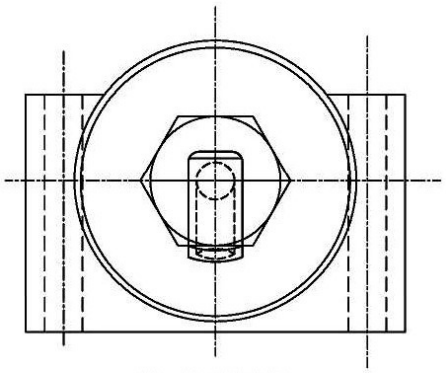
No adjustments are required to be made in the stabilizing valve after it has been thoroughly inspected on the test bench.

OPERATIONAL CHECKS

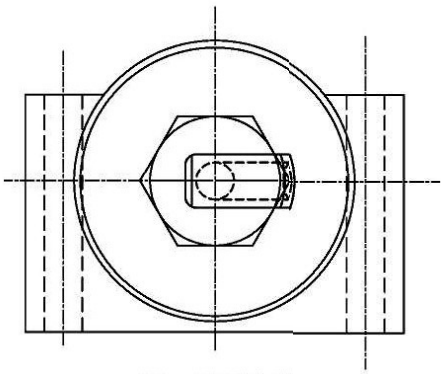
Due to constant application and release in the brake system on the running trains, chances of moisture condensate in the bulb of EP unit bracket are there.

The water condensate may cause brake binding and, hence, it should be **drained out after every 3 months or so**. Provision for draining the water in the bulb has been provided in the fabricated EP bracket (a plug at the lower reservoir). Hex. Allen key of 10mm A/F (across flat) to be used and its sealing ring should be replaced. Also in our casted aluminium bracket, a plug, almost at the same position is located for draining out water condensate. For draining out water, stabilizing valve has to be taken out from the EP unit. The bulb is further cleaned with air pressure and the plug is then again screwed in. In case of any leakage from the mounting of the stabilizing valve, the mounting round cord rings should be replaced. Also check the exhaust port with soap water and in case of any leakages, the valve is to be dismantled and overhauled.





3A 47492/1
I/17275



3A 47492/2
I/24696

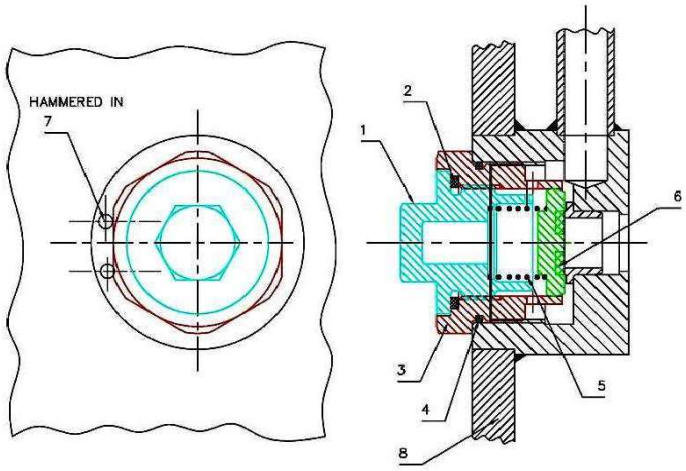
7	SEALING RING (A30x36)	DIN 7603	1	A	14	FILTER	4EP 43157	1	B
6	LOCKING SCREW	4A 47496	1		13	EXHAUST PLUG ASSY.	4A 34520	1	
5	VALVE HEAD	4A 47235	1	C	12	FILTER	4B 62338	1	B
4	K – RING	N890/16	1	B	11	LOCKING SCREW	4EP 5296	1	
3	K – RING	N890/40	1	B	10	COMP. SPRING	4A 28000	1	C
2	VALVE PISTON	4A 47495	1	C	9	ROUND CORD RING	4A 38204	3	B
1	HOUSING	3A 47494	1		8	COMP. SPRING	4A 30485/8	1	C
S.NO.	DESCRIPTION	DRG.NO.	NO. OFF	CAT.	S.NO.	DESCRIPTION	DRG.NO.	NO. OFF	CAT.

STABILISING VALVE

CHECK VALVE (DRG. NO. OA 68051)

The check valve in the EP unit works as a one way valve. During electric application the air from the application magnet valve and limiting valve goes to the brake cylinder through this check valve. During the full application, air pressure from the limiting valve strikes the valve

plate (item 31), lifts it against the force of the spring (item 32) and goes to the brake cylinder. When the pressure under and above the valve plate equalizes, it automatically closes the passage and it rests on its seat. In case of any leakages from the exhaust port of the EP bracket open the locking screw (item 33) and clean / replace the valve plate. Complete EP units are to be tested in the accordance with pruf 3108, respectively on the main test bench to drg. no. 3A 83149. EP units thus tested and passed will give absolutely trouble-free service in the day to day operation of the trains. **It is always recommended to use genuine spare parts for longer life and better service.**



S.NO.	DESCRIPTION	DRG.NO.	NO.OFF	CAT.
8	BRACKET		1	
7	GROOVE DOWEL PIN	DIN 1473	1	
6	VALVE PLATE	4A 42896	1	C
5	COMPRESSION SPRING	4A 59987	1	C
4	O-RING	4A 70745	1	B
3	GUIDE SCREW	4A 67970	1	
2	O-RING	4A 27763/17	1	B
1	LOCKING SCREW	4A 68415	1	

CHECK VALVE