



ESCORTS

RAILWAY EQUIPMENT DIVISION



Transformation through
Engineering and Innovation

BRAKE SYSTEM

BRAKE SYSTEM

Escorts Limited was the first to commence manufacturing of Compressed Air Brake system in India, for railway applications in 1981.

Escorts has ultra-modern, precision manufacturing facilities for Distributor Valves and is the largest manufacturer in Asia, having supplied over 100,000 nos. to Indian Railway for various freight and passenger car applications.

Conversions from Vacuum Brake to Air Brake system has been Escorts' forte. Over 40% of rolling stock of Indian Railways, one of the largest Railway systems in the world depends on Escorts for their braking requirements.

Some of the Air Brake Valves designed and developed by Escorts have been standardized by Indian Railways. Over 4000 officials of Indian & Foreign Railways have been trained at Escorts facilities, on Air Brake systems.

Complete overhauling and testing facilities have been set up at various locations to meet customer requirements.

The technical expertise accumulated over three decades, includes ability to design and offer customized brake system solutions depending upon vehicle's speed, load and various other parameters as per customer's specific requirements.

1. PASSENGER COACHES

- Air brake for Conventional Coaches
- EP brake system for EMU/DMU Coaches
- Axle Mounted Disc brake System for LHB Alstom Coaches (FIAT Bogie)
- Brake Disc for LHB Alstom Coaches

2. FREIGHT WAGONS

- Air brake for Conventional Wagons
- Bogie Mounted Brake System for wagon fitted with CASNUB bogie

3. LOCOMOTIVE

- Microprocessor Controlled Brake System

4. BRAKE ACCESSORIES

- Distributor valve
- Brake Cylinders
- Slack Adjuster
- Automatic Drain Valve
- Passenger Emergency Brake equipment
- Load Sensing Device
- Centrifugal Dirt Collector & Air Filter
- Isolating Cocks
- Check Valves
- Angle Cocks
- End Cocks
- Air Brake Hose coupling
- Reservoir

AXLE MOUNTED DISC BRAKE SYSTEM FOR HIGH SPEED TRAIN

Escorts Railway Equipment Division has developed Axle Mounted Disc Brake System in collaboration with M/s DAKO-CZ suited for high speed train services. This brake system conforms to UIC standards and is specifically designed to meet the Indian Railways requirement as well.

The disc brake system consist of actuators in form of brake cylinders, caliper units, integrated slack adjusting arrangement and wheel slide protection device (WSP). The system has a panel mounted brake equipment consisting of tri-plates, DV, manifolds, etc. The WSP is approved by UIC which protects the wheels from sliding.

SALIENT FEATURES

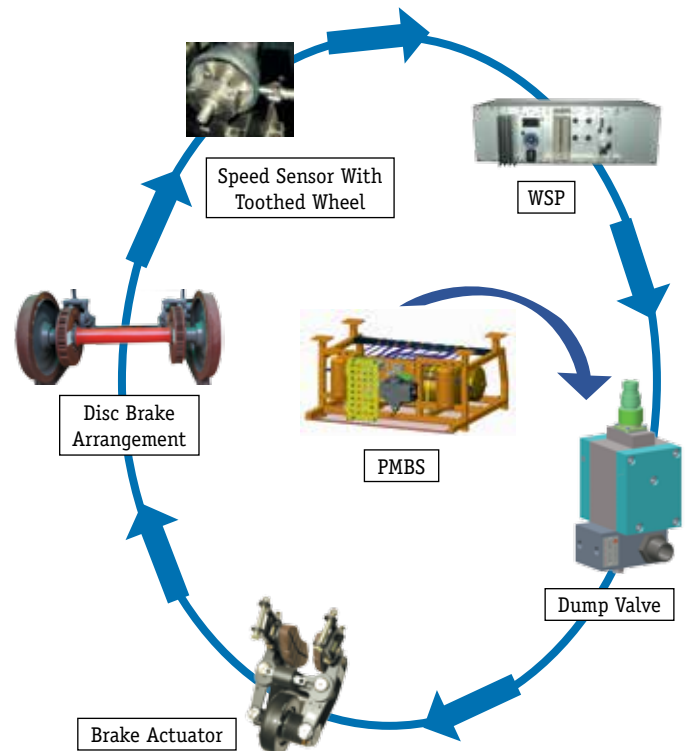
- Brake caliper unit along with Brake Cylinder
- Brake Caliper units with different rigging ratio for coach application
- Wheel Slide Protection unit with latest features to avoid wheel skidding
- Brake pads from Federal Mogul, one of the best manufacturer globally

APPLICATION

- High Speed Passenger Coaches (LHB Alstom)
- Double Decker Coaches

MAJOR COMPONENTS

- Brake control panel
- Brake Cylinder unit with calipers
- Brake Pads
- Wheel Slide Protection device as per UIC





ELECTRO – PNEUMATIC BRAKE SYSTEM FOR EMU

One of the largest railway network in the world with super dense crush load on their EMU and MEMU stock running on suburban network across various cities of India run on Escorts manufactured systems for their braking, coupling and suspensions requirements. Escorts have been manufacturing Electro-Pneumatic Brake systems for more than three decades. These brake Systems are in use on EMUs, MEMUs and DMUs in Indian Railways.

BRIEF DESCRIPTION

Escorts EP Brake system has two distinct modes of operation. The primary mode of operation is electro-pneumatic application of the brakes throughout the train and the second mode of operation is the application of back-up brakes in case of electrical power failure in the system.

SALIENT FEATURES

- Rapid application and Release of brakes
- Graduated application and Release
- Auto control for fail safe operation in Electrical failure

APPLICATION

- EMUs, MEMUs, DMU
- Any other suburban/mass rapid transport system.



ELECTRO PNEUMATIC BRAKE CONTROLLER



JOYSTICK TYPE ELECTRO PNEUMATIC BRAKE CONTROLLER



ALUMINIUM TRIPLATE TYPE EP UNIT

PNEUMATIC BRAKE CONTROLLER FOR MICROPROCESSOR CONTROLLED EMU COACHES

The MRVC/MUTP coaches are running with Escorts manufactured Pneumatic Brake Controller. These coaches are built for Regenerative braking.

BRIEF DESCRIPTION

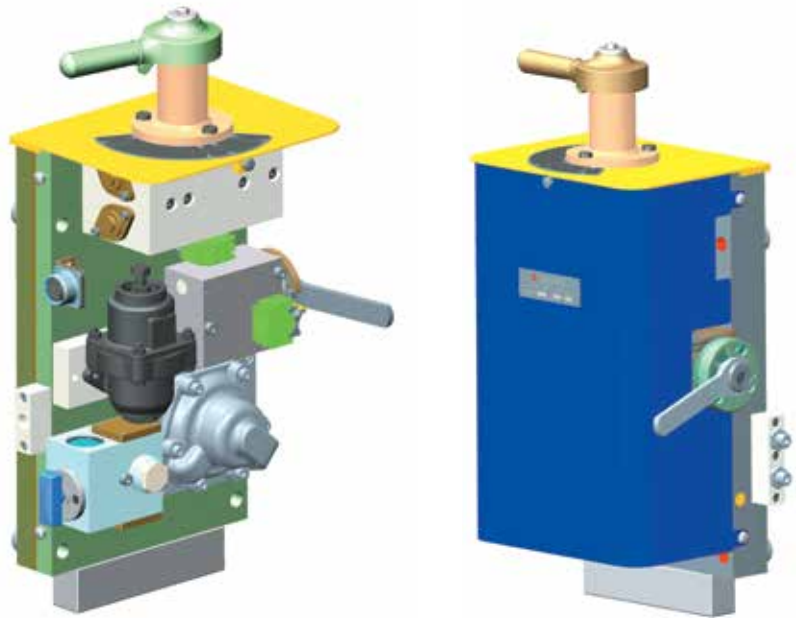
Escorts Pneumatic Controller is for auto/ pneumatic graduated application and direct release system with time dependence on brake pipe drop (i.e. BP shall drop continuously as long as the handle position is kept at auto position). Handle may be placed at "LAP" position for lapping brakes.

SALIENT FEATURES

- Pneumatic brake is used as a supplementary brake to stop the vehicle
- Graduated application and direct release is possible
- Lapping is possible by keeping Handle in "LAP" position
- Isolation of Pneumatic Controller is possible to avoid misuse

APPLICATION

- MRVC/MUTP/Siemens/Bombardier coaches in MUMBAI
- Any other suburban/mass rapid transport system similar to MRVC/MUTP coaches.



PNEUMATIC BRAKE CONTROLLER



BOGIE MOUNTED BRAKE SYSTEM FOR WAGONS

Bogie Mounted Brake System (BMBS) is a modular Braking system developed for use in Freight Wagons. The system is designed to meet Indian Railways specification. This system shall be fitted on new wagons and can be retro fitted on existing fleet wagons having maximum axle load of 22.9 tons.

SALIENT FEATURES

The Bogie Mounted Brake System has the following features compared to the conventional brake system.

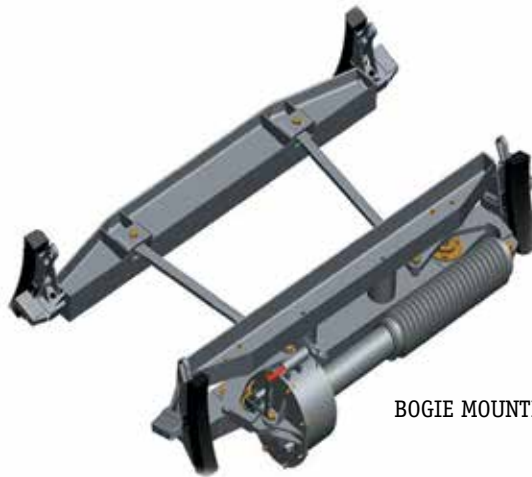
- Improved Braking Efficiency
- Reduced weight
- Less number of parts
- Uniform brake shoe and wheel wear
- Increased reliability
- Easy maintenance
- In-built automatic slack adjustment
- Easy brake shoe replacement
- Brake release and application indication
- No manual intervention (until worn-out condition)

APPLICATION

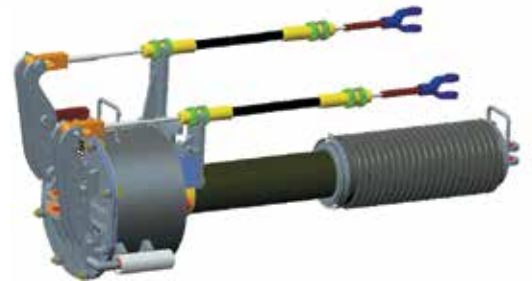
All types of Railway Freight Wagons having maximum Axle load of 22.9 tons such as BOBRN, BOBRNHSM1, BOXN, BOXNHL, BCN, BCNA.

SUB SYSTEMS

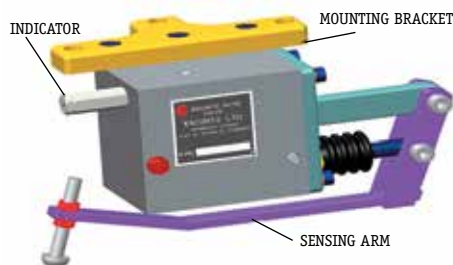
- Primary & Secondary Brake beams
- Brake Cylinder with Slack Adjuster having two variants - with handbrake and without handbrake
- Escort Ratio Valve which performs as a Automatic Pressure Modulation (APM Device)
- Rigging arrangement for hand brake system
- Bell Crank Levers for load transfer
- Piping arrangements



BOGIE MOUNTED BRAKE SYSTEM



BMBS BRAKE CYLINDER WITH HAND BRAKE



ESCORTS RATIO VALVE



BMBS BRAKE CYLINDER WITHOUT HAND BRAKE

MICROPROCESSOR CONTROLLED BRAKE SYSTEM FOR LOCO

The Microprocessor Controlled Brake System (MCBS) is a modular braking system developed for use in Diesel and Electric Locomotives. The system consist of the following parts

- Brake Controllers
- Brake Control Unit
- Driver Back-Up Valve
- Various Communication Channels
- Data/Fault Logging, Diagnostics and Display
- Programmable Variables

SALIENT FEATURES

- Compact design
- Less Modules with high reliability
- User Friendly operation, Easy Maintenance
- User friendly 'state of the art' GUI based software with advanced features and better diagnostics
- Check and configure the programmable variables, fault data viewing and status display.

DRIVERS BRAKE VALVE

This pneumatic Back-Up Valve is used to provide a pneumatic control for BP when electronic control fails.



CAB CONTROLLER



BRAKE CONTROL UNIT



LEAD & TRAIL MODULE



BP MODULE



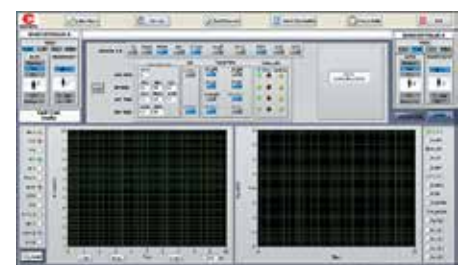
AUTOMATIC & EMERGENCY MODULE



INDEPENDENT MODULE

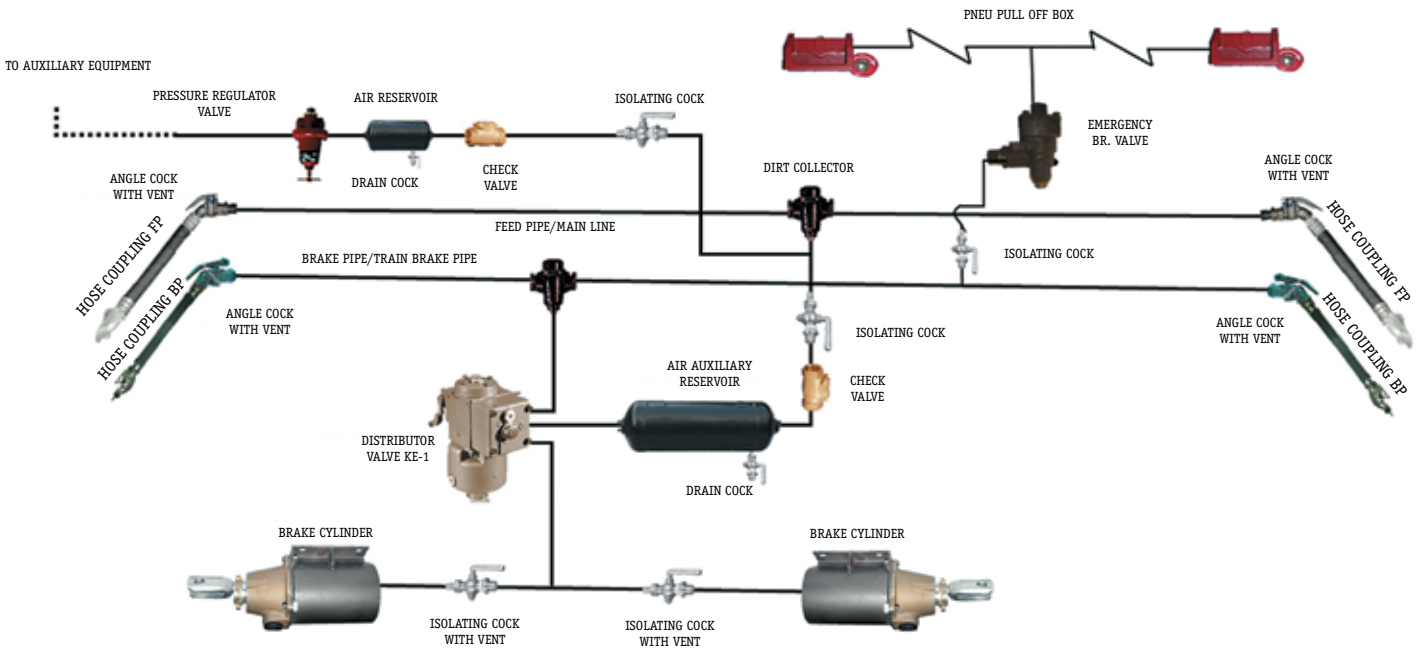


INDEPENDENT MODULE

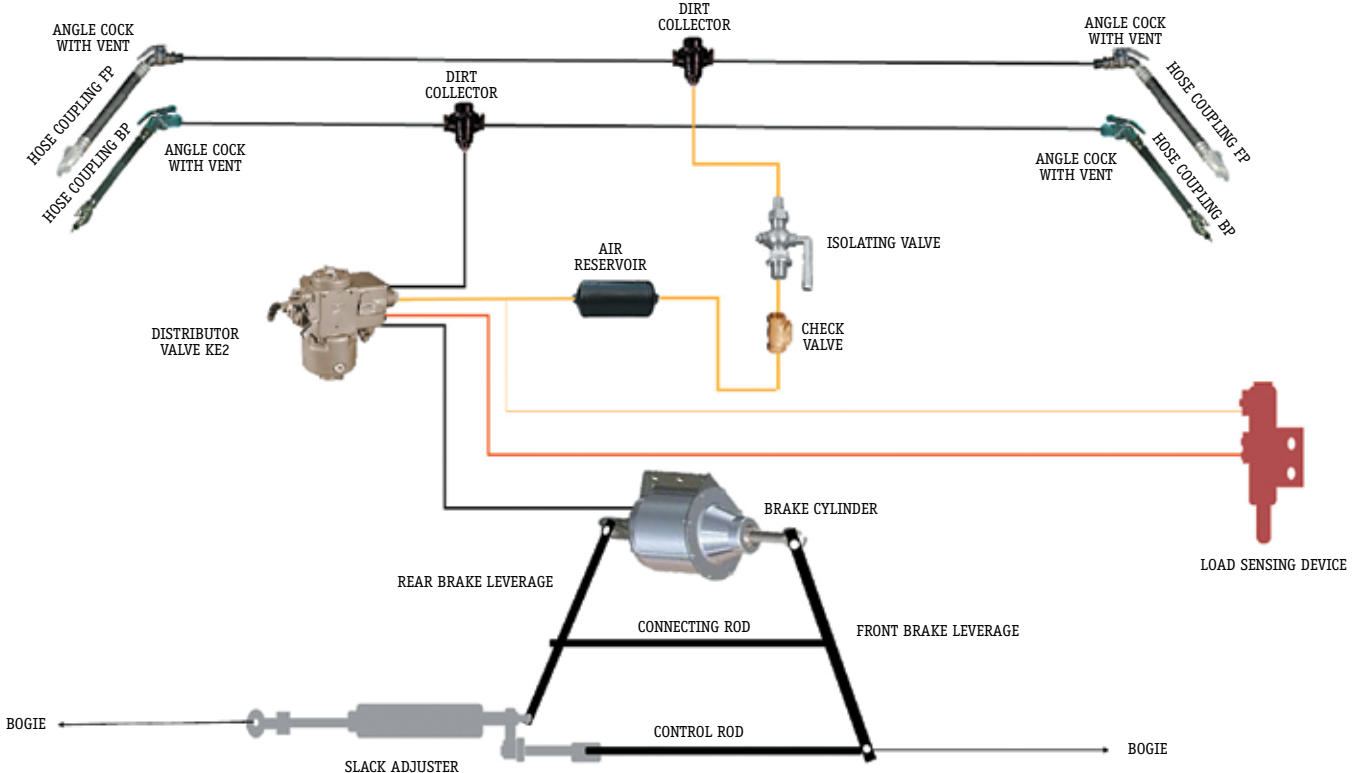


PC SIDE DIAGNOSTIC APPLICATION SOFTWARE

PIPING DIAGRAM OF AIR BRAKE SYSTEM FOR PASSENGER COACHES AND FREIGHT WAGON



PASSENGER COACHES



FREIGHT WAGON

AIR BRAKE ACCESSORIES

Escorts manufactures air brake accessories for air brake systems for freight and passenger cars. Various accessories manufactured by Escorts are as follows

Distributor Valve

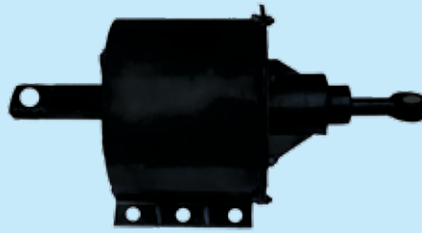
The Distributor valve controls proper applications and release of brakes of different vehicles depending on the pneumatic pressure prevailing in the brake pipe. It works automatically, providing graduated application and release and maintaining the pressure.

Escorts KE distributor valve complies with the requirements of the UIC specifications governing compressed air brake for freight and passenger trains in international traffic.

APPLICATION

The Escorts KE type distributor is suitable for

- A wide range of different vehicles (Passenger and Freight cars)
- Single and twin pipe brake system
- All sizes of brake cylinder



BG/BGS BRAKE CYLINDER



AIR RESERVOIR



LOAD SENSING DEVICE



JSL BRAKE CYLINDER



DISTRIBUTOR VALVE

Modular Design

The Escorts KE type distributor valve is of Modular design. The basic valve body can be supplemented by the connection or incorporation of appropriate accessory components as required for the purpose in view.

Brake Cylinders

- With slack adjusters (8" to 10")
- Without slack adjuster (8" to 14")

Passenger Emergency Brake Equipment

- Emergency Alarm Signal Device
- Emergency Brake Valve

Load Sensing Device

- Single piece and two piece design
- Single piece design, LSD III (Side mounted), LSD IV (Top Mounted)
- Two piece design model available with the operating valve B1 and spring buffer F1

Centrifugal Dirt Collector & Air Filter

- 3-Way suitable for main line
- 2-Way suitable for branch line

Isolating Cocks, Check Valves

Mounting options available are threaded & flange type.

Angle Cocks & End Cocks

As per AAR and UIC design, various models available are LH-3, IRS type.

Air Brake Hose Coupling

As per AAR design and UIC design.

Reservoir

Various sizes of Reservoirs available ranging from 6L to 200L in MS and SS.



UIC ANGLE COCK

ANGLE COCK

AAR ANGLE COCK

ISOLATING COCK WITH AND WITHOUT VENT

THE ESCORTS MAKE KE TYPE DISTRIBUTOR VALVE WITH ITS ACCESSORY COMPONENTS



"Goods-passenger" change-over device (GP Change-over) Contains a complete set of chokes for application and release in goods and passenger train service.

Choke cover Incorporate a complete set of chokes for application and release in the pre-selected traffic type i.e. goods or passenger train service



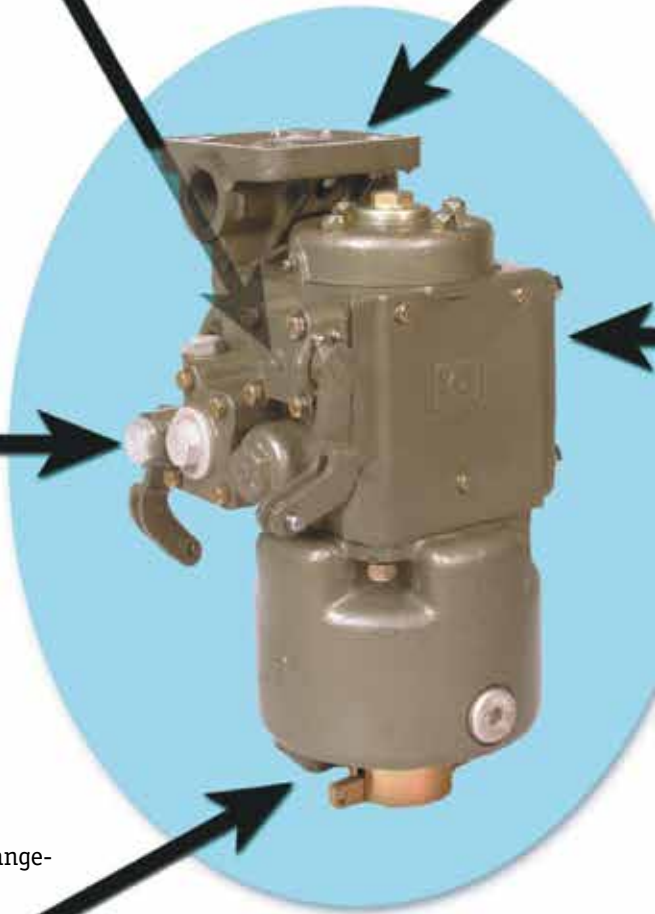
Shut-off device with AR charging valve Shown with fork lever, can be changed over to 'on' 'off thru' rigging arrangement from side wall.

Shut-off device without AR charging valve Shown with resilient handle for manual operation of 'on-off' change-over device.



Control chamber Shown with quick release valve SL for mounting to valve body

Bottom Cover Shown with quick release valve SL





KR Nr Bracket with threaded end connections for mounting Distributor Valve KE, adaptable to pipe sizes of 1-1/4", 1" and 3/4"



Common pipe bracket with flange type connections suitable for mounting various makes of Distributor valve by using an intermediate adaptor.



Side Cover
When the cover is exchanged for one of the following components the distributor valve then is said to be of the 'universal action' type. (**Basic valve with cover = Distributor type KE 0**)



Relay valve KR1
'Unitized action for all brake cylinder sizes. Neither exchange of chokes nor adaptation are required (**Basic valve with KR1 Distributor type KE 1**)



Adjustable relay valve RR 1
Same function as KR 1, but with additional mechanically controlled continuous load controlled braking (**Basic valve with RR1 = Distributor type KE2 AL**)



Pressure transformer DU
Same effect as KR1, but with additional two-stage variable load braking. (**basic valve with DU = Distributor type KE 2 - A, B or C, depending on the type of 'empty-loaded' change-over device**)



SLACK ADJUSTER

A device meant for automatic adjustment of the clearance between brake blocks and wheels. It is fitted in the brake rigging circuit under the frame as a part of pull rod.



H2 Coupling



H1 Coupling



Control Rod End

SPECIFICATIONS

- Application capacity (300,450,600mm)
- Plain end i.e. without coupling
- H1 Spindle coupling
- H2 Spindle coupling
- Width of the adjuster ear "P" (either 30mm or 40mm)
- Inner diameter of the bushing "d" (30,37 and 40mm or as per customer requirement)
- Normal steel spindle

Example: EDRV2A-450H2P-40d-37

REFERENCES

- European Railways
- New Zealand Railway
- Malaysia, Thailand & Indonesian Railways

DESIGN

The slack adjuster is composed essentially of following parts

- Adjuster Spindle provided with screw threads of quick pitch
- Traction unit containing Adjuster nut, Adjuster tube and Adjuster ear
- The Leader nut unit containing Leader nut & Barrel
- Control Rod unit with head

PRODUCT RANGE FOR ROLLING STOCKS

- EDRV 2A 450
- EDRV 2A 450H
- EDRV 2A 600
- EDRV 2A 600H



TESTING EQUIPMENT & RIG

For testing, maintenance & overhauling of airbrake systems fitted on freight cars & passenger cars as well as testing of complete rakes, Escorts manufactures various types of testing equipment like SWTR/ SCTR, RTR, DV test stand etc. Escorts has expertise in designing, developing and customizing test stands as per customer's requirement and specifications.

SINGLE CAR TEST RIGS (SWTR/SCTR)

Suitable for testing air brake system for freight and passenger cars.

RAKE TEST RIG (RTR)

Suitable for testing of Air Brake System for complete rake of freight/passenger stock.

DISTRIBUTOR VALVE TEST STAND

Suitable for testing KE0, KE1 & KE2 type of Distributor Valves or any other make

- Test Stand with Digital pressure gauges interfaced with digital timers to record the various timings
- Test Stand interfaced with computer so as to have the facility to record performance graphs for various tests
- Test Stand for various sub-assemblies of DV like R- charger, GP change-over, Relay Valve Pressure Transformer, Control Chamber

TEST STAND FOR VARIOUS AIRBRAKE ACCESSORIES

Test Stands for various Air Brake accessories like Hose Couplings, Centrifugal Dirt Collectors, Brake Cylinders, Emergency Brake Valves, Angle Cocks, Pressure Reducing Valves, Check Valve, DV Test Bench with LSD.

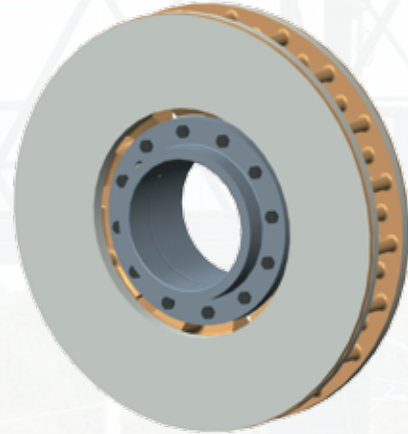


BRAKE DISC

Brake disc is used in LHB Coaches of Indian Railways. It is mounted on the axle. When train need to be stopped or decelerated, pressure is applied on the brake disc through brake pads. The brake pads are on either side of the brake disc and will be operated through caliper.

SALIENT FEATURES

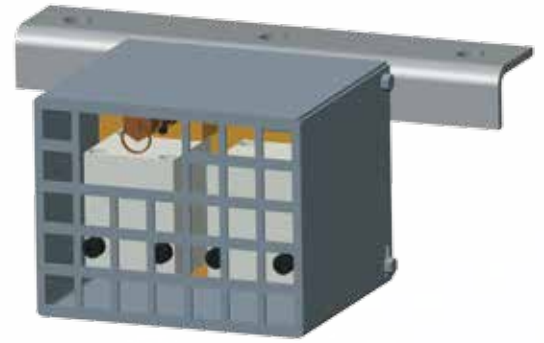
- It is self-ventilated so no additional requirement for cooling of brake disc.
- It is mounted on the axle with the help of 12 bolts.
- The hub of the disc facilitates pressurized liquid assisted assembly and disassembly.
- Velocity of 160Km/hr.
- Brake disc consists of friction ring with cooling ribs and hub. The friction ring is casted as a single piece followed by its machining on required surfaces
- The friction ring of brake disc has a groove around its outside circumference to indicate the condemning limit and when they have to be exchanged.



FAILURE INDICATION AND BRAKE APPLICATION (FIBA) FOR LHB ALSTOM AND EMU COACHES

To meet the requirement of a fool proof arrangement in the air suspension design, FIBA is connected with each air spring fitted under the coach.

The basic principle in this arrangement is to actuate the application of brakes in the event of air spring failure, which will immediately reduce the speed of the train and ultimately bring the train to a standstill.



SALIENT FEATURES

- Aluminium body
- Good performance
- Easy Maintenance
- Environment Friendly

APPLICATION

- High Speed LHB Alstom Coach
- EMU
- Passenger Coach with air spring

ADVANTAGES OF FIBA

- The valve is smaller in size and economical
- The valve is machined from aluminium block and light weight
- Easy to handle due to its smaller size and light weight
- Compact in size with less no. of parts
- More reliable and less maintenance





ESCORTS

RAILWAY EQUIPMENT DIVISION

Head Office & Works:

Plot No. 115, Sector 24,
Faridabad - 121 005
Haryana, (India)
Email: rail@escorts.co.in
Web: escortsrailwayproducts.com
Tel.: 91-129-2516382, 6608
Fax: 91-129-2232148

Mumbai Branch:

Times Square, Unit No. A-1,
A-Wing, 3rd floor,
Andheri Kurla Road,
Andheri East
Sakinaka, Mumbai - 400 059
Maharashtra, India
Email: mumbai@escorts.co.in
Tel.: +91-22-24218159
Fax: +91-22-24218153

Chennai Branch:

M-3, "M" Block, 3rd Avenue,
Anna Nagar East,
Chennai - 600 102
Tamil Nadu, India
Email: chennai@escorts.co.in
Tel.: +91-44-26287229
Fax: +91-44-26287341

Kolkata Branch:

South Western Wing,
9th Floor, "AC Market",
1, Shakespeare Sarani,
Kolkata - 700 071
West Bengal, India
Email: kolkata@escorts.co.in
Tel.: +91-33-22825191
Fax: +91-33-22814518