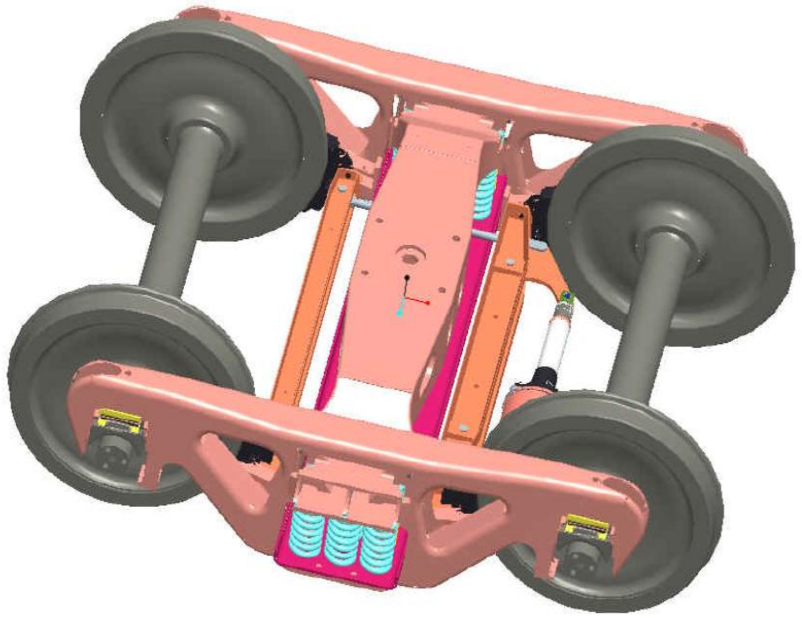


Bogie Mounted Brake System for Freight Stock.

Current Braking System

- Currently IR freight stock has been fitted with under frame mounted air brake system.
- This system works with under frame mounted single brake cylinder for brake application.
- External SAB is provided for slack adjustment.
- Load Empty device is operated manually by lever.
- Brake rigging is more there by noise and weight of rigging is considerably more.

Bogie Mounted Brake System

- Fitted in newly manufactured freight stock.
- Individual bogie mounted brake cylinder is used for brake application.
- Inbuilt double acting slack adjuster is provided.
- Automatic Load and Empty brake force is generated by Automatic Pressure Modifier (APM).
- Brake rigging is considerably less, thereby less maintenance.

Salient Points

- Equal brake shoe force - higher performance.
- Brake Cylinder with built-in double acting Slack Adjuster.
- Simplified brake design. Suitable for all types of wagons.
- Ease of on-car maintenance modular brake cylinder.
- Removable brake heads.
- Cable-actuated handbrake not affected by bogie rotation.
- Lower installation time and cost
- Retrofittment on CASNUB Bogie without modification / welding

Advantages of BMBS

- Improved Braking Efficiency
- Uniform Shoe Wear and wheel wear
- Increased Reliability
- Easy Maintenance
- Lighter and compact system
- Brake force is almost half as ‘K’ type CBB used
- Wear and tear of components is less
- Automatic adjustment of brake force for empty & Loaded
- Lesser maintenance requirements
- Reduction in wheel wear as compared to conventional brake system
- Possibility of use of space between two bogies

Components of BMBS

Floating type Brake Cylinder

- The pneumatic actuator is 10” in diameter with piston stroke of 56 mm.
- Brake cylinder contains an integral double acting slack adjuster with 500 mm push rod length.

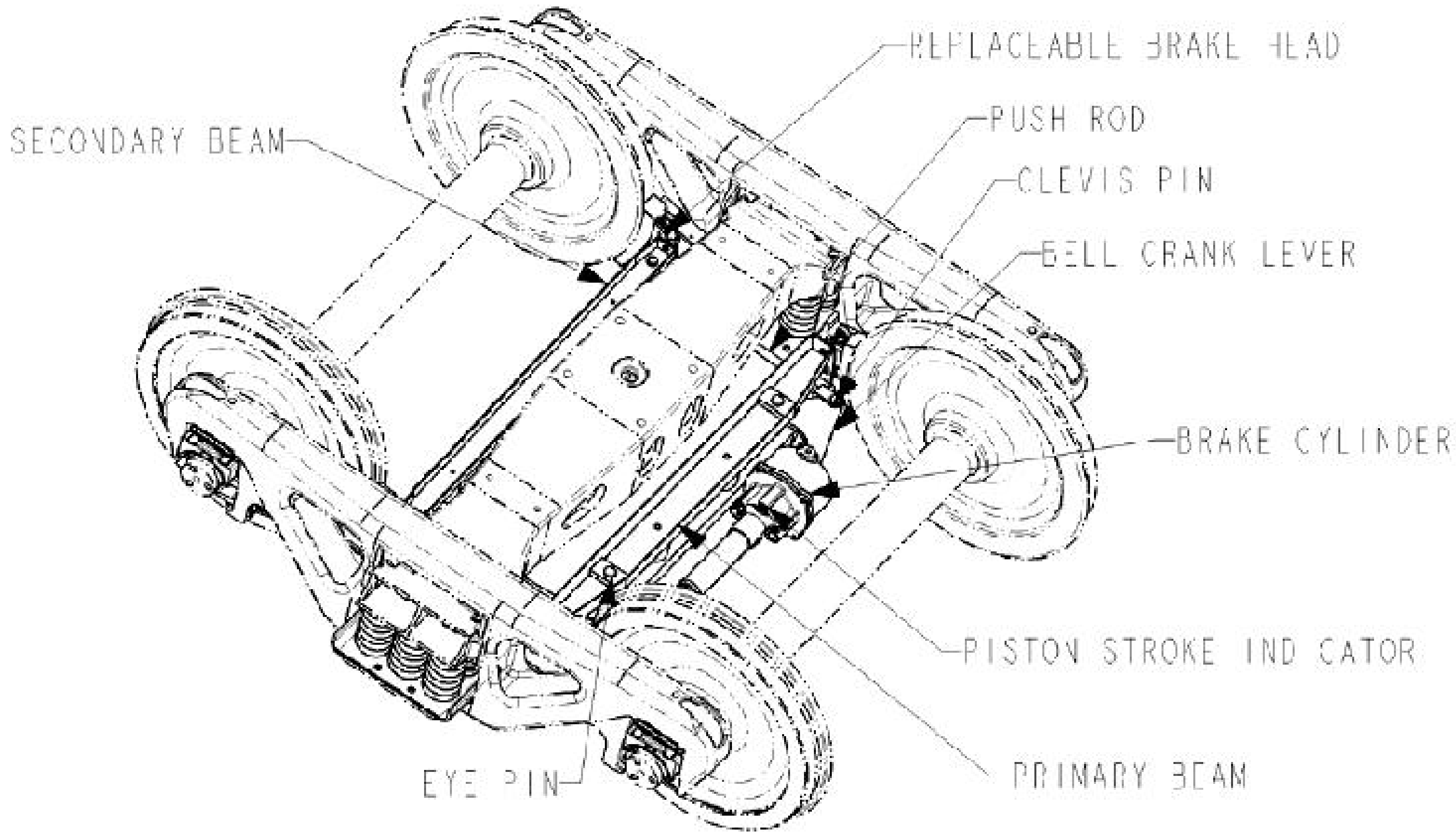
Components of BMBS

- Two brake beams
  a) Primary brake beam
  b) Secondary brake beam
- Two bell crank levers
- Clevis pin
- Eye pin

Components of BMBS

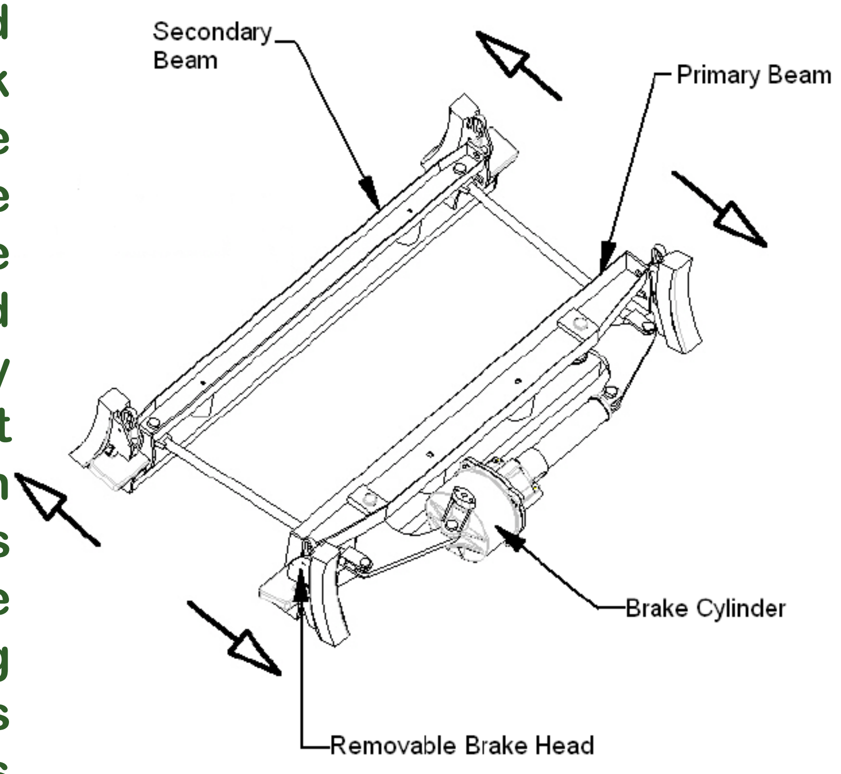
- **Interconnecting push rods**
- **High friction brake block (K type) of 58mm thick on CASNUB type bogies**

Components of BMBS

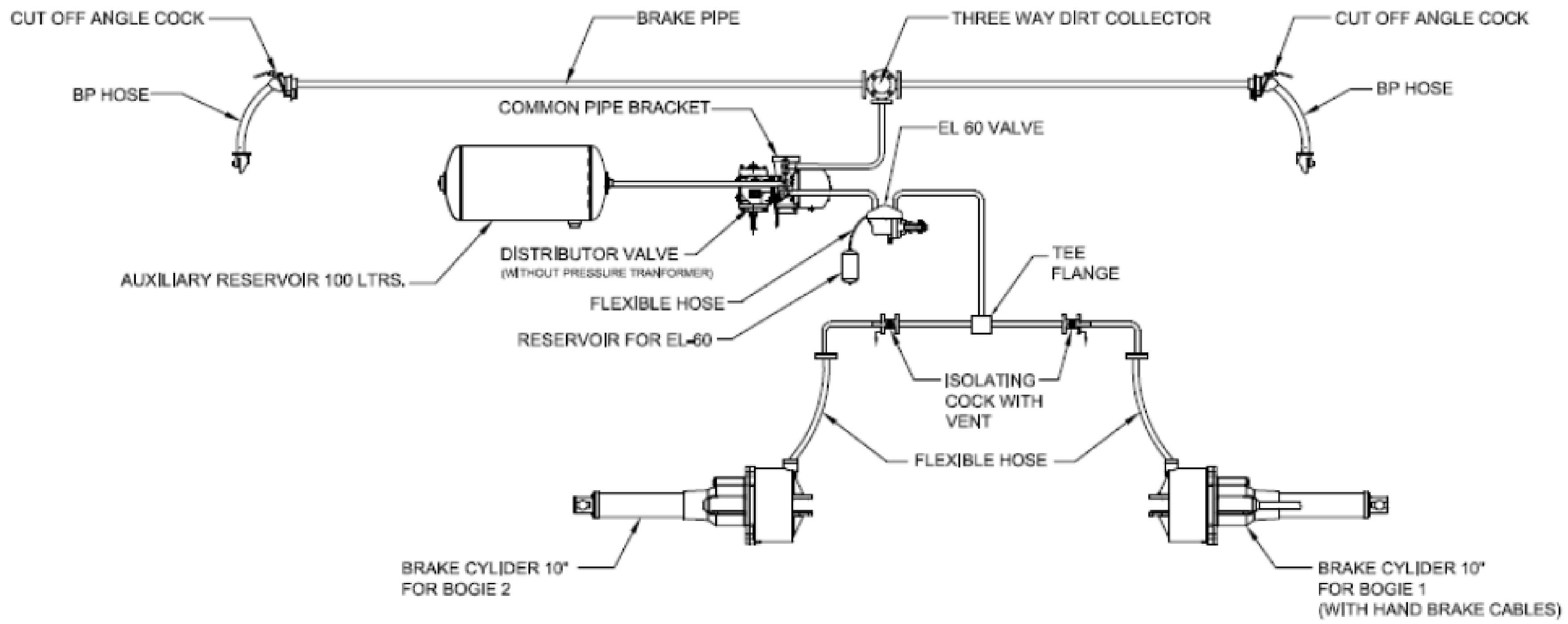


Brake Application and Release

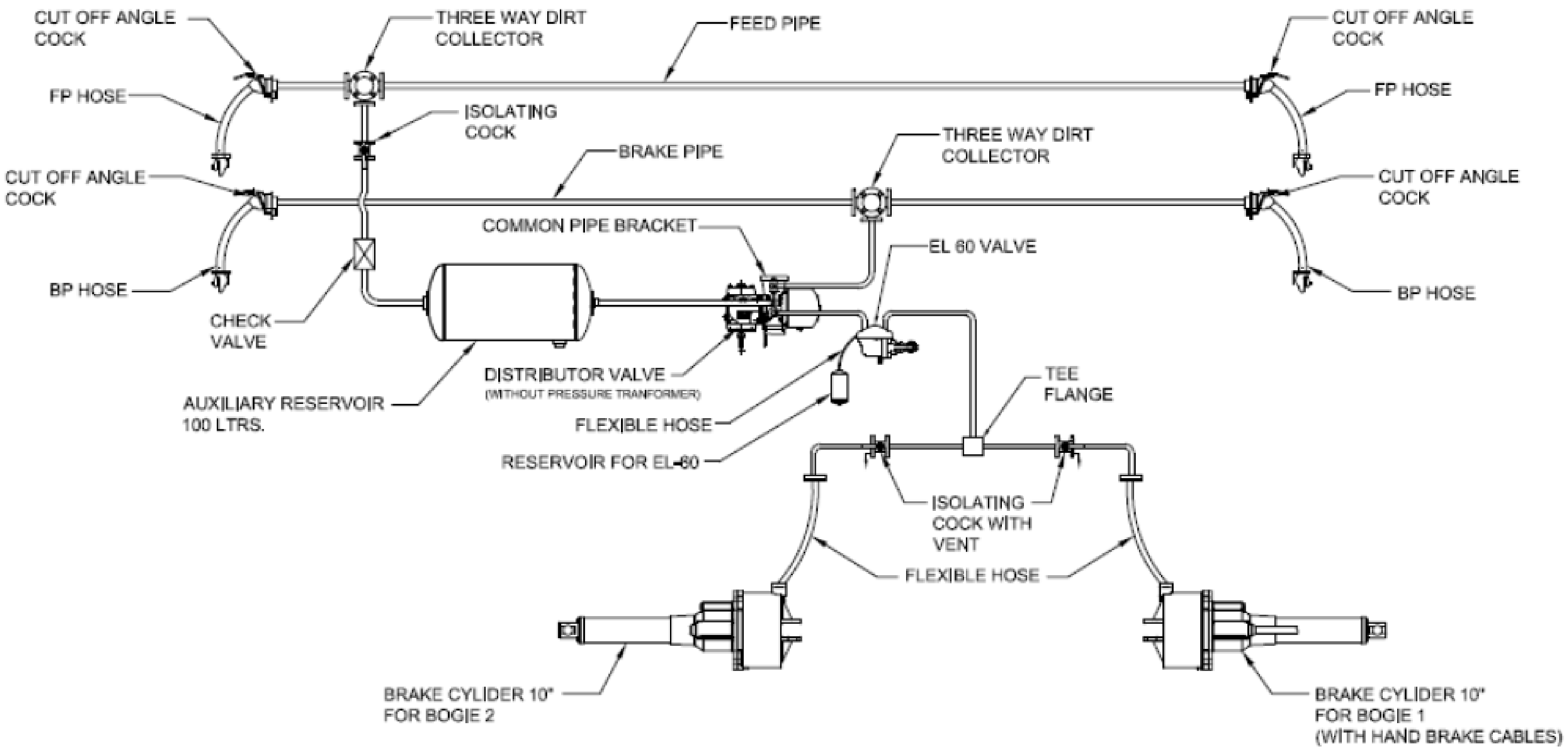
Air pr from APM is introduced into the brake cylinder. The brake cylinder extends equally on both the sides and causes the rotation of the bell crank levers on their pivot and forces the push rod to move towards the secondary beam. Secondary brake beam moves towards the wheels and apply force on the wheels. The primary brake beam continues to move until it touches the wheels and apply force on the wheels. During release, when air is exhausted the return spring inside the brake cylinder pushes the piston along with the ram assembly back to its original position. The brake cylinder is equipped with a double acting slack adjuster.



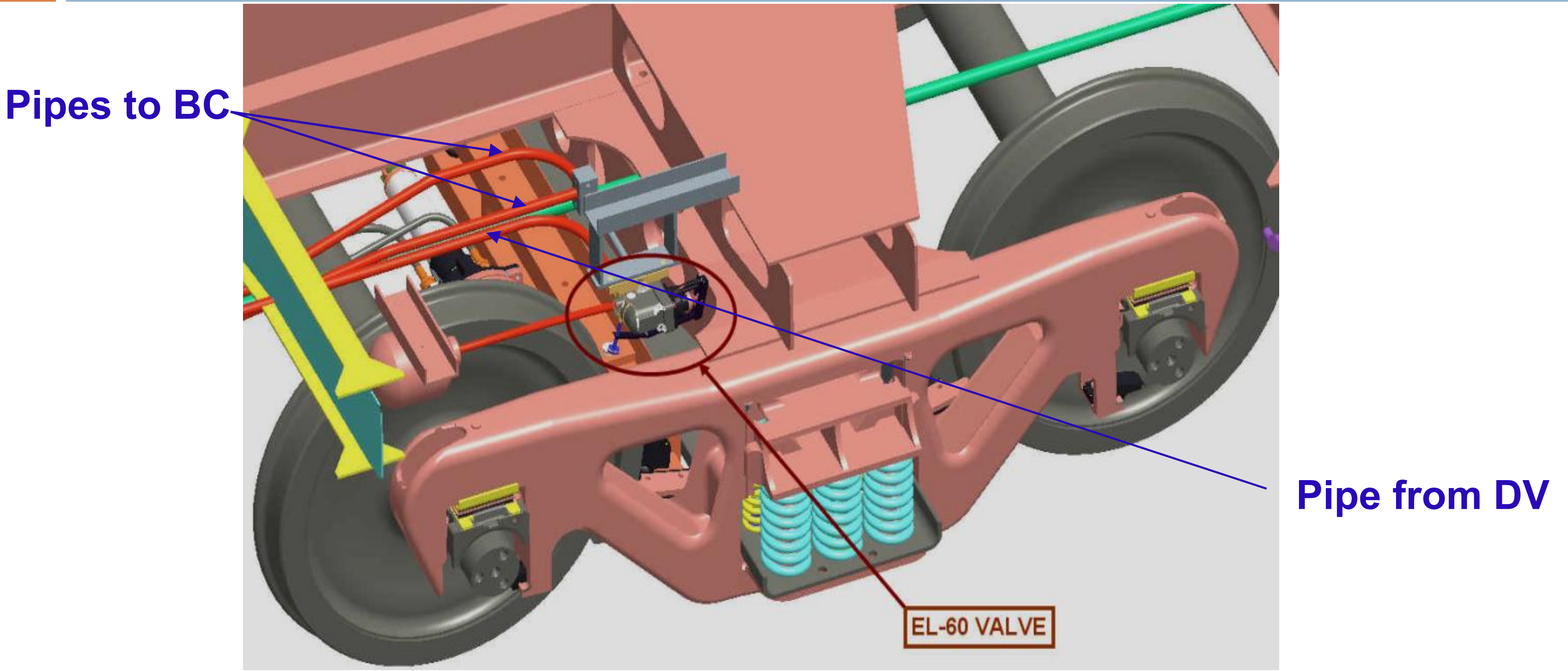
Schematic diagram
(single pipe)



Schematic diagram
(Twin pipe)



Automatic Pressure Modifier



- **APM device is fitted on the under frame of the wagon above the side frame of CASNUB bogie.**
- **APM is interposed between Distributer valve and Brake Cylinder.**

Automatic Pressure Modifier

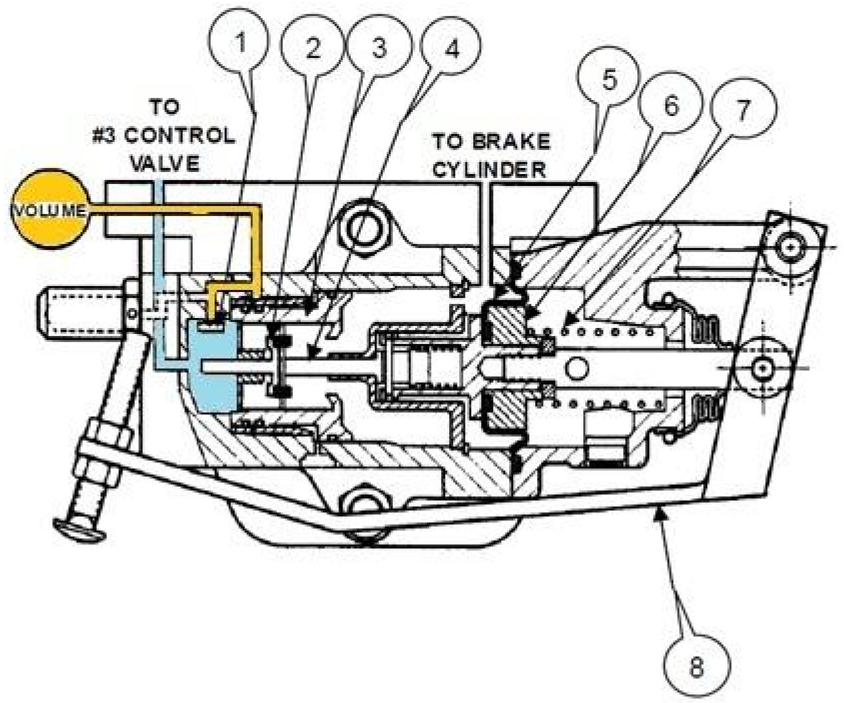
- APM restricts the brake cylinder pressure coming from the Distributor valve to 2.2 ± 0.25 kg/cm2 in empty condition of the wagon
- Allows the brake cylinder pressure of 3.8 ± 0.1 kg/cm2 in loaded condition of the wagon.

Automatic Pressure Modifier

- The sensor arm of the APM device comes down for sensing only during the brake application.
- Stroke of APM piston
  - 80 mm for loaded condition
  - 104 mm for unloaded condition

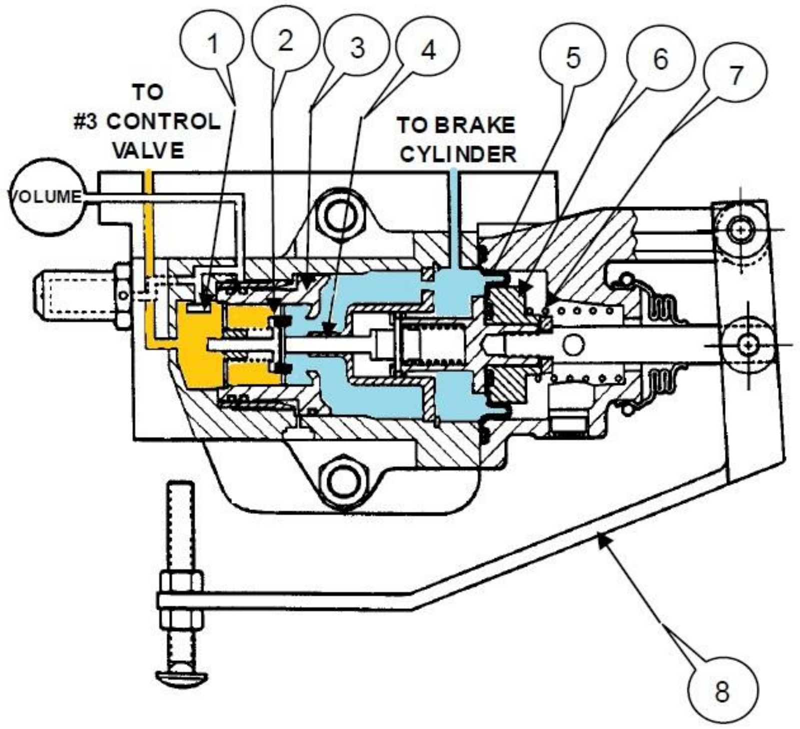
Working of APM
(Release)

In release position, the proportioning valve consisting of a ratio piston (3) and a check valve (2), is maintained to the left by actuating rod (4) connected to sensor piston (6). Check valve (2) is held fully open. Pressure from the brake cylinder will flow back through the ratio piston (3) to the control valve (retainer).



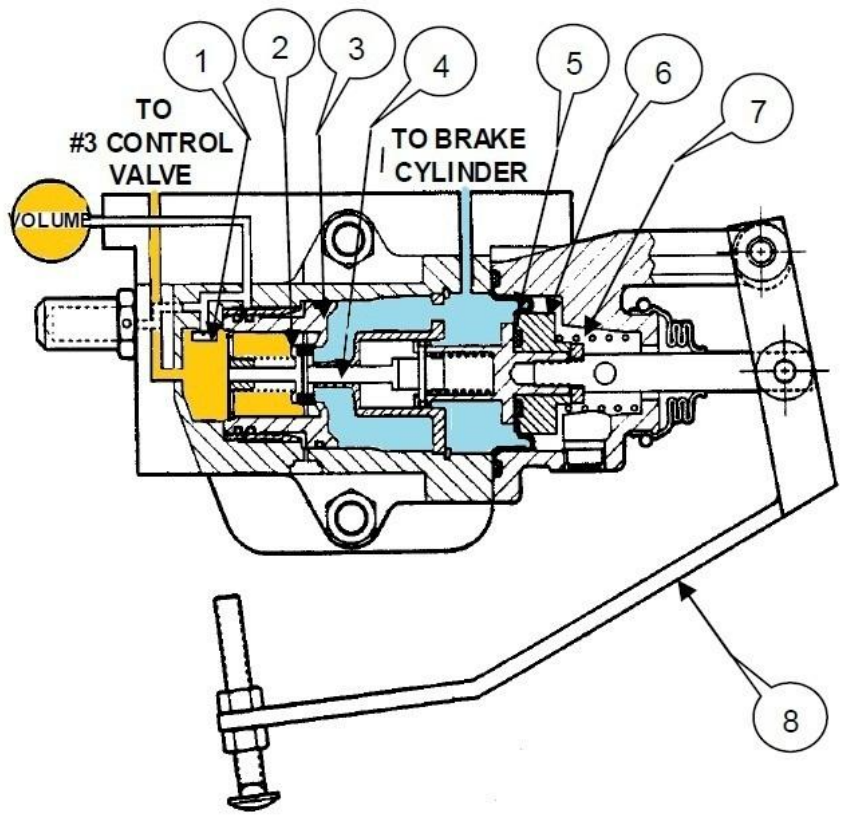
Working of APM
(Application - Load)

In load position, pressure from the control valve #3 port flows past open check valve (2), behind sensor diaphragm (5) and acts against return spring (7) to move the sensor arm (8) down at nominally 15 psi to contact the side frame. Pressure then flows out to the brake cylinder. Brake cylinder pressure build-up will be unaffected by the device in the load position as the ratio piston (3) will remain to the left of the portion and check valve (2) will remain open, permitting #3 port air from the control valve to flow directly to the brake cylinder. The air passage to the volume is cut off by the ratio piston (3) and back flow valve (1).



Working of APM
(Application - Empty)

The ratio piston (3) will move to the right as required until check valve (2) is unseated by actuating rod (4) and satisfy the requirements dictated by the ratio piston (3). Pressure will flow from the control valve to the brake cylinder until the ratio requirements are met when the ratio piston (3) will move back to the left reclosing check valve (2). For example, in a 60% ratio valve, in a full service application, if the control valve pressure was 64 psi then the volume would be 64 psi and the brake cylinder pressure would be 38 psi. If an emergency application occurred over this typical full service pressure, then each pressure would increase by 15% - 20%.



Animated Working Model of BMBS

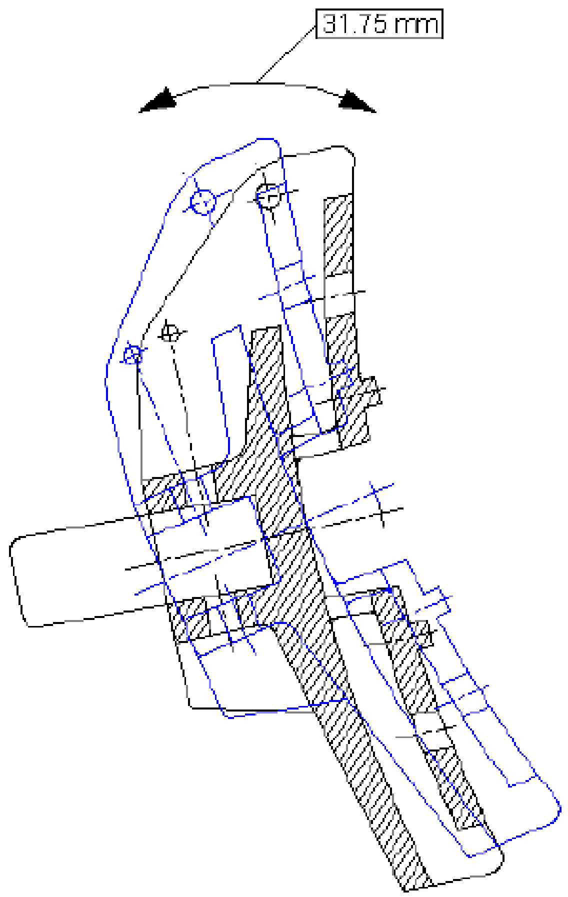
NEW YORK AIR BRAKE

Maintenance

- Air brake system is checked as normal air brake.
- Ensure no leakages in the hose connections to the Brake cylinder from APM.
- During ROH the stopper bolt of the lever of APM should be set such that the bolt just touches the bogie frame in empty condition.
- 25 mm block should be kept on the bogie frame below the lever and checked for the BC pressure (Pr should be 3.8 Kg/cm2 and without block the BC pressure should be 2.2 Kg/cm2

Maintenance

Check brake head tip. Push brake head forward and measure travel by pulling brake head all the way back. Tip travel should NOT exceed 31.75 mm.



Replace Brake Head if more play is found.

Maintenance

Replace Bell Crank Levers if found

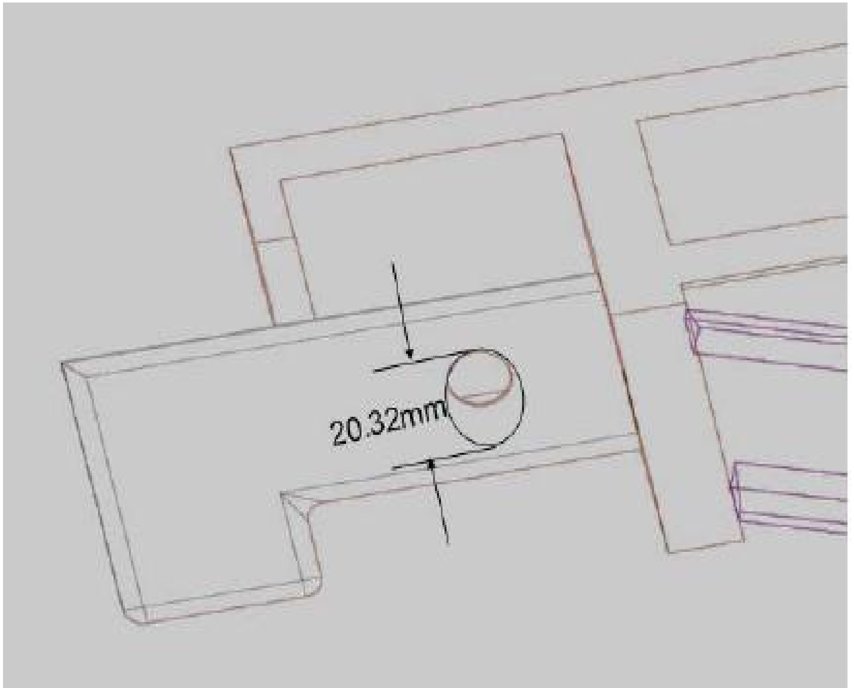
- Excessive Wear on any surface > 1.6 mm
- Worn, Damaged or Broken Spherical Bearing
- Worn/Enlarged Pin Holes
    - 25.4 mm Hole exceeds 26.7 mm in any direction (i.e.: oval condition)
    - 32 mm Hole exceeds 33 mm in any direction (i.e.: oval condition)

Maintenance

Replace Push Rods if

- Any part of the push rod is Bent
- Cracked or Damaged Welds
- Excessive Wear on any surface > 1.6 mm
- Worn , Damaged or Broken Spherical Bearing
- Worn/Enlarged Pin Hole
  - 25.4 mm Hole exceeds 26.7 mm in any direction (i.e.: oval condition)
- Clevis End Gap Exceeds 27.9 mm.

Maintenance



Remove Brake Head and inspect Brake Head pin hole in Beam. If hole exceeds 20.32 mm in length, replace Beam. If not, replace brake head and recheck tip as described earlier. Tip should not exceed 31.75 mm (from FIRST check above). If tip does exceed 31.75 mm, replace Beam and Brake Head.

Maintenance

Gap between Bell crank lever RH & LH and the upper channel of Primary brake beam