

# ENGINEERED FOR RELIABILITY. TRUSTED WORLDWIDE.

Precision Railway Braking Systems &  
Rolling Stock Components

A Global Manufacturing Partner for  
Railway OEMs, Operators &  
Maintenance Organisations



PRECISION  
ENGINEERING



QUALITY  
ASSURED



TESTED FOR  
SAFETY



GLOBAL  
PRESENCE



CUSTOMER  
PARTNERSHIP



## Engineering Excellence Since 1997

A trusted manufacturing partner for OEMs, railway operators and maintenance organisations worldwide.



1997



Howrah,  
West Bengal,  
India



AREA  
**30,000**  
sq.ft.



**75+**  
Skilled  
Professionals



**10+**  
Countries



## Railway Braking Systems & Rolling Stock Components



Advanced CNC  
& Precision  
Engineering



ISO 9001:2015  
RDSO Approved

## OUR JOURNEY

**TODAY**

Company  
Founded

**Advanced CNC  
Machining Facility  
Commissioned**

## Manufacturing Infrastructure Expanded

**Trusted Supplier  
Serving Customers  
in 10+ Countries**

## WHY GLOBAL CUSTOMERS CHOOSE SAM





# WHY SAM INDUSTRIES?

Three decades of engineering excellence, innovation and commitment to quality that make us a trusted partner for railway OEMs and operators worldwide.



## RDSO APPROVED

RDSO approved vendor ensuring compliance with Indian Railway standards.



## QUALITY ASSURED

ISO 9001:2015 certified quality management system with zero tolerance approach.



## ADVANCED CNC MANUFACTURING

State-of-the-art CNC machines for high precision, consistency and repeatability.



## IN-HOUSE TESTING

Comprehensive testing facilities ensuring reliability, safety and performance of every product.



## GLOBAL PRESENCE

Proudly supplying to customers in 10+ countries across the globe.



## TRUSTED OEM PARTNER

Long-term partnerships with leading OEMs, operators and maintenance organisations.





# MANUFACTURING EXCELLENCE

Precision Manufacturing. Consistent  
Quality. Global Standards.



## CNC TURNING

High-precision machining  
for critical railway brake  
components.



## VERTICAL MACHINING CENTRE

Complex milling operations  
with micron-level accuracy  
and repeatability.



## GRINDING

Precision grinding for  
tight dimensional tolerances  
and superior surface finish.



## TESTING

Comprehensive functional  
and performance testing  
for every critical component.



## ASSEMBLY

Controlled assembly  
using standardized  
processes and tooling.



## INSPECTION

100% dimensional and  
quality inspection before  
dispatch to ensure zero defects.



## OUR CAPABILITIES AT A GLANCE



**30,000**  
sq.ft.

Manufacturing Area



**75+**  
Skilled  
Workforce



**Advanced**  
CNC Machines  
for Precision Engineering



**ISO 9001:2015**  
Certified  
Quality Management System

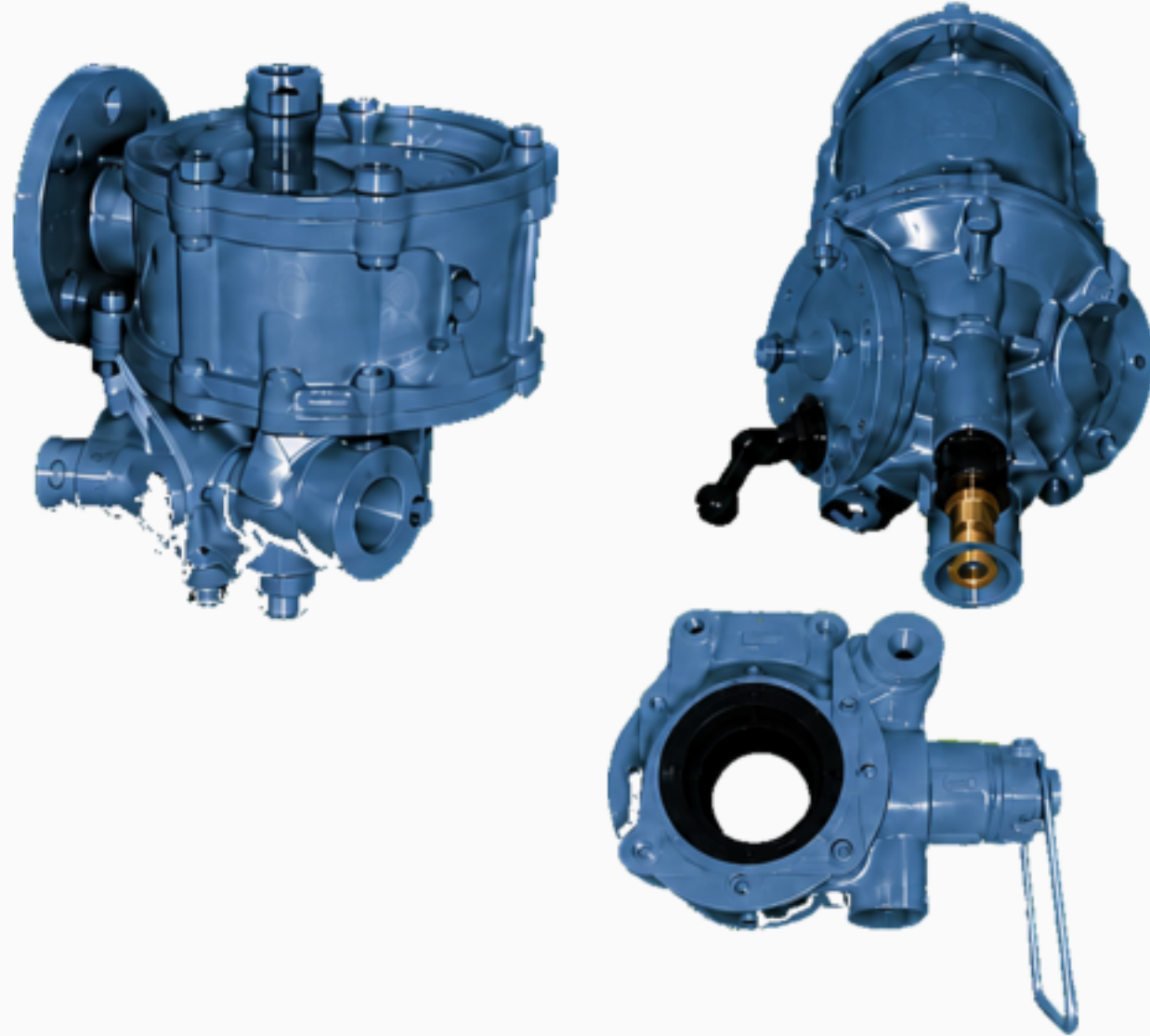


A comprehensive range of precision engineered railway braking systems & components built for safety, performance and durability.



## DISTRIBUTOR VALVES

- C3W Distributor Valve
- C3W2 Distributor Valve
- Bracket for Distributor Valve



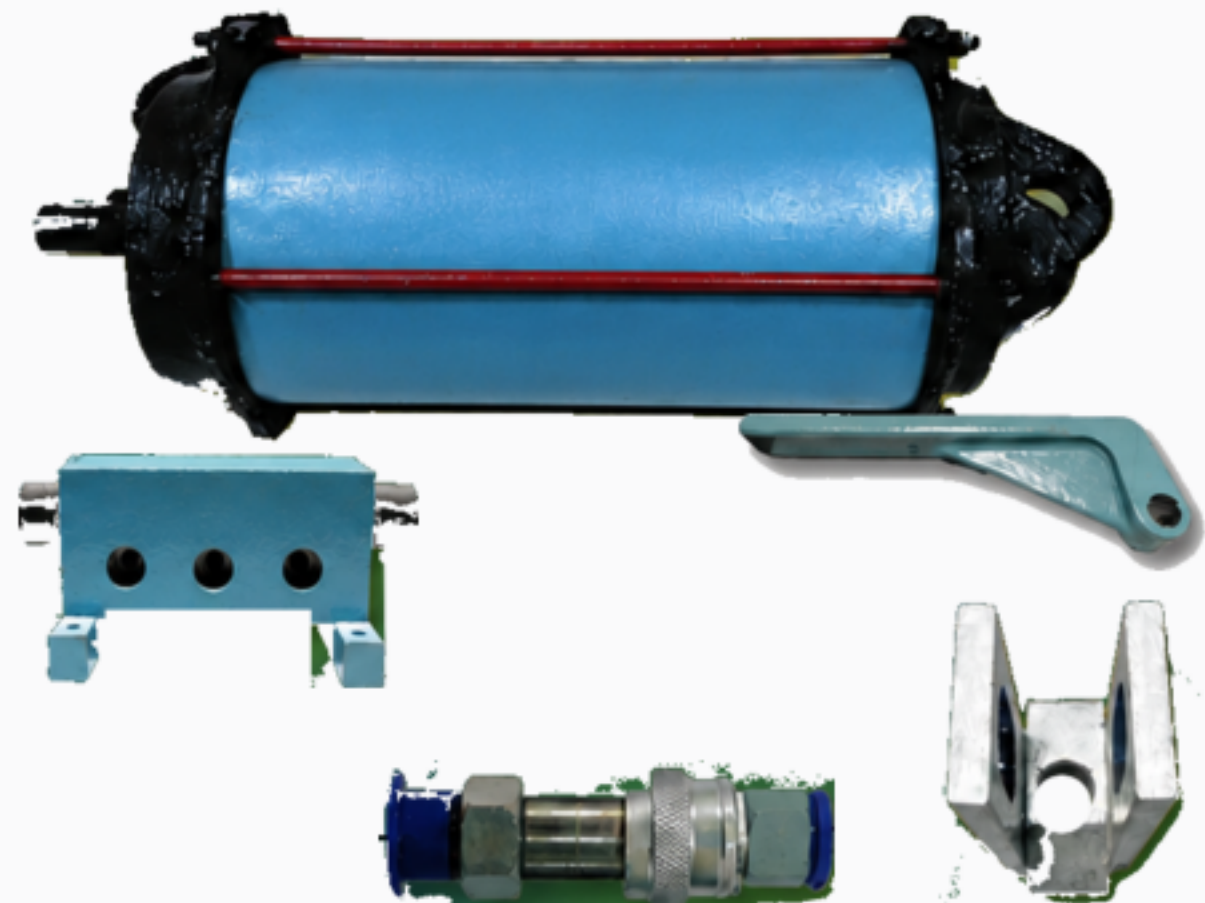
## VACUUM BRAKE SYSTEM COMPONENTS

- Vacuum Brake Cylinder
- Hose Pipe
- Van Valve
- Drain Cock
- Dummy Coupling
- Double Branch Release Valve
- Universal Coupling



## HOPPER WAGON COMPONENTS

- Dom/Air Cylinder
- Pneumatic Control Valve
- Cylinder Rod Clevis Assembly
- Modified Door Hinge
- Quick Coupling







## AIR BRAKE VALVES

- Dirt Collector
- Angle Cock
- Check Valve
- Isolating Cock



## CRITICAL LOCO VALVES

- E1 Safety Valve
- J1 Safety Valve
- C-2W Relay Valve
- 24A Double Check Valve



## OTHER PRODUCTS

- Base Cast Iron (Machined)
- Cast Iron Components
- Detector Rod
- Lock Rod
- Slide Cover
- Single Wagon Test Rig



## BUILT FOR EVERY APPLICATION



### FREIGHT RAIL

Heavy duty performance  
for freight operations



### PASSENGER COACH

Reliable braking for  
passenger safety



### METRO & URBAN RAIL

Precision systems for  
modern metros



### LOCOMOTIVE

High performance  
braking solutions



### MAINTENANCE

Trusted components for  
workshops & depots



### OEM & EXPORT

Partner of choice for  
global OEMs



# COMPONENTS FOR VACUUM BRAKE SYSTEM

## VACUUM BRAKE CYLINDER (VBA-05/M TO VBA-25/M) BOTH E & F TYPE



Each vehicle has at least one brake cylinder. Sometimes two or more are provided. The movement of the piston contained inside the cylinder operates the brakes through links called "rigging". The rigging applies the blocks to the wheels. The piston inside the brake cylinder moves in accordance with the change in vacuum pressure in the brake pipe. Loss of vacuum applies the brakes, restoration of the vacuum releases the brakes.

## VACUUM HOSE PIPE WITH CLIP (3/4", 2" & 2.5")

The brake pipe is carried between adjacent vehicles through flexible hoses. The hoses can be sealed at the outer ends of the train by connecting them to dummy couplings.



## VAN VALVE

Guard's Van Valve is equipped with a single pointer vacuum gauge in the Guard's compartment. This Valve gives a partial control of brakes to the Guard in-charge of the train.



## VACUUM RESERVOIR

The operation of the vacuum brake relies on the difference in pressure between one side of the brake cylinder piston and the other. In order to ensure there is always a source of vacuum available to operate the brake or connected to the upper side of the piston. In the simplest version of the brake, shown above, the brake cylinder is integral with the vacuum reservoir. Some versions of the brake have a separate reservoir and a piped connection to the upper side of the piston.



## DUMMY COUPLING

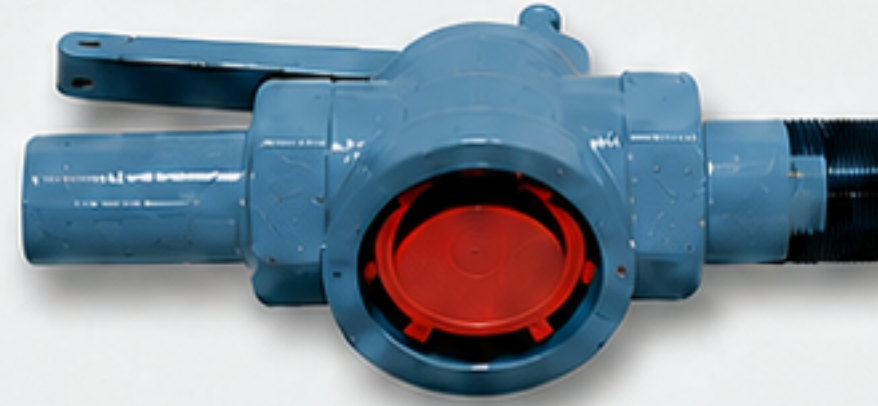
At the ends of each vehicle, a dummy coupling point is provided to allow the ends of the brake pipe hoses to be sealed when the vehicle is uncoupled. The sealed dummy couplings prevent the vacuum being lost from the brake pipe.





# COMPONENTS FOR VACUUM BRAKE SYSTEM

## DRAIN COCK



## VACUUM GAUGE



## SYPHON TEE

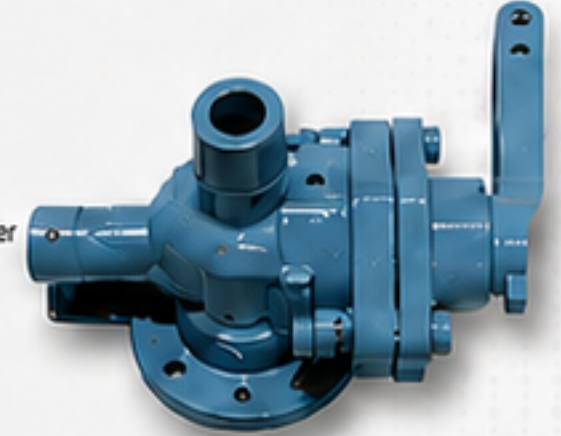


## SWAN NECK



## RELEASE VALVE DOUBLE BRANCH

Used with "F" Type Vacuum Brake Cylinder  
Release Valve is Employed to allow  
atmospheric air pressure into  
the vacuum reservoir



## RELEASE VALVE SINGLE BRANCH

Used with combined "E" Type  
Vacuum Brake Cylinder. Release  
Valve is Employed to allow  
atmospheric air pressure into  
the vacuum reservoir



## HOSE PIPE SYPHON



## DUMMY CARRIER



## UNIVERSAL COUPLING

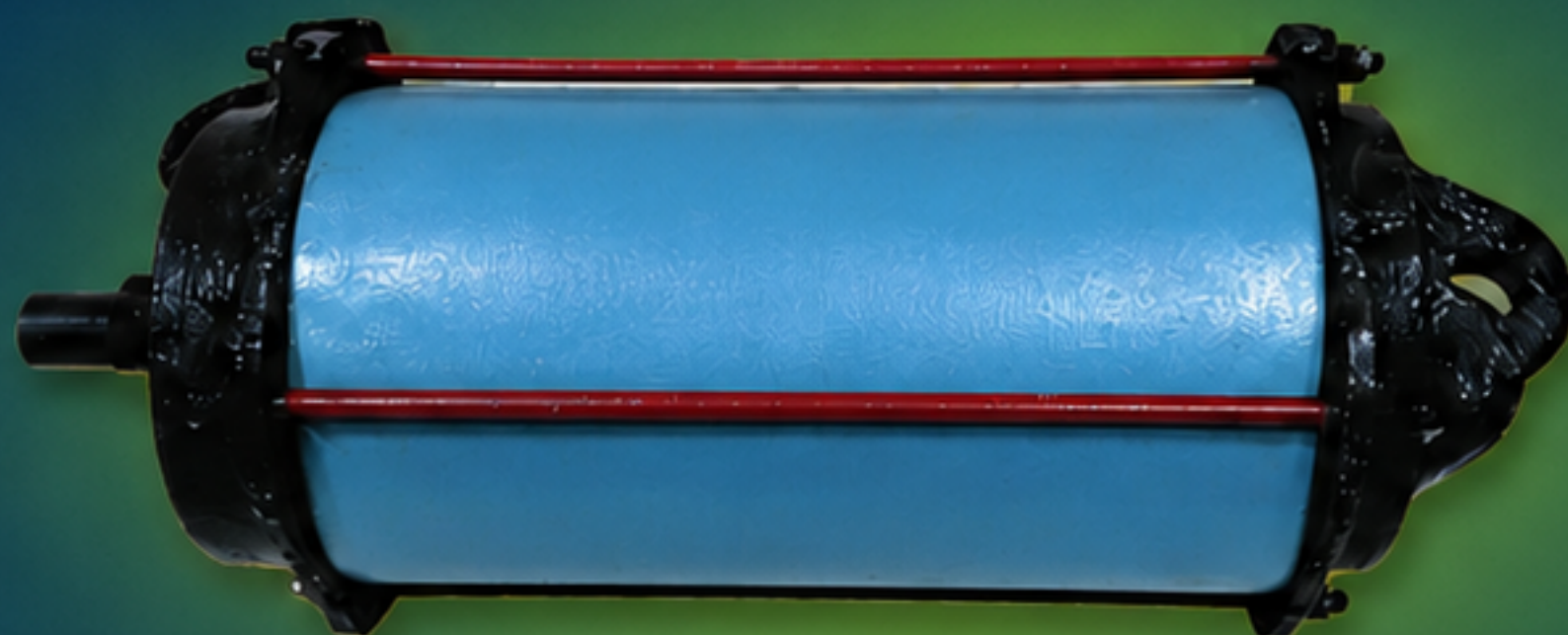




## COMPONENTS FOR HOPPER (COAL) WAGON

### DOM/ AIR CYLINDER ( 12/14")

Double Acting Air Cylinder is a unique mechanism for operating of Door in carriage Wagons (BOBRN/NTPC). The Bottom discharge system is designed to unload coal or other bulk material at speeds ranging from one and a half to 3 mile per hour over trestles or into pits. A car loaded with 30 to 60 tons can be unloaded in less then 20 seconds.



### MODIFIED DOOR HINGE



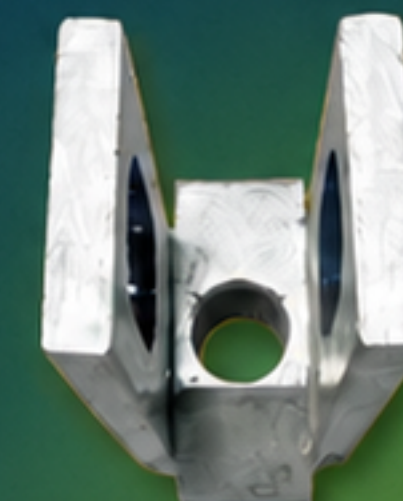
### AIR FILTER



### PNEUMATIC CONTROL VALVE



### CYLINDER ROD CLEVIS ASSEMBLY



### QUICK COUPLING



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# AIR BRAKE VALVES

## DIRT COLLECTOR

Dirt Collector is provided with Tee to ensure inter vehicular full flow of Brake pipe as well as branching for operation of distributor Valve. Centrifugal Dirt Collector is incorporated with filter is designed to trap dirt and dust contained in the air – flowing into the branch pipes , thereby preventing their entry into the distributor valve and auxiliary reservoir. Air entering the branch line is guided through suitably shaped passages in Dirt Collector Body to produce a centrifugal flow and then filtered through filter assembly before it is exhausted through the outlet. The dirt contained in the air descends over the canopy shaped Non Return Valve and gets deposited in the dirt chamber. However, finer particle are arrested in the filter assembly



## ANGLE COCK

Cut – off angle cocks are provided at the ends of brake pipes on each wagon. Whenever a wagon is to be uncoupled, the Angle Cocks on the wagon as well as the nearest Angle Cocks on the preceding wagons are closed to isolate the brake pipes of the wagon. In a closed position , the Angle Cocks also vent the air trapped in the hose couplers making it safe for personnel to uncouple them. The Angle cocks are ball type ensuring better sealing against leakage and facilitating ease of operation and maintenance. The handle of Angle cock is self locking type to avoid any inadvertent movement from open to close position or Vice -Versa during service.

## CHECK VALVE

Check valves are used between feed pipe and auxiliary reservoir to permit flow of air from feed pipe to auxiliary reservoir in one direction only.



## ISOLATING COCK

Ball type isolating cocks are used to provide facility for cutting-off of air supply to auxiliary reservoir from feed pipe as well as isolation of brake cylinder.





# CRITICAL LOCO VALVES

## N-1 REDUCING VALVE

The N-1 Reducing Valve reduces the pressure of compressed air supply to a constant predetermined value and delivers the same usually for operation of auxiliary devices



## E-1 SAFETY VALVE

Safety- valves are used in the brake system to protect the compressors, main reservoir and other piping of the system from excessive pressure. (When the governor fails to function, the safety valve blows off to protect the system by relieving the main reservoirs, compressors and associated piping from excessive pressure).



## 24A-DOUBLE CHECK VALVE

The 24-A Double Check Valve is used to permit a device to be controlled by either of two other devices

## T-2 SAFETY VALVE

The type T2 Safety Valve is a small compact safety valve used for protecting Auxiliary air reservoirs or other equipment against pressure. Valves are available to cover pressures set between 5 and 180 b./ sq. inch. Nipples are available screwed 1/ 4", 3/8", 1/2", 3/4" or 1" B.S.P.(Taper) thread.



## C-2W RELAY VALVE WITH 5MM & 6 mm CHOKE

The C2W Relay Air Valve is a diaphragm cooperated self lapping valve having higher capacity which is used as a remote controlled pneumatic device to relay a large quantity of main air reservoir pressure to the operating system for brake application



## J-1 SAFETY VALVE

The J1 (MR) Safety Valve, installed vertically in the main reservoir system, vents pressure at a predetermined setting to atmosphere in order to prevent excessive main reservoir pressure buildup.



## 2 WAY HORN VALVE



# CRITICAL LOCO VALVES

## D-1 EMERGENCY BRAKE VALVE

The D-1 Emergency Brake Valve is manually operated device which provides a means of initiating an emergency brake application.

The two pipe connections to the emergency brake valve are the air brake pipe and the vacuum brake pipe. During normal train operation the operating handle is positioned to seat the valve seats. When the handle is pulled, the handle lever lifts the vacuum valve off its seat and in the same movement pushes a plunger to unseat the air valve. Thus, the air brake pipe and vacuum brake pipe are simultaneously connected to atmosphere, causing an emergency air brake application and immediate vacuum brake application. The D-1 Emergency Brake Valve handle must be manually reset to seat the air and vacuum valves before the brake can be released.

When installed the D-1 Emergency Brake Valve handle should be in a vertical position so that the vacuum valve rests closed on its seat.



## MU-2B VALVE

The MU-2B Valve is a manually operated, two position and multi-ported valve arranged with a pipe bracket and is normally used for locomotive brake equipment for multiple unit service between locomotives equipped with similar system in conjunction with F-1 Selector Valve.



## A-9 AUTO BRAKE VALVE

The A-9 Automatic Brake Valve is a compact self lapping, pressure maintaining Brake Valve which is capable of graduating the application or release of locomotive and train brakes. A-9 Automatic Brake Valve has five positions: Release, minimum Reduction, Full Service, Over Reduction and Emergency.



## SA-9 IND. BRAKE VALVE

SA-9 Independent Brake Valve is a compact self lapping, pressure maintaining Brake Valve which is capable of graduating the application or release of Locomotive Air Brakes independent of Automatic Brake. The SA-9 Independent Brake Valve is also capable of releasing an automatic brake application on the Locomotive without affecting the train brake application. The SA-9 Brake Valve has three positions: quick release, release and application.





## OTHER CRITICAL ITEM

### COMMON PIPE BRACKET

Common pipe bracket has been evolved with the purpose of making it suitable for use with any of the Distributor valve. However each type of Distributor valve should be used only with its own intermediate piece. The common pipe bracket is precision cast with internal air passages. Intermediate piece mounting face with accurately profiled air cavities and flanged ports on sides for pipe connection to brake pipe ( BP ), Auxiliary Reservoir ( AR ), Brake Cylinder ( BC ) and Empty load device ( EP ).

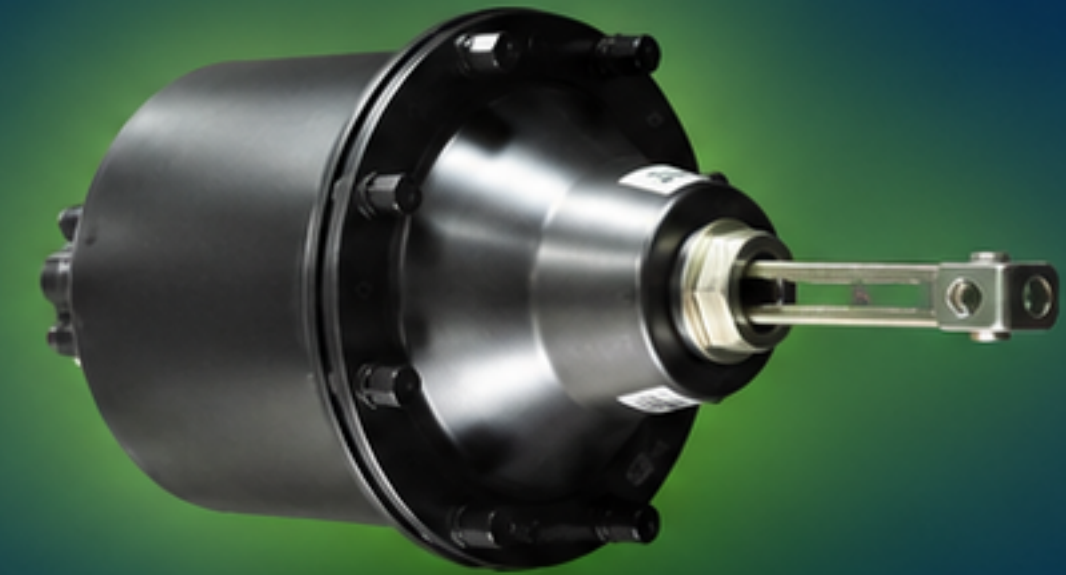
The Intermediate piece assembly is mounted on the pipe bracket face with a common gasket in between Isolating cock for Distributor valve is mounted on the side of intermediate piece and it is provided for cutting off the function of distributor valve in case it malfunctions. The Distributor valve with its gasket should be fixed to the outer face of intermediate piece



### BRAKE CYLINDER 12"

On every coach fitted with air brake system two brake cylinders are provided for actuating the brake rigging for the application and release of brakes. During application of brakes the brake cylinder develops mechanical brake power by

outward movement of its piston assembly after receiving air pressure from Auxiliary reservoir through the distributor valve. This is transmitted to the brake shoes through a combination of levers. During release action of brakes the compression spring provided in the brake cylinder brings back the rigging to its original position.



### SLACK ADJUSTER DRV2A (450 Lg) (600 Lg)

The slack adjuster assembly transmit the braking torque to the S – Cam and facilitate the adjustment of clearance between the brake lining ( Brake pad ) and the brake drum. So when the driver presses down on the brake pedal , air is forced into the brake chamber and forced the push rod out .This device adjust and regulate the brake application. The wear and tear is a common phenomenon of brake shoe. After travelling miles after miles the brake shoe also get wear and tear so thickness of brake shoe get thinner than a new one. Slack adjuster automatically adjust in its length and better to say acts as a telescopic spout to accommodate this worn out and also it plays a vital role for proper brake applications.





## OTHER CRITICAL ITEM

## HOSE UIC TYPE

UIC Hose Coupling are used in between two wagons for continuation of brake pipe lines. Each Air Brake Hose Coupling consists of a specially manufactured hose clamped over a nipple on one end and coupling head on the other end. Rubber sealing washer are provided on the outlet port of coupling head.



## ANGLE COCK UIC TYPE

UIC angle cocks are provided at the ends of brake pipes / Feed pipe on each wagon. Whenever a wagon is to be uncoupled, the Angle Cocks on the wagon as well as the nearest Angle Cocks on the preceding wagons are closed to isolate the brake pipes of the wagon. In a closed position, the Angle Cocks also vent the air trapped in the hose couplers making it safe for personnel to uncouple them. Also it acts as a BP Vent pipe, The Angle cocks are ball type ensuring better sealing against leakage and facilitating ease of operation and maintenance. The handle of Angle cock is self locking type to avoid any inadvertent movement.



## WIPER ASSEMBLY

## SUPPORT RESERVOIR WITH ISOLATING COCK



## EMPTY LOAD DEVICE

### MANUALLY OPERATED EMPTY LOAD DEVICE:

These are used in the wagons equipped with single stage Distributor Valve. The lever has to be adjusted manually to adjust the brake force to Empty or Loaded.

### AIR OPERATED EMPTY LOAD DEVICE:

When fitted along with TVA it automatically senses the load position of freight wagon as empty or loaded and adjusts the brake power accordingly.



## LOAD SENSING DEVICE

To effect the automatic change of a change over valve of distributor valve depending on whether the vehicle is in "EMPTY" or in "LOAD" condition, a load sensing device is employed.



## PANTOGRAPH

Roof-mounted current collector for power transmission from conductive overhead wire to train



# AIR SUSPENSION CONTROL EQUIPMENTS FOR AIR SPRING ASSEMBLY SYSTEM (COACHING STOCK)

## DUPLEX CHECK VALVE

In the pneumatic suspension control system, one set of Duplex check valve is used in between the pipeline connection of the two air springs on the two sides of a bogie. During the functional life of the pneumatic system, leakages at the air spring cannot be ruled out.

Duplex check valve is so designed that whenever a pressure differential between the two air springs on each side of bogie due to leakage and whatever reasons reaches a set pressure of 1.5 kg/cm<sup>2</sup>, the air will flow from one air spring to other through the duplex check valve. Thus the uniform height between the bogies / coach can be maintained till the leakages are attended.



## LEVELLING VALVE

Levelling valve forms a critical valve in the pneumatic circuit of the air suspension system of the rail vehicle. The increase or decrease of height of vehicle due to decrease or increase of passenger load in turn actuates the handle of leveling valve to allow flow of some compressed air from the air spring to atmosphere. Thus a fixed height of vehicle is always maintained irrespective of change of passenger load connection to the upper side of the piston.



## INSTALLATION LEVER

The installation lever is used to connect leveling valve with respect to fixed gear mechanism for proper leveling of coach body. It has ball and socket joint at both ends. When connected to leveling valve lever, top and bottom ball socket joint of installation lever shall enable a free simultaneous or independent movement of the order of 50mm (min.) lateral and 15mm (min.) longitudinal of the assembly at the top articulation with reference to the bottom fixed articulation. flow from one air spring to other through the duplex check valve. Thus the uniform height between the bogies / coach can be maintained till the leakages are attended.



## STAINLESS STEEL RESERVOIR (20 LTRS. TO 150 LLTRS.)



## DRAIN VALVE

Spring loaded Drain Valve is used in the Auxillary Reservoir 20litre capacity to periodically drain off the trapped moisture in the Reservoir.(Ref Drg. No-08810301).articulation with reference to the bottom fixed articulation. flow from one air spring to other through the duplex check valve. Thus the uniform height between the bogies / coach can be maintained till the leakages are attended.





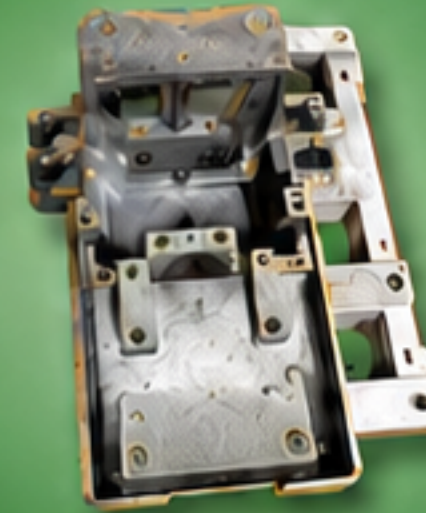
## OTHER ITEMS

## ELECTRIC POINT MACHINE

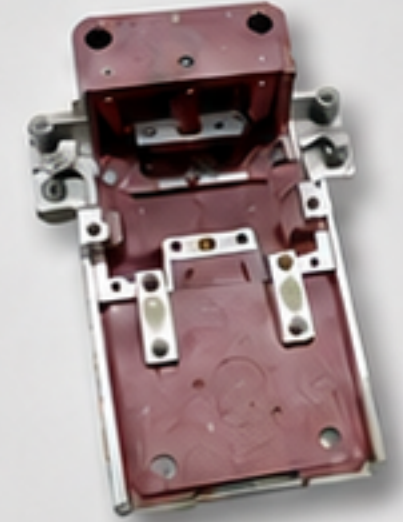


LAPPING COCK

BASE CAST IRON (UNMACHINED)



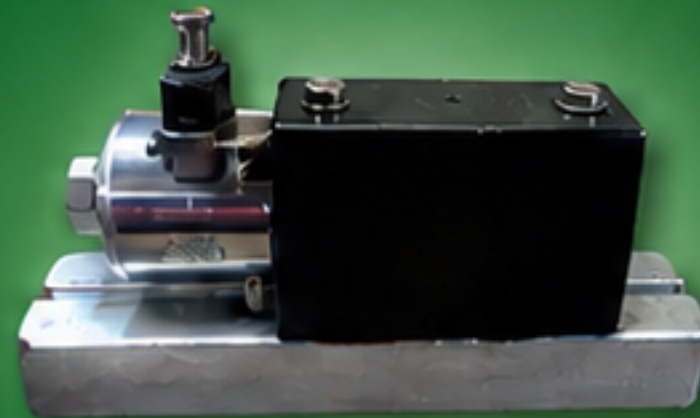
BASE CAST IRON (MACHINED)



REBAR COUPLER



MAGNET VALVE



CAST IRON COMPONENTS  
(5 ITEMS SET)



DETECTOR ROD



SINGLE WAGON TEST RIG



LOCK ROD



SLIDE COVER

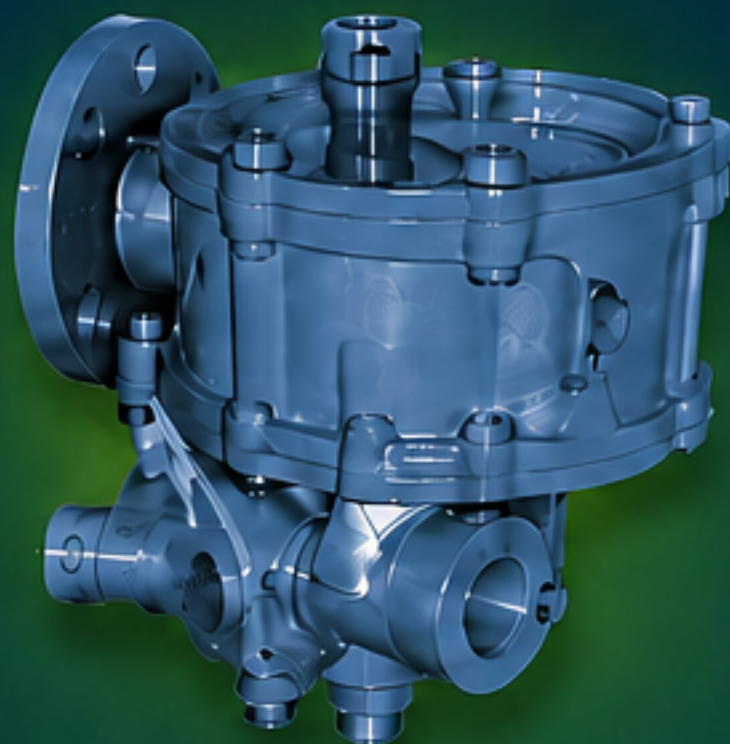




# DISTRIBUTOR VALVES

## C3W2 (AUTOMATIC 2 STAGE DV)

The C3W2 distributor is basically a C3W distributor with the "Empty-Load" function added, providing two stages of brake cylinder pressure. The maximum pressure of 3.8 bars, laid down by the U.I.C., corresponds to the "Load" condition: a lower pressure corresponds to the "Empty". U.I.C leaflet 543, section 8, lays down a maximum brake weight of 120% while the minimum brake weight lies between 40% & 60% according to vehicle type & operating category.



## DISTRIBUTOR VALVE

C3W Distributor valve is the most important functional component of the air brake system and is also sometimes referred to as the heart of the air brake system. The function of the distributor valve is to distribute compressed air received from brake pipe to auxiliary reservoir and control reservoir. In addition to this it also senses drop and rise in brake pipe pressure for brake application and release respectively. Distributor Valve is a graduated release UIC approved Distribution Valve for application in the Coach Brake System and Wagon, used for initiating the brake application.



### RELIABLE PERFORMANCE

Engineered for consistent and dependable operation in all conditions.



### OPTIMIZED EFFICIENCY

Designed to ensure optimal braking performance and system efficiency.



### PRECISION ENGINEERED

Built with high quality materials and advanced manufacturing.

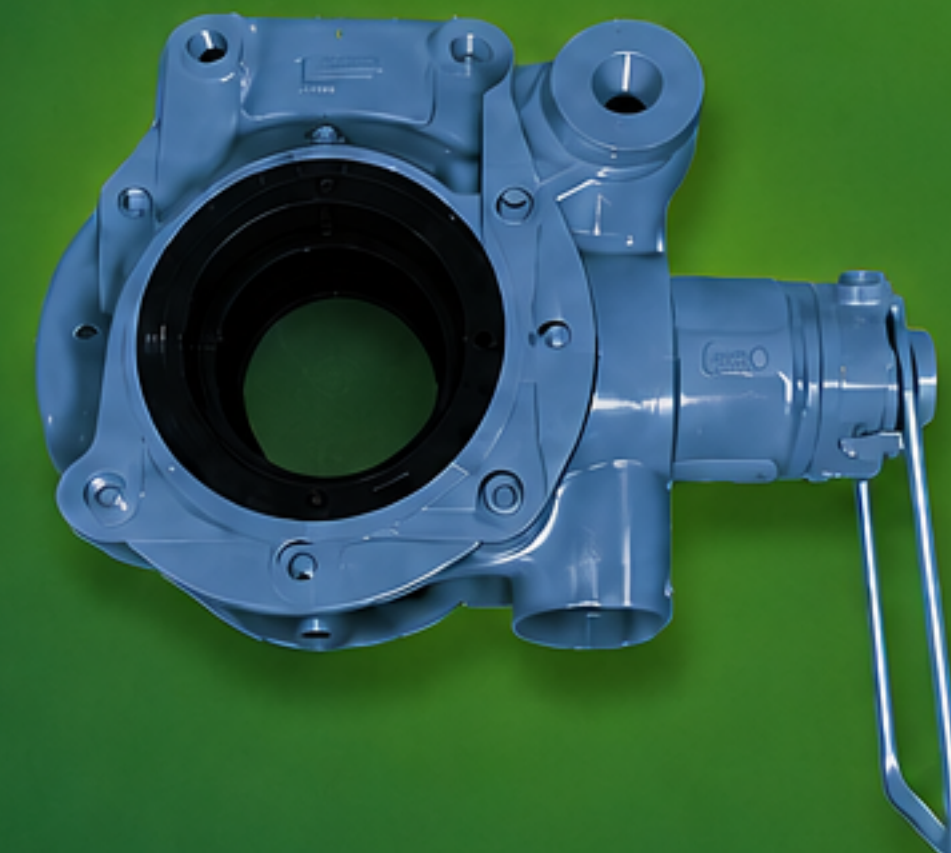


### UIC APPROVED SOLUTIONS

All components comply with UIC standards for safety and reliability.

## BRACKET FOR DISTRIBUTOR VALVE

Check valves are used between feed pipe and auxiliary reservoir to permit flow of air from feed pipe to auxiliary reservoir in one direction only.







# POWERING PROGRESS. CONNECTING THE WORLD.

At SAM Industries, our commitment to precision, quality and innovation has earned the trust of leading railway operators, OEMs and maintenance organisations across the globe.

We are proud to be their trusted partner.

## OUR ESTEEMED CLIENTS

- |                                                                                                                                                                                                                                                 |                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Indian Railways</li> <li>• Texmaco Rail &amp; Engineering</li> <li>• Modern Industries</li> <li>• Jupiter Industries</li> <li>• Titagarh Wagons</li> <li>• Hindustan Engineering Industries</li> </ul> | <ul style="list-style-type: none"> <li>• Burn Standard Co. Ltd.</li> <li>• Braithwaite &amp; Co.</li> <li>• Greysham International</li> <li>• Sanrock Enterprises</li> <li>• NTPC</li> <li>• ICF</li> </ul> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



### MESSAGE FROM THE DIRECTOR

Since our inception in 1997, SAM Industries has been driven by a clear purpose – to engineer reliable solutions that keep the wheels of progress moving.

Our strength lies in precision, quality and a relentless commitment to customer satisfaction. We look forward to growing together and building a safer, stronger and more connected tomorrow.

**Sumit Agarwal**  
Director  
SAM Industries



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