



**Freight
Products**

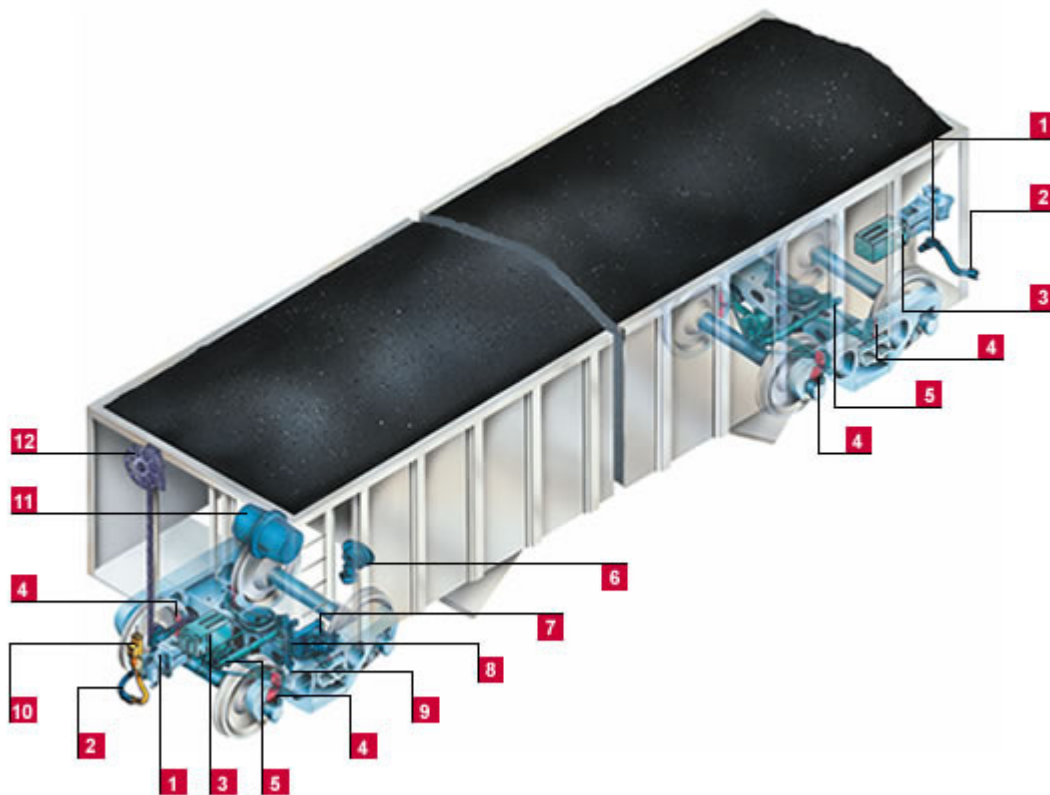
Wabtec's reputation for developing advanced braking equipment for freight cars and locomotives is unsurpassed. No other supplier has more experience or has made more distinguished contributions in this sensitive and complex arena. Wabtec is also the only company in North America that offers the industry a definitive selection of traditional and electronically controlled pneumatic braking components and products - everything from control valves to brake shoes to articulated couplings.

1-Standard Car Assembly

2- Intermodal Car Assembly

- **End Truck Assembly**
- **Center Truck Assembly**

Standard Car Assembly



1.



1-1/4" DYNABALL ANGLE COCK

The DYNABALL angle cock features a Teflon-coated ball to provide smooth, effortless hand movement. Its large rubber seals, which are self-lubricating, self-cleaning and self-adjusting, reduce leakage and can be replaced quickly.

2.



HOSE AND COUPLING

The average pull-off strength of the LOC-HOSE freight car brake hose assembly has been increased by means of an advanced hose clamping method that secures the coupling and hose nipple to the brake pipe hose. This has significantly improved protection against leakage. Manufactured by WABCO Freight Car Products, a Wabtec company, the LOC-HOSE also withstands temperature extremes, in-service shocks and external forces.

3.



MARK 50 DRAFT GEAR

The **Mark 50** was the first to receive unconditional approval under AAR Specification M-901E. It features the Westinghouse friction-clutch design that transfers wear and stress to replaceable, energy-absorbing components. Manufactured by Cardwell Westinghouse, a Wabtec company, it is suited for all types of rail cars having 24-5/8-inch (63.1cm) pockets and 3-1/4-inch (8.3cm) travel in any operating service environment. Since 1961, it has saved millions of dollars for shippers across North America.

4.



COBRA® AP BRAKE SHOE

COBRA® composition brake shoes are a blend of lead- and asbestos-free, friction-producing materials that are molded to a pressed-steel backer plate under controlled heat and pressure to provide consistent, reliable braking under varying conditions. The COBRA® AP (advanced performance) shoe, for standard freight car applications, features a tapered design to help alleviate problems caused by misaligned brake rigging. The shoes are available in both 1-1/2-inch and 2-inch thicknesses.

5.



TMX™ TRUCK-MOUNTED BRAKE ASSEMBLY

The TMX™ truck-mounted brake assembly is made of durable, lightweight materials, including fabricated truss-type brake beams with replaceable brake heads and a single deep-drawn fabricated brake cylinder that provides a rugged, reliable brake arrangement weighing in at 400-500 pounds less than conventional brake rigging. A freely suspended system, which requires no special bolsters or connections of any kind to existing bolsters or the car body, results in even brake pad wear. This, combined with the increased capacity of the double-acting slack adjuster that allows for the use of two-inch-thick composition brake shoes, leads to improved economy through less frequent shoe change-outs. The TMX is currently available in 7-, 8- and 9-1/4-inch cylinder sizes with simplified lever ratio combinations to accommodate all conventional and well-car applications for 70-ton, 100-ton and 125-ton trucks.

6.



ELX-S™ EMPTY AND LOAD VALVE

This device is a diaphragm-actuated, self-contained unit to be mounted on the slope sheet of bulk commodity cars. Car loading is detected directly when the bulk load depresses a reinforced rubber diaphragm in the slope sheet, causing the unit to change from an empty to a loaded brake position. The ELX-S™ includes variable proportioning that further reduces brake cylinder pressure when higher brake pipe pressures are used and during emergency brake applications. This feature permits optimum braking on empty cars when used in train operations under varying brake pipe pressure conditions. The ELX-S™ features a self-resetting lockout button that simplifies single-car testing while ensuring that the device automatically resets when the brake pipe is recharged. It is available in 50 percent or 60 percent capacity versions, along with a newly approved 40 percent capacity version to accommodate ultra-lightweight heavy haul cars.

7.



ABDX™ FREIGHT BRAKE CONTROL VALVE

Several improvements have been made to WABCO Freight Car Products' ABDX™ freight control valve to enhance the performance and extend the service life. These include a higher-performance quick-service limiting valve that can shorten full-service train stopping distances by three percent to five percent; newly designed composite piston guide rings, contact bearings and wear shields that protect against valve contamination due to metal-to-metal contact; and redesigned mounting gaskets that virtually eliminate leakage or blowout due to uneven torque applications. The valve is available in either the traditional "AB-type" pipe bracket mounting arrangement or mounted on a single-sided pipe bracket (shown here) that places service and emergency portion right in front for easy access.

8.



DIRT COLLECTOR AND CUT-OUT COCK

The DYNABALL dirt collector and cut-out cock, which is usually mounted to the brake control valve, can be mounted on a single-sided pipe bracket as shown here. This product has three primary functions. First, it enables manual cutout of brake pipe airflow to the control valve without affecting that flow to other cars. It provides a means for removing large pieces of dirt, gravel, sand and other foreign materials before they can reach the control valve. Lastly, the product provides a local sump to collect brake pipe-precipitated moisture.

9.



RETAINING VALVE

The RX-3 retaining valve controls airflow from the brake cylinder during brake release. For retaining brake cylinder air pressure to control train speed during the brake recharging process, the valve can be positioned manually to provide three cylinder released modes: full release at either normal or slow air flow rates, or retention of 20 psi

10.



TRAINLINK™ ES END-OF-TRAIN DEVICE

Wabtec Railway Electronics' TRAINLINK™ ES improves braking performance by automatically making service brake pipe reductions at the rear of the train. As the locomotive engineer begins making the brake pipe reduction, the desired brake pipe pressure is immediately transmitted to the TRAINLINK™ ES. The TRAINLINK™ ES responds by venting the desired brake pipe pressure at the rear of the train. The effect is a dramatic improvement in the brake application response time, while operating entirely transparent to the locomotive engineer

11.



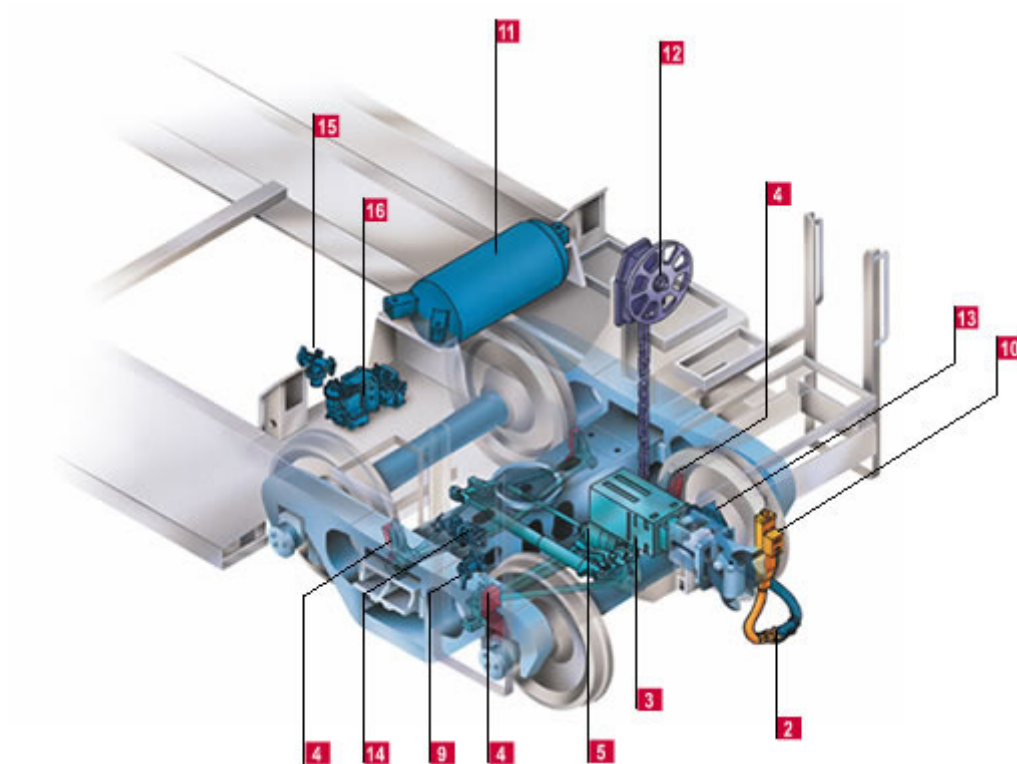
TWO-COMPARTMENT RESERVOIR

A two-compartment reservoir on a freight car is used to store compressed air for auxiliary and emergency air applications. Older cast iron designs consisted of two reservoirs bolted together with a metal plate inserted in the middle. The plate had raised tabs indicating "AUX" for auxiliary side and "EMER" for the emergency side. The new, fabricated one-piece design has two attachment lugs on the auxiliary side and one lug on the emergency side to ensure proper application on the freight car.

12. **Universal Handbrake**

Intermodal Car Assembly

- End Truck Assembly



2.



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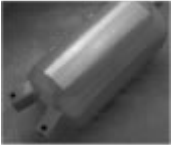
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12. Universal Handbrake

13.



1-1/4" BRAKE PIPE END COCK

The 1-1/4" brake pipe end cock is designed for use on specific rail vehicles where the standard brake pipe angle cock cannot be used, and where the air pressure and the equipment arrangement does not exceed 150 psi. The cock provides a means for the manual closing of the brake pipe, as on the end of the last car of a train consist, and the continuation of the brake pipe between coupled cars by the connection of an attached brake hose assembly.

14.



ELX-U™ EMPTY AND LOAD VALVE

WABCO Freight Car Products' ELX-U™ empty and load valve is designed as a one-piece, self-contained unit with an integral volume attached to the sensor/proportioning assembly. The unit is mounted to the car body in a way that allows the sensor arm to measure truck spring deflection to determine the brake cylinder pressure for empty or loaded car conditions. It is designed with a lost motion feature that prevents false sensor arm readings due to car dynamics in either the loaded or empty positions, and both are available in left- or right-hand versions of 50

percent or 60 percent capacities.

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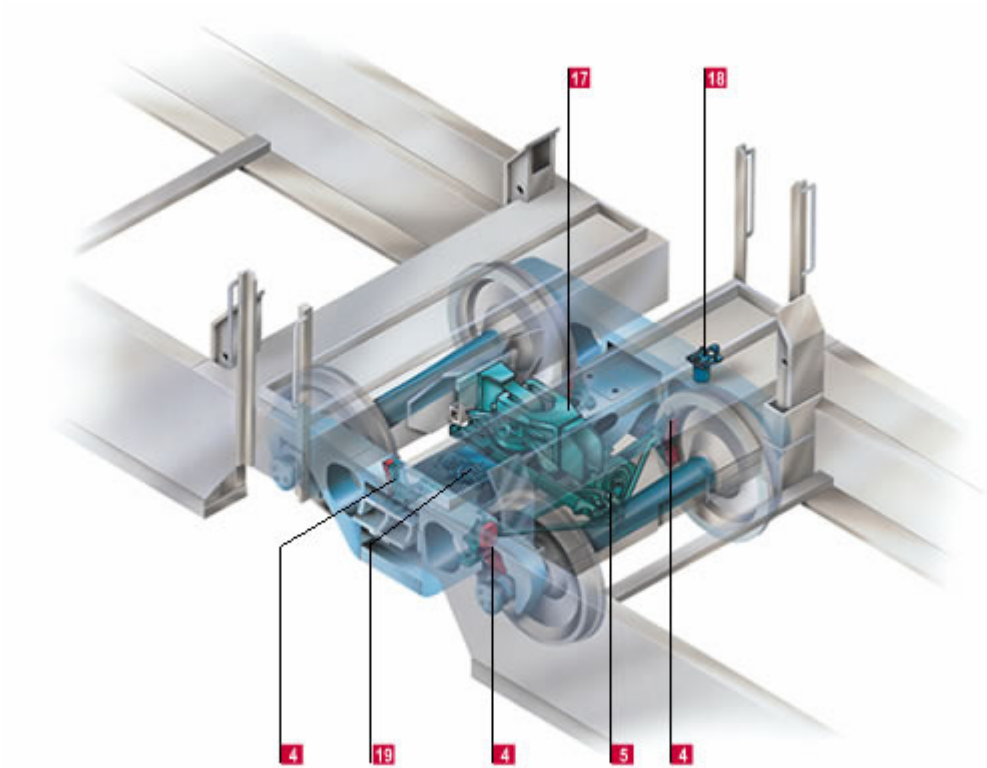
16.



ABDX-R™ FREIGHT BRAKE CONTROL VALVE

WABCO Freight Car Products, a Wabtec company, has developed a patented process for remanufacturing existing ABD freight brake control valves into like-new ABDX-designed valves. The older ABD valves, which were manufactured and sold between 1962 and 1974, lack many of the enhanced design features such as the continuous quick service found in the new ABDW and ABDX valve types. WABCO Freight Car Products has the capabilities and AAR approval to upgrade these ABDs to incorporate all of the technological advancements utilized in the modern ABDX valves. The company also offers an OEM new valve warranty with the sale of each unit.

- **Center Truck Assembly**



4 & 5. See above.

17.



SAC-1™ SPHERICAL ARTICULATED CONNECTOR

The **SAC-1™** is designed for million mile service life on multi-unit cars with no lube, droop, or slack. The semi-permanent connection coupling system features the patented low maintenance, self-lubrication design. Designed to maintain a slack-free connection, the SAC-1™ eliminates the need to stop cars for lubrications and readjustments of side bearing heights. Made for today's competitive transportation market, it offers substantial weight savings, improved car handling and reduced operating costs.

18.



VX VENT VALVE

The VX vent valve is designed to operate during emergency brake pipe reductions to vent the brake pipe locally and to help transmit this rate of reduction throughout the train. The valve features increased emergency-venting capacity and jump-distance capabilities. A diaphragm design eliminates the need for a separate venting piston and provides a self-purging action.

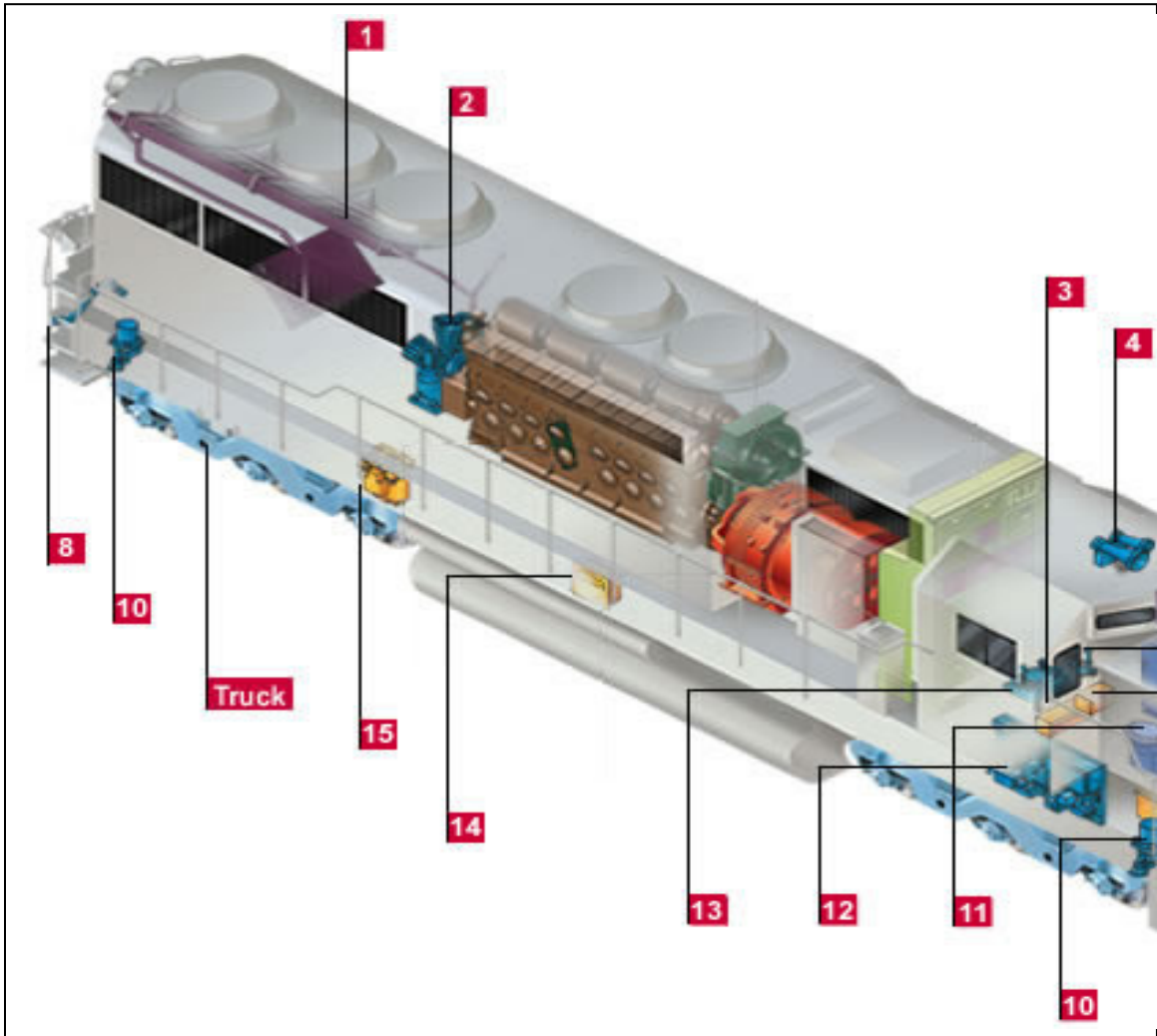
19.



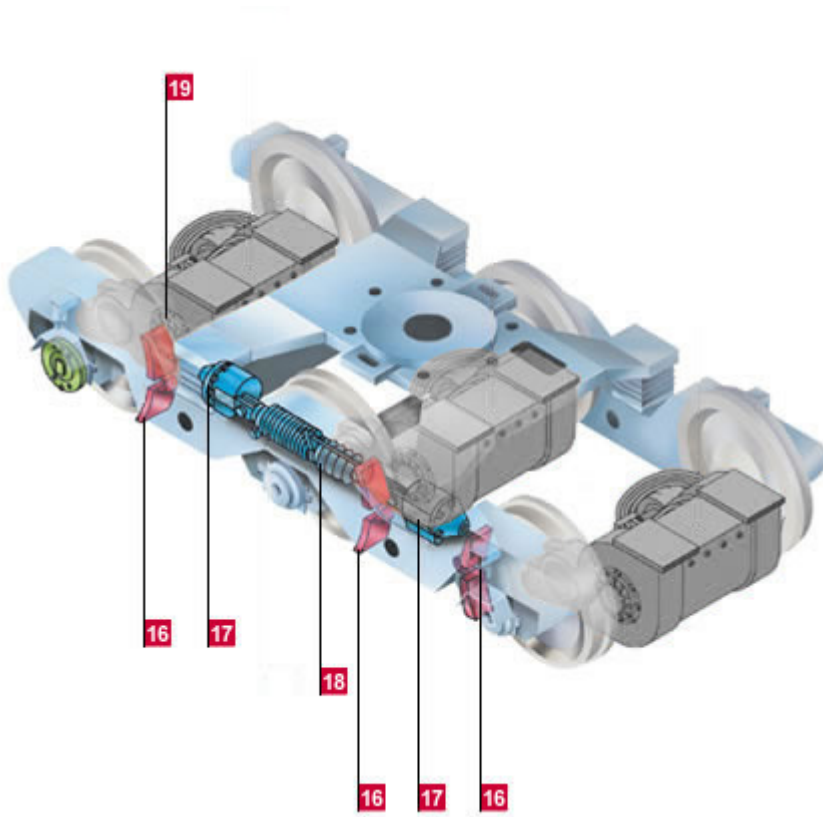
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1. Cooling system
2. Air compressor and after cooler
3. End of train telemetry system
4. Pneumatic horn
5. Emergency Valve
6. Speed indicator
7. Event recorder
8. Angle cock
9. On-Board computer
10. Vent Valve
11. Sanitation system
12. Equipment Brake
13. Cab Control Unit
14. Fuel Monitoring System
15. Vaporized air Dryer



16. Locomotive brake shoes. 17. Locomotive Brake Cylinder. 18. Slack Adjuster. 19. Gears and Pinion.



1. COOLING SYSTEMS



Young Touchstone, a Wabtec company, manufactures a wide range of cooling systems for all types of locomotives, as well as custom applications. The company's charge air coolers, radiators, oil coolers, fuel oil preheaters, replacement aftercoolers and intercoolers, and shell and tube heat exchangers are produced with high quality materials and precision manufacturing processes that ensure optimum heat transfer and superior strength and durability.

2. Air Compressors and Aftercoolers



The 3-CDC-type air compressor is a two-stage, air-cooled reciprocating model developed primarily for use on diesel locomotives. Manufactured by WABCO Locomotive Products, a Wabtec company, this compressor is suitable for service against 140 psi and can be operated at speeds of 250 to 1,100 rpm when adequate cooling air is provided. This range of speeds permits the compressor to be directly connected to the main engine crankshaft of such locomotives. Features of the 3-CDC air compressor include four valve heads (two inlet and two discharge), lightweight aluminum intercooler and optional high-capacity fan.

The 3-CDCLA aftercooler is designed as an alternative, efficient and cost-effective way to precipitate moisture from compressed air systems. The multi-finned aftercooler provides significantly improved heat-transfer characteristics when applied directly to the 3-CD-type air-cooled air compressors. The aftercooler assembly concentrates cooling air generated from the fan to the aftercooler fins, cooling the hot, humid, compressed air from the compressor to near-ambient temperatures. This cooled-down, drier air means less moisture is carried into the brake equipment, thus reducing the incidence of brake equipment freeze-ups and malfunctions, leading to increased brake equipment reliability, reduced maintenance and less locomotive downtime. The aftercooler can be applied to new OEM compressors or can be retrofitted to existing 3-CD-type compressors. Unlike conventional air dryers, maintenance is virtually eliminated as the aftercooler has no moving parts to maintain.

3. TRAINLINK™ II End-of- Train Telemetry System



TRAINLINK™ II monitors key last-car information, including brake pipe pressure, end-of-train motion, battery condition, and communication and marker light status information while adding end-of-train emergency braking capability. The system comprises a locomotive cab unit and an end-of-train unit. Options include RS-232 communications, proximity warning system, undesired emergency detection, HELPERLINK (electronic air hose for pusher locomotives) and TRAINLINK ES, which provides rear-end service brake pipe reductions for improved train braking.

4. Pneumatic Horn



The pneumatic horn on a locomotive is used to indicate or warn of the presence of the vehicle on the tracks. The simple construction of the horn provides low maintenance costs. It is equipped with an extended-life diaphragm mounted entirely in rubber to help reduce wear and breakage. The air pressure required to operate the horn must be greater than 90 psig to produce a sound level of 100 dBa or greater at a distance of 100 feet in front of the locomotive.

5. EMERGENCY VALVE WITH ELECTRICAL SWITCH



Located in the cab of the locomotive, the emergency valve with electrical switch provides a direct means of venting brake pipe air pressure to effect an emergency train brake application. When this valve is actuated, the integral switch sends a signal to the locomotive computer, event recorder and/or electronic air brake communicator. The switch is wired with both a normally open and a normally closed contact.

6. Speed Indicator



State-of-the-art solid-state locomotive speed indicators, produced by Wabtec Railway Electronics, are virtually maintenance-free and easy to use. Product features include display visibility, rugged dependability and cost-effective retrofit capabilities. A wide range of optional features are also available, such as digital or analog meter movement; overspeed output; odometer; acceleromoter; dual range for slow speeds; dual face with alerter outputs; large dial; slave and remote models; locomotive computer driven; and MPH and KPH models.

7. TRAIN TRAX® EVENT RECORDER



Wabtec Railway Electronics' TRAIN TRAX® solid-state event recording system is designed to improve operational safety and performance. The system's open architecture assures configuration flexibility by monitoring a number of customer-specified analog and digital outputs. Downloading alternatives include the use of standard laptop computers, remote memory card download ports or the DataTrax Wireless Download System. Data analysis software is a useful tool for viewing and analyzing data for any specified criteria. Data can be displayed, analyzed and printed in both graphical and tabular formats based on customer-specified requirements. Event recorders are available with a range of capabilities, from basic FRA-compliant units to enhanced models with integrated alertness control, expanded events, integrated air and modular PC board designs.

8. 1-1/4" DYNABALL ANGLE COCK



The DYNABALL angle cock features a Teflon-coated ball to provide smooth, effortless hand movement. Its large rubber seals, which are self-lubricating, self-cleaning and self-adjusting, reduce leakage and can be replaced quickly.

9. On-Board computer & display System

Wbtec “PC Based” on-Board computer and display systems are designed specifically for locomotive and other rail vehicle application. Key features which differentiate Wabtec designs include:

1. Sealed package, with conductive cooling, no moving part.
2. Wide temperature, high shock/vibration environment operation.
3. Power, isolation, and EMI protections as needed for rail application.
4. Multiple networking, serial ports, and specialized communications interfaces.
5. Sunlight readable color graphics display systems, with fully adjustable backlighting.
6. Embedded Pentium class processor and supporting components for long service life.

10. VX Vent Valve



The VX vent valve is designed to operate during emergency brake pipe reductions to vent the brake pipe locally and to help transmit this rate of reduction throughout the train. The valve features increased emergency-venting capacity and jump-distance capabilities. A diaphragm design eliminates the need for a separate venting piston and provides a self-purging action.

11. SANITATION SYSTEMS



Designed to handle human waste and discharge treated wastewater directly to the roadbed, Microphor’s sanitation systems include models that use between 16 ounces and 2 quarts of fresh water per flush, biological digesting treatment tanks, chlorinators and a variety of optional equipment such as fresh water supply tanks. Toilets are available in stainless steel, powder-coated stainless steel and vitreous china. Treatment systems are available in

standard-sized plastic tanks for in-car installations. Tank options include double-walled, insulated tank construction with heating systems for cold weather protection.

12. Equipment Rack



The heart of the EPIC® II brake equipment, the pneumatic equipment rack is completely self-contained. Equipment functions are grouped and valve portions designed so that valve interdependencies are minimized. This method greatly simplifies the pneumatic equipment and reduces the problems encountered when troubleshooting other air brake systems.

13. EPIC® II CAB CONTROL UNIT



Wabtec's EPIC® II (Electro-Pneumatic Integrated Control) is a braking package based on the use of state-of-the-art microcomputer technology. It provides the logic for electro-pneumatic operators to control the compressed air generated from the locomotive main reservoirs. The equipment includes an electronic cab control unit, available in the desk-style consol shown here. A micro-computer is programmed to issue and interpret commands from both the cab controller and pneumatic control units. The pneumatic interface unit and optional cab display unit are designed to provide feedback information to the engineer during equipment operation. The enhanced diagnostics built into the unit greatly reduce locomotive downtime during testing and troubleshooting.

14. Fuel Monitoring System



Wabtec Railway Electronics' FUELLINK fuel measurement system incorporates solid-state electronics and advanced pneumatics to determine locomotive fuel levels. The system is accurate to +/- one percent. The new integrated system provides automatic fuel tank configuration while adding dynamic tag capabilities for the transfer of fuel level and other useful management information to wayside readers for collection. Internal diagnostics and use of the "bubble method" for calculating the fuel level increase the reliability and accuracy of the system. Fuel level can be integrated into locomotive builders' displays, and stand-alone displays are available for internal/external mounting.

15. Vaporized air Dryer.



The VAPORID® air dryer introduces clean, dry compressed air from the locomotive into the train's air system. The dryer has a coalescing filter that removes significant amounts of debris, moisture and oil from the air before it reaches the desiccant. The filter housing is equipped with a pneumatically operated drain valve. Seventy-five-watt heaters and two purge valves are available to prevent freeze-ups. Working in conjunction with WABCO Locomotive Products' 3-CDCLA air compressor and aftercooler, the VAPORID® air dryer will provide protection against contamination to the train air brake system.

16. COBRA® Locomotive Brake Shoe



COBRA® locomotive brake shoes are a blend of lead- and asbestos-free, friction-producing materials that are molded to a pressed-steel backer plate under controlled heat and pressure to provide consistent, reliable braking under varying conditions.

17. LOCOMOTIVE BRAKE CYLINDER



Designed according to the space and leverage requirements of the locomotive, these cylinders differ from freight car brake cylinders primarily in the shorter piston travel, and

the fact that the push rod is pinned to the piston for positive release of the shoe from the wheel when the piston retracts.

18. Slack Adjuster



The RK2 slack adjuster controls air brake cylinder piston travel, thus ensuring a high degree of safety and efficiency in the locomotive braking system. It is an automatic, rapid-acting slack adjuster that keeps piston travel in permissible limits by compensating for the continuous wear of brake shoes and wheels.

19. GEARS AND PINIONS



Wabtec supplies a full line of carburized axle gears and pinions for both standard and narrow gauge locomotives. These gears are manufactured from the highest quality alloy steel forgings, carburized and hardened for maximum strength, high- load capacity and longer wear life.



Operations

<ul style="list-style-type: none">> <u>Allied Friction Australia</u>> <u>BECORIT GmbH</u>> <u>Cardwell Westinghouse</u>> <u>CoFren S.r.l.</u>> <u>F.I.P. Pty. Ltd.</u>> <u>Microphor</u>> <u>MotivePower</u>> <u>Pioneer Friction Ltd.</u>> <u>Q-Tron</u>> <u>Ricon Corporation</u>> <u>Schaefer</u>> <u>Vapor Bus International</u>> <u>Vapor Europe</u>> <u>Vapor Stone Rail Systems</u>	<ul style="list-style-type: none">> <u>Vapor Stone UK Limited</u>> <u>WABCO Freight Car Products</u>> <u>WABCO Locomotive Products</u>> <u>Wabtec Australia Limited</u>> <u>Wabtec Corporation</u>> <u>Wabtec de Mexico</u>> <u>Wabtec Foundry</u>> <u>Wabtec Global Services</u>> <u>Wabtec Passenger Transit</u>> <u>Wabtec Rail Limited</u>> <u>Wabtec Railway Electronics</u>> <u>Wabtec Rubber Products</u>> <u>Young Touchstone</u>
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