ametsis

BRAKE SYSTEMS ADAPTED TO THE TRAIN

PRESENTATION

TÜVRheinland® CERT Sistema de Gestión Certificado según ISO 9001:2008

TÜVRheinland® CERT Sistema de Gestión Certificado según ISO 14001:2004

Company established in 2004 that is:

- **Competitive** in technology, delivery-time and prices compared to other suppliers of braking systems.

- **Flexible** to adapt to the terms and technical necessities of the customer and final user.

We have high qualified **personnel** with a high knowledge of the railway sector.

Activity:

Development of components which are part of the railway brake systems on an innovative way by using new working tools that **facilitate to the customer** both the **implantation** of the equipment and the **maintenance** works.

Advise actively on those modifications that are required to perform on **equipment** already in service (retrofits), or the necessary tools for the **maintenance** of the units (test benches & Spare parts).

Innovation:

Use of **powerful tools** that allow a communication with the manufacturer through a secure a rapid exchange of information. This seeks to implement nimbly our components and systems on the train with a simple documents handling.

Market

All kind of vehicles in the international railway sector.

Customers

- Rolling Stock Manufacturers: Alstom Transport, CAF, Hitachi Rail, Patentes TALGO, Stadler, Ingeteam, IMF, etc.

- Railway Companies / Authorities: RENFE, Metro de Madrid, FGC, FGV, Euskotren, Metro de Bilbao, Ferrocarril de Soller, Shanghai Metro, Ferrocarriles de Ecuador, etc.

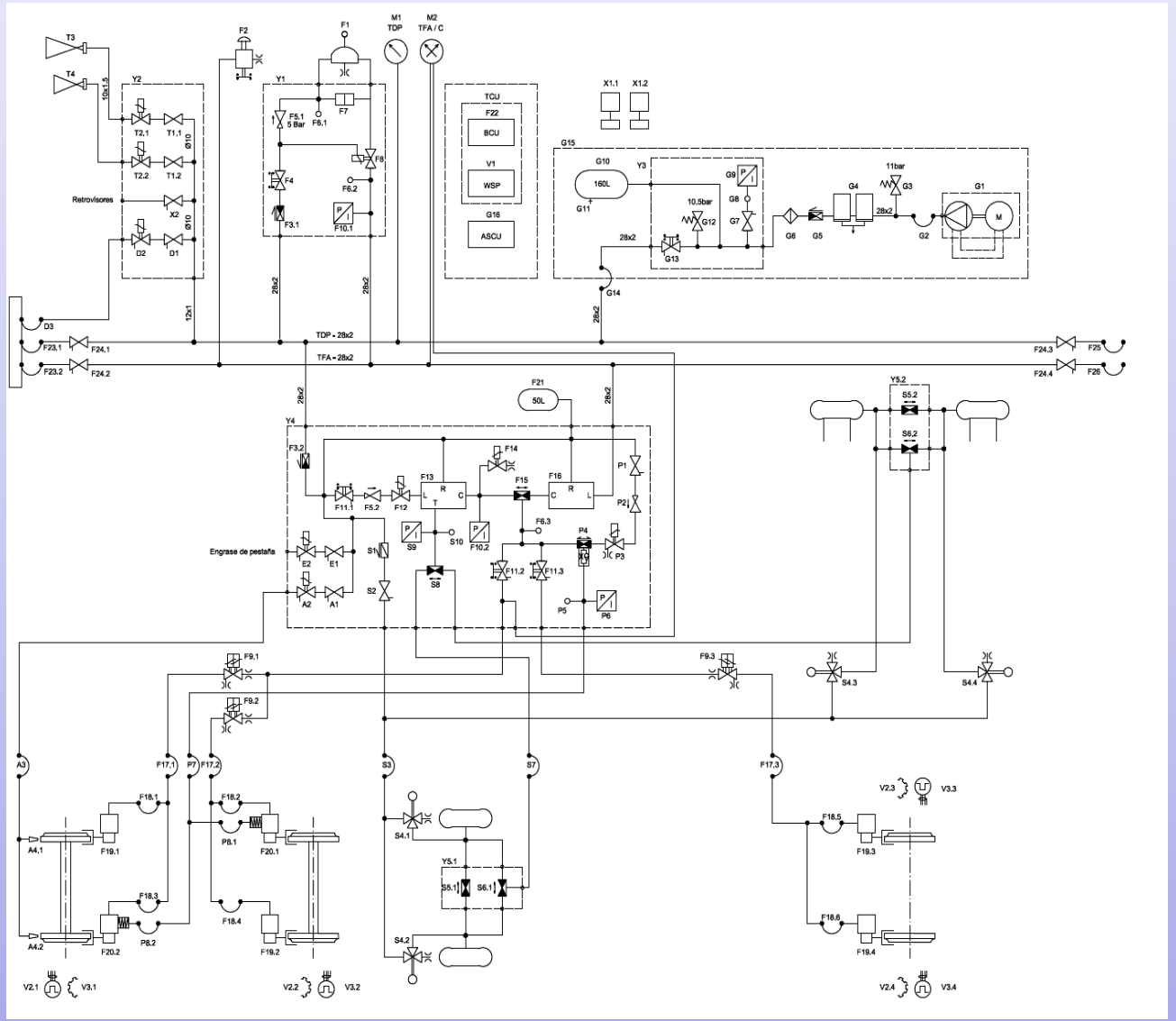
Vehicles

Freight Wagons, Coaches, Metro Trains, Trams, High-Speed Trains, Locomotives, Commuter Trains, etc.

PART 1
OWN DESIGN PRODUCTS

BRAKE SYSTEMS ADAPTED TO THE TRAIN

COMPLETE SOLUTIONS: SYSTEMS & SUB-SYSTEMS



I – AIR SUPPLY SYSTEMS

II – BRAKE CONTROL

III – BOGIE EQUIPMENT

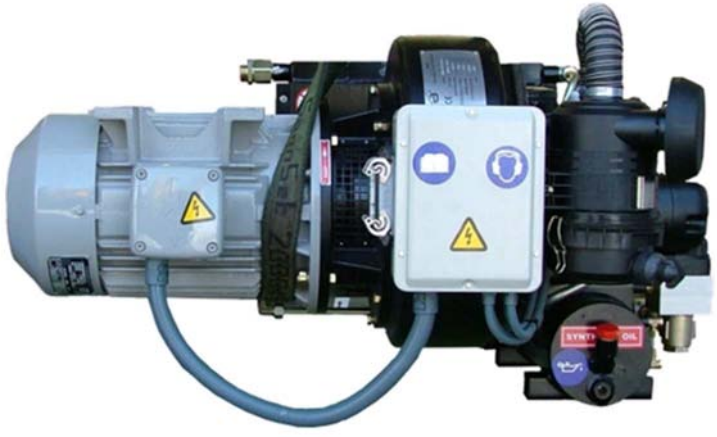
IV – AUXILIARY SUB-SYSTEMS

I – Air Supply Units & Compressors

BRAKE SYSTEMS ADAPTED TO THE TRAIN

I. Air Supply (I)

Railway Compressors CRC



Range	Delivery Rate	Motor Power	Voltage	Speed of rotation	Weight	Operating Temperature
Modelos	Caudal	Potencia	Tensión	Velocidad de giro	Peso	Temperatura de operación
	(Nl/min)	(KW)	(VAC)	(rpm)	(Kg)	(ºC)
CRC-3000	3000	28	380	3000	220	- 30 / + 50
CRC-2200	2200	20	380	3000	215	- 30 / + 50
CRC-1500	1500	13.5	380	3000	215	- 30 / + 50
CRC-1200	1200	11	380	3000	210	- 30 / + 50
CRC-900	900	8.5	380	1500	200	- 30 / + 50
CRC-400	400	4.5	380	1500	125	- 30 / + 50

Railway Air Dryer ASA

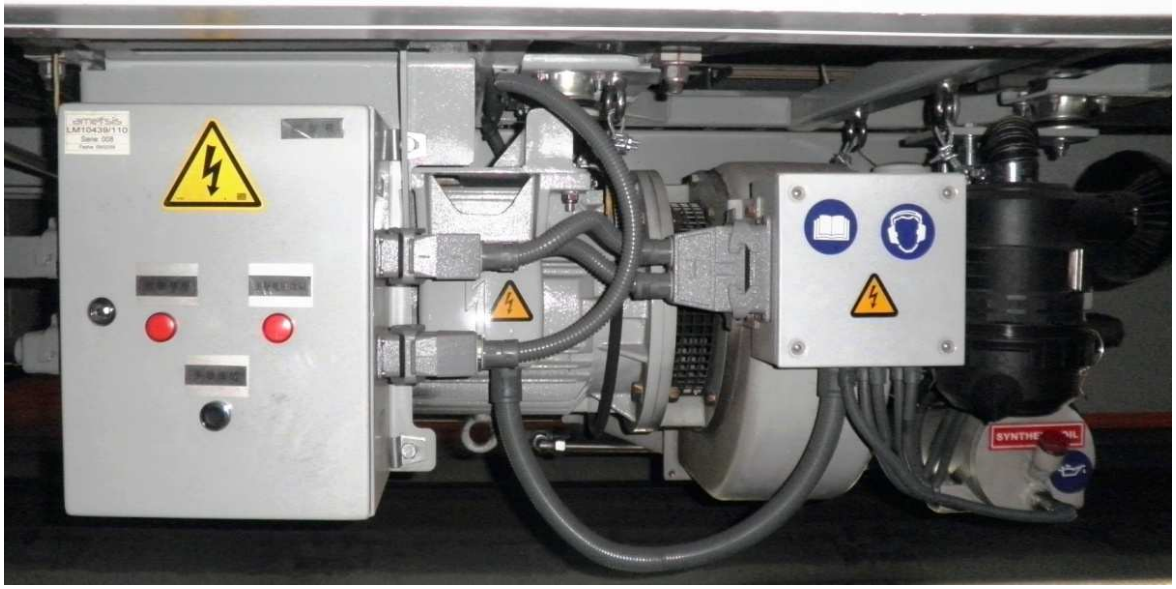
- Normal Gauge
- Low Gauge

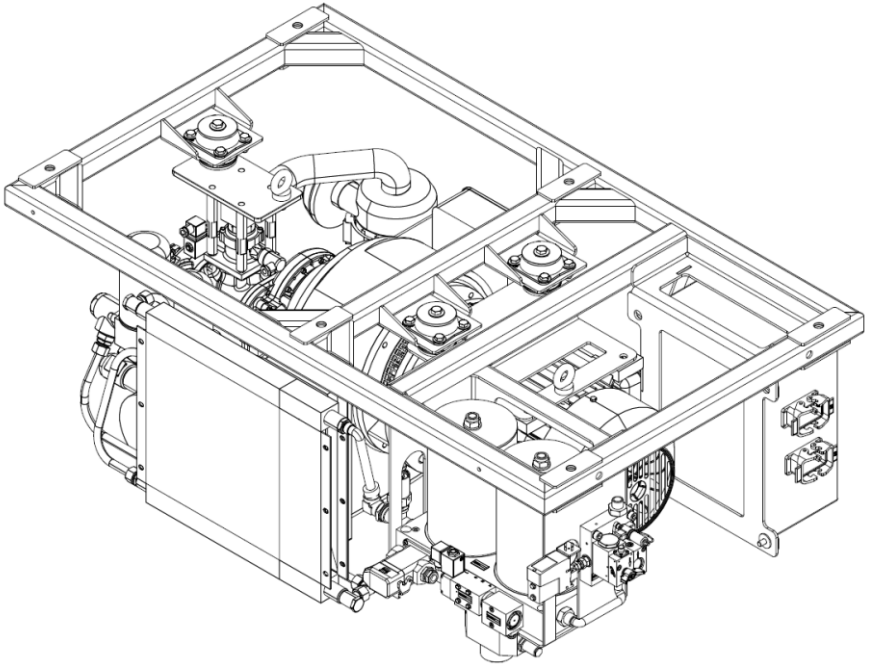
Range	Airflow rate	Operating pressure	Air Consumption	Operating Temperature	Dew Point*
Modelos	Caudal	Presión de trabajo	Consumo de aire	Temperatura de operación	Punto de rocio*
	(Nl/min)	(bar)	(%)	(ºC)	(ºC)
ASA-1	750 / 1,200	10	15	- 40 / + 80	-20
ASA-2	200 / 750	10	15	- 40 / + 80	-20
ASA-3	1,200 / 2,200	10	15	- 40 / + 80	-20
ASA-4	2,200 / 3,200	10	15	- 40 / + 80	-20

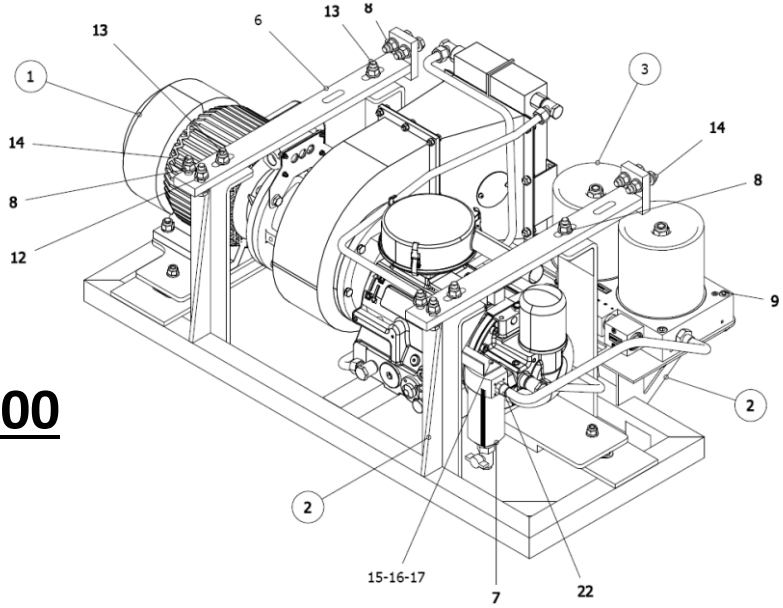
Note*: Referring to room temperature
Nota*: Respecto a la temperatura ambiente

I. Air Supply (II)

Air Supply Unit ASU-900 (CRC-900 Compressor + ASA1 Air dryer)







Air Supply Unit - ASU-400

Low Gauge

I. Air Supply (III)

OUR MOST REPRESENTATIVE PROJECTS & REFERENCES

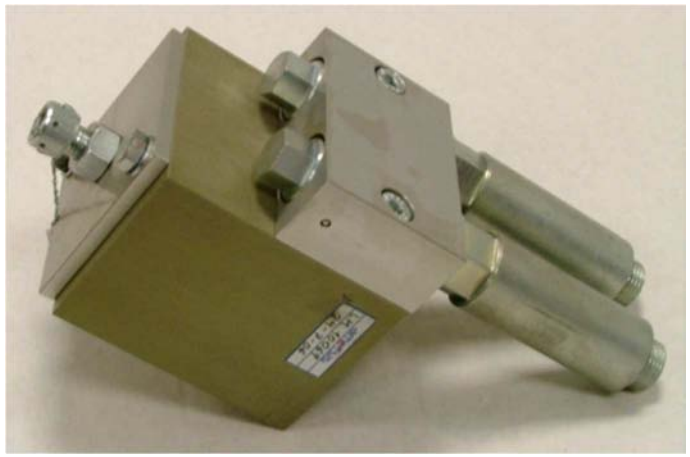
- **RENFE** Compressors – CRC-900
- **METRO DE MADRID** Compressors - CRC-900
- **SHANGHAI METRO** Air Supply Unit - ASU-900
- **CSR: China South Locomotive & Rolling Stock Corporation Limited** Air Supply Unit - ASU-1200
- **SOLLER TRAMWAYS** Air Supply Units - ASU-400
- **TALGO HIGH SPEED** Air Supply Unit - ASU-1200
- **MAJORCA RAILWAYS** Air Supply Unit
- **RENFE FEVE** Compressor + Air Dryer ASA-1
- **ALSTOM** Air Dryer - ASA-3
- **COMSA RAIL** Air Dryer - ASA-4

II – Brake Control
Body Installed Equipment

BRAKE SYSTEMS ADAPTED TO THE TRAIN

II. Body Installed equipment (I) – Brake control

Equalizer valve

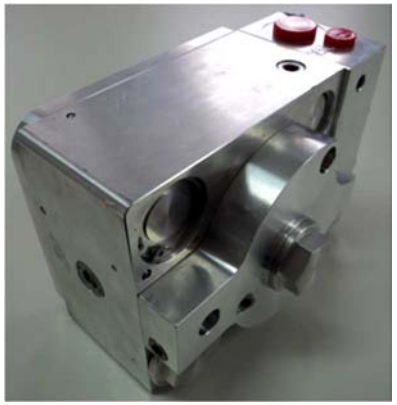


Emergency valve

Relay valve with control chamber A-VR-1

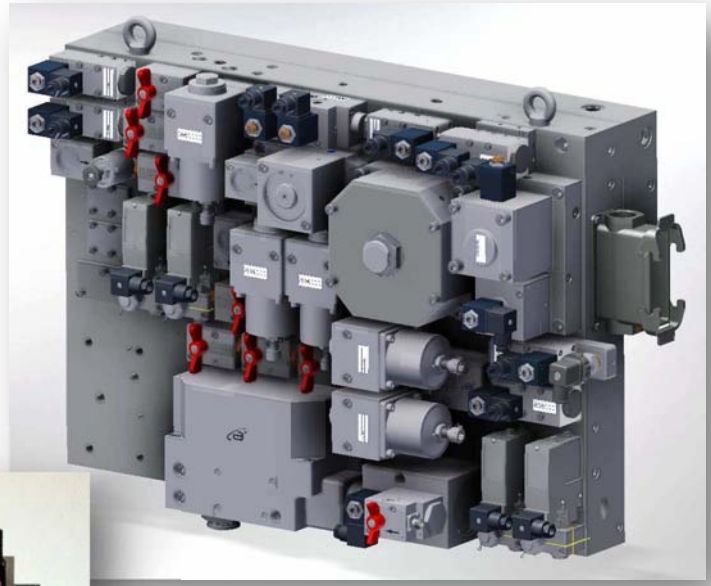
Brake and release Solenoid valves

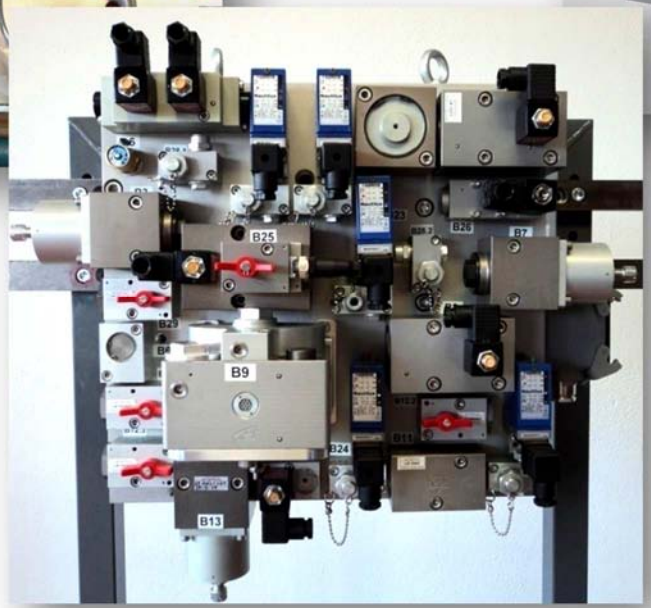
Brake control valve (triple valve) A-VFSC-1

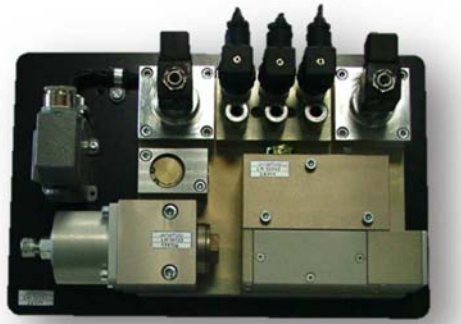


II. Body Installed equipment (II) – Brake Control Manifolds

Aluminium Brake Control Panels and Manifolds for Locomotives and Coaches







II. Body Installed equipment (III) – Brake control

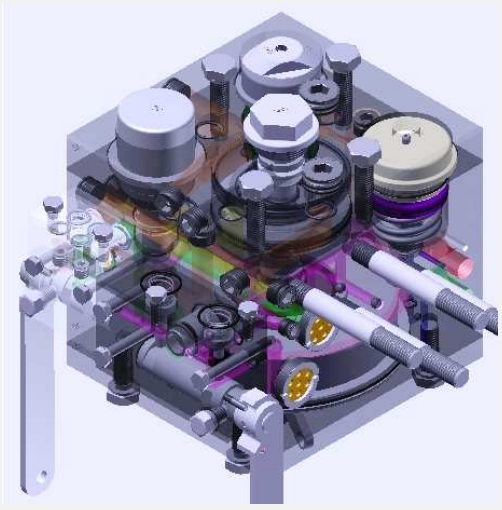
OUR MOST REPRESENTATIVE PROJECTS & REFERENCES

- **RENFE - FEVE**
  - Pneumatic brake control manifold for Passengers Coaches
  - Electro-pneumatic brake control manifold for shunting locomotives
  - Electro-pneumatic brake control manifold for steam locomotives
- **COMSA RAIL** Electro-pneumatic brake control manifold for locomotives
- **MAJORCA RAILWAYS** Electro-pneumatic brake control manifold for locomotives
- **IMF** Electro-pneumatic brake control manifold

II. Body Installed equipment (IV) – Brake control

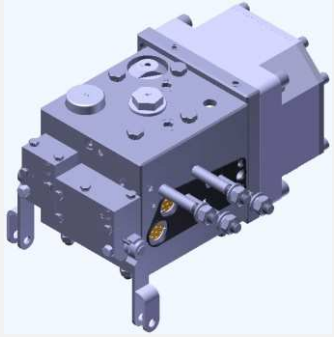
UNIVERSAL BRAKE DISTRIBUTOR – DFA-VQ

- Distributor for automatic brake according to the UIC 541-03
- Equalizer function included
- Temperature: -50 / 75ºC
- Light and compact design
- Weight 10Kg (simple configuration)
- Control chamber of 1l volume

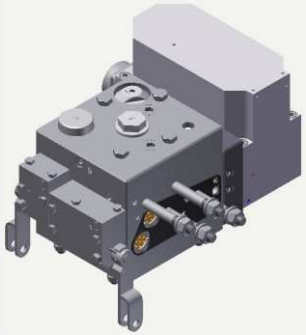


Universal Brake Distributor DFA-VQ

Simple Distributor & manual release



Distributor w relay valve & manual release



Distributor w BFL valve & manual release

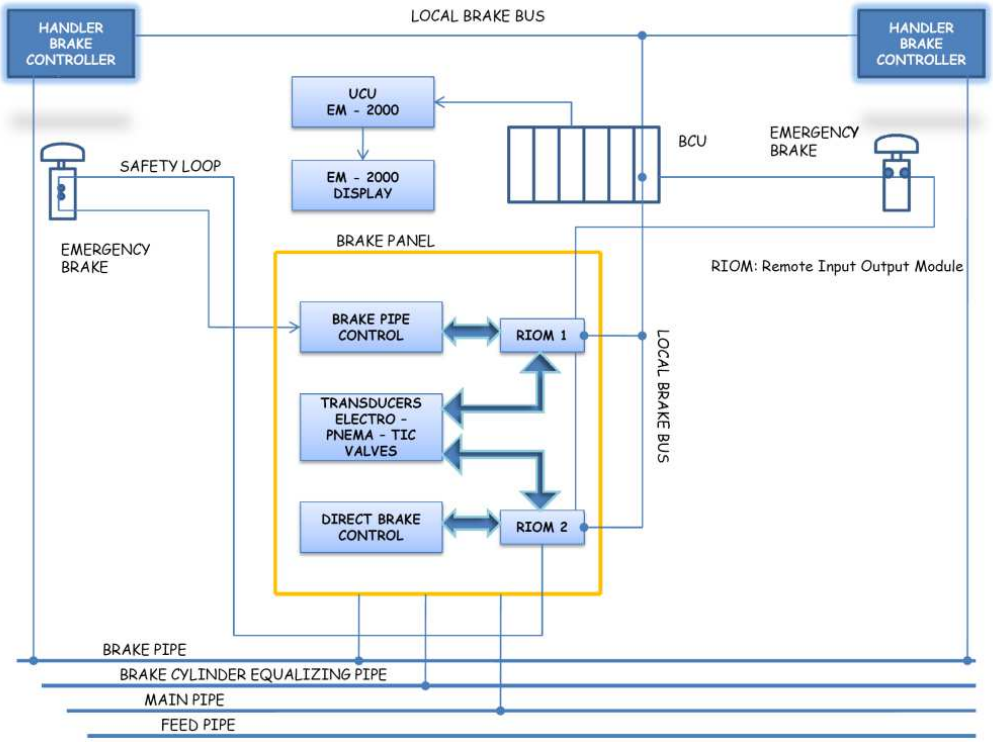
Simple Distributor w control chamber & automatic release

Distributor w relay valve, control chamber & aut. release

Distributor w BFL valve, control chamber & aut. release

II. Body Installed equipment (V) – Control electronics

Brake control electronics



II. Body Installed equipment (VI) – Anti-skid equipment

Brake control electronics

Tachogenerator– Speed sensor

Anti-skid valve

II. Body Installed equipment (VII) – Super-direct brake

Brake control electronics

Tachogenerator– Speed sensor

Super-direct brake manifold

III – Bogie Equipment

BRAKE SYSTEMS ADAPTED TO THE TRAIN

III. Bogie equipment (I) – Pneumatic Suspension Control

Compensation valve

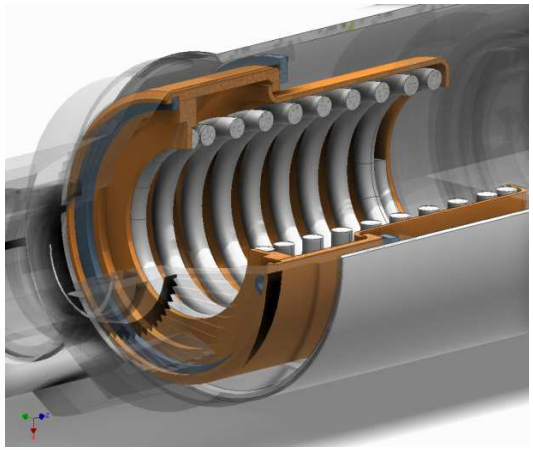
Levelling valve

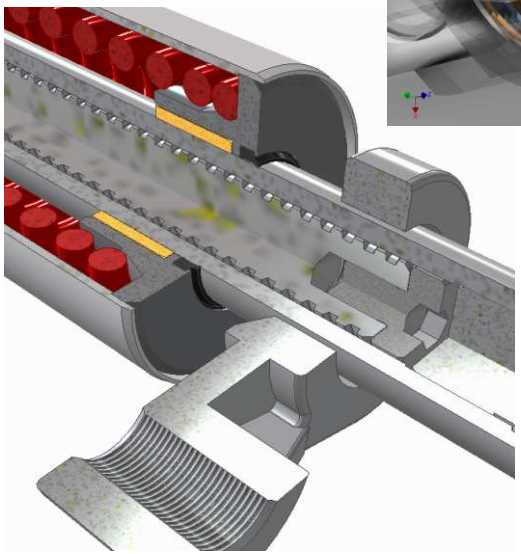
Mean pressure valve

Electro-pneumatic suspension control

III. Bogie equipment (II) – Brake Cylinders, Hydro-Pneumatic Brake Converters and Slack Adjusters

Slack Adjusters for Brake Rigging





Hydro-Pneumatic Brake Converters

Brake Cylinders

III. Bogie equipment (III) – Tread Brake Unit

Name	Affective Area	Amplification	Operating Pressure	Maximum Force
Modelo	Sección Cilindro	Multiplicación	Presión de Servicio	Fuerza Máxima
	(Cm^2)		(Bar)	(KN)
ABF	200	3.9	5.5	43
ABRP	200	3.9	5.5	43

Adjustable Distance	Automatic Adjustment	Parking Brake Part	Operating Temperature
Carrera Ajustable	Carrera de Ajuste Automática	Freno de Estacionamiento	Temperatura de operación
(mm)	(mm)		(ºC)
from 4 to 15	90	No	- 40 / + 80
from 4 to 15	90	YES	- 40 / + 80

III. Bogie equipment (IV)

OUR MOST REPRESENTATIVE PROJECTS & REFERENCES

- **TALGO**
  - Secondary Suspension System for High Speed Train AVRIL
  - Hydro-pneumatic brake converters / Brake cylinders
  - Electro-pneumatic Suspension Control
  - Compensation Valves for Pneumatic Suspension

- **RENFE-FEVE**
  - Brake Cylinders for Shunting Locomotives
  - Brake Cylinders for Steam Locomotives

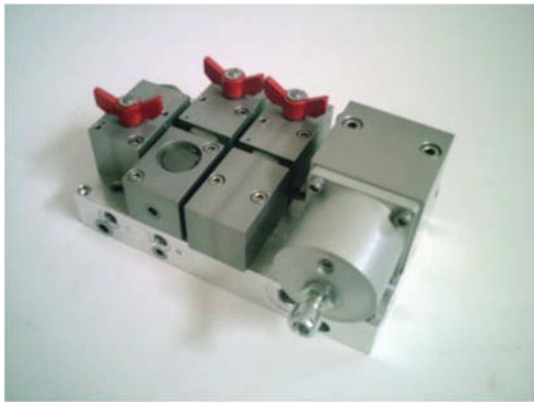
- **ARCELOR MITTAL**
  - Tread Brake Units for locomotives

IV – Auxiliary Equipment

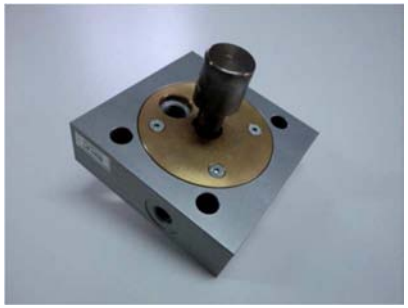
BRAKE SYSTEMS ADAPTED TO THE TRAIN

IV. Auxiliary Equipment (I)

Auxiliary manifolds / panels



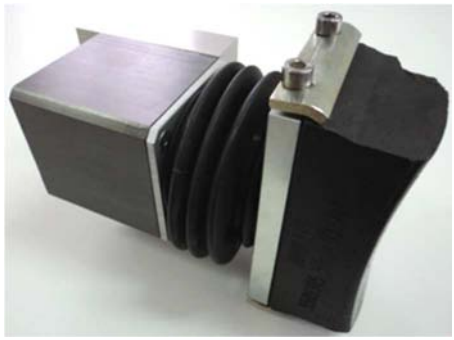
Sand Ejector



High and low frequency horn (UIC 644)

Alarm Devices for Passengers

Cleaning cylinder



Whistle

IV. Auxiliary Equipment (II)

OUR MOST REPRESENTATIVE PROJECTS & REFERENCES

- **TALGO**
  - Electro-pneumatic manifolds for compressed air distribution
  - Emergency pullers for passenger
  - Electro-pneumatic control system for pantograph lifting
  - Sanders / Sand Ejectors
- **ALSTOM**
  - Electro-pneumatic manifolds for doors control
  - High and low frequency horns
- **CAF**
  - Electro-pneumatic manifolds for cleaning cylinders
  - High and low frequency horns
- **METRO DE MADRID**
  - Cleaning cylinders
- **SUNSUNDEGUI - FEVE**
  - High and low frequency horns

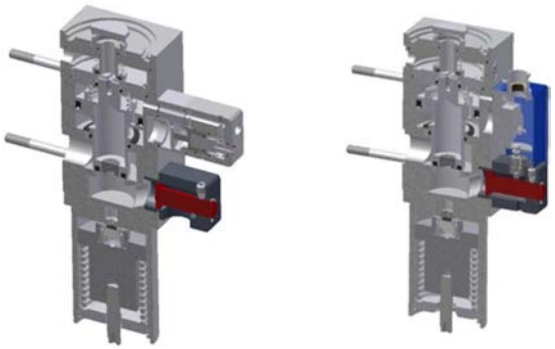
V – Other Innovative Projects
R&D

BRAKE SYSTEMS ADAPTED TO THE TRAIN

V. Derailment detection (I)

Derailment detector SICODE

- Patented system.
- Brake application on all the composition except on the derailed axle.
- There is an EP version for those vehicles with direct brake. The emergency wire will be opened.
- Visual indication to identify the activated device.



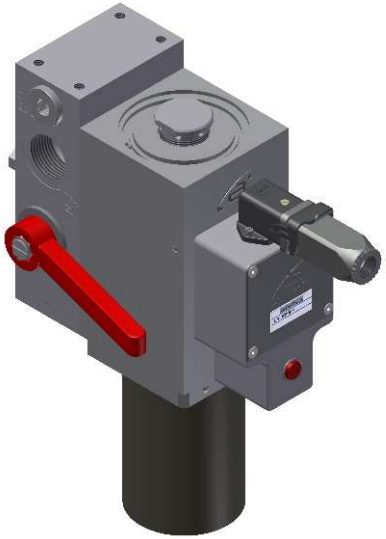
Sectional view of the SICODE UIC541-08

Mix test: temperature and vibrations as UIC541-08

V. Derailment detection (II)

SICODE

Derailment Detector for Freight Wagon



SICODE-EP

Derailment Detector for Passenger Trains

RENFE

Ecuador Railways

CAF

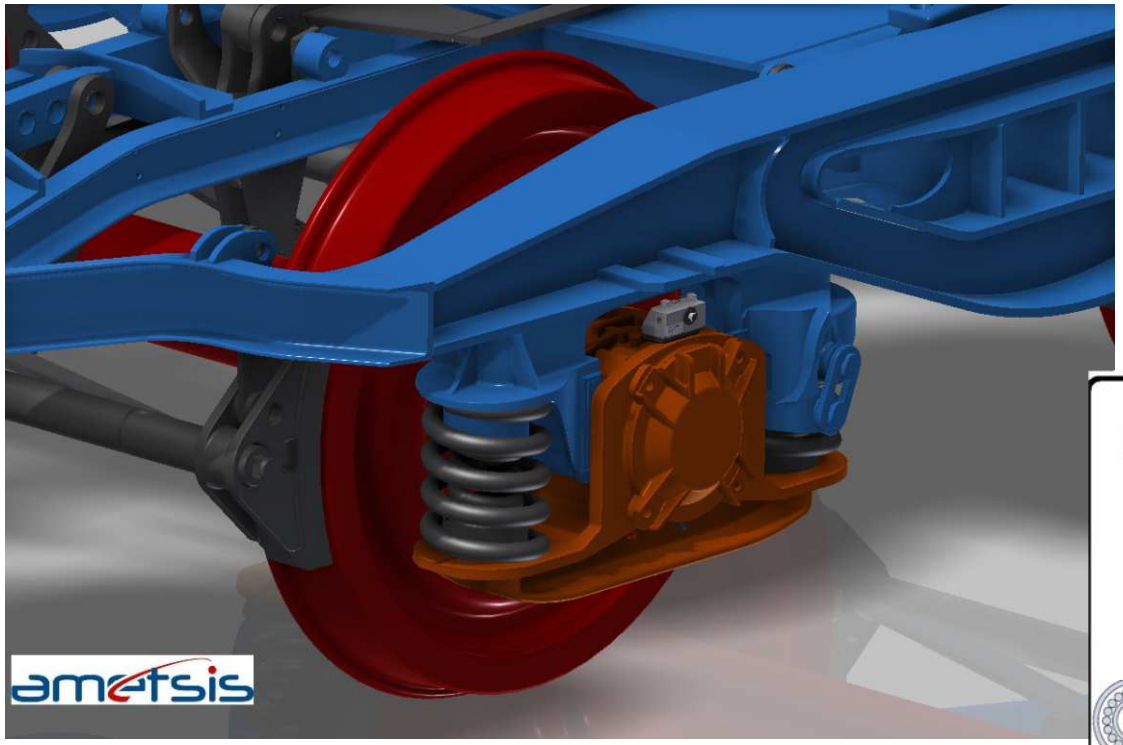
Metro Belo Horizonte

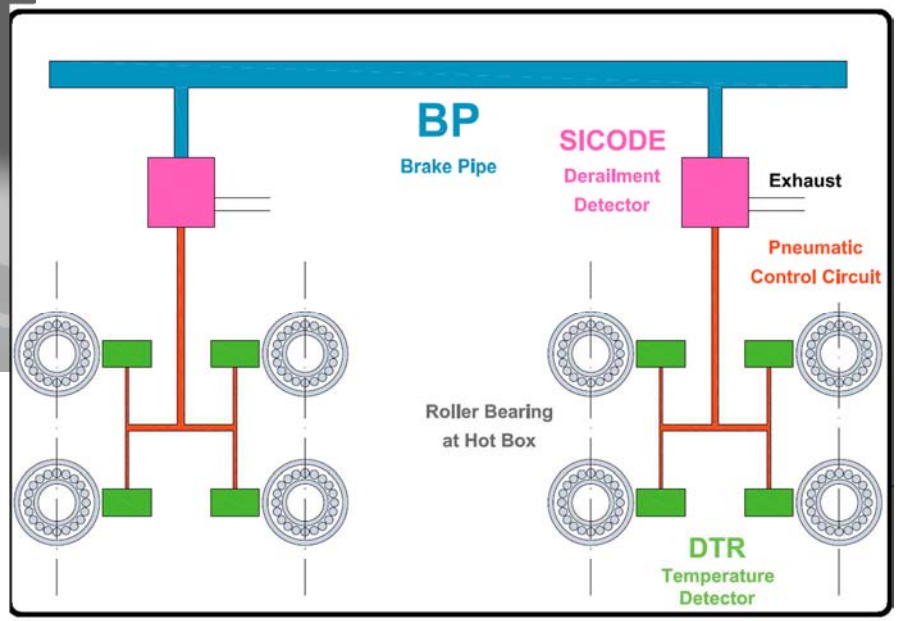
(Brazil)

V. On board rail bearing OVER-TEMPERATURE DETECTOR (I)

DTR
ON BOARD AXLEBOX BEARING TEMPERATURE DETECTOR

Freight Wagons, Coaches, Special Applications or Rail Operations





V. Hydro-Pneumatic Brake System CNHA (I)

The CNHA system by Ametsis presents the following **advantages** over the current systems entirely hydraulic:

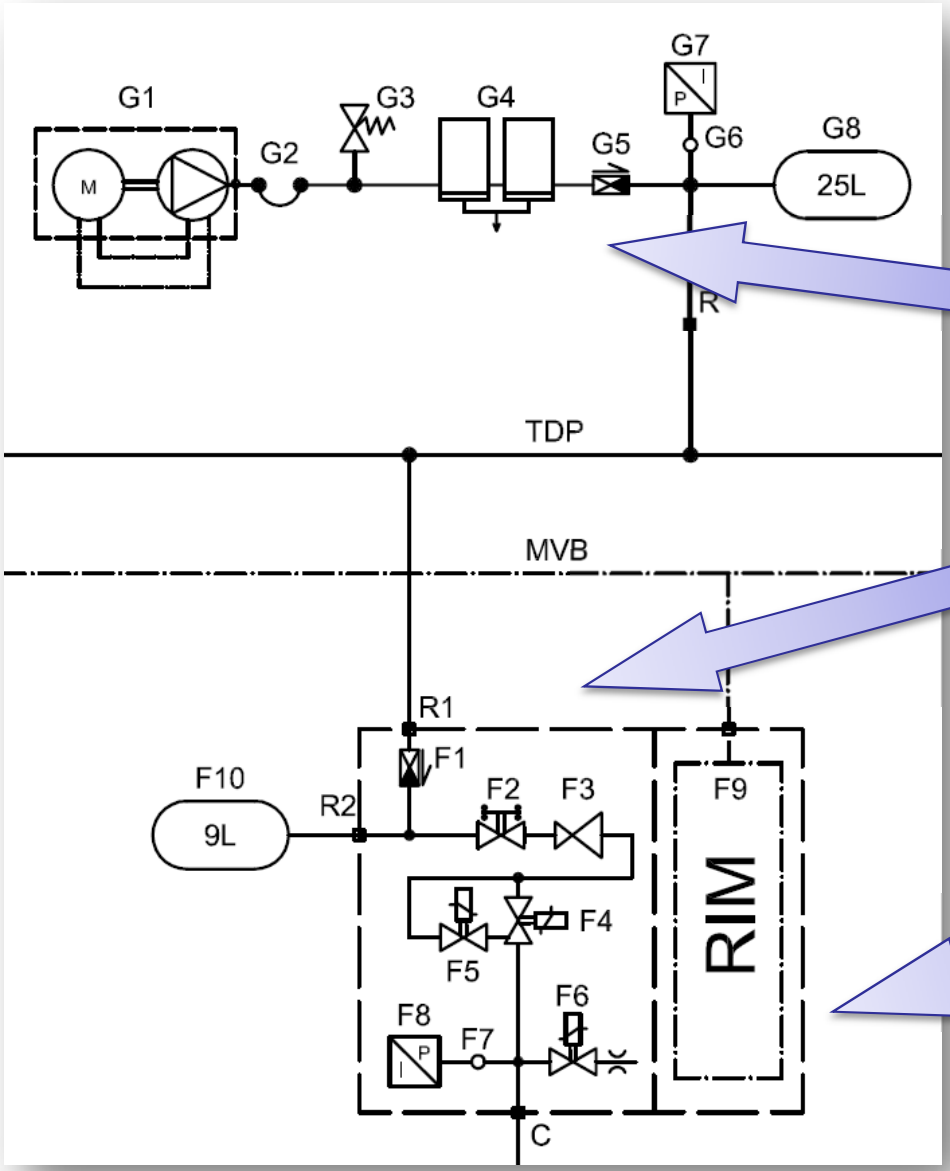
•TECHNICAL ADVANTAGES:

1. Exclusive use of active brake callipers.
2. Parking brake centralized in each bogie.
3. Highly regulable brake, including ABS pneumatic control (WSP).
4. Centralized BCU (Brake Control Unit).
5. Same brake control principle as the common rail vehicles.
6. High reliability, availability and maintainability system.

•ECONOMIC ADVANTAGES

1. Overall reduction of LCC in terms of lower costs of acquisition as well as maintenance during life of the vehicle.
2. Lower cost of the complete system implantation.
3. Costs for passive brake system are eliminated.

V. Hydro-Pneumatic Brake System CNHA (II)



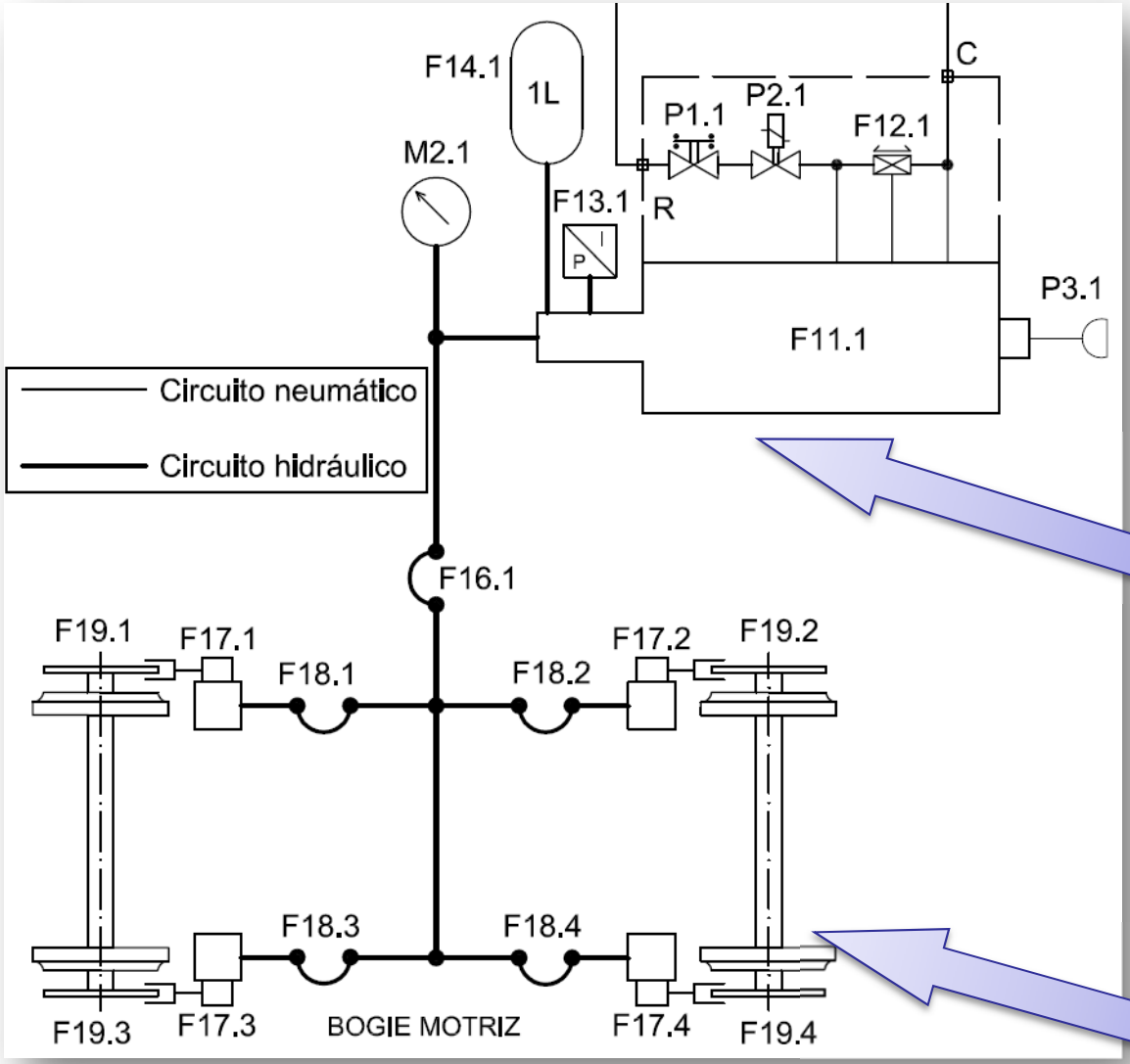
Body mounted brake equipment

- Compressed air production and treatment system

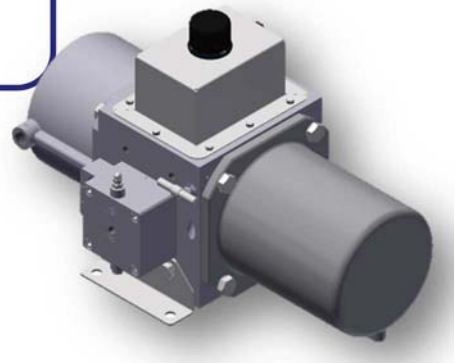
- Electro-pneumatic brake control (Super-Direct Brake)

- RIM: Brake control electronics

V. Hydro-Pneumatic Brake System CNHA (III)

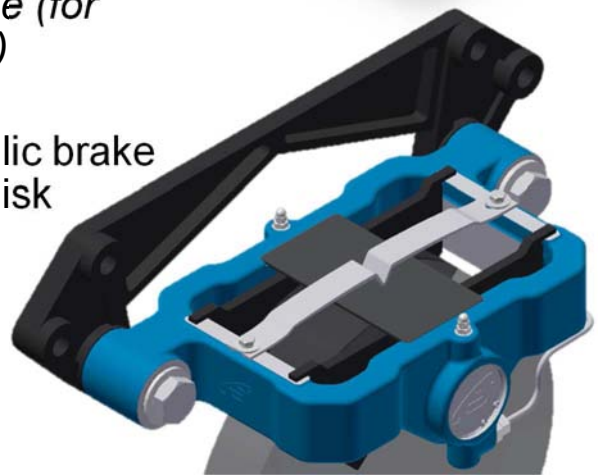


Bogie mounted brake equipment



- Pneumatic/hydraulic brake converter
  - *CNHA-FPAM Model with service and parking brake with hand-operated releasing (for motor bogie)*
  - *CNHA Model with service brake (for trailer bogie)*

- Active hydraulic brake calliper with disk



PART 2
MAINTENANCE
OF
BRAKING SYSTEMS

BRAKE SYSTEMS ADAPTED TO THE TRAIN

I. MAINTENANCE SERVICES

1. **Integral maintenance of pneumatic & brake devices**
   (All the brake brans)

2. **Test benches for pneumatic & brake components, devices and systems**
   (All the brake brands)
   1. Compressors, Air Dryers and Air Supply Systems
   2. Brake control Devices
   3. Brake Manifolds and Panels
   4. Brake Callipers and Cylinders
   5. Auxiliary Equipment and Body Installed Components

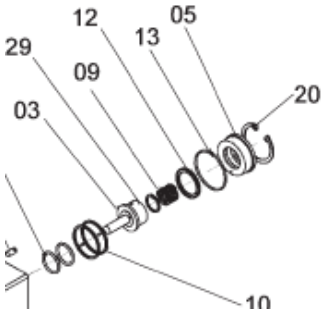
3. **Maintenance Kits and Spare Parts**
   (All the brake brands)

I. Integral maintenance of pneumatic & brake systems – All the brake brands

Success Stories: Rome Metro / Series 449 RENFE

ANALYSIS FOR MAINTENANCE TECHNICAL SPECIFICATIONS OF BRAKES AND SYSTEMS

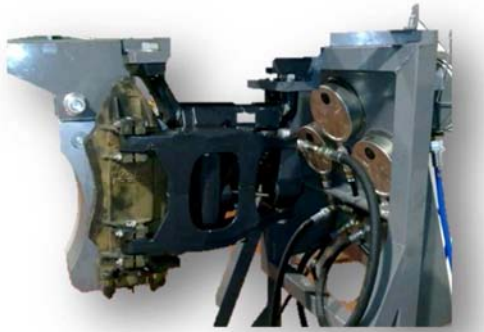
TEST BENCHES DEVELOPMENT, ADAPTED TESTING PROTOCOLS & SPECIAL TOOLS



SYSTEM RECEPTION	EXTERNAL CLEANING	EQUIPMENT DISASSEMBLY	SYSTEMATIC REPLACEMENT OF MAINTENANCE KITS	TEST BENCH VALIDATION & CERTIFICATION

II. Test benches for pneumatic & brake components, devices and systems – All the brake brands

Test Bench for Braking Manifolds with electronic control



Test Bench for Brake Callipers

Test Bench for Auto-continuous Braking Systems

Test Bench for Brake Control Manifolds

- **RENFE**
  - Mega test bench for all the braking components of trains series 102,103,104,112,114 & 253.
  - Portable test benches for the braking system of trains series 446 & 447.
  - Test benches for braking components of the train series 449.

- **CAF**
  - Mexico Metro: Compressors, Main Brake Manifold, Auxiliary Manifolds y Brake Callipers.
  - Rome Metro: Hand Controller, Emergency Valves (SIFA & Emergency Mushroom), Compressors & Air dryers, Brake Manifolds, Auxiliary Manifolds, Brake Callipers, Pneumatic Suspension Components & Other Valves.
  - Alger Metro: Compressors, Safety Valves, Brake Manifolds & Brake Callipers.
  - New Delhi Metro: Brake Callipers, Brake Manifolds, Auxiliary Manifolds & Other Valves on the Train Body.

- **ACTREN – CAF - RENFE**
  - Main Brake Manifolds, Manifold for the BP Generation, Compressor, Air Dryers & Other Valves on the Train Body.

- **OTHER**
  - Test Bench for Auto-continuous Braking System of Freight Wagons.
  - Portable Test Bench for the Braking System of Freight Wagons.
  - Test Benches for Brake Distributors KE & C3W.

III. Maintenance Kits and Spare Parts – All the brake brands

ametsis INGENIERÍA Y ASESORÍA TÉCNICA	Referencia: **KIT DE REPARACIÓN Q5001**		
	Denominación: **Kit compresor**		
Página: 1 de 2	Revisión: 05	ECO: 0695	Fecha: 08/01/2009

Notas:

- Recocer las juntas de Cobre antes de su montaje.
- Almacenar en zona oscura y a temperatura no superior a 30°C.

 Pos.57	 Pos.59	 Pos.58
8 x 200286 (⌀25 x 1,2)	8 x 200390 (engrase ⌀80)	8 x 200391 (rascador ⌀80)
 Pos.128 (Ver nota)	 Pos.66	 Pos.86
8 x DW10956	2 x 200054 (⌀80 x 2,5)	2 x 200317 (⌀6int x 2)
 Pos.39	 Pos.72	 Pos.36
4 x 200393 (⌀6)	4 x 200394 (⌀6)	1 x 200395 (⌀40x1,75)
 Pos.69	 Pos.67	 Pos.84 (Caucho)
1 x 200400 (30 x 40 x 7)	1 x 200396 (50 x 62 x 7)	1 x DW10952
Válvula compresión Pos.137	Válvula aspiración Pos.134	 Pos.18
1 x 200398	1 x 200399	22 x 200397 (⌀10)

1 x DW10030/38

1 x DW11080

1 x DW11085

Many Thanks For Your Attention

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