

# Heating, Ventilation and Air Conditioning Systems



## Applications

- Metros
- Commuter Trains
- Long Distance Trains
- Light Rail Vehicles
- High-Speed Trains
- Locomotives
- Drivers Cabs



# Heating, Ventilation and Air Conditioning Systems

Merak designs and produces heating, ventilating and air-conditioning (HVAC) systems for all types of railway vehicle and a wide range of climatic conditions. The applications are also available with energy-saving heat pump technology.

## OPTIONS

HVAC systems from Merak are available

- with or without heat pump
- with or without integrated auxiliary power system
- with or without emergency inverter
- with or without air quality treatment system
- as compact or split systems
- as roof-mounted or underfloor versions
- for passenger and driver cabins
- for new and refurbished vehicles

## REDUCING ENERGY COSTS

With Merak's optional heat pump technology – which uses the cooling circuit for heating purposes within certain temperature ranges – energy consumption of a passenger carriage, for example, can be reduced by up to 30%. Although there are additional costs for the enlarged heat exchanger and components for the logistic control valves, an icing sensor and a refrigerant fluid container, the high energy savings mean the costs can be recouped within a short period of time.

## ADVANTAGES

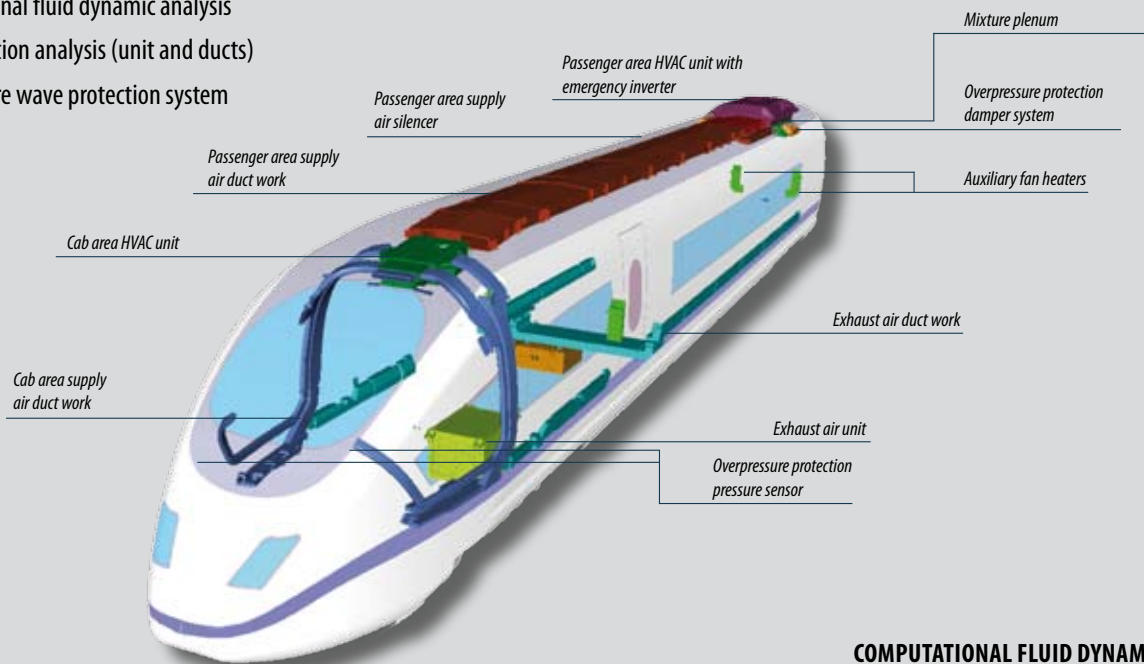
- Improved passenger comfort
- Very compact and quiet
- Low life-cycle costs
- Energy savings
- Air quality treatment
- Maintenance-friendly design
- Tried-and-tested technology
- State-of-the-art
- Applicable worldwide

## MERAK

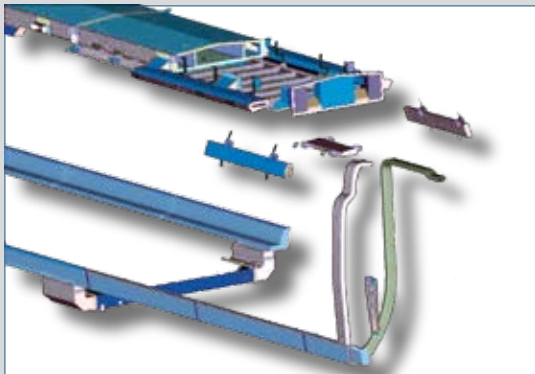
Merak is one of the biggest suppliers of railway vehicle air-conditioning systems on the market, with decades of experience in the field. The company's HVAC systems are used worldwide and it offers a close-to-home service on a global basis. An important part of Merak's turnover is invested in research and development, and the company operates state-of-the-art testing facilities at its headquarters in Getafe, Madrid, in Spain.

## TECHNICAL FEATURES

- Dedicated mechanical and electrical design
- Structural verification by using the finite elements method
- Noise and vibration analysis
- Computational fluid dynamic analysis
- Air distribution analysis (unit and ducts)
- Overpressure wave protection system
- Air quality treatment systems
- Dedicated type testings in controlled ambient conditions (climate room)



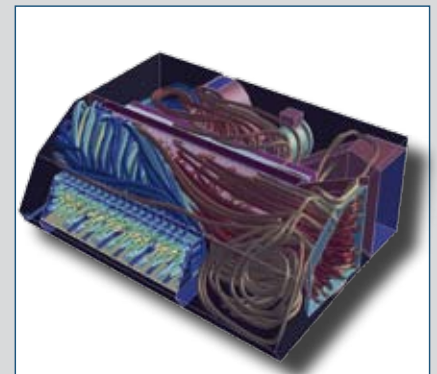
### 3D DUCTING WORKS



### HVAC UNIT



### COMPUTATIONAL FLUID DYNAMIC (CFD) STUDIES OF HVAC UNIT



## Rail Vehicle Systems

**Merak Sistemas Integrados de Climatización, S.A.**  
Parque Empresarial „La Carpetania“  
C/Miguel de Faraday 1  
28906 Getafe (Madrid)  
Spain  
Tel: +34 91 1459400  
Fax: +34 91 6910997

**Merak Railway Technologies (Shanghai) Co., Ltd.**  
No.508, ChuanHong Road;  
ChuanSha  
Pudong New Area  
Shanghai, 201202  
China  
Tel: + 86 21 5192-8000  
Fax: + 86 21 5192-8111

**Merak North America LLC**  
861 Baltimore Boulevard  
Westminster, MD 21157  
USA  
Tel: +1 410 875-0900  
Fax: +1 410 875-1449

**Merak Jinxin Air Conditioning Systems (Wuxi) Co., Ltd**  
Building 6, Taihu Town  
Industrial Park  
#7 Lian He Lu  
Hudai Town, Binhu District,  
Wuxi Jiangsu Province  
P. R. China  
Tel: +86 510 8558-3133  
Fax: +86 510 8558-5030

### Europe – Africa

Austria  
**Dr. techn. J. ZELISKO GmbH**  
Mödling  
Tel: +43 2236 409-0  
Fax: +43 2236 409-279

**Knorr-Bremse GmbH**  
Mödling  
Tel: +43 2236 409-0  
Fax: +43 2236 409-412

**Knorr-Bremse GmbH Division IFE**  
Waidhofen an der Ybbs  
Tel: +43 7442 515-0  
Fax: +43 7442 515-12

France  
**Freinrail Systèmes Ferroviaires S.A.**  
Reims  
Tel: +33 3 2679-7200  
Fax: +33 3 2679-7201

Germany  
**Knorr-Bremse Systeme für Schienenfahrzeuge GmbH Zweigniederlassung Berlin**  
Berlin  
Tel: +49 30 9392-0  
Fax: +49 30 9392-2409

**Knorr-Bremse Systeme für Schienenfahrzeuge GmbH**  
Munich  
Tel: +49 89 3547-0  
Fax: +49 89 3547-2767

Hungary  
**Knorr-Bremse Vasúti Jármű Rendszerek Hungária Kft.**  
Budapest  
Tel: +36 1421 1100  
Fax: +36 1421 1192

Italy  
**Frenisistemi S.r.l.**  
Florence  
Tel: +39 055 3020-1  
Fax: +39 055 3020-333

**Microelettrica Scientifica Spa**  
Rozzano  
Tel: +39 02 575-731  
Fax: +39 02 575-10 940

Netherlands  
**IFE Tebel Technologies B.V.**  
Leeuwarden  
Tel: +31 58 2973-333  
Fax: +31 58 212-8800

Poland  
**Knorr-Bremse Systemy dla Kolejowych Srodków Lokomocji PL Sp. z o.o.**  
Kraków  
Tel: +48 12 260-96 10  
Fax: +48 12 260-96 20

Romania  
**Knorr-Bremse SRL**  
Bucharest  
Tel: +40 037 400-5155  
Fax: +40 021 318-5789

Russia  
**Knorr-Bremse Systeme für Schienenfahrzeuge GmbH**  
Moscow  
Tel: +7 495 739-01 13  
Fax: +7 495 739-01 14

South Africa  
**Knorr-Bremse (SA) (Pty) Ltd.**  
Spartan  
Tel: +27 11 961-7800  
Fax: +27 11 975-8249

**Microelettrica Scientifica (PTY) Ltd**  
Johannesburg  
Tel: +27 11 794-3330  
Fax: +27 11 794-7428

Spain  
**Sociedad Española de Frenos Calefacción y Señales, S.A.**  
Madrid  
Tel: +34 91 145-9400  
Fax: +34 91 145-9444

Sweden  
**Knorr-Bremse Nordic Rail Services AB**  
Lund  
Tel: +46 46 3293-50  
Fax: +46 46 1489-71

Switzerland  
**Oerlikon-Knorr Eisenbahntechnik AG**  
Niederhasli  
Tel: +41 44 852-31 11  
Fax: +41 44 852-31 31

United Kingdom  
**Knorr-Bremse Rail Systems (UK) Ltd.**  
Melksham  
Tel: +44 1225 898-700  
Fax: +44 1225 898-705

### America

Brazil  
**Knorr-Bremse Sistemas para Veículos Ferroviários Ltda.**  
São Paulo  
Tel: +55 11 5681-1129  
Fax: +55 11 5686-8344

Canada  
**Knorr Brake Ltd.**  
Kingston  
Tel: +1 613 389-46 60  
Fax: +1 613 389-87 03

USA  
**IFE North America**  
Westminster  
Tel: +1 410 875-1468  
Fax: +1 410 875-1225

**Knorr Brake Corporation**  
Westminster  
Tel: +1 410 875-09 00  
Fax: +1 410 875-90 53

**Microelettrica-USA**  
Randolph  
Tel: +1 973 598-0806  
Fax: +1 973 598-0677

**New York Air Brake Corporation**  
Watertown  
Tel: +1 315 786-52 00  
Fax: +1 315 786-56 76

### Asia – Australia

Australia  
**Knorr-Bremse Australia Pty. Ltd.**  
Granville NSW  
Tel: +61 2 8863-6500  
Fax: +61 2 9897-9980

China  
**Knorr-Bremse Asia Pacific (Holding) Limited**  
Hong Kong  
Tel: +852 2861-2669  
Fax: +852 2520-6000

**Knorr-Bremse Systems for Rail Vehicles (Suzhou) Co. Ltd.**  
Beijing Office  
Beijing  
Tel: +86 10 6802-9088  
Fax: +86 10 6802-9087

**Knorr-Bremse Nankou Air Supply Unit (Beijing) Co. Ltd.**  
Beijing  
Tel: +86 10 5164-2640  
Fax: +86 10 6978-2010

**Knorr-Bremse Systems for Rail Vehicles Co. Ltd. Suzhou**  
Jiangsu  
Tel: +86 512 6616-5666  
Fax: +86 512 6616-5817

**Westinghouse Platform Screen Doors (Guangzhou) Ltd.**  
Guangzhou  
Tel: +86 20 8770-8700  
Fax: +86 20 8770-5706

India  
**Knorr-Bremse India Private Ltd.**  
Faridabad  
Tel: +91 129 227-64 09  
Fax: +91 129 227-59 35

Japan  
**Knorr-Bremse Rail Systems Japan Ltd.**  
Tokyo  
Tel: +81 3 53 91-10 13  
Fax: +81 3 53 91-10 22

Korea  
**Knorr-Bremse Rail Systems Korea Ltd.**  
Seoul  
Tel: +82 2 22 80-55 55  
Fax: +82 2 22 80-55 99

 **KNORR-BREMSE**

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 *Microelettrica Scientifica*

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