

Aftermarket Services

Modernization Solutions for More Reliable,
Sustainable and Healthier Rail HVAC



Five focus areas in rail HVAC modernization

01

COMPLETE HVAC REPLACEMENT

Proven full-system replacements for fleets already in service.

02

M36

A future-ready replacement for the legacy M35 family.

03

LOW-GWP REFRIGERANT CONVERSIONS

Drop-in conversions that reduce GWP and extend fleet life.

04

PROPANE RETROFIT

A new route to convert existing HFC units to propane.

05

MLLF

Cleaner cabin air, longer filter life and lower lifecycle cost.

Merak's focus on complete HVAC modernizations is delivering proven success across train fleets already in service

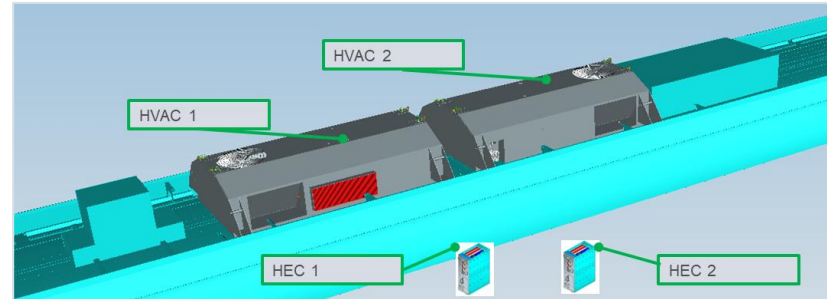
Year	Completed project
2008	PKP PC Poland
2013	PMR Renfe
2014	Fertagus DD Portugal
2016	MI84 RATP France
2018	VIRMm 2/3 NS
2025	VIRMm 4 NS
2020/26	PKP PC Poland
2025	Eurotunnel



VIRMm 2/3 and 4



Fertagus



MI84

M36 resolves M35 legacy-family obsolescence with a seamless, future-ready replacement

A purpose-built successor that protects the installed fleet while removing lifecycle and compliance risk.

01 FULL M35 REPLACEMENT

M36 preserves the required functionality across the legacy family.

02 TRUE PLUG & PLAY

No redesign of the train or HVAC installation is required.

03 OBSOLESCENCE SOLVED BY DESIGN

CRA-aware electronics and current cybersecurity standards extend fleet viability.

Legacy fleet preserved. Lifecycle risk removed.



M36 electronic platform

Many of our customers already trust our M36 solution for their fleets

ALL SECURED PROJECTS

#	PROJECT	CUSTOMER	YEAR
01	MM 7000/8000	Metro de Madrid	2025
02	Regina	Transitio	2025/26
03	LRV Alicante	FGV	2025/26
04	São Paulo	CPTM	2025/26
05	Metro de Roma	ATAC	2026
06	HST S120/S121	Actren	2026
07	MSP L5 ¹	CAF Brasil	2026
08	HST S103	Renfe	2027
09	HST S112	Renfe	2027
10	HST S104/S114	Renfe	2027
11	HST S130	Renfe	2027

¹ HEC CS



M36 platform

SECURED PORTFOLIO

11 projects
8 customers

Railway HVAC is entering a decisive refrigerant transition...

Regulation is accelerating the phase-down of legacy HFCs—forcing fleets to balance environmental ambition with remaining train life.

01 REGULATION IS TIGHTENING

Kigali phase-down and emerging PFAS rules are reducing the long-term viability of fluorinated refrigerants.

02 LEGACY FLEETS REMAIN EXPOSED

R134a and R407C are still widespread in railway HVAC, but face growing environmental and availability pressure.

03 A PRACTICAL BRIDGE EXISTS TODAY

Lower-GWP drop-ins such as R513A and R449A can reduce impact while preserving mature HVAC assets.

04 NATURAL REFRIGERANTS ARE THE DESTINATION

R290 and R744 provide the long-term route for deep modernization and future compliance.



THE DECISION IS NOW
Bridge mature fleets
today.
Design natural
refrigerants into
tomorrow.

Customer demand is accelerating for drop-in conversions that lower GWP and extend fleet life

For mature fleets, **R513A** offers a proportionate transition: lower environmental impact, limited intervention and short downtime.

01 R134a → R513A

LOW COMPLEXITY

Straightforward refrigerant replacement with minor system checks.

Minimal hardware modifications

02 R407C → R513A

MEDIUM-HIGH COMPLEXITY

System conversion may require compressor and key refrigeration-component changes.

THE PRACTICAL LOWER-GWP BRIDGE

R513A

Designed for mature railway fleets

- ✓ Significantly lower GWP
- ✓ Limited system intervention
- ✓ Shorter downtime than HVAC replacement
- ✓ Extends the value of existing assets

Best fit: fleets around 15–20 years

First customer projects validate lower-GWP drop-in conversions to R513A

Three projects in delivery and three in offer confirm demand for a pragmatic transition to R513A.



Ouigo



S114



MMS7000/8000

STATUS	PROJECT	CONVERSION	UNITS	NOTE
IN DELIVERY	Ouigo Spain	R407C→R513A + OVH	200	
IN DELIVERY	MMS7000/8000	R134a→R513A	10	Prototypes
IN DELIVERY	S114	R407C→R513A + OVH	66	
IN OFFER	Talgo S7 Renfe	R134a→R513A + Modern.	319	
IN OFFER	UT447/ Renfe	R407C/R134a→R513A + Modern.	500	
IN OFFER	Civia Renfe	R134a→R513A + Modern.	428	+ Propane ready

Merak improves passenger-cabin air quality and lowers lifecycle costs for customers

Longer service life and higher filtration efficiency mean fewer replacements, less maintenance and more reliable HVAC performance.

80+ customers already use Merak's long life filters

- 01 Better passenger-cabin air quality**
Over 70% filtration efficiency for PM2.5, and over 80% for PM10 and pollen.
- 02 Fewer filter changes**
Up to 4× longer service life than a standard panel filter.
- 03 Higher filtration efficiency**
Up to 2× better efficiency helps protect HVAC performance.
- 04 Lower lifecycle cost**
Less labor, fewer consumables and less waste across the fleet.



Long-life filtration for rail HVAC



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