



ON-ROAD
BUS
APPLICATION

**Our efficiency.
Your edge.**



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Your edge.

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ABOUT FPT INDUSTRIAL

FPT Industrial is a Brand of Iveco Group dedicated to the design, production, and sale of powertrains and solutions for on- and off-road vehicles, as well as marine and power generation applications. Over 8,000 people across ten production sites and eleven R&D centers work for FPT Industrial all around the world.

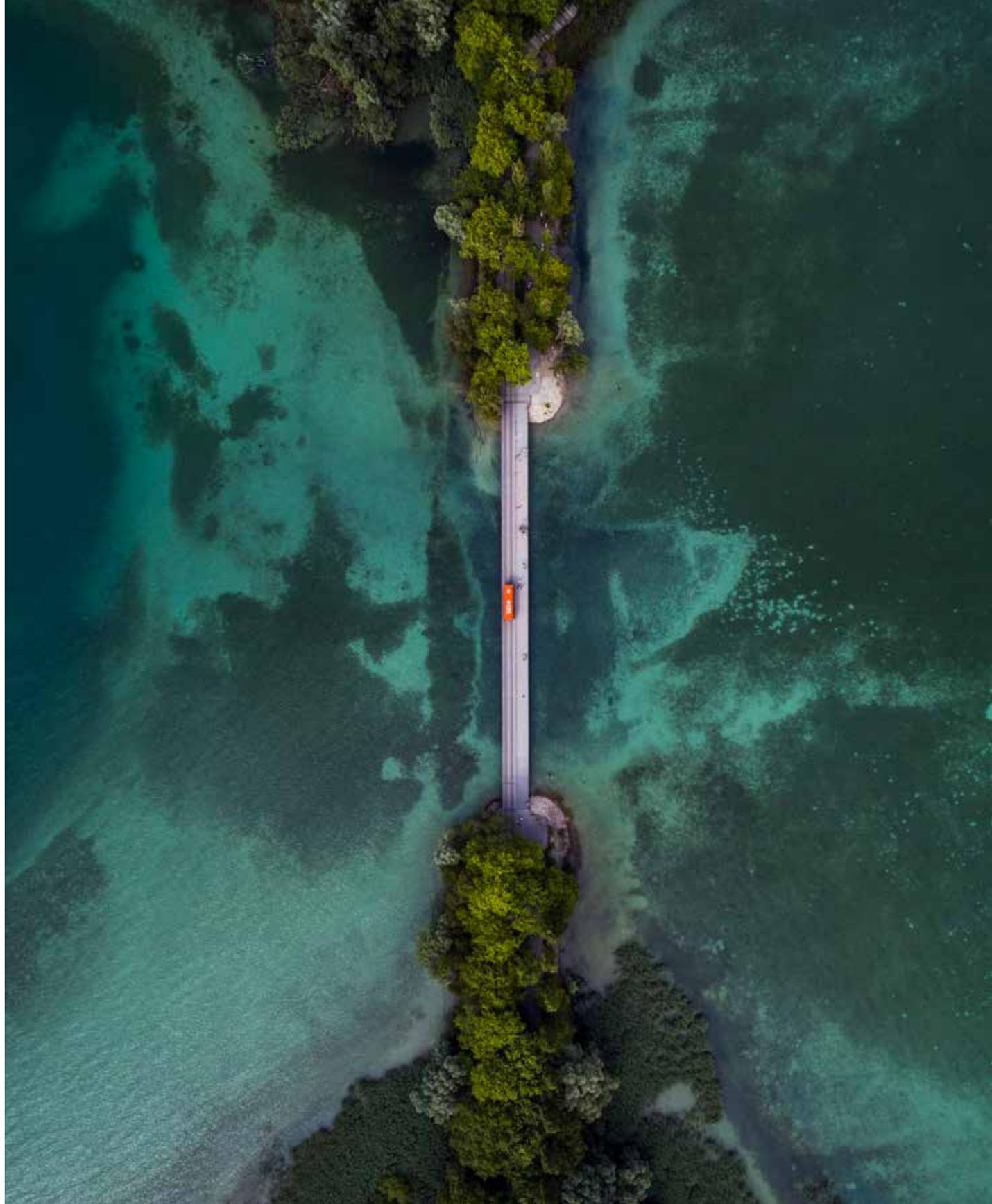
Active in nearly 100 different countries, its global sales and its Customer Service department support all Brand Customers. The extensive product offering includes six engine ranges with power outputs from 42 hp to over 1,000 hp, transmissions with torque up to 500 Nm, and front and rear axles from 2.45 to 32 tonne GAW (Gross Axle Weight). FPT Industrial offers the most complete line-up of natural gas engines for industrial applications on the market, with power outputs ranging from 50 to 520 hp.

A dedicated ePowertrain division is accelerating the path towards net zero-emissions mobility, with electric drivelines, battery packs, and battery management systems.

This extensive offering, and its strong focus on R&D, makes FPT Industrial a world leader in industrial powertrains and solutions. The opening, on October 2022, of FPT Industrial's ePowertrain plant, totally carbon-neutral, marked another important milestone for the Brand in its decarbonization path and for its strategy of achieving net-zero emissions for its products and of all its industrial activities.

We are proud to be a people oriented and innovation driven Company, that builds Customer advantage through continuous research and improvement, and creates value by leveraging this advantage.

**We innovate constantly.
We increase the benefits for
end users and create value
for the businesses we serve.**



ENGINES

A Wide Solution Range for Every Bus Application

FPT Industrial is the N°1 engine manufacturer for bus application in Europe*. Our bus engines range is developed to satisfy the most demanding Customer's requirements. With displacements from 3.0 to 12.9 litres, it suits every daily challenge covering every kind of applications from minibuses to citybus, intercity and coaches.

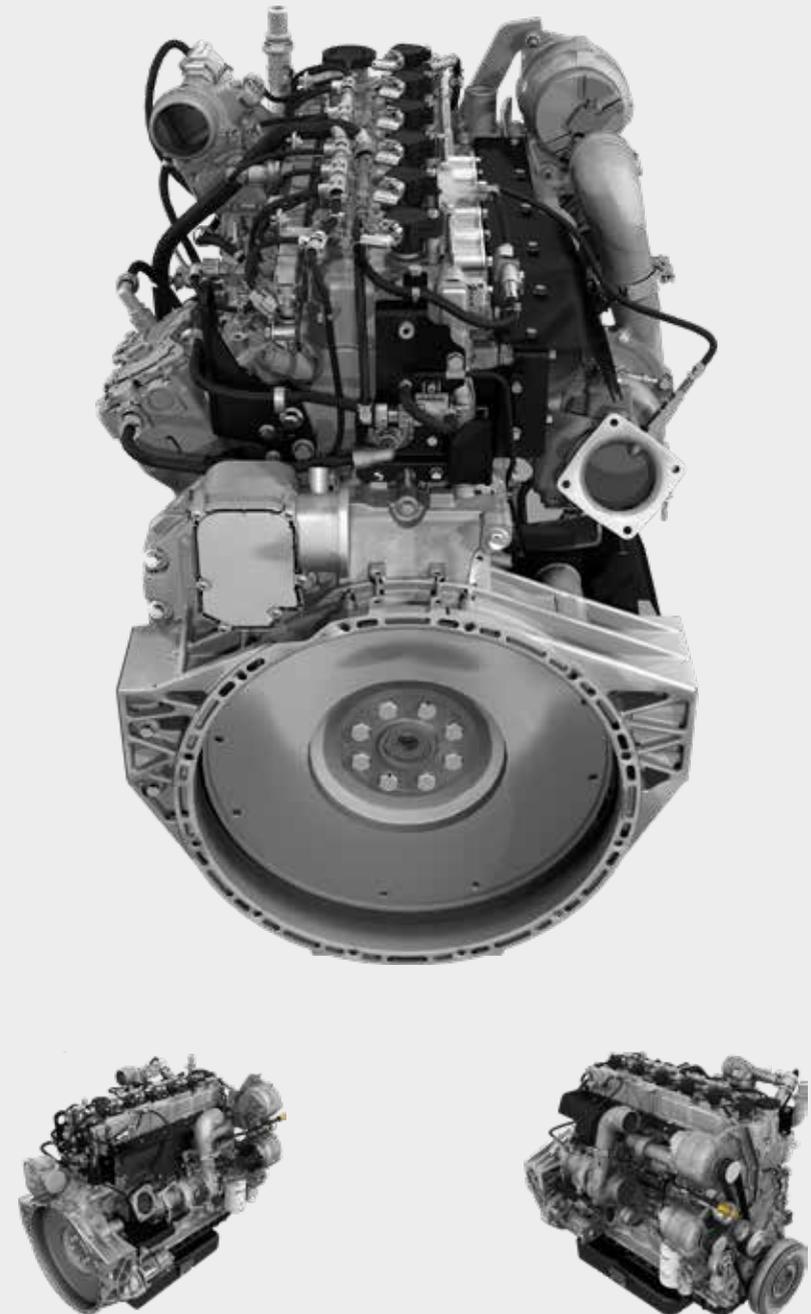
Compliant with Euro VI step E emissions, the three advanced engineering powertrain families (F1, NEF and CURSOR) include natural gas units. Our commitment is to offer a reliable, advanced, clean engine designed for low noise and long life, everyday savings through low fuel and low carbon consumption, respecting the environment and current low emission restrictions while ensuring diesel-like performance.

The F1 family (3.0L) is the perfect and reliable solution for minibuses.

The NEF family (4.5-6.7L) is the evidence of FPT Industrial technological excellence. It is the compact, cost-effective and efficient engine solution for city/intercity buses up to 18 meters.

The CURSOR family (8.7-12.9L) provides superb performance combined with an extremely low fuel consumption, for heavy bus applications.

All our three engine families are available both in diesel and natural gas version.



Engine Specifications

Fuel	Application	Model	Cylinder Arrangement / Valves per cyl.	Turbocharging	Injection System	Displacement Liters	Power			Torque			Emission Standard	Exhaust System	Pivot
							kW	Hp	Rpm	Nm	Kgm	Rpm			
DIESEL	MINIBUS	F1C	L4 / 4	VGT	ECR	3	95	127	3400	430	44	1500	Euro VI E	EGR+DOC+SCRoF+SCR+CUC	●
DIESEL	MINIBUS	F1C	L4 / 4	VGT	ECR	3	96	130	2620	350	36	1400	Euro VI E	EGR+DOC+SCRoF+SCR+CUC	●
DIESEL	MINIBUS	F1C	L4 / 4	VGT	ECR	3	110	150	2620	400	41	1600	Euro VI E	EGR+DOC+SCRoF+SCR+CUC	●
DIESEL	MINIBUS	F1C	L4 / 4	VGT	ECR	3	129	175	2865	430	44	1600	Euro VI E	EGR+DOC+SCRoF+SCR+CUC	●
DIESEL	MINIBUS	F1C	L4 / 4	VGT	ECR	3	129	175	3500	430	44	1600	Euro VI E	EGR+DOC+SCRoF+SCR+CUC	
DIESEL	MINIBUS	F1C	L4 / 4	EVGT	ECR	3	152	207	3500	470	48	1400	Euro VI E	EGR+DOC+SCRoF+SCR+CUC	
NATURAL GAS	MINIBUS	F1C NG	L4 / 4	WG	MPI	3	100	136	3500	350	36	1500	Euro VI E	3 WAY CATALYST + CPF	
DIESEL	BUS	N45	L4 / 4	WG	ECR	4,5	118	158	2500	580	59	1250	Euro VI E	DOC + DPF + SCR + CUC	●
DIESEL	BUS	N45	L4 / 4	WG	ECR	4,5	137	186	2500	750	76	1400	Euro VI E	DOC + DPF + SCR + CUC	●
DIESEL	BUS	N67	L6 / 4	WG	ECR	6,7	184	250	2500	950	97	1400	Euro VI E	DOC + DPF + SCR + CUC	●
DIESEL	BUS	N67	L6 / 4	WG	ECR	6,7	210	286	2500	1000	102	1250	Euro VI E	DOC + DPF + SCR + CUC	●
DIESEL	BUS	N67	L6 / 4	WG	ECR	6,7	235	320	2500	1100	112	1250	Euro VI E	DOC + DPF + SCR + CUC	
NATURAL GAS	BUS	N67 NG*	L6 / 4	WG	MPI	6,7	206	280	2000	1000	102	1250	Euro VI E	3 WAY CATALYST + CPF	
DIESEL	BUS	C9	L6 / 4	WG	ECR	8,7	228	310	2200	1300	133	1100	Euro VI E	DOC + DPF + SCR + CUC	
DIESEL	BUS	C9	L6 / 4	WG	ECR	8,7	251	341	2200	1400	143	1100	Euro VI E	DOC + DPF + SCR + CUC	
DIESEL	BUS	C9	L6 / 4	WG	ECR	8,7	265	360	2200	1650	168	1200	Euro VI E	DOC + DPF + SCR + CUC	
DIESEL	BUS	C9	L6 / 4	EVGT	ECR	8,7	294	400	2200	1700	173	1200	Euro VI E	DOC + DPF + SCR + CUC	
NATURAL GAS	BUS	C9 NG	L6 / 4	WG	MPI	8,7	228	306	1700	1300	133	1100	Euro VI E	3 WAY CATALYST + CPF	
NATURAL GAS	BUS	C9 NG	L6 / 4	WG	MPI	8,7	264	359	2000	1640	167	1100	Euro VI E	3 WAY CATALYST + CPF	
DIESEL	BUS	XC13**	L6 / 4	EVGT BB	ECR 2500bar	12,9	442	601	1900	2850	275	1100	Euro VI E	DOC + DPF + SCR + CUC	
NATURAL GAS	BUS	XC13 NG**	L6 / 4	eWG	MPI	12,9	382	520	1900	2500	255	1100	Euro VI E	EGR + 3 WAY CATALYST	



Legend

Turbocharger
 EVGT Electronic Variable Geometry Turbo
 WG Fixed Geometry Turbocharger with Waste Gate valve

Injection System
 ECR Electronic Common Rail
 MPI Multi-Points Injection

Exhaust System
 EGR external Exhaust Gas Recirculation
 DOC Diesel Oxidation Catalyst
 SCRoF Selective Catalytic Reduction on Filter
 DPF Diesel Particulate Filter w/passive regeneration
 SCR Selective Catalytic Reduction

CUC Clean Up Catalyst
 CPF CNG Particulate Filter

* 210 kW – 1250 Nm as max capability
 ** max capability

Excellent Performance & Improved Sustainability

People transport is built on performance, durability and efficiency: FPT Industrial certified engines are powerful, reliable, robust and innovative.

Customers that can rely on cutting-edge technology contents and a lower cost of ownership become free to focus on growth.

Through sophisticated electronic injection systems, high efficiency combustion, a choice of air handling devices, advanced emission control strategy and access to natural gas versions, FPT Industrial's engines for bus applications are an ideal solution, offering excellent performance and improved sustainability.

Performance

- F1C: best-in-class in performance and transient response thanks also to eVGT turbocharger.

Reliability

- F1C: Class leading in reliability thanks to double chain timing (no maintenance needed, lower cost and noise vs gear timing).
- NEF & CURSOR: Best in class in reliability NO EGR.

Total Cost of Ownership

- F1C: best in class in service maintenance (50,000 km).
- NEF & CURSOR: Class leading Total Cost of Ownership thanks NO EGR and DPF w/ passive regeneration, optimized fuel delivery and reduced maintenance and operating costs.

Durability

- F1C: best in class in durability (400,000 km Be10 on GVW up to 7.2t).

Low Environmental Impact

- F1C: Worldwide Emission Certification according to EuVI step E, GBVI, JP21, Proconve P8.
- F1C: ATS system with double SCR, optimized for urban missions with reduced load and low exhaust temperatures, as well as for suburban use.
- NEF & CURSOR HI-eSCR: exclusive FPT Industrial ATS technology (No EGR and New SCR-TiV-) for enhanced behavior at cold start).

Compactness

- NEF & CURSOR: optimized packaging and installation for truck and bus (small cooling circuit thanks to NO EGR).



AXLES & TRANSMISSIONS

FPT Industrial has been consistently improving its driveline products since the 1970s.

Currently, the Company manufactures one axle/ transmission for all on-road applications, every two minutes.

FPT Industrial designs and manufactures high-performance front and rear axles and 6-speed manual transmissions for people transport applications in order to provide its Customers with a comprehensive range of powertrain solutions.

AXLES

FRONT DRIVING



FRONT NON-DRIVING



REAR SINGLE AXLE



TRANSMISSION

FT50.6 TRANSMISSION



Axles Specifications

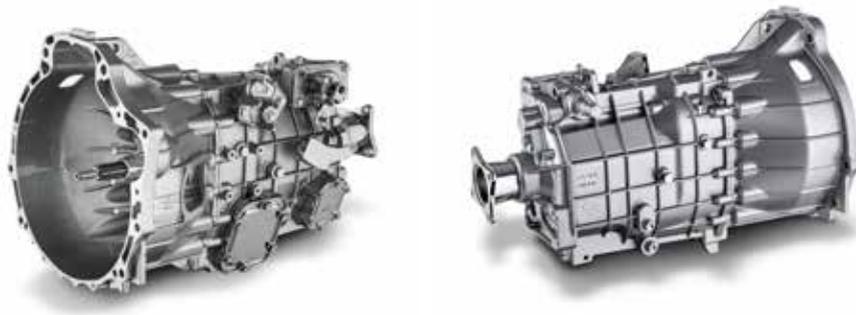
Model	Type	GAW (ton)	GVW (ton)
5833	F/ND/S	3,6	10
5845	F/ND/S	4,6	12
5860	F/ND/S	6	16
5871/2	F/ND/S	7,5	18
NDA SW & TW	R/S/SR	2,45	3,5
4511	R/S/SR	3,7	5
4517/3	R/S/SR	5	7
4517/2	R/S/SR	5,4	7,2
4517	R/S/SR	5,6	8
4521	R/S/SR	6,8	10
MS08	R/S/SR	8,5	12
MS10	R/S/SR	10,5	16
17x	R/S/SR	13	26

Brake system	Oil quantity (l)	Weight (kg)	Axle ratio range
DISC	0,2	175	NOT APPLICABLE
DISC	0,3	246	NOT APPLICABLE
DISC	NO OIL	316	NOT APPLICABLE
DISC	0,7	450	NOT APPLICABLE
DISC	1,35	134 (SW) 140 (TW)	2,92 - 5,63
DISC	1,9	166	2,93 - 5,86
DISC	3,1	250	5,13 - 5,86
DISC	3,1	215	3,91 - 5,13
DISC	3,1	265	3,15 - 5,57
DISC	5,4	296	3,07 - 5,57
DISC	6,5	345	3,07 - 5,57
DISC	12,7	466	2,93 - 6,83
DISC/DRUM	12	625	2,31 - 6,17

Legend

- F front axles
- R rear axles
- D driving axle
- ND not driving axles
- S solo
- SR single reduction

FT50.6 TRANSMISSION



The FT50.6 is engineered to optimize the complete powertrain by our single-reduction rear axles for the F1 engine family.

The FPT Industrial 6-speed FT50.6 longitudinal manual transmission is characterized by low weight, high sturdiness and gear shifting comfort, thanks to the latest generation of synchronizers and gears.

With input torque 300 to 500 Nm – it can offer reduced maintenance and operating cost thanks to an outstanding efficiency of 97% and an oil drain interval up to 350,000 km.

Furthermore it guarantees high reliability and durability standards with lifetime up to 450,000 km.

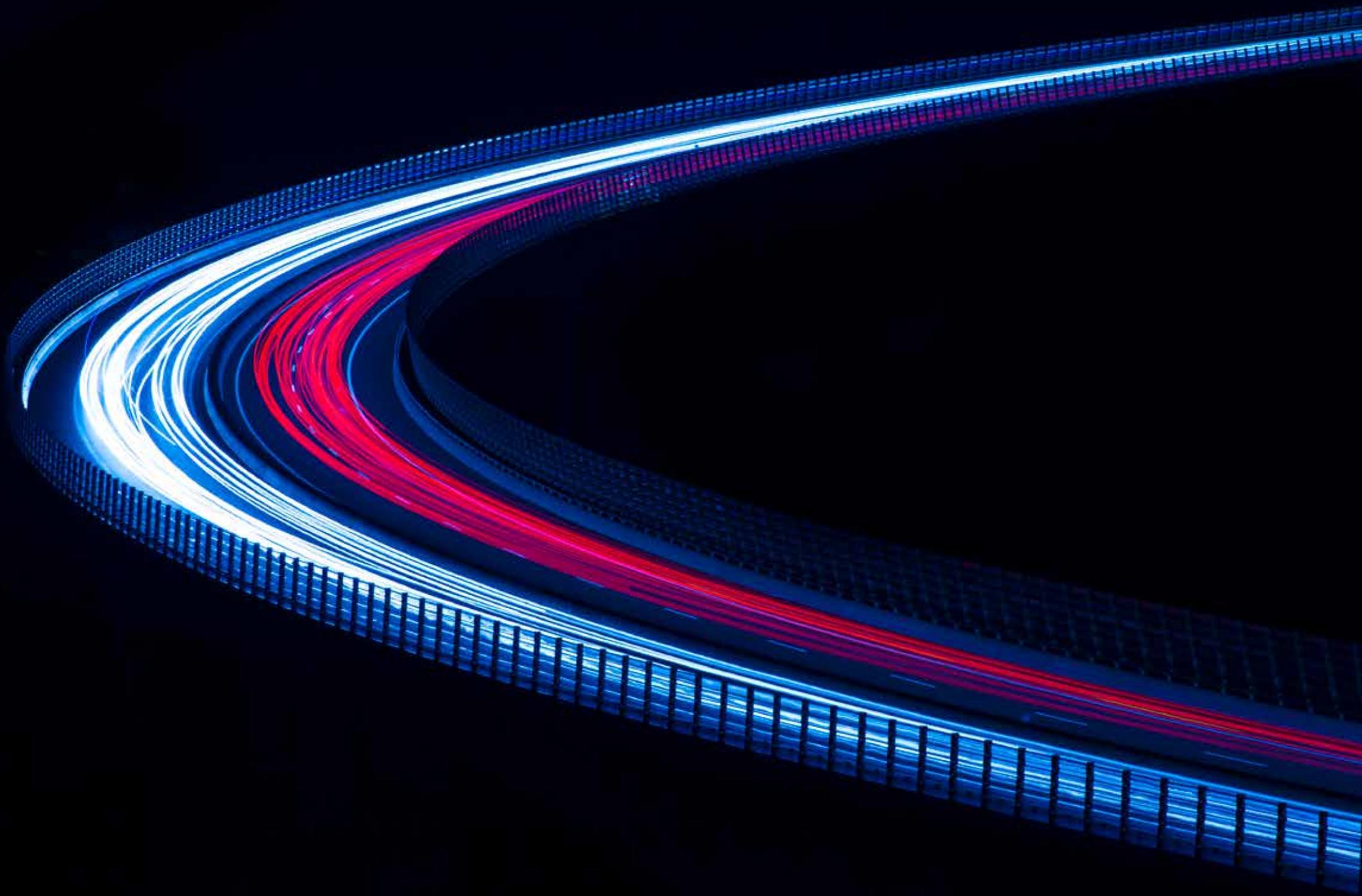
FT50.6 Specifications:

Application:	Minibus
Speeds:	6-speed
Shifting:	Manual
Max input Torque (Nm):	500
GVW (ton):	up to 8
Durability (kKm):	350
Oil quantity (liters):	1.8
Dry Weight (Kg):	57
PTO:	Available
Minibus	Gear Ratio
	1 [^] 5.375
	2 [^] 3.154
	3 [^] 2.041
	4 [^] 1.365
	5 [^] 1.000
	6 [^] 0.791
	RG 4.838

Find out more:

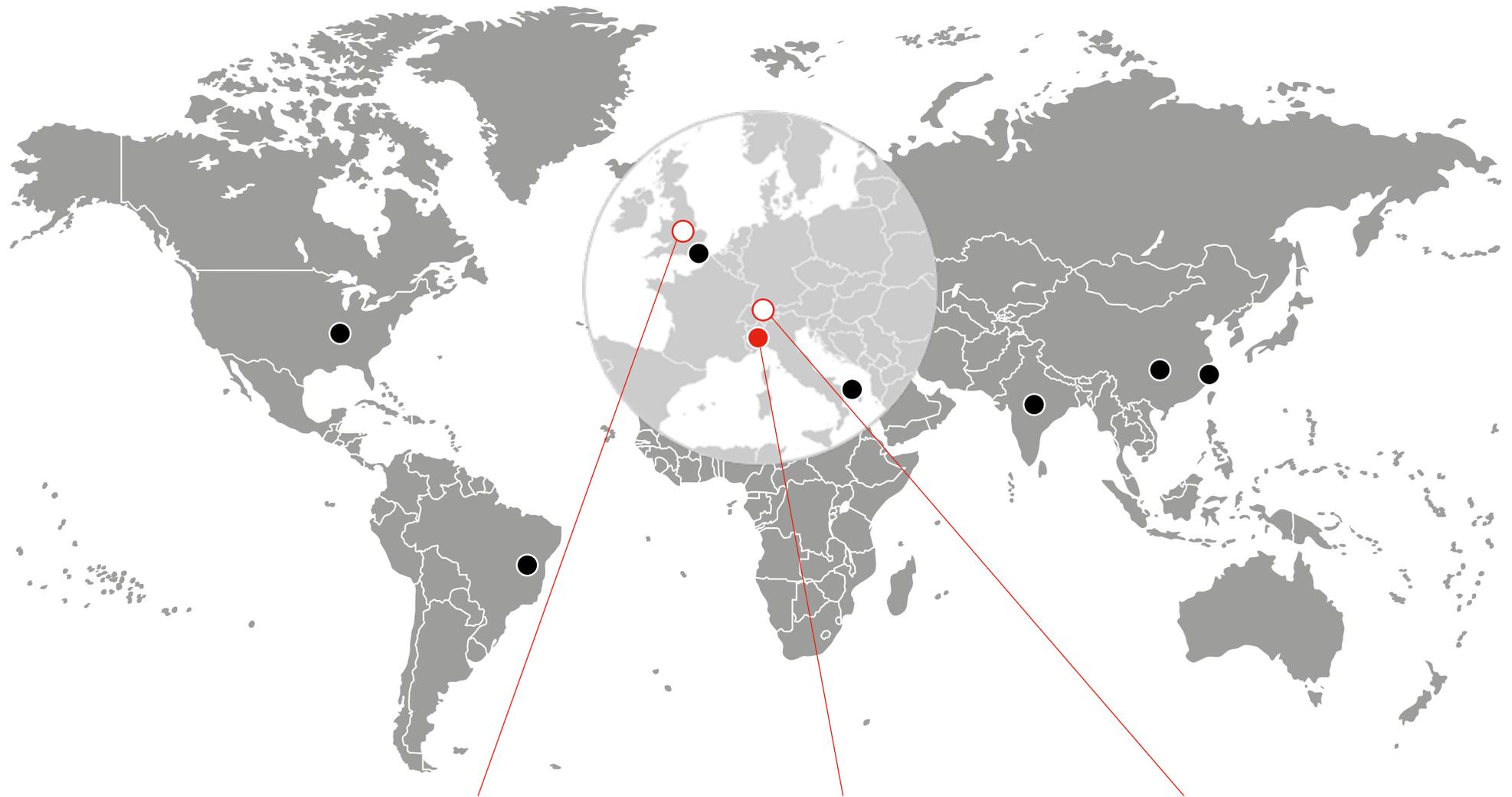


FT50.6



ePOWERTRAIN

ePOWERTRAIN R&D FOOTPRINT



**3 ePOWERTRAIN R&D CENTERS
OUT OF 11 WORLDWIDE**



COVENTRY, UK
Potenza
BMS Design Center



TURIN, ITALY
Main Powertrain Engineering
Development Center at system level
Testing Center

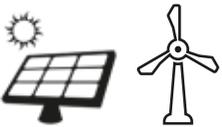


ARBON, SWITZERLAND
Innovation Center Cells & Modules
R&D Center

FPT Industrial Turin ePowertrain Plant & Testing Center: 100% Electric and Zero CO₂ Emissions



Totally carbon-neutral plant, with more than 5 dedicated ePowertrain test benches, offsetting its CO₂ emissions with the purchase of energy from renewable sources and carbon credits.



Solar panels installed on the façade and innovative technologies, such as the "mini-wind tower" and the "smart flower" generate energy for plant activities.



The Sustainability Garden: 6,000 square meter internal space planted with 100 drought-resilient plants of native species with great CO₂ absorption capacity.



FPT Industrial Turin Site: More Than 15,000 Square Meters Dedicated to Electrification

The FPT Industrial ePowertrain plant features four production lines dedicated to the production of its new eDriveline products and Battery Storage in ten variants.



Central Drive
Minibus and Light Commercial Vehicles up to 7.2t GVW



37 kWh Battery Pack
Minibus and & Light Commercial Vehicles



69 kWh Battery Pack
Bus and Coach Applications



Rear eAxle
Heavy Commercial Vehicles up to 44t GCVW



Front + Rear eAxles
High-Performance Car





ePOWERTRAIN PRODUCT PORTFOLIO

FPT Industrial is responding to the crucial challenges of transport sustainability, energy transition, and CO₂ emission reduction with a complete range of innovative products.

Being a global leader means setting new targets that grow more challenging every day. To reach them, we have drawn on our expertise along with the best innovative start-ups worldwide, through partnerships, acquisitions and joint ventures.

Now, we can proudly display the results, showcasing our full range of eDriveline, Battery Storage and Battery Management System solutions.

In response to Customer needs, FPT Industrial's objective is not only to supply individual system components but to serve as an ePowertrain system integrator, guiding its Customers through the process of selecting, designing, and correctly sizing of the complete systems for battery and fuel cell electric vehicles.

ENERGY STORAGE

eBS 37



eBM 5



eBS 37 EVO*



eBS 69



*SOP 2024

eDRIVELINE

eCD 140



eAX 375-R*



*Pilot Phase

eBS 37 and eBS 37 EVO



Battery Pack for zero-emission urban mobility

 Minibus applications

 Up to 37 kWh

Multipack solution:

High flexibility thanks to multipack solution.

High energy density:

> 140Wh/kg to guarantee maximum performance and optimize weight and installation space.

Proprietary Battery Management System:

In house HW & SW BMS to get longest battery life according to mission requirements.

The 37 kWh FPT Industrial Battery Pack for minibus applications is a modular battery pack that incorporates cells and modules with unique Lithium-ion technology for impressive energy density and depth-of-discharge (95%), with advantages in terms of reduced battery weight.

The new eBS 37 EVO battery presents some substantial innovations: the eBM 5 Battery Management System - entirely developed and produced by FPT Industrial - and a new internal design which allows the battery to meet the highest safety standard ECE R100.3.

Thanks to the FPT industrial in-house Battery Management System eBM 5, the eBS 37 EVO has the longest battery life according to mission requirements.

eBS 37 and eBS 37 EVO Specifications:

	eBS 37	eBS 37 EVO
Application:	Minibus	
Type:	Battery Pack	
Cell Technology:	Li-ion	
Cooling system:	Water-cooled	
Nominal energy (kWh):	37	
Energy density (Wh/kg):	> 140	
C-rate (continuous):	1C (charge) 2C (discharge)	
Cathode technology:	NMC	
Protection:	IP67 / IP6K9K	
Life cycles:	>2,500	
Weight (kg):	260	
Regulation compliance:	ECE R100.2, ECE R10.5	ECE R100.3, ECE R10.6
BMS	Microvast	FPT Industrial eBM 5

Find out more:



eBS 37

eBS 69



Battery Pack for zero-emission people transport

 *Bus applications*

 *Up to 69 kWh*

Multipack solution:

High flexibility thanks to multipack solution.

Best-in-Class energy density:

>178Wh/kg to guarantee maximum performance and optimize weight and installation space.

Life Cycle:

> 6,500 depending on specific mission.

Warranty:

Up to 10 years warranty according to mission profile.

The 69 kWh FPT Industrial Battery Pack for bus applications is a modular battery pack that incorporates cells and modules with unique NMC Lithium-ion technology for best-in-class energy density which offers highest performance in City bus applications.

Its customized Battery Management System, ensures longest battery life as well as incorporates specific safety and cyber-security features for bus applications.

Furthermore, the eBS 69 battery pack has been specifically designed to perfectly fit for bus application.

eBS 69 Specifications:

Application:	Bus
Type:	Battery Pack
Cell Technology:	Li-ion
Cooling system:	Water-cooled
Nominal energy (kWh):	69
Energy density (Wh/kg):	>178
C-rate (continuous):	1C (charge)
	1C (discharge)
Cathode technology:	NMC
Protection:	IP67 / IP6K9K
Life cycles:	> 6,500
Weight (kg):	388
Regulation compliance:	ECE R100.2, ECE R10.6
BMS:	Microvast

Find out more:



eBS 69

eBM 5



SBMS
Subpack Battery
Management System



CMC-36
Cell Monitor Circuit

Cutting-edge Battery Management System



Bus applications



Minibus applications

Flexibility:

Highly Flexible, designed according to Customer and mission needs.

Battery optimization:

Thanks to cells and modules balancing controls with improved battery capacity and life.

Enhance safety and performance:

Advanced BMS algorithms.

Cloud backup storage

The FPT Industrial eBM 5 Battery Management System is a cutting-edge solution, conceived to meet the most demanding Customer's needs. eBM 5 enhances safety, accuracy and performance.

Thanks to its advanced algorithms, the eBM 5 ensures battery protection, improving its capacity and life. Furthermore, thanks to its cells and modules balancing controls optimizes the driving range.

eBM 5 also meets ASIL C integrity in accordance with ISO26262 - already certified.

eBM 5 Specifications:

High Voltage range (V):	400 and 800V system compatible
Low Voltage range (V):	6 to 32
Isolation Fault Measurement (M Ω):	1 to 10
Operating Temperature ($^{\circ}$ C):	-40 $^{\circ}$ to +85 $^{\circ}$
Safety measurements:	ISO26262 (ASIL C) Isolation test, HVIL & HV Cyber Security
Software - multipack support:	1-9 packs in parallel
Cell balancing:	Passive
SOx Algorithms:	SOC, SOH & SOP

Find out more:



eBM 5

eCD 140



Integrating an electric drive system into existing conventional vehicles



Minibus applications



Up to 140kW



GVW up to 8 tons

Durability:

Maximum durability (Be10) up to 350k km FOR GVW < 8-ton.

Easy integration:

Matching with available rear axles into existing platform.

High efficiency:

Overall system efficiency: >93%.

The FPT Industrial Central Drive eCD 140 for minibus applications is a compact and complete solution for integrating electric drive systems into existing conventional vehicles. FPT industrial's engineering team has designed a lean, integrated central drive system in order to guarantee easy integration into existing platforms.

For rear-wheel drive applications, as with all FPT Industrial products, the eCD 140 is extremely durable, efficient, and reliable (up to 350,000 km, with a lifetime oil fill).

Specifications:

Application:	Minibus
n. eMotors:	1
Peak Power (kW):	Up to 140
Peak eMotor torque:	up to 450
GVW (ton):	<8
Overall system efficiency:	>92%
Weight (kg):	<115
Gear – n. speed:	1
Gear ratio:	4
Durability Be10 (km):	up to 350k

Find out more:



eCD 140

eAX 375-R



A high-performance, high-efficiency solution for Intercity and Coach applications.



Intercity



Coach Applications



Up to 375kW

Scalable solution:

Scalable and adaptable to minibus application.

Durability:

Extended service life (Be10) up to 1,600k km (depending on Customer and vehicle mission profile).

Applications:

Designed for intercity and coach applications.

FPT Industrial eAX 375-R is suitable for intercity and coach applications. Thanks to two-speed gearing, and a brand-new design, the eAX 375-R delivers high performance, outstanding efficiency and extended durability. The design developed by FPT Industrial's engineering team allows the electric axle to be scalable and extremely adaptable to meet different Customers' needs.

eAX 375-R Specifications (pilot phase):

Application:	Intercity and Coach
Type:	Rear Axle
n. eMotors:	1
Peak Power (kW):	375
Peak Wheel Torque (Nm):	30k
GAW (ton):	11
Overall system efficiency:	>92%
Brake system:	DISC
Braking power of discs (Nm):	-
Weight (kg):	680
Gear - n. speed:	2
Gear ratio:	10 / 33
Durability Be10 (km):	up to 1,600k*

* depending on vehicle mission profile

Find out more:



eAX 375-R



CUSTOMER SERVICE

YOU ASK FOR THE BEST. WE MAKE IT HAPPEN.

When the market becomes increasingly challenging, it is essential to have reliable partners.

We collaborate closely with you to provide tailor-made solutions, maximizing engine performance and durability. We are committed to doing everything possible to support you and your business.

Find out more at:



Extended Warranty. Everyday closer to your needs.

On top of the standard after sales support, it is possible to submit our Extended Warranty program, that covers all required FPT Industrial Genuine Parts along with any repairs carried out by highly qualified technicians.

The FPT Industrial Extended Warranty guarantees:

- Customizable offer according to your needs.
- Peace of mind: Warranty costs of your FPT Industrial Product are known in advance.
- Performed by FPT Industrial qualified technicians.
- Optimal Product performance thanks to FPT Industrial Genuine Parts.

Our FPT Industrial Extended Warranty is made with the aim to be closer to you in your everyday activities. You can customize it according to your needs and extend it up to five years. To request a quotation please contact your FPT Industrial Dealer of reference.

	KM COVERAGE	PERIMETERS	DURATION
	From 100,000 to 350,000 kms	<input type="checkbox"/> BRONZE Engine Major components only* <input type="checkbox"/> SILVER Complete Engine <input type="checkbox"/> GOLD Complete Engine + ATS (only Stage V)	Engine Base Warranty <input type="checkbox"/> 1 Year EW <input type="checkbox"/> 3 Years EW <input type="checkbox"/> 4 Years EW <input type="checkbox"/> 5 Years EW <u>Until 5 years of total coverage</u>

(*) Main engine components list: cylinder head; cylinder block; crankshaft; camshaft; connecting rods; pistons; they fly; flywheel cover; oil pump; exhaust manifold; engine control unit

Proactive Assistance. Your direct connection to the Control Room.

Ensuring optimal engine performance and smooth operations has never been easier, thanks to our advanced connected services, MyFPT App and FPT Industrial Dongle connection. This device connects directly to your engine, allowing our Control Room to analyse your engine data in real-time. Through this advanced system, we can promptly detect any anomalies and identify areas for optimization.

Our dedicated team is always ready to provide prompt assistance and support. With this proactive approach, we can address any potential issues, ensuring that your engine performs at its best.

Experience the convenience of enhanced engine performance and the peace of mind that comes with our close monitoring and support.

- Health status monitoring.
- Maximize uptime thanks to the prompt activation of the FPT Industrial local Service Point, which is informed about the issue in advance even leaving its workshop.
- Engine diagnostics and repair based on FPT Industrial technical know-how and field experience.
- Technical cost of ownership (TCO) reduction by minimizing downtime.





All the pictures, drawings illustrations and descriptions contained in this brochure are based on product information available to FPT Industrial at the time of printing (30/09/2023). Some of the engine line-ups may refer to a specific market configuration which may not be present or offered for sale available in all other markets. The colors featured in this brochure may differ from the originals. FPT Industrial reserves the right to introduce any modifications, at any time and without any prior advance notice, to design, material, components equipment and/or technical specifications.

