

INGETRAC

Power Converters

High Power | Medium Power | Low Power

Traction Technology applied in Ad-hoc Client Solution

Ingeteam

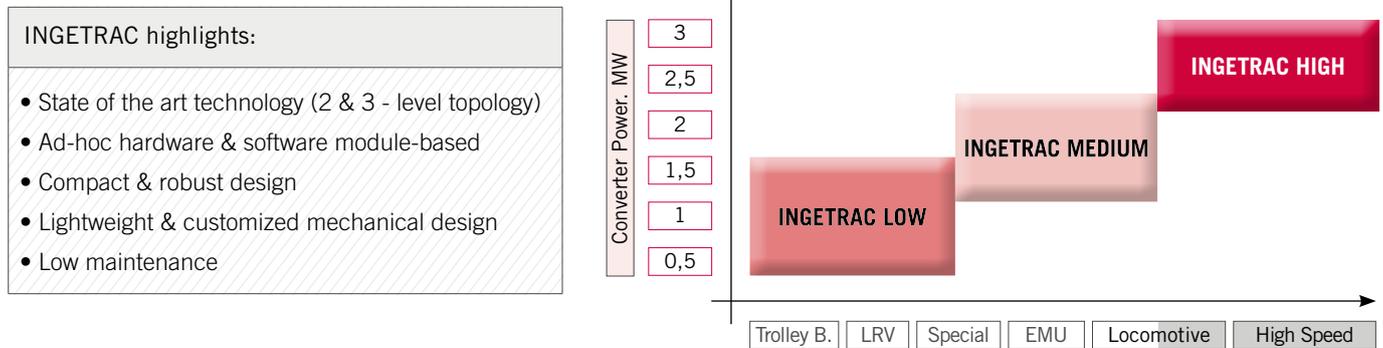
READY FOR YOUR CHALLENGES



Traction Converter Concept

Our concept is based on setting up the traction converters INGETRAC as an smart integration of extensively proved Power Modules. They are comprised of all necessary elements to be fully operational, on each required application. E.g. traction inverter, brake chopper, active front end, traction/auxiliary battery charger and auxiliary inverter when necessary.

Our experience on designing and building high power modules assures that all electrical and mechanical parts have already been proven, to assure the reliability and the quality of the complete system.



Example of possible converter configuration based on modules

For HS (E.g. TR0100)

Line Voltage: 25 kV / 3kV
 Power: 2.4 MW
 Auxiliary Power: 3 x 250 kVA
 Dimensions: 2,850 x 1,050 x 2,048mm
 Weight: 2,500 kg
 Cooling: Liquid
 Temp. Range: -30°C / 50°C

For Locomotives (E.g. TR0700)

Line Voltage: 3kV
 Power: 2.8 MW
 Auxiliary Power: 200 kVA
 Dimensions: 2,300 x 1,050 x 2,048mm
 Weight: 1,500 Kg
 Cooling: Liquid
 Temp. Range: -30°C / 45°C

Control Module ELECTRA

ELECTRA control, manages logic and regulates the variables needed for the whole traction system to operate, fulfilling the most severe requirements of the railway sector (EN 50155 certified).

The Control Module is formed by main TCU, this is optimized for controlling IGBT based inverters / choppers, and a Computer Module is in charge of diagnostic and data logging functions.



Main functions	Control of Power Modules Protections Communication (CAN, MEVB, Ethernet) Measurements of encoders I/O fiber optics Remote connection Slip/Slide Control Traction cut off
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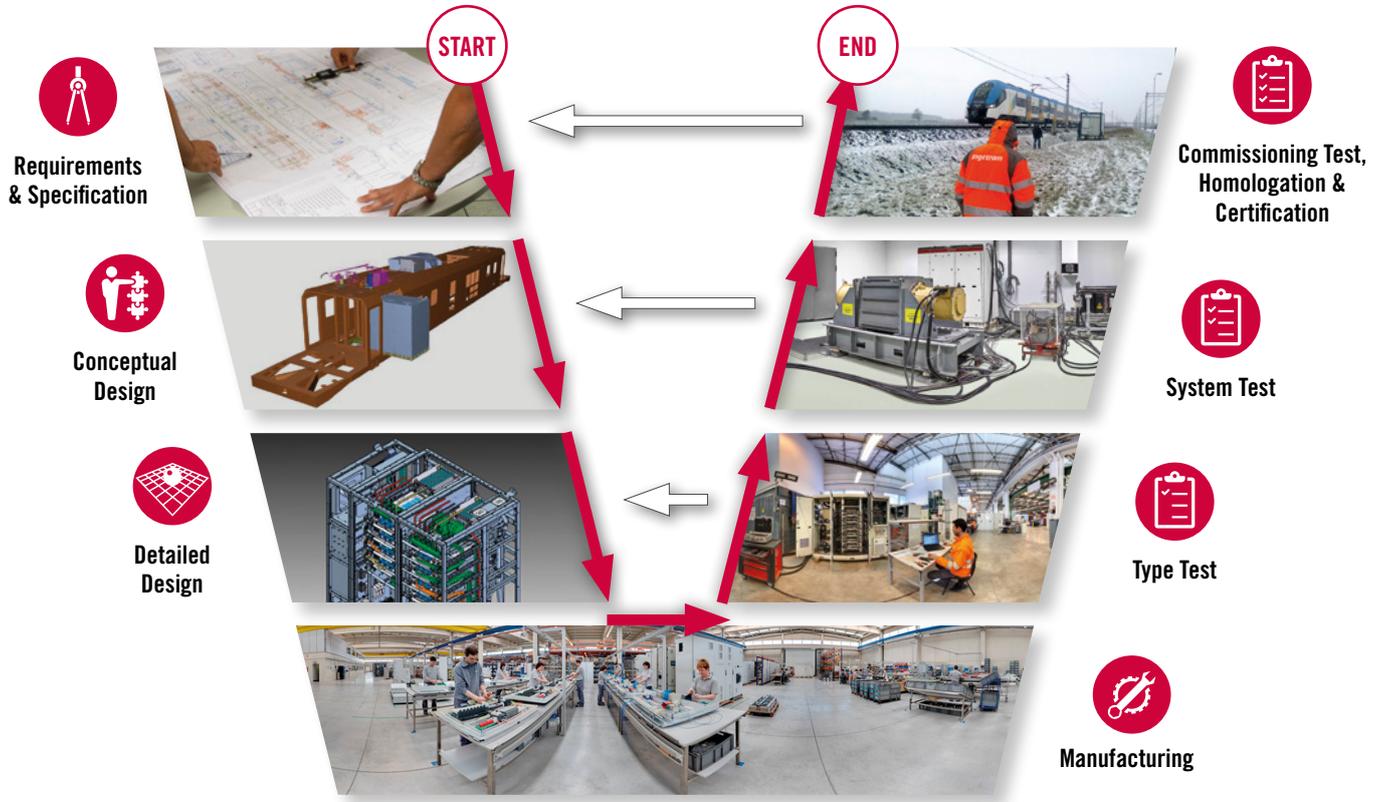
Additional functions	Preventive maintenance Self-diagnosis of problems Analysis of energy balance on-line Control of power factor Registers of working conditions
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Approach to Projects

Our vocation is to work side-by-side with our customers, developing the complete and optimal system solution.

Throughout this process, we carry out all the simulations & tests required to guarantee the correct specification of all embedded electrical systems. This will assure a successful integration into the vehicle's engineering.



Benefits for your projects:

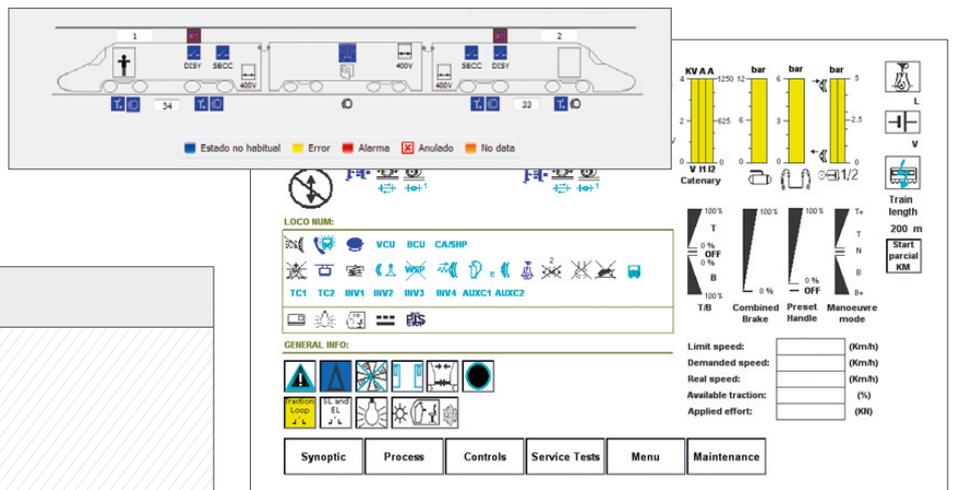
- Quality: ISO/TS 22163 + ISO 9001:2015
- Possibility of full traction chain specification
- GATES project management methodology
- Engineering capacity, incl. TCMS



Maintenance

INGETRAC modular solutions and their integration guarantee an easy performance of all preventive and corrective maintenance tasks without the need for special tools.

Our INGETEAM licensed software allows free access to traction system parameters for diagnosis and data analysis providing a comprehensive maintenance solution.





Main References: INGETRAC High Power



DIESEL-ELECTRIC LOCOMOTIVES
Poland

Power: 2.4 MW



HIGH SPEED POWER HEADS
Uzbekistan

Power: 2.4 MW



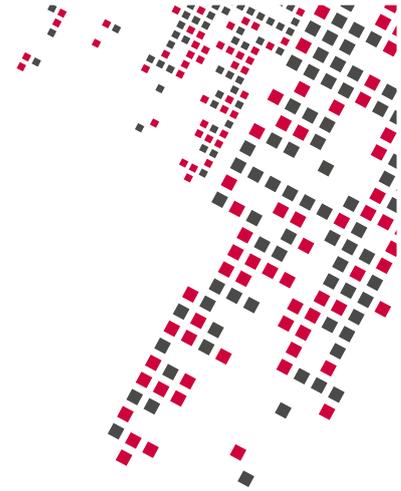
ELECTRIC LOCOMOTIVES
Poland

Power: 5.6 MW



MULTIVOLTAGE HS LOCOMOTIVE
Spain

Power: 3.6 MW



Key Technology Assets

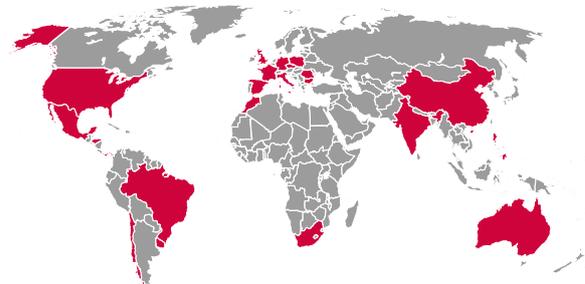
- INGETEAM Group in-house R&D resources
- One of most advanced power laboratories in Europe (up to 13 MW)
- Test facilities for the complete traction chain system test validation (EN61377)



Worldwide Presence

Internationalization is a vehicle for future progress.

At present we have production, commercial and service establishments in more than 22 countries.



Ingeteam

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