

INGETRAC

Power Converters

High Power | Medium Power | **Low Power**

Traction Technology applied in Ad-hoc Client Solution

Ingeteam

READY FOR YOUR CHALLENGES



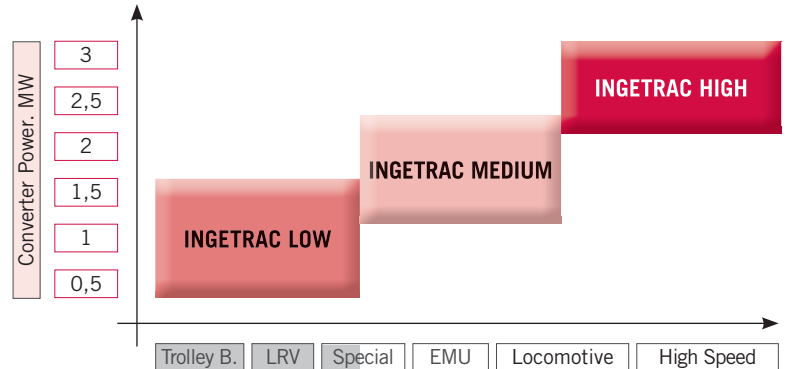
Traction Converter Concept

Our concept is based on setting up the traction converters INGETRAC as an smart integration of extensively proved forced-air or liquid cooled Power Modules. They are comprised of all necessary elements to be fully operational, on each required application.

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

INGETRAC highlights:

- State of the art technology
- Ad-hoc hardware & software module-based
- Compact & robust design
- Lightweight
- Low maintenance



Example of possible converter configuration based on modules

For Shunting: Under-frame (E.g. TF 0630)

Line Voltage: 750 V DC (third rail); Battery
 Power: 800 kW
 Auxiliary Power: 125 kVA
 Dimensions: 3,200 x 1,730 x 700 mm
 Weight: 2,500 kg
 Cooling: Forced Air
 Temp. Range: -30° / 40°C

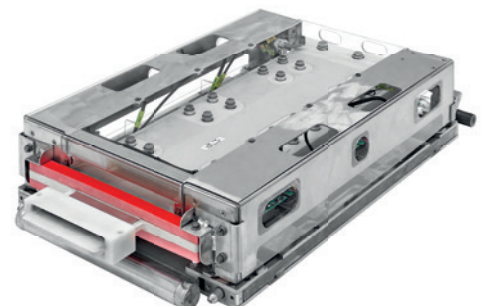
For Maintenance: On-board (E.g. TR 0890)

Line Voltage: 25 kV AC; 1.5 kV
 Power: 1 MW
 Auxiliary Power: 2* 87 kVA
 Dimensions: 1,300 x 1,900 x 2,070 mm
 Weight: 1,950 Kg
 Cooling: Water
 Temp. Range: -40°C / 60°C

Basic Power Module

This Basic Power Module for Low Power INGETRAC is prepared with different integration strategy. Its approach, which assures higher modularity concept maintaining high reliability, cost effectiveness and low maintenance, once integrated. It could be mixed and used e.g. as for traction, auxiliary inverter, AFE, alternator module... The rest of converter elements as ELECTRA, traction capacitors, cooling circuit, etc... is integrated directly in the traction converter.

Main Characteristics	
	Maximum Power: 500 kW
	Input Voltage: 1.8kV DC
	Output Voltage: 0-1,404 Vrms
	2-level topology [IGBT 3.3kV]
	Weight: 33 kg
	Dimensions: 823 x 455 x 186 mm
	Liquid Cooled

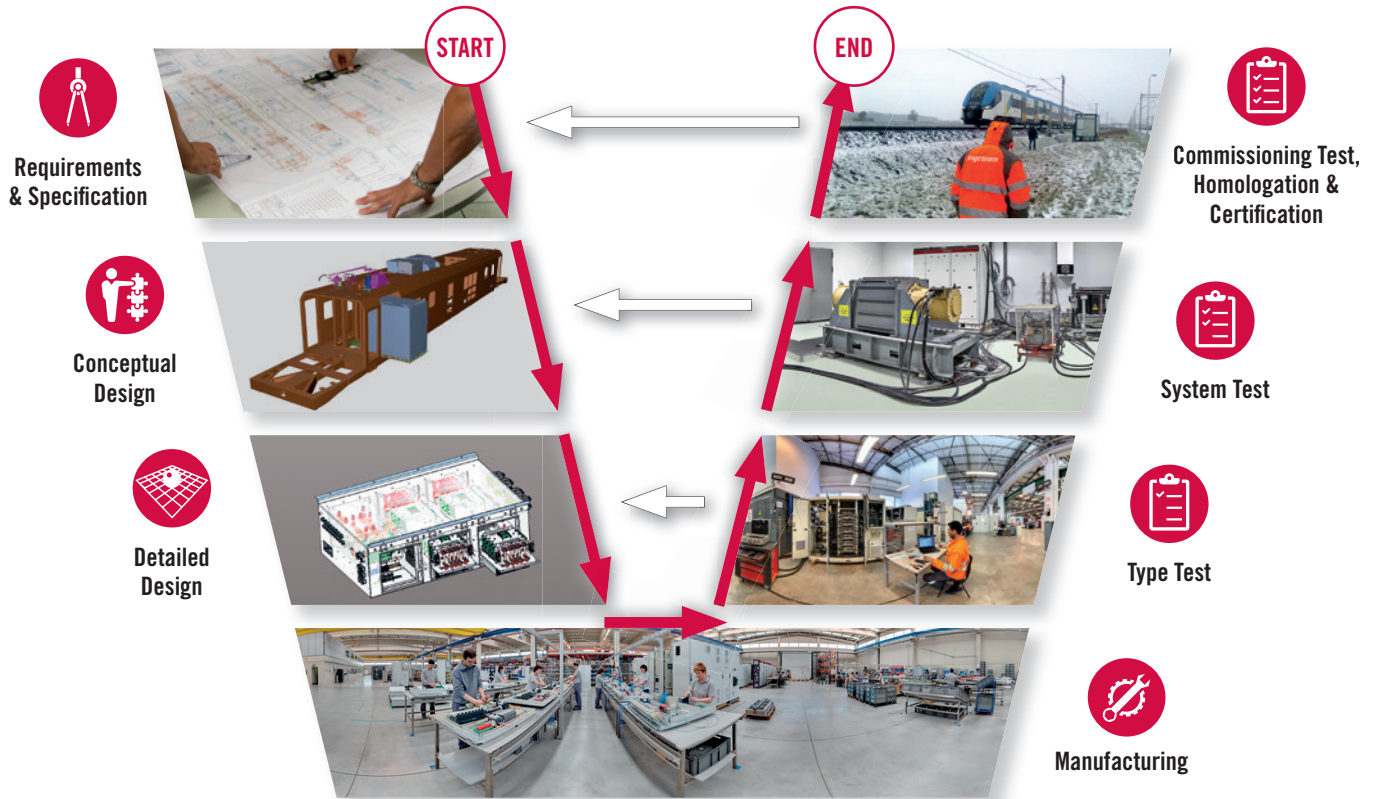




Approach to Projects

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:

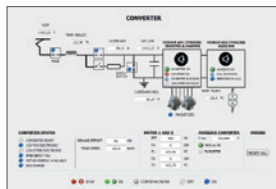
- Quality: ISO/TS 22163 + ISO 9001:2015
- Possibility of full traction chain specification
- GATES project management methodology
- Engineering capacity, incl. TCMS



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.



Key factors:

- Low operating Life Cycle Cost (LCC)
- Predictive Maintenance (PdM)
- Maximum availability
- Focused on safety and reliability



Main References: INGETRAC Low Power



**Shunting Vehicle
Germany**

Power: 800 kW



**Maintenance Vehicle
Finland**

Power: 800 kW



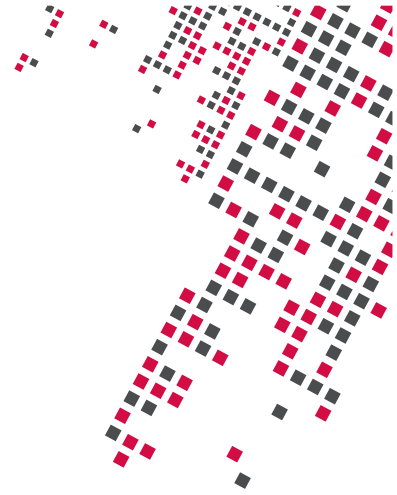
**Tramways
Spain**

Power: 500 kW



**TrolleyBus
Mexico**

Power: 500 kW



Key Technology Assets

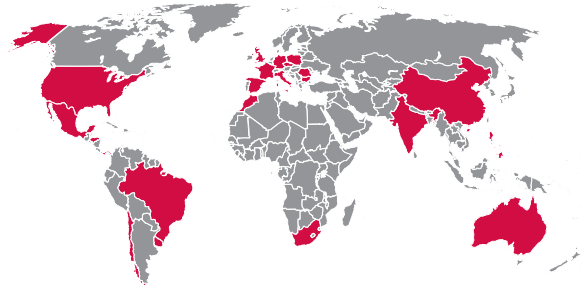
- INGETEAM Group in-house R&D resources
- One of most advanced power laboratories in Europe (up to 13 MW)
- Test facilities for the complete traction chain system test validation (EN61377)



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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