

Ingeteam

READY FOR YOUR CHALLENGES

www.ingeteam.com

Ingeteam
READY FOR YOUR CHALLENGES

Ingeteam highlights

- In-house technology for:
 - Motors and Generators
 - Frequency Converters
 - Control & Automation
- Highlights:
 - 3900 + professionals
 - Back-to-Back Testing up to 43 MW
 - Subsidiaries in 22 countries
 - 2019 R&D Investment:
> 5,5% of Group´s Turnover



INGEDRIVE™ Own technology

BPM

Basic Power Module

+



- Compact designs
- Modularity and easily maintainable
- Different semiconductors:
 - LV -> IGBTs
 - MV -> HV-IGBTs / IGCTs



INGEDRIVE™

Frequency Converters

INGEGRID™

FACTS & Custom Power

INGECON™

Wind Converters



CCU

Converter Control Unit

&

+

PMM

Power Management Module



- Single drive.
- Multi drive.
- Inverter.

Great commonality with a very large installed base

Certifications



COMPANY CERTIFICATES

ISO 9001



ISO 14001



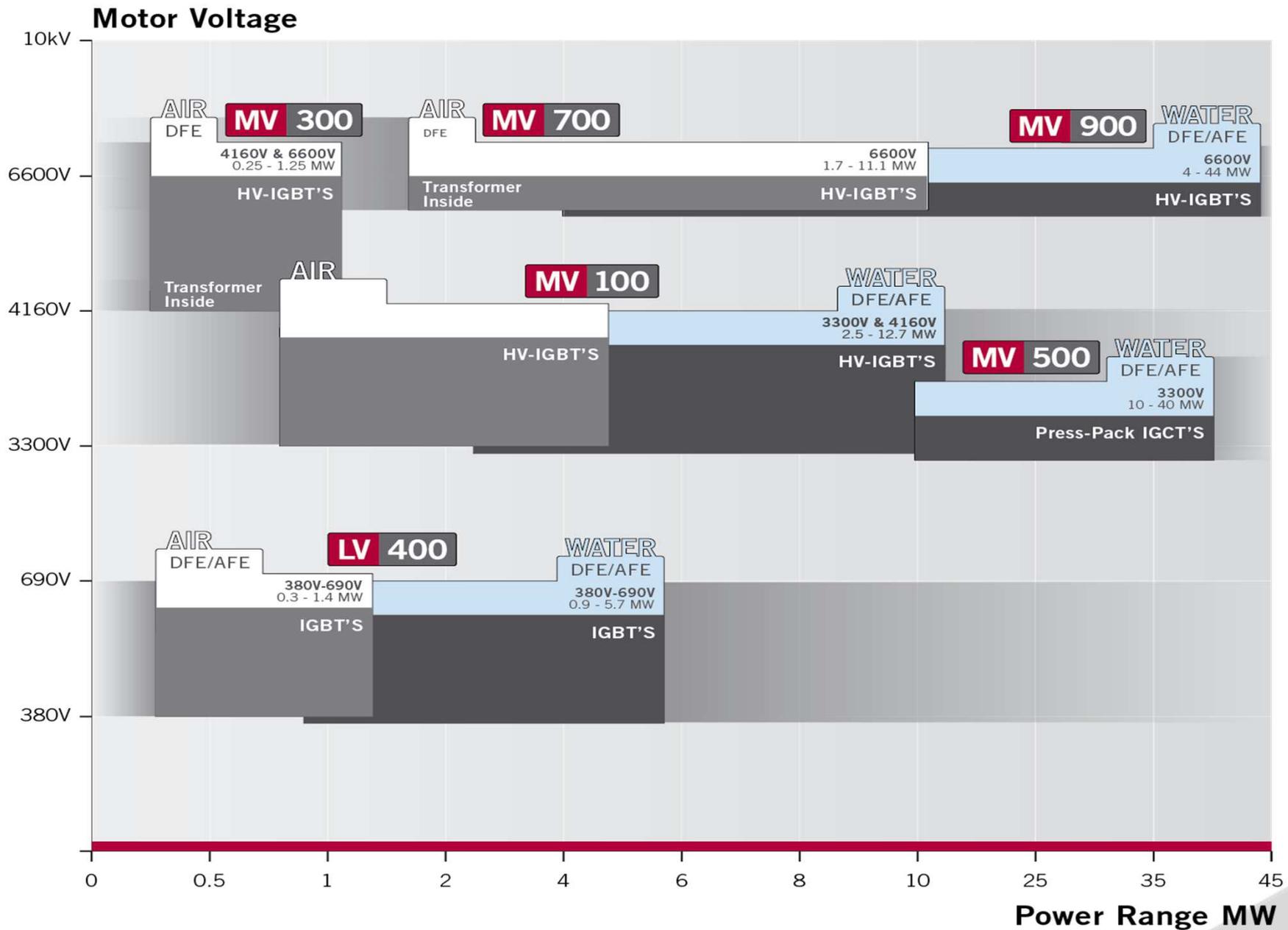
OHSAS 18001



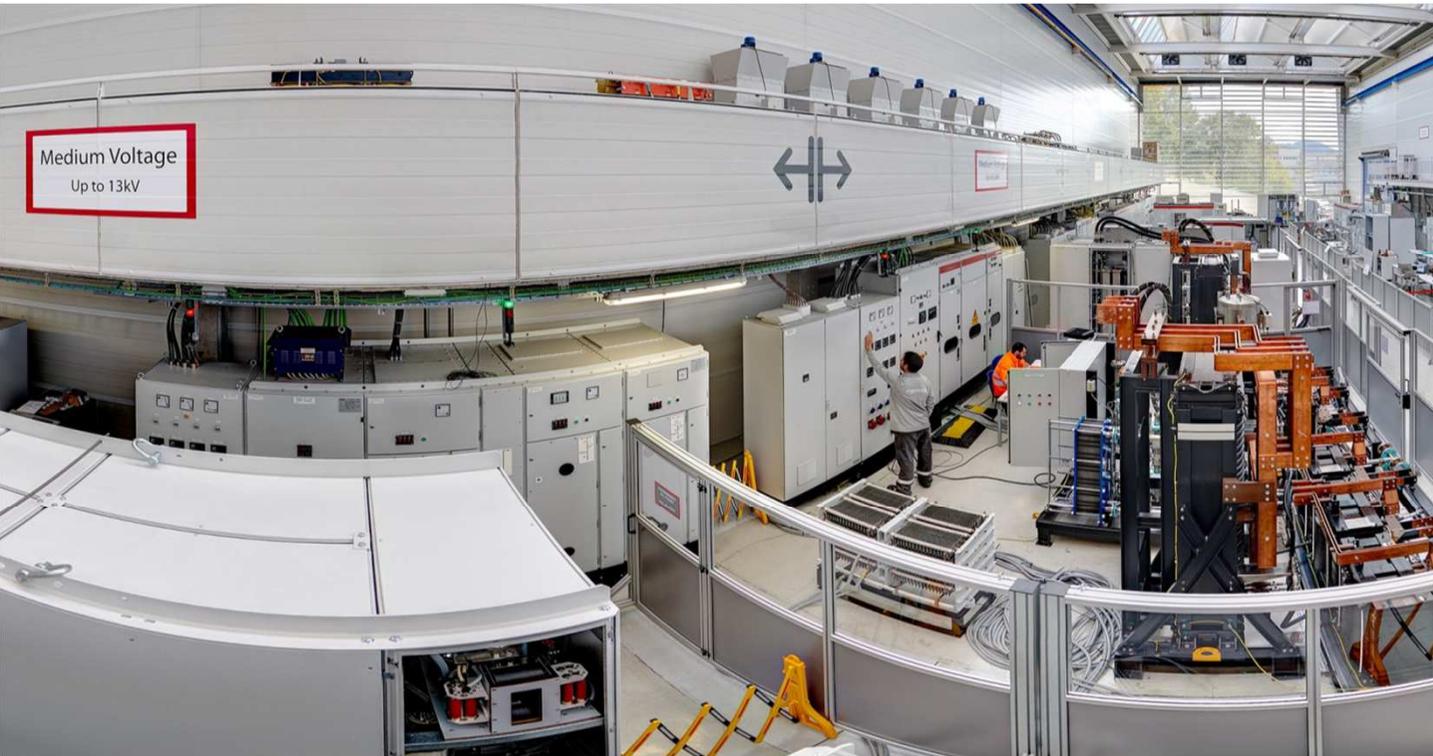
PRODUCT CERTIFICATES



INGEDRIVE™ Product Range



High Power Electronics Laboratory



- **High Power Electronics** laboratory for **R&D** and **special projects**
- Test Area: 3000 m²
- Test up to **30MVA @ 6.6kV_{AC}** converters

- **Key Component Testing**
- **Power Stack Testing**
- **Power Converter Testing**

Electrical Motor Laboratory



- **200 m² testing floor** over a **seismic mass** of 1600 Ton (126 Ton crane)
- **2 Driving machines**
 - ✓ 4MW supplied via 690V PWM from 1000 to 2500 rpm
 - ✓ 9MW supplied via 3.3kV PWM from 450 to 1500 rpm
- Torque meter to measure **efficiency** directly

Converter & Motor Combined Load Testing

43 MW active power in back-to-back configuration

Production facilities



EUROPE (SPAIN)

Power Converter,
Control Panels

Sesma (Navarre)
Zamudio (Bizkaia)
Trapaga (Bizkaia)

Employees: 330
Usable Floor Area: 7000 m²
Capacity: 4500 MW



BRAZIL

Power Converter,
Control Panels

Campinas
(Sao Paulo)

Employees: 105
Usable Floor Area: 5250 m²
Capacity: 4500 MW



USA

Power Converter,
Control Panels,
Generators

Milwaukee
(Wisconsin)

Employees: 130
Usable Floor Area: 4500 m²
Capacity: 1800 MW

New Production facilities in 2019



**EUROPE
(SPAIN)**
INGEDRIVE
Power Converters

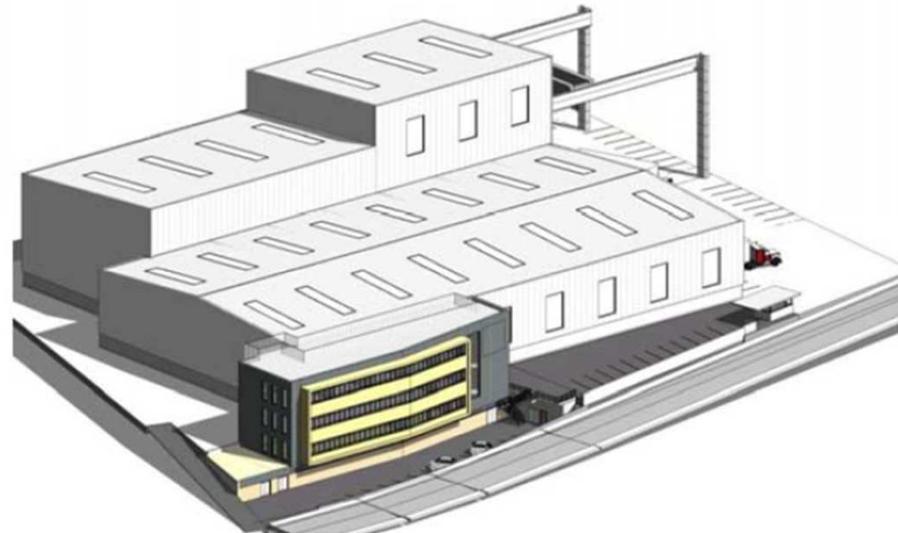
Ortuella (Bizkaia)

Employees: 80

Production Floor Area: 5000 m²

Offices Floor Area: + 1600 m²

Capacity: 2000 MW



INGEDRIVE™

Marine Converters

Ingeteam is a fully independent supplier of **INGEDRIVE™** advanced frequency converters for use in propulsion & auxiliary applications for all type of vessels. Our customers are system integrators, shipyards, shipowners & OEMs, whether internal or external to the Ingeteam Group



INGEDRIVE™

Main Milestones

More than

230 
vessels

More than

900 
frequency converters

1972: Founding of Ingeteam

1980: Design and Manufacture of DC Drives

1996: 1st AC Drive (Ingedrive LV400)

2000: 1st Marine LV400 Drive (Air cooled AFE)

2003: 1st Marine MV100 Drive (Water cooled DFE)

2006: Launching of new LV400 water cooled family

2008: 1st Marine MV500 Drive (Water Cooled DFE)

2011: Launching of new MV100 Drive (Water cooled AFE/DFE)

2013: 100th vessel driven by INGEDRIVE™

2017: More than 200 vessels driven by INGEDRIVE™

2019: More than 230 vessels driven by INGEDRIVE™



INGEDRIVE™

Marine Converter Solutions



1. Main and Auxiliary Propulsions
2. Dredgers
3. Silent Propulsion for Research Vessels
4. Hybrid Electrical Drives. PTI/PTO
5. Battery integration on diesel – electric ships
6. On-Shore Power Supply
7. Special Ships
8. Passenger Vessels

INGEDRIVE™

Hybrid electrical Drives [Topologies PTI / PTO Concept]

Grid Side

AFE for dual functionality

Circuit Breaker included

Filter included for IEEE519 and IEC60092 compliance

Short time overload capability: up to 300%
2 seconds

Cooling

Fully water cooled. No losses to the environment IP54

Stand by pump as standard

Power Take In (PTI)



Power Take Off (PTO)

PTI/PTO Laboratory Results

M/G Side

Suitable for asynchronous, synchronous or PM machines

Optional Sinus Filter for standard machines (Retrofits)

Control

Flexible interface with customer

7" screen for operation and analysis

Remote access as standard



Main & Auxiliary Propulsions · Dredgers · Silent RV · Hybrid PTI-PTO · Battery integration · On-Shore Supply · Special Ships · Passenger Vessels

Ingeteam
READY FOR YOUR CHALLENGES

INGEDRIVE™

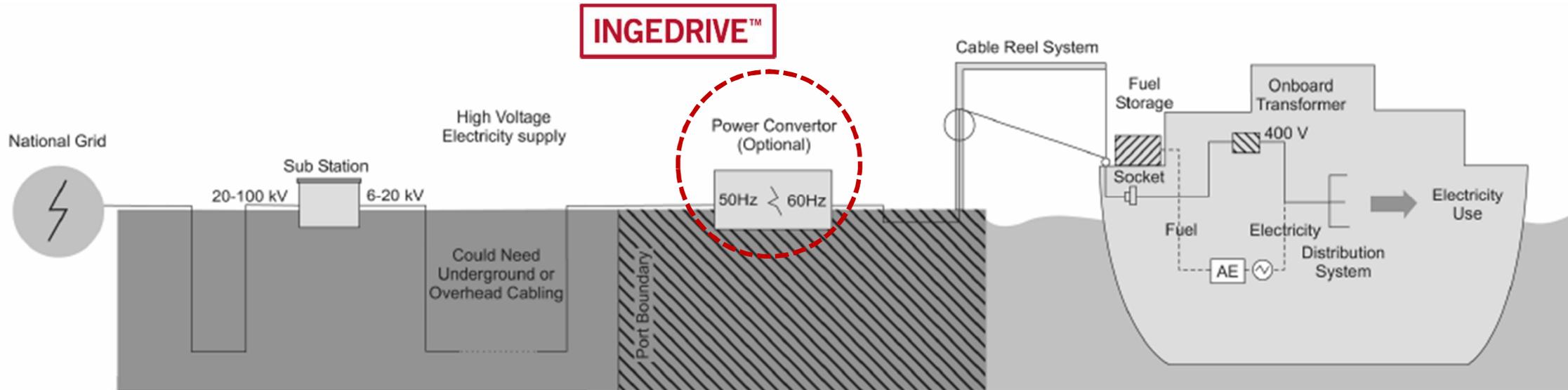
Battery integration on diesel electric ships [Advantages]

- ▶ The use of batteries as *spinning reserve* resources (Virtual Gensets) allows to *reduce number of Gensets* running in DP modes
- ▶ The use of batteries as smart *storage* load permits the operation of the connected Gensets in *better specific fuel consumption* operating points
- ▶ The use of batteries for *grid support* allows to perform *peak shaving, simplifying the connection of big DOL loads in AC*
- ▶ The use of batteries for *grid stabilization* allows to make grids stronger, avoiding possible resonances, *especially in DC grids*
- ▶ The use of batteries allows to *improve vessel dynamics*, specially when *variable speed generation* is used



INGEDRIVE™

On-Shore Power Supply



Solutions up to 4 x 11MVA



Main & Auxiliary Propulsions · Dredgers · Silent RV · Hybrid PTI-PTO · Battery integration · **On-Shore Supply** · Special Ships · Passenger Vessels

Ingeteam
READY FOR YOUR CHALLENGES

INGEDRIVE™

On-Shore Power Supply

BENEFITS On-shore Power Supply



No
Emissions



No
Noise



No
Vibration



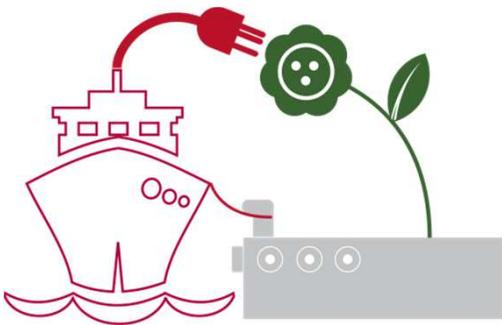
Savings in
maintenance
costs



Savings in
operation costs



Commercial
opportunities
for ports



INGEDRIVE™ services

CRS 360° Programme



Ingeteam partners with you from the beginning

INGEDRIVE™

Highlights

**CRS
360°** CUSTOMER
RELATIONSHIP
SERVICE
by *Ingeteam*



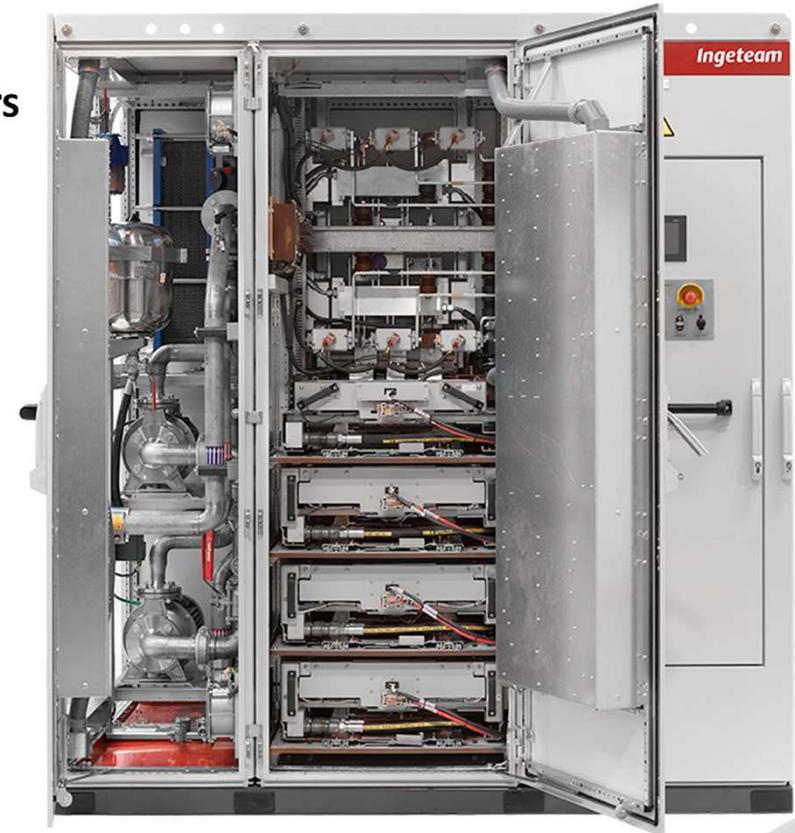
24h/7days support incl. Direct access to R&D engineers



25-yr lifecycle incl. Service + spares



**More than 35-yr experience in Drives
with in-house technology**



INGEDRIVE™ services

CRS 360° Programme



Support:

- Direct e-mail contact to Ingeteam engineers at ingedrive.support@ingetteam.com
- Telephone availability of an engineer during office working time.



Preventive Maintenance:

- Regular inspections scheduled.
- Reduces risk of failures and increases product life expectancy.



Ingewebapp Remote Diagnostic Support:

- Quickest way to receive qualified and skilled first technical assistance.
- Fast and efficient fault-finding procedure.
- Standard in all Ingedrive Converters.
- No licences whatsoever.



INGEDRIVE™ services

CRS 360° Programme



Training and learning:

- Specialist for customers training courses at Ingeteam.
- Investment in professional training improves productivity.



On-Site Technical Support:

- Skilled engineers will support customer on-site for troubleshooting and technical assistance.
- Quick reaction time.



Emergency Technical Support:

- 24/7 immediate phone access to a specialized engineer with problem-solving capabilities.



INGEDRIVE™ services

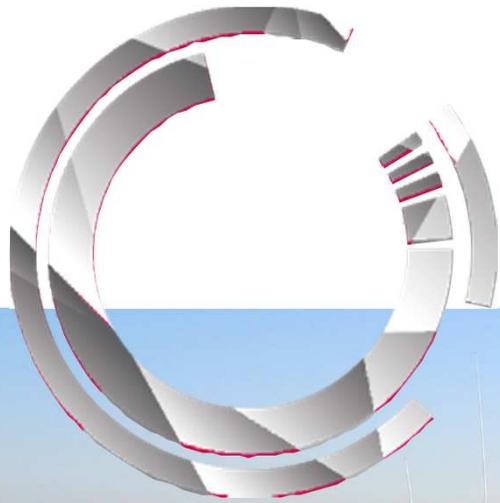


25 year Life Cycle



- The product is available with all of its services
- The product is available only for extensions, retrofit, replacements and/or repairs
- Improvements in the design and new functionalities are added
- Replacements and repairs depending on the availability of materials
- The replacement with a new Ingeteam equipment is recommended
- It is not possible to guarantee its manufacture or repair due to technical reasons or at a reasonable cost
- The replacement with a new Ingeteam equipment is recommended





INGEDRIVE™
Marine References



INGEDRIVE™ By the numbers

Over 2 GW Installed



30

Years of Experience
In Power Electronics



230

Vessels with INGEDRIVE
Power Converters



22

Presence In Number
of Countries



3

Production across
Number of Continents



3,900

Employees Worldwide



5,5%

Annual Investment
of Turnover In R&D



Track – record global marine

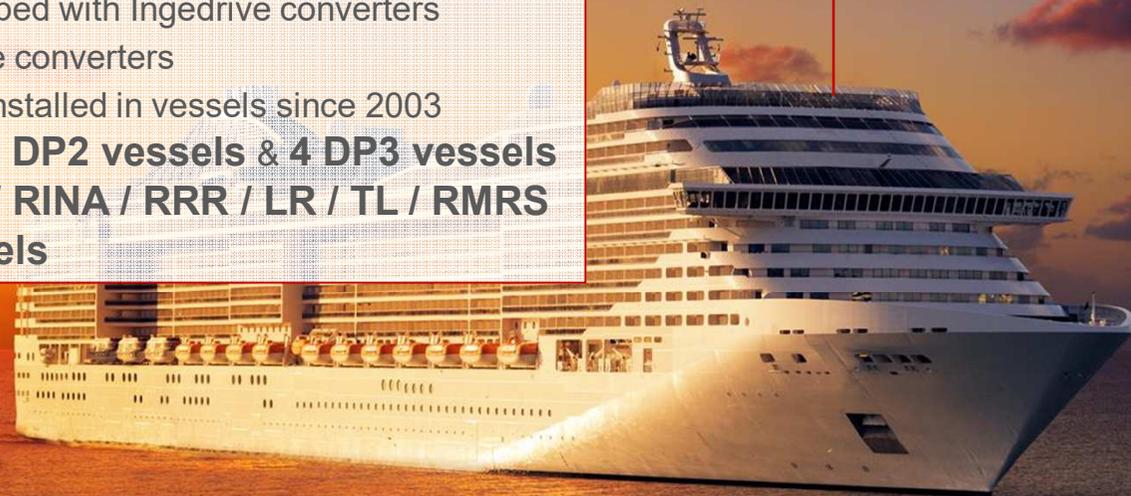
- More than **128 vessels** with transformerless LV400 AFE drives since 2000
- **50 vessels** with **Ulstein** Power and Control since 2010
- **25 Jan de Nul** vessels equipped with Ingedrive converters
- **10 research vessel** complying with **ICES209**
- **4 wind turbine installation vessels** equipped with Ingedrive converters
- **28 dredging** vessels equipped with Ingedrive converters
- **64 Medium voltage** frequency converters installed in vessels since 2003
- Ingedrive converters supplied for more than **50 DP2 vessels & 4 DP3 vessels**
- Clasification societies: **DNV-GL / ABS / BV / RINA / RRR / LR / TL / RMRS**
- **38** converters supplied for **passenger vessels**

More than

900



frequency converters



Ingeteam

READY FOR YOUR CHALLENGES

Variable Speed Drives [VSD]

Why leading companies like yours are partnering with us?



PRODUCT RANGE:

We offer a comprehensive range of proven and reliable electrical equipment for many sectors.



R&D:

We are committed to innovation and development of full in-house technology.

R&D expenditure accounts for 6% of net sales.



FLEXIBILITY:

Our engineering teams can provide you with flexible solutions tailored to meet your project needs.



WORLDWIDE:

We have manufacturing facilities and service centers strategically located in Europe, Asia, North and South America to deliver the most efficient support and service to you.



EXPERIENCE:

We have 20+ GW of installed power capacity worldwide and 20+ years of experience in the Industry.



PARTNERSHIP:

We are partners, providing you active support for each specific project throughout the entire product life cycle.

Our partners

