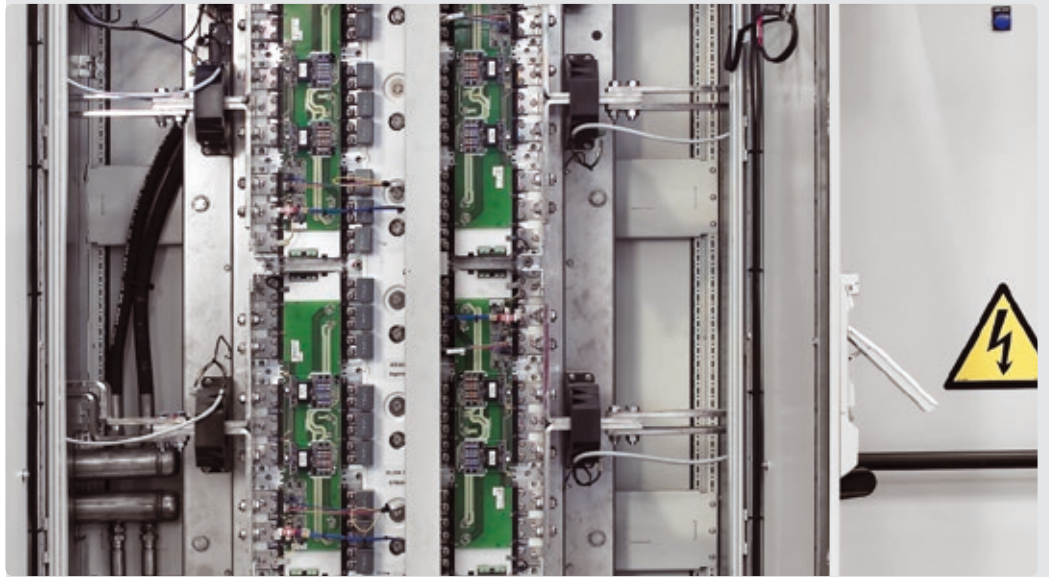
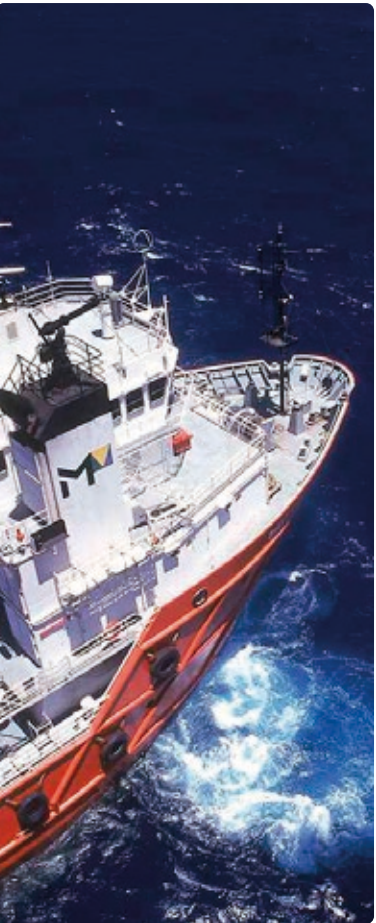


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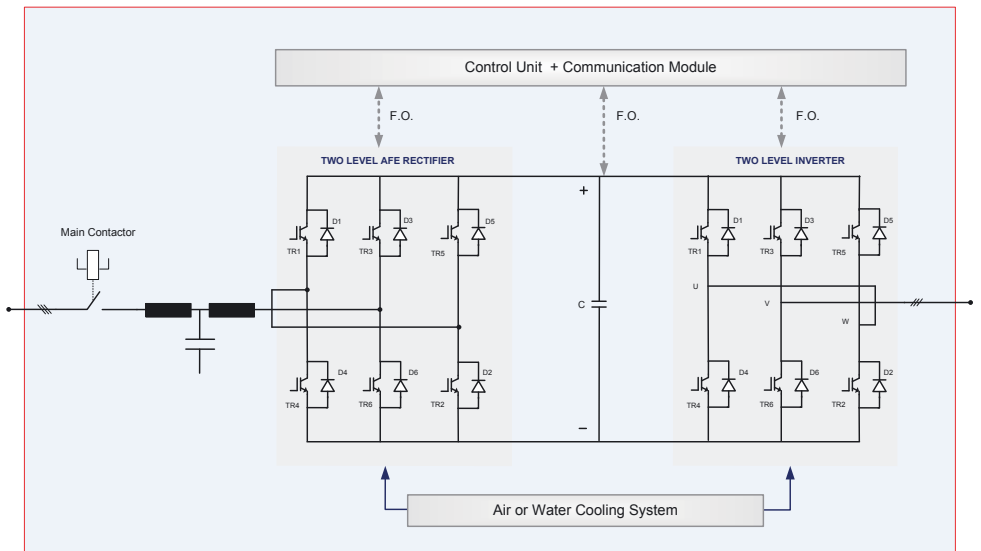
LV 400

Frequency converters
air or water-cooled, low-voltage



The **LV400** series of the INGEDRIVE™ converter range is composed of low-voltage frequency converters. They are designed to control induction, synchronous or permanent magnet motors in a wide range of industrial and marine applications. Its modular design makes it possible to encompass a wide range of powers and voltages while its intuitive structure facilitates its use and maintenance. The whole Ingedrive converter range offers a powerful configuration tool enabling the user to view and parameterise drives both locally using the touch screen and remotely via an Ethernet connection.

with IGBT Power Semiconductors



Applications:

Metals, water treatment, cement,
oil&gas, power generation, chemical and
marine

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Ingeteam

General data	
Inverter Type Rectifier Type	Two-Level Voltage Source Inverter with LV-IGBT Power Semiconductors Diode Front End (DFE) 6P Diode Front End (DFE) 12P Active Front End (AFE)
Main Supply Voltage Range Output Power Range ⁽¹⁾	380 - 480 V AC 500 kVA - 2300 kVA (Water Cooled) 250 kVA - 1250 kVA (Air Cooled)
Supply Voltage Tolerance Supply Frequency Input Power Factor	500 - 690 V AC 500 kVA - 6500 kVA (Water Cooled) 250 kVA - 1500 kVA (Air Cooled) Typically ±10 % 50 / 60Hz (± 5%) 0.91 to 0.96 for DFE rectifiers 1 for AFE rectifiers 0 to supply voltage
Output Voltage Output Frequency Efficiency at Rated Load	0 to 120Hz (higher on request) Typically > 0.97 for DFE rectifiers Typically > 0.96 for AFE rectifiers
Motor Types Converter Cooling	Induction, Synchronous or Permanent Magnet Motor Air Cooled Water Cooled with Built-In Water to Water Heat Exchanger
Control properties	
Control types Static Speed Acc. (closed loop) ⁽³⁾ Static Torque Acc. (closed loop) ⁽³⁾ Static Torque Acc. (open loop) ⁽³⁾	Vector Control (VC), Voltage Frequency Control (VF) ⁽²⁾ < 0.01% in field weakening / < 0.01% in constant flux < 1% in field weakening / < 1% in constant flux < 2% in field weakening / < 2% in constant flux (for synchronous motors) < 5% in field weakening / < 3% in constant flux (for induction motors)
Torque Response Time Shaft Torque Ripple ⁽³⁾ Drive Protection Functions	< 10ms ± 1 % Overcurrent, overvoltage and undervoltage monitoring; earth fault; short-circuit detection and protection; semiconductor failure monitoring; cooling supervision; phase loss and others
Motor Protection Functions	Overload ⁽⁴⁾ , overspeed
Environmental cond.	
Ambient Temp. for Storage Ambient Temp. for Transport Operation Altitude	-15 °C to +75 °C (for empty cooling system in water cooled version) -15 °C to +75 °C (for empty cooling system in water cooled version) < 1000m above sea level (100% load capacity) > 1000m above sea level (with derating)
Relative Air Humidity Paint Colour	5% to 95% (condensation not permitted) RAL 7035 (others on request)
Compliance with Standards	IEC 61800-2, IEC 60146-1-1, marine standards
Air cooled converter	
Noise	< 80dB (A) at a distance of 1m from the cubicle
Ambient Temp. for Operation	+0 °C to +40 °C (higher with derating)
Degree of Protection	IP23 (others on request)
Water cooled converter	
Noise	< 75dB (A) at a distance of 1m from the cubicle
Ambient Temp. for Operation	+0 °C to +45 °C (higher with derating)
Degree of Protection	IP44 (others on request)
Primary Circuit Coolants Allowed	Seawater or freshwater
Primary Coolant Temp. Allowed	+0 °C to +38 °C (higher with derating)
Primary Circuit Pressure Drop	< 1bar
Max. Primary Service Pressure	6bar
Max. Primary ΔT	5 °C
Secondary Circuit Coolant	Controlled pre-mixed liquid (fresh water < 10μS/cm + anti-freezing)
Secondary Circuit Features	Redundant pump
Options	
Main Options	Dynamic braking chopper, different communication modules, dv/dt filter, sinusoidal filter, input/output isolation switch, marine customization and others

(1) Power rating are defined for 400V and 690V converters

(2) Only for induction motors and quadratic torque loads. No speed sensor needed

(3) Refers to maximum values of equipment

(4) Depends on electrical characteristics