

GE
Power Conversion

MV7000 Press Pack (PP)

Reliable, high performance
medium voltage drive



ecomagination



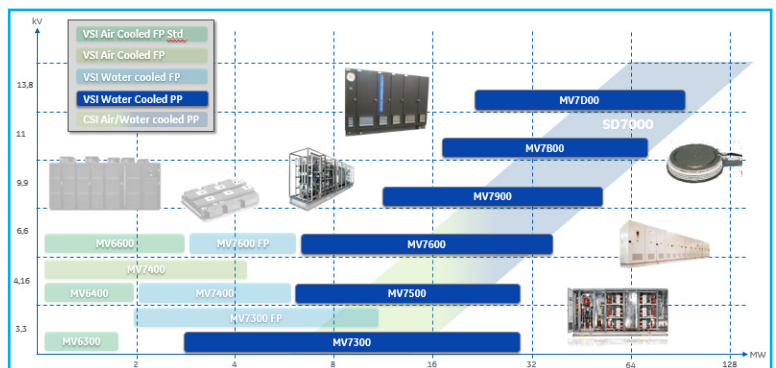
The next generation of drive technology

Cutting-edge power electronics technology and decades of process expertise come together in the MV7000 — a world-class water-cooled medium voltage drive suitable for a wide range of power conversion applications. Easy to install and maintain, the drive offers high reliability and availability and helps increase the uptime of critical processes. The MV7000 provides a flexible approach to achieve a customized solution across different applications.

With the MV7000 PP our power conversion expertise helps increase operating efficiency, power availability, plant throughput, operational precision, and process yield. We are helping our customers meet the demands and opportunities of the new electric age.

Benefits

- Peak power density — our drive can deliver up to 15MW with just 18 IGBTs, which is equivalent to a power density of 1.5MVA/m³
- High reliability and availability — over 14 million hours in operation across an installed base of over 15+GW
- Power scalability with à la carte option packaging that can be adapted to a wide range of applications
- Standard configurations for improved delivery time and reduced price
- A full family of drives — GE is your one-stop provider with a wide portfolio of drives



The MV7000 PP belongs to GE's wide range of drives for all applications.

Advantages of a medium voltage variable frequency system

Reliability & availability

The higher reliability and lower maintenance needs of a variable speed drive system compared to gearboxes and hydraulic couplings result in lower lifecycle cost.

Short repair times thanks to optimized design also directly improve customer system availability.

Saving energy, caring for the environment

In today's world more than ever, energy saved is energy produced. For a variety of loads, from water pumps to gas compressors, variable speed control

offers the best way to capture energy savings.

The introduction of variable speed drives in customers' systems when they are upgraded directly improves efficiency, which answers to the latest regulations' requirements.

Precise power delivery

In many applications, the superiority of electrical control simply cannot be matched by mechanical systems. Precise control of power means better outcomes, from the flatness of a steel sheet to the accuracy of offshore Oil & Gas exploration.

Variable frequency drives can be used in a variety of industries and applications

Industry sector	Applications
Oil and gas	eLNG trains, injection compressors and pumps, gas storage, multiphase pumps, pipeline compressors
Marine	Cruise ships, LNG carriers, offshore drilling vessels, research vessels, megayachts, merchant vessels, navy support vessels
General and heavy industry	Metal rolling mills, test benches, grinders, water pumps, mine winders, crushers, ID fans, FD fans, wind turbines, static frequency converters, boiler feed pumps, STATCOM (rail, wind, utilities)

MV7000 — Enhanced technology

Key benefits

- Peak power density
 - High reliability and availability
 - Power scalability with customizable options featuring:
 - Low harmonics without additional equipment
 - Four quadrant operation for regenerative applications
 - Transformerless design for compactness
 - Common DC bus system for energy savings
 - High performance process control
 - Visor Connect supports warranty with remote real-time support and advice
 - Front access maintenance
- Simplified cooling system architecture and gate drive power supply topology
 - Fuseless design

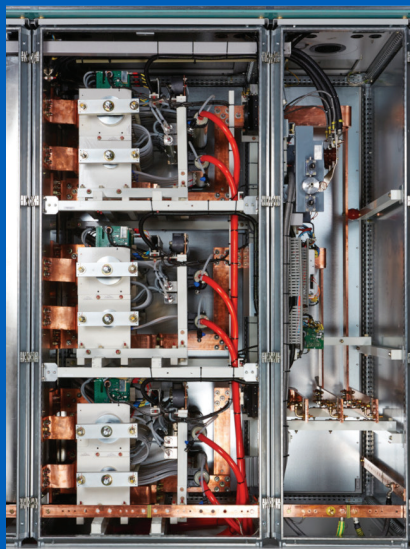


Power stack

Best-in-class power density

The phase power stack is the main modular building block of the three-level inverter.

- Compact enclosures thanks to double sided cooling of the IGBTs
- Just 18 IGBTs at 3.3kV can deliver 15MW
- Control hardware mounted on a slide in/out frame
- Inverters can be mounted against walls or back to back



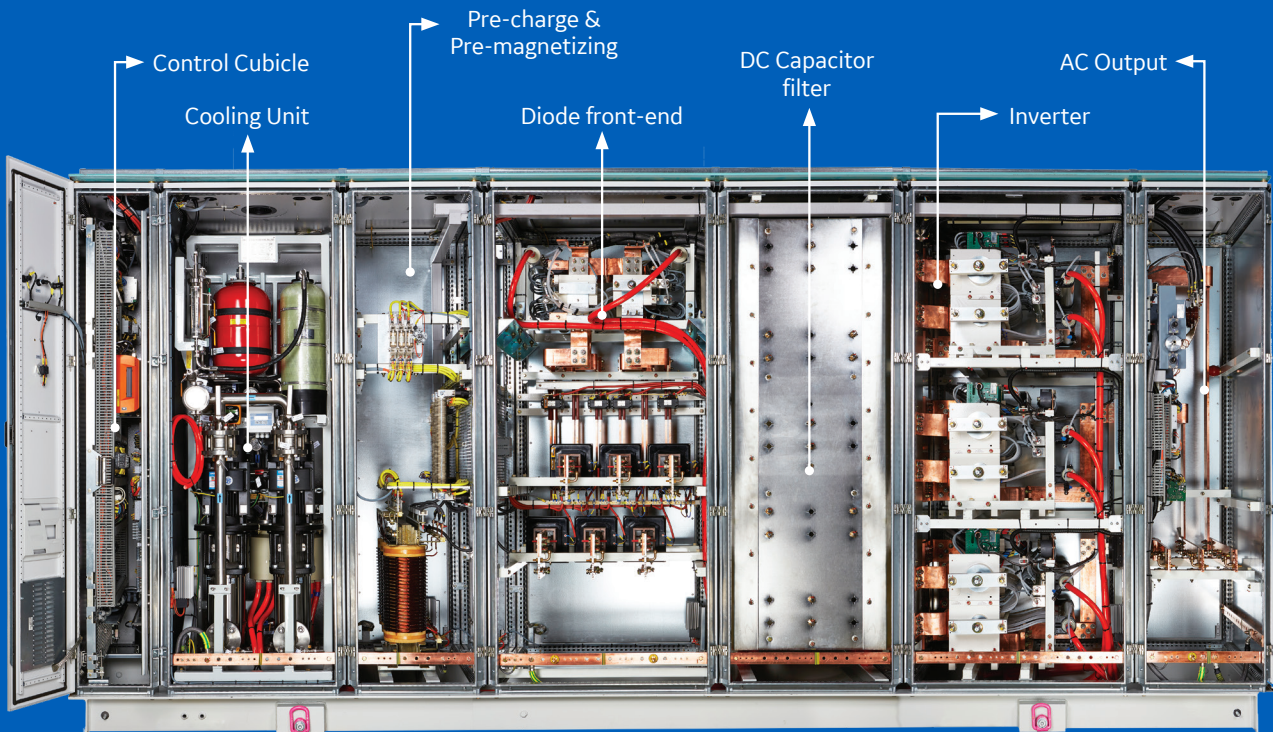
Inverter cubicle

High reliability and availability

The MV7000 is a great example of a design philosophy based on minimizing component count while retaining peak performance. Press-pack IGBT (PPI) power devices enable:

- The capability to limit overcurrent with safe turn-off under all operating and failure conditions
- Case rupture-free due to pressed contacts and no-wire bonding

- N+1 series redundancy thanks to the capability of PPI for continuous conduction under failure mode
- Long life expectancy even under load cycling
- Effective performance even at low motor frequency operation



Inside look at the MV7000

Power scalability with customizable options

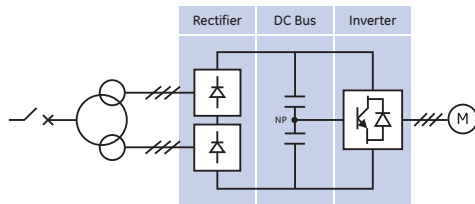
The MV7000 PP drive comes in a standard Diode-Front-End (DFE) rectifier configuration.

Low harmonics without additional equipment

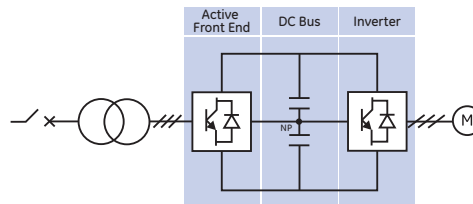
- Available in 12, 24 and 36-pulse configurations
- Low levels on harmonics – IEEE 519 compliant
- No additional filters necessary
- Fully able to handle faults such as voltage dips
- For regenerative applications, an active-front-end (AFE) is available

Four quadrant operation for energy savings

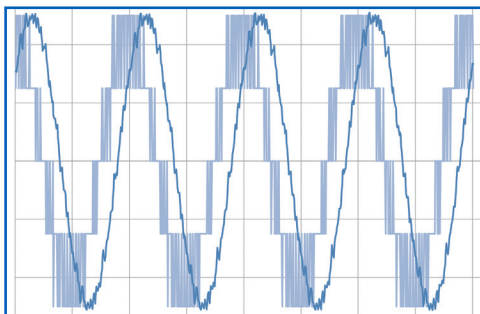
- Regeneration of the energy to the network through IGBT bridge
- Sinusoidal input with negligible harmonics
- Unity power factor for cable losses reduction
- Reactive compensation on network side



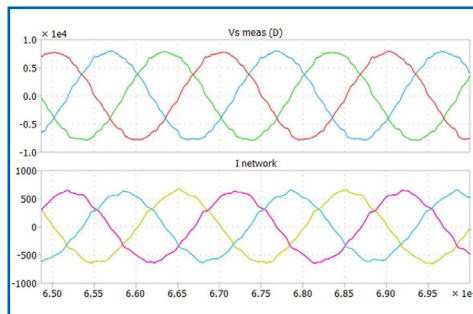
Diode front-end



Active front-end



Output voltage and current

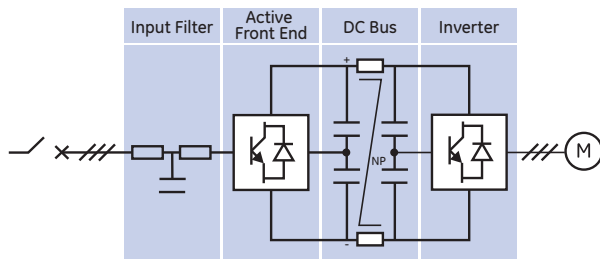


Ph-Ph voltages and line currents at common point of coupling

Transformerless design for compactness

The MV7000 is available in transformerless design

- AFE with additional input filter to reduce line harmonics
- Big savings in capital cost, installation cost and footprint
- Increased overall system efficiency and reliability



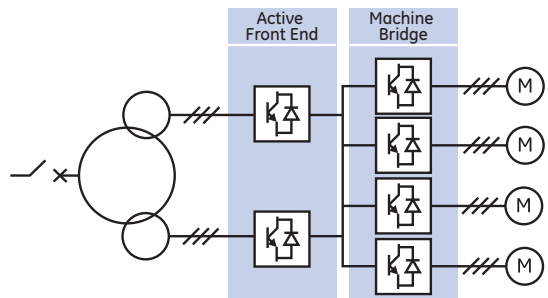
Transformerless design

Common DC bus system for energy savings

For multi-drive applications, a common DC link system is available

- Shared Active-Front-End rectifier configuration

- Saves energy by the redistribution of power from braking
- Reduction in overall equipment cost, operating cost and footprint

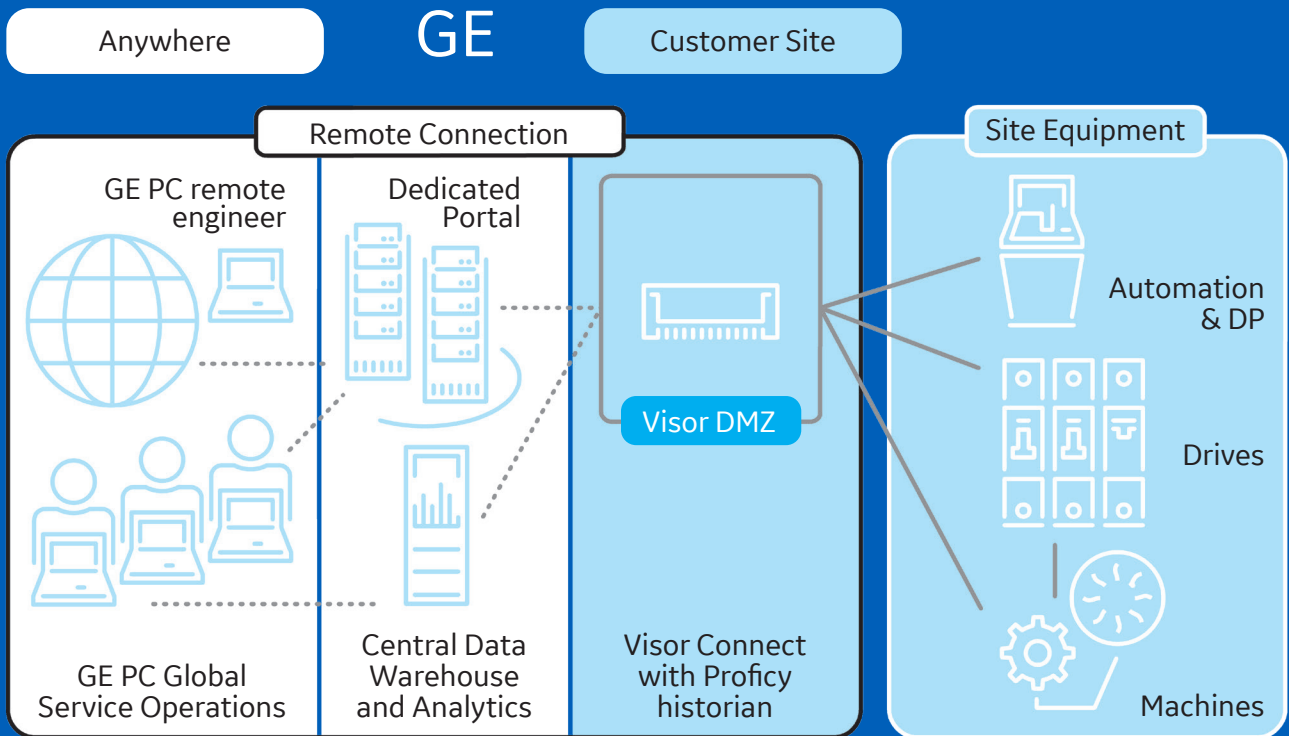


Common DC bus system

High performance process control

MV7000 is equipped with a standard Power Electronics Controller (PECe)

- Mounted on slide in/out frame for easy access and compactness
- Advanced Vector Control (AVC)
- Fast dynamic response
- Clean, robust power delivery
- Fully customizable



Visor Connect: Remote connection to equipment, monitoring and support

Visor Connect provides secured remote connection to GE equipment (outside the control network). Remote connection enables GE's service engineers to provide real-time support, ongoing health analytics and key performance indicators (KPIs), as well as basic configuration management support.

Key benefits

- Reduce unscheduled downtime
- Real-time support and advice
- Customers can access GE's global Services organization 24/7, 365 days a year from anywhere in the world

Process control benefits

Incoming power dip ride-through

The MV7000 provides incoming power loss ride-through and keeps the process running without tripping.

Under-voltage operation

The MV7000 operates continuously and provides power to the motor at a lower input supply voltage (down to 70% of nominal voltage).

Flying start into a spinning load

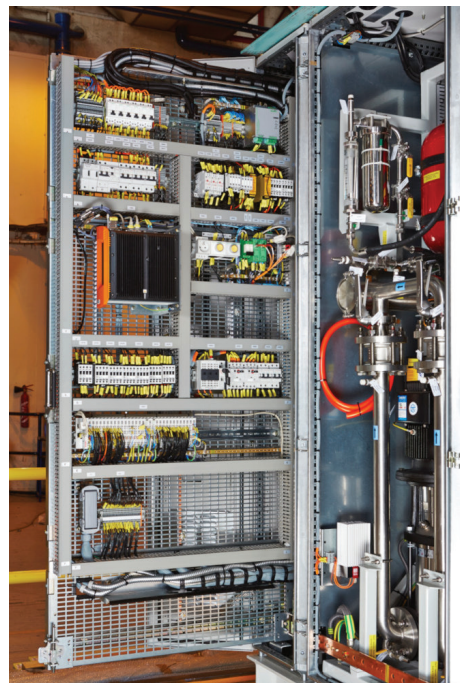
The MV7000 offers the ability to catch and take control of a spinning load without any damaging torque, voltage or current impacting the equipment if started while the load is already spinning.

Critical speed avoidance

The MV7000 can be programmed for up to three critical frequency bands and ride-through these without any resonance issues.

Independent acceleration and deceleration ramps

The MV7000 can be programmed into the drive controls as needed for controlled starting and stopping of the load.



High performance control

MV7000 — À la carte option packaging

Feature suite for every application

Standard product customizable with pre-engineered options including, but not limited to:

- Redundant pump for cooling
- Customizable process control
- DB chopper
- Communication protocols
- Harsh environment packaging
- Vibration and shock reinforcement
- Marine-class package
- Up and down synchronous transfer

Motor friendly

- Suited for synchronous induction and permanent magnet motors
- Output waveforms reduce motor losses
- Reduced motor noise and vibration
- No significant motor shaft torque pulsations
- Wide speed range with a consistent response

MV7000 ratings, dimensions & weights

Output voltage	VFD frame size	Rectifier type	Power output	Output current	Width	Depth	Weight
			MVA	A	inches/mm	inches/mm	lbs./kg
3.3kV	MV7303-3L	DFE 12p	4	700	165/4,200	39/1,000	9,257/4,200
	MV7303-3L	AFE	4	700	205/5,200	39/1,000	11,461/5,200
	MV7306-3L	DFE 12p	8	1,400	173/4,400	39/1,000	9,698/4,400
	MV7306-3L	AFE	8	1,400	220/5,600	39/1,000	12,342/5,600
	MV7308-3L	DFE 12p	12	2,100	181/4,600	39/1,000	10,138/4,600
	MV7308-3L	AFE	12	2,100	228/5,800	39/1,000	12,783/5,800
	MV7310-3L	DFE 12p	11	2,000	173/4,400	39/1,000	9,698/4,400
	MV7310-3L	AFE	11	1,875	220/5,600	39/1,000	12,342/5,600
	MV7310-5L	DFE 12p	35	2,000	220/5,600	39/1,000	12,342/5,600
	MV7310-5L	AFE	28	1,600	244/6,200	39/1,000	13,665/6,200
	MV7312-3L	DFE 24p	14	2,400	189/4,800	39/1,000	10,579/4,800
	MV7312-3L	AFE	14	2,400	283/7,200	39/1,000	15,869/7,200
	MV7315-3L	DFE 24p	17	3,050	197/5,000	39/1,000	11,020/5,000
	MV7315-3L	AFE	17	3,050	315/8,000	39/1,000	17,632/8,000
	2xMV7310-3L	2xDFE 12p	23	4,000	346/8,800	39/1,000	19,395/8,800
	2xMV7310-3L	AFE	17	3,000	441/11,200	39/1,000	24,685/11,200
	2xMV7312-3L	2xDFE 24p	27	4,800	378/9,600	39/1,000	21,158/9,600
	2xMV7312-3L	AFE	27	4,800	567/14,400	39/1,000	31,738/14,400
	2xMV7315-3L	2xDFE 24p	35	6,100	394/10,000	39/1,000	22,040/10,000
	2xMV7315-3L	AFE	35	6,100	630/16,000	39/1,000	35,264/16,000
5.2kV	MV7507-3L*	DFE 24p	8.1	900	331/8,400	55/1,400	18,514/8,400
	MV7507-3L*	AFE	7	750	441/11,200	55/1,400	24,685/11,200
	MV7515-3L*	DFE 24p	15	1,700	339/8,600	55/1,400	18,954/8,600
	MV7515-3L*	AFE	14	1,500	504/12,800	55/1,400	28,211/12,800

*N+1 redundancy Available

Table shows the typical ratings for variable torque load applications. Please contact GE sales for constant torque applications.

MV7000 ratings, dimensions & weights

Output voltage	VFD frame size	Rectifier type	Power output	Output current	Width	Depth	Weight
			MVA	A	inches/mm	inches/mm	lbs./kg
6.6kV	MV7609-3L*	DFE 24p	13	1,100	331/8,400	55/1,400	18,514/8,400
	MV7609-3L*	AFE	11	1,000	441/11,200	55/1,400	24,685/11,200
	MV7616-3L*	DFE 24p	17	1,500	339/8,600	55/1,400	18,954/8,600
	MV7616-3L*	AFE	17	1,500	504/12,800	55/1,400	28,211/12,800
	MV7618-3L*	DFE 24p	23	2,000	339/8,600	55/1,400	18,954/8,600
	MV7618-3L*	AFE	23	2,000	661/16,800	55/1,400	37,027/16,800
8.2kV	MV7821-3L*	DFE 36p	26	1,800	465/11,800	55/1,400	26,007/11,800
	MV7821-3L*	AFE	25	1,750	567/14,400	55/1,400	31,738/14,400
10kV	MV7913-3L	DFE 36p	17	1,000	425/10,800	55/1,400	23,803/10,800
	MV7913-3L	AFE	17	1,000	472/12,000	55/1,400	26,448/12,000
	MV7927-3L	DFE 36p	35	2,000	465/11,800	55/1,400	26,007/11,800
	MV7927-3L	AFE	32	1,875	567/14,400	55/1,400	31,738/14,400
	2xMV7927	2xDFE 36p	69	4,000	929/23,600	55/1,400	52,014/23,600
	3xMV7927	3xDFE 36p	104	6,000	1,394/35,400	55/1,400	78,022/35,400
11kV	MV7B18-5L	DFE 24p	19	1,100	457/11,600	63/1,600	25,566/11,600
	MV7B18-5L	AFE	15/19**	1,000	On request	63/1,600	On request
	MV7B37-5L	DFE 24p	42	2,200	512/13,000	63/1,600	28,652/13,000
	MV7B37-5L	AFE	30/38**	2,000	On request	63/1,600	On request
13.8kV	MV7D23-5L	DFE 36p	24	1,000	449/11,400	63/1,600	25,126/11,400
	MV7D23-5L	AFE	19/24**	1,000	On request	63/1,600	On request
	MV7D45-5L	DFE 24p	48	2,000	504/12,800	63/1,600	28,211/12,800
	MV7D45-5L	AFE	38/48**	2,000	On request	63/1,600	On request

*N+1 redundancy Available

** AFE/Inverter

MV7000 drive specifications

VFD ratings

Output power	3 – 81MW
Output voltage	up to 13kV
Output frequency	15-90 Hz, 0 to 15 Hz and 90 to 300Hz on request
Input voltage	3 to 13.8kV \pm 10% for AFE Txless, 3-650kV with transformer
Input frequency	50 or 60Hz \pm 5%
Auxiliary voltage	3 phase, 400V, 440V, 480V, or 600V; 50/60Hz 1 phase, 110V, 230V, 50/60Hz

Power quality

Line side converter	DFE 12 to 36-pulse / AFE IGBT 6-pulse
Load side inverter	3- or 5-level VSI; IGBTs
VFD system efficiency	Up to 99%
Power factor	>0.96 (DFE) / 1 (AFE)
Input harmonics	IEEE 519 compliant

Energy storage

DC link	Self-healing, long life, film capacitors
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VFD control

Mode of operation	Four-quadrant
Mode of control	Flux vector / without encoder / induction motor & synchronous (option)
Analog input / output	(3) inputs / (3) outputs +/-10 Vdc or 4-20 mA standard
Digital input / output	(6) inputs / (6) outputs standard
Speed regulation	<0.5% without encoder and <0.1% with encoder
LAN interface	Standard: Profinet, Modbus, Ethercat, IEC618150 Optional: profibus, devicenet, EGD
Protective functions	Over-current, current limit, over and under-voltage, motor stall

Environment & enclosure

Enclosure	IP31, standard, IP33, IP44, option, others on request
Ambient / elevation	0-45°C / 1000m above sea level; higher with de-rating
Insulation coordination	Pollution degree 2 per EN 61800-5-1 and EN 50178

Industry standards

Standards	IEC 61800-3, IEC 61800-4, IEC 61800-5, IEC 60068-2-31 (vibration) Qualification to industry-specific standards available Marine classification society/compliant
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Services from GE – a focus on availability

We understand the vital importance of process availability – and our focus on service keeps us actively engaged, both when things are going right, and when they are going wrong.

Our world-class Global Customer Service and Support Center is available 24/7, 365 days a year. Our strategic distribution centers and authorized distributors carry an extensive inventory of GE's drives, allowing us to quickly fulfill your genuine replacement part needs, no matter where you are located.

With a comprehensive global network of service engineers and technicians, GE is uniquely positioned to provide the knowledge, experience and skills for your full range of industrial service requirements. From system design to maintenance and outage support, we have the resources and capabilities to advance your equipment's performance and reliability. Some key benefits of GE's support are:

- Single point of contact
- Reduced call-out rates
- 24/7 availability
- Rapid mobilization of engineers
- Routine maintenance visits
- Training
- System health checks
- Spares management
- Obsolescence management

GE also provides managed system upgrade paths for our legacy systems and has significant experience in replacing systems from other manufacturers with low disruption to the existing infrastructure.

Remote support

Visor Connect, GE's remote diagnostic and support system, is based on highly secure satellite communications links. It enables our experts, regardless of their geographical location, to look over the shoulder of your onsite equipment operator or technician and advise and assist you on fault finding and resolution.

MAIN OFFICES

Australia

Tel: +61 408 134 094

Brazil

Tel: +55 31 3268 8000

China

Tel: +86 177 0163 1000

France

Tel: +33 1 77 31 20 00

Germany

Tel: +49 30 7622 0

India

Tel: +91 44 49680000

Korea

Tel: +82 51 712 8000

Russia

Tel: +7 495 739 68 11

Singapore

Tel: +65 6326 3000

UK

Tel: +44 1788 563 563

USA

Tel: +1 412 967 0765



www.gepowerconversion.com

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