MV7000 Flat Pack (FP)
Reliable, high performance medium voltage drive
Cutting-edge power electronics technology and decades of process expertise come together in the MV7000 — a world-class 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 FP provides both a flexible approach to achieve a customized solution across different applications and on the shelf configurations.

With the MV7000 FP 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 10MW, which is equivalent to a power density of 0.8MVA/m$^3$
- 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 FP 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

<table>
<thead>
<tr>
<th>Industry sector</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil and gas</td>
<td>eLNG trains, injection compressors and pumps, gas storage, multiphase pumps, pipeline compressors</td>
</tr>
<tr>
<td>Marine</td>
<td>Cruise ships, LNG carriers, offshore drilling vessels, research vessels, megayachts, merchant vessels, navy support vessels</td>
</tr>
<tr>
<td>General and heavy industry</td>
<td>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)</td>
</tr>
</tbody>
</table>
MV7000 FP drive — Enhanced technology

Key benefits

• High reliability and availability
• Power scalability with customizable options featuring:
  – Low harmonics without additional equipment
  – Four quadrant operation for regenerative applications
  – Optional Transformerless design allows for compactness and smooth integration of existing loads direct to line
  – 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
• Available in Air Cooled and Water Cooled versions to match most of installation constraints

• Inverters can be mounted against walls or back to back
• Low energy gating, with simple and reliable gate drivers
• Simplified cooling system architecture and gate drive power supply topology
• Fuseless design

Best-in-class power density

The phase power stack is the main modular building block of the three-level inverter.
• Compact enclosures thanks to water cooling
• Compactness with modularity for higher power scaling-up
High reliability and availability

The MV7000 FP drive 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
• High commutation speed for high switching frequency and low losses
• Capability to limit over-current with safe turn-off
• Long life expectancy even under load cycling thanks to AlSiC base plate
• Effective performance even at low motor frequency operation
• Modularity and scalability for low power operation

Inside look at the MV7000
Power scalability with customizable options

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

Low harmonics without additional equipment

- Available in 12, 18 and 24-pulse DFE configuration
- 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 FP drive 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

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

High performance process control

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

**Under-voltage operation**

The MV7000 FP drive 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 FP drive 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 FP drive 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 FP drive can be programmed into the drive controls as needed for controlled starting and stopping of the load.
MV7000 FP drive
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
• Communication protocols
• Harsh environment packaging
• 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 FP drives ratings

<table>
<thead>
<tr>
<th>Output voltage</th>
<th>VFD frame size</th>
<th>Cooling</th>
<th>Rectifier type</th>
<th>Power output</th>
<th>Output current</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3kV</td>
<td>MV7303-3L</td>
<td>Water</td>
<td>DFE 12p</td>
<td>4 MVA</td>
<td>700 A</td>
</tr>
<tr>
<td></td>
<td>MV7303-3L</td>
<td>Water</td>
<td>AFE</td>
<td>4 MVA</td>
<td>700 A</td>
</tr>
<tr>
<td></td>
<td>MV7306-3L</td>
<td>Water</td>
<td>DFE 24p</td>
<td>8 MVA</td>
<td>1,400 A</td>
</tr>
<tr>
<td></td>
<td>MV7306-3L</td>
<td>Water</td>
<td>AFE</td>
<td>8 MVA</td>
<td>1,400 A</td>
</tr>
<tr>
<td></td>
<td>MV7309-3L</td>
<td>Water</td>
<td>DFE 24p</td>
<td>12 MVA</td>
<td>2,100 A</td>
</tr>
<tr>
<td></td>
<td>MV7309-3L</td>
<td>Water</td>
<td>AFE</td>
<td>12 MVA</td>
<td>2,100 A</td>
</tr>
<tr>
<td></td>
<td>MV7403-3L</td>
<td>Water</td>
<td>DFE 12p</td>
<td>3 MVA</td>
<td>424 A</td>
</tr>
<tr>
<td></td>
<td>MV7403-3L</td>
<td>Water</td>
<td>DFE 24P</td>
<td>3 MVA</td>
<td>424 A</td>
</tr>
<tr>
<td></td>
<td>MV7403-3L</td>
<td>Water</td>
<td>AFE</td>
<td>3 MVA</td>
<td>424 A</td>
</tr>
<tr>
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<td>MV7404-3L</td>
<td>Water</td>
<td>DFE 12P</td>
<td>5 MVA</td>
<td>715 A</td>
</tr>
<tr>
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<td>MV7404-3L</td>
<td>Water</td>
<td>DFE 24P</td>
<td>5 MVA</td>
<td>715 A</td>
</tr>
<tr>
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<td>MV7404-3L</td>
<td>Water</td>
<td>AFE</td>
<td>5 MVA</td>
<td>715 A</td>
</tr>
<tr>
<td></td>
<td>MV7405-3L</td>
<td>Water</td>
<td>DFE 12P</td>
<td>6 MVA</td>
<td>840 A</td>
</tr>
<tr>
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<td>Water</td>
<td>DFE 24P</td>
<td>6 MVA</td>
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<td>MV7405-3L</td>
<td>Water</td>
<td>AFE</td>
<td>6 MVA</td>
<td>840 A</td>
</tr>
<tr>
<td>4.1kV</td>
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<tr>
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<td>MV7406-3L</td>
<td>Water</td>
<td>DFE 24P</td>
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<td>1,060 A</td>
</tr>
<tr>
<td></td>
<td>MV7408-3L</td>
<td>Water</td>
<td>DFE 12P</td>
<td>10 MVA</td>
<td>1,400 A</td>
</tr>
<tr>
<td></td>
<td>MV7408-3L</td>
<td>Water</td>
<td>DFE 24P</td>
<td>10 MVA</td>
<td>1,400 A</td>
</tr>
<tr>
<td></td>
<td>MV7401-3L</td>
<td>Air</td>
<td>DFE 24P</td>
<td>1.6 MVA</td>
<td>237 A</td>
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<tr>
<td></td>
<td>MV7401-3L</td>
<td>Air</td>
<td>AFE</td>
<td>1.6 MVA</td>
<td>237 A</td>
</tr>
<tr>
<td></td>
<td>MV7402-3L</td>
<td>Air</td>
<td>DFE 24P</td>
<td>2.4 MVA</td>
<td>354 A</td>
</tr>
<tr>
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<td>MV7402-3L</td>
<td>Air</td>
<td>AFE</td>
<td>2.4 MVA</td>
<td>354 A</td>
</tr>
<tr>
<td></td>
<td>MV7403-3L</td>
<td>Air</td>
<td>DFE 24P</td>
<td>3.6 MVA</td>
<td>530 A</td>
</tr>
<tr>
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<td>MV7403-3L</td>
<td>Air</td>
<td>AFE</td>
<td>3.6 MVA</td>
<td>530 A</td>
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<td>MV7404-3L</td>
<td>Air</td>
<td>DFE 24P</td>
<td>4.8 MVA</td>
<td>700 A</td>
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<td>DFE 24P</td>
<td>7.2 MVA</td>
<td>1,000 A</td>
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<tr>
<td>6.6kV</td>
<td>MV7606-5L</td>
<td>Water</td>
<td>DFE 36P</td>
<td>8 MVA</td>
<td>700 A</td>
</tr>
<tr>
<td></td>
<td>MV7606-5L</td>
<td>Water</td>
<td>AFE</td>
<td>8 MVA</td>
<td>700 A</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Output voltage</th>
<th>VFD frame size</th>
<th>Width</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3kV</td>
<td>MV7303-3L</td>
<td>165/4,200</td>
<td>39/1,000</td>
<td>9,257/4,200</td>
</tr>
<tr>
<td></td>
<td>MV7303-3L</td>
<td>205/5,200</td>
<td>39/1,000</td>
<td>11,461/5,200</td>
</tr>
<tr>
<td></td>
<td>MV7306-3L</td>
<td>228/5,800</td>
<td>39/1,000</td>
<td>12,786/5,800</td>
</tr>
<tr>
<td></td>
<td>MV7306-3L</td>
<td>228/5,800</td>
<td>39/1,000</td>
<td>12,786/5,800</td>
</tr>
<tr>
<td></td>
<td>MV7309-3L</td>
<td>276/7,000</td>
<td>39/1,000</td>
<td>15,432/7,000</td>
</tr>
<tr>
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<td>MV7309-3L</td>
<td>276/7,000</td>
<td>39/1,000</td>
<td>15,432/7,000</td>
</tr>
<tr>
<td></td>
<td>MV7403-3L</td>
<td>126/3,200</td>
<td>31/800</td>
<td>6,392/2,900</td>
</tr>
<tr>
<td></td>
<td>MV7403-3L</td>
<td>142/3,600</td>
<td>31/800</td>
<td>6,832/3,100</td>
</tr>
<tr>
<td></td>
<td>MV7403-3L</td>
<td>181/4,600</td>
<td>31/800</td>
<td>8,596/3,900</td>
</tr>
<tr>
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<td>MV7404-3L</td>
<td>134/3,400</td>
<td>39/1,000</td>
<td>7,053/3,200</td>
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<tr>
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<td>MV7404-3L</td>
<td>150/3,800</td>
<td>39/1,000</td>
<td>7,494/3,400</td>
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<tr>
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<td>MV7404-3L</td>
<td>197/5,000</td>
<td>39/1,000</td>
<td>8,375/5,800</td>
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<tr>
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<td>MV7405-3L</td>
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<td>31/800</td>
<td>7,934/3,600</td>
</tr>
<tr>
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<td>MV7405-3L</td>
<td>205/5,200</td>
<td>31/800</td>
<td>8,375/5,800</td>
</tr>
<tr>
<td></td>
<td>MV7405-3L</td>
<td>291/7,400</td>
<td>31/800</td>
<td>11,902/5,400</td>
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<tr>
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<td>MV7406-3L</td>
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<td>39/1,000</td>
<td>8,816/4,000</td>
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<tr>
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<td>220/5,600</td>
<td>39/1,000</td>
<td>9,257/4,200</td>
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<td>MV7408-3L</td>
<td>213/5,400</td>
<td>39/1,000</td>
<td>8,816/4,000</td>
</tr>
<tr>
<td></td>
<td>MV7408-3L</td>
<td>220/5,600</td>
<td>39/1,000</td>
<td>9,477/4,300</td>
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<tr>
<td></td>
<td>MV7401-3L</td>
<td>87/2,200</td>
<td>39/1,000</td>
<td>5,400/2,450</td>
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<tr>
<td></td>
<td>MV7401-3L</td>
<td>189/4,800</td>
<td>39/1,000</td>
<td>8,375/5,800</td>
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<tr>
<td></td>
<td>MV7402-3L</td>
<td>110/2,800</td>
<td>39/1,000</td>
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<td></td>
<td>MV7402-3L</td>
<td>197/5,000</td>
<td>39/1,000</td>
<td>10,138/4,600</td>
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<tr>
<td></td>
<td>MV7403-3L</td>
<td>110/2,800</td>
<td>39/1,000</td>
<td>7,273/3,300</td>
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<tr>
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<td>MV7403-3L</td>
<td>205/5,200</td>
<td>39/1,000</td>
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<td>MV7404-3L</td>
<td>157/4,000</td>
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<td>10,138/4,600</td>
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<td>MV7405-3L</td>
<td>157/4,000</td>
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<td>10,138/4,600</td>
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<tr>
<td>4.1kV</td>
<td>MV7606-5L</td>
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<td>12,786/5,800</td>
</tr>
<tr>
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<td>MV7606-5L</td>
<td>228/5,800</td>
<td>39/1,000</td>
<td>12,786/5,800</td>
</tr>
<tr>
<td>6.6kV</td>
<td>MV7606-5L</td>
<td>228/5,800</td>
<td>39/1,000</td>
<td>12,786/5,800</td>
</tr>
</tbody>
</table>
### MV7000 FP drive specifications

#### VFD ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output power</td>
<td>0.7 – 10MW</td>
</tr>
<tr>
<td>Output voltage</td>
<td>3.3 up to 6.6kV</td>
</tr>
<tr>
<td>Output frequency</td>
<td>15-90 Hz, 0 to 15 Hz and 90 to 300Hz on request</td>
</tr>
<tr>
<td>Input voltage</td>
<td>3 to 6.6kV ±10% Tless, 3-650kV with transformer</td>
</tr>
<tr>
<td>Input frequency</td>
<td>50 or 60 Hz ±5%</td>
</tr>
<tr>
<td>Auxiliary voltage</td>
<td>3 phase, 400 V, 440 V, 480 V, or 600 V; 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>1 phase, 110 V, 230 V, 50/60 Hz</td>
</tr>
</tbody>
</table>

#### 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

#### 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, IEC61850
  - 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**: 0-45ºC / 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
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.
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