Our business units

Energy Management
- Oil & Gas
- Power & Water

Healthcare
- Aviation
- Transportation

Capital
- Home & Business Solutions
Providing power conversion solutions across the world’s energy infrastructure
Application Examples

Electricity into motion
- Compressors
- Propellers
- Rolling mills
- Pumps

Motion into electricity
- Wind turbines
- Turbogenerators
- Hydropower
- Wet renewables

Electricity into electricity
- Wind/solar PV
- Railway substations
- Pulse power supply
- Soft starters

Transforming energy to optimize customer process is our mission
Motor Technology Portfolio

- High Torque
  - Up to 20 MW
  - Below 400 rpm

- Induction
  - Conventional Speed
  - Up to 80 MW

- Synchronous
  - Up to 100 MW

- Explosion-Proof
  - Up to 6 MW

- Marinized
  - Up to 18 MW

- Induction
  - High Speed
  - Up to 18,000 rpm

Full range to meet operating needs
High Power Drive Technology

Grid side
- Diode or Active Front End technology
- High power factor
- No pollution on grid
- Addressing diverse grid environment
- Isolated grid
- Remote area

Motor side
- Scalable Inverter
- Powering all types of motors
- Long distance application
- High speed solutions

Proven across all business segments
Neutral Point Piloted Converter

IGBT stack for phase U
IGBT stack for phase V
IGBT stack for phase W

GE’s MV Experience

- Proven Technology: first medium-voltage drive installed in 1975
- Installed Base >1000 units; Accumulated Operating Time* >1,000,000 hours
## MV7000 Range Scalability & Modularity

### Power Scalability

Power scalability is achieved by voltage increase 3.3 up to 13.8kV

<table>
<thead>
<tr>
<th>Output voltage</th>
<th>3.3kV ac</th>
<th>5.5kV ac</th>
<th>6.6kV ac</th>
<th>8.2kV ac</th>
<th>9.9kV ac</th>
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<tbody>
<tr>
<td>IGBT ST750</td>
<td>5MW</td>
<td>7MW</td>
<td>9MW</td>
<td>11MW</td>
<td>13MW</td>
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<tr>
<td>MV7305</td>
<td>MV7607</td>
<td>MV7609</td>
<td>MV7811</td>
<td>MV7913</td>
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<tr>
<td>IGBT ST1500</td>
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<td>15MW</td>
<td>18MW</td>
<td>21MW</td>
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<td>MV7310</td>
<td>MV7615</td>
<td>MV7618</td>
<td>MV7821</td>
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<td>IGBT ST2100</td>
<td>10MW</td>
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<td>MV7311</td>
<td>MV7312</td>
<td>MV7315</td>
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</tbody>
</table>
MV7618 line-up

- A look inside

Redundant pump
Film capacitors
Power interface board PIBe

Cooling unit
DC capacitor
Inverter local control

Control unit
Diode front end
Diode power stack

Inverter
d\text{V}/d\text{t} filter
d\text{V}/d\text{t} reactor
Integrated Compressor Line (ICL)

Direct-drive high-speed Induction Motor / Permanent Magnet motor

High fundamental frequency capability of MV drive using novel multi-level converter technology

Can high switching frequency capability of SiC simplify converter topology?
Integrated drive system configuration

DYNAMIC RETARDING ASSEMBLY
Dissipates Heat Generated in Retarding

Control Group
Directs Engine & Controls Power Circuit

ALTERNATOR
Generates Electrical Power

Need for high power density, high temp, harsh environment operation

Motorized Wheels
Propel & Retard Vehicle
Enabling New Solutions with SiC

High-speed Medium Voltage Drives

Simpler 2L or 3L topologies using high switching frequency of SiC devices can provide simpler solution

“Transformer-less” Medium Voltage Drives

MV drives typically require a large transformer at the input for voltage scaling and isolation
Possible to significantly reduce drive footprint and potential cost by using high frequency transformer (from 60Hz to 60 kHz)

Integrated Motor-Drive

Integration of power electronics with machines at low and medium power
Substantially increase power density, particularly in mobile applications
High temperature capability of SiC can be effectively used to minimize cooling loops