The optimized drive for every application

SINAMICS Medium Voltage Drives

for every type of medium-voltage application:

• Specialized applications such as rolling mills, horizontal mills,
  
  Siemens has more than four decades of experience manufac-
  
  operating costs and reinforce reliability, SINAMICS VFDs are the preferred choice in power
  
  Feeding (2Q & 4Q)

  Feeding &

  High dynamic performance

  Compact, rugged; saves costs and space.

  Optimal footprint and design –

  Utilizing a common DC link.

  Regenerative capability for energy-saving drive system

  4-quadrant operation –

  Active Front End (AFE) for regenerating motors –

  Mature and proven LCI topology –

  Compared to VSI drives, most cost-competitive solution

  High dynamic performance

  Compact, rugged; saves costs and space.

  High voltage motors to provide unparalleled levels of reliability,

  Fault tolerant, high MTBF, utilized in marine,

  Rugged and compact design for complex

  Mature and proven LCI topology –

  For large power ratings – Power density per M2.

  In the course of further developments of the products, the maximum perfor-

  DEDICATION TO INNOVATION

  Our focus is on innovation and progress, pushing the boundaries of what is possible to create

  Solutions that meet the needs of our customers, providing them with the technology and services

  they need to succeed.

  Our commitment to innovation is driven by a passion for excellence, a dedication to quality,

  and a commitment to continuous improvement.

  We believe in the power of collaboration, working closely with our customers,

  partners, and suppliers to bring new ideas to life and deliver exceptional results.

  Our innovative approach has led us to create solutions that

  push the boundaries of what is possible, providing

  our customers with a competitive edge.

  Innovation is at the heart of our organization,

  driving us to consistently deliver the best possible outcomes for our customers.

  Whether it’s developing new technologies,

  or finding new ways to improve existing products,

  we are constantly seeking ways to

  improve and evolve.

  Our commitment to innovation is not just about creating

  new products and services,

  but also about creating a culture of innovation within our organization,

  and within our industry as a whole.

  We believe that innovation is the key to success,

  and we are committed to being leaders in this area.

  We welcome the challenge of taking on

  new ideas and approaches,

  and we are always looking for ways to

  improve and enhance our products and services.

  Our focus is on creating solutions

  that meet the needs of our customers,

  and that help them to achieve their goals.

  Our commitment to innovation is our

  way of ensuring that we remain relevant and competitive in an
table of contents
SIDRIVE IQ – our holistic solution and service to IIoT for drive systems

SIDRIVE IQ is an integral component of SINAMICS drives. SINAMICS drives are equipped with a connectivity module (SINAMICS CONNECT 500) so that they can be easily integrated into our digital, cloud-based solution. Condition data such as drive information, historic logs, parameters and fault logs are evaluated, processed and sent to our cloud for analysis. In addition to that it can be analyzed with our digital platform SIDRIVE IQ Suite. With SIDRIVE IQ Suite users can track and visualize various drive system conditions, show trends, error messages and generate reports.

The goal of SIDRIVE IQ is to:
• Boost your productivity
• Reduce service and maintenance costs
• Increase availability
• Shorten unplanned downtimes

SIDRIVE IQ – the holistic solution and service to IIoT for your drive system
siemens.com/sidrive-iq

Proven reliability. Endless possibilities.

There’s no such thing as a one-size-fits-all variable frequency drive (VFD). That’s why the SINAMICS family of drives draws on the Siemens legacy of innovation to deliver reliable, high-quality power for a wide range of applications. Designed to save energy, reduce operating costs and reinforce reliability, SINAMICS VFDs are the preferred choice in power conversion.

SINAMICS Medium Voltage Drives

Siemens has more than four decades of experience manufacturing nearly every type of medium-voltage converter or inverter that exists today. We have developed our portfolio of drives to meet specific needs with the optimal solution for every type of medium-voltage application:
• Standard applications such as conveyors, pumps, fans and compressors
• Specialized applications such as rolling mills, horizontal mills, shaft generators and high-speed compressors

One single topology or drive configuration does not fit all applications. This is the reason we offer converters and inverters featuring six different technologies, motor voltage classes from 1.4 kV to 13.8 kV and power ratings from 150 kW to 85 MW. Plus, our drive systems match perfectly with our high-voltage motors to provide unparalleled levels of reliability, availability, flexibility and performance.

The optimized drive for every application

Pumps
Compressors
Extruders
Text Benches
Conveyor Belts
Rolling Mills
Fans
Propulsion
Crushers
Winders
Shaft Generators
Grids

Application Complexity

Feeding (2Q) Variable torque Feeding & Regenerative (2Q & 4Q) Single & multi motor Constant torque

SERENITY. SECURITY. SIDRIVE IQ

Trust every choice.
The optimized drive for every application

Core Applications and Product Highlights

SINAMICS Medium Voltage Drives

Proven reliability. Endless possibilities.

There's no such thing as a one-size-fits-all variable frequency drive (VFD). That's why the SINAMICS family of drives draws on the Siemens legacy of innovation to deliver reliable, high-quality power for a wide range of applications. Designed to save energy, reduce operating costs and reinforce reliability, SINAMICS VFDs are the preferred choice in power conversion.

SINAMICS drives are equipped with a connectivity module (SINAMICS CONNECT 500) so that they can be easily integrated into our digital, cloud-based solution. Condition data such as drive information, historic logs, and data from external sensors can be sent to our cloud for analysis. In addition to that it can be used to monitor and control drive parameters, thereby improving overall system performance.

One single topology or drive configuration does not fit all applications. This is the reason we offer converters and inverters featuring six different technologies, motor voltage classes from 1.4 kV to 15 kV and power ratings from 150 kW to 85 MW. Plus, our drive systems match perfectly with our high-voltage motors to provide unparalleled levels of reliability, availability, flexibility and performance.

Core Applications

- Single- and multi-motor applications such as mills, fans, compressors, and mine hoists.
- Extremely motor-friendly – Can drive any motor except for small ac servomotors.
- Transformer flexibility – Bitree or five-wire star-delta connections available.
- Active Front End (AFE) for regenerating motors – Dynamic reactive power for voltage stabilization (STATCOM).
- Fewest drive components for any given power rating – Reliability, reduced cost, easier commissioning.
- Transformer-less connection to local grids on request.

Product Highlights

- Regenerative capability for energy-saving drive systems.
- Single- and multi-motor capability – Easy to co-supply together with other generators. Additionally supply additional motor power for voltage and reactive power compensation (SINAMICS ATO).
- Flexible cooling arrangement perfect for any installation requirements. Can be installed in any environment.
- Rugged and compact design for complex high-power applications.
- Extremely motor-friendly – Can drive any motor, including small ac servomotors.
- Extremely high altitudes, temperatures and air quality, plus service conditions.
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- Extremely motor-friendly – Can drive any motor, including small ac servomotors.
Discover why no other drive portfolio can match the flexibility and performance of our SINAMICS medium voltage drives. With systems in motor voltage classes from 1.4 kV to 13.8 kV, and power ratings from 150 kW to 85 MW, Siemens drives are built to provide the reliability, longevity and quality that modern applications demand – because in today’s competitive market, downtime is not an option.

**SINAMICS Medium Voltage Drives**

**Technical Specifications**

<table>
<thead>
<tr>
<th>Type of converter</th>
<th>SINAMICS PERFECT HARMONY GM150</th>
<th>SINAMICS GM150</th>
<th>SINAMICS GL150</th>
<th>SINAMICS SH150</th>
<th>SINAMICS SM150</th>
<th>SINAMICS SL150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-cell voltage source inverter featuring M2C technology (M2C-VSI)</td>
<td>variably integrated converter (M2C2)</td>
<td>Voltage source inverter with 3-level NPC and Diode Front End (DFE-VSI)</td>
<td>Current Source inverter with load-commutated inverter technology (LCI)</td>
<td>Multi-cell voltage source inverter with active front end and Active Front End (AFE) featuring M2C technology (M2C-VSI)</td>
<td>Voltage source inverter with 3-level NPC and Active Front End (AFE-VSI)</td>
<td>Cycloconverter (CC)</td>
</tr>
</tbody>
</table>

**Converter cooling**

<table>
<thead>
<tr>
<th>Power range</th>
<th>SINAMICS PERFECT HARMONY GM150</th>
<th>SINAMICS GM150</th>
<th>SINAMICS GL150</th>
<th>SINAMICS SH150</th>
<th>SINAMICS SM150</th>
<th>SINAMICS SL150</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: 1.4-30 MVA</td>
<td>A: 2.5-110 MVA</td>
<td>A: 1.4-5.8 MVA</td>
<td>A: 4.6-5.8 MVA</td>
<td>A: 4.6-10.8 MVA</td>
<td>A: 6.2-11.6 MVA</td>
<td>A: 6.2-13.8 MVA</td>
</tr>
</tbody>
</table>

**Transformer**

<table>
<thead>
<tr>
<th>Transformer type</th>
<th>SINAMICS PERFECT HARMONY GM150</th>
<th>SINAMICS GM150</th>
<th>SINAMICS GL150</th>
<th>SINAMICS SH150</th>
<th>SINAMICS SM150</th>
<th>SINAMICS SL150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separate transformer</td>
<td>Separate transformer</td>
<td>Separate transformer</td>
<td>Separate transformer</td>
<td>Separate transformer</td>
<td>Separate transformer</td>
<td>Separate transformer</td>
</tr>
</tbody>
</table>

**Long cable capabilities**

<table>
<thead>
<tr>
<th>Long cable capabilities</th>
<th>SINAMICS PERFECT HARMONY GM150</th>
<th>SINAMICS GM150</th>
<th>SINAMICS GL150</th>
<th>SINAMICS SH150</th>
<th>SINAMICS SM150</th>
<th>SINAMICS SL150</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500 m: longer distances on request</td>
<td>1000 m: longer distances on request</td>
<td>1000 m: longer distances on request</td>
<td>1000 m: longer distances on request</td>
<td>1000 m: longer distances on request</td>
<td>1000 m: longer distances on request</td>
<td>1000 m: longer distances on request</td>
</tr>
</tbody>
</table>

**Features**

<table>
<thead>
<tr>
<th>Features</th>
<th>SINAMICS PERFECT HARMONY GM150</th>
<th>SINAMICS GM150</th>
<th>SINAMICS GL150</th>
<th>SINAMICS SH150</th>
<th>SINAMICS SM150</th>
<th>SINAMICS SL150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest flexibility</td>
<td>Separate transformer</td>
<td>Separate transformer</td>
<td>Highest power ratings</td>
<td>Separate transformer</td>
<td>Highest flexibility</td>
<td>Low speed</td>
</tr>
<tr>
<td>Cell redundancy</td>
<td>Cell redundancy</td>
<td>Marine &amp; offshore duty</td>
<td>Control redundancy</td>
<td>Lowest maintenance-free</td>
<td>Multi-motor do-box</td>
<td>Highest efficiency</td>
</tr>
<tr>
<td>Dynamic braking</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
</tr>
<tr>
<td>Marine certification</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
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<tr>
<td>Air-cooled service</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
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<tr>
<td>New process control</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
</tr>
<tr>
<td>Semiconductor technology</td>
<td>IGBT</td>
<td>IGBT</td>
<td>IGBT</td>
<td>IGBT</td>
<td>IGBT</td>
<td>IGBT</td>
</tr>
<tr>
<td>Control system</td>
<td>Sensors for vector control (optional with sensor), automatic relay identification, automatic startup</td>
<td>Closed-loop vector control</td>
<td>Closed-loop vector control</td>
<td>Closed-loop vector control</td>
<td>Closed-loop vector control</td>
<td>Closed-loop vector control</td>
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<tr>
<td>Reactive power compensation</td>
<td>Synchronous bypass to grid</td>
<td>Synchronous bypass to grid</td>
<td>Synchronous bypass to grid</td>
<td>Synchronous bypass to grid</td>
<td>Synchronous bypass to grid</td>
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<td>Fuses</td>
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</table>

**Motor Compatibility**

Below is a table detailing our most commonly supported applications. Siemens is experienced and able to support numerous applications. Below is a table detailing our most commonly supported applications. Siemens is experienced and able to support numerous applications.

**Application Compatibility**

Below is a table detailing our most commonly supported applications. Siemens is experienced and able to support numerous applications.
Due to complex project requirements, it is always recommended that users consult Siemens local Siemens representatives for proper technical assistance in selecting the correct drive for the application.

### Motor Compatibility

No drive or motor is perfect for every application or challenge. In addition to our medium voltage drives portfolio, Siemens also offers the most extensive portfolio of high voltage motors that have been crafted to work seamlessly with our medium voltage drives.

### Application Compatibility

Below is a table detailing our field-proven compatible applications. Siemens is experienced and able to support such applications in other medium-voltage applications that are not listed here. The compatibility can differ based on their configurations, and it’s always recommended to consult Siemens representatives for proper technical assistance in selecting the correct equipment for the application.

<table>
<thead>
<tr>
<th>SINAMICS High-voltage Series</th>
<th>SINAMICS PERFECT HARMONY GH150</th>
<th>SINAMICS PERFECT HARMONY GH150</th>
<th>SINAMICS GM150</th>
<th>SINAMICS GL150</th>
<th>SINAMICS SH150</th>
<th>SINAMICS SM150</th>
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<tr>
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<td>SINAMICS PERFECT HARMONY GH150</td>
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<tr>
<td>SINAMICS GM150</td>
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<td>SINAMICS GL150</td>
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<td>SINAMICS SH150</td>
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<td>SINAMICS SM150</td>
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<tr>
<td>SINAMICS SL150</td>
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</table>

### Technical Specifications

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<thead>
<tr>
<th>Feature</th>
<th>SINAMICS PERFECT HARMONY GH150</th>
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<th>SINAMICS GL150</th>
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<th>SINAMICS SM150</th>
<th>SINAMICS SL150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of converter</td>
<td>Multi-cell voltage source inverter featuring SINAMICS PERFECT HARMONY technology (PH VSI)</td>
<td>Multi-cell voltage source inverter featuring M2C technology (M2C VSI) [Modular multilevel converter (MMC2)]</td>
<td>Voltage source inverter with 3-level NPC and Dual Front End (DFE VSI)</td>
<td>Current Source inverter with load-commutated inverter technology (LCI)</td>
<td>Multi-cell voltage source inverter with active front end (AFE) featuring M2C technology (M2C VSI)</td>
<td>Voltage source inverter with 3-level NPC and Active Front End (AFE VSI)</td>
<td>Cycloconverter (CC)</td>
</tr>
<tr>
<td>Converter cooling</td>
<td>Air (A), water (W)</td>
<td>Air (A) excl. optional integral APB and AIA-HEX, water (W)</td>
<td>Air (A), water (W)</td>
<td>Air (A), water (W)</td>
<td>Water (W)</td>
<td>Air (A), water (W)</td>
<td>Air (A), water (W)</td>
</tr>
<tr>
<td>Power range</td>
<td>A: up to 1.4 MVA W: up to 54 MVA</td>
<td>A: 1.4-5.6 MVA W: 4-47.6 MVA</td>
<td>A: 1.4-10.2 MVA W: 6-85 MVA (higher on request)</td>
<td>A: 1.4-3.2 MVA W: 1-6.5 MVA (higher on request)</td>
<td>A: 3.4-5.8 MVA W: 4.6-11.5 MVA</td>
<td>A: 2.9-18.8 MVA W: 12-40 MVA</td>
<td></td>
</tr>
<tr>
<td>Transformer</td>
<td>Integrated transformer</td>
<td>Separate transformer</td>
<td>Separate transformer</td>
<td>Separate transformer</td>
<td>Separate transformer</td>
<td>Separate transformer</td>
<td>Separate transformer</td>
</tr>
<tr>
<td>Input section</td>
<td>A: 4Q (AFE) W: 2Q (DFE) and/or partial recharge</td>
<td>2Q (DFE)</td>
<td>2Q (DFE)</td>
<td>4Q</td>
<td>2Q (DFE) or 4Q (AFE)</td>
<td>4Q (AFE)</td>
<td>4Q</td>
</tr>
<tr>
<td>Type of motor</td>
<td>IM, SYN, PEM, WRM</td>
<td>IM, SYN, PEM</td>
<td>IM, SYN, PEM</td>
<td>IM, SYN, PEM</td>
<td>IM, SYN, PEM</td>
<td>IM, SYN, PEM</td>
<td>IM, SYN, PEM</td>
</tr>
<tr>
<td>Output voltage</td>
<td>A: 2.3 to 11 kV W: 4.0 to 11 kV</td>
<td>A: 4.16 to 11.8 kV W: 4.16 to 11 kV</td>
<td>2.3 to 4.6 kV</td>
<td>1.4 to 10.5 kV</td>
<td>3.3 to 11 kV</td>
<td>3.3 kV, 4.16 (IGBT only)</td>
<td>1.5 to 4 kV</td>
</tr>
<tr>
<td>Long cable capabilities</td>
<td>2000 m; longer distances on request</td>
<td>1000 m; longer distances on request</td>
<td>Option LOB: up to 1000 m</td>
<td>Option LOB: up to 1000 m</td>
<td>1000 m; longer distances on request</td>
<td>Option L10: up to 1000 m</td>
<td></td>
</tr>
</tbody>
</table>

### Differentiating Features

- **Highest flexibility**
- **Separate transformer**
- **Separate transformer**
- **Highest power ratings**
- **Highest overload capability**
- **Multi-motor do-bus**
- **Highest efficiency**
- **Cell redundancy**
- **Cell redundancy**
- **Navy & offshore duty**
- **Low speed**
- **Cell redundancy**
- **Marine & offshore duty**
- **Control redundancy**
- **Line friendly**
- **Water friendly**
- **Water friendly**
- **Almost maintenance-free**
- **Grid applications**
- **Multi-motor do-bus**

### Features

- **Cell bypass**
- **Cell redundancy**
- **ProTAP™ warning system**
- **Separate central cabinet design**
- **Multi-wire**
- **Dynamic braking**
- **Marine certification**
- **Anti-fault rated design**
- **Semiconductor technology**
- **Control system**
- **Communication profiles**
- **Reactance-power compensation**
- **Synchronous bypass to grid**
- **Failures"**
- **Multi-motor starting/sync transfer"**

---

**SINAMICS Medium Voltage Drives**

Discover why no other drive portfolio can match the flexibility and performance of our SINAMICS medium voltage drives, with systems in medium voltage classes from 1.4 kV to 13.8 kV, and power ratings from 150 kW to 85 MW. Siemens drives are built to provide the reliability, longevity and quality that modern applications demand – because in today’s competitive market, downtime is not an option.

***HARMONY technology***

**High overload**

**Highest power ratings**

**High overload**

**On request**

**Marine & offshore duty**

**Highest efficiency**

**Low speed**

**High dynamic**

**Low speed**

**High overload**

**Highest overload capability**

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**SINAMICS PERFECT HARMONY GH150**

**SINAMICS PERFECT HARMONY GH150**

**SINAMICS GM150**

**SINAMICS GL150**

**SINAMICS SH150**

**SINAMICS SM150**

**SINAMICS SL150**

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**Application Compatibility**

Below is a table detailing our field-proven compatible applications. Siemens is experienced and able to support such applications in other medium-voltage applications that are not listed here. The compatibility can differ based on their configurations, and it’s always recommended to consult Siemens representatives for proper technical assistance in selecting the correct equipment for the application.
Motor Compatibility

No drive or motor is perfect for every application or challenge. In addition to our medium voltage drives portfolio, Siemens also offers the most extensive portfolio of high voltage motors that have been crafted to work seamlessly with our medium voltage drives.

A different drive may be required for each motor depending on the operational requirements, motor type selected and preference of drive technology. This table provides a basic view of which drives and motors are compatible in the majority of circumstances.

### Motor Compatibility Table

<table>
<thead>
<tr>
<th>SIMOTICS High-Voltage Series Motors</th>
<th>SIMOTICS PERFECT HARMONY GH180</th>
<th>SIMOTICS PERFECT HARMONY GH150</th>
<th>SIMOTICS GM150</th>
<th>SIMOTICS GL150</th>
<th>SIMOTICS SH150</th>
<th>SIMOTICS SM150</th>
<th>SIMOTICS SL150</th>
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<td>SIMOTICS HV C</td>
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<td>SIMOTICS HV Series Injection Pump</td>
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</table>

### Application Compatibility

Below is a table detailing our most commonly supported applications. Siemens is experienced and able to support numerous other medium-voltage applications that are not listed here. Drive capabilities can differ based on their configurations and the options selected so there may be exceptions to the suitability of the drive assignments listed here.

<table>
<thead>
<tr>
<th>Application</th>
<th>SINAMICS PERFECT HARMONY GH180</th>
<th>SINAMICS PERFECT HARMONY GH150</th>
<th>SINAMICS GM150</th>
<th>SINAMICS GL150</th>
<th>SINAMICS SH150</th>
<th>SINAMICS SM150</th>
<th>SINAMICS SL150</th>
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<td>Shaft generator / booster</td>
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<td>LNG start / helper (all-electric)</td>
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</tbody>
</table>
The optimized drive for every application

SINAMICS Medium Voltage Drives

Proven reliability. Endless possibilities.

- Specialized applications such as rolling mills, horizontal mills,
- There’s no such thing as a one-size-fits-all variable frequency drive (VFD).

Fans, Propulsion, Crushers, Winders, Shaft Generators, Grids

Pumps, Compressors, Extruders, Test Benches, Conveyor Belts, Rolling Mills

Variable availability, flexibility and performance.

High-voltage motors to provide unparalleled levels of reliability,

inverters featuring six different technologies, motor voltage classes from 1.4 kV to 13.8 kV and power ratings from 150 kW to 85 MW. Plus, our drive systems match perfectly with our most rugged thyristor technology.

Rugged and compact design for complex pump storage and starting applications (e.g., blast main Marine propulsion, extruders and rolling mills,

Core Applications

- Simultaneous 2Q or 4Q operation and grid VAR compensation
- Dedicated U/f droop control to create an island grid or to
- Active Front End (AFE) for grid applications – Transformer-less connection to local grids on request.
- VAR compensation by AFE-drives.
- Over 16,000 drives sold worldwide – plug-and-play drive system setup.
- Integrated and optimized drive and transformer design –

Large drives Applications

Drives for every demand

The SINAMICS family of medium voltage drives

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