ACS6000 Medium Voltage Drive
The modularity you require.
The reliability you expect.
The ACS6000 special purpose drive

The ACS6000 medium voltage drive is part of ABB's special purpose drives portfolio. These engineered drives are specifically suitable for your high power, high speed or special performance applications such as test stands, marine propulsion and thrusters, rolling mills, SAG and ball mills, large pumps, fans and compressors.

The drives cover a wide power and voltage range, including voltages up to 13.8 kV and powers of more than 100 MW.

Get a drive solution that meets the requirements of your application and ensures high productivity and the optimum performance of your operations. Benefit from the built-in expertise of our special purpose drives and take your business forward with everything working like clockwork.

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ABB Medium Voltage Drives
Product portfolio

A broad range of variable speed drives for medium voltage applications allows you to select the drive that best meets your requirements. Get the perfect match for you.

**ACS1000 industrial drive**
Whatever your industry, the ACS1000 is an all-rounder to control your standard applications and optimize your processes.

**Power range**
315 kW – 5 MW

**Output voltage**
2.3 – 4.16 kV

**ACS2000 industrial drive**
The ACS2000 is an industrial all-rounder that perfectly adapts to a wide variety of standard applications across all industries.

**Power range**
250 kW – 3.2 MW

**Output voltage**
4.0 – 6.9 kV

**ACS5000 special purpose drive**
The ACS5000 effortlessly controls your high power applications such as compressors, pumps and fans.

**Power range**
2 MW – 36 MW
(higher on request)

**Output voltage**
6.0 – 13.8 kV

**ACS6000 special purpose drive**
Look no further than the ACS6000 if your high performance applications require a single- or multi-motor drive solution.

**Power range**
5 MW – 36 MW

**Output voltage**
2.3 – 3.3 kV

**MEGADRIVE-LCI special purpose drive**
The well-proven technology offered in the MEGADRIVE-LCI controls your high power applications and provides soft starting of large synchronous motors.

**Power range**
2 MW – 72 MW
(higher on request)

**Output voltage**
2.1 – 10 kV
**Get more using less**
Our broad portfolio of medium voltage drives will help you to increase your productivity and profitability. Your processes will use only the energy required to carry out the job and no more. Precise control ensures efficient operation with high uptime and optimized use of raw materials. This will all add up to cost and time savings for you.

**Delivering global support and peace of mind**
Our worldwide network offers you fast service and support around the clock, providing peace of mind by always being there when you need us.

**Reliable performance you can count on**
Depending on your industry and application, we provide you with drive solutions that meet your individual needs and requirements. Our variable speed drives – from 250 kW to more than 100 MW – control a wide range of medium voltage applications.

Through the use of quality components and the integration of special features, our drives ensure high process availability and safety for your business. With well-proven drive technology at the heart, your operations will run smoothly and reliably every day.

Our product portfolio comprises medium voltage drives in the range of 250 kW to more than 100 MW.

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**Power range**
- **315 kW – 5 MW**
- **250 kW – 3.2 MW**
- **2 MW – 36 MW** (higher on request)
- **5 MW – 36 MW**
- **2 MW – 72 MW** (higher on request)

**Output voltage**
- **2.3 – 4.16 kV**
- **4.0 – 6.9 kV**
- **6.0 – 13.8 kV**
- **2.3 – 3.3 kV**
ACS6000
The right choice for high performance

The accomplished expert for heavy industries offers you unlimited possibilities of drive configurations to drive both single- and multi-motor applications. Industry-specific functions and unique features ensure reliable control of your processes and systems that require precision and high safety standards.

Modular and reliable
Well-proven modules, redundancy possibilities and a compact footprint have been instrumental in having the design of the ACS6000 commonly referred to as “best-in-class”. The drive is configured to fit with your needs and the specific conditions of your business.

The customized drive solutions deliver fast and accurate control of dynamic processes such as those found in the metals, marine and mining industries. Select from a wide range of industry-specific options and certifications (e.g. marine, offshore) to tailor the drive according to your requirements and get the optimum configuration by combining the engineered modules.

The drive’s multi-motor operation optimizes efficiency whilst reducing your costs and space requirements. Integration into your system is simple thanks to the flexible connection to the network through one or several transformers.
Energy efficiency

Our medium voltage drives run your motors based on the demands of your process rather than running them at full speed and ensure optimized power consumption and process efficiency. In this way you can save energy and reduce CO₂ emissions.

Customized solutions thanks to modular design

Enjoy the benefits of a proven, modular drive for even your most demanding single- or multi-motor applications. Combine standardized and engineered modules to get exactly the configuration that fits your requirements and allows your application to achieve optimum performance.

Design flexibility for smooth integration

Thanks to the compact and modular design, the ACS6000 can be easily integrated into your systems. You can use the drive with one or several supply transformers and for applications with or without regeneration capability. A wide range of standardized options can be integrated into the drive.

Increased productivity due to precise process control

Reduce your energy consumption and increase process efficiency with ABB’s Direct Torque Control (DTC) technology. The drive control is immediate and smooth in any conditions, ensuring optimum output and productivity.
Highest level of personnel safety

Your people and goods are protected from electric arcs as the ACS6000 features an advanced arc resistant design. Certified functional safety features, an integrated DC grounding switch and door interlocking make your systems even safer and more reliable.

High reliability through well-proven design

Reliability is ensured thanks to the simple and fuseless design of the ACS6000. A low parts count and proven components result in high uptime and a long lifetime of the drive. Availability is further increased with the drive’s power loss ride-through function.

Drive robustness ensures high availability

The robust ACS6000 effortlessly drives your high power applications and controls operations even in harsh environments using the IP54 solution. Special features such as automatic restart ensure high availability of your processes.

Serviceability

Easy front access to all components ensures that service and maintenance for the ACS6000 is simple and smooth. Complete phase modules can be exchanged easily and quickly. In addition to powerful diagnostic tools, you can profit by convenient remote monitoring.
With the ACS6000 you can control your high performance applications in the metals, marine and mining industries.
Applications

Cement, mining and minerals
Mine hoists, conveyors, crushers and mills

Marine
Propulsion, thrusters, shaft generators, pumps and compressors

Chemical, oil and gas
Pumps, compressors, extruders, mixers and blowers

Metals
Rolling mills, coilers, pumps and fans

Power generation
Fans and pumps

Water
Pumps

Other applications
Test stands, wind tunnels, grid simulators and shore-to-ship supplies
Customized solutions enable a smooth integration of the drive into any industrial environment.

**Easier than you think**
With its modular design, you can easily integrate the ACS6000 into any industrial environment. The drive can be optimally configured for single-motor and multi-motor applications without additional control equipment. The high power density, the compact footprint and the drive’s communication abilities minimize the overall installation costs.

**Flexible network connections**
The ACS6000 can be connected to the network through one or several transformers depending on process, power and harmonics requirements. Optionally, the integration of a harmonic filter is possible for weak networks.

**Power factor correction**
The drive can also provide reactive power (VAR) compensation, controlling the voltage level to stay within tight limits. A smooth network voltage profile can be maintained and reactive power penalties can be avoided.

**Control system**
We offer an open communication concept, enabling connection to a Programmable Logic Controller (PLC) or a Distributed Control System (DCS). Fieldbus connectivity with a wide variety of protocols is available. The ACS6000 platform offers the possibility to monitor the transformers, as well as the motors with the drive’s control system.

**Commissioning**
You can benefit from the ACS6000s multidrive configuration as commissioning is much faster compared to using the equivalent number of single drives. The commissioning wizard DriveStartup is an advanced tool that simplifies and speeds up commissioning. Standardized parameter sets and trained, certified professionals ensure smooth and fast commissioning.
Packaged drive solutions provide you with ultimate efficiency and reliability to optimize your cost of ownership.

All in one package
Committed to supporting you in your business, we offer packaged drive solutions for applications in various industries. Customer-specific drive packages including medium voltage converters, motors and transformers can be developed as turnkey solutions meeting your individual requirements.

Matched performance
To ensure design integrity and an optimum match of equipment, ABB products have undergone combined tests ensuring performance predictability for your application.

Single point of contact
The combined power of the ABB offering is geared to deliver on customer expectations. We deliver motor-drive solutions that support your technical and commercial needs, from quotation, through delivery and service, over the entire product life-cycle.

Converter motors
With ABB’s motors for your applications you will benefit from high versatility, reliability and simplicity.

Converter transformers
ABB offers converter transformers for all ratings, as well as for indoor or outdoor mounting. Particularly designed for operation with variable speed drives, the transformer adapts the converter to the supply network and provides a galvanic isolation between drive and supply network.
Service and support
You choose, we respond, globally

For decades we have built one of the most comprehensive service networks, globally. It is well-structured to ensure you have all the experts close at hand, locally and globally. We have local drives and control service units complemented by external ABB value providers in over 60 countries. Regional service centers, training centers and authorized drive service workshops form a well-structured and large service organization, making sure that ABB drives and control service team is never too far from your site.

For everyone who makes the decision to choose our expert drive service solutions, we are with them every step of the way. To guide and facilitate whatever service choices suit their business, for the entire drive's lifetime. With expert service and advice and on-time delivery, every time.

1500 service professionals

Services in more than 60 countries

120 years of drives technology knowledge and experience

500 service partners

Providing services for drives for almost 40 years
Technical features
Modular solution with unique features

**Modular drive design**
The modular product platform of the ACS6000 allows the optimum configuration of any drive system. The compact, standardized design and the integrated water cooling system will reduce your space requirements and have positive impacts on your room air conditioning.

The ACS6000 is designed as a set of modules that are arranged according to the required output power, motor configuration and process needs. The use of well-proven modules minimizes the risk of design errors even when complex systems are engineered.

Depending on the application, three basic types of configurations are used.

**Single-motor drive configurations**
Single-motor configurations are commonly used in applications that require large, independent and decentralized drives. They are suitable for synchronous, induction and permanent magnet motors with passive or active front end.

**Multi-motor drive configurations**
Up to eight motors can be linked to a common DC bus, enabling multiple motor operation. Synchronous and/or induction motors, high or low power, any combination is possible in order to provide the optimum configuration with passive or active front end.

**Redundant drive configurations**
Single drives can be configured to allow various schemes for redundancy for motors with two winding systems. This will increase the availability of your drive system.
The ACS6000 is equipped with SIL (safety integrity level) 3 and PL (performance level) e certified functional safety features making your systems even safer and more reliable. An integrated grounding switch and door interlocking ensure the highest safety standards for your personnel.

Optimized energy flow
The common DC bus allows several motors to be connected to the same DC bus, providing an optimized energy flow.

The braking energy generated in one motor can be transferred to other inverters via the common DC bus without power consumption from the supply network. Due to the near unity power factor throughout the whole speed range, the energy efficiency is optimal.

Flexible drive design
Integrating the ACS6000 into your systems is smooth and simple. It can control both low and standard speed motors, enabling operation without a gearbox. Depending on your system, you can operate the drive with one or several transformers. For special applications, we can offer you even a transformerless solution. You can select from our broad range of options to configure your system.

Power loss ride-through
A special feature of DTC is its ability to ride through short main supply voltage interruptions so that in most cases the process is not affected.

Powerful performance with DTC
Fast and accurate process control in combination with low energy consumption results in top performance. The motor control platform of the ACS6000 is based on ABB’s award-winning Direct Torque Control (DTC) technology. DTC provides the highest torque and speed performance ever achieved in medium voltage drives. As a result, control of the drive is immediate and smooth under all conditions.

IGCT semiconductors
The ACS6000 uses a power semiconductor known as IGCT (Integrated Gate Commutated Thyristor), which is an ideal switch for high-powered medium voltage applications. The use of IGCTs results in a low parts count, providing an efficient and reliable drive. The inherently low total losses of the IGCT require less cooling resulting in smaller cooling equipment.

Fuseless design
The converter design does not require any medium voltage power fuses, which are known to be unreliable, costly and subject to aging. The ACS6000 uses IGCTs which provide faster and more reliable protection for the power components. The protection scheme responds in less than 25 μsec, about two hundred times faster than fuses.

Drive robustness
Special control features of the ACS6000 drive allow reliable operation in both weak and unbalanced networks. The drive is available with IP54 enclosure, making it suitable for operations even in harsh environments.

Highest level of personal and equipment safety
Electric arcs represent a hazard source for people and goods. For systems where large and dangerous arc fault currents can occur, special attention is required. Therefore, the ACS6000 is equipped with a superior protection function and ABB’s Arc Guard System™. This IAC classified solution assures very fast arc detection and elimination (less than 6 ms) to protect people and equipment and eliminate unnecessary production stops.

Reliable and efficient components
The combination of well-proven parts and an innovative topology results in a reliable drive solution to control your processes.

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Cost and energy savings are possible with a water-cooled drive system that is configured to fully meet your needs.

- User-friendly drive control panel for local operation
  - Keypad with multi-language display
  - Main supply on/off pushbuttons
  - Emergency off pushbutton

- EMC compliant cabinet for problem-free operation in electromagnetic environment

- DC bus grounding switch and electromechanically interlocked doors of power sections for personal safety

- Terminal Unit (TEU) and Control Unit (COU)
  Contains the power terminals and the control swing frame

- Capacitor Bank Unit (CBU)
  DC capacitors for smoothing the intermediate DC voltage

- Water Cooling Unit (WCU)
  Supplies deionized water for cooling the main power components

- Active Rectifier Unit (ARU)
  Self-commutated, 6-pulse, 3-level voltage source inverter with IGCT technology

- Inverter unit (INU)
  Self-commutated, 6-pulse, 3-level voltage source inverter with IGCT technology

- Voltage Limiter Unit (VLU)
  Optional dynamic DC voltage limiter

- Power Electronic Building Block (PEBB),
  One phase leg of a 3-level Voltage Source Inverter (VSI) topology, which can be used both as an AC to DC or DC to AC converter
## Technical data

### At a glance

<table>
<thead>
<tr>
<th>Input</th>
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| Input configuration | 6-, 12- or 24-pulse diode rectifier  
6-, 12- or 18-pulse active rectifier |
| Input voltage | 6-pulse diode rectifier: 3300 V  
12- and 24-pulse diode rectifier: 1725 V  
6-, 12- and 18-pulse active rectifier: 3160 V |
| Input voltage variation | ±10% without derating  
+15/-30 with derating |
| Input frequency | 50/60 Hz |
| Input frequency variation | ±5% |
| Input power factor | Diode rectifier: >0.95  
Active rectifier: standard 1.0, optionally controllable |
| Input harmonics | Compliance with IEC61000-2-4 and IEEE 519 |
| Auxiliary voltage | Control (optional): 110, 220 VDC or 110 – 240 VAC 50/60 Hz  
Auxiliary: 380 – 690 VAC 50/60 Hz, 3-phase |

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<tr>
<th>Output</th>
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<tbody>
<tr>
<td>Output power</td>
<td>5000 – 36000 kW</td>
</tr>
<tr>
<td>Output voltage</td>
<td>2.3 – 3.3 kV</td>
</tr>
<tr>
<td>Output frequency</td>
<td>0 – 75 Hz (higher on request)</td>
</tr>
<tr>
<td>Motor type</td>
<td>Induction, synchronous and permanent magnet</td>
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<tr>
<td>Efficiency of converter</td>
<td>&gt;98%</td>
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</table>

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<thead>
<tr>
<th>Mechanical</th>
<th></th>
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</table>
| Enclosure | Standard: IP32  
Optional: IP42, IP54 |
| Cable entry | Top/bottom |

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<th>Environmental</th>
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<tbody>
<tr>
<td>Altitude</td>
<td>2000 m.a.s.l. (higher with derating)</td>
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<tr>
<td>Ambient air temperature</td>
<td>+0 – +40 °C (lower and higher with derating)</td>
</tr>
<tr>
<td>External cooling water temperature</td>
<td>+5 – +32 °C (lower and higher with derating)</td>
</tr>
<tr>
<td>Noise</td>
<td>&lt;75 dB (A)</td>
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<tr>
<td>Cooling type</td>
<td>Water</td>
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<tr>
<td>Standards</td>
<td>EN, IEC, CE, (optional CSA and all common marine standards)</td>
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</table>
### Ratings, types and voltages

**ACS6000 water-cooled**

<table>
<thead>
<tr>
<th>Motor data</th>
<th>Converter data</th>
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<tbody>
<tr>
<td><strong>Nominal rating</strong></td>
<td><strong>Type code</strong></td>
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<tr>
<td>kw¹</td>
<td>hp¹</td>
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<tr>
<td><strong>3300 V - induction motors, single drive with passive front end</strong></td>
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<tr>
<td>4300</td>
<td>5800</td>
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<tr>
<td>6000</td>
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<td>7700</td>
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<td>27100</td>
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<td>23200</td>
<td>31100</td>
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<td><strong>3300 V - induction motors, single drive with active front end</strong></td>
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<td>23200</td>
<td>31100</td>
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<tr>
<td><strong>3300 V - synchronous motors, single drive with passive front end</strong></td>
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<td>4800</td>
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<td><strong>3300 V - multidrive examples with passive front end</strong></td>
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Notes:

¹ Indicative information: induction motor efficiency 97.5%, power factor 0.88; synchronous motor efficiency 97.5%, power factor 1.0.

Dimensions:

- **Height:** 2200 mm cabinet height
- **Depth:** 1040 mm

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Contact us

For more information contact your local ABB representative or visit:

www.abb.com/drives

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