The drive solution for your medium voltage challenges

Altivar Process ATV6000
Introducing Altivar Process ATV6000

The Altivar™ Process ATV6000 services-oriented drive completes the Altivar Process line-up with a solution to address your medium voltage operation and maintenance challenges.

ATV6000 is a smart, connected product which will help optimize your business by:

- Enabling process optimization
- Improving energy management
- Enhancing asset management
- Providing a tailored engineering solution

Improved performance without the additional investment

The ATV6000 improves your process performance and asset management capability to transform data into valuable and actionable business insights. As a result, you get increased overall equipment effectiveness (OEE) and optimized total cost of ownership (TCO).

- Services-oriented drives for 0 to 20MW
- Real-time intelligence
- Easy integration in process automation systems
- Intuitive and easy to use
- Optimized performance of applications such as fans, pumps, compressors and conveyors
- EcoStruxure™-ready

Altivar Process ATV6000

The first services-oriented drive for medium voltage operations with measureable benefits.

Connected products for smarter operations

ATV6000’s connectivity integrates at every level of EcoStruxure.

Apps & Analytics & Services

Edge Control

Connected Products

Scada
Web server
Asset Advisor

On Premise

* Based on previous data. This is not a guarantee of future performance or performance in your particular circumstance.
Targeted applications

Altivar Process ATV6000 continues to establish medium voltage AC drive product technology, in-depth application expertise, and the ability to offer comprehensive, cost-efficient, and application-specific solutions for industries.

Mining, Mineral & Metals

Material handling:
- Overland Conveyor
- Single/Multi Flat Conveyor
- Transfer Conveyor
- Belt Conveyor

Grinding:
- High Pressure Grinding Roller
- SAG / Ball Mill
- Vertical Roller Mill
- Jaw Crusher Mill

Processing:
- Sintering / De-dusting / ID Fan
- Mill Fan
- Blast Furnace
- Slurry Pump
- Rotary Kiln

Water extraction:
- Natural Spring/Well/Pump
- Electro Submersible Pump
- Raw Water Intake Pump

Water treatment:
- Raw Water Intake Pump
- Lifting Station
- High Pressure Pump
- Air Blower/Compressor

Water transportation:
- Booster Pump
- Multi-pump Station
- Distribution Pump
Altivar Process ATV6000

Targeted applications

**Oil & Gas**
- **Upstream:**
  - ESP (Electric Submersible Pump)
  - Crude Oil Transfer Pump
  - Injection Pump
  - FPSO Pumps/Compressors
- **Midstream:**
  - LNG Compressor
  - Gas Booster Compressor
  - Pipeline Pumps
  - Load Commutate Inverter Retrofit (Compressors)
- **Downstream:**
  - Petrochemical Fan/Pump
  - Extruder
  - Mixer
  - Blower

**Power Plant**
- **Fuel handling:**
  - Coal Belt Conveyor
  - Coal Mill
  - Oil Pump
- **Thermal power plant:**
  - Boiler Feed-Water Pump
  - Cooling Water Circulation Pump
  - Primary/Secondary Draft Fan/ID Fans
  - Cooling Tower Fan
  - Condense Water Pump
- **Gas turbine power plants:**
  - Fuel Gas Booster Compressors
  - Boiler (HRSG)
  - Feed-Water Pumps
  - Cooling Water Pumps
  - Condense Water Pump
ATV6000 product features

User friendly interface

- 10” Magelis HMI, based on Altivar Process structure, easy to use and clear parameter structure
- Languages: English, Spanish, French, German, Russian, Chinese
- Four signal lamps as standard for clear indication of drive status: (Ready, Run, Warning, Alarm)
- Easy to operate and fast commissioning
- Dynamic QR code for instantaneous help
- Error and warning history logging
- Oscilloscope function
- Versatile I/O usage

Robust design

- Failure tolerant operation
  - Cell bypass function
  - Uninterrupted operation in case of inverter failure
  - Without load derating
- Safety
  - Mechanical key interlock system
  - Security lock-screw: Special door opening tool required
  - Door handle lock
  - 4 peepholes on each door of the power cell cabinet
- Environment
  - Operating temperature: 0°C to +40°C w/o derating, up to +50°C with derating on power
  - Altitude: Up to 2000m within defined conditions
  - Chemical environment 3C2
  - Mechanical environment 3S1
  - Pollution degree 2
  - Conformal coated boards
ATV6000 product features

Communication versatility

- Standard: Ethernet dual port
  (Ethernet IP, Modbus TCP) Modbus SL
- Optional: Profibus, Profinet, EtherCAT, DeviceNet

Integrated transformer

- Compactness: Fewer cables and simpler commissioning
- Clean power
  - 18-66 pulse operation
  - Clean sinusoidal current and voltage wave form

High-performance inverter

- Inverter efficiency: 98.5% efficiency
- Motor-friendly
  - Up to 23 levels of pulse-width modulation (PWM) for minimal switching surges
  - Insignificant harmonics
  - Up to 2km motor cable length
Predictive maintenance with EcoStruxure Asset Advisor

ATV6000 provides a unique solution to optimize the operation and maintenance of your installation. It allows you to manage maintenance tasks on your assets with preventive and predictive management based on real-time assessments and predictive analytics. All thanks to the combination of smart connected device technologies and powerful cloud-based risk prediction capabilities.

The ATV6000 with EcoStruxure Asset Advisor transforms data into insight to help run your operations more efficiently and safer, with more availability, and increased profits.

Continuous health monitoring

The operator gets a complete health monitoring view of its assets and conditions of usage (drive, transformer, MCB, motor) and the assets are seen as super-sensors providing relevant data and KPIs.

Risk evaluation

The operator knows in real-time where and what risks are on the installation. Predictive analytics constantly evaluates the level and criticality of risk by looking at an asset, the process duty cycle, and the condition of usage. This enables the ability to predict, in advance, a potential failure or dysfunction of the installation.

Risk mitigation

The operator receives notification of the necessary maintenance task required at the right time to secure the asset and production at minimal cost, mitigating the risks of downtime.

EcoStruxure Asset Advisor - digital services for your medium voltage drive

MV Transformer aging & failure prediction
- Load factor
- Hotspot temperature profile
- Ambient temperature profile
- Temperature discrepancy
- Contact quality
- Partial discharge

Fan aging calculation
Over temperature prediction

Dust filter clogging prediction
Ambient environment monitoring

Drive & Motor aging (Electrical and thermal)
Failure probability & fault detection
Dynamic update of the interval based maintenance plan
Predictive maintenance with EcoStruxure Asset Advisor

EcoStruxure Asset Advisor provides features to efficiently manage the integrity of your equipment:

- Using predictive maintenance for maintenance planning
- Risks and safety management solutions

Financial management (Opex & Capex):

- Energy management
- Optimized maintenance budgeting

Piloting the performance of your production:

- 360° diagnostic with report and analysis
- Record-keeping of your critical assets
- Database management for improvement analytics

Be aware of potential risk and the performance of your installation

- Health and aging monitoring
- Asset and environment conditions and status

Get expert diagnostic and risk management of your production tool

- Advanced report analysis & diagnostic
- Advanced mitigation plan & maintenance planning
- Live connected Service Bureau and worldwide coverage

Be informed of events or risks on the installation for fast intervention

- Email: complete automatic and customized analysis
- SMS notification of events and alarms

Secure your production and generate savings

- Do it yourself: Get a step-by-step mitigation plan with work order
- On demand: On-site maintenance intervention by a Schneider-Electric Drive Service expert

Authorized access by local authority
- Encrypted data

Secured connection gateway (unidirectional data flow)

Cybersecurity Achilles level 2

Digital Dashboard

SE Service Officer 24/7

Notifications

Work Order

Notifications

Asset View

Cybersecurity Achilles level 2

Secured connection gateway (unidirectional data flow)

Cybersecurity Achilles level 2

Secured connection gateway (unidirectional data flow)
Achieve a higher level of service operation

With the ATV6000 you can optimize production and improve productivity by 20%*. With its digital capabilities and mechanical characteristics, you get:

- Improved operator efficiency
- Easy troubleshooting with dynamic QR codes
- Easy access to technical documentation from anywhere
- Remote technical support
- Minimized downtime

Simple, comfortable usability with the 10” Magelis HMI

- Graphical dashboard
- Simple-to-read KPIs
- Process monitoring (Vijeo designer)
- Multi-language pre-set interface (6 as standard)
- Real-time and historical data helps quickly detect deviations to avoid device breakdown

Reliable, actionable, and relevant information with embedded web server

- Connection to IT functions
- One click access to live insights, available 24/7
- Data diagnosis for quick intervention on potential risks

Quick and easy on-site maintenance operation

Faster intervention and optimized management of spare parts stock. Thanks to the ATV6000’s modular architecture and easy front access design, you get simple parts replacement, quicker maintenance, and minimized spare parts stock references.

- All inverter power modules are identical and exchangeable with each other
- One unique inverter module type
- Control cabinet and power cabinet can be maintained with easy front access design

Energy management benefits of the ATV6000

The Altivar 6000 provides you with sustainable energy efficiency without the extra cost. Here’s how the ATV6000 can help you optimize and reduce your energy consumption by up to 30%*:

Better usage of energy

- Embedded power management with <5% measurement error
- Key performance indicators and lifetime monitoring on energy usage
- Smart data collection and access to real-time information

Use of clean power

- Designed for seamless integration into installation
- Eliminated need for harmonic filtering on line side
- Minimized energy waste
- Reduced motor losses, vibrations, and torque pulses with advanced harmonic-free technology THDi<3%
Tailored solutions

The ATV6000 provides a high level of customization to meet specific purposes, offering flexibility for modifications and extensions. This means that no matter what the challenge, electrical or mechanical, our application specialists and design engineers will provide you with optimized solutions resulting in Capex and Opex savings. The benefits include:

- Global and local engineering and application center
- Energy audit on retrofit or evaluating new project
- Ready-to-use Application Function Blocks (AFBs)
- Dedicated design team
- Strong technical team to ensure efficient process control
- 24/7 local service team for fast, professional support
- Deep understanding and careful analysis of your needs, constraints and challenges
- Ability to customize solutions to fit specific purposes

Turnkey Solution

- E-house
- Cooling
- Plant
- Sub station

Architecture (TVDAs)

- Applicative solutions in segments of
  - MMM
  - Energy
  - Oil & Gas
  - WWW

Automation System integration

- Drive interface
- Automation control
- Solution & programming
- Power distribution

Product (Drive)

- Mechanical (size/weight/options)
- Electrical (options cabling)
- Automation (control/features)

Service

- Service package
- Onsite asset management
- Digital service subscription
- Spare parts management
Enhance your equipment effectiveness and reduce downtime

Designed to ensure the continuity of your process and optimize maintenance costs, ATV6000 incorporates innovative power technology and advanced communication capabilities.

Failure-tolerant operations prevent production stoppages, even in the case of power module failure:
- ATV6000 is equipped with level inverter bypass features. This system enables balance phases without modifying IGBT’s PWM to avoid an artificial shift of the neutral point that might create common mode voltage.
- The contactless bypass switch system is not sensitive to dust, delivering high performance in all environmental conditions.

Maximized performance and production output for sustainable operation efficiency:
- Apply condition-based monitoring techniques and advanced system management to collect and analyze data to react in case of deviation from the best efficiency point.
- Detect deviation and perform at the optimal point.
- Determine BEP based on pumps, motor characteristic and the condition of usage.
- Generate saving after adjustment of operation point.

IIoT ready EcoStruxure solutions for control of operation and maintenance:
- EcoStruxure Hybrid DCS and Modicon™ M580 compatible, enabling use of specific libraries for quicker product implementation and commissioning.
- DTM library and application function blocks provide full programming and diagnostic functions.
- EcoStruxure Asset Advisor uses the drive as a super sensor for predictive maintenance.
An optimized end-to-end customer solution

Schneider Electric’s comprehensive support and maintenance assistance is backed by our strong engineering expertise and extensive industrial application knowledge. When you opt for the ATV6000, you will be assured of customized end-to-end solutions that encompass the entire service cycle of planning, installing, operating, optimizing and maintaining it.

Audit and consultancy:
- Architecture and application study
- Line supply consultancy (compensation, filtering, harmonics, etc.)
- Shaft line study (torsional analysis, etc.)
- Energy efficiency, enabling an optimized drive solution

Installation and start-up with:
- Installation supervision
- Commissioning
- Assistance and troubleshooting

Factory tests:
- Deliver factory acceptance test (FAT)
- Test at maximum power with or without motor

Customized training
- On user site or in Schneider Electric training center
- Official qualification for medium-voltage drive operations

Spare parts:
- Supply worldwide
- Local stock management

Maintenance plan:
- Preventive time-based, predictive, corrective and condition-based to avoid failure
- Specific maintenance contract (with optional remote access and reconditioning)

Digital services:
- On-screen and issue-specific QR codes help your operators diagnose problems quickly
- Online troubleshooting with step-by-step procedures
- Track and analyze events related to your drive
- Automatic creation of technical support requests

Retrofit and modernization services:
- Renewal, enhancement and upgrade; audit, study and solution design
- Retrofit of obsolete devices any brands
Altivar 6000 general technical specification

### Standard features

<table>
<thead>
<tr>
<th>Altivar 6000 Medium Voltage Drive Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
</tr>
<tr>
<td>• 18-66 pulse diode rectifier bridge</td>
</tr>
<tr>
<td><strong>Output</strong></td>
</tr>
<tr>
<td>• Multilevel PWM with 2 level low-voltage IGBT inverter cells</td>
</tr>
<tr>
<td><strong>Input voltage</strong></td>
</tr>
<tr>
<td>• 2.4kV, 3.0 kV, 3.3kV, 4.16kV, 5.5kV, 6.0kV, 6.3kV, 6.6kV, 6.9kV, 10kV, 11kV, 13.8kV</td>
</tr>
<tr>
<td><strong>Input frequency</strong></td>
</tr>
<tr>
<td>• 50/60 Hz ±5%</td>
</tr>
<tr>
<td><strong>Overload capability</strong></td>
</tr>
<tr>
<td>• Standard overload 120% 60s/10 min and 150% 3s/10 min</td>
</tr>
<tr>
<td>• High overload 150% 60s/10 min, 185% 3s/10 min</td>
</tr>
<tr>
<td><strong>Total harmonics THD(i)</strong></td>
</tr>
<tr>
<td>• Complies with the requirements of power quality standard of IEEE519-1992</td>
</tr>
<tr>
<td><strong>Input power factor</strong></td>
</tr>
<tr>
<td>• ≥ 0.96 from 20% to 100% of load</td>
</tr>
<tr>
<td><strong>Cable entry</strong></td>
</tr>
<tr>
<td>• Bottom (others on request)</td>
</tr>
<tr>
<td><strong>Trigger signal transmission</strong></td>
</tr>
<tr>
<td>• Fiber optic transmission</td>
</tr>
<tr>
<td><strong>Efficiency at rated power</strong></td>
</tr>
<tr>
<td>• Inverter efficiency is 98.5%. Drive efficiency including input transformer is 96% to 96.5% depending on product.</td>
</tr>
<tr>
<td><strong>Type of motor</strong></td>
</tr>
<tr>
<td>• Asynchronous motor, synchronous motor, permanent magnet motor</td>
</tr>
<tr>
<td><strong>Three-phase output voltage for motor connection</strong></td>
</tr>
<tr>
<td>• 0 to input voltage</td>
</tr>
<tr>
<td><strong>Output frequency</strong></td>
</tr>
<tr>
<td>• Up to 120Hz</td>
</tr>
<tr>
<td><strong>Control power supply</strong></td>
</tr>
<tr>
<td>• 100…240VAC±10% (47…63Hz, 120…370VDC, 1kVA capacity, other voltage on request)</td>
</tr>
<tr>
<td><strong>Auxiliary power supply</strong></td>
</tr>
<tr>
<td>• 230VAC±10%, capacity depending on auxiliary options</td>
</tr>
<tr>
<td><strong>Cooling fan power supply</strong></td>
</tr>
<tr>
<td>• 400VAC±10%, capacity depending on drive reference. Other voltage on request</td>
</tr>
<tr>
<td><strong>Communication port protocol</strong></td>
</tr>
<tr>
<td>• Modbus TCP, Ethernet IP, Modbus serial</td>
</tr>
<tr>
<td><strong>HMI</strong></td>
</tr>
<tr>
<td>• 10inch, color graphic, touch screen, multi-languages</td>
</tr>
<tr>
<td><strong>Control interface</strong></td>
</tr>
<tr>
<td>• 8 DI, 3AI, 2AO, 3 relay output (more on request)</td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
</tr>
<tr>
<td>• Standard: IP31</td>
</tr>
<tr>
<td>• Option: IP41, IP42</td>
</tr>
<tr>
<td><strong>Paint</strong></td>
</tr>
<tr>
<td>• RAL 7035</td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
</tr>
<tr>
<td>• Forced air ventilation</td>
</tr>
<tr>
<td><strong>EMC</strong></td>
</tr>
<tr>
<td>• C4 for power, C3 for control</td>
</tr>
<tr>
<td><strong>Reference standard</strong></td>
</tr>
<tr>
<td>• IEC EN 61800-3, IEC EN 61800-4, IEC EN 61800-5-1, IEC EN 60529, IEEE 519 and other optional ones</td>
</tr>
<tr>
<td><strong>Product certification</strong></td>
</tr>
<tr>
<td>• CE, EAC</td>
</tr>
</tbody>
</table>

### Environment features

| Storage temperature                     |
| • 0°C to 50°C                           |
| **Transportation temperature**          |
| • -25°C to 70°C                         |
| **Working temperature**                 |
| • 0-40°C, up to 50°C possible with derating |
| **Relative humidity**                   |
| • Up to 95% (without condensate)        |
| **Altitude**                            |
| • ≤1000m without derating. With derating of 1% every 100m up to 2000 meters |
| **Noise level**                         |
| • Approx. 80 dB (A) - depending on size |
| **Pollution in accordance with IEC 61800-5-1** |
| • Pollution degree 2
Identification code

The product designation of the ATV6000 consists of several points of reference (characters and figures). The meaning of each point is illustrated in the following example.

<table>
<thead>
<tr>
<th>Product range</th>
<th>ATV 6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor for power rating</td>
<td>D x 1kVA</td>
</tr>
<tr>
<td>Transformer rating</td>
<td>470, 470</td>
</tr>
<tr>
<td>Cooling type</td>
<td>A Air cooled</td>
</tr>
<tr>
<td>Input voltage</td>
<td>24 2.4 kV</td>
</tr>
<tr>
<td>Output voltage</td>
<td>24 2.4 kV</td>
</tr>
<tr>
<td>Style</td>
<td>N No bypass</td>
</tr>
<tr>
<td>Standard</td>
<td>A CE standard</td>
</tr>
<tr>
<td>IP rating</td>
<td>3 IP31</td>
</tr>
</tbody>
</table>