ATV630U30M3
variable speed drive ATV630 - 3kW - 200...240V - IP21/UL type 1

Main
Range of product: Altivar Process AT600
Product or component type: Variable speed drive
Product specific application: Process and utilities
Device short name: ATV630
Variant: Standard version
Product destination: Synchronous motors, Asynchronous motors
Mounting mode: Wall mount
EMC filter: Without EMC filter
IP degree of protection: IP21 conforming to IEC 61800-5-1, IP21 conforming to IEC 60529
Degree of protection: UL type 1 conforming to UL 508C
Type of cooling: Forced convection
Supply frequency: 50...60 Hz - 5...5 %
Network number of phases: 3 phases
[Us] rated supply voltage: 200...240 V - 15...10 %
Motor power kW: 3 kW (normal duty), 2.2 kW (heavy duty)
Motor power hp: 3 hp heavy duty, 4 hp normal duty
Line current: 11.5 A at 200 V (normal duty), 9.9 A at 240 V (normal duty), 8.7 A at 200 V (heavy duty), 7.6 A at 240 V (heavy duty)
Prospective line Isc: 50 kA
Apparent power: 4.1 kVA at 240 V (normal duty), 3.2 kVA at 240 V (heavy duty)
Continuous output current: 13.7 A at 4 kHz for normal duty, 11.2 A at 4 kHz for heavy duty
Maximum transient current: 16.8 A during 60 s (heavy duty), 15.1 A during 60 s (normal duty)

Disclaimer: This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asynchronous motor control profile</td>
<td>Optimized torque mode&lt;br&gt;Variable torque standard&lt;br&gt;Constant torque standard</td>
</tr>
<tr>
<td>Synchronous motor control profile</td>
<td>Permanent magnet motor&lt;br&gt;Synchronous reluctance motor</td>
</tr>
<tr>
<td>Output frequency</td>
<td>0.0001…0.5 kHz</td>
</tr>
<tr>
<td>Speed drive output frequency</td>
<td>0.1…599 Hz</td>
</tr>
<tr>
<td>Nominal switching frequency</td>
<td>4 kHz</td>
</tr>
<tr>
<td>Switching frequency</td>
<td>2…12 kHz adjustable&lt;br&gt;4…12 kHz with derating factor</td>
</tr>
<tr>
<td>Safety function</td>
<td>STO (safe torque off) SIL 3</td>
</tr>
<tr>
<td>Discrete input logic</td>
<td>16 preset speeds</td>
</tr>
<tr>
<td>Communication port protocol</td>
<td>Modbus TCP&lt;br&gt;Ethernet&lt;br&gt;Modbus serial</td>
</tr>
<tr>
<td>Option card</td>
<td>Slot A: communication module, Profibus DP V1&lt;br&gt;Slot A: communication module, Profinet&lt;br&gt;Slot A: communication module, DeviceNet&lt;br&gt;Slot A: communication module, Modbus TCP/EtherNet/IP&lt;br&gt;Slot A: communication module, CANopen daisy chain RJ45&lt;br&gt;Slot A: communication module, CANopen SUB-D 9&lt;br&gt;Slot A: communication module, CANopen screw terminals&lt;br&gt;Slot A/slot B: digital and analog I/O extension module&lt;br&gt;Slot A/slot B: output relay extension module&lt;br&gt;Slot A: communication module, Ethernet IP/Modbus TCP/MD-Link&lt;br&gt;Communication module, BACnet MS/TP&lt;br&gt;Communication module, Ethernet Powerlink</td>
</tr>
<tr>
<td>Complementary</td>
<td>Output voltage &lt;= power supply voltage&lt;br&gt;Permissible temporary current boost: 1.1 x In during 60 s (normal duty)&lt;br&gt;1.5 x In during 60 s (heavy duty)&lt;br&gt;Motor slip compensation: Can be suppressed&lt;br&gt;Automatic whatever the load&lt;br&gt;Adjustable&lt;br&gt;Not available in permanent magnet motor law&lt;br&gt;Acceleration and deceleration ramps: Linear adjustable separately from 0.01…9999 s&lt;br&gt;Braking to standstill: By DC injection&lt;br&gt;Protection type: Thermal protection: motor&lt;br&gt;Safe torque off: motor&lt;br&gt;Motor phase break: motor&lt;br&gt;Thermal protection: drive&lt;br&gt;Safe torque off: drive&lt;br&gt;Overheating: drive&lt;br&gt;Overcurrent between output phases and earth: drive&lt;br&gt;Overload of output voltage: drive&lt;br&gt;Short-circuit protection: drive&lt;br&gt;Motor phase break: drive&lt;br&gt;Overvoltages on the DC bus: drive&lt;br&gt;Line supply overvoltage: drive&lt;br&gt;Line supply undervoltage: drive&lt;br&gt;Line supply phase loss: drive&lt;br&gt;Overspeed: drive&lt;br&gt;Break on the control circuit: drive&lt;br&gt;Frequency resolution: Display unit: 0.1 Hz&lt;br&gt;Analog input: 0.012/50 Hz&lt;br&gt;Electrical connection: Control: removable screw terminals&lt;br&gt;Motor: screw terminals&lt;br&gt;Line side: screw terminals&lt;br&gt;Connector type: RJ45 (on the remote graphic terminal) for Ethernet/Modbus TCP&lt;br&gt;RJ45 (on the remote graphic terminal) for Modbus serial&lt;br&gt;Physical interface: 2-wire RS 485 for Modbus serial&lt;br&gt;Transmission frame: RTU for Modbus serial&lt;br&gt;Transmission rate: 10/100 Mbit/s for Ethernet IP/Modbus TCP&lt;br&gt;4.8, 9.6, 19.2, 38.4 kbit/s for Modbus serial</td>
</tr>
</tbody>
</table>
Exchange mode
Half duplex, full duplex, autonegotiation Ethernet/Modbus TCP

Data format
8 bits, configurable odd, even or no parity for Modbus serial

Type of polarization
No impedance for Modbus serial

Number of addresses
1…247 for Modbus serial

Method of access
Slave Modbus TCP

Supply
External supply for digital inputs: 24 V DC (19…30 V), <1.25 mA, protection type: overload and short-circuit protection
Internal supply for reference potentiometer (1 to 10 kOhm): 10.5 V DC +/- 5 %, <10 mA, protection type: overload and short-circuit protection
Internal supply for digital inputs and STO: 24 V DC (21…27 V), <200 mA, protection type: overload and short-circuit protection

Local signalling
3 LEDs local diagnostic:
3 LEDs (dual colour) embedded communication status:
4 LEDs (dual colour) communication module status:
1 LED (red) presence of voltage:

Width
144 mm

Height
350 mm

Depth
203 mm

Net weight
4.5 kg

Analogue input number
3

Analogue input type
AI1, AI2, AI3 software-configurable voltage: 0…10 V DC, impedance: 30 kOhm, resolution 12 bits
AI1, AI2, AI3 software-configurable current: 0…20 mA/4…20 mA, impedance: 250 Ohm, resolution 12 bits

Discrete input number
8

Discrete input type
DI1…DI6 programmable, 24 V DC (<= 30 V), impedance: 3.5 kOhm
DI5, DI6 programmable as pulse input: 0…30 kHz, 24 V DC (<= 30 V)
STOA, STOB safe torque off, 24 V DC (<= 30 V), impedance: > 2.2 kOhm

Input compatibility
DI1…DI6: discrete input level 1 PLC conforming to EN/IEC 61131-2
DI5, DI6: discrete input level 1 PLC conforming to IEC 65A-68
STOA, STOB: discrete input level 1 PLC conforming to EN/IEC 61131-2

Discrete input logic
Positive logic (source) (DI1…DI6), < 5 V (state 0), > 11 V (state 1)
Negative logic (sink) (DI1…DI6), > 16 V (state 0), < 10 V (state 1)
Positive logic (source) (DI5, DI6), < 0.6 V (state 0), > 2.5 V (state 1)

Analogue output number
2

Analogue output type
Software-configurable voltage AO1, AO2: 0…10 V DC, impedance 470 Ohm, resolution 10 bits
Software-configurable current AO1, AO2: 0…20 mA, resolution 10 bits

Sampling duration
2 ms +/- 0.5 ms (DI1…DI4) - discrete input
5 ms +/- 1 ms (DI5, DI6) - discrete input
5 ms +/- 0.1 ms (AI1, AI2, AI3) - analog input
10 ms +/- 1 ms (AO1) - analog output

Accuracy
+/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input
+/- 1 % AO1, AO2 for a temperature variation 60 °C analog output

Linearity error
AI1, AI2, AI3: +/- 0.15 % of maximum value for analog input
AO1, AO2: +/- 0.2 % for analog output

Relay output number
3

Relay output type
Configurable relay logic R1: fault relay NO/NC electrical durability 1000000 cycles
Configurable relay logic R2: sequence relay NO electrical durability 1000000 cycles
Configurable relay logic R3: sequence relay NO electrical durability 1000000 cycles

Refresh time
Relay output (R1, R2, R3): 5 ms (+/- 0.5 ms)

Minimum switching current
Relay output R1, R2, R3: 5 mA at 24 V DC

Maximum switching current
Relay output R1, R2, R3 on resistive load, cos phi = 1: 3 A at 250 V AC
Relay output R1, R2, R3 on resistive load, cos phi = 1: 3 A at 30 V DC
Relay output R1, R2, R3 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 250 V AC
Relay output R1, R2, R3 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 30 V DC

Isolation
Between power and control terminals

Variable speed drive application selection
Building - HVAC Compressor centrifugal
Food and beverage processing Other application
Mining mineral and metal Fan
Mining mineral and metal Pump
Oil and gas Fan
Water and waste water Other application
Building - HVAC Screw compressor
### Environment

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation resistance</td>
<td>&gt; 1 MOhm 500 V DC for 1 minute to earth</td>
</tr>
<tr>
<td>Noise level</td>
<td>54.5 dB conforming to 86/188/EEC</td>
</tr>
<tr>
<td>Power dissipation in W</td>
<td>Natural convection: 34 W at 200 V, switching frequency 4 kHz</td>
</tr>
<tr>
<td></td>
<td>Forced convection: 104 W at 200 V, switching frequency 4 kHz</td>
</tr>
<tr>
<td>Volume of cooling air</td>
<td>38 m³/h</td>
</tr>
<tr>
<td>Operating position</td>
<td>Vertical +/- 10 degree</td>
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<tr>
<td>Maximum THDI</td>
<td>&lt;48 % full load conforming to IEC 61000-3-12</td>
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<tr>
<td>Electromagnetic compatibility</td>
<td>Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2</td>
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<td></td>
<td>Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3</td>
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<tr>
<td></td>
<td>Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4</td>
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<tr>
<td></td>
<td>1.2/50 µs - 8/20 µs surge immunity test level 3 conforming to IEC 61000-4-5</td>
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<td></td>
<td>Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-6</td>
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<tr>
<td>Pollution degree</td>
<td>2 conforming to EN/IEC 61800-5-1</td>
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<tr>
<td>Vibration resistance</td>
<td>1.5 mm peak to peak (f= 2…13 Hz) conforming to IEC 60068-2-6</td>
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<tr>
<td></td>
<td>1 gn (f= 13…200 Hz) conforming to IEC 60068-2-6</td>
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<tr>
<td>Shock resistance</td>
<td>15 gn for 11 ms conforming to IEC 60068-2-27</td>
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<tr>
<td>Relative humidity</td>
<td>5…95 % without condensation conforming to IEC 60068-2-3</td>
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<tr>
<td>Ambient air temperature for operation</td>
<td>-15…50 °C (without) 50…60 °C (with derating factor)</td>
</tr>
<tr>
<td>Ambient air temperature for storage</td>
<td>-40…70 °C</td>
</tr>
<tr>
<td>Operating altitude</td>
<td>&lt;= 1000 m without 1000…4800 m with current derating 1 % per 100 m</td>
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<tr>
<td>Environmental characteristic</td>
<td>Chemical pollution resistance class 3C3 conforming to EN/IEC 60721-3-3</td>
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<td>Dust pollution resistance class 3S3 conforming to EN/IEC 60721-3-3</td>
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<td>Standards</td>
<td>UL 508C</td>
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<td>EN/IEC 61800-3</td>
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<td>Environment 1 category C2 EN/IEC 61800-3</td>
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<td></td>
<td>Environment 2 category C3 EN/IEC 61800-3</td>
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<td>EN/IEC 61800-5-1</td>
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<td>IEC 61000-3-1</td>
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<td>IEC 60721-3</td>
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<td>IEC 61508</td>
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<td>IEC 13849-1</td>
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<td>Product certifications</td>
<td>DNV-GL</td>
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<td>ATEX zone 2/22</td>
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<td>REACH</td>
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<td>UL</td>
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<tr>
<td>Marking</td>
<td>CE</td>
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</tbody>
</table>

### Offer Sustainability

<p>| Sustainable offer status           | Green Premium product                                                                                 |</p>
<table>
<thead>
<tr>
<th>REACh Regulation</th>
<th>REACh Declaration</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU RoHS Directive</td>
<td>Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration</td>
</tr>
<tr>
<td>Mercury free</td>
<td>Yes</td>
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<tr>
<td>RoHS exemption information</td>
<td>Yes</td>
</tr>
<tr>
<td>China RoHS Regulation</td>
<td>China RoHS declaration</td>
</tr>
<tr>
<td>Environmental Disclosure</td>
<td>Product Environmental Profile</td>
</tr>
<tr>
<td>Circularity Profile</td>
<td>End of Life Information</td>
</tr>
<tr>
<td>WEEE</td>
<td>The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins</td>
</tr>
</tbody>
</table>
Product data sheet

ATV630U30M3

Dimensions

Drives with IP21 Top Cover
Right and Front Views

Drives Without IP21 Top Cover
Left and Rear Views
Clearances

<table>
<thead>
<tr>
<th>X1</th>
<th>X2</th>
<th>X3</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 100 mm (3.94 in.)</td>
<td>≥ 100 mm (3.94 in.)</td>
<td>≥ 10 mm (0.39 in.)</td>
</tr>
</tbody>
</table>
Mounting and Clearance

Mounting Types

Mounting Type A: Individual IP21

\[ a \geq 100 \text{ mm (3.94 in.)} \]

Mounting Type B: Side by Side IP20

Mounting Type C: Individual IP20

\[ a \geq 0 \]
Three-Phase Power Supply with Upstream Breaking via Line Contactor

Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1.

(1) Line choke if used
(2) Use relay R1 set to operating state Fault to switch Off the product once an error is detected.

A1 : Drive
KM1 : Line Contactor
Q2, Q3 : Circuit breakers
S1, S2 : Pushbuttons
T1 : Transformer for control part
Three-Phase Power Supply with Downstream Breaking via Contactor

Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1.

(1) Line choke if used
(2) Use relay R1 set to operating state Fault to switch Off the product once an error is detected.

A1: Drive
KM1: Contactor
Control Block Wiring Diagram

(1) Safe Torque Off
(2) Analog Output
(3) Digital Input
(4) Reference potentiometer
(5) Analog Input
R1A, R1BFUQ relay
R2A, R2C Sequence relay
R3A, R3C Sequence relay

Sensor Connection
It is possible to connect either 1 or 3 sensors on terminals AI2 or AI3.
Sink / Source Switch Configuration

The switch is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

- Set the switch to Source (factory setting) if using PLC outputs with PNP transistors.
- Set the switch to Ext if using PLC outputs with NPN transistors.

Switch Set to SRC (Source) Position Using the Output Power Supply for the Digital Inputs

Switch Set to SRC (Source) Position and Use of an External Power Supply for the DIs

Switch Set to SK (Sink) Position Using the Output Power Supply for the Digital Inputs

Switch Set to EXT Position Using an External Power Supply for the DIs
Derating Curves

- 40 °C (104 °F) - Mounting type A, B and C
- 50 °C (122 °F) - Mounting type A, B and C
- 60 °C (140 °F) - Mounting type B and C

In : Nominal Drive Current
SF : Switching Frequency