ATV320U40M3C
variable speed drive, ATV320, 4 kW, 200…240 V, 3 phases, compact

Product availability: Stock - Normally stocked in distribution facility

Price**: 650.00 USD

Main
Range of product  Altivar Machine ATV320
Product or component type  Variable speed drive
Product specific application  Complex machines
Device short name  ATV320
Product destination  Synchronous motors
Asynchronous motors
Format of the control block  Compact
EMC filter  Without EMC filter
IP degree of protection  IP20 IEC 61800-5-1
IP20 IEC 60529
Degree of protection  with conformity kit
Type of cooling  Fan
Phase  3 phase
[Us] rated supply voltage  200…240 V - 15…10 %
Supply frequency  50…60 Hz - 5…5 %
Motor power kW  4.0 kW heavy duty
Maximum Horse Power Rating  5.0 hp heavy duty
Line current  22.4 A 200 V heavy duty
18.8 A 240 V heavy duty
Prospective line Isc  5 kA
Apparent power  7.8 kVA 240 V heavy duty
Continuous output current  17.5 A 4 kHz heavy duty
Maximum transient current  26.3 A 60 s heavy duty
Power range  4…5.5 kW
Asynchronous motor control profile  Voltage/frequency ratio, 5 points
Flux vector control without sensor, standard
Voltage/frequency ratio - Energy Saving, quadratic U/f
Flux vector control without sensor - Energy Saving

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

Dec 4, 2019
<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage/frequency ratio, 2 points</td>
<td>Vector control without sensor</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…16 kHz adjustable 4…16 kHz with derating factor</td>
</tr>
<tr>
<td>Safety function</td>
<td>STO (safe torque off) SIL 3 SLS (safe limited speed) SS1 (safe stop 1) SMS (safe maximum speed) GDL (guard door locking)</td>
</tr>
<tr>
<td>Communication port protocol</td>
<td>Modbus serial CANopen</td>
</tr>
<tr>
<td>Optional communication modules</td>
<td>communication module, CANopen daisy chain RJ45 communication module, CANopen SUB-D 9 communication module, CANopen open style terminal block communication module, EtherCAT RJ45 communication module, DeviceNet communication module, Ethernet/IP communication module, Profinet DP V1 communication module, Profinet communication module, Ethernet Powerlink</td>
</tr>
<tr>
<td>Complementary</td>
<td>Standard version</td>
</tr>
<tr>
<td>Output voltage</td>
<td>&lt;= power supply voltage</td>
</tr>
<tr>
<td>Permissible temporary current boost</td>
<td>1.5 x In 60 s heavy duty)</td>
</tr>
<tr>
<td>Speed range</td>
<td>1…100 asynchronous motor in open-loop mode</td>
</tr>
<tr>
<td>Speed accuracy</td>
<td>+/- 10 % of nominal slip 0.2 Tn to Tn</td>
</tr>
<tr>
<td>Torque accuracy</td>
<td>+/- 15 %</td>
</tr>
<tr>
<td>Transient overtorque</td>
<td>170…200 % of nominal motor torque</td>
</tr>
<tr>
<td>Braking torque</td>
<td>&lt;= 170 % 60 s with braking resistor</td>
</tr>
<tr>
<td>Regulation loop</td>
<td>Adjustable PID regulator</td>
</tr>
<tr>
<td>Motor slip compensation</td>
<td>Automatic whatever the load Adjustable 0…300 % Not available in voltage/frequency ratio (2 or 5 points)</td>
</tr>
<tr>
<td>Acceleration and deceleration ramps</td>
<td>Linear U S CUS Ramp switching Acceleration/deceleration ramp adaptation Acceleration/deceleration automatic stop with DC injection</td>
</tr>
<tr>
<td>Braking to standstill</td>
<td>By DC injection</td>
</tr>
<tr>
<td>Protection type</td>
<td>Input phase breaks drive Overcurrent between output phases and earth drive Overheating protection drive Short-circuit between motor phases drive Thermal protection drive</td>
</tr>
<tr>
<td>Frequency resolution</td>
<td>Display unit 0.1 Hz Analog input 0.012/50 Hz</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Screw terminal 0.5…1.5 mm², AWG 20…AWG 16 control Screw terminal 6 mm², AWG 10 motor/braking resistor Screw terminal 6 mm², AWG 10 power supply)</td>
</tr>
<tr>
<td>Connector type</td>
<td>1 RJ45 on terminal)Modbus/CANopen</td>
</tr>
<tr>
<td>Physical interface</td>
<td>2-wire RS 485 Modbus serial/CANopen</td>
</tr>
<tr>
<td>Transmission frame</td>
<td>RTU Modbus serial</td>
</tr>
<tr>
<td>Transmission rate</td>
<td>4.8, 9.6, 19.2, 38.4 kbit/s Modbus serial 50 kbps, 125 kbps, 250 kbps, 500 kbps, 1 Mbps CANopen</td>
</tr>
<tr>
<td>Data format</td>
<td>8 bits, configurable odd, even or no parity Modbus serial</td>
</tr>
<tr>
<td>Type of polarization</td>
<td>No impedance Modbus serial</td>
</tr>
<tr>
<td>Number of addresses</td>
<td>1…127 CANopen</td>
</tr>
</tbody>
</table>
Method of access
Slave CANopen

Supply
Internal supply for reference potentiometer (1 to 10 kOhm) 10.5 V DC +/- 5 %, <10 mA overload and short-circuit protection

Local signalling
CANopen run 1 LED green)
CANopen error 1 LED red)
Drive fault 1 LED red)

Width
5.51 in (140.0 mm)
Height
7.24 in (184.0 mm)
Depth
6.22 in (158.0 mm)
Net weight
4.85 lb(US) (2.2 kg)

Analogue input number
3
Analogue input type
AI1 voltage 0...10 V DC 30000 Ohm 10 bits
AI2 bipolar differential voltage +/- 10 V DC 30000 Ohm 10 bits
AI3 current 0...20 mA (or 4-20 mA, x-20 mA, 20-x mA or other patterns by configuration) 250 Ohm 10 bits

Discrete input number
7
Discrete input type
Programmable (sink/source) DI1...DI4)24...30 V DC level 1 PLC
Programmable as pulse input 20 kpps DI5)24...30 V DC level 1 PLC
Switch-configurable PTC probe DI6)24...30 V DC
Safe torque off STO)24...30 V DC - 1500 Ohm

Discrete input logic
Negative logic (sink) DI1...DI6), > 19 V, < 13 V
Positive logic (source) DI1...DI6), < 5 V, > 11 V

Analogue output number
1
Analogue output type
AQ1 software-configurable current 0...20 mA 800 Ohm 10 bits
AQ1 software-configurable voltage 0...10 V 470 Ohm 10 bits

Sampling duration
2 ms AI1, AI2, AI3) - analog input
2 ms AQ1) - analog output

Accuracy
+/- 0.2 % AI1, AI2, AI3 for a temperature of -10...60 °C analog input
+/- 0.5 % AI1, AI2, AI3 for a temperature of 25 °C analog input
+/- 1 % AQ1 for a temperature of 25 °C analog output
+/- 2 % AQ1 for a temperature of -10...60 °C analog output

Linearity error
AI1, AI2, AI3 +/- 0.2...0.5 % of maximum value analog input
AQ1 +/- 0.3 % analog output

Discrete output number
3
Discrete output type
Configurable relay logic R1A, R1B, R1C) NO/NC - 100000 cycles
Configurable relay logic R2A, R2B) NO - 100000 cycles
Logic LO)

Refresh time
Logic input DI1...DI6)8 ms +/- 0.7 ms
Relay output R1A, R1B, R1C)2 ms
Relay output R2A, R2C)2 ms

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

Maximum switching current
Relay output R1 resistive, cos phi = 1 3 A 250 V AC
Relay output R1 resistive, cos phi = 1 4 A 30 V DC
Relay output R1, R2 inductive, cos phi = 0.4 2 A 250 V AC
Relay output R1, R2 inductive, cos phi = 0.4 2 A 30 V DC
Relay output R2 resistive, cos phi = 1 5 A 250 V AC
Relay output R2 resistive, cos phi = 1 5 A 30 V DC

Specific application
Machinery

Variable speed drive application selection
Hoisting Self erecting
Material handling Carousel
Material handling Conveyor
Material handling Lifting platform
Material handling Palletizers - medium performance
Material handling Transfer table
Material handling Turn table
Material working (wood, ceramic, stone, pvc, metal) Cutting - medium accuracy
Material working (wood, ceramic, stone, pvc, metal) Drilling
Material working (wood, ceramic, stone, pvc, metal) Saw
Packaging Bagging
Packaging Feed conveyor low performance
Packaging Filling bottles - intermittent operation
Packaging Linear labeling
Packaging Other application
Packaging Stretching wrapping
<table>
<thead>
<tr>
<th><strong>Environment</strong></th>
<th></th>
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<tbody>
<tr>
<td>Isolation</td>
<td>Between power and control terminals</td>
</tr>
<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>52 dB 86/188/EEC</td>
</tr>
<tr>
<td>Power dissipation in W</td>
<td>Fan 140.5 W 200 V 4 kHz</td>
</tr>
<tr>
<td>Volume of cooling air</td>
<td>4332.50 Gal/hr(US) (16.4 m3/h)</td>
</tr>
<tr>
<td>Operating position</td>
<td>Vertical +/- 10 degree</td>
</tr>
</tbody>
</table>
| Electromagnetic compatibility | 1.2/50 μs - 8/20 μs surge immunity test level 3 IEC 61000-4-5  
Conducted radio-frequency immunity test level 3 IEC 61000-4-6  
Electrical fast transient/burst immunity test level 4 IEC 61000-4-4  
Electrostatic discharge immunity test level 3 IEC 61000-4-2  
Radiated radio-frequency electromagnetic field immunity test level 3 IEC 61000-4-3  
Voltage dips and interruptions immunity test IEC 61000-4-11 |
| Pollution degree | 2 EN/IEC 61800-5-1  
3 EN/IEC 61800-5-1 |
| Vibration resistance | 1 gn 13…200 Hz)EN/IEC 60068-2-6  
1.5 mm peak to peak 2…13 Hz]EN/IEC 60068-2-6 |
| Shock resistance | 15 gn 11 ms EN/IEC 60068-2-27 |
| Relative humidity | 5…95 % without condensation IEC 60068-2-3  
5…95 % without dripping water IEC 60068-2-3 |
| Ambient air temperature for operation | 14…122 °F (-10…50 °C) without  
122…140 °F (50…60 °C) with derating factor |
| Ambient air temperature for storage | -13…158 °F (-25…70 °C) |
| Operating altitude | <= 3280.84 ft (1000 m) without  
3280.84…9842.52 ft (1000…3000 m) with current derating 1 % per 100 m |
| Environmental characteristic | Chemical pollution resistance class 3C3 EN/IEC 60721-3-3  
Dust pollution resistance class 3S2 EN/IEC 60721-3-3 |
| Standards | EN/IEC 61800-3  
Environment 2 category C3 EN/IEC 61800-3  
EN/IEC 61800-5-1  
IEC 61000-3-12  
IEC 60721-3  
IEC 61508  
IEC 13849-1 |
| Product certifications | CE  
ATEX  
NOM  
EAC  
RCM  
KC |
| Marking | CE  
ATEX  
UL  
CSA  
EAC  
RCM  
KC |

**Ordering and shipping details**

<p>| <strong>Category</strong> | 22152 - ATV320/ATV312/ATV32 (.25 THRU 7.5HP) |
| <strong>Discount Schedule</strong> | CP4B |
| <strong>GTIN</strong> | 00785901556671 |
| <strong>Package weight(Lbs)</strong> | 2.56 kg (5.64 lb(US)) |</p>
<table>
<thead>
<tr>
<th><strong>Offer Sustainability</strong></th>
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<tbody>
<tr>
<td><strong>Sustainable offer status</strong></td>
<td>Green Premium product</td>
</tr>
<tr>
<td><strong>REACH Regulation</strong></td>
<td>REACH Declaration</td>
</tr>
</tbody>
</table>
| **EU RoHS Directive** | Pro-active compliance (Product out of EU RoHS legal scope)  
EU RoHS Declaration |
| **Mercury free** | Yes |
| **RoHS exemption information** | Yes |
| **China RoHS Regulation** | China RoHS declaration |
| **Environmental Disclosure** | Product Environmental Profile  
Circularity Profile |
| **WEEE** | The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins. |
Dimensions

Right View, Front View and Front View with EMC Plate

[Diagrams showing dimensions]
Mounting Types

Mounting Type A: Individual with Ventilation Cover

Only Possible at Ambient Temperature Less or Equal to 50 °C (122 °F)

Mounting Type B: Side by Side, Ventilation Cover Removed

Mounting Type C: Individual, Ventilation Cover Removed

For Operation at Ambient Temperature Above 50 °C (122 °F)
Connection Diagrams

Diagram with Line Contactor
Connection diagrams conforming to standards ISO13849 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1.

![Line Contactor Diagram](image)

(1) Line choke (if used)
(2) Fault relay contacts, for remote signaling of drive status

Diagram with Switch Disconnect
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.

![Switch Disconnect Diagram](image)

(1) Line choke (if used)
(2) Fault relay contacts, for remote signaling of drive status
Control Connection Diagram in Source Mode

(1) Analog output
(2) Analog inputs
(3) Reference potentiometer (10 kOhm maxi)
(4) Digital inputs
Digital Inputs Wiring

The logic input switch (SW1) is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

Switch SW1 set to “Source” position and use of the output power supply for the DIs.

Switch SW1 set to “Source” position and use of an external power supply for the DIs.

Switch SW1 set to “Sink Int” position and use of the output power supply for the DIs.

Switch SW1 set to “Sink Ext” position and use of 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 C
60 °C (140 °F) - Mounting type C

IN: Nominal Drive Current
SF: Switching Frequency