

# Product data sheet

Specifications



## Variable speed drive, Altivar Machine ATV320, 4 kW, 380...500 V, 3 phases, book

ATV320U40N4B

**Product availability : Stock - Normally stocked in distribution facility**

### Main

Range of Product	Altivar Machine ATV320
Product or Component Type	Variable speed drive
Product Specific Application	Complex machines
Variant	Standard version
Format of the drive	Book
Mounting Mode	Cabinet mount
Communication Port Protocol	Modbus serial CANopen
Option card	communication module, CANopen communication module, EtherCAT communication module, Profibus DP V1 communication module, Profinet communication module, Ethernet Powerlink communication module, EtherNet/IP communication module, DeviceNet
[Us] rated supply voltage	380...500 V - 15...10 %
Nominal output current	9.5 A
Motor power kW	4.0 kW heavy duty
EMC filter	Class C2 EMC filter integrated
IP degree of protection	IP20

### Complementary

Discrete input number	7
Discrete input type	STO safe torque off, 24 V DC 1.5 kOhm DI1...DI6 logic inputs, 24 V DC 30 V) DI5 programmable as pulse input 0...30 kHz, 24 V DC 30 V)
Discrete input logic	Positive logic (source) Negative logic (sink)
Discrete output number	3
Discrete output type	Open collector DQ+ 0...1 kHz 30 V DC 100 mA Open collector DQ- 0...1 kHz 30 V DC 100 mA
Analogue input number	3
Analogue input type	AI1 voltage 0...10 V DC 30 kOhm 10 bits AI2 bipolar differential voltage +/- 10 V DC 30 kOhm 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

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

<b>Analogue output number</b>	1
<b>Analogue output type</b>	Software-configurable current AQ1 0...20 mA 800 Ohm 10 bits Software-configurable voltage AQ1 0...10 V DC 470 Ohm 10 bits
<b>Relay output type</b>	Configurable relay logic R1A 1 NO 100000 cycles Configurable relay logic R1B 1 NC 100000 cycles Configurable relay logic R1C Configurable relay logic R2A 1 NO 100000 cycles Configurable relay logic R2C
<b>Maximum switching current</b>	Relay output R1A, R1B, R1C resistive, cos phi = 1 3 A 250 V AC Relay output R1A, R1B, R1C resistive, cos phi = 1 3 A 30 V DC Relay output R1A, R1B, R1C, R2A, R2C inductive, cos phi = 0.4 7 ms 2 A 250 V AC Relay output R1A, R1B, R1C, R2A, R2C inductive, cos phi = 0.4 7 ms 2 A 30 V DC Relay output R2A, R2C resistive, cos phi = 1 5 A 250 V AC Relay output R2A, R2C resistive, cos phi = 1 5 A 30 V DC
<b>Minimum switching current</b>	Relay output R1A, R1B, R1C, R2A, R2C 5 mA 24 V DC
<b>Method of access</b>	Slave CANopen
<b>4 quadrant operation possible</b>	True
<b>Asynchronous motor control profile</b>	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 Voltage/frequency ratio, 2 points
<b>Synchronous motor control profile</b>	Vector control without sensor
<b>Maximum output frequency</b>	0.599 kHz
<b>Transient overtorque</b>	170...200 % of nominal motor torque
<b>Acceleration and deceleration ramps</b>	Linear U S CUS Ramp switching Acceleration/deceleration ramp adaptation Acceleration/deceleration automatic stop with DC injection
<b>Motor slip compensation</b>	Automatic whatever the load Adjustable 0...300 % Not available in voltage/frequency ratio (2 or 5 points)
<b>Switching frequency</b>	2...16 kHz adjustable 4...16 kHz with derating factor
<b>Nominal switching frequency</b>	4 kHz
<b>Braking to standstill</b>	By DC injection
<b>Brake chopper integrated</b>	True
<b>Line current</b>	13.7 A 380 V heavy duty) 10.5 A 500 V heavy duty)
<b>Maximum Input Current per Phase</b>	13.7 A
<b>Maximum output voltage</b>	500 V
<b>Apparent power</b>	9.1 kVA 500 V heavy duty)
<b>Network Frequency</b>	50-60 Hz
<b>Relative symmetric network frequency tolerance</b>	5 %
<b>Prospective line I<sub>sc</sub></b>	5 kA
<b>Base load current at high overload</b>	9.5 A
<b>Power dissipation in W</b>	Fan 111 W 380 V 4 kHz
<b>With safety function Safely Limited Speed (SLS)</b>	True
<b>With safety function Safe brake management (SBC/SBT)</b>	False

With safety function Safe Operating Stop (SOS)	False
With safety function Safe Position (SP)	False
With safety function Safe programmable logic	False
With safety function Safe Speed Monitor (SSM)	False
With safety function Safe Stop 1 (SS1)	True
With sft fct Safe Stop 2 (SS2)	False
With safety function Safe torque off (STO)	True
With safety function Safely Limited Position (SLP)	False
With safety function Safe Direction (SDI)	False
Protection type	Input phase breaks drive Overcurrent between output phases and earth drive Overheating protection drive Short-circuit between motor phases drive Thermal protection drive
Width	2.36 in (60 mm)
Height	12.80 in (325.0 mm)
Depth	9.65 in (245.0 mm)
Net Weight	6.61 lb(US) (3.0 kg)

## Environment

Operating position	Vertical +/- 10 degree
Product Certifications	CE ATEX NOM GOST EAC RCM KC
Marking	CE ATEX UL CSA EAC RCM
Standards	EN/IEC 61800-5-1
Electromagnetic compatibility	Electrostatic discharge immunity test level 3 IEC 61000-4-2 Radiated radio-frequency electromagnetic field immunity test level 3 IEC 61000-4-3 Electrical fast transient/burst immunity test level 4 IEC 61000-4-4 1.2/50 $\mu$ s - 8/20 $\mu$ s surge immunity test level 3 IEC 61000-4-5 Conducted radio-frequency immunity test level 3 IEC 61000-4-6 Voltage dips and interruptions immunity test IEC 61000-4-11
Environmental class (during operation)	Class 3C3 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3
Maximum acceleration under shock impact (during operation)	150 m/s <sup>2</sup> at 11 ms
Maximum acceleration under vibrational stress (during operation)	10 m/s <sup>2</sup> at 13...200 Hz
Maximum deflection under vibratory load (during operation)	1.5 mm at 2...13 Hz
Permitted relative humidity (during operation)	Class 3K5 according to EN 60721-3

Volume of cooling air	2985.20 Gal/hr(US) (11.3 m3/h)
Overtoltage category	III
Regulation loop	Adjustable PID regulator
Speed accuracy	+/- 10 % of nominal slip 0.2 Tn to Tn
Pollution degree	2
Ambient air transport temperature	-13...158 °F (-25...70 °C)
Ambient air temperature for operation	14...122 °F (-10...50 °C) without derating 122...140 °F (50...60 °C) with derating factor
Ambient Air Temperature for Storage	-13...158 °F (-25...70 °C)

## Ordering and shipping details

Category	22152 - ATV320/ATV312/ATV32 (.25 THRU 7.5HP)
Discount Schedule	CP4B
GTIN	3606480931284
Nbr. of units in pkg.	1
Package weight(Lbs)	6.44 lb(US) (2.921 kg)
Returnability	Yes
Country of origin	ID

## Packing Units

Unit Type of Package 1	PCE
Package 1 Height	3.78 in (9.6 cm)
Package 1 width	10.83 in (27.5 cm)
Package 1 Length	12.80 in (32.5 cm)
Unit Type of Package 2	P06
Number of Units in Package 2	20
Package 2 Weight	157.10 lb(US) (71.26 kg)
Package 2 Height	28.94 in (73.5 cm)
Package 2 width	23.62 in (60 cm)
Package 2 Length	31.50 in (80 cm)
Package 3 Height	31.50 in (80 cm)

## Offer Sustainability

Sustainable offer status	Green Premium product
California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to <a href="http://www.P65Warnings.ca.gov">www.P65Warnings.ca.gov</a>
REACH Regulation	<a href="#">REACH Declaration</a>
EU RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope) <a href="#">EU RoHS Declaration</a>
Mercury free	Yes
RoHS exemption information	<a href="#">Yes</a>
China RoHS Regulation	<a href="#">China RoHS declaration</a>
Environmental Disclosure	<a href="#">Product Environmental Profile</a>

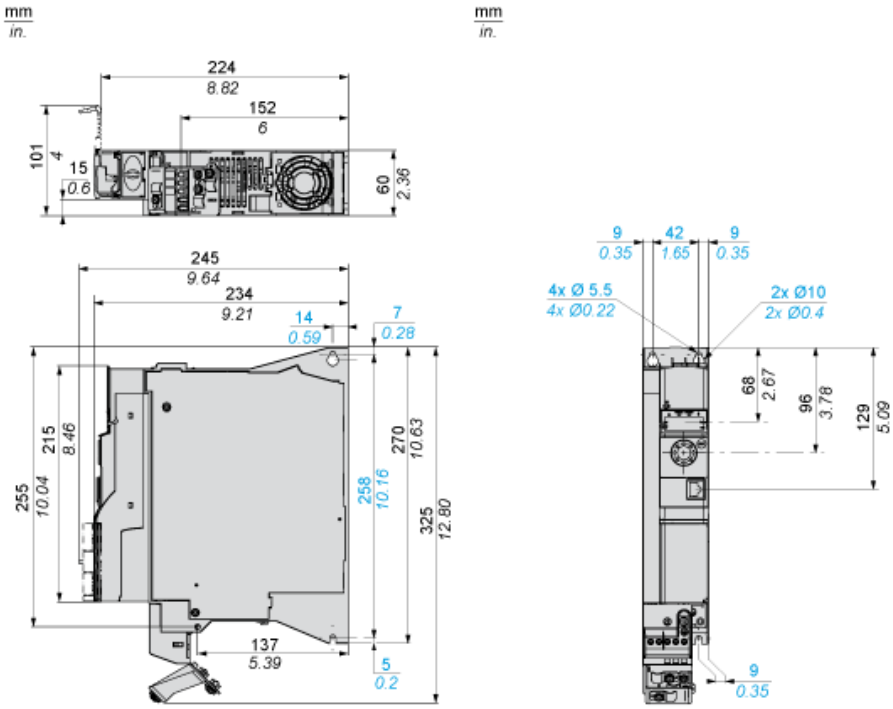
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<b>Circularity Profile</b>	<a href="#">End of Life Information</a>
<b>WEEE</b>	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins.
<b>Upgradeability</b>	<a href="#">Upgraded components available</a> 

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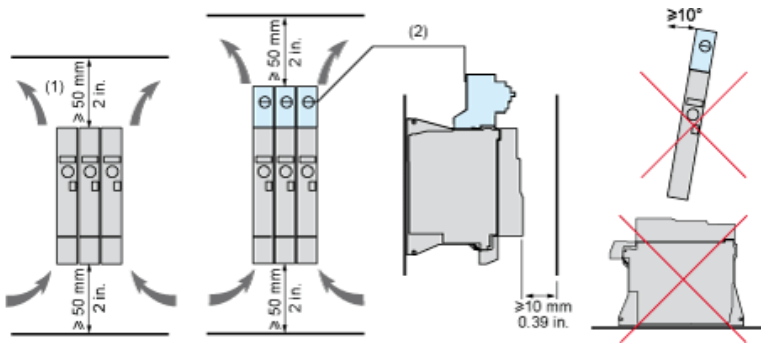
**Dimensions**

**Bottom, Right and Front View**



Mounting and Clearance

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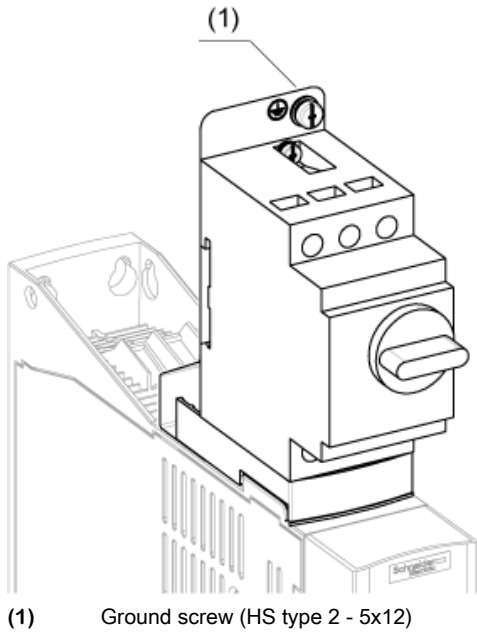


- (1) Minimum value corresponding to thermal constraints.
- (2) Optional GV2 circuit-breaker

**Option: Protection Device, GV2 circuit-breaker**

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**NOTE:** The product overall height dimension, including GV2 adapter and EMC plate mounted, becomes 424 mm (16.7 in.) instead of 325 mm (12.80 in.)

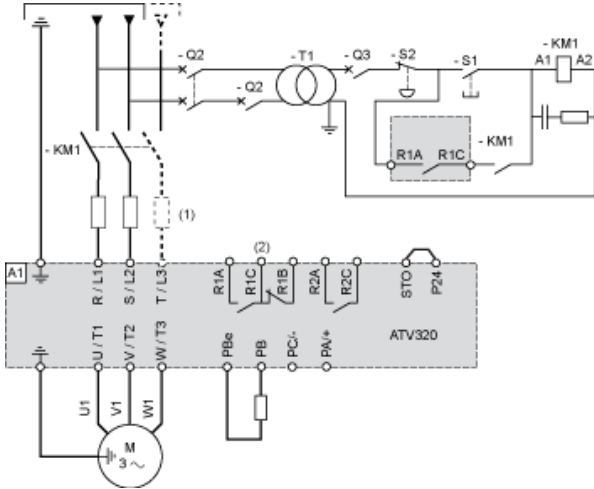




**Connection Diagrams**

**Diagram with Line Contactor**

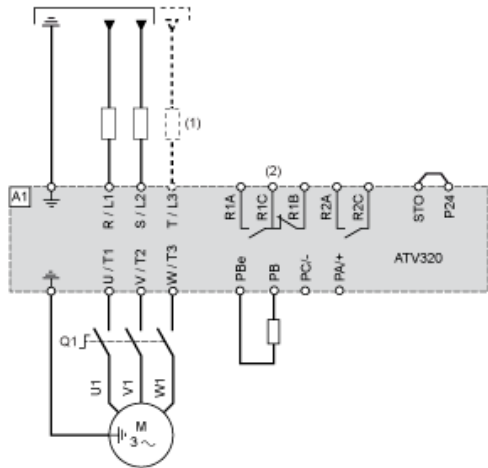
Connection diagrams conforming to standards ISO13849 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1.



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

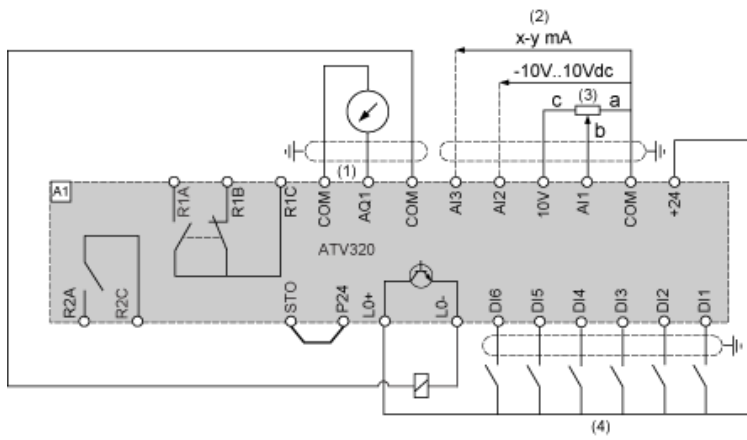
**Diagram with Switch Disconnect**

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.



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

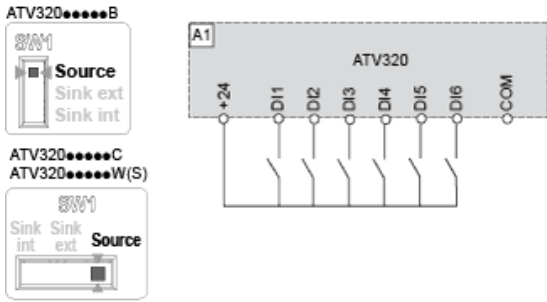
**Control Connection Diagram in Source Mode**



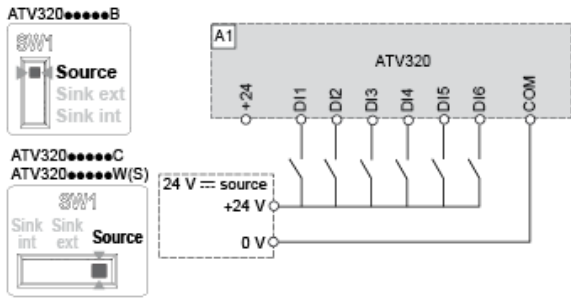
- (1) Analog output
- (2) Analog inputs
- (3) Reference potentiometer (10 kOhm maxi)
- (4) Digital inputs

**Digital Inputs Wiring**

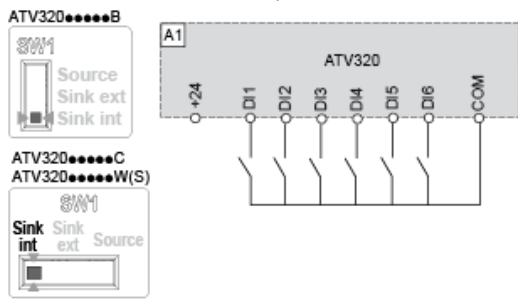
The logic input switch (SW1) is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs. Switch SW1 set to "Source" position and use of the output power supply for the DIs.



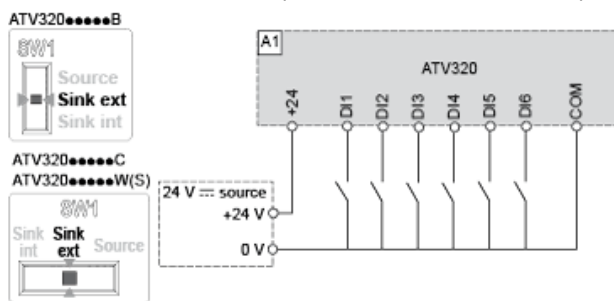
Switch SW1 set to "Source" position and use of an external power supply for the DIs.



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

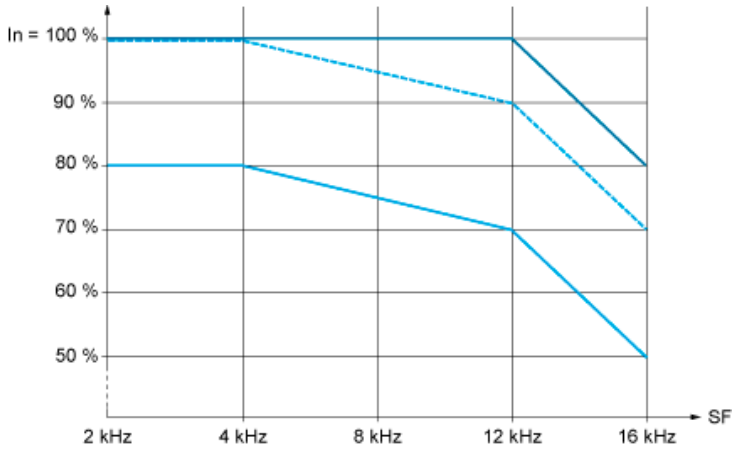


Switch SW1 set to "Sink Ext" position and use of an external power supply for the DIs.



**Derating Curves**

Derating curve for the nominal drive current ( $I_n$ ) as a function of temperature and switching frequency (SF).



- 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