

ATV320U22N4C

variable speed drive ATV320 - 2.2kW -
380...500V - 3 phase - compact



Main

Range of product	Altivar Machine ATV320
Product or component type	Variable speed drive
Product specific application	Complex machines
Device short name	ATV320
Format of the drive	Compact
Product destination	Synchronous motors Asynchronous motors
EMC filter	Class C2 EMC filter integrated
IP degree of protection	IP20 conforming to EN/IEC 61800-5-1
Degree of protection	UL type 1 with UL type 1 conformity kit
Type of cooling	Fan
Network number of phases	3 phases
[Us] rated supply voltage	380...500 V (- 15...10 %)
Supply frequency	50...60 Hz (- 5...5 %)
Motor power kW	2.2 kW for heavy duty
Motor power hp	3 hp for heavy duty
Line current	8.7 A at 380 V for heavy duty 6.6 A at 500 V for heavy duty
Prospective line I _{sc}	<= 5 kA
Apparent power	5.7 kVA at 500 V for heavy duty
Continuous output current	5.5 A at 4 kHz for heavy duty
Maximum transient current	8.3 A during 60 s for heavy duty
Asynchronous motor control profile	Voltage/Frequency ratio, 5 points Flux vector control without sensor - Energy Saving Flux vector control without sensor, standard Voltage/Frequency ratio, 2 points Voltage/Frequency ratio - Energy Saving, quadratic U/f
Synchronous motor control profile	Vector control without sensor
Speed drive output frequency	0.1...599 Hz

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

Nominal switching frequency	4 kHz
Switching frequency	4...16 kHz with current derating 2...16 kHz adjustable
Safety function	STO (safe torque off) SIL 2
Communication port protocol	Modbus CANopen
Option card	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: Profibus DP V1 Communication module: Profinet Communication module: Ethernet Powerlink

Complementary

Output voltage	<= power supply voltage
Permissible temporary current boost	1.5 x I _n during 60 s for heavy duty
Speed range	1...100 with asynchronous motor in open-loop mode
Speed accuracy	+/- 10 % of nominal slip 0.2 T _n to T _n
Torque accuracy	+/- 15 %
Transient overtorque	170...200 % of nominal motor torque
Braking torque	< 170 % with braking resistor during 60 s
Regulation loop	Adjustable PID regulator
Motor slip compensation	Not available in voltage/frequency ratio (2 or 5 points) Adjustable 0...300 % Automatic whatever the load
Acceleration and deceleration ramps	Linear Deceleration ramp automatic stop DC injection CUS Deceleration ramp adaptation Ramp switching S U
Braking to standstill	By DC injection
Protection type	Drive: thermal protection Drive: overcurrent between output phases and earth Drive: input phase breaks Drive: overheating protection Drive: short-circuit between motor phases
Frequency resolution	Display unit: 0.1 Hz Analog input: 0.012/50 Hz
Electrical connection	Control, screw terminal: 0.5...1.5 mm ² AWG 20...AWG 16 Motor/Braking resistor, screw terminal: 2.5...6 mm ² AWG 14...AWG 10 Power supply, screw terminal: 2.5...6 mm ² AWG 14...AWG 10
Type of connector	1 RJ45 for Modbus/CANopen on control terminal
Physical interface	2-wire RS 485 for Modbus
Transmission frame	RTU for Modbus
Transmission rate	4.8, 9.6, 19.2, 38.4 kbit/s for Modbus 50 kbps, 125 kbps, 250 kbps, 500 kbps, 1 Mbps for CANopen
Data format	8 bits, configurable odd, even or no parity for Modbus
Type of polarization	No impedance for Modbus
Number of addresses	1...247 for Modbus 1...127 for CANopen
Method of access	Slave for CANopen
Supply	Internal supply for reference potentiometer (1 to 10 kOhm): 10.5 V DC (+/- 5 %) current <= 10 mA (overload and short-circuit protection)
Local signalling	1 LED green for CANopen run 1 LED red for CANopen error 1 LED red for drive fault

Width	140 mm
Height	184 mm 227.9 mm with EMC plate
Depth	158 mm
Product weight	2.1 kg
Analogue input number	3
Analogue input type	Voltage (AI1): 0...10 V DC, impedance 30000 Ohm, resolution 10 bits Bipolar differential voltage (AI2): +/- 10 V DC, impedance 30000 Ohm, resolution 10 bits Current (AI3): 0...20 mA (or 4-20 mA, x-20 mA, 20-x mA or other patterns by configuration), impedance 250 Ohm, resolution 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, impedance 1500 Ohm
Discrete input logic	Negative logic (sink): : DI1...DI6, > 19 V (state 0) < 13 V (state 1) Positive logic (source): : DI1...DI6, < 5 V (state 0) > 11 V (state 1)
Analogue output number	1
Analogue output type	Software-configurable current (AQ1): 0...20 mA, impedance 800 Ohm, resolution 10 bits Software-configurable voltage (AQ1): 0...10 V, impedance 470 Ohm, resolution 10 bits
Sampling duration	Analog input (AI1, AI2, AI3): 2 ms Analog output (AQ1): 2 ms
Accuracy	Analog input AI1, AI2, AI3: +/- 0.2 % for a temperature of -10...60 °C Analog input AI1, AI2, AI3: +/- 0.5 % for a temperature of 25 °C Analog output AQ1: +/- 1 % for a temperature of 25 °C Analog output AQ1: +/- 2 % for a temperature of -10...60 °C
Linearity error	Analog input (AI1, AI2, AI3): +/- 0.2...0.5 % of maximum value Analog output (AQ1): +/- 0.3 %
Discrete output number	3
Discrete output type	Configurable relay logic NO/NC (R1A, R1B, R1C): electrical durability 100000 cycles Configurable relay logic NO (R2A, R2B): electrical durability 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 at 24 V DC
Maximum switching current	Relay output (R1) on resistive load (cos phi = 1): 3 A at 250 V AC Relay output (R1) on resistive load (cos phi = 1): 4 A at 30 V DC Relay output (R1, R2) on inductive load (cos phi = 0.4): 2 A at 250 V AC Relay output (R1, R2) on inductive load (cos phi = 0.4): 2 A at 30 V DC Relay output (R2) on resistive load (cos phi = 1): 5 A at 250 V AC Relay output (R2) on resistive load (cos phi = 1): 5 A at 30 V DC
Specific application	Machinery

Environment

Isolation	Between power and control terminals
Insulation resistance	> 1 mOhm at 500 V DC for 1 minute to earth
Noise level	52 dB conforming to 86/188/EEC
Power dissipation in W	76 W (fan) at 380 V, 4 kHz
Volume of cooling air	37.7 m3/h
Operating position	Vertical +/- 10 degree
Electromagnetic compatibility	Conducted radio-frequency immunity test conforming to IEC 61000-4-6 level 3 Electrical fast transient/burst immunity test conforming to IEC 61000-4-4 level 4 Electrostatic discharge immunity test conforming to IEC 61000-4-2 level 3 Radiated radio-frequency electromagnetic field immunity test conforming to IEC 61000-4-3 level 3 Voltage dips and interruptions immunity test conforming to IEC 61000-4-11 1.2/50 µs - 8/20 µs surge immunity test conforming to IEC 61000-4-5 level 3
Pollution degree	2 conforming to EN/IEC 61800-5-1
Vibration resistance	1.5 mm peak to peak (f = 2...13 Hz) conforming to EN/IEC 60068-2-6 1 gn (f = 13...200 Hz) conforming to EN/IEC 60068-2-6
Shock resistance	15 gn during 11 ms conforming to EN/IEC 60068-2-27

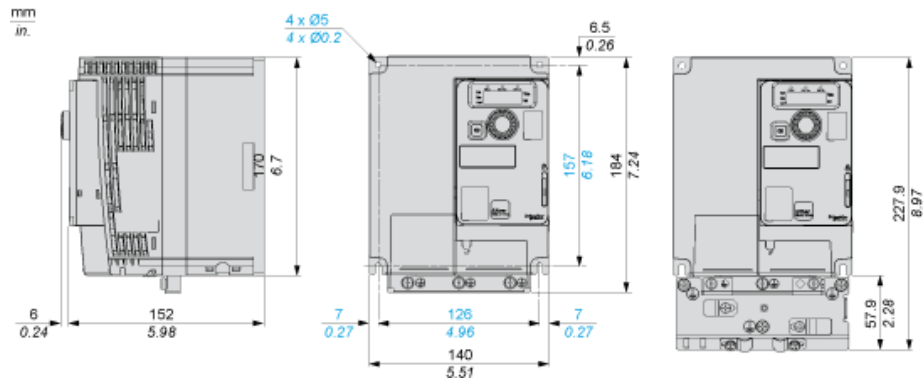
Relative humidity	5...95 % without condensation conforming to IEC 60068-2-3 5...95 % without dripping water conforming to IEC 60068-2-3
Ambient air temperature for operation	-10...50 °C without derating 50...60 °C with derating factor
Ambient air temperature for storage	-25...70 °C
Operating altitude	<= 1000 m without derating 1000...3000 m with current derating 1 % per 100 m
Standards	EN/IEC 61800-3 EN/IEC 61800-3 environment 1 category C2 EN/IEC 61800-5-1 IEC 60721-3 IEC 61508 IEC 13849-1
Product certifications	UL NOM 117 CSA RCM EAC
Marking	CE

Offer Sustainability

Sustainable offer status	Not Green Premium product
RoHS (date code: YYWW)	Compliant - since 1610 - Schneider Electric declaration of conformity Schneider Electric declaration of conformity
REACH	Reference not containing SVHC above the threshold Reference not containing SVHC above the threshold

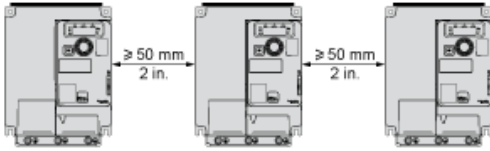
Dimensions

Views: Right - Front - Front with EMC Plate



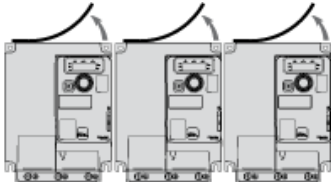
Mounting Types

Mounting Type A: Individual with Ventilation Cover

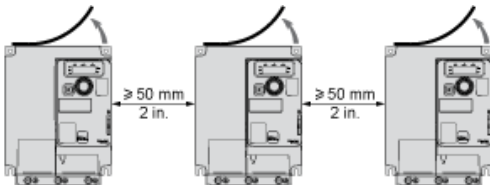


Only Possible at Ambient Temperature Less or Equal to 50 °C (122 °F)

Mounting Type B: Side by Side, Ventilation Cover Removed



Mounting Type C: Individual, Ventilation Cover Removed

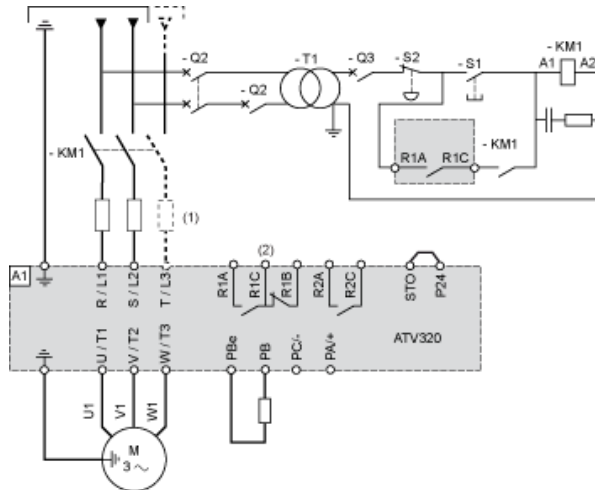


For Operation at Ambient Temperature Above 50 °C (122 °F)

Connection Diagrams

Diagram with Line Contactor

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



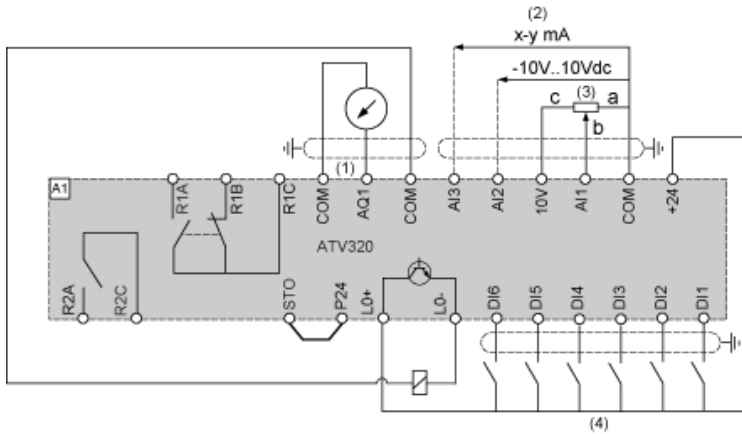
- (1) Line choke (if used)
- (2) Fault relay contacts, for remote signaling of drive status

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

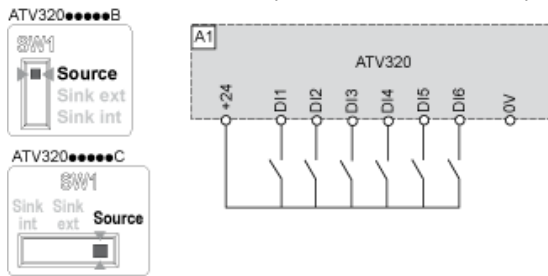
Control Connection Diagram in Source Mode



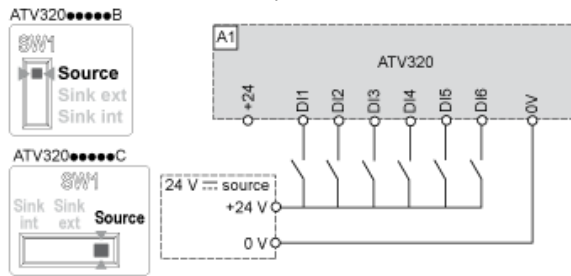
- (1) Analog output
- (2) Analog inputs
- (3) Reference potentiometer (10 kOhm maxi)
- (4) Digital inputs

Digital Inputs Wiring

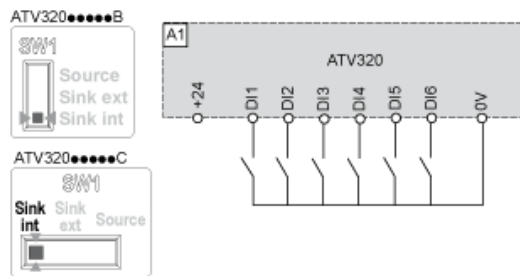
The logic input switch (SW1) is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs. Switch SW1 set to "Source" position and use of the output power supply for the DIs.



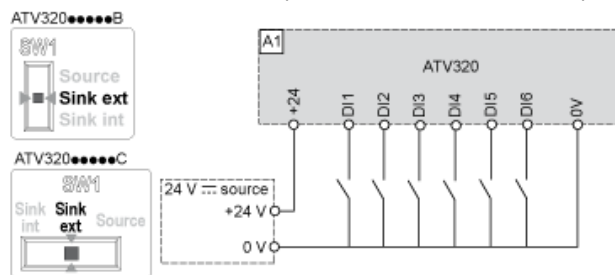
Switch SW1 set to "Source" position and use of an external power supply for the DIs.



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

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