

ATV320D15N4B

variable speed drive ATV320 - 15kW -
380...500V - 3 phase - book



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	Book
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	15 kW for heavy duty
motor power hp	20 hp for heavy duty
line current	33.3 A at 500 V for heavy duty 47.3 A at 380 V for heavy duty
prospective line I _{sc}	<= 22 kA
apparent power	28.8 kVA at 500 V for heavy duty
continuous output current	33 A at 4 kHz for heavy duty
maximum transient current	49.5 A during 60 s for heavy duty
asynchronous motor control profile	Voltage/Frequency ratio - Energy Saving, quadratic U/f Voltage/Frequency ratio, 5 points Flux vector control without sensor, standard Voltage/Frequency ratio, 2 points Flux vector control without sensor - Energy Saving
synchronous motor control profile	Vector control without sensor
nominal switching frequency	4 kHz
switching frequency	2...16 kHz adjustable
safety function	SS1 (safe stop 1) STO (safe torque off) SIL 3 SMS (safe maximum speed) SLS (safe limited speed) GDL (guard door locking)
communication port protocol	CANopen Modbus
option card	Communication module: Profibus DP V1 Communication module: DeviceNet Communication module: EtherCAT RJ45 Communication module: CANopen daisy chain RJ45 Communication module: CANopen SUB-D 9 Communication module: Profinet Communication module: Ethernet Powerlink Communication module: CANopen open style terminal block Communication module: Ethernet/IP

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. 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. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric Industries SAS nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein.

Complementary

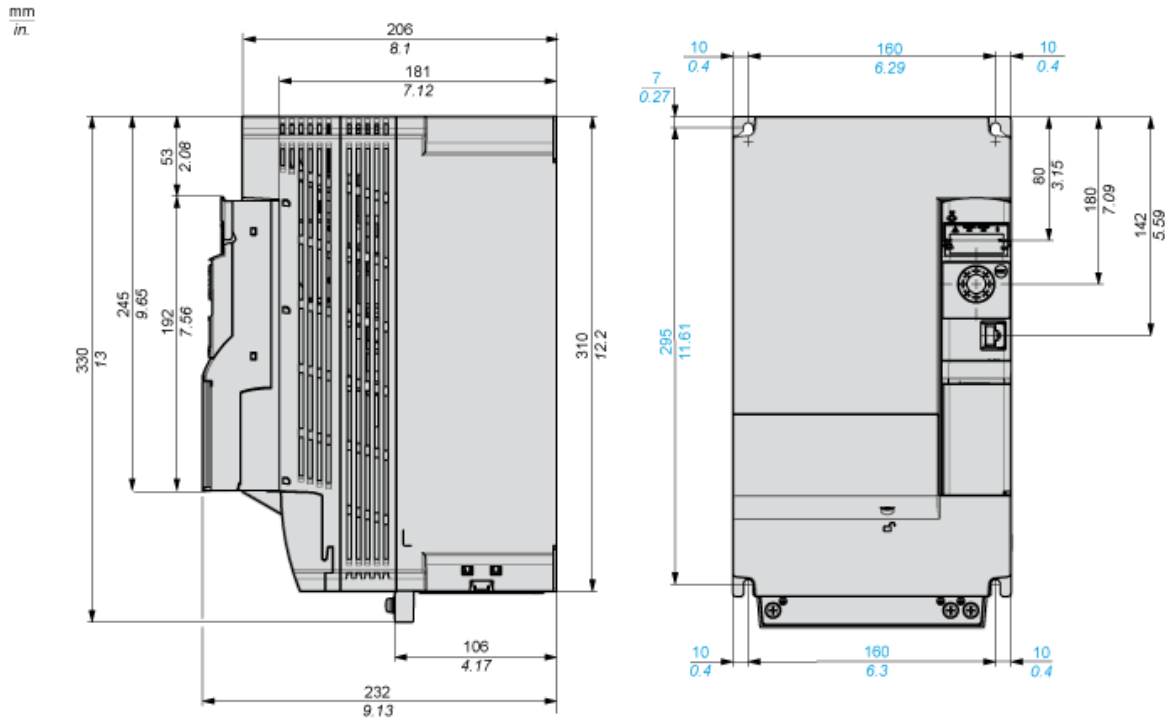
output voltage	\leq power supply voltage
permissible temporary current boost	1.5 x I_n during 60 s for heavy duty
speed range	1...100 with asynchronous motor in open-loop mode
speed accuracy	+/- 10 % of nominal slip 0.2 T_n to T_n
torque accuracy	+/- 15 %
transient overtorque	170...200 % of nominal motor torque
braking torque	< 170 % with braking resistor during 60 s
regulation loop	Adjustable PID regulator
motor slip compensation	Adjustable 0...300 % Automatic whatever the load Not available in voltage/frequency ratio (2 or 5 points)
acceleration and deceleration ramps	U CUS Ramp switching S Deceleration ramp adaptation Linear Deceleration ramp automatic stop DC injection
braking to standstill	By DC injection
protection type	Drive: short-circuit between motor phases Drive: thermal protection Drive: overheating protection Drive: input phase breaks Drive: overcurrent between output phases and earth
frequency resolution	Display unit: 0.1 Hz Analog input: 0.012/50 Hz
electrical connection	Power supply, screw terminal: 16 mm ² AWG 6 Motor/Braking resistor, screw terminal: 6...16 mm ² AWG 8...AWG 6 Control, screw terminal: 0.5...1.5 mm ² AWG 18...AWG 14
type of connector	1 RJ45 for Modbus/CANopen on front face
physical interface	2-wire RS 485 for Modbus
transmission frame	RTU for Modbus
transmission rate	50 kbps, 125 kbps, 250 kbps, 500 kbps, 1 Mbps for CANopen 4.8, 9.6, 19.2, 38.4 kbit/s for Modbus
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 \leq 10 mA (overload and short-circuit protection)
local signalling	1 LED red for drive fault 1 LED red for CANopen error 1 LED red for drive voltage 1 LED green for CANopen run
width	180 mm
height	330 mm 404 mm with EMC plate
depth	232 mm
product weight	8.8 kg
analogue input number	3
analogue input type	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 Voltage (AI1): 0...10 V DC, impedance 30000 Ohm, resolution 10 bits
discrete input number	7
discrete input type	Programmable (sink/source) (DI1...DI4): 24...30 V DC: level 1 PLC Safe torque off (STO): 24...30 V DC, impedance 1500 Ohm Switch-configurable PTC probe (DI6): 24...30 V DC Programmable as pulse input 20 kpps (DI5): 24...30 V DC: level 1 PLC
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 output (AQ1): 2 ms Analog input (AI1, AI2, AI3): 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: +/- 2 % for a temperature of -10...60 °C Analog output AQ1: +/- 1 % for a temperature of 25 °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 (R2A, R2C): 2 ms Relay output (R1A, R1B, R1C): 2 ms
minimum switching current	Relay output (R1, R2): 5 mA at 24 V DC
maximum switching current	Relay output (R1, R2) on inductive load (cos phi = 0.4: 2 A at 250 V AC Relay output (R2) on resistive load (cos phi = 1: 5 A at 30 V DC 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 30 V DC Relay output (R2) on resistive load (cos phi = 1: 5 A at 250 V AC Relay output (R1) on resistive load (cos phi = 1: 3 A at 250 V AC

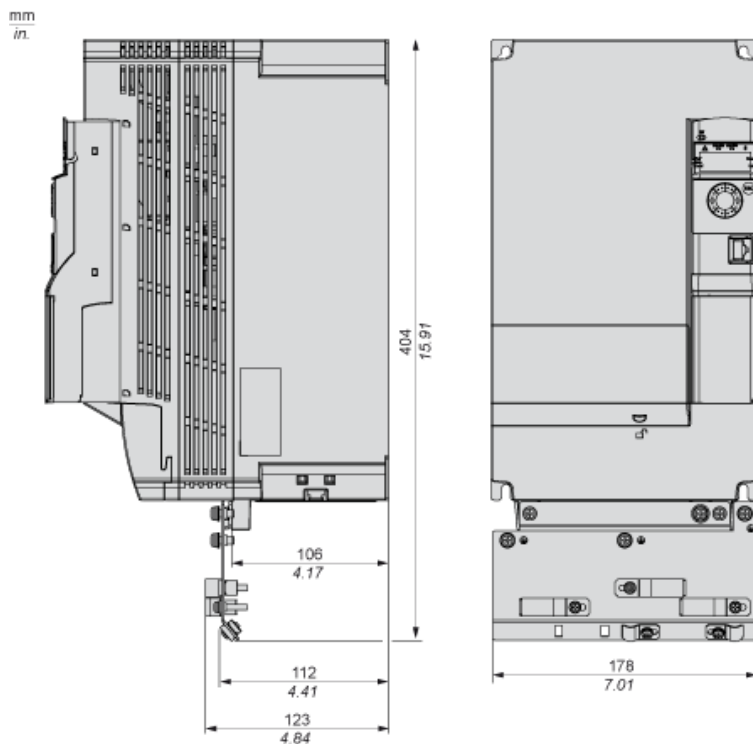
Environment

isolation	Between power and control terminals
insulation resistance	> 1 mOhm at 500 V DC for 1 minute to earth
noise level	58 dB conforming to 86/188/EEC
power dissipation in W	480 W (fan) at 380 V, 4 kHz for heavy duty
operating position	Vertical +/- 10 degree
electromagnetic compatibility	1.2/50 µs - 8/20 µs surge immunity test conforming to IEC 61000-4-5 level 3 Radiated radio-frequency electromagnetic field immunity test conforming to IEC 61000-4-3 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 Voltage dips and interruptions immunity test conforming to IEC 61000-4-11 Conducted radio-frequency immunity test conforming to IEC 61000-4-6 level 3
pollution degree	2 conforming to EN/IEC 61800-5-1
vibration resistance	1.5 mm peak to peak (f = 3...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 dripping water conforming to IEC 60068-2-3 5...95 % without condensation conforming to IEC 60068-2-3
ambient air temperature for operation	50...60 °C with derating factor -10...50 °C without derating
ambient air temperature for storage	-25...70 °C
operating altitude	1000...2000 m with current derating 1 % per 100 m <= 1000 m without derating
standards	EN/IEC 61800-5-1 EN 61800-3 environment 2 category C2 EN 55011 class A group 1 EN 61800-3 environment 1 category C2 EN/IEC 61800-3
product certifications	NOM 117 CSA EAC RCM UL
marking	CE

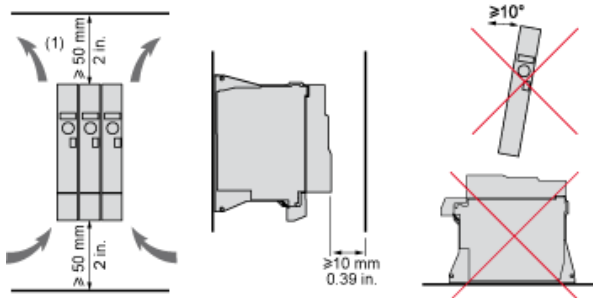
Dimensions



With EMC Plate



Mounting and Clearance

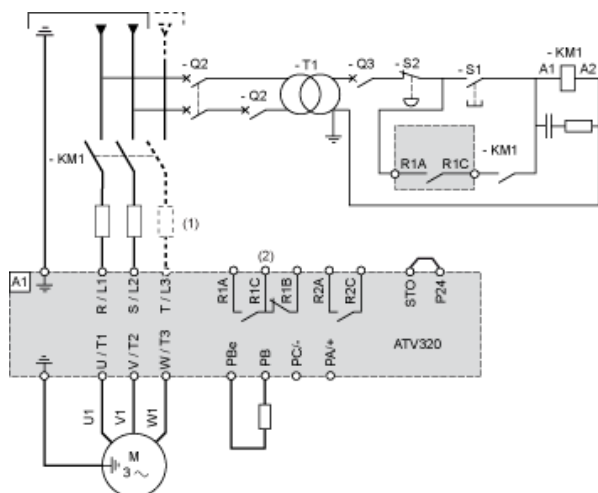


(1) Minimum value corresponding to thermal constraints.

Connection Diagrams

Diagram with Line Contactor

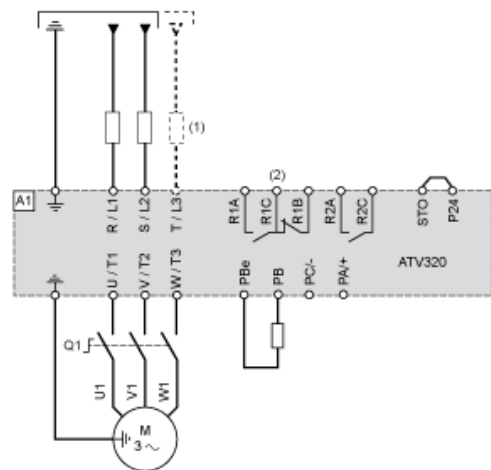
Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1.



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

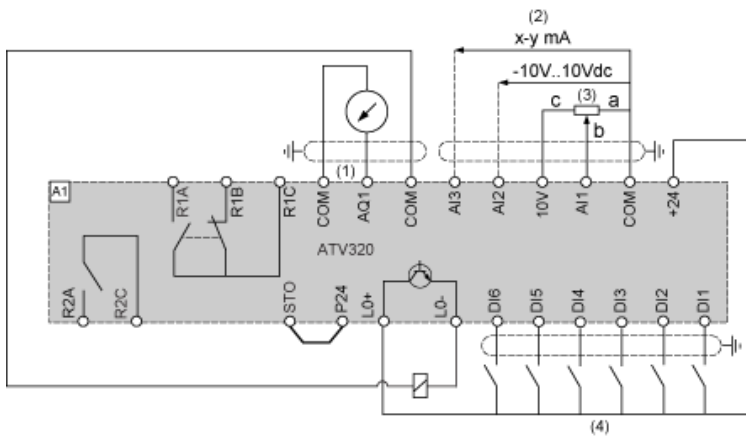
Diagram with Switch Disconnect

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.



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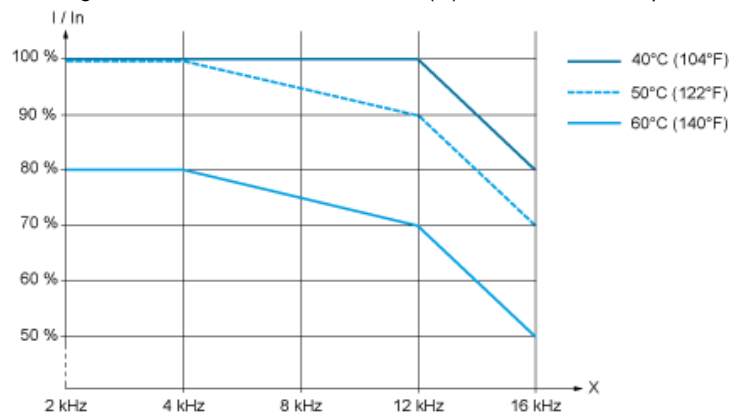
Control Connection Diagram in Source Mode



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

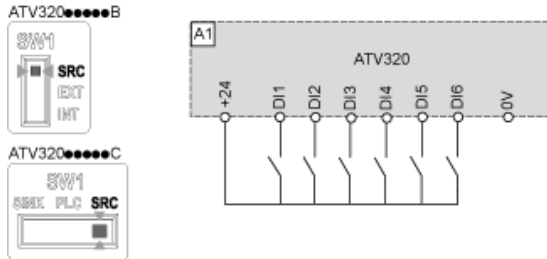
Derating Curves

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

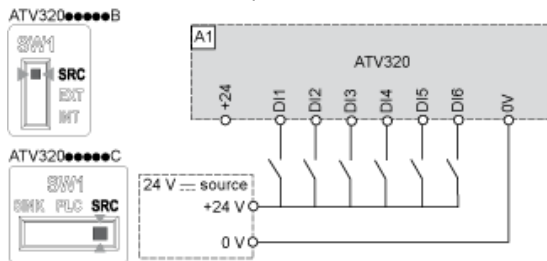


Sink / Source Switch Configuration (SW1)

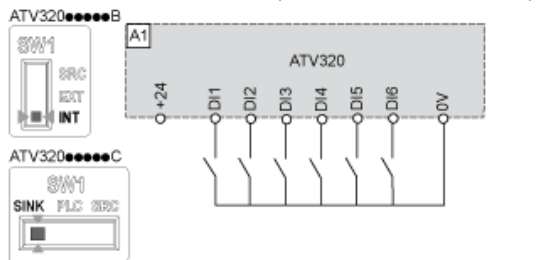
The logic input switch (SW1) is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs. Switch SW1 set to "SRC" position and use of the output power supply for the DIs.



Switch SW1 set to "SRC" 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.

