



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	Asynchronous motors Synchronous 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	11 kW for heavy duty
Motor power hp	15 hp for heavy duty
Line current	25.6 A at 500 V for heavy duty 36.6 A at 380 V for heavy duty
Prospective line I _{sc}	<= 22 kA
Apparent power	22.2 kVA at 500 V for heavy duty
Continuous output current	27.7 A at 4 kHz for heavy duty
Maximum transient current	41.6 A during 60 s for heavy duty
Asynchronous motor control profile	Voltage/Frequency ratio, 2 points Flux vector control without sensor - Energy Saving Voltage/Frequency ratio - Energy Saving, quadratic U/f Voltage/Frequency ratio, 5 points Flux vector control without sensor, standard
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	2...16 kHz adjustable
Safety function	GDL (guard door locking) SS1 (safe stop 1) SMS (safe maximum speed) SLS (safe limited speed) STO (safe torque off) SIL 3
Communication port protocol	CANopen Modbus
Option card	Communication module: CANopen open style terminal block Communication module: EtherCAT RJ45 Communication module: CANopen SUB-D 9 Communication module: Ethernet Powerlink Communication module: Profibus DP V1 Communication module: Profinet Communication module: Ethernet/IP Communication module: CANopen daisy chain RJ45 Communication module: DeviceNet

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 % Not available in voltage/frequency ratio (2 or 5 points) Automatic whatever the load
Acceleration and deceleration ramps	S CUS Deceleration ramp automatic stop DC injection Deceleration ramp adaptation Ramp switching Linear U
Braking to standstill	By DC injection
Protection type	Drive: overheating protection Drive: thermal protection Drive: input phase breaks Drive: short-circuit between motor phases Drive: overcurrent between output phases and earth
Frequency resolution	Analog input: 0.012/50 Hz Display unit: 0.1 Hz
Electrical connection	Control, screw terminal: 0.5...1.5 mm ² AWG 20...AWG 16 Motor/Braking resistor, screw terminal: 6...16 mm ² AWG 8...AWG 6 Power supply, screw terminal: 10...16 mm ² AWG 8...AWG 6
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...127 for CANopen 1...247 for Modbus
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 green for CANopen run

	1 LED red for CANopen error 1 LED red for drive voltage 1 LED red for drive fault
Width	180 mm
Height	404 mm with EMC plate 330 mm
Depth	232 mm
Product weight	8.7 kg
Analogue input number	3
Analogue input type	Bipolar differential voltage (AI2): +/- 10 V DC, impedance 30000 Ohm, resolution 10 bits Voltage (AI1): 0...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	Safe torque off (STO): 24...30 V DC, impedance 1500 Ohm 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
Discrete input logic	Positive logic (source): : DI1...DI6, < 5 V (state 0) > 11 V (state 1) Negative logic (sink): : DI1...DI6, > 19 V (state 0) < 13 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 output AQ1: +/- 1 % for a temperature of 25 °C Analog output AQ1: +/- 2 % for a temperature of -10...60 °C Analog input AI1, AI2, AI3: +/- 0.5 % for a temperature of 25 °C Analog input AI1, AI2, AI3: +/- 0.2 % 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	Relay output (R2A, R2C): 2 ms Relay output (R1A, R1B, R1C): 2 ms Logic input (DI1...DI6): 8 ms (+/- 0.7 ms)
Minimum switching current	Relay output (R1, R2): 5 mA at 24 V DC
Maximum switching current	Relay output (R2) on resistive load (cos phi = 1): 5 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) on resistive load (cos phi = 1): 4 A at 30 V DC Relay output (R1) on resistive load (cos phi = 1): 3 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

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	403 W (fan) at 380 V, 4 kHz
Operating position	Vertical +/- 10 degree
Electromagnetic compatibility	Voltage dips and interruptions immunity test conforming to IEC 61000-4-11 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 1.2/50 µs - 8/20 µs surge immunity test conforming to IEC 61000-4-5 level 3 Conducted radio-frequency immunity test conforming to IEC 61000-4-6 level 3 Electrostatic discharge immunity test conforming to IEC 61000-4-2 level 3
Pollution degree	2 conforming to EN/IEC 61800-5-1
Vibration resistance	1 gn (f = 13...200 Hz) conforming to EN/IEC 60068-2-6 1.5 mm peak to peak (f = 3...13 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	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 61800-3 environment 2 category C2 EN 55011 class A group 1 EN/IEC 61800-3 EN/IEC 61800-5-1 EN 61800-3 environment 1 category C2
Product certifications	UL EAC NOM 117 CSA RCM
Marking	CE