



Main

Range of product	Altivar 312 Solar
Product or component type	Variable speed drive
Product destination	Asynchronous motors
Product specific application	Pumping station with photovoltaic arrays
Assembly style	With heat sink
Device short name	ATV312

Complementary

Motor power kW	4 kW
Motor power hp	5 hp
[Us] rated supply voltage	380...500 V (- 5...5 %)
Supply voltage limits	323...550 V
Supply frequency	50...60 Hz (- 5...5 %)
Network frequency	47.5...63 Hz
Network number of phases	3 phases
Line current	13.9 A at 380 V, I _{sc} = 1 kA 10.6 A at 500 V
EMC filter	Integrated
Apparent power	9.2 kVA
Prospective line I _{sc}	1 kA
Continuous output current	9.5 A at 4 kHz
Maximum transient current	14.3 A for 60 s
Power dissipation in W	150 W at nominal load
Speed drive output frequency	0.5...500 Hz
Nominal switching frequency	4 kHz
Switching frequency	2...16 kHz (adjustable)
Speed range	1...50
Transient overtorque	150...170 % of nominal motor torque
Braking torque	150 % without braking resistor 100 % with braking resistor continuously ≤ 150 % with braking resistor for 60 s
Asynchronous motor control profile	Factory set : constant torque Sensorless flux vector control with PWM type motor control signal
Regulation loop	Frequency PI regulator
Motor slip compensation	Adjustable Automatic whatever the load Suppressable
Output voltage	≤ power supply voltage
Electrical connection	Terminal - cable cross section: 2.5 mm ² , AWG 14 (terminal(s) L1, L2, L3, U, V, W, PA, PB, PA+, PC/-) Terminal - cable cross section: 2.5 mm ² , AWG 14 (terminal(s) AI1, AI2, AI3, AOV, AOC, R1A, R1B, R1C, R2A, R2B, LI1...LI6)
Tightening torque	0.8 N.m (terminal(s) L1, L2, L3, U, V, W, PA, PB, PA+, PC/-) 0.6 N.m (terminal(s) AI1, AI2, AI3, AOV, AOC, R1A, R1B, R1C, R2A, R2B, LI1...LI6)
Insulation	Electrical between power and control

Supply	Internal supply for reference potentiometer (2.2 to 10 kOhm) at 10...10.8 V, <= 10 A, protection type: overload and short-circuit protection Internal supply for logic inputs at 19...30 V, <= 100 A, protection type: overload and short-circuit protection
Analogue input number	3
Analogue input type	AI3 configurable current 0...20 mA, impedance: 250 Ohm AI2 configurable voltage +/- 10 V, 30 V max, impedance: 30000 Ohm AI1 configurable voltage 0...10 V, 30 V max, impedance: 30000 Ohm
Sampling duration	4 ms (terminal(s) LI1...LI6), input: discrete 8 ms (terminal(s) AI1, AI2, AI3), input: analog
Response time	8 ms, output: discrete (terminal(s) R1A, R1B, R1C, R2A, R2B) 8 ms, output: analog (terminal(s) AOV, AOC)
Linearity error	+/- 0.2 % output
Analogue output number	2
Analogue output type	AOV configurable voltage 0...10 V, impedance: 470 Ohm, resolution: 8 bits AOC configurable current 0...20 mA, impedance: 800 Ohm, resolution: 8 bits
Discrete input logic	LI1...LI6 positive logic (source) at State 0: < 5 V, at State 1: > 11 V LI1...LI6 negative logic (source) at State 0: > 19 V, LI1...LI4 logic input not wired at State 1: < 13 V
Discrete output number	2
Discrete output type	R2A, R2B configurable relay logic, NC, electrical service life: 100000 cycles R1A, R1B, R1C configurable relay logic, 1 NO + 1 NC, electrical service life: 100000 cycles
Minimum switching current	10 mA at 5 V DC (terminal(s) R1-R2)
Maximum switching current	5 A at 30 V DC on resistive load - cos phi = 1 - L/R = 0 ms (R1-R2) 5 A at 250 V AC on resistive load - cos phi = 1 - L/R = 0 ms (R1-R2) 2 A at 30 V DC on inductive load - cos phi = 0.4 - L/R = 7 ms (R1-R2) 2 A at 250 V AC on inductive load - cos phi = 0.4 - L/R = 7 ms (R1-R2)
Discrete input number	6
Discrete input type	LI1...LI6 programmable at 24 V, 0...100 mA for PLC, impedance: 3500 Ohm
Acceleration and deceleration ramps	Linear adjustable separately from 0.1 to 999.9 s S, U or customized
Braking to standstill	By DC injection
Protection type	Thermal protection for motor Short-circuit between motor phases for drive Overheating protection for drive Overcurrent between output phases and earth (on power up only) for drive Motor phase breaks for drive Line supply phase loss safety function, for three phases supply for drive Line supply overvoltage and undervoltage safety circuits for drive Input phase breaks for drive
Dielectric strength	3400 V AC between control and power terminals 2410 V DC between earth and power terminals
Insulation resistance	>= 500 mOhm at 500 V DC for 1 minute
Local signalling	Four 7-segment display units signal for CANopen bus status 1 LED (red) signal for drive voltage
Time constant	5 ms for reference change
Frequency resolution	0.1 Hz for display unit 0.1...100 Hz for analog input
Communication port protocol	CANopen Modbus
Type of connector	1 RJ45 for Modbus/CANopen
Physical interface	RS485 multidrop serial link
Transmission frame	RTU
Transmission rate	4800, 9600 or 19200 bps for Modbus 10, 20, 50, 125, 250, 500 kbps or 1 Mbps for CANopen
Number of addresses	1...247 for Modbus 1...127 for CANopen
Number of drive	31 for Modbus 127 for CANopen
Electromagnetic compatibility	Radiated radio-frequency electromagnetic field immunity test - test level 3 conforming to IEC 61000-4-3 Electrostatic discharge immunity test - test level 3 conforming to IEC 61000-4-2 Electrical fast transient/burst immunity test - test level 4 conforming to IEC 61000-4-4 1.2/50 µs - 8/20 µs surge immunity test - test level 3 conforming to IEC 61000-4-5

Standards	IEC 61800-3 IEC 61800-5-1
Marking	CE
Outer dimension	184 x 140 x 150 mm 215 x 185 x 158 mm 402 x 239 x 192 mm
Height	184 mm
Width	142 mm
Depth	152 mm
Product weight	3.1 kg
Option card	Communication card for Profibus DP Communication card for Modbus TCP Communication card for Fipio Communication card for DeviceNet Communication card for CANopen daisy chain

Environment

IP degree of protection	IP20 without cover plate
Pollution degree	2
Protective treatment	TC
Vibration resistance	1.5 mm (f = 3...13 Hz) conforming to EN/IEC 60068-2-6 1 gn (f = 13...150 Hz) conforming to EN/IEC 60068-2-6
Shock resistance	15 gn for 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 storage	-25...70 °C
Ambient air temperature for operation	-10...60 °C with derating factor without protective cover on top of the drive -10...50 °C without derating with protective cover on top of the drive
Operating altitude	>= 1000 m with current derating 1 % per 100 m <= 1000 m without derating
Operating position	Vertical +/- 10 degree

Contractual warranty

Period	18 months
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