



## 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                     | 7.5 kW  |
| Motor power hp                     | 10 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                       | 21 A at 500 V<br>27.7 A at 380 V, I <sub>sc</sub> = 22 kA   |
| EMC filter                         | Integrated  |
| Apparent power                     | 18 kVA  |
| Prospective line I <sub>sc</sub>   | 22 kA   |
| Continuous output current          | 17 A at 4 kHz   |
| Maximum transient current          | 25.5 A for 60 s   |
| Power dissipation in W             | 269 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                     | 30 % without braking resistor<br>100 % with braking resistor continuously<br>150 % with braking resistor for 60 s   |
| Asynchronous motor control profile | Factory set: energy saving mode   |
| Regulation loop                    | Frequency PI regulator  |
| Motor slip compensation            | Adjustable<br>Automatic whatever the load<br>Suppressable   |
| Output voltage                     | <= power supply voltage   |
| Electrical connection              | Terminal - cable cross section: 16 mm <sup>2</sup> , AWG 6 (terminal(s) L1, L2, L3, U, V, W, PA, PB, PA+, PC/-)<br>Terminal - cable cross section: 2.5 mm <sup>2</sup> , AWG 14 (terminal(s) AI1, AI2, AI3, AOV, AOC, R1A, R1B, R1C, R2A, R2B, LI1...LI6) |
| Tightening torque                  | 2.5 N.m (terminal(s) L1, L2, L3, U, V, W, PA, PB, PA+, PC/-)<br>0.6 N.m (terminal(s) AI1, AI2, AI3, AOV, AOC, R1A, R1B, R1C, R2A, R2B, LI1...LI6)   |
| Insulation                         | Electrical between power and control  |

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|                                     |   |
|-------------------------------------|---|
| Supply                              | Internal supply for reference potentiometer (2.2 to 10 kOhm) at 10...10.8 V, <= 10 mA, protection type: overload and short-circuit protection<br>Internal supply for logic inputs at 19...30 V, <= 100 mA, protection type: overload and short-circuit protection   |
| Analogue input number               | 3   |
| Analogue input type                 | AI3 configurable current 0...20 mA, impedance: 250 Ohm<br>AI2 configurable voltage +/- 10 V, 30 V max, impedance: 30000 Ohm<br>AI1 configurable voltage 0...10 V, 30 V max, impedance: 30000 Ohm  |
| Sampling duration                   | 4 ms (terminal(s) LI1...LI6), input: discrete<br>8 ms (terminal(s) AI1, AI2, AI3), input: analog  |
| Response time                       | 8 ms, output: discrete (terminal(s) R1A, R1B, R1C, R2A, R2B)<br>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<br>AOC configurable current 0...20 mA, impedance: 800 Ohm, resolution: 8 bits   |
| Discrete input logic                | LI1...LI6 positive logic (source), < 5 V (state 0), > 11 V (state 1)<br>LI1...LI6 negative logic (source), > 19 V (state 0)<br>LI1...LI4 logic input not wired, < 13 V (state 1)  |
| Discrete output number              | 2   |
| Discrete output type                | R2A, R2B configurable relay logic, NC, electrical service life: 100000 cycles<br>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)<br>5 A at 250 V AC on resistive load - cos phi = 1 - L/R = 0 ms (R1-R2)<br>2 A at 30 V DC on inductive load - cos phi = 0.4 - L/R = 7 ms (R1-R2)<br>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<br>S, U or customized  |
| Braking to standstill               | By DC injection   |
| Protection type                     | Thermal protection for motor<br>Short-circuit between motor phases for drive<br>Overheating protection for drive<br>Overcurrent between output phases and earth (on power up only) for drive<br>Motor phase breaks for drive<br>Line supply phase loss safety function, for three phases supply for drive<br>Line supply overvoltage and undervoltage safety circuits for drive<br>Input phase breaks for drive |
| Dielectric strength                 | 3400 V AC between control and power terminals<br>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<br>1 LED (red) signal for drive voltage  |
| Time constant                       | 5 ms for reference change   |
| Frequency resolution                | 0.1 Hz for display unit<br>0.1...100 Hz for analog input  |
| Communication port protocol         | CANopen<br>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<br>10, 20, 50, 125, 250, 500 kbps or 1 Mbps for CANopen  |
| Number of addresses                 | 1...247 for Modbus<br>1...127 for CANopen   |
| Number of drive                     | 31 for Modbus<br>127 for CANopen  |
| Electromagnetic compatibility       | Radiated radio-frequency electromagnetic field immunity test - test level 3 conforming to IEC 61000-4-3<br>Electrostatic discharge immunity test - test level 3 conforming to IEC 61000-4-2<br>Electrical fast transient/burst immunity test - test level 4 conforming to IEC 61000-4-4<br>1.2/50 µs - 8/20 µs surge immunity test - test level 3 conforming to IEC 61000-4-5                                   |

|                |   |
|----------------|---|
| Standards      | IEC 61800-3<br>IEC 61800-5-1  |
| Marking        | CE  |
| Height         | 232 mm  |
| Width          | 180 mm  |
| Depth          | 172 mm  |
| Product weight | 6.5 kg  |
| Option card    | Communication card for Profibus DP<br>Communication card for Modbus TCP<br>Communication card for Fipio<br>Communication card for DeviceNet<br>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<br>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<br>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<br>-10...50 °C without derating with protective cover on top of the drive |
| Operating altitude                    | 1000...3000 m with current derating 1 % per 100 m<br><= 1000 m without derating   |
| Operating position                    | Vertical +/- 10 degree  |