

# ATV31CU40N4

enclosed variable speed drive ATV31 - 4kW - 500V - IP55



## Main

|                                    |                                                                                                    |
|------------------------------------|----------------------------------------------------------------------------------------------------|
| Range of product                   | Altivar 31                                                                                         |
| Product or component type          | Variable speed drive                                                                               |
| Product specific application       | Simple machine                                                                                     |
| Component name                     | ATV31                                                                                              |
| Assembly style                     | Enclosed                                                                                           |
| EMC filter                         | Integrated                                                                                         |
| [Us] rated supply voltage          | 380...500 V - 15...10 %                                                                            |
| Supply frequency                   | 50...60 Hz - 5...5 %                                                                               |
| Network number of phases           | 3 phases                                                                                           |
| Motor power kW                     | 4 kW                                                                                               |
| Motor power hp                     | 5 hp                                                                                               |
| Line current                       | 10.6 A 500 V 1 kA<br>13.9 A 380 V 1 kA                                                             |
| Apparent power                     | 9.2 kVA                                                                                            |
| Prospective line I <sub>sc</sub>   | 5 kA                                                                                               |
| Maximum transient current          | 14.3 A 60 s                                                                                        |
| Power dissipation in W             | 150 W at nominal load                                                                              |
| Asynchronous motor control profile | Factory set : constant torque<br>Sensorless flux vector control with PWM type motor control signal |

## Complementary

|                              |                                                                                                                                                                                |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product destination          | Asynchronous motors                                                                                                                                                            |
| Supply voltage limits        | 323...550 V                                                                                                                                                                    |
| Network frequency limits     | 47.5...63 Hz                                                                                                                                                                   |
| Speed drive output frequency | 0.5...500 Hz                                                                                                                                                                   |
| Nominal switching frequency  | 4 kHz                                                                                                                                                                          |
| Switching frequency          | 2...16 kHz adjustable                                                                                                                                                          |
| 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 60 s                                                                |
| Regulation loop              | Frequency PI regulator                                                                                                                                                         |
| Motor slip compensation      | Adjustable<br>Automatic whatever the load<br>Suppressable                                                                                                                      |
| Output voltage               | ≤ power supply voltage                                                                                                                                                         |
| Electrical connection        | Terminal 2.5 mm <sup>2</sup> AWG 14 AI1, AI2, AI3, AOV, AOC, R1A, R1B, R1C, R2A, R2B, LI1...LI6<br>Terminal 2.5 mm <sup>2</sup> AWG 14 L1, L2, L3, U, V, W, PA, PB, PA/+, PC/- |
| Tightening torque            | 0.6 N.m AI1, AI2, AI3, AOV, AOC, R1A, R1B, R1C, R2A, R2B, LI1...LI6<br>0.8 N.m L1, L2, L3, U, V, W, PA, PB, PA/+, PC/-                                                         |
| Insulation                   | Electrical between power and control                                                                                                                                           |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supply                              | Internal supply for logic inputs 19...30 V > 0...0.1 A short-circuit protection<br>Internal supply for logic inputs 19...30 V > 0...0.1 A overload protection<br>Internal supply for reference potentiometer 10...10.8 V > 0...0.01 A short-circuit protection<br>Internal supply for reference potentiometer 10...10.8 V > 0...0.01 A overload protection                      |
| Analogue input number               | 3                                                                                                                                                                                                                                                                                                                                                                               |
| Analogue input type                 | Configurable current AI3 0...20 mA 250 Ohm<br>Configurable voltage AI1 0...10 V 30 V max 30000 Ohm<br>Configurable voltage AI2 +/- 10 V 30 V max 30000 Ohm                                                                                                                                                                                                                      |
| Sampling duration                   | 4 ms LI1...LI6 discrete<br>8 ms AI1, AI2, AI3 analog                                                                                                                                                                                                                                                                                                                            |
| Response time                       | 8 ms discrete R1A, R1B, R1C, R2A, R2B<br>8 ms analog AOV, AOC                                                                                                                                                                                                                                                                                                                   |
| Linearity error                     | +/- 0.2 % output                                                                                                                                                                                                                                                                                                                                                                |
| Analogue output number              | 2                                                                                                                                                                                                                                                                                                                                                                               |
| Analogue output type                | Configurable current AOC 0...20 mA 800 Ohm 8 bits<br>Configurable voltage AOV 0...10 V 470 Ohm 8 bits                                                                                                                                                                                                                                                                           |
| Discrete input logic                | Logic input not wired LI1...LI4 < 13 V<br>Negative logic (source) LI1...LI6 > 19 V<br>Positive logic (source) LI1...LI6 < 5 V > 11 V                                                                                                                                                                                                                                            |
| Discrete output number              | 2                                                                                                                                                                                                                                                                                                                                                                               |
| Discrete output type                | Configurable relay logic R1A, R1B, R1C 1 NO + 1 NC 100000 cycles<br>Configurable relay logic R2A, R2B NC 100000 cycles                                                                                                                                                                                                                                                          |
| Minimum switching current           | 10 mA 5 V DC R1-R2                                                                                                                                                                                                                                                                                                                                                              |
| Maximum switching current           | 2 A 250 V AC inductive cos phi = 0.4 L/R = 7 ms R1-R2<br>2 A 30 V DC inductive cos phi = 0.4 L/R = 7 ms R1-R2<br>5 A 250 V AC resistive cos phi = 1 L/R = 0 ms R1-R2<br>5 A 30 V DC resistive cos phi = 1 L/R = 0 ms R1-R2                                                                                                                                                      |
| Discrete input number               | 6                                                                                                                                                                                                                                                                                                                                                                               |
| Discrete input type                 | Programmable LI1...LI6 24 V 0...100 mA PLC 3500 Ohm                                                                                                                                                                                                                                                                                                                             |
| Acceleration and deceleration ramps | S, U or customized<br>Linear adjustable separately from 0.1 to 999.9 s                                                                                                                                                                                                                                                                                                          |
| Braking to standstill               | By DC injection                                                                                                                                                                                                                                                                                                                                                                 |
| Protection type                     | Input phase breaks drive<br>Line supply overvoltage and undervoltage safety circuits drive<br>Line supply phase loss safety function, for three phases supply drive<br>Motor phase breaks drive<br>Overcurrent between output phases and earth (on power up only) drive<br>Overheating protection drive<br>Short-circuit between motor phases drive<br>Thermal protection motor |
| Insulation resistance               | ≥ 500 MOhm 500 V DC for 1 minute                                                                                                                                                                                                                                                                                                                                                |
| Time constant                       | 5 ms for reference change                                                                                                                                                                                                                                                                                                                                                       |
| Frequency resolution                | 0.1...100 Hz analog input<br>0.1 Hz display unit                                                                                                                                                                                                                                                                                                                                |
| Type of connector                   | 1 RJ45 Modbus<br>1 RJ45 CANopen via VW3 CANTAP2 adaptor                                                                                                                                                                                                                                                                                                                         |
| Physical interface                  | RS485 multidrop serial link Modbus                                                                                                                                                                                                                                                                                                                                              |
| Transmission frame                  | RTU Modbus                                                                                                                                                                                                                                                                                                                                                                      |
| Transmission rate                   | 10, 20, 50, 125, 250, 500 kbps or 1 Mbps CANopen via VW3 CANTAP2 adaptor<br>4800, 9600 or 19200 bps Modbus                                                                                                                                                                                                                                                                      |
| Number of addresses                 | 1...127 CANopen via VW3 CANTAP2 adaptor<br>1...247 Modbus                                                                                                                                                                                                                                                                                                                       |
| Number of drive                     | 31 Modbus<br>127 CANopen via VW3 CANTAP2 adaptor                                                                                                                                                                                                                                                                                                                                |
| Marking                             | CE                                                                                                                                                                                                                                                                                                                                                                              |
| Operating position                  | Vertical +/- 10 degree                                                                                                                                                                                                                                                                                                                                                          |
| Product weight                      | 10.7 kg                                                                                                                                                                                                                                                                                                                                                                         |

## Environment

|                                       |                                                                                                                                                                                                                                                                                                     |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dielectric strength                   | 2410 V DC between earth and power terminals<br>3400 V AC between control and power terminals                                                                                                                                                                                                        |
| Electromagnetic compatibility         | 1.2/50 $\mu$ s - 8/20 $\mu$ s surge immunity test level 3 IEC 61000-4-5<br>Electrical fast transient/burst immunity test level 4 IEC 61000-4-4<br>Electrostatic discharge immunity test level 3 IEC 61000-4-2<br>Radiated radio-frequency electromagnetic field immunity test level 3 IEC 61000-4-3 |
| Standards                             | EN 50178                                                                                                                                                                                                                                                                                            |
| Product certifications                | C-Tick<br>CSA<br>N998<br>UL                                                                                                                                                                                                                                                                         |
| IP degree of protection               | IP55                                                                                                                                                                                                                                                                                                |
| Pollution degree                      | 2                                                                                                                                                                                                                                                                                                   |
| Protective treatment                  | TC                                                                                                                                                                                                                                                                                                  |
| Vibration resistance                  | 1 gn 13...150 Hz EN/IEC 60068-2-6<br>1.5 mm 3...13 Hz EN/IEC 60068-2-6                                                                                                                                                                                                                              |
| Shock resistance                      | 15 gn 11 ms EN/IEC 60068-2-27                                                                                                                                                                                                                                                                       |
| Relative humidity                     | 5...95 % without condensation IEC 60068-2-3<br>5...95 % without dripping water IEC 60068-2-3                                                                                                                                                                                                        |
| Ambient air temperature for storage   | -25...70 °C                                                                                                                                                                                                                                                                                         |
| Ambient air temperature for operation | -10...50 °C without derating with protective cover on top of the drive<br>-10...60 °C with derating factor without protective cover on top of the drive                                                                                                                                             |
| Operating altitude                    | $\leq$ 1000 m without derating<br>$\geq$ 1000 m with current derating 1 % per 100 m                                                                                                                                                                                                                 |
| RoHS EUR conformity date              | 2Q2009                                                                                                                                                                                                                                                                                              |
| RoHS EUR status                       | Will be compliant                                                                                                                                                                                                                                                                                   |