

# ATV31CU75N4

enclosed variable speed drive ATV31 - 7.5kW - 500V - IP56



## Main

|                                    |                                                                                                    |
|------------------------------------|----------------------------------------------------------------------------------------------------|
| Range of product                   | Altivar 31                                                                                         |
| Product or component type          | Variable speed drive                                                                               |
| Product destination                | Asynchronous motors                                                                                |
| Product specific application       | Simple machine                                                                                     |
| Assembly style                     | Enclosed                                                                                           |
| Component name                     | ATV31                                                                                              |
| EMC filter                         | Integrated                                                                                         |
| Power supply voltage               | 380...500 V (- 15...10 %)                                                                          |
| Power supply frequency             | 50...60 Hz (- 5...5 %)                                                                             |
| Network number of phases           | 3 phases                                                                                           |
| Motor power kW                     | 7.5 kW                                                                                             |
| Motor power hp                     | 10 hp                                                                                              |
| Line current                       | 21 A for 500 V and 1 kA<br>27.7 A for 380 V and 1 kA                                               |
| Apparent power                     | 18 kVA                                                                                             |
| Maximum prospective line Isc       | 22 kA                                                                                              |
| Maximum transient current          | 25.5 A during 60 s                                                                                 |
| Power dissipation in W             | 269 W at nominal load                                                                              |
| Speed range                        | 1...50                                                                                             |
| Transient overtorque               | 150...170 % of nominal motor torque                                                                |
| Asynchronous motor control profile | Factory set : constant torque<br>Sensorless flux vector control with PWM type motor control signal |
| IP degree of protection            | IP55                                                                                               |
| Nominal output current             | 17 A at 4 kHz                                                                                      |

## Complementary

|                               |                                                                                                                       |
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| Power supply voltage limit    | 323...550 V                                                                                                           |
| Power supply 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                                                                                                 |
| Braking torque                | 30 % without braking resistor<br>100 % with braking resistor continuously<br>≤ 150 % with braking resistor for 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<br>Terminal 2.5 mm <sup>2</sup> / AWG 14                                        |
| Tightening torque             | AI1, AI2, AI3, AOV, AOC, R1A, R1B, R1C, R2A, R2B, LI1...LI6 0.6 N.m<br>L1, L2, L3, U, V, W, PA, PB, PA+, PC/- 0.8 N.m |
| Insulation                    | Electrical between power and control                                                                                  |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                    |
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| Supply                              | Internal supply for logic inputs 19...30 V , > 0...0.1 A for short-circuit protection<br>Internal supply for logic inputs 19...30 V , > 0...0.1 A for overload protection<br>Internal supply for reference potentiometer 10...10.8 V , > 0...0.01 A for short-circuit protection<br>Internal supply for reference potentiometer 10...10.8 V , > 0...0.01 A for overload protection |
| Analogue input number               | 3                                                                                                                                                                                                                                                                                                                                                                                  |
| Analogue input type                 | AI1 configurable voltage 0...10 V , input voltage 30 V max , impedance 30000 Ohm<br>AI2 configurable voltage +/- 10 V , input voltage 30 V max , impedance 30000 Ohm<br>AI3 configurable current 0...20 mA , impedance 250 Ohm                                                                                                                                                     |
| Input sampling time                 | Analog AI1, AI2, AI3 8 ms<br>Discrete LI1...LI6 4 ms                                                                                                                                                                                                                                                                                                                               |
| Output response time                | Analog AOV, AOC , 8 ms<br>Discrete R1A, R1B, R1C, R2A, R2B , 8 ms                                                                                                                                                                                                                                                                                                                  |
| Linearity error                     | +/- 0.2 % for output                                                                                                                                                                                                                                                                                                                                                               |
| Analogue output number              | 2                                                                                                                                                                                                                                                                                                                                                                                  |
| Analogue output type                | AOC configurable current 0...20 mA , impedance 800 Ohm , resolution 8 bits<br>AOV configurable voltage 0...10 V , impedance 470 Ohm , resolution 8 bits                                                                                                                                                                                                                            |
| Discrete input logic                | LI1...LI4 logic input not wired , state 1 < 13 V<br>LI1...LI6 positive logic (source) , state 0 < 5 V , state 1 > 11 V<br>LI1...LI6 negative logic (source) , state 0 > 19 V                                                                                                                                                                                                       |
| Discrete output number              | 2                                                                                                                                                                                                                                                                                                                                                                                  |
| Discrete output type                | R1A, R1B, R1C configurable relay logic 1 NO + 1 NC 100000 cycles<br>R2A, R2B configurable relay logic NC 100000 cycles                                                                                                                                                                                                                                                             |
| Minimum switching current           | R1-R2 10 mA at 5 V DC                                                                                                                                                                                                                                                                                                                                                              |
| Maximum switching current           | R1-R2 on resistive load, 5 A at 250 V AC, cos phi = 1, L/R = 0 ms<br>R1-R2 on resistive load, 5 A at 30 V DC, cos phi = 1, L/R = 0 ms<br>R1-R2 on inductive load, 2 A at 250 V AC, cos phi = 0.4, L/R = 7 ms<br>R1-R2 on inductive load, 2 A at 30 V DC, cos phi = 0.4, L/R = 7 ms                                                                                                 |
| Discrete input number               | 6                                                                                                                                                                                                                                                                                                                                                                                  |
| Discrete input type                 | LI1...LI6 programmable 24 V , 0...100 mA compatible with PLC , impedance 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                     | Drive short-circuit between motor phases<br>Drive input phase breaks<br>Drive motor phase breaks<br>Drive line supply phase loss safety function, for three phases supply<br>Drive line supply overvoltage and undervoltage safety circuits<br>Drive overcurrent between output phases and earth (on power up only)<br>Drive overheating protection<br>Motor thermal protection    |
| Insulation resistance               | ≥ 500 MOhm at 500 V DC for 1 minute                                                                                                                                                                                                                                                                                                                                                |
| Local signalling                    | 1 LED (red) for drive voltage<br>Four 7-segment display units for CANopen bus status                                                                                                                                                                                                                                                                                               |
| Time constant                       | 5 ms for reference change                                                                                                                                                                                                                                                                                                                                                          |
| Frequency resolution                | Analog input 0.1...100 Hz<br>Display unit 0.1 Hz                                                                                                                                                                                                                                                                                                                                   |
| Communication port protocol         | CANopen<br>Modbus                                                                                                                                                                                                                                                                                                                                                                  |
| Type of connector                   | 1 RJ45 for Modbus<br>1 RJ45 for CANopen via VW3 CANTAP2 adaptor                                                                                                                                                                                                                                                                                                                    |
| Physical interface                  | RS485 multidrop serial link for Modbus                                                                                                                                                                                                                                                                                                                                             |
| Transmission frame                  | RTU for Modbus                                                                                                                                                                                                                                                                                                                                                                     |
| Transmission rate                   | 10, 20, 50, 125, 250, 500 kbps or 1 Mbps for CANopen via VW3 CANTAP2 adaptor<br>4800, 9600 or 19200 bps for Modbus                                                                                                                                                                                                                                                                 |
| Number of addresses                 | 1...127 for CANopen via VW3 CANTAP2 adaptor<br>1...247 for Modbus                                                                                                                                                                                                                                                                                                                  |
| Number of drive                     | 31 for Modbus<br>127 for CANopen via VW3 CANTAP2 adaptor                                                                                                                                                                                                                                                                                                                           |
| Marking                             | CE                                                                                                                                                                                                                                                                                                                                                                                 |
| Operating position                  | Vertical +/- 10 degree                                                                                                                                                                                                                                                                                                                                                             |

|                                       |                                                                                                                                                                                                                                                                                                                                                             |
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| Product weight                        | 23.6 kg                                                                                                                                                                                                                                                                                                                                                     |
| <b>Environment</b>                    |                                                                                                                                                                                                                                                                                                                                                             |
| 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 conforming to IEC 61000-4-5 level 3<br>Electrical fast transient/burst immunity test conforming to IEC 61000-4-4 level 4<br>Electrostatic discharge immunity test conforming to IEC 61000-4-2 level 3<br>Radiated radio-frequency electromagnetic field immunity test conforming to IEC 61000-4-3 level 3 |
| Standards                             | EN 50178                                                                                                                                                                                                                                                                                                                                                    |
| Product certifications                | C-Tick                                                                                                                                                                                                                                                                                                                                                      |
| Pollution degree                      | 2                                                                                                                                                                                                                                                                                                                                                           |
| Protective treatment                  | TC                                                                                                                                                                                                                                                                                                                                                          |
| Vibration resistance                  | 1 gn (f = 13...150 Hz) conforming to EN/IEC 60068-2-6<br>1.5 mm (f = 3...13 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 condensation conforming to IEC 60068-2-3<br>5...95 % without dripping water conforming to 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              | 0915                                                                                                                                                                                                                                                                                                                                                        |
| RoHS EUR status                       | Compliant                                                                                                                                                                                                                                                                                                                                                   |