

# ATV31HD15M3XA

variable speed drive ATV31 - 15kW - 240V 3-phase supply - IP20

## Main

|                                    |                                                                                                    |
|------------------------------------|----------------------------------------------------------------------------------------------------|
| Range of product                   | Altivar                                                                                            |
| Product or component type          | Variable speed drive                                                                               |
| Product specific application       | Simple machine                                                                                     |
| Component name                     | ATV31                                                                                              |
| Assembly style                     | With heat sink                                                                                     |
| Variant                            | With drive order potentiometer                                                                     |
| EMC filter                         | Without EMC filter                                                                                 |
| [Us] rated supply voltage          | 200...240 V - 5...5 %                                                                              |
| Supply frequency                   | 50...60 Hz - 5...5 %                                                                               |
| Network number of phases           | 3 phases                                                                                           |
| Motor power kW                     | 15 kW 4 kHz                                                                                        |
| Motor power hp                     | 20 hp 4 kHz                                                                                        |
| Line current                       | 71.9 A 240 V<br>82.1 A 200 V 1 kA                                                                  |
| Apparent power                     | 28.5 kVA                                                                                           |
| Prospective line Isc               | 1 kA                                                                                               |
| Nominal output current             | 66 A 4 kHz                                                                                         |
| Maximum transient current          | 99 A 60 s                                                                                          |
| Power dissipation in W             | 628 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        | 170...264 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                                                                                                                                  |
| Speed range                  | 1...50                                                                                                                                                 |
| Transient overtorque         | 150...170 % of nominal motor torque                                                                                                                    |
| Braking torque               | 100 % with braking resistor continuously<br>150 % without braking resistor<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 mm² AWG 14 AI1, AI2, AI3, AOV, AOC, R1A, R1B, R1C, R2A, R2B, LI1...LI6<br>Terminal 2.5 mm² 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 $19...30\text{ V} \leq 100\text{ mA}$ overload and short-circuit protection<br>Internal supply for reference potentiometer ( $2.2\text{ to }10\text{ k}\Omega$ ) $10...10.8\text{ V} \leq 10\text{ mA}$ overload and short-circuit protection                                                                                                  |
| Analogue input number               | 4                                                                                                                                                                                                                                                                                                                                                                               |
| Analogue input type                 | Configurable current AI3 $0...20\text{ mA}$ $250\text{ }\Omega$<br>Configurable voltage AI1 $0...10\text{ V}$ $30\text{ V}$ max $30000\text{ }\Omega$<br>Configurable voltage AI2 $\pm 10\text{ V}$ $30\text{ V}$ max $30000\text{ }\Omega$<br>Potentiometer reference AIP $8\text{ ms}$ $10\text{ bits}$ $\pm 4.3\%$ $\pm 0.2\%$                                               |
| Sampling duration                   | $4\text{ ms}$ LI1...LI6 discrete<br>$8\text{ ms}$ AI1, AI2, AI3 analog                                                                                                                                                                                                                                                                                                          |
| Response time                       | $8\text{ ms}$ discrete R1A, R1B, R1C, R2A, R2B<br>$8\text{ ms}$ analog AOV, AOC                                                                                                                                                                                                                                                                                                 |
| Linearity error                     | $\pm 0.2\%$ output                                                                                                                                                                                                                                                                                                                                                              |
| Analogue output number              | 2                                                                                                                                                                                                                                                                                                                                                                               |
| Analogue output type                | Configurable current AOC $0...20\text{ mA}$ $800\text{ }\Omega$ $8\text{ bits}$<br>Configurable voltage AOV $0...10\text{ V}$ $470\text{ }\Omega$ $8\text{ bits}$                                                                                                                                                                                                               |
| Discrete input logic                | Logic input not wired LI1...LI4 $< 13\text{ V}$<br>Negative logic (source) LI1...LI6 $> 19\text{ V}$<br>Positive logic (source) LI1...LI6 $< 5\text{ V}$ $> 11\text{ V}$                                                                                                                                                                                                        |
| Discrete output number              | 2                                                                                                                                                                                                                                                                                                                                                                               |
| Discrete output type                | Configurable relay logic R1A, R1B, R1C $1\text{ NO} + 1\text{ NC}$ $100000\text{ cycles}$<br>Configurable relay logic R2A, R2B NC $100000\text{ cycles}$                                                                                                                                                                                                                        |
| Minimum switching current           | $10\text{ mA}$ $5\text{ V}$ DC R1-R2                                                                                                                                                                                                                                                                                                                                            |
| Maximum switching current           | $2\text{ A}$ $250\text{ V}$ AC inductive $\cos\phi = 0.4$ $7\text{ ms}$ R1-R2<br>$2\text{ A}$ $30\text{ V}$ DC inductive $\cos\phi = 0.4$ $7\text{ ms}$ R1-R2<br>$5\text{ A}$ $250\text{ V}$ AC resistive $\cos\phi = 1$ $0\text{ ms}$ R1-R2<br>$5\text{ A}$ $30\text{ V}$ DC resistive $\cos\phi = 1$ $0\text{ ms}$ R1-R2                                                      |
| Discrete input number               | 6                                                                                                                                                                                                                                                                                                                                                                               |
| Discrete input type                 | Programmable LI1...LI6 $24\text{ V}$ $0...100\text{ mA}$ PLC $3500\text{ }\Omega$<br>Programmable LI1...LI6 $24\text{ V}$ $0...100\text{ mA}$ PLC $3500\text{ }\Omega$                                                                                                                                                                                                          |
| Acceleration and deceleration ramps | S, U or customized<br>Linear adjustable separately from $0.1$ to $999.9\text{ s}$                                                                                                                                                                                                                                                                                               |
| 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               | $\geq 500\text{ M}\Omega$ $500\text{ V}$ DC for $1\text{ minute}$                                                                                                                                                                                                                                                                                                               |
| Display type                        | $1\text{ LED}$ red drive voltage<br>Four 7-segment display units CANopen bus status                                                                                                                                                                                                                                                                                             |
| Time constant                       | $5\text{ ms}$ for reference change                                                                                                                                                                                                                                                                                                                                              |
| Frequency resolution                | $0.1...100\text{ Hz}$ analog input<br>$0.1\text{ Hz}$ display unit                                                                                                                                                                                                                                                                                                              |
| Type of connector                   | $1\text{ RJ45}$ Modbus<br>$1\text{ RJ45}$ CANopen via VW3 CANTAP2 adaptor                                                                                                                                                                                                                                                                                                       |
| Physical interface                  | RS485 multidrop serial link Modbus<br>RS485 multidrop serial link CANopen via VW3 CANTAP2 adaptor                                                                                                                                                                                                                                                                               |
| Transmission frame                  | RTU Modbus<br>RTU CANopen via VW3 CANTAP2 adaptor                                                                                                                                                                                                                                                                                                                               |
| Transmission rate                   | $10, 20, 50, 125, 250, 500\text{ kbps}$ or $1\text{ Mbps}$ CANopen via VW3 CANTAP2 adaptor<br>$4800, 9600$ or $19200\text{ bps}$ 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 $\pm 10\text{ degree}$                                                                                                                                                                                                                                                                                                                                                 |
| Product weight                      | $10.5\text{ kg}$                                                                                                                                                                                                                                                                                                                                                                |

## Environment

|                                       |                                                                                                                                                                                                                                                                                                     |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dielectric strength                   | 2040 V DC between earth and power terminals<br>2880 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               | IP20 on upper part without cover plate<br>IP21 on connection terminals<br>IP31 on upper part<br>IP41 on upper part                                                                                                                                                                                  |
| 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              | 0801                                                                                                                                                                                                                                                                                                |
| RoHS EUR status                       | Compliant                                                                                                                                                                                                                                                                                           |