

# Product datasheet

Specifications



## variable speed drive ATV610 - 4 kW / 5HP - 380...415 V - IP20

ATV610U40N4

Training Objectives : Compliant

### Main

|                                    |                                                                                                                            |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Range of product                   | Easy Altivar 610                                                                                                           |
| Product or component type          | Variable speed drive                                                                                                       |
| Product specific application       | Fan, pump, compressor, conveyor                                                                                            |
| Device short name                  | ATV610                                                                                                                     |
| Variant                            | Standard version                                                                                                           |
| Product destination                | Asynchronous motors                                                                                                        |
| Mounting mode                      | Cabinet mount                                                                                                              |
| EMC filter                         | Integrated conforming to EN/IEC 61800-3 category C3 with 50 m                                                              |
| IP degree of protection            | IP20                                                                                                                       |
| Type of cooling                    | Forced convection                                                                                                          |
| Supply frequency                   | 50...60 Hz +/-5 %                                                                                                          |
| Network number of phases           | 3 phases                                                                                                                   |
| [Us] rated supply voltage          | 380...460 V - 15...10 %                                                                                                    |
| Motor power kW                     | 4 kW for normal duty<br>3 kW for heavy duty                                                                                |
| Motor power hp                     | 5 hp for normal duty                                                                                                       |
| Line current                       | 8.8 A at 380 V (normal duty)<br>7.9 A at 460 V (normal duty)<br>7.2 A at 380 V (heavy duty)<br>6.2 A at 460 V (heavy duty) |
| Prospective line Isc               | 5 kA                                                                                                                       |
| Apparent power                     | 6.3 kVA at 460 V (normal duty)<br>4.9 kVA at 460 V (heavy duty)                                                            |
| Continuous output current          | 9.3 A at 4 kHz for normal duty<br>7.2 A at 4 kHz for heavy duty                                                            |
| Maximum transient current          | 10.2 A during 60 s (normal duty)<br>10.8 A during 60 s (heavy duty)                                                        |
| Asynchronous motor control profile | Optimized torque mode<br>Variable torque standard<br>Constant torque standard                                              |
| Output frequency                   | 0.0001...0.5 kHz                                                                                                           |
| Nominal switching frequency        | 4 kHz                                                                                                                      |
| Switching frequency                | 2...12 kHz adjustable                                                                                                      |
| Number of preset speeds            | 16 preset speeds                                                                                                           |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Communication port protocol         | Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Option card                         | Slot A: communication card, Profibus DP V1<br>Slot A: digital or analog I/O extension card<br>Slot A: relay output card                                                                                                                                                                                                                                                                                                                                                  |
| <b>Complementary</b>                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Output voltage                      | <= power supply voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Motor slip compensation             | Adjustable<br>Automatic whatever the load<br>Can be suppressed<br>Not available in permanent magnet motor law                                                                                                                                                                                                                                                                                                                                                            |
| Acceleration and deceleration ramps | S, U or customized<br>Linear adjustable separately from 0.01 to 9000 s                                                                                                                                                                                                                                                                                                                                                                                                   |
| Braking to standstill               | By DC injection                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Protection type                     | Thermal protection: motor<br>Motor phase break: motor<br>Thermal protection: drive<br>Overheating: drive<br>Overcurrent between output phases and earth: drive<br>Overload of output voltage: drive<br>Short-circuit protection: drive<br>Motor phase break: drive<br>Overvoltages on the DC bus: drive<br>Line supply overvoltage: drive<br>Line supply undervoltage: drive<br>Line supply phase loss: drive<br>Overspeed: drive<br>Break on the control circuit: drive |
| Frequency resolution                | Display unit: 0.1 Hz<br>Analog input: 0.012/50 Hz                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Electrical connection               | Control, screw terminal: 0.5...1.5 mm <sup>2</sup><br>Line side, screw terminal: 2.5...16 mm <sup>2</sup><br>Motor, screw terminal: 2.5...16 mm <sup>2</sup>                                                                                                                                                                                                                                                                                                             |
| Connector type                      | 1 RJ45 (on the remote graphic terminal) for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                |
| Physical interface                  | 2-wire RS 485 for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Transmission frame                  | RTU for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Transmission rate                   | 4.8, 9.6, 19.2, 38.4 kbit/s for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Type of polarization                | No impedance for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Number of addresses                 | 1...247 for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Method of access                    | Slave                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Supply                              | External supply for digital inputs: 24 V DC (19...30 V), <1.25 mA, protection type: overload and short-circuit protection<br>Internal supply for reference potentiometer (1 to 10 kOhm): 10.5 V DC +/- 5 %, <10 mA, protection type: overload and short-circuit protection                                                                                                                                                                                               |
| Local signalling                    | 2 LEDs for local diagnostic<br>1 LED (yellow) for embedded communication status<br>2 LEDs (dual colour) for communication module status<br>1 LED (red) for presence of voltage                                                                                                                                                                                                                                                                                           |
| Width                               | 145 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Height                              | 297 mm<br>350 mm with EMC plate                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Depth                               | 203 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Product weight                      | 4.045 kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Analogue input number               | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Analogue input type                 | AI1, AI2, AI3 software-configurable voltage: 0...10 V DC, impedance: 30 kOhm, resolution 12 bits<br>AI1, AI2, AI3 software-configurable current: 0...20 mA, impedance: 250 Ohm, resolution 12 bits<br>AI2, AI3 software-configurable temperature probe or water level sensor                                                                                                                                                                                             |
| Discrete input number               | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Discrete input type                 | DI1...DI6 programmable as logic input, 24 V DC (<= 30 V), impedance: 3.5 kOhm<br>DI5, DI6 programmable as pulse input: 0...30 kHz, 24 V DC (<= 30 V)                                                                                                                                                                                                                                                                                                                     |
| Input compatibility                 | DI1...DI6: logic input level 1 PLC conforming to EN/IEC 61131-2                                                                                                                                                                                                                                                                                                                                                                                                          |

|                           |                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           | DI5, DI6: pulse input level 1 PLC conforming to IEC 65A-68                                                                                                                                                                                                                                                                               |
| Discrete input logic      | Positive logic (source): DI1...DI6 configurable logic input, < 5 V (state 0), > 11 V (state 1)<br>Negative logic (sink): DI1...DI6 configurable logic input, > 16 V (state 0), < 10 V (state 1)<br>Positive logic (source): DI5, DI6 configurable pulse input, < 0.6 V (state 0), > 2.5 V (state 1)                                      |
| Analogue output number    | 2                                                                                                                                                                                                                                                                                                                                        |
| Analogue output type      | Software-configurable current AQ1, AQ2: 0...20 mA, resolution 10 bits<br>Software-configurable voltage AQ1, AQ2: 0...10 V DC impedance 470 Ohm, resolution 10 bits                                                                                                                                                                       |
| Sampling duration         | 5 ms +/- 0.1 ms (AI1, AI2, AI3) - analog input<br>2 ms +/- 0.5 ms (DI1...DI6)configurable - discrete input<br>5 ms +/- 1 ms (DI5, DI6)configurable - pulse input<br>10 ms +/- 1 ms (AQ1, AQ2) - analog output                                                                                                                            |
| Accuracy                  | +/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input<br>+/- 1 % AQ1, AQ2 for a temperature variation 60 °C analog output                                                                                                                                                                                               |
| Linearity error           | AI1, AI2, AI3: +/- 0.15 % of maximum value for analog input<br>AQ1, AQ2: +/- 0.2 % for analog output                                                                                                                                                                                                                                     |
| Relay output number       | 3                                                                                                                                                                                                                                                                                                                                        |
| Relay output type         | Configurable relay logic R1: fault relay NO/NC electrical durability 100000 cycles<br>Configurable relay logic R2: sequence relay NO electrical durability 100000 cycles<br>Configurable relay logic R3: sequence relay NO electrical durability 100000 cycles                                                                           |
| Refresh time              | Relay output (R1, R2, R3): 5 ms (+/- 0.5 ms)                                                                                                                                                                                                                                                                                             |
| Minimum switching current | Relay output R1, R2, R3: 5 mA at 24 V DC                                                                                                                                                                                                                                                                                                 |
| Maximum switching current | Relay output R1, R2, R3 on resistive load, cos phi = 1: 3 A at 250 V AC<br>Relay output R1, R2, R3 on resistive load, cos phi = 1: 3 A at 30 V DC<br>Relay output R1, R2, R3 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 250 V AC<br>Relay output R1, R2, R3 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 30 V DC |
| Isolation                 | Between power and control terminals                                                                                                                                                                                                                                                                                                      |
| Insulation resistance     | > 1 MOhm 500 V DC for 1 minute to earth                                                                                                                                                                                                                                                                                                  |

## Environment

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Noise level                           | 55 dB conforming to 86/188/EEC                                                                                                                                                                                                                                                                                                                                                                                                   |
| Power dissipation in W                | 128 W(forced convection) at 380 V, switching frequency 4 kHz<br>32 W(natural convection) at 380 V, switching frequency 4 kHz                                                                                                                                                                                                                                                                                                     |
| Operating position                    | Vertical +/- 10 degree                                                                                                                                                                                                                                                                                                                                                                                                           |
| Electromagnetic compatibility         | Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2<br>Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3<br>Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4<br>1.2/50 µs - 8/20 µs surge immunity test level 3 conforming to IEC 61000-4-5<br>Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-6 |
| Pollution degree                      | 2 conforming to EN/IEC 61800-5-1                                                                                                                                                                                                                                                                                                                                                                                                 |
| Vibration resistance                  | 1.5 mm peak to peak (f= 2...13 Hz) conforming to IEC 60068-2-6<br>1 gn (f= 13...200 Hz) conforming to IEC 60068-2-6                                                                                                                                                                                                                                                                                                              |
| Shock resistance                      | 15 gn for 11 ms conforming to IEC 60068-2-27                                                                                                                                                                                                                                                                                                                                                                                     |
| Relative humidity                     | 5...95 % without condensation conforming to IEC 60068-2-3                                                                                                                                                                                                                                                                                                                                                                        |
| Ambient air temperature for operation | -15...45 °C (without derating)<br>45...60 °C (with derating factor)                                                                                                                                                                                                                                                                                                                                                              |
| Operating altitude                    | <= 1000 m without derating<br>1000...4800 m with current derating 1 % per 100 m                                                                                                                                                                                                                                                                                                                                                  |
| Environmental characteristic          | Chemical pollution resistance class 3C3 conforming to EN/IEC 60721-3-3<br>Dust pollution resistance class 3S3 conforming to EN/IEC 60721-3-3                                                                                                                                                                                                                                                                                     |
| Standards                             | EN/IEC 61800-3<br>Environment 2 category C3 EN/IEC 61800-3<br>EN/IEC 61800-5-1<br>IEC 60721-3                                                                                                                                                                                                                                                                                                                                    |
| Marking                               | CE                                                                                                                                                                                                                                                                                                                                                                                                                               |

## Packing Units

|                              |     |
|------------------------------|-----|
| Unit Type of Package 1       | PCE |
| Number of Units in Package 1 | 1   |

|                              |          |
|------------------------------|----------|
| Package 1 Height             | 19.6 cm  |
| Package 1 Width              | 12.8 cm  |
| Package 1 Length             | 28.0 cm  |
| Package 1 Weight             | 4.0 kg   |
| Unit Type of Package 2       | S06      |
| Number of Units in Package 2 | 4        |
| Package 2 Height             | 73.5 cm  |
| Package 2 Width              | 80.0 cm  |
| Package 2 Length             | 60.0 cm  |
| Package 2 Weight             | 21.73 kg |

Offer Sustainability

|                            |                                                                                                                             |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Sustainable offer status   | Green Premium product                                                                                                       |
| REACH Regulation           | <a href="#">REACH Declaration</a>                                                                                           |
| EU RoHS Directive          | Pro-active compliance (Product out of EU RoHS legal scope)<br><a href="#">EU RoHS Declaration</a>                           |
| Mercury free               | Yes                                                                                                                         |
| China RoHS Regulation      | <a href="#">China RoHS declaration</a>                                                                                      |
| RoHS exemption information | <a href="#">Yes</a>                                                                                                         |
| Environmental Disclosure   | <a href="#">Product Environmental Profile</a>                                                                               |
| Circularity Profile        | <a href="#">End of Life Information</a>                                                                                     |
| WEEE                       | The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins |
| Upgradeability             | Upgradeable through digital modules and upgraded components                                                                 |

Recommended replacement(s)