

# ATV650U30N4EU

variable speed drive ATV650 - 3kW - 380/480V  
- IP55/UL type12 - disc.switch





## Main

|                                    |                                                                                                                   |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Range of product                   | Altivar Process ATV600                                                                                            |
| Product or component type          | Variable speed drive                                                                                              |
| Product specific application       | Process and utilities                                                                                             |
| Device short name                  | ATV650                                                                                                            |
| Variant                            | With disconnect switch                                                                                            |
| Product destination                | Asynchronous motors<br>Synchronous motors                                                                         |
| Mounting mode                      | Wall mount                                                                                                        |
| EMC filter                         | Integrated 164.04 ft (50 m) EN/IEC 61800-3 category C2<br>Integrated 492.13 ft (150 m) EN/IEC 61800-3 category C3 |
| IP degree of protection            | IP55IEC 61800-5-1<br>IP55IEC 60529                                                                                |
| Degree of protection               | UL type 12 UL 508C                                                                                                |
| Type of cooling                    | Forced convection                                                                                                 |
| Supply frequency                   | 50...60 Hz - 5...5 %                                                                                              |
| Phase                              | 3 phase                                                                                                           |
| [Us] rated supply voltage          | 380...480 V - 15...10 %                                                                                           |
| Motor power kW                     | 3 kW normal duty)<br>2.2 kW heavy duty)                                                                           |
| Maximum Horse Power Rating         | 3 Hp heavy duty<br>4 hp normal duty                                                                               |
| Line current                       | 5.8 A 380 V normal duty)<br>5.1 A 480 V normal duty)<br>4.5 A 380 V heavy duty)<br>4 A 480 V heavy duty)          |
| Prospective line Isc               | 50 kA                                                                                                             |
| Apparent power                     | 4.2 KVA 480 V normal duty)<br>3.3 kVA 480 V heavy duty)                                                           |
| Continuous output current          | 7.2 A 4 kHz normal duty<br>5.6 A 4 kHz heavy duty                                                                 |
| Maximum transient current          | 8.4 A 60 s heavy duty)<br>7.9 A 60 s normal duty)                                                                 |
| Asynchronous motor control profile | Optimized torque mode<br>Constant torque standard<br>Variable torque standard                                     |
| Synchronous motor control profile  | Permanent magnet motor<br>Synchronous reluctance motor                                                            |
| Output frequency                   | 0.0001...0.5 kHz                                                                                                  |
| Speed drive output frequency       | 0.1...599 Hz                                                                                                      |
| Nominal switching frequency        | 4 kHz                                                                                                             |
| Switching frequency                | 2...12 kHz adjustable<br>4...12 kHz with derating factor                                                          |
| Safety function                    | STO (safe torque off) SIL 3                                                                                       |
| Discrete input logic               | 16 preset speeds                                                                                                  |

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| Communication port protocol | Ethernet<br>Modbus serial<br>Modbus TCP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Option card                 | Slot A communication module, Profibus DP V1<br>Slot A communication module, Profinet<br>Slot A communication module, DeviceNet<br>Slot A communication module, Modbus TCP/EtherNet/IP<br>Slot A communication module, CANopen daisy chain RJ45<br>Slot A communication module, CANopen SUB-D 9<br>Slot A communication module, CANopen screw terminals<br>Slot A/slot B digital and analog I/O extension module<br>Slot A/slot B output relay extension module<br>Slot A communication module, Ethernet IP/Modbus TCP/MD-Link<br>Communication module, BACnet MS/TP<br>Communication module, Ethernet Powerlink |

## Complementary

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output voltage                      | $\leq$ power supply voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Permissible temporary current boost | 1.1 x In 60 s normal duty)<br>1.5 x In 60 s heavy duty)                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Motor slip compensation             | Can be suppressed<br>Not available in permanent magnet motor law<br>Adjustable<br>Automatic whatever the load                                                                                                                                                                                                                                                                                                                                                                                                |
| Acceleration and deceleration ramps | Linear adjustable separately from 0.01...9999 s                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Braking to standstill               | By DC injection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Protection type                     | Thermal protection motor<br>Safe torque off motor<br>Motor phase break motor<br>Thermal protection drive<br>Safe torque off 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 removable screw terminals 0.5...1.5 mm <sup>2</sup><br>Line side screw terminal 4...6 mm <sup>2</sup><br>Motor screw terminal 4...6 mm <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                  |
| Connector type                      | RJ45 on the remote graphic terminal)Ethernet/Modbus TCP<br>RJ45 on the remote graphic terminal)Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                 |
| Physical interface                  | 2-wire RS 485 Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Transmission frame                  | RTU Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Transmission rate                   | 10/100 Mbit/s Ethernet IP/Modbus TCP<br>4.8, 9.6, 19.2, 38.4 kbit/s Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Exchange mode                       | Half duplex, full duplex, autonegotiation Ethernet/Modbus TCP                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Data format                         | 8 bits, configurable odd, even or no parity Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Type of polarization                | No impedance Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Number of addresses                 | 1...247 Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Method of access                    | Slave Modbus TCP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Supply                              | External supply for digital inputs 24 V DC 19...30 V), <1.25 mA overload and short-circuit protection<br>Internal supply for reference potentiometer (1 to 10 kOhm) 10.5 V DC +/- 5 %, <10 mA overload and short-circuit protection<br>Internal supply for digital inputs and STO 24 V DC 21...27 V), <200 mA overload and short-circuit protection                                                                                                                                                          |

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| Local signalling          | Local diagnostic 3 LEDs<br>Embedded communication status 3 LEDs dual colour)<br>Communication module status 4 LEDs dual colour)<br>Presence of voltage 1 LED red)                                                                                                    |
| Width                     | 10.39 in (264 mm)                                                                                                                                                                                                                                                    |
| Height                    | 26.69 in (678 mm)                                                                                                                                                                                                                                                    |
| Depth                     | 11.81 in (300 mm)                                                                                                                                                                                                                                                    |
| Product weight            | 23.37 lb(US) (10.6 kg)                                                                                                                                                                                                                                               |
| Analogue input number     | 3                                                                                                                                                                                                                                                                    |
| Analogue input type       | AI1, AI2, AI3 software-configurable voltage 0...10 V DC 30 kOhm 12 bits<br>AI1, AI2, AI3 software-configurable current 0...20 mA/4...20 mA 250 Ohm 12 bits                                                                                                           |
| Discrete input number     | 8                                                                                                                                                                                                                                                                    |
| Discrete input type       | DI1...DI6 programmable, 24 V DC ≤ 30 V)3.5 kOhm<br>DI5, DI6 programmable as pulse input 0...30 kHz, 24 V DC ≤ 30 V)<br>STOA, STOB safe torque off, 24 V DC ≤ 30 V)> 2.2 kOhm                                                                                         |
| Input compatibility       | DI1...DI6 discrete input level 1 PLC EN/IEC 61131-2<br>DI5, DI6 discrete input level 1 PLC IEC 65A-68<br>STOA, STOB discrete input level 1 PLC EN/IEC 61131-2                                                                                                        |
| Discrete input logic      | Positive logic (source) DI1...DI6), < 5 V, > 11 V<br>Negative logic (sink) DI1...DI6), > 16 V, < 10 V<br>Positive logic (source) DI5, DI6), < 0.6 V, > 2.5 V<br>Positive logic (source) STOA, STOB), < 5 V, > 11 V                                                   |
| Analogue output number    | 2                                                                                                                                                                                                                                                                    |
| Analogue output type      | Software-configurable voltage AO1, AO2 0...10 V DC 470 Ohm 10 bits<br>Software-configurable current AO1, AO2 0...20 mA 10 bits                                                                                                                                       |
| Sampling duration         | 2 Ms +/- 0.5 ms DI1...DI4) - discrete input<br>5 Ms +/- 1 ms DI5, DI6) - discrete input<br>5 Ms +/- 0.1 ms AI1, AI2, AI3) - analog input<br>10 ms +/- 1 ms AO1) - analog output                                                                                      |
| Accuracy                  | +/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input<br>+/- 1 % AO1, AO2 for a temperature variation 60 °C analog output                                                                                                                           |
| Linearity error           | AI1, AI2, AI3 +/- 0.15 % of maximum value analog input<br>AO1, AO2 +/- 0.2 % analog output                                                                                                                                                                           |
| Relay output number       | 3                                                                                                                                                                                                                                                                    |
| Relay output type         | Configurable relay logic R1 fault relay NO/NC 100000 cycles<br>Configurable relay logic R2 sequence relay NO 100000 cycles<br>Configurable relay logic R3 sequence relay NO 100000 cycles                                                                            |
| Refresh time              | Relay output R1, R2, R3)5 ms +/- 0.5 ms)                                                                                                                                                                                                                             |
| Minimum switching current | Relay output R1, R2, R3 5 mA 24 V DC                                                                                                                                                                                                                                 |
| Maximum switching current | Relay output R1, R2, R3 resistive, cos phi = 1 3 A 250 V AC<br>Relay output R1, R2, R3 resistive, cos phi = 1 3 A 30 V DC<br>Relay output R1, R2, R3 inductive, cos phi = 0.4 7 ms 2 A 250 V AC<br>Relay output R1, R2, R3 inductive, cos phi = 0.4 7 ms 2 A 30 V DC |
| Isolation                 | Between power and control terminals                                                                                                                                                                                                                                  |

## Environment

|                                       |                                                                                                                                                                                                                                                                                                                                                            |
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| Insulation resistance                 | > 1 MOhm 500 V DC for 1 minute to earth                                                                                                                                                                                                                                                                                                                    |
| Noise level                           | 52 dB 86/188/EEC                                                                                                                                                                                                                                                                                                                                           |
| Operating position                    | Vertical +/- 10 degree                                                                                                                                                                                                                                                                                                                                     |
| Maximum THDI                          | <48 % full load IEC 61000-3-12                                                                                                                                                                                                                                                                                                                             |
| Electromagnetic compatibility         | Electrostatic discharge immunity test level 3 IEC 61000-4-2<br>Radiated radio-frequency electromagnetic field immunity test level 3 IEC 61000-4-3<br>Electrical fast transient/burst immunity test level 4 IEC 61000-4-4<br>1.2/50 µs - 8/20 µs surge immunity test level 3 IEC 61000-4-5<br>Conducted radio-frequency immunity test level 3 IEC 61000-4-6 |
| Pollution degree                      | 2 EN/IEC 61800-5-1                                                                                                                                                                                                                                                                                                                                         |
| Vibration resistance                  | 1.5 mm peak to peak 2...13 Hz)IEC 60068-2-6<br>1 gn 13...200 Hz)IEC 60068-2-6                                                                                                                                                                                                                                                                              |
| Shock resistance                      | 15 gn 11 ms IEC 60068-2-27                                                                                                                                                                                                                                                                                                                                 |
| Relative humidity                     | 5...95 % without condensation IEC 60068-2-3                                                                                                                                                                                                                                                                                                                |
| Ambient air temperature for operation | 5...104 °F (-15...40 °C) without)<br>104...122 °F (40...50 °C) with derating factor)                                                                                                                                                                                                                                                                       |
| Ambient air temperature for storage   | -40...158 °F (-40...70 °C)                                                                                                                                                                                                                                                                                                                                 |

|                              |                                                                                                                                                                                         |
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| Operating altitude           | <= 3280.84 ft (1000 m) without<br>1000...4800 m with current derating 1 % per 100 m                                                                                                     |
| Environmental characteristic | Chemical pollution resistance class 3C3 EN/IEC 60721-3-3<br>Dust pollution resistance class 3S3 EN/IEC 60721-3-3                                                                        |
| Standards                    | EN/IEC 61800-3<br>Environment 1 category C2 EN/IEC 61800-3<br>Environment 2 category C3 EN/IEC 61800-3<br>EN/IEC 61800-5-1<br>IEC 61000-3-12<br>IEC 60721-3<br>IEC 61508<br>IEC 13849-1 |
| Product certifications       | Bureau Veritas<br>DNV-GL<br>CSA<br>ABS<br>TÜV<br>REACH<br>ATEX INERIS<br>UL                                                                                                             |
| Marking                      | CE                                                                                                                                                                                      |

### Ordering and shipping details

|                     |                             |
|---------------------|-----------------------------|
| Category            | 22205 - ATV630 FRAMES 1 & 2 |
| Discount Schedule   | CP4E                        |
| GTIN                | 00785901789154              |
| Package weight(Lbs) | 0.13 kg (0.28 lb(US))       |
| Returnability       | No                          |
| Country of origin   | CN                          |

### Offer Sustainability

|                            |                                                                                                                                                                                                                                                                       |
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| Sustainable offer status   | Green Premium product                                                                                                                                                                                                                                                 |
| California proposition 65  | WARNING: This product can expose you to chemicals including: Lead and lead compounds which is known to the State of California to cause Carcinogen & Reproductive harm. For more information go to <a href="http://www.p65warnings.ca.gov">www.p65warnings.ca.gov</a> |
| REACH Regulation           | <a href="#">REACH Declaration</a>                                                                                                                                                                                                                                     |
| EU RoHS Directive          | Pro-active compliance (Product out of EU RoHS legal scope) <a href="#">EU RoHS Declaration</a>                                                                                                                                                                        |
| Mercury free               | Yes                                                                                                                                                                                                                                                                   |
| RoHS exemption information | <a href="#">Yes</a>                                                                                                                                                                                                                                                   |
| China RoHS Regulation      | <a href="#">China RoHS Declaration</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.                                                                                                                                          |