

# ATV650U22N4EU

Variable speed drive, Altivar Process ATV600,  
ATV650, 2.2kW/3 hp -380/480 V, 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                                                                         |
| 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 60529<br>IP55IEC 61800-5-1                                                                                |
| [Us] rated supply voltage          | 380...480 V                                                                                                       |
| Degree of protection               | UL type 12 UL 508C                                                                                                |
| Type of cooling                    | Forced convection                                                                                                 |
| Supply frequency                   | 50...60 Hz - 5...5 %                                                                                              |
| [Us] rated supply voltage          | 380...480 V - 15...10 %                                                                                           |
| Motor power kW                     | 1.5 KW heavy duty)<br>2.2 kW normal duty)                                                                         |
| Maximum Horse Power Rating         | 2 Hp heavy duty<br>3 hp normal duty                                                                               |
| Line current                       | 3.8 A 480 V normal duty)<br>3.1 A 380 V heavy duty)<br>2.9 A 480 V heavy duty)<br>4.3 A 380 V normal duty)        |
| Prospective line Isc               | 50 kA                                                                                                             |
| Apparent power                     | 2.4 KVA 480 V heavy duty)<br>3.2 kVA 480 V normal duty)                                                           |
| Continuous output current          | 4 A 4 kHz heavy duty<br>5.6 A 4 kHz normal duty                                                                   |
| Maximum transient current          | 6.2 A 60 s normal duty)<br>6 A 60 s heavy duty)                                                                   |
| Asynchronous motor control profile | Variable torque standard<br>Constant torque standard<br>Constant torque standard                                  |
| Synchronous motor control profile  | Synchronous reluctance motor<br>Permanent magnet motor                                                            |
| Speed drive output frequency       | 0.1...500 Hz                                                                                                      |
| Nominal switching frequency        | 4 kHz                                                                                                             |
| Switching frequency                | 4...12 kHz with derating factor<br>2...12 kHz adjustable                                                          |
| Safety function                    | STO (safe torque off) SIL 3                                                                                       |
| Discrete input logic               | 16 preset speeds                                                                                                  |

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Communication Port Protocol | Ethernet<br>Modbus TCP<br>Modbus TCP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Option card                 | Slot A communication module, Profinet<br>Slot A communication module, DeviceNet<br>Slot A communication module, Modbus TCP/<br>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<br>Slot A communication module, Profibus DP V1 |

## Complementary

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mounting Mode                       | Wall mount                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Phase                               | 3 phase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Discrete output number              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Discrete output type                | Relay outputs R1A, R1B, R1C 250 V AC 3000 mA<br>Relay outputs R1A, R1B, R1C 30 V DC 3000 mA<br>Relay outputs R2A, R2C 250 V AC 5000 mA<br>Relay outputs R2A, R2C 30 V DC 5000 mA<br>Relay outputs R3A, R3C 250 V AC 5000 mA<br>Relay outputs R3A, R3C 30 V DC 5000 mA                                                                                                                                                                                                                                        |
| Output voltage                      | <= power supply voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Permissible temporary current boost | 1.5 x I <sub>n</sub> 60 s heavy duty)<br>1.1 x I <sub>n</sub> 60 s normal duty)                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Motor slip compensation             | Can be suppressed<br>Not available in permanent magnet motor law<br>Adjustable<br>Not available in permanent magnet motor law                                                                                                                                                                                                                                                                                                                                                                                |
| Acceleration and deceleration ramps | Linear adjustable separately from 0.01...9999 s                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Physical interface                  | Ethernet<br>2-wire RS 485                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Braking to standstill               | By DC injection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Protection type                     | 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<br>Thermal protection motor |
| Transmission Rate                   | 10, 100 Mbits<br>4800 bps, 9600 bps, 19200 bps, 38.4 Kbps                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Frequency resolution                | Analog input 0.012/50 Hz<br>Display unit 0.1 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Transmission frame                  | RTU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Electrical connection               | Line side screw terminal 4...6 mm <sup>2</sup><br>Motor screw terminal 4...6 mm <sup>2</sup><br>Control removable screw terminals 0.5...1.5 mm <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                  |
| Connector type                      | RJ45 on the remote graphic terminal)Modbus serial<br>RJ45 on the remote graphic terminal)Ethernet/Modbus TCP                                                                                                                                                                                                                                                                                                                                                                                                 |
| Data format                         | 8 bits, configurable odd, even or no parity                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Type of polarization                | No impedance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Exchange mode                       | Half duplex, full duplex, autonegotiation Ethernet/Modbus TCP                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|                                 |                                                                                                                                                                                                                                                                                                                                                     |
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| Number of addresses             | 1...247 Modbus serial                                                                                                                                                                                                                                                                                                                               |
| Method of access                | Slave Modbus TCP                                                                                                                                                                                                                                                                                                                                    |
| Supply                          | 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<br>External supply for digital inputs 24 V DC 19...30 V), <1.25 mA overload and short-circuit protection |
| Local signalling                | For embedded communication status 3 LEDs (dual colour)<br>For communication module status 4 LEDs (dual colour)<br>For presence of voltage 1 LED (red)<br>For local diagnostic 3 LEDs                                                                                                                                                                |
| Width                           | 10.39 in (264 mm)                                                                                                                                                                                                                                                                                                                                   |
| Height                          | 26.69 in (678 mm)                                                                                                                                                                                                                                                                                                                                   |
| Depth                           | 11.81 in (300 mm)                                                                                                                                                                                                                                                                                                                                   |
| Net Weight                      | 23.15 lb(US) (10.5 kg)                                                                                                                                                                                                                                                                                                                              |
| Analogue input number           | 3                                                                                                                                                                                                                                                                                                                                                   |
| Analogue input type             | AI1, AI2, AI3 software-configurable voltage 0...10 V DC 31.5 kOhm 12 bits<br>AI1, AI2, AI3 software-configurable current 0...20 mA 250 Ohm 12 bits<br>AI2 voltage analog input - 10...10 V DC 31.5 kOhm 12 bits                                                                                                                                     |
| Discrete input number           | 8                                                                                                                                                                                                                                                                                                                                                   |
| Discrete input type             | DI7, DI8 programmable as pulse input 0...30 kHz, 24 V DC <= 30 V)                                                                                                                                                                                                                                                                                   |
| Input compatibility             | DI5, DI6 discrete input level 1 PLC IEC 65A-68<br>STOA, STOB discrete input level 1 PLC EN/IEC 61131-2<br>DI1...DI6 discrete input level 1 PLC EN/IEC 61131-2                                                                                                                                                                                       |
| Discrete input logic            | Positive logic (source) DI1...DI8), < 5 V, > 11 V<br>Negative logic (sink) DI1...DI8), > 16 V, < 10 V                                                                                                                                                                                                                                               |
| Analogue output number          | 2                                                                                                                                                                                                                                                                                                                                                   |
| Analogue output type            | Software-configurable voltage AQ1, AQ2 0...10 V DC 470 Ohm 10 bits<br>Software-configurable current AQ1, AQ2 0...20 mA 10 bits<br>Software-configurable current DQ-, DQ+ 30 V DC<br>Software-configurable current DQ-, DQ+ 100 mA                                                                                                                   |
| Sampling duration               | 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<br>2 ms +/- 0.5 ms DI1...DI4) - discrete input                                                                                                                                                                     |
| Accuracy                        | +/- 1 % AO1, AO2 for a temperature variation 60 °C analog output<br>+/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input                                                                                                                                                                                                          |
| Linearity error                 | AO1, AO2 +/- 0.2 % analog output<br>AI1, AI2, AI3 +/- 0.15 % of maximum value analog input                                                                                                                                                                                                                                                          |
| Relay output number             | 3                                                                                                                                                                                                                                                                                                                                                   |
| Relay output type               | Configurable relay logic R2 sequence relay NO 100000 cycles<br>Configurable relay logic R3 sequence relay NO 100000 cycles<br>Configurable relay logic R1 fault relay NO/NC 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 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<br>Relay output R1, R2, R3 resistive, cos phi = 1 3 A 250 V AC                                                                                |
| Isolation                       | Between power and control terminals                                                                                                                                                                                                                                                                                                                 |
| Maximum output frequency        | 500 kHz                                                                                                                                                                                                                                                                                                                                             |
| Maximum Input Current per Phase | 4.3 A                                                                                                                                                                                                                                                                                                                                               |
| Quantity per Set                | 1                                                                                                                                                                                                                                                                                                                                                   |
| Enclosure mounting              | Wall mounted                                                                                                                                                                                                                                                                                                                                        |

## Environment

|                                       |                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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         | 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<br>Electrostatic discharge immunity test level 3 IEC 61000-4-2 |
| Pollution degree                      | 2 EN/IEC 61800-5-1                                                                                                                                                                                                                                                                                                                                         |
| Vibration resistance                  | 1 gn 13...200 Hz)IEC 60068-2-6<br>1.5 mm peak to peak 2...13 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 | 104...122 °F (40...50 °C) with derating factor)<br>5...104 °F (-15...40 °C) without derating)                                                                                                                                                                                                                                                              |
| Ambient Air Temperature for Storage   | -40...158 °F (-40...70 °C)                                                                                                                                                                                                                                                                                                                                 |
| Operating altitude                    | 1000...4800 m with current derating 1 % per 100 m<br><= 3280.84 ft (1000 m) without derating                                                                                                                                                                                                                                                               |
| Standards                             | 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<br>EN/IEC 61800-3                                                                                                                                                                    |
| Product Certifications                | ATEX INERIS<br>DNV-GL<br>TÜV<br>UL<br>ATEX zone 2/22<br>UL                                                                                                                                                                                                                                                                                                 |
| Marking                               | CE                                                                                                                                                                                                                                                                                                                                                         |
| Standards                             | EN/IEC 61800-3 environment 1 category C2<br>EN/IEC 61800-3 environment 2 category C3<br>EN/IEC 61800-5-1<br>IEC 61000-3-12<br>IEC 60721-3<br>IEC 61508<br>IEC 13849-1<br>EN/IEC 61800-3                                                                                                                                                                    |
| Overvoltage category                  | III                                                                                                                                                                                                                                                                                                                                                        |
| Regulation loop                       | Adjustable PID regulator                                                                                                                                                                                                                                                                                                                                   |
| Noise level                           | 52 dB                                                                                                                                                                                                                                                                                                                                                      |
| Pollution degree                      | 3                                                                                                                                                                                                                                                                                                                                                          |

## Ordering and shipping details

|                       |                             |
|-----------------------|-----------------------------|
| Category              | 22205 - ATV630 FRAMES 1 & 2 |
| Discount Schedule     | CP4E                        |
| GTIN                  | 3606480907005               |
| Nbr. of units in pkg. | 1                           |
| Package weight(Lbs)   | 46.30 lb(US) (21 kg)        |
| Returnability         | No                          |
| Country of origin     | CN                          |

## Packing Units

|                        |                    |
|------------------------|--------------------|
| Unit Type of Package 1 | PCE                |
| Package 1 Height       | 21.26 in (54 cm)   |
| Package 1 width        | 15.43 in (39.2 cm) |
| Package 1 Length       | 31.50 in (80 cm)   |

## Offer Sustainability

|                            |                                                                                                                                                                                                                                                                                             |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 cancer and birth defects or other 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.                                                                                                                                                                |
| Upgradeability             | <a href="#">Upgraded Components Available</a>                                                                                                                                                                                                                                               |

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