

# Product data sheet

Specifications



## variable speed drive - ATV21 - 2.2kW 3HP - 480V - EMC filter class A - IP20

ATV21HU22N4

⚠ Discontinued

⚠ Discontinued on: Dec 31, 2012

⚠ End-of-service on: Dec 31, 2020

### Main

|                                    |  |
|------------------------------------|--|
| Range of Product                   | Altivar 21   |
| Product or Component Type          | Variable speed drive   |
| Product destination                | Asynchronous motors  |
| Product Specific Application       | Pumps and fans in HVAC   |
| Assembly style                     | With heat sink   |
| Component name                     | ATV21  |
| EMC filter                         | Class A EMC filter integrated  |
| power supply voltage               | 380...480 V - 15...10 %  |
| Phase                              | 3 phase  |
| Motor power kW                     | 2.2 kW   |
| Maximum Horse Power Rating         | 3 hp   |
| Line current                       | 3.6 A 480 V<br>4.6 A 380 V   |
| Speed range                        | 1...10   |
| Transient overtorque               | 120 % of nominal motor torque +/- 10 % 60 s  |
| Asynchronous motor control profile | Energy saving ratio<br>Quadratic voltage/frequency ratio<br>Current flux vector control (FVC) without speed feedback<br>Constant voltage/frequency ratio<br>Constant voltage/frequency ratio with automatic IR compensation                                    |
| Communication Port Protocol        | Modbus   |
| Type of polarization               | No impedance   |
| IP degree of protection            | IP20 on upper part without blanking plate on cover EN/IEC 60529<br>IP20 on upper part without blanking plate on cover EN/IEC 61800-5-1<br>IP21 EN/IEC 60529<br>IP21 EN/IEC 61800-5-1<br>IP41 on upper part EN/IEC 60529<br>IP41 on upper part EN/IEC 61800-5-1 |
| Option card                        | Communication card APOGEE FLN<br>Communication card BACnet<br>Communication card LonWorks<br>Communication card METASYS N2   |

### Complementary

|                             |                      |
|-----------------------------|----------------------|
| power supply voltage limits | 323...528 V          |
| power supply frequency      | 50...60 Hz - 5...5 % |

Price is "List Price" and may be subject to a trade discount – check with your local distributor or retailer for actual price.

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| <b>power supply frequency limits</b>                          | 47.5...63 Hz   |
| <b>Apparent power</b>   | 3.9 kVA 380 V  |
| <b>maximum prospective line Isc</b>                           | 5 kA   |
| <b>maximum continuous output current</b>                      | 5.1 A 380 V<br>5.1 A 460 V   |
| <b>Maximum transient current</b>                              | 5.6 A 60 s   |
| <b>Speed drive output frequency</b>                           | 0.5...200 Hz   |
| <b>Nominal switching frequency</b>                            | 12 kHz   |
| <b>Switching frequency</b>                                    | 12...16 kHz with derating factor<br>6...16 kHz adjustable  |
| <b>Speed accuracy</b>   | +/- 10 % of nominal slip 0.2 Tn to Tn  |
| <b>Torque accuracy</b>  | +/- 15 %   |
| <b>Regulation loop</b>  | Adjustable PI regulator  |
| <b>Motor slip compensation</b>                                | Not available in voltage/frequency ratio motor control<br>Automatic whatever the load<br>Adjustable  |
| <b>diagnostic</b>   | for DC bus energized 1 LED (red)   |
| <b>Output voltage</b>   | <= power supply voltage  |
| <b>Insulation</b>   | Electrical between power and control   |
| <b>recommended type of cable for mounting in an enclosure</b> | With UL Type 1 kit 3 UL 508 cable 104 °F (40 °C), copper 75 °C / PVC<br>Without mounting kit 1 IEC cable 113 °F (45 °C), copper 70 °C / PVC<br>Without mounting kit 1 IEC cable 113 °F (45 °C), copper 90 °C / XLPE/EPR                                    |
| <b>Electrical connection</b>                                  | L1/R, L2/S, L3/T terminal 0.009 in <sup>2</sup> (6 mm <sup>2</sup> ) / AWG 10<br>VIA, VIB, FM, FLA, FLB, FLC, RY, RC, F, R, RES terminal 0.004 in <sup>2</sup> (2.5 mm <sup>2</sup> ) / AWG 14   |
| <b>Tightening torque</b>                                      | 11.5 lbf.in (1.3 N.m), 11.5 lb.in L1/R, L2/S, L3/T<br>5.3 lbf.in (0.6 N.m) VIA, VIB, FM, FLA, FLB, FLC, RY, RC, F, R, RES)   |
| <b>Supply</b>   | Internal supply 24 V DC 21...27 V), <200 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  |
| <b>Analogue input number</b>                                  | 2  |
| <b>Analogue input type</b>                                    | VIA switch-configurable current 0...20 mA 242 Ohm 11 bits<br>VIA switch-configurable voltage 0...10 V DC 24 V max 30000 Ohm 11 bits<br>VIB configurable PTC probe 0...6 probes 1500 Ohm<br>VIB configurable voltage 0...10 V DC 24 V max 30000 Ohm 11 bits |
| <b>Sampling duration</b>                                      | F 2 ms +/- 0.5 ms discrete<br>R 2 ms +/- 0.5 ms discrete<br>RES 2 ms +/- 0.5 ms discrete<br>VIA 2 ms +/- 0.5 ms analog<br>VIB 2 ms +/- 0.5 ms analog   |
| <b>Response time</b>  | FLA, FLC 7 ms +/- 0.5 ms discrete<br>FLB, FLC 7 ms +/- 0.5 ms discrete<br>FM 2 ms +/- 0.5 ms analog<br>RY, RC 7 ms +/- 0.5 ms discrete   |
| <b>Accuracy</b>   | +/- 1 % (FM) for a temperature variation 60 °C<br>+/- 0.6 % (VIA) for a temperature variation 60 °C<br>+/- 0.6 % (VIB) for a temperature variation 60 °C   |
| <b>Linearity error</b>  | FM +/- 0.2 % output<br>VIA +/- 0.15 % of maximum value input<br>VIB +/- 0.15 % of maximum value input  |
| <b>Analogue output number</b>                                 | 1  |
| <b>Analogue output type</b>                                   | FM switch-configurable current 0...20 mA 500 Ohm 10 bits<br>FM switch-configurable voltage 0...10 V DC 470 Ohm 10 bits   |

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| <b>Discrete output number</b>              | 2   |
| <b>Discrete output type</b>                | Configurable relay logic FLA, FLC) NO - 100000 cycles<br>Configurable relay logic FLB, FLC) NC - 100000 cycles<br>Configurable relay logic RY, RC) NO - 100000 cycles   |
| <b>Minimum switching current</b>           | 3 mA 24 V DC configurable relay logic   |
| <b>Maximum switching current</b>           | 2 A 250 V AC inductive $\cos \phi = 0.4$ L/R = 7 ms FL, R)<br>2 A 30 V DC inductive $\cos \phi = 0.4$ L/R = 7 ms FL, R)<br>5 A 250 V AC resistive $\cos \phi = 1$ L/R = 0 ms FL, R)<br>5 A 30 V DC resistive $\cos \phi = 1$ L/R = 0 ms FL, R)  |
| <b>Discrete input type</b>                 | F programmable 24 V DC level 1 PLC 3500 Ohm<br>R programmable 24 V DC level 1 PLC 3500 Ohm<br>RES programmable 24 V DC level 1 PLC 3500 Ohm   |
| <b>Discrete input logic</b>                | Negative logic (sink) F, R, RES), $\geq 16$ V, $\leq 10$ V<br>Positive logic (source) F, R, RES), $\leq 5$ V, $\geq 11$ V   |
| <b>Acceleration and deceleration ramps</b> | Automatic based on the load<br>Linear adjustable separately from 0.01 to 3200 s   |
| <b>Braking to standstill</b>               | By DC injection   |
| <b>Protection type</b>                     | Against input phase loss drive<br>Break on the control circuit drive<br>Input phase breaks drive<br>Line supply overvoltage and undervoltage drive<br>Line supply undervoltage drive<br>Overcurrent between output phases and earth drive<br>Overheating protection drive<br>Overvoltages on the DC bus drive<br>Short-circuit between motor phases drive<br>Thermal power stage drive<br>Motor phase break motor<br>Thermal protection motor<br>With PTC probes motor<br>Against exceeding limit speed drive |
| <b>Insulation resistance</b>               | $\geq 1$ mOhm 500 V DC for 1 minute   |
| <b>Frequency resolution</b>                | Analog input 0.024/50 Hz<br>Display unit 0.1 Hz   |
| <b>Connector Type</b>                      | 1 RJ45  |
| <b>Physical interface</b>                  | 2-wire RS 485   |
| <b>Transmission frame</b>                  | RTU   |
| <b>Transmission Rate</b>                   | 9600 bps or 19200 bps   |
| <b>Data format</b>                         | 8 bits, 1 stop, odd even or no configurable parity  |
| <b>Number of addresses</b>                 | 1...247   |
| <b>Communication Service</b>               | Monitoring inhibitible<br>Time out setting from 0.1 to 100 s<br>Read holding registers (03) 2 words maximum<br>Read device identification (43)<br>Write multiple registers (16) 2 words maximum<br>Write single register (06)   |
| <b>Marking</b>                             | CE  |
| <b>Operating position</b>                  | Vertical +/- 10 degree  |
| <b>Height</b>                              | 5.6 in (143 mm)   |
| <b>Width</b>                               | 4.2 in (107 mm)   |
| <b>Depth</b>                               | 5.9 in (150 mm)   |
| <b>Product Weight</b>                      | 4.4 lb(US) (2 kg)   |

## Environment

|                    |                  |
|--------------------|------------------|
| <b>Noise level</b> | 51 dB 86/188/EEC |
|--------------------|------------------|

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| <b>Dielectric strength</b>                   | 3535 V DC between earth and power terminals<br>5092 V DC between control and power terminals  |
| <b>Electromagnetic compatibility</b>         | 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>Electrical fast transient/burst immunity test level 4 IEC 61000-4-4<br>Electrostatic discharge immunity test level 3 IEC 61000-4-2<br>Radiated radio-frequency electromagnetic field immunity test level 3 IEC 61000-4-3<br>Voltage dips and interruptions immunity test IEC 61000-4-11   |
| <b>Standards</b>                             | EN 61800-3 environments 1 category C1<br>EN 61800-3<br>IEC 61800-3<br>IEC 61800-5-1<br>IEC 61800-3 category C3<br>IEC 61800-3 environments 1 category C3<br>EN 61800-3 category C3<br>UL Type 1<br>IEC 61800-3 environments 1 category C1<br>EN 61800-5-1<br>IEC 61800-3 environments 2 category C1<br>EN 61800-3 environments 2 category C2<br>EN 61800-3 environments 2 category C3<br>IEC 61800-3 environments 1 category C2<br>EN 61800-3 environments 1 category C3<br>IEC 61800-3 environments 2 category C2<br>EN 61800-3 environments 2 category C1<br>EN 61800-3 category C2<br>IEC 61800-3 category C2<br>EN 61800-3 environments 1 category C2<br>EN 55011 class A group 1<br>IEC 61800-3 environments 2 category C3 |
| <b>Product Certifications</b>                | CSA<br>UL<br>NOM 117<br>C-tick  |
| <b>Vibration resistance</b>                  | 1 gn 13...200 Hz)EN/IEC 60068-2-8<br>1.5 mm 3...13 Hz)EN/IEC 60068-2-6  |
| <b>Shock resistance</b>                      | 15 gn 11 ms IEC 60068-2-27  |
| <b>Pollution degree</b>                      | 3 IEC 61800-5-1   |
| <b>Environmental characteristic</b>          | Classes 3C1 IEC 60721-3-3<br>Classes 3S2 IEC 60721-3-3  |
| <b>Relative humidity</b>                     | 5...95 % without condensation IEC 60068-2-3<br>5...95 % without dripping water IEC 60068-2-3  |
| <b>Ambient air temperature for operation</b> | 14...104 °F (-10...40 °C) without derating)<br>104...122 °F (40...50 °C) with derating factor)  |
| <b>Ambient Air Temperature for Storage</b>   | -13...158 °F (-25...70 °C)  |
| <b>Operating altitude</b>                    | <= 6561.68 ft (2000 m)<br>3280.84...9842.52 ft (1000...3000 m) limited to 2000 m for the Corner Grounded distribution network   |

## Ordering and shipping details

|                          |                                 |
|--------------------------|---------------------------------|
| <b>Category</b>          | 22157-ATV212 1 - 25 HP 460 VOLT |
| <b>Discount Schedule</b> | CP4D                            |
| <b>GTIN</b>              | 00785901503453                  |
| <b>Returnability</b>     | No                              |
| <b>Country of origin</b> | ID                              |

## Contractual warranty

|                 |           |
|-----------------|-----------|
| <b>Warranty</b> | 18 months |
|-----------------|-----------|