variable speed drive, Altivar 212, 2.2kW, 3hp, 240V, 3 phases, without EMC, IP21

ATV212HU22M3X

Discontinued on: 10 February 2023

<table>
<thead>
<tr>
<th><strong>Main</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Device short name</td>
<td>ATV212</td>
</tr>
<tr>
<td>Product destination</td>
<td>Asynchronous motors</td>
</tr>
<tr>
<td>Phase</td>
<td>3 phase</td>
</tr>
<tr>
<td>Motor power kW</td>
<td>2.2 kW</td>
</tr>
<tr>
<td>Maximum Horse Power Rating</td>
<td>3 hp</td>
</tr>
<tr>
<td>Supply voltage limits</td>
<td>170…264 V</td>
</tr>
<tr>
<td>Supply frequency</td>
<td>50...60 Hz - 5…5 %</td>
</tr>
<tr>
<td>Line current</td>
<td>7.3 A 240 V</td>
</tr>
<tr>
<td></td>
<td>8.7 A 200 V</td>
</tr>
<tr>
<td>Range of Product</td>
<td>Altivar 212</td>
</tr>
<tr>
<td>Product or Component Type</td>
<td>Variable speed drive</td>
</tr>
<tr>
<td>Product Specific Application</td>
<td>Pumps and fans in HVAC</td>
</tr>
<tr>
<td>Communication Port Protocol</td>
<td>APOGEE FLN</td>
</tr>
<tr>
<td></td>
<td>Modbus</td>
</tr>
<tr>
<td></td>
<td>LonWorks</td>
</tr>
<tr>
<td></td>
<td>METASYS N2</td>
</tr>
<tr>
<td></td>
<td>BACnet</td>
</tr>
</tbody>
</table>

[Us] rated supply voltage | 200…240 V - 15…10 % |
| EMC filter | Without EMC filter |
| IP degree of protection | IP21 |

<table>
<thead>
<tr>
<th><strong>Complementary</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparent power</td>
<td>4 kVA 240 V</td>
</tr>
<tr>
<td>Continuous output current</td>
<td>10.6 A 230 V</td>
</tr>
<tr>
<td>Maximum transient current</td>
<td>11.7 A 60 s</td>
</tr>
<tr>
<td>Speed drive output frequency</td>
<td>0.5…200 Hz</td>
</tr>
<tr>
<td>Speed range</td>
<td>1…10</td>
</tr>
<tr>
<td>Speed accuracy</td>
<td>+/- 10 % of nominal slip 0.2 Tn to Tn</td>
</tr>
<tr>
<td>Local signalling</td>
<td>for DC bus energized 1 LED (red)</td>
</tr>
<tr>
<td>Output voltage</td>
<td>&lt;= power supply voltage</td>
</tr>
<tr>
<td>Isolation</td>
<td>Electrical between power and control</td>
</tr>
</tbody>
</table>

Disclaimer: This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications.
Type of cable
Without mounting kit 1 IEC cable 113 °F (45 °C), copper 90 °C / XLPE/EPR
Without mounting kit 1 IEC cable 113 °F (45 °C), copper 70 °C / PVC
With UL Type 1 kit 3 UL 508 cable 104 °F (40 °C), copper 75 °C / PVC

Electrical connection
VIA, VIB, FM, PLA, FLB, FLC, RC, R, RES terminal 0.00 in² (2.5 mm²) / AWG 14
L1/R, L2/S, L3/T terminal 0.01 in² (6 mm²) / AWG 10

Tightening torque
11.51 lbf.in (1.3 N.m), 11.5 lbf.in L1/R, L2/S, L3/T)
6.31 lbf.in (0.6 N.m) VIA, VIB, FM, PLA, FLB, FLC, RC, R, RES)

Supply
Internal supply for reference potentiometer (1 to 10 kOhm) 10.5 V DC +/- 5 %, <10 A overload and short-circuit protection
Internal supply 24 V DC 21...27 V), <200 A overload and short-circuit protection

Sampling duration
2 ms +/- 0.5 ms F discrete
2 ms +/- 0.5 ms R discrete
3.5 ms +/- 0.5 ms VIA analog
22 ms +/- 0.5 ms VIB analog

Response time
FM 2 ms +/- 0.5 ms analog
FLA, FLC 7 ms +/- 0.5 ms discrete
FLB, FLC 7 ms +/- 0.5 ms discrete
RY, RC 7 ms +/- 0.5 ms discrete

Accuracy
VIA +/- 0.6 % for a temperature variation 60 °C
VIB +/- 0.6 % for a temperature variation 60 °C
FM +/- 1 % for a temperature variation 60 °C

Linearity error
VIA +/- 0.15 % of maximum value input
VIB +/- 0.15 % of maximum value input
FM +/- 0.2 % output

Analogue output type
FM switch-configurable voltage 0...10 V DC 7620 Ohm 10 bits
FM switch-configurable current 0...10 mA 970 Ohm 10 bits

Discrete output type
Configurable relay logic FLA, FLC) NO - 100000 cycles
Configurable relay logic FLB, FLC) NC - 100000 cycles
Configurable relay logic RC, R) NO - 100000 cycles

Minimum switching current
3 mA 24 V DC configurable relay logic

Maximum switching current
5 A 250 V AC resistive cos phi = 1 L/R = 0 ms FL, R)
5 A 30 V DC resistive cos phi = 1 L/R = 0 ms FL, R)
2 A 250 V AC inductive cos phi = 0.4 L/R = 7 ms FL, R)
2 A 30 V DC inductive cos phi = 0.4 L/R = 7 ms FL, R)

Discrete input type
F programmable 24 V DC level 1 PLC 4700 Ohm
R programmable 24 V DC level 1 PLC 4700 Ohm
RES programmable 24 V DC level 1 PLC 4700 Ohm

Discrete input logic
Positive logic (source) F, R, RES), <= 5 V, >= 11 V
Negative logic (sink) F, R, RES), >= 5 V, <= 16 V, <= 10 V

Dielectric strength
2830 V DC between earth and power terminals
4230 V DC between control and power terminals

Insulation resistance
>= 1 mOhm 500 V DC for 1 minute

Frequency resolution
Display unit 0.1 Hz
Analog input 0.024/50 Hz

Communication Service
Time out setting from 0.1 to 100 s
Monitoring inhibitible
Read device identification (43)
Read holding registers (03) 2 words maximum
Write multiple registers (16) 2 words maximum
Write single register (06)

Option card
Communication card LonWorks

Power dissipation in W
120 W

Air flow
10831.25 Gal/hr(US) (41 m3/h)

Specific application
HVAC

Variable speed drive application selection
Building - HVAC compressor for scroll
Building - HVAC fan
Building - HVAC pump

Motor power range AC-3
2.2...3 kW 200...240 V 3 phase

Motor starter type
Variable speed drive

Discrete output number
2

Analogue input number
2

Analogue input type
VIA switch-configurable voltage 0...10 V DC 24 V max 3000 Ohm 10 bits

Nov 26, 2023
<table>
<thead>
<tr>
<th><strong>Analogue output number</strong></th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical interface</strong></td>
<td>2-wire RS-485</td>
</tr>
</tbody>
</table>
| **Connector Type**         | 1 RJ45  
1 open style |
| **Transmission Rate**      | 9600 bps or 19200 bps |
| **Transmission frame**     | RTU |
| **Number of addresses**    | 1...247 |
| **Data format**            | 8 bits, 1 stop, odd even or no configurable parity |
| **Type of polarization**   | No impedance |
| **Asynchronous motor control profile** | Voltage/frequency ratio, 5 points  
Voltage/frequency ratio - Energy Saving, quadratic U/f  
Voltage/frequency ratio, automatic IR compensation (U/f + automatic Uo)  
Flux vector control without sensor, standard  
Voltage/frequency ratio, 2 points |
| **Torque accuracy**        | +/- 15 % |
| **Transmit overtorque**    | 120 % of nominal motor torque +/- 10 % 60 s |
| **Acceleration and deceleration ramps** | Automatic based on the load  
Linear adjustable separately from 0.01 to 3200 s |
| **Motor slip compensation** | Automatic whatever the load  
Adjustable  
Not available in voltage/frequency ratio motor control |
| **Switching frequency**    | 6...16 kHz adjustable  
12...16 kHz with derating factor |
| **Nominal switching frequency** | 12 kHz |
| **Braking to standstill**  | By DC injection |
| **Network Frequency**      | 47.5...63 Hz |
| **Prospective line Isc**   | 5 kA |
| **Protection type**        | Overheating protection drive  
Thermal power stage drive  
Short-circuit between motor phases drive  
Input phase breaks drive  
Overcurrent between output phases and earth drive  
Overvoltages on the DC bus drive  
Break on the control circuit drive  
Against exceeding limit speed drive  
Line supply overvoltage and undervoltage drive  
Line supply undervoltage drive  
Against input phase loss drive  
Thermal protection motor  
Motor phase break motor  
With PTC probes motor |
| **Width**                  | 4.21 in (107 mm) |
| **Height**                 | 5.63 in (143 mm) |
| **Depth**                  | 5.91 in (150 mm) |
| **Net Weight**             | 3.97 lb(US) (1.8 kg) |

**Environment**

| **Pollution degree** | 3 IEC 61800-5-1  
IP20 on upper part without blanking plate on cover IEC 61800-5-1  
IP20 on upper part without blanking plate on cover IEC 60529  
IP21 IEC 61800-5-1  
IP21 IEC 60529  
IP41 on upper part IEC 61800-5-1  
IP41 on upper part IEC 60529 |
| **Vibration resistance**  | 1.5 mm 3...13 Hz/IEC 60068-2-6  
1 gn 13...200 Hz/EN/IEC 60068-2-8 |
| **Shock resistance**      | 15 gn 11 ms IEC 60068-2-27 |
### Environmental characteristics

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3C1 IEC 60721-3-3</td>
<td>Classes 3C1 IEC 60721-3-3</td>
</tr>
<tr>
<td>3S2 IEC 60721-3-3</td>
<td>Classes 3S2 IEC 60721-3-3</td>
</tr>
</tbody>
</table>

### Noise level

51 dB 86/188/EEC

### Operating altitude

- 3280.84 ft (1000 m) limited to 2000 m for the Corner Grounded distribution network with current derating 1 % per 100 m
- <= 3280.84 ft (1000 m) without derating

### Relative humidity

- 5…95 % without condensation IEC 60068-2-3
- 5…95 % without dripping water IEC 60068-2-3

### Ambient air temperature for operation

- 14…104 °F (-10…40 °C) without derating
- 104…122 °F (40…50 °C) with derating factor

### Operating position

Vertical +/- 10 degree

### Product Certifications

- UL
- CSA
- NOM 117
- C-tick

### Marking

- CE

### Standards

- IEC 61800-5-1
- IEC 61800-3 environments 1 category C1
- UL Type 1
- IEC 61800-3
- IEC 61800-3 environments 2 category C3
- IEC 61800-3 environments 1 category C2
- IEC 61800-3 environments 2 category C1
- IEC 61800-5-1
- IEC 61800-3 environments 1 category C2
- IEC 61800-3 environments 1 category C1
- IEC 61800-3 environments 2 category C1
- IEC 61800-3 environments 1 category C3
- IEC 61800-3 environments 2 category C3
- IEC 61800-3 environments 2 category C2
- IEC 61800-3 environments 2 category C2
- IEC 61800-3 environments 1 category C3

### Assembly style

With heat sink

### Electromagnetic compatibility

- Electrostatic discharge immunity test level 3 IEC 61000-4-2
- Radiated radio-frequency electromagnetic immunity test level 3 IEC 61000-4-3
- Electrical fast transient/burst immunity test level 4 IEC 61000-4-4
- 1.250 µs - 8/20 µs surge immunity test level 3 IEC 61000-4-5
- Conducted radio-frequency immunity test level 3 IEC 61000-4-6
- Voltage dips and interruptions immunity test IEC 61000-4-11

### Regulation loop

Adjustable PI regulator

### Ambient Air Temperature for Storage

-13…158 °F (-25…70 °C)

### Ordering and shipping details

<table>
<thead>
<tr>
<th>Category</th>
<th>22155-ATV212 1 - 25 HP 230 VOLT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount Schedule</td>
<td>CP4D</td>
</tr>
<tr>
<td>GTIN</td>
<td>360648032341</td>
</tr>
<tr>
<td>Returnability</td>
<td>No</td>
</tr>
<tr>
<td>Country of origin</td>
<td>ID</td>
</tr>
</tbody>
</table>

### Packing Units

<table>
<thead>
<tr>
<th>Unit Type of Package 1</th>
<th>PCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Units in Package 1</td>
<td>1</td>
</tr>
<tr>
<td>Package 1 Height</td>
<td>7.09 in (18 cm)</td>
</tr>
<tr>
<td>Package 1 Width</td>
<td>8.27 in (21 cm)</td>
</tr>
<tr>
<td>Package 1 Length</td>
<td>6.89 in (17.5 cm)</td>
</tr>
<tr>
<td>Package 1 Weight</td>
<td>3.87 lb(US) (1.756 kg)</td>
</tr>
<tr>
<td>Unit Type of Package 2</td>
<td>P06</td>
</tr>
<tr>
<td>Number of Units in Package 2</td>
<td>27</td>
</tr>
</tbody>
</table>
### Package 2 Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>29.53 in (75 cm)</td>
</tr>
<tr>
<td>Width</td>
<td>23.62 in (60 cm)</td>
</tr>
<tr>
<td>Length</td>
<td>31.50 in (80 cm)</td>
</tr>
<tr>
<td>Weight</td>
<td>133.19 lb (US) (60.412 kg)</td>
</tr>
</tbody>
</table>

### Offer Sustainability

<table>
<thead>
<tr>
<th>Sustainability Feature</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>California proposition 65</td>
<td>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></td>
</tr>
<tr>
<td>REACh Regulation</td>
<td>REACh Declaration</td>
</tr>
<tr>
<td>EU RoHS Directive</td>
<td>Pro-active compliance (Product out of EU RoHS legal scope)</td>
</tr>
<tr>
<td>Mercury free</td>
<td>Yes</td>
</tr>
<tr>
<td>China RoHS Regulation</td>
<td>China RoHS declaration</td>
</tr>
<tr>
<td>RoHS exemption information</td>
<td>Yes</td>
</tr>
<tr>
<td>WEEE</td>
<td>The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins.</td>
</tr>
</tbody>
</table>

### Contractual Warranty

<table>
<thead>
<tr>
<th>Warranty</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18 months</td>
</tr>
</tbody>
</table>
ATV212HU22M3X
Dimensions Drawings

Dimensions

Dimensions in mm

<table>
<thead>
<tr>
<th>ATV212H</th>
<th>a</th>
<th>b</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>075M3X...U22M3X</td>
<td>107</td>
<td>143</td>
<td>93</td>
<td>121.5</td>
<td>5</td>
<td>16.5</td>
<td>2 x Ø5</td>
</tr>
<tr>
<td>075N4...U22N4</td>
<td>142</td>
<td>184</td>
<td>126</td>
<td>157</td>
<td>6.5</td>
<td>20.5</td>
<td>4 x Ø5</td>
</tr>
</tbody>
</table>

Dimensions in in.

<table>
<thead>
<tr>
<th>ATV212H</th>
<th>a</th>
<th>b</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>075M3X...U22M3X</td>
<td>4.21</td>
<td>5.63</td>
<td>3.66</td>
<td>4.78</td>
<td>0.20</td>
<td>0.65</td>
<td>2 x Ø0.20</td>
</tr>
<tr>
<td>075N4...U22N4</td>
<td>5.59</td>
<td>7.24</td>
<td>4.96</td>
<td>6.18</td>
<td>0.26</td>
<td>0.81</td>
<td>4 x Ø0.20</td>
</tr>
</tbody>
</table>

Plate for EMC mounting (supplied with the drive)

Dimensions in mm

<table>
<thead>
<tr>
<th>ATV212H</th>
<th>b1</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>075M3X...U22M3X</td>
<td>49</td>
<td>67.3</td>
</tr>
<tr>
<td>075N4...U22N4</td>
<td>48</td>
<td>88.8</td>
</tr>
</tbody>
</table>

Dimensions in in.

<table>
<thead>
<tr>
<th>ATV212H</th>
<th>b1</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>075M3X...U22M3X</td>
<td>1.93</td>
<td>2.65</td>
</tr>
<tr>
<td>075N4...U22N4</td>
<td>1.89</td>
<td>3.50</td>
</tr>
</tbody>
</table>
Mounting Recommendations

Clearance
Depending on the conditions in which the drive is to be used, its installation will require certain precautions and the use of appropriate accessories.

Install the unit vertically:

- Do not place it close to heating elements.
- Leave sufficient free space to ensure that the air required for cooling purposes can circulate from bottom to the top of the unit.

Mounting Types
Type A mounting

Type B mounting

Type C mounting

By removing the protective blanking cover from the top of the drive, the degree of protection for the drive becomes IP21. The protective blanking cover may vary according to the drive model, see opposite.
Specific Recommendations for Mounting in an Enclosure

To help ensure proper air circulation in the drive:
- Fit ventilation grilles.
- Check that there is sufficient ventilation. If there is not, install a forced ventilation unit with a filter. The openings and/or fans must provide a flow rate at least equal to that of the drive fans (refer to the product characteristics).
- Use special filters with UL Type 12/IP54 protection.
- Remove the blanking cover from the top of the drive.

Sealed Metal Enclosure (IP54 Degree of Protection)

The drive must be mounted in a dust and damp proof enclosure in certain environmental conditions, such as dust, corrosive gases, high humidity with risk of condensation and dripping water, splashing liquid, etc. This enables the drive to be used in an enclosure where the maximum internal temperature reaches 50°C.
**3-Phase Power Supply**

- **A1:** ATV 212 drive
- **KM1:** Contactor
- **Q1:** Circuit breaker
- **Q2:** GV2 L rated at twice the nominal primary current of T1
- **Q3:** GB2CB05
- **S1, S2:** XB4 B or XB5 A pushbuttons
- **T1:** 100 VA transformer 220 V secondary
- **(1)** Fault relay contacts for remote signalling of the drive status
- **(2)** Connection of the common for the logic inputs depends on the positioning of the switch (Source, PLC, Sink)
- **(3)** Reference potentiometer SZ1RV1202

**Switches (Factory Settings)**

- Voltage/current selection for analog I/O (VIA and VIB)
  - VIA: U
  - VIB: PTC

- Voltage/current selection for analog I/O (FM)
  - FM: U

- Selection of logic type
  - PLC: Source
  - (1) negative logic
  - (2) positive logic

**NOTE:** All terminals are located at the bottom of the drive. Install interference suppressors on all inductive circuits near the drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.
Logic Inputs According to the Position of the Logic Type Switch

"Source" position

"Sink" position

"PLC" position with PLC transistor outputs

2-wire control

F: Forward
R: Preset speed
(2) ATV 212 control terminals

3-wire control

F: Forward
R: Stop
RES: Reverse
(2) ATV 212 control terminals

PTC probe

(2) ATV 212 control terminals
(3) Motor

Analog Inputs

Voltage analog inputs

External +10 V

(2) ATV 212 control terminals
(4) Speed reference potentiometer 2.2 to 10 kΩ

Analog input configured for current: 0-20 mA, 4-20 mA, X-Y mA

(2) ATV 212 control terminals
(5) Source 0-20 mA, 4-20 mA, X-Y mA
Analog input VIA configured as positive logic input ("Source" position)

(2) ATV 212 control terminals

Analog input VIA configured as negative logic input ("Sink" position)

(2) ATV 212 control terminals
Derating Curves

The derating curves for the drive nominal current (In) depend on the temperature, the switching frequency and the mounting type (A, B or C). For intermediate temperatures (45°C for example), interpolate between 2 curves.

![Derating Curves Graph]

Recommended replacement(s)

ATV212HU22M3X is replaced by the following product range:

**Altivar 320 Variable Frequency Drive VFD**
For simple and advanced machines

Products: 246

Nov 26, 2023