

Product data sheet

Characteristics

ATV12HU22M2

variable speed drive ATV12 - 2.2kW - 3hp - 200..240V - 1ph - with heat sink



Main

| | |
|------------------------------------|--|
| Range of product | Altivar 12 |
| Product or component type | Variable speed drive |
| Product destination | Asynchronous motors |
| Product specific application | Simple machine |
| Assembly style | With heat sink |
| Component name | ATV12 |
| Quantity per set | Set of 1 |
| EMC filter | Integrated |
| Built-in fan | With |
| Network number of phases | 1 phase |
| [Us] rated supply voltage | 200...240 V - 15...10 % |
| Motor power kW | 2.2 kW |
| Motor power hp | 3 hp |
| Communication port protocol | Modbus |
| Line current | 24 A at 200 V 20.2 A at 240 V |
| Speed range | 1...20 |
| Transient overtorque | 150...170 % of nominal motor torque depending on drive rating and type of motor |
| Asynchronous motor control profile | Sensorless flux vector control Quadratic voltage/frequency ratio Voltage/frequency ratio (V/f) |
| IP degree of protection | IP20 without blanking plate on upper part |
| Noise level | 45 dB |

Complementary

| | |
|------------------------------|--|
| Supply frequency | 50/60 Hz +/- 5 % |
| Connector type | 1 RJ45 (on front face) for Modbus |
| Physical interface | 2-wire RS 485 for Modbus |
| Transmission frame | RTU for Modbus |
| Transmission rate | 4800 bit/s 9600 bit/s 19200 bit/s 38400 bit/s |
| Number of addresses | 1...247 for Modbus |
| Communication service | Read holding registers (03) 29 words Write single register (06) 29 words Write multiple registers (16) 27 words Read/Write multiple registers (23) 4/4 words Read device identification (43) |
| Prospective line Isc | 1 kA |
| Continuous output current | 10 A at 4 kHz |
| Maximum transient current | 15 A for 60 s |
| Speed drive output frequency | 0.5...400 Hz |
| Nominal switching frequency | 4 kHz |

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|--|---|
| Switching frequency | 2...16 kHz adjustable 4...16 kHz with derating factor |
| Braking torque | Up to 70 % of nominal motor torque without braking resistor |
| Motor slip compensation | Adjustable Preset in factory |
| Output voltage | 200...240 V 3 phases |
| Electrical connection | Terminal, clamping capacity: 5.5 mm ² , AWG 10 (L1, L2, L3, U, V, W, PA, PC) |
| Tightening torque | 1.2 N.m |
| Insulation | Electrical between power and control |
| Supply | Internal supply for reference potentiometer: 5 V DC (4.75...5.25 V), <10 mA, protection type: overload and short-circuit protection Internal supply for logic inputs: 24 V DC (20.4...28.8 V), <100 mA, protection type: overload and short-circuit protection |
| Analogue input number | 1 |
| Analogue input type | Configurable current AI1 0...20 mA 250 Ohm Configurable voltage AI1 0...10 V 30 kOhm Configurable voltage AI1 0...5 V 30 kOhm |
| Discrete input number | 4 |
| Discrete input type | Programmable LI1...LI4 24 V 18...30 V |
| Discrete input logic | Negative logic (sink), > 16 V (state 0), < 10 V (state 1), input impedance 3.5 kOhm Positive logic (source), 0...< 5 V (state 0), > 11 V (state 1) |
| Sampling duration | 20 Ms, tolerance +/- 1 ms for logic input 10 ms for analogue input |
| Linearity error | +/- 0.3 % of maximum value for analogue input |
| Analogue output number | 1 |
| Analogue output type | AO1 software-configurable voltage: 0...10 V, impedance: 470 Ohm, resolution 8 bits AO1 software-configurable current: 0...20 mA, impedance: 800 Ohm, resolution 8 bits |
| Discrete output number | 2 |
| Discrete output type | Logic output LO+, LO- Protected relay output R1A, R1B, R1C 1 C/O |
| Minimum switching current | 5 mA at 24 V DC for logic relay |
| Maximum switching current | 2 A 250 V AC inductive cos phi = 0.4 L/R = 7 ms logic relay 2 A 30 V DC inductive cos phi = 0.4 L/R = 7 ms logic relay 3 A 250 V AC resistive cos phi = 1 L/R = 0 ms logic relay 4 A 30 V DC resistive cos phi = 1 L/R = 0 ms logic relay |
| Acceleration and deceleration ramps | Linear from 0 to 999.9 s U S |
| Braking to standstill | By DC injection, <30 s |
| Protection type | Line supply overvoltage Line supply undervoltage Overcurrent between output phases and earth Overheating protection Short-circuit between motor phases Against input phase loss in three-phase Thermal motor protection via the drive by continuous calculation of I ² t |
| Frequency resolution | Analog input: converter A/D, 10 bits Display unit: 0.1 Hz |
| Time constant | 20 ms +/- 1 ms for reference change |
| Marking | CE |
| Operating position | Vertical +/- 10 degree |
| Height | 142 mm |
| Width | 105 mm |
| Depth | 156.2 mm |
| Net weight | 1.4 kg |
| Functionality | Basic |
| Specific application | Commercial equipment |
| Variable speed drive application selection | Commercial equipment Mixer Commercial equipment Other application Textile Ironing |
| Motor starter type | Variable speed drive |

Environment

| | |
|---------------------------------------|---|
| Electromagnetic compatibility | Electrical fast transient/burst immunity test level 4 conforming to EN/IEC 61000-4-4 Electrostatic discharge immunity test level 3 conforming to EN/IEC 61000-4-2 Immunity to conducted disturbances level 3 conforming to EN/IEC 61000-4-6 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-3 Surge immunity test level 3 conforming to EN/IEC 61000-4-5 Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-11 |
| Electromagnetic emission | Radiated emissions environment 1 category C2 conforming to EN/IEC 61800-3 2...16 kHz shielded motor cable Conducted emissions with integrated EMC filter environment 1 category C1 conforming to EN/IEC 61800-3 2, 4, 8, 12 and 16 kHz shielded motor cable <5 m Conducted emissions with additional EMC filter environment 1 category C1 conforming to EN/IEC 61800-3 4...12 kHz shielded motor cable <20 m Conducted emissions with additional EMC filter environment 1 category C2 conforming to EN/IEC 61800-3 4...12 kHz shielded motor cable <50 m Conducted emissions with additional EMC filter environment 2 category C3 conforming to EN/IEC 61800-3 4...12 kHz shielded motor cable <50 m Conducted emissions with integrated EMC filter environment 1 category C2 conforming to EN/IEC 61800-3 4...16 kHz shielded motor cable <5 m Conducted emissions with integrated EMC filter environment 1 category C2 conforming to EN/IEC 61800-3 2, 4, 8, 12 and 16 kHz shielded motor cable <10 m |
| Product certifications | C-Tick CSA NOM UL GOST |
| Vibration resistance | 1 gn (f = 13...200 Hz) conforming to EN/IEC 60068-2-6 1.5 mm peak to peak (f = 3...13 Hz) - drive unmounted on symmetrical DIN rail - conforming to EN/IEC 60068-2-6 |
| Shock resistance | 15 gn conforming to EN/IEC 60068-2-27 for 11 ms |
| Relative humidity | 5...95 % without condensation conforming to IEC 60068-2-3 5...95 % without dripping water conforming to IEC 60068-2-3 |
| Ambient air temperature for storage | -25...70 °C |
| Ambient air temperature for operation | -10...50 °C protective cover from the top of the drive removed 50...60 °C with current derating 2.2 % per °C |
| Operating altitude | > 1000...2000 m with current derating 1 % per 100 m <= 1000 m without derating |

Packing Units

| | |
|------------------------------|----------|
| Unit Type of Package 1 | PCE |
| Number of Units in Package 1 | 1 |
| Package 1 Weight | 1.753 kg |
| Package 1 Height | 20 cm |
| Package 1 width | 18 cm |
| Package 1 Length | 20 cm |
| Unit Type of Package 2 | S03 |
| Number of Units in Package 2 | 2 |
| Package 2 Weight | 4.04 kg |
| Package 2 Height | 30 cm |
| Package 2 width | 30 cm |
| Package 2 Length | 40 cm |
| Unit Type of Package 3 | P06 |
| Number of Units in Package 3 | 30 |
| Package 3 Weight | 65.95 kg |
| Package 3 Height | 80 cm |
| Package 3 width | 80 cm |
| Package 3 Length | 60 cm |

Offer Sustainability

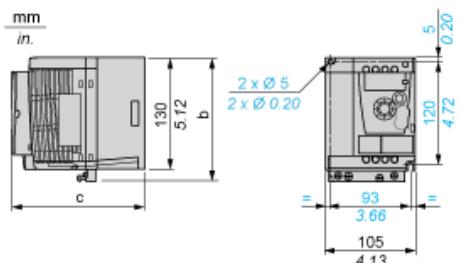
| | |
|----------------------------|--|
| Sustainable offer status | Green Premium product |
| REACH Regulation |  REACH Declaration |
| EU RoHS Directive | Pro-active compliance (Product out of EU RoHS legal scope)  EU RoHS Declaration |
| Mercury free | Yes |
| RoHS exemption information |  Yes |
| China RoHS Regulation |  China RoHS Declaration |
| Environmental Disclosure |  Product Environmental Profile |
| Circularity Profile |  End Of Life Information |
| WEEE | The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins |

Contractual warranty

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|----------|-----------|
| Warranty | 18 months |
|----------|-----------|

Dimensions

Drive without EMC Conformity Kit



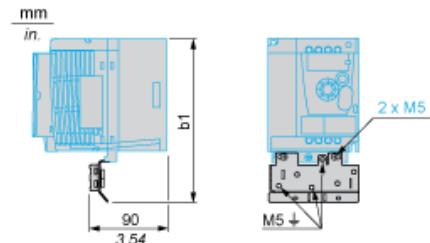
Dimensions in mm

| b | c |
|-----|-------|
| 142 | 156.2 |

Dimensions in in.

| b | c |
|------|------|
| 5.59 | 6.15 |

Drive with EMC Conformity Kit



Dimensions in mm

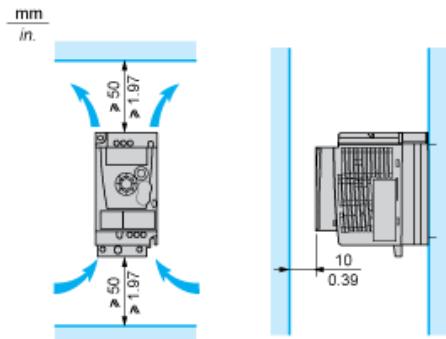
| | |
|-------|--|
| b1 | |
| 188.2 | |

Dimensions in in.

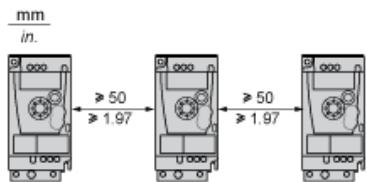
| | |
|------|--|
| b1 | |
| 7.41 | |

Mounting Recommendations

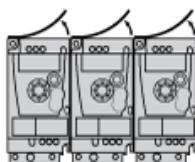
Clearance for Vertical Mounting



Mounting Type A

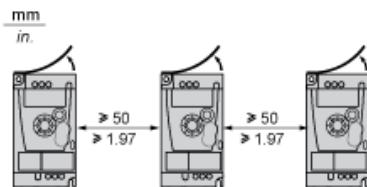


Mounting Type B



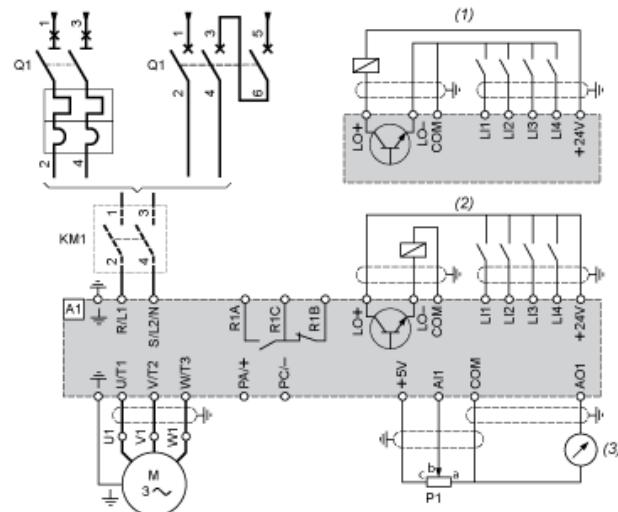
Remove the protective cover from the top of the drive.

Mounting Type C



Remove the protective cover from the top of the drive.

Single-Phase Power Supply Wiring Diagram



A1 Drive

KM1 Contactor (only if a control circuit is needed)

P1 2.2 kΩ reference potentiometer. This can be replaced by a 10 kΩ potentiometer (maximum).

Q1 Circuit breaker

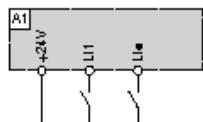
(1) Negative logic (Sink)

(2) Positive logic (Source) (factory set configuration)

(3) 0...10 V or 0...20 mA

Recommended Schemes

2-Wire Control for Logic I/O with Internal Power Supply

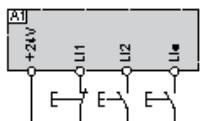


L11 : Forward

L12 : Reverse

A1 : Drive

3-Wire Control for Logic I/O with Internal Power Supply



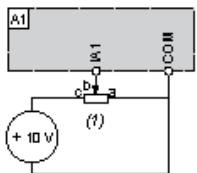
L11 : Stop

L12 : Forward

L13 : Reverse

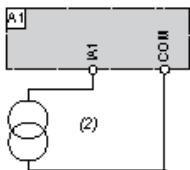
A1 : Drive

Analog Input Configured for Voltage with Internal Power Supply



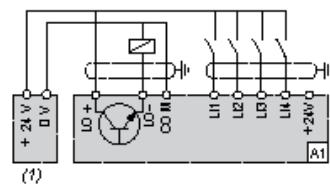
(1) 2.2 kΩ...10 kΩ reference potentiometer
A1 : Drive

Analog Input Configured for Current with Internal Power Supply



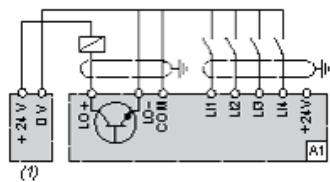
(2) 0-20 mA 4-20 mA supply
A1 : Drive

Connected as Positive Logic (Source) with External 24 vdc Supply



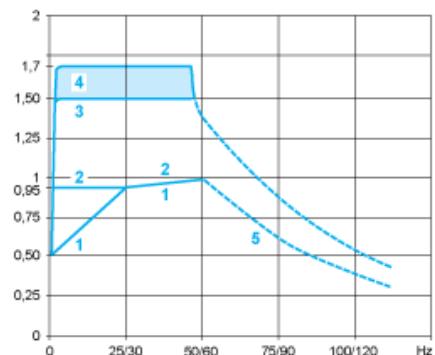
(1) 24 vdc supply
A1 : Drive

Connected as Negative Logic (Sink) with External 24 vdc supply



(1) 24 vdc supply
A1 : Drive

Torque Curves



1 : Self-cooled motor: continuous useful torque (1)

2 : Force-cooled motor: continuous useful torque

3 : Transient overtorque for 60 s

4 : Transient overtorque for 2 s

5 : Torque in overspeed at constant power (2)

(1) For power ratings ≤ 250 W, derating is 20% instead of 50% at very low frequencies.

(2) The nominal motor frequency and the maximum output frequency can be adjusted from 0.5 to 400 Hz. The mechanical overspeed capability of the selected motor must be checked with the manufacturer.