

# Product data sheet

Specifications



variable speed drive, Altivar 12,  
2.2kW, 3hp, 200 to 240V, 1 phase,  
with heat sink

ATV12HU22M2

Product availability : Stock - Normally stocked in distribution facility

**Price\* : 418.60 USD**

## Main

Range of Product	Altivar 12
Product or Component Type	Variable speed drive
Product Specific Application	Simple machine
Mounting Mode	Cabinet mount
Communication Port Protocol	Modbus
Supply frequency	50/60 Hz +/- 5 %
[Us] rated supply voltage	200...240 V - 15...10 %
Nominal output current	10 A
Maximum Horse Power Rating	3 hp
Motor power kW	2.2 kW 3 hp
EMC filter	Integrated
IP degree of protection	IP20

## Complementary

Discrete input number	4
Discrete output number	2
Analogue input number	1
Analogue output number	1
Relay output number	1
Physical interface	2-wire RS 485
Connector Type	1 RJ45
Continuous output current	10 A 4 kHz
Method of access	Server Modbus serial
Speed drive output frequency	0.5...400 Hz
Speed range	1...20
Sampling duration	20 ms +/- 1 ms logic input 10 ms analogue input
Linearity error	+/- 0.3 % of maximum value analogue input

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

<b>Frequency resolution</b>	Analog input converter A/D, 10 bits Display unit 0.1 Hz
<b>Time constant</b>	20 ms +/- 1 ms for reference change
<b>Transmission Rate</b>	9.6 kbit/s 19.2 kbit/s 38.4 kbit/s
<b>Transmission frame</b>	RTU
<b>Number of addresses</b>	1...247
<b>Data format</b>	8 bits, configurable odd, even or no parity
<b>Communication service</b>	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)
<b>Type of polarization</b>	No impedance
<b>4 quadrant operation possible</b>	False
<b>Asynchronous motor control profile</b>	Sensorless flux vector control Quadratic voltage/frequency ratio Voltage/frequency ratio (V/f)
<b>Maximum output frequency</b>	4 kHz
<b>Transient overtorque</b>	150...170 % of nominal motor torque depending on drive rating and type of motor
<b>Acceleration and deceleration ramps</b>	Linear from 0 to 999.9 s U S
<b>Motor slip compensation</b>	Adjustable Preset in factory
<b>Switching frequency</b>	2...16 kHz adjustable 4...16 kHz with derating factor
<b>Nominal switching frequency</b>	4 kHz
<b>Braking to standstill</b>	By DC injection
<b>Brake chopper integrated</b>	False
<b>Line current</b>	24.0 A 100 V heavy duty) 20.2 A 120 V heavy duty)
<b>Maximum Input Current per Phase</b>	20.2 A
<b>Maximum output voltage</b>	240 V
<b>Apparent power</b>	4.8 kVA 240 V heavy duty)
<b>Maximum transient current</b>	15.0 A 60 s heavy duty) 16.5 A 2 s heavy duty)
<b>Network Frequency</b>	50-60 Hz
<b>Relative symmetric network frequency tolerance</b>	5 %
<b>Prospective line I<sub>sc</sub></b>	1 kA
<b>Base load current at high overload</b>	10.0 A
<b>Power dissipation in W</b>	Forced cooling 93.0 W
<b>With safety function Safely Limited Speed (SLS)</b>	False
<b>With safety function Safe brake management (SBC/SBT)</b>	False
<b>With safety function Safe Operating Stop (SOS)</b>	False
<b>With safety function Safe Position (SP)</b>	False

With safety function Safe programmable logic	False
With safety function Safe Speed Monitor (SSM)	False
With safety function Safe Stop 1 (SS1)	False
With sft fct Safe Stop 2 (SS2)	False
With safety function Safe torque off (STO)	False
With safety function Safely Limited Position (SLP)	False
With safety function Safe Direction (SDI)	False
<b>Protection type</b>	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 <sup>2</sup> t
<b>Tightening torque</b>	10.62 lbf.in (1.2 N.m)
<b>Insulation</b>	Electrical between power and control
<b>Quantity per Set</b>	Set of 1
<b>Width</b>	4.13 in (105 mm)
<b>Height</b>	5.59 in (142 mm)
<b>Depth</b>	6.15 in (156.2 mm)
<b>Net Weight</b>	3.09 lb(US) (1.4 kg)

## Environment

<b>Operating altitude</b>	> 3280.84...6561.68 ft (> 1000...2000 m) with current derating 1 % per 100 m <= 3280.84 ft (1000 m) without derating
<b>Operating position</b>	Vertical +/- 10 degree
<b>Product Certifications</b>	NOM CSA C-tick UL GOST RCM KC
<b>Marking</b>	CE
<b>Standards</b>	UL 508C UL 618000-5-1 EN/IEC 61800-5-1 EN/IEC 61800-3
<b>Assembly style</b>	With heat sink
<b>Electromagnetic compatibility</b>	Electrical fast transient/burst immunity test level 4 EN/IEC 61000-4-4 Electrostatic discharge immunity test level 3 EN/IEC 61000-4-2 Immunity to conducted disturbances level 3 EN/IEC 61000-4-6 Radiated radio-frequency electromagnetic field immunity test level 3 EN/IEC 61000-4-3 Surge immunity test level 3 EN/IEC 61000-4-5 Voltage dips and interruptions immunity test EN/IEC 61000-4-11
<b>Environmental class (during operation)</b>	Class 3C3 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3
<b>Maximum acceleration under shock impact (during operation)</b>	150 m/s <sup>2</sup> at 11 ms
<b>Maximum acceleration under vibrational stress (during operation)</b>	10 m/s <sup>2</sup> at 13...200 Hz

<b>Maximum deflection under vibratory load (during operation)</b>	1.5 mm at 2...13 Hz
<b>Volume of cooling air</b>	4226.83 Gal/hr(US) (16 m3/h)
<b>Overvoltage category</b>	Class III
<b>Regulation loop</b>	Adjustable PID regulator
<b>Electromagnetic emission</b>	Radiated emissions environment 1 category C2 EN/IEC 61800-3 2...16 kHz shielded motor cable Conducted emissions with integrated EMC filter environment 1 category C1 EN/IEC 61800-3 2, 4, 8, 12 and 16 kHz shielded motor cable <16.40 ft (5 m) Conducted emissions with additional EMC filter environment 1 category C1 EN/IEC 61800-3 4...12 kHz shielded motor cable <65.62 ft (20 m) Conducted emissions with additional EMC filter environment 1 category C2 EN/IEC 61800-3 4...12 kHz shielded motor cable <164.04 ft (50 m) Conducted emissions with additional EMC filter environment 2 category C3 EN/IEC 61800-3 4...12 kHz shielded motor cable <164.04 ft (50 m) Conducted emissions with integrated EMC filter environment 1 category C2 EN/IEC 61800-3 4...16 kHz shielded motor cable <16.40 ft (5 m) Conducted emissions with integrated EMC filter environment 1 category C2 EN/IEC 61800-3 2, 4, 8, 12 and 16 kHz shielded motor cable <32.81 ft (10 m)
<b>Vibration resistance</b>	1 gn 13...200 Hz)EN/IEC 60068-2-6 1.5 mm peak to peak 3...13 Hz) - drive unmounted on symmetrical DIN rail - EN/IEC 60068-2-6
<b>Shock resistance</b>	15 gn 11 ms EN/IEC 60068-2-27
<b>Relative humidity</b>	5...95 % without condensation IEC 60068-2-3 5...95 % without dripping water IEC 60068-2-3
<b>Noise level</b>	45 dB
<b>Pollution degree</b>	2
<b>Ambient air transport temperature</b>	-13...158 °F (-25...70 °C)
<b>Ambient air temperature for operation</b>	14...122 °F (-10...50 °C) without derating 122...140 °F (50...60 °C) with current derating 2.2 % per °C
<b>Ambient Air Temperature for Storage</b>	-13...158 °F (-25...70 °C)

## Ordering and shipping details

<b>Category</b>	22042-ATV12 DRIVE AND ACCESSORIES
<b>Discount Schedule</b>	CP4B
<b>GTIN</b>	3606480071102
<b>Returnability</b>	Yes
<b>Country of origin</b>	ID

## Packing Units

<b>Unit Type of Package 1</b>	PCE
<b>Number of Units in Package 1</b>	1
<b>Package 1 Height</b>	7.87 in (20.000 cm)
<b>Package 1 Width</b>	7.09 in (18.000 cm)
<b>Package 1 Length</b>	7.87 in (20.000 cm)
<b>Package 1 Weight</b>	3.86 lb(US) (1.753 kg)
<b>Unit Type of Package 2</b>	P06
<b>Number of Units in Package 2</b>	30
<b>Package 2 Height</b>	29.53 in (75.000 cm)
<b>Package 2 Width</b>	23.62 in (60.000 cm)
<b>Package 2 Length</b>	31.50 in (80.000 cm)
<b>Package 2 Weight</b>	145.39 lb(US) (65.950 kg)

## Offer Sustainability

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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
China RoHS Regulation	<a href="#">China RoHS declaration</a>
RoHS exemption information	<a href="#">Yes</a>
WEEE	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins.

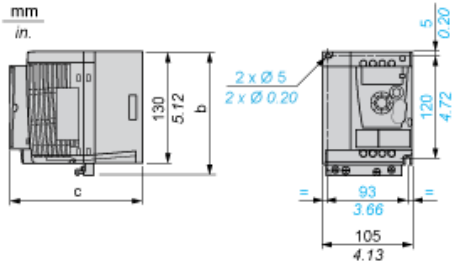
## Contractual warranty

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Warranty	18 months
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**Dimensions**

**Drive without EMC Conformity Kit**



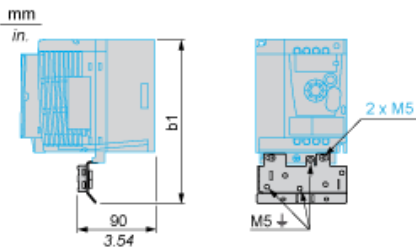
Dimensions in mm

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

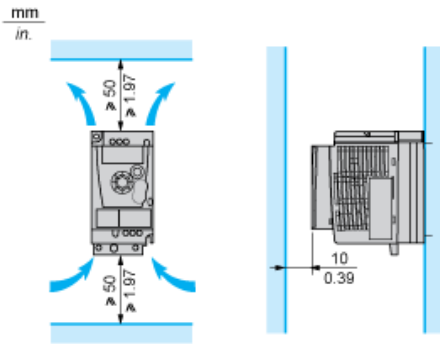
Dimensions in in.

b1
7.41

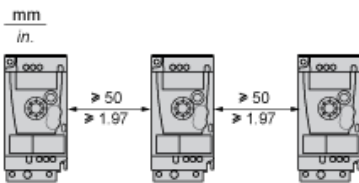
**Mounting Recommendations**

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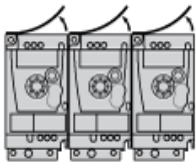
**Clearance for Vertical Mounting**



**Mounting Type A**

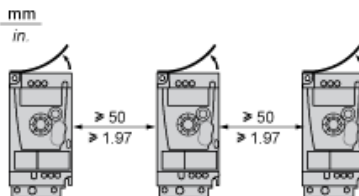


**Mounting Type B**



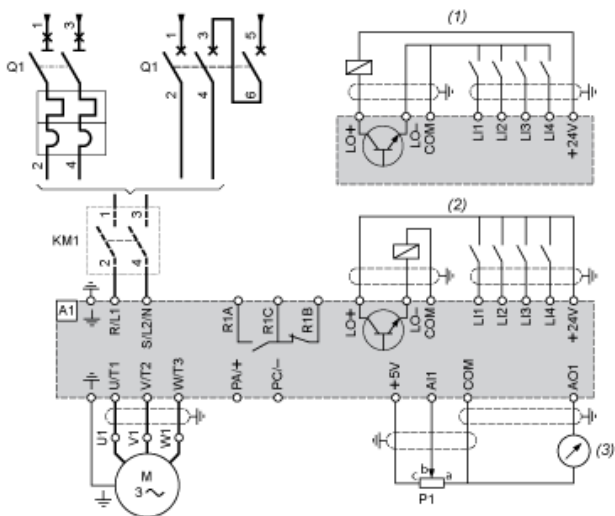
Remove the protective cover from the top of the drive.

**Mounting Type C**



Remove the protective cover from the top of the drive.

**Single-Phase Power Supply Wiring Diagram**

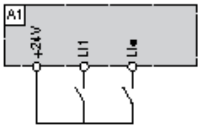


- A1** Drive
- KM1** Contactor (only if a control circuit is needed)
- P1** 2.2 kΩ reference potentiometer. This can be replaced by a 10 kΩ potentiometer (maximum).
- Q1** Circuit breaker
- (1)** Negative logic (Sink)
- (2)** Positive logic (Source) (factory set configuration)
- (3)** 0...10 V or 0...20 mA



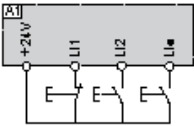
**Recommended Schemes**

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



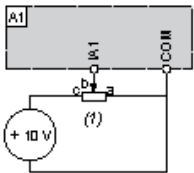
LI1 : Forward  
LIe : Reverse  
A1 : Drive

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



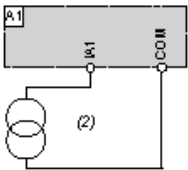
LI1 : Stop  
LI2 : Forward  
LIe : Reverse  
A1 : Drive

**Analog Input Configured for Voltage with Internal Power Supply**



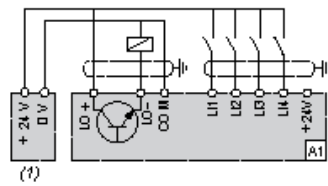
(1) 2.2 kΩ...10 kΩ reference potentiometer  
A1 : Drive

**Analog Input Configured for Current with Internal Power Supply**



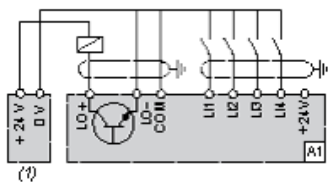
(2) 0-20 mA 4-20 mA supply  
A1 : Drive

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



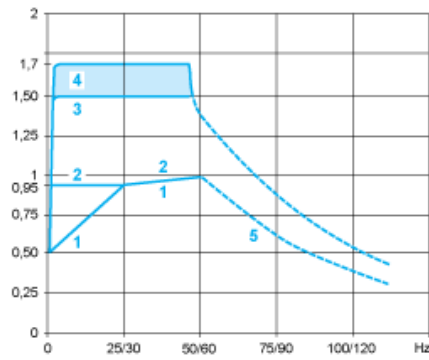
(1) 24 vdc supply  
A1 : Drive

**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  $\leq 250$  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 motor is 150%.

Recommended replacement(s)