

# ATV12HU22M3

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



## 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
Maximum Horse Power Rating	3 hp
EMC filter	Without EMC filter
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
Frequency resolution	Analog input converter A/D, 10 bits Display unit 0.1 Hz
Time constant	20 ms +/- 1 ms for reference change
Transmission Rate	9.6 kbit/s 19.2 kbit/s 38.4 kbit/s
Transmission frame	RTU
Number of addresses	1...247
Data format	8 bits, configurable odd, even or no parity
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)
Type of polarization	No impedance
4 quadrant operation possible	False

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Asynchronous motor control profile	Quadratic voltage/frequency ratio Sensorless flux vector control Voltage/frequency ratio (V/f)
Maximum output frequency	4 kHz
Transient overtorque	150...170 % of nominal motor torque depending on drive rating and type of motor
Acceleration and deceleration ramps	Linear from 0 to 999.9 s S U
Motor slip compensation	Adjustable Preset in factory
Switching frequency	2...16 kHz adjustable 4...16 kHz with derating factor
Nominal switching frequency	4 kHz
Braking to standstill	By DC injection
Brake chopper integrated	False
Line current	14.9 A 100 V heavy duty) 12.5 A 120 V heavy duty)
Maximum Input Current per Phase	12.5 A
Maximum output voltage	240 V
Apparent power	5.2 kVA 240 V heavy duty)
Maximum transient current	15.0 A 60 s heavy duty) 16.5 A 2 s heavy duty)
Network Frequency	50-60 Hz
Relative symmetric network frequency tolerance	5 %
Prospective line Isc	5 kA
Base load current at high overload	10.0 A
Power dissipation in W	Forced cooling 85.0 W
With safety function Safely Limited Speed (SLS)	False
With safety function Safe brake management (SBC/ SBT)	False
With safety function Safe Operating Stop (SOS)	False
With safety function Safe Position (SP)	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
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 <sup>2</sup> t
Tightening torque	10.62 lbf.in (1.2 N.m)
Insulation	Electrical between power and control
Quantity per Set	Set of 1
Width	4.13 in (105 mm)
Height	5.63 in (143 mm)
Depth	5.17 in (131.2 mm)
Net Weight	2.65 lb(US) (1.2 kg)

## Environment

Operating altitude	<= 3280.84 ft (1000 m) without derating > 3280.84...9842.52 ft (> 1000...3000 m) with current derating 1 % per 100 m
Operating position	Vertical +/- 10 degree
Product Certifications	NOM[RETURN]CSA[RETURN]C-tick[RETURN]UL[RETURN]GOST[RETURN]RCM[RETURN]KC
Marking	CE
Standards	UL 508C UL 618000-5-1 EN/IEC 61800-5-1 EN/IEC 61800-3
Assembly style	With heat sink
Electromagnetic compatibility	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
Environmental class (during operation)	Class 3C3 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3
Maximum acceleration under shock impact (during operation)	150 m/s <sup>2</sup> at 11 ms
Maximum acceleration under vibrational stress (during operation)	10 m/s <sup>2</sup> at 13...200 Hz
Maximum deflection under vibratory load (during operation)	1.5 mm at 2...13 Hz
Volume of cooling air	3909.82 Gal/hr(US) (14.8 m <sup>3</sup> /h)
Overvoltage category	Class III
Regulation loop	Adjustable PID regulator
Electromagnetic emission	Radiated emissions environment 1 category C2 EN/IEC 61800-3 2...16 kHz shielded motor cable Conducted emissions with additional EMC filter environment 1 category C1 EN/IEC 61800-3 4...12 kHz shielded motor cable <16.40 ft (5 m) Conducted emissions with additional EMC filter environment 1 category C2 EN/IEC 61800-3 4...12 kHz shielded motor cable <65.62 ft (20 m) Conducted emissions with additional EMC filter environment 2 category C3 EN/IEC 61800-3 4...12 kHz shielded motor cable <65.62 ft (20 m)
Vibration resistance	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
Shock resistance	15 gn 11 ms EN/IEC 60068-2-27
Relative humidity	5...95 % without condensation IEC 60068-2-3 5...95 % without dripping water IEC 60068-2-3
Noise level	50 dB
Pollution degree	2
Ambient air transport temperature	-13...158 °F (-25...70 °C)
Ambient air temperature for operation	14...122 °F (-10...50 °C) without derating 122...140 °F (50...60 °C) with current derating 2.2 % per °C
Ambient Air Temperature for Storage	-13...158 °F (-25...70 °C)

## Ordering and shipping details

Category	22042-ATV12 DRIVE AND ACCESSORIES
Discount Schedule	CP4B
GTIN	3606480071188
Returnability	Yes
Country of origin	ID

## Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Height	7.28 in (18.500 cm)
Package 1 Width	7.36 in (18.700 cm)
Package 1 Length	7.36 in (18.700 cm)
Package 1 Weight	3.32 lb(US) (1.508 kg)
Unit Type of Package 2	P06
Number of Units in Package 2	30
Package 2 Height	29.53 in (75.000 cm)
Package 2 Width	23.62 in (60.000 cm)
Package 2 Length	31.50 in (80.000 cm)
Package 2 Weight	130.84 lb(US) (59.350 kg)

## Offer Sustainability

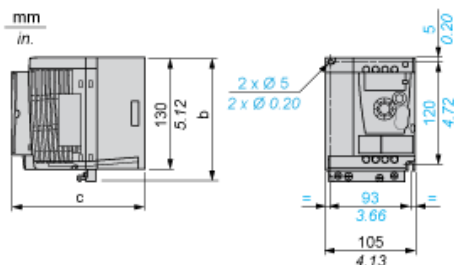
California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to <a href="http://www.P65Warnings.ca.gov">www.P65Warnings.ca.gov</a>
REACH Regulation	<a href="#">REACH Declaration</a>
EU RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope)
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

Warranty	18 months
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Dimensions

Drive without EMC Conformity Kit



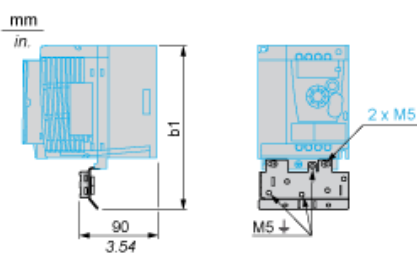
Dimensions in mm

b	c
143	131.2

Dimensions in in.

b	c
5.63	5.16

Drive with EMC Conformity Kit



Dimensions in mm

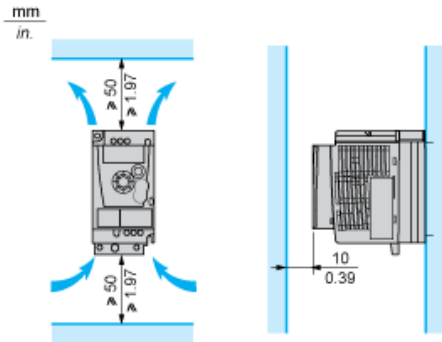
b1
189.3

Dimensions in in.

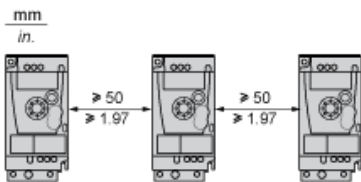
b1
7.45

Mounting Recommendations

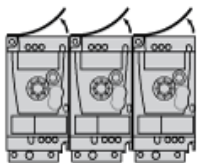
Clearance for Vertical Mounting



Mounting Type A

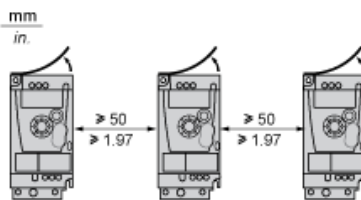


Mounting Type B



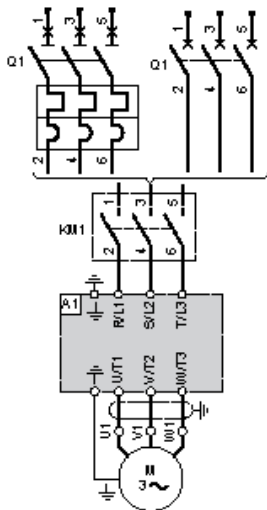
Remove the protective cover from the top of the drive.

Mounting Type C



Remove the protective cover from the top of the drive.

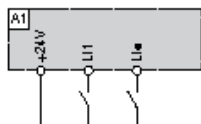
Three-Phase Power Supply Wiring Diagram



- A1 Drive
- KM1 Contactor (only if a control circuit is needed)
- Q1 Circuit breaker

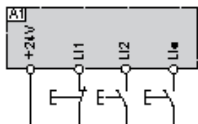
Recommended Schemes

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



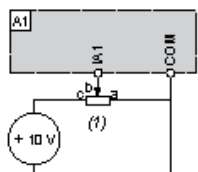
- L1 : Forward
- L1• : Reverse
- A1 : Drive

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



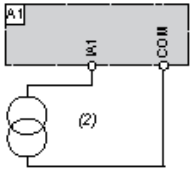
- L1 : Stop
- L2 : Forward
- L1• : Reverse
- A1 : Drive

Analog Input Configured for Voltage with Internal Power Supply



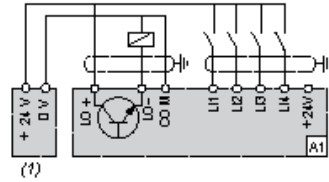
- (1) 2.2 kΩ...10 kΩ reference potentiometer
- A1 : Drive

## Analog Input Configured for Current with Internal Power Supply



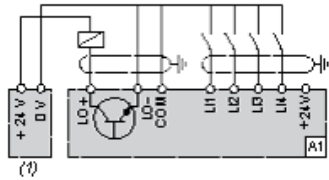
(2) 0-20 mA 4-20 mA supply  
A1 : Drive

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



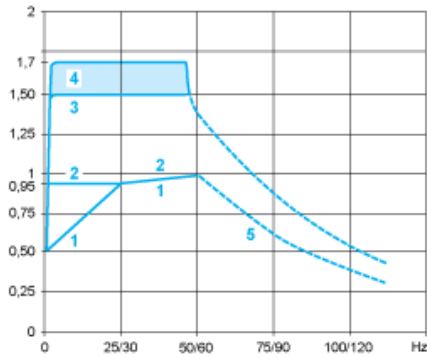
(1) 24 vdc supply  
A1 : Drive

## 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 selected motor must be checked with the manufacturer.