



### 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	Without EMC filter
Built-in fan	With
Network number of phases	3 phases
[Us] rated supply voltage	200...240 V - 15...10 %
Motor power kW	3 kW
Motor power hp	4 hp
Communication port protocol	Modbus
Line current	19 A at 200 V 15.9 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	50 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 I <sub>sc</sub>	5 kA
Continuous output current	12.2 A at 4 kHz
Maximum transient current	18.3 A for 60 s
Speed drive output frequency	0.5...400 Hz
Nominal switching frequency	4 kHz
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 <sup>2</sup> , 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 S U
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 <sup>2</sup> 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	184 mm
Width	140 mm
Depth	141.2 mm
Product weight	2 kg
Specific application	Commercial equipment
Variable speed drive application selection	Mixer Commercial equipment Other application Commercial equipment Ironing Textile
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 conforming to EN/IEC 61800-3
Product certifications	NOM UL CSA GOST C-Tick
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 m without derating > 1000...3000 m with current derating 1 % per 100 m

## Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Weight	2.436 kg
Package 1 Height	22 cm
Package 1 width	21.5 cm
Package 1 Length	22 cm
Unit Type of Package 2	P06
Number of Units in Package 2	12
Package 2 Weight	42.23 kg
Package 2 Height	73.5 cm
Package 2 width	60 cm
Package 2 Length	80 cm

## Offer Sustainability

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>

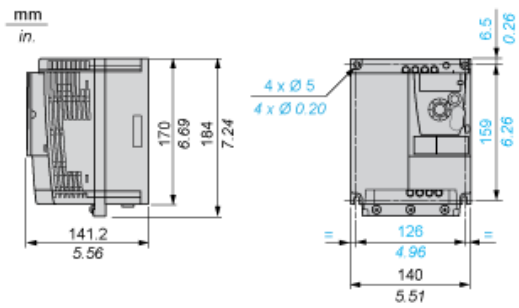
Mercury free	Yes
RoHS exemption information	<a href="#">Yes</a>
China RoHS Regulation	<a href="#">China RoHS declaration</a>
WEEE	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins

### Contractual warranty

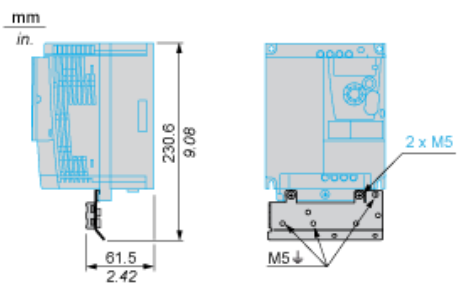
Warranty	18 months
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Dimensions

Drive without EMC Conformity Kit

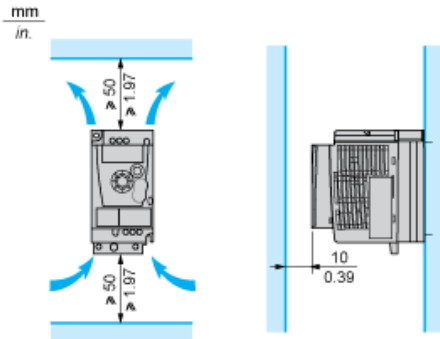


Drive with EMC Conformity Kit

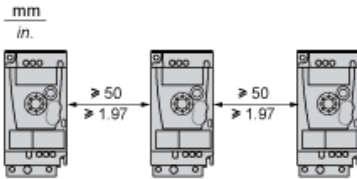


Mounting Recommendations

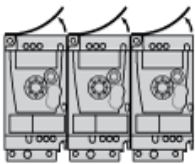
Clearance for Vertical Mounting



Mounting Type A

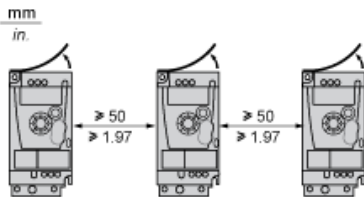


Mounting Type B



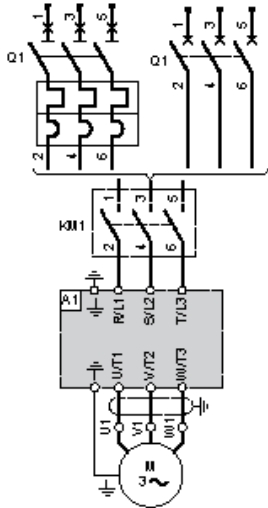
Remove the protective cover from the top of the drive.

Mounting Type C



Remove the protective cover from the top of the drive.

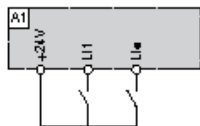
## Three-Phase Power Supply Wiring Diagram



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

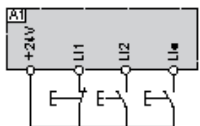
Recommended Schemes

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



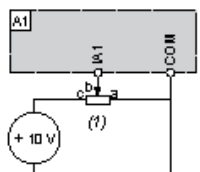
LI1 : Forward  
LI• : Reverse  
A1 : Drive

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



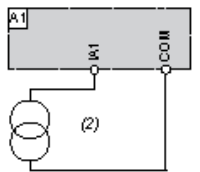
LI1 : Stop  
LI2 : Forward  
LI• : Reverse  
A1 : Drive

Analog Input Configured for Voltage with Internal Power Supply



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

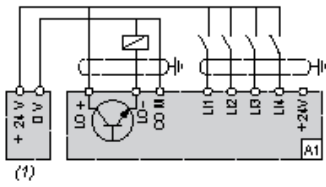
Analog Input Configured for Current with Internal Power Supply



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

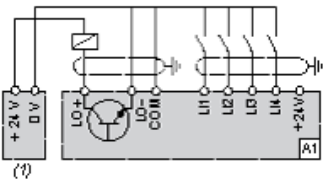


### Connected as Positive Logic (Source) with External 24 vdc Supply



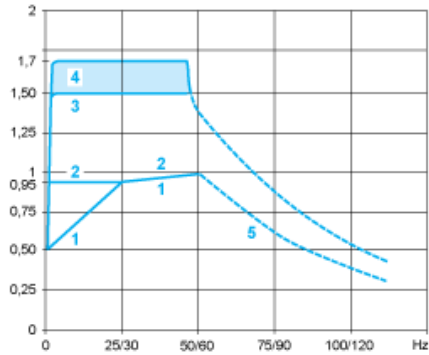
- (1) 24 vdc supply
- A1 : Drive

### 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.