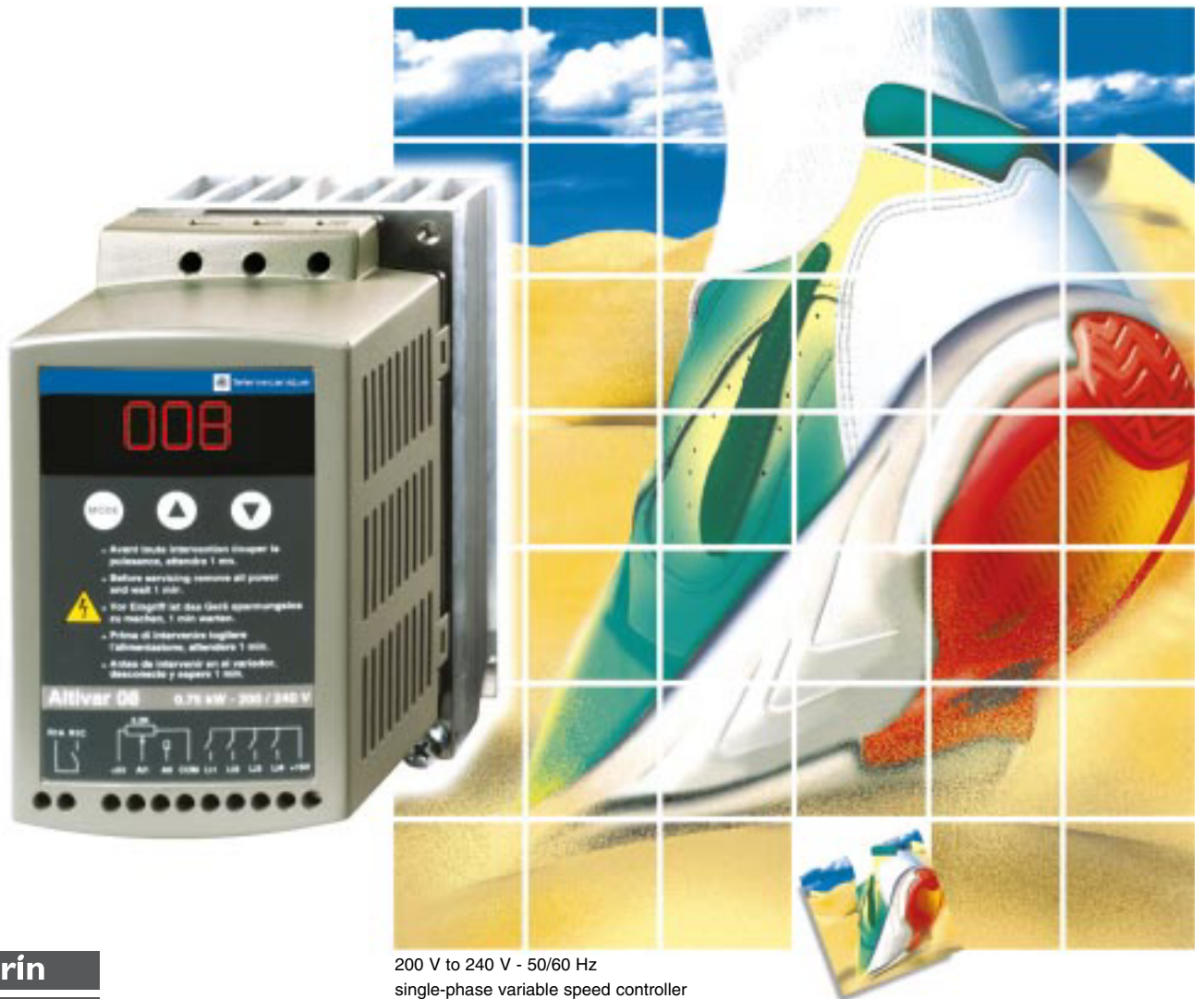


# Altivar 08 Telemecanique

Catalogue

put your  
best *foot* forward



200 V to 240 V - 50/60 Hz  
single-phase variable speed controller

Merlin Gerin

Modicon

Square D

Telemecanique

Schneider  
 Electric

# Variable speed controllers for asynchronous motors

---

## Altivar 08

### Contents

---

Presentation	Pages 2 and 3
--------------	---------------

---

Characteristics	Pages 4 and 5
-----------------	---------------

---

References	Pages 6 and 7
------------	---------------

---

Additional components for customer assembly	Page 7
---	--------

---

Dimensions, schemes	Page 8
---------------------	--------

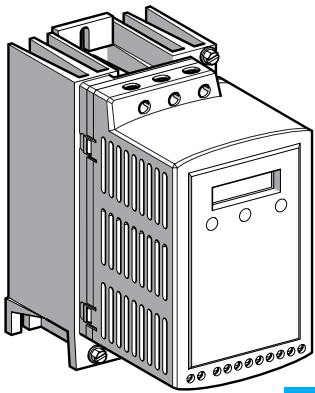
---

Mounting	Page 9
----------	--------

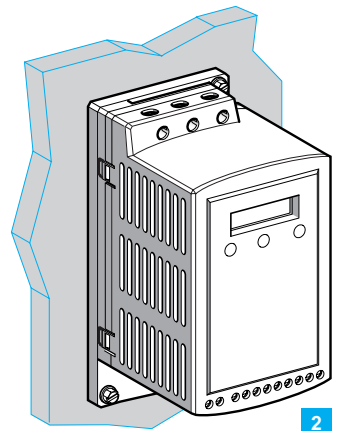
---

Functions	Pages 10 to 13
-----------	----------------

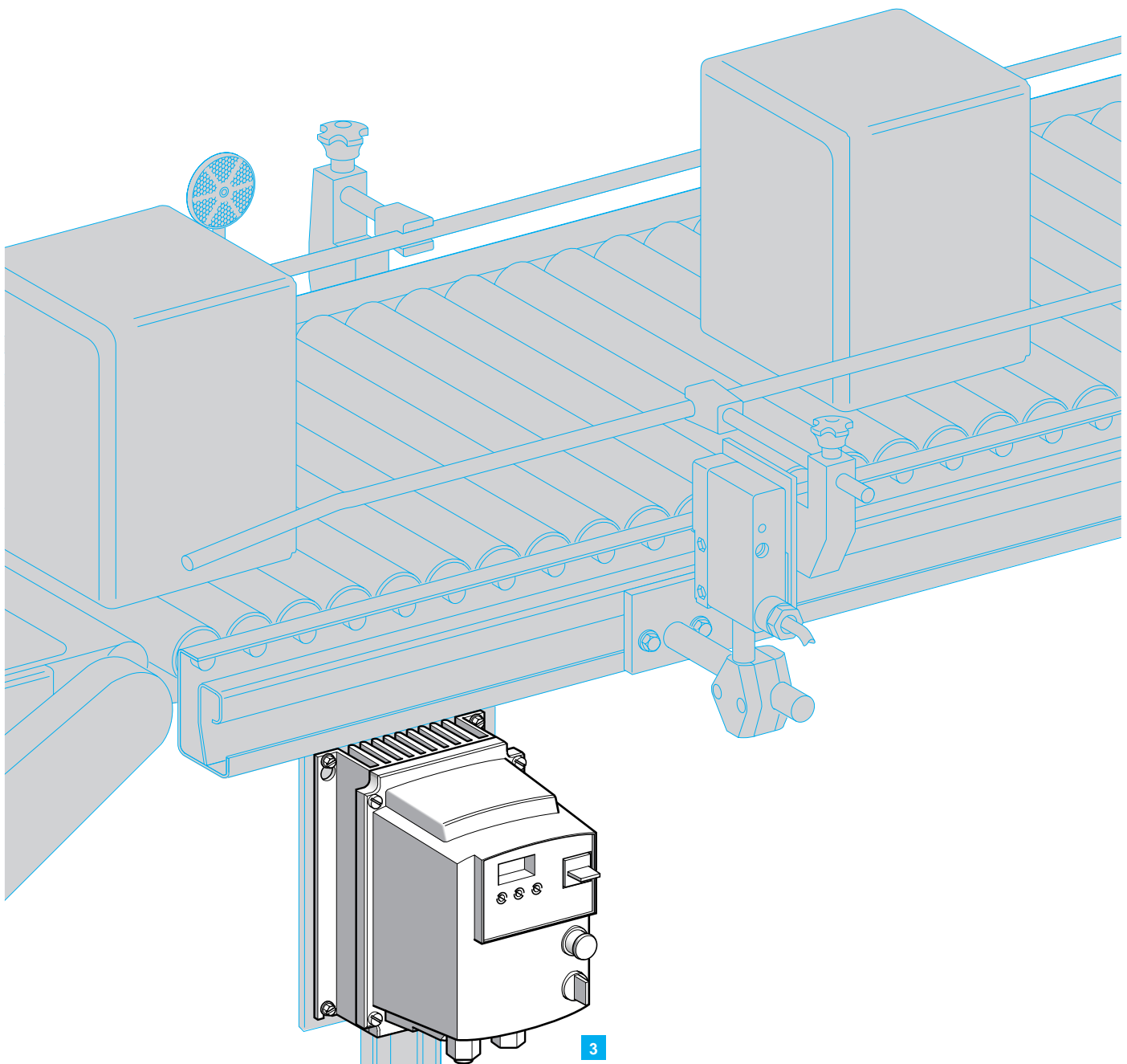
---



1



2



3

# Variable speed controllers for asynchronous motors

---

Characteristics :  
pages 60161/2 and 60161/3  
References :  
pages 60161/4 and 60161/5  
Dimensions, schemes :  
pages 60162/2 and 60162/3  
Functions :  
pages 60163/2 to 60163/5

## Altivar 08

### Presentation

---

### Applications

---

Frequency inverters for 3-phase asynchronous squirrel cage motors and single-phase 200 to 240 V supply. The Altivar 08 incorporates the latest technological developments. Its functions meet the requirements of the most up-to-date applications, notably :

- horizontal material handling (conveyors, etc)
  - packing/packaging (gluing machines, labelling machines, etc)
  - special machines (mixers, etc)
- 

### Functions

---

The main functions are :

- starting and speed control
  - inversion of the operating direction
  - deceleration, acceleration, stopping
  - motor and speed controller protection, etc
- 

### Versions

---

The Altivar 08 is available in three versions for ease of integration into machines :

- **ATV-08HU●●●● standard speed controller with heatsink** (label **1**)  
For normal ambiance, within enclosure.
  - **ATV-08PU●●●● speed controller with base plate** (label **2**)  
Enables the speed controller to be mounted on the machine frame where the mass of the frame is sufficient for heat adsorption. In this case, no special cut-outs are required other than the fixing holes for the speed controller.
  - **ATV-08EU●●●● ready-assembled speed controller** (label **3**)  
This IP 65 enclosure comprises a speed controller with a built-in EMC filter, a power switch, direction switch and a speed potentiometer.  
This enclosure, fully wired and ready to use, for installation close to the motor.
- 

### Electromagnetic compatibility (EMC)

---

The Altivar 08 has built-in EMC filters. The incorporation of filters in the speed controllers simplifies installation and reduces the cost of conformity for CE marking.  
They conform to the following standards : EN 61800-3/IEC 1800-3, public and industrial supplies.

ATV-08HU●●●● and ATV-08PU●●●● speed controllers are also available without EMC filters if conformity to EMC standards is not required.

# Variable speed controllers for asynchronous motors

Presentation :  
pages 60160/2 and 60160/3  
References :  
pages 60161/4 and 60161/5  
Dimensions, schemes :  
pages 60162/2 and 60162/3  
Functions:  
pages 60163/2 to 60163/5

Altivar 08

## Characteristics

### Environment

<b>Conformity to standards</b>		Altivar 08 speed controllers have been developed to conform to the strictest international standards and to the recommendations for electrical industrial control devices (IEC, EN), notably : ● EN 50178  ● EMC immunity : - IEC 61000-4-2/EN 61000-4-2 level 3 - IEC 61000-4-3/EN 61000-4-3 level 3 - IEC 61000-4-4/EN 61000-4-4 level 4 - IEC 61000-4-5/EN 61000-4-5 level 3 (access to power) - IEC 61800-3/EN 61800-3, environments 1 and 2  ● EMC, conducted and radiated emissions : - IEC 1800-3/EN 61800-3, environments : 2 (industrial supply) and 1 (public supply) with restricted distribution - EN 55011, EN 55022 class B (radio interference suppression filters included)
<b>CE marking</b>		The speed controllers have CE marking in respect of the European low voltage (73/23/CEE and 93/68/CEE) and EMC (89/336/CEE) directives.
<b>Product certifications</b>		UL and CSA
<b>Degree of protection</b>		IP 20 : ATV-08PU●●●● and ATV-08HU●●●● speed controllers, all ratings IP 65 : ATV-08EU●●●● speed controllers, all ratings
<b>Vibration resistance</b>		Conforming to IEC 68-2-6 : - 1.5 mm peak from 3 to 13 Hz - 1 gn from 13 to 200 Hz
<b>Shock resistance</b>		15 gn for 11 ms conforming to IEC 68-2-27
<b>Maximum relative humidity</b>		93 % without condensation or dripping water, conforming to IEC 68-2-3
<b>Ambient air temperature in the vicinity of the device</b>		
Storage	°C	- 25...+ 65
Operation	°C	ATV-08PU●●●● and ATV-08EU●●●● speed controllers, all ratings : 0...+ 40  ATV-08HU●●●● speed controllers, all ratings : ● 0...+ 40 without derating ● Up to + 60 with current derating of 2.2 % per °C above 40 °C
<b>Maximum operating altitude</b>	m	1000 without derating (above this, derate the current by 1 % per additional 100 m)
<b>Operating position</b>		Vertical for ATV-08HU●●●● and ATV-08EU●●●● Vertical for horizontal for ATV08PU●●●●

### Drive characteristics

<b>Output frequency range</b>	Hz	0.5...120
<b>Switching frequency</b>	kHz	4
<b>Speed range</b>		1...10
<b>Transient overtorque</b>		150 % of nominal motor torque
<b>Braking torque</b>		50 % of nominal motor torque
<b>Maximum transient current</b>		120 % of speed controller nominal current for 20 s 150 % of speed controller nominal current for 1 s

# Variable speed controllers for asynchronous motors

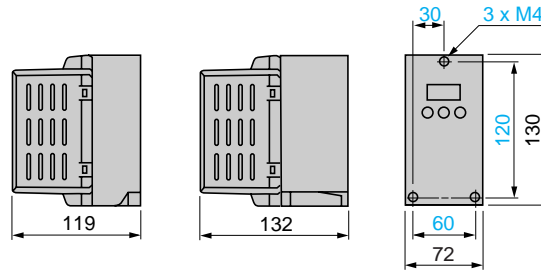
Presentation :  
pages 60160/2 and 60160/3  
Characteristics :  
pages 60161/2 and 60161/3  
References :  
pages 60161/4 and 60161/5  
Functions :  
pages 60163/2 to 60163/5

Altivar 08

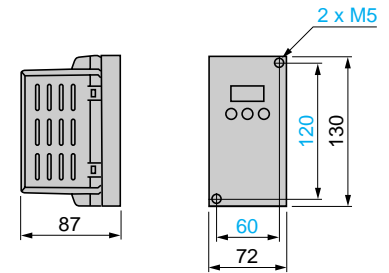
Dimensions, schemes

## Dimensions

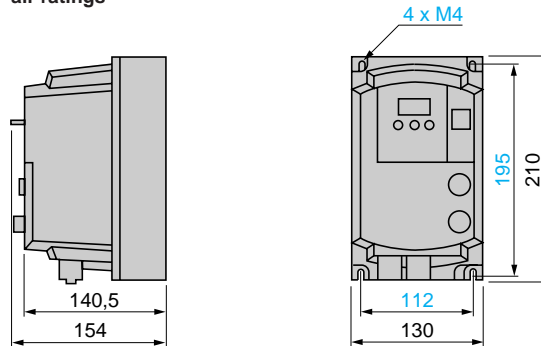
ATV-08HU●●●● (with heatsink)  
ATV-08HU05M2    ATV-08HU18M2



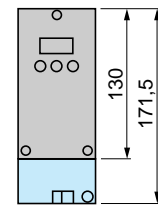
ATV-08PU●●●● (on baseplate)  
all ratings



ATV-08EU●●●● (ready-assembled)  
all ratings

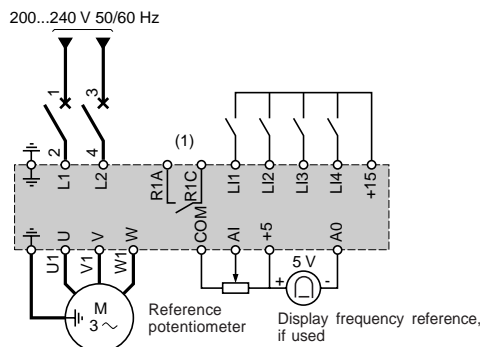


EMC grounding plate  
VW3-A08831



## Schemes (circuit diagram without contactor recommended for non-dangerous machines)

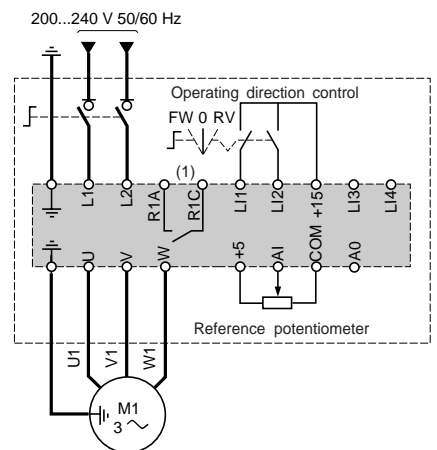
ATV-08HU●●●● and ATV-08PU●●●●



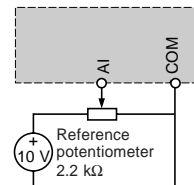
(1) Fault relay contact, signals the state of the controller remotely (open when fault present or power off):

- L11 : forward
- L12 : reverse
- L13/L14 : 4 preset speeds : speed 1 (L13 = 0, L14 = 0), speed 2 (L13 = 1, L14 = 0), speed 3 (L13 = 0, L14 = 1), speed 4 (L13 = 1, L14 = 1).

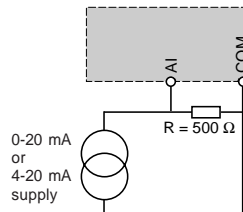
ATV-08EU●●●●



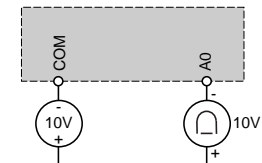
Analogue input  
Use 10 V external



Analogue input  
0-20 or 4-20 mA



Analogue output  
Use 10 V external



# Variable speed controllers for asynchronous motors

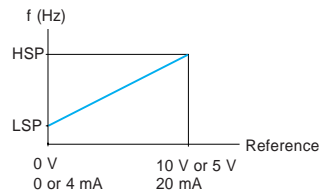
Presentation :  
pages 60160/2 and 60160/3  
Characteristics :  
pages 60161/2 and 60161/3  
References :  
pages 60161/4 and 60161/5  
Dimensions, schemes :  
pages 60162/2 and 60162/3

Altivar 08

Functions

## Operating speed range

**Function** : determines the 2 frequency limits which define the speed range permitted by the machine in real operating conditions.



**Adjustments** :

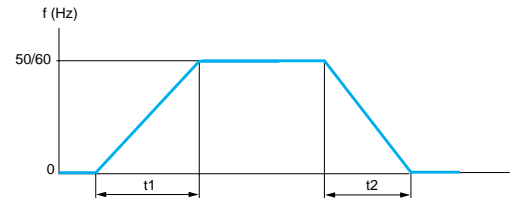
LSP : low speed, 0 to HSP, factory preset 0.

HSP : high speed, from LSP to 120 Hz, factory preset 50 Hz.

## Acceleration and deceleration ramp times

**Function** : determines the acceleration and deceleration times as a function of the application and the machine dynamics.

**Adjustments** : acceleration (ACC) and deceleration (DEC). Adjustment 0.1 to 100 s, factory preset 3 s.



$t_1$  : ACC

$t_2$  : DEC

# Variable speed controllers for asynchronous motors

Presentation :  
pages 60160/2 and 60160/3  
Characteristics :  
pages 60161/2 and 60161/3  
References :  
pages 60161/4 and 60161/5  
Dimensions, schemes :  
pages 60162/2 and 60162/3

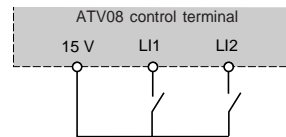
## Altivar 08

### Functions (cont.)

#### 2-wire control

**Function** : controls the operating direction with a stay-put contact. Forward direction having priority over reverse direction.

Wiring example

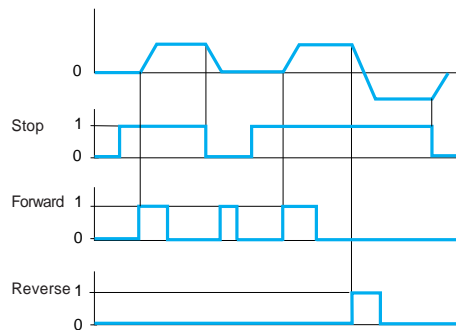


LI1 : Forward  
LI2 : Reverse

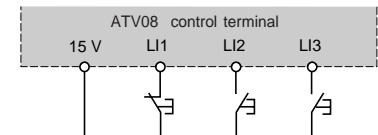
#### 3-wire control

**Function** : controls the operating direction and stopping with pulsed contacts.  
Enable : 2 or 3 logic inputs (1 or 2 operating directions).

Motor frequency



Wiring example



LI1 : Stop  
LI2 : Forward  
LI3 : Reverse

#### Configuration of analogue input AI

**Function** : used to modify the characteristics of the analogue input.

Factory preset : 0-5 V.  
Other values : 0-10 V or, with a 500  $\Omega$  external resistor : 0-20 mA or 4-20 mA.



# Variable speed controllers for asynchronous motors

Presentation :  
pages 60160/2 and 60160/3  
Characteristics :  
pages 60161/2 and 60161/3  
References :  
pages 60161/4 and 60161/5  
Dimensions, schemes :  
pages 60162/2 and 60162/3

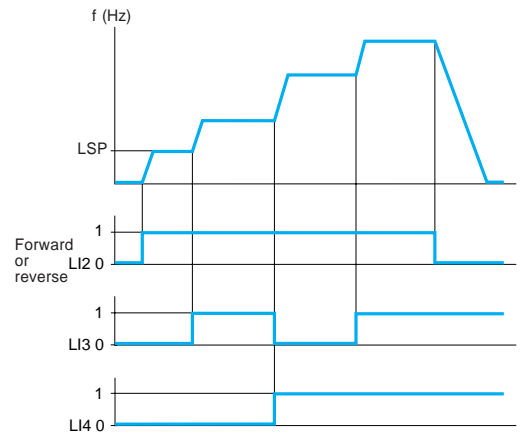
Altivar 08

Functions (cont.)

## Preset speeds

**Function :** switching of preset speed references. Choice of either 2 or 4 preset speeds.  
**Enable :** 1 or 2 logic inputs

Example with 4 speeds



Speed achieved with inputs LI3 and LI4 at state 0 : LSP or speed reference depending on the level of analogue input AI.  
Adjustment of preset speeds from 0.5 Hz to maximum frequency.

## d.c. injection braking

**Functions :**

- braking to a standstill by d.c. injection (0.5 to 0 Hz)
  - the injection current is adjustable from 0.25  $I_n$  to  $I_n$
  - the injection time is adjustable from 0 (function disabled) to 20 s or continuous. If the injection time is continuous the adjusted current is divided by 2 after 30 s.

# Variable speed controllers for asynchronous motors

---

Presentation :  
pages 60160/2 and 60160/3  
Characteristics :  
pages 60161/2 and 60161/3  
References :  
pages 60161/4 and 60161/5  
Dimensions, schemes:  
pages 60162/2 and 60162/3

## Altivar 08

Functions (cont.)

---

### Automatic restart

---

**Function** : providing the operating conditions permit, automatic restart of the speed controller on the disappearance of certain types of faults listed below.

Faults which allow automatic restart :

- motor thermal overload
- speed controller thermal overload
- supply undervoltage
- overvoltage due to excessive deceleration, supply overvoltage (in these two cases, the speed controller restarts if the fault has disappeared at least one minute after it appeared)

If six faults which can be reset occur within a six minute period, the speed controller remains locked.

There are three possible configurations :

- automatic restart inactive
- automatic restart active for supply undervoltage only
- automatic restart active for all faults listed above

This function requires the speed reference and operating direction to be maintained.  
It is reserved for fans, pumps and conveyor systems.

---

### Fault relay, unlocking

---

The fault relay energises when the speed controller is powered up and there are no faults present.

The speed controller is unlocked after a fault by :

- switching speed controller off for at least 1 minute and then switching it on again
- using the "automatic restart" function if it has been configured

---

### Thermal protection of the motor

---

**Function** : indirect thermal protection of the motor by continuous calculation of its theoretical overheating.  
The controller locks on a fault if overheating exceeds 118 % of nominal heating.

The microprocessor calculates theoretical overheating using two different elements :

- current absorbed by the motor
- operating time

The thermal memory is reset to zero by the microprocessor if the supply to the speed controller is interrupted.

40 °C is considered to be the maximum ambient temperature around the motor.

**Adjustment** :

- 0.45 to 1.2 times the nominal speed controller current
- set to the nominal current shown on the motor rating plate

---

### Thermal protection of the speed controller

---

**Function** : direct protection via a thermistor attached to the heatsink, providing protection for components even in the event of poor ventilation or excessive ambient temperature.  
The speed controller locks if there is a fault.

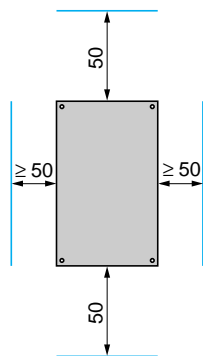
# Variable speed controllers for asynchronous motors

Presentation :  
pages 60160/2 and 60160/3  
Characteristics :  
pages 60161/2 and 60161/3  
References :  
pages 60161/4 and 60161/5  
Functions :  
pages 60163/2 to 60163/5

Altivar 08

Mounting

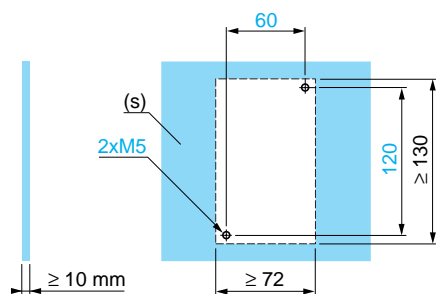
## Installation precautions



Install the device vertically, at  $\pm 10^\circ$ , except for the ATV-08PU●●●● which can be installed vertically or horizontally.

- Do not place it close to heating elements.
- Leave sufficient clearance for air circulation necessary for cooling. Cooling is via an air flow from bottom to top.
- Clearance in front of the device : 10 mm minimum.

## Precautions when mounting on the machine frame (specific to ATV-08PU●●●● controllers)



These can be mounted on (or in) a steel or aluminium machine frame, if the following conditions are respected :

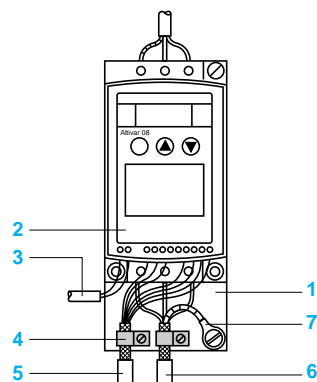
- Maximum ambient temperature :  $40^\circ\text{C}$
  - Speed controller contact surface (130 x 72) machined on frame, with a smooth surface of  $100\ \mu\text{m}$  max. and unevenness of  $3.2\ \mu\text{m}$  max.
  - The variable speed controller must be fixed in the centre of a support (frame) with a minimum thickness of 10 mm and a minimum cooling surface area ( $0.12\ \text{m}^2$  for steel or  $0.09\ \text{m}^2$  for aluminium), open to the air.
- To ensure heat transfer, thermal contact grease (or equivalent) must be applied to all contact surfaces. Check this mounting when operating conditions are close to the maximum limits (power, cycle and temperature) by monitoring the thermal state (tHd) of the controller.

## Mounting for conformity to EMC standards

### Principle :

- High frequency equipotentiality of earthing between the speed controller, the motor and the cable shielding
- Use of shielded cables with  $360^\circ$  connection of the shield to earth at both ends for the motor cable and the control-command cables. This shielding can be provided by metal tubes or ducting provided that continuity is guaranteed.
- The power supply cable (mains) and motor cable should be kept as far apart as possible.

### Installation layout for ATV-08HU●●●● :



- 1 VW3-A08831 grounding plate (supplied with two metallic clamps) to be mounted on the controller. To respect radiated emissions, we recommend that this plate (to be ordered separately) is used to earth the cable shielding. However, for level A, earthing the cables to the machine ground wiring using clamps (enclosure backplane or machine frame) is sufficient.
- 2 Altivar 08
- 3 Unshielded cable for the fault relay contact output
- 4 Metal clamps
- 5 Shielded cables for control/command connection
- 6 Shielded cable for motor connection
- 7 Lug for PE conductor

For the ATV-08PU●●●●, attach the clamps directly to the machine ground wiring as close as possible to the speed controller. ATV-08EU●●●● speed controllers already meet EMC requirements.

# Variable speed controllers for asynchronous motors

Presentation :  
pages 60160/2 and 60160/3  
References :  
pages 60161/4 and 60161/5  
Dimensions, schemes :  
pages 60162/2 and 60162/3  
Functions :  
pages 60163/2 to 60163/5

Altivar 08

Characteristics (cont.)

## Electrical characteristics

<b>Power supply</b>	Voltage	<b>V</b>	200 - 10 % to 240 + 10 % single-phase
	Frequency	<b>Hz</b>	50 ± 5 % or 60 ± 5 %
	I <sub>cc</sub>	<b>A</b>	≤ 1000 (presumed short-circuit current at point of connection)
<b>Output voltage</b>			Maximum 3-phase voltage equal to mains supply voltage
<b>Electrical isolation</b>			Electrical isolation between power and control (inputs, outputs, supplies)
<b>Available internal supplies</b>			Protected against short-circuits and overloads : - + 5 V supply for the setpoint potentiometer (2.2 kΩ), maximum current 10 mA - + 15 V supply for control inputs, maximum current 100 mA
<b>Analogue input AI</b>			1 configurable analogue input : - voltage 0-5 V, impedance 50 kΩ - voltage 0-10 V, impedance 50 kΩ - current 0-20 mA or 4 - 20 mA with the addition of a 500 Ω external resistor
<b>Logic inputs LI</b>			4 assignable logic inputs with an impedance of 5 kΩ + 15 V internal or 24 V external power supply (11 V min., 30 V max.) State 0 if < 5 V, state 1 if ≥ 10 V Sampling time : 30 ms max.
<b>Analogue outputs AO</b>			Open collector PWM type output at 1.2 kHz. Usable on magneto-electric galvanometer Max. current 10 mA Output impedance 1 kΩ Linearity ± 1 %
<b>Logic outputs</b>			1 relay logic output R1 (open contact when fault present and protected against overvoltages) 1 N/O contact Minimum switching capacity : 10 mA for ~ 24 V Maximum switching capacity : ● on resistive load (cos φ = 1) : 5 A for ~ 250 V or ~ 30 V ● on inductive load (cos φ = 0.3 and L/R = 10 ms) : 2 A for ~ 250 V or ~ 30 V
<b>Acceleration and deceleration ramps</b>			Ramp shape : linear Automatic adaptation of the deceleration ramp time if the braking capacity is exceeded
<b>Braking to a standstill</b>			d.c. injection : automatically on stopping if the frequency falls below 0.5 Hz, duration adjustable from 0 to 20 s or continuous, current adjustable from 0.25 I <sub>n</sub> to I <sub>n</sub>
<b>Protective and safety devices on the speed controller</b>			<ul style="list-style-type: none"> <li>● Thermal protection against excessive overheating</li> <li>● Protection against short-circuits between output phases</li> <li>● Protection against overcurrents between output phases and ground on power up</li> <li>● Mains undervoltage and overvoltage protection</li> </ul>
<b>Motor protection</b>			Thermal protection integrated in the speed controller by continuous calculation of I <sup>2</sup> t Thermal memory cleared when switched off
<b>Insulation resistance to earth</b>		<b>MΩ</b>	> 500 (electrical isolation)

# Variable speed controllers for asynchronous motors

Presentation :  
pages 60160/2 and 60160/3  
Characteristics :  
pages 60161/2 and 60161/3  
Dimensions, schemes :  
pages 60162/2 and 60162/3  
Functions :  
pages 60163/2 to 60163/5

Altivar 08  
for asynchronous motors from 0.18 to 0.75 kW  
Single-phase supply voltage 200...240 V 50/60 Hz

## References



ATV-08HU●●●●

### Speed controllers with heatsink (frequency range from 0.5 to 120 Hz)

Motor Power indicated on rating plate	Mains supply Line current for presumed lcc 1 kA	Altivar 08 Permanent output current	Maximum transient current (1)	Power dissipated at nominal load	Reference	Weight
kW	A	A	A	W		kg
0.18	2.7	1.1	1.32	15	<b>ATV-08HU05M2 (2)</b>	1.000
0.37	4.5	2.1	2.52	27	<b>ATV-08HU09M2 (2)</b>	1.000
0.75	8.2	3.6	4.32	39	<b>ATV-08HU18M2 (2)</b>	1.150



ATV-08PU●●●●

### Speed controllers on baseplate (frequency range from 0.5 to 120 Hz)

0.18	2.7	1.1	1.32	15	<b>ATV-08PU05M2 (2)</b>	0.880
0.37	4.5	2.1	2.52	27	<b>ATV-08PU09M2 (2)</b>	0.880
0.75	8.2	3.6	4.32	39	<b>ATV-08PU18M2 (2)</b>	0.910



ATV-08EU●●●●

### Ready-assembled speed controllers (frequency range from 0.5 to 120 Hz)

0.18	2.7	1.1	1.32	–	<b>ATV-08EU05M2</b>	2.500
0.37	4.5	2.1	2.52	–	<b>ATV-08EU09M2</b>	2.500
0.75	8.2	3.6	4.32	–	<b>ATV-08EU18M2</b>	2.500

(1) For 20 seconds.

(2) Speed controller supplied with built-in RFI filter. For a speed controller without filter, add an X at the end of the reference. Example : for the **ATV-08HU05M2** controller without filter, the reference would be : **ATV-08HU05M2X**. In this case the speed controller does not conform to EMC emissions standards.

# Variable speed controllers for asynchronous motors

Presentation :  
pages 60160/2 and 60160/3  
Characteristics :  
pages 60161/2 and 60161/3  
Dimensions, schemes :  
pages 60162/2 and 60162/3  
Functions :  
pages 60163/2 to 60163/5

Altivar 08  
for asynchronous motors from 0.18 to 0.75 kW  
Single-phase supply voltage 200...240 V 50/60 Hz

References, associations



VW3-A08851



VW3-A08831



GB2-DB  
+  
ATV-08

## Accessories for speed controllers with heatsink

Description	Reference	Weight kg
Plate for mounting on rail (width 35 mm)	<b>VW3-A08851</b>	0.250
EMC grounding plate	<b>VW3-A08831</b>	0.160

## Additional components for customer assembly

**Function** : to ensure the protection of people and equipment, regardless of the level of overcurrent encountered (overload or short-circuit).

Power ratings for 3-phase, 4-pole 50/60 Hz 230 V motors <b>kW</b>	Circuit-breaker		Maximum short-circuit current <b>kA</b>	Speed controller Reference (1)
	Reference	Rating <b>A</b>		
0.18	<b>GB2-DB10</b>	5	1	<b>ATV-08●U05M2</b>
0.37	<b>GB2-DB10</b>	5	1	<b>ATV-08●U09M2</b>
0.75	<b>GB2-DB16</b>	10	1	<b>ATV-08●U18M2</b>

(1) Replace the bullet point in the reference according to the type of speed controller required (see page opposite).