

Altivar 58 Telemecanique

Guide d'exploitation
User's manual
Bedienungsanleitung
Guía de explotación

Variateurs de vitesse pour
moteurs asynchrones,
Variable speed controllers
for asynchronous motors,
Frequenzumrichter
für Drehstrom-Asynchronmotoren,
Variadores de velocidad
para motores asíncronos.



Merlin Gerin

Modicon

Square D

Telemecanique

Schneider
Electric

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IT NEUTRAL POINT CONNECTION : In the event of use on a 3-phase network with a voltage greater than $480V \pm 10\%$ with an isolated or high-impedance system (IT), the internal EMC filter capacitors which are connected to ground must be disconnected. Consult Schneider product support who are the only people qualified to perform this operation.

When the speed controller is powered up, the power components and some of the control components are connected to the line supply. *It is extremely dangerous to touch them. The speed controller cover must be kept closed.*

After the ALTIVAR has been switched off and the green LED has gone out, *wait for 3 minutes before working on the equipment.* This is the time required for the capacitors to discharge.

The motor can be stopped during operation by inhibiting start commands or the speed reference while the speed controller remains powered up. If personnel safety requires prevention of sudden restarts, this electronic locking system is not sufficient : *fit a cut-off on the power circuit.*

The speed controller is fitted with safety devices which, in the event of a fault, can shut down the speed controller and consequently the motor. The motor itself may be stopped by a mechanical blockage. Finally, voltage variations, especially line supply failures, can also cause shutdowns.

If the cause of the shutdown disappears, there is a risk of restarting which may endanger certain machines or installations, especially those which must conform to safety regulations.

In this case the user must take precautions against the possibility of restarts, in particular by using a low speed detector to cut off power to the speed controller if the motor performs an unprogrammed shutdown.

The design of equipment must conform to the requirements of IEC standards.

In general, *the speed controller power supply must be disconnected* before any operation on either the electrical or mechanical parts of the installation or machine.

The products and equipment described in this document may be changed or modified at any time, either from a technical point of view or in the way they are operated. Their description can in no way be considered contractual.

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Warning

The Altivar 58 must be considered as a component : it is neither a machine nor a device ready for use in accordance with European directives (machinery directive and electromagnetic compatibility directive). It is the responsibility of the end user to ensure that the machine meets these standards.

The speed controller must be installed and set up in accordance with both international and national standards. Bringing the device into conformity is the responsibility of the systems integrator who must observe the EMC directive among others within the European Union.

The specifications contained in this document must be applied in order to comply with the essential requirements of the EMC directive.

Preliminary recommendations

Delivery

Check that the speed controller reference printed on the label is the same as that on the delivery note corresponding to the purchase order.

Remove the Altivar 58 from its packaging and check that it has not been damaged in transit.

Handling and storage

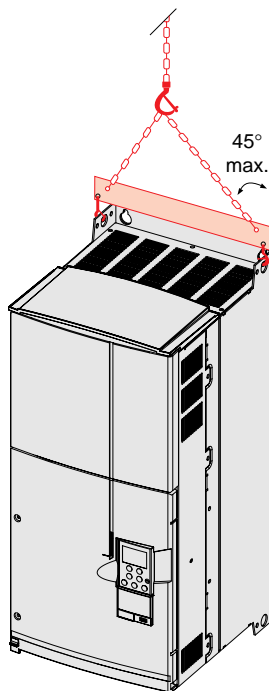
To ensure the speed controller is protected before installation, handle and store the device in its packaging.

Handling on installation

The Altivar 58 range comprises 7 sizes of device, with various weights and dimensions.

Small speed controllers can be removed from their packaging and installed without a handling device.

A hoist must be used with large speed controllers; for this reason they are supplied with handling "lugs". The precautions described below must be respected :



Selecting a Speed Controller with Heatsink and Built-in EMC Filters

Line supply	Motor				Altivar 58			Reference (6)	Weight
Supply voltage (1)	Line current (2)	Max. prospective line Isc (3)	Power indicated on plate (3)	Nominal current	Max. transient current (4)	Power dissipated at nominal load (5)			
U1...U2	at U1	at U2	at U1 at U2						

High torque applications (170% Tn)

V	A	A	kA	kA	kW	HP	A	A	W		kg
200...240	5.6	4.7	2	2	0.37	0.5	2.3	3.1	42	ATV-58HU09M2	2.2
50/60 Hz	9.8	8.3	2	2	0.75	1	4.1	5.6	64	ATV-58HU18M2	2.2
single-phase	18.5	15.6	5	5	1.5	2	7.8	10.6	107	ATV-58HU29M2	3.8
	24.8	21.1	5	5	2.2	3	11	15	145	ATV-58HU41M2	3.8
	24.7	21.3	5	5	3	–	13.7	18.6	220	ATV-58HU72M2(7)	6.9
	35	30	22	22	4	5	18.2	24.7	235	ATV-58HU90M2(7)	13
	46	39.4	22	22	5.5	7.5	24.2	32.9	310	ATV-58HD12M2(7)	13
200...240	9.7	8.3	5	5	1.5	2	7.8	10.6	107	ATV-58HU29M2	3.8
50/60 Hz	13.4	11.4	5	5	2.2	3	11	15	145	ATV-58HU41M2	3.8
3-phase	17.2	15	5	5	3	–	13.7	18.6	170	ATV-58HU54M2	6.9
	22.4	19.5	5	5	4	5	18.2	24.7	220	ATV-58HU72M2	6.9
	34.7	30	22	22	5.5	7.5	24.2	32.9	235	ATV-58HU90M2	13
	44.4	38.2	22	22	7.5	10	31	42.2	310	ATV-58HD12M2	13
380...500	3.4	2.6	5	5	0.75	1	2.3	3.1	55	ATV-58HU18N4	3.8
50/60 Hz	6	4.5	5	5	1.5	2	4.1	5.6	65	ATV-58HU29N4	3.8
3-phase	7.8	6	5	5	2.2	3	5.8	7.9	105	ATV-58HU41N4	3.8
	10.2	7.8	5	5	3	–	7.8	10.6	145	ATV-58HU54N4	6.9
	13	10.1	5	5	4	5	10.5	14.3	180	ATV-58HU72N4	6.9
	17	13.2	5	5	5.5	7.5	13	17.7	220	ATV-58HU90N4	6.9
	26.5	21	22	22	7.5	10	17.6	24	230	ATV-58HD12N4	13
	35.4	28	22	22	11	15	24.2	32.9	340	ATV-58HD16N4	13
	44.7	35.6	22	22	15	20	33	44.9	410	ATV-58HD23N4	15
	43	35	22	65	18.5	25	41	55	670	ATV-58HD28N4	34
	51	41	22	65	22	30	48	66	780	ATV-58HD33N4	34
	68	55	22	65	30	40	66	90	940	ATV-58HD46N4	34
	82	66	22	65	37	50	79	108	940	ATV-58HD54N4	57
	101	82	22	65	45	60	94	127	1100	ATV-58HD64N4	57
	121	98	22	65	55	75	116	157	1475	ATV-58HD79N4	57

Standard torque applications (120% Tn)

V	A	A	kA	kA	kW	HP	A	A	W		kg
380...500	51	41	22	65	22	30	44	55	750	ATV-58HD28N4	34
50/60 Hz	67	53	22	65	30	40	60	66	925	ATV-58HD33N4	34
3-phase	82	66	22	65	37	50	72	90	1040	ATV-58HD46N4	34
	99	79	22	65	45	60	85	108	1045	ATV-58HD54N4	57
	121	97	22	65	55	75	105	127	1265	ATV-58HD64N4	57
	160	130	22	65	75	100	138	157	1730	ATV-58HD79N4	57

Selecting a Speed Controller with Heatsink and Built-in EMC Filters

- (1) Nominal supply voltages : min. U1, max. U2.
- (2) Typical value for a 4-pole motor with no additional choke except in single-phase for ATV-58PU72M2, U90M2 and D12M2 (7).
- (3) These power levels are for a maximum switching frequency of 2 to 4 kHz, depending on the rating, and continuous operation. Switching frequencies are detailed in the section on "Technical Specifications".

Using the ATV-58 with a higher switching frequency :

- For continuous operation derate by one power rating, for example :
ATV-58PU09M2 for 0.25 kW – ATV-58PU18N4 for 0.37 kW – ATV-58PD12N4 for 5.5 kW.
- If no power derating is applied, do not exceed the following operating conditions :
Cumulative running time 36 s maximum per 60 s cycle (load factor 60 %).

- (4) For 60 seconds.
- (5) These power levels are given for the maximum permissible switching frequency in continuous operation (2 or 4 kHz, depending on the rating).
- (6) Speed controllers ordered under references ATV-58P●●●M2 and ATV-58P●●●N4 are supplied with a display module.
Speed controllers ordered under the same references ending in Z (ATV-58P●●●●Z) are supplied without a display module.
The additional letter Z only appears on the packaging.
- (7) • A line choke must be used if the speed controllers are to be connected to a single-phase line supply (see selection table in catalog).
• The "Supply phase loss" fault, code IPL, must be configured to "No" for these 3-phase speed controllers to operate on a single-phase supply. If this fault remains in its factory set-up (Yes), the speed controller will remain locked on a "PHF" fault.



Selecting a Speed Controller with Heatsink, without EMC Filters

Line supply	Line current		Max. prospective line Isc		Motor Power indicated on plate		Altivar 58		Power dissipated at nominal load (5)	Reference (6)	Weight
Supply voltage (1) U1...U2	at U1 (2)	at U2	at U1	at U2	(3)	Nominal current	Max. transient current (4)				

High torque applications (170% Tn)

V	A	A	kA	kA	kW	HP	A	A	W		kg
208...240 50/60 Hz 3-phase	43	40	10	22	11	15	47	64	745	ATV-58HD16M2X	34
	59	54	10	22	15	20	60	82	900	ATV-58HD23M2X	34
	71	64	10	22	18,5	25	75	102	895	ATV-58HD28M2X	57
	84	78	10	22	22	30	88	120	1030	ATV-58HD33M2X	57
	115	104	10	22	30	40	116	158	1315	ATV-58HD46M2X	57
380...500 50/60 Hz 3-phase	43	35	22	65	18,5	25	41	55	660	ATV-58HD28N4X	34
	51	41	22	65	22	30	48	66	775	ATV-58HD33N4X	34
	68	55	22	65	30	40	66	90	925	ATV-58HD46N4X	34
	82	66	22	65	37	50	79	108	930	ATV-58HD54N4X	57
	101	82	22	65	45	60	94	127	1085	ATV-58HD64N4X	57
	121	98	22	65	55	75	116	157	1455	ATV-58HD79N4X	57

Standard torque applications (120% Tn)

V	A	A	kA	kA	kW	HP	A	A	W		kg
208...240 50/60 Hz 3-phase	58	52	10	22	15	20	60	64	890	ATV-58HD16M2X	34
	70	63	10	22	18,5	25	75	82	980	ATV-58HD23M2X	34
	82	74	10	22	22	30	88	102	975	ATV-58HD28M2X	57
	114	102	10	22	30	40	116	120	1215	ATV-58HD33M2X	57
	141	125	10	22	37	50	143	158	1610	ATV-58HD46M2X	57
380...500 50/60 Hz 3-phase	51	41	22	65	22	30	44	55	735	ATV-58HD28N4X	34
	67	53	22	65	30	40	60	66	915	ATV-58HD33N4X	34
	82	66	22	65	37	50	72	90	1020	ATV-58HD46N4X	34
	99	79	22	65	45	60	85	108	1030	ATV-58HD54N4X	57
	121	97	22	65	55	75	105	127	1245	ATV-58HD64N4X	57
	160	130	22	65	75	100	138	157	1700	ATV-58HD79N4X	57

Selecting a Speed Controller with Heatsink, without EMC Filters

- (1) Nominal supply voltages : min. U1, max. U2.
- (2) These power levels are for the maximum permissible switching frequency for the speed controller (2 to 4 kHz depending on the rating) and continuous operation without derating. Switching frequencies are detailed in the section on "Technical Specifications".

Using the ATV-58 with a higher switching frequency :

- For continuous operation derate by one power rating, for example, for applications with high overtorque :
ATV-58HD16M2X for 7.5 kW — ATV-58HD28N4X for 15 kW — ATV-58HD54N4X for 30 kW.
- If no power derating is applied, do not exceed the following operating conditions :
Cumulative running time 36 s max. per 60 s cycle (load factor 60 %).

- (3) For 60 seconds.
- (4) These dissipated power levels are given for the maximum permissible switching frequency for the speed controller in continuous operation (2 or 4 kHz, depending on the rating).
- (5) Speed controllers ordered under references ATV-58P●●●M2 and ATV-58P●●●N4 are supplied with a display module. Speed controllers ordered under the same references ending in Z (ATV-58HD●●●M2XZ and ATV-58HD●●●N4XZ) are supplied without a display module.

The additional letter Z only appears on the packaging.

Selecting a Speed Controller on a Baseplate with Built-in EMC Filters

Line supply		Motor			Altivar 58			Reference (6)	Weight
Supply voltage (1)	Line current (2)	Max. prospective line Isc at U1	Power indicated on plate at U2 (3)	Nominal current	Max. transient current (4)	Power dissipated at nominal load (5)			
U1...U2	at U1	at U2	at U1	at U2					

High torque applications (170% Tn)

V	A	A	kA	kW	HP	A	A	W		kg
200...240 50/60 Hz single-phase	5.6	4.7	2	0.37	0.5	2.3	3.1	25	ATV-58PU09M2	1.8
	9.8	8.3	2	0.75	1	4.1	5.6	30	ATV-58PU18M2	1.8
	18.5	15.6	5	1.5	2	7.8	10.6	40	ATV-58PU29M2	2.9
	24.8	21.1	5	2.2	3	11	15	50	ATV-58PU41M2	2.9
	24.7	21.3	5	3	–	13.7	18.6	70	ATV-58PU72M2(7)	4.8
	35	30	22	4	5	18.2	24.7	75	ATV-58PU90M2(7)	11.5
200...240 50/60 Hz 3-phase	46	39.4	22	5.5	7.5	24.2	32.9	100	ATV-58PD12M2(7)	11.5
	9.7	8.3	5	1.5	2	7.8	10.6	40	ATV-58PU29M2	2.9
	13.4	11.4	5	2.2	3	11	15	50	ATV-58PU41M2	2.9
	17.2	15	5	3	–	13.7	18.6	60	ATV-58PU54M2	4.8
	22.4	19.5	5	4	5	18.2	24.7	70	ATV-58PU72M2	4.8
	34.7	30	22	5.5	7.5	24.2	32.9	75	ATV-58PU90M2	11.5
380...500 50/60 Hz 3-phase	44.4	38.2	22	7.5	10	31	42.2	100	ATV-58PD12M2	11.5
	3.4	2.6	5	0.75	1	2.3	3.1	35	ATV-58PU18N4	2.9
	6	4.5	5	1.5	2	4.1	5.6	40	ATV-58PU29N4	2.9
	7.8	6	5	2.2	3	5.8	7.9	50	ATV-58PU41N4	2.9
	10.2	7.8	5	3	–	7.8	10.6	55	ATV-58PU54N4	4.8
	13	10.1	5	4	5	10.5	14.3	65	ATV-58PU72N4	4.8
	17	13.2	5	5.5	7.5	13	17.7	80	ATV-58PU90N4	4.8
	26.5	21	22	7.5	10	17.6	24	90	ATV-58PD12N4	11.5
	35.4	28	22	11	15	24.2	32.9	110	ATV-58PD16N4	11.5
44.7	35.6	22	15	20	33	44.9	140	ATV-58PD23N4	13.5	

ENGLISH

Selecting a Speed Controller on a Baseplate with Built-in EMC Filters

- (1) Nominal supply voltages : min. U1, max. U2.
- (2) Typical value for a 4-pole motor with no additional choke except in single-phase for ATV-58PU72M2, U90M2 and D12M2 (7).
- (3) These power levels are for a maximum switching frequency of 4 kHz in continuous operation. Switching frequencies are detailed in the section on "Technical Specifications".

Using the ATV-58 with a higher switching frequency :

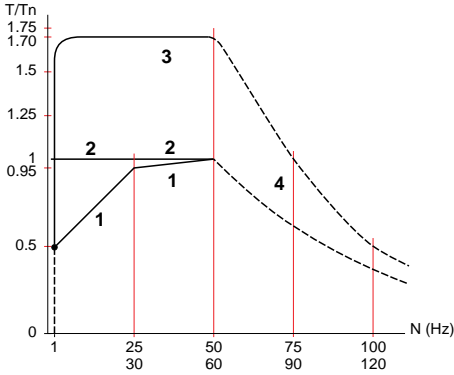
- For continuous operation derate by one power rating, for example :
ATV-58PU09M2 for 0.25 kW – ATV-58PU18N4 for 0.37 kW – ATV-58PD12N4 for 5.5 kW.
- If no power derating is applied, do not exceed the following operating conditions :
Cumulative running time 36 s max. per 60 s cycle (load factor 60 %).

- (4) For 60 seconds.
- (5) The power levels shown here concern the proportion of losses dissipated internally. Other losses are dissipated externally via the additional heatsink or the machine frame. These power levels are given for the maximum permissible switching frequency in continuous operation (4 kHz).
- (6) Speed controllers ordered under references ATV-58P●●●M2 and ATV-58P●●●N4 are supplied with a display module. Speed controllers ordered under the same references ending in Z (ATV-58P●●●●Z) are supplied without a display module. **The additional letter Z only appears on the packaging.**
- (7) A line choke must be used if the speed controllers are to be connected to a single-phase line supply (see selection table in catalog).

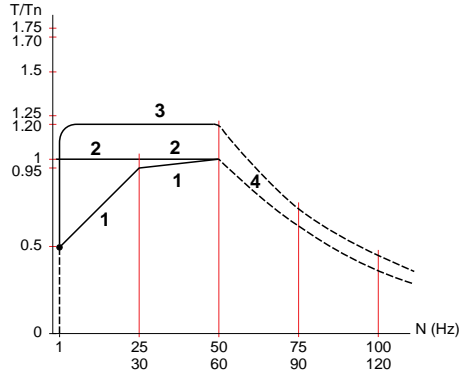
Available Torque

Torque characteristics :

- High torque applications :



- Standard torque applications :



- 1 Self-cooled motor : continuous useful torque
- 2 Force-cooled motor : continuous useful torque
- 3 Transient overtorque for max. 60 seconds.
- 4 Torque at overspeed with constant power

Available overtorque :

- High torque applications :
200 % of nominal motor torque for 2 seconds, and 170 % for 60 seconds.
- Standard torque applications :
140 % of nominal motor torque for 2 seconds, and 120 % for 60 seconds.

Continuous operation

For self-cooled motors, cooling is linked to the motor speed. Derating therefore occurs at speeds of less than half the nominal speed.

Overspeed operation

As the voltage can no longer change with the frequency, there is a reduction in torque. Check with the manufacturer that the motor can operate at overspeed.

Note : With a special motor the nominal and maximum frequencies can be adjusted from 40 to 500 Hz using the operator display module, the programming terminal or the PC software.

Technical Specifications

Environment

Degree of protection	IP 21 and IP 41 on upper part (conforming to EN 50178)
Vibration resistance	Conforming to IEC 68-2-6 : <ul style="list-style-type: none"> • 1.5 mm peak from 2 to 13 Hz • 1 gn from 13 to 200 Hz.
Shock resistance	Conforming to IEC 68-2-27 : <ul style="list-style-type: none"> • 15 g, 11 ms)
Maximum ambient pollution	Speed controllers ATV-58HD16M2X to D46M2X, ATV-58HD28N4 to D79N4 and ATV-58HD28N4X to D79N4X : <ul style="list-style-type: none"> • Degree 3 conforming to UL508C Other speed controllers : <ul style="list-style-type: none"> • Degree 2 conforming to IEC 664-1 and EN 50718.
Maximum relative humidity	93 % without condensation or dripping water conforming to IEC 68-2-3
Ambient temperature around the unit	Storage : - 25 °C to + 65 °C Operation : ATV-58P speed controllers, all ratings : <ul style="list-style-type: none"> • - 10 °C to + 40 °C Speed controllers ATV-58HU09M2 to U72M2 and ATV-58HU18N4 to U90N4 : <ul style="list-style-type: none"> • - 10 °C to + 50 °C without derating • up to + 60 °C derating the current by 2.2 % per °C over 50°C Speed controllers ATV-58HU90M2 to D12M2 and ATV-58HD12N4 to D23N4 : <ul style="list-style-type: none"> • - 10 °C to + 40 °C without derating • up to + 50 °C derating the current by 2.2 % per °C over 40 °C Speed controllers ATV-58HD16M2X to D46M2X, ATV-58HD28N4 to D79N4 and ATV-58HD28N4X to D79N4X : <ul style="list-style-type: none"> • - 10 °C to + 40 °C without derating • up to + 60 °C with fan kit derating the current by 2.2 % per °C over 40 °C
Maximum operating altitude	1000 m without derating (above this derate the current by 1 % for each additional 100 m)
Operating position	Vertical

Technical Specifications

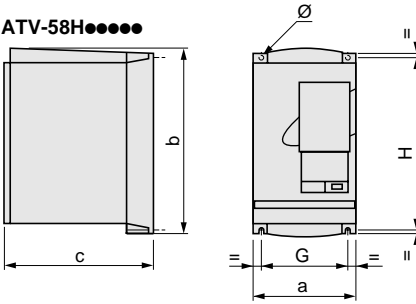
Electrical specifications

Power supply	Voltage	Speed controllers ATV-58●●●●M2 : • 200 V - 10 % to 240 V + 10 % single-phase and 3-phase
		Speed controllers ATV-58HD●●M2X : • 208 V - 10 % to 240 V + 10 % 3-phase
		Speed controllers ATV-58●●●●N4 and ATV-58●●●●N4X : • 380 V - 10 % to 500 V + 10 % 3-phase
	Frequency	50/60 Hz ± 5 %
Output voltage		Maximum voltage equal to line supply voltage
Electrical isolation		Electrical isolation between power and control (inputs, outputs, power supplies)
Output frequency range		0.1 to 500 Hz
Switching frequency		Configurable : • without derating : 0.5 - 1 - 2 - 4 kHz for speed controllers ATV-58●U09M2 to D23M2X, ATV-58●U18N4 to D46N4 and ATV-58HD28N4X to D46N4X 0.5 - 1 - 2 kHz for speed controllers ATV-58HD28M2X to D46M2X, ATV-58HD54N4 to D79N4 and ATV-58HD54N4X to D79N4X • without derating with intermittent operating cycle or with derating by one power rating in continuous operation : 8 - 12 - 16 kHz for speed controllers ATV-58●U09M2 to D12M2 and ATV-58●U18N4 to D23N4 8 - 12 kHz for speed controllers ATV-58HD16M2X to D23M2X, ATV-58HD28N4 to D46N4 and ATV-58HD28N4X to D46N4X 4 - 8 kHz for speed controllers ATV-58HD28M2X to D46M2X, ATV-58HD54N4 to D79N4 and ATV-58HD54N4X to D79N4X
Speed range		1 to 100
Braking torque		30 % of motor nominal torque without braking resistor (typical value). Up to 150 % with braking resistor fitted as option
Transient overtorque		200 % (or 140 % for standard torque) of motor nominal torque (typical values to ±10 %) for 2 seconds 170 % (or 120 % for standard torque) of motor nominal torque (typical values to ±10 %) for 60 seconds
Protection and safety features of speed controller		- Short-circuit protection : . between output phases . between output phases and earth . on internal supply outputs - Thermal protection against overheating and overcurrents - Undervoltage and overvoltage supply - Loss of supply phase safety circuit (avoids single-phase operation on 3-phase speed controllers)
Motor protection		- Thermal protection integrated in speed controller via continuous calculation of I ² t taking speed into account Memorization of motor thermal state when speed controller is powered down Function can be modified (using display module or programming terminal or PC software) depending on the type of motor cooling - Protection against motor phase breaks - Protection via PTC probes with option card

Dimensions - Mounting Recommendations

Dimensions

ATV-58H●●●●●

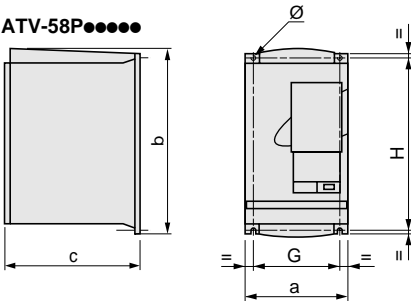


ATV-58H	a	b	c	G	H	Ø
U09M2, U18M2	113	206	167	96	190	5
U29M2, U41M2, U18N4, U29N4, U41N4	150	230	184	133	210	5
U54M2, U72M2, U54N4, U72N4, U90N4	175	286	184	155	270	5.5
U90M2, D12M2, D12N4, D16N4	230	325	210	200	310	5.5
D23N4	230	415	210	200	400	5.5
D16M2X, D23M2X, D28N4, D33N4, D46N4	240	550	283	205	530	7
D28N4X, D33N4X, D46N4X	240	550	283	205	530	7
D28M2X, D33M2X, D46M2X, D54N4, D64N4, D79N4	350	650	304	300	619	9
D54N4X, D64N4X, D79N4X	350	650	304	300	619	9

Fan flow rate

ATV-58HU09M2, U18M2, U18N4	not cooled
ATV-58HU29M2, U54M2, U29N4, U41N4, U54N4	36 m ³ /hour
ATV-58HU41M2	47 m ³ /hour
ATV-58HU72M2, U90M2, D12M2	72 m ³ /hour
ATV-58HU72N4, U90N4, D12N4, D16N4, D23N4	72 m ³ /hour
ATV-58HD16M2X, D23M2X, D28N4, D33N4, D46N4, D28N4X, D33N4X, D46N4X	292 m ³ /hour
ATV-58HD28M2X, D33M2X, D46M2X, D54N4, D64N4, D79N4, D54N4X, D64N4X, D79N4X	492 m ³ /hour

ATV-58P●●●●●



ATV-58P	a	b	c	G	H	Ø
U09M2, U18M2	113	206	132	96	190	5
U29M2, U41M2, U18N4, U29N4, U41N4	150	230	145	133	210	5
U54M2, U72M2, U54N4, U72N4, U90N4	175	286	151	155	270	5.5
U90M2, D12M2, D12N4, D16N4	230	325	159	200	310	5.5
D23N4	230	415	159	200	400	5.5

Fan flow rate : only the ATV-58PU41M2 speed controller has an internal fan with a flow rate of 11 m³ /hour.

Mounting recommendations

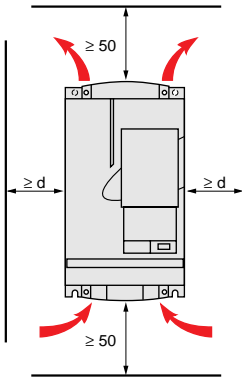
Install the unit vertically at +/-10 °.

Do not place it close to heating elements.

Leave sufficient free space to ensure that the air required for cooling purposes can circulate from the bottom to the top of the unit.

Mounting and Temperature Conditions

ATV-58●U09M2 to D12M2 and U18N4 to D23N4



Free space in front of unit : 10 mm minimum.

ATV-58HU09M2 to U72M2 and ATV-58HU18N4 to U90N4 :

- From - 10°C to 40°C : $d \geq 50$ mm : no special precautions.

$d = 0$: remove the protective blanking cover from the top of the speed controller as shown overleaf (the degree of protection is then IP 20).

- From 40°C to 50°C : $d \geq 50$ mm : remove the protective blanking cover from the top of the speed controller as shown overleaf (the degree of protection is then IP 20).

$d = 0$: add control ventilation kit VW3-A5882● (see ATV-58 catalog).

- From 50°C to 60°C : $d \geq 50$ mm : add control ventilation kit VW3-A5882● (see ATV-58 catalog). Derate the current by 2.2 % per °C over 50°C.

ATV-58HU90M2 to D12M2 and ATV-58HD12N4 to D23N4 :

- From - 10°C to 40°C : $d \geq 50$ mm : no special precautions.

$d = 0$: remove the protective blanking cover from the top of the speed controller as shown overleaf (the degree of protection is then IP 20).

- From 40°C to 50°C : $d \geq 50$ mm : remove the protective blanking cover from the top of the speed controller as shown overleaf (the degree of protection is then IP 20). Derate the current by 2.2 % per °C over 40°C.

$d = 0$: add control ventilation kit VW3-A5882● (see ATV-58 catalog). Derate the current by 2.2 % per °C over 40°C.

ATV-58P●●●●● :

- For mounting in enclosure

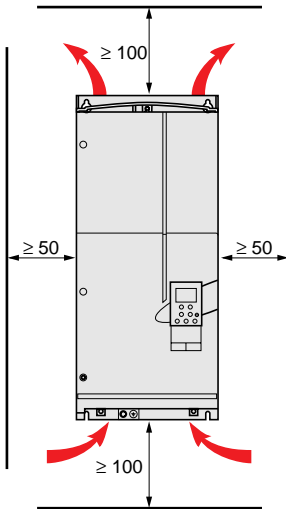
- External ambient temperature (VW3-A5880● coolest surface) : - 10°C to + 40°C.
 - Temperature inside enclosure : same limits and conditions for mounting and any derating as for ATV-58H●●●●●.

- Mounting on machine frame :

- Ambient temperature : -10°C to + 40°C.

Mounting and Temperature Conditions

ATV-58HD16M2X, D46M2X, D28N4 to D79N4 and D28N4X to D79N4X

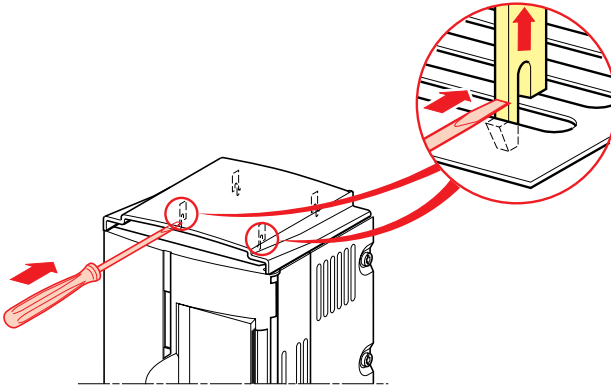


Free space in front of unit : 50 mm minimum.

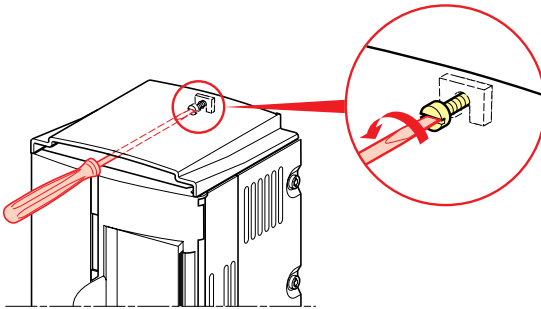
- From - 10°C to 40°C : no special precautions.
- From 40°C to 60°C : add control card fan kit VW3A588●●● (see ATV-58 catalog).
Derate the operating current by 2.2 % per °C over 40°C.

Removing the IP 41 Protective Blanking Cover

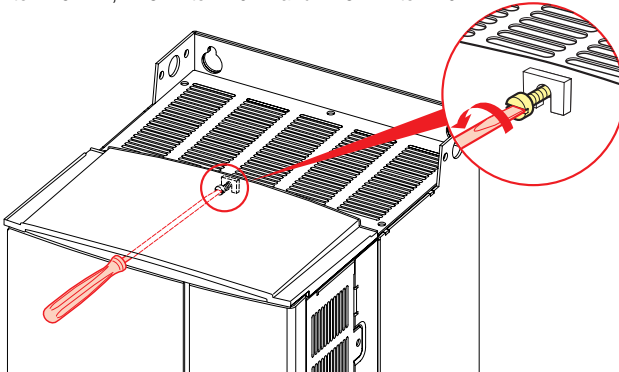
ATV-58●U09M2 to U72M2 and U18N4 to U90N4



ATV-58●U90M2, D12M2 and D12N4 to D23N4



ATV-58HD16M2X to D46M2X, D28N4 to D79N4 and D28N4X to D79N4X



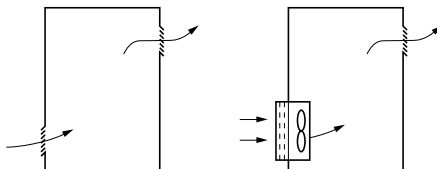
ENGLISH

Mounting in a Wall-fixing or Floor-standing Enclosure

Observe the mounting recommendations on the previous page.

To ensure proper air circulation in the speed controller :

- Fit ventilation grilles
- Ensure that ventilation is adequate : if not install forced ventilation with a filter
- Use special IP 54 filters



Dust and damp proof metal enclosure (degree of protection IP 54)

The speed controller must be mounted in a dust and damp proof casing in certain environmental conditions : dust, corrosive gases, high humidity with risk of condensation and dripping water, splashing liquid, etc.

To avoid hot spots in the speed controller, add a fan to circulate the air inside the enclosure, reference VW3-A5882* (see ATV-58 catalog).

This enables the speed controller to be used in an enclosure where the maximum internal temperature can reach 60 °C.

Calculating the size of the enclosure

Maximum thermal resistance R_{th} (°C/W) :

$$R_{th} = \frac{\theta^{\circ} - \theta^{\circ}e}{P}$$

θ° = maximum temperature inside enclosure in °C
 $\theta^{\circ}e$ = maximum external temperature in °C
 P = total power dissipated in the enclosure in W

Power dissipated by speed controller : see section Selecting a Speed Controller.
 Add the power dissipated by the other equipment components.

Useful heat dissipation surface of casing S (m²) :
 (sides + top + front panel if wall-mounted)

$$S = \frac{K}{R_{th}}$$

K = thermal resistance per m² of casing

For metallic casing : $K = 0.12$ with internal fan
 $K = 0.15$ without fan

Caution : Do not use insulated enclosures as they have a poor level of conductivity.

Using the speed controller on a baseplate reduces the power dissipated in the enclosure, which makes the IP 54 degree of protection easier to achieve.

From 11 kW at 208-240 V and 18.5 kW at 380-500 V, IP54 kits can be used to dissipate power to the outside by ventilation (see ATV58 catalog).

Mounting in Wall-fixing or Floor-standing Enclosure - Speed Controller on Baseplate

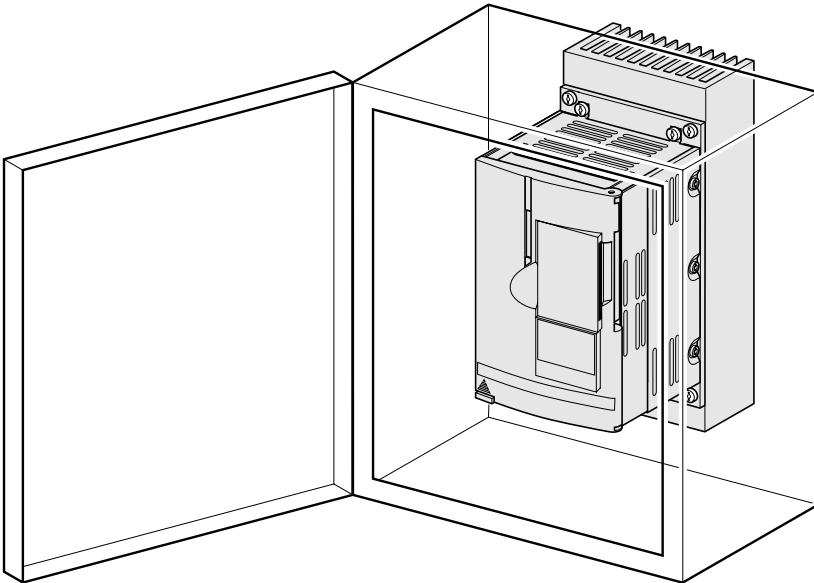
- Use the VW3-A5880 kit for dust and damp proof mounting (see ATV-58 catalog) and observe the mounting instructions supplied with the equipment.

Remember to fit the two thermal liners on each side of the metal sheet forming the casing. One liner is supplied with the speed controller, the other with the VW3-A5880 kit.

- The metal sheet or enclosure used for mounting the speed controller must have the following characteristics :

- thickness 1.5 to 3 mm
- metal sheet : stainless steel or painted steel, sufficiently smooth
- baked epoxy paintwork (do not use lacquer), max. thickness 70 µm, fine or medium texture.

- Check the thermal state of the speed controller as shown in the "Setup" section to ensure that the mounting is correct.

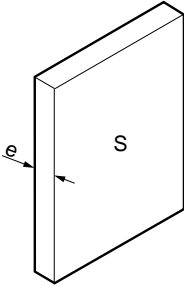


ENGLISH

Mounting on Machine Frame - Speed Controller on Baseplate

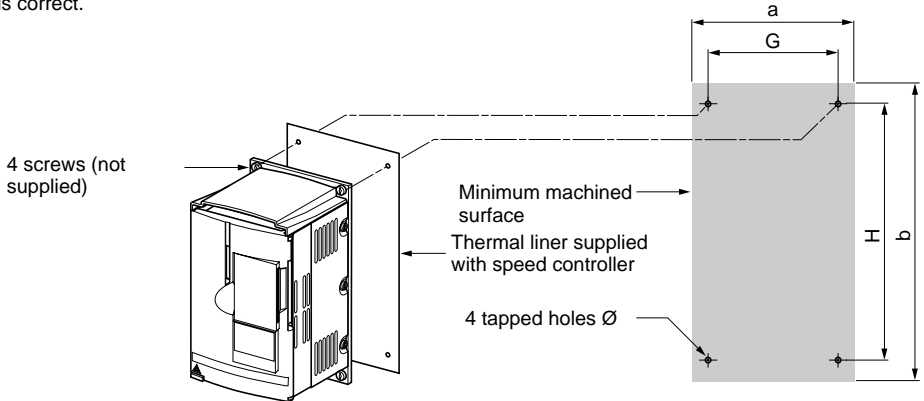
Speed controllers on baseplates with the following ratings can be mounted on (or in) a cast iron or aluminum machine frame provided the following conditions are observed :

- Maximum ambient temperature : 40°C
- Mating surface on frame machined to provide 100 µm max. smoothness and 3.2 µm max. roughness.
- The speed controller must be mounted in the centre of a support (frame) with minimum thickness "e" and minimum square cooling surface "S" exposed to the open air.



Speed controller reference	Minimum surface S m ²	Minimum thickness e mm ²	
		Cast iron	Aluminum
ATV-58PU09M2 ATV-58PU18M2	0.25	20	10
ATV-58PU29M2 ATV-58PU41M2 ATV-58PU18N4 ATV-58PU29N4 ATV-58PU41N4	1		20

Check the thermal state of the speed controller as shown in the "Setup" section to ensure that the mounting is correct.



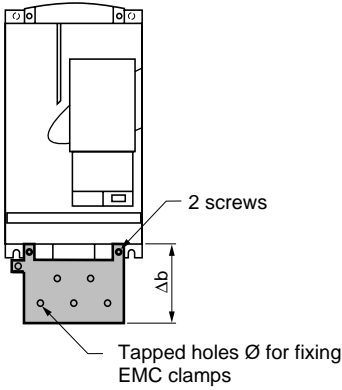
Lightly file the tapped holes to remove any burrs.

Speed controller reference	a mm	b mm	G mm	H mm	Ø mm
ATV-58PU09M2 ATV-58PU18M2	120	220	96	190	M4
ATV-58PU29M2 ATV-58PU41M2 ATV-58PU18N4 ATV-58PU29N4 ATV-58PU41N4	160	240	133	210	M5

Electromagnetic Compatibility - Mounting

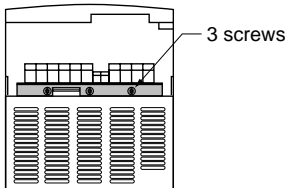
EMC mounting plate supplied with speed controller

Fix the EMC equipotentiality mounting plate to the holes in the ATV58 heatsink using the screws supplied as shown in the drawings below.

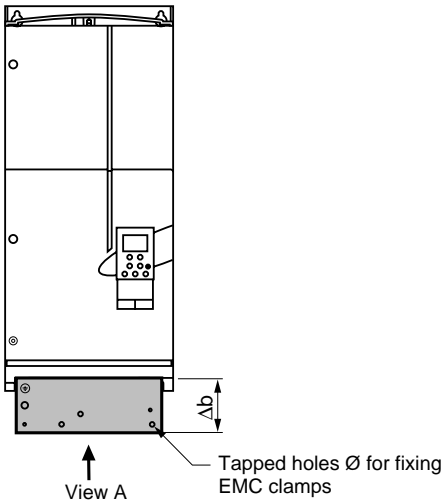


	Δb	\varnothing
ATV58●U09M2, U18M2,	63	4
ATV58●U29M2, U41M2, U18N4, U29N4, U41N4	64.5	4
ATV58●U54M2, U72M2, U54N4, U72N4, U90N4	64.5	4
ATV58●U90M2, D12M2, D12N4, D18N4,	76	4
ATV58●D23N4	76	4

View A



	Δb	\varnothing
ATV58HD16M2X, D23M2X, D28N4, D33N4, D46N4 D28N4X, D33N4X, D46N4X	80	5
ATV58HD28M2X, D33M2X, D46M2X, D54N4, D64N4, D79N4 D54N4X, D64N4X, D79N4X	110	5

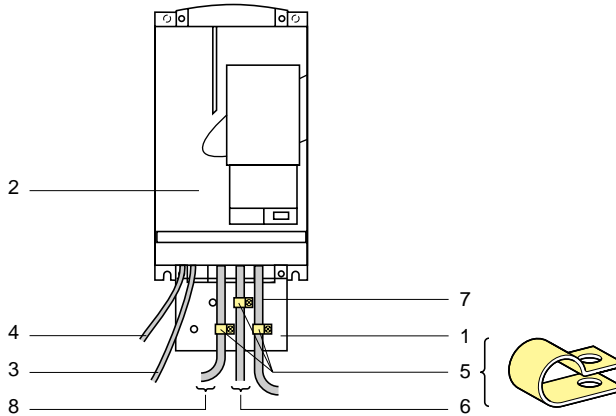


Electromagnetic Compatibility - Wiring

Principle

- Grounds between speed controller, motor and cable shielding must have "high frequency" equipotentiality.
- Use shielded cables with shielding connected to the ground at 360° at both ends of the motor cable, braking resistor (if fitted) and control-command cables. Conduit or metal ducting can be used for part of the shielding length provided that there is no break in continuity.
- Ensure maximum separation between the power supply cable (line supply) and the motor cable.

Installation diagram



- 1 - Metal sheet machine grounding supplied with the speed controller, to be mounted as shown in the drawing
- 2 - Altivar 58
- 3 - Non-shielded power supply wires or cable
- 4 - Non-shielded wires for fault relay contacts output
- 5 - Fix and ground the shielding of cables 6, 7 and 8 as close as possible to the speed controller :
 - strip the shielding
 - use the correct size clamps on the stripped part of the shielding to fix to metal sheet 1
 - The shielding must be clamped tightly enough to the metal sheet to ensure good contact
 - clamp types : stainless steel
- 6 - Shielded cable for motor connection with shielding connected to ground at both ends
The shielding must be continuous and intermediate terminals must be in EMC shielded metal cases
- 7 - Shielded cable for connecting the control/command system
For applications requiring several conductors, use small cross-sections (0.5 mm²).
The shielding must be connected to ground at both ends. The shielding must be continuous and intermediate terminals must be in EMC shielded metal cases.
- 8 - Shielded cable for connecting braking resistor (if fitted). The shielding must be connected to ground at both ends. The shielding must be continuous and intermediate terminals must be in EMC shielded metal cases.

Note :

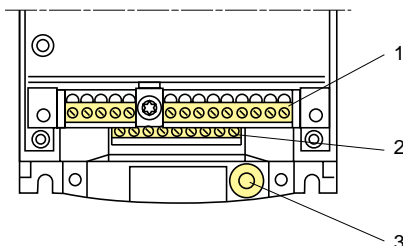
- If using an additional input filter, it should be mounted under the speed controller (ATV-58H) or to one side (ATV-58P), and connected directly to the line supply via an unshielded cable. Link 3 on the speed controller is via the filter output cable.
- The HF equipotential ground connection between the speed controller, motor and cable shielding does not remove the need to connect the PE protective conductors (green-yellow) to the appropriate terminals on each unit.

Access to Terminals - Power Terminals

Access to terminals

To access the terminals, switch off the speed controller, then unlock and open the hinged cover.

Location of terminals : on the lower part of the Altivar.



- 1 - Control
- 2 - Power
- 3 - Terminal for connecting a protective conductor with a 10 mm² cross-section conforming to EN50178 (earth leakage current)

Power Terminals

Terminal specifications

Altivar ATV-58●	Terminals	Maximum connection capacity		Tightening torque in Nm
		AWG	mm ²	
U09M2, U18M2	all terminals	AWG 14	1.5	0.5
U29M2, U41M2, U18N4 U29N4, U41N4	all terminals	AWG 8	6	0,75
U54M2, U72M2, U54N4 U72N4, U90N4	all terminals	AWG 8	6	0,75
U90M2, D12M2, D12N4 D16N4, D23N4	all terminals	AWG 6	10	2

Altivar ATV-58H	Terminals	Maximum connection capacity		Tightening torque in Nm
		AWG	mm ²	
D28N4, D28N4X,	PA PB	AWG 6	10	2
	other terminals	AWG 4	16	3
D16M2X, D23M2X, D33N4, D46N4 D33N4X, D46N4X	PA PB	AWG 4	16	3
	other terminals	AWG 2	35	4
D28M2X, D33M2X, D46M2X, D54N4, D64N4, D79N4 D54N4X, D64N4X, D79N4X	PA PB	AWG 2	35	4
	other terminals	AWG 2/0	70	10

Power Terminals

Arrangement of terminals

⏏	L1	L2	+	-	U	V	W	⏏
---	----	----	---	---	---	---	---	---

ATV-58●U09M2 and U18M2

⏏	L1	L2	L3	PA	PB	U	V	W	⏏
---	----	----	----	----	----	---	---	---	---

ATV-58●U29M2 to D12M2
and ATV-58●U18N4 to D23N4

⏏	L1	L2	L3	+	-	PA	PB	U	V	W	⏏
---	----	----	----	---	---	----	----	---	---	---	---

ATV-58HD16M2X to D46M2X,
ATV-58HD28N4 to D79N4
and ATV-58HD28N4X to D79N4X

Function of terminals

Terminals	Function	For Altivar ATV-58●
⏏	Altivar ground terminal	All ratings
L1 L2	Power supply	All ratings
L3		All ratings except U09M2 and U18M2
+	DC bus outputs	U09M2 and U18M2 D16M2X to D46M2X D28N4 to D79N4 D28N4X to D79N4X
-		
PA PB	Output to braking resistor	All ratings except U09M2 and U18M2
U V W	Outputs to motor	All ratings
⏏	Altivar ground terminal	All ratings

Access to DC bus : connecting an external DC supply

For ATV58●U09M2 and U18M2, an external DC supply is connected directly to the speed controller + and - terminals.

For ATV58●U29M2 to D12M2 and ATV●U18N4 to D23N4, connect the supply + to the PA terminal and connect the supply - to the J16 tag connector located next to the power terminal.

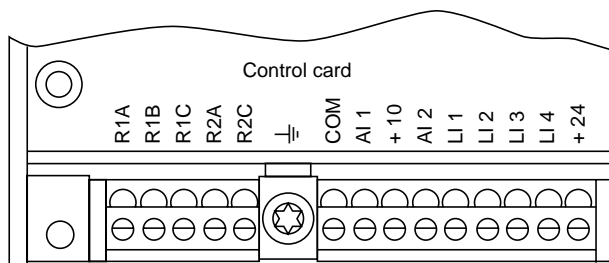
For ATV58HD16M2X to D46M2X, ATV58HD28N4 to D79N4 and ATV58HD28N4X to D79N4X, an external DC supply is connected to the speed controller + and - terminals, but an external device with resistors for preloading the filter capacitors is required.

Control Terminals

Terminal characteristics

- Connection terminal for shielding : for metal connector or clamp
- 2 removable terminals, one for relay contacts, the other for low level I/O
- Maximum connection capacity : 1.5 mm² - AWG 14
- Max. tightening torque : 0.4 Nm.

Arrangement of terminals

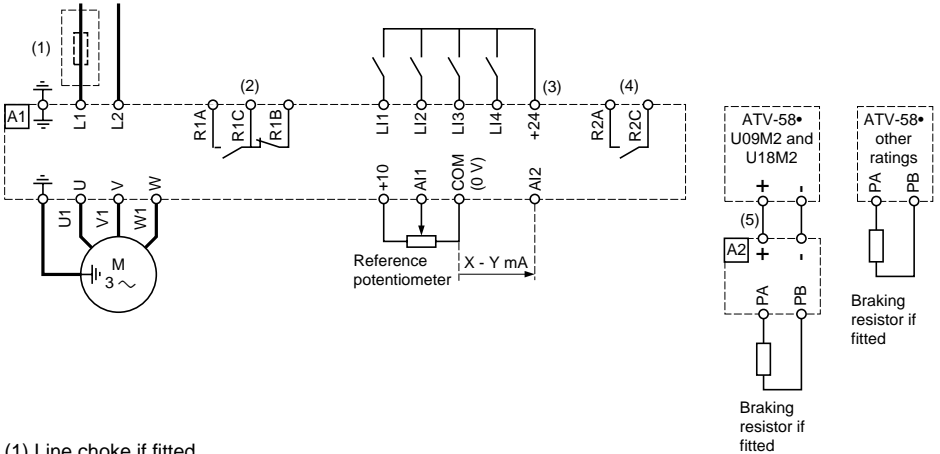
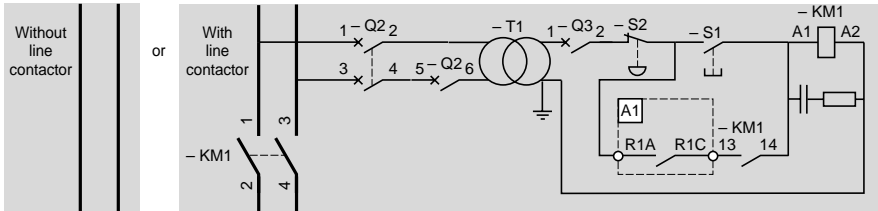
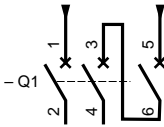


Function of terminals

Terminal	Function	Electrical characteristics
R1A R1B R1C	C/O contact at common point (R1C) of R1 fault relay	Min. switching capacity : - 10 mA for 24 V _{DC} Max. switching capacity on inductive load (cos φ 0.4 and L/R 7 ms) : 1.5 A for 250 V _{AC} and 30 V _{DC}
R2A R2C	N/O contact of R2 programmable relay	
⏏	Connection for cable shielding	
COM	Common for logic and analog inputs	
AI1	Analog input for voltage	Analog input 0 + 10 V impedance 30 kΩ
+10	Power supply for potentiometer with setpoint 1 to 10 kΩ	+10 V ± 1 % 10 mA max. protected against short-circuits and overloads
AI2	Analog input for current	Analog input X - Y mA, X and Y are programmable Factory preset to 4 - 20 mA impedance 100 Ω
L1 L2 L3 L4	Logic inputs	Programmable logic inputs impedance 3.5 kΩ Power supply + 24 V (max. 30 V) State 0 if < 5 V, state 1 if > 11 V
+ 24	Power supply for inputs	+ 24 V protected against short-circuits and overloads, min. 18 V, max. 30 V Max. flow rate 200 mA


Connection Diagrams

Single-phase power supply



- (1) Line choke if fitted.
- (2) Fault relay contacts for remote signalling of speed controller status.
- (3) + 24 V internal. If using with a + 24 V external supply, connect its 0 V to the COM terminal - do not use the speed controller + 24 terminal - and connect the LI inputs common to the + 24 V of the external supply.
- (4) R2 reassignable relay.
- (5) A2 braking module VW3 A58701 if using a braking resistor for U09M2 and U18M2 ratings only.

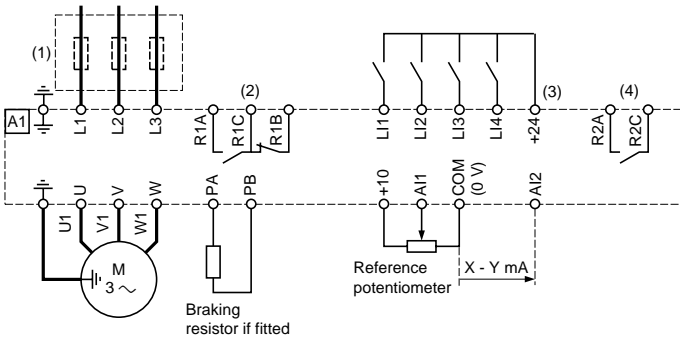
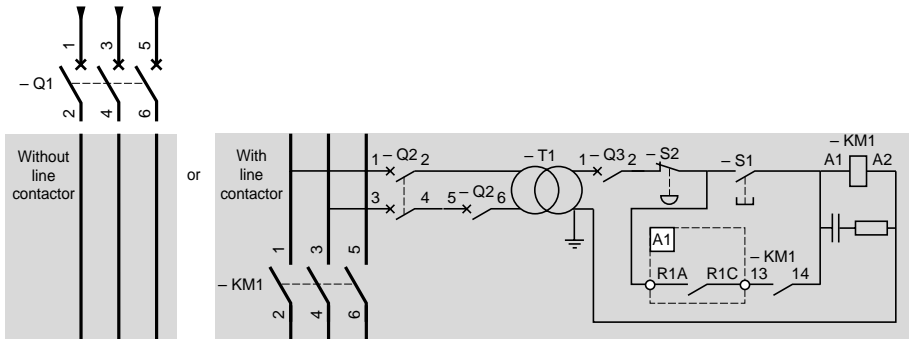
Note : Fit interference suppressors to all inductive circuits near the speed controller or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

 The "Supply phase loss" fault, code IPL, must be configured to "No" for these 3-phase speed controllers to operate on a single-phase supply. If this fault remains in its factory set-up (Yes), the speed controller will remain locked on a "PHF" fault.

Components which can be used in association with the Altivar : see catalog.

Connection Diagrams

3-phase power supply



- (1) Line choke if fitted (ATV-58●U29M2 to D12M2 and U18N4 to D23N4).
- (2) Fault relay contacts for remote signalling of speed controller status.
- (3) + 24 V internal. If using with an + 24 V external supply, connect its 0 V to the COM terminal - do not use the speed controller + 24 terminal - and connect the LI inputs common to the + 24 V of the external supply.
- (4) R2 reassignable relay.

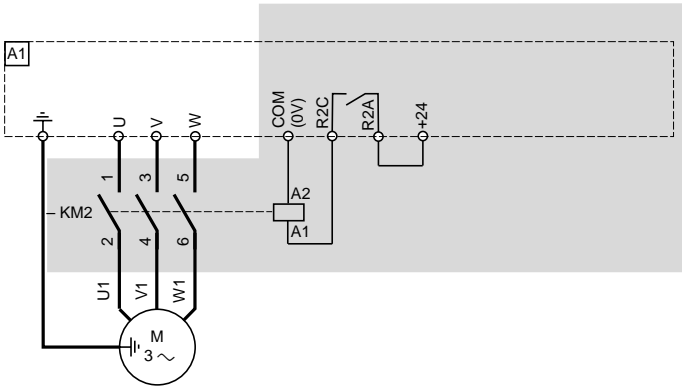
Note : Fit interference suppressors to all inductive circuits near the speed controller or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Components which can be used in association with the Altivar : see catalog.

Connection Diagrams

Diagram with downstream contactor for ATV-58●U09M2 to D12M2 and U18N4 to D23N4

The shaded part should be added to the various diagram types (single-phase, 3-phase, etc).



Use the "downstream contactor control" function with relay R2, or logic output LO (\approx 24 V) with an I/O extension card.
Consult the programming manual.

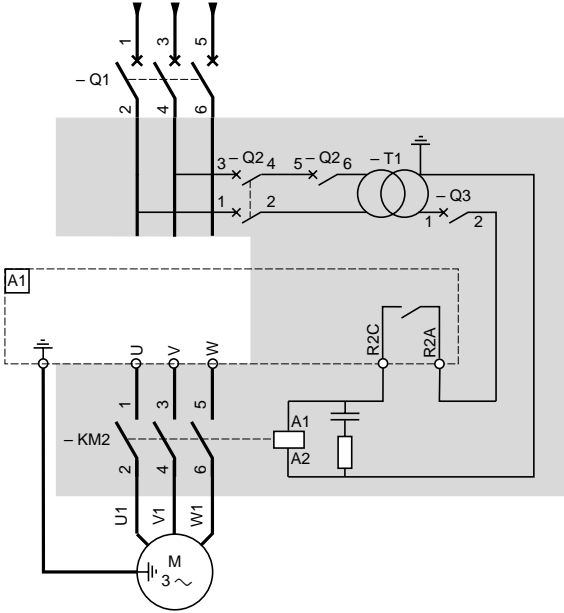
Note : Fit interference suppressors to all inductive circuits near the speed controller or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Components which can be used in association with the Altivar : see catalog.

Connection Diagrams

Diagram with downstream contactor for ATV-58HD16M2X to D46M2X, D28N4 to D79N4 and D28N4X to D79N4X

The shaded part should be added to the 3-phase power supply diagram.

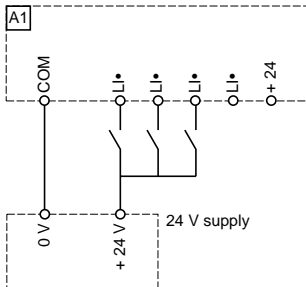


Use the "downstream contactor control" function with relay R2, or logic output LO (24 V) switching the coil using an I/O extension card. Consult the programming manual.

Note : Fit interference suppressors to all inductive circuits near the speed controller or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Components which can be used in association with the Altivar : see catalog.

24 V external supply for supplying logic inputs



Wiring Recommendations, Use

Wiring recommendations, use

Power

Observe the cable cross-sectional areas recommended in the standards.

The speed controller must be earthed to conform with the regulations concerning high leakage currents (over 3.5 mA). Do not use a residual current device for upstream protection on account of the DC elements which may be generated by leakage currents. If the installation involves several speed controllers on the same line, each speed controller must be earthed separately. If necessary, fit a line choke (consult the catalog).

Keep the power cables separate from circuits in the installation with low-level signals (detectors, PLCs, measuring apparatus, video, telephone).

Control

Keep the control circuits and the power cables apart. For control and speed reference circuits, we recommend using shielded twisted cables with a pitch of between 25 and 50 mm, connecting the shielding to each end.

Recommendations for use

In power control mode using a **line contactor** :



- **Do not switch contactor KM1 frequently** (otherwise premature aging of the filtering capacitors will occur) **and use inputs LI1 to LI4 to control the speed controller.**
- **If the cycles are longer than 60 s these measures are absolutely necessary.**

If safety standards necessitate isolation of the motor, fit a contactor on the speed controller output and use the "downstream contactor control" function ([consult the programming manual](#)).

Fault relay, unlocking

The fault relay is energized when the speed controller is powered up and is not faulty. It has one C/O contact at the common point.

The speed controller is unlocked after a fault by :

- powering down the speed controller until both the display and indicator lamps go out, then powering up again
- automatically or remotely via logic input : [consult the programming manual](#).

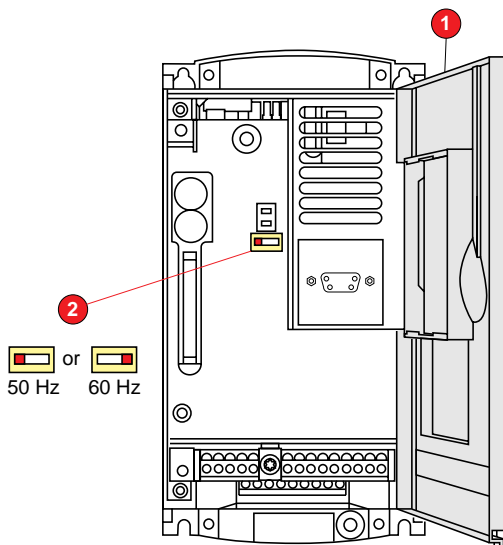
Programmable I/O, functions :

[Consult the programming manual](#).

Setup

The Altivar is factory preset for the most common operating conditions.

Prior to powering up the Altivar :



Unlock and open the cover ① of the Altivar on its hinges to access the 50/60 Hz selector switch ② on the control board.

If an option card is present, the selector switch can be accessed through it.

Position the selector switch on 50 or 60 Hz, whichever corresponds to your motor.

Preset operating point :

50 Hz position (factory set-up) :

- 230 V 50 Hz for ATV-58●●●●M2 and M2X
- 400 V 50 Hz for ATV-58●●●●N4 and N4X

60 Hz position :

- 230 V 60 Hz for ATV-58●●●●M2 and M2X
- 460 V 60 Hz for ATV-58●●●●N4 and N4X

Several tools are available to help with setup :

- display module ref : VW3 A58101 (the speed controller is supplied with or without this display module, according to the reference ordered).
- programming terminal ref : VW3 A58102L1 or VW3 A58102L2 to be ordered separately.
- PC software and interface ref : VW3 A58104 to be ordered separately.

Refer to the documentation provided with each of the tools for information on setup and maintenance of the Altivar.

If your Altivar is equipped with an I/O extension or communication card, consult the documentation supplied with the card.

Reminder for IT neutral point connection : in the event of use on a 3-phase network with a voltage greater than 480V $\pm 10\%$ with an isolated or high-impedance neutral system (IT), the internal EMC filter capacitors which are connected to ground must be disconnected except for ATV-58H●●●●X. Consult Schneider product support who are the only people qualified to perform this operation.

Checking the thermal state of the speed controller

The mounting of the speed controllers on ATV-58P●●●● baseplates must be checked, especially when mounting on the machine frame.

- Proceed as follows :
- Operate the speed controller at the maximum operating and temperature conditions for the application.
 - Using the display module, programming terminal or PC software, observe until the following parameter stabilizes :

DriveThermal. THd (menu 1-SUPERVISION)

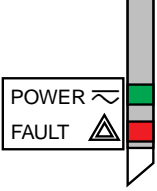
It must not exceed 100 %.


If this value is exceeded, check the mounting, conditions of use and size of the speed controller.


Operation - Maintenance - Spares and Repairs

Operation

Signalling on the front panel of the Altivar



Green LED **POWER**  on : Altivar powered up

Red LED **FAULT**  • on : Altivar faulty
• flashing : Altivar locked following use of the "STOP" button on the display module or a configuration change. The motor must not be powered up until the "forward", "reverse" and "shutdown via injection" commands have been reset.

Display mode on display module screen

Displays preset frequency set point or faults.

The display mode can be modified via the display module : [consult the programming manual.](#)

Maintenance

Before working with the equipment, **switch off the power supply, check that the green LED is off and wait for the capacitors to discharge** (approximately 3 minutes).



The DC voltage at the + and - terminals or PA and PB terminals may reach 850 V depending on the line supply voltage.

If problems arise during setup or operation, first ensure that the recommendations relating to environment, mounting and connections have been observed.

Maintenance

The Altivar 58 does not require preventative maintenance. We nevertheless advise you regularly to :

- Check the condition and tightness of connections
- Ensure that the temperature around the unit remains at an acceptable level and that ventilation is effective (average service life of fans : 3 to 5 years depending on operating conditions)
- Remove dust from the speed controller if necessary

Assistance with maintenance

The first fault detected is memorized and displayed on the display module screen if power is maintained : the speed controller locks, the red LED lights up, and the R1 fault relay is activated.

[Consult the programming manual.](#)

Spares and repairs

For spare parts and repairs to Altivar 58 speed controllers, consult Schneider group product support.



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