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# Preliminary checks

## Receipt

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

Open the packaging and check that the Altivar 66 has not been damaged during transport.

## Handling and storage

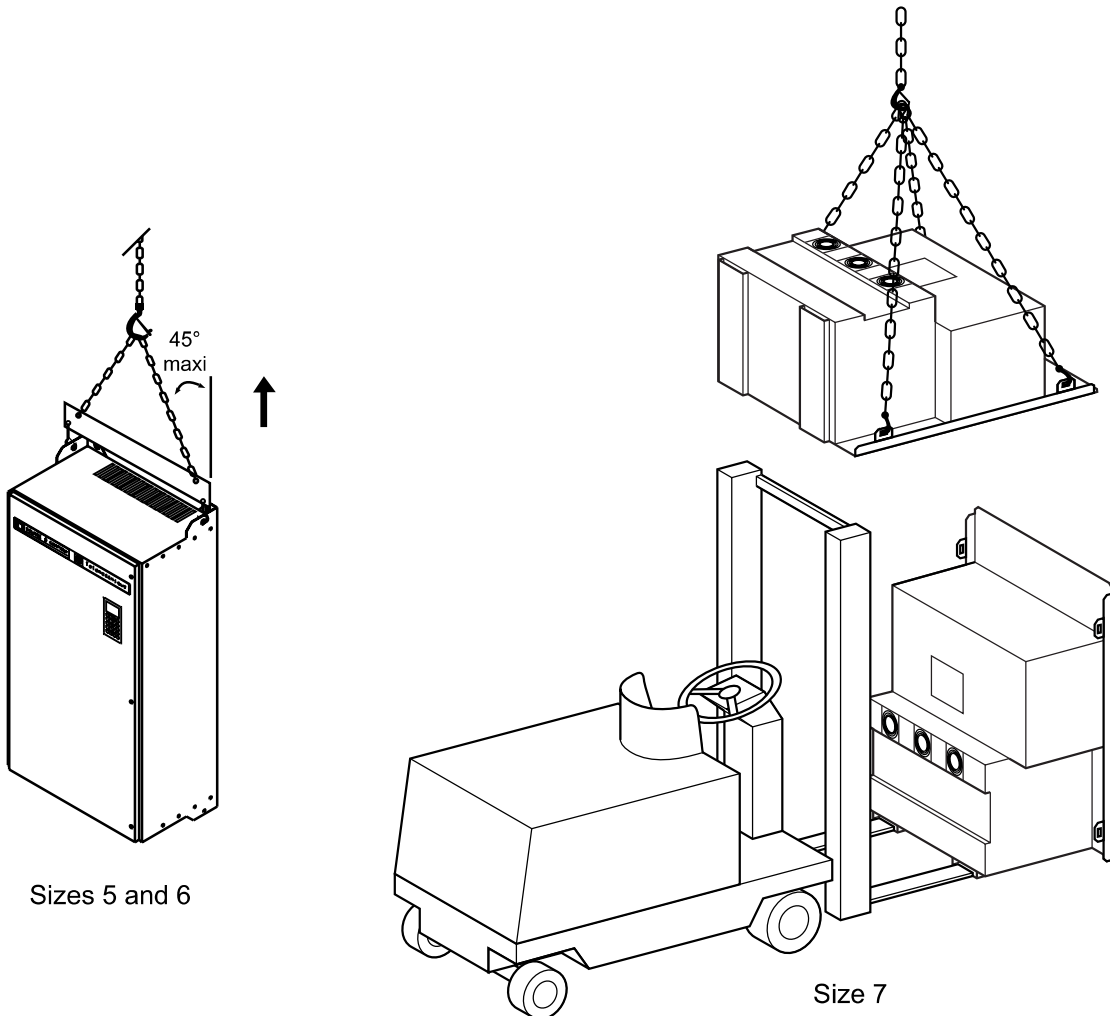
To ensure that the speed controller is protected prior to installation, handle and store it in its packaging.

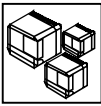
## Handling prior to installation

The Altivar 66 400-460 V range consists of 19 models divided into 7 sizes. The Altivar 66 208-230 V range consists of 8 models divided into 5 sizes.

Sizes 1 to 4 can be removed from their packaging and installed manually.

From size 5 upwards, a hoist must be used.





# Motor-speed controller combination

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## Preliminary comments

### Motor power rating

In the tables on pages 4 to 12, the values given are the standard power ratings.

At 460 V - 60 Hz, the HP ratings conform to NEC (National Electrical Code).

There is no HP equivalent on a 460 V supply for a motor rated at 3 kW on a 400 V AC supply, while the ATV-66U54N4 speed controller can be supplied at 460 V - 60 Hz.

### Line current

The line current corresponds to the current consumed by the speed controller at nominal operating power on an AC supply with an impedance to limit the presumed short-circuit current to :

- 12000 A for a 208 V - 50/60 Hz supply voltage,
- 22000 A for a 230 V - 50/60 Hz supply voltage,
- 22000 A for a 400 V - 50 Hz supply voltage,
- 65000 A for a 460 V - 60 Hz supply voltage.

Providing the supply via a power transformer suitable for the speed controller, or adding a line choke from the catalogue, reduces current consumption to a value close to the speed controller nominal current.

Example : ATV-66D23N4 with 15 kW motor on a 400 V AC supply.

Constant torque application :  $I_{nv} = 33$  A.

Line current with no choke : 45 A.

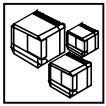
Line current with choke from catalogue : 28 A.

### Variable torque applications

For variable torque applications not involving high switching frequency ([see tables on pages 6, 7 and 11](#)), limiting overtorque makes it possible to use a speed controller with a motor with a higher power rating.

### ATV-66U41N4 speed controller

When a speed controller is used with a motor whose power rating is below 2.2 kW (or 3 kW for variable torque), the speed controller should be reconfigured via the graphic terminal to adapt its integral thermal protection ([see the Programming Manual](#)).

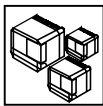


# Motor-speed controller combination

## Constant torque applications (switching frequency 4 kHz)

Supply voltage : 400 V  $\pm$  15 % and 460 V  $\pm$  15 %, 50 Hz  $\pm$  5 % or 60 Hz  $\pm$  5 %

Speed controller		Motor power rating		Line current	Controller nominal current (Inv)	Controller maximum transient current (60 s)	Total power dissipated at nominal load
Reference	Power	400 V 50 Hz	460 V 60 Hz				
	kVA	kW	HP	A	A	A	W
<b>ATV-66U41N4</b> <a href="#">(see page 3)</a>	4.1	0.75	–	4	2.3	3.2	100
		–	1	3.5	1.8	2.7	95
		1.5	–	6.5	4.1	5.6	123
		–	2	6	3.4	5.1	117
		2.2	–	9	5.8	8	146
		–	3	9	4.8	7.2	140
<b>ATV-66U54N4</b>	5.4	3	–	12	7.8	10.7	173
<b>ATV-66U72N4</b>	7.2	4	–	15	10.5	14.3	209
		–	5	13	7.6	11.4	195
<b>ATV-66U90N4</b>	9	5.5	–	20	13	17.7	251
		–	7.5	18	11	16.5	225
<b>ATV-66D12N4</b>	12	7.5	–	26	17.6	24	317
		–	10	24	14	21	290
<b>ATV-66D16N4</b>	16	11	–	35	24.2	33	447
		–	15	34	21	31.5	380
<b>ATV-66D23N4</b>	23	15	–	45	33	45	580
		–	20	44	27	40.5	530
<b>ATV-66D33N4</b>	33	22	–	60	48.4	66	754
		–	30	59	40	60	655
<b>ATV-66D46N4</b>	46	30	–	78	66	90	1060
		–	40	75	52	78	880

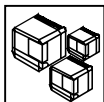


# Motor-speed controller combination

## Constant torque applications (switching frequency 2 kHz)

Supply voltage : 400 V  $\pm$  15 % and 460 V  $\pm$  15 %, 50 Hz  $\pm$  5 % or 60 Hz  $\pm$  5 %

Speed controller		Motor power rating		Line current	Controller nominal current (Inv)	Controller maximum transient current (60 s)	Total power dissipated at nominal load
Reference	Power	400 V 50 Hz	460 V 60 Hz				
	kVA	kW	HP	A	A	A	W
<b>ATV-66D54N4</b>	54	37	–	94	79.2	108	1159
		–	50	92	65	97.5	885
<b>ATV-66D64N4</b>	64	45	–	110	93.5	127.5	1374
		–	60	105	77	115.5	1055
<b>ATV-66D79N4</b>	79	55	–	130	115.5	157.5	1610
		–	75	128	96	144	1270
<b>ATV-66C10N4</b>	100	75	–	171	151.8	207	2175
		–	100	173	124	186	
<b>ATV-66C13N4</b>	130	90	–	198	187	258	2525
		–	125	211	156	234	1952
<b>ATV-66C15N4</b>	150	110	–	237	226	307.5	3000
		–	150	246	180	270	2251
<b>ATV-66C19N4</b>	190	132	–	275	270	367.5	3500
		–	200	314	240	360	3067
<b>ATV-66C23N4</b>	230	160	–	326	330	450	
		–	250	379	300	450	4483
<b>ATV-66C28N4</b>	280	200	–	399	407	555	
		–	300	441	360	540	5246
<b>ATV-66C31N4</b>	310	220	–	421	448.8	612	
		–	350	506	420	630	5966

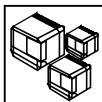


# Motor-speed controller combination

## Variable torque applications (switching frequency 4 kHz)

Supply voltage : 400 V  $\pm$  15 % and 460 V  $\pm$  15 %, 50 Hz  $\pm$  5 % or 60 Hz  $\pm$  5 %

Speed controller		Motor power rating		Line current	Controller nominal current (Inv)	Controller maximum transient current (60 s)	Total power dissipated at nominal load
Reference	Power	400 V 50 Hz	460 V 60 Hz				
	kVA	kW	HP	A	A	A	W
<b>ATV-66U41N4</b> <a href="#">(see page 3)</a>	4.9	0.75	–	4	2	2.2	97
		–	1	3.5	1.8	2	90
		1.5	–	6.5	3.7	4	118
		–	2	6	3.4	3.8	110
		2.2	–	9	5.3	5.8	130
		–	3	9	4.8	5.3	
		3	–	12	7.1	7.8	164
<b>ATV-66U54N4</b>	6.5	4	–	16	9.5	10.5	196
		–	5	12	7.6	8.4	180
<b>ATV-66U72N4</b>	8.2	5.5	–	20	11.8	13	230
		–	7.5	18	11	12.1	205
<b>ATV-66U90N4</b>	11	7.5	–	25	16	17.6	295
		–	10	23	14	15.4	265
<b>ATV-66D12N4</b>	15.2	11	–	36	22	24.2	384
		–	15	34	21	23.1	350
<b>ATV-66D16N4</b>	20.7	15	–	45	30	33	487
		–	20	43	27	29.7	480
<b>ATV-66D23N4</b>	28	18.5	–	57	37	40.7	620
		–	25	54	34	37.4	560
<b>ATV-66D33N4</b>	42	22	–	60	44	48.4	600
		–	30	59	40	44	
		30	–	79	60	66	860
		–	40	75	52	57.2	800
<b>ATV-66D46N4</b>	50	37	–	94	72	79.2	1069
		–	50	90	65	71.5	910

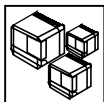


# Motor-speed controller combination

## Variable torque applications (switching frequency 2 kHz)

Supply voltage : 400 V  $\pm$  15 % and 460 V  $\pm$  15 %, 50 Hz  $\pm$  5 % or 60 Hz  $\pm$  5 %

Speed controller		Motor power rating		Line current	Controller nominal current (Inv)	Controller maximum transient current (60 s)	Total power dissipated at nominal load
Reference	Power	400 V 50 Hz	460 V 60 Hz				
	kVA	kW	HP	A	A	A	W
<b>ATV-66D54N4</b>	59	45	–	112	85	93.5	1171
		–	60	107	77	84,7	960
<b>ATV-66D64N4</b>	73	55	–	130	105	115.5	1374
		–	75	128	96	105.6	1150
<b>ATV-66D79N4</b>	99	75	–	176	138	151.8	1760
		–	100	166	124	136.4	1400
<b>ATV-66C10N4</b>	119	90	–	199	170	187	2400
		–	125	210	156	171	
<b>ATV-66C13N4</b>	140	110	–	238	205	226	2800
		–	150	246	180	198	
<b>ATV-66C15N4</b>	170	132	–	278	245	270	3300
		–	200	314	240	264	
<b>ATV-66C23N4</b>	208	160	–	336	300	330	
		–	250	379	300	330	4483
<b>ATV-66C23N4</b>	257	200	–	399	370	407	
		–	300	443	360	396	5246
<b>ATV-66C28N4</b>	283	220	–	428	408	449	
		–	350	506	420	462	5966
<b>ATV-66C31N4</b>	319	250	–	472	460	506	
		–	400	571	477	525	6624



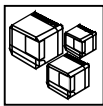
# Motor-speed controller combination

Low noise variable torque applications (switching frequency 10 kHz)

Supply voltage : 400 V  $\pm$  15 % and 460 V  $\pm$  15 %, 50 Hz  $\pm$  5 % or 60 Hz  $\pm$  5 %

Speed controller		Motor power rating		Line current	Controller nominal current (Inv)	Controller maximum transient current (60 s)	Total power dissipated at nominal load
Reference	Power	400 V 50 Hz	460 V 60 Hz				
	kVA	kW	HP	A	A	A	W
<b>ATV-66U41N4</b> <a href="#">(see page 3)</a>	3.6	0.75	–	4	2	2.2	111
		–	1	3.5	1.8	2	90
		1.5	–	6.5	3.7	4	142
		–	2	6	3.4	3.8	110
		2.2	–	9	5.3	5.8	174
		–	3	9	4.8	5.3	130
<b>ATV-66U54N4</b>	4.9	3	–	13	7.1	7.8	210
<b>ATV-66U72N4</b>	6.5	4	–	15	9.5	10.5	258
		–	5	12	7.6	8.4	180
<b>ATV-66U90N4</b>	8.1	5.5	–	20	11.8	13	311
		–	7.5	18	11	12.1	205
<b>ATV-66D12N4</b>	11	7.5	–	26	16	17.6	398
		–	10	23	14	15.4	265
<b>ATV-66D16N4</b>	15	11	–	35	22	24.2	490
		–	15	34	21	23.1	350
<b>ATV-66D23N4</b>	20	15	–	45	30	33	614
		–	20	43	27	29.7	480
<b>ATV-66D33N4</b>	30	22	–	60	44	48.4	796
		–	30	59	40	44	600
<b>ATV-66D46N4</b>	41	30	–	78	60	66	1182
		–	40	75	52	57.2	800





# Motor-speed controller combination

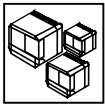
## Low noise variable torque applications (switching frequency 4 kHz)

Supply voltage : 400 V  $\pm$  15 % and 460 V  $\pm$  15 %, 50 Hz  $\pm$  5 % or 60 Hz  $\pm$  5 %

Speed controller		Motor power rating		Line current	Controller nominal current (Inv)	Controller maximum transient current (60 s)	Total power dissipated at nominal load
Reference	Power	400 V 50 Hz	460 V 60 Hz				
	kVA	kW	HP	A	A	A	W
<b>ATV-66D54N4</b>	49	37	–	94	72	79.2	1096
		–	50	90	65	71.5	910
<b>ATV-66D64N4</b>	58	45	–	110	85	93.5	1292
		–	60	107	77	84.7	960
<b>ATV-66D79N4</b>	73	55	–	130	105	115.5	1433
		–	75	128	96	105.6	1150

### Note

**ATV-66C10N4 to C31N4** speed controllers are not designed for low noise variable torque applications with high switching frequency.

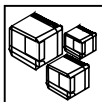


# Motor-speed controller combination

## Constant torque applications (switching frequency 4 kHz)

Supply voltage : 208 V - 10 % to 230 V + 15 %, 50 Hz  $\pm$  5 % or 60 Hz  $\pm$  5 %

Speed controller		Motor power rating		Line current	Controller nominal current (Inv)	Controller maximum transient current (60 s)	Total power dissipated at nominal load
Reference	Power	208 V 50/60 Hz					
		kVA	kW	HP	A	A	A
<b>ATV-66U41M2</b>	4,2	2,2	3	14,7	11,7	15,9	170
<b>ATV-66U72M2</b>	6,6	4	5	24,2	18,4	25	239
<b>ATV-66U90M2</b>	9,6	5,5	7,5	32	26,6	37	354
<b>ATV-66D12M2</b>	12,2	7,5	10	41	34	47	437
<b>ATV-66D16M2</b>	18,3	11	15	57	51	70	589
<b>ATV-66D23M2</b>	23,5	15	20	71	66	89	728
<b>ATV-66D33M2</b>	34,9	22	30	97	97	132	1052
<b>ATV-66D46M2</b>	45,3	30	40	126	126	172	1439

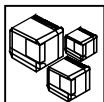


## Motor-speed controller combination

### Variable torque applications (switching frequency 4 kHz)

Supply voltage : 208 V - 10 % to 230 V + 15 %, 50 Hz  $\pm$  5 % or 60 Hz  $\pm$  5 %

Speed controller		Motor power rating		Line current	Controller nominal current (Inv)	Controller maximum transient current (60 s)	Total power dissipated at nominal load
Reference	Power	208V 50/60 Hz					
	kVA	kW	HP	A	A	A	W
<b>ATV-66U41M2</b>	6	3	5	19,1	16,7	18,4	192
<b>ATV-66U72M2</b>	8,7	5,5	7,5	32	24,2	26,6	302
<b>ATV-66U90M2</b>	11,1	7,5	10	41	31	34	414
<b>ATV-66D12M2</b>	16,6	11	15	56	47	51	559
<b>ATV-66D23M2</b>	21,4	15	20	72	60	66	770
<b>ATV-66D23M2</b>	27	18,5	25	86	75	83	831
<b>ATV-66D33M2</b>	41,2	30	40	125	116	126	1260
<b>ATV-66D46M2</b>	51,5	37	50	151	143	158	1528



## Motor-speed controller combination

Low noise variable torque applications (switching frequency 10 kHz)

Supply voltage : 208 V - 10 % to 230 V + 15 %, 50 Hz  $\pm$  5 % or 60 Hz  $\pm$  5 %

Speed controller		Motor power rating		Line current	Controller nominal current (Inv)	Controller maximum transient current (60 s)	Total power dissipated at nominal load
Reference	Power	208V 50/60 Hz					
	kVA	kW	HP	A	A	A	W
<b>ATV-66U41M2</b>	3,8	2,2	3	14,8	10,6	11,7	181
<b>ATV-66U72M2</b>	6	4	5	24,3	16,7	18,4	252
<b>ATV-66U90M2</b>	8,7	5,5	7,5	32	24,2	26,6	375
<b>ATV-66D12M2</b>	11,1	7,5	10	41	31	34	459
<b>ATV-66D16M2</b>	16,6	11	15	57	47	51	619
<b>ATV-66D23M2</b>	21,4	15	20	71	60	66	785
<b>ATV-66D33M2</b>	31,7	22	30	98	88	97	1127
<b>ATV-66D46M2</b>	41,2	30	40	126	115	126	1332



# Available torque

## Continuous operation

For naturally ventilated motors, motor cooling is linked to speed. This leads to derating for speeds which are below half the nominal speed.

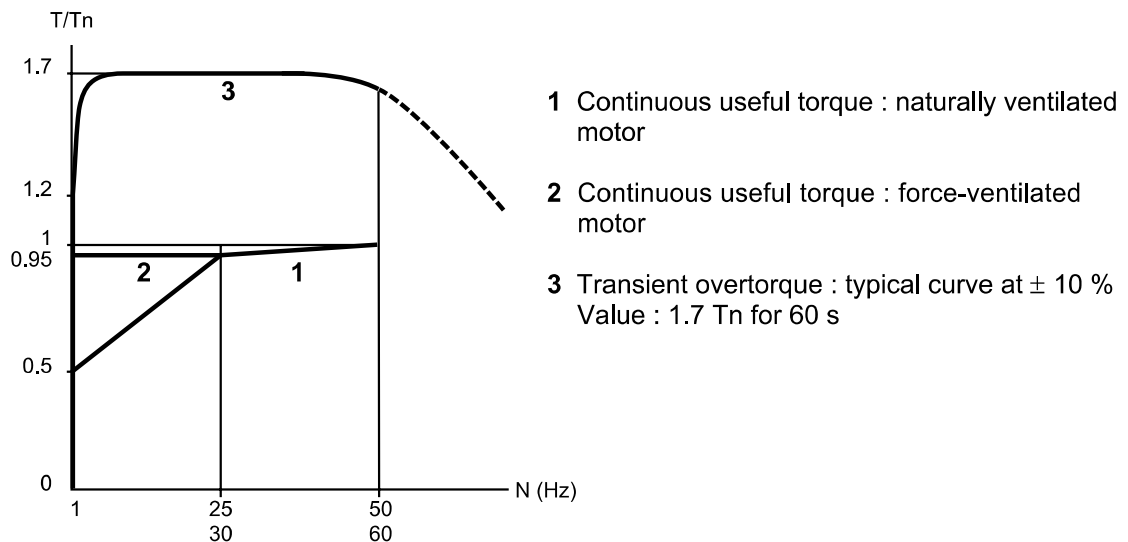
## Transient operation

The overtorque depends on the maximum transient current which the speed controller can supply. On starting : up to  $2 I_n$  for 0.2 s

## Overspeed operation

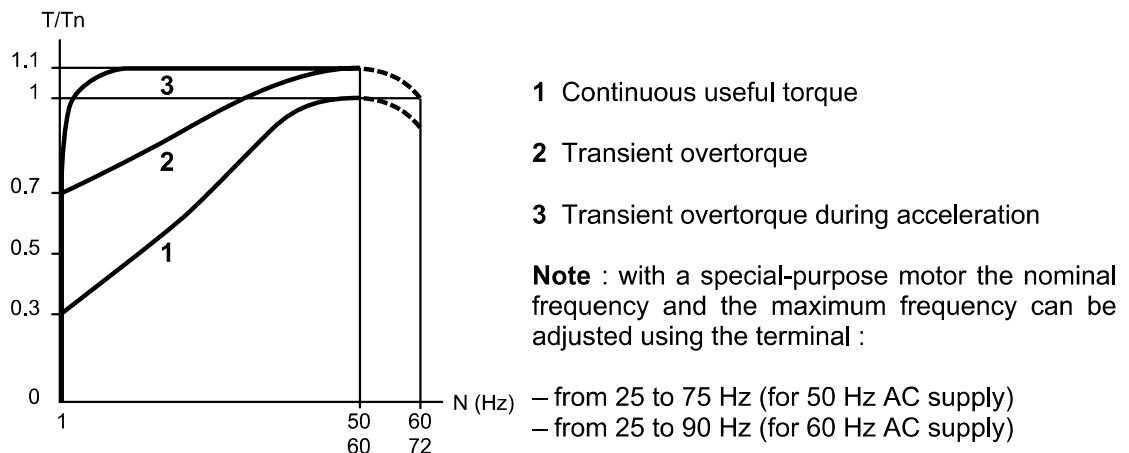
As the voltage can no longer vary as the frequency when the rated speed is exceeded, leading to a decrease in motor induction which results in a loss of torque. Check with the manufacturer that the motor can operate at overspeed.

## Constant torque applications : torque characteristics



Note : The rated and maximum frequencies can be controlled.  
 – from 25 to 400 Hz for ATV-66U41N4 to D79N4 controllers,  
 and ATV-66U41M2 to D46M2 controllers.  
 – from 25 to 200 Hz for ATV-66C10N4 and C31N4 controllers.

## Variable torque applications : torque characteristics





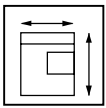
## Characteristics

<b>Output voltage</b>	Maximum voltage equal to that of AC supply voltage
<b>Frequency range</b>	0.1 to 50/60 Hz Extension possible : – up to 200/400 Hz for constant torque application – up to 75/90 Hz for variable torque application
<b>Frequency resolution</b>	0.05 Hz with analog reference signal at HSP = 50 Hz (10 bits) 0.015 Hz with digital reference signal (12 bits + sign)
<b>Acceleration and deceleration ramps</b>	Individually adjustable from 0.1 to 999.9 s (resolution 0.1 s) Automatic adaptation of the ramp times in the event of the torque capacity being exceeded
<b>Main protective and safety devices of the speed controller</b>	Protection against short-circuits : – between output phases – between output phases and earth (ground) – on internal supply outputs – on logic and analog outputs Thermal protection against overheating AC supply overvoltage and undervoltage protection Protection in the event of an AC supply phase fault
<b>Motor protection</b>	Integrated electronic thermal protection (calculation of $I^2t$ taking frequency into account) Memorization of motor thermal state Protection against phase faults
<b>Degree of protection</b>	IP 30 – NEMA type 1 cover closed, IP 20 cover open : controllers ATV-66U41N4 to D79N4 and ATV-66U41M2 to D46M2 IP 30 - NEMA type 1 cover closed, IP 00 cover open : controllers ATV-66C10N4 to C19N4 IP 00 controller ATV-66C23N4 to C31N4
<b>Ambient air temperature</b>	Operation : 0 °C to + 40 °C ATV-66U41N4 to D79N4 and ATV-66U41M2 to D46M2 : operation possible up to + 60 °C with ventilation kit and current derating of 2,2% per °C between + 40 °C and + 60 °C Storage : - 25 °C to + 70 °C



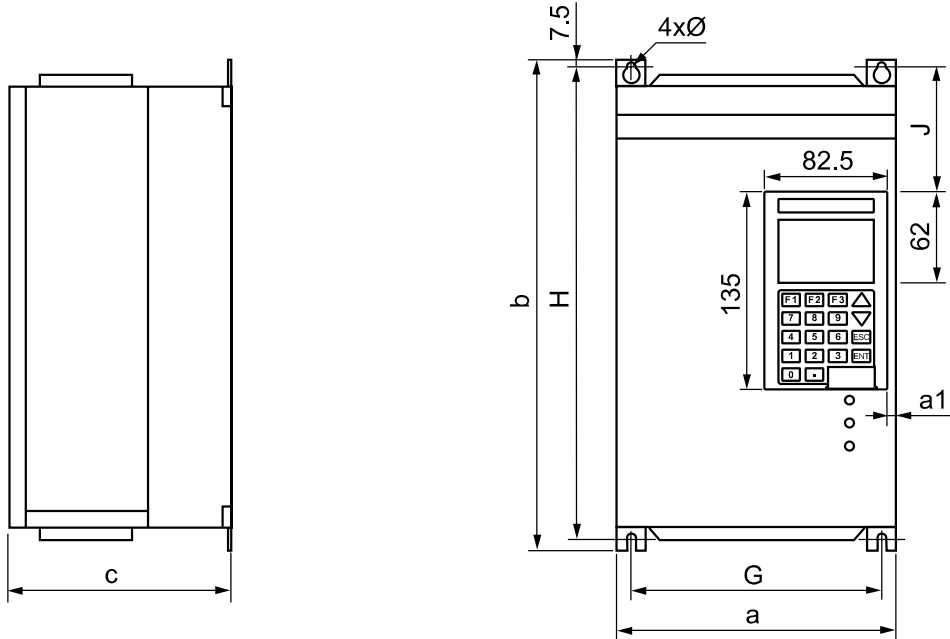
## Characteristics

<b>Maximum operating altitude</b>	1000 m without derating (above this, derate the current by 1 % for each additional 100 m)
<b>Maximum relative humidity</b>	93 % without condensation or dripping water, conforming to IEC 68-2-3
<b>Degree of pollution</b>	Degree 3 conforming to IEC 664-1
<b>Vibration resistance</b>	Conforming to IEC 68-2-6 : – 1.5 mm peak to peak from 3 to 13 Hz– 1mm from 13 to 22.3 Hz and 2 gn from 22.3 to 150 Hz : ATV-66U41N4 to D23N4 and ATV-66U41M2 to D16M2 – 1.5 mm peak to peak from 3 to 13 Hz and 1 gn from 13 to 150 Hz : ATV-66D33N4 to D79N4 and ATV-66D23M2 to D46M2 speed controllers – 0.15 mm from 10 to 58 Hz and 1 gn from 58 to 150 Hz : ATV-66C10N4 to C31N4
<b>Shock resistance</b>	Conforming to IEC 68-2-27 : 15 g, 11 ms

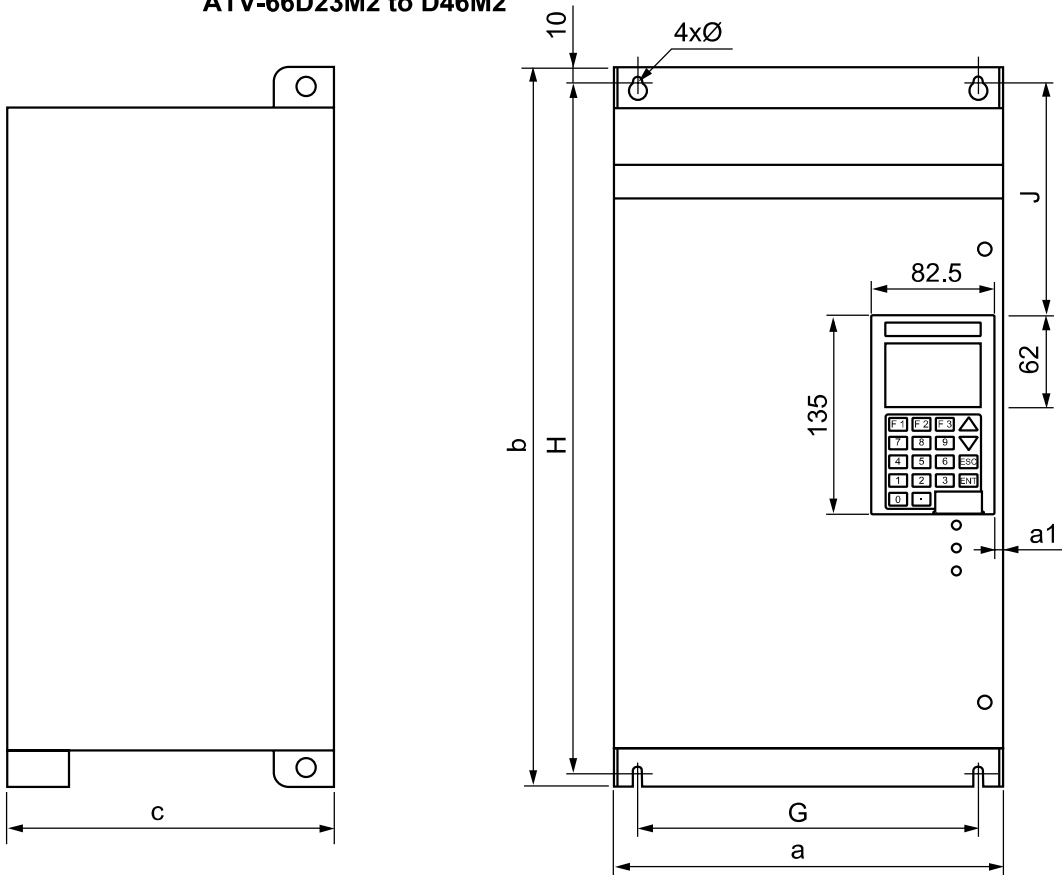


# Dimensions

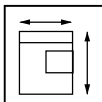
Sizes 1 to 3 : ATV-66U41N4 to D23N4  
ATV-66U41M2 to D16M2



Sizes 4 and 5 : ATV-66D33N4 to D79N4  
ATV-66D23M2 to D46M2

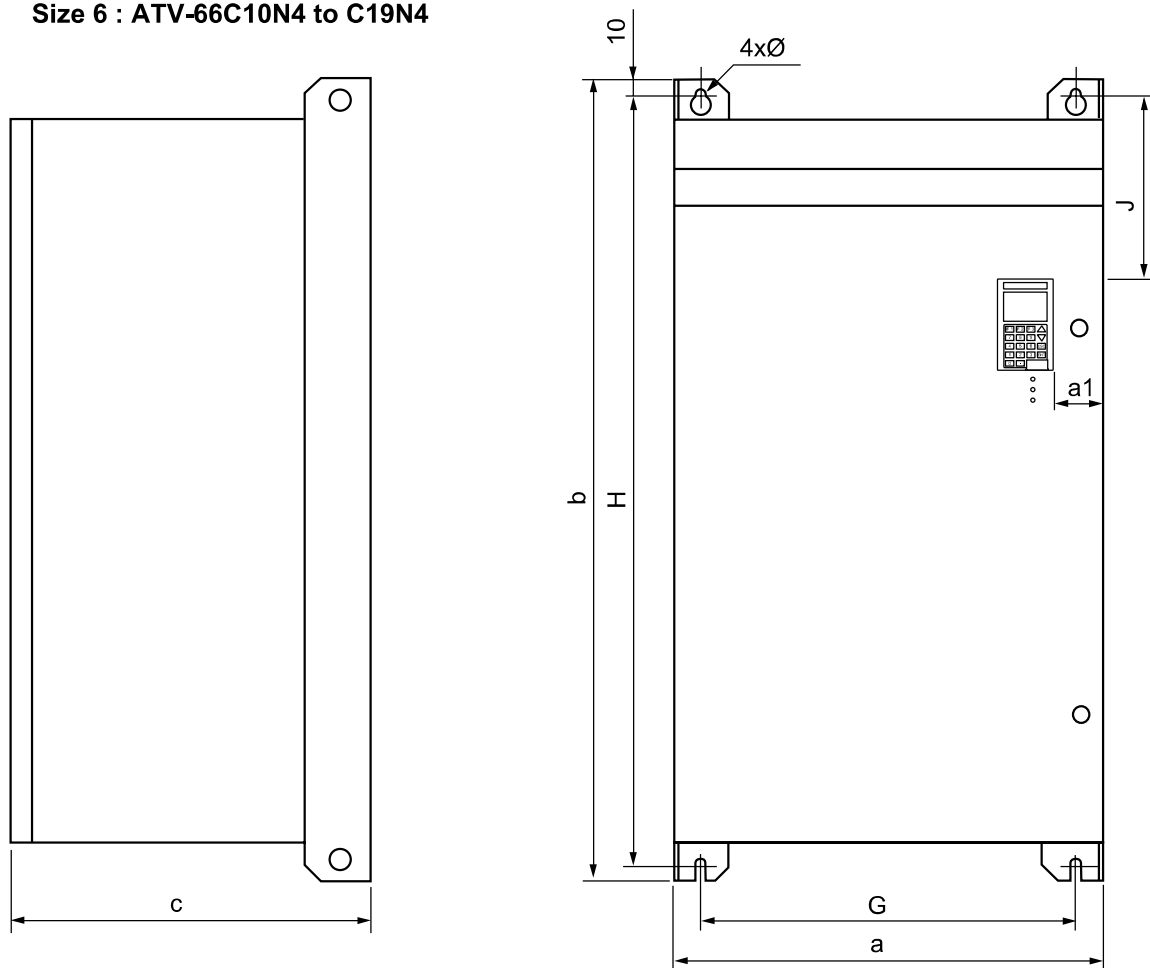




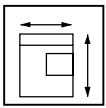


# Dimensions

Size 6 : ATV-66C10N4 to C19N4

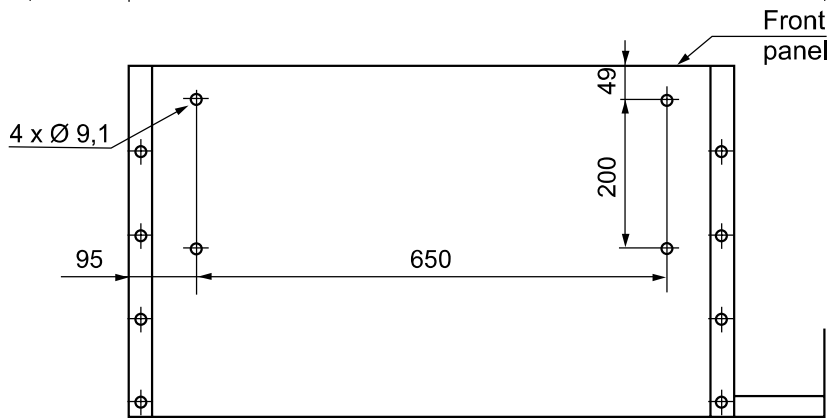
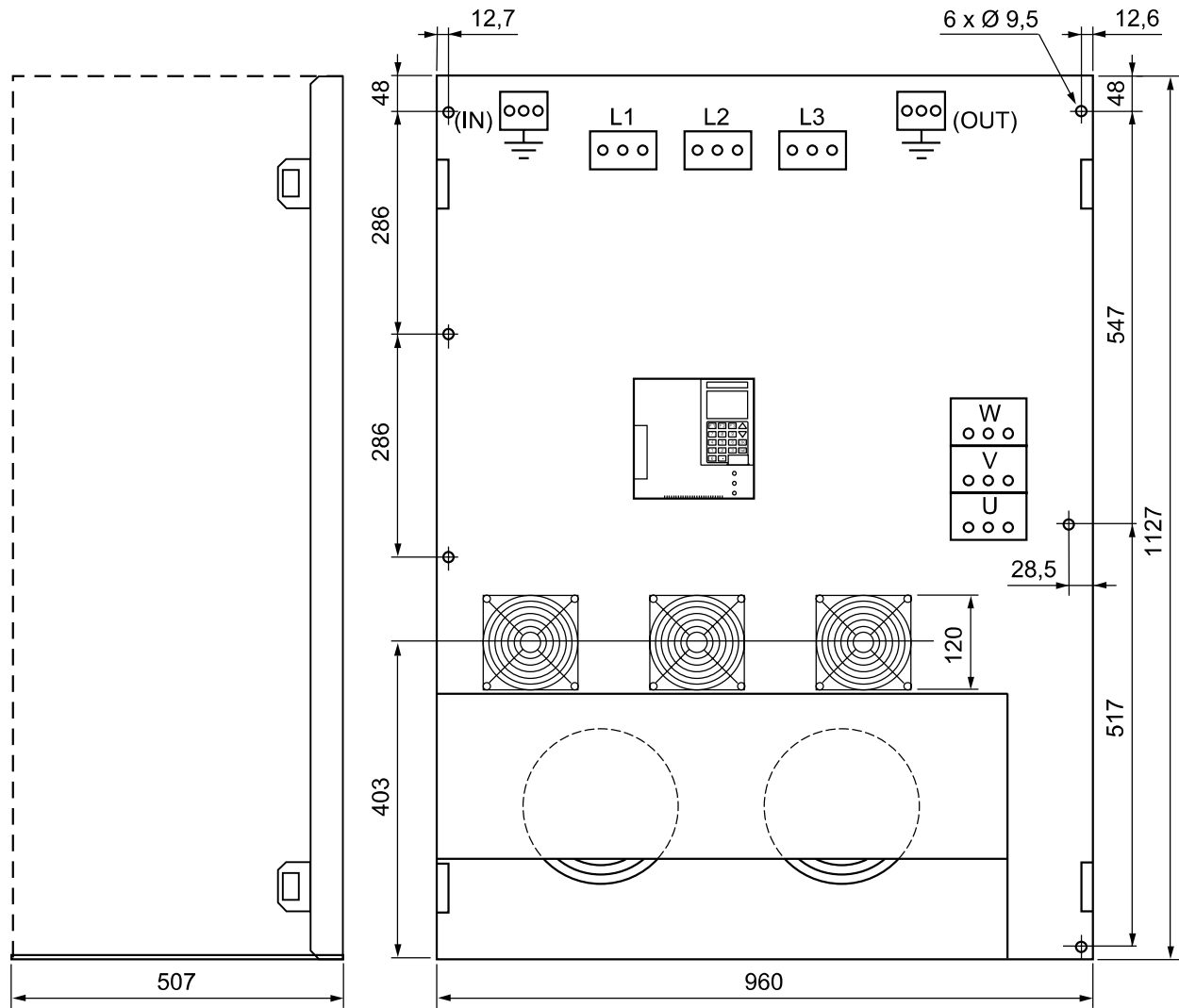


Size	Altivar reference	a mm	b mm	c mm	G mm	H mm	J mm	Ø mm	a1 mm	Weight kg
1	ATV-66U41N4 ATV-66U54N4 ATV-66U72N4 ATV-66U41M2	200	295	165	175	278	35.4	5.5	6	4.7
2	ATV-66U90N4 ATV-66D12N4 ATV-66U72M2 ATV-66U90M2	234	325	195	209	308	44.3	5.5	6	7.3
3	ATV-66D16N4 ATV-66D23N4 ATV-66D12M2 ATV-66D16M2	234	416	245	209	398	79	5.5	6	14
4	ATV-66D33N4 ATV-66D46N4 ATV-66D23M2 ATV-66D33M2	243	600	280	205	580	116.4	7	12	27
5	ATV-66D54N4 ATV-66D64N4 ATV-66D79N4 ATV-66D46M2	350	650	300	300	620	121.4	9	12	40 41 41 41
6	ATV-66C10N4 ATV-66C13N4 ATV-66C15N4 ATV-66C19N4	585	980	370	525	960	205	11	70	127 136 136 136



# Dimensions

Size 7 : ATV-66C23N4 to C31N4



Bottom view

Weight : 255 kg

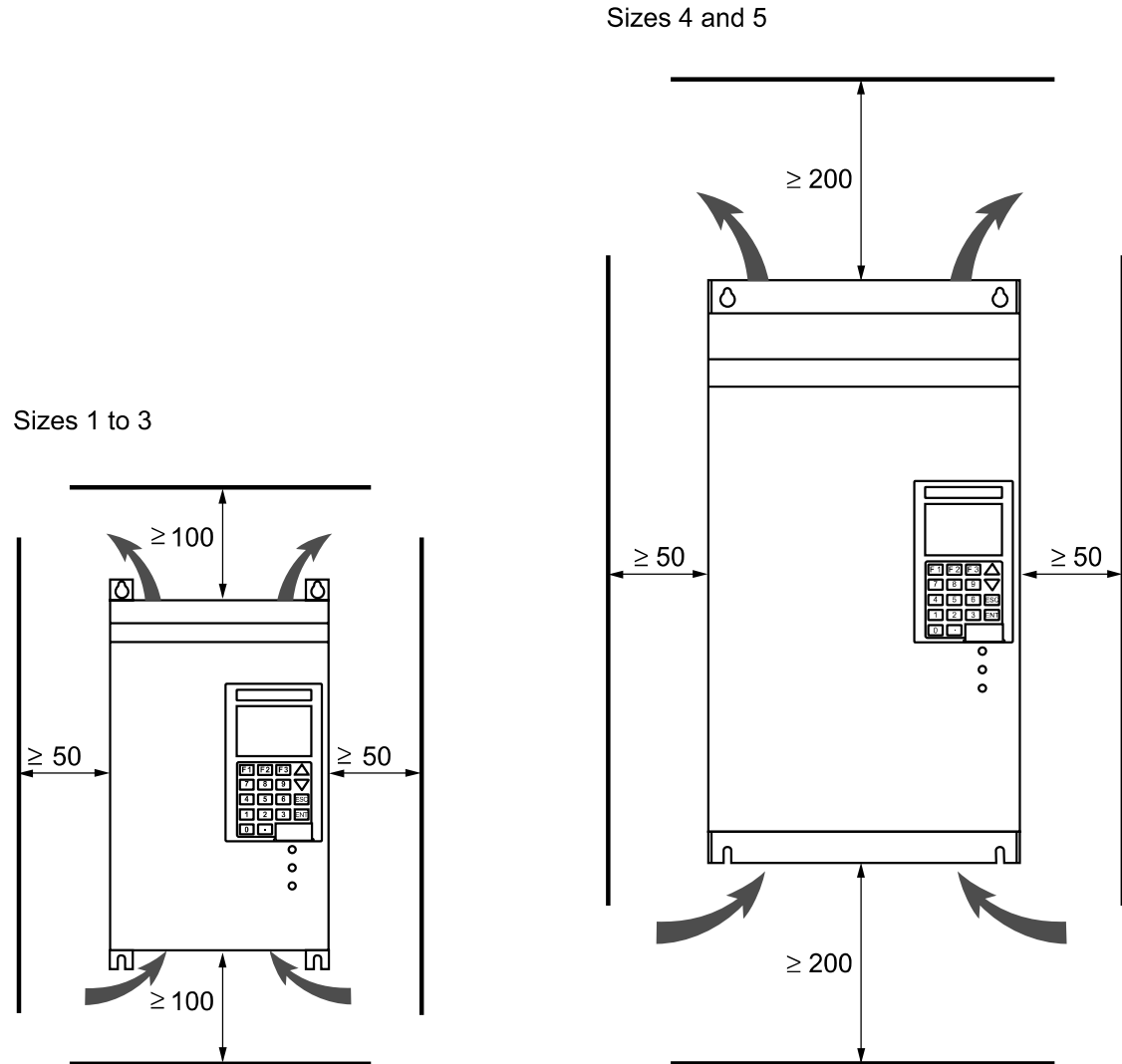


## Mounting recommendations (sizes 1 to 5)

Install the device vertically.

Do not place it close to heating elements.

Leave sufficient clearance to allow circulation of air necessary for cooling. Ventilation is from the bottom to the top of the device.



### Ventilating fan flow rates

ATV-66U41N4 and U54N4 (size 1)	: 5 dm <sup>3</sup> /s
ATV-66U72N4, ATV-66U41M2 (size 1)	: 10 dm <sup>3</sup> /s
ATV-66U90N4 and D12N4, ATV-66U72M2 and U90M2 (size 2)	: 22 dm <sup>3</sup> /s
ATV-66D16N4 and D23N4, ATV-66D12M2 and D16M2 (size 3)	: 47 dm <sup>3</sup> /s
ATV-66D33N4 to D79N4, ATV-66D23M2 to D46M2 (sizes 4 and 5)	: 100 dm <sup>3</sup> /s

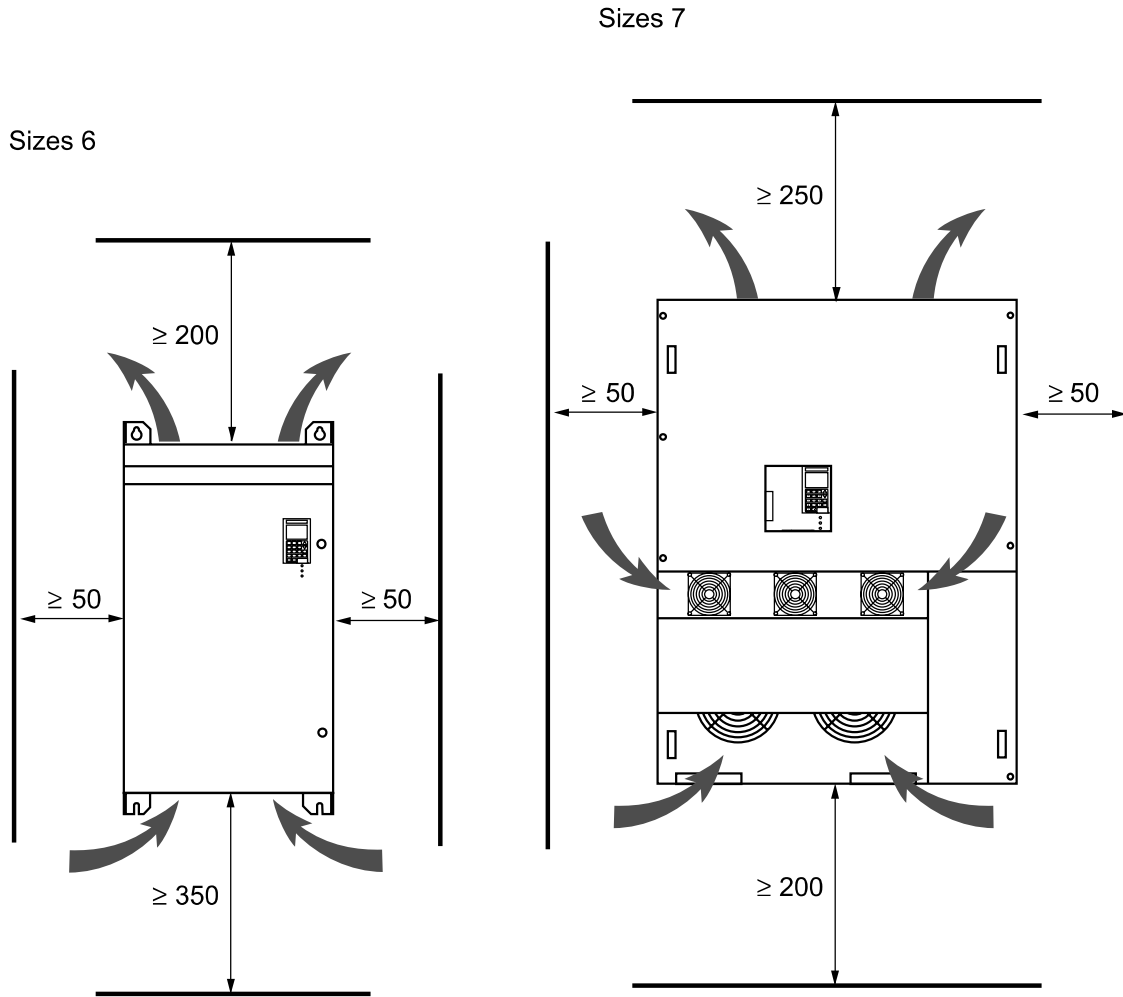


## Mounting recommendations (sizes 6 and 7)

Install the device vertically.

Do not place it close to heating elements.

Maintain enough clearance for the cooling air flow that a fan provides from bottom to top for Size 6 unit and from the bottom of the front panel to the top for Size 7 unit.



### Ventilating fan flow rates

ATV-66C10N4 to C19N4 (size 6) : 250 dm<sup>3</sup>/s

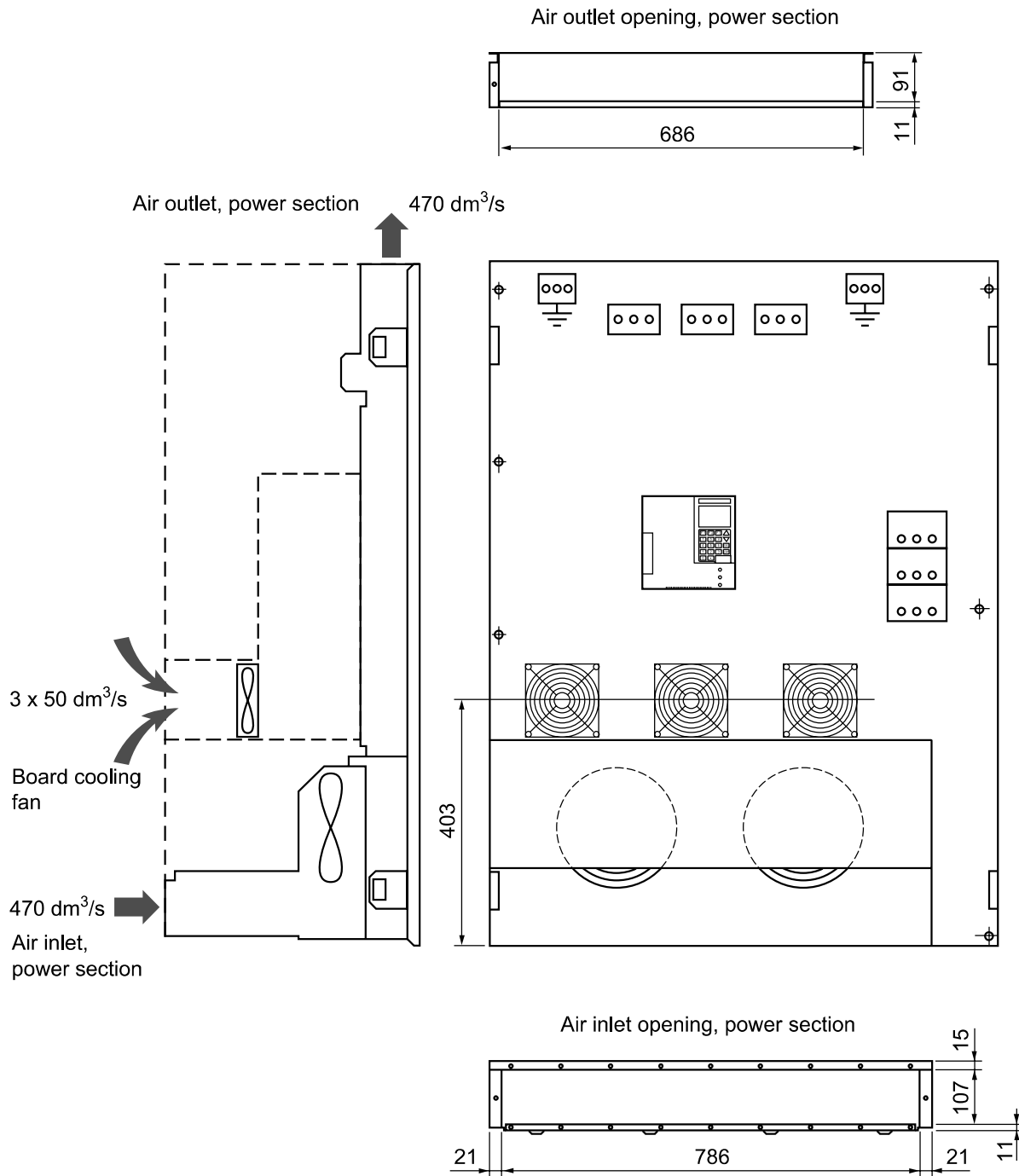
ATV-66C23N4 to C31N4 (size 7) : 470 dm<sup>3</sup>/s

Recommendation for installing a Size 7 unit in a cabinet : A clearance greater than 250 mm should be provided between the VSC and the cabinet walls for easier routing of cables and easier access to the unit.



## Mounting recommendations (size 7)

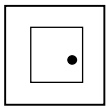
Principle of forced-air cooling in IP 00



Recommendation : Hot air must be exhausted to the outside.



The IP00 version of the Altivar 66 Size 7 unit must be equipped with a protective barrier to ensure personnel safety against electric shocks.



# Mounting in a wall-fixing or floor-standing enclosure

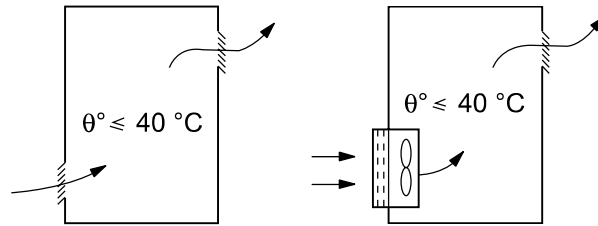
## Metal enclosure, degree of protection IP 23 or IP 54

Observe the mounting recommendations given on [pages 19 to 21](#).

To ensure adequate air circulation

inside the speed controller :

- provide ventilation louvres,
- check that the ventilation is adequate. If not fit a forced ventilation unit with a filter,
- use special filters at IP 54.



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

Under certain environmental conditions the speed controller must be mounted in a dust and damp proof enclosure : dust, corrosive gas, high humidity with a risk of condensation or dripping water, splashing liquid, etc.

Observe the mounting recommendations given on [pages 19 to 21](#).

To avoid hot spots in the speed controller, add a ventilation kit to circulate the air inside the device.

This arrangement makes it possible to use the speed controller in an enclosure whose maximum internal temperature can reach 60 °C.

### Warning

In this case, derate the speed controller nominal current by 2.2 % for each °C above 40 °C.

Ventilation kit references : **VW3-A66821** for ATV-66U41N4 to U72N4  
ATV-66U41M2 (size 1)

**VW3-A66822** for ATV-66U90N4 to D23N4  
ATV-66U72M2 to D16M2 (sizes 2 and 3)

**VW3-A66824** for ATV-66D33N4 to D46N4  
ATV-66D23M2 to D33M2 (size 4)

**VW3-A66825** for ATV-66D54N4 to D79N4  
ATV-66D46M2 (size 5)

### Calculating the size of the enclosure

Maximum thermal resistance Rth (°C/W) :

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

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

Power dissipated by the speed controller : [see pages 4 to 12](#).

Add the power dissipated by the other component parts of the device.

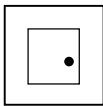
Useful heat exchange surface of the enclosure S (m<sup>2</sup>) :  
(sides + upper surface + front panel, when wall mounted)

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

K = thermal resistance per m<sup>2</sup> of enclosure.

For a metal enclosure : K = 0.12 with internal fan,  
K = 0.15 with no fan.

**Warning** : do not use insulated enclosures, as they have a poor level of conductivity.



## Mounting in a wall-fixing or floor-standing enclosure

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### Flush mounting (sizes 1 to 3)

To reduce the power dissipated in the enclosure, the speed controller can be flush mounted, with the heatsink on the outside. This necessitates making a cut-out in the rear of the enclosure and using a mounting kit which comprises : dust and damp proof gaskets, leaflet and a cut-out drawing.

IP 54 kit references : **VW3-A66801** for ATV-66U41N4 to U72N4  
ATV-66U41M2 (size 1)  
**VW3-A66802** for ATV-66U90N4 and D12N4  
ATV-66U72M2 to U90M2 (size 2)  
**VW3-A66803** for ATV-66D16N4 and D23N4  
ATV-66D12M2 to D16M2 (size 3)

### Mounting as an air heat exchanger with the exterior (sizes 1 to 5)

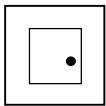
To reduce the power dissipated in the enclosure, the speed controller can be fitted with adaptors which enable the ventilation fan to draw in cool air at the bottom of the controller and evacuate hot air at the top.

This necessitates making a two cut-outs in the rear of the enclosure and using a mounting kit which comprises : adaptors, dust and damp proof gaskets, leaflet and a cut-out drawing.

Kit references : **VW3-A66811** for ATV-66U41N4 to U72N4  
ATV-66U41M2 (size 1)  
**VW3-A66812** for ATV-66U90N4 and D12N4  
ATV-66U72M2 and U90M2 (size 2)  
**VW3-A66813** for ATV-66D16N4 and D23N4  
ATV-66D12M2 and D16M2 (size 3)  
**VW3-A66814** for ATV-66D33N4 and D46N4  
ATV-66D23M2 and D33M2 (size 4)  
**VW3-A66814** for ATV-66D54N4 to D79N4  
ATV-66D46M2 (size 5)

With each of these mounting methods, the maximum internal temperature in the enclosure can reach 60 °C without having to derate the speed controller current. To avoid hot spots, use the ventilation kit to circulate the air inside the speed controller.

**Note** : with each of these mounting methods, the heatsink and ventilation fan outside the enclosure remains protected to IP 30.



## Mounting in a wall-fixing or floor-standing enclosure

Power dissipated by the speed controller in the enclosure using one of the mounting methods			
Altivar reference	Power in W	Altivar reference	Power in W
<b>ATV-66U41N4</b>	70	<b>ATV-66U41M2</b>	70
<b>ATV-66U54N4</b>	70	<b>ATV-66U72M2</b>	70
<b>ATV-66U72N4</b>	70	<b>ATV-66U90M2</b>	110
<b>ATV-66U90N4</b>	75	<b>ATV-66D12M2</b>	130
<b>ATV-66D12N4</b>	75	<b>ATV-66D16M2</b>	130
<b>ATV-66D16N4</b>	110	<b>ATV-66D23M2</b>	145
<b>ATV-66D23N4</b>	130	<b>ATV-66D33M2</b>	200
<b>ATV-66D33N4</b>	130	<b>ATV-66D46M2</b>	200
<b>ATV-66D46N4</b>	145		
<b>ATV-66D54N4</b>	198		
<b>ATV-66D64N4</b>	200		
<b>ATV-66D79N4</b>	210		

### Possibility of condensation

If the device is left switched off for long periods, a heating system must be provided (0.2 to 0.5 W per 10 cm<sup>2</sup> of the enclosure) which switches on automatically as soon as the device stops.

This device keeps the inside of the enclosure at a temperature slightly above the external temperature, and avoids any risk of condensation or dripping water while the device is switched off.

Alternative solution : keep the device powered up when it is stopped (the heat of the device itself when it is powered up is generally sufficient to provide this difference in temperature).





## Access to terminal blocks (sizes 1 to 5)

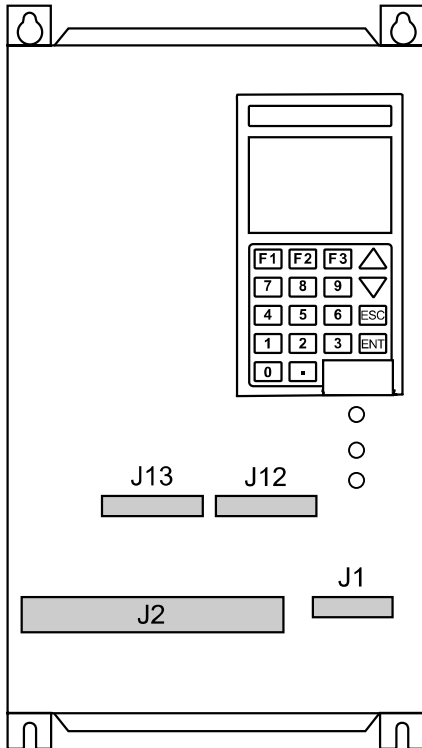
The protective cover is attached to the front panel of the Altivar in the following way :

- Sizes 1 to 3 : clip-on attachment,
- Sizes 4 and 5 : using 2 captive screws.

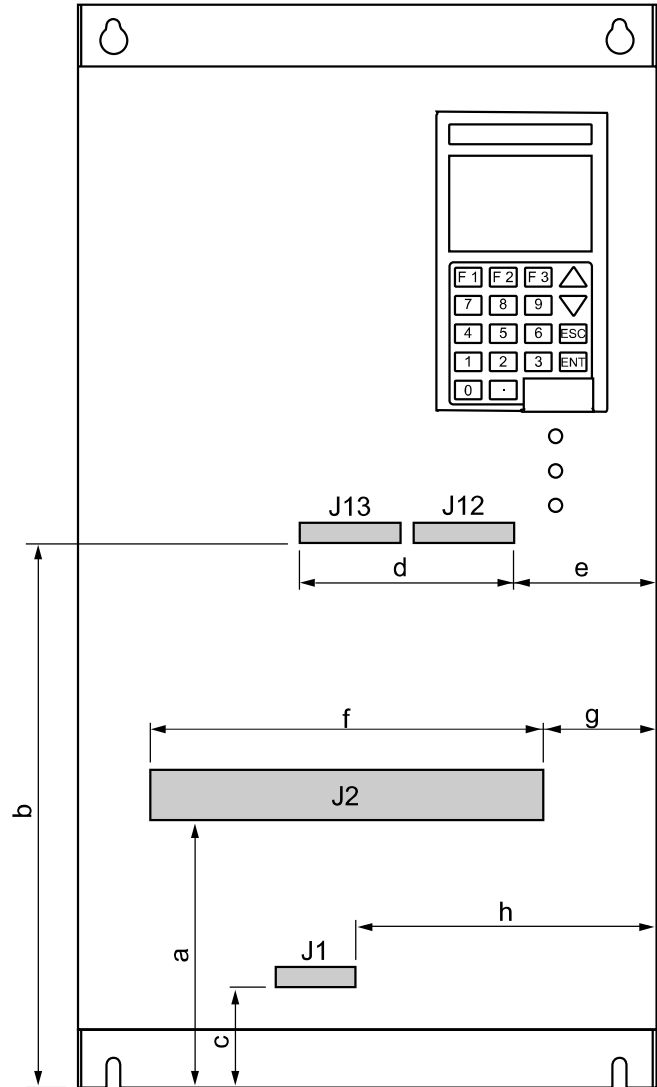
To access the terminal blocks, detach the cover and pivot it from right to left.

### Location of the terminal blocks

Sizes 1 to 3



Sizes 4 and 5

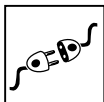


	a mm	b mm	c mm	d mm	e mm	f mm	g mm	h mm
S4	110	300	80	100	60	180	40	180
S5	200	320	90	100	60	220	60	170

The connection cables enter through the base of the Altivar ([see page 37 and 38](#)) :

- sizes 1 to 3 : via holes which are fitted with cable glands in the insulating plate (attached with 2 screws), or via the opening created by the removal of this plate.
- sizes 4 and 5 : via holes which are fitted with cable glands in the metal plate or via the opening created by the removal of this plate.

When the plate is removed the degree of protection of the speed controller becomes IP 20.



# Power terminal blocks (sizes 1 to 5)

## Terminal blocks

J13 : control card analog I/O.  
 J12 : control card logic I/O.  
 J1 : relay logic outputs.  
 J2 : power terminal block.

J2 terminals	Function	Maximum connection capacity <i>Terminaltightening torque</i>				
		Size 1	Size 2	Size 3	Size 4	Size 5
	Earth (ground) terminal connected to Altivar earth	6 mm <sup>2</sup> <i>1,96 Nm</i>	6 mm <sup>2</sup> <i>1,96 Nm</i>	10 mm <sup>2</sup> <i>2,5 Nm</i>	35 mm <sup>2</sup> <i>4 Nm</i>	70 mm <sup>2</sup> <i>10 Nm</i>
CL1 CL2	Control and ventilation power supply	2.5 mm <sup>2</sup> <i>0,76 Nm</i>	2.5 mm <sup>2</sup> <i>0,76 Nm</i>	2.5 mm <sup>2</sup> <i>0,76 Nm</i>	2.5 mm <sup>2</sup> <i>0,76 Nm</i>	2.5 mm <sup>2</sup> <i>0,76 Nm</i>
L1 L2 L3	Power supply	2.5 mm <sup>2</sup> <i>0,76 Nm</i>	6 mm <sup>2</sup> <i>1,96 Nm</i>	10 mm <sup>2</sup> <i>2,5 Nm</i>	35 mm <sup>2</sup> <i>4 Nm</i>	70 mm <sup>2</sup> <i>10 Nm</i>
+ -	DC bus connection	2.5 mm <sup>2</sup> <i>0,76 Nm</i>	6 mm <sup>2</sup> <i>1,96 Nm</i>	10 mm <sup>2</sup> <i>2,5 Nm</i>	35 mm <sup>2</sup> <i>4 Nm</i>	70 mm <sup>2</sup> <i>10 Nm</i>
PA PB	Connection to the braking resistor	2.5 mm <sup>2</sup> <i>0,76 Nm</i>	6mm <sup>2</sup> <i>1,96 Nm</i>	6 mm <sup>2</sup> <i>1,96 Nm</i>	16 mm <sup>2</sup> <i>3 Nm</i>	35 mm <sup>2</sup> <i>4 Nm</i>
U/T1 V/T2 W/T3	Connection to the motor	2.5 mm <sup>2</sup> <i>0,76 Nm</i>	6 mm <sup>2</sup> <i>1,96 Nm</i>	10 mm <sup>2</sup> <i>2,5 Nm</i>	35 mm <sup>2</sup> <i>4 Nm</i>	70 mm <sup>2</sup> <i>10 Nm</i>
	Earth (ground) terminal connected to Altivar earth	6 mm <sup>2</sup> <i>1,96 Nm</i>	6 mm <sup>2</sup> <i>1,96 Nm</i>	10 mm <sup>2</sup> <i>2,5 Nm</i>	35 mm <sup>2</sup> <i>4 Nm</i>	70 mm <sup>2</sup> <i>10 Nm</i>

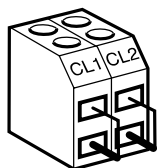
The Altivar is delivered in a configuration to ensure control of power by a circuit-breaker ([see diagram page 32](#)).

Terminals CL1-CL2 are connected to power supply L1-L2 via a strap.

Should the control power supply CL1-CL2 be supplied separately from the load power supply, it is then better to remove the tow straps so as to facilitate connection at terminals CL1-CL2 (see below).

– ATV-66U41N4 to D12N4 } Remove the straps between (CL1, CL2)  
 – ATV-66U41M2 to U90M2 } and (L1, L2)

– ATV-66D16N4 to D79N4 } Remove the straps at terminals CL1-CL2.  
 – ATV-66D12M2 to D46M2 } Unscrew the top section and then pull out the strap, leaving the bottom section simply plugged in.



**Remark :** For the gauges ATV-66033N4 to C31N4 or D23M2 to D46M2, the control power supply must always be present before the load power supply (where this is separate). The variator must not be in the following configuration : load power supply present, control power supply absent.

**Note :** if the load and control power supplies come from two separate networks with a common ground, make sure that the phases match between L1 and CL1, and between L2 and CL2.

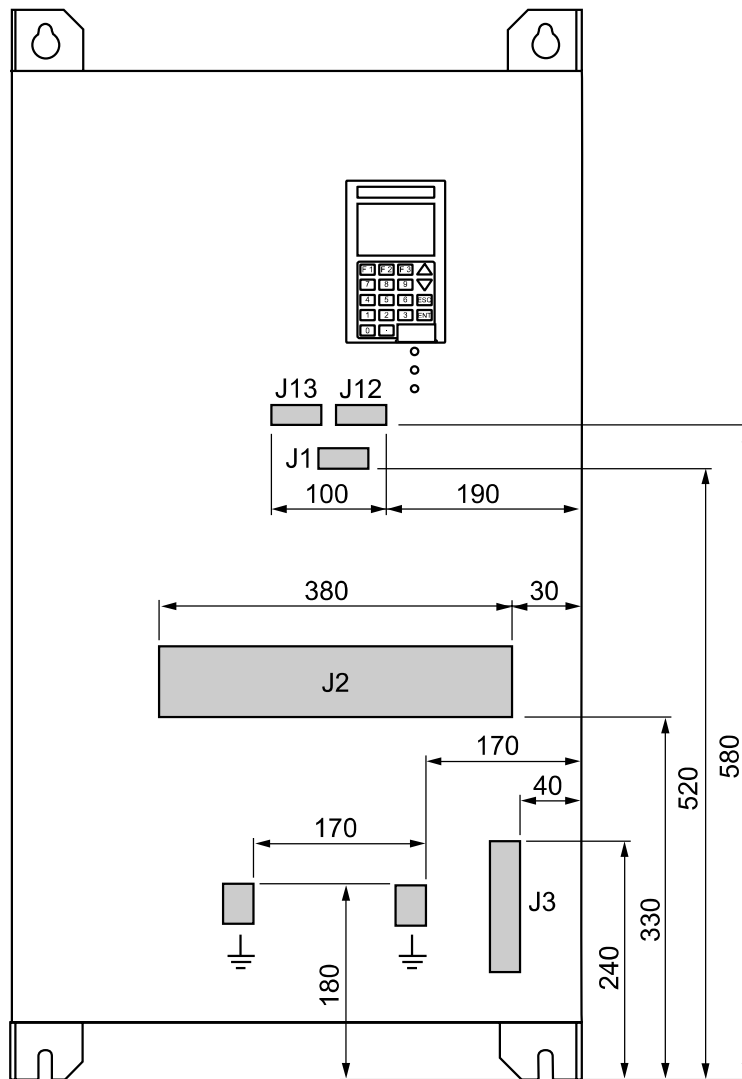


## Access to terminal blocks (size 6)

For size 6 Altivars, the metal protective cover on the front panel supports the graphic terminal and the 3 LED indicators. It is attached via two captive screws.

To access the terminal blocks, unscrew the cover and pivot it from right to left. Before doing this, read the instructions on the label on the right hand side of the speed controller.

### Location of terminal blocks



The connection cables enter through the base of the Altivar via holes which are fitted with cable glands in the metal plate or via the opening created by the removal of this plate ([see page 39](#)).

Inside the speed controller, there is a vertical insulating conduit on the right hand side to carry the control and signalling circuit wires.

When the plate is removed the degree of protection of the speed controller becomes IP 00.



# Power terminal blocks (size 6)

## Terminal blocks

J13 : control card analog I/O.  
 J12 : control card logic I/O.  
 J1 : relay logic outputs.  
 J2 and J3 : power terminal blocks.

J2 - terminals	Function	Maximum connection capacity <i>Terminaltightening torque</i>	
		ATV-66C10N4 and C13N4	ATV-66C15N4 and C19N4
L1 L2 L3	Power supply	120 mm <sup>2</sup> 36,7 Nm	185 mm <sup>2</sup> 36,7 Nm
+ -	DC bus connection	120 mm <sup>2</sup> 36,7 Nm	185 mm <sup>2</sup> 36,7 Nm
U/T1 V/T2 W/T3	Connection to the motor	120 mm <sup>2</sup> 36,7 Nm	185 mm <sup>2</sup> 36,7 Nm
J3 - terminals			
PA PB	Connection to the braking resistor	50 mm <sup>2</sup> 5,6 Nm	50 mm <sup>2</sup> 5,6 Nm
CL1 CL2	Control and ventilation power supply	4 mm <sup>2</sup> 2,3 Nm	4 mm <sup>2</sup> 2,3 Nm
	Earth (ground) terminals connected to Altivar earth	70 mm <sup>2</sup> 10 Nm	95 mm <sup>2</sup> 10 Nm

The Altivar is delivered in a configuration to ensure control of power by a circuit-breaker ([see diagram page 32](#)).

Terminals CL1-CL2 are connected to power supply L1-L2 via a strap.

Should the control power supply CL1-CL2 be supplied separately from the load power supply, it is then better to remove the tow straps so as to facilitate connection at terminals CL1-CL2 (see below).

– ATV-66C10N4 to C31N4    Remove the straps between (CL1, CL2) and (CL21, CL22)

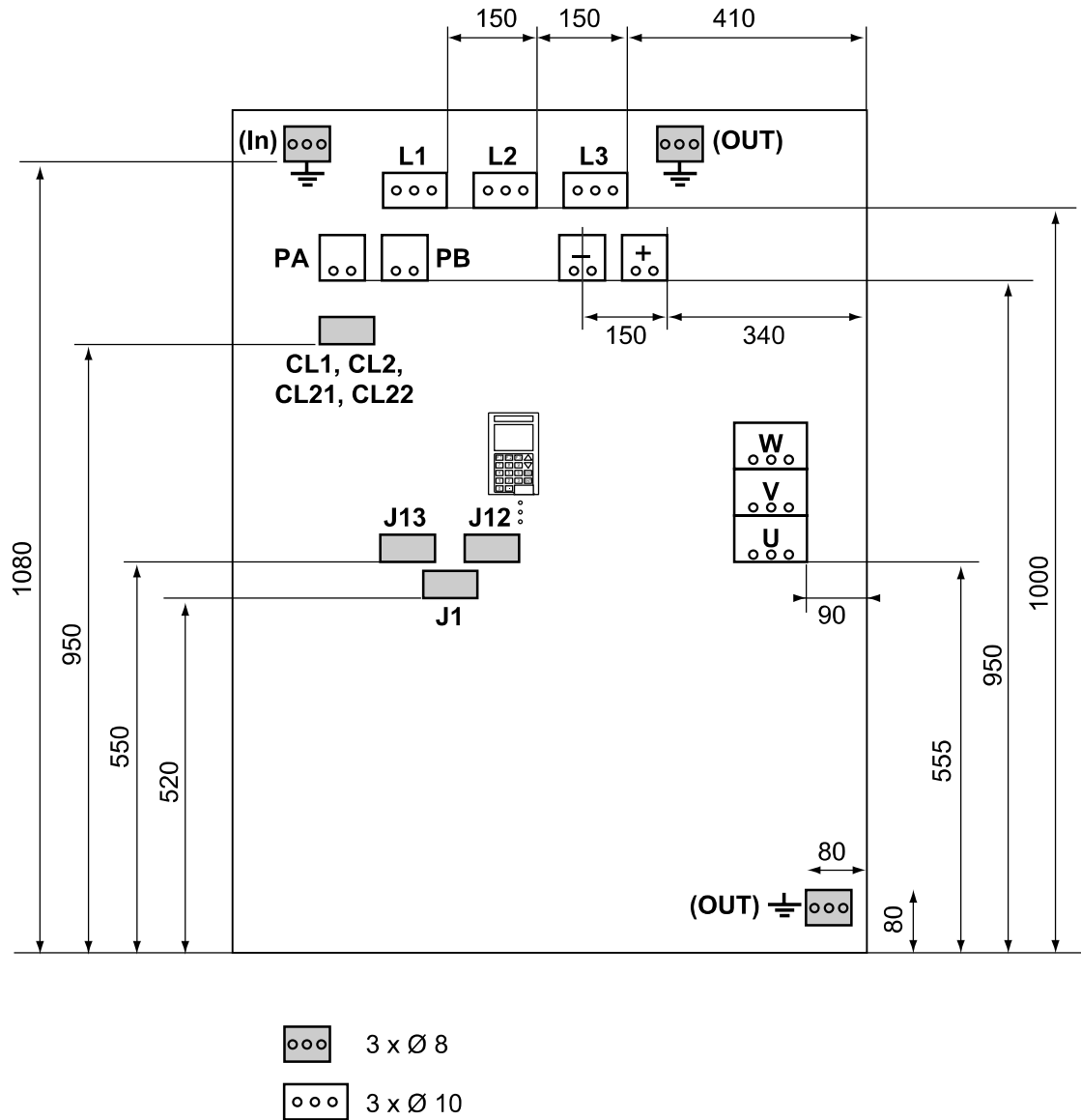
**Remark :** For the gauges ATV-66033N4 to C31N4 or D23M2 to D46M2, the control power supply must always be present before the load power supply (where this is separate). The variator must not be in the following configuration : load power supply present, control power supply absent.

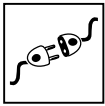


## Access to terminal blocks (size 7)

The size 7 Altivars have no metal protecting cover on the front face (variator protection class IP 00). The terminal and the 3 indicator LEDs are installed on the insulating rank of the control card.

### Location of terminal blocks






## Power terminal blocks (size 7)

### Terminal blocks

J13 : control card analog I/O.

J12 : control card logic I/O.

J1 : relay logic outputs.

J2 - terminals	Function	Maximum connection capacity <i>Terminaltightening torque</i> <b>ATV-66C23N4 to C31N4</b>
L1 L2 L3	Power supply	3 x 240 mm <sup>2</sup> 42,4 Nm
+ –	DC bus connection	2 x 240 mm <sup>2</sup> 42,4 Nm
U/T1 V/T2 W/T3	Connection to the motor	3 x 240 mm <sup>2</sup> 42,4 Nm
CL1 CL2	Control and ventilation power supply	4 mm <sup>2</sup> 2,3 Nm
PA PB	Connection to the braking resistor	2 x 240 mm <sup>2</sup> 42,4 Nm
CL21 CL22	Terminals for common load/control power supply	4 mm <sup>2</sup> 2,3 Nm
	Earth (ground) terminals connected to Altivar earth	3 x 240 mm <sup>2</sup> 42,4 Nm

The Altivar is delivered in a configuration to ensure control of power by a circuit-breaker ([see diagram page 32](#)).

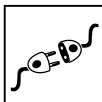
Terminals CL1-CL2 are connected to power supply L1-L2 via a strap.

Should the control power supply CL1-CL2 be supplied separately from the load power supply, it is then better to remove the tow straps so as to facilitate connection at terminals CL1-CL2 (see below).

– ATV-66C10N4 to C31N4    Remove the straps between (CL1, CL2) and (CL21, CL22)

**Remark :** For the gauges ATV-66033N4 to C31N4 or D23M2 to D46M2, the control power supply must always be present before the load power supply (where this is separate). The variator must not be in the following configuration : load power supply present, control power supply absent.

**Note :** if the load and control power supplies come from two separate networks with a common ground, make sure that the phases match between L1 and CL1, and between L2 and CL2.

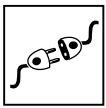


## Control terminal blocks

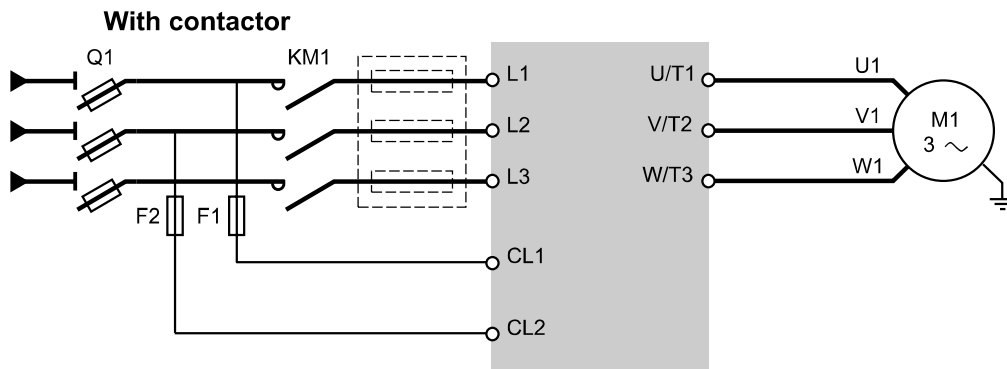
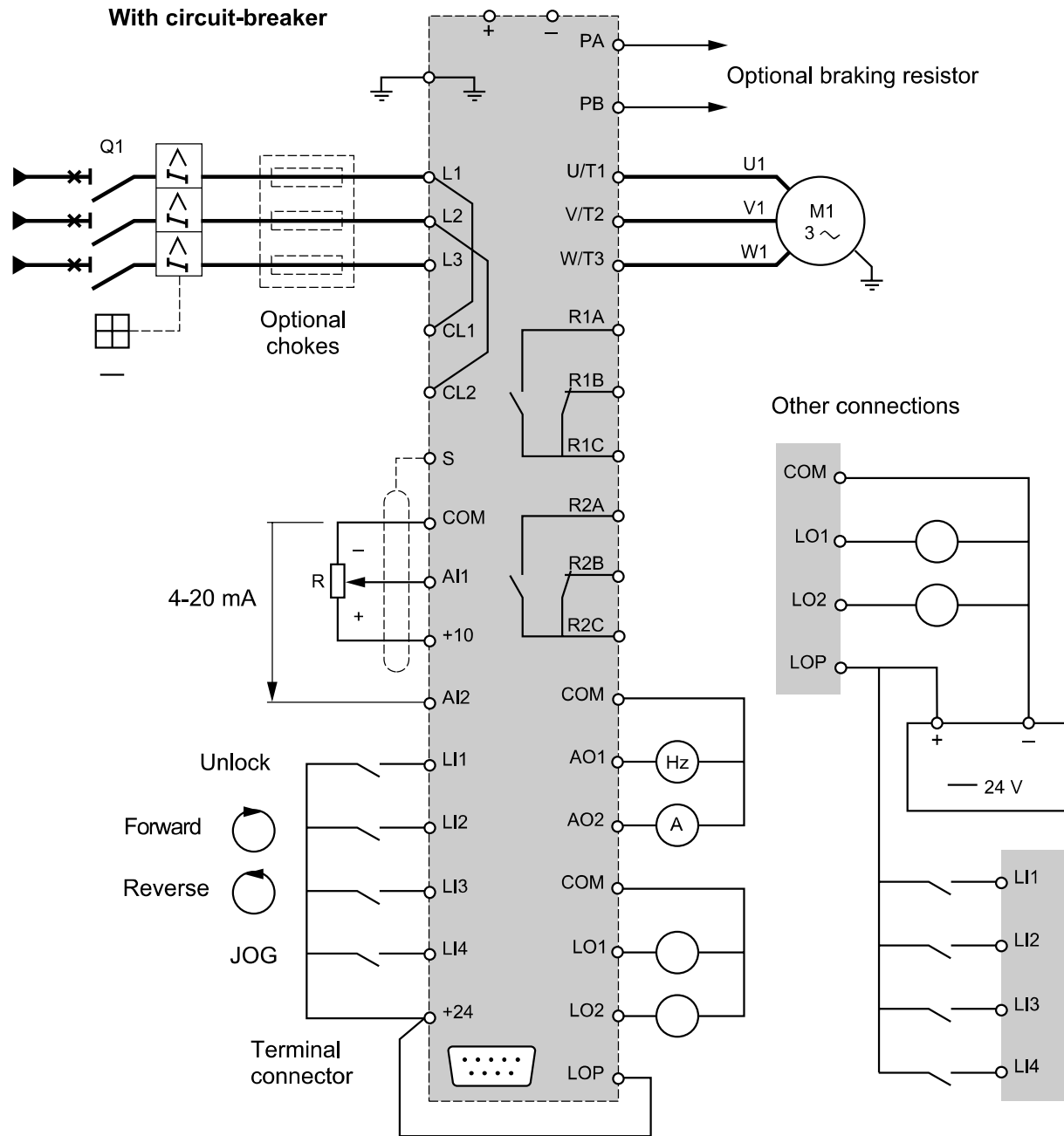
Terminal blocks J13, J12 and J1 have plug-in connectors with a coding chip.  
Maximum connection capacity : 2.5 mm<sup>2</sup>.

### Factory configuration of the speed controller

J13-J12 terminals	Function	Characteristics
S	Connection of screening to reference circuits	Earth (ground) terminal connected to Altivar earth
	Terminal not connected	
COM	Analog input common	0 V
AI1	Voltage speed reference	Analog input 0-10 V, impedance 30 k $\Omega$
+10	Supply to speed reference potentiometer R	+ 10 V isolated and regulated, maximum 10 mA, recommended value of R between 1 k $\Omega$ and 10 k $\Omega$
AI2	Current speed reference	Analog input 4-20 mA, impedance 250 $\Omega$ 0-5 V, impedance 30 k $\Omega$
AO1 AO2	Output frequency Output current	2 analog outputs 0-20 mA, maximum recommended load impedance 500 $\Omega$
COM	Analog output common	0 V
LI1 LI2 LI3 LI4	Unlock speed controller Forward operation command Reverse operation command Step by step operation (JOG)	4 logic inputs, impedance 3.5 k $\Omega$ , supply + 24 V (min 11 V, max 30 V), state 0 if < 5 V, state 1 if $\geq$ 11 V
+24	Supply to logic inputs	+ 24 V isolated and not regulated (min 20 V, max 30 V), maximum 200 mA
LOP	Supply to logic outputs	Connect to + 24 V of internal supply or of an external supply
LO1 LO2	Speed reached Current limit reached	2 PLC compatible logic outputs (open collector), + 24 V (max 32 V), max 20 mA with internal supply or 200 mA with external supply
COM	Logic output common	0 V
J1 terminals		
R1A R1B R1C	C/O contact on relay R1 : activated on power up, de-activated at a fault	Switching capacity of contacts : min 10 mA for 24 V DC, max for inductive load ( $\cos \varphi = 0.4$ and $L/R = 7$ ms) : 1.5 A for 250 V AC or 2.5 A for 30 V DC
R2A R2B R2C	C/O contact on relay R2 : activated when speed controller operating (detection of current in the motor)	

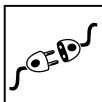


# Connection diagrams



Access to terminals CL1-CL2 : remove the 2 straps. When load power supply (L1-L2-L3) is present or when supplied by the DC bus (+, -), power supply CL1-CL2 must always be present.





# Ferrite core installation and recommendations

## Wiring precautions

### Power

Respect the cable cross-sections recommended by the standards ([see page 36](#)).

Speed controller-motor connection cables :

- minimum length : 0.5 m,
- maximum length 100 m with non-screened cables, or 50 m with screened cables.

Above this, install an L or LC filter between the speed controller and the motor (refer to the catalogue).

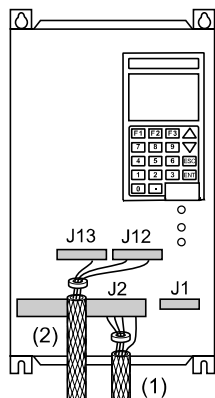
The speed controller must be connected to earth (ground), in order to conform with the regulations covering high leakage currents (above 3.5 mA). Use of a differential circuit-breaker upstream is not recommended since DC components could be generated by leakage currents from the speed controller. If the installation comprises several speed controllers on the same line, connect each controller to earth separately. If necessary, install a line choke (refer to the catalogue).

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

### Control

Keep the control circuits separate from the power cables. For the speed reference circuits, it is recommended that twisted cable with a pitch of between 25 and 50 mm is used, or screened cable with the screening connected to terminal S.

## Ferrite core installation



The options to enable compliance with the EMC directive are those indicated in our documentation (EMC Catalogue No. 75011). These items need to be ordered separately.

The only items delivered with the product are :

- The control cable ferrite (blue) : "control ferrite core".
- The motor cable ferrite (red) : "motor ferrite core".

- (1) motor cable
- (2) control cable

**The ferrites must be installed on the unscreened cable as close as possible to the terminals on the Altivar.**

Please note : Schneider organisation is at your disposal to provide any assistance required in terms of Documentation, Practical Advice, Technical Assistance, EMC Training Courses.

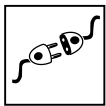
## Selection of associated components

**Circuit-breaker or isolator Q1** (with gI type fuses) : determine according to the line current, plus the consumption of the other parts of the device.

**Contactor KM1** : select for category AC-1, according to the line current.

**Fuses F1-F2** : determine according to the AC supply voltage and the rating of the control and ventilation power supply transformer (terminals CL1-CL2) :

- ATV-66U41N4 to D23N4 (sizes 1 to 3) : 40 VA,  
and ATV-66U41M2 to D16M2
- ATV-66D33N4 to D79N4 (sizes 4 and 5) : 110 VA,  
and ATV-66D23M2 to D46M2
- ATV-66C10N4 to C19N4 (size 6) : 630 VA,
- ATV-66C23N4 to C31N4 (size 7) : 1000 VA.



# Recommendations

## Reassignment of I/O

The following I/O can be reassigned via the graphic terminal : logic inputs LI3 and LI4, logic outputs LO1 and LO2, relay output R2, and analog outputs AO1 and AO2.

The characteristics of current input AI2 and analog outputs AO1 and AO2 can also be modified using the graphic terminal :

- input AI2 : 4-20 mA, 0-20 mA, 20-4 mA, X-20 mA (X programmable : resolution 0.1 mA),
- outputs AO1 and AO2 : 0-20 mA or 4-20 mA.

This is described in more detail [in the Programming Manual](#).

A switch on the control card (to the left of terminal block J13) is used to convert input AI2 to a 0-5 V reference input (after having configured it as 0-20 mA via the graphic terminal).

## Minimum braking resistance values

Using a lower resistance value than the one given in the table below will cause the resistance thermal protection to become inefficient.

Reference	Min. value ( $\Omega$ )	Reference	Min. value ( $\Omega$ )
ATV-66U41N4	56	ATV-66U41M2	41
ATV-66U54N4	56	ATV-66U72M2	28
ATV-66U72N4	56	ATV-66U90M2	14
ATV-66U90N4	54	ATV-66D12M2	10
ATV-66D12N4	50	ATV-66D16M2	10
ATV-66D16N4	27	ATV-66D23M2	7,5
ATV-66D23N4	27	ATV-66D33M2	5
ATV-66D33N4	14	ATV-66D46M2	2,7
ATV-66D46N4	14		
ATV-66D54N4	10		
ATV-66D64N4	5		
ATV-66D79N4	5		
ATV-66C10N4	2,5		
ATV-66C13N4	2,5		
ATV-66C15N4	2,5		
ATV-66C19N4	2,5		



# Command type

## 2 or 3-wire command

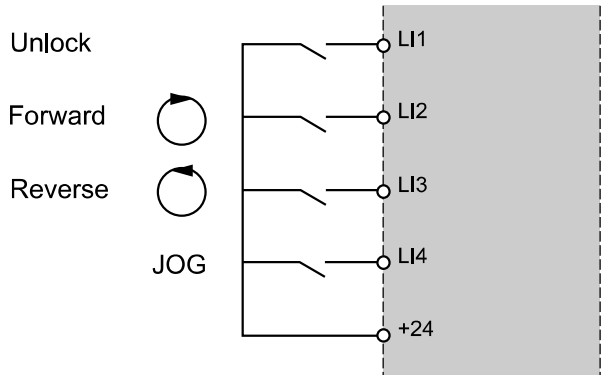
**2-wire command** : logic states maintained (factory setting for the speed controller).

**3-wire command** : pulse control (selected via the graphic terminal).

### 2-wire command

Input LI1 :

- change to state 1 : controller unlocked,
- change to state 0 : speed controller locked and "freewheel" stop of motor.



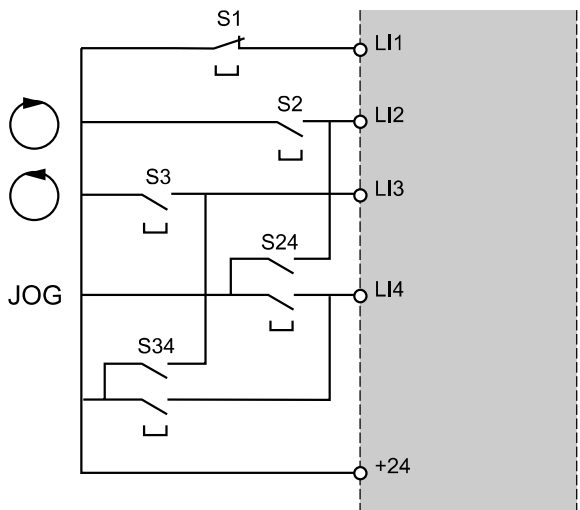
To stop the motor following the deceleration ramp, inhibit the direction command on the enabled input LI2 or LI3.

Step by step function (JOG) : enable input LI4 before unlocking using input LI1, apply pulses to input LI2 or LI3 (direction of operation).

### 3-wire command

Input LI1 :

- change to state 1 : controller unlocked,
- change to state 0 : stop motor following deceleration ramp.



- S1 Stop
- S2 Forward operation
- S3 Reverse operation
- S24 Step by step (JOG) forward
- S34 Step by step (JOG) reverse

Step by step operation (JOG) only lasts as long as the pulse command.

### Characteristics common to both methods of command :

- the first direction command selected takes priority over the other,
- if the two direction commands are enabled simultaneously, forward operation takes priority.



## Cable cross-sections

### Power cables to terminals L1-L2-L3 and U/T1-V/T2-W/T3

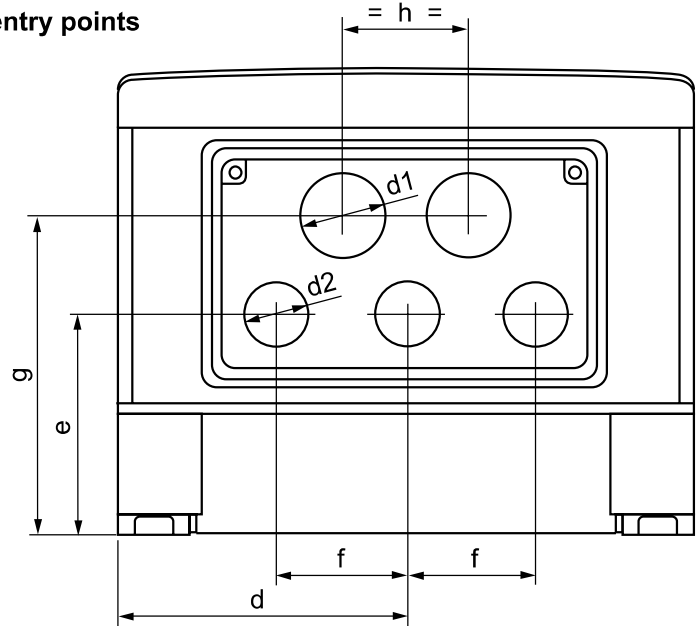
Altivar reference	Cable cross-section recommended by
	IEC 947-1 standards mm <sup>2</sup>
ATV-66U41N4	2,5
ATV-66U54N4	2,5
ATV-66U72N4	2,5
ATV-66U90N4	4
ATV-66D12N4	6
ATV-66D16N4	6
ATV-66D23N4	10
ATV-66D33N4	25
ATV-66D46N4	35
ATV-66D54N4	35
ATV-66D64N4	50
ATV-66D79N4	50
ATV-66C10N4	95
ATV-66C13N4	120
ATV-66C15N4	185
ATV-66C19N4	185
ATV-66C23N4	150 x 2 (2 cables)
ATV-66C28N4	185 x 2 (2 cables)
ATV-66C31N4	185 x 2 (2 cables)
ATV-66U41M2	2,5
ATV-66U72M2	4
ATV-66U90M2	6
ATV-66D12M2	6
ATV-66D16M2	10
ATV-66D23M2	25
ATV-66D33M2	35
ATV-66D46M2	35



# Cable entry points

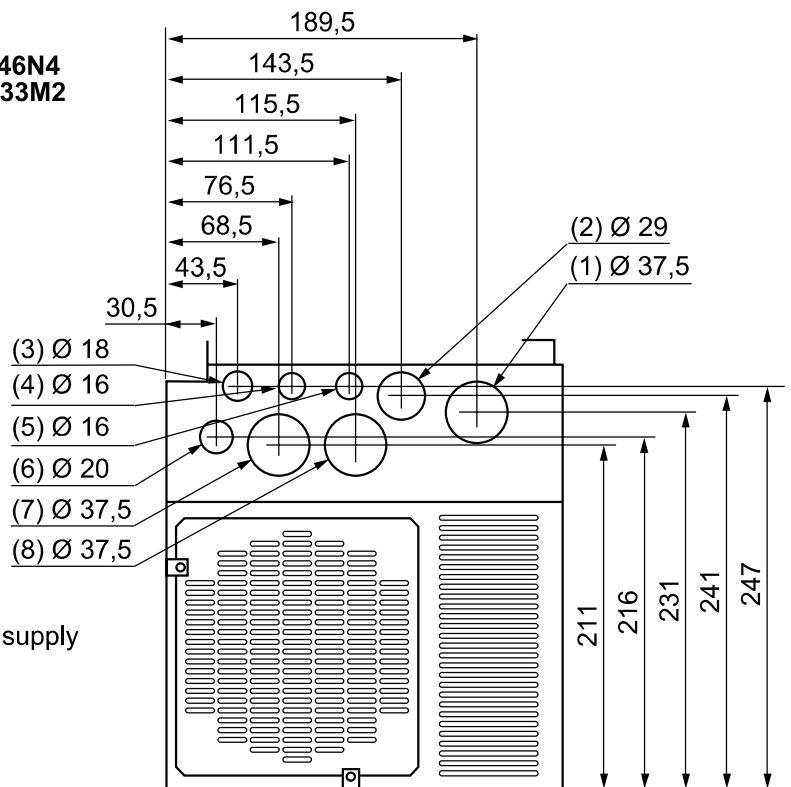
View from below showing cable entry points

Sizes 1 to 5

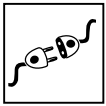


Size	Altivar reference	d1	d2	d	e	f	g	h
1	ATV-66U41N4 to U72N4 ATV-66U41M2	29	22	100	79	45	113	43
2	ATV-66U90N4 & D12N4 ATV-66U72M2 & U90M2	29	29	117	106	58	134	58
3	ATV-66D16N4 & D23N4 ATV-66D12M2 & D16M2	29	29	117	147	58	175	58

Size 4 ATV-66D33N4 & D46N4  
ATV-66D23M2 & D33M2



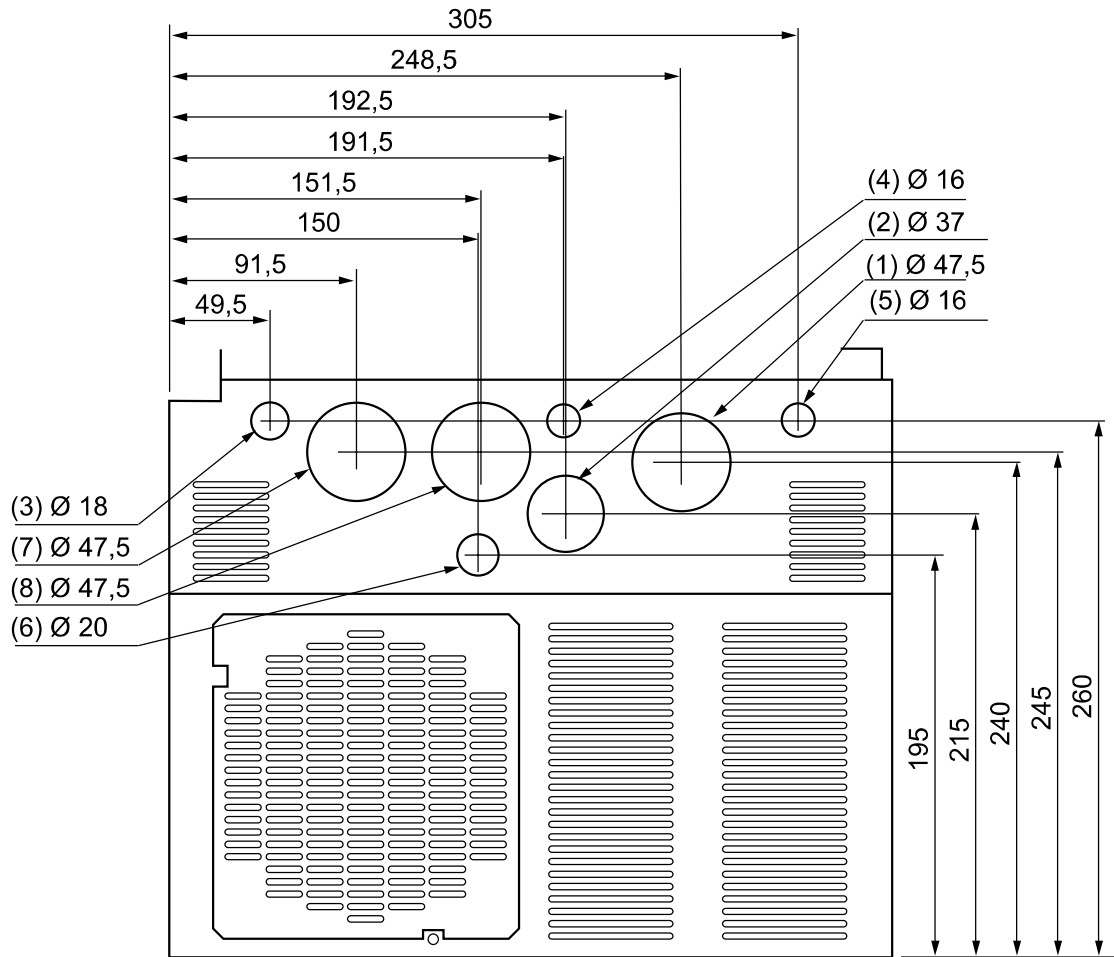
- 1 - Motor output
- 2 - PA / PB output
- 3 - Separate control power supply
- 4 - Option board
- 5 - Monitoring control
- 6 - Relay output
- 7 - Power supply
- 8 - + / - output



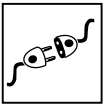
# Cable entry points

View from below showing cable entry points

Size 5 : ATV-66D54N4 to D79N4  
ATV-66D46M2



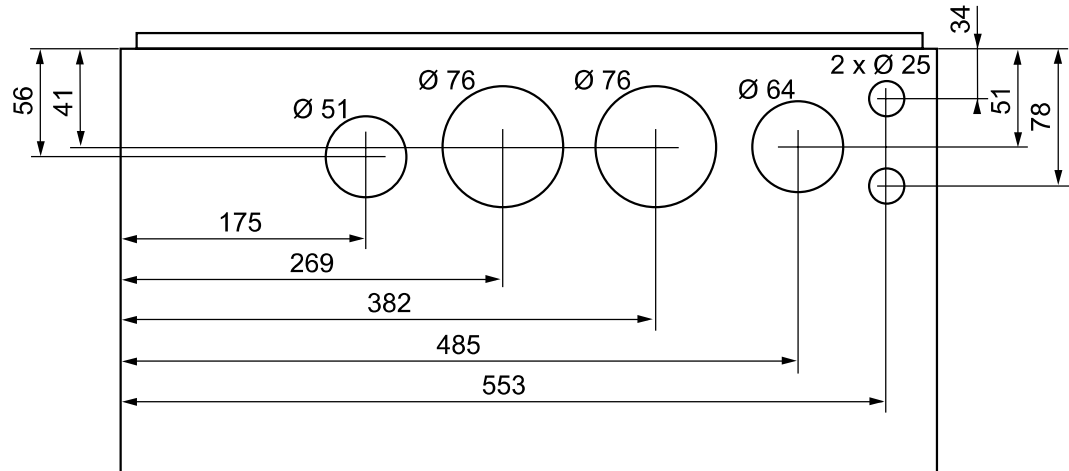
- 1 - Motor output
- 2 - PA / PB output
- 3 - Separate control power supply
- 4 - Option board
- 5 - Monitoring control
- 6 - Relay output
- 7 - Power supply
- 8 - + / - output

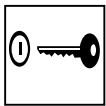


# Cable entry points

View from below showing cable entry points

Size 6 : ATV-66C10N4 to C19N4



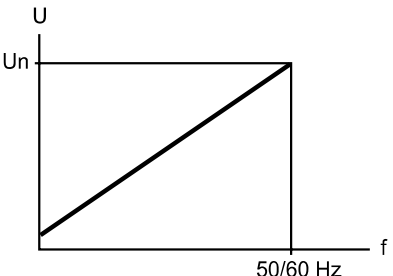


# Start-up

The Altivar is factory-set for the most widely used operating conditions :

- **constant torque applications,**
- **2-wire command.**

## Factory settings

<b>Nominal output frequency and voltage</b>	Automatic adaptation on <b>1<sup>st</sup> power-up</b> to the AC supply frequency 50 Hz AC supply : 400 V 60 Hz AC supply : 460 V
<b>Voltage / frequency ratio</b>	Normal linear ratio, IR compensation set at 100 % of the correction range, damping set at 20 % of the adjustment range  <b>Applications</b> : machines with average load at low speed  
<b>Slip compensation</b>	Operational and automatic
<b>Operating frequency range</b>	50 Hz AC supply : 0.1 to 75 Hz 60 Hz AC supply : 0.1 to 90 Hz
<b>Ramp times</b>	Acceleration : 3 s    Deceleration : 3 s Automatic adaptation of the ramp times in the event of the torque capacity being exceeded
<b>Braking to standstill at low speed</b>	Automatic by DC injection (0.7 Inv) for 0.5 s as soon as the deceleration frequency becomes < 0.1 Hz
<b>Motor thermal protection</b>	Set for a motor nominal current equal to 0.9 Inv
<b>JOG function</b>	Speed limited to 5 Hz, ramp times : 0.1 s Dead time between 2 pulses : 0.5 s

If the above values are compatible with the application, the speed controller can be powered up. To understand the messages displayed, [see the Programming Manual](#).

If necessary, reconfigure the controller and the settings using the graphic terminal : [see the Programming Manual](#).

When power switching using a **line contactor** ([see diagram on page 32](#)) :



- **Avoid frequent operation of contactor KM1** (premature ageing of the filtering capacitors), **use inputs LI1 to LI4 to control the speed controller.**
- **For cycles < 60 s, this is essential.** If it is not respected the load resistors will be damaged.
- If the safety standards state that the motor must be insulated, install a contactor at the speed controller output and use the “bypass” function ([see the Programming Manual](#)).





## Operating assistance

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### Signalling on the Altivar front panel

Red LED  on : Altivar faulty

Yellow LED  on : Altivar is operating in current limiting mode or automatic ramp adjustment mode

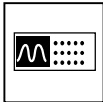
Green LED  on : Altivar powered up (voltage at terminals CL1-CL2)

Yellow LED flashing : thermal early warning indicating speed controller and motor overheated (ATV-66D16N4 to C31N4 and ATV-66D12M2 to D46M2 only). Locks at the fault 1 minute later if the overheating persists.

### Display mode on the graphic terminal screen

Display of the factory set frequency reference, or of a fault.

Display mode can be modified via the graphic terminal : [see the Programming Manual](#).



## Maintenance

Before performing any operation on the speed controller, **switch off the power supply and wait for the capacitors to discharge** (approximately 1 minute) : the red LED inside the speed controller (visible when the protective cover is removed) goes off.



**The DC voltage at terminals + and – or PA and PB may reach 800 to 900 V depending on the supply voltage.**

In the event of a problem during start-up or operation, check first that the recommendations relating to the environment, mounting and connection have been respected.

### Servicing

The Altivar 66 does not require any preventive servicing.  
It is however advisable to perform the following at regular intervals :

- check the state and tightness of connections,
- check that the temperature around the device remains at an acceptable level, and that the ventilation is efficient (average lifetime for fans : 3 to 5 years depending on the operating conditions),
- remove dust from the speed controller if necessary.

### Maintenance assistance

The first fault detected is memorized and displayed on the graphic terminal screen if the control voltage (terminals CL1-CL2) is maintained : the speed controller locks, the red LED lights, and security relay R1 is tripped.

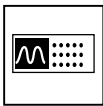
#### Clearing the fault

Switch off the power supply to the speed controller : to the power terminals in the event of a fault which can be reset, to the power and control terminals in the event of a fault which cannot be reset (see the following pages).

Find the cause of the fault in order to correct it.

Reconnect the power supply : this clears the fault if it has disappeared.

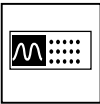
In some cases, the speed controller may restart automatically when the fault has disappeared, if this function has been programmed using the graphic terminal ([see the Programming Manual](#)).



# Maintenance assistance

## Faults which can be reset

Fault	Probable cause	Remedial procedure
Input phase loss	<ul style="list-style-type: none"><li>– incorrect supply to controller or melting of fuses</li><li>– transient fault of one phase of the AC supply (<math>t \geq 1</math> s)</li></ul>	<ul style="list-style-type: none"><li>– check the connection and the power fuses</li><li>– reset</li></ul>
Undervoltage	<ul style="list-style-type: none"><li>– AC supply too low</li><li>– transient voltage dip (<math>t \geq 200</math> ms)</li><li>– load resistor damaged</li></ul>	<ul style="list-style-type: none"><li>– check the voltage or the motor parameter <math>U_n</math> via the graphic terminal</li><li>– reset</li><li>– change the resistor</li></ul>
AC-line overvoltage	<ul style="list-style-type: none"><li>– AC supply too high</li></ul>	<ul style="list-style-type: none"><li>– check the voltage or the motor parameter <math>U_n</math> via the graphic terminal</li></ul>
Drive overtemperature	<ul style="list-style-type: none"><li>– heatsink temperature too high</li></ul>	<ul style="list-style-type: none"><li>– check the motor load, the speed controller ventilation and the environment, and wait for the controller to cool before resetting</li></ul>
Motor overload	<ul style="list-style-type: none"><li>– thermal tripping caused by prolonged overload</li></ul>	<ul style="list-style-type: none"><li>– check the adjustment of the thermal protection via the graphic terminal, check the motor load</li><li>– can be reset after approximately 7 minutes</li></ul>
DC-bus overvoltage	<ul style="list-style-type: none"><li>– excessive braking or driving load</li></ul>	<ul style="list-style-type: none"><li>– increase the deceleration time via the graphic terminal, add a braking resistor if necessary</li></ul>
Output phase loss	<ul style="list-style-type: none"><li>– fault on one phase at speed controller output</li></ul>	<ul style="list-style-type: none"><li>– check the motor connections</li></ul>
Loss follower	<ul style="list-style-type: none"><li>– loss of the 4-20 mA reference on input AI2</li></ul>	<ul style="list-style-type: none"><li>– check the connection of the reference circuits</li></ul>
Serial link	<ul style="list-style-type: none"><li>– communication fault via the serial link</li></ul>	<ul style="list-style-type: none"><li>– check the connection of the graphic terminal to the speed controller</li><li>– check the connection of the communication option and of the PLC</li></ul>
Overspeed	<ul style="list-style-type: none"><li>– Motor control loss</li></ul>	<ul style="list-style-type: none"><li>– Excessively high motor load</li></ul>



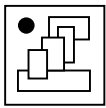
## Maintenance assistance

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### Faults which cannot be reset

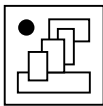
Fault	Probable cause	Remedial procedure
Short-circuit Ground fault	– short-circuit or earthing (grounding) at speed controller output	– check the connection cables (with the speed controller disconnected) and the motor insulation, check the speed controller using the graphic terminal in diagnostic mode
Precharge failure	– control fault in the capacitor charging relay – load resistor damaged	– check the connections in the speed controller and the load resistor
Internal fault	– internal fault – connection fault	– check the speed controller using the graphic terminal in diagnostic mode – check the connections in the speed controller
Memory failure	– memory error in EEPROM	– return to factory settings or client settings using the graphic terminal
Transistor short-circuit Open transistor Dynamic brake fault (fault detected if braking resistor present)	– transistor fault detected by the automatic self-test each time the speed controller is powered up	– check the speed controller using the graphic terminal in diagnostic mode

Other faults may appear if they have been programmed using the graphic terminal ([see the Programming Manual](#)).



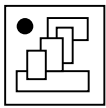
## Spare parts

Description	For speed controllers	Reference
Programming graphic terminal	ATV-66 all sizes	<b>VW3-A66206</b>
Control terminal blocks (plug-in parts of terminal blocks J1 - J12 - J13)	ATV-66 all sizes	<b>VZ3-N006</b>
Set of two-ferrite cores	ATV-66U41N4 to D46N4	<b>VW3-A66470</b>
	ATV-66U41M2 to D33M2	<b>VW3-A66470</b>
	ATV-66D54N4 to D79N4	<b>VW3-A66471</b>
	ATV-66D46M2	<b>VW3-A66471</b>
"Controle" card (with isolating basket)	ATV-66U41N4 to D79N4	<b>VX4-A661</b>
	ATV-66U41M2 to D46M2	<b>VX4-A661</b>
	ATV-66C10N4 to C19N4	<b>VX4-A661S238</b>
	ATV-66C23N4 to C31N4	<b>VX4-A661S238</b>
"Power" assemblies	ATV-66U41N4	<b>VX5-A66U41N4</b>
	ATV-66U54N4	<b>VX5-A66U54N4</b>
	ATV-66U72N4	<b>VX5-A66U72N4</b>
	ATV-66U41M2	<b>VX5-A66U41M2</b>
	ATV-66U90N4	<b>VX5-A66U90N4</b>
	ATV-66D12N4	<b>VX5-A66D12N4</b>
"Power" cards	TV-66D16N4	<b>VX5-A66D16N4</b>
	ATV-66D23N4	<b>VX5-A66D23N4</b>
	ATV-66D12M2	<b>VX5-A66D12M2</b>
	ATV-66D16M2	<b>VX5-A66D16M2</b>
Tool for removing and inserting the power card	ATV-66U41N4 to D23N4	<b>VY1-ADV608</b>
	ATV-66U41M2 to D16M2	<b>VY1-ADV608</b>
"Power" cards	ATV-66D33N4	<b>VX5-A66D33N4</b>
	ATV-66D46N4	<b>VX5-A66D46N4</b>
	ATV-66D23M2	<b>VX5-A66D23M2</b>
	ATV-66D33M2	<b>VX5-A66D33M2</b>
	ATV-66D54N4	<b>VX5-A66D54N4</b>
	ATV-66D64N4	<b>VX5-A66D64N4</b>
	ATV-66D79N4	<b>VX5-A66D79N4</b>
	ATV-66D46M2	<b>VX5-A66D46M2</b>
	ATV-66C10N4	<b>VX5-A66C10N4</b>
	ATV-66C13N4	<b>VX5-A66C13N4</b>
ATV-66C15N4	<b>VX5-A66C15N4</b>	
ATV-66C19N4	<b>VX5-A66C19N4</b>	
ATV-66C23N4	<b>VX5-A66C23N4</b>	
ATV-66C28N4	<b>VX5-A66C28N4</b>	
ATV-66C31N4	<b>VX5-A66C31N4</b>	



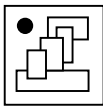
## Spare parts

Description	For speed controllers	Reference
"Channel control" cards	ATV-66D16N4 ATV-66D23N4	<b>VX5-A66103</b> <b>VX5-A66104</b>
	ATV-66D12M2 ATV-66D16M2	<b>VX5-A66112</b> <b>VX5-A66113</b>
	ATV-66D33N4 ATV-66D46N4	<b>VX5-A66105</b> <b>VX5-A66106</b>
	ATV-66D23M2 ATV-66D33M2	<b>VX5-A66114</b> <b>VX5-A66115</b>
	ATV-66D54N4 ATV-66D64N4 ATV-66D79N4	<b>VX5-A66107</b> <b>VX5-A66108</b> <b>VX5-A66109</b>
	ATV-66D46M2	<b>VX5-A66116</b>
"Filter" cards	ATV-66D16N4 and D23N4	<b>VX4-A66103</b>
	ATV-66D12M2 and D16M2	<b>VX4-A66103</b>
	ATV-66D33N4 and D46N4	<b>VX4-A66104</b>
	ATV-66D23M2 and D33M2	<b>VX4-A66104</b>
	ATV-66D54N4 to D79N4	<b>VX4-A66105</b>
	ATV-66D46M2	<b>VX4-A66105</b>
	ATV-66C10N4 to C19N4	<b>VX4-A66106</b>
Transformers	ATV-66D33N4 to D79N4	<b>VY1-ADA604</b>
	ATV-66D23M2 and D46M2	<b>VY1-ADA614</b>
	ATV-66C10N4 to C19N4	<b>VY1-ADA606</b>
	ATV-66C23N4 to C31N4	<b>VY1-ADA607</b>
Current sensors (set of 2)	ATV-66D33N4 and D46N4	<b>VY1-A66104</b>
	ATV-66D23M2 ATV-66D33M2	<b>VY1-A66104</b> <b>VY1-A66105</b>
	ATV-66D54N4 to D79N4	<b>VY1-A66105</b>
	ATV-66D33M2 to D46M2	<b>VY1-A66105</b>
	ATV-66C10N4 and C13N4 ATV-66C15N4 and C19N4 ATV-66C23N4 to C31N4	<b>VY1-A66106</b> <b>VY1-A66107</b> <b>VY1-A66108</b>



## Spare parts

Description	Characteristics	For speed controllers	Reference	
Modules with 2 IGBT	50 A - 1200 V	ATV-66D16N4	<b>VZ3-IM2050M1201</b>	
	75 A - 1200 V	ATV-66D23N4	<b>VZ3-IM2075M1201</b>	
	100 A - 1200 V	ATV-66D33N4	<b>VZ3-IM2100M1201</b>	
	150 A - 1200 V	ATV-66D46N4 and D54N4	<b>VZ3-IM2150M1201</b>	
	200 A - 1200 V	ATV-66D64N4	<b>VZ3-IM2200M1201</b>	
	300 A - 1200 V	ATV-66D79N4	<b>VZ3-IM2300M1201</b>	
	75 A - 600 V	ATV-66D12M2	<b>VZ3-IM2075M0601</b>	
	100 A - 600 V	ATV-66D16M2	<b>VZ3-IM2100M0601</b>	
	150 A - 600 V	ATV-66D23M2	<b>VZ3-IM2150M0601</b>	
	200 A - 600 V	ATV-66D33M2	<b>VZ3-IM2200M0601</b>	
	300 A - 600 V	ATV-66D46M2	<b>VZ3-IM2300M0601</b>	
	Kits comprising : – 2 modules with 1 IGBT – cards	300 A - 1200 V	ATV-66C10N4	<b>VZ3-IM1300M1206</b>
		400 A - 1200 V	ATV-66C13N4 and C15N4	<b>VZ3-IM1400M1206</b>
		500 A - 1200 V	ATV-66C19N4	<b>VZ3-IM1500M1206</b>
Kits comprising : – 4 modules with 1 IGBT – cards	400 A - 1200 V	ATV-66C23N4 to C28N4	<b>VZ3-IM1400M1207</b>	
	500 A - 1200 V	ATV-66C31N4	<b>VZ3-IM1500M1207</b>	
IGBT braking transistor modules	25 A - 1000 V	ATV-66D16N4 and D23N4	<b>VZ3-IM1025M1001</b>	
	50 A - 1200 V	ATV-66D33N4 and D46N4	<b>VZ3-IM2050M1201</b>	
	100 A - 1200 V	ATV-66D54N4	<b>VZ3-IM2100M1201</b>	
	150 A - 1200 V	ATV-66D64N4 and D79N4	<b>VZ3-IM2150M1201</b>	
	60 A - 600 V	ATV-66D12M2 and D16M2	<b>VZ3-IM1060M0601</b>	
	75 A - 600 V	ATV-66D23M2	<b>VZ3-IM2075M0601</b>	
	100 A - 600 V	ATV-66D33M2	<b>VZ3-IM2100M0601</b>	
	150 A - 600 V	ATV-66D46M2	<b>VZ3-IM2150M0601</b>	
	IGBT braking transistor and card kit	300 A - 1200 V	ATV-66C10N4 to C19N4	<b>VZ3-IM1300M1207</b>
		400 A - 1200 V	ATV-66C23N4	<b>VZ3-IM1400M1208</b>
400 A - 1200 V		ATV-66C28N4 to C31N4	<b>VZ3-IM1300M1208</b>	
Rectifier with 6 diodes	75 A - 1600 V	ATV-66D16N4 and D23N4	<b>VZ3-DM6075M1601</b>	
	75 A - 1600 V	ATV-66D12M2 and D16M2	<b>VZ3-DM6075M1601</b>	
Rectifiers with 2 diodes	80 A - 1600 V	ATV-66D33N4	<b>VZ3-DM2080M1606</b>	
	100 A - 1600 V	ATV-66D46N4	<b>VZ3-DM2100M1601</b>	
	160 A - 1600 V	ATV-66D54N4 to D79N4	<b>VZ3-DM2160M1606</b>	
	80 A - 1600 V	ATV-66D23M2	<b>VZ3-DM2080M1606</b>	
	100 A - 1600 V	ATV-66D33M2	<b>VZ3-DM2100M1601</b>	
	160 A - 1600 V	ATV-66D46M2	<b>VZ3-DM2160M1606</b>	
Kit to 3 modules of 2 diodes	170 A - 1600 V	ATV-66C10N4 and C13N4	<b>VZ3-DM2170M1601</b>	
	260 A - 1600 V	ATV-66C15N4	<b>VZ3-DM2260M1601</b>	
	350 A - 1600 V	ATV-66C19N4	<b>VZ3-DM2350M1601</b>	
	600 A - 1600 V	ATV-66C23N4 to C31N4	<b>VZ3-DM2600M1601</b>	



## Spare parts

Description	Characteristics	For speed controllers	Reference
Cooling sub-assemblies	Rate 5 dm <sup>3</sup> /s	ATV-66U41N4 and U54N4	<b>VZ3-V661</b>
	Rate 10 dm <sup>3</sup> /s	ATV-66U72N4	<b>VZ3-V662</b>
	Rate 22 dm <sup>3</sup> /s	ATV-66U90N4 and D12N4	<b>VZ3-V663</b>
	Rate 47 dm <sup>3</sup> /s	ATV-66D16N4 and D23N4	<b>VZ3-V664</b>
	Rate 100 dm <sup>3</sup> /s	ATV-66D33N4 to D79N4	<b>VZ3-V665</b>
	Rate 250 dm <sup>3</sup> /s	ATV-66C10N4 to C31N4	<b>VZ3-V666</b>
	Rate 10 dm <sup>3</sup> /s	ATV-66U41M2	<b>VZ3-V662</b>
	Rate 22 dm <sup>3</sup> /s	ATV-66U72M2 and U90M2	<b>VZ3-V663</b>
	Rate 47 dm <sup>3</sup> /s	ATV-66D12M2 and D16M2	<b>VZ3-V664</b>
	Rate 100 dm <sup>3</sup> /s	ATV-66D23M2 to D46M2	<b>VZ3-V665</b>
Internal cooling units	Rate 11 dm <sup>3</sup> /s	ATV-66D33N4 and D46N4	<b>VZ3-V6654</b>
	Rate 14 dm <sup>3</sup> /s	ATV-66D54N4 to D79N4	<b>VZ3-V6655</b>
	Rate 14 dm <sup>3</sup> /s	ATV-66C10N4 to C19N4	<b>VZ3-V667</b>
	Rate 18 dm <sup>3</sup> /s	ATV-66C23N4 to C31N4	<b>VZ3-V669</b>
	Rate 11 dm <sup>3</sup> /s	ATV-66D23M2 and D33M2	<b>VZ3-V6654</b>
	Rate 14 dm <sup>3</sup> /s	ATV-66D46M2	<b>VZ3-V6655</b>
Load resistors	33 Ω - 8,5 W	ATV-66D16N4 and D23N4	<b>VZ3-R033W009</b>
	10 Ω - 25 W	ATV-66D33N4 and D46N4	<b>VZ3-R010W025</b>
	10 Ω - 480 W	ATV-66D54N4 to C31N4	<b>VZ3-R010W481</b>
	33 Ω - 8,5 W	ATV-66D12M2 and D16M2	<b>VZ3-R033W009</b>
	10 Ω - 25 W	ATV-66D23M2 and D33M2	<b>VZ3-R010W025</b>
	10 Ω - 480 W	ATV-66D46M2	<b>VZ3-R010W481</b>
Control fuse	5 A- 600(8,5 x 31,5)	ATV-66C10N4 to C31N4	<b>DF3-CF00501</b>
DC bus protection fuses	400 A - 700 V	ATV-66C10N4 and C13N4	<b>VY1-ADF400V700</b>
	450 A - 700 V	ATV-66C15N4 and C19N4	<b>VY1-ADF450V700</b>
		ATV-66C23N4 and C31N4	<b>VY1-ADF400V700</b>
Capacitors		ATV-66D16N4 and D23N4	<b>VY1-ADC152V450</b>
		ATV-66D33N4 and D46N4	<b>VY1-ADC472V450</b>
		ATV-66D12M2 and D16M2	<b>VY1-ADC152V450</b>
		ATV-66D23M2 and D33M2	<b>VY1-ADC472V450</b>
Capacitor sub-assemblies		ATV-66D54N4	<b>VY1-ADC605</b>
		ATV-66D64N4 and D79N4	<b>VY1-ADC606</b>
		ATV-66C10N4 to C19N4	<b>VY1-ADC607</b>
		ATV-66C23N4 to C31N4	<b>VY1-ADC608</b>
		ATV-66D46M2	<b>VY1-ADC605</b>
Discharge resistors	5 kΩ - 40 W	ATV-66D33N4 to D79N4	<b>VZ3-R5K0W040</b>
	640 Ω - 135 W	ATV-66D10N4 to D19N4	<b>VZ3-R640W135</b>
	1,2 kΩ - 480 W	ATV-66D23N4 to D31N4	<b>VZ3-R1K2W480</b>
	5 kΩ - 40 W	ATV-66D23M2 to D46M2	<b>VZ3R5K0W040</b>
Temperature sensor kit		ATV-66C10N4 to C19N4	<b>VZ3-G003</b>
		ATV-66C23N4 and C31N4	<b>VZ3-G004</b>
Contactor		ATV-66C10N4 to C13N4	<b>VY1-A661C1010</b>
		ATV-66C15N4 and C19N4	<b>VY1-A661C1510</b>
		ATV-66C23N4 to C31N4	<b>VY1-A661C2310</b>
Auxiliary contact			<b>LA1-DN04</b>
Circuit breaker		ATV-66C10N4 to C31N4	<b>GV2M10</b>



## **Herstellereklärung**

**Die Frequenzumrichter Altivar 66 erfüllen die wesentlichen Anforderungen der Niederspannungsrichtlinie der EG. Sie sind in diesem Sinne CE-gekennzeichnet. Die Frequenzumrichter Altivar 66 sind im Sinne der Maschinen - und der EMV-Richtlinie weder eine Maschine noch ein gebrauchsfertiges Gerät, sondern eine Komponente, deren Wirkungsweise erst durch den Einbau in die Konstruktion des Anwenders festgelegt wird. Die endgültige Inbetriebnahme der Frequenzumformer Altivar 66 ist solange untersagt, bis die Maschine den Anforderungen der Maschinenrichtlinie der EG entspricht.**

**Einbau und Inbetriebnahme dieses Frequenzumrichters müssen den internationalen und den am Einbauort geltenden nationalen Normen entsprechen. Die Verantwortung dafür trägt das mit diesen Arbeiten betraute Unternehmen. In der EG sind außerdem die entsprechenden Vorschriften zur elektromagnetischen Verträglichkeit (EMV) zu beachten.**

**Die für eine EMV-gerechte Installation erforderlichen Komponenten und Vorsichtsmaßnahmen sind in unserem Zubehörkatalog für Frequenzumrichter sowie in der allen Umrichtern beiliegenden technischen Dokumentation zusammengefaßt.**

**Für eventuelle Fragen zur Dokumentation wenden Sie sich bitte an Ihre Schneider-Niederlassung.**



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