Altivar 71

Installation manual

Variable speed drives
for asynchronous motors

a brand of Schneider Electric

Telemecanique

Table of contents

Read and take note of these instructions before you begin any procedure with this drive.

⚠ DANGER

DANGEROUS VOLTAGE

- Read and make sure you understand the whole of this installation manual before installing and operating the ATV71 variable speed drive. Installation, settings, and repairs must be undertaken by qualified personnel.
- The user is responsible for compliance with all international and national electrical standards in force concerning earthing of all equipment.
- Many parts of this variable speed drive, including the printed circuit boards, operate at the line voltage. DO NOT TOUCH THEM.
  Only use tools equipped with electrical insulation.
- Do not touch unshielded components or screws on the terminals if the device is switched on.
- Do not short-circuit the PA/+ and PC/- terminals or the DC bus capacitors.
- Fit and close all the covers before switching on, starting or stopping the drive.
- Before any servicing or repair work on the variable speed drive
  - disconnect the power supply
  - place a label stating "DO NOT SWITCH ON" on the variable speed drive circuit-breaker or isolator
  - lock the circuit-breaker or isolator in the open position
- Switch off the entire power supply, including any external control circuit supply which might be present, before working on the variable speed drive. WAIT FOR 15 MINUTES to allow the DC bus capacitors to discharge. Then follow the procedure for measuring the DC bus voltage on page 18 to check whether the DC voltage is below 45 V. The LED on the variable speed drive is not an accurate indicator of lack of voltage on the DC bus.

Electrocution will cause death or serious injury

INSTALLATION

■ 1 Acceptance and conformity

- Check that the reference printed on the label is the same as that on the purchase order
- Remove the Altivar from its packaging and check that it has not been damaged in transit

■ 2 Line voltage check

- Check that the line voltage is compatible with the voltage range of the drive (see pages 7 and 8)

⚠ The drive may be damaged if the line voltage is not compatible.

Steps 1 to 4 must be performed with the power off

■ 3 Mounting

- Fix the drive in accordance with the instructions in this document
- Fit any internal and external options

■ 4 Wiring

- Connect the motor, ensuring that its connections correspond to the voltage
- Connect the control
- Connect the speed reference
- Connect the line supply, after making sure that it is switched off

PROGRAMMING

☐ 1 Consult the programming manual

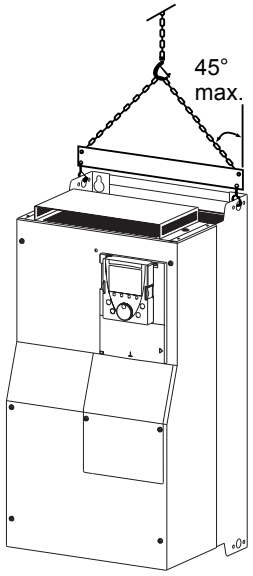
Preliminary recommendations

Handling and storage

To protect the drive prior to installation, handle and store the device in its packaging. Ensure that the ambient conditions are acceptable

⚠ CAUTION
DAMAGED UNIT Do not either install or operate the drive if it appears to be damaged. **If this precaution is not adhered to, material damage may occur.**

Handling on installation



The ALTIVAR 71 range comprises 15 sizes with various weights and dimensions.

ALTIVAR 71 drives up to ratings ATV71HD15M3X and ATV71HD18N4 can be removed from their packaging and installed without a handling device.

A hoist must be used with higher ratings; for this reason they are fitted with handling "lugs". The precautions described below must be observed.

Precautions

Read and take note of the instructions in the "programming manual".

⚠ CAUTION
INCOMPATIBLE LINE VOLTAGE Before switching on and configuring the drive, check that the line voltage is compatible with the drive supply voltage. The drive may be damaged if the line voltage is not compatible **If this precaution is not adhered to, material damage may occur.**

⚠ DANGER
UNEXPECTED OPERATION OF THE DEVICE • Before switching on and configuring the Altivar 71, check that the PWR (POWER REMOVAL) input is deactivated (at state 0) in order to prevent unexpected restarting. • Before switching on or on exiting the configuration menus, check that the inputs assigned to the run command are deactivated (at state 0) since they can cause the motor to start immediately. **Failure to adhere to these precautions will result in death or serious injury.**

- If the safety of personnel requires the prohibition of unwanted or unexpected restarting, electronic locking is performed by the Altivar 71's Power Removal function.
- This function requires the use of connection diagrams conforming to category 3 of standard EN954-1 and integrity level 2 according to IEC/EN61508.
  The Power Removal function takes priority over any run command.

Drive references

Single phase supply voltage: 200…240 V 50/60 Hz

3-phase motor 200...240 V

Motor		Line supply (input)					Drive (output)			Altivar 71
Power indicated on plate (1)		Max. line current (2)		Max. prospective line Isc	Apparent power	Max. inrush current (3)	Nominal current In (1)	Max. transient current for (1)		Reference (5)
		at 200 V	at 240 V					60 s	2 s	
kW	HP	A	A	kA	kVA	A	A	A	A	
0.37	0.5	6.9	5.8	5	1.4	9.6	3	4.5	4.9	**ATV71H075M3(4)**
0.75	1	12	9.9	5	2.4	9.6	4.8	7.2	7.9	**ATV71HU15M3(4)**
1.5	2	18.2	15.7	5	3.7	9.6	8	12	13.2	**ATV71HU22M3(4)**
2.2	3	25.9	22.1	5	5.3	9.6	11.0	16.5	18.1	**ATV71HU30M3(4)**
3	-	25.9	22	5	5.3	9.6	13.7	20.6	22.6	**ATV71HU40M3(4)(6)**
4	5	34.9	29.9	22	7	9.6	17.5	26.3	28.8	**ATV71HU55M3(4)(6)**
5.5	7.5	47.3	40.1	22	9.5	23.4	27.5	41.3	45.3	**ATV71HU75M3(4)(6)**

3-phase supply voltage: 200…240 V 50/60 Hz

3-phase motor 200...240 V

Motor		Line supply (input)					Drive (output)			Altivar 71
Power indicated on plate (1)		Max. line current (2)		Max. prospective line Isc	Apparent power	Max. inrush current (3)	Nominal current In (1)	Max. transient current for (1)		Reference (5)
		at 200 V	at 240 V					60 s	2 s	
kW	HP	A	A	kA	kVA	A	A	A	A	
0.37	0.5	3.5	3.1	5	1.3	9.6	3	4.5	4.9	**ATV71H037M3(4)**
0.75	1	6.1	5.3	5	2.2	9.6	4.8	7.2	7.9	**ATV71H075M3(4)**
1.5	2	11.3	9.6	5	4	9.6	8	12	13.2	**ATV71HU15M3(4)**
2.2	3	15	12.8	5	5.3	9.6	11	16.5	18.1	**ATV71HU22M3(4)**
3	-	19.3	16.4	5	6.8	9.6	13.7	20.6	22.6	**ATV71HU30M3(4)**
4	5	25.8	22.9	5	9.2	9.6	17.5	26.3	28.8	**ATV71HU40M3(4)**
5.5	7.5	35	30.8	22	12.4	23.4	27.5	41.3	45.3	**ATV71HU55M3(4)**
7.5	10	45	39.4	22	15.9	23.4	33	49.5	54.5	**ATV71HU75M3(4)**
11	15	53.3	45.8	22	18.8	93.6	54	81	89.1	**ATV71HD11M3X(4)**
15	20	71.7	61.6	22	25.1	93.6	66	99	109	**ATV71HD15M3X(4)**
18.5	25	77	69	22	27.7	100	75	112	124	**ATV71HD18M3X**
22	30	88	80	22	32	100	88	132	145	**ATV71HD22M3X**
30	40	124	110	22	42.4	250	120	180	198	**ATV71HD30M3X**
37	50	141	127	22	51	250	144	216	238	**ATV71HD37M3X**
45	60	167	147	22	65	250	176	264	290	**ATV71HD45M3X**
55	75			35			221	331	365	**ATV71HD55M3X**
75	100			35			285	427	470	**ATV71HD75M3X**

(1) These power ratings and these currents are given for an ambient temperature of 50°C at the factory-set switching frequency, used in continuous operation (switching frequency factory setting 4 kHz for ATV71H 037M3 to D15M3X drives and 2.5 kHz for ATV71H D18M3X to D75M3X drives).
Above this factory setting, the drive will reduce the switching frequency of its own accord in the event of excessive temperature rise. For continuous operation above the factory setting, derating must be applied to the drive nominal current in accordance with the curves on pages 12 and 13.

(2) Current on a line supply with the "Max. prospective line Isc" indicated and for a drive without any external options.

(3) Peak current on power-up for the max. voltage (240 V +10%).

(4) ATV71H 037M3 to D15M3X drives are available with or without a graphic keypad. The reference for drives without a graphic keypad has the letter Z added at the end, e.g.: ATV71H075M3Z.

(5) Drives with the S337 or 337 extension have a protective varnish on the electronic cards for particular environmental conditions (class 3C2 in accordance with IEC 721-3-3).

(6) A line choke must be used if these drives are connected to a single phase supply (please refer to the catalog).

The [Input phase loss] fault must be configured as [No] so that ATV71H 075M3 to HU75M3 drives can operate on a single phase supply. If this fault is set to its factory configuration [Yes], the drive will stay locked in [Mains phase loss] fault mode.

Drive references

3-phase supply voltage: 380…480 V 50/60 Hz

3-phase motor 380...480 V

Motor		**Line supply (input)**					**Drive (output)**				**Altivar 71**
Power indicated on plate (1)		Max. line current (2)		Max. prospective line Isc	Apparent power	Max. inrush current (3)	Max. available nominal current In (1)		Max. transient current for (1)		Reference (5)
		at 380 V	at 480 V				at 380 V	at 460 V	60 s	2 s	
kW	HP	A	A	kA	kVA	A	A	A	A	A	
0.75	1	3.7	3	5	2.4	19.2	2.3	2.1	3.5	3.8	**ATV71H075N4(4)**
1.5	2	5.8	5.3	5	4.1	19.2	4.1	3.4	6.2	6.8	**ATV71HU15N4(4)**
2.2	3	8.2	7.1	5	5.6	19.2	5.8	4.8	8.7	9.6	**ATV71HU22N4(4)**
3	-	10.7	9	5	7.2	19.2	7.8		11.7	12.9	**ATV71HU30N4(4)**
4	5	14.1	11.5	5	9.4	19.2	10.5	7.6	15.8	17.3	**ATV71HU40N4(4)**
5.5	7.5	20.3	17	22	13.7	46.7	14.3	11	21.5	23.6	**ATV71HU55N4(4)**
7.5	10	27	22.2	22	18.1	46.7	17.6	14	26.4	29	**ATV71HU75N4(4)**
11	15	36.6	30	22	24.5	93.4	27.7	21	41.6	45.7	**ATV71HD11N4(4)**
15	20	48	39	22	32	93.4	33	27	49.5	54.5	**ATV71HD15N4(4)**
18.5	25	45.5	37.5	22	30.5	93.4	41	34	61.5	67.7	**ATV71HD18N4**
22	30	50	42	22	33	75	48	40	72	79.2	**ATV71HD22N4**
30	40	66	56	22	44.7	90	66	52	99	109	**ATV71HD30N4**
37	50	84	69	22	55.7	90	79	65	118.5	130	**ATV71HD37N4**
45	60	104	85	22	62.7	200	94	77	141	155	**ATV71HD45N4**
55	75	120	101	22	81.8	200	116	96	174	191	**ATV71HD55N4**
75	100	167	137	22	110	200	160	124	240	264	**ATV71HD75N4**
90	125	166	134	35	110		179	179	295	268	**ATV71HD90N4**
110	150	202	163	35	134		215	215	354	322	**ATV71HC11N4**
132	200	239	192	35	158		259	259	427	388	**ATV71HC13N4**
160	250	289	233	50	192		314	314	518	471	**ATV71HC16N4**
200	300	357	286	50	236		387	387	638	580	**ATV71HC20N4**
220	350	396	320	50	263		427	427	704	640	**ATV71HC28N4**
250	400	444	357	50	294		481	481	793	721	
280	450	494	396	50	327		550	550	907	825	
315	500	555	444	50	367		616	616	1016	924	**ATV71HC35N4**
355	-	637	512	50	422		671	671	1107	1006	
400	600	709	568	50	469		759	759	1252	1138	**ATV71HC40N4**
500	800	876	699	50	578		941	941	1552	1411	**ATV71HC50N4**

(1) These power ratings and these currents are given for an ambient temperature of 50°C at the factory-set switching frequency, used in continuous operation (switching frequency factory setting 4 kHz for ATV71H 075N4 to D30N4 drives and 2.5 kHz for ATV71H D37N4 to C50N4 drives).
Above this factory setting, the drive will reduce the switching frequency of its own accord in the event of excessive temperature rise. For continuous operation above the factory setting, derating must be applied to the drive nominal current in accordance with the curves on pages 12 and 13

(2) Current on a line supply with the "Max. prospective line Isc" indicated and for a drive without any external options.

(3) Peak current on power-up for the max. voltage (480 V +10%).

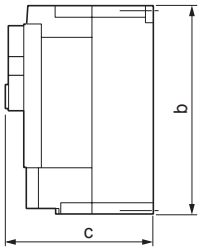
(4) ATV71H 075N4 to D15N4 drives are available with or without a graphic keypad. The reference for drives without a graphic keypad has the letter Z added at the end, eg: ATV71H075N4Z.

(5) Drives with the S337 or 337 extension have a protective varnish on the electronic cards for particular environmental conditions (class 3C2 in accordance with IEC 721-3-3).

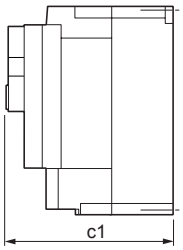
Dimensions and weights

With graphic keypad

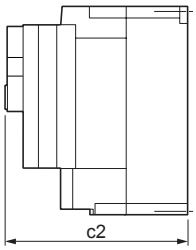
Without option card

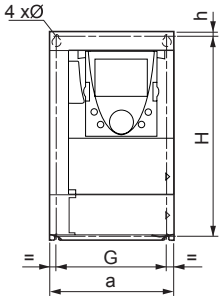


With 1 option card (1)



With 2 option cards (1)

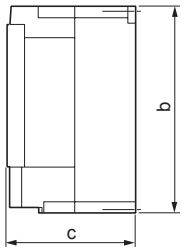




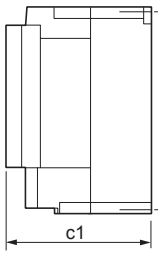
ATV71H	a mm (in.)	b mm (in.)	c mm (in.)	c1 mm (in.)	c2 mm (in.)	G mm (in.)	H mm (in.)	h mm (in.)	Ø mm (in.)	For screw	Weight kg (lb.)
037M3, 075M3, U15M3, 075N4, U15N4,U22N4	130 (5.12)	230 (9.05)	172 (6.77)	195 (7.68)	218 (8.58)	113.5 (4.47)	220 (8.66)	5 (0.20)	5 (0.20)	M4	3 (6.61)
U22M3, U30M3, U40M3, U30N4, U40N4	155 (6.10)	260 (10.23)	184 (7.25)	207 (8.15)	230 (9.06)	138 (5.43)	249 (9.80)	4 (0.16)	5 (0.20)	M4	4 (8.82)
U55M3, U55N4, U75N4	175 (6.89)	295 (11.61)	184 (7.25)	207 (8.15)	230 (9.06)	158 (6.22)	283 (11.14)	6 (0.24)	6 (0.24)	M5	5.5 (12.13)
U75M3, D11N4	210 (8.27)	295 (11.61)	210 (8.27)	233 (9.17)	256 (10.08)	190 (7.48)	283 (11.14)	6 (0.24)	6 (0.24)	M5	7 (15.43)
D11M3X, D15M3X, D15N4, D18N4	230 (9.05)	400 (15.75)	210 (8.27)	233 (9.17)	256 (10.08)	210 (8.26)	386 (15.20)	8 (0.31)	6 (0.24)	M6	9 (19.84)
D18M3X, D22M3X, D22N4	240 (9.45)	420 (16.54)	210 (8.27)	243 (9.57)	266 (10.47)	206 (8.11)	403 (15.87)	11 (0.45)	5.5 (0.22)	M6	30 (66.14)
D30N4, D37N4	240 (9.45)	550 (21.65)	240 (9.45)	263 (10.35)	286 (11.25)	206 (8.11)	531.5 (20.93)	11 (0.45)	5.5 (0.22)	M6	37 (81.57)
D30M3X, D37M3X, D45M3X	320 (12.60)	550 (21.65)	240 (9.45)	263 (10.35)	286 (11.25)	280 (11.02)	524 (20.93)	20 (0.79)	8.6 (0.22)	M8	37 (81.57)
D45N4, D55N4, D75N4	320 (12.60)	630 (24.80)	290 (11.42)	315 (12.40)	335 (13.19)	280 (11.02)	604.5 ((23.80)	15 (0.59)	9 (0.22)	M8	45 (99.21)

Without graphic keypad

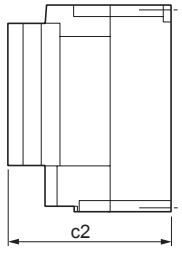
Without option card

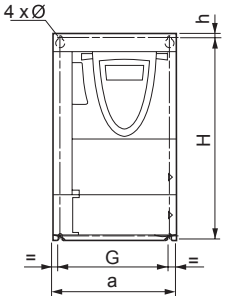


With 1 option card (1)



With 2 option cards (1)



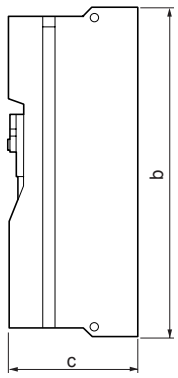


ATV71H	a mm (in.)	b mm (in.)	c mm (in.)	c1 mm (in.)	c2 mm (in.)	G mm (in.)	H mm (in.)	h mm (in.)	Ø mm (in.)	For screw	Weight kg (lb.)
037M3Z, 075M3Z, U15M3Z, 075N4Z, U15N4Z,U22N4Z	130 (5.12)	230 (9.05)	149 (5.87)	172 (6.77)	195 (7.68)	113.5 (4.47)	220 (8.66)	5 (0.20)	5 (0.20)	M4	3 (6.61)
U22M3Z, U30M3Z, U40M3Z, U30N4Z, U40N4Z	155 (6.10)	260 (10.23)	161 (6.34)	184 (7.25)	207 (8.15)	138 (5.43)	249 (9.80)	4 (0.16)	5 (0.20)	M4	4 (8.82)
U55M3Z, U55N4Z, U75N4Z	175 (6.89)	295 (11.61)	161 (6.34)	184 (7.25)	207 (8.15)	158 (6.22)	283 (11.14)	6 (0.24)	6 (0.24)	M5	5.5 (12.13)
U75M3Z, D11N4Z	210 (8.27)	295 (11.61)	187 (7.36)	210 (8.27)	233 (9.17)	190 (7.48)	283 (11.14)	6 (0.24)	6 (0.24)	M5	7 (15.43)
D11M3XZ, D15M3XZ, D15N4Z	230 (9.05)	400 (15.75)	187 (7.36)	210 (8.27)	233 (9.17)	210 (8.26)	386 (15.20)	8 (0.31)	6 (0.24)	M6	9 (19.84)

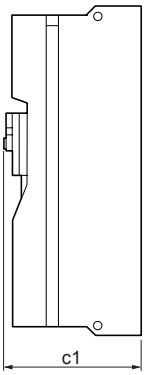
(1) For the addition of I/O extension cards, communication cards or the programmable card "Controller Inside".

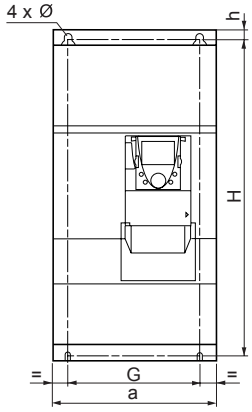
Dimensions and weights

With 0 or 1 option card (1)



With 2 option cards (1)



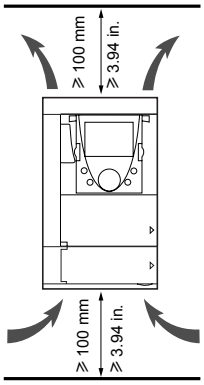


ATV71H	a mm (in.)	b1 mm (in.)	c mm (in.)	c1 mm (in.)	G mm (in.)	H mm (in.)	h mm (in.)	Ø mm (in.)	For screw	Weight kg (lb.)
D55M3X, D90N4, C11N4	310 (12.20)	680 (26.77)	375 (14.57)	395 (15.47)				12 (0.47)	M10	
D75M3X, C13N4	350 (13.78)	780 (30.71)	375 (14.57)	395 (15.47)				12 (0.47)	M10	
C16N4	440 (17.32)	950 (37.40)	375 (14.57)	392 (15.43)	350 (13.78)	920 (36.22)	15 (0.59)	12 (0.47)	M10	
C20N4, C28N4	590 (23.23)	950 (37.40)	375 (14.57)	393 (15.43)	500 (18.70)	920 (36.22)	15 (0.59)	12 (0.47)	M10	
C35N4, C40N4	890 (35.04)	1150 (45.28)	375 (14.57)							
C50N4	1110 (43.7)	1150 (45.28)	375 (14.57)							

(1) For the addition of I/O extension cards, communication cards or the programmable card "Controller Inside".

Mounting and temperature conditions

ATV71H 037M3X to D45M3X and ATV71H 075N4 to D75N4



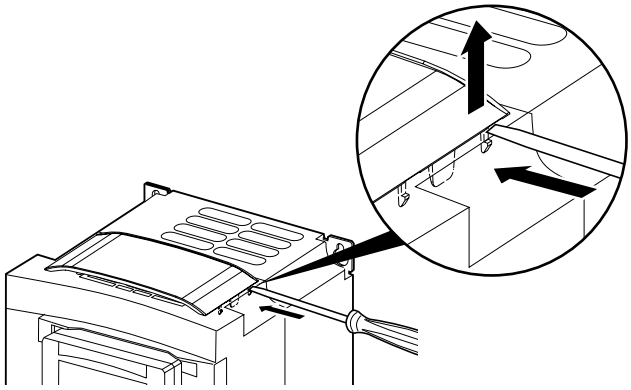
Install the drive vertically at ± 10°.
Do not place it close to heating elements.
Leave sufficient free space to ensure that the air required for cooling purposes can circulate from the bottom to the top of the unit.

Free space in front of the drive: 10 mm (0.39 in.) minimum

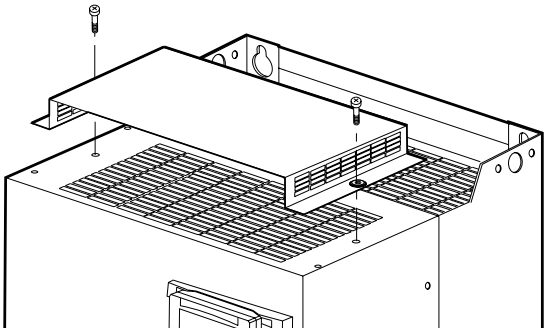
When IP20 is adequate, it is recommended that the protective cover on the top of the drive is removed as shown below.

Removing the protective cover

ATV71H 037M3 to D15M3X and ATV71H 075N4 to D18N4

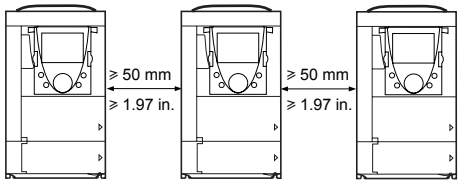


ATV71H D18M3X to D45M3X and ATV71H D22N4 to D75N4

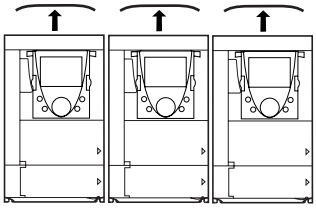


3 types of mounting are possible:

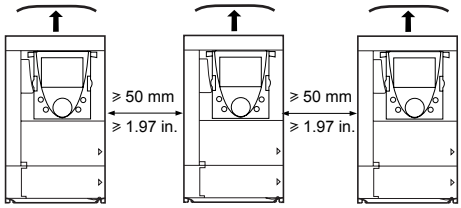
Type A mounting Free space ≥ 50 mm (≥ 1.97 in.) on each side, with protective cover fitted



Type B mounting Drives mounted side-by-side, protective cover removed (the degree of protection becomes IP20)



Type C mounting Free space ≥ 50 mm (≥ 1.97 in.) on each side, protective cover removed (the degree of protection becomes IP20)

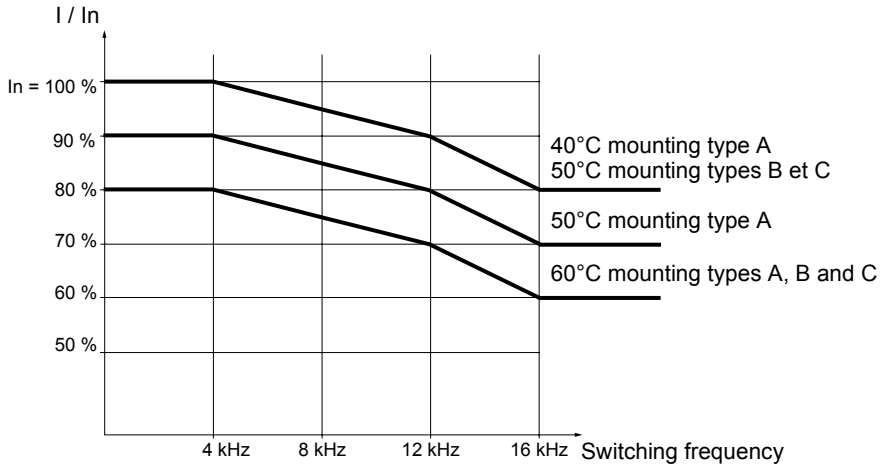


Mounting and temperature conditions

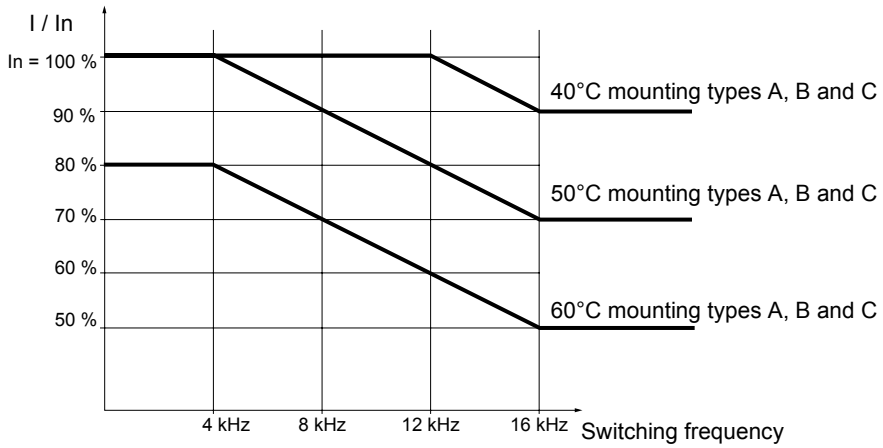
Derating curves

Derating curves for the drive current In as a function of the temperature, switching frequency and type of mounting.

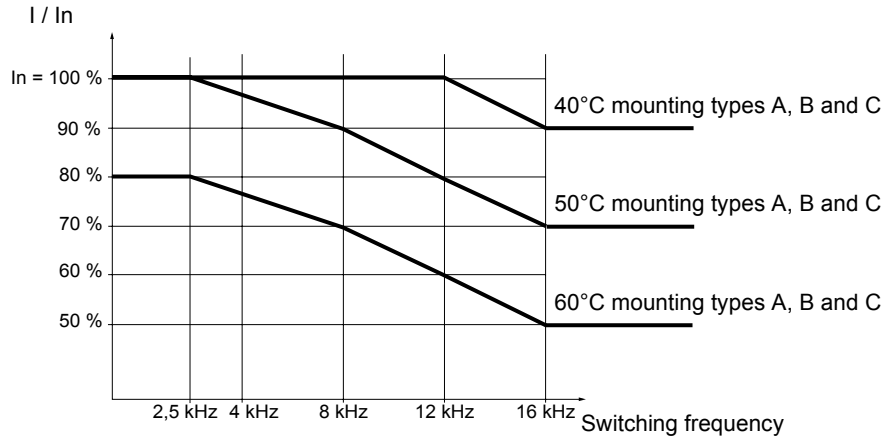
ATV71H 037M3 to D15M3X and ATV71H 075N4 to D18N4



ATV71H D22N4 and ATV71H D30N4



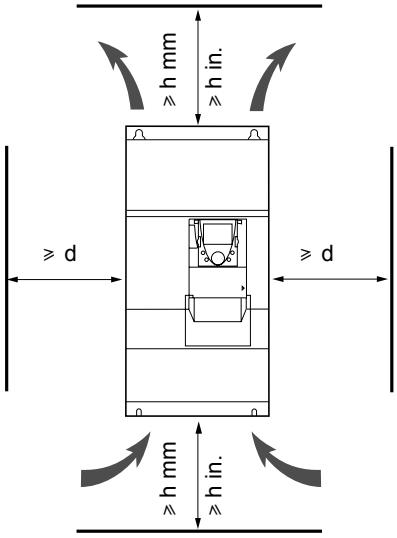
ATV71H D18M3X to D45M3X and ATV71H D37N4 to D75N4



For intermediate temperatures (e.g. 55°C), interpolate between 2 curves.

Mounting and temperature conditions

ATV71H D55M3X to D75M3X and ATV71H D90N4 to C50N4



Install the drive 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.

Free space in front of the drive: 10 mm (0.39 in.) minimum

- **ATV71H D55M3X to D75M3X and ATV71H D90N4 to C40N4:**
  d = 0 (No free space is required on either side)
- **ATV71HC50N4:**
  d = 50 mm (1.97 in.)

Derating curves

Derating curves for the drive current In as a function of the temperature and switching frequency.

I/In

40°C

50°C

60°C

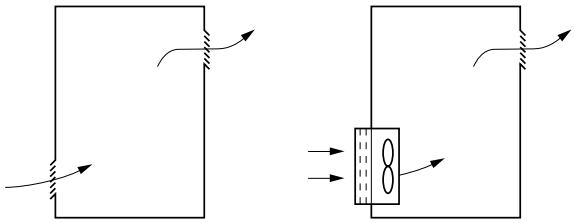
Switching frequency

For intermediate temperatures (e.g. 55°C), interpolate between 2 curves.

Mounting in a wall-fixing or floor-standing enclosure

Observe the mounting recommendations on the previous pages.
To ensure proper air circulation in the drive:

- Fit ventilation grilles
- Ensure that ventilation is adequate: if not, install forced ventilation with a filter
- Use special IP54 filters



Dust and damp proof metal wall-fixing or floor-standing enclosure (degree of protection IP54)

The drive must be mounted in a dust and damp proof enclosure 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 drive, add a fan to circulate the air inside the enclosure, reference VW3A71XXX (please refer to the catalog).

Mounting the drive in the enclosure

Power dissipated

These power ratings are given for operation at nominal load and for the factory-set switching frequency.

ATV71H	Power dissipated (1) W
037M3	46
075M3	66
U15M3	101
U22M3	122
U30M3	154
U40M3	191
U55M3	293
U75M3	363
D11M3X	566
D15M3X	620
D18M3X	799
D22M3X	865
D30M3X	1134
D37M3X	1337
D45M3X	1567
D55M3X	
D75M3X	

ATV71H	Power dissipated (1) W
075N4	44
U15N4	64
U22N4	87
U30N4	114
U40N4	144
U55N4	178
U75N4	217
D11N4	320
D15N4	392
D18N4	486
D22N4	717
D30N4	976
D37N4	1174
D45N4	1360
D55N4	1559
D75N4	2326
D90N4	

ATV71H	Power dissipated (1) W
C11N4	
C13N4	
C16N4	
C20N4	
C28N4	
C35N4	
C40N4	
C50N4	

(1) Add 7W to this value for each option card added

Ensure that the flow of air in the enclosure is at least equal to the value given in the table below for each drive.

ATV71H	Flow rate	
	m^3 / hour	CFM
037M3, 075M3, U15M3, 075N4, U15N4, U22N4	17	10
U22M3, U30M3, U40M3, U30N4, U40N4	56	33
U55M3, U55N4, U75N4	112	66
U75M3, D11N4	163	96
D11M3X, D15M3X, D15N4, D18N4	252	148
D18M3X, D22M3X, D22N4	203	119
D30N4, D37N4	203	119
D30M3X, D37M3X, D45M3X	406	239

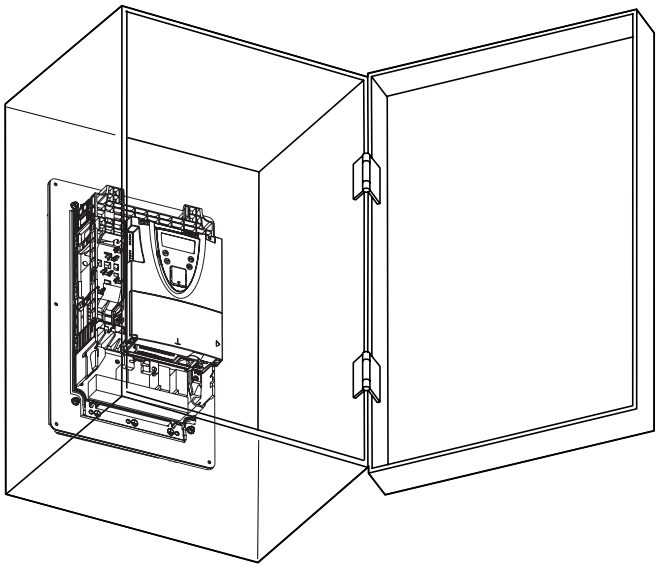
ATV71H	Flow rate	
	m^3 / hour	CFM
D45N4, D55N4, D75N4	406	239
D55M3X, D90N4, C11N4		
D75M3X, C13N4		
C16N4		
C20N4, C28N4		
C35N4, C40N4		
C50N4		

Mounting in a wall-fixing or floor-standing enclosure

Dust and damp proof flush mounting

This mounting is used to reduce the power dissipated in the enclosure by putting the power section outside the enclosure.
This requires the use of the dust and damp proof flush mounting kit VW3A9501...516.
The degree of protection for the drive mounted in this way becomes IP54.

To fit the kit to the drive, observe the mounting instructions supplied with the kit.



Example: ATV71HU55N4

Power dissipated inside the enclosure for dust and damp proof flush mounting

These power ratings are given for operation at nominal load and for the factory-set switching frequency.

ATV71H	Power dissipated (1) W
037M3	25
075M3	28
U15M3	35
U22M3	39
U30M3	41
U40M3	48
U55M3	71
U75M3	81
D11M3X	120
D15M3X	137
D18M3X	291
D22M3X	294
D30M3X	368
D37M3X	447
D45M3X	452
D55M3X	
D75M3X	

ATV71H	Power dissipated (1) W
075N4	28
U15N4	31
U22N4	35
U30N4	43
U40N4	48
U55N4	54
U75N4	64
D11N4	76
D15N4	100
D18N4	134
D22N4	298
D30N4	354
D37N4	441
D45N4	538
D55N4	592
D75N4	958
D90N4	

ATV71H	Power dissipated (1) W
C11N4	
C13N4	
C16N4	
C20N4	
C28N4	
C35N4	
C40N4	
C50N4	

(1) Add 7W to this value for each option card added

Fitting the DC choke

The ATV71H D55M3X to D75M3X and ATV71H D90N4 to C50N4 drives are supplied with a DC choke to be fitted on top of the drive.
This should ideally be fitted once the drive is fixed in place and before wiring it up.
Check that the drive is switched off. If not, disconnect the power supply downstream and wait 15 minutes until the red LED has gone out.
See page 18 for the position of the LED.

During installation, check that no liquids, dust or conductive objects can fall into the drive (degree of protection IP00 on top).
Once fitted, the degree of protection becomes IP31 on top.

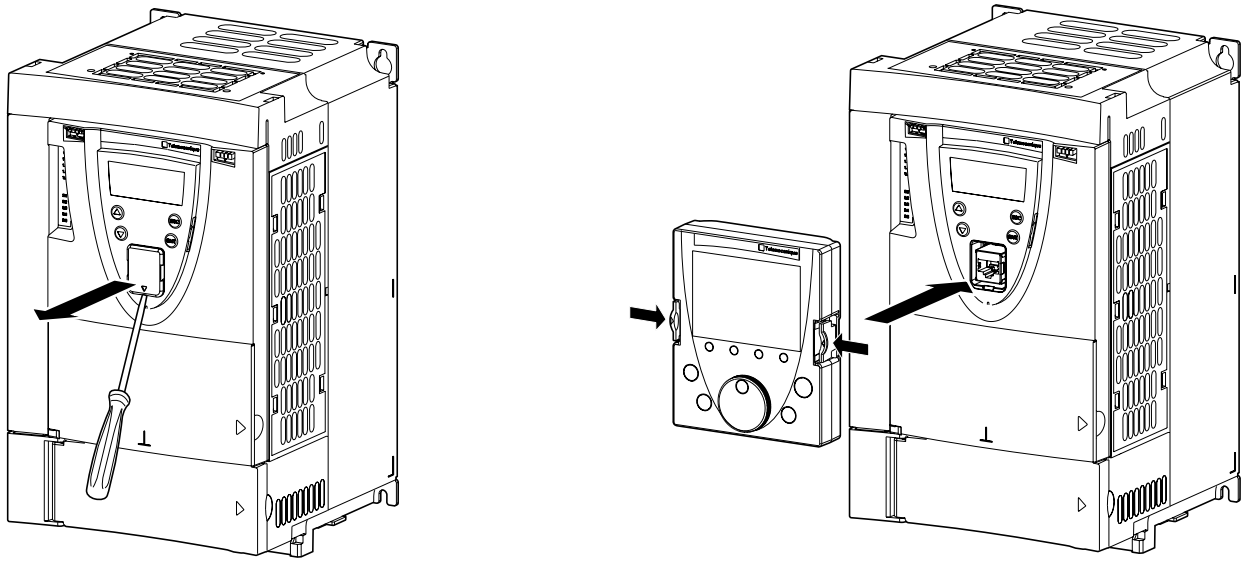
Take care not to damage the seals during this procedure.

ATV71H	a mm (in.)	b mm (in.)	H mm (in.)	Ø mm (in.)

Fitting the graphic keypad

Fitting the keypad on the drive

Drives whose reference ends in the letter Z are supplied without a graphic keypad (VW3A1101). This can be ordered separately.
It is fitted to the drive as shown below.



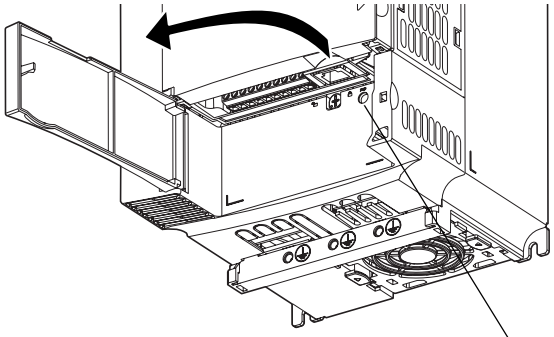
The graphic keypad may be connected or disconnected with the power on. Before disconnecting it, drive control via the keypad must be disabled (refer to the programming manual).

Position of the charging LED

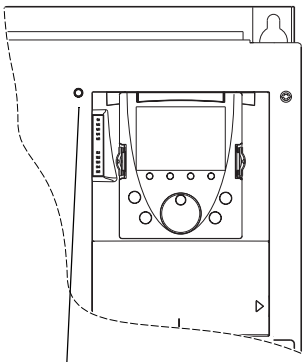
Before working on the drive, switch it off, wait until the red capacitor charging LED has gone out, then measure the DC bus voltage.

Position of the capacitor charging LED

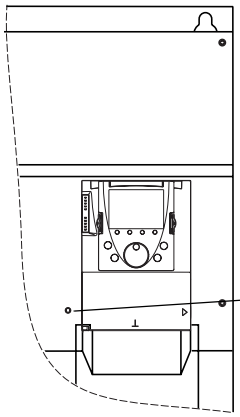
ATV71H 037M3 to D15M3X and ATV 71 075N4 to D18N4



ATV71H D18M3 to D45M3X and ATV 71H D22N4 to D75N4



ATV71H D55M3 to D75M3X and ATV 71H D90N4 to C50N4



Red LED indicating that the DC bus is switched on

Procedure for measuring the DC bus voltage

Read and take note of the instructions in the "programming manual".

⚠ DANGER

DANGEROUS VOLTAGE

Read and make sure you understand the precautions on page 4 before you begin this procedure.
Failure to adhere to this precaution will result in death or serious injury.

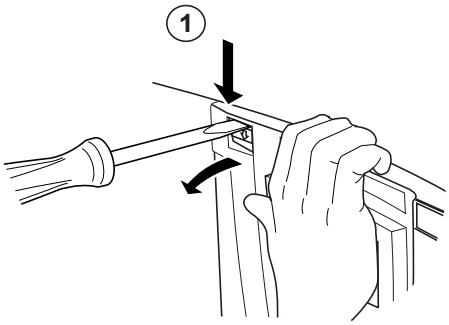
The bus voltage can exceed 1000 V⎓. Use a suitable measuring instrument when undertaking this procedure. To measure the DC bus voltage:

1 Disconnect the drive power supply.
2 Wait 3 minutes to allow the bus to discharge.
3 Measure the voltage of the DC bus between the PA/+ and PC/- terminals to check whether the voltage is less than 45V⎓. Refer to pages 26 and 28 for the layout of the power terminals. **It may take up to 15 minutes for the DC bus capacitors to discharge.**
4 If the DC bus capacitors have not discharged completely, contact your local Schneider Electric agent (do not repair or operate the drive).

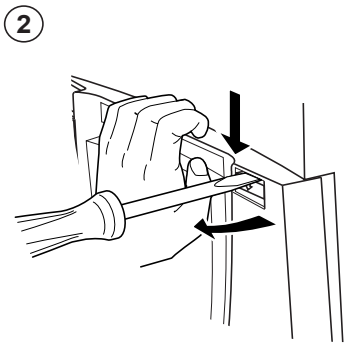
Fitting the option cards

These should ideally be fitted once the drive is fixed in place and before wiring it up.
Check that the red capacitor charging LED has gone out. Measure the DC bus voltage in accordance with the procedure indicated on page 18.
The option cards are fitted under the drive control front panel. Take off the graphic keypad, then remove the control front panel as indicated below.

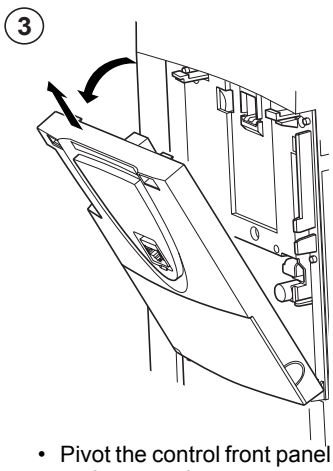
Removing the control front panel



- Using a screwdriver, press down on the catch and pull to release the left-hand part of the control front panel



- Do the same on the right-hand side



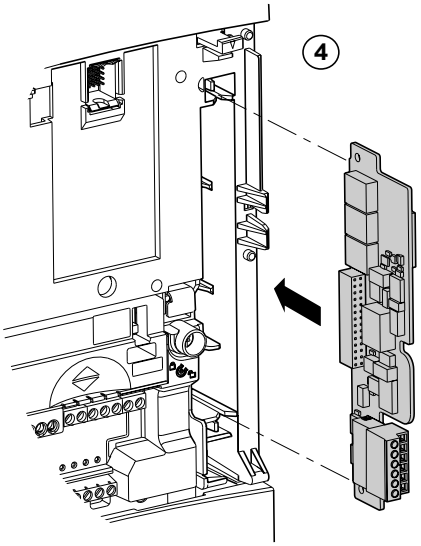
- Pivot the control front panel and remove it

ATV71H D55M3X to D75M3X and ATV71H D90N4 to C50N4 drives are supplied with an option card holder already fitted. If an I/O or communication option card or a programmable card "Controller Inside" has been added, remove it as indicated below.

Fitting the option cards

Fitting an encoder feedback card

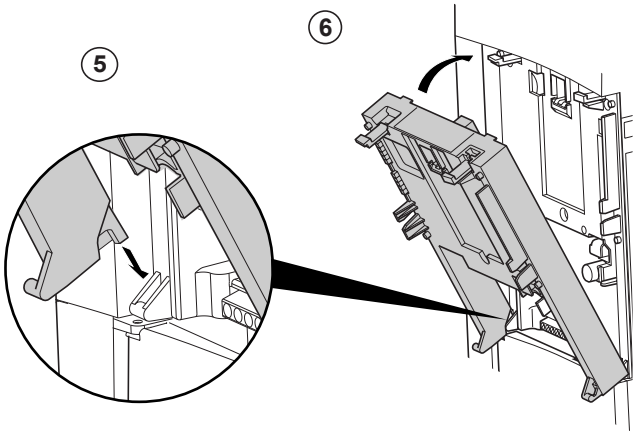
There is a special slot on the drive for the addition of an encoder feedback card



(1), (2) and (3) Remove the control front panel (see previous page)

If an I/O or communication option card or a programmable card "Controller Inside" has already been fitted, remove it so you can access the slot designed for the encoder feedback card

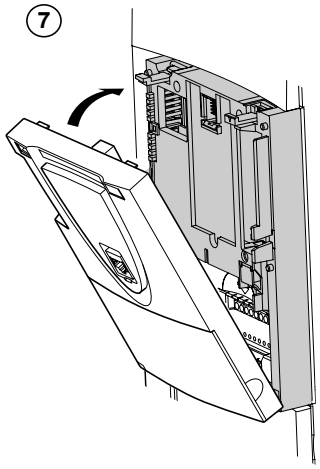
Fitting an I/O extension card, a communication card or programmable card "Controller Inside"



(1), (2) and (3) Remove the control front panel (see previous page)

(5) Position the option card on the clasps

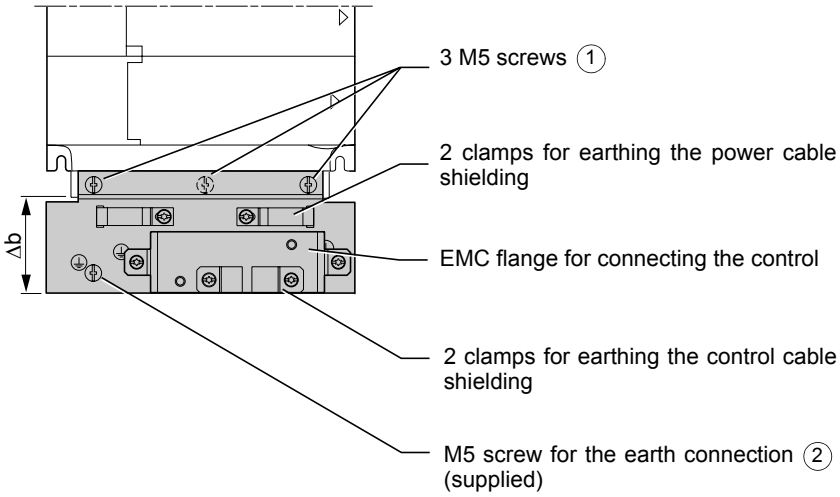
(6) then pivot it until it clicks into place



(7) Replace the control front panel over the option card (same procedure as for fitting the option, see (5) and (6))

Fitting the EMC plate

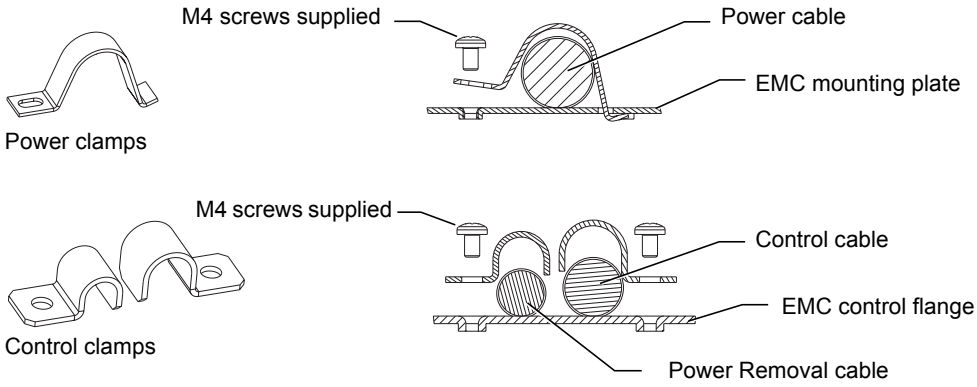
ATV71H 037M3 to D15M3X and ATV71H 075N4 to D18N4



Take out the three screws (1), then use two of these screws to fix the EMC equipotentiality plate in position.
Put the third screw in the position marked (2).

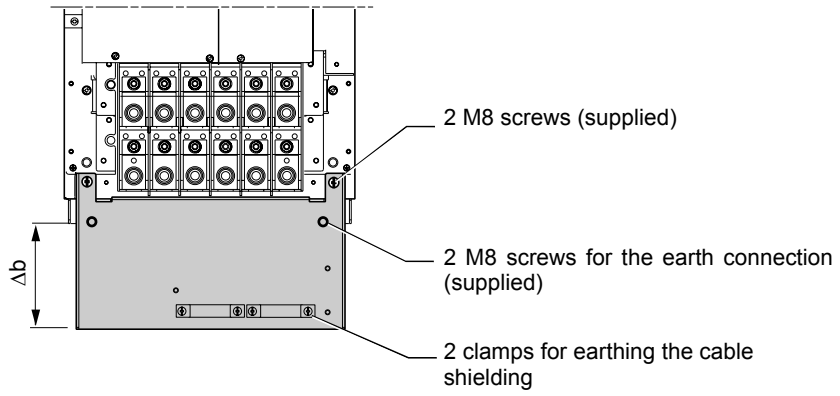
ATV71H	Δb mm (in.)
037M3, 075M3, U15M3, U22M3, U30N4, U40M3, 075N4, U15N4, U22N4, U30N4, U40N4	50 (1.97)
U55M3, U75M3, D11M3X, D15M3X, U55N4, U75N4, D11N4, D15N4, D18N4	49 (1.93)

Fixing the EMC clamps



ATV71H D18M3X to D45M3X and ATV71H D22N4 to D75N4

Remove the front panel so that you can fix the EMC mounting plate as shown below.



ATV71H	Δb mm (in.)
D18M3X, D22M3X, D22N4,D30N4, D37N4	120 (4.72)
D30M3X, D37M3X, D45M3X	120 (4.72)
D45N4, D55N4, D75N4	120 (4.72)

Fitting the EMC plate

ATV71H D55M3X to D75M3X and ATV71H D90N4 to C50N4

The EMC mounting plate is not supplied with the drive for these ratings. It must be ordered separately (please refer to the catalog)
It is fixed under the ATV71 as described below

ATV71H	a mm (in.)	b mm (in.)	c mm (in.)

Wiring recommendations

Power

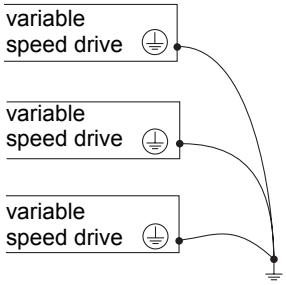
The drive must be earthed to conform with the regulations concerning high leakage currents (over 3.5 mA).

⚠ DANGER

DANGEROUS VOLTAGE

Earth the drive using the earthing connection point supplied as shown in the diagram. The drive fixing points must be earthed before switching on.

Failure to adhere to these precautions will result in death or serious injury.



• check whether the resistance to earth is one ohm or less. Earth a number of variable speed drives as shown on the left. Do not put earthing cables in a loop or in series.

⚠ WARNING

UNSUITABLE WIRING CONNECTIONS

- The ATV71 will be damaged if the line voltage is applied to the output terminals (U/T1,V/T2,W/T3).
- Check the electrical connections before switching on the ATV71.
- If you are replacing another variable speed drive, check that all the cable connections to the ATV71 conform to all the wiring instructions in this manual.

Failure to adhere to this precaution will result in death or serious injury.

When upstream protection by means of a "residual current device" is required by the installation standards, a type A device should be used for single phase drives and type B for 3-phase drives. Choose a suitable model incorporating:
- HF current filtering
- a time delay which prevents tripping caused by the load from stray capacitance on power-up. The time delay is not possible for 30 mA devices. In this case, choose devices with immunity against accidental tripping, for example "residual current devices" with reinforced immunity from the **s.i** range (Merlin Gerin brand).

If the installation includes several drives, provide one "residual current device" per drive.

⚠ WARNING

PROTECTION AGAINST INADEQUATES OVERCURRENTS

- Devices for protecting against overcurrents must be matched to the drive correctly.
- The Canadian electricity code or National Electrical code (US) insist on protection of branch circuits. Use the fuses recommended on the drive rating plate in order to obtain the nominal short-circuit current.
- Do not connect the drive to a power supply cable whose short-circuit capacity exceeds the short-circuit resistance indicated on the drive rating plate.

Failure to adhere to this precaution will result in death or serious injury.

Wiring recommendations

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

The motor cables must be at least 0.5 m (20 in.) long.
If you are using cables > 50 m (> 164 ft.) between the drive and the motor, add output filters (please refer to the catalog).

Do not immerse the motor cables in water.
Do not use lightning arresters or power factor correction capacitors on the variable speed drive output.

Control

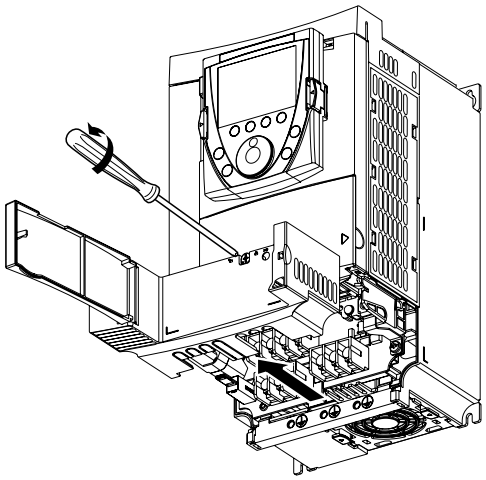
Keep the control circuits away from the power circuits. For control and speed reference circuits, we recommend using shielded twisted cables with a pitch of between 25 and 50 mm (0.98 and 1.97 in.) and connecting the shielding to ground at each end.

If using conduit, do not put the motor, power supply and control cables in the same conduit. Keep the metal conduit containing the power supply cables at least 8 cm (3 in.) away from the metal conduit containing the control cables. Keep the non-metal conduit or cable ducts containing the power supply cables at least 31 cm (12 in.) away from the metal conduits containing the control cables. The power supply and control cables must always cross over at right-angles.

Power terminals

Access to the power terminals

ATV71 H037M3 to HD15M3X and ATV71 H075N4 to HD18N4
Unlock the power access flap and remove it as shown below



Example of ATV71HU22M3

ATV71 HD18M3X to HD75M3X and ATV71 HD22N4 to HC50N4
Remove the front panel in order to access the power terminals

Example of ATV71HD22N4

Characteristics and functions of the power terminals

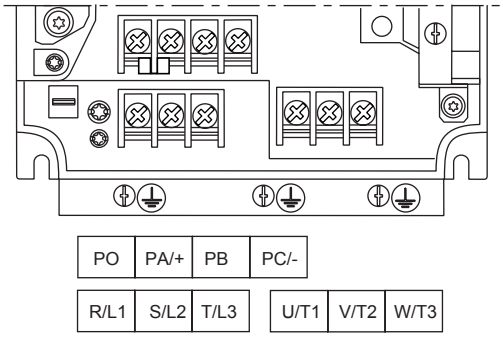
Terminal	Function	Altivar
⏚	Ground terminal	All ratings
R/L1 S/L2 T/L3	Power supply	All ratings
PO	DC bus + polarity	All ratings
PA/+	Output to braking resistor (+ polarity)	ATV71H●●●M3● ATV71H075N4 to HC16N4
PB	Output to braking resistor	
PC/-	DC bus - polarity	All ratings
U/T1 V/T2 W/T3	Outputs to the motor	All ratings

ATV71 H037M3 to HD45M3X and ATV71 H075N4 to HD75N4: Only remove the PO and PA/+ commoning link if a DC choke has been added

Power terminals

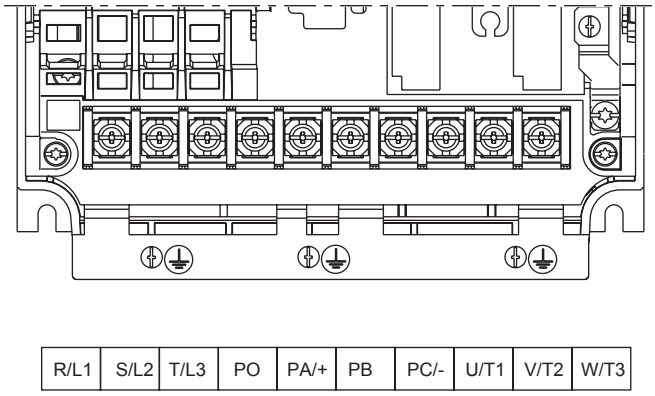
Arrangement of the power terminals

ATV71H 037M3, 075M3, U15M3, U22M3, U30M3, U40M3, 075N4, U15N4, U22N4, U30N4, U40N4



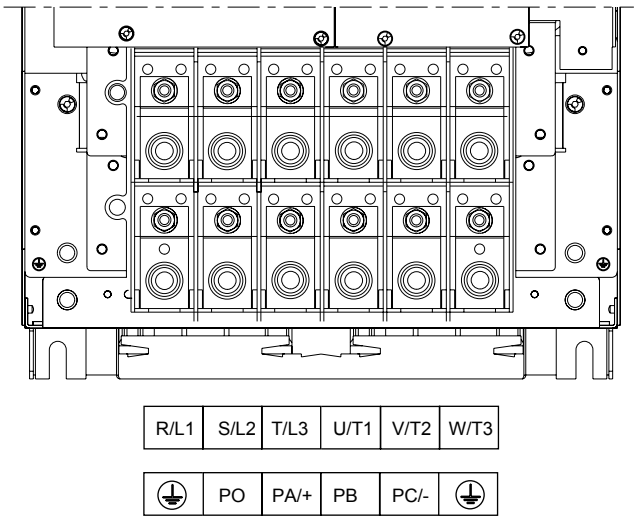
ATV71H	Maximum connection capacity:		Tightening torque
	mm²	AWG	Nm (lb.in)
037M3, 075M3, U15M3, 075N4, U15N4, U22N4	2.5	14	1.2 (10.6)
U22M3, U30M3, U40M3, U30N4, U40N4	6	8	1.2 (10.6)

ATV71H U55M3, U75M3, D11M3X, D15M3X, U55N4, U75N4, D11N4, D15N4, D18N4



ATV71H	Maximum connection capacity:		Tightening torque
	mm²	AWG	Nm (lb.in)
U55M3, U55N4, U75N4	10	6	2 (17.7)
U75M3, D11N4	16	4	2.4 (21)
D11M3X, D15M3X, D15N4, D18N4	35	1	2.4 (21)

ATV71H D18M3X, D22M3X, D30M3X, D37M3X, D45M3X, D22N4, D30N4, D37N4, D45N4, D55N4, D75N4



ATV71H	Maximum connection capacity:		Tightening torque
	mm²	AWG	Nm (lb.in)
D18M3X, D22M3X, D22N4, D30N4, D37N4	50	1/0	6 (53)

ATV71H	Maximum connection capacity		Tightening torque
	mm²	kcmils	Nm (lb.in)
D30M3X, D37M3X, D45M3X, D45N4, D55N4, D75N4	120	350	19 (168)

Power terminals

ATV71H D55M3X, D90N4, C11N4

	Tightening torque
	Nm (lb.in)

ATV71H D75M3X, C13N4

	Tightening torque
	Nm (lb.in)

ATV71HC16N4

	Tightening torque
	Nm (lb.in)

Power terminals

ATV71H C20N4, C28N4

	Tightening torque
	Name (lb.in)

ATV71H C35N4, C40N4

	Tightening torque
	Name (lb.in)

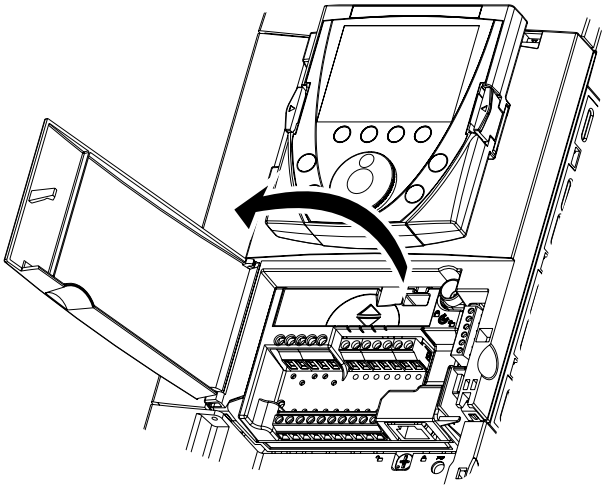
ATV71HC50N4

	Tightening torque
	Name (lb.in)

Power terminals

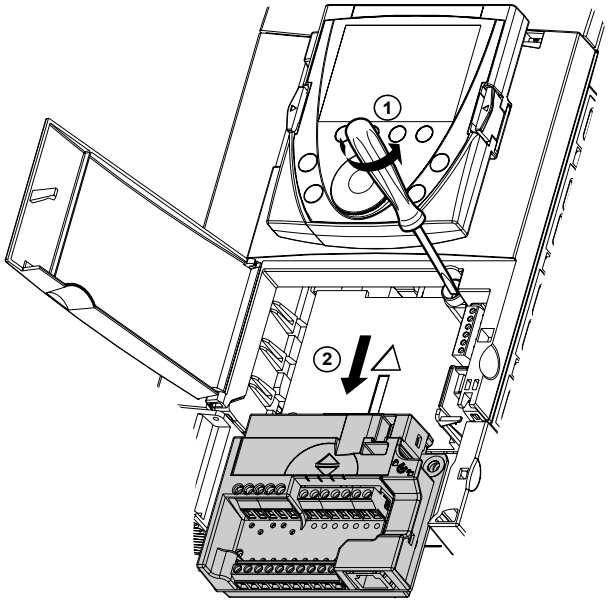
Control terminals

Access to the control terminals



To access the control terminals,
open the cover on the control front panel

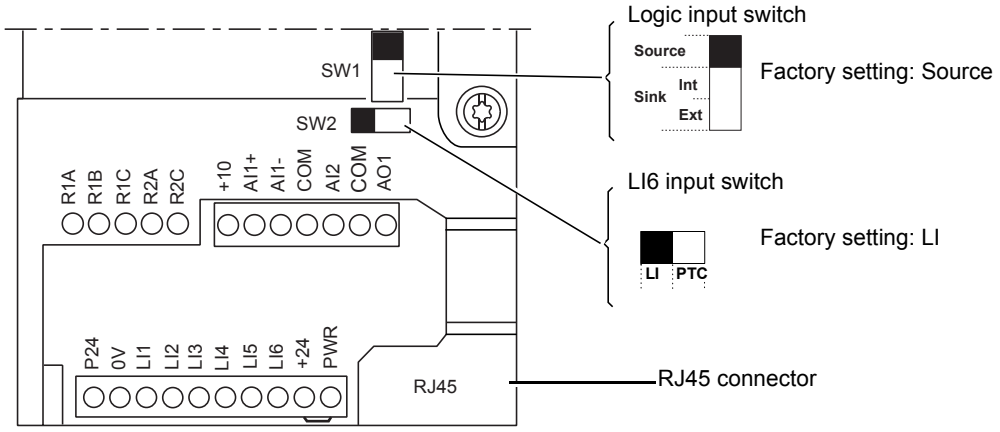
Removing the terminal card



To make it easier to wire up the drive control section,
the control terminal card can be removed.

- undo the screw until the spring is fully extended
- remove the card by sliding it downwards

Arrangement of control terminals



Maximum connection capacity:
2.5 mm² - AWG 14

Max. tightening torque:
0.6 Nm - 5.3 lb.in

Note: The ATV71 is supplied with a link between the PWR and +24 terminals.

Control terminals

Arrangement, characteristics and functions of the control terminals

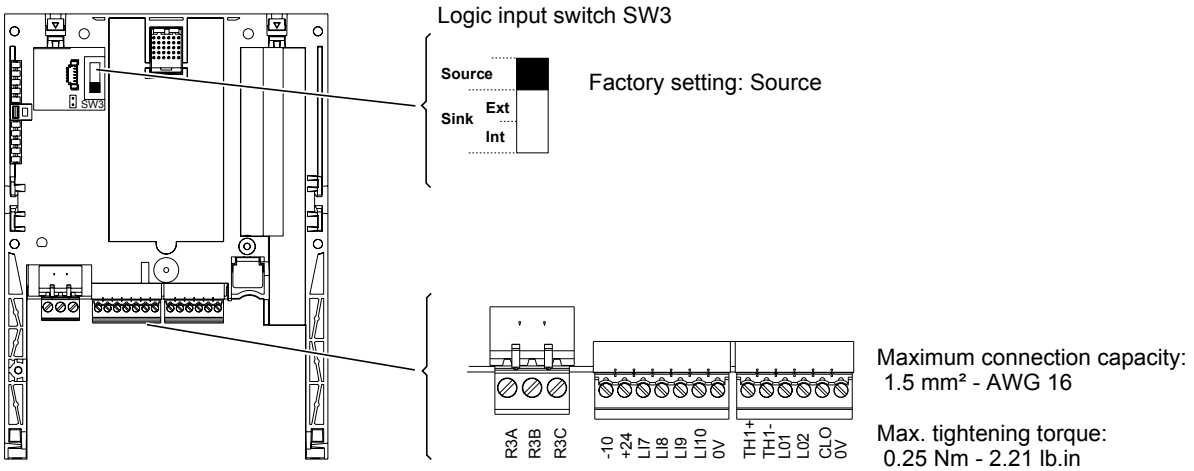
Terminals	Function	Electrical characteristics
R1A R1B R1C	Common point C/O contact (R1C) of programmable relay R1	• minimum switching capacity: 3 mA for 24 V ⎓ • maximum switching capacity on resistive load (cos φ = 1): 5 A for 250 V ∿ or 30 V ⎓ • maximum switching current on inductive load (cos φ = 0.4 L/R = 7 ms): 2 A for 250 V ∿ or 30 V ⎓ • reaction time: 7 ms ± 0.5 ms • service life: 100,000 operations at max. switching power
R2A R2C	N/O contact of programmable relay R2	

+10	+ 10 V ⎓ power supply for reference potentiometer 1 to 10 kΩ	• + 10 V ⎓ (10.5 V ⎓ ± 5V) • 10 mA max.
AI1+ AI1 -	Differential analog input AI1	• -10 to +10 V ⎓ (max. safe voltage 24 V ⎓) • reaction time: 2 ms ± 0.5 ms, 11-bit resolution + 1 sign bit • accuracy ± 0.6% for a Δθ = 60°C, linearity ± 0.15%, of max. value
COM	Analog I/O common	0V
AI2	Depending on software configuration: Analog voltage input or Analog current input	• analog input 0 to +10 V⎓ (max. safe voltage 24 V ⎓), impedance 30 kΩ or • analog input X - Y mA, X and Y can be programmed from 0 to 20 mA • impedance 250 Ω • reaction time: 2 ms ± 0.5 ms • 11-bit resolution, accuracy ± 0.6% for a Δθ = 60°C, linearity ± 0.15%, of max. value
COM	Analog I/O common	0V
AO1	Depending on software configuration: Analog voltage output or Analog current output	• analog output 0 to +10 V⎓, min. load impedance 470 Ω or • analog output X - Y mA, X and Y can be programmed from 0 to 20 mA • max. load impedance 500 Ω • 10-bit resolution, reaction time: 2 ms ± 0.5 ms • accuracy ± 1% for a Δθ = 60°C, linearity ± 0.2%, of max. value

P24	External +24V⎓ control power supply	• +24 V ⎓ (min. 19 V ⎓, max. 30 V ⎓) • power 30 Watts
0V	Logic I/O common	
LI1 LI2 LI3 LI4 LI5	Programmable logic inputs	• +24 V ⎓ (Max. 30 V ⎓) • impedance 3.5 kΩ • reaction time: 2 ms ± 0.5 ms SW1 switch / State 0 / State 1 Source (factory setting) / < 5 V ⎓ / > 11 V ⎓ Sink Int or Sink Ext / > 16 V ⎓ / < 10 V ⎓
LI6	Depending on the position of the SW2 switch. - Programmable logic input or - Input for PTC probes	SW2 switch on LI (factory setting) • same characteristics as logic inputs LI1 to LI5 or SW2 switch on PTC • trip threshold 3 kΩ, reset threshold 1.8 kΩ • short-circuit detection threshold < 50 Ω
+24	Logic input power supply	SW1 switch in Source or Sink Int position • +24 V ⎓ output (min. 21 V ⎓, max. 27 V ⎓), protected against short-circuits and overloads • max. current available for customers 200 mA SW1 switch in Sink Ext position • inputs for external +24 V ⎓ power supply for the logic inputs
PWR	Power Removal safety function input When PWR is not connected to the 24V, the motor cannot be started (compliance with safety standard EN954-1 and IEC/EN61508)	• 24 V ⎓ power supply (max. 30 V ⎓) • impedance 1.5 kΩ • state 0 if < 2V , state 1 if > 17V

Option terminals

Logic I/O option card terminals



Arrangement, specifications and functions of the terminals

Terminals	Function	Electrical characteristics
R3A R3B R3C	Common point C/O contact R3C of programmable relay R3	• minimum switching capacity: 3mA for 24 V ⎓ • maximum switching capacity on resistive load (cos φ = 1): 5 A for 250 V ∿ or 30 V ⎓ • maximum switching capacity on inductive load (cos φ = 0.4 L/R = 7 ms): 2 A for 250 V ∿ or 30 V ⎓ • reaction time: 7 ms ± 0.5 ms • service life: 100,000 operations

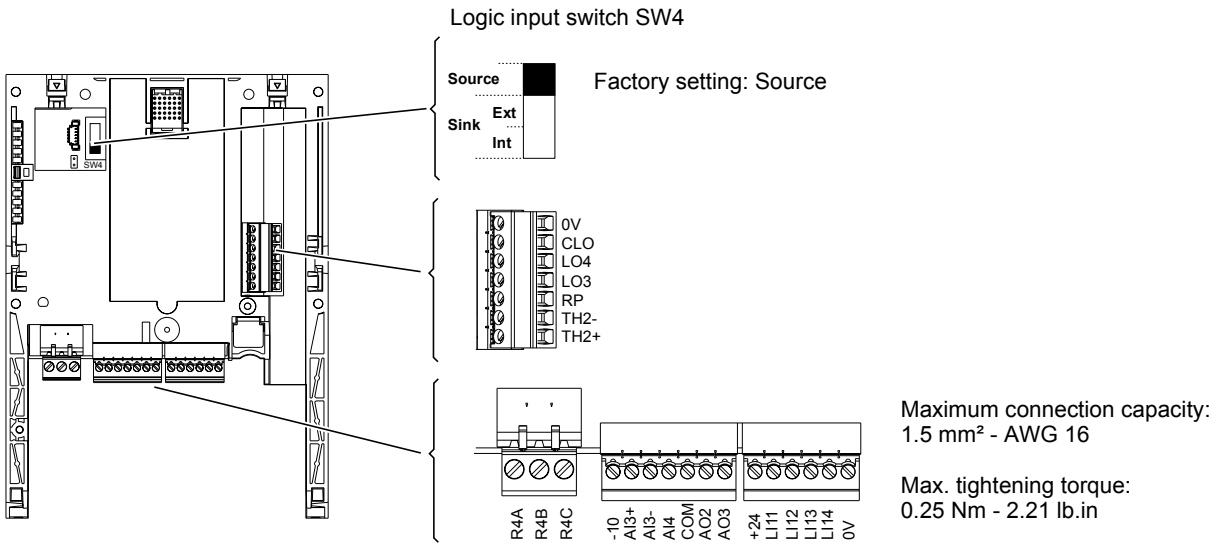
-10	-10 V ⎓ power supply for reference potentiometer 1 to 10 kΩ	• - 10 V ⎓ (-10.5 V⎓ ± 5V) • 10 mA max.
+24	Logic input power supply	SW3 switch in Source or Sink Int position • +24 V ⎓ (min. 21 V ⎓, max. 27 V ⎓), protected against short-circuits and overloads • max. current available for customers 200 mA (This current corresponds to the total consumption on the control card +24 and the option cards +24) SW3 switch in Sink Ext position • inputs for external +24 V ⎓ power supply for the logic inputs
LI7 LI8 LI9 LI10	Programmable logic inputs	• +24 V ⎓ (max. 30 V ⎓) • impedance 3.5 kΩ • reaction time 2 ms ± 0.5 ms
0 V	0 V	0 V

SW3 switch	State 0	State 1
Source (factory setting)	< 5 V ⎓	> 11 V ⎓
Sink Int or Sink Ext	> 16 V ⎓	< 10 V ⎓

TH1+	PTC probe input	• trip threshold 3 kΩ, reset threshold 1.8 kΩ • short-circuit or open-circuit detection threshold < 50 Ω
TH1-	PTC probe zero	
LO1 LO2	Open collector programmable logic outputs	• +24 V ⎓ (max. 30 V ⎓) • max. current 20 mA for internal power supply and 200 mA for external power supply • reaction time: 2 ms ± 0.5 ms
CLO	Logic output common	
0V	0 V	0 V

Option terminals

Extended I/O option card terminals



Arrangement, specifications and functions of the terminals

Terminals	Function	Electrical characteristics
R4A R4B R4C	Common point C/O contact R4C of programmable relay R4	• minimum switching capacity: 3mA for 24 V ⎓ • maximum switching capacity on resistive load (cos φ = 1): 5 A for 250 V ∿ or 30 V ⎓ • maximum switching capacity on inductive load (cos φ = 0.4 L/R = 7 ms): 1.5 A for 250 V ∿ or 30 V ⎓ • reaction time 10 ms ± 1ms • service life: 100,000 operations

-10	-10 V ⎓ power supply for reference potentiometer 1 to 10 kΩ	• - 10 V ⎓ (-10.5 V⎓ ± 5V) • 10 mA max.
AI3 +	+ polarity of the current differential analog input AI3	• analog input X - Y mA, X and Y can be programmed from 0 to 20 mA, impedance 250 Ω • reaction time: 5 ms ± 1 ms • 11-bit resolution + 1 sign bit, accuracy ± 0.6% for a Δθ = 60°C • linearity ± 0.15% of max. value
AI3 -	- polarity of the current differential analog input AI3	
AI4	Depending on software configuration: Analog current input or Analog voltage input	• analog input 0 to +10 V⎓ (max. safe voltage 24 V ⎓), impedance 30 kΩ or • analog input X - Y mA, X and Y can be programmed from 0 to 20 mA, impedance 250 Ω • reaction time: 5 ms ± 1 ms • 11-bit resolution, accuracy ± 0.6% for a Δθ = 60°C, linearity ± 0.15%, of max. value
COM	Analog I/O common	0 V
AO2 AO3	Depending on software configuration: Analog voltage outputs or Analog current outputs	• 0 - 10 V ⎓ or -10/+10 V ⎓ bipolar analog input depending on software configuration, min. load impedance 470 Ω or • current analog input X-Y mA, X and Y can be programmed from 0 to 20 mA, max. load impedance 500 Ω • 10-bit resolution • reaction time 5 ms ± 1ms, accuracy ± 1% for a Δθ = 60°C, linearity ± 0.2%

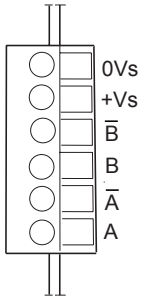
Option terminals

+24	Logic input power supply	SW4 switch in Source or Sink Int position • +24 V ⎓ output (min. 21 V ⎓, max. 27 V ⎓), protected against short-circuits and overloads • max. current available for customers 200 mA (This current corresponds to the total consumption on the control card +24 and the option cards +24) SW4 switch in Sink ext position • inputs for external +24 V ⎓ power supply for the logic inputs
LI11 LI12 LI13 LI14	Programmable logic inputs	• +24 V ⎓ (max. 30 V ⎓) • impedance 3.5 kΩ • reaction time: 5 ms ± 1 ms SW4 switch / State 0 / State 1 Source (factory setting) / < 5 V ⎓ / > 11 V ⎓ Sink Int or Sink Ext / > 16 V ⎓ / < 10 V ⎓
0V	Logic input common	0 V

TH2 + TH2 -	PTC probe input	• trip threshold 3 kΩ, reset threshold 1.8 kΩ • short-circuit or open-circuit detection threshold < 50 Ω
RP	Frequency input	• frequency range 0 to 30 kHz • reaction time 5 ms ± 1ms
LO3 LO4	Open collector programmable logic outputs	• +24 V ⎓ (Max. 30 V ⎓) • max. current 20 mA for internal power supply and 200 mA for external power supply • reaction time 5 ms ± 1ms
CLO	Logic output common	
0V	0 V	0 V

Encoder feedback card terminals

VW3A71XXX...XXX



Maximum connection capacity:
1.5 mm² - AWG 16

Max. tightening torque:
0.25 Nm - 2.21 lb.in

Arrangement, specifications and functions of the terminals

Terminals	Function	Electrical characteristics				
		VW3A71XXX	VW3A71XXX	VW3A71XXX	VW3A71XXX	VW3A71XXX
		RS422 5V incremental encoder	RS422 12V incremental encoder	12V open collector or push pull incremental encoder	15V open collector or push pull incremental encoder	24V push pull incremental encoder
+Vs	Power supply for encoder	• 5V (max. 5.5V) protected against short-circuits and overloads • max. current 200 mA	• 12V (max. 13V) protected against short-circuits and overloads • max. current 200 mA	• 12V (max. 13V) protected against short-circuits and overloads • max. current 200 mA	• 15V (max. 16V) protected against short-circuits and overloads • max. current 200 mA	• 24V (min. 20V, max. 30V) protected against short-circuits and overloads • max. current 200 mA
0Vs	0V	0V	0V	0V	0V	0V
A, Ā B, B̄	Incremental logic inputs	• impedance • max. resolution 10000 points/revolution • 300 kHz max. frequency				

Selecting the encoder

The 5 encoder feedback cards available as an option with the ATV71 enable three different encoder technologies to be used.

- incremental optical encoder with RS422-compatible differential outputs
- incremental optical encoder with open collector outputs
- incremental optical encoder with push-pull outputs

The encoder must comply with both these limits:
- Max. encoder frequency 300 kHz
- Resolution ⩽ 10000 points/revolution

Choose the max. standard resolution within these limits to obtain optimum accuracy.

Wiring the encoder

Use a shielded cable comprising 3 twisted pairs with a pitch of between 25 and 50 mm. Connect the shielding to ground at both ends. The minimum cross-section of the conductors must comply with the table below to limit line voltage drop:

Max. length of encoder cable	VW3A71XXX			VW3A71XXX and VW3A71XXX		
	Max. consumption current of encoder	Minimum cross-section of conductors		Max. consumption current of encoder	Minimum cross-section of conductors	
10 m 32.8 ft	100 mA	0.2 mm²	AWG 24	100 mA	0.2 mm²	AWG 24
	200 mA	0.2 mm²	AWG 24	200 mA	0.2 mm²	AWG 24
50 m 164 ft	100 mA	0.5 mm²	AWG 20	100 mA	0.5 mm²	AWG 20
	200 mA	0.75 mm²	AWG 18	200 mA	0.75 mm²	AWG 18
100 m 328 ft	100 mA	0.75 mm²	AWG 18	100 mA	0.75 mm²	AWG 18
	200 mA	1.5 mm²	AWG 15	200 mA	1.5 mm²	AWG 16
200 m 656 ft	-	-	-	100 mA	0.5 mm²	AWG 20
	-	-	-	200 mA	1.5 mm²	AWG 15
300 m 984 ft	-	-	-	100 mA	0.75 mm²	AWG 18
	-	-	-	200 mA	1.5 mm²	AWG 15

Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1

Single phase power supply (ATV71H 075M3 to U75M3)

Diagram with line contactor

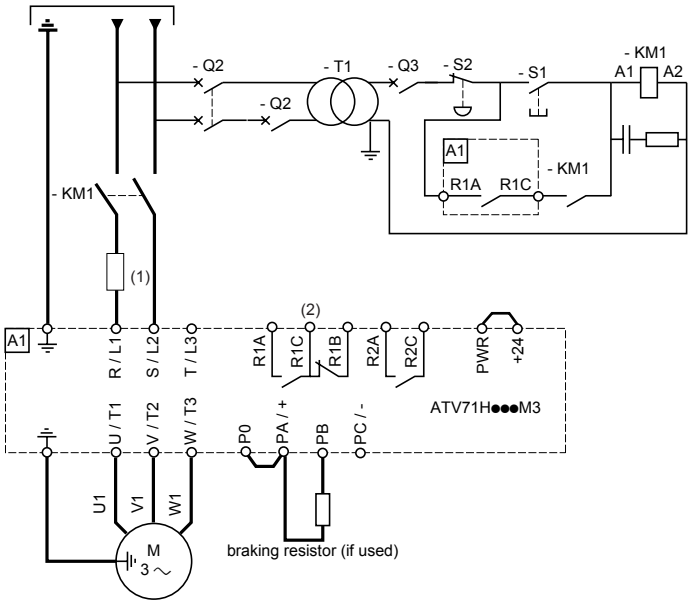
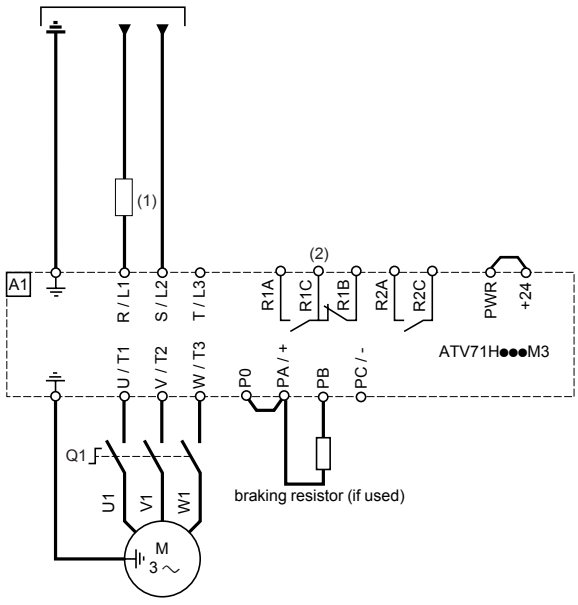


Diagram with switch disconnector



(1) Line choke if used (compulsory for ATV71H U40M3 to U75M3 drives)
(2) Fault relay contacts, for remote signaling of drive status

The [Input phase loss] fault must be configured as [No] to enable operation on a single phase supply. If this fault is set to its factory configuration [Yes], the drive will stay locked in [Mains phase loss] fault mode.

Note: Fit interference suppressors to all inductive circuits near the drive or connected to the same circuit (relays, contactors, solenoid valves, etc).

Choice of associated components:
Please refer to the catalog.

Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1

3-phase power supply

Diagram with line contactor

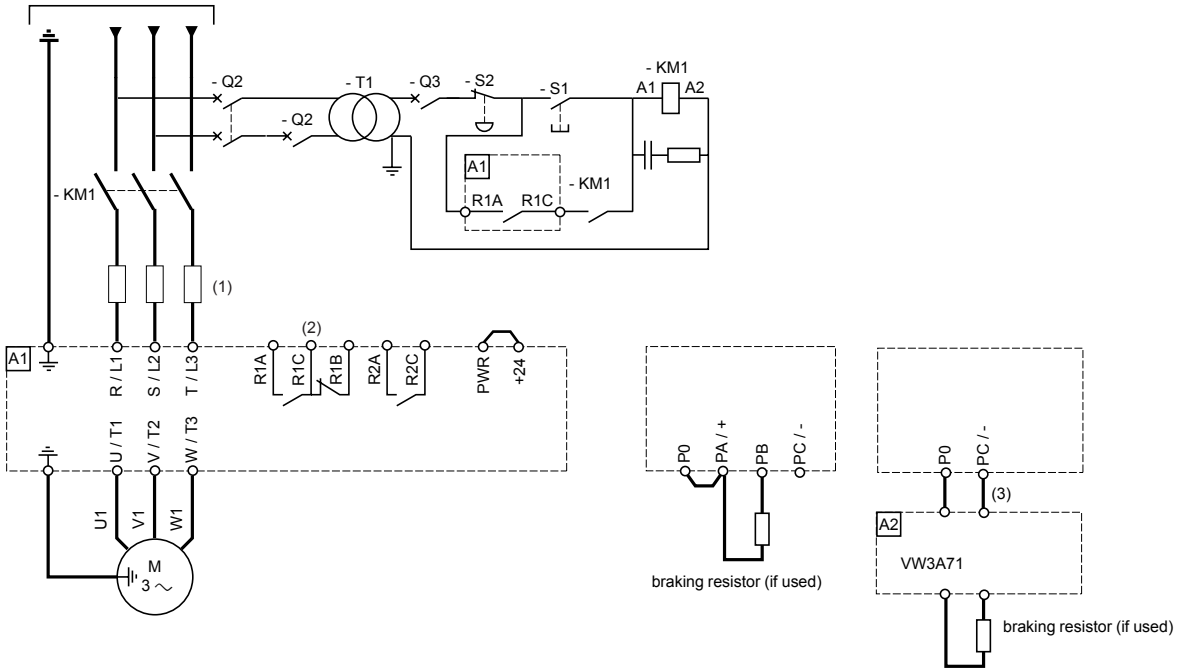
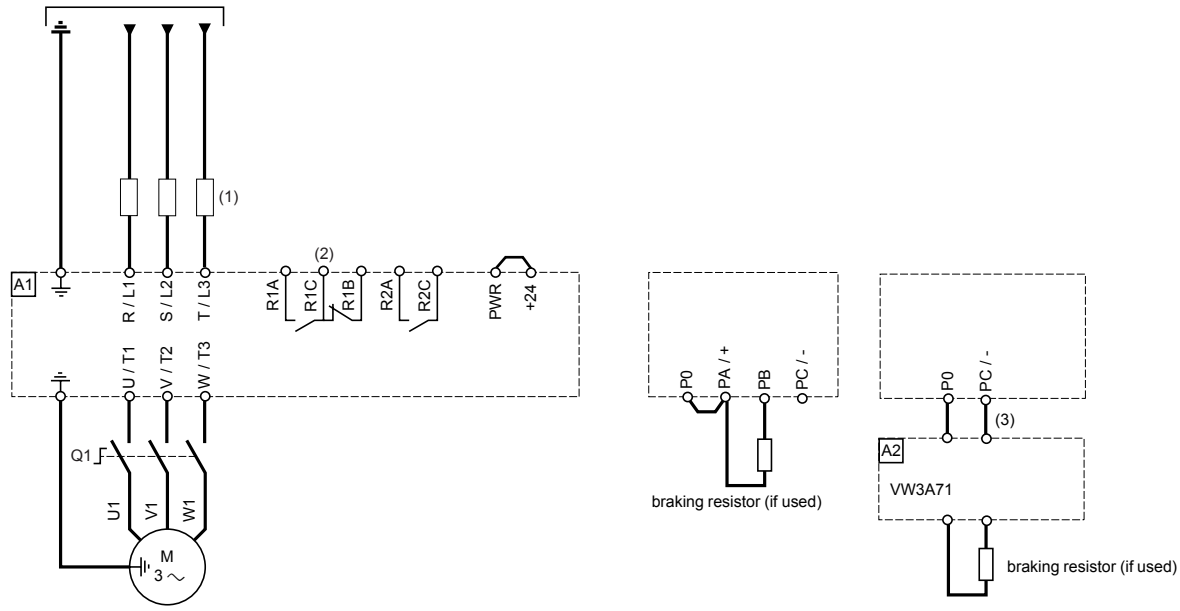


Diagram with switch disconnector



(1) Line choke if used (compulsory for ATV71HD55M3X and ATV71HD90N4 drives upwards)
(2) Fault relay contacts, for remote signaling of drive status
(3) A2 braking module VW3AXXXX, if using a braking resistor for ATV71HC20N4 to C50N4 ratings only.

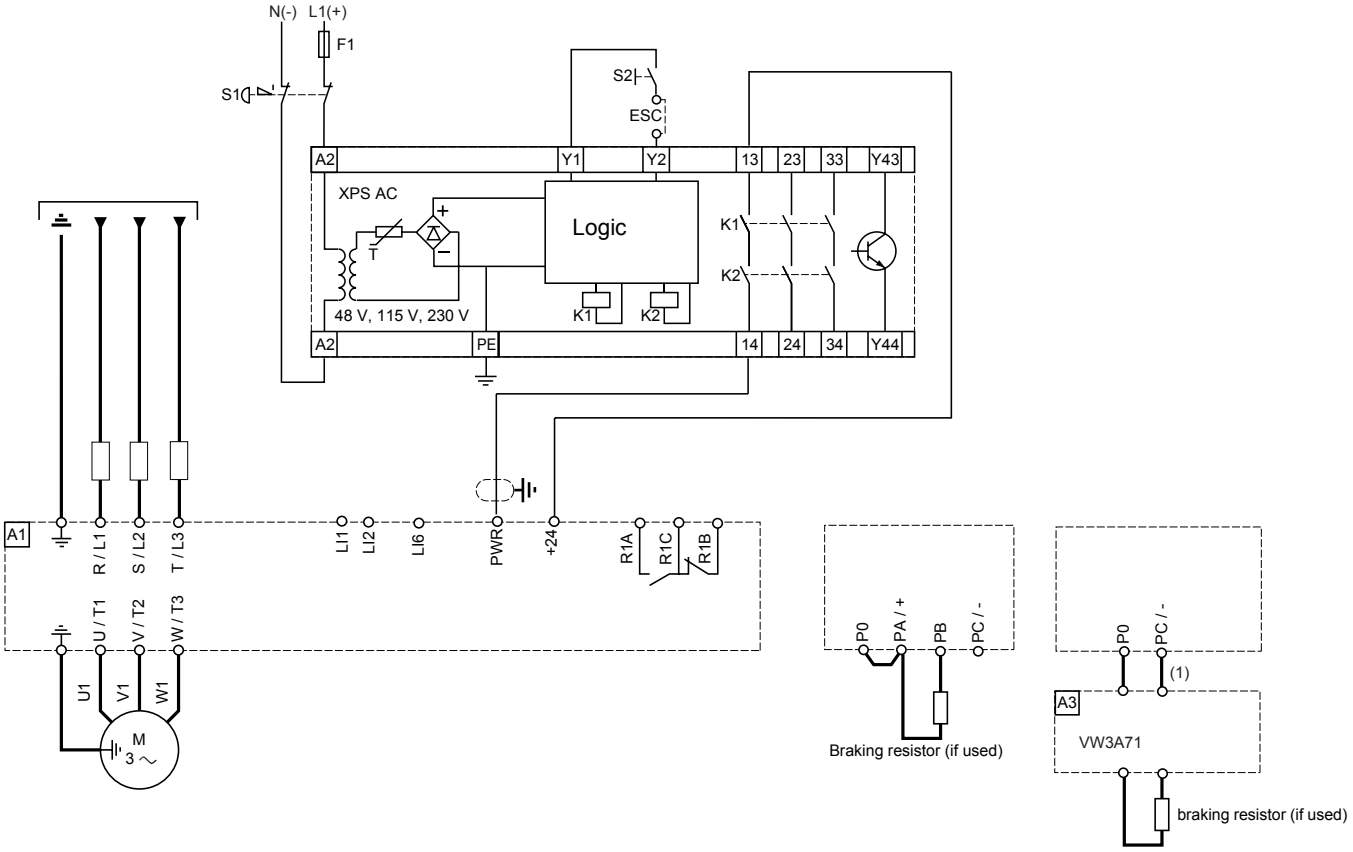
Note: Fit interference suppressors to all inductive circuits near the drive or connected to the same circuit (relays, contactors, solenoid valves, etc).

Choice of associated components:
Please refer to the catalog.

Connection diagram conforming to standards EN 954-1 category 3 and IEC/EN 61508 capacity SIL2, stopping category 0 in accordance with standard IEC/EN 60204-1

This connection diagram is suitable for use with machines with a short freewheel stop time (with low inertia or high resistive torque).
When the emergency stop is activated, the drive power supply is switched off immediately and the motor stops in accordance with category 0 of standard IEC/EN 60204-1.

This diagram must be used for lifting applications.
A contact on the Preventa XPS AC module must be inserted in the brake control circuit to engage it safely when the "Power Removal" safety function is activated.



(1) A3 braking module VW3AXXXX, if using a braking resistor for ATV71HC20N4 to C50N4 ratings only.

- Standard EN 954-1 category 3 requires the use of an emergency stop with double contact (S1).
- S1 is used to activate the "Power Removal" safety function
- S2 is used to initialize the Preventa module when switching on or after an emergency stop. ESC (External Starting Conditions) enables the use of other initialization conditions for the module.
- The same Preventa module can be used for the "Power Removal" safety function on several ATV71.
- A logic input on the Preventa module can be used to indicate safely that the drive is operating in safe conditions.

Note:
For preventive maintenance, the "Power Removal" function must be activated at least once a year.
The drive logic output signals cannot be considered as safety-type signals.
Fit interference suppressors to all inductive circuits near the drive or connected to the same circuit (relays, contactors, solenoid valves, etc).

Choice of associated components:
Please refer to the catalog.

Connection diagrams

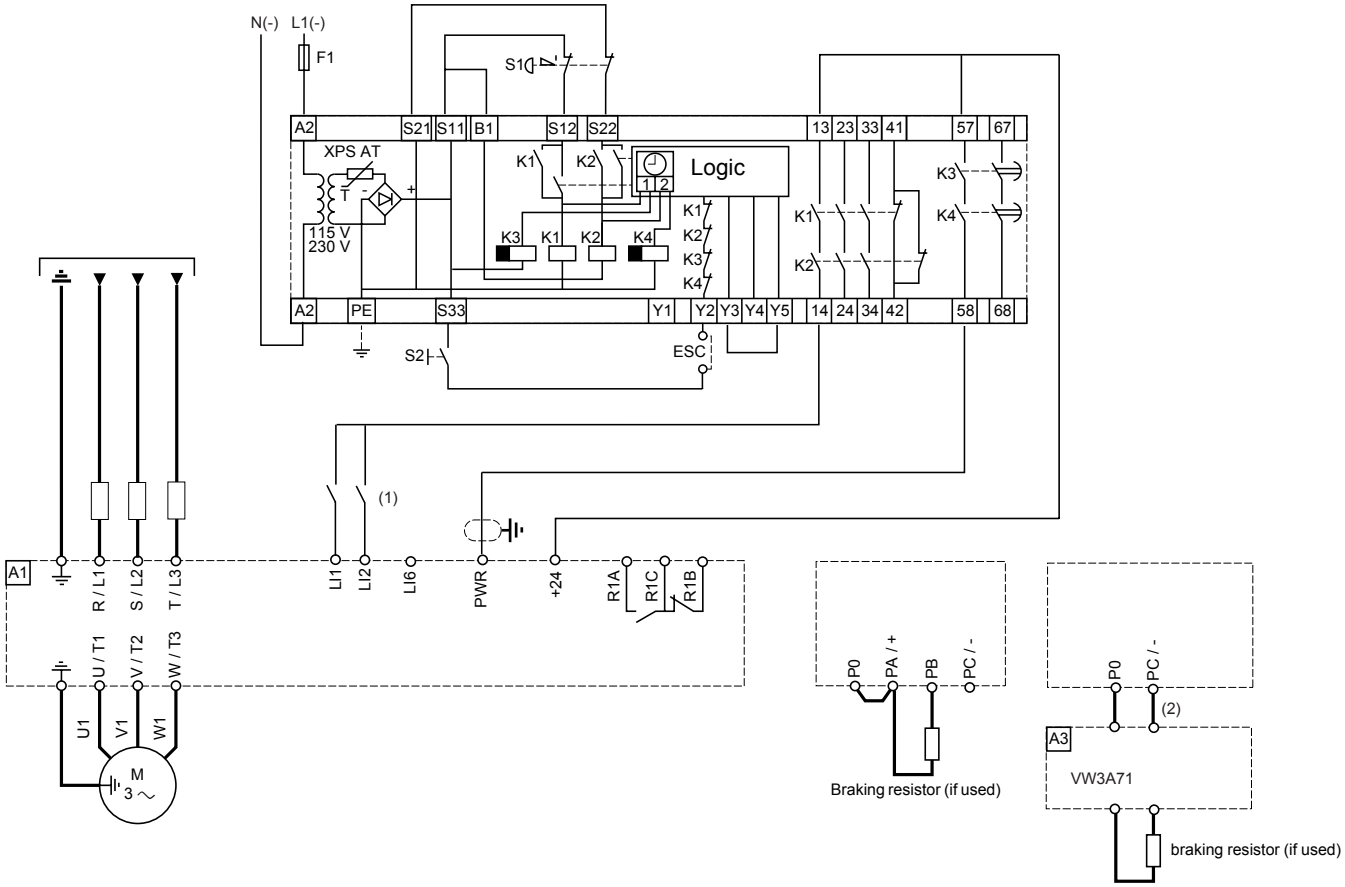
Connection diagram conforming to standards EN 954-1 category 3 and IEC/EN 61508 capacity SIL2, stopping category 1 in accordance with standard IEC/EN 60204-1

This connection diagram is suitable for use with machines with a long freewheel stop time (machines with high inertia or low resistive torque).

This diagram must not be used for lifting applications.

When the emergency stop is activated, deceleration of the motor controlled by the drive is first requested, then, after a time delay corresponding to the deceleration time, the "Power Removal" safety function is activated.

Example:
- 2-wire control
- LI1 assigned to forward
- LI2 assigned to reverse



(1) In this example, logic inputs LIx are wired as "Source" but can be wired as "Sink Int" or "Sink Ext".
(2) A3 braking module VW3AXXXX, if using a braking resistor for ATV71HC20N4 to C50N4 ratings only.

- Standard EN 954-1 category 3 requires the use of an emergency stop with double contact (S1).
- S1 is used to activate the "Power Removal" safety function
- S2 is used to initialize the Preventa module when switching on or after an emergency stop. ESC enables the use of other initialization conditions for the module.
- The same Preventa module can be used for the "Power Removal" safety function on several ATV71. In this case the time delay must be set to the longest stopping time.
- A logic output on the Preventa module can be used to indicate safely that the drive is operating in safe conditions.

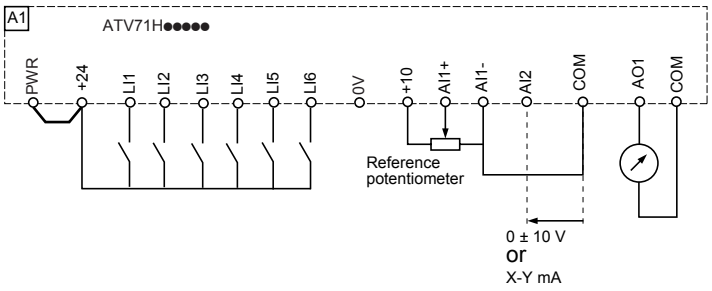
Note:
For preventive maintenance, the "Power Removal" function must be activated at least once a year.
The drive logic output signals cannot be considered as safety-type signals.
Fit interference suppressors to all inductive circuits near the drive or connected to the same circuit (relays, contactors, solenoid valves, etc).

Choice of associated components:
Please refer to the catalog.

Connection diagrams

Control connection diagrams

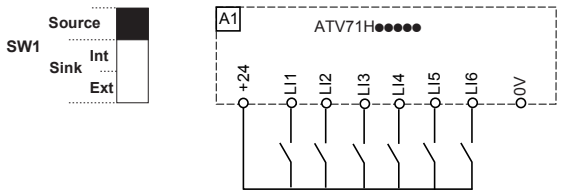
Control card connection diagram



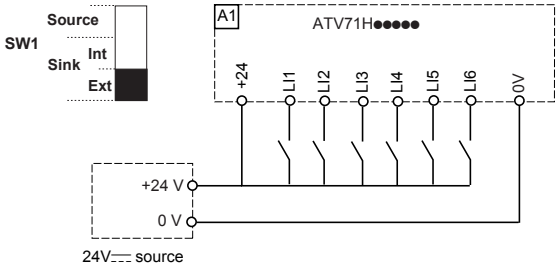
Logic input switch (SW1)

The logic input switch (SW1) is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.
- Position the switch on Source (factory setting) if using PLC outputs with PNP transistors.
- Position the switch on Sink Int or Sink Ext if using PLC outputs with NPN transistors.

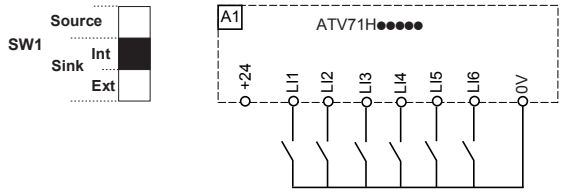
• SW1 switch on the "Source" position



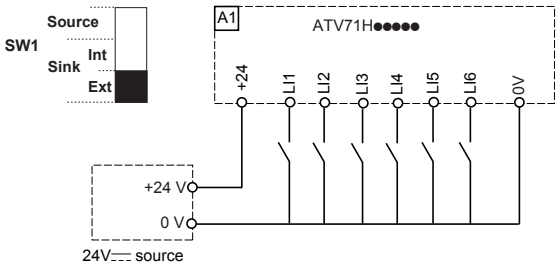
• SW1 switch on the "Source" position and use of an external power supply for the LIs



• SW1 switch on the "Sink Int" position



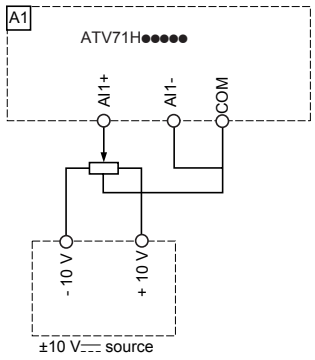
• SW1 switch on the "Sink Ext" position



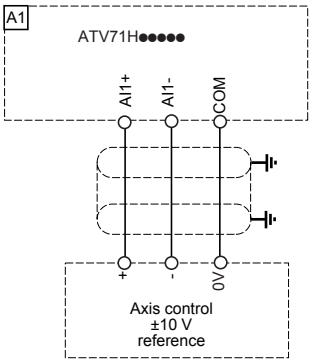
When the SW1 switch is on "Sink Int" or "Sink Ext", the common must never be connected to ground or earth, as there is then a risk of accidental starting on the first insulation fault.

Connection diagrams

Bipolar speed reference

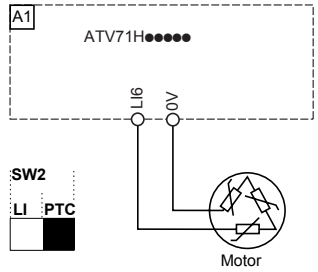


Speed reference using axis control



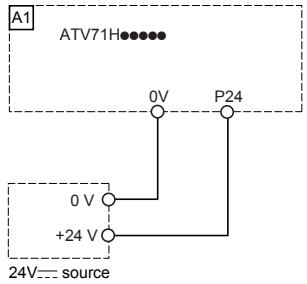
SW2 switch

The LI6 logic input switch (SW2) makes it possible to use the LI6 input:
- either as a logic input by setting the switch to LI (factory setting)
- or for motor protection via PTC probes by setting the switch to PTC



Control power supply via an external source

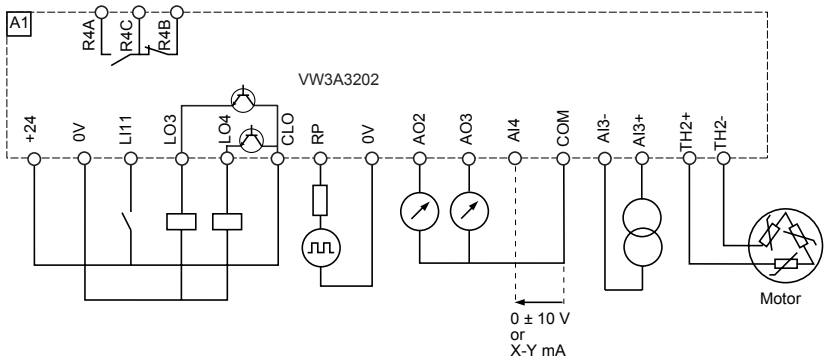
the control card can be supplied via an external +24V⎓ source



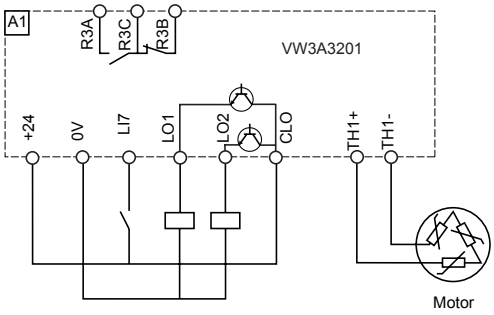
Connection diagrams

Control connection diagram

Connection diagram for extended I/O option card (VW3A3202)



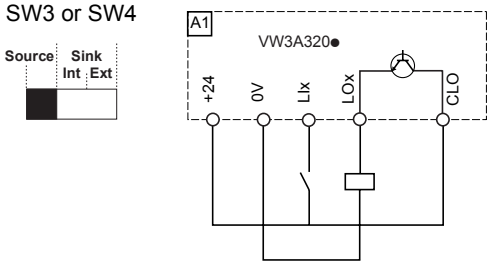
Connection diagram for logic I/O option card (VW3A3201)



Logic I/O switch

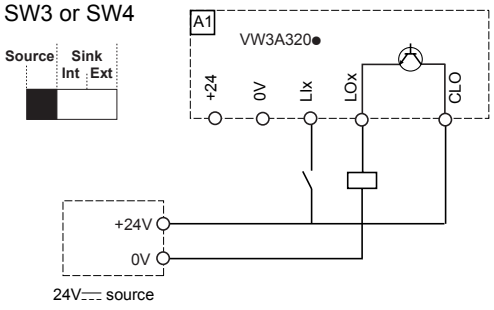
- Switch in "Source" position

SW3 or SW4



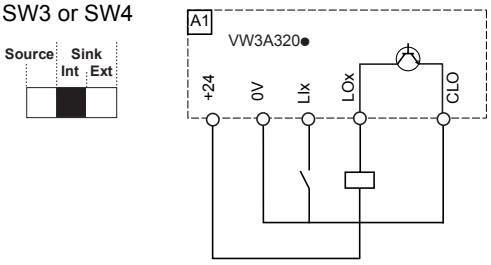
- Switch in "Source" position and use of an external +24 V⎓ source

SW3 or SW4



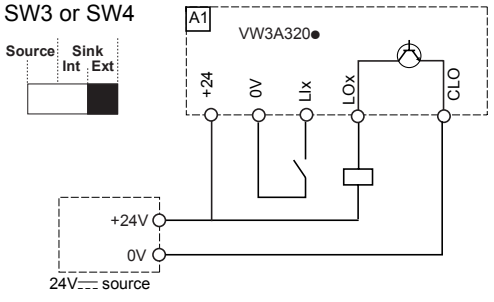
- Switch in "Sink Int" position

SW3 or SW4



- Switch in "Sink Ext" position

SW3 or SW4

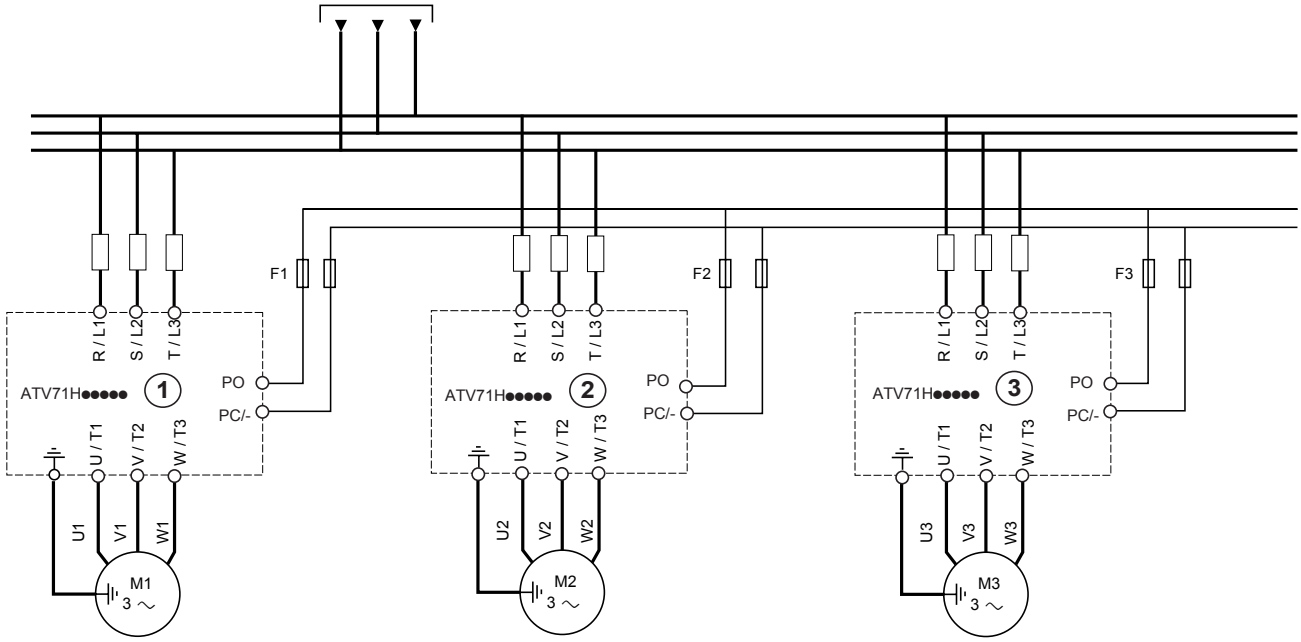


When the logic input switch is on "Sink Int" or "Sink Ext", the common must never be connected to ground or earth, as there is then a risk of accidental starting on the first insulation fault.

Connection of several drives in parallel on the DC bus

Connection in parallel on the DC bus is recommended in applications for which full motor power must be guaranteed.

Each drive uses its own charging circuit



Drives (1), (2) and (3) must not be more than one size apart when they are connected in this way.

F1, F2, F3: fast-acting fuses for protection on the DC bus side.

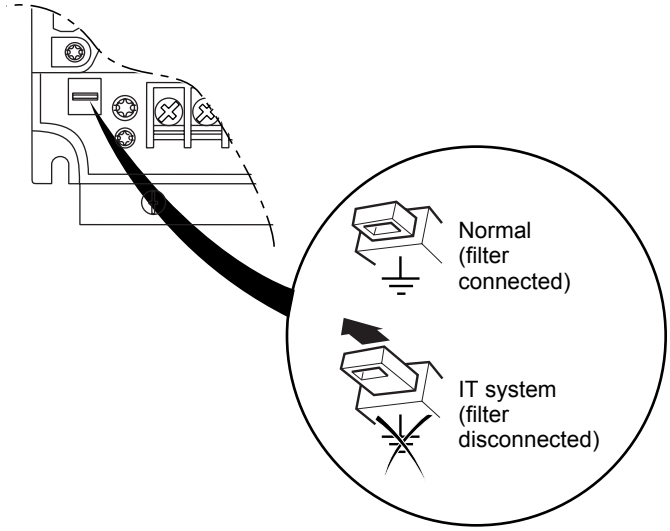
Operation on an IT system

IT system: Isolated or impedance earthed neutral.
Use a permanent insulation monitor compatible with non-linear loads: a Merlin Gerin type XM200, for example.

Altivar 71 drives feature built-in RFI filters. These filters can be isolated from ground for operation on an IT system as follows:

ATV71H037M3 to ATV71HD45M3X and ATV71H075N4 to ATV71HD75N4

Remove the jumper located to the left of the power terminals



ATV71HD55M3X to ATV71HD75M3X and ATV71HD90N4 to ATV71HC50N4

When the filters are disconnected, the drive switching frequency must not exceed 4 kHz. Refer to the programming manual for the corresponding parameter setting.

Electromagnetic compatibility

Principle

- Grounds between drive, motor and cable shielding must have "high frequency" equipotentiality.
- Use shielded cables with shielding connected to ground at 360° at both ends for the motor cable, braking resistor (if used) and control-signaling 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.

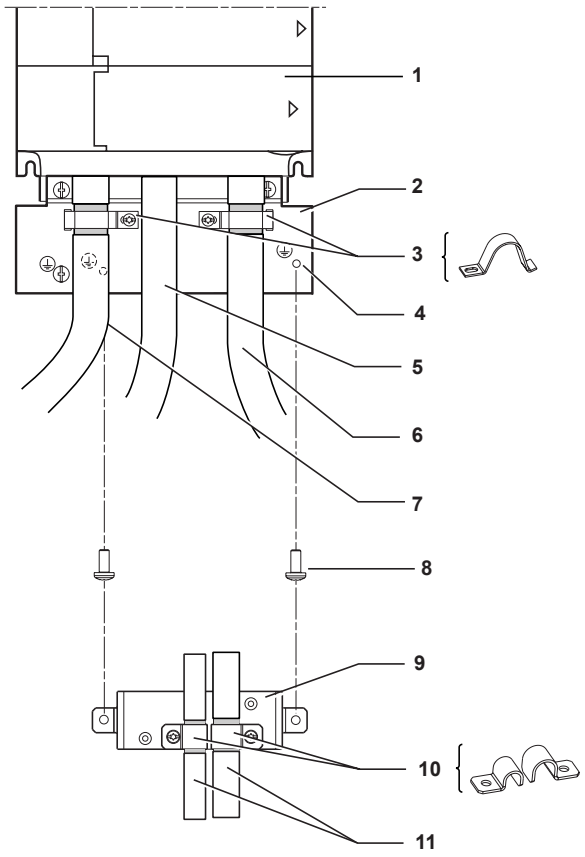
Installation diagram

ATV71H 037M3 to D15M3X and ATV71H 075N4 to D18N4

- Fix and earth the shielding of cables **6** and **7** as close as possible to the drive:
  - Strip the shielding.
  - Use stainless metal cable clamps on the parts from which the shielding has been stripped, to attach them to the plate **2**.
  The shielding must be clamped tightly enough to the metal plate to ensure correct contact.

- Fit the control EMC flange **9** on the sheet steel grounded plate **2**, as shown in the drawing.

- Fix and earth the shielding of cables **11** as close as possible to the drive:
  - Strip the shielding.
  - Use stainless metal cable clamps on the parts from which the shielding has been stripped, to attach them to the control EMC flange **9**.
  The shielding must be clamped tightly enough to the metal plate to ensure correct contact.



1 Altivar 71

2 Sheet steel grounded plate supplied with the drive

3 Metal clamps for power cables **6** and **7**

4 Tapped holes for fixing the control EMC flange.

5 Non-shielded power supply wires or cable

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 boxes.

7 Shielded cable for connecting the braking resistor (if fitted).
The shielding must be continuous and intermediate terminals must be in EMC shielded metal boxes.

8 2 M4 screws for fixing the control flange to the sheet steel grounded plate.

9 Control EMC flange.

10 Metal clamps for control cables **11.**

11 Shielded cables for connecting the control/signaling cables. For applications requiring several conductors, use cables with a small cross-section (0.5 mm^2).
The shielding must be connected to ground at both ends. The shielding must be continuous and intermediate terminals must be in EMC shielded metal boxes.

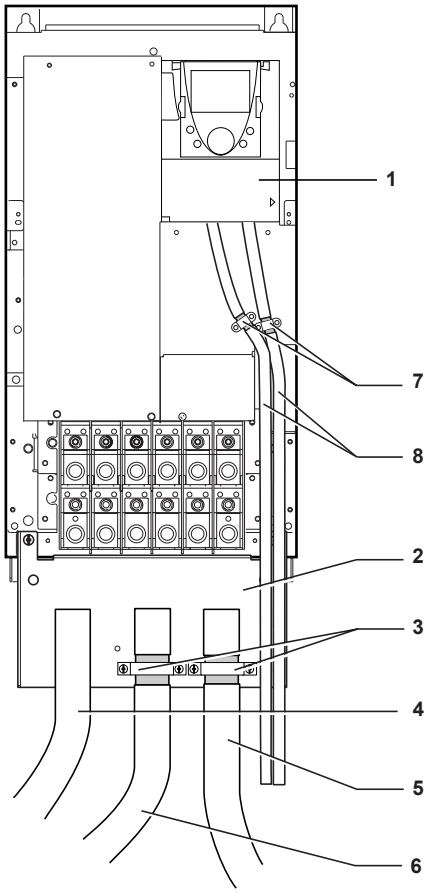
Note:
- If using an additional input filter, it should be fitted under the drive and connected directly to the line supply via an unshielded cable. Link **5** on the drive is then via the filter output cable.
- The HF equipotential ground connection between the drive, motor and cable shielding does not remove the need to connect the PE protective conductors (green-yellow) to the appropriate terminals on each unit.

Installation diagram

ATV71H D22M3X to D45M3X and ATV71H D22N4 to D75N4

- Fix and earth the shielding of cables **5** and **6** as close as possible to the drive:
  - Strip the shielding.
  - Use stainless metal cable clamps on the parts from which the shielding has been stripped, to attach them to the plate **2**.
  The shielding must be clamped tightly enough to the metal plate to ensure correct contact.

- Fix and earth the shielding of cables **8** as close as possible to the drive:
  - Strip the shielding.
  - Use stainless metal cable clamps on the parts from which the shielding has been stripped, to attach them.
  The shielding must be clamped tightly enough to the metal plate to ensure correct contact.



1 Altivar 71

2 Sheet steel grounded plate supplied with the drive

3 Metal clamps for power cables **5** and **6**

4 Non-shielded power supply wires or cable

5 Shielded cable for connecting the braking resistor (if fitted).
The shielding must be continuous and intermediate terminals must be in EMC shielded metal boxes.

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 boxes.

7 Metal clamps for control cables **8.**

8 Shielded cables for connecting the control/signaling cables. For applications requiring several conductors, use cables with a small cross-section (0.5 mm^2). The shielding must be connected to ground at both ends. The shielding must be continuous and intermediate terminals must be in EMC shielded metal boxes.

Note:
- If using an additional input filter, it should be fitted under the drive and connected directly to the line supply via an unshielded cable. Link **4** on the drive is then via the filter output cable.
- The HF equipotential ground connection between the drive, motor and cable shielding does not remove the need to connect the PE protective conductors (green-yellow) to the appropriate terminals on each unit.