Altivar 71

Variable speed drives
for synchronous and asynchronous motors

Network braking units manual

VW3A72101 ... 112

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The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

Contents

Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Qualification Of Personnel

Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation are authorized to work on and with this product. In addition, these persons must have received safety training to recognize and avoid hazards involved. These persons must have sufficient technical training, knowledge and experience and be able to foresee and detect potential hazards that may be caused by using the product, by changing the settings and by the mechanical, electrical and electronic equipment of the entire system in which the product is used. All persons working on and with the product must be fully familiar with all applicable standards, directives, and accident prevention regulations when performing such work.

Before you begin

Intended Use

This product is a drive for three-phase synchronous and asynchronous motors and intended for industrial use according to this manual.The product may only be used in compliance with all applicable safety regulations and directives, the specified requirements and the technical data.Prior to using the product, you must perform a risk assessment in view of the planned application. Based on the results, the appropriate safety measures must be implemented.Since the product is used as a component in an entire system, you must ensure the safety of persons by means of the design of this entire system (for example, machine design). Any use other than the use explicitly permitted is prohibited and can result in hazards. Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.

Product Related Information

Read and understand these instructions before performing any procedure with this drive.

⚠ ⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system. Installation, adjustment, repair and maintenance must be performed by qualified personnel..
- The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.
- Many components of the product, including the printed circuit boards, operate with mains voltage. Do not touch. Use only electrically insulated tools.
- Do not touch unshielded components or terminals with voltage present.
- Motors can generate voltage when the shaft is rotated. Prior to performing any type of work on the drive system, block the motor shaft to prevent rotation.
- AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors of the motor cable
- Do not short across the DC bus terminals or the DC bus capacitors or the braking resistor terminals.
- Before performing work on the drive system:
  - Disconnect all power, including external control power that may be present.
  - Place a **Do Not Turn On** label on all power switches.
  - Lock all power switches in the open position.
  - Wait 15 minutes to allow the DC bus capacitors to discharge. The DC bus LED is not an indicator of the absence of DC bus voltage that can exceed 800 Vdc.
  - Measure the voltage on the DC bus between the DC bus terminals (PA/+, PC/–) using a properly rated voltmeter to verify that the voltage is <42 Vdc
  - If the DC bus capacitors do not discharge properly, contact your local Schneider Electric representative. Do not repair or operate the product.
- Install and close all covers before applying voltage.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

UNEXPECTED MOVEMENT

Drive systems may perform unexpected movements because of incorrect wiring, incorrect settings, incorrect data or other errors.
- Carefully install the wiring in accordance with the EMC requirements.
- Do not operate the product with unknown or unsuitable settings or data.
- Perform a comprehensive commissioning test.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Damaged products or accessories may cause electric shock or unanticipated equipment operation.

⚠⚠ DANGER

ELECTRIC SHOCK OR UNANTICIPATED EQUIPMENT OPERATION

Do not use damaged products or accessories.

Failure to follow these instructions will result in death or serious injury.

Contact your local Schneider Electric sales office if you detect any damage whatsoever.

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop, overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines (1).
- Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

(1) For USA: Additional information, refer to NEMA ICS 1.1 (latest edition), Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control and to NEMA ICS 7.1 (latest edition), Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems.

NOTICE

DESTRUCTION DUE TO INCORRECT MAINS VOLTAGE

Before switching on and configuring the product, verify that it is approved for the mains voltage

Failure to follow these instructions can result in equipment damage.

⚠ WARNING

HOT SURFACES

- Ensure that any contact with hot surfaces is avoided.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Steps for setting up the Network braking unit

Steps 1 to 4 must be performed with the power off

■ 1 Receive and inspect of the Network braking unit (see page 8)

- ☐ Check that the catalog number printed on the label is the same as that on the purchase order.
- ☐ Remove the Network braking unit from its packaging and check that it has not been damaged.

■ 2 Verify the supply mains (see page 14)

- ☐ Verify that the supply mains is compatible with the voltage range of the Network braking unit

■ 3 Install the Network braking unit (see page 22)

- ☐ Mount the Network braking unit in accordance with the instructions in this document

■ 4 Wire the Network braking unit (see page 23)

- ☐ Connect the Network braking unit to the 3-phase supply (L1, L2, L3)
- ☐ Connect the Network braking unit to the drive DC bus
- ☐ Connect the control cable

Recommendations

Receipt

Verify that the equipment catalog number printed on the label is the same as that on the delivery note corresponding to the purchase order. Open the packaging and check that the equipment has not been damaged in transit.

For more information, please contact your local representative.

⚠ DANGER

ELECTRIC SHOCK OR UNANTICIPATED EQUIPMENT OPERATION

Do not use damaged products or accessories.

Failure to follow these instructions will result in death or serious injury.

Contact your local Schneider Electric sales office if you detect any damage whatsoever.

Cable length of the DC bus

The maximum inductance of the DC bus connecting output PA/+, PC/– on the drive to the Network braking unit must not exceed a set level, as this inductance results in an additional difference in potential on the DC bus when the IGBTs are open. To avoid an overload on the components of the Network braking unit, this difference in potential must not exceed 100 Vdc. The maximum inductance can be calculated using this and other characteristics of the Network braking unit (value of the DC bus capacitors and absolute value of the grid current).

$$L_{MAX} = \frac{C \bullet \left(\Delta U_{GL}\right)^2}{\hat{I}^2}$$

This inductance must be greater than or equal to the sum of the inductance of the DC bus on the drive and the inductance of the DC bus connection cables. The inductance of the DC bus on the drive must be taken into consideration. The inductance per unit of length of the cables generally used for the power supply is close to around of 0.6 µH/m.

The maximum length of the conductors **LMAX** is calculated according to the following information:
- Values of the input capacities **C**
- Maximum DC voltage edge permitted during motor generator operation (∆**UGL =** 100 Vdc)
- Maximum AC current level for the equipment **î** (=2*Irms)
- Inductance per unit of length **L'**
- Inductance of the coil **LZKD** of the DC bus

The equation below can be used to calculate L_{max}:

$$L_{MAX} = \frac{C \bullet \left(\Delta U_{GL}\right)^2}{\hat{I}^2 \bullet L'} - \frac{L_{ZKD}}{L'}$$

Typical capacity of the DC connection inside the Network braking unit

Network braking unit	Power	DC capacity
VW3A7...	8 - 16 kW	20 µF
	20 - 32 kW	40 µF
	40 - 48 kW	100 µF
	58 kW	220 µF
	80 - 140 kW	440 µF
	170 - 200 kW	660 µF
	230 kW	880 µF
	265 kW	1100 µF
	300 - 345 kW	1320 µF

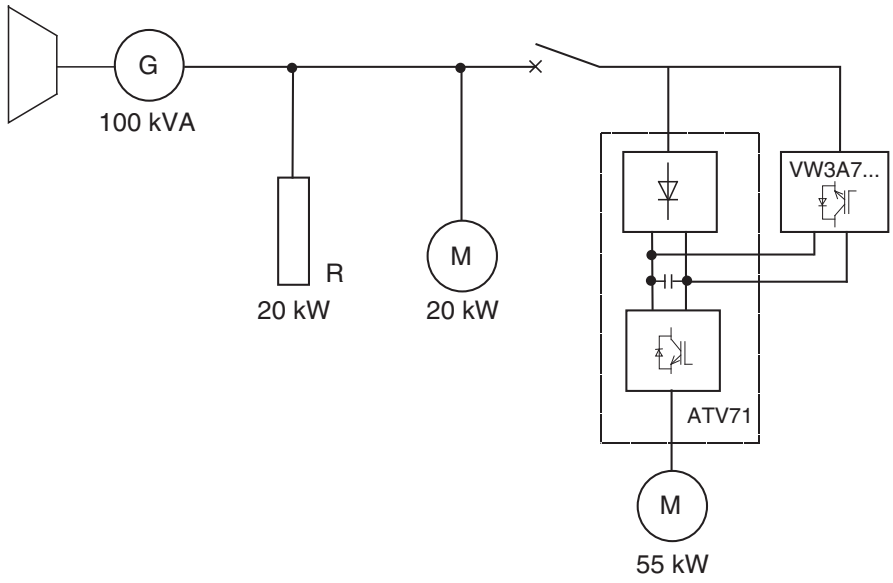
Example:
C = 200 µF, ΔU_{GL} = 100 V, i = 271 A, a = 80 mm (3.15 in.), r = 8.5 mm (0.3 in.), μ_0=1.257.10^{-6} H/m

For longer DC bus cables, additional capacitors have to be installed (Please contact your local representative).

Operation on a generator

It is possible to use a Network braking unit with an isolated supply mains (for example: a diesel engine generating set), but there are restrictive rules limiting the power.

Example:



With a supply mains whose architecture is similar to that shown in the diagram above, there are 2 additional restrictions:
- The power of the motor connected to the drive must be less than half of the nominal power of the generator.
- The total power of the two other loads must be more than double of the power returned on the supply mains.

If these conditions are not verified, changing the motor to operate as a generator could result in a sudden overload. The controller of the generator will react with an overshoot which leads to an overvoltage within the isolated supply mains.

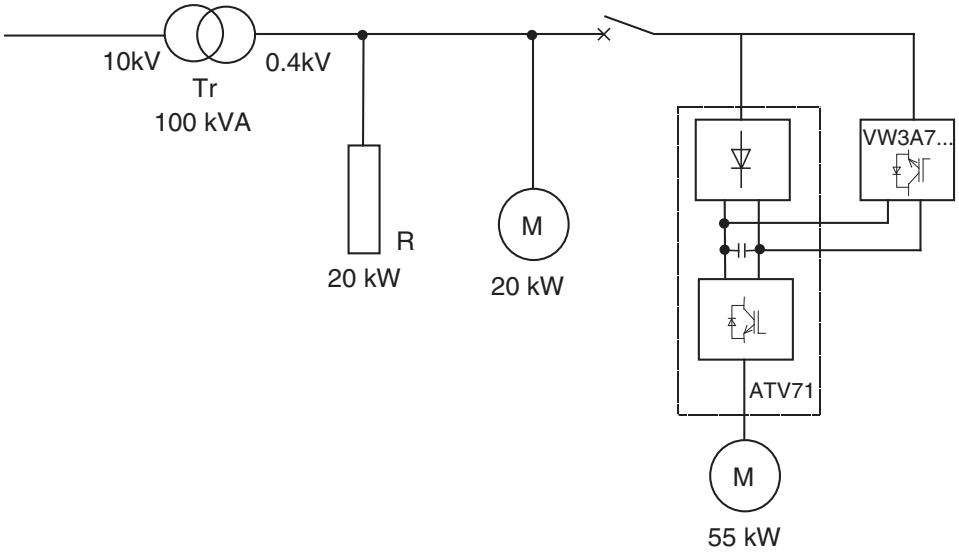
NOTICE
DESTRUCTION OF SYSTEM COMPONENTS
Overvoltages can cause damage to the drive and/or the braking unit and the other loads. Apply the instructions given in this chapter.
Failure to follow these instructions can result in equipment damage.

Operation on a transformer

If the energy balance of the installation is negative (even for short period), the transformer must be able to handle the unused generated power. The nominal power of the transformer must therefore be 1.5 times greater than the power generated outside the section.

If the power generated is near the nominal power of the transformer, then the transformer short circuit voltage (Usc) must be lower than 6%.

Example:

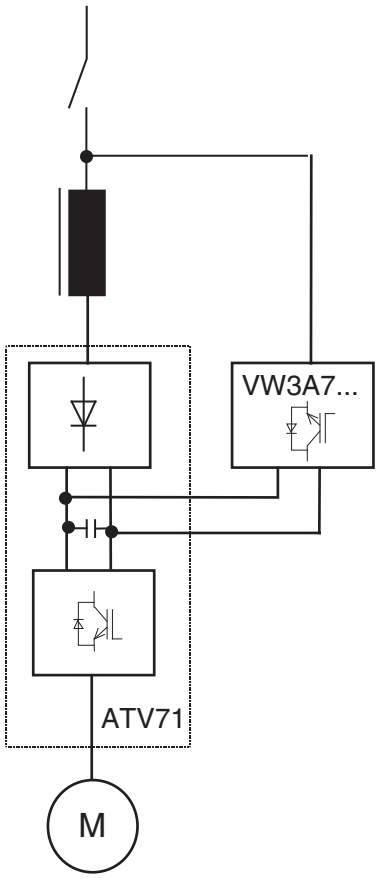


Position of the Line Choke

If the drive is connected to an external line choke, then the Network braking unit must be connected according to the diagram below. If the Network braking unit is connected downstream of the line choke, then the inductance of the line choke prevents the Network braking unit from synchronizing on supply mains and thus generates overvoltages.

NOTICE
RISK OF DAMMAGE TO THE EQUIPMENT If the drive is connected to an external line choke, connect the Network braking unit according to the diagram below. **Failure to follow these instructions can result in equipment damage.**

Example:

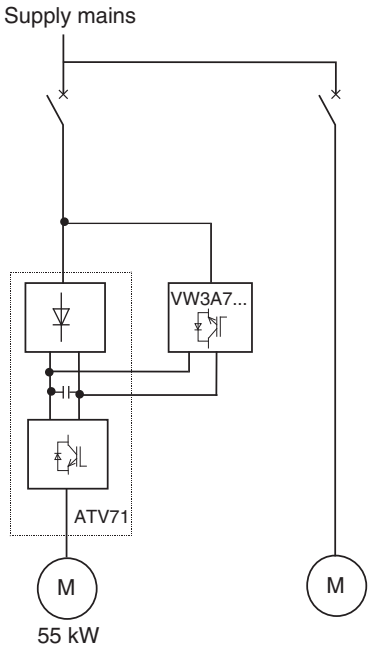


Connection of other loads

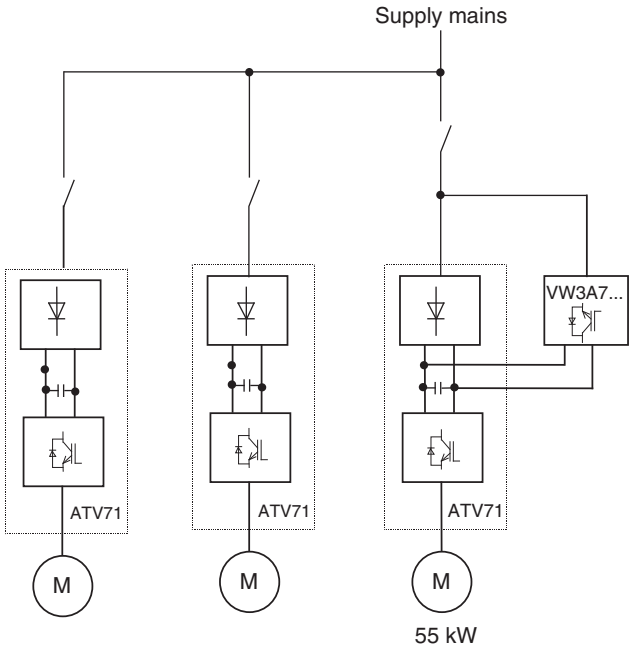
Connection of other loads (for example ventilation or air conditioning enclosure) in parallel on the drive and the Network braking unit with a common circuit-breaker will result in overvoltages.

NOTICE
RISK OF DAMMAGE TO THE EQUIPMENT Connection of loads in parallel on the drive and the Network braking unit must be done according to the diagram below. **Failure to follow these instructions can result in equipment damage.**

Example 1:



Example 2:



Technical Data

General Data

Degree of protection			IP 20
Maximum relative humidity			Class F humidity without condensation 5…85%
Ambient temperature around the unit	*Operation*	°C (°F)	+ 5…+ 40 (41…+ 104) without derating Up to 55 (131) with current derating of 3% per °C above 40°C (104°F)
	Storage	°C (°F)	– 25…+ 55 (– 13…+ 131)
	Transport	°C (°F)	– 25…+ 55 (– 13…+ 131)
Maximum operating altitude		m (ft)	1000 (3280) without derating 1000…4000 (3280...13120) derating the current by 5% per additional 1000 m (3280)

Electrical Data

Type of module	**Unit**	**VW3A72101...212**
Supply voltage	V ac	400 (– 15% / +10%)
Operating frequency	Hz	50…60 ± 2%
Overload capacity	A	1.2 x maximum current (Irms)
Efficiency	η[%]	98% (2% of thermal losses)
Power factor	cos φ	±1
Fundamental frequency component	g	0.7…0.95

Connection characteristics

Catalog Number	**Connection for AC**			**Connection for DC**			**Connection for Fan supply**	
	Maximum Wire Size	**Tightening Torque**	**UL Type**	**Maximum Wire Size**	**Tightening Torque**	**UL Type**	**Maximum Wire Size**	**Tightening Torque**
VW3A72101	16 mm² (5 AWG)	2 N•m (17.7 lb.in)	70 A, 600 V	35 mm² (2 AWG)	3.7 N•m (32.7 lb.in)	150 A, 1000 V	–	–
VW3A72102	16 mm² (5 AWG)	2 N•m (17.7 lb.in)	70 A, 600 V	35 mm² (2 AWG)	3.7 N•m (32.7 lb.in)	150 A, 1000 V	–	–
VW3A72103	16 mm² (5 AWG)	2 N•m (17.7 lb.in)	70 A, 600 V	35 mm² (2 AWG)	3.7 N•m (32.7 lb.in)	150 A, 1000 V	–	–
VW3A72104	50 mm² (0.08 sq in.)	10 N•m (88.5 lb.in)	Cu 150 A, 600 V Al 120 A, 600 V	50 mm² (0.08 sq in.)	10 N•m (88.5 lb.in)	Cu 150 A, 600 V Al 120 A, 600 V	–	–
VW3A72105	95 mm² (0.15 sq in.)	20 N•m (177 lb.in)	Cu 230 A, 600 V Al 180 A, 600 V	150 mm² (0.23 sq in.)	24 N•m (212.4 lb.in)	Cu 285 A, 600 V Al 230 A, 600 V	–	–
VW3A72106	95 mm² (0.15 sq in.)	20 N•m (177 lb.in)	Cu 230 A, 600 V Al 180 A, 600 V	150 mm² (0.23 sq in.)	24 N•m (212.4 lb.in)	Cu 285 A, 600 V Al 230 A, 600 V	–	–
VW3A72107	95 mm² (0.15 sq in.)	20 N•m (177 lb.in)	Cu 230 A, 600 V Al 180 A, 600 V	150 mm² (0.23 sq in.)	24 N•m (212.4 lb.in)	Cu 285 A, 600 V Al 230 A, 600 V	–	–
VW3A72108	150 mm² (0.23 sq in.)	24 N•m (212.4 lb.in)	Cu 285 A, 600 V Al 230 A, 600 V	240 mm² (0.4 sq in.)	45 N•m (398.2 lb.in)	Cu 380 A, 600 V Al 310 A, 600 V	4 mm² (11 AWG)	0.7 N•m (6.2) lb.in
VW3A72109	150 mm² (0.23 sq in.)	24 N•m (212.4 lb.in)	Cu 285 A, 600 V Al 230 A, 600 V	240 mm² (0.4 sq in.)	45 N•m (398.2 lb.in)	Cu 380 A, 600 V Al 310 A, 600 V	4 mm² (11 AWG)	0.7 N•m (6.2) lb.in
VW3A72110	150 mm² (0.23 sq in.)	24 N•m (212.4 lb.in)	Cu 285 A, 600 V Al 230 A, 600 V	240 mm² (0.4 sq in.)	45 N•m (398.2 lb.in)	Cu 380 A, 600 V Al 310 A, 600 V	4 mm² (11 AWG)	0.7 N•m (6.2) lb.in
VW3A72111	240 mm² (0.4 sq in.)	30 N•m (265.5 lb.in)	Cu 380 A, 600 V Al 310 A, 600 V	240 mm² (0.4 sq in.)	30 N•m (265.5 lb.in)	Cu 380 A, 600 V Al 310 A, 600 V	4 mm² (11 AWG)	0.7 N•m (6.2) lb.in
VW3A72112	240 mm² (0.4 sq in.)	30 N•m (265.5 lb.in)	Cu 380 A, 600 V Al 310 A, 600 V	240 mm² (0.4 sq in.)	30 N•m (265.5 lb.in)	Cu 380 A, 600 V Al 310 A, 600 V	4 mm² (11 AWG)	0.7 N•m (6.2) lb.in

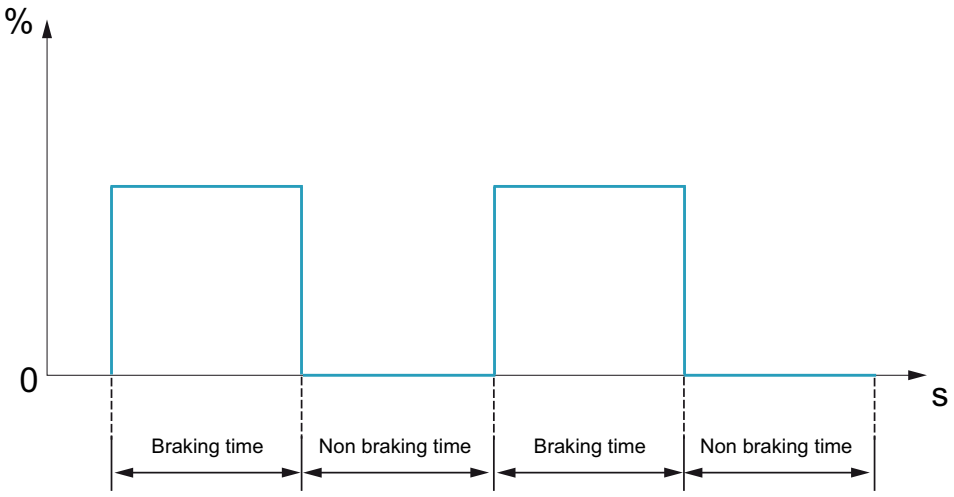
Weight

Catalog Number	Weight
	kg (lb)
VW3A72101	16 (35.27)
VW3A72102	17 (37.47)
VW3A72103	18 (39.68)
VW3A72104	22 (48.50)
VW3A72105	27 (59.52)
VW3A72106	30 (66.14)
VW3A72107	35 (77.16)
VW3A72108	52 (114.64)
VW3A72109	60 (114.64)
VW3A72110	68 (149.91)
VW3A72111	115 (253.53)
VW3A72112	125 (275.58)

Network Braking Unit Sizing

The selection of the Network braking unit depends on your application. Calculate the targeted braking power of your installation to select the right Network braking unit.

Braking Cycle Time Characteristics



Catalog Number	Mains Voltage	Braking Power	Braking Current	Braking Cycle at 40°C (104°F)		Comment
				Maximum Braking Time	Minimum Non Braking Time	
	(Vac)	(kW)	(A)	(s)	(s)	
VW3A72101	400	8	12	∞	–	Continuous braking power
	400	9	13	400	180	
	400	10	14	300	180	
	400	11	16	3	–	After 3 seconds, the Network braking unit will trigger an error (overcurrent)
VW3A72102	400	12	17	∞	–	Continuous braking power
	400	13	19	400	180	
	400	14	20	300	180	
	400	16	23	3	–	After 3 seconds, the Network braking unit will trigger an error (overcurrent)
VW3A72103	400	20	29	∞	–	Continuous braking power
	400	22	32	400	180	
	400	24	35	300	180	
	400	26	37	3	–	After 3 seconds, the Network braking unit will trigger an error (overcurrent)

Catalog Number	Mains Voltage	Braking Power	Braking Current	Braking Cycle at 40°C (104°F)		Comment
				Maximum Braking Time	Minimum Non Braking Time	
	(Vac)	(kW)	(A)	(s)	(s)	
VW3A72104	400	19	27	∞	–	Continuous braking power
	400	22	32	520	180	
	400	26	37	480	180	
	400	29	42	270	180	
	400	32	46	180	180	
	400	35	50	150	180	
	400	38	55	120	180	
	400	41	60	3	–	After 3 seconds, the Network braking unit will trigger an error (overcurrent)
VW3A72105	400	29	42	∞	–	Continuous braking power
	400	34	49	520	240	
	400	38	55	460	240	
	400	43	62	400	240	
	400	48	69	360	240	
	400	53	76	300	240	
	400	58	84	180	240	
	400	62	89	3	–	After 3 seconds, the Network braking unit will trigger an error (overcurrent)
VW3A72106	400	48	69	∞	-	Continuous braking power
	400	56	81	520	240	
	400	64	92	460	240	
	400	72	104	400	240	
	400	80	116	360	240	
	400	88	127	300	240	
	400	96	139	180	240	
	400	104	150	3	-	After 3 seconds, the Network braking unit will trigger an error (overcurrent)
VW3A72107	400	57	82	∞	-	Continuous braking power
	400	66	95	520	240	
	400	76	110	400	240	
	400	85	123	360	240	
	400	95	137	300	240	
	400	105	151	180	240	
	400	114	164	150	240	
	400	123	177	3	-	After 3 seconds, the Network braking unit will trigger an error (overcurrent)

Catalog Number	Mains Voltage	Braking Power	Braking Current	Braking Cycle at 40°C (104°F)		Comment
				Maximum Braking Time	Minimum Non Braking Time	
	(Vac)	(kW)	(A)	(s)	(s)	
VW3A72108	400	84	121	∞	–	Continuous braking power
	400	98	142	500	240	
	400	112	162	400	240	
	400	126	182	360	240	
	400	140	202	300	240	
	400	154	223	240	240	
	400	168	243	180	240	
	400	182	263	3	–	After 3 seconds, the Network braking unit will trigger an error (overcurrent)
VW3A72109	400	91	132	∞	–	Continuous braking power
	400	107	155	500	240	
	400	136	197	400	240	
	400	153	221	360	240	
	400	170	246	300	240	
	400	187	270	240	240	
	400	204	295	180	240	
	400	221	319	3	–	After 3 seconds, the Network braking unit will trigger an error (overcurrent)
VW3A72110	400	120	173	∞	–	Continuous braking power
	400	140	202	500	240	
	400	160	231	400	240	
	400	180	260	360	240	
	400	200	289	300	240	
	400	220	318	180	240	
	400	240	346	150	240	
	400	260	378	3	–	After 3 seconds, the Network braking unit will trigger an error (overcurrent)
VW3A72111	400	133	192	∞	–	Continuous braking power
	400	159	230	420	360	
	400	186	269	270	360	
	400	212	306	210	360	
	400	239	345	180	360	
	400	265	383	150	360	
	400	292	422	100	360	
	400	318	460	80	360	
	400	345	499	3	–	After 3 seconds, the Network braking unit will trigger an error (overcurrent)

Catalog Number	Mains Voltage	Braking Power	Braking Current	Braking Cycle at 40°C (104°F)		Comment
				Maximum Braking Time	Minimum Non Braking Time	
	(Vac)	(kW)	(A)	(s)	(s)	
VW3A72112	400	173	250	∞	–	Continuous braking power
	400	207	299	360	360	
	400	241	349	240	360	
	400	276	400	150	360	
	400	310	450	120	360	
	400	345	498	100	360	
	400	380	548	80	360	
	400	414	600	3	–	After 3 seconds, the Network braking unit trip in fault (overcurrent)

Example

Required braking power of **10 kW** with **VW372101**
For a braking time of 300 seconds, there must be at least 180 seconds between 2 braking operations.

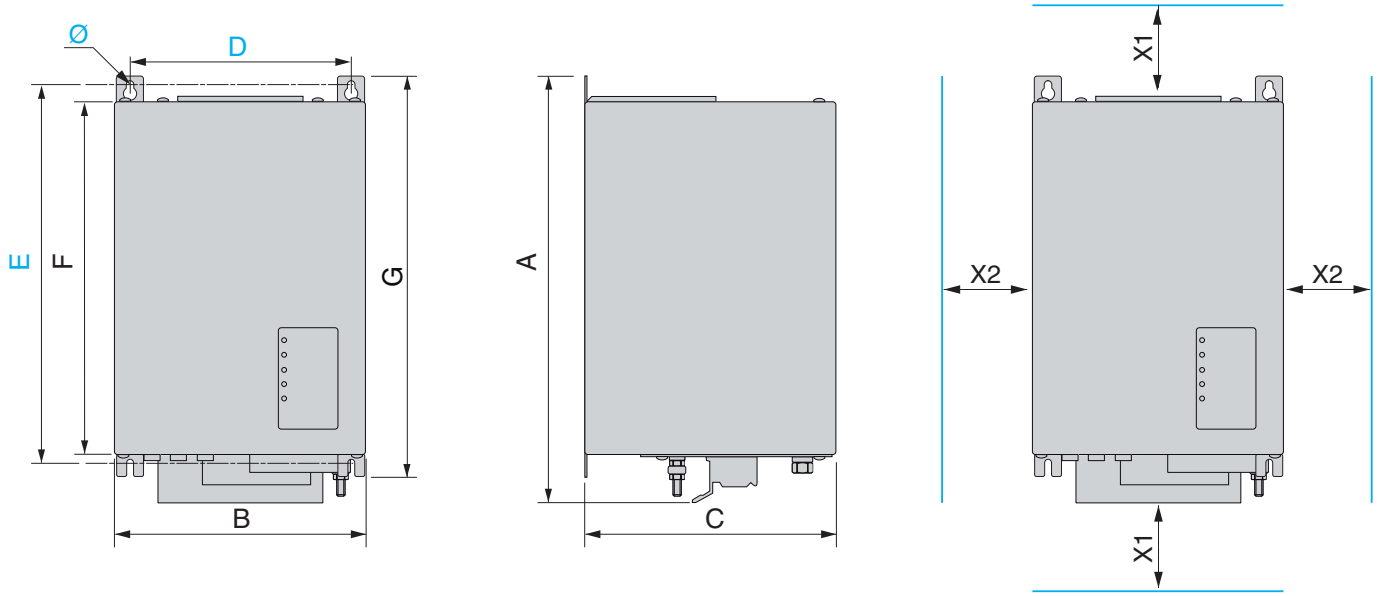
If the Braking time is longer, the Network braking unit will trigger an over-temperature.
Follow these instructions to monitor this error on the drive:

- On the Network braking unit the "General error relay" terminals must be connected to a drive Logic Input (LIx), See “Wiring diagram for Network braking units VW3A72101...107”, page 24
- On the ATV71 drive, configure the logic Input (LIx) with **E L F** [External fault ass.]. See ATV71 programming manual (1755855).

STOP terminals must be connected to the drive, the module will send a STOP command to the drive. See “Wiring diagram for Network braking units VW3A72101...107”, page 24

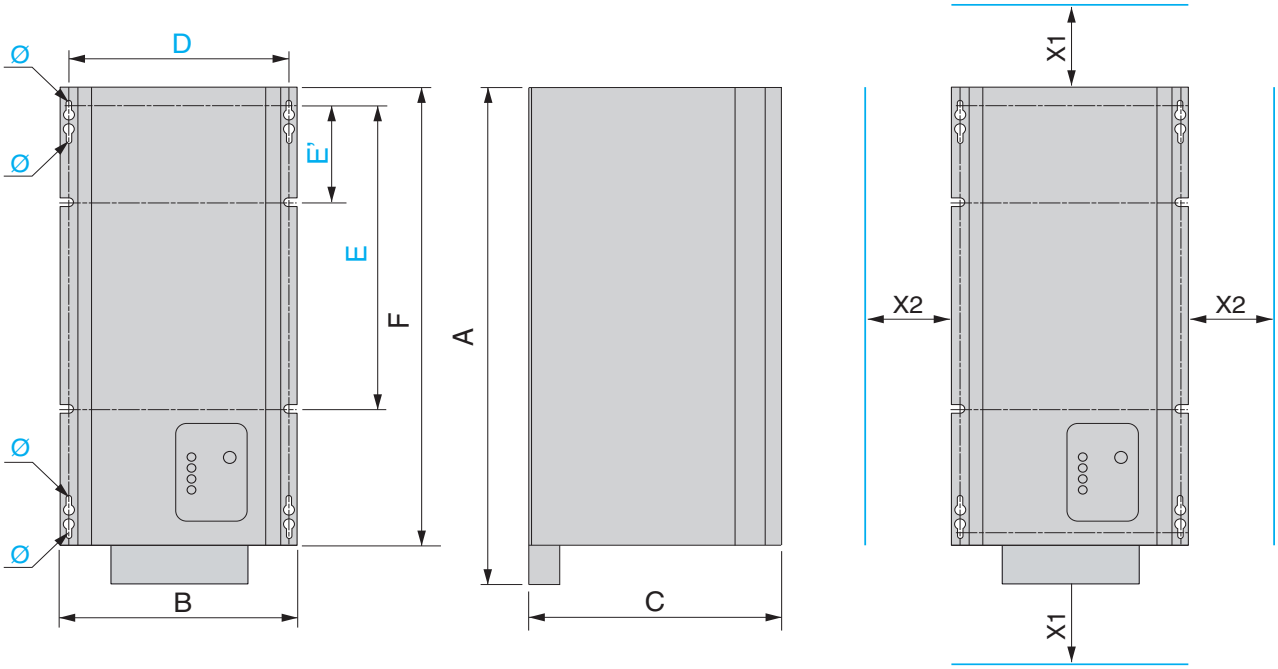
Dimensions and Mounting

VW3A72101 ... 107



VW3A72...	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)	E mm (in.)	F mm (in.)	G mm (in.)	X1 mm (in.)	X2 mm (in.)	4 Ø
101... 103	409 (16.1)	240 (9.45)	240 (9.45)	211 (8.3)	365 (14.37)	340 (13.38)	384 (15.12)	150 (5.9)	70 (2.8)	M6 x 20
104	499 (19.64)	240 (9.45)	275 (10.83)	211 (8.3)	430 (16.92)	404 (15.9)	449 (17.67)	150 (5.9)	70 (2.8)	M6 x 20
105 ... 107	568 (22.36)	255 (10)	315 (12.4)	226 (8.9)	530 (20.87)	504 (19.84)	549 (21.61)	150 (5.9)	70 (2.8)	M6 x 20

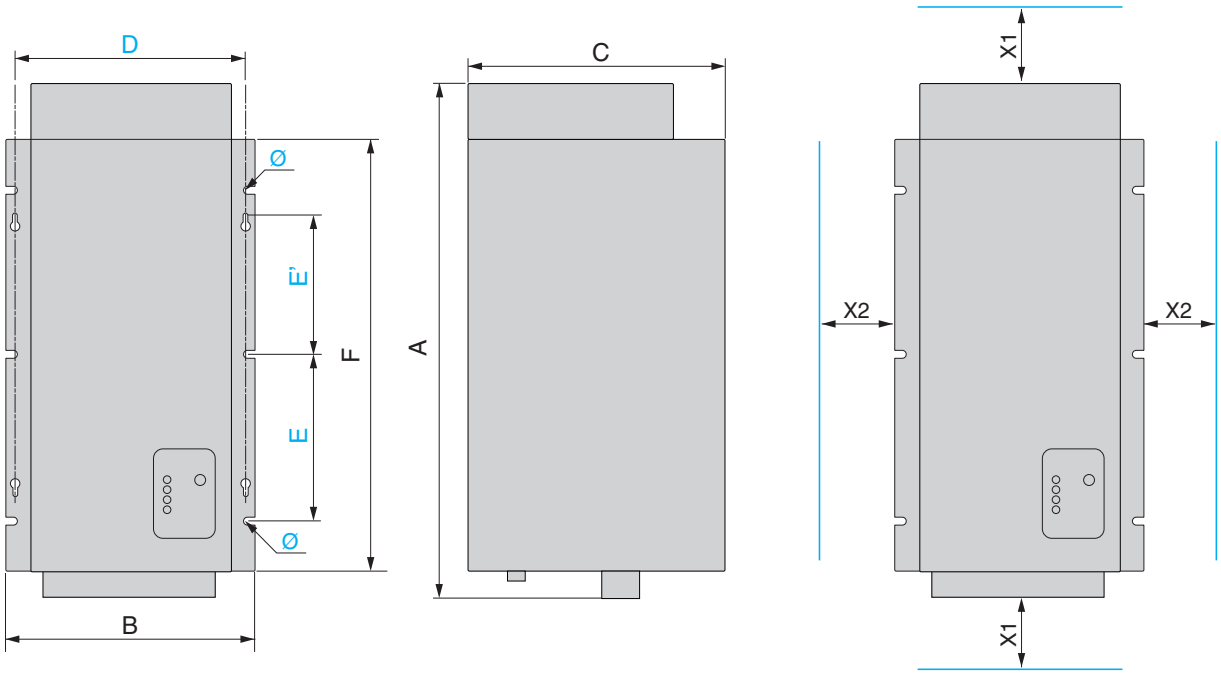
VW3A72108 ... 111



VW3A72...	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)	E mm (in.)	E' mm (in.)	F mm (in.)	X1 mm (in.)	X2 mm (in.)	Ø
108 ...110	763 (30.04)	273 (10.8)	305 (12)	254.4 (10)	490 (19.3)	–	701.5 (27.62)	150 (5.9)	70 (2.8)	4 M6 x 20
111	888 (85)	378 (14.9)	390 (15.34)	349.2 (13.75)	598 (23.54)	279 (11)	836 (33)	150 (5.9)	70 (2.8)	6 M8 x 20

Dimensions and Mounting

VW3A72112



VW3A72...	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)	E mm (in.)	E' mm (in.)	F mm (in.)	X1 mm (in.)	X2 mm (in.)	Ø
112	994 (39.13)	378 (14.9)	390 (15.34)	349.2 (13.75)	319 (12.56)	279 (11)	836 (33)	150 (5.9)	70 (2.8)	6 M8 x 20

Mounting and temperature conditions

Required mounting position

The Network braking unit has been designed to be mounted on a vertical wall only (+/– 15°). The unit can only be mounted on a smooth surface without the use of any type of spacer. It must be mounted in this way to help correct circulation of the cooling air.

- Leave sufficient free space.
  - Leave a horizontal distance of at least 70 mm (2.8 in.) between the Network braking units and the other components, and between the Network braking units and the enclosure walls.
  - Leave a vertical distance of at least 70 mm (2.8 in.) between the Network braking units and the other components, and between the Network braking units and the enclosure walls.
- Verify that there are no obstacles to the entry and exit of the cooling air. Leave a minimum distance of 15 cm (5.9 in.) at the air intake and outlet apertures.
- If the cooling air is polluted (dust, grease, corrosive gas) this may hamper some of the functions of the Network braking unit.
  - Take appropriate measures, for example: Keep the cooling air separate, fit air filters, clean regularly.
- Do not exceed the acceptable ambient temperature during use.

Dissipated thermal power = 3% of the maximum nominal power. Take into account this dissipated power if you install the Network Braking unit in an Enclosure.
The air temperature must not exceed 40°C (104°F) in the vicinity of the Network braking unit. The air inputs and air outputs at the top and bottom of the Network braking unit must not be covered by installation equipment such as cable ducts or other equipment.

The required air flow rate depends on the size of the Network braking unit (nominal power and nominal voltage).

Network braking unit	Required air flow rate in m^3/h (cu ft/h)
VW3A72101...104	200 (7063)
VW3A72105...107	350 (12360)
VW3A72108...110	450 (15892)
VW3A72111, 112	700 (24720)

Connection diagrams, fuses and associated cables

Electrical power supply

Branch Circuit Protection (F4, F5, F6) Supply mains voltage: 400 Vac

Maximum Current Irms		Continuous Braking Power	Fast-acting Semi-conductor Fuses AC uR		Catalog Number
~	⎓		~	~	
A	A	kW	A	V	
12	14	8	20	690	VW3A72101
17	20	12	30	690	VW3A72102
29	35	20	50	690	VW3A72103
46	55	19	80	690	VW3A72104
69	83	29	100	690	VW3A72105
116	139	48	160	690	VW3A72106
137	165	57	200	690	VW3A72107
202	242	84	315	690	VW3A72108
246	295	91	400	1100	VW3A72109
290	348	120	500	1100	VW3A72110
383	460	133	500	1100	VW3A72111
500	600	173	630	1100	VW3A72112

⚠ WARNING

INSUFFICIENT PROTECTION AGAINST OVERCURRENTS

- Properly rated overcurrent protective devices must be used.
- Use the fuses specified in this manual.

Failure to follow these instructions can result in death, serious injury or equipment damage.

Wiring

⚠ WARNING

SIGNAL AND DEVICE INTERFERENCE

Signal interference can cause unexpected responses of the device.
- Install the wiring in accordance with the EMC requirements.
- Verify compliance with the EMC requirements.

Failure to follow these instructions can result in death, serious injury or equipment damage.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- The cable shield must be connected to Ground.
- The shield must not come into contact with live parts

Failure to follow these instructions will result in death or serious injury.

- All the connections must be as short as possible.
- Shielded cables must be used in order to comply the EMC directives (in accordance with current standards such as EN 61800.3).
- Connect the supply mains to terminals L1, L2 and L3 on the Network braking unit. Only a three-phase supply is permitted.
- A defined phase sequence (indirect rotation of the field) must be followed when connecting the Network braking unit to the supply mains. The Network braking unit has a phase sequence check. If the rotating field is incorrect, the LED "phase failure" is displayed. In this case, two phases connected to the Network braking unit must be inverted.
- Connect the ground of the power supply cables to the ground connection screw on the Network braking unit.
- Wire the DC bus between the Drive and the Network braking unit.

NOTICE

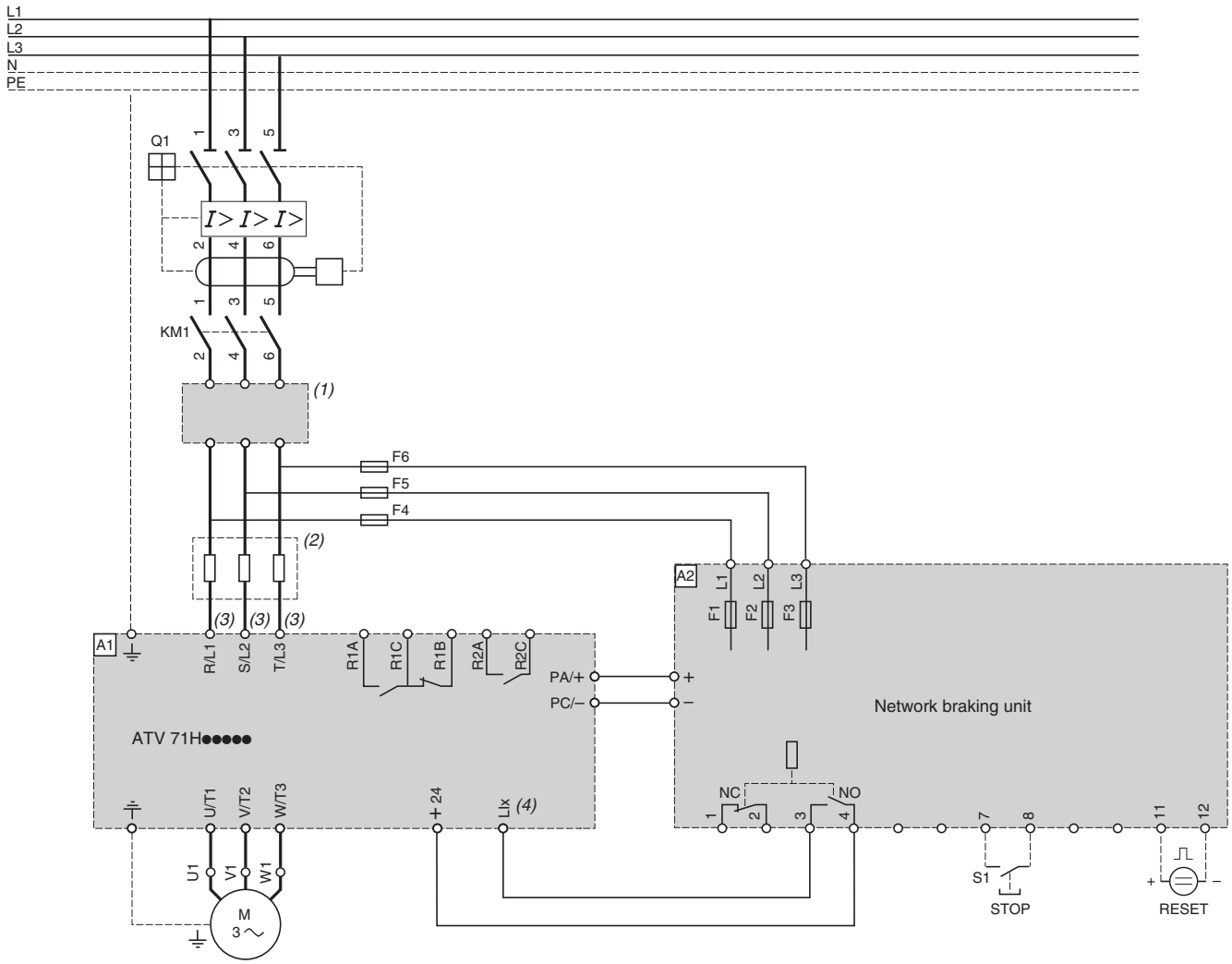
DESTRUCTION DUE TO INCORRECT WIRING

Verify the DC bus polarity connection.

Failure to follow these instructions can result in equipment damage.

Connection diagrams, fuses and associated cables

Wiring diagram for Network braking units VW3A72101...107



(1) Optional additional EMC input filter, see the ATV71 Catalog on www.schneider-electric.com
(2) Line reactor, use the fuses specified in the annex (S1B86981) provided with the drive.
(3) For ATV71HC40N4 drives combined with a 400 kW (600 HP) motor and ATV71HC50N4, see the ATV71 Installation Manual (1755849).
(4) Configuration of the LIx in external fault is necessary, see E L F [External fault ass.] *on the ATV71 programming manual (1755855).*

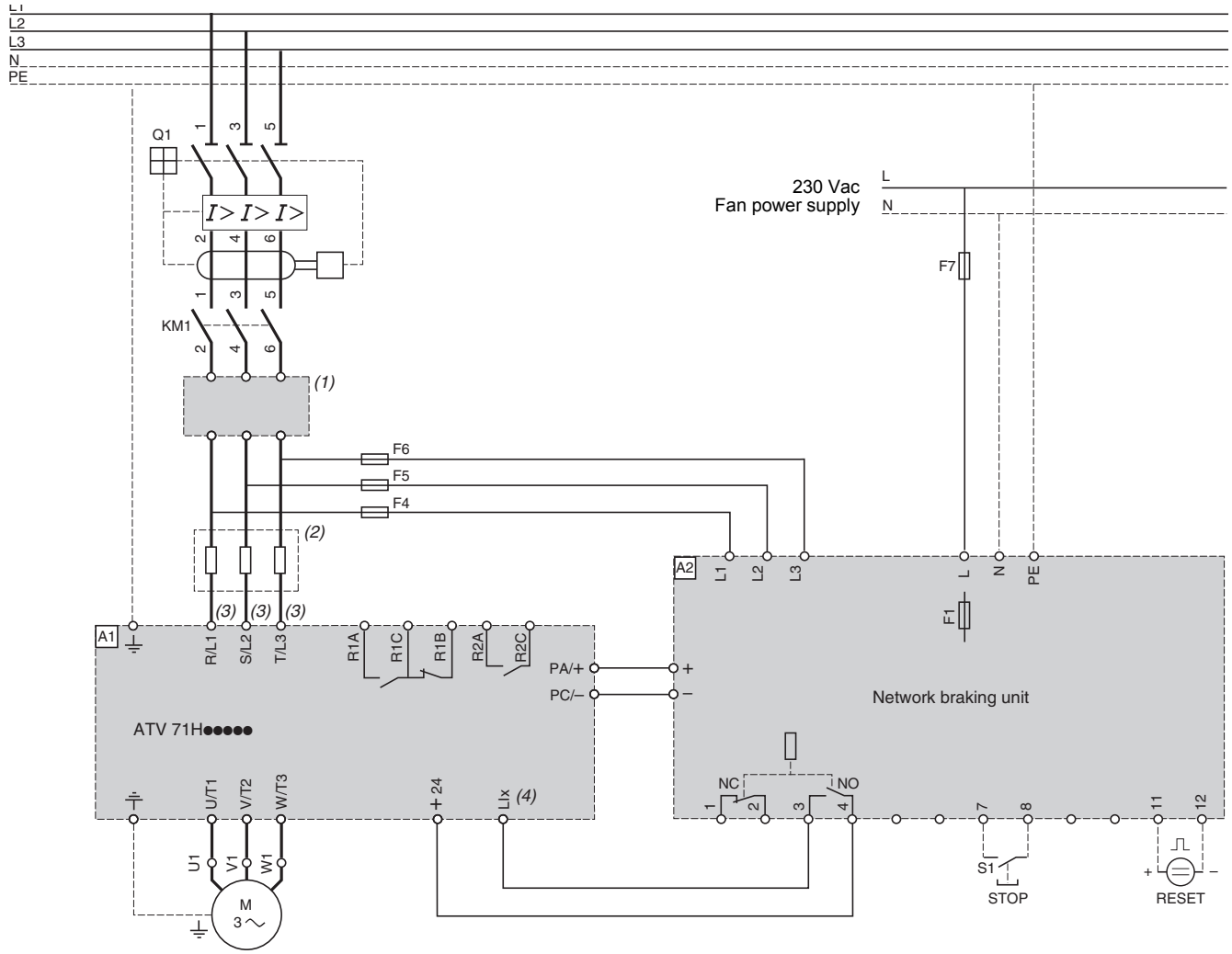
Components for use with the unit

NOTE: for a complete list of references, see our “Motor starter solutions. Power control and protection components” specialist catalog).

Ref.	Description
A1	ATV71 drive
A2	Network braking unit
F1, F2, F3	2 A fuse, 500 Vac, size: 5*30 mm
F4, F5, F6	For the fuses, refer to the reference tables on page 23
Q1	Residual current circuit breaker 300 mA.

Connection diagrams, fuses and associated cables

Wiring diagram for Network braking units VW3A72108...112 (external power supply for the fan)



(1) Optional additional EMC input filter, see the ATV71 Catalog on www.schneider-electric.com
(2) Line reactor, use the fuses specified in the annex (S1B86981) provided with the drive.
(3) For ATV71HC40N4 drives combined with a 400 kW (600 HP) motor and ATV71HC50N4, see the ATV71 Installation Manual (1755849).
(4) Configuration of the LIx in external fault is necessary, see E L F [External fault ass.] *on the ATV71 programming manual (1755855).*

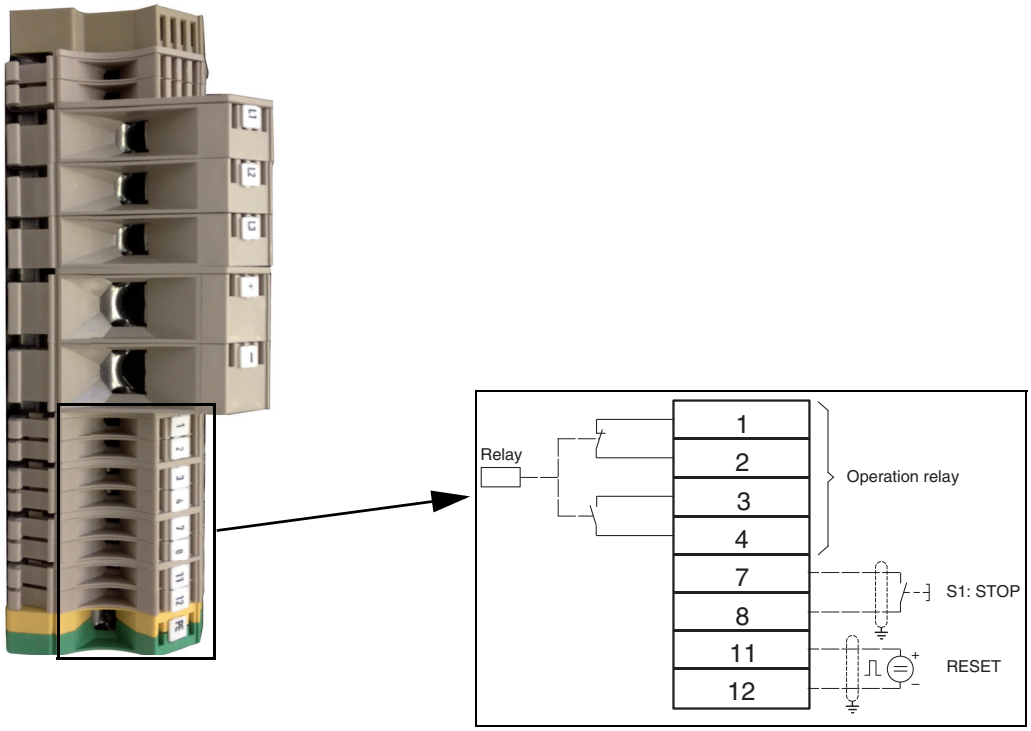
Components for use with the unit

NOTE: for a complete list of references, see our “Motor starter solutions. Power control and protection components” specialist catalog).

Ref.	Description
A1	ATV71 drive
A2	Network braking unit
F1	2 A fuse, 500 Vac, size: 5*30 mm
F4, F5, F6	For the fuses, refer to the reference tables on page 23
F7	2 A fuse, 230 V AC
Q1	Residual current circuit breaker 300 mA.

Connection diagrams, fuses and associated cables

Use of the terminals



Terminals 1 to 4 (refer to the diagram above)

- 1-2-3-4: operation relay with maximum load current of 5A AC or 3A DC.
- 1-2: Normally Closed (NC) contact
- 3-4: Normally Open (NO) contact

The relay is activated if:

- The supply mains is OK
  And
- There is no detected error

Terminals 7 and 8

(use shielded cables only, maximum length: 1.5 m (4.9 in.))
STOP signal
These terminals can be used to stop the Network braking unit.
After a STOP signal, the Network braking unit triggers an error. The operation relay is disabled, and the yellow LED "Off/collective error" is switched on.

Terminals 11 and 12

(use shielded cables only)
These connections can be used to RESET the Network braking unit. Same behavior as the "Reset" button on the front cover of the Network braking unit. (external voltage of 12 - 24 Vdc, for example from a PLC, short duration pulse).

Note: respect the polarity.

Control cable

Do not place the control cables near the power supply cables as the power supply cables cause interference.
Connect the shielding of the control cables with the metal connector on the guide, over as large an area as possible.

Control functions

The control terminals are on the Network braking unit control card. These terminals can be removed easily using a simple operation. (see diagram “Use of the terminals”, page 26)
The control card must always be configured for the voltage of the supply mains.

The contacts of the general error relay on the terminals can be connected to the outside. It is also possible to perform an external reset or switching functions by connecting them to the drive or the PLC.

Grounding System

Types of electrical network and their grounding systems

Comply with the restrictions relating to each type of network.

Grounding System	Use of the Network braking unit	Note
TN, TT	Allowed	Comply with the technical data for the unit
IT	Contact your local Schneider Electric representative for possible adaptation.	Contact your local Schneider Electric representative for possible adaptation.
Corner Grounded	Contact your local Schneider Electric representative for possible adaptation.	Contact your local Schneider Electric representative for possible adaptation.

Electromagnetic Compatibility

EMC requirements for the control cabinet

EMC measures	Objective
Use mounting plates with good electrical conductivity, connect large surface areas of metal parts, remove paint from contact areas.	Good conductivity due to large surface contact.
Ground the control cabinet, the control cabinet door and the mounting plate with ground straps or ground wires. The conductor cross section must be at least 10 mm^2 (AWG 8).	Reduces emissions.
Fit switching devices such as power contactors, relays or solenoid valves with interference suppression units or arc suppressors (for example, diodes, varistors, RC circuits).	Reduces mutual interference.
Install power components and control components separately.	

Shielded cables

EMC measures	Objective
Connect large surface areas of cable shields, use cable clamps and ground straps.	Reduces emissions.
Use cable clamps to connect a large surface area of the shields of all shielded cables to the mounting plate at the control cabinet entry.	
Ground shields of digital signal wires at both ends by connecting them to a large surface area or via conductive connector housings	Reduces interference affecting the signal wires, reduces emissions
Ground the shields of analog signal wires directly at the device (signal input); insulate the shield at the other cable end or ground it via a capacitor (for example, 10 nF, 100 V or higher.	Reduces ground loops due to low-frequency interference.
Use only shielded motor cables with copper braid and a coverage of at least 85%, ground a large surface area of the shield at both ends.	Diverts interference currents in a controlled way, reduces emissions.

Cable Installation

EMC measures	Objective
Do not route fieldbus cables and signal wires in a single cable duct together with lines with DC and AC voltages of more than 60 V. (Fieldbus cables, signal lines and analog lines may be in the same cable duct) Recommendation: Use separate cable ducts at least 20 cm apart.	Reduces mutual interference.
Keep cables as short as possible. Do not install unnecessary cable loops, use short cables from the central grounding point in the control cabinet to the external ground connection.	Reduces capacitive and inductive interference.
Use equipotential bonding conductors in the following cases: wide-area installations, different voltage supplies and installation across several buildings.	Reduces current in the cable shield, reduces emissions.
Use fine stranded equipotential bonding conductors.	Diverts high-frequency interference currents
If motor and machine are not conductively connected, for example by an insulated flange or a connection without surface contact, you must ground the motor with a ground strap or a ground wire. The conductor cross section must be at least 10 mm2 (AWG 6).	Reduces emissions, increases immunity.
Use twisted pair for the DC supply. For digital and analog inputs use shielded twisted cables with a pitch of between 25...50 mm (1...2 in).	Reduces interference affecting the signal cables, reduces emissions.

Power Supply

EMC measures	Objective
Operate product on mains with grounded neutral point.	Enables effectiveness of mains filter.
Surge arrester if there is a risk of overvoltage.	Reduces the risk of damage caused by overvoltage.

Electromagnetic Compatibility

Additional measures for EMC improvement

Depending on the application, the following measures can improve the EMC-dependent values:

EMC measures	Objective
Use mains reactors	Reduces mains harmonics, prolongs product service life.
Use external mains filters	Improves the EMC limit values.
Additional EMC measures, for example mounting in a closed control cabinet with 15 dB shielding attenuation of radiated interference	

NOTE: If using an additional input filter, it should be mounted as close as possible to the drive and the Network braking unit, connected directly to the supply mains via an unshielded cable, see wiring diagram page 23.

NOTICE
DESTRUCTION DUE TO INCORRECT WIRING • Before switching on and configuring the equipment, verify that it is properly wired. **Failure to follow these instructions can result in equipment damage.**

Initial power-up

Step 1: Switch the Supply mains on.

- The Network braking unit is ready to operate after approximately 1 s.

Step 2: Verify that the Network braking unit is ready to be used.

- If the **operation** green LED only is ON, the Network braking unit is ready to be used.
- If the other LEDs are also ON, as well as the green LED, the Network braking unit has detected an error. (see section “Diagnostic and Troubleshooting”, page 31).

Step 3: Verify that the drive is ready to run.

- Proceed in accordance with the drive manual.

Step 4: Verify braking sequences.

- Realize tests of braking sequences with the drive, to verify that the Network braking unit operates properly.

Check List Before Switching On

Mechanical Installation

Verify the mechanical installation of the entire drive system:

Step	Action	✔
1	Does the installation meet the specified distance requirements?	
2	Did you tighten all fastening screws with the specified tightening torque?	

Electrical installation

Verify the electrical connections and the cabling:

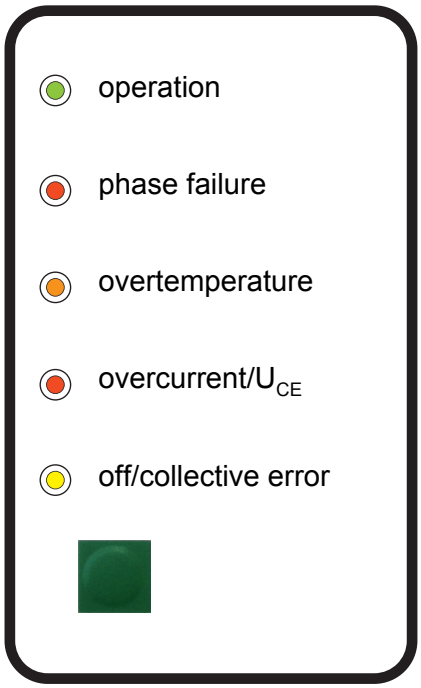
Step	Action	✔
1	Did you connect all protective ground conductors?	
2	Do all fuses and circuit breaker have the correct rating; are the fuses of the specified type? (refer to the catalog and the Getting Started Annex available with the product).	
3	Did you connect or insulate all wires at the cable ends?	
4	Did you properly connect and install all cables and connectors?	
5	Do all plug-in terminals colors and markings correspond to the colors and marking of the control block?	
6	Did you properly connect the signal wires?	
7	Are the required shield connections EMC-compliant?	
8	Did you take all measures for EMC compliance?	

Covers And Seals

Verify that all covers and seals of the control cabinet are properly installed to meet the required degree of protection.

LEDs on the Network braking unit

The 5 LEDs on the cover of the Network braking unit display the operating conditions.



LED messages

	LED display						
Case	**Operation**	**Phase failure**	**Over-temperature**	**overcurrent/ U_{CE}**	**Off/ Collective error**	**First start (after ± 1 s)**	**During operation**
	Green	**Red**	**Orange**	**Red**	**Yellow**		
1	●	–	–	–	–	Ready to operate	System in operation
2	●	–	–	–	–	Ready to operate, but no power generated ⇒ Verify the DC bus connection	
3	●	–	●	–	●	–	Overheating ⇒ error message cannot be reset to zero while overheating continues
4	●	–	–	–	●	–	After a case 3 ⇒ the heatsink temperature decreased to normal and the error can be reset
5	●	–	–	–	●	The system has stopped, (STOP) ⇒ reset required to restart	The system has stopped, (STOP) ⇒ reset required to restart
6	●	–	–	–	●	An overvoltage has been detected => reset required	
7	●	●	–	–	●	Incorrect phase rotation direction or a missing phase.	Phase loss detected => reset required
8	●	–	–	●	●	–	Overcurrent detected => reset required
9	●	●	–	●	●	Incorrect phase rotation direction or missing phase	Overcurrent and phase loss detected simultaneously => reset required
10	●	●	●	●	●	Several errors have been detected simultaneously	Several errors have been detected simultaneously
11	–	–	–	–	–	System stopped, at least 2 phases missing	System stopped, at least 2 phases missing

STOP

As optional function, it is possible to wire a "STOP" switch, see diagram page 24 or 25.
To restart the Network braking unit after a STOP command, push the RESET button.

Reset of the product

The cause of the detected error must be removed before resetting:
- by pressing the RESET button,
- or by turning the power OFF and then back ON.

NOTICE
RISK OF DAMAGE TO THE EQUIPMENT Do not reset the product during the braking operation. The power semi-conductors might be exposed to increased stress, which can result in accelerated aging. **Failure to follow these instructions can result in equipment damage.**

Phase loss and undervoltage detection

Phase loss and undervoltage function monitors the 3 phases of the supply mains.
In case of a phase loss or low voltage on one phase, the Network braking unit triggers an error on terminals 1,2,3,4 (relay) and the LED "phase failure".

Overvoltage Detection

The Network braking unit will trigger an error if the mains voltage is higher than 460 Vac.

Overcurrent Detection

The cause of periodic tripping on Overcurrent detection may be an overload, a fall in Mains voltage, an oscillating or defective drive, an oscillating input reference.