SERVICE LETTER

Exhaust Treatment
Technical Services

WV92S317
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Verify proper connections on the Variable Speed Drives (VSD)

Distribution to:

- **Operators and owners of installations concerned**
- **Commissioning teams of projects concerned**

For immediate attention *

Components concerned
Variable Speed Drives (VSD) used in WÄRTSILÄ® Exhaust Gas Cleaning systems (EGC).

Reference
Enclosed pages from the Schneider VSD (Variable Speed Drive) Installation Manual.

Introduction
The purpose of this bulletin is to underline the importance of proper cable connection and termination for VSD's and motors using proper cable lugs or wire ferrules.

It has been reported drive failures due to overheating of drive and motors connections.

Follow the Instructions described in the enclosures to this bulletin.

Preventive action
Customers to verify proper termination and connection condition on VSD's and motors installed within EGC system.

Warning
Verification shall be conducted by qualified personnel with all safety precautions.

Validity
Until further notice.

Before taking any action, always check the available online systems for the latest revision of this document. Any locally stored or printed version is considered to be an uncontrolled document.

* For immediate attention: This bulletin should be read immediately with possibly immediate action as well. Neglecting this bulletin can be dangerous for personnel or cause damage to the installation or environment.

Wärtsilä Finland Oy
P.O. Box 244 (Järvikatu 2-4)
FIN-65101 Vaasa

Tel: +358 010 709 0000

www.wartsila.com

Introduction

The purpose of this bulletin is to underline the importance of proper cable connection and termination for Variable Speed Drives (VSD) and motors using proper cable lugs or wire ferrules.

Recently it has been reported some cases of drive failures due to overheating of the drive and motors connections.

The root cause of mentioned cases has been determined as not proper tightening of cable connections and termination and installation without ferrules or lugs fitted to the cables. See Figure 1 and Figure 2 for examples of the described failures.

Figure 1, Example of burnt connector block on VSD

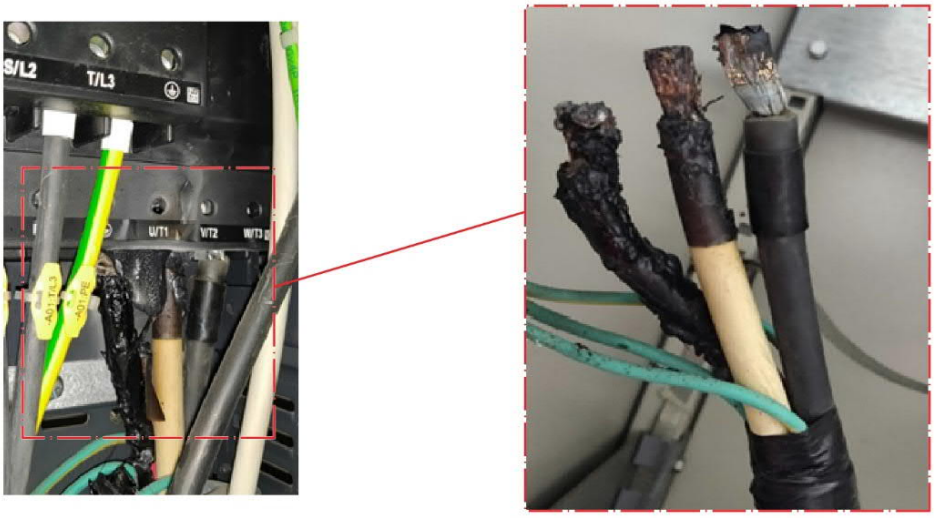


Figure 2, Example of burnt connector block and burnt cables <u>without</u> ferrules or lugs

Recommendation

- Verify proper termination and connection condition on VSD's and motors installed within EGC system as describe in Actions, see page 3.
- Distribute this information to all maintenance teams concerned.

Actions

Verify that the drive and the motor connections are checked and corrected as needed. Follow the instructions very precisely as described in the Enclosures.

WARNING:
Ensure that no power is present on the equipment prior to verification. The verification shall be conducted by qualified personnel with all safety precautions.

Please note that Wärtsilä's policy states that the ferrules or lugs shall be used regardless of cable type for connecting main power to all VSDs and motors, see also Figure 3.

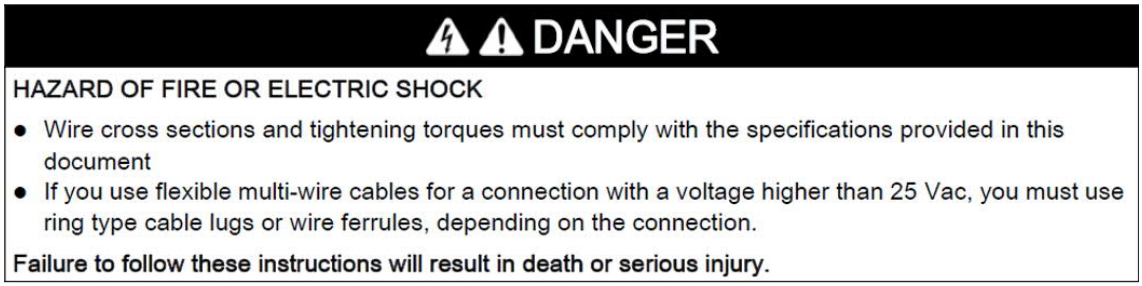


Figure 3, From Schneider VSD installation manual

WARNING:
Pay also attention to the following to avoid potential dangerous and life-threating situation to personnel conducting verification as well as damages to equipment:

- Power down the VSD and wait, at least, 15 minutes to let internal capacitors discharge.
- Check tightening of torques verification at least every year as per Schneider Electric Maintenance Manual.

See Figure 4 for determine model code for ATV 61 series and please see size chart found in section Enclosures "Offer Overview Product ATV630/930" for determine model code for ATV 630 series.

Figure 4, ATV61, menu 1.11 "IDENTIFICATION" (ATV71 is shown as reference only)

Enclosures

- Sections from the Schneider installation manual:
  - Wiring Instructions from Schneider Electric document EAV64301.03/2019 (pages 122 - 126), 5 pages.
  - Characteristics of the Power Part Terminals from Schneider Electric document EAV64301.03/2019 (pages 140 - 145), 6 pages.
  - Scheduled Servicing from Schneider Electric document EAV64301.03/2019 (pages 189 - 190), 2 pages.
- Power Terminals from Schneider Electric document 1760643.04/2017 (page 26), 1 page.
- Offer Overview Product ATV630/930, 2 pages.

Contacts

If technical support is needed, please create a **TechRequest** in Wärtsilä Online.

For services, spare parts and/or tools, please contact your nearest Wärtsilä representative or the Customer Support Centre (CSC):

www.wartsila.com/csc

Wiring Instructions

General Instructions

The entire installation procedure must be performed without voltage present.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Read and understand the instructions in **Safety Information** chapter before performing any procedure in this chapter.

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

Drive systems may perform unexpected movements because of incorrect wiring, incorrect settings, incorrect data or other errors.

WARNING

UNANTICIPATED EQUIPMENT OPERATION

- 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.

Unsuitable settings or unsuitable data or unsuitable wiring may trigger unintended movements, trigger signals, damage parts and disable monitoring functions.

WARNING

UNANTICIPATED EQUIPMENT OPERATION

- Only start the system if there are no persons or obstructions in the zone of operation.
- Verify that a functioning emergency stop push-button is within reach of all persons involved in the operation.
- Do not operate the drive system with unknown settings or data.
- Verify that the wiring is appropriate for the settings.
- Never modify a parameter unless you fully understand the parameter and all effects of the modification.
- When commissioning, carefully run tests for all operating states, operating conditions and potential error situations.
- Anticipate movements in unintended directions or oscillation of the motor.

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

DANGER

HAZARD OF FIRE OR ELECTRIC SHOCK

- Wire cross sections and tightening torques must comply with the specifications provided in this document
- If you use flexible multi-wire cables for a connection with a voltage higher than 25 Vac, you must use ring type cable lugs or wire ferrules, depending on the connection.

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

The product has a leakage current greater than 3.5 mA. If the protective ground connection is interrupted, a hazardous touch current may flow if the product is touched.

DANGER

ELECTRIC SHOCK CAUSED BY HIGH LEAKAGE CURRENT

- Verify compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of the entire drive system.

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

DANGER

INSUFFICIENT PROTECTION AGAINST OVERCURRENTS CAN CAUSE FIRE OR EXPLOSION

- Use properly rated overcurrent protection devices.
- Use the fuses/circuit breakers specified.
- Do not connect the product to a supply mains whose prospective short circuit current rating (current that flows during a short circuit) exceeds the specified maximum permissible value.
- When rating the upstream mains fuses and the cross sections as well as the lengths of the mains cables, take into account the minimum required prospective short-circuit current (Isc). Refer to the Upstream Protection Device section.
- If the minimum required prospective short-circuit current (Isc) is not available, apply the instructions given in the section below.

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

Cable Characteristics

Only use cables with insulator heat resistance of 75°C (167°F) min.

If you are using cables longer than 150 m (492 ft) between the drive and the motor, add output filters (for more details refer to the catalog).

Use a shielded cable to meet the requirements of Category C2 or C3 according to the standard IEC 61800-3, except when using a sinus filter. In this case, the use of a non-shielded motor cable is possible.

To limit the currents in common mode, use common mode output filters (ferrite) in order to reduce the circulating currents in the motor windings.

Standard linear capacity cables can be used with Altivar Process. Use of cables with lower linear capacity could increase cable length performances.

The overvoltage limitation function **[Motor surge limit.]** SVL enables you to increase the cable length while decreasing the torque performances (refer to Programming manual). *(see page 10)*

Power Part Cables Stripping lengths 

Catalog Number and Frame Size [•] (1)		Cable Stripping Length	
		Input (Supply Mains	Output (Motor)
		mm (in.)	mm (in.)
ATV630U07M3...U40M3	[1]	11 ± 1 (0.43 ± 0.04)	11 ± 1 (0.43 ± 0.04)
ATV630U07N4...U55N4	[1]	11 ± 1 (0.43 ± 0.04)	11 ± 1 (0.43 ± 0.04)
ATV630U55M3	[2]	11 ± 1 (0.43 ± 0.04)	11 ± 1 (0.43 ± 0.04)
ATV630U75N4...D11N4	[2]	11 ± 1 (0.43 ± 0.04)	11 ± 1 (0.43 ± 0.04)
ATV630U22S6X...U75S6X, D11S6X...D15S6X	[2]	11 ± 1 (0.43 ± 0.04)	11 ± 1 (0.43 ± 0.04)
ATV630U22Y6...U75Y6, D11Y6...D15Y6	[3Y]	20 ± 2 (0.79 ± 0.08)	20 ± 2 (0.79 ± 0.08)
ATV630U75M3...D11M3	[3]	20 ± 2 (0.79 ± 0.08)	20 ± 2 (0.79 ± 0.08)
ATV630D15N4...D22N4	[3]	20 ± 2 (0.79 ± 0.08)	20 ± 2 (0.79 ± 0.08)
ATV630D18S6, D22S6	[3S]	20 ± 2 (0.79 ± 0.08)	20 ± 2 (0.79 ± 0.08)
ATV630D18Y6...D30Y6	[3Y]	32 ± 3 (1.26 ± 0.12)	32 ± 3 (1.26 ± 0.12)
ATV630D15M3...D22M3	[4]	26 ± 2 (1.02 ± 0.08)	26 ± 2 (1.02 ± 0.08)
ATV630D30N4...D45N4	[4]	26 ± 2 (1.02 ± 0.08)	26 ± 2 (1.02 ± 0.08)
ATV630D30M3...D45M3	[5]	32 ± 3 (1.26 ± 0.12)	32 ± 3 (1.26 ± 0.12)
ATV630D55N4...D90N4	[5]	32 ± 3 (1.26 ± 0.12)	32 ± 3 (1.26 ± 0.12)
ATV630D30S6...D75S6	[5S]	32 ± 3 (1.26 ± 0.12)	32 ± 3 (1.26 ± 0.12)
ATV630D37Y6...D90Y6	[5Y]	32 ± 3 (1.26 ± 0.12)	32 ± 3 (1.26 ± 0.12)
ATV650U07N4...D11N4	[A]	11 ± 1 (0.43 ± 0.04)	11 ± 1 (0.43 ± 0.04)
ATV650U07N4E...D11N4E	[A]	11 ± 1 (0.43 ± 0.04)	11 ± 1 (0.43 ± 0.04)
ATV650D15N4, D18N4, D22N4	[A]	20 ± 2 (0.79 ± 0.08)	20 ± 2 (0.79 ± 0.08)
ATV650D15N4E...D22N4E	[A]	17 ± 2 (0.67 ± 0.08)	20 ± 2 (0.79 ± 0.08)
ATV650D30N4, D37N4, D45N4	[B]	26.2 ± 2 (1.03 ± 0.08)	26.2 ± 2 (1.03 ± 0.08)
ATV650D30N4E, D37N4E, D45N4E	[B]	21.5 ± 2.5 (0.85 ± 0.1)	21.5 ± 2.5 (0.85 ± 0.1)
ATV650D55N4, D75N4, D90N4	[C]	32 ± 3 (1.27 ± 0.12)	32 ± 3 (1.27 ± 0.12)
ATV650D55N4E, D75N4E, D90N4E	[C]	32 ± 3 (1.27 ± 0.12)	32 ± 3 (1.27 ± 0.12)
(1) Size 1...5 drives: Including catalog numbers ATV630•••N4Z.			

Control Part

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

Verify that the digital and analog inputs and outputs are wired with the shielded, twisted-pair cables specified in the present manual.

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

- Keep the control circuits away from the power cables. For digital and analog inputs/outputs, use shielded twisted cables with a pitch of 25...50 mm (1 in. and 2 in.)
- It is advisable to use cable ends, available on *www.schneider-electric.com.*

Residual Current Device

Direct current can be introduced in the protective ground conductor of this drive. If a residual current device (RCD / GFCI) or a residual current monitor (RCM) is used for additional protection against direct or indirect contact, the following specific types must be used.

⚠ WARNING

DIRECT CURRENT CAN BE INTRODUCED INTO THE PROTECTIVE GROUND CONDUCTOR

- Use a Type A Residual Current Device (RCD / GFCI) or a Residual Current Monitor (RCM) for single-phase drives connected to a phase and to the neutral conductor.
- Use a Type B Residual Current Device (RCD / GFCI) or a Residual Current Monitor (RCM) that has approval for use with frequency inverters and is sensitive to all types of current for three-phase devices and for single-phase devices not connected to a phase and the neutral conductor.

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

Further conditions for use of a residual current device:

- The drive has an increased leakage current at the moment power is applied. Use a residual current device (RCD / GFCI) or a residual current monitor (RCM) with a response delay.
- High-frequency currents must be filtered.

Due to high leakage current in standard operation, it is advisable to choose at least a 300 mA device.

If the installation requires a residual current device less than 300 mA, it can be possible to use a device lower than 300 mA by changing the IT switch position (drive sizes 5S and 5Y) or by removing the screws (drive sizes 1...7) according to the instructions given in the Operation on an IT System section *(see page 170)*.

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

Equipment Grounding

NOTICE

DESTRUCTION DUE TO INCORRECT WIRING

- Before switching on and configuring the product, verify that it is properly wired.

Failure to follow these instructions can result in equipment damage.

⚠ ⚠ DANGER

ELECTRIC SHOCK CAUSED BY INSUFFICIENT GROUNDING

- Verify compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of the entire drive system.
- Ground the drive system before applying voltage.
- The cross section of the protective ground conductor must comply with the applicable standards.
- Do not use conduits as protective ground conductors; use a protective ground conductor inside the conduit.
- Do not consider cable shields to be protective ground conductors.

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

Tighten the grounding screws according to the instructions given in the Ground Cables section *(see page 140)*.

Connection Instructions

The product has a leakage current greater than 3.5 mA. If the protective ground connection is interrupted, a hazardous touch current may flow if the product is touched.

DANGER

ELECTRIC SHOCK CAUSED BY HIGH LEAKAGE CURRENT

- Verify compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of the entire drive system.

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

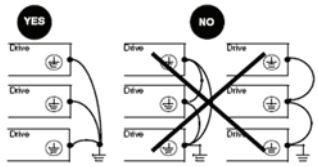
DANGER

INSUFFICIENT PROTECTION AGAINST OVERCURRENTS CAN CAUSE FIRE OR EXPLOSION

- Use properly rated overcurrent protection devices.
- Use the fuses/circuit breakers specified.
- Do not connect the product to a supply mains whose prospective short circuit current rating (current that flows during a short circuit) exceeds the specified maximum permissible value.
- When rating the upstream mains fuses and the cross sections as well as the lengths of the mains cables, take into account the minimum required prospective short-circuit current (Isc). Refer to the Upstream Protection Device section.
- If the minimum required prospective short-circuit current (Isc) is not available, apply the instructions given in the section below.

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

- Ensure that the resistance to Ground is 1 Ohm or less.
- When grounding several drives, you must connect each one directly, as shown in the above figure.
- Do not loop Ground cables or connect them in series.



Characteristics of the Power Part Terminals

Description of the Power Terminals

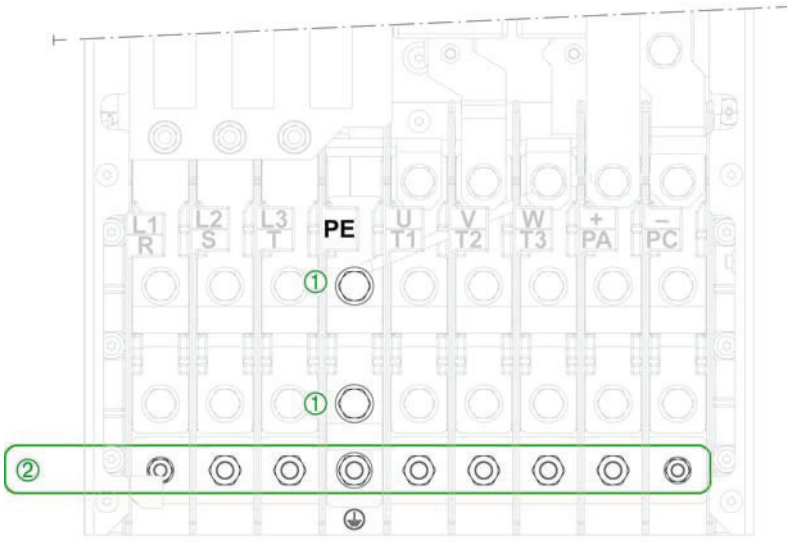
Terminal	Function
PE or ⏚	Ground connection terminal
R/L1 S/L2 T/L3	AC supply mains
U/T1 V/T2 W/T3	Outputs to the motor

Ground Cables

Ground cable cross sections of input and output ground cables are the same as those given for the input and output cables. Minimum cross section of protective ground cable is 10 mm^2 (AWG 8) and 16 mm^2 (AWG 6) for AL cable.

Tightening torques according to frame size

- Frame sizes 1...3: 2.5 N·m (22.1 lb.in)
- Frame size 3S: 12 N·m (106.2 lb.in)
- Frame size 3Y:
  - ATV•30U22Y6...U75Y6, ATV•30D11Y6: 3 N·m (26.5 lb.in)
  - ATV•30D15Y6, D18Y6: 5.4 N·m (47.8 lb.in)
  - ATV•30D22Y6, D30Y6: 12 N·m (106.2 lb.in)
- Frame size 4: 5 N·m (44.2 lb.in)
- Frame size 5: 25 N·m (221.3 lb.in)
- Frame sizes 5S and 5Y: 41 N·m (362.89 lb.in)
- Frame size 6:
  - ①: 27 N·m (239 lb.in)
  - ②:13.5 N·m (119.5 lb.in)



- Frame size 7: 37.5...50.8 N·m (332...449 lb.in)

Frame Size 1

ATV630 (**)	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Rated	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
U07••, U15••, U22••, U30N4, U40N4	2.5 (14)	6 (10)	1.3 (11.5)	2.5 (14)	6 (10)	1.3 (11.5)
U55N4, U30M3	2.5 (14)	6 (10)	1.3 (11.5)	4 (12)	6 (10)	1.3 (11.5)
U40M3	4 (12)	6 (10)	1.3 (11.5)	6 (10)	6 (10)	1.3 (11.5)
Only use cables with solid wires or rigid stranded wires. (*) Maximum cross section of the terminals (**) The 2 dots may stand for M3 or N4. The values for ATV••••••N4 catalog numbers also apply to ATV••••••N4Z.						

Frame Size 2

ATV630 (**)	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Rated	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
U22S6X...U75S6X D11S6X...D15S6X D11N4	6 (10)	6 (10)	1.8 (15.6)	6 (10)	10 (8)	1.8 (15.6)
U75N4	4 (12)	6 (10)	1.8 (15.6)	6 (10)	10 (8)	1.8 (15.6)
U55M3	6 (10)	6 (10)	1.8 (15.6)	10 (8)	10 (8)	1.8 (15.6)
Only use cables with solid wires or rigid stranded wires. (*) Maximum cross section of the terminals (**) The values for ATV••••••N4 catalog numbers also apply to ATV••••••N4Z.						

Frame Size 3

ATV630 (**)	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Rated	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
D15N4, D18N4, U75M3	10 (8)	16 (6)	3.5 (30.4)	10 (8)	16 (6)	3.5 (30.4)
D22N4, D11M3	10 (8)	16 (6)	3.5 (30.4)	16 (6)	16 (6)	3.5 (30.4)
Only use cables with solid wires or rigid stranded wires. (*) Maximum cross section of the terminals (**) The values for ATV630•••N4 catalog numbers also apply to ATV630•••N4Z.						

Frame Size 3S

ATV630	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Rated	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
D18S6, D22S6	10 (8)	10 (8)	12 (106.2)	10 (8)	10 (8)	12 (106.2)
Only use cables with solid wires or rigid stranded wires. (*) Maximum cross section of the terminals						

Frame Size 3Y

ATV630	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Rated	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
U22Y6...U75Y6, D11Y6	4 (12)	10 (8)	3 (26.5)	4 (12)	10 (8)	3 (26.5)
D15Y6, D18Y6	6 (10)	10 (8)	5.4 (47.7)	6 (10)	10 (8)	5.4 (47.7)
D22Y6, D30Y6	10 (8)	10 (8)	12 (106.2)	10 (8)	10 (8)	12 (106.2)
Only use cables with solid wires or rigid stranded wires. (*) Maximum cross section of the terminals						

Frame Size 4

ATV630 (**)	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Rated	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
D30N4, D15M3	25 (4)	50 (1)	12 (106.2)	25 (4)	50 (1)	12 (106.2)
D37N4, D18M3	35 (3)	50 (1)	12 (106.2)	35 (3)	50 (1)	12 (106.2)
D45N4, D22M3	35 (2)	50 (1)	12 (106.2)	50 (1)	50 (1)	12 (106.2)
Only use cables with rigid stranded wires. (*) Maximum cross section of the terminals (**) The values for ATV630•••N4 catalog numbers also apply to ATV630•••N4Z.						

Frame Size 5

ATV630 (**)	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Min. to Maximum	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
D55N4	70 (1/0)	120 (250MCM)	25 (221.3)	70 (1/0)	120 (250MCM)	25 (221.3)
D30M3	70 (1/0)	120 (250MCM)	25 (221.3)	70 (2/0)	120 (250MCM)	25 (221.3)
D75N4	95 (3/0)	120 (250MCM)	25 (221.3)	95 (3/0)	120 (250MCM)	25 (221.3)
D37M3	70 (2/0)	120 (250MCM)	25 (221.3)	95 (3/0)	120 (250MCM)	25 (221.3)
D90N4, D45M3	120 (4/0)	120 (250MCM)	25 (221.3)	120 (250MCM)	120 (250MCM)	25 (221.3)
Only use cables with rigid stranded wires. (*) Maximum cross section of the terminals (**) The values for ATV630•••N4 catalog numbers also apply to ATV630•••N4Z.						

Frame Size 5S

ATV630	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Min. to Maximum	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
D30S6	16 (6)	50 (1/0)	11.3 (100)	16 (6)	50 (1/0)	41 (360)
D37S6, D45S6	25 (4)	50 (1/0)	11.3 (100)	25 (4)	50 (1/0)	41 (360)
D55S6	35 (2)	50 (1/0)	11.3 (100)	35 (2)	50 (1/0)	41 (360)
D75S6	50 (1/0)	50 (1/0)	11.3 (100)	50 (1/0)	50 (1/0)	41 (360)
Only use cables with rigid stranded wires. (*) Maximum cross section of the terminals						

Frame Size 5Y

ATV630	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Min. to Maximum	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
D37Y6	25 (4)	50 (1/0)	11.3 (100)	25 (4)	50 (1/0)	41 (360)
D45Y6, D55Y6	25 (4)	50 (1/0)	11.3 (100)	25 (4)	50 (1/0)	41 (360)
D75Y6	35 (2)	50 (1/0)	11.3 (100)	35 (2)	50 (1/0)	41 (360)
D90Y6	50 (1/0)	50 (1/0)	11.3 (100)	50 (1/0)	50 (1/0)	41 (360)
Only use cables with rigid stranded wires. (*) Maximum cross section of the terminals						

Frame Size 6

NOTE:

- If used with ring tongue: selection criteria are compatible with screw M10, width 24 mm (0.94 in.), following DIN 46234.
- If used with lugs: selection criteria are compatible with standard cable lug according to DIN 46234. You may also use lug kit DZ2FH6 and DZ2FH1 available on *schneider-electric.com*

ATV630	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Rated	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
C11N4	2 x 50 (2 x 1/0)	3 x 120 (2 x 300MCM)	27 (239)	2 x 50 (2 x 1/0)	3 x 120 (2 x 300MCM)	27 (239)
C13N4, D55M3	2 x 70 (2 x 2/0)	3 x 120 (2 x 300MCM)	27 (239)	2 x 70 (2 x 2/0)	3 x 120 (2 x 300MCM)	27 (239)
C16N4, D75M3	2 x 95 (2 x 3/0)	3 x 120 (2 x 300MCM)	27 (239)	2 x 95 (2 x 3/0)	3 x 120 (2 x 300MCM)	27 (239)
(*) Maximum cross section of the terminals						

Frame Size 7A and 7B

ATV630	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Rated	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
C22N4	2 x 150 (2 x 350MCM)	2 x 150 (2 x 350MCM)	41 (360)	2 x 150 (2 x 350MCM)	2 x 150 (2 x 350MCM)	41 (360)
C25N4, C31N4	4 x 185 (3 x 350MCM)	4 x 185 (3 x 350MCM)	41 (360)	4 x 185 (3 x 350MCM)	4 x 185 (3 x 350MCM)	41 (360)
(*) Maximum cross section of the terminals						

Frame Size A

ATV650	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Rated	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
U07N4...U55N4	4 (12)	6 (10)	1.3 (11.5)	4 (12)	6 (10)	1.3 (11.5)
U07N4E...U55N4E	4	6	2.1 (18.3)	4	6	1.3 (11.5)
U75N4	4 (12)	6 (10)	1.8 (15.6)	6 (10)	10 (8)	1.8 (15.6)
U75N4E	4	6	2.1 (18.3)	6	10	1.8 (15.6)
D11N4	6 (10)	6 (10)	1.8 (15.6)	6 (10)	10 (8)	1.8 (15.6)
D11N4E	6	6	2.1 (18.3)	6	10	1.8 (15.6)
D15N4, D18N4	10 (8)	16 (6)	3.5 (30.4)	10 (8)	16 (6)	3.5 (30.4)
D15N4E, D18N4E	10	16	4.5 (40)	10	16	3.5 (30.4)
D22N4	10 (8)	16 (6)	3.5 (30.4)	16 (6)	16 (6)	3.5 (30.4)
D22N4E	10	16	4.5 (40)	16	16	3.5 (30.4)
Only use cables with solid wires or rigid stranded wires. (*) Maximum cross section of the terminals						

Frame Size B

ATV650	Supply Terminals (L1, L2, L3)			Output Power Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Rated	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
D30N4	25 (4)	50 (1)	12 (106.2)	25 (4)	50 (1)	12 (106.2)
D30N4E	25	50	12 (106.2)	25	50	12 (106.2)
D37N4	25 (4)	50 (1)	12 (106.2)	35 (3)	50 (1)	12 (106.2)
D37N4E	25	50	12 (106.2)	35	50	12 (106.2)
D45N4	35 (3)	50 (1)	12 (106.2)	35 (2)	50 (1)	12 (106.2)
D45N4E	35	50	12 (106.2)	35	50	12 (106.2)
Only use cables with rigid stranded wires. (*) Maximum cross section of the terminals						

Frame Size C

ATV650	Supply Terminals (L1, L2, L3)			Output Terminals (U, V, W)		
	Wire Cross Section		Tightening Torque	Wire Cross Section		Tightening Torque
	Minimum	Maximum (*)	Rated	Minimum	Maximum (*)	Rated
	mm² (AWG)	mm² (AWG)	N·m (lb.in)	mm² (AWG)	mm² (AWG)	N·m (lb.in)
D55N4	50 (1)	120 (250MCM)	25 (221.3)	70 (1/0)	120 (250MCM)	25 (221.3)
D55N4E	70	95	22.6 (200)	70	120	25 (221.3)
D75N4	70 (2/0)	120 (250MCM)	25 (221.3)	95 (3/0)	120 (250MCM)	25 (221.3)
D75N4E	95	95	22.6 (200)	95	120	25 (221.3)
D90N4	95 (3/0)	120 (250MCM)	25 (221.3)	120 (4/0)	120 (250MCM)	25 (221.3)
D90N4E	95	95	22.6 (200)	120	120	25 (221.3)
Only use cables with rigid stranded wires. (*) Maximum cross section of the terminals						

Floor Standing Drives - Normal Duty

ATV•30 and ATV•50	Supply Terminals (L1, L2, L3)		Output Terminals (U, V, W)	
	Wire Cross Section in mm²		Wire Cross Section in mm²	
	Recommended	Maximum (*)	Recommended	Maximum (*)
C11N4F	1 x (3 x 150 mm²) or 2 x (3 x 70 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)	1 x (3 x 120 mm²) or 2 x (3 x 70 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)
C13N4F	1 x (3 x 185 mm²) or 2 x (3 x 70 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)	1 x (3 x 150 mm²) or 2 x (3 x 70 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)
C16N4F	1 x (3 x 185 mm²) or 2 x (3 x 95 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 95 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)
C20N4F	2 x (3 x 120 mm²) or 3 x (3 x 70 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)	2 x (3 x 120 mm²) or 3 x (3 x 70 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)
C25N4F	2 x (3 x 185 mm²) or 3 x (3 x 95 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)	2 x (3 x 150 mm²) or 3 x (3 x 95 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)
C31N4F	3 x (3 x 150 mm²) or 4 x (3 x 95 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)	2 x (3 x 185 mm²) or 4 x (3 x 120 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)
(*) Maximum cross section of the terminals				

Floor Standing Drives - Heavy Duty

ATV•30 and ATV•50	Supply Terminals (L1, L2, L3)		Output Terminals (U, V, W)	
	Wire Cross Section in mm²		Wire Cross Section in mm²	
	Recommended	Maximum (*)	Recommended	Maximum (*)
C11N4F	1 x (3 x 150 mm²) or 2 x (3 x 70 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)	1 x (3 x 150 mm²) or 2 x (3 x 70 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)
C13N4F	1 x (3 x 185 mm²) or 2 x (3 x 70 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)	1 x (3 x 150 mm²) or 2 x (3 x 70 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)
C16N4F	1 x (3 x 185 mm²) or 2 x (3 x 70 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)	1 x (3 x 150 mm²) or 2 x (3 x 70 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 120 mm²)
C20N4F	2 x (3 x 95 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)	1 x (3 x 185 mm²) or 2 x (3 x 95 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)
C25N4F	2 x (3 x 120 mm²) or 3 x (3 x 70 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)	2 x (3 x 120 mm²) or 3 x (3 x 70 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)
C31N4F	3 x (3 x 150 mm²) or 4 x (3 x 95 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)	2 x (3 x 185 mm²) or 4 x (3 x 120 mm²)	3 x (3 x 185 mm²) or 4 x (3 x 120 mm²)
(*) Maximum cross section of the terminals				

Chapter 6
Maintenance

What Is in This Chapter?

This chapter contains the following topics:

Scheduled Servicing

Servicing

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Read and understand the instructions in **Safety Information** chapter before performing any procedure in this chapter.

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

The temperature of the products described in this manual may exceed 80 °C (176 °F) during operation.

⚠ 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 product has sufficiently cooled down before handling it.
- 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.

⚠ WARNING

INSUFFICIENT MAINTENANCE

Verify that the maintenance activities described below are performed at the specified intervals.

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

Adherence to the environmental conditions must be ensured during operation of the drive. In addition, during maintenance, verify and, if appropriate, correct all factors that may have an impact on the environmental conditions.

	Part concerned	Activity	Interval (1)
Overall condition	All parts such as housing, HMI, control block, connections, etc.	Perform a visual inspection	At least every year
Corrosion	Terminals, connectors, screws, EMC plate	Inspect and clean if required	
Dust	Terminals, fans, cabinet air inlets and air outlets, air filters of cabinet	Inspect and clean if required	
	Drives filter mats Floor standing	Inspect	At least every year
		Change	At least every 4 years
Cooling	Wall mounting drives fan	Verify the fan operation	At least every year
		Replace the fan, see catalog and the instructions sheets on www.schneider-electric.com.	After 3 to 5 years, depending on the operating conditions
	Floor standing drives fan for power part and enclosure door fan	Replace the fans, see catalog and the instructions sheets on www.schneider-electric.com.	Every 35000 operating hours or every 6 years
Fastening	All screws for electrical and mechanical connections	Verify tightening torques	At least every year
(1) Maximum maintenance intervals from the date of commissioning. Reduce the intervals between maintenance to adapt maintenance to the environmental conditions, the operating conditions of the drive, and to any other factor that may influence the operation and/ or maintenance requirements of the drive.			

NOTE: The fan operation depends on the drive thermal state. The drive may be running and the fan not.

Fans may continue to run for a certain period of time even after power to the product has been disconnected.

⚠ CAUTION

RUNNING FANS

Verify that fans have come to a complete standstill before handling them.

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

Diagnostic And Troubleshooting

Refer to the ATV600 Programming Manual *(see page 10)* available on www.schneider-electric.com

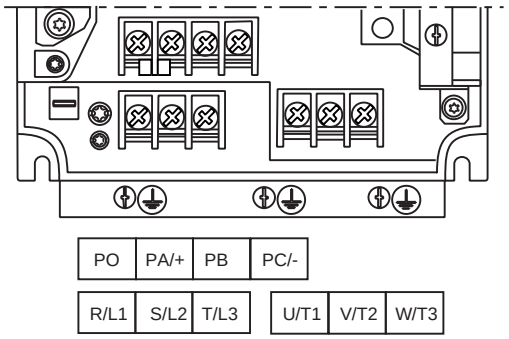
Spares and repairs

Serviceable product. Please refer to your Customer Care Center on:

www.schneider-electric.com/CCC.

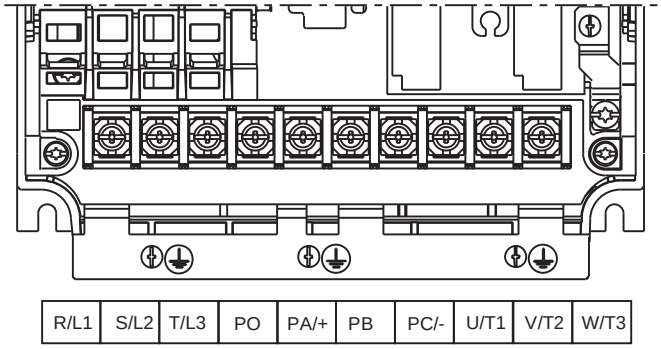
Arrangement of the power terminals

ATV61H 075M3, U15M3, U22M3, U30M3, U40M3, 075N4, U15N4, U22N4, U30N4, U40N4



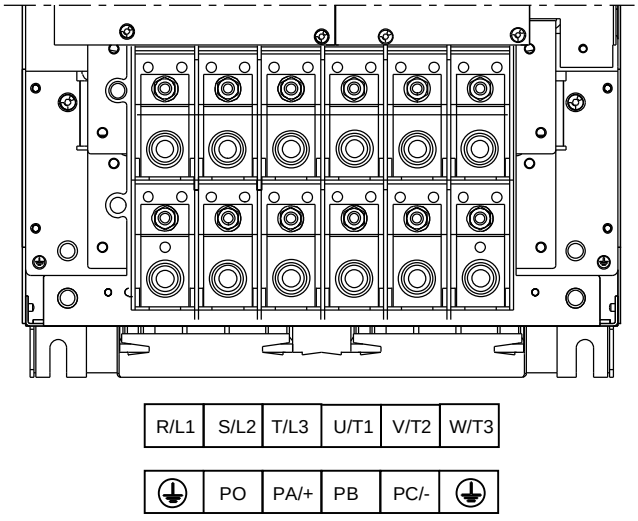
ATV61H	Maximum wire size		Tightening torque
	mm²	AWG	Nm (lb.in)
075M3, U15M3,	2.5	14	1.4 (12.3)
U22M3, U30M3,	4	12	1.4 (12.3)
U40M3,	6	10	1.4 (12.3)
075N4, U15N4, U22N4, U30N4	2.5	14	1.4 (12.3)
U40N4	4	12	1.4 (12.3)

ATV61H U55M3, U75M3, D11M3X, D15M3X, U55N4, U75N4, D11N4, D15N4, D18N4, U22S6X, U30S6X, U40S6X, U55S6X, U75S6X



ATV61H	Maximum wire size		Tightening torque
	mm²	AWG	Nm (lb.in)
U55M3, U75M3	10	8	3 (26.5)
D11M3X, D15M3X,	10	8	5.4 (47.7)
U55N4, U75N4	6	10	3 (26.5)
D11N4,	10	8	3(26.5)
D15N4, D18N4	14	6	5.4(47.7)
U22S6X...U40S6X	2.5	14	5.4(47.7)
U55S6X	4	12	5.4(47.7)
U75S6X	6	10	5.4 (47.7)

ATV61H D18M3X, D22M3X, D30M3X, D37M3X, D45M3X, D22N4, D30N4, D37N4, D45N4, D55N4, D75N4, U30Y, U40Y, U55Y, U75Y, D11Y, D15Y, D18Y, D22Y, D30Y, D37Y, D45Y, D55Y, D75Y, D90Y



ATV61H	Maximum wire size		Tightening torque
	mm²	AWG	Nm (lb.in)
D18M3X	2.5	3	24 (212)
D22M3X	34	2	24 (212)
D30M3X	69.5	2/0	41 (360)
D37M3X	88	3/0	41 (360)
D45M3X	111.5	4/0	41 (360)
D22N4	14	6	24 (212)
D30N4, D37N4,	16	4	24 (212)
D45N4,	43	1	41 (360)
D55N4,	55	1/0	41 (360)
D75N4,	88	3/0	41 (360)
U30Y...U55Y,	2.5	14	3 (26.5)
U75Y	4	12	3 (26.5)
D11Y	6	10	3 (26.5)
D15Y	6	10	5.4 (47.7)
D18Y	10	8	5.4 (47.7)
D22Y	10	8	124 (106.2)
D30Y	14	6	124 (106.2)
D37Y, D45Y	16	4	360 (41)
D55Y	88	3	360 (41)
D75Y	43	1	360 (41)
D90Y	55	1/0	360 (41)

Offer Overview – Product – ATV630/930

Dimensions IP21 – 240V and 400V

Power in grey = **240V**

Power in blue = **400V**

Size 1
0,75 – 4kW
0,75 – 5,5kW

4,7kg

Size 2
5,5kW
7,5 – 11kW

7,7kg

Size 3
7,5 – 11kW
15 – 22kW

14,3kg

Size 4
15 – 22kW
30 – 45kW

28,7kg

Size 5
30 – 45kW
55 – 90kW

58,5kg

Size 6
55 – 75kW
110 – 160kW

80,0kg

Enclosure to WV92S317, issue 1

Offer Overview – Product – ATV630/930

Dimensions IP21 – 400V

Size 7A

220kW

Size 7B

250 – 315kW

H=1503mm when using the option “conduit box”

Size 7 drives are based on the ATV61/71 Hardware (size 12 + size 13)

Redesign with Integrated ATV600 / ATV900 control block