Specifications



variable speed drive ATV71 -250kW-400HP - 480V - EMC filtergraphic terminal

ATV71HC25N4

Discontinued on: 01 June 2021

1 To be end-of-service on: 31 December 2028

Discontinued - Service only

Main				
Range of product	Altivar 71			
Product or component type	Variable speed drive			
Product specific application	Complex, high-power machines			
Component name	ATV71			
Motor power kW	220 kW, 3 phases at 380480 V 250 kW, 3 phases at 380480 V			
Motor power hp	350 hp, 3 phases at 380480 V 400 hp, 3 phases at 380480 V			
Maximum motor cable length	100 m shielded cable 200 m unshielded cable			
Power supply voltage	380480 V - 1510 %			
Network number of phases	3 phases			
Line current	320 A for 480 V 3 phases 220 kW / 350 hp 357 A for 480 V 3 phases 250 kW / 400 hp 396 A for 380 V 3 phases 220 kW / 350 hp 444 A for 380 V 3 phases 250 kW / 400 hp			
EMC filter	Integrated			
Assembly style	With heat sink			
Variant	Reinforced version			
Apparent power	260.6 kVA at 380 V 3 phases 220 kW / 350 hp 292.2 kVA at 380 V 3 phases 250 kW / 400 hp			
Prospective line Isc	50 kA for 3 phases			
Nominal output current	427 A at 2.5 kHz 380 V 3 phases 220 kW / 350 hp 427 A at 2.5 kHz 460 V 3 phases 220 kW / 350 hp 481 A at 2.5 kHz 380 V 3 phases 250 kW / 400 hp 481 A at 2.5 kHz 460 V 3 phases 250 kW / 400 hp			
Maximum transient current 640 A for 60 s 3 phases 220 kW / 350 hp 704 A for 2 s 3 phases 220 kW / 350 hp 721 A for 60 s 3 phases 250 kW / 400 hp 793 A for 2 s 3 phases 250 kW / 400 hp				
Output frequency	0.1500 Hz			
Nominal switching frequency	2.5 kHz			
Switching frequency	2.58 kHz adjustable 2.58 kHz with derating factor			
Asynchronous motor control profile	Sensorless flux vector control (SFVC) (voltage or current vector) Flux vector control (FVC) with sensor (current vector) Voltage/frequency ratio (2 or 5 points)			

Voltage/frequency ratio (2 or 5 points)



Disclaimer: 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

ENA (Energy adaptation) system for unbalanced loads

Type of polarization	No impedance for Modbus			
Complementer				
Complementary				
Product destination	Synchronous motors Asynchronous motors			
Power supply voltage limits	323528 V			
Power supply frequency	5060 Hz - 55 %			
Power supply frequency limits	47.563 Hz			
Speed range	1100 for asynchronous motor in open-loop mode, without speed feedback 11000 for asynchronous motor in closed-loop mode with encoder feedback 150 for synchronous motor in open-loop mode, without speed feedback			
Speed accuracy	+/- 0.01 % of nominal speed in closed-loop mode with encoder feedback 0.2 Tn to Tn +/- 10 % of nominal slip without speed feedback 0.2 Tn to Tn			
Torque accuracy	+/- 15 % in open-loop mode, without speed feedback +/- 5 % in closed-loop mode with encoder feedback			
Transient overtorque	170 % of nominal motor torque +/- 10 % for 60 s every 10 minutes 220 % of nominal motor torque +/- 10 % for 2 s			
Braking torque	<= 150 % with braking or hoist resistor 30 % without braking resistor			
Synchronous motor control profile	Vector control without speed feedback			
Regulation loop	Adjustable PI regulator			
Motor slip compensation	Not available in voltage/frequency ratio (2 or 5 points) Automatic whatever the load Adjustable Suppressable			
Diagnostic	1 LED (red) for drive voltage			
Output voltage	<= power supply voltage			
Insulation	Electrical between power and control			
Type of cable for mounting in an enclosure	With a NEMA Type1 kit: 3 wire(s)UL 508 cable at 40 °C, copper 75 °C / PVC With an IP21 or an IP31 kit: 3 wire(s)IEC cable at 40 °C, copper 70 °C / PVC Without mounting kit: 1 wire(s)IEC cable at 45 °C, copper 70 °C / PVC Without mounting kit: 1 wire(s)IEC cable at 45 °C, copper 90 °C / XLPE/EPR			
Electrical connection	Terminal, clamping capacity: 2.5 mm², AWG 14 (AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1LI6, PWR) Terminal, clamping capacity: 4 x 185 mm² (L1/R, L2/S, L3/T, U/T1, V/T2, W/T3) Terminal, clamping capacity: 4 x 185 mm² (PC/-, PA/+)			
Tightening torque	0.6 N.m (AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1LI6, PWR) 41 N.m, 360 lb.in (L1/R, L2/S, L3/T, U/T1, V/T2, W/T3) 41 N.m, 360 lb.in (PC/-, PA/+)			
Supply	Internal supply for reference potentiometer (1 to 10 kOhm): 10.5 V DC +/- 5 %, <10 mA, protection type: overload and short-circuit protection Internal supply: 24 V DC (2127 V), <200 mA, protection type: overload and short-circuit protection			
Analogue input number	2			
Analogue input type	AI1-/AI1+ bipolar differential voltage: +/- 10 V DC 24 V max, resolution 11 bits + sign AI2 software-configurable current: 020 mA, impedance: 242 Ohm, resolution 11 bits AI2 software-configurable voltage: 010 V DC 24 V max, impedance: 30000 Ohm, resolution 11 bits			
Input sampling time	2 ms +/- 0.5 ms (AI1-/AI1+) - analog input(s) 2 ms +/- 0.5 ms (AI2) - analog input(s) 2 ms +/- 0.5 ms (LI1LI5) - discrete input(s) 2 ms +/- 0.5 ms (LI6)if configured as logic input - discrete input(s)			
Response time	<= 100 ms in STO (Safe Torque Off) AO1 2 ms, tolerance +/- 0.5 ms for analog output(s) R1A, R1B, R1C 7 ms, tolerance +/- 0.5 ms for discrete output(s) R2A, R2B 7 ms, tolerance +/- 0.5 ms for discrete output(s)			
Absolute accuracy precision	+/- 0.6 % (AI1-/AI1+) for a temperature variation 60 °C +/- 0.6 % (AI2) for a temperature variation 60 °C +/- 1 % (AO1) for a temperature variation 60 °C			
Linearity error	+/- 0.15 % of maximum value (Al1-/Al1+, Al2) +/- 0.2 % (AO1)			

+/- 0.15 % of maximum value (Al1-/Al1+, Al2) +/- 0.2 % (AO1)

Analogue output number	1
Analogue output type	AO1 software-configurable logic output 10 V 20 mA AO1 software-configurable current 020 mA, impedance: 500 Ohm, resolution 10 bits AO1 software-configurable voltage 010 V DC, impedance: 470 Ohm, resolution 10 bits
Discrete output number	2
Discrete output type	Configurable relay logic: (R1A, R1B, R1C) NO/NC - 100000 cycles Configurable relay logic: (R2A, R2B) NO - 100000 cycles
Minimum switching current	3 mA at 24 V DC for configurable relay logic
Maximum switching current	R1, R2: 2 A at 250 V AC inductive load, cos phi = 0.4 R1, R2: 2 A at 30 V DC inductive load, cos phi = 0.4 R1, R2: 5 A at 250 V AC resistive load, cos phi = 1 R1, R2: 5 A at 30 V DC resistive load, cos phi = 1
Discrete input number	7
Discrete input type	LI1LI5: programmable 24 V DC with level 1 PLC, impedance: 3500 Ohm LI6: switch-configurable 24 V DC with level 1 PLC, impedance: 3500 Ohm LI6: switch-configurable PTC probe 06, impedance: 1500 Ohm PWR: safety input 24 V DC, impedance: 1500 Ohm conforming to ISO 13849-1 level d
Discrete input logic	Negative logic (sink) (LI1LI5), > 16 V (state 0), < 10 V (state 1) Positive logic (source) (LI1LI5), < 5 V (state 0), > 11 V (state 1) Negative logic (sink) (LI6)if configured as logic input, > 16 V (state 0), < 10 V (state 1) Positive logic (source) (LI6)if configured as logic input, < 5 V (state 0), > 11 V (state 1)
Acceleration and deceleration ramps	Automatic adaptation of ramp if braking capacity exceeded, by using resistor Linear adjustable separately from 0.01 to 9000 s S, U or customized
Braking to standstill	By DC injection
Protection type	Against exceeding limit speed: drive Against input phase loss: drive Break on the control circuit: drive Input phase breaks: drive Line supply overvoltage: drive Line supply undervoltage: drive Overcurrent between output phases and earth: drive Overheating protection: drive Overvoltages on the DC bus: drive Short-circuit between motor phases: drive Thermal protection: drive Motor phase break: motor Power removal: motor
Insulation resistance	> 1 mOhm 500 V DC for 1 minute to earth
Frequency resolution	Analog input: 0.024/50 Hz Display unit: 0.1 Hz
Communication port protocol	CANopen Modbus
Connector type	1 RJ45 (on front face) for Modbus 1 RJ45 (on terminal) for Modbus Male SUB-D 9 on RJ45 for CANopen
Physical interface	2-wire RS 485 for Modbus
Transmission frame	RTU for Modbus
Transmission rate	4800 bps, 9600 bps, 19200 bps, 38.4 Kbps for Modbus on terminal 9600 bps, 19200 bps for Modbus on front face 20 kbps, 50 kbps, 125 kbps, 250 kbps, 500 kbps, 1 Mbps for CANopen
Data format	8 bits, 1 stop, even parity for Modbus on front face 8 bits, odd even or no configurable parity for Modbus on terminal
Number of addresses	1127 for CANopen 1247 for Modbus
Method of access	Slave CANopen
Marking	CE
Operating position	Vertical +/- 10 degree
Height	1190 mm
Depth	377 mm
Width	595 mm



Net weight	207 kg
Functionality	Full
Specific application	Other applications
Option card	Communication card for CC-Link Controller inside programmable card Communication card for DeviceNet Communication card for EtherNet/IP Communication card for Fipio I/O extension card Communication card for Interbus-S Interface card for encoder Communication card for Modbus Plus Communication card for Modbus TCP Communication card for Modbus/Uni-Telway Overhead crane card Communication card for Profibus DP Communication card for Profibus DP V1
Environment	
Noise level	77 dB conforming to 86/188/EEC
Dielectric strength	3535 V DC between earth and power terminals 5092 V DC between control and power terminals
Electromagnetic compatibility	1.2/50 μs - 8/20 μs surge immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-6 Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4 Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3 Voltage dips and interruptions immunity test conforming to IEC 61000-4-1
Standards	EN/IEC 61800-5-1 UL Type 1 IEC 60721-3-3 class 3C2 EN 61800-3 environments 1 category C3 EN/IEC 61800-3 EN 55011 class A group 2 EN 61800-3 environments 2 category C3
Product certifications	NOM 117 GOST CSA C-Tick UL
Pollution degree	2 conforming to EN/IEC 61800-5-1 3 conforming to UL 840
IP degree of protection	IP20
Vibration resistance	0.6 gn (f= 10…200 Hz) conforming to EN/IEC 60068-2-6 1.5 mm peak to peak (f= 3…10 Hz) conforming to EN/IEC 60068-2-6
Shock resistance	4 gn for 11 ms conforming to EN/IEC 60068-2-27
Relative humidity	595 % without condensation conforming to IEC 60068-2-3 595 % without dripping water conforming to IEC 60068-2-3
Ambient air temperature for operation	-1050 °C (without derating)
Ambient air temperature for storage	-2570 °C
Operating altitude	<= 1000 m without derating 10003000 m with current derating 1 % per 100 m
Packing Units	
Unit Type of Package 1	PCE
Number of Units in Package 1	1

Number of Units in Package 1	1
Package 1 Weight	68 kg
Package 1 Height	43 cm
Package 1 width	51 cm
Package 1 Length	122.5 cm

Offer Sustainability

Sustainable offer status	Green Premium product				
REACh Regulation	REACh Declaration				
EU RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration				
Mercury free	Yes				
RoHS exemption information	Yes				
China RoHS Regulation	China RoHS declaration				
Environmental Disclosure	Product Environmental Profile				
WEEE	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins				
California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov				

Contractual warranty

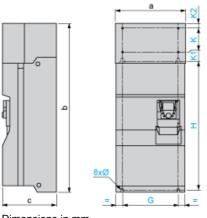
Warranty

18 months

Dimensions Drawings

UL Type 1/IP 20 Drives

Dimensions with or without 1 Option Card (1)

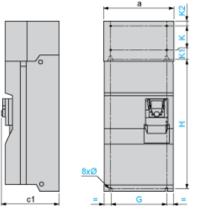


Dimensions in mm

а	b	с	G	Н	К	K1	K2	Ø
595	1190	377	540	920	150	75	30	11.5
Dimensions in in.								
а	b	С	G	Н	К	K1	K2	Ø
23.43	46.85	14.84	21.26	36.22	5.90	2.95	1.18	0.45

(1) Option cards: I/O extension cards, communication cards or "Controller Inside" programmable card.

Dimensions with 2 Option Cards (1)



Dimensions in mm

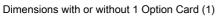
а	c1	G	Н	К	K1	K2	Ø
595	392	540	920	150	75	30	11.5

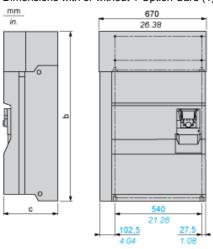
Dimensions in in.

а	c1	G	н	К	K1	K2	Ø
23.43	15.43	21.26	36.22	5.90	2.95	1.18	0.45

(1) Option cards: I/O extension cards, communication cards or "Controller Inside" programmable card.

Drive with Braking Unit VW3A7101

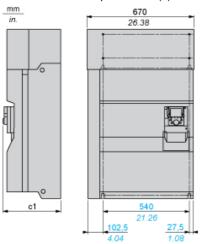




b in mm	c in mm	b in in.	c in in.
1190	377	46.85	14.84

(1) Option cards: I/O extension cards, communication cards or "Controller Inside" programmable card.

Dimensions with 2 Option Cards (1)



c1 in mm	c1 in in.
392	15.43

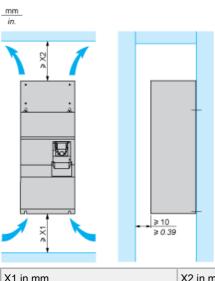
(1) Option cards: I/O extension cards, communication cards or "Controller Inside" programmable card.

ATV71HC25N4

Mounting and Clearance

Mounting Recommendations

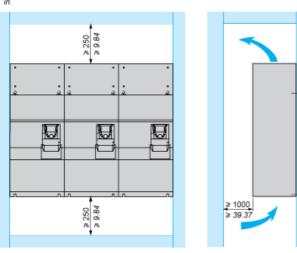
Clearance



X1 in mm	X2 in mm	X1 in in.	X2 in in.
150	200	5.91	7.87

These drives can be mounted side by side, observing the following mounting recommendations:

in.



ATV71HC25N4

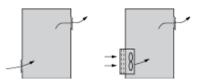
Mounting and Clearance

Specific Recommendations for Mounting the Drive in an Enclosure

Ventilation

To ensure proper air circulation in the drive:

- Fit ventilation grilles.
- Ensure that there is sufficient ventilation. If there is not, install a forced ventilation unit with a filter. The openings and/or fans must provide a flow rate a



- Use special filters with IP 54 protection.
- Remove the blanking cover from the top of the drive.

Dust and Damp Proof Metal Enclosure (IP 54)

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.

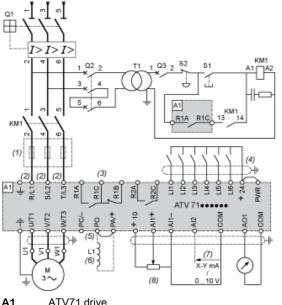
This enables the drive to be used in an enclosure where the maximum internal temperature reaches 50°C.

ATV71HC25N4

Connections and Schema

Wiring Diagram Conforming to Standards EN 954-1 Category 1, IEC/EN 61508 Capacity SIL1, in Stopping Category 0 According to IEC/EN 60204-1

Three-Phase Power Supply with Upstream Breaking via Contactor



A1 KM1

Contactor L1 DC choke

Q1 Circuit-breaker

Q2 GV2 L rated at twice the nominal primary current of T1

Q3 GB2CB05

S1, S2 XB4 B or XB5 A pushbuttons

Т1 100 VA transformer 220 V secondary

Line choke (three-phase); mandatory for ATV71HC11Y...HC63Y drives (except when a special transformer is used (12-pulse)).

(1) (2) For ATV71HC40N4 drives combined with a 400 kW motor, ATV71HC50N4 and ATV71HC40Y...HC63Y, refer to the power terminal connections (3) Fault relay contacts. Used for remote signalling of the drive status.

(4) Connection of the common for the logic inputs depends on the positioning of the SW1 switch. The above diagram shows the internal power supp (5) There is no PO terminal on ATV71HC11Y...HC63Y drives.

(6) Optional DC choke for ATV71H•••M3, ATV71HD11M3X...HD45M3X, ATV71•075N4...•D75N4 and ATV71P•••N4Z drives. Connected in place of (7) Software-configurable current (0...20 mA) or voltage (0...10 V) analog input.

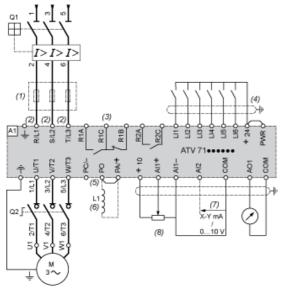
(8) Reference potentiometer.

ATV71HC25N4

Connections and Schema

Wiring Diagram Conforming to Standards EN 954-1 Category 1, IEC/EN 61508 Capacity SIL1, in Stopping Category 0 According to IEC/EN 60204-1

Three-Phase Power Supply with Downstream Breaking via Switch Disconnector



A1 ATV71 drive

L1 DC choke

Q1 Circuit-breaker Q2 Switch disconnector (Vario)

(1) (2)

Line choke (three-phase), mandatory for ATV71HC11Y...HC63Y drives (except when a special transformer is used (12-pulse)). For ATV71HC40N4 drives combined with a 400 kW motor, ATV71HC50N4 and ATV71HC40Y...HC63Y, refer to the power terminal connections Fault relay contacts. Used for remote signalling of the drive status.

Connection of the common for the logic inputs depends on the positioning of the SW1 switch. The above diagram shows the internal power supp

(3) (4) (5) (6) (7) There is no PO terminal on ATV71HC11Y...HC63Y drives. Optional DC choke for ATV71H••••M3, ATV71HD11M3X...HD45M3X, ATV71•075N4...•D75N4 and ATV71P••••N4Z drives. Connected in place of

Software-configurable current (0...20 mA) or voltage (0...10 V) analog input.

(8) Reference potentiometer.

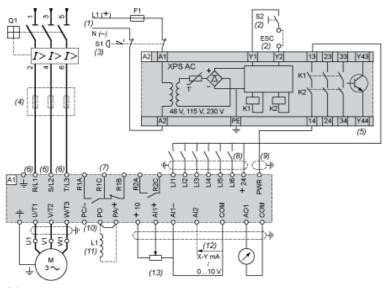


ATV71HC25N4

Connections and Schema

Wiring Diagram Conforming to Standards EN 954-1 Category 3, IEC/EN 61508 Capacity SIL2, in Stopping Category 0 According to IEC/EN 60204-1

Three-Phase Power Supply, Low Inertia Machine, Vertical Movement



A1 ATV71 drive

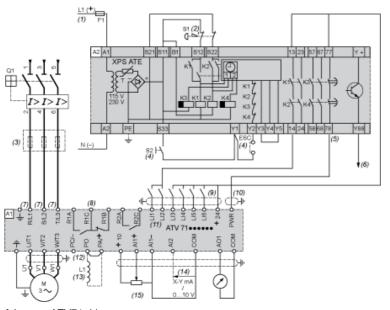
- A2 Preventa XPS AC safety module for monitoring emergency stops and switches. One safety module can manage the "Power Removal" function for F1 Fuse
- L1 DC choke
- Q1 Circuit-breaker
- **S1** Emergency stop button with 2 contacts
- **S**2 XB4 B or XB5 A pushbutton
- (1) Power supply: 24 Vdc or Vac, 48 Vac, 115 Vac, 230 Vac.
- (2) S2: resets XPS AC module on power-up or after an emergency stop. ESC can be used to set external starting conditions.
- (3) Requests freewheel stopping of the movement and activates the "Power Removal" safety function.
- Line choke (three-phase), mandatory for and ATV71HC11Y...HC63Y drives (except when a special transformer is used (12-pulse)).
- The logic output can be used to signal that the machine is in a safe stop state.
- (4) (5) (6) (7) For ATV71HC40N4 drives combined with a 400 kW motor, ATV71HC50N4 and ATV71HC40Y...HC63Y, refer to the power terminal connections Fault relay contacts. Used for remote signalling of the drive status.
- Connection of the common for the logic inputs depends on the positioning of the SW1 switch. The above diagram shows the internal power supp Standardized coaxial cable, type RG174/U according to MIL-C17 or KX3B according to NF C 93-550, external diameter 2.54 mm /0.09 in., maxir (8) (9)
- (10) There is no PO terminal on ATV71HC11Y...HC63Y drives.
- Optional DC choke for ATV71H•••M3, ATV71HD11M3X...HD45M3X, ATV71•075N4...•D75N4 and ATV71P•••N4Z drives. Connected in place of (11)
- (12) Software-configurable current (0...20 mA) or voltage (0...10 V) analog input.
- (13) Reference potentiometer.

ATV71HC25N4

Connections and Schema

Wiring Diagram Conforming to Standards EN 954-1 Category 3, IEC/EN 61508 Capacity SIL2, in Stopping Category 1 According to IEC/EN 60204-1

Three-Phase Power Supply, High Inertia Machine



A1 ATV71 drive

A2 (5) Preventa XPS ATE safety module for monitoring emergency stops and switches. One safety module can manage the "Power Removal" safety fu F1 Fuse

L1 DC choke

Q1 Circuit-breaker **S1** Emergency stop button with 2 N/C contacts

S2 Run button

Power supply: 24 Vdc or Vac. 115 Vac. 230 Vac.

(1) (2) (3) Requests controlled stopping of the movement and activates the "Power Removal" safety function.

Line choke (three-phase), mandatory for ATV71HC11Y...HC63Y drives (except when a special transformer is used (12-pulse)).

(4) (5) S2: resets XPS ATE module on power-up or after an emergency stop. ESC can be used to set external starting conditions.

For stopping times requiring more than 30 seconds in category 1, use a Preventa XPS AV safety module which can provide a maximum time del (6) The logic output can be used to signal that the machine is in a safe state.

(7) For ATV71HC40N4 drives combined with a 400 kW motor, ATV71HC50N4 and ATV71HC40Y...HC63Y, refer to the power terminal connections (8) Fault relay contacts. Used for remote signalling of the drive status.

(9) Connection of the common for the logic inputs depends on the positioning of the SW1 switch. The above diagram shows the internal power supp (10) Standardized coaxial cable, type RG174/U according to MIL-C17 or KX3B according to NF C 93-550, external diameter 2.54 mm/0.09 in., maxim

(11) Logic inputs LI1 and LI2 must be assigned to the direction of rotation: LI1 in the forward direction and LI2 in the reverse direction.

(12) There is no PO terminal on ATV71HC11Y...HC63Y drives.

(13) Optional DC choke for ATV71H•••M3, ATV71HD11M3X...HD45M3X, ATV71•075N4...•D75N4 and ATV71P•••N4Z drives. Connected in place of (14) Software-configurable current (0...20 mA) or voltage (0...10 V) analog input.

(15) Reference potentiometer.

ATV71HC25N4

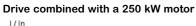
Performance Curves

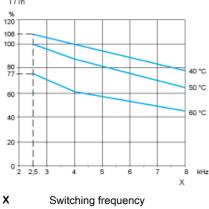
Derating Curves

The derating curves for the drive nominal current (In) depend on the temperature and the switching frequency. For intermediate temperatures (e.g. 55°C), interpolate between 2 curves.

Drive combined with a 220 kW motor 1/In % 120 110 100 80 40 °C 72 50 °C 60 60 °C 40 20 0 2 2,5 3 , 8 kHz 5

X Switching frequency





Recommended replacement(s)

ATV71HC25N4 may be replaced by any of the following products:

Х



Variable speed drive, Altivar Process ATV900, ATV930, 315 kW, 400/480 V, w/o braking unit, IP00 ATV930C31N4C

Variable speed drive, Altivar Process ATV900, floor standing ATV930, 315 kW, 400/440 V, w/o braking unit, IP21 ATV930C31N4F