Product data sheet
Characteristics

ATV71HD90N4
variable speed drive ATV71 - 90kW-125HP - 480V - EMC filter-graphic terminal

Green Premium

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	90 kW at 380...480 V 3 phases
Motor power hp	125 hp at 380...480 V 3 phases
Motor cable length	<= 100 m Shielded cable <= 200 m Unshielded cable
[Us] rated supply voltage	380...480 V (- 15...10 %)
Network number of phases	3 phases
Line current	134 A for 480 V 3 phases 90 kW / 125 hp 166 A for 380 V 3 phases 90 kW / 125 hp
EMC filter	Integrated
Assembly style	With heat sink
Variant	Reinforced version
Apparent power	109.3 kVA at 380 V 3 phases 90 kW / 125 hp
Prospective line Isc	<= 35 kA, 3 phases
Nominal output current	179 A at 2.5 kHz 380 V 3 phases 90 kW / 125 hp 179 A at 2.5 kHz 460 V 3 phases 90 kW / 125 hp
Maximum transient current	269 A for 60 s 3 phases 90 kW / 125 hp 295 A for 2 s 3 phases 90 kW / 125 hp
Output frequency	0.1...500 Hz
Nominal switching frequency	2.5 kHz
Switching frequency	2.5...8 kHz adjustable 2.5...8 kHz with derating factor
Asynchronous motor control profile	Flux vector control (FVC) with sensor (current vector) ENA (Energy adaptation) system for unbalanced loads Sensorless flux vector control (SFVC) (voltage or current vector) Voltage/Frequency ratio (2 or 5 points)
Type of polarization	No impedance for Modbus

Complementary

Product destination	Synchronous motors Asynchronous motors
Supply voltage limits	323...528 V
Supply frequency	50...60 Hz (- 5...5 %)
Network frequency	47.5...63 Hz
Speed range	1...100 for asynchronous motor in open-loop mode, without speed feedback 1...50 for synchronous motor in open-loop mode, without speed feedback 1...1000 for asynchronous motor in closed-loop mode with encoder feedback
Speed accuracy	+/- 0.01 % of nominal speed for 0.2 Tn to Tn torque variation in closed-loop mode with encoder feedback +/- 10 % of nominal slip for 0.2 Tn to Tn torque variation without speed feedback
Torque accuracy	+/- 15 % in open-loop mode, without speed feedback +/- 5 % in closed-loop mode with encoder feedback
Transient overtorque	220 % of nominal motor torque +/- 10 % for 2 s 170 % of nominal motor torque +/- 10 % for 60 s every 10 minutes
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	Suppressable Automatic whatever the load Adjustable Not available in voltage/frequency ratio (2 or 5 points)
Local signalling	1 LED red presence of drive voltage
Output voltage	<= power supply voltage
Insulation	Electrical between power and control
Type of cable	With a NEMA Type1 kit : 3-strand UL 508 cable at 40 °C, copper 75 °C PVC With an IP21 or an IP31 kit : 3-strand IEC cable at 40 °C, copper 70 °C PVC Without mounting kit : 1-strand IEC cable at 45 °C, copper 70 °C PVC Without mounting kit : 1-strand IEC cable at 45 °C, copper 90 °C XLPE/EPR
Electrical connection	AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR terminal 2.5 mm² / AWG 14 L1/R, L2/S, L3/T, U/T1, V/T2, W/T3 terminal 2 x 100 mm² PA, PB terminal 60 mm² PC/-, PO, PA/+ terminal 2 x 100 mm²
Tightening torque	L1/R, L2/S, L3/T, U/T1, V/T2, W/T3 24 N.m / 212 lb.in PA, PB 12 N.m / 106 lb.in PC/-, PO, PA/+ 41 N.m / 360 lb.in AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR 0.6 N.m
Supply	Internal supply for reference potentiometer (1 to 10 kOhm), 10.5 V DC +/- 5 %, <= 10 mA for overload and short-circuit protection Internal supply, 24 V DC, voltage limits 21...27 V, <= 200 mA for overload and short-circuit protection
Analogue input number	2
Analogue input type	AI1-/AI1+ bipolar differential voltage +/- 10 V DC, input voltage 24 V max, resolution 11 bits + sign AI2 software-configurable current 0...20 mA, impedance 242 Ohm, resolution 11 bits AI2 software-configurable voltage 0...10 V DC, input voltage 24 V max, impedance 30000 Ohm, resolution 11 bits
Sampling duration	AI1-/AI1+ 2 ms, +/- 0.5 ms for analog input(s) AI2 2 ms, +/- 0.5 ms for analog input(s) LI1...LI5 2 ms, +/- 0.5 ms for discrete input(s) LI6 (if configured as logic input) 2 ms, +/- 0.5 ms for 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)
Accuracy	AI1-/AI1+ +/- 0.6 % for a temperature variation 60 °C AI2 +/- 0.6 % for a temperature variation 60 °C AO1 +/- 1 % for a temperature variation 60 °C
Linearity error	AI1-/AI1+, AI2 +/- 0.15 % of maximum value AO1 +/- 0.2 %
Analogue output number	1
Analogue output type	AO1 software-configurable current 0...20 mA, impedance 500 Ohm, resolution 10 bits

	AO1 software-configurable logic output 10 V <= 20 mA AO1 software-configurable voltage 0...10 V DC, impedance 470 Ohm, resolution 10 bits
Discrete output number	2
Discrete output type	R1A, R1B, R1C configurable relay logic NO/NC, electrical durability 100000 cycles R2A, R2B configurable relay logic NO, electrical durability 100000 cycles
Minimum switching current	Configurable relay logic 3 mA at 24 V DC
Maximum switching current	R1, R2 on resistive load, 5 A at 250 V AC, cos phi = 1, R1, R2 on resistive load, 5 A at 30 V DC, cos phi = 1, R1, R2 on inductive load, 2 A at 250 V AC, cos phi = 0.4, R1, R2 on inductive load, 2 A at 30 V DC, cos phi = 0.4,
Discrete input number	7
Discrete input type	LI6 : switch-configurable 24 V DC with level 1 PLC, impedance: 3500 Ohm PWR : safety input 24 V DC, impedance: 1500 Ohm conforming to ISO 13849-1 level d LI1...LI5 : programmable 24 V DC with level 1 PLC, impedance: 3500 Ohm LI6 : switch-configurable PTC probe 0...6, impedance: 1500 Ohm
Discrete input logic	LI1...LI5 positive logic (source), < 5 V (state 0), > 11 V (state 0) LI1...LI5 negative logic (sink), > 16 V (state 0), < 10 V (state 0) LI6 (if configured as logic input) positive logic (source), < 5 V (state 0), > 11 V (state 0) LI6 (if configured as logic input) negative logic (sink), > 16 V (state 0), < 10 V (state 0)
Acceleration and deceleration ramps	Linear adjustable separately from 0.01 to 9000 s Automatic adaptation of ramp if braking capacity exceeded, by using resistor S, U or customized
Braking to standstill	By DC injection
Protection type	Drive 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 Motor motor phase break Motor power removal Motor thermal protection
Insulation resistance	> 1 mOhm at 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 for Modbus on front face 1 RJ45 for Modbus on terminal Male SUB-D 9 on RJ45 for CANopen
Physical interface	2-wire RS 485 for Modbus
Transmission frame	RTU for Modbus
Transmission rate	20 kbps, 50 kbps, 125 kbps, 250 kbps, 500 kbps, 1 Mbps for CANopen 4800 bps, 9600 bps, 19200 bps, 38.4 Kbps for Modbus on terminal 9600 bps, 19200 bps for Modbus on front face
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	1...247 for Modbus 1...127 for CANopen
Method of access	Slave for CANopen
Marking	CE
Operating position	Vertical +/- 10 degree
Height	920 mm
Depth	377 mm
Width	320 mm
Product weight	60 kg
Functionality	Full
Specific application	Other applications

Option card	CC-Link communication card
	Controller inside programmable card
	DeviceNet communication card
	Ethernet/IP communication card
	Fipio communication card
	I/O extension card
	Interbus-S communication card
	Interface card for encoder
	Modbus Plus communication card
	Modbus TCP communication card
	Modbus/Uni-Telway communication card
	Overhead crane card
	Profibus DP communication card
	Profibus DP V1 communication card

Environment

Noise level	60.5 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	Conducted radio-frequency immunity test conforming to IEC 61000-4-6 level 3
	Electrical fast transient/burst immunity test conforming to IEC 61000-4-4 level 4
	Electrostatic discharge immunity test conforming to IEC 61000-4-2 level 3
	Radiated radio-frequency electromagnetic field immunity test conforming to IEC 61000-4-3 level 3
	Voltage dips and interruptions immunity test conforming to IEC 61000-4-11
	1.2/50 µs - 8/20 µs surge immunity test conforming to IEC 61000-4-5 level 3
Standards	UL Type 1
	EN 61800-3 environments 2 category C3
	EN/IEC 61800-5-1
	EN 61800-3 environments 1 category C3
	EN/IEC 61800-3
	IEC 60721-3-3 class 3C2
	EN 55011 class A group 2
Product certifications	UL
	CSA
	C-Tick
	NOM 117
	GOST
Pollution degree	2 conforming to EN/IEC 61800-5-1
	3 conforming to UL 840
IP degree of protection	IP20
Vibration resistance	1.5 mm peak to peak (f = 3...10 Hz) conforming to EN/IEC 60068-2-6
	0.6 gn (f = 10...200 Hz) conforming to EN/IEC 60068-2-6
Shock resistance	7 gn for 11 ms conforming to EN/IEC 60068-2-27
Relative humidity	5...95 % without condensation conforming to IEC 60068-2-3
	5...95 % without dripping water conforming to IEC 60068-2-3
Ambient air temperature for operation	-10...50 °C without derating
Ambient air temperature for storage	-25...70 °C
Operating altitude	<= 1000 m without derating
	1000...3000 m with current derating 1 % per 100 m

## Offer Sustainability

Sustainable offer status	Green Premium product
RoHS (date code: YYWW)	Compliant - since 1001 - Schneider Electric declaration of conformity
	Schneider Electric declaration of conformity
REACh	Reference contains SVHC above the threshold - Go to CaP for more details
	Go to CaP for more details
Product environmental profile	Available
	Product environmental
Product end of life instructions	Available
	End of life manual

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Contractual warranty

Warranty period	18 months

ATV71HD90N4

UL Type 1/IP 20 Drives

Dimensions with or without 1 Option Card (1)
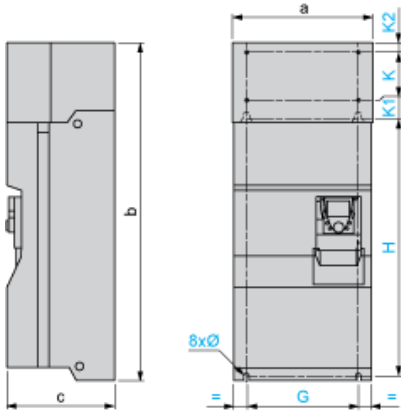
Dimensions in mm

a	b	c	G	H	K	K1	K2	Ø
320	920	377	250	650	150	75	30	11.5

Dimensions in in.

a	b	c	G	H	K	K1	K2	Ø
12.60	36.22	14.84	9.84	25.59	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)
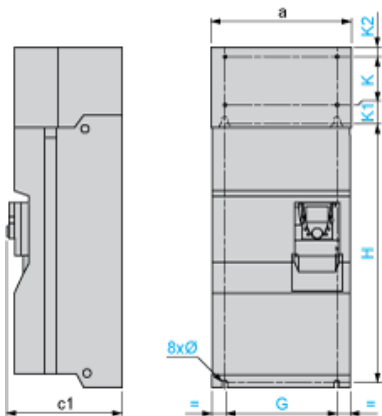
Dimensions in mm

a	c1	G	H	K	K1	K2	Ø
320	392	250	650	150	75	30	11.5

Dimensions in in.

a	c1	G	H	K	K1	K2	Ø
12.60	15.43	9.84	25.59	5.90	2.95	1.18	0.45

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

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Mounting Recommendations

Clearance
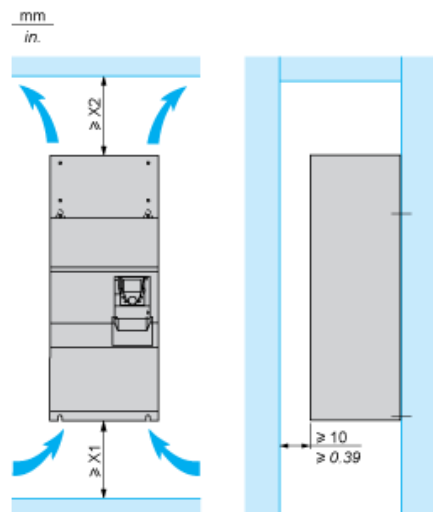
X1 in mm	X2 in mm	X1 in in.	X2 in in.
100	100	3.94	3.94

These drives can be mounted side by side, observing the following mounting recommendations:
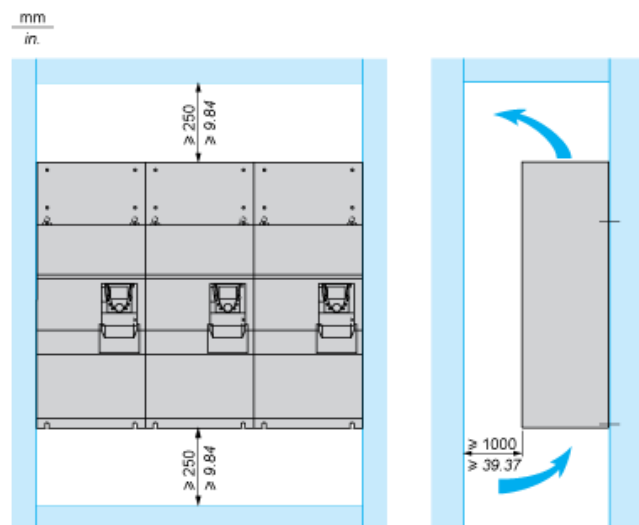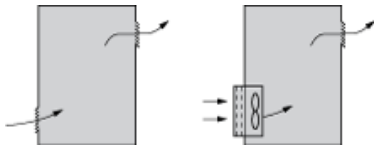
Specific Recommendations for Mounting the Drive in an Enclosure

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 at least

- 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.

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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
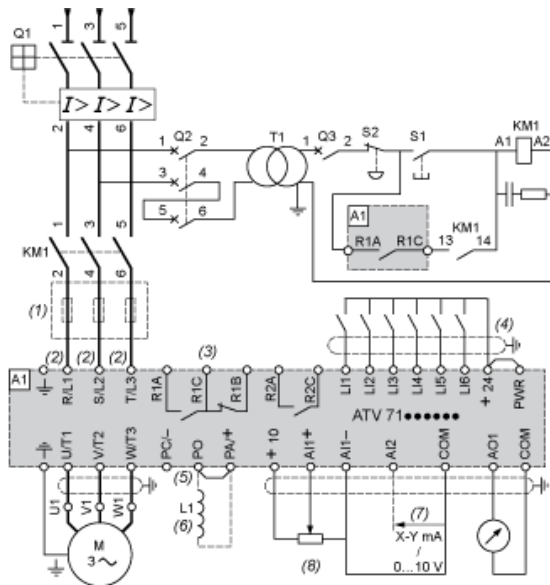
A1   ATV71 drive
KM1 Contactor
L1   DC choke
Q1   Circuit-breaker
Q2   GV2 L rated at twice the nominal primary current of T1
Q3   GB2CB05
S1, S2 XB4 B or XB5 A pushbuttons
T1   100 VA transformer 220 V secondary
(1)   Line choke (three-phase); mandatory for ATV71HC11Y…HC63Y drives (except when a special transformer is used (12-pulse)).
(2)   For ATV71HC40N4 drives combined with a 400 kW motor, ATV71HC50N4 and ATV71HC40Y…HC63Y, refer to the power terminal connections diagram
(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 supply switch
(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 the strap
(7)   Software-configurable current (0…20 mA) or voltage (0…10 V) analog input.
(8)   Reference potentiometer.

All terminals are located at the bottom of the drive. Fit interference suppressors on all inductive circuits near the drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

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
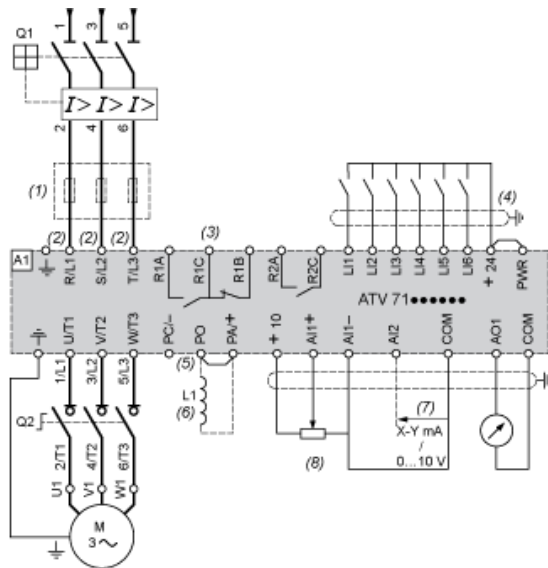
A1   ATV71 drive
L1   DC choke
Q1   Circuit-breaker
Q2   Switch disconnector (Vario)
(1)   Line choke (three-phase), mandatory for ATV71HC11Y…HC63Y drives (except when a special transformer is used (12-pulse)).
(2)   For ATV71HC40N4 drives combined with a 400 kW motor, ATV71HC50N4 and ATV71HC40Y…HC63Y, refer to the power terminal connections diagram.
(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 supply switched
(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 the strap b
(7)   Software-configurable current (0…20 mA) or voltage (0…10 V) analog input.
(8)   Reference potentiometer.

All terminals are located at the bottom of the drive. Fit interference suppressors on all inductive circuits near the drive or connected on the same
circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

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

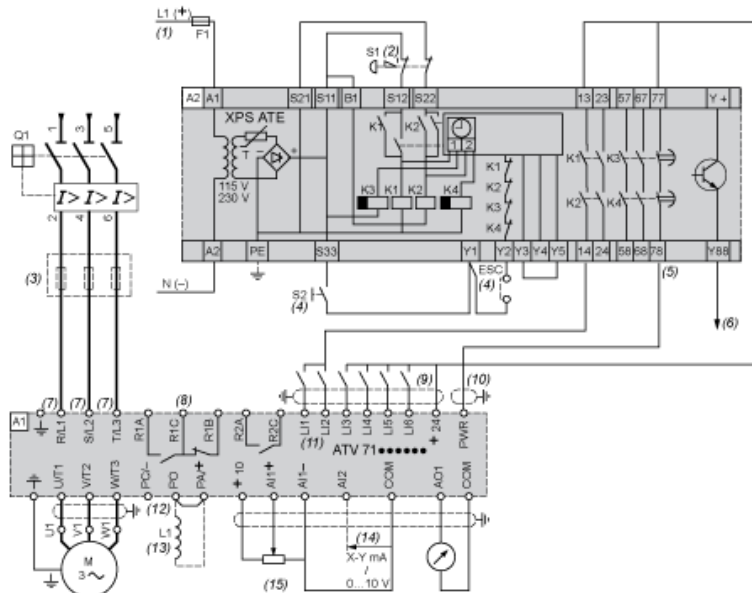### Three-Phase Power Supply, Low Inertia Machine, Vertical Movement

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 severa
F1 Fuse
L1 DC choke
Q1 Circuit-breaker
S1 Emergency stop button with 2 contacts
S2 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.
(4) Line choke (three-phase), mandatory for and ATV71HC11Y…HC63Y drives (except when a special transformer is used (12-pulse)).
(5) The logic output can be used to signal that the machine is in a safe stop state.
(6) For ATV71HC40N4 drives combined with a 400 kW motor, ATV71HC50N4 and ATV71HC40Y…HC63Y, refer to the power terminal connections diagram
(7) Fault relay contacts. Used for remote signalling of the drive status.
(8) Connection of the common for the logic inputs depends on the positioning of the SW1 switch. The above diagram shows the internal power supply switch
(9) 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., maximum leng
(10) There is no PO terminal on ATV71HC11Y…HC63Y drives.
(11) Optional DC choke for ATV71H•••M3, ATV71HD11M3X…HD45M3X, ATV71•075N4…•D75N4 and ATV71P•••N4Z drives. Connected in place of the strap
(12) Software-configurable current (0…20 mA) or voltage (0…10 V) analog input.
(13) Reference potentiometer.

All terminals are located at the bottom of the drive. Fit interference suppressors on all inductive circuits near the drive or connected on the same
circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

ATV71HD90N4

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
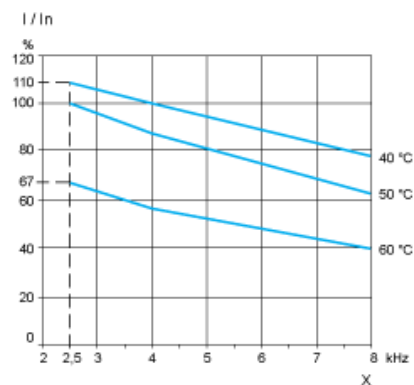
Three-Phase Power Supply, High Inertia Machine

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 function for s
F1   Fuse
L1   DC choke
Q1   Circuit-breaker
S1   Emergency stop button with 2 N/C contacts
S2   Run button
(1)   Power supply: 24 Vdc or Vac, 115 Vac, 230 Vac.
(2)   Requests controlled stopping of the movement and activates the "Power Removal" safety function.
(3)   Line choke (three-phase), mandatory for ATV71HC11Y…HC63Y drives (except when a special transformer is used (12-pulse)).
(4)   S2: resets XPS ATE module on power-up or after an emergency stop. ESC can be used to set external starting conditions.
(5)   For stopping times requiring more than 30 seconds in category 1, use a Preventa XPS AV safety module which can provide a maximum time delay of 300 s
(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 diagram.
(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 supply switched
(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., maximum length 1
(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 the strap be
(14)   Software-configurable current (0…20 mA) or voltage (0…10 V) analog input.
(15)   Reference potentiometer.

All terminals are located at the bottom of the drive. Fit interference suppressors on all inductive circuits near the drive or connected on the same
circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

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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.

X   Switching frequency