



### 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	4 kW
Motor power hp	5 hp
Power supply voltage	380...480 V (- 15...10 %)
Network number of phases	3 phases
Line current	11.5 A for 480 V 14.1 A for 380 V
EMC filter	Class A EMC filter Integrated
Assembly style	Enclosed with Vario switch disconnecter
Variant	With EMC plate
Apparent power	9.3 kVA at 380 V
Maximum transient current	15.8 A for 60 s 17.3 A for 2 s
Speed drive output frequency	0...1600 Hz
Nominal switching frequency	4 kHz
Switching frequency	1...16 kHz adjustable 4...16 kHz with derating factor
Asynchronous motor control profile	ENA (Energy adaptation) system for unbalanced loads Flux vector control (FVC) with sensor (current vector) 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	Asynchronous motors Synchronous motors
Power supply voltage limits	323...528 V
Power supply frequency	50...60 Hz +/- 5 %
Power supply frequency limits	47.5...63 Hz
Prospective line I <sub>sc</sub>	<= 5 kA

Continuous output current	7.6 A at 4 kHz 460 V 10.5 A at 4 kHz 380 V
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	170 % of nominal motor torque +/- 10 % for 60 s 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	Adjustable Automatic whatever the load Not available in voltage/frequency ratio (2 or 5 points) Suppressable
Diagnostic	1 LED red presence of drive voltage
Output voltage	<= power supply voltage
Insulation	Electrical between power and control
Type of cable for mounting in an enclosure	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 With NEMA Type 1 kit : 3-strand UL 508 cable at 40 °C, copper 75 °C PVC
Electrical connection	AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR terminal 2.5 mm <sup>2</sup> / AWG 14 L1/R, L2/S, L3/T terminal 10 mm <sup>2</sup> / AWG 6 U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB terminal 4 mm <sup>2</sup> / AWG 8
Tightening torque	AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR 0.6 N.m U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB 1.4 N.m / 12.3 lb.in L1/R, L2/S, L3/T 2.1 N.m / 18.3 lb.in
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, 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, impedance 30000 Ohm, resolution 11 bits
Input sampling time	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)
Absolute accuracy precision	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 logic output 10 V <= 20 mA AO1 software-configurable current 0...20 mA, impedance 500 Ohm AO1 software-configurable voltage 0...10 V DC, impedance 470 Ohm
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	LI1...LI5 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 0...6 probes, impedance 1500 Ohm PWR safety input 24 V DC, impedance 1500 Ohm
Discrete input logic	LI1...LI5 positive logic (source), < 5 V (state 0), > 11 V (state 1) LI1...LI5 negative logic (sink), > 16 V (state 0), < 10 V (state 1) LI6 (if configured as logic input) negative logic (sink), > 16 V (state 0), < 10 V (state 1) LI6 (if configured as logic input) positive logic (source), < 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	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 input phase breaks 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	490 mm
Width	240 mm
Depth	310 mm
Product weight	15.4 kg
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

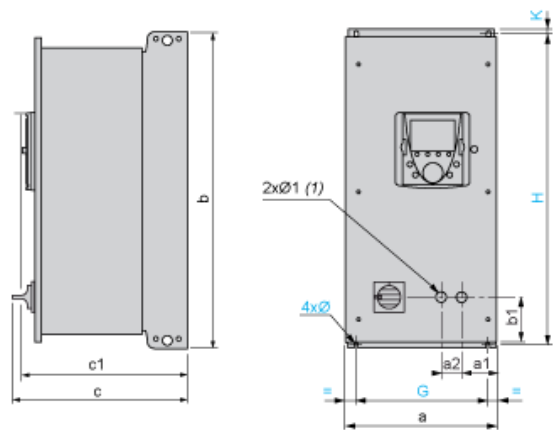
Noise level	54.5 dB conforming to 86/188/EEC
Dielectric strength	3535 V DC between earth and power terminals 5092 V DC between control and power terminals
Electromagnetic compatibility	Conducted radio-frequency immunity test conforming to IEC 61000-4-6 level 3 Electrical fast transient/burst immunity 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 $\mu$ s - 8/20 $\mu$ s surge immunity test conforming to IEC 61000-4-5 level 3
Standards	EN 55011 class A group 1 EN 61800-3 environments 1 category C2 EN 61800-3 environments 2 category C2 EN/IEC 61800-3 EN/IEC 61800-5-1 IEC 60721-3-3 class 3C2 UL Type 12
Product certifications	CSA C-Tick GOST NOM 117 UL
Pollution degree	2 conforming to EN/IEC 61800-5-1 3 conforming to UL 840
IP degree of protection	IP54
Vibration resistance	1.5 mm peak to peak (f = 3...13 Hz) conforming to EN/IEC 60068-2-6 1 gn (f = 13...200 Hz) conforming to EN/IEC 60068-2-6
Shock resistance	15 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

## Contractual warranty

Warranty period	18 months
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UL Type 12/IP 54 Drives with Vario

Dimensions



(1) The diameters and positions of the drill holes for mounting control and/or signalling units must be complied with. The customer is responsible for drill

Dimensions in mm

a	a1	a2	b	b1	c	c1	G	H	K	Ø	Ø1
240	60.5	30	490	80	310	286	200	476	6	6	22.3

Dimensions in in.

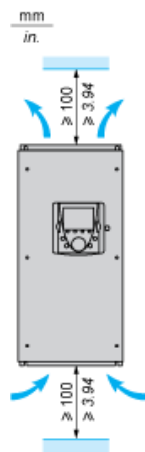
a	a1	a2	b	b1	c	c1	G	H	K	Ø	Ø1
9.44	2.38	1.18	19.29	3.15	12.2	11.26	7.87	18.74	0.23	0.23	0.87

## Mounting Recommendations

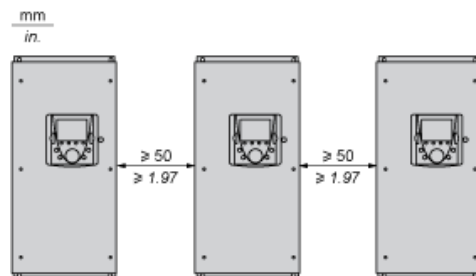
Depending on the conditions in which the drive is to be used, its installation will require certain precautions and the use of appropriate accessories. Install the unit vertically:

- Avoid placing it close to heating elements
- Leave sufficient free space to ensure that the air required for cooling purposes can circulate from the bottom to the top of the unit.

### Clearance

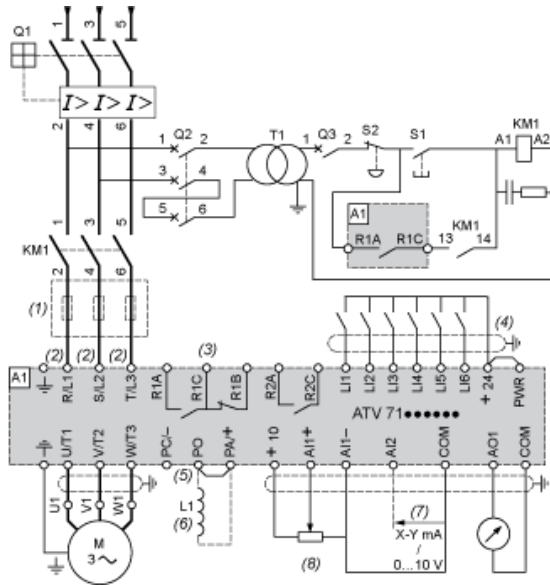


### Mounting



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

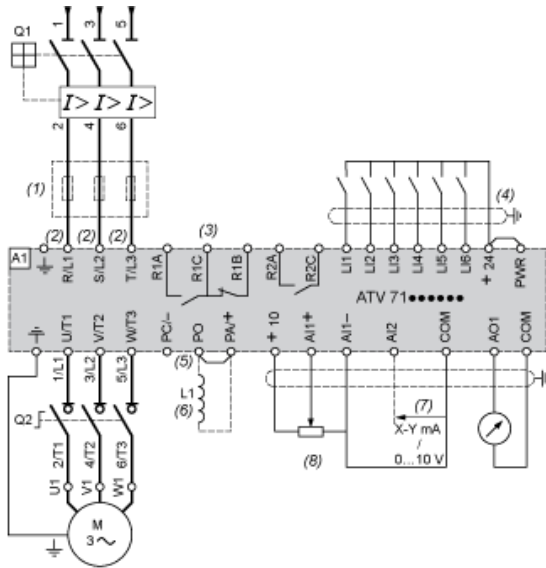


- A1     ATV71 drive
- KM1    Contactor
- L1     DC choke
- Q1     Circuit-breaker
- Q2     GV2 L rated at twice the nominal primary current of T1
- Q3     GB2CB05
- S1, S2  XB4 B or XB5 A pushbuttons
- T1     100 VA transformer 220 V secondary
- (1)    Line choke (three-phase); mandatory for ATV71HC11Y...HC63Y 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 L1.
- (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 Disconnecter



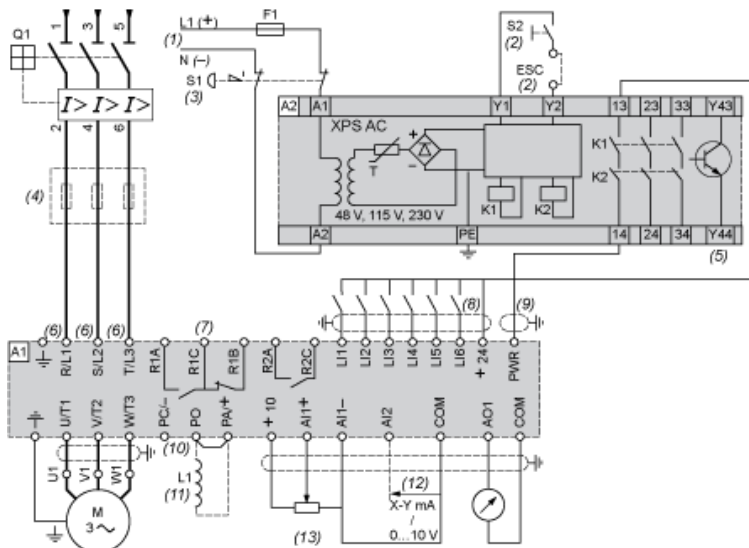
- A1      ATV71 drive
- L1      DC choke
- Q1      Circuit-breaker
- Q2      Switch disconnecter (Vario)
- (1)     Line choke (three-phase), mandatory for ATV71HC11Y...HC63Y drives (except when a special transformer is used (12-pulse)).
- (2)     For ATV71HC40N4 drives combined with a 400 kW motor, ATV71HC50N4 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 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 DC choke.
- (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

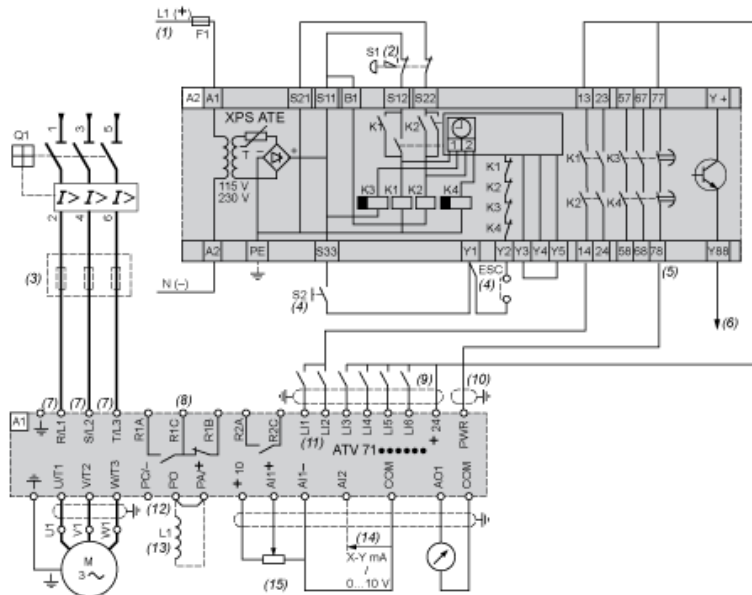


- A1     ATV71 drive
- A2     Preventa XPS AC safety module for monitoring emergency stops and switches. One safety module can manage the "Power Removal" function for several drives.
- F1     Fuse
- L1     DC choke
- Q1     Circuit-breaker
- S1     Emergency stop button with 2 contacts
- S2     XB4 B 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 length 100 m.
- (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 DC choke.
- (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.

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

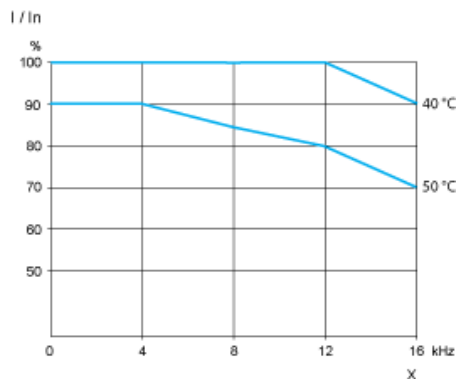


- A1     ATV71 drive
- A2 (5)   Preventa XPS ATE safety module for monitoring emergency stops and switches. One safety module can manage the "Power Removal" safety function
- F1     Fuse
- L1     DC choke
- Q1     Circuit-breaker
- S1     Emergency stop button with 2 N/C contacts
- S2     Run button
- (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 30 seconds.
- (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 switch.
- (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 100 m.
- (11)    Logic inputs L1 and L2 must be assigned to the direction of rotation: L1 in the forward direction and L2 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 standard DC choke.
- (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.

## Derating Curves

The derating curves for the drive nominal current ( $I_n$ ) depend on the temperature and the switching frequency. For intermediate temperatures (e.g. 45°C), interpolate between 2 curves.



X Switching frequency

ATV71E5U40N4 may be replaced by any of the following products:



### Drive Products ATV950U40N4E

variable speed drive - ATV950 - 4kW - 400/480V- w braking unit/switch - IP55

Qty 1

Reason for Substitution: End of life | Substitution date: 03 February 2016



### Drive Products ATV950U55N4E

variable speed drive - ATV950 - 5,5kW - 400/480V- w braking unit/switch - IP55

Qty 1

Reason for Substitution: End of life | Substitution date: 01 April 2016