

# ATV71WD37N4

variable speed drive ATV71 - 37kW-50HP - 480V-  
EMC filter-graphic terminal -IP54



## 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	37 kW at 380...480 V 3 phases
Motor power hp	50 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	69 A for 480 V 3 phases 37 kW / 50 hp 84 A for 380 V 3 phases 37 kW / 50 hp
EMC filter	Class A EMC filter integrated
Assembly style	Enclosed
Variant	With EMC plate
Apparent power	55.3 kVA at 380 V 3 phases 37 kW / 50 hp
Prospective line I <sub>sc</sub>	<= 22 kA, 3 phases
Nominal output current	65 A at 2.5 kHz 460 V 3 phases 37 kW / 50 hp 79 A at 2.5 kHz 380 V 3 phases 37 kW / 50 hp
Maximum transient current	130 A for 2 s 3 phases 37 kW / 50 hp 118.5 A for 60 s 3 phases 37 kW / 50 hp
Output frequency	0.1...599 Hz
Nominal switching frequency	2.5 kHz
Switching frequency	1...16 kHz adjustable 2.5...16 kHz with derating factor
Asynchronous motor control profile	Voltage/Frequency ratio (2 or 5 points) ENA (Energy adaptation) system for unbalanced loads Flux vector control (FVC) with sensor (current vector) Sensorless flux vector control (SFVC) (voltage or current vector)
Type of polarization	No impedance for Modbus

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

## Complementary

Product destination	Asynchronous motors Synchronous 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 T <sub>n</sub> to T <sub>n</sub> torque variation in closed-loop mode with encoder feedback +/- 10 % of nominal slip for 0.2 T <sub>n</sub> to T <sub>n</sub> 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 Adjustable Automatic whatever the load 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	A11-/A11+, A12, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR terminal 2.5 mm <sup>2</sup> / AWG 14 L1/R, L2/S, L3/T, U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB terminal 50 mm <sup>2</sup> / AWG 1/0
Tightening torque	L1/R, L2/S, L3/T, U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB 12 N.m / 102.2 lb.in A11-/A11+, A12, 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	A11-/A11+ bipolar differential voltage +/- 10 V DC, input voltage 24 V max, resolution 11 bits + sign A12 software-configurable current 0...20 mA, impedance 242 Ohm, resolution 11 bits A12 software-configurable voltage 0...10 V DC, input voltage 24 V max, impedance 30000 Ohm, resolution 11 bits
Sampling duration	A11-/A11+ 2 ms, +/- 0.5 ms for analog input(s) A12 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	A11-/A11+ +/- 0.6 % for a temperature variation 60 °C A12 +/- 0.6 % for a temperature variation 60 °C AO1 +/- 1 % for a temperature variation 60 °C
Linearity error	A11-/A11+, A12 +/- 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	S, U or customized Linear adjustable separately from 0.01 to 9000 s Automatic adaptation of ramp if braking capacity exceeded, by using resistor
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	Modbus CANopen
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	880 mm
Depth	383 mm
Width	285 mm
Product weight	38.5 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

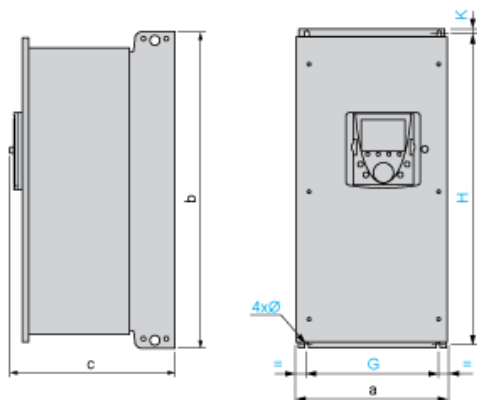
Noise level	64 dB conforming to 86/188/EEC
Dielectric strength	3535 V DC between earth and power terminals 5092 V DC between control and power terminals
Electromagnetic compatibility	Conducted radio-frequency immunity test conforming to IEC 61000-4-6 level 3 Electrical fast transient/burst immunity test 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 12 EN 61800-3 environments 2 category C3 EN 55011 class A group 2 EN 61800-3 environments 1 category C3 EN/IEC 61800-5-1 EN/IEC 61800-3 IEC 60721-3-3 class 3C2
Product certifications	GOST UL NOM 117 CSA C-Tick
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

Dimensions



Dimensions in mm

a	b	c	G	H	K	Ø
285	880	343	245	860	10	7

Dimensions in in.

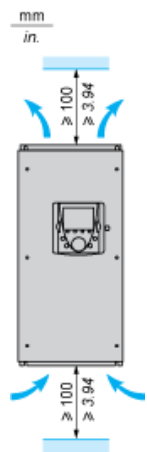
a	b	c	G	H	K	Ø
11.22	34.65	13.50	9.64	33.86	0.39	0.27

## Mounting Recommendations

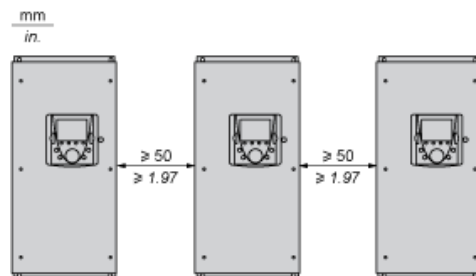
Depending on the conditions in which the drive is to be used, its installation will require certain precautions and the use of appropriate accessories. Install the unit vertically:

- 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

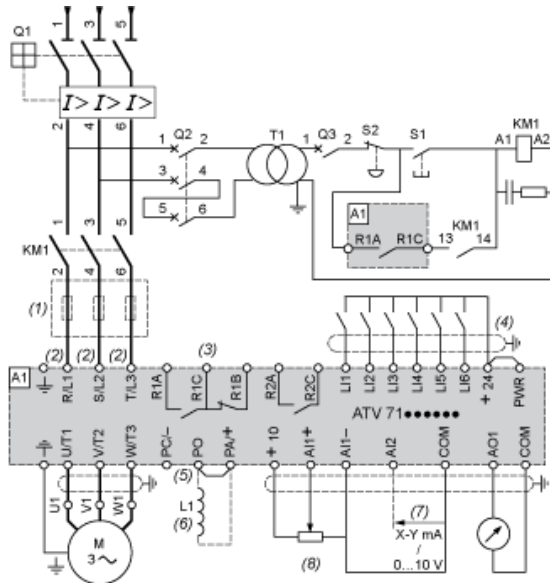


### Mounting



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

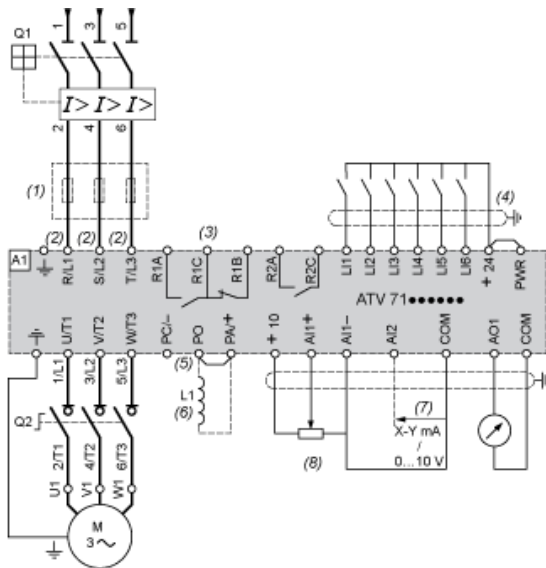


- A1 ATV71 drive
- KM1 Contactor
- L1 DC choke
- Q1 Circuit-breaker
- Q2 GV2 L rated at twice the nominal primary current of T1
- Q3 GB2CB05
- S1, S2 XB4 B or XB5 A pushbuttons
- T1 100 VA transformer 220 V secondary
- (1) Line choke (three-phase); mandatory for ATV71HC11Y...HC63Y drives (except when 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, ATV71075N4...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 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 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 between the +10 and -10 terminals.

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

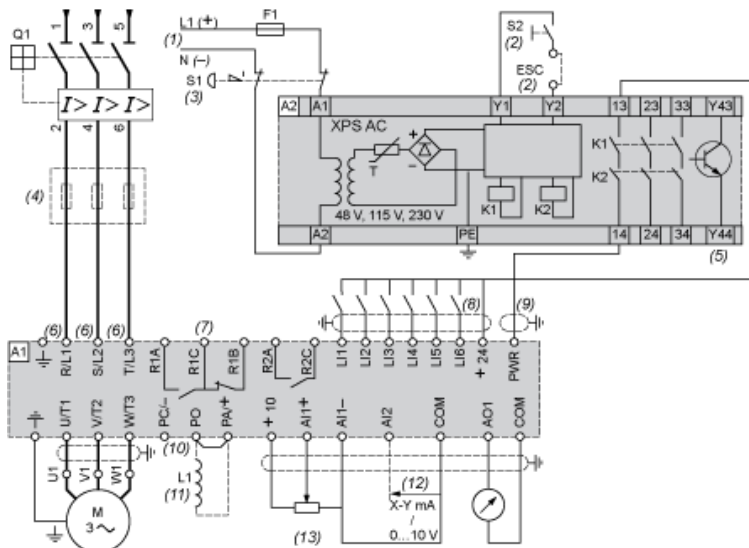
(8) Reference potentiometer.

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

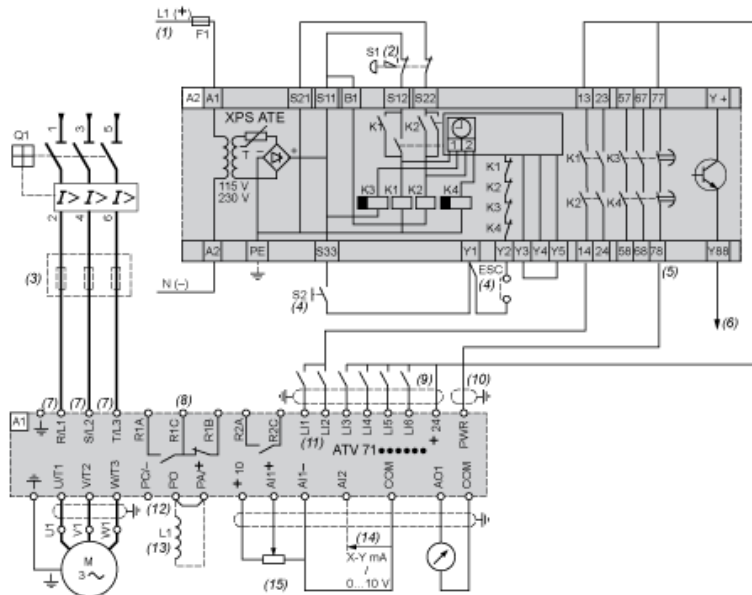


- A1 ATV71 drive
- A2 Preventa XPS AC safety module for monitoring emergency stops and switches. One safety module can manage the "Power Removal" function for several drives.
- F1 Fuse
- L1 DC choke
- Q1 Circuit-breaker
- S1 Emergency stop button with 2 contacts
- S2 XB4 B or XB5 A pushbutton
- (1) Power 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 stray inductor.
- (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 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
- (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 b
- (14) Software-configurable current (0...20 mA) or voltage (0...10 V) analog input.
- (15) Reference potentiometer.

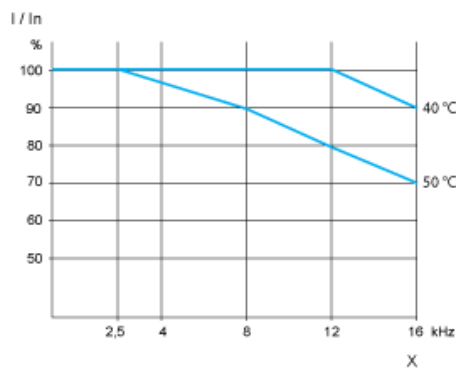
All terminals are located at the bottom of the drive. Fit interference suppressors on all inductive circuits near the drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

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### Derating Curves

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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