

ATV71HU22S6X

variable speed drive ATV71 - 2.2kW-3HP -
600V - w/o EMC filter-graphic terminal



Product availability: Non-Stock - Not normally stocked in distribution facility



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	2.2 kW, 3 phase 500 V
Maximum Horse Power Rating	3 hp, 3 phase 575 V
Maximum motor cable length	98.43 Ft (30 m) shielded cable 164.04 ft (50 m) unshielded cable
Power supply voltage	500...600 V - 15...10 %
Phase	3 phase
Line current	7.6 A 500 V 3 phase 2.2 kW / 3 hp 6.7 A 600 V 3 phase 2.2 kW / 3 hp
EMC filter	Without EMC filter
Assembly style	With heat sink
Variant	Built-in unit with forced cooling
Prospective line I _{sc}	22 kA 3 phase
Nominal output current	4.5 A 4 kHz 500 V 3 phase 2.2 kW / 3 hp 3.9 A 4 kHz 575 V 3 phase 2.2 kW / 3 hp
Maximum transient current	6.8 A 60 s 3 phase 2.2 kW / 3 hp 7.4 A 2 s 3 phase 2.2 kW / 3 hp
Output frequency	0.1...500 Hz
Nominal switching frequency	4 kHz
Switching frequency	2.5...6 kHz adjustable 4...6 kHz with derating factor
Asynchronous motor control profile	Flux vector control with sensor, standard Voltage/Frequency ratio, 5 points Flux vector control without sensor, standard Flux vector control without sensor, ENA (energy Adaptation) system Voltage/Frequency ratio - Energy Saving, quadratic U/f Voltage/Frequency ratio, 2 points Flux vector control without sensor, 2 points
Type of polarization	No impedance Modbus

Complementary

Product destination	Asynchronous motors Synchronous motors
Power supply voltage limits	425...660 V
Power supply frequency	50...60 Hz +/- 5 %
Power supply frequency limits	47.5...63 Hz
Speed range	1...100 in open-loop mode, without speed feedback
Speed accuracy	+/- 10 % of nominal slip without speed feedback 0.2 T _n to T _n
Torque accuracy	+/- 15 % in open-loop mode, without speed feedback
Transient overtorque	220 % +/- 10 % 2 s 170 % +/- 10 % 60 s
Braking torque	30 % without braking resistor ≤ 125 % with braking resistor

Synchronous motor control profile	Vector control without sensor, standard Vector control with sensor, standard
Regulation loop	Frequency PI regulator
Motor slip compensation	Can be suppressed Not available in voltage/frequency ratio (2 or 5 points) Adjustable Automatic whatever the load
Diagnostic	Operation function, status and configuration LCD display unit
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 IEC cable 104 °F (40 °C), copper 70 °C / PVC Without mounting kit 1 IEC cable 113 °F (45 °C), copper 70 °C / PVC Without mounting kit 1 IEC cable 113 °F (45 °C), copper 90 °C / XLPE/EPR With UL Type 1 kit 3 UL 508 cable 104 °F (40 °C), copper 75 °C / PVC
Electrical connection	Terminal 2.5 mm ² , AWG 14 AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR) Terminal 16 mm ² , AWG 4 L1/R, L2/S, L3/T, U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB)
Tightening torque	5.31 Lbf.in (0.6 N.m) AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR) 26.55 lbf.in (3 N.m), 26.5 lb.in L1/R, L2/S, L3/T, U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB)
Supply	Internal supply for reference potentiometer (1 to 10 kOhm) 10.5 V DC +/- 5 %, <10 mA overload and short-circuit protection Internal supply 24 V DC 21...27 V), <200 mA overload and short-circuit protection External supply 24 V DC 19...30 V)
Analogue input number	2
Analogue input type	AI1-/AI1+ bipolar differential voltage +/- 10 V DC 24 V max 11 bits + sign AI2 software-configurable current 0...20 mA 242 Ohm 11 bits AI2 software-configurable voltage 0...10 V DC 24 V max 30000 Ohm 11 bits
Input sampling time	2 Ms +/- 0.5 ms AI1-/AI1+) - analog 2 Ms +/- 0.5 ms AI2) - analog 2 Ms +/- 0.5 ms LI1...LI5) - discrete 2 Ms +/- 0.5 ms LI6)if configured as logic input - discrete 2 ms +/- 0.5 ms AO1) - analog
Response time	<= 100 ms in STO (Safe Torque Off) R1A, R1B, R1C <= 7 ms +/- 0.5 ms R2A, R2B <= 7 ms +/- 0.5 ms
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	+/- 0.2 % AO1) +/- 0.15 % of maximum value AI1-/AI1+) +/- 0.15 % of maximum value AI2)
Analogue output number	1
Analogue output type	AO1 software-configurable logic output 10 V 20 mA AO1 software-configurable current 0...20 mA 500 Ohm 10 bits AO1 software-configurable voltage 0...10 V DC 470 Ohm 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 24 V DC configurable relay logic
Maximum switching current	R1, R2 2 A 250 V AC inductive, cos phi = 0.4 R1, R2 2 A 30 V DC inductive, cos phi = 0.4 R1, R2 5 A 250 V AC resistive, cos phi = 1 R1, R2 5 A 30 V DC resistive, cos phi = 1
Discrete input number	7
Discrete input type	LI1...LI5 programmable 24 V DC level 1 PLC 3500 Ohm LI6 switch-configurable 24 V DC level 1 PLC 3500 Ohm LI6 switch-configurable PTC probe 0...6 1500 Ohm PWR safety input 24 V DC 1500 Ohm ISO 13849-1 level d
Discrete input logic	Negative logic (sink) LI1...LI5), > 16 V, < 10 V Positive logic (source) LI1...LI5), < 5 V, > 11 V Negative logic (sink) LI6)if configured as logic input, > 16 V, < 10 V Positive logic (source) LI6)if configured as logic input, < 5 V, > 11 V Positive logic (source) PWR), < 2 V, > 17 V

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	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 Thermal protection motor Power removal drive
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	Modbus CANopen
Connector type	1 RJ45 on front face)Modbus 1 RJ45 on terminal)Modbus 1 RJ45CANopen
Physical interface	2-wire RS 485 Modbus
Transmission frame	RTU Modbus
Transmission rate	4800 bps, 9600 bps, 19200 bps, 38.4 Kbps Modbus on terminal 9600 bps, 19200 bps Modbus on front face 20 kbps, 50 kbps, 125 kbps, 250 kbps, 500 kbps, 1 Mbps CANopen
Data format	8 bits, 1 stop, even parity Modbus on front face 8 bits, odd even or no configurable parity Modbus on terminal
Number of addresses	1...127 CANopen 1...247 Modbus
Method of access	Slave CANopen
Marking	CE
Operating position	Vertical +/- 10 degree
Height	11.61 in (295 mm)
Depth	8.39 in (213 mm)
Width	8.27 in (210 mm)
Product weight	16.53 lb(US) (7.5 kg)
Option card	Communication card CC-Link Controller inside programmable card Communication card DeviceNet Communication card Ethernet/IP Communication card Fipio I/O extension card Communication card Interbus-S Communication card Modbus Plus Communication card Modbus TCP Communication card Modbus/Uni-Telway Communication card Profibus DP Communication card Profibus DP V1 Communication card LonWorks Communication card METASYS N2 Communication card APOGEE FLN Communication card BACnet




Environment

Noise level	60.2 dB 86/188/EEC
Dielectric strength	5092 V DC between control and power terminals 3800 V DC between earth and power terminals
Electromagnetic compatibility	1.2/50 μ s - 8/20 μ s surge immunity test level 3 IEC 61000-4-5 Conducted radio-frequency immunity test level 3 IEC 61000-4-6 Electrical fast transient/burst immunity test level 4 IEC 61000-4-4 Electrostatic discharge immunity test level 3 IEC 61000-4-2 Radiated radio-frequency electromagnetic field immunity test level 3 IEC 61000-4-3 Voltage dips and interruptions immunity test IEC 61000-4-11
Standards	UL Type 1 EN/IEC 61800-3 environment 1 EN 55011 group 1 class B EN/IEC 61800-3 EN/IEC 61800-3 environment 2 IEC 60721-3-3 class 3C1 EN/IEC 61800-5-1 IEC 60721-3-3 class 3S2
Product certifications	GOST NOM 117 UL C-Tick CSA
Pollution degree	3 UL 840 3 EN/IEC 61800-5-1
IP degree of protection	IP20 on upper part without blanking plate on cover EN/IEC 60529 IP20 on upper part without blanking plate on cover EN/IEC 61800-5-1 IP21 EN/IEC 60529 IP21 EN/IEC 61800-5-1 IP41 on upper part EN/IEC 60529 IP41 on upper part EN/IEC 61800-5-1 IP54 on lower part EN/IEC 60529 IP54 on lower part EN/IEC 61800-5-1
Vibration resistance	1 gn 13...200 Hz)EN/IEC 60068-2-6 1.5 mm peak to peak 3...13 Hz)EN/IEC 60068-2-6
Shock resistance	15 gn 11 ms EN/IEC 60068-2-27
Relative humidity	5...95 % without condensation IEC 60068-2-3 5...95 % without dripping water IEC 60068-2-3
Ambient air temperature for operation	14...122 °F (-10...50 °C) without) 122...140 °F (50...60 °C) with derating factor)
Ambient air temperature for storage	-13...158 °F (-25...70 °C)
Operating altitude	<= 3280.84 ft (1000 m) without 3280.84...7414.7 ft (1000...2260 m) with current derating 1 % per 100 m

Ordering and shipping details

Category	22130 - ATV71 - 1/2 THRU 5HP DRIVES
Discount Schedule	CP4C
GTIN	00785901856269
Package weight(Lbs)	10.04 kg (22.13 lb(US))
Returnability	No
Country of origin	CN

Offer Sustainability

Sustainable offer status	Green Premium product
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 Carcinogen & Reproductive harm. For more information go to www.p65warnings.ca.gov
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

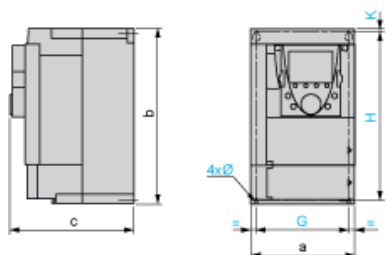
China RoHS Regulation	China RoHS Declaration
Environmental Disclosure	Product Environmental Profile
Circularity Profile	End Of Life Information
WEEE	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins.

Contractual warranty

Warranty	18 months
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UL Type 1/IP 20 Drives

Dimensions without Option Card



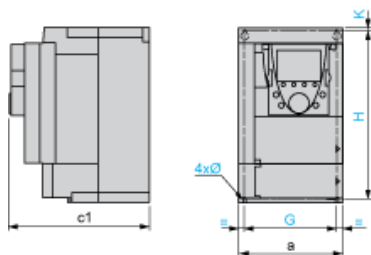
Dimensions in mm

a	b	c	G	H	K	Ø
210	295	213	190	283	6	6

Dimensions in in.

a	b	c	G	H	K	Ø
8.26	11.61	8.38	7.48	11.14	0.23	0.23

Dimensions with 1 Option Card (1)



Dimensions in mm

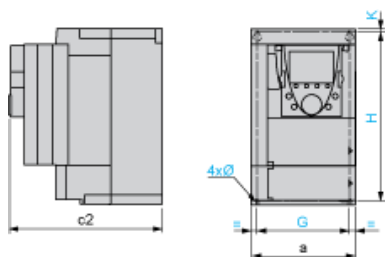
a	c1	G	H	K	Ø
210	236	190	283	6	6

Dimensions in in.

a	c1	G	H	K	Ø
8.26	9.29	7.48	11.14	0.23	0.23

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

Dimensions with 2 Option Cards (1)



Dimensions in mm

a	c2	G	H	K	Ø
210	259	190	283	6	6

Dimensions in in.

a	c2	G	H	K	Ø
8.26	10.20	7.48	11.14	0.23	0.23

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

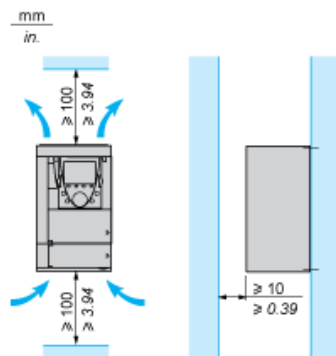
Mounting Recommendations

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:

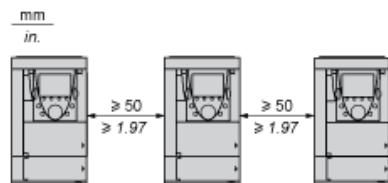
- Avoid placing it close to heating elements
- Leave sufficient free space to ensure that the air required for cooling purposes can circulate from the bottom to the top of the unit.

Clearance

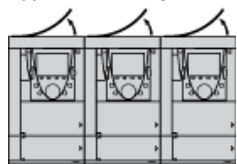


Mounting Types

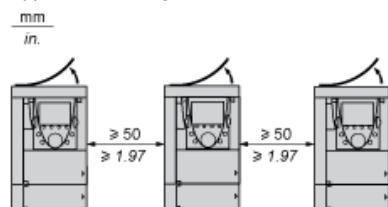
Type A Mounting



Type B Mounting



Type C Mounting



By removing the protective blanking cover from the top of the drive, the degree of protection for the drive becomes IP 20.

The protective blanking cover may vary according to the drive model (refer to the user guide).

The protective blanking cover must be removed from ATV 71P•••N4Z drives when they are mounted in a dust and damp proof enclosure.

Mounting and Temperature Conditions

Mounting type A and B

The drive can operate with a switching frequency 2,5...6 kHz up to 50°C without derating.

Mounting type C

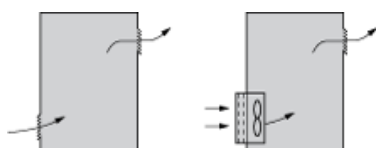
The drive can operate with a switching frequency 2,5...6 kHz up to 60°C without derating. For operation above 50°C (122°F), power supply voltage must be limited up to 600 V +5%.

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 equal to that of the drive fans (refer to the product characteristics).



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

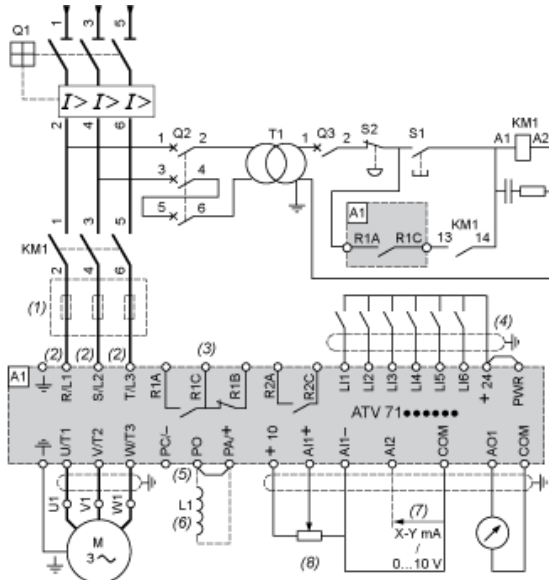
Dust and Damp Proof Metal Enclosure (IP 54)

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.

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

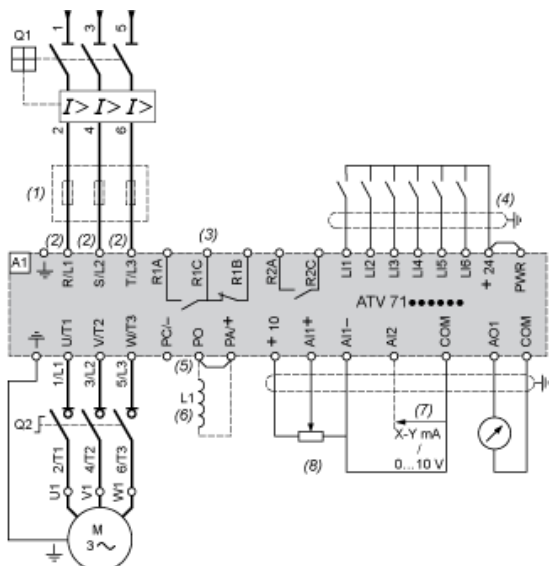


- A1 ATV71 drive
- KM1 Contactor
- L1 DC choke
- Q1 Circuit-breaker
- Q2 GV2 L rated at twice the nominal primary current of T1
- Q3 GB2CB05
- S1, XB4 B or XB5 A pushbuttons
- S2
- T1 100 VA transformer 220 V secondary
- (1) Line choke (three-phase); mandatory for ATV71HC11Y...HC63Y drives (except when 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 switched to the "source" position (for other connection types, refer to the user guide).
- (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 PO and PA/+ terminals. For ATV71HD55M3X, HD75M3X, ATV71HD90N4...HC50N4 drives, the choke is supplied with the drive; the customer is responsible for connecting it.
- (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

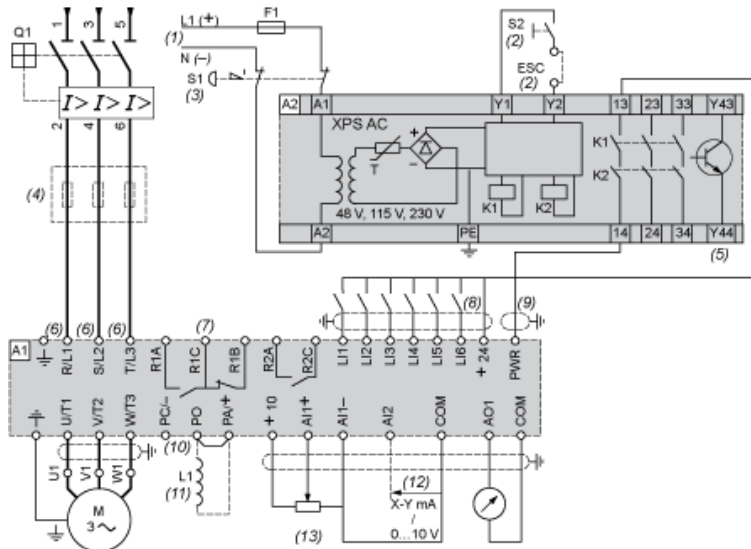


- A1 ATV71 drive
- L1 DC choke
- Q1 Circuit-breaker
- Q2 Switch disconnecter (Vario)
- (1) Line choke (three-phase), mandatory for ATV71HC11Y...HC63Y drives (except when a special transformer is used (12-pulse)).
- (2) For ATV71HC40N4 drives combined with a 400 kW motor, ATV71HC50N4 and ATV71HC40Y...HC63Y, 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 to the "source" position (for other connection types, refer to the user guide).
- (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 PO and PA/+ terminals. For ATV71HD55M3X, HD75M3X, ATV71HD90N4...HC50N4 drives, the choke is supplied with the drive; the customer is responsible for connecting it.
- (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

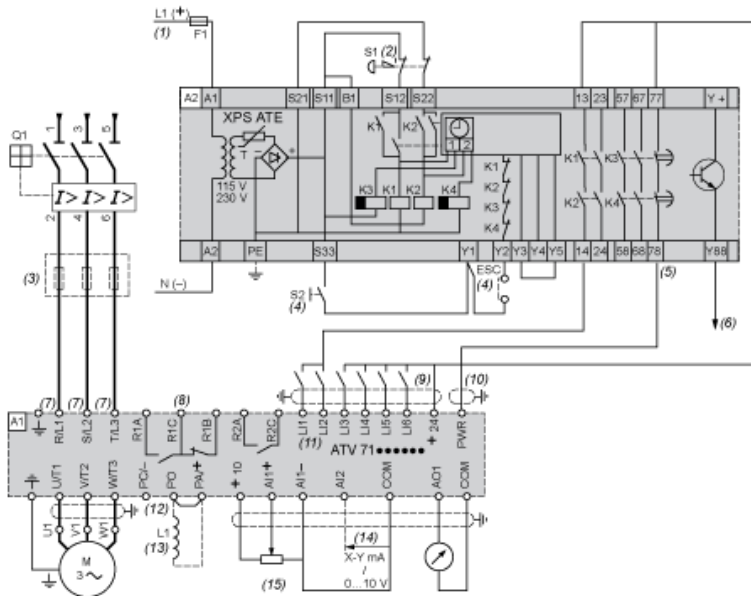


- A1 ATV71 drive
- A2 Preventa XPS AC safety module for monitoring emergency stops and switches. One safety module can manage the “Power Removal” function for several drives on the same machine. In this case, each drive must connect its PWR terminal to its + 24 V via the safety contacts on the XPS AC module. These contacts are independent for each drive.
- 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 switched to the “source” position (for other connection types, refer to the user guide).
- (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 15 m / 49.21 ft. The cable shielding must be earthed.
- (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 between the PO and PA/+ terminals. For ATV71HD55M3X, HD75M3X, ATV71HD90N4...HC50N4 drives, the choke is supplied with the drive; the customer is responsible for connecting it.
- (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 Preventa XPS ATE safety module for monitoring emergency stops and switches. One safety module can manage the "Power Removal" (5) safety function for several drives on the same machine. In this case the time delay must be adjusted on the drive controlling the motor that requires the longest stopping time. In addition, each drive must connect its PWR terminal to its + 24 V via the safety contacts on the XPS ATE module. These contacts are independent for each drive.
- 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 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 switched to the "source" position (for other connection types, refer to the user guide).
(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 15 m/49.21 ft. The cable shielding must be earthed.
(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 between the PO and PA/+ terminals. For ATV71HD55M3X, HD75M3X, ATV71HD90N4...HC50N4 drives, the choke is supplied with the drive; the customer is responsible for connecting it.
(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.