Product data sheet

Specifications

Discontinued - Service only

variable speed drive ATV61 - 22kW 30HP - 380...480V - EMC filter - IP54

ATV61E5D22N4

Discontinued on: 31 March 2016

To be end-of-service on: 01 April 2024

Main

Range of product	Altivar 61
Product or component type	Variable speed drive
Product specific application	Pumping and ventilation machine
Component name	ATV61
Motor power kW	22 kW
Motor power hp	30 hp
Power supply voltage	380...480 V - 15...10 %
Supply number of phases	3 phases
Line current	36.6 A at 480 V 43.6 A at 380 V
EMC filter	Class C2 EMC filter integrated
Assembly style	Enclosed with Vario switch disconnector
Apparent power	28.7 kVA at 380 V
Maximum prospective line Isc	22 kA
Maximum transient current	47.8 A for 60 s
Nominal switching frequency	4 kHz
Switching frequency	2...16 kHz adjustable 8...16 kHz with derating factor
Asynchronous motor control	Voltage/frequency ratio, 2 points Flux vector control without sensor, standard Voltage/frequency ratio, 5 points Voltage/frequency ratio - Energy Saving, quadratic U/f
Synchronous motor control profile	Vector control without sensor, standard
Communication port protocol	CANopen Modbus
Type of polarization	No impedance for Modbus
Option card	Communication card for APOGEE FLN Communication card for BACnet 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 Communication card for LonWorks

	Communication card for METASYS N2 Communication card for Modbus Plus Communication card for Modbus TCP Communication card for Modbus/Uni-Telway Multi-pump card Communication card for Profibus DP Communication card for Profibus DP V1

Complementary

Product destination	Synchronous motors Asynchronous motors
Power supply voltage limits	323…528 V
Power supply frequency	50...60 Hz - 5...5 %
Power supply frequency limits	47.5…63 Hz
Continuous output current	40 A at 4 kHz, 460 V 43.5 A at 4 kHz, 380 V
Speed drive output frequency	0.5…500 Hz
Speed range	1…100 in open-loop mode, without speed feedback
Speed accuracy	+/- 10 % of nominal slip 0.2 Tn to Tn without speed feedback
Torque accuracy	+/- 15 % in open-loop mode, without speed feedback
Transient overtorque	130 % of nominal motor torque +/- 10 % for 60 s
Braking torque	<= 125 % with braking resistor 30 % without braking resistor
Regulation loop	Frequency PI regulator
Motor slip compensation	Can be suppressed Not available in voltage/frequency ratio (2 or 5 points) Automatic whatever the load Adjustable
Diagnostic	1 LED (red) for drive voltage
Output voltage	<= power supply voltage
Electrical isolation	Between power and control terminals
Type of cable for mounting in an enclosure	With an IP21 or an IP31 kit: 3 wire(s)IEC cable at 40 °C, copper 70 °C / PVC With UL Type 1 kit: 3 wire(s)UL 508 cable at 40 °C, copper 75 °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 2.5 mm² / AWG 14 (AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR) Terminal 25 mm² / AWG 3 (L1/R, L2/S, L3/T, U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB)
Tightening torque	0.6 N.m (AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR) 5.4 N.m, 47.7 lb.in (L1/R, L2/S, L3/T, U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB)
Supply	Internal supply: 24 V DC (21…27 V), <200 mA with overload and short-circuit protection Internal supply for reference potentiometer (1 to 10 kOhm): 10.5 V DC, +/- 5 %, <10 mA with 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, 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 24 V max, impedance: 30000 Ohm, resolution 11 bits
Sampling time	2 ms +/- 0.5 ms (AI1-/AI1+) - analog input 2 ms +/- 0.5 ms (AI2) - analog input 2 ms +/- 0.5 ms (AO1) - analog output 2 ms +/- 0.5 ms (LI1...LI5) - discrete input 2 ms +/- 0.5 ms (LI6)if configured as logic input - discrete input
Absolute accuracy precision	+/- 0.6 % (AI1-/AI1+) for a temperature variation 60 °C +/- 0.6 % (AI2) for a temperature variation 60 °C +/- 0.6 % (AO1) for a temperature variation 60 °C
Linearity error	+/- 0.15 % of maximum value (AI1-/AI1+) +/- 0.15 % of maximum value (AI2) +/- 0.2 % (AO1)
Analogue output number	1
Analogue output type	AO1 software-configurable logic output 10 V, 20 mA

	AO1 software-configurable current, analogue output range 0...20 mA, impedance: 500 Ohm, resolution 10 bits AO1 software-configurable voltage, analogue output range 0...10 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
Maximum response time	<= 100 ms in STO (Safe Torque Off) R1A, R1B, R1C <= 7 ms, tolerance +/- 0.5 ms R2A, R2B <= 7 ms, tolerance +/- 0.5 ms
Minimum switching current	3 mA at 24 V DC for configurable relay logic
Maximum switching current	2 A at 250 V AC on inductive load - cos phi = 0.4 - L/R = 7 ms (R1, R2) 2 A at 30 V DC on inductive load - cos phi = 0.4 - L/R = 7 ms (R1, R2) 5 A at 250 V AC on resistive load - cos phi = 1 - L/R = 0 ms (R1, R2) 5 A at 30 V DC on resistive load - cos phi = 1 - L/R = 0 ms (R1, R2)
Discrete input number	7
Discrete input type	Programmable (LI1...LI5)24 V DC (<= 30 V), with level 1 PLC - 3500 Ohm Switch-configurable (LI6)24 V DC (<= 30 V), with level 1 PLC - 3500 Ohm Switch-configurable PTC probe (LI6)0…6 probes - 1500 Ohm Safety input (PWR)24 V DC (<= 30 V) - 1500 Ohm
Discrete input logic	Negative logic (sink) (LI1...LI5), > 16 V (state 0), < 10 V (state 1) Positive logic (source) (LI1...LI5), < 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	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	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 Power removal: drive Short-circuit between motor phases: drive Thermal protection: drive Motor phase break: motor Power removal: motor Thermal protection: 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
Connector type	1 RJ45 (on front face) for Modbus Male SUB-D 9 on RJ45 (on terminal) 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	1…127 for CANopen 1…247 for Modbus
Method of access	Slave CANopen
Marking	CE
Operating position	Vertical +/- 10 degree
Width	315 mm
Height	665 mm
Depth	340 mm

Net weight	45.4 kg

Environment

Noise level	60.2 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 61000-4-11
Standards	UL Type 12 EN/IEC 61800-5-1 IEC 60721-3-3 class 3C1 EN/IEC 61800-3 IEC 60721-3-3 class 3S2 EN 61800-3 environments 2 category C2 EN 61800-3 environments 1 category C2 EN 55011 class A group 1
Product certifications	GOST C-Tick NOM 117 DNV CSA UL
Pollution degree	3 conforming to EN/IEC 61800-5-1 3 conforming to UL 840
Degree of proctection	IP54 conforming to EN/IEC 60529 IP54 conforming to EN/IEC 61800-5-1 IP54 conforming to UL Type 12
Vibration resistance	1 gn (f= 13…200 Hz) conforming to EN/IEC 60068-2-6 1.5 mm peak to peak (f= 3…13 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…40 °C (without derating) -10…50 °C (with derating factor)
Ambient air temperature for storage	-25…70 °C
Operating altitude	<= 1000 m without derating 1000...3000 m with current derating 1 % per 100 m

Packing Units

Package 1 Weight	24.000 kg
Package 1 Height	3.600 dm
Package 1 width	6.000 dm
Package 1 Length	8.000 dm

Contractual warranty

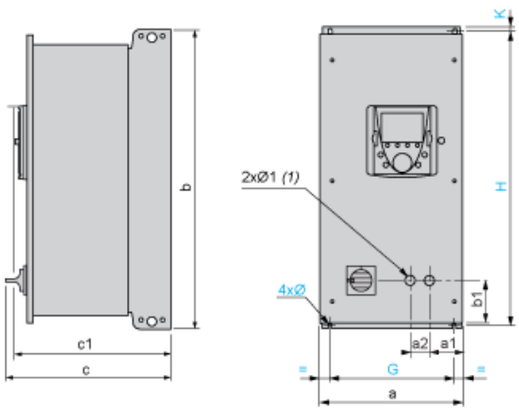
Warranty	18 months

Product data sheet ATV61E5D22N4

Dimensions Drawings

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

Dimensions in mm

a	a1	a2	b	b1	c	c1	G	H	K	Ø	Ø1
315	77	30	665	81	340	315	270	647	10	6	22.3

Dimensions in in.

a	a1	a2	b	b1	c	c1	G	H	K	Ø	Ø1
12.40	3.03	1.18	26.18	3.18	13.39	12.40	10.63	25.47	0.39	0.39	0.87

Product data sheet ATV61E5D22N4

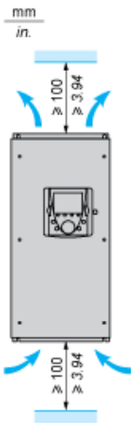
Mounting and Clearance

Mounting Recommendations

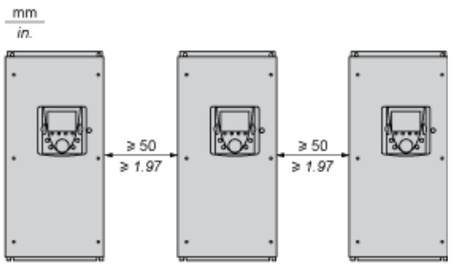
Depending on the conditions in which the drive is to be used, its installation will require certain precautions and the use of appropriate accessories.Install the unit vertically:

- 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

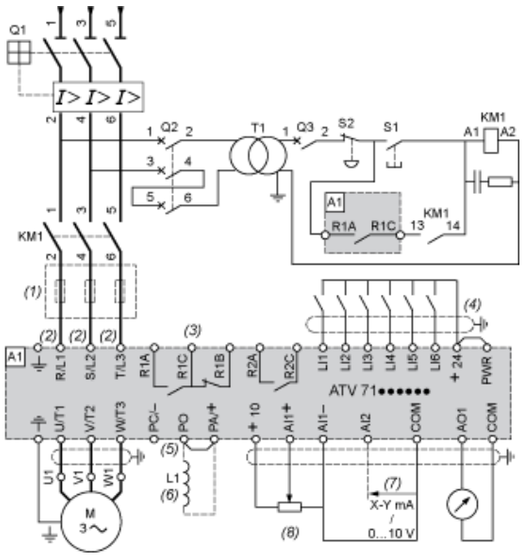


Mounting



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

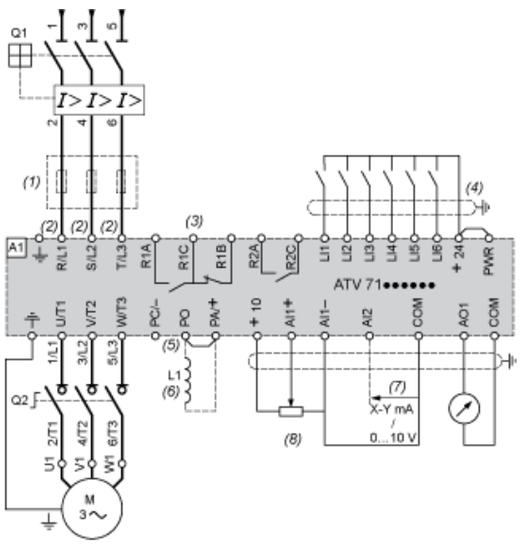


A1 ATV61 drive
KM1 Contactor
L1 DC choke
Q1 Circuit-breaker
Q2 GV2 L rated at twice the nominal primary current of T1
Q3 GB2CB05
S1, S2 XB4 B or XB5 A pushbuttons
T1 100 VA transformer 220 V secondary
(1) Line choke (three-phase); mandatory for ATV61HC11Y…HC80Y drives (except when a special transformer is used (12-pulse)).
(2) For ATV61HC50N4, ATV61HC63N4 and ATV61HC50Y…HC80Y drives, 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 supp
(5) There is no PO terminal on ATV61HC11Y…HC80Y drives.
(6) Optional DC choke for ATV61H•••M3, ATV61HD11M3X…HD45M3X and ATV61H075N4…HD75N4 drives. Connected in place of the strap betw
(7) Software-configurable current (0…20 mA) or voltage (0…10 V) analog input.
(8) Reference potentiometer.

NOTE: 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

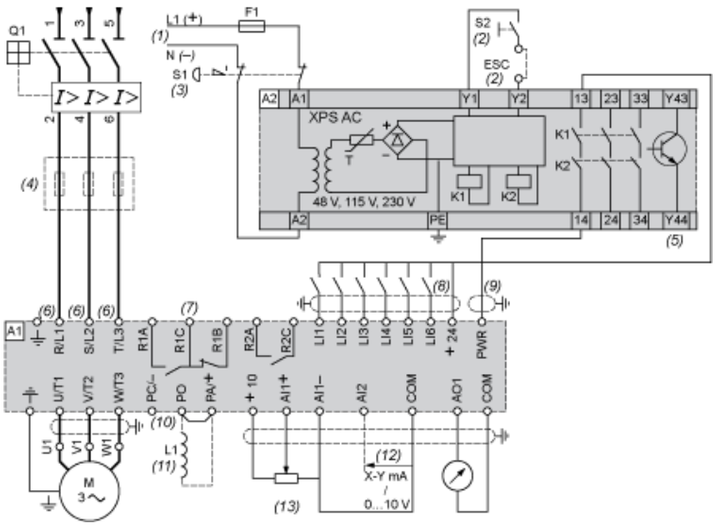


A1 ATV61 drive
L1 DC choke
Q1 Circuit-breaker
Q2 Switch disconnector (Vario)
(1) Line choke (three-phase), mandatory for ATV61HC11Y…HC80Y drives (except when a special transformer is used (12-pulse)).
(2) For ATV61HC50N4, ATV61HC63N4 and ATV61HC50Y…HC80Y drives, refer to the power terminal connections 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 supp
(5) There is no PO terminal on ATV61HC11Y…HC80Y drives.
(6) Optional DC choke for ATV61H•••M3, ATV61HD11M3X…HD45M3X and ATV61H075N4…HD75N4 drives. Connected in place of the strap betw
(7) Software-configurable current (0…20 mA) or voltage (0…10 V) analog input.
(8) Reference potentiometer.

NOTE: 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

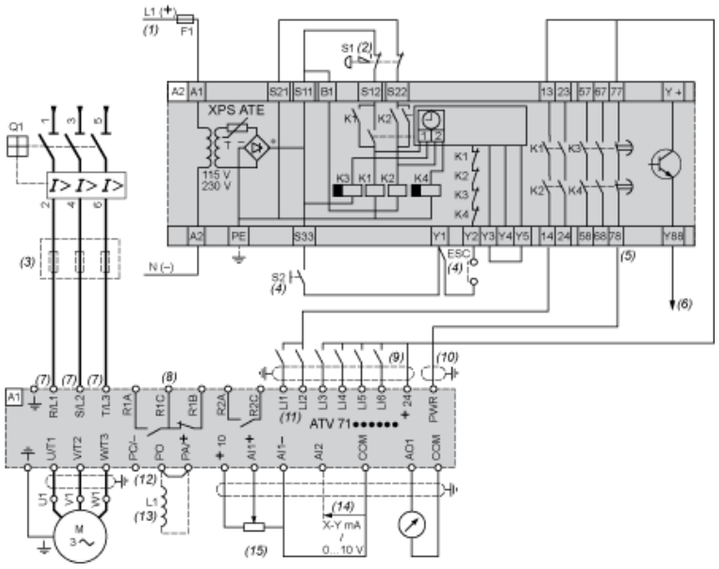


A1 ATV61 drive
A2 Preventa XPS AC safety module for monitoring emergency stops and switches. One safety module can manage the “Power Removal” function fo
F1 Fuse
L1 DC choke
Q1 Circuit-breaker
S1 Emergency stop button with 2 contacts
S2 XB4 B or XB5 A pushbutton
(1) Power supply: 24 Vdc or Vac, 115 Vac, 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 ATV61HC11Y…HC80Y 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 ATV61HC50N4, ATV61HC63N4 and ATV61HC50Y…HC80Y drives, 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 supp
(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., maxim
(10) There is no PO terminal on ATV61HC11Y…HC80Y drives.
(11) Optional DC choke for ATV61H•••M3, ATV61HD11M3X…HD45M3X and ATV61H075N4…HD75N4 drives. Connected in place of the strap betw
(12) Software-configurable current (0…20 mA) or voltage (0…10 V) analog input.
(13) Reference potentiometer.

NOTE: 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

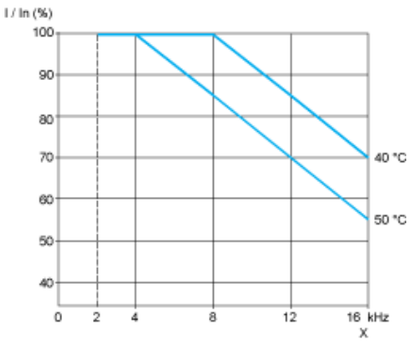


A1 ATV61 drive
A2 (5) Preventa XPS ATE safety module for monitoring emergency stops and switches. One safety module can manage the "Power Removal" safety fu
F1 Fuse
L1 DC choke
Q1 Circuit-breaker
S1 Emergency stop button with 2 contacts
S2 XB4 B or XB5 A pushbutton
(1) Power supply: 24 Vdc or Vac, 115 Vac, 230 Vac.
(2) Requests controlled stopping of the movement and activates the “Power Removal” safety function.
(3) Line choke (three-phase), mandatory for ATV61HC11Y…HC80Y 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) The logic output can be used to signal that the machine is in a safe state.
(6) 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
(7) For ATV61HC50N4, ATV61HC63N4 and ATV61HC50Y…HC80Y drives, 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 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 ATV61HC11Y…HC80Y drives.
(13) Optional DC choke for ATV61H•••M3, ATV61HD11M3X…HD45M3X and ATV61H075N4…HD75N4 drives. Connected in place of the strap betw
(14) Software-configurable current (0…20 mA) or voltage (0…10 V) analog input.
(15) Reference potentiometer.

NOTE: 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 (In) depend on the temperature and the switching frequency. For intermediate temperatures (e.g. 55°C), interpolate between 2 curves.



X Switching frequency

Recommended replacement(s)

ATV61E5D22N4 may be replaced by any of the following products:

1x

Variable speed drive, Altivar Process ATV600, ATV650, 22 kW, 400...480 V, IP55

ATV650D22N4E

1x

Variable speed drive, Altivar Process ATV600, ATV650, 30kW/40 hp, 380...480 V, IP55, disconnect switch

ATV650D30N4E