

ATV71HC16N4

variable speed drive ATV71 - 160KW 250HP -
480V - EMC filter

Main

Range of product	Altivar 71
Product or component type	Variable speed drive
Product specific application	Complex, high-power machines
Assembly style	With heat sink
Component name	ATV71
Variant	Reinforced version
EMC filter	Integrated
Network number of phases	3 phases
Power supply voltage	380...480 V (- 15...10 %)
Motor power kW	160 kW at 380...480 V 3 phases
Motor power hp	250 hp at 380...480 V 3 phases
Line current	233 A for 480 V 3 phases 160 kW / 250 hp 289 A for 380 V 3 phases 160 kW / 250 hp
Apparent power	190.2 kVA at 380 V 3 phases 160 kW / 250 hp
Prospective line Isc	≤ 50 kA , 3 phases
Nominal output current	314 A at 2.5 kHz 380 V 3 phases 160 kW / 250 hp 314 A at 2.5 kHz 460 V 3 phases 160 kW / 250 hp
Maximum transient current	471 A for 60 s 3 phases 160 kW / 250 hp 518 A for 2 s 3 phases 160 kW / 250 hp
Speed drive output frequency	0...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	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...5 %)
Power supply frequency limits	47.5...63 Hz
Speed range	1...100 for asynchronous motor in open-loop mode, without speed feedback 1...1000 for asynchronous motor in closed-loop mode with encoder feedback 1...50 for synchronous motor in open-loop mode, without speed 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

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Braking torque	30 % without braking resistor < 150 % with braking or hoist 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 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 mm ² / AWG 14 L1/R, L2/S, L3/T, U/T1, V/T2, W/T3 terminal 2 x 150 mm ² PA, PB terminal 120 mm ² PC/-, PO, PA/+ terminal 2 x 150 mm ²
Tightening torque	AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR 0.6 N.m L1/R, L2/S, L3/T, U/T1, V/T2, W/T3 41 N.m / 360 lb.in PA, PB 24 N.m / 212 lb.in PC/-, PO, PA/+ 41 N.m / 360 lb.in
Supply	Internal supply , 24 V DC , voltage limits 21...27 V , ≤ 200 mA for overload and short-circuit protection Internal supply for reference potentiometer (1 to 10 kOhm) , 10.5 V DC +/- 5 % , ≤ 10 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
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	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) <= 100 ms in STO (Safe Torque Off)
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 voltage 0...10 V DC , impedance 470 Ohm , resolution 10 bits AO1 software-configurable current 0...20 mA , impedance 500 Ohm , resolution 10 bits AO1 software-configurable logic output 10 V ≤ 20 mA
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 , impedance 1500 Ohm PWR safety input 24 V DC , impedance 1500 Ohm

Discrete input logic	LI1...LI5 negative logic (sink) , > 16 V (state 0), < 10 V (state 0) LI1...LI5 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) LI6 (if configured as logic input) positive logic (source) , < 5 V (state 0), > 11 V (state 0) PWR , < 2 V (state 0), > 17 V (state 0)
Acceleration and deceleration ramps	S, U or customized Automatic adaptation of ramp if braking capacity exceeded, by using resistor Linear adjustable separately from 0.01 to 9000 s
Braking to standstill	By DC injection
Protection type	Drive overheating protection Drive thermal protection Drive short-circuit between motor phases Drive input phase breaks Drive overcurrent between output phases and earth Drive overvoltages on the DC bus Drive break on the control circuit Drive against exceeding limit speed Drive line supply undervoltage Drive line supply overvoltage Drive against input phase loss Motor thermal protection Motor motor phase break Motor power removal
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
Type of connector	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...127 for CANopen 1...247 for Modbus
Method of access	Slave for CANopen
Marking	CE
Operating position	Vertical +/- 10 degree
Product weight	110 kg
Option card	CC-Link communication card DeviceNet communication card Ethernet/IP communication card Fipio communication card Interbus-S communication card Modbus/Uni-Telway communication card Modbus Plus communication card Modbus TCP communication card Profibus DP communication card Profibus DP V1 communication card Interface card for encoder I/O extension card Controller inside programmable card Overhead crane card

Environment

Noise level	66 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 μ s - 8/20 μ s surge immunity test conforming to IEC 61000-4-5 level 3 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
Standards	EN/IEC 61800-3 EN/IEC 61800-5-1 EN 55011 class A group 2 EN 61800-3 environments 1 category C3 EN 61800-3 environments 2 category C3 IEC 60721-3-3 class 3C2 UL Type 1
Product certifications	C-Tick CSA GOST NOM 117 UL
Pollution degree	2 conforming to EN/IEC 61800-5-1 3 conforming to UL 840
IP degree of protection	IP00 conforming to EN/IEC 60529 IP00 conforming to EN/IEC 61800-5-1 IP30 on side parts conforming to EN/IEC 61800-5-1 IP30 on the front panel conforming to EN/IEC 60529 IP30 on the front panel conforming to EN/IEC 61800-5-1 IP30 on side parts conforming to EN/IEC 60529 IP41 on upper part conforming to EN/IEC 61800-5-1 IP41 on upper part conforming to EN/IEC 60529 IP54 on lower part conforming to EN/IEC 61800-5-1 IP54 on lower part conforming to EN/IEC 60529
Vibration resistance	0.6 gn (f = 10...200 Hz) conforming to EN/IEC 60068-2-6 1.5 mm peak to peak (f = 3...10 Hz) conforming to EN/IEC 60068-2-6
Shock resistance	4 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...3000 m with current derating 1 % per 100 m \leq 1000 m without derating
RoHS EUR conformity date	4Q2009
RoHS EUR status	Will be compliant