

Schneider Series Service Manual

ATV71HC16N4

1. Description

The Schneider Electric ATV71HC16N4 is a robust variable speed drive engineered for high-performance applications. It accommodates a motor power rating of 160 kW and supports output voltages in the range of 380 to 480 volts, making it suitable for various industrial motor control needs.

2. Specifications

Specification	Value
Manufacturer	Schneider Electric
Product	Type Variable speed drive
Product	Line Altivar 71
Part	Number ATV71HC16N4
EAN	3389119201063
Weight	396.00 lbs (179.62 kg)
Motor	Power 160 kW
Output	Voltage 380 to 480 Volts
Power	Supply Voltage 380 to 480 Volts
EMC	Filter Integrated
Heat	Sink Yes
Apparent	Power 190.2 kVA
Output	Current 314 Amps
Output	Frequency 0.1 to 500 Hz
Switching	Frequency 2.5 kHz
Analog	Input 2
Analog	Output 1
Discrete	Inputs 7
CE	Marking Yes

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Technical specifications for ATV71HC16N4

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Power Supply Voltage 380 to 480 Volts

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Heat Sink Yes

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Output Frequency 0.1 to 500 Hz

Switching Frequency 2.5 kHz

Analog Input 2

Analog Output 1

Discrete Inputs 7

CE Marking Yes

Description

The part ATV71HC16N4 from Schneider Electric belongs to the Altivar 71 series and is classified as a variable speed drive. It's designed to manage motors effectively, delivering a power rating of 160 kW. This drive functions within an output voltage specification of 380 to 480 volts, ensuring compatibility with a wide range of industrial systems. The power supply voltage aligns with the output rating, supporting seamless integration into existing setups.

The drive is rated for an apparent power of 190.2 kVA, capable of handling severe loading conditions. An output current capability of 314 Amps allows it to control high-power motors efficiently. Operating frequencies range wide from 0.1 to 500 Hz, making the product versatile for various applications. Additionally, the switching frequency of 2.5 kHz facilitates high-resolution speed control, enabling precise motor management.

This model also supports multiple input/output options. It features two analog inputs and one analog output, allowing for flexible interfacing with other equipment. Additionally, the unit provides seven discrete inputs, enhancing its functionality with external devices. The design includes an integrated EMC filter, improving electromagnetic compatibility for cleaner operation.

A heat sink is incorporated to manage thermal performance effectively, especially during high-load operations. Despite its substantial capabilities, the ATV71HC16N4 weighs 163 kg. It also carries the CE marking, verifying compliance with European safety standards. Overall, this drive is built for durability and high performance, making it suitable for advanced industrial applications.

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

160 kW, 3 phase 380...480 V

Maximum Horse Power Rating

250 hp, 3 phase 380...480 V

Maximum motor cable length

328.08 ft (100 m) shielded cable

656.2 ft (200 m) unshielded cable

power supply voltage

380...480 V - 15...10 %

Phase

3 phase

Line current

233 A 480 V 3 phase 160 kW / 250 hp

289 A 380 V 3 phase 160 kW / 250 hp

EMC filter

Integrated

Assembly style

With heat sink

Variant

Reinforced version

Apparent power

190.2 kVA 380 V 3 phase 160 kW / 250 hp

Prospective line I_{sc}

50 kA 3 phase

Nominal output current

314 A 2.5 kHz 380 V 3 phase 160 kW / 250 hp

314 A 2.5 kHz 460 V 3 phase 160 kW / 250 hp

Maximum transient current

471 A 60 s 3 phase 160 kW / 250 hp

518 A 2 s 3 phase 160 kW / 250 hp

Output frequency

0.1...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

Voltage/frequency ratio (2 or 5 points)

ENA (Energy adaptation) system for unbalanced loads

Sensorless flux vector control (SFVC) (voltage or current vector)

Flux vector control (FVC) with sensor (current vector)

Type of polarization

No impedance 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 asynchronous motor in open-loop mode, without speed feedback

1...1000 asynchronous motor in closed-loop mode with encoder feedback

1...50 synchronous motor in open-loop mode, without speed feedback

Speed accuracy

+/- 0.01 % of nominal speed in closed-loop mode with encoder feedback 0.2 T_n to T_n

+/- 10 % of nominal slip without speed feedback 0.2 T_n to T_n

Torque accuracy

+/- 15 % in open-loop mode, without speed feedback

+/- 5 % in closed-loop mode with encoder feedback

Transient overtorque

170 % +/- 10 % 60 s every 10 minutes

220 % +/- 10 % 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) for drive voltage

Output voltage

$\leq$ power supply voltage

Insulation

Electrical between power and control

type of cable for mounting in an enclosure

With a NEMA Type1 kit 3 UL 508 cable 104 °F (40 °C), copper 75 °C / PVC

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

Electrical connection

Terminal 2.5 mm², AWG 14 AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR)

Terminal 2 x 150 mm² PC/-, PO, PA/+))

Terminal 120 mm² PA, PB)

Terminal 2 x 150 mm² L1/R, L2/S, L3/T, U/T1, V/T2, W/T3)

Tightening torque

5.3 lbf.in (0.6 N.m) AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR)

362.9 lbf.in (41 N.m), 360 lb.in PC/-, PO, PA/+))

212.4 lbf.in (24 N.m), 212 lb.in PA, PB)

362.9 lbf.in (41 N.m), 360 lb.in L1/R, L2/S, L3/T, U/T1, V/T2, W/T3)

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

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

Response time

$\leq$ 100 ms in STO (Safe Torque Off)

AO1 2 ms +/- 0.5 ms analog

R1A, R1B, R1C 7 ms +/- 0.5 ms discrete

R2A, R2B 7 ms +/- 0.5 ms discrete

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

+/- 0.15 % of maximum value AI1-/AI1+, AI2)

+/- 0.2 % AO1)

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), $> 16 \text{ V}$, $< 10 \text{ V}$

Positive logic (source) LI1...LI5), $< 5 \text{ V}$, $> 11 \text{ V}$

Negative logic (sink) LI6)if configured as logic input, $> 16 \text{ V}$, $< 10 \text{ V}$

Positive logic (source) LI6)if configured as logic input, $< 5 \text{ V}$, $> 11 \text{ V}$

Acceleration and deceleration ramps

Linear adjustable separately from 0.01 to 9000 s

S, U or customized

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

Short-circuit between motor phases drive

Thermal protection drive

Motor phase break motor

Power removal motor

Thermal protection motor

Insulation resistance

$> 1 \text{ mOhm}$ 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

Male SUB-D 9 on 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

46.9 in (1190 mm)

Depth

14.8 in (377 mm)

Width

17.3 in (440 mm)

Net Weight

359.4 lb(US) (163 kg)

Functionality

Full

Specific application

Other applications

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

Interface card for encoder

Communication card Modbus Plus

Communication card Modbus TCP

Communication card Modbus/Uni-Telway

Overhead crane card

Communication card Profibus DP

Communication card Profibus DP V1

Environment

Noise level

66 dB 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 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

IEC 60721-3-3 class 3C2

EN/IEC 61800-3

UL Type 1

EN/IEC 61800-5-1

EN 61800-3 environments 2 category C3

EN 55011 class A group 2

EN 61800-3 environments 1 category C3

Product Certifications

GOST

CSA

NOM 117

UL

C-tick

Pollution degree

2 EN/IEC 61800-5-1

3 UL 840

IP degree of protection

IP20

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 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 derating)

Ambient Air Temperature for Storage

-13...158 °F (-25...70 °C)

Operating altitude

<= 3280.84 ft (1000 m) without derating

3280.84...9842.52 ft (1000...3000 m) with current derating 1 % per 100 m

Ordering and shipping details

Category

US1CP4C22133

Discount Schedule

CP4C

GTIN

3389119201063

Returnability

Yes

Country of origin

IN

Packing Units

Unit Type of Package 1

PCE

Nbr. of units in pkg.

1

Package 1 Height

21.00 in (53.34 cm)

Package 1 Width

19.20 in (48.77 cm)

Package 1 Length

50.50 in (128.27 cm)

Package weight(Lbs)

395.99 lb(US) (179.62 kg)