Schneider □□□ Series Service Manual

ATV71HC25N4

1. Description

The ATV71HC25N4 from Schneider Electric is a variable speed drive that excels in managing motor speed and torque under varying conditions. With a continuous power rating of 220 kW and a maximum rating of 250 kW, this drive operates efficiently within a 3-phase voltage input of 380 to 480 VAC.

2. Specifications

Specification	Value
Manufacturer	**Schneider Electric**
Product	**Type Variable Speed Drive (VSD)**
Product	**Line Altivar 71**
Part	**Number ATV71HC25N4**
EAN	**3389119201087**
Weight	**442.00 lbs (200.49 kg)**
Power	**Rating 220 / 250 kW (continuous/max)**
Input	**Voltage 3-phase, 380–480 VAC**
Enclosure	**Rating IP20 (Open Type)**
Horsepower	**Equivalent ~400 HP**
Frequency	**50/60 Hz**
Control	**Method Sensorless Vector, Vector, V/f, and Synchronous**
EMC	**Filter Integrated EMC Filter**
Display	**Interface Graphic Terminal (HMI)**
Cooling	**Method Forced Air Cooling**
Output	**Frequency 0.1 – 599 Hz**
Motor	**Compatibility Asynchronous & Synchronous Motors**

3. Product Information

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Technical specifications for ATV71HC25N4

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Product Type Variable Speed Drive (VSD)

Product Line Altivar 71

Part Number ATV71HC25N4

EAN 3389119201087

Weight 442.00 lbs (200.49 kg)

Power Rating 220 / 250 kW (continuous/max)

Input Voltage 3-phase, 380–480 VAC

Enclosure Rating IP20 (Open Type)

Horsepower Equivalent ~400 HP

Frequency 50/60 Hz

Control Method Sensorless Vector, Vector, V/f, and Synchronous

EMC Filter Integrated EMC Filter

Display Interface Graphic Terminal (HMI)

Cooling Method Forced Air Cooling

Output Frequency 0.1 – 599 Hz

Motor Compatibility Asynchronous & Synchronous Motors

Description

The ATV71HC25N4 variable speed drive by Schneider Electric is designed for robust motor control in demanding environments. With a substantial power rating of 220 kW for continuous operation and up to 250 kW as the maximum output, it is suitable for high-performance machinery. This unit works with a 3-phase input voltage ranging from 380 to 480 VAC, which allows for versatility in various industrial settings.

In terms of design, the drive carries an IP20 rating, indicating it is an open-type enclosure where operating conditions do not expose it to excessive dust or moisture. Its weight is recorded at 200.49 kg, making it a considerable unit to be integrated into automated systems. The horse power equivalent stands at approximately 400 HP, matching the demand for substantial mechanical output.

The ATV71HC25N4 operates effectively across a frequency range of 50/60 Hz. The control methods it offers include Sensorless Vector, Vector, V/f, and Synchronous, providing a range of options to suit diverse application needs. Its output frequency is adjustable, spanning from 0.1 Hz to 599 Hz, allowing precise control of motor speed.

An integrated EMC filter enhances the drive's capacity for electromagnetic compatibility, reducing interference in sensitive environments. Furthermore, it includes a graphic terminal (HMI) display interface for straightforward interaction and monitoring of drive functions. This model employs forced air cooling to maintain optimal performance during operation, thereby ensuring it performs reliably, even in demanding 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

220 kW, 3 phase 380...480 V

250 kW, 3 phase 380...480 V

Maximum Horse Power Rating

350 hp, 3 phase 380...480 V

400 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

320 A 480 V 3 phase 220 kW / 350 hp

357 A 480 V 3 phase 250 kW / 400 hp

396 A 380 V 3 phase 220 kW / 350 hp

444 A 380 V 3 phase 250 kW / 400 hp

EMC filter

Integrated

Assembly style

With heat sink

Variant

Reinforced version

Apparent power

260.6 kVA 380 V 3 phase 220 kW / 350 hp

292.2 kVA 380 V 3 phase 250 kW / 400 hp

Prospective line Isc

50 kA 3 phase

Nominal output current

427 A 2.5 kHz 380 V 3 phase 220 kW / 350 hp

427 A 2.5 kHz 460 V 3 phase 220 kW / 350 hp

481 A 2.5 kHz 380 V 3 phase 250 kW / 400 hp

481 A 2.5 kHz 460 V 3 phase 250 kW / 400 hp

Maximum transient current

640 A 60 s 3 phase 220 kW / 350 hp

704 A 2 s 3 phase 220 kW / 350 hp

721 A 60 s 3 phase 250 kW / 400 hp

793 A 2 s 3 phase 250 kW / 400 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

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

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

Voltage/frequency ratio (2 or 5 points)

ENA (Energy adaptation) system for unbalanced loads

Type of polarization

No impedance Modbus

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

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 Tn to Tn

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

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

Not available in voltage/frequency ratio (2 or 5 points)

Automatic whatever the load

Adjustable

Suppressable

diagnostic

1 LED (red) for 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 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 4 x 185 mm² L1/R, L2/S, L3/T, U/T1, V/T2, W/T3)

Terminal 4 x 185 mm² PC/-, PA/+)

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 L1/R, L2/S, L3/T, U/T1, V/T2, W/T3)

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

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

<= 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 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

Acceleration and deceleration ramps

Automatic adaptation of ramp if braking capacity exceeded, by using resistor

Linear adjustable separately from 0.01 to 9000 s

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

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

CANopen

Modbus

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

23.4 in (595 mm)

Net Weight

456.4 lb(US) (207 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

77 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 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

EN/IEC 61800-5-1

UL Type 1

IEC 60721-3-3 class 3C2

EN 61800-3 environments 1 category C3

EN/IEC 61800-3

EN 55011 class A group 2

EN 61800-3 environments 2 category C3

Product Certifications

NOM 117

GOST

CSA

C-tick

UL

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

3389119201087

Returnability

No