

Schneider Series Service Manual

ATV71HD45N4

1. Description

The Schneider Electric ATV71HD45N4 is a variable-speed drive in the Altivar 71 series. Designed for 3-phase applications, it supports motor power ratings of 45 kW (60 HP) and operates efficiently in various environments with an allowed temperature range of -10 to 50 °C.

2. Specifications

Specification	Value
Manufacturer	Schneider Electric
Product	Type Variable Speed Drive
Product	Line Altivar 71
Part	Number ATV71HD45N4
EAN	3389118069534
Weight	100.00 lbs (45.36 kg)
Phase	3-phase
Operating	Temperature -10 to 50 °C
Frequency	Range 0.1 to 500 Hz
Motor	Power 45 kW (60 HP)
Input	Voltage 380-480 V, -15/+10 %
IP	Rating IP20
Current	Range 84-104 A
Assembly	Style With heat sink
Nominal	Switching Frequency 2.5 kHz (standard)
EMC	Filter Integrated

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Technical specifications for ATV71HD45N4

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Product Type Variable Speed Drive

Product Line Altivar 71

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EAN 3389118069534

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IP Rating IP20

Current Range 84-104 A

Assembly Style With heat sink

Nominal Switching Frequency 2.5 kHz (standard)

EMC Filter Integrated

Description

The Schneider Electric ATV71HD45N4 variable-speed drive is designed for 3-phase motor control, providing versatility and performance. This unit is rated for a motor power of 45 kW, equivalent to 60 HP, making it suitable for diverse industrial applications. Its operational temperature can range from -10 to 50 °C, allowing reliable performance in challenging environments.

This drive's input voltage range is 380 to 480 V, with a tolerance of -15% to +10%. Its frequency range extends from 0.1 Hz to 500 Hz, accommodating various operational needs. The current range for this drive is noted between 84 and 104 A, ensuring it can adequately handle substantial loads.

Constructed to meet an IP20 rating, the ATV71HD45N4 is suitable for non-harsh environments. Its weight is approximately 19.96 kg, which makes it manageable during installation. Additionally, the unit incorporates an EMC filter to minimize electromagnetic interference, promoting improved functionality. The variable speed drive is assembled with a heat sink for efficient heat dissipation. Furthermore, it operates at a nominal switching frequency of 2.5 kHz, providing standard application performance.

ATV71

Motor power kW

45 kW, 3 phase 380...480 V

Maximum Horse Power Rating

60 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

104 A 380 V 3 phase 45 kW / 60 hp

85 A 480 V 3 phase 45 kW / 60 hp

EMC filter

Integrated

Assembly style

With heat sink

Apparent power

68.5 kVA 380 V 3 phase 45 kW / 60 hp

Prospective line Isc

22 kA 3 phase

Nominal output current

77 A 2.5 kHz 460 V 3 phase 45 kW / 60 hp

94 A 2.5 kHz 380 V 3 phase 45 kW / 60 hp

Maximum transient current

141 A 60 s 3 phase 45 kW / 60 hp

155 A 2 s 3 phase 45 kW / 60 hp

Output frequency

0.1...500 Hz

Nominal switching frequency

2.5 kHz

Switching frequency

1...16 kHz adjustable

2.5...16 kHz with derating factor

Asynchronous motor control profile

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

Voltage/frequency ratio (2 or 5 points)

ENA (Energy adaptation) system for unbalanced loads

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

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

Automatic whatever the load

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

Suppressable

Adjustable

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 150 mm² L1/R, L2/S, L3/T, U/T1, V/T2, W/T3, PC/-, PO, PA/+, PA, PB)

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, 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

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
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
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
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
24.8 in (630 mm)
Depth
11.4 in (290 mm)

Width

12.6 in (320 mm)

Net Weight

97.003 lb(US) (44 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

63.7 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

UL Type 1

EN 61800-3 environments 1 category C3

IEC 60721-3-3 class 3S2

EN 61800-3 environments 2 category C3

IEC 60721-3-3 class 3C1

EN 55011 class A group 2

EN/IEC 61800-3

EN/IEC 61800-5-1

Product Certifications

NOM 117

CSA

UL

C-tick

GOST

Pollution degree

2 EN/IEC 61800-5-1

3 UL 840

IP degree of protection

IP20

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 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
US1CP4C22132

Discount Schedule
CP4C

GTIN
3389118069534

Returnability
No

Packing Units
Unit Type of Package 1
PCE
Nbr. of units in pkg.
1

Package 1 Height
14.2 in (36.0 cm)

Package 1 Width
19.7 in (50.0 cm)

Package 1 Length
30.3 in (77.0 cm)

Package weight(Lbs)
75.0 lb(US) (34.0 kg)