

Schneider Series Service Manual

ATV71HD90N4

1. Description

The ATV71HD90N4, part of Schneider Electric's Altivar 71 series, is a robust variable speed drive designed for motor control applications. It delivers a motor power of up to 90 kW and is capable of operating within a voltage range of 380-480V AC.

2. Specifications

Specification	Value
Manufacturer	Schneider Electric
Product	Line Altivar 71
Part	Number ATV71HD90N4
EAN	3389119201032
Weight	236.00 lbs (107.05 kg)
Product	Variable Speed Drive
Motor	Power 90 kW
Maximum	Motor Cable Lengths 100m (shielded cable) and 200m (unshielded cable)
Power	Supply Voltage 380-480V AC
Phase	3-Phase
EMC	Filter Included
Synchronous	Servo Motors Supported
Asynchronous	Servo Motors Supported
Operating	Temperature -10 to 50 degrees Celsius
Storage	Temperature -25 to 70 degrees Celsius
IP	Rating IP20
Modbus	Communication Supported
CANopen	Communication Supported

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Technical specifications for ATV71HD90N4

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Operating Temperature -10 to 50 degrees Celsius

Storage Temperature -25 to 70 degrees Celsius

IP Rating IP20

Modbus Communication Supported

CANopen Communication Supported

Description

The ATV71HD90N4 model is a variable speed drive manufactured by Schneider Electric, falling within the Altivar 71 product line. This drive supports a motor power capacity of 90 kW, making it suitable for demanding applications.

It operates on a three-phase power supply with a voltage rating between 380 and 480 volts AC. This model provides flexibility in wiring, accommodating motor cable lengths of 100 meters for shielded types and 200 meters for unshielded types. It demonstrates compatibility with both synchronous and asynchronous servo motors, offering broad usability across various motor types.

For operational reliability, the drive includes an EMC filter, mitigating electromagnetic interference that can affect performance. The device functions optimally within a temperature range of -10 to 50 degrees Celsius, ensuring stable operation in industrial settings. Its storage temperature capability expands from -25 to 70 degrees Celsius, indicating resilience against temperature fluctuations.

With an IP20 rating, the ATV71HD90N4 is designed for indoor use, providing adequate protection against solid objects while allowing easy access for maintenance. Communication options are versatile, supporting both Modbus and CANopen protocols for effective integration into automation systems.

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

90 kW, 3 phase 380...480 V

Maximum Horse Power Rating

125 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

134 A 480 V 3 phase 90 kW / 125 hp

166 A 380 V 3 phase 90 kW / 125 hp

EMC filter

Integrated

Assembly style

With heat sink

Variant

Reinforced version

Apparent power

109.3 kVA 380 V 3 phase 90 kW / 125 hp

Prospective line Isc

35 kA 3 phase

Nominal output current

179 A 2.5 kHz 380 V 3 phase 90 kW / 125 hp

179 A 2.5 kHz 460 V 3 phase 90 kW / 125 hp

Maximum transient current

269 A 60 s 3 phase 90 kW / 125 hp

295 A 2 s 3 phase 90 kW / 125 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)

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

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

ENA (Energy adaptation) system for unbalanced loads

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 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

Suppressable

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

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 100 mm² L1/R, L2/S, L3/T, U/T1, V/T2, W/T3)

Terminal 60 mm² PA, PB)

Terminal 2 x 100 mm² PC/-, PO, PA/+)

Tightening torque

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

212.4 lbf.in (24 N.m), 212 lb.in L1/R, L2/S, L3/T, U/T1, V/T2, W/T3)

106.2 lbf.in (12 N.m), 106 lb.in PA, PB)

362.9 lbf.in (41 N.m), 360 lb.in PC/-, PO, 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), $> 16 \text{ V}$, $< 10 \text{ V}$

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

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

$> 1 \text{ mOhm}$ 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

36.2 in (920 mm)

Depth

14.8 in (377 mm)

Width

12.6 in (320 mm)

Net Weight

220.5 lb(US) (100 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

60.5 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 61800-5-1

EN 55011 class A group 2

IEC 61800-3 environments 2 category C3

IEC 60721-3-3 class 3C2

UL Type 1

IEC 61800-3 environments 1 category C3

IEC 61800-3

Product Certifications

GOST

NOM 117

C-tick

CSA

UL

Pollution degree

2 IEC 61800-5-1

3 UL 840

IP degree of protection

IP20

Vibration resistance

0.6 gn (f= 10...200 Hz) conforming to IEC 60068-2-6

1.5 mm peak to peak (f= 3...10 Hz) conforming to IEC 60068-2-6

Shock resistance

7 gn 11 ms 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

US1000I22000

Discount Schedule

000I

GTIN

3389119201032

Returnability

No

Packing Units

Unit Type of Package 1

PCE

Nbr. of units in pkg.

1

Package 1 Height

20.9 in (53.0 cm)

Package 1 Width

16.1 in (41.0 cm)

Package 1 Length

48.2 in (122.5 cm)

Package weight(Lbs)

169.8 lb(US) (77.0 kg)