

Schneider Series Service Manual

ATV71HD15N4

1. Description

The Schneider Electric ATV71HD15N4 is a variable-speed drive designed for high efficiency. It can handle motor power up to 15 kW (20 hp) and operates at 380 to 408 volts AC.

2. Specifications

Specification	Value
Manufacturer	Schneider Electric
Product	Type Variable Speed Drive
Product	Line Altivar 71
Part	Number ATV71HD15N4
EAN	3389118064652
Weight	20.00 lbs (9.07 kg)
Motor	Power 15 kW (20 hp)
Graphic	Terminal Included
Voltage	Rating 380 - 408 V AC
Heat	Sink Included
Phase	3-phase
Input	Current 48 A at 380 V, 39 A at 480 V
EMC	Filter Integrated
Frequency	50/60 Hz
Storage	Temperature -25 to 70°C
Operating	Temperature Typically 0 to 50°C (standard for Altivar 71)

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Technical specifications for ATV71HD15N4

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Description

The Schneider Electric ATV71HD15N4 is classified as a variable-speed drive, capable of delivering a motor power of 15 kW or 20 hp. This drive operates efficiently across a 380 to 408-volt AC voltage range. Designed for a 3-phase connection, it maintains an input current of 48 A when connected to a 380-volt supply and slightly less, at 39 A, when connected to 480 volts.

This model incorporates a graphic terminal to enhance usability and simplify operation and monitoring. Additionally, it comes with a built-in heat sink, ensuring optimal cooling during extended operation. The integrated electromagnetic compatibility (EMC) filter helps reduce electrical noise and enhance performance stability.

This unit's frequency of operation aligns with standard industrial norms, accommodating both 50 Hz and 60 Hz inputs. Operating conditions typically allow for ambient temperatures from 0 to 50 degrees Celsius, making it suitable for various applications. Furthermore, it can withstand storage temperatures from -25 to 70 degrees Celsius without any detrimental effects, solidifying its reliability in diverse environmental settings. With a weight of 15.88 kg, this drive is designed to deliver robust performance while remaining manageable in various installation scenarios.

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

15 kW, 3 phase 380...480 V

Maximum Horse Power Rating

20 hp, 3 phase 380...480 V

Maximum motor cable length

164.04 ft (50 m) shielded cable

328.08 ft (100 m) unshielded cable

power supply voltage

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

Phase

3 phase

Line current

39 A 480 V 3 phase 15 kW / 20 hp

48 A 380 V 3 phase 15 kW / 20 hp

EMC filter

Integrated

Assembly style

With heat sink

Apparent power

31.6 kVA 380 V 3 phase 15 kW / 20 hp

Prospective line Isc

22 kA 3 phase

Nominal output current

27 A 4 kHz 460 V 3 phase 15 kW / 20 hp
 33 A 4 kHz 380 V 3 phase 15 kW / 20 hp
 Maximum transient current
 49.5 A 60 s 3 phase 15 kW / 20 hp
 54.5 A 2 s 3 phase 15 kW / 20 hp
 Output frequency
 0.1...599 Hz
 Nominal switching frequency
 4 kHz
 Switching frequency
 1...16 kHz adjustable
 4...16 kHz with derating factor
 Asynchronous motor control profile
 ENA (Energy adaptation) system for unbalanced loads
 Sensorless flux vector control (SFVC) (voltage or current vector)
 Flux vector control (FVC) with sensor (current vector)
 Voltage/frequency ratio (2 or 5 points)
 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
 Adjustable
 Not available in voltage/frequency ratio (2 or 5 points)
 Automatic whatever the load
 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 35 mm², AWG 2 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)

47.8 lbf.in (5.4 N.m), 47.7 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
 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
 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

15.7 in (400 mm)

Depth

8.4 in (213 mm)

Width

9.06 in (230 mm)

Net Weight

28.7 lb(US) (13 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

60.2 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 61800-3 environments 2 category C3

IEC 60721-3-3 class 3S2

EN 55011 class A group 2

IEC 60721-3-3 class 3C1

IEC 61800-3 environments 1 category C3

UL Type 1

IEC 61800-5-1

IEC 61800-3

Product Certifications

CSA

UL

C-tick

NOM 117

GOST

Pollution degree

2 IEC 61800-5-1

IP degree of protection

IP20

Vibration resistance

1 gn (f= 13...200 Hz) conforming to IEC 60068-2-6

1.5 mm peak to peak (f= 3...13 Hz) conforming to IEC 60068-2-6

Shock resistance

15 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

US1CP4C22131

Discount Schedule

CP4C

GTIN

3389118064652

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

23.6 in (60.0 cm)

Package 1 Length

16.1 in (41.0 cm)

Package weight(Lbs)

34.079 lb(US) (15.458 kg)