Schneider □□□ Series Service Manual

ATV930D37N4

1. Description

ATV930D37N4

3. Product Information

ATV930D37N4

Variable speed drive, Altivar Process ATV900,

ATV930, 37 kW, 400/480 V, with braking unit,

IP21

Main

Range of product Altivar Process ATV900

Device application Industrial application

Product or component type Variable speed drive

Product destination Asynchronous motors

Synchronous motors

Product specific application Process for industrial

Variant With braking chopper

Standard version

Network number of phases 3 phases

Mounting mode Wall mount

Communication port protocol Modbus TCP

Modbus serial

EtherNet/IP

[Us] rated supply voltage 380...480 V - 15...10 %

Motor power kW 37.0 KW for normal duty

30.0 KW for heavy duty

Motor power hp 50.0 Hp for normal duty

40.0 Hp for heavy duty

Continuous output current 74.5 A at 4 kHz for normal duty

61.5 A at 4 kHz for heavy duty

EMC filter Integrated

With EMC plate option

IP degree of protection IP21

Degree of protection UL type 1

Option card Slot A: communication module for Profibus DP V1

Slot A: communication module for PROFINET

Slot A: communication module for DeviceNet

Slot A: communication module for EtherCAT

Slot A: communication module for CANopen daisy chain RJ45

Slot A: communication module for CANopen SUB-D 9

Slot A: communication module for CANopen screw terminals

Slot A/slot B/slot C: digital and analog I/O extension module

Slot A/slot B/slot C: output relay extension module

Slot B: 5/12 V digital encoder interface module

Slot B: analog encoder interface module

Slot B: resolver encoder interface module

communication module for Ethernet Powerlink

Discrete input logic 16 preset speeds

Asynchronous motor control profile Variable torque standard

Optimized torque mode

Constant torque standard

Synchronous motor control profile Permanent magnet motor

Synchronous reluctance motor

Maximum output frequency 599 Hz

Switching frequency 2...16 kHz adjustable

4...16 kHz with derating factor

Nominal switching frequency 4 kHz

Line current 66.2 A at 380 V (normal duty)

54.8 A at 380 V (heavy duty)

57.3 A at 480 V (normal duty)

48.3 A at 480 V (heavy duty)

Apparent power 47.6 KVA at 480 V (normal duty)

40.2 KVA at 480 V (heavy duty)

Maximum transient current 89.4 A during 60 s (normal duty)

92.3 A during 60 s (heavy duty)

Network frequency 50...60 Hz

Prospective line Isc 50 KA

Complementary

Discrete input number 10

Discrete input type DI1...DI8 programmable, 24 V DC (<= 30 V), impedance: 3.5 kOhm

DI7, DI8 programmable as pulse input: 0...30 kHz, 24 V DC (<= 30 V)

STOA, STOB safe torque off, 24 V DC (<= 30 V), impedance: > 2.2 kOhm

Discrete output number 2

Discrete output type Logic output DQ+ 0...1 kHz <= 30 V DC 100 mA

Programmable as pulse output DQ+ 0...30 kHz <= 30 V DC 20 mA

Logic output DQ- 0...1 kHz <= 30 V DC 100 mA

Analogue input number 3

Analogue input type AI1, AI2, AI3 software-configurable voltage: 0...10 V DC, impedance: 30 kOhm, resolution 12 bits

AI1, AI2, AI3 software-configurable current: 0...20 mA/4...20 mA, impedance: 250 Ohm, resolution 12 bits

Analogue output number 2

Analogue output type Software-configurable voltage AQ1, AQ2: 0...10 V DC impedance 470 Ohm, resolution 10 bits

Software-configurable current AQ1, AQ2: 0...20 mA impedance 500 Ohm, resolution 10 bits

Relay output number 3

Relay output type Configurable relay logic R1: fault relay NO/NC electrical durability 100000 cycles

Configurable relay logic R2: sequence relay NO electrical durability 1000000 cycles

Configurable relay logic R3: sequence relay NO electrical durability 1000000 cycles

Maximum switching current Relay output R1 on resistive load, cos phi = 1: 3 A at 250 V AC

Relay output R1 on resistive load, cos phi = 1: 3 A at 30 V DC

Relay output R1 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 250 V AC

Relay output R1 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 30 V DC

Relay output R2, R3 on resistive load, cos phi = 1: 5 A at 250 V AC

Relay output R2, R3 on resistive load, cos phi = 1: 5 A at 30 V DC

Relay output R2, R3 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 250 V AC

Relay output R2, R3 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 30 V DC

Minimum switching current Relay output R1, R2, R3: 5 mA at 24 V DC

Physical interface Ethernet

2-wire RS 485

Connector type 2 RJ45

1 RJ45

Method of access Slave Modbus TCP

Transmission rate 10, 100 Mbits

4.8 kbps

9600 bit/s

19200 bit/s

Transmission frame RTU

Number of addresses 1...247

Data format 8 bits, configurable odd, even or no parity

Type of polarization No impedance

4 quadrant operation possible True

Acceleration and deceleration ramps Linear adjustable separately from 0.01...9999 s

Motor slip compensation Can be suppressed

Adjustable

Automatic whatever the load

Not available in permanent magnet motor law

Braking to standstill By DC injection

Brake chopper integrated True

Maximum input current 66.2 A

Maximum output voltage 480.0 V

Relative symmetric network frequency tolerance 5 %

Base load current at high overload 61.5 A

Base load current at low overload 74.5 A

Power dissipation in W Natural convection: 106 W at 380 V, switching frequency 4 kHz

Forced convection: 796 W at 380 V, switching frequency 4 kHz

With safety function Safely Limited Speed (SLS) True

With safety function Safe brake management (SBC/SBT)

True

With safety function Safe Operating Stop (SOS) False

With safety function Safe Position (SP) False

With safety function Safe programmable logic False

With safety function Safe Speed Monitor (SSM) False

With safety function Safe Stop 1 (SS1) True

With sft fct Safe Stop 2 (SS2) False

With safety function Safe torque off (STO) True

With safety function Safely Limited Position (SLP) False

With safety function Safe Direction (SDI) False

Protection type Thermal protection: motor

Safe torque off: motor

Motor phase break: motor

Thermal protection: drive

Safe torque off: drive

Overheating: drive

Overcurrent between output phases and earth: drive

Overload of output voltage: drive

Short-circuit protection: drive

Motor phase break: drive

Overvoltages on the DC bus: drive

Line supply overvoltage: drive

Line supply undervoltage: drive

Line supply phase loss: drive

Overspeed: drive

Break on the control circuit: drive

Quantity per set 1

Width 226 Mm

Height 673 Mm

Depth 271 Mm

Product weight 28.2 Kg

Electrical connection Control: screw terminal 0.5...1.5 mm²/AWG 20...AWG 16

DC bus: screw terminal 25...50 mm²/AWG 4...AWG 1

Line side: screw terminal 35...50 mm²/AWG 3...AWG 1

Motor: screw terminal 35...50 mm²/AWG 3...AWG 1

Transmission rate 10/100 Mbit/s for Ethernet IP/Modbus TCP

4.8, 9.6, 19.2, 38.4 kbit/s for Modbus serial

Exchange mode Half duplex, full duplex, autonegotiation Ethernet IP/Modbus TCP

Data format 8 bits, configurable odd, even or no parity for Modbus serial

Type of polarization No impedance for Modbus serial

Number of addresses 1...247 for Modbus serial

Supply External supply for digital inputs: 24 V DC (19...30 V), <1.25 mA, protection-

type: overload and short-circuit protection

Internal supply for reference potentiometer (1 to 10 kOhm): 10.5 V DC +/- 5 %, <10 mA, protection type: overload and short-circuit protection

Internal supply for digital inputs and STO: 24 V DC (21...27 V), <200 mA, protection type: overload and short-circuit protection

Local signalling Local diagnostic: 3 LED (mono/dual colour)

Embedded communication status: 5 LED (dual colour)

Communication module status: 2 LED (dual colour)

Presence of voltage: 1 LED (red)

Input compatibility DI1...DI8: discrete input level 1 PLC conforming to EN/IEC 61131-2

DI7, DI8: pulse input level 1 PLC conforming to IEC 65A-68

STOA, STOB: discrete input level 1 PLC conforming to EN/IEC 61131-2

Discrete input logic Positive logic (source) (DI1...DI8), < 5 V (state 0), > 11 V (state 1)

Negative logic (sink) (DI1...DI8), > 16 V (state 0), < 10 V (state 1)

Positive logic (source) (DI7, DI8), < 0.6 V (state 0), > 2.5 V (state 1)

Positive logic (source) (STOA, STOB), < 5 V (state 0), > 11 V (state 1)

Sampling duration 2 Ms +/- 0.5 ms (DI1...DI8) - discrete input

5 Ms +/- 1 ms (DI7, DI8) - pulse input

1 Ms +/- 1 ms (AI1, AI2, AI3) - analog input

5 Ms +/- 1 ms (AQ1, AQ2) - analog output

Accuracy +/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input

+/- 1 % AQ1, AQ2 for a temperature variation 60 °C analog output

Linearity error AI1, AI2, AI3: +/- 0.15 % of maximum value for analog input

AQ1, AQ2: +/- 0.2 % for analog output

Refresh time Relay output (R1, R2, R3): 5 ms (+/- 0.5 ms)

Isolation Between power and control terminals

Environment

Operating altitude <= 1000 m without derating

1000...4800 m with current derating 1 % per 100 m

Operating position Vertical +/- 10 degree

Product certifications TÜV

CSA

UL

Marking CE

Standards UL 508C

EN/IEC 61800-3

EN/IEC 61800-5-1

IEC 61000-3-12

IEC 60721-3

IEC 61508

IEC 13849-1

Maximum THDI <48 % from 80...100 % of load conforming to IEC 61000-3-12

Assembly style Enclosed

Electromagnetic compatibility 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

Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4

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

Environmental class (during operation) Class 3C3 according to IEC 60721-3-3

Class 3S3 according to IEC 60721-3-3

Maximum acceleration under shock impact (during-

operation)

150 m/s² at 11 ms

Maximum acceleration under vibrational-

stress (during operation)

10 m/s² at 13...200 Hz

Maximum deflection under vibratory load (during operation)

1.5 mm at 2...13 Hz

Permitted relative humidity (during operation) Class 3K5 according to EN 60721-3

Volume of cooling air 240 M3/H

Overvoltage category III

Regulation loop Adjustable PID regulator

Insulation resistance > 1 MOhm 500 V DC for 1 minute to earth

Noise level 71.5 DB conforming to 86/188/EEC

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

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

Shock resistance 15 gn for 11 ms conforming to IEC 60068-2-27

Environmental characteristic Chemical pollution resistance class 3C3 conforming to EN/IEC 60721-3-3

Dust pollution resistance class 3S3 conforming to EN/IEC 60721-3-3

Relative humidity 5...95 % without condensation conforming to IEC 60068-2-3

Ambient air temperature for operation -15...50 °C (without derating)

50...60 °C (with derating factor)

Noise level 71.5 DB

Pollution degree 2

Ambient air transport temperature -40...70 °C

Ambient air temperature for storage -40...70 °C

Packing Units

Unit Type of Package 1 PCE

Number of Units in Package 1 1

Package 1 Height 50 Cm

Package 1 Width 34.5 Cm

Package 1 Length 84.5 Cm

Package 1 Weight 22.2 Kg