# **Product datasheet**

Specification





# variable speed drive - ATV930 - 90kW - 400/480V - w/o braking unit - IP21

ATV930D90N4C

#### Main

Wall	
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	Without braking chopper Standard version
Network number of phases	3 phases
Mounting mode	Wall mount
Communication port protocol	EtherNet/IP Modbus serial Modbus TCP
[Us] rated supply voltage	380480 V - 1510 %
Motor power kW	90.0 kW for normal duty 75.0 kW for heavy duty
Continuous output current	173 A at 2.5 kHz for normal duty 145 A at 2.5 kHz for heavy duty
EMC filter	Integrated With EMC plate option
IP degree of protection	IP21
Degree of protection	UL type 1
option module	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 Constant torque standard Optimized torque mode
Synchronous motor control profile	Permanent magnet motor Synchronous reluctance motor
Maximum output frequency	599 Hz

Switching frequency	18 kHz adjustable 2.58 kHz with derating factor
Nominal switching frequency	2.5 kHz
Line current	156.2 A at 380 V (normal duty) 134.3 A at 380 V (heavy duty) 135.8 A at 480 V (normal duty) 118.1 A at 480 V (heavy duty)
Apparent power	112.9 kVA at 480 V (normal duty) 98.2 kVA at 480 V (heavy duty)
Maximum transient current	207.6 A during 60 s (normal duty) 217.5 A during 60 s (heavy duty)
Network frequency	5060 Hz
Prospective line Isc	50 kA

# Complementary

Somplementary		
Discrete input number	10	
Discrete input type	DI1DI8 programmable, 24 V DC (<= 30 V), impedance: 3.5 kOhm DI7, DI8 programmable as pulse input: 030 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+ 01 kHz <= 30 V DC 100 mA  Programmable as pulse output DQ+ 030 kHz <= 30 V DC 20 mA  Logic output DQ- 01 kHz <= 30 V DC 100 mA	
Analogue input number	3	
Analogue input type	Al1, Al2, Al3 software-configurable voltage: 010 V DC, impedance: 30 kOhm, resolution 12 bits Al1, Al2, Al3 software-configurable current: 020 mA/420 mA, impedance: 250 Ohm, resolution 12 bits	
Analogue output number	2	
Analogue output type	Software-configurable voltage AQ1, AQ2: 010 V DC impedance 470 Ohm, resolution 10 bits Software-configurable current AQ1, AQ2: 020 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	1247		
Data format	8 bits, configurable odd, even or no parity		
Type of polarization	No impedance		
4 quadrant operation possible	False		
Acceleration and deceleration ramps	Linear adjustable separately from 0.019999 s		
Motor slip compensation	Not available in permanent magnet motor law Automatic whatever the load Adjustable Can be suppressed		
Braking to standstill	By DC injection		
Brake chopper integrated	False		
Maximum input current	156.2 A		
Maximum output voltage	480.0 V		
Relative symmetric network frequency tolerance	5 %		
Base load current at high overload	145.0 A		
Base load current at low overload	173.0 A		
Power dissipation in W	Natural convection: 196 W at 380 V, switching frequency 2.5 kHz Forced convection: 1585 W at 380 V, switching frequency 2.5 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	290 mm		

Height	922 mm	
Depth	325.5 mm	
Net weight	58.5 kg	
Electrical connection	Control: screw terminal 0.51.5 mm²/AWG 20AWG 16 Line side: screw terminal 120 mm²/AWG 4/0250 kcmil Motor: screw terminal 120 mm²/250 kcmil DC bus: screw terminal 95120 mm²/AWG 3/0250 kcmil	
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	1247 for Modbus serial	
Supply	External supply for digital inputs: 24 V DC (1930 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 (2127 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	DI1DI8: discrete input level 1 PLC conforming to IEC 61131-2 DI7, DI8: pulse input level 1 PLC conforming to IEC 65A-68 STOA, STOB: discrete input level 1 PLC conforming to IEC 61131-2	
Discrete input logic	Positive logic (source) (DI1DI8), < 5 V (state 0), > 11 V (state 1) Negative logic (sink) (DI1DI8), > 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 (DI1DI8) - 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 % Al1, Al2, Al3 for a temperature variation 60 °C analog input +/- 1 % AQ1, AQ2 for a temperature variation 60 °C analog output	
Linearity error	Al1, Al2, Al3: +/- 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 10004800 m with current derating 1 % per 100 m	
Operating position	Vertical +/- 10 degree	
Product certifications	UL TÜV CSA	
Marking	CE	
Standards	UL 508C IEC 61800-3 IEC 61800-5-1 IEC 61000-3-12 IEC 60721-3 IEC 61508 IEC 13849-1	

Maximum THDI	<48 % from 80100 % 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 13200 Hz	
Maximum deflection under vibratory load (during operation)	1.5 mm at 213 Hz	
Permitted relative humidity (during operation)	Class 3K5 according to EN 60721-3	
Volume of cooling air	295 m3/h	
Overvoltage category	III	
Regulation loop	Adjustable PID regulator	
Insulation resistance	> 1 MOhm 500 V DC for 1 minute to earth	
Noise level	68.3 dB conforming to 86/188/EEC	
Vibration resistance	1.5 mm peak to peak (f= 213 Hz) conforming to IEC 60068-2-6 1 gn (f= 13200 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 IEC 60721-3-3  Dust pollution resistance class 3S3 conforming to IEC 60721-3-3	
Relative humidity	595 % without condensation conforming to IEC 60068-2-3	
Ambient air temperature for operation	-1550 °C (without derating) 5060 °C (with derating factor)	
Noise level	68.3 dB	
Pollution degree	2	
Ambient air transport temperature	-4070 °C	
Ambient air temperature for storage	-4070 °C	
Packing Units		
Unit Type of Package 1	PCE	
Number of Units in Package 1	1	
Package 1 Height	59.0 cm	
Package 1 Width	46.0 cm	
Package 1 Length	104.5 cm	

63.0 kg

Package 1 Weight

# Sustainability Green Premium\*

**Green Premium**<sup>TM</sup> **label** is Schneider Electric's commitment to delivering products with best-inclass environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO<sub>2</sub> products.

**Guide to assessing product sustainability** is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.

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Transparency RoHS/REACh

#### Resource performance



Upgraded Components Available

### Well-being performance



Mercury Free



Rohs Exemption Information

Yes

#### **Certifications & Standards**

Reach Regulation	REACh Declaration		
Eu Rohs Directive	Pro-active compliance (Product out of EU RoHS legal scope)		
China Rohs Regulation	China RoHS declaration		
Environmental Disclosure	Product Environmental Profile		
Weee	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins		
Circularity Profile	End of Life Information		

Aug 7, 2024

# **Product datasheet**

## ATV930D90N4C

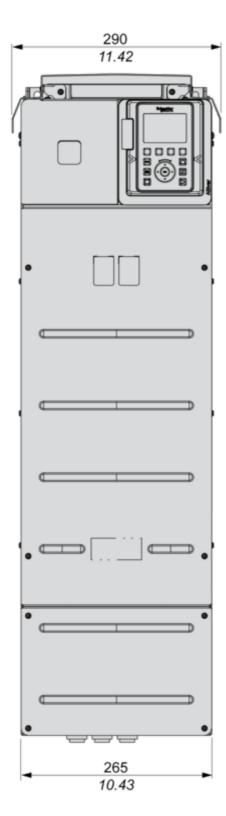
**Dimensions Drawings** 

**Dimensions** 

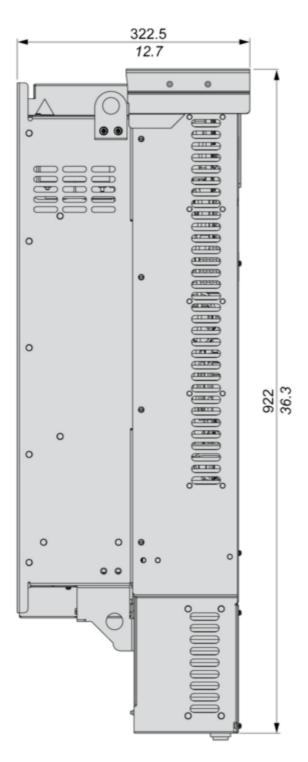
Aug 7, 2024

Front and Left View

 $\frac{\text{mm}}{\text{in.}}$ 

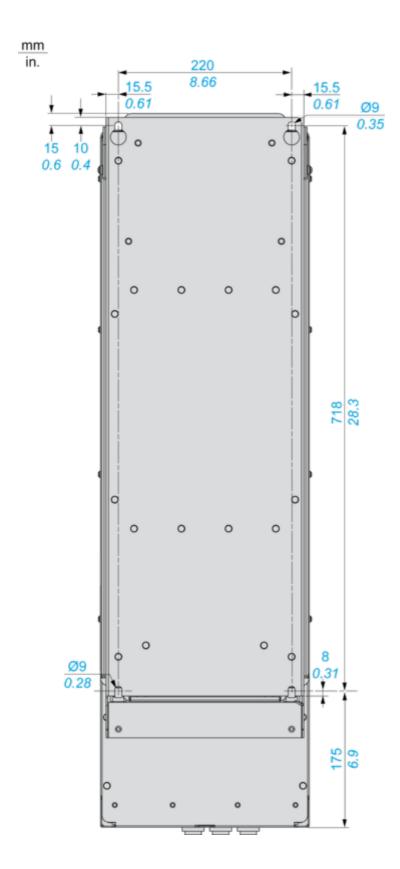


 $\frac{\text{mm}}{\text{in}}$ 



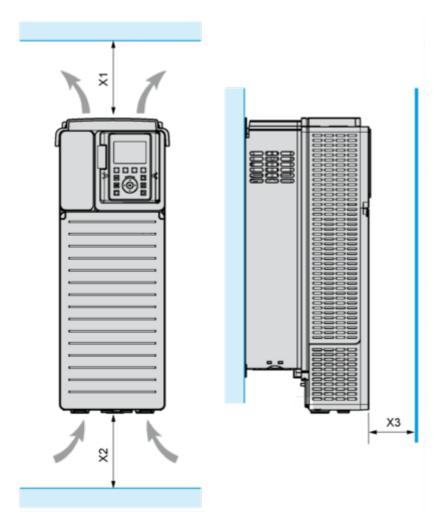
#### **Drives without IP21 Top Cover**

Rear view



#### Mounting and Clearance

#### Clearances

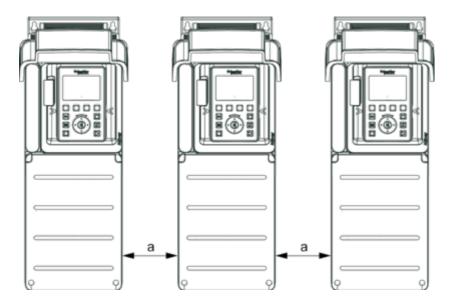


X1	X2	X3
≥ 100 mm (3.94 in.)	≥ 100 mm (3.94 in.)	≥ 10 mm (0.39 in.)

- $_{\bullet}$  Mount the device in a vertical position (±10°). This is required for cooling the device.
- Do not mount the device close to heat sources.
- Leave sufficient free space so that the air required for cooling purposes can circulate from the bottom to the top of the drive.

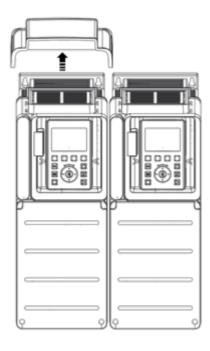
#### **Mounting Types**

#### Mounting Type A: Individual IP21

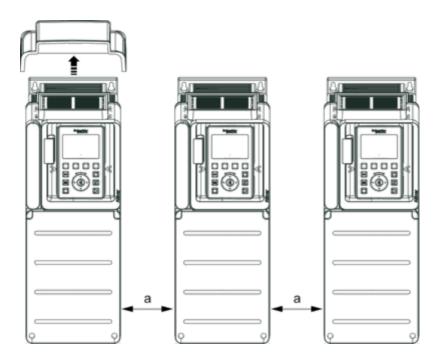


a ≥ = 110 mm (4.33 in.)

#### Mounting Type B: Side by Side IP20 (Possible, 2 Drives Only)



Mounting Type C: Individual IP20

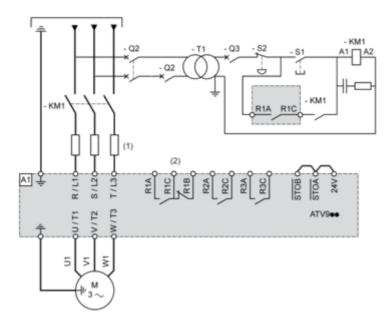


a ≥ = 110 mm (4.33 in.)

#### Connections and Schema

#### Three-Phase Power Supply with Upstream Breaking via Line Contactor

Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1



(1) Line choke if used

(2) Use relay R1 set to operating state Fault to switch Off the product once an error is detected.

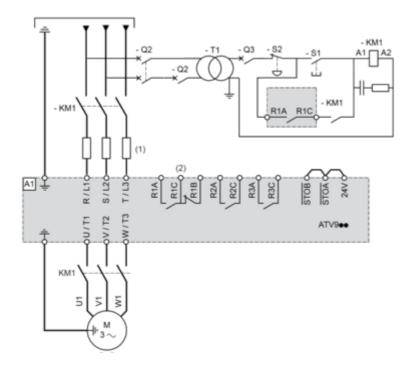
A1: Drive

KM1 : Line Contactor Q2, Q3 : Circuit breakers S1, S2 : Pushbuttons

T1: Transformer for control part

#### Three-Phase Power Supply with Downstream Breaking via Contactor

Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1

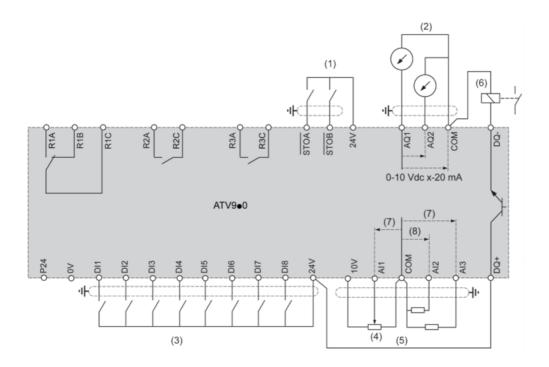


(1) Line choke if used

(2) Use relay R1 set to operating state Fault to switch Off the product once an error is detected.

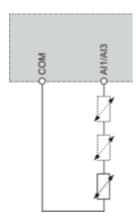
A1 : Drive KM1 : Contactor

#### **Control Block Wiring Diagram**



- (1) Safe Torque Off
- (2) Analog Output
- (3) Digital Input
- (4) Reference potentiometer
- (5) Analog Input
- (6) Digital Output
- (7) 0-10 Vdc, x-20 mA
- (8) 0-10 Vdc, -10 Vdc...+10 Vdc R1A, R1B, R1C: Fault relay R2A, R2C: Sequence relay R3A, R3C: Sequence relay

#### **Sensor Connection**



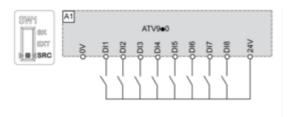
It is possible to connect either 1 or 3 sensors on terminals Al1 or Al3

#### Sink / Source Switch Configuration

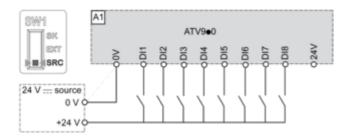
The switch is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

- Set the switch to Source (factory setting) if using PLC outputs with PNP transistors.
- Set the switch to Ext if using PLC outputs with NPN transistors.

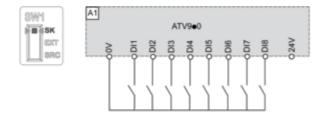
#### Switch Set to SRC (Source) Position Using the Output Power Supply for the Digital Inputs



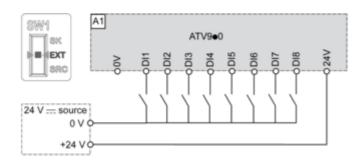
#### Switch Set to SRC (Source) Position and Use of an External Power Supply for the DIs



#### Switch Set to SK (Sink) Position Using the Output Power Supply for the Digital Inputs

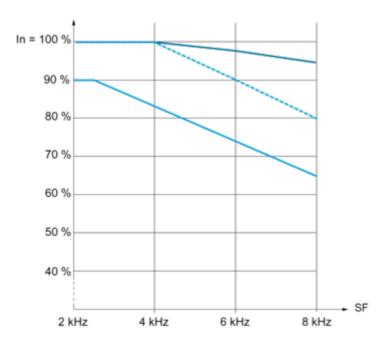


#### Switch Set to EXT Position Using an External Power Supply for the DIs



#### Performance Curves

#### **Derating Curves**



40 °C (104 °F) - Mounting type A, B and C 50 °C (122 °F) - Mounting type A, B and C 60 °C (140 °F) - Mounting type B and C

In: Nominal Drive Current SF: Switching Frequency