# Product data sheet

Specifications



## Variable Speed Drive, Altivar Process ATV900, ATV930, 22kW, 400 to 480V, with braking unit, IP21

ATV930D22N4

**Product availability: Stock - Normally stocked in distribution facility**

## Main

| | |
|---|---|
| **Range of Product** | Altivar Process ATV900 |
| **Product Specific Application** | Process for industrial |
| **Product or Component Type** | Variable speed drive |
| **Variant** | Standard version<br>With braking chopper |
| **Device Application** | Industrial Application |
| **Product destination** | Synchronous motors<br>Asynchronous motors |
| **Phase** | 3 phase |
| **Mounting Mode** | Wall mount |
| **Continuous output current** | 46.3 A 4 kHz normal duty<br>39.2 A 4 kHz heavy duty |
| **Communication Port Protocol** | Modbus serial<br>EtherNet/IP<br>Modbus TCP |
| **option module** | Slot A communication module Profibus DP V1<br>Slot A communication module PROFINET<br>Slot A communication module DeviceNet<br>Slot A communication module EtherCAT<br>Slot A communication module CANopen daisy chain RJ45<br>Slot A communication module CANopen SUB-D 9<br>Slot A communication module CANopen screw terminals<br>Slot A/slot B/slot C digital and analog I/O extension module<br>Slot A/slot B/slot C output relay extension module<br>Slot B 5/12 V digital encoder interface module<br>Slot B analog encoder interface module<br>Slot B resolver encoder interface module<br>communication module Ethernet Powerlink |
| **[Us] rated supply voltage** | 380...480 V - 15...10 % |
| **[Us] rated supply voltage** | 380...480 V |
| **Relative symmetric mains voltage tolerance** | 10 % |
| **Relative symmetric network frequency tolerance** | 5 % |
| **nominal output current** | 46.3 A |
| **Motor power kW** | 22.0 kW normal duty<br>18.5 kW heavy duty |
| **EMC filter** | Integrated<br>With EMC plate option |
| **IP degree of protection** | IP21 |
| **Degree of protection** | UL type 1 |

## Complementary

Price is “List Price” and may be subject to a trade discount – check with your local distributor or retailer for actual price.

Disclaimer: This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications

| | |
|---|---|
| **Electrical connection** | Control screw terminal 0.5...1.5 mm² 20 AWG...16 AWG<br>Line side screw terminal 10...16 mm² 8 AWG...6 AWG<br>DC bus screw terminal 10...16 mm² 8 AWG...6 AWG<br>Motor screw terminal 16 mm² 6 AWG |
| **Transmission Rate** | 10/100 Mbit/s Ethernet IP/Modbus TCP<br>4.8, 9.6, 19.2, 38.4 kbit/s Modbus serial |
| **Exchange mode** | Half duplex, full duplex, autonegotiation Ethernet IP/Modbus TCP |
| **Data format** | 8 bits, configurable odd, even or no parity Modbus serial |
| **Type of polarization** | No impedance Modbus serial |
| **Number of addresses** | 1…247 Modbus serial |
| **Supply** | External supply for digital inputs 24 V DC 19…30 V), <1.25 mA overload and short-circuit protection<br>Internal supply for reference potentiometer (1 to 10 kOhm) 10.5 V DC +/- 5 %, <10 mA overload and short-circuit protection<br>Internal supply for digital inputs and STO 24 V DC 21…27 V), <200 mA overload and short-circuit protection |
| **Local signalling** | Local diagnostic: 3 LED (mono/dual colour)<br>Embedded communication status: 5 LED (dual colour)<br>Communication module status: 2 LED (dual colour)<br>Presence of voltage: 1 LED (red) |
| **Input compatibility** | DI1...DI8 discrete input level 1 PLC IEC 61131-2<br>DI7, DI8 pulse input level 1 PLC IEC 65A-68<br>STOA, STOB discrete input level 1 PLC IEC 61131-2 |
| **Discrete input logic** | Positive logic (source) DI1...DI8), < 5 V, > 11 V<br>Negative logic (sink) DI1...DI8), > 16 V, < 10 V<br>Positive logic (source) DI7, DI8), < 0.6 V, > 2.5 V<br>Positive logic (source) STOA, STOB), < 5 V, > 11 V |
| **Sampling duration** | 2 ms +/- 0.5 ms DI1...DI8) - discrete input<br>5 ms +/- 1 ms DI7, DI8) - pulse input<br>1 ms +/- 1 ms AI1, AI2, AI3) - analog input<br>5 ms +/- 1 ms AQ1, AQ2) - analog output |
| **Accuracy** | +/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input<br>+/- 1 % AQ1, AQ2 for a temperature variation 60 °C analog output |
| **Linearity error** | AI1, AI2, AI3 +/- 0.15 % of maximum value analog input<br>AQ1, AQ2 +/- 0.2 % analog output |
| **Refresh time** | Relay output R1, R2, R3)5 ms +/- 0.5 ms) |
| **Isolation** | Between power and control terminals |
| **Discrete input number** | 10 |
| **Discrete input type** | DI1...DI8 programmable, 24 V DC <= 30 V)3.5 kOhm<br>DI7, DI8 programmable as pulse input 0…30 kHz, 24 V DC <= 30 V)<br>STOA, STOB safe torque off, 24 V DC <= 30 V)> 2.2 kOhm |
| **Discrete output number** | 2 |
| **Discrete output type** | Logic output DQ+ 0…1 kHz <= 30 V DC 100 mA<br>Programmable as pulse output DQ+ 0…30 kHz <= 30 V DC 20 mA<br>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 30 kOhm 12 bits<br>AI1, AI2, AI3 software-configurable current 0...20 mA/4...20 mA 250 Ohm 12 bits |
| **Analogue output number** | 2 |
| **Analogue output type** | Software-configurable voltage AQ1, AQ2 0...10 V DC 470 Ohm 10 bits<br>Software-configurable current AQ1, AQ2 0...20 mA 500 Ohm 10 bits |
| **Relay output number** | 3 |
| **Relay output type** | Configurable relay logic R1 fault relay NO/NC 100000 cycles<br>Configurable relay logic R2 sequence relay NO 1000000 cycles<br>Configurable relay logic R3 sequence relay NO 1000000 cycles |

| | |
|---|---|
| **Maximum switching current** | Relay output R1 resistive, cos phi = 1 3 A 250 V AC<br>Relay output R1 resistive, cos phi = 1 3 A 30 V DC<br>Relay output R1 inductive, cos phi = 0.4 7 ms 2 A 250 V AC<br>Relay output R1 inductive, cos phi = 0.4 7 ms 2 A 30 V DC<br>Relay output R2, R3 resistive, cos phi = 1 5 A 250 V AC<br>Relay output R2, R3 resistive, cos phi = 1 5 A 30 V DC<br>Relay output R2, R3 inductive, cos phi = 0.4 7 ms 2 A 250 V AC<br>Relay output R2, R3 inductive, cos phi = 0.4 7 ms 2 A 30 V DC |
| **Minimum switching current** | Relay output R1, R2, R3 5 mA 24 V DC |
| **Discrete input logic** | 16 preset speeds |
| **Physical interface** | Ethernet<br>2-wire RS 485 |
| **Connector Type** | 2 RJ45<br>1 RJ45 |
| **Method of access** | Slave Modbus TCP |
| **Transmission Rate** | 10, 100 Mbits<br>4.8 kbps<br>9600 bit/s<br>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 |
| **Asynchronous motor control profile** | Variable torque standard<br>Optimized torque mode<br>Constant torque standard |
| **Synchronous motor control profile** | Permanent magnet motor<br>Synchronous reluctance motor |
| **Maximum output frequency** | 599 Hz |
| **Acceleration and deceleration ramps** | Linear adjustable separately from 0.01...9999 s |
| **Motor slip compensation** | Adjustable<br>Automatic whatever the load<br>Can be suppressed<br>Not available in permanent magnet motor law |
| **Switching frequency** | 2...16 kHz adjustable<br>4...16 kHz with derating factor |
| **Nominal switching frequency** | 4 kHz |
| **Braking to standstill** | By DC injection |
| **Brake chopper integrated** | True |
| **Line current** | 39.6 A 380 V normal duty)<br>34.1 A 380 V heavy duty)<br>34.4 A 480 V normal duty)<br>29.9 A 480 V heavy duty) |
| **Maximum Input Current per Phase** | 39.6 A |
| **Maximum output voltage** | 480.0 V |
| **Apparent power** | 28.6 kVA 480 V normal duty)<br>24.9 kVA 480 V heavy duty) |
| **Maximum transient current** | 55.6 A 60 s normal duty)<br>58.8 A 60 s heavy duty) |
| **Network Frequency** | 50-60 Hz |
| **Prospective line Isc** | 50 kA |

| | |
|---|---|
| **Base load current at high overload** | 39.2 A |
| **Base load current at low overload** | 46.3 A |
| **Power dissipation in W** | Natural convection 68 W 380 V 4 kHz<br>Forced convection 505 W 380 V 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<br>Safe torque off motor<br>Motor phase break motor<br>Thermal protection drive<br>Safe torque off drive<br>Overheating drive<br>Overcurrent between output phases and earth drive<br>Overload of output voltage drive<br>Short-circuit protection drive<br>Motor phase break drive<br>Overvoltages on the DC bus drive<br>Line supply overvoltage drive<br>Line supply undervoltage drive<br>Line supply phase loss drive<br>Overspeed drive<br>Break on the control circuit drive |
| **Quantity per Set** | 1 |
| **Width** | 8.3 in (211 mm) |
| **Height** | 21.5 in (545.9 mm) |
| **Depth** | 9.3 in (235 mm) |
| **Net Weight** | 31.5 lb(US) (14.3 kg) |

# Environment

| | |
|---|---|
| **Insulation resistance** | > 1 MOhm 500 V DC for 1 minute to earth |
| **Noise level** | 59.5 dB 86/188/EEC |
| **Vibration resistance** | 1.5 mm peak to peak (f= 2…13 Hz) conforming to IEC 60068-2-6<br>1 gn (f= 13…200 Hz) conforming to IEC 60068-2-6 |
| **Shock resistance** | 15 gn 11 ms IEC 60068-2-27 |
| **Environmental characteristic** | Chemical pollution resistance class 3C3 IEC 60721-3-3<br>Dust pollution resistance class 3S3 IEC 60721-3-3 |
| **Relative humidity** | 5…95 % without condensation IEC 60068-2-3 |
| **Ambient air temperature for operation** | 5…122 °F (-15…50 °C) (without derating)<br>122…140 °F (50…60 °C) (with derating factor) |

| | |
|---|---|
| **Operating altitude** | <= 3280.84 ft (1000 m) without derating<br>1000...4800 m with current derating 1 % per 100 m |
| **Operating position** | Vertical +/- 10 degree |
| **Product Certifications** | CSA<br>UL<br>TÜV |
| **Marking** | CE |
| **Standards** | UL 508C<br>IEC 61800-3<br>IEC 61800-5-1<br>IEC 61000-3-12<br>IEC 60721-3<br>IEC 61508<br>IEC 13849-1 |
| **Maximum THDI** | <48 % from 80...100 % of load IEC 61000-3-12 |
| **Assembly style** | Enclosed |
| **Electromagnetic compatibility** | Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2<br>Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3<br>Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4<br>1.2/50 µs - 8/20 µs surge immunity test level 3 conforming to IEC 61000-4-5<br>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<br>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** | 56798.008 Gal/hr(US) (215 m3/h) |
| **Overvoltage category** | III |
| **Regulation loop** | Adjustable PID regulator |
| **Noise level** | 59.5 dB |
| **Pollution degree** | 2 |
| **Ambient air transport temperature** | -40…158 °F (-40…70 °C) |
| **Ambient Air Temperature for Storage** | -40…158 °F (-40…70 °C) |

# Ordering and shipping details

| | |
|---|---|
| **Category** | US1CP4E22277 |
| **Discount Schedule** | CP4E |
| **GTIN** | 3606480883354 |
| **Returnability** | Yes |
| **Country of origin** | IN |

# Packing Units

| | |
|---|---|
| **Unit Type of Package 1** | PCE |
| **Nbr. of units in pkg.** | 1 |
| **Package 1 Height** | 10.2 in (26.0 cm) |

| | |
|---|---|
| **Package 1 Width** | 28.9 in (73.5 cm) |
| **Package 1 Length** | 13.6 in (34.5 cm) |
| **Package weight(Lbs)** | 38.363 lb(US) (17.401 kg) |
| **Unit Type of Package 2** | P06 |
| **Number of Units in Package 2** | 4 |
| **Package 2 Height** | 35.4 in (90.0 cm) |
| **Package 2 Width** | 31.5 in (80.0 cm) |
| **Package 2 Length** | 23.6 in (60.0 cm) |
| **Package 2 Weight** | 177.904 lb(US) (80.696 kg) |

## Contractual warranty

| | |
|---|---|
| **Warranty (in months)** | 18 |

## Environmental Data

Schneider Electric aims to achieve Net Zero status by 2050 through supply chain partnerships, lower impact materials, and circularity via our ongoing “Use Better, Use Longer, Use Again” campaign to extend product lifetimes and recyclability.

Environmental Data explained >

How we assess product sustainability >

### Environmental footprint

| | |
|---|---|
| Total lifecycle Carbon footprint | **7 979 kg CO2 eq.** |
| Carbon footprint of the manufacturing phase [A1 to A3] | **186 kg CO2 eq.** |
| Carbon footprint of the distribution phase [A4] | **3 kg CO2 eq.** |
| Carbon footprint of the installation phase [A5] | **6 kg CO2 eq.** |
| Carbon footprint of the use phase [B2, B3, B4, B6] | **7 762 kg CO2 eq.** |
| Carbon footprint of the end-of-life phase [C1 to C4] | **21 kg CO2 eq.** |
| Environmental Disclosure | Product Environmental Profile |

## Use Better

### Materials and Substances

| | |
|---|---|
| Average percentage of recycled plastic content | **1 %** |
| Average percentage of ASI certified metals | **100 %** |
| Packaging made with recycled cardboard | **Yes** |
| Packaging without single use plastic | **Yes** |
| SCIP Number | **83582fb4-747a-4c5a-a577-c19ed82740b2** |
| EU RoHS Directive | Compliant By Exemption |
| REACh Regulation | Reference contains Substances of Very High Concern above the threshold |
| California proposition 65 | **WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov** |

### Energy efficiency

| | |
|---|---|
| Product contributes to saved and avoided emissions | **Yes** |

## Use Again

### Repack and remanufacture

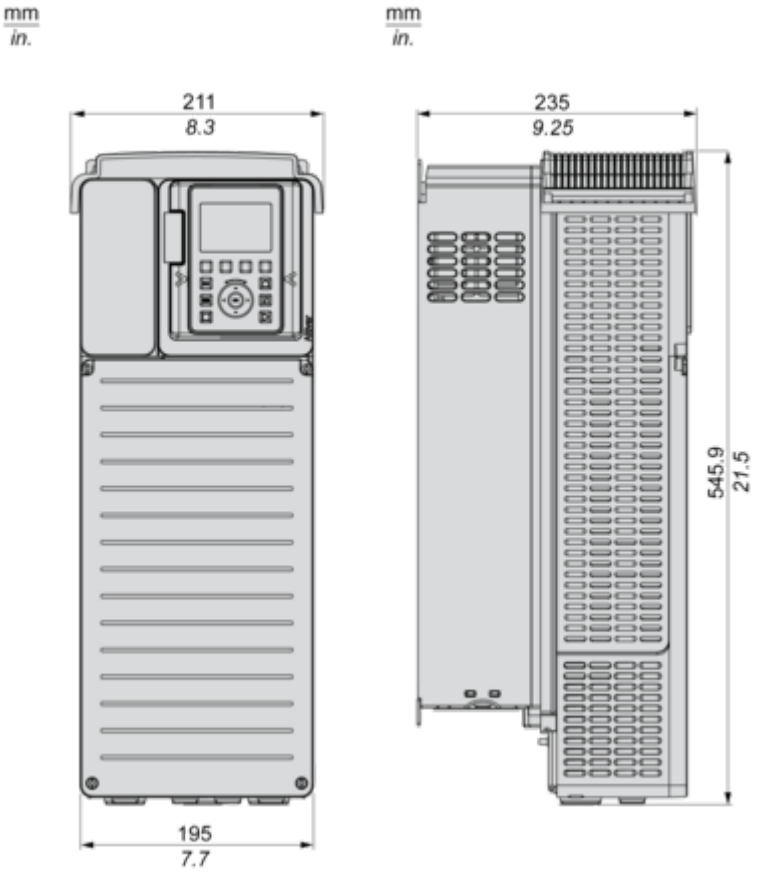
| | |
|---|---|
| Recyclability potential, in % | **80** |
| Circularity Profile | End of Life Information |
| Removable battery | **Yes** |
| Take-back | **No** |

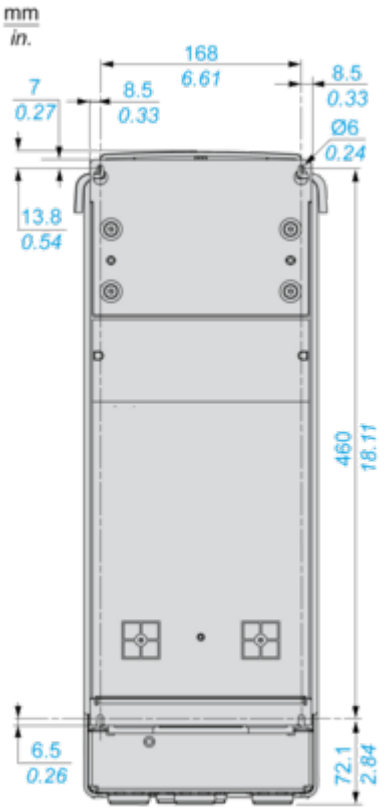
| | |
|---|---|
| WEEE Label | The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins. |

Dimensions Drawings

## Dimensions

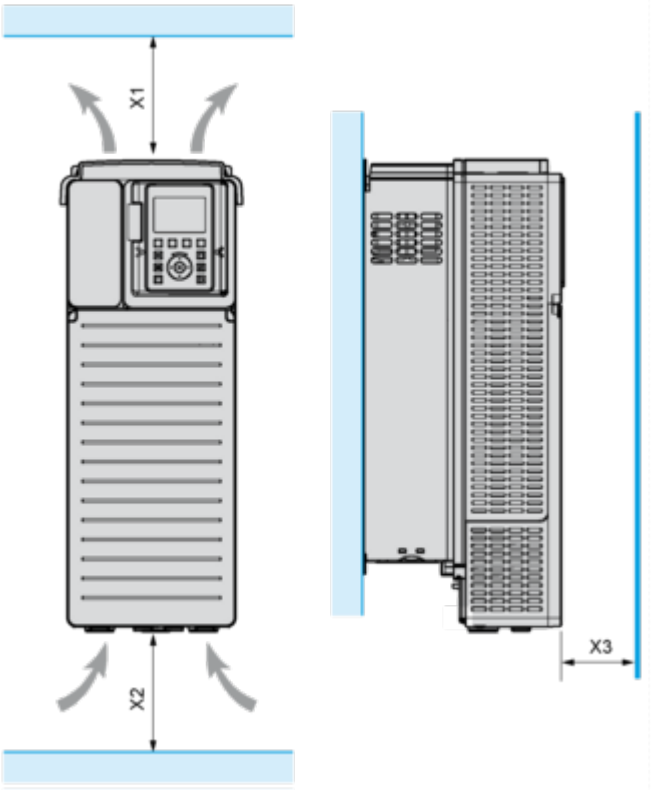
Front, Left and Rear View



Mounting and Clearance

## Clearances

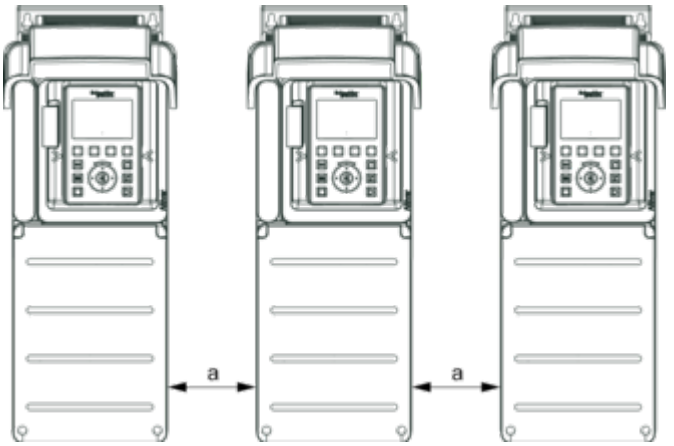



| X1 | X2 | X3 |
|---|---|---|
| ≥ 100 mm (3.94 in.) | ≥ 100 mm (3.94 in.) | ≥ 10 mm (0.39 in.) |

- 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.

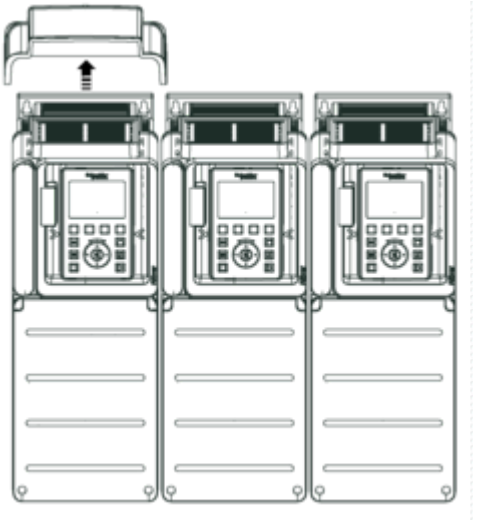
## Mounting Types

### Mounting Type A: Individual IP21

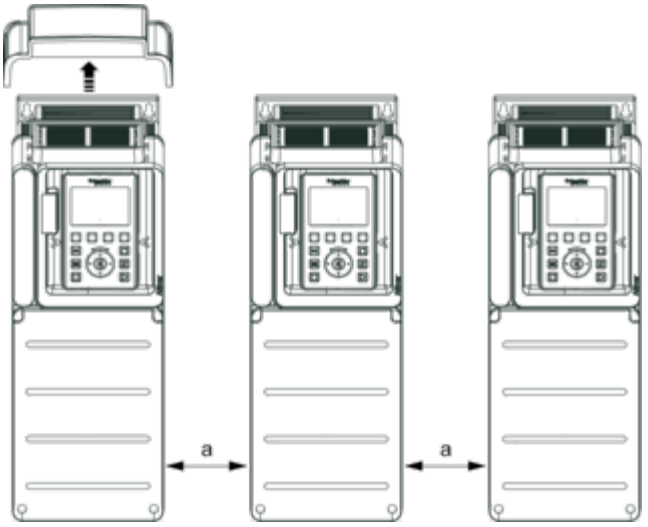



**a ≥** 100 mm (3.94 in.)

### Mounting Type B: Side by Side IP20



### Mounting Type C: Individual IP20

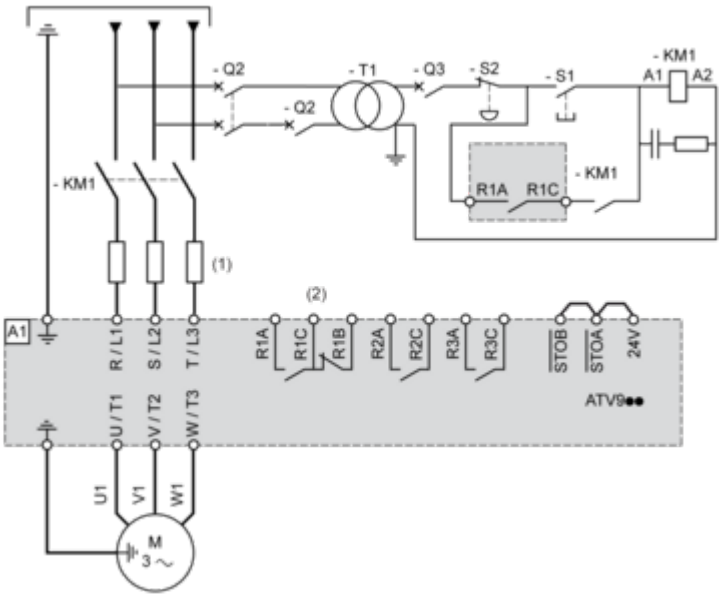



**a ≥** 0

## Connections and Schema

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

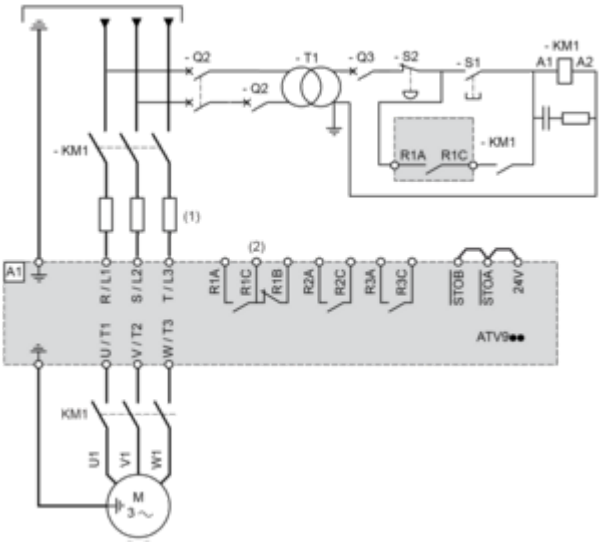
Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1




**(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

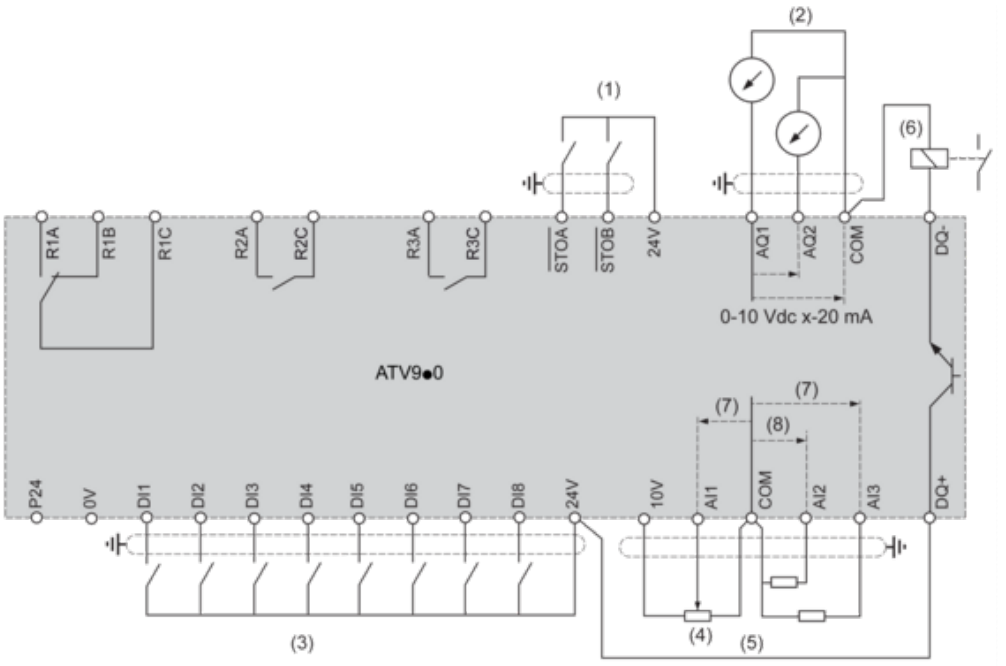
## Three-Phase Power Supply with Downstream Breaking via Contactor

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



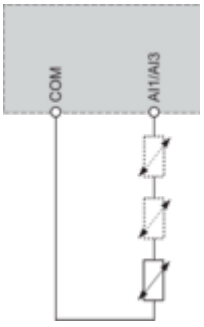

**(1)** Line choke if used
**(2)** Use relay R1 set to operating state Fault to switch Off the product once an error is detected.
**A1 :** Drive
**KM1 :** Contactor

## 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



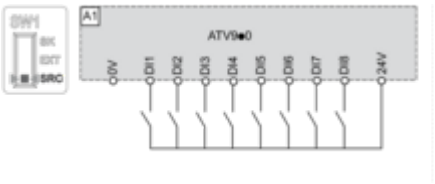

It is possible to connect either 1 or 3 sensors on terminals AI1 or AI3

## Sink / Source Switch Configuration

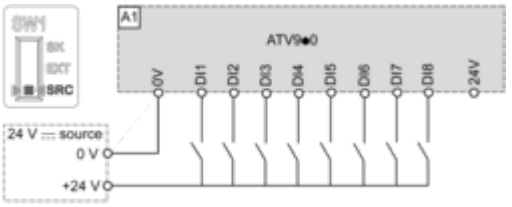
The switch is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

- 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.

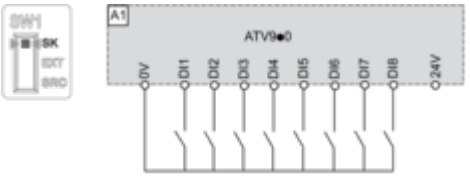
### Switch Set to SRC (Source) Position Using the Output Power Supply for the Digital Inputs



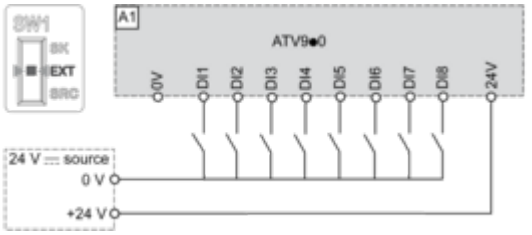

### Switch Set to SRC (Source) Position and Use of an External Power Supply for the DIs




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

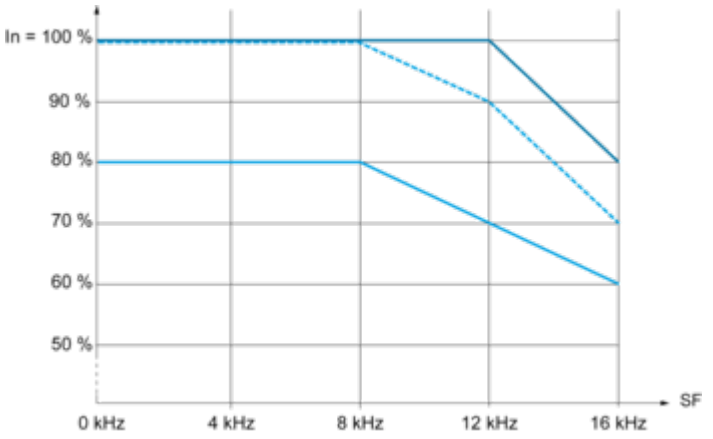



### Switch Set to EXT Position Using an External Power Supply for the DIs



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

Image of product / Alternate images

**Alternative**











