# Product data sheet
## Characteristics

# ATV630D15N4
## Variable speed drive, Altivar Process ATV600, ATV630, 15kW/20 hp, 380...480 V, IP21/UL type 1

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## Main

| | |
|---|---|
| Range of product | Altivar Process ATV600 |
| Product or component type | Variable speed drive |
| Product specific application | Process and utilities |
| Device short name | ATV630 |
| Variant | Standard version |
| Product destination | Synchronous motors<br>Asynchronous motors |
| EMC filter | Integrated with 50 m conforming to EN/IEC 61800-3 category C2<br>Integrated with 150 m conforming to EN/IEC 61800-3 category C3 |
| IP degree of protection | IP21 conforming to IEC 61800-5-1<br>IP21 conforming to IEC 60529 |
| [Us] rated supply voltage | 380...480 V |
| Degree of protection | UL type 1 conforming to UL 508C |
| Type of cooling | Forced convection |
| Supply frequency | 50...60 Hz - 5...5 % |
| [Us] rated supply voltage | 380...480 V - 15...10 % |
| Motor power kW | 15 KW (normal duty)<br>11 kW (heavy duty) |
| Motor power hp | 20 Hp normal duty<br>15 hp heavy duty |
| Line current | 27 A at 380 V (normal duty)<br>23.3 A at 480 V (normal duty)<br>20.6 A at 380 V (heavy duty)<br>18.1 A at 480 V (heavy duty) |
| Prospective line Isc | 50 kA |
| Apparent power | 19.4 KVA at 480 V (normal duty)<br>15 kVA at 480 V (heavy duty) |
| Continuous output current | 31.7 A at 4 kHz for normal duty<br>23.5 A at 4 kHz for heavy duty |
| Maximum transient current | 34.9 A during 60 s (normal duty)<br>35.3 A during 60 s (heavy duty) |
| Asynchronous motor control profile | Constant torque standard<br>Variable torque standard<br>Optimized torque mode |
| Synchronous motor control profile | Permanent magnet motor<br>Synchronous reluctance motor |
| Speed drive output frequency | 0.1…500 Hz |
| Nominal switching frequency | 4 kHz |
| Switching frequency | 2...12 kHz adjustable<br>4...12 kHz with derating factor |
| Safety function | STO (safe torque off) SIL 3 |
| Discrete input logic | 16 preset speeds |


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|---|---|
| Communication port protocol | Ethernet<br>Modbus serial<br>Modbus TCP |
| Option card | Slot A: communication module, Profibus DP V1<br>Slot A: communication module, PROFINET<br>Slot A: communication module, DeviceNet<br>Slot A: communication module, Modbus TCP/ EtherNet/IP<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: digital and analog I/O extension module<br>Slot A/slot B: output relay extension module<br>Slot A: communication module, Ethernet IP/Modbus TCP/MD-Link<br>Communication module, BACnet MS/TP<br>Communication module, Ethernet Powerlink |

## Complementary

| | |
|---|---|
| Mounting mode | Wall mount |
| Network number of phases | 3 phases |
| Discrete output number | 0 |
| Discrete output type | Relay outputs R1A, R1B, R1C 250 V AC 3000 mA<br>Relay outputs R1A, R1B, R1C 30 V DC 3000 mA<br>Relay outputs R2A, R2C 250 V AC 5000 mA<br>Relay outputs R2A, R2C 30 V DC 5000 mA<br>Relay outputs R3A, R3C 250 V AC 5000 mA<br>Relay outputs R3A, R3C 30 V DC 5000 mA |
| Output voltage | <= power supply voltage |
| Permissible temporary current boost | 1.1 x In during 60 s (normal duty)<br>1.5 x In during 60 s (heavy duty) |
| Motor slip compensation | Can be suppressed<br>Adjustable<br>Automatic whatever the load<br>Not available in permanent magnet motor law |
| Acceleration and deceleration ramps | Linear adjustable separately from 0.01...9999 s |
| Physical interface | Ethernet<br>2-wire RS 485 |
| Braking to standstill | By DC injection |
| 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 |
| Transmission rate | 10, 100 Mbits<br>4800 bps, 9600 bps, 19200 bps, 38.4 Kbps |
| Frequency resolution | Display unit: 0.1 Hz<br>Analog input: 0.012/50 Hz |
| Transmission frame | RTU |
| Electrical connection | Control: removable screw terminals 0.5...1.5 mm²/AWG 20...AWG 16<br>Line side: screw terminal 10...16 mm²/AWG 8...AWG 6<br>Motor: screw terminal 10...16 mm²/AWG 8...AWG 6 |
| Connector type | RJ45 (on the remote graphic terminal) for Ethernet/Modbus TCP<br>RJ45 (on the remote graphic terminal) for Modbus serial |
| Data format | 8 bits, configurable odd, even or no parity |
| Type of polarization | No impedance |

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|---|---|
| Exchange mode | Half duplex, full duplex, autonegotiation Ethernet/Modbus TCP |
| Number of addresses | 1…247 for Modbus serial |
| Method of access | Slave Modbus TCP |
| Supply | External supply for digital inputs: 24 V DC (19…30 V), <1.25 mA, protection type: overload and short-circuit protection<br>Internal supply for reference potentiometer (1 to 10 kOhm): 10.5 V DC +/- 5 %, <10 mA, protection type: overload and short-circuit protection<br>Internal supply for digital inputs and STO: 24 V DC (21…27 V), <200 mA, protection type: overload and short-circuit protection |
| Local signalling | 3 LEDs for local diagnostic<br>3 LEDs (dual colour) for embedded communication status<br>4 LEDs (dual colour) for communication module status<br>1 LED (red) for presence of voltage |
| Width | 211 mm |
| Height | 546 mm |
| Depth | 232 mm |
| Net weight | 13.6 kg |
| Analogue input number | 3 |
| Analogue input type | AI1, AI2, AI3 software-configurable voltage: 0...10 V DC, impedance: 31.5 kOhm, resolution 12 bits<br>AI1, AI2, AI3 software-configurable current: 0...20 mA, impedance: 250 Ohm, resolution 12 bits<br>AI2 voltage analog input: - 10...10 V DC, impedance: 31.5 kOhm, resolution 12 bits |
| Discrete input number | 8 |
| Discrete input type | DI7, DI8 programmable as pulse input: 0…30 kHz, 24 V DC (<= 30 V) |
| Input compatibility | DI1...DI6: discrete input level 1 PLC conforming to EN/IEC 61131-2<br>DI5, DI6: discrete input level 1 PLC conforming to IEC 65A-68<br>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)<br>Negative logic (sink) (DI1...DI8), > 16 V (state 0), < 10 V (state 1) |
| Analogue output number | 2 |
| Analogue output type | Software-configurable voltage AQ1, AQ2: 0...10 V DC impedance 470 Ohm, resolution 10 bits<br>Software-configurable current AQ1, AQ2: 0...20 mA, resolution 10 bits<br>Software-configurable current DQ-, DQ+: 30 V DC<br>Software-configurable current DQ-, DQ+: 100 mA |
| Sampling duration | 2 Ms +/- 0.5 ms (DI1...DI4) - discrete input<br>5 Ms +/- 1 ms (DI5, DI6) - discrete input<br>5 Ms +/- 0.1 ms (AI1, AI2, AI3) - analog input<br>10 ms +/- 1 ms (AO1) - analog output |
| Accuracy | +/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input<br>+/- 1 % AO1, AO2 for a temperature variation 60 °C analog output |
| Linearity error | AI1, AI2, AI3: +/- 0.15 % of maximum value for analog input<br>AO1, AO2: +/- 0.2 % for analog output |
| Relay output number | 3 |
| Relay output type | Configurable relay logic R1: fault relay NO/NC electrical durability 100000 cycles<br>Configurable relay logic R2: sequence relay NO electrical durability 100000 cycles<br>Configurable relay logic R3: sequence relay NO electrical durability 100000 cycles |
| Refresh time | Relay output (R1, R2, R3): 5 ms (+/- 0.5 ms) |
| Minimum switching current | Relay output R1, R2, R3: 5 mA at 24 V DC |
| Maximum switching current | Relay output R1, R2, R3 on resistive load, cos phi = 1: 3 A at 250 V AC<br>Relay output R1, R2, R3 on resistive load, cos phi = 1: 3 A at 30 V DC<br>Relay output R1, R2, R3 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 250 V AC<br>Relay output R1, R2, R3 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 30 V DC |
| Isolation | Between power and control terminals |
| Maximum output frequency | 500 kHz |
| Maximum input current | 27.0 A |

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| Variable speed drive application selection | Building - HVAC Compressor centrifugal<br>Food and beverage processing Other application<br>Mining mineral and metal Fan<br>Mining mineral and metal Pump<br>Oil and gas Fan<br>Water and waste water Other application<br>Building - HVAC Screw compressor<br>Food and beverage processing Pump<br>Food and beverage processing Fan<br>Food and beverage processing Atomization<br>Oil and gas Electro submersible pump (ESP)<br>Oil and gas Water injection pump<br>Oil and gas Jet fuel pump<br>Oil and gas Compressor for refinery<br>Water and waste water Centrifuge pump<br>Water and waste water Positive displacement pump<br>Water and waste water Electro submersible pump (ESP)<br>Water and waste water Screw pump<br>Water and waste water Lobe compressor<br>Water and waste water Screw compressor<br>Water and waste water Compressor centrifugal<br>Water and waste water Fan<br>Water and waste water Conveyor<br>Water and waste water Mixer |
| Motor power range AC-3 | 15…25 KW at 380…440 V 3 phases<br>15…25 kW at 480…500 V 3 phases |
| Quantity per set | 1 |
| Enclosure mounting | Wall mounted |

## Environment

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|---|---|
| Insulation resistance | > 1 MOhm 500 V DC for 1 minute to earth |
| Noise level | 59.5 dB conforming to 86/188/EEC |
| Power dissipation in W | Natural convection: 59 W at 380 V, switching frequency 4 kHz<br>Forced convection: 366 W at 380 V, switching frequency 4 kHz |
| Volume of cooling air | 215 m3/h |
| Operating position | Vertical +/- 10 degree |
| Maximum THDI | <48 % from 80...100 % of load conforming to IEC 61000-3-12 |
| 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 |
| Pollution degree | 2 conforming to EN/IEC 61800-5-1 |
| 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 for 11 ms conforming to IEC 60068-2-27 |
| Relative humidity | 5…95 % without condensation conforming to IEC 60068-2-3 |
| Ambient air temperature for operation | -15…50 °C (without derating)<br>50…60 °C (with derating factor) |
| Ambient air temperature for storage | -40…70 °C |
| Operating altitude | <= 1000 m without derating<br>1000...4800 m with current derating 1 % per 100 m |
| Standards | UL 508C<br>EN/IEC 61800-3<br>Environment 1 category C2 EN/IEC 61800-3<br>Environment 2 category C3 EN/IEC 61800-3<br>EN/IEC 61800-5-1<br>IEC 61000-3-12<br>IEC 60721-3<br>IEC 61508<br>IEC 13849-1 |
| Product certifications | ATEX zone 2/22<br>TÜV<br>ATEX INERIS<br>CSA<br>UL<br>DNV-GL |
| Marking | CE |

| | |
|---|---|
| Standards | UL 508C<br>EN/IEC 61800-3<br>EN/IEC 61800-3 environment 1 category C2<br>EN/IEC 61800-3 environment 2 category C3<br>EN/IEC 61800-5-1<br>IEC 61000-3-12<br>IEC 60721-3<br>IEC 61508<br>IEC 13849-1 |
| Overvoltage category | III |
| Regulation loop | Adjustable PID regulator |
| Noise level | 59.5 dB |
| Pollution degree | 2 |

## Packing Units

| | |
|---|---|
| Unit Type of Package 1 | PCE |
| Number of Units in Package 1 | 1 |
| Package 1 Weight | 16.71 kg |
| Package 1 Height | 25.5 cm |
| Package 1 width | 73.5 cm |
| Package 1 Length | 34.0 cm |
| Unit Type of Package 2 | P06 |
| Number of Units in Package 2 | 4 |
| Package 2 Weight | 78.472 kg |
| Package 2 Height | 90.0 cm |
| Package 2 width | 80.0 cm |
| Package 2 Length | 60.0 cm |

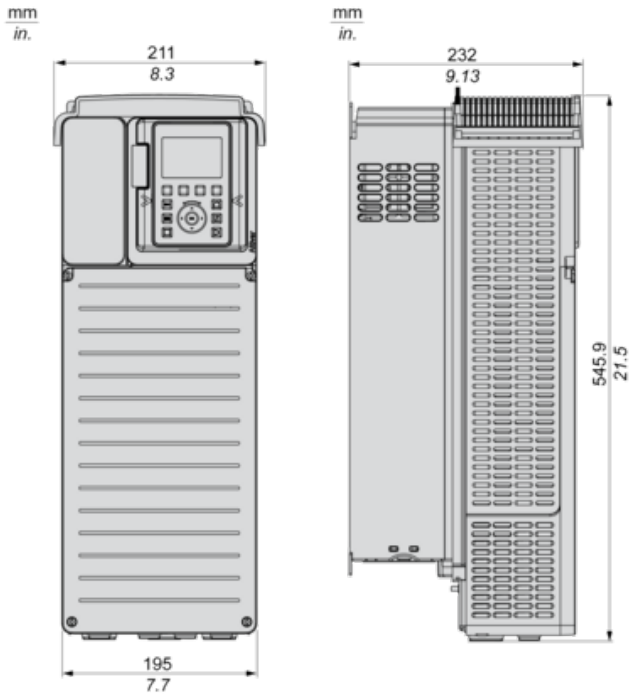
## Offer Sustainability

| | |
|---|---|
| Sustainable offer status | Green Premium product |
| REACh Regulation | REACh Declaration |
| EU RoHS Directive | Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration |
| Mercury free | Yes |
| RoHS exemption information | Yes |
| China RoHS Regulation | China RoHS Declaration |
| Environmental Disclosure | Product Environmental Profile |
| Circularity Profile | End Of Life Information |
| WEEE | The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins |
| Upgradeability | Upgraded Components Available |

## Dimensions

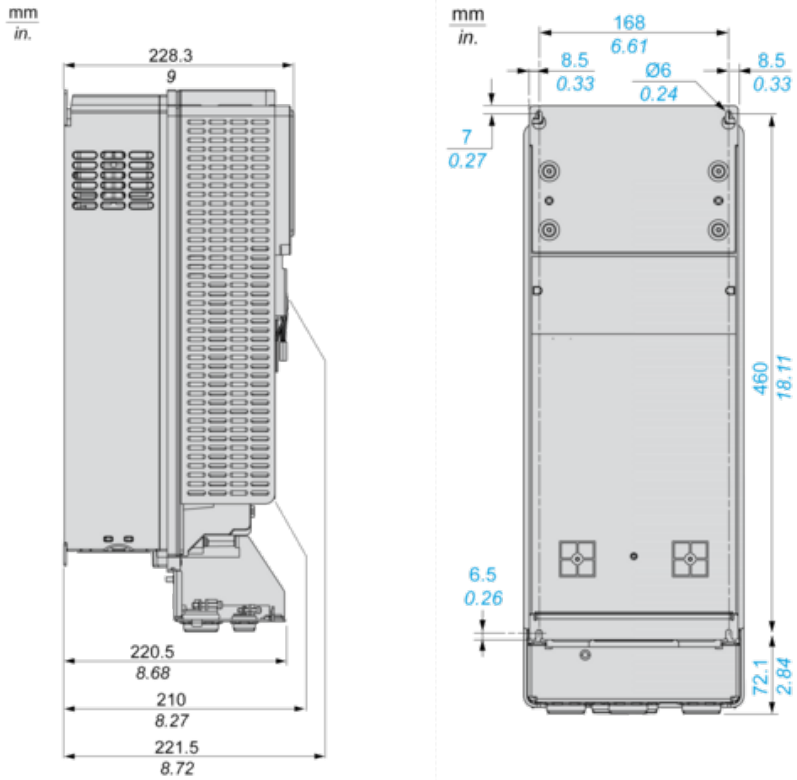
### Drives with IP21 Top Cover

Front and Left Views

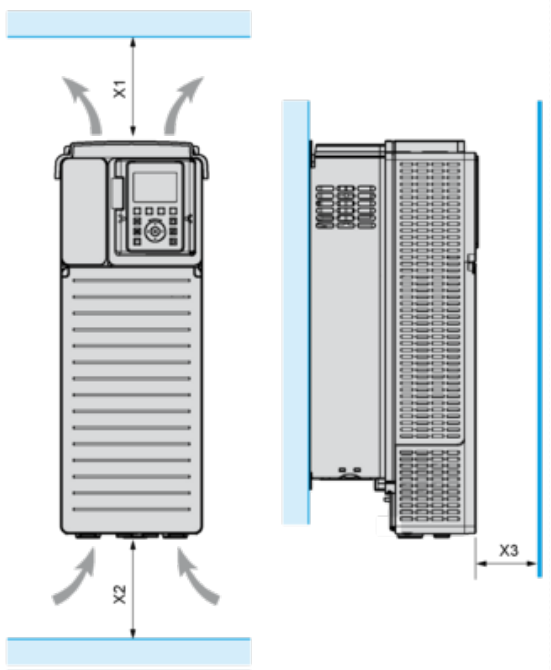



### Drives Without IP21 Top Cover

Left and Rear Views



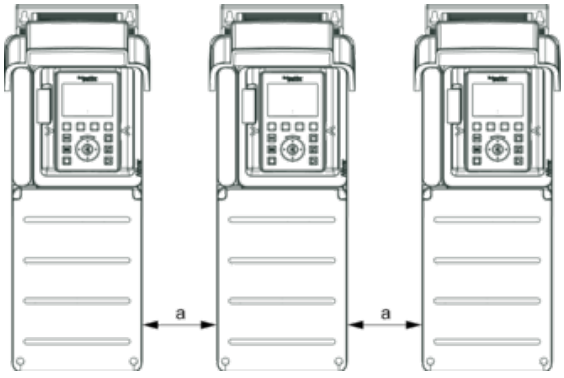
## Clearances




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

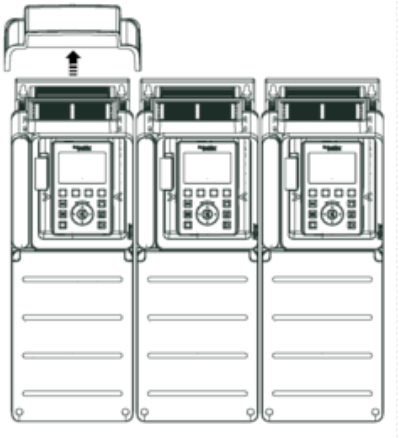
## Mounting Types

### Mounting Type A: Individual IP21

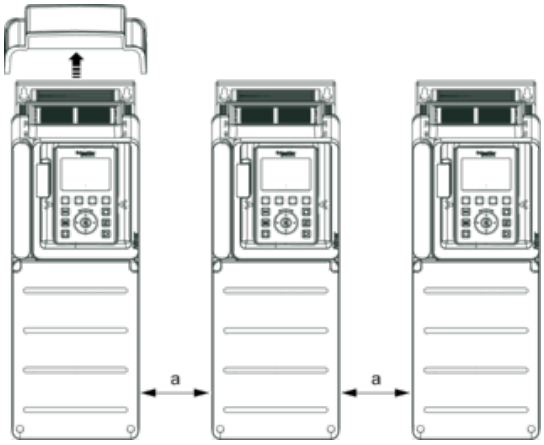



a ≥ 100 mm (3.94 in.)

## Mounting Type B: Side by Side IP20



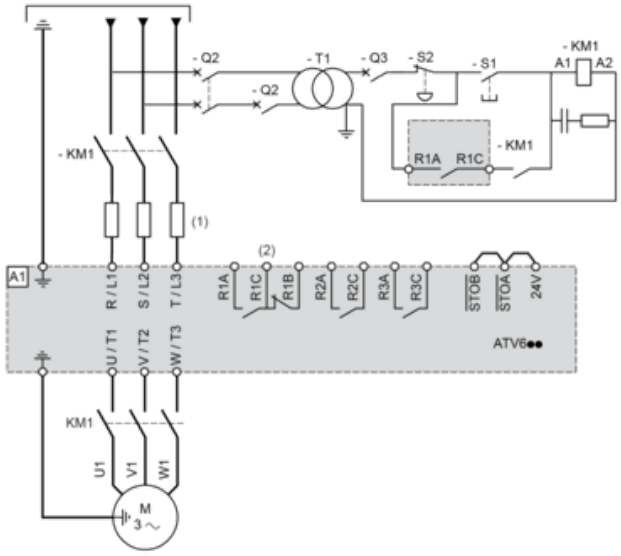
## Mounting Type C: Individual IP20




a ≥ 0

## 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

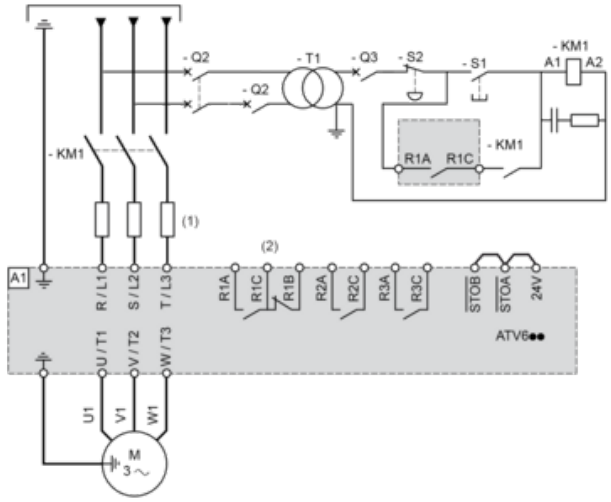
Q2, Q3 : Circuit breakers

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



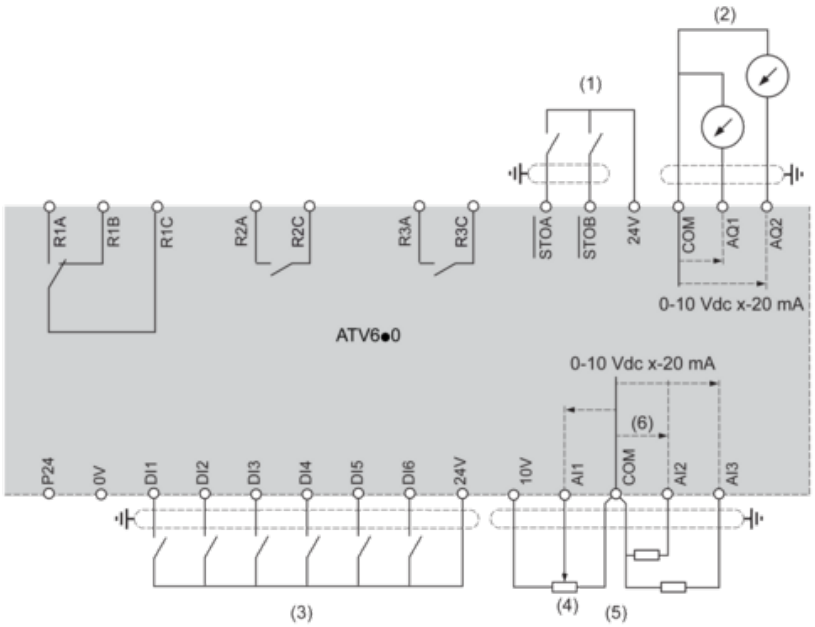

(1) Line choke if used

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

A1 : Drive

KM1 : Contactor

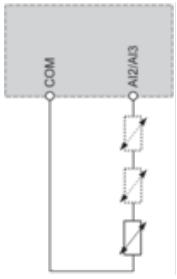
## Control Block Wiring Diagram




(1) Safe Torque Off
(2) Analog Output
(3) Digital Input
(4) Reference potentiometer
(5) Analog Input
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 AI2 or AI3.

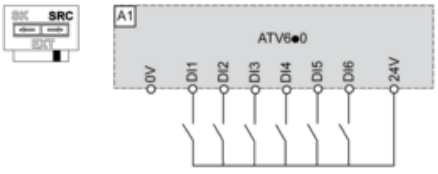



## Sink / Source Switch Configuration

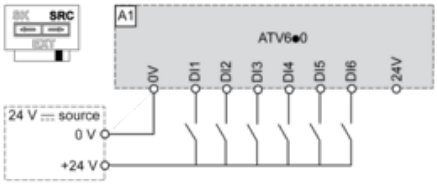
The switch is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

- 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.

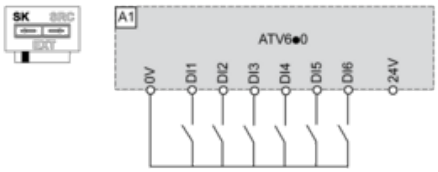
## Switch Set to SRC (Source) Position Using the Output Power Supply for the Digital Inputs



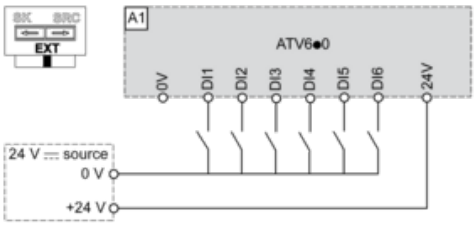
## Switch Set to SRC (Source) Position and Use of an External Power Supply for the DIs



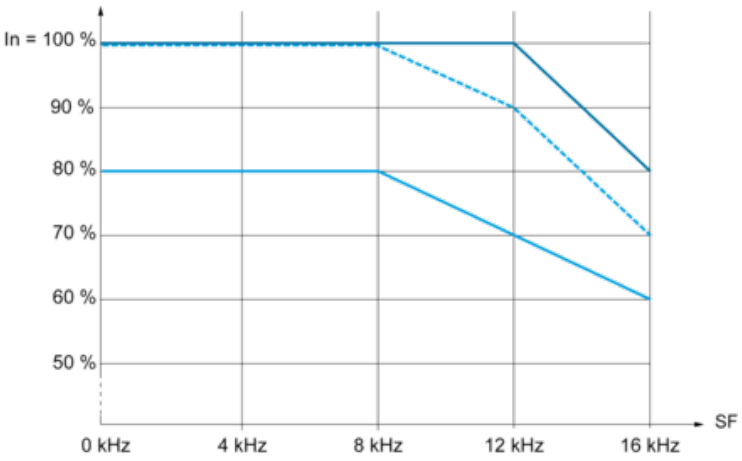

## Switch Set to SK (Sink) Position Using the Output Power Supply for the Digital Inputs




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



## 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