

# ATV630D15N4

variable speed drive, Altivar Process ATV600,  
ATV630, 15kW, 20hp, 380 to 480V, IP21, UL  
type 1





## 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                | Asynchronous motors<br>Synchronous 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 I <sub>sc</sub>   | 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   |
| 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  |

|                             |   |
|-----------------------------|---|
| 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/<br>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   |
| Maximum transient current           | 34.9 A during 60 s (normal duty)<br>35.3 A during 60 s (heavy duty)  |
| 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 I <sub>n</sub> during 60 s (normal duty)<br>1.5 x I <sub>n</sub> 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 mm <sup>2</sup> /AWG 20...AWG 16<br>Line side: screw terminal 10...16 mm <sup>2</sup> /AWG 8...AWG 6<br>Motor: screw terminal 10...16 mm <sup>2</sup> /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   |
| 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   |

|  |  |
|--|--|
| 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

|                                       |  |
|---------------------------------------|--|
| 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 m <sup>3</sup> /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   |
| Product certifications                | ATEX zone 2/22[RETURN]TÜV[RETURN]ATEX<br>INERIS[RETURN]CSA[RETURN]UL[RETURN]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 Height             | 25.500 cm |
| Package 1 Width              | 73.500 cm |
| Package 1 Length             | 34.000 cm |
| Package 1 Weight             | 16.710 kg |
| Unit Type of Package 2       | P06       |
| Number of Units in Package 2 | 4         |
| Package 2 Height             | 90.000 cm |
| Package 2 Width              | 60.000 cm |
| Package 2 Length             | 80.000 cm |
| Package 2 Weight             | 78.472 kg |

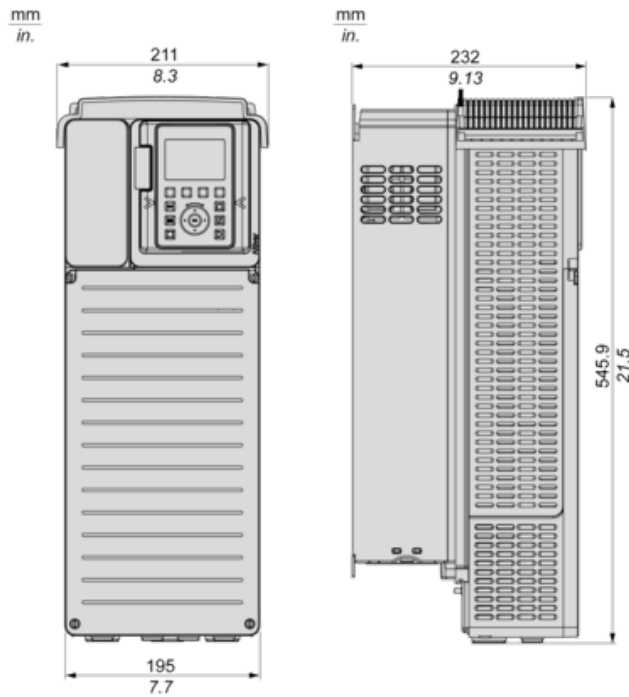
## Offer Sustainability

|                            |   |
|----------------------------|---|
| Sustainable offer status   | Green Premium product   |
| REACH Regulation           | <a href="#">REACH Declaration</a>   |
| EU RoHS Directive          | Pro-active compliance (Product out of EU RoHS legal scope)  |
| Mercury free               | Yes   |
| China RoHS Regulation      | <a href="#">China RoHS Declaration</a>  |
| RoHS exemption information | <a href="#">Yes</a>   |
| Environmental Disclosure   | <a href="#">Product Environmental Profile</a>   |
| Circularity Profile        | <a href="#">End Of Life Information</a>   |
| 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

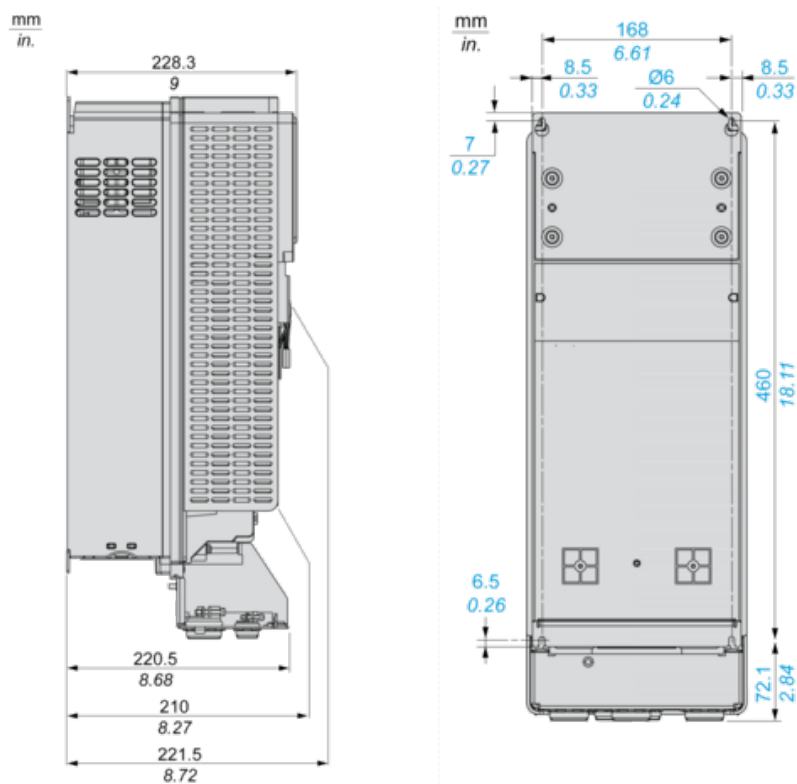
Drives with IP21 Top Cover

Front and Left Views



Drives Without IP21 Top Cover

Left and Rear Views



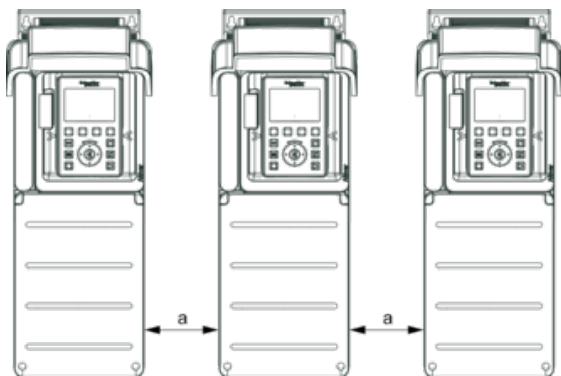
Clearances



| 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



$a \geq 100 \text{ mm (3.94 in.)}$



Mounting Type B: Side by Side IP20



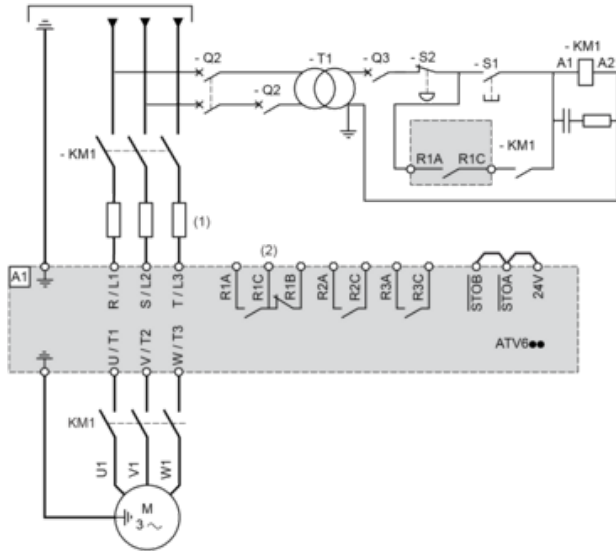
Mounting Type C: Individual IP20



$a \geq 0$

Three-Phase Power Supply with Upstream Breaking via Line Contactor

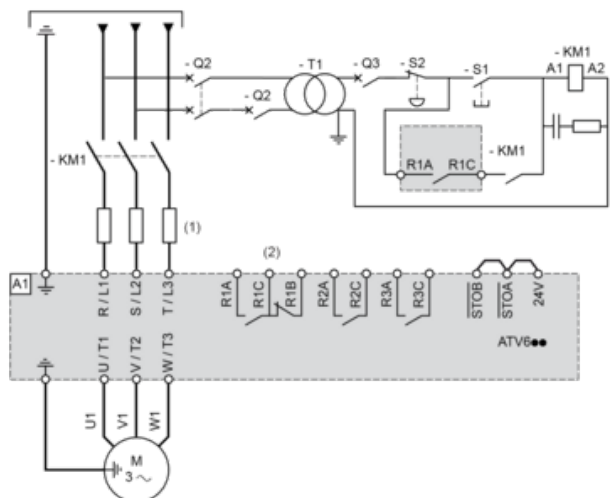
Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1



- (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

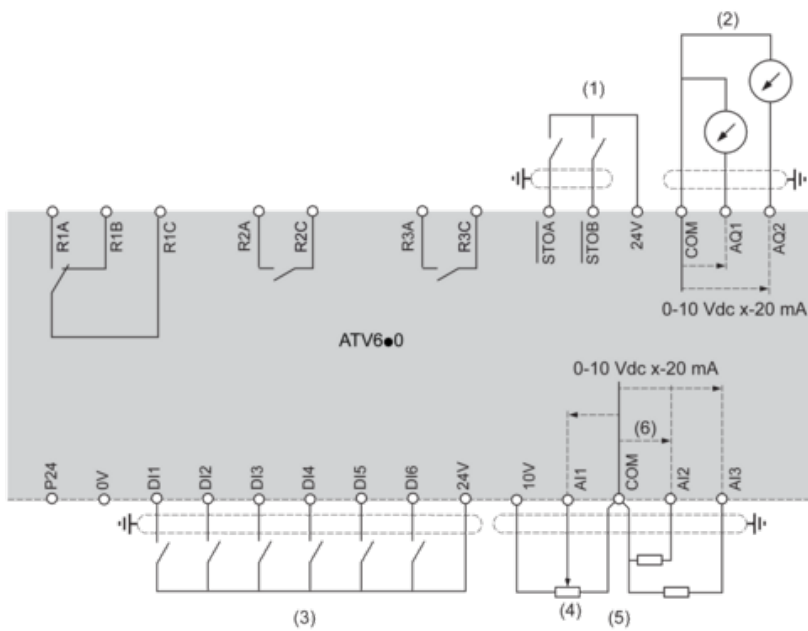
Three-Phase Power Supply with Downstream Breaking via Contactor

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

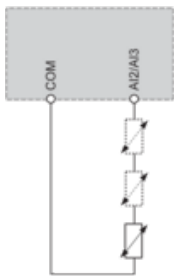
## Control Block Wiring Diagram



- (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.

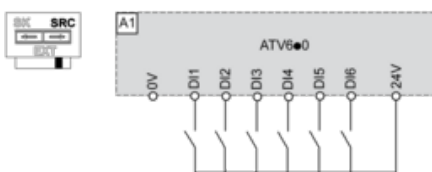


## Sink / Source Switch Configuration

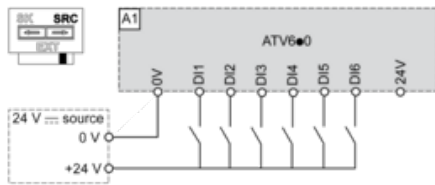
The switch is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

- 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.

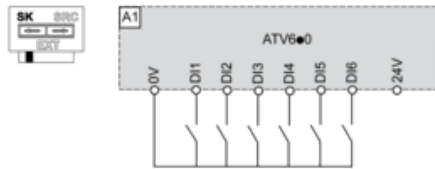
## Switch Set to SRC (Source) Position Using the Output Power Supply for the Digital Inputs



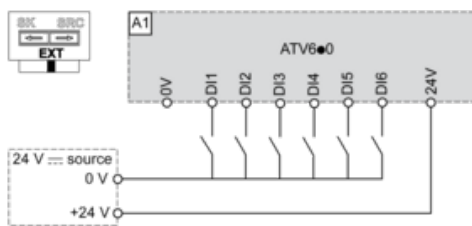
### Switch Set to SRC (Source) Position and Use of an External Power Supply for the DIs



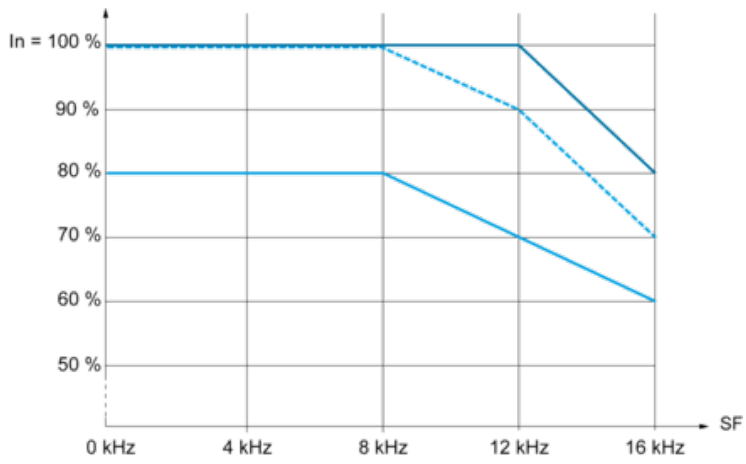
### Switch Set to SK (Sink) Position Using the Output Power Supply for the Digital Inputs



### 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