





## 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 C3                                                                                                                |
| IP degree of protection            | IP00 conforming to IEC 61800-5-1<br>IP00 conforming to IEC 60529<br>IP21 (with kit VW3A9113) conforming to IEC 61800-5-1<br>IP21 (with kit VW3A9113) conforming to IEC 60529 |
| Type of cooling                    | Forced convection                                                                                                                                                            |
| Supply frequency                   | 50...60 Hz - 5...5 %                                                                                                                                                         |
| [Us] rated supply voltage          | 380...480 V - 15...10 %                                                                                                                                                      |
| Motor power kW                     | 250 KW (normal duty)<br>220 kW (heavy duty)                                                                                                                                  |
| Motor power hp                     | 400 Hp normal duty<br>300 hp heavy duty                                                                                                                                      |
| Line current                       | 451 A at 380 V (normal duty)<br>366 A at 480 V (normal duty)<br>365 A at 380 V (heavy duty)<br>301 A at 480 V (heavy duty)                                                   |
| Prospective line I <sub>sc</sub>   | 50 kA                                                                                                                                                                        |
| Apparent power                     | 279 KVA at 480 V (normal duty)<br>229 kVA at 480 V (heavy duty)                                                                                                              |
| Continuous output current          | 481 A at 2.5 kHz for normal duty<br>387 A at 2.5 kHz for heavy duty                                                                                                          |
| Maximum transient current          | 529 A during 60 s (normal duty)<br>581 A during 60 s (heavy duty)                                                                                                            |
| Asynchronous motor control profile | Variable torque standard<br>Constant torque standard<br>Optimized torque mode                                                                                                |
| Synchronous motor control profile  | Permanent magnet motor<br>Synchronous reluctance motor                                                                                                                       |
| Output frequency                   | 0.0001...0.5 kHz                                                                                                                                                             |
| Speed drive output frequency       | 0.1...599 Hz                                                                                                                                                                 |
| Nominal switching frequency        | 2.5 kHz                                                                                                                                                                      |
| Switching frequency                | 2.5...8 kHz with derating factor<br>2...8 kHz adjustable                                                                                                                     |
| Safety function                    | STO (safe torque off) SIL 3                                                                                                                                                  |
| Discrete input logic               | 16 preset speeds                                                                                                                                                             |

| Communication port protocol | Modbus TCP<br>Modbus serial<br>Ethernet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Output voltage                      | $\leq$ 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             | Automatic whatever the load<br>Adjustable<br>Not available in permanent magnet motor law<br>Can be suppressed                                                                                                                                                                                                                                                                                                                                                                                                                |
| Acceleration and deceleration ramps | Linear adjustable separately from 0.01...9999 s                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 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 |
| Frequency resolution                | Display unit: 0.1 Hz<br>Analog input: 0.012/50 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Electrical connection               | Control: removable screw terminals 0.5...1.5 mm <sup>2</sup> /AWG 20...AWG 16<br>Line side: screw terminal 4 x 185 mm <sup>2</sup> /3 x 350 kcmil<br>Motor: screw terminal 4 x 185 mm <sup>2</sup> /3 x 350 kcmil                                                                                                                                                                                                                                                                                                            |
| Connector type                      | RJ45 (on the remote graphic terminal) for Ethernet/Modbus TCP<br>RJ45 (on the remote graphic terminal) for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                     |
| 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                               | 598 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Height                              | 1195 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Depth                               | 380 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Net weight                                 | 203 kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Analogue input number                      | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Analogue input type                        | AI1, AI2, AI3 software-configurable voltage: 0...10 V DC, impedance: 30 kOhm, resolution 12 bits<br>AI1, AI2, AI3 software-configurable current: 0...20 mA/4...20 mA, impedance: 250 Ohm, resolution 12 bits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Discrete input number                      | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Discrete input type                        | DI1...DI6 programmable, 24 V DC ( $\leq 30$ V), impedance: 3.5 kOhm<br>DI5, DI6 programmable as pulse input: 0...30 kHz, 24 V DC ( $\leq 30$ V)<br>STOA, STOB safe torque off, 24 V DC ( $\leq 30$ V), impedance: $> 2.2$ kOhm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 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...DI6), $< 5$ V (state 0), $> 11$ V (state 1)<br>Negative logic (sink) (DI1...DI6), $> 16$ V (state 0), $< 10$ V (state 1)<br>Positive logic (source) (DI5, DI6), $< 0.6$ V (state 0), $> 2.5$ V (state 1)<br>Positive logic (source) (STOA, STOB), $< 5$ V (state 0), $> 11$ V (state 1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Analogue output number                     | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Analogue output type                       | Software-configurable voltage AO1, AO2: 0...10 V DC impedance 470 Ohm, resolution 10 bits<br>Software-configurable current AO1, AO2: 0...20 mA, resolution 10 bits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Sampling duration                          | 2 Ms $\pm 0.5$ ms (DI1...DI4) - discrete input<br>5 Ms $\pm 1$ ms (DI5, DI6) - discrete input<br>5 Ms $\pm 0.1$ ms (AI1, AI2, AI3) - analog input<br>10 ms $\pm 1$ ms (AO1) - analog output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Accuracy                                   | $\pm 0.6$ % AI1, AI2, AI3 for a temperature variation 60 °C analog input<br>$\pm 1$ % AO1, AO2 for a temperature variation 60 °C analog output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Linearity error                            | AI1, AI2, AI3: $\pm 0.15$ % of maximum value for analog input<br>AO1, AO2: $\pm 0.2$ % 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 ( $\pm 0.5$ 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 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                     | 250...500 kW at 380...440 V 3 phases<br>250...500 kW at 480...500 V 3 phases                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## Environment

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Insulation resistance                 | > 1 MOhm 500 V DC for 1 minute to earth                                                                                                                                                                                                                                                                                                                                                                                          |
| Noise level                           | 68 dB conforming to 86/188/EEC                                                                                                                                                                                                                                                                                                                                                                                                   |
| Power dissipation in W                | Forced convection: 5773 W<br>Natural convection: 606 W at 380 V, switching frequency 2.5 kHz                                                                                                                                                                                                                                                                                                                                     |
| Volume of cooling air                 | 1260 m <sup>3</sup> /h                                                                                                                                                                                                                                                                                                                                                                                                           |
| Operating position                    | Vertical +/- 10 degree                                                                                                                                                                                                                                                                                                                                                                                                           |
| Maximum THDI                          | <48 % full 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 | -10...40 °C (without derating)<br>40...60 °C (with derating factor)                                                                                                                                                                                                                                                                                                                                                              |
| Ambient air temperature for storage   | -25...70 °C                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Operating altitude                    | <= 1000 m without derating<br>1000...3000 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                | CSA<br>UL<br>TÜV                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Marking                               | CE                                                                                                                                                                                                                                                                                                                                                                                                                               |

## Packing Units

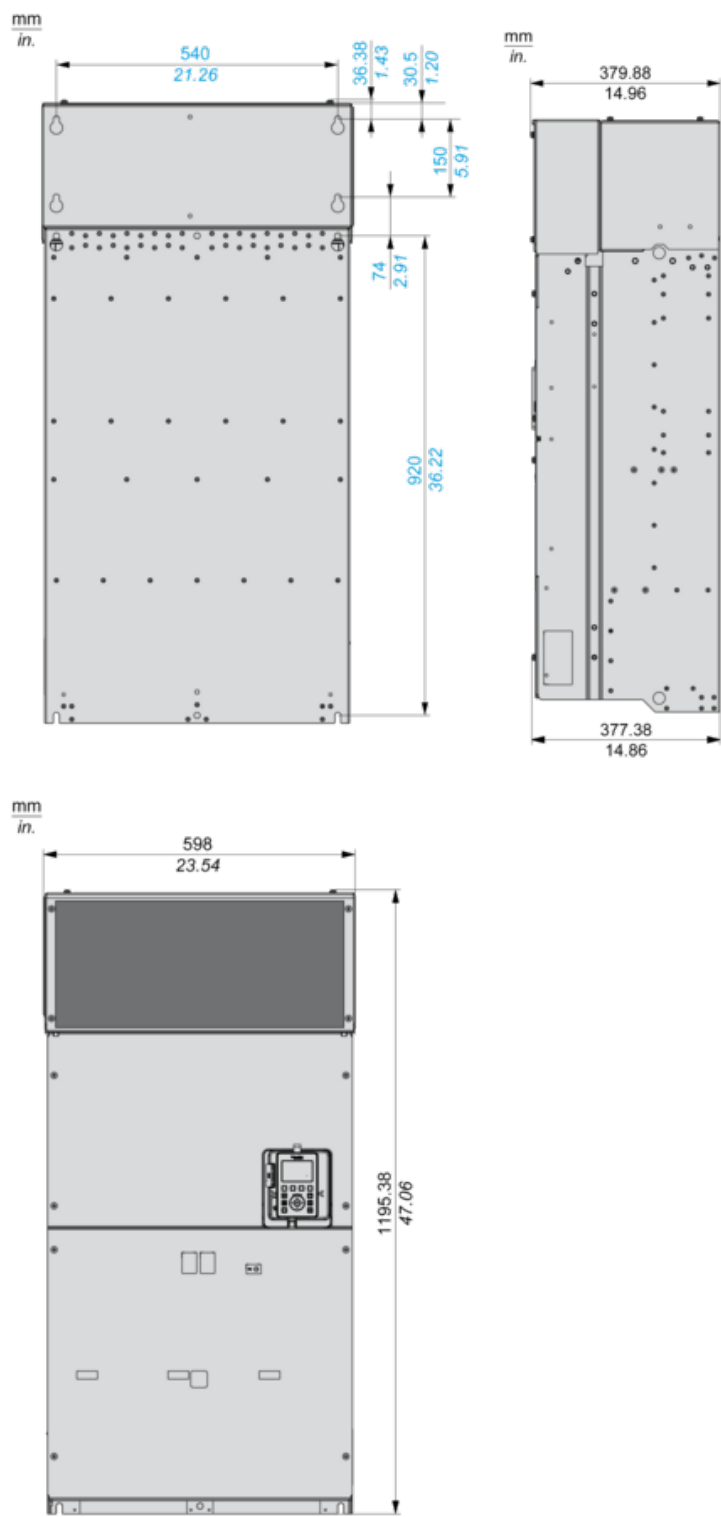
|                  |            |
|------------------|------------|
| Package 1 Weight | 207.000 kg |
| Package 1 Height | 11.950 dm  |
| Package 1 width  | 5.980 dm   |
| Package 1 Length | 3.800 dm   |

## 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)  <a href="#">EU RoHS Declaration</a> |
| Mercury free               | Yes                                                                                                                                                                                  |
| RoHS exemption information |  <a href="#">Yes</a>                                                                              |
| China RoHS Regulation      |  <a href="#">China RoHS Declaration</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             |  <a href="#">Upgraded Components Available</a>                                                    |

Dimensions

Rear, Right and Front Views



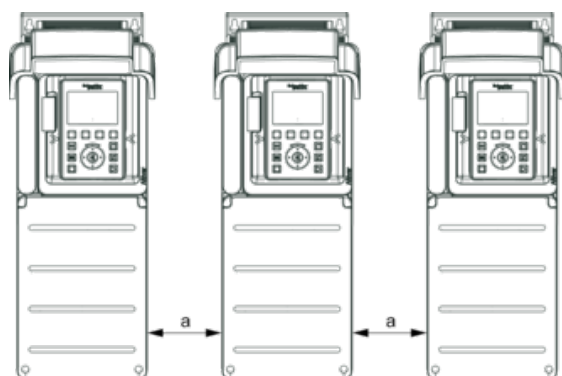
## Clearances



| X1                               | X2                               | X3                              |
|----------------------------------|----------------------------------|---------------------------------|
| $\geq 200 \text{ mm (7.87 in.)}$ | $\geq 150 \text{ mm (5.91 in.)}$ | $\geq 10 \text{ mm (0.39 in.)}$ |

## Mounting Types

### Mounting Type A: Individual IP21



$a \geq 0$

### 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.

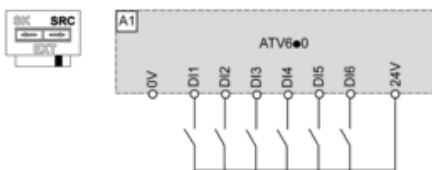


## Sink / Source Switch Configuration

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



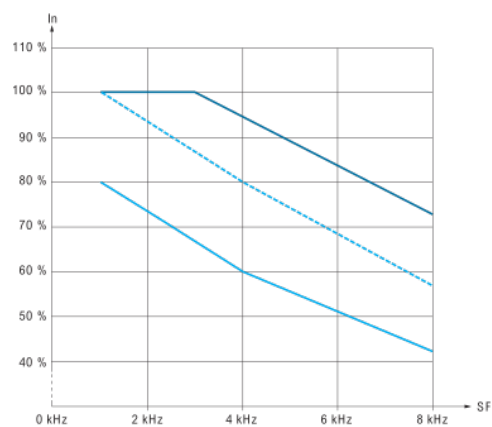
### Switch Set to SK (Sink) Position Using the Output Power Supply for the Digital Inputs



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



## Derating Curves



— 40 °C (104 °F)

--- 50 °C (113 °F)

— 60 °C (140 °F)

$I_n$  : Nominal Drive Current

$SF$  : Switching Frequency