





## 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                                                                                                                                    |
| Mounting mode                      | Wall mount                                                                                                                                                                   |
| 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 %                                                                                                                                                         |
| Network number of phases           | 3 phases                                                                                                                                                                     |
| [Us] rated supply voltage          | 380...480 V - 15...10 %                                                                                                                                                      |
| Motor power kW                     | 315 kW (normal duty)<br>250 kW (heavy duty)                                                                                                                                  |
| Motor power hp                     | 500 Hp normal duty<br>400 hp heavy duty                                                                                                                                      |
| Line current                       | 569 A at 380 V (normal duty)<br>461 A at 480 V (normal duty)<br>457 A at 380 V (heavy duty)<br>375 A at 480 V (heavy duty)                                                   |
| Prospective line I <sub>sc</sub>   | 50 kA                                                                                                                                                                        |
| Apparent power                     | 351 KVA at 480 V (normal duty)<br>286 kVA at 480 V (heavy duty)                                                                                                              |
| Continuous output current          | 616 A at 2.5 kHz for normal duty<br>481 A at 2.5 kHz for heavy duty                                                                                                          |
| Maximum transient current          | 678 A during 60 s (normal duty)<br>722 A during 60 s (heavy duty)                                                                                                            |
| Asynchronous motor control profile | Constant torque standard<br>Optimized torque mode<br>Variable torque standard                                                                                                |
| 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 serial<br>Ethernet<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

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output voltage                      | $\leq$ power supply voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Permissible temporary current boost | 1.1 x $I_n$ during 60 s (normal duty)<br>1.5 x $I_n$ during 60 s (heavy duty)                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Motor slip compensation             | Adjustable<br>Can be suppressed<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                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 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                                                                                                                                                                                                                                                                                                                                                                                                     |
| Physical interface                  | 2-wire RS 485 for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Transmission frame                  | RTU for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Transmission rate                   | 10/100 Mbit/s for Ethernet IP/Modbus TCP<br>4.8, 9.6, 19.2, 38.4 kbit/s for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Exchange mode                       | Half duplex, full duplex, autonegotiation Ethernet/Modbus TCP                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Data format                         | 8 bits, configurable odd, even or no parity for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Type of polarization                | No impedance for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Number of addresses                 | 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 LEDslocal diagnostic:<br>3 LEDs (dual colour)embedded communication status:<br>4 LEDs (dual colour)communication module status:<br>1 LED (red)presence of voltage:                                                                                                                                                                                       |
| Width                     | 598 mm                                                                                                                                                                                                                                                                                                                                                     |
| Height                    | 1195 mm                                                                                                                                                                                                                                                                                                                                                    |
| Depth                     | 380 mm                                                                                                                                                                                                                                                                                                                                                     |
| Product 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

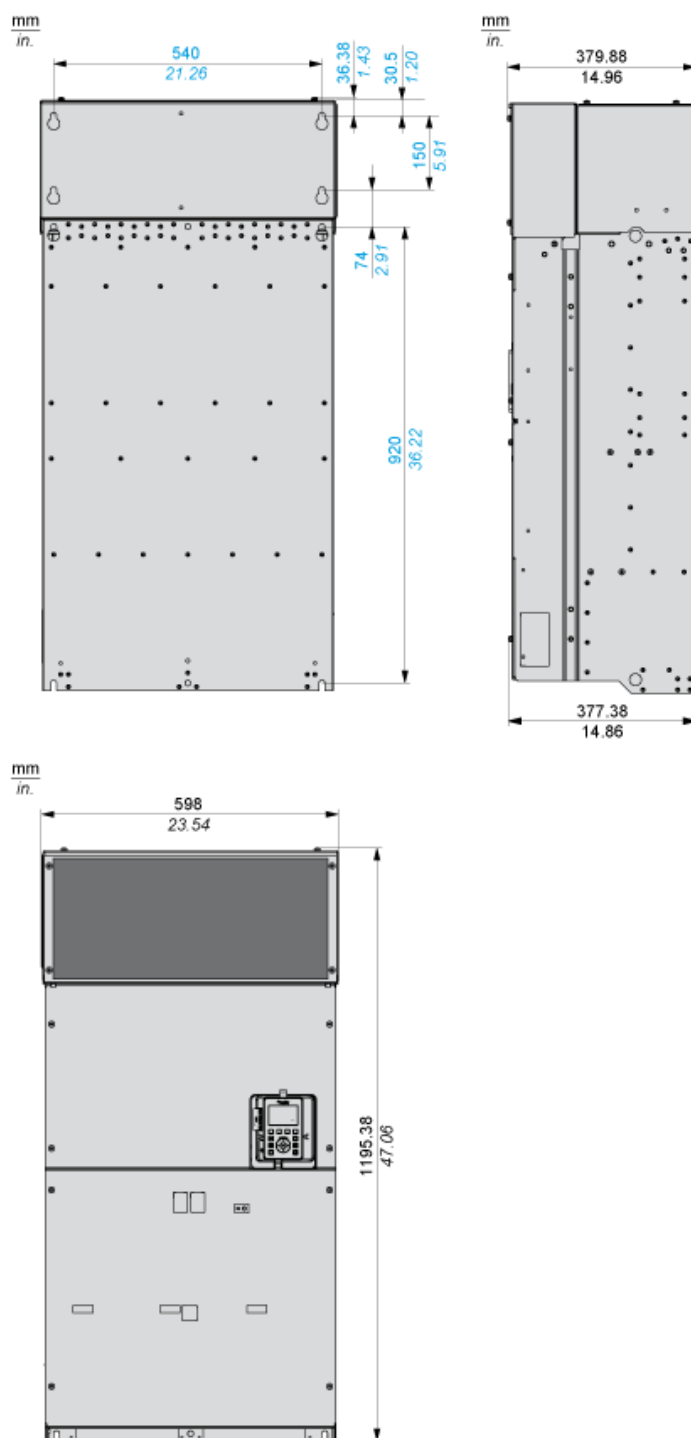
|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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: 7099 W<br>Natural convection: 769 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)<br>40...60 °C (with derating factor)                                                                                                                                                                                                                                                                                                                                                                       |
| Ambient air temperature for storage   | -25...70 °C                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Operating altitude                    | <= 1000 m without<br>1000...3000 m with current derating 1 % per 100 m                                                                                                                                                                                                                                                                                                                                                           |
| Environmental characteristic          | Chemical pollution resistance class 3C2 conforming to EN/IEC 60721-3-3<br>Dust pollution resistance class 3S2 conforming to EN/IEC 60721-3-3                                                                                                                                                                                                                                                                                     |
| 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                | UL<br>REACH<br>TÜV<br>CSA                                                                                                                                                                                                                                                                                                                                                                                                        |
| Marking                               | CE                                                                                                                                                                                                                                                                                                                                                                                                                               |

## Offer Sustainability

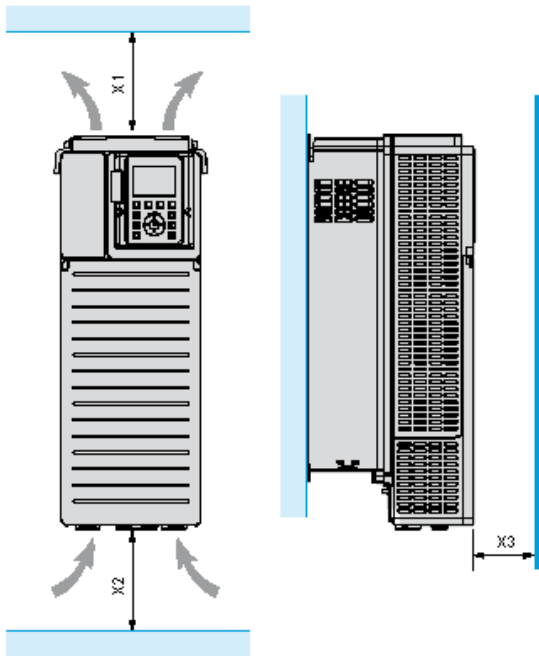
|                            |                                                                                                                             |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Sustainable offer status   | Green Premium product                                                                                                       |
| 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 |

## Dimensions

### Rear, Right and Front Views



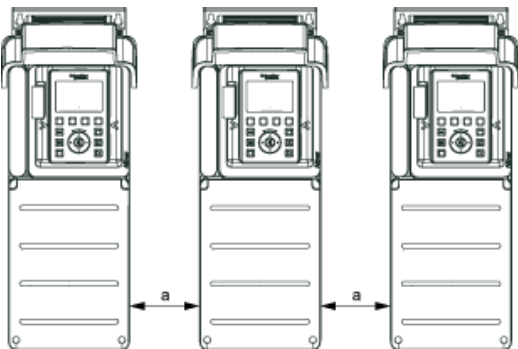
Clearances



| X1                  | X2                  | X3                 |
|---------------------|---------------------|--------------------|
| ≥ 200 mm (7.87 in.) | ≥ 150 mm (5.91 in.) | ≥ 10 mm (0.39 in.) |

Mounting Types

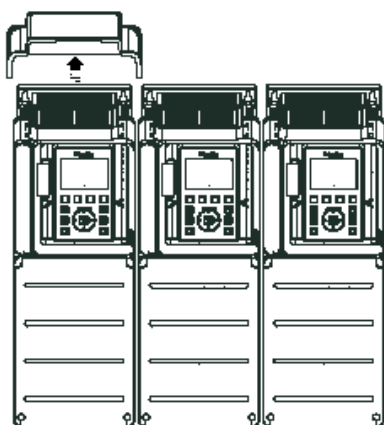
Mounting Type A: Individual IP21



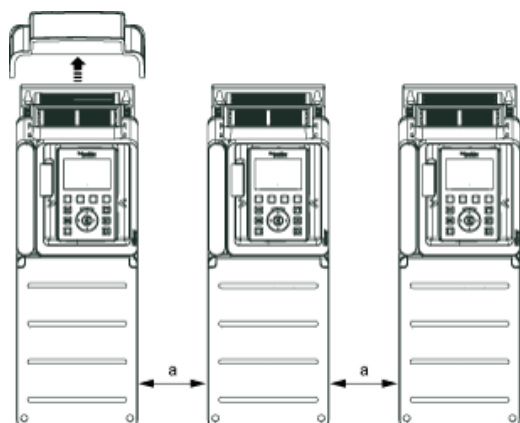
$a \geq 0$



### Mounting Type B: Side by Side IP20



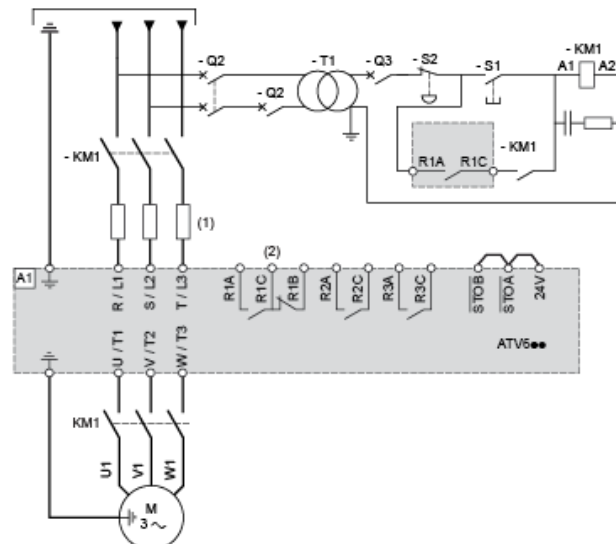
### Mounting Type C: Individual IP20



$a \geq 0$

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

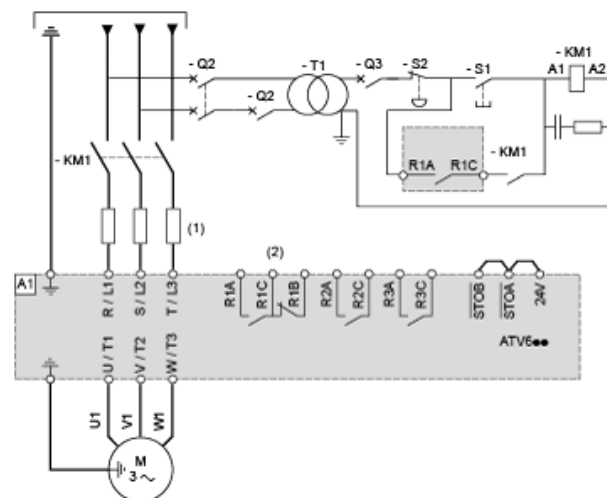
Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1



- (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, Circuit breakers
- Q3 :
- S1, Pushbuttons
- S2 :
- T1 : Transformer for control part

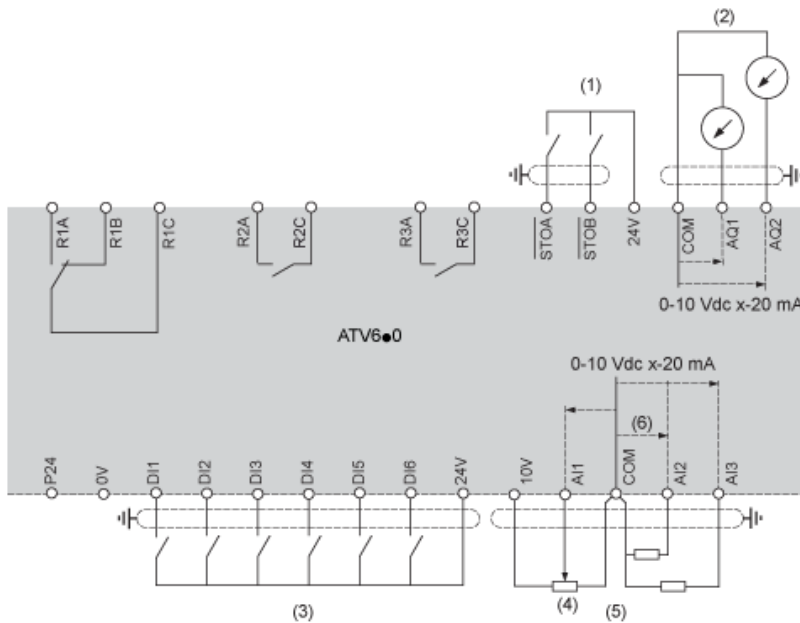
## Three-Phase Power Supply with Downstream Breaking via Contactor

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

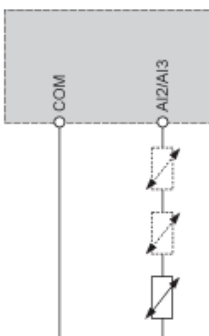
## Control Block Wiring Diagram



- (1) Safe Torque Off
- (2) Analog Output
- (3) Digital Input
- (4) Reference potentiometer
- (5) Analog Input
- R1A, Fault relay
- R1B,
- R1C :
- R2A, Sequence relay
- R2C :
- R3A, Sequence relay
- R3C :

## Sensor Connection

It is possible to connect either 1 or 3 sensors on terminals AI2 or AI3.

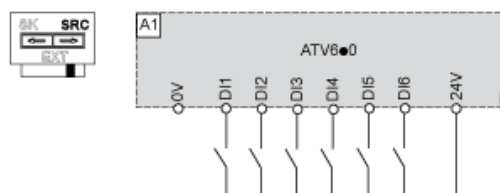


## Sink / Source Switch Configuration

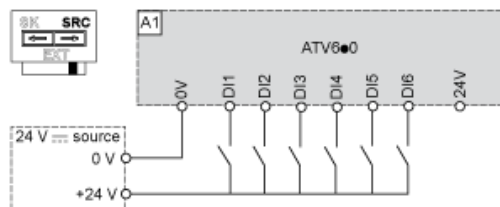
The switch is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

- 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.

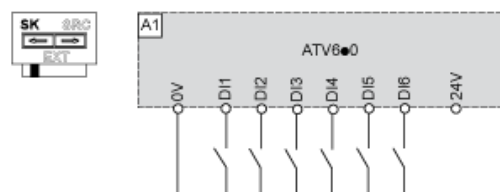
## Switch Set to SRC (Source) Position Using the Output Power Supply for the Digital Inputs



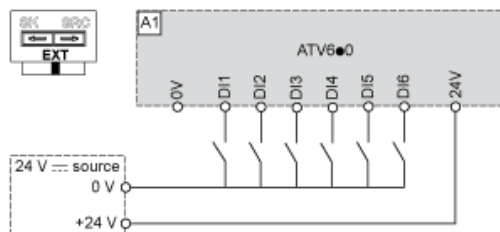
## Switch Set to SRC (Source) Position and Use of an External Power Supply for the DI6



## 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 DI6



### Derating Curves

