

## Product data sheet

### Characteristics

# ATV630U15N4

Variable speed drive, Altivar Process ATV600,  
ATV630, 1.5kW/2 hp, 380...480 V, IP21/UL  
type 1





## Main

|                                    |                                                                                                                                 |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Range of product                   | Altivar Process ATV600                                                                                                          |
| Product or component type          | Variable speed drive                                                                                                            |
| Product specific application       | Process and utilities                                                                                                           |
| Device short name                  | ATV630                                                                                                                          |
| Variant                            | Standard version                                                                                                                |
| Product destination                | Asynchronous motors<br>Synchronous motors                                                                                       |
| EMC filter                         | Integrated with 50 m conforming to EN/IEC 61800-3 category C2<br>Integrated with 150 m conforming to EN/IEC 61800-3 category C3 |
| IP degree of protection            | IP21 conforming to IEC 61800-5-1<br>IP21 conforming to IEC 60529                                                                |
| [Us] rated supply voltage          | 380...480 V                                                                                                                     |
| Degree of protection               | UL type 1 conforming to UL 508C                                                                                                 |
| Type of cooling                    | Forced convection                                                                                                               |
| Supply frequency                   | 50...60 Hz - 5...5 %                                                                                                            |
| [Us] rated supply voltage          | 380...480 V - 15...10 %                                                                                                         |
| Motor power kW                     | 1.5 KW (normal duty)<br>0.75 kW (heavy duty)                                                                                    |
| Motor power hp                     | 2 Hp normal duty<br>1 hp heavy duty                                                                                             |
| Line current                       | 3 A at 380 V (normal duty)<br>2.6 A at 480 V (normal duty)<br>1.7 A at 380 V (heavy duty)<br>1.5 A at 480 V (heavy duty)        |
| Prospective line Isc               | 50 kA                                                                                                                           |
| Apparent power                     | 2.2 KVA at 480 V (normal duty)<br>1.2 kVA at 480 V (heavy duty)                                                                 |
| Continuous output current          | 4 A at 4 kHz for normal duty<br>2.2 A at 4 kHz for heavy duty                                                                   |
| Maximum transient current          | 4.4 A during 60 s (normal duty)<br>3.3 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                                                                          |
| Speed drive output frequency       | 0.1...500 Hz                                                                                                                    |
| Nominal switching frequency        | 4 kHz                                                                                                                           |
| Switching frequency                | 2...12 kHz adjustable<br>4...12 kHz with derating factor                                                                        |
| Safety function                    | STO (safe torque off) SIL 3                                                                                                     |
| Discrete input logic               | 16 preset speeds                                                                                                                |

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Communication port protocol | Modbus TCP<br>Ethernet<br>Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Option card                 | Slot A: communication module, Profibus DP V1<br>Slot A: communication module, PROFINET<br>Slot A: communication module, DeviceNet<br>Slot A: communication module, Modbus TCP/EtherNet/IP<br>Slot A: communication module, CANopen daisy chain RJ45<br>Slot A: communication module, CANopen SUB-D 9<br>Slot A: communication module, CANopen screw terminals<br>Slot A/slot B: digital and analog I/O extension module<br>Slot A/slot B: output relay extension module<br>Slot A: communication module, Ethernet IP/Modbus TCP/MD-Link<br>Communication module, BACnet MS/TP<br>Communication module, Ethernet Powerlink |

## Complementary

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mounting mode                       | Wall mount                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Network number of phases            | 3 phases                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Discrete output number              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Discrete output type                | Relay outputs R1A, R1B, R1C 250 V AC 3000 mA<br>Relay outputs R1A, R1B, R1C 30 V DC 3000 mA<br>Relay outputs R2A, R2C 250 V AC 5000 mA<br>Relay outputs R2A, R2C 30 V DC 5000 mA<br>Relay outputs R3A, R3C 250 V AC 5000 mA<br>Relay outputs R3A, R3C 30 V DC 5000 mA                                                                                                                                                                                                                                                        |
| Output voltage                      | <= power supply voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Permissible temporary current boost | 1.1 x I <sub>n</sub> during 60 s (normal duty)<br>1.5 x I <sub>n</sub> during 60 s (heavy duty)                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Motor slip compensation             | Can be suppressed<br>Adjustable<br>Not available in permanent magnet motor law<br>Automatic whatever the load                                                                                                                                                                                                                                                                                                                                                                                                                |
| Acceleration and deceleration ramps | Linear adjustable separately from 0.01...9999 s                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Physical interface                  | Ethernet<br>2-wire RS 485                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Braking to standstill               | By DC injection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Protection type                     | Thermal protection: motor<br>Safe torque off: motor<br>Motor phase break: motor<br>Thermal protection: drive<br>Safe torque off: drive<br>Overheating: drive<br>Overcurrent between output phases and earth: drive<br>Overload of output voltage: drive<br>Short-circuit protection: drive<br>Motor phase break: drive<br>Overvoltages on the DC bus: drive<br>Line supply overvoltage: drive<br>Line supply undervoltage: drive<br>Line supply phase loss: drive<br>Overspeed: drive<br>Break on the control circuit: drive |
| Transmission rate                   | 10, 100 Mbits<br>4800 bps, 9600 bps, 19200 bps, 38.4 Kbps                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Frequency resolution                | Display unit: 0.1 Hz<br>Analog input: 0.012/50 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Transmission frame                  | RTU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Electrical connection               | Control: removable screw terminals 0.5...1.5 mm <sup>2</sup> /AWG 20...AWG 16<br>Motor: screw terminal 2.5...6 mm <sup>2</sup> /AWG 14...AWG 10<br>Line side: screw terminal 2.5...6 mm <sup>2</sup> /AWG 14...AWG 10                                                                                                                                                                                                                                                                                                        |
| Connector type                      | RJ45 (on the remote graphic terminal) for Ethernet/Modbus TCP<br>RJ45 (on the remote graphic terminal) for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                                     |
| Data format                         | 8 bits, configurable odd, even or no parity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Type of polarization                | No impedance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exchange mode             | Half duplex, full duplex, autonegotiation Ethernet/Modbus TCP                                                                                                                                                                                                                                                                                                                                                  |
| Number of addresses       | 1...247 for Modbus serial                                                                                                                                                                                                                                                                                                                                                                                      |
| Method of access          | Slave Modbus TCP                                                                                                                                                                                                                                                                                                                                                                                               |
| Supply                    | External supply for digital inputs: 24 V DC (19...30 V), <1.25 mA, protection type: overload and short-circuit protection<br>Internal supply for reference potentiometer (1 to 10 kOhm): 10.5 V DC +/- 5 %, <10 mA, protection type: overload and short-circuit protection<br>Internal supply for digital inputs and STO: 24 V DC (21...27 V), <200 mA, protection type: overload and short-circuit protection |
| Local signalling          | 3 LEDs for local diagnostic<br>3 LEDs (dual colour) for embedded communication status<br>4 LEDs (dual colour) for communication module status<br>1 LED (red) for presence of voltage                                                                                                                                                                                                                           |
| Width                     | 144 mm                                                                                                                                                                                                                                                                                                                                                                                                         |
| Height                    | 350 mm                                                                                                                                                                                                                                                                                                                                                                                                         |
| Depth                     | 203 mm                                                                                                                                                                                                                                                                                                                                                                                                         |
| Net weight                | 4.5 kg                                                                                                                                                                                                                                                                                                                                                                                                         |
| Analogue input number     | 3                                                                                                                                                                                                                                                                                                                                                                                                              |
| Analogue input type       | AI1, AI2, AI3 software-configurable voltage: 0...10 V DC, impedance: 31.5 kOhm, resolution 12 bits<br>AI1, AI2, AI3 software-configurable current: 0...20 mA, impedance: 250 Ohm, resolution 12 bits<br>AI2 voltage analog input: - 10...10 V DC, impedance: 31.5 kOhm, resolution 12 bits                                                                                                                     |
| Discrete input number     | 8                                                                                                                                                                                                                                                                                                                                                                                                              |
| Discrete input type       | DI7, DI8 programmable as pulse input: 0...30 kHz, 24 V DC (<= 30 V)                                                                                                                                                                                                                                                                                                                                            |
| Input compatibility       | DI1...DI6: discrete input level 1 PLC conforming to EN/IEC 61131-2<br>DI5, DI6: discrete input level 1 PLC conforming to IEC 65A-68<br>STOA, STOB: discrete input level 1 PLC conforming to EN/IEC 61131-2                                                                                                                                                                                                     |
| Discrete input logic      | Positive logic (source) (DI1...DI8), < 5 V (state 0), > 11 V (state 1)<br>Negative logic (sink) (DI1...DI8), > 16 V (state 0), < 10 V (state 1)                                                                                                                                                                                                                                                                |
| Analogue output number    | 2                                                                                                                                                                                                                                                                                                                                                                                                              |
| Analogue output type      | Software-configurable voltage AQ1, AQ2: 0...10 V DC impedance 470 Ohm, resolution 10 bits<br>Software-configurable current AQ1, AQ2: 0...20 mA, resolution 10 bits<br>Software-configurable current DQ-, DQ+: 30 V DC<br>Software-configurable current DQ-, DQ+: 100 mA                                                                                                                                        |
| Sampling duration         | 2 Ms +/- 0.5 ms (DI1...DI4) - discrete input<br>5 Ms +/- 1 ms (DI5, DI6) - discrete input<br>5 Ms +/- 0.1 ms (AI1, AI2, AI3) - analog input<br>10 ms +/- 1 ms (AO1) - analog output                                                                                                                                                                                                                            |
| Accuracy                  | +/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input<br>+/- 1 % AO1, AO2 for a temperature variation 60 °C analog output                                                                                                                                                                                                                                                                     |
| Linearity error           | AI1, AI2, AI3: +/- 0.15 % of maximum value for analog input<br>AO1, AO2: +/- 0.2 % for analog output                                                                                                                                                                                                                                                                                                           |
| Relay output number       | 3                                                                                                                                                                                                                                                                                                                                                                                                              |
| Relay output type         | Configurable relay logic R1: fault relay NO/NC electrical durability 100000 cycles<br>Configurable relay logic R2: sequence relay NO electrical durability 100000 cycles<br>Configurable relay logic R3: sequence relay NO electrical durability 100000 cycles                                                                                                                                                 |
| Refresh time              | Relay output (R1, R2, R3): 5 ms (+/- 0.5 ms)                                                                                                                                                                                                                                                                                                                                                                   |
| Minimum switching current | Relay output R1, R2, R3: 5 mA at 24 V DC                                                                                                                                                                                                                                                                                                                                                                       |
| Maximum switching current | Relay output R1, R2, R3 on resistive load, cos phi = 1: 3 A at 250 V AC<br>Relay output R1, R2, R3 on resistive load, cos phi = 1: 3 A at 30 V DC<br>Relay output R1, R2, R3 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 250 V AC<br>Relay output R1, R2, R3 on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 30 V DC                                                                       |
| Isolation                 | Between power and control terminals                                                                                                                                                                                                                                                                                                                                                                            |
| Maximum output frequency  | 500 kHz                                                                                                                                                                                                                                                                                                                                                                                                        |
| Maximum input current     | 3.0 A                                                                                                                                                                                                                                                                                                                                                                                                          |

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Variable speed drive application selection | Compressor centrifugal Building - HVAC<br>Other application Food and beverage processing<br>Fan Mining mineral and metal<br>Pump Mining mineral and metal<br>Fan Oil and gas<br>Other application Water and waste water<br>Screw compressor Building - HVAC<br>Pump Food and beverage processing<br>Fan Food and beverage processing<br>Atomization Food and beverage processing<br>Electro submersible pump (ESP) Oil and gas<br>Water injection pump Oil and gas<br>Jet fuel pump Oil and gas<br>Compressor for refinery Oil and gas<br>Centrifuge pump Water and waste water<br>Positive displacement pump Water and waste water<br>Electro submersible pump (ESP) Water and waste water<br>Screw pump Water and waste water<br>Lobe compressor Water and waste water<br>Screw compressor Water and waste water<br>Compressor centrifugal Water and waste water<br>Fan Water and waste water<br>Conveyor Water and waste water<br>Mixer Water and waste water |
| Motor power range AC-3                     | 1.1...2 kW at 380...440 V 3 phases<br>1.1...2 kW at 480...500 V 3 phases                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Quantity per set                           | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Enclosure mounting                         | Wall mounted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## Environment

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Insulation resistance                 | > 1 MOhm 500 V DC for 1 minute to earth                                                                                                                                                                                                                                                                                                                                                                                          |
| Noise level                           | 54.5 dB conforming to 86/188/EEC                                                                                                                                                                                                                                                                                                                                                                                                 |
| Power dissipation in W                | Natural convection: 28 W at 380 V, switching frequency 4 kHz<br>Forced convection: 41 W at 380 V, switching frequency 4 kHz                                                                                                                                                                                                                                                                                                      |
| Volume of cooling air                 | 38 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 | -15...50 °C (without derating)<br>50...60 °C (with derating factor)                                                                                                                                                                                                                                                                                                                                                              |
| Ambient air temperature for storage   | -40...70 °C                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Operating altitude                    | <= 1000 m without derating<br>1000...4800 m with current derating 1 % per 100 m                                                                                                                                                                                                                                                                                                                                                  |
| Standards                             | UL 508C<br>EN/IEC 61800-3<br>Environment 1 category C2 EN/IEC 61800-3<br>Environment 2 category C3 EN/IEC 61800-3<br>EN/IEC 61800-5-1<br>IEC 61000-3-12<br>IEC 60721-3<br>IEC 61508<br>IEC 13849-1                                                                                                                                                                                                                               |
| Product certifications                | ATEX INERIS<br>DNV-GL<br>ATEX zone 2/22<br>UL<br>CSA<br>TÜV                                                                                                                                                                                                                                                                                                                                                                      |
| Marking                               | CE                                                                                                                                                                                                                                                                                                                                                                                                                               |

|                      |                                                                                                                                                                                                    |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standards            | UL 508C<br>EN/IEC 61800-3<br>EN/IEC 61800-3 environment 1 category C2<br>EN/IEC 61800-3 environment 2 category C3<br>EN/IEC 61800-5-1<br>IEC 61000-3-12<br>IEC 60721-3<br>IEC 61508<br>IEC 13849-1 |
| Overvoltage category | III                                                                                                                                                                                                |
| Regulation loop      | Adjustable PID regulator                                                                                                                                                                           |
| Noise level          | 54.5 dB                                                                                                                                                                                            |
| Pollution degree     | 2                                                                                                                                                                                                  |

## Packing Units

|                              |           |
|------------------------------|-----------|
| Unit Type of Package 1       | PCE       |
| Number of Units in Package 1 | 1         |
| Package 1 Weight             | 5.751 kg  |
| Package 1 Height             | 31.5 cm   |
| Package 1 width              | 19.0 cm   |
| Package 1 Length             | 40.5 cm   |
| Unit Type of Package 2       | P06       |
| Number of Units in Package 2 | 6         |
| Package 2 Weight             | 47.506 kg |
| Package 2 Height             | 73.5 cm   |
| Package 2 width              | 80.0 cm   |
| Package 2 Length             | 60.0 cm   |

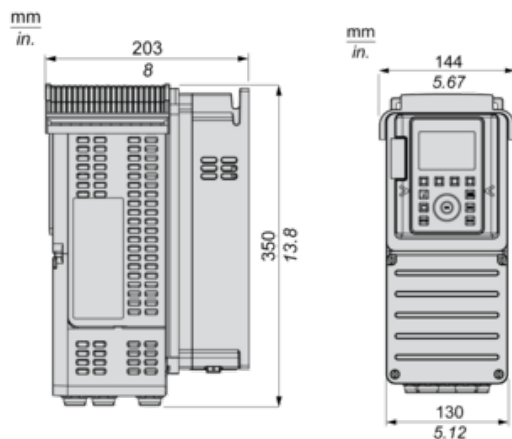
## Offer Sustainability

|                            |                                                                                                                             |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 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

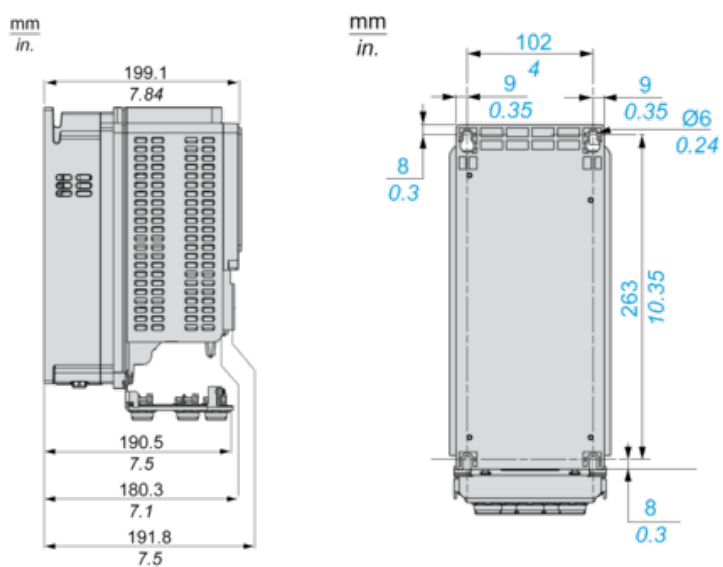
### Drives with IP21 Top Cover

Right and Front Views

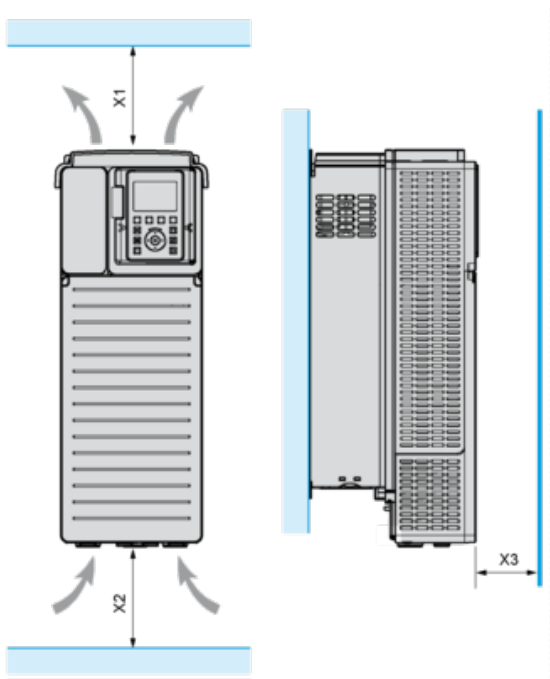


### Drives Without IP21 Top Cover

Left and Rear Views



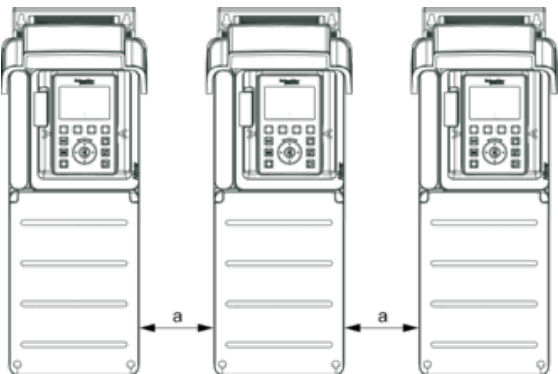
Clearances



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

Mounting Types

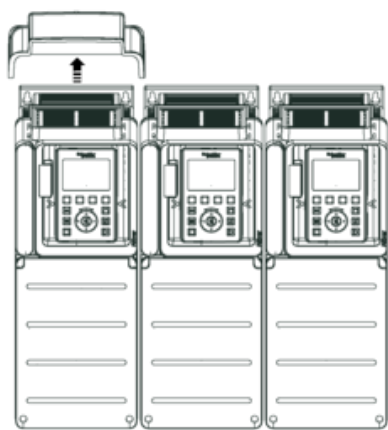
Mounting Type A: Individual IP21



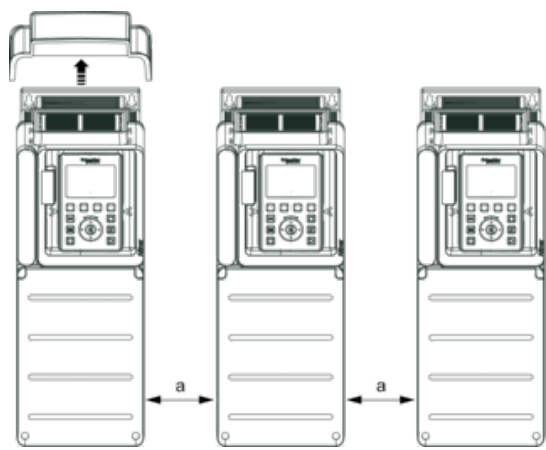
a ≥ 100 mm (3.94 in.)



### Mounting Type B: Side by Side IP20



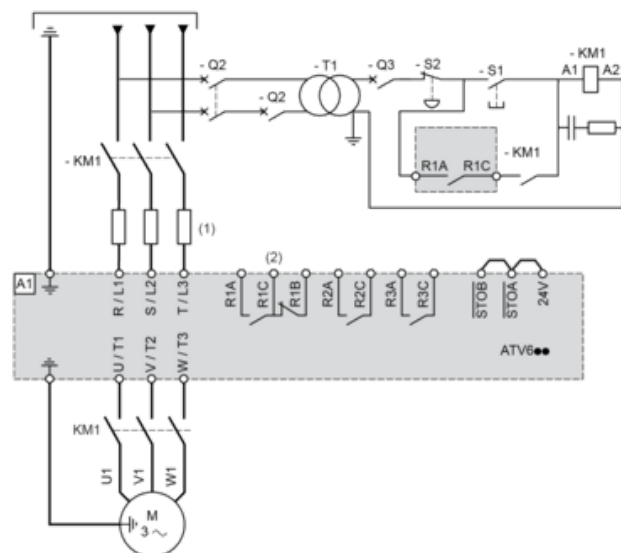
### Mounting Type C: Individual IP20



$a \geq 0$

## 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

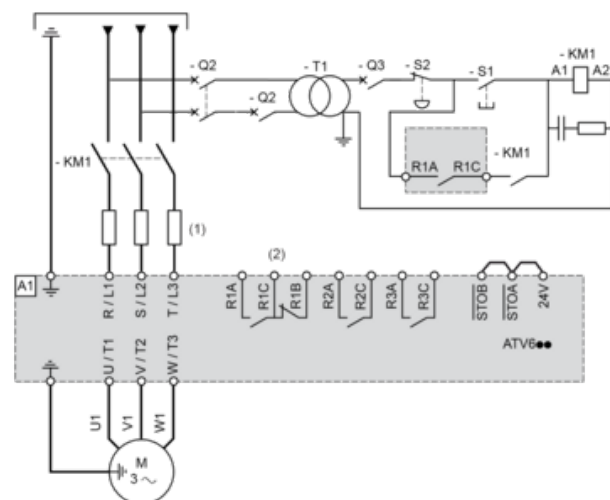
Q2, Q3 : Circuit breakers

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



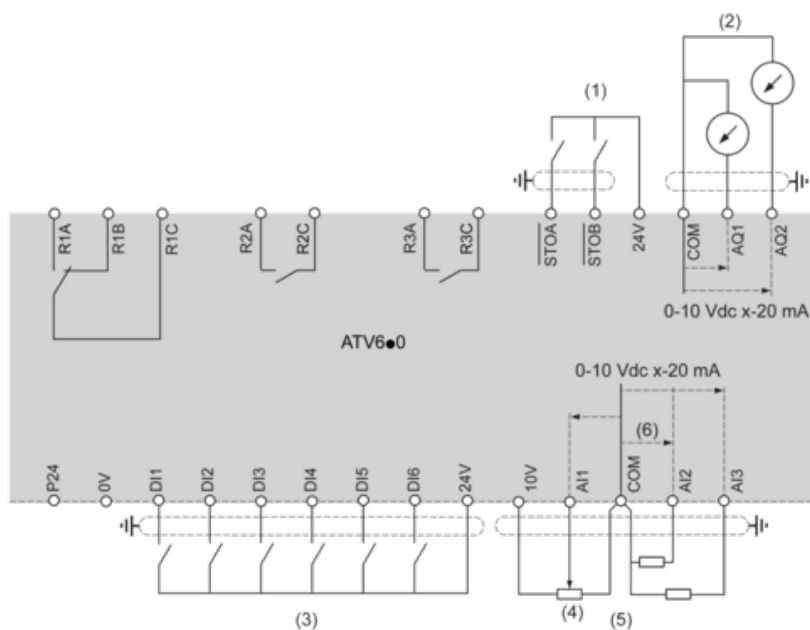
(1) Line choke if used

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

A1 : Drive

KM1 : Contactor

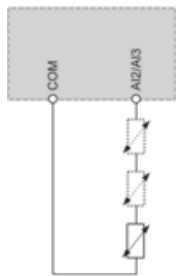
## Control Block Wiring Diagram



- (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.

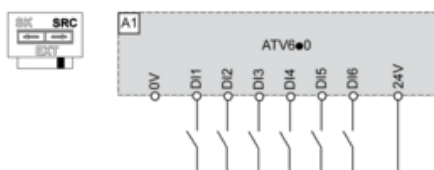


## Sink / Source Switch Configuration

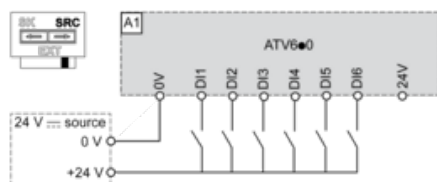
The switch is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

- 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.

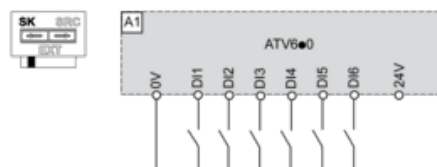
## Switch Set to SRC (Source) Position Using the Output Power Supply for the Digital Inputs



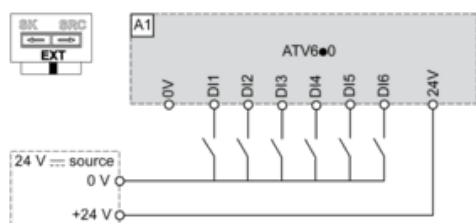
### Switch Set to SRC (Source) Position and Use of an External Power Supply for the DI6



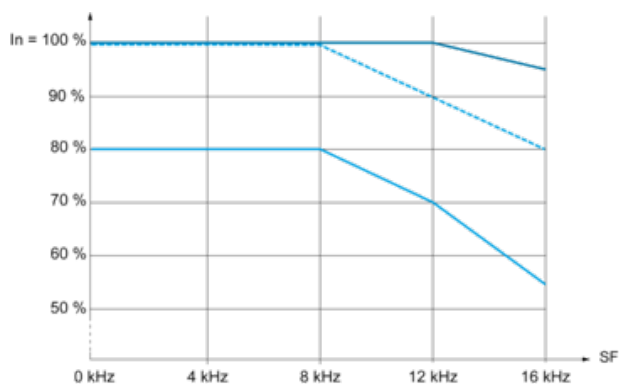
### Switch Set to SK (Sink) Position Using the Output Power Supply for the Digital Inputs



### Switch Set to EXT Position Using an External Power Supply for the DI6



### Derating Curves



— 40 °C (104 °F) - Mounting type A, B and C

--- 50 °C (122 °F) - Mounting type A, B and C

— 60 °C (140 °F) - Mounting type B and C

$I_n$  : Nominal Drive Current

SF : Switching Frequency