

# ATV630U22M3

Variable speed drive, Altivar Process ATV600,  
ATV630, 2.2kW/3 hp, 200...240 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                | Synchronous motors<br>Asynchronous motors                                                                |
| EMC filter                         | Without EMC filter                                                                                       |
| IP degree of protection            | IP21IEC 61800-5-1<br>IP21IEC 60529                                                                       |
| [Us] rated supply voltage          | 200...240 V                                                                                              |
| Degree of protection               | UL type 1 UL 508C                                                                                        |
| Type of cooling                    | Forced convection                                                                                        |
| Supply frequency                   | 50...60 Hz - 5...5 %                                                                                     |
| [Us] rated supply voltage          | 200...240 V - 15...10 %                                                                                  |
| Motor power kW                     | 2.2 KW normal duty)<br>1.5 kW heavy duty)                                                                |
| Maximum Horse Power Rating         | 3 Hp normal duty<br>2 hp heavy duty                                                                      |
| Line current                       | 8.4 A 200 V normal duty)<br>7.2 A 240 V normal duty)<br>6 A 200 V heavy duty)<br>5.3 A 240 V heavy duty) |
| Prospective line Isc               | 50 kA                                                                                                    |
| Apparent power                     | 3 KVA 240 V normal duty)<br>2.2 kVA 240 V heavy duty)                                                    |
| Continuous output current          | 11.2 A 4 kHz normal duty<br>8 A 4 kHz heavy duty                                                         |
| Maximum transient current          | 12 A 60 s heavy duty)<br>12.3 A 60 s normal 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 | Ethernet<br>Modbus serial<br>Modbus TCP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Option card                 | Slot A communication module, Profibus DP V1<br>Slot A communication module, Profinet<br>Slot A communication module, DeviceNet<br>Slot A communication module, Modbus TCP/<br>EtherNet/IP<br>Slot A communication module, CANopen daisy chain RJ45<br>Slot A communication module, CANopen SUB-D 9<br>Slot A communication module, CANopen screw terminals<br>Slot A/slot B digital and analog I/O extension module<br>Slot A/slot B output relay extension module<br>Slot A communication module, Ethernet IP/Modbus TCP/MD-Link<br>Communication module, BACnet MS/TP<br>Communication module, Ethernet Powerlink |

## Complementary

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mounting Mode                       | Wall mount                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Phase                               | 3 phase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 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> 60 s normal duty)<br>1.5 x I <sub>n</sub> 60 s heavy duty)                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Motor slip compensation             | Automatic whatever the load<br>Not available in permanent magnet motor law<br>Can be suppressed<br>Adjustable                                                                                                                                                                                                                                                                                                                                                                                                |
| 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)Ethernet/Modbus TCP<br>RJ45 on the remote graphic terminal)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 Modbus serial                                                                                                                                                                                                                                                                                                                               |
| Method of access                | Slave Modbus TCP                                                                                                                                                                                                                                                                                                                                    |
| Supply                          | External supply for digital inputs 24 V DC 19...30 V), <1.25 mA overload and short-circuit protection<br>Internal supply for reference potentiometer (1 to 10 kOhm) 10.5 V DC +/- 5 %, <10 mA overload and short-circuit protection<br>Internal supply for digital inputs and STO 24 V DC 21...27 V), <200 mA overload and short-circuit protection |
| Local signalling                | For local diagnostic 3 LEDs<br>For embedded communication status 3 LEDs (dual colour)<br>For communication module status 4 LEDs (dual colour)<br>For presence of voltage 1 LED (red)                                                                                                                                                                |
| Width                           | 5.67 in (144 mm)                                                                                                                                                                                                                                                                                                                                    |
| Height                          | 13.78 in (350 mm)                                                                                                                                                                                                                                                                                                                                   |
| Depth                           | 7.99 in (203 mm)                                                                                                                                                                                                                                                                                                                                    |
| Product Weight                  | 9.92 lb(US) (4.5 kg)                                                                                                                                                                                                                                                                                                                                |
| Analogue input number           | 3                                                                                                                                                                                                                                                                                                                                                   |
| Analogue input type             | AI1, AI2, AI3 software-configurable voltage 0...10 V DC 31.5 kOhm 12 bits<br>AI1, AI2, AI3 software-configurable current 0...20 mA 250 Ohm 12 bits<br>AI2 voltage analog input - 10...10 V DC 31.5 kOhm 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 EN/IEC 61131-2<br>DI5, DI6 discrete input level 1 PLC IEC 65A-68<br>STOA, STOB discrete input level 1 PLC EN/IEC 61131-2                                                                                                                                                                                       |
| Discrete input logic            | Positive logic (source) DI1...DI8), < 5 V, > 11 V<br>Negative logic (sink) DI1...DI8), > 16 V, < 10 V                                                                                                                                                                                                                                               |
| Analogue output number          | 2                                                                                                                                                                                                                                                                                                                                                   |
| Analogue output type            | Software-configurable voltage AQ1, AQ2 0...10 V DC 470 Ohm 10 bits<br>Software-configurable current AQ1, AQ2 0...20 mA 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 analog input<br>AO1, AO2 +/- 0.2 % analog output                                                                                                                                                                                                                                                          |
| Relay output number             | 3                                                                                                                                                                                                                                                                                                                                                   |
| Relay output type               | Configurable relay logic R1 fault relay NO/NC 100000 cycles<br>Configurable relay logic R2 sequence relay NO 100000 cycles<br>Configurable relay logic R3 sequence relay NO 100000 cycles                                                                                                                                                           |
| Refresh time                    | Relay output R1, R2, R3)5 ms +/- 0.5 ms)                                                                                                                                                                                                                                                                                                            |
| Minimum switching current       | Relay output R1, R2, R3 5 mA 24 V DC                                                                                                                                                                                                                                                                                                                |
| Maximum switching current       | Relay output R1, R2, R3 resistive, cos phi = 1 3 A 250 V AC<br>Relay output R1, R2, R3 resistive, cos phi = 1 3 A 30 V DC<br>Relay output R1, R2, R3 inductive, cos phi = 0.4 7 ms 2 A 250 V AC<br>Relay output R1, R2, R3 inductive, cos phi = 0.4 7 ms 2 A 30 V DC                                                                                |
| Isolation                       | Between power and control terminals                                                                                                                                                                                                                                                                                                                 |
| Maximum output frequency        | 500 kHz                                                                                                                                                                                                                                                                                                                                             |
| Maximum Input Current per Phase | 8.4 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                     | 2.2...3 kW 200...240 V 3 phase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 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 86/188/EEC                                                                                                                                                                                                                                                                                                                                         |
| Power dissipation in W                | Natural convection 32 W 200 V 4 kHz<br>Forced convection 74 W 200 V 4 kHz                                                                                                                                                                                                                                                                                  |
| Volume of cooling air                 | 10038.72 Gal/hr(US) (38 m3/h)                                                                                                                                                                                                                                                                                                                              |
| Operating position                    | Vertical +/- 10 degree                                                                                                                                                                                                                                                                                                                                     |
| Maximum THDI                          | <48 % full load IEC 61000-3-12                                                                                                                                                                                                                                                                                                                             |
| Electromagnetic compatibility         | Electrostatic discharge immunity test level 3 IEC 61000-4-2<br>Radiated radio-frequency electromagnetic field immunity test level 3 IEC 61000-4-3<br>Electrical fast transient/burst immunity test level 4 IEC 61000-4-4<br>1.2/50 µs - 8/20 µs surge immunity test level 3 IEC 61000-4-5<br>Conducted radio-frequency immunity test level 3 IEC 61000-4-6 |
| Pollution degree                      | 2 EN/IEC 61800-5-1                                                                                                                                                                                                                                                                                                                                         |
| Vibration resistance                  | 1.5 mm peak to peak 2...13 Hz)IEC 60068-2-6<br>1 gn 13...200 Hz)IEC 60068-2-6                                                                                                                                                                                                                                                                              |
| Shock resistance                      | 15 gn 11 ms IEC 60068-2-27                                                                                                                                                                                                                                                                                                                                 |
| Relative humidity                     | 5...95 % without condensation IEC 60068-2-3                                                                                                                                                                                                                                                                                                                |
| Ambient air temperature for operation | 5...122 °F (-15...50 °C) without derating)<br>122...140 °F (50...60 °C) with derating factor)                                                                                                                                                                                                                                                              |
| Ambient Air Temperature for Storage   | -40...158 °F (-40...70 °C)                                                                                                                                                                                                                                                                                                                                 |
| Operating altitude                    | <= 3280.84 ft (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>ATEX zone 2/22<br>CSA<br>DNV-GL<br>TÜV<br>UL                                                                                                                                                                                                                                                                                                |
| 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                                                                                                                                                                                                  |

### Ordering and shipping details

|                       |                             |
|-----------------------|-----------------------------|
| Category              | 22205 - ATV630 FRAMES 1 & 2 |
| Discount Schedule     | CP4E                        |
| GTIN                  | 3606480761638               |
| Nbr. of units in pkg. | 1                           |
| Package weight(Lbs)   | 13.07 lb(US) (5.928 kg)     |
| Returnability         | Yes                         |
| Country of origin     | ID                          |

### Packing Units

|                              |                          |
|------------------------------|--------------------------|
| Unit Type of Package 1       | PCE                      |
| Package 1 Height             | 12.40 in (31.5 cm)       |
| Package 1 width              | 7.48 in (19 cm)          |
| Package 1 Length             | 15.94 in (40.5 cm)       |
| Unit Type of Package 2       | P06                      |
| Number of Units in Package 2 | 6                        |
| Package 2 Weight             | 108.86 lb(US) (49.38 kg) |
| Package 2 Height             | 28.94 in (73.5 cm)       |
| Package 2 width              | 23.62 in (60 cm)         |
| Package 2 Length             | 31.50 in (80 cm)         |

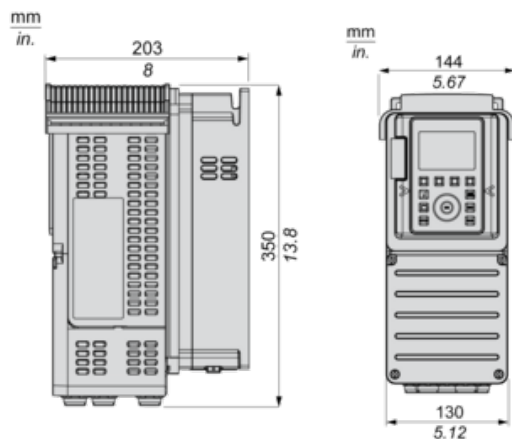
### Offer Sustainability

|                            |                                                                                                                                                                                                                                                                                             |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sustainable offer status   | Green Premium product                                                                                                                                                                                                                                                                       |
| California proposition 65  | WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to <a href="http://www.P65Warnings.ca.gov">www.P65Warnings.ca.gov</a> |
| 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>                                                                                                                                                                                                                                                      |
| 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

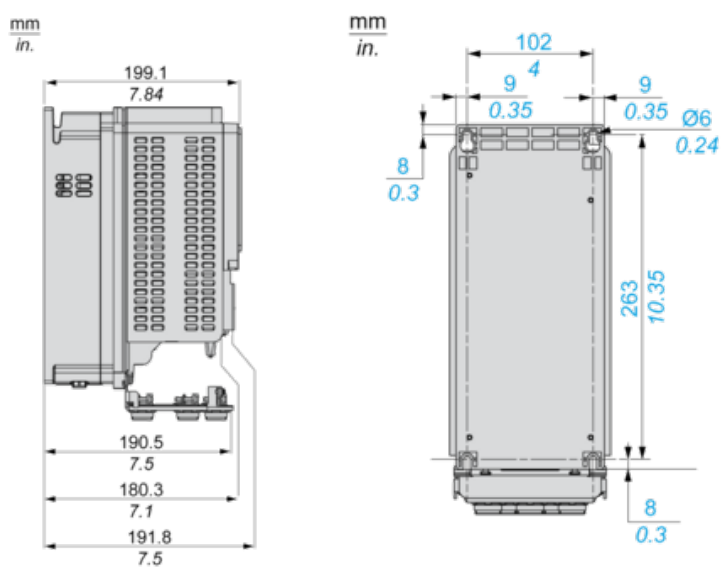
### Drives with IP21 Top Cover

Right and Front Views



### Drives Without IP21 Top Cover

Left and Rear Views



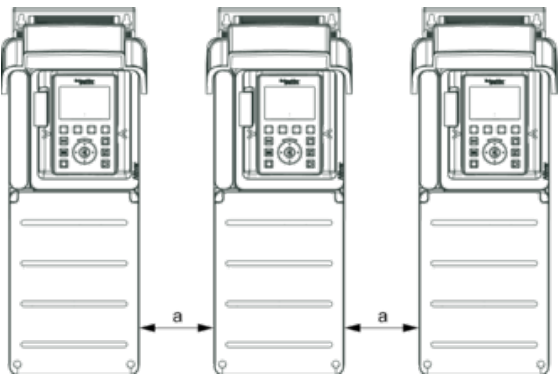
Clearances



| 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

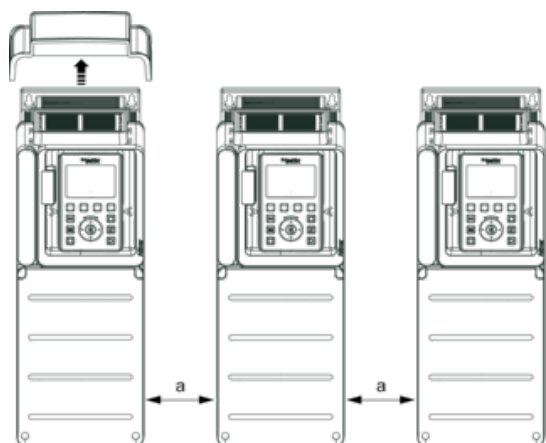


a ≥ 100 mm (3.94 in.)

### Mounting Type B: Side by Side IP20



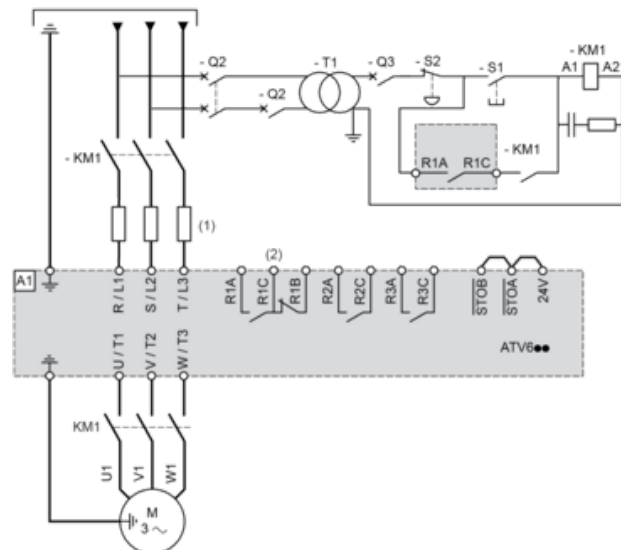
### Mounting Type C: Individual IP20



$a \geq 0$

### 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

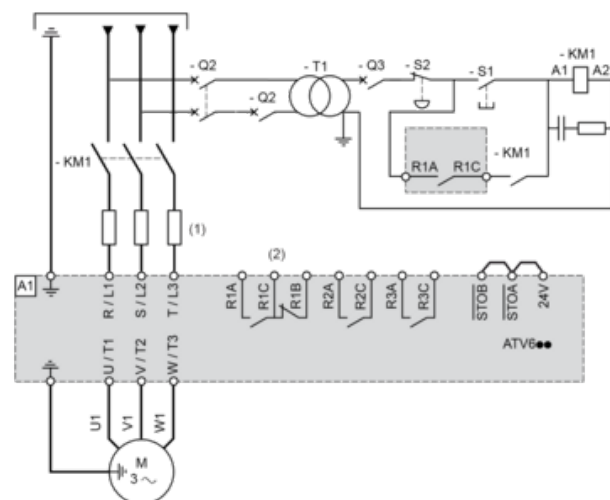
Q2, Q3 : Circuit breakers

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



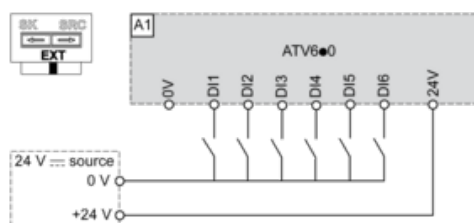
## Switch Set to SRC (Source) Position and Use of an External Power Supply for the DI6



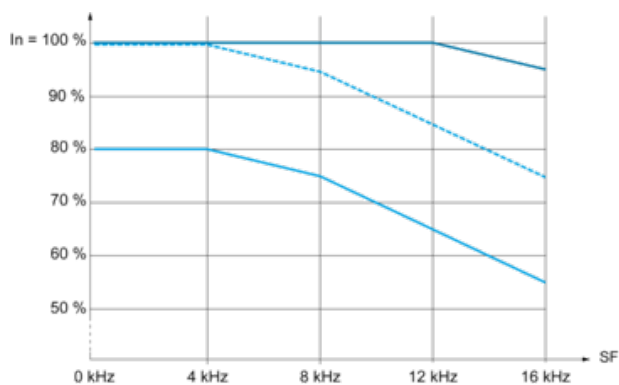
## Switch Set to SK (Sink) Position Using the Output Power Supply for the Digital Inputs



## 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

In : Nominal Drive Current

SF : Switching Frequency

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