

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

ALTIVAR PROCESS

ATV630C16N4

160 KW VARIABLE SPEED DRIVE

Applicable product family: Schneider Electric Altivar Process ATV600

OFFICIAL SOURCE

ATV630C16N4.pdf

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ATV630C16N4

variable speed drive ATV630 - 160kW/250HP -
380...480V - IP00



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 Synchronous motors
mounting mode	Wall mount
EMC filter	Integrated conforming to EN/IEC 61800-3 category C3 with 150 m motor cable maxi
IP degree of protection	IP00 conforming to IEC 60529 IP21 with kit VW3A9704 conforming to IEC 60529 IP21 with kit VW3A9704 conforming to IEC 61800-5-1 IP00 conforming to IEC 61800-5-1
type of cooling	Forced convection
supply frequency	50...60 Hz (- 5...5 %)
network number of phases	3 phases
[Us] rated supply voltage	380...480 V (- 15...10 %)
motor power kW	160 kW (normal duty) 132 kW (heavy duty)
motor power hp	200 hp (heavy duty) 250 hp (normal duty)
line current	213 A at 480 V (heavy duty) 237 A at 380 V (heavy duty) 262 A at 480 V (normal duty) 284 A at 380 V (normal duty)
prospective line I _{sc}	50 kA
apparent power	161.4 kVA at 480 V (heavy duty) 201.3 kVA at 480 V (normal duty)
continuous output current	240 A at 2.5 kHz (heavy duty) 302 A at 2.5 kHz (normal duty)
maximum transient current	332.2 A during 60 s (normal duty) 375 A during 60 s (heavy duty)
asynchronous motor control profile	Constant torque standard Optimized torque mode Variable torque standard
synchronous motor control profile	Permanent magnet motor
output frequency	0.0001...0.5 kHz
nominal switching frequency	2.5 kHz
switching frequency	2...8 kHz adjustable 2.5...8 kHz With derating factor
safety function	STO (safe torque off) SIL 3
discrete input logic	16 preset speeds

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communication port protocol	Ethernet Modbus serial Modbus TCP
option card	Slot A : communication module for Profibus DP V1 Slot A/slot B : output relay extension module Slot A/slot B : digital and analog I/O extension module Slot A : communication module for Profinet Slot A : communication module for CANopen SUB-D 9 Slot A : communication module for Modbus TCP/EtherNet/IP Slot A : communication module for DeviceNet Slot A : communication module for CANopen screw terminals Slot A : communication module for Ethernet IP/Modbus TCP/MD-Link Slot A : communication module for CANopen daisy chain RJ45

Complementary

output voltage	$\leq$ power supply voltage
permissible temporary current boost	1.5 x In for 60 s (heavy duty) 1.1 x In for 60 s (normal duty)
motor slip compensation	Not available in permanent magnet motor law Adjustable Can be suppressed Automatic whatever the load
acceleration and deceleration ramps	S, U or customized Linear adjustable separately from 0.01 to 9000 s
braking to standstill	By DC injection
protection type	Drive : overheating Drive : line supply undervoltage Drive : line supply phase loss Drive : line supply overvoltage Motor : safe torque off Drive : motor phase break Drive : break on the control circuit Drive : thermal protection Drive : overvoltages on the DC bus Motor : motor phase break Drive : short-circuit protection Drive : overspeed Drive : overload of output voltage Drive : overcurrent between output phases and earth Drive : safe torque off Motor : thermal protection
frequency resolution	Analog input : 0.012/50 Hz Display unit : 0.1 Hz
electrical connection	Control : removable screw terminals 0.5...1.5 mm ² (AWG 20...AWG 16) Line side : screw terminal 2 x 95...3 x 120 mm ² (2 x AWG 3/0...2 x 300 kcmil) Motor : screw terminal 2 x 95...3 x 120 mm ² (2 x AWG 3/0...2 x 300 kcmil)
type of connector	RJ45 (on the remote graphic terminal) for Ethernet/Modbus TCP RJ45 (on the remote graphic terminal) for Modbus serial
physical interface	2-wire RS 485 for Modbus serial
transmission frame	RTU for Modbus serial
transmission rate	10/100 Mbit/s for Ethernet IP/Modbus TCP 4.8, 9.6, 19.2, 38.4 kbit/s for Modbus serial
exchange mode	Half duplex, full duplex, autonegotiation for Ethernet/Modbus TCP
data format	8 bits, configurable odd, even or no parity for Modbus serial
type of polarization	No impedance for Modbus serial
number of addresses	1...247 for Modbus serial
method of access	Slave for Modbus TCP
supply	Internal supply for digital inputs and STO : 24 V DC (21...27 V) current $\leq$ 200 mA (overload and short-circuit protection) External supply for digital inputs : 24 V DC (19...30 V) current $\leq$ 1.25 mA (overload and short-circuit protection) Internal supply for reference potentiometer (1 to 10 kOhm) : 10.5 V DC $\pm$ 5 % current $\leq$ 10 mA (overload and short-circuit protection)

local signalling	1 LED red for presence of voltage 4 LEDs dual colour for communication module status 3 LEDs for local diagnostic 3 LEDs dual colour for embedded communication status
width	320.0 mm
height	852 mm
depth	390 mm
product weight	82 kg
analogue input number	3
analogue input type	Software-configurable voltage AI1, AI2, AI3 : 0...10 V DC impedance 30 kOhm, resolution 12 bits Software-configurable current AI1, AI2, AI3 : 0...20 mA impedance 250 Ohm, resolution 12 bits
discrete input number	8
discrete input type	Programmable as pulse input DI5, DI6 0...30 kHz : 24 V DC ≤ 30 V Programmable DI1...DI6 : 24 V DC ≤ 30 V impedance 3.5 kOhm Safe torque off STOA, STOB : 24 V DC ≤ 30 V impedance > 2.2 kOhm
input compatibility	Discrete input DI5, DI6 : level 1 PLC conforming to IEC 65A-68 Discrete input STOA, STOB : level 1 PLC conforming to EN/IEC 61131-2 Discrete input DI1...DI6 : level 1 PLC conforming to EN/IEC 61131-2
discrete input logic	DI1...DI6, positive logic (source) : , < 5 V (state 0), > 11 V (state 1) DI5, DI6, positive logic (source) : , < 0.6 V (state 0), > 2.5 V (state 1) STOA, STOB, positive logic (source) : , < 5 V (state 0), > 11 V (state 1) DI1...DI6, negative logic (sink) : , > 16 V (state 0), < 10 V (state 1)
analogue output number	2
analogue output type	Software-configurable voltage AO1, AO2 : 0...10 V DC impedance 470 Ohm, resolution 10 bits Software-configurable current AO1, AO2 : 0...20 mA, resolution 10 bits
sampling duration	Analog input AI1, AI2, AI3 : 5 ms (+/- 0.1 ms) Discrete input DI5, DI6 : 5 ms (+/- 1 ms) Analog output AO1 : 10 ms (+/- 1 ms) Discrete input DI1...DI4 : 2 ms (+/- 0.5 ms)
accuracy	Analog output AO1, AO2 : +/- 1 % for a temperature variation 60 °C Analog input AI1, AI2, AI3 : +/- 0.6 % for a temperature variation 60 °C
linearity error	Analog output AO1, AO2 : +/- 0.2 % Analog input AI1, AI2, AI3 : +/- 0.15 % of maximum value
relay output number	3
relay output type	Configurable relay logic R1 : fault relay NO/NC electrical durability 100000 cycles Configurable relay logic R2 : sequence relay NO electrical durability 100000 cycles 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 Relay output R1, R2, R3 on inductive load (cos phi = 0.4 and L/R = 7 ms) : 2 A at 250 V AC Relay output R1, R2, R3 on inductive load (cos phi = 0.4 and L/R = 7 ms) : 2 A at 30 V DC Relay output R1, R2, R3 on resistive load (cos phi = 1) : 3 A at 30 V DC
isolation	Between power and control terminals
IP degree of protection	IP00

Environment

insulation resistance	> 1 mOhm at 500 V DC for 1 minute to earth
noise level	69.9 dB conforming to 86/188/EEC
power dissipation in W	3270 W (forced convection) at 380 V switching frequency 2.5 kHz
volume of cooling air	600 m3/h
operating position	Vertical +/- 10 degree
THDI	≤ 48 % full load conforming to IEC 61000-3-12
electromagnetic compatibility	Conducted radio-frequency immunity test conforming to IEC 61000-4-6 level 3 1.2/50 µs - 8/20 µs surge immunity test conforming to IEC 61000-4-5 level 3 Electrical fast transient/burst immunity test conforming to IEC 61000-4-4 level 4 Electrostatic discharge immunity test conforming to IEC 61000-4-2 level 3 Radiated radio-frequency electromagnetic field immunity test conforming to IEC 61000-4-3 level 3

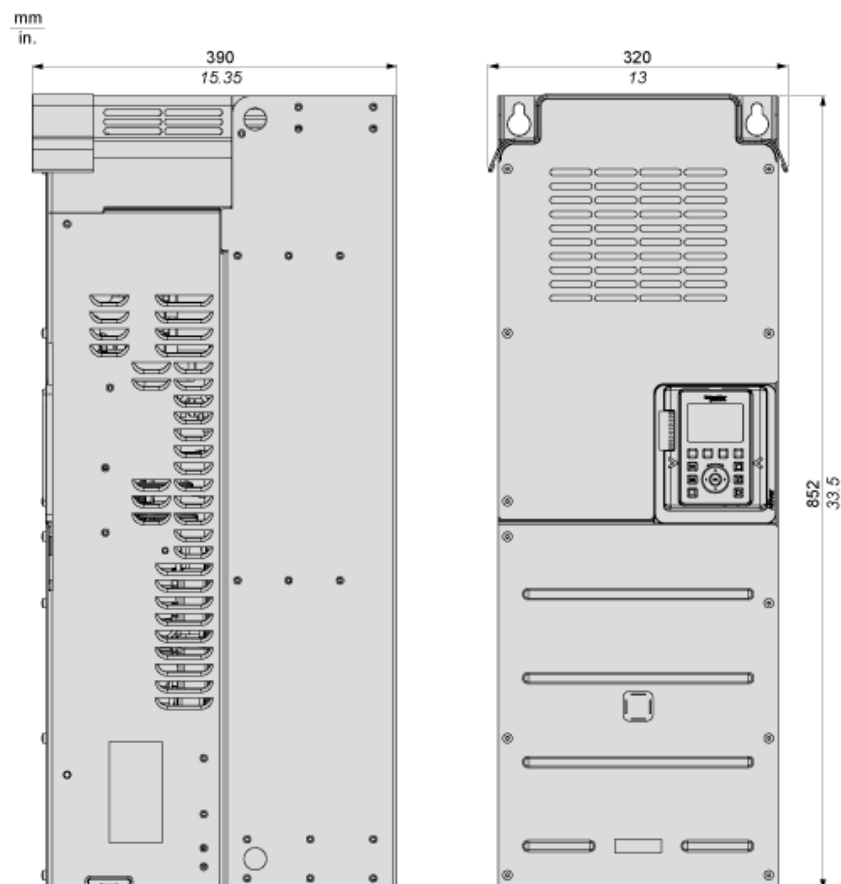
pollution degree	2 conforming to EN/IEC 61800-5-1
vibration resistance	1.5 mm peak to peak (f = 2...13 Hz) conforming to IEC 60068-2-6 1 gn (f = 13...200 Hz) conforming to IEC 60068-2-6
shock resistance	15 gn during 11 ms conforming to IEC 60068-2-27
relative humidity	5...95 % without condensation conforming to IEC 60068-2-3
ambient air temperature for operation	50...60 °C with derating factor -15...50 °C without derating
ambient air temperature for storage	-40...70 °C
operating altitude	1000...4800 m with current derating 1 % per 100 m <= 1000 m without derating
environmental characteristic	Chemical pollution resistance class 3C3 EN/IEC 60721-3-3 Dust pollution resistance class 3S3 EN/IEC 60721-3-3
standards	EN/IEC 61800-3 IEC 61000-3-12 EN/IEC 61800-3 environment 2 category C3 IEC 61508 IEC 13849-1 EN/IEC 61800-5-1 EN/IEC 61800-3 environment 1 category C2 IEC 60721-3 UL 508C
product certifications	REACH CSA ATEX INERIS UL DNV-GL ATEX zone 2/22 TÜV
marking	CE

Offer Sustainability

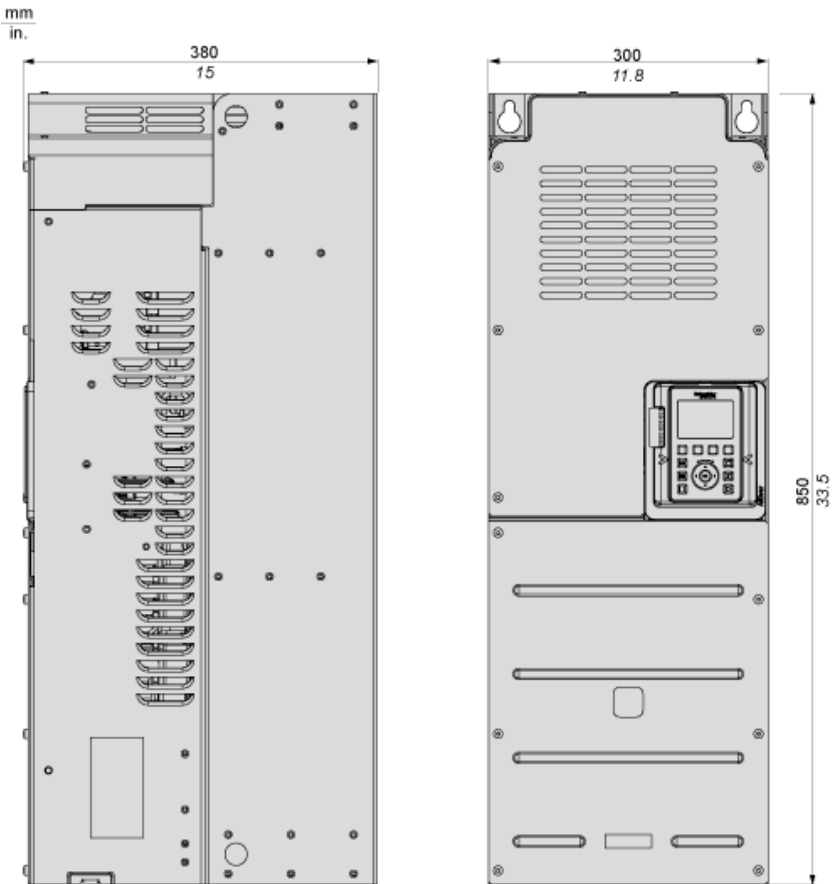
Sustainable offer status	Not Green Premium product
RoHS (date code: YYWW)	Compliant - since 1502 - Schneider Electric declaration of conformity- Schneider Electric declaration of conformity
REACH	Reference not containing SVHC above the threshold
Product environmental profile	Available Product Environmental

Dimensions

IP21 On Top and IP00 on Bottom Drives - Right and Front View

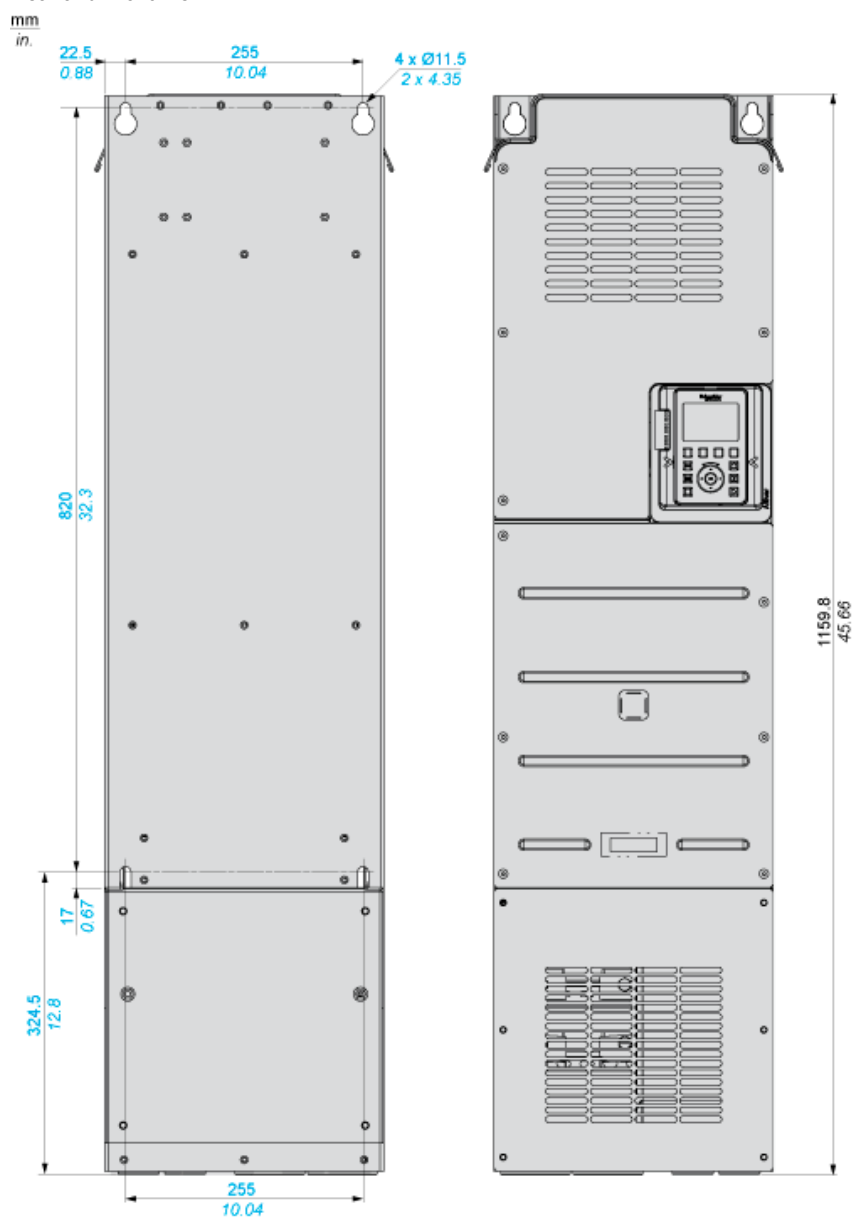


IP20 on Top (without top cover) and IP00 Bottom Drives - Right and Front View

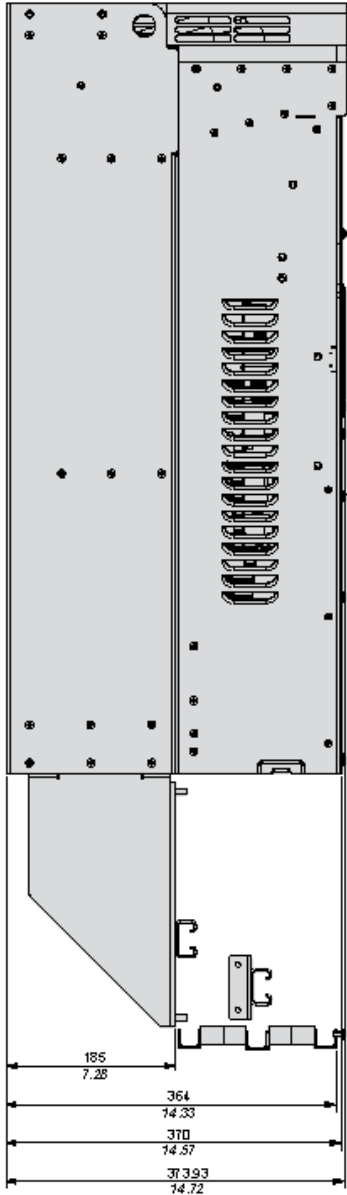


Drives with Lower Conduit Box Sold Separately

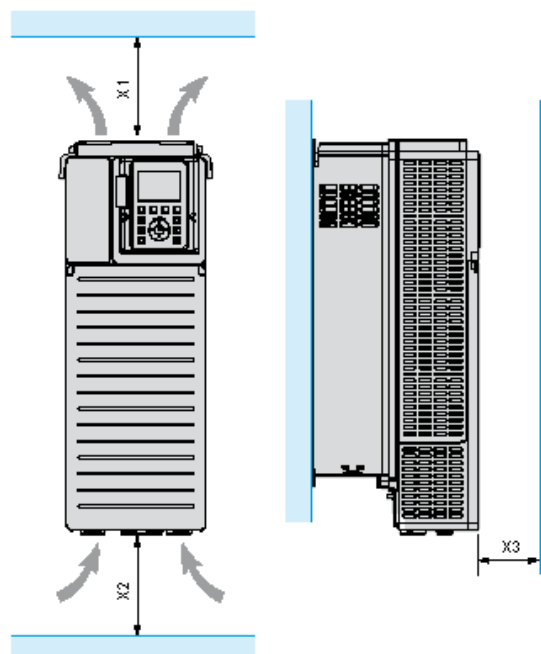
Rear and Front View



Left View



Clearances

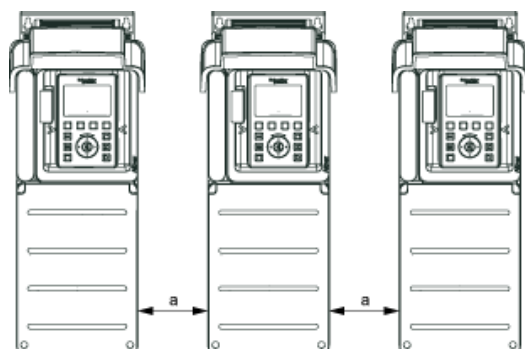


X1	X2	X3
≥ 250 mm (10 in.)	≥ 250 mm (10 in.)	≥ 100 mm (3.94 in.)

- Mount the device in a vertical position ($\pm 10^\circ$). This is required for cooling the device.
- Do not mount the device close to heat sources.
- Leave sufficient free space so that the air required for cooling purposes can circulate from the bottom to the top of the drive.

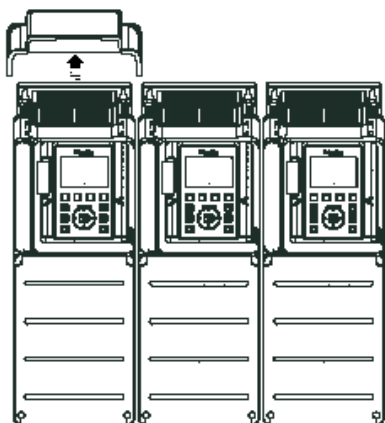
Mounting Types

Mounting Type A: Individual IP21

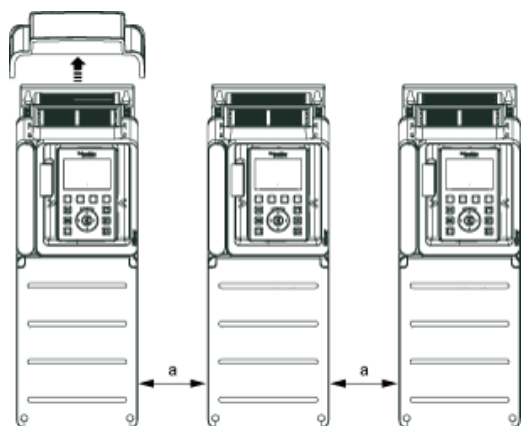


$a \geq 110 \text{ mm (4.33 in.)}$

Mounting Type B: Side by Side IP20 , Only possible at ambient temperature lower than 40 °C (104 °F)



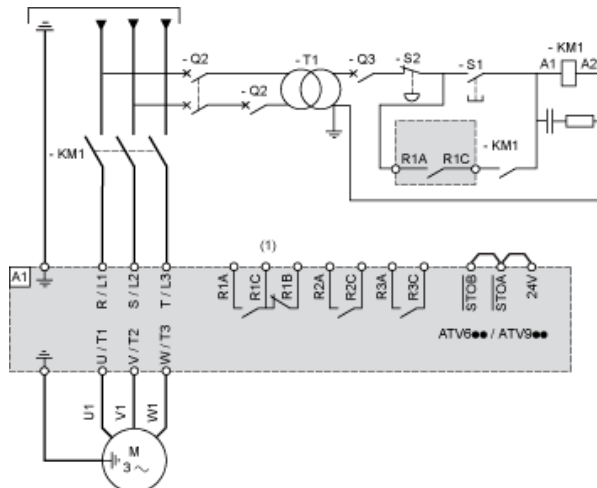
Mounting Type C: Individual IP20



$a \geq 110 \text{ mm (4.33 in.)}$

Single or 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) Use digital output R1 set to operating state Fault to switch Off the product once an error is detected.

A1 : Drive

KM1 Line Contactor

Q2, Circuit breakers

Q3 :

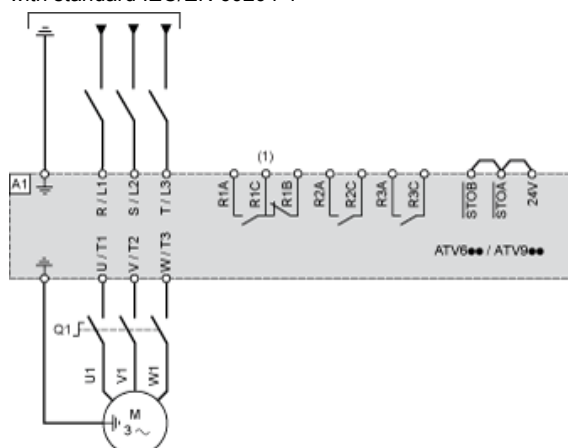
S1, Pushbuttons

S2 :

T1 : Transformer for control part

Single or Three-Phase Power Supply with Downstream Breaking via Switch Disconnecter

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

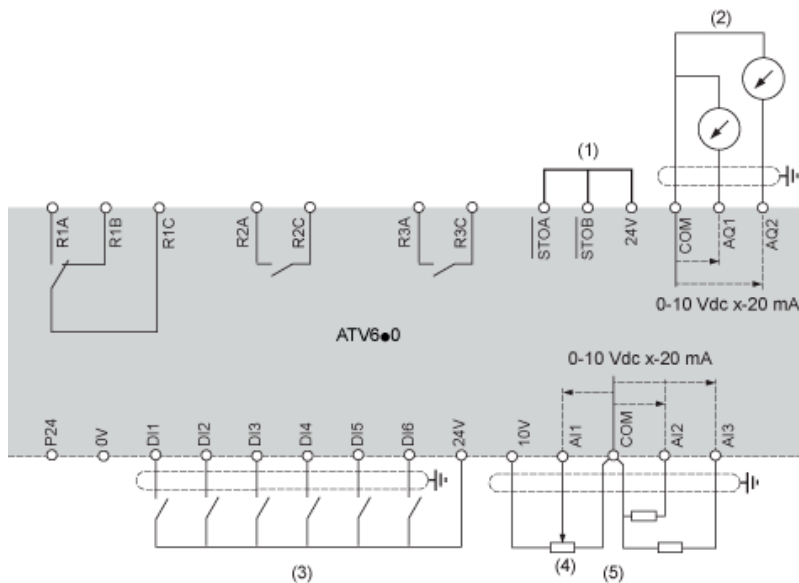


(1) Use digital output R1 set to operating state Fault to switch Off the product once an error is detected.

A1 : Drive

Q1 : Switch disconnector

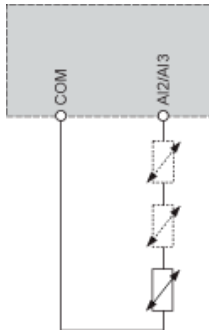
Control Block Wiring Diagram



- (1) Safe Torque Off
 (2) Analog Output
 (3) Digital Input
 (4) Reference potentiometer
 (5) Analog Input
 A1 : ATV6.. Drive
 R1A, Fault relay
 R1B,
 R1C :
 R2A, Sequence relay
 R2C :
 R3A, Sequence relay
 R3C :

Sensor Connection

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

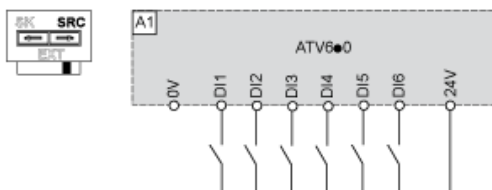


Sink / Source Switch Configuration

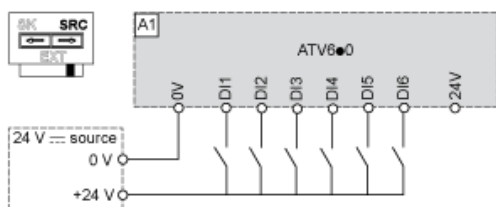
The switch is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

- Set the switch to Source (factory setting) if using PLC outputs with PNP transistors.
- Set the switch to Ext if using PLC outputs with NPN transistors.

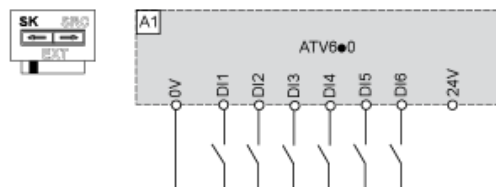
Switch Set to SRC (Source) Position Using the Output Power Supply for the Digital Inputs



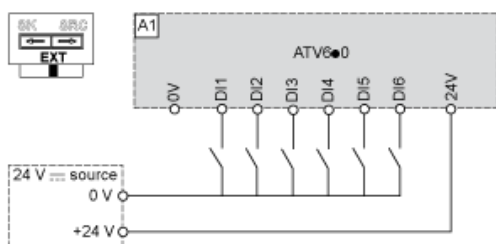
Switch Set to SRC (Source) Position and Use of an External Power Supply for the DIs



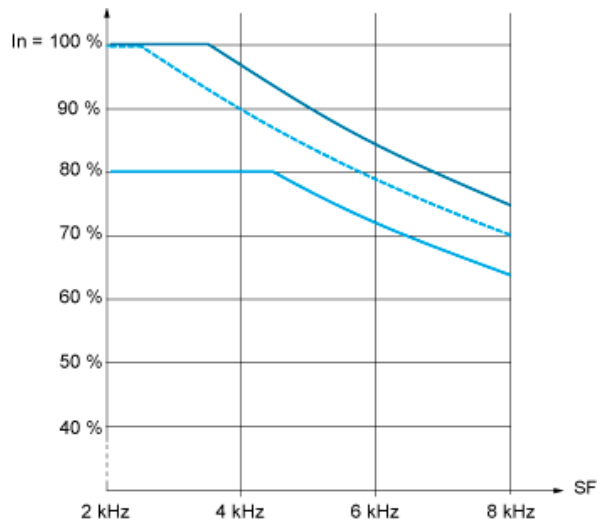
Switch Set to SK (Sink) Position Using the Output Power Supply for the Digital Inputs



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



Derating Curves



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

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

— 60 °C (140 °F) - Mounting type C

In : Nominal Drive Current

SF : Switching Frequency