

Variable speed drive, Altivar Machine ATV320, 15 kW, 200...240 V, 3 phases, compact

ATV320D15M3C

IVIAIII	
Range of product	Altivar Machine ATV320
Product or component type	Variable speed drive
Product specific application	Complex machines
Variant	Standard version
Format of the drive	Compact
Mounting mode	Wall mount
Communication port protocol	Modbus serial CANopen
Option card	Communication module, CANopen Communication module, EtherCAT Communication module, Profibus DP V1 Communication module, PROFINET Communication module, Ethernet Powerlink Communication module, EtherNet/IP Communication module, DeviceNet
[Us] rated supply voltage	200240 V - 1510 %
Nominal output current	66.0 A
Motor power kW	15.0 kW for heavy duty
EMC filter	Without EMC filter
IP degree of protection	IP20
Complementary	
Discrete input number	7
Discrete input type	STO safe torque off, 24 V DC, impedance: 1.5 kOhm DI1DI6 logic inputs, 24 V DC (30 V) DI5 programmable as pulse input: 030 kHz, 24 V DC (30 V)
Discrete input logic	Positive logic (source) Negative logic (sink)
Discrete output number	3
Discrete output type	Open collector DQ+ 01 kHz 30 V DC 100 mA Open collector DQ- 01 kHz 30 V DC 100 mA
Analogue input number	3
Analogue input type	Al1 voltage: 010 V DC, impedance: 30 kOhm, resolution 10 bits Al2 bipolar differential voltage: +/- 10 V DC, impedance: 30 kOhm, resolution 10 bits

Analogue output number

1

250 Ohm, resolution 10 bits

Al3 current: 0...20 mA (or 4-20 mA, x-20 mA, 20-x mA or other patterns by configuration), impedance:

Analogue output type	Software-configurable current AQ1: 020 mA impedance 800 Ohm, resolution 10 bits Software-configurable voltage AQ1: 010 V DC impedance 470 Ohm, resolution 10 bits
Relay output type	Configurable relay logic R1A 1 NO electrical durability 100000 cycles Configurable relay logic R1B 1 NC electrical durability 100000 cycles
	Configurable relay logic R1C Configurable relay logic R2A 1 NO electrical durability 100000 cycles Configurable relay logic R2C
Maximum switching current	Relay output R1A, R1B, R1C on resistive load, cos phi = 1: 3 A at 250 V AC Relay output R1A, R1B, R1C on resistive load, cos phi = 1: 3 A at 30 V DC Relay output R1A, R1B, R1C, R2A, R2C on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 250 V
	AC Relay output R1A, R1B, R1C, R2A, R2C on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 30 V DC
	Relay output R2A, R2C on resistive load, cos phi = 1: 5 A at 250 V AC Relay output R2A, R2C on resistive load, cos phi = 1: 5 A at 30 V DC
Minimum switching current	Relay output R1A, R1B, R1C, R2A, R2C: 5 mA at 24 V DC
Method of access	Slave CANopen
4 quadrant operation possible	True
Asynchronous motor control	Voltage/frequency ratio, 5 points
profile	Flux vector control without sensor, standard Voltage/frequency ratio - Energy Saving, quadratic U/f
	Flux vector control without sensor - Energy Saving Voltage/frequency ratio, 2 points
Synchronous motor control profile	Vector control without sensor
Maximum output frequency	0.599 kHz
Transient overtorque	170200 % of nominal motor torque
Acceleration and deceleration	Linear U
ramps	S CUS
	Ramp switching
	Acceleration/deceleration ramp adaptation Acceleration/deceleration automatic stop with DC injection
Motor slip compensation	Automatic whatever the load Adjustable 0300 % Not available in voltage/frequency ratio (2 or 5 points)
Switching frequency	216 kHz adjustable 416 kHz with derating factor
Nominal switching frequency	4 kHz
Braking to standstill	By DC injection
Brake chopper integrated	True
Line current	79.7 A at 200 V (heavy duty) 67.1 A at 240 V (heavy duty)
Maximum input current	79.7 A
Maximum output voltage	240 V
Apparent power	27.9 kVA at 240 V (heavy duty)
Network frequency	5060 Hz
Relative symmetric network frequency tolerance	5 %
Prospective line Isc	22 kA
Base load current at high overload	8.0 A
Power dissipation in W	Fan: 551 W at 200 V, switching frequency 4 kHz
With safety function Safely Limited Speed (SLS)	True
With safety function Safe brake management (SBC/SBT)	False
With safety function Safe Operating Stop (SOS)	False

With safety function Safe Speed Falso	With safety function Safe Position (SP)	False
With safety function Safe Stop 1 True (SSS) With safety function Safe Stop 2 (SS2) False With safety function Safe torque of (STO) With safety function Safe torque of (STO) With safety function Safe (SSO) With safety funct	With safety function Safe programmable logic	False
With safety function Safe torque off (STO) With safety function Safety Limited Position (SLP) With safety function Safety Limited Position (SLP) With safety function Safety Limited Position (SLP) With safety function Safe Direction (SDI) Protection type Input phase breaks dive Overcurrent between output phases and earth drive Overclaring protection drive Short-facini between motor phases: drive Thermal protection drive Width 180 mm Height 330 mm Depth 198.0 mm Net weight 6.9 kg Environment Operating position Vertical +/- 10 degree Environment Environmental compatibility Electrosial scientific design frequency immunity test level 3 conforming to IEC 61000-4-2 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test level 3 conforming to IEC 61000-4-3 Feliated addit-frequency immunity test	With safety function Safe Speed Monitor (SSM)	False
With safety function Safe torque off (STO) With safety function Safe United Position (SLP) With safety function Safe United Position (SLP) Protection (SD) Protection (SD) Protection (SD) Protection type Input phase breaks: drive Overcurrent between outbut phases and earth drive Overcurrent between outbut phases: drive Thermal protection: drive Height 180 mm Height 330 mm Depth 198.0 mm Net weight 6 9 kg Environment Operating position Product certifications CE ATEX NOM COST EAC RCM STO RCM RCM STO RCM ST	With safety function Safe Stop 1 (SS1)	True
With safety function Safely Limited Position (SLP) With safety function Safe Direction (SDI) Protection (SDI) Protection type	With sft fct Safe Stop 2 (SS2)	False
Limited Position (SLP) With safety function Safe Direction (SpB) Protection type Impulsive breaks, drive Overloading protection, drive Short-clinar between output phases and earth; drive Overloading protection, drive Short-clinar between motor phases; drive Thermal protection; drive Width 180 mm Height 330 mm Depth 198.0 mm Net weight 6.9 kg Environment Operating position Vertical +/- 10 degree Environment Operating position Vertical +/- 10 degree Environment CE AFEX OGST EAC RCM KC Marking CE AFEX UL CSA EAC RCM KC Standards Environmentic compatibility Electroading in munity less level 3 conforming to IEC 61000-4-2 Redated randorf-requency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3 Electrical fast transienthust immunity test level 3 conforming to IEC 61000-4-3 Electrical fast transienthust immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 3 conforming to IEC 61000-4-3 Electroading and interruptors immunity test level 4 Electroading and interruptors immunity test level 4 Electroading and interruptors immunity test level 4 Electroading and interruptors	With safety function Safe torque off (STO)	True
Protection (\$DI) Protection type	With safety function Safely Limited Position (SLP)	False
Overcurrent between output phases and earth; drive Overheating protection: drive Short-circuit between motor phases; drive Thermal protection: drive The	With safety function Safe Direction (SDI)	False
Height 330 mm Depth 188.0 mm Net weight 6.9 kg Environment Operating position Vertical +/- 10 degree Product certifications CE ATEX NOM GOST EAC RCM KC Marking CE ATEX UL US CS ATEX UL US CS ATEX CS ATEX CS ATEX US ATEX ATEX ATEX ATEX ATEX ATEX ATEX ATEX	Protection type	Overcurrent between output phases and earth: drive Overheating protection: drive Short-circuit between motor phases: drive
Depth 198.0 mm Net weight 6.9 kg Environment Operating position Vertical +/- 10 degree Product certifications CE ATEX NOM GOST EAC RCM RCM RCM RCM RCM RCM RCM RCM RCM RC	Width	180 mm
Environment Operating position Vertical +/- 10 degree Product certifications CE ATEX NOM RCM GOT GOT GOT RCM KCM KCM KCM KCM KCM KCM KCM KCM KCM K	Height	330 mm
Environment Operating position Vertical +/- 10 degree Product certifications CE ATEX NOM GOST EAC RCM KC Marking CE ATEX UL CSA EAC RCM EAC RCM EAC RCM Standards EnvireC 61800-5-1 Electromagnetic compatibility Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3 Relectrical fast transient/burst immunity test level 3 conforming to IEC 61000-4-1 1.250 ps - 8/20 ps surge immunity test level 3 conforming to IEC 61000-4-4 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-4 1.250 ps - 8/20 ps surge immunity test level 3 conforming to IEC 61000-4-4 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-4 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-4 1.250 ps - 8/20 ps surge immunity test level 3 conforming to IEC 61000-4-4 Conducted radio-frequency immunity test evel 3 conforming to IEC 61000-4-4 1.250 ps - 8/20 ps surge immunity test evel 3 conforming to IEC 61000-4-4 1.250 ps - 8/20 ps surge immunity test evel 3 conforming to IEC 61000-4-4 1.250 ps - 8/20 ps surge immunity test evel 3 conforming to IEC 61000-4-3 Relectrical fast transient/burst immunity test evel 3 conforming to IEC 61000-4-3 Relectrical fast transient/burst immunity test evel 3 conforming to IEC 61000-4-3 Relectrical fast transient/burst immunity test evel 3 conforming to IEC 61000-4-3 Relectrical fast transient/burst immunity test evel 3 conforming to IEC 61000-4-3 Relectrical fast transient/burst immunity test evel 3 conforming to IEC 61000-4-3 Relectrical fast transient/burst immunity test evel 3 conforming to IEC 61000-4-3 Relectrical fast transient/burst immunity test evel 3 conforming to IEC 61000-4-3 Relectrical fast transient/burst immunity test evel 3 conforming to IEC 61000-4-3 Relectrical fast transient/burst immunity test evel 3 conforming to IEC 61000-4-3 Relectrical fast transient/burst immunity test evel 3 conforming to IEC 61000-4-3 Re	Depth	198.0 mm
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ATEX UL CSA EAC RCM Standards EN/IEC 61800-5-1 Electromagnetic compatibility Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3 Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-3 Electrical fast transient/burst immunity test level 3 conforming to IEC 61000-4-3 Electrical fast transient/burst immunity test level 3 conforming to IEC 61000-4-4 1.2/50 µs - 8/20 µs surge immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-5 Voltage dips and interruptions immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-3 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-2 Radio-frequency information t	Product certifications	ATEX NOM GOST EAC RCM
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Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3 Electrical fast transient/burst immunity test level 3 conforming to IEC 61000-4-4 1.2/50 µs - 8/20 µs surge immunity test level 3 conforming to IEC 61000-4-6 Voltage dips and interruptions immunity test conforming to IEC 61000-4-6 Voltage dips and interruptions immunity test conforming to IEC 61000-4-11 Environmental class (during operation) Class 3C3 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3 150 m/s² at 11 ms 10 m/s² at 13200 Hz wibrational stress (during operation) Maximum acceleration under vibratory load (during operation) 1.5 mm at 213 Hz Class 3K5 according to EN 60721-3 Class 3K5 according to EN 60721-3 Class 3K5 according to EN 60721-3	Standards	EN/IEC 61800-5-1
Maximum acceleration under shock impact (during operation) Maximum acceleration under vibrational stress (during operation) Maximum deflection under vibratory load (during operation) Maximum deflection under vibratory load (during operation) Permitted relative humidity (during operation) Class 3K5 according to EN 60721-3 Class 3K5 according to EN 60721-3 Volume of cooling air 150 m/s² at 11 ms 10 m/s² at 13200 Hz 1.5 mm at 213 Hz Class 3K5 according to EN 60721-3	Electromagnetic compatibility	Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3 Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4 1.2/50 µs - 8/20 µs surge immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-6
Maximum acceleration under vibrational stress (during operation) Maximum deflection under vibratory load (during operation) Permitted relative humidity (during operation) Class 3K5 according to EN 60721-3 Volume of cooling air 10 m/s² at 13200 Hz 1.5 mm at 213 Hz Class 3K5 according to EN 60721-3	Environmental class (during operation)	Class 3C3 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3
vibrational stress (during operation) Maximum deflection under vibratory load (during operation) Permitted relative humidity (during operation) Class 3K5 according to EN 60721-3 Volume of cooling air 1.5 mm at 213 Hz Class 3K5 according to EN 60721-3	Maximum acceleration under shock impact (during operation)	150 m/s² at 11 ms
vibratory load (during operation) Permitted relative humidity (during operation) Volume of cooling air Class 3K5 according to EN 60721-3 156.0 m3/h	Maximum acceleration under vibrational stress (during operation)	10 m/s² at 13200 Hz
(during operation) Volume of cooling air 156.0 m3/h	Maximum deflection under vibratory load (during operation)	1.5 mm at 213 Hz
	Permitted relative humidity (during operation)	Class 3K5 according to EN 60721-3
Overvoltage category III	Volume of cooling air	156.0 m3/h
	Overvoltage category	III

Regulation loop	Adjustable PID regulator
Speed accuracy	+/- 10 % of nominal slip 0.2 Tn to Tn
Pollution degree	2
Ambient air transport temperature	-2570 °C
Ambient air temperature for operation	-1050 °C without derating 5060 °C with derating factor
Ambient air temperature for storage	-2570 °C

Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Height	22.500 cm
Package 1 Width	25.700 cm
Package 1 Length	42.000 cm
Package 1 Weight	8.149 kg
Unit Type of Package 2	P06
Number of Units in Package 2	6
Package 2 Height	75.000 cm
Package 2 Width	60.000 cm
Package 2 Length	80.000 cm
Package 2 Weight	61.894 kg

Offer Sustainability

Sustainable offer status	Green Premium product
REACh Regulation	REACh Declaration
EU RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration
Mercury free	Yes
China RoHS Regulation	China RoHS declaration
RoHS exemption information	Yes
Environmental Disclosure	Product Environmental Profile
Circularity Profile	End of Life Information
WEEE	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins
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 www.P65Warnings.ca.gov
Upgradeability	Upgraded components available

Product data sheet

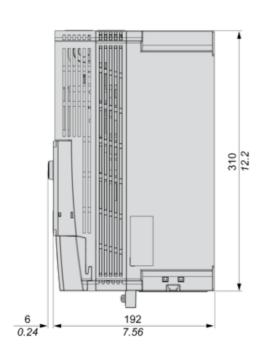
ATV320D15M3C

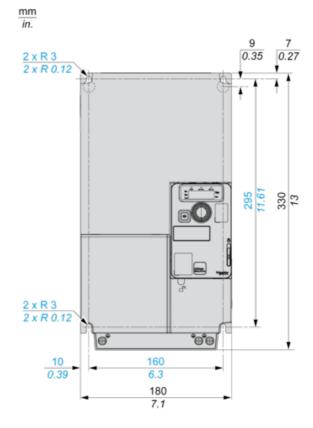
Dimensions Drawings

Dimensions

Right and Front View

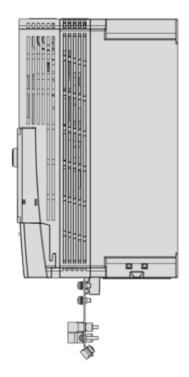
mm in



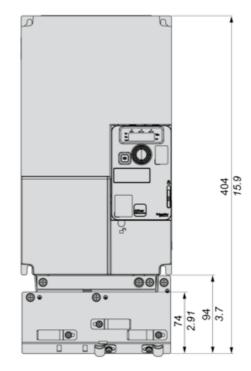


Right and Front View with EMC Plate

mm in.

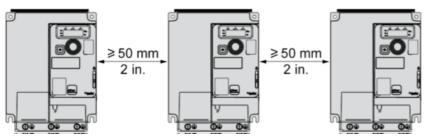






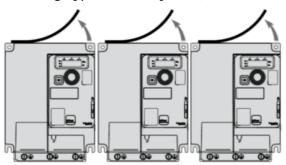
Mounting Types

Mounting Type A: Individual with Ventilation Cover

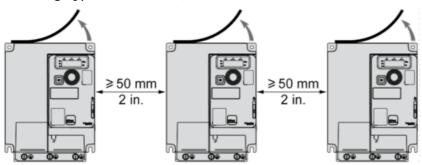


Only Possible at Ambient Temperature Less or Equal to 50 $^{\circ}$ C (122 $^{\circ}$ F)

Mounting Type B: Side by Side, Ventilation Cover Removed



Mounting Type C: Individual, Ventilation Cover Removed



For Operation at Ambient Temperature Above 50 $^{\circ}\text{C}$ (122 $^{\circ}\text{F})$

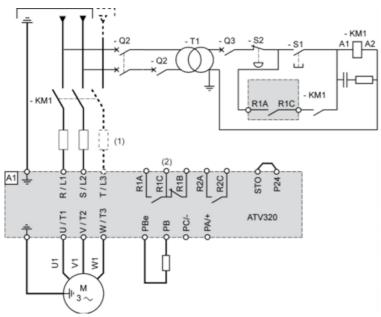
ATV320D15M3C

Connections and Schema

Connection Diagrams

Diagram with Line Contactor

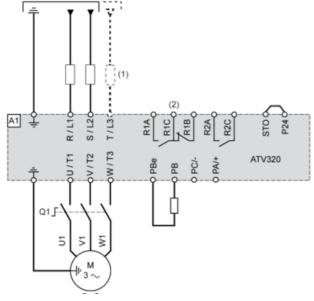
Connection diagrams conforming to standards ISO13849 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1.



- (1) Line choke (if used)
- (2) Fault relay contacts, for remote signaling of drive status

Diagram with Switch Disconnect

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.

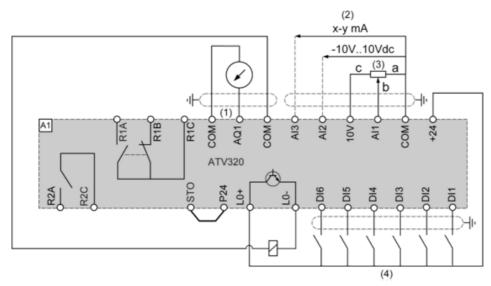


- (1) Line choke (if used)
- (2) Fault relay contacts, for remote signaling of drive status

ATV320D15M3C

Connections and Schema

Control Connection Diagram in Source Mode



- (1) Analog output
- (2) Analog inputs
- (3) Reference potentiometer (10 kOhm maxi)
- (4) Digital inputs

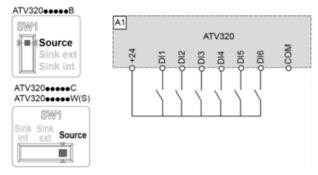
Product data sheet

ATV320D15M3C

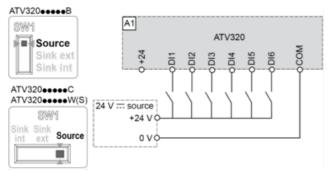
Connections and Schema

Digital Inputs Wiring

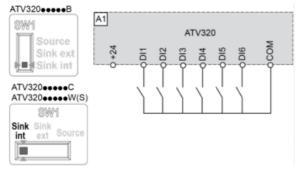
The logic input switch (SW1) is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs. Switch SW1 set to "Source" position and use of the output power supply for the DIs.



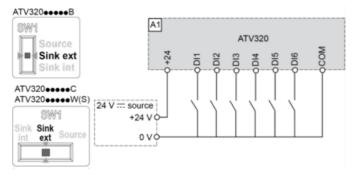
Switch SW1 set to "Source" position and use of an external power supply for the DIs.



Switch SW1 set to "Sink Int" position and use of the output power supply for the DIs.

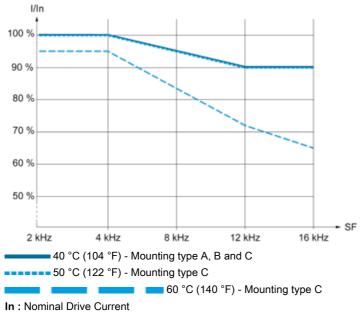


Switch SW1 set to "Sink Ext" position and use of an external power supply for the DIs.



Performance Curves

Derating Curves



SF: Switching Frequency

Recommended replacement(s)