

ATV630D45N4

Variable speed drive, Altivar Process ATV600,
ATV630, 45kW/60 hp, 380...480 V, IP21/UL
type 1





Main

Range of product	Altivar Process ATV600
Product or component type	Variable speed drive
Product specific application	Process and utilities
Device short name	ATV630
Variant	Standard version
Product destination	Synchronous motors Asynchronous motors
EMC filter	Integrated with 50 m conforming to EN/IEC 61800-3 category C2 Integrated with 150 m conforming to EN/IEC 61800-3 category C3
IP degree of protection	IP21 conforming to IEC 61800-5-1 IP21 conforming to IEC 60529
Degree of protection	UL type 1 conforming to UL 508C
Type of cooling	Forced convection
Supply frequency	50...60 Hz - 5...5 %
[Us] rated supply voltage	380...480 V - 15...10 %
Motor power kW	45 kW (normal duty) 37 kW (heavy duty)
Motor power hp	60 Hp normal duty 50 hp heavy duty
Line current	79.8 A at 380 V (normal duty) 69.1 A at 480 V (normal duty) 67.1 A at 380 V (heavy duty) 59 A at 480 V (heavy duty)
Prospective line Isc	50 kA
Apparent power	57.4 KVA at 480 V (normal duty) 49.1 kVA at 480 V (heavy duty)
Continuous output current	88 A at 4 kHz for normal duty 74.5 A at 4 kHz for heavy duty
Maximum transient current	96.8 A during 60 s (normal duty) 111.8 A during 60 s (heavy duty)
Asynchronous motor control profile	Optimized torque mode Constant torque standard Variable torque standard
Synchronous motor control profile	Permanent magnet motor Synchronous reluctance motor
Output frequency	0.0001...0.5 kHz
Speed drive output frequency	0.1...599 Hz
Nominal switching frequency	4 kHz
Switching frequency	2...12 kHz adjustable 4...12 kHz with derating factor
Safety function	STO (safe torque off) SIL 3
Discrete input logic	16 preset speeds

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

Complementary

Mounting mode	Wall mount
Output voltage	$\leq$ power supply voltage
Permissible temporary current boost	1.1 x I _n during 60 s (normal duty) 1.5 x I _n during 60 s (heavy duty)
Motor slip compensation	Adjustable Not available in permanent magnet motor law Automatic whatever the load Can be suppressed
Acceleration and deceleration ramps	Linear adjustable separately from 0.01...9999 s
Braking to standstill	By DC injection
Protection type	Thermal protection: motor Safe torque off: motor Motor phase break: motor Thermal protection: drive Safe torque off: drive Overheating: drive Overcurrent between output phases and earth: drive Overload of output voltage: drive Short-circuit protection: drive Motor phase break: drive Overvoltages on the DC bus: drive Line supply overvoltage: drive Line supply undervoltage: drive Line supply phase loss: drive Overspeed: drive Break on the control circuit: drive
Frequency resolution	Display unit: 0.1 Hz Analog input: 0.012/50 Hz
Electrical connection	Control: removable screw terminals 0.5...1.5 mm ² /AWG 20...AWG 16 Line side: screw terminal 35...50 mm ² /AWG 2...AWG 1 Motor: screw terminal 50 mm ² /AWG 1
Connector type	RJ45 (on the remote graphic terminal) for Ethernet/Modbus TCP RJ45 (on the remote graphic terminal) for Modbus serial
Exchange mode	Half duplex, full duplex, autonegotiation Ethernet/Modbus TCP
Number of addresses	1...247 for Modbus serial
Method of access	Slave Modbus TCP
Supply	External supply for digital inputs: 24 V DC (19...30 V), <1.25 mA, protection type: overload and short-circuit protection Internal supply for reference potentiometer (1 to 10 kOhm): 10.5 V DC +/- 5 %, <10 mA, protection type: overload and short-circuit protection Internal supply for digital inputs and STO: 24 V DC (21...27 V), <200 mA, protection type: overload and short-circuit protection
Local signalling	3 LEDs for local diagnostic 3 LEDs (dual colour) for embedded communication status 4 LEDs (dual colour) for communication module status 1 LED (red) for presence of voltage
Width	226 mm
Height	673 mm
Depth	271 mm

Net weight	28.7 kg
Analogue input number	3
Analogue input type	AI1, AI2, AI3 software-configurable voltage: 0...10 V DC, impedance: 30 kOhm, resolution 12 bits AI1, AI2, AI3 software-configurable current: 0...20 mA/4...20 mA, impedance: 250 Ohm, resolution 12 bits
Discrete input number	8
Discrete input type	DI1...DI6 programmable, 24 V DC (≤ 30 V), impedance: 3.5 kOhm DI5, DI6 programmable as pulse input: 0...30 kHz, 24 V DC (≤ 30 V) STOA, STOB safe torque off, 24 V DC (≤ 30 V), impedance: > 2.2 kOhm
Input compatibility	DI1...DI6: discrete input level 1 PLC conforming to EN/IEC 61131-2 DI5, DI6: discrete input level 1 PLC conforming to IEC 65A-68 STOA, STOB: discrete input level 1 PLC conforming to EN/IEC 61131-2
Discrete input logic	Positive logic (source) (DI1...DI6), < 5 V (state 0), > 11 V (state 1) Negative logic (sink) (DI1...DI6), > 16 V (state 0), < 10 V (state 1) Positive logic (source) (DI5, DI6), < 0.6 V (state 0), > 2.5 V (state 1) Positive logic (source) (STOA, STOB), < 5 V (state 0), > 11 V (state 1)
Analogue output number	2
Analogue output type	Software-configurable voltage AO1, AO2: 0...10 V DC impedance 470 Ohm, resolution 10 bits Software-configurable current AO1, AO2: 0...20 mA, resolution 10 bits
Sampling duration	2 Ms ± 0.5 ms (DI1...DI4) - discrete input 5 Ms ± 1 ms (DI5, DI6) - discrete input 5 Ms ± 0.1 ms (AI1, AI2, AI3) - analog input 10 ms ± 1 ms (AO1) - analog output
Accuracy	± 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input ± 1 % AO1, AO2 for a temperature variation 60 °C analog output
Linearity error	AI1, AI2, AI3: ± 0.15 % of maximum value for analog input AO1, AO2: ± 0.2 % for analog output
Relay output number	3
Relay output type	Configurable relay logic R1: fault relay NO/NC electrical durability 100000 cycles 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 resistive load, $\cos \phi = 1$: 3 A at 30 V DC 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
Isolation	Between power and control terminals
Variable speed drive application selection	Compressor centrifugal Building - HVAC Other application Food and beverage processing Fan Mining mineral and metal Pump Mining mineral and metal Fan Oil and gas Other application Water and waste water Screw compressor Building - HVAC Pump Food and beverage processing Fan Food and beverage processing Atomization Food and beverage processing Electro submersible pump (ESP) Oil and gas Water injection pump Oil and gas Jet fuel pump Oil and gas Compressor for refinery Oil and gas Centrifuge pump Water and waste water Positive displacement pump Water and waste water Electro submersible pump (ESP) Water and waste water Screw pump Water and waste water Lobe compressor Water and waste water Screw compressor Water and waste water Compressor centrifugal Water and waste water Fan Water and waste water Conveyor Water and waste water Mixer Water and waste water
Motor power range AC-3	30...50 kW at 380...440 V 3 phases 30...50 kW at 480...500 V 3 phases

Environment

Insulation resistance	> 1 MOhm 500 V DC for 1 minute to earth
Noise level	63.5 dB conforming to 86/188/EEC
Power dissipation in W	Natural convection: 121 W at 380 V, switching frequency 4 kHz Forced convection: 943 W at 380 V, switching frequency 4 kHz
Volume of cooling air	240 m ³ /h
Operating position	Vertical +/- 10 degree
Maximum THDI	<48 % from 80...100 % of load conforming to IEC 61000-3-12
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 61000-4-4 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
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 for 11 ms conforming to IEC 60068-2-27
Relative humidity	5...95 % without condensation conforming to IEC 60068-2-3
Ambient air temperature for operation	-15...50 °C (without derating) 50...60 °C (with derating factor)
Ambient air temperature for storage	-40...70 °C
Operating altitude	<= 1000 m without derating 1000...4800 m with current derating 1 % per 100 m
Standards	UL 508C EN/IEC 61800-3 Environment 1 category C2 EN/IEC 61800-3 Environment 2 category C3 EN/IEC 61800-3 EN/IEC 61800-5-1 IEC 61000-3-12 IEC 60721-3 IEC 61508 IEC 13849-1
Product certifications	UL ATEX zone 2/22 ATEX INERIS CSA TÜV DNV-GL
Marking	CE

Packing Units

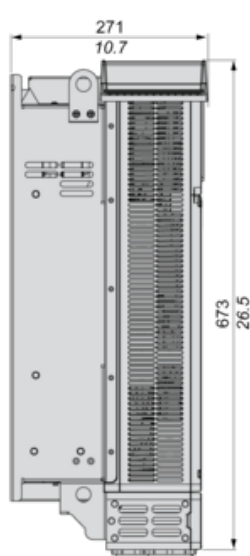
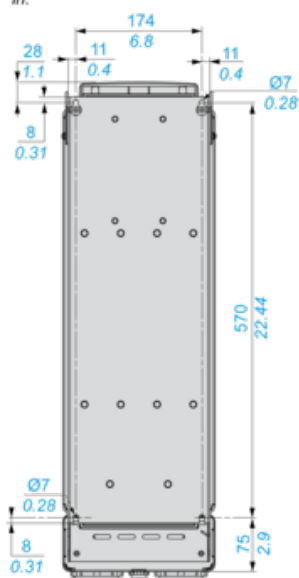
Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Weight	33 kg
Package 1 Height	33 cm
Package 1 width	42 cm
Package 1 Length	83 cm
Unit Type of Package 2	PAL
Number of Units in Package 2	1
Package 2 Weight	39 kg
Package 2 Height	52 cm
Package 2 width	35 cm
Package 2 Length	81 cm

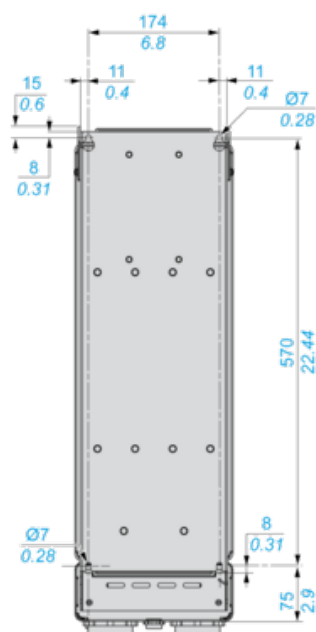
Offer Sustainability

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
RoHS exemption information	Yes
China RoHS Regulation	China RoHS Declaration
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
Upgradeability	Upgraded Components Available

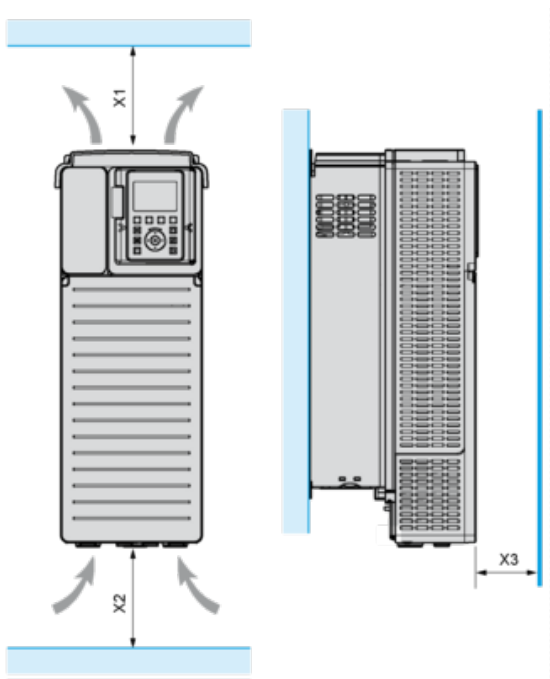
Drives with IP21 Top Cover

$$\frac{\text{mm}}{\text{in.}}$$

$$\frac{\text{mm}}{\text{in.}}$$
mm
in.
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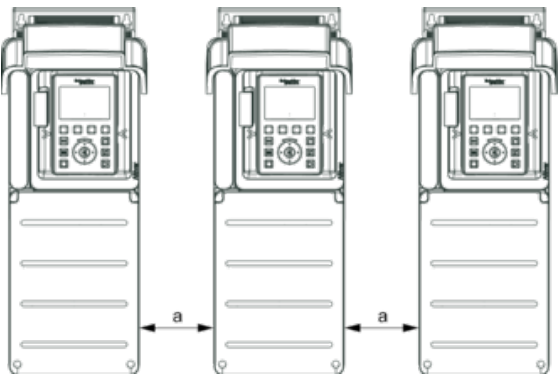
Clearances



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

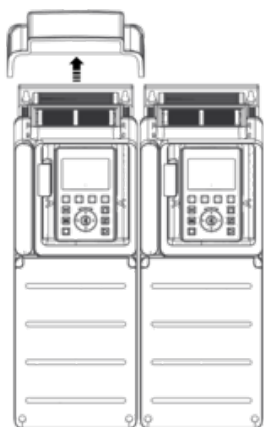
Mounting Types

Mounting Type A: Individual IP21

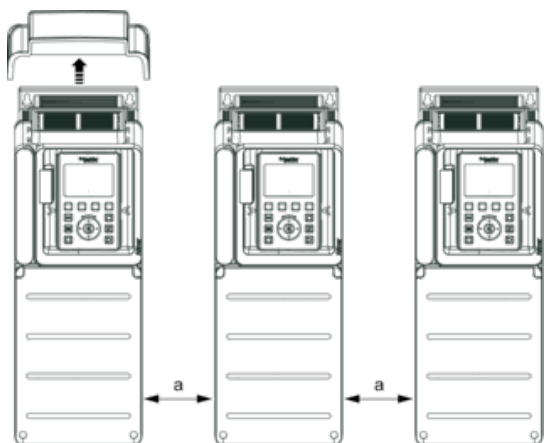


a ≥ 110 mm (4.33 in.)

Mounting Type B: Side by Side IP20 (Possible, 2 Drives Only)



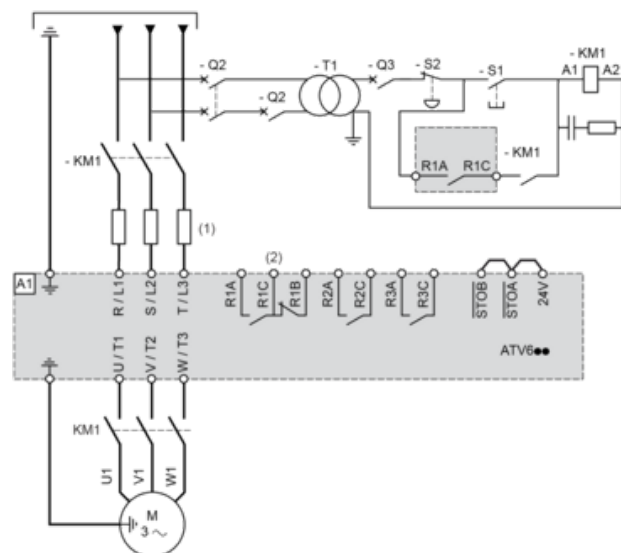
Mounting Type C: Individual IP20



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

Three-Phase Power Supply with Upstream Breaking via Line Contactor

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



(1) Line choke if used

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

A1 : Drive

KM1 : Line Contactor

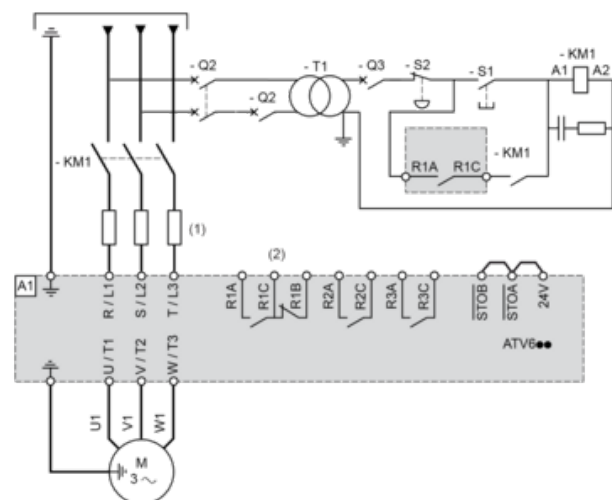
Q2, Q3 : Circuit breakers

S1, S2 : Pushbuttons

T1 : Transformer for control part

Three-Phase Power Supply with Downstream Breaking via Contactor

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



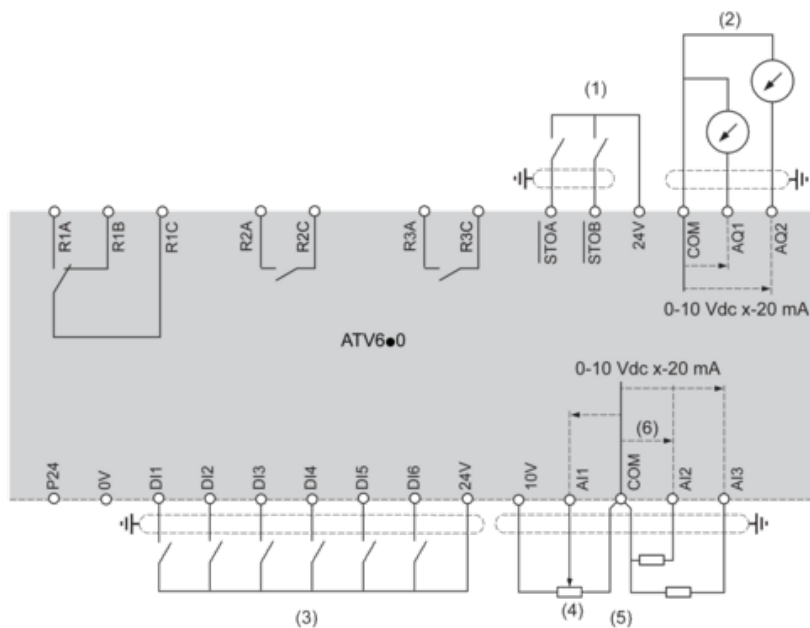
(1) Line choke if used

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

A1 : Drive

KM1 : Contactor

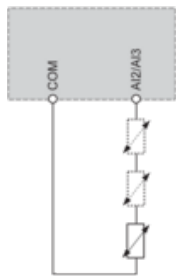
Control Block Wiring Diagram



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

Sensor Connection

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

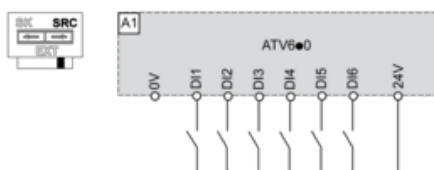


Sink / Source Switch Configuration

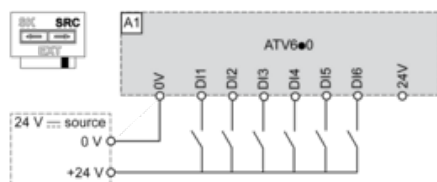
The switch is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

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

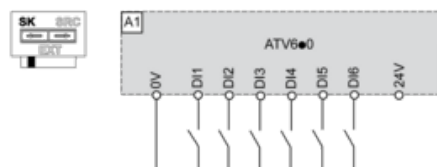
Switch Set to SRC (Source) Position Using the Output Power Supply for the Digital Inputs



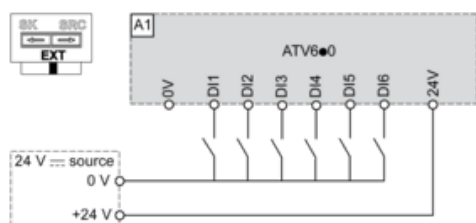
Switch Set to SRC (Source) Position and Use of an External Power Supply for the DI6



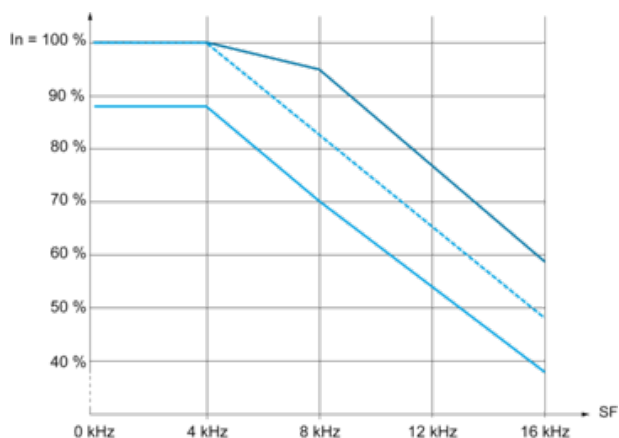
Switch Set to SK (Sink) Position Using the Output Power Supply for the Digital Inputs



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



Derating Curves



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

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

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

I_n : Nominal Drive Current

SF : Switching Frequency