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ENGINEERING TOMORROW

Fact Sheet

VLT® AutomationDrive FC 300
Ambient temperature and derating charts



Products	
VLT® AutomationDrive FC 301/302	0.25 kW to 37 kW @ 200 – 240 V AC
VLT® AutomationDrive FC 301/302	0.37 kW to 75 kW @ 380-480/500 V AC
VLT® AutomationDrive FC 301/302	1.1 kW to 75 kW @ 525-690 V AC
VLT® AutomationDrive FC 302	90 kW to 500 kW @ 380-500 V AC
VLT® AutomationDrive FC 302	55 kW to 710 kW @ 525-690 V AC

Designed for variable speed control of all induction motors and permanent magnet motors, on any industrial machine or production line, a VLT® AutomationDrive FC 300 helps its owner save energy, increase flexibility, and optimize processes.

98%
energy efficiency with flexible robust operation in a wide temperature range

Ambient temperature – general terms

- The definition of ambient and cooling temperature is according to EN50178, and IEC721-3-3 class 3K3.
- The drive can operate at elevated ambient temperatures up to +55 °C, however, the rated current must be de-rated (please refer to the derating chart below).
- Do not operate in environments where the ambient temperature exceeds 55 °C (131 °F). If the temperature exceeds ambient temperature limits, extra air conditioning of the cabinet or installation site is required.
- The drive can operate at temperatures down to -10 °C (14 °F). However, proper operation at rated load is only guaranteed at 0 °C (32 °F) or higher.
- Temperature range during storage / transport is -25 to 65/70 °C (-13 °F- 149/158 °F).
- Avoiding extreme ambient temperatures prolongs the life of the equipment and maximizes overall system reliability.
- As a rule of thumb, the lifetime of electronic components decreases by 50% for every 10 °C when operated above its design temperature.

Ambient temperature for operation and derating

- All products listed are able to work at the below given ambient temperature without any condition /influence on the fulfillment of specifications"
  - Ambient temperature: -10 °C to +45 °C
  - Ambient temperature: +45 °C to 55 °C with derating (refer derating table)
- All products listed are able to work at ambient temperatures up to 50 °C without derating if certain conditions are met/followed:.
  - Applicable for EEF2 Class motors
  - Reduce Switching frequency (refer derating chart)
  - Change switching mode to "60 AVM" from "SFAVM"

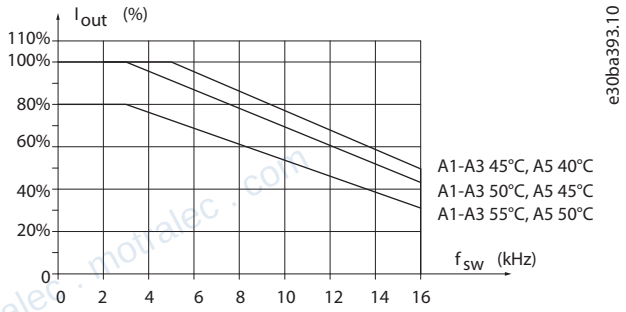
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Derating table for different power sizes and switching mode

- Derate the output current at high temperatures. This calculation takes place after the calculations for derating the switching frequency.
- The result is an attempt to lower the temperatures by first lowering the switching frequency, and then lowering the output current.
- Current derating only takes place if the user has programmed the unit to derate in overtemperature situations. If the user has selected a trip function for overtemperature situations, the current derate factor is not lowered.

Derating for Ambient Temperature – Enclosure Size A (up to 7.5 kW @ 380-480/500 V)

60 ° AVM - Pulse width modulation	SFAVM - Stator frequency induction vector modulation



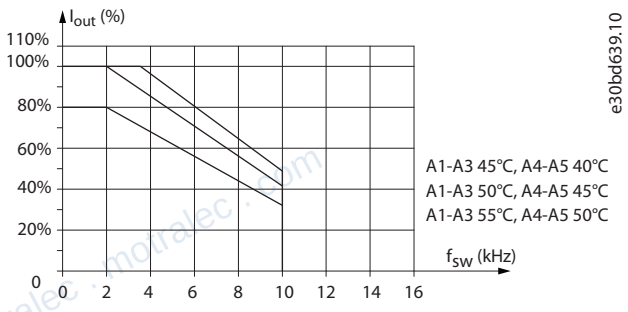
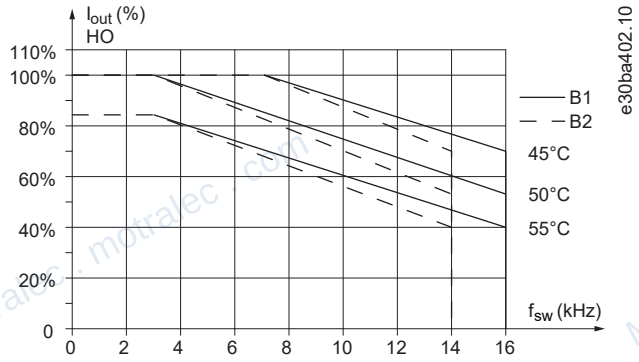


Illustration 62: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Size A, using 60° AVM	Illustration 63: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Size A, using SFAVM

Derating for Ambient Temperature – Enclosure Size B (up to 30 kW (IP20) and 22 kW (IP21/55 @ 380-480/500 V)

B1 & B2 – 60° AVM – High Overload	B1 & B2 – 60° AVM - Normal Overload
60° AVM - Pulse width modulation, high overload (160%)	60° AVM - Pulse width modulation, normal overload (110%)



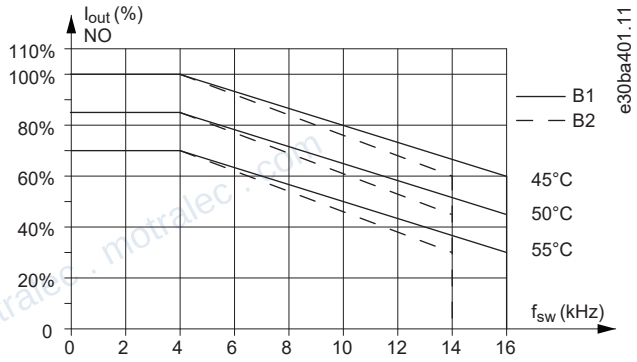
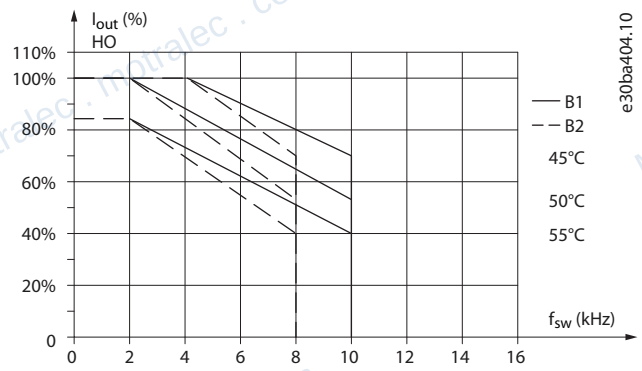


Illustration 66: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes B1 and B2, using 60° AVM	Illustration 67: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes B1 and B2, using 60° AVM

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B1 & B2 – SFAVM – High Overload	B1 & B2 – SFAVM – Normal Overload
SFAVM - Stator frequency induction vector modulation, high overload (160%)	SFAVM - Stator frequency induction vector modulation, normal overload (110%)



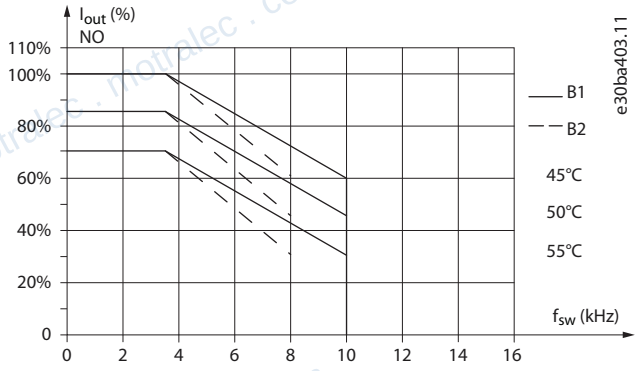
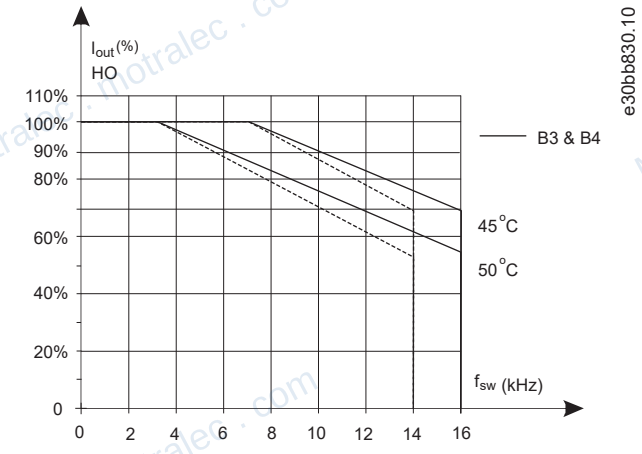


Illustration 70: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes B1 and B2, using SFAVM	Illustration 71: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes B1 and B2, using SFAVM

B3 & B4 – 60° AVM- High Overload	B3 & B4 – 60° AVM- Normal Overload



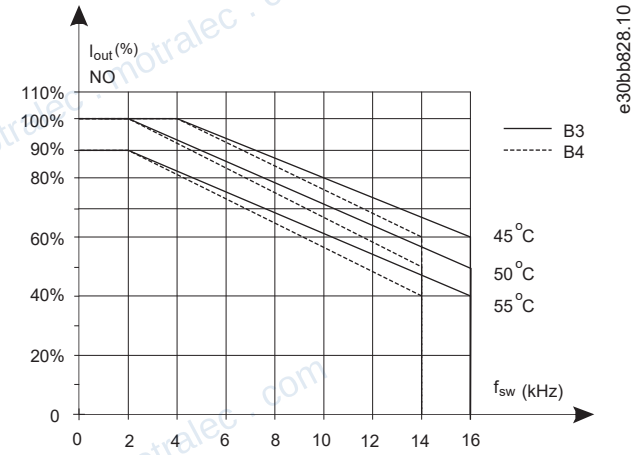
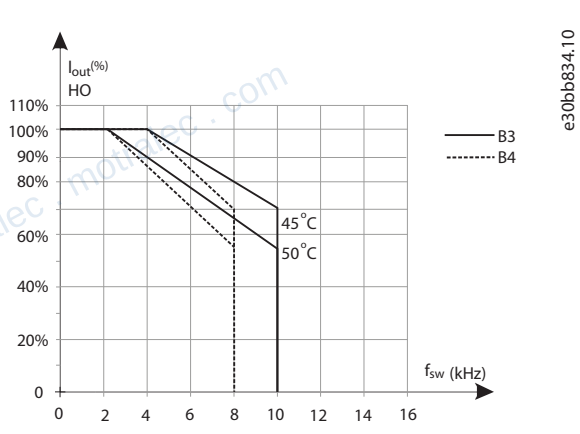


Illustration 68: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes B3 and B4, using 60° AVM	Illustration 69: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes B3 and B4, using 60° AVM

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B3 & B4 – SFAVM – High Overload	B3 & B4 – SFAVM – Normal Overload



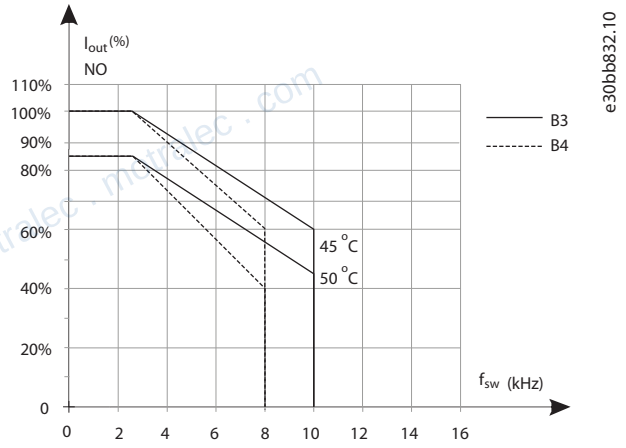
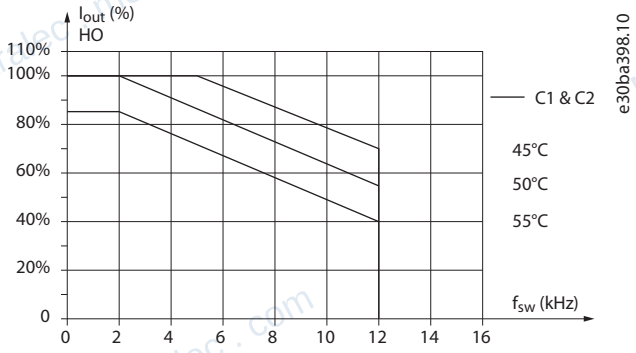


Illustration 72: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes B3 and B4, using SFAVM	Illustration 73: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes B3 and B4, using SFAVM

Derating for Ambient Temperature – Enclosure Size C (upto 75 kW 380/500 V)

C1 & C2 – 60° AVM – High Overload	C1 & C2 – 60° AVM – Normal Overload
60° AVM - Pulse width modulation, high overload (160%)	60° AVM - Pulse width modulation, normal overload (110%)



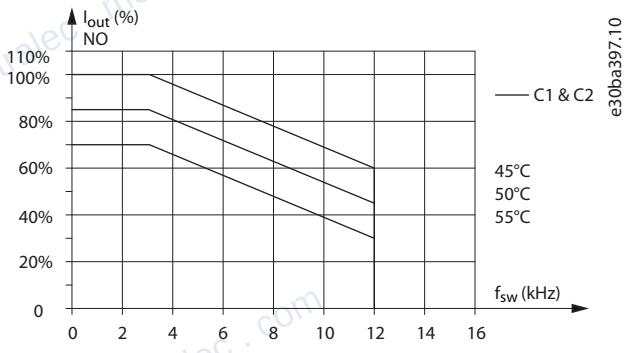
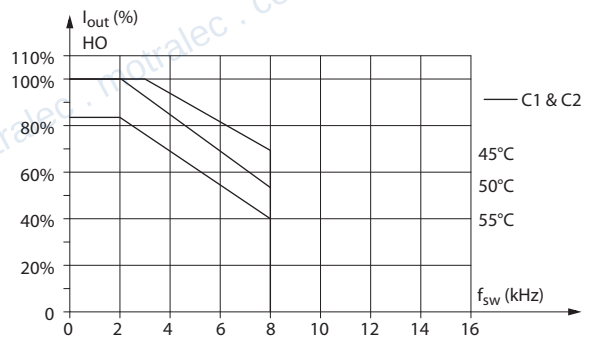


Illustration 80: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes C1 and C2, using 60° AVM	Illustration 81: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes C1 and C2, using 60° AVM

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C1 & C2 – SFAVM – High Overload	C1 & C2 – SFAVM – Normal Overload
SFAVM - Stator frequency induction vector modulation, high overload (160%)	SFAVM - Stator frequency induction vector modulation, normal overload (110%)



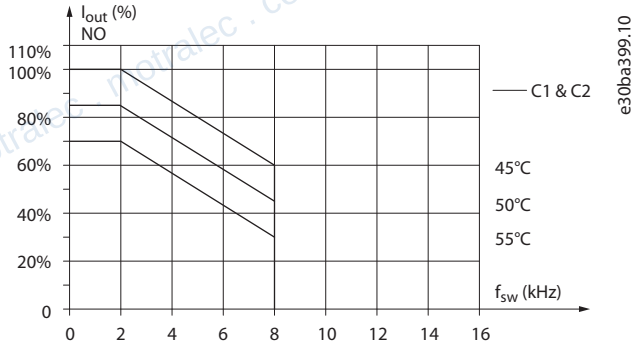
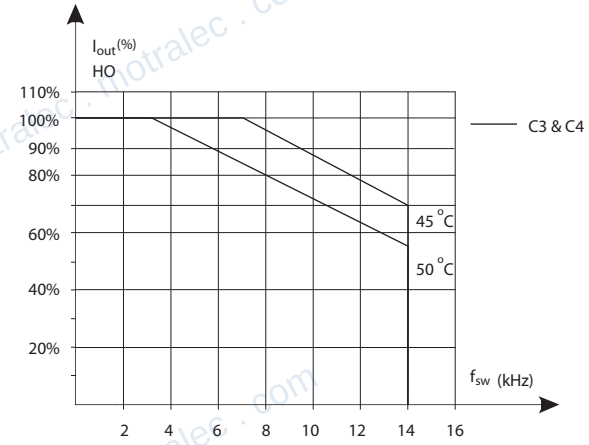


Illustration 84: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes C1 and C2, using SFAVM	Illustration 85: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes C1 and C2, using SFAVM

C3 & C4 – 60° AVM – High Overload	C3 & C4 – 60° AVM – Normal Overload



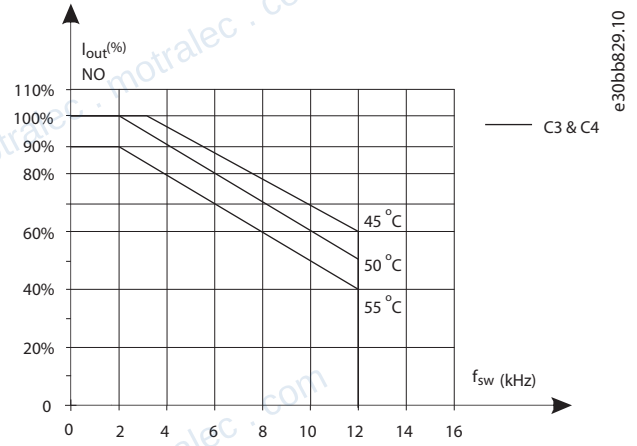
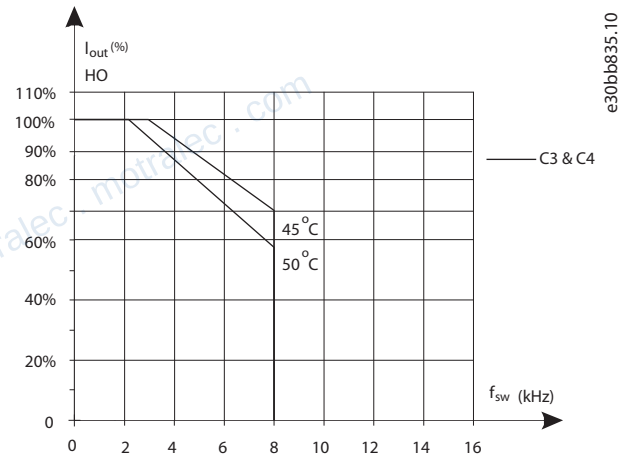


Illustration 82: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes C3 and C4, using 60° AVM	Illustration 83: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes C3 and C4, using 60° AVM

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C3 & C4 – SFAVM – High Overload	C3 & C4 – SFAVM – Normal Overload



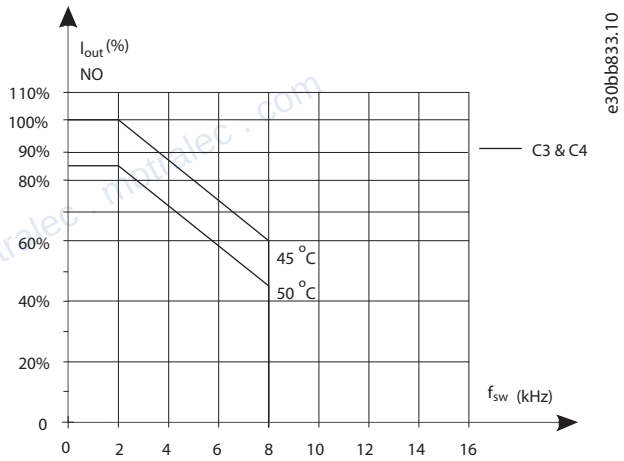
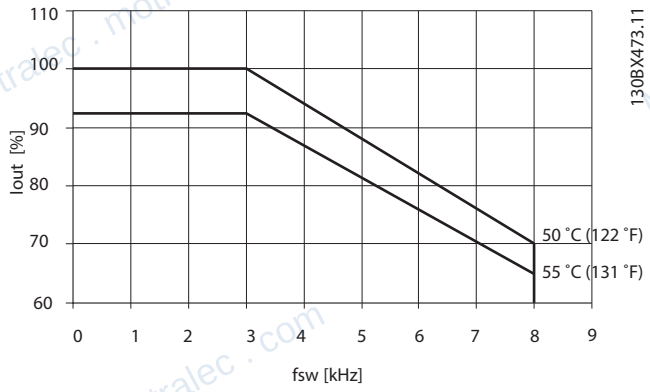
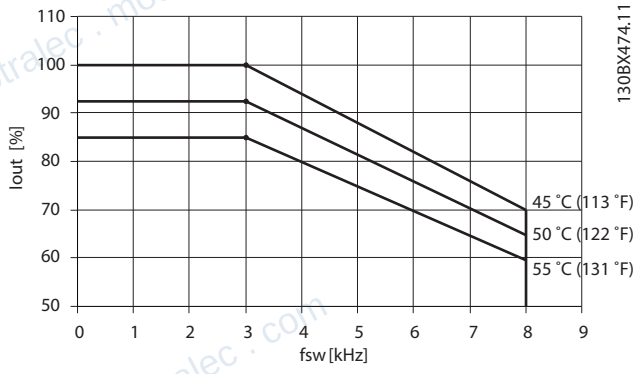


Illustration 86: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes C3 and C4, using SFAVM	Illustration 87: Derating of I_{out} for Different $T_{AMB,MAX}$ for Enclosure Sizes C3 and C4, using SFAVM

Derating for Ambient Temperature – Enclosure Size D(N90 to N250 kW 380-500 V)

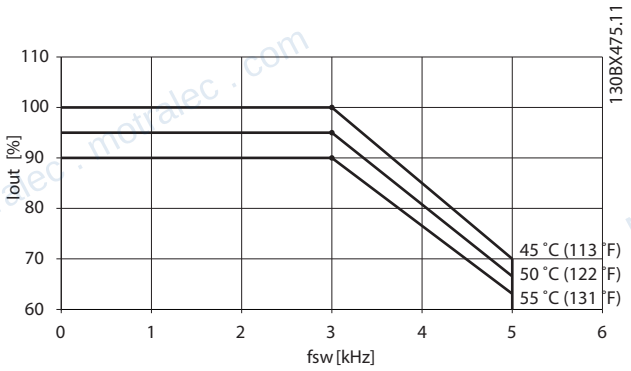
D1 to D8h – 60° AVM – High Overload	D1 to D8h – 60° AVM – Normal Overload
High overload HO, 150%	Normal overload NO, 110%

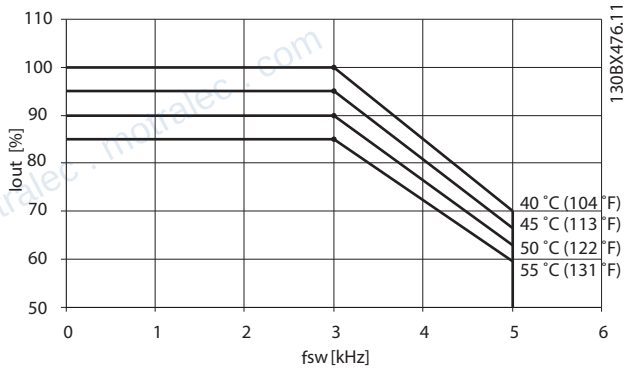




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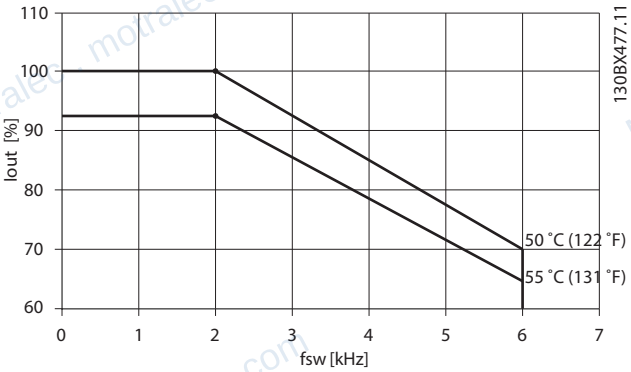
D1 to D8h – SFAVM – High Overload	D1 to D8h – SFAVM – Normal Overload

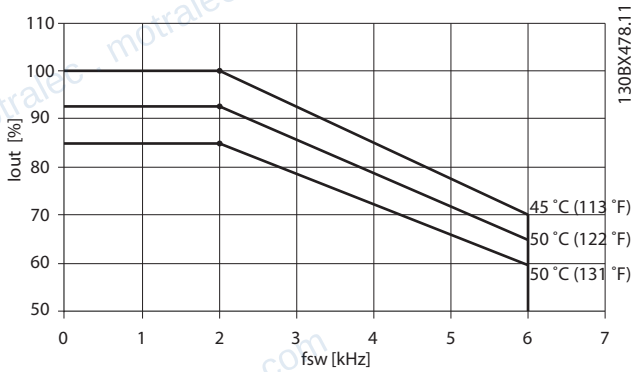




Derating for Ambient Temperature – Enclosure Size E (N315 to N500 kW 380-500 V)

E1 to E4h – 60° AVM – High Overload	E1 to E4h – 60° AVM – Normal Overload

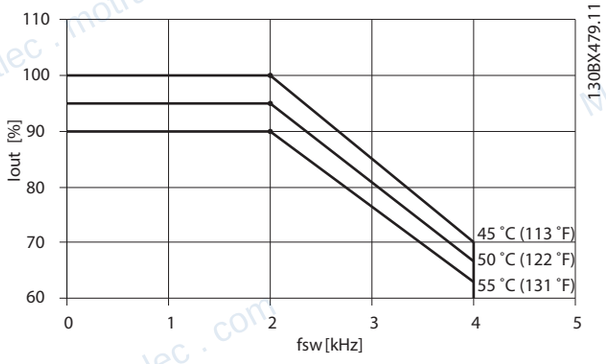




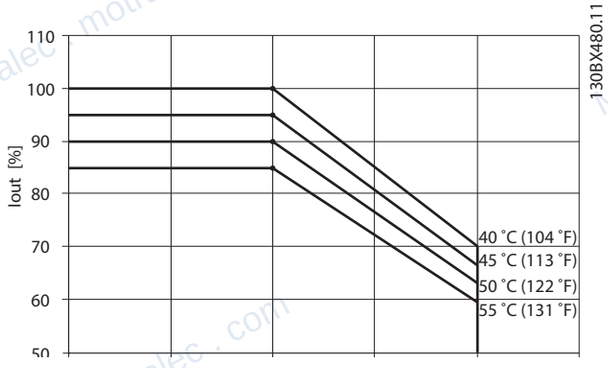
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E1 to E4h – SFAVM – High Overload



E1 to E4h – SFAVM – Normal Overload



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