

- Connectors for the electrical connection points at the device
- 1 × Instruction Manual (in the English language)

6.3.4 Technical data HMS02.1N-Wxxxx

Ambient and operating conditions

General information

Conditions for [transport](#) and [storage](#): See [chapter 4.2 "Transport and storage" on page 23](#).

Installation conditions: See [chapter 4.3 "Installation conditions" on page 24](#).

This chapter contains:

- Limit values for use in the scope of CSA / UL
- Applied standards (CE conformity, UL listing)

UL ratings

Ambient and operating conditions - UL ratings

Description	Symbol	Unit	HMS02.1N-W0028-A-07-NNNN	HMS02.1N-W0054-A-07-NNNN
Short circuit current rating	SCCR	A rms	42000	
Rated input voltage, power ¹⁾	U_{LN_nenn}	V	DC 254...750	
Rated input current	I_{LN}	A	18.4	30.7
Output voltage	U_{out}	V	3 x AC 0...500	
Output current	I_{out}	A	13.8	25.0
Latest amendment: 2019-06-04*				

- 1) Mains input L1, L2, L3 (for HMV and HCS only); For use on a solidly grounded wye source only.

Tab. 6-27: HMS - Ambient and operating conditions - UL ratings

Applied standards

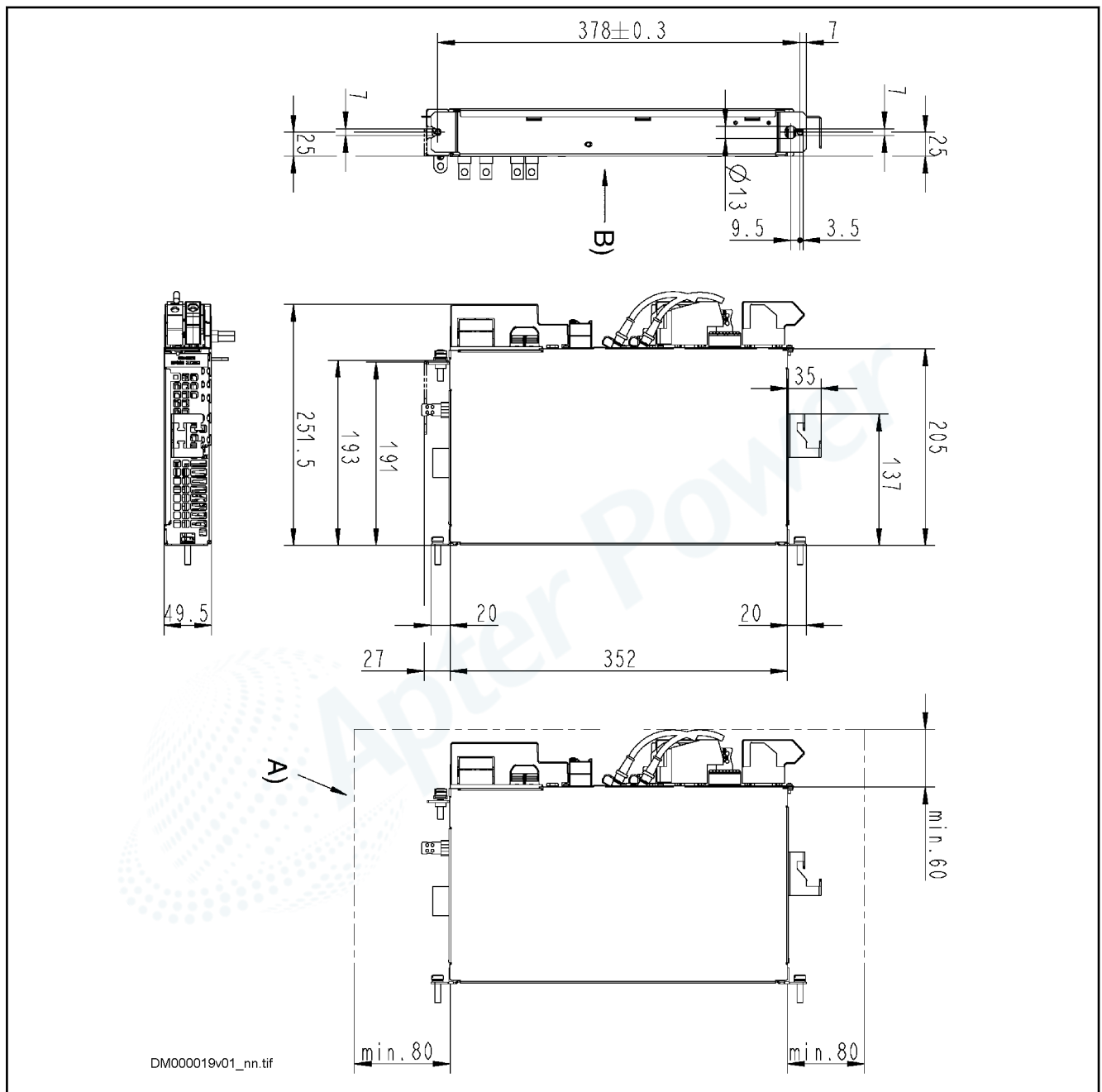
Description	Symbol	Unit	HMS02.1N-W0028	HMS02.1N-W0054
Listing in accordance with UL standard			UL 508C	
UL files			E134201	
Listing in accordance with CSA standard			C22.2 No. 274-13	
Latest amendment: 2017-01-23				

Tab. 6-28: HMS - Applied standards

Mechanics and mounting

Dimensional drawings

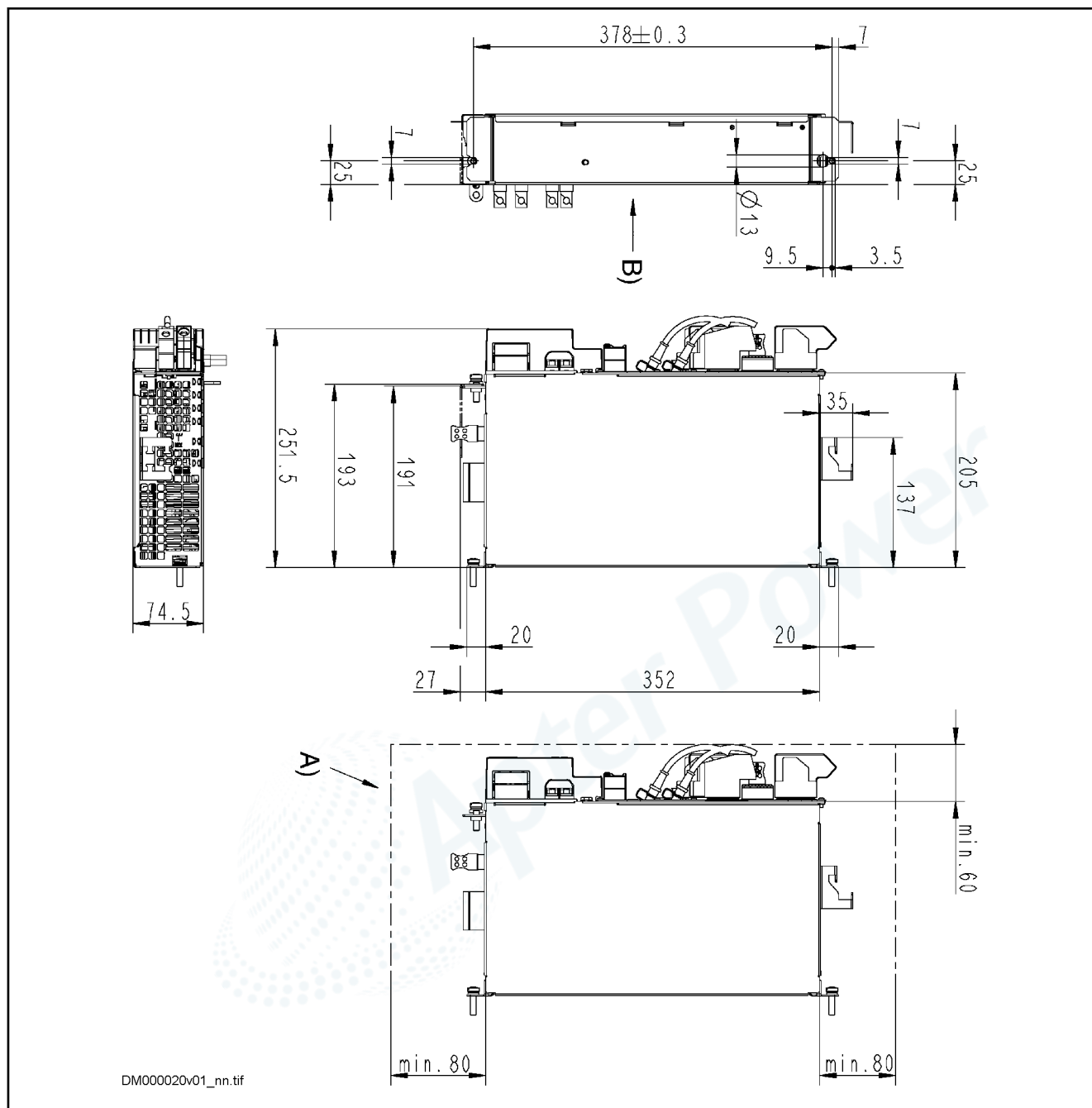
Dimensions HMS02.1N-W0028



- A)** Minimum mounting clearance (plus additional space for motor cable)
Note: Rexroth IndraDrive supply units require greater mounting clearance!
- B)** Rear view!

Fig. 6-28: Dimensions HMS02.1N-W0028

Dimensions HMS02.1N-W0054



- A)** Minimum mounting clearance (plus additional space for motor cable)
Note: Rexroth IndraDrive supply units require greater mounting clearance!
- B)** Rear view!
- Fig. 6-29: Dimensions HMS02.1N-W0054

Dimensions, mass, insulation, sound pressure level

Data for mass, sound pressure level, insulation

Description	Symbol	Unit	HMS02.1N-W0028-A-07-NNNN	HMS02.1N-W0054-A-07-NNNN
Mass	m	kg	3.50	5.00
Device height ¹⁾	H	mm	352	
Device depth ²⁾	T	mm	205	
Device width ³⁾	B	mm	50	75
Insulation resistance at 500 V DC	R _{is}	Mohm	>8	
Capacitance against housing	C _Y	nF	2 x 68	
Average sound pressure level (accuracy class 2) at P _{DC_cont} ⁴⁾	L _P	dB (A)	tbd	
Latest amendment: 2007-01-02				

1) 2) 3)
4)

Housing dimension; see also related dimensional drawing
According to DIN EN ISO 11205; comparative value at 1 m distance, out of cabinet; HCS types in -L*** design: load-dependent

Tab. 6-29: HMS - Data for mass, dimensions, sound pressure level, insulation

Power dissipation, mounting position, cooling, distances

Cooling and power dissipation data

Description	Symbol	Unit	HMS02.1N-W0028-A-07-NNNN	HMS02.1N-W0054-A-07-NNNN
Ambient temperature range for operation with nominal data	T _{a_work}	°C	0...40	
Ambient temperature range for operation with reduced nominal data	T _{a_work_red}	°C	0...55	
Derating of P _{DC_cont} ; P _{BD} ; I _{out_cont} when T _{a_work} < T _a < T _{a_work_red}	f _{Ta}	%/K	2	
Allowed mounting position			G1	
Cooling type			Forced ventilation	
Volumetric capacity of forced cooling	V	m ³ /h	17.20	37.00
Allowed switching frequencies ¹⁾	f _s	kHz	4, 8	4, 8, 12, 16
Power dissipation at I _{out_cont} = 0 A; f _s = f _s (min.) ²⁾	P _{Diss_0A_fs_min}	W	35	40
Power dissipation at I _{out_cont} = 0 A; f _s = f _s (max.) ³⁾	P _{Diss_0A_fs_max}	W	70	150
Power dissipation at continuous current and continuous DC bus power respectively ⁴⁾	P _{Diss_cont}	W	150.00	350.00
Latest amendment: 2009-10-26				

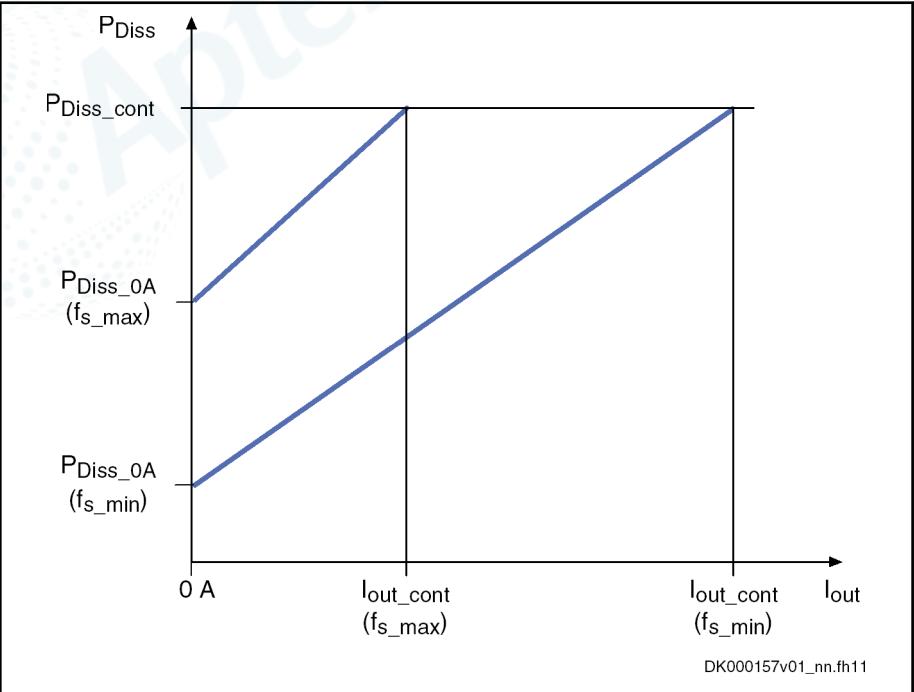
Description	Symbol	Unit	HMS02.1N-W0028-A-07-NNNN	HMS02.1N-W0054-A-07-NNNN
Minimum distance on the top of the device ⁵⁾	d _{top}	mm	80	
Minimum distance on the bottom of the device ⁶⁾	d _{bot}	mm	80	
Temperature increase with minimum distances d _{bot} ; d _{top} ; P _{BD}	ΔT	K	65	
Latest amendment: 2009-10-26				

- 1)
Also depending on firmware and control section; see parameter description "P-0-0001, Switching frequency of the power output stage"; see "P-0-4058, Amplifier type data"; for supply units the switching frequency is 4.2 kHz
- 2) 3)
Plus dissipation of braking resistor and control section; find interim values by interpolation to P_{Diss_cont}
- 4)
Plus dissipation of braking resistor and control section
- 5) 6)
See fig. "Air intake and air outlet at device"
- Tab. 6-30:
HMS - Data for cooling and power dissipation

Power dissipation vs. output current

The figure below illustrates the connection between power dissipation and output current, depending on the switching frequency f_s which was set at the drive controller. See also Parameter Description "P-0-0001, Switching frequency of the power output stage".

 In addition, take the power at the braking resistor and the power consumption of the control section into account. Both powers are not contained in the figure.



I_{out} Output current
 P_{Diss} Power dissipation
 f_s Switching frequency

Fig. 6-30: Power Dissipation vs. Output Current

For the data P_{Diss_cont} , $P_{Diss_0A_fsmax}$ and $P_{Diss_0A_fsmin}$, see the table "Data for Cooling and Power Dissipation".

Distances

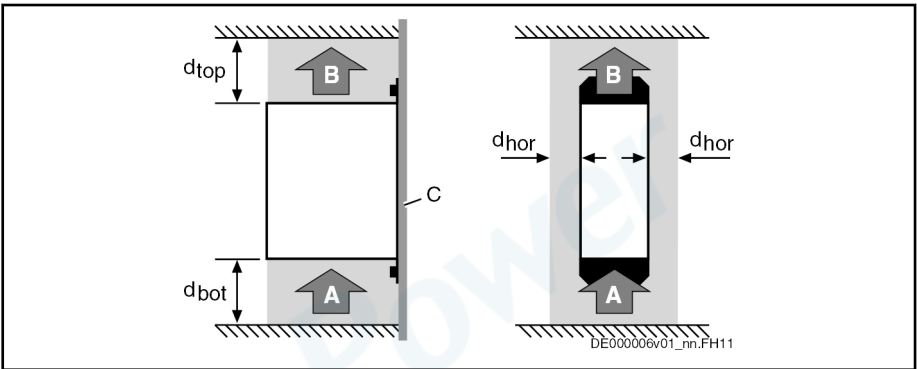
NOTICE

Property damage due to temperatures higher than 105 °C!

Observe the indicated minimum distances!

Above the devices there may only be such materials which

- are not combustible
- are insensitive to the occurring high temperatures



- A Air intake
- B Air outlet
- C Mounting surface in control cabinet
- d_{top} Distance top
- d_{bot} Distance bottom
- d_{hor} Distance horizontal

Fig. 6-31: Air intake and air outlet at device

Basic data of HMS02.1N-Wxxxx power section

General information

This section contains

- Data for control voltage supply
- Data of DC bus
- Data of inverter

The order of the data tables below follows the energy flow in the drive controller - from mains connection to motor output.

Control voltage

Control voltage supply data

Description	Symbol	Unit	HMS02.1N-W0028-A-07-NNNN	HMS02.1N-W0054-A-07-NNNN
Control voltage input ¹⁾	U_{N3}	V	24 ± 20%	
Control voltage when using motor holding brake with motor cable length less than 50 m (HCS01 less than 40 m) ²⁾	U_{N3}	V	24 ± 5 %	
Control voltage when using motor holding brake with motor cable length more than 50 m (HCS01 more than 40 m) ³⁾	U_{N3}	V	26 ± 5 %	
Max. inrush current at 24 V supply	I_{EIN3_max}	A	4.80	
Pulse width of I_{EIN3}	$t_{EIN3Lade}$	ms	10	
Input capacitance	C_{N3}	mF	1.20	
Rated power consumption control voltage input at U_{N3} ⁴⁾	P_{N3}	W	13	17
Latest amendment: 2007-01-02				

- 1) 2) 3) Observe supply voltage for motor holding brake
4) See information on "Rated power consumption control voltage input at U_{N3} "

Tab. 6-31: HMS - Control voltage supply data



Rated power consumption control voltage input at U_{N3}

Plus motor holding brake and control section, plus safety option

Power section - DC bus

Power section data - DC bus

Description	Symbol	Unit	HMS02.1N-W0028-A-07-NNNN	HMS02.1N-W0054-A-07-NNNN
DC bus voltage	U _{DC}	V	254...750	
Capacitance in DC bus	C _{DC}	mF	0.14	0.27
DC resistance in DC bus (L+ to L-)	R _{DC}	kohm	approx. 300	approx. 150
Monitoring value maximum DC bus voltage, switch-off threshold	U _{DC_limit_max}	V	900	
Monitoring value minimum DC bus voltage, undervoltage threshold	U _{DC_limit_min}	V	254	
Latest amendment: 2007-07-27				

Tab. 6-32: HMS - Power section data - DC bus

Power section - inverter

Power section data - inverter

Description	Symbol	Unit	HMS02.1N-W0028-A-07-NNNN	HMS02.1N-W0054-A-07-NNNN
Allowed switching frequencies ¹⁾	f_s	kHz	4, 8	4, 8, 12, 16
Output voltage, fundamental wave in V/Hz (U/f) control	U_{out_eff}	V	~ UDC x 0.71	
Output voltage, fundamental wave in closed-loop operation	U_{out_eff}	V	~ UDC x 0.71	
Rise of voltage at output with U_{LN_nenn} and 15 m motor cable length phase-phase (10-90%) ²⁾	dv/dt	kV/ μ s	5.00	
Rise of voltage at output with U_{LN_nenn} and 15 m motor cable length phase-ground (10-90%) ³⁾	dv/dt	kV/ μ s	5.00	
Output frequency range when $f_s = 2$ kHz	f_{out_2k}	Hz	-	
Output frequency range when $f_s = 4$ kHz	f_{out_4k}	Hz	0...400	
Output frequency range when $f_s = 8$ kHz	f_{out_8k}	Hz	0...800	
Output frequency range when $f_s = 12$ kHz	f_{out_12k}	Hz	-	0...1200
Output frequency range when $f_s = 16$ kHz	f_{out_16k}	Hz	-	0...1600
Output frequency threshold to detect motor standstill ⁴⁾	f_{out_still}	Hz	2...4	
Maximum output current when $f_s = 2$ kHz	I_{out_max2}	A	-	
Maximum output current when $f_s = 4$ kHz	I_{out_max4}	A	28.3	54.0
Maximum output current when $f_s = 8$ kHz	I_{out_max8}	A	28.3	54.0
Maximum output current when $f_s = 12$ kHz	I_{out_max12}	A	-	54.0
Maximum output current when $f_s = 16$ kHz	I_{out_max16}	A	-	40.0
Continuous output current when $f_s = 2$ kHz	I_{out_cont2}	A	-	
Continuous output current when $f_s = 4$ kHz	I_{out_cont4}	A	13.8	25.0
Continuous output current when $f_s = 8$ kHz	I_{out_cont8}	A	8.5	20.0

Latest amendment: 2007-02-12

Description	Symbol	Unit	HMS02.1N-W0028-A-07-NNNN	HMS02.1N-W0054-A-07-NNNN
Continuous output current when $f_s = 12 \text{ kHz}$ ⁵⁾	$I_{\text{out_cont12}}$	A	-	12.7
Continuous output current when $f_s = 16 \text{ kHz}$ ⁶⁾	$I_{\text{out_cont16}}$	A	-	10.2
Continuous output current when $f_s = 2 \text{ kHz}$; output frequency f_{out} less than $f_{\text{out_still}}$	$I_{\text{out_cont0Hz_2}}$	A	-	
Continuous output current when $f_s = 4 \text{ kHz}$; output frequency f_{out} less than $f_{\text{out_still}}$	$I_{\text{out_cont0Hz_4}}$	A	9.2	19.2
Continuous output current when $f_s = 8 \text{ kHz}$; output frequency f_{out} less than $f_{\text{out_still}}$	$I_{\text{out_cont0Hz_8}}$	A	5.1	12.5
Continuous output current when $f_s = 12 \text{ kHz}$; output frequency f_{out} less than $f_{\text{out_still}}$ ⁷⁾	$I_{\text{out_cont0Hz_12}}$	A	-	7.0
Continuous output current when $f_s = 16 \text{ kHz}$; output frequency f_{out} less than $f_{\text{out_still}}$ ⁸⁾	$I_{\text{out_cont0Hz_16}}$	A	-	5.6
Assigned output filters at nom. data; $f_s = 4 \text{ kHz}$			-	
Latest amendment: 2007-02-12				

- 1)
- Also depending on firmware and control section; see parameter description "P-0-0001, Switching frequency of the power output stage"; see "P-0-4058, Amplifier type data"; for supply units the switching frequency is 4.2 kHz
- 2) 3)
- Guide value, see following note
- 4)
- See following note regarding output current reduction
- 5) 6) 7) 8)
- See parameter description "P-0-0556, Config word of axis controller", load-dependent reduction of switching frequency f_s
- Tab. 6-33:
- HMS - Power section data - inverter



Guide value "Rise of voltage at output"

Observe that the voltage load at the motor is almost independent of the power section used.

Especially when using **standard motors**, make sure that they comply with the occurring voltage load.

Observe the information on third-party motors at drive controllers (see documentation "Rexroth IndraDrive Drive Systems with HMV01/02 HMS01/02, HMD01, HCS02/03", index entry "Third-party motors → At drive controllers").



Reduced output current at motor standstill

Depending on the electric output frequency, the output current is reduced for thermal protection of the power section.

The output current is reduced, when the electric output frequency has fallen below the threshold to detect motor standstill.