

# IndraDrive

Drive Controllers  
Power Sections HMS01

**Instruction Manual**  
**R911319996**

Edition 08



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 Drive Controllers  
 Power Sections HMS01

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**Purpose of Documentation** This documentation provides information on the installation and operation of the described products, by persons trained and qualified to work with electrical installations.

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# Table of Contents

	Page
<b>1</b>	<b>Important notes..... 1</b>
1.1	Safety instructions..... 1
1.1.1	General information..... 1
1.1.2	Protection against contact with electrical parts and housings..... 2
1.1.3	Battery safety..... 3
1.2	Intended use..... 4
<b>2</b>	<b>Ratings and dimensions..... 5</b>
2.1	HMS01..... 5
<b>3</b>	<b>Overview of documentations..... 17</b>
3.1	Motors..... 17
<b>4</b>	<b>Instructions for use..... 19</b>
4.1	Power supply and input voltage..... 19
4.2	Connection..... 20
4.2.1	Connection diagram..... 20
4.2.2	Connection points..... 21
<b>5</b>	<b>Service and support..... 23</b>
	<b>Index..... 25</b>



# 1 Important notes

## 1.1 Safety instructions

### 1.1.1 General information

- Do not attempt to install and operate the components of the electric drive and control system without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation prior to working with these components. If you do not have the user documentation for the components, contact our Rexroth sales representative. Ask for these documents to be sent immediately to the person or persons responsible for the safe operation of the components.
- If the supplied documents contain some information you do not understand, it is absolutely necessary that you ask Rexroth for explanation before you start working at or with the components.
- If the component is resold, rented and/or passed on to others in any other form, these safety instructions must be delivered with the component in the official language of the user's country.
- Only qualified persons may work with components of the electric drive and control system or within its proximity.

In terms of this Instruction Manual, qualified persons are those persons who are familiar with the installation, mounting, commissioning and operation of the components of the electric drive and control system, as well as with the hazards this implies, and who possess the qualifications their work requires. To comply with these qualifications, it is necessary, among other things,

- to be trained, instructed or authorized to switch electric circuits and components safely on and off, to ground them and to mark them,
- to be trained or instructed to maintain and use adequate safety equipment,
- to attend a course of instruction in first aid.
- The technical data, connection and installation conditions of the components are specified in the respective application documentations and must be followed at all times.
- If the components take the form of hardware, then they must remain in their original state, in other words, no structural changes are permitted. It is not permitted to decompile software components or alter source codes.
- Do not mount damaged or faulty components or use them in operation.
- Only use accessories and spare parts approved by Rexroth.
- Follow the safety regulations and requirements of the country in which the electric components of the electric drive and control system are operated.
- Proper and correct transport, storage, mounting and installation, as well as care in operation and maintenance, are prerequisites for optimal and safe operation of the component.

**Improper use of these components, failure to follow the safety instructions in this document or tampering with the product, including disabling of safety devices, could result in property damage, injury, electric shock or even death.**

## 1.1.2 Protection against contact with electrical parts and housings



This section concerns components of the electric drive and control system with voltages of **more than 50 volts**.

Contact with parts conducting voltages above 50 volts can cause personal danger and electric shock. When operating components of the electric drive and control system, it is unavoidable that some parts of these components conduct dangerous voltage.

### **High electrical voltage! Danger to life, risk of injury by electric shock or serious injury!**

- Only qualified persons are allowed to operate, maintain and/or repair the components of the electric drive and control system.
- Follow the general installation and safety regulations when working on power installations.
- Before switching on, the equipment grounding conductor must have been permanently connected to all electric components in accordance with the connection diagram.
- Even for brief measurements or tests, operation is only allowed if the equipment grounding conductor has been permanently connected to the points of the components provided for this purpose.
- Before accessing electrical parts with voltage potentials higher than 50 V, you must disconnect electric components from the mains or from the power supply unit. Secure the electric component from reconnection.
- With electric components, observe the following aspects:  
Always wait **30 minutes** after switching off power to allow live capacitors to discharge before accessing an electric component. Measure the electrical voltage of live parts before beginning to work to make sure that the equipment is safe to touch.
- Install the covers and guards provided for this purpose before switching on.
- Never touch any electrical connection points of the components while power is turned on.
- Do not remove or plug in connectors when the component has been powered.
- Under specific conditions, electric drive systems can be operated at mains protected by residual-current-operated circuit-breakers sensitive to universal current (RCDs/RCMs).
- Secure built-in devices from penetrating foreign objects and water, as well as from direct contact, by providing an external housing, for example a control cabinet.

### **High housing voltage and high leakage current! Danger to life, risk of injury by electric shock!**

- Before switching on and before commissioning, ground or connect the components of the electric drive and control system to the equipment grounding conductor at the grounding points.

- Connect the equipment grounding conductor of the components of the electric drive and control system permanently to the main power supply at all times. The leakage current is greater than 3.5 mA.
- Establish an equipment grounding connection with a minimum cross section according to the table below. With an outer conductor cross section smaller than 10 mm<sup>2</sup> (8 AWG), the alternative connection of two equipment grounding conductors is allowed, each having the same cross section as the outer conductors.

Cross section outer conductor	Minimum cross section equipment grounding conductor Leakage current ≥ 3.5 mA	
	1 equipment grounding conductor	2 equipment grounding conductors
1.5 mm <sup>2</sup> (16 AWG)	10 mm <sup>2</sup> (8 AWG)	2 × 1.5 mm <sup>2</sup> (16 AWG)
2.5 mm <sup>2</sup> (14 AWG)		2 × 2.5 mm <sup>2</sup> (14 AWG)
4 mm <sup>2</sup> (12 AWG)		2 × 4 mm <sup>2</sup> (12 AWG)
6 mm <sup>2</sup> (10 AWG)		2 × 6 mm <sup>2</sup> (10 AWG)
10 mm <sup>2</sup> (8 AWG)		-
16 mm <sup>2</sup> (6 AWG)	16 mm <sup>2</sup> (6 AWG)	-
25 mm <sup>2</sup> (4 AWG)		-
35 mm <sup>2</sup> (2 AWG)		-
50 mm <sup>2</sup> (1/0 AWG)	25 mm <sup>2</sup> (4 AWG)	-
70 mm <sup>2</sup> (2/0 AWG)	35 mm <sup>2</sup> (2 AWG)	-
...	...	...

Tab. 1-1: Minimum cross section of the equipment grounding connection

### 1.1.3 Battery safety

Batteries consist of active chemicals in a solid housing. Therefore, improper handling can cause injury or property damage.

**Risk of injury by improper handling!**

- Do not attempt to reactivate low batteries by heating or other methods (risk of explosion and cauterization).
- Do not attempt to recharge the batteries as this may cause leakage or explosion.
- Do not throw batteries into open flames.
- Do not dismantle batteries.
- When replacing the battery/batteries, do not damage the electrical parts installed in the devices.
- Only use the battery types specified for the product.



Environmental protection and disposal! The batteries contained in the product are considered dangerous goods during land, air, and sea transport (risk of explosion) in the sense of the legal regulations. Dispose of used batteries separately from other waste. Observe the national regulations of your country.

---

## 1.2 Intended use

This product may only be used for the mentioned applications under the specified application, ambient and operating conditions.

This product is exclusively intended for use in machines and systems in an industrial environment. This is to be understood as applications according to IEC 60204-1 "Safety of machinery, Electric equipment of machines" and NFPA 79 "Electrical Standard for Industrial Machinery".



Components of the Rexroth IndraDrive system are **products of Category C3** (with restricted distribution) in accordance with IEC 61800-3. This Category comprises EMC limit values for line-based and radiated noise emission. Compliance with this Category (limit values) requires the appropriate measures of interference suppression to be used in the drive system (e.g., mains filters, shielding measures).

These components are not provided for use in a public low-voltage mains supplying residential areas. If these components are used in such a mains, high-frequency interference is to be expected. This can require additional measures of interference suppression.

---

## 2 Ratings and dimensions

### 2.1 HMS01

#### UL ratings and dimensions

Description	Symbol	Unit	HMS01.1 N-W0020	HMS01.1 N-W0036	HMS01.1 N-W0054	HMS01.1 N-W0070	HMS01.1 N-W0110
Listing in accordance with UL standard			UL 508C				
Listing in accordance with CSA standard			C22.2 No. 274-13				
UL files			E134201				
Pollution degree			2				
Ambient temperature range with nominal data	$T_{amax}$	°C	40				
Ambient temperature range with reduced nominal data	$T_{amax\_red}$	°C	55				
Mass	m	kg	5.27		6.68	7.94	11.06
Device height <sup>1)</sup>	H	mm	440				
Device depth <sup>2)</sup>	T	mm	262				
Device width <sup>3)</sup>	B	mm	50		75	100	125
Minimum distance on the top of the device <sup>4)</sup>	$d_{top}$	mm	80				
Horizontal spacing at the device <sup>5)</sup>	$d_{hor}$	mm	0				
Minimum distance on the bottom of the device <sup>6)</sup>	$d_{bot}$	mm	100				
Rated control voltage input <sup>7)</sup>	$U_{N3}$	V	24 ± 20%				
Rated power consumption control voltage input at $U_{N3}$ <sup>8)</sup>	$P_{N3}$	W	10	15	10	16	34
Short circuit current rating	SCCR	A rms	42000				
Rated input voltage, power <sup>9)</sup>	$U_{LN\_nom}$	V	DC 254...750				
Rated input current	$I_{LN}$	A	14.0	24.5	40.0	49.0	80.0
Output voltage	$U_{out}$	V	3 x AC 0...500				
Output current	$I_{out}$	A	12.1	21.3	35.0	42.4	68.5
Field wiring material (material; conductor temperature; class)			Cu; 60/75 °C; 1				
Latest amendment: 2017-01-23							

## Ratings and dimensions

Description	Symbol	Unit	HMS01.1 N-W0020	HMS01.1 N-W0036	HMS01.1 N-W0054	HMS01.1 N-W0070	HMS01.1 N-W0110
Output frequency range <sup>10)</sup>	$f_{out}$	Hz	0...1000				
Power dissipation at continuous current and continuous DC bus power respectively <sup>11)</sup>	$P_{Diss\_cont}$	W	165.00	210.00	420.00	485.00	640.00
Latest amendment: 2017-01-23							

- 1) 2) 3) Housing dimension; see also related dimensional drawing  
4) 5) 6) See fig. "Air intake and air outlet at device"  
7) Observe supply voltage for motor holding brake  
8) See information on "Rated power consumption control voltage input at  $U_{N3}$ "  
9) Mains input L1, L2, L3 (for HMV and HCS only); For use on a solidly grounded wye source only.  
10) Depending on switching frequency which was set in parameter P-0-0001  
11) Plus dissipation of braking resistor and control section  
*Tab. 2-1: HMS - UL ratings and dimensions*



### Rated power consumption control voltage input at $U_{N3}$

Plus motor holding brake and control section, plus safety option

### UL ratings and dimensions

Description	Symbol	Unit	HMS01.1N- W0150	HMS01.1N- W0210	HMS01.1N- W0300	HMS01.1N- W0350
Listing in accordance with UL standard			UL 508C			
Listing in accordance with CSA standard			C22.2 No. 274-13			
UL files			E134201			
Pollution degree			2			
Ambient temperature range with nominal data	$T_{amax}$	°C	40			
Ambient temperature range with reduced nominal data	$T_{amax\_red}$	°C	55			
Mass	m	kg	12.74	16.44	31.70	
Device height <sup>1)</sup>	H	mm	440			
Device depth <sup>2)</sup>	T	mm	262			
Device width <sup>3)</sup>	B	mm	150	200	350	
Minimum distance on the top of the device <sup>4)</sup>	$d_{top}$	mm	80			
Horizontal spacing at the device <sup>5)</sup>	$d_{hor}$	mm	0			
Minimum distance on the bottom of the device <sup>6)</sup>	$d_{bot}$	mm	100			
Latest amendment: 2017-01-23						

Description	Symbol	Unit	HMS01.1N-W0150	HMS01.1N-W0210	HMS01.1N-W0300	HMS01.1N-W0350
Rated control voltage input <sup>7)</sup>	$U_{N3}$	V	24 ± 20%			
Rated power consumption control voltage input at $U_{N3}$ <sup>8)</sup>	$P_{N3}$	W	23	75	100	218
Short circuit current rating	SCCR	A rms	42000			
Rated input voltage, power <sup>9)</sup>	$U_{LN,nom}$	V	DC 254...750			
Rated input current	$I_{LN}$	A	115.0	167.0	290.0	
Output voltage	$U_{out}$	V	3 x AC 0...500			
Output current	$I_{out}$	A	100.0	151.0	250.0	
Field wiring material (material; conductor temperature; class)			Cu; 60/75 °C; 1			
Output frequency range <sup>10)</sup>	$f_{out}$	Hz	0...1000			
Power dissipation at continuous current and continuous DC bus power respectively <sup>11)</sup>	$P_{Diss\_cont}$	W	965.00	1570.00	1700.00	2750.00
Latest amendment: 2017-01-23						

- 1) 2) 3) Housing dimension; see also related dimensional drawing
  - 4) 5) 6) See fig. "Air intake and air outlet at device"
  - 7) Observe supply voltage for motor holding brake
  - 8) See information on "Rated power consumption control voltage input at  $U_{N3}$ "
  - 9) Mains input L1, L2, L3 (for HMV and HCS only); For use on a solidly grounded wye source only.
  - 10) Depending on switching frequency which was set in parameter P-0-0001
  - 11) Plus dissipation of braking resistor and control section
- Tab. 2-2: *HMS - UL ratings and dimensions*

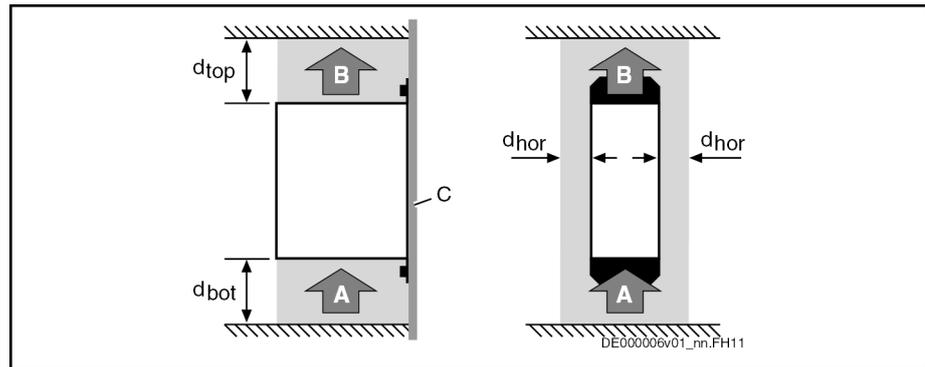


**Rated power consumption control voltage input at  $U_{N3}$**

Plus motor holding brake and control section, plus safety option

## Ratings and dimensions

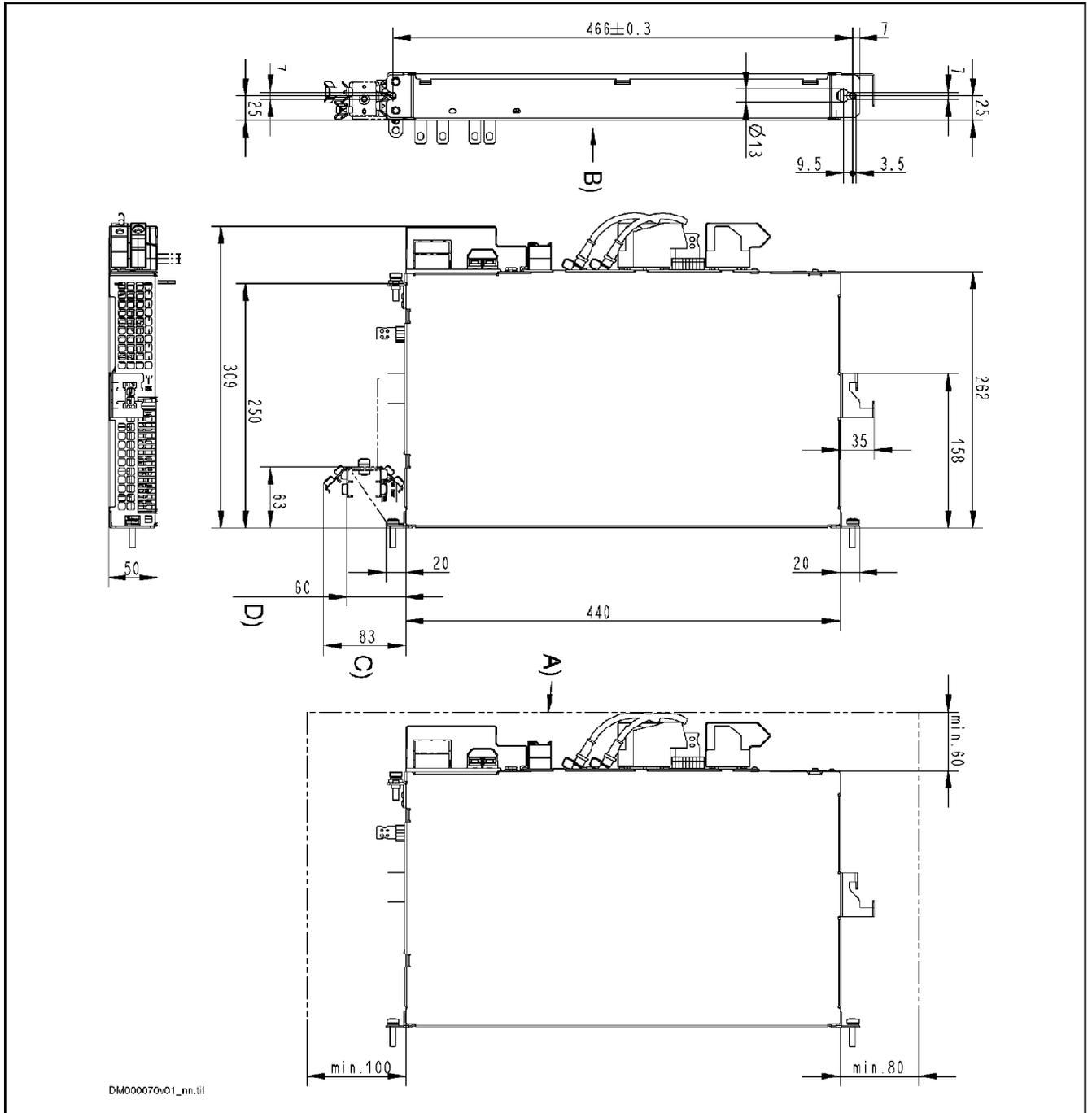
## Distances



- A** Air intake
- B** Air outlet
- C** Mounting surface in control cabinet
- d<sub>top</sub>** Distance top
- d<sub>bot</sub>** Distance bottom
- d<sub>hor</sub>** Distance horizontal

Fig. 2-1: Air intake and air outlet at device

HMS01.1N-W0020 and HMS01.1N-W0036

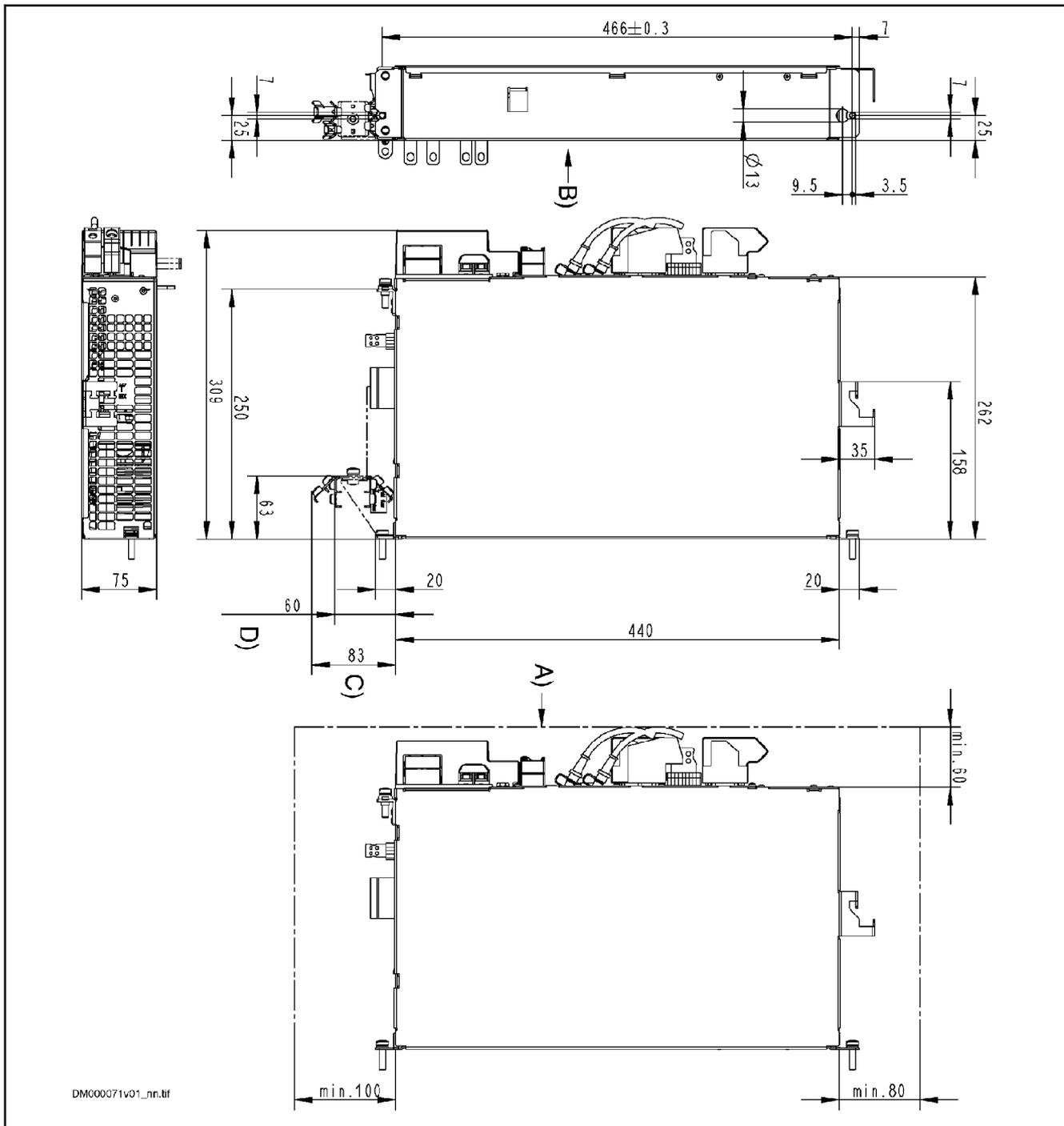


- A) Minimum mounting clearance (plus additional space for motor cable)  
Note: Rexroth IndraDrive supply units require greater mounting clearance!
- B) Rear view!
- C) Dimensions for accessory HAS02.1 when motor cable run with 45°
- D) Dimensions for accessory HAS02.1 when motor cable run horizontally

Fig. 2-2: Dimensions HMS01.1N-W0020 and HMS01.1N-W0036

## Ratings and dimensions

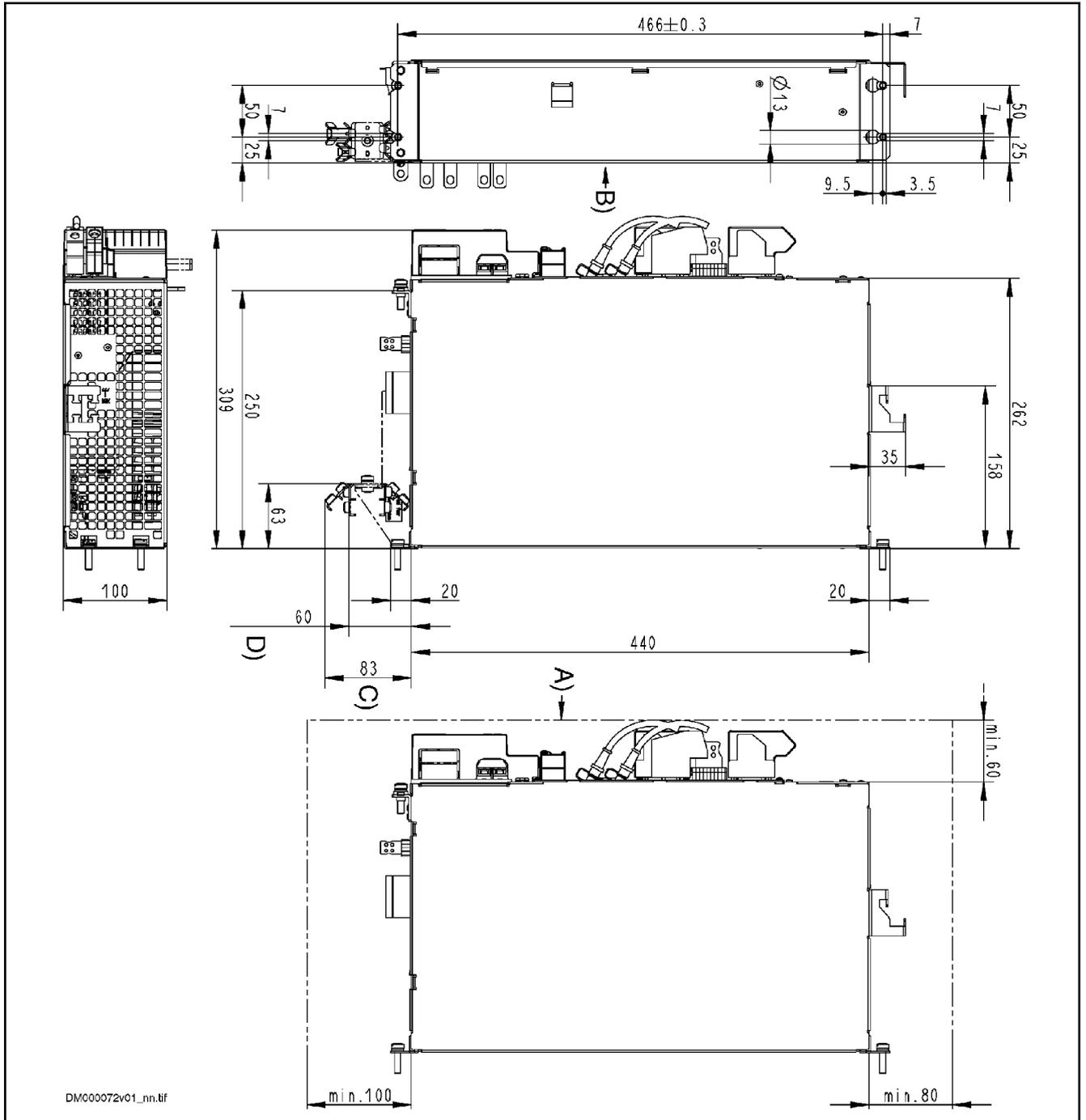
HMS01.1N-W0054



- A)** Minimum mounting clearance (plus additional space for motor cable)  
Note: Rexroth IndraDrive supply units require greater mounting clearance!
- B)** Rear view!
- C)** Dimensions for accessory HAS02.1 when motor cable run with 45°
- D)** Dimensions for accessory HAS02.1 when motor cable run horizontally

Fig. 2-3: Dimensions HMS01.1N-W0054

HMS01.1N-W0070

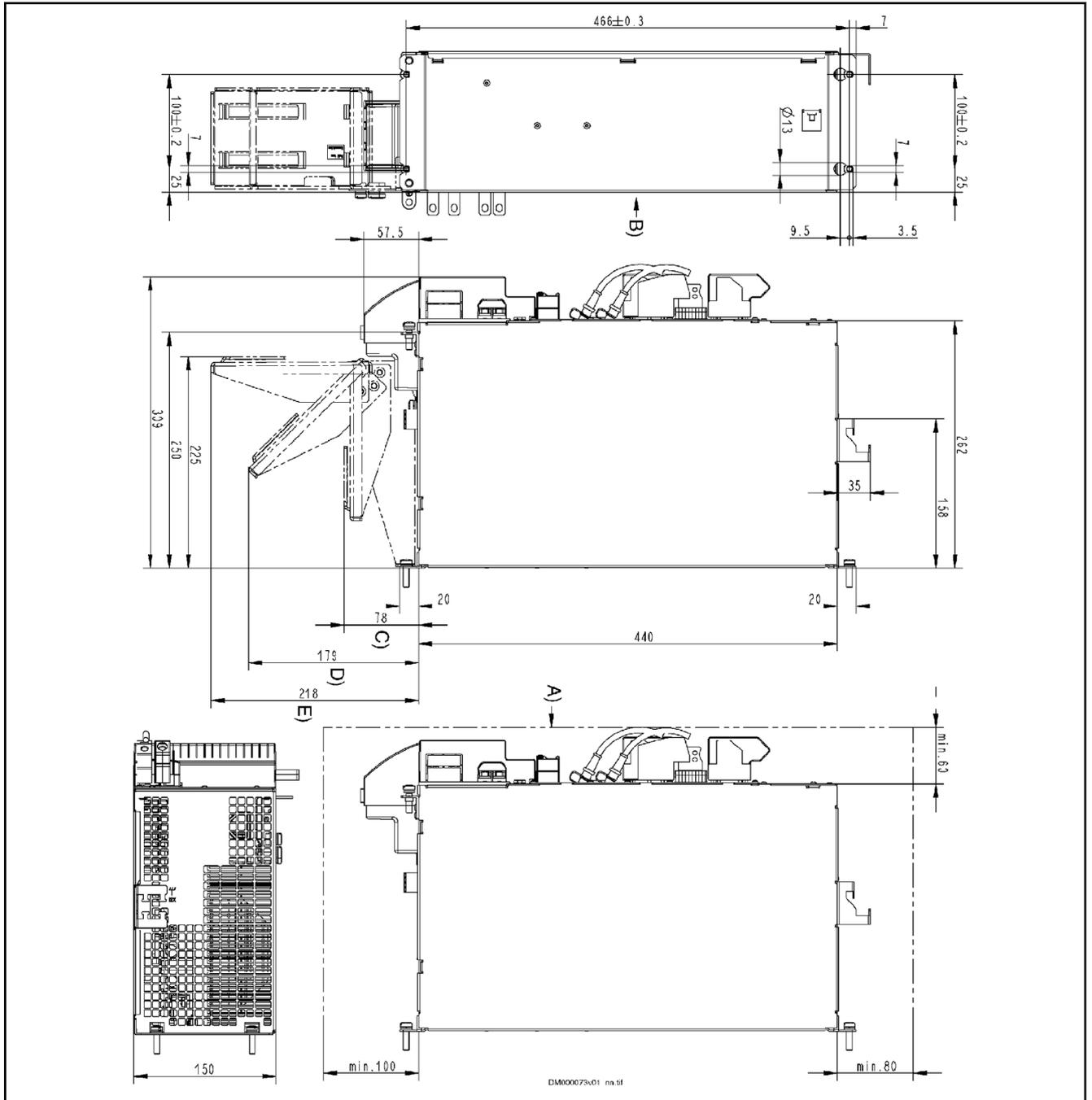


- A) Minimum mounting clearance (plus additional space for motor cable)  
Note: Rexroth IndraDrive supply units require greater mounting clearance!
- B) Rear view!
- C) Dimensions for accessory HAS02.1 when motor cable run with 45°
- D) Dimensions for accessory HAS02.1 when motor cable run horizontally

Fig. 2-4: Dimensions HMS01.1N-W0070



HMS01.1N-W0150

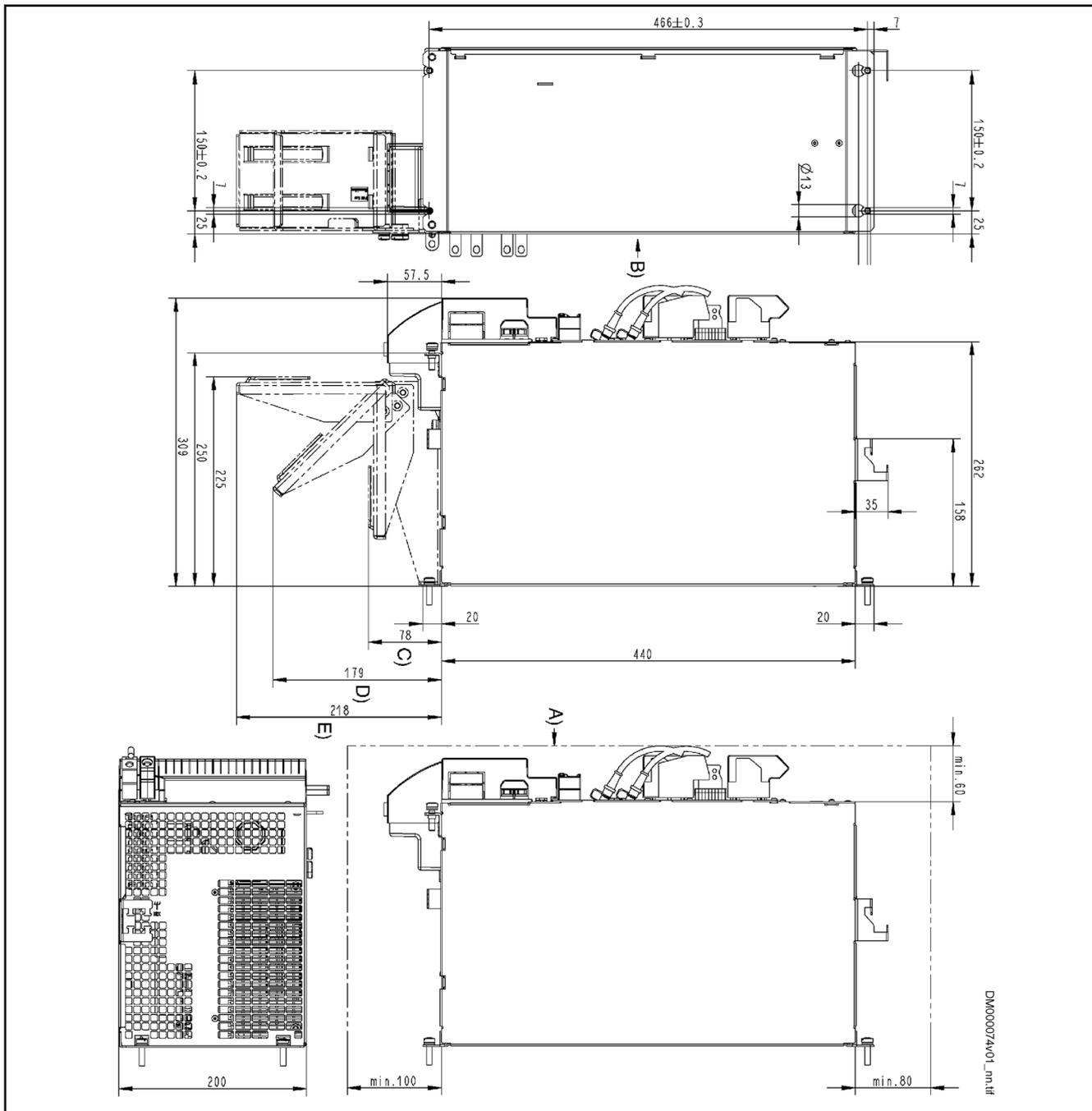


- A) Minimum mounting clearance (plus additional space for motor cable)  
Note: Rexroth IndraDrive supply units require greater mounting clearance!
- B) Rear view!
- C) Dimensions for accessory HAS02.1 when motor cable run horizontally
- D) Dimensions for accessory HAS02.1 when motor cable run with 45°
- E) Dimensions for accessory HAS02.1 when motor cable run vertically

Fig. 2-6: Dimensions HMS01.1N-W0150

## Ratings and dimensions

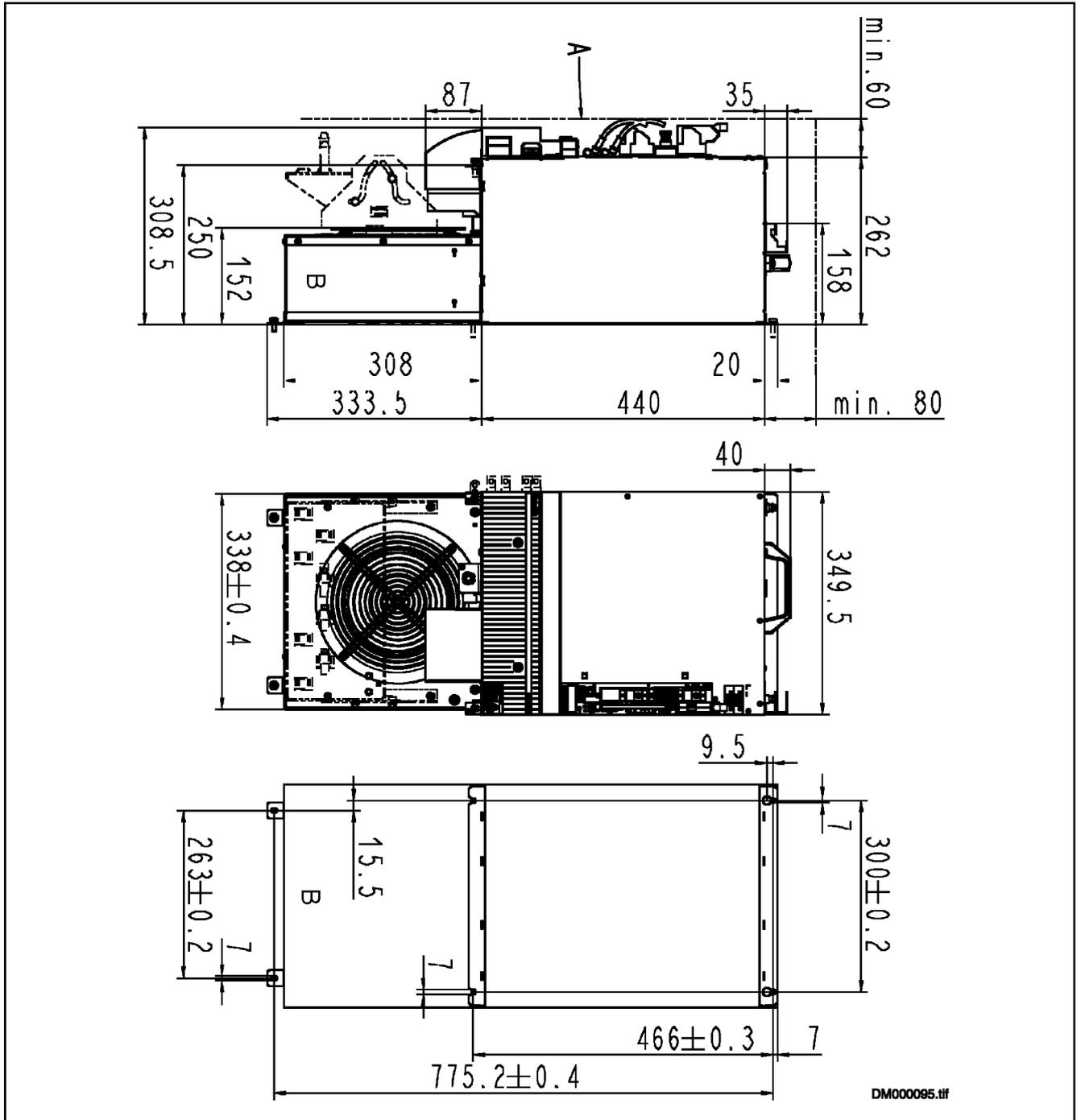
## HMS01.1N-W0210 and HMS01.1N-W0300



- A)** Minimum mounting clearance (plus additional space for motor cable)  
Note: Rexroth IndraDrive supply units require greater mounting clearance!
- B)** Rear view!
- C)** Dimensions for accessory HAS02.1 when motor cable run horizontally
- D)** Dimensions for accessory HAS02.1 when motor cable run with 45°
- E)** Dimensions for accessory HAS02.1 when motor cable run vertically

Fig. 2-7: *Dimensions HMS01.1N-W0210 and HMS01.1N-W0300*

HMS01.1N-W0350 with External Fan unit HAB01



- A Minimum mounting clearance (plus additional space for motor cable)
- B HAB01 fan unit (notes on data and mounting: see index entry "HAB01 → Data", "HAB01 → Mounting")  
Note: Rexroth IndraDrive supply units require greater mounting clearance!

Fig. 2-8: Dimensions HMS01.1N-W350



## 3 Overview of documentations

### 3.1 Motors

Title	Type of documentation	Document typecode <sup>1)</sup> DOK-MOTOR*-...	Material number R911...
MAD / MAF Asynchronous Motors MAD / MAF	Project Planning Manual	MAD/MAF****-PRxx-EN-P	295781
MBS-H Synchronous Kit Spindle Motors	Project Planning Manual	MBS-H*****-PRxx-EN-P	297895
MLF Synchronous Linear Motors	Project Planning Manual	MLF*****-PRxx-EN-P	293635
MCL Ironless Linear Motors MCL	Project Planning Manual	MCL*****-PRxx-EN-P	330592
MKE Synchronous Motors Synchronous Servo Motors for Potentially Explosive Areas acc. to ATEX and UL / CSA	Project Planning Manual	MKE*GEN2***-PRxx-EN-P	297663
MSK Synchronous Servo Motors	Project Planning Manual	MSK*****-PRxx-EN-P	296289
MSK Synchronous Servo Motors for Potentially Explosive Areas	Project Planning Manual	MSK*EXGIK3-PRxx-EN-P	312709
MSM Synchronous Servo Motors	Data Sheet	MSM*****-DAxx-EN-P	329338
MS2E Synchronous Servo Motors acc. to ATEX Directive 2014/34/EU	Project Planning Manual	MS2E*****-PR01-EN-P	394140
MS2N Synchronous Servo Motors	Project Planning Manual	MS2N*****-PRxx-EN-P	347583
MBT Synchronous Torque Motors	Project Planning Manual	MBT*****-PRxx-EN-P	298798

1) In the documentation typecodes, "xx" is a placeholder for the current edition of the documentation (e.g.: PR01 is the first edition of a Project Planning Manual)

Tab. 3-1: Documentations – motors



## 4 Instructions for use

### 4.1 Power supply and input voltage

Power sections HMS and HMD are only to be used in conjunction with listed (NMMS) DC power supply units like HMV, which are capable of delivering the rated input current for the applicable power section. Branch circuit protection has to be provided externally according to the maximum values (voltage and current), which are mentioned in the supply unit manual (Project Planning Manual).

## 4.2 Connection

### 4.2.1 Connection diagram

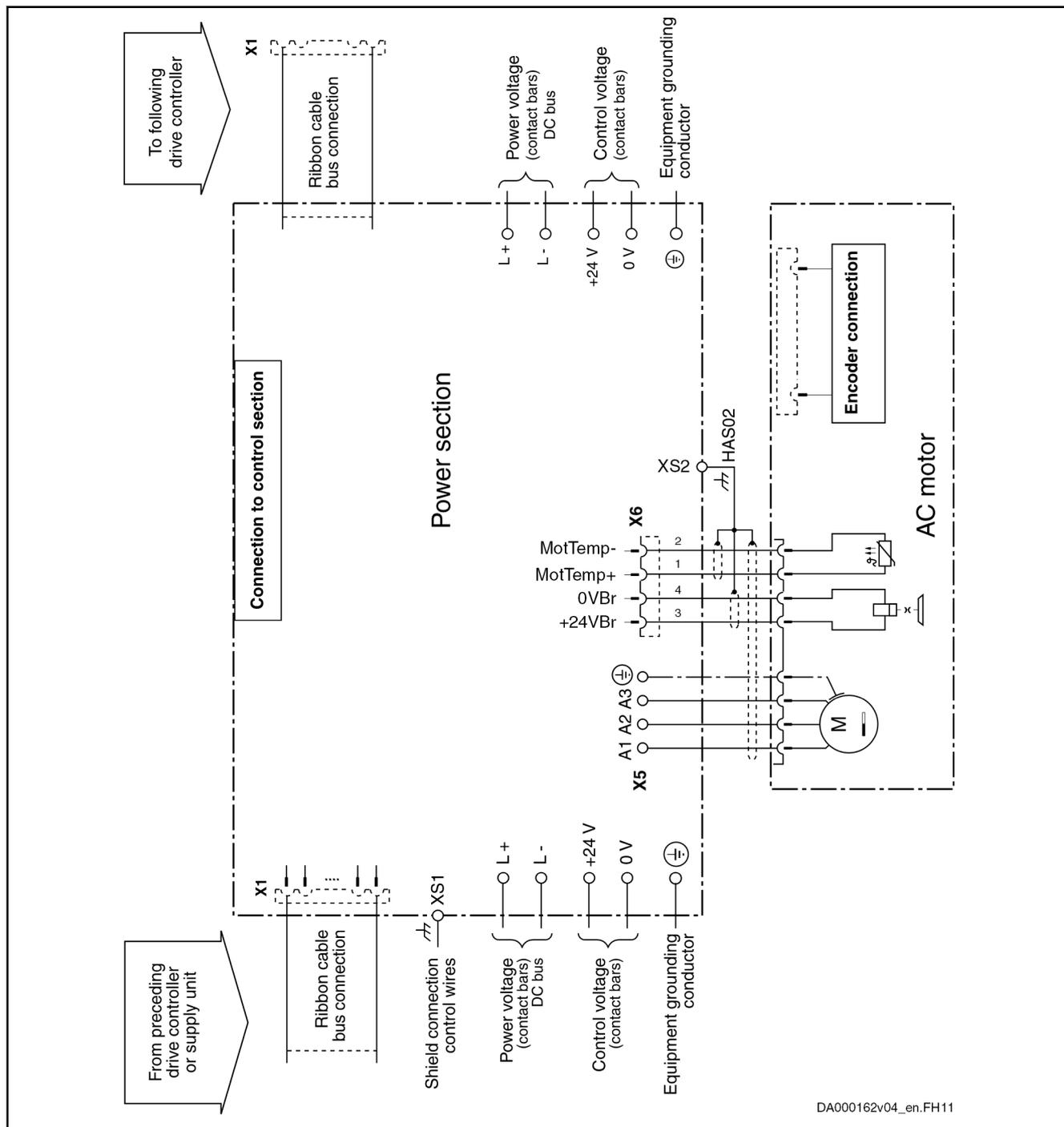


Fig. 4-1: Connection Diagram HMS



Apart from the indicated connections, it is necessary to wire the **Bb contact at the control section** for signaling the readiness for operation of the drive controller (see Project Planning Manual "Rexroth IndraDrive Drive Controllers Control Sections").

For proper function of the **motor thermal management** connect the motor thermal sensor as described in the wiring diagram. Otherwise motor overtemperature sensing is not provided by the drive.

For Rexroth motors with data memory in the motor encoder, such as MSK, the motor overload protection level is set automatically while connecting the motor to the drive. There is no adjustment necessary. Otherwise refer to the Rexroth firmware documentation.

## 4.2.2 Connection points

Symbols used to describe the connection points				
Screw terminal block	Spring terminal	Thread	Max. connection cross section	Max. tightening torque
⊗	→	■	∅	⌚

Tab. 4-1: Symbols

Connection point	HMS01	⊗ → ■	∅ mm <sup>2</sup> (AWG)	⌚ Nm
X5	A <sup>1)</sup>	⊗	4,0 (10)	0,6
	B <sup>2)</sup>	⊗	16,0 (6)	1,7
	C <sup>3)</sup>	■	M6 1×16; 1×25; 1×35 2×16; 2×25; 2×35 (1×6; 1×4; 1×2; 1×1 2×6; 2×4; 2×2; 2×1)	6,5
	D <sup>4)</sup>	■	M6 1×16; 1×25; 1×35; 1×50 2×16; 2×25; 2×35; 2×50 (1×6; 1×4; 1×2; 1×1 2×6; 2×4; 2×2; 2×1)	6,5
	E <sup>5)</sup>	■	M10 1×16; 1×25; 1×35; 1×50; 1×70; 1×120 2×16; 2×25; 2×35; 2×50; 2×70; 2×120 (1×6; 1×4; 1×2; 1×1; 1×1/0; 1×2/0; 1×4/0 2×6; 2×4; 2×2; 2×1; 2×1/0; 2×2/0; 2×4/0)	20
X6	A, B, C, D, E	→	1,5 (16)	-
24V, 0V L+, L-	A, B, C, D, E	■	M6	6,5

## Instructions for use

Connection point	HMS01	⊗ → ⊠	∅ mm <sup>2</sup> (AWG)	C Nm
⊕	A, B	⊗	4,0 (10)	0,6
	C, D, E	⊠	M6	6,0

- 1) **A:** HMS01.1N-W0020, -W0036  
 2) **B:** HMS01.1N-W0054, -W0070  
 3) **C:** HMS01.1N-W0110  
 4) **D:** HMS01.1N-W0150, -W0210, -W0300  
 5) **E:** HMS01.1N-W0350

Tab. 4-2: *Connection points*

## 5 Service and support

Our worldwide service network provides an optimized and efficient support. Our experts offer you advice and assistance should you have any queries. You can contact us **24/7**.

**Service Germany** Our technology-oriented Competence Center in Lohr, Germany, is responsible for all your service-related queries for electric drive and controls.

Contact the **Service Hotline** and **Service Helpdesk** under:

Phone:	<b>+49 9352 40 5060</b>
Fax:	<b>+49 9352 18 4941</b>
E-mail:	<a href="mailto:service.svc@boschrexroth.de">service.svc@boschrexroth.de</a>
Internet:	<a href="http://www.boschrexroth.com">http://www.boschrexroth.com</a>

Additional information on service, repair (e.g. delivery addresses) and training can be found on our internet sites.

**Service worldwide** Outside Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses on the internet.

**Preparing information** To be able to help you more quickly and efficiently, please have the following information ready:

- Detailed description of malfunction and circumstances
- Type plate specifications of the affected products, in particular type codes and serial numbers
- Your contact data (phone and fax number as well as your e-mail address)



# Index

<b>0 ... 9</b>	
24V, 0V.....	21
<b>A</b>	
Additional documentations.....	17
<b>C</b>	
Connection diagram.....	20
Connection points.....	21
<b>D</b>	
Dimensional drawing	
HMS01.1N-W0020.....	9
HMS01.1N-W0036.....	9
HMS01.1N-W0054.....	10
HMS01.1N-W0070.....	11
HMS01.1N-W0110.....	12
HMS01.1N-W0150.....	13
HMS01.1N-W0210.....	14
HMS01.1N-W0300.....	14
HMS01.1N-W0350.....	15
Dimensions.....	5
Distances.....	8
Documentation	
Motors.....	17
Overview.....	17
Reference documentations.....	17
<b>H</b>	
HAB01	
With HMS01.1N-W0350.....	15
Helpdesk.....	23
HMS01.1N-W0020	
Dimensional drawing.....	9
HMS01.1N-W0036	
Dimensional drawing.....	9
HMS01.1N-W0054	
Dimensional drawing.....	10
HMS01.1N-W0070	
Dimensional drawing.....	11
HMS01.1N-W0110	
Dimensional drawing.....	12
HMS01.1N-W0150	
Dimensional drawing.....	13
HMS01.1N-W0210	
Dimensional drawing.....	14
HMS01.1N-W0300	
Dimensional drawing.....	14
HMS01.1N-W0350	
Dimensional drawing.....	15
Hotline.....	23
<b>I</b>	
Instructions for use.....	19
Intended use.....	4
<b>L</b>	
L+, L-.....	21
<b>M</b>	
Motor	
Documentation.....	17
<b>P</b>	
Power consumption.....	5
Project Planning Manuals.....	17
<b>R</b>	
Ratings.....	5
Reference documentations.....	17
RoHS	
China RoHS 2.....	15
<b>S</b>	
Safety instructions.....	1
Service hotline.....	23
Support.....	23
<b>U</b>	
Use	
Instructions.....	19
Intended.....	4
<b>V</b>	
Voltage load capacity.....	5
<b>X</b>	
X5.....	21
X6.....	21
X9.....	21
X14.....	21
X31.....	21
X32.....	21
X33.....	21
X34.....	21
X40.....	21

## Notes

# Notes

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